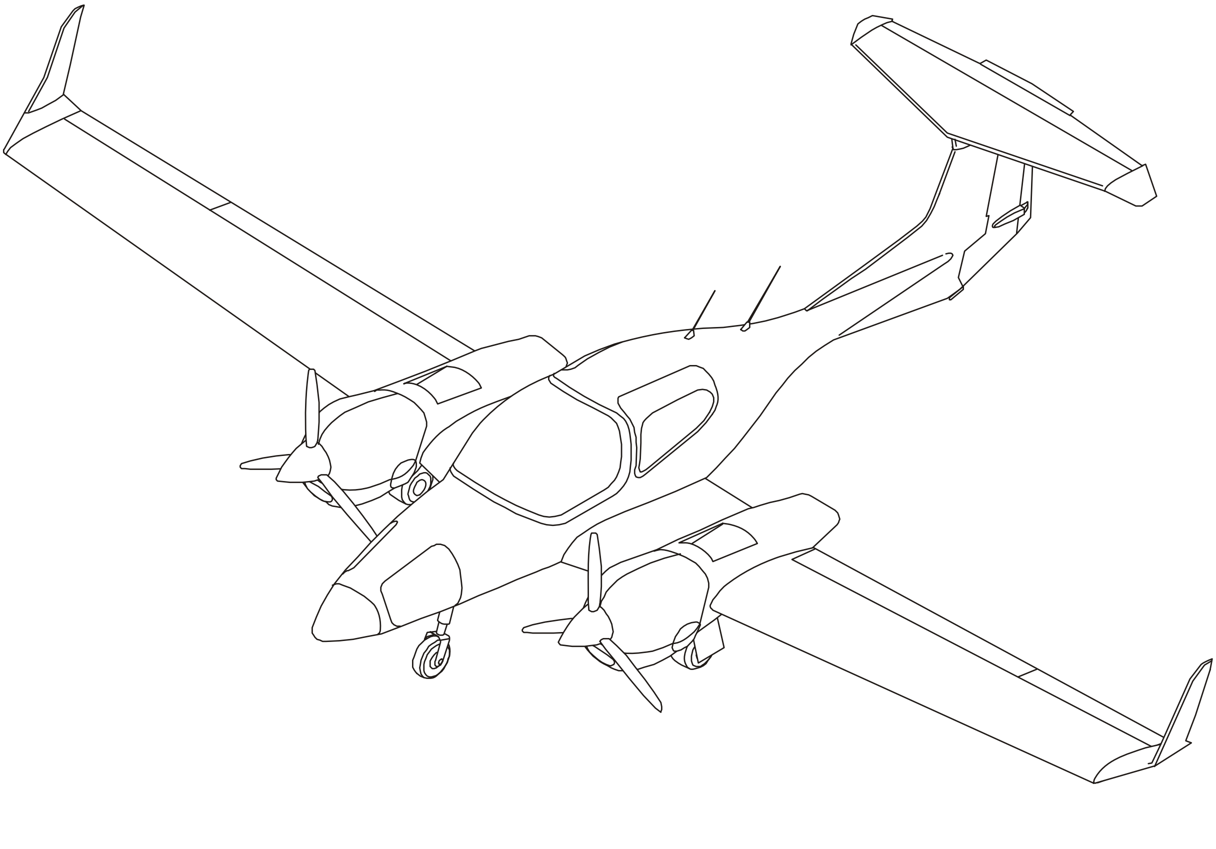
DA 42 SERIES

AIRPLANE MAINTENANCE MANUAL



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Record of Revision

1. Record of Revision

Use this check list to record and control all of the revisions which you put in this Airplane Maintenance Manual (AMM). Put the affected pages of the revision into the AMM as soon as you get them. Remove and destroy the pages which are superseded. Complete the table below when you have put the revision in the AMM.

Revision Number	Date Issued	Inserted On	Inserted By	Revision Number	Date Issued	Inserted On	Inserted By
Original	01 Dec 2004						
Rev. 1	25 Jan 2005						
Rev. 2	30 Jun 2008						
Rev. 3	31 Mar 2012						
Rev. 4	01 Jun 2017						
Rev. 5	15 Nov 2021						

2. Record of Incorporated Temporary Revisions

The following Temporary Revisions are incorporated into the DA 42 AMM by Revision 2:

Temporary Revision Number	Description of Temporary Revision
AMM-TR-MÄM-42-031	Structural Inspection Intervals
AMM-TR-MÄM-42-037	Use of Diesel Fuel in the DA 42
AMM-TR-MÄM-42-049	Pitot Static System
AMM-TR-MÄM-42-055	Access Panels in Front Seats
AMM-TR-MÄM-42-063	Coolant G48
AMM-TR-MÄM-42-072	New Coolant Tank Design
AMM-TR-MÄM-42-088	1785 kg MTOW
AMM-TR-MÄM-42-091	Engine Oil Specifications
AMM-TR-MÄM-42-095b	Fuel Selector Gearbox
AMM-TR-MÄM-42-097	Canopy Locking Mechanism
AMM-TR-MÄM-42-119	Neutral Position
AMM-TR-MÄM-42-121	Removal of 50 Hour Inspection
AMM-TR-MÄM-42-128	Fuel Lines with Lockwire Holes
AMM-TR-MÄM-42-134	Additional Orifice
AMM-TR-MÄM-42-139	Config Module Relocation
AMM-TR-MÄM-42-144	Use of 28V Glow Plugs
AMM-TR-MÄM-42-186	Autopilot Static Source
AMM-TR-MÄM-42-198	TAE 125-02 Engine
AMM-TR-MÄM-42-221	Water Separator ECU
AMM-TR-MÄM-42-224	Compression Check
AMM-TR-MÄM-42-234	G1000 Test Procedure
AMM-TR-MÄM-42-240	ECU Backup Batteries
AMM-TR-MÄM-42-252	Composite Bonding Values
AMM-TR-MÄM-42-256	Alternative Cable Standards
AMM-TR-OÄM-42-053/a&054/a	Ice Protection System
AMM-TR-OÄM-42-055/a	Oxygen System
AMM-TR-OÄM-42-056/f	Aux. Tanks

Temporary Revision Number	Description of Temporary Revision
AMM-TR-OÄM-42-057	Stormscope
AMM-TR-OÄM-42-061	Self-extinguishing Resin
AMM-TR-OÄM-42-067	Adjustable Backrests on Front Seats
AMM-TR-OÄM-42-070/a	Electrical Rudder Pedals Adjustment
AMM-TR-OÄM-42-074/a	Mission Power Supply
AMM-TR-OÄM-42-077	Removable Fuselage Nose Cone
AMM-TR-OÄM-42-080	ELT ME406
AMM-TR-OÄM-42-082	GDU 1040 Part Number Change
AMM-TR-OÄM-42-088a, 089a & 090a	Composite Debris Protection
AMM-TR-OÄM-42-094	TAS
AMM-TR-OÄM-42-101	Sun Visors
AMM-TR-OÄM-42-112	NAV GS Antenna
AMM-TR-OÄM-42-121	ECU Installation
AMM-TR-OÄM-42-129	ECU Backup Battery
AMM-TR-OÄM-42-130	Exhaust End Pipe
AMM-TR-VÄM-42-002	DA 42 M

The following Temporary Revisions are incorporated into the DA 42 AMM by Revision 3:

Temporary Revision Number	Description of Temporary Revision
AMM-TR-MÄM-42-288	Drain Holes Inspection Checklist
AMM-TR-MÄM-42-306a	Modified Gearbox Oil Change
AMM-TR-MÄM-42-319	Several AMM-Modifications
AMM-TR-MÄM-42-332	Inspection Intervals Rudder Trim Mechanism
AMM-TR-MÄM-42-334	Improved Maintenance Instructions for the Passenger Door
AMM-TR-MÄM-42-336a	Optimized NLG Actuator
AMM-TR-MÄM-42-339	Remove/Install the Un-Feathering Accumulator
AMM-TR-MÄM-42-361	Safety Walk Adhesive Strips
AMM-TR-MÄM-42-364	Gear Up Landing Check
AMM-TR-MÄM-42-368	Conservation of Exterior Parts

Temporary Revision Number	Description of Temporary Revision
AMM-TR-MÄM-42-369	AMM Corrections to Match TAE OM & IM
AMM-TR-MÄM-42-436	Installation Instructions for TAE 125-02 Engine
AMM-TR-MÄM-42-440	Flap Preload Adjustment
AMM-TR-MÄM-42-447c & AMM-TR-MÄM-42-452b	Replacement Instructions MLG Joints
AMM-TR-MÄM-42-454	Inspection of MLG Door Hinges
AMM-TR-MÄM-42-478	Extended Time Limit Oxygen Cylinder
AMM-TR-MÄM-42-495	Alternative Hydraulic Fluids and Grease
AMM-TR-MÄM-42-508a	Position of RH Front EM Bolt
AMM-TR-MÄM-42-522	Maintenance Interval GFC 700
AMM-TR-MÄM-42-524 & AMM-TR-MÄM-42-380	Maintenance Program Phase 1
AMM-TR-MÄM-42-533	Caliper Back Plate Torque Value Correction
AMM-TR-MÄM-42-534	Propeller Shipping Plug Removal
AMM-TR-MÄM-42-538	Fuel Drain Valve Mounting Torque
AMM-TR-MÄM-42-541	Definition of Coolant Pipe Installation
AMM-TR-MÄM-42-550	Routing in Center Wing
AMM-TR-MÄM-42-641	Propeller Pitch Trim
AMM-TR-OÄM-42-056g	Auxiliary Fuel Tanks
AMM-TR-OÄM-42-102	GFC 700 Installation
AMM-TR-OÄM-42-107f	Universal Nose
AMM-TR-OÄM-42-142	Sun Visors for Tall Canopy
AMM-TR-OÄM-42-175	Use of TS-1 Fuel
AMM-TR-OÄM-42-187	Coated Safety Walk
AMM-TR-OÄM-42-188	Increase of Maximum Zero Fuel Mass
AMM-TR-OÄM-42-195	Maximum Landing Mass 1785 kg
AMM-TR-OÄM-42-205	Emergency Axe
AMM-TR-OÄM-42-215	Removal of Volt / Ammeter on the Connector Box

The following Temporary Revisions are incorporated into the DA 42 AMM by Revision 4:

Temporary Revision Number	Description of Temporary Revision
AMM-TR-MÄM-42-684	Stall Warning System
AMM-TR-MÄM-42-687	Passenger Door Improvement
AMM-TR-MÄM-42-707/a	Correction of Aircraft Leveling
AMM-TR-MÄM-42-728	Unfeathering Accu Procedure
AMM-TR-MÄM-42-730	Fuel Level Sensor Installation
AMM-TR-MÄM-42-756	Ground Handling
AMM-TR-MÄM-42-849	Wiggins Clamp (Turbo Charger Clamp)
AMM-TR-MÄM-42-875	Replacement of Passenger Door Hinges
AMM-TR-MÄM-42-879	Turbo Charger Clamp
AMM-TR-MÄM-42-880	Drag Brace Figure Correction
AMM-TR-MÄM-42-881	Additional Elevator Mass
AMM-TR-MÄM-42-893	Inspection of Cardan Joint Bracket
AMM-TR-MÄM-42-900	Silicate Cartridge
AMM-TR-MÄM-42-920	New Type 6 Lubricants
AMM-TR-MÄM-42-961/a&1007	Flap Control System
AMM-TR-MÄM-42-989	Conservation of Parts
AMM-TR-MÄM-42-994	Door Handle Improvement
AMM-TR-OÄM-42-053/b&054/b	Ice Protection System
AMM-TR-OÄM-42-055/b	Continuous Flow Oxygen System
AMM-TR-OÄM-42-111/b & -158/a &-246	Operator Desk
AMM-TR-OÄM-42-119/a	Garmin GWX 68 Weather Radar
AMM-TR-OÄM-42-222	Whelen LED Position / Ani Collision Lights
AMM-TR-OÄM-42-248	Provisions for Tablet Mount
AMM-TR-OÄM-42-252	TAE 125-02-114 Engine
AMM-TR-OÄM-42-259/a	Front Seats with Adjustable Backrest Hydrolok
AMM-TR-OÄM-42-283	Pilot’s Removable Stick
AMM-TR-OÄM-42-304	Emergency Egress Hammer

The following Temporary Revisions are incorporated into the DA 42 AMM by Revision 5:

Temporary Revision Number	Description of Temporary Revision
AMM-TR_MÄM-42-911	Exhaust without Heat Shield
AMM-TR-MÄM-42-1024	New Maplight
AMM-TR-MÄM-42-1025	Alternative Emergency Battery Tray
AMM-TR-MÄM-42-1029	Coolant System Pressure Test
AMM-TR-MÄM-42-1049	Horizontal Stabilizer Torque
AMM-TR-MÄM-42-1073	MLG Tire Clearance
AMM-TR-MÄM-42-1079/a	Fuel Tank Sealant Material
AMM-TR-MÄM-42-1094	New Sealing Concept for Map Light Attachment
AMM-TR-MÄM-42-1099	Improved Filling Procedure for Cooling System
AMM-TR-MÄM-42-1112	Fuel Tank Connection Hoses
AMM-TR-MÄM-42-1124	Improved Rudder Yoke Bolt Design
AMM-TR-MÄM-42-1125	Inspection of Airfilter for Manufacturing Residues
AMM-TR-MÄM-42-1126	Definition of Special Torque at Hydraulic Pump Unit
AMM-TR-MÄM-42-1129	Door Warning Switch
AMM-TR-MÄM-42-1180	Actualisation of Wing Movable Mass
AMM-TR-MÄM-42-1189	Aileron Controls in the Fuselage
AMM-TR-OÄM-42-053/c & 42-054/c	Flight Into Known Icing
AMM-TR-OÄM-42-053/d	Flight Into Known Icing
AMM-TR-OÄM-42-324/a & 42-334	AmSafe Seatbelt Airbag V23 System

LIST OF EFFECTIVE PAGES

1. General

The list of effective pages uses this abbreviation:

- TOC = Table of Contents.
- ROR = Record of Revisions
- LOEP = List of effective Pages

All Sections have a Title Page and a Table of Contents. The TOC can have one page or it can have many pages.

Each revision to the Airplane Maintenance Manual will have a new List of Effective Pages.

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71-60	206	15 Nov 2021	72-00	101	15 Nov 2021	75-00	4	15 Nov 2021
71-60	207	15 Nov 2021	72-00	102	15 Nov 2021	75-00	5	15 Nov 2021
71-60	208	15 Nov 2021	72-00	201	15 Nov 2021	75-00	6	15 Nov 2021
71-60	209	15 Nov 2021	72-00	202	15 Nov 2021	75-00	7	15 Nov 2021
71-60	210	15 Nov 2021	72-00	203	15 Nov 2021	75-00	8	15 Nov 2021
71-60	211	15 Nov 2021	72-00	204	15 Nov 2021	75-00	101	15 Nov 2021
71-60	212	15 Nov 2021	72-00	205	15 Nov 2021	75-00	102	15 Nov 2021
71-60	213	15 Nov 2021	72-00	206	15 Nov 2021	75-00	201	15 Nov 2021
71-60	214	15 Nov 2021	72-00	207	15 Nov 2021	75-00	202	15 Nov 2021

Chapter Section	Page	Revision Date	Chapter Section	Page	Revision Date	Chapter Section	Page	Revision Date
75-00	203	15 Nov 2021	76-00	208	15 Nov 2021	77-40	207	15 Nov 2021
75-00	204	15 Nov 2021	76-00	209	15 Nov 2021	77-40	208	15 Nov 2021
75-00	205	15 Nov 2021	76-00	210	15 Nov 2021	77-40	209	15 Nov 2021
75-00	206	15 Nov 2021	76-00	211	15 Nov 2021	77-40	210	15 Nov 2021
75-00	207	15 Nov 2021	76-00	212	15 Nov 2021	77-40	211	15 Nov 2021
75-00	208	15 Nov 2021	76-00	213	15 Nov 2021	77-40	212	15 Nov 2021
75-00	209	15 Nov 2021	76-00	214	15 Nov 2021	77-40	213	15 Nov 2021
75-00	210	15 Nov 2021	76-00	215	15 Nov 2021	77-40	214	15 Nov 2021
75-00	211	15 Nov 2021	76-00	216	15 Nov 2021	78-00	Title 1	15 Nov 2021
75-00	212	15 Nov 2021	76-00	217	15 Nov 2021	78-00	Title 2	15 Nov 2021
76-00	Title 1	15 Nov 2021	76-00	218	15 Nov 2021	78-00	TOC 1	15 Nov 2021
76-00	Title 2	15 Nov 2021	77-00	Title 1	15 Nov 2021	78-00	TOC 2	15 Nov 2021
76-00	TOC 1	15 Nov 2021	77-00	Title 2	15 Nov 2021	78-00	1	15 Nov 2021
76-00	TOC 2	15 Nov 2021	77-00	TOC 1	15 Nov 2021	78-00	2	15 Nov 2021
76-00	1	15 Nov 2021	77-00	TOC 2	15 Nov 2021	78-00	101	15 Nov 2021
76-00	2	15 Nov 2021	77-00	1	15 Nov 2021	78-00	102	15 Nov 2021
76-00	3	15 Nov 2021	77-00	2	15 Nov 2021	78-00	201	15 Nov 2021
76-00	4	15 Nov 2021	77-40	1	15 Nov 2021	78-00	202	15 Nov 2021
76-00	5	15 Nov 2021	77-40	2	15 Nov 2021	78-00	203	15 Nov 2021
76-00	6	15 Nov 2021	77-40	3	15 Nov 2021	78-00	204	15 Nov 2021
76-00	101	15 Nov 2021	77-40	4	15 Nov 2021	78-00	205	15 Nov 2021
76-00	102	15 Nov 2021	77-40	101	15 Nov 2021	78-00	206	15 Nov 2021
76-00	201	15 Nov 2021	77-40	102	15 Nov 2021	78-00	207	15 Nov 2021
76-00	202	15 Nov 2021	77-40	201	15 Nov 2021	78-00	204	15 Nov 2021
76-00	203	15 Nov 2021	77-40	202	15 Nov 2021	79-00	Title 1	15 Nov 2021
76-00	204	15 Nov 2021	77-40	203	15 Nov 2021	79-00	Title 2	15 Nov 2021
76-00	205	15 Nov 2021	77-40	204	15 Nov 2021	79-00	TOC 1	15 Nov 2021
76-00	206	15 Nov 2021	77-40	205	15 Nov 2021	79-00	TOC 2	15 Nov 2021
76-00	207	15 Nov 2021	77-40	206	15 Nov 2021	79-00	1	15 Nov 2021

Chapter Section	Page	Revision Date	Chapter Section	Page	Revision Date
79-00	2	15 Nov 2021	80-00	211	15 Nov 2021
79-00	3	15 Nov 2021	80-00	212	15 Nov 2021
79-00	4	15 Nov 2021	81-00	Title 1	15 Nov 2021
79-00	101	15 Nov 2021	81-00	Title 2	15 Nov 2021
79-00	102	15 Nov 2021	81-00	TOC 1	15 Nov 2021
79-00	201	15 Nov 2021	81-00	TOC 2	15 Nov 2021
79-00	202	15 Nov 2021	81-00	1	15 Nov 2021
79-00	203	15 Nov 2021	81-00	2	15 Nov 2021
79-00	204	15 Nov 2021	81-00	3	15 Nov 2021
79-00	205	15 Nov 2021	81-00	4	15 Nov 2021
79-00	206	15 Nov 2021	81-00	5	15 Nov 2021
80-00	Title 1	15 Nov 2021	81-00	6	15 Nov 2021
80-00	Title 2	15 Nov 2021	81-00	7	15 Nov 2021
80-00	TOC 1	15 Nov 2021	81-00	8	15 Nov 2021
80-00	TOC 2	15 Nov 2021	81-00	101	15 Nov 2021
80-00	1	15 Nov 2021	81-00	102	15 Nov 2021
80-00	2	15 Nov 2021	81-00	201	15 Nov 2021
80-00	101	15 Nov 2021	81-00	202	15 Nov 2021
80-00	102	15 Nov 2021	81-00	203	15 Nov 2021
80-00	201	15 Nov 2021	81-00	204	15 Nov 2021
80-00	202	15 Nov 2021	81-00	205	15 Nov 2021
80-00	203	15 Nov 2021	81-00	206	15 Nov 2021
80-00	204	15 Nov 2021	92-00	Title 1	15 Nov 2021
80-00	205	15 Nov 2021	92-00	Title 2	15 Nov 2021
80-00	206	15 Nov 2021	92-00	TOC 1	15 Nov 2021
80-00	207	15 Nov 2021	92-00	TOC 2	15 Nov 2021
80-00	208	15 Nov 2021	92-00	1	15 Nov 2021
80-00	209	15 Nov 2021	92-00	2	15 Nov 2021
80-00	210	15 Nov 2021	Wiring diagrams as listed in Chapter 92		

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CHAPTER 01

INTRODUCTION

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INTRODUCTION

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CHAPTER 01
INTRODUCTION

1. General

This Airplane Maintenance Manual contains the data necessary to do the maintenance of the DA 42 airplane. It contains a full description of the systems, trouble shooting procedures, component removal and installation procedures and maintenance instructions. It does not contain maintenance data for components removed from the airplane. (Maintenance Shop data).

The Airplane Maintenance Manual contains the wiring diagrams for the electrical system.

Use the DA 42 Airplane Flight Manual, latest revision with the Airplane Maintenance Manual, and the related Service Bulletins. Additional maintenance data is referenced in Chapter 05-00.

2. Revision Service

The manufacturer provides a revision service for the Airplane Maintenance Manual. The revision shows design changes to the airplane or changes in procedures. Each page of the manual shows the date of issue. If the page has changed, it shows the date of the revision.

3. Warning, Cautions and Notes

Obey all the usual safety precautions and maintenance instructions when doing maintenance.

This Airplane Maintenance Manual also contains warnings, cautions and notes before applicable instructions:

WARNING: A WARNING TELLS THE PERSON DOING THE MAINTENANCE THAT INJURY OR DEATH IS POSSIBLE IF THEY DO NOT STRICTLY FOLLOW THE INSTRUCTIONS.

CAUTION: A CAUTION TELLS THE PERSON DOING THE MAINTENANCE THAT DAMAGE TO EQUIPMENT IS POSSIBLE IF THEY DO NOT FOLLOW THE INSTRUCTIONS.

Note: A Note tells the person doing the maintenance how to make the task easier.

4. Manual Configuration

This manual is written using the regulations of the Air Transport Association of America Specification iSpec2200. Each system is given a chapter number from the ATA iSpec2200. Where applicable, a chapter contains sections for each sub-system.

The specification AECMA Simplified English has been used to write this Airplane Maintenance

Manual. This is a mandatory requirement of the ATA iSpec2200.

There are only 3 sources of words available to use in Simplified English (SE).

- Approved words from the SE Guide. These words have defined meanings and selected parts of speech.
- Technical names as defined in the SE Guide. Used only as adjectives or nouns.
- Manufacturing processes as defined in the SE Guide. Always used as verbs.

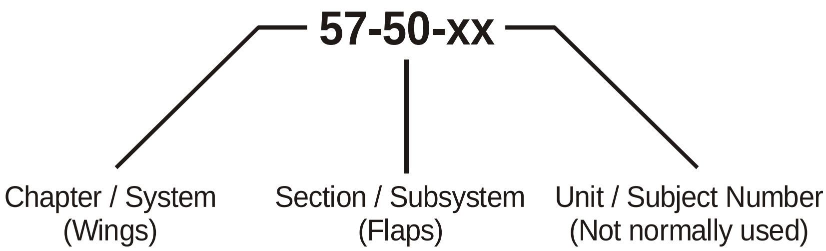
To obtain a copy of the SE Guide contact AECMA, Gulledelle 94, B-1200 Bruxelles, Belgium.

Tel: +32-2775-81-10, Fax: +32-2775-81-11

This manual does not use the ATA iSpec2200 Airplane Maintenance Task Oriented Support System (ATMOSS) or the ATA iSpec2200 Production Management Data Base (PMDB).

A. The ATA iSpec2200 Numbering System

The ATA iSpec2200 numbering system uses 3 pairs of numbers, for example:



The first pair of numbers shows the system. System 57 is the wings. Chapter 57 contains the data for the wings.

The second pair of numbers shows the sub-system. Sub-system 50 is the Trailing Edge Flap. Chapter 57, section 50 contains the data for the trailing edge flaps installation.

The third pair of numbers shows a unit. A unit could be the flap itself. Only complex systems use unit numbers.

For simple systems, the main chapter has all of the data and there are no section/sub-system break-downs.

B. Groups of Chapters

The chapters are put together in these groups:

Group A	Introduction	Chapters 01 to 02
Group B	Airplane General	Chapters 03 to 12
Group C	Airframe Systems	Chapters 20 to 35
Group D	Structure	Chapters 51 to 57
Group E	Propeller	Chapter 61
Group F	Engine	Chapters 71 to 81

A separation sheet divides each chapter. The separation sheet shows the number of the chapter and the title.

The main contents of each group of chapters is given below:

(1) Group A - Introduction

Chapter 1 tells you about the Airplane Maintenance Manual, and Chapter 2 tells you how to use the Airplane Maintenance Manual.

(2) Group B - Airplane General

Chapter 3 gives you a general description of the airplane and its systems.

Chapter 4 gives you data about the Airworthiness Limitations and certification of the airplane.

Chapter 5 contains the Scheduled Maintenance Checklist. Some tasks require a maintenance procedure. The scheduled maintenance checklist identifies the Section in the manual that gives the maintenance procedure for the task. It also tells you where to find general information.

Chapters 6 to 10 tell you about the dimensions of the airplane and general procedures such as towing, parking and weighing.

Chapter 11 tells you about the placards and markings which are important for the safe operation of the airplane.

Chapter 12 contains servicing tasks such as refueling and lubrication. It also contains data about cleaning the airplane.

(3) Group C - Airframe Systems

Chapter 20 contains the standard practices for airframe maintenance.

Chapters 21 to 35 tells you about the airframe systems. They include the avionics systems (such as communications (23)) and the mechanical systems (such as flight controls (27)).

Chapter 31 shows the location of the instruments. The chapter which is applicable to the system gives the details. For example, Chapter 27 gives the details for the flap position indicator.

(4) Group D - Structure

Chapter 51 contains data about the design of the airframe. It also gives instructions for assessing damage to the airframe and how to do minor repairs.

Chapters 52 to 57 tell you about each part of the structure.

(5) Group E - Propeller

Chapter 61 contains the maintenance procedures for the propeller. Refer to the propeller manufacturer's manual for other data.

(6) Group F - Engine

This group of chapters describes the engine and its systems. It contains the maintenance procedures for maintenance of the engine on the airplane. Refer to the engine manufacturer's manual for other data.

C. Chapter Configuration

The first page of each chapter shows the number of the chapter and the title. The second page shows the contents. Where applicable, each chapter and section contains the topics that follow:

– Description and Operation.

– Trouble-Shooting.

– Maintenance Practices. Where applicable the maintenance practices give data on these procedures:

- Servicing.
- Removal and Installation.
- Adjustment/Tests.
- Checking/Testing.
- Cleaning/Painting.
- Repairs.

5. Page Numbering System

This manual uses the ATA iSpec2200 page block-numbering system. The page number is at the bottom of the page at the outer edge. It is adjacent to the chapter/section number.

Each topic in a section has numbers from these page blocks:

– Description and Operation - Pages 1 to 99.

– Trouble Shooting - Pages 101 to 199.

– Maintenance Procedures - 201 to 299.

6. Figures

Figures are given numbers in sequence. The first figure in a chapter or section is figure 1.

7. Record of Revisions

The Airplane Maintenance Manual has a Record of Revisions. Use the Record of Revisions to show when changes were included in the Airplane Maintenance Manual.

8. List of Effective Pages

This Airplane Maintenance Manual has a List of Effective Pages. The List of Effective Pages shows you the number and effective date of each page contained in the Airplane Maintenance Manual.

CHAPTER 02

ORGANIZATION AND HANDLING OF THE MANUAL

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CHAPTER 02
ORGANIZATION AND HANDLING OF THE MANUAL

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CHAPTER 02

ORGANIZATION AND HANDLING OF THE MANUAL

1. General

For data about a system, look in the list of chapters and find the chapter number. The first page of each chapter after the title page shows the contents.

2. Applicability

Data applicable to a series of airplane is marked with an applicability note. For example:

Valid for S/N 42.001 thru 42.999.

This shows that you can use this data for airplane with serial numbers 42.001 thru 42.999 inclusive.

3. Revisions

The manufacturer makes changes to the Airplane Maintenance Manual to show design changes, maintenance procedure changes or other changes. Each group of changes is called a ‘Revision’.

A manual revision contains these items:

– The changed pages.

– The reason for the revision.

– Instructions for putting the revision into the Airplane Maintenance Manual.

– A new List of Effective Pages (LOEP).

A vertical bar in the left margin of the page shows the changes.

4. Temporary Revisions

Temporary revisions correct errors, or they give temporary instructions. The manufacturer sends them to the airplane owners quickly. The manufacturer uses yellow pages for temporary revisions. The manufacturer usually puts the contents of a temporary revision in the next approved revision.

5. Service Bulletins and Service Informations

Service Bulletins (SB) regulate modifications carried out on registered, in field operated airplanes.

Service Informations give the operator technical Instruction about the product which are not included in the standard documentation. This could be for example recommendations for maintenance or information about SBs of other manufacturers (Thielert, mt-Propeller etc.).

Refer to Service Information No. SI42-001 for details on the organization of Service Bulletins and Service Instructions.

6. Concession-Reports and Non-Conformance-Reports

Concession- and Non-Conformance-Reports are tools to approve and document deviations from the standard manufacturing processes during construction and assembly of an individual airplane (for example, handling of a mis-drilled hole in the fuselage). In case the operator or the maintenance organization needs to be informed as a consequence of the deviations for that particular airplane (for example, the use of a special spare part is necessary or a different limit in a control surface balancing report applies), these Concession- and Non-Conformance-Reports are contained in the airplane log. Before you do maintenance, check the airplane log for such Concession- and Non-Conformance Reports.

7. Document Notifications

Manual Revisions, Temporary Revisions, Service Bulletins and Service Information are announced via e-mail. The new documents are available for download on the Internet web site of Diamond Aircraft: www.diamond-air.at

8. Abbreviations

Where possible, the abbreviations used correspond with the related regulations.

ACL	Anti-Collision Light
ADF	Automatic Direction Finder
AFM	Airplane Flight Manual
AHRS	Attitude, Heading and Reference Unit
A&P	Airplane and Power Plant Mechanic
ASI	Airspeed Indicator
CFRP	Carbon Fiber Reinforced Plastic
DME	Distance Measuring Equipment
ECU	Engine Control Unit
ELT	Emergency Locator Transmitter
FADEC	Full Authority Digital Engine Control
FRP	Fiber Reinforced Plastic
GFRP	Glass Fiber Reinforced Plastic
GPS	Global Positioning System
G/S	Glide Slope
HSI	Horizontal Situation Indicator
IAU	Integrated Avionics Unit
ICS	Integrated Cockpit System
IFR	Instrument Flight Rules
LOC	Localizer
MPP	Multi Purpose Platform
MSI	Major Structural Inspection
OAT	Outside Air Temperature
PFD	Primary Flight Display
RCPI	Remote Control Panel/Indicator
SB	Service Bulletin
SI	Service Information
S/N	Serial Number

TBO	Time Between Overhaul
TSMOH	Time Since Major Overhaul
TTSN	Total Time Since New
TTSO	Total Time Since Overhaul
UHF	Ultra High Frequency
VFR	Visual Flight Rules
VHF	Very High Frequency
VOR	VHF Omni-directional Ranging
VSI	Vertical Speed Indicator

9. Conversion Factors and Abbreviations

Dimension Unit [Abbreviation]	Conversion Factor SI to US/Imperial	Conversion Factor US/Imperial to SI
Length		
Meter [m]	[m] / 0.3048 = [ft]	
Millimeter [mm]	[mm] / 25.4 = [in]	
Kilometer [km]	[km] / 1.852 = [nm]	
	[km] / 1.609 = [sm]	
Inch [in]		[in] x 25.4 = [mm]
Foot [ft]		[ft] x 0.3048 = [m]
Nautical mile [nm]		[nm] x 1.852 = [km]
Statute mile [sm]		[sm] x 1.609 = [km]
Velocity		
Kilometers per hour [km/h]	[km/h] / 1.852 = [kts]	
	[km/h] / 1.609 = [mph]	
Meters per second [m/s]	[m/s] x 196.85 = [fpm]	
Miles per hour [mph]		[mph] x 1.609 = [km/h]
Knots [kts]		[kts] x 1.852 = [km/h]
Feet per minute [fpm]		[fpm] / 196.85 = [m/s]
Rotational Speed		
Revolutions per minute [RPM]		[RPM] = [min^{-1}]
Pressure		
Bar [bar]	[bar] x 14.5038 = [PSI]	
Hectopascal [hPa] = Millibar [mbar]	[hPa] / 33.864 = [inHg]	
	[mbar] / 33.864 = [inHg]	
Pounds per square inch [PSI]		[PSI] / 14.5038 = [bar]
Inches of mercury column [inHg]		[inHg] x 33.864 = [hPa]
		[inHg] x 33.864 = [mbar]

Dimension Unit [Abbreviation]	Conversion Factor SI to US/Imperial	Conversion Factor US/Imperial to SI
Force or Weight		
Newton [N]	[N] / 4.448 = [lb]	
Decanewton [daN]	[daN] / 0.4448 = [lb]	
Pound [lb]		[lb] x 4.448 = [N]
		[lb] x 0.4448 = [daN]
Mass ('Weight')		
Kilogram [kg]	[kg] / 0.45359 = [lb]	
Pound [lb]		[lb] x 0.45359 = [kg]
Volume		
Liter [l]	[l] / 3.7854 = [US gal]	
	[l] / 0.9464 = [US qts]	
	[l] / 4.5459 = [Imp gal]	
	[l] / 61.024 = [in^3]	
US gallon [US gal]		[US gal] x 3.7854 = [l]
US quart [US qt]		[US qt] x 0.9464 = [l]
Imperial gallon [Imp gal]		[Imp gal] x 4.5459 = [l]
Cubic inch [in^3]		[in^3] x 61.024 = [l]
Torque		
Newton meter [Nm]	[Nm] / 1.3558 = [lbf.ft.]	
	[Nm] x 8.851 = [lbf.in.]	
Foot pound [lbf.ft.]		[lbf.ft.] x 1.3558 = [Nm]
Inch pound [lbf.in.]		[lbf.in.] / 8.851 = [Nm]
Temperature		
Degree Celsius [°C]	[°C] x 1.8 + 32 = [°F]	
Degree Fahrenheit [°F]		([°F] - 32) / 1.8 = [°C]

Note: In this Airplane Maintenance Manual masses are referred to as weights. The authors accept, that this is technically incorrect but have used the expression for simplicity and convenience.

10.Torque Conversion Factor

Use figure 1 for conversion of torque values Nm - lbf.ft. Use figure 2 for conversion of Nm - lbf.in.

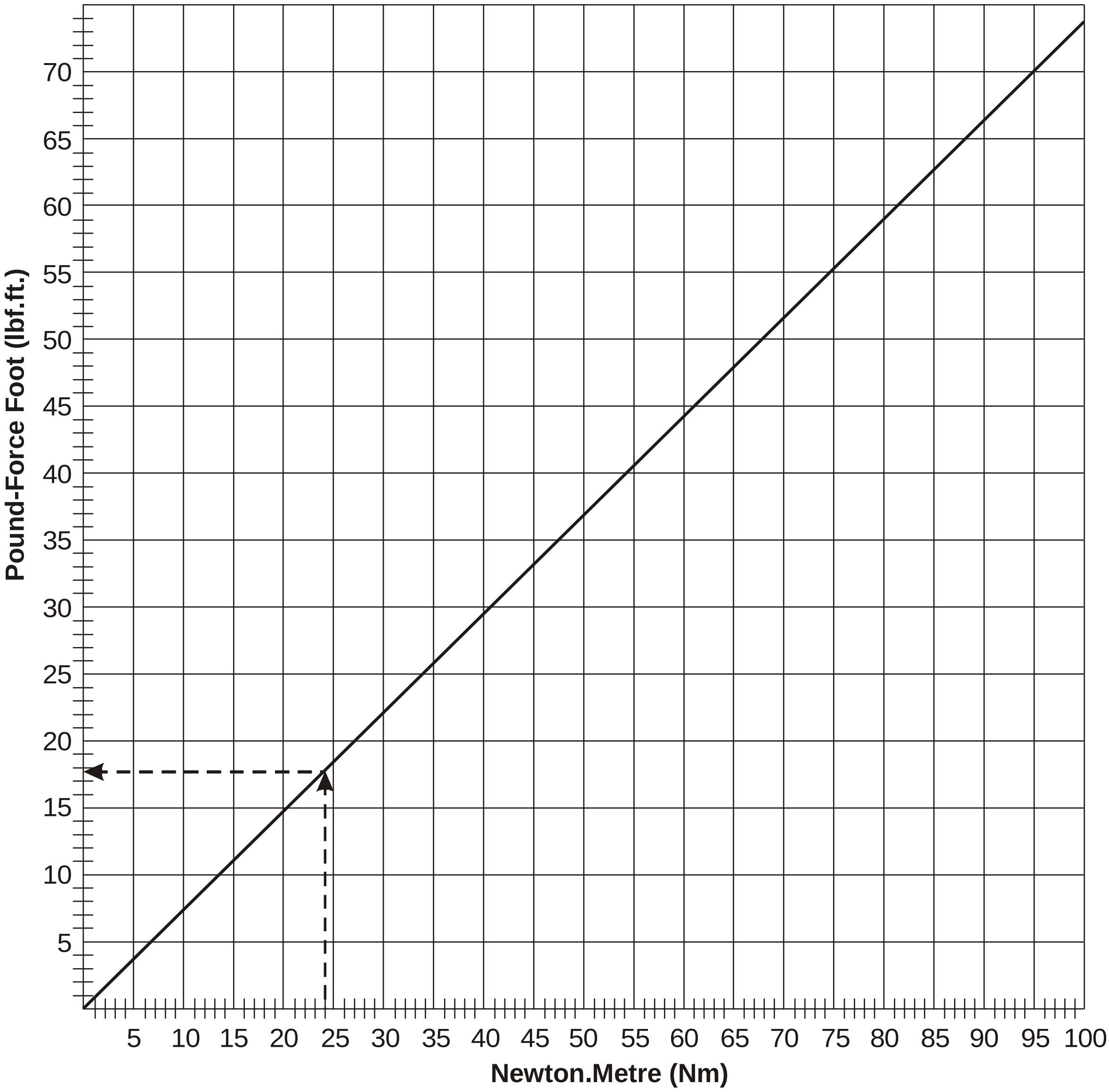

Figure 1: Nm - lbf.ft.

Find the Nm value on the horizontal axis. Move vertically to the solid black diagonal line. Then move horizontally to the vertical axis. Read the value in lbf.ft.

Example: To convert 24 Nm to lbf.ft., find 24 Nm on the horizontal axis (see the dashed line). Follow the dashed line vertically to the solid black diagonal line. Then follow the dashed line horizontally to the vertical axis. Read the value of 17.7 lbf.ft.

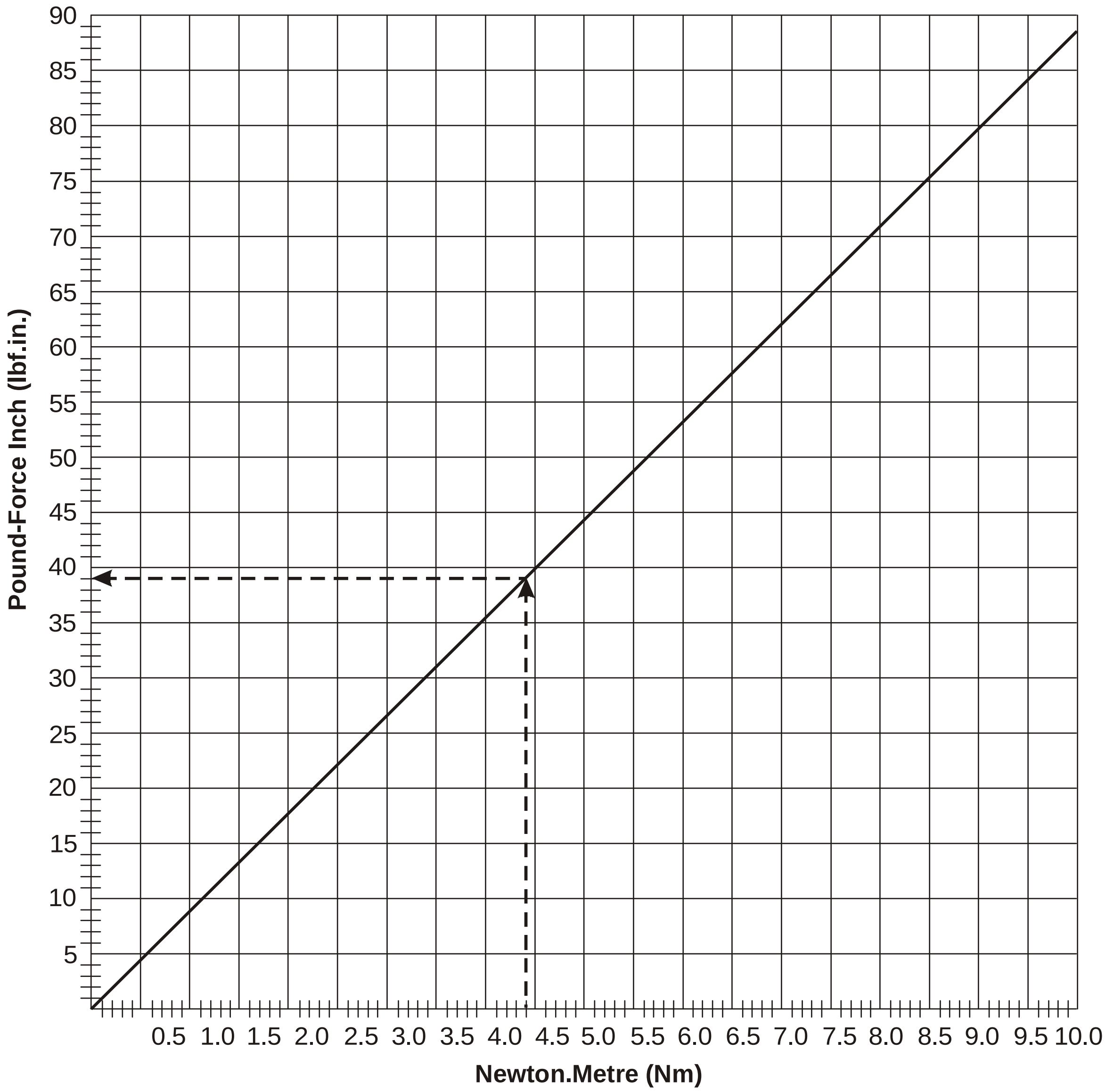

Figure 2: Nm - lbf.in.

Find the Nm value on the horizontal axis. Move vertically to the solid black diagonal line. Then move horizontally to the vertical axis. Read the value in lbf.in.

Example: To convert 4.4 Nm to lbf.in., find 4.4 Nm on the horizontal axis (see the dashed line). Follow the dashed line vertically to the solid black diagonal line. Then follow the dashed line horizontally to the vertical axis. Read the value of 39 lbf.in.

11.Supplemental Airplane Maintenance Manuals (DA 42 M Airplanes, VÄM 42-002 incorporated)

Supplemental Airplane Maintenance Manuals are used to provide maintenance procedures and installation instructions for additional equipment.

A. List of Supplemental AMMs

Doc. No.	Title	Rev. No.	Date	applicable	
				YES	NO
7.02.21-M01	DA 42 M - Installation Instructions for System M01 - Belly Pod	2	30-Sep-2008	□	□
7.02.21-M02	DA 42 M - Installation Instructions for System M02 - Riegl Laserscanner	1	29-Feb-2008	□	□
7.02.21-M10	DA 42 M - Installation Instructions for System M10 - Operator Desk	2	20-Apr-2015	□	□
7.02.21-M30	DA 42 M - Installation Instructions for System M30 - Universal Nose	1	30-Sep-2008	□	□
7.02.21-M32	DA 42 M - Installation Instructions for System M32 - Cobolt 350 with Scotty Satcom	0	26-Aug-2008	□	□
7.02.21-M60	DA 42 M - Installation Instructions for System M60 - Nose Pod	0	15-Oct-2009	□	□
7.02.21-M130	DA 42 M - Installation Instructions for System M130 - Universal Nose	1	20-Dec-2010	□	□

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CHAPTER 03

GENERAL DESCRIPTION OF THE AIRPLANE

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CHAPTER 03
GENERAL DESCRIPTION OF THE AIRPLANE

1. Description

The DA 42 is a twin-engine, four seat, low wing mono-plane. It has a cantilever wing and a ‘T’ tail.

The airplane structure is fiber reinforced plastic composite. This gives a very strong but lightweight structure.

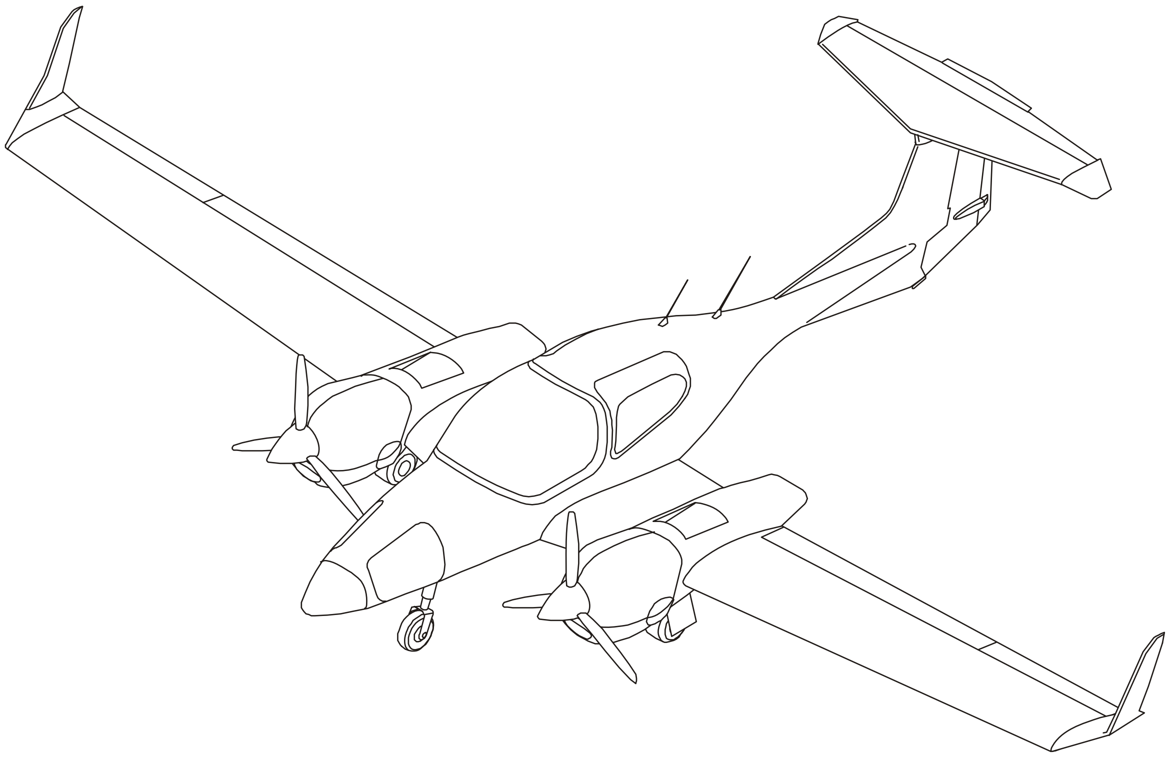

Figure 1: DA 42 Airplane

The semi-monocoque fuselage is a carbon-fiber reinforced-plastic (CFRP) shell with glass-fiber reinforced-plastic (GFRP) bulkheads and stiffeners. The fuselage is constructed in 2 halves that are bonded together after installation of the fuselage bulkheads and frames. Carbon fiber is used in many areas to give increased strength and rigidity. A roll-over protection bar forms part of the construction of the cockpit area. The vertical stabilizer is integral with the fuselage shells.

A wing center section is attached to the bottom of the fuselage center section. The wing center section has the 2 engine nacelles, the wing stubs and the fuselage center-section floor. The engine nacelles give the fixing points for the engines. The wing stubs have the attachment points for the outer wings. Two main spars ('spar bridges') transfer the loads from the wings to the fuselage. Four main bolts and 2 auxiliary bolts attach the wing spar stubs to the wing center section. The center section has the main landing gear bays and landing gear leg attachments.

The cantilever outer wing is a semi-monocoque structure. Each wing has two I-shaped spars with webs made from GFRP/rigid foam sandwich and caps made from carbon-fiber reinforced plastic (CFRP) bands. Each wing has top and bottom shells made of carbon fiber reinforced plastic-sandwich construction which are bonded to the spars. Carbon fiber reinforced plastic ribs and webs are bonded to the spars and shells to complete the structure. Electrically operated flaps and mechanical ailerons are attached to the trailing edge of the wings.

The horizontal stabilizer is a semi-monocoque structure. It has top and bottom shells made of GFRP and two main spars. The shells are bonded to the spars and ribs. The trailing edge has a conventional elevator with both mechanical and electrical trim systems.

The one-piece canopy has a large quantity of wrap-around glazing. This gives a good all-round view from the cockpit. A glazed rear passenger door on the left side of the airplane gives access to the rear seats. The passenger door lifts up to give good access and is supported in the open position by a gas strut.

A two-part acrylic lacquer finish protects the outside skin of the airplane from ultraviolet rays and humidity.

The tricycle landing gear is fully retractable and hydraulically operated. The main landing gear legs are attached to mounting points in the wing center-section. The main landing gear retracts into integral compartments in the wing center section. Landing gear doors seal the landing gear bays when the gear is retracted. The nose landing gear is steerable and is attached to the lower front of the fuselage. The nose landing gear bay is integral with the front fuselage and doors seal the bay when the gear is retracted.

The flight control system uses conventional ailerons, elevator and rudder. The DA 42 has 2 control sticks (if OÄM 42-283 is installed, the RH control stick is removable by the pilot) and 2 rudder pedal assemblies to operate the primary flight controls. Push-pull rods operate the ailerons and the elevator. Cables operate the rudder. An electric motor operates the flaps via push-pull rods. The elevator has both an electric and a manual trim system. A handwheel and Bowden cable operate the elevator trim mechanically. The rudder has a mechanical trim system which uses a rotary drive and Bowden cable to operate a rudder trim tab.

Two TAE 125-01, TAE 125-02-99 or TAE 125-02-114 4-cylinder, liquid cooled, 4-stroke Diesel engines power the DA 42. The engine has a wet sump oil system and an oil cooling system. The engines are equipped with constant speed propellers with 3 blades. The propellers are driven through an integral reduction gearbox. An overload clutch or a dual mass flywheel provide vibration damping. The engine is controlled by a Full Authority Digital Electronic Control (FADEC) system. The engine has a direct injection fuel system using the common rail technique. The engine is turbo charged.

The airplane has aluminum fuel tank assemblies in each wing. Each fuel tank has 3 chambers which are mounted longitudinally between the wing spars. The outer fuel chamber of each assembly has a fuel filler. Flexible hoses connect the fuel tanks to the fuel distribution system. Each tank can feed either engine via a fuel cross-feed system. Fuel level sensors are installed in the inner and outer fuel tank chambers. The fuel level sensors control the fuel indicating system in the cockpit. The total fuel capacity of the airplane is approximately 197 liter (52 US gal.) with standard tanks installed, or 300.8 liter (79.4 US gal.) with auxiliary tanks installed (OÄM 42-056).

The airplane has two sources of electrical power. A 24 V battery supplies electrical power when the engines are not running. Engine generators provide electrical power when minimum one of the engines is running. Switches and circuit breakers control all electrical devices. A key switch controls the engine starting system.

The DA 42 has a full range of flight instruments contained in an integrated cockpit system (ICS). The ICS has 2 display screens. Both of them are able to show at the airplane flight instrumentation data, navigation data, engine data and other airplane system data. The ICS also displays all the airplane warnings, cautions and alerts. The ICS can also be configured to show ground and flight check lists.

2. Equipment Data

The table below gives you the names and address of the manufacturers who supply systems and/or equipment for the DA 42. This will help you to get more data on a system and/or equipment.

"Yes" in the "Direct Shipping Approved" column means that the part can be ordered directly from the vendor. "No" means that the part must be obtained as a genuine Diamond Aircraft spare part. This is the case when a part needs to be configured for the DA 42 airplane.

In any case, the parts must have exactly the part numbers shown in the Equipment List in Chapter 6 of the Airplane Flight Manual, Doc. No. 7.01.05-E (if the KAP 140 A/P is installed) or Doc. No. 7.01.06-E (if the GFC 700 A/P is installed).

ATA Chapter	Equipment/System	Manufacturer/Address	Direct Shipping Approved
12	Anti-Corrosion Cleaning Agent: Ardrox AV 980 Anti-Corrosion Coating: Ardrox AV 30	Chemetall GmbH Trakehnerstrasse 3 D-60487 Frankfurt a. M. BRD Tel: +49 69 7165-0 Fax: +49 69 7165-3018 Website: www.chemetall.com	yes
	Anti-Corrosion Cleaning Agent: Diestone DLS Anti-Corrosion Coating: Socopac 65H	Socomor ZI du Prat - RP 3707 F56037 Vannes Cedex Tel: +33 (0)297437690 Fax : +33 (0)297437686 Website: www.socomor.com	yes
22	Autopilot System (if KAP 140 A/P is installed):	Honeywell International Inc. One Technology Center 23500 West 105th Street Olathe, Kansas 66061 USA Tel: 1 855 250 7027 (U.S. and Canada) 1 602 365 7027 (International) Website: www.bendixking.com	yes

ATA Chapter	Equipment/System	Manufacturer/Address	Direct Shipping Approved
22, 23, 31, 34	Integrated Cockpit System and GFC 700 A/P (if installed):	Garmin International, Inc. 1200 East 151st Street Olathe, Kansas 66062 USA Tel: (913) 397-8200 Fax: (913) 397-8282 Website: www.garmin.com	yes
	Cooling Fans for Integrated Cockpit System:	SANDIA aerospace 3700 Osuna Road NE, Suite 711 Albuquerque, NM 87109 USA Tel: (505) 341-2930 Fax: (505) 341-2927 Website: www.sandia.aero	yes

ATA Chapter	Equipment/System	Manufacturer/Address	Direct Shipping Approved
24	Battery:	Concorde Battery Corp. 2009 San Bernardino Road West Covina, CA 91790 USA Tel: (626) 813-1234 Website: www.concordebattery.com	yes
		Teledyne Battery Products 840 West Brockton Avenue Redlands, CA 92374 USA Tel: (800) 456 0070 Website: www.gillbatteries.com	yes
25	Emergency Locator Transmitter (ELT):	Artex Aircraft Supplies 14405 Keil Road NE Aurora, Oregon 97002 USA Tel: (503) 678-7929 Fax: (503) 678-7930 Website: www.artex.net	yes
25	Safety Belts:	Schroth Safety Products GmbH P.O. Box 24 40 59714 Arnsberg Germany Tel: +49-2932-9742 Website: www.schroth.com	yes
25	AmSafe Seatbelt Airbag V23 System	AMSAFE, Inc. 1043 N. 47th Ave. Phoenix, AZ 85043 USA Tel: +1 602 850 2850 Fax: +1 602 850 2812 Website: www.amsafe.com	yes

ATA Chapter	Equipment/System	Manufacturer/Address	Direct Shipping Approved
26	Fire Extinguisher:	Total Feuerschutz GmbH Industriestr. 13 68526 Ladenburg Germany Tel: +49-6203-75-369 Fax: +49-6203-75-265 Website: www.total-feuerschutz.de	yes
Note: The airspeed indicator must have the markings specified in Chapter 2 of the Airplane Flight Manual, Doc. No. 7.01.05-E or 7.01.06-E if the GFC 700 autopilot (OÄM 42-102) is installed.			
31	Airspeed Indicator, Altimeter:	United Instruments Inc. 3625 Comotara Avenue Wichita, Kansas 67226 USA Tel: (316) 636-9203 Fax: (316) 636-9243 Website: www.unitedinst.com	yes
31	Attitude Gyro:	Mid-Continent Instrument Co., Inc. 7706 E, Osie, Wichita, Kansas 67207 USA Tel: (316) 683-5619 Fax: (316) 683-1861 Website: www.mcico.com	yes
32	Main Wheels and Brakes:	Parker Hannifin Corporation Aircraft Wheel and Brake Division 1160 Center Road Avon, Cleveland, Ohio 44011 USA Tel: (440) 937 6211 Fax: (440) 937 6416 Website: www.parker.com	yes

ATA Chapter	Equipment/System	Manufacturer/Address	Direct Shipping Approved
33	Strobe Lights:	Whelen Engineering Company, Inc. Route 145, Winthrop Rd. Chester, CT 06412-0684 USA Tel: (860) 526-9504 Fax: (860) 526-2009 Website: www.whelen.com	yes
33	Landing and Taxi Lights:	XeVision 4245 Airport Rd. Ogden, UT 84405 USA Tel: (801) 622-7000 Fax: (801) 622-7277 Website: www.xevision.com	yes
Note: The propeller must have the pitch settings specified in Chapter 61 of this manual.			
61	Propeller:	mt-Propeller Airport Straubing Wallmühle D-94348 Atting GERMANY Tel: +49-9429-9409-0 E-mail: sales@mt-propeller.com Website: www.mt-propeller.com	yes
72	Engines TAE 125-01 and TAE 125-02-99	Thielert Aircraft Engines GmbH Platanenstrasse 14 D-09350 Lichtenstein Germany Tel: +49-37204-696-90 Fax: +49-37204-696-50 Website: www.thielert.com	yes

ATA Chapter	Equipment/System	Manufacturer/Address	Direct Shipping Approved
72	Engine TAE 125-02-99 and TAE 125-02-114	Technify Motors GmbH Platanenstrasse 14 D-09356 St. Egidien Germany Tel: +49 37204 696-0 Fax: +49 37204 696-2910 Website: www.technify.de	yes

3. Handling of Identification Data

No person shall remove, change, or place identification information on any airplane, engine, propeller, propeller blade, or propeller hub, without the approval of the competent national Airworthiness Authority.

If a deviation from the procedure above is necessary, any person performing maintenance work may in consultation with the competent national Airworthiness Authority:

– Remove, change, or place the identification plate on any airplane, engine, propeller, propeller blade, or propeller hub.

– Remove an identification plate, when necessary during maintenance operations.

– No person shall install an identification plate, removed in accordance with the procedures above, on any aircraft, engine, propeller, propeller blade, or propeller hub other than the one from which it was removed.

CHAPTER 04

AIRWORTHINESS LIMITATIONS

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CHAPTER 04
AIRWORTHINESS LIMITATIONS

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CHAPTER 04
AIRWORTHINESS LIMITATIONS

THIS AIRWORTHINESS LIMITATIONS SECTION IS APPROVED BY EUROPEAN AVIATION SAFETY AGENCY (EASA) IN ACCORDANCE WITH THE APPLICABLE CERTIFICATION PROCEDURES AND THE TYPE CERTIFICATION BASIS. IT SPECIFIES THE AIRWORTHINESS LIMITATIONS REQUIRED BY JAR 23.

THIS AIRPLANE MAINTENANCE MANUAL CHAPTER 04 (AIRWORTHINESS LIMITATIONS) IS APPROVED WITH EASA APPROVAL NO. 10042779.

THE AIRWORTHINESS LIMITATIONS SECTION IS FAA APPROVED AND SPECIFIES MAINTENANCE REQUIRED UNDER SECS. 43.16 AND 91.403 OF THE FEDERAL AVIATION REGULATIONS UNLESS AN ALTERNATIVE PROGRAM HAS BEEN FAA APPROVED.

SERVICE BULLETINS OR OTHER DOCUMENTS REVISING THIS SECTION WHICH CONTAIN A STATEMENT THAT THE DOCUMENT IS AUSTRO CONTROL GMBH (ACG) / EUROPEAN AVIATION SAFETY AGENCY (EASA) APPROVED ARE CONSIDERED FAA APPROVED.

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1. Airworthiness Limitations

This Chapter is approved and shows the mandatory limitations which were established as a result of the certification process.

The time limits given in Chapter 04 must be applied to ensure Continued Airworthiness of the DA 42.

Note: Regular inspections of the airplane including replacement and overhaul of certain components are required to ensure Continued Airworthiness of the DA 42.

For possible airworthiness limitations of engine, propeller, components and vendor equipment refer to the applicable Maintenance data as listed in Section 05-00.

A. Certification Maintenance Requirements

(1) Component and System Checks

The component and system checks under this paragraph are also included in Section 05-10.

The following table lists airplane components and systems which require monitoring through scheduled maintenance.

Where an interval is given in both flight time and calendar years, the limit which is reached first must be applied.

ATA Ch.	Component	Maintenance Requirement	Interval	
			hrs.	yrs.
24	Alternator fail relay. (if VÄM 42-002 is carried out)	Functional check (refer to Section 24-80).	1000 ± 50	2 yrs. ± 30 days
25	Electronics Module Assembly EMA (if OÄM 42-324 is installed)	Remove EMA and return to AmSafe for refurbishment.		7 years, calculated from the month of manufacture*
51	Bonding system and static discharging system.	Resistance measurements (refer to Section 51-80).	1000 ± 50	4 yrs. ± 60 days

*Storage or installation life

(2) Life Time Limit / Structure Checks

There is no structural life limit.

Note: The DA 42 has been designed and tested under a 'damage tolerant structure' philosophy. Therefore the structural inspections given in Chapter 05 cover all required structure checks.

B. Replacement Requirements

The following table lists life limited airplane components which must be replaced at a specific time.

Where an interval is given in both flight time and calendar years, the limit which is reached first must be applied.

Note: The replacement requirements under this paragraph are also included in Section 05-10.

ATA Ch.	Component	Replacement Time	
		hrs.	yrs.
24	Emergency battery package.		2 years ± 30 days, or upon reaching the date marked on the package, or after use, whichever comes first.
24	ECU backup batteries LH/RH.		1 yr. ± 30 days
25	Installation screws for forward inflators (if OÄM 42-324 is installed)	1000 ± 50	
25	Electronics Module Assembly (if OÄM 42-324 is installed)		14 years, calculated from the month of manufacture*

ATA Ch.	Component	Replacement Time	
		hrs.	yrs.
25	Inflator Assembly (if OÄM 42-324 is installed)**		10 years, calculated from the month of manufacture* (as indicated in the expiration date stamp on the gas cylinder)
28	Fuel filter element.	100 ± 10	1 yr. ± 15 days

* Replacement times are shown as service life, defined as total sum of storage life and installation life.
** Return Inflator Assembly to AmSafe for disposal.

C. Paint

It is mandatory to paint the DA 42 white with a solar absorptivity not exceeding 0.3. This will prevent the temperature of the structure from becoming too high. Examples of approved shades are:

– RAL 9016.

– Mercedes DB 147.

– BMW 218.

– Volvo XG28.

– Volvo BC76.

– Saab 5AC6.

– Alfa Romeo 230.

Before painting the DA 42 in a different shade the manufacturer must be contacted.

Only certain areas which are defined in Chapter 51 of this manual (for example, registration markings, placards and warning markings) may have a different color.

D. Repairs

Repairs which are not described in Chapter 51 of this manual may only be carried out in accordance with a repair scheme which must be approved in accordance with the procedures established by the competent certifying authority.

CHAPTER 05

TIME LIMITS AND MAINTENANCE CHECKS

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CHAPTER 05
TIME LIMITS AND MAINTENANCE CHECKS

1. General

This Chapter will help you to do the maintenance of the DA 42 correctly. Refer to Chapter 04-00 and 05-00 to help you when you do maintenance and inspections.

The times given in this Chapter are times recommended by the airplane manufacturer. Do the scheduled maintenance at the given times, because they are the minimum required to keep the airplane in a good technical condition.

These checks do not over-ride the requirements of the airworthiness authority of the country where the airplane is registered. You must make sure that all Airworthiness Directives, Service Bulletins and any other requirements of the airworthiness authority of the country where the airplane is registered are completed as required.

The airplane manufacturer can change the time between checks. If this happens, the airplane manufacturer will publish the change as a revision to the Airplane Maintenance Manual.

Time limits and maintenance checks were established for operation in a moderate climate and on paved runways. For operation under rough conditions (extreme temperatures, saline air, wind-borne sand, operation on grass runways, etc.) it may be necessary to make changes to the maintenance requirements given in this Chapter. You can decrease the time between scheduled maintenance checks if the airplane's operation makes it necessary. You must not extend the time between scheduled maintenance checks without the approval of the airworthiness authority of the country where the airplane is registered.

2. Chapter Configuration

A. Section 05-10

Section 05-10 contains the recommended time limits for maintenance checks. It also contains the recommended time between overhaul for components. Use the data in Section 05-10 to find when to do the maintenance.

B. Section 05-20

Section 05-20 contains information about the maintenance checklist organization.

C. Section 05-21

Section 05-21 contains information about the Flight Line Checks.

D. Section 05-22

Section 05-22 contains information about the 5 hour check of the TAE engines.

E. Section 05-25

Section 05-25 contains the Drain Holes Inspection Checklist.

F. Section 05-28

Section 05-28 contains the Maintenance Checklist for the DA 42 airplane. The Section is subdivided into engine and airframe Sections and provides checklists for the engines, the propellers, the airframe and the corresponding reports.

(1) Section 05-28-00

DA 42 Maintenance Checklist for the engines: Maintenance checks schedule for 100, 200, 1000, and 2000 hour checks on the engine and propeller.

(2) Section 05-28-50

DA 42 Maintenance Checklist for the airframe: Maintenance checks schedule for 100, 200, 1000, and 2000 hour checks on the airframe.

(3) Section 05-28-90

DA 42 Maintenance Report.

(4) Section 05-28-91

DA 42 Engine Ground Test Reports.

(5) Section 05-28-92

DA 42 Check Flight Report.

(6) Section 05-28-93

Major Structural Inspection (MSI) Check Findings Report.

G. Section 05-50

Section 05-50 contains the unscheduled maintenance checks. Do these checks after hard landings, propeller damage, engine fire and lightning strike.

H. Referenced Maintenance Data

Use latest revision of referenced maintenance data.

Supplier	Document Name	Document No.
Aerox	Component Maintenance Manual with Illustrated Parts List, Part Numbers 4110-120 Series	35-00-01
AMSAFE	Supplemental Instructions for Continued Airworthiness AmSafe Seatbelt Airbag V23 System for Diamond Aircraft, Models DA 40, DA 40 NG, DA 40 F, DA 42, DA 42, and DA 42 M-NG Inflatable Restraint System Assy. Series No. 7053 and 7057.	E509605
Artex	Installation and Maintenance Manual for the ME406 ELT	570-1600
Cleveland/Parker	Cleveland/Parker Maintenance Manual	AWBCMM0001-8
Cleveland/Parker	Cleveland/Parker Product Catalog	AWBPC0001-8
Cleveland/Parker	Cleveland/Parker Technician’s Service Guide	AWBTSG0001-6
Concorde	ICA and Supplement for Valve Regulated Lead-Acid Main Battery	5-0171
Garmin	Garmin G1000 System Maintenance Manual	190-00907-00
Garmin	Garmin G1000 Line Maintenance and Configuration Manual	190-00303-04
Gill	Dry Charges Lead Acid Aircraft Battery Service Manual	Q01-1120
Honeywell	Honeywell Flightline Maintenance Manual Bendix/King KAP 140 Flight Control System	006-15574-0002
L-3	Stormscope WX-500 Installation Manual	009-11500-001
mt-Propeller	mt-Propeller Operation and Installation Manual	E-124, ATA 61-01-24
TAE	TAE 125-01 Operation and Maintenance Manual	OM-02-01
TAE	TAE 125-02-99 Operation and Maintenance Manual	OM-02-02
TAE	TAE 125-01 Repair Manual	RM-02-01
TAE	TAE 125-02-99 Repair Manual	RM-02-02
Technify	TAE 125-02 Operation and Maintenance Manual	OM-02-02
Technify	TAE 125-02 Repair Manual	RM-02-02
Goodyear	Aircraft Tire Care & Maintenance	-

3. Definitions

In this Airplane Maintenance Manual, the words that follow have special meanings:

Adjust.	To put to a specified position or condition. For example, adjust the clearance to 1 mm.
Check.	A technical name for a group of maintenance tasks. For example, the 100 hour check.
Examine.	To look carefully at an item. It includes steps such as these:

- Make sure that the item:

  Is complete.
  Is correctly attached.
  Has no loose parts.
  Shows no signs of leaks.
  Is not cracked or damaged.
  Is not worn.

- Make sure that:

  The surface protection is not damaged.
  All locking devices are installed correctly.

- Make sure that items such as pipes and cables:

  Look serviceable.
  Do not rub against other items.

- For log books and other technical records:

  To find outstanding faults.
  To make sure they are up-to-date and correctly maintained.

Inspection.	The procedure which compares an object with its standard or specification.
Measure.	To find out the dimensions, capacity or quantity of something.
Monitor.	To look at something over a period of time. For example, monitor the engine speed indicator.

Record.	(1) Technical name for something that shows what was done. For example, write the result of the test in the engine record. (2) The act of making a record. For example, record the result of the test in the Airplane Maintenance Log.
Replace.	To remove an item and install a serviceable item in the same location.
Set.	To put equipment into a given adjustment, condition or mode. For example, set the altimeter scale to 1013 mbar (= 1013 hPa).
Task.	An assigned work or a procedure. For example, each step of the task has an identification letter.
Test.	That which you do when you operate or examine an item to make sure that it agrees with the applicable specifications. For example, disconnect the systems which are not necessary for the test. Or do an engine test.

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Section 05-10
Time Limits

1. General

All scheduled maintenance checks have time limits. You must do the scheduled maintenance within the time limits.

The flight time recorded in the airplane log book is the time that is relevant for the time limits.

Some components installed in the airplane have a fixed time between overhaul (TBO). Refer to Paragraph 4.

2. Regulatory Authorities

The recommended time limits given in this Chapter were created to meet the requirements of the certification process.

Note: National Regulatory Authorities can have different requirements. You must make sure that you meet the requirements of the Regulatory Authority of the country where the airplane is registered.

3. Scheduled Maintenance Time Limits

(Refer to Sections 05-20 through 05-28).

The following recommended hourly and calendar time limits apply to the scheduled maintenance checks which are necessary to maintain the airplane in a good technical condition. Do the scheduled maintenance at the intervals and within the tolerances shown below.

A. Non-Recurring Maintenance Inspections

Scheduled Maintenance Check	Do At These Times	Maximum Tolerance
5 Hour Engine Check	At 5 hours since new do a 5 hour engine check of the TAE engine.	+1 hr. -2 hrs.

B. Recurring Maintenance Inspections

Note: Where an interval is given in both flight hours and calendar years, the limit which is reached first must be applied. The next interval starts with the Flying Hours **and** Calender Time of the latest performed Scheduled Maintenance Check.

Note: National requirements may require different maintenance schedules. For example, on airplanes registered in the USA a 100 hour inspection must be carried out annually.

Scheduled Maintenance Check	Interval	
	Flight Hours	**Calendar Time**
100 Hour Check	100 ± 10	
200 Hour Check	200 ± 10	12 months ± 30 days
1000 Hour Check	1000 ± 50	
2000 Hour Check	2000 ± 50	
First Major Structural Inspection (MSI)	6000 ± 50	12 years ± 6 months
Subsequent Major Structural Inspections	4000 ± 50	12 years ± 6 months

The intervals between the inspections must be adhered to within the tolerances shown. These tolerances must not be added up. For example: if the 100 hour inspection was done at 110 hours, the next inspection must be done at 200 ±10 hours, not 210 ±10 hours.

If an inspection is carried out earlier than allowed by the specified tolerance, all subsequent inspection intervals are counted from that inspection. For example: If the 100 hour inspection was done at 83 hours, the next inspection must be done at 183 ±10 hours.

Some inspection items must be done at other intervals than the standard intervals listed in the table above. In these cases, the maintenance interval (for example, 800 hrs.) is shown as a number in the maintenance checklists. Refer to Section 05-20, Paragraph 2.

C. Complete Aircraft Inspection

The Complete Aircraft Inspection consists of a 200 Hour Check.

D. Scope of Maintenance Inspections

For maintenance of airplanes registered in the USA, do the items marked X and the items marked X* in the Maintenance Checklist.

For maintenance of airplanes registered in other countries, do only the items marked X in the Maintenance Checklist.

4. Component Time Limits

Note: Those component time limits which are airworthiness limitations are also listed in Chapter 04.

A. Maintenance Requirements

The following table lists airplane components and systems which require overhaul or specific checks.

Where an interval is given in both flight time and calendar time, the limit which is reached first must be applied.

ATA Ch.	Component	Maintenance Requirement	Interval	
			hrs.	calendar time
Note: The mechanical check of the KAP 140 autopilot system (if installed) is not mandatory. It is however recommended to do this check at the times shown below.				
22	Autopilot KAP 140.	Mechanical check (recommended).	1000 ± 50	1 yr ± 30 days
Note: The mechanical check of the GFC 700 autopilot system (if installed) is mandatory.				
22	Autopilot GFC 700.	Mechanical check.	-	1 yr ± 30 days
24	Main battery Concorde.	Capacity test. Refer to Concorde RG® Series Main Aircraft Batteries Component Maintenance Manual, latest revision.	1000 ± 100	1 yr ± 30 days
24	Main battery Gill.	Battery service. Refer to Gill Dry Charges Lead Acid Aircraft Battery Service Manual, latest revision.	800 ± 50	11 months ± 30 days
24	Alternator fail relay. (if VÄM 42-002 is carried out).	Functional check (refer to Section 24-80).	1000 ± 50	2 yrs ± 30 days

ATA Ch.	Component	Maintenance Requirement	Interval	
			hrs.	calendar time
25	Safety harnesses equipped with AmSafe Seatbelt Airbag System (if OÄM 42-324 is installed). If OÄM 42-334 is installed, only the pilots' seats are equipped with the AmSafe Seatbelt Airbag System.	Functional test with V23 System diagnostic tool. Refer to AmSafe Maintenance Documentation.	1000 ± 50	1 yrs ± 30 days
26	Fire extinguisher.	Overhaul by fire extinguisher manufacturer (see Chapter 03).	-	10 yrs ± 90 days
29	Hydraulic reservoir air filter.	Check.	1000 ± 50	-
30	De-icing fluid strainer, if installed.	Clean.	-	1 yr ± 15 days
34	Pitot-static system.	Leakage test (refer to Section 34-10).	1000 ± 50	2 yrs ± 30 days
34	Airspeed indicators. (G1000 and backup).	Check for correct indication.	-	4 yrs ± 60 days
			-	2 yrs ± 30 days*
34	Vertical speed indicator. (G1000).	Check for correct indication.	-	4 yrs ± 60 days
			-	2 yrs ± 30 days*
* Only required for airplanes for which 14 CFR § 91.411 and 14 CFR § 91.411 Part 43 Appendix E are applicable.				
34	Altimeters. (G1000 and backup).	Check for correct indication.	-	2 yrs ± 30 days
34	Magnetic compass.	Compensate.	-	1 yrs ± 15 days
34	Transponder (G1000) and blind altitude encoder (altitude digitizer).	System check (refer to Garmin Line Maintenance and Configuration Manual 190-00303-04, latest revision).	1000 ± 50	2 yrs ± 30 days
35	Oxygen regulator valve (if installed).	Overhaul.	-	5 yrs ± 60 days

ATA Ch.	Component	Maintenance Requirement	Interval	
			hrs.	calendar time
35	Oxygen cylinder (if installed). Manufacture / test dates before 01-Jul-2006: 01-Jul-2006, or later:	Hydro test per DOT.	-	 3 yrs ± 30 days 5 yrs ± 60 days (Unless otherwise governed by the local authority)
51	Bonding system and static discharging system.	Resistance measurements (refer to Section 51-80).	1000 ± 50	4 yrs ± 60 days

B. Airplane Life-Limited Components

The following table lists life limited airplane components which must be replaced at a specific time.

Where an interval is given in both flight time and calendar time, the limit which is reached first must be applied.

ATA Ch.	Component	Replacement Time	
		hrs.	calendar time
24	Emergency battery package.	2 years ± 30 days, or upon reaching the date marked on the package, or after use, whichever comes first.	
24	2 Alternator excitation batteries.	-	1 yr ± 15 days
24	ECU backup batteries.	-	1 yr ± 15 days
25	Safety harnesses, front and rear.	-	12 yrs ± 90 days
25	Safety harnesses, front and rear (if OÄM 42-324 is NOT installed). Note: If OÄM 42-324 is installed, refer to the AmSafe Maintenance Documentation for on condition inspection requirements.	-	12 yrs ± 90 days
25	First aid kit. Replace aseptic items.	Upon reaching the date marked on the kit.	
27	Rudder cables, non-stainless steel, 3.2 mm (1/8 in) diameter.	3000 ± 50	5 yrs ± 60 days
27	Rudder cables, stainless steel, 3.2 mm (1/8 in) diameter.	On condition.	
Note: If material of rudder cables is unknown, assume non-stainless steel.			
28	Fuel tank vent hoses.	-	8 yrs ± 60 days
28	Fuel hoses interconnecting the individual fuel tank chambers.	-	8 yrs ± 60 days
28	Fuel filter element (TAE 125-01 engine).	100 ± 10	1 yr ± 15 days
28	Fuel filter element (TAE 125-02-99 engine).	100 ± 10	1 yr ± 15 days

ATA Ch.	Component	Replacement Time	
		hrs.	calendar time
29	Metal/paper filter element of high pressure filter between the pressure pipe of the hydraulic pump and the hydraulic control unit.	1000 ± 50	-
30	If the ice protection system is installed: Filter cartridges on the LH side.	2000 ± 50	-
32	Brake fluid.	-	3 yrs ± 60 days
32	Hydraulic fluid in landing gear dampers.	-	2 yrs ± 30 days
32	Hydraulic fluid in hydraulic system.	-	2 yrs ± 30 days
32	If OÄM 42-188 is carried out: Structural temperature indicators in the LH and RH landing gear bays.	-	MSI
35	Oxygen cylinder (if installed).	-	15 yrs ± 90 days
35	Oxygen masks (if installed).	-	3 yrs ± 30 days
35	Oxysaver cannulas (if installed).	200 of cumulative use	-
52	If MÄM 42-097 is installed: Canopy Door Handle Compression Gas Spring.	3000 ± 50	6 yrs ± 60 days
71	Air filter.	200 ± 10	-
75	Coolant silicate pouch.	Co-incident with engine TBO.	6 yrs ± 60 days

5. Component Time Tracking

To make sure that components overhaul/replacement is done at the correct time you must record the data that follows in the Airplane Maintenance Log for each component requiring overhaul/replacement:

- Serial Number.
- Flight hours and date at installation.
- Flight hours and date at removal.

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Section 05-20
Scheduled Maintenance Checks

1. General

Do the scheduled maintenance checks in this Section at the intervals (flight hours and calendar time) stated in Section 05-10, Paragraph 3.

Note: Only persons or maintenance organizations authorized by national regulatory authorities of the country where the airplane is registered may do these checks. The inspection level for each item is a general visual inspection unless differently specified.

Note: Only TAE authorized maintenance organizations may carry out maintenance and inspection work on the TAE engine. Refer to TM TAE 125-0003. Any engine malfunction must be reported to TAE.

2. Maintenance Checklist Organization

Do the scheduled maintenance checks with reference to the Maintenance Checklist in this Section. Before starting a check, complete the requirements of Paragraphs 2 and 3 of the checklist.

Do all the applicable tasks on the checklist.

Note: For maintenance of airplanes registered in the USA, do the items marked X and the items marked X* in the Maintenance Checklist.
For maintenance of airplanes registered in other countries, do only the items marked X in the Maintenance Checklist.

Note: The interval columns "100", "200", "1000", and "2000" are used for maintenance items which must be done at intervals of 100, 200, 1000, or 2000 flight hours.

Note: The interval column "time" is used for

(a) Maintenance items which must be done at certain calendar time intervals. These items are marked with the explicit time interval.
(b) Maintenance items which must be done during a Major Structural Inspection (MSI). These items are marked with the term "MSI."

Note: Where an interval is given in both flight time and calendar years, the limit which is reached first must be applied.

Note: Some inspection items must be done at other intervals than the standard intervals (100, 200, 1000, or 2000 hrs.). In these cases, the maintenance interval is shown in the column for the next shorter interval instead of an X. For example, an item which must be done every 800 hours is identified by the words "800 hrs." in the 200 hrs. column.

All of the applicable items must be signed by authorized maintenance personnel. Record the completion of the check in the airplane log book. Complete a copy of the Maintenance Report (refer to Section 05-28-90).

The Maintenance Checklist is divided into the following Sections:

A. Section 05-28-00: Engine Compartments

All items forward of the firewalls. It includes the cowlings and the propellers.

B. Section 05-28-50 - Airframe:

(1) Exterior of the Fuselage

All items on the outside of the fuselage from the nose to the leading edge of the vertical tail. It includes the nose baggage compartment, the nose landing gear, and the main landing gear.

(2) Cabin

All items inside the fuselage shell from the aft face of the instrument panel frame to the forward face of the baggage compartment frame. It also includes the internal parts of the flight control system, the internal pars of the brake system, and the canopy and rear door.

(3) Interior of the Rear Fuselage

All items inside the fuselage shell from the aft face of the baggage compartment frame to the vertical tail. It includes the control systems and the hydraulic systems in the rear fuselage.

(4) Center Wing

All items between the LH and RH wing root. It includes the engine nacelles aft of the firewalls.

(5) Tail

All items aft of the leading edge of the vertical tail. It includes the vertical stabilizer and the horizontal stabilizer.

(6) Wings

All items on the left and right wings. It includes the ailerons, flaps, Pitot-static probe, and fuel tanks.

(7) General

Those items which include more than one zone at the same time. It includes items such as control checks which need one person in the cockpit and another person at the control surface.

3. Major Structural Inspection

The Major Structural Inspection (MSI) is an important part of the infinite lifetime concept of the DA 42. It is required to prove the structural integrity of the airframe. It must be carried out at the intervals shown in Section 05-10.

Since the MSI is intended to coincide with a 2000 hour inspection, the inspection items are included in the maintenance checklist, and are identified by the term “MSI” in the ‘time’ column.

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Section 05-21
Flight-line Checks

1. General

These checks include the pre-flight and post-flight checks. Do these checks each day the airplane is used.

2. Flight-Line Checks

The Pre-Flight Check must be done before the first flight of the day. It shows the pilot the general condition of the airplane and the engine. It is important for flight safety. Look in the airplane log-book for problems before doing the pre-flight check.

WARNING: DO ALL THE STEPS OF THE PRE-FLIGHT CHECK CAREFULLY. ACCIDENTS CAN OCCUR IF THE PRE-FLIGHT CHECK IS NOT DONE CORRECTLY.

The schedule for the pilot's pre-flight check is furnished in the Airplane Flight Manual for the DA 42.

3. Post-Flight Check

Do the post-flight check after the last flight of the day. The post-flight check includes all the steps of the pre-flight check.

You must also:

Refuel the airplane (Section 12-10).

Record in the log book each problem found in flight and during the post-flight check.

Park the airplane (Sections 10-00 and 10-10).

If necessary, moor the airplane (Section 10-20).

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Section 05-22
5 Hours Engine Check

1. General

The 5 hour engine check must only be done on the TAE 125 Diesel engine at 5 hours since new.

Do all the tasks on the checklist. All items must be signed by TAE authorized maintenance personnel (refer to Note in Paragraph 1). Record the completion of the 5 hour engine check in the engine log book and in the airplane log book.

This check must only be done on new TAE 125 engines after 5 hours (+1 hr./-2 hrs.) of operation.

Enter the applicable data in the blocks below:

Registration : ____________________	Date : __________________
Airplane S/N : ____________________	Airplane Operating Hours : __________________
LH RH Engine S/N : _______ ________	Engine LH RH Operating Hours : _______ ________

2. Checklist for the 5 Hour Engine Check

Do the inspection items given in the following table. Refer to the TAE Operation and Maintenance Manual OM-02-01, latest revision for the TAE 125-01 engine.

Refer to the TAE Operation and Maintenance Manual OM-02-02, latest revision for the TAE 125-02-99 engine (if MÄM 42-198 installed) or TAE 125-02-114 engine (if OÄM 42-252 installed).

	Inspection Items	Initials	
		LH engine	RH engine
1.	Check oil system for leakage.		
2.	Check engine fuel system for leakage.		
3.	Check engine cooling system for leakage.		
4.	Visually examine the air filter.		
5.	Visually examine all hoses and fuel lines.		

	Inspection Items	Initials	
		LH engine	RH engine
6.	Visually examine the FADEC sensors.		
7.	Visually examine the exhaust system.		
8.	Visually examine the flat-belt.		
9.	Replace the coolant. Refer to Section 75-00 (TAE 125-01 engine).		
10.	Torque bolts attaching engine mount to firewall. Refer to Section 71-20 for information on the engine mount. Refer to Section 20-10 for the proper torque.		
11.	Exchange the gearbox oil filter.		
12.	Do an engine test run (refer to Section 71-00). Read out FADEC, send Real Time Log and Event Logfiles to TAE via e-mail (refer to Section 72-00).		

Events/Remarks:

Place   Date   Authorized

Section 05-25
Drain Holes Inspection Checklist and Report

1. General

Do a check of the drain holes. The drain holes must not be blocked by dirt or other residues. Make sure to remove all foreign objects and clean the drain holes to their full diameter. Otherwise the drain capacity may not be sufficient under certain conditions like heavy rain etc.

All drain holes should be drilled with a diameter of 5 mm (+2 mm / -0 mm) or 0.2 in. (+0.08 in. / -0.00 in.). The holes should be circular, deburred, not frayed and cleaned.

At drain holes marked with an asterisk (*) the adhesive bonding is recessed.

Refer to the corresponding indication on the figures to identify the locations of the drain holes listed below.

2. Drain Holes Inspection Checklist

Drain Holes Inspection Checklist			
Ref.	**Drain Hole Location**	**Hours**	**Initials**
1	**FUSELAGE**		
1.01	Lower shell, in front of radar frame (if OÄM 42-119 is NOT installed)	100	
1.02	Lower shell, behind the radar frame, on the left and right side of EPU	100	
1.03	Lower shell, behind nose gear frame, on the left and right side of nose gear	100	
1.04	Lower shell under the center console	100	
1.05	In the floor panel rear side, LH & RH	100	
1.06	Lower fuselage shell, aft of baggage compartment frame base	100	
1.07	On lowest point of the fin	100	
1.08	On the back side of the fin	100	
1.09	Bolt in rudder mounting shell (on top of the rudder)	100	
1.10	On lowest point of the cowling (LH & RH)	100	
1.11	On lowest point of the engine nacelle two holes in the LH & RH nacelle	100	
1.12	On lowest point of the engine nacelle aft of the front box spar (LH & RH)	100	
1.13	Lower center wing shell, next to landing light	100	
1.14	Lower center wing shell, in front of front box - spar (LH & RH)	100	
1.15	Lower center wing shell, in front of front box - spar center	100	
1.16	Lower center wing shell, aft of the front box - spar 4 holes in line	100	
1.17	Lower center wing shell, in front of rear box - spar 3 holes in line	100	
1.18	Flange top at main landing gear in front of rear box - spar (LH & RH)	100	

Drain Holes Inspection Checklist			
Ref.	**Drain Hole Location**	**Hours**	**Initials**
1.19	Lower center wing shell aft of rear spar center position	100	
1.20	Lower center wing shell, fuselage rib reinforcement section LH and RH and one in center position	100	
1.21	Lower center wing shell, in front of baggage compartment frame base	100	
1.22	Lower center wing shell, rear bonding flange	100	
1.23	Engine nacelle rear; LH of fuel cooler cover	100	
1.24	Engine nacelle rear; RH of fuel cooler cover	100	
1.25	Through lower (if OÄM 42-119 is installed) and upper end of radar frame	200	
1.26	In front of nose gear leg compartment floor (LH & RH)	200	
1.27	In rear of nose gear leg compartment (LH & RH)	200	
1.28	Through baggage compartment frame, center position above lower fuselage shell	200	
1.29	Through lower end of ring frame 1	200	
1.30	Through lower end of ring frame 2	200	
1.31	Through lower end of ring frame 3	200	
1.32	In rib of vertical stabilizer, in front of vertical stabilizer front web	200	
1.33	In rib of vertical stabilizer, in front of vertical stabilizer rear web	200	
1.34	Lower fuselage shell, aft of vertical stabilizer rear web	200	
1.35	Lower fuselage shell, aft of vertical stabilizer front web	200	
1.36	In the front box spar, to the engine nacelle fuel compartment, (LH & RH)	200	
1.37	In the rear box spar, to the engine nacelle maintenance cap 2 (LH & RH)	200	
1.38	Through roll over bar duct and baggage compartment frame	200	
1.39	In rear of nose gear leg compartment RH	2000	

Drain Holes Inspection Checklist			
Ref.	**Drain Hole Location**	**Hours**	**Initials**
2	**CANOPY AND DOOR**		
2.01	Lower canopy frame, in front of Bowden cable guide (LH & RH)	100	
2.02	Lower canopy frame, aft of the canopy locking mechanism (LH & RH)	100	
2.03	Inner door shell, below the front locking bolt	100	
3	**HORIZONTAL STABILIZER**		
3.01	Lower shell, next to the mid inspection hole (LH & RH)	100	
3.02	Lower shell, next to the front inspection hole (LH & RH)	100	
3.03	On the lowest point of the horizontal stabilizer tips (LH & RH)	100	
3.04	Elevator end rib, next to the rear spar, next to lower shell (LH & RH)	200	
3.05	LH & RH rib, in front of the rear spar, above the lower shell	200	
3.06	LH & RH rib, aft of the front spar, above the lower shell	200	
3.07	LH & RH rib, in front of the front spar, above the lower shell	200	
3.08	Mid LH & RH rib, behind the rear spar, above the lower shell	2000	
3.09	Mid LH & RH rib, behind the front spar, above the lower shell	2000	
4	**ELEVATOR**		
4.01	Lower shell, leading edge section (LH & RH)	100	
4.02	Lower shell, in front of trailing edge (LH & RH)	100	
5	**ELEVATOR TRIM TAB**		
5.01	Lower shell, leading edge section (LH & RH)	100	
5.02	Lower shell, in front of trailing edge bonding (LH & RH)	100	

Drain Holes Inspection Checklist			
Ref.	**Drain Hole Location**	**Hours**	**Initials**
6	**RUDDER**		
6.01	Lower edge of the rudder shell	100	
6.02	Lower edge of the trim rudder shell	100	
7	**WINGS**		
7.01	In outer wing end rib at aileron mass balance cut out	100	
7.02	Wing tip in front of rear bonding (LH & RH wing)	100	
7.03	First fuel tank rib, next to front and rear spar bonding and lower shell (LH & RH wing)*	200	
7.04	In flap rib rear spar next to lower shell (LH & RH wing)	200	
7.05	In rear root rib next to rear spar and lower shell (LH & RH wing)*	200	
7.06	In aileron rib next to rear spar and lower shell (LH & RH wing)*	200	
7.07	Second fuel tank rib, next to front and rear spar and lower shell (LH & RH wing)*	200	
7.08	Third fuel tank rib, next to front and rear spar and lower shell (LH & RH wing)*	200	
7.09	Fourth fuel tank rib, next to front and rear spar and lower shell (LH & RH wing)*	200	
7.10	Fifth fuel tank rib, next to front and rear spar bonding and lower shell (LH & RH wing)	200	
7.11	In front root rib, next to front spar and lower shell (LH & RH wing)	2000	
7.12	Vent hole on face side of wing spar (LH & RH)	2000	

Drain Holes Inspection Checklist			
Ref.	**Drain Hole Location**	**Hours**	**Initials**
8	**FLAPS**		
8.01	Root rib, next to trailing edge bonding (LH & RH)	100	
8.02	Inner flap root rib, next to trailing edge bonding (LH & RH)	100	
8.03	Inner flap root rib, at the leading edge (LH & RH)	100	
9	**AILERONS**		
9.01	Inner root rib, next to the trailing edge bonding (LH & RH)	100	
9.02	Lower shell, aft of mass balance weight (LH & RH)	100	
9.03	Lower shell, in front of mass balance hinge line (LH & RH)	100	
9.04	Outer root rib, at the leading edge (LH & RH)	100	

At drain holes marked with an asterisk (*) the bonding is recessed.

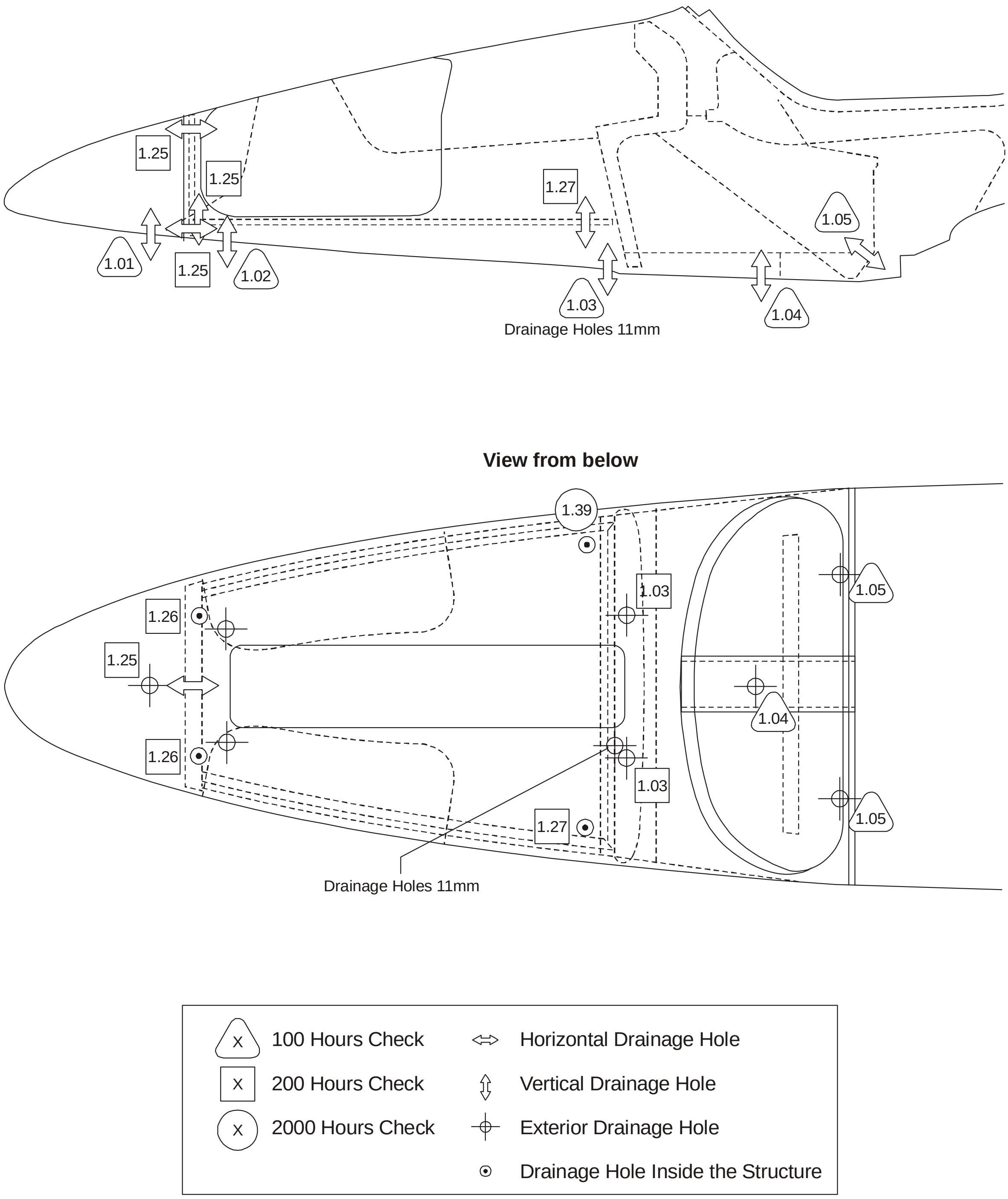


Figure 1: Drain Holes Fuselage (Part 1)

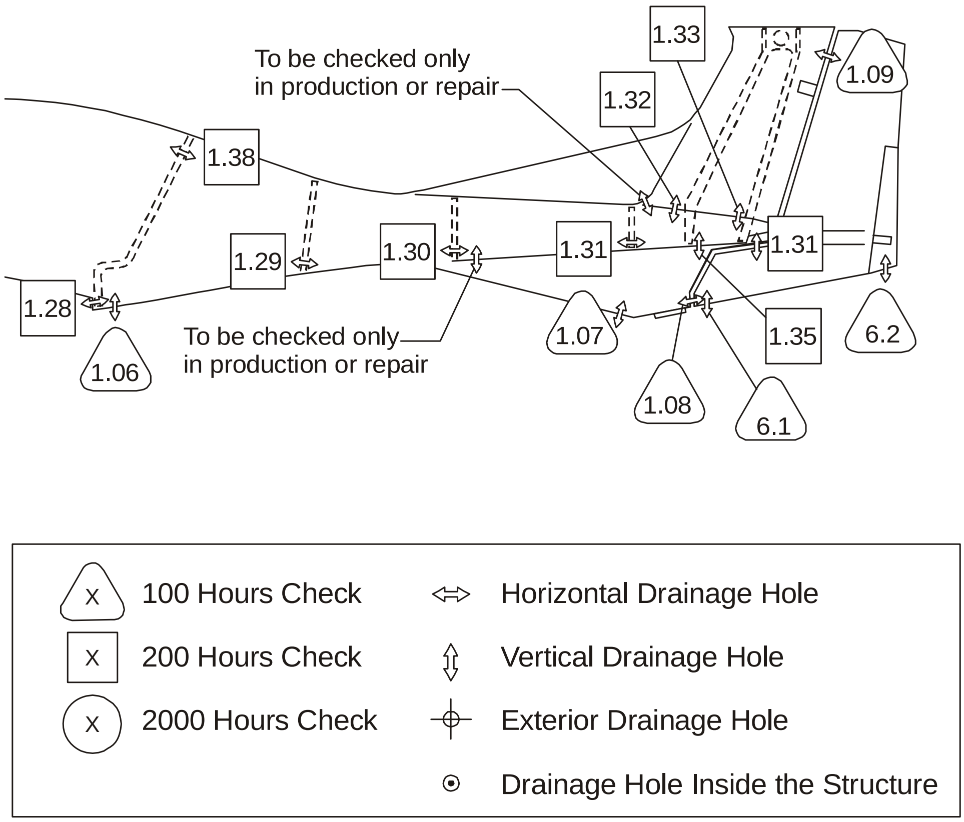


Figure 2: Drain Holes Fuselage (Part 2)

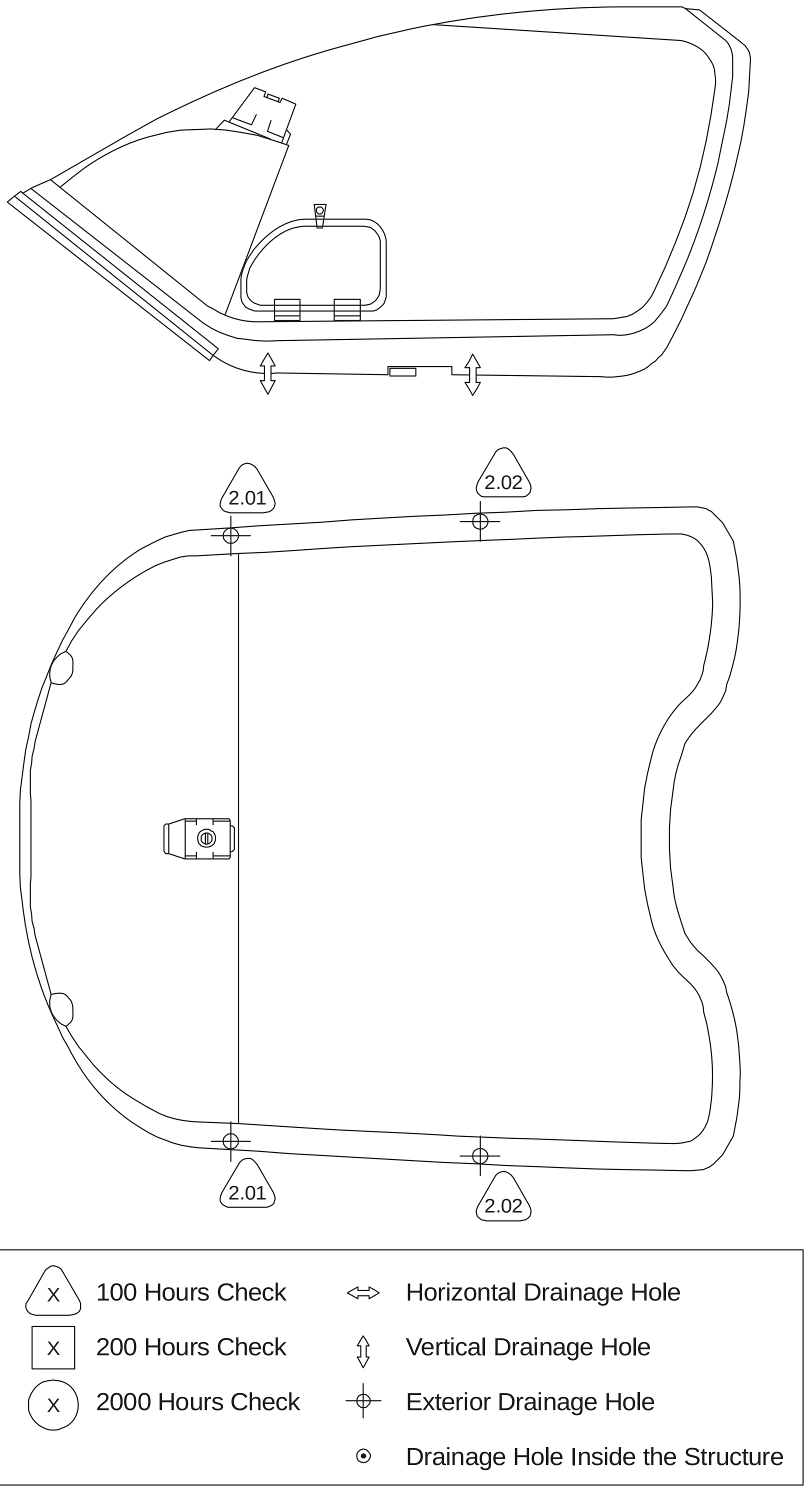


Figure 3: Drain Holes Canopy

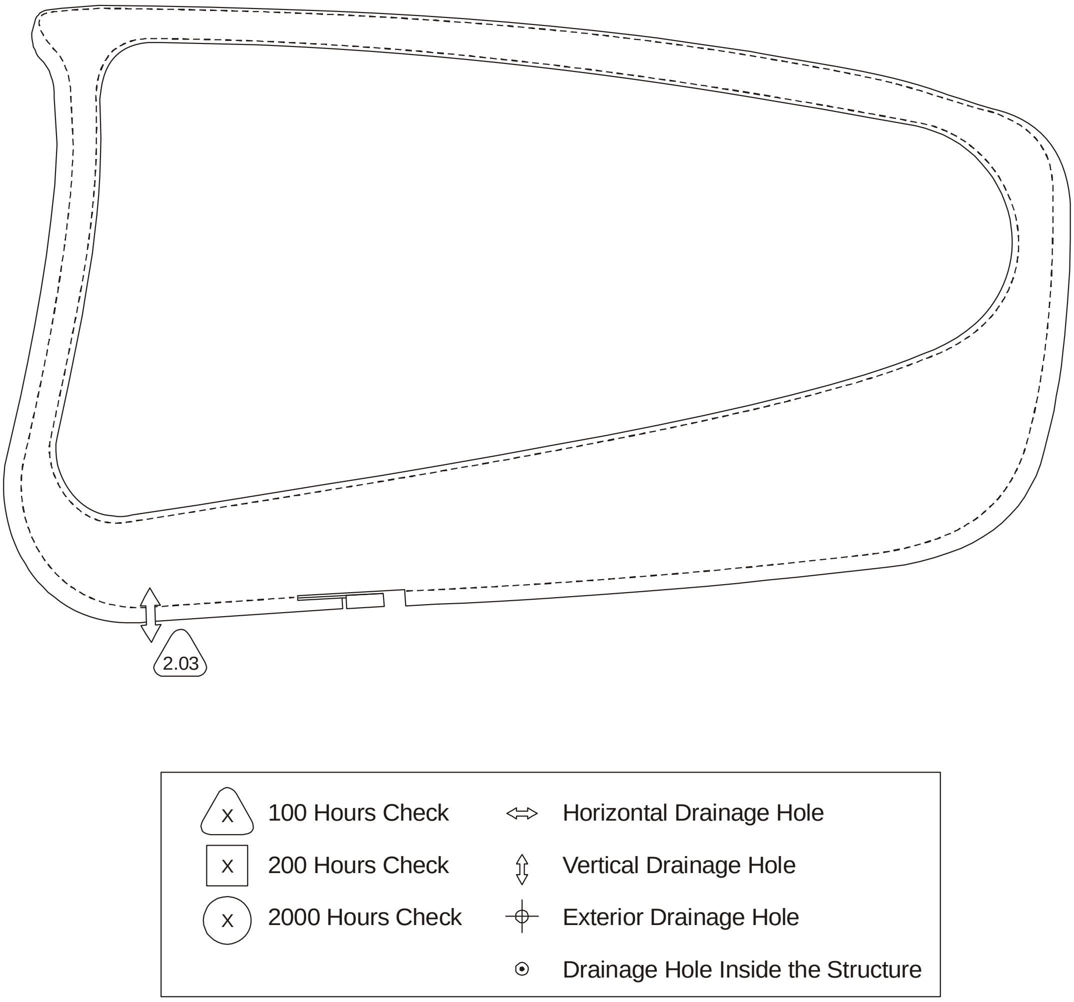


Figure 4: Drain Holes Door

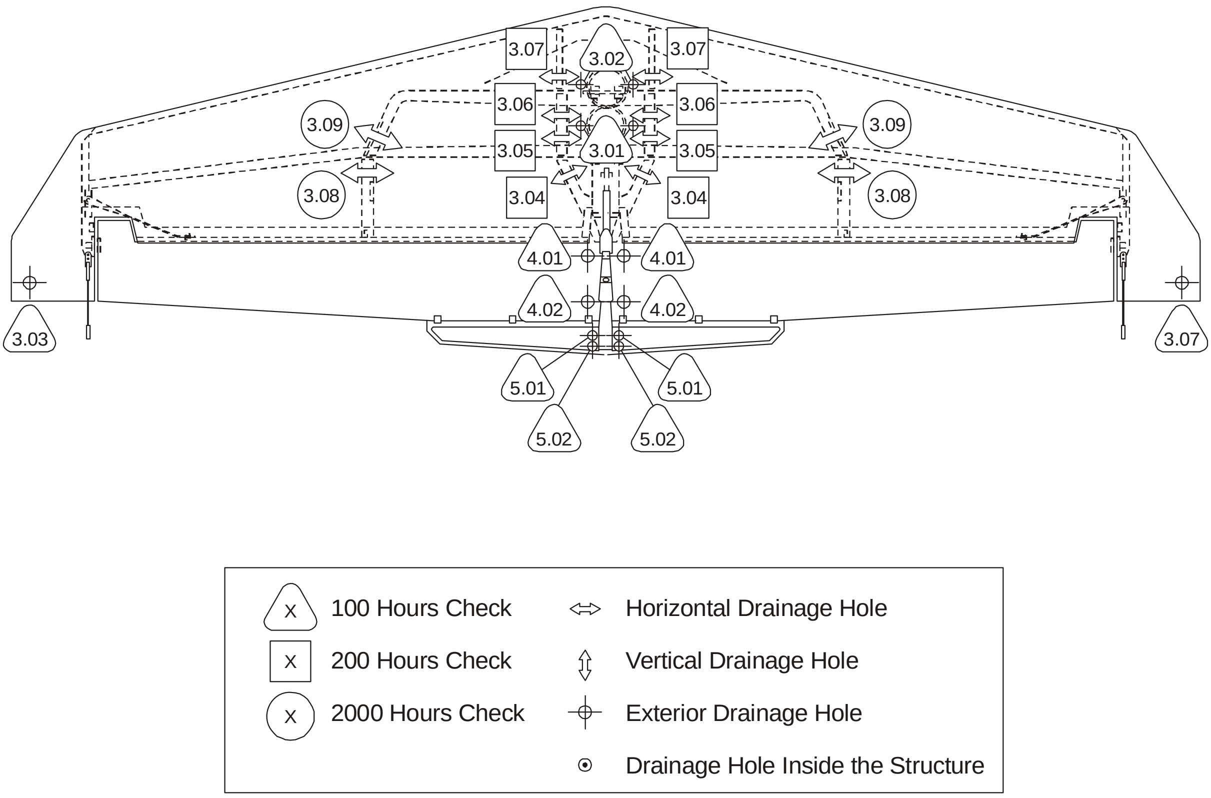


Figure 5: Drain Holes Horizontal Stabilizer, Elevator and Elevator Trim Tab

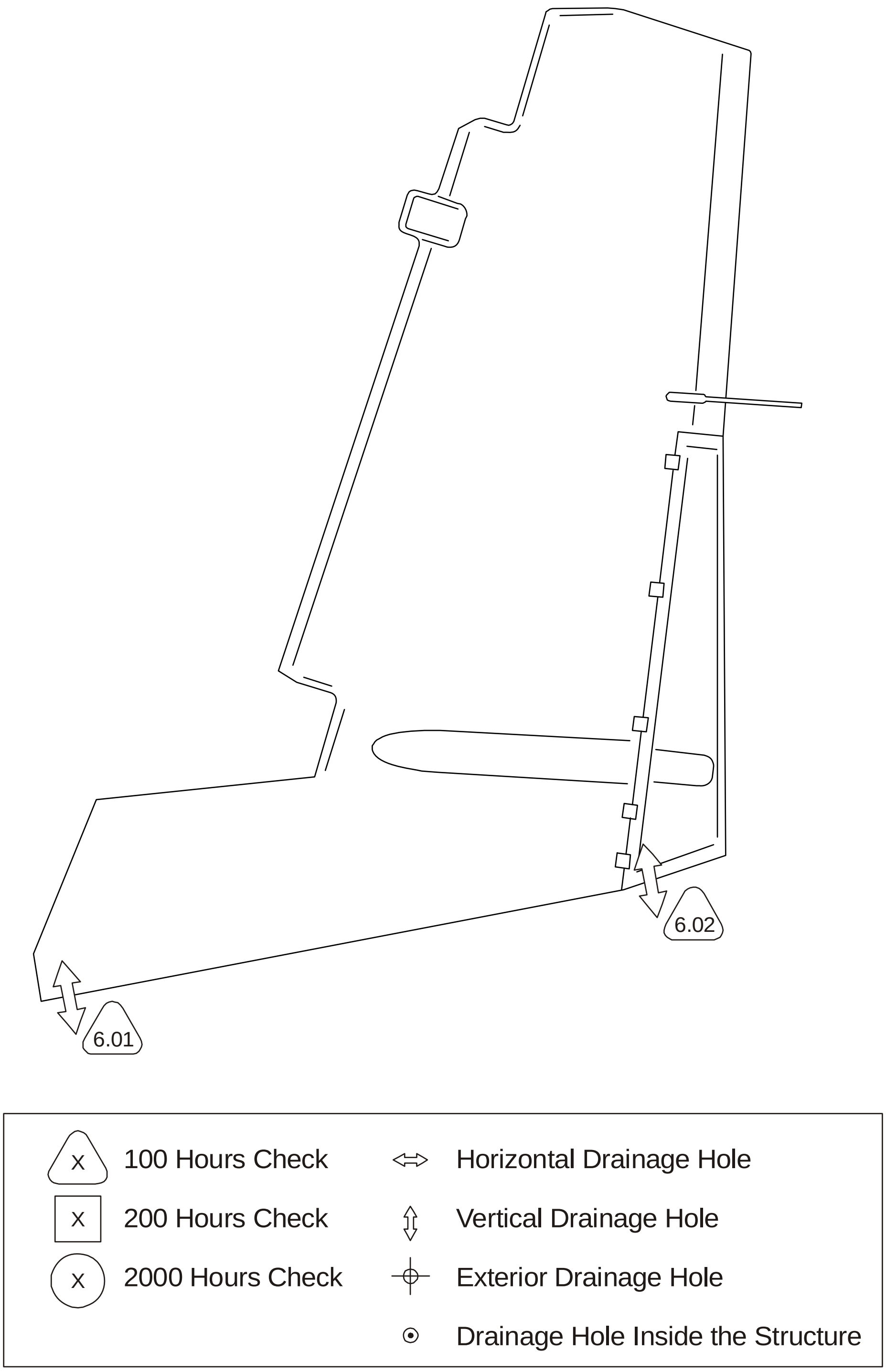
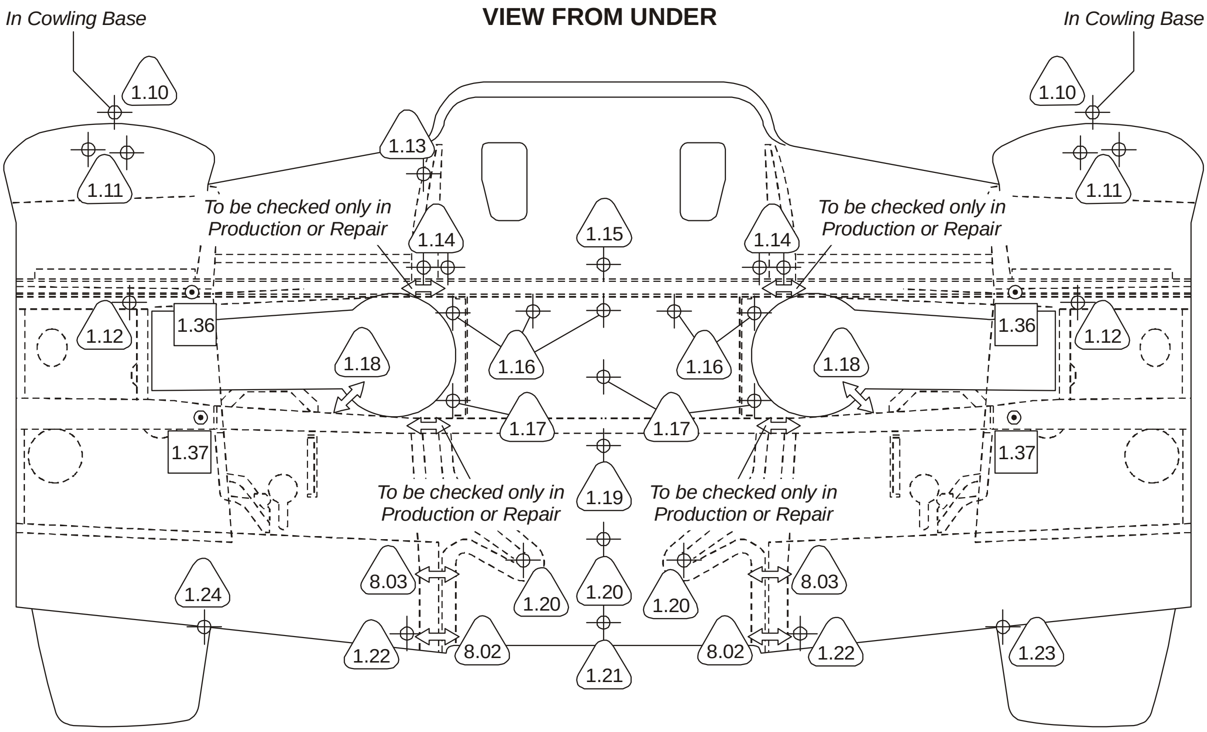


Figure 6: Drain Holes Rudder



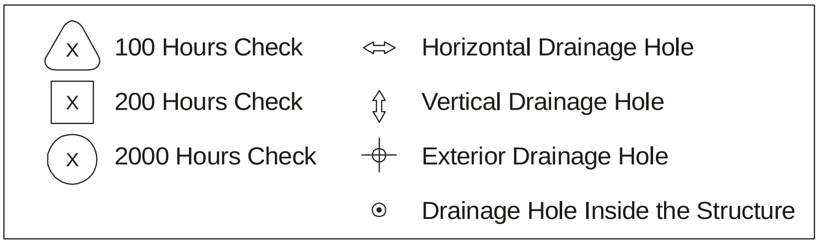
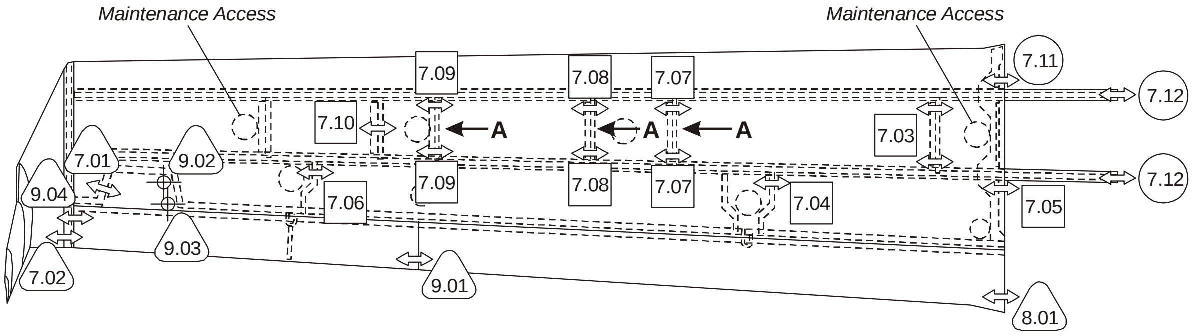
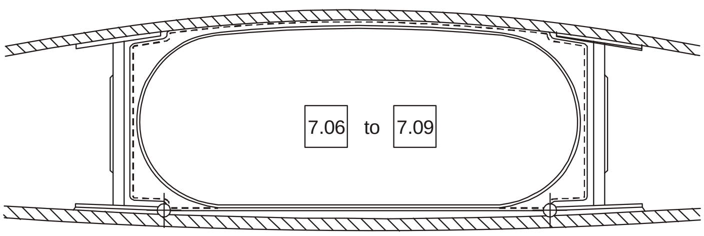


Figure 7: Drain Holes Center Wing



View A



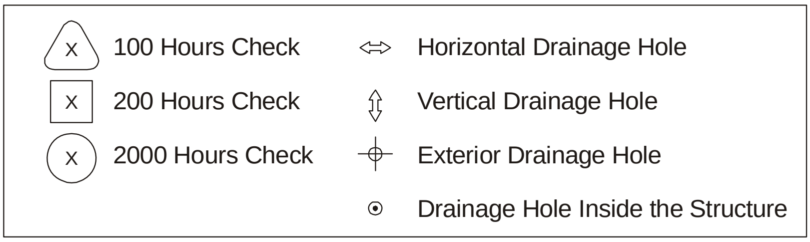


Figure 8: Drain Holes Wings, Flaps and Ailerons

Section 05-28-00
Maintenance Checklist DA 42 Engines

1. General

Enter the applicable data in the blocks below:

Registration : ________________	Date : ________________
Airplane S/N: ________________	Engine S/N : LH ________ RH ________
Airplane Operating Hours : ________________	Engine hours, TTSN : LH ________ RH ________
Inspection : ________________ (100, 200, 1000, 2000 hr, Annual Insp.)	Propeller S/N : LH ________ RH ________ Propeller hours, TTSN : LH ________ RH ________

2. Preparation

Do the following items before you start the applicable check:

		Interval				
	Inspection Items	**100**	**200**	**1000**	**2000**	**Initials**
1.	Before you do the inspection: – Read the applicable Airworthiness Directives. – Read the applicable Service Bulletins.	X	X	X	X	
2.	Examine the Log Books. Look specially for: – Life limited parts. – Reported problems.	X	X	X	X	
3.	Read the engine event-log. (Refer to Section 72-00).	X	X	X	X	
4.	Clean the airplane fully. (Refer to Section 12-30).	X	X	X	X	

3. Engine Ground Test

Do an engine ground test as follows (complete a copy of the Engine Ground Test Record as part of the engine ground test (Refer to Section 05-28-91)):

		Interval					
	Inspection Items	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
WARNING: DO NOT LET PERSONS GO INTO THE DANGER AREA OF THE PROPELLER. PROPELLERS CAN CAUSE INJURY OR DEATH. **WARNING:** SET THE PARKING BRAKE TO ON. IF YOU DO NOT DO THIS, THE AIRPLANE CAN MOVE. THIS CAN CAUSE INJURY OR DEATH.							
1.	Set the parking brake to ON.	X	X	X	X		
2.	Put the chocks against the airplane main wheels.	X	X	X	X		
3.	Do an engine run. (Refer to the AFM).	X	X	X	X		
4.	Check engine instruments.	X	X	X	X		
5.	Do a test of the cross-feed system. (Refer to Section 28-20).	X	X	X	X		
6.	Do a test of the fuel shut-off system. (Refer to Section 28-20).			X	X		
7.	If auxiliary tanks are installed (OÄM 42-056) do a test of the auxiliary fuel transfer system (Refer to Section 28-20).	X	X	X	X		
8.	Do a test of the feathering & unfeathering system (Refer to Section 61-20).	X	X	X	X		
9.	Shut engines down.	X	X	X	X		
10.	Read FADEC values. (Refer to Section 72-00).	X	X	X	X		

4. Maintenance Checklist Engines

For engine related inspection intervals refer to the TAE Operation and Maintenance Manual OM-02-01, latest revision for the TAE 125-01 engine and to the TAE Operation and Maintenance Manual OM-02-02, latest revision for the TAE 125-02-99 engine (if MÄM 42-198 installed) or TAE 125-02-114 (if OÄM 42-252 installed).

A. LH Engine

		Interval					
	Inspection Items, LH Engine	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
	WARNING: MAKE SURE THE EXHAUST SYSTEM IS COOL BEFORE YOU DO MAINTENANCE ON THE ENGINE. THE EXHAUST SYSTEM CAN BE HOT. THIS CAN CAUSE INJURY TO PERSONS. **WARNING: DO NOT GET OIL ON YOU. OIL CAN CAUSE SKIN DISEASE.** **WARNING: DO NOT GET FUEL ON YOU. FUEL CAN CAUSE SKIN DISEASE. DO NOT ALLOW FIRE NEAR FUEL. FUEL BURNS AND CAN CAUSE INJURY TO PEOPLE AND DAMAGE TO EQUIPMENT.**						
1.	Remove the top and bottom cowlings. (Refer to Section 71-10). Examine the cowlings. Make sure that the fasteners are serviceable. Look for cracks and areas that have got too hot. Check rubber seals.	X	X	X	X		
2.	Clean the engine and engine compartment. Refer to Section 12-30 and the applicable TAE Operation and Maintenance Manual, latest revision.	X	X	X	X		
3.	Do engine maintenance in accordance with TAE Maintenance Manual, latest revision.	X	X	X	X		

		Interval					
	Inspection Items, LH Engine	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
4.	Cut open the used oil filter. – Look for particles of metal. – If the filter contains particles of metal, refer to the engine manufacturer. – Preserve the old oil filter. Refer to the applicable TAE Operation and Maintenance Manual, latest revision.	X	X	X	X	1 yr.	
5.	Bleed the fuel distribution system. (Refer to Section 28-20).	X	X	X	X		
	WARNING: MAKE SURE THE EXHAUST SYSTEM IS COOL BEFORE YOU DO MAINTENANCE ON THE EXHAUST SYSTEM. THE EXHAUST SYSTEM CAN BE HOT. THIS CAN CAUSE INJURY TO PERSONS.						
6.	Examine the exhaust system. Look specially for cracks and heat damage. (Refer to Section 78-00).	X	X	X	X		
7.	Examine the air hoses. – Look specially for signs of leakage and damage. – Make sure the air hoses are correctly attached.	X	X	X	X		

		Interval					
	Inspection Items, LH Engine	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
8.	Examine the water separator: – Remove the ECU access cover. – Remove lock wire. – Screw off lower part of water separator. – Check drill hole for blockage. – Check ball and sealing ring for damage or contamination. – Tighten lower part of water separator approx. 270° against O-ring seal. – Secure with lock wire.		500 hrs.				
9.	Examine the cable ties and all electrical connectors in the engine area. – Look specially for rub marks and damage. – Pull lightly to make sure they are not loose.	X	X	X	X		
10.	Examine the bonding cables and their connectors in the engine area. – Look specially for rub marks and damage. – Pull lightly to make sure they are not loose.	X	X	X	X		
11.	Examine the fuel, oil and coolant hoses. – Look specially for signs of leakage, material deterioration, chafings and damage. – Make sure the hoses are correctly attached.	X	X	X	X		
12.	Examine the oil breather line and overboard vent. Look specially for blockage.		X	X	X		

		Interval					
	Inspection Items, LH Engine	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
13.	Examine the oil radiator (if TAE 125-01 or TAE 125-02-99 is installed). – Look specially for leakage, damage, and insecure attachment. – Make sure the cooling fins are not blocked.		X	X	X		
14.	Examine the propeller control system. – Examine all hoses and hose connections. Look specially for leakage and damage. – Examine the un-feathering pressure accumulator. Look specially for: – Leakage and damage. – Insecure attachment. Refer also to mt-Propeller Operation and Installation manual, latest revision.	X	X	X	X		
15.	Verify correct operation of propeller un-feathering system: – Charge the propeller un-feathering accumulator to the correct pressure. Refer to Section 61-20. – Carry out a propeller un-feathering test. Refer to Section 61-20.		X	X	X	1 yr.	

		Interval					
	Inspection Items, LH Engine	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
16.	Examine the air intake and turbo-charging system. Look specially at these items: – Air filter (Refer to Section 71-60). – Hose from air filter to turbo-charger. – Turbo-charger. On the pressure side of the turbo-charger: – Hoses and hose clamps. – Aluminum pipes. – Intercooler.	X	X	X	X		
17.	Examine the Wiggins clamp or the turbo charger clamp on the turbo-charging system: – Check if the Wiggins clamp or the turbo charger clamp can be rotated by hand. If the Wiggins clamp or the turbo charger clamp can NOT be easily rotated by hand, refer to item 18. for maintenance instructions. – Inspect the Wiggins clamp or the turbo charger clamp for cracks.	X	X	X	X		

		Interval					
	Inspection Items, LH Engine	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
18.	Examine the Wiggins clamp or the turbo charger clamp: – Remove the Wiggins clamp or the turbo charger clamp. – Clean the Wiggins clamp or the turbo charger clamp. – Inspect the Wiggins clamp or the turbo charger clamp for cracks. – If a Wiggins clamp is installed: Check hinge pins for wear and play. – If a Wiggins clamp is installed: Check the clamp locking mechanism and the springs for cracks and damage. – Check the inner ring and the O-rings for wear and damage. – Install the Wiggins or turbo charger clamp. Note: Tension at the clamp or misalignment of piping can lead to deformation or damage.		X	X	X		
19.	Check cooling system for leaks. Look specially at these items: – Hoses and hose clamps. – Aluminum pipes.	X	X	X	X		
20.	Examine the coolant radiators. – Look specially for leakage, damage, and insecure attachment. – Make sure the cooling fins are not blocked.	X	X	X	X		

		Interval					
	Inspection Items, LH Engine	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
21.	Examine the coolant tank. – Look specially for leakage and damage. – Check the attachment for cracks.	X	X	X	X		
22.	Examine the alternate air valve assembly. Make sure that the valve flap moves when the alternate air lever in the cockpit is operated. (Refer to Section 71-60).	X	X	X	X		
23.	Examine the engine mounts. Look specially for: – Cracks or corrosion. No cracks or corrosion allowed. – Damaged surface protection. Repair damaged surface protection. – Mounting bolts: – Incorrect attachment. – Damage. No damage allowed. – Incorrect torque value. (Refer to Section 20-10). – Damaged shock mounts. Replace damaged shock mounts.	X	X	X	X		
24.	Check the overheat detector for damage and loose connectors.	X	X	X	X		
25.	Do a function test of the overheat detector. (Refer to Section 26-00).	X	X	X	X		

B. RH Engine

		Interval					
	Inspection Items, RH Engine	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
	WARNING: MAKE SURE THE EXHAUST SYSTEM IS COOL BEFORE YOU DO MAINTENANCE ON THE ENGINE. THE EXHAUST SYSTEM CAN BE HOT. THIS CAN CAUSE INJURY TO PERSONS. **WARNING: DO NOT GET OIL ON YOU. OIL CAN CAUSE SKIN DISEASE.** **WARNING: DO NOT GET FUEL ON YOU. FUEL CAN CAUSE SKIN DISEASE. DO NOT ALLOW FIRE NEAR FUEL. FUEL BURNS AND CAN CAUSE INJURY TO PEOPLE AND DAMAGE TO EQUIPMENT.**						
1.	Remove the top and bottom cowlings. (Refer to Section 71-10). Examine the cowlings. Make sure that the fasteners are serviceable. Look for cracks and areas that have got too hot. Check rubber seals.	X	X	X	X		
2.	Clean the engine and engine compartment. Refer to Section 12-30 and the applicable TAE Operation and Maintenance Manual, latest revision.	X	X	X	X		
3.	Do engine maintenance in accordance with TAE Maintenance Manual, latest revision.	X	X	X	X		
4.	Cut open the used oil filter. – Look for particles of metal. – If the filter contains particles of metal, refer to the engine manufacturer. – Preserve the old oil filter. Refer to the applicable TAE Operation and Maintenance Manual, latest revision.	X	X	X	X	1 yr.	
5.	Bleed the fuel distribution system. (Refer to Section 28-20).	X	X	X	X		

		Interval					
	Inspection Items, RH Engine	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
WARNING:	**MAKE SURE THE EXHAUST SYSTEM IS COOL BEFORE YOU DO MAINTENANCE ON THE EXHAUST SYSTEM. THE EXHAUST SYSTEM CAN BE HOT. THIS CAN CAUSE INJURY TO PERSONS.**						
6.	Examine the exhaust system. Look specially for cracks and heat damage. (Refer to Section 78-00).	X	X	X	X		
7.	Examine the air hoses. – Look specially for signs of leakage and damage. – Make sure the air hoses are correctly attached.	X	X	X	X		
8.	Examine the water separator: – Remove the ECU access cover. – Remove lock wire. – Screw off lower part of water separator. – Check drill hole for blockage. – Check ball and sealing ring for damage or contamination. – Tighten lower part of water separator approx. 270° against O-ring seal. – Secure with lock wire.		500 hrs.				
9.	Examine the cable ties and all electrical connectors in the engine area. – Look specially for rub marks and damage. – Pull lightly to make sure they are not loose.	X	X	X	X		

		Interval					
	Inspection Items, RH Engine	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
10.	Examine the bonding cables and their connectors in the engine area. – Look specially for rub marks and damage. – Pull lightly to make sure they are not loose.	X	X	X	X		
11.	Examine the fuel, oil and coolant hoses. – Look specially for signs of leakage, material deterioration, chafings and damage. – Make sure the hoses are correctly attached.	X	X	X	X		
12.	Examine the oil breather line and overboard vent. Look specially for blockage.		X	X	X		
13.	Examine the oil radiator (if TAE 125-01 or TAE 125-02-99 is installed). – Look specially for leakage, damage, and insecure attachment. – Make sure the cooling fins are not blocked.		X	X	X		
14.	Examine the propeller control system. – Examine all hoses and hose connections. Look specially for leakage and damage. – Examine the un-feathering pressure accumulator. Look specially for: – Leakage and damage. – Insecure attachment. Refer also to mt-Propeller Operation and Installation manual, latest revision.	X	X	X	X		

		Interval					
	Inspection Items, RH Engine	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
15.	Verify correct operation of propeller un-feathering system: – Charge the propeller un-feathering accumulator to the correct pressure. Refer to Section 61-20. – Carry out a propeller un-feathering test. Refer to Section 61-20.		X	X	X	1 yr.	
16.	Examine the air intake and turbo-charging system. Look specially at these items: – Air filter (Refer to Section 71-60). – Hose from air filter to turbo-charger. – Turbo-charger. On the pressure side of the turbo-charger: – Hoses and hose clamps. – Aluminum pipes. – Intercooler.	X	X	X	X		
17.	Examine the Wiggins clamp or the turbo charger clamp on the turbo-charging system: – Check if the Wiggins clamp or the turbo charger clamp can be rotated by hand. If the Wiggins clamp or the turbo charger clamp can NOT be easily rotated by hand, refer to item 18. for maintenance instructions. – Inspect the Wiggins clamp or the turbo charger clamp for cracks.	X	X	X	X		

		Interval					
	Inspection Items, RH Engine	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
18.	Examine the Wiggins clamp or the turbo charger clamp: – Remove the Wiggins clamp or the turbo charger clamp. – Clean the Wiggins clamp or the turbo charger clamp. – Inspect the Wiggins clamp or the turbo charger clamp for cracks. – If a Wiggins clamp is installed: Check hinge pins for wear and play. – If a Wiggins clamp is installed: Check the clamp locking mechanism and the springs for cracks and damage. – Check the inner ring and the O-rings for wear and damage. – Install the Wiggins or turbo charger clamp. Note: Tension at the clamp or misalignment of piping can lead to deformation or damage.		X	X	X		
19.	Check cooling system for leaks. Look specially at these items: – Hoses and hose clamps. – Aluminum pipes.	X	X	X	X		
20.	Examine the coolant radiators. – Look specially for leakage, damage, and insecure attachment. – Make sure the cooling fins are not blocked.	X	X	X	X		

		Interval					
	Inspection Items, RH Engine	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
21.	Examine the coolant tank. – Look specially for leakage and damage. – Check the attachment for cracks.	X	X	X	X		
22.	Examine the alternate air valve assembly. Make sure that the valve flap moves when the alternate air lever in the cockpit is operated. (Refer to Section 71-60).	X	X	X	X		
23.	Examine the engine mounts. Look specially for: – Cracks or corrosion. No cracks or corrosion allowed. – Damaged surface protection. Repair damaged surface protection. – Mounting bolts: – Incorrect attachment. – Damage. No damage allowed. – Incorrect torque value. (Refer to Section 20-10). – Damaged shock mounts. Replace damaged shock mounts.	X	X	X	X		
24.	Check the overheat detector for damage and loose connectors.	X	X	X	X		
25.	Do a function test of the overheat detector. (Refer to Section 26-00).	X	X	X	X		

5. Propellers

A. LH Propeller

*100 hr items marked * apply to US registered airplanes only*		**Interval**					
	Inspection Items, LH Propeller	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
	WARNING: DO NOT LET PERSONS GO INTO THE DANGER AREA OF THE PROPELLER. PROPELLERS CAN CAUSE INJURY OR DEATH. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU TURN THE PROPELLER.**						
1.	Inspection in accordance with mt-Propeller Maintenance Manual, latest revision.	X*	X	X	X		

A. RH Propeller

*100 hr items marked * apply to US registered airplanes only*		**Interval**					
	Inspection Items, RH Propeller	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
	WARNING: DO NOT LET PERSONS GO INTO THE DANGER AREA OF THE PROPELLER. PROPELLERS CAN CAUSE INJURY OR DEATH. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU TURN THE PROPELLER.**						
1.	Inspection in accordance with mt-Propeller Maintenance Manual, latest revision.	X*	X	X	X		

Section 05-28-50
Maintenance Checklist DA 42 Airframe

1. Exterior of the Fuselage

A. General

*100 hr items marked * apply to US registered airplanes only*		Interval					
	Inspection Items, Exterior Fuselage, General	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the complete surface of the fuselage. Look specially for damage (dents, cracks, holes and delamination). Examine the surface protection system.	X*	X	X	X		
2.	If the autopilot static source (MÄM 42-186) is installed: – Check static source holes for blockage.	X	X	X	X		
3.	Do a coin-tap test for delamination of the entire fuselage shell from the nose to the vertical tail. (Refer to Section 51-10).					MSI	
4.	Do a coin-tap test for defects in the entire fuselage tube bonding (top and bottom). (Refer to Section 51-10).					MSI	
5.	Examine all antennas. Look specially for damage, incorrect attachment, and cracks in the fuselage skin.	X	X	X	X		
6.	Examine the exterior placards. Make sure that: – They are not damaged. – None are missing. (Refer to Chapter 11).	X*	X	X	X		
7.	Lift the airplane on jacks. (Refer to Section 07-10).	X*	X	X	X		

B. Nose Landing Gear

*100 hr items marked * apply to US registered airplanes only*		Interval					
	Inspection Items, Nose Landing Gear	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the composite structure to which the nose landing gear assembly is attached. Look specially for cracks and delamination.	X	X	X	X		
2.	Examine the forward part of the steering linkage. Look specially for: – Damage and corrosion. – Damaged surface protection. – Incorrect attachment and loose or missing lock devices. – Defective bonding strap.	X	X	X	X		
3.	Examine the cardan joint bracket. Look specially for corrosion, cracks and damage.	X	X	X	X		
4.	Examine the nose wheel centering device. Look specially for damage, excessive wear, and looseness.	X	X	X	X		
5.	Examine the nose landing gear actuator. Look specially for leakage. (Refer to Section 32-20).	X	X	X	X		
6.	Examine the damper and the hydraulics. Look specially for leakage. (Refer to Section 32-20).	X	X	X	X		
7.	Examine the nose landing gear doors: – Check for damage to the doors. – Check for cracked hinges. – Examine the door operating rods.	X	X	X	X		

*100 hr items marked * apply to US registered airplanes only*		Interval					
	Inspection Items, Nose Landing Gear	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
8.	Examine the interior of the nose landing gear leg: – Disassemble the nose landing gear leg (refer to Section 32-20). – Clean all parts. – Examine all parts. Look specially for deformation and cracks. – Re-assemble the nose landing gear leg (refer to Section 32-20).				X		
9.	Examine the nose landing gear assembly for damage. Look specially for cracks, deformation, wear, corrosion and damaged surface protection. (Refer to Section 32-20).	X	X	X	X		
10.	Ensure correct gas pressure in the damper (15 bar / 218 PSI with the wheel off the ground, if OÄM 42-195 is carried out: 16 bar / 232 PSI with the wheel off the ground). (Refer to Section 32-20)	X*	X	X	X		
11.	Apply grease to the actuator bearing. (Refer to Sections 12-20 and 32-20).	X	X	X	X		
12.	Apply a small amount of oil to the bearings of the cardan joint. (Refer to Sections 12-20).	X	X	X	X		
13.	Examine the torque links for smooth operation and cracks.	X	X	X	X		
14.	Examine the up-locks and the down-lock micro-switches. (Refer to Section 32-20).	X	X	X	X		

C. Main Landing Gear

*100 hr items marked * apply to US registered airplanes only*		**Interval**					
	Inspection Items, Main Landing Gear	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the composite structure to which the main landing gear assembly is attached. Look specially for cracks and delamination.	X	X	X	X		
2.	Examine the bearings for the main landing gear assemblies in the center wing. Look specially for play.	X	X	X	X		
3.	Apply a small amount of oil to the bearings of the main landing gear legs. (Refer to Section 12-20).	X	X	X	X		
4.	Examine the landing gear legs and trailing arms. Look specially for cracks, deformation, corrosion, and damaged surface protection.	X	X	X	X		
5.	Examine the hydraulic lines of the brake system for damage, leakage, and loose or defective connectors.	X	X	X	X		
6.	Examine the main landing gear actuators and hydraulics. Look specially for leakage. (Refer to Chapter 32).	X	X	X	X		
7.	Examine the damper. Look specially for leakage.	X	X	X	X		
8.	Examine the main landing gear doors: – Check for damage to the doors. – Check for cracked hinges. – Examine the door operating rods.	X	X	X	X		
9.	Remove the dampers, trunnions, and trailing arms from the legs. (Refer to Section 32-10).				X		
10.	Examine these bearings: – Plain bearings in the trailing arm. – Upper and lower bearings for the dampers.				X		
11.	Examine the bolt that attaches the trailing arm to the leg. Look specially for deformation and cracks.				X		

*100 hr items marked * apply to US registered airplanes only*		Interval					
	Inspection Items, Main Landing Gear	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
12.	Examine the interior of the dampers: – Disassemble the dampers (refer to Section 32-10). – Clean all parts. – Examine all parts. Look specially for deformation and cracks. – Re-assemble the dampers (refer to Section 32-10).				X		
13.	Re-install the dampers, trunnions, and trailing arms to the legs. (Refer to Section 32-10).				X		
14.	Ensure correct gas pressure in the dampers (18 bar / 261 PSI with the wheel off the ground; if OÄM 42-195 is carried out: 19 bar / 276 PSI with the wheel off the ground). (Refer to Chapter 32).	X*	X	X	X		
15.	Apply grease to the actuator bearing. (Refer to Sections 12-20 and 32-10).	X	X	X	X		
16.	Examine the up-locks and the down-lock micro-switches. (Refer to Chapter 32).	X	X	X	X		
17.	Examine the Weight-on-Wheels switches. – Look specially for: – Damage. No damage allowed. – Incorrect attachment. – Verify proper operation.	X*	X	X	X		

D. Wheels

100 hr items marked * apply to US registered airplanes only		Interval					
	Inspection Items, Wheels	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the tires: – Look for cuts and wear. (Refer to Goodyear Aircraft Tire Care & Maintenance manual, latest revision). – Check slip marks. – Ensure correct inflation pressure (nose wheel: 6 bar / 87 PSI; main wheels: 4.5 bar / 65 PSI; if OÄM 42-195 is carried out: nose wheel: 6 bar / 87 PSI; main wheels: 4.7 bar / 68 PSI.	X	X	X	X		
2.	Examine the main wheel brakes: – Check brake linings for excessive wear. – Check brake disks for distortion and excessive wear. – Check brake cylinders for leaks. (Refer to Cleveland/Parker Maintenance Manual, latest revision or Technician's Service Guide, latest revision).	X	X	X	X		
3.	Remove all 3 wheels.	X*	X	X	X		
4.	Examine the wheel axles. Look specially for cracks and corrosion.	X*	X	X	X		
5.	Examine the wheel bearings. Look specially for play, corrosion and irregular running.	X*	X	X	X		
6.	Clean and lubricate all 3 wheel bearings. (Refer to Section 12-20 and Cleveland/Parker Maintenance Manual, latest revision).	X*	X	X	X		
7.	Examine the rims of all 3 wheels. Look specially for cracks.	X	X	X	X		
8.	Do a test for toe-in and camber. (Refer to Section 32-10).			X	X		

E. Fuselage Nose

*100 hr items marked * apply to US registered airplanes only*		Interval					
	Inspection Items, Fuselage Nose	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the nose baggage doors: – Check for damage to the doors. – Check for defective hinges. – Make sure that the locks operate correctly. – Check operation of door warning switches.	X*	X	X	X		
2.	Close only one nose baggage door and test the lock of the other one by pushing from inside. Repeat the procedure for the other side.		X	X	X		
3.	Remove the covers from the rear wall of the nose baggage compartment.	X*	X	X	X		
4.	Examine the cable ties and all electrical connectors. – Look specially for rub marks and damage. – Pull lightly to make sure they are not loose.	X*	X	X	X		
5.	Do a check of the airplane battery. Refer to the Maintenance Manual of the Battery for additional instruction. Look specially for: – Corrosion, pitting, burn marks or damage on battery terminals. – Incorrect mounting. (Refer to Section 24-31).		X	X	X		
6.	Examine the battery area. Clean the area.		X	X	X		

*100 hr items marked * apply to US registered airplanes only*		Interval					
	Inspection Items, Fuselage Nose	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
7.	Visually inspect the interior structure of the front fuselage (forward of instrument panel frame). Use mirror and flashlight where necessary. Check for damage, cracks, delamination and disbonding from the fuselage skin. Inspect the following components: – Instrument panel frame. – Nose compartment floor. – Nose frame.				X		
8.	If installed, examine the removable nose cone (OÄM 42-077): – Check the nose cone for insecure attachment. – Make sure that all screws are properly tightened.	X	X	X	X		
9.	If installed, check the spraybar for the de-icing fluid for damage.	X*	X	X	X		
10.	If the oxygen system is installed (OÄM 42-055), visually inspect the ventilation of the nose baggage compartments (oxygen, battery, and TKS compartment). Especially check both ventilation caps, installed on the LH and RH side of the nose landing gear.	X	X	X	X		
11.	If the oxygen system is installed (OÄM 42-055), visually inspect all oxygen tubes installed in the oxygen and battery compartment. Check for improper fixture, chafing, leakage and improper ventilation of the high pressure tube.			X	X		
12.	If the oxygen system is installed (OÄM 42-055), visually inspect the cylinder regulator valve installed on the oxygen cylinder. Check for damage, dust and corrosion.			X	X		

*100 hr items marked * apply to US registered airplanes only*		Interval					
	Inspection Items, Fuselage Nose	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
13.	If the oxygen system is installed (OÄM 42-055), visually check the front baggage compartment for residues of oil, TKS fluid and grease.	X	X	X	X		
14.	If the GWX 68 weather radar system (OÄM 42-119) is installed: Examine the airplane nose cone: – Check for structural damage. – Check attachment screws (16 pieces). – Check lightning protection strips (4 pieces) for proper mounting.		X	X	X		
15.	If the GWX 68 weather radar system (OÄM 42-119) is installed: Examine the GWX 68 installation on the radar bulkhead: – Check radar antenna visually. – Check bracket attachment screws. – Check lightning protection bonding for proper mounting. – Examine the wire harness and electrical connectors for chafing, damage and proper attachment. Pull lightly to make sure they are not loose.			X	X	1 yr.	

2. Cabin

A. Cabin, General

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Cabin, General	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Remove the front and rear seat shells. (Refer to Section 25-10).	X*	X	X	X		
	CAUTION: DO NOT LOOSEN THE LEVER FOR THE ADJUSTABLE BACKREST OF THE FRONT SEATS UNINTENTIONALLY. THE SPRING LOADED BACKREST MAY SNAP FORWARD AND CAN CAUSE INJURY.						
2.	If the adjustable front seats (OÄM 40-067 or OÄM 42-259) are installed: – Do a test of the backrest adjustment mechanism on both front seats (refer to Section 25-10). – Do a test of the lumbar support mechanism on both front seats (refer to Section 25-10).	X*	X	X	X		
3.	Examine the seats for damage.	X*	X	X	X		
4.	Examine the safety belts. Make sure the lock mechanism operates correctly. – Insert the tongue into the buckle. – Pull on the strap. Make sure the ratchet holds the tongue in the buckle. – Operate the release button. The tongue must pull freely from buckle. – Inspect belt material for wear, abrasion, poor condition and damage.	X	X	X	X		
5.	Remove all access panels (refer to Section 52-40).	X	X	X	X		
6.	Remove the instrument panel cover (refer to Section 25-10).	X*	X	X	X		

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Cabin, General	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
7.	Remove the cabin baggage compartment (refer to Section 25-50).	X*	X	X	X		
8.	Examine the emergency axe installation: – Check attachments for looseness. – Check release mechanism for interference or improper function.		X	X	X		
9.	Examine the emergency egress hammer installation (if OÄM 42-304 is installed): – Check attachments for looseness. – Check release mechanism for interference or improper function.		X	X	X		

B. Canopy, Door, and Windows

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Canopy, Doors, and Windows	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the canopy. – Make sure the canopy lock mechanism operates correctly. (Refer to Section 52-10). – Examine the acrylic glass window for damage. Look specially for cracks. – Inspect the acrylic glass window for crazing and scratches. No crazing and scratches are acceptable which impair vision of the pilots. – Examine the bonding between the window and the canopy frame. (Refer to Section 56-10). – Examine the emergency windows and their hinges for damage. – Examine the 'pop out' windows and their hinges for damage. Check hinges for improper friction, correct if necessary.	X*	X	X	X		
2.	Do a function test of the door unlocked warning light system. (Refer to Section 52-10).	X	X	X	X		
3.	Examine the safety hook mechanism. (Refer to Section 52-10).	X	X	X	X		
4.	Examine the carbon hinges for cracks. (Refer to Section 52-10).	X	X	X	X		

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Canopy, Doors, and Windows	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
5.	Examine the rear passenger door. – Make sure the door lock mechanism operates correctly. (Refer to Section 52-10). – If MÄM 42-097 is installed: Do a test of the passenger door handle compression gas spring. (Refer to Section 52-10). – Examine the acrylic glass window for damage. Look specially for cracks. – Examine the bonding between the window and the door frame. (Refer to Section 56-10).	X*	X	X	X		
6.	Examine the rear window on the RH side. – Examine the acrylic glass window for damage. Look specially for cracks. – Examine the bonding between the window and the frame. (Refer to Section 56-10).	X*	X	X	X		

C. Cabin Structure

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Cabin Structure	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Visually inspect the inner skin of the front fuselage (forward of baggage compartment frame). Use mirror and flashlight where necessary. Check for damage, cracks, delamination and disbonding from the sandwich foam.					MSI	
2.	Check front and rear main spars for damage, cracks, delamination and disbonding from the fuselage skin.		X	X	X		

100 hr items marked X apply to US registered airplanes only*		Interval						
	Inspection Items, Cabin Structure	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
3.	Visually inspect the interior structure of the front fuselage (from instrument panel frame to baggage compartment frame). Use mirror and flashlight where necessary. Check for damage, cracks, delamination and disbonding from the fuselage skin. Inspect the following components: – Front main spar. – Rear main spar. – Control bulkhead. – Floor element. – Top-hat profile for rudder lever.				X		
4.	Visually inspect the interior structure of the front fuselage. Use mirror and flashlight where necessary. Check for damage, cracks, delamination and disbonding from the fuselage skin. Inspect the following components: – Baggage compartment frame. – Roll bar. – Front and rear seat crash elements.			X	X		
5.	Visually inspect the bolts that attach the center wing to the fuselage. Look specially for: – Damage or looseness. – Cracks in the fuselage structure around the holes for the bolts.			X	X		

D. Instrument Panel and Electrical System in Cabin

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Instrument Panel & Electrical	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the Pitot-static system water traps (below the pilot’s seat).	X*	X	X	X		
2.	Examine all cable ties and electrical connectors in the cabin. Pull lightly to make sure they are not loose.	X*	X	X	X		
3.	Examine the instrument panel. Make sure that: – The wiring is correctly attached. – The instruments are correctly attached. – The hoses are correctly attached. – The circuit breakers are correctly attached. – The cooling fans are operative and correctly attached.	X*	X	X	X		
4.	Examine the emergency battery system. – Measure the voltage of the emergency battery pack on the EMERGENCY switch. Replace emergency battery pack if the voltage is below 30 V.	X*	X	X	X		
5.	Make sure that the seal on the EMERGENCY switch is intact.	X	X	X	X		
6.	Examine the backup instruments. Make sure that: – The markings are clear. – The function is correct. – Switches are correctly attached. – The instrument lights operate correctly (on the instrument panel cover).	X*	X	X	X		

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Instrument Panel & Electrical	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
7.	Examine the alternate static valve. Make sure that: – The valve is correctly attached. – The valve is not blocked. – The hoses are correctly attached.	X*	X	X	X		
8.	Examine the compass. Make sure that: – The compass is correctly attached. – The fluid level is correct.		X	X	X		

E. Flight Control System in Cabin

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Flight Control System in Cabin	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the control sticks. Make sure that the control stick attachments are not loose and do not catch.	X*	X	X	X		
2.	If OÄM 42-283 is installed: – Make sure that the connection of the removable control stick has no play and wear. – Make sure that the safety pin snaps on the rim of the sleeve nut.	X*	X	X	X		
3.	Examine the control stick stops.	X*	X	X	X		

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Flight Control System in Cabin	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
4.	Examine the variable elevator stop. – Check actuator for damage and insecure mounting. – Check actuator wiring for rub-marks and loose connectors. – Check actuator lever for damage and excessive wear.	X*	X	X	X		
5.	Examine the aileron and elevator control system. Look specially for: – Incorrect attachment. – Loose or missing lock devices. – Corrosion and damaged surface protection. (Refer to Sections 27-10 and 27-30).	X*	X	X	X		
6.	Examine the centering springs for the aileron control system. Look specially for damage and looseness.	X*	X	X	X		
7.	Examine the rudder pedals. Look specially for: – Incorrect attachment and function. – Corrosion and damaged surface protection. – Damaged adjustment mechanism. – Improper function of adjustment mechanism. (Refer to Section 27-20).	X*	X	X	X		
8.	Examine the rudder pedals S-tube. Look specially for: – Wear on cable inlets and outlets. – Wear in inner radius of tube (no deformation visible or tactile). (Refer to Section 27-20).	X*	X	X	X		

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Flight Control System in Cabin	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
9.	Examine the rudder cables and pulleys. Look specially for: – Incorrect attachment and function. (Refer to Section 27-20). – Defective cable eyes. – Defective rubber sleeves. – Corrosion. – Rub marks. – Defective safety plates. – Worn out pulleys.		X	X	X		
10.	Examine the elevator trim control in the center console. Make sure that: – There is full and free movement. – There is no unusual play.	X*	X	X	X		
11.	Examine the rudder trim control in the center console. Make sure that: – There is full and free movement. – There is no unusual play.	X*	X	X	X		

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Flight Control System in Cabin	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
12.	Examine the rear part of the steering linkage. Look specially for: – Damage and corrosion. – Damaged surface protection. – Defective linkage buffer. – Incorrect attachment and loose or missing lock devices. – Defective bonding strap.	X*	X	X	X		
13.	Examine the push rod guides for the elevator push-rod. Look specially for incorrect attachment and interference.	X*	X	X	X		
14.	Examine the flap control mechanism on the rear main spar. Look specially for: – Damage and corrosion. – Damaged surface protection. – Incorrect attachment and loose or missing lock devices.	X*	X	X	X		
15.	Examine the aileron control system on the rear main spar. Look specially for: – Damage and corrosion. – Damaged surface protection. – Incorrect attachment and loose or missing lock devices.	X*	X	X	X		

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Flight Control System in Cabin	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
16.	If the GFC 700 autopilot system is installed: Check the following components for wear and/or corrosion: – Servos. – Servo mounts (capstans). – Bridle cable assemblies.	X*	X	X	X		

F. Other Cockpit Controls

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Other Cockpit Controls	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the brake hoses and components. Look specially for leakage.	X	X	X	X		
2.	Examine the brake fluid reservoirs on the co-pilot's side. Make sure the fluid level is correct. – The fluid level must be 12 mm to 25 mm (1/2 to 1 in.) below the top face of the reservoir filler hole.	X*	X	X	X		
3.	Examine the fuel selector valve controls (FUEL CONTROL). – Check levers for damage. – Check safety guards for the OFF position for damage. – Move the controls through their operating range. Check for restricted movement, interference, and unusual play.	X*	X	X	X		
4.	Examine the PARKING BRAKE lever in the center console. – Check for damage. – Move the lever through its operating range. Check for restricted movement, interference, unusual play, and incorrect bounce.	X*	X	X	X		
5.	Examine the ALTERNATE AIR lever. – Check for damage. – Move the lever through its operating range. Check for restricted movement, interference, unusual play, and incorrect bounce.	X*	X	X	X		

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Other Cockpit Controls	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
6.	Examine the CABIN and DEFROST levers. – Check for damage. – Move the levers through their operating range. Check for restricted movement, interference, unusual play, and incorrect bounce.	X*	X	X	X		
7.	Examine the control cables in the center console: – Examine visually the cables in the center console. Look specially for wear and kinks in the cables and for foreign objects.	X*	X	X	X		

G. Miscellaneous Items in Cabin

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Cabin, Miscellaneous	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the interior placards. Make sure that: – They are not damaged. – None are missing. (Refer to Chapter 11).	X*	X	X	X		
2.	Examine the fire extinguisher. Make sure that: – The fire extinguisher will release from the mounting bracket. – The fire extinguisher contents are full. Do a check of the extinguisher expiry date. (Refer to Section 26-00).	X*	X	X	X		

100 hr items marked X apply to US registered airplanes only*		**Interval**					
	Inspection Items, Cabin, Miscellaneous	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
3.	If the sun visors (OÄM 42-101 or OÄM 42-142) are installed: – Check for obvious damage. – Check press-studs for lack of retention force.		X	X	X		
4.	If the oxygen system is installed (OÄM 42-055), visually inspect each oxygen outlet port. Check for dust, damage and corrosion.		X	X	X		
5.	If the oxygen system is installed (OÄM 42-055), visually inspect the oxygen pressure gauge in the cabin. Check for flaws and compare the indicated pressure with the pressure of the filling unit, installed in the nose baggage compartment.		X	X	X		
6.	If the oxygen system is installed (OÄM 42-055), check the oxygen push-pull knob Bowden-cable assembly. Check for interference and corrosion.		X	X	X		
	CAUTION: OIL, GREASE OR OTHER LUBRICATIONS IN CONTACT WITH OXYGEN CREATE A SERIOUS HAZARD. SUCH CONTACT MUST BE AVOIDED WHEN HANDLING WITH ANY PART OF THE OXYGEN SYSTEM.						
7.	If the oxygen system is installed (OÄM 42-055), visually inspect all oxygen tubes installed in the oxygen- and battery compartment. Check for improper fixture, chafing, leakage and improper ventilation of the high pressure tube.			X	X		

3. Interior of the Rear Fuselage

A. Interior Structure of the Rear Fuselage

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Interior Structure of the Rear Fuselage	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the cabin baggage compartment. Look specially for damage and insecure attachment. Inspect the following components: – Baggage compartment structure. – Baggage restraint net. – D-rings for the attachment of the baggage restraint net. – Door to the baggage extension. – Lid for the tray on the floor.		X	X	X		
2.	Visually inspect the inner skin of the rear fuselage (aft of baggage compartment frame) with mirror and flashlight. Check for damage, dents, cracks, delamination and disbonding from the sandwich foam.				X		
3.	Visually inspect the interior structure of the rear fuselage (aft of baggage compartment frame) through all access holes with mirror and flashlight. Check for damage, cracks, delamination and disbonding from the fuselage skin. Inspect the following components: – Ring frames 1, 2, and 3.				X		

B. Hydraulic System in the Rear Fuselage

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Hydraulic System in the Rear Fuselage	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Check hydraulic module platform for improper or insecure attachment.		X	X	X		
2.	Check hydraulic components for damage and leakage.	X*	X	X	X		
3.	Ensure correct level of hydraulic fluid.	X*	X	X	X		
4.	Check condition of reservoir air filter.			X	X		
5.	Check accumulator for inner leakage and pre fill pressure.	X*	X	X	X		

C. Control System in the Rear Fuselage

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Control System in the Rear Fuselage	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the push rod guides for the elevator push-rod. Look specially for: – Incorrect attachment. – Interference.	X*	X	X	X		
2.	Examine the elevator push-rod. Look specially for corrosion and damaged surface protection.	X*	X	X	X		
3.	Examine the rudder-control cables and turnbuckles. Look specially for: – Corrosion and wear. – Incorrect lock devices.	X*	X	X	X		
4.	Do a cable tension test of the rearward rudder control cables. (Refer to Section 27-20).	X*	X	X	X		

D. Miscellaneous Items in the Rear Fuselage

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Miscellaneous Items in the Rear Fuselage	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Do an inspection of the ELT system. (Refer to Section 25-60).	X*	X	X	X		
2.	Examine the Garmin G1000 unit behind the baggage compartment frame. Look specially for: – Insecure cable connections. – Insecure attachment.	X*	X	X	X		

4. Center Wing

A. Center Wing, Exterior

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Center Wing, Exterior	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Remove all access panels in the center wing and the engine nacelles.	X*	X	X	X		
2.	Examine the complete surface of the center fuselage, center wing, and engine nacelles. Look specially for damage (dents, cracks, holes and delamination). Examine the surface protection system.	X*	X	X	X		
3.	Do a coin-tap test for delamination of the entire center wing top and bottom shells. (Refer to Section 51-10).					MSI	
4.	Examine the air inlets for blockage: – In the engine nacelles. – In the RH center wing nose.	X	X	X	X		
5.	Visually inspect the wing main bolts. Look specially for play between the bolts and the bushes.	X*	X	X	X		
6.	De-fuel the airplane (refer to Section 12-10).			X	X		
7.	Do a function test of the fuel low-level switches: – Set the ELECT. MASTER switch to ON. – The L/R FUEL LOW caution messages must appear on the G1000 PFD. – Set the ELECT. MASTER switch to OFF.			X	X		

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Center Wing, Exterior	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
8.	Remove the wings from the center wing. (Refer to Section 57-10). – Examine the main bolts. Look specially for deformation, cracks, scratches, and corrosion. – Examine the main bolt bushes in the center wing spars. Look specially for deformation, cracks, and scratches and looseness. – Grease the main bolts. – Examine the A-bolts. Look specially for deformation, cracks, scratches, and corrosion. – Grease the A-bolts. – Examine the B-bolts. Look specially for deformation, cracks, scratches, and corrosion. – Grease the B-bolts. (Refer to Section 12-20).				X		

B. Center Wing, Interior

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Center Wing, Interior	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Visually inspect the inner skin of the center wing through all access holes with mirror and flashlight. Check for damage, cracks, delamination and disbonding from the sandwich foam.					MSI	
2.	Visually inspect the interior structure of the center wing through all access holes with mirror and flashlight. Check for damage, cracks, delamination and disbonding from the wing skin. Inspect the following components: – Front spar, inner and outer surfaces, specially in the area of the bushes for the main bolts. – Rear spar, inner and outer surfaces, specially in the area of the bushes for the main bolts. – Firewall (LH & RH). – Ribs in center wing nose, behind firewall (2 LH, 2 RH). – Root ribs (LH & RH; middle & rear). – Attachment ribs to fuselage (LH & RH; front, middle & rear). – Landing gear ribs (LH & RH). – Rib for landing gear lock struts (LH & RH). – Rib for wing flap bellcrank (LH & RH). – Rib connecting rear spar to trailing edge spar (LH; outboard of rib for flap bellcrank). – Guiding rib for flap push-rod (RH; inboard of rib for flap bellcrank). – Trailing edge spar (LH, RH).				X		

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Center Wing, Interior	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
3.	Examine the outer surfaces of the front and rear main spars, specially in the area of the bushes for the main bolts.		X	X	X		
4.	Examine the cable ties and electrical connectors. Look specially for rub marks. Pull lightly to make sure they are not loose.	X*	X	X	X		

C. Inner Flaps

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Inner Flaps	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the inner flaps. Look specially for damage (dents, cracks, holes and delamination). Examine the surface protection system.	X*	X	X	X		
2.	Examine the inner flap hinges and horn. Look specially for too much play. (Refer to Section 27-00.) Play allowed: – Axial ± 1.00 mm (± 0.04 in). – Radial ± 0.25 mm (± 0.01 in).	X*	X	X	X		
3.	Examine the inner flap control system. Look specially for incorrect attachment and loose or missing lock devices. (Refer to Sections 27-10 and 27-50).	X*	X	X	X		
4.	Examine the inner flap push-rods: – Remove the inner flap push-rods from the center wing. – Check for corrosion and damaged surface protection. – Look specially for rub marks. – Install the inner flap push-rods. (Refer to Section 27-50).				X		

D. Miscellaneous Items in Center Wing & Nacelles

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Center Wing, Miscellaneous	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine all fuel system components firewall aft: – Look specially for signs of leakage, material deterioration, chafings and damage. – Make sure they are correctly attached.	X*	X	X	X		
2.	Examine the fuel cooler. – Look specially for leakage, damage, and insecure attachment. – Check hoses and connectors on fuel cooler for leakage and damage. – Make sure the cooling fins are not blocked.	X*	X	X	X		

5. Tail

A. Tail, General

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Tail, General	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Remove the fairing for the horizontal stabilizer. (Refer to Section 55-10).	X*	X	X	X		
2.	Check rudder hinges for excessive play.	X*	X	X	X		
3.	Remove the rudder. (Refer to Section 55-40).	X*	X	X	X		
4.	Remove the elevator push-rod II. (Refer to Section 27-30).				X		
5.	Remove the horizontal stabilizer. (Refer to Section 55-10).					MSI	

B. Structure of the Vertical Tail

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Structure of the Vertical Tail	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the complete surface of the vertical stabilizer. Look specially for damage (dents, cracks, holes and delamination). Examine the surface protection system.	X*	X	X	X		
2.	Examine the tail fin (lower strake) on the bottom side of the fuselage tube. Look specially for: – Damage to the bottom of the fin. – Cracks at the junction to the fuselage.	X*	X	X	X		
3.	Visually inspect the inner skin of the vertical stabilizer through all access holes with mirror and flashlight. Check for damage, cracks, and delamination.					MSI	
4.	Visually inspect the interior structure of the vertical stabilizer through all access holes with mirror and flashlight. Check for damage, cracks, delamination and disbonding from the horizontal tail skin. Inspect the following components: – Front web. – Rear web. – Lower rib (front & rear). – Rib for upper hinge. – Strake.				X		

C. Structure of the Horizontal Stabilizer

100 hr items marked X apply to US registered airplanes only*		**Interval**					
	Inspection Items, Structure of the Horizontal Stabilizer	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the complete surface of the horizontal stabilizer. Look specially for damage (dents, cracks, holes and delamination). Examine the surface protection system.	X*	X	X	X		
2.	Do a coin-tap test for delamination of the entire top and bottom shell of the horizontal stabilizer. (Refer to Section 51-10).					MSI	
3.	Examine the mounting brackets for the horizontal stabilizer. Look specially for cracks, deformation, and corrosion. Check the attachment bolts for corrosion. (Refer to Section 55-10).	X*	X	X	X		
4.	Examine the horizontal stabilizer tips. Look specially for cracks, dents, and loose or missing attachment screws. Examine the surface protection system.	X*	X	X	X		
5.	Remove the tips from the horizontal stabilizer. (Refer to Section 55-10).				X		
6.	Visually inspect the inner skin of the horizontal stabilizer through all access holes with mirror and flashlight. Look specially for damage, cracks, and delamination.					MSI	

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Structure of the Horizontal Stabilizer	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
7.	Visually inspect the interior structure of the horizontal stabilizer through all access holes with mirror and flashlight. Look specially for damage, cracks, delamination and disbonding from the horizontal tail skin. Inspect the following components: – Front spar. – Rear spar. – Trailing edge web. – Longitudinal ribs (LH & RH; front, middle, rear). – VT attachment box.				X		
8.	Install the tips to the horizontal stabilizer. (Refer to Section 55-10).				X		

D. Rudder

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Rudder	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the rudder skin. Look specially for: – Dents, cracks, holes, dis-bonding, and delamination. – Cracks and deformation on the bottom edge. – Damage to the surface protection system.	X*	X	X	X		
2.	Examine the lower bracket on the rudder. Look specially for: – Cracks and deformation. – Excessive wear on brass bushes. – Defective stop-screws. – Insecure attachment. – Loose or missing lock devices. – Defective powder coating.	X*	X	X	X		
3.	Check the upper hinge pin on the rudder for deformation, cracks, and corrosion.	X*	X	X	X		
4.	Examine the rudder trim tab. Look specially for: – Damage to the tab structure. – Damage to the surface protection system. – Incorrect attachment to the rudder. – Cracks in hinges. – Wear or excessive play of hinges. – Poor condition of the hinge wire. – Loose or missing lock devices.	X*	X	X	X		

E. Rudder Hinges and Control System in Vertical Tail

100 hr items marked X apply to US registered airplanes only*		**Interval**					
	Inspection Items, Rudder Hinges and Control System in Vertical Tail	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the rudder control cables. Look specially for: – Broken strands. – Defective or worn-out cable eyes. – Corrosion. – Poor general condition.	X*	X	X	X		
2.	Examine the support for the lower rudder hinge. Look specially for: – Cracks and deformation. – Insecure attachment. – Cracks, deformation or corrosion of stops. – Loose or missing lock devices. – Defective powder coating.	X*	X	X	X		
3.	Check the rudder hinges (top and bottom) for corrosion, insecure mounting, and poor general condition.	X*	X	X	X		
4.	Examine the rudder trim mechanism. Look specially for: – Deformation. – Incorrect attachment. – Loose or missing lock devices. – Wear.	X*	X	X	X		

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Rudder Hinges and Control System in Vertical Tail	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
5.	Check the friction of the rudder trim mechanism. Verify smooth running on trim knob and proper function. – Correct friction force at the rudder trim friction rod: 3 daN - 5 daN. – If the friction exceeds 5 daN polish the tube. – In case of new springs, cut up to 1.5 winds of the spring to reach friction value.	X*	X	X	X		

F. Elevator and Elevator Hinges

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Elevator and Elevator Hinges	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the elevator skin. Look specially for: – Dents, cracks, holes, dis-bonding, and delamination. – Damage to the surface protection system.	X*	X	X	X		
2.	Examine the fitting bushes for corrosion and looseness.				X		
3.	Check elevator horn for damage, deformation and cracks.	X*	X	X	X		
4.	Check elevator balancing masses for insecure attachment.	X*	X	X	X		

100 hr items marked X* apply to US registered airplanes only		Interval					
	Inspection Items, Elevator and Elevator Hinges	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
5.	Examine the elevator hinges. Look specially for: – Damage, cracks, and corrosion. – Loose or missing lock devices. – Excessive play. Play allowed: – Axial ± 1.00 mm (± 0.04 in.). – Radial ± 0.25 mm (± 0.01 in.).	X*	X	X	X		
6.	Examine the elevator trim tab. Look specially for: – Damage to the tab structure. – Damage to the surface protection system. – Incorrect attachment to the rudder. – Cracks in hinges. – Wear or excessive play of hinges. – Poor condition of the hinge wire. – Loose or missing lock devices.	X*	X	X	X		

G. Elevator Control System in Tail

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Elevator Control System in Tail	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the elevator push-rods: – Check for damage, deformation, cracks, and corrosion. – Check for rub marks and defective powder coating. – Check rod end bearings for looseness and damage. – Check for insecure connection to the bellcrank or elevator horn. – Check for loose or missing lock devices.	X*	X	X	X		
2.	Examine the centering springs for the elevator control system. Look specially for damage and looseness.	X*	X	X	X		
3.	Examine the elevator push-rod which was removed from the rear fuselage. Look specially for rub marks. (Refer to Section 27-30).				X		
4.	Examine the elevator bellcrank in the vertical tail: – Check for damage, deformation, and cracks. – Check for insecure mounting. – Check for loose or missing lock devices.	X*	X	X	X		
5.	Examine the elevator trim mechanism. Look specially for: – Deformation. – Incorrect attachment. – Loose or missing lock devices. – Wear. – Corrosion.	X*	X	X	X		

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Elevator Control System in Tail	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
6.	Adjust the friction of the elevator trim mechanism.	X*	X	X	X		

H. Miscellaneous Items in Tail

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Miscellaneous Items in Tail	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
Note: The examination of the VHF antenna is not actually a part of the major structural inspection (MSI). It is however carried out at the same time because it can only be done with the horizontal stabilizer removed from the airplane.							
1.	Examine the VHF antenna.					MSI	
2.	Install the horizontal stabilizer (refer to Section 55-50).					MSI	
3.	Install the elevator push-rod which goes through the rear fuselage. (Refer to Section 27-30).				X		
4.	Install the rudder. Lubricate the rudder hinge bushes. Apply grease to the cable eyes. (Refer to Section 55-40).	X*	X	X	X		
5.	Install the fairing for the horizontal stabilizer. (Refer to Section 55-10).	X*	X	X	X		
6.	If installed, check porous panels of the ice protection system on the horizontal and vertical tail for damage.	X*	X	X	X		

6. Wings

A. Wings, General

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Wings, General	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Remove the winglets. (Refer to Section 57-10).				X		
2.	Remove the fuel tanks from the wings. (Refer to Chapter 28). – Remove the main fuel tanks from the wings. – If installed, remove the auxiliary fuel tanks from the engine nacelles (if OÄM 42-056 carried out).				X		
3.	Remove the flap and aileron bell-crank access panels in the wing (Refer to Section 52-40).	X*	X	X	X		

B. Wings, Structure

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Wings, Structure	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the complete surface of the wings. Look specially for damage (dents, cracks, holes and delamination). Examine the surface protection system.	X*	X	X	X		
2.	Examine the winglets. Look specially for cracks, dents, and loose or missing attachment screws. Examine the surface protection system.	X*	X	X	X		
3.	Do a coin-tap test for delamination of the entire top and bottom wing shell. (Refer to Section 51-10).					MSI	
4.	Visually inspect the inner skin of the LH and RH wing through all access holes with mirror and flashlight or endoscope. Check for damage, cracks, delamination and disbonding from the sandwich foam.					MSI	

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Wings, Structure	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
5.	Examine the wing spar stubs (inboard of the root rib). Look specially for damage, cracks, delamination and disbonding.				X		
6.	Examine the main bolt bushes in the wing spar stubs. Look specially for damage, deformation, cracks, and scratches and looseness.				X		
7.	Visually inspect the interior structure of the LH and RH wing through all access holes with mirror and flashlight or endoscope. Check for damage, cracks, delamination and disbonding from the wing skin. Inspect the following components: – Front spar. – Rear spar. – Rear web. – Root rib (front, middle & rear). – End rib (on outboard edge). – 6 fuel tank attachment ribs. – Rib supporting aileron bellcrank. – Rib supporting flap bellcrank.				X		

C. Ailerons and Outer Flaps

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Ailerons and Outer Flaps	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the ailerons. Look specially for damage (dents, cracks, holes and delamination). Examine the surface protection system.	X*	X	X	X		
2.	Examine the outer flaps. Look specially for damage (dents, cracks, holes and delamination). Examine the surface protection system.	X*	X	X	X		
3.	Examine the aileron mass balance. Look specially for cracks.	X*	X	X	X		
4.	Examine the aileron hinges and horn. Look specially for: – Damage, cracks, and corrosion. – Loose or missing lock devices. – Excessive play. Play allowed: – Axial ± 1.00 mm (± 0.04 in). – Radial ± 0.25 mm (± 0.01 in).	X*	X	X	X		
5.	Examine the outer flap hinges and horn. Look specially for: – Damage, cracks, and corrosion. – Loose or missing lock devices. – Excessive play. Play allowed: – Axial ± 1.00 mm (± 0.04 in). – Radial ± 0.25 mm (± 0.01 in).	X*	X	X	X		

100 hr items marked X apply to US registered airplanes only*		**Interval**					
	Inspection Items, Ailerons and Outer Flaps	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
6.	Examine the aileron and flap control system. Look specially for incorrect attachment and loose or missing lock devices (Refer to Sections 27-10 and 27-50).	X*	X	X	X		
7.	Examine the aileron push-rods: – Remove the aileron push-rods from the wings. – Check for corrosion and damaged surface protection. – Look specially for rub marks. – Install the aileron push-rods. (Refer to Section 27-10).				X		
8.	Examine the outer flap push-rods: – Remove the outer flap push-rods from the wings. – Check for corrosion and damaged surface protection. – Look specially for rub marks. – Install the flap push-rods. (Refer to Section 27-50).				X		

D. Fuel Tanks

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Fuel Tanks	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
	Note: If the auxiliary fuel tanks (OÄM 42-056) are installed, the inspection items shown in this table must also be applied to the auxiliary fuel tanks.						
1.	Visually check fuel tank bonding system through access panels for improper connections and damaged strips.	X*	X	X	X		
	WARNING: DO NOT GET FUEL ON YOU. FUEL CAN CAUSE SKIN DISEASE. DO NOT ALLOW FIRE NEAR FUEL. FUEL BURNS AND CAN CAUSE INJURY TO PEOPLE AND DAMAGE TO EQUIPMENT.						
2.	Examine the fuel tank outlets: – Clean the finger filters. – Look for foreign matter. – Look for defective lock wire.				X		
3.	Remove the access covers.		X	X	X		
4.	Check condition of tank interconnecting hoses.		X	X	X		
5.	Check for leaks.	X	X	X	X		
6.	Collect a drain sample: – If sample is contaminated flush tank with removed drain valve.	X	X	X	X		
7.	Flush the tank: – Remove the drain valve. – Flush the fuel tank. – Check for debris and foreign objects. – Install the drain valve.			X	X		

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Fuel Tanks	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
8.	Install the access covers.		X	X	X		
9.	Examine the fuel tank vents for blockage. – Open fuel filler cap and carefully blow through the LH-forward and RH-aft vent lines from outside into the tank with compressed air. – If MÄM 42-577 is installed: Open fuel filler cap and carefully blow through the vent all lines from outside into the tank with compressed air.	X	X	X	X		
10.	If the auxiliary fuel tanks are installed (OÄM 42-056): Examine the auxiliary fuel tank vents for blockage: – Open fuel filler cap and blow through the vent line from outside into the tank with compressed air. – Check vent hole in the fuel tank cap for blockage.	X	X	X	X		
11.	If the auxiliary fuel tanks are installed (OÄM 42-056): – Clean the inline filters.			X	X		
12.	Examine the fuel tanks: – Look specially for corrosion, leaks and other damage. – Look for material deterioration or damage of the flexible fuel hoses connecting the fuel tank chambers. – Look for foreign objects in the tanks. (Refer to Section 28-10).				X		

E. Wings, Miscellaneous

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, Wings, Miscellaneous	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the Pitot-static probe. Look specially for: – Incorrect attachment. – Damage. – Foreign objects.	X	X	X	X		
2.	Install the fuel tanks to the wings. (Refer to Chapter 28). – If OÄM 42-056 is carried out, install the auxiliary fuel tanks into the engine nacelles. – Install the main fuel tanks into the wings.				X		
3.	Install the wings. (Refer to Section 57-10).				X		
4.	Install the winglets. (Refer to Section 57-10).				X		
5.	Examine the stall warning sensor in the LH wing. Do a function test of the sensor.	X	X	X	X		
6.	Examine the placards on the wings. Make sure that: – They are not damaged. – None are missing. (Refer to Chapter 11).	X*	X	X	X		
7.	If installed, check porous panels of the ice protection system on the wings for damage.	X*	X	X	X		

7. General

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, General	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
1.	Examine the Pitot-static system. – Clean the Pitot-static system. (Refer to Section 34-10).			X	X		
2.	If necessary, inspect optional equipment. Refer to: – Chapter 6 of the Airplane Flight Manual (Equipment List). – Chapter 9 of the Airplane Flight Manual (Supplements). – Chapter 05-00 of the Airplane Maintenance Manual (Referenced Maintenance Data).	X	X	X	X		
3.	Lubricate the airplane. (Refer to Section 12-20).	X	X	X	X		
4.	Measure the play in the aileron and elevator controls with the control surfaces locked (Refer to Section 27-30). Look specially for too much play. Do the test at the top of the control stick. – Maximum play allowed ± 2.5 mm (± 0.1 in). (Refer to Section 27-10).	X*	X	X	X		
5.	Check flight controls and engine controls for improper operation and installation.	X*	X	X	X		
6.	Do a function test of the aileron control system. (Refer to Section 27-10).			X	X		
7.	Do a function test of the rudder control system. (Refer to Section 27-20).			X	X		
8.	Do a function test of the elevator control system. (Refer to Section 27-30).			X	X		

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, General	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
9.	Do an operational test of the variable elevator stop. (Refer to Section 27-30).			X	X		
10.	Do a function test of the rudder trim system. Look specially for incorrect operation and indication. (Refer to Section 27-21)			X	X		
11.	Do a function test of the elevator trim system. Look specially for incorrect operation and indication. (Refer to Section 27-38).			X	X		
12.	Do a function test of the flap system. (Refer to Section 27-50). Look specially at the pre-load. With the flaps set to UP: – Correct pre-load 3 - 5 daN (6.7 - 11.2 lbf).			X	X		

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, General	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
13.	Do a function test of the landing gear system. (Refer to Chapter 32). – Verify proper operation of the pressure accumulator (the hydraulic pump must stop operating after the pressure has built up). – Verify proper rectraction and extension. – Verify correct landing gear indication. – Do a test of the landing gear warning with the flaps in LDG position, both power levers above 20% ± 5%. – Do a test of the landing gear warning with the flaps in UP position, LH power lever below 20% ± 5%, and RH power lever above 20% ± 5%. – Do a test of the landing gear warning with the flaps in UP position, RH power lever below 20% ± 5%, and LH power lever above 20% ± 5%. – Do a test of the emergency extension (refer to Section 32-30 or Section 32-31, if OÄM 42-195 is carried out).	X*	X	X	X		
14.	Do a test of the steering linkage and nose wheel centering device. – Move the nose wheel to the left and right. – Verify proper operation of the steering linkage (to the rudder control system). – Verify the nose wheel returns to the neutral position.	X*	X	X	X		
15.	Examine the anti-corrosion coating of exterior parts (Refer to Section 12-30). Replace coating on condition.		X	X	X		
16.	Lower the airplane off jacks. (Refer to Section 07-10).	X*	X	X	X		

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, General	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
17.	Do an operational test of the external lights.	X*	X	X	X		
18.	Do an operational test of the Pitot heat.	X*	X	X	X		
19.	LH and RH ECU backup battery fuses (32A) and wiring check.	X*	X	X	X		
20.	If installed, do an operational test of the de-icing system. (Refer to Chapter 30).	X*	X	X	X		
21.	Examine the airplane. Look specially for foreign objects, for example loose items and tools. Install these items, if previously removed: – All access panels (refer to Section 52-40). – The cabin baggage compartment (refer to Section 25-50). – The instrument panel cover (refer to Section 25-10). – The seat shells (refer to Section 25-10). – The control-stick boots. – The engine cowlings (refer to Section 71-10).	X	X	X	X		
	WARNING: **DO NOT LET PERSONS INTO THE DANGER AREA OF THE PROPELLER. PROPELLERS CAN CAUSE INJURY OR DEATH.** **WARNING:** **SET THE PARKING BRAKE TO ON. IF YOU DO NOT DO THIS THE AIRPLANE CAN MOVE. THIS CAN CAUSE INJURY OR DEATH.**						
22.	Put chocks against the main airplane wheels.	X	X	X	X		

100 hr items marked X apply to US registered airplanes only*		Interval					
	Inspection Items, General	**100**	**200**	**1000**	**2000**	**Time**	**Initials**
23.	Do the post maintenance engine test. – For the engine run procedures refer to the Airplane Flight Manual. – Record the data (Refer to Paragraph 8, Engine Ground Test Record).	X	X	X	X		
24.	Examine the engines for leakage.	X	X	X	X		
25.	Make sure the engine oil filters are tight (LH and RH engine). (Refer to Section 79-00).	X	X	X	X		
26.	Do a maintenance check flight. Put the engine ground test and the maintenance check flight reports in the Airplane Maintenance Log.	X*	X	X	X		
27.	Complete the Maintenance Report and put it in the Airplane Maintenance Log.	X	X	X	X		
	Note: The manufacturer will use the completed Structural Findings Report for the continuous improvement of the Major Structural Inspection (MSI).						
28.	Complete the Structural Findings Report. Put one copy in the Airplane Maintenance Log. Send another copy to the manufacturer, i.e., Diamond Aircraft Industries GmbH Office of Airworthiness N.A. Otto-Str. 5 A-2700 Wiener Neustadt Austria by mail, fax (+43-2622-26780) or e-mail (airworthiness@diamond-air.at).					MSI	

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Section 05-28-90
Maintenance Report

1. Maintenance Report

Complete a copy of the Maintenance Report after all of the applicable maintenance tasks in the Maintenance Checklist have been initialed.

DA 42	
Airplane Serial Number:	Registration Number:
Check: ___________ (100 hr, 200 hr, 1000 hr, 2000 hr, Annual)	
REMARKS:	
The airplane is airworthy with respect to its maintenance condition. ___________________ ___________________ ___________________ Place Date Authorized	

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Section 05-28-91
Engine Ground Test Record

1. Engine Ground Test Record

Do the engine test in accordance with Section 71-00, Paragraph 3. Take photocopies of Sub-Paragraphs C to E of that Paragraph into the cockpit and enter results and comments.

WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS.

WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU TURN THE PROPELLER. MAKE SURE THAT:
- THE ELECT. MASTER SWITCH IS SET TO "OFF".
- THE ENGINE MASTER SWITCH IS SET TO "OFF".
- THE POWER LEVER IS SET TO "IDLE".

WARNING: DO NOT GET OIL ON YOU. OIL CAN CAUSE SKIN DISEASE.

WARNING: DO NOT GET FUEL ON YOU. FUEL CAN CAUSE SKIN DISEASE. DO NOT ALLOW FIRE NEAR FUEL. FUEL BURNS AND CAN CAUSE INJURY TO PEOPLE AND DAMAGE TO EQUIPMENT.

WARNING: WHEN YOU COMPLETE AN INSPECTION, MAKE SURE THAT YOU REMOVE ALL LOOSE ITEMS/TOOLS FROM THAT AREA. LOOSE ITEMS/TOOLS CAN PREVENT FULL MOVEMENT OF THE AIRPLANE CONTROLS. THIS CAN CAUSE DEATH OR INJURY TO PERSONS.

CAUTION: YOU MUST ATTACH BLANKS/CAPS TO HOLES/PIPES WHEN YOU REMOVE COMPONENTS. IF YOU DO NOT DO THIS, UNWANTED DEBRIS CAN ENTER THE HOLES/PIPES. THIS CAN CAUSE BLOCKAGE TO THE AIRPLANE SYSTEMS.

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Section 05-28-92

Check Flight Report

1. Maintenance Check Flight Report

Note: The maintenance check flight must be done in accordance with the applicable national regulations.

Diamond AIRCRAFT	MAINTENANCE CHECK FLIGHT (See Maintenance Checklist for Applicability)	DA 42 Page 1 of 7		
Registration:	Pilot:	Airdrome:		
Date:	Take-Off:	Landing:		
Functional Check, Flight Behavior		**Findings**		
		N/A	**NO**	**YES**
ON GROUND, ENGINES OFF				
Pre-flight inspection in accordance with AFM.				
Front baggage doors: mechanism, key lock, open door warning.				
Front canopy: locking mechanism, key lock, general condition / optics, open door warning.				
Rear door: mechanism, key lock, open door warning.				
Seat belts (4x): function, locking device, general condition.				
Front seats: fixed, general condition.				
Rear seats: locking mechanism, general condition.				
Baggage compartment: general condition.				
First aid kit.				
Flight controls: safety lacquer, centering springs.				
Trims: correct deflection.				
AFM: on board.				
Power levers, friction control.				
Instrument lighting and flood light.				
Map / reading lights.				
G1000 manual dim.				
Oxygen system (if installed).				

Diamond AIRCRAFT	CHECK FLIGHT (See Maintenance Checklist for Applicability)	DA 42		
		Page 2 of 7		
Functional Check, Flight Behavior		Findings		
		N/A	NO	YES
ON GROUND, ENGINES ON				
Engine start in accordance with AFM.				
Starting behavior.				
Warning / caution / advisory alerts.				
Engine parameters (indications): engine oil pressure / temperature, gearbox oil temperature, coolant temperature.				
Load / RPM (indications).				
Fuel quantity / temperature / fuel flow.				
Battery voltage / Ammeters.				
Alternator.				
Altimeters (G1000 and backup), autopilot: QNH adjustment.				
Airspeed indicators (G1000 and backup).				
Vertical speed indicator (G1000).				
Compass (G1000: slaved directional gyro; magnetic compass).				
Turn indicator.				
Attitude, bank (G1000 and backup).				
OAT (outside air temperature).				
G1000 emergency backup (red button).				
Flaps: full travel / intermediate position.				
Stick limiter.				
TKS annunciator test.				
Gear unsafe warning light.				
Fire test.				
Full cross feed.				
Electrical trim.				
Autopilot (manual override, disconnect).				

Diamond AIRCRAFT	**CHECK FLIGHT** (See Maintenance Checklist for Applicability)	**DA 42** Page 3 of 7		
Functional Check, Flight Behavior		**Findings**		
		N/A	**NO**	**YES**
Audio panel / intercom.				
COM 1 / COM 2.				
ELT.				
Moving map: satellite status, GPS position, terrain information.				
TAXIING (in accordance with AFM)				
Compass (G1000 and magnetic compass).				
Turn indicator.				
Attitude, bank.				
Brakes, pilot & co-pilot side.				
Taxiing behavior.				
BEFORE TAKE-OFF CHECK (in accordance with AFM)				
ECU test: normal behavior and warning sequence.				
ECU swap test.				
Available power check.				
Idle RPM.				
TAKE-OFF (in accordance with AFM)				
Gear retraction: hydraulic pump.				
CLIMB (in accordance with AFM)				

Diamond AIRCRAFT	**CHECK FLIGHT** (See Maintenance Checklist for Applicability)	**DA 42**		
		Page 4 of 7		
Functional Check, Flight Behavior		**Findings**		
		N/A	**NO**	**YES**
Trim (pitch, direction).				
CRUISE (in accordance with AFM)				
Control behavior.				
Trim (pitch, direction).				
Engine parameters (indications): oil pressure / temperature, gearbox oil temperature, coolant temperature.				
Load / RPM (indications).				
Fuel quantity / temperature / fuel flow.				
Airspeed indicator (G1000 and backup).				
Altimeter (G1000 and backup).				
Alternate static valve.				
Vertical speed indicator (G1000).				
Compass (G1000: slaved directional gyro; magnetic compass).				
Turn indicator.				
Attitude, bank (G1000 and backup).				
Propeller feathering (engine shut down).				
Propeller unfeathering (engine re-start): starting behavior.				
Emergency gear test.				
Stall warning test.				
Flight behavior at low airspeeds (according to AFM).				
Flight behavior at high airspeeds (according to AFM).				
Alternate air test.				
OAT (outside air temperature) / TAS / ground speed.				
NAV 1 / 2, DME, ILS (LOC, GS, MKR) (if required).				
ADF (if required).				
Transponder.				
Moving map / GPS position.				

CHECK FLIGHT (See Maintenance Checklist for Applicability)	DA 42 Page 5 of 7		
	Findings		
Functional Check, Flight Behavior	N/A	NO	YES
Autopilot (if KAP 140 A/P is installed): – Wings level mode. – HDG mode. – NAV mode (if required) (on VLOC and GPS). – ALT / VS preselect and hold. – CWS (control wheel steering) button. – Disconnect (red button).			
Autopilot (if GFC 700 A/P is installed): – HDG mode. – FD. – YD (yaw damper). – FLC mode. – GA (go around) mode. – NAV mode (if required). – ALT / VS preselect and hold. – CWS (control wheel steering) button. – Disconnect (red button).			
Cabin ventilation.			
Cabin heating.			
Cabin leaks / sounds.			
TKS system (if installed).			
TAS system (if installed).			
Stormscope (if installed).			
Aux. fuel transfer indication (if installed).			

Diamond AIRCRAFT	**CHECK FLIGHT** (See Maintenance Checklist for Applicability)	**DA 42** Page 6 of 7		
		Findings		
Functional Check, Flight Behavior		**N/A**	**NO**	**YES**
Aux. fuel empty indication (if installed).				
Aux. fuel pump via main tank indication (if installed).				
DESCENT AND LANDING (in accordance with AFM)				
Function of flaps.				
Function of landing gear.				
Landing behavior.				
Braking action.				
AFTER LANDING CHECK AND SHUT-DOWN (in accordance with AFM)				
ELT.				
Engine shut-down behavior.				
Engine starting behavior, warm, LH & RH.				
OUTSIDE INSPECTION				
Damage.				
Engine oil / coolant / fuel / hydraulic leaks.				

Diamond AIRCRAFT	CHECK FLIGHT (See Maintenance Checklist for Applicability)	DA 42 Page 7 of 7		
Functional Check, Flight Behavior		**Findings**		
		N/A	**NO**	**YES**
Findings:				

Signature Pilot: ___________________________

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Section 05-28-93
Major Structural Inspection Check Findings Report

1. Structural Findings Report

Complete the Structural Findings Report after each Major Structural Inspection (MSI). Record the following:

– Structural defects found during the MSI.

– All structural defects that were detected and repaired since new or since the last MSI.

STRUCTURAL FINDINGS REPORT DA 42
AT MAJOR STRUCTURAL INSPECTION (MSI)

Registration : ____________________	Date : ________________
Airplane S/N : ___________________	Airplane Operating Hours : ________________
Maintenance Organization:	AMM Rev. used for check : ________________
	Signature : ________________

no.	structural defect/finding	repair method, remarks	at TSN

no.	structural defect/finding	repair method, remarks	at TSN

All defects have been repaired. The airplane is airworthy with respect to its maintenance condition.

Place: ____________________________________

Date: ____________________________________

Authorized: ____________________________________

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Section 05-50
Unscheduled Maintenance Checks

1. General

Unscheduled maintenance checks are necessary after any incident that could cause damage to the airplane.

2. Hard Landing Check

Figure 1 shows the hard landing check areas. You must do a hard landing check when the pilot makes a report of a hard landing. Or when ground handling applies unusual loads.

A. Equipment

Item	Quantity	Part No.
Slide sheets.	4	Commercial.

B. Procedure

	Detail Steps/Work Items	Key Items
(1)	Remove the access panels for the main and nose landing gear.	Refer to Section 52-40.
(2)	Examine the landing gear fittings. Look specially for cracks.	Use a mirror and a flashlight.
(3)	Examine the fuselage and center wing structure where the landing gear attaches. Look specially for: – Disbonds. – Delamination of the CFRP structure. – Damage to the mounting brackets.	Refer to Section 32-10.
(4)	Examine the landing gear struts. Look specially for: – Bending. – Cracks.	Refer to Section 32-10.
(5)	Do a test of wheel-track and camber.	Refer to Section 32-10.

	Detail Steps/Work Items	Key Items
(6)	Examine the tires. Look specially for cuts in the side walls.	Refer to Section 32-40.
(7)	Examine the brake discs. Look specially for damage. Turn the wheel and make sure the disc is not bent.	
(8)	Remove the load from the nose-gear and examine it. Look specially for more than the usual play.	
CAUTION: IF YOU THINK THE AIRPLANE HAS DAMAGE TO AN AREA THAT TRANSMITS A LOAD, YOU MUST ASK THE AIRPLANE MANUFACTURER FOR ADVICE.		
(9)	Examine the structure in the bottom of the fuselage nose for delamination. Look specially in the area of the bearings for the nose-gear assembly.	
(10)	Examine the structure of nose wheel bay in- and outside for delamination.	
(11)	Examine nose landing gear pedestal assy attachment fittings for cracks.	
(12)	Examine the control surfaces. Look specially for: – Correct attachment of the hinges. – Correct attachment of the mass balance to the structure.	
(13)	Examine the leading edge of the wing for damage.	
(14)	Examine the area of the spar attachments to the wing shells. Look specially for cracks.	
(15)	Examine the leading edge of the horizontal and vertical stabilizers for damage.	
(16)	Examine the engine mounts.	
(17)	Examine the engine mounting points front and aft side of the firewall.	

	Detail Steps/Work Items	Key Items
(18)	Examine the propellers. Look specially to see if a propeller has touched the ground.	
If the adjustable front seats (OÄM 42-067 or OÄM 42-259) are installed: CAUTION: DO NOT LOOSEN THE LEVER FOR THE ADJUSTABLE BACKREST OF THE FRONT SEATS UNINTENTIONALLY. THE SPRING LOADED BACKREST MAY SNAP FORWARD AND CAN CAUSE INJURY.		
(19)	If the adjustable front seats (OÄM-42-067 or OÄM 42-259) are installed: Do a test of the backrest adjustment mechanism on both front seats (refer to Section 25-10).	

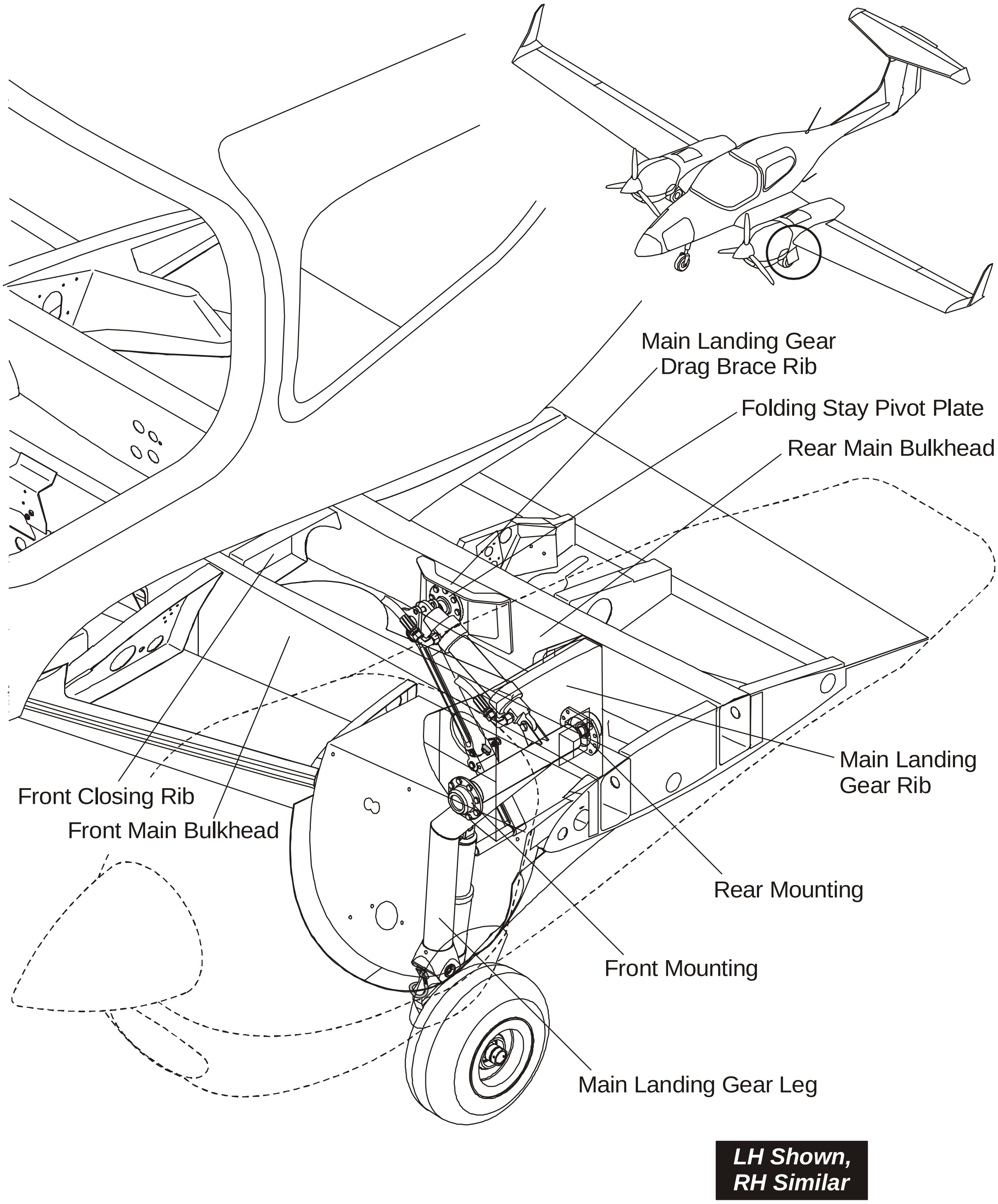

Figure 1: Hard Landing Check Areas - Main Landing Gear

3. Gear Up Landing Check

	Detail Steps/Work Items	Key Items/References
(1)	Perform a hard landing check.	Refer to Paragraph 2, Hard Landing Check.
(2)	Examine the nose cone in the propeller area for external damages.	
(3)	Examine the fuselage to center wing attachment screw joint on lower surface.	
(4)	Examine the foot step attachment structure inboard and outboard: – Remove the aft baggage compartment.	 Refer to Section 52-50.
(5)	Examine the fuselage bonded joints: – Between LH and RH fuselage shell for cracks. – Between fuselage tube shell and ventral fin. – On leading edge of ventral fin. – Between vertical stabilizer front, rear web and fuselage shell. In case of doubt do a coin tap test.	Refer to Section 51-10.
(6)	Examine the antennas for damage.	
(7)	Examine the engine nacelle structure and bonding surfaces in- and outboard for cracks and delamination.	
(8)	Examine the engine mount for damages.	
(9)	Examine the engine cowlings and cowling attachment surface for cracks.	
(10)	If auxiliary fuel tanks (OÄM 42-056) are installed, examine auxiliary tank belt holding angle bracket for cracks.	

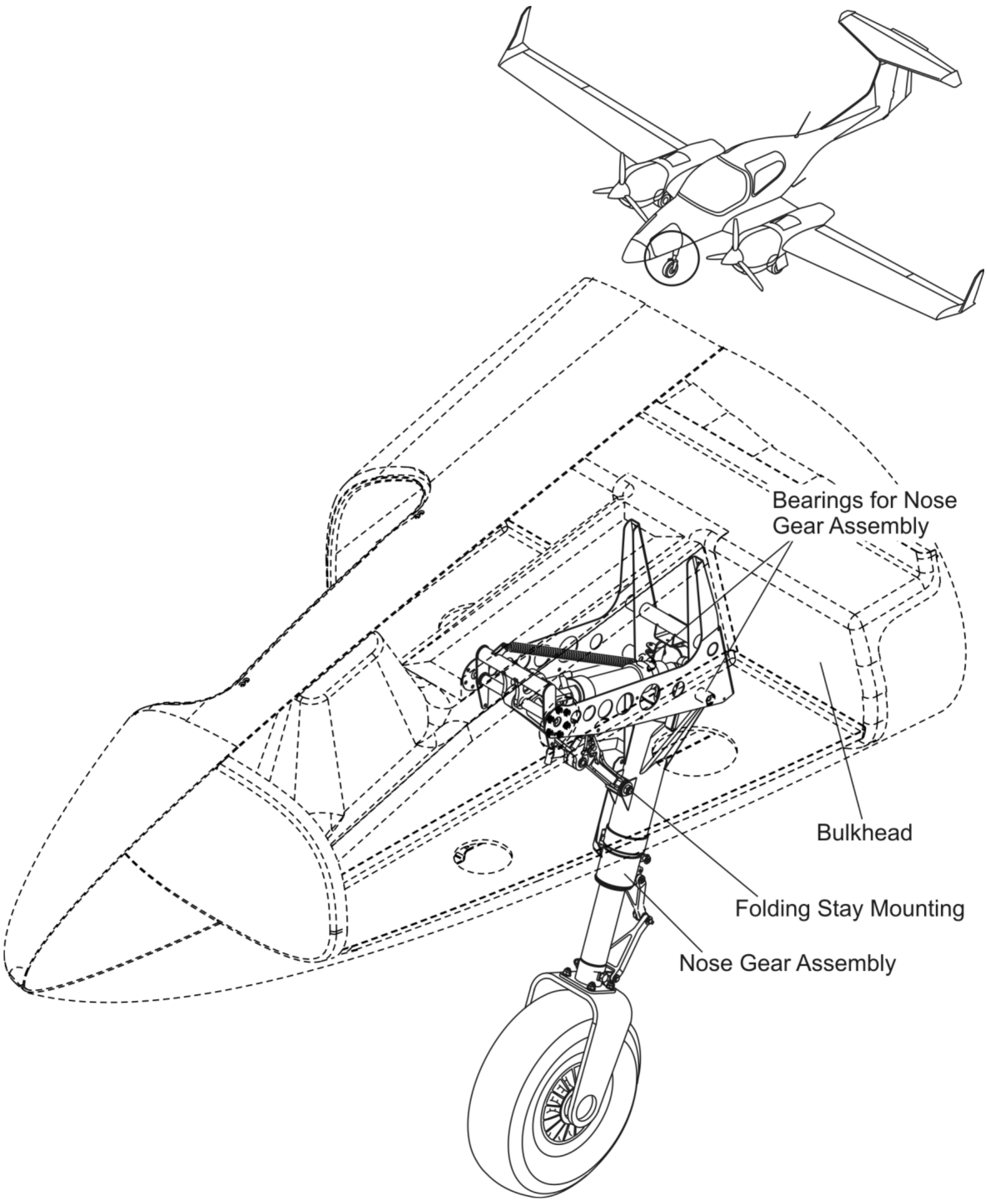

Figure 2: Hard Landing Check Areas - Nose Landing Gear

4. Propeller Strike

A propeller strike can be a moving propeller (engine running) which has hit a solid object. Or it can be a moving object that hits a propeller that is not moving.

A. Propeller Strike with the Engine Running

If the propeller has hit a solid object while the engine was running:

	Detail Steps/Work Items	Key Items
(1)	Remove the propeller.	Refer to Chapter 61.
(2)	Perform a Shock Loading Inspection according to the applicable TAE Repair Manual, latest revision.	Refer to the Engine Repair Manual RM-02-01 or RM-02-02, Chapter 51.
(3)	Do an inspection of the engine mount.	Refer to Section 71-20.
(4)	Do an inspection of the propeller.	Refer to the propeller Owner's Manual.

B. Propeller Hit by a Moving Object

If a propeller which is not moving is hit by a moving object:

	Detail Steps/Work Items	Key Items
(1)	Do an inspection of the propeller. If the propeller must be removed to do a repair other than minor dressing of the blades, you must do the inspection procedure specified for a moving propeller strike.	Refer to the propeller Owner's Manual.
(2)	Inspect the airplane for damage.	

5. Engine Fire

WARNING: BEFORE YOU DO WORK ON THE AIRPLANE MAKE SURE THE FIRE HAS BEEN EXTINGUISHED. LET THE ENGINE COOL AND DISCONNECT THE BATTERY.

WARNING: FIRE CAN SERIOUSLY WEAKEN CFRP. IF YOU FIND ANY DAMAGE TO CFRP, DO NOT OPERATE THE AIRPLANE. ASK THE MANUFACTURER FOR ADVICE.

	Detail Steps/Work Items	**Key Items**
(1)	Remove the engine cowlings.	Refer to Section 71-10.
(2)	Disconnect the airplane battery.	Refer to Section 24-31.
(3)	Examine the engine cowlings. Look specially for signs of fire damage.	
(4)	Examine the electrical cables. Look specially for signs of fire damage.	Replace damaged cables.
(5)	Examine the fuel lines. Look specially for signs of fire damage to the fire-protection sleeves.	Replace damaged fuel lines.
(6)	Examine the engine oil lines. Look specially for signs of fire damage to the fire-protection sleeves.	Replace damaged oil lines.
(7)	Examine the engine. Look specially for: – Damage to the engine air filter. – Damage to gaskets and seals. – Damage to the engine shock mounts. – Damage to the engine mount. – Damage to pipes/hoses.	Make a record of the damage you find and ask the engine manufacturer for advice before you repair or operate the engine.
(8)	Examine the engine nacelles. Look specially for: – Blisters on the paint or burn marks. – Disbonding of the nacelle skin from the firewall. If you find any damage, ask the airplane manufacturer for advice.	

	Detail Steps/Work Items	Key Items
	WARNING: DO NOT GET FIRE EXTINGUISHER PARTICLES ON YOU. THE CHEMICALS USED TO EXTINGUISH A FIRE CAN BE CAUSTIC/POISONOUS. WHEN YOU CLEAN THE ENGINE REFER TO THE FIRE EXTINGUISHER MANUFACTURER'S SAFETY INSTRUCTIONS. USE SAFETY MASKS AND GLOVES AS RECOMMENDED.	
(9)	Clean the engine. Make sure you clean all the fire extinguisher particles from the engine.	Refer to the manufacturer of the fire extinguisher.
(10)	Connect the airplane battery.	Refer to Section 24-31.
(11)	Troubleshoot the engine. Find the cause of the engine fire. Repair the defect if possible.	Ask the engine manufacturer for advice before you repair or operate the engine.
(12)	Install the engine cowlings.	Refer to Section 71-10.
(13)	Do an engine test.	Refer to the engine TAE Operation and Maintenance Manual OM-02-01, latest revision if the TAE 125-01 engine is installed. If the TAE 125-02-99 or the TAE 125-02-114 engine is installed refer to TAE Operation and Maintenance Manual OM-02-02, latest revision.

6. Lightning Strike

A lightning strike usually enters the airplane at one point and leaves the airplane at another point. These points are called "attachment points". You usually find these points at the extremities of the airplane. You will often find the most damage to the airplane occurs at the attachment points. There can be more than 2 attachment points.

When a lightning strike is reported you must do the inspection procedure at sub-paragraph D before the next flight.

A. Group 1 Damage

Group 1 damage is the direct damage caused by the lightning strike. To find this damage you must carefully examine all the external surface of the airplane. Look specially for burn marks, holes, discoloration or other physical damage. If you find this damage you must remove panels or equipment to look for damage on the inside of the airplane. Look specially around the area of the external damage.

You must also examine the airplane lightning protection system. Look specially for signs of heat damage or distortion to the conduction tubes and bonding strips. Also look for heat damage in the structures around the conduction tubes and bonding strips. Refer to Section 51-80 for data about the lightning protection system.

B. Group 2 Damage

Group 2 damage is the indirect damage caused by the lightning strike. It is mostly caused by the electromagnetic fields associated with lightning strikes. The electromagnetic fields can induce temporary voltages into the wiring system. These temporary voltages can cause damage to the electrical and electronic components of the airplane. Refer to the Wiring Diagrams for data about the electrical wiring.

Note: If you find any lightning damage you must make a record of the damage and ask Diamond Aircraft for advice before you repair or operate the airplane.

C. Equipment

Item	Quantity	Part No.
Bonding tester.	1	Commercial.

D. Lightning Strike Inspection

	Detail Steps/Work Items	Key Items
(1)	Examine the surface of the complete fuselage assembly. Look specially in these areas: – Propellers and spinners. – Exhaust pipes. – Engine breather. – Canopy handles. – Strobe lights. – Antennas. – Static discharge wicks. – Vertical fin tip. – Rudder. – Lower fin.	If you find any damage you must examine the airplane internally, specially in the area of the external damage. Make a record of the damage you find and ask Diamond Aircraft for advice before you repair or operate the airplane.
(2)	Examine the surface of the left wing for lightning damage. Look specially in these areas: – Pitot-static probe. – Static discharge wicks. – Winglet. – Wing tip light assembly. – Wing trailing edge. – Aileron trailing edge. – Flap trailing edge. – Aileron horn. – Flap horn.	If you find any damage you must examine the airplane internally, specially in the area of the external damage. Make a record of the damage you find and ask Diamond Aircraft for advice before you repair or operate the airplane.

	Detail Steps/Work Items	Key Items
(3)	Examine the surface of the right wing for lightning damage. Look specially in these areas: – Winglet. – Static discharge wicks. – Wing tip light assembly. – Wing trailing edge. – Aileron trailing edge. – Flap trailing edge. – Aileron horn. – Flap horn.	If you find any damage you must examine the airplane internally, specially in the area of the external damage. Make a record of the damage you find and ask Diamond Aircraft for advice before you repair or operate the airplane.
(4)	Examine the surface of the horizontal stabilizer for lightning damage. Look specially in these areas: – Horizontal stabilizer tip. – Static discharge wicks. – Trailing edge. – Elevator trailing edge. – Trim tab.	If you find any damage you must examine the airplane internally, specially in the area of the external damage. Make a record of the damage you find and ask Diamond Aircraft for advice before you repair or operate the airplane.
(5)	Examine the main landing gear. Look specially in these areas: – Main gear leg attachment points.	Refer to Section 32-10 or 32-11.
(6)	Examine the nose landing gear. Look specially in these areas: – Nose gear attachment points.	Refer to Section 32-20 or 32-21.

	Detail Steps/Work Items	Key Items
(7)	Operate the flight controls through their complete range of movement. Look specially for: – Stiff or unusual feel during movement. – Restriction of movement. – Noisy operation.	Refer Section 27-00.
(8)	Examine the metal conduction tubes and bonding strips in the fuselage and in the wings. Look specially for: – Heat damage or discoloration. – Fusion of bonding joints. – Burn or scorch marks to the structure around the conduction tubes.	Make a record of any damage you find and ask Diamond Aircraft for advice before you repair or operate the airplane
	Use the bonding tester when you are not able to see the whole length of a tube or bonding strip.	Refer to Section 51-80. Follow the instructions of the tester manufacturer. The resistance must be in accordance with Section 51-80.
(9)	Do a test of these lighting systems:	
	– External lights: – Navigation lights. – Strobe lights. – Landing light. – Taxi light.	Refer to Section 33-40.
	– Internal lights: – Instrument panel lights. – Instrument flood lights. – Dome lights.	Refer to Section 33-10.
(10)	Do a test of the Pitot heat system.	Refer to Section 34-10.
(11)	Do a test of all functions on the G1000 system.	

	Detail Steps/Work Items	Key Items
(12)	Operate the engine power levers through their range of movement. Look specially for: – Stiff or unusual feel during movement. – Restriction of movement. – Noisy operation.	Refer to Section 76-10.
(13)	Do a visual check of engine bondings and wirings.	
(14)	Operate the cockpit heating controls through their range of movement. Look specially for: – Stiff or unusual feel during movement. – Restriction of movement. – Noisy operation.	Refer to Section 21-40.
(15)	Operate the parking brake control through its range of movement. Look specially for: – Stiff or unusual feel during movement. – Restriction of movement. – Noisy operation.	Refer to Section 32-40.
(16)	Do an engine run-up. Look specially for abnormal operation of the following systems: – Engine indicating systems. – DC generation.	Refer to Section 71-00. Refer to Section 31-00. Refer to Section 24-30
(17)	Do an ECU test.	Refer to Section 05-20.
(18)	Do an ECU swap test.	Refer to Section 05-20.
(19)	Examine the engine.	Ask the engine manufacturer for advice.
(20)	Do a compass check swing.	

CHAPTER 06

DIMENSIONS AND AREAS

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DIMENSIONS AND AREAS

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CHAPTER 06
DIMENSIONS AND AREAS

1. General

The DA 42 uses the System Internationale (SI) for dimensions and areas. Imperial dimensions are also given in brackets. For example: Wing span 13.42 m (44.03 ft).

Conversions between SI units and imperial units are given in Chapter 02.

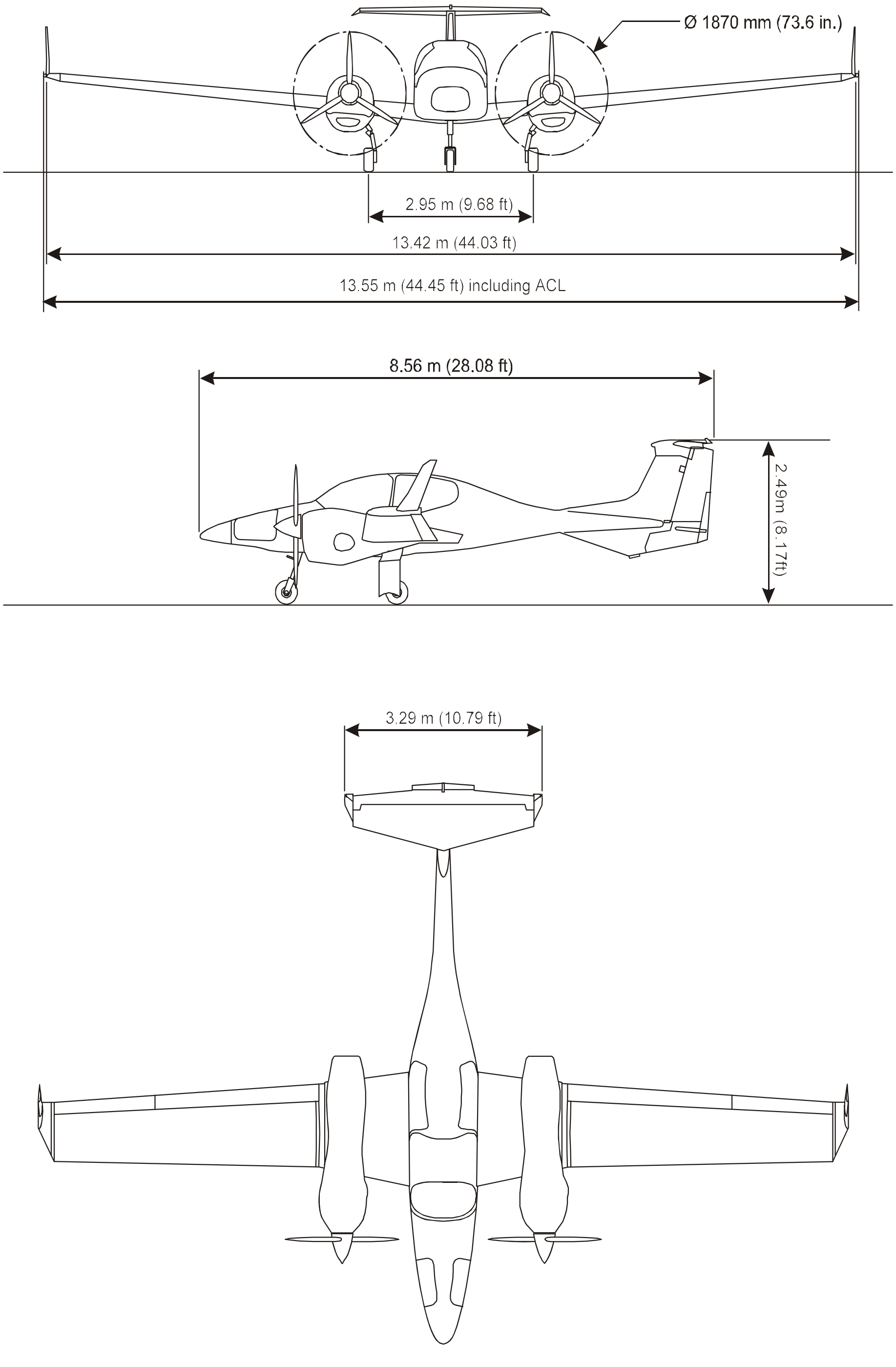


Figure 1: DA 42 Overall Dimensions (Approximate Values)

2. Dimensions

DA 42 Dimensions	
Overall Dimensions	
Wing span	13.42 m (44.03 ft) 13.55 m (44.45 ft) including ACL
Length	8.56 m (27.92 ft)
Height (Nominal)	2.49 m (8.69 ft)
Wing Outer	
Airfoil	Wortmann FX63-137/20-W4
Wing area (each wing, without winglets, flaps and aileron)	3.91 m² (42.07 ft²)
Winglets (each)	0.40 m² (4.30 ft²)
Dihedral (Nominal)	5.5°
Aspect Ratio	11,06
Sweep Back	1°
Wing Center Section	
Area (total without inner flaps)	6.16 m² (66.28 ft²)
Inner Flaps	
Span	2 x 1.42 m (2 x 4.66 ft)
Area	2 x 0.43 m² (2 x 4.63 ft²)
Horizontal Tail Surfaces	
Span	3.50 m (11.48 ft)
Area (with tips, without elevator)	1.79 m² (19.26 ft²)
Angle of incidence	-1°
Elevator	
Span	2.96 m (6.17 ft)
Area (without trim-tab)	0.58 m² (6.24 ft²)
Trim-Tab	0.08 m² (0.86 ft²)
Aileron	
Span	2 x 1.67 m (2 x 5.48 ft)
Area	2 x 0.33 m² (2 x 3.55 ft²)

DA 42 Dimensions	
Outer Flaps	
Span	2 x 2.83 m (2 x 9.28 ft)
Area	2 x 0.65 m² (2 x 6.99 ft²)
Rudder	
Span	1,55 m (5.08) ft)
Area	0.79 m² (8.50 ft²)
Rudder Trim-Tab	
Span	0.71 m (2.33 ft)
Area	0.06 m² (0.64 ft²)
Landing Gear (Typical static, normal load)	
Wheel Track	2.95 m (9.68 ft)
Wheel base	1.735 m (5.7 ft)
Main Wheel	
Tire: Goodyear	15x6.0-6, 6 PR, TT, 160 mph, FS II
Tire inflation pressure	4.5 bar (65 PSI)
Damper gas pressure (unloaded)	18 bar (261 PSI)
Nose Wheel	
Tire: Goodyear	5.00-5, 10PR, TT, 120 mph, FS II
Tire inflation pressure	6 bar (87 PSI)
Damper gas pressure (unloaded)	12 bar (174 PSI) - 15 bar (218 PSI)
Main Wheel (if OÄM 42-195 is carried out)	
Tire: Goodyear	15x6.0-6, 6 PR, TT, 160 mph, FS II
Tire inflation pressure	4.7 bar (68 PSI)
Damper gas pressure (unloaded)	19 bar (276 PSI)
Nose Wheel (if OÄM 42-195 is carried out)	
Tire: Goodyear	5.00-5, 10PR, TT, 120 mph, FS II
Tire inflation pressure	6 bar (87 PSI)
Damper gas pressure (unloaded)	16 bar (232 PSI)

3. Adjustment Reports

The measurements of the DA 42 are recorded on Adjustment Reports and the Main Landing Gear Wheel-Track and Camber Report at the factory when the airplane is built. This report becomes part of the airplane records.

When you measure the dimensions, use the reports as reference to show any deviations.

4. Weight and Static Moments of Control Surfaces

WARNING: IF YOU REPAINT (OR DO REPAIRS TO) THE CONTROL SURFACES, YOU MUST MAKE SURE THAT THE WEIGHT AND STATIC MOMENTS OF THE CONTROL SURFACES ARE IN THE LIMITS GIVEN IN THE CONTROL SURFACE BALANCE REPORT. THIS WILL PREVENT CONTROL SURFACE FLUTTER.

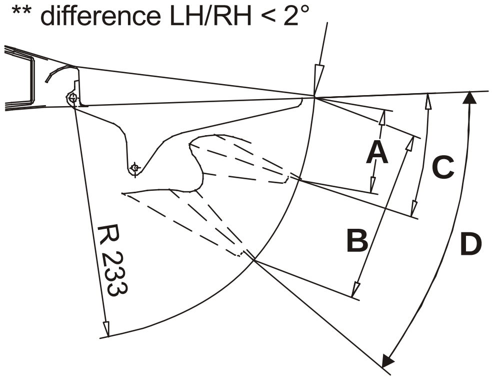
To measure the static moments you must remove the control surface from the airplane. Refer to Section 51-60 for the measuring procedure.

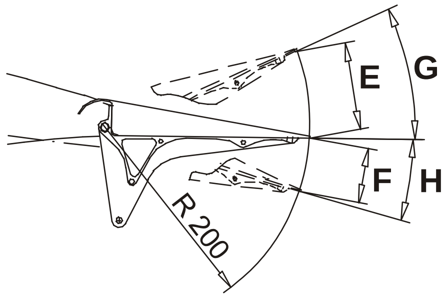
If the values are not within the limits in the Control Surface Balance Report, you must ask the manufacturer for advice before you adjust the balancing weight.

Note: The following Figures and Adjustment Reports are valid for all Serial Numbers.

	Flaps						Ailerons					
	Cruise		Take-Off		Landing		Up		Neutral		Down	
	left	right	left	right	left	right	left	right	left	right	left	right
Travel Limits [mm]	0 +8/-0		81 +16/-8 (see A)		167 +12/-4 (see B)		87 ±7 (see E)		0 ±3.5		52 +7/-0 (see F)	
Travel Limits [in.]	0 +0.32/-0		3.19 +0.64/-0.32 (see A)		6.57 +0.48/-0.16 (see B)		3.43 ±0.27 (see E)		0 ±0.14		2.06 +0.27/-0 (see F)	
Travel Actual												
Angle Limits [°]	0 +2/-0*		20 +4/-2 (see C)**		42 +3/-1 (see D)**		25 ±2 (see G)		0 ±1		+15 +2/-0 (see H)	
Angle Actual [°]												
	Split - Flap		Flap									
Initial Load Limit [kp]	3-10 (6.6-22.0 lbf)		3-5 (6.6-11.0 lbf)									
Initial Load Actual [kp]												

* difference LH/RH < 1°
** difference LH/RH < 2°





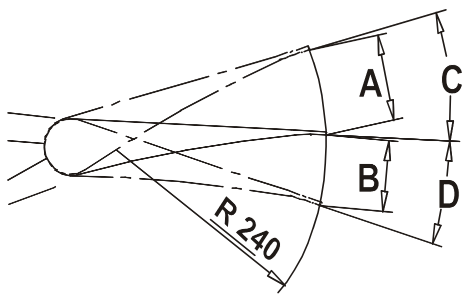
* difference LH / RH less than 1°

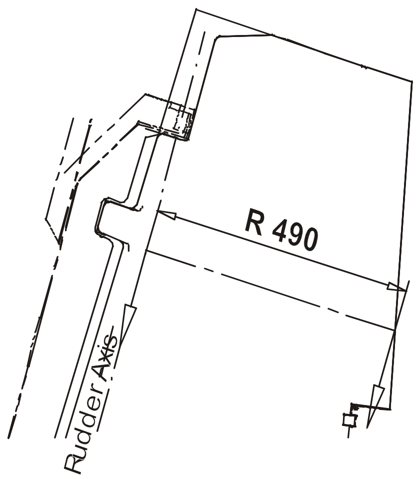
** difference LH / RH less than 2°

Figure 2: Control Surfaces Adjustment Report - Flaps and Ailerons

	Elevator		Rudder	
	up	down	left	right
Travel Limits [mm]	65 ±2 (see A)	54 ±4 (see B)	229 ±9 (see E)	245 ±9 (see F)
Travel Limits [in.]	2.55 ±0.08 (see A)	2.14 ±0.16 (see B)	9.01 ±0.34 (see E)	9.66 ±0.34 (see F)
Travel Actual				
Angle Limits [°]	15.5 ±0.5 (see C)	13 ±1 (see D)	27 ±1 (see G)	29 ±1 (see H)
Angle Actual [°]				

	up with variable elevator stop active
Travel Limits [mm]	54 ±2 (see A)
Travel Limits [in.]	2.14 ±0.08 (see A)
Travel Actual	
Angle Limits [°]	13 ±0.5 (see C)
Angle Actual [°]	





Top View

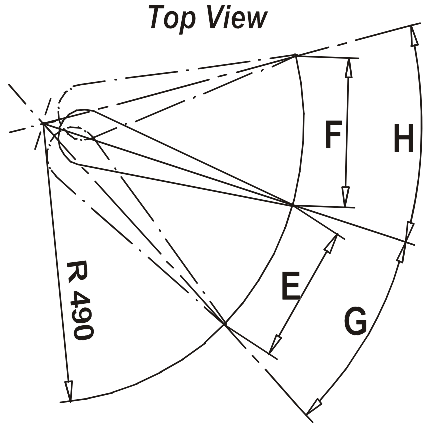


Figure 3: Control Surfaces Adjustment Report - Elevator and Rudder

	Elevator Trim								
	Elevator 10° Up			Elevator Neutral			Elevator 10° Down		
	Nose down	Neutral	Nose up	Nose down	Neutral	Nose up	Nose down	Neutral	Nose up
Travel Limits [mm]	55 ±7	23 ±5	28 ±8	40 ±7	8 ±5	45 ±7	28 ±9	5 ±5	67 ±4
Travel Limits [in.]	2.15 ±0.27	0.91 ±0.19	1.1 ±0.31	1.58 ±0.29	0.33 ±0.19	1.75 ±0.28	1.1 ±0.37	0.19 ±0.19	2.65 ±0.18
Travel Actual									
Angle Limits [°]	35 ±5	14 ±3	17 ±5	25 ±5	5 ±3	28 ±5	17 ±6	3 ±3	45 ±4
Angle Actual [°]									

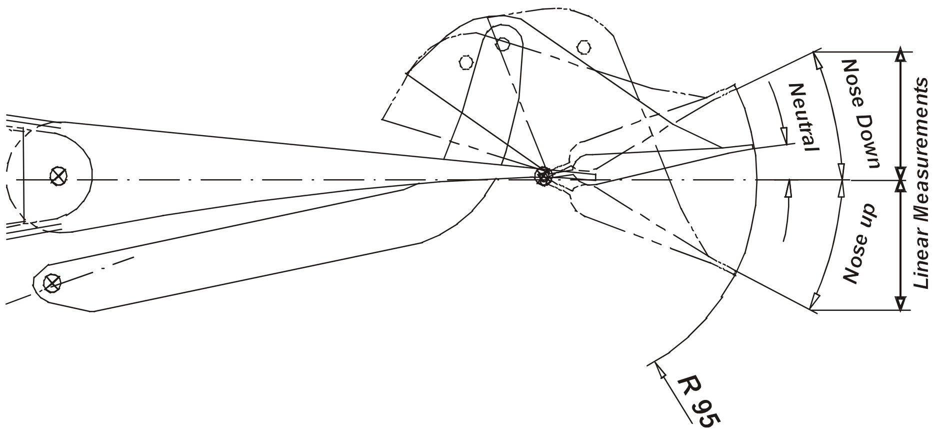


Figure 4: Control Surfaces Adjustment Report - Elevator Trim

	Rudder Trim								
	Rudder 20° LH			Rudder Neutral			Rudder 20° RH		
	Trim RH	Trim Neutral	Trim LH	Trim RH	Trim Neutral	Trim LH	Trim RH	Trim Neutral	Trim LH
Travel Limits [mm]	39 ±6	8 ±4	21 ±6	35 +5/-0	4 ±2	34 +5/-0	24 ±6	8 ±4	43 ±5
Travel Limits [in.]	1.5 ±0.21	0.32 ±0.13	0.82 ±0.22	1.36 +0.22/-0	0.13 ±0.09	1.32 +0.22/-0	0.96 ±0.22	0.32 ±0.13	1.67 ±0.22
Travel Actual									
Angle Limits [°]	34 ±5	7 ±3	18 ±5	30 +5/-0	3 ±2	29 +5/-0	21 ±5	7 ±3	37 ±5
Angle Actual [°]									

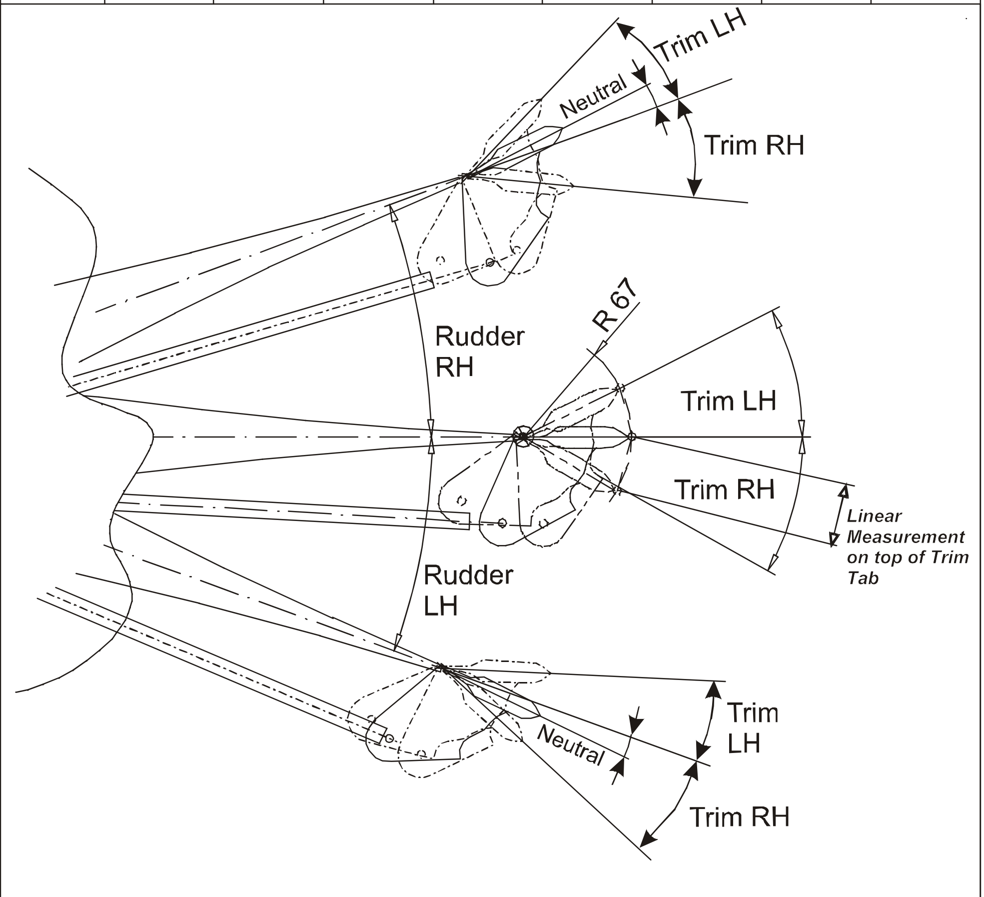


Figure 5: Control Surfaces Adjustment Report - Rudder Trim (if OÄM 42-252 NOT installed)

	Rudder Trim								
	Rudder 20° LH			Rudder neutral			Rudder 20° RH		
	Trim RH	Trim Neutral	Trim LH	Trim RH	Trim Neutral	Trim LH	Trim RH	Trim Neutral	Trim LH
Travel Limits [mm]	61 ±6	15 ±4	25 ±6	51 ±4	7 ±2	47 ±4	47 ±6	3 ±4	58 ±6
Travel Limits [in.]	2.40 ±0.24	0.59 ±0.16	0.98 ±0.24	2.01 ±0.16	0.28 ±0.08	1.85 ±0.16	1.85 ±0.24	0.12 ±0.16	2.28 ±0.24
Travel Actual									
Angle Limits [°]	54 ±5	13 ±3	22 ±5	45 ±3	6 ±2	41 ±3	41 ±5	3 ±3	51 ±5
Angle Actual [°]									

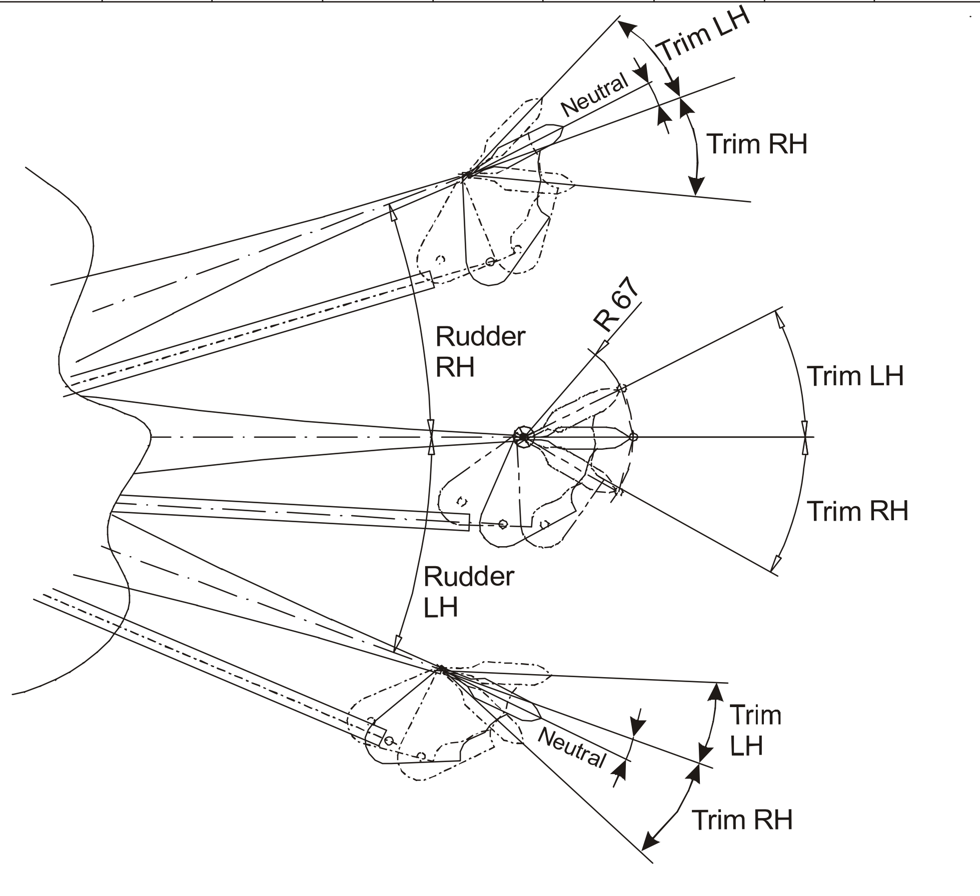
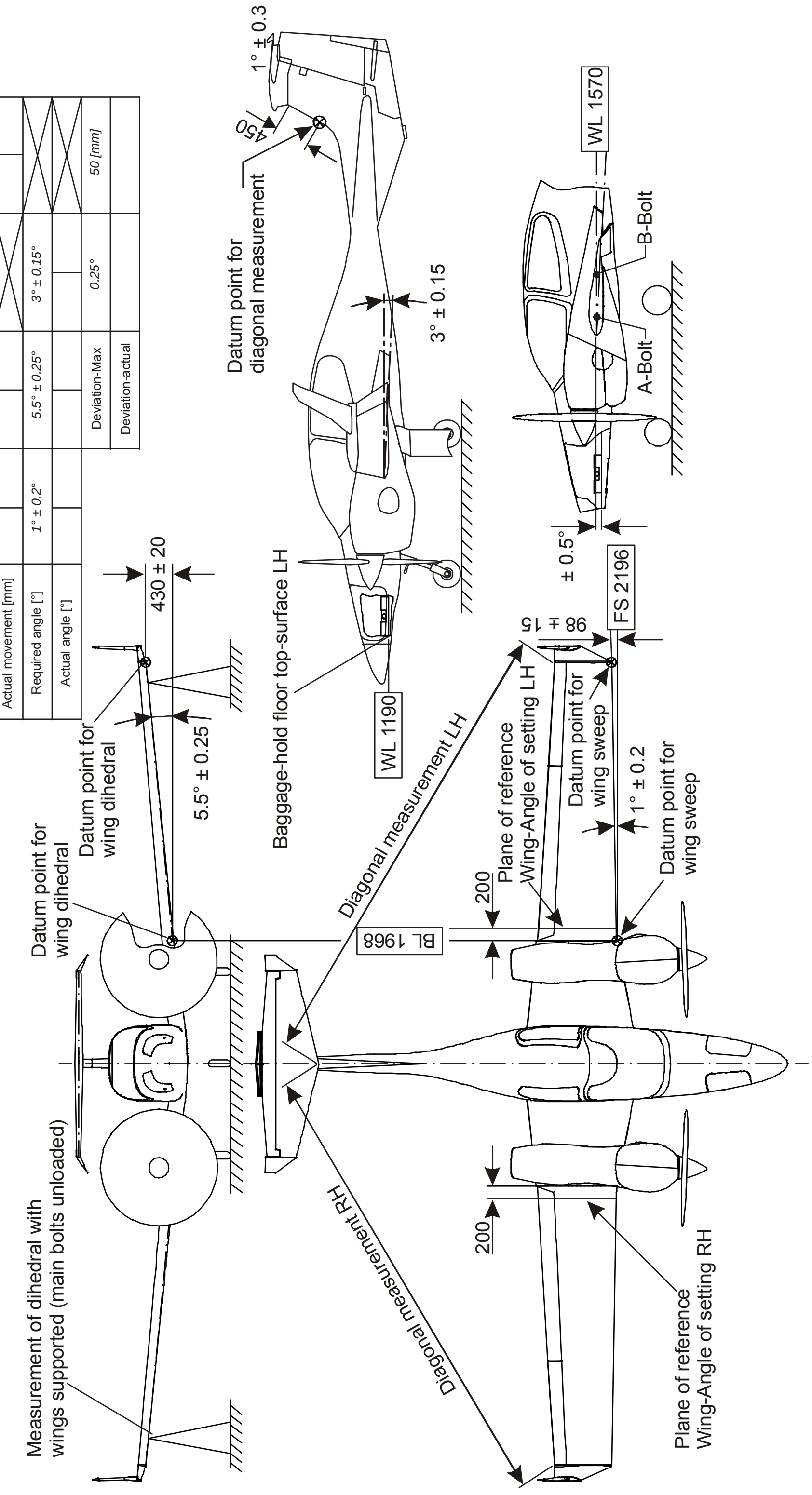


Figure 6: Control Surfaces Adjustment Report - Rudder Trim (if OÄM 42-252 is installed)



Wing	Sweep left	Sweep right	Dihedral left	Dihedral right	Angle of Incidence left	Angle of Incidence right	Diagonal measurement left	Diagonal measurement right
Required movement [mm]	(98 ± 15)		(430 ± 20)					
Actual movement [mm]								
Required angle [°]	1° ± 0.2°		5.5° ± 0.25°		3° ± 0.15°			
Actual angle [°]								
Deviation-Max					0.25°		50 [mm]	
Deviation-actual								

	Horizontal Stabilizer: Angle of Incidence	Horizontal Stabilizer: Symmetry	Reference Plane: Floor LH
Required angle [°]	1.0° ± 0.3°	0° ± 0.5°	0° ± 0.5°
Actual angle [°]			

Figure 7: Adjustment Report, General Items (Metric Dimensions)

Wing	Sweep left	Sweep right	Dihedral left	Dihedral right	Angle of Incidence left	Angle of Incidence right	Diagonal measurement left	Diagonal measurement right
Required movement [in]	(3.86 ± 0.59)		(16.93 ± 0.79)					
Actual movement [in]								
Required angle [°]	1° ± 0.2°		5.5° ± 0.25°		3° ± 0.15°			
Actual angle [°]								
			Deviation-Max		0.25°		1.97 [in]	
			Deviation-actual					

	Horizontal Stabilizer: Angle of Incidence	Horizontal Stabilizer: Symmetry	Reference Plane: Floor LH
Required angle [°]	1.0° ± 0.3°	0° ± 0.5°	0° ± 0.5°
Actual angle [°]			

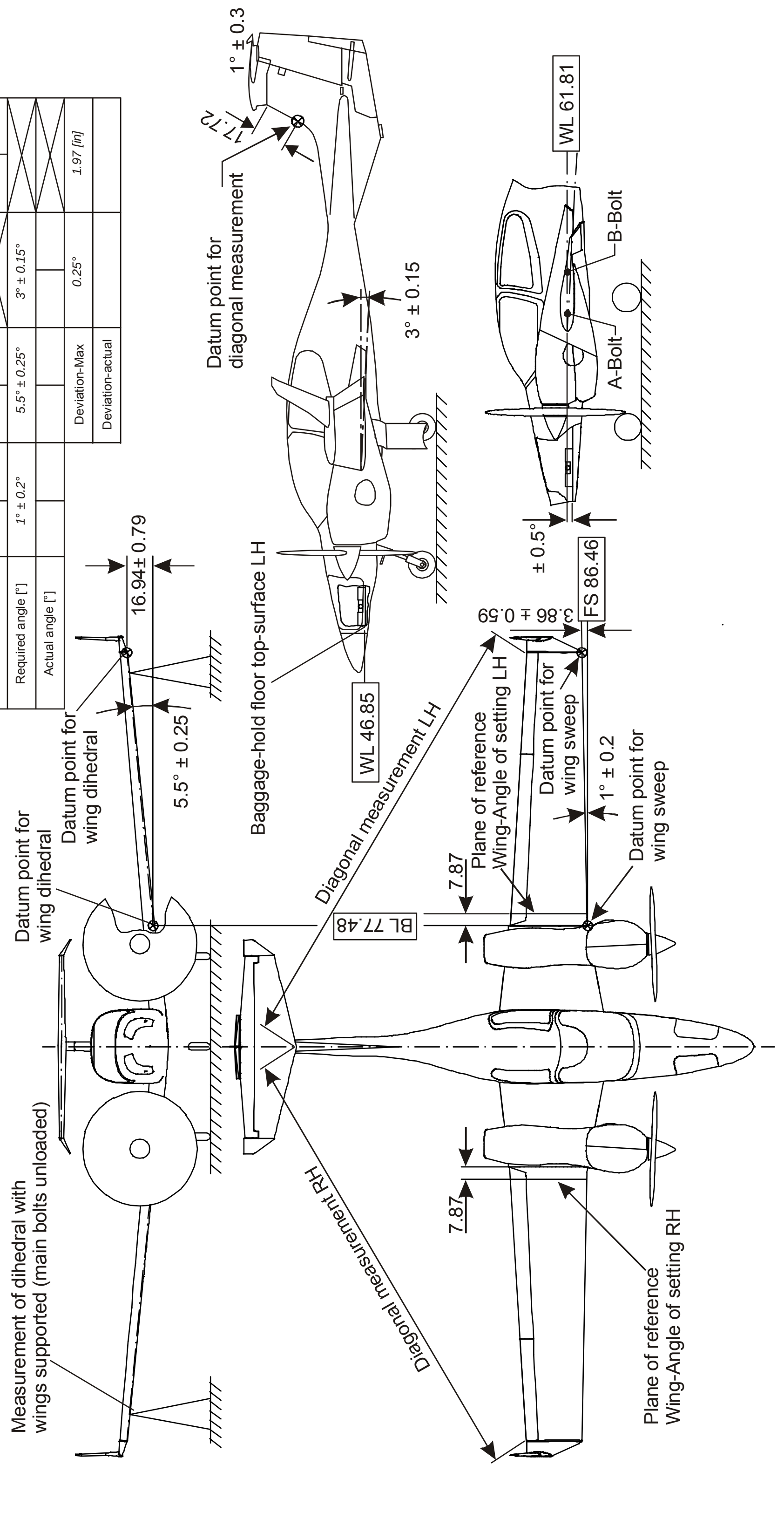


Figure 8: Adjustment Report, General Items (Imperial Dimensions)

Main Landing Gear Wheel-Track and Camber Report (for test/adjustment procedure refer to Section 32-10 or 32-11 Paragraph 11)		
	Check procedure	**Measured data**
(1)	Perform check at basic weight (Fuel tank empty).	
(2)	Set airplane MLG-wheels on relocatable plates (2 steel plates 250 x 300 x 2 mm; use Aeroshell grease between steel plates to reduce friction).	
(3)	Use either a track/camber fixture or perform the check manually.	
	Measure wheel track	
(4)	Track LH wheel	dvsl= -------------------------------------- °
(5)	Track RH wheel	dvsr= -------------------------------------- °
(6)	Angle between LH and RH wheel (dvsl + dvsr)	dvs= -------------------------------------- °
	Measure wheel camber	
(7)	Camber LH wheel	gl= -------------------------------------- °
(8)	Camber RH wheel	gr= -------------------------------------- °
	Measure track width	
(9)	Overall track width	S= -------------------------------------- m

Figure 9: Main Landing Gear Wheel-Track and Camber Report

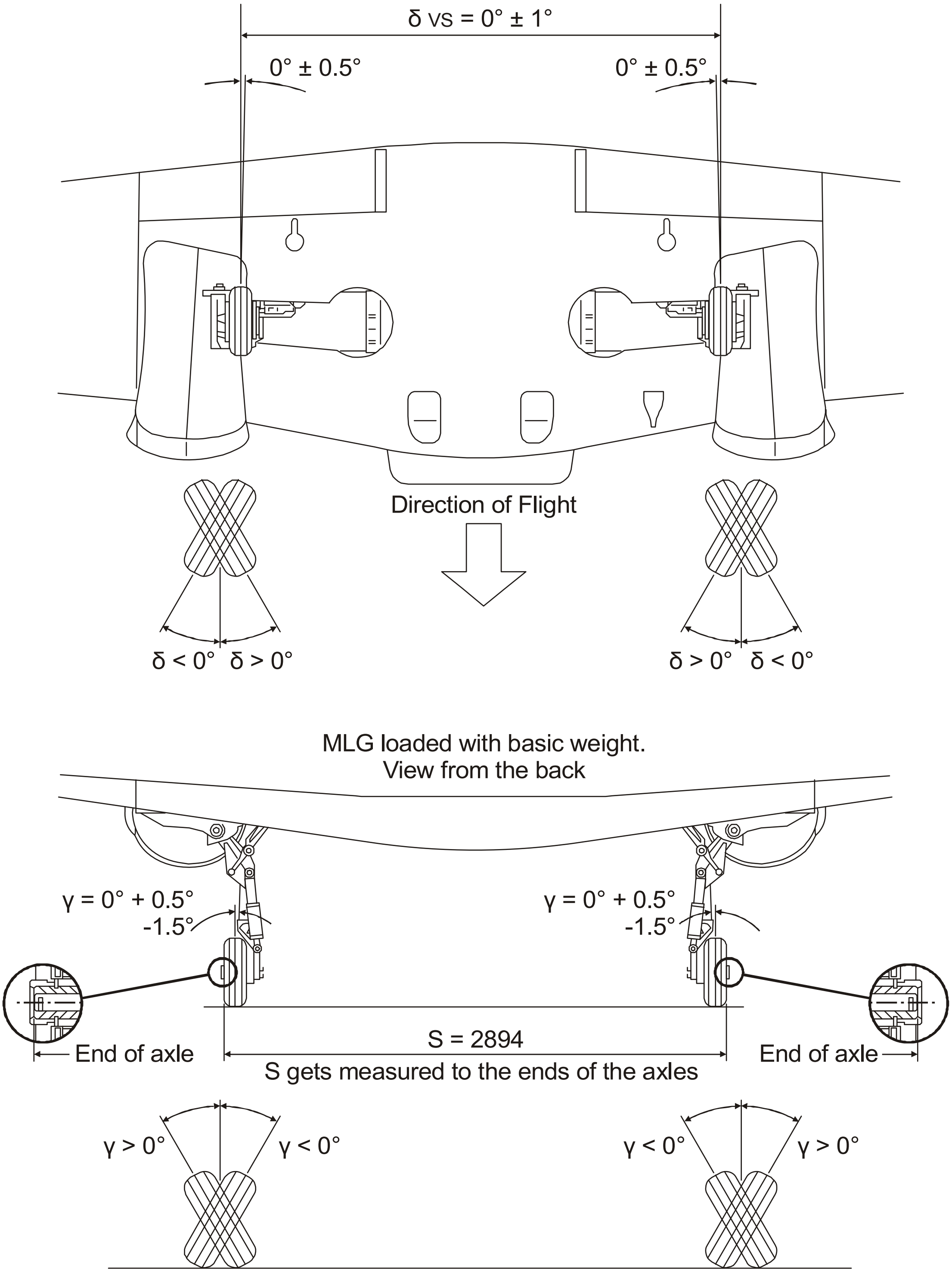


Figure 10: Main Landing Gear Track and Camber

CHAPTER 07

LIFTING AND SHORING - GENERAL

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CHAPTER 07
LIFTING AND SHORING - GENERAL

1. General

The DA 42 has no lifting points. You must use straps to lift the airplane. Two persons can lift the outer wing, or the horizontal stabilizer, or any of the airplane control surfaces.

Section 07-10 tells you how to lift the airplane with jacks.

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Section 07-10
Jacking

1. General

The DA 42 has 2 jacking points, one under each stub-wing. For maintenance lift the fuselage with 2 hydraulic jacks. Use a trestle with a special former to hold the front of the fuselage. Use standard trestles under the wings at the position where the winglets connect to the wing.

Refer to Figure 1.

2. Lifting the Airplane on Jacks

CAUTION: DO NOT JACK THE AIRPLANE AND SWITCH ON THE STALL HEATER (PITOT HEAT SWITCH)! THE HEATERS CAN BURN OUT IN A FEW SECONDS.

A. Equipment

Item	Quantity	Part Number
Airplane jacks (900 kg / 2000 lb minimum lifting capacity).	2	Commercial.
Nose trestle.	1	Commercial.
Wing trestles.	2	Commercial.
Ballast (min. 50 kg / 110 lb).	1	Local Manufacture.
Belt.	1	Commercial.

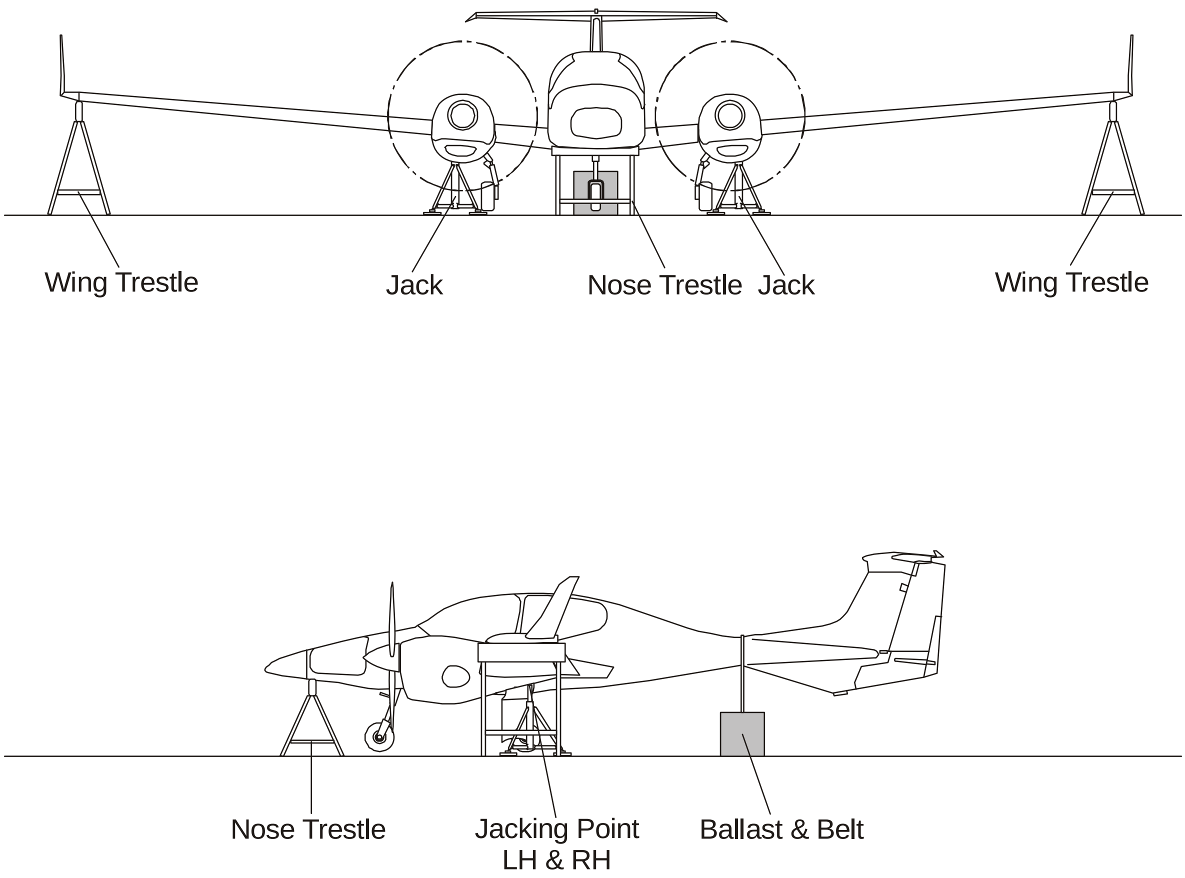

Figure 1: Lifting the Airplane on Jacks

B. Lifting the Airplane

	Detail Steps/Work Items	Key Items/References
	CAUTION: IF THE AIRPLANE IS IN THE OPEN THEN ALIGN IT INTO THE WIND. MAXIMUM WIND SPEED: 10 KM/H (6 KTS).	
(1)	Apply the parking brake. Put chocks under the main wheels.	
(2)	Put the 2 jacks into position under the main jacking points. Extend the jacks to engage with the jacking plates. Ensure proper alignment.	Refer to Figure 1. The jacking plates are bonded to the bottom surface of the stub wing, under of the forward main spar.
(3)	Tie down the tail section by use of a belt connected to the ballast.	
(4)	Extend all the jacks until the airplane wheels are clear of the ground.	You must operate all the jacks together to keep the airplane level.
(5)	If necessary, level the airplane.	Refer to Section 08 - 20.
	CAUTION: DO NOT PUT TRESTLES UNDER THE MIDDLE OF THE WING. YOU MUST ONLY PUT TRESTLES AT THE TIPS OF THE WINGS.	
(6)	Put the wing trestles in position under each wing, at the tip.	Refer to Figure 1.
(7)	Put the nose trestle into position under the front fuselage.	At the front bulkhead.
	CAUTION: YOU MUST USE THE NOSE TRESTLE. CG MOVEMENTS, E.G. RETRACTION/EXTENSION OF THE LANDING GEAR, MAY OVERBALANCE THE AIRPLANE. THE AIRPLANE CAN TILT FORWARD.	

C. Lowering the Airplane

	Detail Steps/Work Items	Key Items/References
WARNING:	**MAKE SURE THAT THE AREA UNDER THE AIRPLANE IS CLEAR BEFORE YOU LOWER THE AIRPLANE WITH THE JACKS.**	
(1)	Remove the nose trestle from under the front fuselage.	
(2)	Remove the wing trestles from under the wing tips.	
(3)	Retract the jacks until the airplane wheels are on the ground.	Retract the 2 jacks equally to keep the airplane level at all times.
(4)	Apply the parking brake. Put chocks under the wheels.	
(5)	Retract the 2 jacks fully and move the jacks clear of the airplane.	
(6)	Remove the belt and the ballast from the fuselage.	

Section 07-11
Hoisting

1. General

You do not need any lifting equipment to remove the wings and you do not need any lifting equipment to remove the horizontal stabilizer.

Use a sling assembly similar to the sling assembly shown in Figure 1. The sling assembly must have a lifting capacity of 1800 kg (3969 lb). If you remove any equipment (for example, an engine or landing gear leg), you move the center of gravity of the airplane. If you move the center of gravity of the airplane then you must change the lifting position of the lifting sling assembly. You can do this by repositioning the sling straps or by repositioning the shackle on the lifting beam.

WARNING: DO NOT GO UNDER THE AIRPLANE WHEN IT IS HELD BY THE HOIST. IF THE HOIST FAILS, YOU CAN BE INJURED.

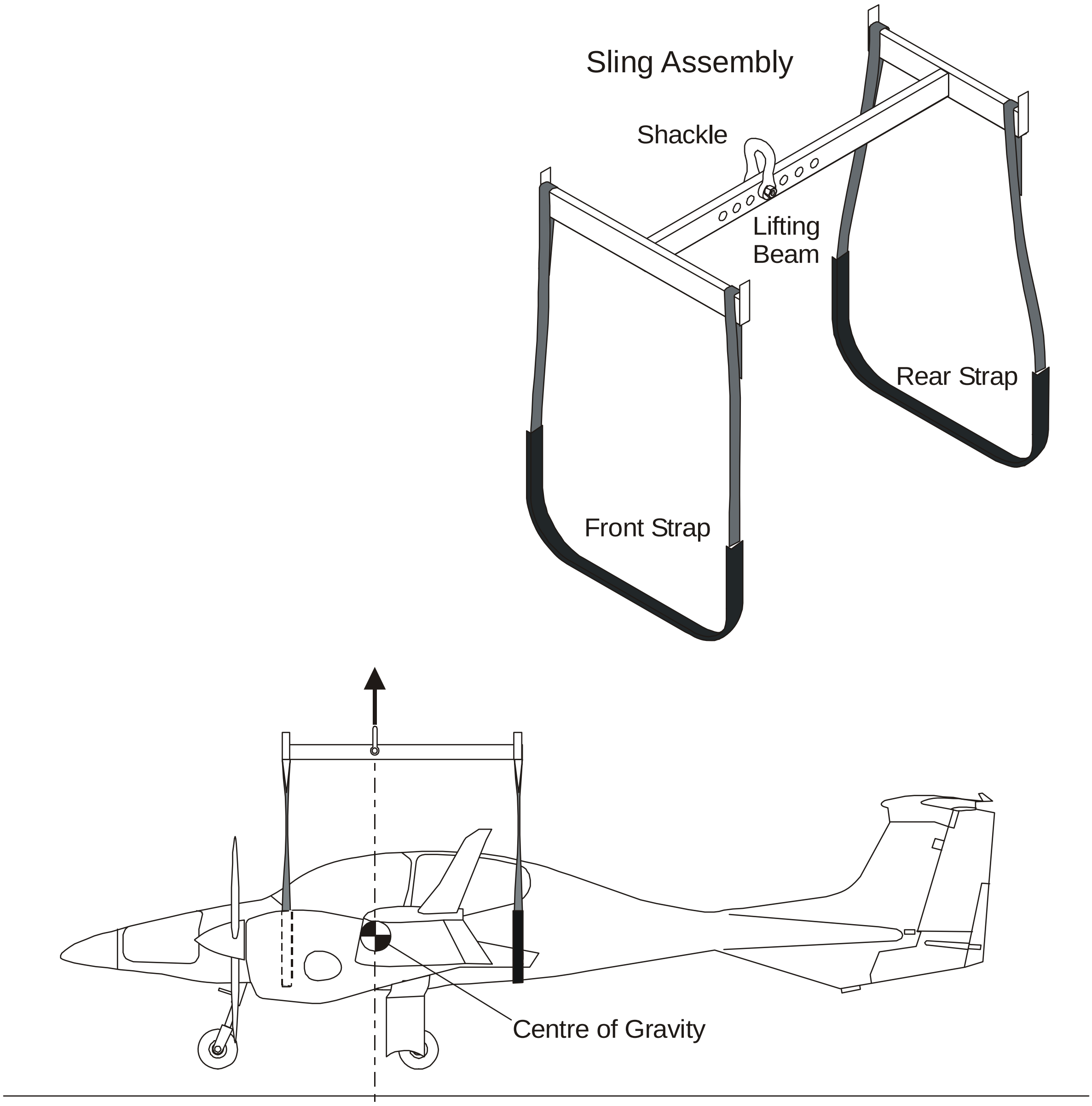

Figure 1: Hoisting the Airplane

CHAPTER 08

LEVELING AND WEIGHING

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CHAPTER 08
LEVELING AND WEIGHING

1. General

This Chapter tells you how to weigh the airplane. It also tells you how to level the airplane. Use the procedures given in Section 08-10 to weigh the airplane and to calculate the airplane moment. Use the procedures in Section 08-20 to level the airplane.

Note: In this Airplane Maintenance Manual masses are referred to as weights. The authors accept that this is technically incorrect but have used the expression for simplicity and convenience.

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Section 08-10
Weighing

1. General

Only operate the airplane within the permitted range of weight and center of gravity limits. This will give good flight performance and good handling qualities. It is also necessary for safe operation of the airplane.

If you make any changes to the airplane that may alter the weight (or the center of gravity), then you must calculate the new weight of the airplane. You must also calculate the center of gravity.

Only an approved person can weigh the airplane. The national airworthiness authority of the country where the airplane is registered gives approval for persons who can weigh the airplane. It also gives the time limits for when the airplane must be weighted.

Use the Weighing Report when you do the weigh and balance calculations (refer to Figure 4 or Figure 6).

You can use mechanical scales or electronic weighting units to weigh the airplane. Electronic weighing units give more accurate and consistent results. They are also easier to use. You must obey the manufacturers’ instructions for using the scales or weighting units.

The reference plane for the DA 42 is a transverse, vertical plane in front of the airplane. It is at right angles to the horizontal reference line. The reference plane lies at 2196 mm (86.46 in) in front of the stub-wing leading edge at the wing root rib.

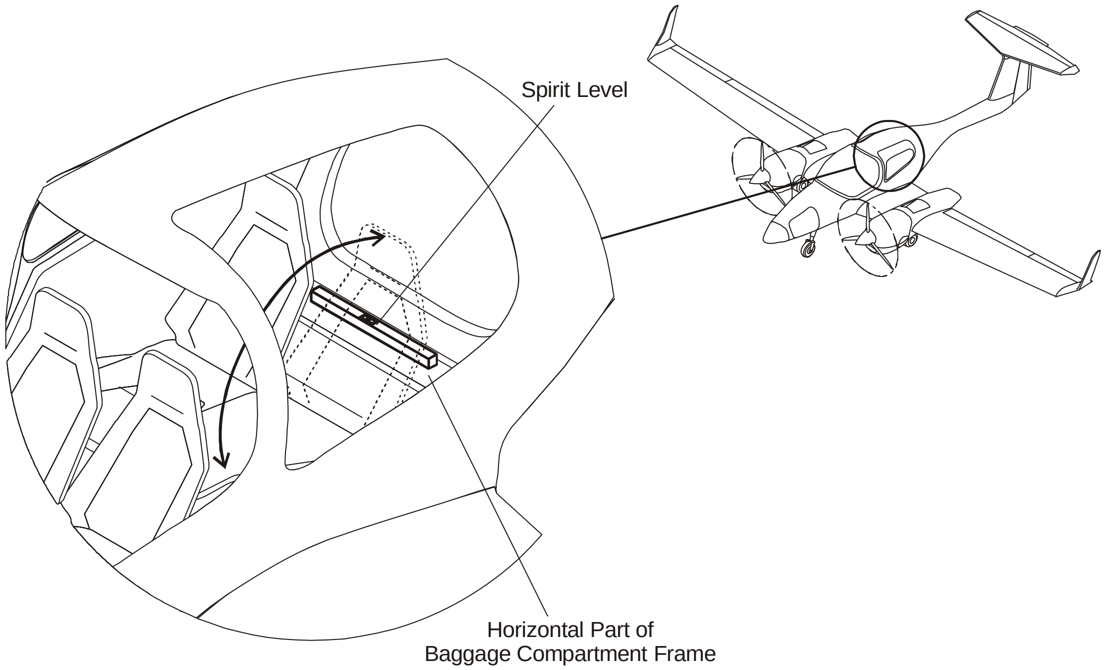


Figure 1: Level the Airplane Laterally for Weighing

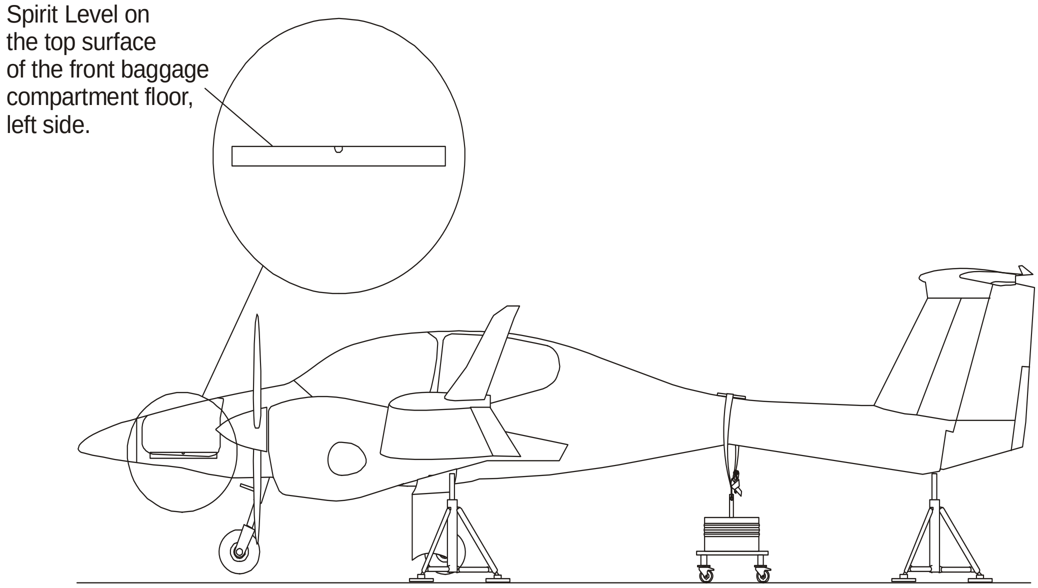
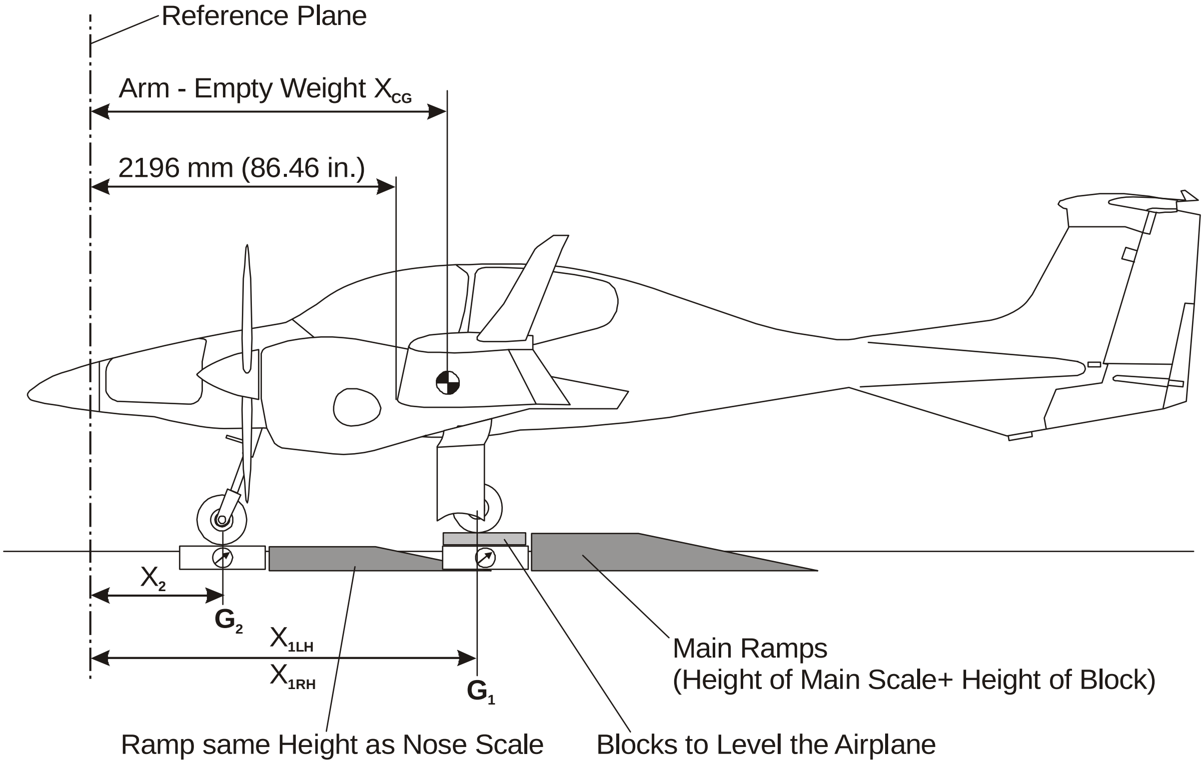


Figure 2: Level the Airplane Longitudinally for Weighing



X_1 = 2780 mm (109.45 in.)
X_2 = 925 mm (36.42 in.)

Legend:

X_1 = Arm, Reference Plane to center line of main wheels.

X_2 = Arm, Reference Plane to center line of nose wheel.

G_1 = G_{1LH} + G_{1RH} = Net weight, main wheel scales LH and RH.

G_2 = Net weight, Nose wheel scale.

G = G_{1LH} + G_{1RH} + G_2 = Empty Weight.

X_{CG} = Arm - Empty Weight center-of-gravity (calculated).

Figure 3: Weighing Dimensions for Mechanical Scales Under the Wheels

2. Weighing with Mechanical Scales Under the Wheels

If you use mechanical scales to weigh the airplane, you must also use wooden blocks under the wheels to level the airplane. You must obey the manufacturers instructions for using the scales.

A. Equipment

Item	Quantity	Part Number
Mechanical scales (The scales used for the main wheels must be the same).	3	Commercial.
Spirit level.	1	Commercial.
Plumb line.	1	Commercial.
Wooden blocks (various thicknesses).	A/R	Local Manufacture.
Ramps.	3	Local Manufacture.
Optional: Airplane jacks (1000 kg / 2200 lb minimum lifting capacity).	3	Commercial.

Note: This procedure uses jacks because the main wheel scales need a number of blocks to bring the airplane level.

Before you weigh the airplane do these items:

– Make sure that the airplane has all its equipment. The equipment must be in the location given in the Airplane Inventory.

– Defuel the airplane to the unusable fuel level 7.57 liters (2 US gal). Refer to Section 12-10.

– Replenish the engine oils, hydraulic fluid and cooling fluid up to the maximum levels. Refer to Section 12-10.

– Clean the airplane and dry it. Check that all the water drain holes are unobstructed. Refer to Section 12-20.

– Remove all objects which are not part of the Airplane Inventory (for example tools, baggage, etc.).

B. Weighing Procedure with Mechanical Scales Under the Wheels

	Detail Steps/Work Items	Key Items/References
Note: Weigh the airplane in a closed room. This will avoid any wind causing weighing errors.		
(1)	Make a copy of the Weighing Report form.	Figure 4.
(2)	Put the weighing scales in position on the floor in front of each wheel.	
(3)	Zero the scales.	Refer to the scale manufacturer’s instructions.
(4)	Close the canopy.	
(5)	Lift the airplane on jacks.	Refer to Section 07-10.
(6)	Put the flat part of the ramps under each wheel.	
(7)	Lower the airplane onto the ramps with the jacks. Remove the jacks.	Refer to Section 07-10.
(8)	Put a wooden block on the scale in front of each main wheel.	The blocks should be of the same thickness. Figure 3.
(9)	Push the airplane forward onto the scales.	Make sure that the wheels are above the center of the scales.
(10)	Make the airplane level laterally: – Put a spirit level on the horizontal surface of the baggage compartment frame. – If necessary, use additional thin blocks between the scale and the main wheel on the low side to bring the spirit level horizontal.	Refer to Figure 1. Behind the back seats. Push the airplane on and off the scales as necessary. Make sure that you do not touch the airplane when you read the spirit level.

	Detail Steps/Work Items	Key Items/References
(11)	Make the airplane level longitudinally: – Place a spirit level on the top surface of the front baggage compartment floor, left side. – Put thin blocks between the nose wheel and the scale to bring the spirit level horizontal. – Or, if necessary, reduce the air pressure in the nose wheel tire to bring the spirit level horizontal.	Refer to Figure 2.
(12)	Remove the leveling equipment from the airplane.	
(13)	Put the rear passenger seats in the upright position.	
(14)	Close the passenger door.	
(15)	Read the value from the left main wheel scale. Enter the value on the weighing form under MAIN G_{1LH} Gross.	
(16)	Read the value from the right main wheel scale. Enter the value on the weighing form under MAIN G_{1RH} Gross.	
(17)	Read the value from the nose wheel scale. Enter the value on the weighing form under NOSE G_2 Gross.	
(18)	Use the plumb line to mark the position of the reference plane on the floor: – Hold the plumb line against the leading edge of the wing where the wing joins the stub-wing. – Mark this position on the floor. – Draw a straight line between the 2 points you marked on the floor. – Draw a second line 2196 mm (86.45 in) forward of the first line.	Do this on each side.

	Detail Steps/Work Items	Key Items/References
(19)	Use the plumb line to mark the position of the nose wheel center line on the floor.	
(20)	Use the plumb line to mark the position of each main wheel center line on the floor.	
(21)	Lift the airplane off the scales with the jacks.	Refer to Section 07-10.
(22)	Read the weight of the wooden blocks on each of the scales. Record the values in the column headed TARE in the Weighing Report.	
(23)	Remove the scales and the ramps.	
(24)	Measure the distance X_{1LH}. Record the value in the Weighing Report.	
(25)	Measure the distance X_{1RH}. Record the value in the Weighing Report.	
(26)	Measure the distance X_2. Record the value in the Weighing Report.	
(27)	Refer to the calibration records for the weighing scales. If necessary, correct the Gross and Tare values of MAIN G_{1LH}, MAIN G_{1RH}, and NOSE G_2.	
(28)	Subtract each Tare value from the related Gross value. Record the result under Net in the Weighing Report.	
(29)	Lower the airplane with the jacks.	
(30)	Calculate the Empty Weight, G, from the Net values.	$G = \text{Net } G_{1LH} + \text{Net } G_{1RH} + \text{Net } G_2$
(31)	Calculate the Empty Weight Moment, M.	$M = (G_{1LH} * X_{1LH})+(G_{1RH} * X_{1RH}) + (G_2 * X_2)$
(32)	Calculate the position of the Empty Weight Center-of-Gravity, X_{CG}.	$X_{CG} = M/G$
(33)	Record the Empty Weight (G) and the Empty Weight Moment (M) in the Airplane Flight Manual.	

WEIGHING REPORT

Model: DA 42   Serial Number:___________ Registration:_____________

Data with reference to the Type Certificate Data Sheet and the Airplane Flight Manual.

Reference Plane: Vertical plane 2196 mm (86.46 in) in front of the leading edge of wing at the root rib.

Horizontal reference line: Front baggage compartment floor, left side.

Equipment Inventory - dated:_______ Cause for Weighing:______________________________

Weight and Balance Calculations (Weighing at the wheels)

Weight Condition: Include brake fluid, hydraulic fluid, coolant, engine oil, unusable fuel main tanks (7.57 liters/ 2 US gal) and unusable fuel auxiliary tanks (if installed, 5.0 liters/ 1.32 US gal).

Support	**Gross**	**Tare**	**Net**
MAIN G_{1LH}			
MAIN G_{1RH}			
NOSE G_2			
		Empty Weight	

Lever Arm
X_{1LH} = ... mm (..... in.)
X_{1RH} = ... mm (..... in.)
X_2 = ... mm (..... in.)

Calculate the Empty Weight, G = MAIN G_{1LH} + MAIN G_{1RH} + NOSE G_2.	G =
Calculate the Empty Weight Moment, $M = (G_{1LH} * X_{1LH}) + (G_{1RH} * X_{1RH}) + (G_2 * X_2)$.	M =
Calculate the Empty Weight Center-of-Gravity position, X_{CG} = M/G.	X_{CG} =
Maximum permitted all-up-weight: Max AUW.	
Maximum useful load = Max AUW - G.	

Record the Empty Weight (G) and the Empty-Weight Moment (M) in the Airplane Flight Manual.

Place/Date	Authorizing Stamp	Authorizing Signature

Figure 4: Weighing Report for Mechanical Scales Under the Wheels

Section 08-20
Leveling

1. General

These procedures tell you how to make the airplane level. See Section 07-10 for lifting the airplane with jacks.

Make the airplane level with jacks unless you are weighing the airplane.

If you have to do an asymmetry test, use the jacks to make the airplane level. If you weigh the airplane, change the airplane tire pressures or use blocks to make the airplane level (see Section 08-10).

2. Make the Airplane Level with Jacks

A. Equipment

Item	Quantity	Part Number
Airplane jacks (1000 kg / 2200 lb minimum lifting capacity).	2	Commercial.
Wing trestle.	2	Commercial.
Nose trestle.	1	Commercial.
Spirit level.	1	Commercial.

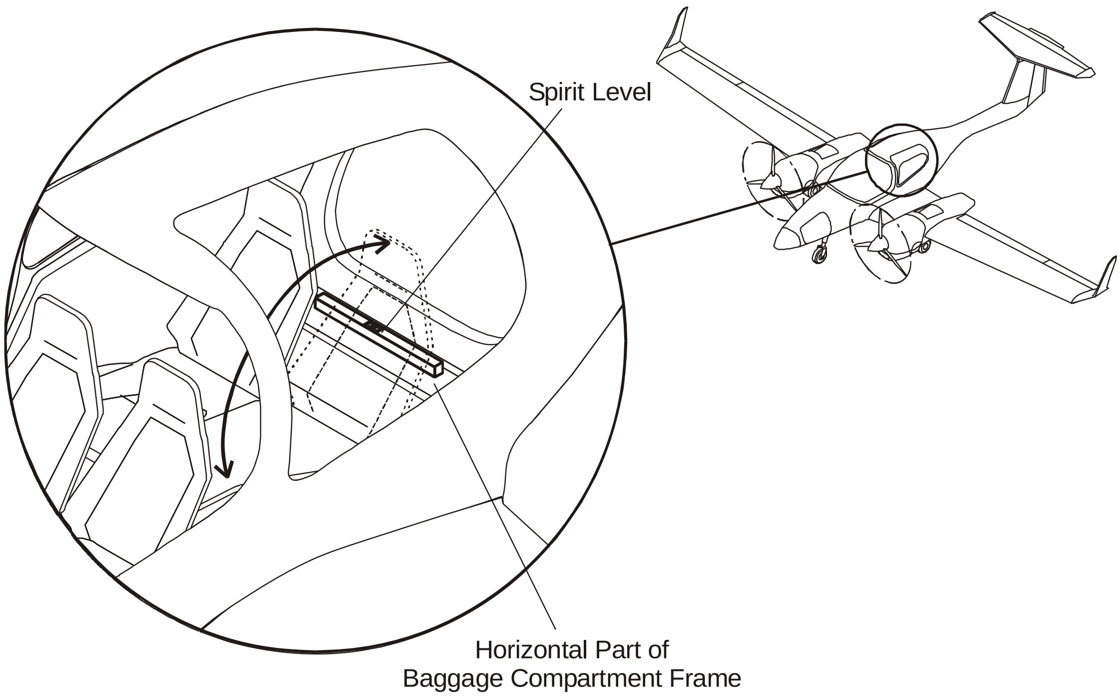


Figure 1: Level the Airplane Laterally

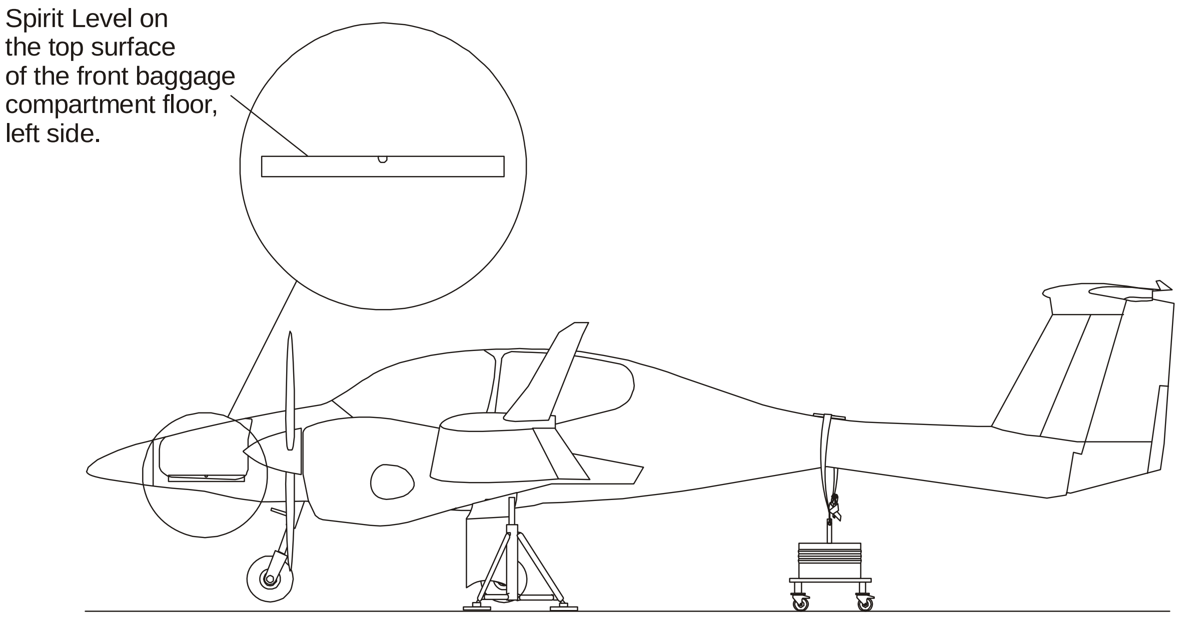


Figure 2: Level the Airplane Longitudinally

B. Level the Airplane with Jacks

	Detail Steps/Work Items	Key Items/References
Note: Weigh the airplane in a closed room.		
(1)	Fasten the ballast with the belt at the airplane.	Refer to Figure 2.
(2)	Lift the airplane on jacks.	Refer to Section 07-10. Pay attention not to lift the ballast.
(3)	Make the airplane level laterally: – Put a spirit level on the horizontal surface of the baggage compartment frame. – Adjust the main jacks to bring the sprit level horizontal.	Refer to Figure 1. Behind the back seats.
(4)	Make the airplane level longitudinally: – Place a spirit level on the top surface of the front baggage compartment floor, left side. – Adjust the tail jack to bring the spirit level horizontal.	Refer to Figure 2.
(5)	Put trestles under each wing and the front fuselage.	Refer to Section 07-10.
(6)	Remove the leveling equipment from the airplane.	

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CHAPTER 09

TOWING AND TAXIING - GENERAL

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CHAPTER 09
TOWING AND TAXIING - GENERAL

1. General

You can move the airplane on the ground by hand or by taxiing it. Use the procedures in Section 09-10 and Section 09-20 to move the airplane safely. Section 09-10 tells you how to tow the airplane. Section 09-20 tells you how to taxi the airplane.

WARNING: YOU MUST NOT TAXI THE AIRPLANE UNLESS YOU HAVE BEEN TRAINED TO TAXI AND HAVE BEEN AUTHORIZED BY YOUR AIRWORTHINESS AUTHORITY.

WARNING: YOU MUST NOT EXCEED THE WHEEL STEERING ANGLE LIMITS WHEN TOWING THE AIRPLANE WITH A TOW VEHICLE. EXCEEDING THE WHEEL STEERING ANGLE LIMITS WILL DAMAGE TO THE NOSE GEAR LEG AND THE RUDDER CONTROL SYSTEM.

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Section 09-10
Towing

1. General

You can move the airplane by hand with or without using a steering or tow bar. You can push or pull the DA 42 at the inner section of the propeller blades near the spinners. You can push the DA 42 at the wing nose and at the rough upper surface of the center wing, inboard of the engine nacelle. Nevertheless the use of a tow bar facilitates towing and is preferable to pulling or pushing.

You can move the airplane using a tow vehicle that is suitable in size and power. You must not exceed the maximum wheel steering angle and starting and stopping of the movement must always be smooth and slowly to avoid damaging the nose landing gear. A qualified person must sit in the cockpit for immediate braking action in the event that the tow vehicle becomes uncoupled.

2. Towing Procedure

WARNING: DO NOT PUSH ON THE SPINNERS. IF YOU PUSH ON A SPINNER YOU CAN DAMAGE THE SPINNER WHICH CAN CAUSE VIBRATION.

CAUTION: NEVER USE FORCE ON THE PROPELLER TIPS OR ON THE CONTROL SURFACES. YOU CAN DAMAGE THE PROPELLERS AND THE CONTROL SURFACES.

CAUTION: NEVER APPLY WEIGHTS TO THE TAILPLANE TO LIFT THE NOSE WHEEL. YOU CAN DAMAGE THE TAILPLANE.

CAUTION: NEVER TOW THE AIRPLANE IF THE WHEELS ARE BLOCKED BY SNOW OR MUD. YOU CAN DAMAGE THE LANDING GEAR.

CAUTION: THE NOSE MAXIMUM WHEEL STEERING ANGLE IS 40º TO THE LEFT AND RIGHT. IF YOU TURN THE WHEEL MORE THAN 40º YOU WILL CAUSE DAMAGE TO THE NOSE GEAR.

A. Movement by Hand

To move the airplane on ground, it can be pushed or pulled by hand on the inner section of the propeller blades near the spinner or pushed at the wing nose and at the rough surface of the center wing, inboard of the nacelles. Do not push on the spinners, as you can damage the spinner which may cause vibration and damage to the engine. Do not use force on the propeller tips or on the airplane control surfaces and do not push on the de-icing nozzles (if installed) on the propeller blade root, as you may damage the propeller, the control surfaces or the de-icing nozzles.

It is recommended to use the steering bar or a tow bar which is available from the manufacturer to assist steering and towing. The tow bar is engaged in the appropriate hole in the nosewheel as shown in Figure 1.

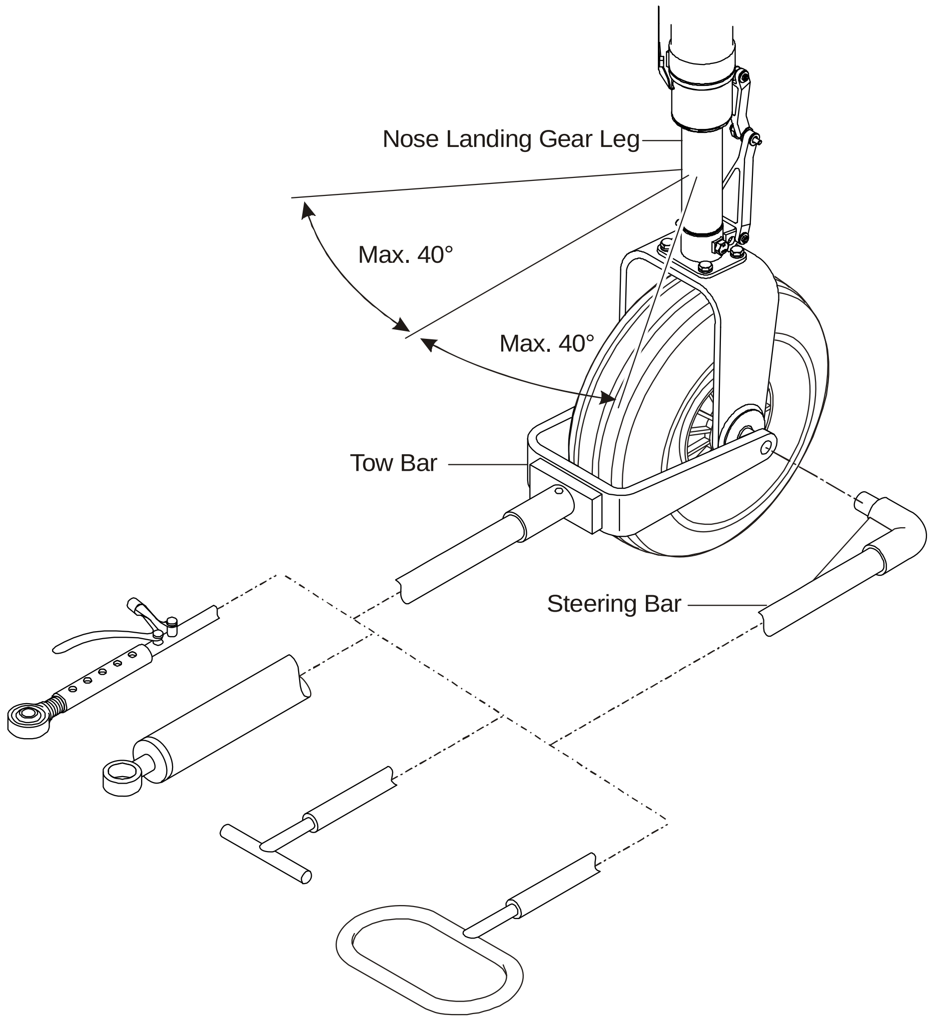

Figure 1: Steering Bar or Tow Bar Attachment

B. Movement with a Tow Vehicle

When towing the airplane with a tow vehicle, a qualified person must sit in the cockpit ready for immediate braking action, in the event that the tow vehicle becomes uncoupled. The movement of the tow vehicle should always be started and stopped slowly to avoid shock loads on the nose landing gear. The maximum steering angle of 40 degrees to either side must not be exceeded.

If the airplane must be pulled out of soft ground or deep snow, towing lines must be used. The towing lines should be attached to the main landing gear struts as high as possible without interfering with the brake lines. The ropes should be long enough to sufficiently clear the nose or tail. Make sure the wheels are not blocked by snow or mud. A qualified person must sit in the cockpit to maintain control of the airplane using the nose wheel steering and brakes.

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Section 09-20
Taxiing

1. General

The DA 42 can easily be taxied by using the nose wheel steering. To reduce the turn radius the wheel brakes furthered by asymmetric power can be used.

WARNING: DO NOT TAXI THE AIRPLANE UNLESS YOU HAVE BEEN TRAINED TO TAXI AND YOU HAVE BEEN AUTHORIZED.

CAUTION: THIS SECTION GIVES GENERAL DATA ON TAXIING ONLY. YOU MUST USE THE DA 42 AIRPLANE FLIGHT MANUAL WHEN YOU TAXI THE AIRPLANE.

<table>
<tr><th colspan="2">Detail Steps/Work Items</th><th>Key Items/References</th></tr>
<tr><td>(1)</td><td>Make sure that the area around the airplane is clear of objects.</td><td>For example: Ground equipment and tools.</td></tr>
<tr><td>(2)</td><td>Operate the parking brake.</td><td></td></tr>
<tr><td>(3)</td><td>If necessary remove:
– The wheel chocks.
– The tow bar.
– The mooring ropes.
– Any other support equipment attached to the airplane.</td><td></td></tr>
<tr><td colspan="3">WARNING: MAKE SURE THAT THERE ARE NO PERSONS OR OBJECTS NEAR THE AIRPLANE. THE AIRPLANE CAN INJURE PERSONS. OBJECTS CAN CAUSE DAMAGE TO THE AIRPLANE.</td></tr>
<tr><td>(4)</td><td>Start the engines.</td><td>Refer to the DA 42 Airplane Flight Manual.</td></tr>
<tr><td>(5)</td><td>Release the parking brake.</td><td></td></tr>
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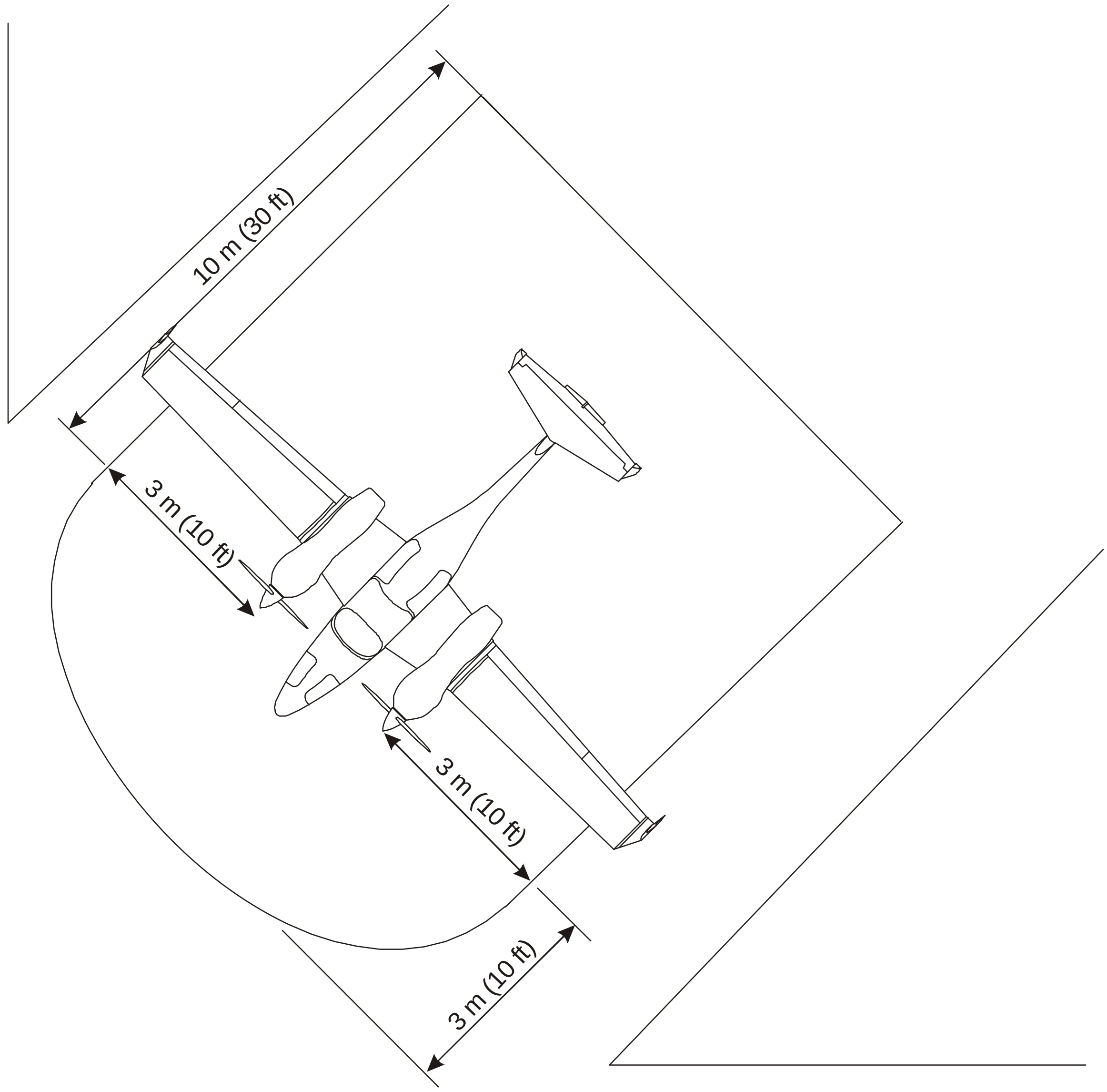

Figure 1: The Safety Area for Taxiing the DA 42 Airplane

<table>
<tr><th colspan="2">Detail Steps/Work Items</th><th>Key Items/References</th></tr>
<tr><td colspan="3">WARNING: MAKE SURE THAT THE BRAKES OPERATE CORRECTLY WHEN YOU TAXI THE AIRPLANE. IF THE BRAKES SHOULD FAIL, YOU MUST BE ABLE TO STOP THE AIRPLANE BEFORE YOU HIT PERSONS OR EQUIPMENT.

CAUTION: COMPLY WITH THE SAFETY AREA FOR TAXIING SHOWN IN FIGURE 1.

CAUTION: TAKE CARE IF YOU TAXI ON UNEVEN GROUND. THE PROPELLERS MUST NOT TOUCH THE GROUND. LOOSE STONES AND GRAVEL CAN DAMAGE THE PROPELLERS. USE THE LOWEST POSSIBLE RPM TO REDUCE THE RISK OF FOREIGN OBJECT DAMAGE TO THE PROPELLERS.</td></tr>
<tr><td>(6)</td><td>Taxi the airplane to the new position.</td><td></td></tr>
<tr><td>(7)</td><td>Shut down the engines.</td><td>Refer to the DA 42 Airplane Flight Manual.</td></tr>
<tr><td>(8)</td><td>Park the airplane. If necessary, moor the airplane.</td><td>Refer to Section 10-00.</td></tr>
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CHAPTER 10

PARKING, MOORING, STORAGE AND RETURN TO SERVICE

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CHAPTER 10

PARKING, MOORING, STORAGE AND RETURN TO SERVICE

1. General

Always park or moor the DA 42 when it is not in use. Use the procedures given in Section 10-10 for parking the airplane. Use the procedures given in Section 10-20 to moor the airplane. If the airplane is parked overnight we recommend that you moor the airplane. If strong winds are forecast, you must always moor the airplane.

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Section 10-10
Parking and Storage

1. General

Use these procedures to protect the airplane when it is parked. Use the short term parking procedure when the airplane will be parked for less than 5 days. Use the long term parking procedure when the airplane will be parked for 5 to 30 days. Use the storage procedure when the airplane will be parked for more than 30 days.

All pilots and all maintenance staff for the DA 42 must know the procedures in this Section.

CAUTION MAKE SURE THAT THE AIRPLANE IS CORRECTLY MOORED AND PROTECTED IF STRONG WINDS ARE FORECAST. STRONG WINDS CAN CAUSE DAMAGE TO AN UNPROTECTED AIRPLANE.

A. Equipment

Item	Quantity	Part Number
Wheel chocks.	4	Commercial.
Gust locks.	1	Commercial.
Pitot cover.	1	-

B. Short-Term Parking

	Detail Steps/Work Items	Key Items/References
(1)	If necessary, taxi or tow the airplane to the parking position.	Refer to Chapter 09.
(2)	Align the airplane into the wind (or forecast wind).	
	CAUTION: MAKE SURE THAT THE NOSE WHEEL IS ALIGNED STRAIGHT AHEAD WHEN THE AIRPLANE STOPS. THIS WILL PREVENT SIDE LOADS WHICH CAN DAMAGE THE NOSE LANDING GEAR.	
(3)	If the wind is gusty (or the weather is stormy) moor the airplane.	Refer to Section 10-20.
(4)	If there is packed snow or ice on the parking area, spread sand under the wheels.	

	Detail Steps/Work Items	Key Items/References
CAUTION: DO NOT APPLY THE PARKING BRAKE WHEN THE BRAKES ARE OVER-HEATED. THE BRAKES CAN SEIZE ON.		
(5)	Set the parking brake ON. Pull the lever fully aft, and push both the brake pedals at least two times.	
(6)	Put chocks in front of and behind the main wheels.	
(7)	RELEASE the parking brake.	Lever fully forward.
(8)	Set the airplane controls to neutral. Install the control lock.	
(9)	Set the flaps to UP position.	
(10)	Make sure that the passenger door and canopy as well as the front baggage doors are closed and locked.	
CAUTION: DO NOT INSTALL THE PITOT COVER WHILE THE PITOT TUBE IS HOT.		
(11)	Install Pitot cover on Pitot tube.	Located on the lower surface of the LH wing.

C. Long-Term Parking

CAUTION: MAKE SURE THAT YOU DO THE LONG TERM PARKING PROCEDURE WHEN YOU PARK THE AIRPLANE FOR A LONG TIME. IF YOU DO NOT DO THE LONG TERM PARKING PROCEDURE CORRECTLY, THE ENGINE CYLINDERS AND WHEEL BEARINGS CAN CORRODE. ALSO THE TIRES CAN DEFORM.

	Detail Steps/Work Items	**Key Items/References**
(1)	Do the procedure for short-term parking.	Refer to Paragraph B.
(2)	If the ice protection system is installed, then do the following procedure: – Fill the de-icing fluid tank to at least one quarter of its capacity. – Close canopy. – Operate the windshield pumps of the ice protection system several times. – Operate the system on HIGH until evidence of de-icing fluid on the porous panels is noticed. – If the de-icing fluid tank is completely empty, refill the de-icing fluid tank with approx. 2 liters (0.5 US gal) of de-icing fluid.	 Refer to Section 12-10. To deaerate the system. Refer to Section 12-10.
(3)	If the airplane can be moved, remove the chocks, move the airplane to turn the wheels 3 or 4 revolutions. Put the chocks back.	You can push or tow the airplane. Make sure that a different part of the tire touches the ground when you stop.
	Note: Do item 3 every day in cold weather and every 7 days in warm weather.	
	CAUTION: DO NOT INSTALL THE PITOT COVER WHILE THE PITOT TUBE IS HOT.	
(4)	Install Pitot cover on Pitot tube.	Located on the lower surface of the LH wing.

	Detail Steps/Work Items	Key Items/References
(5)	Install the gust lock: – Move the rudder pedals fully rearward. – Engage the control surfaces gust lock with the pedals. – Engage the stick; wrap straps around stick once. – Attach the locks and tighten the straps.	
(6)	Do a test for water contamination of the fuel.	Refer to Section 12-10.
	Note: Do item 6 after each rainy day to prevent water contamination due to leaky fuel tank caps.	

2. Storage

If the airplane is parked (or not operated) for more than 30 days, you have to do this storage procedure.

A. Equipment and Material

Item	Quantity	Part Number
Wheel chocks.	4	Commercial.
Tire protector spray.	A/R	Commercial.

B. Preparation

	Detail Steps/Work Items	Key Items/References
(1)	If possible, ventilate the airplane in a dry atmosphere.	
(2)	Do the procedure for the long-term parking.	Refer to Paragraph 1.
(3)	Remove the airplane main battery.	Refer to Section 24-31.
(4)	Completely fill the fuel tanks with fuel.	Refer to Section 12-10.
(5)	Wipe the tires with a dry cloth. Apply tire protector spray.	Obey the tire protector manufacturers instructions.
(6)	Lubricate the airplane.	Refer to Section 12-20.
(7)	Deactivate the ELT.	
(8)	Remove loose equipment from the airplane.	

C. Weekly Routine Check

Do these items each week while the airplane is stored.

	Detail Steps/Work Items	Key Items/References
(1)	Do the test for water contamination of the fuel.	Refer to Section 12-10.
(2)	If the airplane can be moved, move it to turn the wheels 3 or 4 revolutions. If the airplane is on jacks, turn each wheel 3 or 4 revolutions by hand.	You can push or tow the airplane. Make sure that a different part of the tire is in contact with the ground. Mark the position and date on the tire with chalk.
	Note: Do item 2 every day in cold weather and every 7 days in warm weather.	
(3)	Do the test for correct air pressure in each tire. If necessary, inflate the tires.	Refer to Section 12-10.
(4)	Check the strut extension of each gear damper. If necessary, charge the damper assemblies of main and nose landing gear.	Sliding bare piston should be visible. Refer to Sections 32-10 and 32-20.

D. Monthly Routine Check

Do these items each month while the airplane is stored.

	Detail Steps/Work Items	Key Items/References
(1)	Engine ground run: – Install main battery or connect airplane to ground power. – Start up both engines for at least 20 minutes. – Remove main battery or disconnect airplane from ground power.	Refer to AFM Chapter 4A.

Section 10-20
Mooring

1. General

CAUTION: IF THE AIRPLANE MUST BE STORED OUTSIDE FOR A LONG TIME, IT HAS TO BE MOORED. STRONG WINDS OR GUSTS CAN CAUSE DAMAGE TO AN AIRPLANE WHICH IS NOT MOORED.
IT IS RECOMMENDED TO MOOR THE AIRCRAFT FOR OVERNIGHT PARKING TOO. INSTALL THE GUST LOCK TO PREVENT DAMAGE TO THE CONTROL SURFACES.

2. Mooring

A. Equipment

Item	Quantity	Part Number
Wheel chocks.	4	Commercial.
Rope (nylon preferred, or hemp).	A/R	Commercial.

B. Mooring Procedure

	Detail Steps/Work Items	Key Items/References
(1)	Park the airplane.	Refer to Section 10-10.
(2)	Make sure that the flaps are set to UP.	Fully up.
	CAUTION: MOOR THE AIRPLANE AT THE MOORING POINTS ONLY. CAUTION: WHEN USING HEMP ROPES, DO NOT MAKE THEM TIGHT. IF THE ROPES GET WET THEY WILL TIGHTEN AND MAY DAMAGE THE AIRPLANE. THIS IS MOST IMPORTANT WHEN YOU ARE USING SECURE GROUND ANCHOR POINTS.	
(3)	Attach a rope to each mooring point and to the ground anchor point. Do not make the ropes too tight.	
(4)	Remove all items from the area that may cause damage to the airplane.	
(5)	If snow is forecast you must put a trestle under the lower fin.	

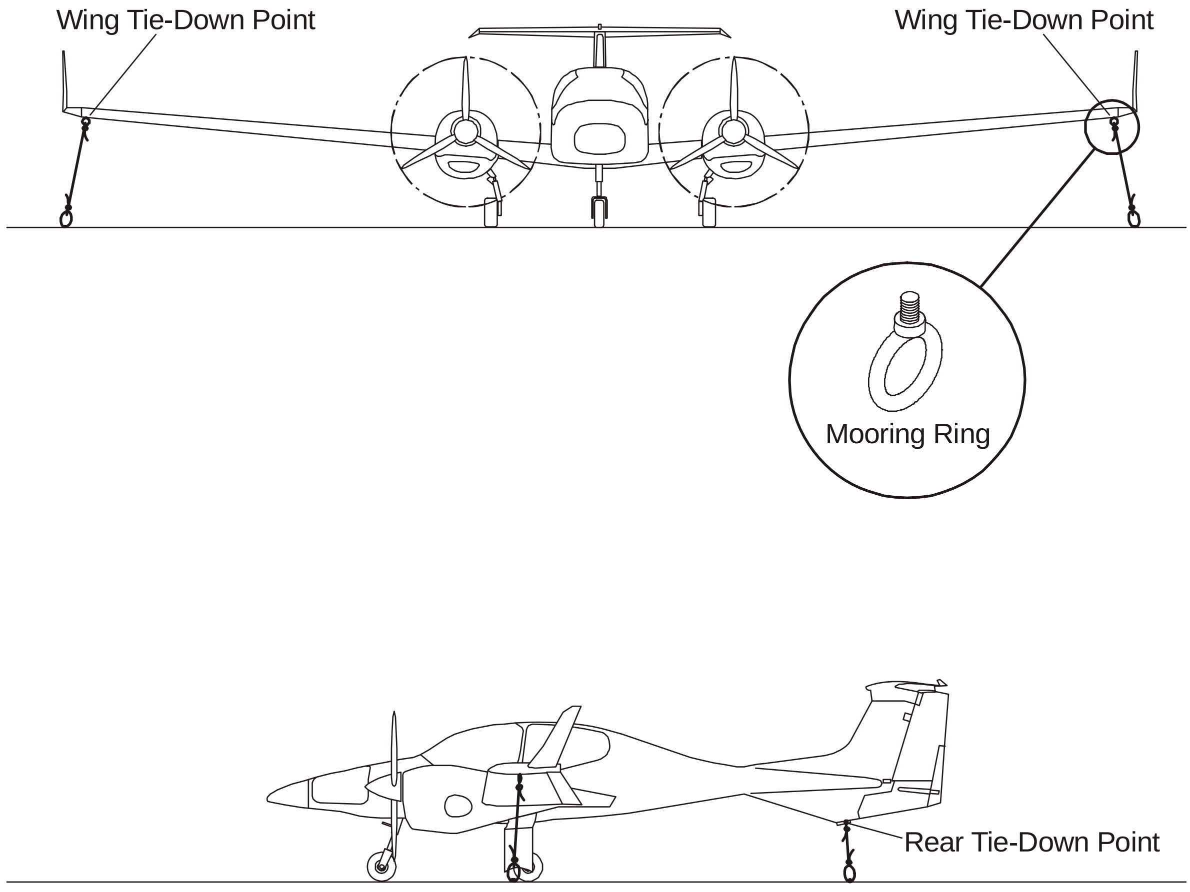

Figure 1: Location of Mooring Points on the Airplane

Section 10-30
Return to Service

1. General

Do this procedure when the airplane has been parked (or stored) for more than 5 days.

2. Return to Service Procedure

A. Storage Time Less than One Year

	Detail Steps/Work Items	Key Items/References
(1)	If necessary, install loose equipment which was removed for storage.	
(2)	If the battery has been removed: – Install the airplane main battery.	Refer to Section 24-31.
(3)	Do the test for water contamination of the fuel.	Refer to Section 12-10.
(4)	Do the test for correct air pressure in each tire. If necessary, inflate the tires.	Refer to Section 12-10.
(5)	Check the strut extension of each gear damper. If necessary, charge the damper assemblies of main and nose landing gear.	Sliding bare piston should be visible. Refer to Sections 32-10 and 32-20.
(6)	Check Pitot system and canopy for contamination/dirt.	
(7)	Check oil and coolant level.	Refer to Section 12-10.
(8)	Reactivate the ELT.	
(9)	Remove the gust lock: – Loosen the straps and detach the locks. – Disengage the stick from the straps. – Disengage the pedals from the gust lock. – Move the rudder pedals into position.	

B. Storage Time One Year and More

	Detail Steps/Work Items	Key Items/References
(1)	If necessary, install loose equipment which was removed for storage.	
(2)	If the battery has been removed: Install the airplane main battery.	Refer to Section 24-31.
(3)	Remove the gust lock: – Loosen the straps and detach the locks. – Disengage the stick from the straps. – Disengage the pedals from the gust lock. – Move the rudder pedals into position.	
(4)	Do a 200 hour maintenance check.	Refer to Section 5-10.

CHAPTER 11

PLACARDS AND MARKINGS

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CHAPTER 11
PLACARDS AND MARKINGS

1. General

Placards are used for identification and indication. They show the function, operation and operating limitations of systems and equipment.

Note: Placards must not be removed, exchanged or altered unless approved by the national Airworthiness Authority.

This Chapter shows you the location of these placards and markings:

– Exterior placards.

– Exterior markings.

– Interior placards.

Self-adhesive foil is used for all the placards except for the aircraft identification plate and the instrument panel labels. The aircraft identification plate is made from metal and the instrument panel with integrated lighting is made from composite plates.

2. Replace Plastic Foil Placards

A. Material

Item	Quantity	Part Number
Solvent.	A/R	Commercial.

B. Replace a Placard

Use this procedure for both internal and external foil placards.

	Detail Steps/Work Items	Key Items/References
(1)	Remove the old placard: – Warm the placard with a hot air blower. – Lift one corner of the placard. – Carefully pull the placard off.	
	WARNING: DO NOT GET SOLVENT ON YOUR SKIN. DO NOT BREATHE SOLVENT VAPOR. SOLVENT CAN CAUSE DISEASE OR ILLNESS.	
(2)	Clean the area where the new placard will go.	Use a commercial solvent. There must be no grease or dirt on the surface. Obey the solvent manufacturer’s instructions.
(3)	Remove the protective backing from the new placard.	
(4)	Put the new placard into the correct position. Make the placard smooth with a clean cloth.	Refer to the related Figure in this Chapter.

Section 11-20
Exterior Placards and Markings

1. General

Figures 1 and 2 show the exterior placards, Figure 3 shows the exterior markings for the DA 42 airplane. Figure 4 shows the single-layer debris protection (material: 3M, if OÄM 42-089 is installed). Figure 5 shows the triple-layer debris protection (material: PM if OÄM 42-088 is installed).

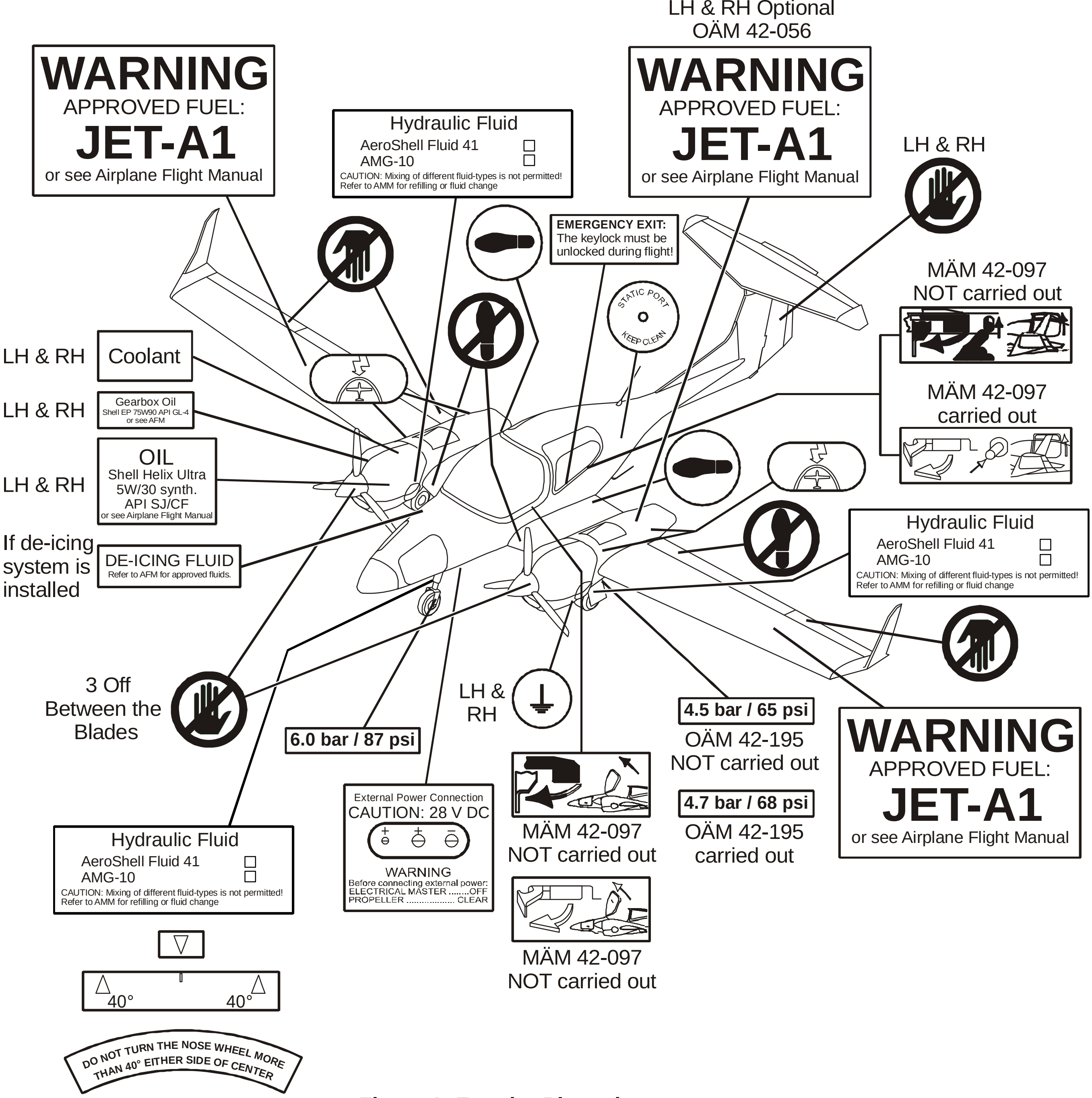

Figure 1: Exterior Placards

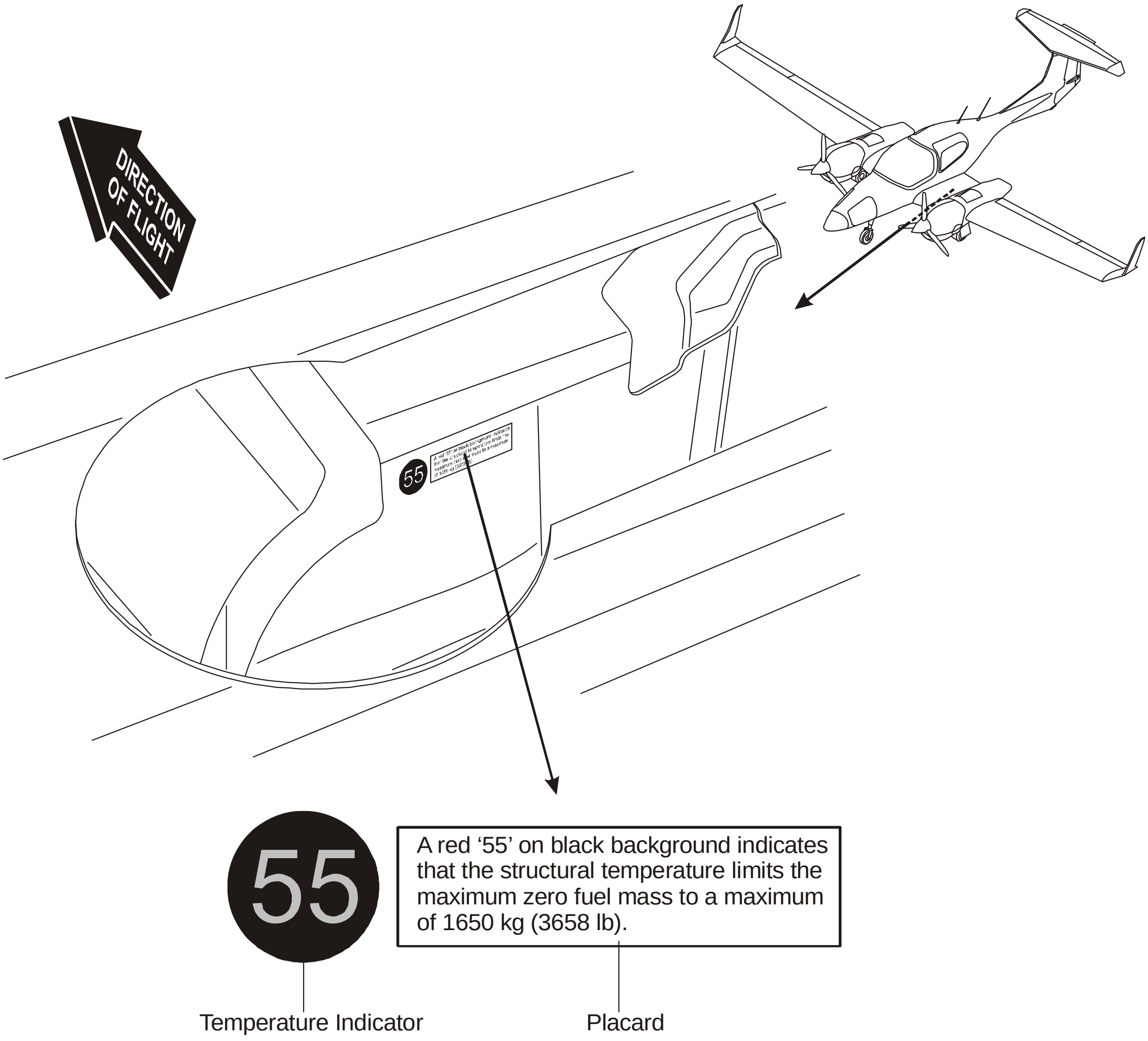

Figure 2: Additional Placard (if OÄM 42-188 is carried out)

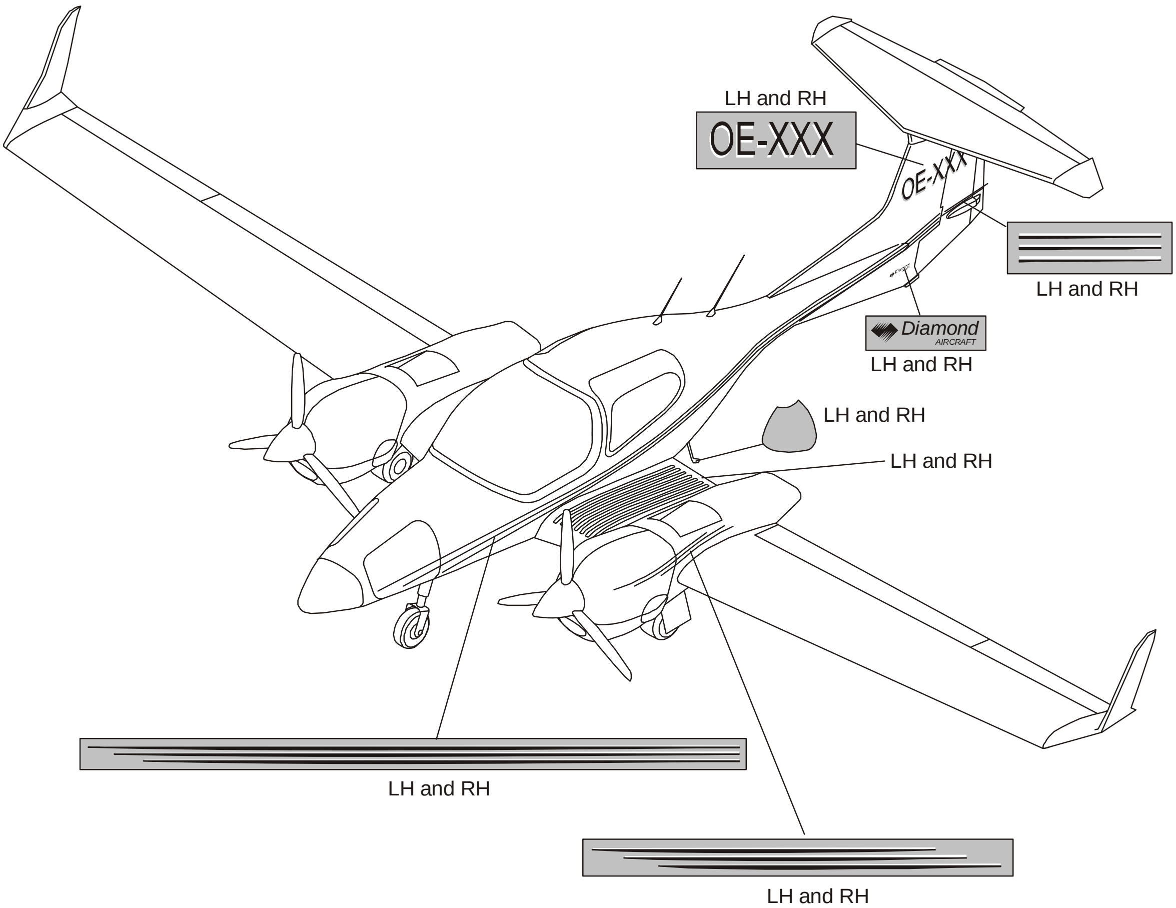

Figure 3: Design Example for Exterior Markings

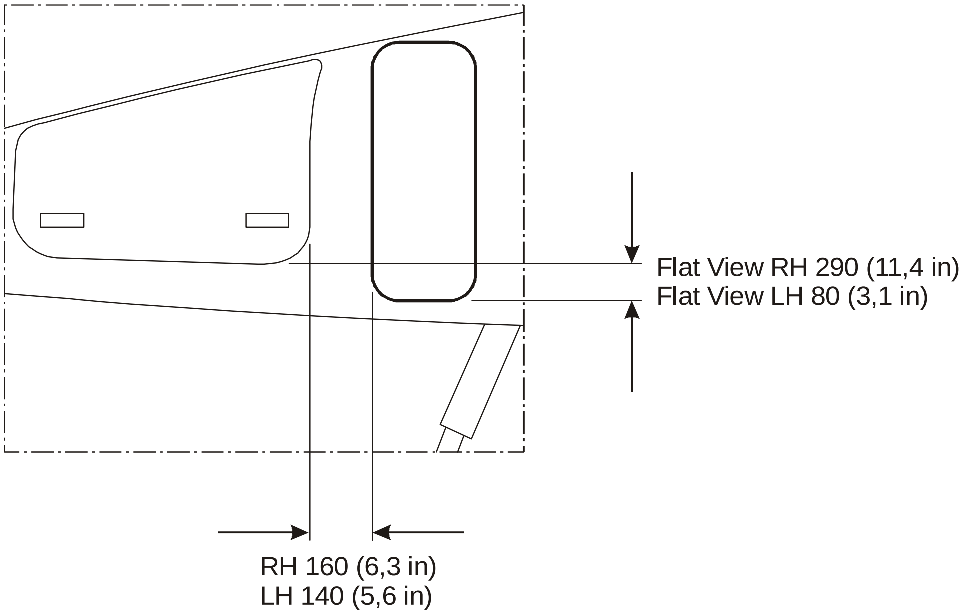

Figure 4: Debris Protection 3M (if OÄM 42-089 is installed)

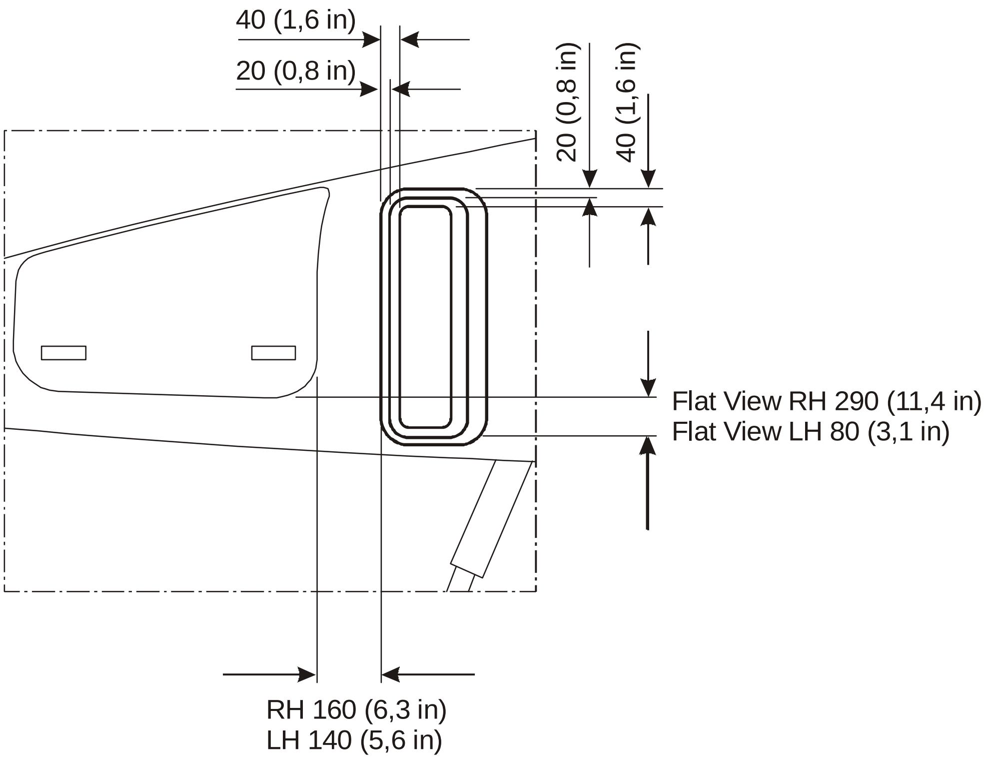

Figure 5: Debris Protection PM (if OÄM 42-088 is installed)

Maintenance Practices

1. General

This Section tells you how to replace safety walk adhesive strips.

If OÄM 42-187 is installed the safety walk is a coated safety walk instead of safety walk with adhesive strips. Refer to Section 51-20 for coated safety walk repair procedures.

2. Replace the Safety Walk Adhesive Strips

A. Equipment

Item	Quantity	Part Number
Safety walk template.	1	D64-1127-10-52.
Roller.	1	Commercial.
Heat gun.	1	Commercial.

B. Material

Item	Quantity	Part Number
Socomore Dienstone DLS Satwipes.	as required	29003-C86-C10.
Acetone.	as required	N000 148.

C. Replacement Procedure

	Detail Steps/Work Items	Key Items/References
(1)	Remove the safety walk adhesive strips: – Use a heat gun to warm up the safety walk adhesive strips. – Start removing the safety walk adhesive strips by lifting one corner. – Carefully pull the safety walk adhesive strips off.	 Do not exceed 60° C (140°F).

	Detail Steps/Work Items	Key Items/References
	WARNING: WHEN HANDLING CHEMICALS ALWAYS OBSERVE HEALTH AND SAFETY REGULATIONS GIVEN BY THE MANUFACTURER OF THE CHEMICALS.	
(2)	Remove the adhesives layer of the safety walk adhesive strips from surface: – Use fresh acetone or Socomore® cleaning cloth (P/N: 29003-C86-C10) to remove the adhesive layer. Do not use cleaning or polishing agents which contain silicon.	
(3)	Use water to remove dirt from the surface. If necessary, add a mild cleaning agent.	Refer to Section 12-30.
(4)	Use a commercial solvent to remove grease from the surface. The surface must be totally clean from grease or dirt.	
(5)	Place the safety walk template on the center wing.	Refer to Figure 6.
(6)	Make sure that the template orientation is parallel to flight direction.	
(7)	Remove the protective layer from the safety walk adhesive strips.	
(8)	Place the safety walk adhesive strips into the slots of the safety walk template.	
(9)	Use a roller to flatten and paste on the safety walk adhesive strips.	
(10)	Place the ‘No Step’ placard (front) and the ‘Foot Step’ placard (rear) according to the safety walk template.	Refer to Figure 6.
(11)	Use a clean cloth to flatten the ‘No Step’ placard and the ‘Foot Step’ placard.	
(12)	Remove the safety walk template.	

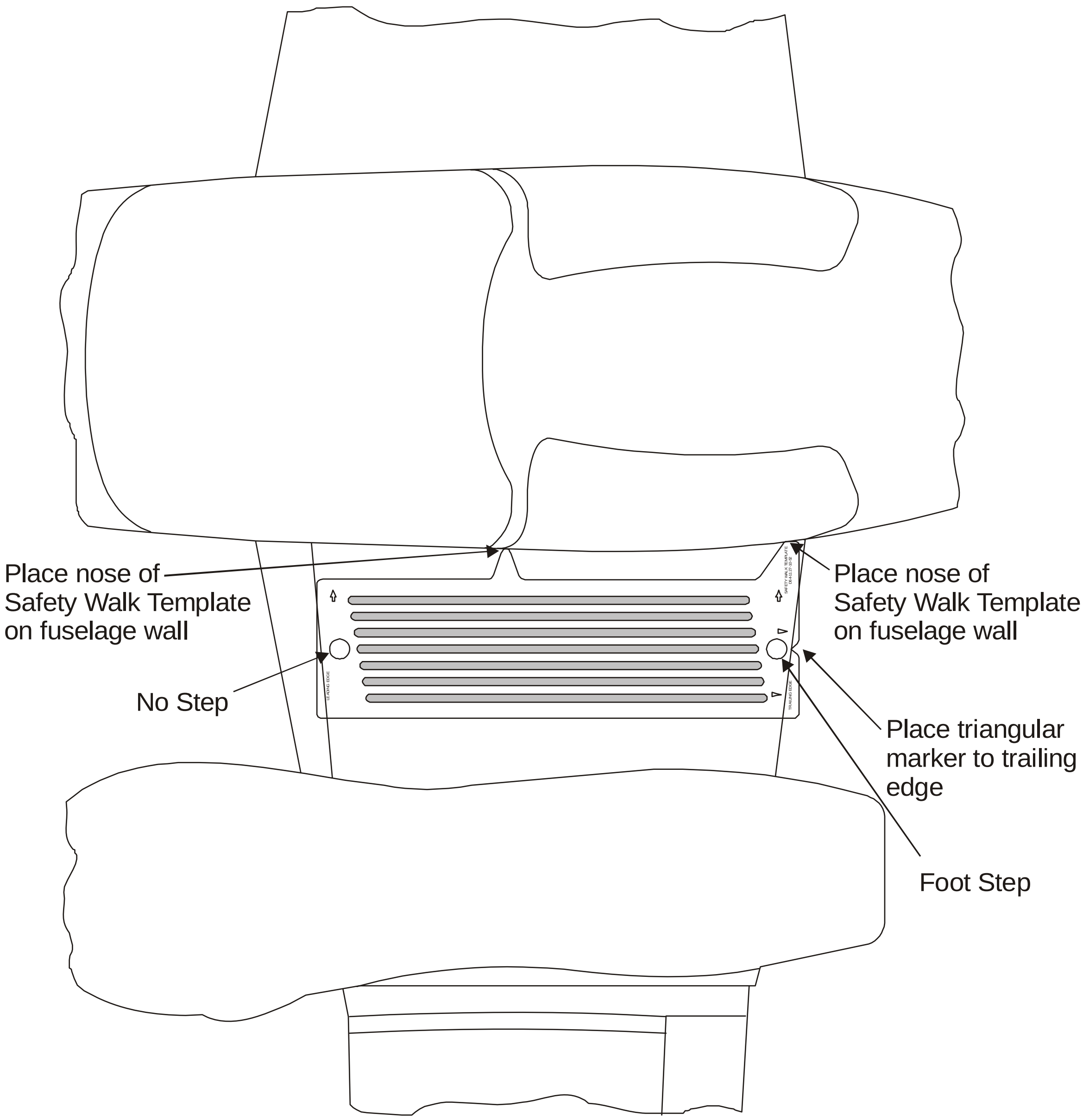

Figure 6: Safety Walk Template Positioning

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Section 11-30
Interior Placards and Markings

1. General

Figure 1 shows the interior placards and markings in the cockpit. Figure 2 shows the instrument and control panel placards. Figures 3 and subsequent show the instrument panel placard panels.

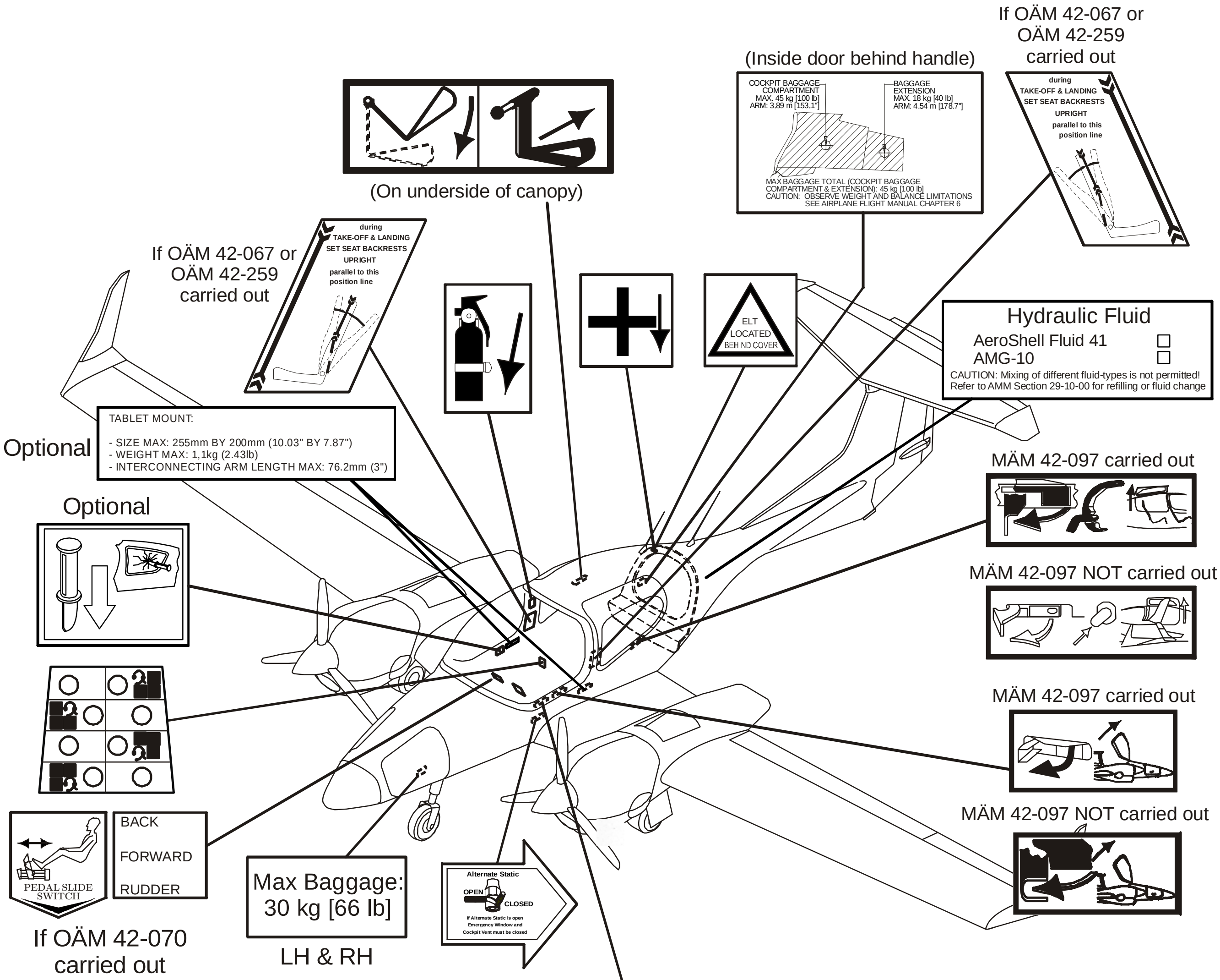
In case of Diesel Fuel Operation (MÄM 42-037 implemented) the fuel temp limitation placard (D60-1131-20-29) is located on the Garmin G1000 MFD.

Diesel Fuel or Unknown Fuel Blend: Below -5° C : No engine start permitted Below +5° C: No take-off permitted

2. Description

The DA 42 has self adhesive foil placards for the cockpit interior. The instrument panel has placard panels which are attached to the instrument panel with screws. The placard panels have integral lighting that is controlled by a combined ON/OFF Dimmer switch. The dimmer switch is mounted on the top left of the instrument panel. Refer to Section 33-10 for more data about the dimmer switch and refer to Section 31-10 for more data about the inverter for the placard panels.

There are 7 placard panels and you can replace each of the placard panels.



If the KAP 140 Autopilot is installed

Limitations for KAP 140 Autopilot System:

Do not use AP if any cabin window is open.	Minimum Altitude for Autopilot Operation:
Do not use AP during single engine operation.	Cruise, Climb, Descent and Maneuvering: 800 feet AGL
Autopilot DISC during take-off and landing.	Approach (130 KIAS or less): 200 feet AGL
Maximum speed for autopilot operation is 185 KIAS.	Approach (above 130 KIAS): 250 feet AGL
Minimum speed for autopilot operation is 90 KIAS.	Departure: 200 feet AGL

If the KAP 140 Autopilot AND OÄM 42-252 are installed

Limitations for KAP 140 Autopilot System:

Do not use AP if any cabin window is open.	Minimum Altitude for Autopilot Operation:
Do not use AP during single engine operation.	Cruise, Climb, Descent and Maneuvering: 800 feet AGL
Autopilot DISC during take-off and landing.	Approach (130 KIAS or less): 200 feet AGL
Maximum speed for autopilot operation is 140 KIAS.	Approach (above 130 KIAS): 250 feet AGL
Minimum speed for autopilot operation is 90 KIAS.	Departure: 200 feet AGL

If the GFC 700 Autopilot is installed

Limitations for GFC 700 Autopilot System:

Autopilot / Yaw Damper DISC during take-off and landing.	Minimum Altitude for Autopilot Operation:
Do not use AP during single engine operation.	Cruise, Climb, Descent and Maneuvering: 800 feet AGL
Maximum speed for autopilot operation is 180 KIAS.	Approach: 200 feet AGL
Minimum speed for autopilot operation is 90 KIAS.	Departure: 200 feet AGL

If the GFC 700 Autopilot AND OÄM 42-252 are installed

Limitations for GFC 700 Autopilot System:

Autopilot / Yaw Damper DISC during take-off and landing.	Minimum Altitude for Autopilot Operation:
Do not use AP during single engine operation.	Cruise, Climb, Descent and Maneuvering: 800 feet AGL
Maximum speed for autopilot operation is 140 KIAS.	Approach: 200 feet AGL
Minimum speed for autopilot operation is 90 KIAS.	Departure: 200 feet AGL

Figure 1: Interior Placards and Markings

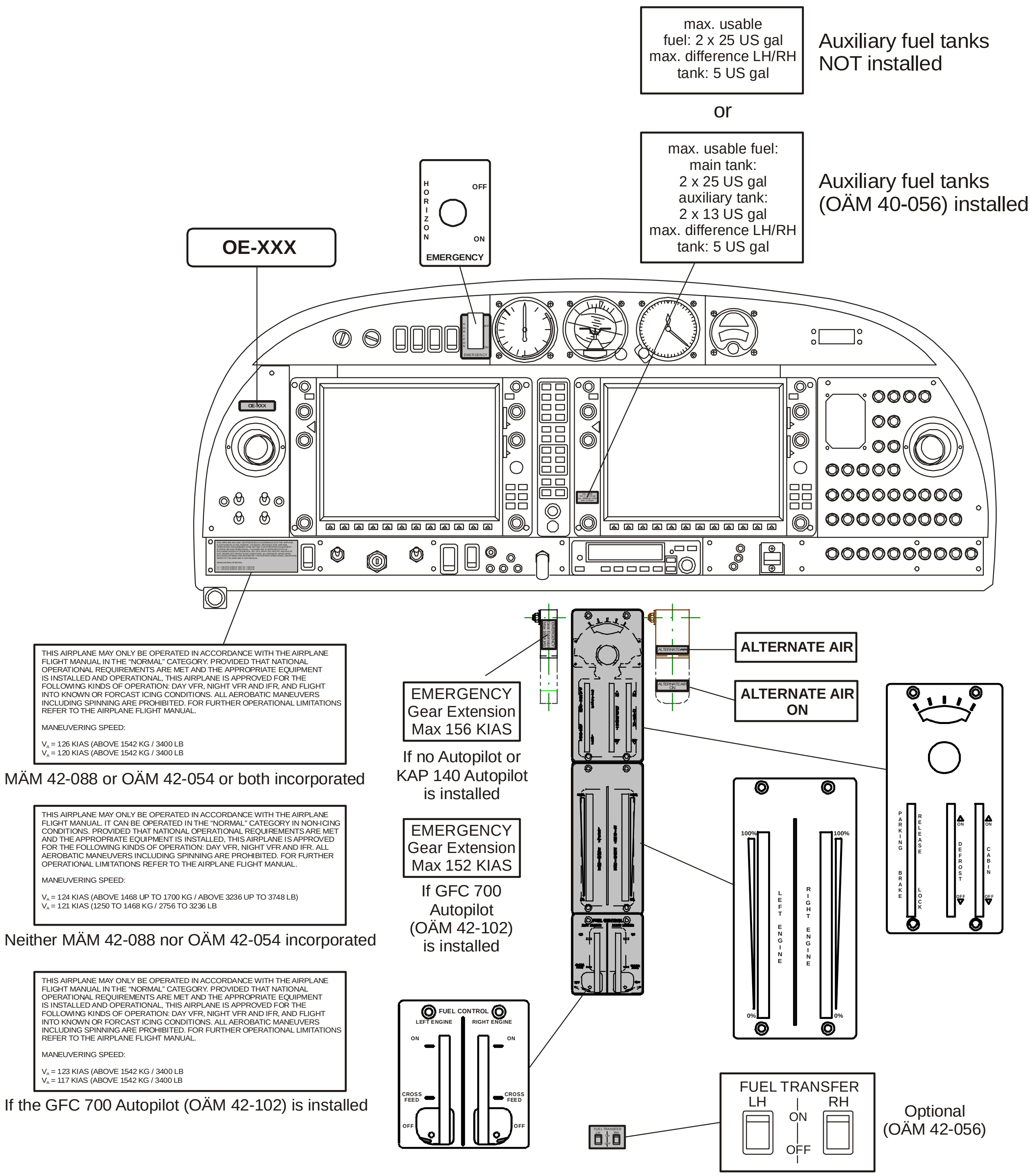


Figure 2: Interior Placards - Instrument and Control Panels

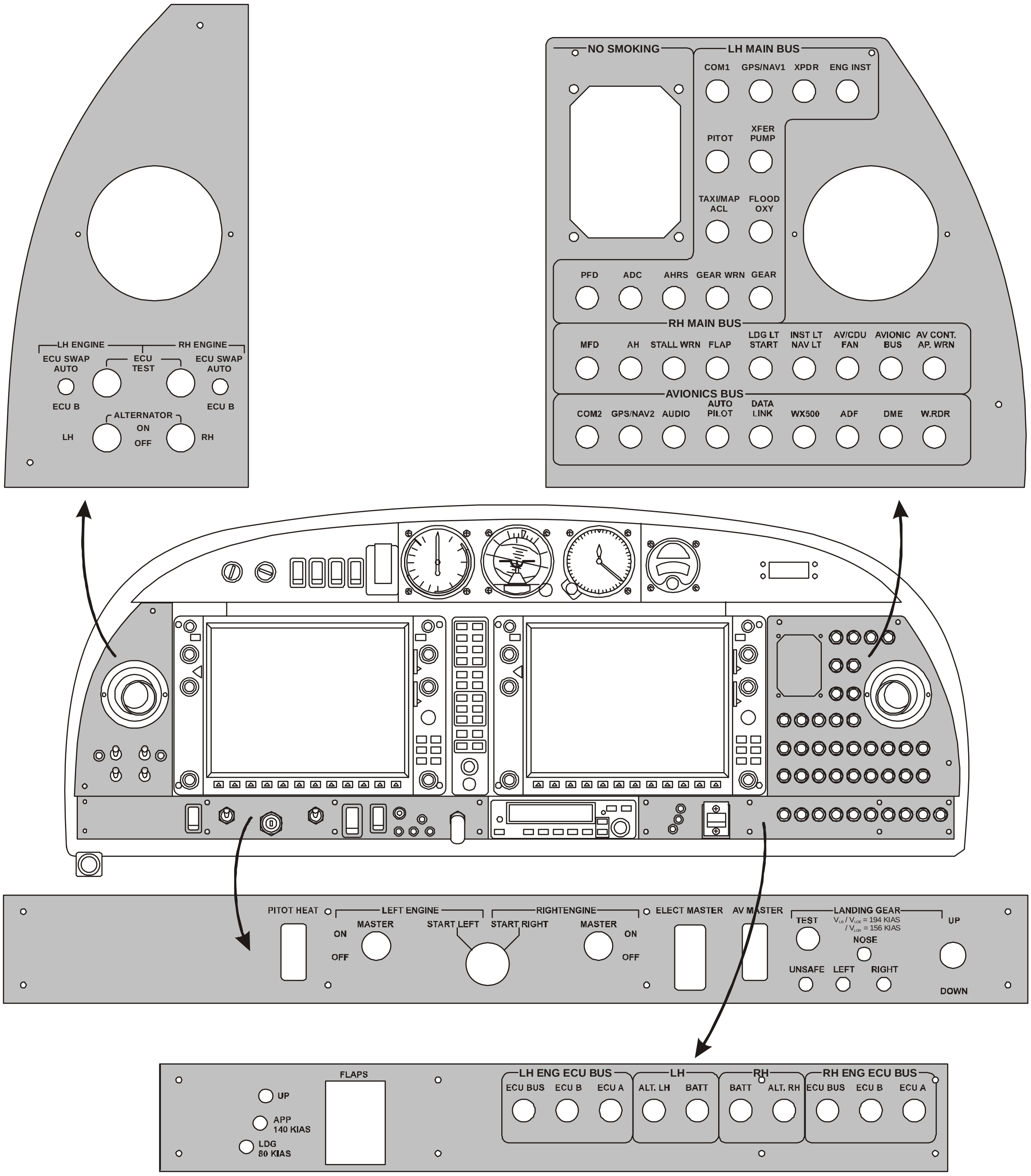


Figure 3: Placard Panels - Sheet 1

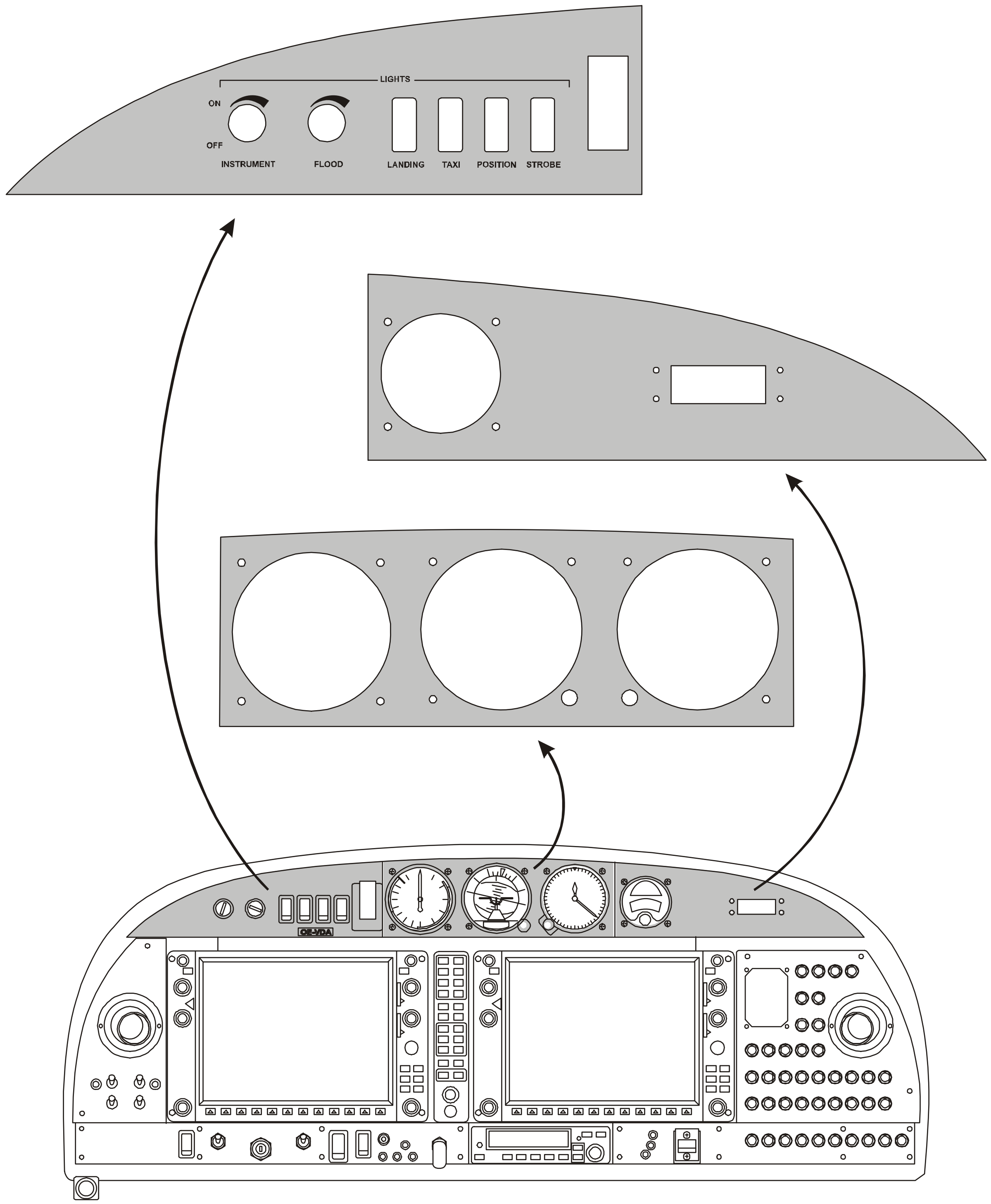


Figure 4: Placard Panels - Sheet 2

The placards shown in figures 5 through 8 are installed only if the optional oxygen system is installed (OÄM 42-055 is incorporated):

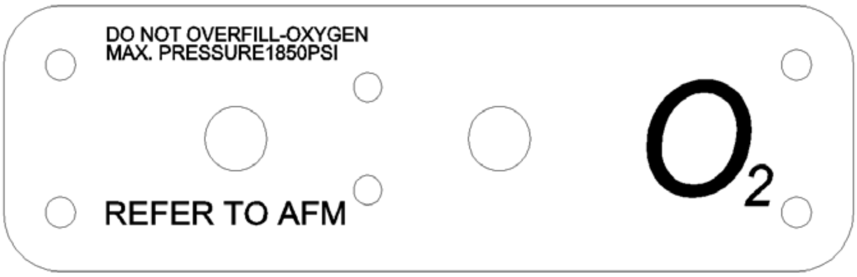


Figure 5: Placard on the Refill Unit, on the LH Side of the Nose Baggage Compartment

Figure 6: Placard on Each Outlet Manifold

Figure 7: Placard on the PUSH/PULL Knob

Figure 8: Placard on the LH/RH Oxygen Compartment Cover

Maintenance Practices

1. General

This Section tells you how to replace a placard panel. You cannot repair a placard panel.

2. Replace a Placard Panel

Use this procedure for all of the placard panels.

	Detail Steps/Work Items	Key Items/References
(1)	Disconnect the airplane main battery.	Refer to Section 24-31.
(2)	Remove the instrument panel cover.	Refer to Section 25-10.
(3)	Disconnect the electrical cables form the placard panel that you will replace.	At the inline connector.
(4)	Replace the placard panel:	
	– Remove the screws that attach the placard panel to the instrument panel.	Make sure that you remove all of the screws!
	– Move the placard panel clear of the instrument panel.	
	– Move the new placard panel into position on the instrument panel.	Make sure that you route the electrical cables correctly.
	– Install the screws that attach the placard panel to the instrument panel.	
	– Connect the electrical cables for the placard panel.	At the inline connector.
(5)	Install the instrument panel cover.	Refer to Section 25-10.
(6)	Connect the airplane main battery.	Refer to Section 24-31.

	Detail Steps/Work Items	Key Items/References
(7)	Do a test for the correct operation of the placard panel lights:	
	– Set the ELECT. MASTER to ON.	
	– Rotate the INSTRUMENT dimmer switch fully clockwise.	The placard lights must come on.
	– Rotate the INSTRUMENT dimmer switch a small amount counter-clockwise.	The placard lights must dim.
	– Rotate the INSTRUMENT dimmer switch fully counter-clockwise.	The placard lights must go out.
	– Set the ELECT. MASTER to OFF.	

CHAPTER 12

SERVICING - GENERAL

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Unscheduled Servicing

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CHAPTER 12
SERVICING

1. General

This Chapter gives the servicing tasks which apply to the whole airplane:

– Section 12-10. Replenishment procedure for refillable systems.

– Section 12-20. Lubrication data.

– Section 12-30. Cleaning and snow and ice removal.

The procedures for preventive and corrective maintenance of systems are given in the related Chapter of this manual. Refer to Chapter 05 for the time limits and servicing schedules.

Note: The designation of "left" and "right" as well as of "forward" and "afterwards" is based on the airplane’s direction of flight.

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Section 12-10
Replenishment

1. General

Use the procedures in this Section to replenish the fluid systems on the airplane.

Figure 1 shows the location of the servicing points.

2. Fuel System

A. Main Fuel Tanks

There are three interconnected fuel tanks in each wing holding the fuel for the DA 42. The fuel capacity is 26 US gal (98.4 liter) per wing. The tanks are located in the wing outboard of the engine nacelles, between the main spars.

Each wing has a filler cap located on the top surface of the wing. The filler cap connects to the outboard end of the outer fuel tanks. A fuel tank drain is located on the lower surface of each wing. The drain connects to the inboard end of the inner fuel tank.

B. Auxiliary Fuel Tanks

Auxiliary fuel tanks are optional equipment (OÄM 42-056).

The auxiliary fuel tanks consist of a single fuel chamber in each engine nacelle. The auxiliary fuel tanks are installed in the rear section of the engine nacelles, above the wing main spars. The additional fuel capacity is 13.7 US gal (52 liter) per side. The total fuel capacity (main fuel tanks and auxiliary fuel tanks) is 39.7 US gal (150 liter) per side.

Each auxiliary tank has a filler cap located on the top surface of the nacelle. The filler cap connects to the forward end of the auxiliary tanks. A fuel tank drain is located at the rear of each auxiliary tank.

WARNING: **DO NOT ALLOW FIRE, SPARKS OR HEAT NEAR FUEL. FUEL BURNS VIOLENTLY AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO THE AIRPLANE.**

WARNING: **DO NOT GET FUEL ON YOUR SKIN. FUEL CAN CAUSE SKIN DISEASE.**

WARNING: **CONNECT THE AIRPLANE AND THE FUEL SUPPLY VEHICLE TO ELECTRICAL GROUND BEFORE REFUELING. IF YOU DO NOT GROUND THE AIRPLANE, STATIC ELECTRICITY CAN CAUSE FIRE DURING REFUELING.**

WARNING: **MAKE SURE THAT A SUITABLE FIRE EXTINGUISHER IS AVAILABLE AT ALL TIMES DURING REFUELING/DEFUELING.**

WARNING: **TURN OFF ALL GROUND EQUIPMENT IN THE REFUELING AREA.**

WARNING: **DO NOT OPERATE ELECTRICAL SWITCHES IN THE AIRPLANE DURING REFUELING.**

WARNING: **REFUELING WITH PERSONS ON BOARD IS PROHIBITED.**

CAUTION: USE ONLY THE FUEL TYPES GIVEN IN CHAPTER 2 OF THE AIRPLANE FLIGHT MANUAL.

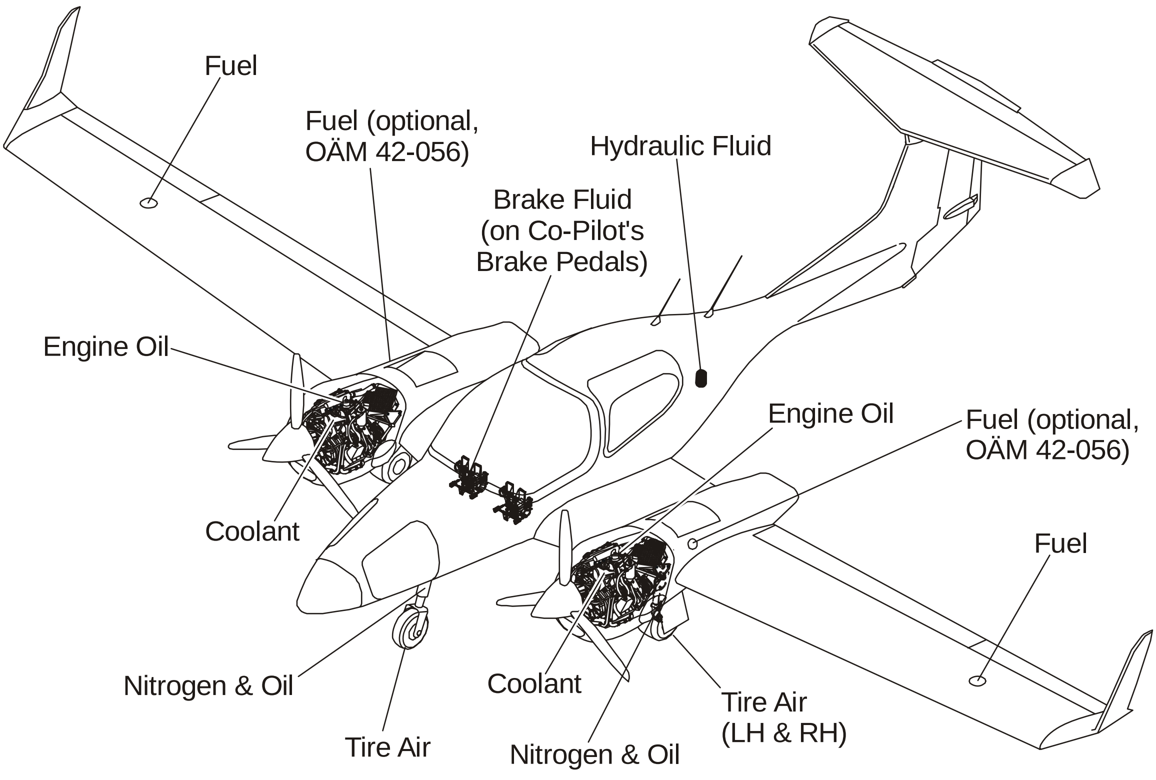

Figure 1: Replenishment Points

3. Refueling/Defueling

A. Refueling

	Detail Steps/Work Items	Key Items/References
(1)	Shut down the engines.	
(2)	Engine MASTER OFF.	
(3)	All occupants leave the airplane.	
(4)	Ground the airplane electrically.	At the refueling connection.
(5)	Ground the refueling vehicle electrically.	
(6)	Remove the fuel filler cap.	
(7)	Refuel the airplane.	
(8)	Install the fuel filler cap.	Make sure that the filler cap is locked.
(9)	Do items 4 thru 6 for the other wing.	
(10)	Do items 6 thru 8 for the auxiliary tanks, if installed (OÄM 42-056).	Filler caps are located on the outboard side of the engine nacelles.
(11)	Remove the ground cable from the airplane.	
(12)	Remove the ground cable from the refueling vehicle.	

B. Defueling

	Detail Steps/Work Items	Key Items/References
(1)	Ground the airplane electrically.	At the refueling connection.
(2)	Put a suitable container below the drain valve for the wing that you will defuel.	Make sure that you have enough containers to hold all the fuel. Each wing can hold approx. 26 US gal (100 liter) fuel.
(3)	Open the drain valve.	
(4)	When the fuel stops draining, close the drain valve.	Make sure that the drain valve is seated correctly.
(5)	Do items 2 thru 4 for the auxiliary fuel tank, if installed (OÄM 42-056).	Each auxiliary tank can hold approx. 13.7 US gal (52 liter) fuel.
(6)	If necessary, do items 2 thru 4 for the other wing.	
(7)	Remove the ground cable from the airplane.	At the refueling ground connection.

4. Fuel Contamination Test

A. Equipment

Item	Quantity	Part Number
Glass container.	1	Commercial.

B. Fuel Contamination Test Procedure

	Detail Steps/Work Items	Key Items/References
(1)	Put the glass container under the fuel tank drain valve that you will take the fuel from.	
(2)	Open the drain valve.	
(3)	When the fuel container is half full, close the drain valve.	Make sure that the drain valve is seated correctly.
(4)	Let the fuel in the glass container stand for 1 minute.	
(5)	Examine the fuel: It must be transparent (JET A1 or Diesel Fuel). – Look specifically for small drops of water in the bottom of the glass container. – Look for small particles of solid material.	If you find any contamination you must do the test again. If you still find contamination after 3 tests, you must drain the related fuel tank. Flush the tank (use fuel) and fill it with clean fuel.
(6)	Perform items 1 thru 5 for the other wing.	
(7)	Drain the nacelle tanks.	

5. Engine Oil System

WARNING: ENGINE OPERATION WITH NO OIL (OR VERY LOW OIL LEVEL) WILL CAUSE ENGINE MALFUNCTION OR DAMAGE.

The engines installed in the DA 42 have a wet sump oil system. The engine oil sump can hold 6 liter (6.3 US quarts). You must only use engine oil specified by the engine manufacturer.

The oil filler is located on the left side of the engine (Figure 2). There is an access hole implemented in the top engine cowling. The oil filler has a dip-stick attached.

A little oil consumption is normal. Measure the oil quantity before each flight (or engine ground run-up). If necessary, replenish the oil system.

A. Replenish the Oil System

	Detail Steps/Work Items	Key Items/References
(1)	Remove the access hole cap from top engine cowling for the engine oil system that you will replenish.	
(2)	Release the oil filler cap.	
(3)	Measure the oil contents: – Remove the filler cap. – Clean the oil dip stick. – Install the filler cap. – Remove the filler cap again. – Read the oil contents from the dip stick.	
	CAUTION: USE ONLY THE CORRECT ENGINE OILS. REFER TO THE ENGINE MANUFACTURERS OPERATION AND MAINTENANCE MANUAL FOR THE CORRECT OIL SPECIFICATIONS AND CHAPTER 2 OF THE AFM. IF YOU DO NOT USE THE CORRECT ENGINE OIL, THE ENGINE CAN BE DAMAGED.	
(4)	If necessary, fill the oil system to the correct level.	Use only engine oil specified by the manufacturer. Specified oils are listed in Chapter 2 of the AFM.
(5)	Install the filler cap.	

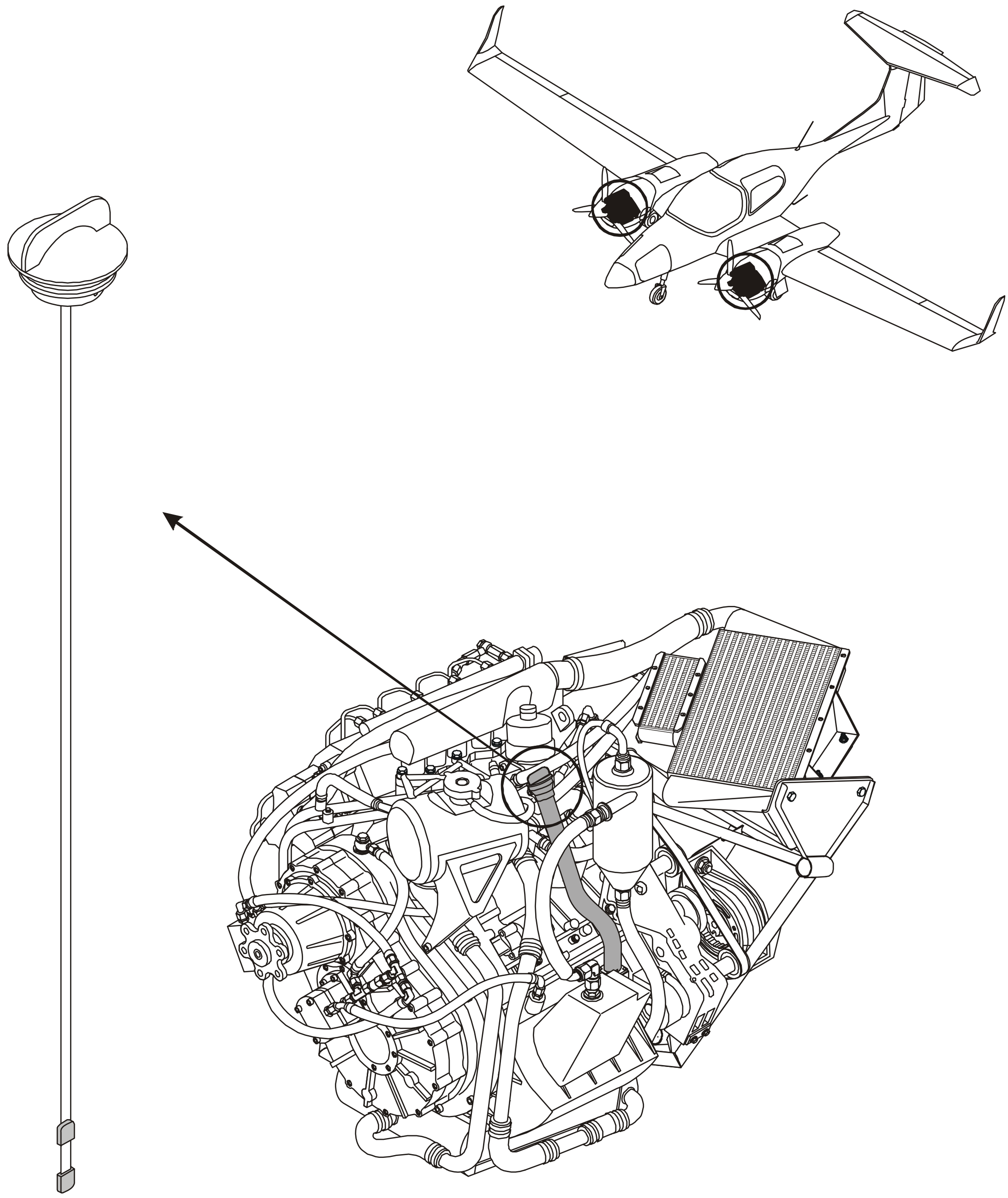

Figure 2 : Engine Oil Filler/Dip-Stick for Airplanes with TAE 125-01 Engines

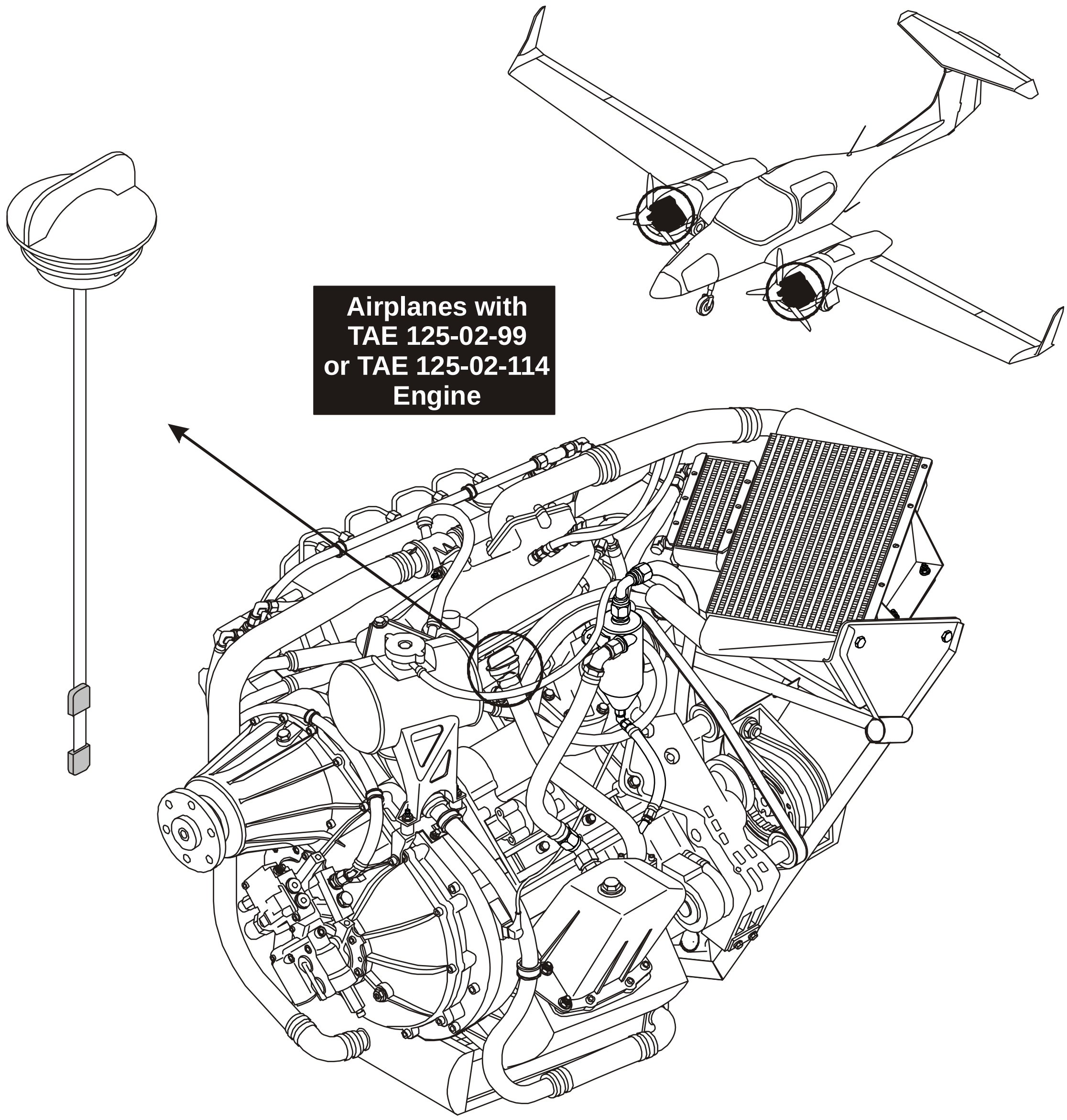

Figure 3 : Engine Oil Filler/Dip-Stick for Airplanes with TAE 125-02-99 Engines (MÄM 42-198 carried out) or TAE 125-02-114 (OÄM 42-252 carried out)

B. Change the Engine Oil

Refer to TAE Operation and Maintenance manual, latest revision.

Detail Steps/Work Items		Key Items/References
(1)	Remove the engine cowlings for the engine oil system that you will replenish.	
(2)	Install the engine cowlings that you removed in step 1.	
Note: For environment protection, changing the engine oil is only allowed on sealed surfaces. Used engine oil has to be disposed according to the applicable regulations. It must not contaminate the environment and groundwater.		

6. Gearbox Oil

WARNING: ENGINE OPERATION WITH NO GEARBOX OIL (OR VERY LOW OIL LEVEL) WILL CAUSE ENGINE MALFUNCTION OR FAILURE.

The gearbox oil quantity is 1.3 liter (1.37 US qts). The gearbox oil level can be checked through an oil level window at the front side of the engine.

A. Replenish the Gearbox Oil System

Refer to TAE Operation and Maintenance manual, latest revision.

CAUTION: IF THE GEARBOX OIL LEVEL IS LOW THE REASON MUST BE DETERMINED AND THE PROBLEM MUST BE CORRECTED BY AUTHORIZED PERSONNEL. REFER TO TAE SERVICE BULLETIN NO. 125-0003, LATEST REVISION.

Detail Steps/Work Items		Key Items/References
(1)	Remove the engine top cowling for the gearbox oil system that you will replenish.	
(2)	Install the top engine cowlings that you removed in step 1.	

B. Change the Gearbox Oil

Refer to Section 72-00.

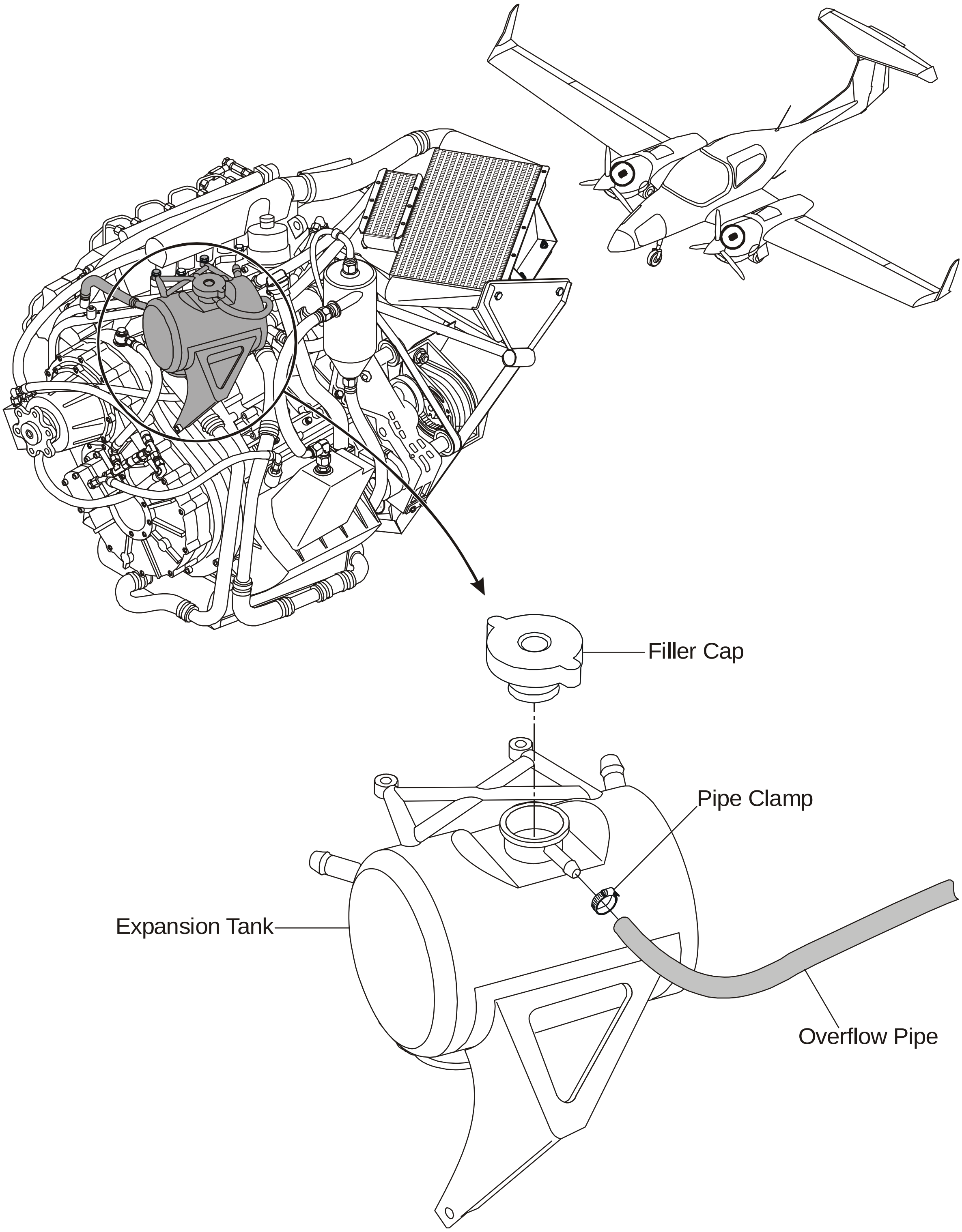

Figure 4: Engine Coolant Expansion Tank / Filler Cap

7. Engine Coolant

WARNING: DO NOT REMOVE THE EXPANSION TANK FILLER CAP WHEN THE ENGINE IS HOT. THE TANK IS PRESSURIZED WITH HOT COOLANT. HOT COOLANT CAN CAUSE INJURY TO PERSONS.

CAUTION: DURING NORMAL OPERATION THE TAE 125 ENGINE SHOULD NOT CONSUME COOLANT. ANY COOLANT LOSS MUST BE INVESTIGATED BEFORE FURTHER OPERATION OF THE ENGINE. OPERATING THE ENGINE WITH A FAULTY COOLING SYSTEM CAN DAMAGE THE ENGINE.

The DA 42 engines use liquid coolant to cool the engine and supply heating to the flight cabin. The coolant is circulated around the engine in an integral water jacket. When the coolant is at normal engine operating temperature a thermostatic valve directs the coolant to flow through a heat exchanger. The thermostatic valve controls the flow of coolant through the heat exchanger in order to control the temperature of the coolant.

A coolant expansion tank is located on the left side of the engine (Figure 4). The expansion tank has a filler cap with a pressure regulating valve. Use the procedures in this paragraph to replenish the coolant system when the system has been drained for maintenance or system repair.

A. Replenish the Engine Coolant

Detail Steps /Work Items		Key Items / References
(1)	Remove the top engine cowling for the engine coolant system that you will replenish.	
	WARNING: DO NOT REMOVE THE EXPANSION TANK FILLER CAP WHEN THE ENGINE IS HOT. THE TANK IS PRESSURIZED WITH HOT COOLANT. HOT COOLANT CAN CAUSE INJURY TO PERSONS.	
(2)	Carefully remove the filler cap from the coolant expansion tank.	
	CAUTION: USE ONLY THE CORRECT COOLANT. REFER TO CHAPTER 2 OF THE AIRPLANE FLIGHT MANUAL FOR THE CORRECT COOLANT SPECIFICATIONS. IF YOU DO NOT USE THE CORRECT COOLANT, THE ENGINE CAN BE DAMAGED.	
(3)	Add coolant until the level is at the bottom of the tank filler neck.	
(4)	Install the filler cap.	Make sure that the seal is in good condition.
(5)	Install the engine cowlings that you removed in step 1.	
	Note: When the coolant system has been drained for maintenance/repair air may get trapped in the system. The following steps are to remove any air trapped in the system and give a correct fluid level in the expansion tank.	
(6)	Do an engine ground run up for the related engine until the engine reaches normal operating temperature. Then shut-down the engine.	Refer to Section 71-00.
(7)	Repeat steps 1 thru 6 until the coolant level remains constant at the correct level.	

B. Fill and Bleed an Engine Cooling System

Refer to Section 75-00.

8. Brake System

The brake fluid reservoirs are located on the brake master cylinders on the co-pilots side. You get access in the cockpit below the instrument panel.

WARNING: DO NOT GET BRAKE FLUID ON YOUR SKIN OR IN YOUR MOUTH. BRAKE FLUID IS TOXIC AND CAN CAUSE INTERNAL INJURY.

CAUTION: REMOVED SPILLED BRAKE FLUID IMMEDIATELY. BRAKE FLUID CAN CAUSE DAMAGE TO PAINT AND OTHER MATERIALS.

A. Fill the Brake System Reservoirs

Detail Steps / Work Items		Key Items / References
(1)	Clean the top of the brake fluid reservoir and filler cap.	
(2)	Remove the filler cap.	
(3)	Fill the reservoir to the correct level.	Use only MIL-PRF-5606H hydraulic fluid. 12 to 25 mm (0.5 to 1 in.) below the top of the filler hole.
(4)	Install the filler cap.	

9. Ice Protection System

The ice protection system is optional equipment (ref. OÄM 42-053 or OÄM 42-054). The deicing fluid tank is installed in the nose compartment of the airplane, on the RH side. It has a capacity of 30 liter (7.9 US gal).

The filler is located in the fuselage nose on the right side and is accessible via the nose baggage compartment.

A. Fill the Deicing Fluid Tank

Detail Steps / Work Items		Key Items / References
(1)	Open the right nose baggage compartment.	
(2)	Clean the filler cap.	
(3)	Remove the filler cap.	
	WARNING: THE APPROVED DE-ICING FLUID FLUIDS ARE HARMFUL. THEY ARE GLYCOL BASED WITH DIFFERENT ADDITIVES. REFER TO THE MATERIAL SAFETY DATA SHEETS FOR PROPER HANDLING WHICH ARE AVAILABLE FROM THE SUPPLIERS OF THE DE-ICING FLUIDS. CAUTION: THE USE OF OTHER FLUIDS WILL PROVIDE A CORRESPONDINGLY LOWER STANDARD OF ICE PROTECTION OR MAY CAUSE DAMAGE TO THE ICE PROTECTION SYSTEM.	
(4)	Fill the de-icing fluid tank.	Refer to the AFM for approved deicing fluids.
(5)	Install the filler cap.	
(6)	Close the right nose baggage compartment.	

10. Tires

The DA 42 uses these tires:

Main tires: 15x6.0-6, 6 PR, TT, 160 mph, Flight Special II, Goodyear

Nose tire: 5.00-5, 10 PR, TT, 120 mph, Flight Special II, Goodyear

A. Examine the Tires and Measure the Pressure

Detail Steps / Work Items		Key Items / References
(1)	Examine the tires. Look specially for:	Move the airplane as necessary so that each part of each tire can be seen.
	– Cuts and friction damage.	Refer to Goodyear Aircraft Tire Care & Maintenance manual, latest revision.
	– Correct alignment of the slippage markers.	If the slippage markers do not align, remove the wheel for shop maintenance.
(2)	Measure the tire pressure. If necessary, inflate the tires to the correct pressure.	Main tire: 4.5 bar (65 PSI). If OÄM 42-195 is carried out: 4.7 bar (68 PSI). Nose tire: 6.0 bar (87 PSI).

11. Oxygen System

The continuous flow oxygen system is optional equipment (OÄM 42-055 incorporated). The oxygen cylinder is installed in its own vented compartment in the nose baggage compartment. Its capacity is 10.7 liter (650 cu.in.) at 128 bar (1850 PSI). The filling unit is also installed in the oxygen compartment accessible via a cover on the LH side of the nose baggage compartment.

WARNING: OXYGEN STRONGLY SUPPORTS RISK FOR FIRE AND EXPLOSION. SMOKING STRICTLY PROHIBITED. AVOID FLAMES, SPARKS AND OTHER SOURCES OF IGNITION. AVOID CONTACT WITH FLAMMABLE MATERIALS (E.G., OIL OR GREASE). SERIOUS PERSONAL INJURY AND/OR DAMAGE TO EQUIPMENT MAY RESULT.

CAUTION: OIL, GREASE OR OTHER LUBRICATIONS IN CONTACT WITH OXYGEN CREATE A SERIOUS HAZARD. SUCH CONTACT MUST BE AVOIDED WHEN HANDLING WITH ANY PART OF THE OXYGEN SYSTEM.

A. Filling the Oxygen Cylinder

Detail Steps/Work Items		Key Items/References
(1)	Open both nose baggage compartment doors.	
(2)	Remove all loose items from the baggage compartment.	
(3)	Check baggage compartment for oil or oil residue.	
(4)	Check deicing fluid tank: must be closed and clean.	
(5)	Open the cover of the oxygen filling unit on the LH side of the oxygen compartment.	
(6)	Check pressure gauges by comparing the pressure indication of the filling block with the pressure indication of the gauge installed on the RH side of the instrument panel.	
(7)	Remove the filling port protection nut and check the filling valve for dust.	
(8)	Connect the oxygen filling station outlet port to the filling valve.	Do not use oxygen with a lower purity grade than prescribed by MIL-PRF-27210.
(9)	Slightly open the valve of the oxygen filling station and check oxygen flow. – Fill the cylinder in steps of 200 PSI. – After filling 200 PSI stop filling for 1 minute before continue filling.	The oxygen cylinder is limited to a pressure of 128 bar (1850 PSI). The maximum filling pressure depends on ambient temperature. Refer to Section 35-10 Paragraph 3.
(10)	Close the valve of the oxygen filling station when a pressure of 128 bar (1850 PSI) is reached.	
(11)	Disconnect the filling station outlet port from the filling valve.	
(12)	Reinstall the filling valve protection nut.	

Detail Steps/Work Items		Key Items/References
(13)	Check pressure gauges by comparing pressure indication of the filling block with pressure indication of the gauge installed on the RH side of the instrument panel.	
(14)	Close the cover of the oxygen filling unit.	

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Section 12-20
Scheduled Servicing

1. General

This Section gives lubrication data. It tells you where components are located. It gives a list of approved lubricants. It also gives components which MUST NOT be lubricated.

Most systems and components have maintenance-free bearings. These can be sealed ball/roller bearings or Teflon bushes. These bearings MUST NOT be lubricated. Table 1 shows the bearings which MUST NOT be lubricated.

Table 1 - Items which MUST NOT be Lubricated	
Rudder pedal sled.	DO NOT LUBRICATE.
Flap rod-end bearings.	DO NOT LUBRICATE.
Aileron rod-end bearings.	DO NOT LUBRICATE.
Elevator rod-end bearings.	DO NOT LUBRICATE.

2. Lubrication Schedule

Table 2 shows the lubrication schedule. Clean each lubrication point before lubrication.

See figures 1 and 2 for the location of the lubrication points listed on the left side of the table. The center column shows the type of lubricant. The right column shows the lubrication interval.

Table 2 - Lubrication Schedule

Location		Type of Lubricant							Interval
No.	See Figure 1 and 2	1	2	3	4	5	6	7	(Hours) see Notes (1), (2)
(1)	Brake pedal pivot		●						200
(2)	Rudder cable S-tubes			●					200
(3)	Flap actuator extension rod			●					200
(4)	Passenger door safety hook button (red)				●				100
(5)	Upper rudder pivot bearing	●							100
(6)	Nose wheel bearing (see Notes 4, 6, and 7)	●						●	200
(7)	Wing main bolts	●							2000
(8)	Landing gear actuator ball bearings		●						100
(9)	Battery terminals				●				200
(10)	A-bolts	●							2000
(11)	A-bolt spherical bearings	●							2000
(12)	B-bolts	●							2000
(13)	B-bolt spherical bearings	●							2000
(14)	Brake pedal pivot shaft interior					●			1000
(15)	Flap actuator universal pivot block	●							1000
(16)	Brake caliper locating pins						●		200
(17)	Main gear leg bearings		●						100
(18)	Main wheel bearings (see Notes 4, 6, and 7)	●						●	200
(19)	Thimble eyes on rudder	●							200
(20)	Stick support pivot pins	●							1000
(21)	Cardan joint bearings (nose landing gear)		●						100

Notes:

(1) Lubricate at the time shown or at every disassembly / assembly.

(2) Lubricate more frequently in severe climates or operating conditions.

(3) Lubricate more frequently when the ice protection system (optional Equipment) is frequently operated.

(4) Lubricate at the time shown and at Annual Inspection.

(5) Do not grease on the threads. It will reduce the friction of the lock-nut.

CAUTION: DO NOT MIX AVIATION WHEEL BEARING GREASES WITH EACH OTHER. IF USING OTHER APPROVED GREASES, COMPLETE REMOVAL OF CONTAINED GREASE AND BEARING CLEANING IS REQUIRED. REPLACEMENT OF PREVIOUSLY LUBRICATED FELT GREASE SEALS IS ALSO REQUIRED.

(6) The wheel manufacturer lubricates the main wheel bearings with Mobil Aviation Grease SHC 100. Type 1 grease is completely compatible with the wheel bearings.

(7) On airplanes registered in the USA, lubricate the wheel bearings at every annual / 100 hour inspection (see FAR 43, Appendix D).

Table 3 - Lubricant Specifications		
Specification	**Product**	**Manufacturer**
TYPE 1		
MIL-G-3545 (obsolete)	AeroShell Grease 5	Shell Oil Company
GOST 6267-74	Grease CIATIM 201	RUSMA LLC Company
GOST 9433-80	Grease CIATIM 221	RUSMA LLC Company
DOD-G-24508A	Mobil Aviation Grease SHC 100	Exxon Mobil Oil Corp.
TYPE 2		
MIL-L-7870	Royco 363	Royal Lubricants Co. Inc.
	Brayco 363	Bray Oil Co.
Warm climates only	LPS 2	LPS
TYPE 3		
Greaseless Lubricant	LPS 1	LPS
TYPE 4		
VV-P-236 (petrolatum)	Royco 1	Royal Lubricants Co. Inc.
	DC 4	Dow Corning
TYPE 5		
MIL-C-16173 (Grade 2)	LPS 3	LPS
TYPE 6		
MIL-A-907	Loctite Antiseize 767	Loctite
-	Multi-Purpose Lubricant	DRI SLIDE
-	LPS Force 842	LPS
-	Lubriplate X-357	Lubriplate
-	Loctite 8191	Loctite
-	Anti-Friction Spray MoS2	WEICON GmbH
TYPE 7		
MIL-PRF-81322, Grade 2	Aeroshell Grease 22	Shell Oil Company
DOD-G-24508A	Mobil Aviation Grease SHC 100	Exxon Mobil Oil Corp.

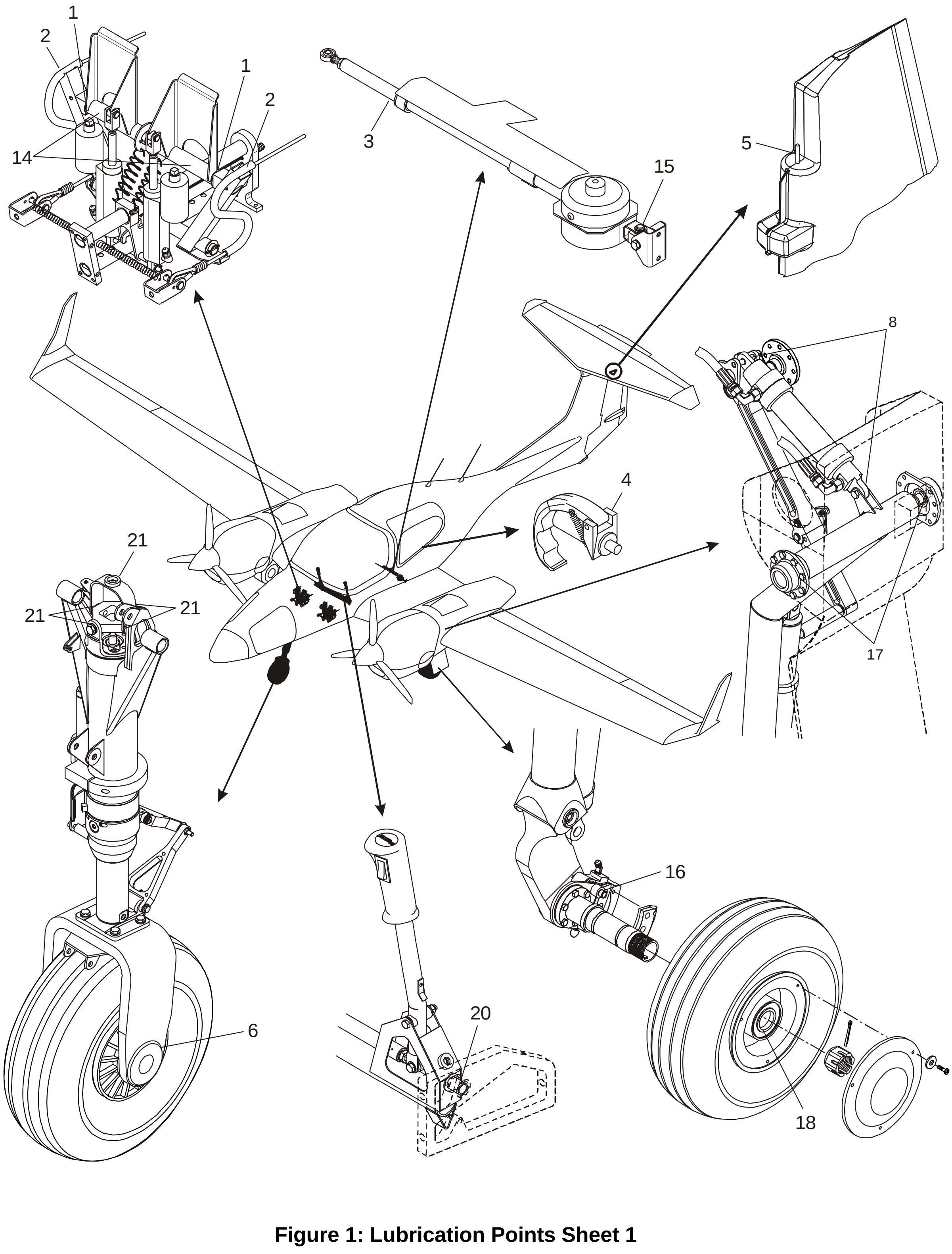

Figure 1: Lubrication Points Sheet 1

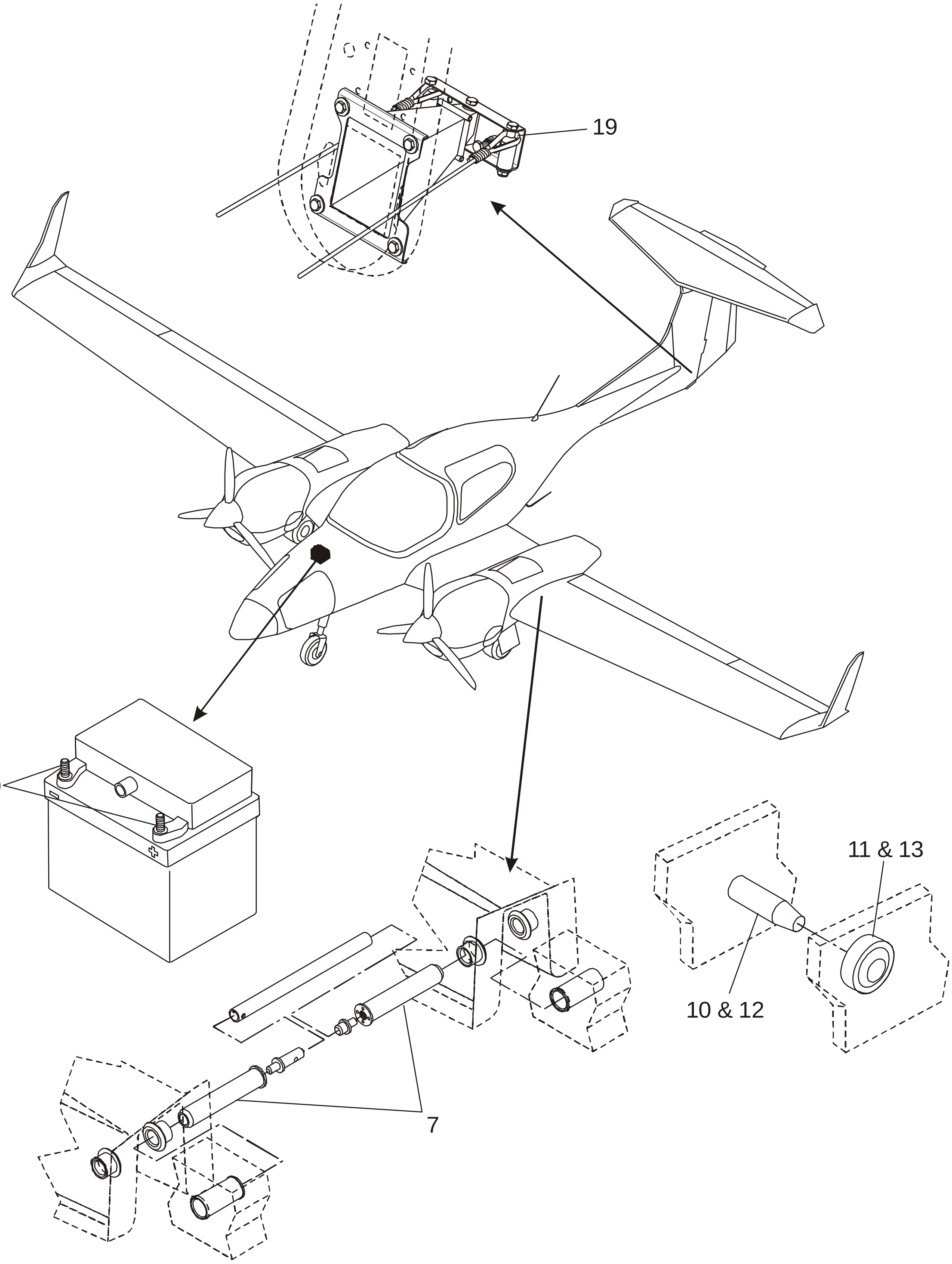

Figure 2: Lubrication Points Sheet 2

Section 12-30
Unscheduled Servicing

1. General

This Section tells you how to clean the airplane. It also tells you how to remove snow and ice from the airplane.

2. Exterior Cleaning

The outer surfaces of the DA 42 must be kept clean to maintain the good performance characteristics of the airplane. The leading edge of the wings are specially important.

Protect all control surface bearings and other lubricated components before cleaning the airplane.

Use large quantities of water to clean the airplane. If necessary, add a mild cleaning agent to the water. Remove excess dirt or dead insects immediately after flight. Dried on dirt and dead insects are very difficult to remove.

CAUTION: DO NOT USE CLEANING OR POLISHING AGENTS WHICH CONTAIN SILICON. IF THE AIRPLANE NEEDS REPAIR AT SOME TIME, SILICON CAN PREVENT REPAIR MATERIALS FROM BONDING CORRECTLY.

Approximately once a year, apply a silicone-free automotive polish to the outer surface of the airplane.

3. Canopy and Transparency Cleaning

CAUTION: DO NOT RUB THE CANOPY OR TRANSPARENCIES WHILE THEY ARE DRY. DO NOT USE DIRTY CLOTHS OR SPONGES. THE ACRYLIC TRANSPARENCIES SCRATCH VERY EASILY WITH THE SMALLEST PARTICLES OF DUST OR DIRT.

Clean the canopy and transparencies with large quantities of clean water. Use clean sponges and good chamois leather that you should not use for any other purpose.

Polish dull or scratched areas using a special acrylic cleaner. Remove scratches with special transparency polishing systems (e.g. Micro-Mesh).

4. Interior Cleaning

Clean the interior of the airplane cabin with a flame-proof vacuum cleaner.

5. Engine Cleaning

Use a cold cleaning agent (e.g. Berner Cold Cleaner, part no. 13618.0 or refer to the TAE Maintenance Manual).

CAUTION: DO NOT CLEAN THE ENGINE WHILE THE ENGINE IS HOT.

CAUTION: DO NOT USE HIGHLY FLAMMABLE OR CORROSIVE CLEANING AGENTS TO CLEAN THE ENGINE.

CAUTION: DO NOT LET THE CLEANING AGENT GET INTO ELECTRICAL COMPONENTS AND ENGINE INTAKES.

CAUTION: DO NOT START THE ENGINE UNTIL ALL OF THE CLEANING AGENT HAS EVAPORATED.

Protect all electrical components and cables. Use polythene bags to seal intakes and other areas that you want to keep dry. After washing you can dry the engine using compressed air (<8 bar (118 PSI)).

6. Snow and Ice Removal

Remove snow and ice as soon as possible to prevent water from the melting snow or ice re-freezing and causing damage.

CAUTION: DO NOT USE SHARP OBJECTS TO REMOVE SNOW OR ICE. YOU CAN DAMAGE THE AIRPLANE STRUCTURE.

Use soft brushes to remove snow from the surfaces.

Put the airplane in a heated hangar to remove ice or spray de-icing fluid onto ice-covered surfaces using a suitable spray bottle. For approved de-icing fluids refer to AFM, Section 8.7.

Use a soft piece of cloth to wipe the airplane dry.

7. Cleaning of the Porous Panels of the Ice Protection System

CAUTION: DO NOT APPLY POLISH OR WAX TO THE PANELS. CERTAIN SOLVENTS, PARTICULARLY METHYL ETHYL KETONE (MEK), ACETONE, THINNER AND OTHER TYPES OF THINNERS AND SOLVENTS DAMAGE THE INNER MEMBRANE OF THE PANELS. MASK ACTIVE AREA OF PANELS WITH A LOW TACK TAPE WHEN USING SOLVENTS OR PAINTING THE AIRPLANE IN THE PROXIMITY OF THE PANELS OR WHEN THE AIRPLANE IS STORED IN A DUSTY ENVIRONMENT.

The porous panels can be cleaned with soap and water using a clean, lint-free cloth. Isopropyl alcohol, ethyl alcohol or methylated spirit may used to remove oil or grease. Furthermore approved de-icing fluids, AVGAS and Jet fuel are permitted for use on the panels.

8. Conservation of Exterior Parts

This Section tells you which exterior parts are protected with an anti-corrosion coating, when and how a new anti-corrosion coating must be applied.

A. Anti-Corrosion Coating Check

Check the protected exterior parts (refer to the Anti-Corrosion Checklist and Figures 1 through 15) for a film of the anti-corrosion coating. If the film is scratched or the part shows signs of corrosion, you must replace the anti-corrosion coating (refer to paragraphs B and C of this section).

B. Remove the Anti-Corrosion Coating

CAUTION: YOU MUST USE THE APPROVED ANTI-CORROSION COATING CLEANING AGENTS IN ORDER TO PREVENT DAMAGE TO OTHER PARTS OF THE AIRPLANE.

Approved anti-corrosion coating cleaning agents are:

– Ardrox® AV 980

– Diestone DLS

Remove the anti-corrosion coating:

- Read the product datasheet carefully.
- Cover the airplane parts and surfaces in your working area, which are not subject to the cleaning.
- Apply the anti-corrosion cleaning agent to the parts.
- Use a cloth to remove the remains.
- Repeat until the surface is clean and dry.

C. Apply the Anti-Corrosion Coating

CAUTION: YOU MUST USE THE APPROVED ANTI-CORROSION COATINGS IN ORDER TO PREVENT DAMAGE TO OTHER PARTS OF THE AIRPLANE.

Approved anti-corrosion coatings are:

- Ardrox® AV 30 (color: red; recommended for not visible parts)
- Socopac 65H (color: red; recommended for not visible parts)
- Cor - Ban 35 (color: transparent; recommended for visible parts)

Apply the anti-corrosion coating:

- Read the product datasheet carefully.
- Cover the airplane parts and surfaces in your working area, which are not subject to the anti-corrosion coating.
- Apply the anti-corrosion agent to the parts. Make sure the surface is covered with a thin film of the anti-corrosion coating.
- The anti-corrosion coating needs 3 hours to dry.
- Remove the covers from the airplane.

D. Anti-Corrosion Coating Checklist

Refer to the figure numbers in the following table to identify the parts, where anti-corrosion coatings must be applied.

Anti-Corrosion Coating Checklist		
Figure	**Part / Location**	**Initials**
	FLAPS LH/RH	
1	Control rod eye end fitting	
1	Ball joint bolt and nut	
	AILERONS LH/RH	
2	Control rod eye end fitting	
2	Ball joint bolt and nut	
	MAIN LANDING GEAR LH/RH	
3, 5	Tension spring	
3, 5	Forward pivot bearing, bolt head and nut	
3, 5	Aft pivot bearing, bolt head and nut	
3, 5	Tension spring	
3, 5	Latch operating arm, bolt heads and nuts (2)	
3, 5	Driver plate and folding stay bracket	
4	Main landing gear axle, bolt heads and nuts (4)	
4	Main landing gear leg assy / trailing arm oversize bolt head and nut	
4	Damper upper bolt head and nut	
4	Damper lower bolt head and nut	
6	Main landing gear bay, door hinges (2), bolt heads (6) and nuts (6)	
6	Main landing gear bay nuts (5)	
	ELEVATOR, ELEVATOR CONTROLS AND ELEVATOR TRIM SYSTEM	
7, 8	Elevator push rod, upper eye end fitting	
7, 8	Elevator upper eye end fitting, bolt head and nut	
7, 8	Elevator trim bolt heads (8) and nuts (8)	
7, 8	Elevator trim actuating lever attaching bolt head and nut	
9	Elevator push eye end fitting, bolt head and nut	
9	Elevator bellcrank, bolt heads (3) and nuts (3)	
9	Elevator centering springs (2) and mountings (3)	

Anti-Corrosion Coating Checklist		
Figure	**Part / Location**	**Initials**
	RUDDER	
10	Rudder pedestal, nuts (4)	
10	Rudder friction damper coupling and bolt heads (2)	
10	Rudder plate, bolt heads (3) and nuts (3)	
11	Rudder upper bearing	
	NOSE LANDING GEAR	
12	Centering unit guidance plate and bolt heads (3)	
12	Nose wheel fork bolt heads (4)	
12	Torque links bolt heads (5) and nuts (5)	
13	Tension spring	
13	Tension spring mounting bolt heads (2) and nuts (2)	
13	Folding stay latching mechanism	
13	Folding stay latch operating arm: lower ball joint, bolt head and nut	
14	Actuator eye end fitting	
14	Mounting bracket bolt heads (5)	
15	Nose landing gear bracket and bolt heads LH (4), RH (4)	
15	Door rod upper eye end fitting LH, RH	
15	Door hinges LH (4), RH (4)	
	FUSELAGE	
16	Foot step screws LH (4), RH (4)	

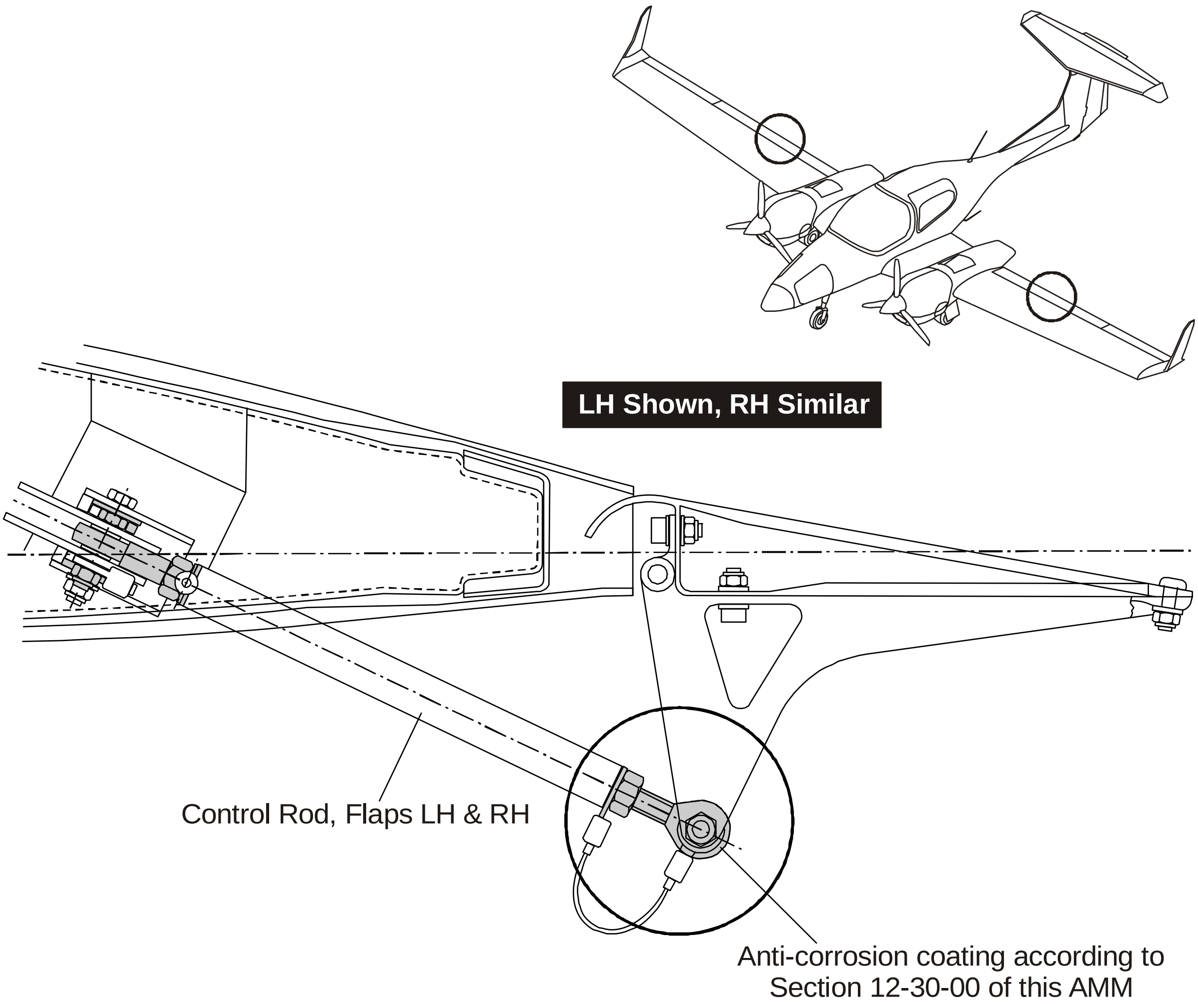

Figure 1: Anti-Corrosion Coating - Control Rods Flaps LH/RH

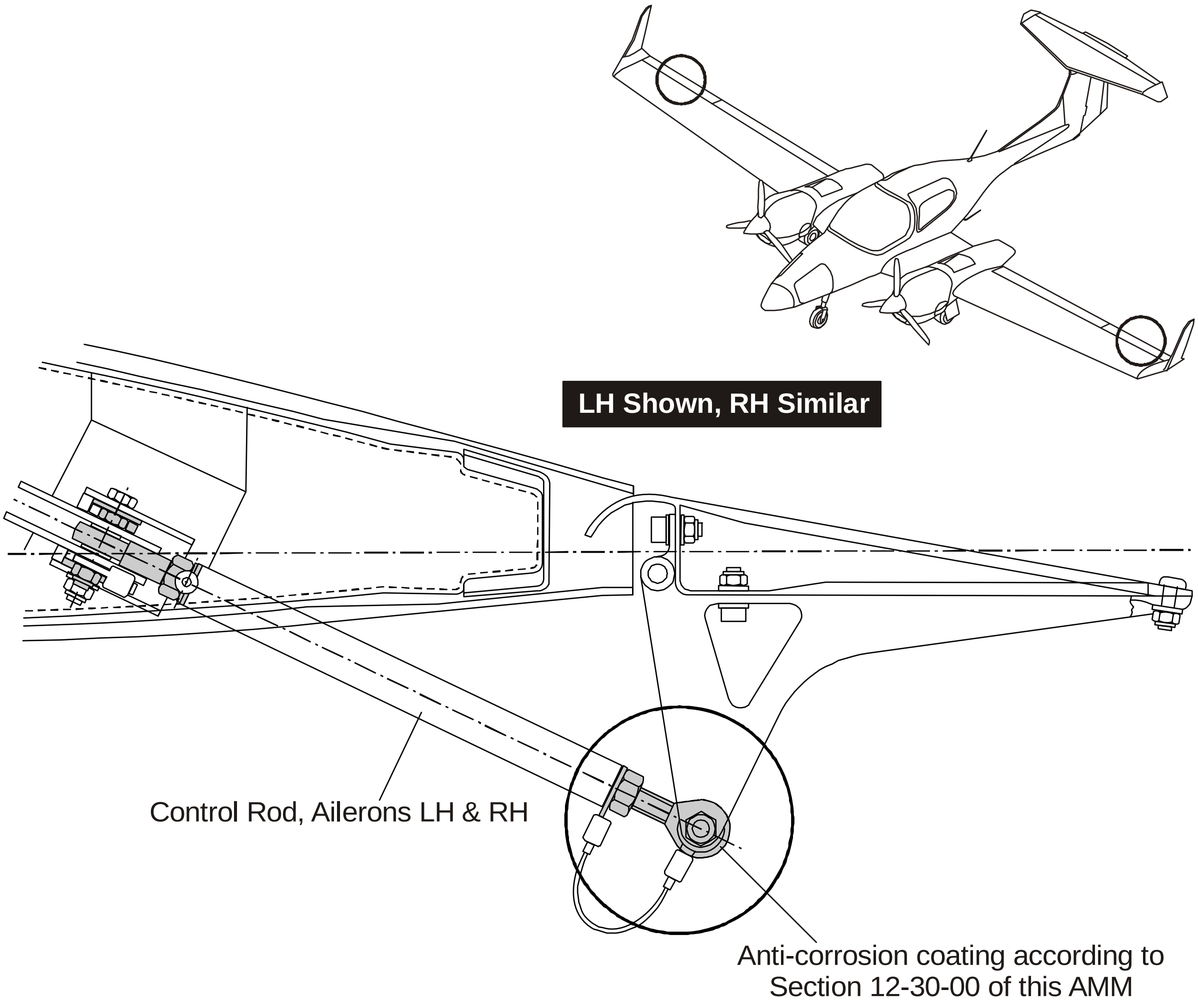

Figure 2: Anti-Corrosion Coating - Control Rods Ailerons LH/RH

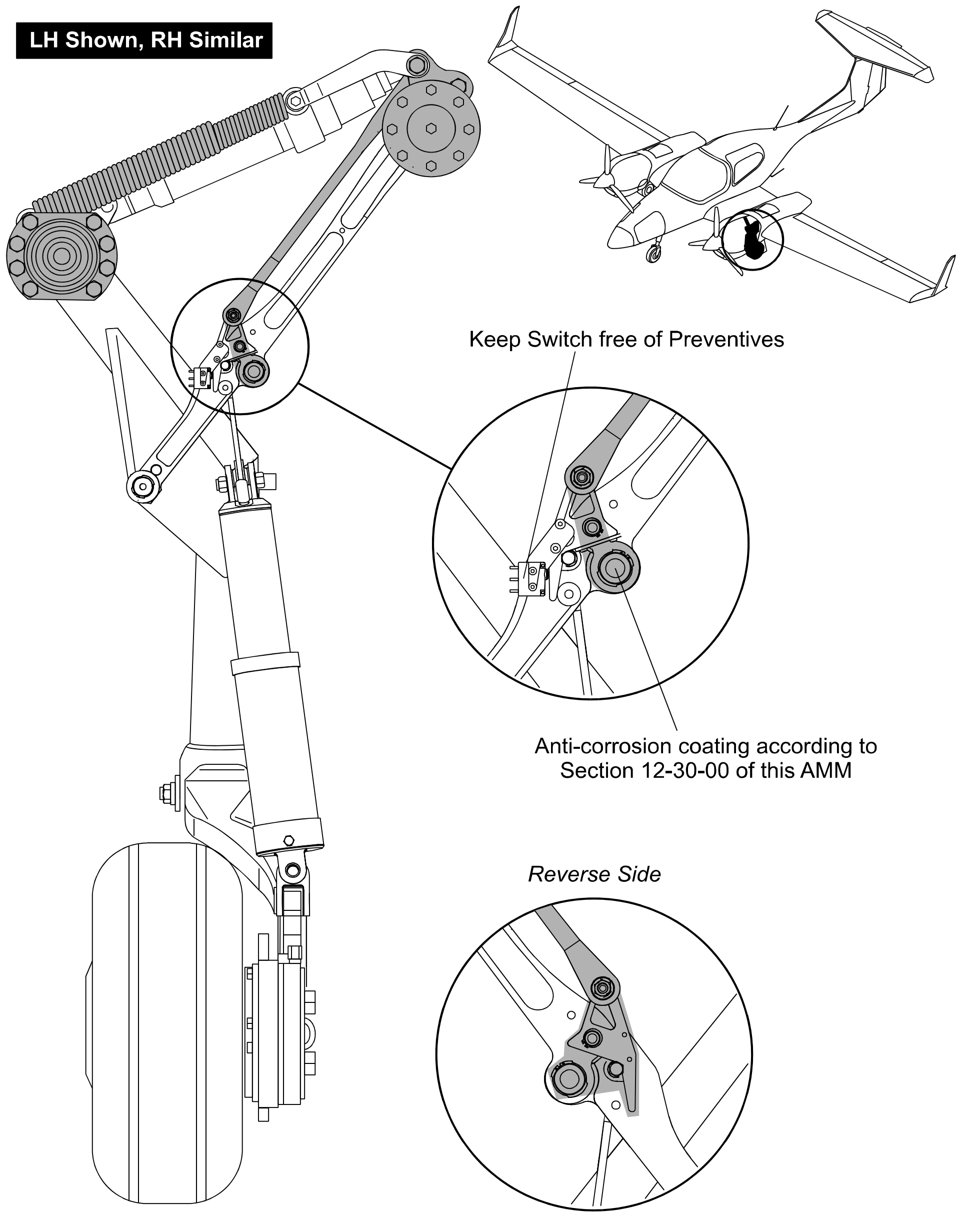

Figure 3: Anti-Corrosion Coating - Main Landing Gear LH/RH (1)

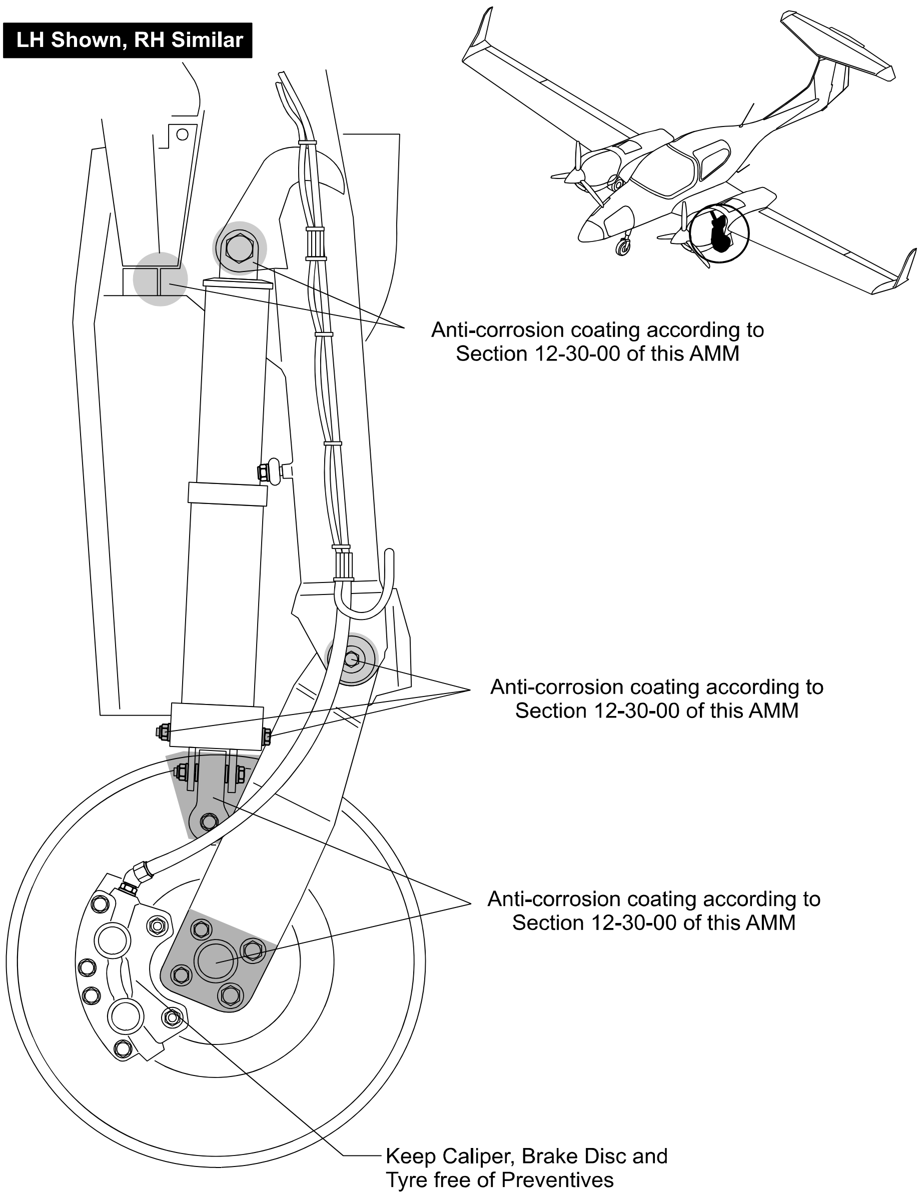

Figure 4: Anti-Corrosion Coating - Main Landing Gear LH/RH (2)

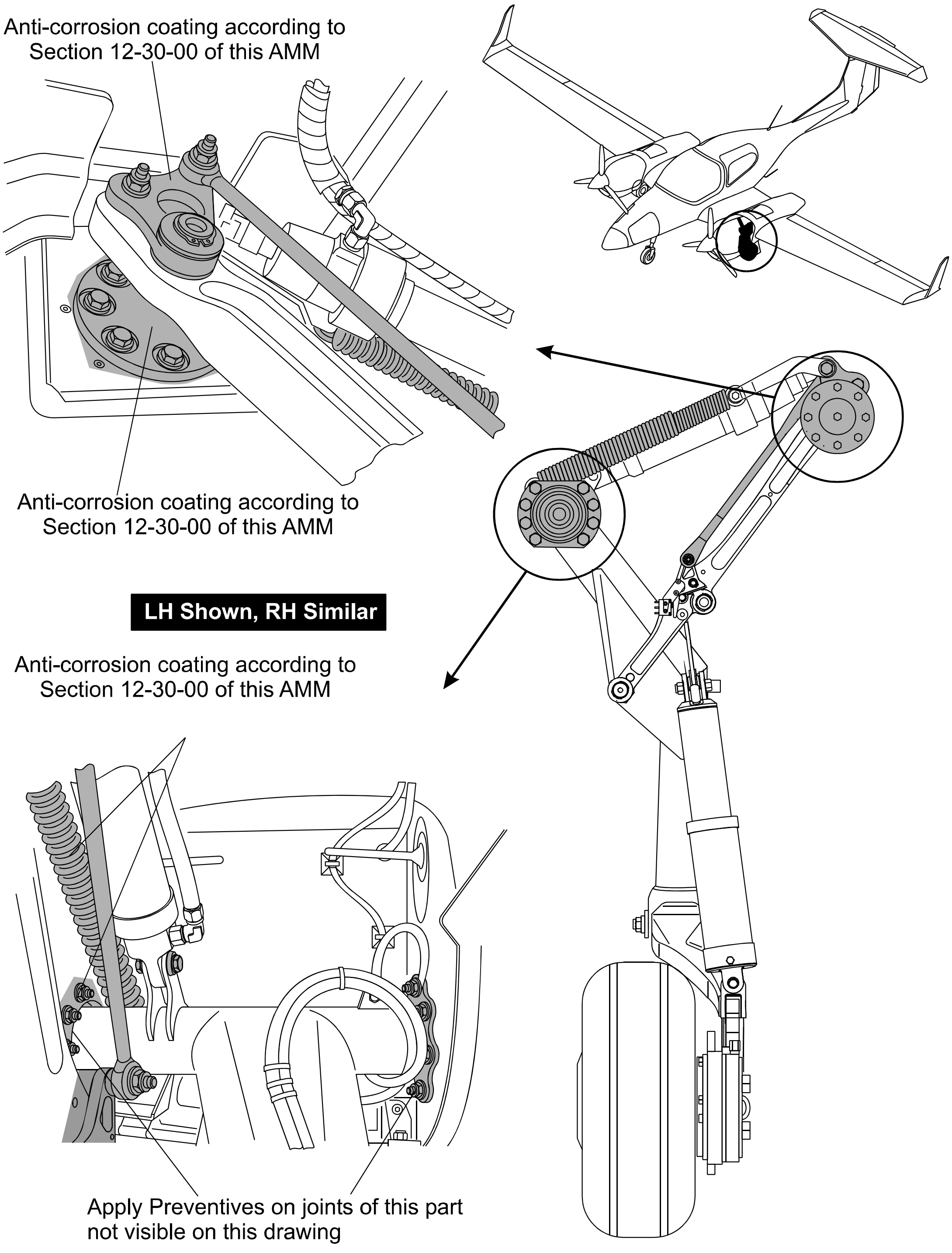

Figure 5: Anti-Corrosion Coating - Main Landing Gear LH/RH (3)

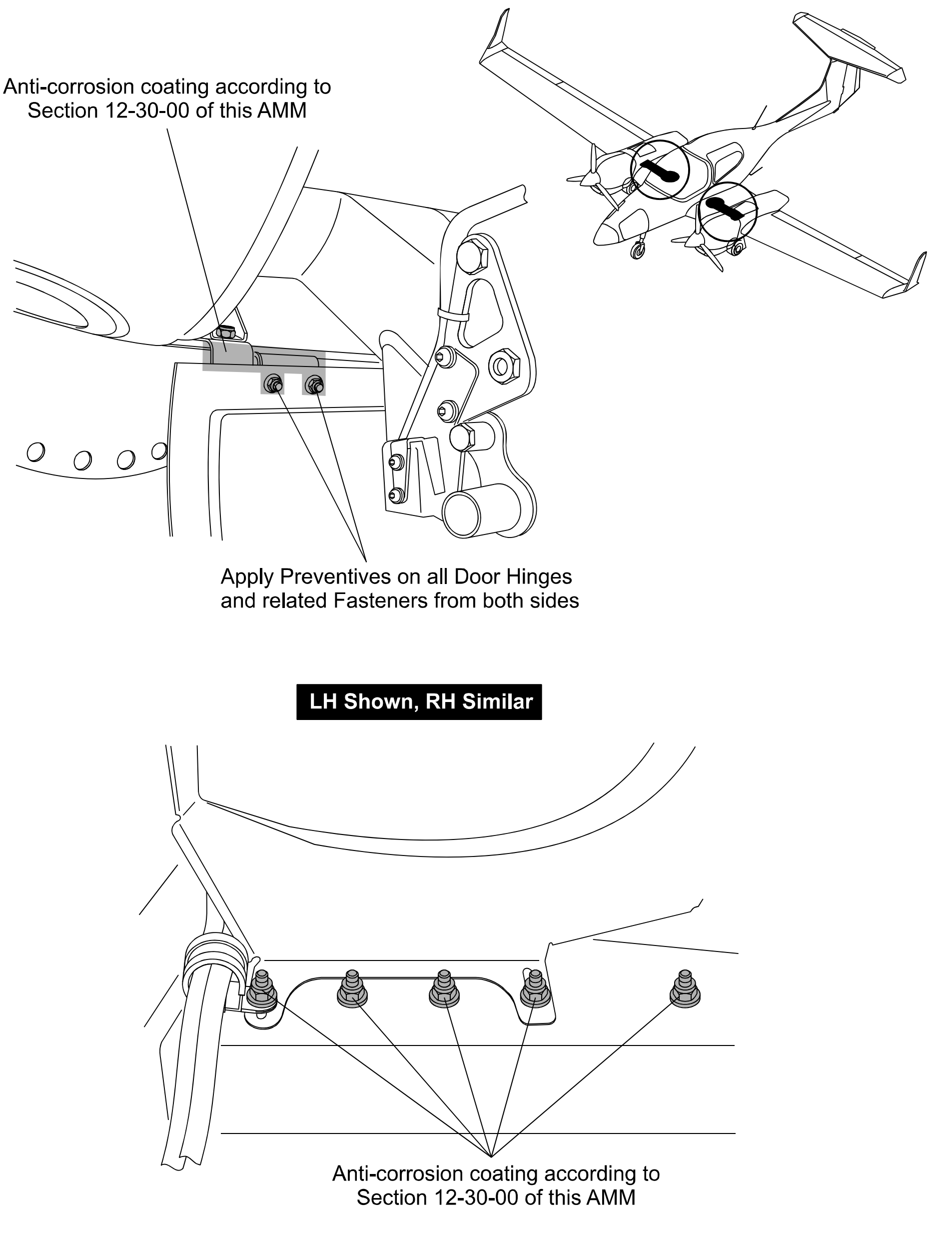

Figure 6: Anti-Corrosion Coating - Main Landing Gear Bay LH/RH

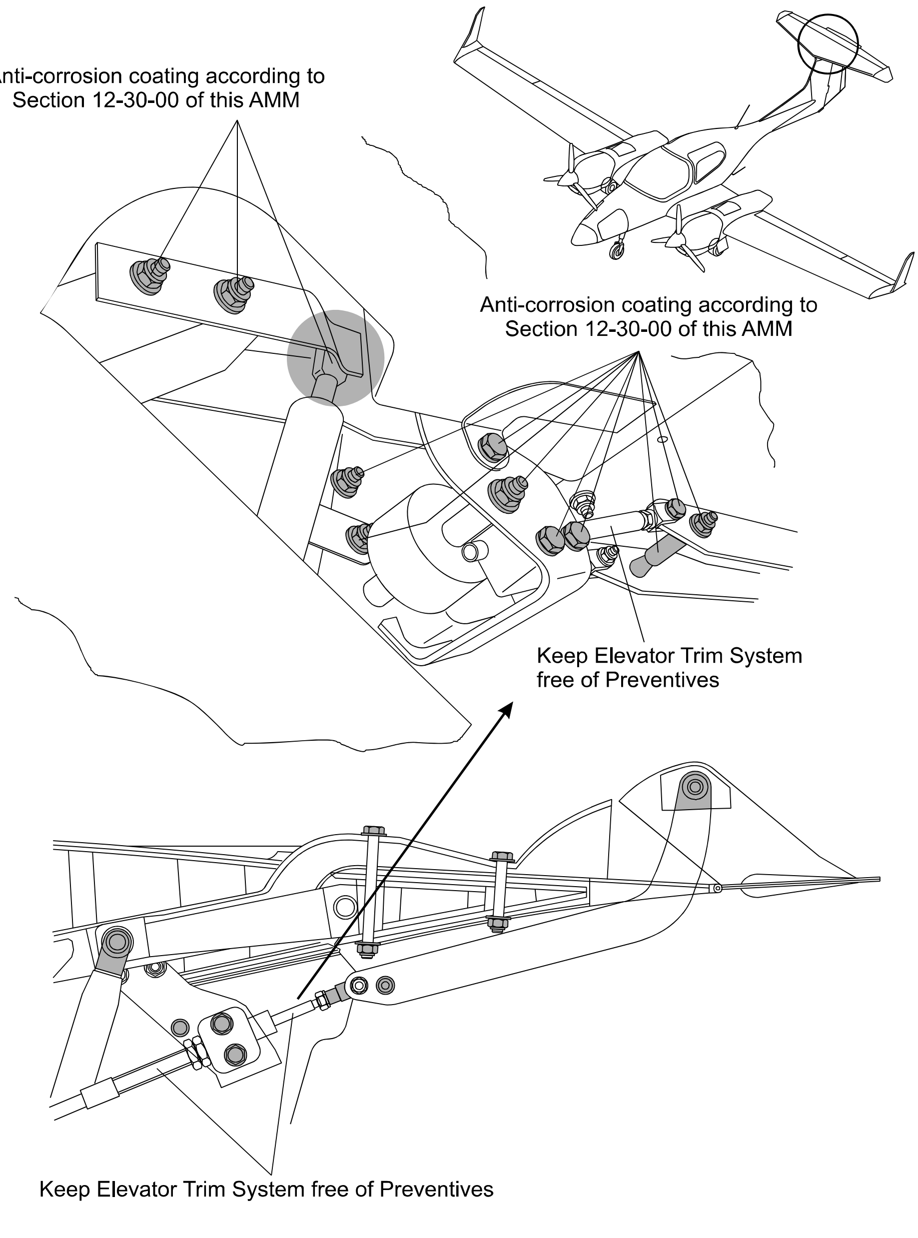

Figure 7: Anti-Corrosion Coating - Elevator and Elevator Trim System (1)

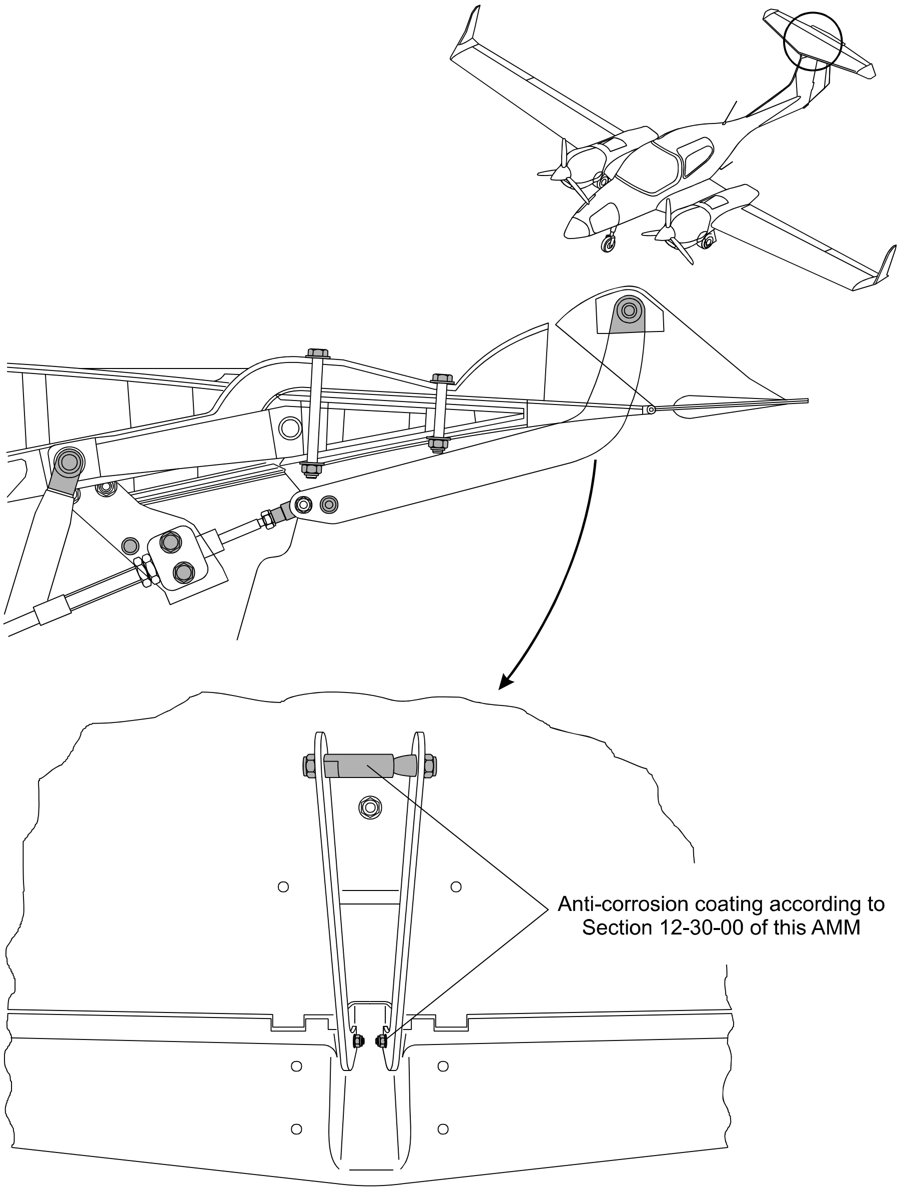

Figure 8: Anti-Corrosion Coating - Elevator and Elevator Trim System (2)

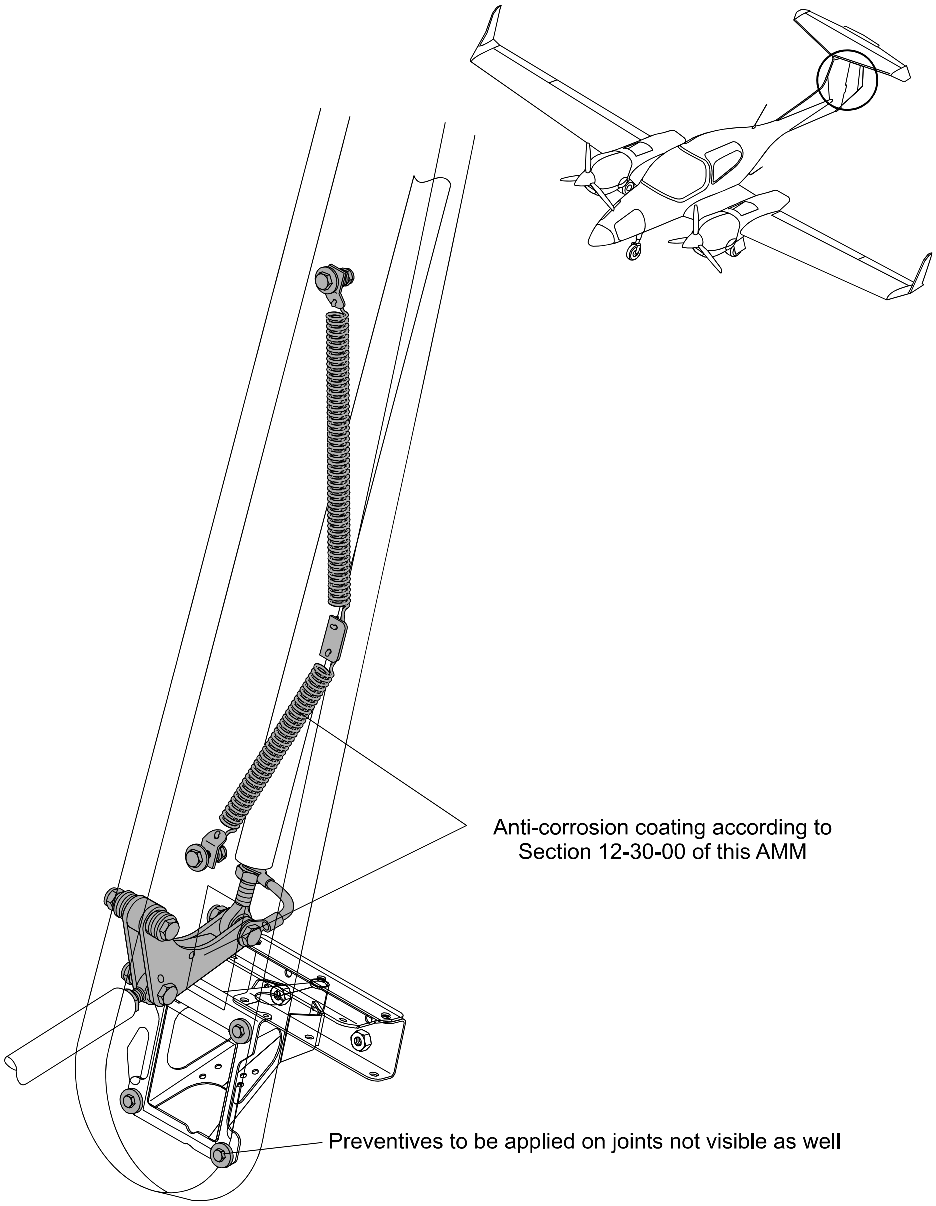

Figure 9: Anti-Corrosion Coating - Elevator Controls

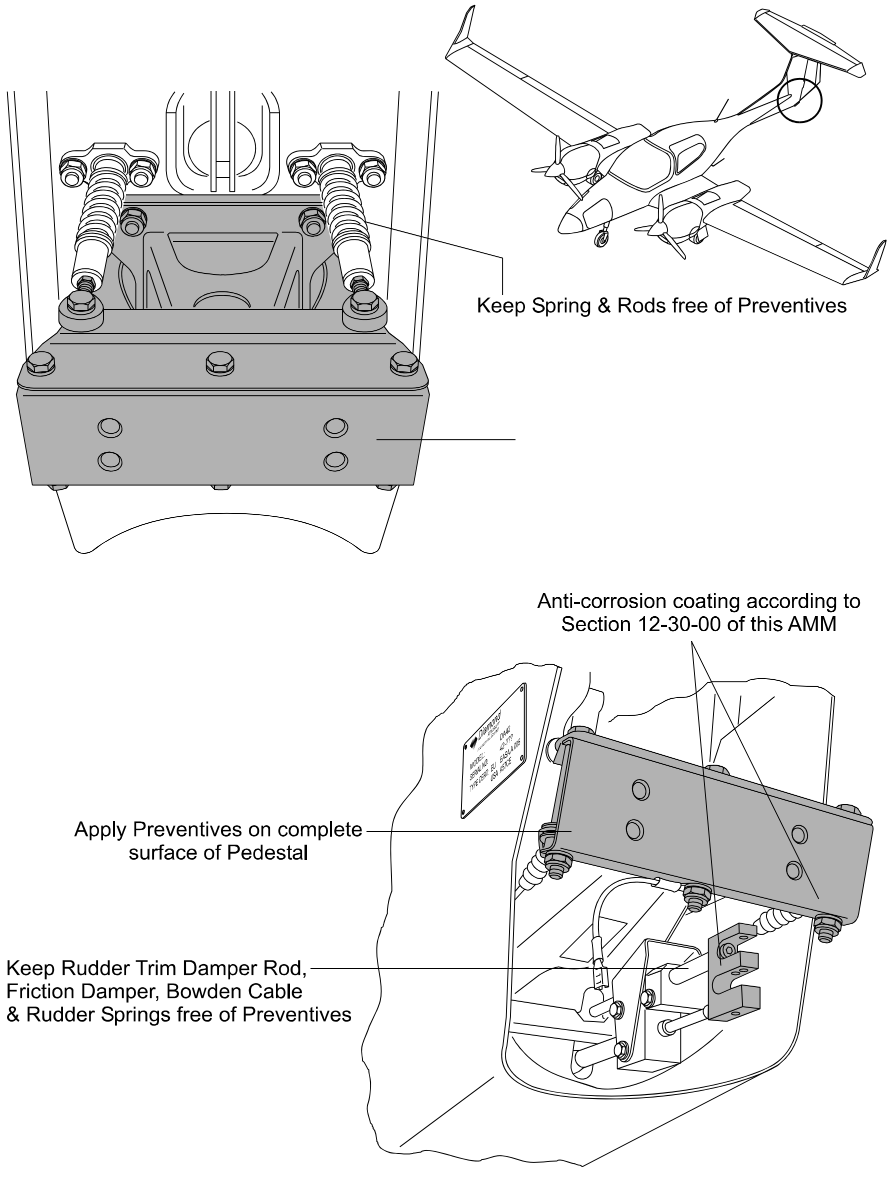

Figure 10: Anti-Corrosion Coating - Rudder Pedestal

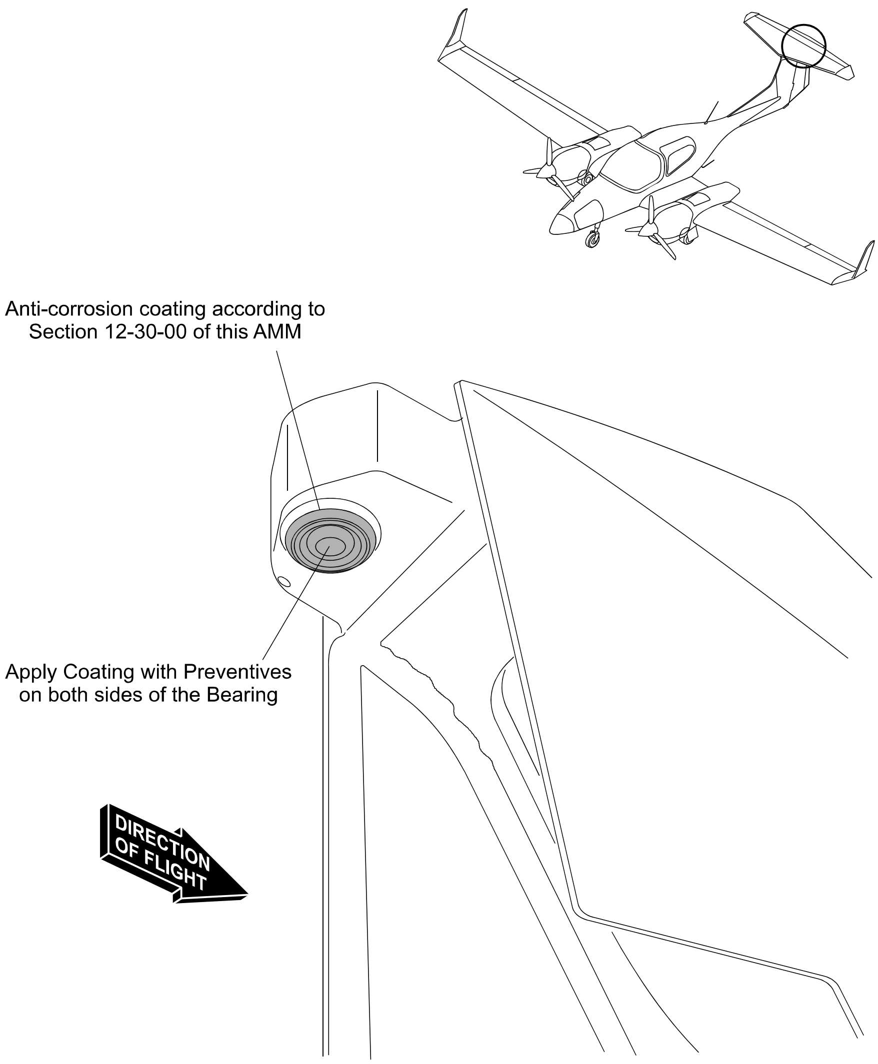

Figure 11: Anti-Corrosion Coating - Rudder

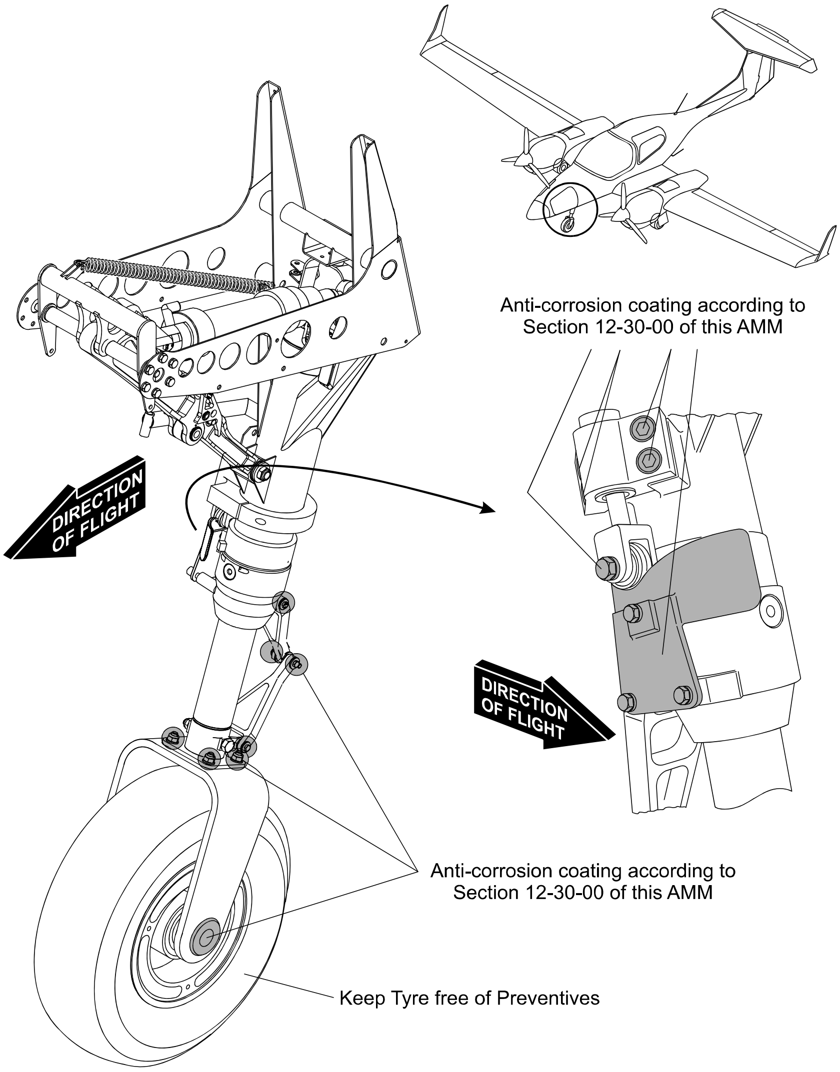

Figure 12: Anti-Corrosion Coating - Nose Landing Gear (1)

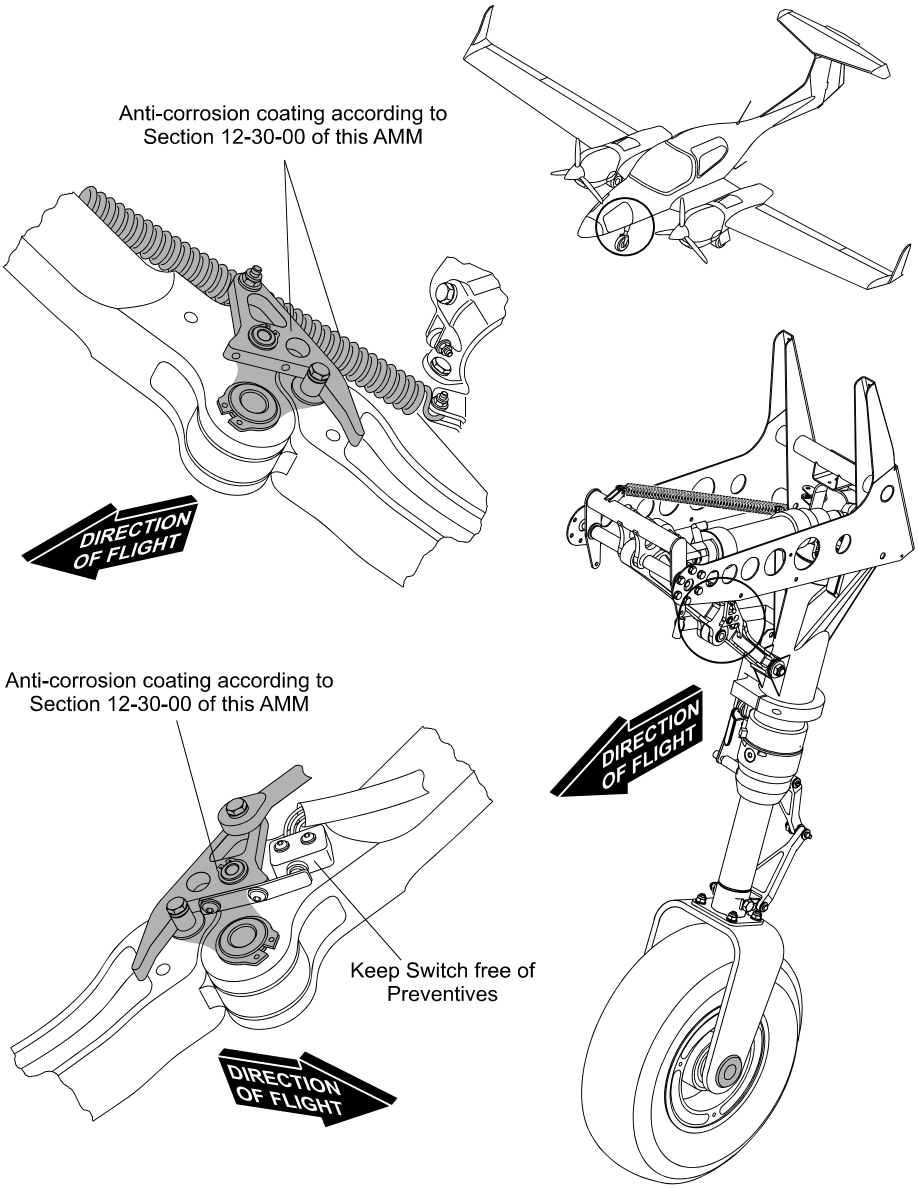

Figure 13: Anti-Corrosion Coating - Nose Landing Gear (2)

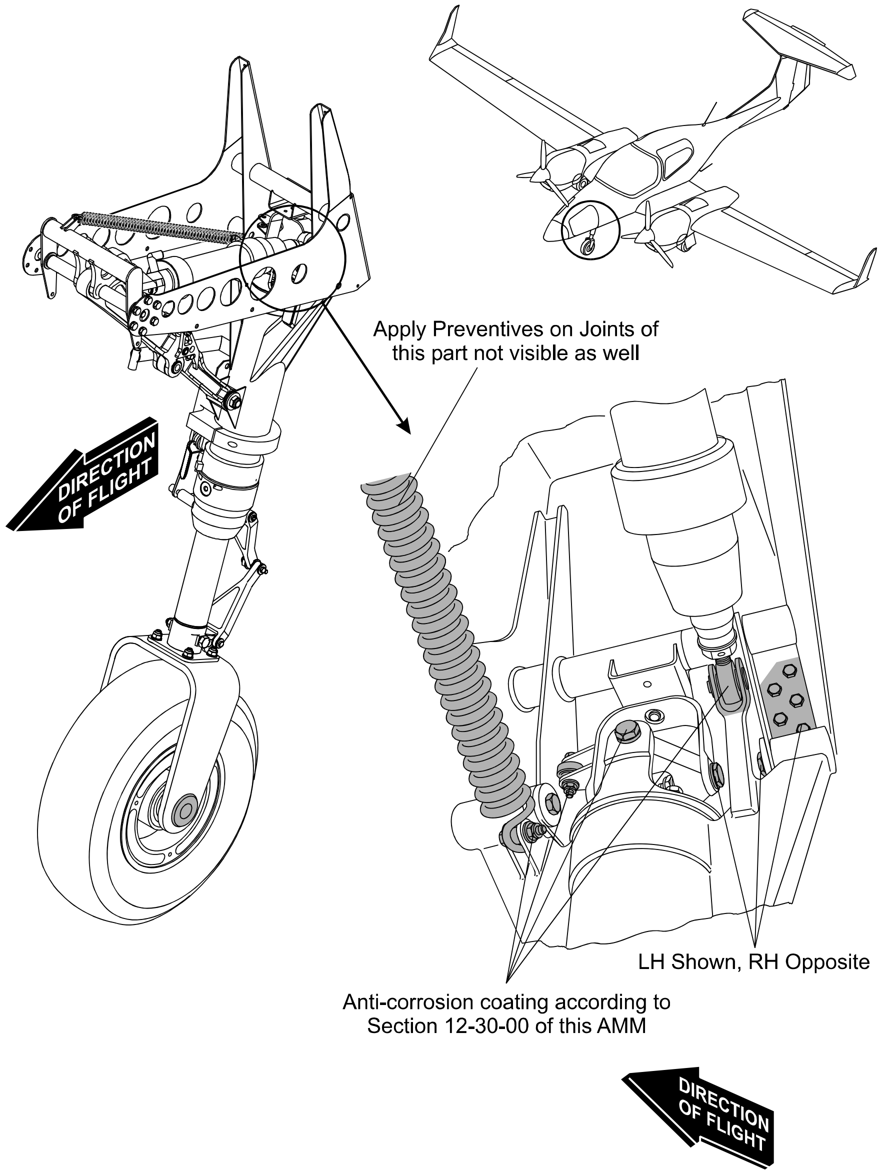

Figure 14: Anti-Corrosion Coating - Nose Landing Gear (3)

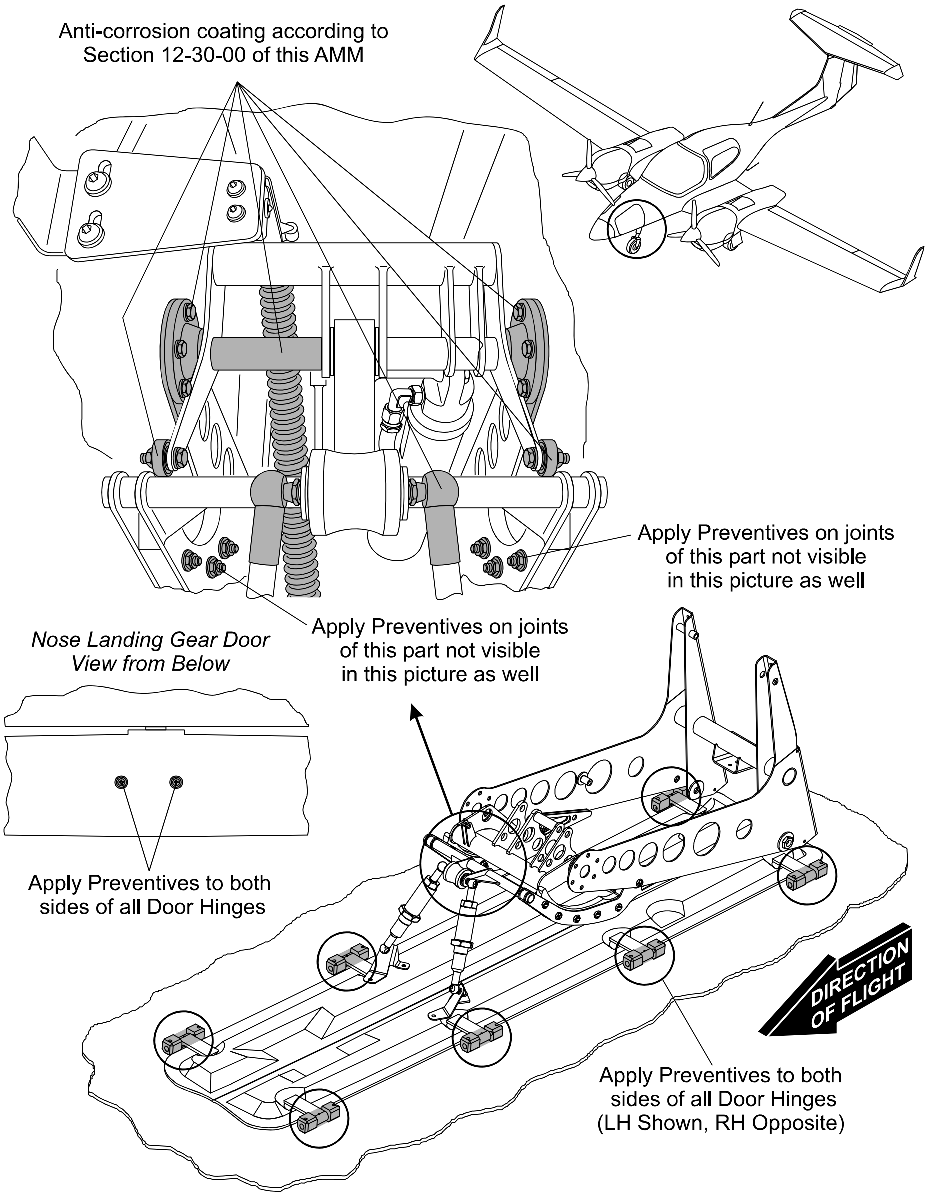

Figure 15: Anti-Corrosion Coating - Nose Landing Gear (4)

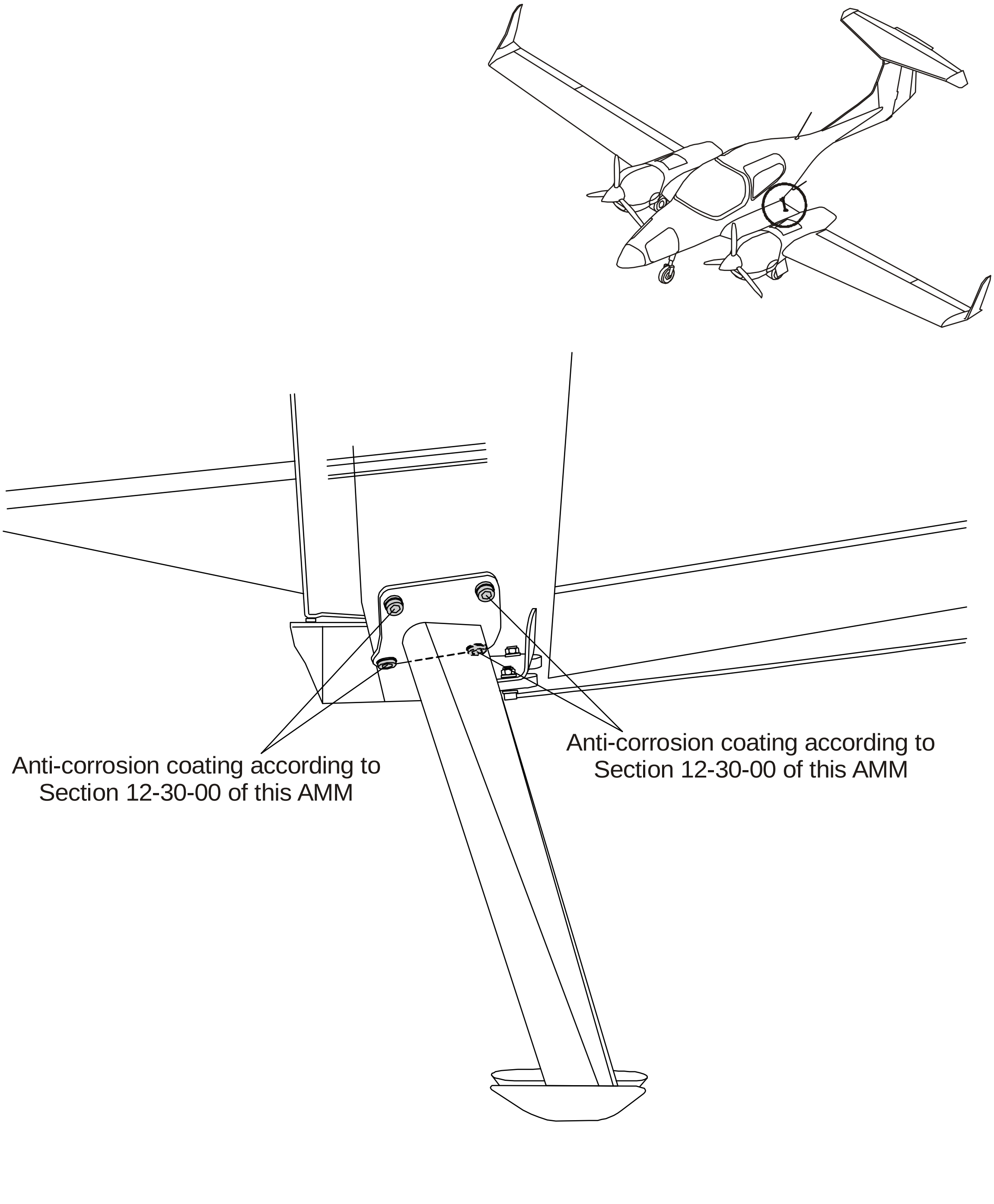

Figure 16: Anti-Corrosion Coating - Foot Step Screws

CHAPTER 20

STANDARD PRACTICES

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CHAPTER 20
STANDARD PRACTICES

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Trouble-Shooting

Maintenance Practices

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CHAPTER 20
STANDARD PRACTICES

1. General

This Chapter gives you the standard practices for the DA 42 airplane. Use industry standard practice where no specific practice is given.

This Chapter has the following Sections:

– Section 20-10. Standard Practices - Airframe.

– Section 20-30. Standard Practices - Electrical.

– Section 20-70. Standard Practices - Engine.

– Section 20-90. Standard Practices - Center Wing.

2. Handling of Identification Data

Note: Procedures for the handling of identification data are given in Chapter 03-00 Paragraph 4. All Placards are shown in Chapter 11 or in the appropriate Supplemental Airplane Maintenance Manual.

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Section 20-10
Standard Practices - Airframe

1. General

This Section gives you data about the fasteners (bolts/screws/nuts) used in the DA 42 airplane and their related torque values. This Section tells you the procedures used to tighten the fasteners.

Note: Use the standard torque values listed on the subsequent pages of this section where no specific values are given.

Note: Composite structures can have a different thickness for the same component or assembly. You must always make sure that you use the correct length of fastener. The length of fastener given in the Illustrated Parts Catalogue may NOT be correct for all components or assemblies.

2. Bolt and Nut Types Used in the Airplane

The DA 42 airplane uses these bolts:

– DIN bolts.

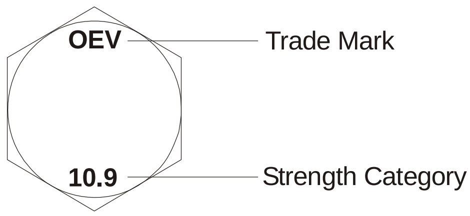
– LN bolts.

– AN bolts.

The minimum strength for the bolts is DIN specification 8.8. Letters and numbers on the head of the bolt identify the bolt type. The surface treatment also identifies the bolt.

A. DIN Bolt

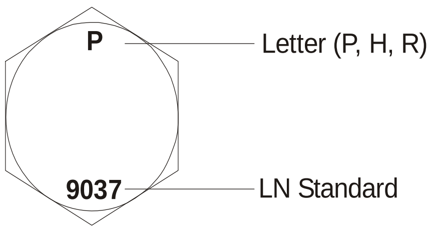
Bolt Head Identification



Surface Treatment - Galvanized

B. LN Bolts

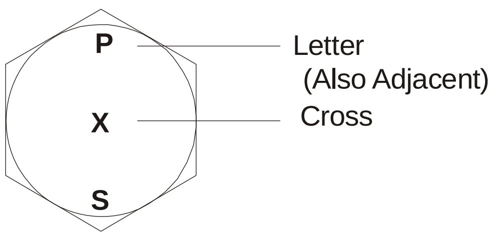
Bolt Head Identification



Surface Treatment - Galvanized and chromated yellow

C. AN Bolts

Bolt Head Identification



Surface Treatment - Galvanized or chromated yellow

The DA 42 uses these types of standard nuts: DIN934, DIN 985, AN 364, AN 365, MS21042, MS21044.

3. Standard Torque Values

A. AN Fine Threads

Bolt Size	Torque (Nm)	Torque (lbf.ft.)
10 - 32	1.6	1.2
1/4 - 28	6.2	4.6
5/16 - 24	13.6	10
3/8 - 24	20.7	15.3
7/16 - 20	37.7	27.8
1/2 - 20	54.2	40
9/16 - 18	90.4	66.7
5/8 - 18	124.3	91.7

B. AN Coarse Thread Series

Bolt Size	Torque (Nm)	Torque (lbf.ft.)
10 - 24	1.6	1.2
1/4 -20	5.7	4.2
5/16 - 18	10.2	7.5
3/8 - 16	20.9	15.4
7/16 - 14	28.9	21.3
1/2 - 13	54.2	40
9/16 - 12	79	58.3
5/8 - 11	101.6	75

C. DIN and LN Specifications

Metric Thread	Torque (Nm)	Torque (lbf.ft.)
M4	1.8	1.3
M5	3.6	2.7
M6	6.4	4.7
M8	16	11.8
M10	32	23.6
M12	60	44.3

4. Special Torque Values

Part	Torque (Nm)	Torque (lbf.ft.)
Propeller to engine nut.	45 - 47	33 - 35
Bolts attaching the engine mount to the firewall.	40	29.5
Bolts attaching the main landing gear brake back plates to the caliper.	Refer to Cleveland/Parker Maintenance Manual, latest revision or placards on affected part.	
Bolts connecting the two wheel halves.	Refer to Cleveland/Parker Maintenance Manual, latest revision or placards on affected part.	
Fuel drain valve.	1 - 3	0.73 - 2.21
Hexagon socket head screws at the turbo charger clamp (if MÄM 42-879 is installed).	8.0	5.9
Clamp screw exhaust pipe (if MÄM 42-911 is installed).	25	18.4
Horizontal stabilizer attachment bolts.	45	33.2
Hydraulic pump motor electric connection bolt.	9-11	6.6-8.1

5. Torque Measurement

For self-locking nuts, add the torque value of the locking device (friction or brake torque) to the value in the table. Read the friction value from the torque wrench before the nut seats.

Where a bolt is tightened from the bolt-head, add the value of the shaft friction (the friction of the bolt in the attached part) to the value in the table. Read the fiction value from the torque wrench before the bolt seats.

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Section 20-30
Standard Practices - Electrical System

1. General

This Section gives you the standard practices for the electrical system. Modern airplanes reliability depends on proper function of the electric and electronic systems to a greater extent than in case of previously certified airplanes. Maintenance carried out must be of good workmanship strictly considering the guidelines of FAA AC 43-13.1B. Any time you work on the engine harness refer to TAE Operation and Maintenance Manual OM-02-01, latest revision for the TAE 125-01 engine, to TAE Operation and Maintenance Manual OM-02-02, latest revision for the TAE 125-02-99 engine (if MÄM 42-198 is installed), Chapter 20-00 - Standard Practices.

The satisfactory performance of a modern airplane, like the DA 42, depends to a great extent on the reliability of its electrical systems. Improperly or carelessly maintained wiring can be a source of potential danger, and many malfunctions and failures of an electrical system can be traced to this cause. The continued proper performance of the electrical systems depends on the knowledge of the personnel who do the inspection and repair.

It is therefore important that maintenance be carried out in accordance with the best available techniques and properly trained maintenance personnel, in order to eliminate possible failures.

2. Thread Locking

Many electrical terminals are locked with electrical varnish or lacquer. If you release a terminal that has been thread locked with lacquer or varnish then use Loctite 222 or equivalent to lock the thread when you re-assemble the terminal.

3. Repair and Maintenance

Repair and maintenance of the electrical system wiring, not covered in a separate document (e.g. Service Bulletin, Work Instruction) is limited to the extent of:

– Replacement of wires and cables.

– Replacement of ring terminals.

A. Crimp Tools

The following crimp tools are commonly used for crimp contacts in the DA 42. Refer to the equipment manufacturer for more details of the tools and their use.

– Tyco, P/N 69478-1.

– Tyco CERTI-LOK, P/N 169400.

– Tyco SUPER CHAMP FT, P/N 720781-3.

– Tyco CERTI-CRIMP, P/N 91523-1.

– Tyco CERTI-CRIMP, P/N 91512-1.

– Commercial, M22520/1-01.

– Commercial, M22520/2-01.

– Commercial, M22520/37-01.

B. Wires and Cables

(1) Wires

For the purpose of electric and electronic installation, an insulated wire consists of a metal conductor covered with a dielectric or insulating material. Wires used in the airplane contain stranded conductors for flexibility. The insulation may consist of several materials and layers to provide:

– Dielectric insulation.

– Thermal protection.

– Abrasion resistance.

– Moisture resistance.

– Fluid resistance.

Approved wires for the DA 42:

– M22759/16.

– M22759/34.

(2) Cables

The term “cable”, may refer to any of the following:

– Two conductors twisted together (twisted pair).

– A single center conductor with a metallic braided outer conductor (coaxial cable).

– Two or more insulated conductors contained in a common covering (multi conductor cable).

– One or more insulated conductors with an overall shield (shielded cable).

Approved cables for the DA 42 are:

– M27500.

– M17/60-RG142.

– M17/128-RG400.

(3) Wire Marking

Locating a specific wire within a large wiring loom would be extremely difficult without individual identification of each wire, or cable. To simplify maintenance, each interconnecting wire and cable installed in the airplane is marked with a combination of numbers and letters. If a wire or cable must be replaced, the wire must be marked according to the wiring diagrams in Chapter 92.

C. Testing

After a wire, cable or ring terminal has been replaced, testing must be done as listed below:

– Visual inspection of the crimp connection (all leads within the crimp, insulation not crimped etc.).

– Check for continuity between the two ends of the conductor.

– Check for NO continuity between the conductor and airplane electrical ground.

– The crimp contact is not damaged of bend.

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Section 20-70
Standard Practices - Engines

1. General

This Section gives you data about the fasteners used on the TAE 125-01 and TAE 125-02-99 engines installed in the DA 42 airplane. It also gives you the procedures for tightening the fasteners.

Refer to the TAE Operation and Maintenance Manual OM-02-01, latest revision, if the TAE 125-01 engine is installed or the TAE Operations and Maintenance Manual OM-02-02, latest revision, if the TAE 125-02-99 engine is installed for more data.

2. Torque Values

Use the torque values given in Tables 1 thru 4 for standard fasteners on the engine and use the torque values given in Table 5 for the components listed.

3. Special Torque Procedures

When you use self-locking nuts, add the safety torque (friction torque or braking torque) to the table values. Set this value on the dial of the torque meter before you tighten the nut.

If a bolt has an additional torque due to shaft friction, add this torque value to the table value. Set this calculated value on the dial of the torque meter before you tighten the bolt.

Lubricate threads unless shown differently.

CAUTION: YOU MUST ADD THE SAFETY TORQUE (OR THE FRICTION TORQUE) TO THE FOLLOWING VALUES FOR SELF-LOCKING NUTS (OR BOLTS WITH SHAFT FRICTION).

Table 1 - Standard Torque Values for Engine Bolts and Nuts

INCH THREAD	TORQUE (Nm)	TORQUE (lbf.ft.)
1/4	11	8
5/16	23	17
3/8	41	30
7/16	68	50
1/2	102	75
9/16	149	110
5/8	203	150
3/4	366	270

Table 2 - Standard Torque Values for Engine Pipe Plugs

TAPER THREAD	TORQUE (Nm)	TORQUE (lbf.ft.)
1/16 - 27 NPT	4.5	3.3
1/8 - 27 NPT	4.5	3.3
1/4 - 18 NPT	9.5	7
3/8 - 18 NPT	12.3	9
1/2 - 14 NPT	18	13.3
3/4 - 14 NPT	26	19

Table 3 - Standard Torque Values for Engine Crush-Type Asbestos Gaskets

THREAD PITCH	ANGLE OF TURN	
THREADS PER INCH	ALUMINUM ASBESTOS	COPPER ASBESTOS
8	135°	67°
10	135°	67°
12	180°	90°
14	180°	90°
16	270°	135°
18	270°	135°
20	270°	135°
24	360°	180°
28	360°	180°

Note: Install all crush type gaskets (except the self-centering type) with the continuous surface against the flange of the plug or against the part which you will tighten against the gasket. Turn the part until the surfaces which you must seal, touch the gasket. Then tighten to the angle of turn shown for the thread size as given in Table 3.

Table 4 - Standard Torque Values for Engine Flexible Hose (or Tube) Connections

TUBE SIZE	THREAD	TORQUE (Nm)	TORQUE (lbf.ft.)
(-4) 1/4	7/16 - 20	11 - 16	7 -11
(-6) 3/8	9/16 - 18	17 - 22	11 - 16
(-10) 5/8	7/8 - 14	41 - 48	30 - 36

Table 5 - Special Torque Values for the Engine

ITEM	THREAD	TORQUE (Nm)	TORQUE (lbf.ft.)
Engine oil filter	-	25	18.5
Fuel filter	-	40	29.5
Coolant silicate pouch cartridge	-	32.5 ± 2.5	24.0 ± 1.8

4. Installation and Tightening Torques of Worm Drive Clamps

The figures and tables show the proper installation and the tightening torques of worm drive clamps.

A. Single Worm Drive Clamp

CAUTION: DO NOT PLACE A WORM DRIVE CLAMP ON A TUBE BEAD. THIS CAN DAMAGE THE HOSE AND MAY (IN CASE OF ENGINE CHARGE AIR INSTALLATION) CAUSE LOSS OF ENGINE POWER.

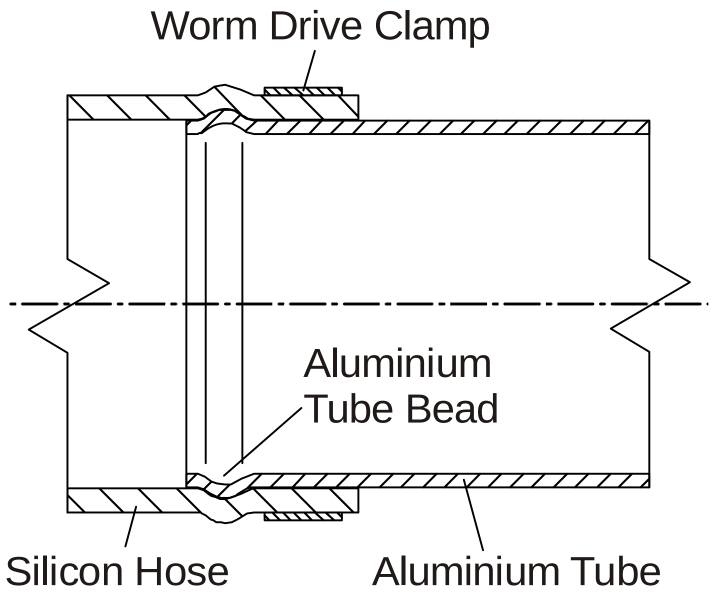

Figure 1: Installation with Single Worm Drive Clamp

B. Two Worm Drive Clamps

(1) Axial Placement

CAUTION: DO NOT PLACE A WORM DRIVE CLAMP ON A TUBE BEAD. THIS CAN DAMAGE THE HOSE AND MAY (IN CASE OF ENGINE CHARGE AIR INSTALLATION) CAUSE LOSS OF ENGINE POWER.

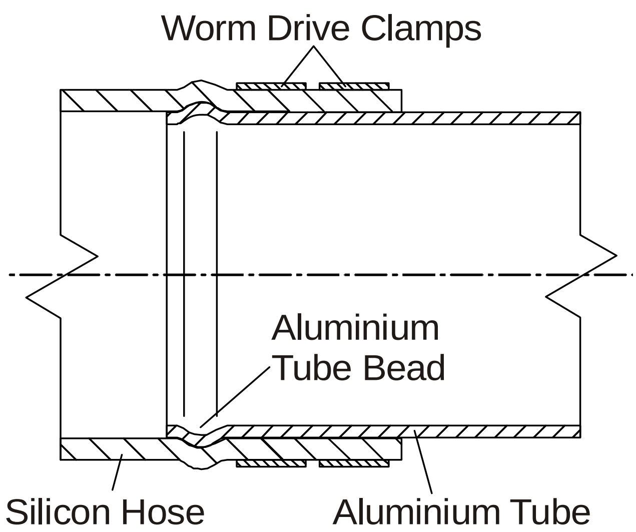

Figure 2: Installation with Two Worm Drive Clamps and Single Bead (Axial Placement)

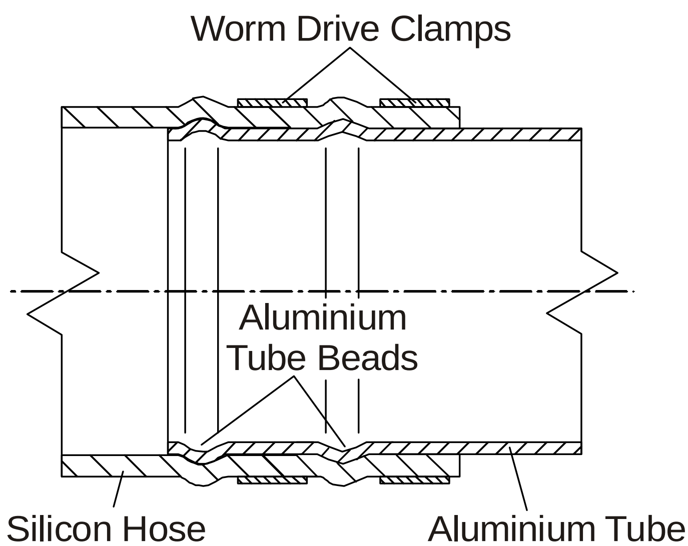

Figure 3: Installation with Two Worm Drive Clamps Two Beads (Axial Placement)

(2) Radial Placement

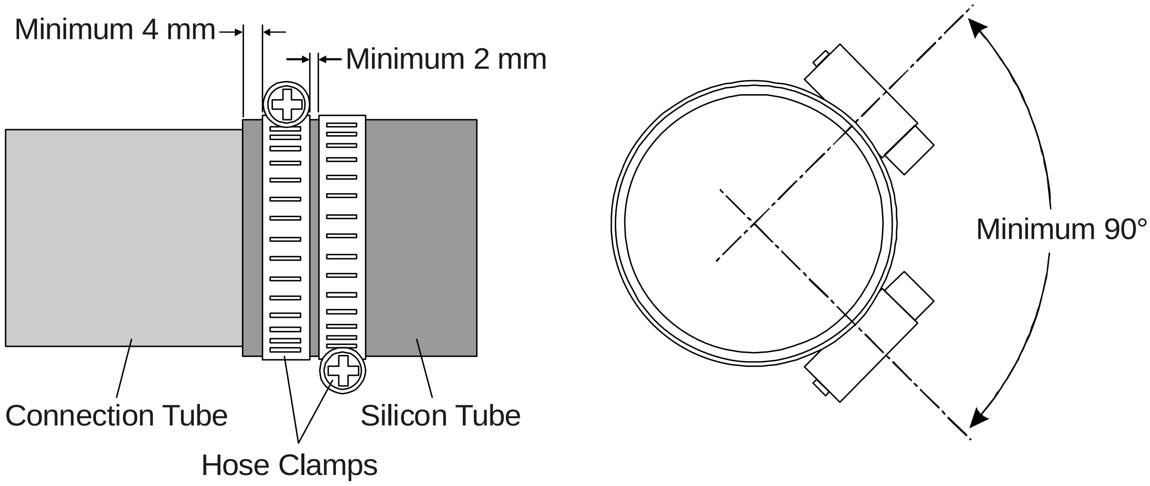

Figure 4: Installation with Two Worm Drive Clamps (Radial Placement)

C. Tightening Torques for Worm Drive Clamps

CAUTION: WORM DRIVE CLAMPS MUST BE TIGHTENED ACCORDING TO THE TABLE BELOW. OVER-TIGHTENING A WORM DRIVE CLAMP CAN DAMAGE THE HOSE AND MAY (IN CASE OF ENGINE INSTALLATIONS) CAUSE LOSS OF ENGINE POWER.

CAUTION: FOR WORM DRIVE CLAMP INSTALLATION THE ENGINE MUST BE COLD. INSTALLATION ON A HOT ENGINE CAN CAUSE DAMAGE TO THE HOSE AND MAY (IN CASE OF ENGINE INSTALLATIONS) CAUSE LOSS OF ENGINE POWER.

CAUTION: DO NOT RE-TIGHTEN A WORM DRIVE CLAMP ON A SILICONE HOSE PERFORMING AN AIRPLANE INSPECTION UNLESS IT IS LOOSE. REFER TO THE TABLE BELOW FOR THE CORRECT TIGHTENING TORQUES OF WORM DRIVE CLAMPS.

(1) Tightening Torques for Clamp Widths Below 12 mm (0.47 in)

Clamp Diameter	Torque (Nm)	Torque (lbf.ft.)
8 - 12	2.5 ± 0.5	1.8 ± 0.4
10 - 160	3.0 ± 0.5	2.2 ± 0.4

(2) Tightening Torques for Clamp Widths of 12 mm (0.47 in) and Higher

Clamp Diameter	Torque (Nm)	Torque (lbf.ft.)
8 - 160	5.0 ± 0.5	3.7 ± 0.4

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Section 20-90
Standard Practices - Center Wing

1. General

This Section shows the typical installation in the center wing section. The installation details of electrical cables, hoses and Bowden cables may change with optional equipment installed and serial number development. The following figures show typical installation positions for the components.

2. Description

The Figures show the key points of the routing. The cables and hoses may be removed for maintenance and repair work. Make sure to install components according to the previous setting.

Note: A minimum clearance of 5 mm (0.2 in) is required between electrical cables or hoses and moving parts, if jamming may occur otherwise.

Note: A minimum clearance of 2 mm (0.08 in) is required between electrical cables or hoses and moving parts, if chafing may occur otherwise.

Note: It might be helpful, to document the actual installation in the center wing section with some photographs.

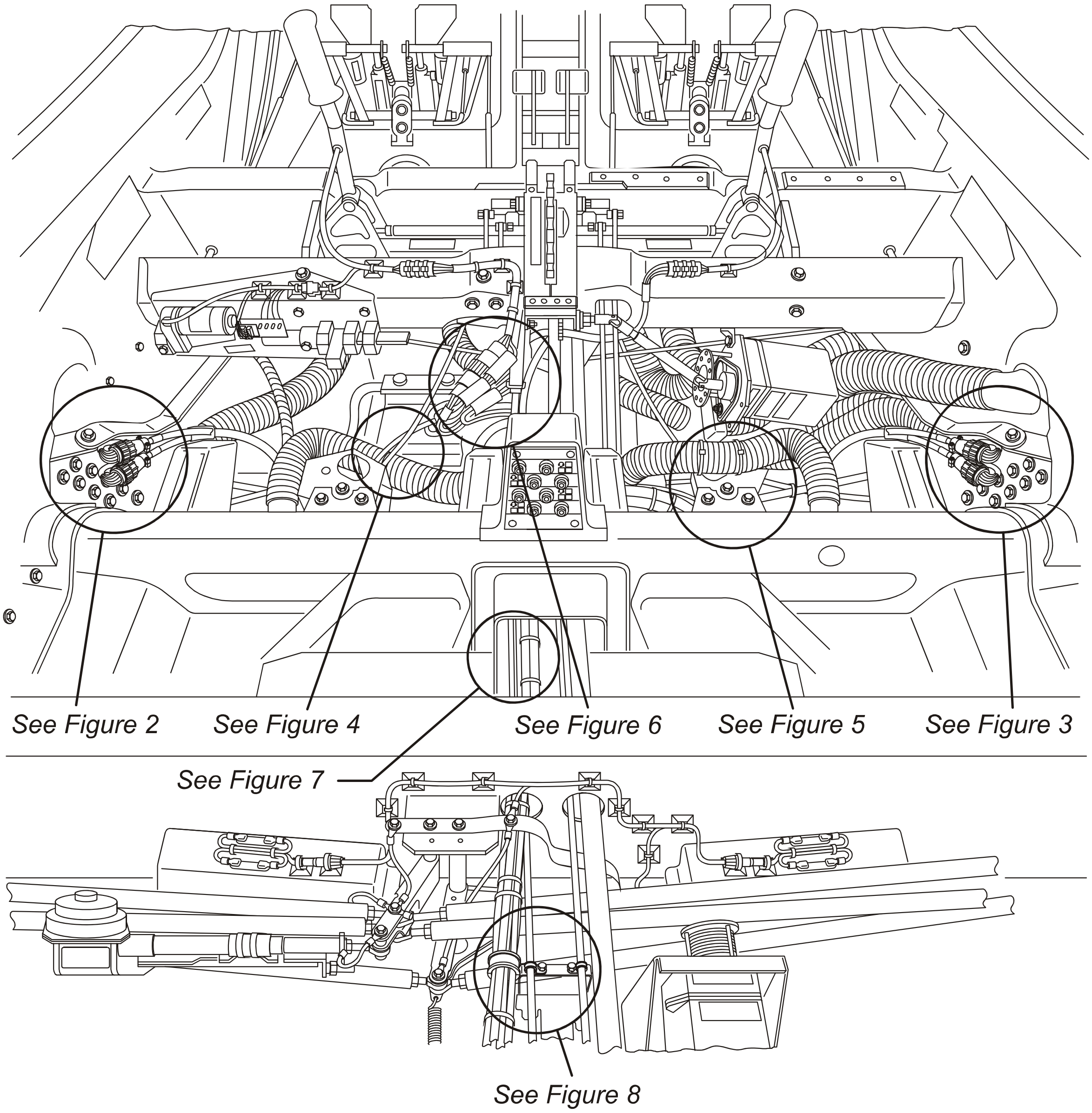

Figure 1: Routing in Center Wing - Overview

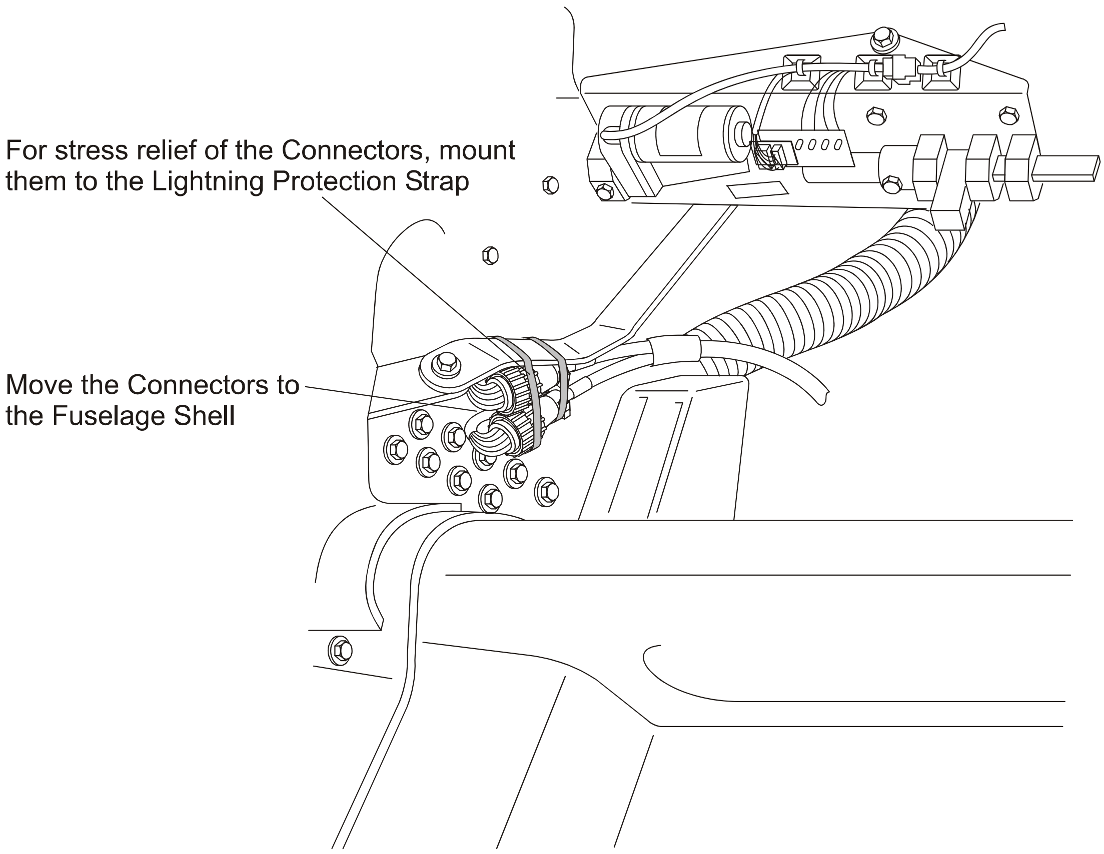

Figure 2: Routing in Center Wing - Detail 1

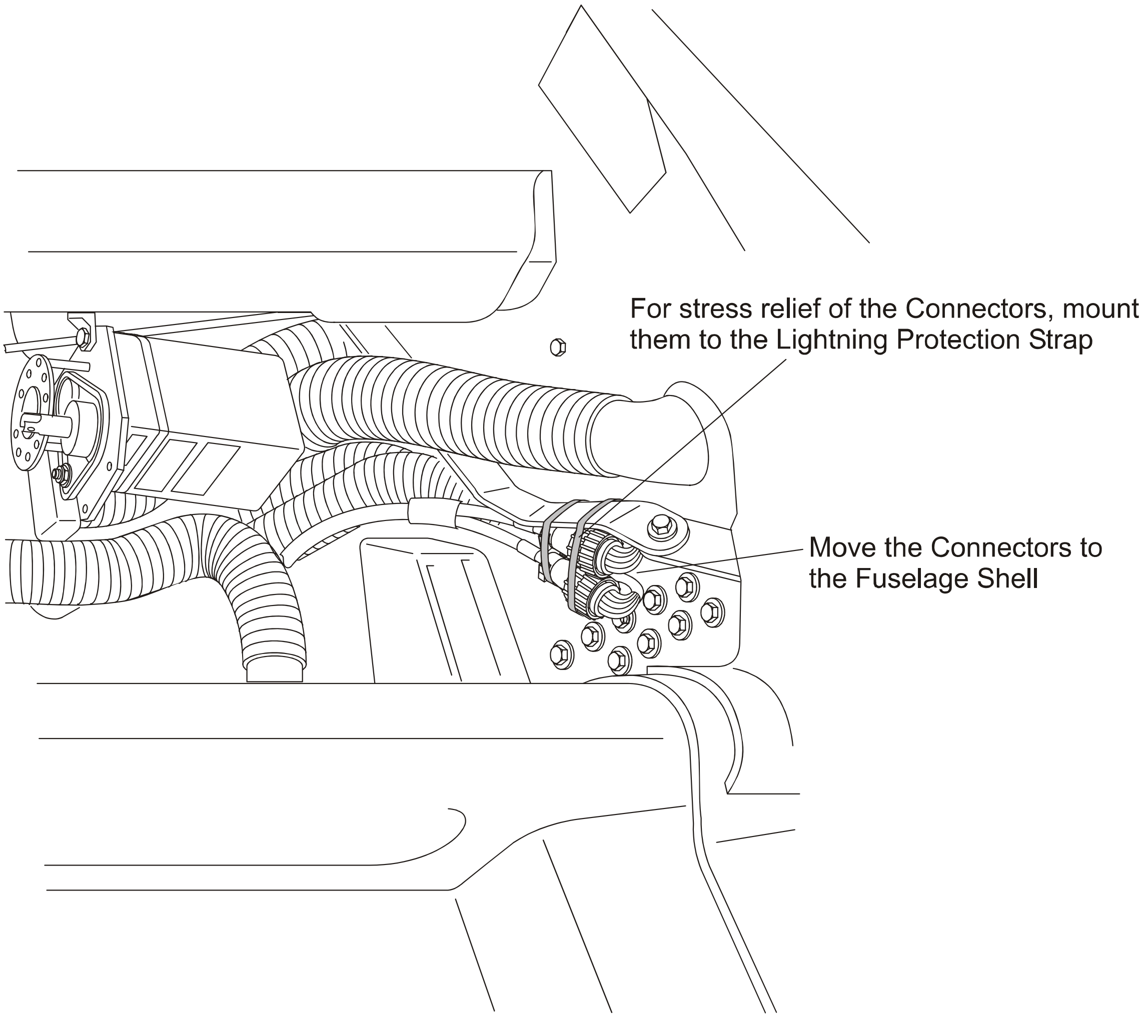

Figure 3: Routing in Center Wing - Detail 2

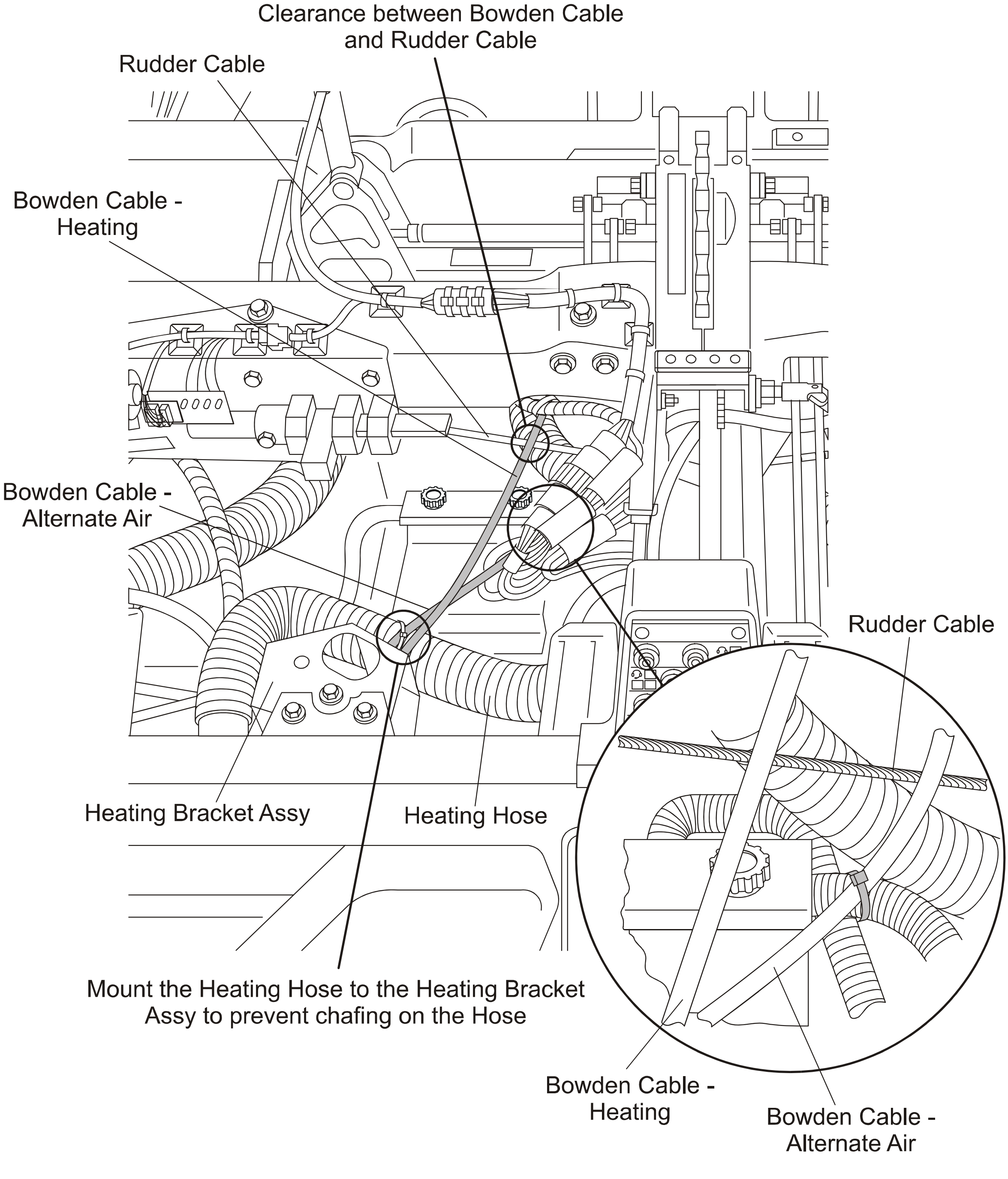

Figure 4: Routing in Center Wing - Detail 3

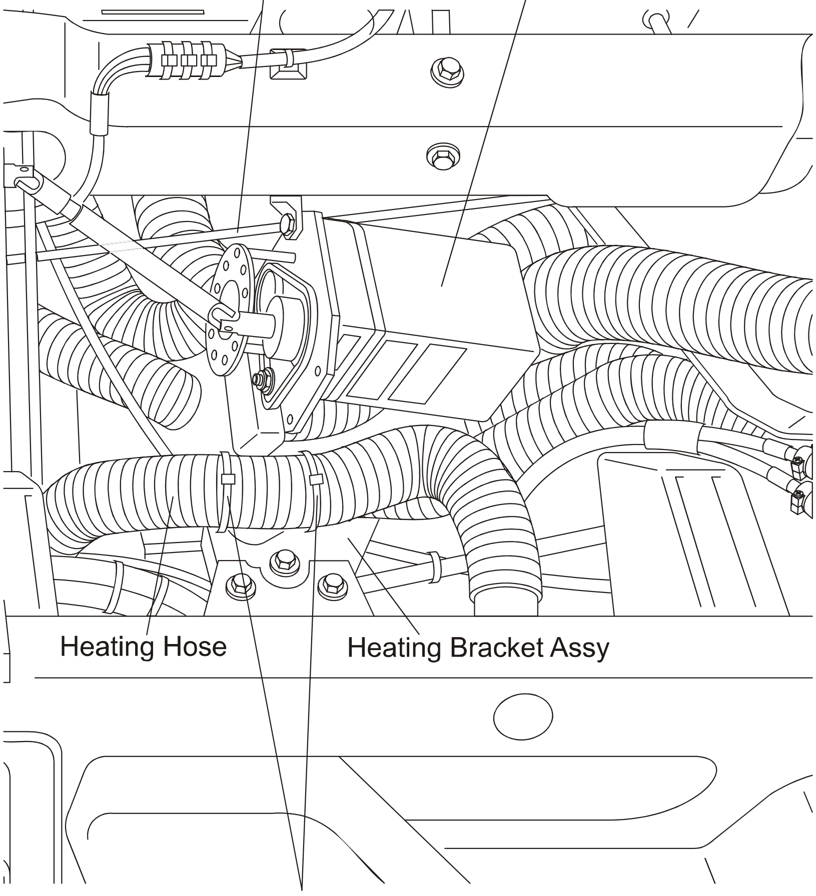

Figure 5: Routing in Center Wing - Detail 4

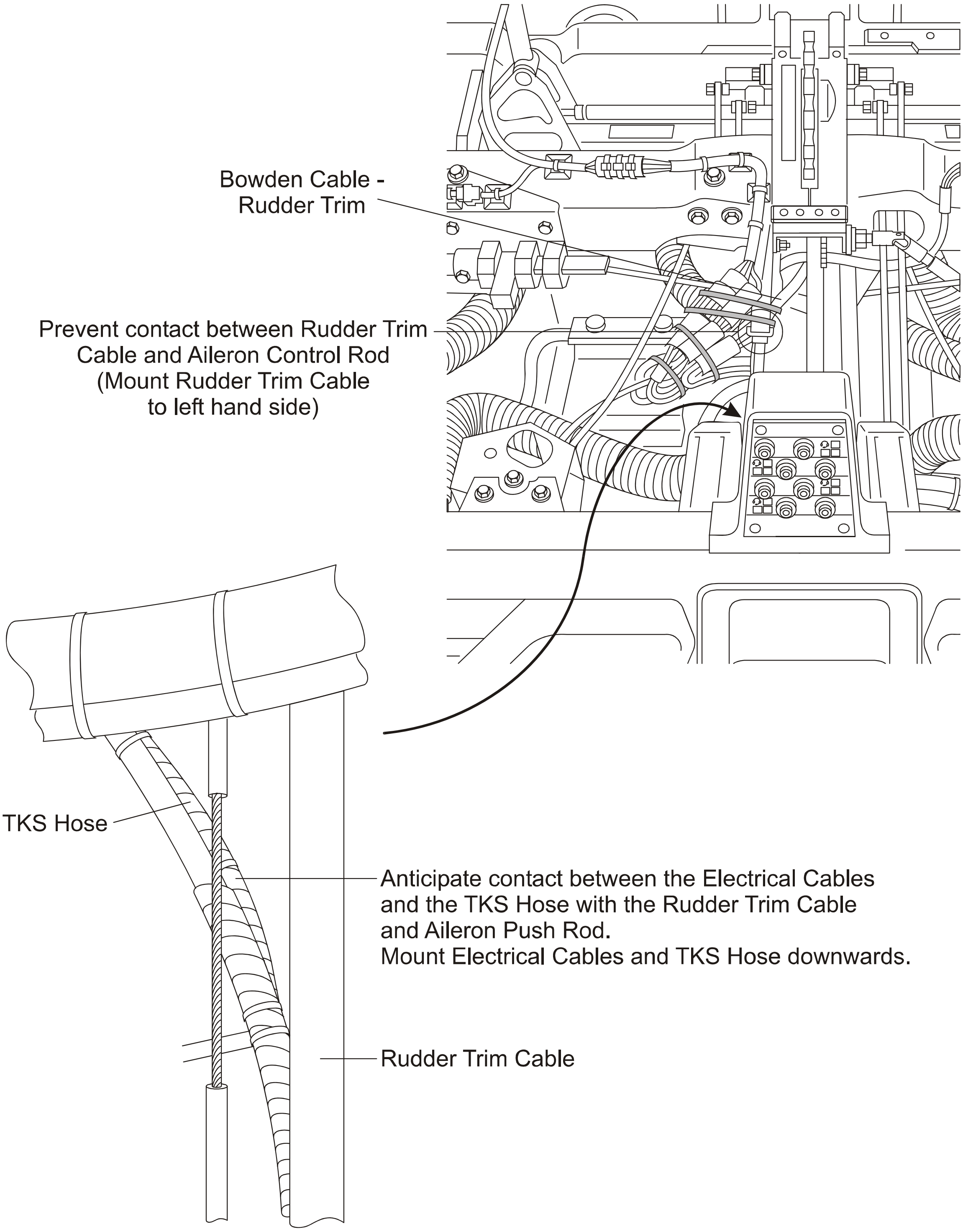

Figure 6: Routing in Center Wing - Detail 5

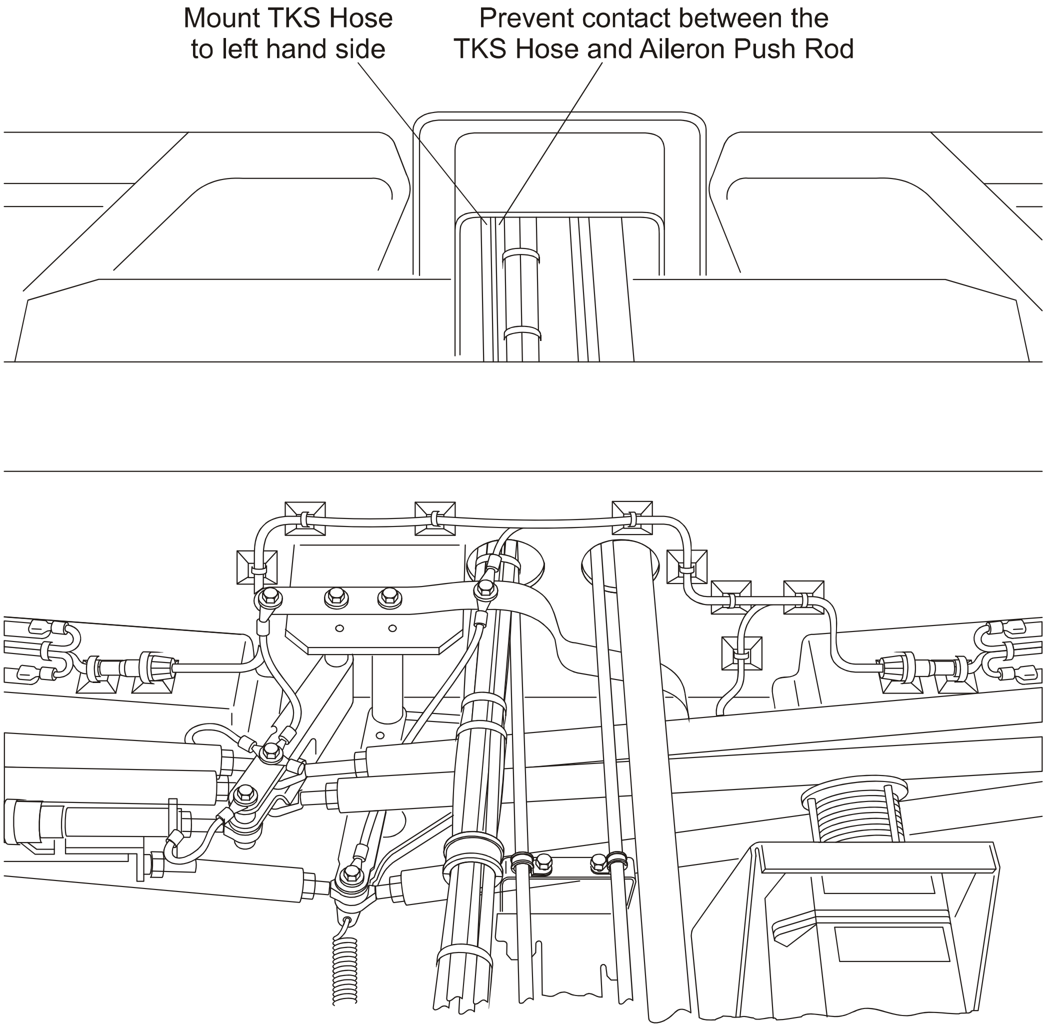

Figure 7: Routing in Center Wing - Detail 6

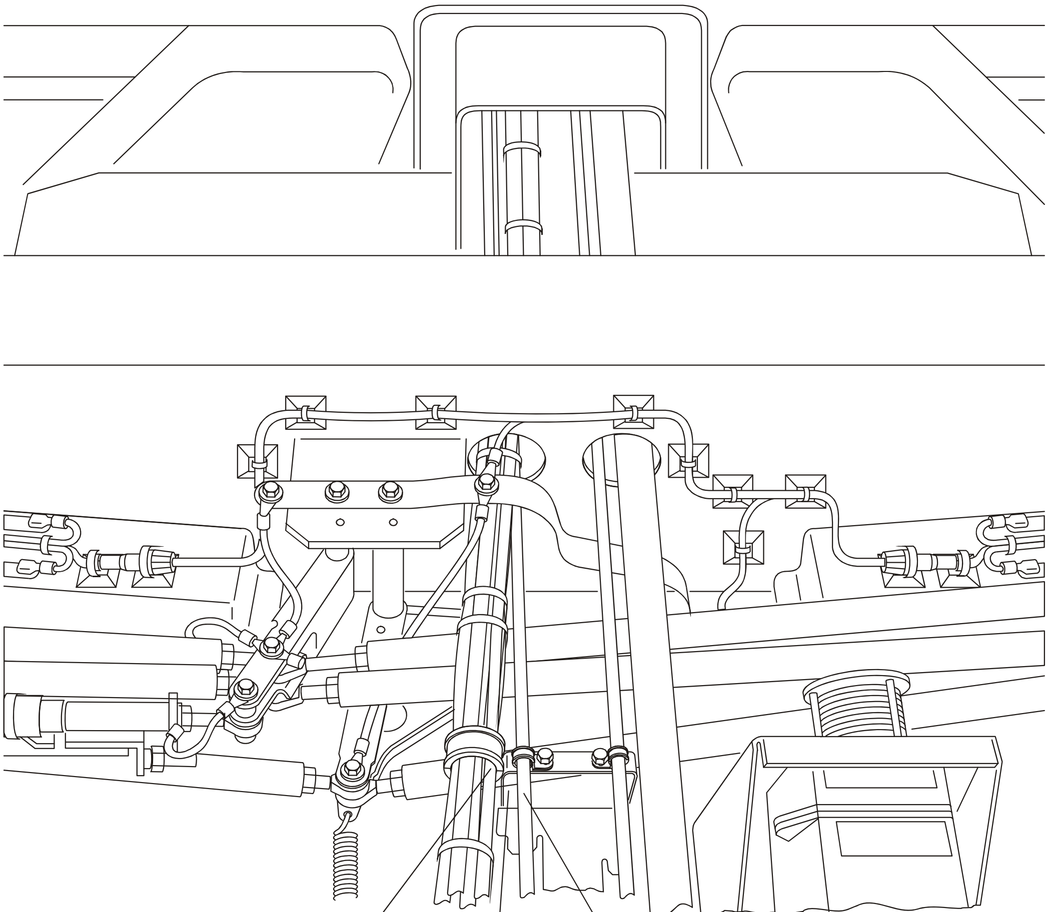

Figure 8: Routing in Center Wing - Detail 7

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Trouble-Shooting

1. General

The table below lists defects you could have in the center wing assembly. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Clearance less than 5 mm (0.2 in) where jamming may occur.	Electrical cables, hoses and Bowden cables position.	Position and fix the electrical cables, hoses and Bowden cables properly.
Clearance less than 2 mm (0.08 in) where chafing may occur.	Electrical cables, hoses and Bowden cables position.	Position and fix the electrical cables, hoses and Bowden cables properly.
Hoses pinched.	Cable tie tightened with undue force.	Replace the cable tie.

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Maintenance Practices

1. General

For Maintenance of the components refer to the related Chapters of the Airplane Maintenance Manual.

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CHAPTER 21

HEATING AND VENTILATION

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CHAPTER 21
HEATING AND VENTILATION

1. General

This Chapter tells you about air conditioning system for the DA 42. It gives you the system description and operation. It also gives you the trouble-shooting data and tells you how to remove and install the main components of the air conditioning system.

Note: Refer to Section 20-90 before starting maintenance work in the center wing area.

2. Description and Operation

The DA 42 has 2 separate systems for heating and ventilating/cooling the cabin area. Figure 1 shows the schematic for the heating and ventilating/cooling systems.

Refer to Section 21-20 for more data about the air conditioning distribution system. Refer to Section 21-40 for more data about the heating system and refer to Section 21-60 for more data about the temperature control system.

A. Cabin Heating and Canopy Defrosting

A heat exchanger in each engine nacelle provides the warm air for heating. Hot water from the engine liquid cooling system flows through the matrix of the heat exchanger. Ambient air flows from an air inlet in the engine nacelle through the heat exchanger. The temperature of the air is raised. Air flows from the heat exchanger through a control valve to the airplane cabin. The heated air is then used for cabin heating and windscreen defrosting. Levers in the central control console of the cockpit connect to the control valves with Bowden cables and control the flow of heated air.

The warm air from the left engine nacelle supplies the canopy defrosting system and the warm air from the right engine supplies the cabin heating.

B. Cabin Ventilation/Cooling

Ambient air flows through a NACA duct in the lower surface of the right-side wing center-section. The NACA duct is located between the fuselage and the engine nacelle. In flight, ambient air flows through the NACA duct into the cabin ventilation/cooling system via flexible hoses. The flow of air into the forward cockpit is controlled by outlets located in each side of the instrument panel. The flow of air to the rear passenger area is controlled by air outlets located in the cockpit I-panel and the rear-cabin overhead-panel. The volume and direction of the air flowing from the outlets can be controlled at the outlets.

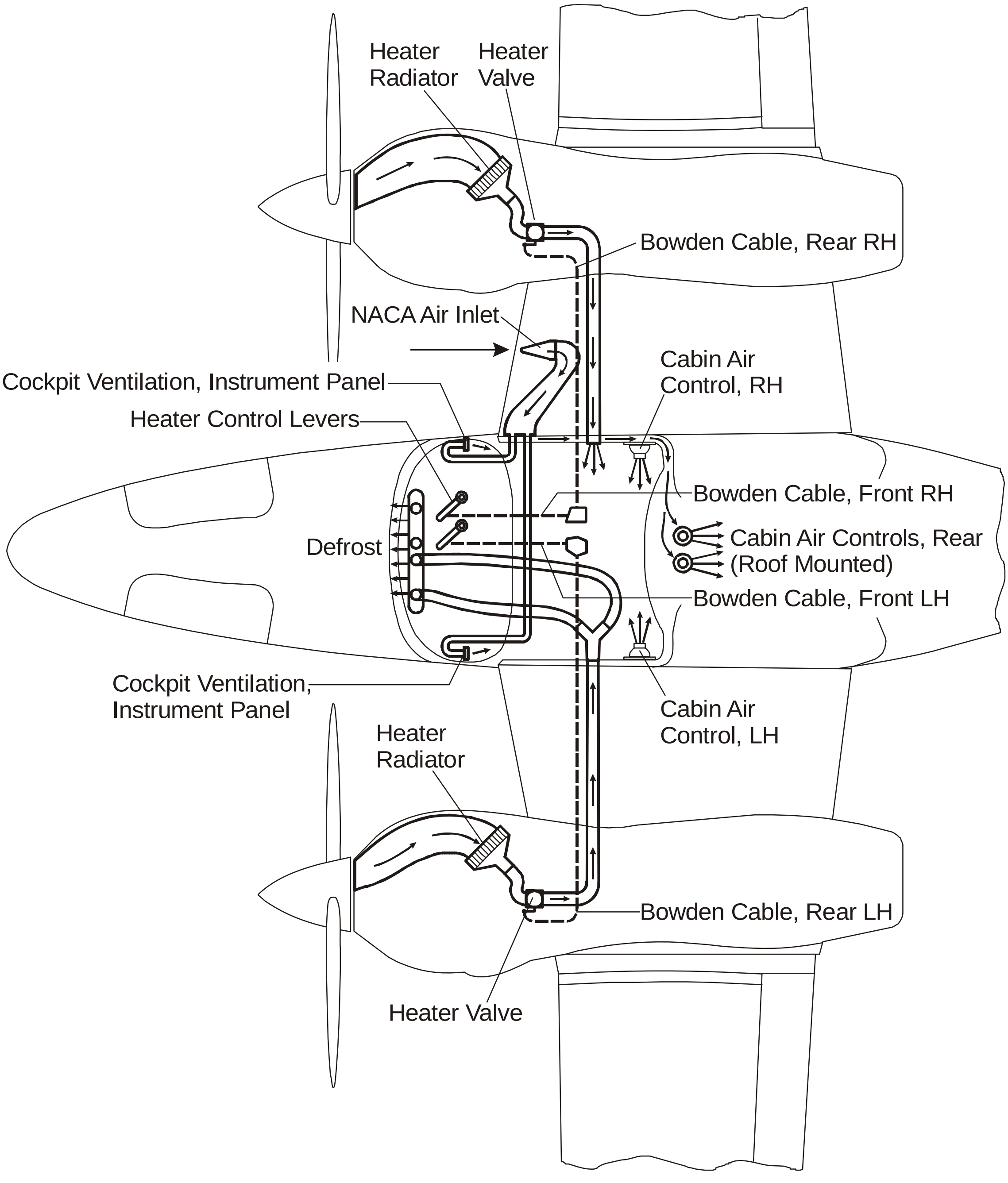

Figure 1: Air Conditioning Schematic Diagram

Section 21-20
Air Distribution

1. General

The DA 42 has two separate systems for heating and ventilation. The ventilation system uses ambient air to ventilate the cabin. Warm air for windscreen defrosting and cabin heating is provided by heat-exchangers located in the engine nacelles. This Section tells you about the air distribution system of the DA 42. Refer to Section 21-40 for data about the air heating system and refer to Section 21-60 for data about the temperature control system.

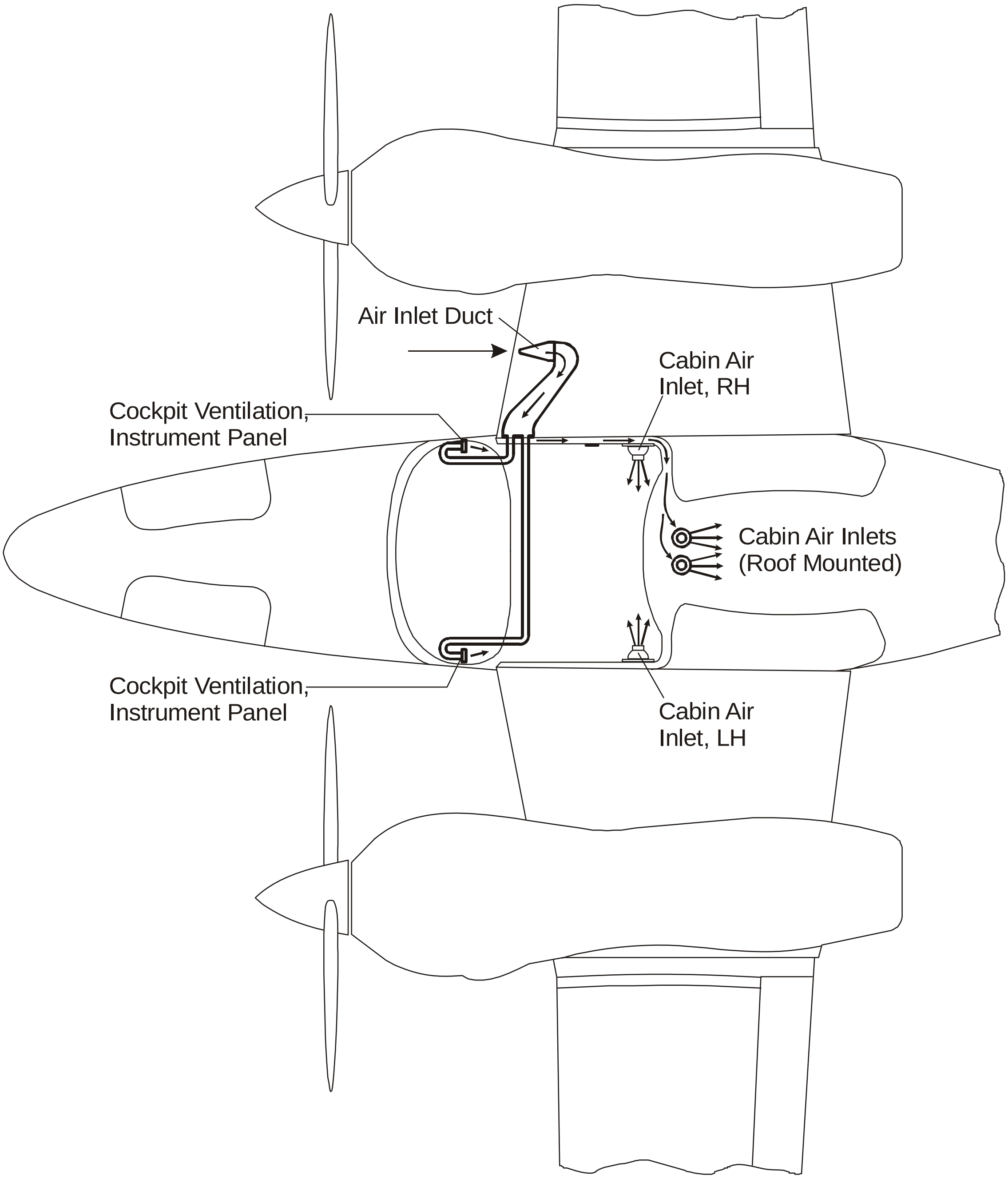

Figure 1: Ventilation Air Distribution System Schematic Description and Operation

A. Ventilation

Figure 1 shows the ventilation air distribution system. In normal flight ambient air flows through a NACA duct on the lower surface of the right -side center wing section. The air flows through sealed compartments in the center wing section to the fuselage. At the fuselage the airflow is divided. Some of the air is directed into an integral GRP duct that directs the air to the 2 air inlet ducts on the I-panel and to the 2 air inlet ducts in the rear passenger compartment roof panel. The remaining air flows through flexible hoses to air inlet ducts located at each side of the instrument panel.

The flow of air from all the ducts is controlled by the opening and closing of the air inlet ducts. Rotate the air inlet duct nozzle to open or close the inlet duct. The air flow from the air inlet nozzle is directed by moving the nozzle.

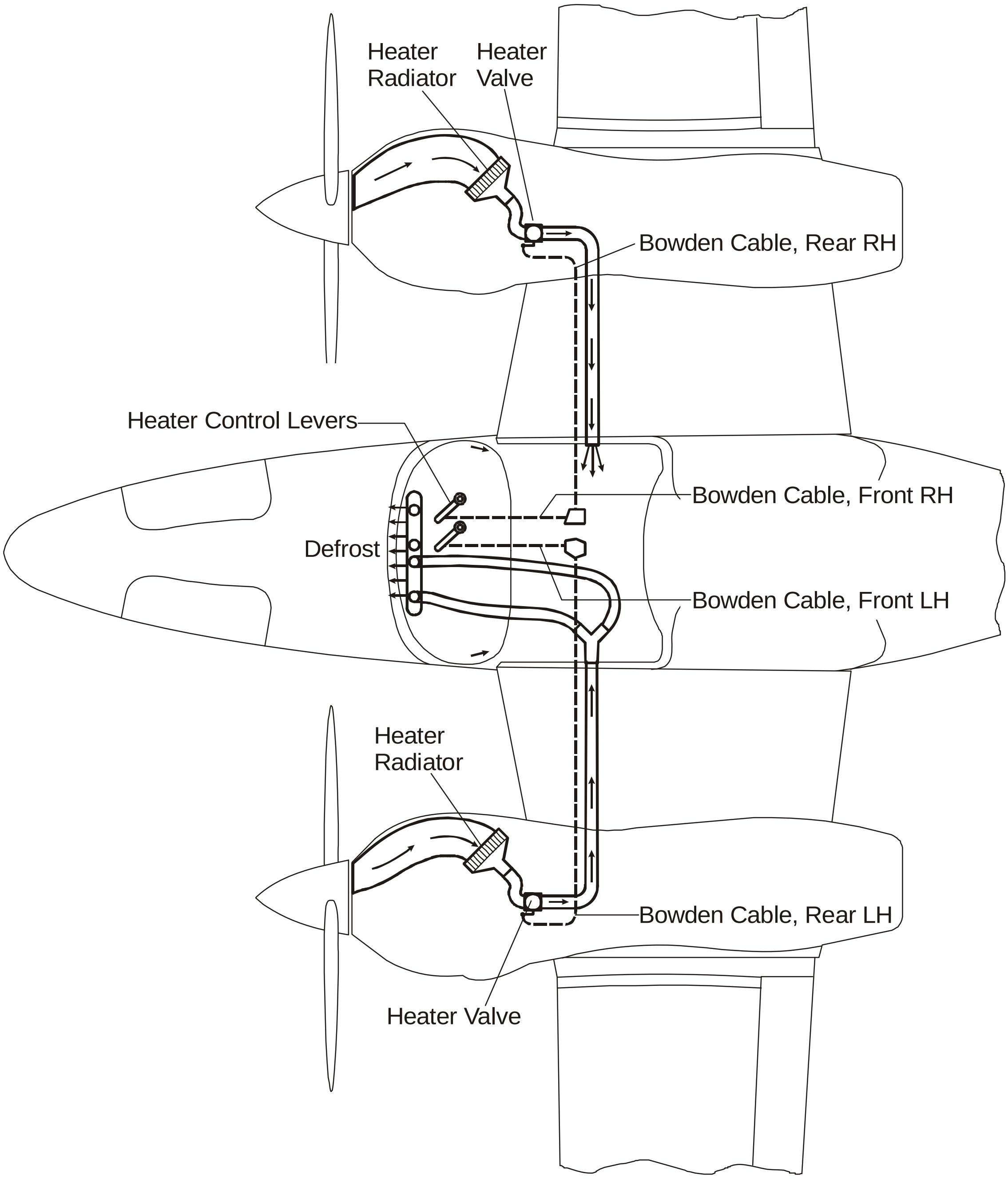

Figure 2: Cabin Heating and Defrost Air Distribution System Schematic (as installed in all S/N except 42.049, 42.054, 42.090 and 42.095 and subsequent)

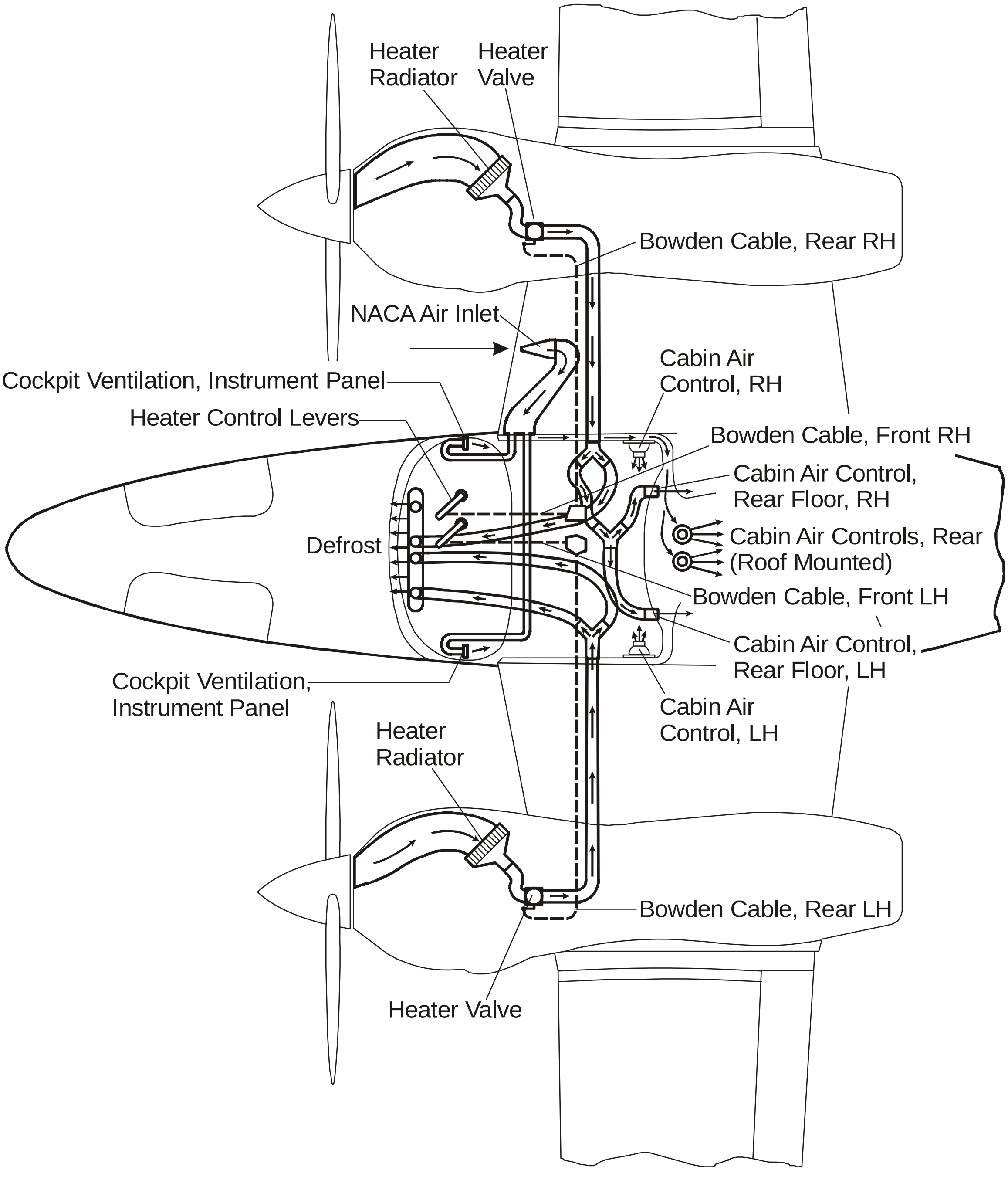

Figure 3: Cabin Heating and Ventilation System Schematic (as installed in S/N: 42.049, 42.054, 42.090 and 42.095 and subsequent)

B. Heating and Defrosting

Figures 2 and 3 show the schematic drawing for the cabin heating and defrost air distribution system. Air enters the heating and defrosting systems through inlet ducts located in the right lower side of each engine nacelle. The left engine supplies warm air to the canopy defrosting system and the right engine supplies warm air to the cabin heating system. The warm air supply system is similar for both engines.

Ambient air flows through the inlet duct in the engine nacelle into a carbon fiber composite (CFC) shroud and is directed through the heat exchanger. When the engine is running, hot coolant flows from the engine through the core of the heat exchanger and back to the engine. The temperature of the air is increased as it passes through the matrix of the heat exchanger. The heated air then flows through flexible hoses from the heat exchanger shroud to a heater valve mounted on the engine firewall. Each engine has a heater valve.

Each heater valve has an internal flap that can be moved from an open position to a bypass position. The flap can also be set anywhere between the open and bypass positions . If a valve is set to the open position the heated air flows into the related heating or defrosting system. If the valve is set to the bypass position the heated air flows out of the valve into the engine compartment.

Two control levers located in the cockpit center console control the position of the flaps in the heater valves via Bowden cables. The left lever (DEFROST) controls the left engine heater valve. The right lever (CABIN) controls the right engine heater valve. A forward Bowden cable from each control lever attach to left and right relay levers located under the pilots seats. Two aft Bowden cables connect the relay levers to the left and right heater valves.

Moving the DEFROST lever from the closed position allows heated air to flow through the heater valve into a flexible hose. The flexible hose connects the heater valve to the cockpit defrosting system. The flexible hose passes through the leading edge of the left-side central wing section into the fuselage. At the fuselage the hose connects to a splitter which causes the air flow to be divided. Two smaller-diameter flexible hoses connects the outlets of the splitter to the left and right side canopy defrosting ducts. The volume of heated air flowing through the defrosting system is controlled by the position of the DEFROST control lever in the center console.

Moving the CABIN lever from the closed position allows heated air to flow through the heater valve into a flexible hose. The flexible hose connects the heater valve to the cockpit heating system at the fuselage. The warm air flows from the flexible hose into the area below the pilots seats and foot-wells. The air also flows from this compartment through cutouts in the front spar bridge and into the rear passenger footwell. The volume of heated air flowing through the cabin heating system is controlled by the position of the CABIN control lever in the center console.

Trouble-Shooting

1. General

This table tells you how to trouble-shoot the air conditioning distribution system. Refer to Section 21-40 for trouble-shooting data for the air heating system and see Section 21-60 for trouble-shooting data for the temperature control system.

If you find the trouble in column 1 do the repair given in column 3.

Trouble	Possible Cause	Repair
No fresh air flows from the cabin fresh air inlets.	Fresh air inlets closed.	Open the fresh air inlets. Section 21-20 Paragraph 2A.
	NACA air inlet duct blocked.	Make sure the inlet duct is not blocked.
	Flexible hose(s) between the air inlet ducts and the fresh air inlet blocked or damaged.	Examine the flexible hoses, repair or replace the hoses as required.
No warm air flows from the cockpit defrosting system.	The DEFROST control lever in the cockpit center console set to OFF.	Make sure that the DEFROST control lever (left lever) is set to ON.
	Left engine heater valve control cables out of adjustment.	Adjust the left engine heater valve control cables.
	Left engine heater valve control forward/aft cable broken.	Replace the left engine heater valve forward/aft control cable.
	Flexible hose(s) between the left engine heater control valve and the de-frosting ducts damaged or broken.	Examine the flexible hoses, repair or replace the hoses as required.

Trouble	Possible Cause	Repair
No warm air flows into the cockpit heating system.	The CABIN lever in the cockpit center console set to OFF.	Make sure that the CABIN control lever (right lever) is set to ON.
	The right engine heater valve control cables out of adjustment.	Adjust the right engine heater valve control cable. Refer to Section 21-20.
	Right engine heater valve forward/aft control cables broken.	Replace the right engine heater valve forward/aft control cable. Refer to Section 21-20.
	Flexible hose(s) between the right engine heater control valve and the fuselage damaged or broken.	Examine the flexible hoses, repair or replace the hoses as required.

Maintenance Practices

1. General

This Section tells you how to replace a heater valve control cable. It also tells you how to adjust a heater valve. Refer to Section 21-60 for more data about engine heater valves.

2. Replace a Heater Control Valve Forward Inner Control Cable

Use these procedures for both the left and right heater valves.

A. Replace a Heater Control Valve Forward Inner Control Cable

Detail Steps/Work Items		Key Items/References
WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**		
(1)	Make sure that the related engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Remove the engine cowlings from the related engine.	Refer to Section 71-10.
(3)	Remove the pilot's/co-pilot's seat as necessary.	Pilot's seat for DEFROST cables, co-pilot's seat for CABIN cables.

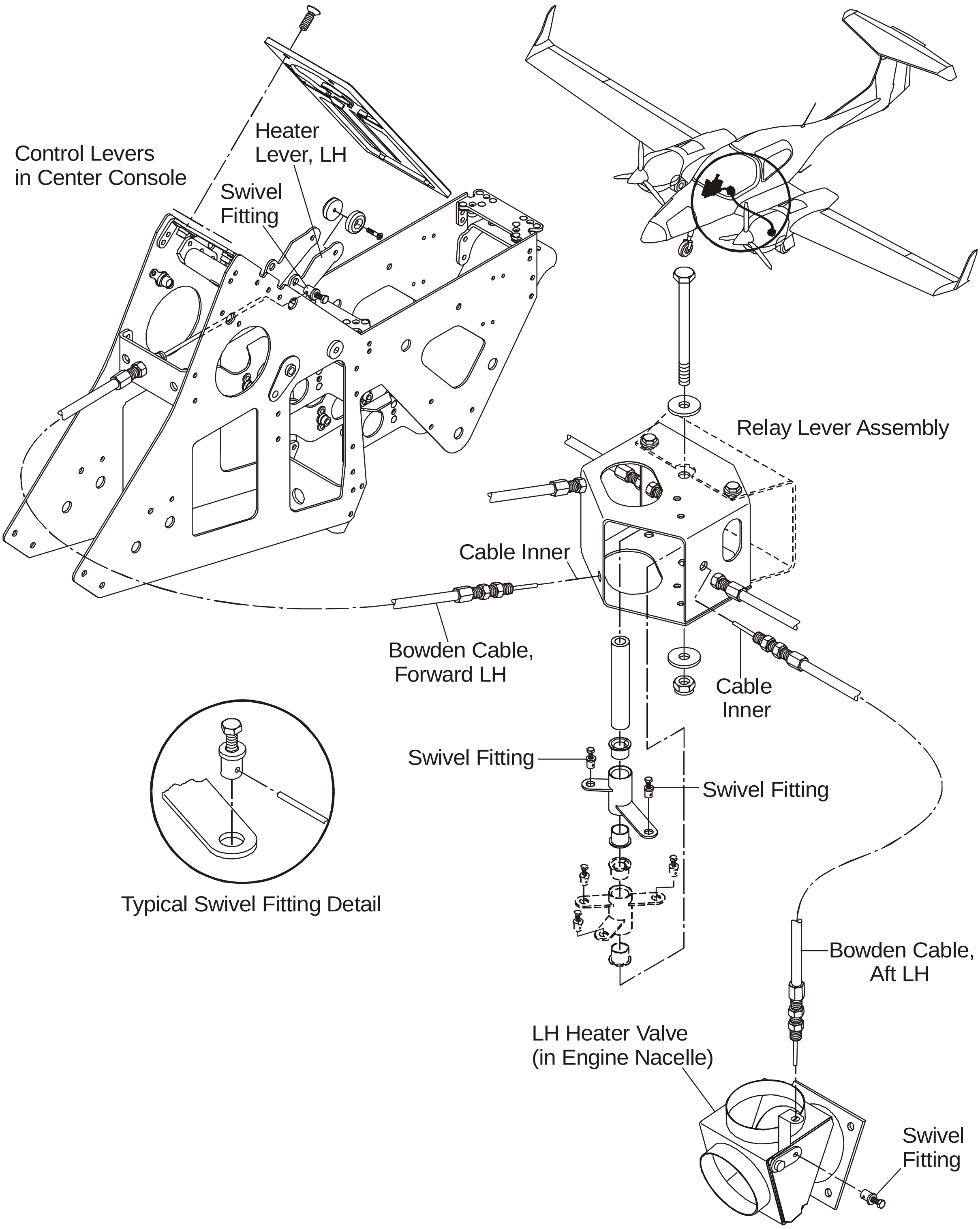

Figure 4: LH Heater Valve Control Cables

Detail Steps/Work Items		Key Items/References
(4)	Disconnect the forward cable at the relay lever: – Loosen the screw that attaches the swivel fitting to the control lever and cable. – Pull the cable clear of the swivel fitting. – Move the swivel fitting clear of the relay lever.	Figures 4 and 5. Retain the swivel fitting.
(5)	Remove the cover-plate from the CABIN and DEFROST control levers in the center console: – Remove the 4 screws that attach the cover-plate to the center console. – Slide the cover plate clear of the control levers.	
(6)	Disconnect the control cable from the related control lever: – Move the related control lever to the OFF position. – Loosen the screw that attaches the swivel fitting to the control lever.	 For access.
(7)	Remove the broken control cable clear of the cable outer sheath.	Remove and retain the swivel fitting from the broken cable.

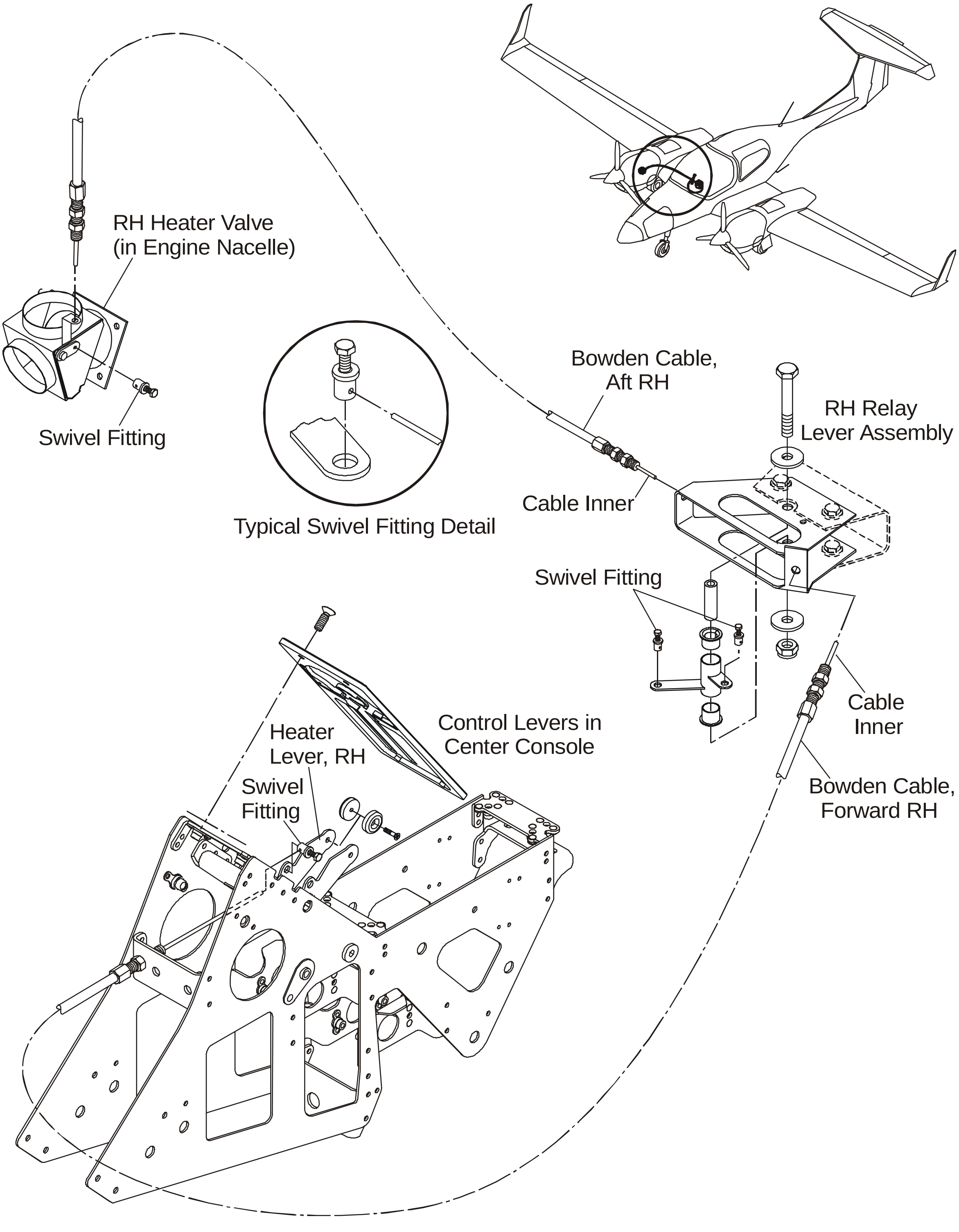

Figure 5: RH Heater Valve Control Cables

Detail Steps/Work Items		Key Items/References

(8)	Install the new control cable inner:
	– Move the new cable into position in the outer sheath.
	– Connect the control cable to the related heater valve flap lever:
	  – Make sure that the heater valve is in the fully closed/bypass position.
	  – Move the swivel fitting into position in the flap lever.
	  – Pass the cable through the swivel fitting.
	  – Tighten the swivel fitting screw.
	– Connect the control cable to the relay lever under the pilot's/co-pilot's seat:
	  – Move the control lever to a position 3 mm (0.1 in) clear of the OFF position.
	  – Move the swivel fitting into position in the relay lever.
	  – Pass the control cable through the swivel fitting.
	  – Tighten the swivel fitting screw.
		
		From the cockpit control lever.

(9)	Do a test for the correct operation of the related heater valve. If necessary, adjust the heater valve cable.	Paragraph 3.

Detail Steps/Work Items		Key Items/References
(10)	Install the DEFROST/CABIN control-lever cover at the center console: – Move the cover into position at the center console. – Install the 4 screws that attach the cover to the center console. – Tighten the 4 screws. – Make sure that both control levers move freely through the full range of movement.	
(11)	Install the engine cowlings that you removed in step 2.	Refer to Section 71-10. Make sure that there is no servicing equipment left in the engine nacelle.
(12)	Install the pilot's/co-pilot's seat that you removed.	Refer to Section 25-10.

B. Replace a Heater Control Valve Aft Cable

<table>
<tr><th colspan="2">Detail Steps/Work Items</th><th>Key Items/References</th></tr>
<tr><td colspan="3">WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS.

WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.</td></tr>
<tr><td>(1)</td><td>Make sure that the related engine is safe:
– Set the ELECT. MASTER switch to OFF.
– Set the ENGINE MASTER switch to OFF.
– Set the power lever to 0%.</td><td></td></tr>
<tr><td>(2)</td><td>Remove the engine cowlings from the related engine.</td><td>Refer to Section 71-10.</td></tr>
<tr><td>(3)</td><td>Remove the pilot’s/co-pilot’s seat as necessary.</td><td>Pilot’s seat for DEFROST cables, co-pilot’s seat for CABIN cables. Refer to Section 25-10.</td></tr>
<tr><td>(4)</td><td>Disconnect the aft cable at the relay lever:
– Loosen the screw that attaches the swivel fitting to the control lever and cable.
– Pull the cable clear of the swivel fitting.
– Move the swivel fitting clear of the relay lever.</td><td>Figures 3 and 4.

Retain the swivel fitting.</td></tr>
</table>

Detail Steps/Work Items		Key Items/References
(5)	Disconnect the cable at the heater valve operating lever: – Loosen the screw that attaches the swivel fitting to the operating lever and cable. – Pull the cable clear of the swivel fitting. – Move the swivel fitting clear of the relay lever.	Figures 3 and 4. Retain the swivel fitting.

(6)	Install the new control cable inner:
	– Move the new cable into position in the outer sheath.
	– Connect the control cable to the related heater valve flap lever:
	  – Make sure that the heater valve is in the fully closed/bypass position.
	  – Move the swivel fitting into position in the flap lever.
	  – Pass the cable through the swivel fitting.
	  – Tighten the swivel fitting screw.
	– Connect the control cable to the relay lever under the pilot's/co-pilot's seat:
	  – Move the control lever at the center console to a position 3 mm (0.1 in) clear of the OFF position.
	  – Move the swivel fitting into position in the relay lever.
	  – Pass the control cable through the swivel fitting.
	  – Tighten the swivel fitting screw.
		
		From the relay lever.

(7)	Do a test for the correct operation of the related heater valve. If necessary, adjust the heater valve cable.	Paragraph 3.

Detail Steps/Work Items		Key Items/References
(8)	Install the engine cowlings that you removed.	Refer to Section 71-10.
(9)	Install the pilot's/co-pilot's seat as necessary.	Refer to Section 25-10.

3. Test/Adjust a Heater Valve Control Cable

Detail Steps/Work Items		Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**	
(1)	Make sure that the related engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Remove the engine cowlings for the heater valve control cable that you will test/adjust.	Refer to Section 71-10.
(3)	Test the operation of the heater valve: – Set the related control lever in the cockpit to the OFF position. – Make sure that the flap of the heater valve fully closes off the outlet from the heater valve to the engine firewall.	There must be 'bounce' of about 3 mm (0.1 in) between the bottom of the lever and the cockpit stop.

Detail Steps/Work Items		Key Items/References
(4)	If necessary, adjust the control cable in the swivel fitting to give the correct bounce: – Set the related heater valve control lever to ON. – Loosen the screw in the swivel fitting and move the flap a small distance towards the closed/bypass position. – Tighten the screw in the swivel fitting.	
(5)	Repeat steps 3 and 4 as necessary to get the correct adjustment.	It may also be necessary to adjust the cables at the relay lever under the pilot's/co-pilot's seats.
(6)	Install the engine cowlings that you removed in step 2.	Refer to Section 71-10. Make sure that there is no servicing equipment left in the engine nacelle.

Section 21-40
Heating

1. General

The DA 42 has separate heating supplies for the windscreen defrosting and the cabin heating systems. The left engine supplies warm air for the defrost system. The right engine supplies warm air for the cabin heating system. This Section tells you about the engine heat exchangers. Refer to Section 21-20 for data about the air distribution systems and Section 21-60 for data about the temperature control systems.

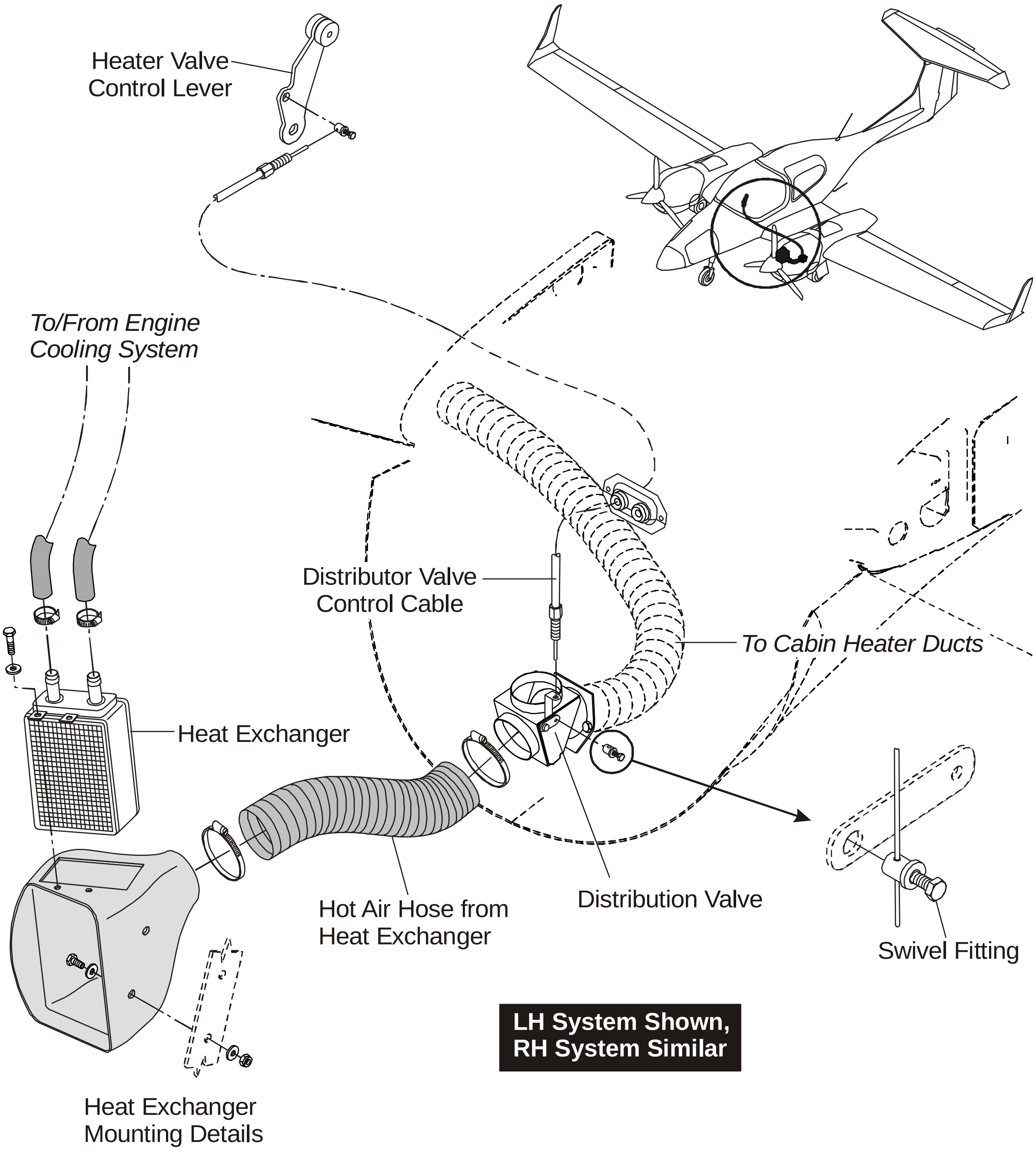

Figure 1: Heating System

2. Description and Operation

The heated air from the left engine is used for windscreen defrosting and the heated air from the right engine is used for cabin heating. Both the left and right engine air heating systems are similar. The left engine system is used in this description.

With the engine running, or when the airplane is in flight, ambient air is forced into a duct on the lower right side of the engine. The duct connects to a carbon fiber composite (CFC) shroud which houses a heat exchanger. Hot coolant from the engine liquid cooling system flows through the core of the heat exchanger. The coolant is taken from upstream of the engine cooling system thermostatic valve. The temperature of the ambient air is raised as it flows through the matrix of the heat exchanger. A flexible hose connects the outlet of the CFC shroud to the heater valve.

The heater valve is mounted on the engine firewall and has 1 air inlet and 2 air outlets. An internal flap divides the air flow from the inlet between the 2 outlets. In the OFF, or bypass position, the flap covers the outlet to the airplane heating system and completes the firewall seal. In the this position all the air from the heat exchanger is vented into the engine nacelle and then overboard with the normal flow of air through the engine nacelle. As the flap moves from the OFF or bypass position some air can flow through the heater valve into the airplane heating system. When the flap is in the fully ON or open position the flap seals the outlet into the engine nacelle and all the air flows into the airplane heating system.

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Trouble-Shooting

1. General

This table tells you how to trouble-shoot the air conditioning heating system. Refer to Section 21-20 for trouble-shooting data for the air distribution system and see Section 21-60 for trouble-shooting data for the temperature control system.

If you find the trouble in column 1 do the repair given in column 3.

Trouble	Possible Cause	Repair
The air flowing from the windscreen defrosting vents is cold or not hot enough.	The left engine is not at normal running temperature.	Allow the engine to warm-up to normal operating temperature.
	Air trapped in the left engine heat exchanger or heat exchanger coolant supply.	Bleed the heat exchanger and heat exchanger supply system.
	Left engine heat exchanger matrix blocked or damaged.	Replace the heat exchanger.
The air flowing from the cabin heating system is cold or not hot enough.	The right engine is not at normal running temperature.	Allow the engine to warm-up to normal operating temperature.
	Air trapped in the right engine heat exchanger or heat exchanger coolant supply.	Bleed the heat exchanger and heat exchanger supply system.
	Right engine heat exchanger matrix blocked or damaged.	Replace the heat exchanger.

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Maintenance Practices

1. General

The Maintenance Practices in this Section tell you how to replace a heat exchanger and how to bleed the heat exchanger coolant system. Refer to Section 75-00 for more data about the engine liquid cooling system.

2. Remove/Install a Heat Exchanger Assembly

Use this procedure for both the left engine and right engine heat exchanger assembly.

A. Remove a Heat Exchanger Assembly

Detail Steps/Work Items		Key Items/References
WARNING:	DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.	
(1)	Make sure that the related engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Remove the engine cowlings from the engine that you will remove the heat exchanger.	Refer to Section 71-10.
WARNING:	IF THE COOLANT SYSTEM IS HOT IT MAY BE PRESSURIZED. IF YOU BREAK INTO A PRESSURIZED SYSTEM YOU MAY SPILL HOT COOLANT. HOT COOLANT CAN CAUSE INJURY TO PERSONS.	

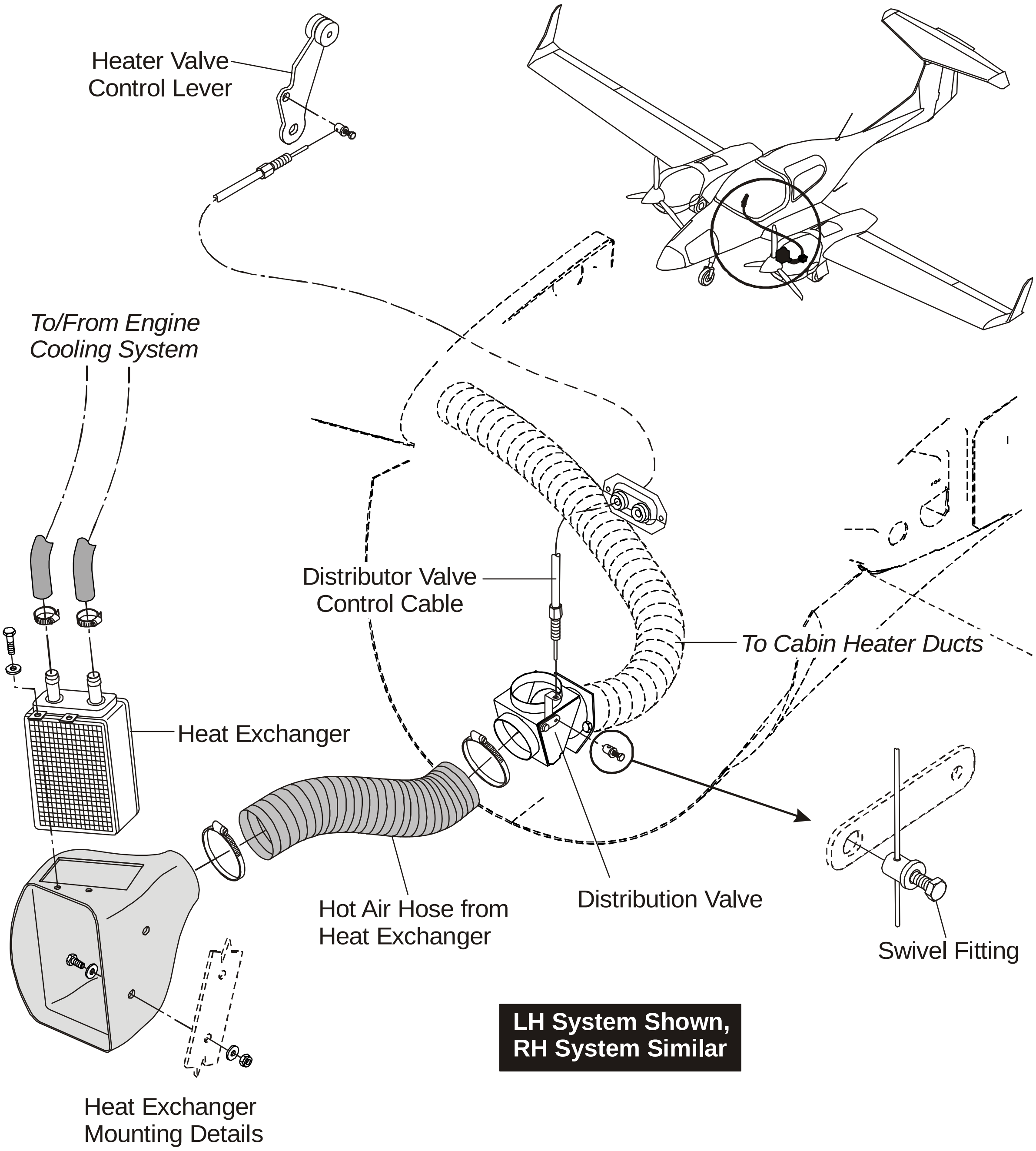

Figure 2: Heat Exchanger Installation

	Detail Steps/Work Items	Key Items/References
(3)	Remove the flexible hose that connects the heat exchanger outlet to the heater valve: – Remove the worm drive clamp. – Remove the flexible hose.	Refer to Figure 2.
(4)	Remove the flexible hoses that connect the heat exchanger to the engine cooling system: – Remove the worm drive clamp from the heat exchanger coolant supply connection. – Remove the worm drive clamp from the heat exchanger coolant return connection. – Remove both the flexible hoses from the heat exchanger.	Make sure that the system is not pressurized. At the heat exchanger. At the heat exchange. Use a suitable container to catch spilt coolant.
(5)	Remove the heat exchanger and shroud assembly from the airplane: – Remove the nuts, washers and bolts that attach the heat exchanger assembly to the mounting bracket. – Move the heat exchanger assembly clear of the airplane and drain the contents of the heat exchanger into a suitable container.	

B. Install a Heat Exchanger Assembly

	Detail Steps/Work Items	Key Items/References
(1)	If necessary, remove the shroud from the heat exchanger that you removed and install it on to the heat exchanger that you will install: – Remove the nuts, washers and bolts that attach the shroud to the heat exchanger. – Move the shroud clear of the heat exchanger. – Move the heat exchanger shroud into position onto the heat exchanger that you will install. – Install the bolts, washers and nuts that attach the heat exchanger shroud to the heat exchanger.	
(2)	Install the heat exchanger assembly: – Move the heat exchanger assembly into position in the engine nacelle. – Install the bolts, washers and nuts that attach the heat exchanger assembly to the mounting bracket. – Tighten the bolts.	
(3)	Install the flexible hoses that connect the coolant supply and return to the heat exchanger: – Move the supply hose into position on the heat exchanger supply pipe. – Move the return hose into position on the heat exchanger return pipe. – Install the worm drive clamps onto the hoses and tighten the clamps.	Make sure that the hose is located correctly. Make sure that the hose is located correctly.

	Detail Steps/Work Items	Key Items/References
(4)	Install the flexible hose that connects the heat exchanger outlet to the heater valve: – Move the flexible hose into position at the connector on the heat exchanger shroud. – Install the worm drive clamp and tighten the worm drive clamp.	Make sure that the hose is correctly located on the outlet.
(5)	Replenish the coolant supply and then bleed the engine liquid cooling system.	Refer to Chapter 75-00.
(6)	Install the engine cowlings that you removed in Paragraph 1A, step 2.	Refer to Section 71-10.
(7)	Do an engine ground test of the related engine and make sure that: – The cooling system operates correctly. – That there are no leaks.	Refer to the DA 42 Airplane Flight Manual.
(8)	If necessary, replenish the liquid cooling system.	Refer to Section 12-10.

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Section 21-60
Temperature Control

1. General

The DA 42 has separate heating supplies for the windscreen defrosting and the cabin heating systems. The left engine supplies warm air for the defrost system. The right engine supplies warm air for the cabin heating system. This Section tells you about the engine heater valves. Refer to Section 21-20 for data about the air distribution systems and Section 21-40 for data about the heating systems.

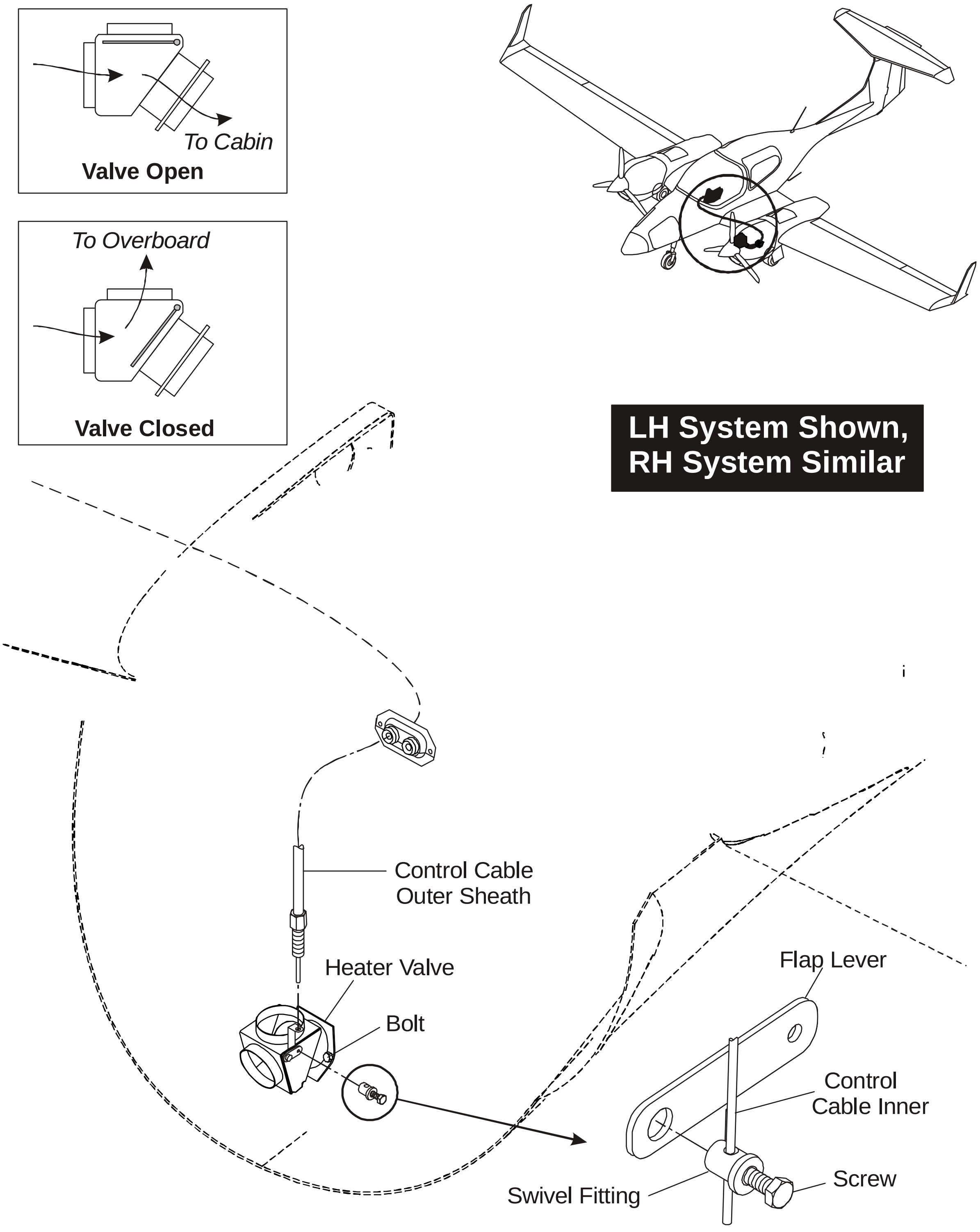

Figure 1: Heater Valve Assembly

2. Description and Operation

The heater valves are similar for both the left and right engines. Figure 1 shows the left engine heater valve installation. A flexible hose connects the outlet of the heat exchanger to the inlet of the heater valve.

The heater valve has 2 outlets. One outlet supplies air to the airplane heating/defrost system. The other outlet directs the heated air into the engine nacelle. An internal flap in the heater valve can be set to close the outlet to the airplane heating system and allow all the warm air to flow overboard. Or it can be set to close the outlet to the engine nacelle and allow all the heated air to flow to the airplane heating/defrost system. Or it can be set to any position between these positions to regulate the flow of air to the airplane heating/defrost systems. The amount of warm air flowing into the related system controls the operating temperature of the system.

The position of the flap in the heater valve is controlled by a control lever in the cockpit center console. The DEFROST control lever controls the left engine heater valve and the CABIN control lever controls the right engine heater valve.

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Trouble-Shooting

1. General

This table tells you how to trouble-shoot the air conditioning temperature control. Refer to Section 21-20 for troubleshooting data for the air distribution system and see Section 21-40 for trouble-shooting data for the heating system. If you find the trouble in column 1 do the repair given in column 3.

Trouble	Possible Cause	Repair
There is no control of the temperature of the DEFROST or CABIN heating systems.	The related heater valve is inoperative.	Replace the heater valve.

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Maintenance Practices

1. General

The Maintenance Practices in this Section tell you how to replace an engine heater valve.

2. Remove/Install a Heater Valve

Use this procedure for both the left and right heater valve.

A. Remove a Heater Valve

Detail Steps/Work Items		Key Items/References
WARNING: **DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS.** **WARNING:** **YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**		
(1)	Make sure that the related engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Remove the engine cowlings from the engine that you will remove the heater valve.	Refer to Section 71-10.
(3)	Remove the flexible hose that attaches the heater valve to the heat exchanger: – Remove the worm-drive-clamp that holds the hose to the valve inlet. – Remove the hose from the valve inlet.	

Detail Steps/Work Items		Key Items/References
(4)	Disconnect the heater valve control cable from the heater valve flap lever: – Loosen the swivel fitting screw. – Remove the cable from the swivel fitting. – Remove and retain the swivel fitting from the flap lever.	
(5)	Remove the flexible hose that attaches the heater valve to the airplane system: – Remove the access panel from under the rear of the engine nacelle. – Remove the worm drive clamp that holds the hose to the valve outlet. – Remove the hose from the valve.	Refer to Section 52-40.
(6)	Remove the heater valve assembly: – Remove the 2 nuts, washers and bolts that attach the heater valve to the engine firewall. – Move the heater valve clear of the engine nacelle.	

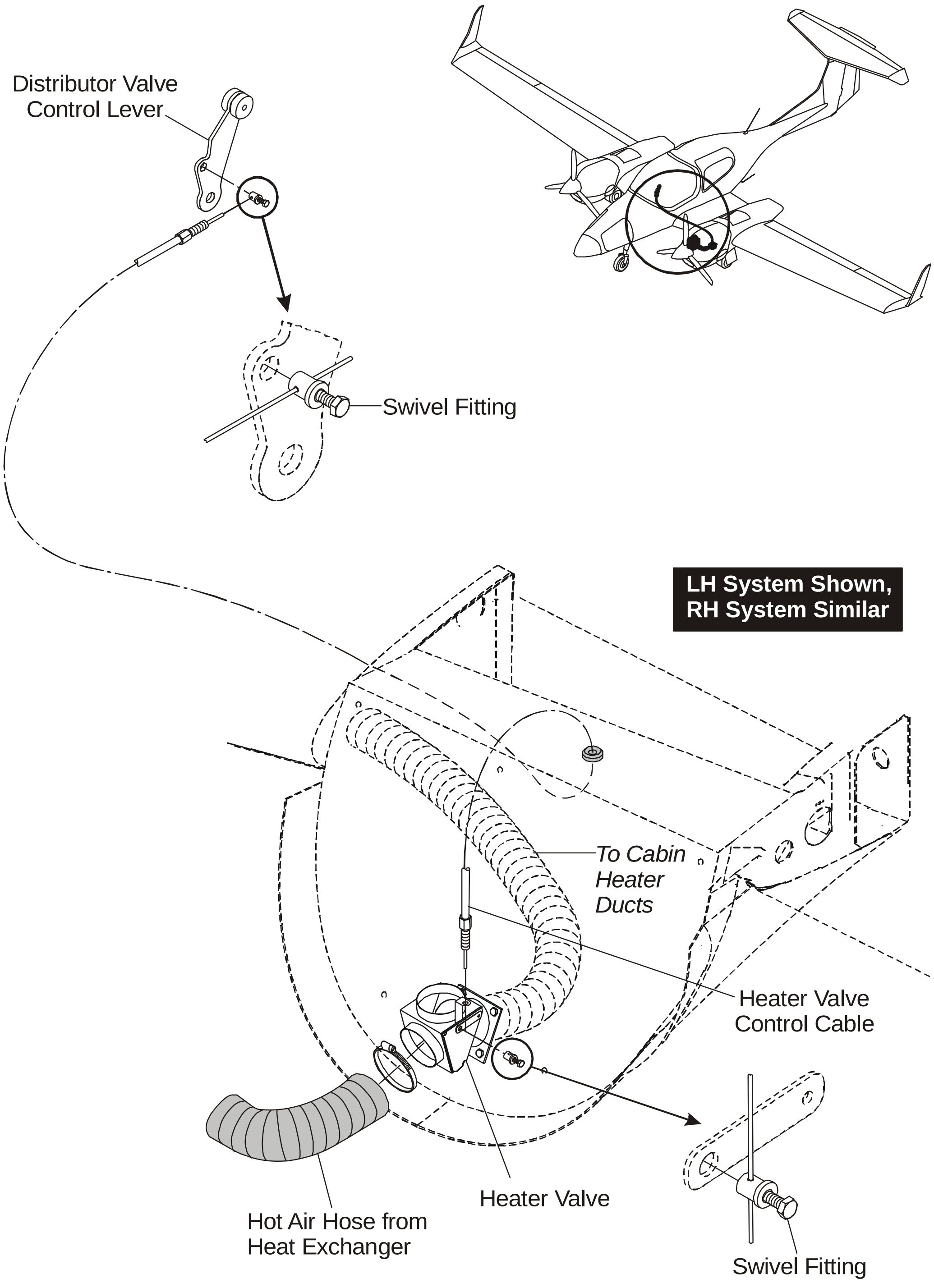

Figure 2: Heater Valve Installation

B. Install a Heater Valve Assembly

	Detail Steps/Work Items	Key Items/References
(1)	Move the heater valve assembly into position at the related engine nacelle.	
(2)	Seal the heater valve with sealant PR 812KIT25.	
(3)	Install the heater valve assembly: – Hold the heater valve assembly in position. – Install the 2 bolts, washers and nuts that attach the heater valve assembly to the firewall. – Tighten the bolts.	
(4)	Connect the flexible hose that attaches the heater valve assembly to the airplane system: – Move the worm drive clamp into position on the flexible hose. – Move the flexible hose into position on the heater valve assembly. – Tighten the worm drive clamp.	
(5)	Connect the heater valve control cable to the heater valve flap lever: – Move the swivel fitting into position on the flap lever. – Move the cable into position through the swivel fitting. – Move the related heater valve control lever to the OFF position and then move it 0.3 mm (0.1 in) towards the ON position. – Make sure that the heater valve flap is in the closed/bypass position. – Tighten the screw of the swivel fitting.	 The flap must completely seal the heater valve outlet to the airplane system.

	Detail Steps/Work Items	Key Items/References
(6)	Test and if necessary adjust the heater valve control cable.	Refer to Section 21-20 Paragraph 3.
(7)	Install the flexible hose that connects the heater valve assembly to the heat exchanger: – Move the worm drive clamp into position on the flexible hose. – Connect the flexible hose to the heater valve assembly inlet. – Tighten the worm drive clamp.	
(8)	Install the engine cowlings that you removed at Paragraph 2A, step 2.	Refer to Section 71-10.
(9)	Do an engine ground test and do a functional test of the related cabin heating/defrost system.	Refer to the DA 42 Airplane Flight Manual.

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CHAPTER 22

AUTO FLIGHT

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CHAPTER 22
AUTO FLIGHT

1. General

This Chapter tells you about the auto flight (autopilot) system installed in the DA 42 airplane. This Chapter tells you about the components of the KAP 140 and the alternatively installed GFC 700 autopilot system of the airplane. This Chapter does not tell you about the workshop maintenance of the equipment. For more data about the equipment refer to the equipment manufacturer's manuals.

For more details refer to the following Sections:

– Section 22-10 if the KAP 140 autopilot system is installed.

– Section 22-11 if the GFC 700 autopilot system is installed.

Note: Refer to Section 20-90 before starting maintenance work in the center wing area.

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Section 22-10
KAP 140 Autopilot

1. General

This Section tells you about the KAP 140 autopilot system installed in the DA 42.

Refer to Section 22-11 if the GFC 700 autopilot system is installed.

2. Description

The KAP 140 autopilot system is a digital flight control system that provides roll, pitch, and pitch trim steering with altitude preselect.

The system has the following components (refer to Figure 1 and Figure 2):

– KC 140 flight control computer (FCC).

– KCM 100 configuration module.

– Turn co-ordinator with autopilot pick-off.

– KS 271C roll servo.

– KS 270C pitch servo.

– KS 272C pitch trim servo.

– KM 275 and KM 277 servo mounts.

– Coupling to the Garmin G1000 integrated cockpit system (ICS).

Heading input is supplied for the KAP 140 autopilot by the Garmin G1000 integrated cockpit system (ICS). Refer to Section 31-40 for more data about the ICS.

The KAP 140 roll axis features includes wing leveler, heading select, and VOR/LOC intercept and tracking. The KAP 140 is also coupled to the ICS for navigation information. Roll rate information is derived from the turn coordinator.

Pitch axis features include vertical speed, glideslope and altitude hold along with the optional altitude preselect. Pitch information is derived from a pressure sensor and accelerometer. Internal monitors keep constant track of the KAP 140's status and provide for automatic shutdown of the autopilot or trim system in the event of a malfunction.

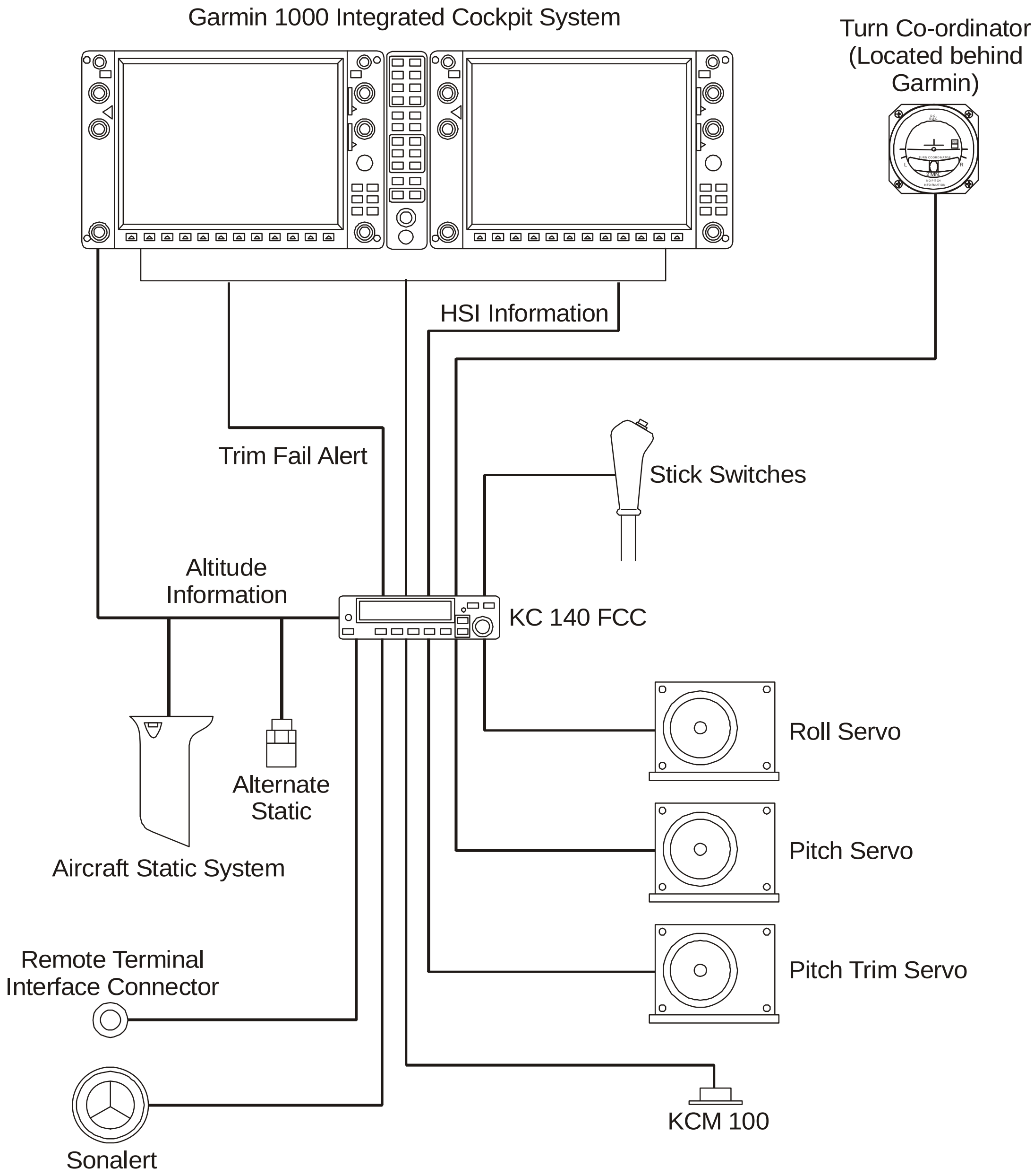

Figure 1: KAP 140 Autopilot System Schematic Diagram

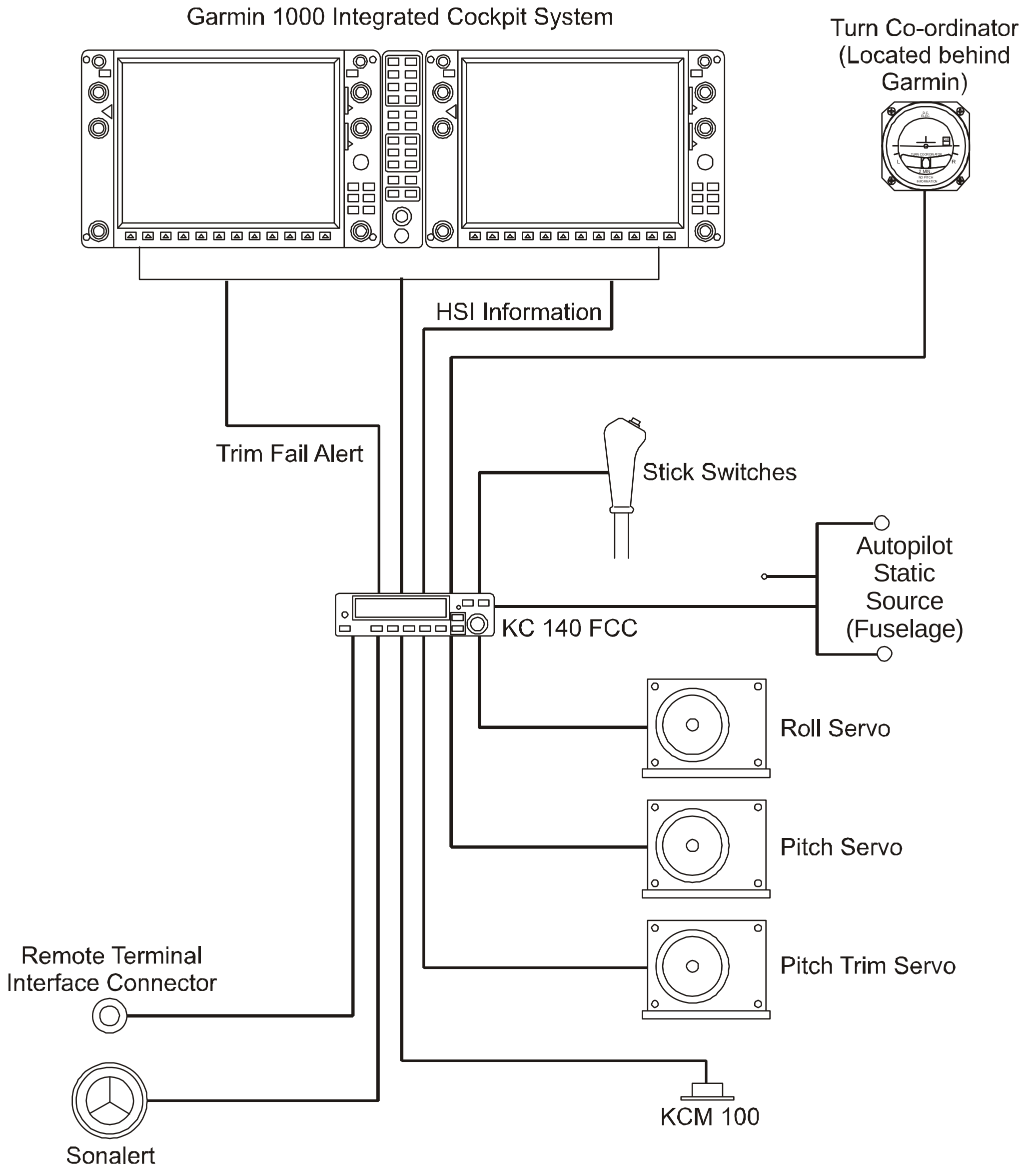

Figure 2: Autopilot System Schematic Diagram (if MÄM 42-186 is carried out)

A. Bendix/King KAP 140 Flight Control Computer

Figure 3 shows the Bendix/King KAP 140 flight control computer. It is located in the instrument panel, at the bottom.

The Bendix/King KAP 140 has the following annunciators on the front panel, above the AP button:

- 'P' (pitch axis) annunciator. It indicates failure of the pitch axis and will either disengage the autopilot or does not allow engagement of the pitch axis. The 'P' annunciator may illuminate with the autopilot disengaged. This condition can occur during maneuvering flight when g thresholds are exceeded. The autopilot monitor will not allow engagement during illumination.

- 'R' (roll axis) annunciator. It indicates failure of the roll axis and will disengage the autopilot or does not allow engagement.

The Bendix/King KAP 140 controls the following annunciator on the ICS alerts panel (also see Section 31-40):

- TRIM FAIL annunciator. It illuminates whenever the automated pre-flight self test detects a pitch trim fault or a continuous monitoring system detects a pitch trim fault in flight. Refer to the EMERGENCY PROCEDURES for proper response to a pitch trim fault.

The Bendix/King KAP 140 has a display which shows the following:

- Pitch and roll mode displays. Displays the active pitch modes (VS, ALT, ARM, ALT, GS ARM, GS) and roll modes (ROL, HDG, NAV ARM, NAV, APR ARM, APR, REV ARM, REV). Also displayed will be a flashing AP annunciation (5 seconds) at each autopilot disconnect, accompanied by an aural alert (for 2 seconds).

- PT (pitch trim) annunciation. It indicates the direction of required pitch trim. With electric trim installed, the annunciation simply provides status to the autopilot request for auto trim. A solid indication represents the lowest demand level for trim, whereas a flashing annunciation implies a greater demand. A solid PT annunciation without an arrow head is an indication of a pitch trim fault. During MET operation, this annunciation can be caused by a stuck MET switch. If the stuck switch fault clears, trim operation will resume.

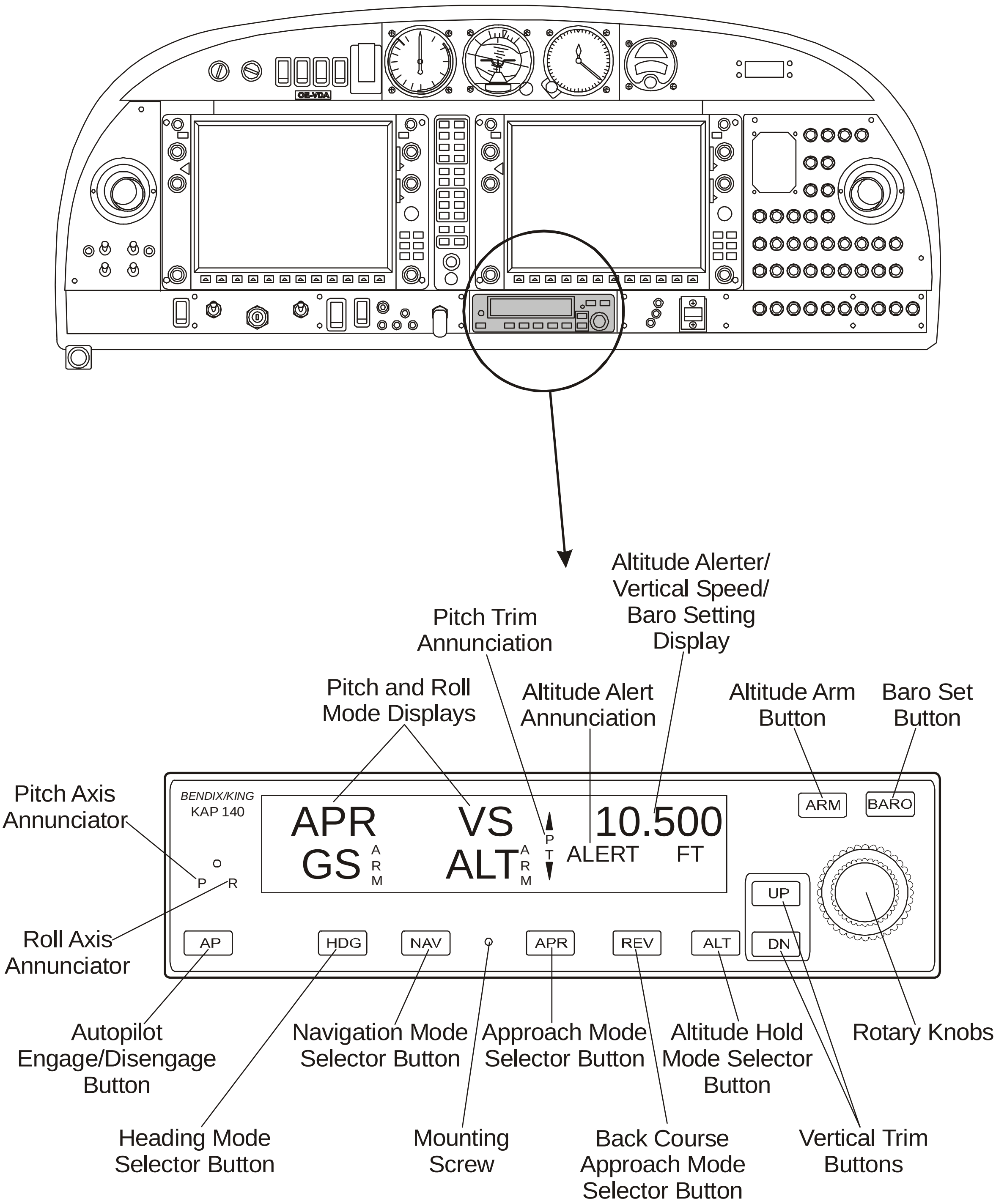

Figure 3: Bendix/King KAP 140 Flight Control Computer

ALERT (altitude alert) annunciation:

- It illuminates continuously in the region of from 200 to 1000 feet from the selected altitude if the airplane was previously outside of this region.

- It flashes for two seconds the first time the airplane crossed the selected altitude.

- If flashes continuously in the 200 to 1000 feet region if the airplane was previously inside of this region (i.e., at the selected altitude). Associated with the visual alerting is an aural alert (5 short tones) which occurs 1000 feet from the selected altitude upon approaching the altitude and 200 feet from the selected altitude on leaving the altitude.

- Altitude alert/vertical speed/baro setting display. Normally the altitude alerter selected altitude is displayed. If the UP or DN button is pushed while in VS hold, the display changes to the command reference for the VS mode in FPM for 3 seconds. If the BARO button is pushed, the display changes to the autopilot baro setting in either IN HG or HPA for 3 seconds.

The flight control computer has these controls on the front panel:

- Rotary knobs. These are used to set the altitude alert reference altitude; or may be used immediately after pressing the BARO button, to adjust the autopilot baro setting to match that of the airplane's altimeter when manual adjustment is required.

- AP (autopilot engage/disengage) button. When pushed, it engages the autopilot if all logic conditions are met. The autopilot will engage in the basic roll (ROL) mode which functions as a wing leveler and in the vertical speed (VS) hold mode. The commanded vertical speed may be displayed manually in the upper right corner of autopilot display area if either UP or DN button is pressed. The captured VS will be the vertical speed present at the moment of AP button press. When pressed again, it will disengage the autopilot.

- HDG (heading) mode selector button. When pushed, it will select the 'heading' mode, which commands the airplane to turn to and maintain the heading selected by the heading bug on the HSI. A new heading may be selected at any time and will result in the airplane turning to the new heading. The button can also be used to toggle between HDG and ROL modes. This button may be used to engage the autopilot.

- NAV (navigation) mode selector button. When pushed, will select the navigation mode. The mode provides automatic beam capture and tracking of VOR, LOC or GPS as selected for presentation on the HSI. NAV mode is recommended for enroute navigation tracking.

– APR (approach) mode selector button. When pushed, it will select the navigation mode. The mode provides automatic beam capture and tracking of VOR, GPS, LOC, and Glideslope (GS) on an ILS, as selected for presentation on the ICS. APR mode tracking sensitivity is recommended for instrument approaches.

– REV (back course approach) mode selector button. When pushed, it will select the Back course approach mode. This mode functions identically to the approach mode except that the autopilot response to LOC signals is reversed.

– ALT (altitude hold) mode select button. When pushed, it will select the altitude hold mode. This mode provides capture and tracking of the selected altitude. The selected altitude is the altitude at the moment the ALT button is pressed. If the ALT button is pressed with an established VS rate present, there will be approximately a 10% (of VS rate) overshoot, with the airplane returned positively to the selected altitude.

– UP/DN (vertical trim) buttons. The action of these buttons is dependent upon the vertical mode present when pressed. If VS mode is active, the initial button stroke will bring up the commanded vertical speed in the display. Subsequent immediate button strokes will increment the vertical commanded either up or down at the rate of 100 ft/min per button press, or at the rate of approximately 300 ft/min per second if pressed continuously. If the ALT mode is active, incremental button strokes will move the altitude hold reference altitude either up or down by 20 feet per press, or if held continuously will command the airplane up or down at the rate of 500 ft/min, synchronizing the altitude hold reference to the actual airplane altitude upon button release. (Note that the altitude hold reference is not displayed. The display will continue to show the altitude alert reference.)

– ARM (altitude arm) button. It toggles altitude arming on or off. When ALT ARM is annunciated, the autopilot will capture the altitude alert displayed altitude (provided the airplane is climbing or descending in VS to the displayed altitude). ALT hold arming when the autopilot is engaged is automatic upon altitude alert altitude selection via the rotary knobs. Note that the alert functions are independent of the arming process, thus providing full time alerting, even when the autopilot is disengaged.

– BARO (baro set) button. When pushed and released, it will change the display from the altitude alert selected altitude to the baro setting display (either IN HG or HPA) for 3 seconds. If pushed and held for 2 seconds, it will change the baro setting display from IN HG to HPA or vice versa. Once the baro setting display is visible, the rotary knobs may be used to manually adjust the baro setting if the system configuration does not employ automatic correction.

The flight control computer is connected to these controls on the control sticks:

– AP DISC (autopilot disconnect) switch on pilot’s and co-pilot’s stick. When pressed, it will disengage the autopilot, and interrupt electric trim power.

– Manual electric trim switches on the pilot’s stick. When both switches are pressed in the same direction, they will activate pitch trim in the selected direction. If only one switch is moved, the trim system will not operate. If one switch fails or is moved and held for 3 seconds, the trim monitoring system will detect a switch failure resulting in a PT annunciation on the autopilot display and the disabling of the electric trim system. Autopilot power will have to be cycled to clear the fault. Use of manual electric trim during autopilot operation will disengage the autopilot.

– CWS (control wheel steering) mode button on the pilot’s stick. When pressed and held, it disengages the pitch, roll and pitch trim clutches allowing the pilot to maneuver the airplane by hand. Pressing the CWS button will also sync the autopilot ALT or VS commands to the actual altitude or vertical speed present at the time the button is released.

B. KCM 100 Configuration Module

The data which is specific to the DA 42 (for example: gain settings) is stored in the KCM 100 configuration module. It is located on the instrument panel floor, between the instrument panel and the instrument panel frame. If MÄM 42-139 is carried out, it is located on the instrument panel floor.

C. KS 271C Roll Servo

The roll servo is located behind the rear main bulkhead on the right side. It is mounted on a mounting plate which is made from sheet aluminum. Two aluminum clamps connect a bridle cable to the aileron push-rod.

D. KS 270C Pitch Servo

The pitch servo is located aft of the baggage compartment frame. It is mounted on a mounting plate which is made from sheet aluminum. Two aluminum clamps connect a bridle cable to the elevator push-rod.

E. KS 272C Pitch Trim Servo

The pitch trim servo is located under the co-pilot’s seat. It is mounted on a mounting plate which is made from sheet aluminum and mounting bracket which is made from GFRP. Servo movement is transmitted to the trim wheel through a chain gear on the servo, a cardan shaft, and a chain gear next to the trim wheel on the right side.

Maintenance Practices

1. General

These Maintenance Practices tell you how to install the components of the autopilot system. They also tell you how to test and adjust the autopilot system.

2. Remove/Install the Flight Control Computer

A. Remove the Flight Control Computer

Detail Steps/Work Items		Key Items/References
(1)	Open the AUTOPILOT circuit breaker.	
(2)	Put a 3/32 Allen wrench into the access hole for the locking screw. Engage the screw.	
(3)	Turn the screw counter-clockwise until the unit disengages from the mounting rack.	
	CAUTION: DO NOT PULL ON THE KNOBS. DO NOT PRY THE FACE-PLATE. IF YOU PULL ON THE KNOBS, OR PRY THE FACE- PLATE, YOU CAN DAMAGE THE UNIT. CAUTION: DO NOT TOUCH THE CONNECTOR CARD AT THE REAR OF THE UNIT. THE ELECTROSTATIC CHARGE ON YOUR BODY CAN DAMAGE THE UNIT.	
(4)	Pull gently on the sides of the unit to remove it from the mounting rack.	
(5)	Install the protective covers on the rear connectors of the flight control computer.	

B. Install the Flight Control Computer

Detail Steps/Work Items		Key Items/References
(1)	Remove the protective covers from the connectors on the replacement unit.	
(2)	Slide the unit into the rack. Engage the locking screw so that the latch front lobe touches the rack.	
(3)	Turn the locking screw clockwise so that the rear lobe engages the mounting rack.	
CAUTION: DO NOT OVER-TIGHTEN THE LOCKING SCREW. YOU CAN DAMAGE THE LOCKING MECHANISM.		
(4)	Continue to turn the screw until the unit is fully installed in the mounting rack.	
(5)	Close the AUTOPILOT circuit breaker.	
(6)	Check and adjust the servo zeros.	Refer to the Installation Manual for the KAP 140 Flight Control System.
(7)	Do a test of the autopilot system: – Set the ELECT. MASTER switch to ON. – Set AVIONICS MASTER switch to ON. – Observe self test of the flight control computer. – Set AVIONICS MASTER to OFF. – Set ELECT. MASTER switch to OFF.	If no error message appears, then the system is operative.

3. Remove/Install the KCM 100 Configuration Module (if MÄM 42-139 is not installed)

A. Remove the KCM 100 Configuration Module

	Detail Steps/Work Items	Key Items/References
(1)	Open the AUTOPILOT and the MFD circuit-breaker.	Instrument panel, right side.
(2)	Remove the MFD from the instrument panel: – Turn the four screws counter-clockwise until the unit disengages from the mounting rack.	
	CAUTION: DO NOT PULL ON THE KNOBS. DO NOT PRY THE FACE-PLATE. IF YOU PULL ON THE KNOBS, OR PRY THE FACE- PLATE, YOU CAN DAMAGE THE UNIT. CAUTION: DO NOT TOUCH THE CONNECTOR CARD AT THE REAR OF THE UNIT. THE ELECTROSTATIC CHARGE ON YOUR BODY CAN DAMAGE THE UNIT.	
(3)	Pull gently on the sides of the MFD to remove it from the instrument panel. Disconnect the in-line connector.	
(4)	Remove the KCM 100: – Remove the two screws that attach the KCM 100 to the mounting rack. – Disconnect the electric cable. – Move the configuration module free of the instrument panel.	

B. Install the the KCM 100 Configuration Module

	Detail Steps/Work Items	Key Items/References
	CAUTION: WHEN A NEW CONFIGURATION MODULE IS INSTALLED, YOU MUST MAKE SURE THAT IT HAS THE PART NUMBER WHICH IS SHOWN IN THE EQUIPMENT LIST IN CHAPTER 6 OF THE AIRPLANE FLIGHT MANUAL. THE CONFIGURATION MODULE CONTAINS INFORMATION WHICH IS SPECIFIC FOR THE DA 42 AIRPLANE.	
(1)	Move the KCM 100 into its position. Connect the electric cable and engage the two locking screws.	
(2)	Install the MFD: – Connect the in-line connector. – Move the display unit into position in the instrument panel. – Turn the four locking screws until the MFD is fully installed.	
	CAUTION: DO NOT OVER-TIGHTEN THE LOCKING SCREW. YOU CAN DAMAGE THE LOCKING MECHANISM.	
(3)	Close the AUTOPILOT and the MFD circuit-breaker.	Instrument panel, right side.
(4)	Do a test of the autopilot system: – Set the ELECT. MASTER switch to ON. – Set AVIONICS MASTER switch to ON. – Observe self-test of the flight control computer. – Set AVIONICS MASTER to OFF. – Set ELECT. MASTER switch to OFF.	If no error message appears, then the system is operative.

4. Remove/Install the KCM 100 Configuration Module (if MÄM 42-139 is installed)

A. Remove the KCM 100 Configuration Module

Detail Steps/Work Items		Key Items/References
(1)	Open the AUTOPILOT circuit-breaker.	Instrument panel, right side.
(2)	Remove instrument panel cover.	Refer to Section 25-10.
(3)	Remove the KCM 100: – Remove the two screws that attach the KCM 100 to the mounting rack. – Disconnect the electric cable. – Move the configuration module free of the instrument panel.	

B. Install the KCM 100 Configuration Module

Detail Steps/Work Items		Key Items/References
CAUTION: WHEN A NEW CONFIGURATION MODULE IS INSTALLED, YOU MUST MAKE SURE THAT IT HAS THE PART NUMBER WHICH IS SHOWN IN THE EQUIPMENT LIST IN CHAPTER 6 OF THE AIRPLANE FLIGHT MANUAL. IF A NEW CONFIGURATION MODULE IS INSTALLED, A COMPLETE CONFIGURATION PROCEDURE INCLUDING SOFTWARE UPLOAD IS NECESSARY.		
(1)	Put the KCM 100 in place on the instrument panel. Connect the electric cable and engage the two locking screws.	
(2)	Install the instrument panel cover.	Refer to Section 25-10.
(3)	Close the AUTOPILOT circuit breaker.	Instrument panel, right side.
(4)	Do a test of the autopilot system: – Set the ELECT. MASTER switch to ON. – Set AVIONICS MASTER switch to ON. – Observe self-test of the flight control computer. – Set AVIONICS MASTER to OFF. – Set ELECT. MASTER switch to OFF.	If no error message appears, then the system is operative.

5. Remove/Install the Roll Servo

A. Remove the Roll Servo

Detail Steps/Work Items		Key Items/References
(1)	Remove the passengers seat.	Refer to Section 25-10.
(2)	Disconnect the connector from the servo.	
(3)	Remove the 2 screws which attach the servo to the mounting plate and the clutch.	Hold the servo.
(4)	Remove the servo clear of the airplane.	

B. Install the Roll Servo

Detail Steps/Work Items		Key Items/References
(1)	Put the servo in place on the mounting plate.	
(2)	Install the 2 screws which attach the servo to the mounting plate and clutch.	
(3)	Connect the connector to the servo.	
(4)	Do a test of the autopilot system: – Set ELECT. MASTER switch to ON. – Set AVIONICS MASTER switch to ON. – Observe self-test of the flight control computer. – Set AVIONICS MASTER switch to OFF. – Set ELECT. MASTER switch to OFF.	If no error message appears, then the system is operative.
(5)	Install the passengers seat.	Refer to Section 25-10.

6. Remove/Install the Roll Servo Clutch

A. Equipment

Item	Quantity	Part Number
Cable tension gauge.	1	Commercial.

B. Remove the Roll Servo Clutch

Detail Steps/Work Items		Key Items/References
(1)	Remove the roll servo.	Refer to Paragraph 5.
(2)	Release the clamps which connect the bridle cable to the aileron push-rod.	
(3)	Remove the bridle cable.	
(4)	Remove the 2 screws which attach the clutch to the mounting plate.	Hold the clutch.
(5)	Remove the clutch clear of the airplane.	

C. Install the Roll Servo Clutch

Detail Steps/Work Items		Key Items/References
(1)	Remove the pilot’s seat or the co-pilot’s seat.	Refer to Section 25-10. To give access for the rigging pin.
(2)	Put the clutch in place on the mounting plate.	
(3)	Install the 2 screws which attach the clutch to the mounting plate.	
(4)	Center the aileron control system with a rigging pin at one control stick.	Refer to Section 27-10.
(5)	Center the capstan.	The recess for the ball in the middle of the bridle cable must be in the uppermost position.
(6)	Install bridle cable to capstan.	The ball in the middle of the bridle cable must engage in the recess on the capstan. Wrap bridle cable around capstan one turn to each side.
(7)	Connect the ends of the bridle cable to the aileron pushrod with the clamps.	Tighten clamps lightly to allow adjustment (see next step).
(8)	Using a small plastic hammer, move the clamps along the pushrod to adjust the bridle cable tension.	Adjust tension to 89 ±22 N (20 ± 5 lb). Measure cable tension with cable tension gauge.
(9)	Tighten the clamps.	
(10)	Remove the rigging pin from the control stick.	
(11)	Install the front seat which was removed.	Refer to Section 25-10.
(12)	Install the roll servo.	Refer to Paragraph 5.

7. Remove/Install the Pitch Servo

A. Remove the Pitch Servo

Detail Steps/Work Items		Key Items/References
(1)	Remove the trim/cover from the front face of the baggage compartment and remove the lower access panel from the baggage compartment insert.	
(2)	Disconnect the connector from the servo.	
(3)	Remove the 2 screws which attach the servo to the mounting plate and the clutch.	Hold the servo.
(4)	Remove the servo clear of the airplane.	

B. Install the Pitch Servo

Detail Steps/Work Items		Key Items/References
(1)	Put the servo in place on the mounting plate.	
(2)	Install the 2 screws which attach the servo to the mounting plate and clutch.	
(3)	Connect the connector to the servo.	
(4)	Do a test of the autopilot system: – Set ELECT. MASTER switch to ON. – Set AVIONICS MASTER switch to ON. – Observe self test of the flight control computer. – Set AVIONICS MASTER switch to OFF. – Set ELECT. MASTER to OFF.	If no error message appears, then the system is operative.
(5)	Install the baggage compartment lower access panel and install the trim/cover to the front face of the baggage compartment.	

8. Remove/Install the Pitch Servo Clutch

A. Equipment

Item	Quantity	Part Number
Cable tension gauge.	1	Commercial.

B. Remove the Pitch Servo Clutch

Detail Steps/Work Items		Key Items/References
(1)	Remove the pitch servo.	Refer to Paragraph 7.
(2)	Release the clamps which connect the bridle cable to the elevator pushrod.	
(3)	Remove the bridle cable.	
(4)	Remove the 2 screws which attach the clutch to the mounting plate.	Hold the clutch.
(5)	Remove the clutch clear of the airplane.	

C. Install the Pitch Servo Clutch

Detail Steps/Work Items		Key Items/References
(1)	Remove the pilot’s seat or the co-pilot’s seat.	Refer to Section 25-10. To give access for the rigging pin.
(2)	Put the clutch in place on the mounting plate.	
(3)	Install the 2 screws which attach the clutch to the mounting plate.	
(4)	Center the elevator control system with a rigging pin at one control stick.	Refer to Section 27-30.
(5)	Center the capstan.	The recess for the ball in the middle of the bridle cable must be in the uppermost position.
(6)	Install bridle cable to capstan.	The ball in the middle of the bridle cable must engage in the recess on the capstan. Wrap bridle cable around capstan one turn to each side.
(7)	Connect the ends of the bridle cable to the elevator push-rod with the clamps.	Tighten clamps lightly to allow adjustment (see next step).
(8)	Using a small plastic hammer, move the clamps along the push-rod to adjust the bridle cable tension.	Adjust tension to 89 ± 22 N (20 ± 5 lb). Measure cable tension with cable tension gauge.
(9)	Tighten the clamps.	
(10)	Remove the rigging pin from the control stick.	
(11)	Install the front seat which was removed.	Refer to Section 25-10.
(12)	Install the pitch servo.	Refer to Paragraph 7.

9. Remove/Install the Pitch Trim Servo

A. Remove the Pitch Trim Servo

Detail Steps/Work Items		Key Items/References
(1)	Remove the co-pilot’s seat.	Refer to Section 25-10.
(2)	Dis-connect the connector from the servo.	
(3)	Remove the 2 screws which attach the servo to the mounting plate and the clutch.	Hold the servo.
(4)	Remove the servo clear of the airplane.	

B. Install the Pitch Trim Servo

Detail Steps/Work Items		Key Items/References
(1)	Put the servo in place on the mounting plate.	
(2)	Install the 2 screws which attach the servo to the mounting plate and clutch.	The upper forward screw also holds the chain adjuster. Ensure proper chain tension.
(3)	Connect the connector to the servo.	
(4)	Do a test of the autopilot system: – Set ELECT. MASTER switch to ON. – Set AVIONICS MASTER switch to ON. – Observe self-test of the flight control computer. – Set AVIONICS MASTER switch to OFF. – Set ELECT. MASTER switch to OFF.	If no error message appears, then the system is operative.
(5)	Install the co-pilot’s seat.	Refer to Section 25-10.

10. Remove/Install the Pitch Trim Servo Clutch

A. Remove the Pitch Trim Servo Clutch

Detail Steps/Work Items		Key Items/References
CAUTION: DO NOT APPLY STRONG FORCES TO THE CARDAN SHAFT. THE UPPER CARDAN JOINT CONNECTS TO A PART WHICH IS WEAK BY DESIGN TO GIVE OCCUPANT PROTECTION IN AN EMERGENCY LANDING.		
(1)	Remove the pitch trim servo.	Refer to Paragraph 9.
(2)	Remove the screw which holds the cap to the capstan.	
(3)	Remove the cap from the capstan.	
(4)	Release chain tension with chain adjuster.	On the chain gear next to the servo.
(5)	Remove the chain from the chain gear.	
(6)	Remove the 2 screws which attach the clutch and the chain adjuster to the mounting plate.	Hold the clutch and the chain adjuster.

B. Install the Pitch Trim Servo Clutch

Detail Steps/Work Items		Key Items/References
(1)	Put the clutch and the chain adjuster in place on the mounting plate.	
(2)	Install the 2 screws which attach the clutch and the chain adjuster to the mounting plate.	
(3)	Install the chain to the chain gear.	
(4)	Put the cap in place on the capstan.	
(5)	Install the screw which holds the cap to the capstan.	
(6)	Install the pitch trim servo.	Refer to Paragraph 9.

11. Adjust the Bridle Cable Tension

A. Equipment

Item	Quantity	Part Number
Cable tension gauge.	1	Commercial.

B. Adjustment Procedure

	Detail Steps/Work Items	Key Items/References
(1)	Loosen the bolts in the clamps which connect the bridle cable to the pushrod.	Do not remove the bolts. Loosen just enough so that the next step can be done.
(2)	Using a small plastic hammer, move the clamps along the pushrod to adjust the bridle cable tension.	Adjust tension to 89 ± 22 N (20 ± 5 lb). Measure cable tension with cable tension gauge.
(3)	Tighten the bolts in the clamps which connect the bridle cable to the pushrod.	

12. Adjust the Servo Clutch Torques

A. Equipment

Item	Quantity	Part Number
Goodrich slip clutch test stand.	1	20-9855-03.

B. Adjustment Procedure

	Detail Steps/Work Items	Key Items/References
(1)	Remove the clutch from the airplane.	Refer to this Section.
(2)	Install the clutch assembly on the slip clutch test stand.	Refer to the equipment manufacturers' documentation.
(3)	Measure clockwise (CW) and counterclockwise (CCW) clutch torque, adjust if necessary.	Refer to the equipment manufacturers' documentation. The correct clutch torques are: Roll servo 2.03 ± 0.23 Nm (18 ± 2 in.lb.) Pitch servo 3.39 ± 0.34 Nm (30 ± 3 in.lb.) Pitch trim servo 4.07 ± 0.45 Nm (36 ± 4 in.lb.)
(4)	Remove the clutch assembly from the slip clutch test stand.	
(5)	Install the clutch to the airplane.	Refer to this Section.

13. Mechanical Test of the Autopilot System

Do this check at the intervals given in Section 05-10.

	Detail Steps/Work Items	Key Items/References
(1)	Check bridle cable tension for the roll servo, adjust if necessary.	Refer to this Section.
(2)	Check bridle cable tension for the pitch servo, adjust if necessary.	Refer to this Section.
(3)	Check the clutch torque settings for the roll servo, adjust if necessary.	Refer to this Section.
(4)	Check the clutch torque settings for the pitch servo, adjust if necessary.	Refer to this Section.
(5)	Check the clutch torque settings for the pitch trim servo, adjust if necessary.	Refer to this Section.
(6)	Perform Pitot and static system leak tests.	Refer to Section 34-10.

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Section 22-11
GFC 700 Autopilot

1. General

This Section tells you about the GFC 700 autopilot system installed in the DA 42.

Refer to Section 22-10 if the KAP 140 autopilot system is installed.

2. Description

The GFC 700 autopilot system is a digital flight control system that provides roll, pitch, pitch trim and yaw steering with altitude control. The system has the following components (refer to Figure 1):

– Flight director (integral part of the Garmin G1000 system).

– GSA 81 roll servo.

– GSA 81 pitch servo.

– GSA 81 pitch trim servo.

– GSA 80 yaw servo.

The GFC 700 autopilot system is controlled via the MFD of the Garmin G1000 integrated cockpit system (ICS).

The GFC 700 roll axis features includes wing leveler, heading select, and VOR/LOC intercept and tracking. The GFC 700 is also coupled to the ICS for navigation information. Attitude information is derived from the AHRS.

Pitch axis features include vertical speed, flight level change, glideslope and altitude hold along with the optional altitude preselect. Pitch information is derived from AHRS and GDC. Internal monitors keep constant track of the GFC 700’s status and provide for automatic shutdown of the autopilot or trim system in the event of a malfunction.

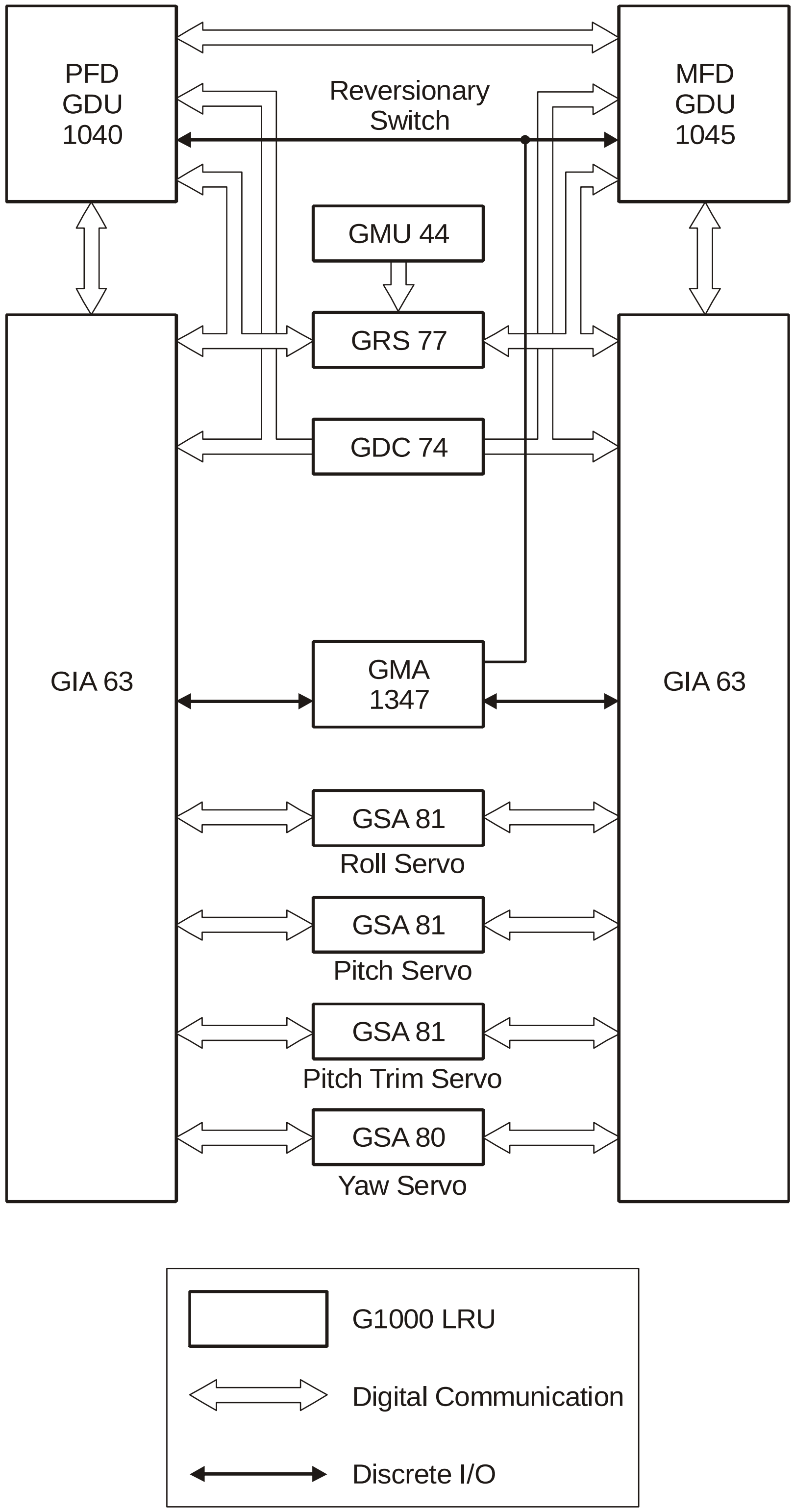

Figure 1: GFC 700 Autopilot Schematic Diagram

A. GFC 700 Flight Control

For details about operation and the indications concerning GFC 700 functions refer to Garmin DA 42 Pilot's Guide (GFC 700), Doc. No. 190-00649-01, latest revision.

B. GSA 81 Roll Servo

The roll servo is located behind the rear main bulkhead on the right side. It is mounted on a mounting plate which is made from sheet aluminum. Two aluminum clamps connect a bridle cable to the aileron push-rod.

C. GSA 81 Pitch Servo

The pitch servo is located aft of the baggage compartment frame. It is mounted on a mounting plate which is made from sheet aluminum. Two aluminum clamps connect a bridle cable to the elevator push-rod.

D. GSA 81 Pitch Trim Servo

The pitch trim servo is located under the co-pilot's seat. It is mounted on a mounting plate which is made from sheet aluminum and mounting bracket which is made from GFRP. Servo movement is transmitted to the trim wheel through a chain gear on the servo, a cardan shaft, and a chain gear next to the trim wheel on the right side.

E. GSA 80 Yaw Servo

The yaw servo is located under the passenger seats. It is mounted on a mounting rack made from stainless steel and a mounting bracket made from CFRP. A braided cable is connected to the two turnbuckles of the rudder control cables.

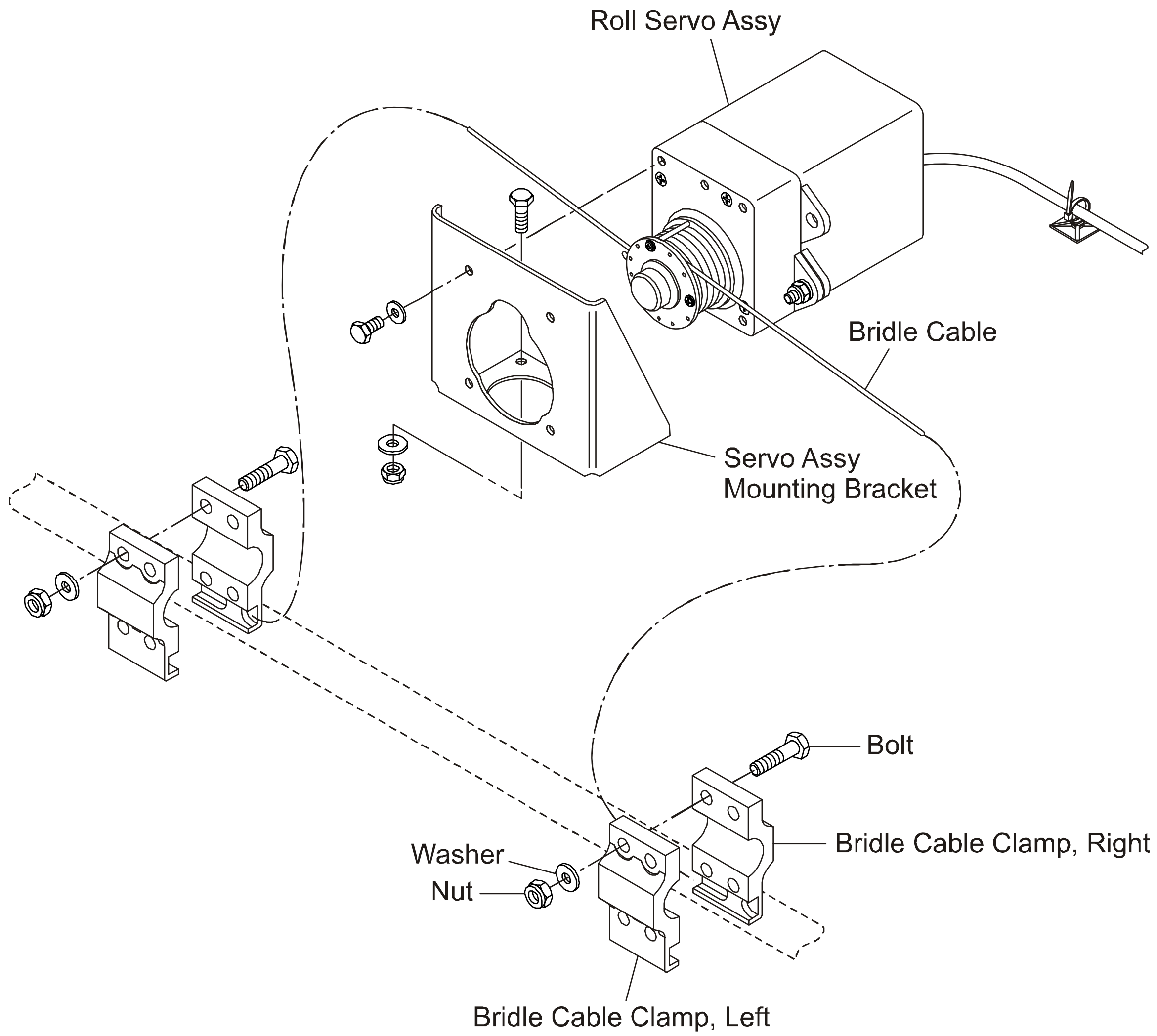

Figure 2: Roll Servo Installation

Maintenance Practices

1. General

These Maintenance Practices tell you how to install the components of the autopilot system. They also tell you how to test and adjust the autopilot system.

2. Remove/Install the Roll Servo

A. Remove the Roll Servo

	Detail Steps/Work Items	Key Items/References
(1)	Remove the passenger seats.	Refer to Section 25-10.
(2)	Dis-connect the connector from the servo.	
(3)	Remove the 2 screws which attach the servo to the clutch.	Hold the servo.
(4)	Remove the servo clear of the airplane.	

B. Install the Roll Servo

	Detail Steps/Work Items	Key Items/References
(1)	Put the servo in place on the clutch.	
(2)	Install the 2 screws which attach the servo to the mounting plate and clutch.	Refer to Figure 2.
(3)	Connect the connector to the servo.	
(4)	Do a test of the autopilot system: – Set ELECT. MASTER switch to ON. – Set AVIONICS MASTER switch to ON. – Observe self-test of the flight control computer. – Set AVIONICS MASTER switch to OFF. – Set ELECT. MASTER switch to OFF.	If no error message appears, then the system is operative.
(5)	Install the passenger seats.	Refer to Section 25-10.

3. Remove/Install the Roll Servo Clutch

A. Equipment

Item	Quantity	Part Number
Cable tension gauge.	1	Commercial.

B. Remove the Roll Servo Clutch

	Detail Steps/Work Items	Key Items/References
(1)	Remove the roll servo.	Refer to Paragraph 2.
(2)	Release the clamps which connect the bridle cable to the aileron push-rod.	
(3)	Remove the cable guard.	
(4)	Remove the 4 screws which attach the clutch to the mounting plate.	Hold the clutch.
(5)	Remove the clutch clear of the airplane.	

C. Install the Roll Servo Clutch

	Detail Steps/Work Items	Key Items/References
(1)	Remove the pilot’s seat or the co-pilot’s seat.	Refer to Section 25-10. To give access for the rigging pin.
(2)	Put the clutch in place on the mounting plate.	
(3)	Install the 4 screws which attach the clutch to the mounting plate.	
(4)	Center the aileron control system with a rigging pin at one control stick.	Refer to Section 27-10.
(5)	Center the capstan.	The recess for the ball in the middle of the bridle cable must be in the uppermost position.
(6)	Install bridle cable to capstan.	The ball in the middle of the bridle cable must engage in the recess on the capstan. Wrap bridle cable around capstan 1.5 turns to each side.
(7)	Connect the ends of the bridle cable to the aileron push-rod with the clamps.	Tighten clamps lightly to allow adjustment (see next step).
(8)	Using a small plastic hammer, move the clamps along the push-rod to adjust the bridle cable tension.	Adjust tension to 156 ± 9 N (35 ± 2 lb). Measure cable tension with cable tension gauge.
(9)	Tighten the clamps.	
(10)	Install the cable guard.	
(11)	Remove the rigging pin from the control stick.	
(12)	Install the front seat which was removed.	Refer to Section 25-10.
(13)	Install the roll servo.	Refer to Paragraph 2.

4. Remove/Install the Pitch Servo

A. Remove the Pitch Servo

	Detail Steps/Work Items	Key Items/References
(1)	Remove the trim/cover from the front face of the baggage compartment and remove the lower access panel from the baggage compartment insert.	
(2)	Dis-connect the connector from the servo.	
(3)	Remove the 2 screws which attach the servo to the clutch.	Hold the servo.
(4)	Remove the servo clear of the airplane.	

B. Install the Pitch Servo

	Detail Steps/Work Items	Key Items/References
(1)	Put the servo in place on the clutch.	
(2)	Install the 2 screws which attach the servo to the clutch.	
(3)	Connect the connector to the servo.	
(4)	Do a test of the autopilot system: – Set ELECT. MASTER switch to ON. – Set AVIONICS MASTER switch to ON. – Observe self-test of the flight control computer. – Set AVIONICS MASTER switch to OFF. – Set ELECT. MASTER to OFF.	If no error message appears, then the system is operative.
(5)	Install the baggage compartment lower access panel and install the trim/cover to the front face of the baggage compartment.	

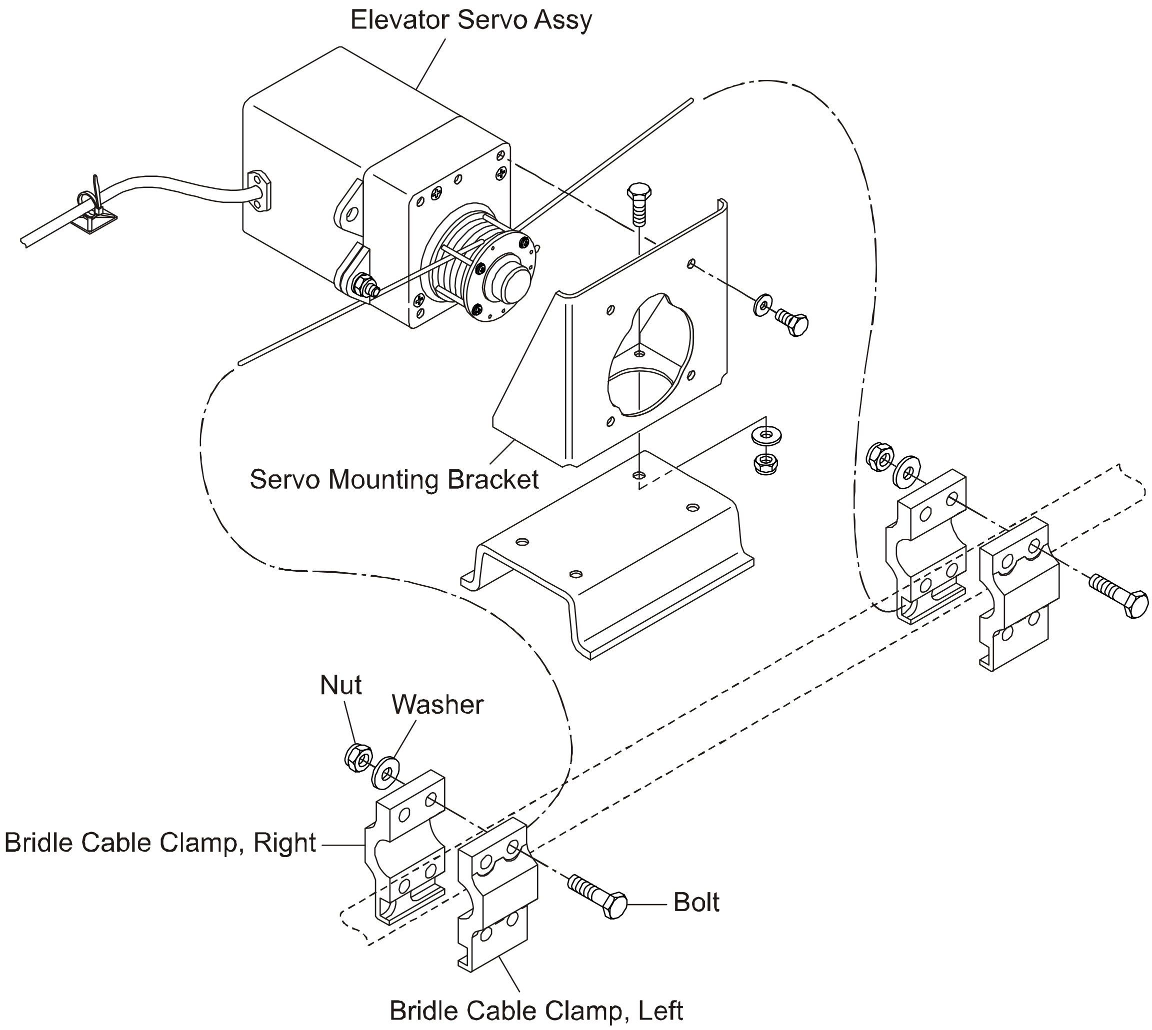

Figure 3: Pitch Servo Installation

5. Remove/Install the Pitch Servo Clutch

A. Equipment

Item	Quantity	Part Number
Cable tension gauge.	1	Commercial.

B. Remove the Pitch Servo Clutch

	Detail Steps/Work Items	Key Items/References
(1)	Remove the pitch servo.	Refer to Paragraph 4.
(2)	Release the clamps which connect the bridle cable to the elevator push-rod.	
(3)	Remove the cable guard.	
(4)	Remove the 4 screws which attach the clutch to the mounting plate.	Hold the clutch.
(5)	Remove the clutch clear of the airplane.	

C. Install the Pitch Servo Clutch

	Detail Steps/Work Items	Key Items/References
(1)	Put the clutch in place on the mounting plate.	
(2)	Install the 4 screws which attach the clutch to the mounting plate.	
(3)	Center the elevator control system with a rigging pin at one control stick.	Refer to Section 27-30.
(4)	Center the capstan.	The recess for the ball in the middle of the bridle cable must be in the undermost position.
(5)	Install bridle cable to capstan.	The ball in the middle of the bridle cable must engage in the recess on the capstan. Wrap bridle cable around capstan 1.5 turns to each side.
(6)	Connect the ends of the bridle cable to the elevator push-rod with the clamps.	Tighten clamps lightly to allow adjustment (see next step).
(7)	Using a small plastic hammer, move the clamps along the push-rod to adjust the bridle cable tension.	Adjust tension to 156 ± 9 N (35 ± 2 lb). Measure cable tension with cable tension gauge.
(8)	Tighten the clamps.	
(9)	Install the cable guard.	
(10)	Remove the rigging pin from the control stick.	
(11)	Install the front seat which was removed.	Refer to Section 25-10.
(12)	Install the pitch servo.	Refer to Paragraph 4.

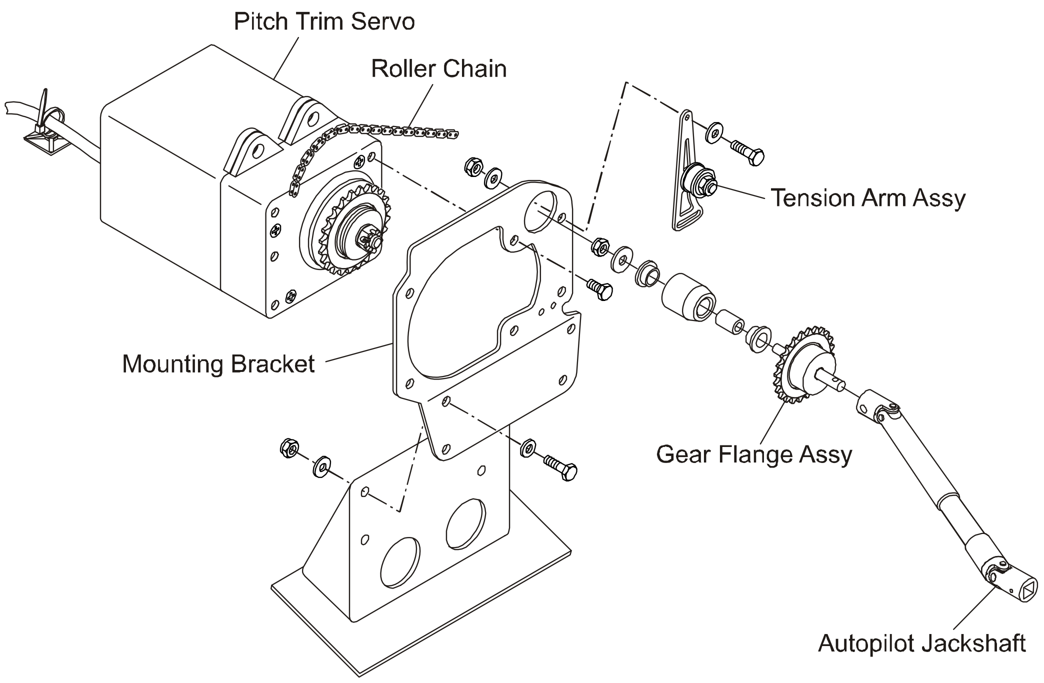

Figure 4: Pitch Trim Servo Installation

6. Remove/Install the Pitch Trim Servo

A. Remove the Pitch Trim Servo

	Detail Steps/Work Items	Key Items/References
(1)	Remove the co-pilot's seat.	Refer to Section 25-10.
(2)	Dis-connect the connector from the servo.	
(3)	Remove the 2 screws which attach the servo to the clutch.	Hold the servo.
(4)	Remove the servo clear of the airplane.	

B. Install the Pitch Trim Servo

	Detail Steps/Work Items	Key Items/References
(1)	Put the servo in place on the clutch.	
(2)	Install the 2 screws which attach the servo to the clutch.	
(3)	Connect the connector to the servo.	
(4)	Do a test of the autopilot system: – Set ELECT. MASTER switch to ON. – Set AVIONICS MASTER switch to ON. – Observe self-test of the flight control computer. – Set AVIONICS MASTER switch to OFF. – Set ELECT. MASTER switch to OFF.	If no error message appears, then the system is operative.
(5)	Install the co-pilot's seat.	Refer to Section 25-10.

7. Remove/Install the Pitch Trim Servo Clutch

A. Remove the Pitch Trim Servo Clutch

	Detail Steps/Work Items	Key Items/References
	CAUTION: DO NOT APPLY STRONG FORCES TO THE CARDAN SHAFT. THE UPPER CARDAN JOINT CONNECTS TO A PART WHICH IS WEAK BY DESIGN TO GIVE OCCUPANT PROTECTION IN AN EMERGENCY LANDING.	
(1)	Remove the pitch trim servo.	Refer to Paragraph 6.
(2)	Remove the screws which hold the cap to the capstan.	
(3)	Remove the cap from the capstan.	
(4)	Release chain tension with chain adjuster.	On the chain gear next to the servo.
(5)	Remove the chain from the chain gear.	
(6)	Remove the 4 screws which attach the clutch and the chain adjuster to the mounting plate.	Hold the clutch and the chain adjuster.

B. Install the Pitch Trim Servo Clutch

	Detail Steps/Work Items	Key Items/References
(1)	Put the clutch and the chain adjuster in place on the mounting plate.	
(2)	Install the 4 screws which attach the clutch and the chain adjuster to the mounting plate.	
(3)	Install the chain to the chain gear.	
(4)	Put the cap in place on the capstan.	
(5)	Install the screws which hold the cap to the capstan.	
(6)	Install the pitch trim servo.	Refer to Paragraph 6.

8. Remove/Install the Yaw Servo and the Yaw Servo Clutch

A. Equipment

Item	Quantity	Part Number
Cable tension gauge.	1	Commercial.

B. Remove the Yaw Servo and the Yaw Servo Clutch

	Detail Steps/Work Items	Key Items/References
(1)	Remove the passenger seats.	Refer to Section 25-10.
(2)	Dis-connect the connector from the servo.	
(3)	Remove 4 screws which attach the rudder cable support.	
(4)	Remove 7 screws which attach the yaw servo mounting cradle to the airplane.	Hold the assembly.
(5)	Remove the bridle cable.	
(6)	Remove the yaw servo, the yaw servo clutch and the mounting cradle from the airplane.	
(7)	Remove the 4 screws witch attach the servo to the clutch and the mounting cradle.	Hold the clutch, servo and cradle.

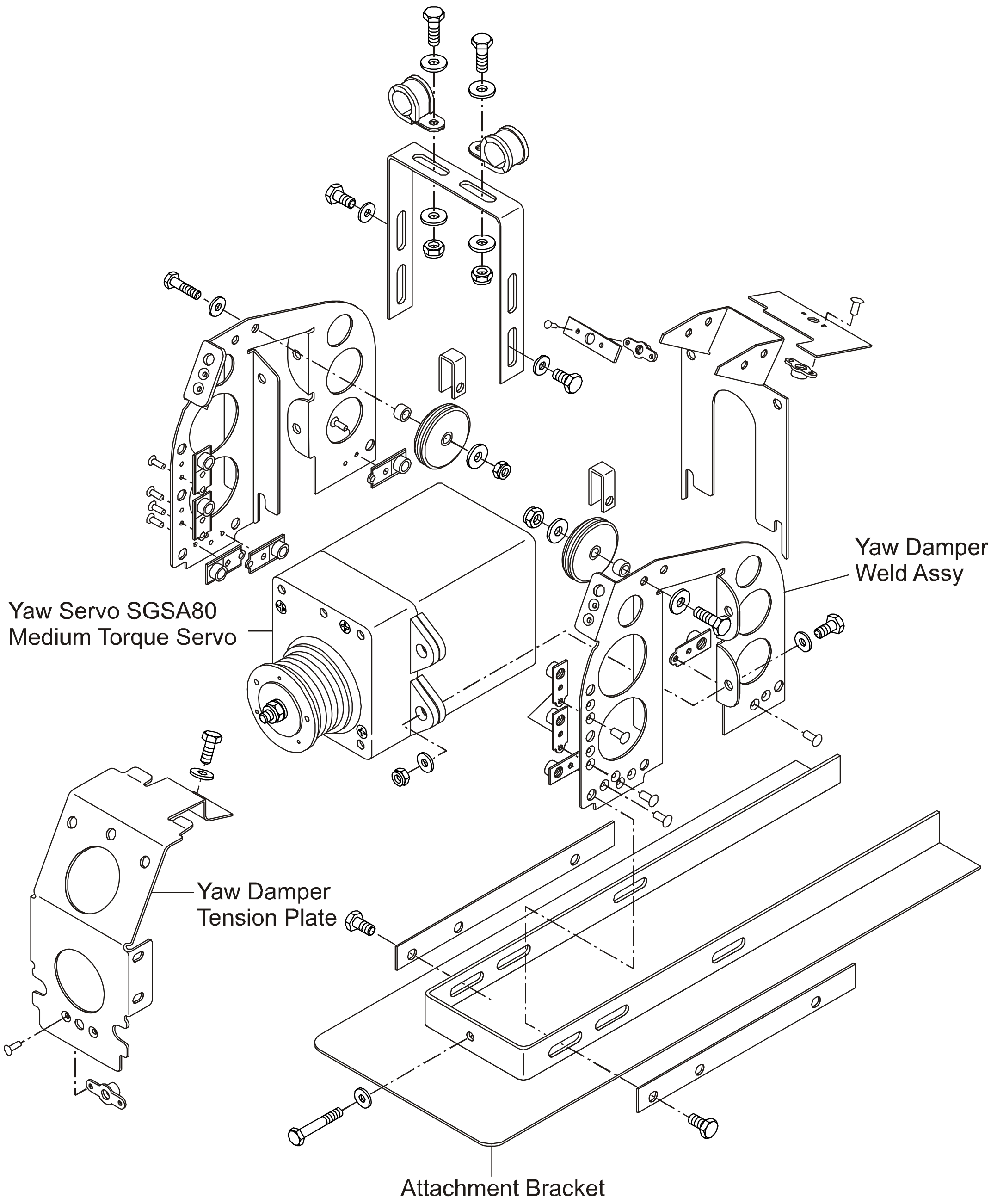

Figure 5: Yaw Servo Installation

C. Install The Yaw Servo, the Yaw Servo Clutch and Bridle Cable

	Detail Steps/Work Items	Key Items/References
(1)	Adjust/check the servo clutch torques.	Refer to Paragraph 11.
(2)	Install the GM 85/86 servo mount and GSA 80 servo into the yaw damper frame assy with 8 screws.	
(3)	Install the yaw damper cable onto the capstan.	Refer to Figure 6.
(4)	Temporarily fix the cable on the servo frame with tape.	
(5)	Install the cable guard kit (GSM 85 only) or the capstan standoff kit (GSM 85 and GSM 86) onto the servo mount and secure with Loctite 243 or equivalent.	
(6)	Install the yaw damper tension plate on the yaw damper frame.	
(7)	Put the rudder cable support in place (if installed).	
(8)	Pre fit the yaw damper frame assy into the airplane. Install but do not tighten the mounting screws to allow axial movement. Install the tension screw located on the front of the yaw damper. Check before crimping: – Rudder in neutral position. – Capstan ball cut-out in center up position. Crimp thimble eye on the cables according to AC 43.13-1B if necessary.	
(9)	Adjust the bridle cable tension.	Refer to Paragraph 10.
(10)	Connect the electrical connection of the yaw servo. Fix the harness with cable ties.	
(11)	Install all clamps and fix the hydraulic lines to the yaw damper frame. Fix the TKS lines with cable ties (if installed).	

	Detail Steps/Work Items	Key Items/References
(12)	Check all flight controls in working area for minium 3 mm (0.12 in) clearance.	
(13)	Check if rudder is in neutral position and the capstan ball cut-out is in center up position.	
(14)	Do an inspection of the adjusted controls. If necessary for the Airworthiness Authority do a second inspection of the controls.	
(15)	Install the passenger seats.	Refer to Section 25-10.

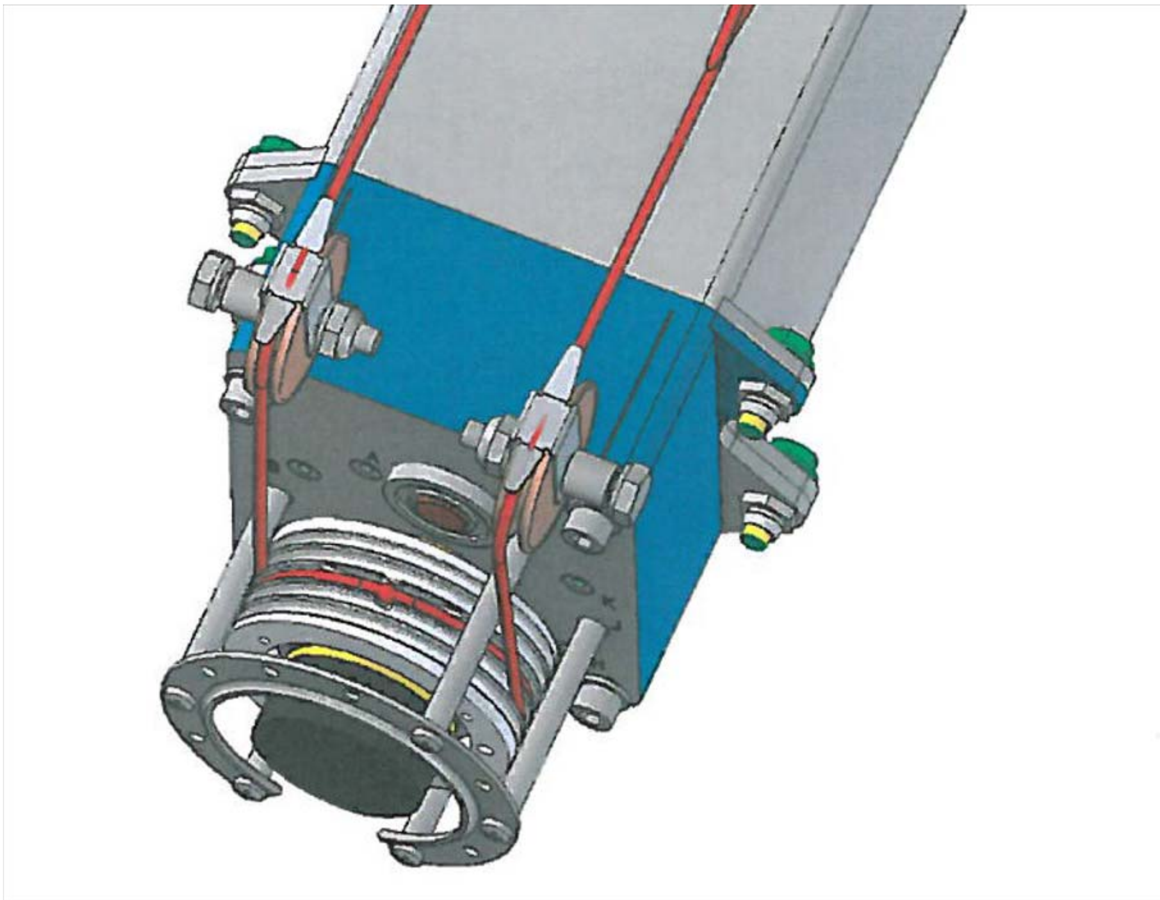

Figure 6: Yaw Damper Cable Installation

9. Adjust the Bridle Cable Tension of the Roll and Pitch Servos

A. Equipment

Item	Quantity	Part Number
Cable tension gauge.	1	Commercial.

B. Adjustment Procedure

	Detail Steps/Work Items	Key Items/References
(1)	Loosen the bolts in the clamps which connect the bridle cable to the push-rod.	Do not remove the bolts. Loosen just enough so that the next step can be done.
(2)	Using a small plastic hammer, move the clamps along the push-rod to adjust the bridle cable tension.	Adjust tension to 156 ± 9 N (35 ± 2 lb) for the pitch and roll servos. Measure cable tension with cable tension gauge.
(3)	Tighten the bolts in the clamps which connect the bridle cable to the push-rod.	

10. Adjust the Bridle Cable Tension of the Yaw Servo

A. Equipment

Item	Quantity	Part Number
Cable tension gauge.	1	Commercial.

B. Adjustment Procedure

	Detail Steps/Work Items	Key Items/References
(1)	Check tension of rudder cables.	Refer to Section 27-20.
(2)	Connect the yaw damper thimble eye to the rudder cable turnbuckle with the carabiner. Secure screwed connection on carabiner using Loctite 243 or equivalent. Remove the cable fixing tape.	
	CAUTION: DO NOT USE THE YAW SERVO ADJUSTMENT SCREW TO ADJUST CABLE TENSION. MOVE THE SERVO UNIT WITH GENTLE STROKES AND SECURE POSITION VIA THE ADJUSTMENT SCREW INSTEAD. CAUTION: DO NOT BEND THE FRAME ASSY DURING ADJUSTMENT.	
(3)	Check and adjust the yaw damper cable tension: – Pull the yaw damper cable centrally between the pulley and the cable eye with the spring scale with a force of 3 kg (6.6 lbf)and adjust cable tension to obtain a deflection of 5 mm to 10 mm (0.2 in to 0.39 in)	
(4)	Tighten the 6 screws mounting the yaw damper frame to the airplane.	
(5)	Fix carabiners and bridle cable eye-ends to thimble eyes with cable ties.	

	Detail Steps/Work Items	Key Items/References
(6)	Do a test of the autopilot system: – Set ELECT. MASTER switch to ON. – Set AV. MASTER switch to ON. – Observe self-test of the flight control computer. – Set AV. MASTER switch to OFF. – Set ELECT. MASTER switch to OFF.	If no error message appears, then the system is operative.

11. Adjust the Servo Clutch Torques

A. Equipment

Item	Quantity	Part Number
Garmin slip clutch adjustment fixture.	1	T10-00110-01.

B. Adjustment Procedure

	Detail Steps/Work Items	Key Items/References
(1)	Remove the clutch from the airplane.	Refer to this Section.
(2)	Clean the servo output gears.	
(3)	Install the clutch assembly on the slip clutch test stand.	Refer to the equipment manufacturers' documentation.
(4)	Measure clockwise (CW) and counter-clockwise (CCW) clutch torque, adjust if necessary.	Refer to the equipment manufacturers' documentation. The correct clutch torques are: Roll servo 5.08 ± 0.68 Nm (45 ± 6 in.lb) Pitch servo 6.21 ± 0.79 Nm (55 ± 7 in.lb) Pitch trim servo 5.08 ± 0.68 Nm (45 ± 6 in.lb) Yaw servo 9.04 ± 1.13 Nm (80 ± 10 in.lb)
(5)	Remove the clutch assembly from the slip clutch test stand.	
(6)	Apply grease to the servo output gears.	
(7)	Install the clutch to the airplane.	Refer to this Section.

12. Mechanical Test of the Autopilot System

Do this check at the intervals given in Section 05-10.

	Detail Steps/Work Items	Key Items/References
(1)	Check bridle cable tension for the roll servo, adjust if necessary.	Refer to this Section.
(2)	Check bridle cable tension for the pitch servo, adjust if necessary.	Refer to this Section.
(3)	Check the clutch torque settings for the roll servo, adjust if necessary.	Refer to this Section.
(4)	Check the clutch torque settings for the pitch servo, adjust if necessary.	Refer to this Section.
(5)	Check the clutch torque settings for the pitch trim servo, adjust if necessary.	Refer to this Section.
(6)	Check the clutch torque settings for the yaw servo, adjust if necessary.	Refer to this Section.
(7)	Check the bridle cable tension for the yaw servo, adjust if necessary.	Refer to this Section.

13. Replacement of the Yaw Servo Bridle Cable

	Detail Steps/Work Items	Key Items/References
(1)	Remove the passenger seats.	Refer to Section 25-10.
(2)	Dis-connect the connector from the servo.	
(3)	Remove 4 screws which attach the rudder cable support.	
(4)	Loosen 7 screws which attach the yaw servo mounting cradle to the airplane.	Hold the assembly.
(5)	Remove both clamps which attach the bridle cable to the turnbuckles and move the cable clear of the airplane.	
(6)	Move the yaw servo cradle to the max. aft location possible by turning the tension adjustment screw counterclockwise.	
(7)	Set both the servo capstan and the rudder to the center position.	The recess for the ball in the middle of the bridle cable must be in the uppermost position.
(8)	Put the bridle cable in place along the cradle towards the turnbuckles.	
(9)	Install bridle cable to capstan.	The ball in the middle of the bridle cable must engage in the recess on the capstan. Wrap bridle cable around capstan 1.5 turns to each side.
(10)	Install both eye-ends to the bridle cable at the turnbuckles of the rudder cable.	
(11)	Adjust bridle cable tension.	Refer to Paragraph 10.
(12)	Install 2 cable ties through each bridle cable eye end and the turnbuckle eye.	
(13)	Install the rudder cable support by use of the 4 screws.	

	Detail Steps/Work Items	Key Items/References
(14)	Do a test of the autopilot system: – Set ELECT. MASTER switch to ON. – Set AVIONICS MASTER switch to ON. – Observe self-test of the flight control computer. – Set AVIONICS MASTER switch to OFF. – Set ELECT. MASTER switch to OFF.	If no error message appears, then the system is operative.
(15)	Install the passenger seats.	

CHAPTER 23

COMMUNICATIONS

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CHAPTER 23
COMMUNICATIONS

1. General

This Chapter tells you about the communications system in the DA 42 airplane. It tells you about the intercom system which lets the pilots and passengers talk to each other. It also tells you about the radio system which lets the pilots talk to the ground and other airplane.

This Chapter does not tell you about the communications equipment. Refer to the equipment manufacturers' manual for data about the equipment. Refer to Chapter 92 for the wiring diagrams.

2. Description

The DA 42 communication system has these components:

– GMA 1347 audio panel.

– NAV/COM transceivers (Integral with the Garmin GIA 63 Integrated Avionics Units).

– COM VHF antennas.

– NAV antenna (Integral with the horizontal stabilizer), or if OÄM 42-112 is carried out externally on the vertical stabilizer.

– Push-to-talk (PTT) switches. A PTT switch is located in each of the pilots control sticks.

– Headset sockets. Headset sockets are located on the back of the center console for both the pilots and the passengers.

– Cabin speaker. A cabin speaker is mounted in the roof of the cockpit.

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Section 23-10
Speech Communication

1. General

This Section tells you about the speech communication system in the DA 42. It does not tell you about the speech communication equipment. Refer to the equipment manufacturers' manuals for more data about the equipment.

Figure 1 shows the main components of speech communication system.

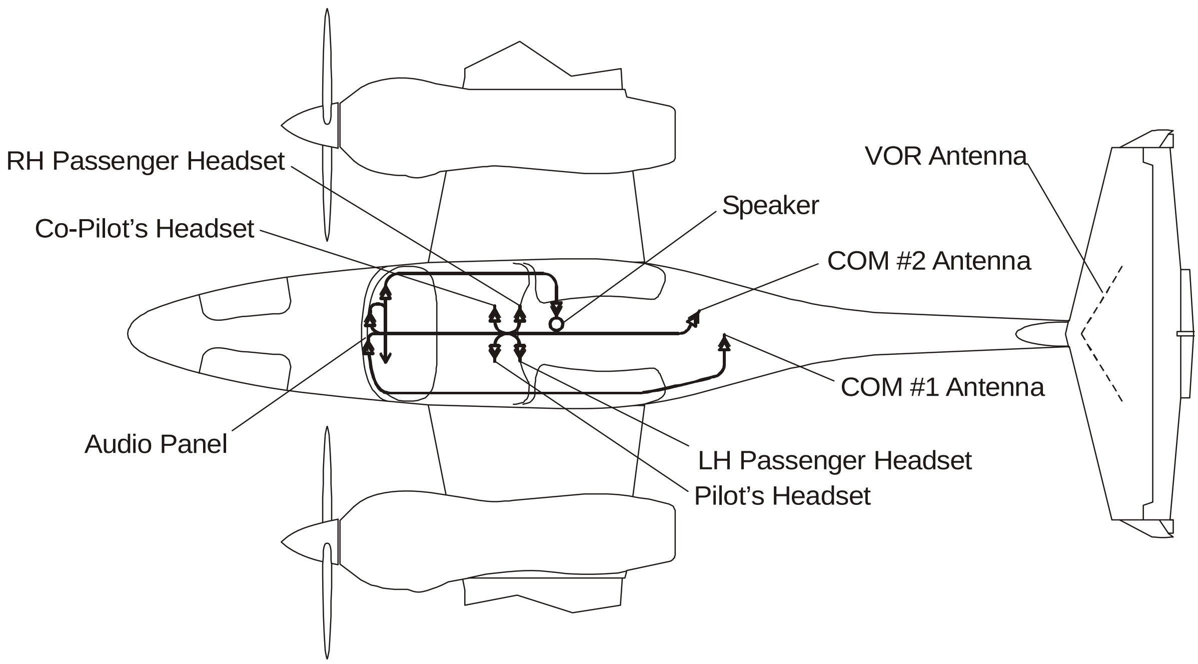

Figure 1: Speech Communication System Main Components

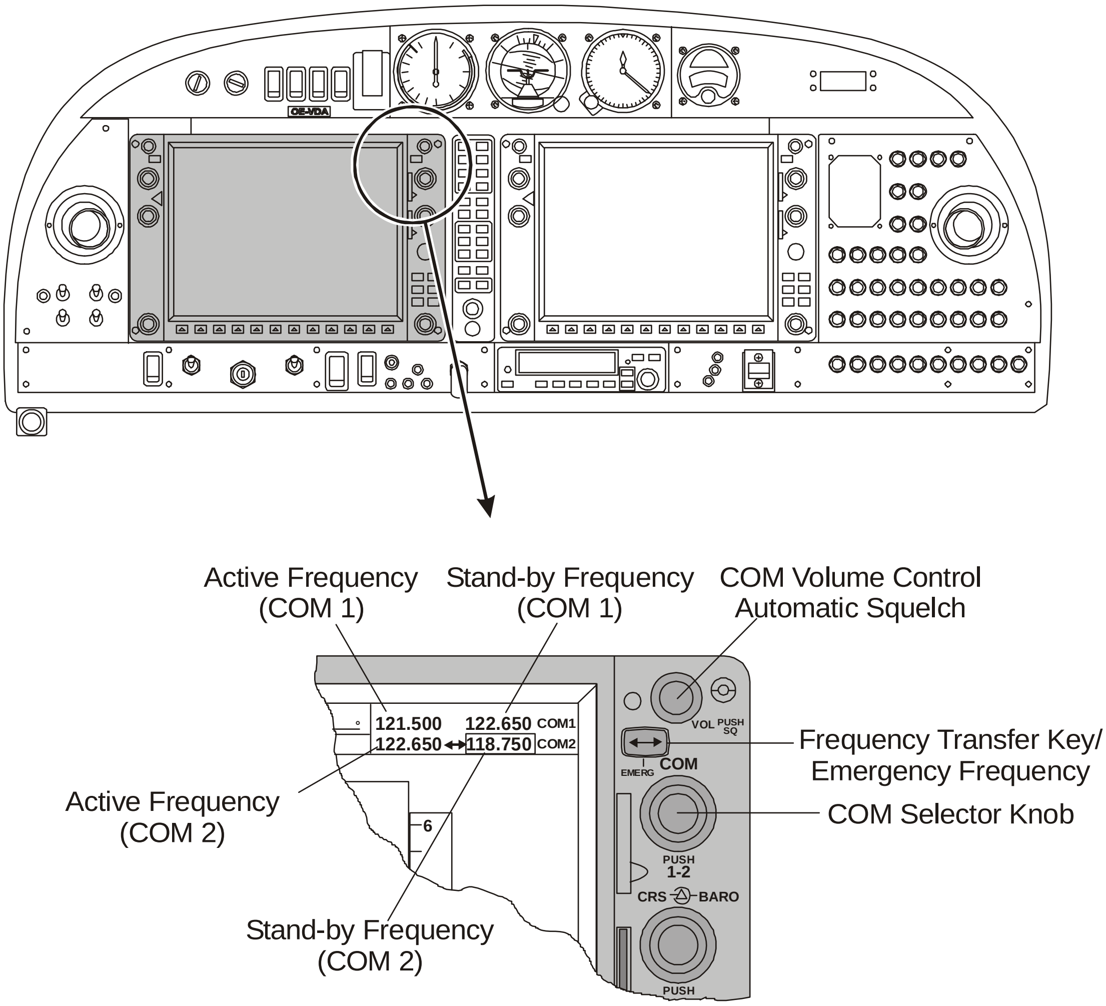

Figure 2: Garmin 1000 Primary Flight Display Panel

2. Description

The DA 42 has dual VHF radio communications transceivers (COM 1 and COM 2) which are integral with the GIA 63 integrated avionics units. The No.1 GIA 63 and No.2 GIA 63 units are remotely located in the aft fuselage avionics rack. The COM 1 antenna is located on the upper surface of the fuselage, aft of the cockpit. The COM 2 antenna is located on the lower surface of the fuselage, aft of the cockpit. Refer to Section 31-40 for more data about the Garmin 1000 ICS.

Figure 2 shows the Garmin 1000 primary flight display (PFD). The speech communication system is integral with the Garmin 1000 integrated cockpit system (ICS). Power is supplied to the dual VHF communications transceivers when the ICS is switched on. The COM selector knob is located at the top-right corner of each ICS display panel. A digital display in the top right corner of the primary flight display (PFD) screen shows which COM system and frequency is in use.

Both the active and standby frequencies are shown for both COM1 and COM 2 systems. Pushing the inner knob of the COM selector will toggle the active COM system between COM 1 and COM 2. Push the COM FREQUENCY TRANSFER key to toggle between the active and standby frequency of the selected communication system. A box is displayed around the stand by frequency.

Pressing and holding the COM FREQUENCY TRANSFER key for approximately 2 seconds will over-ride all previous selections and select the EMERGENCY COM frequency of 121.500 MHz.

You can only change the frequency that is currently selected as the stand by frequency. You must rotate the large outer COM selector knob to select the MHz value of the frequency and rotate the small inner knob of the COM selector to select the kHz value of the frequency.

Above the COM knob is the VOL knob. You control the volume level of the active radio receiver with the VOL knob. Press the knob to toggle the ON/OFF selection of the automatic squelch control.

The pilots use the audio control panel to control all the audio systems of the DA 42. Both speech and navigational audio can be sent to the pilots or passengers headphones. Or can be played on the cockpit loudspeaker. Refer to Section 23-50 for more data about the audio control unit.

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Trouble-Shooting

1. General

This table tells you how to troubleshoot the speech communication system. See Section 23-50 for troubleshooting the audio integrating system.

If you find the trouble in column 1 do the repair given in column 3.

Trouble	Possible Cause	Repair
Radio check reports readability good, strength poor due to low modulation on COM 1/COM 2.	Mic. output low. Faulty related GIA 63 IAU.	Replace the defective mic. Replace the related GIA 63 IAU.
Radio check reports readability poor, strength good.	Faulty related GIA 63 IAU. Faulty mic.	Replace the related GIA 63 IAU. Replace the mic.
Radio check reports readability poor, strength poor on COM 1/COM 2. Received audio is poor.	Coaxial cable connector faulty. Faulty related GIA 63 IAU. Faulty antenna.	Examine the coaxial cable and connections for condition and security. Replace the related GIA 63 IAU. Replace the antenna.
Short range in transmit mode, but reception is OK, COM 1/COM 2.	Faulty related GIA 63 IAU.	Replace the related GIA 63 IAU.
No voice modulation when transmitting from one pilots side. The other pilots side OK.	Audio integrating fault. Related headset defective.	Refer to Section 23-50. Replace related headset.
Cannot transmit. Transmit annunciator not shown in COM display.	Faulty PTT switch. PTT wiring circuit defective. Faulty related GIA 63 IAU.	Replace PTT switch. Do a test of the PTT wiring circuit. Refer to Chapter 92 for the wiring diagrams. Replace the related GIA 63 IAU.

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Maintenance Practices

1. General

This Section tells you how to replace the main components of the speech communication system. Refer to the equipment manufacturers' manuals for more data about the equipment. The communications transceivers are integral with the GIA 63 integrated avionics units (IAU). Refer to Section 31-40 for data about replacing the GIA 63 IAUs.

2. Remove/Install a COM VHF Antenna

Use this procedure for both COM 1 and COM 2 antennas. Access to both the antennas is through the rear baggage compartment.

A. Remove a COM VHF Antenna

Detail Steps/Work Items		Key Items/References
(1)	Remove the aft baggage compartment.	Refer to Section 25-10.
(2)	Identify the antenna that you will replace.	Lower antenna COM 2, top antenna COM 1.
(3)	Disconnect the coaxial cable from the antenna.	At the bayonet connector.
(4)	Remove the antenna: – Remove the 3 nuts and washers that attach the antenna to the airplane structure. – Move the antenna clear of the airplane.	 If necessary, cut the sealant around the base of the antenna. You must not damage the fuselage skin.

B. Install a COM VHF Antenna

	Detail Steps/Work Items	Key Items/References
(1)	Carefully remove any sealant from the area where the antenna attaches to the fuselage.	Take care not to damage the fuselage. If necessary, use a commercial solvent.
(2)	Install the antenna: – Move the antenna into position on the fuselage. – Make sure that the bonding strip for the antenna is correctly located. – Install the 3 washers and nuts that attach the antenna to the fuselage.	
(3)	Connect the coaxial cable to the antenna.	At the bayonet connector.
(4)	Do a test for the correct operation of the related speech communications system.	Refer to the Airplane Flight Manual.
(5)	Install the aft baggage compartment.	Refer to Section 25-10.
(6)	Seal the outer edge of the antenna to the fuselage skin with sealant.	Use Terostat MS 9380 or equivalent. Follow the sealant manufacturer’s instructions.

3. Remove/Install a PTT Switch

Use this procedure for both pilot's and co-pilot's switches.

A. Remove a PTT Switch

Detail Steps/Work Items		Key Items/References
(1)	Set the ELECT. MASTER switch to OFF.	Instrument panel, left side.
(2)	Open the AUDIO circuit breaker.	Instrument panel, right side.
(3)	Remove the PTT switch:	
	– Leverage the switch with a small screwdriver out of the stick's bar end.	Handle with care. You must not damage the bar end.
	– Disconnect the electrical cable from the switch and move the switch clear of the pilot's compartment.	
(4)	Remove the electrical cable, if necessary:	
	– Remove the appropriate pilot's seat.	Refer to Section 25-10.
	– Unplug the cable.	At the connector behind the main bulkhead.
	– Pull the cable downward out.	Through the hole in the stick.

B. Install a PTT Switch

	Detail Steps/Work Items	Key Items/References
(1)	Install the electrical cable, if removed before:	
	– Push the cable through the inside of the stick.	Through the hole in the stick.
	– Connect the lower end of cable.	At the connector behind the main bulkhead.
(2)	Install the PTT switch:	
	– Connect the electrical cable to the switch and move the switch into position at the bar end of the stick.	Put the single cables to the switch.
	– Push the switch in to the cut out of the bar end.	Push carefully. You must not damage the switch.
(3)	Install the pilot's seat.	If removed. Refer to Section 25-10.
(4)	Reset the AUDIO circuit breaker.	Instrument panel, right side.

Section 23-50
Audio Integrating

1. General

The DA 42 has a voice-operated (VOX) intercom. This gives full hands free intercom when headsets are used. The pilot controls the intercom system with the audio control panel. The audio control panel is located in the instrument panel between the integrated cockpit system (ICS) display screens. Figure 1 shows the audio control panel.

Push to talk (PTT) switches are installed in the handles of both control sticks (If OÄM 42-283 is installed, the RH control stick, including the PTT switch is removable by the pilot). The jack sockets for all the headsets are located at the back of the center console.

An amplifier in the radio receiver system operates a loudspeaker located in the roof of the passenger cabin.

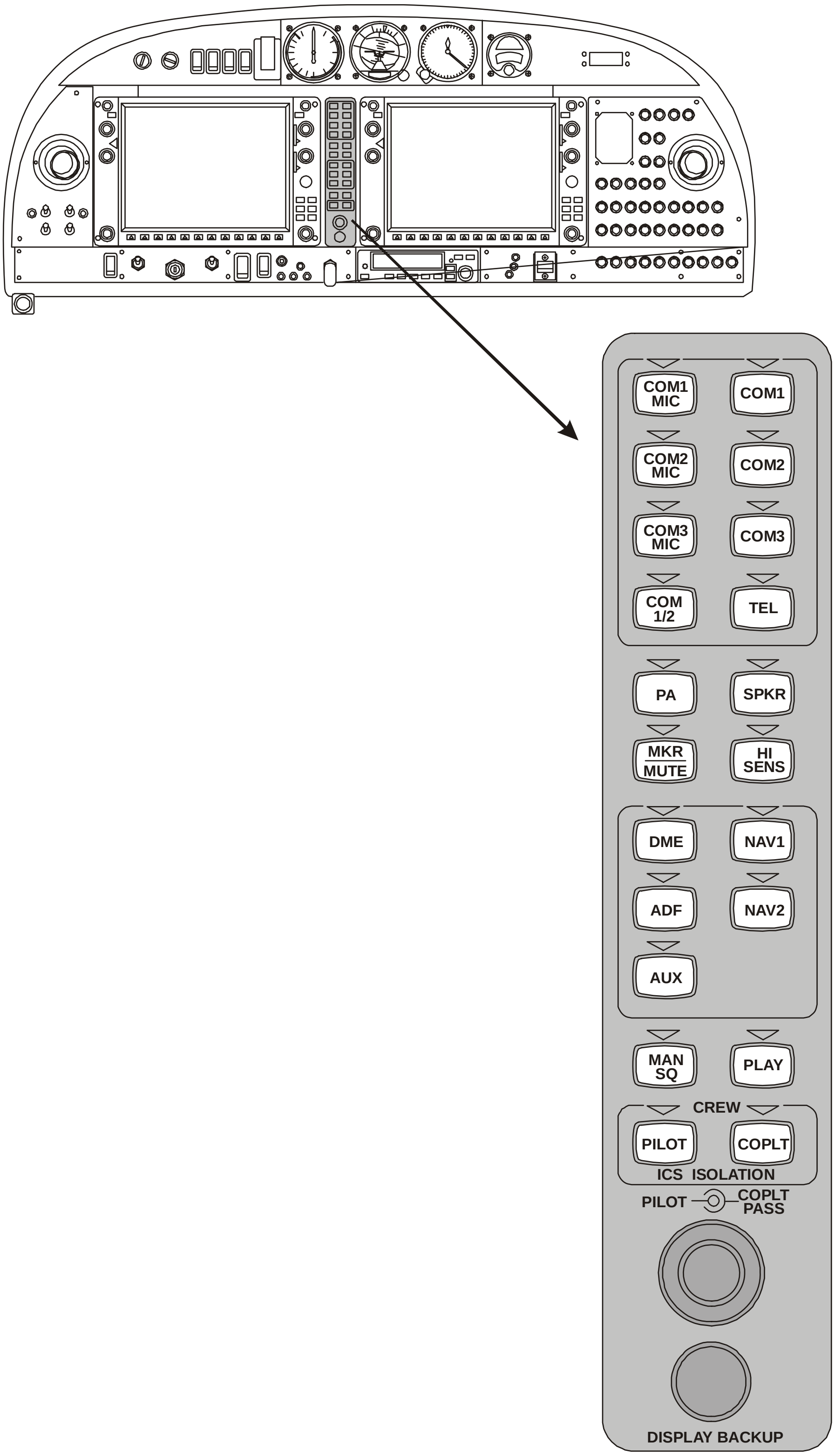

Figure 1: Audio Control Panel

2. Description and Operation

Figure 1 shows the GMA 1347 Audio Control Panel of the DA 42 airplane. The audio control panel is powered with the Garmin 1000 ICS and is an integral component of the integrated cockpit system. The audio control panel makes an interface between the audio systems of the integrated cockpit system (ICS) and the pilots'/crew headsets.

The audio control panel is located in the instrument panel between the ICS displays. The control panel keys have LED annunciator labels and has backlighting which is controlled by the ICS. When a key is active the annunciator is lit by the LED. The control panel performs a self-test when power is applied to the panel which then re-sets the panel to the operating condition that was set when the panel was last powered off. If the control panel fails the self-test the panel switches to a fail safe mode and all fail-safe audio output is directed to the pilot's headset.

The control panel has these keys and selectors:

– COM 1 MIC key. Press this key to select COM 1 as the active microphone source and to automatically deselect any COM MIC key that may have been previously selected. The COM 1 MIC key annunciator illuminates and the COM 1 caption on the ICS display screen is highlighted.

– COM 2 MIC key. Press this key to select COM 2 as the active microphone source and to automatically de-select any COM MIC key that may have been previously selected. The COM 2 MIC key annunciator illuminates and the COM 2 caption on the ICS display screen is highlighted.

– COM 3 MIC key. This key is not active in the DA 42 installation.

– COM 1/2 key. Press this key to toggle the selection of the split com function. When COM 1/2 is selected COM 1 becomes the dedicated COM system for the pilot's mic/audio and COM 2 becomes the dedicated COM system for the co-pilot's mic/audio. When the split com function is selected both the pilot and co-pilot can transmit simultaneously using separate COM systems. The pilot can also monitor all the NAV audio as selected. The co-pilot can only monitor the COM 2 audio.

– COM 1 key. Press this key to select COM 1 as the active audio source. Selecting COM 1 audio using this key maintains COM 1 as an audio source independent of any other selection. The annunciator illuminates when the COM 1 key is activated.

– COM 2 key. Press this key to select COM 2 as the active audio source. Selecting COM 2 audio using this key maintains COM 2 as an audio source independent of any other selection. The annunciator illuminates when the COM 2 key is activated.

– COM 3 key. This key is not active in the DA 42 installation.

– TEL key. This key is not active in the DA 42 installation.

– PA key. This key is not active in the DA 42 installation.

– SPKR key. Press this key to select the cabin speaker. When selected, the cabin speaker will broadcast all the selected audio channels and all unswitched/unmuted audio warnings. The speaker will be muted when a COM microphone is keyed. The annunciator illuminates when the SPKR key is activated.

– MKR/MUTE key. Press this key to select MKR audio. When selected the key annunciator is illuminated. When a marker beacon audio tone is generated it can be heard over the headsets and the related caption will show on the ICS primary flight display. Pressing the MKR/MUTE key while a marker beacon tone is being generated will cause the audio to be muted but the caption on the ICS display will remain. When the next marker beacon signal is generated the it will be heard over the headsets. Pressing the MKR/MUTE key while the marker beacon audio system is in the mute mode will cause the audio signal to be deactivated and the key annunciator will go out.

– Hi SENS key. Press this key to increase the sensitivity of the marker beacon receiver. The annunciator illuminates when the HI SENS key is activated.

– DME, ADF, AUX, NAV 1, NAV 2 keys. Press one of these keys to select the related audio source. The related annunciator illuminates when the key is activated.

– MAN SQ key. Press this key to make the Pilot/Co-Pilot/Pass ICS volume control knob a push toggle switch for setting ICS squelch levels manually. The annunciator illuminates when the MAN SQ key is activated.

– PLAY key. Press this key to replay the digital recording made by the ICS. The digital recording of recent audio activity will be heard over the headsets. The annunciator illuminates when the PLAY key is activated.

– PILOT, COPLT keys. These keys control the intercom system (ICS) isolation system. The ICS isolation system has 4 modes of operation which can all be selected using a combination of the PILOT and COPLT keys. The system has these modes of operation:

  – Pilot Mode. Pilot mode is selected when only the PILOT key is annunciated. In PILOT mode the pilot can hear the selected radios. The co-pilot and passengers can only communicate with each other.

  – Co-pilot mode. Co-pilot mode is selected when only the COPLT key is annunciated. In co-pilot mode the co-pilot’s headset is isolated. The pilot and passengers can hear the selected radios, and communicate with each other.

  – Crew Mode. Crew mode is selected when both the PILOT and co-pilot keys are annunciated. In crew mode both the pilot and co-pilot can hear the selected radios and communicate with each other.

  - All Mode. All mode is selected when neither the PILOT or co-pilot keys are annunciated. In ALL mode both the pilots and the passengers can hear the selected radios and are able to communicate with each other.

- VOLUME/SQ knob. This knob has 2 functions depending on the selection of the MAN SQ key.

  - MAN SQ key deselected. When the MAN SQ key is deselected the ICS squelch levels are set automatically. The VOLUME/SQ knob acts as a volume control and the VOL caption to the lower left of the knob illuminates. Rotate the inner knob clockwise to increase the volume level of the pilot's ICS and rotate the inner knob counterclockwise to reduce the volume of the pilot's ICS. Rotate the outer knob clockwise to increase the volume level of the co-pilot's and passengers' ICS. Rotate the outer knob counterclockwise to reduce the volume level of the co-pilot's and passengers' ICS.

  - MAN SQ key selected. When the MAN SQ is selected the ICS squelch levels can set manually and pressing the VOLUME/SQ knob toggles the manual squelch ON/OFF. Manual squelch is toggled ON when the SQ caption to the lower right of the knob illuminates. Rotate the inner knob clockwise to increase the squelch threshold of the pilot's ICS and rotate the inner knob counter-clockwise to reduce the squelch threshold of the pilot's ICS. Rotate the outer knob clockwise to increase the squelch threshold of the co-pilot's and passengers' ICS. Rotate the outer knob counterclockwise to reduce the squelch threshold of the co-pilot's and passengers' ICS.

- DISPLAY BACKUP button. Pressing the red DISPLAY BACKUP button at the bottom of the audio control panel selects the backup mode for all the displays.

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Trouble-Shooting

1. General

This table tells you how to trouble-shoot the audio integrating system. See Section 23-10 for trouble-shooting the speech communication system.

If you find the trouble in column 1 do the repair given in column 3.

Trouble	Possible Cause	Repair
No voice modulation when transmitting from co-pilot's side on headset. Pilot's side OK.	Faulty headset. Open mic audio line. Faulty GMA 1347.	Replace headset. Do a test of the mic audio wiring. Refer to Chapter 92 for the wiring diagrams. Replace GMA 1347.
No voice modulation when transmitting from pilot's side on headset. Co-pilot's side OK.	Faulty headset. Open mic audio line. Faulty GMA 1347.	Replace headset. Do a test of the mic audio wiring. Refer to Chapter 92 for the wiring diagrams. Replace GMA 1347.
No intercom audio on pilot's headset. Receives radio transmissions correctly.	ICS Mode set incorrectly Faulty GMA 1347.	Set mode to required position, refer to Section 23-50 Paragraph 2. Replace the GMA 1347.
No audio on pilot's headset with the ICS set to OFF.	Faulty headset. Open audio line.	Replace headset. Do a test of the headset audio wiring. Refer to Chapter 92 for the wiring diagrams.
No audio on co-pilot's or passenger headsets.	Open audio line. Faulty GMA 1347.	Do a test of the headset audio wiring. Refer to Chapter 92 for the wiring diagrams. Replace the GMA 1347.

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Maintenance Practices

1. General

This Section tells you how to remove/install the GMA 1347 audio control panel. It also tells you how to adjust/test the ICS. Refer to the equipment manufacturers manuals for more data about the audio integrating system.

2. Remove/Install the GMA 1347 Audio Control Panel

A. Remove the GMA 1347 Audio Control Panel

Detail Steps/Work Items		Key Items/References
(1)	Make sure that the ELECT. MASTER switch is set to OFF.	Instrument panel, lower center.
(2)	Remove the audio control unit: – Insert a 3/32" hexagonal drive wrench into the access hole in the front of the panel. – Rotate the locking mechanism counter-clockwise to release the lock. – Pull the audio control panel towards you and clear of the instrument panel.	Refer to Figure 1.

B. Install the GMA 1347 Audio Control Panel

Detail Steps/Work Items		Key Items/References
(1)	Examine the connecters at the rear of the audio control panel. Look specially for bent or damaged pins.	
(2)	Insert a 3/32" hexagonal drive wrench into the access hole in the front of the panel and rotate the locking mechanism 90° counter-clockwise to make sure that the locking mechanism is in the unlocked position.	
(3)	Install the audio control panel:	
	– Move the audio control panel into position at the instrument panel.	
	– Carefully slide the panel into position in the instrument panel.	Make sure that the audio control panel fully engages with the connectors at the rear of the panel.
	– Insert a 3/32" hexagonal drive wrench into the access hole in the front of the panel and rotate the locking mechanism clockwise to lock the panel into position.	Make sure that you cannot pull the audio control panel towards you!
(4)	Do a test for the correct operation of the audio control panel. If you have installed a replacement audio control panel you may have to update the Garmin G1000 integrated cockpit system software.	Refer to the G1000 Line Maintenance Manual for data about installing software and testing the audio control panel.

Section 23-60
Static Discharging

1. General

The static discharging system has 2 main parts, the airplane bonding system and the surface static-discharging system. The bonding system gives the airplane good lightning protection.

A special bonding system is necessary for the composite structure of the DA 42. The composite structure does not conduct electricity. A series of metal tubes and strips make the airplane bonding system. All the metal components or the airplane and the antenna ground planes connect to the bonding system. Refer to Section 51-80 for more data about the airplane bonding system.

2. Description

The static discharging system removes the electrostatic charge which collects on the airplane surfaces. The composite structure of the DA 42 does not let electricity flow through it. The airplane surfaces are covered with a special conductive filler through which the electrostatic charges can flow to the discharge wicks. The discharge wicks discharge the electrostatic charges back into the air.

Figure 1 shows the location of the static discharge wicks for the DA 42 airplane.

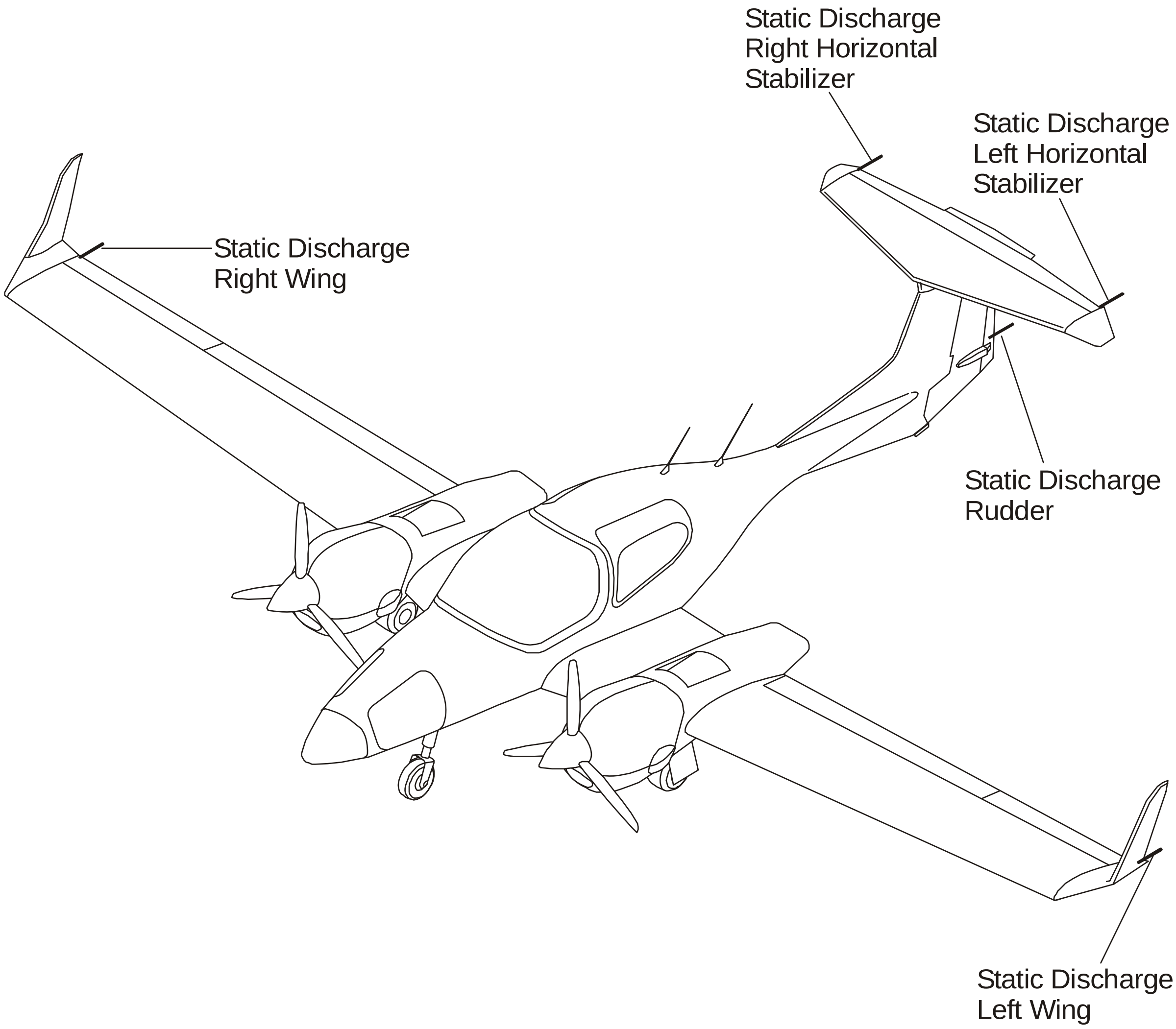

Figure 1: Static Discharge Wick Locations DA 42

Maintenance Practices

1. General

This section tells you how to remove/install a static discharge wick and how to test a static discharge wick.

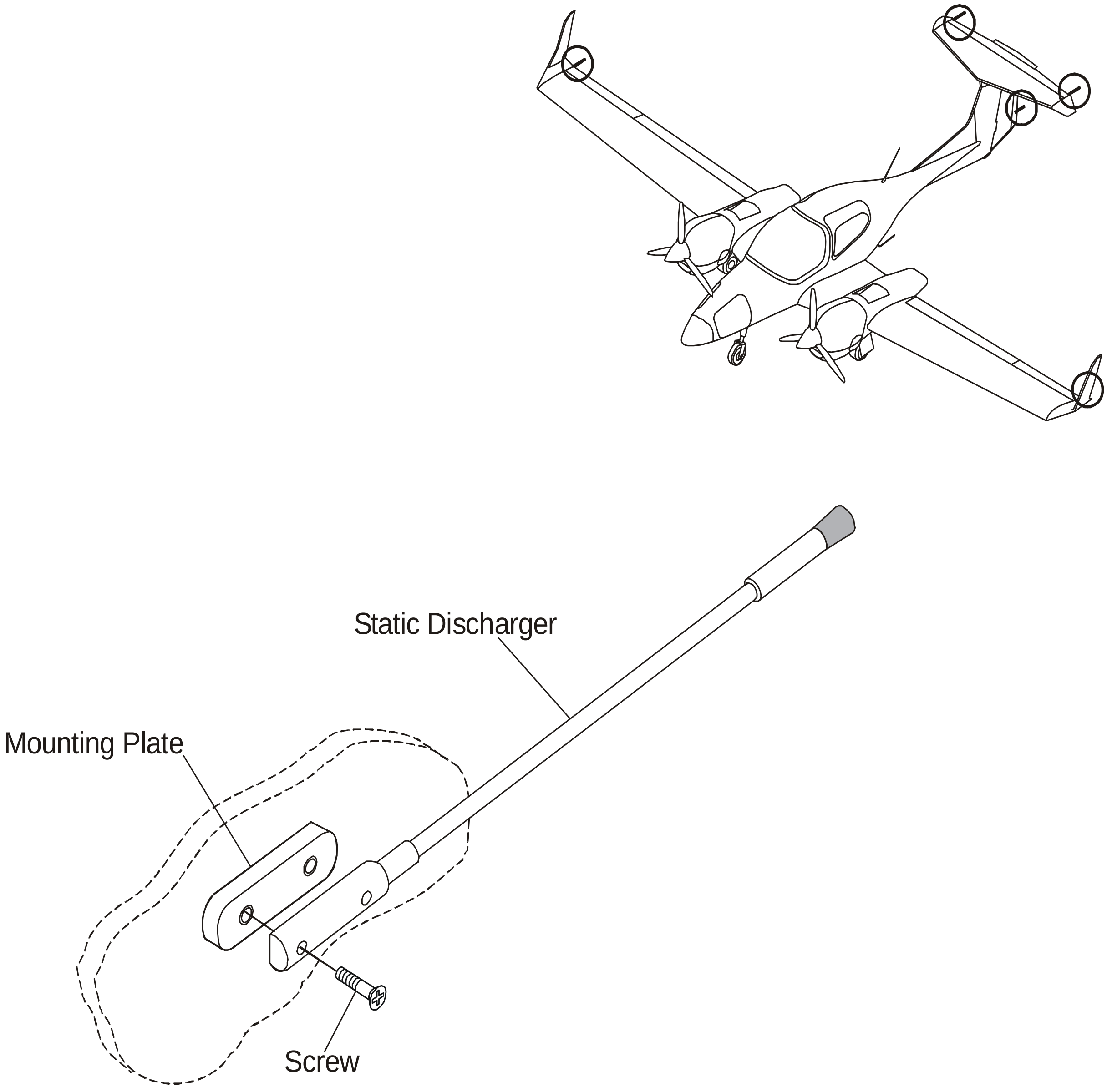

Figure 2: Static Discharge Wick Installation

2. Replace a Static Discharge Wick

Use this procedure for all the static discharge wicks.

A. Replace a Static Discharge Wick

Detail Steps/Work Items		Key Items/References
(1)	Remove the 2 screws that attach the discharge wick to the wick mounting.	Refer to Figure 1.
(2)	Make sure that the mounting is clean and correctly bonded to the airplane structure.	
(3)	Move the new static discharge wick into position at the mounting.	
(4)	Install the 2 screws that attach the wick to the mounting.	
(5)	Do a test for the correct bonding of the static discharge wick to the airplane bonding system.	Refer to Section 51-80.

CHAPTER 24

ELECTRICAL POWER

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CHAPTER 24
ELECTRICAL POWER

1. General

The DA 42 has a 24 V DC electrical system. This Section describes the complete system from the power supplies to the circuit breakers or other interface with the consumer components.

This Chapter has only simplified schematic diagrams and location diagrams. Refer to Chapter 92 for the wiring diagrams. Refer to the related Chapter for data about systems. For example, refer to Chapter 80 for data about the starter system.

For Trouble-Shooting and Maintenance Practices for this electrical system, refer to these Sections:

- Section 24-30. Electrical power generation.
- Section 24-31. Battery installation.
- Section 24-32. Emergency power.
- Section 24-40. External power.
- Section 24-60. Power distribution.
- Section 24-80. Mission power supply system (if installed).

Note: Equipment which is certified for installation in the DA 42 is listed in Section 6.5 of the Airplane Flight Manual. Such equipment may be installed in accordance with the Airplane Maintenance Manual.

Any equipment which is not listed in Section 6.5 of the Airplane Flight Manual is called “Additional Equipment”. The installation of Additional Equipment is a modification which must be handled in accordance with national regulations or a Service Bulletin.

Note: Refer to Section 20-90 before starting maintenance work in the center wing area.

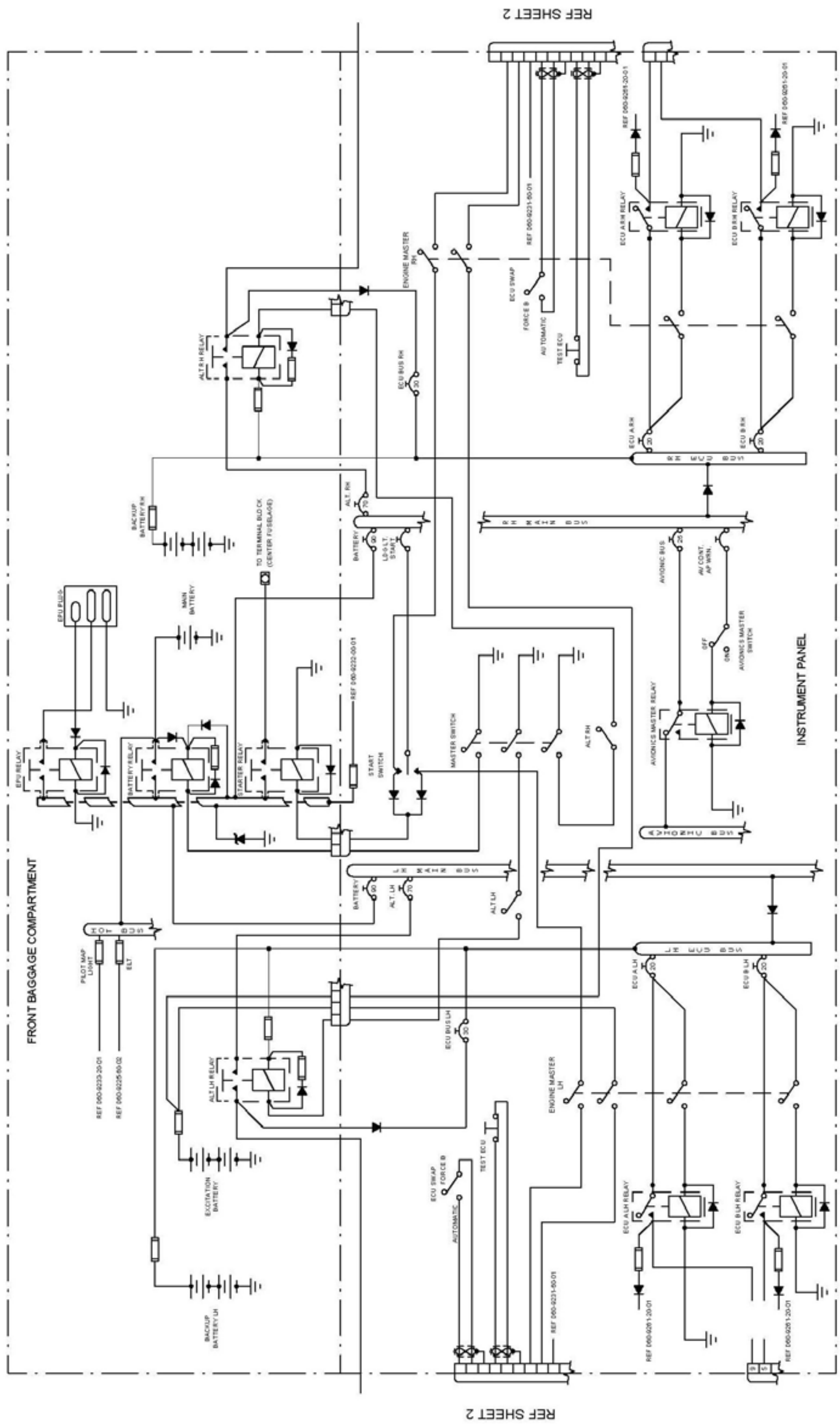


Figure 1: Electrical Schematic (Simplified) - Sheet 1, if MÄM 42-403 is not carried out

2. Electrical System Description and Operation

Figures 1 and 2 show the Electrical System Simplified Schematic Diagrams.

A. Power Supplies

(1) Main Battery

The main battery is located in the front baggage compartment and is mounted on the forward side of the cockpit front bulkhead. It is a 24 V, 10 Ah sealed battery. The battery is connected to the main airplane ground, the battery relay and the battery HOT BUS.

(2) Alternators

Each engine has an alternator located at the left rear of the engine. A flat multi-vee belt with automatic tensioner turns the alternator. The alternator has an external regulator which is located in the engine nacelle. The output from the alternators connects to the left and right main bus, through terminal blocks, relays and fuses. In the event of a main battery failure the alternators can be excited directly from the alternator excitation battery pack which is located in the forward baggage compartment.

(3) Alternator(s) Excitation Battery Pack

The alternator excitation battery back consists of two 12 V, 1.3 Ah batteries connected in series. The battery pack is located on the forward face of the cockpit front bulkhead and can accessed from the front baggage compartment. The battery pack connects to the left and right engine alternator fields through the related left/right ENGINE MASTER switch. The system is protected by a 5 Ampere fuse.

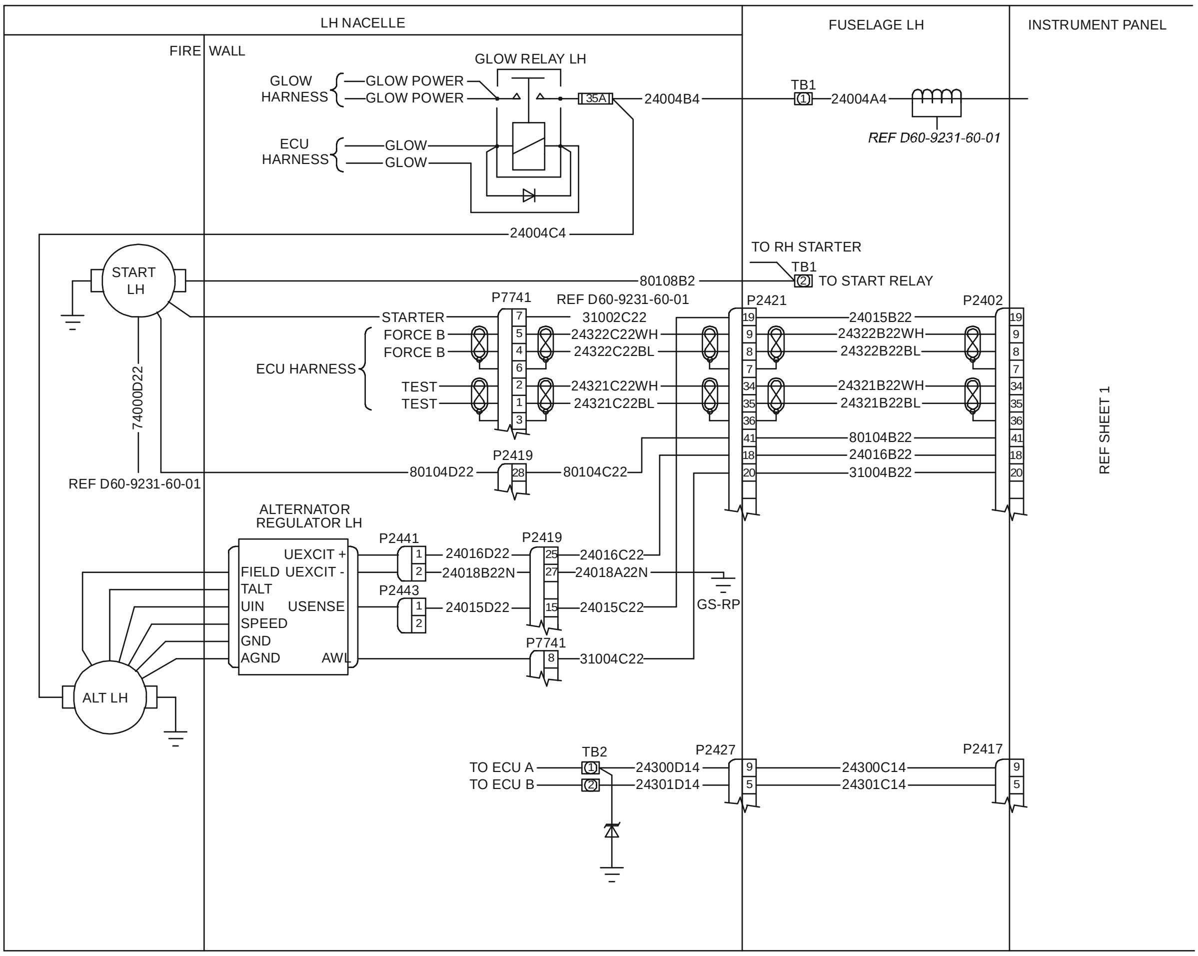
(4) External Power Connector

The external power connector is located below the forward baggage compartment. The external power connector connects to the external power relay in the relay junction box in the forward baggage compartment.

– The control pin connects to the relay coil through a diode to prevent reverse connection.

– The + pin connects to the relay main input connection.

– The – pin connects to ground.



LH Nacelle Shown,
RH Nacelle Similar

Figure 2: Electrical Schematic (Simplified) - Sheet 2

B. Power Supply Control

(1) Battery Relay

The battery relay is located on the relay panel in the front baggage compartment. The output from the battery connects directly relay box bus bar. The coil + of the battery relay is tied to the battery + connection to the relay. The ELECT. MASTER switch provides the coil ground when set to the ON position.

(2) External Power Relay

The external power relay is located on the relay panel in the front baggage compartment. The relay output connects directly to the relay box bus bar.

If a 28 V external power is connected, the +28 V DC on the control pin energizes the relay. The relay operates and connects the external power to the relay box bus bar.

(3) Starter Relay

The starter relay contacts connect to the relay box bus bar. Power is applied to the coil of the starter relay when the ELECT. MASTER switch is set to ON and the START switch is set to START LEFT or START RIGHT. The energized coil operates the starter relay which connects the power to the solenoid of related engine starter motor.

(4) Bus Structure

All buses (except the relay box bus) are flat metal strips connecting rows of circuit breakers. The circuit breakers are located on the right side of the instrument panel.

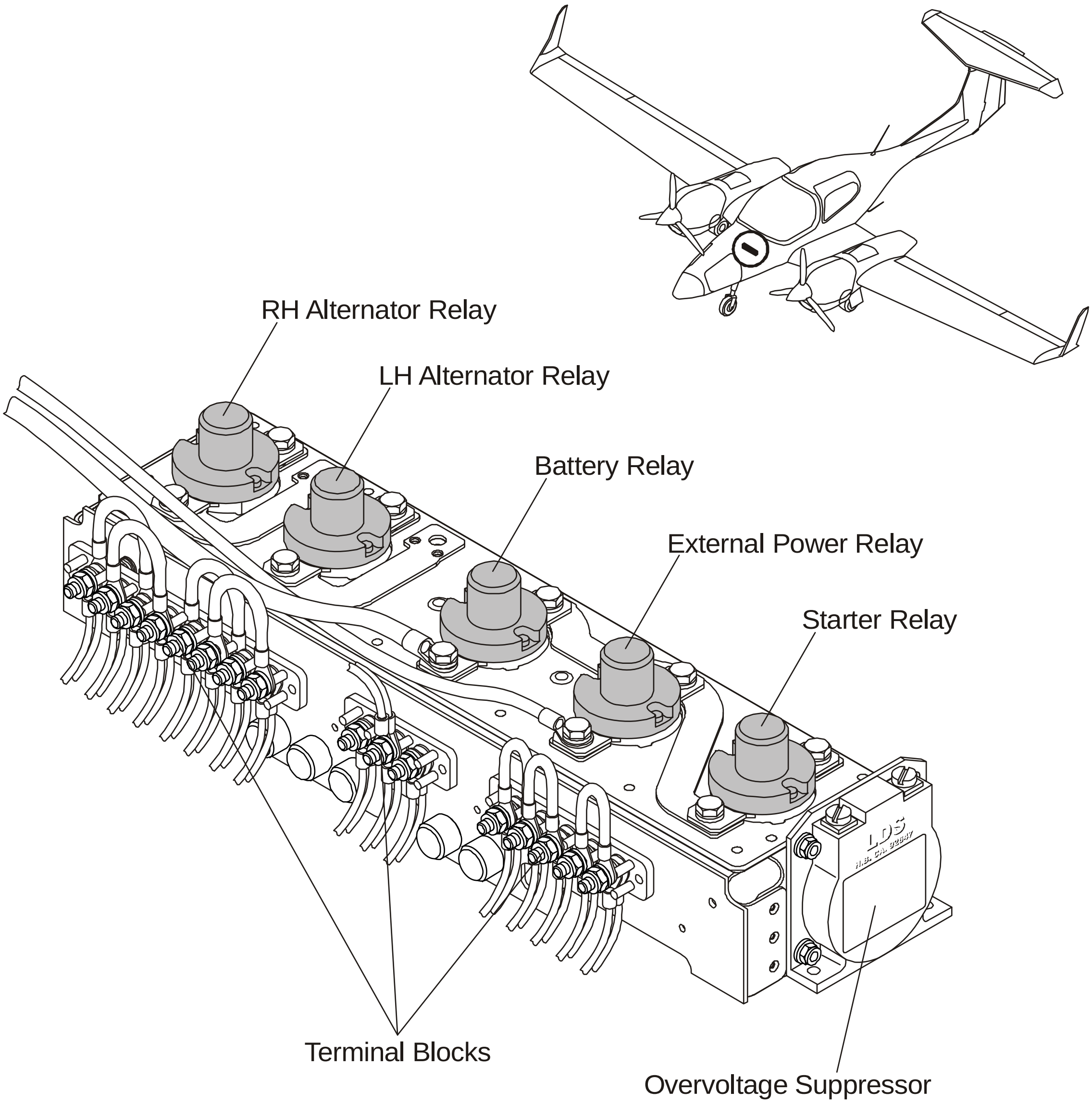


Figure 3: Relay Locations in the Relay Box

(5) Relay Box Bus

Figure 3 shows the relays in the relay box. The relay box bus is located in the front luggage compartment, next to the main battery. The bus is a metal strip which connects these relays:

– The battery relay.

– The starter relay.

– The external power relay.

The relay box also has these relays:

– LH Alternator.

– RH Alternator.

The relay box bus has these outputs:

– Right hand main bus.

– Left hand main bus.

– Hydraulic pump motor.

(6) Hot Bus

The HOT BUS is connected to the main battery relay input connection. The HOT BUS supplies power for the PILOT MAP LIGHT and the emergency locator transmitter (ELT).

(7) LH Main Bus

The LH main bus is connected to the relay box bus through a 90 Ampere circuit breaker. The LH main bus supplies power for the consumers and the LEFT ECU BUS. Each consumer or bus is protected by circuit breakers or fuses. The LH main bus connects to the LH alternator output through a 70 Ampere circuit breaker and a relay.

(8) RH Main Bus

The RH main bus is connected to the relay box bus through a 90 Ampere circuit breaker. The RH main bus supplies power for the consumers, the RIGHT ECU BUS and the AVIONICS BUS. Each consumer or bus is protected by circuit breakers or fuses. The RH main bus connects to the RH alternator output through a 70 Ampere circuit breaker and a relay.

(9) LH ECU BUS

The LH ECU bus is located on the right side of the instrument panel at the bottom. The LH ECU bus has power when power is applied to the LH MAIN BUS or if the left engine alternator is on-line.

The LH ECU bus provides power for the both ECU A and ECU B functions of the LH Engine Control Unit. Both ECU A and ECU B supplies are protected by 20 Ampere circuit breakers.

(10) RH ECU BUS

The RH ECU bus is located on the right side of the instrument panel at the bottom. The RH ECU bus has power when power is applied to the RH MAIN BUS or if the right engine alternator is online.

The RH ECU bus provides power for the both ECU A and ECU B functions of the RH Engine Control Unit. Both ECU A and ECU B supplies are protected by 20 Ampere circuit breakers.

(11) Avionics Bus

The Avionics bus supplies power to avionic consumers through circuit breakers and fuses. The power to the AVIONICS BUS is supplied by the RH MAIN BUS and is controlled by the Avionics Master Relay and Avionics Master Switch.

(12) Avionics Master Control System

The AVIONICS MASTER SWITCH and the AVIONICS MASTER RELAY make the main components of the avionics master control system.

In normal operation the AVIONICS MASTER SWITCH is set to the OFF position. In the OFF position the power is supplied to the coil of the avionics master relay and the avionics master relay operates.

(13) Avionics Master Relay

The avionics master relay connects the AVIONICS BUS to the RH Main Bus. The avionics master switch controls the AVIONICS MASTER RELAY.

(14) Elect. Master Switch

The ELECT. MASTER switch is located on the bottom of the instrument panel, left side. It is a rocker switch that has 3 sets of contacts. When the switch is set to ON the contacts operate as follows:

- The coil of the battery relay is connected to ground and the battery relay operates.
- The ground side of the LH alternator switch is connected to ground.
- The ground side of the RH alternator switch is connected to ground.

(15) Start Switch

The START SWITCH is operated with a key. The switch can be turned to LH or RH and must be held against a spring to maintain the selected position. Setting the START SWITCH to LH or RH, with the MASTER SWITCH set to ON and the related ENGINE MASTER switch set to ON will cause the related engine starter motor to operate.

(16) Engine Master LH / RH

The LH and RH ENGINE MASTER switches are located either side of the START SWITCH. Each switch is similar and has 4 sets of contacts which operate as follows:

- The related engine starter control system is energized.
- The UEXCIT terminal of the related alternator regulator is connected to the external excitation battery.
- The LH / RH ECU bus is connected to the related engine ECU A and ECU B FADEC system.

(17) Alternator LH and Alternator RH Switches

Each engine alternator relay has a control switch. The control switches are labeled ALT LH and ALT RH. When the ELECT. MASTER switch is set to ON setting the ALT LH or ALT RH switch to ON gives a ground to the related engine alternator relay. The Alternator relay operates and the related alternator output is connected to the related main bus.

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Section 24-30
DC Generation

1. General

The DC Generation system for the DA 42 has these components:

- Alternators LH and RH.
- Alternator relays LH and RH.
- Engine master switches LH and RH.
- Electrical master switches.
- Alternator current sensors LH and RH.
- Voltage regulators.
- Alternator excitation battery pack.
- ECU backup batteries (LH and RH).

This Section gives you only the simplified description, trouble-shooting and maintenance practices for the DC generating systems for the DA 42. Refer to Section 24-00 for a general description of complete electrical system.

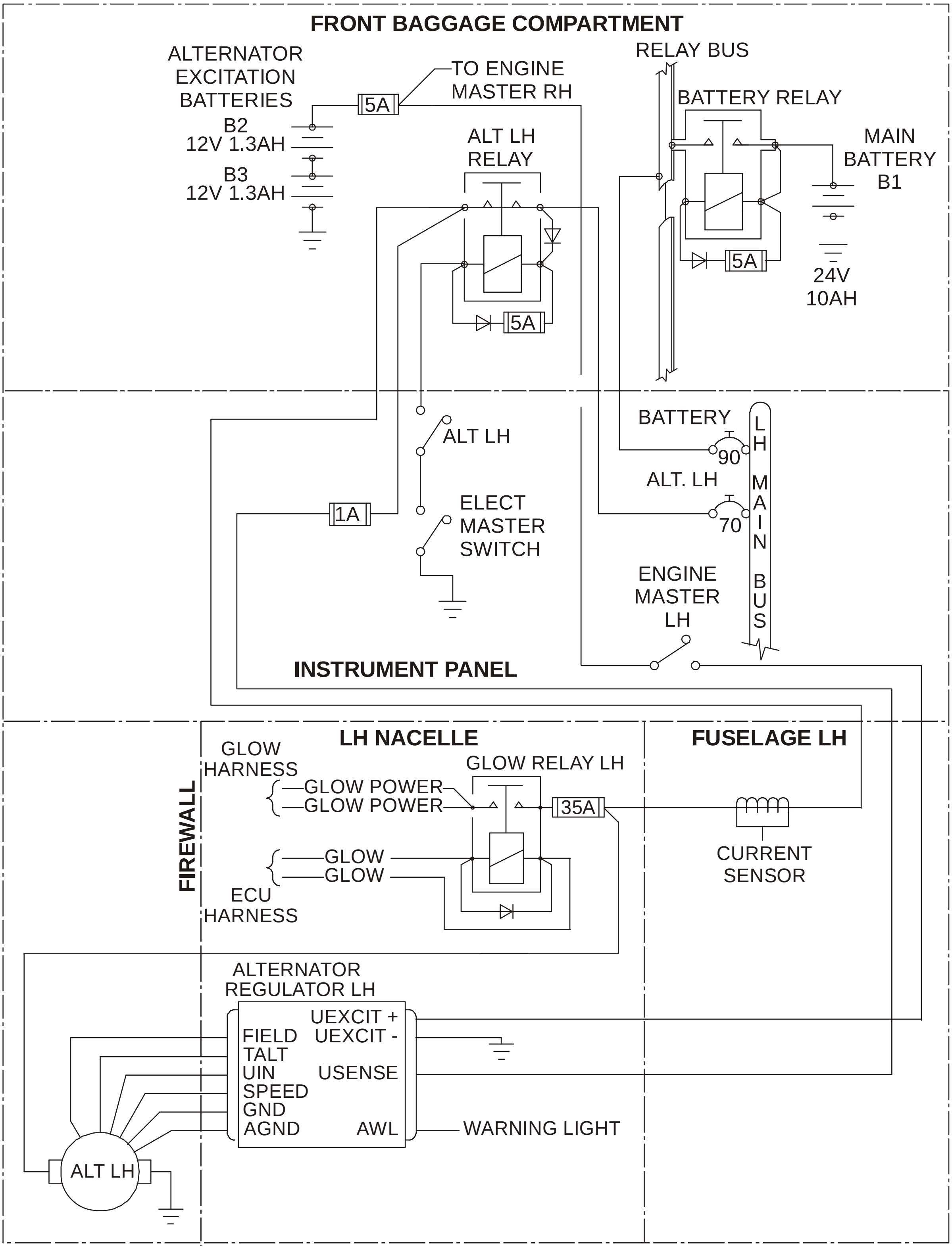

Figure 1: DC Generation Schematic Diagram

2. Description and Operation

Figure 1 shows the generation system simplified schematic diagram.

A. Alternators

Each engine has an alternator supplied with the engine. Each alternator is 28 VDC machine with a maximum output of 60 Ampere. The alternator is located at the rear left of the engine. A multi-V flat belt drives the alternator. An automatic system keeps the belt at the correct tension.

The alternator has an external voltage regulator which is located in the engine nacelle.

There is no approved maintenance that you can do to the alternator.

B. Alternator Relays

The alternator relays connect the output from each alternator to the related main bus. Each alternator relay is controlled by a switch located on the instrument panel. The relays are located in the relay box. The relay box is located in the front baggage compartment.

C. Alternator Current Sensors

A current sensor monitors the current flowing in the alternator outputs. The current sensor is located below the pilot’s seat and monitors the current flow between the alternator and the related alternator relay.

D. Voltage Regulators

Each alternator has an external voltage regulator. The regulator controls the output of the alternator. There is no approved maintenance that you can do to the alternator regulators.

E. Alternator Excitation Battery Pack

The alternator excitation battery pack has 2 sealed batteries connected in series. Each battery is a 12 V, 1.3 Ah lead battery. The battery pack energizes the alternator field during start up. The alternator then becomes self sustaining. The field voltage of the alternator is sufficient to charge the excitation battery. If an alternator field voltage fails the excitation battery can sustain the alternator output for emergencies. The LH/RH ENGINE MASTER switch controls the circuit from the excitation battery pack to each alternator. The alternator excitation battery pack is located in the front baggage compartment.

F. ECU Backup Batteries

To support the alternator electrical power supply to the ECUs in case of a malfunction of the main battery, additional sealed-lead-acid batteries (ECU backup batteries) are connected to the RH and LH ECU bus.

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Trouble-Shooting

1. General

This table tells you how to trouble-shoot the DC generation system. If you find the trouble in column 1 do the repair given in column 3.

Trouble	Possible Cause	Repair
LH or RH alternator warning light illuminated.	Related alternator defective.	Refer to the engine manufacturer.

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Maintenance Practices

1. General

This Section tells you how to replace components of the 28 V DC electrical generation system on the airplane. Refer to the components manufacturers' manuals for more data and for shop data.

2. Electrical Safety

The DA 42 has a low voltage DC electrical system. When correctly maintained it is safe to do work on. The battery can supply heavy current through low resistance circuits (for example, if you ground the battery positive with a wrench by accident).

Always follow the usual safety practices for working on electrical equipment. Allow only qualified persons to maintain the electrical system.

CAUTION: DISCONNECT THE BATTERY BEFORE YOU DO ANY WORK ON THE ELECTRICAL SYSTEM. MAKE SURE THAT YOU DISCONNECT THE NEGATIVE LEAD FIRST.

CAUTION: AFTER DOING ELECTRICAL MAINTENANCE ALWAYS DO A CONFIDENCE TEST OF THE SYSTEM WITH A 24 VOLT POWER SUPPLY THAT HAS OVER-CURRENT PROTECTION. DO THIS BEFORE CONNECTING THE BATTERY.

CAUTION: USE ONLY DA 42 SPARE PARTS APPROVED BY THE MANUFACTURER.

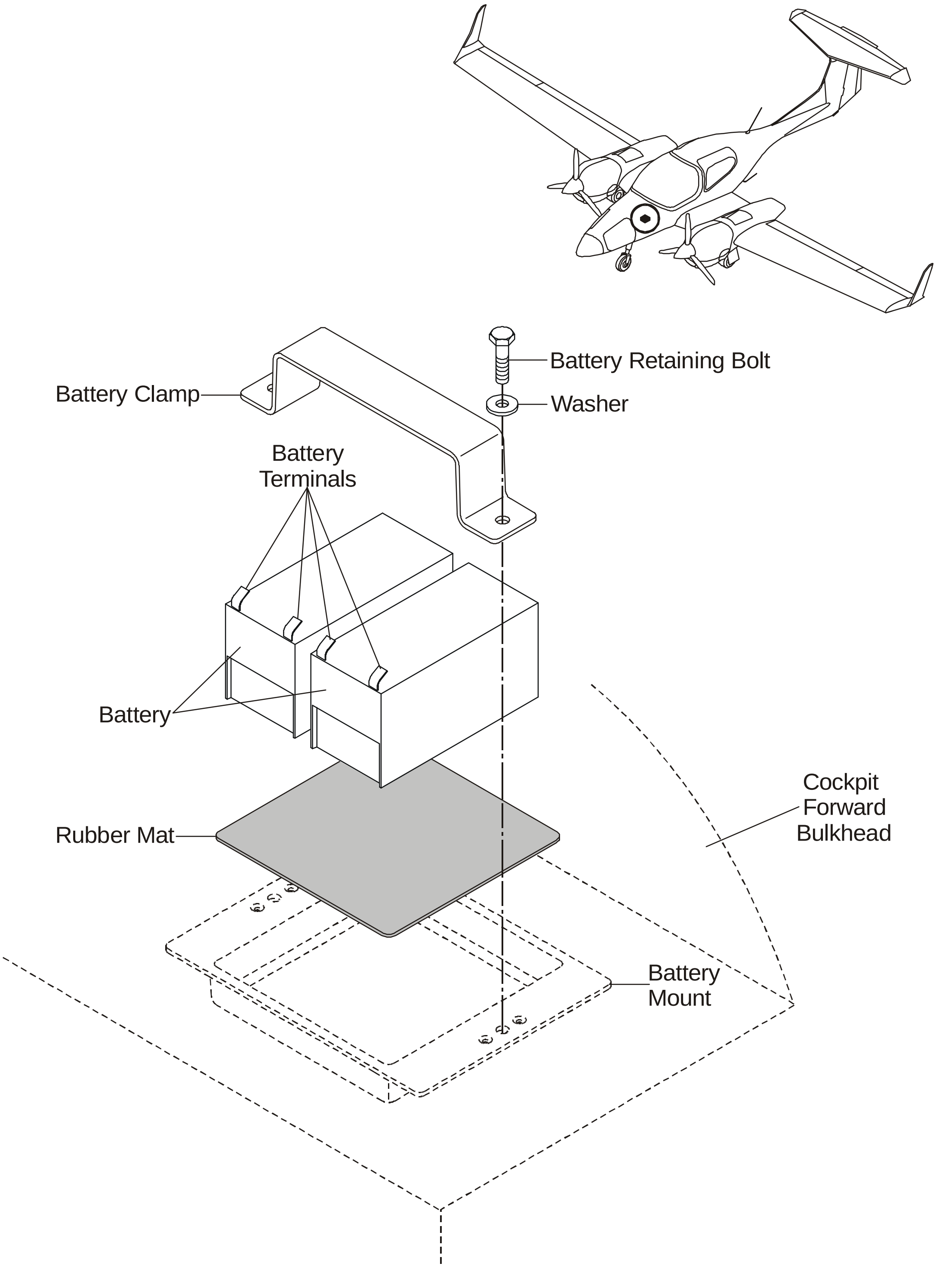

Figure 2: Alternator Excitation Battery Pack Installation

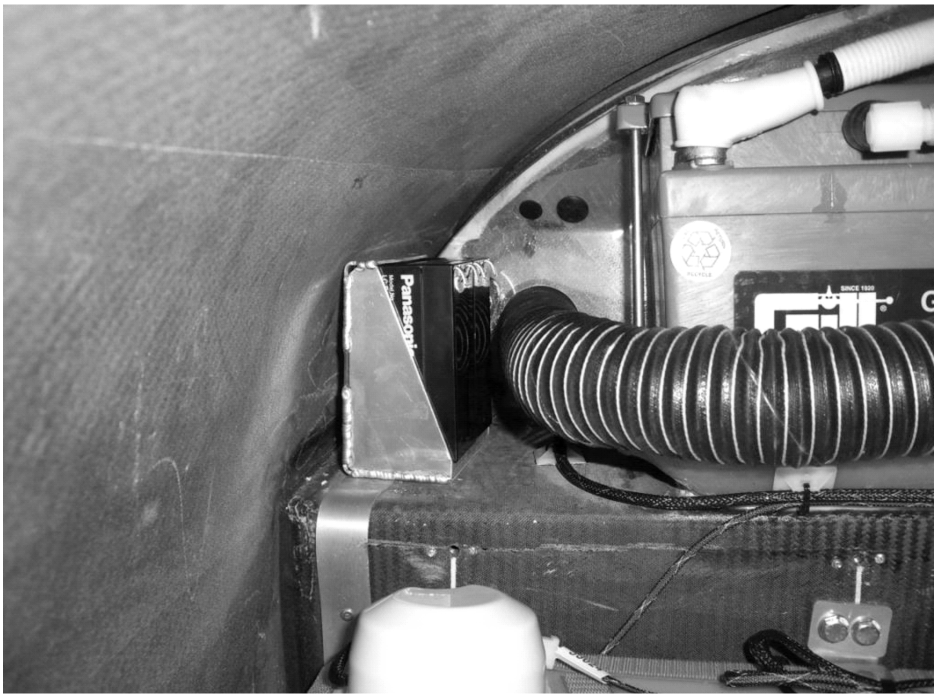

Figure 3: ECU Backup Battery Installation, RH Side (MÄM 42-240 installed)

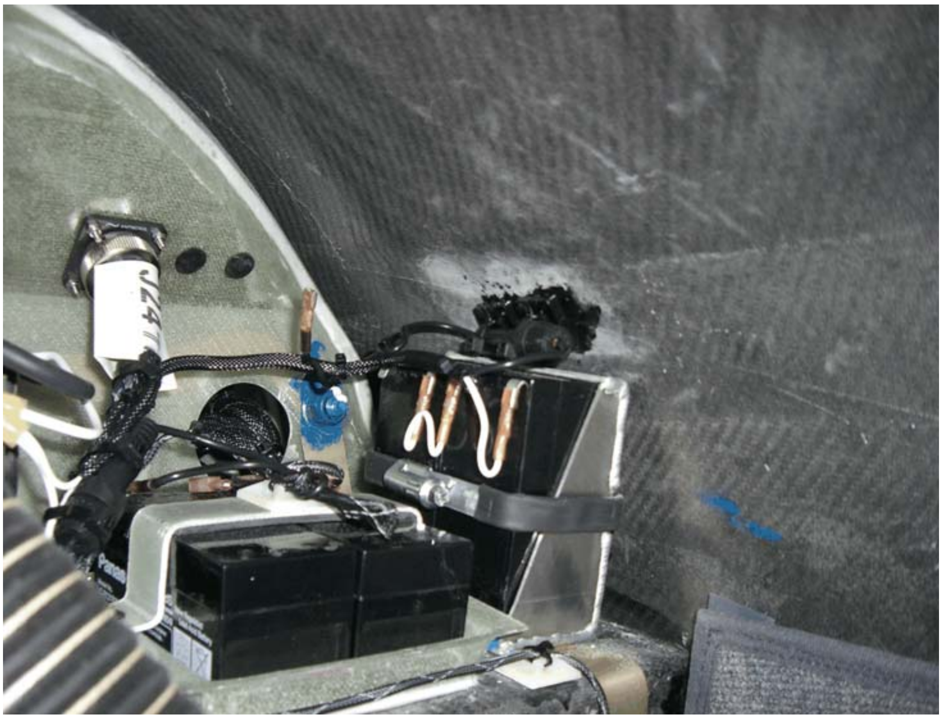

Figure 4: ECU Backup Battery Installation, LH Side (MÄM 42-240 installed)

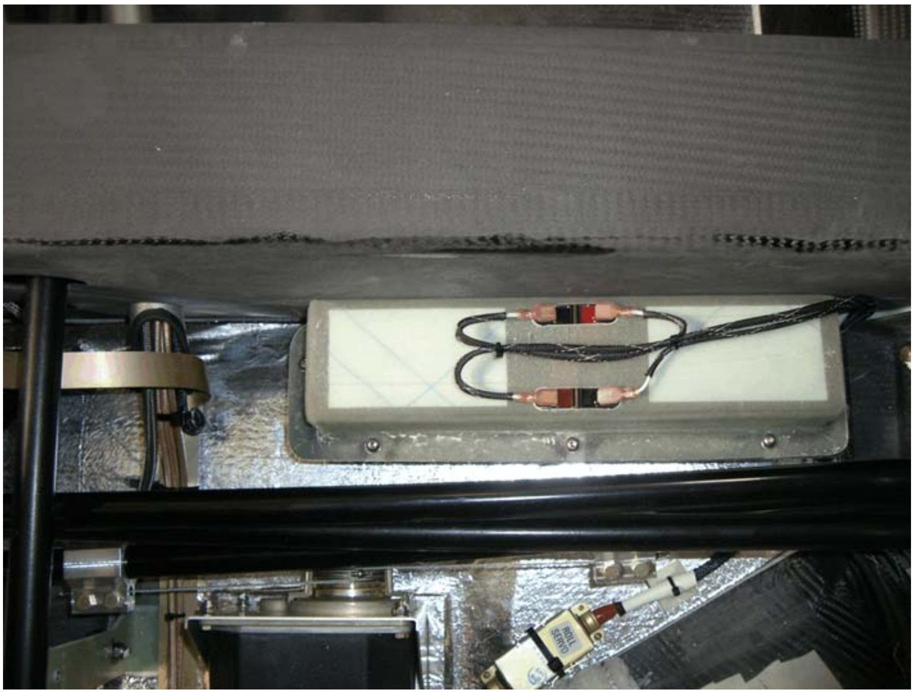

Figure 5: ECU Backup Battery Installation, RH Side (OÄM 42-129 installed)

Figure 6: ECU Backup Battery Installation, LH Side (OÄM 42-129 installed)

3. Remove/Install the Alternator Excitation Battery

A. Remove an Alternator Excitation Battery

	Detail Steps/Work Items	Key Items/References
(1)	Open the front baggage compartment door.	Refer to Section 52-40.
(2)	Remove the baggage compartment rear cover.	
(3)	Disconnect the airplane main battery.	Refer to Section 24-31.
(4)	Remove an alternator excitation battery: – Disconnect the negative cable from the battery that you will remove. – Disconnect the positive cable from the battery that you will remove. – Release the battery pack hold down strap. – Move the related battery clear of the airplane.	Refer to Figure 2.

B. Install an Alternator Excitation Battery

	Detail Steps/Work Items	Key Items/References
(1)	Move the battery into position in its mount on in the front baggage compartment.	
(2)	Install the battery pack hold down strap.	
(3)	Connect the related battery: – Connect the positive cable to the battery that you installed. – Connect the negative cable to the battery that you installed.	
(4)	Connect the airplane main battery.	Refer to Section 24-31.
(5)	Install the baggage compartment rear cover.	
(6)	Close and secure the front baggage compartment door.	Refer to Section 52-40.
(7)	Do an engine ground run up.	Make sure that both alternators operate correctly.

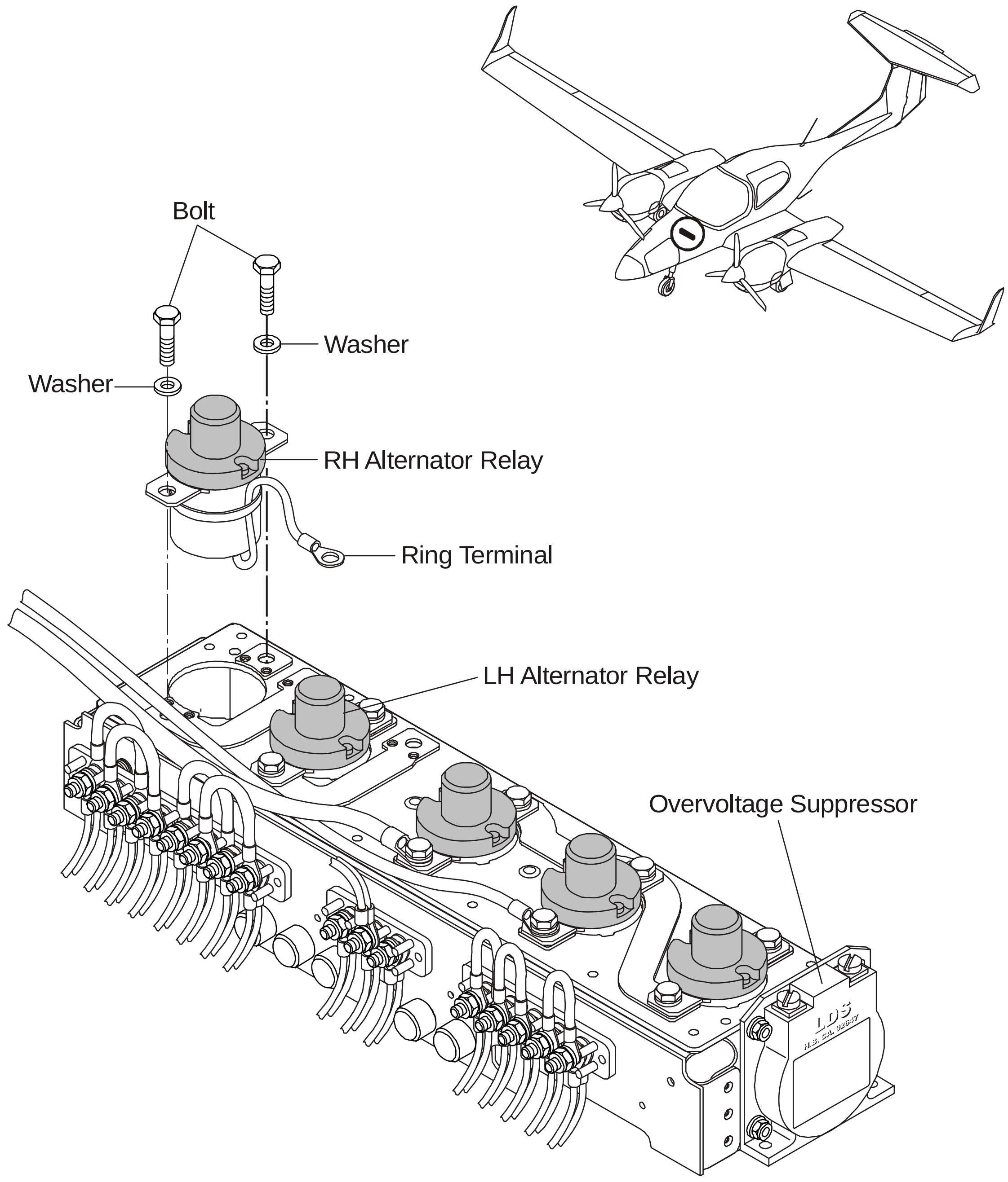

Figure 7: LH/RH Alternator Relay Installation

4. Remove/Install an Alternator Relay

A. Remove an Alternator Relay

Use this procedure for both the LH and the RH alternator relay.

	Detail Steps/Work Items	Key Items/References
(1)	Open the front baggage compartment door.	Refer to Section 52-40.
(2)	Remove the baggage compartment rear cover.	
(3)	Disconnect the battery for maintenance.	Refer to Section 24-31.
(4)	Disconnect the LH/RH alternator relay from the relay box bus bar: – Remove the bolts and washers that attach the relay to the relay box bus bar.	
(5)	Disconnect the electrical cables from the terminal block.	
(6)	Remove the LH/RH alternator relay: – Lift the LH/RH alternator relay clear of the relay box.	

B. Install an Alternator Relay

	Detail Steps/Work Items	Key Items/References
(1)	Lower the relay into position at the relay mounting.	
(2)	Move the LH/RH alternator relay into position at the relay mounting and connect the control cables to the terminal block.	Check for correct polarity.
(3)	Connect the LH/RH alternator relay to the relay box bus bar: – Install the washers and bolts that attach the relay to the relay box bus bar.	
(4)	Connect the main battery.	Refer to Section 24-31.
(5)	Install the baggage compartment rear cover.	
(6)	Close and secure the front baggage compartment door.	Refer to Section 52-40.
(7)	Do a test for the correct operation of the LH/RH alternator relay: – Do a ground run up of the related engine. – Make sure that the alternator comes online. – Shut down the related engine.	 Refer to Section 71-00. Refer to Section 71-00.

5. Remove/Install an ECU Backup Battery

A. Remove an ECU Backup Battery

	Detail Steps/Work Items	Key Items/References
(1)	Open the front baggage compartment door.	Refer to Section 52-40.
(2)	Remove the baggage compartment rear cover.	
(3)	Disconnect the airplane main battery.	Refer to Section 24-31.
(4)	Remove an ECU backup battery: – Disconnect the negative cable from the battery that you will remove. – Disconnect the positive cable from the battery that you will remove. – Release the battery pack hold strap. – Move the related battery clear of the airplane.	Refer to Figure 2.

B. Install an ECU Backup Battery

	Detail Steps/Work Items	Key Items/References
(1)	Move the battery into position in its mount in the front baggage compartment.	
(2)	Install the battery pack hold strap.	
(3)	Connect the relates battery: – Connect the positive cable to the battery that you installed. – Connect the negative cable to the battery that you installed.	
(4)	Connect the airplane main battery.	Refer to Section 24-31.
(5)	Install the baggage compartment rear cover.	
(6)	Close and secure the front baggage compartment door.	Refer to Section 52-40.
(7)	Do an engine ground run-up.	Make sure that the electrical system operates correctly.

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Section 24-31
Battery Systems

1. General

This Section tells you about the battery systems for the DA 42 airplane. See Section 24-00 and 24-30 for the description and operation of the batteries in the electrical generation system.

The DA 42 has these battery systems:

- A main battery located in the front baggage compartment. This battery provides the usual airplane electrical services.
- An alternator excitation battery pack located in the front baggage compartment. The battery pack has two 12 V/1.3 Ah lead batteries. The batteries are connected in series. The battery pack connects to the left/right alternator field connection when the related LH/RH ENGINE MASTER switch is set to ON. Refer to Section 24-30 for the maintenance procedures for the battery pack.

2. Main Battery Description and Operation

The main battery is a 24 V, 10 Ah sealed battery. A battery tray located on the forward face of the cockpit bulkhead holds the battery. You can access the battery through the front baggage compartment, right side after removing the baggage compartment rear cover. A clamp and 2 bolts hold the battery and battery cover in position. The positive and negative cables attach to terminals on the top of the battery, at the front. The usual rubber caps protect the electrical connections.

When either, or both of the engine alternators are online and the system voltage is greater than the battery voltage, the system charges the battery.

When either or both alternators are on-line the integrated cockpit system (ICS) display shows each alternator voltage. When both alternators are offline, the ICS display shows the battery voltage.

The battery supplies current to the relay box bus through the battery relay. There is no circuit protection. The relay box bus also supplies power to the LH MAIN BUS, RH MAIN BUS and the hydraulic pump. Each of the main bus systems are protected by 90 Ampere circuit breakers. The landing gear extension and retraction system is protected by a 50 Ampere fuse.

The battery also supplies the HOT BUS.

Regular maintenance of the battery system is necessary. Do not wait until a problem occurs.

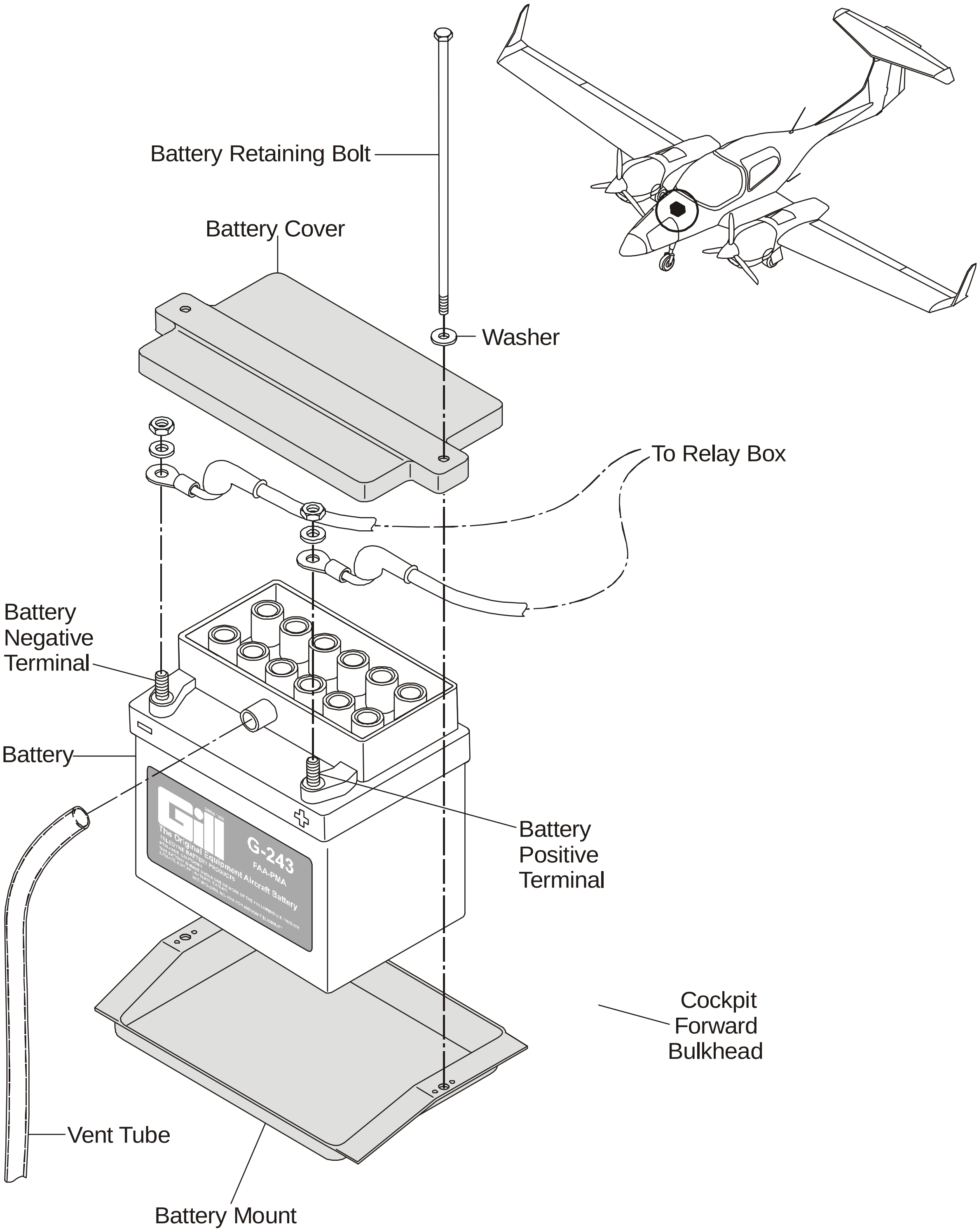

Figure 1: Main Battery Installation

Trouble-Shooting

1. General

This table tells you how to trouble-shoot the battery system. If you find the trouble in column 1 do the repair given in column 3.

Trouble	Possible Cause	Repair
Main battery voltage low.	Battery capacity low.	Do a capacity test. If necessary, replace the battery.
	Alternator(s) low output.	Trouble-shoot the alternator(s). Refer to Section 24-30.
Main battery will not connect to the RELAY bus.	Battery relay defective.	Replace the battery relay.
	ELECT. MASTER switch defective.	Replace the ELECT. MASTER switch.
	Battery system wiring defective.	Do test of the battery system wiring. Refer to Chapter 92 for the wiring diagrams.
Ammeter on ICS display shows zero at all times for LH or RH alternator.	Defective transducer.	Replace the related transducer.
Voltmeter on ICS display shows zero with the BATT MASTER switch set to ON.	Defective voltmeter.	Troubleshoot the ICS.
	Defective wiring in the voltmeter system.	Do a test of the wiring. Refer to Chapter 92 for the wiring diagrams.

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Maintenance Practices

1. General

Keep the battery clean. Remove the grease and other contaminants from the battery case. Remove dirt from the area of the terminals. Protect the terminals and cable lugs with Dow Corning compound 4 (DC4).

If you do not use the airplane regularly you must remove the battery for charging.

CAUTION: INSTALL ONLY A BATTERY WHICH IS APPROVED BY THE AIRPLANE MANUFACTURER.

2. Safety Precautions

Obey the instructions of the battery manufacturer.

Always disconnect the battery before you do work on the airplane electrical system. You must disconnect the negative cable first. Connect the negative cable last.

3. Remove/Install the Main Battery

A. Remove the Main Battery from the Airplane

	Detail Steps/Work Items	Key Items/References
(1)	Open the front baggage compartment door.	Refer to Section 52-40.
(2)	Remove the baggage compartment rear cover.	
(3)	Disconnect the negative cable from the battery. – Pull back the rubber boot from the cable end. – Remove the nut and washer that attaches the negative cable to the battery terminal. – Move the negative cable clear of the battery terminal.	Refer to Figure 1.
(4)	Disconnect the positive cable from the battery. – Pull back the rubber boot from the cable end. – Remove the nut and washer that attaches the positive cable to the battery terminal. – Move the positive cable clear of the battery terminal.	
(5)	Remove the battery retaining clamp and cover: – Remove the 2 bolts and washers that hold the battery clamp. – Remove the battery clamp and battery cover.	
(6)	Remove the battery from the airplane.	

B. Install the Main Battery in the Airplane

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the battery is clean and dry.	
(2)	Move the battery into position in the battery tray.	Refer to Figure 1.
	CAUTION: MAKE SURE THAT YOU CONNECT THE CABLES TO THE CORRECT TERMINALS. INCORRECT CONNECTION CAN DAMAGE THE ELECTRICAL AND AVIONICS SYSTEMS.	
(3)	Connect the positive cable to the positive terminal of the battery: – Move the cable end fitting into place over the positive battery terminal. – Install the washer and nut that attaches the cable to the battery terminal. – Move the rubber boot into position over the cable end.	
(4)	Connect the negative cable to the negative terminal of the battery: – Move the cable end fitting into place over the negative battery terminal. – Install the washer and nut that attaches the cable to the battery terminal. – Move the rubber boot into position over the cable end.	
(5)	Install the battery cover and clamp: – Move the battery cover into position on the battery. – Move the battery clamp into position over the battery cover. – Install the washers on the battery clamp bolts. – Install and tighten the battery clamp bolts.	 Tighten the bolts equally.

	Detail Steps/Work Items	Key Items/References
(6)	Install the baggage compartment rear cover.	
(7)	Close and secure the front baggage compartment door.	Refer to Section 52-40.

4. Disconnect/Connect the Main Battery for Maintenance

A. Disconnect the Main Battery for Maintenance

	Detail Steps/Work Items	Key Items/References
(1)	Open the front baggage compartment door.	Refer to Section 52-40.
(2)	Remove the baggage compartment rear cover.	
(3)	Disconnect the negative cable from the battery. – Pull back the rubber boot from the cable-end. – Remove the nut and washer that attaches the negative cable to the battery terminal. – Move the negative cable clear of the battery terminal.	Refer to Figure 1.
(4)	Disconnect the positive cable from the battery: – Pull back the rubber boot from the cable-end. – Remove the nut and washer that attaches the positive cable to the battery terminal. – Move the positive cable clear of the battery terminal.	

B. Connect the Main Battery after Maintenance

	Detail Steps/Work Items	Key Items/References
	CAUTION: MAKE SURE THAT YOU CONNECT THE CABLES TO THE CORRECT TERMINALS. INCORRECT CONNECTION CAN DAMAGE THE ELECTRICAL AND AVIONICS SYSTEMS.	
(1)	Connect the positive cable to the positive terminal of the battery: – Move the cable end fitting into place over the positive battery terminal. – Install the washer and nut that attaches the cable to the battery terminal. – Move the rubber boot into position over the cable end.	Refer to Figure 1.
(2)	Connect the negative cable to the negative terminal of the battery: – Move the cable end fitting into place over the negative battery terminal. – Install the washer and nut that attaches the cable to the battery terminal. – Move the rubber boot into position over the cable end.	
(3)	Remove the baggage compartment rear cover.	
(4)	Close and secure the front baggage compartment door.	Refer to Section 52-40.

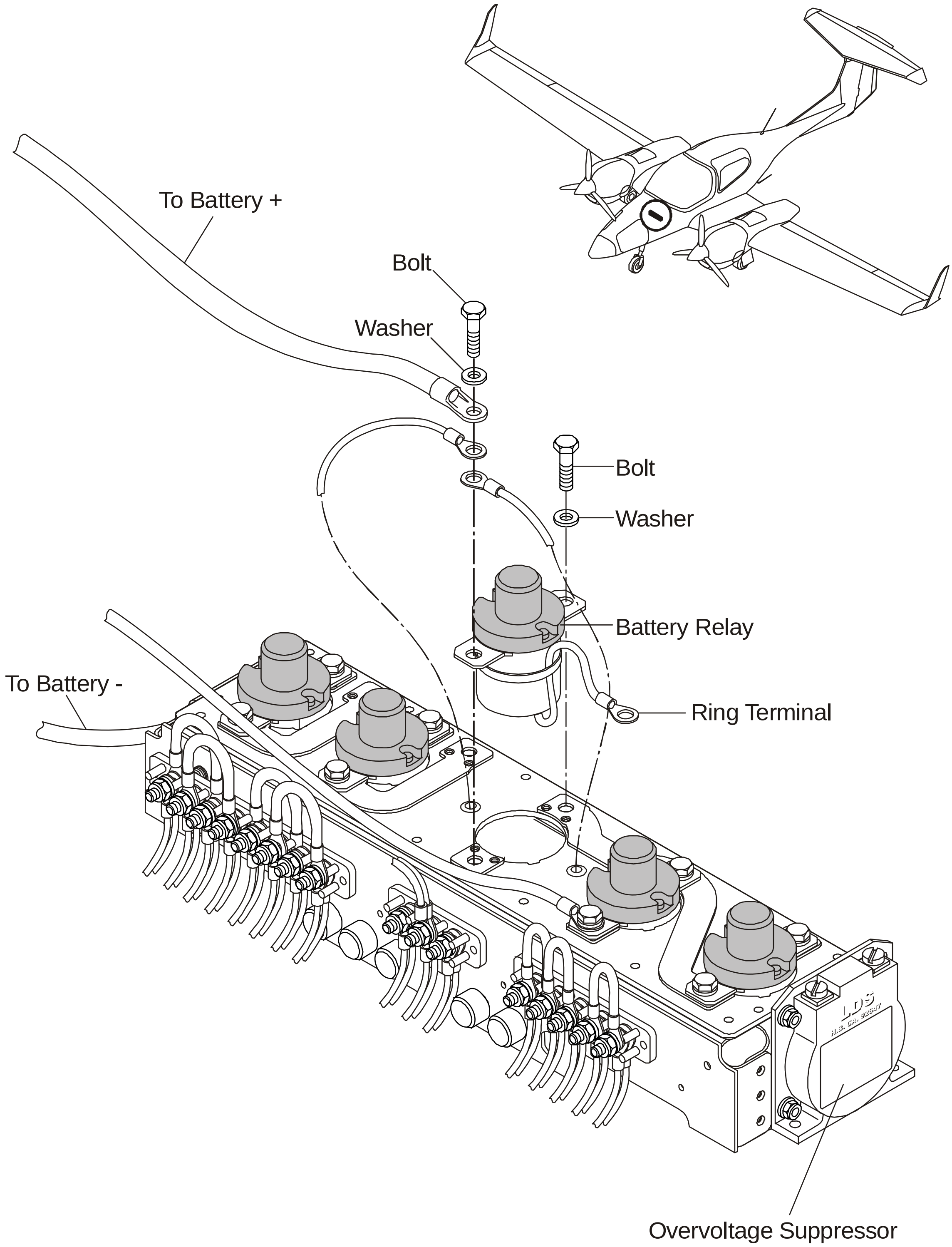

Figure 2: Main Battery Relay Installation

5. Remove/Install the Battery Relay

A. Remove the Battery Relay

	Detail Steps/Work Items	Key Items/References
(1)	Open the front baggage compartment door.	Refer to Section 52-40.
(2)	Remove the baggage compartment rear cover.	
(3)	Disconnect the battery for maintenance.	Refer to Paragraph 4 (A).
(4)	Disconnect the positive cable from the battery relay: – Remove the bolt and washer from the terminal of the battery relay. – Move the positive cable clear of the relay. – Move the 2 smaller cables clear of the relay terminal.	
(5)	Disconnect the battery relay from the relay box bus bar: – Remove the bolt and washer that attaches relay to the relay box bus bar.	Refer to Figure 2.
(6)	Disconnect the electrical cables from the terminal block.	
(7)	Remove the battery relay: – Lift the battery relay clear of the relay box.	

B. Install the Battery Relay

	Detail Steps/Work Items	Key Items/References
(1)	Lower the battery relay into position at the relay mounting.	
(2)	Move the relay into position at the relay mounting and connect the control cables to the terminal block.	Refer to Figure 2. Check for correct polarity.
(3)	Connect the battery relay to the relay box bus bar: – Install the washer and bolt that attaches the relay to the relay box bus bar.	
(4)	Connect the battery positive cable and the two smaller cables to the battery relay: – Move the 2 smaller cables into position at the battery relay. – Move the battery positive cables into position at the battery relay. – Install the bolt and washer that attaches the cables to the relay through all 3 cables and into the relay mounting.	Refer to the wiring diagrams in Chapter 92.
(5)	Connect the main battery.	Refer to Paragraph 4 (B).
(6)	Install the baggage compartment rear cover.	
(7)	Close and secure the front baggage compartment door.	Refer to Section 52-40.

6. Starter Relay Functional Test

Do this test in an area where the engine can be run.

	Detail Steps/Work Items	Key Items/References
(1)	Set the ELECT. MASTER switch to ON.	
(2)	Set the LH or RH ENGINE MASTER to ON.	
WARNING:	**MAKE SURE THAT THE AREA OF THE PROPELLERS IS CLEAR BEFORE YOU OPERATE THE STARTER MOTOR. PROPELLERS CAN CAUSE INJURY OR DEATH.**	
(3)	Turn the key of the START SWITCH to the engine for the ENGINE MASTER switch that you set to ON in step 2.	The engine starter motor must operate. You do not have to start the engine.
(4)	Turn the key of the START SWITCH to OFF.	
(5)	Set the ENGINE MASTER switch that you set on in step 2 to OFF.	
(6)	Set the ELECT. MASTER switch to OFF.	

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Section 24-32
Emergency Power

1. General

This Section tells you about the emergency battery system for the DA 42 airplane. Regular maintenance of the emergency battery system is necessary. Figure 1 shows the main components of the emergency power system.

Refer to Chapter 92 for the wiring diagrams.

2. Description

The emergency battery system consists of:

– An emergency battery pack.

– A sealed HORIZON EMERGENCY switch.

The emergency battery pack consists of 10 lithium manganese batteries, 3 V, 1,300 mAh. Refer to the Equipment List in Section 6.5 of the Airplane Flight Manual for the approved battery pack type.

The emergency battery pack is mounted behind the instrument panel, on the pilot's side.

If MÄM 42-1025 is installed, the batteries are located in a plastic battery box. All used cells must be replaced by a set of new cells with identical expiry dates.

When all other sources of electrical power fail during flight, the EMERGENCY HORIZON switch on the top of the instrument panel is set to ON to use the emergency battery. It supplies the attitude gyro (horizon) and the flood light with power for at least 1 hour and 30 minutes.

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Trouble-Shooting

1. General

The table below lists the defects you could have with the emergency battery system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Batteries leaking.	Batteries expired.	Replace battery pack. If MÄM 42-1025 is installed: replace all battery cells. All used cells must be replaced by a set of new cells with identical expiry date, update placard on cover. Clean all items that are contaminated.
Voltage on the back side of the emergency switch less than 30.0 V.	Batteries expired.	Replace battery pack. If MÄM 42-1025 is installed: replace all battery cells. All used cells must be replaced by a set of new cells with identical expiry date, update placard on cover.
	Batteries have been used.	Replace battery pack. If MÄM 42-1025 is installed: replace all battery cells. All used cells must be replaced by a set of new cells with identical expiry date, update placard on cover.
	Emergency battery system wiring defective.	Repair the emergency battery system wiring.
	If MÄM 42-1025 is installed: Batteries installed incorrectly in battery box.	Install battery cells, correctly.

Note: Expiration date must be the same on all cells and at least five years in the future at time of installation in airplane.

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Maintenance Practices

1. General

This Section tells you how to replace the emergency battery pack. It also tells you how to test the emergency battery system.

Refer to Chapter 92 for the wiring diagrams.

2. Remove/Install the Emergency Battery Pack

A. Remove the Emergency Battery Pack

	Detail Steps/Work Items	Key Items/References
(1)	Remove the instrument panel cover.	Refer to Section 25-10.
(2)	Disconnect the electrical plug of the battery pack.	Refer to Figure 1.
(3)	Remove the GEA 71 of its mounting rack.	
(4)	Remove the two screws and nuts of the battery pack.	Hold the battery pack.
(5)	Remove the battery pack clear of the airplane.	
(6)	If MÄM 42-1025 is installed: Remove all battery cells from the plastic battery box.	Refer to Figure 1.

CAUTION: THE BATTERY PACKS CANNOT BE RE CHARGED. DO NOT TRY TO RE-CHARGE THE BATTERY PACKS. IF YOU TRY TO RE-CHARGE THE BATTERY PACKS, THEY CAN EXPLODE OR LEAK.

CAUTION: DISPOSE OF THE BATTERY PACKS PROPERLY (ASK YOUR BATTERY DEALER FOR ADVISE). BATTERIES CONTAIN POISONS WHICH HARM THE ENVIRONMENT. DO NOT THROW THE USED BATTERY PACKS INTO THE GARBAGE. DO NOT EXPOSE BATTERIES TO FIRE. DO NOT DISMANTLE BATTERY PACKS.

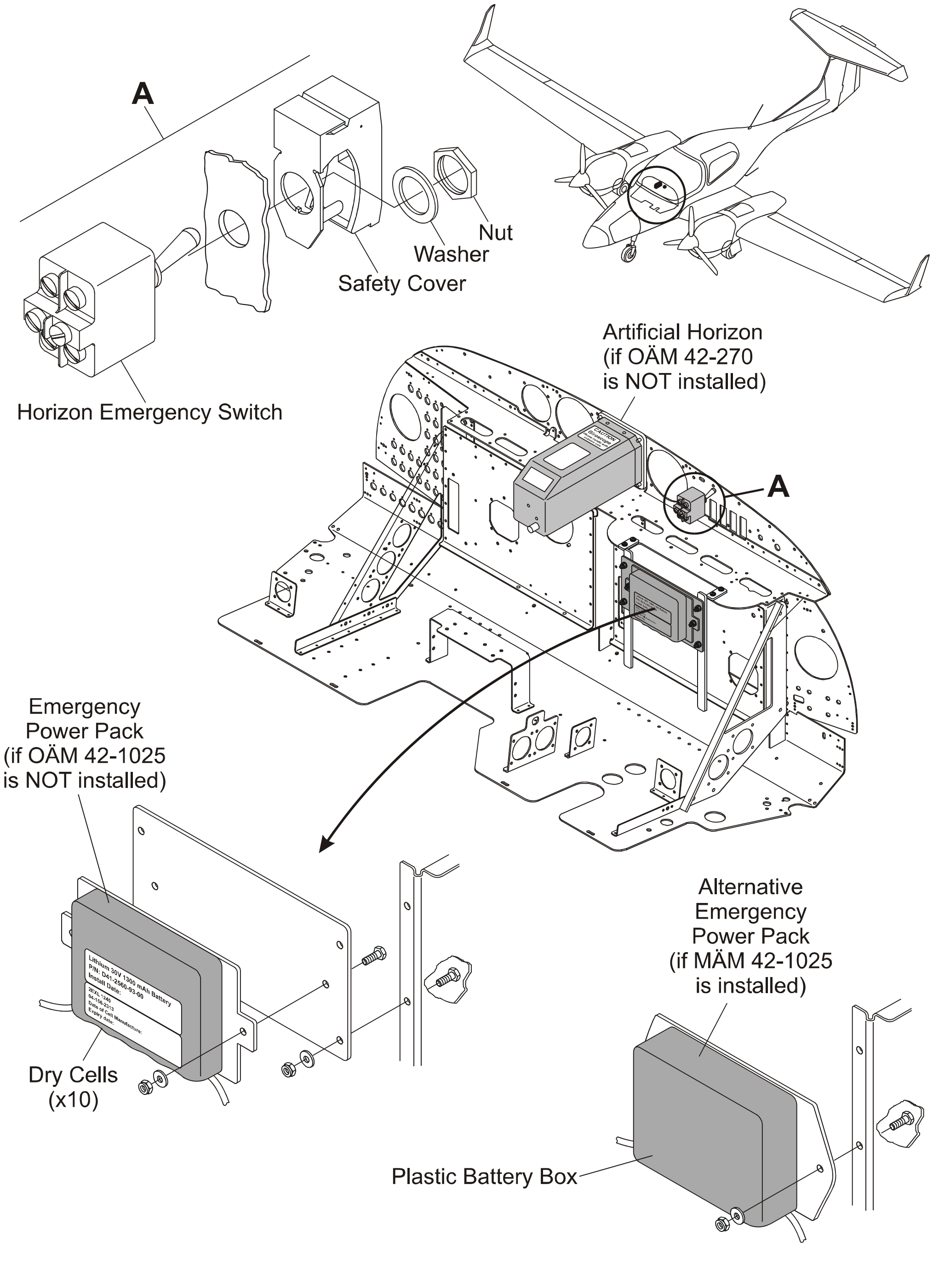

Figure 1: Emergency Battery Pack

B. Install the Battery Pack

CAUTION: USE ONLY NEW BATTERY PACKS. REFER TO THE EQUIPMENT LIST IN THE AIRPLANE FLIGHT MANUAL, SECTION 6.5, FOR THE CORRECT BATTERY TYPE.

CAUTION: DO NOT SHORT CIRCUIT THE BATTERY PACK. ENSURE CORRECT POLARITY OF ALL BATTERIES.

	Detail Steps/Work Items	Key Items/References
(1)	If MÄM 42-1025 is installed, install the battery cells in the Plastic battery pack. Apply Electrolube SGB Contact Treatment Grease 2x on all cell contacts. Always use new, unused battery cells. All battery cells must have the same expiry date. All battery cells must have an output voltage of at least 3.0 V each.	Make sure that the cells are installed correctly.
(2)	Measure the voltage of the battery pack.	On the connector for the electrical plug. If the voltage is less than 30 V, then the batteries are used, or at least one battery was installed incorrectly. Use a new battery pack.
(3)	Put the battery pack in place in the instrument panel on the pilot’s side.	
(4)	Install the two screws and nuts of the battery pack.	
(5)	Connect the electrical plug of the battery pack.	Ensure correct polarity.
(6)	Install the GEA 71.	
(7)	Measure the voltage on the back side of the EMERGENCY HORIZON switch.	If the voltage is below 30 V, it is probable that the wiring is defective. Repair wiring.
(8)	Install the instrument panel cover.	Refer to Section 25-10.

Note: Update date on placard on battery box cover, when cells are replaced.

Note: Expiration date must be the same on all cells and at least five years in the future at time of installation in airplane.

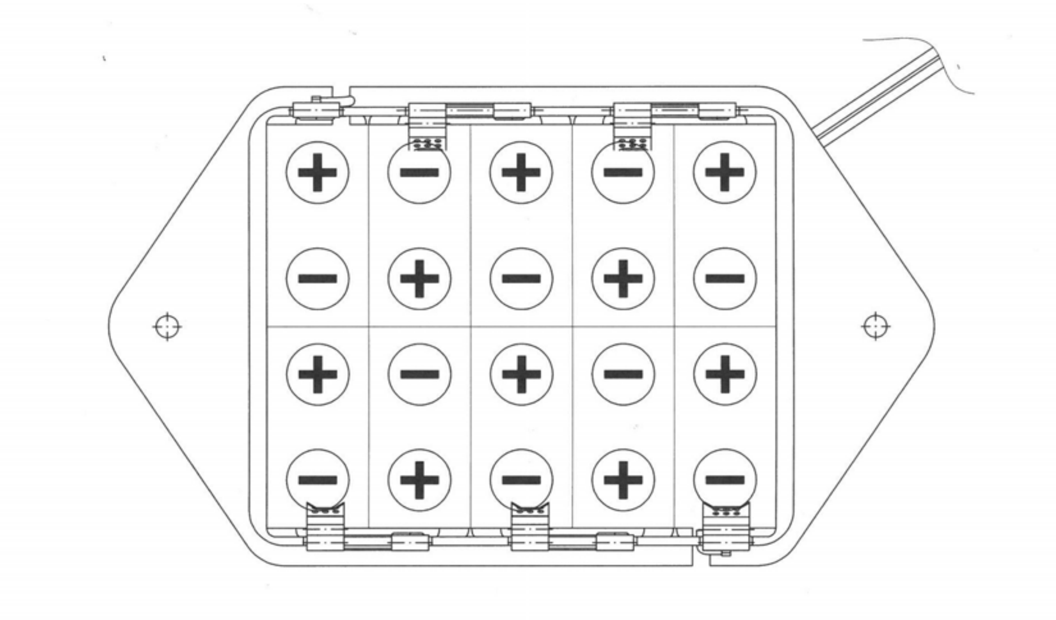

Figure 2: Battery Cell Orientation (Top View)

Section 24-40
External Power

1. General

The DA 42 has an external power socket located on the lower surface of the fuselage nose section. It is a standard 28 V DC power socket. When you connect external power to the external power socket, the external power control relay is energized and the external power comes online.

2. Description and Operation

Figure 1 shows a simple schematic diagram of the external power system. The external power system has these components:

A. 28 Volt Socket

The 28 V DC power socket is located on the lower surface of the fuselage nose section. The socket has 3 pins:

– A large negative pin.

– A large positive pin.

– A small positive pin.

A diode connected between the small positive pin and the external power relay solenoid protects the system from reverse polarity.

B. External Power Relay

The external power relay is located in the relay box mounted on the forward face of the cockpit front bulkhead. You can access the relay box through the front baggage compartment. A heavy duty cable connects the large positive pin to the input terminal of the relay. Another heavy duty cable connects the large negative pin to a ground point.

The small positive pin connects to the solenoid of the external power relay via the diode.

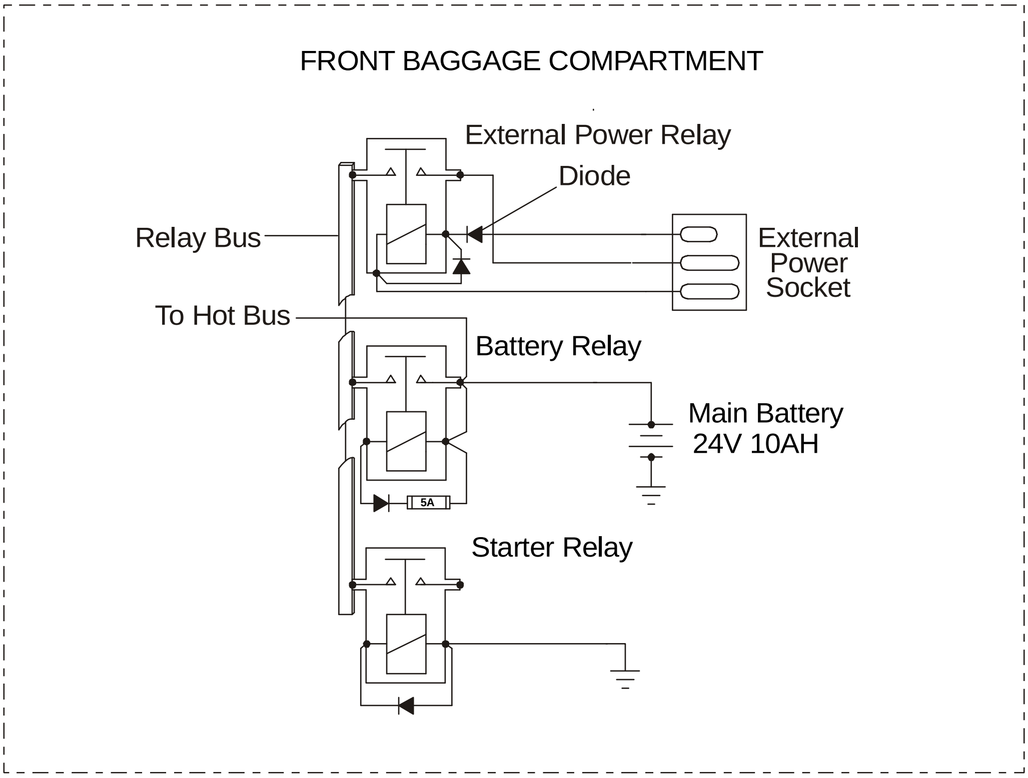

Figure 1: External Power Supply System Schematic

3. Operation

When you connect a 28 V DC power supply to the external power socket these things happen:

– Current can flow from the small positive pin to the solenoid of the external power relay, the solenoid operates and closes the relay.

– Current can flow from the large positive pin through the external power relay to the relay bus.

– The large negative pin is connected to ground.

If the polarity of the power supply is incorrect, then the diode will prevent current from flowing through the solenoid. The solenoid will not operate and current cannot flow through the external power relay to the relay box bus.

Trouble-Shooting

1. General

The table below lists the defects you could have with the external power system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
External power will not come on line.	No external power.	Make sure that the external power plug is securely in the socket. Make sure that the external power is operating correctly.
	External power relay is defective.	Do a test of the external power relay, if necessary, replace the external power relay.

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Maintenance Practices

1. General

This Section tells you how to remove/install the external power relay. Refer to the component manufacturers manuals for more data and shop data.

2. Electrical Safety

The DA 42 has a low voltage DC electrical system. When correctly maintained it is safe to work on. The battery can supply heavy current through low resistance circuits (for example, if you ground the positive output with a wrench by accident).

Always follow the usual safety practices for working on electrical equipment. Allow only qualified persons to maintain the electrical system.

CAUTION: DISCONNECT THE BATTERY BEFORE DOING MAINTENANCE ON THE ELECTRICAL SYSTEM. MAKE SURE THAT YOU DISCONNECT THE NEGATIVE CABLE FIRST.

CAUTION: AFTER DOING ELECTRICAL MAINTENANCE ALWAYS DO A CONFIDENCE TEST OF THE SYSTEM WITH A 24 VOLT POWER SUPPLY THAT HAS OVER-CURRENT PROTECTION. DO THIS BEFORE CONNECTING THE BATTERY.

CAUTION: USE ONLY DA 42 PARTS THAT ARE APPROVED BY THE MANUFACTURER.

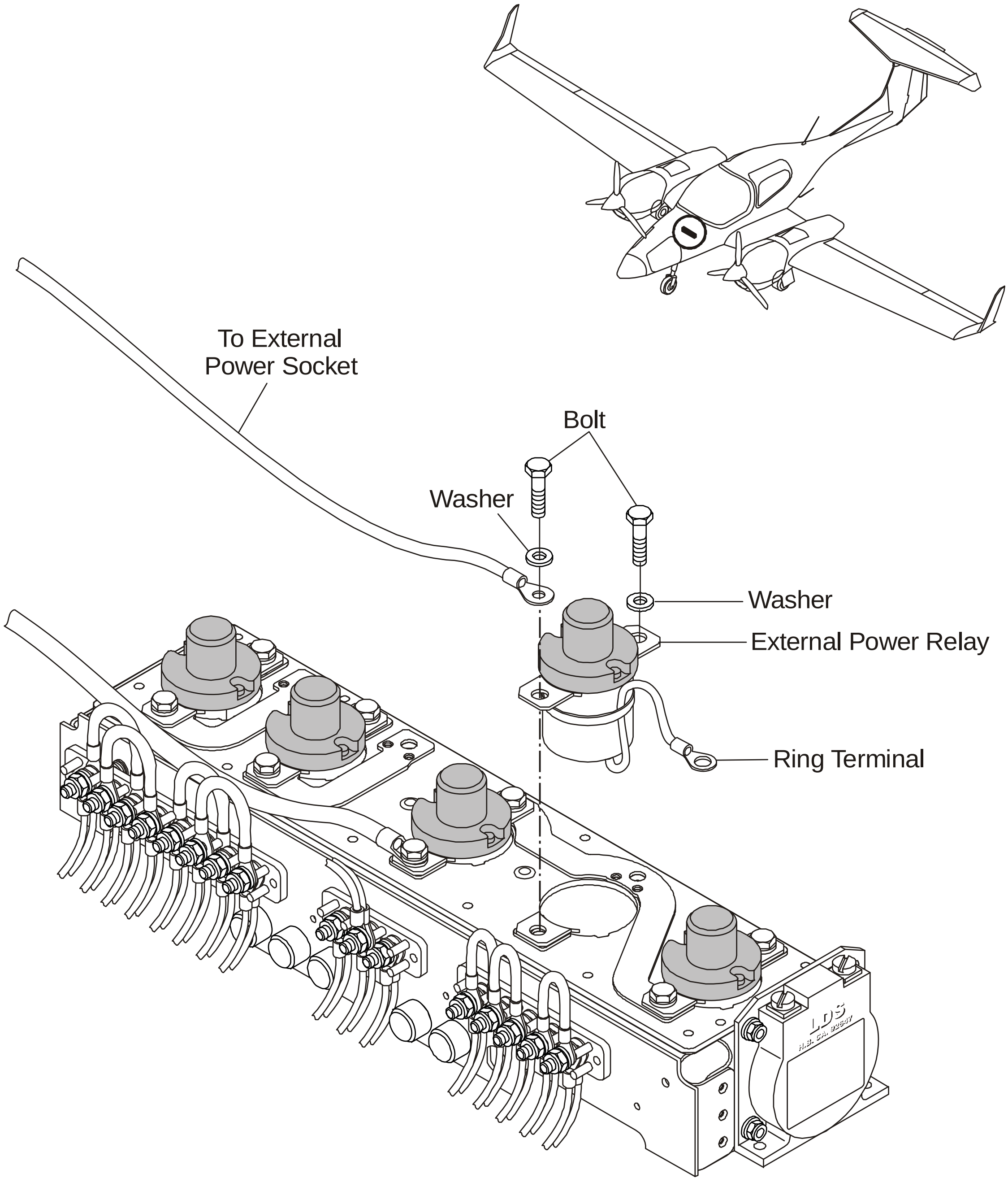


Figure 2: External Power Relay

3. Remove/Install the External Power Relay

A. Remove the External Power Relay

	Detail Steps/Work Items	Key Items/References
(1)	Open the front baggage compartment door.	Refer to Section 52-40.
(2)	Remove the front baggage compartment rear cover.	
(3)	Disconnect the battery for maintenance.	Refer to Section 24-31.
(4)	Disconnect the cable from the external power relay: – Remove the bolt and washer from the terminal of the external power relay. – Move the cable clear of the relay.	
(5)	Disconnect the external power relay from the relay box bus bar: – Remove the bolt and washer that attaches relay to the relay box bus bar.	
(6)	Disconnect the electrical cables from the terminal block.	
(7)	Remove the external power relay: – Lift the external power relay clear of the relay box.	

B. Install the External Power Relay

	Detail Steps/Work Items	Key Items/References
(1)	Lower the external power relay into position at the relay mounting.	
(2)	Move the relay into position at the relay mounting and connect the control cables to the terminal block.	Check for correct polarity.
(3)	Connect the external power relay to the relay box bus bar: – Install the washer and bolt that attaches the relay to the relay box bus bar.	
(4)	Connect the cable to the external power relay terminal: – Move the cables into position at the external power relay. – Install the bolt and washer that attaches the cable to the relay through he cable and into the relay mounting.	Refer to the wiring diagrams in Chapter 92.
(5)	Connect the main battery.	Refer to Section 24-31.
(6)	Remove the front baggage compartment rear cover.	
(7)	Close and secure the front baggage compartment door.	Refer to Section 52-40.
(8)	Do a test for the correct operation of the external power relay.	

Section 24-60
DC Electrical Load Distribution

1. General

This Section tells you about the system which supplies DC electrical power to other systems. The DC electrical load distribution system has these components:

– Relay bus.

– Hot bus.

– LH Main bus.

– RH Main bus.

– LH ECU bus.

– RH ECU bus.

– Avionics bus.

– Battery relay.

– Starter relay.

– Avionics master relay.

– Switches.

– Circuit breakers.

– Fuses.

Figure 1 shows the electrical bus structure for the DA 42. Figure 2 shows the layout of the switches and circuit breakers in the instrument panel.

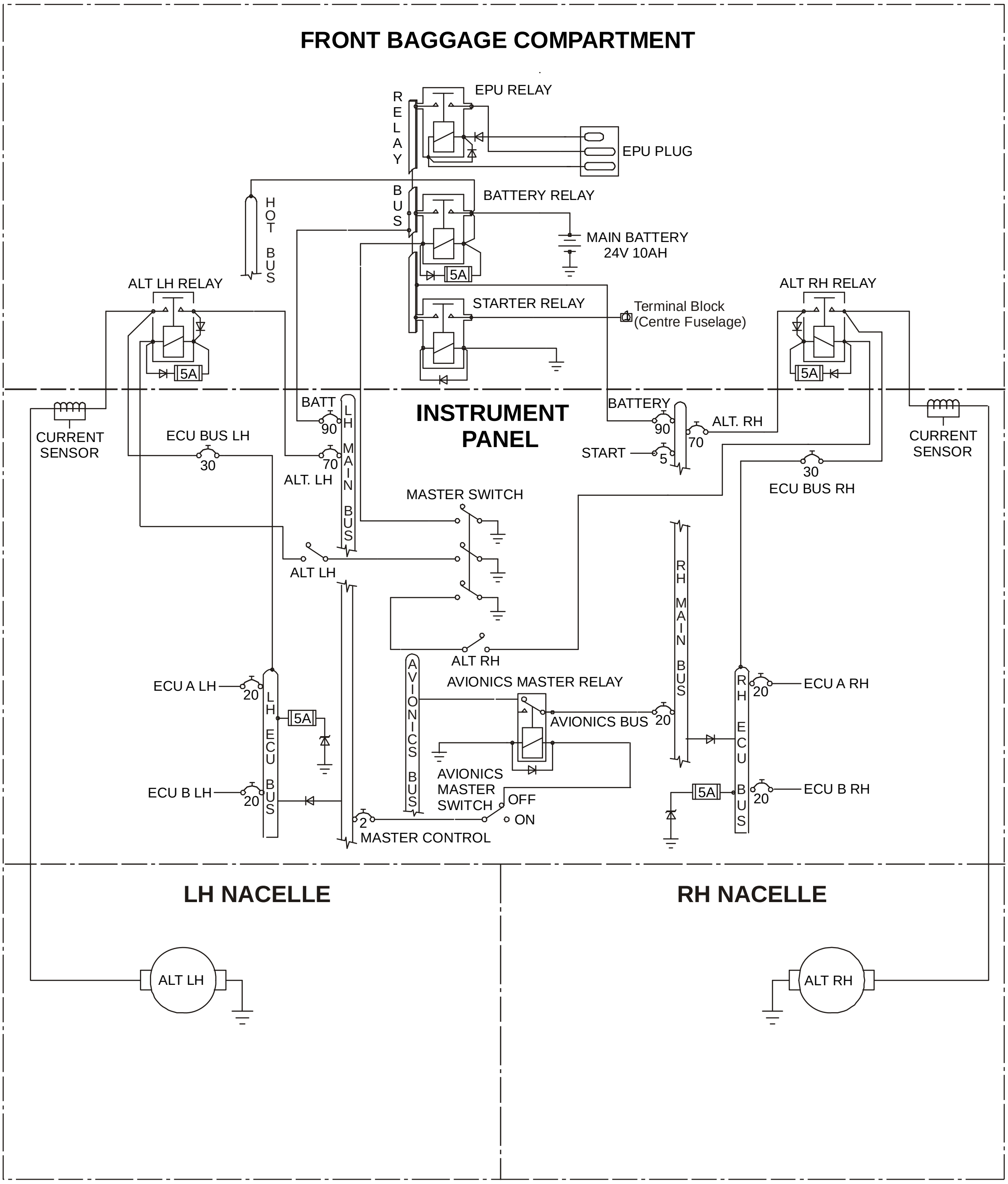
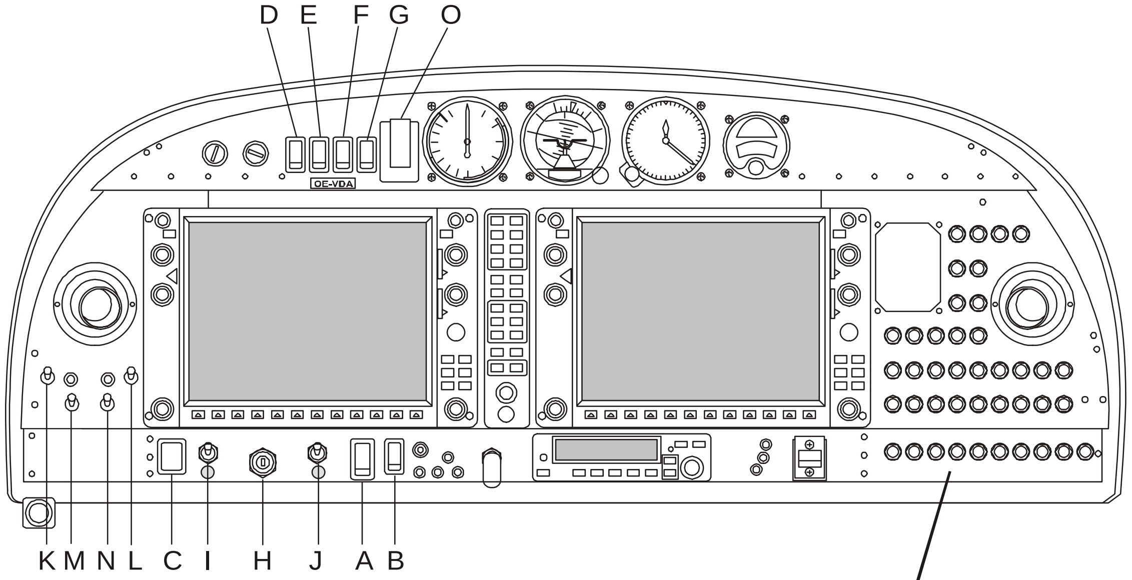


Figure 1: Electrical System Bus Structure Simplified Diagram



SWITCHES

A - ELECT MASTER
B - AVIONICS MASTER
C - PITOT
D - LANDING
E - TAXI
F - POSITION
G - STROBE
H - START SWITCH
I - ENGINE MASTER LH
J - ENGINE MASTER RH
K - ALT LH
L - ALT RH
M - ENGINE SWAP LH
N - ENGINE SWAP RH
O - HORIZON EMERGENCY

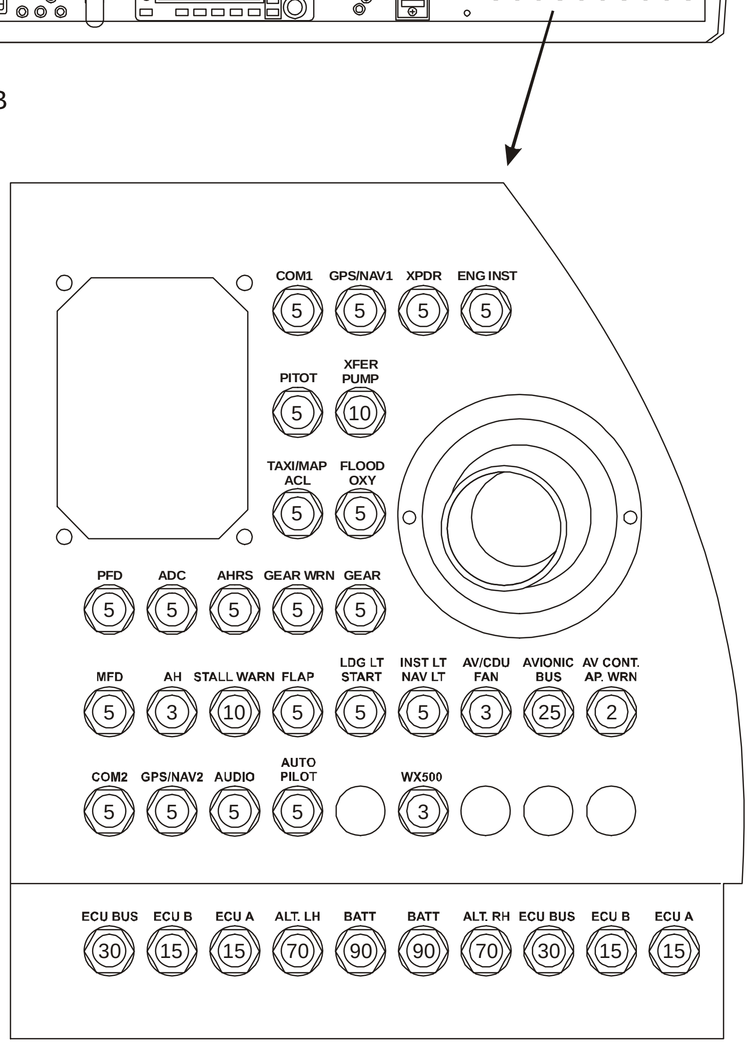


Figure 2: Location of Electrical Switches and Circuit Breakers

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Trouble-Shooting

1. General

This table tells you how to trouble-shoot the DC electrical distribution system. It does not tell you about the equipment. For faults on an item of equipment, or a system, refer to the applicable Chapter, for example, for no oil pressure indication, see Chapter 77, Engine Indicating. Make sure that there is 28 V DC on both the LH main bus and the RH main bus and that the alternators are supplying power.

If you find the trouble in column 1 do the repair given in column 3.

Trouble	Possible Cause	Repair
There is 28 V DC on the RH main bus but not on the Avionics bus.	AVIONIC MASTER SWITCH set to OFF.	Set the AVIONIC MASTER SWITCH to ON.
	MASTER CONTROL circuit-breaker not set.	Set the MASTER CONTROL circuit breaker.
	AVIONICS bus circuit breaker not set.	Set the AVIONICS bus circuit-breaker.
	Avionics master relay defective.	Replace the avionics master relay.
	A failure of the cables which connect the avionic bus to the RH main bus.	Do a continuity test of the cables. Refer to Chapter 92 for the wiring diagrams. Repair/replace defective wiring.

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Maintenance Practices

1. General

This Section tells you how to remove/install components of the DC load distribution system. Refer to the component manufacturers' manuals for more data and shop data.

2. Electrical Safety

The DA 42 has a low voltage DC electrical system. When correctly maintained it is safe to do work on. The battery can supply heavy current through low resistance circuits (for example, if you ground the battery positive with a wrench by accident).

Always follow the usual safety practices for working on electrical equipment. Allow only qualified persons to maintain the electrical system.

CAUTION: DISCONNECT THE BATTERY BEFORE YOU DO ANY WORK ON THE ELECTRICAL SYSTEM. MAKE SURE THAT YOU DISCONNECT THE NEGATIVE LEAD FIRST.

CAUTION: AFTER DOING ELECTRICAL MAINTENANCE ALWAYS DO A CONFIDENCE TEST OF THE SYSTEM WITH A 24 VOLT POWER SUPPLY THAT HAS OVER-CURRENT PROTECTION. DO THIS BEFORE CONNECTING THE BATTERY.

CAUTION: USE ONLY DA 42 SPARE PARTS APPROVED BY THE MANUFACTURER.

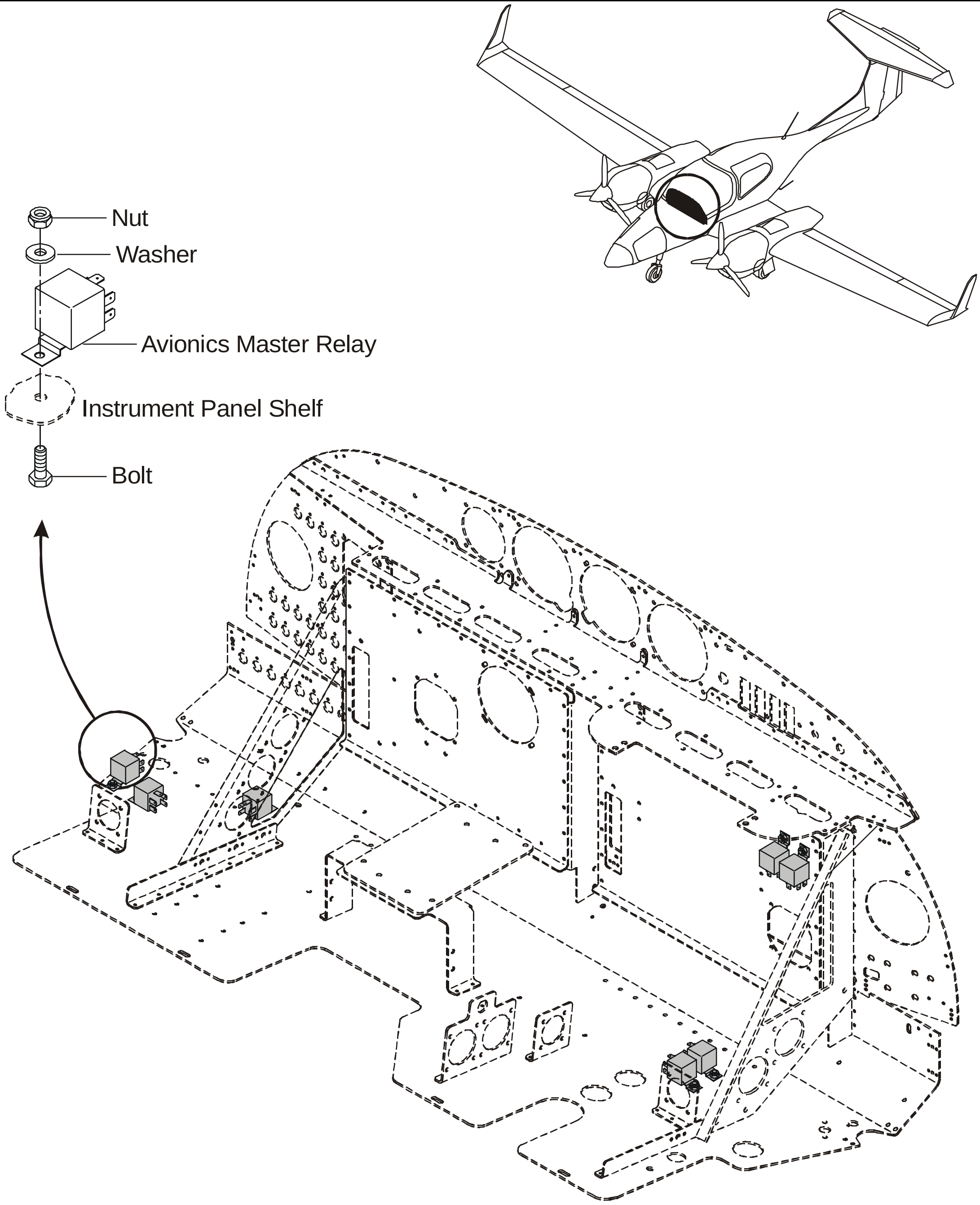

Figure 3 : Avionics Master Relay Installation

3. Remove/Install the Avionics Master Relay

A. Remove the Avionics Master Relay

	Detail Steps/Work Items	Key Items/References
(1)	Open the forward baggage compartment door.	Refer to Section 52-40.
(2)	Remove the battery cover.	
(3)	Disconnect the battery for maintenance.	Refer to Section 24-31.
(4)	Remove the instrument panel cover.	Refer to Section 25-10.
(5)	Locate the avionics master relay.	Refer to Figure 3.
(6)	Disconnect the electrical cables from the relay.	Make a note of the connections.
(7)	Remove the nut, washer and bolt that attaches the relay to the instrument panel floor.	
(8)	Move the relay clear of the airplane.	

B. Install the Avionics Master Relay

	Detail Steps/Work Items	Key Items/References
(1)	Move the new relay into position on the instrument panel shelf.	
(2)	Connect the electrical cables to the relay.	Refer to the wiring diagrams and Paragraph 3 above.
(3)	Install the bolt, washer and nut that attaches the relay to the instrument panel floor.	
(4)	Install the instrument panel cover.	
(5)	Reconnect the main battery.	Refer to Section 24-31.
(6)	Install the battery cover.	
(7)	Close the forward baggage compartment doors.	Refer to Section 52-40.
(8)	Do a test of the relay: – Set the ELECT. MASTER switch to ON. – Set the AVIONICS MASTER switch to ON. – Set the AVIONICS MASTER switch to OFF. – Set the ELECT. MASTER switch to OFF.	 All avionics must operate.

4. Remove/Install a Circuit Breaker

To remove some circuit breakers and switches it may be necessary to remove a placard panel from the instrument panel. Refer to Section 11-30.

A. Remove a Circuit Breaker

	Detail Steps/Work Items	Key Items/References
(1)	Open the front baggage compartment door.	Refer to Section 52-40.
(2)	Disconnect the battery for maintenance.	Refer to Section 24-31.
(3)	Remove the instrument panel cover.	Refer to Section 25-10.
(4)	Remove the nuts and washers that attach the circuit breakers to the instrument panel.	Do this for all the circuit breakers that are attached to the same bus bar.
(5)	Remove the screw that connects the circuit-breaker that you will replace to the bus bar.	
(6)	Disconnect the electrical cables(s) from the circuit breaker that you will replace.	
(7)	Move the bus bar and all the circuit breakers attached to it away from the instrument panel.	
(8)	Move the circuit breaker clear of the instrument panel.	

B. Install a Circuit Breaker

	Detail Steps/Work Items	Key Items/References
(1)	Move the circuit breaker into position in the instrument panel.	
(2)	Move the bus bar back into position with the remaining circuit breakers.	
(3)	Reconnect the electric cables to the circuit-breaker.	Refer to Chapter 92 for the wiring diagrams.
(4)	Install the screw that attaches the circuit-breaker to the bus bar.	
(5)	Install the washers and nuts that attach the circuit breakers to the instrument panel.	
(6)	Install the instrument panel cover.	Refer to Section 25-10.
(7)	Reconnect the battery.	Refer to Section 24-31. Connect the positive cable first.
(8)	Close and secure the baggage compartment door.	Refer to Section 52-40.
(9)	Do a test for the correct function of the circuit-breaker:	
	– Set the ELECT. MASTER to ON.	
	– Operate the electrical system related to the circuit breaker that you will test.	Apply the full electrical load to the system.
	– Pull the circuit breaker.	The system must stop operating. Make sure that there is no power to the system.
	– Set the circuit breaker.	
	– Set the ELECT. MASTER switch to OFF.	

5. Remove/Install an Instrument Panel Switch

To remove some circuit breakers and switches it may be necessary to remove a placard panel from the instrument panel. Refer to Section 11-30.

Use the procedures at Sub-paragraphs A and B for these clip secured switches:

– ELECT. MASTER

– AVIONICS MASTER

– PITOT

– LANDING LIGHT

– TAXI LIGHT

– POSITION LIGHTS

– STROBE

Use the procedures given in Sub-paragraphs C and D for the other switches.

A. Remove a Clip-Secured-Type Instrument Panel Switch

	Detail Steps/Work Items	Key Items/References
(1)	Open the front baggage compartment door.	Refer to Section 52-40.
(2)	Disconnect the battery for maintenance.	Refer to Section 24-31.
(3)	Remove the instrument panel cover.	Refer to Section 25-10.
(4)	Disconnect the electrical cables for the switch that you will remove.	
(5)	Remove the switch from the instrument panel: – Press the locking clips at the sides of the switch to release the switch from the instrument panel. – Move the switch clear of the instrument panel, from the pilot’s side of the instrument panel.	With your fingers, from the back of the instrument panel.

B. Install a Clip-Secured-Type Instrument Panel Switch

	Detail Steps/Work Items	Key Items/References
(1)	Hold the clips on the switch compressed and move the switch into position in the instrument panel.	From the pilot's side of the instrument panel. Make sure that the clips have expanded and that the switch is correctly located.
(2)	Connect the electrical cables to the switch.	Refer to Chapter 92 for the wiring diagrams.
(3)	Install the instrument panel cover.	Refer to Section 25-10.
(4)	Reconnect the battery.	Refer to Section 24-31. Connect the positive cable first.
(5)	Close and secure the baggage compartment door.	Refer to Section 52-40.
(6)	Do a test for the correct function of the switch: – Set the ELECT. MASTER to ON. – Set the switch that you installed to ON. – Set the switch that you installed to OFF. – Set the ELECT. MASTER to OFF.	 The system must operate correctly. The system must switch off.

Use the procedures in Sub-paragraphs C and D for these nut secured switches:

– START SWITCH

– ENGINE MASTER LH

– ENGINE MASTER RH

– ALT LH

– ALT RH

– ECU SWAP LH

– ECU SWAP RH

– HORIZON EMERGENCY

C. Remove a Nut-Secured-Type Instrument Panel Switch

	Detail Steps/Work Items	Key Items/References
(1)	Open the front baggage compartment door.	Refer to Section 52-40.
(2)	Disconnect the battery for maintenance.	Refer to Section 24-31.
(3)	Remove the instrument panel cover.	Refer to Section 25-10.
(4)	Remove the 5 A fuse from alternator excitation battery supply, at the battery installation.	You must only do this step if you will replace an ENGINE MASTER LH or RH switch.
(5)	Remove the nut and washer that attaches the switch to the instrument panel.	
(6)	Move the switch forward and clear of the instrument panel to give access to disconnect the electrical cables from the switch.	
(7)	Disconnect the electrical cables from the switch and move the switch clear of the airplane.	

D. Install a Nut-Secured-Type Instrument Panel Switch

	Detail Steps/Work Items	Key Items/References
(1)	Move the switch into position near to the switch electrical cables.	
(2)	Connect the electrical cables to the switch.	Refer to Chapter 92 for the wiring diagrams.
(3)	Move the switch into position in the instrument panel.	Hold the switch in position.
(4)	Install the washer and nut that attach the switch to the instrument panel.	
(5)	If necessary, install the 5 Amp fuse into the alternator excitation battery.	Only if you removed the fuse in step C.
(6)	Install the instrument panel cover.	Refer to section 25-10.
(7)	Reconnect the battery.	Refer to Section 24-31. Connect the positive cable first.
(8)	Close and secure the baggage compartment door.	Refer to Section 52-40.
(9)	Do a test for the correct function of the switch: – Set the ELECT. MASTER to ON. – Set the switch that you installed to ON. – Set the switch that you installed to OFF. – Set the ELECT. MASTER to OFF.	 The related system must operate. The related system must switch off.

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Section 24-80
Mission Power Supply System

1. General

This Chapter tells you about the optional mission power supply system which can be installed in the DA 42 airplane (OÄM 42-074). This system serves as the central power distribution system for measurement -, camera-, sensor-, datalink-, radar-, scanner- and other additional airborne systems which can be used for aerial work. This Chapter contains general, trouble-shooting and maintenance information on the mission power supply system. Information concerning the additional mission equipment is outlined in the individual supplement to the Airplane Maintenance Manual for that equipment.

2. System Description and Operation

The mission power supply system consists of the following components:

- Connector box. Installed on the front RH side of the rear baggage compartment.
- Cable duct. Installed on the RH side of the cabin.
- Main relay MPP. Installed on the LH side of the battery compartment.
- Control panel. installed on the RH side pocket recess.

As shown in Figure 1 and 2 the removable cable duct consists of 3 parts. The cable duct enables the routing of cables used for the additional equipment and the power cables used to supply electrical power to the connector box. Wiring diagrams are shown in Figures 5 and 6. The control panel MPP is installed in the MPP console which is located under the RH side of the instrument panel.

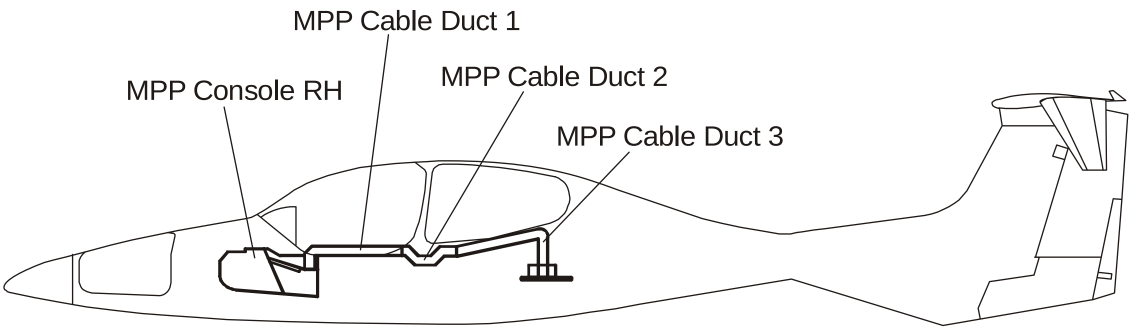

Figure 1: Side View DA 42 with OÄM 42-074 installed

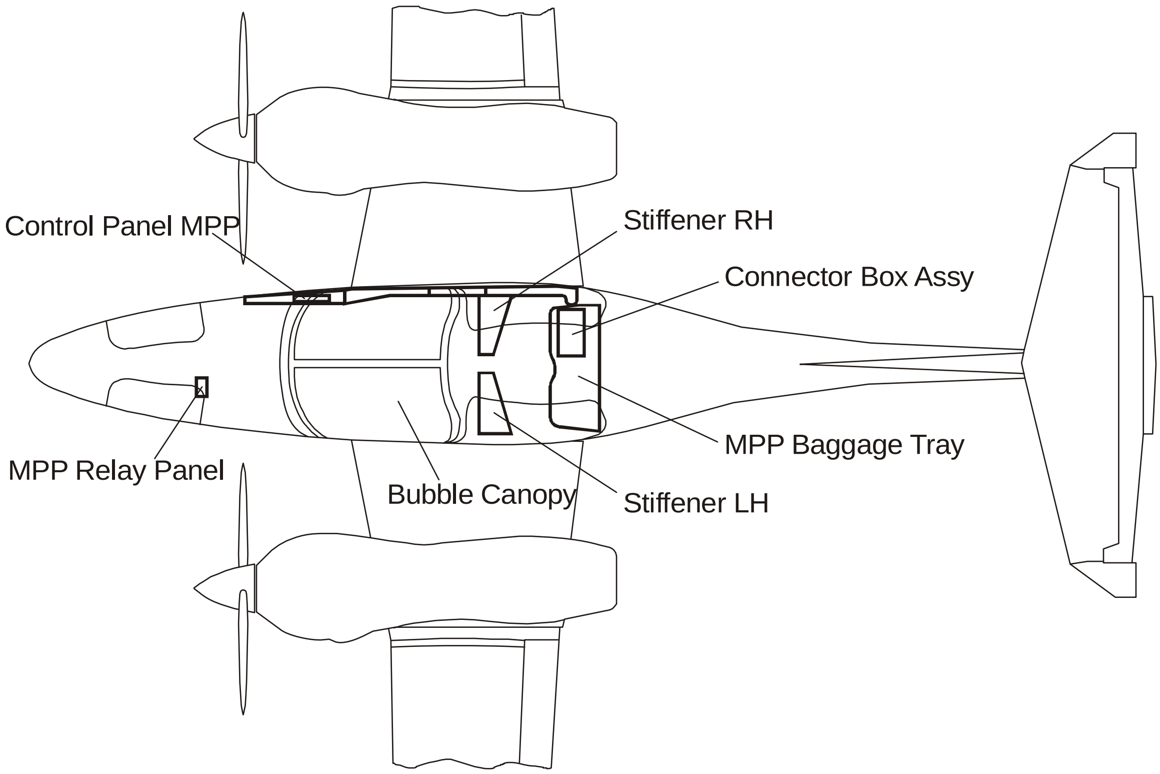

Figure 2: Top View DA 42 with OÄM 42-074 installed

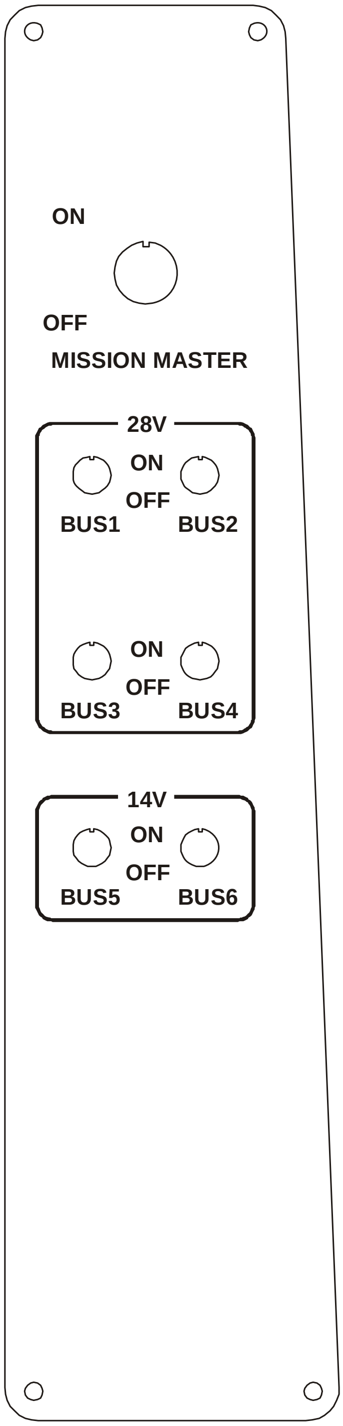

Figure 3: Control Panel MPP

A. Main Relay MPP

The main relay MPP is installed on the LH side of the battery compartment. The main relay is used to switch the power to the mission equipment. The main relay is controlled by the MISSION MASTER switch installed at the front section of the control panel.

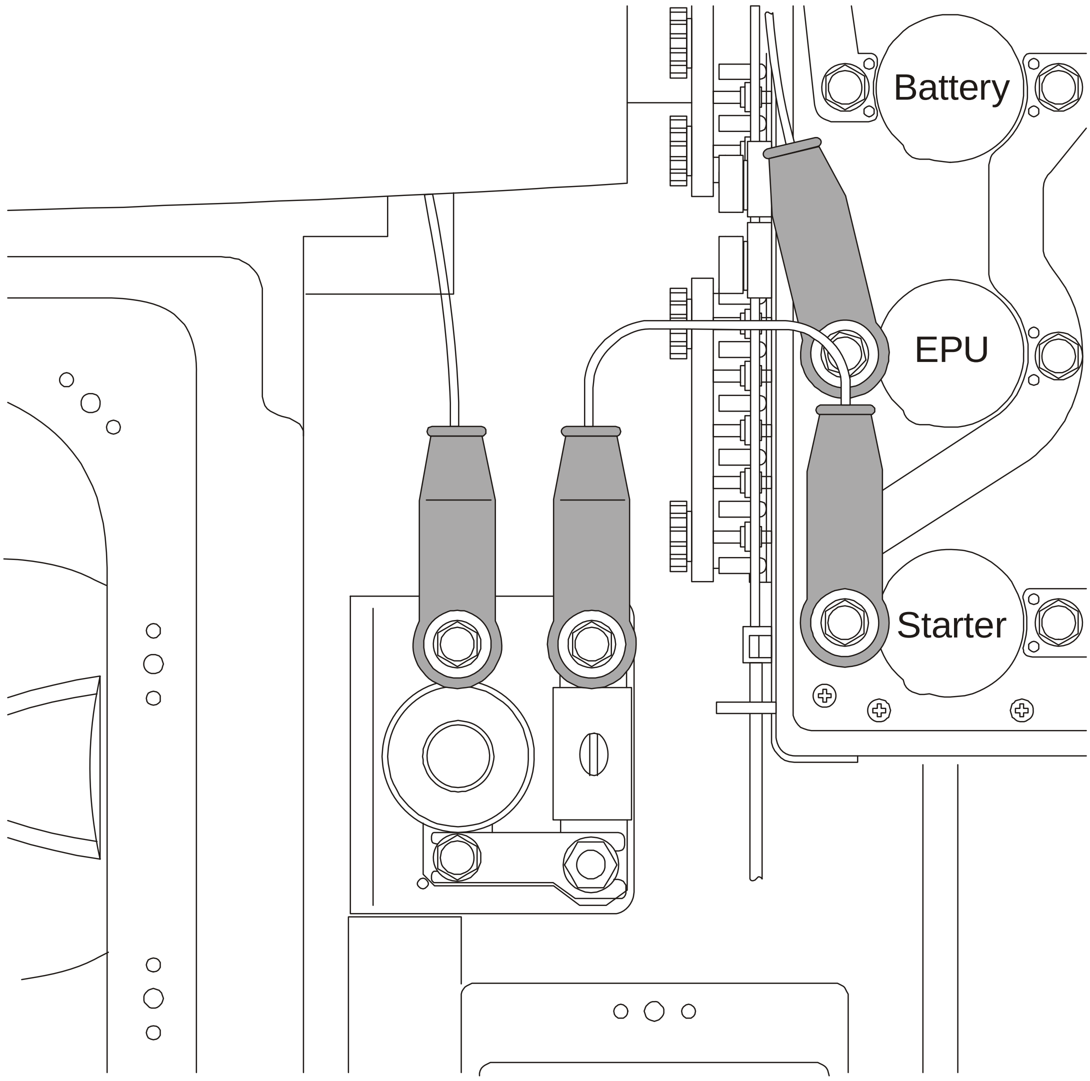

Figure 4: Main Relay MPP Installation

The mission bus is protected by an ANL-60, 60 A fuse installed next to the mission relay. The main relay MPP is accessible after removing the LH battery compartment cover.

Further an alternator fail relay is installed next to the main relay MPP. This relay will open the control circuit of the main relay MPP if an alternator fail warning applies.

Figures 5 and 6 show the wiring diagram of the mission power supply system.

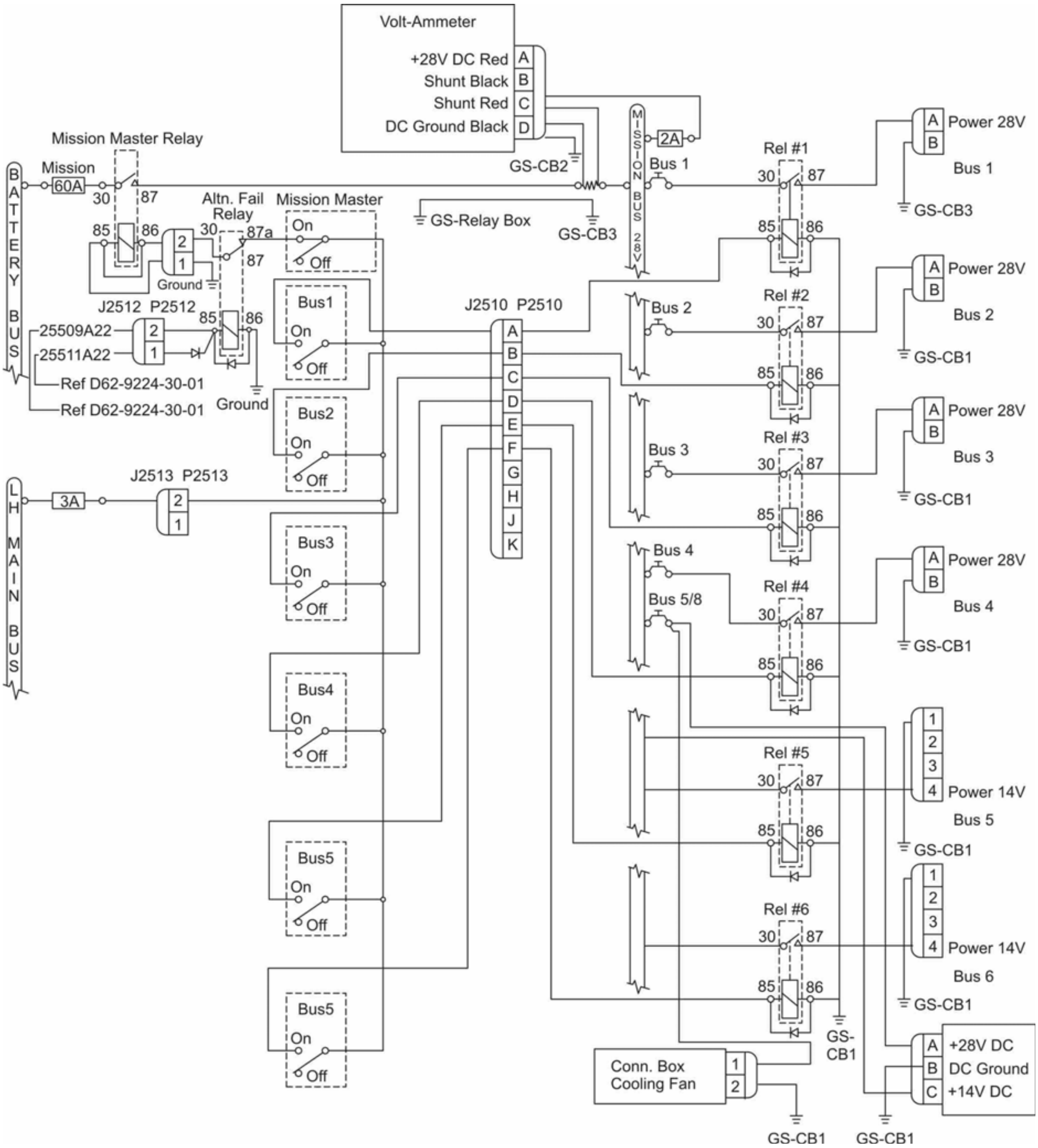

Figure 5: Wiring Diagram - Mission Power Supply System

If OÄM 42-215 is carried out, refer to Figure 6 for the wiring diagram.

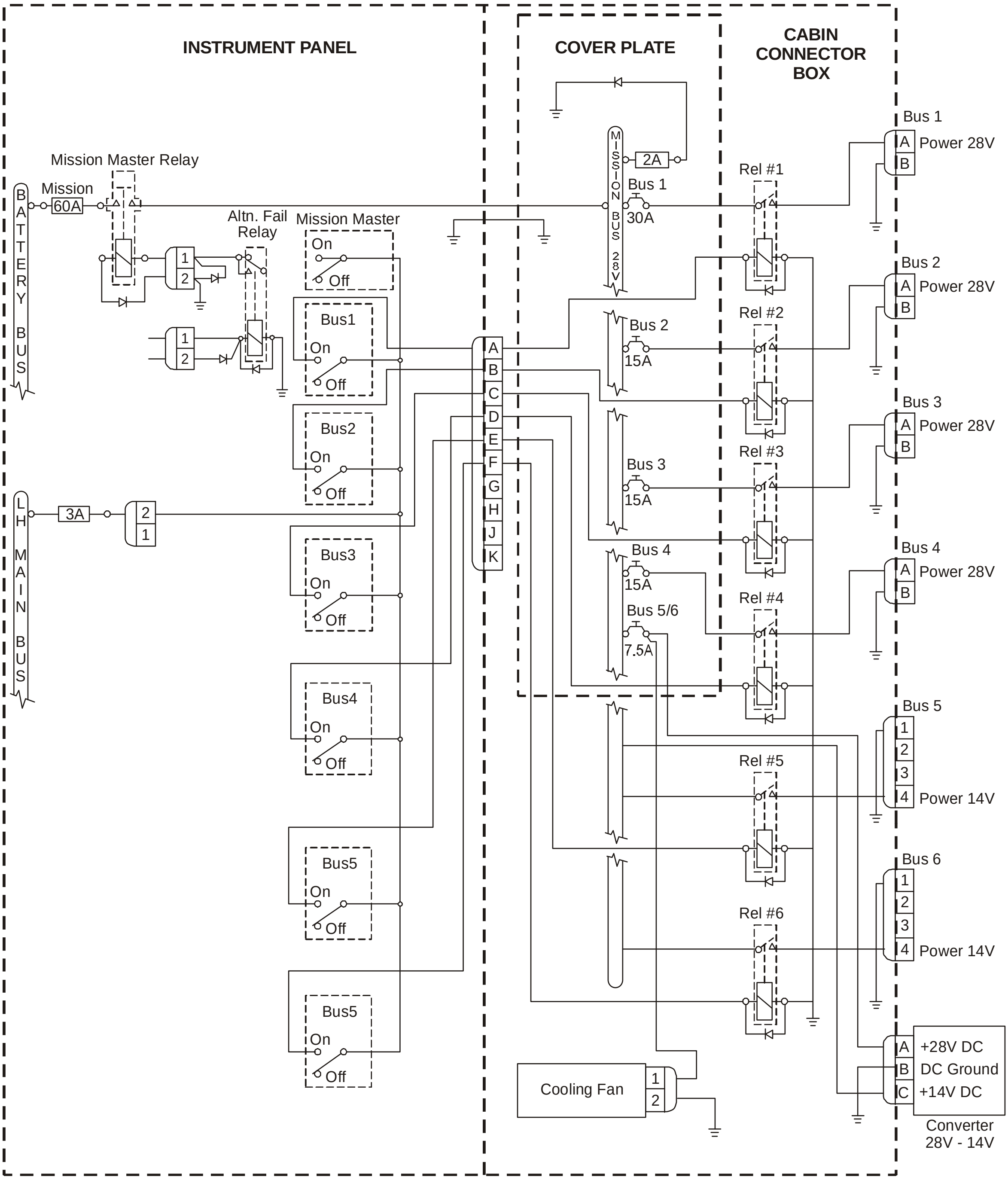

Figure 6: Wiring Diagram - Mission Power Supply System (if OÄM 42-215 is carried out)

B. MPP Connector Box

The MPP connector box is installed on the LH side of the battery compartment (refer to Figure 7 and 8) and serves as the central power distribution unit for each item of mission equipment.

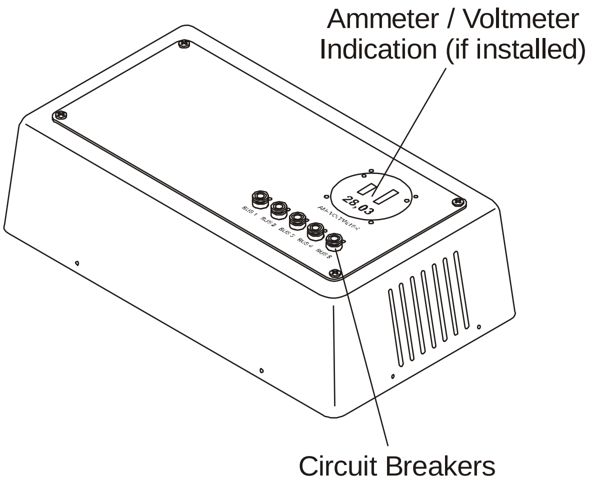

Figure 7: Connector Box Upper Side

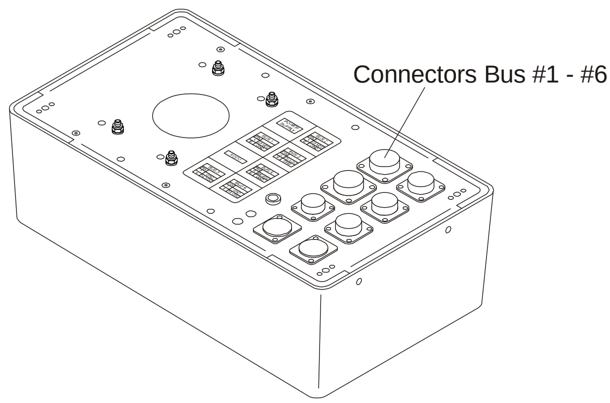

Figure 8: Connector Box Bottom Side

POWER SUPPLY	BUS 2 PIN A 28 VDC B GND
BUS 1 PIN A 28 VDC B GND	BUS 3 PIN A 28 VDC B GND
P2510	BUS 4 PIN A 28 VDC B GND
BUS 5 PIN 1 GND 4 14 VDC	BUS 6 PIN 1 GND 4 14 VDC

Figure 9: Connector Box - Placard

C. Cable Duct

The removable cable duct installed on the RH side of the cabin serves as the cable guide for all cables used for the mission equipment (refer to Figure 9). The power supply and the control cables used for the mission equipment are also installed in this duct. With this cable duct it is possible to route cables from equipment installed in the nose to equipment installed in the aft baggage compartment.

3. Overview - Electrical Loads

Guideline values for the maximum allowed power consumption of the whole additional (mission-) equipment are shown below.

Available Power [Ampère]	Configuration
40*	Normal IFR configuration (DE-ICE OFF).
60*	Minimum VFR configuration.

*) These values are results from the Electrical Load Analysis performed during basic certification of the DA 42 and should be used as a guideline only. The actual available power depends on the amount of electrical power consumers connected to the DA 42 M electrical power distribution system. Nevertheless the mission power supply system must be switched off immediately if a single alternator load of more than 40 A is indicated on the G1000 system.

60 Ampère configuration:

– AV. MASTER OFF.

– Landing, taxi and position light OFF.

– Instrument lights and flood lights OFF.

– De-ice OFF.

– Map/reading lights OFF.

– Pitot heat OFF.

All necessary data to perform an electrical load analysis is shown on the next pages.

A. Overview - Electrical Loads, with Respect to a DCF (Duty Cycle Factor); Normal IFR Configuration*

Equipment		AMPÈRE		
		Load	DCF	Average
Primary Flight Display GDU 1040		1.25	1	1.25
Multi Function Display GDU 1040		1.25	1	1.25
Audio Panel GMA 1347		1.36	1	1.36
Integrated Avionics #1 GIA 63		0.996	1	0.996
COM #1 XMT		4.16	0.1	0.416
Integrated Avionics #2 GIA 63		0.996	1	0.996
COM #2 XMT		4.16	0.05	0.208
Transponder GTX 33		0.786	1	0.786
AHRS GRS 77 including GMU 44		0.3	1	0.3
Engine/Airframe GEA 71		0.3	1	0.3
Air Data GDC 74		0.196	1	0.196
ADF Receiver RA 3502-(01)		0.65	1	0.65
ADF/RMI Converter AC 3504-(01)		0.45	0	0
DME KN 63		0.607	0	0
Autopilot Computer KC 140		0.5	1	0.5
Pitch Servo KC 270C		1	0.5	0.5
Roll Servo KC 271C		1	0.5	0.5
Trim Servo KC 272C		1	0.5	0.5
Turn & Bank		0.35	1	0.35
ECU LH		8	0.62	5
ECU RH		8	0.62	5
Backup Artificial Horizon		0.3	1	0.3
Flaps		5	0.01	0.05
Elevator Limiter		2.1	0.01	0.021
Pitot/Stall Heat		13.97	0.2	2.79
Landing Light		2	0.1	0.2
Taxi Light		2	0.1	0.2
Position Light		3.4	0.2	0.68
Strobe Light		3.4	1	3.4
Flood Light		1	0.5	0.5
Instrument Lights		0.2	0.5	0.1
Illuminated Placards		1.5	0.5	0.75
Map Lights		0.625	0.01	0.00625
AV/GDU Cooling Fans		0.46	1	0.46
Landing Gear Hydraulic Pump		42	0.01	0.42
Hydraulic Valves		1.2	1	1.2
Landing Gear Annunciators and Warning		0.221	0.05	0.111
Landing Gear Pump Relay		0.35	0.01	0.0035
Landing Gear Annunciation Relay		0.067	0.05	0.00335
Battery Relay		0.25	1	0.25

Equipment		AMPÈRE		
		Load	DCF	Average
Alternator LH Relay		0.25	1	0.25
Alternator RH Relay		0.25	1	0.25
ECU A LH Relay		0.067	1	0.067
ECU B LH Relay		0.067	1	0.067
ECU A RH Relay		0.067	1	0.067
ECU B RH Relay		0.067	1	0.067
Stall Warning		0.15	0.01	0.0015
Unfeathering Valve LH		0.6	1	0.6
Unfeathering Valve RH		0.6	1	0.6
Ice Protection System including Lights		6.8	0.5	0
Aux Fuel Tank System LH&RH		5.26	0.5	2.63
Stormscope WX500		0.38	1	0.38
Traffic Advisory System TAS 6X0		1.55	1	1.55

Amps required	39.2

2 alternators	Amps max. on main bus	80.0 A
Load calculation:	Alt. Amps available	80.0 A
	Amps load max.	39.2 A
	Available Amps for mission power supply system	40.8 A
		=====

*) Normal IFR configuration for the DA 42 M means that the ADF and the ice protection system are switched off. If the ice protection system is required the MISSION MASTER switch must be switched off.

**) According to the TAE-125-02 Installation Manual the main bus is defined as the bus after alternator and ECU. The max power consumption of equipment connected to the main bus must not exceed nominal 35 Amps. The G1000 alternator indication measures the alternator load directly after the alternator. Therefore the 10 Amps for both ECUs must be added to the 70 Amps.

B. Overview - Electrical Loads, with Respect to a DCF (Duty Cycle Factor); Min. VFR Configuration*

Equipment			AMPÈRE	
		Load	DCF	Average
Primary Flight Display GDU 1040	ON	1.25	1	1.25
Multi Function Display GDU 1040	ON	1.25	1	1.25
Audio Panel GMA 1347	OFF	1.36	0	0
Integrated Avionics #1 GIA 63	ON	0.996	1	0.996
COM #1 XMT	ON	4.16	0.1	0.416
Integrated Avionics #2 GIA 63	OFF	0.996	0	0
COM #2 XMT	OFF	4.16	0	0
Transponder GTX 33	OFF	0.786	0	0
AHRS GRS 77 including GMU 44	ON	0.3	1	0.3
Engine/Airframe GEA 71	ON	0.3	1	0.3
Air Data GDC 74	ON	0.196	1	0.196
ADF Receiver RA 3502-(01)	OFF	0.65	0	0
ADF/RMI Converter AC 3504-(01)	OFF	0.45	0	0
DME KN 63	OFF	0.607	0	0
Autopilot Computer KC 140	OFF	0.5	0	0
Pitch Servo KC 270C	OFF	1	0	0
Roll Servo KC 271C	OFF	1	0	0
Trim Servo KC 272C	OFF	1	0	0
Turn & Bank	OFF	0.35	0	0
ECU LH	ON	8	0.62	5
ECU RH	ON	8	0.62	5
Backup Artificial Horizon	ON	0.3	1	0.3
Flaps	ON	5	0.01	0.05
Elevator Limiter	ON	2.1	0.01	0.021
Pitot/Stall Heat	OFF	13.97	0	0
Landing Light	OFF	2	0	0
Taxi Light	OFF	2	0	0
Position Light	OFF	3.4	0	0
Strobe Light	OFF	3.4	0	0
Flood Light	OFF	1	0	0
Instrument Lights	OFF	0.2	0	0
Illuminated Placards	OFF	1.5	0	0
Map Lights	OFF	0.625	0	0
AV/GDU Cooling Fans	ON	0.46	1	0.46
Landing Gear Hydraulic Pump	OFF	42	0	0
Hydraulic Valves	OFF	1.2	0	0
Landing Gear Annunciators and Warning	ON	0.221	0.05	0.111
Landing Gear Pump Relay	OFF	0.35	0	0
Landing Gear Annunciation Relay	ON	0.067	0.05	0.00335
Battery Relay	ON	0.25	1	0.25

Equipment		AMPÈRE		
		Load	DCF	Average
Alternator LH Relay	OFF	0.25	0	0
Alternator RH Relay	OFF	0.25	0	0
ECU A LH Relay	ON	0.067	1	0.067
ECU B LH Relay	ON	0.067	1	0.067
ECU A RH Relay	ON	0.067	1	0.067
ECU B RH Relay	ON	0.067	1	0.067
Stall Warning	ON	0.15	0.01	0.0015
Unfeathering Valve LH	ON	0.6	1	0.6
Unfeathering Valve RH	ON	0.6	1	0.6
Ice protection System including Lights	OFF	6.8	0	0
Aux Fuel Tank System LH&RH	OFF	5.26	0	0
Stormscope WX500	OFF	0.38	0	0
Traffic Advisory System TAS 6X0	OFF	1.55	0	0

Amps required	17.4

2 alternators	Amps max. on main bus	80.0 A
Load calculation:	Alt. Amps available	80.0 A
	Amps load max.	17.4 A
	Available Amps for mission power supply system	62.6 A
		=====

*) Minimum VFR configuration the DA 42 M means that the AV. MASTER, lights, aux fuel pumps and the ice protection system are switched off.

**) According to the TAE-125-02 Installation Manual the main bus is defined as the bus after alternator and ECU. The max power consumption of equipment connected to the main bus must not exceed nominal 35 Amps. The G1000 alternator indication measures the alternator load directly after the alternator. Therefore the 10 Amps for both ECUs must be added to the 70 Amps.

Trouble Shooting

1. General

This table tells you how to trouble-shoot the mission power supply system. If you find the trouble in column 1 do the repair given in column 3.

Trouble	Possible Cause	Repair
MPP connector box. No power.	MPP main fuse open.	Open the MPP connector box by removing the bottom screws of the box. Check voltage by using a voltmeter (confirm BATTERY MASTER and MISSION MASTER in ON position).
	Main relay MPP defective.	Replace the main relay MPP.
MPP connector box. Bus #1 - Bus #4 inoperative.	Relay defective.	Replace the defective relay in the MPP connector box.
	Circuit breaker defective.	Replace the defective circuit breaker in the MPP connector box.
MPP connector box. Bus #5 - Bus #6 inoperative.	Relay defective.	Replace the defective relay in the MPP connector box.
	Circuit breaker defective.	Replace the defective circuit breaker in the MPP connector box.
	DC-DC converter defective.	Replace the defective DC-DC converter in the MPP connector box.

Trouble	Possible Cause	Repair
MPP connector box - ammeter / voltmeter (if installed) indication defective.	Inlet fuse open.	Check the inlet fuse. If open, check wiring and ammeter/ voltmeter for short circuit. If wiring is ok and no short circuit have been found. Replace ammeter / voltmeter indication.
	Ammeter / voltmeter unit defective.	Replace the unit.
Control panel - MISSION MASTER or Bus #1 - Bus #6 switch defective.	Bad connection on P2510.	Check the connector.
	Switch defective.	Replace the switch.

Maintenance Practices

1. General

These Maintenance Practices tell you how to remove and install the main components of the mission power supply system.

2. Remove/Install the Main Relay MPP

A. Remove the Main Relay MPP

	Detail Steps/Work Items	Key Items/References
(1)	Confirm that the battery master is switched off and airplane is not powered.	
(2)	Remove LH oxygen compartment cover (if installed).	
(3)	Remove LH battery compartment cover.	
(4)	Remove both screws on the top side of the main relay MPP.	
(5)	Remove MPP bus bar.	
(6)	Disconnect the plug and remove the main relay MPP by lifting it.	

B. Install the Main Relay MPP

	Detail Steps/Work Items	Key Items/References
(1)	Place the main relay MPP in the cut out on the designated bracket and connect it.	
(2)	Install the MPP bus bar.	
(3)	Install both scews of the main relay MPP.	
(4)	Check proper function of the mission bus.	
(5)	Check area for foreign objects.	
(6)	Install the LH battery compartment cover.	
(7)	Install the LH oxygen compartment cover.	

3. Remove/Install the MPP Fuse

A. Remove the MPP Fuse

	Detail Steps/Work Items	Key Items/References
(1)	Confirm that battery master is switched off and airplane is not powered.	
(2)	Remove LH oxygen compartment cover (if installed).	
(3)	Remove LH battery compartment cover.	
(4)	Remove both nuts on the top side of the fuse block (on the MPP main relay bracket)	
(5)	Remove MPP fuse.	60 A fuse: P/N: ANL 60

B. Install the MPP Fuse

	Detail Steps/Work Items	Key Items/References
(1)	Place the MPP fuse on the MPP fuse block and install both nuts on the top side.	
(2)	Check proper function of the mission bus.	
(3)	Check area for foreign objects.	
(4)	Install the LH battery compartment cover.	
(5)	Install the LH oxygen compartment cover.	

4. Remove/Install the Connector Box

A. Remove the Connector Box

	Detail Steps/Work Items	Key Items/References
(1)	Confirm that battery master is switched off and airplane is not powered.	
(2)	Open both camlocks on the MPP baggage tray cover and open the compartment.	
(3)	Disconnect all cables connected to the MPP connector box.	
(4)	Remove all screws on the bottom side of the connector box, open the box and disconnect the main power and ground cable.	
(5)	Remove all 4 mounting screws on the bottom side of the connector box.	

B. Install the Connector Box

	Detail Steps/Work Items	Key Items/References
(1)	Place the MPP connector box on the MPP baggage tray cover.	
(2)	Connect the main power cable as shown on drawing D62-9225-00-00. Close box by installing all screws on the bottom side of the connector box.	
(3)	Mount box with 4 screws from the bottom side.	Refer to drawing D62-2554-00-00.
(4)	Connect cable P2510 to the socket on the bottom side of the connector box.	
(5)	Check area for foreign objects.	
(6)	Close MPP baggage tray compartment and fix the cover by turning both camlocks.	

5. Remove/Install the Cable Duct

A. Remove the Cable Duct 1 - 3

	Detail Steps/Work Items	Key Items/References
(1)	Remove all mounting screws of the cable ducts.	
(2)	Remove cable ducts in the following order: – Duct no. 1. – Duct no. 3. – Duct no. 2.	

B. Install the Cable Duct 1- 3

	Detail Steps/Work Items	Key Items/References
(1)	Install all cables below the cable duct covers by using thy wraps. Fix the cables on the thy wrap bases.	Check installation and confirm that no cable is annihilated.
(2)	Bring the cable duct no. 1 - 3 parts in right positions.	
(3)	Fix duct by using screws.	
(4)	Check area for foreign objects.	

6. Perform Functional Check of the Alternator Fail Relay

	Detail Steps/Work Items	Key Items/References
(1)	Switch ELECT. MASTER ON.	
(2)	Switch both alternators OFF.	
(3)	Switch MISSION MASTER ON.	RH console.
(4)	Switch LH alternator ON.	
(5)	Check LH alternator caution.	
(6)	Switch LH alternator OFF.	
(7)	Repeat steps 4 to 6 for RH alternator.	
(8)	Switch LH and RH alternator ON.	
(9)	Switch MISSION MASTER OFF.	RH console.
(10)	Switch ELECT. MASTER OFF.	

CHAPTER 25

EQUIPMENT/FURNISHINGS

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CHAPTER 25
EQUIPMENT FURNISHINGS

1. General

This Chapter tells you about the equipment and the furnishings in the flight compartment of the DA 42 airplane. Figure 1 shows the location of the cabin equipment. Section 25-10 includes the flight compartment trim panels, the cabin seats and the safety harnesses. Section 25-60 tells you about the Emergency Location Transmitter (ELT) and the first aid kit. Refer to Chapter 26 for data about the hand fire extinguisher.

Note: Equipment which is certified for installation in the DA 42 is listed in Section 6.5 of the Airplane Flight manual. Such equipment may be installed in accordance with the Airplane Maintenance Manual.

Note: Any equipment which is not listed in Section 6.5 of the Airplane Flight Manual is called “Additional Equipment”. The installation of Additional Equipment is a modification which must be handled in accordance with national regulations or a Service Bulletin.

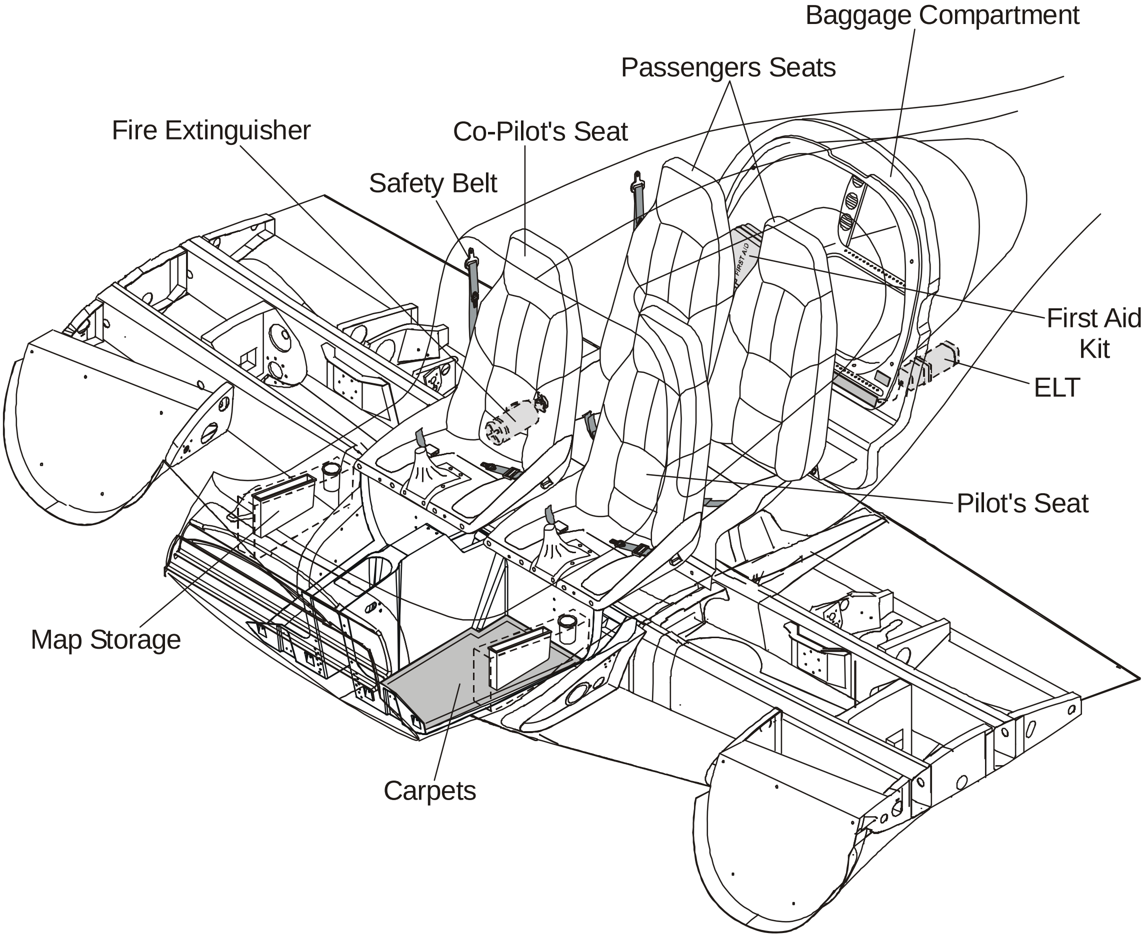

Figure 1: Cabin Equipment

Section 25-10
Flight Compartment

1. General

The flight compartment of the DA 42 has fixed seats for the 2 pilots and 2 passengers. If OÄM 42-067 or OÄM 42-259 is carried out, the pilots' seats are equipped with adjustable backrests.

Each seat has a safety harness. The fuselage shell is trimmed with fabric wall panels. Carpets cover the floor areas and the aft baggage compartment floor. Map pockets are located on the cockpit side by each pilot.

GFRP moldings make the instrument panel cover and the center console. Refer to Section 25-60 for data about the ELT and the first aid kit.

2. Description and Operation

A. Pilots' Seats

(1) Fixed Pilots' Seats

Figure 1 shows the pilot's seat installation. Each pilot's seat is GFRP/Carbon/Kevlar molding. Rivets attach a metal plates to the bottom of the seat pan at the back. Two bolts go through the seat pan and the metal plate to hold the lap straps of the safety harness. These bolts also hold metal anchor plates which attach to anchor nuts in the large cut out in the front main bulkhead.

The front of the seat pan curves down to locate over the rear vertical wall of the front floor panel. Two bolts with washer plates attach the front seat to the floor panel.

A padded seat cushion covers the molding. Velcro tapes attach the forward part of the seat cushion to the seat pan. A flexible gaiter attaches to the front seat pan with velcro tapes. The control stick passes through the gaiter. A velcro tape seals the top of the gaiter to the control stick.

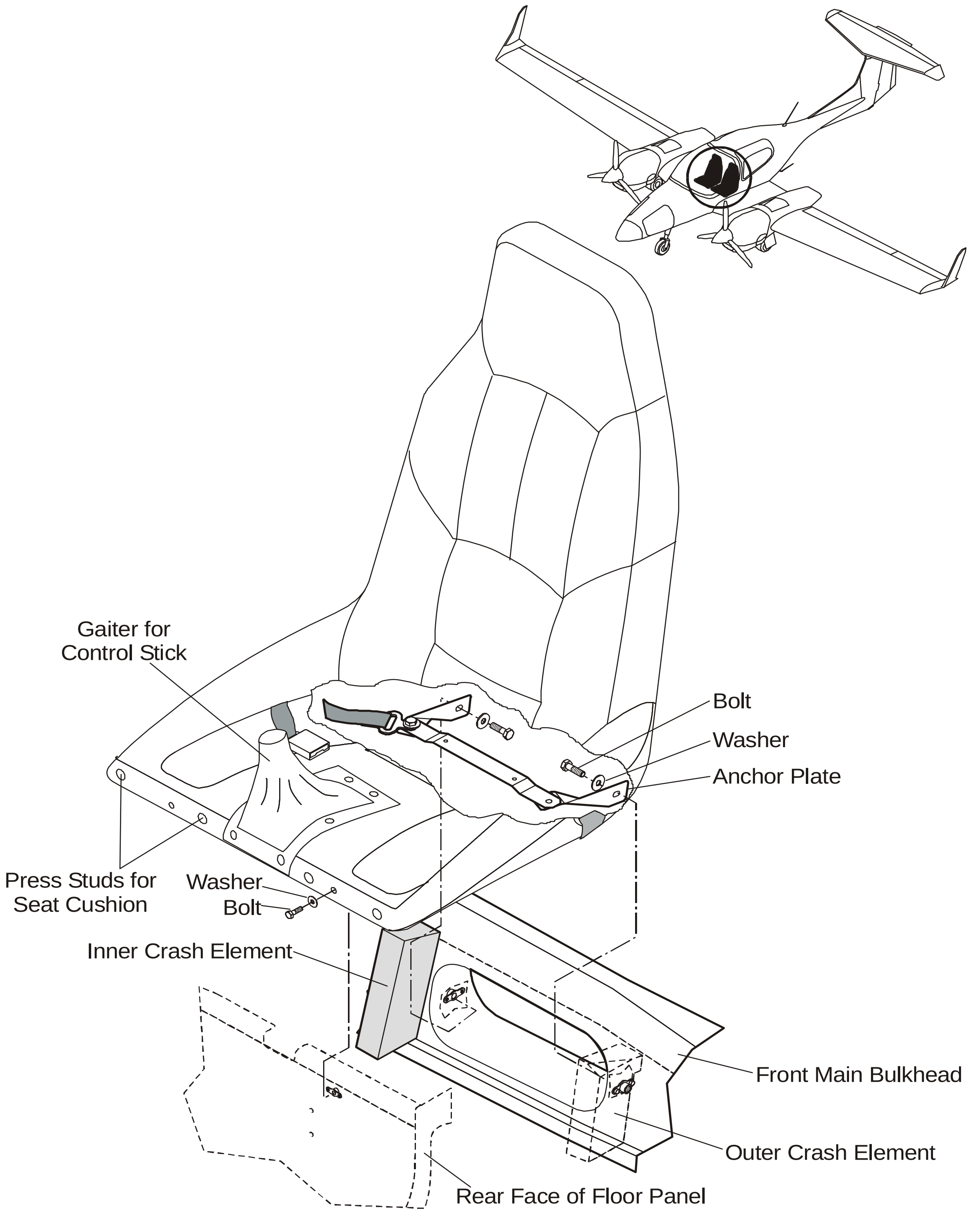

Figure 1: Pilot's Seat Installation

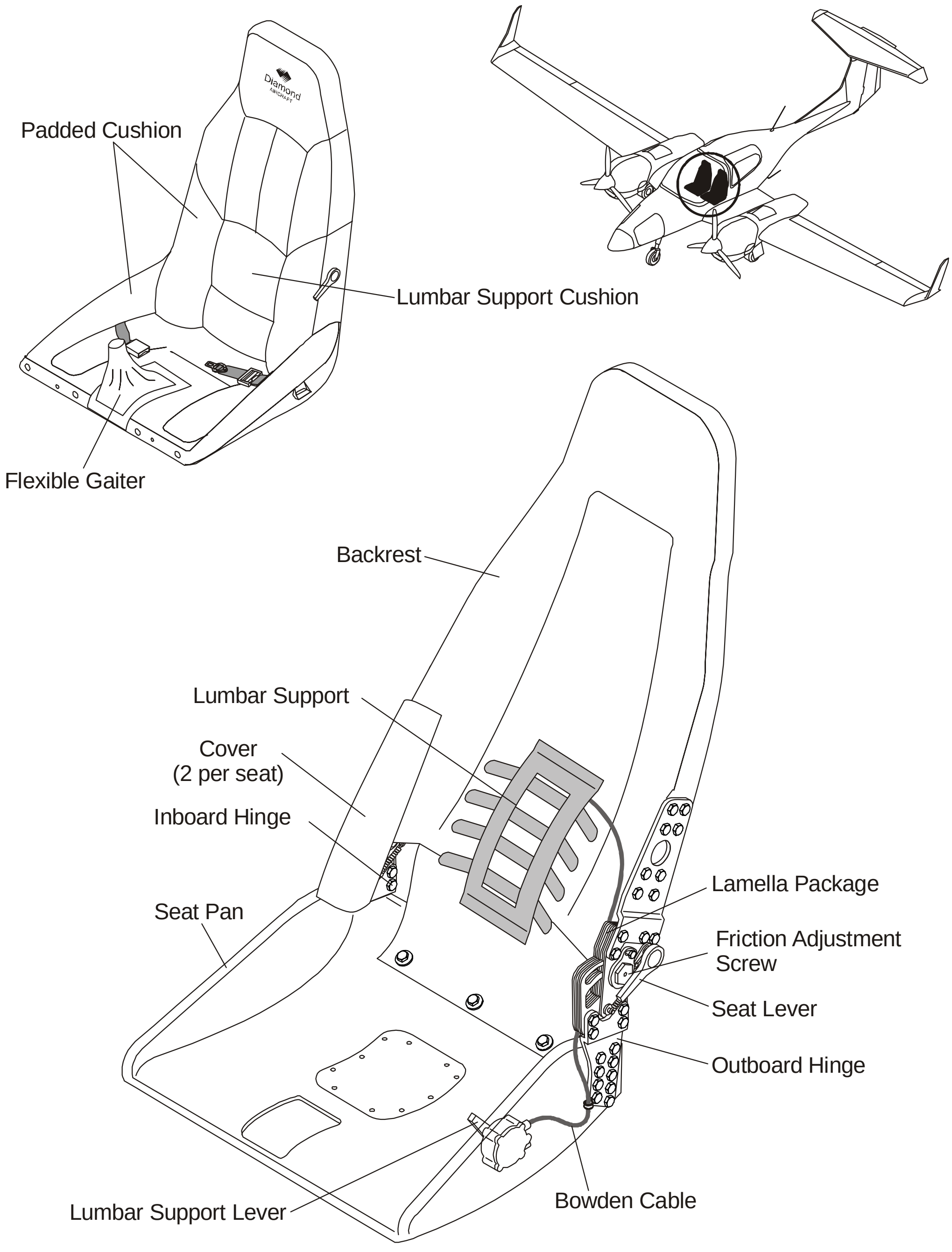

Figure 2: Pilot’s Seat Installation (if OÄM 42-067 is carried out)

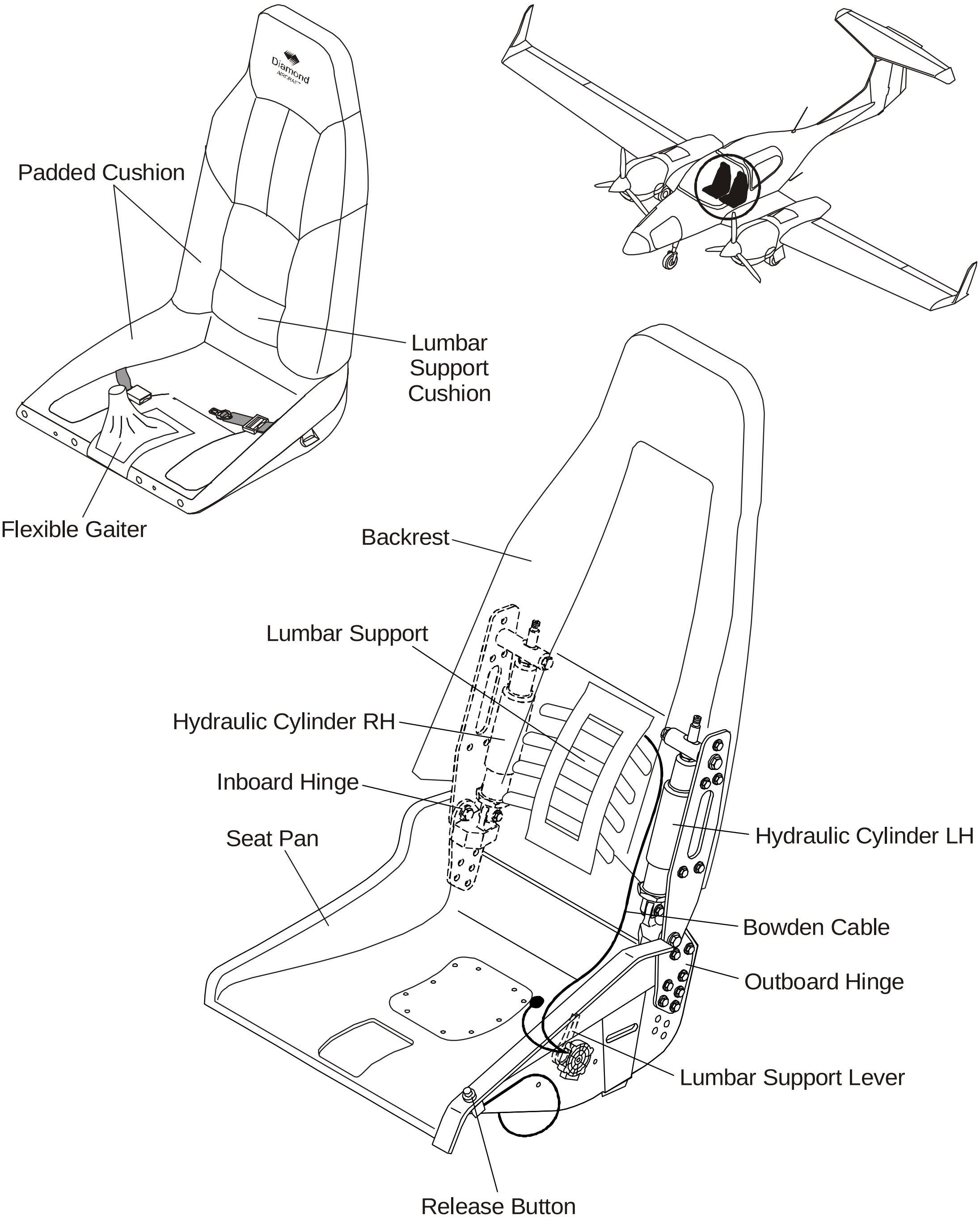

Figure 3: Pilot's Seat Installation (if OÄM 42-259 is carried out)

(2) Pilots' Seats with Adjustable Backrest (if OÄM 42-067 is carried out)

CAUTION: DO NOT LOOSEN THE LEVER FOR THE ADJUSTABLE BACKREST OF THE FRONT SEATS UNINTENTIONALLY. THE SPRING LOADED BACKREST MAY SNAP FORWARD AND CAN CAUSE INJURY.

Figure 2 and Figure 3 show the variants of pilots' seats with adjustable backrest installations. Each pilots' seat consists of a seat pan and a backrest made of GFRP/Carbon/Kevlar. Rivets attach a metal plate to the bottom of the seat pan at the back. Two bolts go through the seat pan and the metal plate to hold the lap straps of the safety harness. These bolts also hold metal anchor plates which attach to anchor nuts in the large cut-out in the front main bulkhead. The front of the seat pan curves down to locate over the rear vertical wall of the front floor panel.

The backrest is attached to the seat pan via an inboard and an outboard hinge. If OÄM 42-067 is installed, each hinge is formed by two lamella packages - one is bolted to the seat pan, the other to the backrest with hexagon head bolts. The lamella packages act as a friction brake controlled by a friction adjustment screw and the seat lever on the outboard side of each backrest. To preload the friction brake to the correct setting refer to the Maintenance Practices in this Section. Additionally the backrest is forced forward by a GFRP/Carbon spring element mounted to the bottom of the seat pan.

If the OÄM 42-259 is installed, the seat pan and backrest are bolted similarly to the inboard and outboard hinges. The hinges are linked twice, once thru brackets with the Hydrolok cylinder and once with a bolt allowing rotation. A button operates via Bowden cable a valve allowing the Hydrolok cylinder retract/extend forcing the hinges rotating around their connecting bolt. Additionally the backrest is forced forward by a spring integrated in the Hydrolok cylinder.

The upright position of the backrest is determined by a placard on the roll-over bar.

A lumbar support cushion is integrated to the lower part of the backrest. The cushion is operated via a Bowden cable by use of a lever mounted to the outboard side of the seat pan.

A padded cushion covers the seat pan molding and the backrest. Press studs attach the forward part of the seat cushion to the seat pan. A flexible gaiter attaches to the front seat pan with press-studs. The control-stick passes through the gaiter. A velcro band seals the top of the gaiter to the control stick.

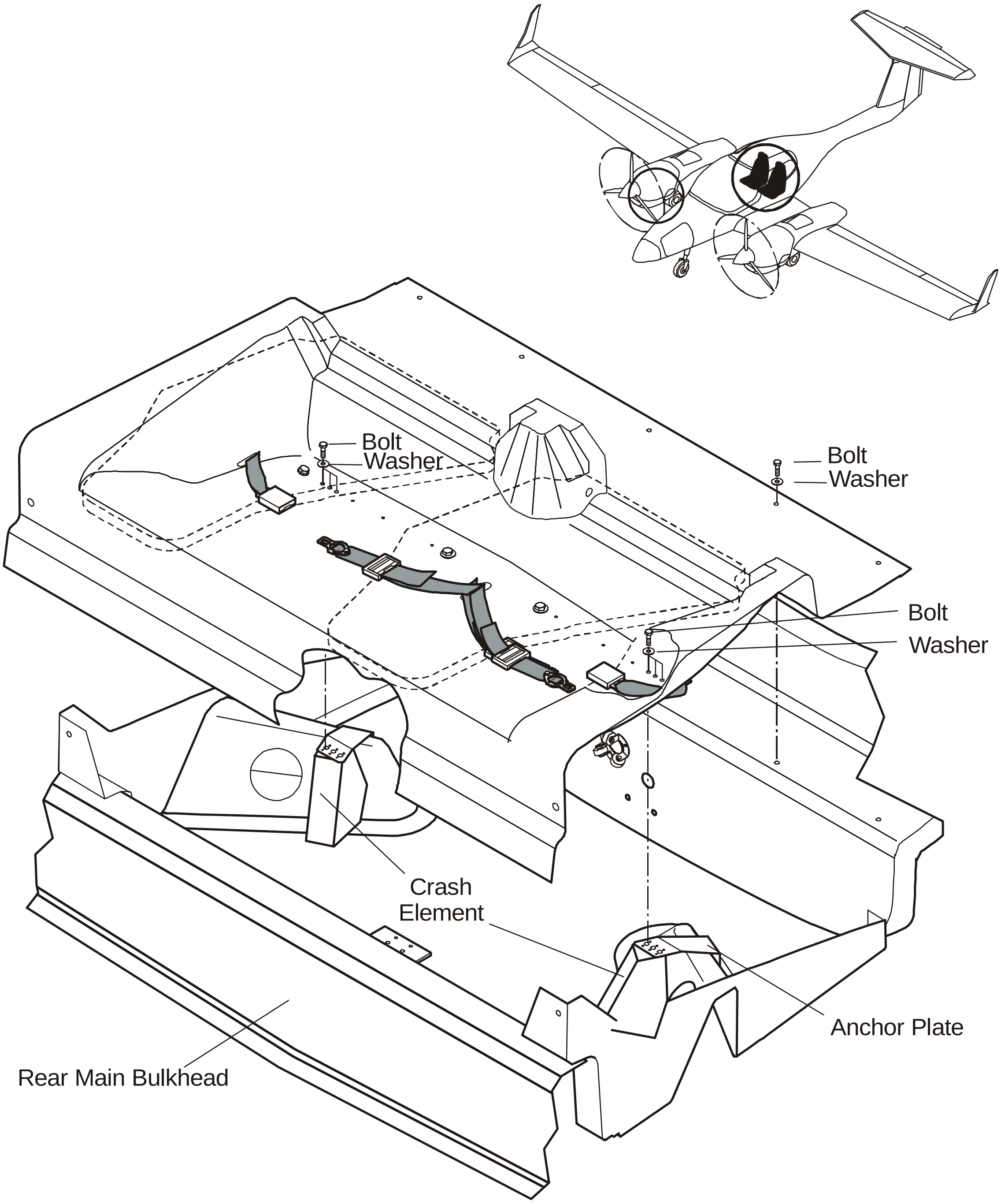

Figure 4: Passenger Seat Installation

B. Passenger Seat

Figure 4 shows the passenger seat installation. The passenger seat has 3 main parts. It has a double seat pan which is the full width of the cockpit. The rear seat pan also makes the baggage compartment floor. The passenger seat also has 2 seat backs which attach to the seat pan with hinges. A latch at the left side of each seat back locks the seat in the upright position. You can lift the latch pin to fold the seat-back forward for access to the aft baggage compartment.

A padded seat cushion covers the seat molding. Velcro tapes attach the forward part of the seat cushion to the seat pan. Padded cushions also cover the seat backs.

Rivets attach a metal plate under each half of the seat pan at the back. Two bolts go through each half of the seat pan and the metal plate to hold the lap straps of the safety harness. Three bolts with washer plates on each side of the seat pan go through the seat pan and metal plate to anchor nuts in metal anchor plates. The anchor plates are bolted to the fuselage structure. Two bolts with washer plates attach the front of the seat pan to ribs on top of the rear main bulkhead. Five bolts with washer plates attach the rear of the seat pan to the top face of the aft baggage compartment frame.

C. Crash Elements

Each seat rests on crash elements. Each crash element has layers of fiber composite and a special rigid foam bonded together. The crash elements compress under the high loads which occur in accidents. They reduce the injuries to pilots and passengers in an accident.

The rear of each pilot’s seat rests on 2 crash elements. They are located just outboard of the safety harness attachments. The passenger seat pan rests on 2 crash elements. They are located under the anchor plates on each side.

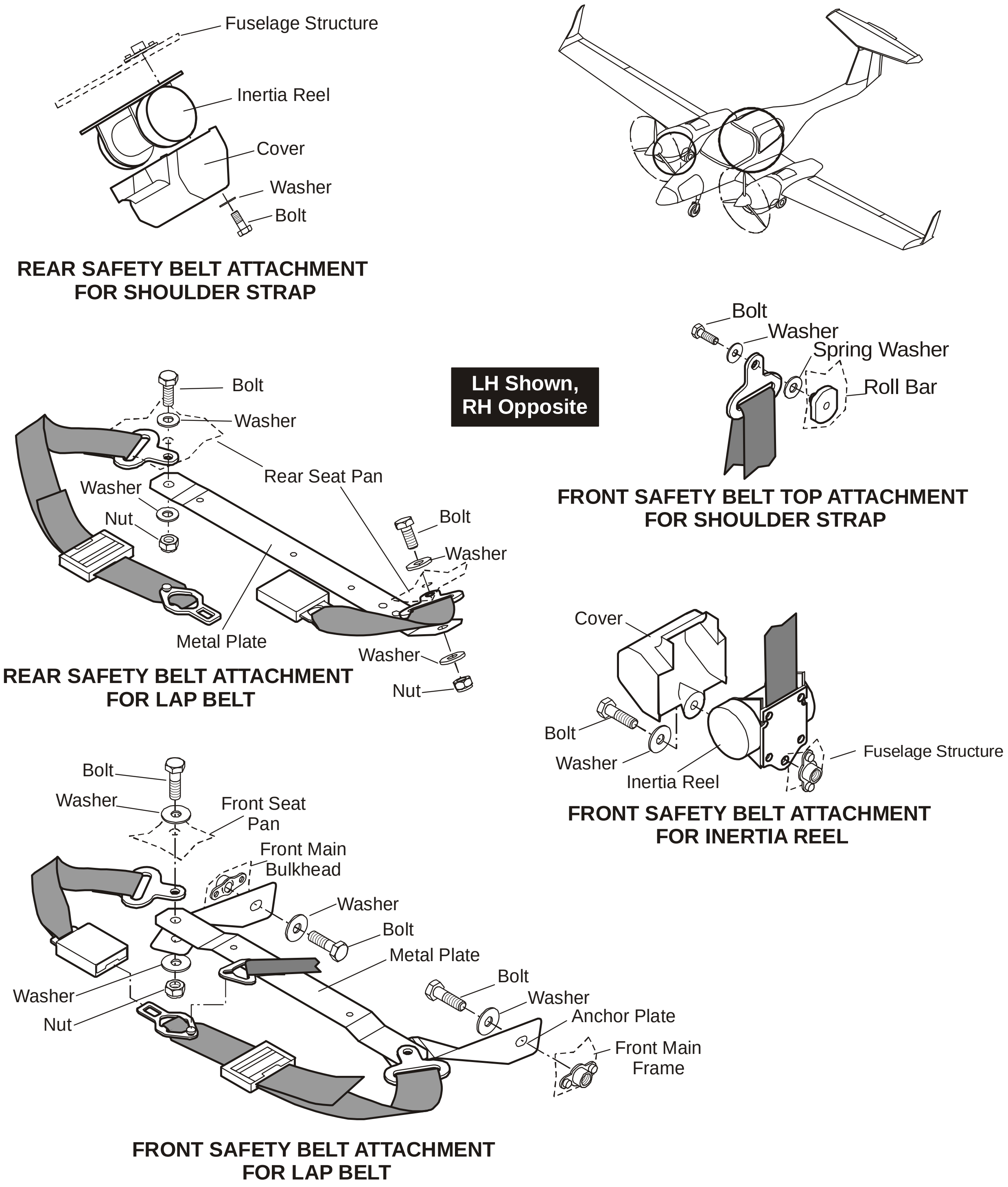

Figure 5: Safety Harness Installation

D. Safety Harness

Figure 5 shows the safety harness installation. Each seat has a fixed lap strap and an inertia sensitive shoulder strap. The lap belt has 2 straps. The outboard strap has an adjuster to tighten the strap in use. It also has tongue to engage the buckle on the inboard strap. The inboard strap is a fixed length. The buckle has a red button at the outboard end to release the tongue of the outboard lap strap. Push the tongue into the end of the buckle to lock them together.

Bolts with washer plates and anchor nuts attach each lap strap to the seat pan. You must remove the seat to remove the lap strap.

The shoulder strap attaches to an inertia reel. The inertia reel has a latch which senses acceleration. With the airplane flying straight and level, the inertia reel lets the shoulder strap pul out against a light spring tension. If the airplane is accelerated (for example, in turbulence), the latch stops the shoulder strap from pulling out.

The inertia reel for the pilot’s safety harness is located on the fuselage wall behind the pilot’s seat. The strap passes up through a guide attached to the roll-bar just above the pilot’s shoulder and down to the tongue on the outboard lap strap. The end fitting on the shoulder strap hooks onto a stud on the tongue.

The inertia reels for the rear passengers’ safety harnesses are located above and to the rear of the passengers. They are mounted on the fuselage top inner surface.

If OÄM 42-324 is installed: Refer to AmSafe Maintenance Documentation for further information.

E. Fabric Wall Panels

Fabric wall panels bond to the inside of the fuselage shell. Each front outboard side-panel has a map pocket.

F. Instrument Panel Cover

A GFRP cover goes over the instrument panel. Screws attach the cover to the instrument panel. The instrument panel cover has a defrost manifold to direct defrost air from the heating system onto the inside of the canopy to prevent canopy misting. Flexible hoses connect the manifold to the airplane heating system.

G. Center Console Panel

A GFRP panel goes between the rear wall of the floor panel and the front face of the main front bulkhead. The center console panel covers the trim mechanism. It also seals the gap between the pilots’ seats.

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Maintenance Practices

1. General

These maintenance procedures tell you how to remove/install the seats, the safety harnesses and other furnishings. See Section 25-60 for data about the ELT and other safety equipment.

2. Remove/Install a Pilot's Seat

Note: Some maintenance procedures described in this AMM require the removal of a front seat. However, if the maintenance hole in the seat gives sufficient access to the system beneath, it is acceptable to leave the seat in place and remove only the maintenance access panel. Refer to Paragraph 3.

If OÄM 42-324 is installed:

WARNING: WHEN REMOVING A SEAT FROM THE AIRCRAFT, VERIFY THAT THE AMSAFE SEATBELT AIRBAG SYSTEM RESTRAINT IS NOT BUCKLED AND DISCONNECT CABLE INTERFACE ASSY. FROM THE END-RELEASE BUCKLE ASSEMBLY CONNECTOR BEFORE REMOVAL OF THE SEAT. AN ELECTRICALLY CONNECTED AMSAFE SEATBELT AIRBAG RESTRAINT SYSTEM AND BUCKLED SEAT BELT MAY RESULT IN DAMAGE TO THE EQUIPMENT OR DEPLOYMENT OF THE SYSTEM. REFER TO AMSAFE MAINTENANCE DOCUMENTATION.

A. Remove a Pilot's Seat

	Detail Steps/Work Items	Key Items/References
If the adjustable front seats (OÄM 42-067 or OÄM 42-259) are installed: CAUTION: DO NOT ENGAGE THE LEVER OR THE BUTTON FOR THE ADJUSTABLE BACKREST OF THE FRONT SEATS UNINTENTIONALLY. THE SPRING LOADED BACKREST MAY SNAP FORWARD AND CAN CAUSE INJURY.		

	Detail Steps/Work Items	Key Items/References
(1)	If the adjustable front seats (OÄM 42-067 or OÄM 42-259) are installed: Set backrest to the upright position: – Sit down in the front seat. – Lift the seat lever or engage button. – Adjust the backrest to the upright position. – Release the button or seat lever.	
(2)	Release the top of the gaiter from the control stick.	Refer to Figure 1 (fixed backrest) or Figure 2 and 3 (adjustable backrests).
(3)	Release the press-studs at the front of the seat-cushion.	Move the cushion to give access to the attaching bolts for the seat.
(4)	Remove the 2 bolts with washer plates which attach the anchor plates to the front main bulkhead.	From the passenger compartment behind the pilot's seat.
(5)	Remove the 2 bolts with washer plates which attach the front of the seat to the rear wall of the floor panel.	
(6)	Remove the lap strap from the seat.	
(7)	Lift the seat forward and out of the cockpit.	Take care that the stick gaiter does not catch on the top of the control stick.

B. Install a Pilot's Seat

	Detail Steps/Work Items	Key Items/References
If the adjustable front seats (OÄM 42-067 or OÄM 42-259) are installed: CAUTION: DO NOT ENGAGE THE LEVER OR THE BUTTON FOR THE ADJUSTABLE BACKREST OF THE FRONT SEATS UNINTENTIONALLY. THE SPRING LOADED BACKREST MAY SNAP FORWARD AND CAN CAUSE INJURY.		
(1)	Examine the crash elements. Look specially for delamination and buckling.	Refer to Figure 1.

	Detail Steps/Work Items	Key Items/References
(2)	Make sure the area below the seat is clean and has no unwanted objects.	For example: tools.
(3)	Move the seat into position so that the anchor plates go through the large holes in the front main bulkhead.	Make sure that the stick gaiter locates correctly over the control stick.
(4)	Install the bolts and washer plates which attach the seat to the floor panel.	Torque 6.4 Nm (4.7 ft.lb).
(5)	Install the bolts and washer plates which attach the anchor plates to the front main bulkhead.	From the passenger compartment behind the pilot’s seat. Torque 16 Nm (11.8 ft.lb).
(6)	Fasten the press-studs which attach the seat cushion.	
(7)	Tighten the top of the gaiter around the control stick.	Make sure that the control stick is free to move throughout its range of operation.
(8)	If the adjustable front seats (OÄM 42-067 or OÄM 42-259) are installed: – Do a test of the backrest adjustment mechanism. – Do a test of the lumbar support mechanism.	 Refer to Paragraph 3. Refer to Paragraph 3.

3. Additional Maintenance Practices for Seats with Adjustable Backrest

Perform the following test of the adjustable backrest mechanism.

If the test fails refer to Paragraph (2), (3).

(1) Test Procedures

(a) Test the Backrest Adjustment Mechanism of a Front Seat (optional, OÄM 42-067 or OÄM 42-259)

	Detail Steps/Work Items	Key Items/References
	CAUTION: DO NOT ENGAGE THE LEVER OR THE BUTTON FOR THE ADJUSTABLE BACKREST OF THE FRONT SEATS UNINTENTIONALLY. THE SPRING LOADED BACKREST MAY SNAP FORWARD AND CAN CAUSE INJURY.	
	Note: If the adjustable backrest mechanism does not pass the following test, perform a visual inspection. Refer to Paragraph (3).	
(1)	Sit down in the front seat.	
(2)	Lean against the backrest.	To counteract the spring loaded backrest mechanism.
(3)	Carefully lift the seat lever or press the button.	
(4)	Move the backrest fully rearward. – Check for limited range of movement and interference. – Release the seat lever or button in different backrest angles and check for improper fixation.	Release the seat lever or button to ensure proper locking. Apply a test load of 90 daN (200 lbf) to the top of the backrest at room temperature.

	Detail Steps/Work Items	Key Items/References
(5)	Allow the backrest to move forward to the upright position. – Check for interference. – Check for lack of spring force.	The spring must be strong enough to move the backrest from the full rearward position to the upright position designated by a placard on the roll-over bar.
(6)	Pull forward on the backrest to move it forward beyond the designated upright position. – Check for limited range of movement and interference. – Let the seat lever move to the locking position or release the button at different backrest angles and check for improper fixation.	Press down the seat lever to ensure proper locking. Apply a test load of 90 daN (200 lb) to the top of the backrest at room temperature.
(7)	Move the seat back to the upright position.	
(8)	Let the seat lever move to the locking position.	Press down the seat lever to ensure proper locking.

(2) Test the Lumbar Support Mechanism of a Front Seat (optional, OÄM 42-067 or OÄM 42-259)

	Detail Steps/Work Items	Key Items/References
(1)	Sit down in the front seat.	
(2)	Turn the lumbar support lever.	You must feel the mechanism increasing and decreasing the effect of the lumbar support cushion in the backrest.

(3) Adjust the Friction of the Backrest (optional, OÄM 42-067)

	Detail Steps/Work Items	Key Items/References
CAUTION: DO NOT ENGAGE THE LEVER OR THE BUTTON FOR THE ADJUSTABLE BACKREST OF THE FRONT SEATS UNINTENTIONALLY. THE SPRING LOADED BACKREST MAY SNAP FORWARD AND CAN CAUSE INJURY.		
(1)	Remove the seat.	
(2)	Pull away the lining from the inboard hinge to gain access to the inboard friction adjustment screw.	Through the access hole in the cover.
(3)	Adjust the friction: – Set the locking lever to the „unlocked“ position. – Loosen the friction adjustment screws (LH and RH). – Tighten friction adjustment screws (LH and RH) with finger force. – Tighten friction adjustment screws (LH and RH) with 10 mm hexagon nut in increments of approx. 15 degrees (1/24 turns) until friction in the hinge mechanism increases notably. – Turn back the adjustment screws (LH and RH) one-quarter turn.	
(4)	Re-attach the lining to the seat.	
(5)	Install the seat.	
(6)	Do a test of the backrest adjustment mechanism.	Refer to Paragraph (1)(a).

(4) Visual Inspection of the Adjustment Mechanism (optional, OÄM 42-067)

	Detail Steps/Work Items	Key Items/References
(1)	Remove the seat from the airplane.	Refer to Section 2.
(2)	Remove the seat lever from the seat: – Remove the plug from the lever. – Remove the lever mounting screw. – Remove the lever from the seat.	
(3)	Carefully separate the leather lining from the backrest: – Remove the cushion from the seat pan (attached with velcro). – Drill out one blind rivet each attaching the two plastic brackets for the rubber bands to the seat pan. – Pull off the rubber bands from the plastic brackets. – Untie the knots of the 3 strings which tie the lower edge of the backrest cushion to the seat pan. – Carefully remove the leather lining from the cover by opening all velcro fasteners.	Turn the lining inside out together with the bag while pulling off.
(4)	Move the cover forward to remove it from the hinge.	The cover remains attached to the cushion.
(5)	Check the lamella package for deformation, corrosion and lack of lubrication.	
(6)	Install the cover by moving it over the hinge.	

	Detail Steps/Work Items	Key Items/References
(7)	Re-install the leather lining to the seat: – Attach the leather lining to the cover using the velcro fasteners. – Tie the backrest cushion to the seat pan with the 3 strings. – Put the rubber bands into the plastic brackets. – Use blind rivets to fasten the plastic brackets to the seat pan. – Attach the cushion to the seat pan using the velcro.	
(8)	Install the seat lever: – Put the lever onto the adjustment mechanism in correct position. – Install the lever mounting screw. – Install plug to lever.	

(5) Visual Inspection of the Adjustment Mechanism (optional, OÄM 42-259)

	Detail Steps/Work Items	Key Items/References
(1)	Remove seat from airplane.	
(2)	Carefully separate the leather lining from the backrest.	Turn lining inside out together with the bag while pulling off.
(3)	Check the Hydrolok cylinder for leakage, contamination, check actuator cable for damage. Replace items if necessary, for disassembly of the mechanism refer to Maintenance Practices, Paragraph (4).	Use mirror and flashlight to be able to inspect the mechanism installed in the backrest tunnel.
(4)	Re-install the leather lining to the seat.	

4. Remove/Install a Pilot's Seat Access Panel

A. Remove a Pilot's Seat Access Panel

	Detail Steps/Work Items	Key Items/References
(1)	Remove the cloth coating from the seat.	
(2)	Remove the 10 bolts which attach the access panel to the seat.	
(3)	Lift the access panel clear of the airplane.	

B. Install a Pilot's Seat Access Panel

	Detail Steps/Work Items	Key Items/References
(1)	Move the access panel in place on the seat.	
(2)	Install the 10 bolts which attach the access panel to the seat.	
(3)	Fasten the cloth coating on the seat.	

5. Disassemble/Assemble the Adjustable Backrest Mechanism

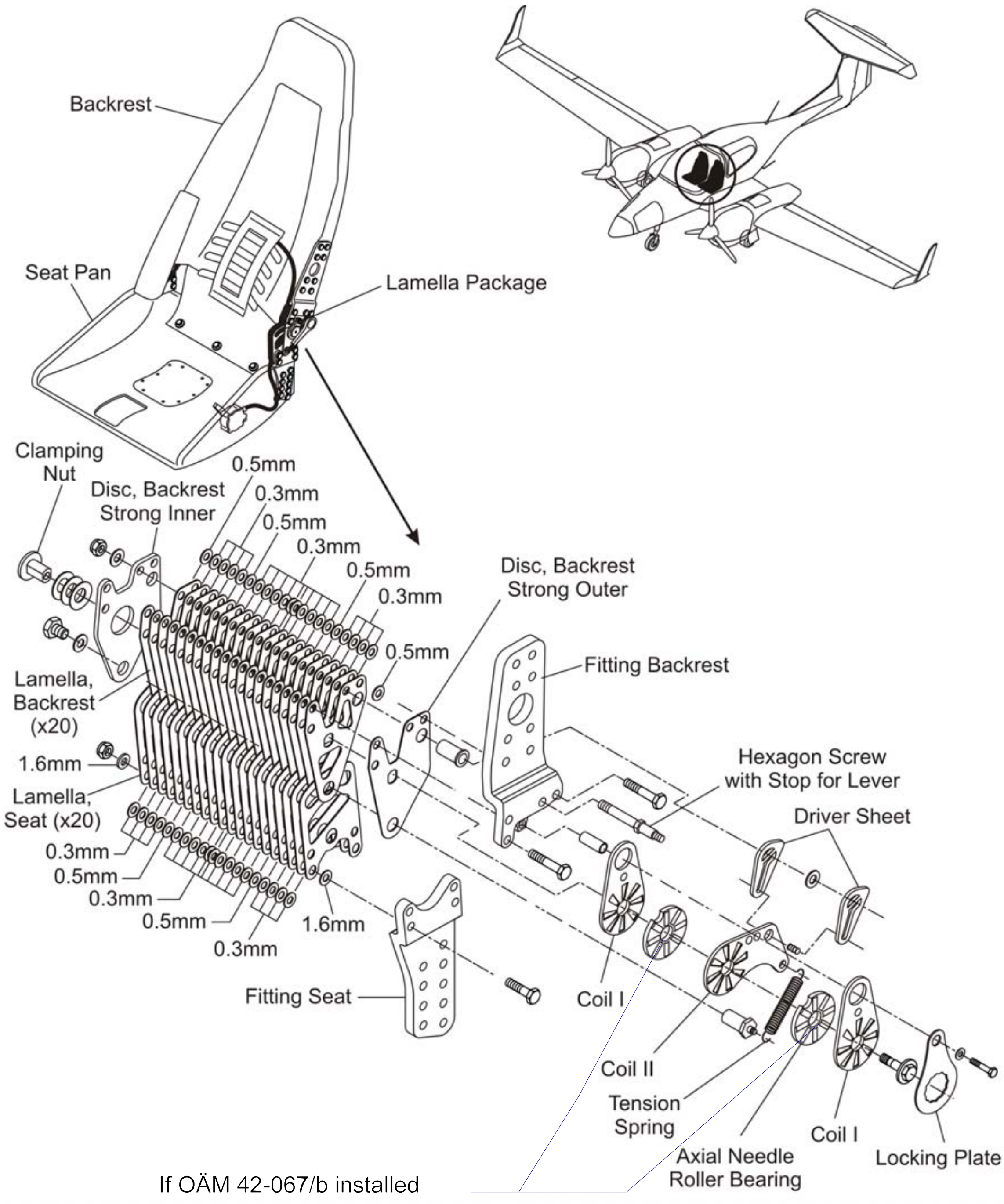

Figure 6: Adjustable Backrest Assembly (if OÄM 42-067 is installed)

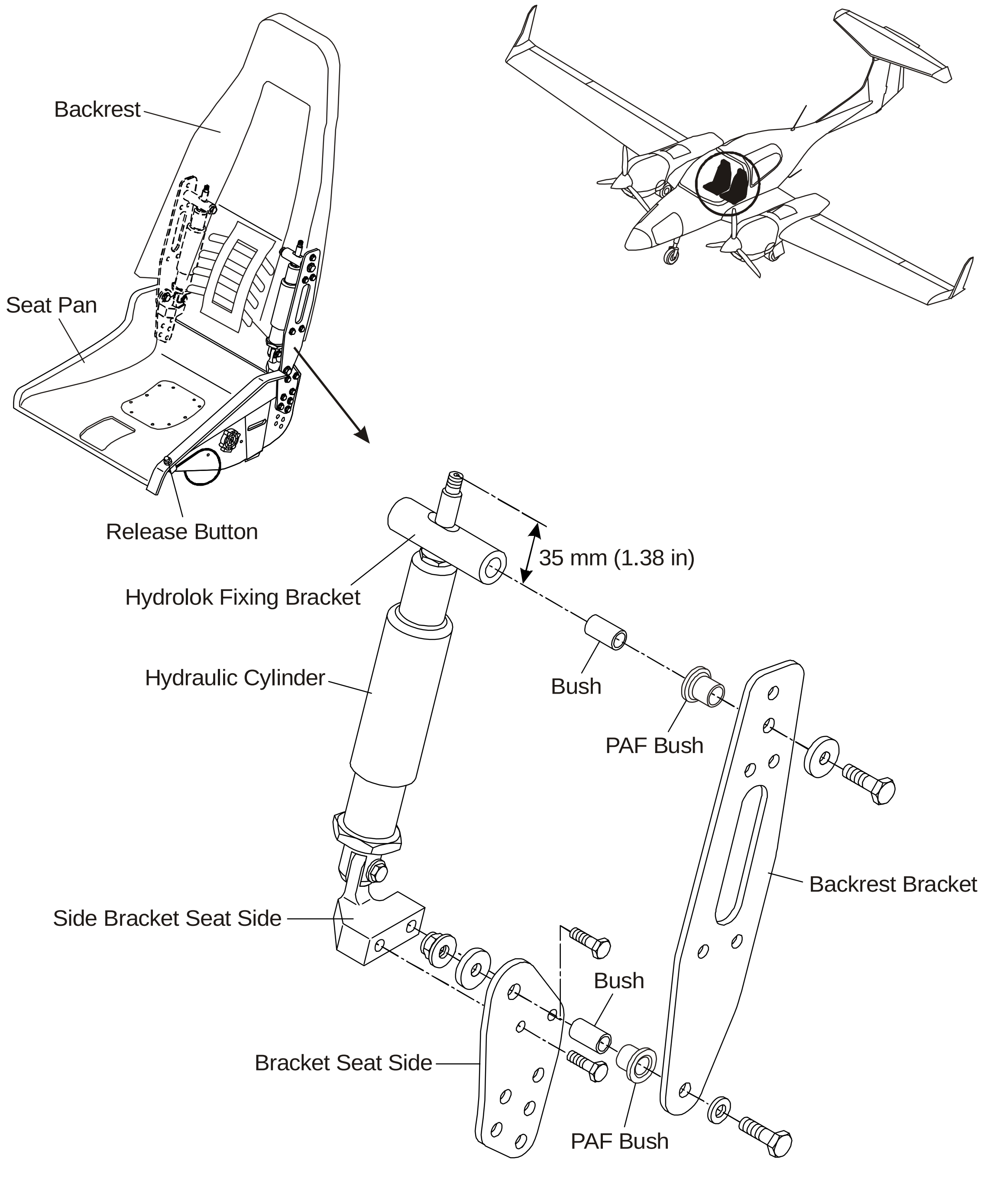

Figure 7: Seat Adjustment Mechanism (if OÄM 42-259 is installed)

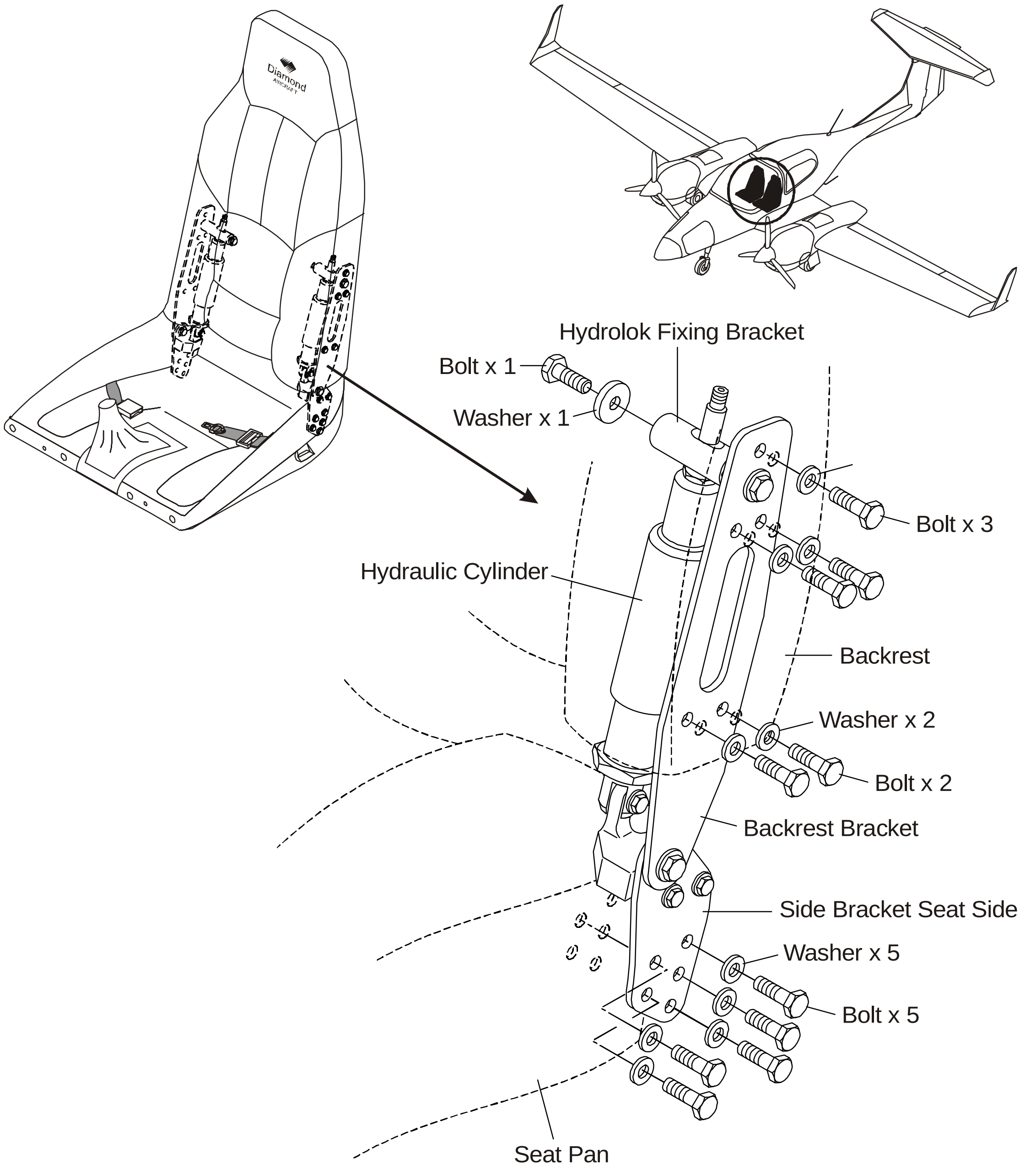

Figure 8: Adjustable Backrest Assembly (if OÄM 42-259 is installed)

(a) Remove the Backrest Assembly from the Seat (optional, OÄM 42-067)

Each seat contains a left and right side mechanism. Before you can disassemble the backrest mechanism you must carry out the following steps:

	Detail Steps/Work Items	Key Items/References
(1)	Remove the seat from the airplane.	Refer to Paragraph 2.
(2)	Remove the seat lever from the seat: – Remove the plug from the lever. – Remove the lever mounting screw. – Remove the lever from the seat.	
(3)	Carefully separate the leather lining from the backrest: – Remove the cushion from the seat pan (attached with velcro). – Drill out one blind rivet each attaching the two plastic brackets for the rubber bands to the seat pan. – Pull off the rubber bands from the plastic brackets. – Untie the knots of the 3 strings which tie the lower edge of the backrest cushion to the seat pan. – Carefully remove the leather lining from the cover by opening all velcro fasteners.	Turn lining inside out together with the bag while pulling off.
(4)	Move the cover forward to remove it from the hinge.	The cover remains attached to the cushion.
(5)	Peel away the leather lining from the bottom of the seat pan on the side which points towards the middle of the fuselage. The nine hexagon screws of the seat fitting become accessible.	
(6)	Remove the screw with the distancing bushing and the washer from the torsion bar.	

	Detail Steps/Work Items	Key Items/References
(7)	Remove the nine hexagon screws on both sides of each seat fitting.	
(8)	Remove the eight hexagon screws on both sides of the backrest fitting.	
(9)	Remove the LH and the RH mechanism.	
(10)	Remove the torsion bar from the backrest.	

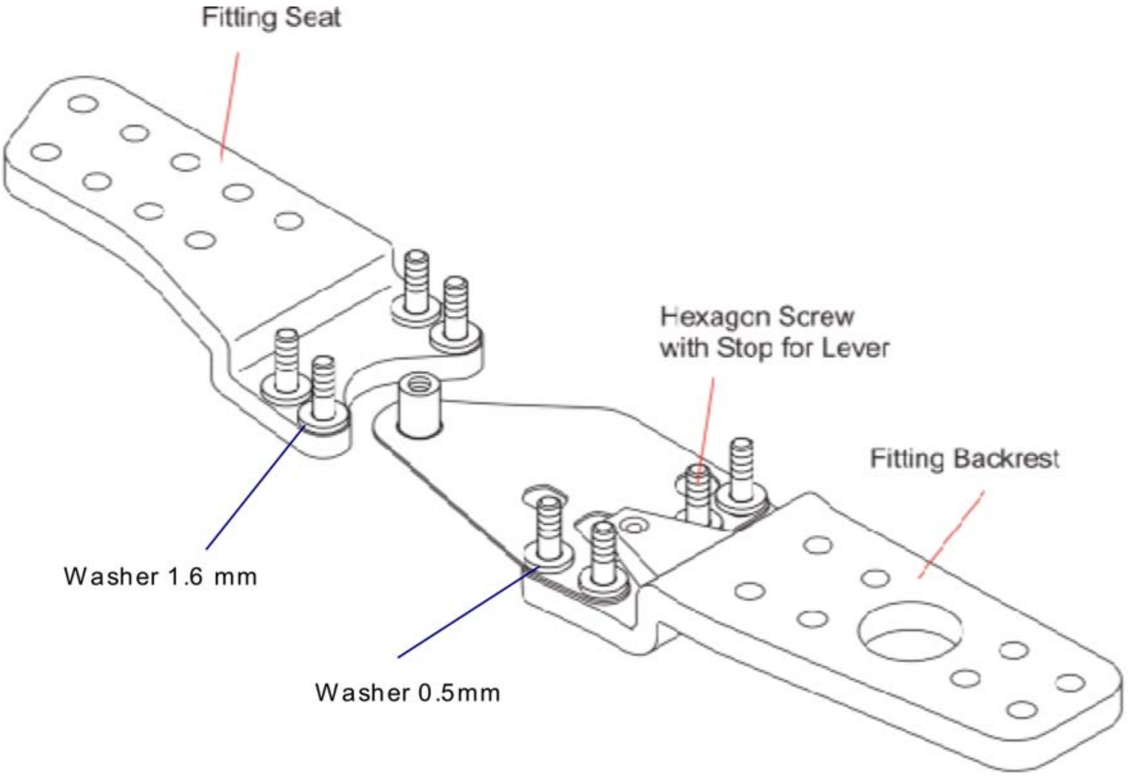

Figure 9: Arrangement of the Fitting Seat, Fitting Backrest and Screws (LH Side Shown, if OÄM 42-067 is installed)

(b) Remove Backrest Assembly from Seat (optional, OÄM 42-259)

Each seat contains a left and right side mechanism. Before you can disassemble the backrest mechanism you must carry out the following steps:

	Detail Steps/Work Items	Key Items/References
(1)	Remove seat from airplane.	
(2)	Carefully separate the leather lining from the backrest.	Turn lining inside out together with the bag while pulling off.
(3)	Disconnect the lumbar actuator bowden cable.	
(4)	Remove the 5 outboard and 1 inboard hexagon screws from the backrest brackets as they become accessible on both sides.	Refer to Figure 8.
(5)	Pull off the backrest shell.	

(c) Disassemble the Adjustable Backrest Mechanism (optional, OÄM 42-067 or OÄM 42-259)

Disassemble the adjustable backrest mechanism carefully. Refer to the table in section (d) or (e) and carry out the steps in the opposite order.

(d) Assemble the Adjustable Backrest Mechanism (optional, OÄM 42-067)

The following table describes the assembling of a single backrest mechanism. The assembly procedure is used for both sides.

Step No.	Seat Fitting	Thickness	Backrest Fitting	Thickness	Remark
(1)	Arrange the seat fitting and the backrest fitting and place the 7 hexagon screws (M6 x 32) and a hexagon screw with stop for lever as shown in Figure 6. Use some adequate bars to put under the fittings.				
(2)	4 Washers	1.6 mm	Disc, Backrest Strong Outer	1.6 mm	
(3)	Stick the bolt (10 mm) through the outer backrest disc.				
(4)	Lamella	0.3 mm	4 Washers	0.5 mm	
(5)	4 Washers	0.3 mm	Lamella	0.3 mm	Repeat steps (5) and (6) four times.
(6)	Lamella	0.3 mm	4 Washers	0.3 mm	
(7)	4 Washers	0.5 mm	Lamella	0.3 mm	
(8)	Lamella	0.3 mm	4 Washers	0.5 mm	
(9)	4 Washers	0.3 mm	Lamella	0.3 mm	
(10)	Lamella	0.3 mm	4 Washers	0.3 mm	
(11)	4 Washers	2 x 0.3 mm	Lamella	0.3 mm	
(12)	Lamella	0,3 mm	4 Washers	2 x 0.3 mm	
(13)	4 Washers	0.3 mm	Lamella	0.3 mm	Repeat steps (13) and (14) four times.
(14)	Lamella	0.3 mm	4 Washers	0.3 mm	

Step No.	Seat Fitting	Thickness	Backrest Fitting	Thickness	Remark
(15)	4 Washers	0.5 mm	Lamella	0.3 mm	
(16)	Lamella	0.3 mm	4 Washers	0.5 mm	
(17)	4 Washers	0.3 mm	Lamella	0.3 mm	Repeat steps (17) and (18) four times.
(18)		0.3 mm	4 Washers	0.3 mm	
(19)	4 Washers	1.6 mm	Lamella	0.3 mm	
(20)	4 self locking Hexagon Nurs	M5	4 Washers	0.3 mm	
(21)	---	---	Disc, Backrest Strong Inner	4 mm	
(22)	Screw the hexagon screw (M5x6) with the washer (17 mm) into the thread of the bolt and apply Loctite 262 screw locking or equivalent.				
(23)	In order to check the correct arrangement of the lamella, view the assembly from side and observe the regular pattern of the lamella formed the varying thickness of the washers.				
(24)	Screw the thinner hexagon nuts on the 4 hexagon screws of the strong backrest disc and apply Loctite 262 screw locking or equivalent.				
(25)	Insert the brass bushing next to the seat fitting side.				
(26)	Insert the clamping nut from the backside with the 3 disc springs, ensuring the outer diameter of the disc springs points towards the backrest disc and the inner diameter points towards the clamping nut.				
(27)	LH side: Place coil 1 so that 1 stamped point can be seen, place one bearing on the coil 1, place coil 2 onto the bearing so that 2 stamped points can be seen, place a bearing on coil 2, place another coil 1 on the bearing so that 1 stamped point can be seen.				
(28)	RH side: Place coil 1 so that 2 stamped point can be seen, place one bearing on the coil 1, place coil 2 onto the bearing so that 1 stamped point can be seen, place a bearing on coil 2, place another coil 1 on the bearing so that 2 stamped point can be seen.				
(29)	Screw the clamping screw into the internal thread of the clamping nut, and just tighten it by hand.				

Step No.	Seat Fitting	Thickness	Backrest Fitting	Thickness	Remark
(30)	Insert the distancing bushing through the holes of the two coils.				
(31)	Put the M4 x 20 screw with the washer and the locking plate through the distancing bushing, screw it into the backrest fitting, but do not tighten it yet.				
(32)	Tighten the clamping screw as far as possible by hand and apply a quarter additional turn with the screw wrench.				
(33)	Place the locking plate over the hexagon screw and tighten the distancing bushing with the hexagon screw (M4 x 20) and the washer and secure it with Loctite 262 screw locking.				
(34)	Put the driver into the hole of coil 2, mount the lower driver sheet, mount the upper driver sheet and insert the washer between the driver sheets.				
(35)	Fix the driver sheets and the washer to the brass bushing with a cable clip.				

(e) Assemble the Adjustable Backrest Mechanism (optional, OÄM 42-259)

The following table describes the assembling of a single backrest mechanism. The assembly procedure is used for both sides.

	Detail Steps/Work Items	Key Items/References
(1)	Screw the Hydrolok hydraulic cylinder into the actuating shaft, so that the cylinder rod end and the center of the actuating shaft are 35 mm apart.	Refer to Figure 7.
(2)	Attach the lower end of the hydraulic cylinder to the side bracket seat shell.	
(3)	Attach the side bracket seat shell to the seat bracket seat side using 2 hexagon screws.	
(4)	Attach the backrest bracket to the actuating shaft using a bush and a hexagon screw.	
(5)	Attach the backrest and the seat bracket with a hexagon screw and nut thru the rotation hole.	

(f) Assemble a Pilots' Seat (optional, OÄM 42-067)

After assembling the adjustable backrest mechanism carry out following steps:

	Detail Steps/Work Items	Key Items/References
(1)	Fix the inboard mechanism with the 17 hexagonal screws.	
(2)	Insert the torsion bar into the backrest, insert the torsion bar through the driver blades of the mechanism.	
(3)	Insert the outboard mechanism through the clearance (hole) of the seatpan.	
(4)	Place the mechanism on the backrest and insert the torsion bar through the driver blades of the mechanism.	
(5)	Fix the outboard mechanism with the 17 hexagon screws.	
(6)	Screw the torsion bar screw with the washer and the distance bushing into the inside thread.	
(7)	Install cover by moving it over the hinge.	
(8)	Re-install the leather lining to the seat: – Attach the leather lining to the cover using the velcro fasteners. – Tie the backrest cushion to the seat pan with the 3 strings. – Put the rubber bands into the plastic brackets. – Use blind rivets to fasten the plastic brackets to the seat pan. – Attach the cushion to the seat pan using the velcro.	
(9)	Install the seat lever: – Put the lever onto the adjustment mechanism in correct position. – Install the lever mounting screw. – Install plug to lever.	

(g) **Assemble a Pilots' Seat (optional, OÄM 42-259)**

After assembling the adjusting mechanisms on both sides install the backrest using the steps in the opposite sequence as described in Maintenance Practices, Paragraph 5.(b).

6. Remove/Install the Passenger Seat

If OÄM 42-324 is installed and OÄM 42-334 is NOT installed:

WARNING: WHEN REMOVING A SEAT FROM THE AIRCRAFT, VERIFY THAT THE AMSAFE SEATBELT AIRBAG SYSTEM RESTRAINT IS NOT BUCKLED AND DISCONNECT CABLE INTERFACE ASSY. FROM THE END-RELEASE BUCKLE ASSEMBLY CONNECTOR BEFORE REMOVAL OF THE SEAT. AN ELECTRICALLY CONNECTED AMSAFE SEATBELT AIRBAG RESTRAINT SYSTEM AND BUCKLED SEAT BELT MAY RESULT IN DAMAGE TO THE EQUIPMENT OR DEPLOYMENT OF THE SYSTEM. REFER TO AMSAFE MAINTENANCE DOCUMENTATION.

A. Remove the Passenger Seat

	Detail Steps/Work Items	Key Items/References
(1)	Release the velcro tapes at the front of the seat cushion.	Refer to Figure 4. Move the cushion to give access to the attaching bolts for the seat.
(2)	Remove the 6 bolts and washer plates which attach the seat pan to the anchor plates.	
(3)	Remove the 2 bolts and washer plates which attach the front of the seat pan to the rib on top of the rear main bulkhead.	
(4)	Fold the seat-backs forward.	Lift the latch pins at the left side of each seat back.
(5)	Remove the 5 bolts and washers which attach the rear of the seat pan to the aft baggage compartment frame.	
(6)	Remove the 2 inertia reels attachment points from the through roll over bar duct.	
(7)	Lift the seat forward and up out of the cockpit.	

B. Install the Passenger Seat

	Detail Steps/Work Items	Key Items/References
(1)	Examine the crash elements. Look specially for delaminating and buckling.	Refer to Figure 4.
(2)	Make sure that the area below the seat is clean and has no unwanted objects.	For example, tools.
(3)	Move the seat into position in the fuselage with the seat-backs folded forward.	Lift the latch pins at the left side of each seat-back.
(4)	Attach the inertia reels to the through roll over bar.	
(5)	Install the 5 bolts and washer plates which attach the rear of the seat pan to the aft baggage compartment frame.	Torque 6.4 Nm (4.7 lbf.ft.).
(6)	Install the 6 bolts and washer plates which attach the seat pan to the anchor plates.	Torque 6.4 Nm (4.7 lbf.ft.).
(7)	Install the 2 bolts and washer plates which attach the front of the seat pan to the rib on top of the rear main bulkhead.	Torque 6.4 Nm (4.7 lbf.ft.).
(8)	Fasten the velcro tapes which hold the seat cushion.	

7. Remove/Install a Safety Harness

If OÄM 42-324 is NOT installed:

Use this procedure for both pilots' seats and passenger seat harnesses.

If OÄM 42-324 is installed and OÄM 42-334 is NOT installed, refer to AmSafe Documentation.

If OÄM 42-334 is installed, use this procedure for the passenger seats and refer to the AmSafe Documentation for the pilots' seats.

If OÄM 42-324 is installed, refer to AmSafe Documentation.

WARNING: WHEN REMOVING A SEAT FROM THE AIRCRAFT, VERIFY THAT THE AMSAFE SEATBELT AIRBAG SYSTEM RESTRAINT IS NOT BUCKLED AND DISCONNECT CABLE INTERFACE ASSY. FROM THE END-RELEASE BUCKLE ASSEMBLY CONNECTOR BEFORE REMOVAL OF THE SEAT. AN ELECTRICALLY CONNECTED AMSAFE SEATBELT AIRBAG RESTRAINT SYSTEM AND BUCKLED SEAT BELT MAY RESULT IN DAMAGE TO THE EQUIPMENT OR DEPLOYMENT OF THE SYSTEM. REFER TO AMSAFE MAINTENANCE DOCUMENTATION.

A. Remove a Safety Harness

	Detail Steps/Work Items	Key Items/References
(1)	Remove the seat.	Refer to Paragraph 2 or 3.
(2)	Remove the anchor nuts, washers and plates which attach the straps to the seat.	Refer to Figure 5. For the pilots' seats only: – Make a note of the position of the anchor plates which these bolts also hold.
(3)	Move the straps through the holes in the seat pan and remove them.	
(4)	Release the bolt and washer which attach the inertia reel and its cover to the fuselage structure.	

(5)	Release the bolt and washer which attach the guide to the roll-bar.	For the pilots' seats only: – Make a note of the position of the washers.
(6)	Remove the shoulder strap.	

B. Install a Safety Harness

	Detail Steps/Work Items	Key Items/References
(1)	Put the lap straps through the holes in the seat pan.	The buckle goes to the inboard side of the pilots' seats (front) and the outboard side of the passenger seat (rear).
(2)	Put the lap straps between the seat pan and the metal plate. Install the bolts and washer plates from the top of the seat pan.	
(3)	Move the anchor plates into position on the bolts.	For the pilots' seats only.
(4)	Install the seat.	Refer to Paragraph 2 or 3.
(5)	Install the bolt and washer which attach the guide to the roll-bar.	For the pilots' seats only.
(6)	Install the bolt and washer which attach the inertia reel and its cover to the structure.	Refer to Figure 5 (1).
(7)	Install washer plates and self-locking nuts onto the bolts.	Torque 16 Nm (11.8 lbf.ft.).

8. Remove/Install the Instrument Panel Cover

A. Remove the Instrument Panel Cover

	Detail Steps/Work Items	Key Items/References
(1)	Remove the screws which attach the instrument panel cover to the instrument panel and the fuselage.	
(2)	Lift the cover for access to the defrost system flexible hoses.	
(3)	Loosen the tie wraps that hold the flexible hoses to the defrost manifold.	
(4)	Lift the cover clear of the instrument panel and the airplane.	

B. Install the Instrument Panel Cover

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the area below the instrument panel cover is free of unwanted objects.	For example: tools.
(2)	Move the instrument panel cover into position near the instrument panel.	
(3)	Connect the flexible hoses to the defrost manifold: – Move the tie wraps into position on the flexible hoses. – Push the flexible hoses onto the defrost manifold of the cover. – Tighten the worm-drive-clamps.	
(4)	Lower the cover into position on the instrument panel.	
(5)	Install the screws which attach the instrument panel cover to the instrument panel and the fuselage.	

9. Cleaning

A. Seats

The seat cushions are made from a fire resistant material. Clean the cushions with a vacuum cleaner. Use a mild soap solution to remove stains. Make sure that the area is well ventilated after cleaning to remove all moisture.

B. Safety Harnesses

If OÄM 42-324 is NOT installed:

Use a mild soap solution to clean the straps of the harnesses.

If OÄM 42-324 is installed and OÄM 42-334 is NOT installed:

Refer to AmSafe Maintenance Documentation.

If OÄM 42-334 is installed:

Refer to AmSafe Maintenance Documentation for both pilots' seats and use a mild soap solution to clean the straps of the harnesses of the passenger seats.

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Section 25-50
Aft Baggage Compartment

1. General

This Section tells you about the aft baggage compartment, the baggage tie-downs and baggage net.

For data about the forward baggage compartment doors refer to Section 52-00.

2. Description

Figure 1 shows the aft baggage compartment.

GFRP makes the aft baggage compartment. Quick release fasteners attach the front of the baggage compartment to the fuselage baggage compartment frame. The rear of the baggage compartment locates in the fuselage ring frame 1. You can remove the aft baggage compartment.

The aft baggage compartment has a rear section that is accessed through a door. The door is hinged along the lower edge. The forward section of the baggage compartment has an access panel in the floor section of the compartment. Quick-Release fasteners attach the access panel to the baggage compartment floor. You can remove this access panel to gain access to the aft fuselage. Carpet covers the floor of the baggage compartment.

A cargo net covers the front of the aft baggage compartment and secures the contents of the aft baggage compartment. The cargo net attaches to special net tie-down brackets that are bolted to the front of the baggage compartment frame.

A flexible air hose connects the G1000 box with the baggage extension. It is fixed with two worm drive clamps.

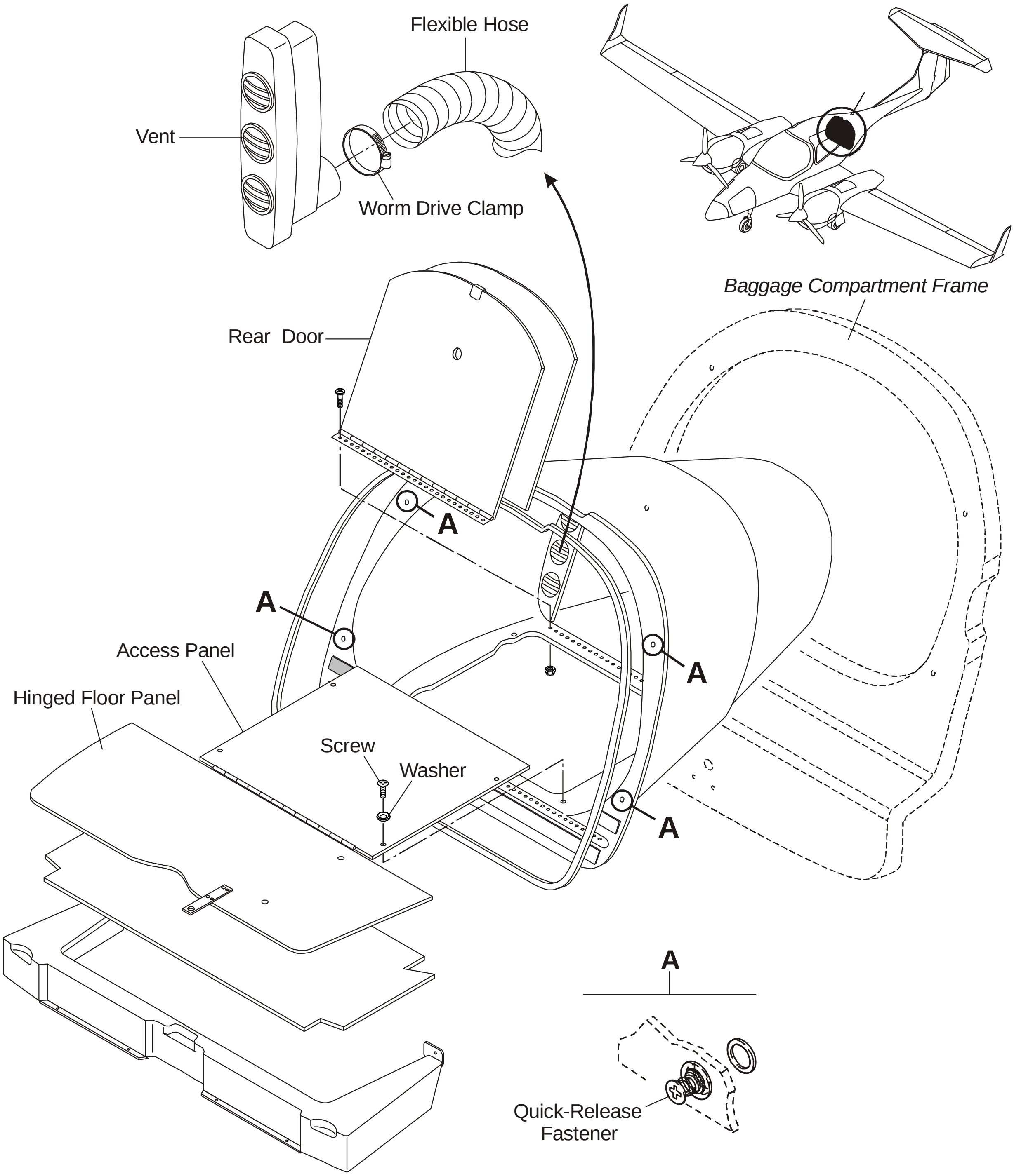

Figure 1: Aft Baggage Compartment

Maintenance Practices

1. General

These Maintenance Practices tell you how to remove the access panel in the aft baggage compartment floor. They also tell you how to remove the aft baggage compartment from the airplane.

2. Remove/Install the Access Panel in the Baggage Compartment Floor

A. Remove the Access Panel

	Detail Steps/Work Items	Key Items/References
(1)	Fold the passenger seat backs forward into the down position.	Refer to Section 25-10.
(2)	If necessary, remove the cargo net and move any equipment stowed in the baggage compartment clear of the airplane.	
(3)	Fold the carpet on the floor of the baggage compartment forward to gain access to the panel.	
(4)	Remove the access panel: – Remove the 4 quick-release fasteners that attach the access panel to the baggage compartment. – Lift the access panel up from the baggage compartment floor and move it clear of the airplane.	Refer to Figure 1.

B. Install the Access Panel

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the rear fuselage is clear of loose objects.	For example, tools, cleaning cloths or other hardware.
(2)	Install the access panel: – Move the access panel into position at the baggage compartment floor. – Install the 4 quick-release fasteners and washers that attach the access panel to the baggage compartment.	
(3)	Move the floor carpet back into position on the baggage compartment floor.	
(4)	If necessary, install any equipment that you removed from the baggage compartment and install the cargo net.	
(5)	Move the passenger seat backs into the upright position.	Make sure that the seat backs are correctly locked into position.

3. Remove/Install the Aft Baggage Compartment

A. Remove the Aft Baggage Compartment

	Detail Steps/Work Items	Key Items/References
(1)	Fold the passenger seat backs forward into the down position.	Refer to Section 25-10.
(2)	If necessary remove the cargo net and move any equipment stowed in the baggage compartment clear of the airplane.	
(3)	Fold the carpet on the floor of the baggage compartment forward and clear of the baggage compartment.	
(4)	Open the 4 quick-release fasteners of the access panel to remove the access panel with the hinged floor panel.	Refer to Figure 1.
(5)	If installed: Open the worm drive clamp of the flexible air hose on the G1000 side and remove the hose from the G1000 box.	
(6)	Remove the aft baggage compartment: – Remove the 4 quick-release fasteners that attach the baggage compartment to the fuselage baggage frame. – Move the baggage compartment forward out of the rear fuselage then upwards and clear of the airplane.	

B. Install the Aft Baggage Compartment

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the rear fuselage is clear of loose objects.	For example tools, cleaning cloths or other hardware.
(2)	Install the aft baggage compartment: – Move the baggage compartment into position at the rear fuselage. – Install the flexible air hose on the G1000 box and attach the worm drive clamp. – Move the baggage compartment aft and into the rear fuselage. – Make sure that baggage compartment is fully into position and install the 4 quick-release fasteners that attach the baggage compartment to the fuselage baggage frame.	Make sure that the aft end of the baggage compartment locates correctly in fuselage ring frame 1.
(3)	Install the hinged floor-panel: – Move the hinged floor panel into position at the front of the baggage compartment. – Align the 4 quick-release fasteners from the floor panel to the baggage compartment floor and attach.	
(4)	Move the floor carpet back into position on the baggage compartment floor.	
(5)	If necessary, install any equipment that you removed from the baggage compartment and install the cargo net.	
(6)	Move the passenger seat backs into the upright position.	Make sure that the seat backs are locked into position correctly.

Section 25-60
Emergency Equipment

1. General

This Section tells you about the emergency equipment installed in the DA 42 airplane. It tells you about the Emergency Location Transmitter (ELT) and the first aid kit. Refer to the equipment manufacturers manuals for more data.

Refer to Chapter 26 for data about the hand fire extinguisher which is installed in the cabin of the DA 42.

2. Description

Figure 1 shows the location of the main components of the ELT system.

The ELT is located in the rear fuselage, below the aft baggage compartment. A protective case attached to a mounting bracket holds the ELT in position. The ELT antenna is mounted on the upper surface of the fuselage, above the ELT. A Remote Control Panel/Indicator (RCPI) is mounted on the instrument panel, right side.

The ELT transmits signals automatically after a crash on the emergency frequencies of 121.5 and 243.0 Megahertz (MHz). Every 50 seconds the transmitter also transmits a signal on the 406.025 MHz frequency to a satellite. The signal to the satellite contains the serial number of the ELT transmitter or the airplane ID, a country code and an unique identity code. The satellite will also give the emergency services a more accurate location for the airplane.

The ELT has its own battery pack to supply electrical power. When the ELT is ON and transmitting the batteries will keep the ELT transmitting for up to 72 hours on the 121.5 and 243.0 MHz frequencies and for up to 24 hours on the 406.025 MHz frequency.

It is important to monitor the battery expiry dates for the battery pack. The expiry date for the battery pack is shown on the identity plate for the transmitter. The battery pack must be replaced in following cases:

– After use in an emergency.

– After the transmitter has been accidentally switched ON for an unknown period of time.

– After 1 hour of accumulated use (testing).

– On or before the battery pack expiry date.

You must do regular functional tests. Refer to the Maintenance Practices in this Section.

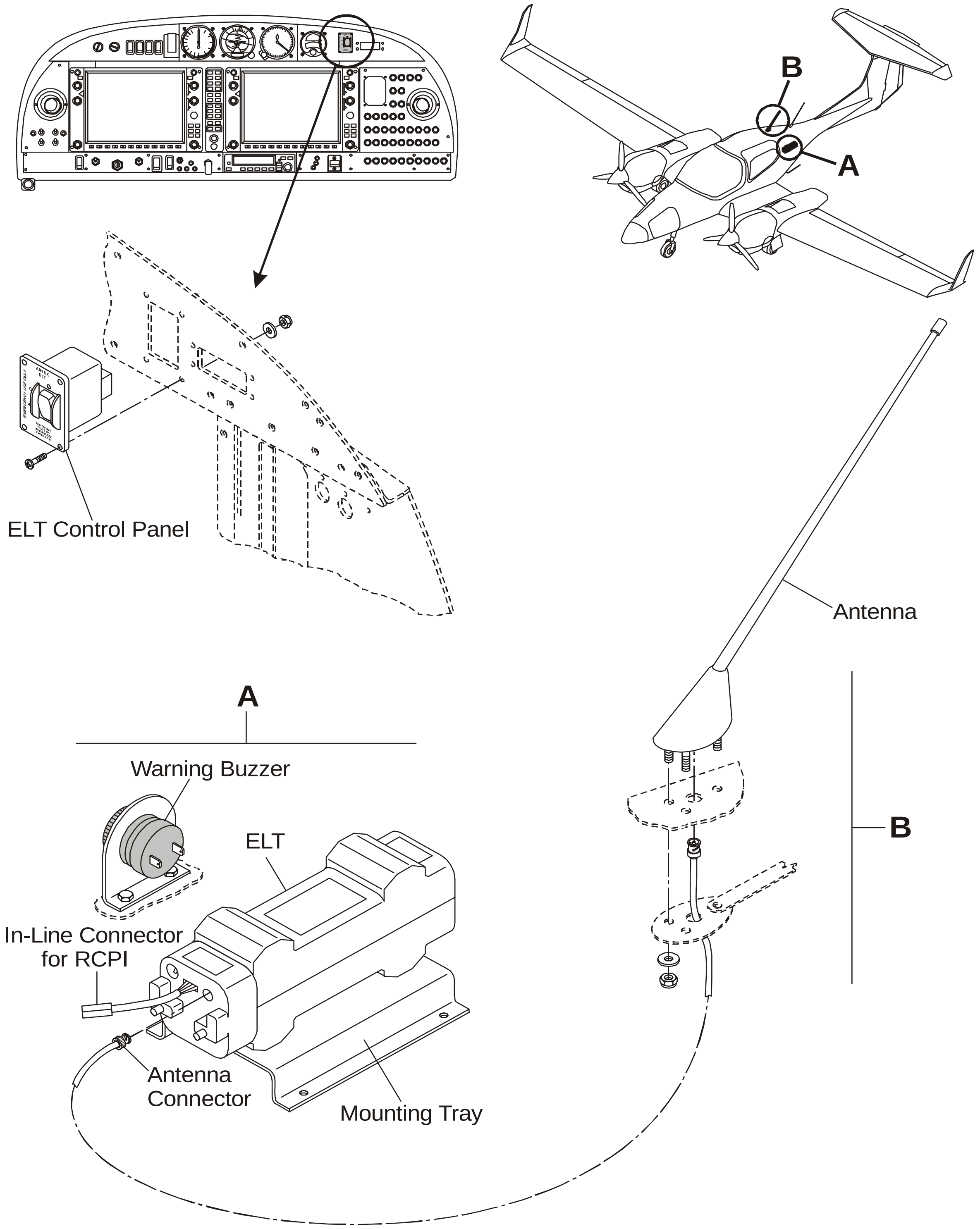

Figure 1: ELT Main Components (Standard Equipment installed)

3. Description of the Artex ME406 ELT (Optional Equipment, if OÄM 42- 080 is carried out)

The ELT is located in the rear fuselage, below the aft baggage compartment. A velcro strap attached to a mounting bracket holds the ELT in position. The ELT antenna is mounted on the upper surface of the fuselage, above the ELT. A Remote Control Panel/Indicator (RCPI) is mounted on the instrument panel, right side.

The ELT transmits signals automatically after a crash on the emergency frequencies of 121.5 and 406.028 Megahertz (MHz). Every 50 seconds the transmitter transmits a signal on the 406.028 MHz frequency to a satellite. The signal to the satellite contains the serial number of the ELT transmitter or the airplane ID, a country code and an unique identity code. The satellite will also give the emergency services a more accurate location for the airplane.

The ELT has its own battery pack to supply electrical power. When the ELT is ON and transmitting the batteries will keep the ELT transmitting until battery power is gone on the 121.5 MHz frequency and for up to 24 hours on the 406.028 MHz frequency.

It is important to monitor the battery expiry dates for the battery pack. The expiry date for the battery pack is shown on the identity plate for the transmitter. The battery pack must be replaced in following cases:

– After use in an emergency.

– After the transmitter has been accidentally switched ON for an unknown period of time.

– After 1 hour of accumulated use (testing).

– On or before the battery pack expiry date.

You must do regular functional tests. Refer to the Maintenance Practices in this Section.

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Trouble-Shooting

1. General

The table below lists the defects you could have with the ELT. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
ELT does not operate on test.	ELT batteries discharged.	Replace the ELT batteries.
	ELT defective.	If the ELT batteries are serviceable replace the ELT.
	RCPI/cables defective.	Do a continuity test of the cables between the RCPI and the ELT. Replace defective cables. If the cables are not defective replace the RCPI.

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Maintenance Practices

1. General

This Section tells you how to remove and install the ELT and the RCPI. It tells you how to test the ELT in the airplane and how to replace the ELT batteries. It also tells you how to replace the ELT antenna.

See the ELT manufacturer's Operator's Manual for more data about the ELT.

2. Remove/Install the ELT

A. Remove the ELT

	Detail Steps/Work Items	Key Items/References
(1)	Remove the access panel in the floor of the aft baggage compartment.	Refer to Section 25-50.
(2)	Remove the ELT protective cover: – Loosen the 2 thumbscrews on the ELT end-cap. – Move the end cap forward and clear of the ELT. – Lift the top protective cover at the aft end and pull the cover aft and up from the ELT. – Move the top protective cover clear of the ELT.	
(3)	Disconnect these cables at the front of the ELT: – The coaxial cable. – The electrical cables.	 At the bayonet connector. At the inline connector.
(4)	Remove the ELT from the ELT mounting tray: – Lift the ELT from the mounting tray at the forward end. – Move the ELT forwards and upwards, clear of the mounting tray. – Move the ELT clear of the airplane.	Use a flat bladed screwdriver to carefully lift the front end of the ELT.

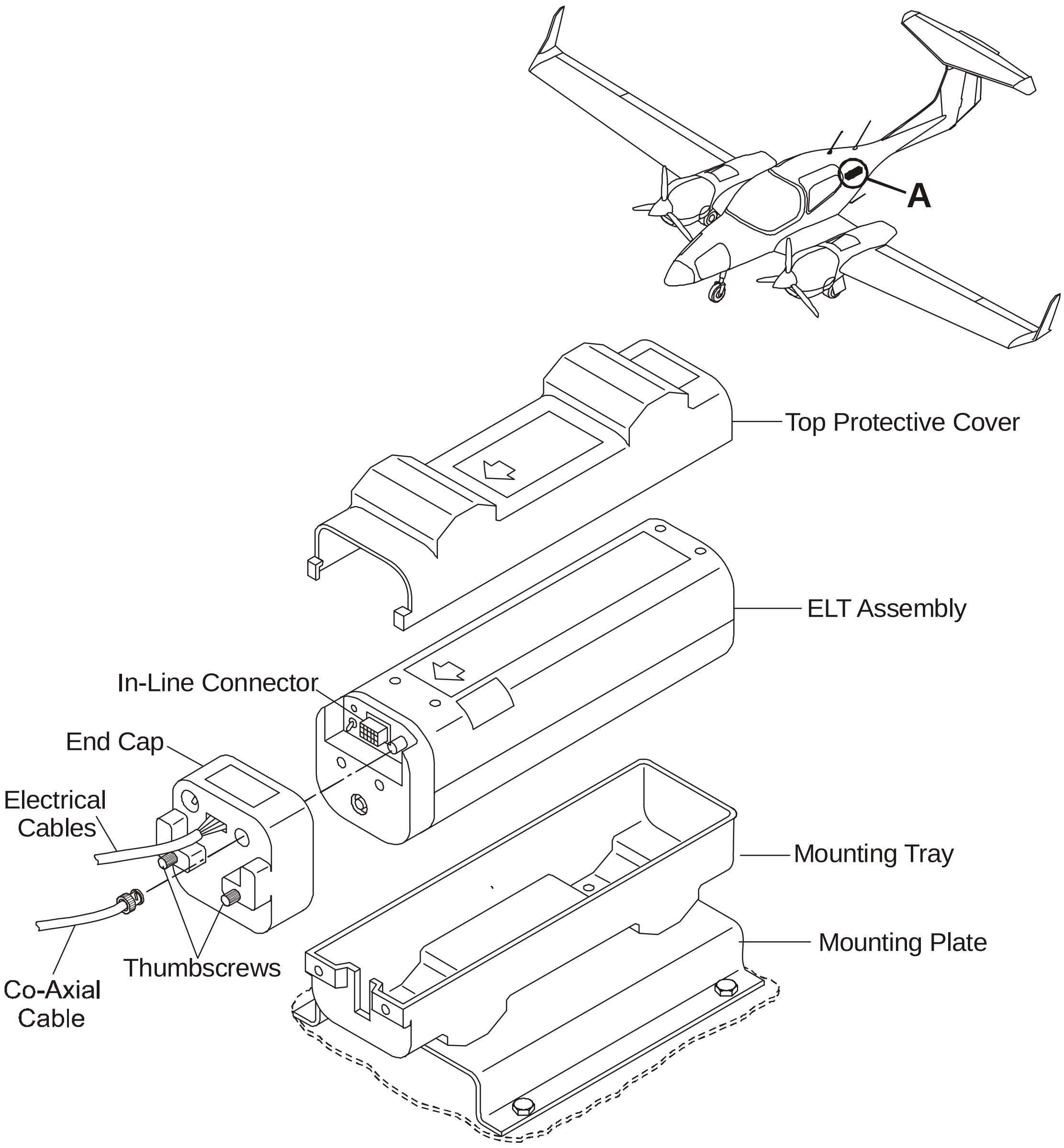

Figure 2: ELT Installation (Standard Equipment)

B. Install the ELT

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the battery pack is serviceable and the battery expiration date is valid.	
(2)	Install the ELT into the mounting tray: – Move the ELT into position at the mounting tray. – Make sure that the ON/OFF switch at the front of the ELT is set to OFF. – Lower the aft end of the ELT into the mounting tray so that the locking 'ears' at the aft end of the ELT engage with the slots in the mounting tray. – Lower the ELT fully into the mounting tray. – Install the top protective cover onto the mounting tray. Make sure that the slots on the top cover engage over the ears on the ELT.	
(3)	Connect the electrical cables.	At the in-line connector. Make sure that the cables pass through the end cap before you connect them!
(4)	Connect the coaxial cable.	At the bayonet connector. Make sure that the cable passes through the end cap before you connect it!
(5)	Install the end cap: – Move the end-cap into position over the top protective cover and the mounting tray. – Align and tighten the thumbscrews.	Finger tight only!
(6)	Make sure that both the electrical cable connector and the coaxial bayonet connector are correctly located.	
(7)	Do a test for the correct operation of the ELT.	Refer to Paragraph 7.

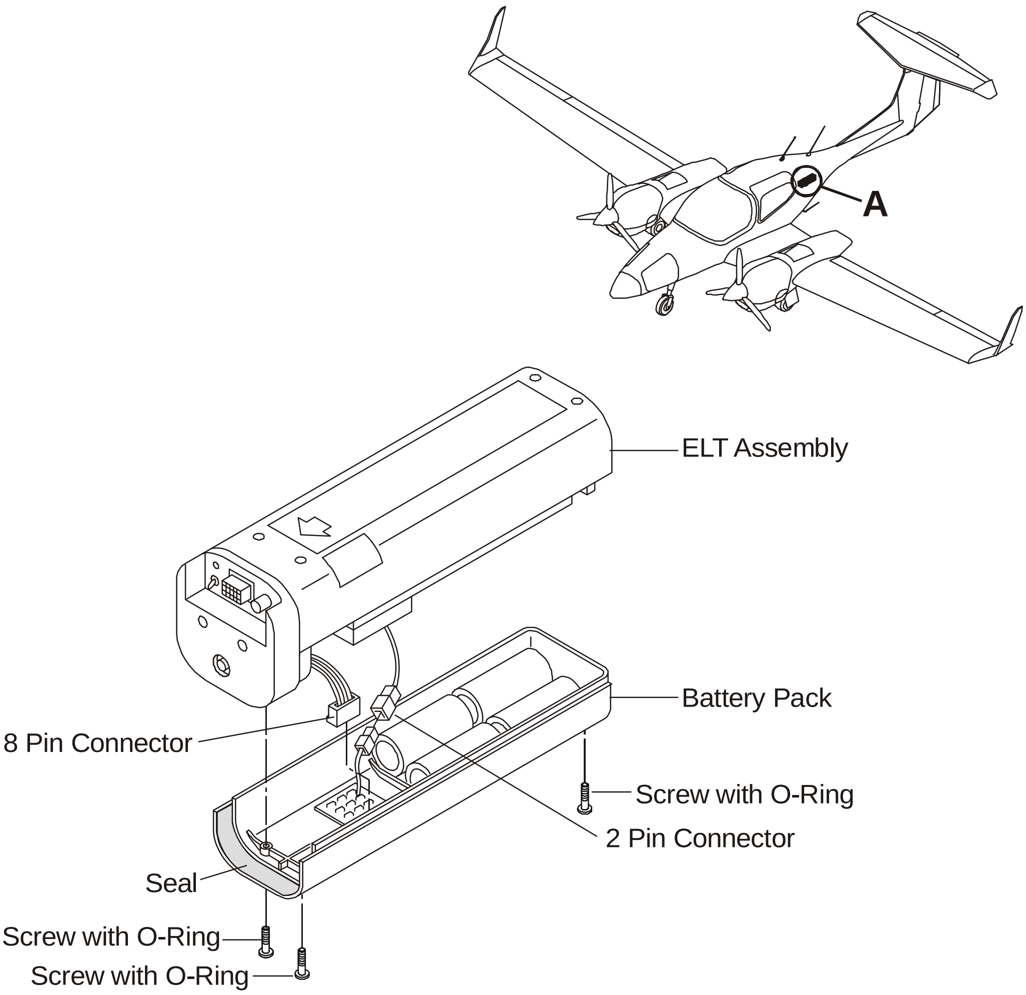

Figure 3: ELT Battery Pack Installation

3. Replace the ELT Battery Pack

You must only use a battery pack that is supplied by the equipment manufacturer.

Note: The battery pack contains components that are sensitive to static electricity. You must take electro-static discharge precautions before doing work on the battery pack.

Note: The battery pack is connected to the ELT by a short electrical cable assembly. You must take care not to strain this cable when you separate the battery pack from the ELT.

	Detail Steps/Work Items	Key Items/References
(1)	Remove the ELT from the airplane ELT mounting.	Refer to Paragraph 2A.
(2)	Remove the battery pack: – Remove the 4 screws that attach the battery pack to the ELT. – Lay the ELT with battery pack on it’s side on a suitable work surface. – Carefully move the battery pack a short distance clear of the ELT. – Disconnect the wiring harness. – Disconnect the 2 smaller cables. – Move the battery pack clear of the ELT.	Refer to Figure 3. Hold the battery pack to the ELT with your hand to prevent the battery pack separating from the ELT. At the 8 pin in-line connector. Take care not to ‘short’ any of the pins. At the 2 pin connector.
(3)	Do a visual inspection of the underside of the ELT (the battery pack side). Look specially for corrosion or other damage to the ELT casing.	

	Detail Steps/Work Items	Key Items/References
(4)	Prepare the new battery pack for installation: – Remove the paper backing from the rubber seal at the connector end of the battery pack. – Lubricate the seal.	Use G GE-635 non-petroleum based silicone grease or similar.
(5)	Install the new battery pack: – Connect the 8 pin connector from the ELT wiring loom to the connector on the battery pack. – Connect the 2 pin connector from the battery pack cables to the recessed connector on the ELT. – Move the battery pack into position on the ELT. – Install the 4 screws that attach the battery pack to the ELT.	Connecting the 2 pin connector will activate the ELT. Reset the ELT by setting the ELT ON/OFF switch to ON then to OFF. Make sure that none of the electrical cables are trapped between the mating surfaces of the ELT and the battery pack.
(6)	Install the ELT in the airplane mounting and attach the battery pack replacement date label to the top surface of the ELT protective cover where it can be easily seen.	Refer to Paragraph 2.
(7)	Record the details of the ELT battery pack replacement date in the airplane log-book.	
(8)	Do a functional test of the ELT.	Refer to Paragraph 7.

4. Remove/Install the Artex ME406 ELT (Optional Equipment, if OÄM 42-080 is carried out)

A. Remove the Artex ME406 ELT (if OÄM 42-080 is carried out)

	Detail Steps/Work Items	Key Items/References
(1)	Remove the access panel in the floor of the aft baggage compartment.	Refer to Section 25-50.
(2)	Disconnect these cables at the front of the ELT: – The co-axial cable. – The electrical cables.	 At the bayonet connector. At the in-line connector.
(3)	Open the velcro strap.	
(4)	Remove the ELT from the ELT mounting tray: – Lift the ELT from the mounting tray at the forward end. – Move the ELT forward and upward, clear of the mounting tray. – Move the ELT clear of the airplane.	

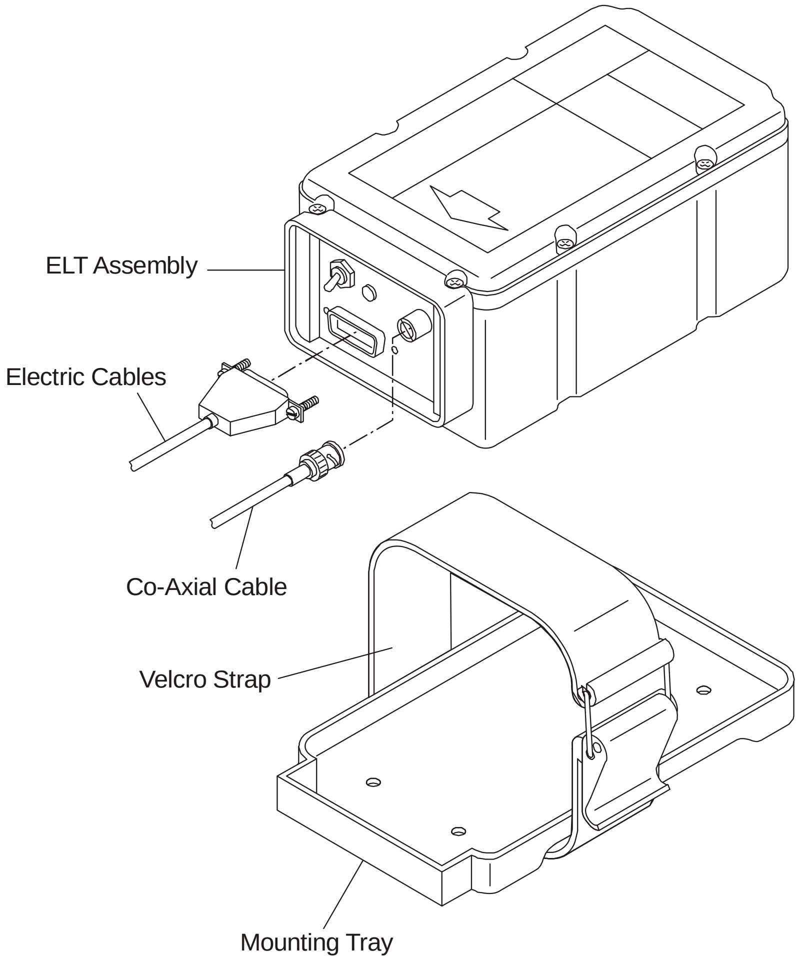

Figure 4: Artex ME406 ELT Installation (if OÄM 42-080 is carried out)

B. Install the Artex ME406 ELT (if OÄM 42-080 is carried out)

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the battery pack is serviceable and the battery expiration date is valid.	
(2)	Install the ELT into the mounting tray: – Move the ELT into position at the mounting tray. – Make sure that the ON/OFF switch at the front of the ELT is set to OFF. – Lower the aft end of the ELT into the mounting tray so that the locking 'ears' at the aft end of the ELT engage with the slots in the mounting tray. – Lower the ELT fully into the mounting tray.	
(3)	Fasten the velcro strap around the ELT so that it is firmly held in place.	
(4)	Connect the electrical cables.	At the in-line connector.
(5)	Connect the coaxial cable.	At the bayonet connector.
(6)	Make sure that both the electrical cable connector and the co-axial bayonet connector are correctly located.	
(7)	Do a test for the correct operation of the ELT.	Refer to Paragraph 7.

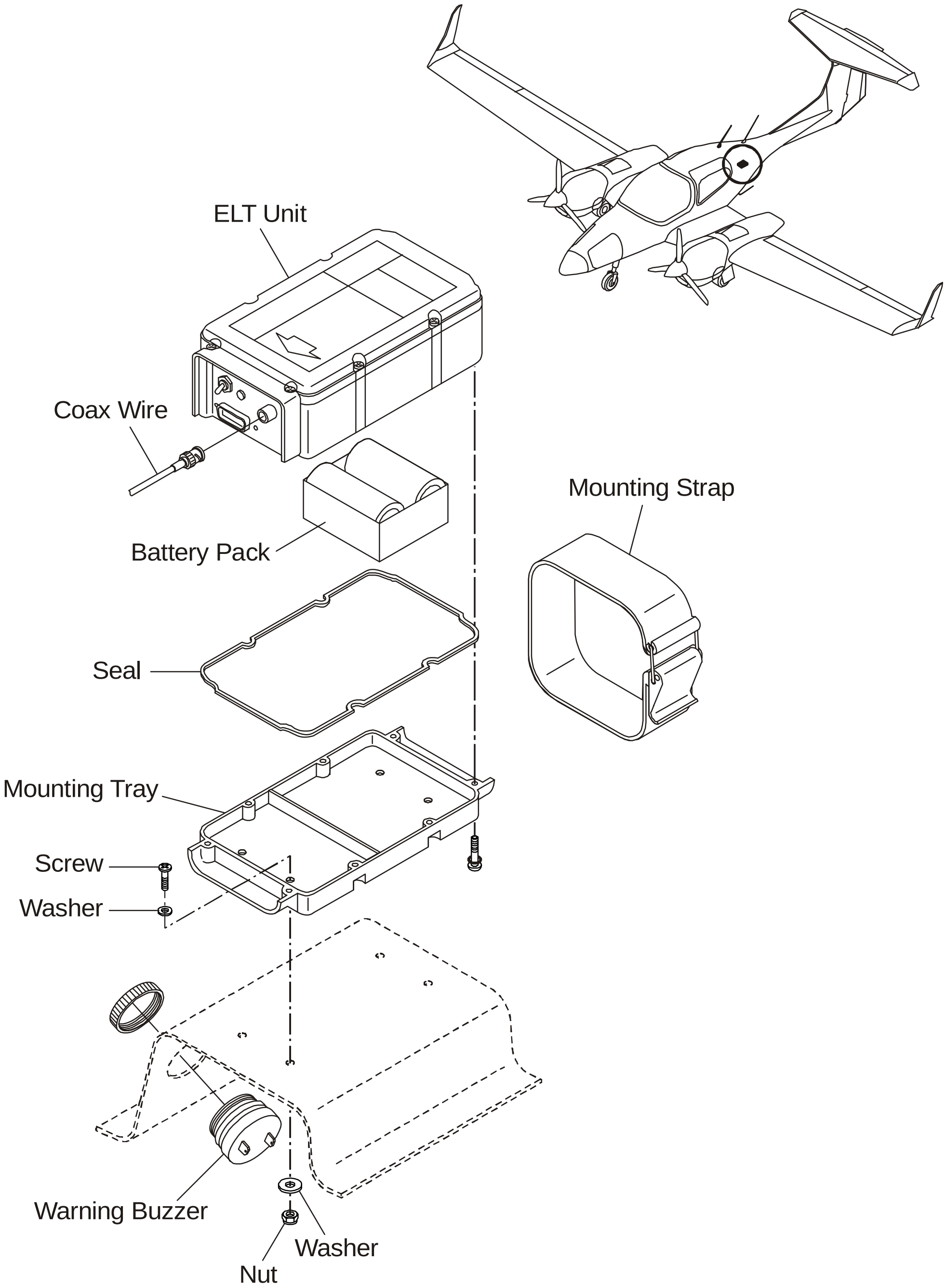

Figure 5: Battery Pack Installation - Artex ME406 (if OÄM 42-080 is carried out)

5. Replace the ELT Battery Pack of the Artex ME406 (if OÄM 42-080 is carried out)

You must only use a battery pack that is supplied by the equipment manufacturer.

Note: The battery pack contains components that are sensitive to static electricity. You must take electrostatic discharge precautions before doing work on the battery pack.

Note: The battery pack is connected to the ELT by a short electrical cable assembly. You must take care not to strain this cable when you separate the battery pack from the ELT.

	Detail Steps/Work Items	Key Items/References
(1)	Remove the ELT from the airplane ELT mounting.	Refer to Paragraph 2A.
(2)	Remove the battery pack: – Remove the 8 screws from the battery-side cover. – Carefully move the battery pack a short distance clear of the ELT. – Disconnect the wiring harness. – Move the battery pack clear of the ELT.	Refer to Figure 5. Hold the battery pack to the ELT with your hand to prevent the battery pack separating from the ELT.
(3)	Do a visual inspection of the underside of the ELT (the battery pack side). Look specially for corrosion or other damage to the ELT casing.	
(4)	Prepare the new battery pack for installation.	
(5)	Lay the battery pack on the work surface with the batteries facing up.	
(6)	Install the replacement seal.	In the slot along the perimeter housing.
(7)	Position the ELT over the battery pack and plug the connector into the battery assembly.	Make sure that the cable is not twisted and that the connector is correctly attached.
(8)	Mate the ELT to the battery.	Make sure that the seal is positioned correctly.
(9)	Install the 8 screws that attach the battery pack to the ELT.	

	Detail Steps/Work Items	Key Items/References
(10)	Install the ELT in the airplane mounting and attach the battery pack replacement date label to the top surface of the ELT protective cover where it can be easily seen.	Refer to Paragraph 2B.
(11)	Record the details of the ELT battery pack replacement date in the airplane log-book.	
(12)	Do a functional test of the ELT.	Refer to Section 25-60, Paragraph 7.

6. Remove/Install the ELT RCPI

A. Remove the ELT Remote Control Panel/Indicator RCPI

	Detail Steps/Work Items	Key Items/References
(1)	Remove the instrument panel cover.	Refer to Section 25-10.
(2)	Disconnect the electrical cables from the rear of the RCPI.	At the in-line connector. Refer to Figure 6.
(3)	Remove the RCPI: – Remove the 4 nuts, washers and screws that attach the RCPI to the instrument panel. – Move the RCPI towards the rear of the airplane and clear of the instrument panel. – Move the RCPI clear of the airplane.	Hold the RCPI.

B. Install the ELT Remote Control Panel/Indicator RCPI

	Detail Steps/Work Items	Key Items/References
(1)	Move the RCPI into position at the instrument panel.	
(2)	Install the RCPI: – Move the RCPI into position in the instrument pane. – Install the 4 screws, washers and nuts that attach the RCPI to the instrument panel.	From the cockpit side.
(3)	Connect the electrical cables to the rear of the RCPI.	At the inline connector.
(4)	Install the instrument panel cover.	Refer to Section 25-10.
(5)	Do a functional test of the ELT system.	Refer to Paragraph 7.

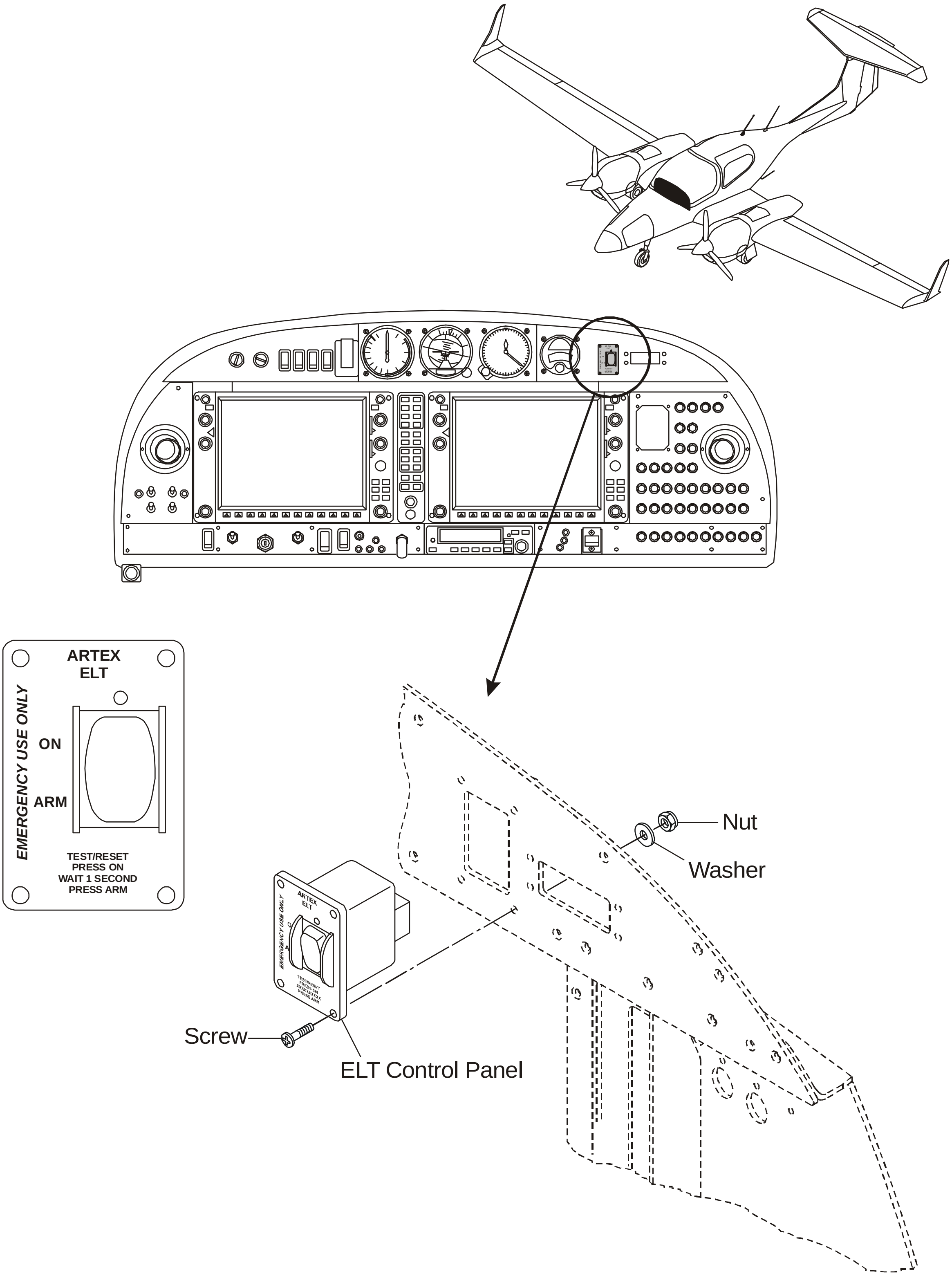

Figure 6: RCPI Installation

7. ELT Functional Test

Note: Do this test only in the first 5 minutes of each hour. If you are at a location with a control tower or other monitoring facility, tell them before you do the test.

Note: For maintenance done to FAR 91 (airplanes registered in the USA) an additional functional test of the ELT is required. Refer to FAA Action Notice 8150.3 for more data.

	Detail Steps/Work Items	Key Items/References
(1)	Set the ELECT. MASTER switch to ON.	
(2)	Set the AV MASTER switch to ON.	
(3)	Set the communications radio to receive 121.50 MHz.	
	WARNING: DO NOT OPERATE THE ELT FOR MORE THAN 5 SECONDS. IF YOU OPERATE THE ELT FOR MORE THAN 5 SECONDS THE ELT WILL TRANSMIT AN EMERGENCY SIGNAL TO THE SATELLITE MONITORING SYSTEM. THE SATELLITE MONITORING SYSTEM WILL REACT TO THE ELT SIGNAL AS IT WOULD TO A VALID EMERGENCY SITUATION.	
(4)	Set the ELT RCPI to ON for about 3 sweeps of the receiver (approximately 1 second). The test MUST NOT last longer than 3 audio sweeps!	The LED in the RCPI must illuminate.
(5)	Monitor the communications receiver for the ELT sweep tone.	
(6)	Set the ELT RCPI switch to ARM.	The LED should switch off within 1 sec. If the LED switches off and then flashes it indicates that there is a fault with the ELT system. Refer to the ELT manufacturer’s manual for more data about ELT Fault Diagnosis.
(7)	Set the AV MASTER switch to OFF.	
(8)	Set the ELECT. MASTER switch to OFF.	

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CHAPTER 26

FIRE PROTECTION

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CHAPTER 26
FIRE PROTECTION

1. General

This Chapter tells you about the fire extinguisher installed in the airplane. It also tells you about the installation of the overheat detector installed in each engine nacelle. See the fire extinguisher manufacturer's manual for more data about the extinguisher and see the overheat detector manufacturer’s manual for more data about the overheat detector.

Note: Equipment which is certified for installation in the DA 42 is listed in Section 6.5 of the Airplane Flight Manual. Such equipment may be installed in accordance with the Airplane Maintenance Manual.

Any equipment which is not listed in Section 6.5 of the Airplane Flight Manual is called "Additional Equipment". The installation of Additional Equipment is a modification which must be handled in accordance with national regulations or a Service Bulletin.

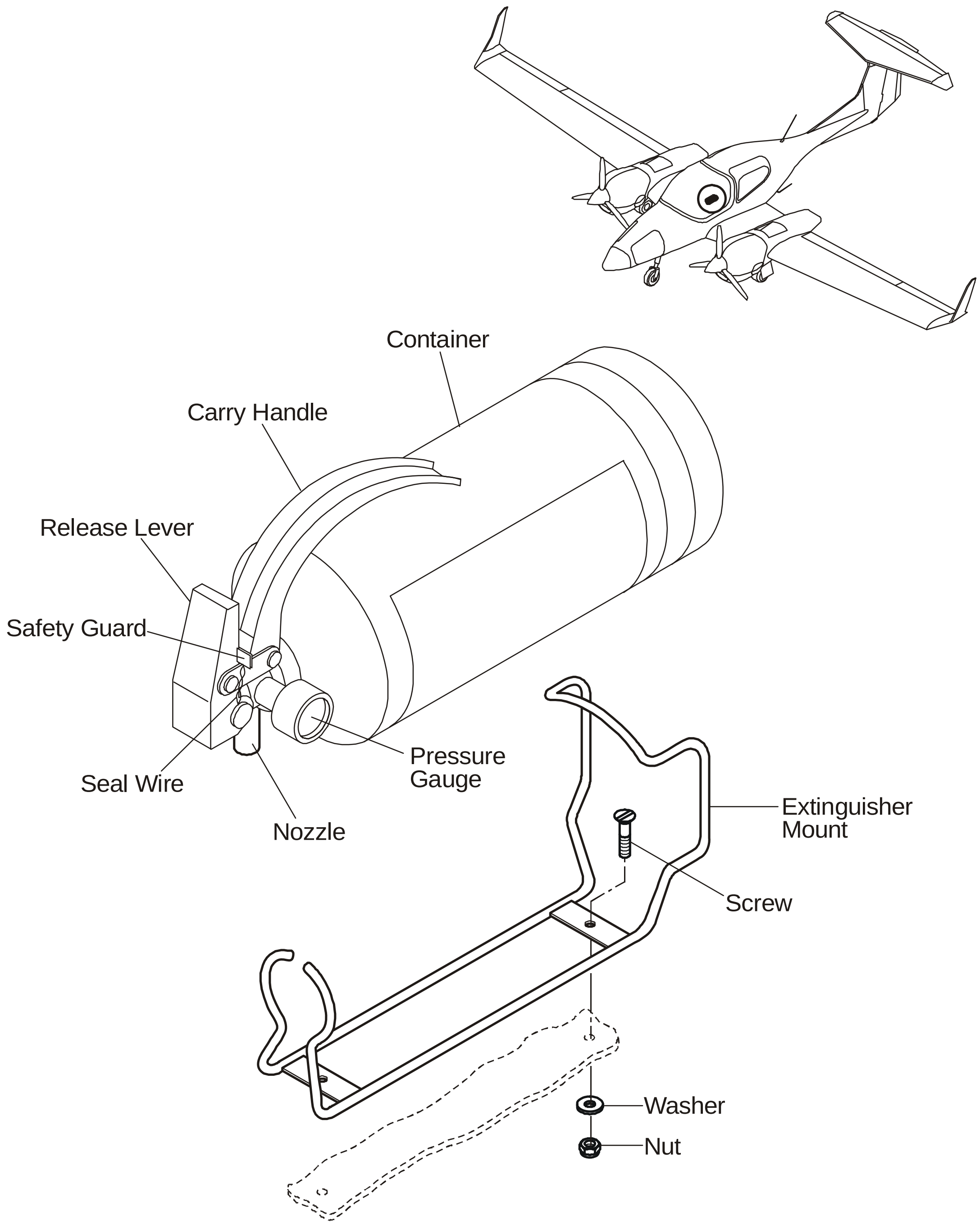

Figure 1: Fire Extinguisher Installation

2. Description

A. Fire Extinguisher

Figure 1 shows the installation of the fire extinguisher in the airplane. The fire extinguisher is located behind the co-pilot's seat. Screws attach the extinguisher mounting bracket to the closing rib between the front and the rear main bulkhead. The extinguisher uses a liquid gas which is non-toxic and does not have a residue.

The only on-airplane maintenance is:

– Monitor the pressure indicator. It must show in the green sector.

– Make sure that the seal wire is not broken.

– Make sure that the extinguisher is correctly held in the mounting.

If the seal wire is broken, remove the extinguisher for weighing. Weight data is given on the label attached to the extinguisher body.

You must replace the extinguisher (or return it to the manufacturer for repair):

– When the weight is incorrect.

– When the pressure is too low.

– When the extinguisher has been used.

– If the extinguisher is damaged.

– At the ‘Next Overhaul Date’ that is given on the label attached to the extinguisher body.

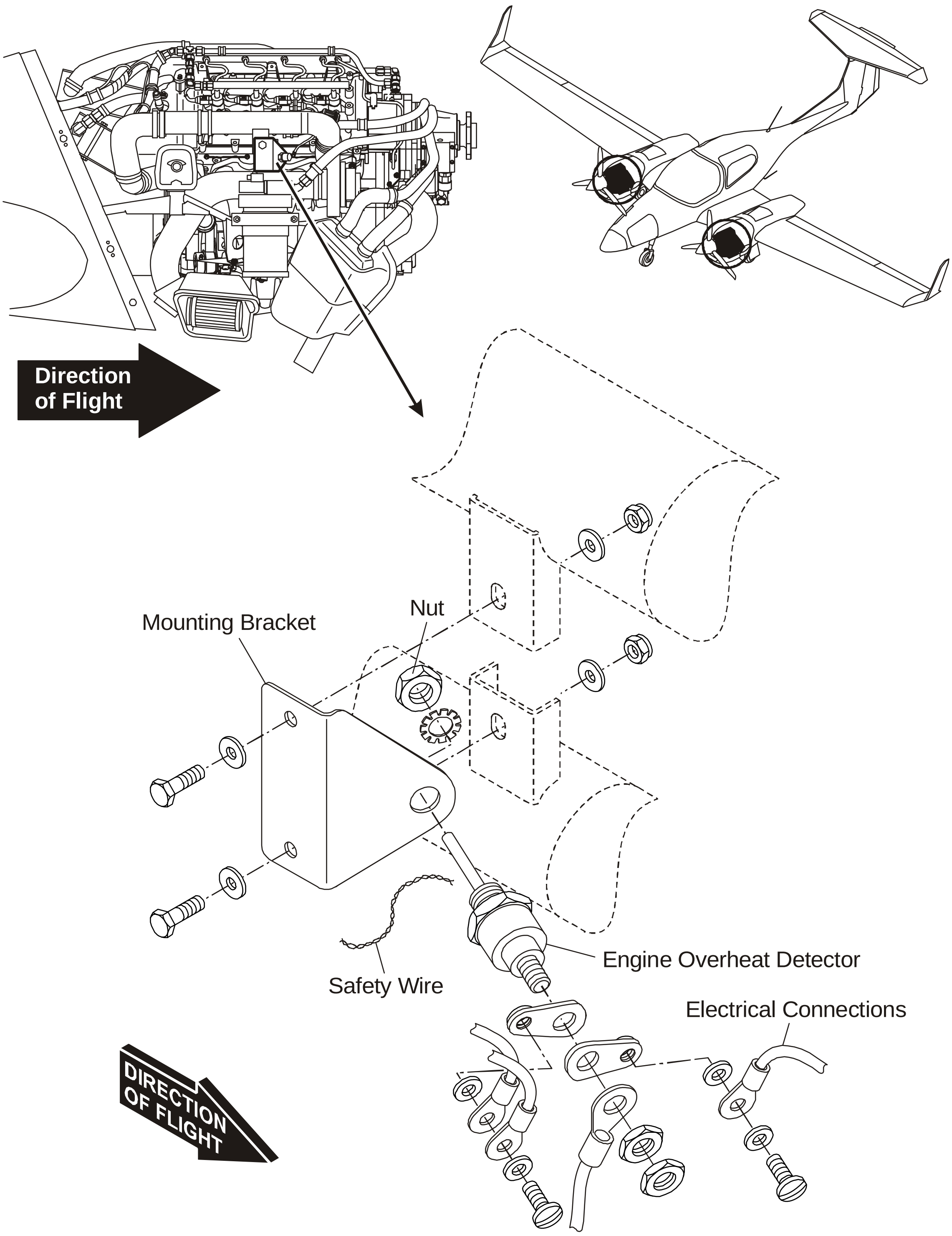

Figure 2: Engine Overheat Detector Installation

B. Overheat Detector

Figure 2 shows the overheat detector installation in an engine nacelle. Each engine has an overheat detector installed on the right side of the engine. The detector is mounted on a bracket and connects with ring terminals to the wiring harness.

A bi-metal switch makes the fire detector. If the fire detector reaches a temperature of 260 °C (500 °F) the switch closes and a LH/RH ENG FIRE warning is displayed on the integrated cockpit system (ICS) display screen. You cannot cancel the LH/RH ENG FIRE warning.

Operating the TEST button for the landing gear will by-pass the bi-metal switch and will cause the LH/RH ENG FIRE warning of ICS to operate. This test system will test the serviceability of the electrical cables for the overheat detectors and the operation of the LH/RH ENG FIRE warning of the ICS. Refer to Section 31-40 for more data about the ICS.

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Trouble-Shooting

1. General

This Section lists some defects you could have with the fire protection system. If you have the trouble shown in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
The LH/RH ENG FIRE warning fails to display when the landing gear TEST button is operated.	Defective overheat detector.	Replace the related engine overheat detector.
	Wiring defective.	Do a continuity test of the wiring. Repair/replace defective wiring. Refer to Chapter 92 for the wiring diagrams.
	ICS display defective.	Refer to Section 31-40 for more data about the ICS.
An LH/RH ENG FIRE warning shows when power is applied to the ICS.	Defective overheat detector.	Replace the related engine overheat detector.
	Wiring defective.	Do a continuity test of the wiring. Repair/replace defective wiring. Refer to Chapter 92 for the wiring diagrams.

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Maintenance Practices

1. General

These Maintenance Practices only tell you how to replace an engine overheat detector. Refer to the overheat detectors manufacturer’s manuals for more data about the overheat detector.

2. Remove/Install an Engine Overheat Detector

A. Remove an Engine Overheat Detector

Detail Steps/Work Items		Key Items/References
WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**		
(1)	Make sure that the related engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Remove the engine cowlings from the related engine.	Refer to Section 71-10.
(3)	Disconnect the electrical cables for the overheat detector.	Refer to Figure 2. At the ring terminals. If so, disconnect the electrical cable for the waste gate sensor first.
(4)	Remove the overheat detector: – Remove the safety wire from overheat detector and mounting bracket. – Screw off the overheat detector from the mounting bracket.	

B. Install an Engine Overheat Detector

Detail Steps/Work Items		Key Items/References
(1)	Install the overheat detector: – Move the overheat detector into position at the mounting bracket. – Lower the overheat detector into the mounting bracket from the top. – Tighten the overheat detector on the mounting bracket. – Secure the overheat detector on the mounting bracket.	Use a new safety wire.
(2)	Connect the electrical cables for the overheat detector.	Refer to Figure 2. At the ring terminals. If so, connect the electrical cable to the waste gate sensor first.
(3)	Do a test of the related overheat detector.	Refer to Paragraph 3.
(4)	Install the engine cowlings to the related engine.	Refer to Section 71-10.

3. Overheat Detector Test

Detail Steps/Work Items		Key Items/References
(1)	Set the ELECT. MASTER switch to ON.	In the cockpit.
(2)	Press and hold the TEST switch of the landing gear.	The LH/RH ENG FIRE warning must appear on the PFD.
(3)	Release the TEST switch of the landing gear.	The LH/RH ENG FIRE warning must disappear from the PFD.
(4)	Set the ELECT. MASTER switch to OFF.	

CHAPTER 27

FLIGHT CONTROLS

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CHAPTER 27
FLIGHT CONTROLS

1. General

This Chapter tells you about the flight controls of the DA 42. It tells about the operation of the controls and it tells you about the assembly and adjustment of the controls. Refer to the related Section for the data about a specific system.

This Section tells you how standard parts are used to make the flight controls for each system.

Note: Equipment which is certified for use in the DA 42 is listed in Section 6.5 of the Airplane Flight Manual. Such equipment may be installed in accordance with the Airplane Maintenance Manual.

Any equipment not listed in Section 6.5 of the Airplane Flight Manual is called ”Additional Equipment”. The installation of Additional Equipment is a modification which must be handled in accordance with national regulations or a Service Bulletin.

Note: Refer to Section 20-90 before starting maintenance work in the center wing area.

2. Description

Figure 1 shows the basic control surfaces of the DA 42. The DA 42 has the usual flight controls. An elevator attached to the horizontal stabilizer gives longitudinal control. Ailerons attaches to the trailing edge of each wing gives lateral control. Rudder attached to the vertical stabilizer gives yaw control. Flaps attach to the trailing edge of each wing to give extra lift for take off and landing. The rudder and the elevator both have trim systems.

Each pilot has a control stick. If OÄM 42-283 is installed, the RH control stick is removable. The pilot can set the elevator trim by using a hand wheel located in the center console or electrically by using a switch mounted on the pilot’s control stick. The DA 42 is equipped with an electrically operated variable elevator stop that limits the upward elevator deflection as soon as the power setting of both engines exceeds approx. 20% and, if OÄM 42-252 is NOT installed, the flaps are in LDG position. The variable elevator stop is controlled by two switches on the throttle quadrant (one for each power lever) and if OÄM 42-252 is NOT installed, the flap selector switch.

Each pilot has a set of rudder pedals. The rudder pedal assembly attaches to the cockpit floor. Each pilot can adjust the position of the rudder pedals with an adjuster handle on the rudder pedal assembly. A rudder trim adjuster is mounted in the front of the center console. A flexible drive cable connects the rudder trim adjuster to the rudder trim tab.

The pilot uses the control stick to move the ailerons and elevator. Both the ailerons and elevator are moved by a series of bellcranks and pushrods. Flexible cables connect the rudder pedal assembly to the rudder. An electric actuator operates the flaps.

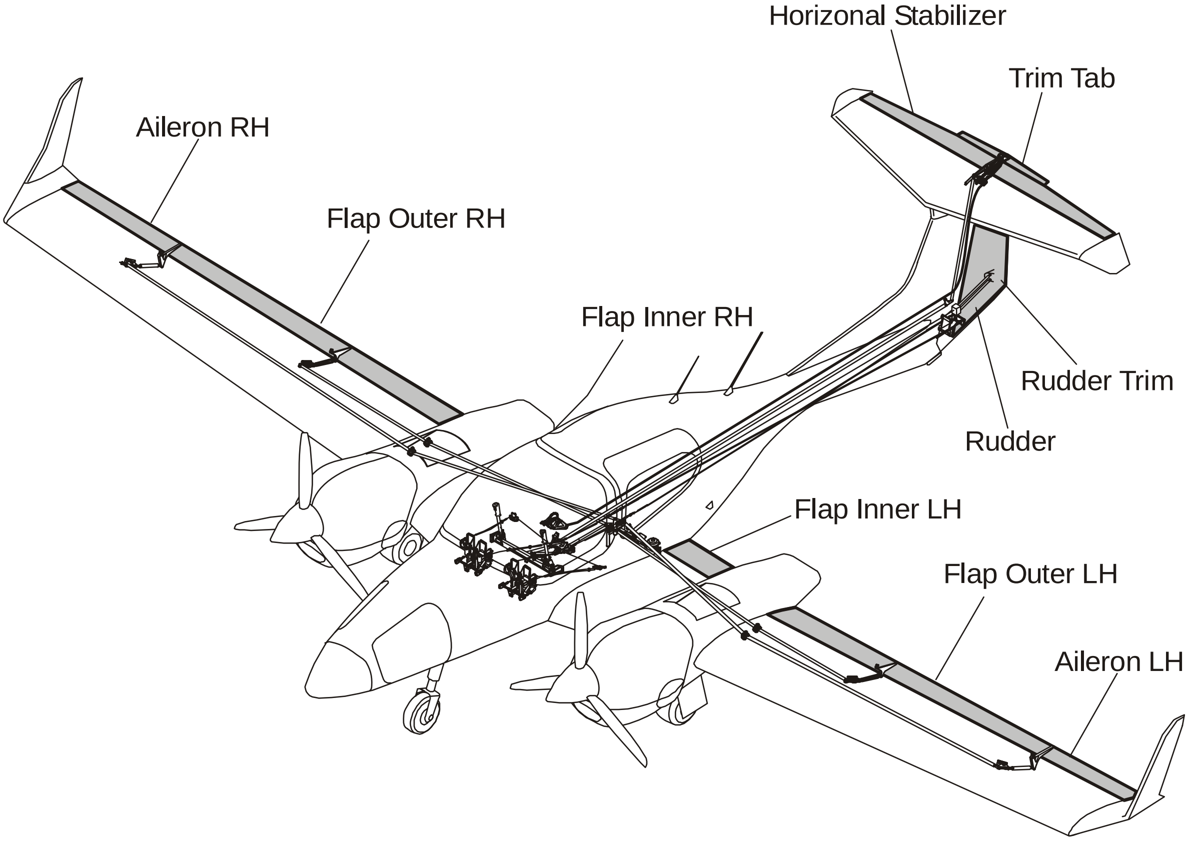

Figure 1: DA 42 Control Surfaces

3. Pushrods

The pushrods used in the DA 42 have standard end fittings. Most control rods also use a standard diameter tube. Only the length of the rods are special. Some rods have one fixed fork end fitting and an adjustable eye end fitting. Other rods have 2 adjustable eye end fittings.

Figure 2 shows an example of a standard pushrod. The rod has adjustable end fittings. The adjustable fittings have eye ends with a threaded shaft. The eye end has a spherical self-aligning bearing. A jam nut on the threaded shaft locks the eye end in position. A toothed washer locks the nut. You can turn the eye ends to adjust the length of the pushrod.

A steel tube makes the rod which connects the end fittings. Threaded inserts are welded into the ends of the tube to make the connections for the eye ends. Safety holes are drilled into the tube at the end fittings. The safety holes shows you if the installation of the eye end into the control rod is correct. If you can push safety wire through the hole when the eye end is installed then the eye end fitting is NOT installed correctly. You cannot push safety wire through the hole if the eye end fitting is installed correctly.

Refer to the Maintenance Practices in this Section for the procedures for adjusting the length of adjustable pushrods.

4. Control Rigging

The flight controls of the DA 42 have been designed to make correct rigging of the controls as easy as possible. Most levers and bellcranks have holes for rigging pins. The rigging pins lock the levers in the neutral position.

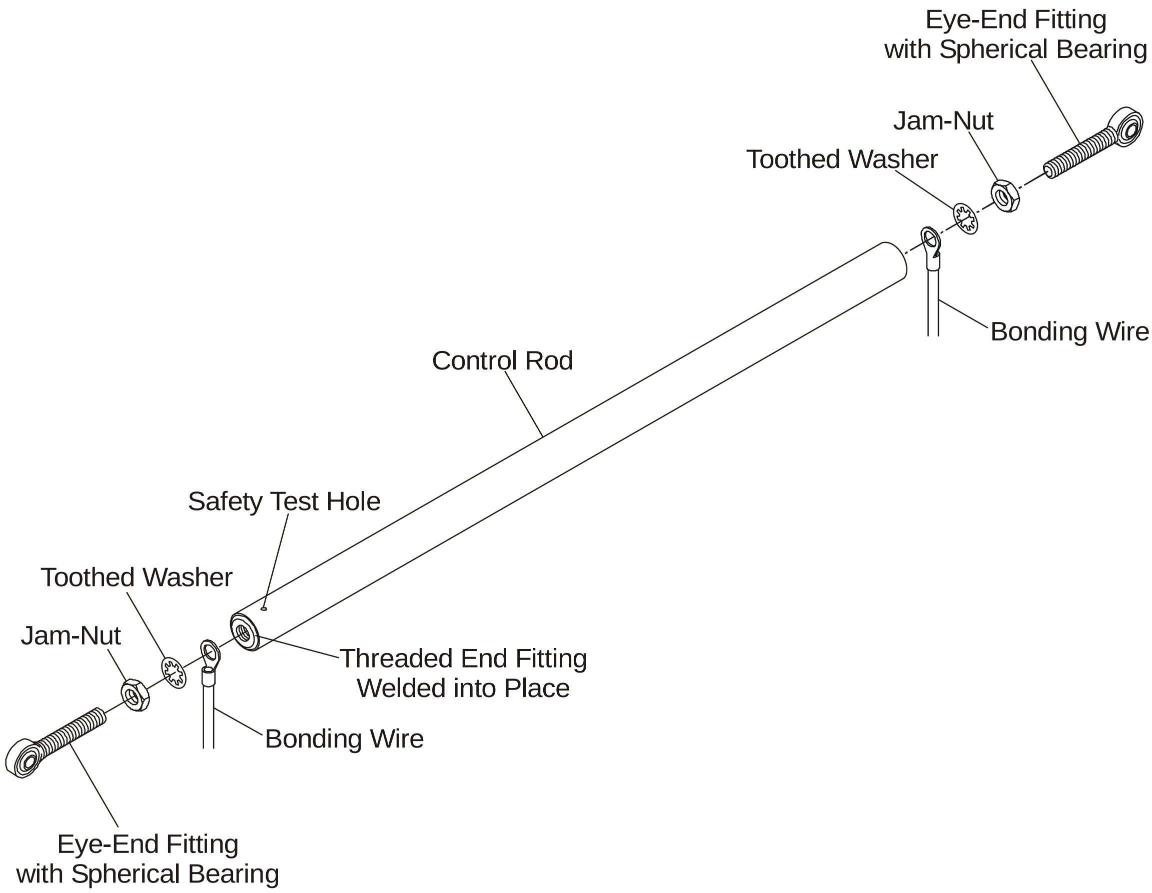

Figure 2: DA 42 Standard Control Pushrod

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Maintenance Practices

1. General

These Maintenance Practices tell you how to do procedures which apply to all of the control systems (such as pushrod adjustment).

2. Pushrod Adjustment

WARNING: IF YOU DO AN ADJUSTMENT OF A PUSHROD, YOU MUST MAKE SURE THAT THE PUSHROD IS STILL IN SAFETY. IF YOU DO NOT DO THIS, THE PUSHROD CAN DISCONNECT. THIS CAN CAUSE DEATH OR INJURY TO PERSONS.

	Detail Steps/Work Items	Key Items/References
(1)	Release the bolt which attaches the pushrod adjustable fitting to its related lever or bellcrank.	
(2)	Loosen the jam nut that locks the adjustable fitting.	Refer to Figure 1.
(3)	Turn the eye end to adjust the length of the rod.	Turn the eye end clockwise to make the rod shorter, turn the eye end counter-clockwise to make the rod longer.
(4)	When you have adjusted the eye end do a test for safety of the eye end: – Try to push lock wire through the safety hole.	The lock wire MUST NOT go through the safety hole and out of the other side.
(5)	Tighten the jam-nut.	Torque 16 Nm (11.8 lbf.ft.).
(6)	Move the eye end fitting into position in its related lever or bellcrank.	
(7)	Install the bolt, washer and self locking nut that attaches the control rod to its related lever or bellcrank.	Torque 6.4 Nm (4.7 lbf.ft.). You must always use a new self locking nut.

	Detail Steps/Work Items	Key Items/References
(8)	Do an inspection of the control that you have adjusted: – If necessary for your Airworthiness Authority, do a duplicate inspection of the control system that you adjusted. – Do a friction check of the appropriate control system.	Make sure that there is no undue friction within the control system.

3. Remove/Install Levers or Bellcranks

The DA 42 has standard attachments for bellcranks and levers in the flight control systems. Refer to the tables at the end of each Section for access data. Refer to the Figures in the related Section for the correct orientation.

A. Remove a Lever or Bellcrank

	Detail Steps/Work Items	Key Items/References
(1)	Release the bolts attaching the pushrods to the lever or bellcrank.	
(2)	Remove the pivot bolt assembly from the lever or bellcrank.	
(3)	If necessary, remove the lever or bellcrank mounting bracket: – Remove the bolts and washers that attach the mounting bracket to the structure.	Where you have access to both side of the attachment, bolts with washers and nuts are used. In all other cases, anchor nuts are used.

B. Install a Lever or Bellcrank

	Detail Steps/Work Items	Key Items/References
(1)	If necessary, put the mounting bracket into position.	
	Note: You must always use new self locking nuts when installing control levers or bellcranks. Do NOT use a self locking nut more than once.	
(2)	Install the bolts, washers and nuts that attach the mounting bracket to the structure.	Torque 6.4 Nm (4.7 lbf.ft.).
(3)	Put the lever or bellcrank into position at the mounting bracket.	Make sure that bushes and spacers are correctly located.
(4)	Install the pivot bolt, washer and nut.	Torque 6.4 Nm (4.7 lbf.ft.).
(5)	Install the bolts, washers and self locking nuts which attach the pushrods.	Torque 6.4 Nm (4.7 lbf.ft.).
(6)	Do a test of the control system.	Refer to the related Section.
(7)	Do an inspection of the control that you have adjusted: – If necessary for your Airworthiness Authority, do a duplicate inspection of the control system that you adjusted. – Do a friction check of the appropriate control system.	 Make sure that there is no undue friction within the control system.

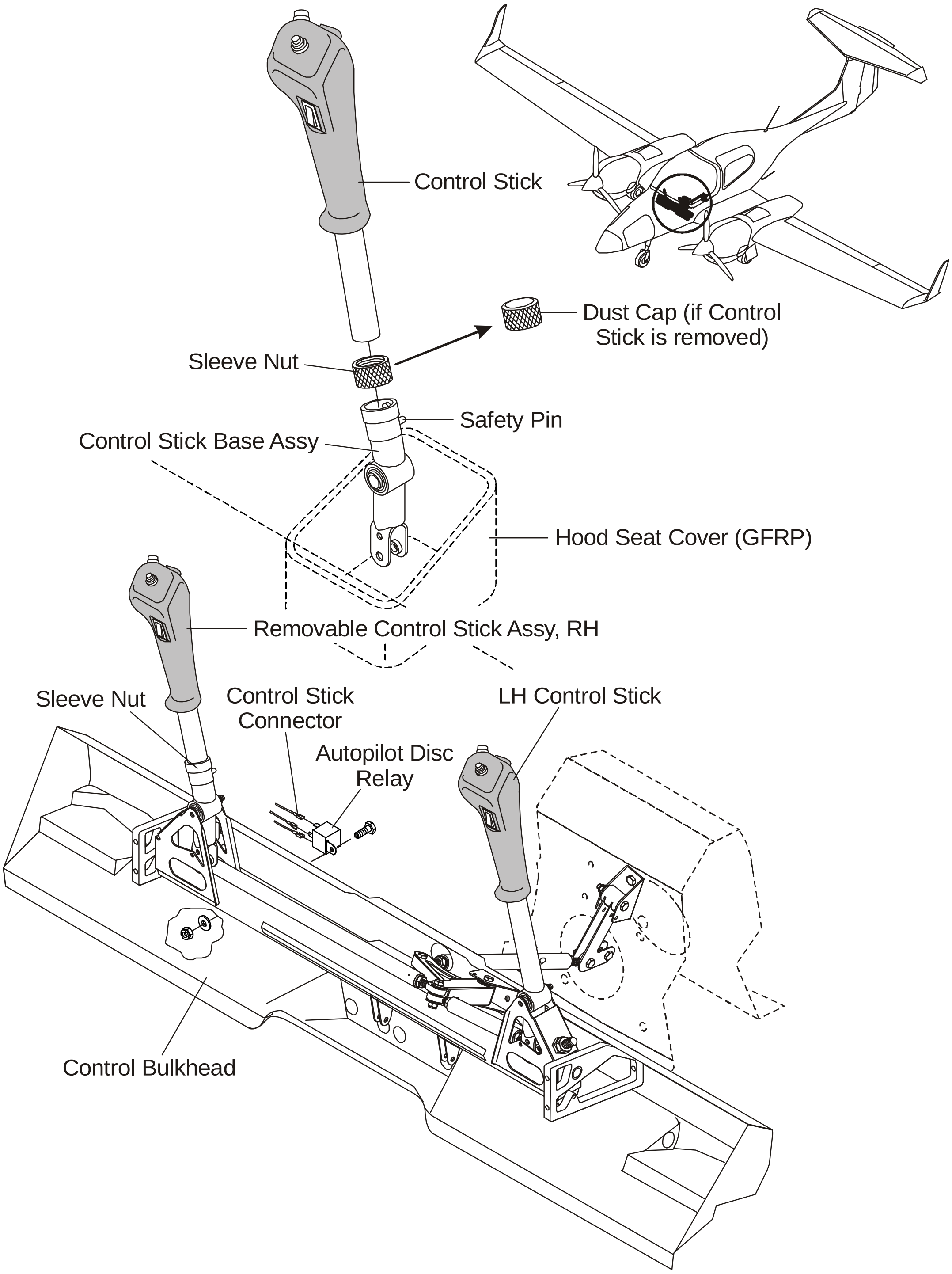

Figure 3: Control Sticks (if OÄM 42-283 is installed)

4. Remove/Install a Control Stick

If OÄM 42-283 is installed, the RH stick can be removed by the pilot and consists of two parts, the control stick base and the removable control stick. For removal / installation of the removable control stick refer to Supplement O08 to the AFM.

A. Remove a Control Stick

	Detail Steps/Work Items	Key Items/References
(1)	Remove the pilot's seat.	Refer to Section 25-10.
(2)	Loosen the control stick electrical harness from the airplane structure.	
(3)	Disconnect the control stick electrical harness connectors. If OÄM 42-283 is installed: Disconnect the AP/DISC relay from the control stick base harness.	
(4)	Remove the nut, washer and the bolt attaching the control stick / stick lever to the torque tube assy and remove the control stick from the torque tube assy.	
(5)	Disconnect the pushrod from the control stick / stick lever: – Remove the bonding wire, the nut and the bolt.	

B. Install a Control Stick

	Detail Steps/Work Items	Key Items/References
(1)	Move the pushrod and the control stick / stick lever into place and install the bolt, bonding wire and nut.	Insert the bolt from the front to the rear.
(2)	Move the control stick / stick lever into place and install the bolt, washer and nut attaching the stick lever to the torque tube assy.	Insert the bolt from the front to the rear.
(3)	Connect the autopilot and the PTT connectors. If OÄM 42-283 is installed: Connect the AP / DSC relay to the control stick base harness.	Refer to Chapter 92 for the wiring diagrams.
(4)	Secure the control stick harness to the airplane structure.	Use cable ties.
(5)	Do an inspection of the control stick / stick lever: – If necessary for your Airworthiness Authority, do a duplicate inspection of the control system that you adjusted. – Do a friction check of the control system.	Make sure that there is no undue friction within the control system.
(6)	Install the pilot's seat.	Refer to Section 25-10.
(7)	If OÄM 42-283 is installed: – Fold the control stick gaiter and use the velcro strap to fix the gaiter to the pilot's seat.	
(8)	Perform an Elevator and an Aileron Control System Test Procedure.	Refer to Section 27-10.

5. Measure the Play in a Hinge

A. Equipment

Item	Quantity	Part Number
Caliper.	1	Commercial.

B. Measure the Axial Play of a Control Surface Hinge

Move the control surface by hand along the direction of the hinge line in both directions (up and down for the rudder, inboard and outboard for the other control surfaces). Measure the maximum travel from one limit position to the other.

C. Measure the Radial Play of a Control Surface Hinge

Move the control surface by hand perpendicular to the direction of the hinge line in both directions (left and right for the rudder, up and down for the other control surfaces). Measure the maximum travel from one limit position to the other.

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Section 27-10
Flight Controls - Aileron and Tabs

1. General

The DA 42 has 2 control sticks that operate the ailerons. If OÄM 42-283 is installed, the RH control stick is removable. The aileron control system uses pushrods and bellcranks.

Figures 1 and 2 show the aileron controls in the fuselage. Figure 3 shows the aileron controls in the wing.

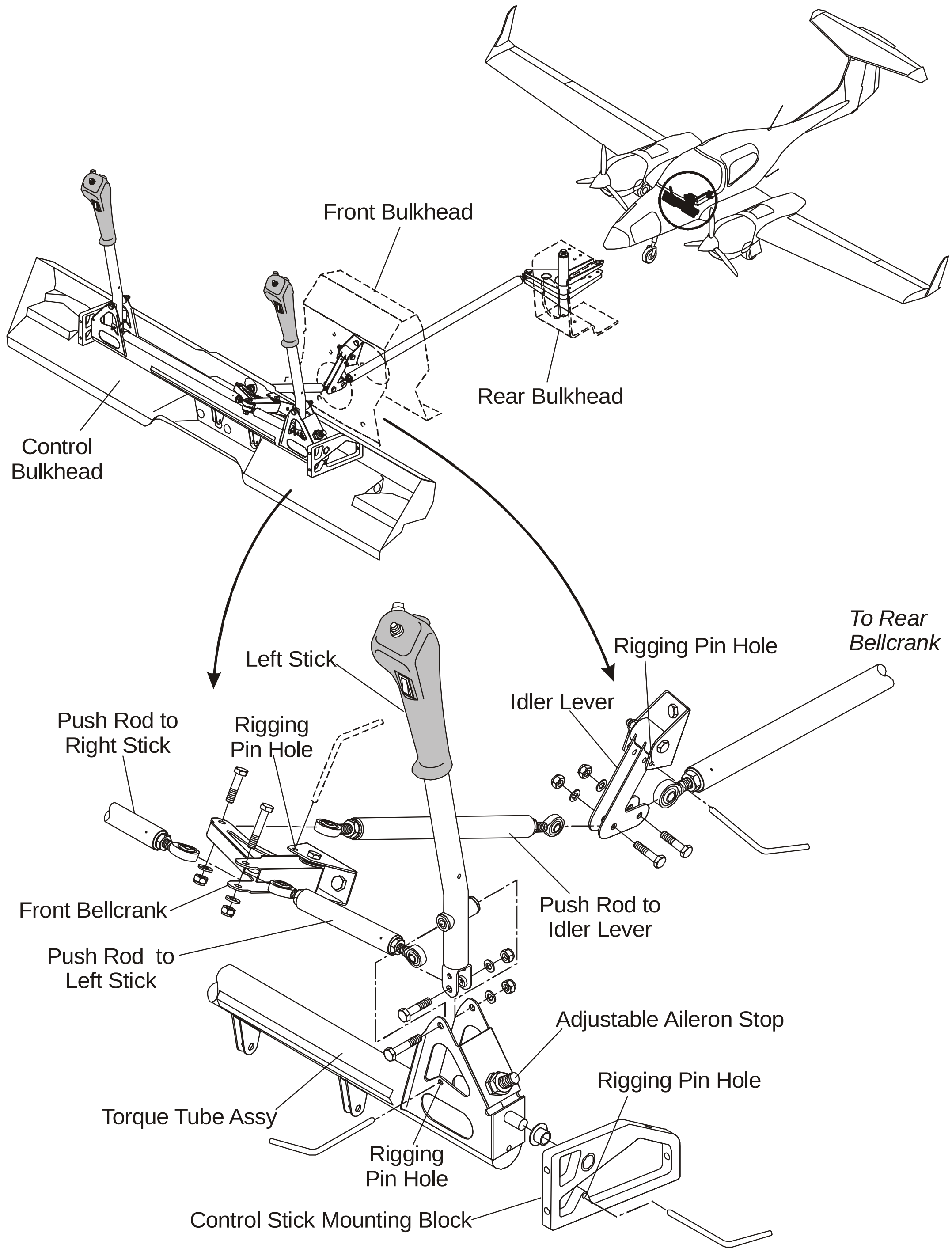

Figure 1: Aileron Controls in the Fuselage (Sheet 1)

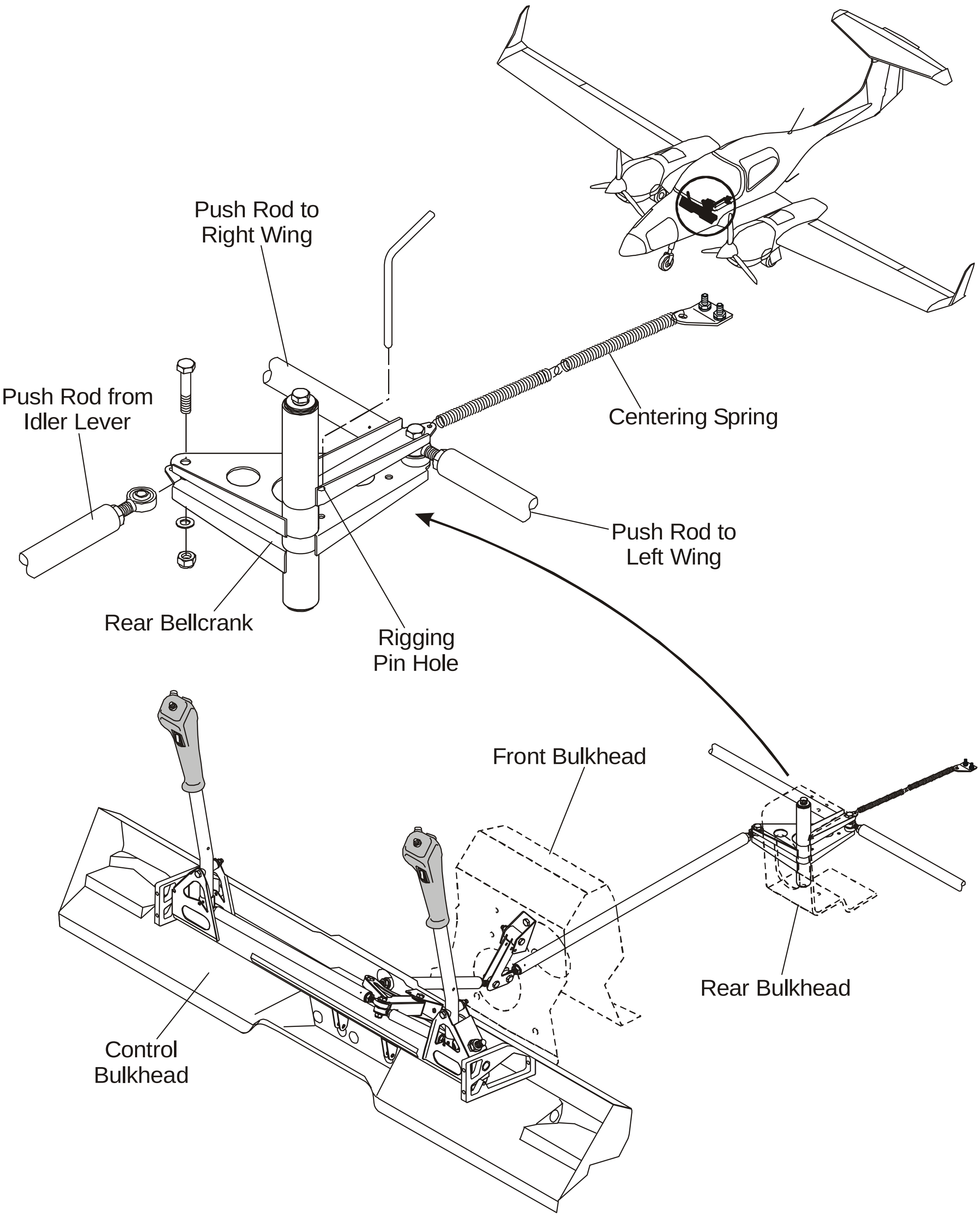

Figure 2: Aileron Controls in the Fuselage (Sheet 2)

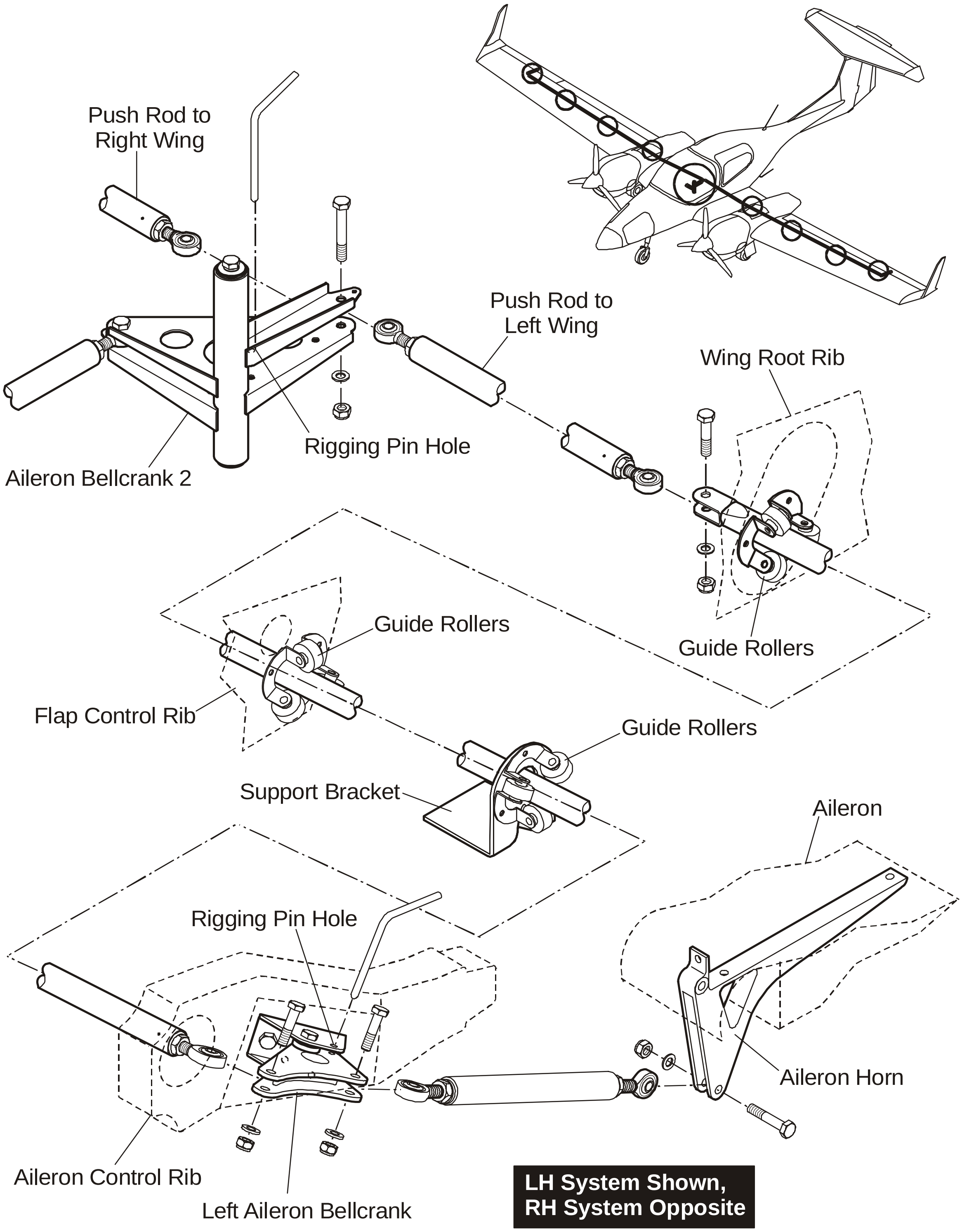

Figure 3: Aileron Controls in the Wing

2. Description

The DA 42 has a control stick for each pilot. If OÄM 42-283 is installed, the RH control stick is removable. The control sticks operate the ailerons and elevator via control rods. Aileron pushrods connect to the bottom of the control sticks. The pushrods connect to the aileron front bellcrank at the control bulkhead. The front bellcrank at the control bulkhead connects to a short pushrod under the center console.

The short pushrod connects to an idler lever attached to the front main bulkhead. Another pushrod connects the idler lever to the aileron rear bellcrank. The aileron rear bellcrank attaches to the rear face of the rear main bulkhead.

The rear bellcrank connects to the 2 pushrods in the center section. Each of these rods connect to long pushrod assemblies located in each of the wings.

Each long pushrod assembly has 3 pushrod guides. The first pushrod guide attaches to a rib located in the wing center section. The second attaches to the outer flap control rib. A small rib holds the third pushrod guide. The 2 long pushrod assemblies attach to the aileron bellcranks which are mounted in each wing, at the aileron control rib.

Short pushrods connect the aileron bellcrank to the aileron horn. You can adjust the short pushrods to move the aileron range-of-movement up or down.

The aileron stop which limits the movement of the control sticks to the right (right aileron up, left aileron down) is located to the left of the pilot's control stick (Figure 1). The aileron stop which limits the movement o the control stick to the left (left aileron up, right aileron down) is located to the right of the co-pilot's control stick. Each aileron stop consists of a nut which is welded to the torque tube assembly, a bolt which is installed in the nut and a jamnut which locks the assembly. The head of the bolt makes the stop.

Additional, non adjustable stops are located in front of the leading edge of the LH and RH aileron. Each stop consists of a GFRP block with a rubber coating, bonded to the inside of the upper wing skin. When the aileron is deflected fully downward, the aileron paddle is deflected fully upward and contacts the stop.

3. Operation

If you move the control stick to the left:

– The pushrods connected to the stick move to the right.

– The front bellcrank moves the pushrod below the center console towards the rear.

– The pushrod below the center console moves the idler lever and second short pushrod to the rear.

– The second short pushrod moves the rear bellcrank so that the long pushrods in the wing move to the left.

– The left aileron bellcrank in the left wing moves the short pushrod attached to the left aileron horn to the rear.

– The left aileron moves up.

If you move the control sticks to the right:

– The left aileron moves down.

– The right aileron moves up.

Trouble-Shooting

1. General

The table below lists defects you could have in the aileron control system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Airplane moves about the longitudinal axis in flight with no input from the pilot.	Aileron pushrods out of adjustment.	Adjust the aileron pushrods.
Aileron controls stiff/catch.	Defective bearings in a control rod eye end.	Replace the defective eyeend.
	Control rod guide(s) defective.	Replace the guides.
	Pushrod bent.	Replace the pushrod.

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Maintenance Practices

1. General

These Maintenance Practices tell you how to do tests on the aileron control system. They also tell you how to adjust the aileron control system. This Section also gives you the access data on the pushrods and bellcranks. Refer to Section 57-60 for data about removing/installing the ailerons.

WARNING: **WHEN YOU DO WORK ON THE AIRPLANE CONTROLS, YOU MUST MAKE SURE THAT THE AREA AROUND THE CONTROL SURFACES ARE CLEAR OF PERSONNEL AND EQUIPMENT. IF YOU DO NOT DO THIS, INJURY TO PERSONNEL AND DAMAGE TO THE CONTROL SURFACES CAN OCCUR.**

WARNING: **WHEN YOU COMPLETE WORK ON THE CONTROLS, MAKE SURE THAT YOU REMOVE ALL LOOSE ITEMS OR TOOLS FROM THAT AREA. LOOSE ITEMS OR TOOLS CAN PREVENT FULL AND FREE MOVEMENT OF THE AIRPLANE CONTROLS. THIS CAN CAUSE DEATH OR INJURY TO PERSONS.**

2. Aileron Control System Test for Correct Range of Movement

A. Equipment

Item	Quantity	Part Number
Control stick rigging pins.	2	VR-D41-2757-3000.
Ruler/measuring stick.	1	Commercial.

B. Aileron Control System Test Procedure

Note: Use a ruler/measuring stick to make all measurements at the control surfaces. Make the measurement between the top surface of the aileron and the top surface of the wing.

	Detail Steps/Work Items	Key Items/References
(1)	Make a copy of the Control Surfaces Adjustment Report.	Refer to Chapter 06-00. Use it to record the measurements.
(2)	Remove the left pilot’s seat.	Refer to Section 25-10.

	Detail Steps/Work Items	Key Items/References
(3)	Install the control stick rigging pins: – At the bottom of the left stick. – Through the left mounting bracket.	Refer to Figure 1. To lock aileron movement. To lock elevator movement.
(4)	Measure the distance between the trailing edge of each aileron and the trailing edge of the wing tip.	Record these measurements. The left aileron must align with the right aileron.
(5)	Remove the rigging pins from the following: – The bottom of the control stick. – The left stick mounting bracket.	
	WARNING: WHEN YOU DO WORK ON THE AIRPLANE CONTROLS, YOU MUST MAKE SURE THAT THE AREAS AROUND THE CONTROLS/CONTROL SURFACES ARE CLEAR OF PERSONNEL/EQUIPMENT. IF YOU DO NOT DO THIS, INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.	
(6)	Move the control stick fully to the left and hold it against the stop.	
(7)	Measure the distance between the trailing edge of the left aileron and the trailing edge of the wing tip.	Record the measurement. The distance must be as shown in the Control Surface Adjustment Report.
(8)	Measure the distance between the trailing edge of the right aileron and the trailing edge of the wing tip.	Record the measurement. The distance must be as shown in the Control Surface Adjustment Report.
(9)	Move the control stick fully to the right and hold it against the stop.	
(10)	Measure the distance between the trailing edge of the right aileron and the trailing edge of the wing tip.	Record the measurement. The distance must be as shown in the Control Surface Adjustment Report.
(11)	Measure the distance between the trailing edge of the left aileron and the trailing edge of the wing tip.	Record the measurement. The distance must be as shown in the Control Surface Adjustment Report.
(12)	Install the left pilot’s seat.	Refer to Section 25-10.

3. Aileron Control System Adjustments

If you cannot get the correct range of movement of the aileron control system, use this procedure to adjust the system. Gust travel refers to the amount of travel remaining at the control surface with the control stick held against the cockpit stop.

WARNING: IF YOU DO AN ADJUSTMENT OF A PUSHROD, YOU MUST MAKE SURE THAT THE PUSHROD IS STILL IN SAFETY. IF YOU DO NOT DO THIS, THE PUSHROD CAN DISCONNECT. THIS CAN CAUSE DEATH OR INJURY TO PERSONS.

A. Equipment

Item	Quantity	Part Number
Rigging pins.	7	VR-D41-2757-3000.
Ruler/measuring stick.	1	Commercial.

B. Aileron Adjustment Procedure

	Detail Steps/Work Items	Key Items/References
(1)	Remove these items for access: – Pilots’ seats. – Passenger seat. – Pushrod access panels under the center section. – Aileron bellcrank access panels under each wing.	Refer to Sections: Section 25-10. Section 52-40.

	Detail Steps/Work Items	Key Items/References
(2)	Install rigging pins in the following:	Refer to Figures 1 and 2.
	– The bottom of each control stick.	To lock the stick to the torque tube.
	– The left stick mounting bracket.	The lock the elevator movement.
	– The front bellcrank.	On the control bulkhead.
	– The idler lever.	On the front main bulkhead.
	– The rear bellcrank.	On the rear main bulkhead.
	– The left aileron bellcrank.	In the left wing.
	– The right aileron bellcrank.	In the right wing.
	Note: Keep the aileron rigging pins into position until you have finished making the adjustments. Lock each lever or bellcrank in sequence.	
(3)	If you cannot put a rigging pin into a lever or bellcrank, adjust the pushrod(s) as necessary.	Refer to Section 27-00 for the pushrod adjustment procedure.
(4)	Measure the distance between the trailing edge of each aileron and the trailing edge of the wing tip.	Record these measurements. The left aileron must align with the right aileron.
	WARNING: ALL RIGGING PINS MUST BE REMOVED TO AVOID DAMAGE OF THE CONTROL SYSTEM.	
(5)	Remove the rigging pins from the following:	
	– The bottom of each control stick.	
	– The left stick mounting bracket.	
	– The front bellcrank.	On the control bulkhead.
	– The idler lever.	On the front main bulkhead.
	– The rear bellcrank.	On the rear main bulkhead.
	– The left aileron bellcrank.	In the left wing.
	– The right aileron bellcrank.	In the right wing.
(6)	Do the Aileron Control Test Procedure.	Refer to Paragraph 2.

	Detail Steps/Work Items	Key Items/References
(7)	If necessary, adjust the pushrods between the aileron bellcranks in the wings and the ailerons.	Refer to Section 27-00. Adjust the rods to give the measurements in the original Control Surfaces Adjustment Report supplied with the airplane.
(8)	If necessary, adjust the aileron stop bolts in the torque tube assembly:	Refer to Figure 1.
	– Release the jam nut on the stop bolt.	
	– Adjust the stop bolt to give the correct range of movement.	The aileron positions must be the distances shown in the original Control Surfaces Adjustment Report (measured from the neutral position).
	– Tighten the jam nut on the stop bolt.	
(9)	Do an inspection of the controls that you have adjusted. If necessary for your Airworthiness Authority, do a duplicate inspection of the controls.	
(10)	Install these items:	Refer to these Sections:
	– Pilots' seats.	Section 25-10.
	– Passenger seat.	Section 25-10.
	– Pushrod access panels under the center section.	Section 27-50.
	– Aileron bellcrank access panels under each wing.	Section 27-10.

4. Aileron Pushrod Access

Aileron Pushrod	Remove/Install Access	References
Between the control stick and the bellcrank at the control bulkhead.	Pilot’s seat.	Section 25-10.
Between the bellcrank at the control bulkhead and the idler lever at the front main bulkhead.	Pilot’s seat.	Section 25-10.
Between the idler lever at the front main bulkhead and the bellcrank at the rear main bulkhead.	Pilot’s seat. Passenger seat.	Section 25-10.
Between the bellcrank at the rear main bulkhead and the center section closing rib.	Passenger seat. Center section access panels.	Section 25-10. Section 52-40.
Between the center section closing rib and the bellcrank in the left/right wing.	Center section access panels. Aileron bellcrank access panels under each wing.	Section 52-40.
Between the bellcrank in the left/right wing and the ailerons.	Aileron bellcrank access panels under each wing.	Section 52-40.

5. Aileron Bellcrank and Lever Access

Aileron Bellcrank/Lever	Remove/Install Access	References
Bellcrank at the control bulkhead.	Pilot’s seat.	Section 25-10.
Idler lever at the front main bulkhead.	Pilot’s seat.	Section 25-10.
Bellcrank at the rear main bulkhead.	Passenger seat.	Section 25-10.
Bellcrank in the wing.	Aileron bellcrank access panels under each wing.	Section 52-40.

Section 27-20
Flight Controls - Rudder

1. General

The DA 42 has the usual rudder control system. Each pilot has a rudder pedal assembly. The pilot can adjust the pedal position. Control cables connect the pedal assembly to the rudder. The rudder has an adjustable trim tab. Refer to Section 27-21 for data about the rudder trim system.

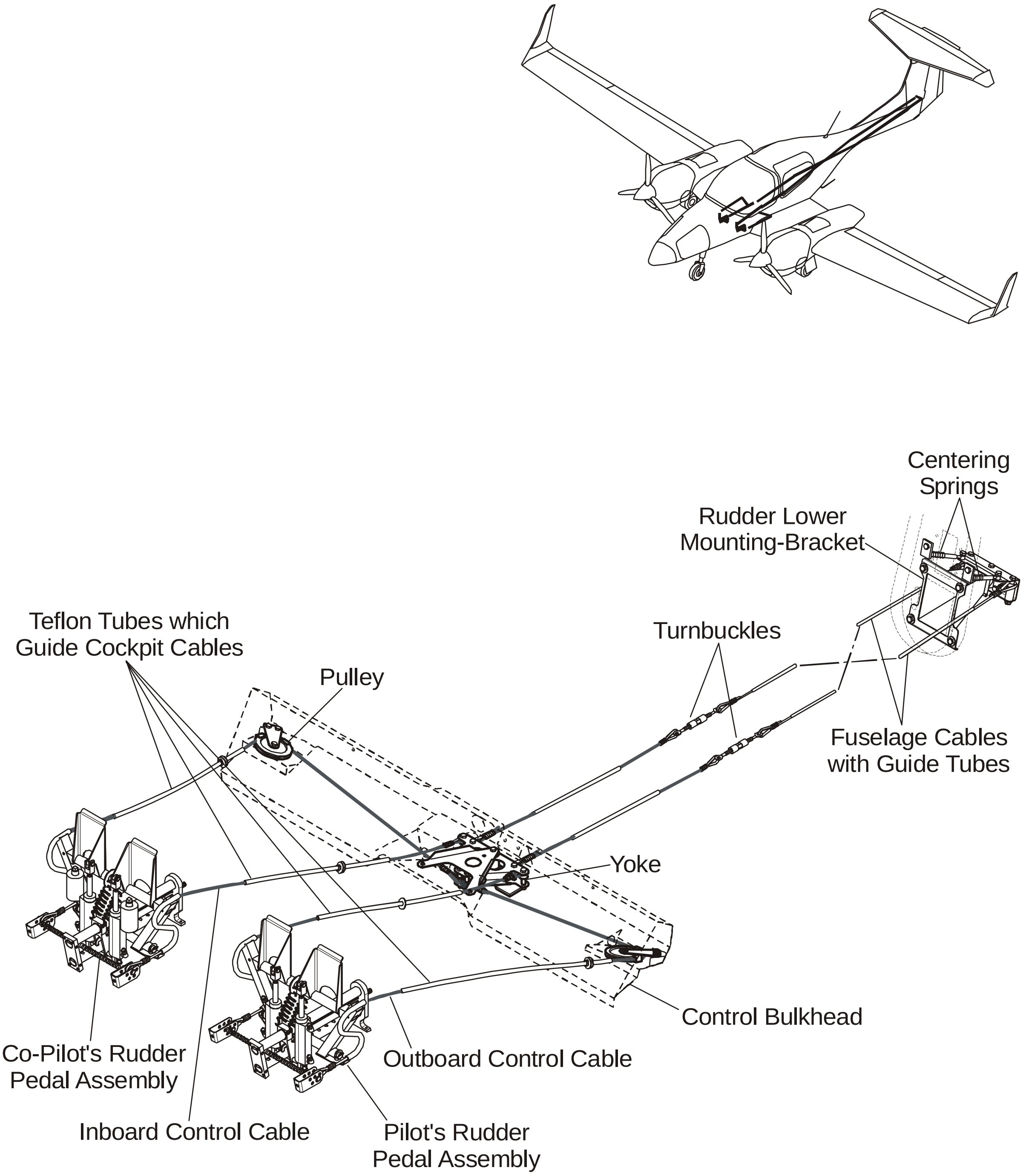

Figure 1: Rudder Control System

2. Description

The DA 42 has a set of rudder control pedals for each pilot. The pedal assembly can be adjusted.

Figure 1 shows the rudder control system. Figure 2 shows the rudder pedal assembly with manual pedal adjustment. Figure 3 shows the rudder pedal assembly with electrical pedal adjustment (optional equipment, OÄM 42-070). Figure 4 shows the rudder control in the cockpit and Figure 5 shows the rudder controls in the fuselage The system has these components:

– A rudder pedal assembly for each pilot at the front of the cockpit. The forward part of each pedal connects to a brake master cylinder (refer to Section 32-40 for more data about the brake system).

– An adjuster handle for each pilot, attached to the aft face of each rudder pedal assembly or as optional equipment, an adjuster switch for each pilot, located at the rear wall of the leg room.

– A yoke (a “T” shaped lever) assembly in the fuselage below the center console. The yoke attaches to the bottom of the control bulkhead and to the fuselage shell.

– A rudder pedestal at the rear of the fuselage. The rudder lower mounting-bracket is attached to the rudder leading edge. It connects the rudder to the rudder pedestal.

– Cable assemblies. Flexible control cables connect the cockpit front bulkhead to the yoke. Two long flexible control cables connect the yoke to the rudder. Each of the long flexible cables has a turnbuckle assembly for adjusting the length of the cable.

Six bolts attach each rudder pedal assembly to the cockpit floor.

Each rudder pedal assembly has 2 pedals. Each pedal has a lever and a foot pad. Each pedal has an “S” shaped tube. The lower part of the tube aligns with the pivot of the pedal. The upper part of the tube aligns with the foot pad of the pedal.

Four control cables (cockpit cables) go from the cockpit front bulkhead to enter the bottom of each “S” shaped tube. A multi hole fitting at the bulkhead gives adjustment for each fitting. Each cable goes through an “S” shaped tube and comes ut at the top of the tube. Each cable then goes from the tube to the yoke.

Each outboard control cable goes through a Teflon tube in the aft face of the floor panel. Each outboard control goes inboard through a guide pulley on the control bulkhead. The cables connect each outer pedal to the front arm of the yoke.

Each inboard control cable goes through a Teflon tube in the aft face of the floor panel. The cables connect each inner pedal to the side arms of the yoke.

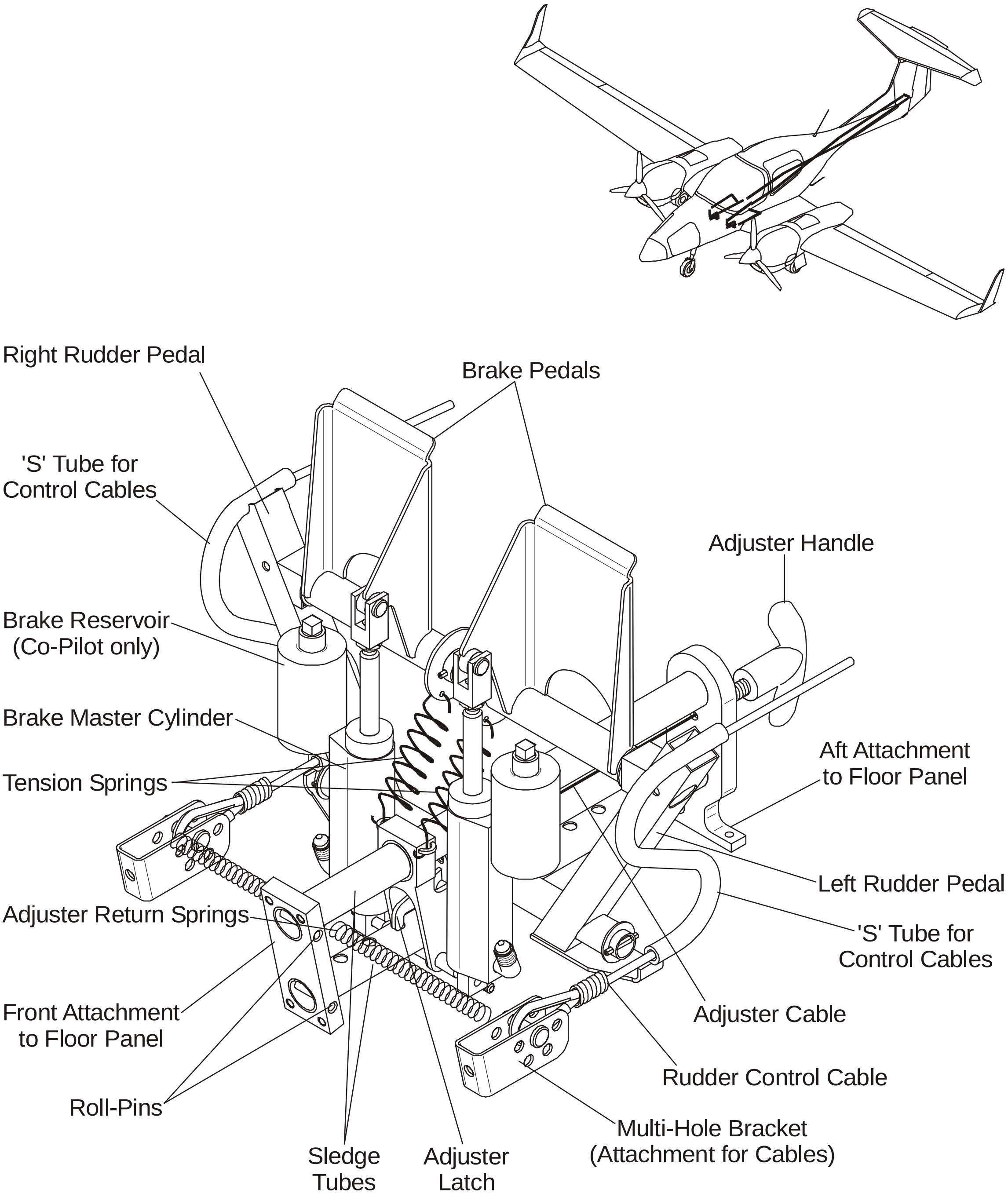

Figure 2: Rudder Pedal Assembly

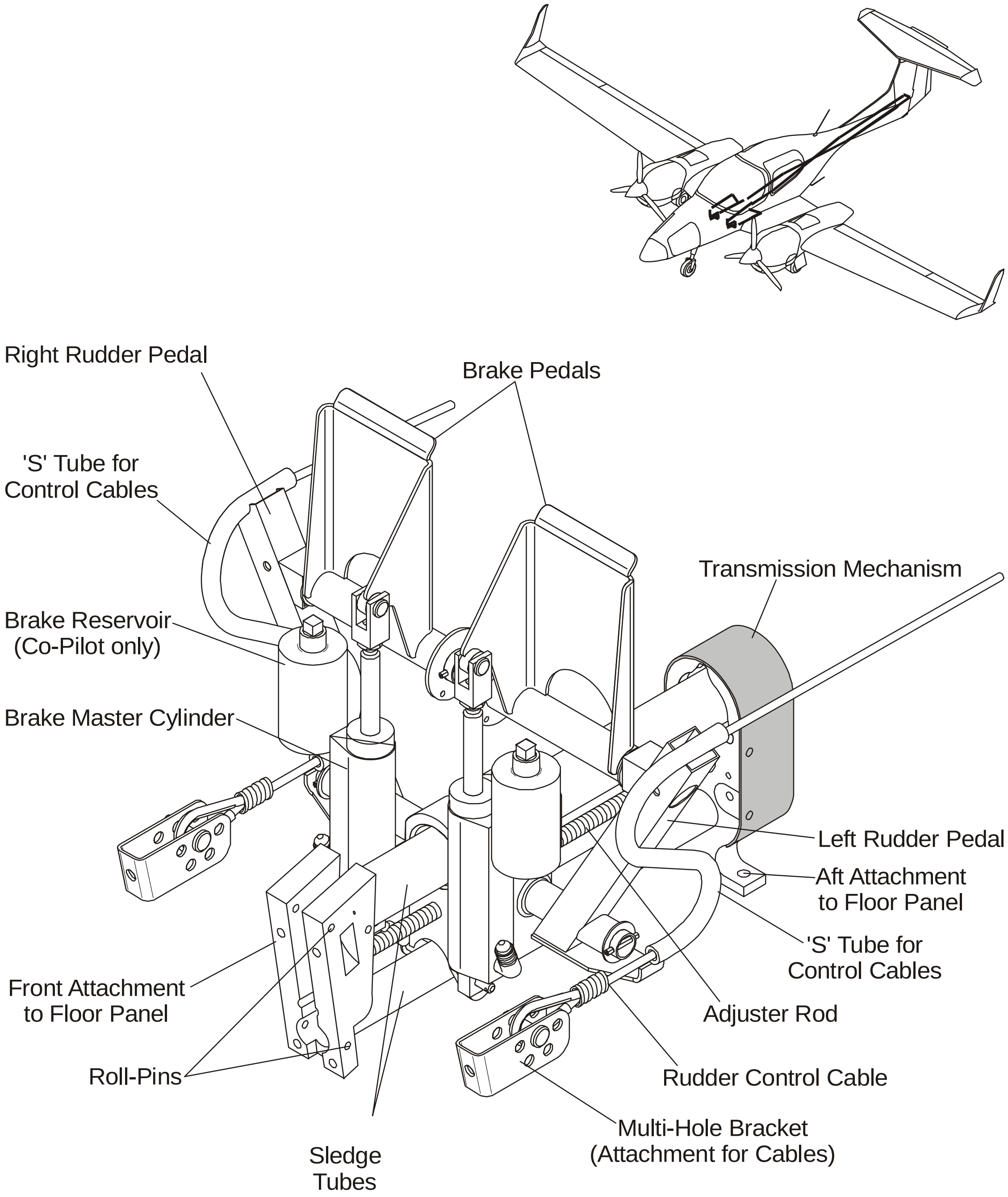

Figure 3: Rudder Pedal Assembly with Electric Adjustment (OÄM 42-070 carried out)

Two cable assemblies (fuselage cables) attach to the rear of the yoke. Each cable has a short front cable and a longer rear cable. All cables go through Teflon tubes. Turnbuckles connect the front cable to the rear cable. The turnbuckles can adjust the tension in the fuselage cables and the neutral position of the rudder.

The 2 fuselage cables go through Teflon tubes in the rear fuselage. The cables attach to the rudder lower mounting bracket. The cables cross over each other in the rear fuselage.

The rudder stop which limits the rudder deflection to the left side is located left of the lower rudder hinge (Figure 4). The rudder stop which limits the ruder deflection to the right side is located right of the rudder lower hinge. Each rudder stop consists of a nut which is welded to the rudder lower mounting-bracket and a bolt which is held tight in the nut by a jam nut.

3. Operation

If you move the left rudder pedal forward:

- The top of the “S” shaped tube moves forward.
- The “S” shaped tube pulls the left cockpit cable.
- The left cockpit cable moves the yoke counterclockwise (seen from above).
- The yoke pulls the fuselage cable attached to its right arm forward. This cable connects to the left of the rudder.
- The fuselage cable deflects the rudder to the left.
- The rudder movement pulls the other fuselage cable aft. This cable connects to the left of the yoke.
- The fuselage cable moves aft with the left side of the yoke.
- The left side of the yoke pulls both of the right cockpit cables aft. And the cables pull the “S” shaped tube on the right rudder pedals aft.

If you move the right rudder pedal forward each part moves in the opposite sense. The rudder moves to the right and pulls the left cables aft.

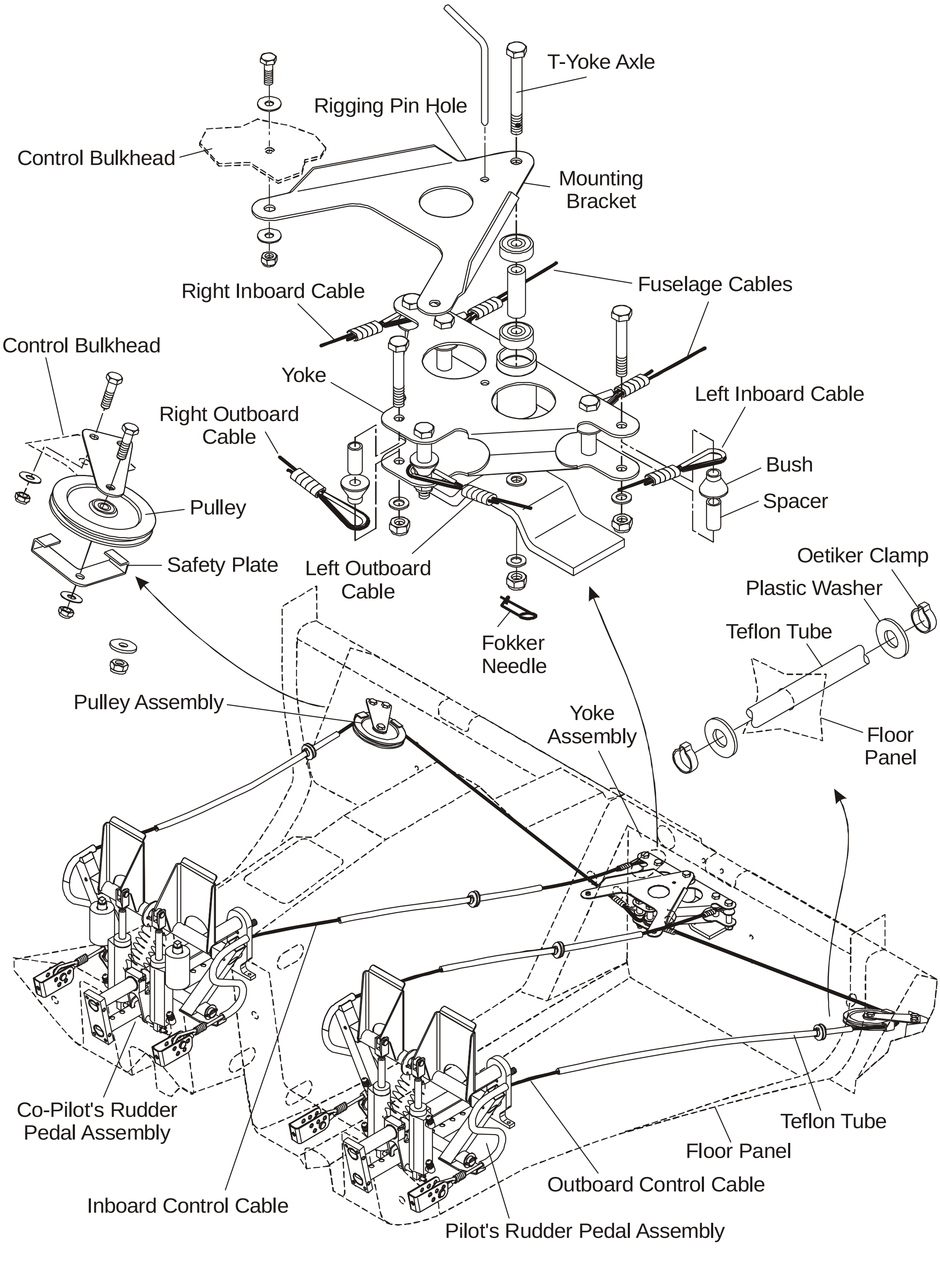

Figure 4: Rudder Controls in Cockpit

A. Manual Adjustment

When you pull on the adjuster handle, the latch disengages from the bottom sledge tube. If you pull further, the pedal assembly moves along the sledge tube towards you. Release the handle, then push with your feet on both pedals. The latch will lock.

If you push with both feet while you pull the handle, the pedal assembly moves along the sledge tube away from you. Release the handle, then push with your feet on both of the pedals. The latch will lock.

When you adjust the position of the pedals, the control cables move through the “S” shaped tubes.

B. Electrical Adjustment (Optional Equipment, OÄM 42-070)

Positioning switches are located on the LH and RH side, at the rear wall of the leg room. The positioning switch causes the rudder pedals on the corresponding side to move along the guide rail.

To move the pedals towards you, press the upper side of the switch. Press the lower end of the switch and the pedals will move away from you.

Releasing the switch will cause the motor to be switched off and the pedals will remain in the current position.

When you adjust the position of the pedals, the control cables move through the "S" shaped tubes.

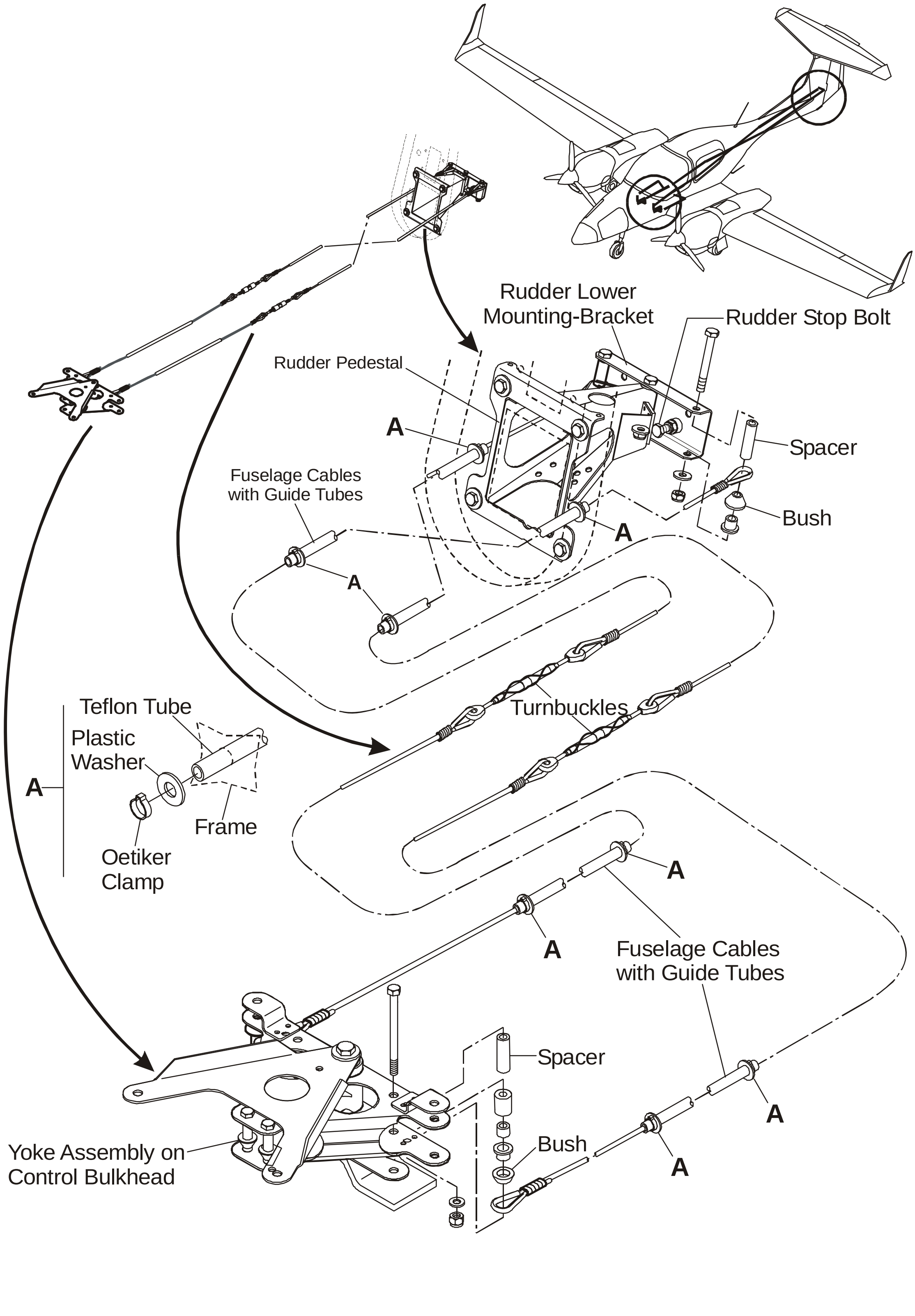

Figure 5: Rudder Controls in the Fuselage

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Trouble-Shooting

1. General

The table below lists the defects you could have in the rudder control system. Refer to Section 27-21 for more data about the rudder trim system. If you have the trouble detailed in the Trouble column, read across to the Possible Cause column and then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Airplane moves about its yaw axis with no input from the pilot.	Rudder control cable needs adjusting. Rudder trim system defective.	Adjust the rudder control cables. Refer to Section 27-21.
Rudder controls stiff/catch.	Bearings defective. Cables chafing in the guide tubes.	Replace the defective bearing. Replace the cables and guide tubes.
Cable tension too low.	Cable worn out. Pulley worn out.	Replace rudder control cable. Adjust rudder control system. Replace pulley.

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Maintenance Practices

1. General

These Maintenance Practices tell you how to do test procedures on the rudder control system. They also tell you how to adjust the rudder control system. Refer to Section 52-40 for data about removing/installing the rudder. Refer to Section 27-21 for data about the rudder trim system.

WARNING: **WHEN YOU DO WORK ON THE AIRPLANE CONTROLS, YOU MUST MAKE SURE THAT THE AREA AROUND THE CONTROL SURFACES ARE CLEAR OF PERSONNEL AND EQUIPMENT. IF YOU DO NOT DO THIS, INJURY TO PERSONNEL AND DAMAGE TO THE CONTROL SURFACES CAN OCCUR.**

WARNING: **WHEN YOU COMPLETE WORK ON THE CONTROLS, MAKE SURE THAT YOU REMOVE ALL LOOSE ITEMS OR TOOLS FROM THAT AREA. LOOSE ITEMS OR TOOLS CAN PREVENT FULL AND FREE MOVEMENT OF THE AIRPLANE CONTROLS. THIS CAN CAUSE DEATH OR INJURY TO PERSONS.**

2. Rudder Control System Test for Correct Range of Movement

A. Equipment

Item	Quantity	Part Number
Rigging pins.	4	VR-D41-2723-5000.
Ruler or deflection gauge.	1	Commercial.

B. Rudder Control Test Procedure

	Detail Steps/Work Items	Key Items/References
(1)	Make a copy of the Control Surfaces Adjustment Report.	Refer to Section 06-00. Use it to record the measurements.
(2)	Set both rudder pedals fully forward.	
	WARNING: WHEN YOU DO WORK ON THE AIRPLANE CONTROLS, YOU MUST MAKE SURE THAT THE AREAS AROUND THE CONTROLS/CONTROL SURFACES ARE CLEAR OF PERSONNEL/EQUIPMENT. IF YOU DO NOT DO THIS, INJURY TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.	
(3)	Set the rudder pedals central.	The left pedal must align with the right pedal. Make sure that the rudder is in the neutral position shown in the Control Surfaces Adjustment Report for the airplane.
(4)	Set the rudder pedals to fully left.	The rudder must hit the stops at the rudder pedestal. The rudder position must be the distance to the left shown in the Control Surfaces Adjustment Report for the airplane. (Measured from the neutral position).
(5)	Set the rudder pedals to fully right.	The rudder must hit the stops at the rudder pedestal. The rudder position must be the distance to the right shown in the Control Surfaces Adjustment Report for the airplane (measured from the neutral position).
(6)	Make sure that the left and right rudder pedals are free to move when they are set in all of the adjustable positions.	

3. Rudder Control System Adjustments

If you cannot get the correct range of movement of the rudder control system, use this procedure to adjust the system.

A. Equipment

Item	Quantity	Part Number
Cable tension gauge (tensiometer).	1	Commercial.
Ruler or deflection gauge.	1	Commercial.
Spring scale (up to 10 kg (22 lbf)).	1	Commercial.

B. Rudder Adjustment Procedure

	Detail Steps/Work Items	Key Items/References
(1)	Remove these items for access: – The pilots' seats. – The passengers seat.	Refer to Section 25-10.
(2)	Set both rudder pedals fully forward.	
(3)	Set the rudder pedals central.	Make sure that the rudder is in the neutral position. The left rudder pedal must align with the right rudder pedal.

	Detail Steps/Work Items	Key Items/References
(4)	If necessary, adjust the length of the cables between the yoke and the rudder lower mounting bracket:	Refer to Figure 4.
	– Remove the lock wire from the turnbuckles.	
	– Adjust the turnbuckles to set the rudder to neutral.	Below the passenger seat.
	– Do a test for the correct cable tension.	Use the tensiometer. Required value: 15 daN (33.72 lbf.) - 17 daN (38.22 lbf.). .
	– If GFC700 autopilot is installed:	
	– Pull on turnbuckle using a spring scale applying a force of 10 kg (22 lbf).	
	– Deflection of turnbuckle should be 20 ± 5 mm (0.79 ± 0.2 in).	
	– If necessary adjust rudder tension accordingly via the turnbuckle.	
	– Tighten the turnbuckles and install the lockwire.	
(5)	Set the rudder pedals to fully left.	The rudder must hit the stops at the rudder pedestal. The rudder position must be the distance to the left shown in the Control Surfaces Adjustment Report for the airplane. (measured from the neutral position).
(6)	If necessary, adjust the rudder stop bolt on the left side of the rudder lower mounting bracket:	
	– Release the jam nut on the left stop bolt.	
	– Adjust the stop bolt to give the correct range of movement.	The rudder position must be the distance to the left shown in the Control Surfaces Adjustment Report for the airplane. (measured from the neutral position).
	– Tighten the jam nut on the stop bolt.	

	Detail Steps/Work Items	Key Items/References
(7)	Set the rudder pedals to fully right.	The rudder must hit the stops at the rudder pedestal. The rudder position must be the distance to the right shown in the Control Surfaces Adjustment Report for the airplane. (measured from the neutral position).
(8)	If necessary, adjust the rudder stop bolt on the right side of the rudder lower mounting bracket: – Release the jam nut on the right stop bolt. – Adjust the stop bolt to give the correct range of movement. – Tighten the jam nut on the stop bolt.	The rudder position must be the distance to the right shown in the Control Surfaces Adjustment Report for the airplane. (measured from the neutral position).
(9)	Do a test for the correct range of rudder movement.	Refer to Paragraph 2.
(10)	Do an inspection of all the controls that you have adjusted. If necessary for your Airworthiness Authority do a duplicate inspection of the controls.	
(11)	Install these items: – The passenger seat. – The pilots’ seats.	Refer to Section 25-10.

4. Remove/Install the Rudder Control Cables

A. Equipment

Item	Quantity	Part Number
Cable tension gauge (tensiometer).	1	Commercial.
Swaging tool.	1	Commercial.
Nicopress oval and stop sleeve gauge (‘go/no-go gauge’) for 1/8 in sleeves.	1	-/-

B. Remove the Cockpit Rudder Control Cables (Front Cables)

	Detail Steps/Work Items	Key Items/References
(1)	Remove these items for access: – The pilots’ seats.	Refer to Section 25-10.
(2)	Remove the cable between the cockpit front bulkhead and the yoke: – Remove the nut, washer, bolt and spacer that attach the cable to the multi hole bracket at the bulkhead. – Remove the nut, washer, bolt, bush and spacer that attach the cable to the yoke. – Cut the eye end from the cable that you will remove at the bulkhead end. – Remove the old cable.	Refer to Figures 2 and 3.

C. Install the Rudder Control Cables (Front Cables)

	Detail Steps/Work Items	Key Items/References
	WARNING: ONLY TRAINED AND AUTHORIZED PERSONS SHOULD INSTALL CABLE EYE-ENDS. IF THE EYE-ENDS ARE NOT INSTALLED CORRECTLY, THE RUDDER CONTROLS CAN FAIL. THIS CAN CAUSE DEATH OR INJURY TO PERSONNEL.	
	Note: Install eye ends in accordance with FAA AC 43.13-1B, Chapter 7, Section 8. Note: To make the work easier, install an eye end on one end of the cable before you install it in the airplane.	
(1)	Install one new eye end to the cable before you install it in the airplane: – Use cables to specification LN9374 or ISO 2020 or MIL-DTL-83420, streched to 60% MBS. – Make the eye-end using Locoloc thimbles and Nico-Press clamps appropriate to the installed 3.2 mm (1/8 in) diameter steel cables. – Inspect the cable eye end for correct assembly. – If necessary for your Airworthiness Authority, send a sample eye end for proof test.	Inspect cable swages with go/no go gauge for 1/8 in Nicopress oval sleeve in accordance with FAA AC 43.13-1B, Chapter 7, Section 8.
(2)	Push the control cable through the Teflon tubes from the rear.	Refer to Figure 3.
(3)	Make sure the cable is in the correct position on the pulley (for the outer cables only).	
(4)	Push the cable through the “S” shaped tube on the rudder pedal assembly.	

	Detail Steps/Work Items	Key Items/References
(5)	Install a new eye end to the cable at the cockpit front bulkhead end: – Make the eye-end using Locoloc thimbles and Nico-Press clamps appropriate to the installed 3.2 mm (1/8 in) diameter steel cables. – Inspect the cable eye end for correct assembly. – If necessary for your Airworthiness Authority, send a sample eye end for proof test.	Inspect cable swages with go/no go gauge for 1/8 in Nicopress oval sleeve in accordance with FAA AC 43.13-1B, Chapter 7, Section 8.
(6)	Install the cable to the yoke: – Install the bolt, bush and spacer that attach the cable to the yoke. – Install a washer and new self-locking nut onto the bolt.	Torque to 6.4 Nm (4.7 lbf.ft.). Always use new self locking nuts.
(7)	Install the cable to the bracket at the cockpit front bulkhead: – Install the bolt and spacer that attach the cable to the bracket. – Install a washer and new self locking nut to the bolt.	Adjust the position of the bolt in the multi hole bracket to give the correct rudder pedal position. The rudder pedal lever must be vertical when the rudder is set to neutral. Torque to 6.4 Nm (4.7 lbf.ft.). Always use new self-locking nuts.
(8)	Do a test for the correct range of rudder movement. If necessary adjust the rudder controls.	Refer to Paragraph 2. Refer to Paragraph 3.
(9)	Do an inspection of all the controls that you have adjusted. If necessary for your Airworthiness Authority do a duplicate inspection of the controls.	

	Detail Steps/Work Items	Key Items/References
(10)	Install these items: – The passenger seat. – The pilots' seats.	Refer to Section 25-10.
(11)	Record type of cables installed (stainless or non-stainless steel cables) in the airplane logs.	

D. Remove the Fuselage Rudder Control Cables (Rear Cables)

	Detail Steps/Work Items	Key Items/References
(1)	Remove these items for access: – The pilots' seats. – The passenger seat.	Refer to Section 25-10.
(2)	Remove the cable between the yoke and the turnbuckle: – Remove the nut, washer, bolt, bush and spacer that attach the cable to the yoke. – Cut the eye end from the cable that you will remove at the yoke. – Remove the old cable aft. – Cut the eye end from the cable that you will remove at the turnbuckle.	Refer to Figure 4.

	Detail Steps/Work Items	Key Items/References
(3)	Remove the cable between the turnbuckle and the rudder: – Remove the nut, washer, bolt, bush and spacer that attach the cable to the rudder lower mounting bracket. – Cut the eye end from the cable that you will remove at the rudder end. – Remove the old cable forward. – Cut the eye end from the cable that you will remove at the turnbuckle.	

E. Install the Fuselage Rudder Control Cables (Rear Cables)

	Detail Steps/Work Items	Key Items/References
	WARNING: ONLY TRAINED AND AUTHORIZED PERSONS SHOULD INSTALL CABLE EYE ENDS. IF THE EYE ENDS ARE NOT INSTALLED CORRECTLY, THE RUDDER CONTROLS CAN FAIL. THIS CAN CAUSE DEATH OR INJURY TO PERSONNEL.	
	Note: Install eye ends in accordance with FAA AC 43.13-1B, Chapter 7, Section 8. Note: To make the work easier, install an eye end on one end of the cable before you install it in the airplane.	

	Detail Steps/Work Items	Key Items/References
(1)	Install a new eye end to the front of the cable at the yoke end before you install the cable in the airplane end: – Use cables to specification LN9374 or ISO 2020 or MIL-DTL-83420, streched to 60% MBS. – Make the eye-end using Locoloc thimbles and Nico-Press clamps appropriate to the installed 3.2 mm (1/8 in) diameter steel cables. – Inspect the cable eye end for correct assembly. – If necessary for your Airworthiness Authority, send a sample eye end for proof test.	Inspect cable swages with go/no go gauge for 1/8 in Nicopress oval sleeve in accordance with FAA AC 43.13-1B, Chapter 7, Section 8.
(2)	Push the control cable through the Teflon tube from the front.	Refer to Figure 4. Through the front and rear main bulkheads.
(3)	Install a new eye end to the cable at the turnbuckle end: – Make the eye-end using Locoloc thimbles and Nico-Press clamps appropriate to the installed 3.2 mm (1/8 in) diameter steel cables. – Inspect the cable eye end for correct assembly. – If necessary for your Airworthiness Authority, send a sample eye end for proof test.	Inspect cable swages with go/no go gauge for 1/8 in Nicopress oval sleeve in accordance with FAA AC 43.13-1B, Chapter 7, Section 8.

	Detail Steps/Work Items	Key Items/References
(4)	Install a new eye end to the rear cable before you install the cable into the airplane: – Use cables to specification LN9374 or ISO 2020 or MIL-DTL-83420, streched to 60% MBS. – Make the eye-end using Locoloc thimbles and Nico-Press clamps appropriate to the installed 3.2 mm (1/8 in) diameter steel cables. – Inspect the cable eye end for correct assembly. – If necessary for your Airworthiness Authority, send a sample eye end for proof test.	Inspect cable swages with go/no go gauge for 1/8 in Nicopress oval sleeve in accordance with FAA AC 43.13-1B, Chapter 7, Section 8.
(5)	Push the cable through the Teflon tubes from the front.	Towards the rudder.
(6)	Install a new eye end to the cable at the rudder mounting bracket end: – Make the eye-end using Locoloc thimbles and Nico-Press clamps appropriate to the installed 3.2 mm (1/8 in) diameter steel cables. – Inspect the cable eye end for correct assembly. – If necessary for your Airworthiness Authority, send a sample eye end for proof test.	Inspect cable swages with go/no go gauge for 1/8 in Nicopress oval sleeve in accordance with FAA AC 43.13-1B, Chapter 7, Section 8.

	Detail Steps/Work Items	Key Items/References
(7)	Install the able to the rudder lower mounting-bracket: – Install the bolt, bush and spacer that attach the cable to the rudder. – Install a washer and new self-locking nut.	Refer to Figure 4. Torque 6.4 Nm (4.7 lbf.ft.). Use a new self-locking nut.
(8)	Install the cable to the yoke: – Install the bolt, bush and spacer that attach he cable to the yoke. – Install a washer and a new self-locking nut.	Refer to Figure 4. Torque 6.4 Nm (4.7 lbf.ft.). Use a new self-locking nut.
(9)	Adjust both left and right rudder cable turnbuckles to give the correct tension to the control cables.	Refer to Paragraph 3.
(10)	Do a test for the correct range of rudder movement.	Refer to Paragraph 2.
(11)	Do an inspection of all the controls that you have adjusted. If necessary for your Airworthiness Authority, do a duplicate inspection of the controls.	
(12)	Install these items: – The pilots' seats. – The passenger seat.	Refer to Section 25-10.
(13)	Record type of cables installed (stainless or non-stainless steel cables) in the airplane logs.	

5. Remove/Install the Pulleys

A. Remove the Pulleys

	Detail Steps/Work Items	Key Items/References
(1)	Remove these items for access: – The pilot’s seat.	Refer to Section 25-10.
(2)	Remove the pulley: – Remove the nut, washers and bolt that attach the pulley to the mounting link at the control bulkhead. – Separate pulley and safety plate from the outer front cable.	Refer to Figure 3. Handle with care. Do not spoil the control cable.

B. Install the Pulleys

	Detail Steps/Work Items	Key Items/References
(1)	Install the pulley: – Put the outer cable into the groove around the pulley. – Bring the safety plate into position. – Install the bolt, washers and nuts that attach the pulley to the mounting link at the control bulkhead.	Refer to Figure 3. Check for correct guidance of the control cable.
(2)	Make sure the cable is in the correct position on the pulley.	Check friction.
(3)	Do a test for the correct range of rudder movement. If necessary adjust the rudder controls.	Refer to Paragraph 2. Refer to Paragraph 3.

	Detail Steps/Work Items	Key Items/References
(4)	Do an inspection of all the controls that you have adjusted. If necessary for your Airworthiness Authority do a duplicate inspection of the controls.	
(5)	Install these items: – The pilot's seat.	Refer to Section 25-10.

6. Rudder Control Cable and Yoke Access

Rudder Cable/Yoke	Remove/Install Access	References
Cockpit cables between the cockpit front bulkhead and the yoke.	Pilot's seat.	Section 25-10.
Rear fuselage cables between the yoke and the rudder.	Pilot's seat. Passenger seat. Rudder.	Section 25-10. Section 55-40.
Yoke.	Pilots' seats.	Section 25-10.

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Section 27-21
Flight Controls - Rudder Trim

1. General

The DA 42 has a rudder with a trim tab. The pilot uses a trim knob located at the front of the center console to move the rudder trim tab. The rudder trim control system is a mechanical control system.

Figure 1 shows the main components of the rudder trim control system.

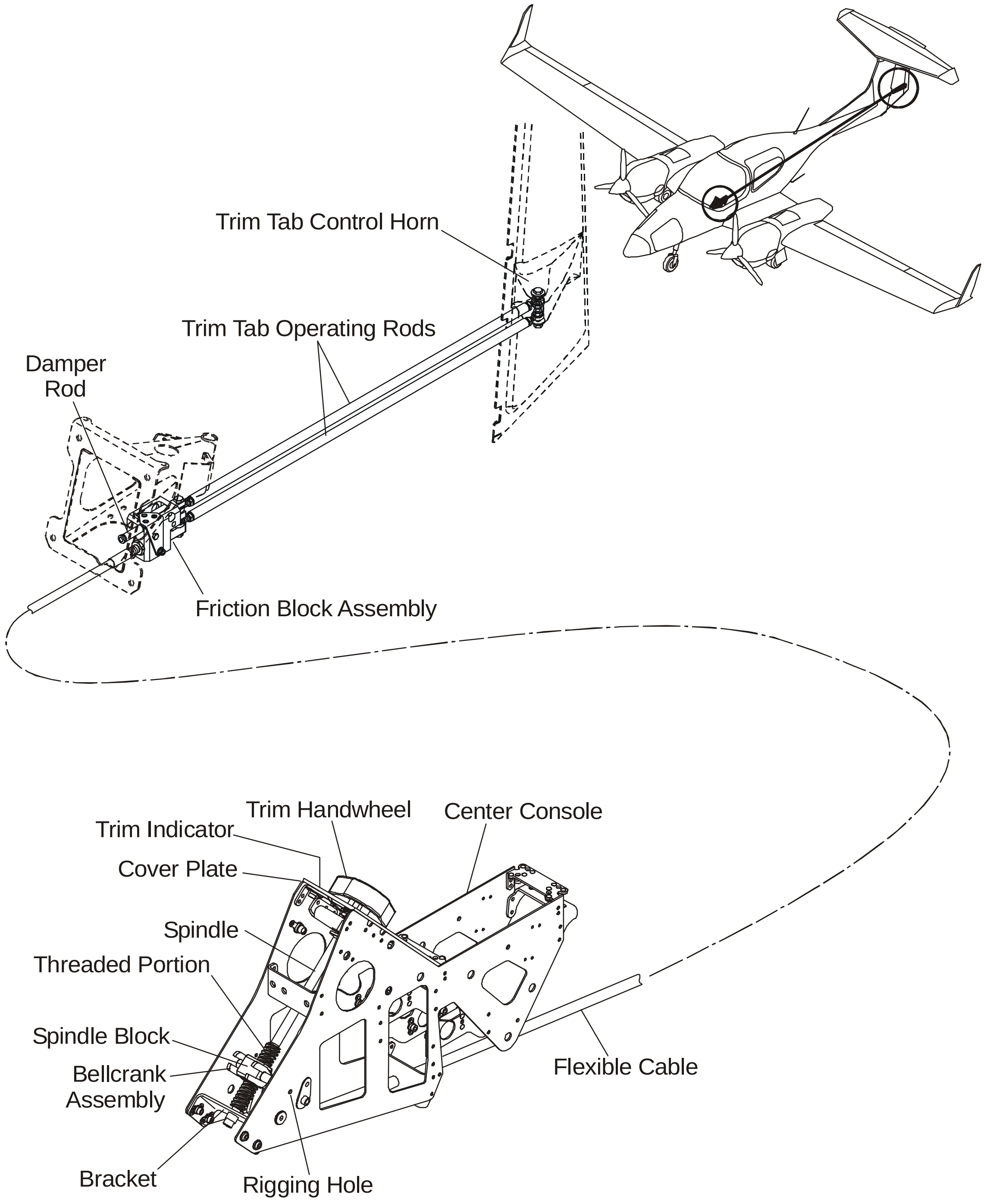

Figure 1: Rudder Trim Control System - Main Components

2. Description

The mechanical rudder trim system has 3 main parts:

– A handwheel assembly with trim indicator.

– A long flexible cable which connects the handwheel to the trim tab operating mechanism.

– The trim tab actuator assembly.

A. Rudder Trim Handwheel Assembly

A handwheel assembly at the top of the center console controls the rudder system. The handwheel attaches to a rectangular drive on the top of a long spindle. The rectangular drive at the top of the spindle also drives the trim indicator. The trim indicator system is a mechanical device and attaches to the lower surface of the center console cover plate.

The long spindle is supported at the top by the center console cover plate and at the bottom by a bearing located on a bracket bolted to the structure of the center console.

The lower section of the spindle has an external thread. A spindle block with an internal thread is positioned on the threaded portion of the spindle. The spindle block has spigots which engage with slots on a bellcrank assembly. The bellcrank has 2 input arms with slots that engage with the spindle block spigots and an operating lever that connects to a long flexible cable.

The 2 input arms of the bellcrank have a hole drilled through both arms that will align with a hole drilled through the structure of the center console. When the holes are aligned the handwheel assembly is in the neutral position. You can insert a rigging pin through the holes when you will adjust the rudder trim control system.

B. Flexible Cable

A long flexible cable connects the trim handwheel assembly to the trim tab actuator assembly. The cable goes through holes in all the fuselage bulkheads and through the bottom of vertical stabilizer. From the rear of the vertical stabilizer the cable goes into the rudder lower mounting bracket where it connects to the rudder trim tab actuator assembly.

The cable has an inner core with threaded end fittings. Fork end fittings attach to the threaded end-fittings of the inner core. The fork end fittings attach to the operating lever of the handwheel assembly at one end and to the trim tab operating rods at the other end.

The outer sleeve of the flexible cable has threaded sections at each end. These threaded sections screw into fixings at the handwheel assembly and the trim actuator assembly. Locknuts are used on the threaded ends to secure the flexible cable in position.

C. Trim Tab Actuator Assembly

The trim tab is a GFRP molding. The trim tab has a control horn with 2 integral levers. Two trim tab operating rods connect the integral levers to the flexible cable fork end fitting. The operating rods have spherical end fittings screwed into each end of the rods. The spherical end fittings are bolted to the integral levers and the fork end fitting.

The end of the flexible cable outer sleeve screws into a friction block assembly. The friction block assembly has a hole with an internal thread. The flexible cable outer sleeve screws into this threaded hole.

The top section of the friction block has a hole drilled in it for the friction rod. The friction rod passes through the upper section of the friction block and attaches to the fork end fitting. A friction shoe in the top section of the friction block is held in contact with the friction rod by springs. This clamping action on the friction rod dampens the movement of the trim tab actuator should the trim tab control system fail.

3. Operation

If the pilot rotates the trim control knob clockwise during flight then these events occur:

- The trim control spindle rotates clockwise. The trim indicator moves to the right to show the position of the spindle.
- The spindle-block moves up the threaded portion of the trim control spindle.
- The moving spindle block rotates the bellcrank and the bellcrank lever arm moves forward.
- The bellcrank lever arm pulls the inner core of the flexible cable forward.
- The flexible cable fork end fitting moves forward and the trim tab control rods move forward.
- The trim tab moves to the left and the dynamic forces acting on the rudder trim tab move the rudder to the right.

If the pilot rotates the trim control knob counterclockwise during flight the system operates in the reverse direction.

Trouble-Shooting

1. General

The table below lists the defects you could have in the rudder control system. If you have the trouble detailed in the Trouble column, read across to the Possible Cause column and then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Airplane moves about its yaw axis with no input from the pilot.	Rudder control cables need adjusting. Rudder trim system defective.	Refer to Section 27-20. Adjust the rudder trim tab control system.

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Maintenance Practices

1. General

This Section tells you how to test and adjust the rudder trim tab control system.

2. Rudder Trim-Tab Control System Test for Correct Range of Movement

If you cannot get the correct range of movement of the rudder trim tab control system, use this procedure to adjust the system.

A. Equipment

Item	Quantity	Part Number
Ruler or deflection gauge.	1	Commercial.
Rigging pin (Ø 4 mm).	1	VR-D41-2757-3000.

B. Adjust the Rudder Trim-Tab Control System

	Detail Steps/Work Items	Key Items/References
(1)	Make a copy of the Control Surfaces Adjustment Report.	Refer to Section 06-00. Use it to record the measurements.
(2)	Make sure that the rudder is in the neutral position.	Refer to Section 27-20. Hold the rudder in this position.
(3)	Operate the rudder trim control knob fully clock-wise, then counterclockwise, then set the control knob to the neutral position.	The system must operate smoothly throughout the full range of movement. The rudder trim tab must be in the neutral position, aligned with the rudder.
(4)	Remove the access panel from the side of the center console: – Remove the 3 screws that attach the access panel to the structure. – Move the access panel clear of the center console.	
(5)	Install a rigging pin through the holes in the center console structure and the bellcrank.	The rudder trim tab indicator should indicate neutral.

	Detail Steps/Work Items	Key Items/References
(6)	The trailing edge of the trim tab must align with the trailing edge of the rudder.	If necessary, adjust the lengths of both trim tab control rods. Refer to Paragraph 3.
(7)	Remove the rigging pin from the center console.	
(8)	Turn the rudder trim control wheel fully clockwise and measure the position of the rudder trim tab.	Record the measurement. The measurement must be the same as shown in the Control Surfaces Adjustment Report.
(9)	Turn the rudder trim control wheel fully counter-clockwise and measure the position of the rudder trim tab.	Record the measurement. The measurement must be the same as shown in the Control Surfaces Adjustment Report.
(10)	Install the access panel in the side of the center console that you removed: – Make sure that there are no loose articles in the center console. – Move the access panel into position at the center console. – Install the 3 screws that attach the access panel to the center console.	 For example: rags or tools.
(11)	Release the rudder and make sure that both the rudder and the rudder trim tab can move can move fully and freely throughout their range of movements.	

3. Adjust the Rudder Trim Tab Control System

If you cannot get the correct range of movement of the rudder trim tab, use this procedure to adjust the trim system.

A. Equipment

Item	Quantity	Part Number
Ruler or deflection gauge.	1	Commercial.
Rigging pin (Ø 4 mm).	1	VR-D41-2757-3000.

B. Rudder Trim Control System Adjustment Procedure

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the rudder is in the neutral position.	Refer to Section 27-20. Hold the rudder in this position.
(2)	Operate the rudder trim control knob fully clockwise, then counterclockwise, then set the control knob to the neutral position.	The system must operate smoothly throughout the full range of movement.
(3)	Remove the access panel from the side of the center console: – Remove the 3 screws that attach the access panel to the structure. – Move the access panel clear of the center console.	See Figure 2.
(4)	Install a rigging pin through the holes in the center console structure and the bellcrank.	The rudder trim tab indicator should indicate neutral.

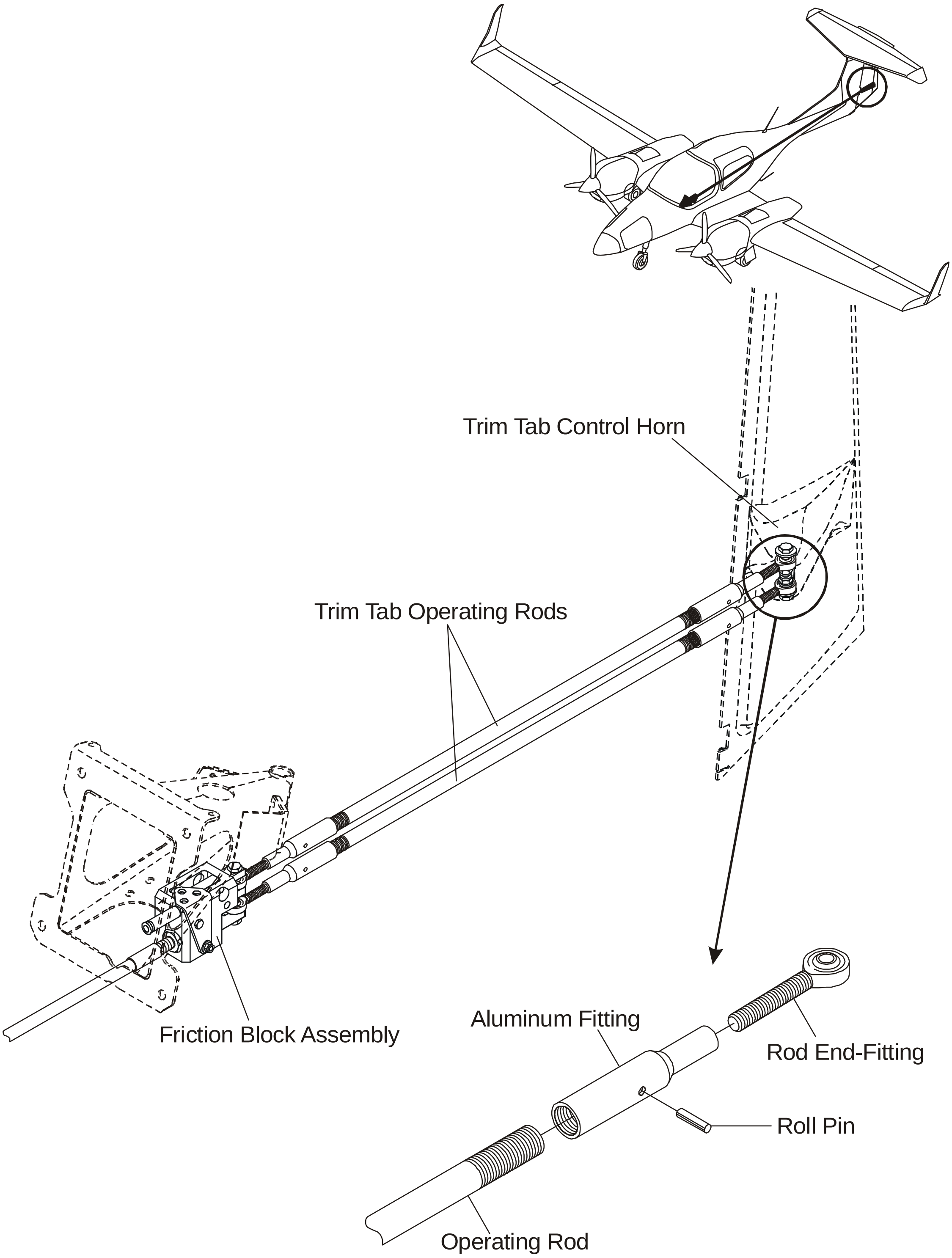

Figure 2: Adjust the Rudder Trim Tab Control System

	Detail Steps/Work Items	Key Items/References
(5)	Adjust the rudder trim tab operating rods to set the rudder trim tab to the neutral position:	3° like rudder trim control tab.
	– Remove the bolts that attach the spherical end fittings of the operating rods to the trim tab levers.	
	– Loosen the locknut on the lower operating rod end fitting.	
	– Screw the end fitting in/out of the operating rod half a turn.	Screw the end fitting into the rod to move the trim tab to the left, screw the end fitting out of the rod to move the trim tab to the right.
	– Move the lower operating rod back into position at the trim tab lever and install the attaching bolt.	The trailing edge of the trim tab must align with the trailing edge of the rudder. If it does not then you must adjust the lower operating rod until the trim tab aligns correctly with the rudder.
	– Adjust the end fitting of the top operating rod until the end fitting aligns with the trim tab lever.	
	– Tighten the lock-nuts on the end fittings of both operating both operating rods.	
	– Install the bolts that attach the spherical end fittings of the operating rods to the trim tab levers.	
(6)	Do an inspection of all the controls that you have adjusted. If necessary for your Airworthiness Authority do a duplicate inspection of the controls.	
(7)	Remove the rigging pin from the center control console.	

	Detail Steps/Work Items	Key Items/References
(8)	Install the access panel in the side of the center console that you removed:	
	– Make sure that there are no loose articles in the center console.	For example: rags or tools.
	– Move the access panel into position at the center console.	
	– Install the 3 screws that attach the access panel to the center console.	
(9)	Release the rudder and make sure that both the rudder and the rudder trim tab can move can move fully and freely throughout their range of movements.	

Section 27-30
Flight Controls - Elevator

1. General

The DA 42 has the usual elevator control system. An elevator attaches to the horizontal stabilizer gives longitudinal control of the airplane. Two control sticks operate the elevator. The DA 42 has an electrically operated elevator trim system and a mechanically operated trim system. Refer to Section 27-38 for data about the mechanical trim system and refer to Section 27-39 for data about the electric trim system.

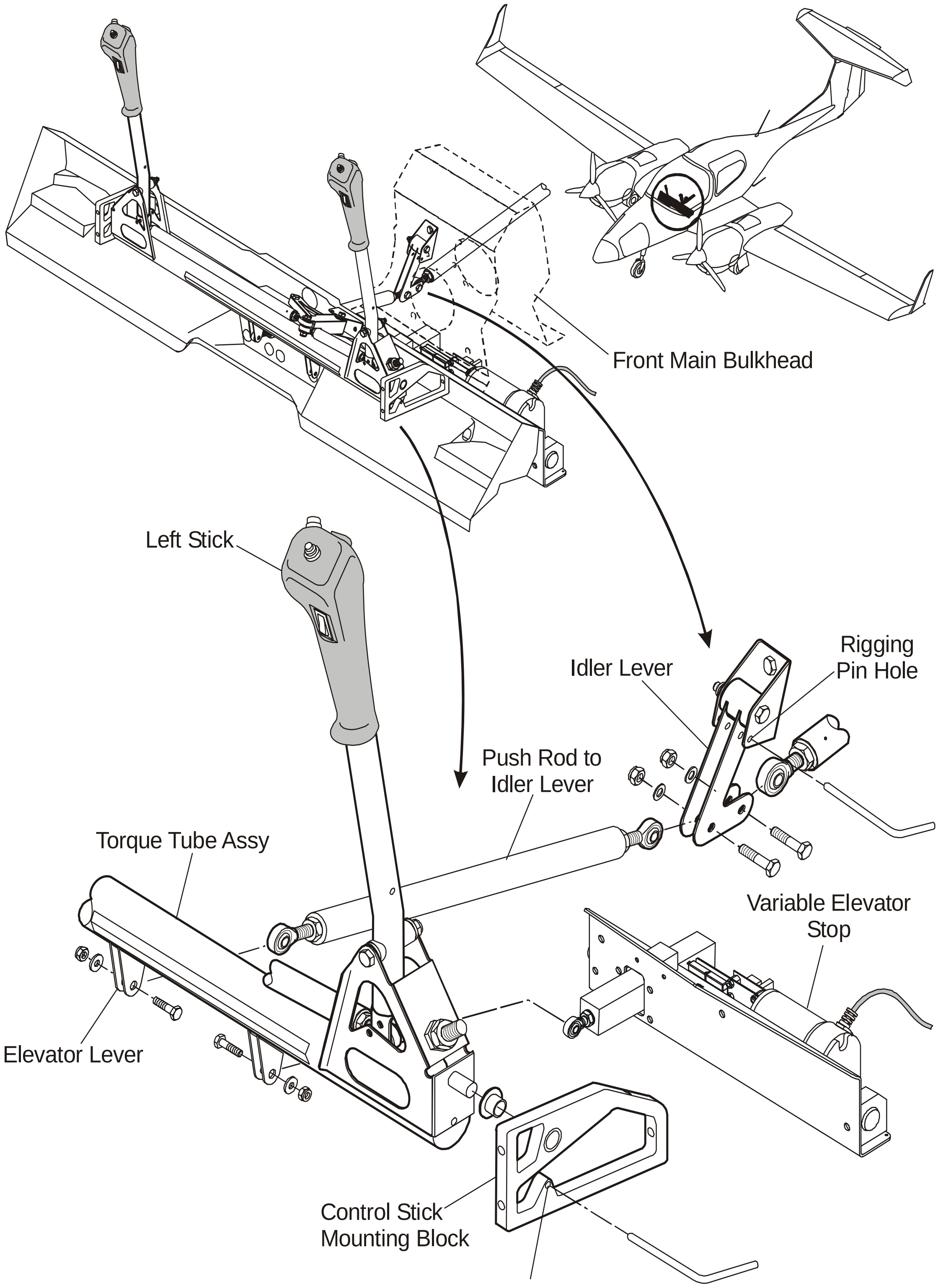

Figure 1: Elevator Control Installation in the Cockpit

2. Description

Figure 1 shows the elevator controls in the cockpit. Figure 2 shows the elevator controls in the rear fuselage.

Each pilot has a control stick that attaches to the torque tube assembly. The torque tube assembly has a lever which attaches to a short pushrod. The short pushrod connects to an idler lever on the front main bulkhead. The idler lever connects to a long pushrod.

The long pushrod has 3 guide bearings. The aft baggage frame, ring frame 1 and ring frame 2 have pushrod guides. Each guide has 3 rollers.

The long pushrod attaches to a bellcrank at the bottom of the vertical stabilizer. The bellcrank attaches to a vertical pushrod in the vertical stabilizer. The vertical pushrod connects to the elevator horn. The vertical pushrod has 2 balance springs attached to a bracket welded to the pushrod. These springs assist the elevator to return to the neural position.

The elevator stop for the downward movement consists of a GFRP block which is bonded to the inside of the upper skin of the horizontal stabilizer. When the elevator is deflected fully downwards, the forward extension of the elevator horn is deflected fully upwards and contacts the stop.

The elevator stop for the upward movement consists of a bolt/bush assembly which is installed in the trim actuator mounting bracket in a transverse direction (refer to Section 27-38). When the elevator is deflected fully upwards, the forward extension of the elevator horn is deflected fully downward and contacts the stop.

Figure 3 shows the variable elevator stop. The DA 42 is equipped with an electrically operated actuator that limits the elevator up travel to 13° as soon as the power setting of both engines exceeds approximately 20% while the flaps are in LDG position or with OÄM 42-252 installed, regardless of the flaps position. This is 2.5° (10 mm/0.4 in) less than the 15.5° full deflection. The linear actuator acts as a movable stop and is controlled by two switches on the throttle quadrant, one for each power lever, and the flap selector switch if OÄM 42-252 is NOT installed. When power is reduced below approximately 20%, full elevator deflection is regained. The operation of the variable elevator stop is only controlled by the position of the engine power levers in combination with the flap position if OÄM 42-252 is NOT installed, and cannot be selected or deselected by the pilot.

An amber STICK LIMIT caution is provided on the PFD to inform the pilot in case a malfunction is present. The STICK LIMIT caution appears when the variable elevator stop should be in place and is actually not activated (power ON condition) or should be retracted and actually limits the elevator travel (power OFF condition). The annunciation circuitry is not operative when one power lever is positioned beyond the approach power setting, while the other is below or in idle position (engine failure or training) or if OÄM 42-252 is NOT installed, when the flaps are not in LDG position.

You cannot adjust the elevator stops.

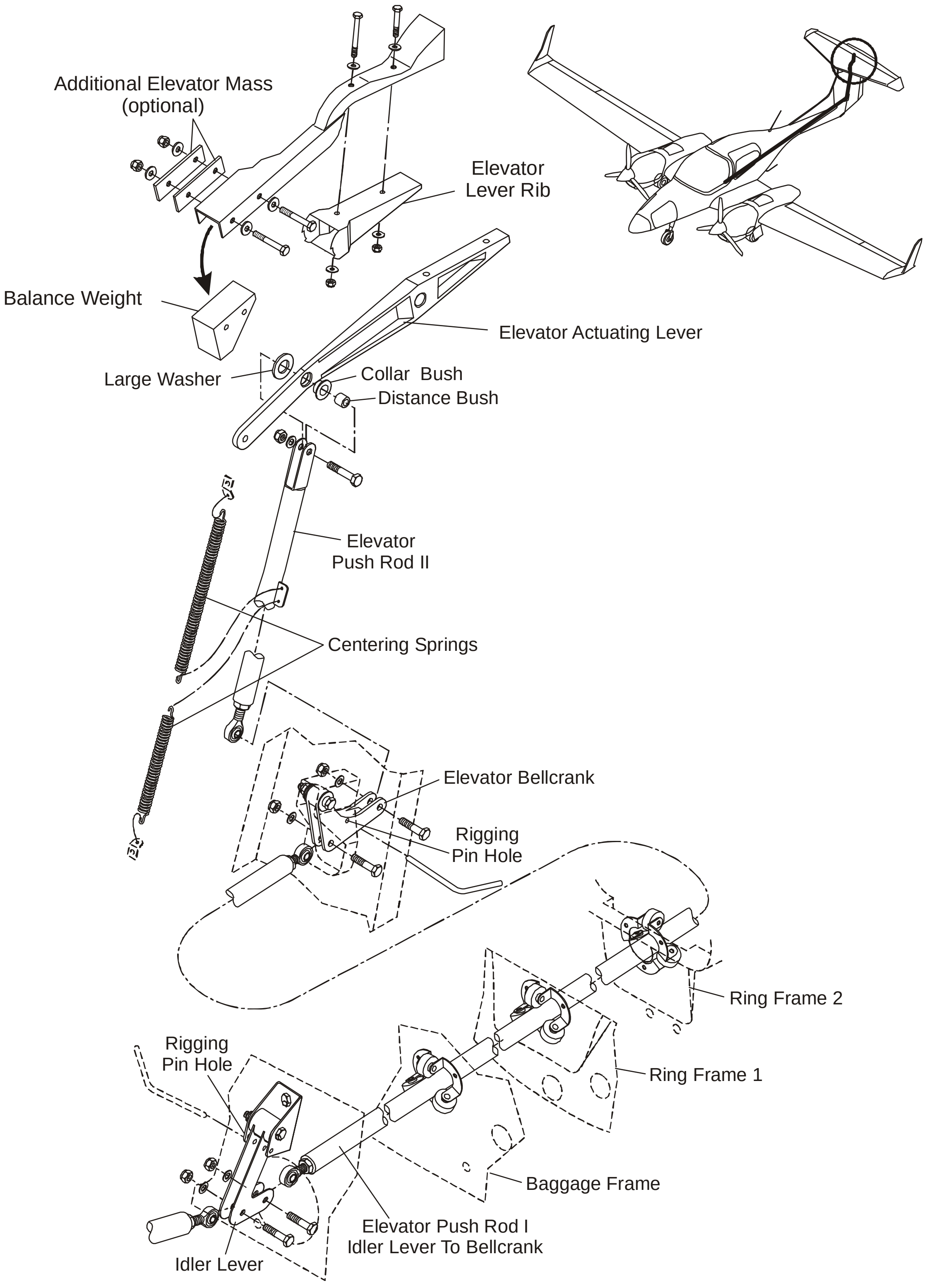

Figure 2: Elevator Controls in the Rear Fuselage

3. Operation

If you move the control stick forward:

– The torque tube assembly turns.

– The lever below the torque tube assembly pushes the short pushrod aft.

– The short pushrod pushes the long pushrod aft.

– The long pushrod pushes the aft bellcrank rearward.

– The bellcrank pushes the vertical pushrod up.

– The vertical pushrod moves the front of the elevator horn upwards.

– The elevator moves down.

If you move the control stick aft:

– The torque tube assembly turns.

– The short and long pushrods move forward.

– The bellcrank pulls the vertical pushrod downwards.

– The elevator moves up.

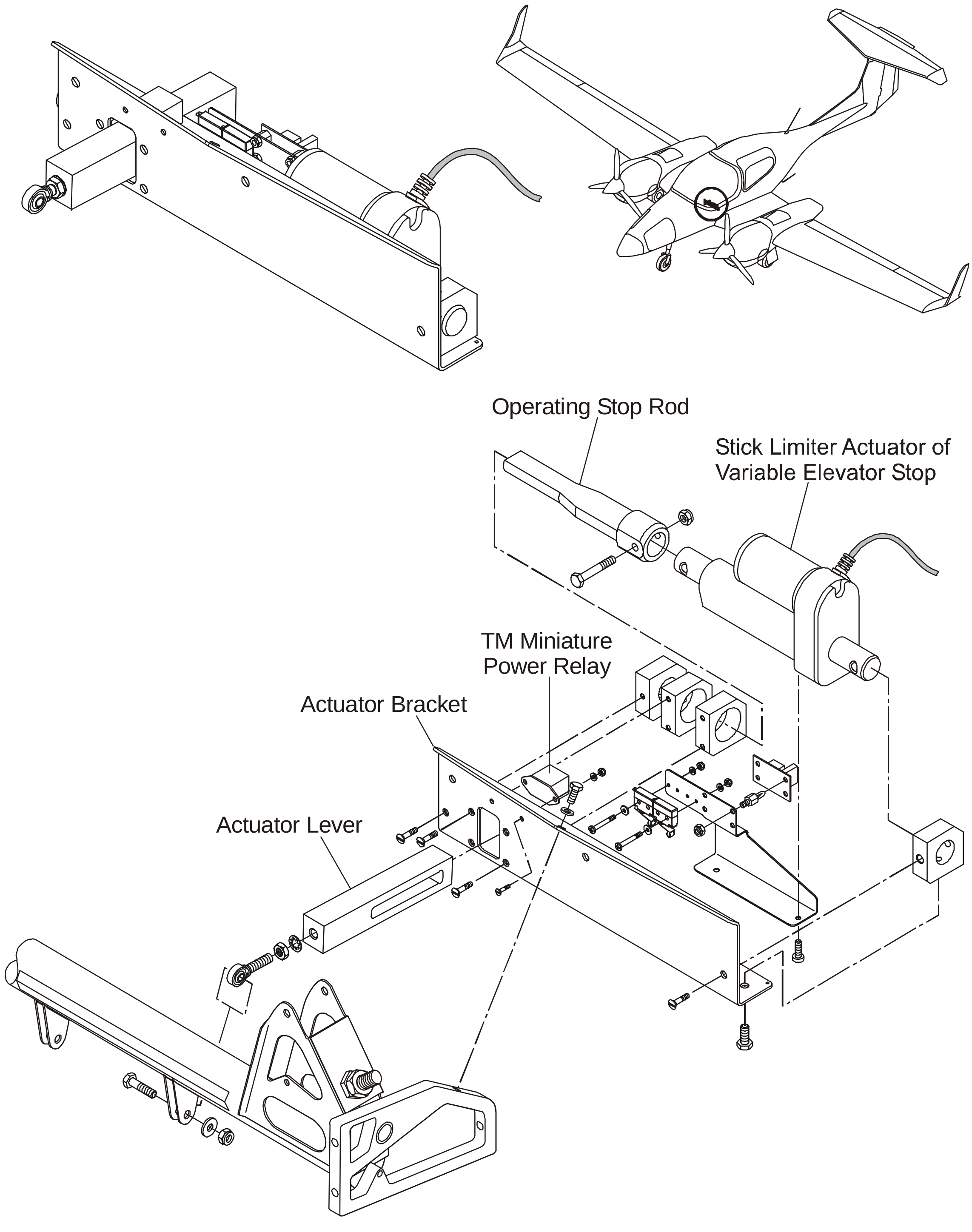

Figure 3: Variable Elevator Stop

Trouble-Shooting

1. General

The table below lists the defects you could have in the elevator control system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Control vibration during flight.	Too much backlash in the flight controls.	Examine the flight control system to isolate the problem. Replace the defective part.
Elevator controls stiff/catch.	Bearings defective. Pushrod deformed.	Replace the defective eye end. Replace the deformed pushrod.

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Maintenance Practices

1. General

These Maintenance Practices tell you how to do test procedures on the elevator control system. They also tell you how to adjust the elevator control system. Refer to Section 55-20 for data on how to remove/install the elevator. Refer to Sections 27-38 and Section 27- 39 for data about the elevator trim systems.

WARNING: **WHEN YOU DO WORK ON THE AIRPLANE CONTROLS, YOU MUST MAKE SURE THAT THE AREA AROUND THE CONTROL SURFACES ARE CLEAR OF PERSONNEL AND EQUIPMENT. IF YOU DO NOT DO THIS, INJURY TO PERSONNEL AND DAMAGE TO THE CONTROL SURFACES CAN OCCUR.**

WARNING: **WHEN YOU COMPLETE WORK ON THE CONTROLS, MAKE SURE THAT YOU REMOVE ALL LOOSE ITEMS OR TOOLS FROM THAT AREA. LOOSE ITEMS OR TOOLS CAN PREVENT FULL AND FREE MOVEMENT OF THE AIRPLANE CONTROLS. THIS CAN CAUSE DEATH OR INJURY TO PERSONS.**

2. Elevator Control System Test for Correct Range of Movement

A. Equipment

Item	Quantity	Part Number
Rigging pin.	1	VR-D41-2757-3000.
Ruler or deflection gauge.	1	Commercial.
Fuselage trestle.	1	Commercial.
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.

B. Elevator Control Test Procedure

	Detail Steps/Work Items	Key Items/References
(1)	Make a copy of the Control Surfaces Adjustment Report.	Refer to Section 06-00. Use it to record measurements.
(2)	Remove the left pilot's seat.	Refer to Section 25-10.
(3)	Install the rigging pin through the stick mounting block and the torque tube.	Refer to Figure 1.
	Note: Place the elevator deflection indicator between the stabilizer tips and the stabilizer so that the markings face backwards to the elevator.	
(4)	Make sure that the elevator deflection indicator is placed correctly.	At the stabilizer tips.
(5)	Read the angle of deflection of the elevator on the elevator deflection indicator.	Record the measurement.
(6)	Remove the rigging pin from the stick mounting block.	
	WARNING: WHEN YOU DO WORK ON THE AIRPLANE CONTROLS, YOU MUST MAKE SURE THAT THE AREA AROUND THE CONTROLS/CONTROL SURFACES ARE CLEAR OF PERSONS/EQUIPMENT. IF YOU DO NOT DO THIS, INJURY TO PERSONNEL AND DAMAGE TO CONTROL SURFACES CAN OCCUR.	
(7)	Move the control stick fully forward and hold it against the stop.	
(8)	Read the angle of deflection of the elevator on the elevator deflection indicator.	Record the measurement. The distance must be as shown in the Control Surfaces Adjustment Report.
(9)	Move the control stick fully aft and hold it against the stop.	
(10)	Read the angle of deflection of the elevator on the elevator deflection indicator.	Record the measurement. The distance must be as shown in the Control Surfaces Adjustment Report.
(11)	Install the pilot's seat.	Refer to Section 25-10.

C. Elevator Control Test Procedure Using the Protractor (Electronic Deflection Gauge)

Note: If you use a protractor, make sure that the airplane does not move in pitch during the test procedure. It will cause errors in the test.

	Detail Steps/Work Items	Key Items/References
(1)	Raise the airplane on jacks.	Refer to Section 07-10.
(2)	Put a trestle under the rear fuselage.	To prevent a movement in pitch.
(3)	Level the airplane.	Refer to Section 08-00.
(4)	Make a copy of the Control Surfaces Adjustment Report.	Refer to Section 06-00. Use it to record measurements.
(5)	Remove the left pilot’s seat.	Refer to Section 25-10.
(6)	Install the rigging pin through the stick mounting block and the torque tube.	Refer to Figure 1.
(7)	Remove the horizontal stabilizer tips: – Remove the 8 screws that attach the tip to the stabilizer.	Hold the tips.
(8)	Protractor reference: – Place the protractor on the edge of the stabilizer onto the rib where the tips were removed before. – Reset the protractor.	This is the 0° reference plane. Make sure that the protractor is placed correctly. Refer to Figure 4.
(9)	Protractor measurement: – Place the protractor on the elevator surface and read the angle of deflection of the elevator surface. – Read the angle of deflection of the elevator on the protractor. The correct angle must be 6.5° because then the elevator is centered.	Make sure to us the same orientation of the protractor like before, taking measurement. Refer to Figure 4. Record the measurement.
(10)	Remove the rigging pin from the stick mounting block.	

	Detail Steps/Work Items	Key Items/References
	WARNING: WHEN YOU DO WORK ON THE AIRPLANE CONTROLS, YOU MUST MAKE SURE THAT THE AREA AROUND THE CONTROLS/CONTROL SURFACES ARE CLEAR OF PERSONS/EQUIPMENT. IF YOU DO NOT DO THIS, INJURY TO PERSONNEL AND DAMAGE TO CONTROL SURFACES CAN OCCUR.	
(11)	Move the control stick fully forward and hold it against the stop.	
(12)	Repeat step 9 and keep the bevelled angle (6.5°) in mind.	Record the measurement. The angle must be as shown in the Control Surfaces Adjustment Report.
(13)	Move the control stick fully aft and hold it against the stop.	
(14)	Repeat step 9 and keep the bevelled angle (6.5°) in mind.	Record the measurement. The angle must be as shown in the Control Surfaces Adjustment Report.
(15)	Install the horizontal stabilizer tips: – Install the 8 screws that attach the tip to the stabilizer.	
(16)	Install the pilot’s seat.	Refer to Section 25-10.
(17)	Remove the trestle from under the rear fuselage.	
(18)	Lower the airplane.	Refer to Section 07-00.

3. Elevator Control System Adjustments

If you cannot get the correct range of movements of the elevator control system, use this procedure to adjust the system. Gust travel refers to the amount of travel remaining at the control surface with the control stick held against the cockpit stop.

WARNING: IF YOU DO AN ADJUSTMENT OF A PUSHROD, YOU MUST MAKE SURE THAT THE PUSHROD IS STILL IN SAFETY. IF YO DO NOT DO THIS, THE PUSHROD CAN DISCONNECT. THIS CAN CAUSE DEATH OR INJURY TO PERSONNEL.

A. Equipment

Item	Quantity	Part Number
Protractor (electronic deflection gauge) or elevator deflection indicator.	1	Commercial.
Rigging pins.	3	-

B. Elevator Control Adjustment Procedure

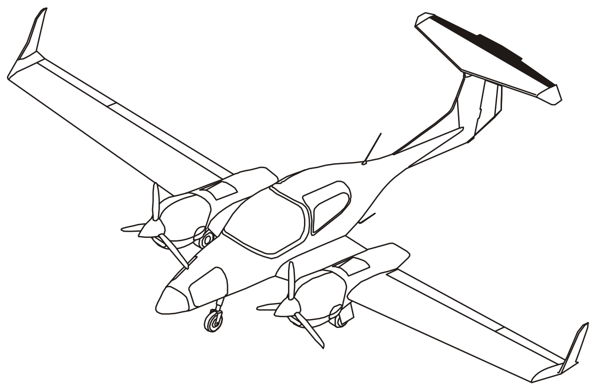
Refer to Figure 1.

	Detail Steps/Work Items	Key Items/References
(1)	Remove these items for access: – The pilots' seats. – The rudder.	Refer to: Section 25-10. Section 55-40.
(2)	Install rigging pins in the following: – Through the stick mounting block and the torque tube. – The idler lever. – The rear bellcrank.	Refer to Figure 1 and 2. On the control bulkhead. On the front main bulkhead. On the vertical stabilizer rear web.
(3)	If you cannot put a rigging pin into a lever or bellcrank, adjust the pushrods as necessary.	Refer to Section 27-00 for the pushrod adjustment procedure.
(4)	Make sure that the elevator is in horizontal position.	Refer to Figure 4.

	Detail Steps/Work Items	Key Items/References
(5)	If the elevator does not align with the horizontal stabilizer, adjust the vertical pushrod at the rear bellcrank.	Refer to Section 27-00 for the pushrod adjustment procedure.
(6)	Remove the rigging pins from the following: – The stick mounting block and the torque tube. – The idler lever. – The rear bellcrank.	 On the control bulkhead. On the front main bulkhead. On the vertical stabilizer rear web.
(7)	Do a test for the correct range of elevator movement.	Refer to Paragraph 2.
(8)	Do an inspection of all the controls that you have adjusted. If necessary for your Airworthiness Authority, do a duplicate inspection of the controls.	
(9)	Install these items: – The pilots' seats. – The rudder.	Refer to: Section 25-10. Section 55-40.

C. Elevator Angle Limits Table

Elevator Position	Elevator Deflection Indicator Angle Limits	Protractor Angle Limits
Upper Limit.	15.5° ± 0.5°	15.5° ± 0.5° (- 6.5°)
Horizontal Position.	0°	6.5°
Lower Limit.	13° ± 1°	13° ± 1° (+ 6.5°)



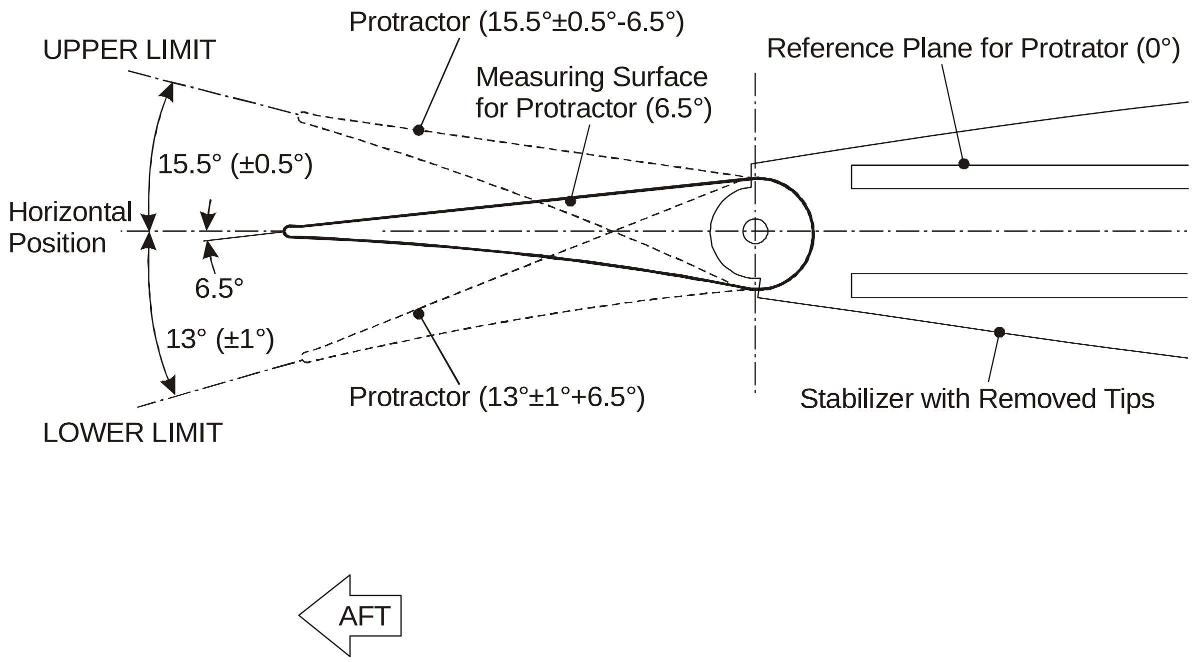


Figure 4: Elevator Angle Measurement

4. Remove/Install the Variable Elevator Stop Assembly

A. Remove the Variable Elevator Stop Assembly

	Detail Steps/Work Items	Key Items/References
(1)	Remove the LH pilot’s seat.	Refer to Section 25-10.
(2)	Open the GEAR WRN/ELEV. LIMIT circuit breaker.	On the right side of the instrument panel.
(3)	Remove the variable elevator stop assembly: – Disconnect the three or two (if OÄM 42-252 installed) inline connectors from the variable elevator stop. – Release the bolt which attaches the actuator lever adjustable fitting to the torque tube assy. – Remove the four bolts, washers and nuts that attach the assembly bracket to the control bulkhead. – Move the variable elevator stop assembly clear of the pilot’s compartment.	Refer to Figure 1 and Figure 3.

B. Install the Variable Elevator Stop Assembly

	Detail Steps/Work Items	Key Items/References
(1)	Install the variable elevator stop assembly: – Put the variable elevator stop assembly into position on the control bulkhead. – Install the four bolts, washers and nuts that attach the assembly bracket to the control bulkhead. – Install the bolt which attaches the actuator lever adjustable fitting to the torque tube assy. – Connect the three or two (if OÄM 42-252 installed) inline connectors to the variable elevator stop.	Refer to Figure 1 and Figure 3.
(2)	Set the GEAR WRN/ELEV. LIMIT circuit breaker.	On the right side of the instrument panel.
(3)	Do an operational test.	Refer to Paragraph 5.
(4)	If necessary adjust the actuator lever.	Refer to Section 27-00.
(5)	Install the LH pilot’s seat.	Refer to Section 25-10.

5. Test/Adjust the Variable Elevator Stop

A. Equipment

Item	Quantity	Part Number
Ruler or deflection gauge.	1	Commercial.

B. Variable Elevator Stop Test/Adjustment Procedure

Note: If you use a deflection gauge, make sure that the airplane does not move in pitch during the test procedure. It will cause errors in the test.

	Detail Steps/Work Items	Key Items/References
(1)	If you will use a deflection gauge, put a trestle under the rear fuselage.	To prevent movement in pitch.
(2)	Switch on the ELECT. MASTER.	Refer to Section 24-00.
(3)	Position both power levers approx. beyond the 20% power level, while flaps in LDG position, or if OÄM 42-252 is installed regardless of flap position.	
(4)	Continue according to the elevator control test procedure.	Refer to Paragraph 2. Required upward deflection: 13 ° ±0.5° (51 mm ±2 mm).
(5)	If necessary adjust the actuator lever.	Refer to Section 27-00, Paragraph 2.
(6)	Do an operational test of the STICK LIMIT caution message.	Refer to Paragraph 7.
(7)	Switch off the ELECT. MASTER.	Refer to Section 24-00.

6. Operational Test of the Variable Elevator Stop

	Detail Steps/Work Items	Key Items/References
(1)	Switch on the ELECT. MASTER.	Refer to Section 24-00.
(2)	Position both power levers above approx. 20% power level. Set the flap selector to LDG, if OÄM 42-252 is NOT installed.	To activate the stick limiter.
(3)	Test the system: – Pull the control stick rearward to the stop. Hold the stick fully rearward. – Set both power levers to IDLE. – Set both power levers above approx. 20%.	 The stick must move rearward. The stick must move forward.
(4)	Switch off the ELECT. MASTER.	Refer to Section 24-00.

7. Operational Test of the STICK LIMIT Caution Message

	Detail Steps/Work Items	Key Items/References
(1)	Remove the pilot’s seat.	Refer to Section 25-10.
(2)	Set the ELECT. MASTER to ON.	Refer to Section 24-00.
(3)	Set both power levers to IDLE.	To test the system in the de-activated configuration.
(4)	Connect pin "A" on the printed circuit (PC) board installed on the variable elevator stop assembly to electrical ground.	Refer to Chapter 92 for the wiring diagram of the variable elevator stop (stick limiter).
(5)	The STICK LIMIT caution message must appear on the G1000 PFD after 6 seconds.	
(6)	Remove ground connection from pin "A".	
(7)	Set both power levers above approx. 20%. Select flaps LDG if OÄM 42-252 is NOT installed.	To test the system in the activated configuration.
(8)	Connect pin "D" on the printed circuit (PC) board installed on the variable elevator stop assembly to electrical ground.	Refer to Chapter 92 for the wiring diagram of the variable elevator stop (stick limiter).
(9)	The STICK LIMIT caution message must appear on the G1000 PFD after 6 seconds.	
(10)	Remove ground connection from pin "D".	
(11)	Set the ELECT. MASTER to OFF.	Refer to Section 24-00.
(12)	Install the pilot’s seat.	Refer to Section 25-10.

8. Elevator Pushrod Access

Elevator Pushrod	Remove/Install Access	References
Between the control torque tube and the idler lever at the front main bulkhead.	Pilot's seat.	Section 25-10.
Between the idler lever at the front main bulkhead and the bellcrank at the vertical stabilizer rear web.	Pilot's seat. Rudder.	Section 25-10. Section 55-40.
Between the bellcrank at the vertical stabilizer rear web and the elevator.	Rudder.	Section 55-40.

9. Elevator Bellcrank and Lever Access

Elevator Pushrod	Remove/Install Access	References
Idler lever at the front main bulkhead.	Pilots' seats.	Section 25-10.
Bellcrank at the vertical stabilizer rear web.	Rudder.	Section 55-40.

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Section 27-37
Stall Warning System

1. General

The DA 42 has a simple electrical stall warning system.

The stall system consists of the following items:

– Stall warning switch.

– Stall warning horn.

2. Description and Operation

A stall warning switch is mounted on the left wing's leading edge. The stall warning switch has heater elements to prevent icing. A switch on the instrument panel controls the stall warning heat. To avoid overheating the heaters are supplied via a resistor if the airplane is on ground. A circuit-breaker protects the system. As the angle of attack increases and the airplane approaches an aerodynamic stall, the stall warning switch closes and activates a stall warning horn, installed in the instrument panel.

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Trouble-Shooting

1. General

CAUTION: DO NOT JACK THE AIRPLANE AND SWITCH ON THE STALL HEATER (PITOT HEAT SWITCH)! THE HEATERS CAN BURN OUT IN A FEW SECONDS.

The table below lists the defects you could have with the stall warning system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Stall warning horn does not operate.	Circuit-breaker not set.	Set the circuit-breaker.
	Stall warning horn defective.	Replace the stall warning horn.
	Stall warning switch (lift detector) defective.	Replace the stall warning switch.
	Faulty cables/connectors.	Do a test for continuity on each cable. Do a test for short circuit to ground and between cables. Replace defective cables.
‘STALL HT FAIL’ caution is indicated on the PFD in flight.	Vane, plate or case heater defective.	Replace the stall warning switch.
	RH Weight on Wheel switch defective.	Replace the switch, refer to Section 32-60.
	PITOT switch defective.	Replace the switch, refer to Section 24-60.
	Stall heat control relay defective.	Replace relay.
	Faulty cables/connectors.	Do a test for continuity on each cable. Do a test for short circuit to ground and between cables. Replace defective cables.

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Maintenance Practices

1. General

This Section tells you how to remove/install the components of the stall warning system.

2. Equipment

Item	Quantity	Part Number
Stall warning installation gauge DA 42.	1	D60-2737-11-PL.

3. Remove/Install the Stall Warning Switch (Lift Detector)

A. Remove the Stall Warning Switch

	Detail Steps/Work Items	Key Items/References
(1)	Open the STALL WRN circuit breaker.	
(2)	If the stall warning switch is mounted firmly and the vane is not bent or damaged: – Mark location and angle of the vane on the stall warning switch installation gauge.	
(3)	Loosen the screws that attach the switch to the wing.	
(4)	Disconnect the electrical wires.	At the in-line connector.
(5)	Remove the stall warning switch from the wing.	

B. Install the Stall Warning Switch

	Detail Steps/Work Items	Key Items/References
(1)	Connect the electrical wires.	At the in-line connector.
(2)	Put the switch in position in the wing.	Use the stall warning installation gauge (listed equipment) to align the vane with the marking from step A(2). Use the standard marking on the gauge, if step A(2) was not performed.
(3)	Install the screws that attach the switch to the wing.	
(4)	Close the STALL WRN circuit breaker.	

(5)	If step A(2) was not performed and the stall warning switch vane was installed according to the standard marking on the gauge:
	Perform a flight check of the stall warning system:
	– Reduce airspeed at 1kts per second.
	– Record stall warning speed and stall speed.
	– Stall warning must occur at minimum 9 kts and a maximum of 12 kts above stall speed. No nuisance warnings during take-off or approach allowed.
	– If standard adjustment is not sufficient, adjust the stall warning switch following the scheme:
	  – Down, if nuisance warning AND a margin of more than 9 kts exists.
	  – Up, if the stall warning margin is less than 9 kts.
	– Repeat the flight check until the test is passed.
		Conditions:
		CG-range: 2.40 m ± 0.01 m.
		Min. test altitude: 3000 ft AGL.
		Max. test altitude: FL 65.
		Trim speed: 100 KIAS.
		Flaps: UP.
		Gear: UP.
		Power: IDLE.
		Attitude: Wings level.

4. Remove/Install the Stall Warning Horn

A. Remove the Stall Warning Horn

	Detail Steps/Work Items	Key Items/References
(1)	Remove the instrument panel cover.	Refer to Section 25-10.
(2)	Open the STALL WRN circuit breaker.	
(3)	Disconnect the electrical wires of the stall warning horn.	
(4)	Remove the nut which attaches the stall warning horn to the instrument panel.	
(5)	Remove the stall warning horn from the instrument panel.	

B. Install the Stall Warning Horn

	Detail Steps/Work Items	Key Items/References
(1)	Put the stall warning horn in position in the instrument panel.	
(2)	Install the nut that attaches the stall warning horn to the instrument panel.	
(3)	Connect the electrical wires to the stall warning horn.	Refer to Section 92-00.
(4)	Close the STALL WRN circuit breaker.	
(5)	Install the instrument panel cover.	Refer to Section 25-10.
(6)	Do a test of the stall warning system.	

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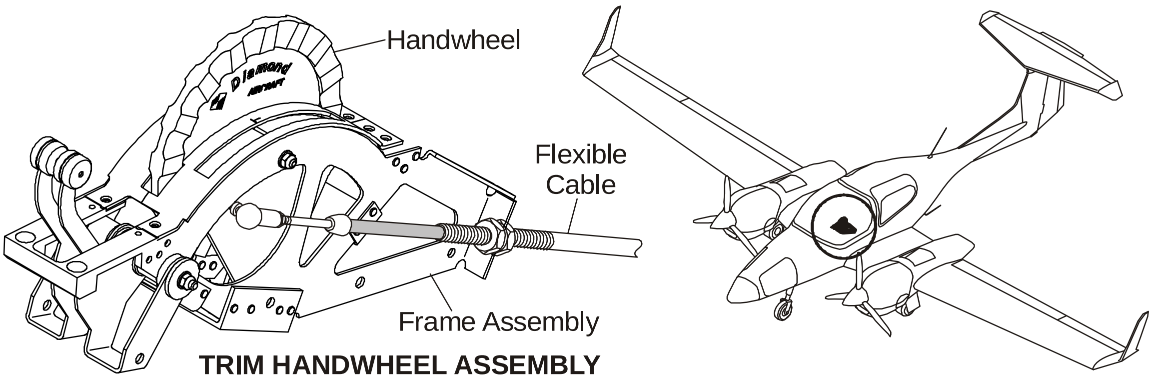
Section 27-38
Flight Controls - Elevator Trim-Mechanical

1. General

The DA 42 has an elevator with a trim tab. The trim tab is mechanically operated. The elevator also has an electric trim system which operates on the elevator via flexible cable. Refer to Section 27-39 for more data about the electrically operated trim system.

A handwheel on the center console controls the elevator trim tab. An indicator tells the pilot the trim tab setting. A flexible cable moves the trim tab.



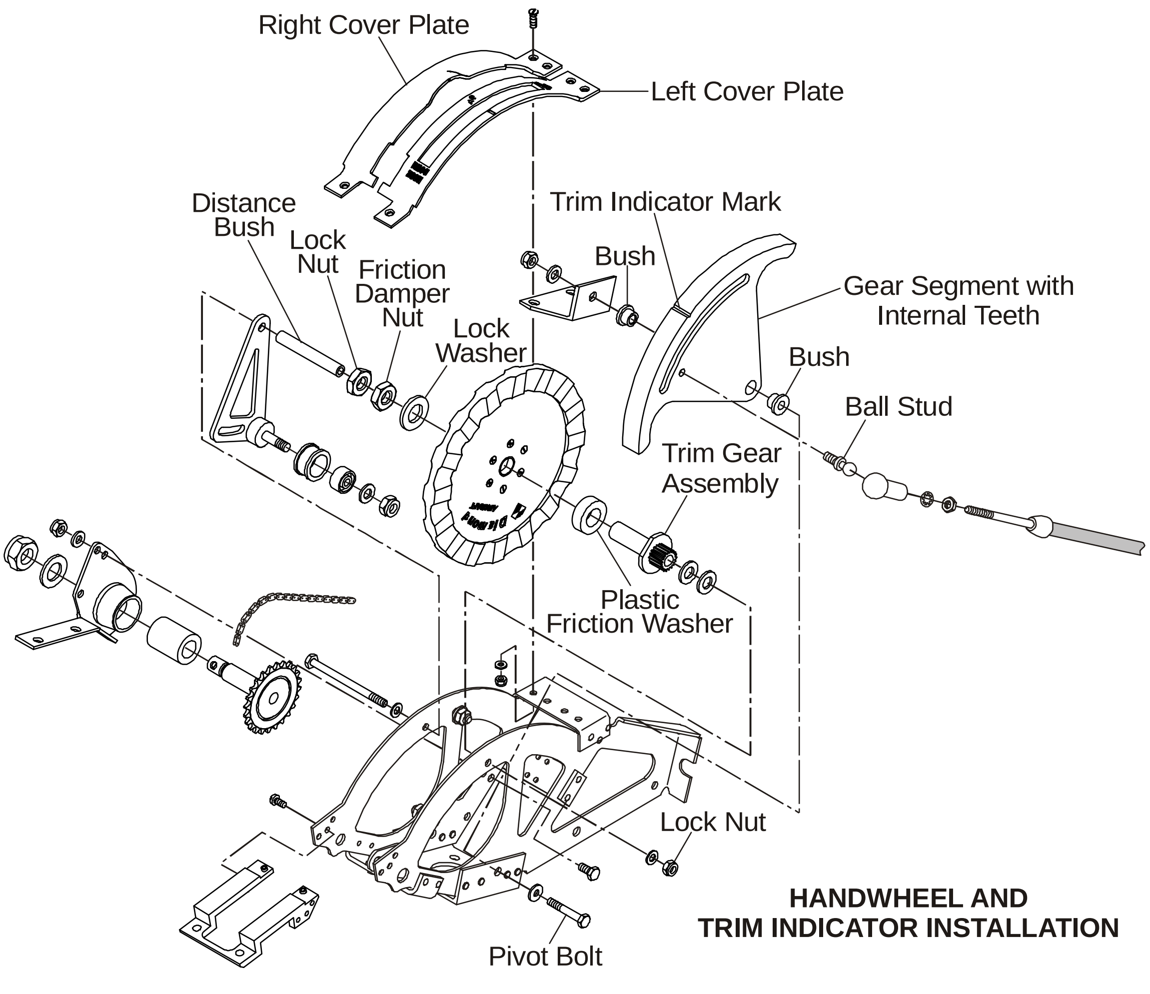


Figure 1: Elevator Mechanical Trim Mechanism in the Cockpit

2. Description

The mechanical trim installation has 3 main parts:

– A handwheel assembly with trim indicator.

– A flexible cable which connects the handwheel to the trim tab.

– The trim tab actuator assembly.

Figure 1 shows the elevator trim mechanism in the cockpit. Figure 2 shows the trim tab actuator assembly.

A. Trim Handwheel Assembly

A handwheel assembly on the center console controls the mechanical elevator trim system. The assembly has a metal mounting frame. The frame attaches to the rear of the engine control assembly and the top of the control bulkhead.

A long bolt through the mounting frame carries the handwheel. The bolt also holds friction discs, plain washers and spring washers against the handwheel. Two jam nuts let you adjust the friction.

A small gear wheel attaches to the handwheel. The small gear wheel engages with a large gear segment with internal teeth. The gear segment has a pivot bolt at the bottom of the mounting frame. A ball stud attaches the eye end of a long flexible cable to the gear segment. An extension to the mounting frame at the rear makes the anchor point for the outer sheath of the flexible cable.

The gear segment is also the trim indicator. The top face of the segment has a white line across it midway between the front and back. The top face can be seen by the pilot through a slot in the cover plate. The side of the cover plate have markings to show the trim position.

B. Flexible Cable

A long flexible cable connects the trim handwheel assembly to the trim tab. The cable goes through holes in the front and rear main bulkheads, the aft baggage frame, and each of the fuselage ring frames. It goes up the front face of the front web of the vertical stabilizer and through a slot near the top. It goes through a large hole at the top of the rear web of the vertical stabilizer to the trim tab actuator assembly.

The cable has an inner core with threaded end fittings. Spherical end fittings at each end connect to the gear segment in the cockpit and the trim actuator assembly at the horizontal stabilizer.

Clamp blocks hold the outer core of the cable to the mounting frame at the front and a bracket from the horizontal stabilizer at the back.

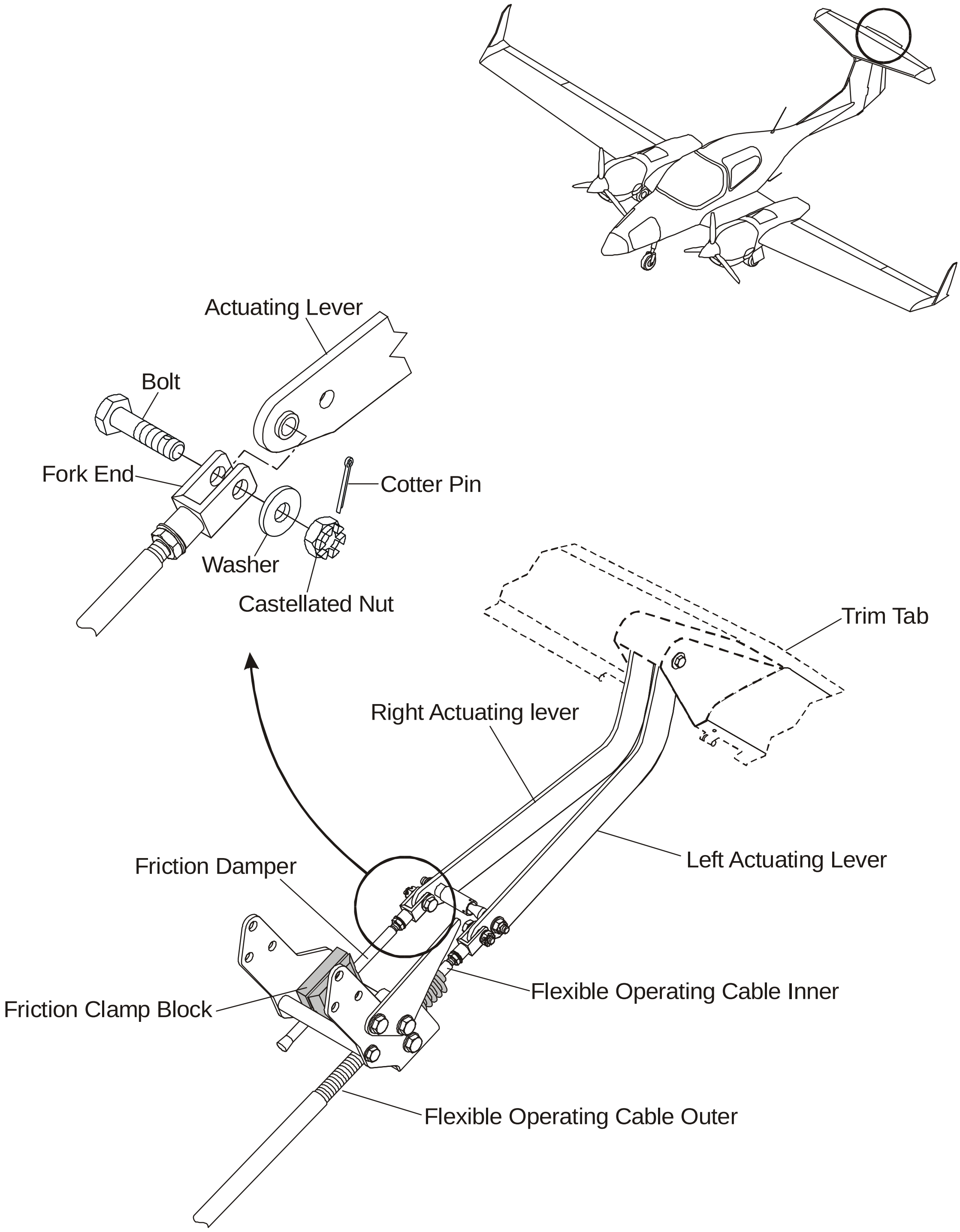


Figure 2: Trim Tab Actuator Assembly

C. Trim Tab Actuator Assembly

The trim tab is a one-piece GFRP molding. The tab has 2 integral levers. Two cranked actuating levers attach to the integral levers. The left cranked actuating lever connects to the long flexible cable. The right actuating lever connects to a friction damper.

The friction damper has a clamp-block with a hole for a rod. The rod connects to the right actuating lever on the trim tab. You can adjust the friction of the rod in the clamp block.

3. Operation

When you move the top of the trim handwheel forward these things happen:

- The small gear wheel moves the top of the gear segment forward.
- The gear segment pulls the inner core of the flexible cable forward.
- The inner core of the flexible cable pulls the left cranked actuating lever forward.
- The left cranked actuating lever pulls the trim tab lever forward to move the trim tab upwards.
- The up movement of the trim tab uses aerodynamic forces to push the elevator down in flight giving nose-down trim.

When you move the top of the trim handwheel aft, the gear segment moves aft, the cable moves aft and the trim tab moves down. This pushes the elevator up during flight to give nose up trim.

In each case the pilot can see the trim position from the white mark on the gear segment.

4. Emergency Operation

In the event of a failure of the mechanical trim control system between the handwheel and the trim actuator lever, the friction damper will prevent the trim tab from fluttering.

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Trouble-Shooting

1. General

The table below list the defects you could have in the elevator mechanical trim control system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair in the Repair column.

Trouble	Possible Cause	Repair
Too much play in the mechanical trim system.	Worn bearings or joints.	Replace the defective items.
Trim handwheel stiff to move.	Flexible cable damaged. Trim damper incorrectly adjusted.	Replace the flexible cable. Adjust the trim damper.

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Maintenance Practices

1. General

These Maintenance Practices tell you how to test the elevator mechanical trim control system. They also tell you how to adjust the system. Refer to Section 55-20 for data on how to remove and install the elevator and trim tab. Refer to Section 27-39 for data about the electric trim system for the DA 42.

2. Elevator Mechanical Trim Control System Test for Correct Range of Movement

A. Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.
Rigging pin.	1	VR-D41-2757-3000.
Protractor (electronic deflection gauge).	1	Commercial.
Elevator trim deflection indicator.	1	D60-5525-00-PL.

B. Elevator Mechanical Trim Control Test Procedure

	Detail Steps/Work Items	Key Items/References
	WARNING: WHEN YOU DO WORK ON THE AIRPLANE CONTROLS, YOU MUST MAKE SURE THAT THE AREA AROUND THE CONTROLS/CONTROL SURFACES ARE CLEAR OF PERSONS/EQUIPMENT. IF YOU DO NOT DO THIS, INJURY TO PERSONNEL AND DAMAGE TO CONTROL SURFACES CAN OCCUR.	
(1)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(2)	Leveling the airplane.	Refer to Section 08-00.
(3)	Make a copy of the Control Surfaces Adjustment Report.	Refer to Section 06-00. Use it to record the measurements.
(4)	Check elevator for correct range of movement.	Refer to Section 27-30.

	Detail Steps/Work Items	Key Items/References
(5)	Set the elevator to horizontal position: – Install the rigging pin through the stick mounting block and the torque tube.	Refer to Figure 1 in Section 27-30. Elevator should have 0° deflection referred later as the horizontal position.
(6)	Place the elevator trim deflection indicator onto the elevator.	Refer to Figure 2.
(7)	Set the elevator trim hand wheel to NEUTRAL.	
(8)	Check the elevator trim angle limits: – Read the angle deflection from the elevator trim deflection indicator – Record your measurement.	Check your measurements with the elevator trim angle limits table in this section.
(9)	Set the elevator trim hand wheel to NOSE UP. Repeat step 8.	
(10)	Set the elevator trim hand wheel to NOSE DOWN. Repeat step 8.	
(11)	Set the elevator to 10° inclined position. Use a protractor or an elevator deflection indicator to measure the inclined position.	Refer to Figure 1.
(12)	Set the elevator trim hand wheel to NEUTRAL. Repeat step 8.	
(13)	Set the elevator trim hand wheel to NOSE UP. Repeat step 8.	
(14)	Set the elevator trim hand wheel to NOSE DOWN.	
(15)	Set the elevator to 10° declined position. Use a protractor or an elevator deflection indicator to measure the declined position.	Refer to Figure 1.
(16)	Set the elevator trim hand wheel to NEUTRAL. Repeat step 8.	

	Detail Steps/Work Items	Key Items/References
(17)	Set the elevator trim hand wheel to NOSE UP. Repeat step 8.	
(18)	Set the elevator trim hand wheel to NOSE DOWN. Repeat step 8.	
(19)	If your measurements do not comply with the limits in the trim angle limit table, then re-adjust the trim elevator.	Refer to Section 27-38.
(20)	Move the wing and rear fuselage trestles clear of the airplane.	
(21)	Lower the airplane.	Refer to Section 07-10.

3. Elevator Mechanical Trim Control System Adjustment

If you cannot get the correct range of movement of the elevator mechanical trim control system, use this procedure to adjust the system.

A. Equipment

Item	Quantity	Part Number
Control clamp.	1	Commercial.
Inclinometer.	1	Commercial.
Fuselage trestle.	1	Commercial.
Spring balance.	1	Commercial.

B. Elevator Mechanical Trim Control Adjustment Procedure

	Detail Steps/Work Items	Key Items/References
(1)	Remove these items for access: – The pilot's seat. – The center console cover.	Refer to Section 25-10.
(2)	Put a trestle under the rear fuselage.	To prevent movement in pitch.
(3)	Hold the trailing edge of the elevator in line with the horizontal stabilizer.	Use a clamp at the tips.
(4)	Set the trim handwheel to neutral.	See the trim indicator.
(5)	Adjust the flexible cable: – Loosen the nuts that hold the outer sheath of the flexible cable to the mounting frame for the trim handwheel. – Turn the nuts to move the outer sheath forward or aft as necessary. – Tighten the nuts.	Refer to Figure 1. Move the outer sheath forward to move the trim tab down. Move the outer sheath aft to move the trim tab up.
(6)	Do an inspection of all the controls that you have adjusted. If necessary for your Airworthiness Authority do a duplicate inspection of the controls.	
(7)	Install these items: – The center console cover. – The pilot's seat.	Refer to Section 25-10.
(8)	Remove the clamps from the elevator/horizontal stabilizer tips.	
(9)	Remove the trestle from under the rear fuselage.	

C. Elevator Mechanical Trim Friction Damper Adjustment Procedure

	Detail Steps/Work Items	Key Items/References
(1)	Remove the horizontal stabilizer fairing.	Refer to Section 55-10.
(2)	Disconnect the right actuator lever from the friction rod: – Release the cotter pin locking the nut, washer and bolt assembly which attaches the fork end fitting to the actuator. – Remove the nut, washer and bolt from the fork end fitting. – Move the fork end fitting clear of the actuator.	Refer to Figure 2.
(3)	Measure the force needed to move the damper rod through the clamp.	Use a spring balance. The friction force must be 15-30 N (3.4 - 6.7 lbf.).
(4)	If necessary, adjust the friction force: Tighten or loosen the clamping screw a small amount.	
(5)	Do steps 3 and 4 again, as necessary.	
(6)	Connect the right actuating lever to the friction rod: – Move the fork end into position at the actuating lever. – Install the bolt, washer and nut that connects the fork end to the actuating lever. – Tighten the nut until it contacts the face of the fork end and then turn it clockwise to align the nut with a cotter pin hole in the bolt. – Install a new cotter pin.	

	Detail Steps/Work Items	Key Items/References
(7)	Do an inspection of all the controls that you have adjusted. If necessary for your Airworthiness Authority do a duplicate inspection of the controls.	
(8)	Install the horizontal stabilizer fairing.	Refer to Section 55-10.

D. Elevator Mechanical Trim Handwheel Friction Damper Adjustment Procedure

	Detail Steps/Work Items	Key Items/References
(1)	Remove these items for access: – The pilot's seat. – The center console cover. – The right cover plate of the trim handwheel assembly.	Refer to Section 25-10.
(2)	Loosen the self-locking nut on the handwheel pivot bolt.	On the right side of the mounting frame.
(3)	Loosen the lock nut for the handwheel friction damper.	Against the right inner face of the mounting frame.
(4)	Adjust the friction damper nut.	Against the pack of washers and spring washers on the pivot bolt.
(5)	Measure the friction force (clamp a spring balance onto the handwheel and measure force).	The friction force must be 3.2 - 4.4 Nm (2.3 - 3.2 lbf.ft.) This corresponds to a force of 60 ± 10 N (13.5 ± 2.25 lbf.) on the corded area of the trim handwheel.
(6)	Do step 4 as necessary to set the correct friction force.	
(7)	Tighten the locknut for the handwheel friction damper.	
(8)	Tighten the self-locking nut on the handwheel pivot bolt.	

	Detail Steps/Work Items	Key Items/References
(9)	Do an inspection of all the controls that you have adjusted. If necessary for your Airworthiness Authority do a duplicate inspection of the controls.	
(10)	Install these items: – The right cover plate of the trim handwheel assembly. – The center console cover. – The pilot's seat.	Refer to Section 25-10.

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Section 27-39
Flight Controls - Elevator Trim-Electrical

1. General

This Section tells you about the elevator electrically controlled trim system. Refer to Section 27-38 for data about the elevator mechanical trim control system.

A thumb switch on the pilot's control stick operates the DA 42 electrically controlled elevator trim system.

2. Description

The DA 42 elevator has a trim tab that can be operated mechanically via the usual trim wheel in the center console or electrically via a trim switch on the pilot's control stick. The elevator electrical trim system is integrated with the autopilot control system. For more data about the autopilot control system and the interaction with the elevator electrical trim system refer to Chapter 22.

The elevator electric trim system has 2 main components:

A. Pilot's Control Stick Switch

A thumb switch on the pilot's control stick operates the elevator electrical trim servo. The switch is spring loaded at the neutral position. The switch can pushed against the spring in a forward or aft direction. When pushed forwards the trim servo will trim the airplane more nose down and when pushed aft the trim servo will trim the airplane more tail heavy.

B. Elevator Trim Servo

The DA 42 has a pitch trim servo located below the co-pilot's seat. The servo is mounted on an aluminum plate and is attached to the plate with a GFRP bracket. A chain gear on the servo, a cardan shaft and a chain gear on the right side of the cockpit trim wheel transmits the movement of the servo to the elevator trim wheel.

When the pilot operates the electric trim switch on the control stick the servo will operate and drive the mechanical trim wheel to the required position.

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Trouble-Shooting

1. General

The table below list the defects you could have in the elevator electrical trim control system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair in the Repair column.

Trouble	Possible Cause	Repair
The elevator electrical trim system does not operate correctly from the switch on the pilot’s control stick but the autopilot elevator trim control system operates correctly.	Defective trim switch on the pilot’s control stick.	Replace the defective trim switch.
The elevator electrical trim system does not operate correctly from the switch on the pilot’s control stick or with the autopilot control system.	Autopilot circuit breaker open. Elevator trim servo defective.	Reset autopilot circuit breaker. Replace elevator trim servo.

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Maintenance Practices

1. General

For data about the removal/installation of the elevator trim electrical servo and the removal/installation of the elevator trim servo clutch refer to Chapter 22.

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Section 27-50
Flight Controls - Flaps

1. General

The DA 42 has flaps for landing and take off. There are 2 flaps attached to the trailing edges of each wing. The inboard and outboard flap assemblies of each wing are directly coupled. The outboard end of the inner flap has a tongue which engages with a slot in the inboard end of the outer flap.

An electric flap actuator moves the flaps. See Section 57-50 for data about the flap structure.

A three position toggle switch controls the flaps. The switch is in the right side of the instrument panel.

Lights located to the left of the flap toggle switch come on when these flap positions are set:

– Green lit, yellow and white off - Flaps UP.

– Yellow lit, green and white off - Flaps at APPROACH.

– White lit, green and yellow off - Flaps at LANDING.

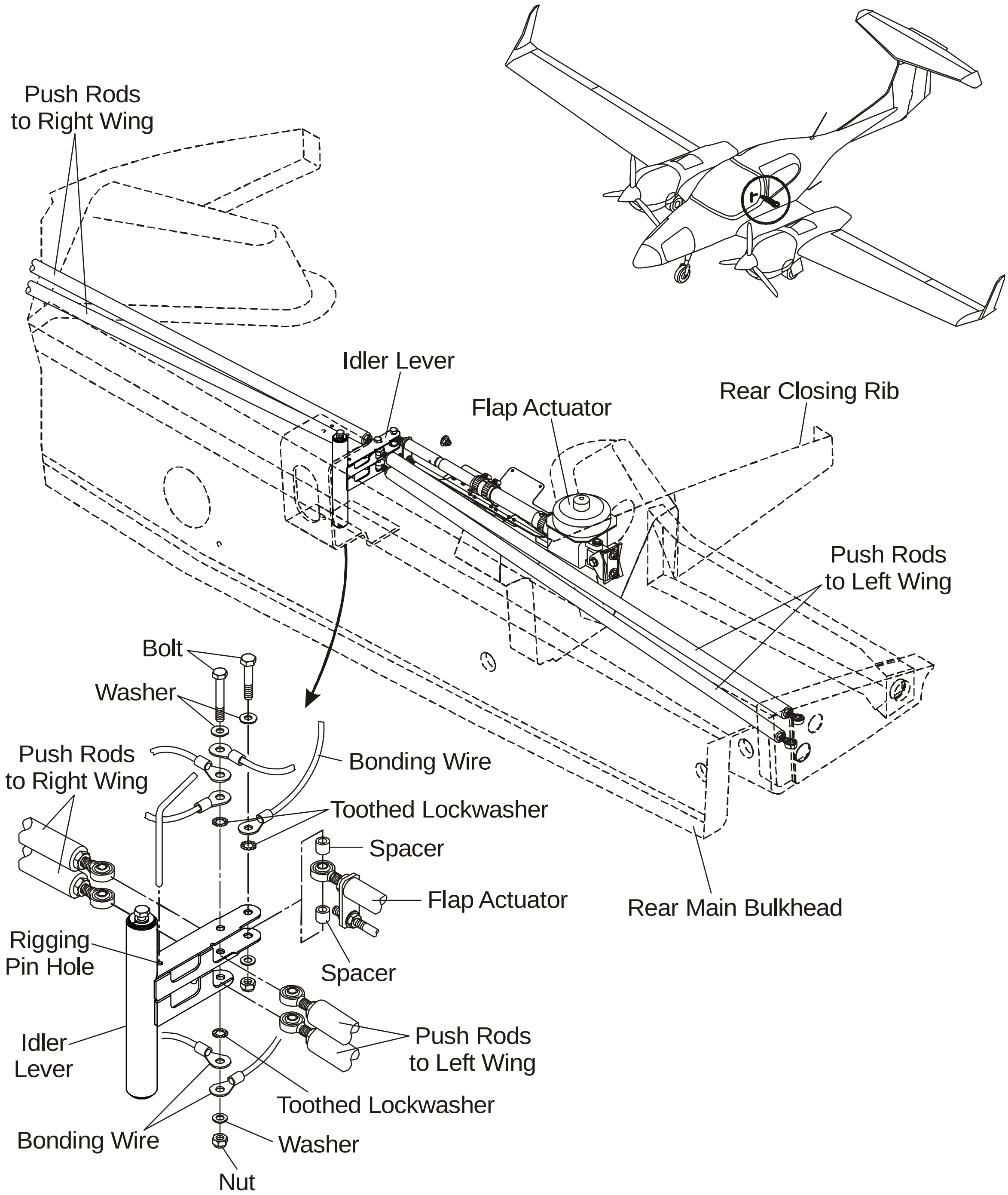


Figure 1: Flap Control System in the Fuselage

2. Description

Figure 1 shows the flap control system in the fuselage. Figure 2 shows the flap pushrods and bellcranks in the wing. Figure 3 shows the flap actuator installation.

A. Flap Actuator

An electric actuator operates the flaps. The electric actuator is under the left passenger seat. A mounting bracket on the left rear closing rib attaches the actuator to the structure.

The actuator has an electric motor. The motor has a reduction gear which turns a spindle. The spindle operates a pushrod. The pushrod connects to an idler lever attached to the rear main bulkhead.

A cam attached to the pushrod operates 5 microswitches. The microswitches are part of the flaps electronic control circuit.

B. Pushrods and Bellcranks

The idler lever on the rear main bulkhead connects to 4 pushrods. Two of the pushrods connect to the inboard ends of longer pushrods in the wing and the other 2 pushrods connect to the inner flap bellcranks. Two short pushrods connect the inner flap bellcranks to the inner flap horns.

The long pushrods connect to flap bellcranks in the outer wing. A guide bearing holds each long pushrod at the root rib. Two short pushrods connect the outer flap bellcranks to the flap horns.

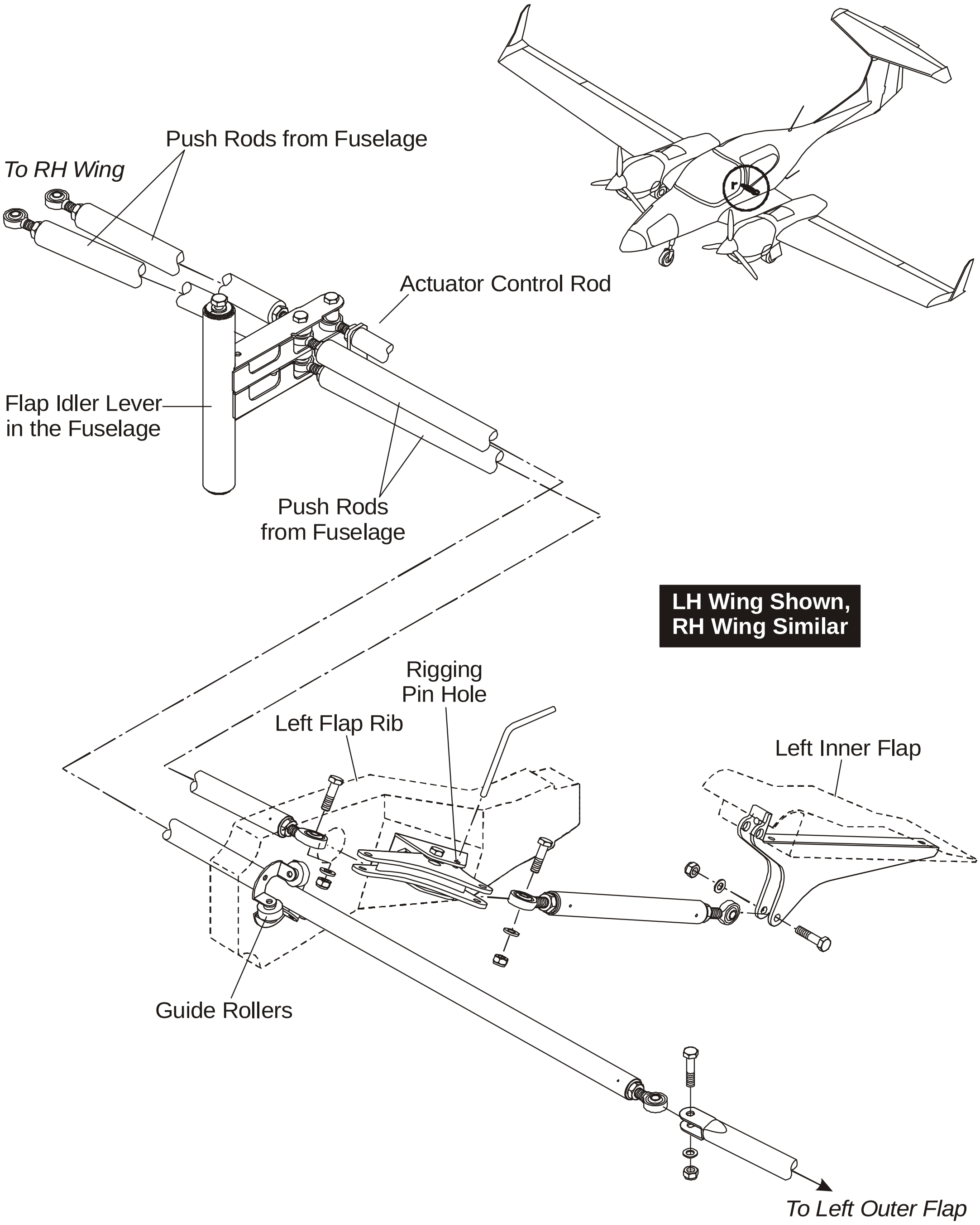


Figure 2: Flap Pushrods and Bellcranks in the Wings

C. Flap Electrical Control

Figure 4 shows the flap electrical control system. The main bus supplies the power for the flaps. A circuit breaker protects the system. See Chapter 92 for the Wiring Diagrams.

The flap electrical control system uses solid state electronics. It has an electronic control unit and a switchboard. The electronic control unit is mounted on the instrument panel. Then switchboard attaches to the flap actuator.

The electronic control unit has a 3-position selector switch and a flap position indicator. The selector switch can be set to:

– UP (fully up) 0° ± 1°

– APP (approach) 20° ± 2°

– LDG (landing) 42° ± 1°

The flap position indicator has three light emitting diodes. The top diode lights when the flaps are in the UP position. The middle diode lights when the flaps rare in the APP position. The bottom diode lights when the flaps are in the LDG position.

The switch board attaches to the body of the flap actuator. The switch board has 5 micro-switches. It also has solid state logic board.

The logic circuits monitor the outputs from the selector switch and the micro-switches on the switch board. They control 4 power transistors. Two of the power transistors can connect the power supply to the flap motor. The other two can connect the motor to ground.

Two screws attach each micro-switch to the switchboard. You can adjust the position of the switch board with 3 worm drive clamps. The micro switches have these functions:

– Micro-switch 1 - UP position.

– Micro-switch 2 - Up indication and APP position moving down.

– Micro-switch 3 - APP indication.

– Micro-switch 4 - LDG position.

– Micro-switch 5 - LDG indication APP position moving up.

Cable harnesses with multi pin connectors connect the components.

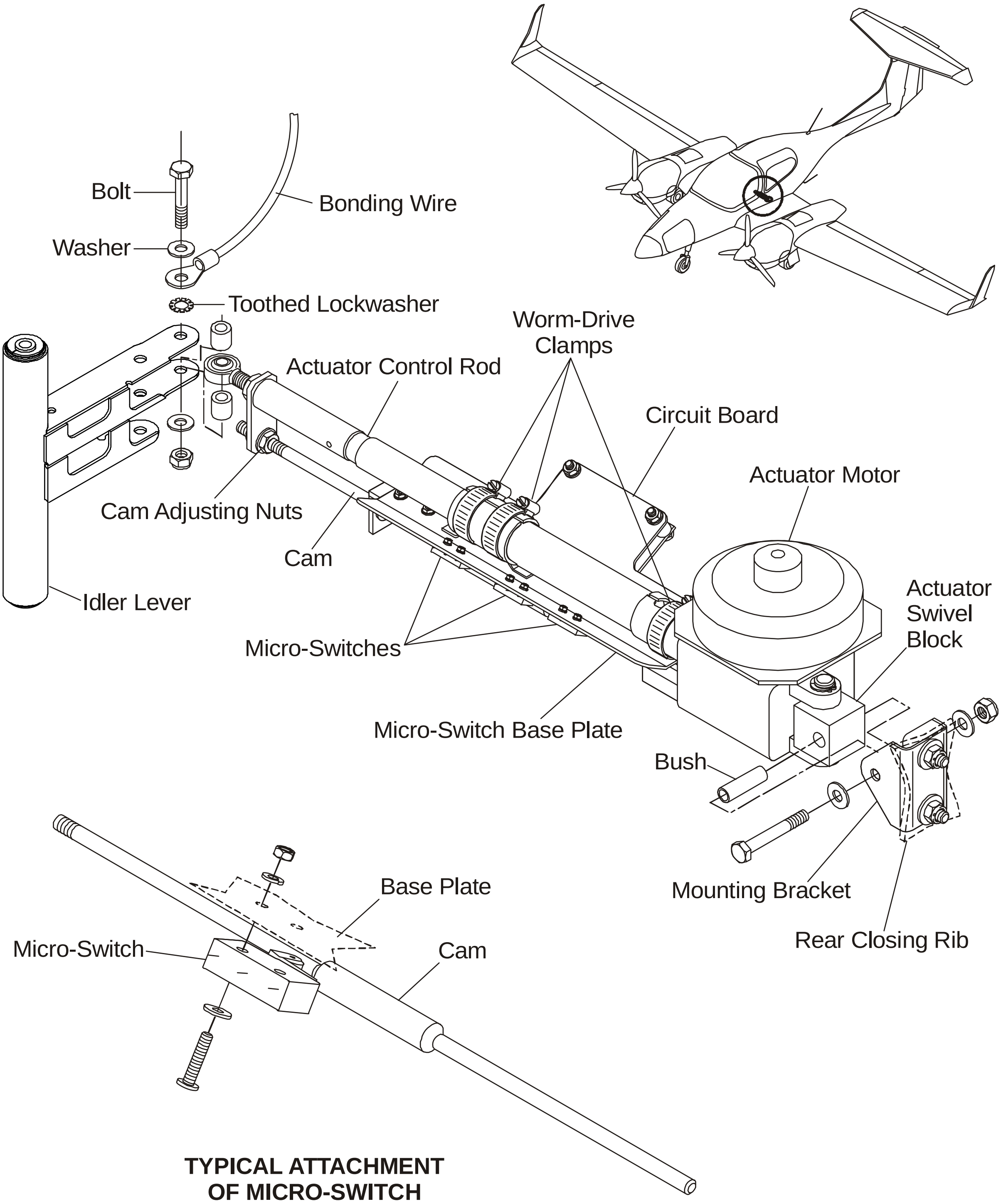


Figure 3: Flap Actuator Installation

3. Operation

If you operate the flap selector switch these things happen:

– The switch energizes the related logic circuit.

– The logic circuit switches on the related transistors to supply power/ground to the flap motor.

– The flap motor turns the reduction gear and spindle. This moves the actuator pushrod towards the new set position.

– The pushrod turns the idler lever around its axis.

– The idler lever moves the flap operating pushrods in the fuselage and the wings.

– The pushrods move the flap bellcranks in the left and right wings.

– The short pushrods move the flaps.

When the flap position reaches the position set by the flap selector:

– The cam on the flap actuator operates the related flap position and indication micro-switches.

– The logic circuit switches off the related transistors to de-energize the flap motor.

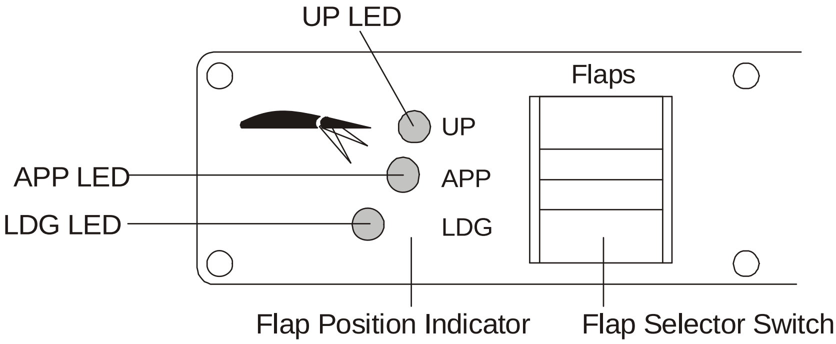
– The flap position indicator shows the new flap position.

4. Fail-Safe Operation

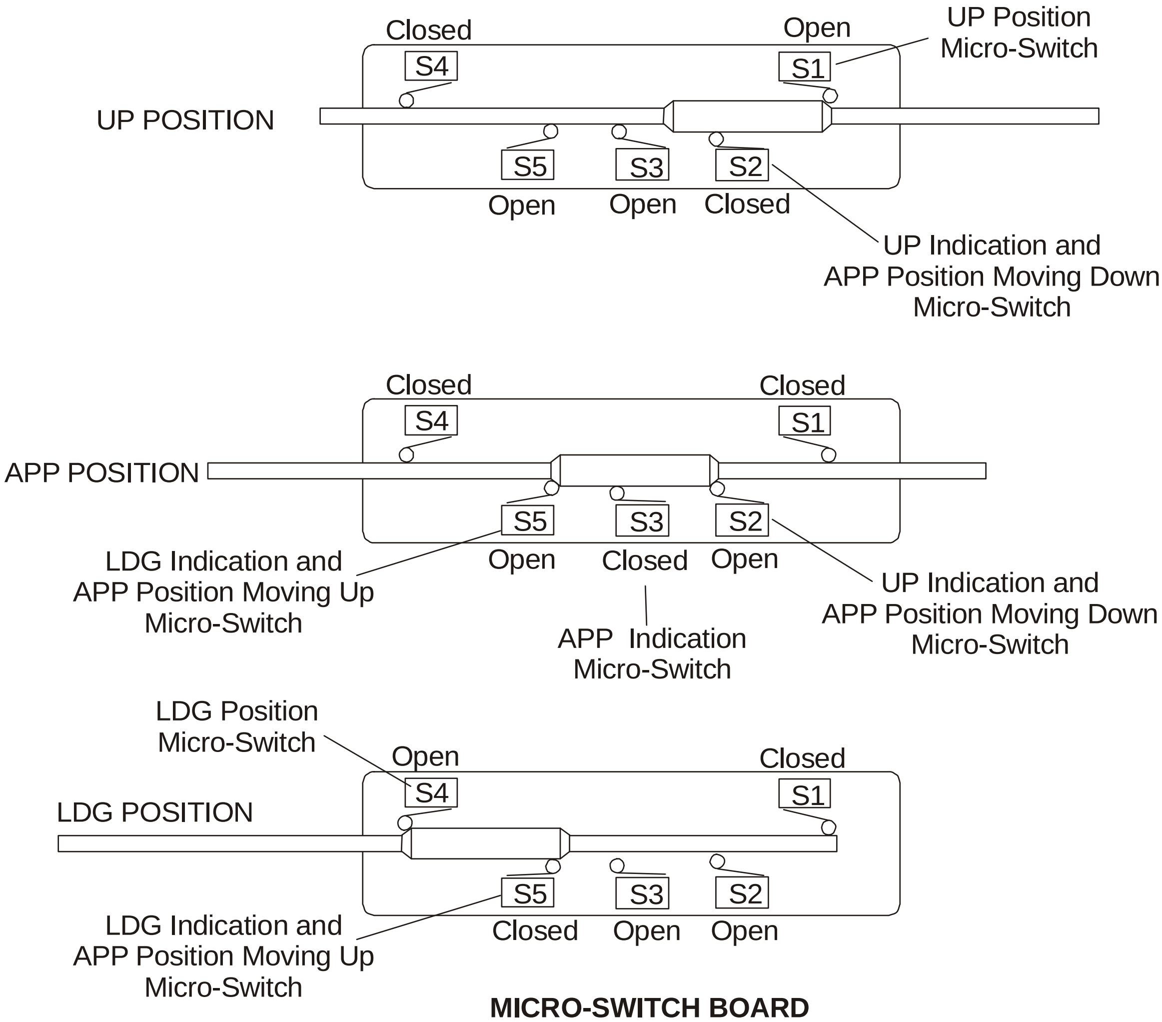
The flap control system has these fail-safe properties:

– If the LDG position micro-switch fails closed the flap actuator pushrod will continue to travel for about 5 mm (0.2 in) until it reaches an internal stop. This prevents damage to the flaps. The FLAP circuit-breaker opens and breaks the flap operating circuit.

– If the UP position micro-switch fails closed, the actuator pushrod contacts the end of the actuator body after about 5 mm (0.2 in) of movement. This prevents damage to the flaps. The FLAP circuit-breaker opens and breaks the flap operating circuit.



FLAP CONTROL UNIT IN THE INSTRUMENT PANEL
(View Looking Forward)



MICRO-SWITCH BOARD
(View Looking Down)

Figure 4: Flap Electrical Control System

Trouble-Shooting

1. General

The table below lists the defects you could have in the flap control system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair in the Repair column.

Trouble	Possible Cause	Repair
Flaps do not operate.	Circuit breaker not set.	Set the flap circuit breaker.
	Airplane electrical system voltage low.	Do a test of the airplane electrical system voltage.
	Flap selector switch defective.	Replace the flap electronic control unit.
Flap circuit breaker will not stay closed.	Short to ground in the wires to the electrical control unit or the micro-switches.	Do an insulation test between each wire and ground. Repair or replace defective wires.
	Short to ground in the electrical control unit.	Replace the electrical control unit.
	Short to ground in a micro-switch.	Replace the micro-switch.
	Short to ground in a wire between a closed micro-switch and the control unit.	Do an insulation test between each wire and ground. Repair or replace defective wires.
Flap circuit breaker opens when flap selector switch moved to any down position.	Short to ground in a motor supply wire.	Do an insulation test between each wire and ground. Repair or replace defective wires.
Flap circuit breaker opens when flap selector switch moved to any up position.	Short to ground in a motor supply wire.	Do an insulation test between each wire and ground. Repair or replace defective wires.
Flap circuit breaker opens when the flaps stop at the chosen position.	Short to ground in the wires to the electrical control unit from the related indication micro-switch.	Do an insulation test between each wire and ground. Repair or replace defective wires.

Trouble	Possible Cause	Repair
Flap circuit breaker opens when the flaps have moved only a short distance from the UP setting.	Short to ground in the wires to the electrical control unit from micro-switch 1.	Do an insulation test between each wire and ground. Repair or replace defective wires.
Flap circuit breaker opens when the flaps have moved only a short distance from the LDG setting.	Short to ground in the wires to the electrical control unit from micro-switch 4.	Do an insulation test between each wire and ground. Repair or replace defective wires.
Flaps move slowly.	Airplane electrical system voltage low. Flap motor defective. Flap actuator defective.	Do a test of the airplane electrical system voltage. Do a test for 24 V at the motor with flaps selected. If there is 24 V at the motor, replace the actuator. Examine the actuator. If you find damage, then replace the flap actuator.
Flaps do no not align with the wing trailing edge.	Flaps extended at too high airspeed.	Examine the flap system. Replace damaged parts. Adjust the system.
Flaps will not move to LDG position. Flaps move to APP and UP correctly.	Micro-switch 4 defective. Open circuit in the Micro-switch 4 wiring.	Replace the micro-switch. Do a continuity test of the wiring. Repair or replace the defective wire.
Flaps will not move to UP position. Flaps move to APP and LDG correctly.	Micro-switch 1 defective. Open circuit in the Micro-switch 1 wiring.	Replace the micro-switch. Do a continuity test of the wiring. Repair or replace the defective wire.

Trouble	Possible Cause	Repair
No LDG indication when the flaps are in the LDG position. Flaps will not move from LDG to APP. Flaps move from LDG to UP correctly.	Micro-switch 5 defective. Open circuit in the Micro-switch 5 wiring.	Replace the micro-switch. Do a continuity test of the wiring. Repair or replace the defective wire.
No UP indication when the flaps are in the UP position. Flaps will not move from UP to APP. Flaps move from UP to LDG correctly.	Micro-switch 2 defective. Open circuit in the Micro-switch 2 wiring.	Replace the micro-switch. Do a continuity test of the wiring. Repair or replace the defective wire.
No APP indication when the flaps are in the APP position. Flaps move to all positions correctly.	Micro-switch 3 defective. Open circuit in the Micro-switch 3 wiring.	Replace the micro-switch. Do a continuity test of the wiring. Repair or replace the defective wire.
Flap circuit breaker opens at the end of down movement.	Micro-switch 4 defective.	Replace the micro-switch.
Flap circuit breaker opens at the end of up movement.	Micro-switch 1 defective.	Replace the micro-switch.
LDG LED stays on when the flaps are not in the LDG position. The other indications operate correctly.	Micro-switch 5 defective.	Replace the micro-switch.
UP LED stays on when the flaps are not in the UP position. The other indications operate correctly.	Micro-switch 2 defective.	Replace the micro-switch.

Trouble	Possible Cause	Repair
APP LED stays on when the flaps are not in the APP position. The other indications operate correctly.	Micro-switch 3 defective.	Replace the micro-switch.
Flaps move to LDG when APP set from UP.	Micro-switch 2 defective.	Replace the micro-switch.
Flaps move to UP when APP set from LDG.	Micro-switch 5 defective.	Replace the micro-switch.

Maintenance Practices

1. General

These Maintenance Practices tell you how to remove and install components of the flap control system.

They also tell you hot to test and adjust the system. See Section 57-50 for data about removing and installing the flaps.

WARNING: WHEN YOU DO WORK ON THE AIRPLANE CONTROLS, YOU MUST MAKE SURE THAT THE AREA AROUND THE CONTROL SURFACES ARE CLEAR OF PERSONNEL AND EQUIPMENT. IF YOU DO NOT DO THIS, INJURY TO PERSONNEL AND DAMAGE TO THE CONTROL SURFACES CAN OCCUR.

WARNING: WHEN YOU COMPLETE WORK ON THE CONTROLS, MAKE SURE THAT YOU REMOVE ALL LOOSE ITEMS OR TOOLS FROM THAT AREA. LOOSE ITEMS OR TOOLS CAN PREVENT FULL AND FREE MOVEMENT OF THE AIRPLANE CONTROLS. THIS CAN CAUSE DEATH OR INJURY TO PERSONS.

2. Remove/Install the Flap Actuator

Refer to Figures 1 and 3.

A. Remove the Flap Actuator

	Detail Steps/Work Items	Key Items/References
(1)	If possible set the flaps to the APP position.	
(2)	Disconnect the airplane main battery.	Refer to Section 24-31.
(3)	Remove the passenger seat.	Refer to Section 25-10.
(4)	Disconnect the electrical supply connector to the flap motor.	At the flap motor.
(5)	Disconnect the control harness plug from the switch board.	
(6)	Remove the bolt which attaches the actuator pushrod to the idler lever.	At the rear main bulkhead. Support the flaps.
(7)	Lower the flaps by hand until they stop.	
(8)	Remove the bolt which attaches the actuator body to the mounting bracket.	At the left rear closing rib.

	Detail Steps/Work Items	Key Items/References
(9)	Remove the actuator from the airplane.	

B. Install the Flap Actuator

	Detail Steps/Work Items	Key Items/References
(1)	Put the flap actuator into position in the fuselage.	
(2)	Install the bolt which attaches the actuator body to the mounting bracket.	At the left rear closing rib. Make suer that the bush is in the correct position in the actuator swivel block. Torque 6.4 Nm (4.7 lbf.ft.).
(3)	Install the bolt which attaches the actuator pushrod to the idler lever.	At the rear main bulkhead. Hold the flaps. Torque 6.4 Nm (4.7 lbf.ft.).
(4)	Connect the control harness plug for the switch-board.	
(5)	Connect the electrical supply connector to the flap motor.	
(6)	Connect the airplane main battery.	Refer to Section 24-31.
(7)	Do the flap adjustment procedure.	See Paragraph 4.
(8)	Do an inspection of all the controls that you connected. If necessary for your Airworthiness Authority do a duplicate inspection of the controls.	
(9)	Install the passenger seat.	Refer to Section 25-10.

3. Test the Flap Control System

A. Equipment

Item	Quantity	Part Number
Inclinometer.	1	Commercial.
Spring balance.	1	Commercial.

B. Test the Flap Control System

	Detail Steps/Work Items	Key Items/References
(1)	Make a copy of the Control Surfaces Adjustment Report.	Refer to Section 06-00. Use it to record the measurements.
(2)	Make sure that the flaps are fully UP: – Set the ELECT. MASTER switch to ON. – Set the flaps to APP. – When the flaps stop moving, set the flaps to UP. – When the flaps stop moving, set the ELECT. MASTER switch to OFF.	
(3)	Do a test for the correct pre-load in the flap UP position: – Build a loop with strong (durable) tape and bond both ends side by side on top of the left inner flap. – Use the loops of tape for the spring balance until the flap just moves from the lower surface of the wing. – Record the value in the Control Surfaces Adjustment report.	The UP position limit stop at the outboard end of the inner flap is the reference point for measurements. Pull vertical downwards. The values must be as shown in the Control Surfaces Adjustment Report.

	Detail Steps/Work Items	Key Items/References
(4)	If the preload is not correct, adjust the control rod between the bellcrank in the wing and the flap horn for the flap you tested. Repeat steps 3 and 4 as necessary until you measure the correct pre-load value.	Refer to Section 27-00.
(5)	Repeat steps 3 and 4 for the right inner flap.	
(6)	Zero the inclinometer to the left outer flap: – Put the inclinometer on the left outer flap close to the flap horn. – Zero the inclinometer. – Remove the inclinometer.	
(7)	Set the flaps to APP: – Set the ELECT. MASTER switch to ON. – Set the flap selector switch to APP. – When the flaps stop moving, set the ELECT. MASTER switch to OFF.	
(8)	Measure the angle of the left outer flap. Record the value in the Control Surfaces Adjustment Report.	Use the inclinometer. The value must be as shown in the Control Surfaces Adjustment Report.
(9)	Set the flaps to LDG: – Set the ELECT. MASTER switch to ON. – Set the flap selector switch to LDG. – When the flaps stop moving, set the ELECT. MASTER switch to OFF.	
(10)	Measure the angle of the left outer flap. Record the value in the Control Surfaces Adjustment Report.	Use the inclinometer. The value must be as shown in the Control Surfaces Adjustment Report.
(11)	Repeat steps 6 to 10 for the right outer flap.	

	Detail Steps/Work Items	Key Items/References
(12)	Set the flaps to UP: – Set the ELECT. MASTER switch to ON. – Set the flap selector switch to UP. – When the flaps stop moving, set the ELECT. MASTER switch to OFF.	

4. Adjust the Flap Control System

If you cannot get the correct range of movement of the flap control system, use this procedure to adjust the system.

A. Equipment

Item	Quantity	Part Number
Rigging pins.	3	VR-D41-2757-3000.
Deflection gauge.	2	D60 5753 00 PL.

B. Adjust the Flap Control System

	Detail Steps/Work Items	Key Items/References
(1)	Make a copy of the Control Surfaces Adjustment Report.	Refer to Section 06-00. Record the measurements.
(2)	Remove these items for access: – The passenger seat. – The flap bellcrank access panels in both wings.	 Refer to Section 25-10. Refer to Section 53-40.
(3)	Disconnect the airplane main battery.	Refer to Section 24-31.
(4)	Remove the bolt, spacer, washer and nut which attach the actuator pushrod to the idler lever.	At the rear main bulkhead. Hold the flaps.
(5)	Put a rigging pin in the idler lever.	Refer to Figure 3. At the rear main bulkhead.
(6)	Put a rigging pin in the left inner bellcrank in the left wing. If necessary adjust the pushrod between the idler lever and the bellcrank.	Refer to Section 27-00.
(7)	Repeat step 6 for the left outer flap and both the right wing inner and outer flaps.	
(8)	Remove the rigging pins from the flap idler lever and the bellcranks in the wings.	
	CAUTION: MAKE SURE THAT ALL THE RIGGING PINS ARE REMOVED!	

	Detail Steps/Work Items	Key Items/References
(9)	Connect the airplane main battery.	Refer to Section 24-31.
	WARNING: DO NOT TOUCH THE ACTUATOR WHEN YOU OPERATE IT. THE MOVING PARTS CAN CAUSE INJURY.	
(10)	Check actuator extension: – Hold the actuator rod end clear of the structure. – Set the ELECT. MASTER switch to ON. – Set the flap selector switch to APP. – When the actuator stops moving, set the flap switch to UP. – When the actuator stops moving, set the ELECT. MASTER switch to OFF.	Use a piece of a string through the eye end.
(11)	Measure the extension of the actuator pushrod.	The distance between the center of the eye-end of the actuator rod and the center of the actuator swivel block mounting must be 379.7 mm (14.95 in).
(12)	If the actuator pushrod extension is not correct, adjust the cam rod: – Loosen the nuts which attach the cam rod to the plate at the eye end. – Turn the nuts to move the cam rod. – Tighten the nuts.	Refer to Figure 3. One turn clockwise decreases the extension by 1 mm (0.04 in). Torque 6.4 Nm (4.7 lbf.ft.).
(13)	Repeat steps 11 and 12 as necessary to get the correct extension.	
(14)	Disconnect the rod end on flap attachment on all 4 flap connections.	At the flap.
(15)	Set the flap actuator to flap UP.	

	Detail Steps/Work Items	Key Items/References
(16)	Connect the flap actuator: – Install the bolt, spacer, washer and nut which attaches the eye end to the idler lever.	Torque 6.4 Nm (4.7 lbf.ft.).
(17)	Install the deflection gauge on the wing.	
(18)	Connect the outer flap rod end LH and RH on flap lever and adjust it to 0°.	
(19)	Connect the inner flap LH and RH on flap lever and adjust it to the flap stop.	
(20)	Measure flap deflection: – Set the flap selector switch to LDG. – Set the flap selector switch to APP. – Set the flap selector switch to UP.	Record the value in the Control Surfaces Adjustment Report.
(21)	Make sure that all the flaps hit the stops at the same time. If necessary, adjust the rod between the bellcrank in the wing and the related flap.	Refer to Section 27-00.
(22)	Do a test and adjust flap pre-load.	Refer to Paragraph C.
(23)	Do an inspection of all the controls that you have adjusted. If necessary for your Airworthiness Authority, do a duplicate inspection of the controls.	
(24)	Install these items: – The passenger seat. – The flap bellcrank panels in both wings.	Refer to Section 25-10. Refer to Section 53-40.

C. Adjust the Flap Preload

	Detail Steps/Work Items	Key Items/References
(1)	Make a copy of the Control Surfaces Adjustment Report.	Refer to Section 06-00.
(2)	Connect external power source.	
(3)	Set the ELECT. MASTER switch to ON.	
(4)	Check flap deflection for UP, APP, LDG position with deflection gauge according to the Control Surfaces Adjustment Report.	If deflection out of limit refer to Paragraph B.
(5)	Disconnect LH and RH outer flap pushrods.	
(6)	Install reinforced tape loop on outer end of inner flap, bond both ends side by side on top of the inner flaps. Do not place loop ends over the flap stop.	Refer to Figure 5.
(7)	Put paper slip between inner flap outer end and flap stop.	
(8)	Set flaps to 0°.	
(9)	Connect scale to the reinforced tape loop.	
(10)	Pull on scale and paper slip until the paper slip is released.	Pull vertical downwards.
(11)	If the paper slip release-force is out of limits, disconnect inner flap pushrod and twist rod end half a revolution. Connect pushrod and try again until limits are reached.	
(12)	Repeat steps 6 to 11 on other side.	
(13)	Disconnect LH and RH inner flap pushrods.	
(14)	Connect LH and RH outer flap pushrods.	
(15)	Put paper slip in outer flap stop fairing between flap stop and flap stop lever.	
(16)	Set flaps to 0°.	
(17)	Position scale on screw head on outer end of flap.	
(18)	Pull on scale and paper slip until paper slip is released.	

	Detail Steps/Work Items	Key Items/References
(19)	If the paper slip release-force is too small bond inserts into the outer flap stop fairing until force is above minimum. If release force is too high, remove layers from the outer flap stop fairing until force is below maximum.	
(20)	Connect the inner flap pushrods.	
(21)	Do an inspection of all controls that you have adjusted. If necessary for your Airworthiness Authority, do a duplicate inspection if the controls.	

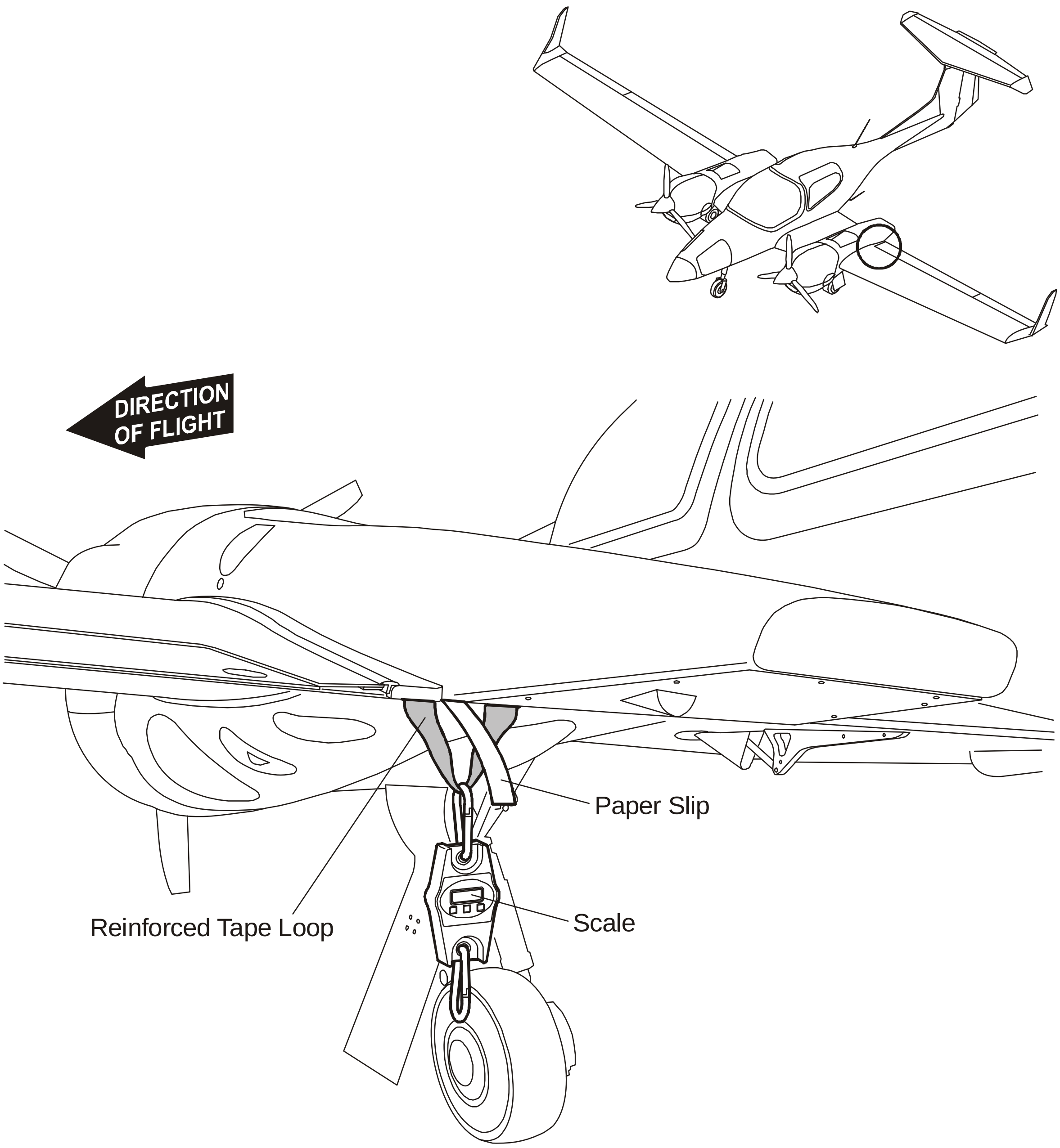


Figure 5: Flap Preload Adjustment

5. Flap Pushrod Access

Flap Pushrod	Remove/Install Access	References
Between the idler lever at the rear bulkhead and the center section closing ribs.	Passenger seat. Center section access panels.	Section 25-10. Section 52-40.
Between the center section closing ribs and the inner flap bellcranks.	Passenger seat. Inner flap bellcrank access panels under each wing.	Section 25-10. Section 52-40.
Between the center section closing ribs and the outer flap bellcranks.	Passenger seat. Outer flap bellcrank access panels under each wing.	Section 25-10. Section 52-40.
Between the inner flap bellcranks and the inner flap horns.	Inner flap bellcrank access panels under each wing.	Section 52-40.
Between the outer flap bellcranks and the outer flap horns.	Outer flap bellcrank access panels under each wing.	Section 52-40.

6. Flap Bellcrank and Lever Access

Flap Pushrod	Remove/Install Access	References
Idler lever at the rear main bulkhead.	Passenger seat.	Section 25-10.
Bellcranks in wings.	Inner and outer bellcrank access panels under each wing.	Section 52-40.

7. Replace a Bulb of the Flap Position Indicator

	Detail Steps/Work Items	Key Items/References
(1)	Remove the lens cover.	Use a small screwdriver.
(2)	Remove the bulb: – Pull the bulb straight out.	 Use a small hose, heat shrink, or equivalent.
(3)	Install the new bulb: – Push the bulb straight in.	 Do not damage the bulb.
(4)	Install the lens cover.	
(5)	Test by selecting the position of the changed bulb with the flap selector switch.	

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CHAPTER 28

FUEL

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CHAPTER 28
FUEL

1. General

This Chapter tells you about the DA 42 fuel system. It tells you about the fuel system from the fuel tanks to the engine fuel filter. For more data on the engine fuel system refer to Chapter 73 and the applicable TAE 125 Operation and Maintenance Manual.

The DA 42 has a fuel tank assembly in each wing. Each fuel tank assembly has an approximate capacity of 26 US gal (100 liters). Each engine has low and high pressure fuel pumps which supply the engine fuel system. A filter mounted in each engine nacelle protects the engine fuel system. A fuel selector/shut-off valve in each engine nacelle can be operated by the pilot to shut-off the fuel supply to each engine.

Auxiliary fuel tanks are optional equipment (OÄM 42-056). The auxiliary fuel tanks consist of a single fuel chamber in each engine nacelle. The additional fuel capacity is 13.7 US gal (52 liters) per side. The total fuel capacity (main fuel tank and auxiliary fuel tank) is 39.6 US gal (150 liters) per side. Each auxiliary tank has its own fuel tank filler and a fuel transfer pump which pumps fuel into the main fuel tank.

Fuel level sensors in the inboard and outboard chambers of each fuel tank assembly give fuel quantity data which is displayed on the multifunction display screen of the integrated cockpit system (ICS). Refer to these Sections for more data on these systems:

– Section 28-10. Fuel storage.

– Section 28-20. Fuel distribution.

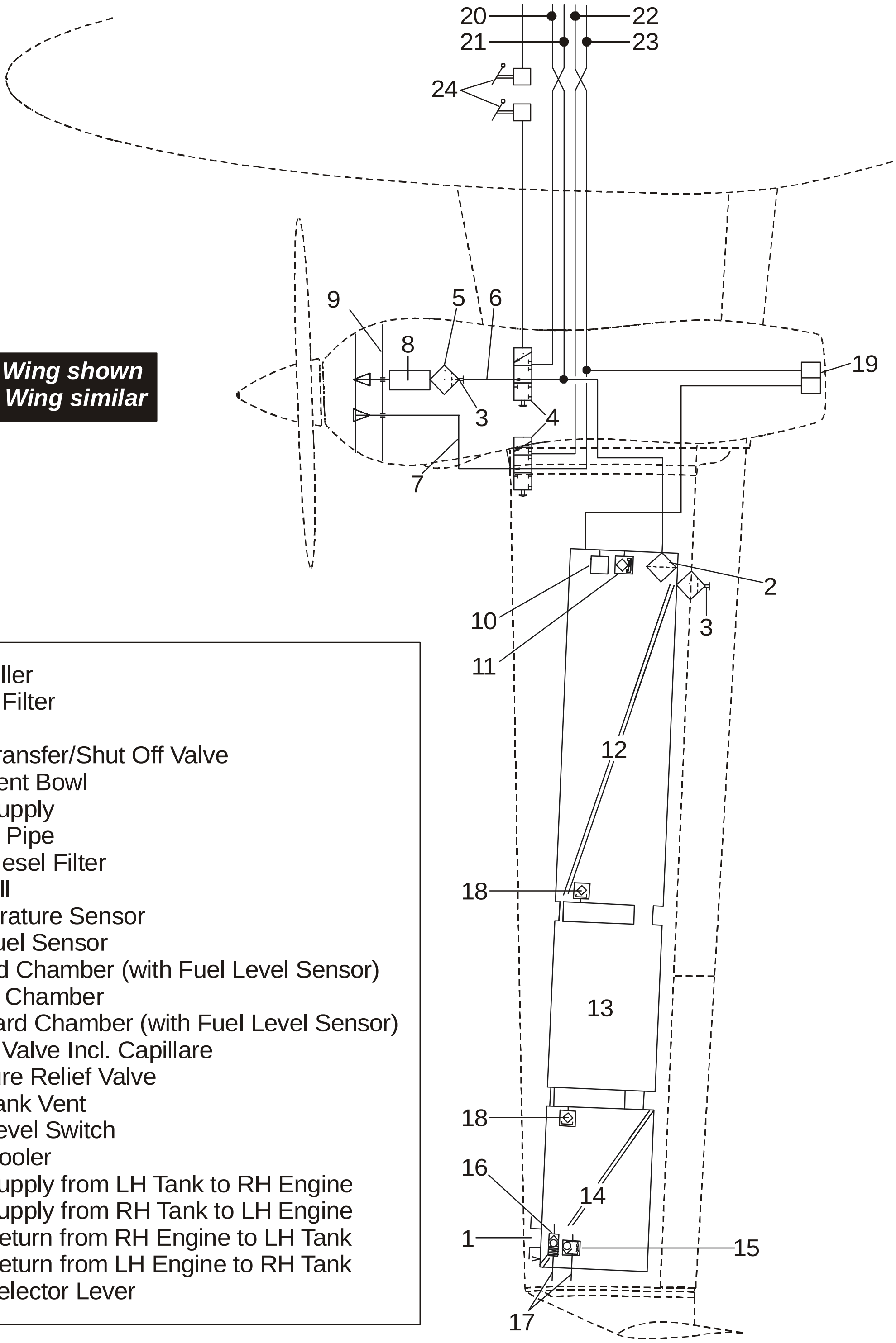
– Section 28-40. Fuel indication.

– Section 73-00. Engine fuel system.

Note: Equipment which is certified for installation in the DA 42 is listed in Section 6.5 of the Airplane Flight Manual. Such equipment may be installed in accordance with the Airplane Maintenance Manual.

Any equipment which is not listed in Section 6.5 of the Airplane Flight Manual is called “Additional Equipment”. The installation of Additional Equipment is a modification which must be handled in accordance with national regulations or a Service Bulletin.

Note: Refer to Section 20-90 before starting maintenance work in the center wing area.



1 Fuel Filler
2 Finger Filter
3 Drain
4 Fuel Transfer/Shut Off Valve
5 Sediment Bowl
6 Fuel Supply
7 Return Pipe
8 TAE Diesel Filter
9 Firewall
10 Temperature Sensor
11 Low Fuel Sensor
12 Inboard Chamber (with Fuel Level Sensor)
13 Middle Chamber
14 Outboard Chamber (with Fuel Level Sensor)
15 Check Valve Incl. Capillare
16 Pressure Relief Valve
17 Fuel Tank Vent
18 Fuel Level Switch
19 Fuel Cooler
20 Fuel Supply from LH Tank to RH Engine
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22 Fuel Return from RH Engine to LH Tank
23 Fuel Return from LH Engine to RH Tank
24 Fuel Selector Lever

Figure 1: Fuel System Schematic Diagram without Auxiliary Tanks

2. Description

Figure 1 shows the fuel system schematic diagram for the DA 42 airplane without auxiliary tanks. The DA 42 has a fuel tank assembly in each wing.

Figure 2 shows the auxiliary fuel tank system schematic diagram for the DA 42 airplane. The auxiliary fuel tank system is optional equipment (OÄM 42-056). It has a fuel chamber in each engine nacelle.

A. Main Fuel Tanks

Each wing tank assembly has 3 separate chambers. The chambers are connected by large diameter flexible hoses. Smaller hoses interconnect the chambers at the top to provide a vent system for the fuel tank assembly.

The inboard chamber has a fuel contents probe, fuel temperature sensor, low fuel level switch, high fuel level switch, and the fuel supply and return connections. Some (low) serial numbers have a high level fuel switch installed which is unused. All other serial numbers have a plug in this place. The fuel supply connection attaches to a finger filter mounted on the fuel chamber. A fuel drain valve is located at the lowest part of the inner fuel chamber.

The middle fuel chamber is a plain chamber and has no installed components.

The outer fuel chamber has a fuel quantity probe, high fuel level switch, and the fuel filler assembly. The high fuel level switch is only used when the optional auxiliary fuel tanks (OÄM 42-056) are installed. The outboard chamber also has the check valve, vent valve and pressure relief valve for the fuel tank assembly vent system.

The fuel quantity probes go from the bottom inboard corner to the top outboard corner of the fuel chambers. The probes sense the level of fuel in the fuel tank assemblies and displays the information on the display screen of the integrated cockpit system.

B. Auxiliary Fuel Tanks

The auxiliary fuel tank system is optional equipment (OÄM 42-056). The auxiliary fuel tanks consist of a single fuel chamber in each engine nacelle. Each auxiliary fuel tank has a fuel transfer pump which pumps fuel into the main fuel tank on the same side of the airplane. Between the fuel pump and return line a solenoid valve and a check valve are installed. The solenoid valve is operated via the fuel transfer pump switch in parallel with the fuel transfer pump.

Each auxiliary fuel tank has a shut-off switch which switches off the fuel transfer pump when the level in the auxiliary fuel tank is low. The fuel supply connection attaches to a finger filter mounted at the rear of the auxiliary fuel tank. A fuel drain valve is located at the lowest part of the auxiliary fuel tank. A vent line with check valve and capillary is connected at the forward wall of the auxiliary fuel tank. A drain line is connected to the filler drip tray.

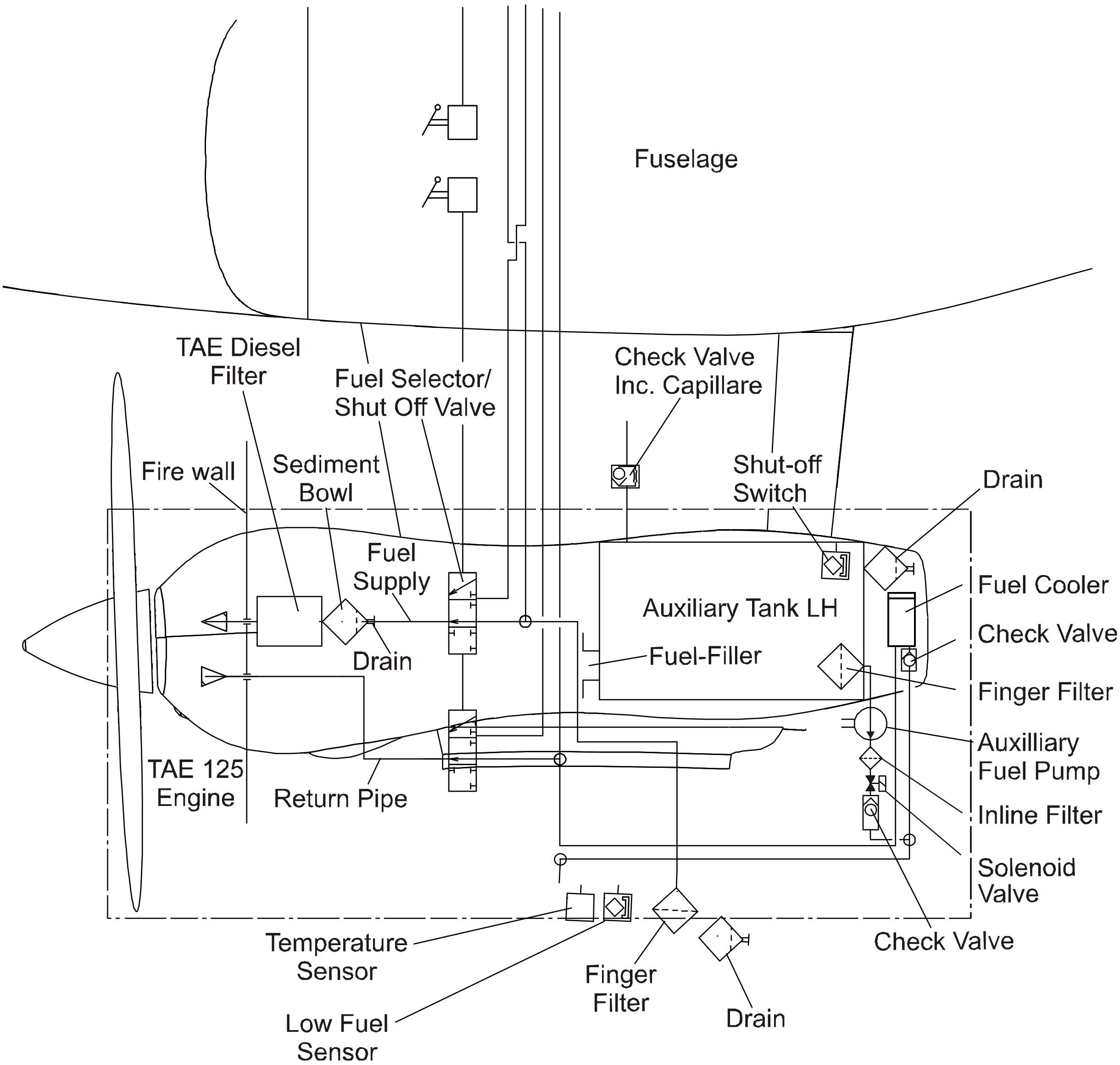


Figure 2: Auxiliary Fuel System Schematic Diagram (OÄM 42-056 implemented)

3. Operation

A. Normal Operation

With an engine running and the fuel selector/shut-off valve set to OPEN the engine fuel pump takes the fuel from its related fuel tank. Fuel flows through the finger filter to the fuel selector/shut-off valve. From the valve the fuel flows through the fuel filter assembly and then to the engine fuel system. The fuel filter assembly has a sediment bowl and a fuel drain valve.

The engine fuel pumps always supply more fuel than the engine fuel injection system can use. The unwanted fuel flows back from the engine fuel system through the fuel selector/shut-off valve. From the fuel selector/shut-off valve the fuel flows through a flexible hose to the fuel cooler. The fuel cooler is located at the rear of the engine nacelle. Fuel from the fuel cooler flows through another flexible hose back into the related main fuel tank.

As the engine uses fuel the fuel level in the related main fuel tank decreases. Air flows through the vent system to fill the space left by the fuel. This prevents the fuel tank pressure from decreasing to less than atmospheric pressure. It allows the engine fuel pump to continuing taking fuel from the tank.

Auxiliary fuel tanks are optional equipment (OÄM 40-056). For each auxiliary tank there is a FUEL TRANSFER switch in the cockpit, in the center console behind the elevator trim wheel. When this switch is set to ON, then the solenoid valve is opened and fuel is pumped from the auxiliary fuel tank into the related main fuel tank. The pump is automatically switched off when the main fuel tank is full, or when the auxiliary fuel tank is empty. If the pump is switched off, the solenoid valve is closed automatically.

B. Fuel Transfer

With an engine running and the fuel selector/shut-off valve set to CROSSFEED the fuel supply and return lines to the related fuel tank are shut-off. The engine fuel pump takes the fuel from the opposite engine fuel tank through the related fuel cross feed line. The fuel returned from the engine is returned to the fuel tank which supplied the fuel.

For example, if the left engine fuel selector/shut-off valve is set to CROSSFEED the left engine fuel pump will take fuel from the right main fuel tank via the related fuel cross feed lines. The fuel that is returned from the left engine will be returned to the right fuel tank. If the right engine fuel selector/shut-off valve is set to CROSSFEED the right engine fuel pump will take fuel from the left main fuel tank via the related fuel cross feed lines. The returned fuel will be returned to the left fuel tank.

The unwanted fuel flows back from the engine fuel system through a check valve and the fuel selector/shut-off valve. From the fuel selector/shut-off valve the fuel flows through the related fuel return line and a flexible hose to the fuel cooler. Fuel from the fuel cooler the fuel flows through a flexible hose back into the fuel tank that supplied the fuel.

C. Emergency Operation

In an emergency (for example, an engine failure) you can set the related engine fuel selector/shut-off valve to SHUT-OFF. The fuel selector/shut-off valve has a safety gate to prevent accidental selection of the SHUT-OFF position. You must turn and hold the gate in the open position to set a fuel selector/shut-off to SHUT-OFF. When the engine fuel selector/shut-off valve is set to SHUT-OFF no fuel can flow to the related engine. The engine can not run.

The pilot can set the other engine fuel selector/shut-off valve to CROSSFEED and use the fuel from both main fuel tanks to supply the engine which is operating. This maintain a similar fuel level in each main fuel tank.

D. Refueling

Add fuel to the tanks through the fuel fillers in the top of each wing. Fuel flows through the filler caps into the main fuel tank assembly. Air in the tank can escape back past the fuel. As the fuel tank becomes full the air can also escape through the usual vent system.

E. Fuel Drains

You can use the fuel drains in each fuel tank, each auxiliary fuel tank (if installed) and each sediment bowl to defuel the airplane. You can also use these drains to drain a small quantity of fuel into a glass container to test for water or other contamination. Push the bottom part of the valve up to release fuel. A spring inside the drain valve closes the valve automatically when you release the bottom part. Always make sure that the drain valves close correctly and do not leak.

Section 28-10
Fuel Storage System

1. General

This Section tells you about the fuel storage system of the DA 42 airplane. It tells you about these components:

– Main fuel tanks.

– Fuel filler assembly.

– Fuel tank vents.

– Auxiliary fuel tanks (optional equipment).

Refer to Section 28-00 for a general description of the fuel system and a schematic diagram of the fuel system. Refer to Section 28-20 for data about the fuel distribution system and refer to Section 28-40 for data about the fuel indicating system.

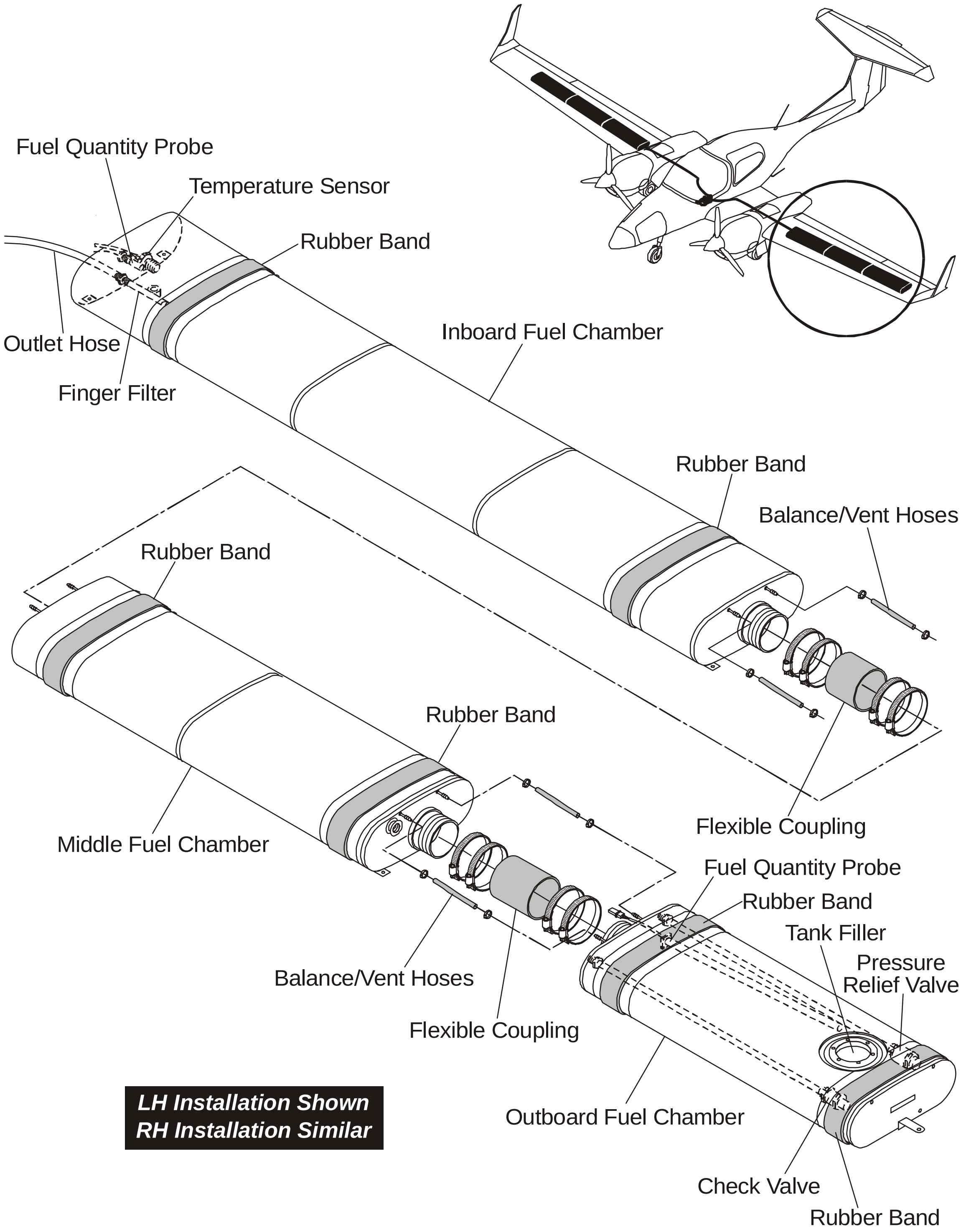


Figure 1: Main Fuel Tank Installation

2. Main Fuel Tank Description

A. Main Fuel Tank

Figure 1 shows the fuel tank installation. The airplane has 2 fuel tank assemblies. One in the left wing and one in the right wing. Three chambers connected by flexible couplings make the fuel tank assembly. The 3 chambers are outboard of the engine nacelles and are located between the main spars of each wing.

Each chamber is a welded aluminum structure. Each chamber has an oval cross section and flat end-plates. Baffles in the chambers prevent the fuel from moving quickly from one end of the tank to the other. The chambers have bosses welded into the end plates to make connections for the flexible hoses and other components that attach to the end plates of the chambers.

A tank outlet is located at the inboard end plate of the inner chamber. A finger filter at the tank outlet prevents debris from entering the engine fuel systems. A drain valve is located at the lower surface of the inner chamber. You can use this drain valve for doing fuel contamination tests and for draining the fuel tank assembly.

A fuel temperature sensor and a fuel low level sensor are also mounted on the inboard end plate of the inner chamber. The fuel return/transfer pipe also connects to the inboard end plate. The outer end plate of the inner chamber has mountings for the flexible connecting hose and a fuel high level switch.

The end plates of the middle chamber has the fittings for the flexible connecting hoses that connect the middle chamber to the inner and outer chambers.

The inboard end plate of the outer fuel chamber has fittings for the flexible connecting hose and a fuel high level switch. The inboard end plate also has fittings for the fuel tank vents. The top surface has the fittings for the fuel filler assembly.

Fuel quantity probes are installed in both the inner and outer chambers. The probes go from the lower inboard corner to the upper outboard corner of each chamber. The signals from the probes are used to set the fuel quantity display on the display screen of the integrated cockpit system. Refer to Section 28-40 for more data about the fuel indicating system.

Ribs in the wing hold the fuel chambers in position between the 2 main spars. Rubber strips go between the tank chambers and the ribs. The filler cap assembly is attached to the upper surface of the wing with screws. It holds the tank assembly in position in a spanwise direction.

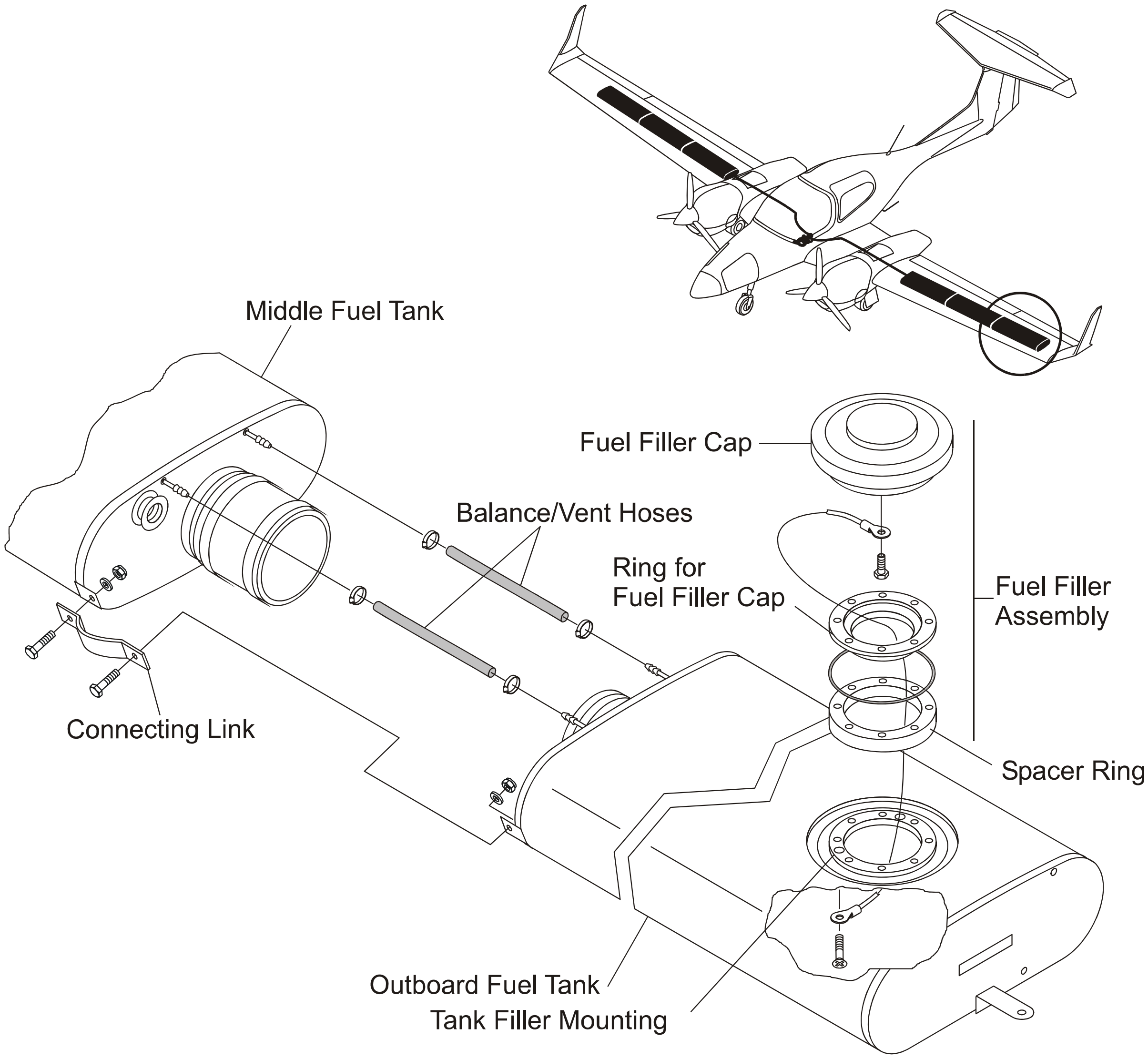


Figure 2: Fuel Filler Assembly LH

B. Fuel Filler Assemblies

The fuel filler assembly is a welded aluminum tubular structure, approximately 75 mm (3 in.) diameter. The filler has a flange that attaches to the top skin of the wing. It also has slots that engage the fuel filler cap.

The filler cap has a locking lever. You pull the locking lever up and turn the filler cap counter-clockwise to release it. You turn the cap clockwise to install it and push down the locking lever to lock it. The area just below the flange has adapters for the vent system flexible hoses.

Bonding strips connect the tank to the fuel filler assembly and the airplane bonding system.

3. Auxiliary Fuel Tank Description

Figure 3 shows the auxiliary fuel tank installation. The airplane has 2 auxiliary fuel tank assemblies (optional equipment, OÄM 42-056). One in the left wing and one in the right wing. A single chamber makes the auxiliary fuel tank assembly. The chamber is located in the rear section of the engine nacelle.

The chamber is a welded aluminum structure. Baffles in the chamber prevent the fuel from moving quickly from one end of the tank to the other. The chamber has bosses welded into the forward and rearward end plates to make connections for the flexible hoses and other components that attach to the end-plates of the chamber.

A tank outlet is located at the inboard rear corner of the chamber. A finger filter at the tank outlet prevents debris from entering the main fuel tank. A drain valve is located at the lower surface at the rear end of the chamber. You can use this drain valve for doing fuel contamination tests and for draining the auxiliary fuel tank assembly. A fuel low level sensor is also mounted on the rearward end plate of the chamber.

The forward end-plate of the fuel chamber has a fitting for the auxiliary fuel tank vent line. The top surface has the fitting for the fuel filler assembly.

The auxiliary fuel tank has no fuel quantity indicating system.

Two ribs in the nacelle hold the fuel chamber in position in the nacelle. The rearward rib is open on the bottom side. A stainless steel strap closes the rear rib.

Rubber strips go between the tank chamber and the ribs. The filler cap assembly is attached to the upper surface of the nacelle.

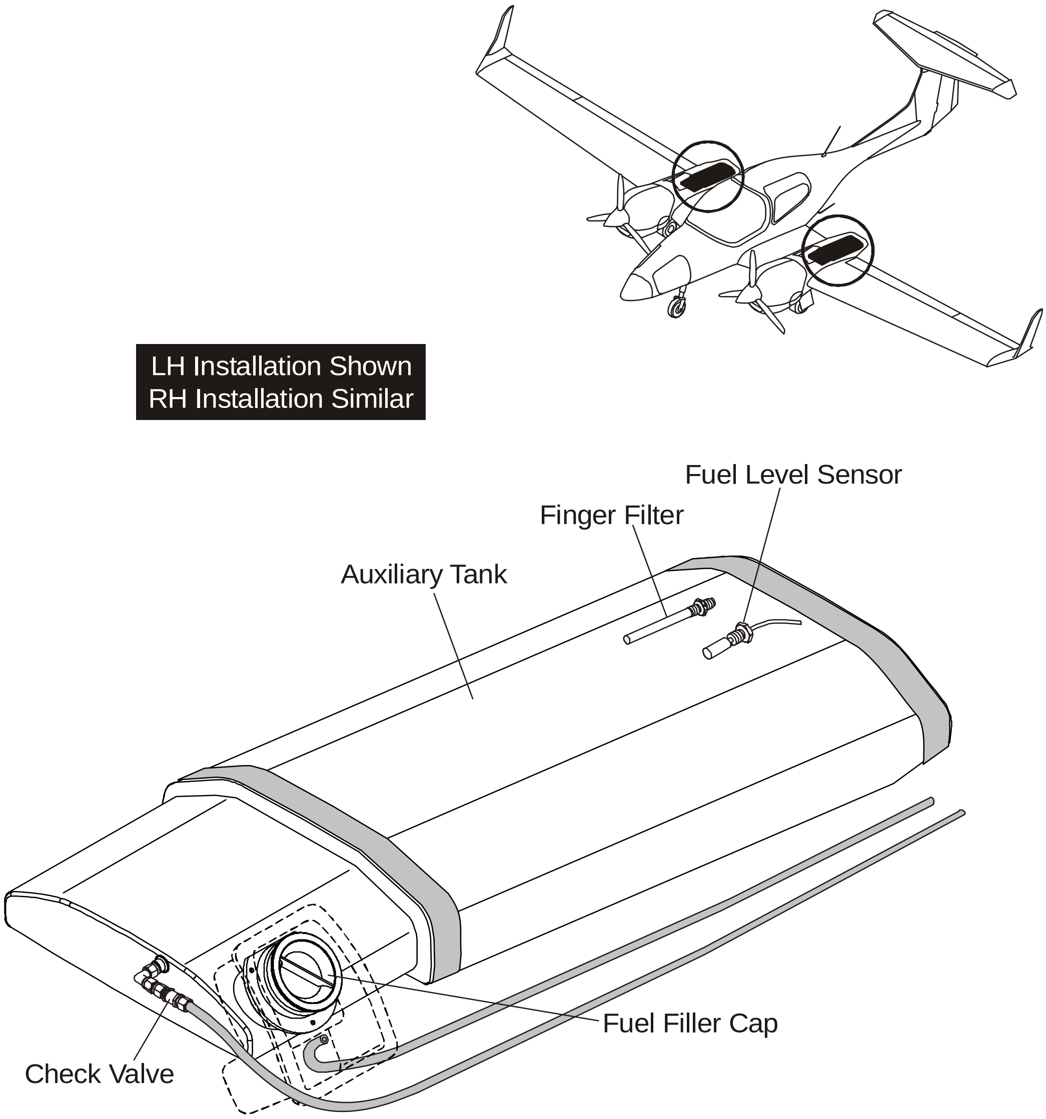


Figure 3: Auxiliary Fuel Tank Installation

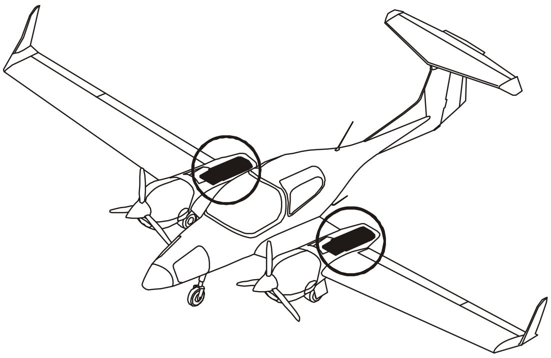
4. Auxiliary Fuel Tank Filler

Refer to Figure 4 for the auxiliary fuel tank filler installation.

The auxiliary fuel tank filler has a flange that attaches to a drip tray in the top skin of the nacelle. It also has slots that engage the fuel filler cap. Turn the filler cap counterclockwise to release it. Turn the cap clockwise to install it.

A drain line is connected to the drip tray.

Bonding strips connect the tank to the airplane bonding system.



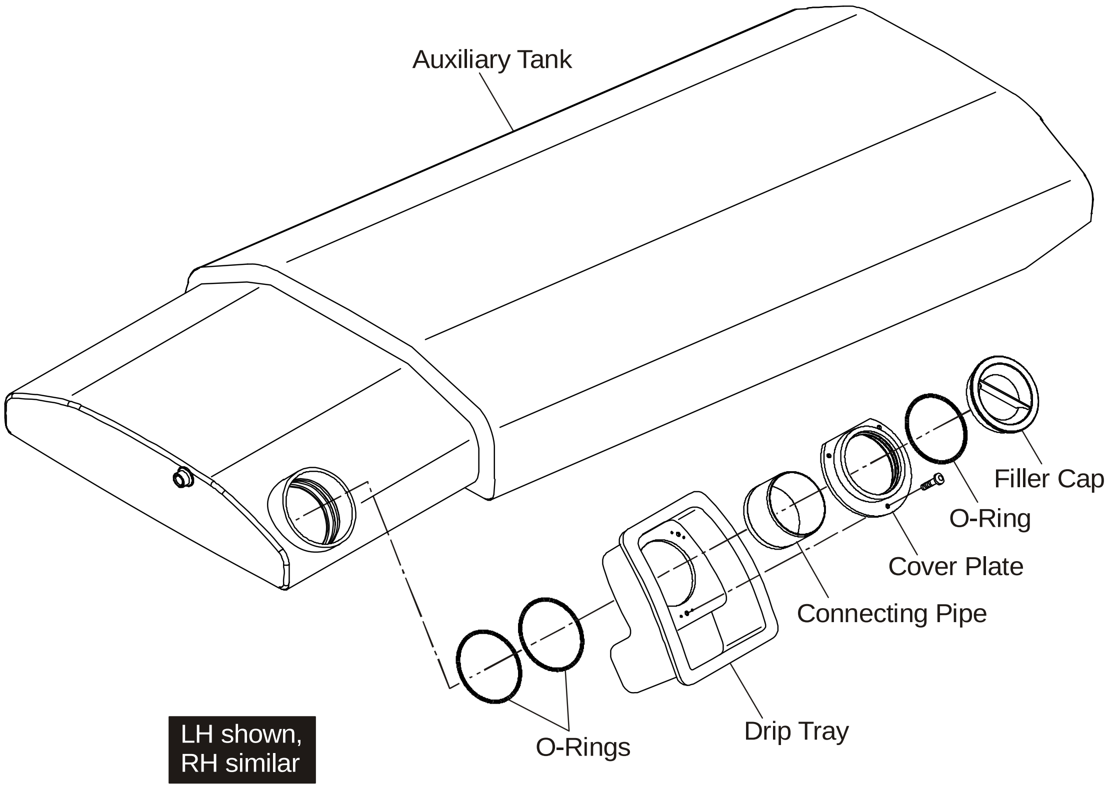


Figure 4: Auxiliary Fuel Tank Filler Installation

Trouble-Shooting

1. General

The table below list the defects you could have with the fuel storage system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Filler cap leaking.	Filler cap damaged. Filler cap does not have a tight fit.	Replace filler cap gasket. Tighten nut on lower side of cap.
Fuel drain valve leaking.	Drain valve damaged. Contamination in drain valve.	Replace fuel drain valve. Open and close drain valve to flush contaminant. Do this until the drain seals. If the drain will not seal then replace the drain valve.

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Maintenance Practices

1. General

These Maintenance Practices tell you how to remove/install the fuel tanks. Obey the safety precautions for fuel at all times.

WARNING: DO NOT GET FUEL ON YOU. FUEL CAN CAUSE SKIN DISEASE.

WARNING: DO NOT ALLOW FIRE NEAR FUEL. FUEL BURNS AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

WARNING: DO NOT BREATHE FUEL VAPOR. FUEL VAPOR CAN MAKE YOU ILL.

2. Remove/Disassemble a Main Fuel Tank Assembly

A. Remove a Main Fuel Tank Assembly

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the fuel tank that you will remove is empty.	Defuel and drain the fuel tank.
(2)	Remove the outer wing that has the fuel tank that you will remove and support the wing on trestles.	Refer to Section 57-10.
(3)	Remove the fuel tank assembly access panels from the lower surface of the wing.	Refer to Section 52-40.
(4)	Remove the fuel drain valve: – Cut the lock-wire. – Remove the drain valve from its mounting.	
(5)	Remove the fuel tank access panel from the wing root rib: – Remove the 11 nuts and washers that attach the access panel to the wing root. – Move the access panel clear of the wing root.	

	Detail Steps/Work Items	Key Items/References
(6)	Disconnect the electrical connector for the fuel quantity probe at the inboard end of the outer fuel chamber.	
(7)	Release the bonding strip from the inboard end of the tank assembly: – Remove the nut and washer from the bolt. – Remove the bonding strip from the bolt and move it clear of the tank. – Remove the bolt.	
(8)	Disconnect the 2 vent hoses from the adapters on the fuel tank access panel: – Remove the access panel from the outer lower surface of the wing. – Remove the clamps that hold the vent hoses to the adapters on the access panels. – Disconnect the vent hoses from the adapters on the access panels.	Near the outboard end of the lower wing. Refer to Section 52-40.
(9)	Disconnect the bonding wire cable from the fuel tank access panel: – Remove the nut and washer from the bolt. – Remove the bonding strip from the bolt and move it clear of the tank. – Remove the bolt.	
(10)	Remove the fuel filler assembly: – Remove the fuel filler cap. – Remove the 8 screws that attach the filler flange to the to the fixing ring in the outer fuel chamber. – Remove the filler flange, the O-ring seal, the spacer ring and the fixing ring.	Note the location of the retaining cable. Discard the O-ring seal.

	Detail Steps/Work Items	Key Items/References
(11)	Remove the fuel tank assembly: – Remove the nut, washer and bolt that attaches the outer fuel chamber to the retaining bracket in the wing. – Gently pull the fuel tank assembly out of the wing through the wing root rib. Move the tank clear of the wing and support the tank on a clean workbench.	

B. Disassemble a Main Fuel Tank Assembly

	Detail Steps/Work Items	Key Items/References
(1)	Remove the fuel tank assembly that you will disassemble and support on a clean workbench.	Refer to Paragraph 2A.
(2)	Remove the connecting link that attach the inboard fuel chamber to the middle fuel chamber: – Remove the nuts, washers and bolts that attach each end of the link to the fuel chambers. – Move the link clear of the fuel chambers.	
(3)	Remove the connecting link that attach the middle fuel chamber to the outboard fuel chamber: – Remove the nuts, washers and bolts that attach each end of the link to the fuel chambers. – Move the link clear of the fuel chambers.	

	Detail Steps/Work Items	Key Items/References
(4)	Remove the vent connector hoses that connect the inboard fuel chamber to the middle fuel chamber: – Remove the hose clips from the 2 hoses. – Pull the hoses off the fuel chamber connectors and clear of the fuel chambers.	
(5)	Remove the vent connector hoses that connect the middle fuel chamber to the outboard fuel chamber: – Remove the hose clips from the 2 hoses. – Pull the hoses off the fuel chamber connectors and clear of the fuel chambers.	
(6)	Remove the flexible coupling that connects the inboard fuel chamber to the middle fuel chamber: – Remove the worm drive clamps from the flexible coupling. – Pull the flexible coupling off the fuel chamber connectors and clear of the fuel chambers.	
(7)	Remove the flexible coupling that connects the middle fuel chamber to the outboard fuel chamber: – Remove the worm drive clamps from the flexible coupling. – Pull the flexible coupling off the fuel chamber connectors and clear of the fuel chambers.	

3. Assemble/Install a Main Fuel Tank Assembly

A. Preparation

	Detail Steps/Work Items	Key Items/References
(1)	Examine the fuel chambers. Look specially for: – Damage to the skins and welded seams of the chambers. – Corrosion. – Damage/wear to the rubber mounting bands which go around the outside of the fuel chambers.	Use a x 10 magnifying glass.
(2)	Examine all the flexible hoses and couplings which connect the fuel chambers together. Look specially for: – Cuts or damage, specially at the ends where the clips and worm drive clamps locate. – Distortion or cracking.	
(3)	Examine the fuel filler flange on the outer fuel chamber. Look specially for: – Corrosion on the mating surfaces. – Cracking around the flange.	Use a strong light and x 10 magnifying glass.
(4)	Make sure that the insides of all the fuel chambers are clean.	

B. Assemble a Main Fuel Tank Assembly

	Detail Steps/Work Items	Key Items/References
(1)	Lay the fuel chambers on a clean workbench in the order in which you will assemble them.	
(2)	Install the flexible coupling that connects the outboard fuel chamber to the middle fuel chamber: – Push a flexible coupling over the large connector on the outboard fuel cell. – Move the middle fuel chamber towards the outer fuel chamber until the large connector engages with the open end of the flexible coupling. – Push the fuel chambers together until the flexible coupling is fully located of the fuel chamber connectors. – Install the worm drive clamps onto the flexible couplings.	
(3)	Install the flexible coupling that connects the inboard fuel chamber to the middle fuel chamber: – Push a flexible coupling over the large connector on the middle fuel chamber. – Move the inboard fuel chamber towards the middle fuel chamber until the large connector engages with the open end of the flexible coupling. – Push the fuel chambers together until the flexible coupling is fully located of the fuel chamber connectors. – Install the worm drive clamps onto the flexible couplings.	

	Detail Steps/Work Items	Key Items/References
(4)	Install the flexible vent hoses that connect the middle fuel chamber to the outboard fuel chamber: – Install 2 flexible hoses over the vent connectors on the outboard fuel chamber. – Install the other end of the 2 flexible hoses on the vent connectors of the middle fuel chamber. – Install the worm-drive-clamps onto the flexible hoses.	
(5)	Install the flexible vent hoses that connect the Inboard fuel chamber to the middle fuel chamber: – Install 2 flexible hoses over the vent connectors on the middle fuel chamber. – Install the other end of the 2 flexible hoses on the vent connectors of the inboard fuel chamber. – Install the worm drive clamps onto the flexible hoses.	

	Detail Steps/Work Items	Key Items/References
(6)	Install the connecting links that connect the fuel chambers together: – Move the link into position between the outboard fuel chamber and the middle fuel chamber. – Install the bolts, washers and nuts that attach the connecting link to the fuel chambers. – Move the link into position between the middle fuel chamber and the inboard fuel chamber. – Install the bolts, washers and nuts that attach the connecting link to the fuel chambers.	

C. Install a Main Fuel Tank Assembly

	Detail Steps/Work Items	Key Items/References
(1)	Move the fuel tank assembly into position in the wing.	Make sure that the tank assembly is correctly located in the wing.
(2)	Install the fuel filler assembly:	
	– Make sure that the mounting in the outboard fuel chamber is correctly aligned with the hole in the top surface of the wing.	If necessary, move the tank assembly to give the correct alignment.
	– Apply a thin layer of sealant to the contact area between spacer ring and tank filler mounting.	Use Hylomar Aerograde PL32M or Hylomar Aerograde Ultra PL32A.
	– Install the spacer ring onto the tank filler mounting.	
	– Install a new O-ring seal in position on the top surface of the wing.	
	– Apply a thin layer of sealant to the contact area between the ring for filler cap and the spacer ring.	Use Hylomar Aerograde PL32M or Hylomar Aerograde Ultra PL32A.
	– Put the ring for filler cap in position over the filler flange.	
	– Install the retaining cable.	At the position noted in Paragraph 2 A, step 10.
	– Install the 8 screws which attach the fuel filler to the outboard fuel chamber.	Finger tight only.
	– When all 8 screws are installed, then tighten the screws.	Tighten opposite screws.
	– Remove any excess sealant squeeze-out from the fuel filler assembly.	CAUTION: FAILURE TO DO SO COULD LEAD TO FUEL CONTAMINATION
(3)	Install the bolt, washer and nut that attaches the bracket at the outboard end of the outboard fuel chamber to the bracket in the wing.	

	Detail Steps/Work Items	Key Items/References
(4)	Install the bonding strip at the inboard end of the tank assembly: – Install the bolt through the bracket on the fuel chamber and the bonding strip. – Install the washer and nut onto the bolt.	
(5)	Connect the 2 vent hoses to the adapters on the fuel tank access panel: – Push the vent hoses onto the adapters on the access panels. – Install the hose clips that hold the hoses.	
(6)	Connect the bonding cable to the fuel tank access panel: – Install the bolt through the bonding cable and the bonding bracket. – Install the washer and nut onto the bolt.	
(7)	Connect the electrical connector for the fuel quantity probe at the inboard end of the outer fuel chamber:	At the inline connector.
(8)	Install the fuel tank access panel at wing root rib: – Move the access panel into position over the studs. – Install the 11 washers and nuts that attach the panel to the wing root rib.	

	Detail Steps/Work Items	Key Items/References
(9)	Install the fuel drain valve on the lower surface of the inboard fuel chamber: – Install a new seal onto the fuel drain. – Install the drain valve into the lower surface of the fuel chamber. – Secure the drain valve with lock-wire.	Torque: 1 - 3 Nm (0.73 - 2.21 lbf.ft.).
(10)	Install the wing assembly onto the airplane.	Refer to Section 57-10.
(11)	Refuel or transfer fuel into the wing tank assembly that you removed and do a test for fuel leaks. Look specially at the hose connections and around the fuel filler assembly.	Refer to Section 12-10.
(12)	Install all the fuel tank access panels in the lower surface of the wing.	Refer to Section 52-40.
(13)	Do an engine ground run up. Make sure that: – Both engines can be supplied with fuel from the fuel tank assembly that you installed. – Make sure that the fuel quantity and temperature indications operate correctly. – Make sure that the LOW FUEL caution on the integrated cockpit system display panel operates at the correct fuel level.	Refer to Chapter 71-00.

4. Remove/Install an Auxiliary Fuel Tank (Optional Equipment, OÄM 42-056)

A. Remove an Auxiliary Fuel Tank

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the auxiliary fuel tank that you will remove is empty.	Defuel and drain the auxiliary fuel tank.
(2)	Remove the auxiliary fuel tank access panel from the engine nacelle: – Remove the 8 screws that attach the access panel to the nacelle. – Disconnect the vent line and the drain line (coming from the drip tray) from the connectors on the access panel. – Move the access panel clear of the nacelle.	
(3)	Disconnect the electrical connector for the fuel level switch at the rearward end of the fuel chamber.	
(4)	Disconnect the fuel line from the tank outlet.	
(5)	Disconnect the bonding strip from the cooler bracket.	
(6)	Remove the fuel filler assembly: – Open the access door to the fuel filler cap. – Remove the fuel filler cap. – Remove the 3 screws that attach the cover plate to the drip tray. – Remove the cover plate with the connection pipe.	
(7)	Remove the bolt, washer and nut which closes the metal strap on the rear attachment rib.	Hold the tank.
(8)	Disconnect the front bonding cable at the connection point, in the chamber below the tank compartment.	Accessible through the inspection cover below the tank filler.

	Detail Steps/Work Items	Key Items/References
(9)	Disconnect the 2 vent hoses at the front wall of the auxiliary fuel tank: – Gently move the tank rearward a small distance. – Pull the vent lines off the connectors on the tank.	Through the hole for the drip tray.
(10)	Remove the fuel tank assembly: – Gently pull the auxiliary fuel tank assembly out of the nacelle in a rearward and downward direction. – Move the tank clear of the nacelle and support it on a clean workbench.	

B. Install an Auxiliary Fuel Tank

	Detail Steps/Work Items	Key Items/References
(1)	Install the fuel tank assembly: – Gently move the auxiliary fuel tank assembly into the nacelle in an upward and forward direction.	Do not move the tank fully forward (see next item).
(2)	Connect the 2 vent hoses at the front wall of the auxiliary fuel tank: – Connect the vent lines to the connectors on the tank. – Gently move the tank fully forward.	Through the hole for the drip tray.
(3)	Connect the front bonding cable at the connection point, in the chamber below the tank compartment.	Accessible through the inspection cover below the tank filler.
(4)	Install the bolt, washer and nut which closes the metal strap on the rear attachment rib.	

	Detail Steps/Work Items	Key Items/References
(5)	Install the fuel filler assembly: – Lubricate thread of connection pipe. – Assemble the cover plate with the connection pipe. – Lubricate outer surface of connection pipe. – Seal the flange of the cover plate to the drip tray. – Install cover plate connection pipe assembly. – Install the 3 screws that attach the cover plate to the drip tray. – Install the fuel filler cap. – Close the access door to the fuel filler cap.	 Use EZ-Turn (Fuel Lube). Use EZ-Turn (Fuel Lube). Use Down Corning 732.
(6)	Connect the bonding strip to the cooler bracket.	
(7)	Connect the fuel line to the tank outlet.	
(8)	Connect the electrical connector for the fuel level switch at the rearward end of the fuel chamber.	
(9)	Install the auxiliary fuel tank access panel to the engine nacelle: – Move the access panel in place on the nacelle. – Connect the vent line and the drain line (coming from the drip tray) to the connectors on the access panel. – Install the 8 screws that attach the access panel to the nacelle.	
(10)	Refuel the auxiliary fuel tank.	
(11)	Check auxiliary fuel tank assembly for leakage.	

Section 28-20
Fuel Distribution

1. General

This Section tells you about the fuel distribution system for the DA 42 airplane. The fuel distribution system supplies fuel from the fuel tanks to the engines. This Section tells you about the components and equipment which make the fuel distribution system. These are the components of the fuel distribution system:

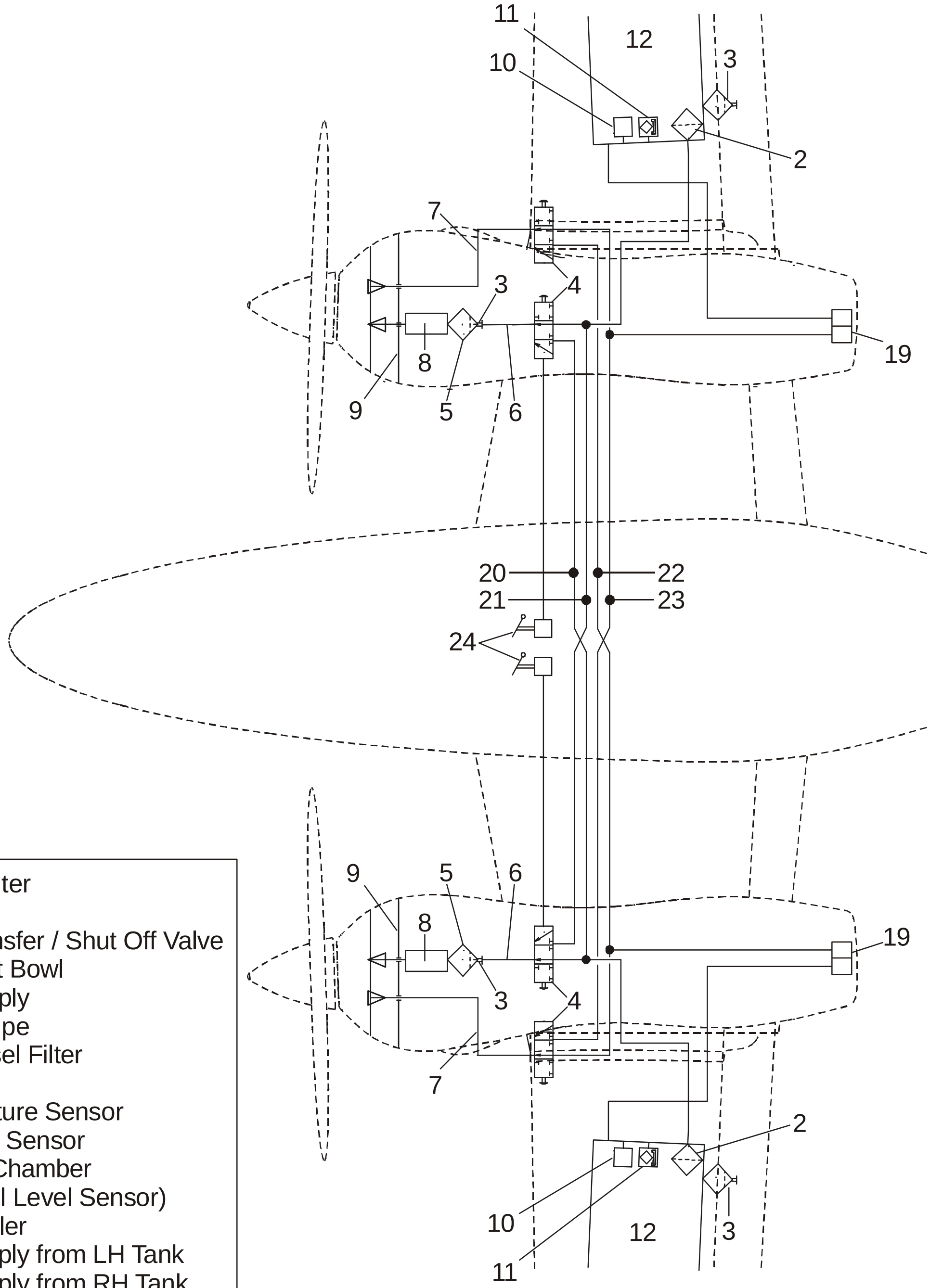
– Flexible fuel hoses.

– Fuel transfer/shut-off valves.

– Fuel filters.

– Fuel coolers.

Refer to Section 28-00 for a general description of the fuel system and for the schematic diagram of the fuel system.



- 2 Finger Filter
- 3 Drain
- 4 Fuel Transfer / Shut Off Valve
- 5 Sediment Bowl
- 6 Fuel Supply
- 7 Return Pipe
- 8 TAE Diesel Filter
- 9 Firewall
- 10 Temperature Sensor
- 11 Low Fuel Sensor
- 12 Inboard Chamber (with Fuel Level Sensor)
- 19 Fuel Cooler
- 20 Fuel Supply from LH Tank
- 21 Fuel Supply from RH Tank
- 22 Fuel Return from RH Engine
- 23 Fuel Return from LH Engine
- 24 Fuel Selector Lever

Figure 1: Fuel Distribution System Schematic without Auxiliary Tanks

2. Description

A. Normal Operation

Figure 1 shows the schematic diagram of the fuel distribution system for the DA 42 airplane when the auxiliary tanks are not installed. Figure 2 shows the schematic diagram with the auxiliary fuel tanks installed. Figure 3 shows the items connecting the fuel tank to the main fuel tank.

A flexible hose connects the fuel tank outlet to the fuel transfer/shut-off valve. The fuel transfer/shut-off valve is located in the related engine nacelle, rear of the engine firewall. A lever in the cockpit center console controls the fuel transfer/shut-off valve via a mechanical drive system. The fuel transfer/shut-off valve connects to the fuel filter assembly. A drain valve is located in the bottom of the fuel filter assembly. The bottom of the fuel filter assembly forms the sediment bowl.

The fuel filter assembly connects to a fuel bulkhead connector on the engine firewall. A flexible hose connects the bulkhead connector to the engine fuel system.

A flexible hose connects the engine fuel system return line to another bulkhead connector located on the engine firewall. A flexible fuel return hose connects the bulkhead connector to the return line of the fuel transfer/shut-off valve. Another flexible hose connects the return of the fuel transfer/shut-off valve to the right fuel tank return system.

During normal operation the fuel returning from the left engine will flow through the left fuel cooler and back into the left fuel tank. Flexible hoses connect the fuel cooler into the fuel return system. The fuel cooler is located in the rear of the engine nacelle. A NACA duct in the lower surface of the rear engine nacelle supplies air for the fuel cooler. A shroud around the fuel cooler guides the air from the NACA duct through the matrix of the fuel cooler. The air from the cooler flows out from the nacelle through air outlets at the rear of the nacelle.

If the optional auxiliary fuel tank is installed (OÄM 42-056), a flexible hose runs from the outlet of the auxiliary tank to the fuel transfer pump. Another flexible hose runs from the outlet of the fuel transfer pump via the solenoid valve and a check valve to a T-piece which feeds the auxiliary fuel into the return fuel circuit.

The solenoid valve and the check valve prevent a backflow of the cooled return fuel from the engine into the auxiliary fuel tank. To protect the solenoid valve from contamination an inline filter is installed in the fuel transfer line direct at the outlet of the fuel transfer pump.

A check valve prevents the auxiliary fuel from being pumped into the fuel cooler.

B. Fuel Transfer Operation

When the left engine fuel transfer/shut-off valve is set to CROSSFEED the fuel for the left engine is taken from the right fuel tank. A flexible hose from the left fuel transfer/shut-off valve connects to the supply system of the right fuel tank. Another flexible hose connects the return port of the left fuel transfer/shut-off valve to the right return system of the right fuel tank. The right engine fuel transfer system is similar.

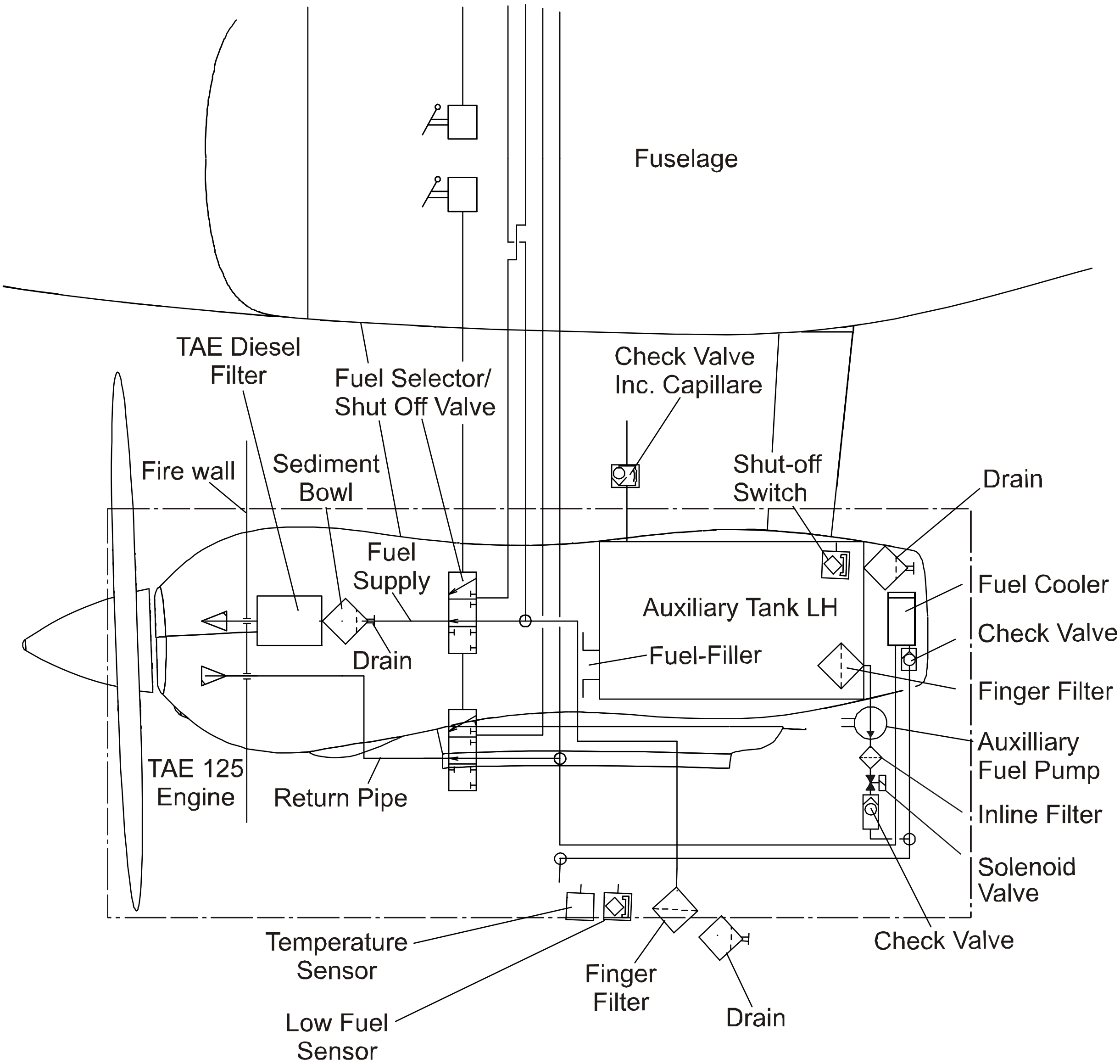


Figure 2: Fuel Distribution System Schematic with Auxiliary Tanks (OÄM 42-056)

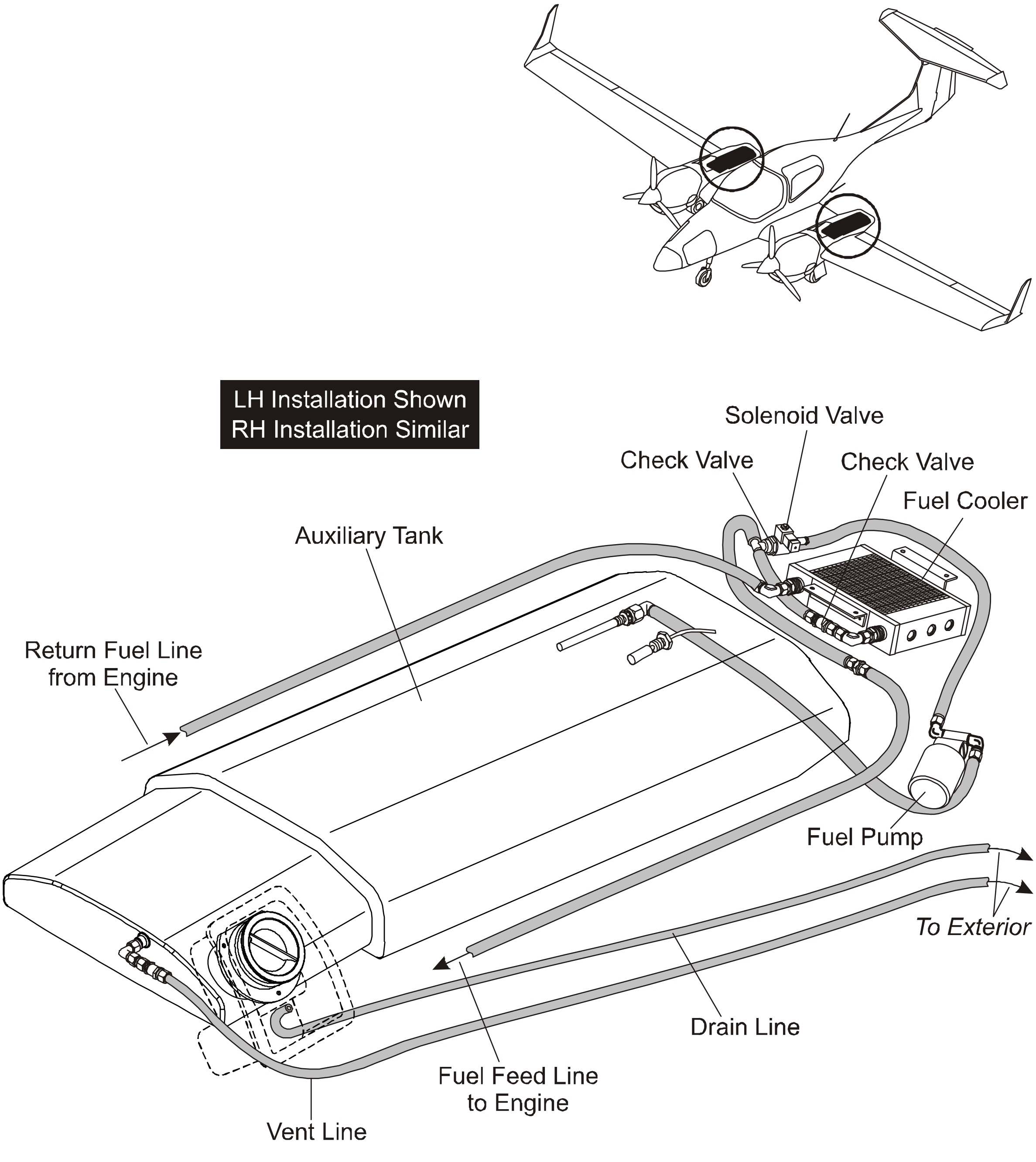


Figure 3: Auxiliary Fuel Supply to the Main Fuel Tank

3. Fuel Distribution System Components

A. Flexible Hoses

The fuel system uses synthetic flexible hoses. The flexible hoses in the engine bay have integral fire-protection sleeves.

You must only use approved flexible hoses in the fuel system which have been pressure tested.

B. Fuel Transfer/Shut-Off Valves

Figure 4 shows a fuel transfer/shut-off valve installation. A fuel transfer/shut-off valve is located in each engine nacelle, aft of the engine firewall. A long shaft connects the valve to a drive unit located under the cockpit floor. A lever connects the drive unit to a fuel selector lever. The selector levers for both fuel transfer/shut-off valves are mounted in the cockpit center console. Each lever has these positions:

(1) ON

If you set the engine fuel selector levers to the ON position both engines will be take fuel from their related fuel tanks. For example, the left engine will take fuel from the left fuel tank and the right engine will take fuel from the right fuel tank.

(2) CROSSFEED

If you set an engine fuel selector lever to the CROSSFEED position the engine will be take fuel from the opposite fuel tank. For example, if you set the left fuel selector lever to CROSSFEED and the right fuel control lever to ON then both engines will take fuel from the right fuel tank. If you set the right fuel selector lever to CROSSFEED and the left selector lever to ON then both engines will take fuel from the left fuel tank.

(3) SHUT-OFF

If you set an engine fuel selector to the SHUT-OFF position then the fuel supply to that engine will be shut-off and the engine will not run. Each lever has a safety guard located on the lever console to prevent accidental selection of the SHUT-OFF position. You must turn the safety guard before you can move the related fuel selector lever to the SHUT-OFF position. The other engine fuel selector lever will operate as normal.

For example, if you set the left fuel selector lever to SHUT-OFF and the right fuel selector lever to ON the left engine takes no fuel and the right engine takes fuel from the right fuel tank. If the right selector lever is moved to CROSSFEED then the right engine will take fuel from the left fuel tank.

C. Fuel Filter Assembly

Figure 5 shows a fuel filter assembly. The fuel filter assembly is installed in the engine nacelle and is accessible through the inspection panel on the lower inboard side.

The bottom of the fuel filter assembly acts as fuel sediment bowl. The sediment bowl collects any sediment in the fuel supply system. A drain is installed in the bottom of the sediment bowl. Use this drain to drain fuel from the fuel distribution system and for draining fuel when you will do a test for fuel contamination.

You can remove the filter element for cleaning/replacement.

D. Fuel Cooler

Figure 6 shows a fuel cooler. A fuel cooler for each fuel return system is located in the rear of each engine nacelle. Flexible hoses connect the fuel cooler to the fuel return line and the related fuel tank. Air for the cooler flows in through a NACA duct in the lower surface of the nacelle. The outlet for the cooling air is on the rear face of the engine nacelle.

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Trouble-Shooting

1. General

The table below lists the trouble you could have with the fuel distribution system. If you have the trouble detailed in the Trouble column then read across to the Probable Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
The airplane smells of fuel.	Hose/pipe leaking.	Examine all hoses and pipes. Replace damaged or defective components.
	Loose connection.	Examine all connections. Tighten loose connections.
	Component leaking.	Examine all components. Replace defective components.

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Maintenance Practices

1. General

This Section gives you the Maintenance Practices for the fuel distribution system. The procedures are limited to the removal/installation of the main components of the system.

Obey the safety precautions for fuel at all times.

WARNING: DO NOT GET FUEL ON YOUR SKIN. FUEL CAN CAUSE SKIN DISEASE.

WARNING: DO NOT ALLOW FIRE NEAR FUEL. FUEL BURNS AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

WARNING: DO NOT BREATHE THE FUEL VAPOR. FUEL VAPOR CAN MAKE YOU ILL.

2. Remove/Install a Fuel Transfer/Shut-Off Valve

Obey the safety precautions for fuel at all times.

A. Remove a Fuel Transfer/Shut-Off Valve

	Detail Steps/Work Items	Key Items/References
(1)	Defuel the airplane.	Refer to Section 12-10.
(2)	Remove the access panels from the related engine nacelle, aft of the bulkhead that give access to the fuel transfer/shut-off valve.	Refer to Section 52-40.
(3)	Remove the engine cowlings for the related engine.	Refer to Section 71-10.

	Detail Steps/Work Items	Key Items/References
(4)	Drain the fuel from the fuel distribution system: – Set the related FUEL SELECTOR lever in the cockpit to the related engine until fuel stops draining from the fuel sediment bowl drain. – Set the related FUEL SELECTOR lever in the cockpit to the CROSSFEED position until fuel stops draining from the fuel sediment bowl drain. – Set the related FUEL SELECTOR lever in the cockpit to the SHUT-OFF position.	Use a suitable container. Use the drain valve on the fuel sediment bowl.
(5)	Disconnect these fuel connections at the fuel transfer/shut-off valve: – The fuel supply to the engine. – The fuel return from the engine. – The fuel supply from the related fuel tank. – The fuel supply from the opposite fuel tank. – The fuel return to the related fuel tank. – The fuel return to the opposite fuel tank.	Refer to Figure 4. Put caps on all the open fuel connections.
(6)	Remove the fuel transfer/shut-off valve from the bulkhead: – Remove the 4 bolts and washers that attach the valve to the mounting bracket. – Move the valve clear of the mounting bracket and pull the valve off the valve drive-tube assembly. – Move the fuel transfer/shut-off valve clear of the engine nacelle.	

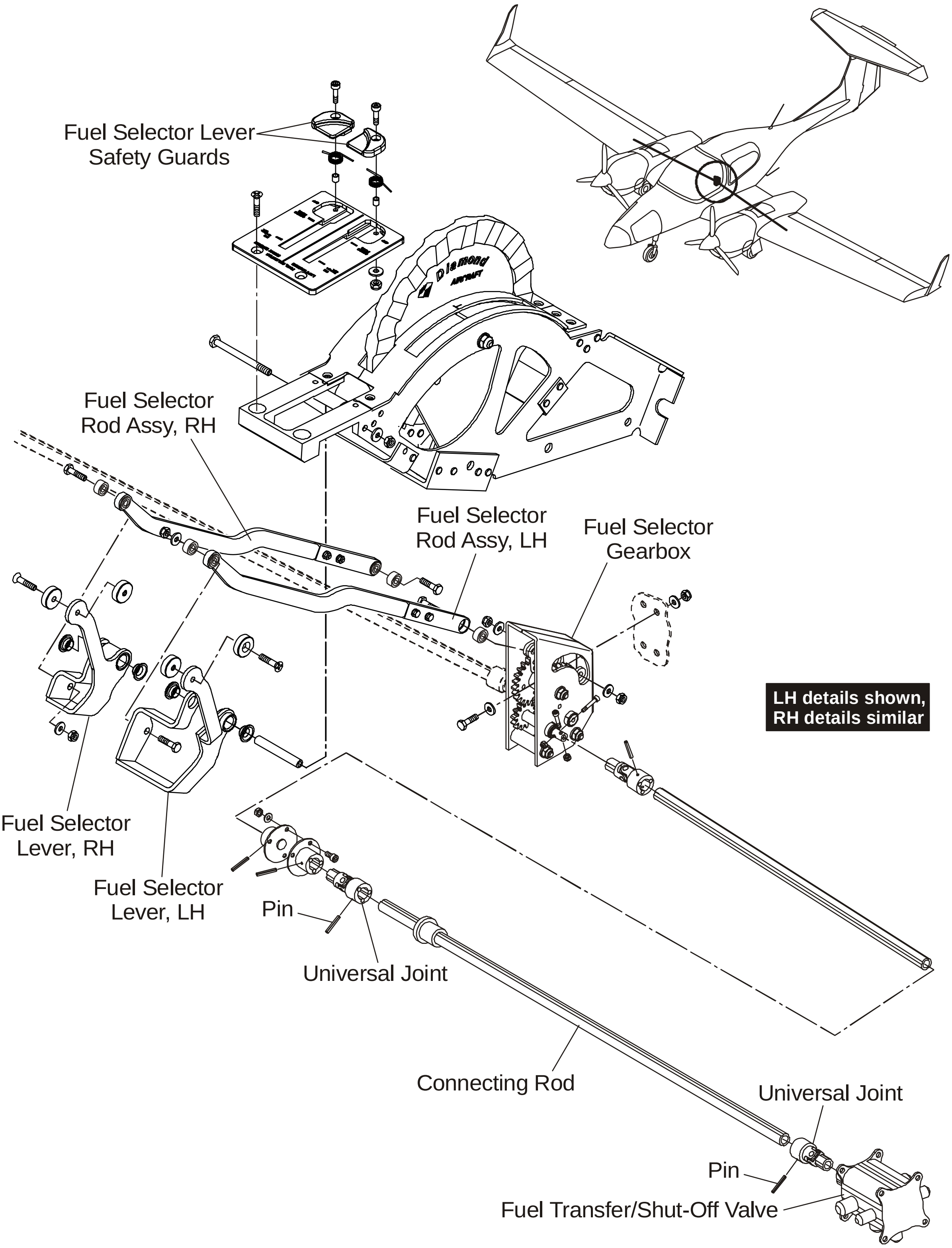

Figure 4: Fuel Transfer/Shut-Off Valve Installation

B. Install a Fuel Transfer/Shut-Off Valve

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the related FUEL SELECTOR lever in the cockpit is set to SHUT-OFF.	In the cockpit.
(2)	Set the fuel transfer/shut-off valve to the shut-off position.	
(3)	Install the fuel transfer/shut-off valve: – Hold the valve in the shut-off position and move the valve into position over the valve drive-tube assembly. – Locate the fuel transfer/shut-off valve on the mounting bracket. – Install the 4 bolts and washers that attach the fuel transfer/shut-off valve to the bracket.	
(4)	Connect these fuel connections at the fuel transfer/shut-off valve: – The fuel supply to the engine. – The fuel return from the engine. – The fuel supply from the related fuel tank. – The fuel supply from the opposite fuel tank. – The fuel return to the related fuel tank. – The fuel return to the opposite fuel tank.	Make sure that all the caps are removed from the connections. Make sure that all the fuel hoses are connected to the correct transfer/shut-off valve connectors.
(5)	Refuel the airplane.	Refer to Section 12-10.
(6)	Bleed both engine fuel distribution systems.	Refer to Paragraph 8.
(7)	Do a test for fuel leaks at these connections: – The inlet from the related fuel tank. – The inlet from the opposite fuel tank.	
(8)	Do a test for correct operation of the fuel transfer/shut-off valve.	Refer to Paragraph 10.

	Detail Steps/Work Items	Key Items/References
(9)	Install the access panels that you removed.	Refer to Section 52-40.
(10)	Install the engine cowlings that you removed.	Refer to Section 71-10.
(11)	Do an engine ground run up. Make sure that the fuel system operates correctly.	

3. Remove/ Install the Fuel Selector Gearbox

A. Remove the Fuel Selector Gearbox

Refer to Figure 4.

	Detail Steps/Work Items	Key Items/References
(1)	Remove pilot’s and co-pilot’s seat.	Refer to Section 25-10.
(2)	Remove center console between the pilot’s and the co-pilot’s seat.	
(3)	Remove knobs from the fuel selector levers.	
(4)	Remove fuel selector cover plate.	
(5)	Push LH fuel selector lever into ON position.	Make sure that the fuel selector valve is engaged in the ON position.
(6)	Mark the ON position on the outer connecting rod (splined tube, which connects the fuel selector gearbox with the fuel selector valve) directly at the bushing in the fuselage wall.	
(7)	Pull fuel selector lever into CROSSFEED position.	Make sure that the fuel selector valve is engaged in the CROSSFEED position.
(8)	Mark the CROSSFEED position on the outer connecting rod directly at the bushing in the fuselage wall.	
(9)	Pull the fuel selector lever into the OFF position.	Make sure that the fuel selector valve is engaged in the OFF position.
(10)	Mark the OFF position on the outer connecting rod directly at the bushing in the fuselage wall.	
(11)	Repeat steps. 5 to 10 for the RH fuel selector lever.	
(12)	Push both fuel selector levers into the ON position.	Make sure that the fuel selector valves are engaged in the ON position. This is the necessary position for adjustment when the new fuel selector valve will be installed.
(13)	Remove crash element above the fuel selector gearbox.	

	Detail Steps/Work Items	Key Items/References
(14)	Disconnect the fuel selector push rods (rods between fuel selector levers and fuel selector gearbox) directly at the fuel selector gear box.	
(15)	Disconnect the LH inner connecting rod from the outer connecting rod.	Open the three bolts at the connection element below the outer crash element.
(16)	Disconnect the RH inner connecting rod from the outer connecting rod.	Open the three bolts at the connection element below the outer crash element.
(17)	Disconnect both inner connecting rods from the fuel selector gearbox.	Open the bolts at the universal joint.
(18)	Remove the fuel selector gearbox.	Open both bolts of the attachment brackets and the bolt which attaches the fuel selector gearbox to the main spar.

B. Install the Fuel Selector Gearbox

Refer to Figure 4.

	Detail Steps/Work Items	Key Items/References
(1)	Bring fuel selector gearbox in position between the attachment brackets.	
(2)	Attach the fuel selector gearbox to both brackets with the bolts on the bottom of the gearbox.	
(3)	Attach the gearbox to the main spar.	
(4)	Connect the fuel selector push rods to the fuel selector gearbox.	
(5)	Install fuel selector cover.	
(6)	Push both fuel selector levers fully forward into the ON position.	Make sure that the length of the push rods is proper to reach the most forward position at the fuel selector gearbox. If necessary adjust the length of the push rods at the designated point. Old push rods are not adjustable. If necessary, exchange these push rods with new ones. Make sure that the fuel selector valve is engaged in the ON position. For reference use marking on the outer push rod directly at the bushing in the fuselage wall.
(7)	Exchange the drilled part of the connection element between the connecting rods with a new undrilled part.	For adjustment of the fuel selector valve positions in accordance with the fuel selector lever positions new holes must be drilled.
(8)	Connect the inner connecting rods to the fuel selector gearbox.	
(9)	Bring both parts of the LH connection element between the connecting rods into position.	
(10)	Mark the position of both parts of the connection element in relation to each other.	

	Detail Steps/Work Items	Key Items/References
(11)	Remove both parts of the connection element.	
(12)	Drill holes in the undrilled part of the connection element.	Use drilled part of the connection element in the marked position as template.
(13)	Install both parts of the connection element.	
(14)	Connect both parts of the connection element with the three bolts.	
(15)	Repeat steps 9 to 14 for the RH connection element.	
(16)	Do a functional test of the fuel selector valve.	Pull fuel selector levers into all positions. Make sure that the fuel selector valve is engaged in the respective positions using the marking at the bushing in the fuselage wall as reference.
(17)	Bond new crash element onto the fuel selector gearbox using bonding paste.	Refer to Section 51-20.
(18)	Install center console between the pilot's and the co-pilot's seat.	
(19)	Install pilot's and co-pilot's seat.	Refer to Section 25-10.

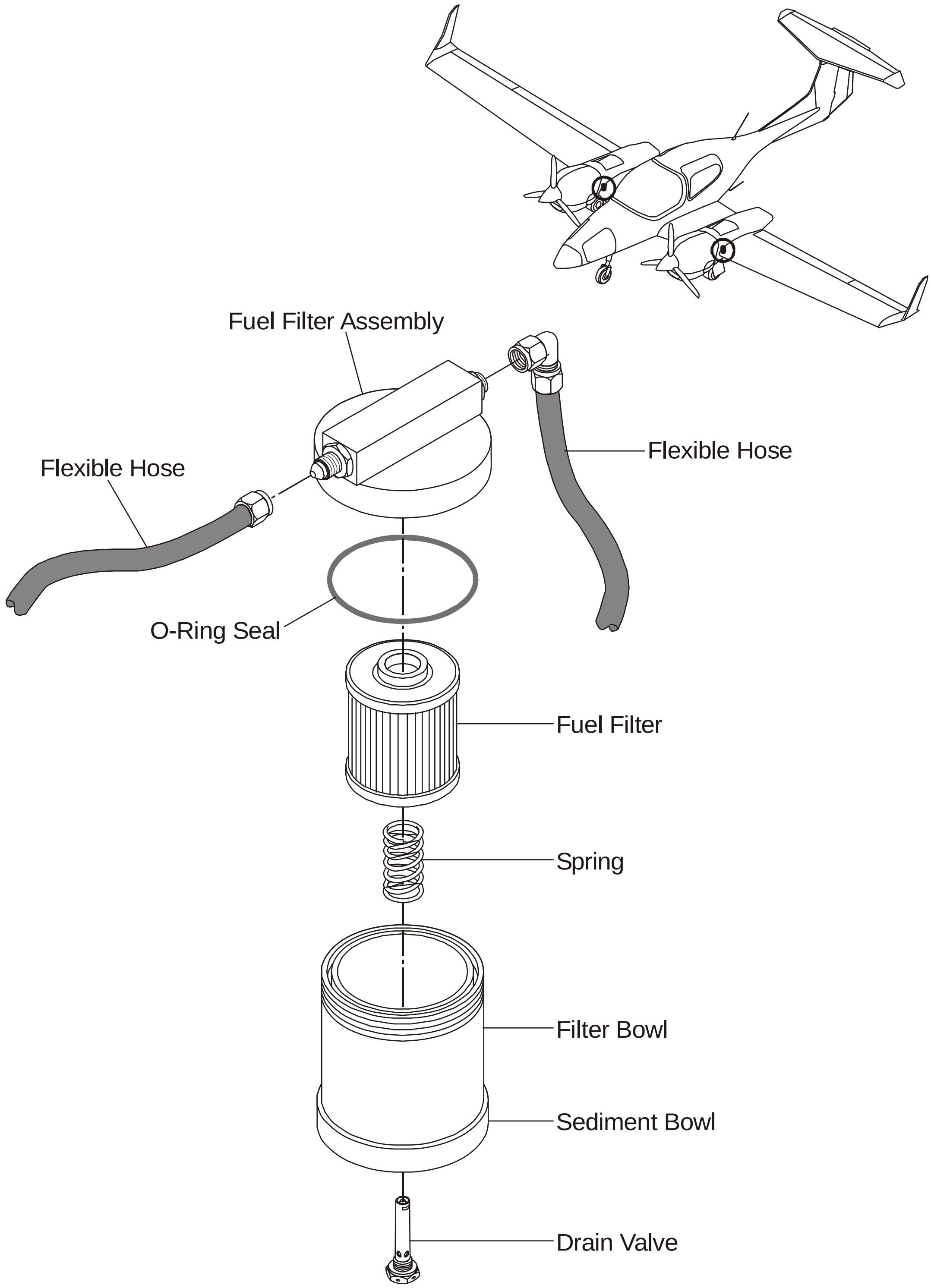

Figure 5: Fuel Filter Assembly

4. Remove/Install the Fuel Filter Element

Obey the safety precautions for fuel at all times.

A. Remove the Fuel Filter Element

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the related FUEL SELECTOR lever is set to SHUT-OFF.	In the cockpit.
(2)	Remove the fuel filter element:	Refer to Figure 5.
	– Drain the fuel from the fuel distribution system.	From the fuel sediment bowl drain. Use a suitable container to catch spilt fluid.
	– Remove the safety wire from the filter bowl.	
	– Unscrew the filter bowl from the filter assembly.	The bowl will contain fuel!
	– Move the bowl and filter assembly clear of the engine nacelle and pour the fuel from the filter bowl into a suitable container.	
	– Remove the filter element from the filter bowl.	
	– Remove and retain the spring from the filter bowl.	
	– Remove and discard the O-ring seal from the fuel filter assembly.	

B. Install the Fuel Filter Element

	Detail Steps/Work Items	Key Items/References
(1)	Install a new O-ring seal into the filter assembly.	Refer to Figure 5.
(2)	Install the filter element into the filter bowl: – Put the spring into position in the filter bowl. – Install the new/clean filter element into the filter bowl. – Move the filter bowl into position at the filter assembly and screw the filter bowl onto the filter assembly.	 Make sure that the spring is located correctly. Make sure that the filter is seated on the spring correctly. Make sure that the O-ring seal is located correctly.
(3)	Secure the filter bowl to the filter assembly with lock-wire.	
(4)	Do a test for leaks of the filter assembly: – Make sure that there is fuel in the related fuel tank. – Set the FUEL SELECTOR lever to the related tank. – Examine the filter bowl assembly for leaks.	
(5)	Bleed the related fuel distribution system.	Refer to Paragraph 8.

5. Clean an Engine Fuel Sediment Bowl

Obey the safety precautions for fuel at all times.

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the related FUEL SELECTOR lever is set to SHUT-OFF.	In the cockpit.
(2)	Drain the fuel from the fuel sediment bowl: – Push up the drain valve and drain the fuel from the sediment bowl. – When the fuel stops flowing release the fuel drain valve.	 Use a suitable container to catch spilt fuel.
(3)	Remove the fuel sediment bowl from the fuel filter assembly and flush the inside of the bowl with clean fuel.	
(4)	Install the fuel sediment bowl to the fuel filter assembly.	
(5)	Bleed the related fuel distribution system.	Refer to Paragraph 8.
(6)	Do a test for leaks at the fuel sediment bowl: – Make sure that there is fuel in the related fuel tank. – Make sure that the FUEL SELECTOR lever is set to the related engine. – Examine the fuel sediment bowl for leaks.	

6. Test a Fuel Check Valve in the Engine Fuel Return Line

Obey the safety precautions for fuel at all times.

CAUTION: YOU MUST REPLACE THE CHECK VALVE IF THE TEST FAILS.

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that there is fuel in the related fuel tank.	
(2)	Disconnect the related fuel return line where the flexible fuel hose connects to the engine fuel return connector.	Put a blank on the engine return fuel connector.
(3)	Connect an external fuel pump to the open hose connector.	
(4)	Switch the external fuel pump ON.	The external fuel pump must NOT draw any fuel.
(5)	Switch the external fuel pump OFF.	
(6)	Disconnect the hose from the external fuel pump.	
(7)	Re-connect the flexible fuel hose to the engine fuel return connector.	
(8)	Bleed the related engine fuel distribution system.	Refer to Paragraph 8.

7. Remove/Install a Fuel Cooler

Obey the safety precautions for fuel at all times.

A. Remove a Fuel Cooler

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the related FUEL SELECTOR lever is set to SHUT-OFF.	In the cockpit.
(2)	Remove the access panel for the fuel cooler: – Remove the screws that attach the panel to the lower surface of the engine nacelle. – Move the access panel clear of the nacelle.	At the rear of the engine nacelle. On the lower surface of the nacelle. Support the panel.
(3)	Disconnect the flexible hoses that connect to the fuel cooler.	Refer to Figure 6. Use a suitable container to catch spilt fuel. Put caps on all open connections.
(4)	Remove the fuel cooler: – Remove the 4 bolts and washers that attach the fuel cooler to the mounting brackets. – Lower the cooler from the mounting brackets and clear of the engine nacelle. – Empty the fuel from the cooler into a suitable container.	Support the cooler. Take care! The cooler will contain fuel!

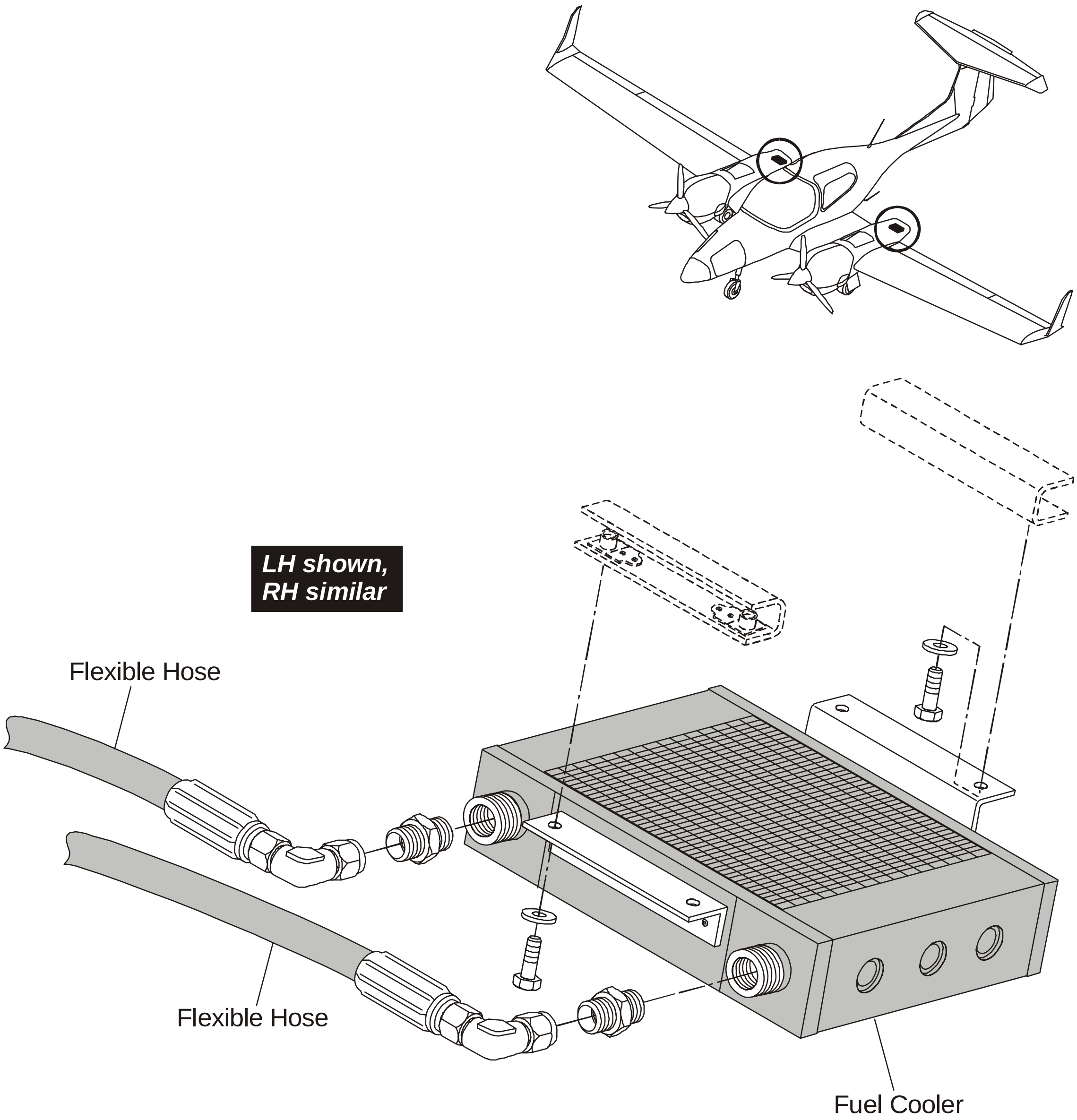

Figure 6: Fuel Cooler Installation

B. Install a Fuel Cooler

	Detail Steps/Work Items	Key Items/References
(1)	Install the fuel cooler: – Move the fuel cooler into position in the engine nacelle. – Align the cooler with the mounting brackets and install the 4 bolts and washers that attach the fuel cooler to the brackets.	
(2)	Connect the flexible hoses to the fuel cooler.	Make sure that you remove all the blanking caps.
(3)	Bleed the related fuel distribution system.	Refer to Paragraph 8.
(4)	Do a test for leaks. Specially at the flexible hose connections to the fuel cooler.	
(5)	Install the fuel cooler access panel: – Move the access panel into position at the rear of the engine nacelle, lower surface. – Install the screws that attach the access panel to the engine nacelle.	

8. Bleed the Fuel Distribution System

Obey the safety precautions for fuel at all times.

A. Equipment

Item	Quantity	Part Number
External fuel pump with power supply.	1	-
25 liter (6.6 US gal) waste fuel container.	1	Commercial.

B. Procedure

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that both engine FUEL SELECTOR levers are set to SHUT-OFF.	In the cockpit.
(2)	Disconnect the fuel hose from the intake side of the related engine low-pressure pump. – Cut the lock wire at the hose connection. – Put a cap on the pump intake connector.	At the upper right side of the engine.
(3)	Connect the open fuel hose to an external fuel pump.	
(4)	Set the related engine FUEL SELECTOR lever to the related engine.	
(5)	Bleed the fuel distribution system: – Switch the external fuel pump ON and pump fuel into a suitable container until fuel with no air is pumped. – Set the related engine FUEL SELECTOR lever to CROSSFEED and continue pumping fuel into the container until fuel with no air is pumped.	
(6)	Switch the external fuel pump to OFF.	
(7)	Disconnect the fuel hose from the external fuel pump.	
(8)	Reconnect the fuel hose to the intake side of the related engine low pressure fuel pump.	

	Detail Steps/Work Items	Key Items/References
(9)	Secure the fuel hose with new lock wire.	
(10)	If necessary, do steps 2 thru 8 for the other engine.	

9. Test the Crossfeed Position of a Fuel Selector Valve

	Detail Steps/Work Items	Key Items/References
(1)	Do the preparation for an engine test.	Refer to Section 71-00.
(2)	Start the related engine.	On the side of the fuel selector valve that you want to test. Refer to Section 71-00. Make sure that the fuel selector valve is in the ON position.
(3)	Set the fuel selector valve that you want to test in the CROSSFEED position.	
(4)	Let the engine idle for 1 minute.	Refer to Section 71-00.
(5)	Set the related power lever to 100% and keep this position for 1 minute.	Keep the engine temperature in view. Do not continue the test if the engine temperature rises too high.
(6)	Make sure that the engine does not stop.	If the engine stops, then the CROSSFEED system is defective. Correct the fault and do the test again.
(7)	Shut the engine down.	Refer to Section 71-00.

10. Test the Fuel Shut-Off System

CAUTION: DO THIS TEST ONLY WHEN REQUIRED WITHIN THE MAINTENANCE CHECKS. DO NOT PERFORM THIS TEST BETWEEN THE SCHEDULED TIME INTERVALS. THE HIGH PRESSURE PUMP CAN BE OVERSTRAINED.

	Detail Steps/Work Items	Key Items/References
(1)	Do the preparation for an engine test.	Refer to Section 71-00.
(2)	Start the related engine.	On the side of the shut-off system that you want to test. Refer to Section 71-00.
(3)	Let the engine idle for 2 minutes.	Refer to Section 71-00.
(4)	Set the related engine FUEL SELECTOR lever to SHUT-OFF.	The engine must stop.
(5)	Redo items 2 thru 5 for the other engine fuel shut-off system.	

11. Remove/Install an Inline Filter

Obey the safety precautions for fuel at all times.

A. Remove an Inline Filter

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the auxiliary fuel tank is empty.	Defuel and drain the auxiliary fuel tank.
(2)	Remove the auxiliary fuel tank access panel from the engine nacelle: – Remove the 8 screws that attach the access panel to the nacelle. – Disconnect the vent line and the drain line (coming from the drip tray) from the connectors on the access panel. – Move the access panel clear of the nacelle.	
(3)	Disconnect the fuel transfer line from the auxiliary fuel pump outlet.	
(4)	Remove the inline filter.	Filter is inserted in the fuel transfer line.

B. Install an Inline Filter

	Detail Steps/Work Items	Key Items/References
(1)	Insert the inline filter into the fuel transfer line.	Directly at the auxiliary tank outlet connection fitting.
(2)	Connect the fuel transfer line to the auxiliary fuel pump outlet.	
(3)	Refuel the auxiliary fuel tank.	Fill more than 2 US gal of fuel into the auxiliary tank.
(4)	Perform a test of the auxiliary fuel transfer system.	Refer to Paragraph 13.
(5)	Check auxiliary fuel tank assembly for leakage.	
(6)	Install the auxiliary fuel tank access panel to the engine nacelle: – Move the access panel in place on the nacelle. – Connect the vent line and the drain line (coming from the drip tray) to the connectors on the access panel. – Install the 8 screws that attach the access panel to the nacelle.	

12. Remove/Install an Auxiliary Tank Fuel Pump

Refer to Figure 3.

A. Remove an Auxiliary Tank Fuel Pump

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the auxiliary fuel tank is empty.	Defuel and drain the auxiliary fuel tank.
(2)	Remove the auxiliary fuel tank access panel from the engine nacelle: – Remove the 8 screws that attach the access panel to the nacelle. – Disconnect the vent line and the drain line (coming from the drip tray) from the connectors on the access panel. – Move the access panel clear of the nacelle.	
(3)	Disconnect the electrical connector of the auxiliary fuel pump.	
(4)	Remove the bolt from the p-clamp.	
(5)	Disconnect the fuel line from the auxiliary fuel pump.	
(6)	Move the auxiliary fuel pump clear of the nacelle.	

(7)	Disassemble the auxiliary fuel pump:
	– Remove the fuel fitting.
	  – Remove the bolt of the bonding wire.
	  – Remove the drain plug and the top plug.	

B. Install an Auxiliary Tank Fuel Pump

	Detail Steps/Work Items	Key Items/References
(1)	Assemble the auxiliary fuel pump: – Install the fitting with new O-rings. – Install the bonding wire. – Install the drain pulg and the top plug. – Crimp the connector pin on the fuel pump harness.	
(2)	Move the auxiliary fuel pump into the nacelle.	
(3)	Connect the fuel line to the auxiliary fuel pump.	
(4)	Connect the bonding wire to the p-clamp and install the p-clamp.	
(5)	Fix the electric harness and connector with tie wrap.	
(6)	Refuel the auxiliary fuel tank.	Fill more than 2 US gal of fuel into the auxiliary tank.
(7)	Perform a test of the auxiliary fuel transfer system.	Refer to Paragraph 13.
(8)	Check auxiliary fuel tank assembly for leakage.	
(9)	Install the auxiliary fuel tank access panel to the engine nacelle: – Move the access panel in place on the nacelle. – Connect the vent line and the drain line (coming from the drip tray) to the connectors on the access panel. – Install the 8 screws that attach the access panel to the nacelle.	

13. Test the Auxiliary Fuel Transfer System

A. Equipment

Item	Quantity	Part Number
Ground power supply.	1	-
Stopwatch.	1	Commercial.

B. Procedure

Obey the safety precautions for fuel at all times.

CAUTION: YOU MUST REPLACE THE INLINE FILTER IF THE TEST FAILS.

	Detail Steps/Work Items	Key Items/References
(1)	Connect the airplane to ground power.	
(2)	Defuel the auxiliary tank using the auxiliary fuel transfer pump.	On the side of the auxiliary fuel system that you want to test. Make sure that the corresponding main tank is empty enough to hold the auxiliary fuel. The auxiliary fuel pump must stop due to the auxiliary tank empty switch.
(3)	Fill 2 US gal of fuel into the auxiliary fuel tank.	
(4)	Measure transfer time for transferring the 2 US gal of fuel from the auxiliary tank into the main tank.	The auxiliary fuel pump must stop due to the auxiliary tank empty switch. Measure time from switching on the fuel pump until the fuel transfer stops due to the auxiliary tank empty switch. The transfer time must not be more than 4 min. Check if the corresponding main tank fuel quantity indication increases.
(5)	Repeat items 2 thru 4 for the other auxiliary fuel transfer system.	

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Section 28-40
Fuel Indicating

1. General

This Section tells you about the fuel indicating systems of the DA 42. Refer to Section 28-00 for the general data on the fuel system.

2. Description

Figure 1 shows the main components of the fuel indicating systems. The DA 42 has these fuel system indications which are displayed on the integrated cockpit system (ICS) display.

- Fuel quantity. Fuel level probes are installed in the inboard and outboard fuel chambers of both the left and right main fuel tank assemblies.
- Fuel temperature. Fuel temperature probes are installed on the inboard end of each inboard fuel chamber.
- Fuel low-level. Fuel low-level sensors are installed on the inboard end of each inboard fuel chamber.

The fuel quantity in the auxiliary fuel tanks (optional equipment, OÄM 42-056) is not indicated.

3. Operation

A. Fuel Quantity

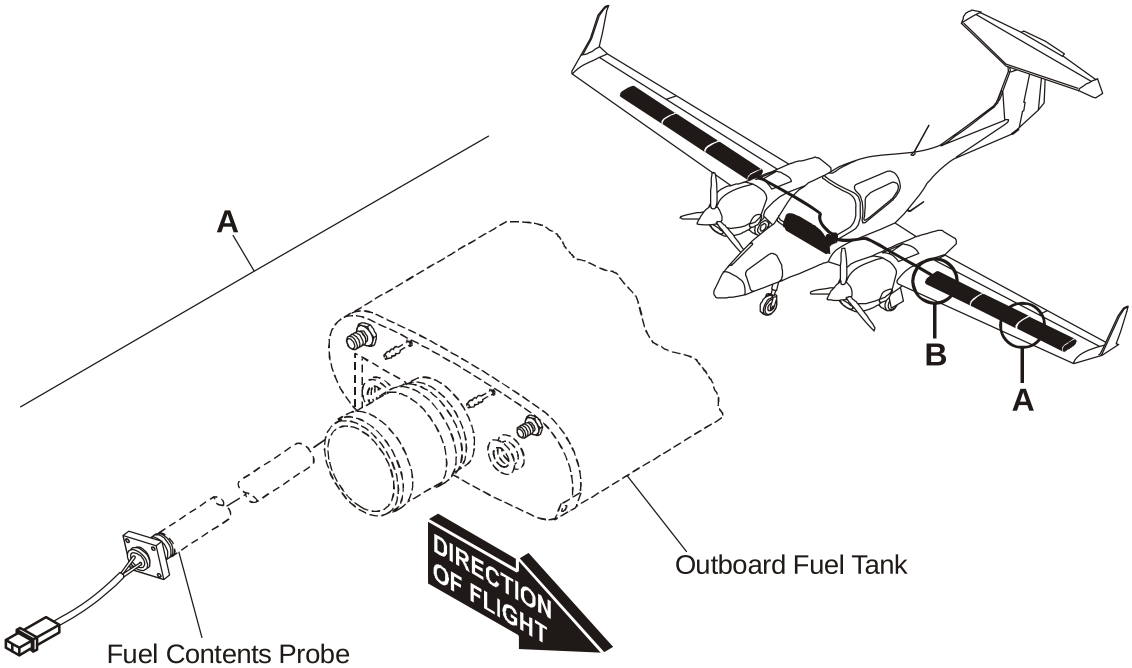
As the fuel level in the fuel tanks decreases, the area of the fuel probes which are ‘wetted’ with fuel also decreases. The amount of ‘wetted’ area of each tank probe is converted into electrical signals which set the fuel quantity indication which is displayed on the ICS. The fuel quantity indication shows the amount of fuel in the left fuel tank and the right fuel tank. The display shows the fuel quantities in US gallons.

Electrical cables connect the fuel probes to the ICS. Refer to Section 31-40 for more data about the ICS.

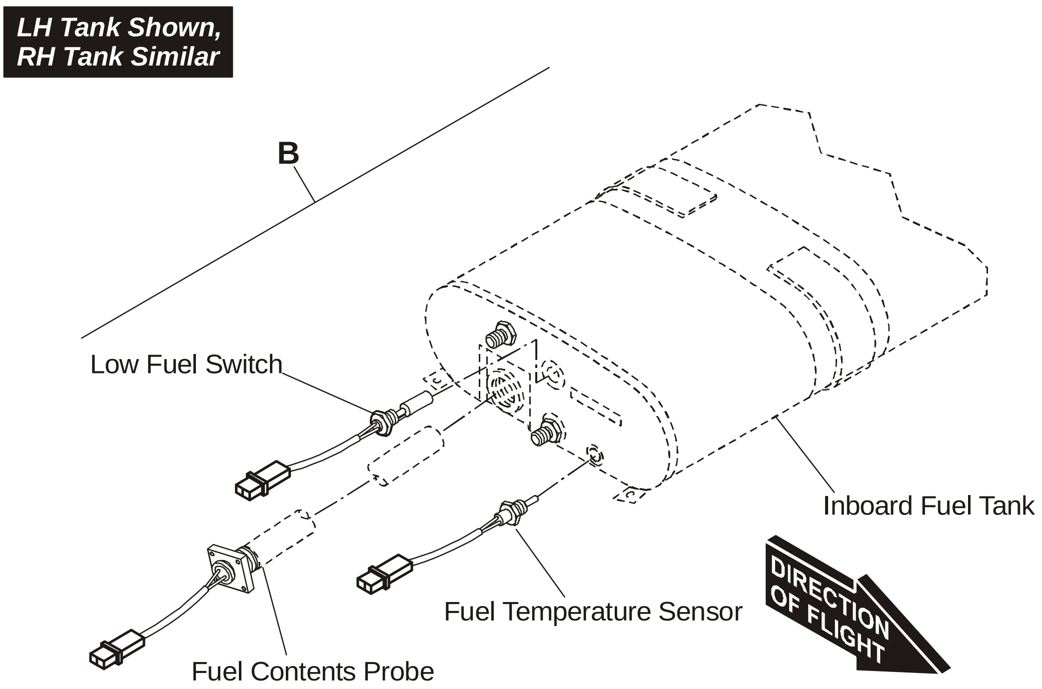
B. Fuel Temperature

The electrical resistance of the fuel temperature probes change with temperature. This change of electrical resistance is used to set the fuel temperature indications shown on the ICS. Electrical cables connect the fuel temperature probes to the ICS.

The display shows the temperature of the fuel in the left main fuel tank and in the right main fuel tank. The temperature is given in °C.



VIEW ON INBOARD END OF LEFT OUTBOARD FUEL TANK



VIEW ON INBOARD END OF LEFT INBOARD FUEL TANK

Figure 1: Fuel Indicating System Components

C. Fuel Low-Level

The fuel low-level sensors are float-type switches. When the fuel in the fuel tank falls to 11 to 15 liters (3 to 4 US gal) the float operates a micro-switch. The micro-switch operates an electrical circuit which gives a LOW FUEL caution on the ICS.

Electrical cables connect the fuel low-level switches to the ICS. Refer to Section 31-40 for more data about the ICS.

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Trouble-Shooting

1. General

The table below lists the defects you could have with the fuel indicating systems of the DA 42. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Fuel quantity for one tank incorrect, other tank reads correctly.	Fuel probe unit in fuel tank defective/contaminated.	Defuel/refuel the related fuel tank to flush the fuel probe. If the indication is still incorrect then replace the fuel probe(s).
	Fuel quantity indicating system wiring defective.	Do a test of the fuel quantity indicating system wiring. Refer to Chapter 92-00 for the wiring diagrams.
Fuel quantity indication on both tanks incorrect.	Fuel quantity display on ICS defective.	Refer to the ICS manufacturer’s manual.
Fuel temperature indication in one tank incorrect.	Temperature probe defective.	Replace the temperature probe in the related fuel tank.
	Fuel temperature wiring defective.	Do a test of the fuel temperature indicating system wiring. Refer to Chapter 92-00 for the wiring diagrams.
Fuel temperature indication in both fuel tanks incorrect.	Fuel temperature display on ICS defective.	Refer to the ICS manufacturer’s manual.
Fuel low level warning fails to operate in one fuel tank.	Fuel low level switch defective.	Replace the related fuel low-level switch.
	Fuel low level warning wiring defective.	Do a test of the fuel low-level warning system wiring. Refer to Chapter 92-00 for the wiring diagrams.
Fuel low-level warning fails to operate in both fuel tanks.	Fuel low level caution on ICS defective.	Refer to the ICS manufacturer’s manual.

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Maintenance Practices

1. General

The Maintenance Practices in this Section tell you how to replace a fuel tank probe, a fuel tank temperature sensor and a fuel tank low-level warning switch.

Refer to Section 31-40 for more data about the related indicator.

Obey the safety precautions for fuel at all times.

WARNING: DO NOT GET FUEL ON YOU. FUEL CAN CAUSE SKIN DISEASE.

WARNING: DO NOT ALLOW FIRE NEAR FUEL. FUEL BURNS AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

WARNING: DO NOT BREATHE THE FUEL VAPOR. FUEL VAPOR CAN MAKE YOU ILL.

2. Remove/Install a Fuel Quantity Probe

The inboard and outboard chambers of each main fuel tank assembly has a fuel quantity probe.

Obey the safety precautions for fuel at all times.

A. Remove a Fuel Quantity Probe

	Detail Steps/Work Items	Key Items/References
(1)	Remove the outer wing section that has the fuel quantity probe(s) that you will remove, and support the wing on trestles.	Refer to Section 57-10.
(2)	Remove the fuel tank assembly from the outer wing section.	Refer to Section 28-10.
(3)	Remove the fuel quantity probe from it mounting: – Remove the lockwire from the probe. – Unscrew the probe from the fuel tank.	

B. Install a Fuel Quantity Probe

	Detail Steps/Work Items	Key Items/References
(1)	Install the fuel quantity probe into the fuel chamber:	
	– Apply sealant to the thread of the fuel quantity probe.	Use Loctite 243 similar.
	– Install a new O-ring seal.	
	– Carefully move the probe into position into the guide tube in the fuel chamber and engage the screw thread.	Make sure that the fuel quantity probe is correctly located.
	– Turn the probe clockwise, by hand, until the fuel quantity probe is fully engaged in its mount.	
	– Tighten the fuel quantity probe until the O-ring seals.	
(2)	Install the fuel tank assembly into the outer wing section.	Refer to Section 28-10.
(3)	Install the outer wing section onto the airplane.	Refer to Section 57-10.
(4)	Refuel the airplane and examine the fuel quantity probe installation for leaks.	

3. Remove/Install a Fuel Temperature Sensor

Obey the safety precautions for fuel at all times.

A. Remove a Fuel Temperature Sensor

	Detail Steps/Work Items	Key Items/References
(1)	Remove the outer wing section that has the fuel temperature sensor that you will remove, and support the wing on trestles.	Refer to Section 57-10.
(2)	Remove the access panel from the wing root rib: – Remove the 11 nuts and washers that attach the access panel to the root rib. – Move the access panel clear of the root rib.	
(3)	Remove the lock-wire from the temperature sensor.	
(4)	Unscrew the temperature sensor from the mounting boss and pull the sensor clear of the tank.	Install a blank on the open tank connector.
(5)	Remove and discard the seal from the sensor.	

B. Install a Fuel Temperature Sensor

	Detail Steps/Work Items	Key Items/References
(1)	Install a new seal onto the temperature sensor.	
(2)	Screw the temperature sensor into the mounting boss on the fuel tank.	Remove the blanking cap. Make sure that the seal is seated correctly.
(3)	Secure the temperature sensor with lock-wire.	
(4)	Install the access panel in the wing root rib: – Move the access panel into position over the studs in the wing root rib. – Install the 11 washers and nuts that attach the access panel to the wing root rib.	
(5)	Install the wing onto the airplane.	Refer to Section 57-10.
(6)	Refuel/transfer fuel into the fuel tank assembly for which you installed the temperature sensor.	
(7)	Bleed the fuel system.	Refer to Section 28-20.
(8)	Do a test for fuel leaks at the temperature sensor that you replaced.	
(9)	Do a test for the correct operation of the related fuel temperature sensor: – Set the ELECT. MASTER switch to ON. – Set the ELECT. MASTER switch to OFF.	Monitor the multi function display screen of the ICS. The fuel temperature indications must both indicate the ambient temperature.

4. Remove/Install a Fuel Low-Level Sensor

Obey the safety precautions for fuel at all times.

A. Remove a Fuel Low-Level Sensor

	Detail Steps/Work Items	Key Items/References
(1)	Defuel the main fuel tank related to the fuel low level switch that will be removed.	Refer to Section 12-10.
(2)	Remove the wing.	Refer to Section 57-10.
(3)	Remove the access panel from the wing root rib: – Remove the 11 nuts and washers that attach the access panel to the root rib. – Move the access panel clear of the root rib.	
(4)	Unscrew the fuel low-level sensor from the inner tank chamber.	

B. Install a Fuel Low-Level Sensor

	Detail Steps/Work Items	Key Items/References
(1)	Screw the low-level sensor into the inner tank chamber. Use Loctite 243.	Make sure the arrow on the wrench face of the low-level sensor is pointing DOWN.
(2)	Install the access panel in the wing root rib: – Move the access panel into position over the studs in the wing root rib. – Install the 11 washers and nuts that attach the access panel to the wing root rib.	
(3)	Install the wing.	Refer to Section 57-10.
(4)	Refuel/transfer fuel into the fuel tank assembly for which you installed the low-level sensor. Monitor the ICS alert panel and:	
	– Note the fuel level indication at which the related L/R FUEL LOW caution goes out.	If the L/R FUEL LOW caution is on.
	– Stop the refuel/transfer.	
	– Transfer fuel out from the related fuel tank.	
	– Note the fuel level indication at which the related L/R FUEL LOW caution comes ON.	The level at which the caution comes on must be at the level given in the Airplane Flight Manual.
(5)	Make sure there are no fuel leaks, especially around the replaced fuel low-level sensor.	

5. Remove/Install a Fuel High-Level Shut-Off Sensor

Obey the safety precautions for fuel at all times

A. Remove a Fuel High-Level Shut-Off Sensor

	Detail Steps/Work Items	Key Items/References
(1)	Defuel the main fuel tank related to the fuel high-level shut-off sensor that will be removed.	Refer to Section 12-10.
(2)	Remove the wing.	Refer to Section 57-10.
(3)	Remove the main fuel tank assembly.	Refer to Section 28-10.
(4)	Unscrew the fuel high-level shut-off sensor from the outer tank chamber.	

B. Install a Fuel High-Level Shut-Sensor

	Detail Steps/Work Items	Key Items/References
(1)	Screw the high-level shut-off sensor into the outer tank chamber. Use Loctite 243.	Make sure the arrow on the wrench face of the high-level shut-off sensor is pointing DOWN.
(2)	Install the main fuel tank assembly.	Refer to Section 28-10.
(3)	Install the wing.	Refer to Section 57-10.
(4)	Refuel/transfer fuel into the fuel tank assembly for which you installed the high-level shut-off sensor.	
(5)	Make sure there are no fuel leaks, especially around the replaced fuel high-level shut-off sensor.	

CHAPTER 29

HYDRAULIC POWER

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HYDRAULIC POWER

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CHAPTER 29
HYDRAULIC POWER

1. General

This Chapter tells you about the Hydraulic system of the DA 42. It gives you the system description. It also gives you the trouble-shooting data and tells you how to remove and install the main components of the hydraulic system.

Note: Refer to Section 20-90 before starting maintenance work in the center wing area.

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Section 29-10
Main Hydraulic Power

1. General

Use these procedures to maintain the hydraulic system of the DA 42. The Trouble-Shooting Section provides information about possible causes and repair procedures.

2. Description

The hydraulic main unit contains all components which are necessary to produce the hydraulic power for the DA 42. It consists of the hydraulic pump, the hydraulic fluid tank, the hydraulic main control block and the hydraulic accumulator.

The hydraulic main unit is shown in Figure 1.

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Trouble-Shooting

1. General

Trouble	Possible Cause	Repaired Items/References
Landing gear is not retracting.	Dump valve is not closed (hydraulic short circuit).	Close the dump valve. Tighten the hexagon socket with 6 - 10 Nm (4.42 - 7.37 lbf.ft.). Tighten counter nut with 8 Nm (5.9 lbf.ft.). See Figure 1.
CAUTION: DO NOT OPERATE THE HYDRAULIC MAIN PUMP WITH LOW FLUID LEVEL IN THE HYDRAULIC PUMP.		
	Fill quantity of hydraulic reservoir is too low. Pump draws air and runs with high speed.	Check the fill quantity of the hydraulic reservoir. Replenish the hydraulic reservoir with fluid. Refer to Section 29-10 (check reason of fluid leakage).
	Bottom solenoid valve is not switching. – No voltage supply on the solenoid valve. – Solenoid valve does not switch, power is switched on and off.	 Check fuses, power supply and cables. Replace solenoid valve. Refer to Section 29-10.
	Solenoid valves are not fully closing. Leakage caused by dirt or low supply voltage.	High rate of re-pump cycles or permanent operation of the pump. Check power supply and solenoid valves. Replace solenoid valve. Refer to Section 29-10.

Trouble	Possible Cause	Repaired Items/References
	Hydraulic pump is not working (landing gear is moving until the accumulator is empty). – Relay is damaged. Check if relay is switching correctly. – Landing gear switch damaged. Check fuses, electric power supply and cables. – Hydraulic pump defect.	 Replace the relay. Replace landing gear switch. Check hydraulic pump and replace if damaged.
Landing gear is retracting too slow.	Dump valve is not fully closed (high re-pump cycles).	Close dump valve. Tighten hexagon socket with 6 -10 Nm (4.42 - 7.37 lbf.ft.). Tighten counter nut with 8 Nm (5.9 lbf.ft.). See Figure 1.
	Poor motor/pump performance. – Power supply low.	 Check power supply.
	Top solenoid valve is switched ON (i.e. differential pressure mode is OFF). – Electrical fault. – Mechanical fault.	 Check cables, connectors and power supply of the solenoid valve. Replace solenoid valve or main control block. Refer to Section 29-10.

Trouble	Possible Cause	Repaired Items/References
	Solenoid valves are not fully closing. Leakage caused by dirt or low supply voltage.	High rate of re-pump cycles or permanent operation of the pump. Check power supply and solenoid valves. Replace solenoid valve. Refer to Section 29-10.
Landing gear is not fully retracting.	Dump valve is not fully closed (high re-pump cycles).	Close dump valve. Tighten hexagon socket with 6 - 10 Nm (4.42 - 7.37 lbf.ft.). Tighten counter nut with 8 Nm (5.9 lbf.ft.). See Figure 1.
	Pressure limitation valve is not working properly. Wrong system pressure.	Check pressure limitation valve. Refer to Section 29-10. Replace pressure limitation valve. Refer to Section 29-10.
	Level of hydraulic fluid in the hydraulic reservoir is too low. Pump draws air and runs with high speed.	Check the level of the hydraulic reservoir. Replenish hydraulic reservoir, if necessary. Refer to Section 29-10 (check reason of fluid leakage).
Landing gear is not extending.	Bottom solenoid valve is not switching. – Landing gear switch defect. – Mechanical fault.	 Check power supply and cables. Replace solenoid valves. Refer to Section 29-10.

Trouble	Possible Cause	Repaired Items/References
Landing gear is extending slow and erratic.	Dump valve is not fully closed (high re-pump cycles).	Open up the dump valve fully, then close the dump valve. Tighten hexagon socket with 6 -10 Nm (4.42 - 7.37 lbf.ft.). Tighten counter nut with 8 Nm (5.9 lbf.ft.). See Figure 1.
	Motor/Pump is not pumping enough hydraulic fluid. – Power supply low.	 Check power supply.
Hydraulic pump does not switch off after extending/retracting the landing gear.	Dump valve is not fully closed (high re-pump cycles).	Close dump valve. Tighten hexagon socket with 6 -10 Nm (4.42 - 7.37 lbf.ft.). Tighten counter nut with 8 Nm (5.9 lbf.ft.). See Figure 1.
	Solenoid valves are not fully closing. Leakage caused by dirt or low supply voltage.	High rate of re-pump cycles or permanent operation of the pump. Check power supply and solenoid valves. Replace solenoid valve. Refer to Section 29-10.
	Pump pressure switch is damaged.	Check switching points (refer to pump pressure switch operation test). Replace pump pressure switch. Refer to Section 29-10.
	Pressure limitation valve is not working properly. Wrong system pressure.	Check pressure limitation valve. Refer to Section 29-10. Replace pressure limitation valve. Refer to Section 29-10.

Trouble	Possible Cause	Repaired Items/References
Charging time of the completely empty accumulator is too long. (More than 25 sec).	Dump valve is not fully closed (high re-pump cycles).	Close dump valve. Tighten hexagon socket with 6 -10 Nm (4.42 - 7.37 lbf.ft.). Tighten counter nut with 8 Nm (5.9 lbf.ft.). See Figure 1.
	Pre-fill pressure in hydraulic accumulator too low.	Check accumulator pressure. Refer to Section 29-10. Charge accumulator to appropriate pressure.
	Pressure limitation valve is not working properly. Wrong system pressure.	Check pressure limitation valve. Refer to Section 29-10. Replace pressure limitation valve.
	Leakage of the emergency extension block. Occurs only when retracting the landing gear.	Check Bowden cables. Replace the emergency extension block. Refer to Section 29-10.
Re-pump time of the pump is too short. (less than 2 sec).	Pre-fill pressure in hydraulic accumulator too low.	Check accumulator pressure. Refer to Section 29-10. Charge accumulator to appropriate pressure.
	Pump pressure switch is damaged.	Check switching points (refer to pump pressure switch operation test). Replace pump pressure switch. Refer to Section 29 -10.
Re-pump cycles are too high. (more than 1 cycle per 45 min).	Dump valve is not fully closed (high re-pump cycles).	Close dump valve. Tighten hexagon socket with 6 -10 Nm (4.42 - 7.37 lbf.ft.). Tighten counter nut with 8 Nm (5.9 lbf.ft.). See Figure 1.

Trouble	Possible Cause	Repaired Items/References
	Pre-fill pressure in hydraulic accumulator is too low.	Check accumulator pressure. Refer to Section 29-10. Charge accumulator to appropriate pressure.
	Solenoid valves are not fully closing. Leakage caused by dirt or low supply voltage.	High rate of re-pump cycles or permanent operation of the pump. Check power supply and solenoid valves. Replace solenoid valve. Refer to Section 29-10.
Emergency extension slow or not completed.	High stream resistance in the hydraulic system.	Check hydraulic hoses for damage.
Note: Emergency extension does not fully extend on the ground because of missing aerodynamic forces. Pull the gear backwards to extend it fully!		
	Pressure in the hydraulic reservoir.	Open FILL plug on the hydraulic reservoir to check if pressurized. Send reservoir to vendor.
	High friction on landing gear legs and/or actuators. Remove hydraulic actuators and move the landing gear manually.	Send hydraulic actuators to vendor (Rev. B of main gear and Rev. A of nose gear have friction optimized piston sealings). Refer to Section 32-20.

Maintenance Practices

1. Check the Hydraulic Fluid Level of the Hydraulic System

	Detail Steps/Work Items	Key Items/References
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Get access to the hydraulic system: – Fold the rear passenger seat-backs forward. – Remove the rear baggage compartment lower access panel.	 Refer to Section 25-10. Refer to Section 25-60.
(3)	Push the GEAR circuit-breaker.	Right side of instrument panel.
(4)	Charge the hydraulic accumulator: – Set the ELECT. MASTER switch to ON. – The hydraulic pump must operate until the system pressure stabilizes. – The hydraulic pump must stop operating. – Set the ELECT. MASTER switch to OFF.	Approx. 16 (+4/-3) sec with a completely empty accumulator.
(5)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(6)	Check the fluid level on the hydraulic reservoir: – The accumulator must be fully charged and the landing gear has to be fully extended. – The airplane must be even on the ground and the fluid level should be in the middle of the inspection glass.	
(7)	Reset the GEAR circuit-breaker.	Right side of instrument panel.

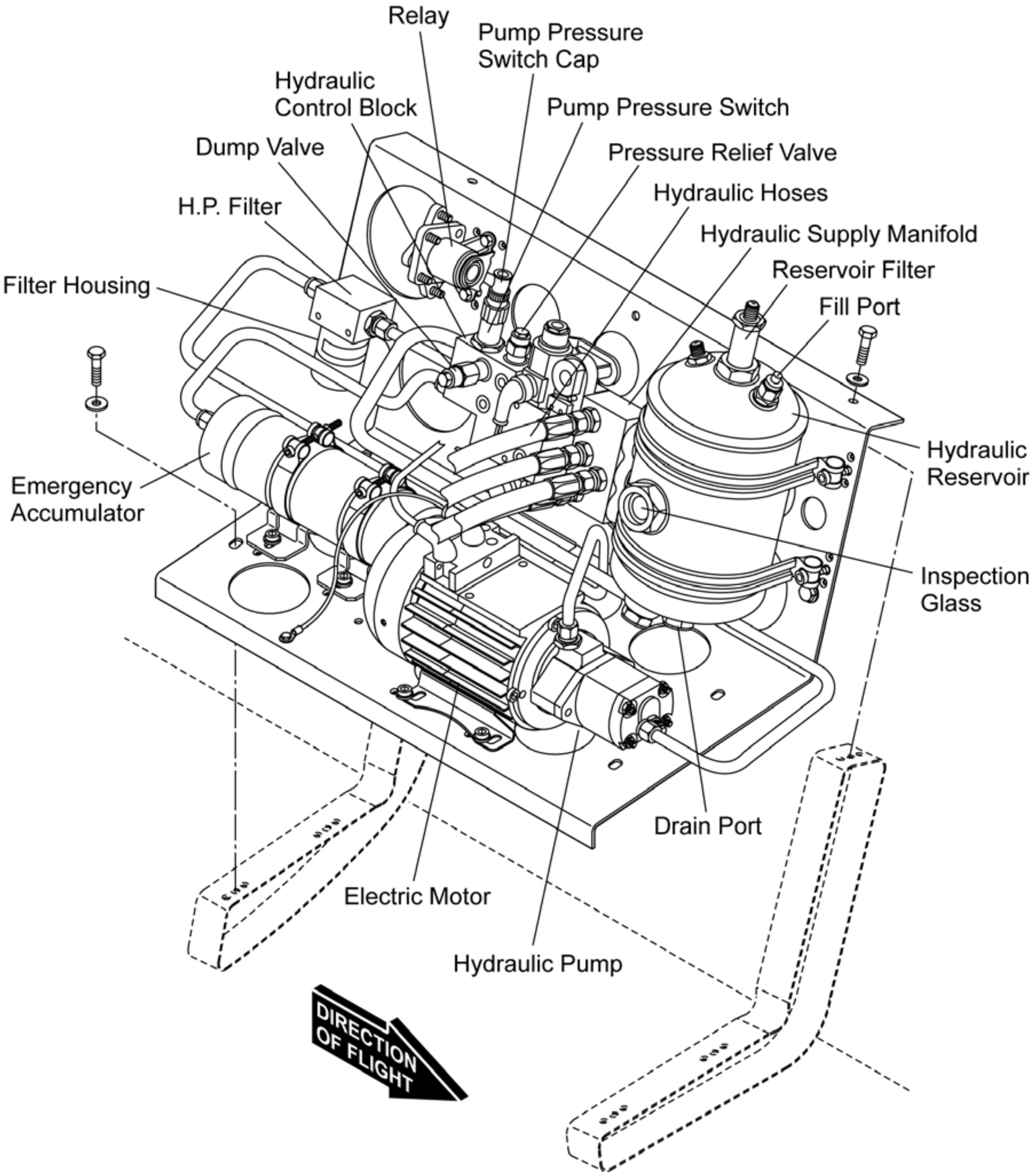

Figure 1: Hydraulic Supply and Control Assembly

2. Fluid Change of the Hydraulic System

A. Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.
Pump (for emptying the reservoir).	1	Commercial.

B. Fluid Change of the Hydraulic System

WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.

WARNING: DO NOT GET HYDRAULIC FLUID ON YOU. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE. IT CAN ALSO DAMAGE CLOTHING.

CAUTION: CLEAN OFF SPILT HYDRAULIC FLUID IMMEDIATELY. HYDRAULIC FLUID CAN DAMAGE THE AIRPLANE STRUCTURE. IT CAN ALSO REMOVE THE PAINT FROM SOME COMPONENTS.

CAUTION: DO NOT OPERATE THE HYDRAULIC PUMP WITH LOW FLUID LEVEL. THE PUMP WILL HEAT UP AND GETS DAMAGED.

	Details Steps/Work Items	Key Items/References
(1)	Connect an external power supply to the airplane.	Refer to Section 24-40.
(2)	Raise the airplane on jacks and move the wing.	Refer to Section 07-10.
(3)	Retract the landing gear.	Refer to Section 32-30.
(4)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(5)	Extend the landing gear with the emergency extension switch.	

	Details Steps/Work Items	Key Items/References
(6)	Set the landing gear handle down.	
(7)	Set the emergency gear lever up.	
(8)	Get access to the hydraulic system: – Fold the rear passenger seat-backs forward. – Remove the rear baggage compartment lower access panel.	 Refer to Section 25-10. Refer to Section 25-60.
(9)	Remove the fluid from the hydraulic reservoir using a pump to suck it out.	
(10)	Replace the high pressure filter.	Refer to Section 29-10.
(11)	Maintain the hydraulic reservoir filter.	Refer to Section 29-10.
(12)	First fill / replenish the hydraulic system.	Refer to Section 29-10.
(13)	Bleed the accumulator.	Refer to Section 29-10.
(14)	Bleed the hydraulic system.	Refer to Section 29-10.
(15)	Re-set the GEAR circuit-breaker.	Right side of instrument panel.
(16)	Do the normal operation test for the hydraulic system.	Refer to Section 29-10.
(17)	Replenish the hydraulic system, if necessary.	Refer to Section 29-10.
(18)	Check level of the hydraulic reservoir.	Refer to Section 29-10.
(19)	Repeat the last two steps until the level of the hydraulic reservoir is correct.	
(20)	Lower the airplane with the jacks.	Make sure that the area around the airplane is clear. Refer to Section 07-10.

C. Fluid Change of the Hydraulic System from Aero Shell Fluid 41 to AMG-10

	Detail Steps/Work Items	Key Items/References
(1)	Repeat the Fluid Change of the Hydraulic System procedure 3 times.	Refer to Paragraph B.
(2)	Apply the Hydraulic Fluid placard and mark the used fluid.	Refer to Figure 2. Mark hydraulic fluid type by punching.

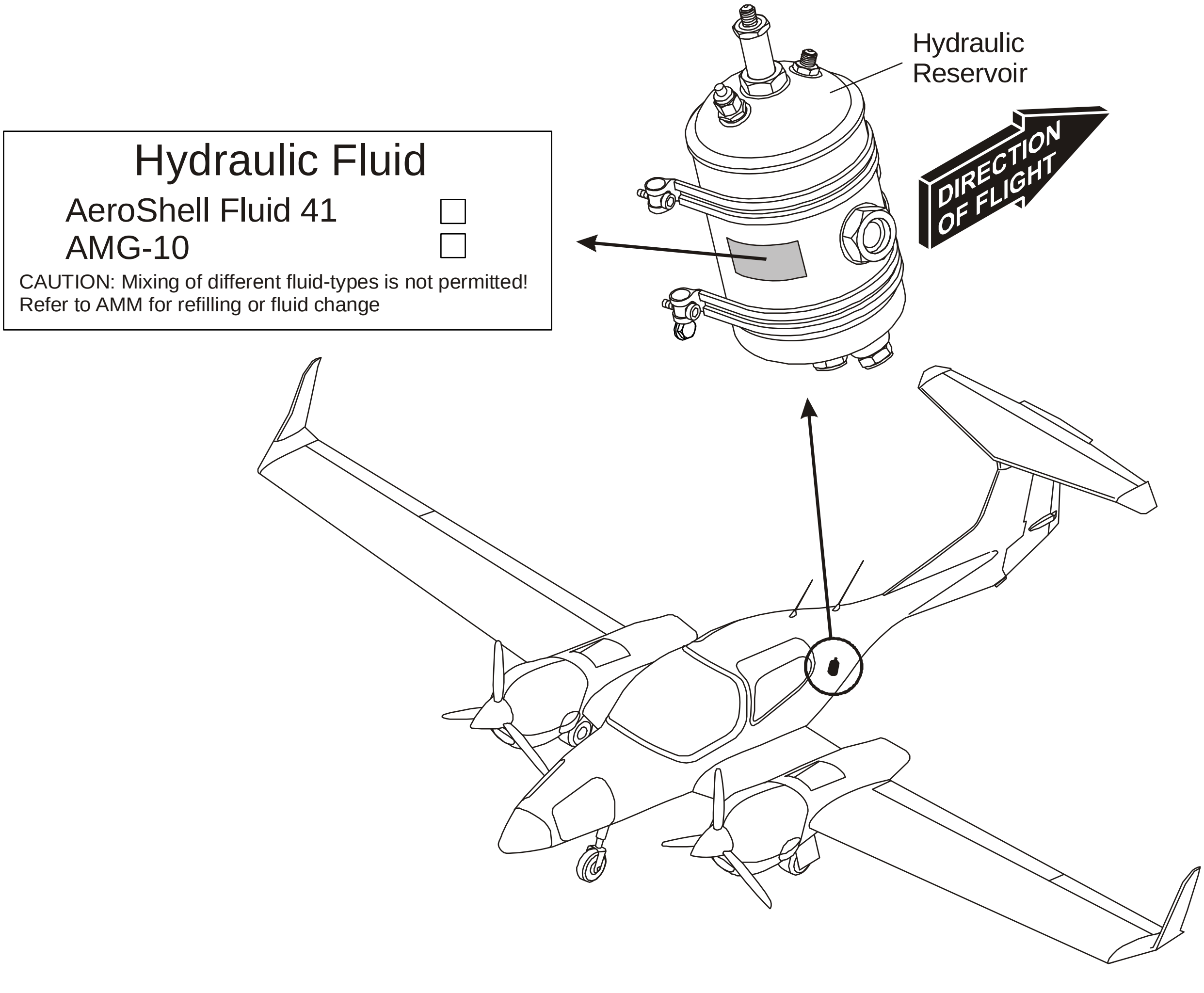

Figure 2: Position of the Hydraulic Fluid Placard

3. Depressurize the Hydraulic System

	Detail Steps/Work Items	Key Items/References
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Remove the protection cap from the MiniMess 1215 plug.	If the hydraulic system is an old revision without MiniMess 1215 contact the vendor to get it installed.
(3)	Install a test manometer on the MiniMess 1215 plug. The normal pressure should be between 95 and 120 bar (1378 to 1740 PSI).	Located on the hydraulic control block. Refer to Figure 4.
(4)	Operate the dump valve: – Remove the lock wire from the dump valve. – Loosen the counter nut. – Loosen the hexagon socket to open the dump valve. – After emptying wait 10 to 15 min until the accumulator is thermally balanced.	 Wrench size 19 mm. Wrench size 1/4 in.
(5)	Operate the pressure button on the upper solenoid valve. Located on the top of the hydraulic control block.	See Figure 4. Use a little metal pin or ball pen to operate the button.
(6)	Check the drop in pressure on the manometer.	There should be no pressure left.
(7)	Close the dump valve: – Tighten the hexagon socket to close the dump valve. – Tighten the counter nut. – Install the lock wire onto the dump valve.	 6 - 10 Nm (4.4 - 7.3 lbf.ft.), wrench size 1/4 in. 8 Nm (5.9 lbf.ft.), wrench size 19 mm.
(8)	Disconnect the test manometer from the MiniMess 1215 plug.	
(9)	Install the protection cap onto the MiniMess 1215 plug.	

4. Bleed the Hydraulic System

A. Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.

B. Bleed the Hydraulic System

	Detail Steps/Work Items	Key Items/Reference
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
	CAUTION: MAKE SURE THAT THE AREA AROUND THE AIRPLANE IS CLEAR. IF THE LANDING GEAR HITS AN OBJECT THE LANDING GEAR CAN BE DAMAGED.	
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel
(2)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(3)	Connect an external power supply to the airplane.	Refer to Section 24-40.

	Detail Steps/Work Items	Key Items/Reference
(4)	Extend and retract the landing gear to bleed the system: – Retract and extend the landing gear 2 to 4 times with short breaks in between. – Between the extension/retraction the dump valve should be operated 3 to 4 times to release possible air pockets.	Refer to Paragraph 7 in Chapter 32-30. (Landing gear extension and retraction test). Check the times of extending and retracting the landing gear. Refer to Section 29-10.
(5)	Operate the emergency extension of the landing gear (repeat this step 1 to 2 times).	Refer to Section 29-10.
(6)	Move the wing and rear fuselage trestles clear of the airplane.	
(7)	Lower the airplane with the jacks.	Make sure that the area around the airplane is clear.

5. Drain Fluid from the Hydraulic System

WARNING: DO NOT GET HYDRAULIC FLUID ON YOU. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE. IT CAN ALSO DAMAGE CLOTHING.

CAUTION:: CLEAN OFF SPILT HYDRAULIC FLUID IMMEDIATELY. HYDRAULIC FLUID CAN DAMAGE THE AIRPLANE STRUCTURE. IT CAN ALSO REMOVE THE PAINT FROM SOME COMPONENTS.

CAUTION: DO NOT OPERATE THE HYDRAULIC PUMP WITH LOW FLUID LEVEL. THE PUMP WILL HEAT UP AND GETS DAMAGED.

	Detail Steps/Work Items	Key Items/References
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Getting access to the hydraulic system: – Fold the rear passenger seat-backs forward. – Remove the rear baggage compartment lower access panel.	 Refer to Section 25-10. Refer to Section 25-60.
(3)	Prepare the drain hose: – Put a container under the drain hose to collect spilt hydraulic fluid.	Use a drain hose which can be connected to the MiniMess 1215 plug Refer to Figure 4.
(4)	Install the drain hose: – Remove the protection cap from the MiniMess 1215 plug. – Install the drain hose onto the plug.	The MiniMess 1215 plug is situated on the hydraulic control block. Refer to Figure 4. If your hydraulic system is an old revision without the MiniMess 1215 plug contact the vendor to get it installed.
(5)	Reset the GEAR circuit breaker.	Right side of instrument panel.
(6)	Drain hydraulic fluid from the hydraulic system: – Turn the ELECT. MASTER switch to ON. – The hydraulic pump starts pumping and drains hydraulic fluid into the container. – Turn the ELECT. MASTER switch to OFF.	For most Maintenance Practices it's the best to drain approx. ½ liters of hydraulic fluid from the fully filled hydraulic system.
(7)	Remove the drain hose: – Remove the drain hose from the MiniMess 1215 plug. – Install the protection cap back onto the plug.	

6. Remove/Install the Relay

Note: To change the relay on an old hydraulic system contact the customer service of Diamond Aircraft.

	Detail Steps/Work Items	Key Items/References
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Getting access to the hydraulic system: – Fold the rear passenger seat-backs forward. – Remove the rear baggage compartment lower access panel.	 Refer to Section 25-10. Refer to Section 25-60.
(3)	Disconnect all electric connectors from the relay.	Remember how the cables where connected to the relay.
(4)	Remove the 2 bolts which hold the relay onto the mounting plate.	
(5)	Install the new relay with two bolts onto the hydraulic panel.	
(6)	Re-connect all electric connectors with the relay.	
(7)	Do the normal operation test for the hydraulic system.	Refer to Section 29-10.
(8)	Reset the GEAR circuit-breaker.	Right side of instrument panel.

7. Remove/Install the Hydraulic Reservoir

WARNING: DO NOT GET HYDRAULIC FLUID ON YOU. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE. IT CAN ALSO DAMAGE CLOTHING.

CAUTION: CLEAN OFF SPILT HYDRAULIC FLUID IMMEDIATELY. HYDRAULIC FLUID CAN DAMAGE THE AIRPLANE STRUCTURE. IT CAN ALSO REMOVE THE PAINT FROM SOME COMPONENTS.

A. Remove Hydraulic Reservoir

	Detail Steps/Work Items	Key Items/References
(1)	Getting access to the hydraulic system: – Fold the rear passenger seat-backs forward. – Remove the rear baggage compartment lower access panel.	 Refer to Section 25-10. Refer to Section 25-60.
(2)	Depressurize the hydraulic system.	Refer to Section 29-10
(3)	Remove the hydraulic supply and control assembly.	Refer to Section 32-30.
(4)	Draining the hydraulic tank: – Remove the fill port to put a drain hose into the hydraulic tank and use a commercial pump to suck the fluid. – Remove the fluid from the hydraulic reservoir until the tank is completely empty.	

	Detail Steps/Work Items	Key Items/References
(5)	Remove the hydraulic reservoir: – Remove the intake line and the return line from the reservoir. – Put caps onto the open ends of the lines and the end fittings of the reservoir. – Remove the 4 bolts from the clamp which secure the hydraulic tank. – Then move the tank clear from the hydraulic system.	Refer to Figure 3.

B. Install the Hydraulic Reservoir

	Detail Steps/Work Items	Key Items/References
(1)	Install the hydraulic reservoir: – Move the reservoir into position. – Install the 4 bolts onto the clamp to secure the hydraulic tank. – Install the intake line and the return line onto the reservoir.	
(2)	Install the hydraulic supply and control assembly.	Refer to Section 32-30.
(3)	Replenish the hydraulic reservoir with hydraulic fluid.	Refer to Section 29-10.
(4)	Bleed the accumulator.	Refer to Section 29-10.
(5)	Bleed the hydraulic system.	Refer to Section 29-10.
(6)	Do the normal operation test for the hydraulic system.	Refer to Section 29-10.
(7)	Reset the GEAR circuit breaker.	Right side of instrument panel.

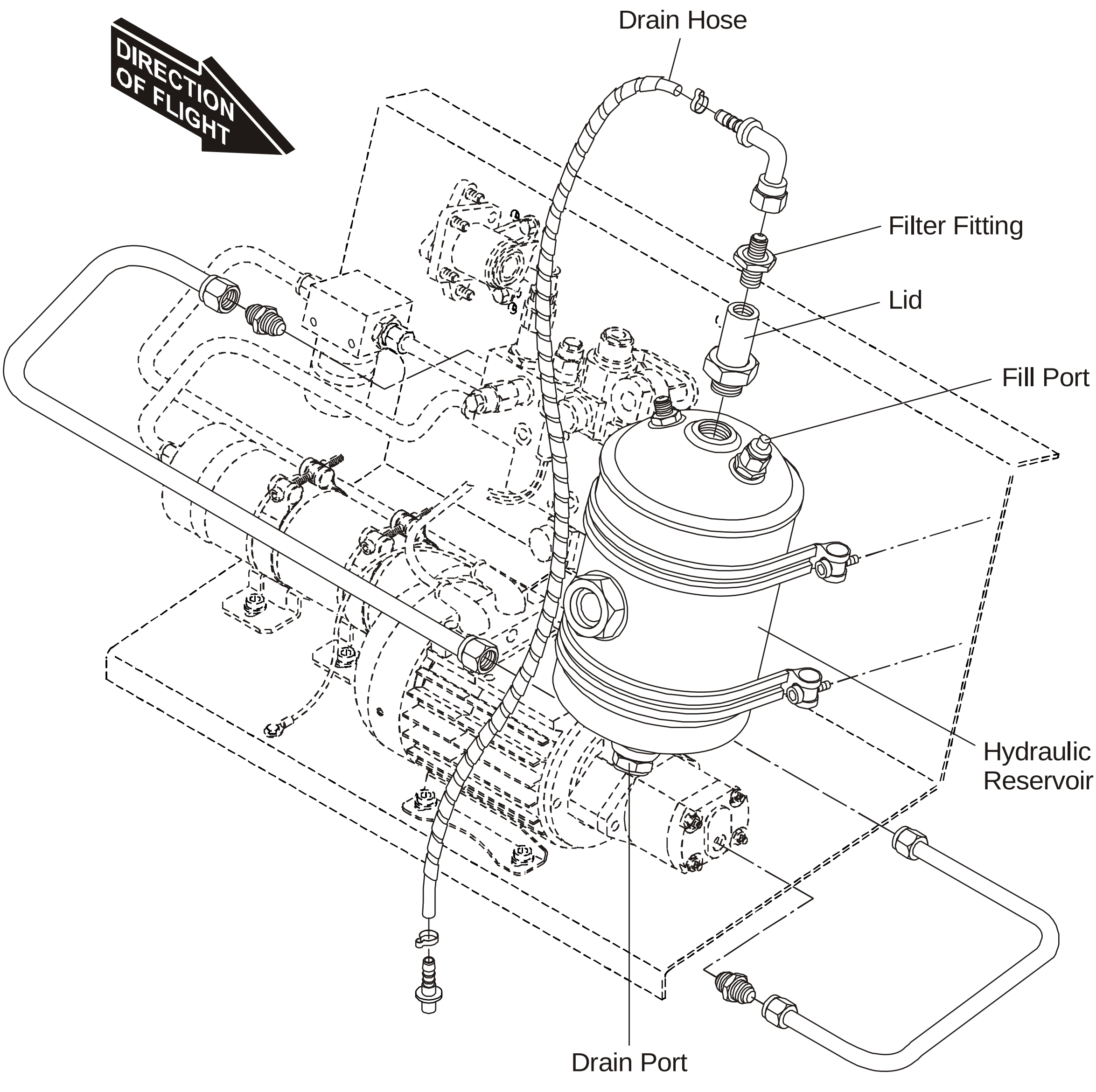

Figure 3: DA 42 Hydraulic Reservoir Assembly

8. Remove/Install the Hydraulic Supply and Control Assembly

A. Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.

WARNING: DO NOT GET HYDRAULIC FLUID ON YOUR SKIN OR YOUR CLOTHES. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE.

CAUTION: CLEAN UP SPILT HYDRAULIC FLUID IMMEDIATELY. HYDRAULIC FLUID CAN CAUSE DAMAGE TO AIRPLANE COMPONENTS.

B. Remove the Hydraulic Supply and Control Assembly

	Detail Steps/Work Items	Key Items/References
WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.		
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 7-10.
(3)	Release the hydraulic pressure from the hydraulic system: – Fold the rear passenger seat-backs forward. – Remove the rear baggage compartment lower access panel. – Operate the accumulator dump-valve.	 Refer to Section 25-10. Refer to Section 25-60. Hydraulic supply and control assembly.

	Detail Steps/Work Items	Key Items/References
(4)	Disconnect these hydraulic hoses from the hydraulic manifold:	Use a suitable container to catch spilt fluid.
	– Disconnect the 3 return hoses from the hydraulic manifold.	Fit blanking caps to all connectors.
	– Disconnect the pressure hose from the hydraulic manifold.	Fit blanking caps to all connectors.
(5)	Disconnect these electrical cables from the hydraulic supply and control assembly:	
	– Disconnect the electrical cables from the 2 solenoid valves.	At the in-line connectors.
	– Disconnect the electrical cables from the hydraulic pump pressure switch.	At the in-line connectors.
	– Disconnect the electrical cables from the hydraulic pump motor.	At the hydraulic pump electric motor. Loosen the connection by holding the lower nut and applying torque to the upper nut.
(6)	Disconnect the flexible cable from the emergency extension valve:	
	– Loosen the bolt on the cable swivel fitting.	
	– Move the cable clear of the swivel fitting.	
	– Release the cable clamp and move the cable clear of the supply and control assembly.	
(7)	Remove the hydraulic supply and control assembly:	
	– Remove the 4 bolts and washers that attach the mounting tray to the surrounding structure.	Note the location of the bonding strip connection and the earth wire.
	– Lift the complete assembly clear of the airplane. Hold the assembly level to minimize hydraulic fluid spillage.	Use a suitable container/material to catch spilt hydraulic fluid.

C. Install the Hydraulic Supply and Control Assembly

	Detail Steps/Work Items	Key Items/References
(1)	Install the hydraulic supply and control assembly:	
	– Move the hydraulic supply and control assembly into position in the fuselage.	
	– Install the 4 bolts and washers that attach the hydraulic supply and control assembly mounting to the fuselage structure.	Attach the bonding strip and earth cable in the location noted in Paragraph 8 B step 7.
(2)	Connect these flexible hydraulic hoses to the hydraulic supply and control assembly: – The 3 return hoses to the hydraulic manifold. – The supply hose to the hydraulic manifold.	Make sure that all the blanking caps are removed.
(3)	Connect these electrical cables to the hydraulic supply and control assembly:	
	– Connect the electrical cables to the hydraulic pump motor.	At the hydraulic pump electric motor. Tighten the connection by holding the lower nut and applying torque to the upper nut. Torque: 9 - 11 Nm (6.6 - 8.1 lbf.ft.).
	– Connect the electrical cables to the 2 solenoid valves.	At the in-line connectors.
	– Connect the electrical cables to the hydraulic pump pressure switch	At the in-line connectors.

	Detail Steps/Work Items	Key Items/References
(4)	Connect the flexible cable to the emergency extension valve: – Make sure that the emergency extension valve is in the fully closed (normal) position. – Make sure that the emergency extension control lever in the cockpit is fully forward. – Attach the flexible cable outer sheath to the mounting bracket. – Pass the flexible cable inner through the swivel fitting in the emergency extension valve operating lever and tighten the screw.	
(5)	Do a visual test for the correct adjustment of the emergency extension valve operating cable: – Set and hold the lever in the cockpit to the EMERGENCY position. – Set the lever in the cockpit to the NORMAL position.	The emergency valve at the supply and control panel must be in the emergency position. The hydraulic pump cut-out micro-switch must be open. The emergency valve at the supply and control panel must be in the normal position. The hydraulic pump cut-out micro-switch must be closed.
(6)	If necessary, fill the hydraulic reservoir with fluid.	Refer to Section 29-10.
(7)	If necessary, charge the hydraulic accumulator with Nitrogen.	
(8)	Install the rear baggage compartment lower access panel.	Refer to Section 25-60.
(9)	Bleed the hydraulic system.	Refer to Section 29-10.
(10)	Do a test for the correct operation of the landing gear extension and retraction system.	Refer to Section 32-30.
(11)	Do a test for the correct operation of the emergency extension system.	Refer to Section 32-30.

	Detail Steps/Work Items	Key Items/References
(12)	Move the wing and fuselage trestles clear of the airplane.	
(13)	Lower the airplane with the jacks.	Make sure that the area around the airplane is clear.

9. Remove/Install Hydraulic Pump

WARNING: DO NOT GET HYDRAULIC FLUID ON YOU. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE. IT CAN ALSO DAMAGE CLOTHING.

CAUTION: CLEAN OFF SPILT HYDRAULIC FLUID IMMEDIATELY. HYDRAULIC FLUID CAN DAMAGE THE AIRPLANE STRUCTURE. IT CAN ALSO REMOVE THE PAINT FROM SOME COMPONENTS.

	Detail Steps/Work Items	Key Items/References
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Getting access to the hydraulic system: – Fold the rear passenger seat-backs forward. – Remove the rear baggage compartment lower access panel.	 Refer to Section 25-10. Refer to Section 25-60.
(3)	Depressurize the hydraulic system.	Refer to Section 29-10.
(4)	Drain fluid from the hydraulic system.	Refer to Section 29-10. The fluid level should be lower than the hydraulic lines of the motor-pump.
(5)	Disconnect the motor-pump: – Disconnect the two hydraulic connectors from the pump. – Put caps onto the hydraulic lines and on the pump so that no hydraulic fluid can leak. – Disconnect the electric connectors from the motor.	Refer to Figure 1. Remember which one is the plus and minus pole. Loosen the connection by holding the lower nut and applying torque to the upper nut.

	Detail Steps/Work Items	Key Items/References
(6)	Remove the motor-pump: – Remove the bolts which hold the motor-pump on the hydraulic panel. – Move the motor-pump clear from the hydraulic system.	
(7)	Install the new motor-pump: – Move the motor-pump into position. – Install the bolts which hold the motor-pump onto the hydraulic panel.	
(8)	Connect the motor-pump: Connect the electric connectors to the motor. Remove the caps from the hydraulic lines and the pump. Connect the two hydraulic connectors onto the pump.	 Tighten the connection by holding the lower nut and applying torque to the upper nut. Torque: 9 - 11 Nm (6.6 - 8.1 lbf.ft.).
(9)	If hydraulic fluid was drained, replenish the hydraulic reservoir with hydraulic fluid.	Refer to Section 29-10.
(10)	Bleed the accumulator.	Refer to Section 29-10.
(11)	Bleed the hydraulic system.	Refer to Section 29-10.
(12)	Do the normal operation test for the hydraulic system.	Refer to Section 29-10.
(13)	Reset the GEAR circuit breaker.	Right side of instrument panel.

10. First Fill/Replenishment of the Hydraulic System

A. Material

Item	Quantity	Part Number
CAUTION: DO NOT MIX OR REPLACE HYDRAULIC FLUIDS OF DIFFERENT TYPES OR MANUFACTURERS.		
Note: If MÄM 42-495 is carried out, a placard is installed by the airplane manufacturer identifying the type of hydraulic fluid. All airplanes with MÄM 42-495 NOT installed have been manufactured with Aeroshell Fluid 41 (MIL-PRF-5606 H). The identification placard must be installed if a hydraulic fluid change to another fluid type is carried out.		
Hydraulic fluid.	As required.	Aeroshell Fluid 41 (MIL-PRF-5606 H) or AMG-10 (GOST 6794-75 Amdt 1-5), see CAUTION above.

B. Fluid Capacity

Item	Capacity
Hydraulic reservoir.	0.9 l (0.24 US gal) (mid-level on the inspection glass).
Extended landing gear (when hydraulic actuators are retracted).	Both actuators: Approx. 0.5 l (0.13 US gal).
Accumulator.	Approx. 0.09 l (0.02 US gal).
Hoses and misc. components.	Approx. 0.25 l (0.07 US gal).
Total hydraulic system.	Approx. 1.74 l (0.46 US gal).

Note: If the level of the hydraulic reservoir differs 1 cm (0.4 inch) it equals approx. 0.12 liter (0.03 US gal.) of hydraulic fluid.

C. Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.
Hand pump.	1	P/N X11-P004.

D. First Fill/Replenishment of the Hydraulic System

	Detail Steps/Work Items	Key Items/References
	WARNING: **TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.**	
	CAUTION: MAKE SURE THAT THE AREA AROUND THE AIRPLANE IS CLEAR. IF THE LANDING GEAR HITS AN OBJECT THE LANDING GEAR CAN BE DAMAGED.	
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(3)	Connect an external power supply to the airplane.	Refer to Section 24-40.
(4)	Get access to the hydraulic system: – Fold the rear passenger seat-backs forward. – Remove the rear baggage compartment lower access panel.	 Refer to Section 25-10. Refer to Section 25-60.

	Detail Steps/Work Items	Key Items/References
	CAUTION: DO NOT MIX OR REPLACE HYDRAULIC FLUIDS OF DIFFERENT TYPES OR MANUFACTURERS.	
	Note: If MÄM 42-495 is carried out, a placard is installed by the airplane manufacturer identifying the type of hydraulic fluid. All airplanes with MÄM 42-495 NOT installed have been manufactured with Aeroshell Fluid 41 (MIL-PRF-5606 H). The identification placard must be installed if a hydraulic fluid change to another fluid type is carried out.	
(5)	ONLY FOR FIRST FILL: Fill the hydraulic reservoir with 1.25 liter (0.33 US gal) using a hand pump which connects to the "FILL" port of the hydraulic reservoir.	See Figure 3.
(6)	Reset the GEAR circuit-breaker.	Right side of instrument panel.
(7)	Charge the hydraulic accumulator: – Set the ELECT. MASTER switch to ON. – The hydraulic pump must operate until the system pressure stabilizes. – The hydraulic pump must stop operating. – Set the ELECT. MASTER switch to OFF.	Approx. 16 (+4/-3) sec with a completely empty accumulator.
(8)	Check the fluid level of the hydraulic reservoir.	Refer to Section 29-10.
	CAUTION: DO NOT FILL THE HYDRAULIC TANK FULL BECAUSE IT MAY OVERFLOW. FILL IT IN SMALL STEPS.	
(9)	Use the hand pump to replenish the hydraulic reservoir to adjust the fluid level.	
(10)	Repeat steps 8 and 9 until the fluid level of the hydraulic reservoir is correct.	
(11)	Bleed the accumulator.	Refer to Section 29-10.
(12)	Bleed the hydraulic system.	Refer to Section 29-10.

	Detail Steps/Work Items	Key Items/References
(13)	Do the normal operational test of the hydraulic system.	Refer to Section 29-10.
(14)	Move the wing and rear fuselage trestles clear of the airplane.	
(15)	Lower the airplane with the jacks.	Make sure that the area around the airplane is clear.

11. Tests of the Hydraulic System

A. Normal Operation Test of the Hydraulic System

(1) Charging Time of the Empty Accumulator

	Detail Steps/Work Items	Key Items/References
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Get access to the hydraulic system: – Fold the rear passenger seat-backs forward. – Remove the rear baggage compartment lower access panel.	 Refer to Section 25-10. Refer to Section 25-60.
(3)	Depressurize the hydraulic system.	Refer to Section 29-10.
(4)	Reset the GEAR circuit-breaker.	Right side of instrument panel.
(5)	Measure the charging time of the accumulator: – Set the ELECT. MASTER switch to ON. – Charging time of a completely empty accumulator until the electronic pump pressure switch turns it off. – Set the ELECT. MASTER switch to OFF.	 16 (+4/-3 sec). (18-20 sec for control blocks before revision D).
Note:	The normal re-fill cycle is shorter (from the lower switching point to the upper switching point of the pump pressure switch). If the measured time differs significantly from the actual value, then check the pre-fill pressure of the accumulator.	

(2) Extending and Retracting Time of the Landing Gear

These values assume that the hydraulic system is fully bled.

Cycle	Set-point
Retracting.	5 (+2) sec.
Follow-up time of the pump.	11 (±2) sec.
Extending.	7 (+2) sec.
Follow-up time of the pump.	11 (±2) sec.
Note: Make sure to raise the airplane according to Section 07-10 and connect an external power supply according to Section 24-40 before doing this test. If the measured values accord to the set-points, the function of the “differential pressure mode for retracting” is given automatically.	

(3) Differential Pressure Mode for Retracting of the Landing Gear

	Detail Steps/Work Items	Key Items/References
(1)	Retract the landing gear.	Refer to Section 32-30.
(2)	Getting access to the hydraulic system:	
	– Fold the rear passenger seat-backs forward.	Refer to Section 25-10.
	– Remove the rear baggage compartment lower access panel.	Refer to Section 25-60.
	– Use a screwdriver or any magnetizable material and hold it close to the solenoid valve.	A magnetic testing device (P/NX11-P005) can also be used to test the solenoid valve.
	– If the tool gets pulled to the valve it means it is energized and the differential mode is OFF.	
(3)	In case the solenoid valve is not energized, check the micro switches in the nose landing gear bay.	Refer to Section 32-60.

(4) Internal Leak Tightness

High re-pump cycles as a result of internal leakage at the fully bled system are usually a maximum of one cycle in 2 hours.

Re-pump cycles at completely bled and thermally balanced system cycle	Set-point
Retracted landing gear.	Max. 1 cycle per hour.
Extended landing gear.	Max. 1 cycle per hour.
Note: When the system is cooling down it starts to re-pump earlier. High re-pump cycles can be caused by internal leakage in the valves or also by the piston sealing of the actuator.	

B. Emergency Operation Function Test of the Hydraulic System

(1) Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.

(2) Emergency Extension Test

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
	CAUTION: MAKE SURE THAT THE AREA AROUND THE AIRPLANE IS CLEAR.	
(1)	Pull the GEAR circuit-breaker.	Right side of the instrument panel.
(2)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(3)	Connect an external power supply to the airplane.	Refer to Section 24-40.
(4)	Release the hydraulic pressure from the hydraulic system: – Fold the rear passenger seat-backs forward. – Remove the rear baggage compartment lower access panel.	 Refer to Section 25-10. Refer to Section 25-60.
(5)	Open the dump valve: – Remove the lock wire from the dump valve. – Loosen the counter nut. – Loosen the hexagon socket to open the dump valve. – After emptying wait 10 to 15 min until the accumulator is thermally balanced.	 Wrench size 19 mm. Wrench size 1/4 in.

	Detail Steps/Work Items	Key Items/References
(6)	Close the dump valve: – Tighten the hexagon socket to close the dump valve. – Tighten the counter nut. – Install the lock wire onto the dump valve.	6 - 10 Nm (4.4 – 7.3 lbf.ft.), Wrench size 1/4 in. 8 Nm (5.9 lbf.ft.), Wrench size 19 mm.
(7)	Reset the GEAR circuit-breaker.	Right side of instrument panel.
(8)	Emergency extension: – Operate the emergency extension micro switch (Located on the hydraulic main control block).	This causes the solenoid valves to switch off and the landing gear extends. See Figure 4.
(9)	Retract the landing gear.	Refer to Section 32-30.
(10)	Extend the landing gear regular.	
(11)	Move the wing and rear fuselage trestles clear of the airplane.	
(12)	Lower the airplane with the jacks.	Make sure that the area around the airplane is clear.

C. Leak Tightness Test of the Hydraulic System

WARNING: DO NOT GET HYDRAULIC FLUID ON YOU. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE. IT CAN ALSO DAMAGE CLOTHING.

CAUTION: CLEAN OFF SPILT HYDRAULIC FLUID IMMEDIATELY. HYDRAULIC FLUID CAN DAMAGE THE AIRPLANE STRUCTURE. IT CAN ALSO REMOVE THE PAINT FROM SOME COMPONENTS.

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
	CAUTION: MAKE SURE THAT THE AREA AROUND THE AIRPLANE IS CLEAR. IF THE LANDING GEAR HITS AN OBJECT THE LANDING GEAR CAN BE DAMAGED.	
(1)	Pull the GEAR circuit-breaker.	Right side of the instrument panel.
(2)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(3)	Connect an external power supply to the airplane.	Refer to Section 24-40.
(4)	Retract the landing gear.	Refer to Section 32-30 (Landing Gear Extension and Retraction Test).
(5)	Getting access to the hydraulic system: – Fold the rear passenger seat-backs forward. – Remove the rear baggage compartment lower access panel.	 Refer to Section 25-10. Refer to Section 25-60.

	Detail Steps/Work Items	Key Items/References
(6)	Switch to permanent differential pressure mode: – Remove the electrical plug from the upper solenoid valve.	This causes the hydraulic system to stay in differential pressure mode. Refer to Figure 4 to see the solenoid valve.
(7)	Drain fluid from the hydraulic system.	Refer to Section 29-10. This is important because when testing the hydraulic system, fluid gets pumped into the system and can cause an overflow.
(8)	Install the hand pump: – Remove the protection cap from the MiniMess 1215 plug. – Install the hand pump onto the plug.	The MiniMess 1215 plug is situated on the hydraulic control block. Refer to Figure 4. If your hydraulic system is an old revision without the MiniMess 1215 plug contact the vendor to get it installed.
	Note: Make sure to use clean hydraulic fluid with the hand pump for testing the hydraulic system. Don't overfill the hydraulic reservoir by pumping too much hydraulic fluid with the hand pump into the system.	
(9)	Adjust the pressure limitation valve of the hand pump to 190 bar (2755 PSI).	
(10)	Check for external/internal leakage: – Increase the pressure with the hand pump in the hydraulic system to 170 bar (2466 PSI). – Keep this pressure for 5 minutes and check for any pressure decrease. – Use checklist for leakage test.	The pressure should stay at 170 (-5) bar (2466 [-72] PSI). If the pressure drops below 165 bar (2393 PSI) and there is no external leakage visible it can be assumed that there is an internal leakage. Please contact after sales support at Diamond Aircraft. Refer to Paragraph D (Checklist for external leakage).

	Detail Steps/Work Items	Key Items/References
(11)	Check operation of the protection valve on the main control block: – Increase the pressure of the hydraulic system to more than 180 bar (2610 PSI). – The protection valve should open and after the valve closes and the pressure in the hydraulic system is stabilized the pressure is steady at 150 bar (2175 PSI).	Refer to Figure 4.
(12)	Move the wings and rear fuselage trestles clear of the airplane.	
(13)	Lower the airplane with the jacks. Make sure that area around the airplane is clear.	
(14)	Reset the GEAR circuit breaker.	Right side of instrument panel.

D. Checklist for External Leakage

Note: Check the hydraulic hoses on the hydraulic kit which is installed in the back of the fuselage. Also check the connections of the hoses on the hydraulic control block and on the hydraulic actuators visually for leak-tightness.

Checkpoint	Set-point
Leakage on the fittings of the hydraulic kit.	No leakage.
Leakage on the hose connections of the manifold and control block.	No leakage.
Leakage on the hose connections of the hydraulic actuators.	No leakage.
Leakage on the piston seal of the hydraulic actuator.	No drop formation allowed. Maximum a little amount of dried fluid on the cylinder head respectively on the piston rod end.

Note: After fixing a leakage on the fittings or hose connections a leak tightness test has to be done.

(1) External Leakage

In general you should check if there is any damage of the piston of the hydraulic actuator when the landing gear is retracted. (Refer to Section 32-30 Landing gear extension and retraction test). Look for scratches, bumps, grooves or any other physical damage. If there are any damages in the range of the piston seal the hydraulic actuator piston has to be replaced. (Refer to Section 29-10)

If a hydraulic actuator has a major leakage (drop formation visible) send the hydraulic actuator to the vendor for a repair.

If a hydraulic actuator has a minor leakage (a little amount of dried fluid, no drop formation) perform a detailed check.

(2) Detailed Check

Static (landing gear extended, ELECT. MASTER switch ON / Set GEAR circuit-breaker):

– Max. leakage 1 drop of fluid in 10 hours.

Dynamic (after 25 extend/retract cycles):

– Max. leakage 1 drop of fluid.

Note: If one of the measurements don’t comply with these set-points send the actuator to the vendor for a repair. Otherwise you can continue the operation but observe the situation.

E. Pump Pressure Switch and Pressure Limitation Valve Operation Test

(1) Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.
Manometer to test hydraulic pressure.	1	X11-P001.

(2) Testing Procedure

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
	CAUTION: MAKE SURE THAT THE AREA AROUND THE AIRPLANE IS CLEAR. IF THE LANDING GEAR HITS AN OBJECT THE LANDING GEAR CAN BE DAMAGED.	
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(3)	Connect an external power supply to the airplane.	Refer to Section 24-40.
(4)	Get access to the hydraulic system: – Fold the rear passenger seat-backs forward. – Remove the rear baggage compartment lower access panel.	 Refer to Section 25-10. Refer to Section 25-60.
(5)	Remove the protection cap from the test plug (MiniMess 1215) located on the main control block and connect the manometer.	See Figure 4. If your hydraulic system is an old revision without the MiniMess 1215 plug contact the vendor to get it installed.
(6)	Reset the GEAR circuit-breaker.	Right side of instrument panel.

	Detail Steps/Work Items	Key Items/References
(7)	Check of the pressure limitation valve: – Landing gear fully extended. – Pump is still running to charge the accumulator.	 Set-point: 120 (+5) bar (1740 [+72] PSI).
	Note: The following 2 steps to test the pump pressure switch are not required if the system is working properly.	
(8)	Check closing point of the pump pressure switch: – Retract the landing gear fully. – Operate the emergency extension lever just a little bit, so that the micro switch on the emergency extension doesn't switch but that the valve is opened a little bit. – The pressure on the manometer should decrease. – When the pump switches on, read the manometer value.	 Refer to Section 32-30, Paragraph 7. See Figure 4. 93 ±1 bar (1349 ± 14.5 PSI).

	Detail Steps/Work Items	Key Items/References
(9)	Check opening point of the pump pressure switch:	
	– Extend the landing gear fully.	Refer to Section 32-30.
	– Open dump valve until the pump switches ON:	
	– Remove the lock wire from the dump valve.	
	– Loosen the counter nut.	
	– Loosen the hexagon socket to open the dump valve.	
	– Slowly close the dump valve so that the pressure on the manometer increases slowly.	Adjust the dump valve so that the circulation pressure is at 110 bar (1595 PSI).
	– Now wait approx. 20 sec so that the accumulator can charge fully.	
	– **Slowly** close the dump valve completely and check the pressure with the manometer:	Set-point: 114 ±1 bar (1653 ± 14.5 PSI).
	– Tighten the hexagon socket to close the dump valve.	6-10 Nm / wrench size 1/4 in.
	– Tighten the counter nut.	8 Nm (5.9 lbf.ft.), wrench size 19 mm.
	– Install the lock wire onto the dump valve.	
(10)	Move the wing and rear fuselage trestles clear of the airplane.	
(11)	Lower the airplane with the jacks.	Make sure that the area around the airplane is clear.

12. Filters

A. Maintain Hydraulic Reservoir Filter

WARNING: DO NOT GET HYDRAULIC FLUID ON YOU. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE. IT CAN ALSO DAMAGE CLOTHING.

CAUTION: CLEAN OFF SPILT HYDRAULIC FLUID IMMEDIATELY. HYDRAULIC FLUID CAN DAMAGE THE AIRPLANE STRUCTURE. IT CAN ALSO REMOVE THE PAINT FROM SOME COMPONENTS.

Note: A contaminated filter causes a bad intake performance of the pump, because it needs a minimum intake pressure of 350 mbar.

	Detail Steps/Work Items	Key Items/References
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Get access to the hydraulic system:	
	– Fold the rear passenger seat-backs forward.	Refer to Section 25-10.
	– Remove the rear baggage compartment lower access panel.	Refer to Section 25-60.
(3)	Remove the vent hose by disconnecting the 90° fitting on the top of the hydraulic reservoir.	In case you have an old revision without drain hose skip this step. Refer to Figure 3.
(4)	Maintain the filter assembly (fitting and filter):	Use wrench size 27 mm.
	– Remove the lock wire from the filter fitting.	
	– Hold the reservoir lid screw with a wrench so that the lid doesn't turn while removing the filter.	Use wrench size 22 mm.
	– Remove the filter fitting while holding the lid.	
	– Clean the filter by using benzine or other washing solvent. Blow the filter with compressed-air to remove dirt.	Make sure to blow the filter in the correct direction.
(5)	If removed, install vent hose by connecting the 90° fitting on the top of the hydraulic reservoir.	

	Detail Steps/Work Items	Key Items/References
(6)	Install the rear baggage compartment lower access panel.	Refer to Section 25-60.
(7)	Fold the rear passenger seat-backs backwards.	Refer to Section 25-10.
(8)	Reset the GEAR circuit-breaker.	Right side of instrument panel.

B. Replace/Maintain the High Pressure Filter

WARNING: **DO NOT GET HYDRAULIC FLUID ON YOU. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE. IT CAN ALSO DAMAGE CLOTHING.**

CAUTION: CLEAN OFF SPILT HYDRAULIC FLUID IMMEDIATELY. HYDRAULIC FLUID CAN DAMAGE THE AIRPLANE STRUCTURE. IT CAN ALSO REMOVE THE PAINT FROM SOME COMPONENTS.

	Detail Steps/Work Items	Key Items/References
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Get access to the hydraulic system: – Fold the rear passenger seat-backs forward. – Remove the rear baggage compartment lower access panel.	 Refer to Section 25-10. Refer to Section 25-60.
(3)	Replace high pressure filter: – Remove filter housing. – Pull the old filter element clear of the filter body. – Push and slightly turn the filter element into the filter body until it's secure. – Install filter housing.	Refer to Figure 1. Put paper towel underneath to avoid spilling of hydraulic fluid. Metal/paper filter element. Tighten the filter housing with your hand (approx. 5 Nm, 3.7 lbf.ft.)
(4)	Install the rear baggage compartment lower access panel.	Refer to Section 25-60.
(5)	Fold the rear passenger seat-backs backwards.	Refer to Section 25-10.
(6)	Reset the GEAR circuit-breaker.	Right side of instrument panel.

CAUTION: **BECAUSE OF ITS DESIGN THIS FILTER ELEMENT CAN NOT BE CLEANED. IT HAS TO BE REPLACED IF IT'S CONTAMINATED.**

Note: The high pressure filter is located between the pressure pipe of the hydraulic pump and the hydraulic control unit. It consists of a metal/paper filter element.

13. Valves

A. Replace the Dump Valve

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	Detail Steps/Work Items	Key Items/References
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Getting access to the hydraulic system: – Fold the rear passenger seat-backs forward. – Remove the rear baggage compartment lower access panel.	 Refer to Section 25-10. Refer to Section 25-60.
(3)	Depressurize the hydraulic system.	Refer to Section 29-10.
(4)	Drain fluid from the hydraulic system.	Refer to Section 29-10. The fluid level of the reservoir should be lower than the top surface of the main control block.
(5)	Replace the dump valve: – Remove both lock wires from the valve. – Remove the dump valve. – Install the new dump valve. – Install lock wires on the dump valve.	 Use wrench size 22 mm. Put Rivolta F.L.A onto the thread and tighten the valve with 25 Nm (18.4 lbf.ft.).
(6)	If hydraulic fluid was drained in step 3, replenish the hydraulic reservoir with hydraulic fluid.	Refer to Section 29-10.
(7)	Bleed the accumulator.	Refer to Section 29-10.
(8)	Bleed the hydraulic system.	Refer to Section 29-10.

	Detail Steps/Work Items	Key Items/References
(9)	Do the normal operation test for the hydraulic system.	Refer to Section 29-10.
(10)	Reset the GEAR circuit breaker.	Right side of instrument panel.

B. Replace the Pressure Relief Valve / Pump Pressure Switch

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	Detail Steps/Work Items	Key Items/References
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Getting access to the hydraulic system: – Fold the rear passenger seat-backs forward. – Remove the rear baggage compartment lower access panel.	 Refer to Section 25-10. Refer to Section 25-60.
(3)	Depressurize the hydraulic system.	Refer to Section 29-10.
(4)	Drain fluid from the hydraulic system.	Refer to Section 29-10. The fluid level of the reservoir should be lower than the top surface of the main control block.
(5)	Remove the pump pressure switch: – Remove the electric connector from the switch. – Remove the pump pressure switch.	To get a better access to the pressure relief valve remove the pump pressure switch first. Use wrench size 27 mm.
Note: The following 2 steps are not required if only the pump pressure switch should be replaced.		

	Detail Steps/Work Items	Key Items/References
(6)	Install a cap onto the main control block where the pump pressure switch was installed.	This is to protect the control block from dirt/dust. Use a DIN908-G 1/4 size plug.
(7)	Replace the pressure relief valve: – Remove the valve carefully. – Install the pressure relief valve.	Use wrench size 24 mm. Make sure not to damage the backup ring on the valve. Apply Rivolta F.L.A onto the thread and tighten with 25 Nm (18.4 lbf.ft.).
(8)	Install the pump pressure switch: – Install the switch. – Install the electric connector back onto the switch.	 Use wrench size 27 mm. Apply Rivolta F.L.A. onto the thread and tighten with 18 Nm (13.3 lbf.ft.).
(9)	If hydraulic fluid was drained in step 3, replenish the hydraulic reservoir with hydraulic fluid.	Refer to Section 29-10.
(10)	Bleed the accumulator.	Refer to Section 29-10.
(11)	Bleed the hydraulic system.	Refer to Section 29-10.
(12)	Do the normal operation test for the hydraulic system.	Refer to Section 29-10.
(13)	Reset the GEAR circuit-breaker.	Right side of the instrument panel.

C. Replace/Check a Solenoid Valve

Note: In order to replace the bottom solenoid valve, remove the bolts from the metal plate where the hydraulic system is mounted on. Now lift the plate to get access to the solenoid valve.

(1) Replace a Solenoid Valve

	Detail Steps/Work Items	Key Items/References
(1)	Pull the GEAR circuit breaker.	Right side of instrument panel.
(2)	Remove the electric connector from the solenoid valve.	
(3)	Remove the knurled nut on the top of the valve.	Use special tool to remove the nut.
(4)	Remove the solenoid valve from the shaft.	Make sure all the O-rings are removed from the shaft.
(5)	Install the new solenoid valve onto the shaft. Tighten the valve by hand (approx. 5 Nm).	Make sure the valve is installed properly otherwise you can damage it.
(6)	Plug the electric connector back onto the solenoid valve.	
(7)	Do the normal operation test for the hydraulic system.	Refer to Section 29-10.
(8)	Reset the GEAR circuit breaker.	Right side of instrument panel.

(2) Electric States of the Solenoid Valves

Checkpoint	Set-Point
Retracting.	Top solenoid valve: energized. Bottom solenoid valve: not energized.
Fully retracted.	Top solenoid valve: energized. Bottom solenoid valve: energized.
Extending / Fully extended.	Top solenoid valve: not energized. Bottom solenoid valve: not energized.

D. Replace the Accumulator Charging Valve

	Detail Steps/Work Items	Key Items/References
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel
(2)	Getting access to the hydraulic system: – Fold the rear passenger seat-backs forward. – Remove the rear baggage compartment lower access panel.	 Refer to Section 25-10. Refer to Section 25-60.
Note: Make sure when loosening the counter nut that you don't accidentally loosen the whole accumulator charging valve.		
(3)	Releasing the nitrogen from the accumulator: – Remove the yellow protection cap from the accumulator charging valve. – Loosen the counter nut on the accumulator charging valve until you feel a resistance. Now slowly continue to loosen the nut. This will cause the valve to open.	Make sure to release the nitrogen slowly. The accumulator cools down while releasing the nitrogen. Use wrench size ¾ in.
(4)	Replace the accumulator charging valve: – Remove the accumulator charging valve by loosening the hexagon head of valve body (not the counter nut). – Install the new accumulator charging valve.	MS-28889-2 standard valve is used. Use wrench size ¾ in. Apply Rivolta F.L.A onto the thread and tighten the valve with 25 Nm (18.4 lbf.ft.).
(5)	Charge the accumulator with nitrogen.	Refer to Section 29-10.
(6)	Test the accumulator charging valve for leak-tightness.	Apply some leak-finder spray onto the valve and look for air bubbles.
(7)	Reset the GEAR circuit-breaker.	Right side of instrument panel.

E. Replace the Flow Regulation Valve

WARNING: DO NOT GET HYDRAULIC FLUID ON YOU. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE. IT CAN ALSO DAMAGE CLOTHING.

CAUTION: CLEAN OFF SPILT HYDRAULIC FLUID IMMEDIATELY. HYDRAULIC FLUID CAN DAMAGE THE AIRPLANE STRUCTURE. IT CAN ALSO REMOVE THE PAINT FROM SOME COMPONENTS.

	Detail Steps/Work Items	Key Items/References
(1)	Getting access to the hydraulic system: – Fold the rear passenger seat-backs forward. – Remove the rear baggage compartment lower access panel.	 Refer to Section 25-10. Refer to Section 25-60.
(2)	Depressurize the hydraulic system.	Refer to Section 29-10.
(3)	Drain fluid from the hydraulic system.	Refer to Section 29-10. The fluid level should be lower than the hydraulic control manifold.
(4)	Remove the flow regulation valves. – Remove the valves and two seal rings on each valve. – Make sure to catch spilt hydraulic fluid.	 Wrench size 22 mm.
(5)	Install flow regulation valves: – Install the M1.7 valve in the middle hole of the hydraulic supply manifold and tighten it with 25 Nm (18.4 lbf.ft.). – Install the two M1.5 valves in the top and bottom hole of the hydraulic supply manifold and tighten them with 25 Nm (18.4 lbf.ft.).	 Put Rivolta F.L.A on both, the thread and the O-rings.
(6)	Replenish the hydraulic reservoir with hydraulic fluid.	Refer to Section 29-10.
(7)	Bleed the accumulator.	Refer to Section 29-10.
(8)	Bleed the hydraulic system.	Refer to Section 29-10.

	Detail Steps/Work Items	Key Items/References
(9)	Do the normal operation test for the hydraulic system.	Refer to Section 29-10.
(10)	Reset the GEAR circuit breaker.	Right side of instrument panel.

14. Remove/Install/Disassemble/Assemble Hydraulic Control Block

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A. Remove the Hydraulic Control Block

	Detail Steps/Work Items	Key Items/References
(1)	Getting access to the hydraulic system: – Fold the rear passenger seat-backs forward. – Remove the rear baggage compartment lower access panel.	 Refer to Section 25-10. Refer to Section 25-60.
(2)	Depressurize the hydraulic system.	Refer to Section 29-10.
(3)	Remove all seven hydraulic hoses from the hydraulic control block.	Use a suitable container to catch spilt hydraulic fluid. Fit caps on all open connections.
(4)	Remove all electrical connections from the hydraulic control block.	(Pump pressure switch connector, solenoid valve connections)
(5)	Remove the emergency extension micro switch.	Refer to Figure 4.
(6)	Disconnect the Bowden cable from the emergency extension block.	Refer to Figure 4.

	Detail Steps/Work Items	Key Items/References
(7)	Remove the control block: – Remove the three bolts which secure the hydraulic control block. – Move the control block clear from the rest of the hydraulic system.	Use hexagon socket size 4.

B. Install the Hydraulic Control Block

	Detail Steps/Work Items	Key Items/References
(1)	Install the control block: – Move the control block into position onto the hydraulic system. – Install the three bolts which secure the hydraulic control block but don't tighten them yet.	Use hexagon socket size 4.
(2)	Connect the Bowden cable onto the emergency extension module.	Refer to Figure 4.
(3)	Install the emergency extension micro switch.	Refer to Figure 4.
(4)	Install all electrical connections onto the hydraulic control block (Pump pressure switch connector, solenoid valve connections).	Check polarity of solenoid valve connections.
(5)	Install all seven hydraulic hoses onto the hydraulic control block.	Remove the caps from the connections.
(6)	Tighten the three bolts which secure the hydraulic control block.	
(7)	If hydraulic fluid was drained, replenish the hydraulic reservoir with hydraulic fluid.	Refer to Section 29-10.
(8)	Bleed the accumulator.	Refer to Section 29-10.
(9)	Bleed the hydraulic system.	Refer to Section 29-10.

	Detail Steps/Work Items	Key Items/References
(10)	Do the normal operation test for the hydraulic system.	Refer to Section 29-10.
(11)	Reset the GEAR circuit breaker.	Right side of instrument panel.

C. Disassemble Hydraulic Control Block

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	Detail Steps/Work Items	Key Items/References
(1)	Remove hydraulic control block.	Refer to Section 29-10.
(2)	Remove the four bolts from the control block. (hexagonal socket head [Allen head], Size 4)	
(3)	Separate the three main blocks.	Refer to Figure 4.
(4)	Remove the control block: – Clean the holes and bolts from residues of the adhesive. – Remove the seal rings from contact surface of the blocks.	Standard MS28778-4 seal rings are used.

D. Assemble Hydraulic Control Block

	Detail Steps/Work Items	Key Items/References
(1)	Prepare the three main blocks: – Make sure there is no residues of the adhesive on the holes and bolts. – Position the three main blocks vertical so that seal rings can be installed easier. – Install the seal rings onto the blocks.	Refer to Figure 4. So that the plane surface where the seals get installed is horizontal. Make sure there is no dirt on the plane surfaces otherwise the control block may be leaking.
(2)	Install the four bolts to secure the three main parts: – Apply some Loctite 243 onto each bolt thread to secure it. – Install the bolts and tighten them with 4 Nm.	
(3)	Install the hydraulic control block.	Refer to Section 29-10.

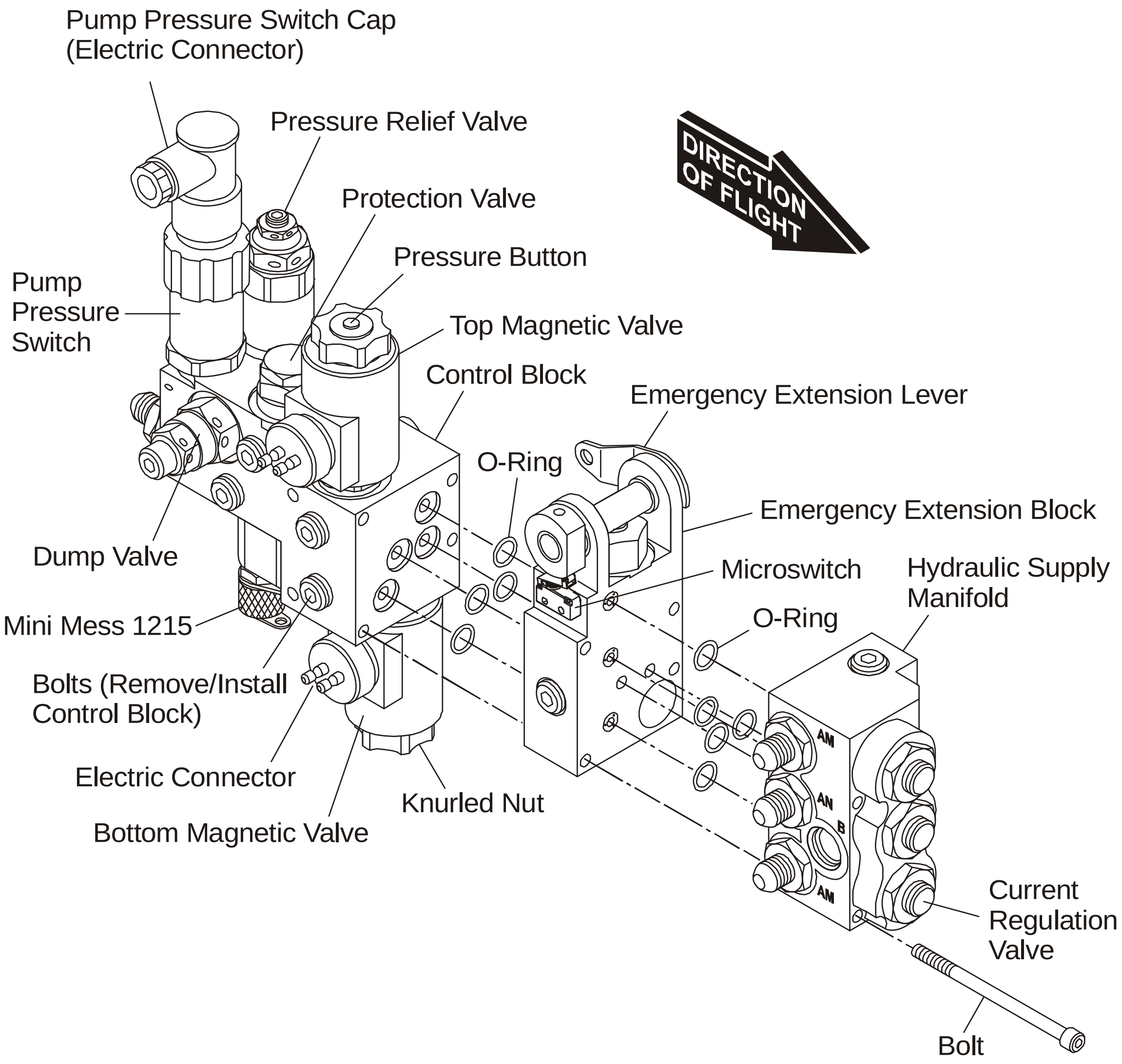

Figure 4: Hydraulic Control Block

15. Bleed/Remove/Install the Accumulator

A. Bleed the Accumulator

	Detail Steps/Work Items	Key Items/References
(1)	Check level of hydraulic reservoir.	Refer to Section 29-10.
(2)	Replenish hydraulic reservoir if necessary.	Refer to Section 29-10.
(3)	Set GEAR circuit-breaker.	Right side of instrument panel.
(4)	Set ELECT. MASTER switch to ON.	
(5)	The hydraulic pump must operate until the system pressure stabilizes.	The hydraulic pump must stop operating.
(6)	Set the ELECT. MASTER switch to OFF.	
(7)	Open the dump valve: – Remove the lock wire from the dump valve. – Loosen the counter nut. – Loosen the hexagon socket to open the dump valve. – After emptying wait 10-15 min until the accumulator is thermally balanced.	 Wrench size 19 mm. Wrench size 1/4 in.
(8)	Close the dump valve: – Tighten the hexagon socket to close the dump valve. – Tighten the counter nut. – Install the lock wire onto the dump valve.	 6–10 Nm (4.4-7.3 lbf.ft.) / wrench size 1/4 in. 8 Nm (5.9 lbf.ft.) / wrench size 19 mm.
(9)	Pull GEAR circuit breaker.	Right side of instrument panel.

B. Remove the Accumulator

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	Detail Steps/Work Items	**Key Items/References**
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Open the dump valve: – Remove the lock wire from the dump valve. – Loosen the counter nut. – Loosen the hexagon socket to open dump valve. – After emptying wait 10 - 15 min. until the accumulator is thermally balanced.	Wrench size 19 mm. Wrench size 1/4 in.
(3)	Operate the pressure button on the upper solenoid valve on the top of the hydraulic control block.	See Figure 4. Use a little metal pin or ball pen to operate the button.
(4)	Remove the accumulator: – Remove the hydraulic hose from the accumulator. – Open the bolts which hold the accumulator in place and open the clamp – Move the accumulator clear from the hydraulic system.	

C. Install the Accumulator

	Detail Steps/Work Items	Key Items/References
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Install the accumulator: – Move the accumulator in position. – Close the clamps and install the bolts which hold the accumulator in place. – Install the hydraulic hose from the accumulator.	Apply Rivolta F.L.A for corrosion protection. Tighten with 5 - 6 Nm (3.7 - 4.4 lbf.ft.).
(3)	Check the hydraulic fluid level of the hydraulic reservoir.	Refer to Section 29-10.
(4)	Bleed the hydraulic system.	Refer to Section 29-10.
(5)	Bleed the accumulator.	Refer to Section 29-10.
(6)	Do the normal operation test for the hydraulic system.	Refer to Section 29-10.

16. Check the Accumulator

The accumulator should be tested every 200 hours of operation respectively once a year if there is any inner leakage and the correct pre-fill pressure.

A. Equipment

Item	Quantity	Part Number
Adapter MS28889-2 / MiniMess1615.	1	Commercial.
Manometer to test pressure on the accumulator.	1	X11-P002.

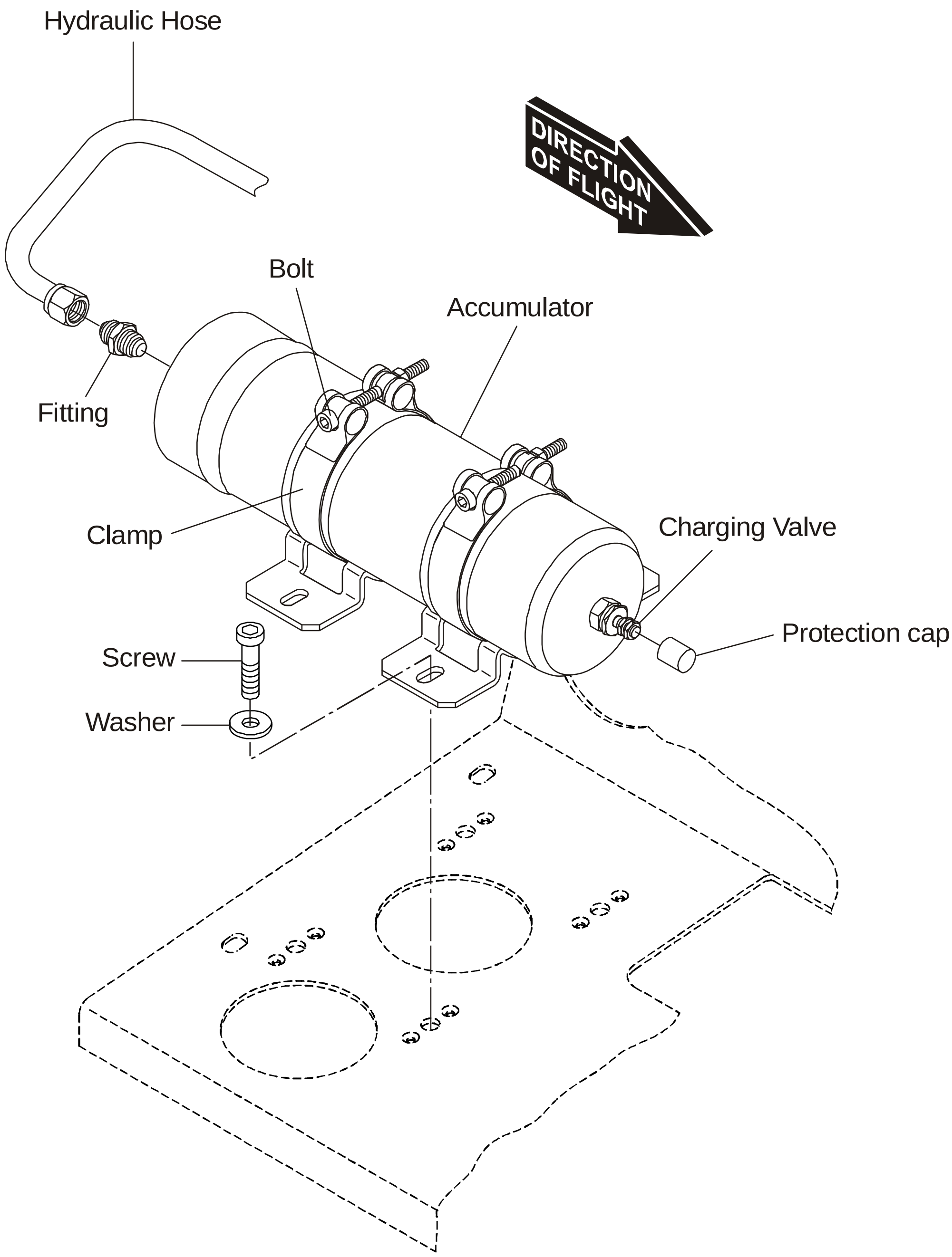

Figure 5: Hydraulic Accumulator Installation

B. Testing Procedure

	Detail Steps/Work Items	Key Items/References
(1)	Get access to the hydraulic system: – Fold the rear passenger seat-backs forward. – Remove the rear baggage compartment lower access panel.	 Refer to Section 25-10. Refer to Section 25-60.
(2)	Depressurize the hydraulic system.	Refer to Section 29-10.
	Note: Make sure when loosening the counter nut on the accumulator that you don't accidentally loosen the whole high pressure valve.	
	WARNING: IF THE HOSE OF THE MANOMETER IS NOT CONNECTED PROPERLY TO THE HIGH PRESSURE VALVE, NITROGEN CAN LEAK FROM THE ACCUMULATOR. IF THAT IS THE CASE, CLOSE THE COUNTER NUT IMMEDIATELY AND CHECK ALL CONNECTIONS AGAIN. THE ACCUMULATOR HAS TO BE REFILLED ACCORDING TO SECTION 29-10 PARAGRAPH 17.	
(3)	Connecting the test manometer: – Remove the yellow protection cap from the high pressure valve on the accumulator. – Screw the adapter (MS28889-2 / MiniMess1615) onto the valve as far as it will go (sealing face). – Screw the swivel nut from the manometer onto the adapter. – Loosen the counter nut on the valve until it reaches the end face. Now slowly continue to loosen the nut. This will cause the valve to open.	

	Detail Steps/Work Items	Key Items/References
(4)	Check the pressure on the manometer: The reqiured pressure is 80 bar (1160 PSI) at 15°C, (82.8 bar [1200 PSI] at 25°C).	If the measured pressure differs a lot compared to the set-point, see the Trouble-Shooting Section.
(5)	Disconnecting the test manometer: – Tighten the counter nut on the valve with 10 Nm (7.4 lbf.ft.). – Remove the manometer from the adapter. – Remove the Adapter (MS28889-2 / MiniMess 1615) from the valve. – Put the yellow protection cap back onto the high pressure valve.	
(6)	Reset the GEAR circuit-breaker.	Right side of instrument panel.
(7)	Check for correct charging time of the hydraulic accumulator: – Set the ELECT. MASTER switch to ON. – The hydraulic pump must operate until the system pressure stabilizes. – The hydraulic pump must stop operating. – Set the ELECT. MASTER switch to OFF.	Approx. 16 (+4/ -3) seconds with a completely empty accumulator.

17. Charge the Hydraulic Accumulator with Nitrogen

A. Equipment

Item	Quantity	Part Number
Adapter MS28889-2 / MiniMess1615.	1	Commercial.
Nitrogen bottle with pressure reducer.	1	X11-P003.

B. Charge Accumulator with Nitrogen

	Detail Steps/Work Items	Key Items/References
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Get access to the hydraulic system: – Fold the rear passenger seat-backs forward. – Remove the rear baggage compartment lower access panel.	 Refer to Section 25-10. Refer to Section 25-60.
(3)	Depressurize the hydraulic system.	Refer to Section 29-10.
	Note: Make sure when loosening the counter nut on the accumulator that you do not accidentally loosen the whole high pressure valve.	
	WARNING: IF THE HOSE OF THE MANOMETER IS NOT CONNECTED PROPERLY TO THE HIGH PRESSURE VALVE, NITROGEN CAN LEAK FROM THE ACCUMULATOR. IF THAT IS THE CASE, CLOSE THE COUNTER NUT IMMEDIATELY AND CHECK ALL CONNECTIONS AGAIN.	

	Detail Steps/Work Items	Key Items/References
(4)	Connecting the nitrogen bottle: – Check the pressure reducer on the nitrogen bottle. It must be set to 90 bar (1305 PSI). – Remove the yellow protection cap from the accumulator charging valve. – Screw the Adapter (MS28889-2 / MiniMess1615) onto the valve as far as possible (sealing face). – Screw the swivel nut of the charging hose onto the adapter. – Loosen the counter nut on the high pressure valve until it reaches the end face. Now slowly continue to loosen the nut. This will cause the valve to open.	
(5)	Charge the accumulator: – Read the pressure on the manometer of the pressure reducer. – Charge the accumulator to a pressure of 85-90 bar (1233-1305 PSI). – Close the valve on the nitrogen bottle and wait 10 min until the accumulator is thermally balanced. – Check the pressure of the accumulator again and fine tune the pressure with the pressure reducer on the nitrogen bottle until the set-point is reached.	Set-point: 80 bar, 1160 PSI (15°C) 82.8 bar, 1200 PSI (25°C)

	Detail Steps/Work Items	Key Items/References
(6)	Disconnect the nitrogen bottle: – Tighten the counter nut on the valve with 10 Nm (7.3 lbf.ft.). – Close the valve on the nitrogen bottle and release the remaining pressure with the pressure reducer. – Remove the nitrogen bottle from the adapter. – Remove the Adapter (MS28889-2 / MiniMess 1615) from the valve. – Put the yellow protection cap back onto the high pressure valve.	
(7)	Reset the GEAR circuit-breaker.	Right side of instrument panel.
(8)	Check operation of the hydraulic accumulator:	Refer to Section 29-10.

CHAPTER 30

ICE PROTECTION SYSTEM

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ICE PROTECTION SYSTEM

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Note: The Ice Protection System is optional equipment (OÄM 42-053 & 42-054 carried out)

CHAPTER 30
ICE PROTECTION SYSTEM

1. General

WARNING: DO NOT GET DE-ICING FLUID ON YOUR SKIN OR ON YOUR CLOTHES. DE-ICING FLUID IS HARMFUL AND CAN CAUSE INJURIES TO PERSONS AND CAN DAMAGE YOUR CLOTHING.

CAUTION: HANDLE DE-ICING FLUID WITH CARE. DE-ICING FLUID IS FLAMMABLE AND CAN CAUSE DAMAGE TO EQUIPMENT.

This Section explains the fluid based ice protection system of the DA 42 airplane. It gives you general data and the trouble-shooting data on the system. Refer to CAV Aerospace Ltd. for data on the ice protection system.

The ice protection system prevents accumulation of ice by distributing a thin film of a special de-icing fluid on the wings, horizontal stabilizer, vertical stabilizer, propellers and canopy. The area on the panels at which de-icing fluid weeps out through many fine holes is called the 'active area.'

The airframe and propellers are grouped and operate together. Windshield de-icing is a separate system and operates independently. All systems draw fluid from a common tank.

Note: Refer to Section 20-90 before starting maintenance work in the center wing area.

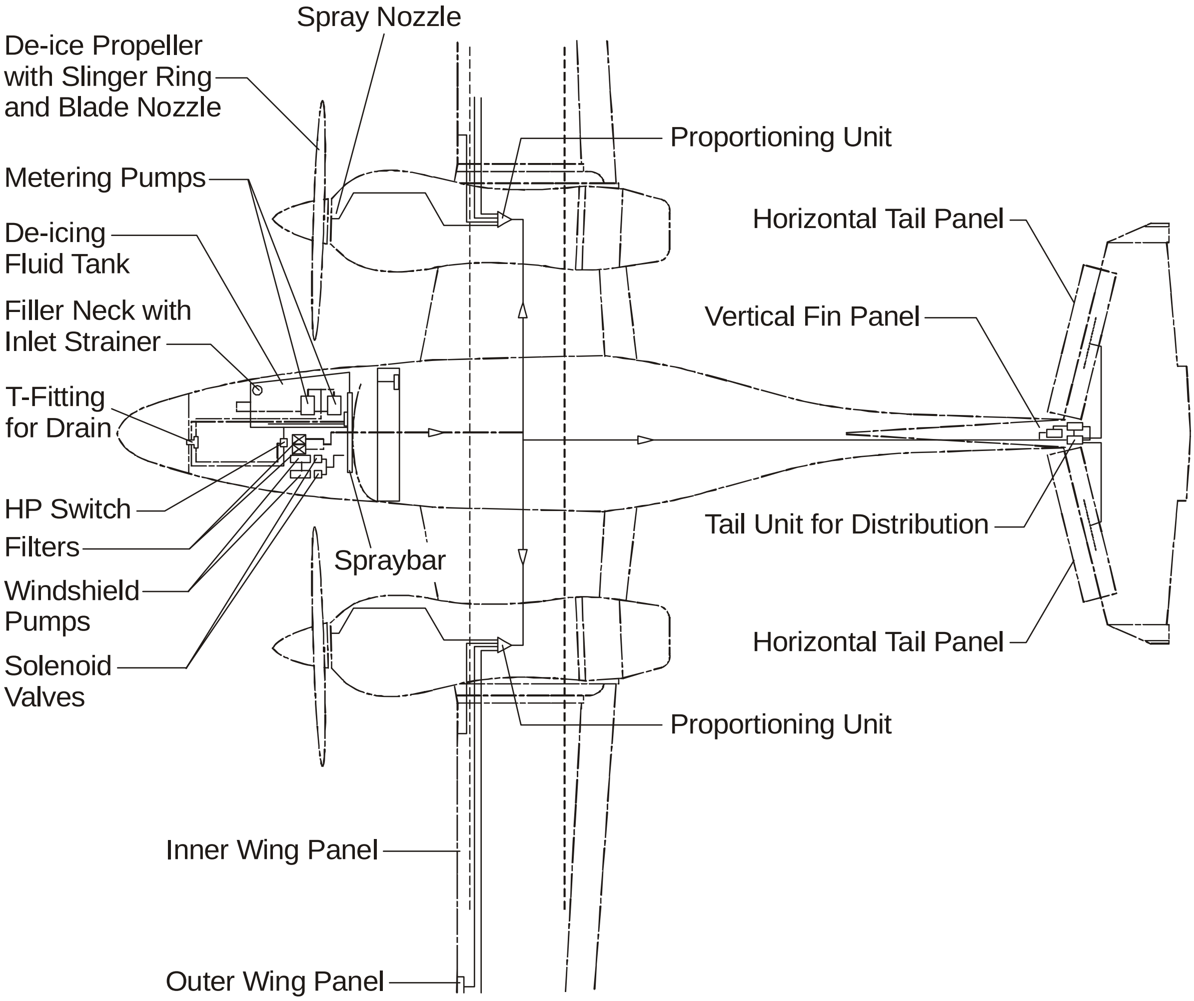

Figure 1: Ice Protection System - Mechanical Schematic

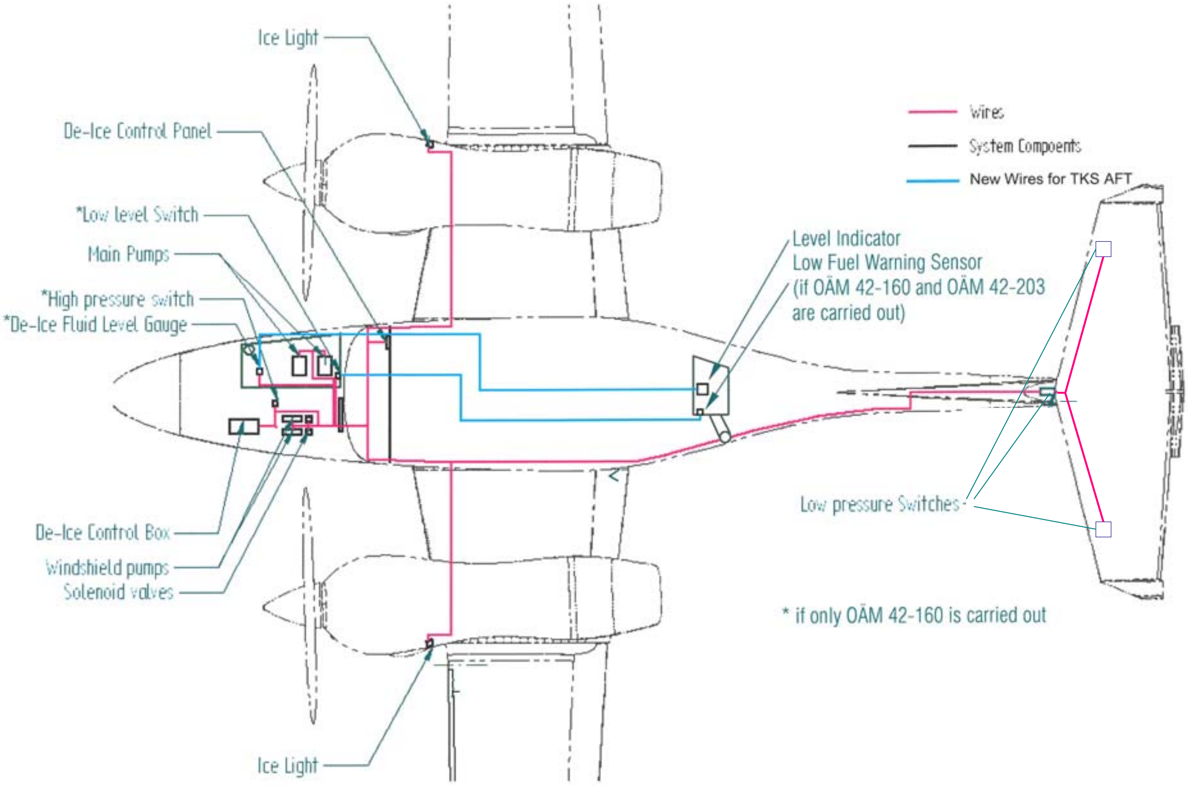

Figure 2: Ice Protection System - Electrical Schematic

2. Description

Figure 1 shows the schematic diagram for the mechanical parts of the fluid based ice protection system on the DA 42. The mechanical part of the ice protection system consists of:

– Porous panels on the leading edge of the horizontal tail.

– Porous panel on the leading edge of the vertical tail.

– Porous panels on the leading edge of the outer wings.

– De-icing fluid tank with integrated level sensor, level switch and inlet strainer.

– De-icing fluid main pumps.

– De-icing fluid filters.

– Drain hose connector in nose landing gear bay.

– Proportioning units in each engine nacelle.

– Nozzles and slinger rings on the LH and RH propeller.

– Proportioning unit in the vertical tail.

– Low pressure sensors in the vertical tail.

– High pressure sensor.

– Windshield pumps with solenoid valves.

– Spraybar in front of the canopy.

These system components are connected with nylon tubing. For the ice protection of the propeller Teflon lines through the engine nacelles to the slinger rings of the propeller are used.

Figure 2 shows the schematic diagram for the electrical parts of the fluid based ice protection system on the DA 42. The electrical part of the ice protection system consists of:

– De-ice control box.

– De-ice control panel.

– Low level sensor.

– De-ice fluid level gauge.

– Low pressure sensor.

– High pressure sensor.

– Main pumps.

– Windshield pumps.

– Solenoid valves.

– Ice lights.

The ice protection system is electrically operated. It is supplied with power via the XFR PUMP/DE-ICE circuit breaker. Refer to Chapter 92 for wiring diagrams.

A. De-Icing Fluid Tank

The de-icing fluid tank is installed in the nose baggage compartment of the airplane on the RH side. It consists of a single polyethylene (XPE) chamber with a usable capacity of 30 liter (7.9 US gal). The tank filler is located in the fuselage nose on the RH side, aft of the nose baggage door.

A fluid level sensor provides the signal for the fluid level indication on the G1000. A level switch in the tank provides indication of the minimum quantity for dispatch (45 minutes) via a caution message on the G1000.

The tank has an inlet with an integrated strainer. From the outlet, nylon tubing feeds the fluid to the inlet of the main pump assembly.

B. Main Pump Assembly

The main pump assembly consists of two electrical pumps which are connected in series. These pumps are mounted to the bottom side of a lid in the floor of the nose baggage compartment on the RH side.

The main pump assembly has two outlets. One outlet supplies the airframe ice protection system (see Paragraph C). The other outlet supplies the windshield de-icing system (see Paragraph D).

C. Airframe Ice Protection System

(1) High Pressure Sensor

A high pressure sensor is situated between the main pump assembly and the filter. It is attached to the LH inspection hole cover in the nose baggage compartment.

When the resistance of the filters becomes too high, the sensor activates a caution message ("DEIC PRES HI") on the Garmin G1000 PFD. The system remains operative, but the filter cartridges must be replaced at the next scheduled inspection.

(2) De-Icing Fluid Filters

Two filters protect the capillaries in the proportioning units from fouling . The filters are connected in parallel for redundancy purposes. The outlets of the filters are merged with a T-piece and then the fluid runs underneath the cockpit floor to a manifold block in the center of the airplane. Each filter has a bleeding socket connected to a bleeding hose, which is located in the LH nose baggage compartment.

(3) Manifold Block

The manifold block is located under the small center console between the center wing main spars. It divides the flow of de-icing fluid into three branches. One branch goes to each wing to feed the wing and propeller ice protection system (see Paragraph 4). One branch goes back to feed the empennage ice protection system (see Paragraph 5).

(4) Wing and Propeller Ice Protection System

(a) Proportioning Unit

A proportioning unit is located in each engine nacelle between the center wing spars. It is accessible after removal of the small inspection panel on the outboard side of the nacelle.

The proportioning unit divides the fluid flow into three sub-branches. For each sub-branch there is a capillary which ensures that the correct amount of de-icing fluid flows to the related sub-branch.

One sub-branch goes forward to feed the propeller ice protection system (see Paragraph b). Two branches go to the outer wing to feed the wing ice protection system (see Paragraph c).

(b) Propeller Ice Protection System

A Teflon tube goes from the proportioning unit forward to a nozzle near the propeller, where the de-icing fluid drops onto a slinger ring. In the engine compartment of the nacelle the tube is protected by a fire sleeve. The slinger ring has three notches that allow the de-icing fluid to be distributed over the propeller blades by centrifugal action.

(c) Wing Ice Protection System

Two porous panels are attached to the leading edge of each outer wing. They discharge the fluid onto the wing through many fine holes.

The panels are bonded to the wing leading edge. They cannot be removed without damage.

(d) Purging Connections

Near the rearward inspection hole cover on the outboard side of each nacelle an equal tee for purging of the system is installed.

(e) Filter Bleeding Hose

In the LH nose baggage compartment behind the floor carpet.

(5) Empennage Ice Protection System

(a) Proportioning Unit

A proportioning unit is attached forward of the front spar of the vertical stabilizer.

The proportioning unit divides the fluid flow into three sub branches. For each sub-branch there is a capillary which ensures that the correct amount of de-icing fluid flows to the related horizontal or vertical tail porous panel.

(b) Horizontal Tail Ice Protection System

One porous panel is attached to the leading edge of the horizontal tail on the LH side. Another panel is attached on the RH side. The panels discharge the fluid onto the horizontal tail through many fine holes.

The panels are bonded to the horizontal tail leading edge. They cannot be removed without damage.

(c) Vertical Tail Ice Protection System

One porous panel is attached to the leading edge of the vertical tail. The panel discharges the fluid onto the vertical stabilizer through many fine holes.

The panel is bonded to the vertical tail leading edge. It cannot be removed without damage.

(d) Low Pressure Sensors

Three low pressure sensors are situated between the proportioning unit and the porous panels on the empennage. If one of these panels is not supplied with sufficient pressure, then the sensor activates a caution message on the G1000 PFD ("DEIC PRES LO").

D. Windshield De-Icing System

(1) Windshield De-Icing Pumps

One outlet of the main pump assembly is connected to the inlets of the two windshield de-icing pumps via an equal tee. The windshield de-icing pumps are connected in parallel. The pumps are mounted to the bottom side of a lid in the floor of the nose baggage compartment on the LH side. Only one pump is operative at a time, while the other pump is a backup. The active pump is selected with a switch in the cockpit.

(2) Solenoid Valves

A solenoid valve is located in front of each windshield de-icing pump. When the pilot operates the switch for the windshield de-icing system, then the valves allow the de-icing fluid to flow to the spraybar for 5 seconds. The solenoid valves avoid that air is drawn into the system via the spraybar.

(3) Spraybar

A spraybar is located in front of the canopy. It is aligned parallel with the center axis of the airplane. When activated, it sprays de-icing fluid onto the canopy.

A deflector-wedge is mounted to the airplane in front of the spraybar for protection and airflow guide purposes.

E. Ice Protection Control System

(1) De-Ice Control Box

The de-ice control box consists basically of relays and is connected to the de-ice control panel. It is supplied with electrical power via the XFER PUMP / DE-ICE circuit breaker. It is installed to control all 4 pumps of the ice protection system. The de-ice control box is mounted on the bottom side of the LH baggage compartment floor.

(2) De-Ice Control Panel

The ice protection system (including ice-lights) installed in the DA 42 is operated via the de-ice control panel. The de-ice control panel is connected to the de-ice control box and to the instrument panel lighting bus. It is supplied with electrical power via the XFER PUMP / DE-ICE circuit breaker.

3. Operation

The system is operated through 4 toggle type switches and two push buttons located on the de-ice control panel in the RH section of the instrument panel.

A. OFF/NORM/HIGH Switch

The left OFF/NORM/HIGH switch operates the main pumps and thus activates the system. It has 3 positions:

– Down position: OFF.

– Center position: NORM (normal). The main pumps produce a cycled fluid flow: for 30 seconds both main pumps provide fluid to the system, followed by a 90 seconds off. This mode is selected when icing conditions are encountered and prior to ice formation. Maximum system operating time is approximately 2.5 hours.

– Up position: HIGH. The active main pump produces a continuous fluid flow. This mode is selected when icing conditions are more demanding or if ice has already accumulated. Maximum system operating time is approximately 1.0 hour.

B. MAX Push Button

The upper push button activates the MAX mode of the ice protection system when the system is presently in the HIGH mode. This mode is only active for 2 minutes. In this mode both pumps are active simultaneously and provide fluid to the system. This mode is selected when icing conditions are severe or if significant ice has accumulated on the airplane. Maximum system operating time in the MAX mode is approximately 30 minutes.

C. PUMP1/PUMP2 Switch

The RH bottom switch selects one of the two main pumps and one of the two windshield pumps. It has 2 positions.

Down position: PUMP 1. Main pump 1 is selected as the active pump in HIGH mode. Pump 2 is standby. Also windshield pump 1 is selected in case the windshield switch is activated. Windshield pump 2 is inoperative.

Up position: PUMP 2. Main pump 2 is selected as the active pump in HIGH mode. Pump 1 is standby. Also windshield pump 2 is selected in case the windshield switch is activated. Windshield pump 1 is inoperative.

D. WINDSHIELD Push Button

The WINDSHIELD push button activates the selected windshield de-icing pump for a duration of 5 seconds. During this time it feeds de-icing fluid to the spraybar in front of the canopy.

The windshield de-icing works even when the OFF/NORM/HIGH switch of the ice protection system is set to OFF. Air removal from the ice protection system is also provided by these pumps by continuously pressing the WINDSHIELD push button.

E. ALTERNATE Switch

The ALTERNATE switch connects main pump 2 directly to the RH main bus. Thus, in case of a total loss of the LH main bus in icing conditions, operation of the ice protection system similar to the HIGH- mode is possible.

F. ICE LIGHT / ANNUN-TEST Switch

This switch activates either both ice lights or the annunciation test procedure.

(1) Ice Lights Operation

The ice lights are switched ON by setting the toggle switch to the upper position.

(2) Test of Annunciations

Proper function of the fluid level switch and the low pressure sensor can be tested with the annunciation test mode.

(a) Test of the DEIC PRES LO Annunciation

After the switch is set to ANNUN-TEST, the DEIC PRES LO annunciation in the alert window of the PFD appears with a delay of 2 minutes.

(b) Test of the DEICE LVL LO Annunciation

This test can only be carried out if the fluid level in the de-ice tank is less than 10 liter (2.6 US gal). After the switch is set to ANNUN-TEST, the DEICE LVL LO annunciation in the alert window of the PFD appears.

4. Handling of Porous Panels

Only the following solvents are permitted for use on the porous panels:

- Water with soap or detergent.
- Approved de-icing fluids.
- Propylene glycol.
- Avgas.
- Jet fuel.
- Isopropylalcohol.
- Ethyl alcohol.
- Industrial methylated spirit.

CAUTION: DON'T USE OTHER MATERIALS AS THE ABOVE STATED ONES. THE MICROSCOPIC LASER DRILLED HOLES MAY BE CLOGGED BY USE OF ANY OTHER MATERIALS LIKE ADHESIVES, SEALANTS, PAINT, OR ANY FINE PARTICLES. THIS MAY AFFECT PANEL PERFORMANCE AND IS CAUSE FOR PANEL REJECTION.

Mask panel active area with low tack tape and plug inlet ports when working with adhesives near panels or in a dusty environment.

The inlets should be protected with appropriate caps.

Note: The porous panels are not approved for temperatures above 82° C (180°F).

The following tapes are approved for use on the porous panels:

- Low tack masking tape: Scotch Flatback tape 2517, width 48 mm.
- Surface protection film: 3M Protective tape type 7007 AB, width 150 mm.

Trouble-Shooting

1. General

The table below lists the defects you could have with the ice protection system.

If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Cycle time of the WINDSHIELD, NORM or/and MAX- mode is/are out of tolerance.	Internal failure of the de-ice control box.	Replace control box.
No de-icing fluid comes out of the spraybar and porous panels.	De-icing fluid tank empty. De-icing fluid pump defective. De-icing fluid filter(s) clogged. De-icing fluid tubing leaky. De-icing fluid tubing clogged.	Replenish. Replace pump. Replace filter(s). Replace the affected part of the tubing. Replace the affected part of the tubing.
No fluid dissipates from part of the active area of a porous panel.	Trapped air in porous panel.	Purge system.
DEICE PRES HI caution alert active.	De-icing fluid filter(s) clogged.	Replace filter(s).

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Maintenance Practices

1. General

These maintenance practices tell you how to perform an operational test of the ice protection system. They also tell you how to remove and install the main components of the ice protection system.

WARNING: DO NOT GET DE-ICING FLUID ON YOUR SKIN OR ON YOUR CLOTHES. DE-ICING FLUID IS HARMFUL AND CAN CAUSE INJURIES TO PERSONS AND CAN DAMAGE YOUR CLOTHING.

CAUTION: HANDLE DE-ICING FLUID WITH CARE. DE-ICING FLUID IS FLAMMABLE AND CAN CAUSE DAMAGE TO EQUIPMENT.

CAUTION: DO NOT APPLY POLISH OR WAX TO THE PANELS. CERTAIN SOLVENTS, PARTICULARLY METHYL ETHYL KETONE (MEK), ACETONE, LACQUER THINNER AND OTHER TYPES OF THINNERS AND SOLVENTS DAMAGE THE INNER MEMBRANE OF THE PANELS. MASK ACTIVE AREA OF PANELS WITH A LOW TACK TAPE WHEN USING SOLVENTS OR PAINTING THE AIRPLANE IN THE PROXIMITY OF THE PANELS OR WHEN THE AIRPLANE IS STORED IN A DUSTY ENVIRONMENT. REFER TO PARAGRAPH 4 “HANDLING OF POROUS PANELS” IN THE GENERAL SECTION OF THIS CHAPTER.

Note: It is of particular importance that components and tubes upstream of the pumps and between the filters and the proportioning units are protected from ingress of foreign matter, as particles in the orifices of the proportioning units may cause a malfunction of the system. Cap ends of loose tubes during maintenance with plastic caps. The use of self adhesive tape is not recommended as protective material for nylon tubes.

2. Operational Test

A. Equipment

Item	Quantity	Part Number
TKS set.	1	A00305.
TKS system test cart.	1	D60-3000-04-00-ST.

B. Operational Test

	Detail Steps/Work Items	Key Items/References
(1)	Drain the de-ice fluid tank and verify that it is empty.	Use the T-fitting of feed line installed in the front wheel well for drainage.
(2)	Verify the following de-ice control panel settings: – OFF/NORM/HIGH switch: OFF. – ICE LIGHT / ANNUN-TEST switch: OFF. – PUMP SELECTOR: PUMP 1.	
(3)	Set the ELECT MASTER switch to ON.	
(4)	Check the following indications: – MFD: De-ice fluid level indication must show empty. – PFD: No ice protection system related message in the alert window is active.	Press SYSTEM - ENGINE softkey to indicate de-ice fluid level.
Annunciation Checkout		
(5)	Switch to ANNUN-TEST mode on the de-ice control panel and check that the DEICE LVL LO message appears in the alert window of the PFD.	The DEICE LVL LO message appears only if less then approx. 6 liter (1.59 US gal) are in the de-icing fluid tank.
(6)	Wait 2 minutes and verify that the DEIC PRES LO message appears in the alert window of the PFD.	
(7)	Turn the ICE LIGHT / ANNUN-TEST switch back into the OFF position and verify that both messages disappear immediately.	
Fluid Emission Test Preparation		
(8)	Verify that all gutters, catchment tanks and shieldings are fixed on the airplane and protection tapes on the porous panels are removed.	Recommended when system is turned on inside of hangar. See also TKS system test cart.

	Detail Steps/Work Items	Key Items/References
(9)	Sprinkle all 7 ice protection panels with approved de-icing fluid by using a clean, lint free cloth.	
(10)	Fill the de-icing fluid tank.	Refer to Section 12-10.
(11)	Verify that the de-ice level indication on the MFD shows full.	
(12)	Switch to the ANNUN-TEST mode on the de-ice control panel and verify that there is no DEICE LVL LO message in the alert window of the PFD.	
(13)	Set ICE LIGHT / ANNUN-TEST - switch to OFF.	
	Windshield Spraybar Check	
(14)	Verify that the canopy is closed.	
(15)	Check that each hole on the canopy spraybar emits de-icing fluid with pump 1 and pump 2:	
	– Press the WINDSHIELD push-button on the de-ice control panel for 1 second.	Repeat procedure until de-icing fluid emits from all holes in the spraybar.
	– Select PUMP2 on the de-ice control panel.	
	– Press the WINDSHIELD push-button on the de-ice control panel for 1 second.	Repeat procedure until de-icing fluid emits from all holes in the spraybar.
(16)	If the check described in the previous step was not successful, then shortly apply high air pressure to blocked holes of the spray bar and repeat the check procedure.	
	Main De-Ice Panel Test	
(17)	Verify that the Pump-Selector switch on the de-ice control panel is in PUMP 1 position.	
(18)	Open canopy and set the OFF/NORM/HIGH switch to the HIGH position and check operation of the annunciation light on the de-ice control panel.	

	Detail Steps/Work Items	Key Items/References
(19)	Check all ice protection panels for evidence of de-icing fluid.	
(20)	After each part of the ice protection panels become wet select PUMP 2 on the de-ice control panel.	The DEIC PRES LO annunciation may appear on the PFD in HIGH-mode. The ice protection system pressure depends on the system temperature.
(21)	Check that each panel emits de-icing fluid with pump 1 or pump 2.	
(22)	Turn the OFF/NORM/HIGH switch in HIGH position and check the middle, amber annunciation light if on.	
(23)	Verify that both main pumps are running.	
(24)	Verify that no DEIC PRES LO warning is now indicated in the alert window on the PFD.	
	Cycle Time Test	
(25)	In the NORM - Mode the operation of both main pumps is cycled. Therefore check runtime of the cycles: – Pumps ON: 30 s (Tolerance +1 s / -3 s). – Pumps OFF: 90 s (Tolerance +9 s / -1 s).	
(26)	Turn the OFF/NORM/HIGH switch in the HIGH position, press the MAX push-button and check operation of both amber annunciation lights.	
(27)	Check the runtime of the MAX-mode. Pumps ON: 120 s (± 10 s).	
(28)	Check the runtime of the WINDSHIELD-pumps. Pump ON: 5 s (± 1s).	Verify that the canopy is closed.
(29)	Turn the OFF/NORM/HIGH switch in OFF position.	

	Detail Steps/Work Items	Key Items/References
ICE LIGHT / ANNUN-TEST - Test		
(30)	Turn the ICE LIGHT / OFF/ ANNUN TEST switch in ICE LIGHT position and check operation of the LH and the RH Ice Light.	
(31)	Turn the ICE LIGHT / OFF/ ANNUN TEST back in the OFF position.	
(32)	Set the ELECT MASTER switch to OFF.	

3. Drain the Ice Protection System

	Detail Steps/Work Items	Key Items/References
(1)	Open blanking plug on the T-fitting in the nose wheel bay.	Refer to Figure 1.
(2)	Allow the de-icing fluid to flow into suitable containers.	
(3)	Close blanking plug on the T-fitting in the nose wheel bay.	

4. Remove/Install the De-Icing Fluid Tank

A. Remove the De-Icing Fluid Tank

	Detail Steps/Work Items	Key Items/References
(1)	Drain the ice protection system.	Refer to Paragraph 3.
(2)	Open the RH door to the nose baggage compartment.	
(3)	Disconnect all hose and electrical connections from the de-icing fluid tank.	Use caps to protect the loose line connections from contamination.
(4)	Remove the 4 bolts and washers which attach the tank to the nose baggage compartment.	
(5)	Remove the battery cover.	
(6)	Move the tank clear of the airplane.	Twist the tank 90° clockwise inboard for easier removal.

B. Install the De-Icing Fluid Tank

	Detail Steps/Work Items	Key Items/References
(1)	Move the tank in position in the RH nose baggage compartment.	Twist the tank 90° counter-clockwise inboard for easier installation.
(2)	Connect all hose and electrical connections to the de-icing fluid tank.	Remove caps. Use new O-rings. Keep the aluminum olives free from dust.
(3)	Install the 4 bolts and washers which attach the tank to the nose baggage compartment.	
(4)	Install the battery cover.	
(5)	Close the RH door to the nose baggage compartment.	
(6)	Replenish the ice protection system.	Refer to Section 12-10.
(7)	Carry out operational test.	Refer to Paragraph 2.

5. Remove/Install the De-Icing Fluid Inlet Strainer

A. Equipment

Item	Quantity	Part Number
Drive slot tool.	1	12160-01.

B. Remove the De-Icing Fluid Inlet Strainer

	Detail Steps/Work Items	Key Items/References
(1)	Open the filler cap of the de-icing fluid tank.	
(2)	Removal of inlet strainer – Put drive pins of tool into drive slots of lock ring. – Unscrew the strainer lock ring counter-clockwise. – Remove strainer lock and O-ring. – Take out inlet strainer of filler neck.	Use drive slot tool.
(3)	Protect filler neck with glycol cap.	

C. Install the De-Icing Fluid Inlet Strainer

	Detail Steps/Work Items	Key Items/References
(1)	Remove glycol cap from filler neck.	Verify that interior of tank is clean before installing the strainer
CAUTION: MAKE SURE THAT THE STRAINER DOESN'T TURN. A TURNING STRAINER CAN DAMAGE THE TANK VENTILATION.		
(2)	Implementation of inlet strainer: – Move strainer in place in the filler neck. – Apply O-ring and strainer lock. – Put drive pins of tool into drive slots of lock ring. – Fix strainer lock ring by twisting clockwise.	Use drive slot tool.
(3)	Close the filler cap of the de-icing fluid tank.	

6. Remove/Install a De-Icing Metering Pump

A. Remove a De-Icing Metering Pump

	Detail Steps/Work Items	Key Items/References
(1)	Remove the de-icing fluid tank.	Only for removal of the main pumps (RH side). Refer to Paragraph 4.
(2)	Remove the bolts and washers which attach the lid to the floor in the nose baggage compartment.	
(3)	Lift the lid upward.	
(4)	Disconnect all electrical connectors from the pumps.	
(5)	Remove the locking wire from all hose connections.	
(6)	Disconnect all hose connections from the pumps.	Use caps to protect the loose line connections from contamination.
(7)	Remove the bolts and washers which hold the pump to the lid including the l-sections.	
(8)	Remove the pump from the lid.	

B. Install a De-Icing Metering Pump

	Detail Steps/Work Items	Key Items/References
(1)	Move the pump in place on the nose floor lid.	
(2)	Install the bolts and washers which hold the pump to the lid including the l-sections.	
(3)	Move the lid in place in the nose baggage compartment.	Leave a gap to connect the hoses and electrical connectors.
(4)	Connect all hose connections to the pumps.	Remove caps. Use new seals.
(5)	Secure all hose connections with locking wire	
(6)	Connect all electrical connectors to the pumps.	
(7)	Move the lid in place in the floor.	
(8)	Attach the bolts and washers which attach the lid to the floor in the nose baggage compartment.	

	Detail Steps/Work Items	Key Items/References
(9)	Install the de-icing fluid tank.	Only for installation of the main pumps (RH side). Refer to Paragraph 4.
(10)	Carry out operational test.	Refer to Paragraph 2.

7. Replace the Filter Cartridge or Windshield Pump or Solenoid Valve

	Detail Steps/Work Items	Key Items/References
(1)	Open front baggage door LH.	
(2)	Remove the bolts and washers which attach the lid (small inspection hole) to the floor in the LH nose baggage compartment.	
(3)	Remove locking wire of hose connections downstream of the high pressure switch (½ in).	
(4)	Remove locking wire of both hose connections downstream of equal tee (5/16 in).	
(5)	Disconnect hose line connections.	Use caps to protect the loose line connections from contamination.
(6)	Lift up access lid in the nose baggage compartment on the LH side.	
(7)	Disconnect all electrical connectors from the windshield pump/solenoid valve.	
(8)	Remove locking wire of hose connection to spray bar (3/16 in), filter bleeding hose (3/16 in) and to the manifold block (½ in) downstream of equal tee.	
(9)	Disconnect hose line connections.	Use caps to protect the loose line connections from contamination.
(10)	Remove the access lid in the nose baggage compartment on the LH side.	Twist up outer edge of lid and push slightly rearward.
(11)	Remove the locking wire from the hose connections to the component(s) to be replaced.	
(12)	Remove the bolts and washers which hold the component(s) to the lid.	

	Detail Steps/Work Items	Key Items/References
(13)	Disconnect all hose line connections from the component(s).	Use caps to protect the loose line connections from contamination.
(14)	Replace component(s).	
(15)	Attach the bolts and washers which attach the new component(s) to the lid.	
(16)	Connect all hose connections to the new component(s).	Remove caps. Use new seals.
(17)	Secure all hose connections with locking wire.	
(18)	Move the lid in place in the floor.	
(19)	Connect all hose connections (spray bar, filter bleeding hose and manifold block)	Remove caps. Use new seals.
(20)	Secure all hose connections with locking wire.	
(21)	Connect all hose connections below small inspection hole (High pressure switch and equal tee).	Remove caps. Use new seals.
(22)	Connect all electrical connectors of the windshield pump/solenoid valve.	
(23)	Secure all hose connections with locking wire.	
(24)	Attach the bolts and washers which attach the lids to the floor of the LH nose baggage compartment.	
(25)	Close the door of the LH nose baggage compartment.	
(26)	Bleed the de-icing system.	Refer to Paragraph 8.

8. Bleed the De-Icing System

	Detail Steps/Work Items	Key Items/References
(1)	Bleed the metering pumps:	
	– Fill the de-icing fluid tank to at least one quarter of its capacity.	Refer to Section 12-10.
	– Close canopy.	
	– Operate the windshield pumps of the ice protection system several times.	To remove all air.
	– Operate the system on HIGH until evidence of de-icing fluid on the porous panels is noticed.	
	– If de-icing fluid tank is completely empty, re-fill the de-icing fluid tank with approx. 2 liter (0.5 US gal) of de-icing fluid.	Refer to Section 12-10.
(2)	Bleed the filter elements.	
	– Move end of bleeding hose to the exterior of the airplane.	Accessible via the LH baggage compartment door behind carpet.
	– Remove the blanking plug from the filter bleeding hose.	To prevent the baggage compartment floor from becoming contaminated.
	– Set ELECT. MASTER switch to ON.	
	– Set OFF/NORM/HIGH switch of the de-icing control unit to HIGH.	
	– Operate system until air free fluid is discharged from the bleeding hose of the filter elements.	
	– Set OFF/NORM/HIGH switch of the de-icing control unit to OFF.	
	– Set ELECT. MASTER switch to OFF.	
	– Install the blanking plug to the filter bleeding hose.	Use new seal if necessary.
	– Put bleeding hose back in place.	Make sure that no leakage occurs.

9. Purge the De-Icing System

Purging is required when part of the active area of one or more porous panels fails to dissipate fluid.

	Detail Steps/Work Items	Key Items/References
	Open the small inspection panels on the outboard side of the proportioning unit.	To give access to the proportioning units.
(1)	Open blanking plugs on the tee-pieces.	LH and RH nacelles.
(2)	Use external pump (max. 6 bar or 87 PSI) with filtration fitted (0.8 micrometers or 1/25,000 inch) to force de-icing fluid through the porous panels.	LH and RH. Refer to the AFM for approved de-icing fluids.
(3)	Close blanking plugs on the proportioning unit.	LH and RH nacelles.
(4)	Close the small inspection panels on the outboard side of the engine nacelles.	

10. Remove/Install a Proportioning Unit

A. Remove a Proportioning Unit from the Nacelle

	Detail Steps/Work Items	Key Items/References
(1)	Drain the ice protection system.	Refer to Paragraph 3.
	CAUTION: YOU MUST MARK THE HOSES AND PORTS SO THAT YOU CAN RE-CONNECT THE HOSES TO THE CORRECT PORTS ON THE PROPORTIONING UNIT. IF YOU DO NOT RE-CONNECT THE HOSES CORRECTLY, THE SYSTEM WILL NOT WORK PROPERLY.	
(2)	Remove the bolts, washers and the spacer holding the proportioning unit.	Hold the proportioning unit.
(3)	Remove the locking wire from the hose connections to the filter element.	
(4)	Disconnect all hose connections from the proportioning unit.	Use caps to protect the loose line connections from contamination.
(5)	Move the proportioning unit clear of the airplane.	

B. Install a Proportioning Unit to the Nacelle

	Detail Steps/Work Items	Key Items/References
(1)	Move the proportioning unit in position in the nacelle.	
	CAUTION: YOU MUST CONNECT THE HOSES TO THE CORRECT PORTS. IF YOU DO NOT CONNECT THE HOSES CORRECTLY, THE SYSTEM WILL NOT WORK PROPERLY.	
(2)	Connect all hose connections to the proportioning unit.	Remove caps.
(3)	Secure all hose connections with wire lock.	
(4)	Install the bolts and washers which hold the proportioning unit.	
(5)	Close the small inspection panels on the outboard side of the engine nacelles.	
(6)	Carry out operational test.	Refer to Paragraph 2.

11. Replace an Ice Protection Porous Panel

The porous panels for the ice protection system are bonded to the wing, vertical and horizontal stabilizer leading edges. They cannot be removed without damage to the panels. Refer to the airplane manufacturer when you must replace a porous panel.

12. Replace De-Icing Fluid Nylon Tubing

Used diameters are: 3/16 in, 5/16 in and 1/2 in. Only replace tubes by tubes with the same diameter.

Refer to the CAV Aerospace Nylon Tubing and Coupling General Practices Manual for the replacement procedure. For the feeder lines in the engine nacelle to the propeller only use PTFE tubing. Minimum bending radius cold formed are:

Tool No.	Tube outside diameter	Min. recommended bend radius inch (mm) measured to inside wall of tube, cold formed
T300 - 112 A.	3/16 in	1 (25)
T300 - 120 A.	5/16 in	3 (75)
T300 - 144 A.	1/2 in	4 (100)

13. Replace Ice Protection Control Box

	Detail Steps/Work Items	Key Items/References
(1)	Confirm that the XFER PUMP/ DE-ICE circuit breaker is pulled.	
(2)	Open the access lid in the nose baggage compartment on the LH side.	To give access the ice protection control box.
(3)	Unscrew the 2 mounting screws from the upper side of the baggage compartment floor.	
(4)	Extract the de-ice control box via the access hole.	
(5)	Disconnect plug no. P3011 from control box.	
(6)	Connect plug no. P3011 to new control box.	
(7)	Move the de-ice control box to the prior position and fix it by using the 2 mounting screws and the upper-floor reinforcement doubler.	
(8)	Close the access lid in the nose baggage compartment on the LH side.	

14. Remove/Install the High Pressure Switch

A. Remove High Pressure Switch

	Detail Steps/Work Items	Key Items/References
(1)	Drain the ice protection system.	Refer to Paragraph 3.
(2)	Open front baggage door LH.	
(3)	Remove the bolts and washers which attach the small inspection lid to the floor of LH nose baggage compartment.	
(4)	Lift the lid upward.	
(5)	Disconnect electrical connectors from high pressure switch.	
(6)	Remove locking wire from all hose connections on the high pressure switch.	
(7)	Disconnect all hose connections from the high pressure switch.	Use caps to protect the loose line connections from contamination.
(8)	Remove cable ties which fix high pressure switch to the nose cone.	
(9)	Remove high pressure switch from baggage compartment.	

B. Install High Pressure Switch

(1) High Pressure Switch Values

HP Switch Value	
Activate.	5.86 (± 0.35) bar / 85 (± 5) PSI.
Reset.	4.83 (± 0.35) bar / 70 (± 5) PSI.

(2) Install High Pressure Switch

	Detail Steps/Work Items	Key Items/References
(1)	Move high pressure switch in place below the small inspection lid on the LH side in the nose baggage compartment.	

	Detail Steps/Work Items	Key Items/References
(2)	Connect hose line connection upstream of the high pressure switch.	Remove caps. Use new seals.
(3)	Fit tubing containing valve and dampened manometer downstream of the high pressure switch.	For appropriate range of manometer see table above. Prepare collecting container for dissipating fluid.
(4)	Operate ice protection system in HIGH mode.	
(5)	Adjust pressure in tubing with the vessel above the activation limit of the high pressure switch.	See table above for limits.
(6)	Check high pressure caution on PFD of G1000 after 2 minutes (tolerance + 5 sec.) delay since pressure adjusted above limit.	
(7)	Check low-pressure warning on PDF of G1000 after 2 minutes (tolerance +5 sec.) delay since pressure adjusted above limit.	
(8)	Check if high pressure indication extinguishes after pressure in tubing has been adjusted below reset value according the table above.	
(9)	Switch off ice protection system.	
(10)	Remove nylon tubing containing vessel and manometer downstream of high pressure switch.	
(11)	Connect hose line connection downstream of the high pressure switch.	Remove caps. Use new seals.
(12)	Secure hose line connections of high pressure switch with lock wire.	
(13)	Fix high pressure switch with cable ties to the nose cone.	Replace cable tie base if necessary.
(14)	Move small inspection lid in place.	
(15)	Install bolts and washers which attach the lid to the floor of the nose baggage compartment.	
(16)	Close LH door of nose baggage compartment.	
(17)	Do an operational test.	Refer to Paragraph 2.

15. Remove/Install the Low Pressure Switch Proportioning Unit

A. Remove the Low Pressure Switch Proportioning Unit

	Detail Steps/Work Items	Key Items/References
(1)	Remove fairing cover from empennage.	
(2)	Remove cable ties.	
(3)	Disconnect VOR antenna (coaxial cable).	
	CAUTION: YOU MUST MARK THE HOSES AND PORTS SO THAT YOU CAN RE-CONNECT THE HOSES TO THE CORRECT PORTS ON THE PROPORTIONING UNIT. IF YOU DO NOT RE-CONNECT THE HOSES CORRECTLY, THE SYSTEM WILL NOT WORK PROPERLY.	
(4)	Disconnect all electrical connectors from the low pressure switches.	
(5)	Remove locking wire from the hose connections pointing in flight direction.	
(6)	Disconnect the hose connections to the low pressure switches.	Use caps to protect the loose line connections from contamination.
(7)	Remove bolts and washers, which hold the low pressure switch proportioning unit to the vertical stabilizer.	
(8)	Pull low pressure switch proportioning unit upward.	To give access to the feeder line of the fuselage section.
(9)	Remove locking wire from the feeder line connection.	
(10)	Disconnect feeder line to the low pressure switch proportioning unit.	Use caps to protect the loose line connections from contamination.
(11)	Remove locking wire from the two hose connections labeled as 2 and 3 on the proportioning unit (LH & RH HT panel).	
(12)	Disconnect the two hose connections labeled as 2 and 3 on the proportioning unit (LH & RH panel).	Use caps to protect the loose line connections from contamination.
(13)	Remove low pressure switch proportioning unit.	

B. Install the Low Pressure Switch Proportioning Unit

	Detail Steps/Work Items	Key Items/References
(1)	Connect feeder line to the low pressure switch proportioning unit.	
(2)	Secure feeder line connection with locking wire.	
(3)	Move low pressure switch proportioning unit in position in the vertical stabilizer.	To give access to the feeder line of the fuselage section.
(4)	Install bolts and washers which hold the low pressure switch proportioning unit to the vertical stabilizer.	
(5)	Connect the two hose connections to the proportioning unit labeled as 2 and 3 on the proportioning unit.	
(6)	Secure the two hose connections with locking wire.	
CAUTION:	YOU MUST CONNECT THE HOSES TO THE CORRECT PORTS. IF YOU DO NOT CONNECT THE HOSES CORRECTLY, THE SYSTEM WILL NOT WORK PROPERLY.	
(7)	Connect the hose connections to the low pressure switches.	Remove caps. Use new seals.
(8)	Secure the hose connections with locking wire.	
(9)	Connect all electrical connectors from the low pressure switches.	
(10)	Connect VOR antenna (coaxial cable).	
(11)	Install cable ties.	
(12)	Install fairing cover to empennage.	
(13)	Carry out operational test.	Refer to Paragraph 2.

16. Remove/Install a Low Pressure Switch in the Horizontal Tail

A. Remove a Low Pressure Switch in the Horizontal Tail

	Detail Steps/Work Items	Key Items/References
(1)	Remove the maintenance cap horizontal tail outboard.	Cut sealant.
(2)	Disconnect the electrical connectors from the low pressure switch.	
(3)	Remove the locking wire from the hose connections and the screw connections.	
(4)	Disconnect the hose connections to the low pressure switch.	
(5)	Remove bolts and washers, which hold the low pressure switch to the low pressure switch bracket.	
(6)	Remove low pressure switch from bracket.	Use caps to protect the loose line connections from contamination.

B. Install a Low Pressure Switch in the Horizontal Tail

	Detail Steps/Work Items	Key Items/References
(1)	Connect the hose connection of the feeding line (from the proportioning unit) to the low pressure switch.	
(2)	Secure the hose connection with locking wire.	
(3)	Move the low pressure switch in position to the low pressure switch bracket bonded to the upper shell of the horizontal tail.	In flight direction.
(4)	Install bolts and washers which hold the low pressure switch to the bracket.	
(5)	Secure the bolts with locking wire.	
(6)	Connect the hose connections of the feeding line (to panel inlet) to the low pressure switch.	Max. length 200 mm.
(7)	Secure the hose connection with locking wire.	
(8)	Connect the electrical connector from the low pressure switch.	
(9)	Carry out operational test.	
(10)	Install maintenance cap.	Use sealant.

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CHAPTER 31

INDICATING SYSTEMS

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CHAPTER 31
INDICATING SYSTEMS

1. General

This Chapter tells you about the indicating systems installed in the airplane. Refer to these Sections for the related data:

– Section 31-10. The instrument and control panels installed in the DA 42.

– Section 31-20. Independent instruments.

– Section 31-40. The integrated cockpit system.

The DA 42 has these indicating systems:

– An instrument panel. The instrument panel is made of several pieces with a shelf. The shelf goes between the panel and the cockpit forward bulkhead.

– A control panel in the center console. This panel has the engine controls, fuel controls, cabin heat control levers, parking brake and trim. It has a forward part and an aft part.

– Integrated cockpit system (ICS). The airplane has an integrated cockpit system with 2 displays which give the airplane flight and navigation displays, engine instrument displays and airplane systems indications. The ICS has “softkeys” on the display screens for the option of selecting which indications will be displayed on the screen.

This Section does not tell you about the indicators that belong to systems. See the related system for data. For example, see Section 27-31 for data about the trim indicator.

Note: Equipment which is certified for installation in the DA 42 is listed in Section 6.5 of the Airplane Flight Manual. Such equipment may be installed in accordance with the Airplane Maintenance Manual.

Any equipment which is not listed in Section 6.5 of the Airplane Flight Manual is called "Additional Equipment". The installation of Additional Equipment is a modification which must be handled in accordance with national regulations or a Service Bulletin.

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Section 31-10
Instrument and Control Panels

1. General

The DA 42 has these instrument and control panels:

– An instrument panel. The instrument panel is made of several pieces with a shelf. The shelf goes between the panel and the instrument panel frame.

– A control panel in the center console. This panel has a forward cover and an aft cover. The forward cover has the cabin heat control levers, parking brake lever and rudder trim control. The aft cover has the engine controls and fuel transfer/shut-off valve.

See the related Chapter or Section for data about the controls. For example, see Section 76-00 for data on the engine controls.

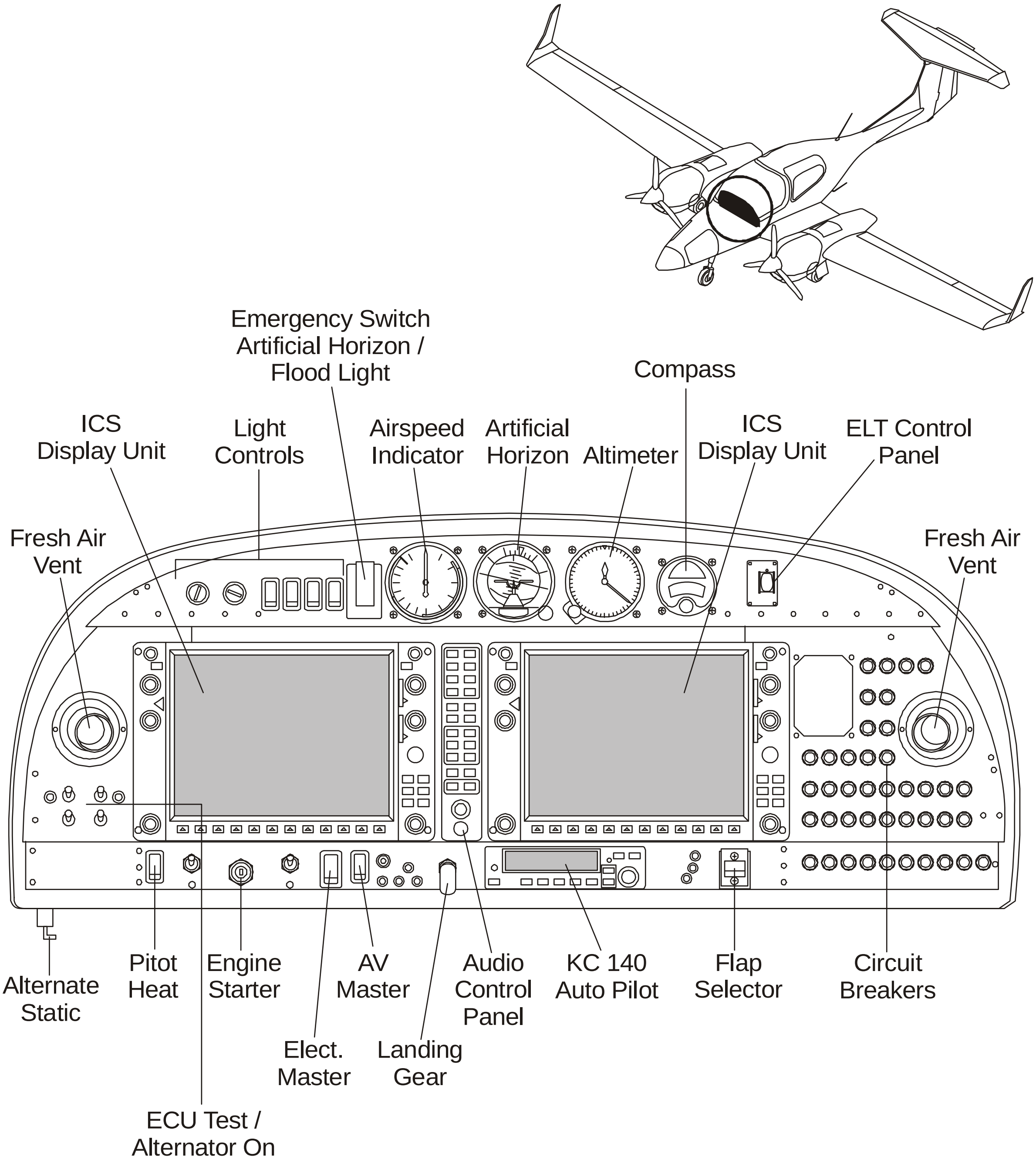

Figure 1: Instrument Panel

2. Instrument Panel Description

The instrument panel consists of several pieces of aluminum alloy. The panel has a vertical face with instruments and a horizontal ‘shelf’ with electrical components. The shelf goes between the forward bulkhead of the cockpit and the vertical face of the panel.

The DA 42 has an integrated cockpit system (ICS). The ICS has 2 large LCD display screens which are located in the instrument panel. These 2 display screens can digitally display all of the flight, navigation and airplane system data. An audio control panel is located between the display screens. The audio control panel integrates with the ICS and is used to control all of the airplane radio and navigation audio systems. Refer to Section 31-40 for more data about the ICS.

An airspeed indicator, artificial horizon, altimeter and magnetic compass are located along the top of the instrument panel. These instruments provide the basic data required to fly the airplane in the event of a power failure and the loss of the ICS. The artificial horizon is a gyroscopic instrument that can be powered from an emergency power pack. An emergency switch is located near the artificial horizon and has a guard installed to prevent accidental selection.

The circuit-breakers for the electrical systems are all located on the right side of the instrument panel. The electrical system bus-bars are directly connected to the rear of the circuit-breakers.

Along the bottom of the instrument panel are the electrical, the avionic and the engine master switches. The landing gear and flap control switches are also located along the bottom of the instrument panel and on each side of the autopilot control panel, if the KAP 140 autopilot is installed. The instrument panel and airplane light switches are located at the top-left of the instrument panel.

The shelf part of the instrument panel holds relays, junction blocks, connectors and ground studs.

The instrument panel has a cover attached by screws.

Refer to Chapter 24 for more data about the electrical system and Chapter 22 for more data about the autopilot system.

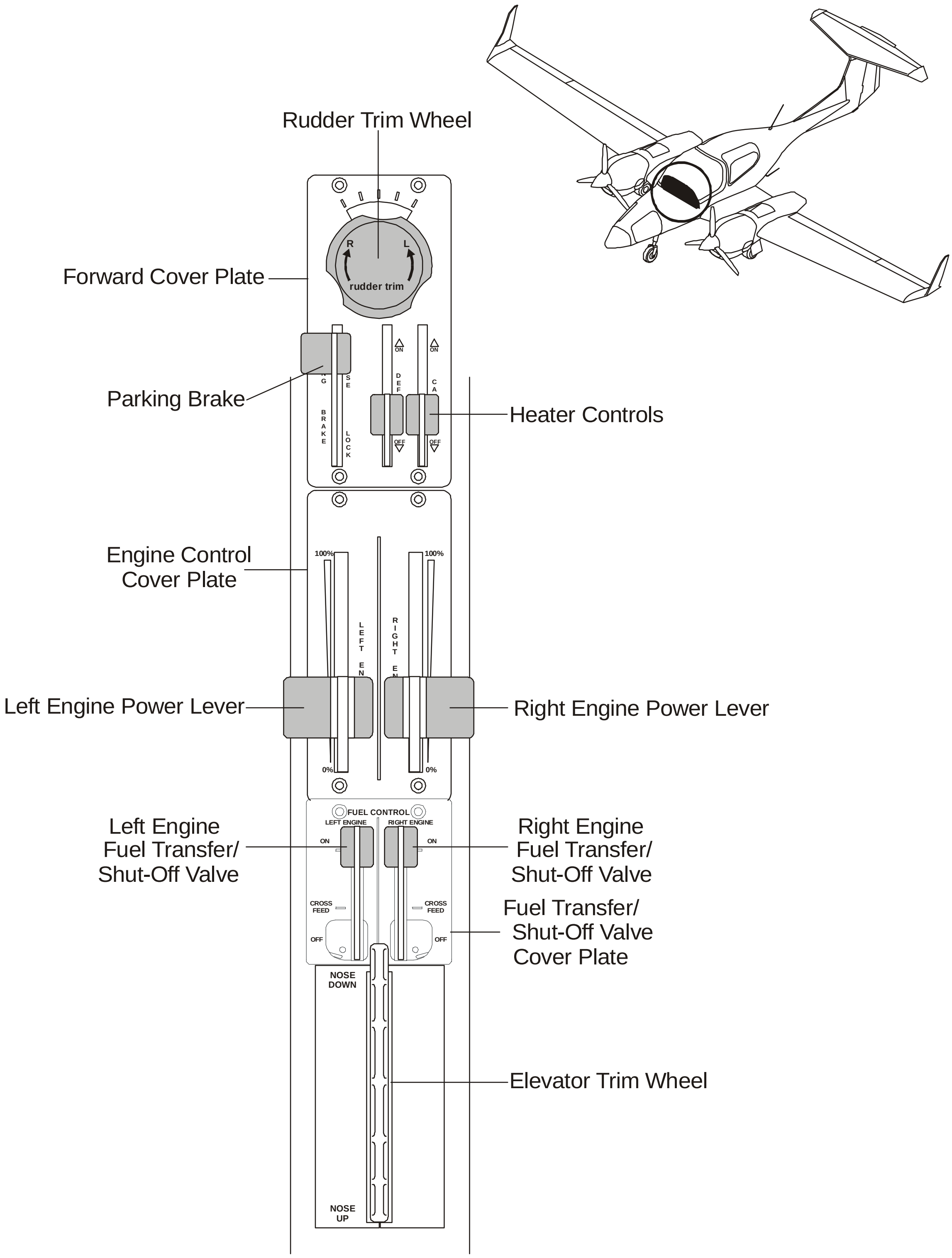

Figure 2: Center Console

3. Center Console Description

Figure 2 shows the center console structure. Refer to the related Chapters for the data on the controls.

The center console holds the engine control assembly. The engine control assembly holds the rudder trim, parking brake, heating controls and engine power levers. Aft of the engine control assembly are the controls for the fuel transfer/shut off valves and the elevator trim wheel.

The engine control assembly has two aluminum alloy side plates. Four brackets attach to the side plates with rivets. The front bracket has holes to anchor the outer sheaths of the brake and heat control cables. The top bracket has two anchor nuts. Bolts engage the anchor nuts to attach the engine control assembly to the top of the floor panel.

The center bracket has two anchor nuts for the control cover plates. The rear bracket attaches to the elevator trim control assembly.

There are no user maintainable parts in the engine control assembly structure or the center console structure.

4. De-Ice Control Panel Description

Figure 3 shows the de-ice control panel which is installed on the RH side of the instrument panel. All functions of the de-ice system are operated by the de-ice control panel in conjunction with the de-ice control box. Refer to Chapter 30 for a detailed description of the de-icing system.

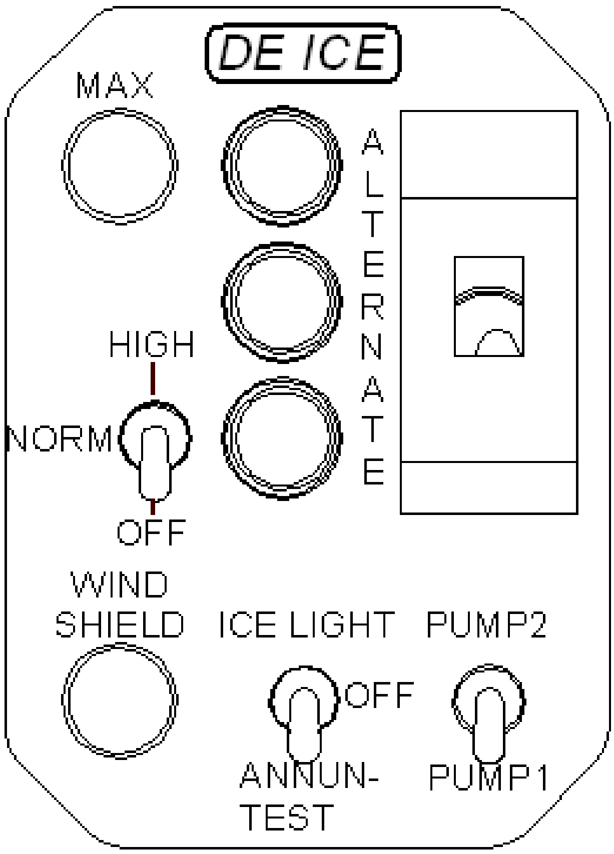

Figure 3: DE-ICE Control Panel

Trouble-Shooting

1. General

The table below lists the defects you could have with the control panel in the center console. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Parking brake or cabin heat control levers do not stay in the set position.	Friction tension too low. Too much wear in the friction washers.	Adjust the friction. Replace the friction washers.

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Maintenance Practices

1. General

These Maintenance Practices tell you how to remove/install the engine control assembly.

2. Remove/Install the Engine Control Assembly

A. Remove the Engine Control Assembly

	Detail Steps/Work Items	Key Items/References
(1)	Remove the knob from the rudder trim control: – Remove the grub screw from the recess in the knob. – Pull the knob clear of the spindle.	
(2)	Remove the knob from the parking brake control lever: – Remove the screw that attaches the plain knob to the threaded knob. – Remove the knobs and spacer from the lever.	
(3)	Remove the knobs from the heater control levers. Do this procedure for each lever: – Remove the screw that attaches the plain knob to the threaded knob. – Remove the knobs and spacer from the lever.	
(4)	Remove the forward cover plate: – Remove the 4 screws that attach the cover plate to the engine control assembly. – Lift the cover plate clear of the engine control assembly.	

	Detail Steps/Work Items	Key Items/References
(5)	Remove the engine control cover plate: – Remove the 4 screws that attach the cover plate to the engine control assembly. – Lift the cover plate clear of the engine control assembly.	
(6)	Remove the knobs from the fuel transfer/shut off control levers. Do this procedure for each lever: – Remove the screw that attaches the plain knob to the threaded knob. – Remove the knobs and spacer from the lever.	
(7)	Remove the fuel transfer/shut off control assembly cover plate: – Remove the 4 screws that attach the cover plate to control assembly. – Move the cover plate clear of the center console.	

	Detail Steps/Work Items	Key Items/References
(8)	Remove the engine control assembly:	
	– Remove the 2 bolts that attach the aft end of the engine control assembly to the structure.	
	– Lift the engine control assembly up from the center console and release these components as they become accessible:	
	– The parking brake control cable.	Refer to Section 32-40.
	– The heater control cables.	Refer to Sections 21-20 and 21-40.
	– The electrical cables for the engine power levers.	Refer to Section 76-00.
	– The rudder trim cable.	Refer to Section 27-21.
	– The electrical cables for the engine control assembly micro-switches.	At the in-line connectors.
	– When all the components are released lift the engine control assembly clear of the center console.	

B. Install the Engine Control Assembly

	Detail Steps/Work Items	Key Items/References
(1)	Install the engine control assembly: – Move the control into position in the cockpit and hold above the center console and: – Connect the rudder trim cable. – Connect the electrical cables for the micro-switches in the engine control assembly. – The electrical cables for the engine power levers. – The heater control cables. – The parking brake control cable. – When all the components are connected lower the engine control assembly into position in the center console. – Install the 2 bolts at the rear of the engine control assembly that attach the engine control assembly to the center console.	 Refer to Section 27-21. At the in-line connectors. Refer to Section 76-00. Refer to Sections 21-20 and 21-40. Refer to Section 32-40.
(2)	Install the fuel transfer/shut off control assembly cover plate: – Move the cover plate into position at the center console. – Install the 4 screws that attach the cover plate to control assembly.	
(3)	Install the knobs onto the fuel transfer/shut off control levers. Do this procedure for each lever: – Install the plain knob, spacers and threaded knob onto the lever. – Install the screw that attaches the plain knob to the threaded knob.	

	Detail Steps/Work Items	Key Items/References
(4)	Install the engine control cover plate: – Move the cover plate into position over the power levers. – Install the 4 screws that attach the cover plate to the engine control assembly.	
(5)	Install the forward cover plate: – Move the cover plate into position over the engine control assembly. – Install the 4 screws that attach the cover plate to the engine control assembly.	
(6)	Install the knobs onto the heater control levers. Do this procedure for each lever: – Install the plain knob, spacer and threaded knob onto the lever. – Install the screw that attaches the plain knob to the threaded knob.	
(7)	Install the knobs onto the parking brake lever: – Install the plain knob, spacer and threaded knob onto the lever. – Install the screw that attaches the plain knob to the threaded knob.	
(8)	Install the knob onto the rudder trim control: – Move the knob into position over the spindle. – Install the grub-screw into the recess in the knob.	

	Detail Steps/Work Items	Key Items/References
(9)	Do a test for the correct operation of the rudder trim system. If necessary for your airworthiness authority do a duplicate inspection of the rudder trim system.	Refer to Section 27-21.
(10)	Do a test for the correct operation of the parking brake system.	Refer to Section 32-40.
(11)	Do a test for the correct operation of the airplane heating and ventilation system.	Refer to Sections 21-20 and 21-40.
(12)	Do a test for the correct operation of the engine control system.	Refer to Section 76-00.

3. Remove/Install the De-Ice Control Panel

A. Remove De-Ice Control Panel from Instrument Panel

	Detail Steps/Work Items	Key Items/References
(1)	If necessary, set the XFR PUMP/DE-ICE circuit breaker open.	Right side of instrument panel.
(2)	Remove instrument panel cover.	
(3)	Disconnect plug no. P3015 from socket J3015.	
(4)	Remove all cable ties which used for the de-ice panel installation.	
(5)	Remove the 4 bolts, washers and locknuts which attach the de-ice control panel to the instrument panel.	Take care that no washer or nut falls into the instrument panel.
(6)	Move the control panel clear from instrument panel.	

B. Install the De-Ice Control Panel in the Instrument Panel

	Detail Steps/Work Items	Key Items/References
(1)	If necessary, set the XFR PUMP/DE-ICE circuit breaker open.	Right side of instrument panel.
(2)	Attach the de-ice control panel in the designated cutout on the RH side of the instrument panel.	Right side of instrument panel.
(3)	Screw in all 4 bolts, washers and locknuts in the designated holes around the control panel.	Take care that no washer or nut falls into the instrument panel.
(4)	Connect plug no. P3015 to socket J3015.	
(5)	Use cable ties to fix loose cables of the de-ice control panel.	
(6)	Install instrument panel cover.	
(7)	If necessary, set the XFR PUMP/DE-ICE circuit breaker closed.	

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Section 31-20
Independent Instruments

1. General

The current version of the DA 42 airplane has no independent instruments that are not part of the integrated cockpit system (ICS). For more data about the ICS refer to Section 31-40.

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Section 31-40
Central Computers

1. General

The DA 42 has a Garmin G1000 integrated cockpit system (ICS). The ICS integrates all the usual flight, avionic and airframe system indications into one system. The system displays the data on 2 display screens located in the instrument panel. An audio control panel is located between the 2 display screens. The audio control panel integrates and controls the airplane radio, navigation and intercom systems.

Refer to Section 23-50 for more data about the audio control panel.

Electrical power is supplied to the ICS control and display screens when the ELECT. MASTER switch is set to ON. Power is supplied to the audio control panel when the AVIONICS MASTER switch is set to ON.

During normal operation the left display screen is referred to as the primary flight display (PFD) and the right display screen as the multi function display (MFD). Either display can be used as PFD or MFD. If one display fails the remaining screen can be toggled automatically to reversionary mode.

For more detailed data about the ICS refer to the G1000 Cockpit Reference Guide for the DA 42 Airplane.

Figure 1 shows the ICS system schematic.

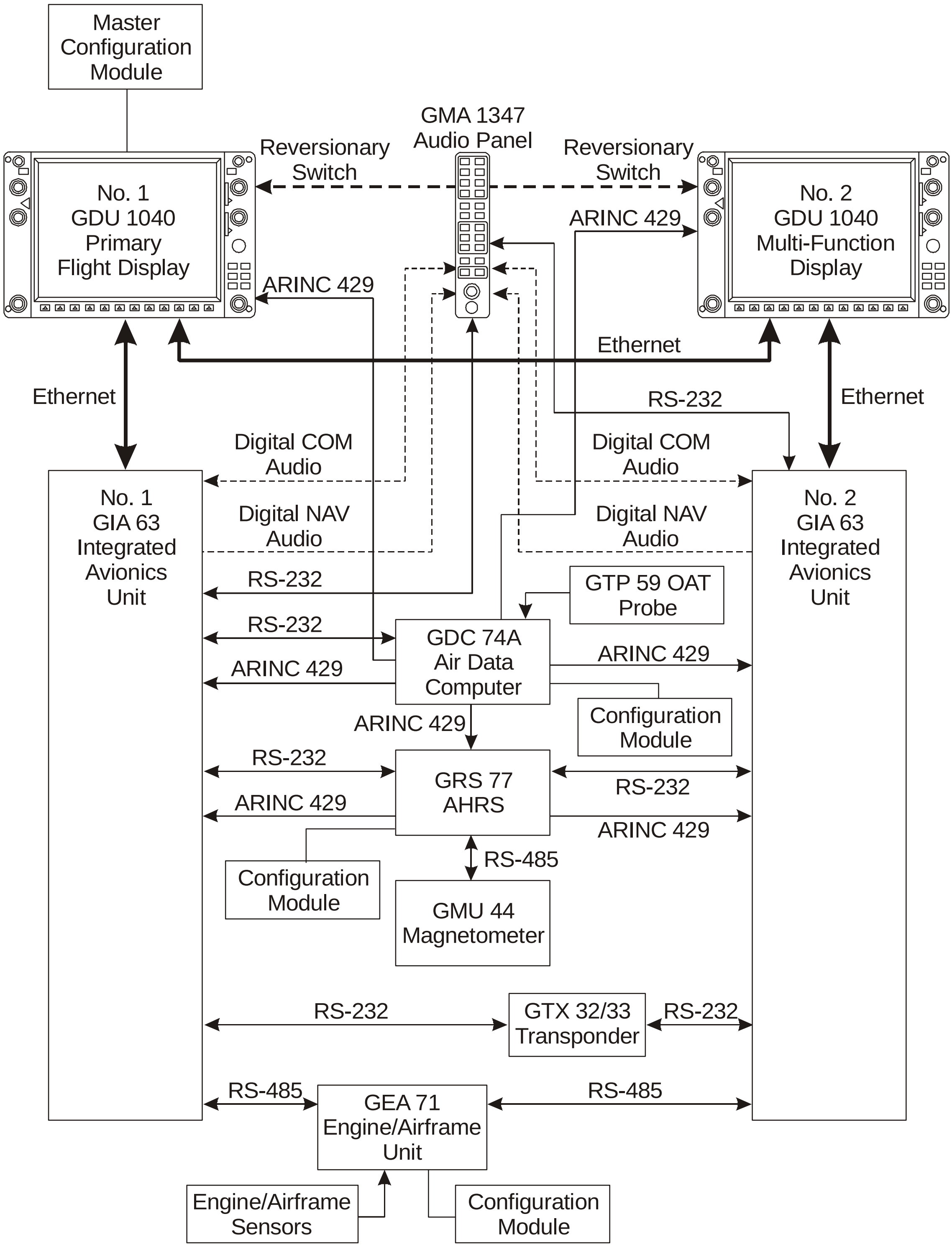

Figure 1: Integrated Cockpit System Schematic diagram

2. Description

Figure 2 shows the schematic diagram for the ICS. The ICS has these main components:

A. Primary Flight Display (PFD)

The PFD is a 10.4" liquid crystal display. Bezels on the left and right side of the PFD have the controls for the ICS. The lower edge of the PFD has ‘softkeys’. The function of the softkeys relates to the on-screen display and the display will show the function of the key.

The PFD shows the basic primary flight display plus a number of additional options that can selected manually. Some other indications will be generated automatically for example, alert captions.

The left side bezel has these controls:

– NAV Vol/Sq knob. This controls the NAV audio level. Press the knob to toggle the ident filter OFF/ON.

– NAV Frequency Transfer key. Press this key to make the standby NAV frequency the active frequency.

– NAV knob. This control has a large outer knob and a smaller inner knob. Rotate these knobs to select the NAV frequency. Rotate the large outer knob to select the MHz and the inner knob to select the kHz. Pressing the smaller inner knob will toggle the tuning cursor between the NAV1 and NAV2 frequency display.

– HDG knob. You can manually select the heading with this control. Pressing this knob will cause a heading window to momentarily appear to the left of the heading indicator. This window will show the airplane heading in a digital display and the heading bug will align with the compass lubber line.

– ALT SEL knob. Sets the selected altitude in the window over the altimeter tape display. The large outer knob sets the thousands indication and the inner knob sets the hundreds indication.

The right side bezel has these controls:

– COM VOL/SQ knob. Controls the COM audio level. Press the knob to toggle the COM automatic squelch ON/OFF.

– COM Frequency Transfer key. Press this key momentarily to make the standby COM frequency active. Press and hold this key to automatically make the emergency frequency (121.5 MHz) the standby frequency.

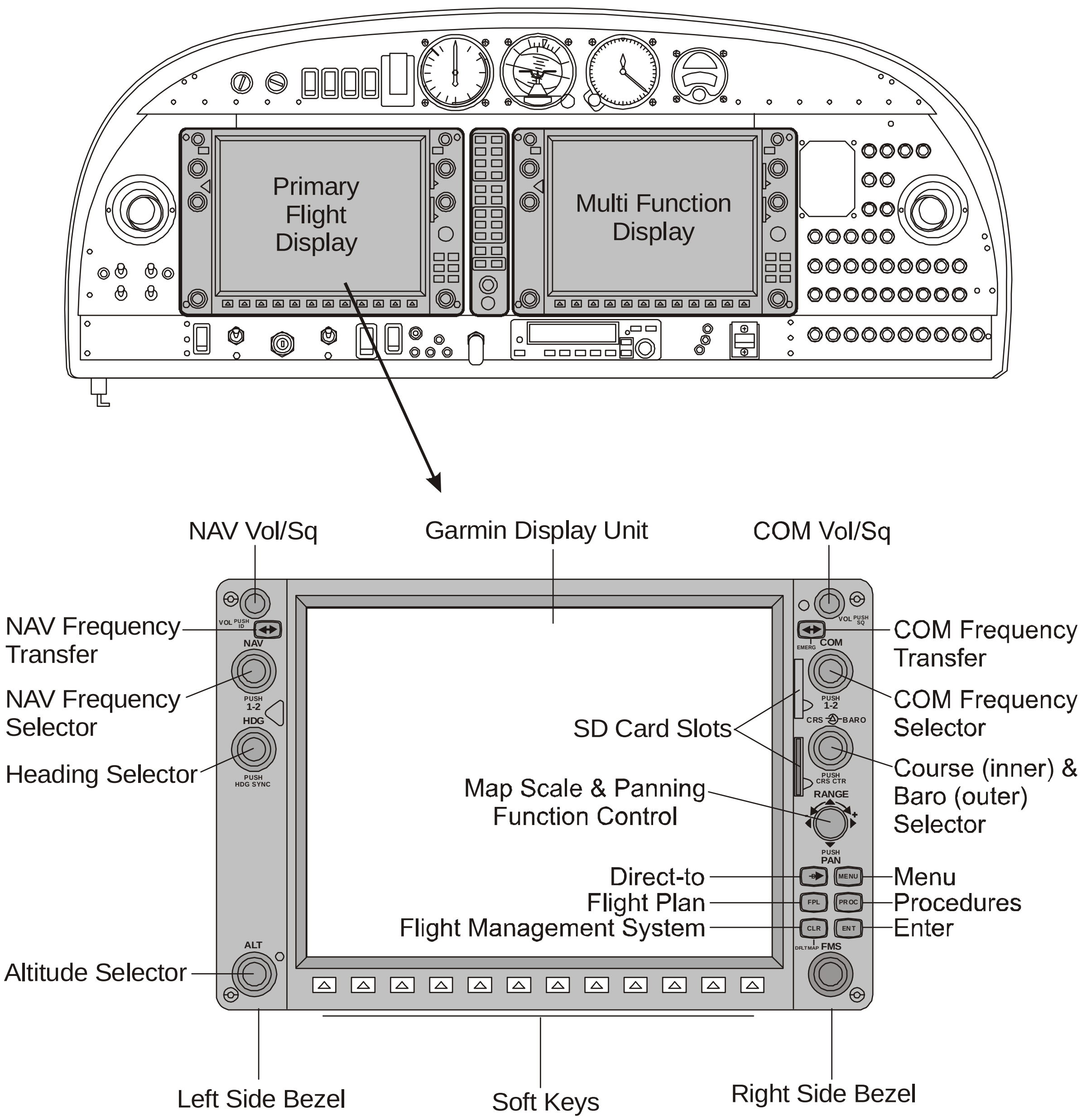

Figure 2: Garmin G1000 Display Screens and Audio Integrating Unit

- COM knob. This control has a large outer knob and a smaller inner knob. Rotate these knobs to select the COM frequency. Rotate the large outer knob to select the MHz and the inner knob to select the kHz. Pressing the smaller inner knob will toggle the tuning cursor between the COM1 and COM2 frequency display.

- CRS/BARO knob. This control has a large outer knob and a small inner knob. The outer knob sets the barometric pressure. The inner knob sets the airplane course.

- RANGE/PAN JOYSTICK knob. Rotate the knob to increase/decrease the map scale. Use the knob as a joystick to pan the map display.

- DIRECT TO key. Press this key to activate the direct-to function. This will give the direct course to a waypoint selected from the active route or to a position indicated by the map cursor.

- MENU key. Press the key to display the menu. The menu displays the options associated with the currently displayed page.

- FPL key. Press this key to display the active flight plan page. You can create or edit an existing flight plan using the bezel controls and soft keys when this page is displayed.

- PROC key. Press this key to display the procedures page. If this page is used with a selected flight plan then the procedures page will display the data associated with the flight plan. If the page is not used with a flight plan then an airfield and its relate procedures can be selected from a database.

- CLR key. Press this key to cancel an entry or delete information. Press and hold this key to immediately display the Default Navigation Map Page.

- ENT key. Press to accept a menu selection or data entry. Use this key to approve an operation or to complete a data entry.

- FMS knobs. Use these concentric knobs select the page to be displayed. The outer large knob selects a page group and the inner knob selects a specific page from within the selected page group. Press the inner knob to activates an on-screen cursor. When the cursor is activated the outer knob can be used to move the cursor on the page and the small inner knob can used to scroll the cursor through an item or menu selected by the outer knob.

- Secure Digital (SD) cards. Secure Digital cards can be inserted into the slots in the right side bezel. These cards can contain data such as updated GPS navigation charts or special-to-type airplane checklists.

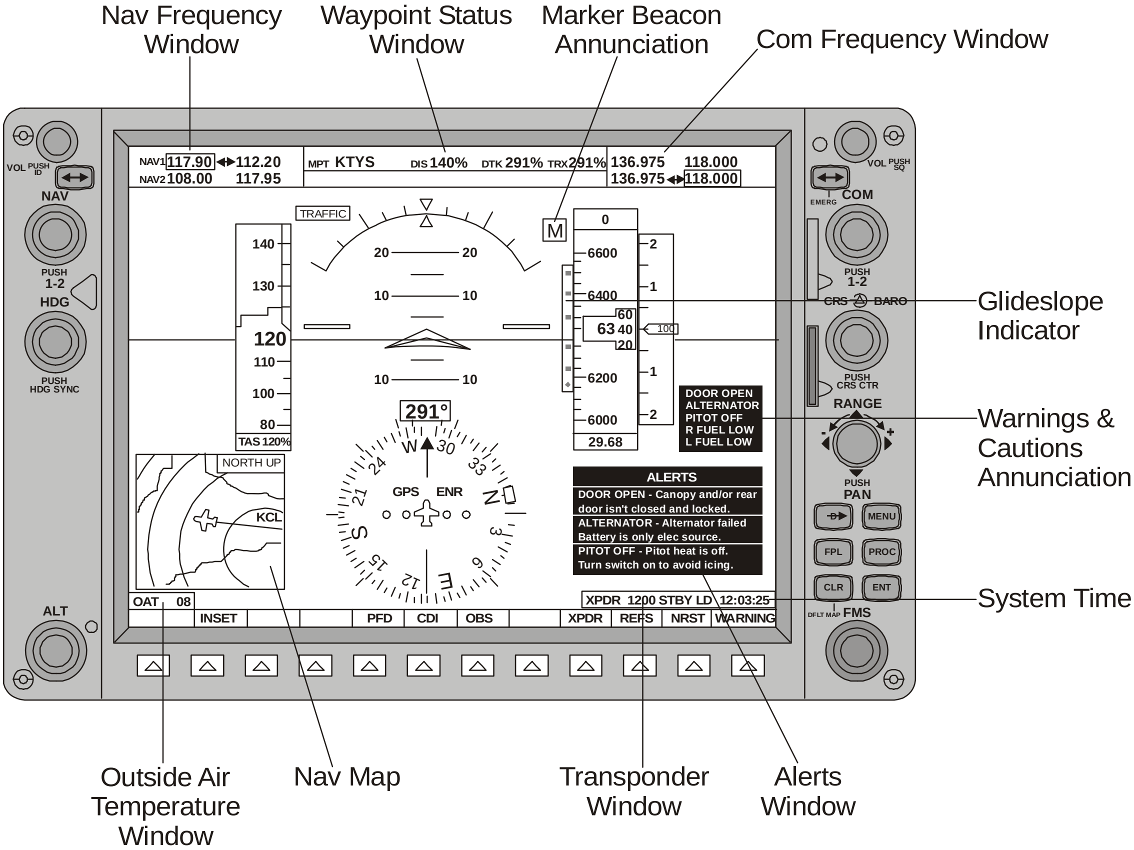

Figure 3: Primary Flight Display

The PFD window displays the usual primary flight instruments in a standard ‘T’ configuration. The basic flight instruments are:

– Airspeed Indicator (ASI). The airspeed indicator is on the left side of the display and indicates the airspeed on a rolling number gauge using a moving tape. The airspeed indicator also displays speed ranges for different airplane configurations, airspeed trends and ‘V’ speeds. If the airspeed indicator fails the display marks the airspeed display area with a red ’X’ and yellow text spelling out ‘AIRSPEED FAIL’.

– TAS. True airspeed is digitally displayed in a small window below the airspeed indicator.

– Attitude Indicator (Artificial Horizon). The attitude indicator is located in the center of the PFD, at the top. The attitude indicator shows the pitch, roll and yaw situation of the airplane. If the attitude indicator fails the display marks the pitch attitude display area with a red ’X’ and yellow text spelling out ‘ATTITUDE FAIL’.

– Altimeter. The altimeter is located at the top right of the PFD. The altimeter displays the airplane altitude in feet on a rolling number gauge using a moving tape. The altimeter also shows a altitude ‘bug’ at the selected altitude or the edge of the tape, whichever is closest to the current altitude. If the altitude indicator fails the display marks the tape display area with a red ’X’ and yellow text spelling out ‘ALTITUDE FAIL’.

– Barometric Pressure Indicator. The barometric pressure indicator is located immediately below the altitude indicator. The indicator shows the barometric pressure that has been set in either inches of mercury (Hg) or hectopascal number (hPa).

– Vertical Speed Indicator (VSI). The vertical speed indicator is located to the right of the altitude indicator. The indicator displays the airplane vertical speed in feet/min. A numeric pointer moves vertically up/down a fixed tape. The vertical speed indication is also shown digitally on the pointer. A negative sign is shown on the pointer to indicate negative vertical speeds (airplane descending). If the VSI fails the display marks the tape display area with a red ’X’ and yellow text spelling out ‘VERT SPEED FAIL’.

– Horizontal Situation Indicator (HSI). The HSI is located in the center of the PFD at the bottom. The HSI displays a rotating circular compass with heading markings. The HSI shows the following information:

– Heading Information. The heading is shown digitally in a window at the top of the rotating compass.

– Turn Rate Indicator. A turn rate indicator is located between the digital heading window and the rotating compass.

Course Deviation Indicator (CDI). The CDI is a line with an arrowhead that points to the airplane heading on the rotating compass. The line can slide left or right of the center marking to show the deviation of the actual course being flown to the required course. Course data can be supplied from the airplane VOR, LOC or GPS system. If the heading data is invalid the digital heading display window is marked with a red cross and yellow text spelling ‘HDG’.

– Vertical Deviation (Glidescope) Indicator. The glidescope indicator is located to the left of the vertical speed indicator.

– Alerts Window. The alerts window is located on the lower right side of the PFD. This window opens when an alert is activated or when the WARNINGS softkey is operated.

– Warnings and Cautions Window. The warnings and cautions window is located above the alerts window. This window opens when a warning or caution is activated or if the WARNING softkey is operated.

– NAV MAP. The NAV MAP window is located in the lower left of the PFD. The window is activated by pressing the INSET softkey and when activated shows a pictorial view of the airplane on a moving map.

Small windows in the top left corner of the PFD show active and standby NAV frequencies. Small windows in the top right of the PFD show active and standby COM frequencies. A larger window in the top of the PFD flight planning data when activated.

A small window in the bottom left of the PFD shows the outside air temperature (OAT). A small window on the bottom right of the PFD shows the transponder settings and operational state. Another small window in the right bottom corner of the PFD shows a digital clock.

A set of labels along the very bottom of the PFD identify the function of the softkeys for the current page being displayed on the PFD.

The PFD has a self-monitoring system. If the PFD self-monitoring system detects a fault the PFD enters reversionary mode. In the reversionary mode the PFD is configured to display the flight instrument symbology and the basic engine parameter monitoring indications. The PFD reversionary mode can also be entered by pressing the DISPLAY BACKUP selector. The DISPLAY BACKUP selector is located on the bottom of the audio control panel.

B. Multi-Function Display (MFD)

The MFD is a 10.4" liquid crystal display. Bezels on the left and right side of the MFD have the controls for the ICS. The lower edge of the MFD has ‘softkeys’. The function of the soft keys relates to the on-screen display and if a key has a function related to the current display the display will show the function of the key.

The MFD displays engine and airplane pages on the left slide of the screen. The remainder of the screen is used to display navigational pages. The bezels on the left and right side of the MFD have the same controls and function as the bezels on the PFD.

The MFD has these displays:

(1) SYSTEM Page

Engine Instrumentation System Window (EIS). The engine indication system window is on the left side of the MFD displays a full-time dedicated display of these engine parameters:

– Engine Load. The engine load indicator is at the top of the EIS window. The engine loads are displayed as a percentage. Pointers on each side of a vertical scale move to show the engine load. If the system fails the display shows a red cross to the left or right of the load indicator to show which engine system has failed.

– Engine RPM. The engine RPM indicator is located below the engine load indicator. Pointers on each side of a vertical scale move to show the engine rpm. If the system fails the display shows a red cross to the left or right of the rpm indicator to show which engine system has failed.

– Volts. Main bus voltage is displayed below the rpm indicator. Pointers above and below a horizontal range bar show the bus voltages. The top pointer indicates the left main bus voltage and the bottom pointer indicated the right main bus voltage. The horizontal range bar is color coded. The green central section of the bar indicates that the voltage is within limits. The red section at the left end of the range bar indicates too low a voltage. The red section at the right end of the range bar indicates too high a voltage. Above the range bar are left and right windows displaying the main bus voltages digitally.

– Amps. Generator load is shown by an indicator located below the Volts indicator. Pointers above horizontal range bar show the generator loads. The range bar is color coded, green in the normal load range and then red at the high end of the range. The range bar is also marked numerically at the 0 and 90 Amp indications. The pointers move from left to right to show the load on each generator. The top pointer shows the left generator load. The bottom pointer shows the right generator load. Small windows above the range bar show the related generator loads digitally.

– Engine Gearbox Temperature. Below the Amps indication is the engine gearbox temperature indication. Pointers above and below a horizontal range bar show the gearbox temperatures. The range bar is color coded, green in the normal temperature range, yellow in the caution range and then red at the high end of the range. The pointers move from left to right to show the temperature of each gear. The top pointer shows the left gearbox temperature and the bottom pointer shows the right gearbox temperature. Small windows above the range bar show the related gearbox temperatures digitally. If the system fails the display shows red crosses in place of the indications for the failed system(s).

– Coolant Temperature. Below the engine gearbox temperature indication is the engine coolant temperature indication. Small windows to the left and right of a °C marking show the engine coolant temperatures digitally. If the system fails a red cross is displayed in place of the digital indication for the failed system(s).

– Oil Temperature. Below the engine coolant temperature indication is the engine oil temperature indication. Small windows to the left and right of a °C marking show the engine oil temperatures digitally. If the system fails a red cross is displayed in place of the digital indication for the failed system(s).

– Oil Pressure. Below the engine oil temperature indication is the engine oil pressure indication. Small windows to the left and right of a BAR marking show the engine oil pressures digitally. If the system fails a red cross is displayed in place of the digital indication for the failed system(s).

(2) ENGINE Page (default)

Pressing the FUEL softkey at the bottom of the MFD will change the display to the FUEL page in the EIS panel. The display will now give the following indications:

– Engine Load and RPM. These indications are in the same location and format as in the SYSTEM page.

– Fuel Flow. Below the engine load and rpm indications is the fuel flow indication. Small windows to the left and right of a GPH marking show the engine fuel flow digitally. If the system fails a red cross is displayed in place of the digital indication for the failed system(s).

– Oil Temperature. The engine oil temperature is shown below the fuel flow indication. Pointers above and below a horizontal range bar show the engine oil temperatures. The range bar is color coded yellow at the cool end of the range bar, then green to show the normal operating range and yellow in the high range. The pointers move from left to right to indicate the temperature of the engine oil. The pointer above the range bar indicates the left engine oil temperature and the pointer below the range bar indicates the right engine oil temperature.

- Oil Pressure. The engine oil pressure indication is shown below the engine oil temperature indication. Pointers above and below a range bar indicate the oil pressure. The range bar is color coded yellow at the low pressure (left) end of the range bar, green to show the normal operating range, yellow in the cautionary range and red in the high range. The pointers move from left to right to indicate the oil pressure. The pointer above the range bar indicates the left engine oil pressure and the pointer below the range bar indicates the right engine oil pressure.

- Coolant Temperature. The coolant temperature indication is shown below the engine oil pressure indication. Pointers above and below a range bar indicate the coolant temperature. The range bar is color coded yellow at the low temperature (left) end of the range bar, green to show the normal operating range, yellow in the cautionary range and red in the high range. The pointers move from left to right to indicate the coolant temperature. The pointer above the range bar indicates the left engine coolant temperature and the pointer below the range bar indicates the right engine coolant temperature.

- Fuel Temperature. The fuel temperature indication is located below the coolant temperature indication. Pointers above and below a range bar indicate the fuel temperature. The range bar is color coded yellow at the low temperature (left) end of the range bar, green to show the normal operating range, yellow in the cautionary range and red in the high range. The pointers move from left to right to indicate the fuel temperature. The pointer above the range bar indicates the temperature of the fuel in the left fuel tank and the pointer below the range bar indicates the temperature of the fuel in the right fuel tank.

- Fuel Quantity. The fuel quantity indication is located at the bottom of the EIS. Pointers above and below a range bar indicate the fuel quantities. The pointers move from left (low) to right (full) to indicate the fuel quantity. The pointer above the range bar indicates the quantity of fuel in the left fuel tank and the pointer below the range bar indicates the quantity of fuel in the right fuel tank.

(3) FUEL Page

From this page you can use softkeys to enter data for the fuel system. Refer to the Garmin G1000 Cockpit Reference Guide for more data about entering data into the ICS.

C. GMA 1347 Audio Control Panel

The GMA 1347 audio control panel is located in the airplane instrument panel between the 2 display screens. The audio control panel integrates the NAV/COM digital audio, intercom system and marker beacon controls. Manual display reversion is also controlled from the GMA 1347. The GMA 1347 communicates with both IAUs using RS-232 digital interface. For more data about the audio control panel refer to Section 23-50.

D. GIA 63 Integrated Avionics Unit (IAU)

The ICS has 2 GIA 63 IAUs. The two IAUs are identical and independent. They are both installed in the avionics rack in the rear fuselage, just aft of the rear baggage frame. The IAU processes all the data that is displayed on the cockpit display. Either IAU can supply data to either cockpit display. You cannot service the IAU.

E. GTX 33 Transponder

The GTX 33 transponder is a solid state Mode-S transponder. The transponder provides modes A, C and S functions. The unit is operated directly through the PFD in the cockpit. The transponder is linked to both IAUs via RS-232 digital interface. The transponder is installed in the in the avionics rack in the rear fuselage, just aft of the rear baggage frame.

F. GRS 77 Attitude, Heading and Reference Unit (AHRS)

The GRS 77 provides airplane attitude and related flight data to the cockpit displays. The GRS 77 receives data from the air data computer, the GMU 44 magnetometer and GPS signals from the GIA 63. The GRS communicates with both the GIA 63s and the cockpit displays via ARINC 429 digital inetrface. The GRS 77 is located next to the avionics rack in the rear fuselage, just aft of the rear baggage frame.

G. GDC 74A Air Data Computer (ADC)

The ADC receives data from the pitot/static system, OAT sensor. The ADC uses this data to provide pressure altitude, airspeed, vertical speed and outside air temperature data to the G1000 system. The ADC communicates with the GIA 63s, GDU 1040 display screens and the GRS 77 using ARINC 429 digital interface. Software and configuration data is received through RS-232 digital interface with the GIA 63s. The ADC is located on the instrument panel shelf.

H. GEA 71

The GEA 71 is a microprocessor based unit that receives and processes signals from airframe and engine sensors. The GEA 71 communicates directly with both IAUs using RS 485 digital interface. The GEA 71 is located on the instrument panel shelf.

I. GMU 44 Magnetometer

The magnetometer senses magnetic field information. Data is sent to the GRS77 AHRS for processing. The magnetometer receives power from the GRS 77 and communicates with the GRS 77 using RS-485 digital interface. The magnetometer is located in the right outer wing and can accessed through a panel in the lower surface of the wing.

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Trouble-Shooting

1. General

The Garmin ICS has a built-in test and trouble-shooting facility. For more data about trouble-shooting the ICS refer to the G1000 Cockpit Reference Guide for the DA 42 Airplane.

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Maintenance Practices

1. General

These maintenance procedures tell you how to replace the main components of the ICS. They do not tell you how to maintain the components. For data about removing/installing the GMA 1347 Audio Control Unit refer to Section 23-50. For more data about maintaining the equipment refer to the G1000 Line Maintenance Manual. The G1000 Line Maintenance Manual gives you particular information on:

– Unit related alerts and problems.

– Equipment removal and installation.

– Uploading software, configuring and testing.

– Final system checkout.

– Periodic maintenance.

– G1000 system software and configuration.

– GDU lighting setup.

Refer to the DAI MSB 42-008 for data about the approved software configurations.

The specific DA 42 values as to the equipment basic setting are given in the table below:

Note: In the DA 42 are two types of PFD and MFD displays in use. Check the Part number to read the correct values for the basic settings.

Item	Basic Setting	
Main Lighting – Display	Source:	photo
all except P/N 011-00972-03	Response Time:	3
	Minimum:	1.75
	Edit Curve Vertex:	none
	GMA Annunciator Gain	1.00
	GMA Annunciator Offset	0

Item	Basic Setting	
Main Lighting – Key all except P/N 011-00972-03	Source: Response Time: Minimum: Edit Curve Vertex: GMA Key Gain GMA Key Offset	photo 1 2.72 none 2.00 2
Main Lighting – Display P/N 011-00972-03	Source: Response Time: Minimum: Edit Curve Vertex: Photo Transition: Edit Photo Vertex: GMA Annunciator Gain GMA Annunciator Offset	28 V 3 3.50 none 20 % none 1.00 0
Main Lighting – Key P/N 011-00972-03	Source: Response Time: Minimum: Edit Curve Vertex: GMA Key Gain GMA Key Offset	28 V 1 1.75 none 2.00 2
Audio Alert Configuration	Volume: Voice:	45 male

Item	Basic Setting
Transponder Configuration	VFR Code: specific to Country (e.g. USA: 1200) Aircraft Weight: < 15,500 lbs Max Airspeed: <= 300 kts Address Type - Europe: hex id - USA: us tail Flight ID Type - Europe: PFD Entry - USA: same as tail
GMA Configuration – Headset Volume	Music #1: -20 Music #2 -20 Unswitched in #1: -20 Unswitched in #2: -20 Unswitched in #3: -20 Altitude Warning: -20
GMA Configuration – Speaker Volume	Crew Audio: 5
GMA Configuration – Master Squelch	Threshold Value: -16

Note: Unlisted items are preset. You can not change their values.

2. Remove/Install a GDU 1040 Display

A. Remove a GDU 1040 Display

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the ELECT. MASTER switch is set to OFF.	
(2)	Set the PFD and MFD circuit-breakers open.	Right side of instrument panel.
(3)	Remove the display unit:	Refer to Figure 4.
	– Rotate the 4 locking studs that attach the display to the instrument panel 90° counter-clockwise.	
	– Move the instrument panel aft and disconnect the electrical cables.	At the in-line connector.
	– Move the display unit clear of the instrument panel.	

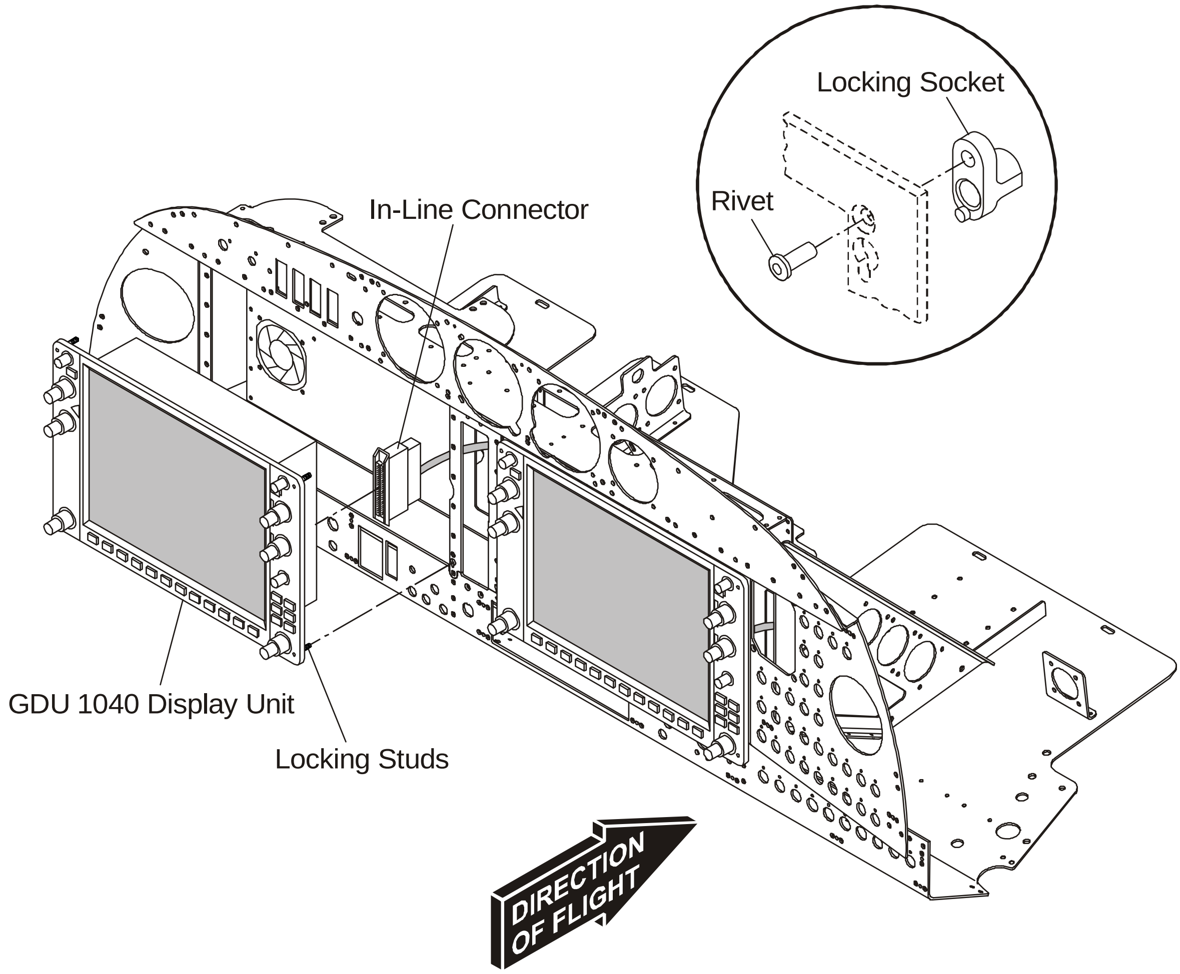

Figure 4: GDU 1040 Display Unit Installation

B. Install a GDU 1040 Display

	Detail Steps/Work Items	Key Items/References
(1)	If necessary, set the PFD and MFD circuit-breakers open.	Right side of instrument panel.
(2)	Install the display unit:	
	– Move the display unit into position at the instrument panel.	
	– Connect the electrical cables to the display unit.	At the in-line connector.
	– Move the display unit fully forward into position on the instrument panel.	Make sure that you do not trap the electrical cables.
	– Rotate the 4 locking studs that attach the display unit to the instrument panel 90° clockwise.	The locking studs should be oriented with the alignment marks in the vertical position for installation. When locked, the alignment marks are in the horizontal position.
(3)	Re-set the PFD and MFD circuit breakers.	Right side of instrument panel.
(4)	Do a test for the correct operation of the integrated cockpit system (ICS):	
	– Set the ELECT. MASTER switch to ON.	The ICS must power-up and successfully complete its self-test procedure.
	– Set the ELECT. MASTER switch to OFF.	

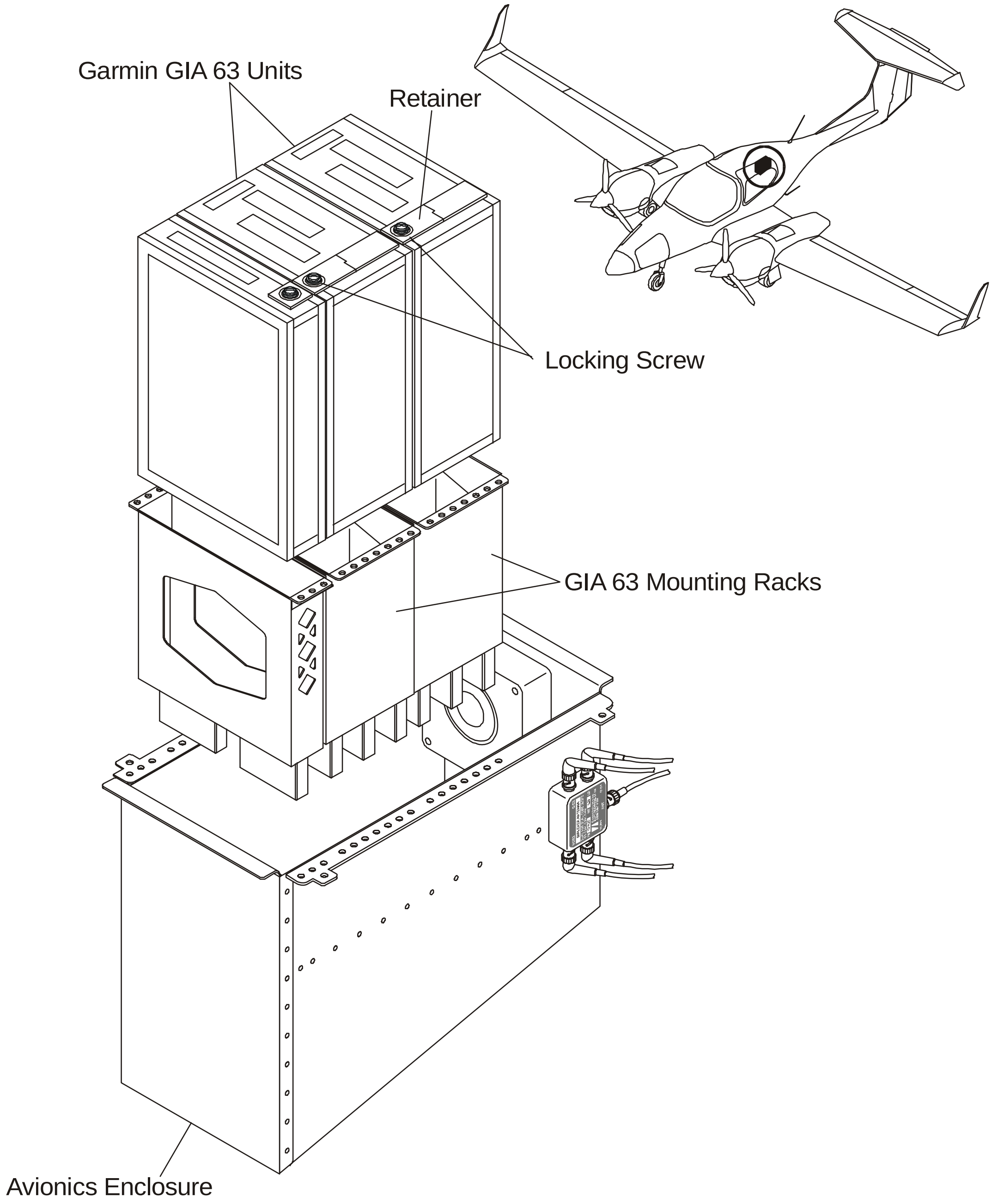

Figure 5: GIA 63 Integrated Avionics Unit (IAU) Installation

3. Remove/Install a GIA 63 Integrated Avionics Unit (IAU)

A. Remove a GIA 63 Integrated Avionics Unit (IAU)

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the ELECT. MASTER switch is set to OFF.	
(2)	Remove the lower access panel from the rear baggage compartment.	Refer to Section 25-50.
(3)	Remove the GIA IAU: – Identify the unit that you will remove. – Release the locking screw from the retainer. – Lift the retainer clear of the unit. – Lift the IAU clear of the mounting rack and the airplane.	Refer to Figure 5.

B. Install a GIA 63 Integrated Avionics Unit (IAU)

	Detail Steps/Work Items	Key Items/References
(1)	Install the IAU: – Move the GIA IAU into position at the mounting and lower the unit into position in the rack. – Move the retainer into position and secure with the locking screw.	Make sure that the unit is seated correctly. Do not force the unit into position!
(2)	Install the lower access panel in the rear baggage compartment.	Refer to Section 25-50.
(3)	Do a test for the correct operation of the integrated cockpit system (ICS): – Set the ELECT. MASTER and AV MASTER switches to ON. – Set the ELECT. MASTER and AV MASTER switches to OFF.	The ICS must power up and successfully complete its selftest procedure.

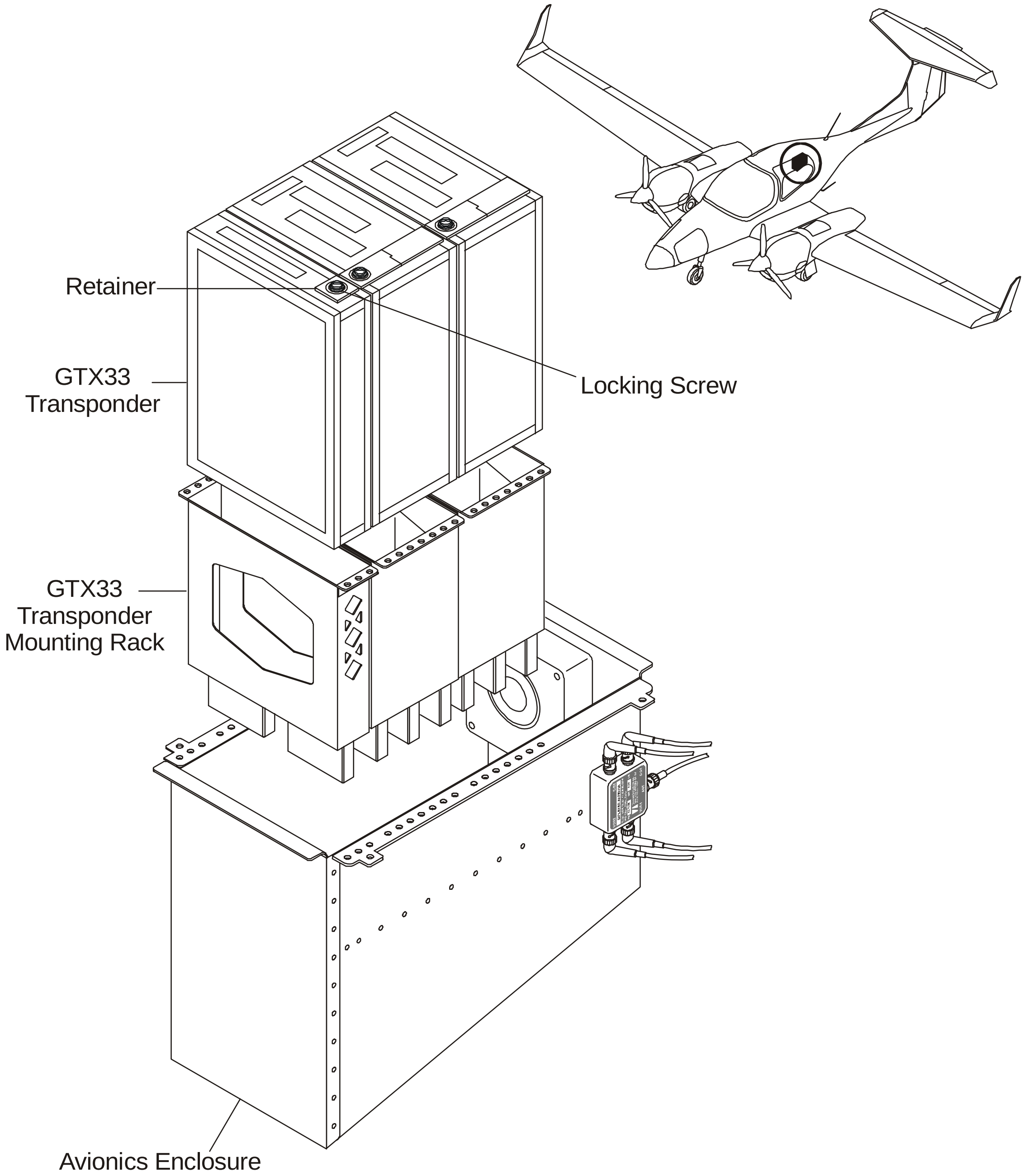

Figure 6: GTX33 Transponder Installation

4. Remove/Install the GTX33 Transponder

A. Remove the GTX33 Transponder

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the ELECT. MASTER switch is set to OFF.	
(2)	Remove the lower access panel from the rear baggage compartment.	Refer to Section 25-50.
(3)	Remove the GTX33: – Identify the unit that you will remove. – Release the locking screw from the retainer. – Lift the retainer clear of the unit. – Lift the GTX33 clear of the mounting rack and the airplane.	Refer to Figure 6.

B. Install the GTX33 Transponder

	Detail Steps/Work Items	Key Items/References
(1)	Install the GTX33: – Move the GTX33 into position at the mounting and lower the unit into position in the rack. – Move the retainer into position and secure with the locking screw.	Make sure that the unit is seated correctly. Do not force the unit into position!
(2)	Install the lower access panel in the rear baggage compartment.	Refer to Section 25-50.
(3)	Do a test for the correct operation of the integrated cockpit system (ICS): – Set the ELECT. MASTER switch to ON. – Set the ELECT. MASTER switch to OFF.	The ICS must power-up and successfully complete its self-test procedure.

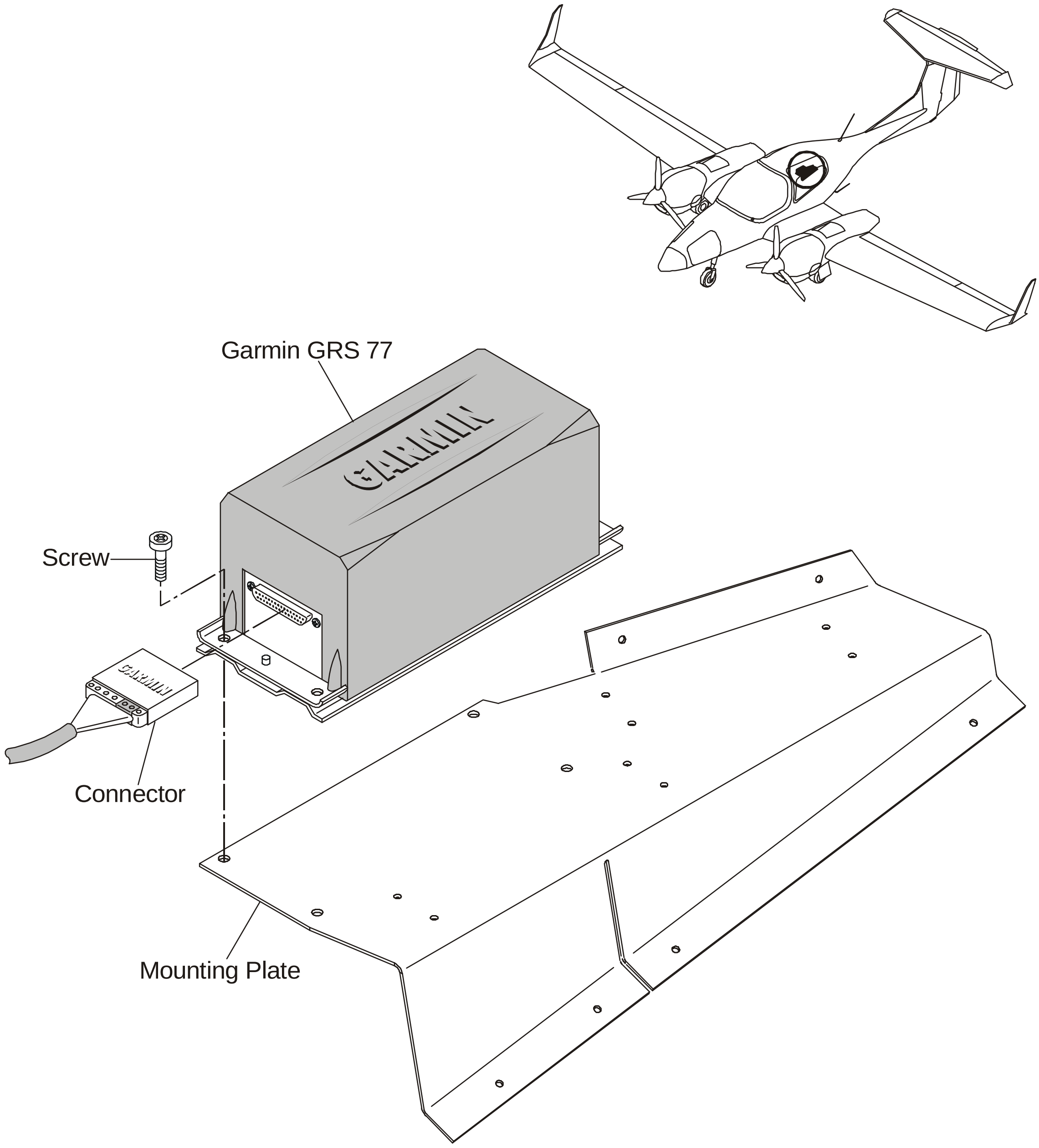

Figure 7: GRS77 Attitude, Heading and Reference Unit (AHRS) Installation

5. Remove/Install the GRS77 Attitude, Heading and Reference Unit (AHRS)

A. Remove the GRS77 Attitude, Heading and Reference Unit (AHRS)

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the ELECT. MASTER switch is set to OFF.	
(2)	Remove the lower access panel from the rear baggage compartment.	Refer to Section 25-50.
(3)	Remove the GRS77: – Disconnect the electrical cables. – Loosen the 4 screws that attach the GRS77 to the mounting. – Move the GRS77 clear of the airplane.	Refer to Figure 7.

B. Install the GRS77 Attitude, Heading and Reference Unit (AHRS)

	Detail Steps/Work Items	Key Items/References
(1)	Install the GRS77 unit: – Move the unit into position next to the avionics rack. – Tighten the 4 screws that attach the unit to the mount. – Connect the electrical cables.	At the in-line connector.
(2)	Install the lower access panel in the rear baggage compartment.	Refer to Section 25-50.
(3)	Do a test for the correct operation of the integrated cockpit system (ICS): – Set the ELECT. MASTER switch to ON. – Set the ELECT. MASTER switch to OFF.	The ICS must power up and successfully complete its selftest procedure.

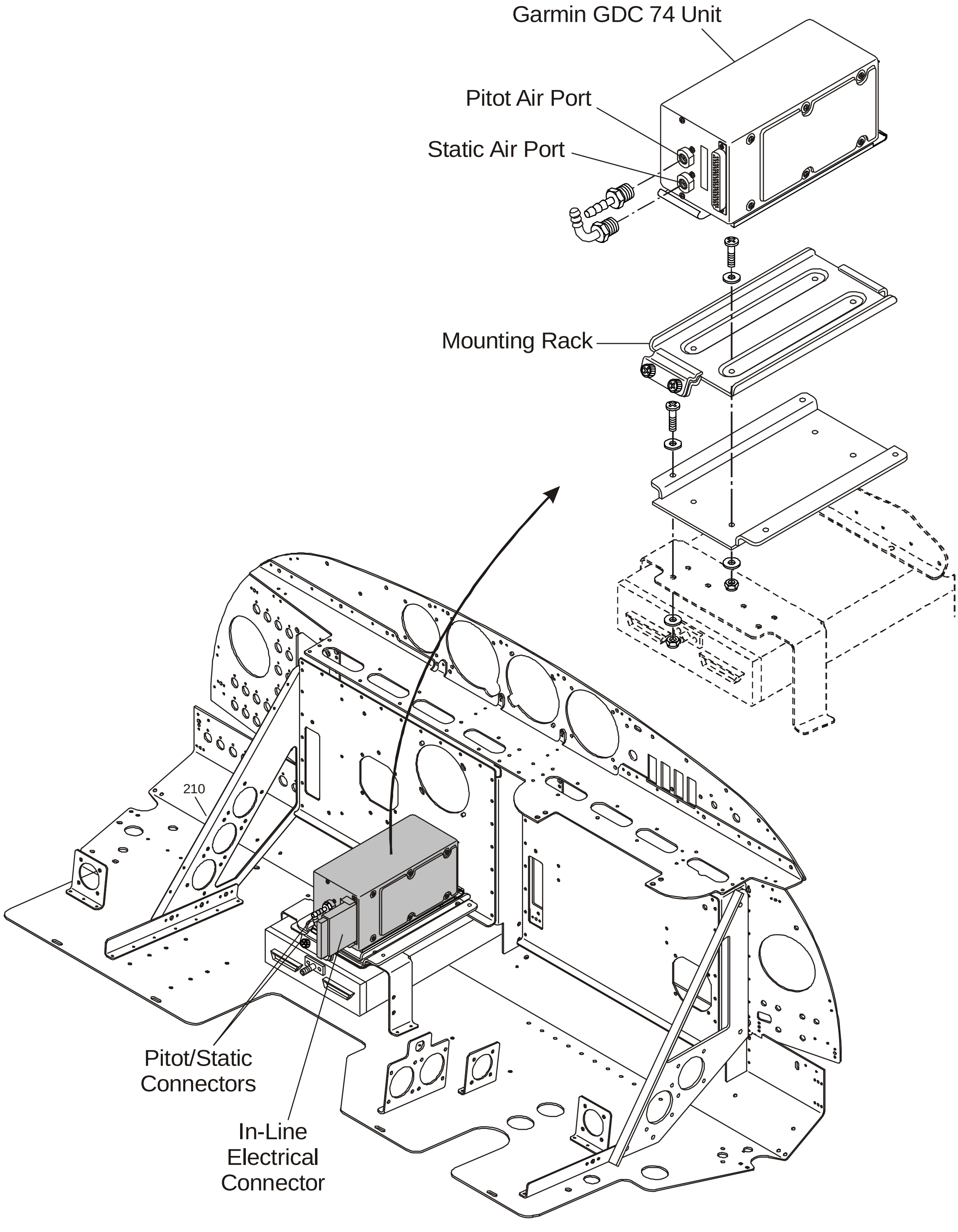

Figure 8: GDC 74A Air Data Computer (ADC) Installation

6. Remove/Install the GDC 74A Air Data Computer (ADC)

A. Remove the GDC 74A Air Data Computer (ADC)

	Detail Steps/Work Items	Key Items/References
(1)	Disconnect the airplane main battery.	Refer to Section 24-31.
(2)	Remove the instrument panel cover.	Refer to Section 25-10.
(3)	Remove the GDC 74A: – Locate the GDC 74A on the instrument panel shelf. – Disconnect the electrical cables. – Disconnect the Pitot/static tubes from the unit. – Loosen the 2 screws of the adapter plate that attach the GDC 74A to its mounting rack. – Move the GDC 74A clear of the airplane.	Refer to Figure 8. Note the connections!

B. Install the GDC 74A Air Data Computer (ADC)

	Detail Steps/Work Items	Key Items/References
(1)	Install the GDC 74A: – Move the GDC 74A assembly into position on the mounting rack. – Install the adapter plate and tighten the 2 screws that attach the GDC 74A to the mounting rack. – Install the Pitot/Static tubes to the unit. – Connect the electrical cables.	As noted in 6A. At the in-line connector.
(2)	Install the instrument panel cover.	Refer to Section 25-10.
(3)	Connect the airplane main battery.	Refer to Section 24-31.
(4)	Do a test for the correct operation of the integrated cockpit system (ICS): – Set the ELECT. MASTER switch to ON. – Set the ELECT. MASTER switch to OFF.	The ICS must power-up and successfully complete its self-test procedure.
(5)	Do a Pitot/static leak test.	Refer to Section 34-10.

7. Remove/Install the GEA 71 Processor

A. Remove the GEA 71 Processor

	Detail Steps/Work Items	Key Items/References
(1)	Disconnect the airplane main battery.	Refer to Section 24-31.
(2)	Remove the instrument panel cover.	Refer to Section 25-10.
(3)	Remove the GEA 71: – Locate the GEA 71 on the instrument panel shelf. – Release the screw that secures the retainer. – Move the retainer clear and lift the GEA 71 clear of the mounting.	Refer to Figure 9.

B. Install the GEA 71 Processor

	Detail Steps/Work Items	Key Items/References
(1)	Install the GEA 71: – Move the GEA 71 into position at its mounting. – Lower the GEA 71 into its mounting. – Install the retainer and secure the retainer with the retaining screw.	
(2)	Install the instrument panel cover.	Refer to Section 25-50.
(3)	Connect the airplane main battery.	Refer to Section 24-31.
(4)	Do a test for the correct operation of the integrated cockpit system (ICS): – Set the ELECT. MASTER switch to ON. – Set the ELECT. MASTER switch to OFF.	The ICS must power-up and successfully complete its selftest procedure.

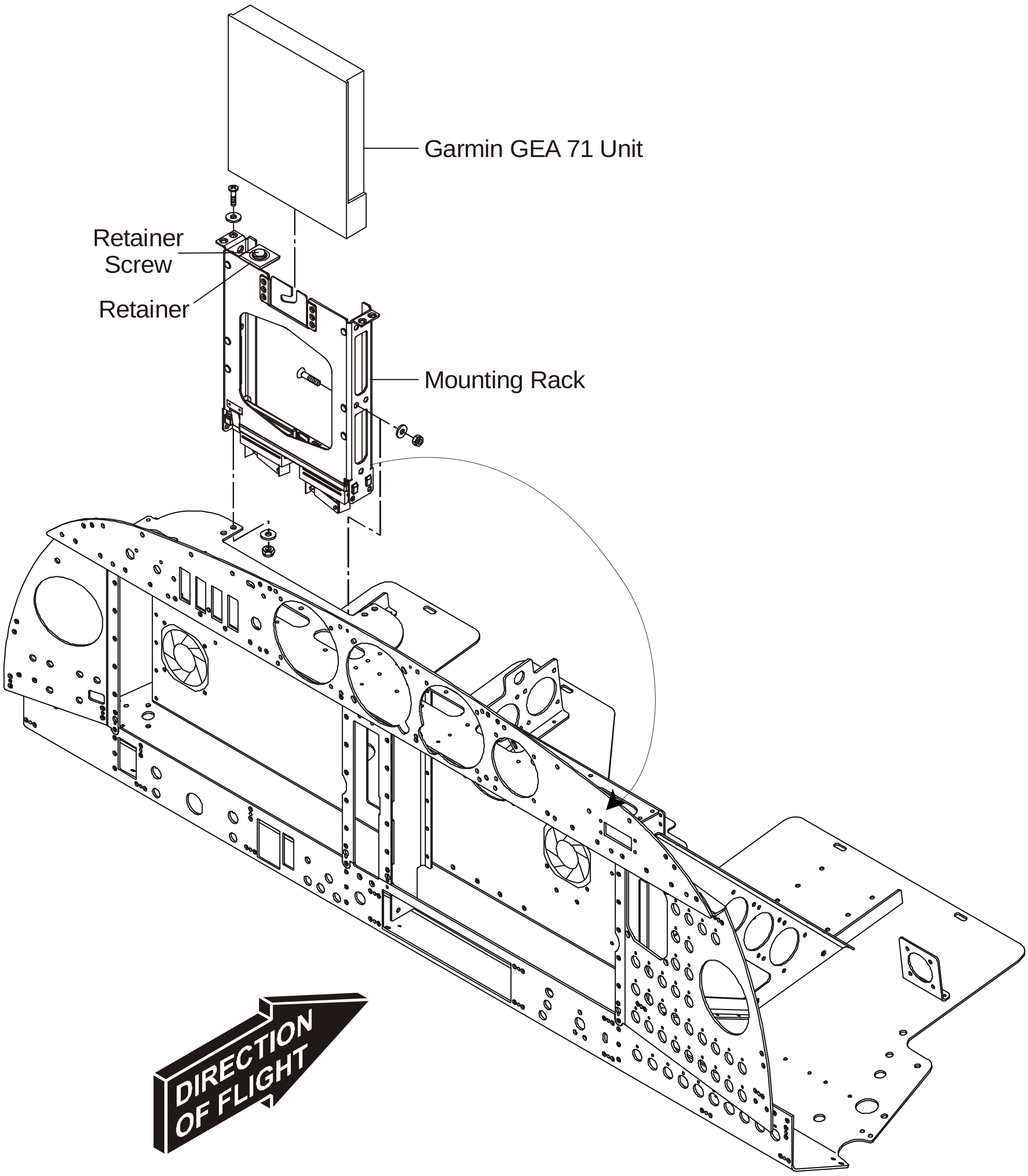

Figure 9: GEA 71 Processor Installation

8. GMU 44 Magnetometer

A. Remove the GMU 44 Magnetometer

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the ELECT. MASTER switch is set to OFF.	
(2)	Remove the magnetometer assembly: – Remove the 3 screws that attach the magnetometer assembly to the lower surface of the right wing. – Lower the magnetometer assembly clear of the structure and disconnect the electrical cables. – Move the magnetometer assembly clear of the airplane.	 Support the assembly.
(3)	If necessary, remove the magnetometer from the panel.	

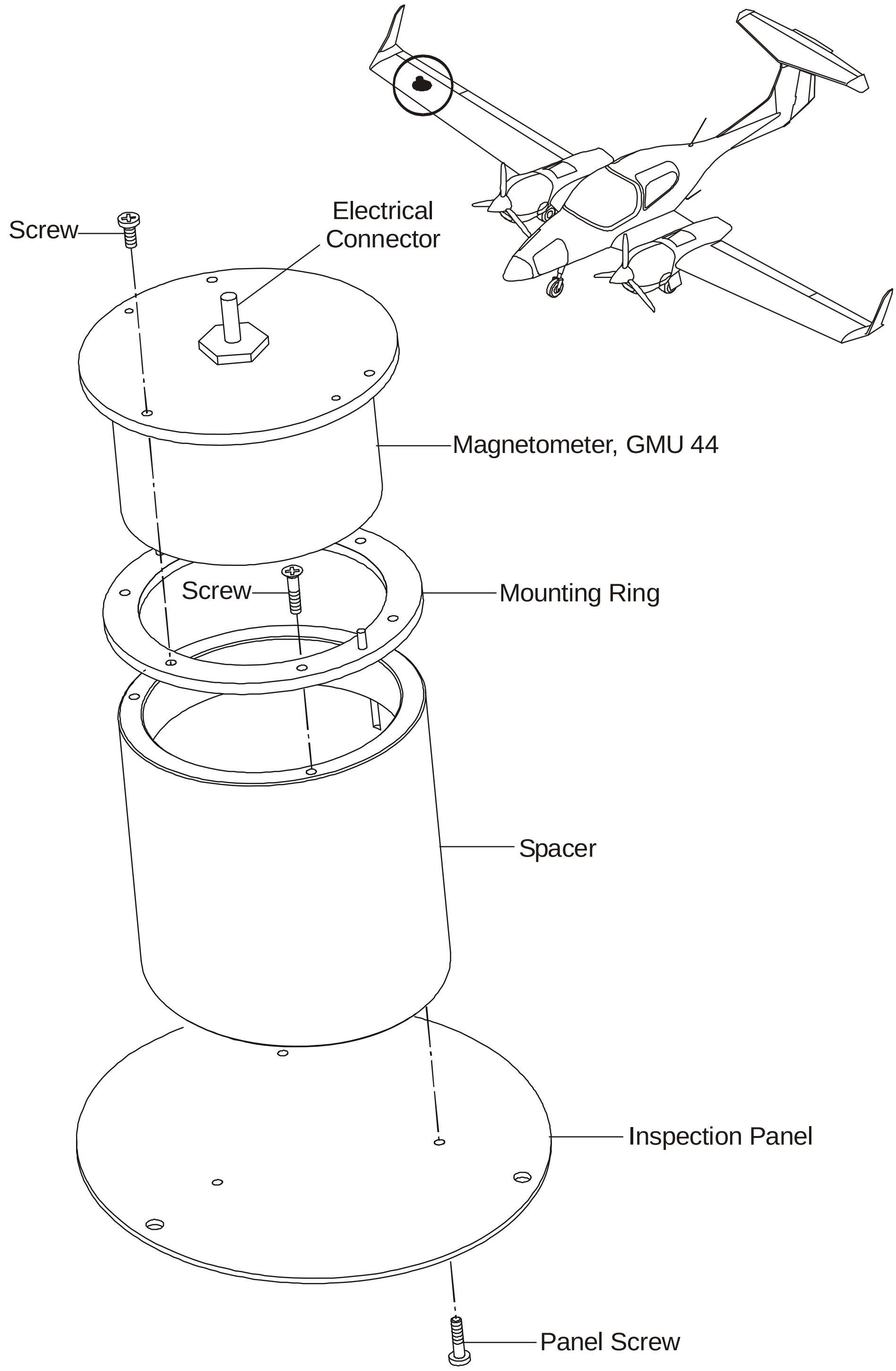

Figure 10: Magnetometer Assembly Installation

B. Install the GMU 44 Magnetometer

	Detail Steps/Work Items	Key Items/References
(1)	Install the magnetometer assembly: – Move the magnetometer assembly into position at the right wing. – Connect the electrical cables to the magnetometer assembly. – Move the magnetometer assembly fully into position in the lower surface of the right wing. – Install the 3 screws that attach the magnetometer assembly to the wing.	Pay attention on the dedicated mounting direction marked by an arrow! At the inline connector.
(2)	Do a test for the correct operation of the integrated cockpit system (ICS): – Set the ELECT. MASTER switch to ON.	The ICS must power up and successfully complete its selftest procedure.
(3)	Do a magnetometer calibration.	Refer to Paragraph 9.

9. G1000 Magnetometer Calibration

Note: This calibration procedure must be carried out on a compass rose in order to guarantee measurements free of environmental magnetic disturbances. Attempting to carry out this maneuver on a typical ramp area will not yield a successful calibration. The accuracy of the AHRS cannot be guaranteed if this calibration is not performed on a magnetically clean compass rose.

Taxi the aircraft to a compass rose. Ensure that there are no nearby magnetic materials. If unavoidable, maneuver the aircraft to keep the magnetometer from passing within 6 meter (19.7 feet) of such objects. At the compass rose, align the aircraft to a heading of magnetic north (± 5°).

(1) With the airplane stationary, initiate the GRS 77 AHRS magnetometer calibration procedure as follows:

(a) Enter the CDU configuration mode by holding the ENTER button while applying power. Release the ENTER button when the words INITIALIZING SYSTEM are displayed on the CDU.

(b) Press the FMS inner knob to select which calibration procedure to run. Select MAGNETOMETER and press the ENTER button.

(c) Follow the checklist items displayed on the CDU and press the ENTER button as each one is completed or confirmed. When the CALIBRATE field is blinking, press the ENTER button to begin the procedure.

(d) The CDU display advises the operator when to turn the aircraft, when to stop, and when to turn again.

(2) Upon advice to turn, taxi the aircraft in a right turn. After approximately 25° to 30° of turn from the last heading the CDU display advises the operator to stop the aircraft.

(3) The CDU display guides the operator to dwell at multiple headings around a complete circle.

Note: The operator may use outside references to turn the aircraft by about 30° each time the CDU displays that it is time to turn, rather than attempting to use the CDUs real-time indication of how much additional turn is needed. Simply turning the aircraft by roughly 30° (± 5°) increments and dwelling for the time recommended by the CDU is all that is needed for successful calibration.

(4) Repeat the turn-and stop process until the CDU display advises that a successful calibration is complete. The GRS 77 AHRS then enters its normal operational mode. Press the ENTER button on the CDU to conclude this procedure.

Refer to the GRS 77/ GMU 44 Installation Manual for more information on the post installation configuration and checkout procedure.

CHAPTER 32

LANDING GEAR

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CHAPTER 32
LANDING GEAR

1. General

This Chapter tells you about the landing gear for the DA 42 airplane. Refer to Chapter 57-00 for data about the wing structure where the main landing gear attaches. Refer to Chapter 53-00 for data about the fuselage structure where the nose landing gear attaches.

The DA 42 airplane is equipped with one of the following landing gears:

– Standard landing gear.

– High capacity landing gear (OÄM 42-195 is carried out).

Refer to Chapter 92-00 for the wiring diagrams for the position control and position indicating systems of the landing gear.

Note: Refer to Section 20-90 before starting maintenance work in the center wing area.

2. Description

Figure 1 shows the main components of the landing gear. The landing gear absorbs landing loads and let you move the airplane on the ground. The landing gear also provides steering control and braking when the airplane is on the ground.

The DA 42 has a tricycle landing gear. The landing gear can retract. The left main gear leg attaches to the wing center section on the left side of the fuselage. The right main landing gear attaches the wing center section on the right side of the fuselage. The nose gear leg attaches to the fuselage front bulkhead. All three legs have CFRP doors that seal the landing gear bays when the landing gear is retracted in flight.

Each main leg is a tubular steel strut. A trailing arm attaches to the bottom of the strut and an axle for the wheel assembly attaches to the trailing arm. A damper behind the tubular strut also attaches to the trailing arm and absorbs the landing loads. The landing gear hydraulic system holds the main gear legs in the retracted position. When the main gear legs are extended the legs geometrically lock and a latch holds the legs in the locked position during rebound loads.

Each main gear leg has a single main-wheel and a hydraulic disk-brake. Toe pedals on the rudder pedals operate the disk-brakes.

The nose gear leg attaches to the fuselage front bulkhead. A steel strut with an integral telescopic damper absorbs the landing loads. The nose gear leg carries a single nose-wheel. The pilot uses the rudder control pedals to steer the nose-wheel. Two steering stops attached to the gear leg limit the rotary motion of the nose landing gear.

The landing gear hydraulic system holds the nose leg in the retracted position. When the nose leg is extended the leg geometrically locks and a latch holds the leg in the locked position during rebound loads.

The landing gear has a electrically powered hydraulic supply and control system. The hydraulic supply and control system is mounted on a bracket located in the rear fuselage, near the rear baggage compartment. Refer to Chapter 29, Section 32-30 for more data about the hydraulic system.

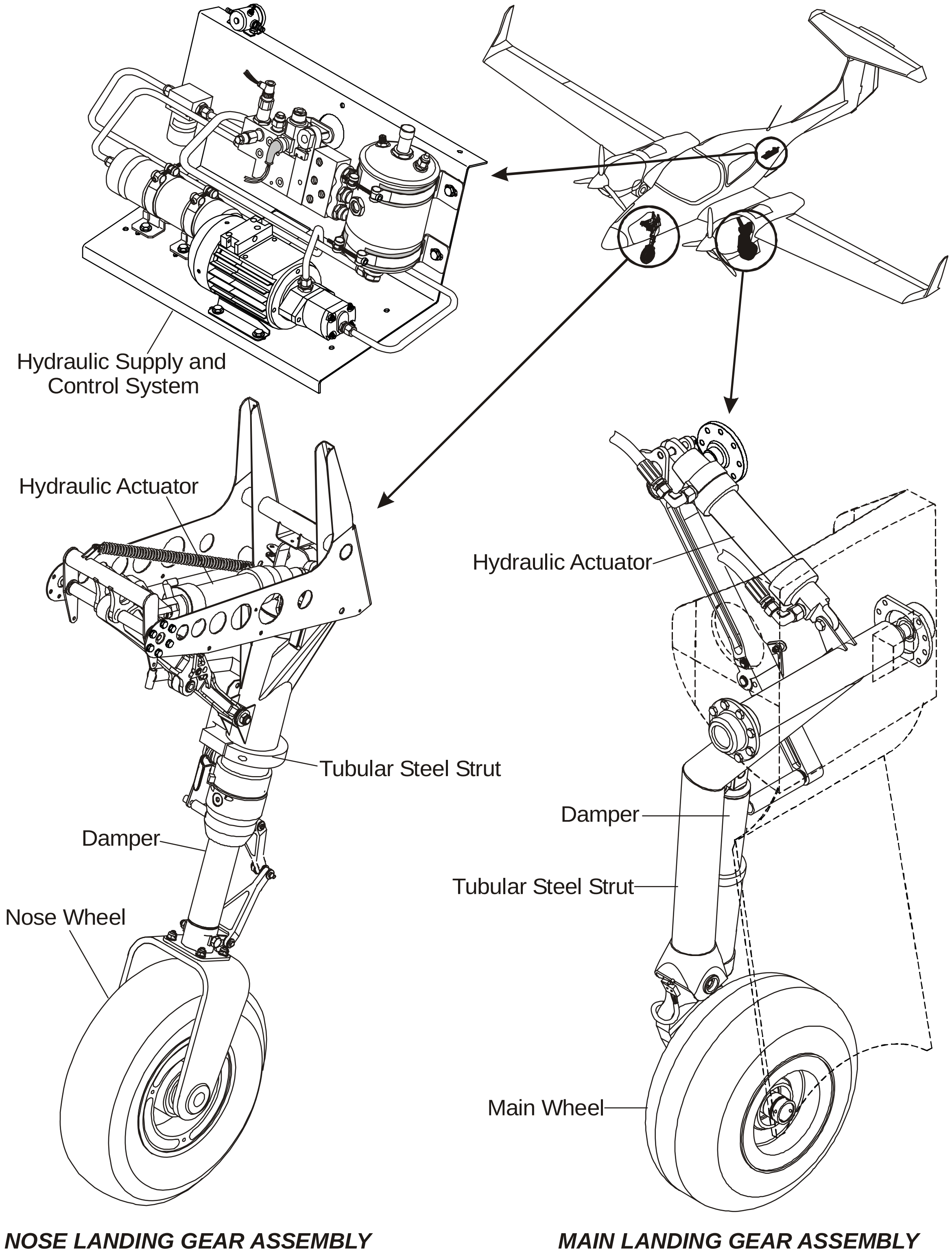

Figure 1: Landing Gear - Main Components

3. Operation on the Ground

The pilot can steer the airplane with the rudder pedals. When he pushes the left rudder pedal forward the nose gear leg turns to the left and the airplane turns to the left. When he pushes the right rudder pedal forward the nose gear turns to the right and the airplane turns to the right.

Refer to Section 32-50 for more data about the nose-wheel steering.

If the pilot pushes the toe brake pedals, hydraulic fluid from the brake master cylinders flows to the disk brake cylinders and applies the brakes. If the pilot sets the parking brake lever while he pushes the toe brake pedals, the parking brake valve keeps the brakes in the ON position.

Refer to Section 32-40 for more data about the wheels and brakes.

Each landing leg has an oil/gas damper. When the airplane is moving on the wheels over uneven ground the dampers can compress and absorb the loads. The dampers can absorb loads that are greater than the normal landing loads.

Refer to Section 32-10 for more data about the main landing gear components and refer to Section 32-20 for more data about the nose landing gear components.

4. Operation in the Air

When the airplane is airborne, the pilot can retract the landing gear into the landing gear bays. The landing gear bays have doors which close when the landing gear is retracted. Refer to Section 32-30 for more data about the extension and retraction system for the landing gear.

5. Emergency Operation

If the hydraulic system fails the pilot can extend the landing gear by setting the landing gear lever to the DOWN position. The weight of the landing gear assisted by a spring, will cause the gear to extend. When the gear is fully extended spring loaded latches operate and hold the landing gear legs geometrically locked in the down position. The pilot can make a normal landing. The pilot can NOT retract the landing gear if the hydraulic system has failed.

Note: A failure of the on-board electrical system causes the landing gear automatically to extend. The hydraulic pump is not driven anymore and both solenoid valves open. The hydraulic locking mechanism of the landing gear system is inoperable. When the gear is fully extended it will geometrically lock in the down position.

Section 32-10
Main Landing Gear

1. General

This Section tells you about the main landing gear. See the related Sections for data about these systems that connect to the main gear:

– Section 32-30. Extension and retraction.

– Section 32-40. Wheels and brakes.

– Section 32-60. Position and warning.

– Section 57-00. Wing structure.

Refer to Chapter 92 for data about the electrical wiring of the landing gear systems.

2. Description

Figure 1 shows the main landing gear.

Each main landing gear is a tubular steel strut. The strut has a longitudinal pivot at the top. Large bearings at each end of the longitudinal pivot hold the leg to the wing structure. A trailing arm attaches to the bottom of the tubular steel strut. A gas/oil filled damper attaches to the rear of the tubular steel strut and it attaches to the trailing arm.

The trailing arm carries an axle for the main-wheel assembly. Four bolts attach the axle to the trailing arm. The axle has a steel plate that holds the brake unit. Clips and cable binders hold the hydraulic hose for the brake unit and the electrical cables for the micro-switches to the leg.

Each main gear leg has a large hydraulic actuator to retract and extend the leg. One end of the hydraulic actuator connects to the top of the tubular steel strut, near the longitudinal pivot. The other end of the actuator connects to the wing structure via a folding stay.

3. Operation

Each main leg transmits vertical loads (for example, landing loads) to the airplane structure. When the leg has a vertical load, the wheel pushes up the trailing arm. The trailing arm moves and compresses the damper. The damper pushes up on the top of the tubular strut.

The damper can compress quickly but can only extend slowly. This prevents the leg from pushing the airplane up after the landing and it also prevents vibration.

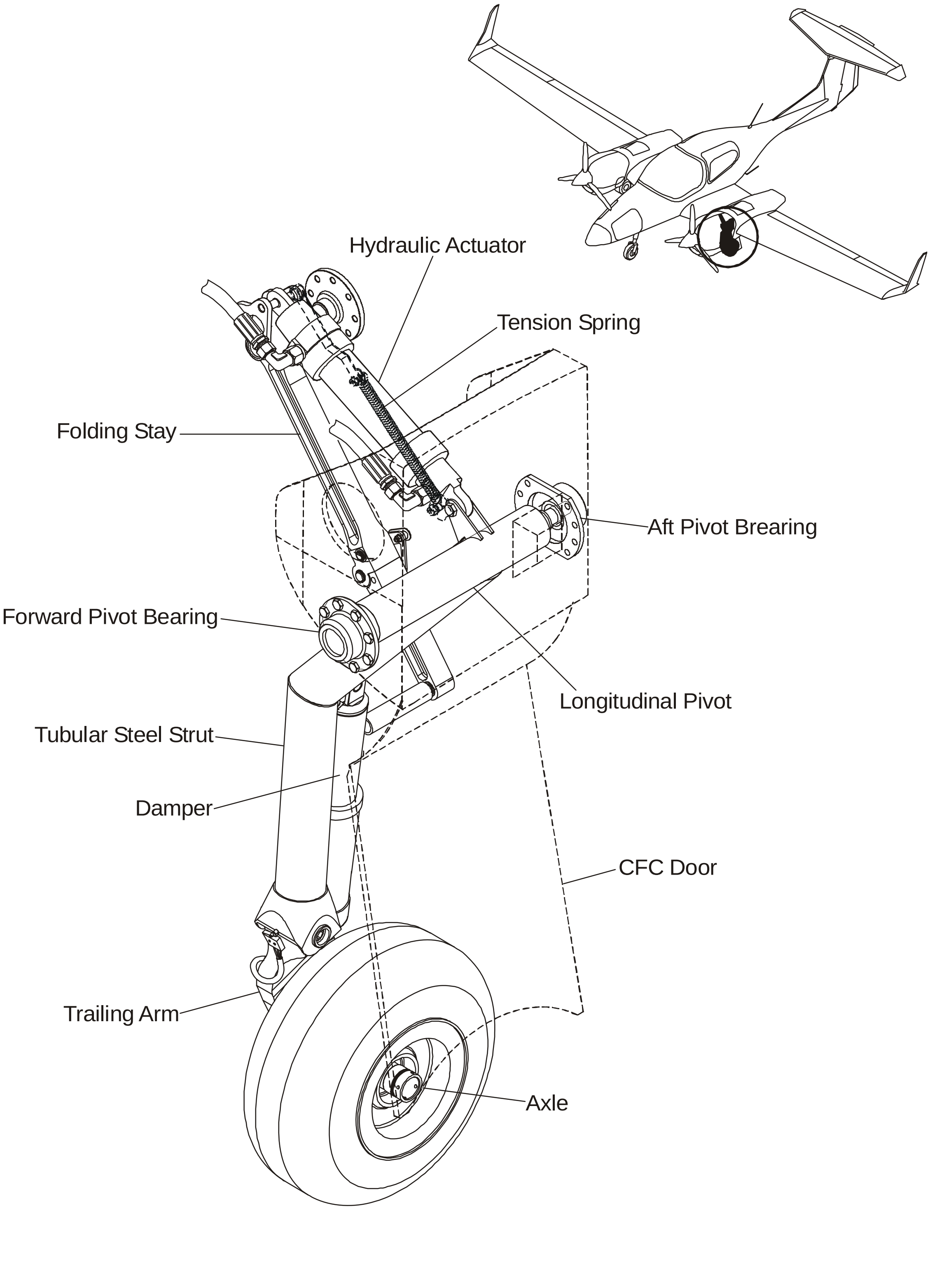

Figure 1: Main Landing Gear

Trouble-Shooting

1. General

This table gives you the trouble-shooting procedures for the main landing gear. Refer to Section 32-30 for trouble-shooting the main gear extension/retraction system. Refer to Section 32-40 for trouble-shooting the main gear wheels and brakes. Refer to Section 32-60 for trouble-shooting the main landing gear position and warning system. Refer to Chapter 29 for trouble-shooting on the hydraulic power generation.

If you find the trouble given in Trouble column read across to the possible cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Airplane stands on ground with one wing low.	Uneven ground.	Move airplane to level ground.
	Hard landing.	Do a test for hard landing. Refer to Section 05-50. Replace damaged parts.
	Damper pressure low.	Inflate the damper to the correct pressure. Refer to MAINTENANCE PRACTICES, Paragraphs 3 & 4 of this Section.
	Damper defective.	Replace damper.

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Maintenance Practices

1. General

These Maintenance Practices tell you how to remove/install the main gear leg components. The Maintenance Practices are applicable to both the left and right main gear legs. You can remove the main gear leg with the wheel or you can remove the wheel first.

Refer to Section 32-30 for data on the main gear retraction system. Refer to Section 32-40 for data on the main gear wheels/brakes. Refer to Section 32-60 for data about the landing gear position and warning system.

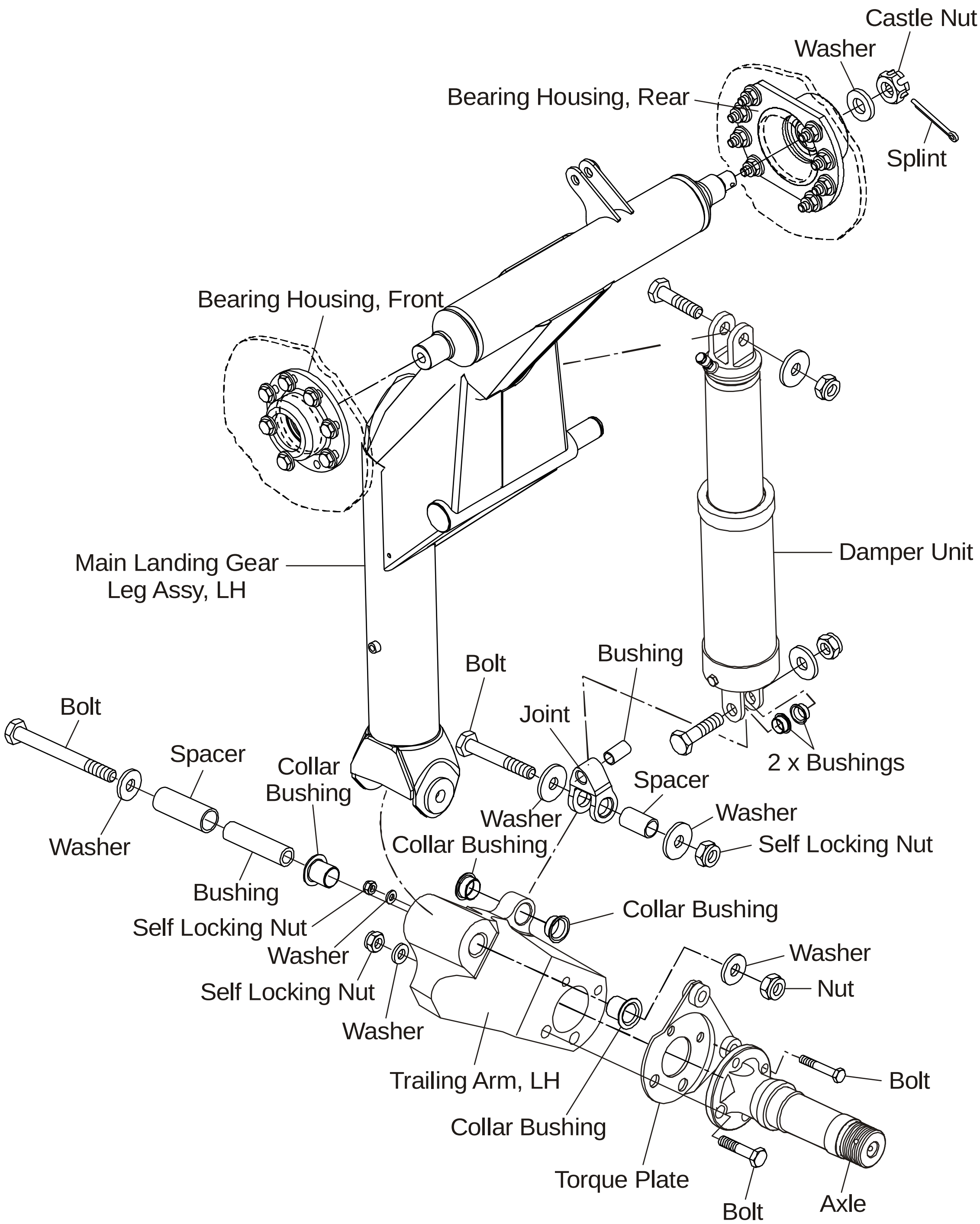


Figure 2: Main Landing Gear Leg Assy

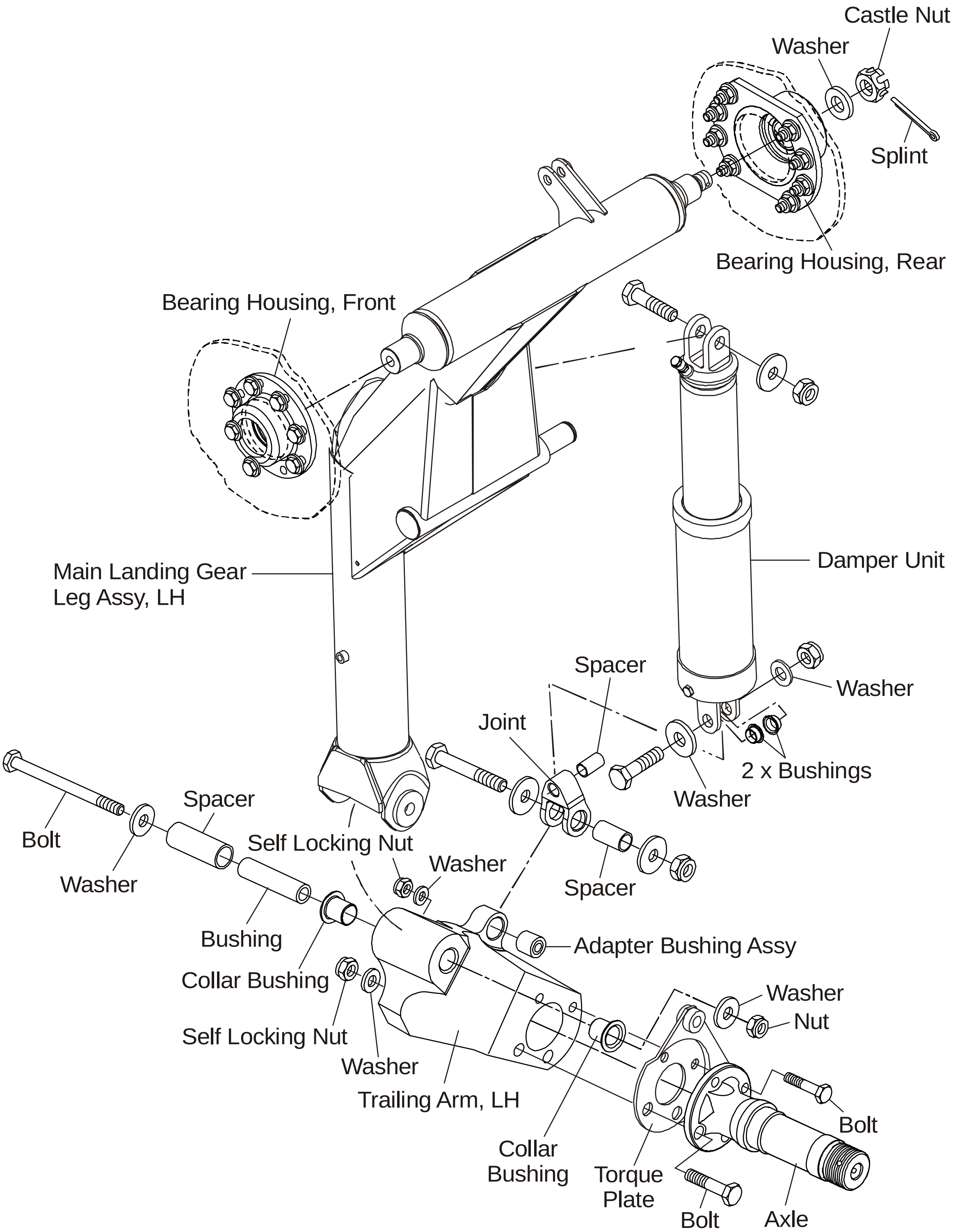


Figure 3: Main Landing Gear Assy (if MÄM 42-452 or MSB 42-088/2 is installed)

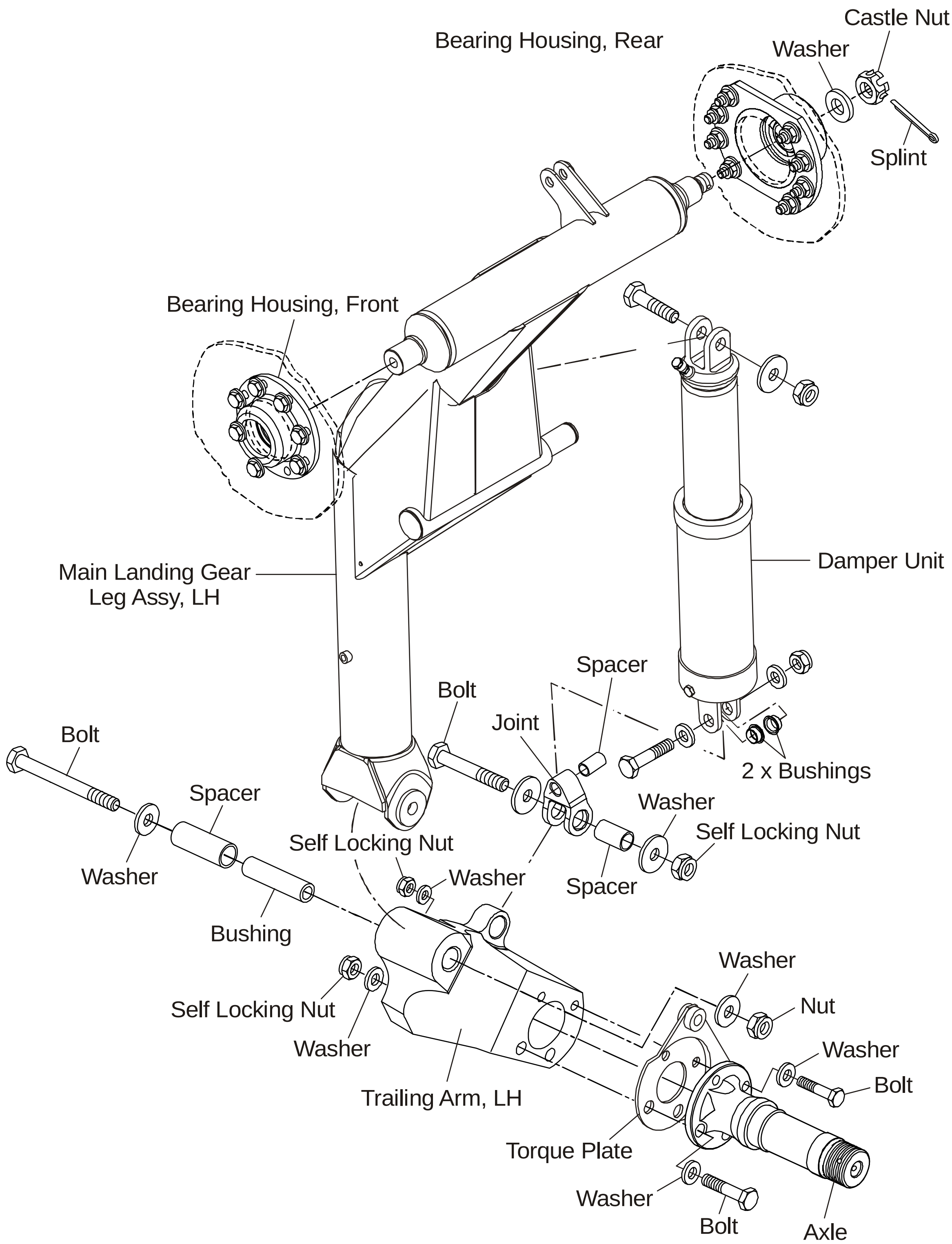


Figure 4: Main Landing Gear Assy (if OÄM 42-195 is installed)

2. Remove/Install the Main Gear Leg (Completely with Axle and Brake Unit)

WARNING: DO NOT GET HYDRAULIC FLUID ON YOU. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE. IT CAN ALSO DAMAGE CLOTHING.

CAUTION: CLEAN OFF SPILT HYDRAULIC FLUID IMMEDIATELY. HYDRAULIC FLUID CAN DAMAGE THE AIRPLANE STRUCTURE. IT CAN ALSO REMOVE THE PAINT FROM SOME COMPONENTS.

A. Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.
Aft bearing centering tool.	1	VR-D60-3217-12-31.
Front bearing centering tool.	1	VR-D60-3217-12-30.
Bearing housing puller.	1	VR-D60-3217-11-00.

B. Remove the Main Gear Leg

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
(1)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.

	Detail Steps/Work Items	Key Items/References
(2)	Bleed the system: – Retract the landing gear to bleed the system. – Operate the emergency extension of the landing gear (Repeat this step one or two times).	Refer to Section 32-30.
(3)	Pull the GEAR circuit breaker.	Right side of instrument panel.
(4)	Disconnect the main gear door from the main gear leg: – Remove the nut, washer and spacer that attach the door connecting arm to the main gear leg. – Pull the connecting arm clear of the main gear leg attachment and secure to the door. – Move and hold the main gear door clear of the main gear leg.	Refer to Figure 10.
(5)	Remove the brake calliper.	Refer to Section 32-40.
(6)	Remove the main-wheel.	Refer to Section 32-40.
(7)	Remove all cable binders which secure the flexible brake hose and the electric cables to the micro switch.	
(8)	Remove the weight-on-wheels switch.	Refer to Section 32-60.
(9)	Remove the MLG folding stay switch.	Refer to Section 32-60.
(10)	Disconnect the folding stay assembly of the MLG.	Refer to Paragraph 10.

	Detail Steps/Work Items	Key Items/References
(11)	Remove the rear bearing housing: – Remove the cotter-pin from the castle nut. – Remove the castle nut. – Remove the 7 bolts, nuts and washers which hold the bearing housing onto the fuselage. – Remove the bolt, 4 washers, 2 spacers, the spacer sleeve and the nut from the bearing housing. – Use the bearing housing puller to get the bearing housing off the longitudinal pivot.	Refer to Figures 5 and 6. Support the main gear leg and make sure not to scratch the surface.
(12)	Remove the fuel filter element.	Refer to Section 28-20.
(13)	Optional: Remove the flexible heat pipe from the clamp to gain more space to reach the front bearing housing.	
(14)	Remove the front bearing housing: – Remove the 8 bolts, nuts and washers which hold the bearing housing onto the fuselage. – Use the bearing housing puller to get the bearing housing off the longitudinal pivot.	Refer to Figures 5 and 6.

	Detail Steps/Work Items	Key Items/References
(15)	Remove the main gear leg: – Move the leg aft to slide the forward longitudinal pivot clear of its bearing housing. – Lower the forward longitudinal pivot clear of the landing gear bay. – Move the leg forward until aft longitudinal pivot is clear of the main gear housing. – Move the leg clear of the airplane.	

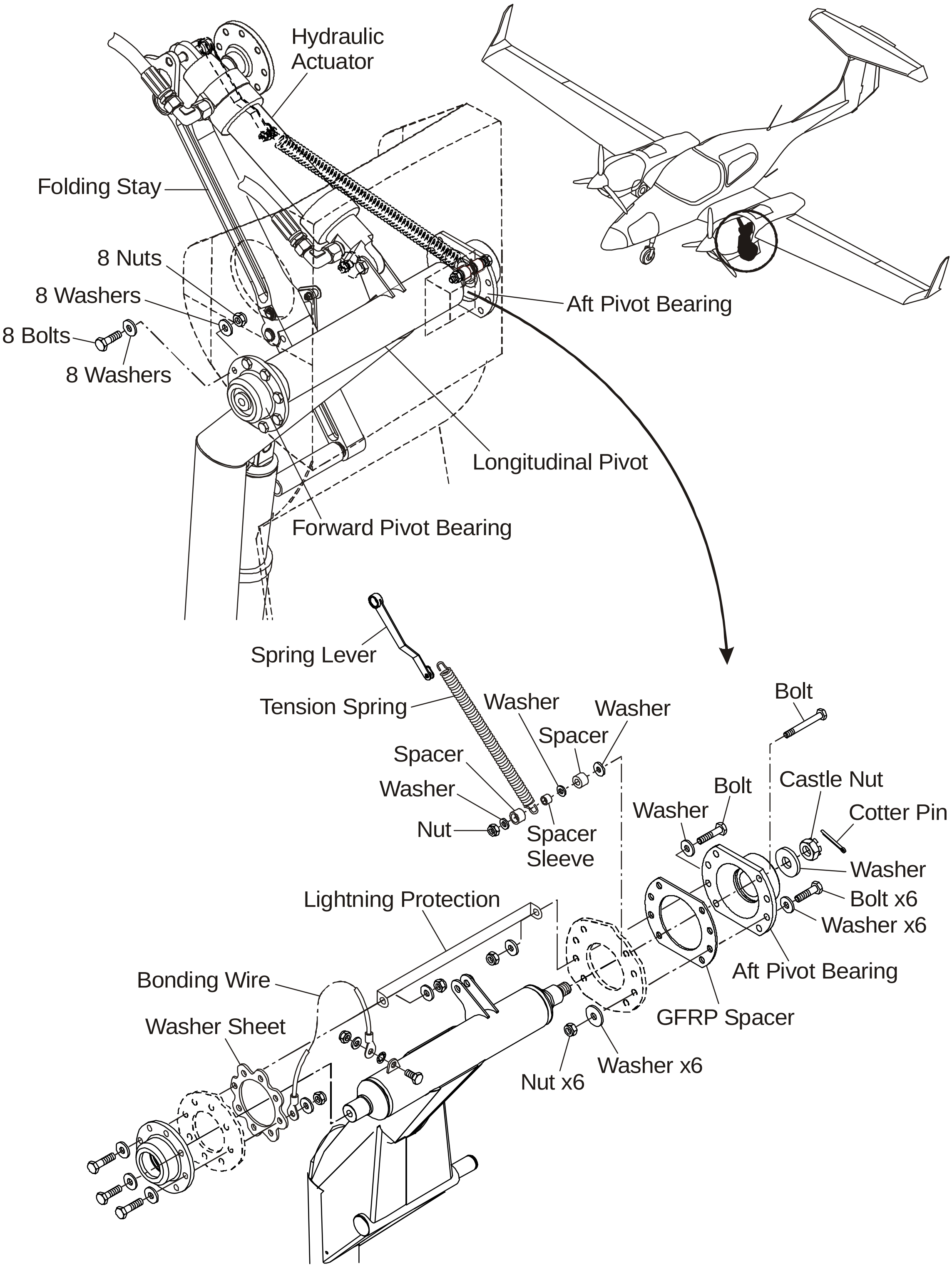


Figure 5: Main Landing Gear Installation

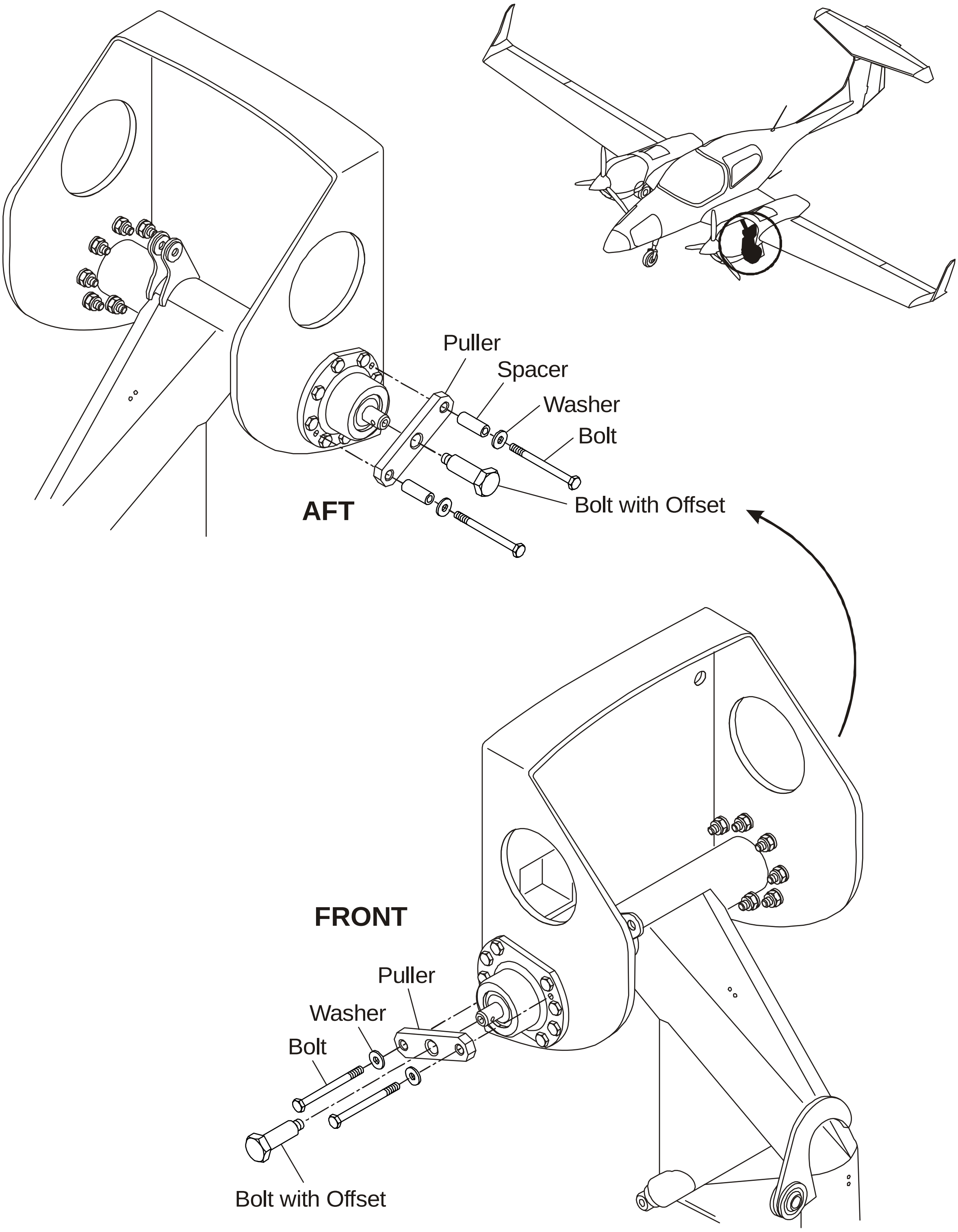


Figure 6: Removal of the Main Landing Gear Leg

C. Install the Main Gear Leg

	Detail Steps/Work Items	Key Items/References
(1)	Install the main gear leg: – Position the washer sheet on the MLG pivot. – Slide the main gear leg into the aft main gear web. – Move the forward longitudinal pivot up and engage it with the front bearing. – Move the leg forward until the forward longitudinal pivot is fully engaged in the front main gear bearing.	Support the main gear leg and make sure not to scratch the surface.
(2)	Install the front bearing housing: – Use the front bearing centering tool to push the bearing housing onto the longitudinal pivot. – Install the 8 bolts, nuts and washers which secure the bearing housing onto the fuselage.	Refer to Figure 5. Use new self-locking nuts.

	Detail Steps/Work Items	Key Items/References
(3)	Install the rear bearing housing: – Use the aft bearing centering tool to push the bearing housing onto the longitudinal pivot. – Install the 7 bolts, nuts and washers which secure the bearing housing onto the fuselage. – Install the bolt, 4 washers, 2 spacers, the spacer sleeve and the nut onto the bearing housing. – Check the axial clearance of the gear leg. – Install the castle nut and adjust axial clearance by tightening the castle nut. – Check the axial clearance again. – Install the cotter-pin onto the castle nut.	Refer to Figure 5. Use new nuts. Use new nuts. Required axial clearance: max. 0.2 mm. Tighten by hand.
(4)	Optional: Install the flexible heat pipe back onto the worm-drive clamp if it was removed.	
(5)	Install the fuel filter element.	Refer to Section 28-20.
(6)	Connect the folding stay assembly of the MLG.	Refer to Paragraph 10.
(7)	Install the main gear wheel.	Refer to Section 32-40.
(8)	Install the brake calliper.	Refer to Section 32-40.
(9)	Bleed the brake system.	Refer to Section 32-40.
(10)	Install the weight on wheels switch.	Refer to Section 32-60.
(11)	Install the MLG folding stay switch.	Refer to Section 32-60.
(12)	Adjust the weight on wheels switch and the MLG folding stay switch.	Refer to Section 32-60.
(13)	Install all cable binders to secure the electrical cables and the flexible brake hose.	
(14)	Reset the GEAR circuit-breaker.	Right side of instrument panel.
(15)	Adjust the wheel in retracted position and check MLG door pre-load.	Refer to Paragraph 12.

	Detail Steps/Work Items	Key Items/References
(16)	Move the wing and rear fuselage trestles clear of the airplane.	
(17)	Lower the airplane.	Refer to Section 07-10.

3. Disassemble/Assemble a Main Landing Gear Leg

A. Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.

B. Disassemble Main Landing Gear Leg

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
(1)	Remove main landing gear leg.	Refer to Section 32-10.
(2)	Optional: If not removed before, remove the main gear wheel.	Refer to Section 32-40.
(3)	Remove the main gear damper.	Refer to Section 32-10.
(4)	Remove the trailing arm from the main gear leg: – Remove the bolt, self locking nut, washers, bushing and the spacer from the trailing arm.	
(5)	Remove the joint from the trailing arm.	Refer to Paragraph 3D.
(6)	Remove the axle installation from the rocker arm: – Remove the four bolts, washers and self locking nuts which hold the axle. – Remove the torque plate.	

C. Assemble Main Landing Gear Leg

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
(1)	Install the axle installation onto the rocker arm: – Move the torque plate and the axle in position. – Install the four bolts, washers and self locking nuts which secure the axle and the torque plate.	Use a new self locking nuts.
(2)	Install the joint oversize onto the trailing arm.	Refer to Paragraph 3D.
(3)	Install the trailing arm onto the main gear leg: – Slide the bushing into the spacer and install them onto the trailing arm. – Move the trailing arm into position. – Install the trailing arm onto the main gear leg by installing the bolt, washers and self locking nut.	Use a new self locking nut.
(4)	Install the main gear damper.	Refer to Section 32-10.
(5)	Install the main gear wheel.	Refer to Section 32-40.
(6)	Install main landing gear leg.	Refer to Section 32.10.
(7)	Move the wing and rear fuselage trestles clear of the airplane.	
(8)	Lower the airplane with the jacks.	Make sure that the area around the airplane is clear.

D. Remove/Install a Joint on Main Landing Gear Leg

(1) Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.

(2) Remove a Joint on Main Landing Gear Leg

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
(1)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(2)	Pull the GEAR circuit breaker.	Right side of instrument panel.
(3)	Support the tire and remove the nut, washer, lower bolt and bushing from the joint.	Refer to Figure 2. If MÄM 42-452 or MSB 42-088/2 is installed refer to Figure 3. If OÄM 42-195 is installed refer to Figure 4.
(4)	Move the damper and the joint clear of the trailing arm.	
(5)	Remove the nut, washer and the upper bolt from the joint. If MÄM 42-452 or MSB 42-088/2 is installed remove the nut, washer, spacer and the upper bolt from the joint.	Refer to Figure 2. If MÄM 42-452 or MSB 42-088/2 is installed refer to Figure 3. If OÄM 42-195 is installed refer to Figure 4.
(6)	Move the joint clear of the MLG damper.	

<table>
<tr><th></th><th>Detail Steps/Work Items</th><th>Key Items/References</th></tr>
<tr><td>(7)</td><td>Measure the joint.</td><td>Refer to Figure 7.</td></tr>
<tr><td>(8)</td><td colspan="2">Make a note of ordering numbers of the LH and RH joint sizes:
– D60-3217-23-51 Joint: x = 59 mm, z = 32 mm
– D60-3217-23-52 Joint oversize 1: x = 61 mm, z = 34 mm
– D60-3217-23-53 Joint oversize 2: x = 63 mm, z = 36 mm
– D60-3217-23-54 Joint oversize 3: x = 65 mm, z = 38 mm
If MÄM 42-452 or MSB 42-088/2 is installed:
– D64-3217-23-00 Joint: x = 62 mm, z = 32 mm
– D64-3217-23-01 Joint oversize 1: x = 64 mm, z = 34 mm
– D64-3217-23-02 Joint oversize 2: x = 66 mm, z = 36 mm
– D64-3217-23-03 Joint oversize 3: x = 68 mm, z = 38 mm</td></tr>
<tr><td colspan="3">Note: Different part numbers may be used on LH and RH MLG of the airplane.</td></tr>
</table>

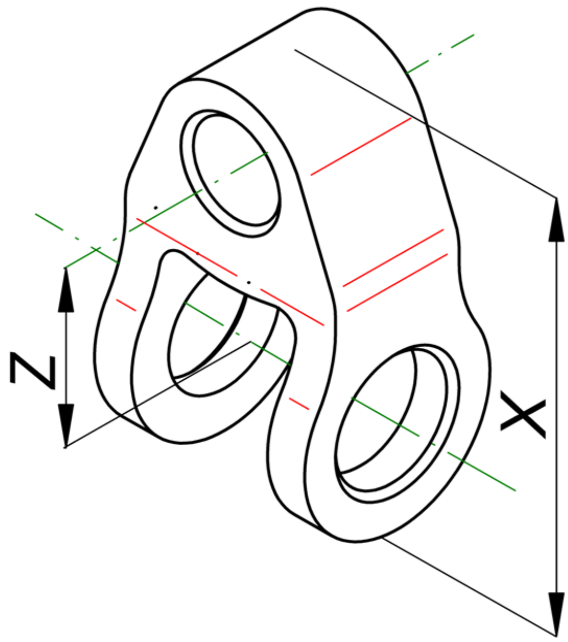


Figure 7: Main Landing Gear Joint Measurement

(3) Install a Joint on Main Landing Gear Leg

	Detail Steps/Work Items	Key Items/References
(1)	Use a joint according to your measurement.	As noted in Sub-Paragraph (2).
	Note: You must use the correct joint / joint oversize.	
(2)	Examine the bushing for wear, if a D60-3217-23-5X joint is reused.	Use new bushing if worn.
(3)	Install joint on damper: – Move joint on damper – Verify smooth and easy movement – Install the bolt, washer and self locking nut. If MÄM 42-452 or MSB 42-088/2 is installed: – Install the bolt, washer, spacer and self locking nut.	 Use new self-locking nut. Use new self-locking nut.
(4)	Connect joint to main landing gear trailing arm: – Move trailing arm into position – Install bushing, bolt, washer and self locking nut.	 Use new self locking nut.
(5)	Adjust the wheel in retracted position and check MLG door pre-load.	Refer to Paragraph 12.

4. Fill/Charge the Damper Assemblies on the Main Gear Legs

The following procedure tells you how to fill the main gear damper assemblies with hydraulic fluid and then charge with nitrogen.

A. Equipment

Item	Quantity	Part Number
Bottle.	1	Commercial.
Bleed tube.	1	Commercial.
Valve core removal tool.	1	Commercial.
Nitrogen charging equipment.	1	Commercial.
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.
Nose trestle.	1	Commercial.

B. Material

Item	Quantity	Part Number
CAUTION: DO NOT MIX OR REPLACE HYDRAULIC FLUIDS OF DIFFERENT TYPES OR MANUFACTURERS.		
Note: If MÄM 42-495 is carried out, a placard is installed by the airplane manufacturer identifying the type of hydraulic fluid. All airplanes with MÄM 42-495 NOT installed have been manufactured with Aeroshell Fluid 41 (MIL-PRF-5606 H). The identification placard must be installed if a hydraulic fluid change to another fluid type is carried out.		
Hydraulic fluid.	As required.	Aeroshell Fluid 41 (MIL-PRF-5606 H) or AMG-10 (GOST 6794-75 Amdt 1-5), see CAUTION above.
Grease for sliding interfaces.	As required.	DOD-L-25681 or NATO S-1735 (for example, Mocil 50/50).
Gaseous nitrogen.	As required.	Commercial.

C. Procedure

WARNING: DO NOT GET HYDRAULIC FLUID ON YOUR SKIN OR YOUR CLOTHES. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE.

WARNING: DO NOT LET NITROGEN AT HIGH PRESSURE BLOW ONTO YOUR SKIN. NITROGEN AT HIGH PRESSURE CAN PENETRATE THE SKIN AND CAUSE SERIOUS INJURY.

CAUTION: CLEAN UP SPILT HYDRAULIC FLUID IMMEDIATELY. HYDRAULIC FLUID CAN CAUSE DAMAGE TO AIRPLANE COMPONENTS.

CAUTION: YOU MUST FILL/CHARGE THE MAIN-WHEEL DAMPER ASSEMBLIES CORRECTLY. IF YOU DO NOT FILL/CHARGE THE MAIN-WHEEL DAMPER CORRECTLY THE MAIN LANDING GEAR WILL NOT OPERATE CORRECTLY. THIS CAN CAUSE DAMAGE TO THE MAIN LANDING GEAR AND THE AIRPLANE STRUCTURE.

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY. **WARNING: THE TRAILING ARM AND THE WHEEL ARE CONNECTED TO THE GAS LOADED DAMPER. DUE TO THE HIGH FORCES INVOLVED THE ELEMENTS OF THE DAMPING SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS.**	
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(3)	Release the nitrogen pressure from the damper: – Remove the dust cap from the charging valve. – Press and hold down the pin inside the valve until all the pressure is released.	
	WARNING: YOU MUST RELEASE ALL THE NITROGEN PRESSURE FROM THE DAMPER BEFORE YOU REMOVE THE CHARGING VALVE. NITROGEN AT HIGH PRESSURE CAN PENETRATE YOUR SKIN. THIS CAN CAUSE INJURY.	
(4)	Remove the core of the charging valve from the damper assembly.	
(5)	Compress the damper assembly.	
	WARNING: DO NOT GET HYDRAULIC FLUID ON YOUR SKIN. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE.	
(6)	Connect the tube of the hydraulic fluid filler bottle to the charging valve.	

	Detail Steps/Work Items	Key Items/References
	CAUTION: DO NOT MIX OR REPLACE HYDRAULIC FLUIDS OF DIFFERENT TYPES OR MANUFACTURERS.	
	Note: If MÄM 42-495 is carried out, a placard is installed by the airplane manufacturer identifying the type of hydraulic fluid. All airplanes with MÄM 42-495 NOT installed have been manufactured with Aeroshell Fluid 41 (MIL-PRF-5606 H). The identification placard must be installed if a hydraulic fluid change to another fluid type is carried out.	
(7)	Turn the bottle to the open position and allow the hydraulic fluid to flow from the bottle into the damper.	Use Aeroshell Fluid 41 (MIL-PRF-5606 H) or AMG-10 (GOST 6794-75 Amdt 1-5) hydraulic fluid (see CAUTION above) with 0.3 % grease compliant with DOD-L-25681 or NATO S-1735 (for example, Mocil 50/50) added.
(8)	Extend the damper assembly by hand to allow the hydraulic fluid to fill the damper assembly.	
(9)	Compress and extend the damper not less than 6 times to release the air from the damper and allow the hydraulic fluid to flow into the damper.	
(10)	Compress the damper and hold the damper compressed while you close the bottle and remove the tube from the charging valve.	Keep the damper compressed.
(11)	Install the core of the charging valve.	
(12)	Connect the gaseous nitrogen charging equipment to the damper charging valve.	Allow the damper to extend as it is charged.
(13)	Charge the damper with nitrogen to the correct pressure.	Refer to Paragraph 4 of this Section. The damper must be fully extended.
(14)	Disconnect and remove the gaseous nitrogen charging equipment from the damper charging valve.	
(15)	Install the dust cap onto the charging valve.	
(16)	Reset the GEAR circuit-breaker.	Right side of instrument panel.

	Detail Steps/Work Items	Key Items/References
(17)	Remove the rear fuselage and wing trestles clear of the airplane.	
(18)	Lower the airplane with the jacks.	Refer to Section 07-10. Make sure that the area around the airplane is clear of equipment.

D. Fluid Change from Aero Shell Fluid 41 to AMG-10 or Vice Versa

	Detail Steps/Work Items	Key Items/References
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(3)	Release the nitrogen pressure from the damper: – Remove the dust cap from the charging valve. – Press and hold down the pin inside the valve until all the pressure is released.	
	WARNING: YOU MUST RELEASE ALL THE NITROGEN PRESSURE FROM THE DAMPER BEFORE YOU REMOVE THE CHARGING VALVE. NITROGEN AT HIGH PRESSURE CAN PENETRATE YOUR SKIN. THIS CAN CAUSE INJURY.	
(4)	Remove the core of the charging valve from the damper assembly.	
(5)	Compress the damper assembly.	

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT GET HYDRAULIC FLUID ON YOUR SKIN. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE.	
	CAUTION: DO NOT MIX OR REPLACE HYDRAULIC FLUIDS OF DIFFERENT TYPES OR MANUFACTURERS.	
	Note: If MÄM 42-495 is carried out, a placard is installed by the airplane manufacturer identifying the type of hydraulic fluid. All airplanes with MÄM 42-495 NOT installed have been manufactured with Aeroshell Fluid 41 (MIL-PRF-5606 H). The identification placard must be installed if a hydraulic fluid change to another fluid type is carried out.	
(6)	Connect the tube of the hydraulic fluid filler bottle to the charging valve.	Hydraulic fluid filler bottle filled with new fluid: Use AMG-10 (GOST 6794-75 Amdt 1-5) or Aeroshell Fluid 41 (MIL-PRF-5606 H) hydraulic fluid (see CAUTION above) with 0.3 % grease compliant with DOD-L-25681 or NATO S-1735 (for example, Mocil 50/50) added.
(7)	Turn the bottle to the open position and allow the hydraulic fluid to flow from the bottle into the damper.	
(8)	Extend the damper assembly by hand to allow the hydraulic fluid to fill the damper assembly.	
(9)	Compress and extend the damper not less than 6 times to release the air from the damper and allow the hydraulic fluid to flow into the damper.	
(10)	Compress the damper and hold the damper compressed while you close the bottle and remove the tube from the charging valve.	Keep the damper compressed.

	Detail Steps/Work Items	Key Items/References
(11)	Dispose the hydraulic fluid of the filler bottle and refill it with new fluid.	Use AMG-10 (GOST 6794-75 Amdt 1-5) or Aeroshell Fluid 41 (MIL-PRF-5606 H) hydraulic fluid (see CAUTION above) with 0.3 % grease compliant with DOD-L-25681 or NATO S-1735 (for example, Mocil 50/50) added.
(12)	Repeat steps 7 to 12 three times.	Do not refill the filler bottle at last iteration.
(13)	Install the core of the charging valve.	
(14)	Connect the gaseous nitrogen charging equipment to the damper charging valve.	Allow the damper to extend as it is charged.
(15)	Charge the damper with nitrogen to the correct pressure.	Refer to Paragraph 4 of this Section. The damper must be fully extended.
(16)	Disconnect and remove the gaseous nitrogen charging equipment from the damper charging valve.	
(17)	Install the dust cap onto the charging valve.	
(18)	Reset the GEAR circuit-breaker.	Right side of instrument panel.
(19)	Remove the rear fuselage and wing trestles clear of the airplane.	
(20)	Lower the airplane with the jacks.	Refer to Section 07-10. Make sure that the area around the airplane is clear of equipment.
(21)	Apply the Hydraulic Fluid placard and mark the used fluid.	Refer to Figure 8. Mark hydraulic fluid type by punching.

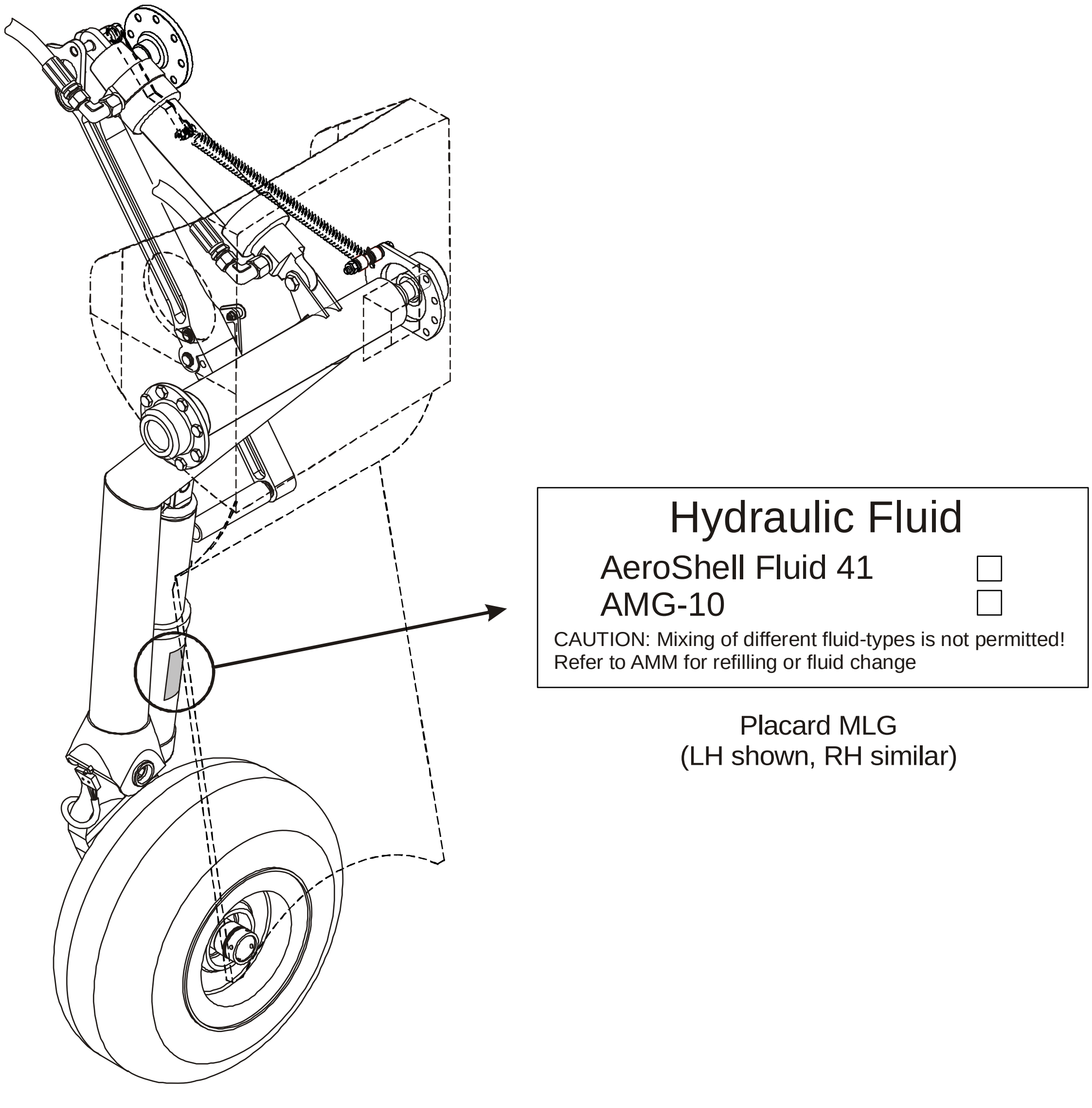


Figure 8: Position of the Hydraulic Fluid Placard - Main Landing Gear Dampers

5. Required Strut Extension of the Main Gear Damper Assemblies

The subsequent table tells you about the correct strut extension and pressure of the unloaded, fully extended main landing gear dampers.

MLG Damper	**Strut Extension (unloaded)** (visible length of bare piston)	**Gas Pressure**
LH	15 cm (6 inches)	18 bar (261 PSI)
RH	15 cm (6 inches)	18 bar (261 PSI)

If OÄM 42-195 is carried out:

MLG Damper	**Strut Extension (unloaded)** (visible length of bare piston)	**Gas Pressure**
LH	15 cm (6 inches)	19 bar (276 PSI)
RH	15 cm (6 inches)	19 bar (276 PSI)

6. Remove/Install a Main Landing Gear Damper

A. Remove a Main Landing Gear Damper

It is possible but not necessary to remove the main landing gear from the airplane.

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY. **WARNING: THE TRAILING ARM AND THE WHEEL ARE CONNECTED TO THE GAS LOADED DAMPER. DUE TO THE HIGH FORCES INVOLVED THE ELEMENTS OF THE DAMPING SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS.**	
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(3)	Release the nitrogen pressure from the damper: Remove the dust cap from the charging valve. Press and hold down the pin inside the valve until all the pressure is released.	
(4)	Remove the nut, washer and bolt that attach the top of the damper to the main gear leg.	
(5)	Remove the nut, washer and bolt that attach the bottom of the damper to the trailing arm. If MÄM 42-452 or MSB 42-088/2 is installed: Remove the nut, washer, spacer and bolt that attach the bottom of the damper to the trailing arm.	
(6)	Move the damper clear of the main gear leg.	

B. Install a Main Landing Gear Damper

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY. **WARNING: THE TRAILING ARM AND THE WHEEL ARE CONNECTED TO THE GAS LOADED DAMPER. DUE TO THE HIGH FORCES INVOLVED THE ELEMENTS OF THE DAMPING SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS.**	
(1)	Move the damper in position at the main gear leg.	
(2)	Install the nut, washer and bolt that attach the bottom of the damper to the trailing arm. If MÄM 42-452 or MSB 42-088/2 are installed: Install the nut, washer, spacer and bolt that attach the bottom of the damper to the trailing arm.	Use a new lock nut.
(3)	Install the nut, washer and bolt that attach the top of the damper to the main gear leg.	Use a new lock nut.
(4)	Fill the damper if necessary.	Refer to Paragraph 4.
(5)	Charge the damper.	Refer to Paragraph 4.
(6)	Remove the trestles and lower the airplane with the jacks.	Refer to Section 07-10.
(7)	Reset the GEAR circuit-breaker.	Right side of instrument panel.

7. Disassemble/Assemble Main Landing Gear Damper

A. Disassemble Main Landing Gear Damper

Note: If the damper unit D60-3277-10-00_1 is installed, refer to RSB 42-089.

If RSB 42-089 is carried out, refer to RSB 42-089.

If the damper unit D60-3277-10-00_1 is not installed and RSB 42-089 is not carried out it is recommended to carry out RSB 42-089.

	Detail Steps/Work Items	Key Items/References
(1)	Remove the MLG damper.	Refer to Section 32-10.
(2)	Release nitrogen and oil from the damper: – Install a drain hose onto the charging valve of the damper. – Wait until the nitrogen is fully released. – Compress the damper to drain the oil.	Use a suitable container to catch the damper oil (approx. 0.5 l [0.13 US gal]).
(3)	Remove the charging valve from the damper.	Refer to Figure 9.
(4)	Remove the bottom cap: – Remove M6 lower cross bolt, washer and lock nut. – Pull the bottom cap from the damper assembly. – Remove the O-ring from the cap.	Refer to Figure 9.
(5)	Disassemble damper tube: – Slide the inner cylinder out of the damper tube. – Remove the quad ring and the two backup rings from the tube.	Refer to Figure 9. Use a screwdriver or a thin metal plate. Make sure not to damage the parts.

	Detail Steps/Work Items	Key Items/References
(6)	Disassemble the inner cylinder: – Remove the M8 nut and pull the orifice plate from the damper pipe. – Pull the upper cap together with the center bolt from the damper pipe. – Remove the O-ring from the lid.	Refer to Figure 9.

B. Assemble Main Landing Gear Damper

	Detail Steps/Work Items	Key Items/References
(1)	Assemble the inner cylinder: – Install the O-ring onto the upper cap. – Install the upper cap together with the center bolt onto the damper pipe. – Install the orifice plate onto the damper pipe. – Install the lock nut.	Refer to Figure 9. Apply Teflon oil S408 onto the O-ring. Use a new O-ring. Make sure to install the cap onto the correct side (Grooves are different on each side). Apply Loctite 262 on thread and tighten with 15 Nm (11 lbf.ft.).
(2)	Assemble damper tube: – Install the quad ring and the two backup rings onto the tube. – Put inner cylinder onto a tube (special tool) to raise it. – Slide the damper tube onto the inner cylinder.	Refer to Figure 9. Use new O-rings.
(3)	Install the bottom cap: – Install the O-ring onto the cap. – Push the bottom cap onto the damper tube. – Install the M6 lower cross bolt, washer and lock nut to secure the cap.	Refer to Figure 9. Apply Teflon oil S408 onto the O-ring. Apply Loctite 262 onto the thread.

	Detail Steps/Work Items	Key Items/References
(4)	Install the charging valve onto the damper.	Apply Teflon oil S408 onto the O-ring.
(5)	Charge the damper with nitrogen and oil.	Refer to Section 32-10.
(6)	Install the MLG damper.	Refer to Section 32-10.

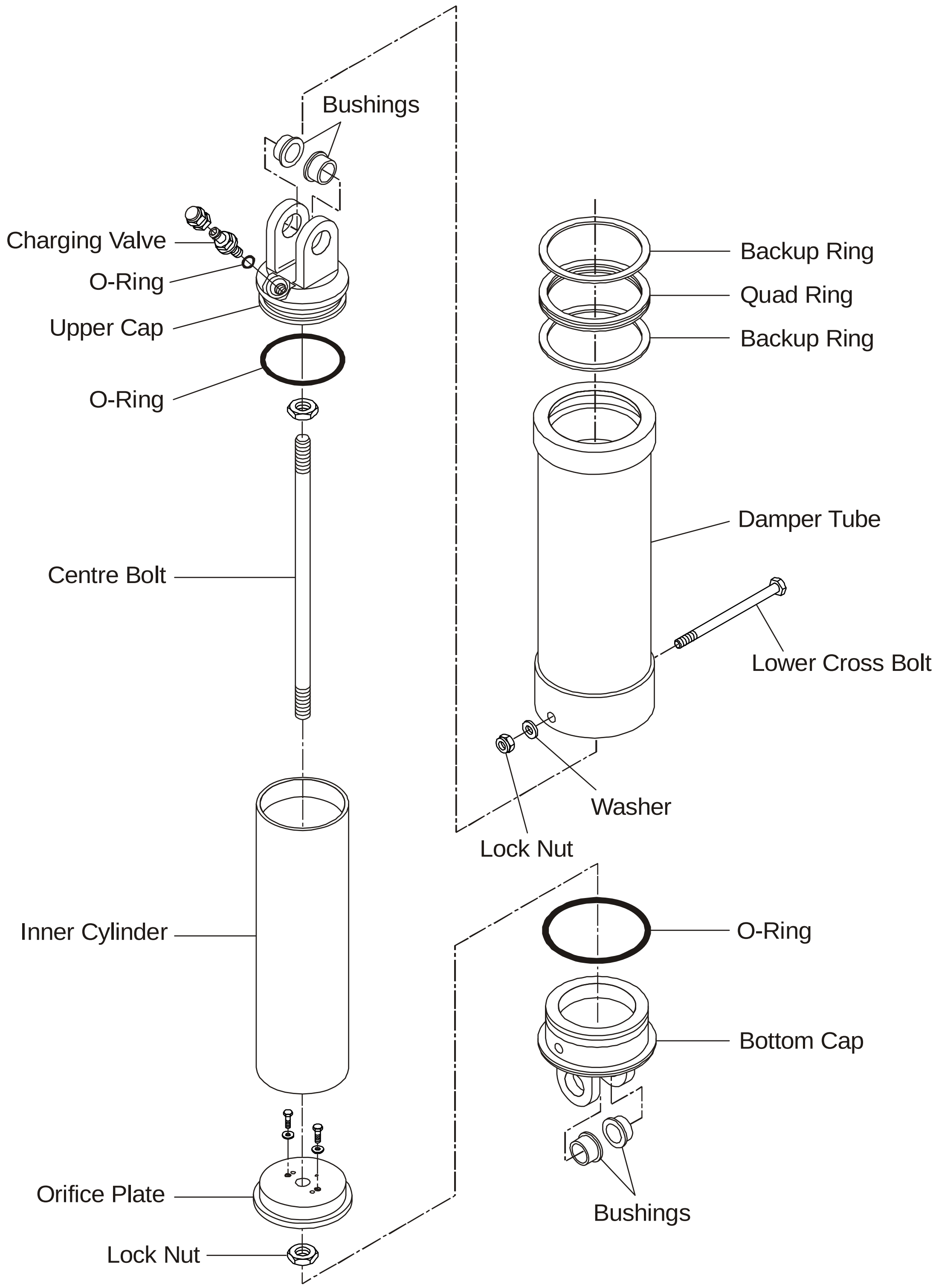


Figure 9: Main Landing Gear Damper Assembly

8. Remove/Install a Main Landing Gear Door

A. Remove a Main Gear Door

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
(1)	Pull the GEAR circuit-breaker.	On the right side of instrument panel.
(2)	Disconnect the door operating rod from the door that will be removed:	Refer to Figure 10.
	– Remove the nut, washers, spacers and the bolt from the rod end.	At the door end of the rod.
	– Pull the operating rod clear of the angle bracket.	
(3)	Remove the door:	
	– Remove the two bolts, washers and self locking nuts from one of the hinges.	At the hinge mounted on the door.
	– Remove the hinge.	
	– Unhinge and move the door clear of the main gear bay.	Support the door.
	– Mount the hinge back on the door with the two bolts and washers.	For not loosing the hinge and hardware.

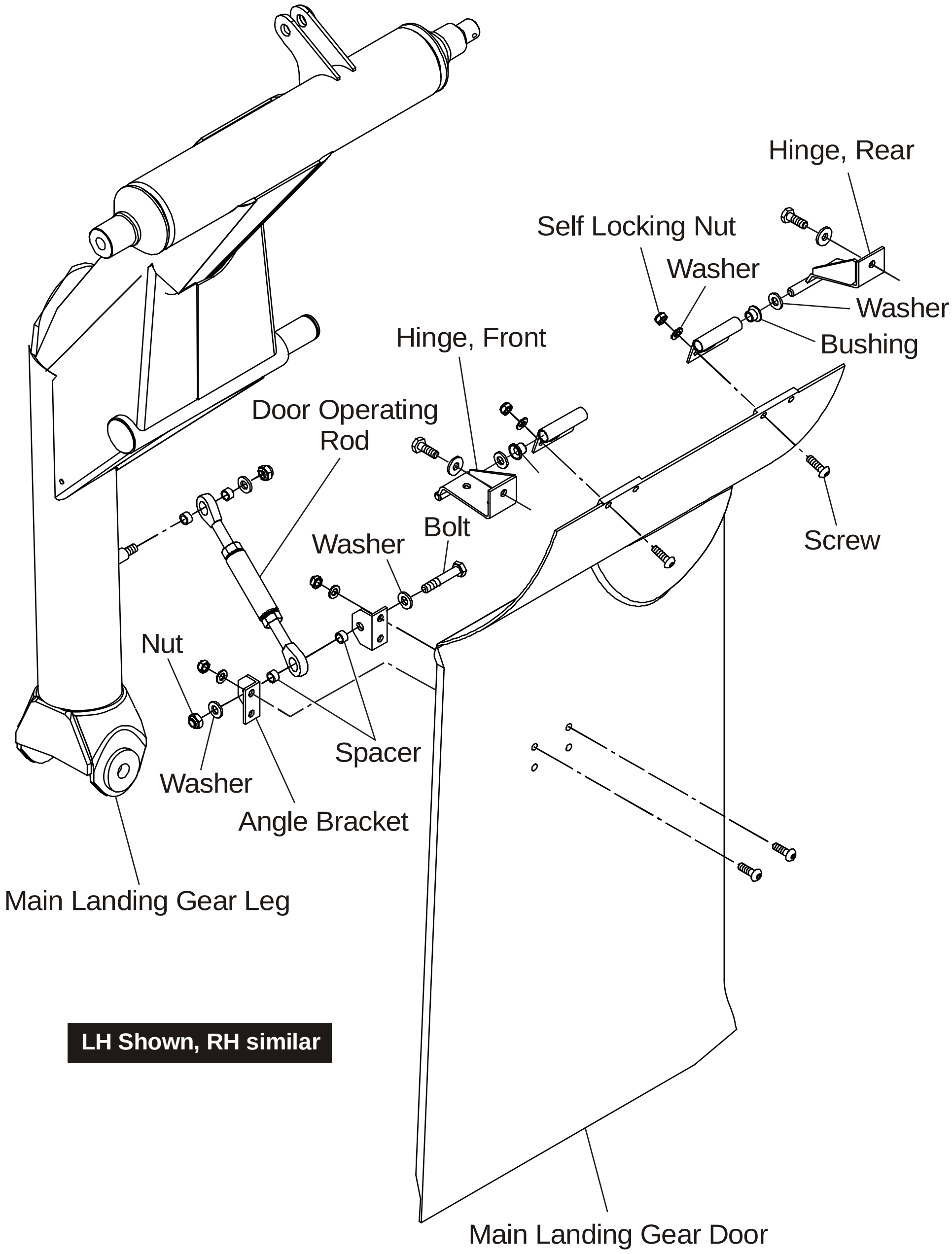


Figure 10: Main Landing Gear Door

B. Install a Main Gear Door

	Detail Steps/Work Items	Key Items/References
(1)	Install the main gear door: – Remove the two bolts, washers and self locking nuts from one of the hinges on the main gear door. – Move the main gear into position at the main gear bay. – Push the removed hinge onto the hinge in the main gear bay and align the gear door with the hinge. – Install the two bolts, washers and self locking nuts.	 Refer to Figure 10. Use new self locking nuts.
(2)	Connect the door operating rod to the door that you installed: – Push the door operating rod onto the angle bracket. – Install the nut, washers, spacers and the bolt onto the rod end on the door side.	 Refer to Figure 10. Use a new self locking nut.
(3)	Reset the GEAR circuit-breaker.	On the right side of the instrument panel.
(4)	Do a test of the MLG door preload.	Refer to Paragraph 12 B.
(5)	Do a test of the extension/retraction system.	Refer to Section 32-30.

9. Remove/Install the MLG Folding Stay / Hydraulic Actuator

WARNING: DO NOT GET HYDRAULIC FLUID ON YOU. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE. IT CAN ALSO DAMAGE CLOTHING.

CAUTION: CLEAN OFF SPILT HYDRAULIC FLUID IMMEDIATELY. HYDRAULIC FLUID CAN DAMAGE THE AIRPLANE STRUCTURE. IT CAN ALSO REMOVE THE PAINT FROM SOME COMPONENTS.

A. Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.

B. Remove the Folding Stay / Hydraulic Actuator

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
(1)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(2)	Retract the landing gear.	Use the landing gear switch.
(3)	Pull the GEAR circuit breaker.	Right side of instrument panel.
(4)	Set the ELECT. MASTER switch to OFF.	
(5)	Depressurize the hydraulic system: – Operate the emergency extension lever of the landing gear.	Refer to Section 29-10.
(6)	Disconnect the MLG door from the main gear leg.	Refer to Figure 10.

	Detail Steps/Work Items	Key Items/References
(7)	Remove the folding stay switch.	Refer to Section 32-60.
(8)	Disconnect the MLG folding stay assembly.	Refer to Section 32-10.
(9)	Disconnect the hydraulic lines from the actuator. (Only if removing the actuator).	Use a suitable container to catch spilt hydraulic fluid. Fit caps on all open connections.
(10)	Measure and record the distance from the actuator safety lock washer to the center of spherical rod-end bearing.	Refer to Figure 11. Note the distance marked 'x'.
(11)	Disassemble the folding stay/actuator: – Remove the nut, 4 spacers, washer and bolt from the driver plate. – Move the spring lever with spring, the latch operating arm, the drag lever assembly and the actuator clear from the airplane.	Refer to Figure 12.

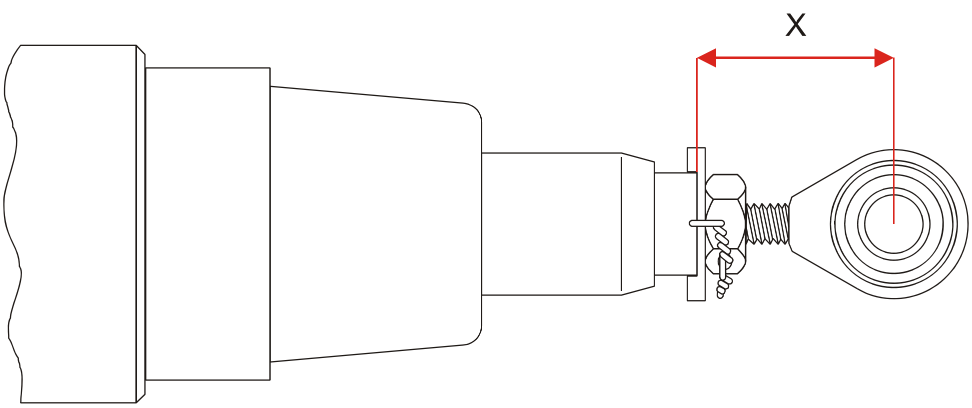


Figure 11: MLG Actuator Measurement

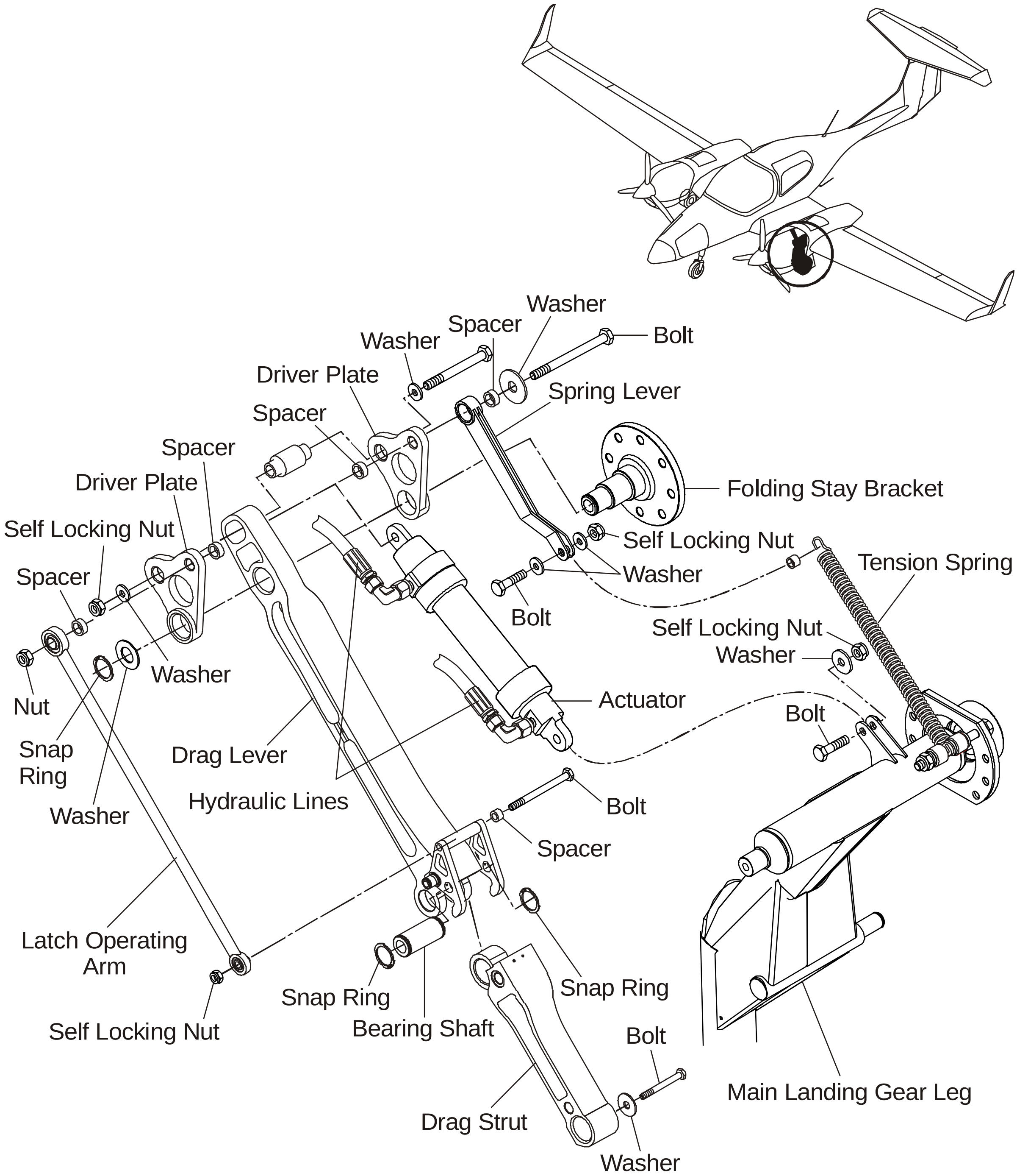


Figure 12: Main Landing Gear Folding Stay

C. Install the Folding Stay / Hydraulic Actuator

	Detail Steps/Work Items	Key Items/References
(1)	Verify the distance from the actuator safety lock washer to the center of the spherical rod-end bearing with your record or adjust base setting of 34 mm (1.34 in).	Refer to Figure 11. Base setting equals min. screw-in depth. Maximum distance x (min. screw-in depth): 34 mm (1.34 in).
(2)	Connect actuator with folding stay: – Following parts will be connected in the next step: Spring lever, latch operating arm, the drag lever assembly and the actuator. – Install the nut, 4 spacers, washer and bolt onto the driver plate.	Refer to Figure 12.
(3)	Connect the hydraulic lines with the actuator.	Remove caps from all open connections.
(4)	Replenish the hydraulic reservoir if necessary.	Refer to Section 29-10.
(5)	Connect the folding stay assembly of the MLG.	Refer to Section 32-10.
(6)	Install and adjust the folding stay assembly of the MLG.	Refer to Section 32-60.
(7)	Reset the GEAR circuit-breaker.	Right side of instrument panel.
(8)	Bleed the hydraulic system.	Refer to Section 29-10.
(9)	Carry out a test for the correct operation of the landing gear retraction and extension system.	Refer to Section 32-30.
(10)	Carry out a test for the correct pre-load of the main landing gear door.	Refer to Paragraph 12 B.
(11)	Move the wing and rear fuselage trestles clear of the airplane.	
(12)	Lower the airplane.	Refer to Section 07-10.

10. Disconnect/Connect the MLG Folding Stay Assembly

A. Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.

B. Disconnect the Folding Stay Assembly of the MLG

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
(1)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(2)	Bleed the system: – Retract the landing gear to bleed the system. – Operate the emergency extension of the landing gear.	Refer to Section 32-30.
(3)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
	CAUTION: THE MAIN LANDING GEAR LEG MAY GET DAMAGED IF THE FUSELAGE SKIN IS NOT PROTECTED WHEN DISCONNECTING THE FOLDING STAY.	
(4)	Put foam plastic between MLG leg and the airplane fuselage to protect it.	

	Detail Steps/Work Items	Key Items/References
(5)	Remove the nut, spacer and bolt which connect the latch operating arm with the folding stay and disconnect the arm.	Disconnect at the lock hook. Refer to Figure 12.
	WARNING: THE FOLDING STAY AND THE ACTUATOR ARE TENSED BY THE SPRING. IT CAN CAUSE SERIOUS DAMAGE IF HANDLED UNPROPER. MAKE SURE TO SUPPORT THESE PARTS WHEN REMOVING THEM.	
(6)	Disconnect the drag strut: – Remove the DIN 471-20 snap ring between the drag strut and the drag lever from the folding stay. – Push the drag lever outward to release the stress from the folding stay and slowly remove the bearing shaft from the folding stay. – Open the lock hook and slowly release the drag lever. – Move the drag strut free from the drag lever. – Remove the bolt and the washer which connects the drag strut with the MLG leg. – Remove the drag strut.	Refer to Figure 12.
	CAUTION: WHEN DISCONNECTING THE ACTUATOR THE MAIN LANDING GEAR LEG WILL MOVE OUTWARDS. DON'T FORGET THE FOAM PLASTIC TO PROTECT THE FUSELAGE SKIN.	
(7)	Disconnect the actuator: – Remove the nut and washer which connects the actuator with the MLG leg.	Make sure to support the actuator after removing the bolt.

	Detail Steps/Work Items	Key Items/References
(8)	Disconnect the tension spring: – Pull the tension spring out of its mounting where it is connected to the MLG leg. – Move the tension spring clear of the MLG leg.	Refer to Figure 12.
(9)	Disconnect the folding stay assembly: – Remove the snap ring and the washer from the drag lever were it connects to the folding stay bracket. – Pull the drag lever and the actuator off the folding stay bracket. – The whole assembly will come off but is still connected to the fuselage through the actuator hydraulic lines and the MLG folding stay switch. – Make sure to affix the whole assembly so that the hydraulic lines and the electrical connections are not stressed.	

C. Connect the Folding Stay Assembly to the MLG

	Detail Steps/Work Items	Key Items/References
(1)	Connect folding stay assembly: – Install the drag lever and the actuator together with the whole assembly onto the folding stay bracket. – Move the actuator to the main gear leg until it is on top of it. – Bring the main gear leg and the actuator into position. – Install the bolt, washer and nut to secure the actuator. – Install the washer and the snap ring onto the drag lever to secure the whole folding stay / actuator assembly onto the folding stay bracket.	Refer to Figure 12.
(2)	Make sure the lock wire for the hydraulic actuator is installed.	
(3)	Connect the tension spring: – Move the tension spring into position. – Push the tension spring into its mounting where it is connected to the MLG leg. – Make sure the spring fits solidly to the spacer.	Refer to Figure 12.
CAUTION: MAKE SURE TO SUPPORT THE DRAG LEVER UNTIL THE BEARING SHAFT IS INSTALLED. OTHERWISE THE FOLDING STAY SWINGS BACK AND CAN CAUSE SERIOUS DAMAGE AND INJURIES.		

	Detail Steps/Work Items	Key Items/References
(4)	Connect the drag strut: – Move the drag strut into position. – Install the bolt and the washer which connects the drag strut with the MLG leg. – Push the drag lever outward to align the drag lever with the drag strut. – Close the lock hook. – Install the bearing shaft. – Install the DIN471-20 snap ring which connects the drag strut and the drag lever.	Refer to Figure 12.
(5)	Install the nut, spacer and bolt which connect the latch operating arm with the folding stay.	Refer to Figure 12.
(6)	Remove the foam plastic between MLG leg and the GFRP of the airplane fuselage.	
(7)	Set the GEAR circuit-breaker.	
(8)	Bleed the hydraulic system.	Refer to Section 29-10.
(9)	Carry out a test for the correct operation of the landing gear retraction and extension system.	Refer to Section 32-30.
(10)	Carry out a test for the correct pre-load of the main landing gear door.	Refer to Paragraph 12B.
(11)	Move the wing and rear fuselage trestles clear of the airplane.	
(12)	Lower the airplane.	Refer to Section 07-10.

11. Test Main Landing Gear (Wheel-Track and Camber)

A. Equipment

Item	Quantity	Part Number
Slide sheets - 2 per side.	4	Commercial.
E-protractor.	1	Commercial.

B. Test Main Landing Gear (Wheel-Track and Camber)

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the airplane is at the empty weight.	Refer to Wheel-Track and Camber Report.
(2)	Remove the main landing gear doors.	Refer to Paragraph 8.
(3)	Move the airplane to put the main wheels on the slide sheets. Make sure there is no horizontal friction load on the landing gear.	Make sure the floor is level in the work area. Refer to Figure 14.
(4)	Measure the wheel-track: – Measure from the front wing root edge LH and RH (between wing and fuselage) perpendicular to the ground. – Mark these points on the ground and draw a line or use a straight beam which aligns with both points. – Use a metal angle or similar and hold it onto the measured line from the previous step to the rim of the main gear wheel. – Measure the wheel-track of the rim in the front and the rear. – Subtract the two measurements and write this wheel-track measurement down. – Use the wheel-track table to convert your wheel-track measurement into degrees.	Refer to Figures 13 and 14.
(5)	Measure the camber using an e-protractor.	

	Detail Steps/Work Items	Key Items/References
(6)	Fill out the Wheel-Track and Camber Report.	Refer to Section 06-00, Figure 8.
(7)	If the Wheel-Track and Camber Report does not meet the requirement: contact DAI.	
(8)	Measure the wheel track. If the wheel track does not meet the requirement: contact DAI.	Refer to Section 06-00, Figure 9.
(9)	Move the airplane off the slide sheets.	
(10)	Install the main gear door.	Refer to Paragraph 8.

DA 42 Toe-In Table (valid for DA 42 with 6" – Parker rim P/N: 40-75Z)					
mm	°	mm	°	mm	°
0,1	0,03	3,4	1,04	6,7	2,05
0,2	0,06	3,5	1,07	6,8	2,08
0,3	0,09	3,6	1,10	6,9	2,11
0,4	0,12	3,7	1,13	7	2,15
0,5	0,15	3,8	1,16	7,1	2,18
0,6	0,18	3,9	1,20	7,2	2,21
0,7	0,21	4	1,23	7,3	2,24
0,8	0,25	4,1	1,26	7,4	2,27
0,9	0,28	4,2	1,29	7,5	2,30
1	0,31	4,3	1,32	7,6	2,33
1,1	0,34	4,4	1,35	7,7	2,36
1,2	0,37	4,5	1,38	7,8	2,39
1,3	0,40	4,6	1,41	7,9	2,42
1,4	0,43	4,7	1,44	8	2,45
1,5	0,46	4,8	1,47	8,1	2,48
1,6	0,49	4,9	1,50	8,2	2,51
1,7	0,52	5	1,53	8,3	2,54
1,8	0,55	5,1	1,56	8,4	2,57
1,9	0,58	5,2	1,59	8,5	2,61
2	0,61	5,3	1,62	8,6	2,64
2,1	0,64	5,4	1,65	8,7	2,67
2,2	0,67	5,5	1,69	8,8	2,70
2,3	0,70	5,6	1,72	8,9	2,73
2,4	0,74	5,7	1,75	9	2,76
2,5	0,77	5,8	1,78	9,1	2,79
2,6	0,80	5,9	1,81	9,2	2,82
2,7	0,83	6	1,84	9,3	2,85
2,8	0,86	6,1	1,87	9,4	2,88
2,9	0,89	6,2	1,90	9,5	2,91
3	0,92	6,3	1,93	9,6	2,94
3,1	0,95	6,4	1,96	9,7	2,97
3,2	0,98	6,5	1,99	9,8	3,00
3,3	1,01	6,6	2,02	9,9	3,03

Figure 13: DA 42 Wheel-Track Table

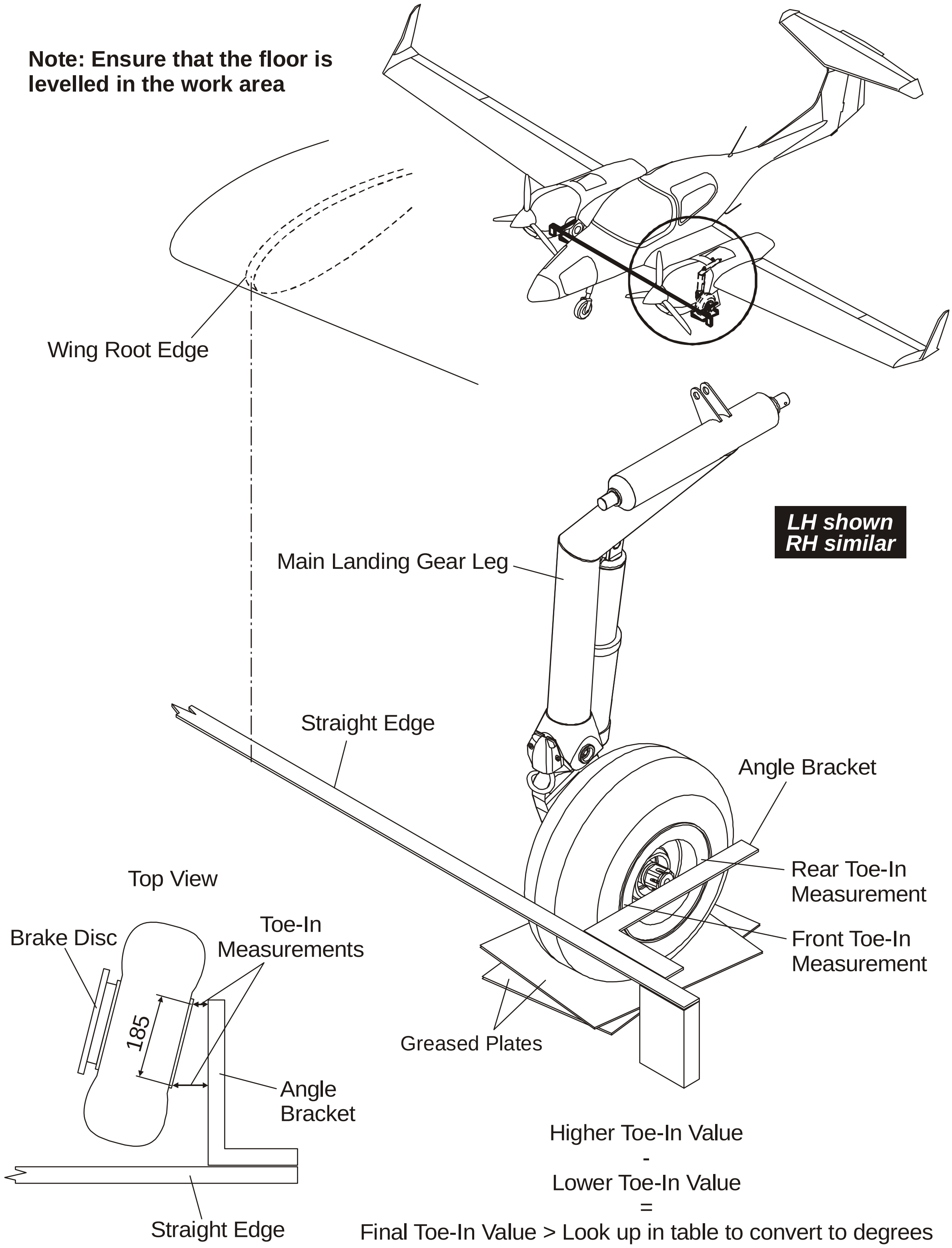


Figure 14: Main Gear Wheel-Track

12. Adjustment of the MLG Wheel in Retracted Position and Check of MLG Door Pre-Load

A. Adjustment of the MLG Wheel in Retracted Position

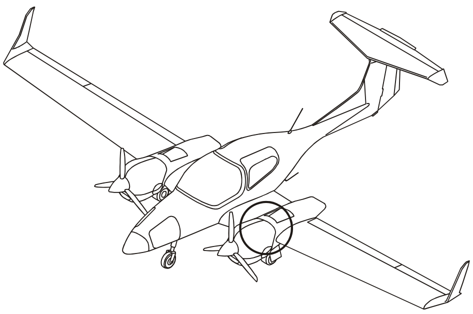
	Detail Steps/Work Items	Key Items/References
WARNING:	**TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.**	
(1)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(2)	Remove the dust cup from the wheel.	
(3)	Verify the tire pressure.	Refer to the AFM for correct pressure.
(4)	Disconnect the MLG door from the MLG leg.	Refer to Paragraph 8.
(5)	Set the ELECT. MASTER switch to ON.	
(6)	Retract the landing gear.	
(7)	Check the clearance between the MLG tire and the lower wing-shell, wheel bay cutout:	
	– Put a trestle under the MLG wheel.	
	– Set the emergency gear lever to the EXTEND position.	
	– Set the ELECT. MASTER switch to OFF.	
	– Support the MLG wheel in the position shown in Figure 15.	Refer to Figure 15.
	– Measure the clearance between the MLG tire and the wheel bay cutout.	Minimum clearance: 4 mm (0.16 in) circumferential and along full depth of the wheel bay cutout.
	– Remove the trestle and extend landing gear.	

	Detail Steps/Work Items	Key Items/References
(8)	If the clearance is asymmetric between front and rear side: Adjust the clearance by use of an oversize joint and replace joint. Too small gap on front side: use a shorter joint. Too big gap on front side: use a longer joint.	For replacement refer to Paragraph 3D.

B. Check of MLG Door Pre-Load

	Detail Steps/Work Items	Key Items/References
(1)	Connect the MLG door.	Refer to Paragraph 8.
(2)	Push the emergency landing gear extension lever.	
(3)	Set the ELECT. MASTER switch to ON.	
(4)	Retract the landing gear.	
(5)	Measure the distance between the end plane of the wheel axle and the lower wing shell.	Refer to Figure 16.
(6)	If the measurement does not meet the requirements: Adjust the rod end bearing of the MLG actuator until obtaining the above mentioned value. Therefore change screw-in depth of rod and bearing.	Refer to Section 32-30 for disassembly and assembly of the MLG actuator.
	Note: Check assembly for min. screw-in depth.	

	Detail Steps/Work Items	Key Items/References
(7)	Measure the MLG door pre-load: – Attach the spring-scale / load cell to the MLG door. – calibrate the spring scale / load cell to display zero. – read the force value, when the MLG door starts to lift off from the lower wing shell. The correct pre-load is 5 to 10 kg (11 to 22 lbf).	Refer to Figure 17.
(8)	If the measurement does not meet the requirements: Adjust the MLG door pre-load with the MLG door operating rod.	
(9)	Carry out a test of the correct operation of the landing gear retraction and extension system.	Refer to Section 32-30.
(10)	Extend the landing gear.	
(11)	Set the ELECT. MASTER switch to OFF.	
(12)	Install the dust cap on the wheel.	
(13)	Move the wing and rear fuselage trestles clear of the airplane.	
(14)	Lower the airplane.	Refer to Section 07-10.



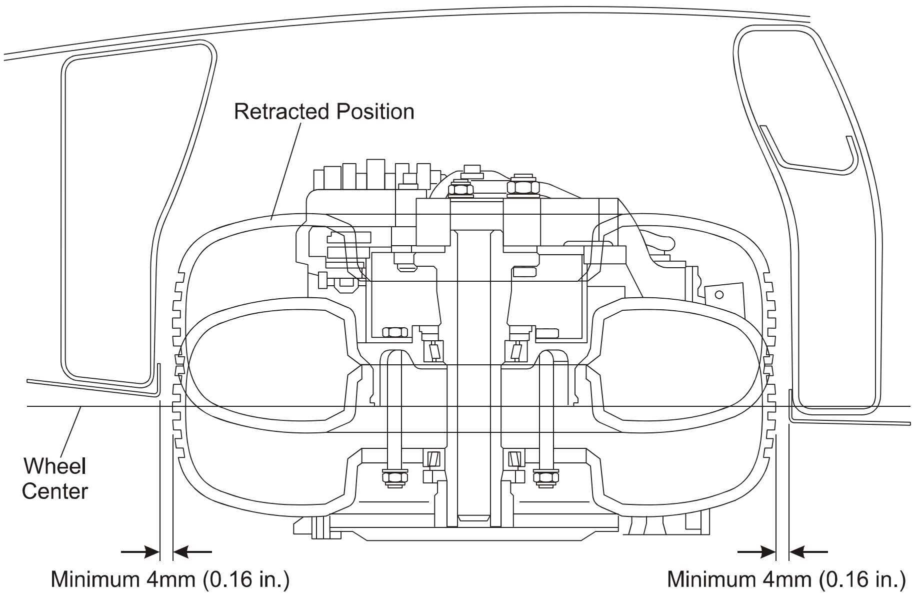


Figure 15: Main Landing Gear Tire Clearance Measurement

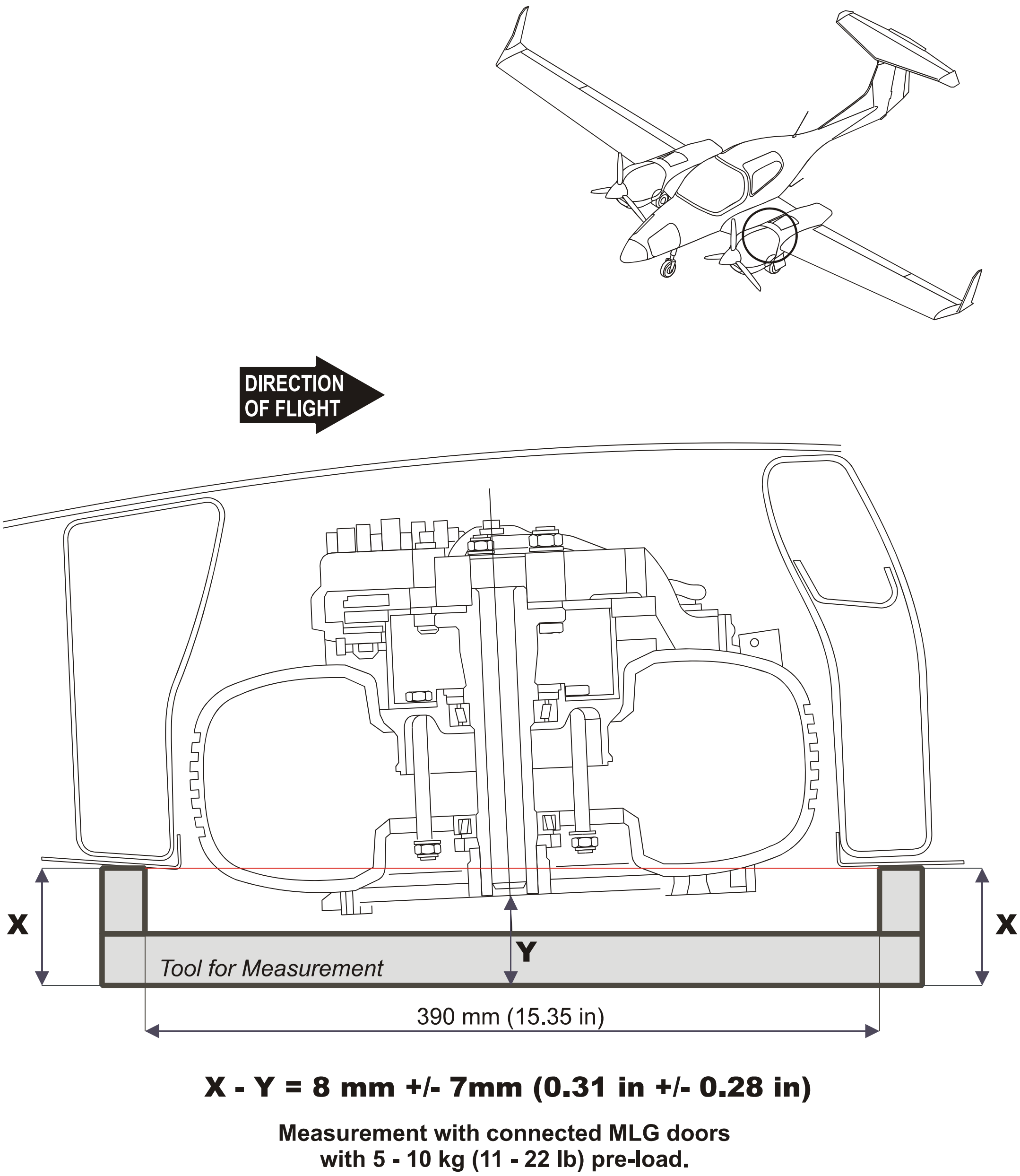
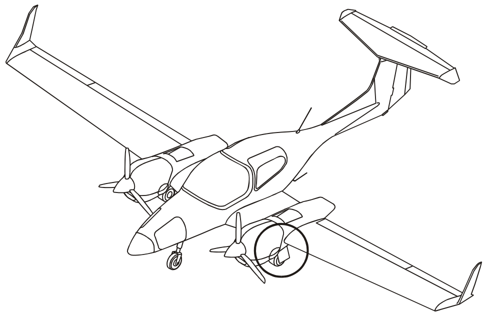


Figure 16: Main Landing Gear Door Measurement



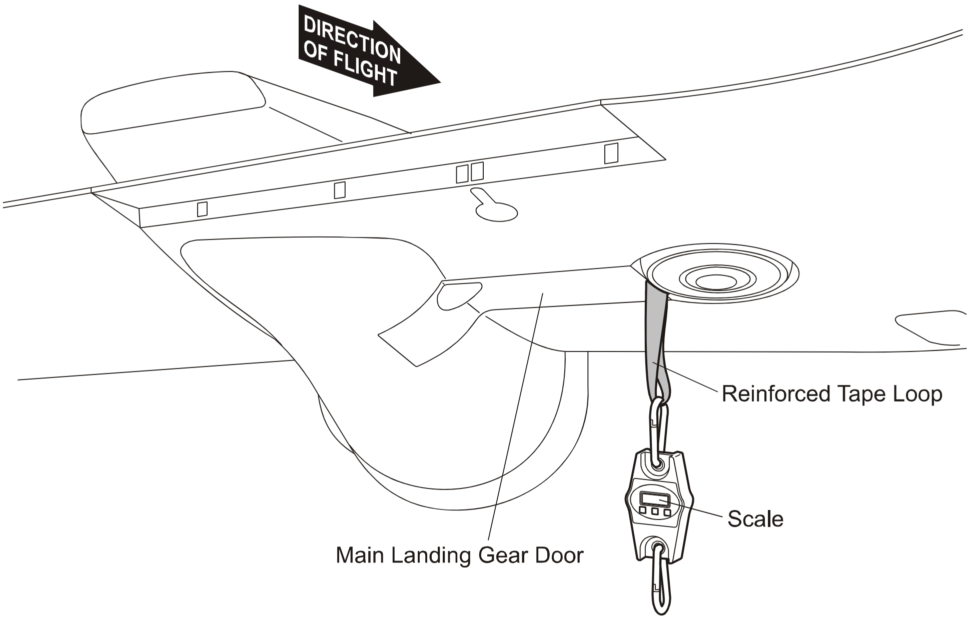


Figure 17: Main Landing Gear Door Pre-Load Measurement

Section 32-20
Nose Landing Gear

1. General

The nose landing gear is housed in the nose gear bay and is attached to the surrounding structure by the nose landing gear mounting-bracket. The nose gear leg has an oleo-pneumatic strut and a single wheel. The nose gear bay has 2 composite doors and the rudder control system operates the nose wheel steering.

2. Description

Figures 1, 2 and 3 show the nose landing gear. The nose gear bay is located in the nose of the airplane and is an integral part of the nose structure. The nose landing gear attaches to a mounting bracket. Bolts attach the mounting bracket to the cockpit front frame and the nose gear bay.

The nose gear leg has a tubular steel housing. The tubular steel housing makes the top of the leg and has the leg swivel mountings. Bronze bushes in the tubular steel housing hold a tubular strut. The strut can turn in the housing. Stops on the tubular steel housing and the tubular steel strut limit the amount that the tubular steel strut can turn.

The tubular strut carries a universal joint coupling at the top. The coupling has 3 parts. A top pivot gimbal, a bottom pivot gimbal and a central pivot block. The top pivot gimbal has a steering actuator lever. Refer to Section 32-50 for more data about the nose wheel steering.

A sliding tube is located in the bottom of the tubular steel strut. A seal holds the sliding tube in the tubular steel strut. The bottom part of the sliding tube contains hydraulic fluid. The top part of the tubular steel strut contains nitrogen at high pressure. These components make the nose gear leg damper. Two torque-links hold the sliding tube aligned with the tubular steel strut.

Four bolts attach the nose wheel fork to the bottom of the sliding tube. The fork holds the nose wheel. Refer to Section 32-40 for more data about the nose wheel. A plate under the nose wheel fork has the attachments for the airplane towing arm.

The nose gear bay is sealed by 2 doors when the landing gear is retracted. Each nose gear door has 4 hinges. Two short operating rods connect the nose gear bay doors to the nose gear leg operating mechanism.

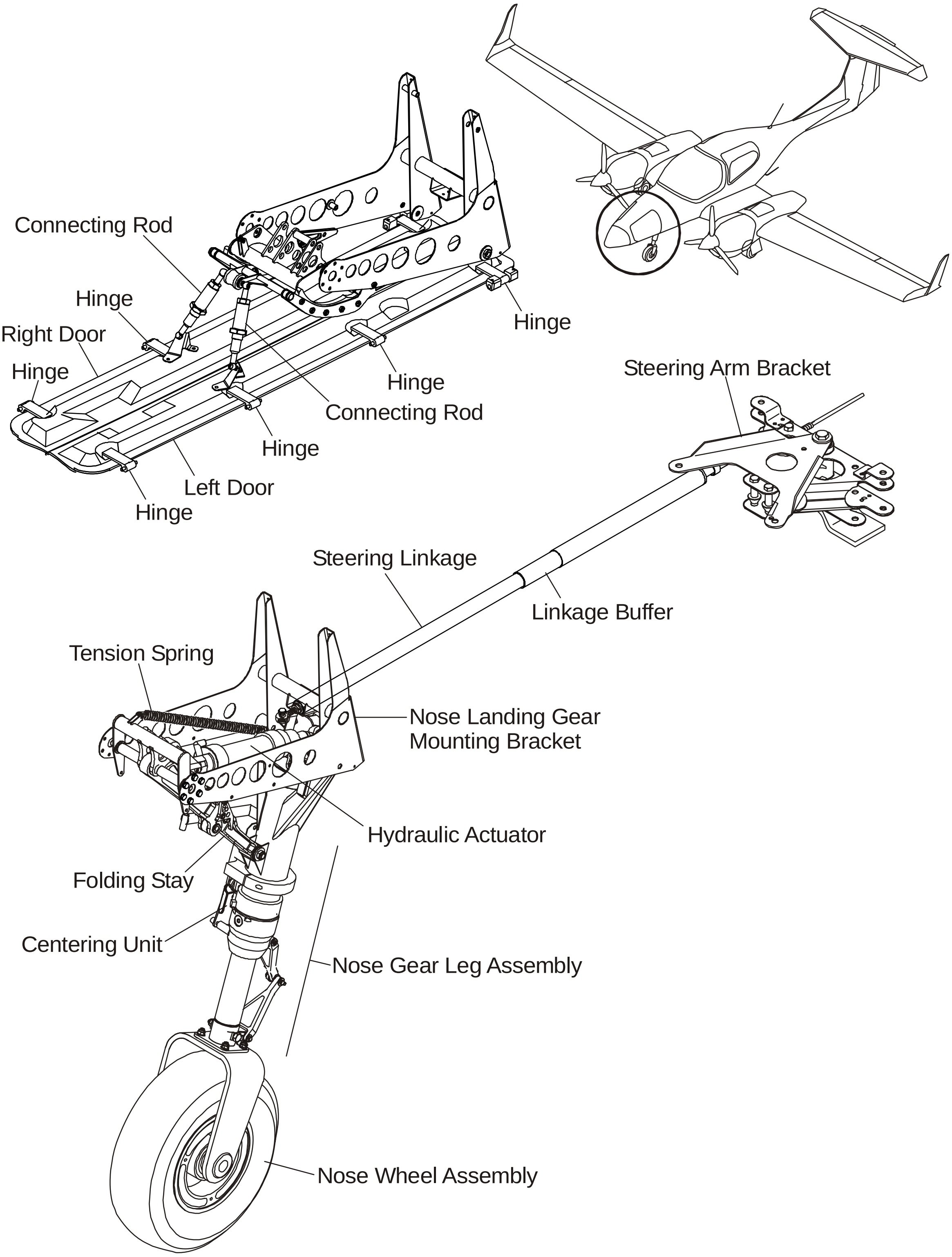


Figure 1: Nose Gear Assembly

3. Operation

The nose gear leg has 2 functions. It absorbs vertical loads and it provides steering on the ground.

If the nose gear has vertical load (for example during landing), the sliding tube moves up into the tubular strut. This movement compresses the nitrogen in the damper. When the load decreases the sliding tube moves out of the tubular strut. The sliding tube can move quickly into the tubular strut. In the reverse direction the speed of the sliding tube is limited by a damper. This prevents the airplane from being pushed up after the landing and it also prevents vibration.

Refer to Section 32-50 for data about the nose wheel steering. Refer to Section 32-30 for data about the extension and retraction system.

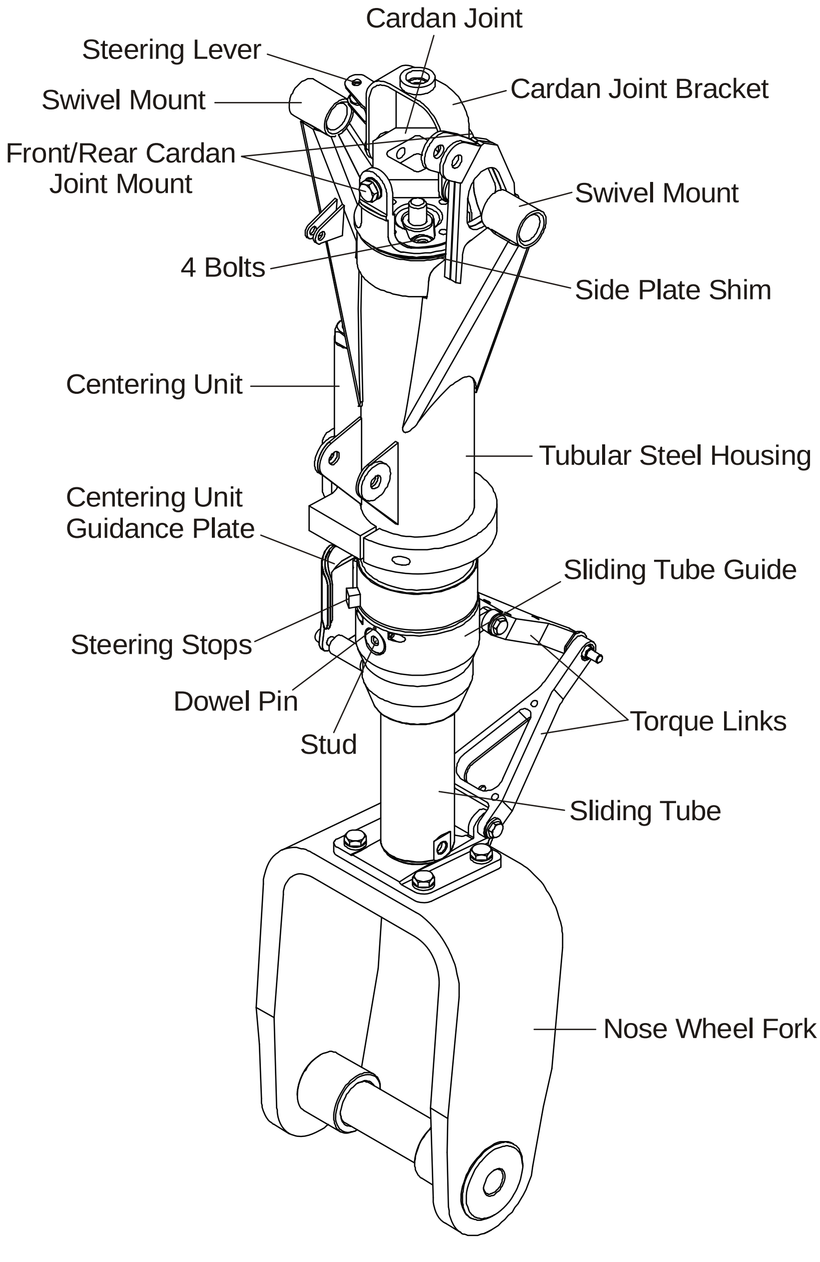


Figure 2: Nose Gear Leg Assembly

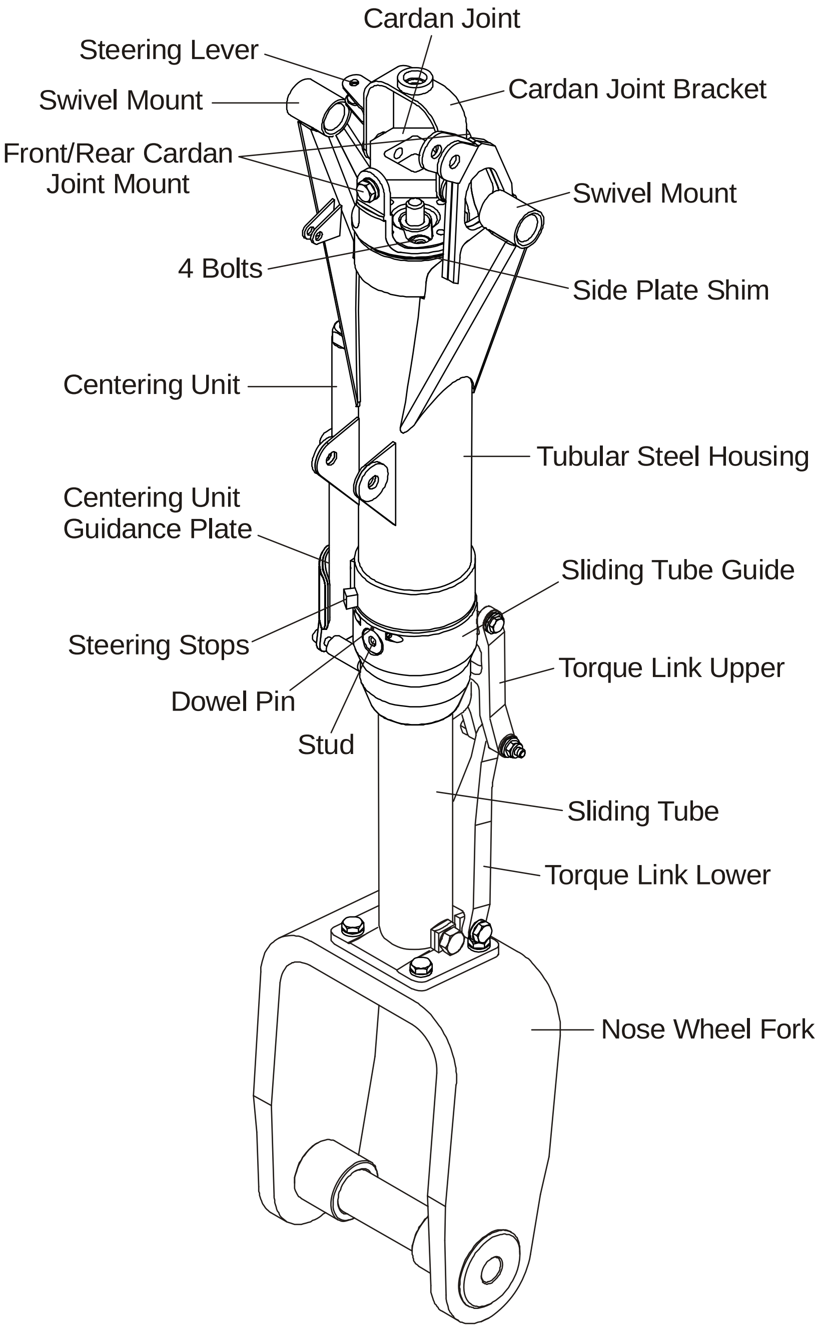


Figure 3: Nose Gear Leg Assembly (if OÄM 42-195 is installed)

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Trouble-Shooting

1. General

This table gives you the trouble-shooting procedures for the nose landing gear. Refer to Section 32-30 for trouble-shooting the nose gear extension/retraction system. Refer to Section 32-40 for trouble-shooting the nose wheel assembly. Refer to Section 32-50 for trouble-shooting the nose wheel steering. Refer to Section 32-60 for trouble-shooting the nose landing gear position and warning system.

If you find the trouble given in Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Nose gear leg cracked or bent.	Hard landing.	Do the hard landing inspection given in Section 05-50.
WARNING: THE FOLDING STAY AND THE DAMPER ARE SPRING LOADED. DUE TO THE HIGH FORCES INVOLVED THE ELEMENTS OF THE DAMPING SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS.		
Nose gear leg extension too small. Airplane sits nose-down when parked on level ground.	Nitrogen pressure in the damper to low.	Charge the leg with nitrogen to the correct pressure. Refer to MAINTENANCE PRACTICES, Paragraphs 5 and 6.
	Damper leaking.	Remove the nose gear leg. Disassemble the nose gear leg in a workshop and repair/replace the damper seals. Assemble and install the nose gear leg.

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Maintenance Practices

1. General

The Maintenance Practices in this Section tell you how to remove/install the nose gear leg and other main nose landing gear components. They also tell you how to charge the damper with hydraulic fluid/nitrogen. You can remove the nose gear leg complete with the nose wheel or you can remove the wheel first.

Refer to Section 32-30 for data about the nose gear retraction/extension system. Refer to Section 32-40 for data about the nose-wheel. Refer to Section 32-60 for data abut the landing gear position and warning system.

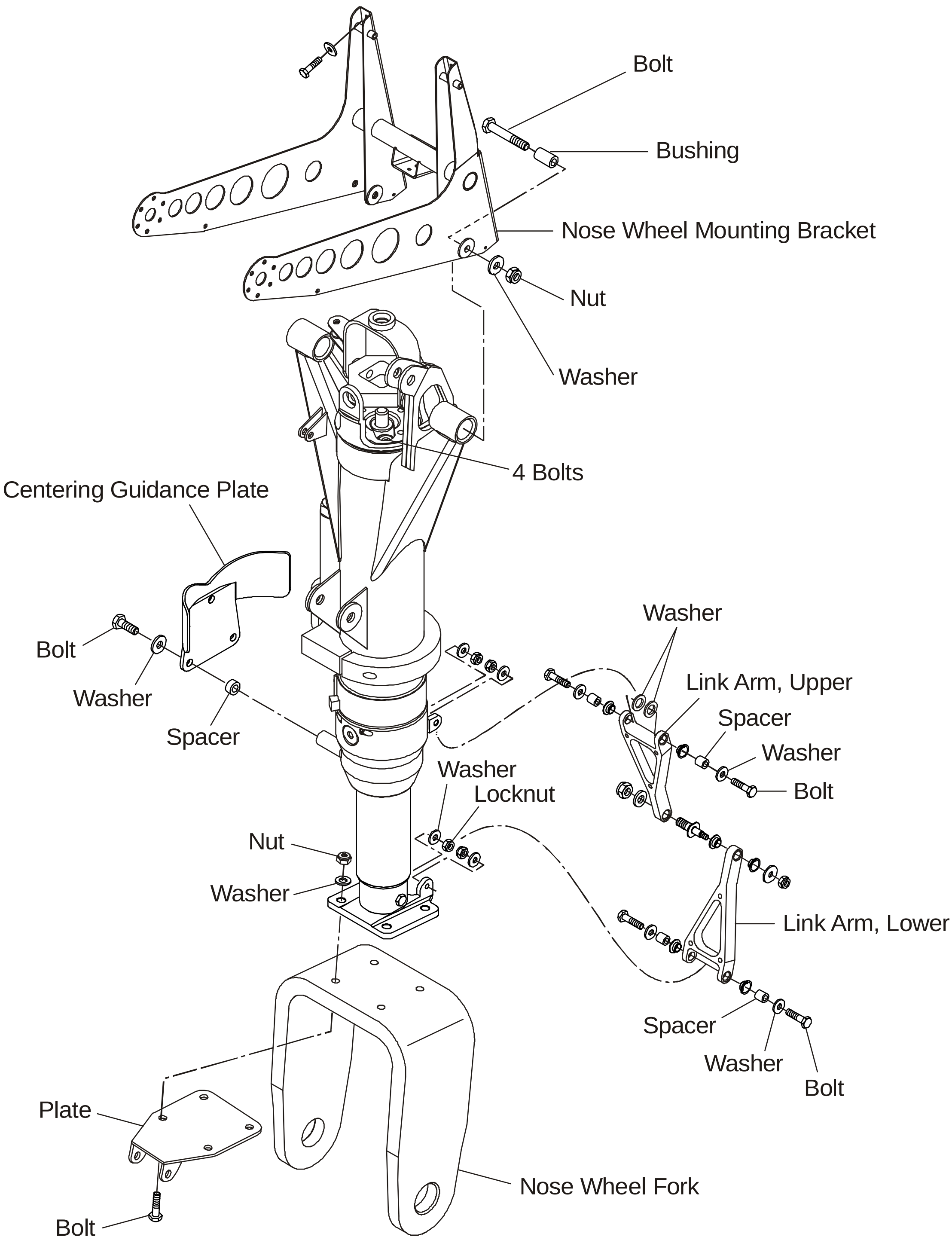


Figure 4: Nose Landing Gear Leg

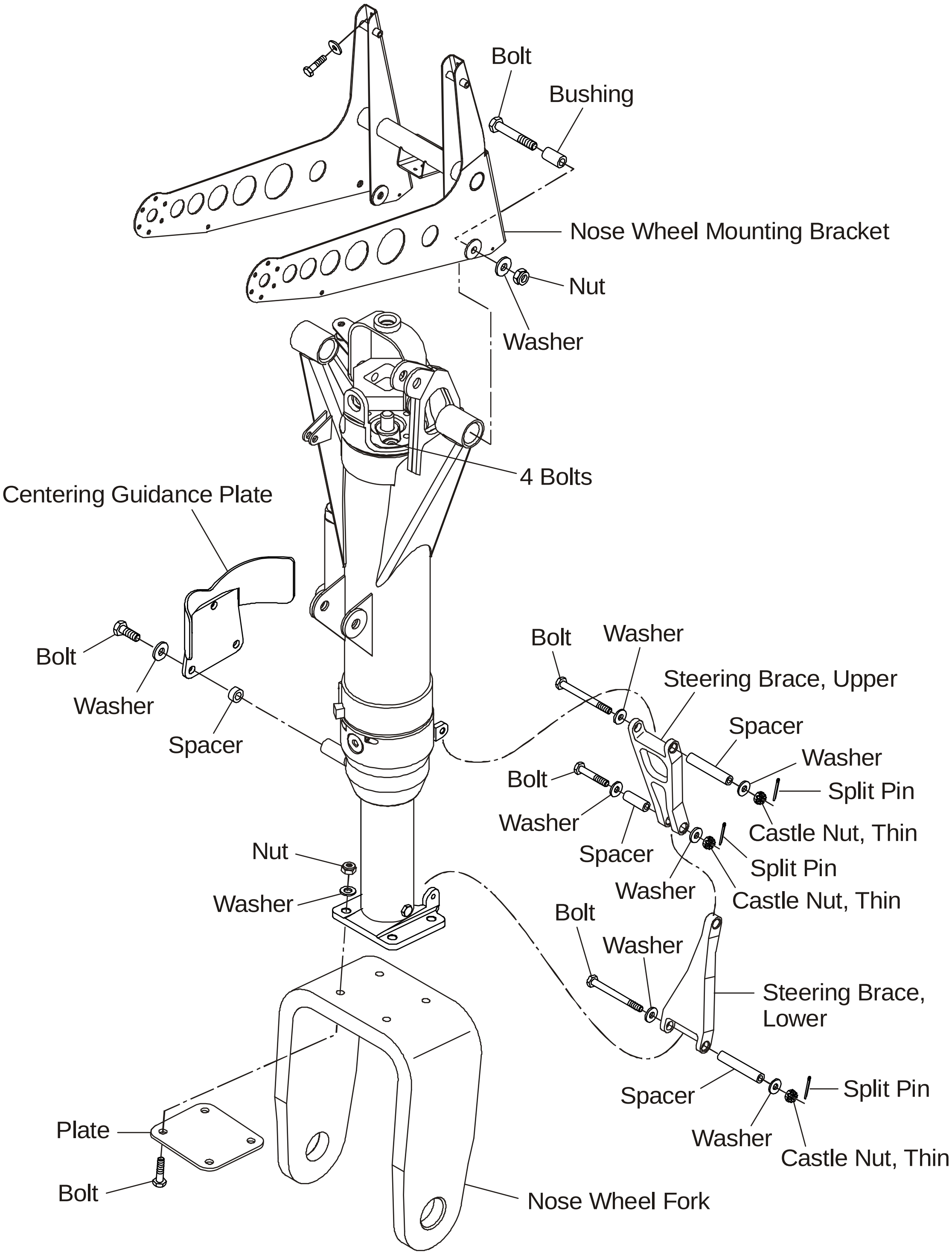


Figure 5: Nose Landing Gear Leg (if OÄM 42-195 is installed)

2. Remove/Install the Nose Gear Leg

A. Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.

B. Remove the Nose Gear Leg

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY. **WARNING: THE FOLDING STAY AND THE DAMPER ARE SPRING LOADED. DUE TO THE HIGH FORCES INVOLVED THE ELEMENTS OF THE DAMPING SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS.**	
(1)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(2)	Depressurize the hydraulic system.	Refer to Section 29-00.
(3)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(4)	Remove the two nose gear folding stay switches and move them together with the electrical connections clear of the landing gear.	Refer to Section 32-60.
(5)	Disconnect the NLG folding stay assembly.	Refer to Section 32-20.

	Detail Steps/Work Items	Key Items/References
(6)	Disconnect the nose-wheel steering rod from the steering lever at the top of the nose gear leg: – Remove the bolt, nut and washer. – Move the nose-wheel steering rod clear of the nose gear leg.	
(7)	Remove the cardan joint assy: – Remove the bolt, washer and nut from the front cardan joint mount. – Remove the bolt, washer and nut from the rear cardan joint mount. – Remove the cardan joint bracket from the pin and the cardan joint.	Refer to Figure 4. Steer the nose gear by hand so you get better access to the rear joint mount.
(8)	Remove the carpet in the front baggage compartment.	
(9)	Airplanes with de-icing system: – Remove the de-icing fluid tank. – Remove the de-icing metering pump. – Remove the filter cartridge.	Refer to Section 30-00. This step is necessary to get access to the nose gear leg mount.
(10)	Airplanes without de-icing system: – Remove the LH and RH aft access panels in the baggage compartment.	
(11)	Remove the nose gear leg: – Remove the bolt, bushing, washer and nut on the LH and RH side of the nose gear. – Move the nose gear leg clear of the airplane.	Refer to Figure 7. Support the nose gear.

C. Install Nose Gear Leg

	Detail Steps/Work Items	Key Items/References
(1)	Install the nose gear leg: – Move the nose gear leg into position. – Install the bolt, bushing, washer and nut on the LH and RH side of the nose gear.	Refer to Figure 7. Support the nose gear.
(2)	Airplanes with de-icing system: – Install the filter cartridge – Install the de-icing metering pump. – Install the de-icing fluid tank.	Refer to Section 30-00. This step is necessary to get access to the nose gear leg mount.
(3)	Airplanes without de-icing system: – Install the LH and RH aft access panels in the front baggage compartment.	
(4)	Install the carpet in the front baggage compartment.	
(5)	Install the cardan joint assy: – Install the cardan joint bracket onto the pin and move the cardan joint into position. – Install the bolt, washer and nut onto the rear cardan joint mount. – Install the bolt, washer and nut onto the front cardan joint mount.	Refer to Figure 4.
(6)	Connect the nose-wheel steering rod onto the steering lever at the top of the nose gear leg: – Install the bolt, nut and washer.	
(7)	Connect the NLG folding stay assembly.	Refer to Section 32-20.
(8)	Install the two nose gear folding stay switches and secure the electrical connections with cable binder.	Refer to Section 32-60.

	Detail Steps/Work Items	Key Items/References
(9)	Make sure the lock wire for the hydraulic actuator is installed.	
(10)	Reset the GEAR circuit-breaker.	Right side of instrument panel.
(11)	Do a test for the correct operation of the landing gear retraction and extension system.	
(12)	Move the wing and rear fuselage trestles clear of the airplane.	
(13)	Lower the airplane.	Refer to Section 07-10.

3. Remove/Install a Nose Gear Door

A. Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.

B. Remove a Nose Gear Door

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY. **WARNING: THE FOLDING STAY AND THE DAMPER ARE SPRING LOADED. DUE TO THE HIGH FORCES INVOLVED THE ELEMENTS OF THE DAMPING SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS.**	
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 7-10.

	Detail Steps/Work Items	Key Items/References
(3)	Disconnect the door operating rod from the door that you will remove: – Remove the safety clip from the end of the operating rod. – Pull the operating rod clear of the ball-fitting.	 At the door-end of the rod.
(4)	Remove the door: – Remove the roll-pins from the door hinges. – Remove the 4 hinge pins from the door. – Move the door clear of the nose gear bay.	 All 4 hinges. Support the door.

C. Install a Nose Gear Door

	Detail Steps/Work Items	Key Items/References
(1)	Install the nose gear door: – Move the nose gear door into position at the nose gear bay. – Align the hinges of the door with the hinges at the nose gear bay and install the 4 hinge pins. – Install the roll-pins into the door hinges.	Use new roll-pins.
(2)	Connect the door operating rod to the door that you installed: – Push the rod onto the ball-end fitting. – Install the safety clip onto the end of the operating rod.	
(3)	Reset the GEAR circuit-breaker.	Right side of instrument panel.
(4)	Do a test of the retraction/extension system.	Refer to Section 32-30.
(5)	Remove the rear fuselage and wing trestles clear of the airplane.	

	Detail Steps/Work Items	Key Items/References
(6)	Lower the airplane with the jacks.	Refer to Section 07-10. Make sure that the area around the airplane is clear of equipment.

4. Remove/Inspect/Install Nose Landing Gear Damper Assembly

A. Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.
Narrow wrench.	1	Commercial.

B. Disassemble the Nose Landing Damper Assembly

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
(1)	Pull the GEAR circuit-breaker.	On the right side of instrument panel.
(2)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(3)	Remove the nose gear wheel.	Refer to Section 32-40.
(4)	Remove the nose wheel fork: – Remove the four bolts, washers, nuts and the plate from the nose wheel fork. – Move the fork clear from the nose gear.	Refer to Figure 4.

	Detail Steps/Work Items	Key Items/References
(5)	Remove the damper assembly: – Remove the four bolts which hold the whole damper assembly. – Remove the shim and slide plate. The cardan joint assembly stays mounted. – Slide the damper assembly out of the nose gear.	Support the nose gear. Refer to Figures 2 and 3. Use the special tool (narrow wrench).
(6)	Remove the torque links: – Remove the bolts, washers, spacers and lock nuts from the nose gear. – Move the torque links clear from the nose gear.	Refer to Figure 4. Refer to Figure 5 if OÄM 42-195 is installed.
(7)	Remove the centering guidance plate: – Remove locking wire. – Remove the spacers, washers and bolts. – Move the centering unit clear from the damper assembly.	Refer to Figure 4. If bolts with drilled heads are used.

C. Inspect the Nose Gear Damper Assembly

	Detail Steps/Work Items	Key Items/References
(1)	Inspect the nose wheel: – Examine the wheel bearings. – Check the wheel rim. – Examine the tire and check the pressure.	 Refer to Section 32-40. Look specially for scratches and deformation. Refer to Section 12-10.
(2)	Inspect the nose wheel fork: – Examine the (composite) structure.	In case of composite structure: Look for cracks and delamination. In case of aluminium structure: Look for cracks.
(3)	Inspect the torque links.	Look for cracks and deformation.
(4)	Inspect the nose gear damper: – Examine the sliding tube. – Check the strut extension.	 Look specially for surface damages and deformation. Refer to Paragraph 6.

D. Install the Nose Landing Gear Damper Assembly

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
(1)	Install the centering guidance plate: – Move the centering guidance plate into position. – Install the spacers, washers and bolts.	Refer to Figure 4. Use a new self locking nut. Apply Loctite 262 on the thread. Alternatively secure the bolts with locking wire if bolts with drilled heads are used.
(2)	Install the torque links: – Move the torque links into position. – Install the bolts, washers and lock nuts onto the nose gear.	Refer to Figure 4 and Figure 5, if OÄM 42-195 is installed. Use new self locking nuts. Apply Loctite 262 onto the thread. There must be a play sideways of 0.1 - 0.3 mm (0.004 - 0.012 in).
(3)	Install the nose gear damper assembly: – Slide the damper assembly into the nose gear. – Move the shim, slide plate and the cardan joint assembly into position. – Install the four bolts which hold the whole damper assembly.	Refer to Figures 2 and 3. Use a new self locking nut. Apply Loctite 262 onto the thread. Alternatively secure the bolts with locking wire if bolts with drilled heads are used.
(4)	Install the nose gear fork: – Move the fork clear into position. – Install the four bolts, washers, nuts and the plate onto the nose wheel fork.	Refer to Figure 4. Use a new self locking nut. Apply Loctite 262 onto the thread.

	Detail Steps/Work Items	Key Items/References
(5)	Install the nose gear wheel.	Refer to Section 32-40.
(6)	Reset the GEAR circuit breaker.	On the right side of instrument panel.

5. Required Strut Extension of the Nose Gear Damper Assembly

The subsequent table tells you about the correct strut extension and pressure of the unloaded, fully extended nose landing gear damper.

Strut Extension (unloaded) (visible length of bare piston)	**Gas Pressure**
20 cm (8 inches).	12 to 15 bar (174 to 218 PSI). if OÄM 42-195 is installed: 16 bar (232 PSI) at 20° C (68 °F).

6. Fill/Charge the Damper Assembly on the Nose Gear Leg

The following procedure tells you how to fill the nose gear damper assembly with hydraulic fluid and then charge with nitrogen.

A. Equipment

Item	Quantity	Part Number
Bottle.	1	Commercial.
Bleed tube.	1	Commercial.
Valve core removal tool.	1	Commercial.
Nitrogen charging equipment.	1	Commercial.
Airplane Jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.

B. Material

Item	Quantity	Part Number
CAUTION: DO NOT MIX OR REPLACE HYDRAULIC FLUIDS OF DIFFERENT TYPES OR MANUFACTURERS.		
Note: If MÄM 42-495 is carried out, a placard is installed by the airplane manufacturer identifying the type of hydraulic fluid. All airplanes with MÄM 42-495 NOT installed have been manufactured with Aeroshell Fluid 41 (MIL-PRF-5606 H). The identification placard must be installed if a hydraulic fluid change to another fluid type is carried out.		
Hydraulic fluid.	As required.	Aeroshell Fluid 41(MIL-PRF-5606 H) or AMG-10 (GOST 6794-75 Amdt 1-5), see CAUTION above.
Grease for sliding interfaces.	As required.	DOD-L-25681 or NATO S-1735 (for example, Mocil 50/50).
Gaseous nitrogen.	As required.	Commercial.

C. Procedure

WARNING: DO NOT GET HYDRAULIC FLUID ON YOUR SKIN OR YOUR CLOTHES. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE.

WARNING: DO NOT LET NITROGEN AT HIGH PRESSURE BLOW ONTO YOUR SKIN. NITROGEN AT HIGH PRESSURE CAN PENETRATE THE SKIN AND CAUSE SERIOUS INJURY.

CAUTION: CLEAN UP SPILT HYDRAULIC FLUID IMMEDIATELY. HYDRAULIC FLUID CAN CAUSE DAMAGE TO AIRPLANE COMPONENTS.

CAUTION: YOU MUST FILL/CHARGE THE NOSE-WHEEL DAMPER ASSEMBLY CORRECTLY. IF YOU DO NOT FILL/CHARGE THE NOSE-WHEEL DAMPER CORRECTLY THE NOSE LANDING GEAR WILL NOT OPERATE CORRECTLY. THIS CAN CAUSE DAMAGE TO THE NOSE LANDING GEAR AND THE AIRPLANE STRUCTURE.

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(3)	Release the nitrogen pressure from the damper: – Remove the dust cap from the charging valve. – Press and hold down the pin inside the valve until all the pressure is released.	
	WARNING: YOU MUST RELEASE ALL THE NITROGEN PRESSURE FROM THE DAMPER BEFORE YOU REMOVE THE CHARGING VALVE. NITROGEN AT HIGH PRESSURE CAN PENETRATE YOUR SKIN. THIS CAN CAUSE INJURY.	
(4)	Remove the core of the charging valve from the damper assembly.	
(5)	Compress the damper assembly.	
	WARNING: DO NOT GET HYDRAULIC FLUID ON YOUR SKIN. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE.	
(6)	Connect the tube of the hydraulic fluid filler bottle to the charging valve.	
	CAUTION: DO NOT MIX OR REPLACE HYDRAULIC FLUIDS OF DIFFERENT TYPES OR MANUFACTURERS.	

	Detail Steps/Work Items	Key Items/References
	Note: If MÄM 42-495 is carried out, a placard is installed by the airplane manufacturer identifying the type of hydraulic fluid. All airplanes with MÄM 42-495 NOT installed have been manufactured with Aeroshell Fluid 41 (MIL-PRF-5606 H). The identification placard must be installed if a hydraulic fluid change to another fluid type is carried out.	
(7)	Turn the bottle to the open position and allow the hydraulic fluid to flow from the bottle into the damper.	Use Aeroshell Fluid 41 (MIL-PRF-5606 H) or AMG-10 (GOST 6794-75 Amdt 1-5) hydraulic fluid (see CAUTION above) with 0.3 % grease compliant with DOD-L-25681 or NATO S-1735 (for example, Mocil 50/50) added.
(8)	Extend the damper assembly by hand to allow the hydraulic fluid to fill the damper assembly.	
(9)	Compress and extend the damper not less than 6 times to release the air from the damper and allow the hydraulic fluid to flow into the damper.	
(10)	Compress the damper and hold the damper compressed while you close the bottle and remove the tube from the charging valve.	Keep the damper compressed.
(11)	Install the core of the charging valve.	
(12)	Connect the gaseous nitrogen charging equipment to the damper charging valve.	Allow the damper to extend as it is charged.
(13)	Charge the damper with nitrogen to the correct pressure.	Refer to Paragraph 5 of this Section. The damper must be fully extended.
(14)	Disconnect and remove the gaseous nitrogen charging equipment from the damper charging valve.	
(15)	Install the dust cap onto the charging valve.	
(16)	Reset the GEAR circuit-breaker.	Right side of instrument panel.
(17)	Remove the rear fuselage and wing trestles. clear of the airplane.	
(18)	Lower the airplane with the jacks.	Refer to Section 07-10. Make sure that the area around the airplane is clear of equipment.

D. Fluid Change from Aero Shell Fluid 41 to AMG-10 or Vice Versa

	Detail Steps/Work Items	Key Items/References
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(3)	Release the nitrogen pressure from the damper: – Remove the dust cap from the charging valve. – Press and hold down the pin inside the valve until all the pressure is released.	
	WARNING: YOU MUST RELEASE ALL THE NITROGEN PRESSURE FROM THE DAMPER BEFORE YOU REMOVE THE CHARGING VALVE. NITROGEN AT HIGH PRESSURE CAN PENETRATE YOUR SKIN. THIS CAN CAUSE INJURY.	
(4)	Remove the core of the charging valve from the damper assembly.	
(5)	Compress the damper assembly.	
	WARNING: DO NOT GET HYDRAULIC FLUID ON YOUR SKIN. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE.	
	CAUTION: DO NOT MIX OR REPLACE HYDRAULIC FLUIDS OF DIFFERENT TYPES OR MANUFACTURERS.	
	Note: If MÄM 42-495 is carried out, a placard is installed by the airplane manufacturer identifying the type of hydraulic fluid. All airplanes with MÄM 42-495 NOT installed have been manufactured with Aeroshell Fluid 41 (MIL-PRF-5606 H). The identification placard must be installed if a hydraulic fluid change to another fluid type is carried out.	

	Detail Steps/Work Items	Key Items/References
(6)	Connect the tube of the hydraulic fluid filler bottle to the charging valve.	Hydraulic fluid filler bottle filled with new fluid: Use AMG-10 (GOST 6794-75 Amdt 1-5) or Aeroshell Fluid 41 (MIL-PRF-5606 H) hydraulic fluid (see CAUTION above) with 0.3 % grease compliant with DOD-L-25681 or NATO S-1735 (for example, Mocil 50/50) added.
(7)	Turn the bottle to the open position and allow the hydraulic fluid to flow from the bottle into the damper.	
(8)	Extend the damper assembly by hand to allow the hydraulic fluid to fill the damper assembly.	
(9)	Compress and extend the damper not less than 6 times to release the air from the damper and allow the hydraulic fluid to flow into the damper.	
(10)	Compress the damper and hold the damper compressed while you close the bottle and remove the tube from the charging valve.	Keep the damper compressed.
(11)	Dispose the hydraulic fluid of the filler bottle and refill it with new fluid.	Use AMG-10 (GOST 6794-75 Amdt 1-5) or Aeroshell Fluid 41 (MIL-PRF-5606 H) hydraulic fluid (see CAUTION above) with 0.3 % grease compliant with DOD-L-25681 or NATO S-1735 (for example, Mocil 50/50) added.
(12)	Repeat steps 7 to 12 three times.	Do not refill the filler bottle at last iteration.
(13)	Install the core of the charging valve.	
(14)	Connect the gaseous nitrogen charging equipment to the damper charging valve.	Allow the damper to extend as it is charged.
(15)	Charge the damper with nitrogen to the correct pressure.	Refer to Paragraph 4 of this Section. The damper must be fully extended.
(16)	Disconnect and remove the gaseous nitrogen charging equipment from the damper charging valve.	
(17)	Install the dust cap onto the charging valve.	

	Detail Steps/Work Items	Key Items/References
(18)	Reset the GEAR circuit-breaker.	Right side of instrument panel.
(19)	Remove the rear fuselage and wing trestles clear of the airplane.	
(20)	Lower the airplane with the jacks.	Refer to Section 07-10. Make sure that the area around the airplane is clear of equipment.
(21)	Apply the Hydraulic Fluid placard and mark the used fluid.	Refer to Figure 6. Mark hydraulic fluid type by punching.

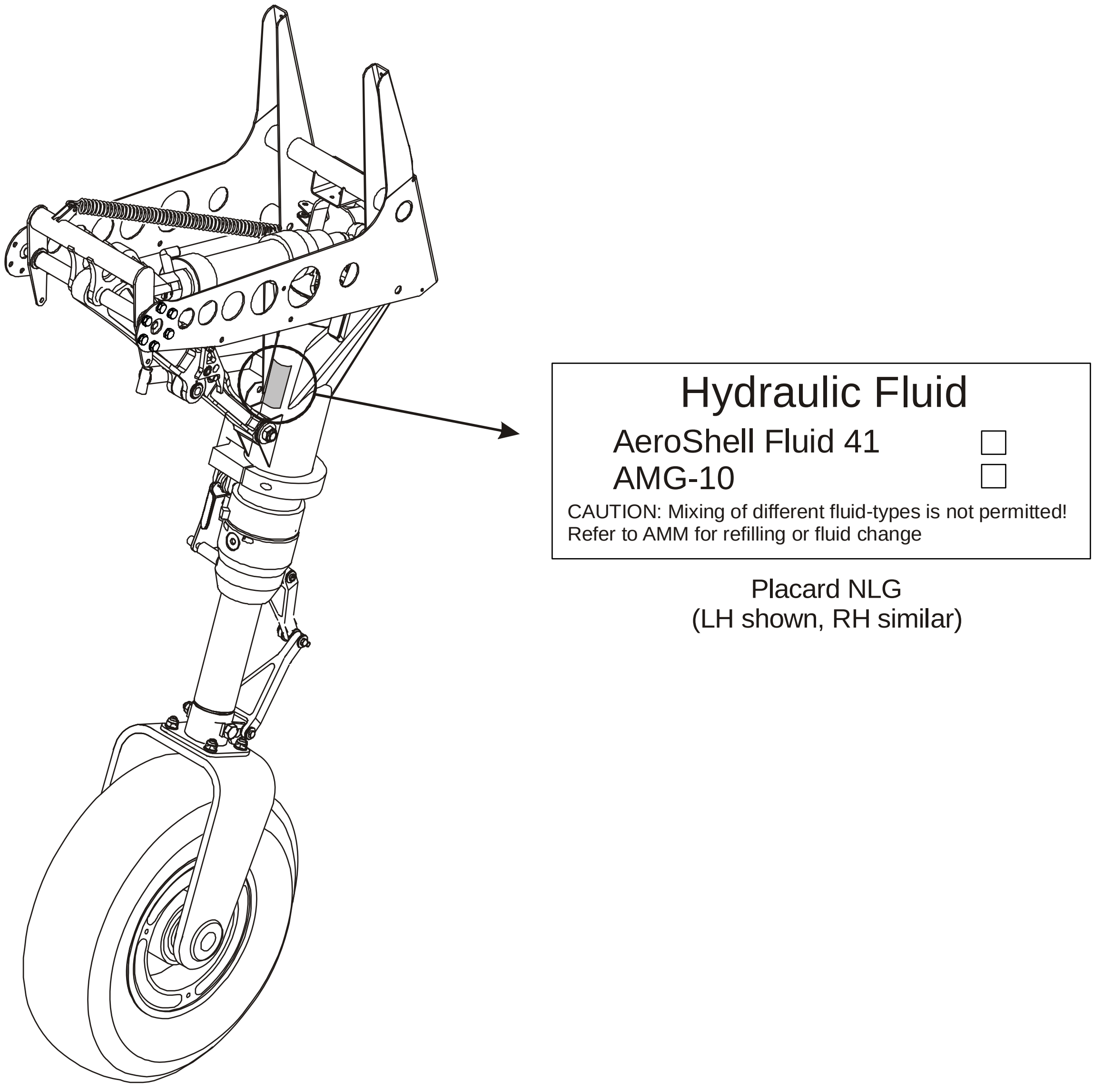


Figure 6: Position of the Hydraulic Fluid Placard - Nose Landing Gear Damper

7. Disconnect/Connect the NLG Folding Stay Assembly

The NLG folding stay assembly consists of the following main parts:

– Folding stay.

– Curve part.

– Nose landing gear brace assembly.

– Tension spring.

WARNING: DO NOT GET HYDRAULIC FLUID ON YOU. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE. IT CAN ALSO DAMAGE CLOTHING.

CAUTION: CLEAN OFF SPILT HYDRAULIC FLUID IMMEDIATELY. HYDRAULIC FLUID CAN DAMAGE THE AIRPLANE STRUCTURE. IT CAN ALSO REMOVE THE PAINT FROM SOME COMPONENTS.

A. Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.

B. Disconnect the Nose Landing Gear Folding Stay Assembly (if OÄM 42-195 is NOT carried out)

	Detail Steps/Work Items	Key Items/References
WARNING:	**TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.**	
(1)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(2)	Disconnect the main battery.	Refer to Section 24-31.
(3)	Pull the GEAR circuit breaker and secure against inadvertent operation.	Right hand side of instrument panel.
(4)	Set the ELECT. MASTER switch to OFF.	
(5)	Depressurize the hydraulic system: – Operate the emergency extension of the landing gear.	Refer to Section 29-10.
(6)	Disconnect the nose landing gear doors: – Remove the pins attaching the door connecting arms to the nose landing gear door. – Move the connecting arms clear of the nose landing gear door.	Make sure to collect all pins.
CAUTION:	WHEN DISCONNECTING THE FOLDING STAY THE NOSE LANDING GEAR LEG SWINGS BACK AND CAN DAMAGE THE DIFFERENTIAL SWITCH. HOLD THE NOSE LANDING GEAR LEG FIRMLY.	
(7)	Put foam plastic in between the nose landing gear leg and the airplane fuselage for damage protection.	
(8)	Remove the two nose landing gear extension switches.	Refer to Section 32-60.

	Detail Steps/Work Items	Key Items/References
	CAUTION: THE NOSE LANDING GEAR FOLDING STAY IS SPRING LOADED. DUE TO THE HIGH FORCES INVOLVED THE ELEMENT OF THE FOLDING STAY CAN CAUSE SERIOUS INJURY TO PERSONS.	
	WARNING: FOR THE FOLLOWING STEP SIT IN FRONT OF THE NOSE LANDING GEAR LEG FACING THE AFT. MAKE SURE TO POSITION YOURSELF SO THAT THE NOSE LANDING GEAR FOLDING STAY CANNOT HIT YOU WHEN IT IS RELEASED.	
	WARNING: DO NOT REMOVE THE PIN WHICH CONNECTS THE NOSE LANDING GEAR FOLDING STAY DRAG LEVER AND THE DRAG STRUT WHEN STILL MOUNTED IN THE AIRPLANE. THE FOLDING STAY SWINGS BACK AND CAN CAUSE SERIOUS INJURY TO PERSONS.	
(9)	Release the nose landing gear folding stay tension: – Remove the nut and washer from the nose landing gear leg which holds the folding stay. – Carefully remove the bolt with spacer while securing the folding stay firmly. – Release the nose landing gear folding stay slowly until the tension is fully released.	Refer to Figure 7. Support the folding stay with your hands and at the same time hold the nose landing gear leg with your feet. The nose landing gear leg falls backwards, when the bolt is removed.
(10)	Remove the tension spring: – Remove the bolt, nut, washer, spacer and bushing which connects the tension spring to the nose landing gear leg. – Move the tension spring clear of the nose landing gear leg.	Refer to Figure 7. Note the directions of the bushing and the spring. The slot of the bushing must point to the direction of the spring. The spring hook tip must be on top.
(11)	Remove the carpets from the front baggage compartment.	

	Detail Steps/Work Items	Key Items/References
(12)	If a de-icing system is installed: – Remove the de-icing fluid tank.	Refer to Section 30-00. In some cases the de-icing fluid tank can be moved sideways by loosening the mounting belt and thus access to the nose landing gear brace mounting bolt heads is gained.
(13)	Disconnect the nose landing gear actuator from the nose landing gear brace: – Remove the bolt which connects the nose landing gear actuator to the nose landing gear brace. – Move the nose landing gear actuator clear of the nose gear brace assembly.	Refer to Figure 7.
(14)	Disconnect the curve part from the fuselage: – Remove the bolt, bushing, washer and nut from both sides of the curve part.	Refer to Figure 7.
(15)	Disconnect the nose landing gear brace assembly. – Remove the 6 mounting bolts, washers and nuts from both sides of the brace.	Refer to Figure 7.
(16)	Move the nose landing gear brace assembly clear of the nose landing gear folding stay assembly: – The nose landing gear actuator is still connected to the nose landing gear leg. – Secure all parts so that the hydraulic lines are not stressed.	

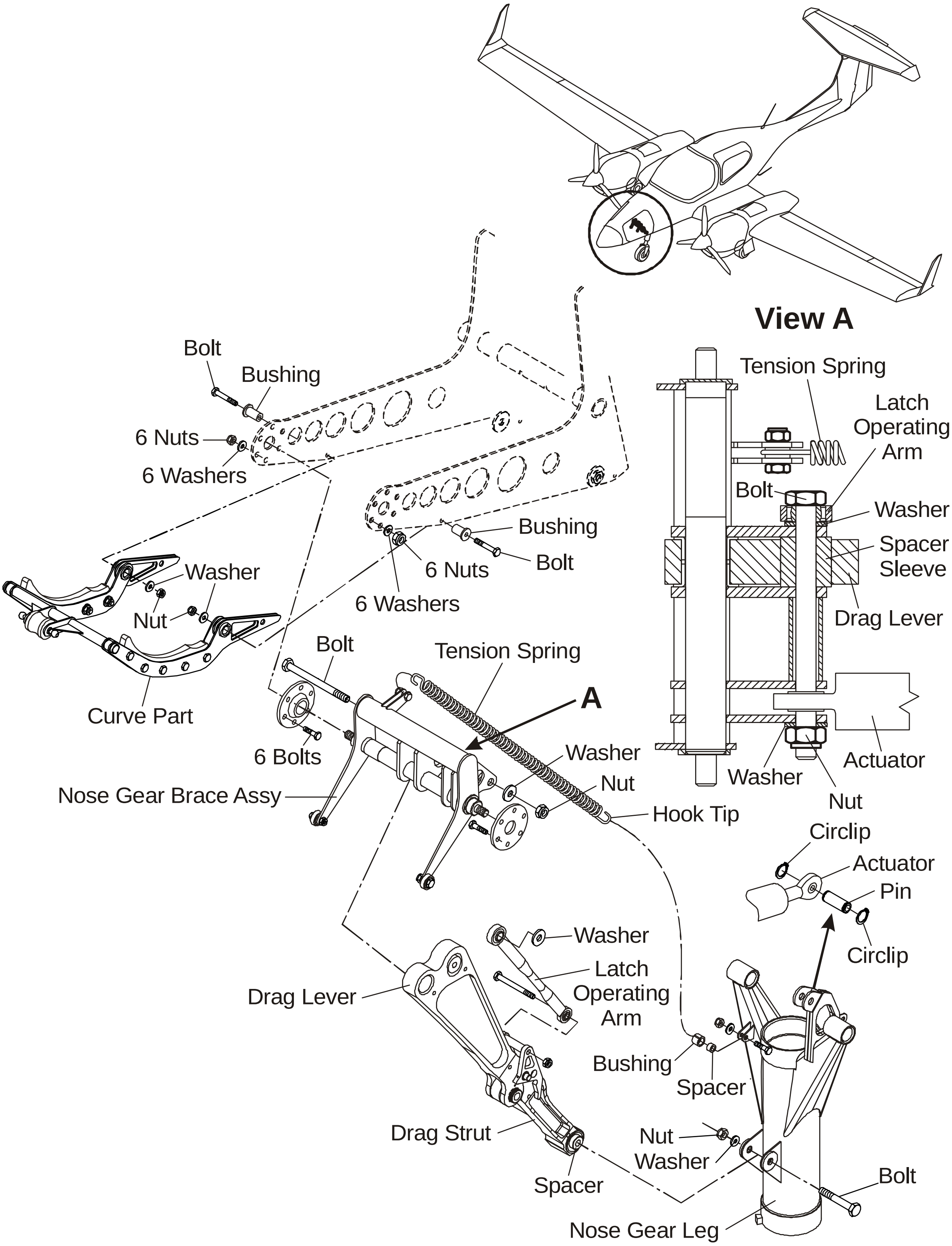


Figure 7: Nose Landing Gear Extension and Retraction

C. Disconnect the Nose Landing Gear Folding Stay Assembly (if OÄM 42-195 is installed)

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
(1)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(2)	Disconnect the main battery.	Refer to Section 24-31.
(3)	Pull the GEAR circuit breaker and secure against inadvertent operation.	Right hand side of instrument panel.
(4)	Set the ELECT. MASTER switch to OFF.	
(5)	Depressurize the hydraulic system: – Operate the emergency extension of the landing gear.	Refer to Section 29-10.
(6)	Disconnect the nose landing gear doors: – Remove the pins attaching the door connecting arms to the nose landing gear door. – Move the connecting arms clear of the nose landing gear door.	Make sure to collect all pins.
	CAUTION: WHEN DISCONNECTING THE FOLDING STAY THE NOSE LANDING GEAR LEG SWINGS BACK AND CAN DAMAGE THE DIFFERENTIAL SWITCH. HOLD THE NOSE LANDING GEAR LEG FIRMLY.	
(7)	Put foam plastic in between the nose landing gear leg and the airplane fuselage for damage protection.	

	Detail Steps/Work Items	Key Items/References
(8)	Disconnect the differential switch located in the nose gear bay: – Remove the two bolts, four washers and two nuts which mount the switch assembly to the nose landing gear mounting bracket. – Remove the cable ties which hold the electrical cables of the switch. – Move the differential switch clear of the airplane.	Refer to Section 32-60.
(9)	Remove the two nose landing gear extension switches.	Refer to Section 32-60.

CAUTION: THE NOSE LANDING GEAR FOLDING STAY IS SPRING LOADED. DUE TO THE HIGH FORCES INVOLVED THE ELEMENT OF THE FOLDING STAY CAN CAUSE SERIOUS INJURY TO PERSONS.

WARNING: FOR THE FOLLOWING STEP SIT IN FRONT OF THE NOSE LANDING GEAR LEG FACING THE AFT. MAKE SURE TO POSITION YOURSELF SO THAT THE NOSE LANDING GEAR FOLDING STAY CANNOT HIT YOU WHEN IT IS RELEASED.

WARNING: DO NOT REMOVE THE PIN WHICH CONNECTS THE NOSE LANDING GEAR FOLDING STAY DRAG LEVER AND THE DRAG STRUT WHEN STILL MOUNTED IN THE AIRPLANE. THE FOLDING STAY SWINGS BACK AND CAN CAUSE SERIOUS INJURY TO PERSONS.

	Detail Steps/Work Items	Key Items/References
(10)	Release the nose landing gear folding stay tension: – Remove the nut and washer from the nose landing gear leg which holds the folding stay. – Carefully remove the bolt with spacer while securing the folding stay firmly. – Release the nose landing gear folding stay slowly until the tension is fully released.	Refer to Figure 8. Support the folding stay with your hands and at the same time hold the nose landing gear leg with your feet. The nose landing gear leg falls backwards, when the bolt is removed.
(11)	Remove the tension spring: – Remove the bolt, nut, washer, spacer and bushing which connects the tension spring to the nose landing gear leg. – Move the tension spring clear of the nose landing gear leg.	Refer to Figure 8. Note the directions of the bushing and the spring. The slot of the bushing must point to the direction of the spring. The spring hook tip must be on top.
(12)	Remove the carpets from the front baggage compartment.	
(13)	If a de-icing system is installed: – Remove the de-icing fluid tank.	Refer to Section 30-00. In some cases the de-icing fluid tank can be moved sideways by loosening the mounting belt and thus access to the nose landing gear brace mounting bolt heads is gained.
(14)	Disconnect the nose landing gear actuator from the nose landing gear brace: – Remove the bolt which connects the nose landing gear actuator to the nose landing gear brace. – Move the nose landing gear actuator clear of the nose gear brace assembly.	Refer to Figure 8.

	Detail Steps/Work Items	Key Items/References
(15)	Disconnect the curve part from the fuselage: – Remove the bolt, bushing, washer and nut from both sides of the curve part.	Refer to Figure 8.
(16)	Remove the nose landing gear leg.	Refer to Section 32-20
(17)	Disconnect the nose landing gear brace assembly: – Remove the 6 mounting bolts, washers and nuts from both sides of the brace.	Refer to Figure 8.
(18)	Disconnect the nose landing gear mounting bracket: – Remove the 22 bolts, washers and nuts which hold the mounting bracket on the nose landing gear frame.	
(19)	Move the nose landing gear folding stay assembly with the nose landing gear mounting bracket clear of the nose gear bay: – The nose landing gear actuator is still connected via the hydraulic lines. – Secure all parts so that the hydraulic lines are not stressed.	

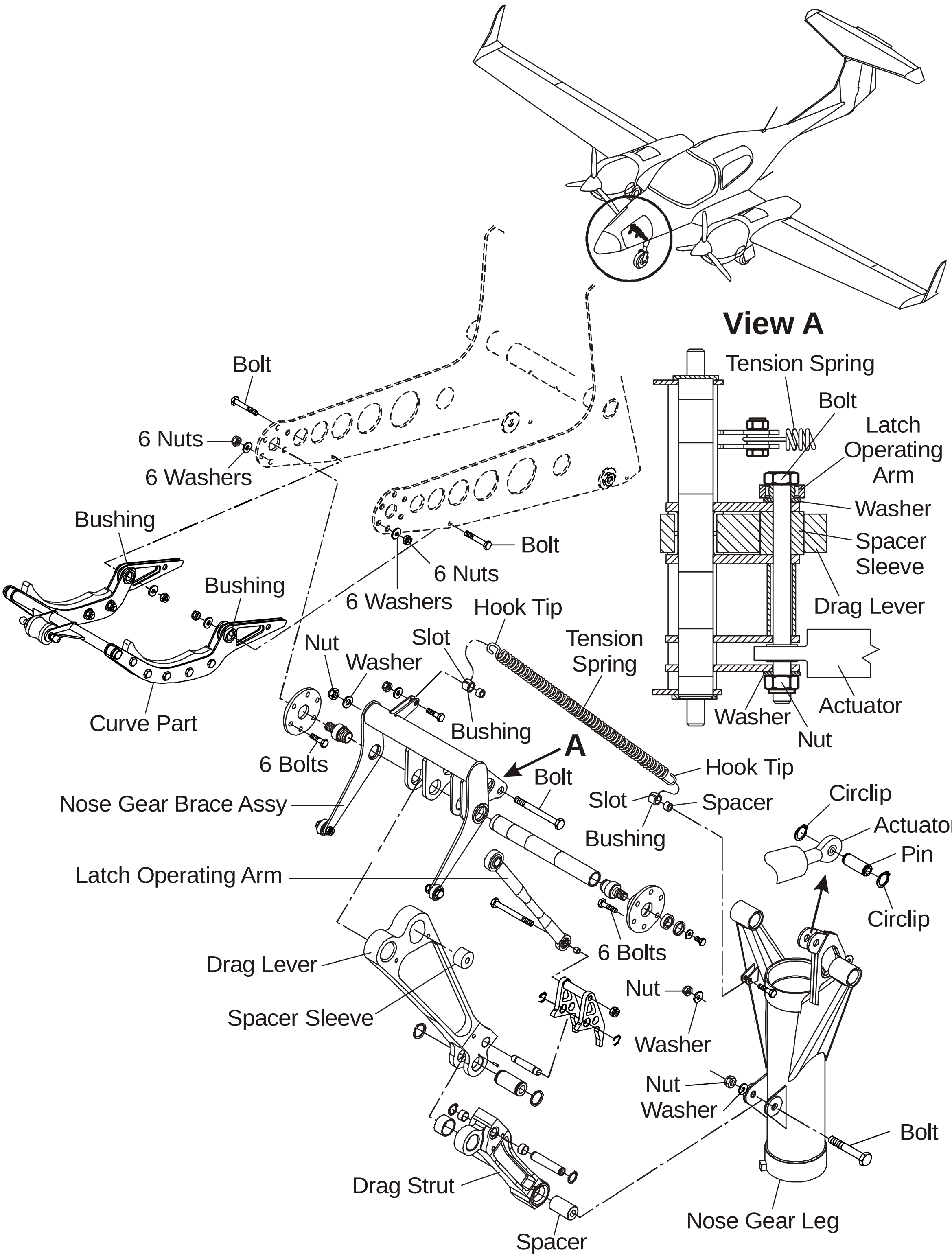


Figure 8: Nose Landing Gear Extension and Retraction (if OÄM 42-195 is installed)

D. Connect the Nose Landing Gear Folding Stay Assembly (if OÄM 42-195 is NOT installed)

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
(1)	Move the nose landing gear folding stay assembly into position.	
(2)	Connect the nose landing gear brace assembly to the nose landing gear bay: – Install the 6 bolts, washers and nuts on both sides of the nose landing gear brace.	Refer to Figure 7. Use new self locking nuts.
(3)	Connect the curve part in the nose landing gear bay: – Install the bolt, bushing, washer and nut on both sides of the curve part.	Refer to Figure 7. Use new self locking nuts.
(4)	Connect the nose landing gear actuator to the nose landing gear brace assembly: – Move the nose landing gear actuator into position in the nose landing gear brace assembly. – Install the bolt, washer and nut connecting the actuator to the nose landing gear brace assembly.	Refer to Figure 7. Use new self locking nut.
(5)	If a de-icing system is installed: – Install the de-icing fluid tank.	Refer to Section 30-00.
(6)	Install the carpets in the front baggage compartment.	

	Detail Steps/Work Items	Key Items/References
(7)	Install the tension spring: – Move the tension spring into position. – Install the bolt, nut, washer, spacer and bushing which connects the tension spring to the nose landing gear leg.	Refer to Figure 7. Make sure to mount the tension spring and the bushing as noted during disassembling.
(8)	Connect the nose landing gear folding stay to the nose landing gear leg: – Push the folding stay towards the nose landing gear leg slowly. – Install the bolt and the spacer while supporting the folding stay. – Install the nut and washer onto the folding stay bolt.	Hold the nose landing gear leg with your feet and move it close to the folding stay.
(9)	Remove the protective foam plastic.	
(10)	Install the two nose landing gear extension switches.	Refer to Section 32-60.
(11)	Adjust the nose landing gear extension switches.	Refer to Section 32-60.
(12)	Connect the nose landing gear door arms to the nose landing gear doors.	
(13)	Connect the main battery.	Refer to Section 24-31.
(14)	Set the GEAR circuit breaker.	
(15)	Set the ELECT. MASTER switch to ON.	
(16)	Perform a test of the correct operation of the landing gear retraction and extension system.	Refer to Section 32-30.
(17)	Move the wing and rear fuselage trestles clear of the airplane.	
(18)	Lower the airplane to the ground.	Refer to Section 07-10.

E. Connect the Nose Landing Gear Folding Stay Assembly and the Mounting Bracket (if OÄM 42-195 is installed)

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
(1)	Move the nose landing gear folding stay assembly into position on the mounting bracket.	
(2)	Move the nose landing gear mounting bracket with the folding stay assembly in position on the nose landing gear frame:	
	– Connect the mounting bracket with the 22 bolts, washers and nuts to the nose landing gear frame.	Seal the bonding connections.
(3)	Connect the nose landing gear brace assembly to the nose landing gear bay:	Refer to Figure 8.
	– Install the 6 bolts, washers and nuts on both sides of the nose landing gear brace.	Use new self locking nuts.
(4)	Connect the curve part in the nose landing gear bay:	Refer to Figure 8.
	– Install the bolt, bushing, washer and nut on both sides of the curve part.	Use new self locking nuts.
(5)	Install the nose landing gear leg.	Refer to Section 32-20.

	Detail Steps/Work Items	Key Items/References
(6)	Connect the nose landing gear actuator to the nose landing gear brace assembly: – Move the nose landing gear actuator into position in the nose landing gear brace assembly. – Install the bolt, washer and nut connecting the actuator to the nose landing gear brace assembly.	Refer to Figure 8. Use new self locking nut.
(7)	If a de-icing system is installed: – Install the de-icing fluid tank.	Refer to Section 30-00.
(8)	Install the carpets in the front baggage compartment.	
(9)	Install the tension spring: – Move the tension spring into position. – Install the bolt, nut, washer, spacer and bushing which connects the tension spring to the nose landing gear leg.	Refer to Figure 8. Make sure to mount the tension spring and the bushing as noted during disassembling.
(10)	Connect the nose landing gear folding stay to the nose landing gear leg: – Push the folding stay towards the nose landing gear leg slowly. – Install the bolt and the spacer while supporting the folding stay. – Install the nut and washer onto the folding stay bolt.	Hold the nose landing gear leg with your feet and move it close to the folding stay.
(11)	Remove the protective foam plastic.	

	Detail Steps/Work Items	Key Items/References
(12)	Install the nose landing gear differential switch: – Install the two bolts, four washers and two nuts which mount the nose landing gear differential switch to the nose landing gear bay. – Install the cable ties which hold the electrical cables of the differential switch.	Refer to Section 32-60.
(13)	Adjust the differential switch.	Refer to Section 32-60.
(14)	Install the two nose landing gear extension switches.	Refer to Section 32-60.
(15)	Adjust the nose landing gear extension switches.	Refer to Section 32-60.
(16)	Connect the nose landing gear door arms to the nose landing gear doors.	
(17)	Connect the main battery.	Refer to Section 24-31.
(18)	Set the GEAR circuit breaker.	
(19)	Set the ELECT. MASTER switch to ON.	
(20)	Perform a test of the correct operation of the landing gear retraction and extension system.	Refer to Section 32-30.
(21)	Move the wing and rear fuselage trestles clear of the airplane.	
(22)	Lower the airplane to the ground.	Refer to Section 07-10.

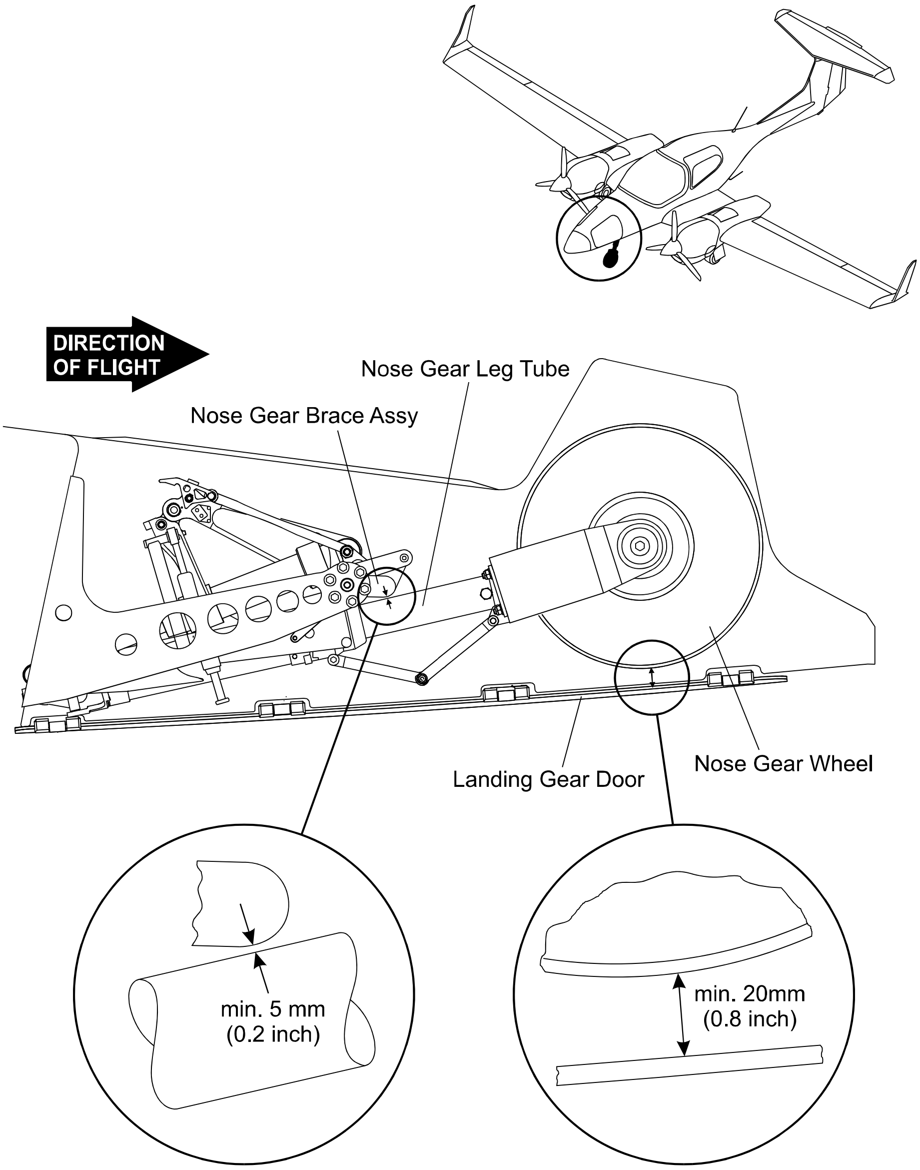


Figure 9: Nose Landing Gear Actuator

8. Remove/Install the NLG Actuator

WARNING: DO NOT GET HYDRAULIC FLUID ON YOU. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE. IT CAN ALSO DAMAGE CLOTHING.

CAUTION: CLEAN OFF SPILT HYDRAULIC FLUID IMMEDIATELY. HYDRAULIC FLUID CAN DAMAGE THE AIRPLANE STRUCTURE. IT CAN ALSO REMOVE THE PAINT FROM SOME COMPONENTS.

A. Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.

B. Remove the Nose Landing Gear Actuator

	Detail Steps/Work Items	Key Items/References
WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.		
(1)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(2)	Retract the landing gear.	Use the Landing Gear switch.
(3)	Disconnect the main battery.	Refer to Section 24-31.
(4)	Pull the GEAR circuit breaker and secure against inadvertent operation.	Right hand side of instrument panel.
(5)	Set the ELECT. MASTER switch to OFF.	
(6)	Depressurize the hydraulic system: – Operate the emergency extension of the landing gear.	Refer to Section 29-10.

<table>
<tr><th></th><th>Detail Steps/Work Items</th><th>Key Items/References</th></tr>
<tr><td>(7)</td><td>Disconnect the nose landing gear doors:
– Remove the pins attaching the door connecting arms to the nose landing gear door.
– Move the connecting arms clear of the nose landing gear door.</td><td>
Make sure to collect all pins.</td></tr>
<tr><td colspan="3">CAUTION: WHEN DISCONNECTING THE FOLDING STAY THE NOSE LANDING GEAR LEG SWINGS BACK AND CAN DAMAGE THE DIFFERENTIAL SWITCH. HOLD THE NOSE LANDING GEAR LEG FIRMLY.</td></tr>
<tr><td>(8)</td><td>Put foam plastic in between the nose landing gear leg and the airplane fuselage for damage protection.</td><td></td></tr>
<tr><td colspan="3">CAUTION: THE NOSE LANDING GEAR FOLDING STAY IS SPRING LOADED. DUE TO THE HIGH FORCES INVOLVED THE ELEMENT OF THE FOLDING STAY CAN CAUSE SERIOUS INJURY TO PERSONS.</td></tr>
<tr><td colspan="3">WARNING: FOR THE FOLLOWING STEP SIT IN FRONT OF THE NOSE LANDING GEAR LEG FACING THE AFT. MAKE SURE TO POSITION YOURSELF SO THAT THE NOSE LANDING GEAR FOLDING STAY CANNOT HIT YOU WHEN IT IS RELEASED.</td></tr>
<tr><td colspan="3">WARNING: DO NOT REMOVE THE PIN WHICH CONNECTS THE NOSE LANDING GEAR FOLDING STAY DRAG LEVER AND THE DRAG STRUT WHEN STILL MOUNTED IN THE AIRPLANE. THE FOLDING STAY SWINGS BACK AND CAN CAUSE SERIOUS INJURY TO PERSONS.</td></tr>
</table>

	Detail Steps/Work Items	Key Items/References
(9)	Release the nose landing gear folding stay tension: – Remove the nut and washer from the nose landing gear leg which holds the folding stay. – Carefully remove the bolt with spacer while securing the folding stay firmly. – Release the nose landing gear folding stay slowly until the spring tension is fully released.	Refer to Figure 7. Support the folding stay with your hands and at the same time hold the nose landing gear leg with your feet. The nose landing gear leg falls backwards, when the bolt is removed.
(10)	Disconnect the hydraulic lines from the actuator.	Use a suitable container to catch spilt hydraulic fluid. Fit caps on all open connections.
(11)	Disconnect the actuator from the nose landing gear: – Remove the circlip which secures the ball joint of the actuator. – Remove the pin with the second circlip. – Remove the bolt from the nose landing gear brace assembly. – Move the actuator clear of the airplane.	
(12)	Measure and record the distance from the actuator safety lock washer to the center of the ball joint.	Refer to Figure 10. Note the distance marked ‘Y’.

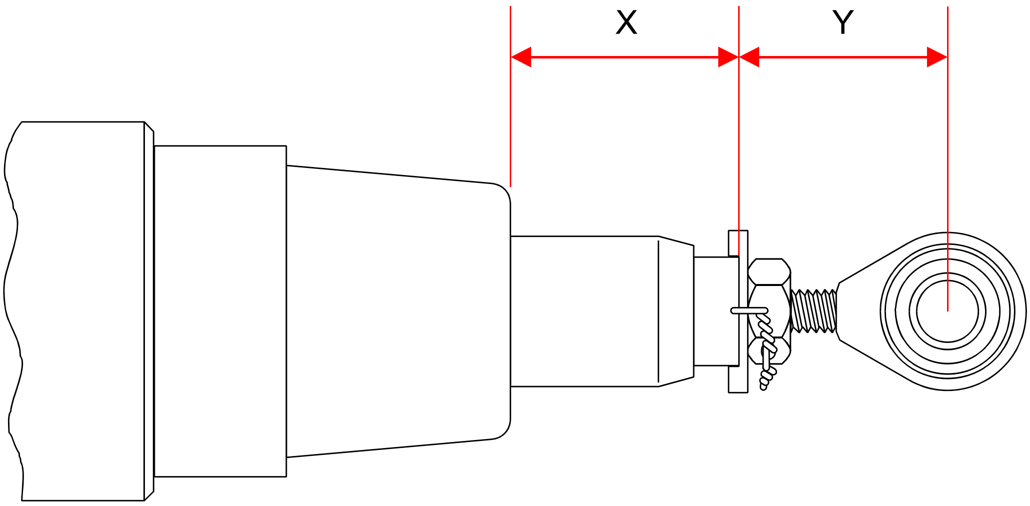


Figure 10: Nose Landing Gear Actuator Measurements

C. Install the Nose Landing Gear Actuator (Part#: D60-9029-03-01_1 or D60-9029-03-01_2)

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
(1)	Install the hydraulic fittings to the actuator.	Make sure to achieve appropriate orientation. Remove all caps.
(2)	Install the ball joint rod to the piston rod of the actuator. Adjust the ball joint center according to the measurement ‘Y’.	Refer to Figure 10.
(3)	Connect the hydraulic lines to the actuator.	Remove all caps.
(4)	Connect the nose landing gear actuator to the nose landing gear brace assembly: – Move the nose landing gear actuator into position in the nose landing gear brace assembly. – Install the bolt, washer and nut connecting the actuator to the nose landing gear brace assembly. – Install the pin with the two circlips to connect the actuator to the nose landing gear leg.	 Use new self locking nuts. Use new circlips.
(5)	Bleed the hydraulic system.	Refer to Section 29-10.
(6)	Replenish the hydraulic reservoir as necessary.	Refer to Section 29-10.
(7)	Connect the main battery.	Refer to Section 24-31.

	Detail Steps/Work Items	Key Items/References
	WARNING: DUE TO THE HIGH FORCES INVOLVED, THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS. MAKE SURE THAT NO PERSON CAN BE HIT OR CRUSHED WHEN OPERATING THE LANDING GEAR RETRACTION SYSTEM.	
(8)	Set the GEAR circuit breaker.	
(9)	Set the ELECT. MASTER switch to ON.	
(10)	Retract the landing gear: – Set the Landing Gear switch to the UP position and secure against inadvertent operation.	
(11)	Pull the emergency landing gear lever to the emergency extension position.	
(12)	Measure and record the distance in between the nose landing gear actuator safety lock washer to the cylinder head.	Refer to Figure 10. Note the distance ‘X’.
(13)	Extend the landing gear: – Set the gear selector to DOWN. – Push the landing gear emergency lever to the normal position.	
(14)	Pull the GEAR circuit breaker and secure against inadvertent operation.	
(15)	Set the ELECT. MASTER switch to OFF.	
(16)	Measure the distance in between the nose landing gear actuator safety lock washer to the cylinder head.	Refer to Figure 10. Note the distance ‘X’.

	Detail Steps/Work Items	Key Items/References
(17)	The difference of the measurements in step (12) and step (16) must lie in between 0.1 mm (0.004 in) and 0.9 mm (0.035 in). If the measurements do not meet the requirement: – Adjust the pushrod of the nose landing gear actuator. – Repeat steps (8) to (17).	Refer to Figure 10.
(18)	Tighten the nose landing gear actuator counter nut and install the safety lock wire.	
	WARNING: DUE TO THE HIGH FORCES INVOLVED, THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS. MAKE SURE THAT NO PERSON CAN BE HIT OR CRUSHED WHEN OPERATING THE LANDING GEAR RETRACTION SYSTEM.	
(19)	Set the GEAR circuit breaker.	
(20)	Set the ELECT. MASTER switch to ON.	
(21)	Retract the landing gear: – Set the Landing Gear switch to the UP position and secure against inadvertent operation.	
(22)	Check the clearance between the nose landing gear tire and the nose landing gear doors: – Close one nose landing gear door by hand. – The clearance must be at least 20 mm (0.8 in). If the clearance does not meet the requirement: contact DAI.	Refer to Figure 9.

	Detail Steps/Work Items	Key Items/References
(23)	Check the clearance between the nose landing gear leg strut and the nose landing gear brace: – The clearance must be at least 5 mm (0.2 in). If the clearance does not meet the requirement: contact DAI.	Refer to Figure 9.
(24)	Set the Landing Gear switch to DOWN.	
(25)	Connect the nose landing gear door arms to the nose landing gear doors.	
(26)	Perform a test of the correct operation of the landing gear extension and retraction system.	Refer to Section 32-30.
(27)	Move the wing and rear fuselage trestles clear of the airplane.	
(28)	Lower the airplane to the ground.	Refer to Section 07-10.

D. Install the Nose Landing Gear Actuator (Part#:D60-9029-03-01)

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
(1)	Install the hydraulic fittings to the actuator.	Make sure to achieve appropriate orientation. Remove all caps.
(2)	Install the ball joint rod to the piston rod of the actuator. Adjust the ball joint center according to the measurement ‘Y’.	Refer to Figure 10.
(3)	Connect the hydraulic lines to the actuator.	Remove all caps.

	Detail Steps/Work Items	Key Items/References
(4)	Connect the nose landing gear actuator to the nose landing gear brace assembly: – Move the nose landing gear actuator into position in the nose landing gear brace assembly. – Install the bolt, washer and nut connecting the actuator to the nose landing gear brace assembly. – Install the pin with the two circlips to connect the actuator to the nose landing gear leg.	Use new self locking nuts. Use new circlips.
(5)	Bleed the hydraulic system.	Refer to Section 29-10.
(6)	Replenish the hydraulic reservoir as necessary.	Refer to Section 29-10.
(7)	Connect the main battery.	Refer to Section 24-31.

WARNING: DUE TO THE HIGH FORCES INVOLVED, THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS. MAKE SURE THAT NO PERSON CAN BE HIT OR CRUSHED WHEN OPERATING THE LANDING GEAR RETRACTION SYSTEM.

	Detail Steps/Work Items	Key Items/References
(8)	Set the GEAR circuit breaker.	
(9)	Set the ELECT. MASTER switch to ON.	
(10)	Retract the landing gear: – Set the Landing Gear switch to the UP position and secure against inadvertent operation.	

	Detail Steps/Work Items	Key Items/References
(11)	Check the clearance between the nose landing gear tire and the nose landing gear doors: – Close one nose landing gear door by hand. – The clearance must be at least 20 mm (0.8 in). If the clearance does not meet the requirement: – Adjust the nose landing gear actuator pushrod.	Refer to Figure 9.
(12)	Check the clearance between the nose landing gear leg strut and the nose landing gear brace: – The clearance must be at least 5 mm (0.2 in). If the clearance does not meet the requirement: – Adjust the nose landing gear actuator pushrod.	Refer to Figure 9.
(13)	Tighten the nose landing gear counter nut and install the safety lock wire.	
(14)	Set the Landing Gear switch to DOWN.	
(15)	Connect the nose landing gear door arms to the nose landing gear doors.	
(16)	Perform a test of the correct operation of the landing gear extension and retraction system.	Refer to Section 32-30.
(17)	Move the wing and rear fuselage trestles clear of the airplane.	
(18)	Lower the airplane to the ground.	Refer to Section 07-10.

Section 32-30
Extension and Retraction

1. General

This Section tells you about the components that extend and retract the landing gear. It tells you how the system operates in normal operation and it tells you how the systems operates in an emergency.

Refer to Section 32-10 for data about the main gear legs. Refer to Section 32-20 for data about the nose gear leg. Refer to Section 32-60 for data about the landing gear position and warning system. Refer to the wiring manual for data about the related electrical systems.

2. Description

Figure 1 shows the main components of the of the extension and retraction system. Figure 2 shows the main landing gear extension and retraction system and Figure 3 shows the nose landing gear extension and retraction system. The landing gear has a dedicated hydraulic system to extend and retract the legs. Folding stays that attach to the legs and the surrounding structure unfold to lock the legs in the extended position. A spring operated latching mechanism hold the folding stays in a geometrically locked position. The initial movement of the gear actuator when moving to retract the landing gear operates the mechanism to unlock the folding stay. As the gear retracts, the folding stay folds and retracts into the landing gear bay with its related leg. The landing gear extension and retraction system has these main components:

A. Hydraulic Actuators

The hydraulic actuators are located in the related main gear bay. The actuators use hydraulic fluid pressure to extend and retract the airplane landing gear during normal operation of the system.

B. Folding Stays

Each landing gear leg has a folding stay. The folding stay holds the extended leg locked in the down position. When the leg extends to the fully down position the folding stay unfolds and a latching mechanism locks the stay in the unfolded position. When the pilot retracts the landing gear the hydraulic actuator operates a mechanism to unlatch the folding stay. The folding stay then folds into the landing gear bay with the landing gear.

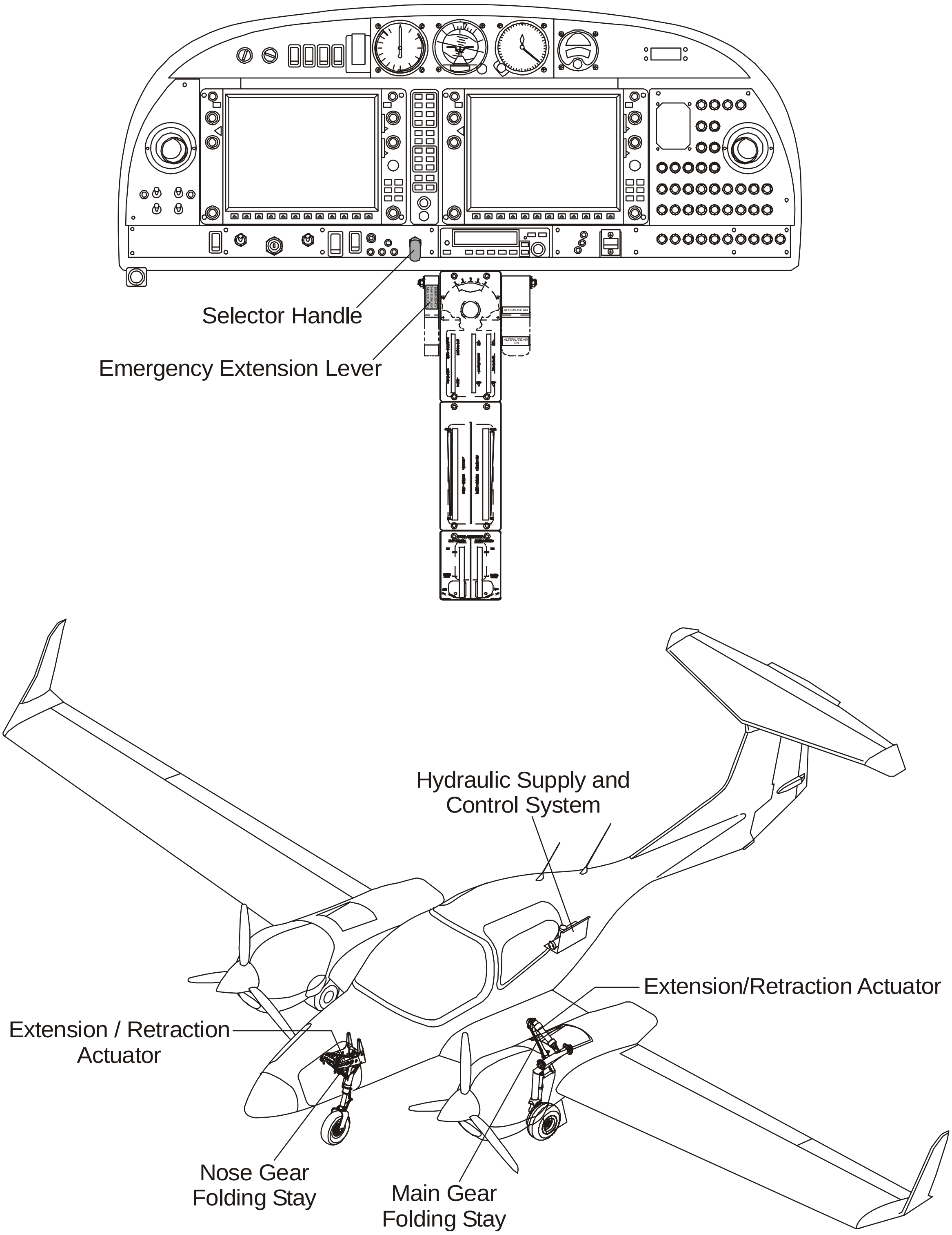


Figure 1: Extension and Retraction System Main Components

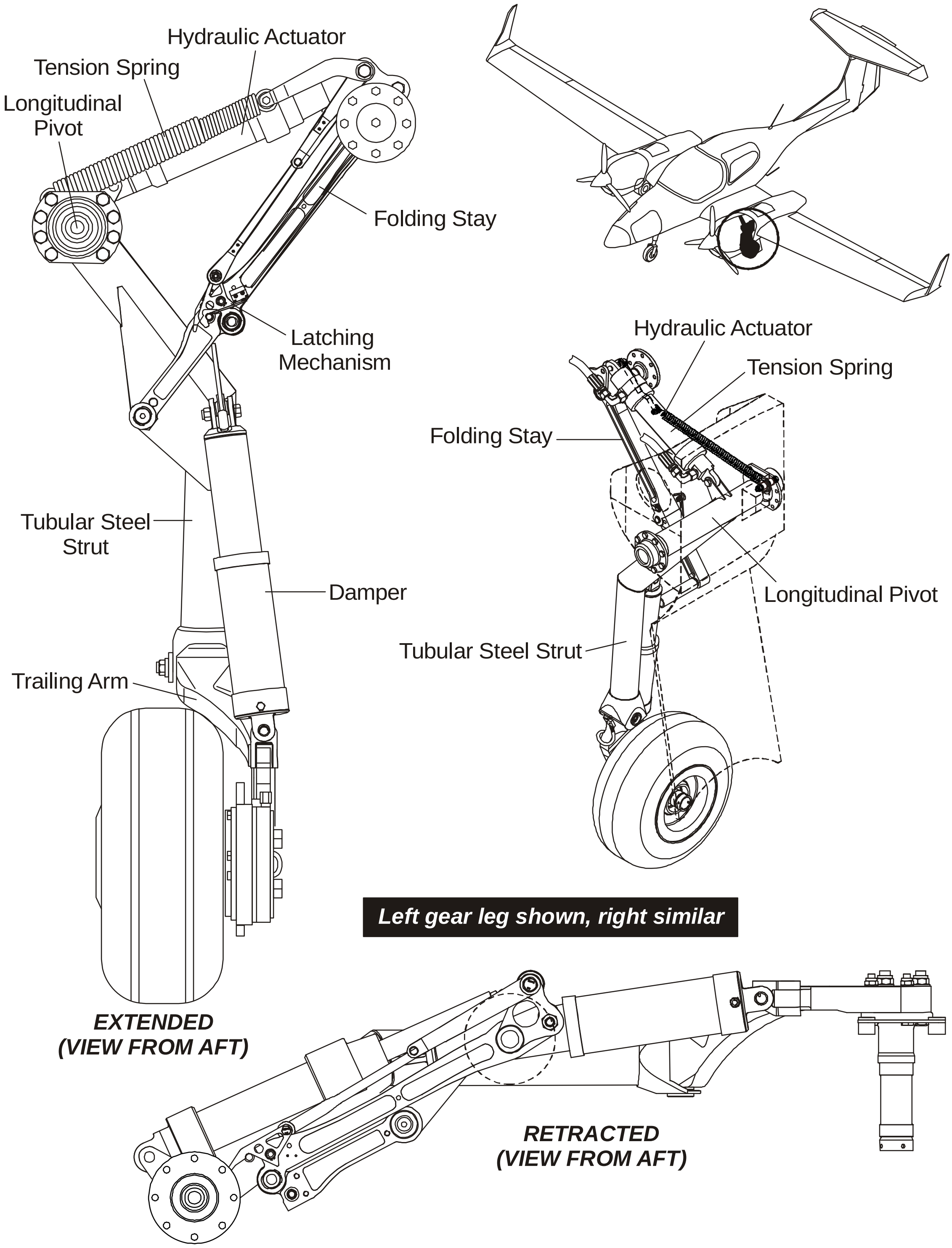


Figure 2: Main Landing Gear - Extension and Retraction

C. Selector Handle

The selector handle is located in the cockpit, in the instrument panel. The selector lever is used for normal extension and retraction of the landing gear. Three LEDs located on the instrument panel next to the selector handle show the status of the main landing gear.

D. Emergency Extension System

The emergency extension system allows the pilot to extend the landing gear in the event of a system failure. The forces of gravity are used to extend the legs and a spring-loaded mechanism on each leg folding-stay locks the leg in the extended position. The main component of the emergency extension system is the:

– Emergency extension valve. The emergency extension valve is located on the hydraulic control and is operated by the emergency extension lever. When the emergency extension valve is operated (emergency extension position) the return flow from the actuators by-passes the actuator regulating valves. The emergency extension lever is located on the left side of the cockpit, below the instrument panel. A micro-switch located at the emergency extension valve isolates the hydraulic pump when the valve has been set to the EMERGENCY position.

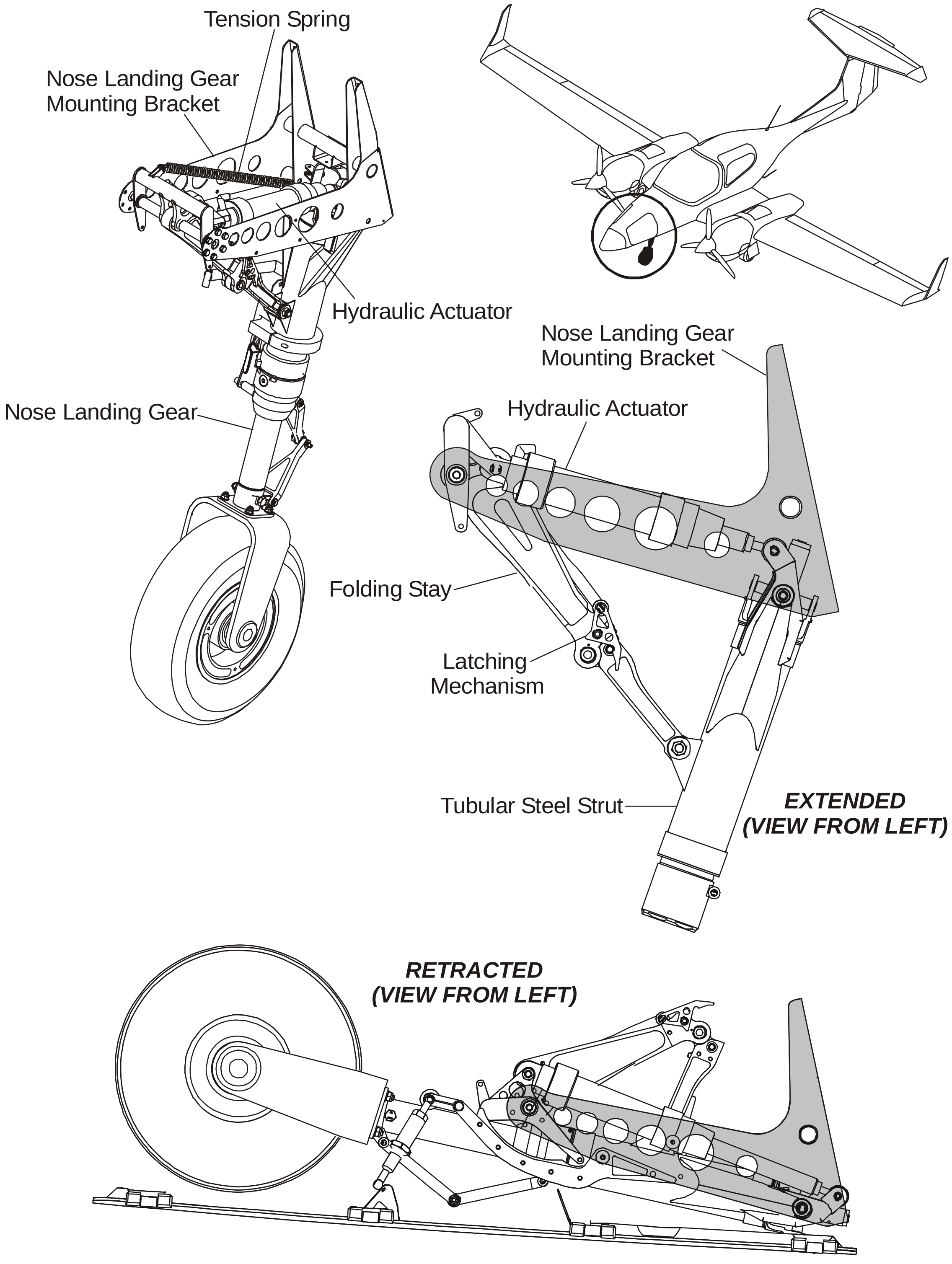


Figure 3: Nose Landing Gear - Extension and Retraction

3. Operation

Figures 4 thru 7 show the hydraulic schematic diagrams for the operation of the landing gear.

A. Retraction

When the pilot sets the landing gear selector handle to UP during flight the following occurs:

– The electrical circuit to the hydraulic pump is made and the pump will operate if the system pressure is less than 96.5 bar (1400 PSI). The retract solenoid valve is energized through the LH main gear 'weight-on-wheels' micro-switch and allows fluid to flow from the pump to the retract side of the actuator. The extend solenoid valve is de-energized and allows fluid to flow from the pump to the extend side of the actuator (Figure 4).

– The pump pressure switch operates the pump as necessary to maintain the system pressure at 96.5 - 113.8 bar (1400 - 1650 PSI). Fluid at pump pressure acts on both sides of the actuator piston. The effective surface area of the retract side of the piston is larger than the effective surface area on the extend side of the actuator piston. Because the same fluid pressure is acting on different effective areas of the actuator pistons the resulting 'differential pressure' acting on the piston causes the actuator to move the landing gear leg towards the retract position.

– The initial movement of the hydraulic actuators towards the retract position releases the folding stay latching mechanism. The folding stay can then fold into the landing gear bay with the landing gear.

– When the landing gear is fully retracted the nose landing gear UP micro-switch operates and the extend solenoid valve is energized and moves to the 'full pressure' position (Figure 5). Fluid returning from the extend side of the actuators flows through the extend solenoid valve and back into the reservoir. The full pump pressure acting on the retract side of the actuator pistons holds the landing gear in the fully retracted position.

– The pump pressure switch operates the pump as necessary, to maintain the system pressure at 96.5 - 113.8 bar (1400 - 1650 PSI). If there are no internal leaks in the system the hydraulic accumulator will maintain the pressure in the system without the hydraulic pump operating.

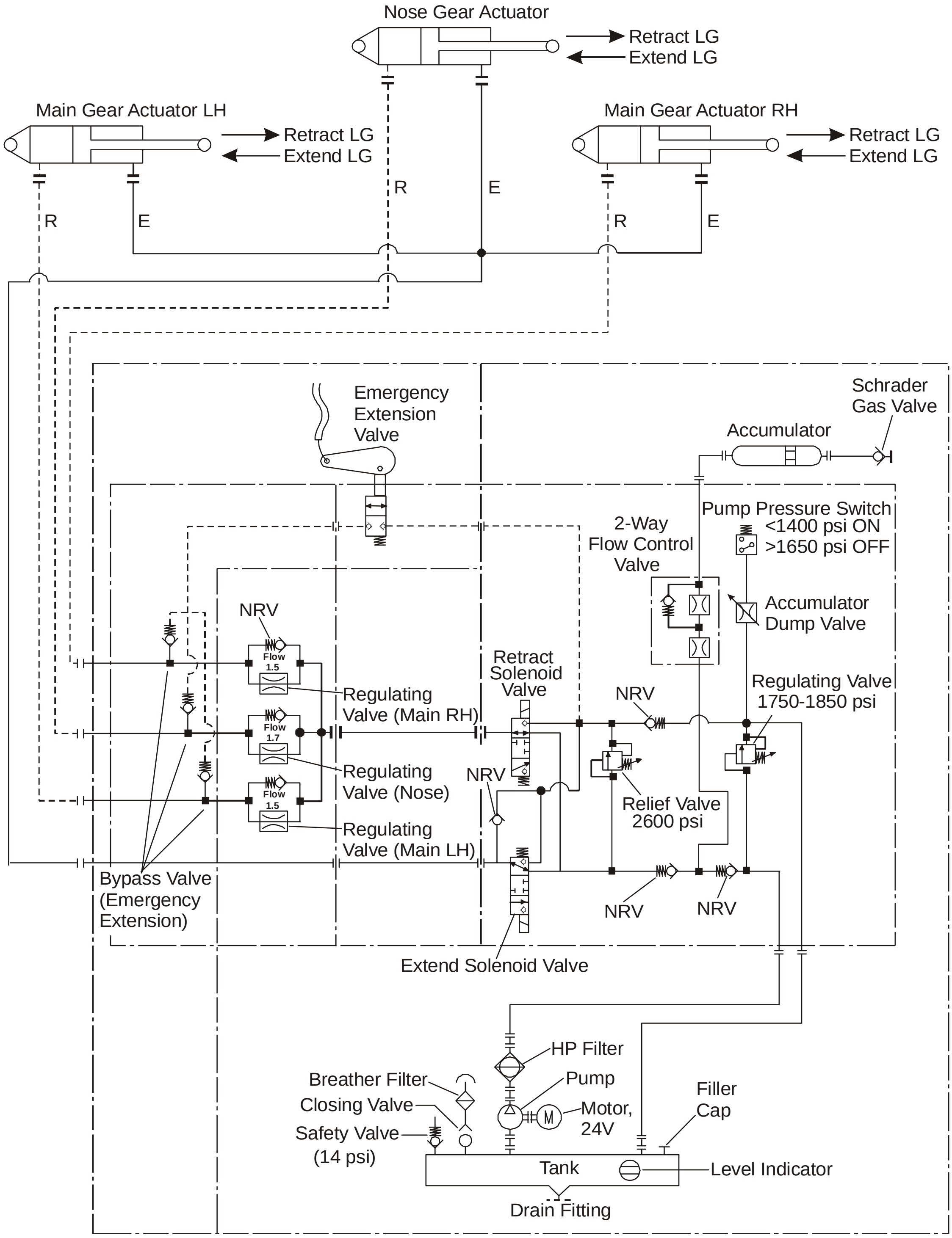


Figure 4: Hydraulic Schematic Diagram - ‘Differential Pressure’ Retraction Operation

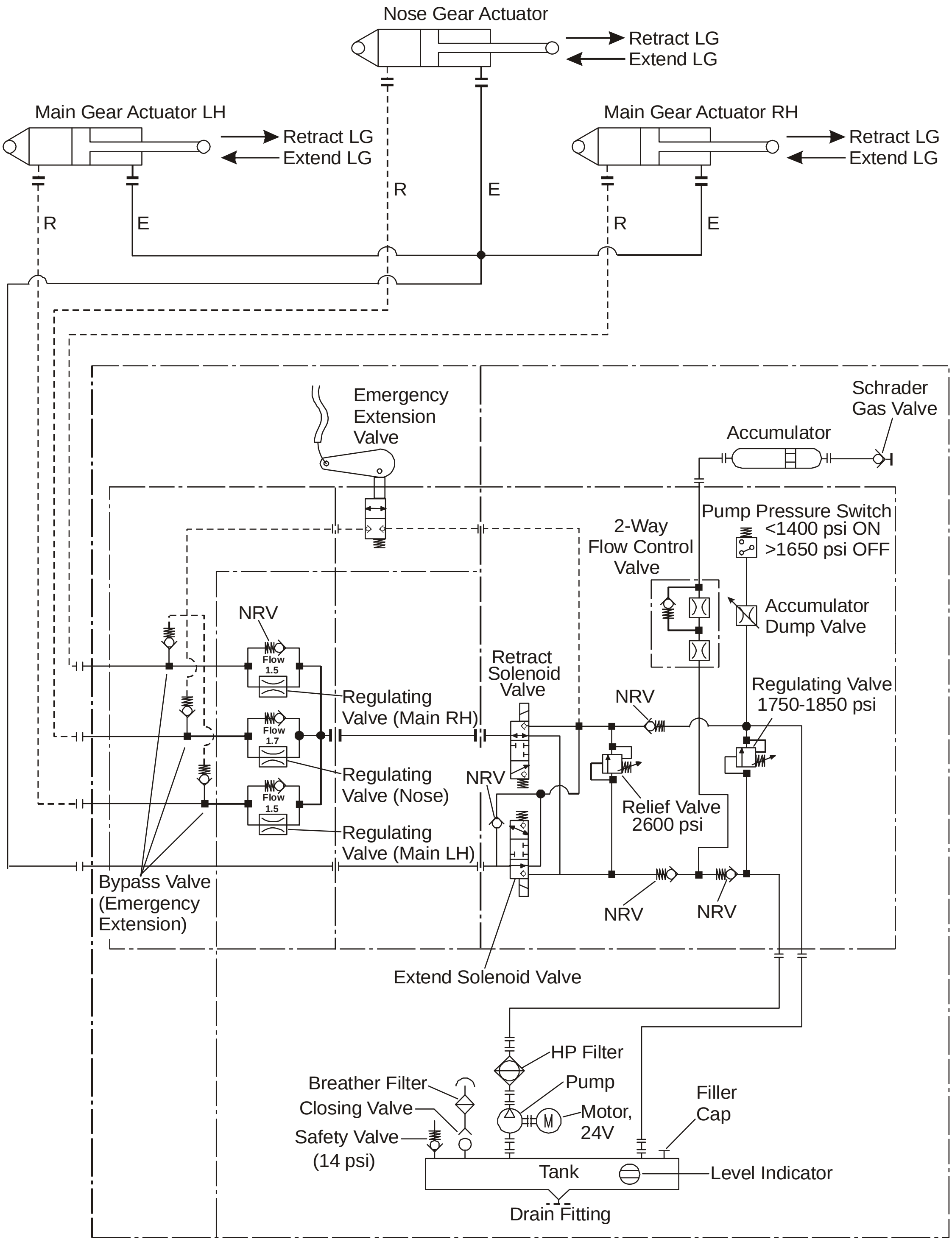


Figure 5: Hydraulic Schematic Diagram - ‘Full Pressure’ Retraction Operation

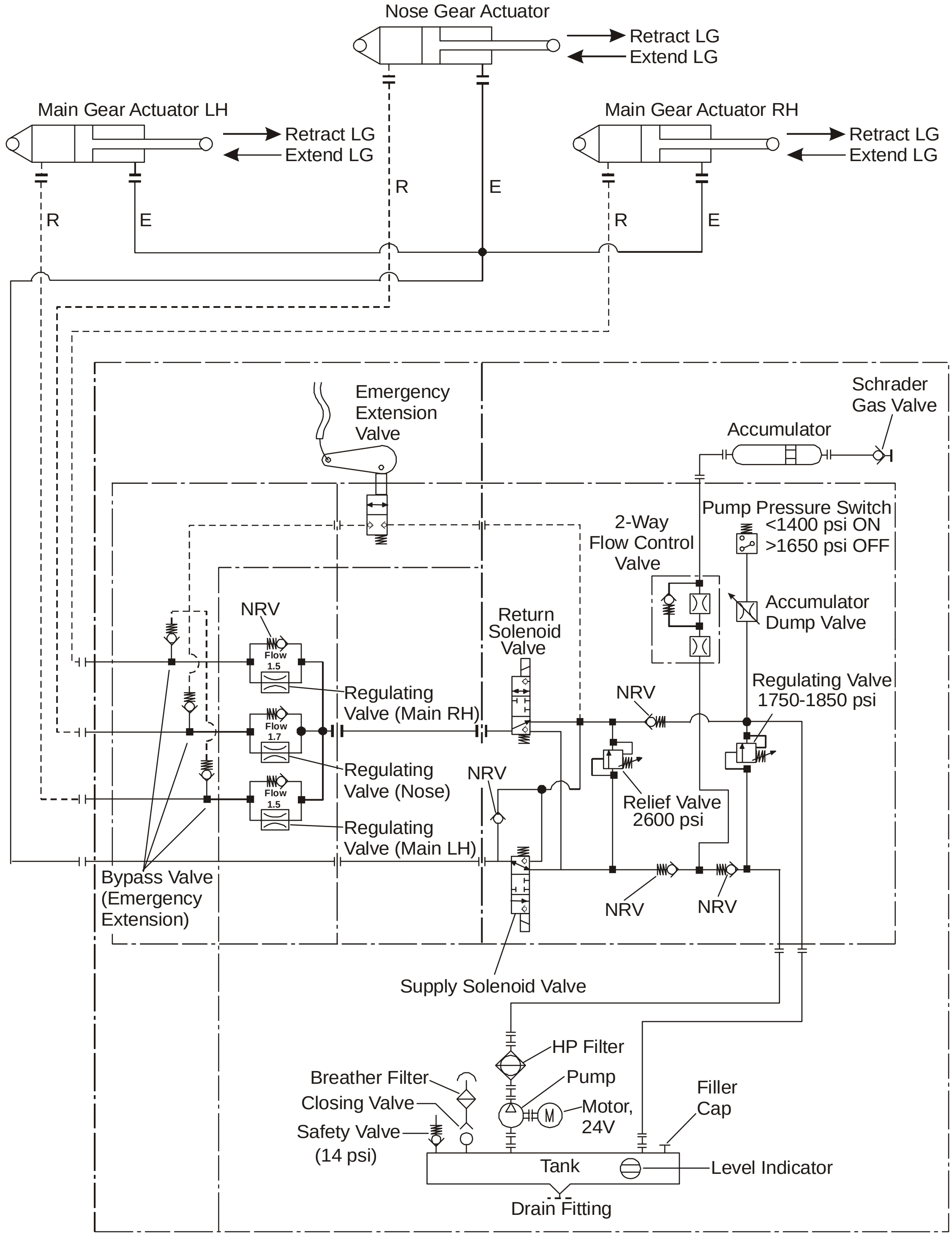


Figure 6: Hydraulic Schematic Diagram - Normal Extension Operation

B. Extension

When the pilot sets the landing gear selector handle to DOWN during normal operation the following occurs:

- The electrical circuit to the hydraulic pump is closed and the pump will operate if the system pressure is less than 96.5 bar (1400 PSI). The extend solenoid valve de-energizes (Figure 6) and fluid from the hydraulic pump flows through the extend solenoid valve into the extend side of the actuator. The retract solenoid valve de-energizes and allows the hydraulic fluid to flow from the retract side of the actuators, through the regulating valves and back into the reservoir.

- The pump pressure switch operates the pump as necessary to maintain the system pressure at 96.5 -113.8 bar (1400 - 1650 PSI). The pressure acting on the extend side of the actuator piston moves the piston to extend the landing gear legs.

- As the legs reach the fully extended position the latches on the folding stays operate against spring pressure to lock the stay in the unfolded position.

- When all the hydraulic actuators are fully retracted (legs fully extended) the pressure in the system increases until the system pressure reaches 113.8 bar (1650 PSI). The pump pressure switch opens at 113.8 bar (1650 PSI) and isolates the hydraulic pump. If there are no internal leaks in the system the hydraulic accumulator will maintain the pressure in the system without the hydraulic pump operating.

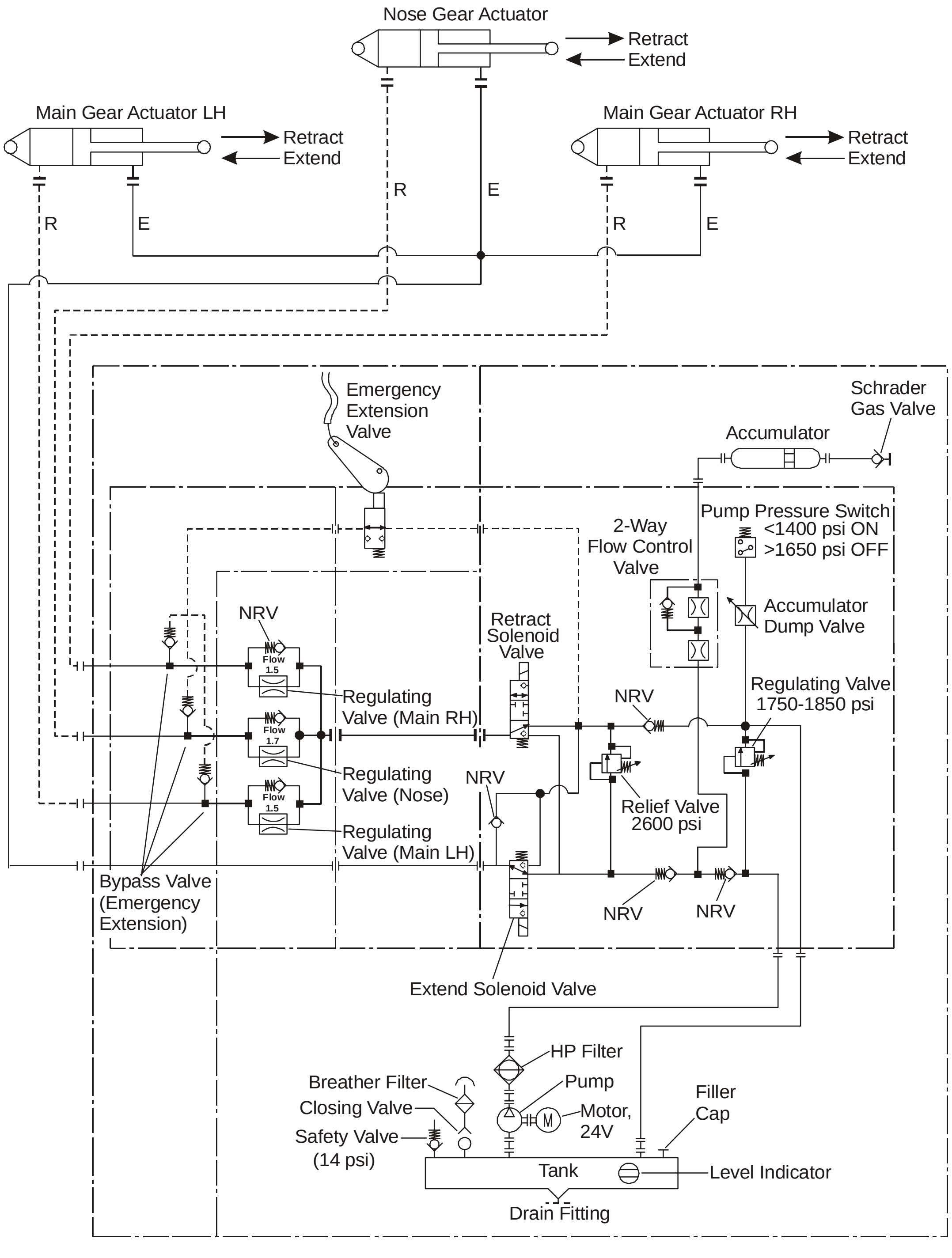


Figure 7: Hydraulic Schematic Diagram - Emergency Extension Operation

C. Emergency Extension

Figure 7 shows the schematic diagram for the main landing gear emergency hydraulic extension system. The pilot can use this system to extend the landing gear when there is a problem with the normal extension system. You cannot retract the landing gear with the emergency system. The emergency extension lever is located on the left side of the cockpit, below the instrument panel. A flexible cable connects the emergency extension lever to the emergency extension valve. When the pilot operates the emergency extension lever these events occur:

– The emergency control lever opens the emergency extension valve. The actuating lever for the emergency extension valve also operates a micro-switch which isolates the electrical power from the hydraulic pump. The pump cannot run.

– Gravity causes the weight of each landing gear leg to move the piston in each actuator inwards. The open emergency extension valve allows the fluid on the retract side of the piston in each actuator to flow through the by-pass valves. The by-pass valves allow the hydraulic fluid flowing from the actuators to by-pass the regulating valves and return to the reservoir. The position of the solenoid valves does not affect the operation of the emergency extension system.

– As each landing gear leg extends the related folding stay unfolds. Tension springs located in each landing gear bay ensure that each folding stay fully unfolds. When the stay fully unfolds the spring operated latching mechanism positively locks the folding stay open. The locked stay holds the related landing gear leg fully extended.

– When the folding-stays are locked, the related folding-stay switches (LDG GEAR DOWN) are closed and electrical ground is supplied to the related green indicator lights. The electrical circuit for the selected indicator light is closed and the green light illuminates.

Trouble-Shooting

1. General

This table gives you the trouble-shooting procedures for the landing gear extension and retraction system. Refer to Section 32-10 for trouble-shooting the main landing gear assembly. Refer to Section 32-20 for trouble-shooting the nose landing gear assembly. Refer to Section 32-40 for trouble-shooting the nose wheel assembly. Refer to Section 32-50 for trouble-shooting the nose wheel steering. Refer to Section 32-60 for trouble-shooting the nose landing gear position and warning system.

If you find the trouble given in Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Landing gear does not retract when the selector lever is set to UP.	Hydraulic pump (GEAR) circuit-breaker pulled.	Reset GEAR circuit breaker.
	Emergency extension lever operated.	Reset emergency extension lever.
	Hydraulic pump defective.	Replace hydraulic pump.
	Hydraulic supply and control assembly defective.	Replace hydraulic supply and control assembly.
	Wiring from landing gear selector to hydraulic supply and control panel defective.	Do a test for continuity of the related wiring. Replace or repair defective wiring as necessary. Refer to Chapter 92 for the Wiring Diagrams.
Landing gear does not extend when the selector lever is set to DOWN.	Hydraulic supply and control assembly defective.	Replace hydraulic supply and control assembly.
	Wiring from landing gear selector to hydraulic supply and control panel defective.	Do a test for continuity of the related wiring. Replace or repair defective wiring as necessary. Refer to Chapter 92 for the Wiring Diagrams.

Trouble	Possible Cause	Repair
One landing gear leg does not retract correctly.	Defective hydraulic actuator.	Replace defective hydraulic actuator.
Hydraulic pump runs continuously/keeps cycling.	Accumulator pressure low/defective.	Re-charge/replace accumulator.
	Pump pressure switch defective.	Replace pump pressure switch. Refer to MAINTENANCE PRACTICES, Paragraph 5.
	Internal leak in the hydraulic supply and control assembly.	Replace hydraulic supply and control assembly.
Hydraulic system fluid level low.	Hydraulic fluid leak.	Do a test for leaks in the hydraulic system. Tighten leaking connections. Repair/replace leaking components.

Maintenance Practices

1. General

The Maintenance Practices in this Section tell you how to remove/install the main components of the landing gear extension and retraction system. They also tell you how to do a test for the correct operation of the landing gear extension and retraction system.

Refer to Section 32-10 for data about the main landing gear. Refer to Section 32-20 for data about the nose landing gear. Refer to Section 32-40 for data about the wheels and brakes. Refer to Section 32-50 for data about the nose wheel steering system. Refer to Section 32-60 for data abut the landing gear position and warning system.

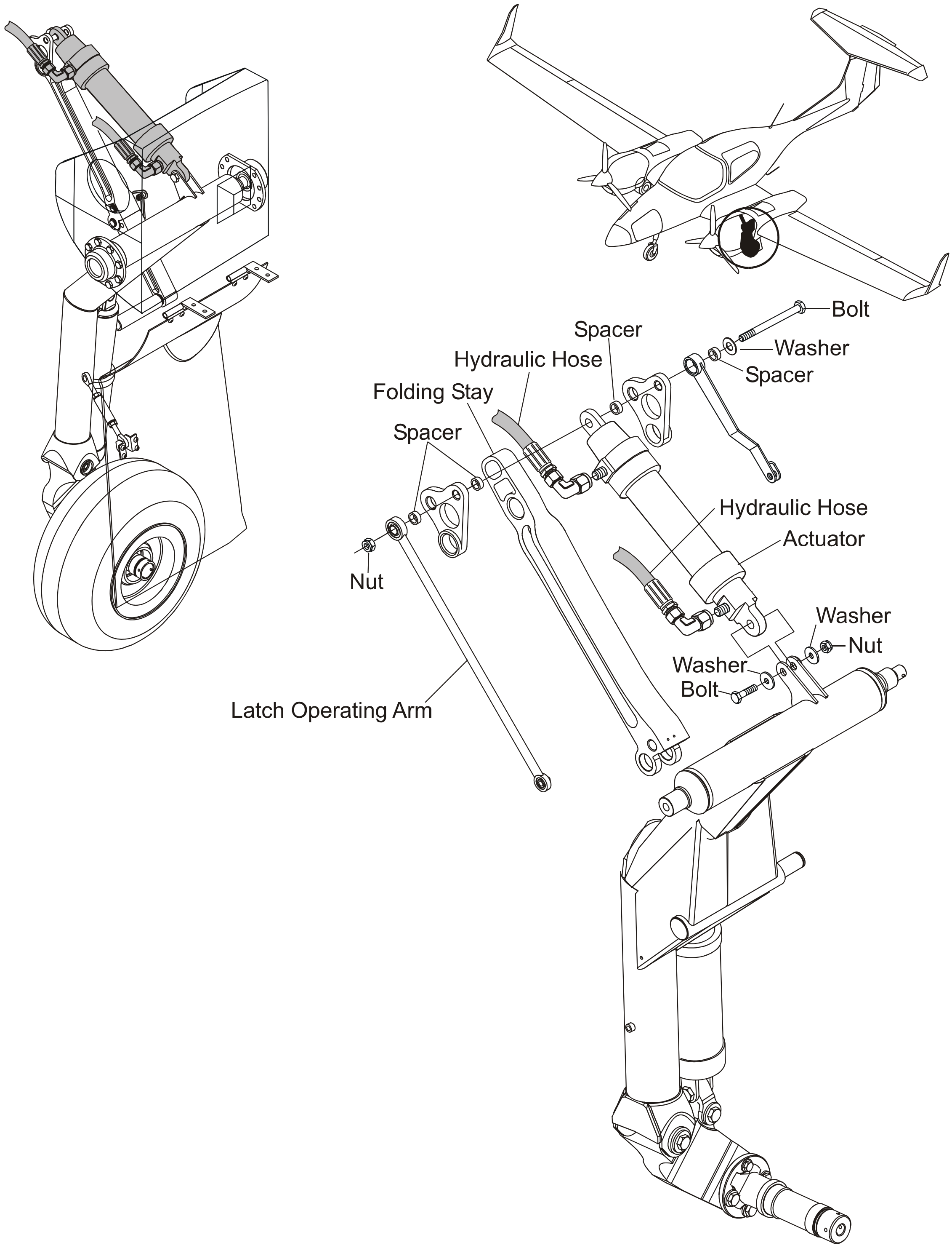


Figure 8: Main Landing Gear Hydraulic Actuator Installation

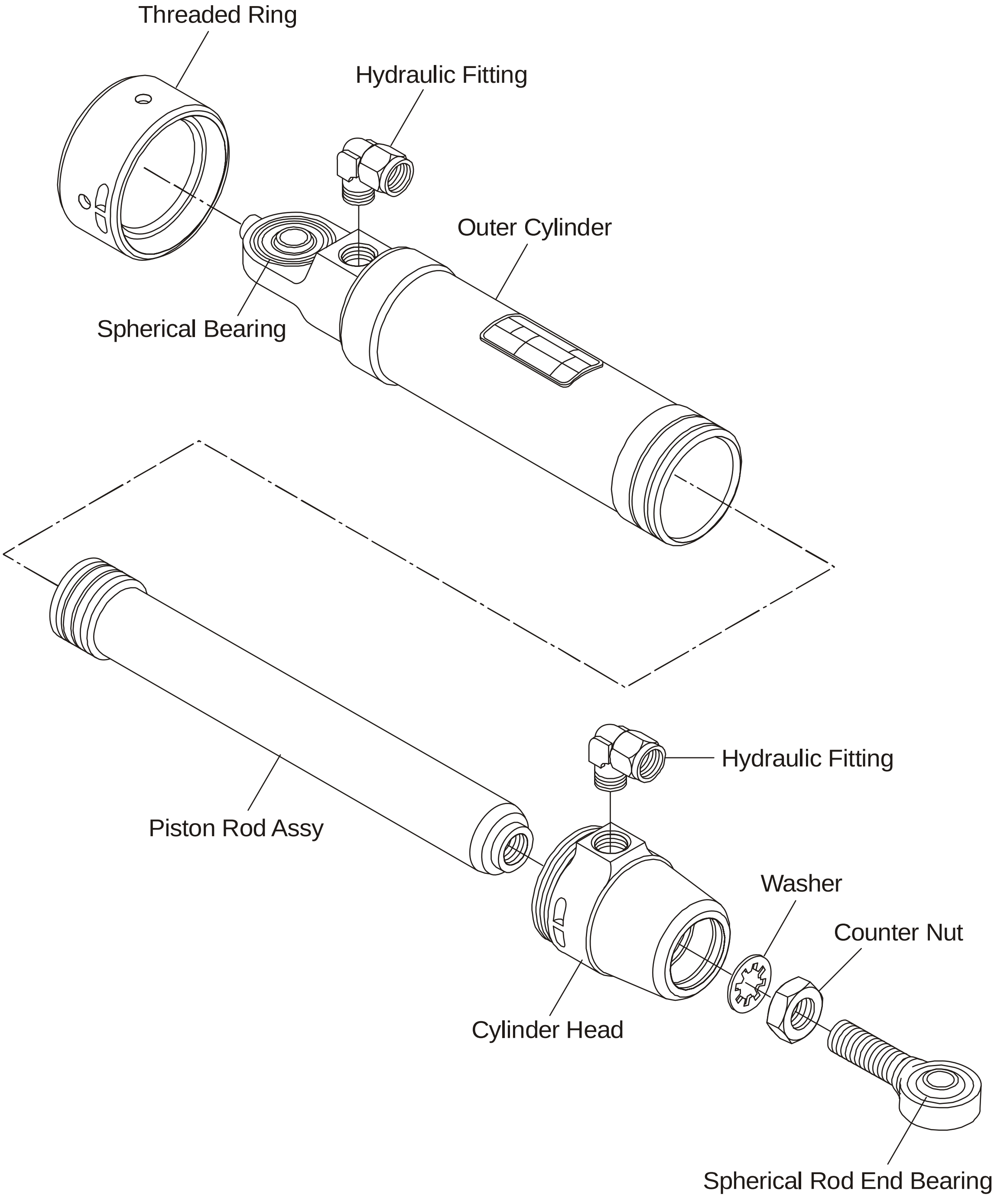
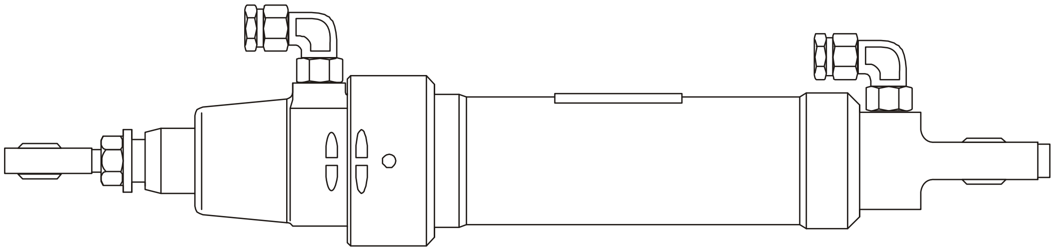


Figure 9: Landing Gear Hydraulic Actuator Assembly
(for Correct Alignment of Hydraulic Fittings Refer to Figure 10)

Main Landing Gear Actuator



Nose Landing Gear Actuator

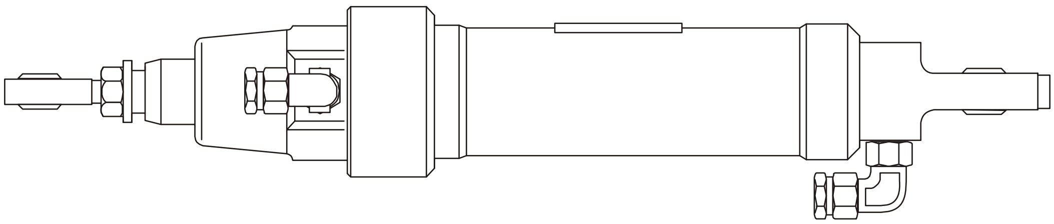


Figure 10: Hydraulic Actuator Alignments

2. Disassemble/Assemble the Actuator

A. Equipment

Item	Quantity	Part Number
Spanner wrench.	1	Commercial.
Seal ring protection.	1	Commercial.

WARNING: DO NOT GET HYDRAULIC FLUID ON YOU. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE. IT CAN ALSO DAMAGE CLOTHING.

CAUTION: CLEAN OFF SPILT HYDRAULIC FLUID IMMEDIATELY. HYDRAULIC FLUID CAN DAMAGE THE AIRPLANE STRUCTURE. IT CAN ALSO REMOVE THE PAINT FROM SOME COMPONENTS.

B. Disassemble the Actuator

	Detail Steps/Work Items	Key Items/References
(1)	Measure and make a note of the distance from the actuator safety lock washer to the center of the rod-end bearing.	Refer to Figure 11.
(2)	Remove spherical rod end bearing: – Remove the lock wire from the counter nut. – Loosen the counter nut. – Remove the spherical rod end bearing, counter nut and the washer from the actuator.	Refer to Figure 9.
(3)	Clamp the actuator: – Put two washers onto the spherical bearing on the actuator assembly. – Use a vice to clamp the actuator assembly at the spherical bearings side. This helps when disassembling the actuator.	This helps protecting the spherical bearing. Make sure not to damage or scratch the actuator.

	Detail Steps/Work Items	Key Items/References
(4)	Remove the cylinder head: – Remove the lock wire from the cylinder head. – Place the spanner wrench (special tool) onto the cylinder head. – Place the hook wrench onto the threaded ring. – Loosen the cylinder head by turning the hook wrench and holding the spanner wrench (special tool) against it. – Remove the cylinder head.	Refer to Figure 9.
(5)	Remove the hydraulic fitting, the threaded ring and the piston rod from the actuator.	Refer to Figure 9.

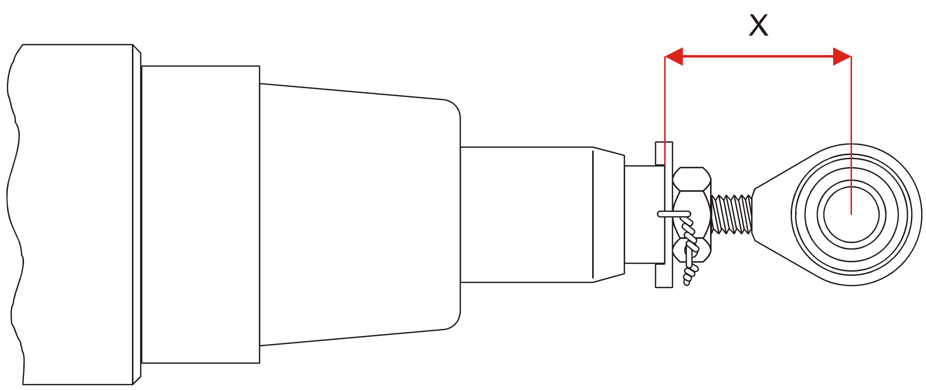


Figure 11: MLG Actuator Measurement

C. Assemble the Actuator

	Detail Steps/Work Items	Key Items/References
(1)	Install the piston rod.	Slide into the outer cylinder.
(2)	Slide the threaded ring from the backside onto the actuator assembly which has an already installed “snap ring”.	Refer to Figure 9.
	CAUTION: THERE IS A DIFFERENT ALIGNMENT FOR THE MAIN GEAR ACTUATOR THAN FOR THE NOSE GEAR ACTUATOR. REFER TO FIGURE 10 TO SEE THE DIFFERENCE.	
(3)	Install the hydraulic fitting onto the actuator.	Refer to Figure 9.
(4)	Install the cylinder head: – Install the seal ring protection (special tool) onto the piston rod. – Slide the cylinder head onto the piston rod. – Remove the seal ring protection (special tool) from the piston rod. – Apply Rivolta F.L.A on the cylinder head thread, the O-ring and the snap ring. – Install the spanner wrench (special tool) onto the cylinder head. – Place the hook wrench onto the threaded ring. – Tighten the cylinder head by turning the hook wrench and hold the spanner wrench (special tool) against it. – Secure the cylinder head with 120 Nm (88.5 lbf.ft.) by using a torque hook wrench. – Install the lock wire onto the cylinder head.	Make sure the alignment of the cylinder head is correct. Refer to Figure 10.

	Detail Steps/Work Items	Key Items/References
(5)	Install spherical rod end bearing: – Apply Rivolta F.L.A on the spherical rod end bearing thread. – Install the rod end together with the counter nut and washer. – Adjust the main landing gear rod-end bearing according to the measurement or the base setting of 34 mm (1.34 in) from the safety lock washer to the center of the rod-end bearing. – Tighten the counter nut.	Install the lock wire not until installing the actuator into the airplane because of correct alignment. Refer to Figure 9. Refer to Figure 11. Base settings equals min. screw-in depth. Maximum distance x (min. screw-in depth): 34 mm (1.34 in).
(6)	Remove the actuator from the vice and remove the protection washers.	

3. Landing Gear Extension and Retraction Test (Normal Extension)

A. Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.

B. Landing Gear Extension and Retraction Test

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT LET PERSONS NEAR THE LANDING GEAR WHEN YOU DO THE EXTENSION AND RETRACTION TEST. THE LANDING GEAR CAN CAUSE INJURY TO PERSONS. CAUTION: MAKE SURE THAT THE AREA AROUND THE AIRPLANE IS CLEAR. IF THE LANDING GEAR HITS AN OBJECT THE LANDING GEAR CAN BE DAMAGED.	
(1)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(2)	Connect an external power supply to the airplane.	Refer to Section 24-40.
(3)	Set the ELECT. MASTER switch to ON.	
(4)	Set both engine power levers to 100%	Fully forward.

	Detail Steps/Work Items	Key Items/References
(5)	Retract the landing gear: – Set the landing gear selector lever to UP and these events must occur: – The hydraulic pump operates. – The green (SAFE) leds switch off. – The red led (UNSAFE) illuminates. – The landing gear retracts. – When the gear is fully retracted: – The red led (UNSAFE) switches off. – The hydraulic pump stops operating (allow 15 sec. after gear is fully retracted).	Refer to Section 32-60 for more data about the landing gear indicating system.
(6)	Do a test for the correct operation of the landing gear warning horn:	
	– Move the left engine power lever to IDLE.	The landing gear warning horn must operate.
	– Move the right engine power lever to IDLE.	The landing gear warning horn must operate.
	– Move the left engine power lever to 100%.	The landing gear warning horn must operate.

	Detail Steps/Work Items	Key Items/References
(7)	Do a test for the correct operation of the landing gear extension system: – Set the landing gear selector lever to DOWN and these events must occur: – The hydraulic pump operates. – The red led (UNSAFE) illuminates. – The landing gear extends. – When all the landing gear legs are fully extended and locked: – The red led (UNSAFE) switches off. – The green (SAFE) leds illuminate. – The hydraulic pump stops operating (allow 15 sec. after gear is fully extended). – Set both engine power levers to IDLE.	
(8)	Set ELECT. MASTER switch to OFF.	
(9)	Disconnect the external power supply from the airplane.	
(10)	Move the wing and fuselage trestles clear of the airplane.	
(11)	Lower the airplane with the jacks.	Make sure that the area around the airplane is clear.

4. Landing Gear Emergency Extension System Test

A. Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.

B. Landing Gear Emergency Extension Test

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT LET PERSONS NEAR THE LANDING GEAR WHEN YOU DO THE EMERGENCY EXTENSION TEST. THE LANDING GEAR CAN CAUSE INJURY TO PERSONS. CAUTION: MAKE SURE THAT THE AREA AROUND THE AIRPLANE IS CLEAR. IF THE LANDING GEAR HITS AN OBJECT THE LANDING GEAR CAN BE DAMAGED.	
(1)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(2)	Connect an external power supply to the airplane.	Refer to Section 24-40.
(3)	Set the ELECT. MASTER switch to ON.	

	Detail Steps/Work Items	Key Items/References
(4)	Retract the landing gear: – Set the landing gear selector lever to UP and these events must occur: – The hydraulic pump operates. – The green (SAFE) leds switch off. – The red led (UNSAFE) illuminates. – The landing gear retracts. – When the gear is fully retracted: – The red led (UNSAFE) switches off. – The hydraulic pump stops operating (allow 15 sec. after gear is fully retracted).	Refer to Section 32-60 for more data about the landing gear indicating system.
(5)	Set the EMERGENCY EXTENSION lever to the EXTEND position, these events must occur: – The hydraulic pump must not operate. – The red (UNSAFE) led illuminates. – The landing gear extends. When the landing gear is fully extended and locked: – The red (UNSAFE) led remains on. – The 3 green (SAFE) leds illuminate.	Pull fully aft.
(6)	Reset the landing gear emergency extension lever: – Set the normal landing gear selector to DOWN. – Set the emergency extension lever to close and these events must occur: – The hydraulic pump operates until the system pressure stabilizes at 96.5 - 113.5 bar (1400 - 1650 PSI).	Fully forward.

	Detail Steps/Work Items	Key Items/References
(7)	Do a test of the correct operation of the landing gear normal retraction and extension system.	Refer to Paragraph 3.
(8)	Move the wing and fuselage trestles clear of the airplane.	
(9)	Lower the airplane with the jacks.	Make sure that the area around the airplane is clear.

Section 32-40
Wheels and Brakes

1. General

The DA 42 has 2 main wheels and 1 nose wheel. All wheels have split hubs and tires with inner tubes. The main wheels are standard Cleveland components.

The main wheels have brake disks and a Cleveland brake caliper. Toe-brake pedals operate hydraulic cylinders. Hydraulic pipes and hoses connect the cylinders to the brake calipers. A parking valve locks the brakes ON.

Each main wheel has an independent brake system. The left pedal of each rudder pedal assembly operates the left wheel brake and the right rudder pedal operates the right wheel brake.

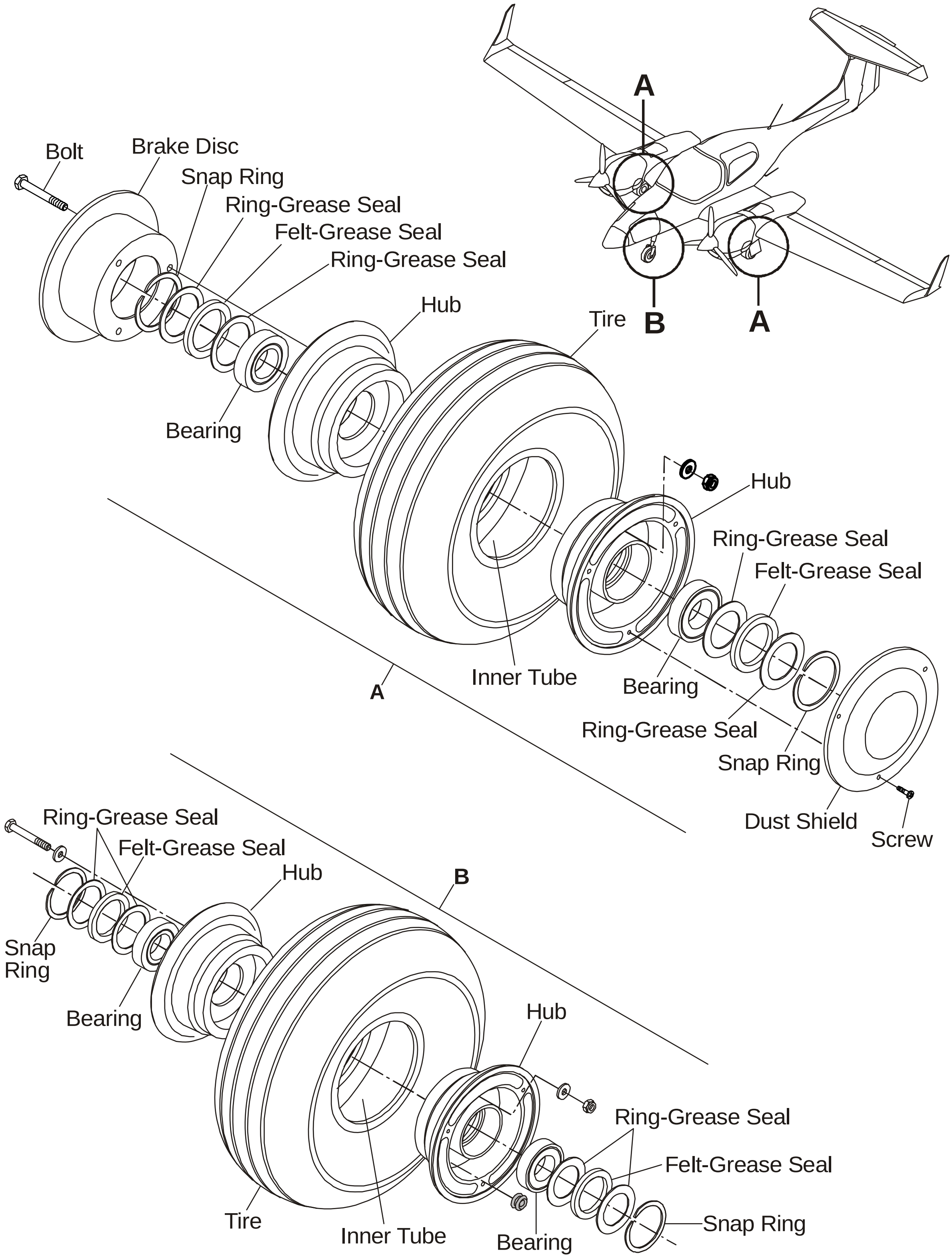


Figure 1: Main and Nose Wheel Assemblies

2. Description - Main Wheels

Figure 1 shows the main and nose wheel assemblies. The main wheel hub has 2 halves. Each half of the hub is made from light alloy. Three bolts with nuts and washers hold the 2 halves of the hub together. The bolts also hold a brake disk to the wheel.

Each half of the hub has a roller bearing assembly. Each bearing has 2 grease seals and a felt seal. Snap rings hold each bearing assembly in position.

Each main wheel has a Goodyear 15 x 6.0 - 6, 6 PR, TT, 160 mph, FS II tire with a Goodyear 6.00 - 6 / 15 x 6.00 - 6 (G15 / 6.00 - 6), valve type TR-20 inner tube. Two red slip marks - one on the tire and the other on the wheel - are aligned.

3. Description - Nose Wheel

Figure 1 shows the main and nose wheel assemblies. The nose wheel has a split hub. Each half of the hub is made from light alloy. Three internal hexagon headed bolts hold the two halves of the hub together. Each hub half has a sealed bearing.

The nose wheel has a Goodyear 5.00 - 5, 10 PR, TT, 120 mph, FS II and a Goodyear 5.00 - 5 / 15 x 6.00 - 5 / 380x150-5 inner tube, valve type TR-67.

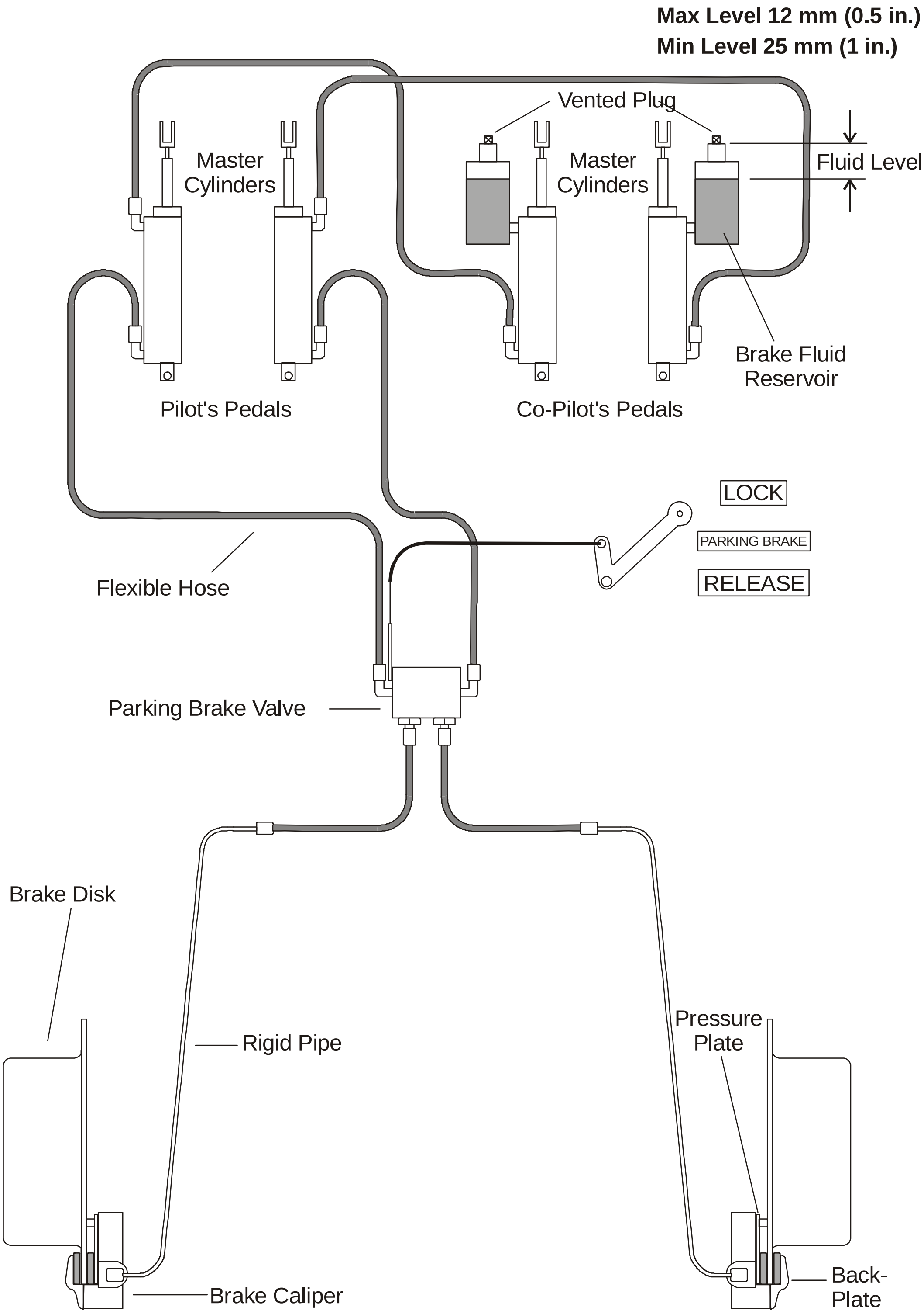


Figure 2: Wheel Brake System Schematic Diagram

4. Description - Brake System

Figure 2 shows the brake system schematic diagram.

The left and right wheel brakes are independent systems. Each system has a reservoir on the co-pilot's brake pedals. The reservoirs are directly connected to the brake master cylinders. Two flexible hoses connect the master cylinders on the co-pilot's brake pedals to the master cylinders on the pilot's brake pedals.

Two more flexible hoses connect the pilot's left and right master cylinders to the parking brake valve. Flexible hoses connect the parking brake valve to each main-wheel brake caliper. The parking brake valve is mounted on the floor of the fuselage, below the seats. A flexible cable connects the parking brake valve to an operating lever mounted in the cockpit center console.

The brake calipers are standard Cleveland components. Two pistons in each caliper push a friction lining against the brake disk and a back-plate attached to the caliper pulls the other friction lining against the outer face of the brake disk. The caliper can move laterally on 2 anchor pins.

Each main wheel has a brake disc. Bolts attach the brake disk to the wheel. The brake disk turns between the 2 friction linings in the brake caliper. The caliper is located on an torque plate which is attached to the landing gear axle.

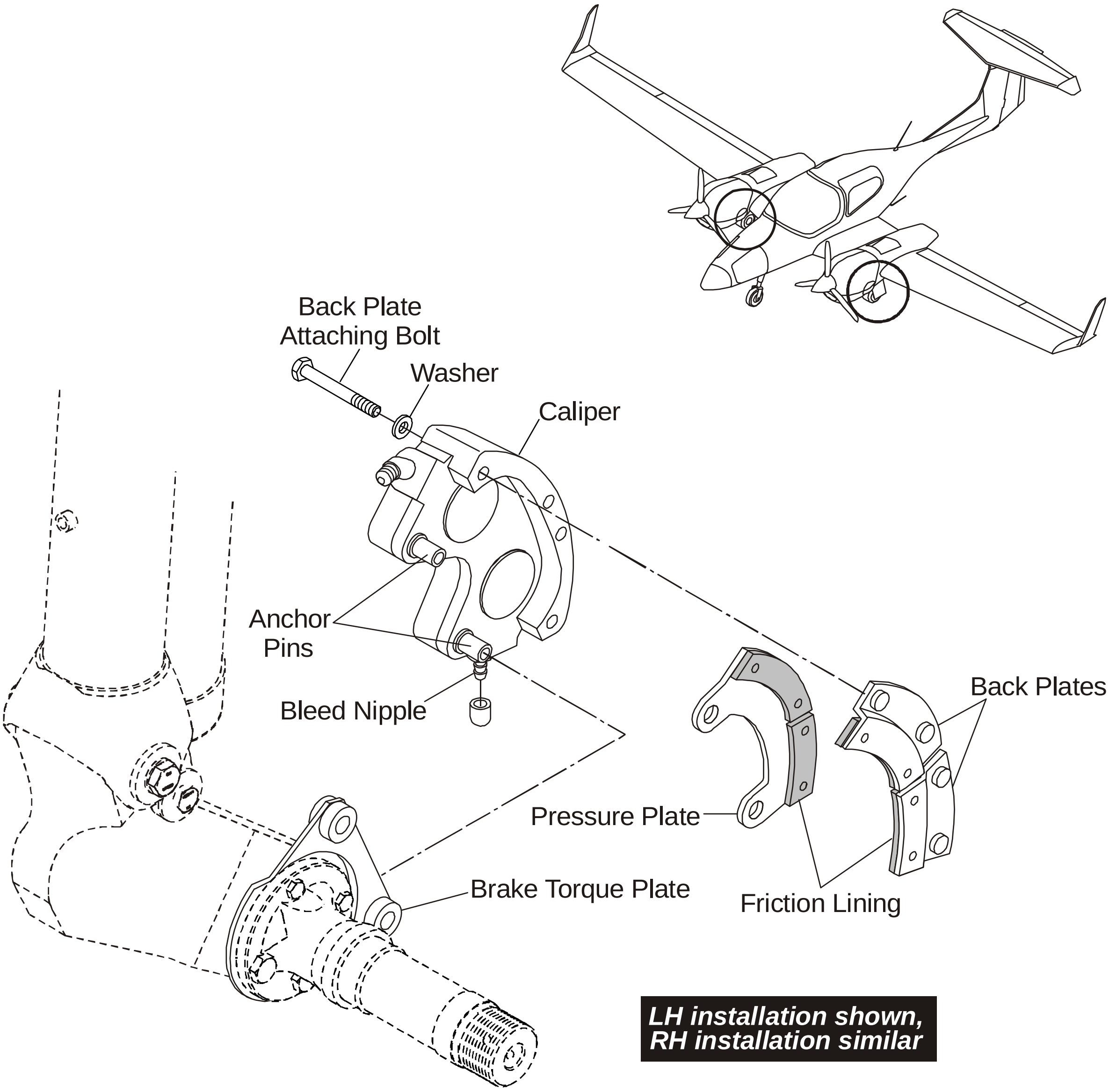


Figure 3: Main Wheel Brake Assembly

5. Operation - Brake System

If you press on the toe brake of a rudder pedal the fluid in the master cylinder is pushed along the outlet hose. The fluid at the brake caliper pushes the 2 pistons. The pistons push the pressure plate onto the wheel brake disk. The reaction of the pressure plate pushing on the wheel brake disk forces the brake caliper away from the wheel disk. The caliper moving away from the brake disk pulls the friction lining of the caliper back-plate against the other side of the disk. The wheel brake disk is held between the friction linings.

If you release the pressure on the brake pedal the fluid can go back into the master cylinder and the brake caliper releases the brake disk. The wheel is free to turn.

The right brake pedal of each set of rudder pedals operates the right wheel brake. The left brake pedal of each set of rudder pedals operate the left wheel brake.

If you push on the left brake pedal and the right brake pedal together, then both wheel brakes operate. If you set the parking brake to LOCK while you push on both brake pedals the parking brake valve traps the fluid in the brake units and the wheel brakes stay on. Move the parking brake lever to RELEASE to release the brakes.

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Trouble-Shooting

1. General

This table gives you the trouble-shooting data for the wheels and brakes.

If you find the trouble given in Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Too much wheel run-out.	Wheel bearing(s) defective.	Replace the defective wheel bearing(s).
Brake disk damaged.	Hard landing. Excessive braking.	Replace damaged brake disk. Do a hard landing inspection. Refer to Section 05-50. Replace brake disk(s).

Trouble	Possible Cause	Repair
Brake(s) do not operate.	No brake fluid.	Examine the brake system. Look specially for leaks. Repair/replace defective components. Fill the brake reservoir(s) with brake fluid.
	Air trapped in brake system.	Bleed the brake system.
	Master cylinder defective.	Examine the brake system. Look specially for leaks. Do a test for the correct operation of each master cylinder. Replace defective master cylinder(s).
	Brake caliper defective.	Examine the brake caliper. Look specially for leaks and for a piston that is seized. Repair/replace the caliper.
	Brake friction linings worn excessively.	Replace the brake friction linings.
	Brake hose connector leaking.	Tighten/replace leaking connectors.
Parking brake does not operate correctly.	Parking brake valve operating cable out of adjustment.	Adjust the parking brake valve operating cable.
	Parking brake valve defective.	Replace parking brake valve.

Maintenance Practices

1. General

This Section tells you how to remove/install the wheels and the main brake system components. It also tells you how to disassemble/assemble the wheels.

Refer to the component manufacturers manuals for repair of all other components in the workshop.

2. Remove/Install a Main Wheel

A. Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.

B. Remove a Main Wheel

WARNING: DO NOT LIFT THE AIRPLANE ON JACKS IN THE OPEN IF THE WIND SPEED IS MORE THAN 10 KM/H (6 KNOTS).

	Detail Steps/Work Items	Key Items/References
(1)	Lift the airplane on jacks.	Refer to Section 07-10.
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
(2)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
	CAUTION: MAKE SURE THAT THE PARKING BRAKE IS SET TO RELEASE BEFORE YOU RELEASE THE BRAKE CALIPER. CAUTION: DO NOT STRAIN THE BRAKE HOSE. YOU CAN CAUSE DAMAGE TO THE BRAKE HOSE AND CAUSE BRAKE FAILURE.	

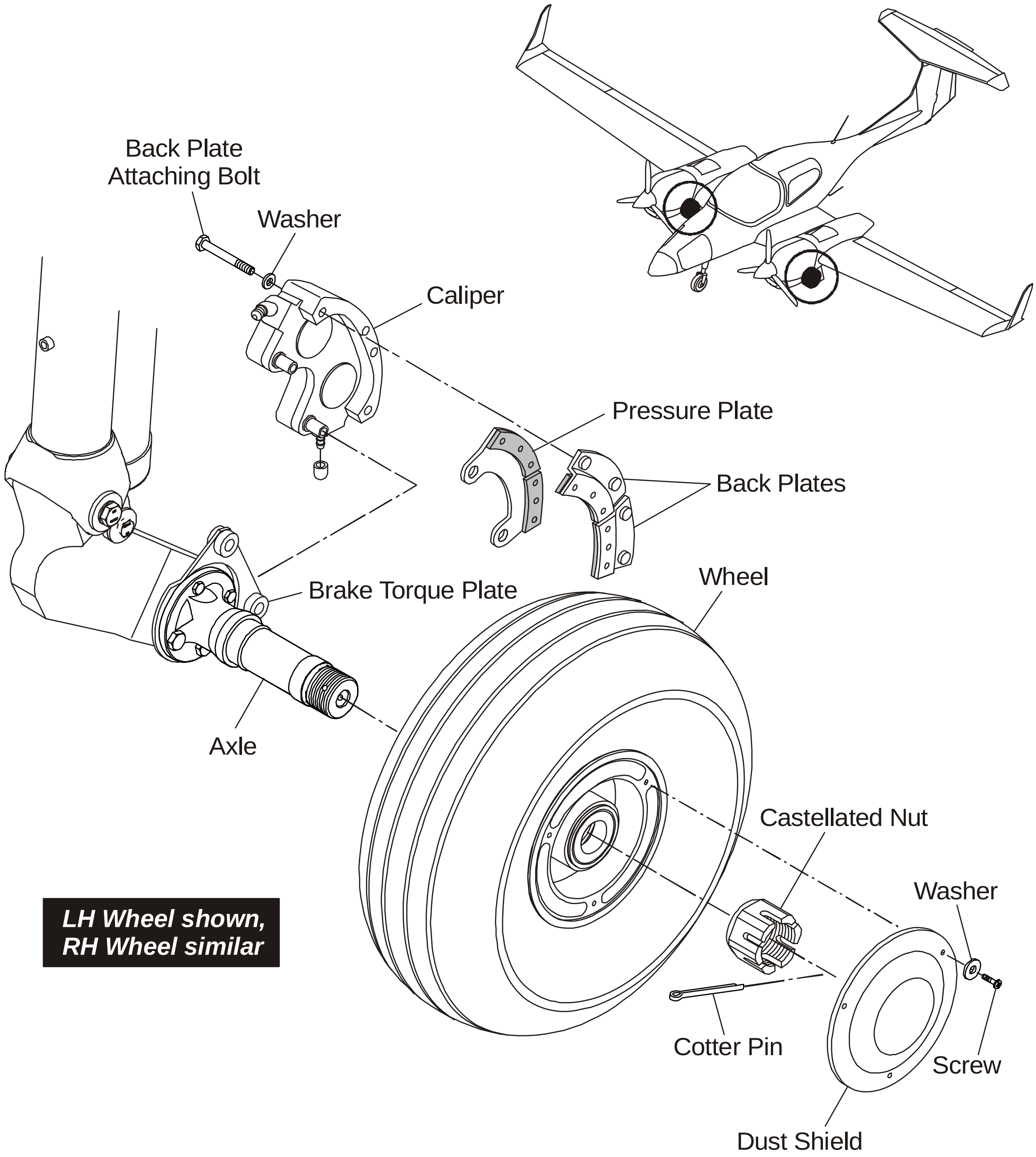

Figure 4: Remove/Install a Main Wheel

	Detail Steps/Work Items	Key Items/References
(3)	Release the brake caliper: – Remove the 4 bolts that attach the back-plates to the caliper. – Move the back-plates clear of the wheel disk.	Refer to Figure 4. Do NOT remove the brake caliper from the torque plate.
(4)	Examine the wheel. Make sure that the wheel turns smoothly.	
(5)	Remove the wheel from the axle: – Remove dust shield. – Remove the cotter pin from the castle nut. – Remove the castle nut that holds the wheel to the axle. – Pull the wheel off the axle and clear of the airplane.	
(6)	Examine the wheel bearings: – Examine the wheel bearings for contamination. – Look for damage to the bearings. – Turn the bearing slowly and listen for noise that may indicate wear to the bearings. Make sure that the bearing turns freely and quietly.	Look specially for sand, dust or similar contaminants. Signs of overheating or scoring. Replace damaged bearings. Replace damaged bearings.

C. Install a Main Wheel

	Detail Steps/Work Items	Key Items/References
(1)	Install the wheel: – Make sure that the axle is clean. – Move the wheel into position on the axle. – Install the castle nut. Tighten the castle nut finger tight and align the cotter pin hole in the axle with a castellation in the nut. – Install the cotter pin.	
(2)	Make sure that the wheel turns freely and with no noise.	
(3)	Move the caliper into position at the wheel. Make sure that the mounting spigots engage with the locating bushes.	Make sure that the pressure plate is correctly located within the caliper.
(4)	Install the back-plates: – Move the back-plates into position at the caliper. – Install the 4 bolts and washers that attach the back-plates to the caliper, finger tight. – Make sure that the wheel brake disk can rotate freely between the caliper pressure plate and the back-plates. – Tighten the bolts that attach the back-plates to the caliper.	Torque according to Cleveland/Parker Maintenance Manual, latest revision or placard on caliper.
(5)	Install dust shield.	

CAUTION: MAKE SURE THAT THE AREA AROUND THE AIRPLANE IS CLEAR. IF THE LANDING GEAR HITS AN OBJECT THE LANDING GEAR CAN BE DAMAGED.

CAUTION: MAKE SURE THAT THE LANDING GEAR IS LOCKED DOWN BEFORE YOU LOWER THE AIRPLANE WITH THE JACKS.

	Detail Steps/Work Items	Key Items/References
(6)	Reset the GEAR circuit-breaker and make sure that the landing gear selector is set to DOWN.	
(7)	If a tire/wheel change is performed check minimum clearance between MLG tire and the lower wing shell / wheel bay cut-out.	Refer to Section 32-10 - Adjustment of the MLG wheel in retracted position.
(8)	Carry out a test of the correct operation of the landing gear retraction and extension system.	Refer to Section 32-30.
(9)	Move the wing and fuselage trestles clear of the airplane.	
(10)	Lower the airplane with the jacks.	Make sure that the area around the airplane is clear.

3. Remove/Install the Nose Wheel

A. Equipment

Item	Quantity	Part Number
Airplane jacks.	1	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.

B. Remove the Nose Wheel

	Detail Steps/Work Items	Key Items/References
(1)	Raise the nose of the airplane on an airplane jack. Move the wing and rear fuselage trestle into position to steady the airplane.	
(2)	Examine the wheel. Make sure that the wheel can turn easily and quietly.	
(3)	Remove the nose wheel form the airplane: – Remove the nut and washer that holds the axle bolt in the wheel fork. – Remove the axle bolt and flanged bushes. – Move the nose wheel clear of the airplane. – Remove and retain the spacers and tubular axle from the wheel.	Refer to Figure 5. Support the nose wheel.
(4)	Examine the wheel bearings: – Examine the wheel bearings for contamination. – Look for damage to the bearings. – Turn the bearing slowly and listen for noise that may indicate wear of the bearings. Make sure that the bearing turns freely and quietly.	Look specially for sand, dust or similar contaminants. Signs of overheating or scoring. Replace damaged bearings. Replace damaged bearings.

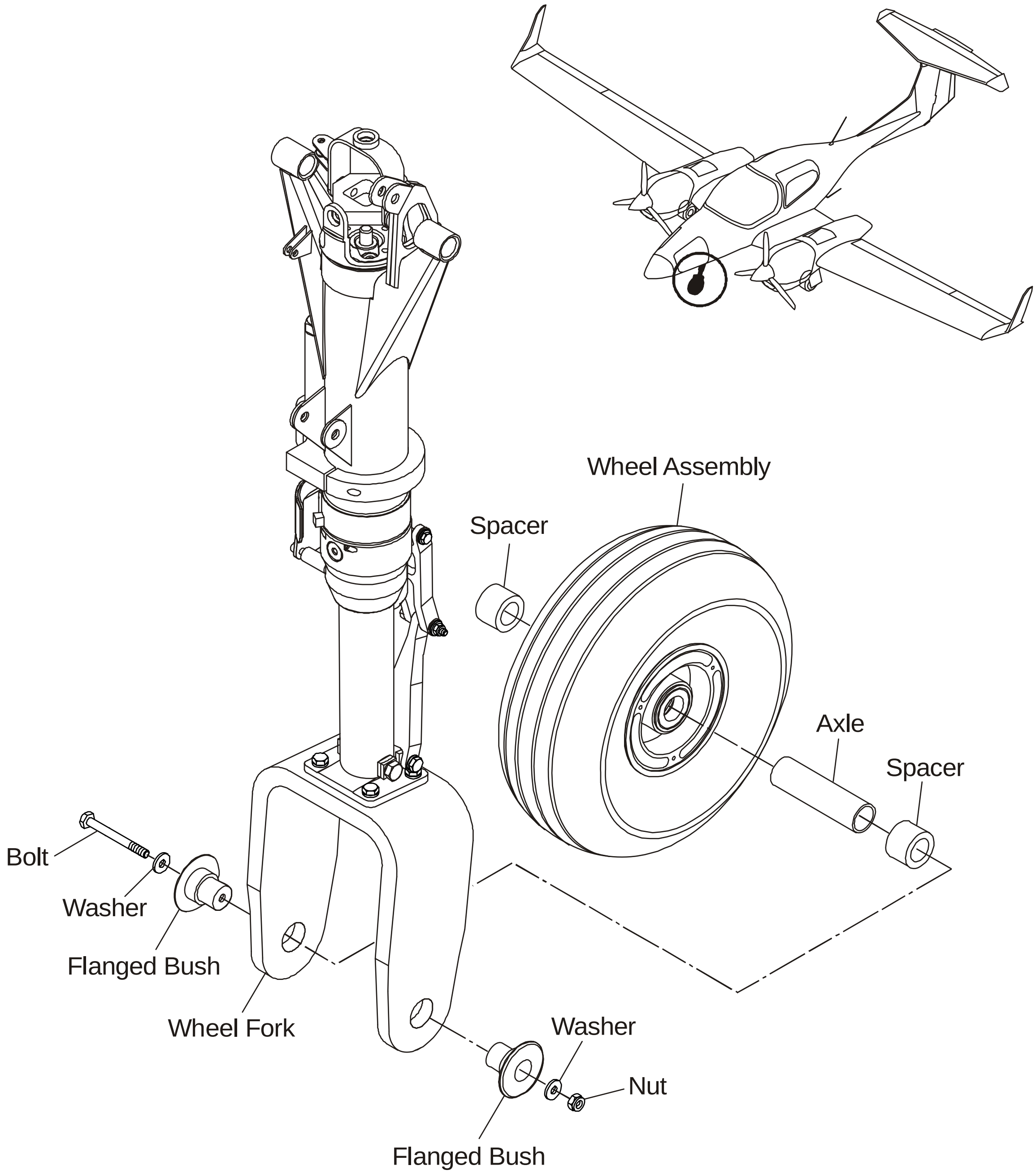

Figure 5: Remove/Install the Nose Wheel

C. Install the Nose Wheel

	Detail Steps/Work Items	Key Items/References
(1)	Install the wheel: – Make sure that the tubular axle is clean and install the axle into the wheel. – Install the spacers on the tubular axle. – Move the wheel into position in the fork. – Install the flanged bushes. – Install the axle bolt with washers through the fork and wheel. – Install the washer and nut that holds the axle bolt into the fork.	Torque: 16 Nm (11.5 lbf.ft.).
(2)	Make sure that the wheel turns freely and with no noise.	
(3)	Make sure that the nose gear leg is locked down.	
(4)	Move the wing trestles and rear fuselage trestles clear of the airplane.	
(5)	Lower the nose of the airplane with the jack.	

4. Disassemble/Assemble Main/Nose Wheel

A. Disassemble the Main/Nose Wheel

WARNING: DEFLATE THE TIRE COMPLETELY BEFORE YOU DISASSEMBLE THE WHEEL. IF YOU DO NOT DEFLATE THE TIRE COMPLETELY BEFORE YOU DISASSEMBLE THE WHEEL YOU MAY GET INJURED.

	Detail Steps/Work Items	Key Items/References
(1)	Remove the wheel from the airplane.	Paragraph 2/3 of this Section.
(2)	Deflate the tire.	
(3)	Remove the bolts that hold the 2 halves of the hub together.	Refer to Figure 1.
(4)	Remove the brake disk from the wheel.	Main wheels only.
(5)	Remove the hubs from the tire.	
(6)	Remove the inner tube from the tire.	
(7)	Remove the bearings from each hub of the wheel: – Remove the snap ring. – Remove the grease seals from the hub. – Remove the bearing cones.	 Note the order of the seals. Refer to Cleveland/Parker Maintenance Manual, latest revision.
(8)	Examine the wheel hubs, brake disc and the bearings for wear/damage.	Main wheels only. Refer to Cleveland/Parker Maintenance Manual, latest revision.
(9)	Examine the wheel hubs and bearings for wear/damage.	Refer to Cleveland/Parker Maintenance Manual, latest revision.

B. Assemble Main/Nose Wheel

	Detail Steps/Work Items	Key Items/References
(1)	Install the bearings into each half of the wheel hub: – Make sure that the hub is clean. – Grease and install the bearing cone. – Install the grease seals. – Install the snap ring.	 Refer to Cleveland/Parker Maintenance Manual, latest revision. In the order note in Paragraph 4 A (7).
(2)	Move the inner tube into position in the tire.	Prior to mounting make sure the inside of the tire and tire bead is clean. Apply talcum powder to the outside of the inner tube.
(3)	Assemble the main wheel: – Move the main wheel hubs into position in the tire. – Move the brake disk into position at the inner hub. – Install the bolts that attach the brake disk and the 2 hub halves. – Install the washers and nuts onto the bolts.	Torque according to Cleveland/Parker Maintenance Manual, latest revision, or placard on hub.
(4)	Assemble the nose wheel: – Move the nose wheel hubs into position in the nose tire. – Install the bolts, washers and nuts that hold the hub halves.	Torque according to Cleveland/Parker Maintenance Manual, latest revision, or placard on hub.
(5)	Inflate the tire.	Refer to Section 12-10.
(6)	Paint a red slip mark on the tire and on the hub.	
(7)	Install the wheel on to the airplane.	Paragraphs 2/3 in this Section.

5. Remove/Install Brake System Components - General

This Section tells you how to remove and install the major components of the brake system. Refer to the equipment manufacturer's manuals for data about repairing the equipment in the workshop.

WARNING: RELEASE PRESSURE FROM THE WHEEL BRAKE SYSTEM BEFORE YOU DO WORK ON THE SYSTEM. HYDRAULIC FLUID AT HIGH PRESSURE CAN PENETRATE YOUR SKIN AND CAUSE DISEASE.

WARNING: DO NOT GET HYDRAULIC FLUID ON YOU. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE AND IT CAN DAMAGE CLOTHING.

CAUTION: CLEAN OFF SPILT HYDRAULIC FLUID IMMEDIATELY. HYDRAULIC FLUID CAN CAUSE DAMAGE TO THE AIRPLANE STRUCTURE AND IT CAN REMOVE PAINT FROM COMPONENTS.

Note: Put caps on all open hydraulic connections to prevent contamination.

Note: Put a container below a connection before you release the connection to catch spilt hydraulic fluid.

Note: If you open a brake system connection you must bleed the brake system after you have re-made the connection.

6. Remove/Install a Brake Master Cylinder

A. Equipment

Item	Quantity	Part Number
Hydraulic bleeding equipment.	1	Commercial.
Syringe for hydraulic fluid.	1	Commercial.

B. Material

Item	Quantity	Part Number
Hydraulic fluid.	A/R	MIL-PRF-5606H (for example, Aeroshell Fluid 41).

C. Remove a Brake Master Cylinder

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT GET HYDRAULIC FLUID ON YOU. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE AND IT CAN DAMAGE CLOTHING. CAUTION: CLEAN OFF SPILT HYDRAULIC FLUID IMMEDIATELY. HYDRAULIC FLUID CAN CAUSE DAMAGE TO THE AIRPLANE STRUCTURE AND IT CAN REMOVE PAINT FROM COMPONENTS.	
(1)	If necessary, remove the brake fluid reservoir: – Remove the hose from lower hydraulic connection. – Remove the reservoir from the top hydraulic connection.	Co-pilot's pedals only. Use a container to catch spilt fluid. Put caps on all open connections.
(2)	Disconnect the hoses from the upper and lower hydraulic connection.	Pilot's pedals only. Use a container to catch spilt fluid. Put caps on all open connections.

	Detail Steps/Work Items	Key Items/References
(3)	Remove the upper clevis pin: – Remove the cotter pin from the clevis pin. – Remove the washer. – Remove the clevis pin.	
(4)	Release the master cylinder from the lower mounting spindle: – Remove the cotter pin from the mounting spindle. – Remove the washer. – Move the master cylinder clear of the pedal assembly. – Remove and retain the spacer from the lower mounting spindle.	

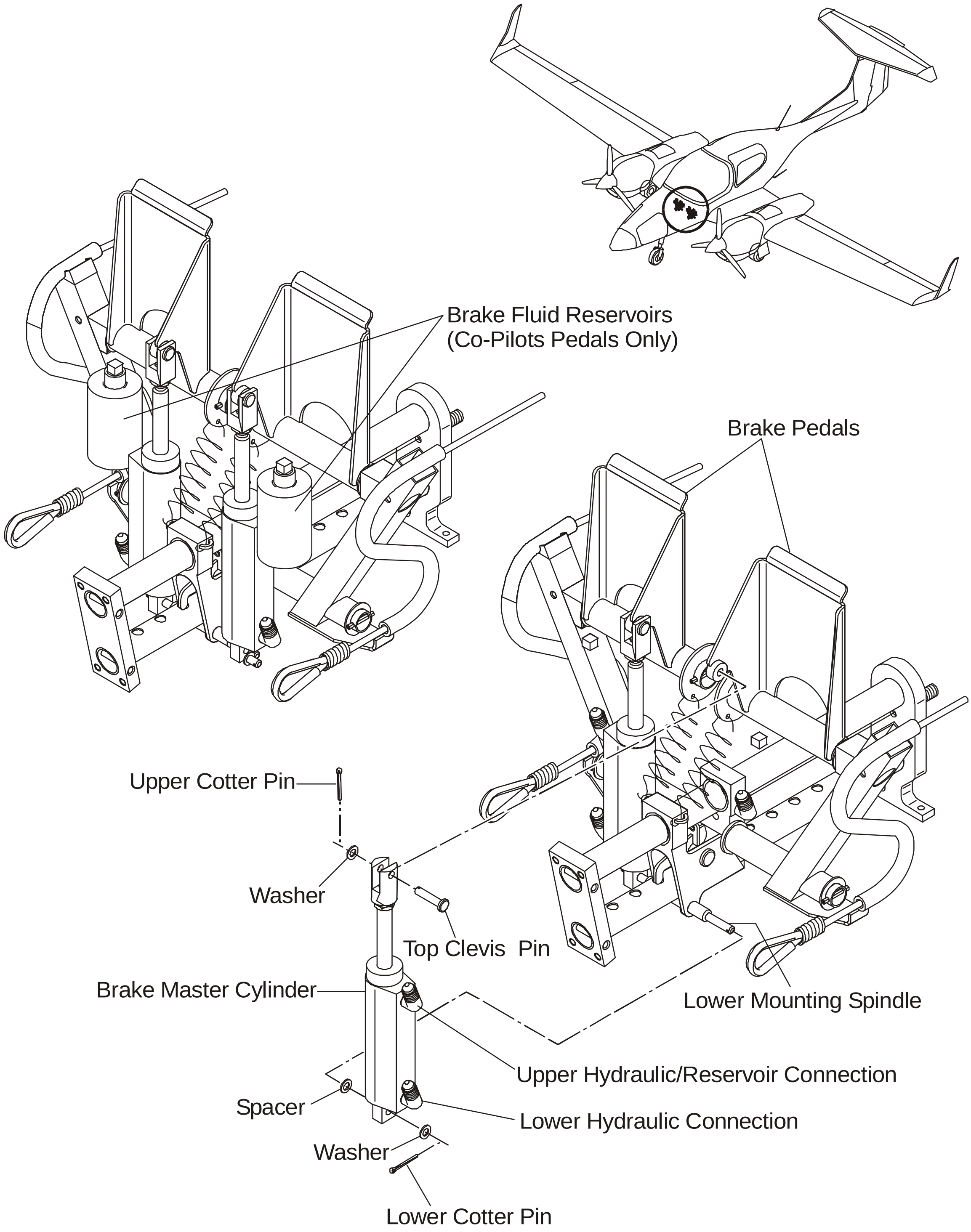

Figure 6: Brake Master Cylinder Installation

D. Install a Brake Master Cylinder

	Detail Steps/Work Items	Key Items/References
(1)	Move the master cylinder into position at the brake pedal assembly.	
(2)	Install the master cylinder onto the lower mounting spindle: – Install the spacer onto the lower mounting spindle. – Move the master cylinder into position on the mounting spindle. – Install the washer. – Install the cotter pin.	
(3)	Install the upper clevis pin: – Align the top of the master cylinder with the mounting on the brake pedal. – Install the upper clevis pin. – Install the washer onto the clevis pin. – Install the cotter pin.	
(4)	Install the hose onto the lower hydraulic connection on the master cylinder.	Make sure that all blanking caps are removed.
(5)	Install the hose onto the upper hydraulic connection on the master cylinder.	Pilot's pedals only. Make sure that all blanking caps are removed.
(6)	If necessary, install the hydraulic reservoir onto the upper hydraulic connection of the master cylinder.	Co-pilot's pedals only. Make sure that all blanking caps are removed.
(7)	Bleed the brake system.	Refer to Paragraph 9.
(8)	Do a test for the correct operation of the brake system.	

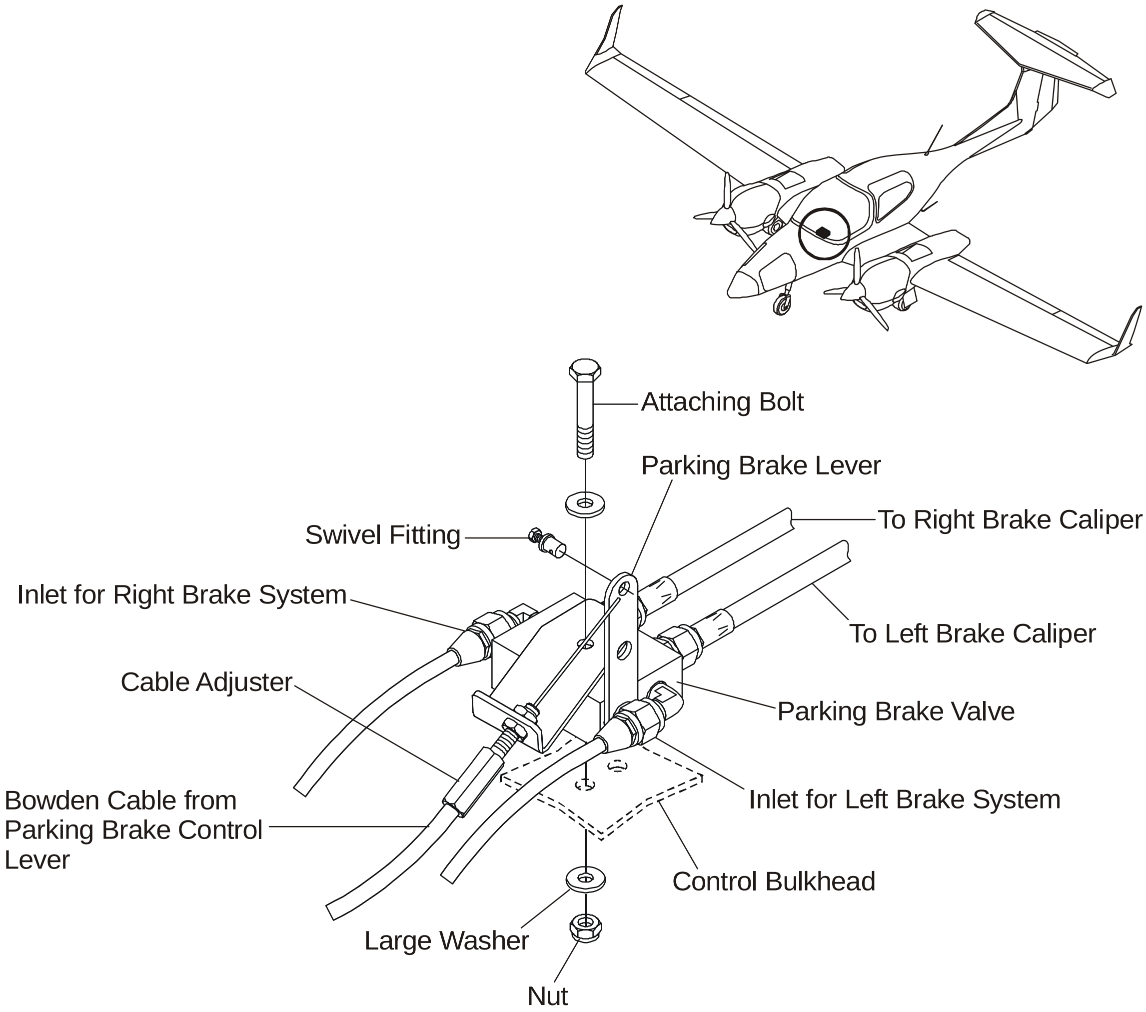

Figure 7: Parking Brake Valve Installation

7. Remove/Install the Parking Brake Valve

A. Remove the Parking Brake Valve

	Detail Steps/Work Items	Key Items/References
(1)	Remove the pilots' seats.	Refer to Section 25-10.
	WARNING: DO NOT GET HYDRAULIC FLUID ON YOU. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE AND IT CAN DAMAGE CLOTHING. CAUTION: CLEAN OFF SPILT HYDRAULIC FLUID IMMEDIATELY. HYDRAULIC FLUID CAN CAUSE DAMAGE TO THE AIRPLANE STRUCTURE AND IT CAN REMOVE PAINT FROM COMPONENTS.	
(2)	Disconnect the Bowden cable: – Loosen the screw in the swivel fitting. – Pull the inner wire of the Bowden cable out of the swivel fitting.	Refer to Figure 7.
(3)	Disconnect the 4 brake hoses from the parking brake valve.	Use a suitable container to catch spilt fluid. Install blanking caps on all open connections.
(4)	Remove the 2 nuts, bolts and washers that attach the parking brake valve to its mounting.	
(5)	Move the valve clear of the airplane.	

B. Install the Parking Brake Valve

	Detail Steps/Work Items	Key Items/References
(1)	Move the parking brake valve into position by its mounting.	
(2)	Install the 2 bolts washers and nuts that attach the parking brake valve to its mounting.	
(3)	Connect the 4 brake hoses to the parking brake valve.	Remove all blanking caps.
(4)	Connect the Bowden control cable to the parking brake valve: – Move the inner cable of the Bowden cable through the swivel fitting. – Make sure that the parking brake control lever in the cockpit is set to RELEASE. – Make suer that the operating lever on the parking brake valve is set to the fully open position. – Tighten the screw of the swivel fitting.	
(5)	Bleed the brake system.	Refer to Paragraph 9.
(6)	Do a test for the correct operation of the parking brake system: – Push and hold both brake pedals on the pilot’s rudder pedal assembly. – Set the PARKING BRAKE to PARK. – Both wheel brakes must stay on. – Set the PARKING BRAKE to RELEASE. – Both wheel brakes must release.	
(7)	Install the pilots’ seats.	Refer to Section 25-10.

8. Remove/Install a Brake Caliper

A. Remove a Brake Caliper

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT GET HYDRAULIC FLUID ON YOU. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE AND IT CAN DAMAGE CLOTHING. **WARNING: MAKE SURE THAT THE PARKING BRAKE IS SET TO RELEASE BEFORE YOU DISCONNECT THE HYDRAULIC HOSE TO THE BRAKE CALIPER. HYDRAULIC FLUID AT HIGH PRESSURE CAN PENETRATE YOUR SKIN AND CAUSE DISEASE.** CAUTION: CLEAN OFF SPILT HYDRAULIC FLUID IMMEDIATELY. HYDRAULIC FLUID CAN CAUSE DAMAGE TO THE AIRPLANE STRUCTURE AND IT CAN REMOVE PAINT FROM COMPONENTS.	
(1)	Disconnect the brake hose from the brake caliper.	Refer to Figure 8. Use a suitable container to catch spilt fluid. Put blanking caps on all open connectors.
	CAUTION: DO NOT OPERATE THE BRAKES WHILE THE CALIPER BACK PLATES ARE REMOVED OR THE CALIPER IS REMOVED FROM THE AIRPLANE. IF YOU DO OPERATE THE BRAKES, THE PISTONS BE PUSHED OUT FROM THE CYLINDERS.	
(2)	Remove the backing plates from the brake caliper: – Remove the lock-wire from the 4 bolts that attach the back plates to the brake caliper. – Remove the 4 bolts and washers that attach the backing plate to the brake caliper. – Remove the backing plates.	 If bolts with drilled heads are used.
(3)	Move the caliper inboard until the mounting spigots are clear of the torque plate, then move the caliper clear of the airplane.	Retain the pressure plate with the caliper.

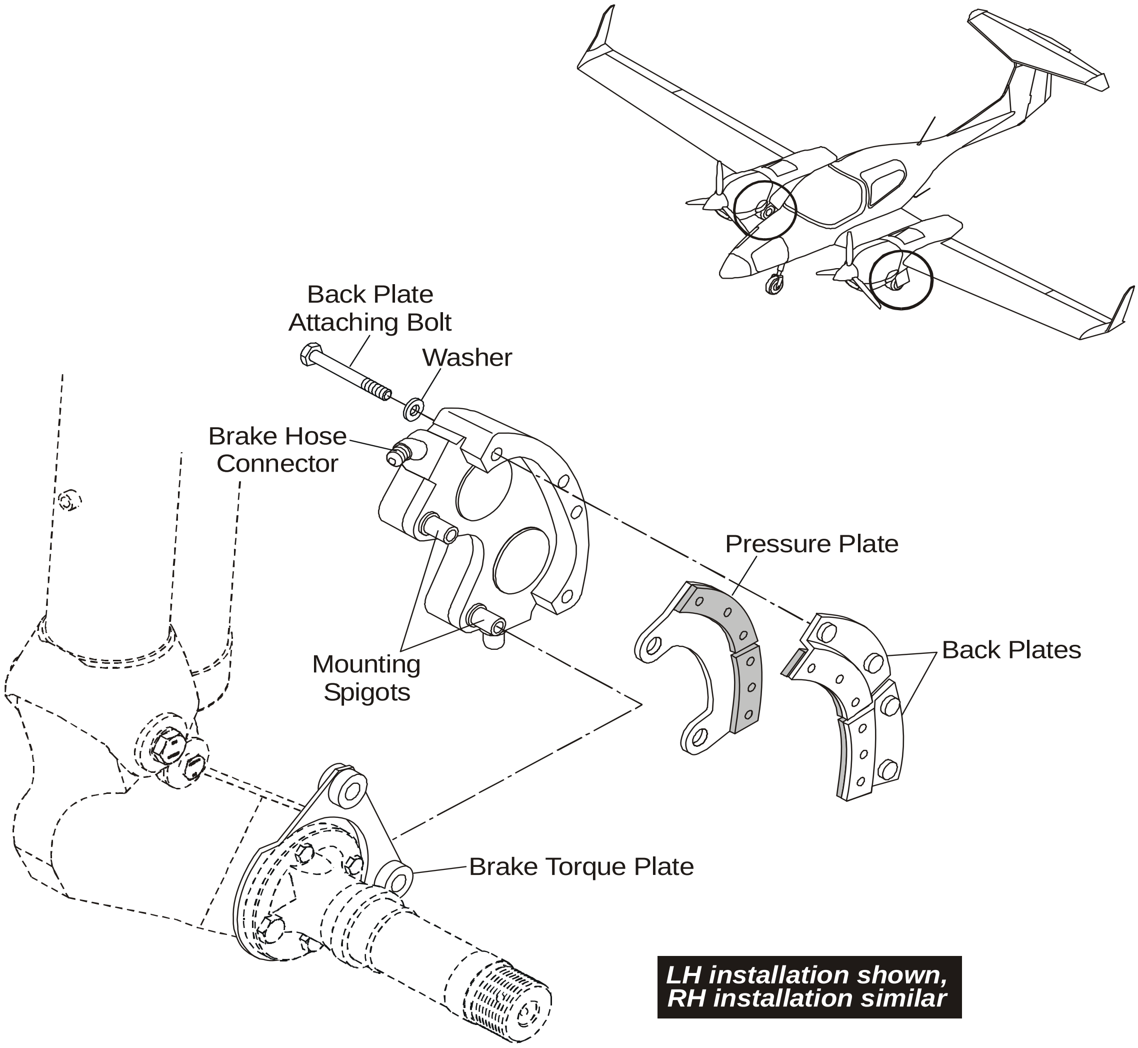

Figure 8: Brake Caliper Installation

B. Install the Brake Caliper

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the friction linings on both the pressure plate and the back-plate are in good condition.	Refer to Cleveland/Parker Maintenance Manual, latest revision.
(2)	Make sure that the mounting spigots on the caliper are clean.	
(3)	Make sure that the spigot locating bushes on the brake torque plate are clean.	
(4)	Move the caliper into position at the wheel. Make sure that the mounting spigots engage with the locating bushes.	Make sure that the pressure plate is correctly located within the caliper.
(5)	Install the back-plates: – Move the back-plates into position at the caliper. – Install the 4 bolts and washers that attach the back-plates to the caliper, finger tight. – Make sure that the wheel brake disk can rotate freely between the caliper pressure plate and the back-plates. – Tighten the bolts that attach the back-plates to the caliper.	Torque refer to Cleveland/Parker Maintenance Manual, latest revision, or placard on caliper.
(6)	Connect the hydraulic brake hose to the connection on the caliper.	
(7)	Bleed the brake system.	Refer to Paragraph 9.
(8)	Do a test for the correct operation of the brake system.	

9. Bleed the Wheel Brake System

A. Equipment

Item	Quantity	Part Number
Pressure-hydraulic bleeding equipment.	1	Commercial.
Syringe.	1	Commercial.

B. Material

Item	Quantity	Part Number
Hydraulic fluid.	A/R	MIL-PRF-5606H (for example, Aeroshell Fluid 41).

C. Bleed the Wheel Brake System

Use a pressure-hydraulic bleeding tool to bleed the wheel brake system.

WARNING: DO NOT GET HYDRAULIC FLUID ON YOU. HYDRAULIC FLUID CAN CAUSE SKIN DISEASE. IT CAN ALSO DAMAGE CLOTHING.

CAUTION: CLEAN OFF SPILT HYDRAULIC FLUID IMMEDIATELY. HYDRAULIC FLUID CAN DAMAGE THE AIRPLANE STRUCTURE. IT CAN ALSO REMOVE THE PAINT FROM SOME COMPONENTS.

	Detail Steps/Work Items	Key Items/References
(1)	Remove the cap from the brake fluid reservoir. If necessary remove fluid until the fluid level is at MINIMUM.	On the co-pilot’s brake pedals. Use a syringe.
(2)	Set the parking brake to RELEASE.	At the center console.
(3)	Connect the brake bleeding tool to the caliper: – Remove the blanking cap from the left brake caliper bleed nipple. – Connect the outlet hose of the hydraulic bleeding tool to the bleed nipple of the left brake caliper.	

	Detail Steps/Work Items	Key Items/References
(4)	Bleed the left brake system: – Open the bleed nipple on the brake caliper a small amount until fluid flows from the bleeding tool into the airplane brake system. – Let hydraulic fluid continue to flow into the airplane brake system until no more air bubbles can be seen in the airplane reservoir. – Close the bleed nipple on the brake caliper. – Disconnect the outlet hose of the bleeding tool from the nipple of the brake caliper. – Install the blanking cap onto the nipple.	Monitor the level of fluid in the left brake fluid reservoir. If necessary use a syringe to remove brake fluid.
(5)	Do steps 3 and 4 for the right wheel brake system.	
(6)	Make sure that both brake fluid reservoirs are filled to the correct level.	The MAXIMUM line on the reservoir.
(7)	Install both the left and right reservoir caps onto the reservoirs.	Use “vented caps”.
(8)	Do a test for the correct operation of the wheel brake systems.	

10. Replace the Brake Friction Linings

A. Equipment

Item	Quantity	Part Number
Drill bit 1/8".	1	Commercial.
Pin punch.	1	Commercial.
Cleveland brake riveting set.	1	Cleveland 199-00100.

B. Material

Item	Quantity	Part Number
Cleveland brake friction linings for Brake Caliper 30-52Z.	4 per brake.	Cleveland 066-10500.
Rivets.	8 per brake.	Cleveland 105-00200.

C. Replace the Brake Friction Linings

Note: For detailed instructions refer to Cleveland/Parker Maintenance Manual, latest revision.

WARNING: DO NOT BREATHE THE DUST FROM BRAKE LININGS. THE DUST CAN CAUSE DISEASE.

CAUTION: MAKE SURE THAT THE PARKING BRAKE IS SET TO RELEASE BEFORE YOU RELEASE THE BRAKE CALIPER BACK-PLATE.

Note: For brake component limits refer to Cleveland/Parker Maintenance Manual, latest revision.

	Detail Steps/Work Items	Key Items/References
(1)	Remove the brake caliper from the wheel assembly.	Refer to Paragraph 8.
(2)	Remove the pressure plate from the caliper.	Refer to Figure 8.

	Detail Steps/Work Items	Key Items/References
(3)	Remove the brake friction lining from the pressure plate: – Drill out the rivets that attach the friction lining to the pressure plate. – Use pin-punch to remove the rivet stems.	
(4)	Remove the brake friction linings from the back plates: – Drill out the rivets that attach the friction lining to the pressure plate. – Use pin-punch to remove the rivet stems.	
(5)	Install the new friction linings onto the pressure plate and the back-plates.	Use only approved parts. Use the Cleveland rivet set to install the new brake friction linings. Follow the Cleveland rivet set Instruction Manual.
(6)	Install the pressure plate into the caliper.	
(7)	Install the brake caliper.	Refer to Paragraph 8.
(8)	Bleed the brake system.	Refer to Paragraph 9.
(9)	Do a test for the correct operation of the airplane braking system.	

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Section 32-50
Steering

1. General

The DA 42 has nose-wheel steering. The rudder pedals can turn the nose gear leg. The rudder pedals connect to the nose gear leg with a steering rod. You can turn the nose wheel up to 9° using the rudder pedals and up to 42° using a wheel brake.

This Section tells you about the nose-wheel steering system form the interface with the rudder controls to the nose wheel leg. See Section 27-20 for more data about the rudder control system and see Section 32-20 for more data about the nose gear leg.

Figure 1 shows the nose wheel steering system.

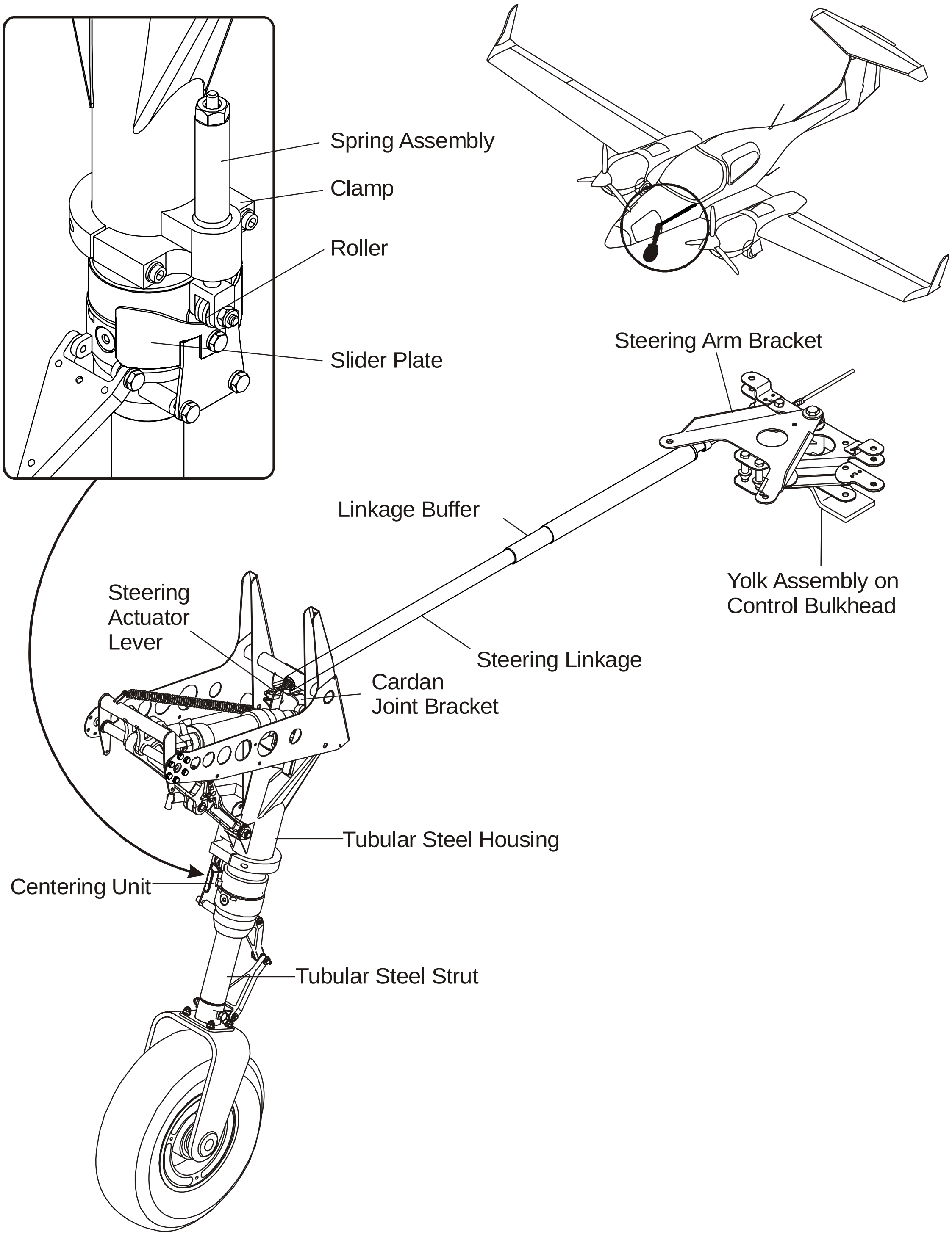

Figure 1: Nose Wheel Steering

2. Description

The nose wheel steering system has these major components:

A. Steering Linkage

One end of the steering linkage connects to the steering arm bracket on the rudder yolk assembly. The rudder yolk assembly is located on the forward control bulkhead. The other end of the steering linkage attaches to the steering actuator lever which is bolted to the top of the tubular strut of the nose gear leg.

B. Linkage Buffer

A telescopic arm containing a compression spring makes the linkage buffer. When a force is applied to one end of the telescopic arm the arm compresses the spring which then exerts a force onto the other end of the telescopic arm. This allows the pilot to operate the rudder control system when the nose wheel steering system has reached it’s limit of operation.

C. Centering Unit

A spring assembly which presses a roll against a slider plate makes the centering unit. The spring assembly with the roller are attached to the tubular steel strut which does not rotate. The slider plate is attached to the sliding tube guide which rotates about the leg axis when the nose wheel is deflected.

When the nose wheel is deflected, the slider plate pushes the spring loaded roller up. The spring creates a counterforce which moves the nose wheel back into neutral position.

3. Operation

When the pilot pushes the left rudder pedal when taxiing the airplane these events occur:

– The rudder cables from the rudder pedal turns the steering arm bracket of the yolk assembly on the control bulkhead counter-clockwise.

– The steering linkage moves forward and turns the tubular steel strut of the nose gear leg to counter-clockwise.

– The airplane will turn to the left.

When the pilot pushes the right rudder pedal when taxiing the airplane these events occur:

– The rudder cables from the rudder pedal turns the steering arm bracket of the yolk assembly on the control bulkhead clockwise.

– The steering linkage moves aft and turns the tubular steel strut of the nose gear leg to clockwise.

– The airplane will turn to the right.

Trouble-Shooting

1. General

This Section gives you the trouble-shooting data for the nose wheel steering components only. Refer to Section 32-20 for trouble-shooting data on the nose gear leg and refer to Section 27-20 for trouble-shooting data on the rudder control system.

If you find the trouble given in Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Nose wheel steering ineffective, the pilot must give inputs to the rudder pedals to steer the airplane.	Linkage buffer defective.	Replace the steering linkage.

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Maintenance Procedures

1. General

These maintenance procedures tell you how to remove/install the steering linkage and the centering unit. It also tells you how to check the friction of the nose wheel steering. Refer to these Sections for the related data:

– Section 32-10. Main landing gear.

– Section 32-20. Nose landing gear.

– Section 32-30. Extension and retraction.

2. Remove/Install the Steering Linkage

A. Remove the Steering Linkage

	Detail Steps/Work Items	Key Items/References
(1)	Remove the pilot's seat.	Refer to Section 25-10.
(2)	Disconnect the steering linkage from the steering arm bracket at the yolk assembly: – Remove the nut, washer and bolt that attaches the steering linkage to the steering arm bracket. – Move the end of the steering linkage clear of the steering arm bracket.	Refer to Figure 1.
(3)	Disconnect the steering linkage from the steering actuator lever: – Remove the nut, washer and bolt that attaches the steering linkage to the steering actuator. – Move the steering linkage clear of the steering actuator. – Pull the steering linkage forward through into the nose gear bay and clear of the airplane.	At the top of the nose gear leg. Note the orientation of the steering linkage.

B. Install the Steering Linkage

	Detail Steps/Work Items	Key Items/References
(1)	Move the steering linkage into position through the nose gear bay and into the fuselage.	Make sure that you install the steering linkage in the correct orientation as noted in Paragraph 2A.
(2)	Connect the steering linkage to the steering arm bracket at the yolk assembly:	
	– Move the end of the steering linkage into position so that it aligns with the steering arm bracket.	
	– Install the bolt, washer and nut that attaches the steering linkage to the steering arm bracket.	Always use a new self-locking nut.
(3)	Connect the steering linkage to the steering actuator at the top of the nose gear leg:	
	– Move the end of the steering linkage into position to align with the steering actuator lever.	
	– Install the bolt, washer and nut that attaches the steering linkage to the steering actuator lever.	Always use a new self-locking nut.
(4)	Do a test for the correct operation of the rudder control system.	Refer to Section 27-20.
(5)	If necessary for your Airworthiness Authority do a duplicate inspection of the rudder control system.	
(6)	Install the pilot’s seat.	Refer to Section 25-10.

3. Remove/Install the Centering Unit

Refer to Figure 1.

A. Remove the Centering Unit

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Remove the spring assembly: – Remove the bolts and washers which hold the clamp to the leg. – Move the clamp and spring assembly clear of the leg.	
(3)	Remove the slider plate: – Remove the 3 bolts and washers which attach the slider plate to the leg. – Move the slider plate clear of the leg.	Remove lock wire first if bolts with drilled heads are used.

B. Install the Centering Unit

	Detail Steps/Work Items	Key Items/References
(1)	Install the slider plate: – Release the nose landing gear. – Move the slider plate in position on the leg. – Install the 3 bolts and washers which attach the slider plate to the leg.	 Jack the airplane. Refer to Section 07-10. Use Loctite 243 or lock wire if bolts with drilled heads are used.
(2)	Align the nose wheel to the center position.	
(3)	Install the spring assembly: – Move the clamp and spring assembly in position at the leg. – Install the bolts and washers which hold the clamp to the leg. Do not tighten the bolts. – Align the spring so that the roller just contacts the lowest point on the slider plate. – Turn the nose gear leg in one of its maximum deflected positions. – Move the spring assembly towards the slider plate so that 2.5 mm (0.1 in) of bare piston remain visible. – Tighten the bolts which hold the clamp to the leg. – Align the nose wheel to the center position.	 Use Loctite 243. Hold the spring assembly in this position. The centering unit must be slightly pre-stressed while in center position.
(4)	Remove the jacks from the airplane.	Refer to Section 07-10.
(5)	Reset the GEAR circuit breaker.	Right side of instrument panel.

4. Nose Wheel Steering Friction Test

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
(1)	Release the nose landing gear.	Jack the airplane. Refer to Section 07-10.
(2)	Check the strut extension of the nose landing gear damper.	Refer to Section 32-20. If necessary charge the damper assembly.
(3)	Turn the nose wheel to its fully deflected position left hand.	The counter force of the centering unit must move the nose wheel back into neutral position.
(4)	Turn the nose wheel to its fully deflected position right hand.	The counter force of the centering unit must move the nose wheel back into neutral position.
(5)	Lower the airplane.	Remove the jacks from the airplane. Refer to Section 07-10.

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Section 32-60
Position and Warning

1. General

This Section tells you about the parts of the landing gear system that give the pilot position and warning data. Refer to these Sections for the related data:

- Section 32-10. Main landing gear.
- Section 32-20. Nose landing gear.
- Section 32-30. Extension and retraction.
- Section 32-50. Nose wheel steering.

2. Description

The landing gear position and warning system has these functions:

- Landing gear control.
- Landing gear position.
- Landing gear warning.
- To give position data for the extension and retraction system.

The system has these components:

- A cockpit selector handle and indicators. The cockpit selector handle controls the position of the landing gear. The indicators show the position/condition of the landing gear legs.
- Switches that sense ‘weight-on-wheels’.
- Switches that sense ’folding-stay locked’.
- Switches that sense ‘landing gear retracted’.
- Switches that sense the position of the engine power levers.
- Control relays and circuit-breakers.

Figure 1 shows the landing gear electrical system schematic diagram.

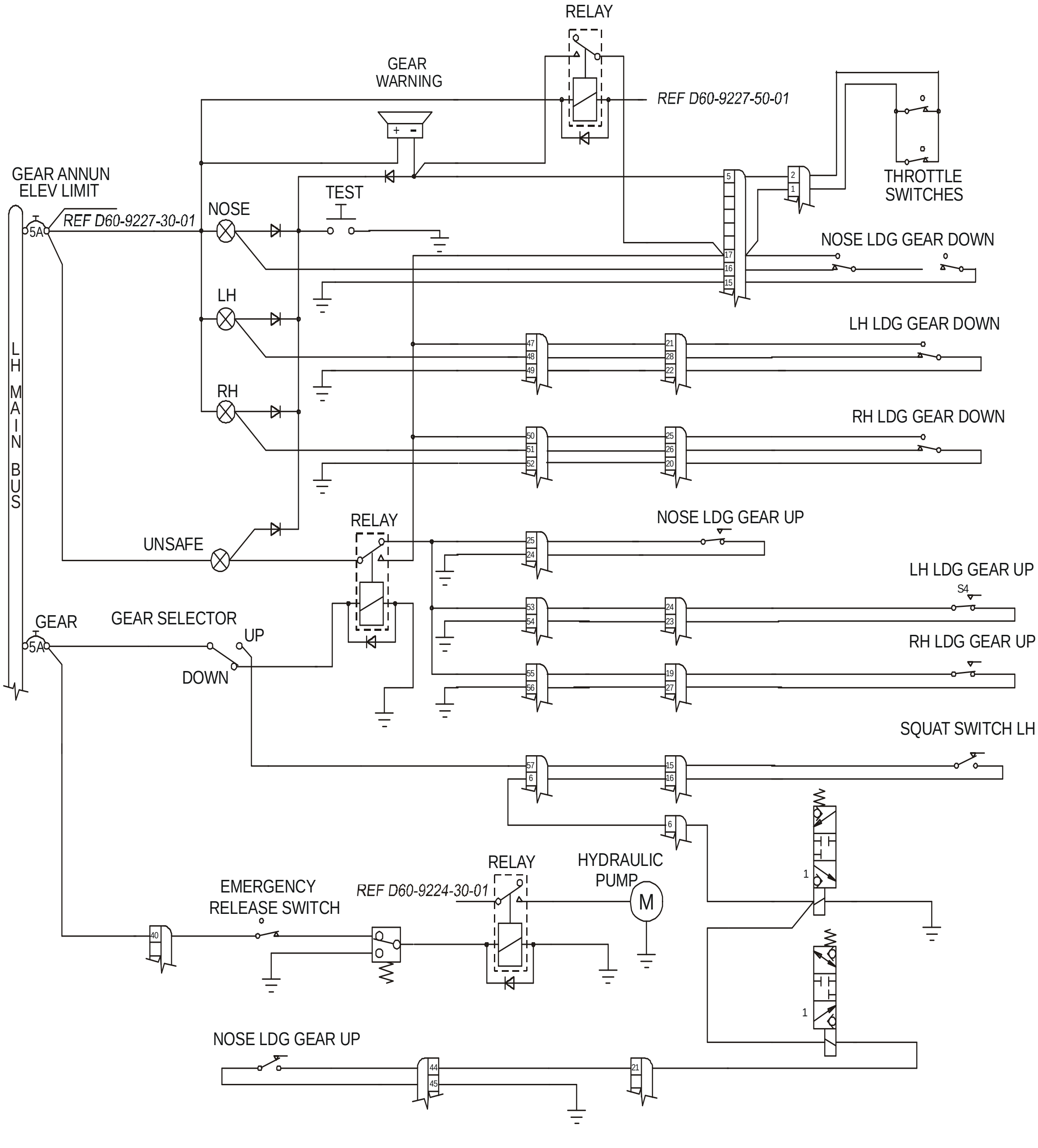

Figure 1: Landing Gear Electrical Schematic Diagram

A. Landing Gear Selector

The landing gear selector is in the middle of the instrument panel. The gear selector has a handle and can be set to UP or DOWN. Next to the gear selector are 3 green indicators and 1 red indicator. There is also a push-to-test type TEST switch. Each landing gear has a related green indicator. The green indicators will light if all the landing gear legs are down and locked when the gear selector is set to DOWN. The green indicators will not light if all the landing gear legs are fully up when the gear selector is set to UP. During the movement of the legs during extension or retraction the red UNSAFE indicator will light and the green indicators will be off.

The red indicator will stay lit if one, or more, of the landing gear legs has not fully retracted when the selector has been set to UP. The red indicator will stay lit if one, or more, of the landing gear legs has not fully locked down when the selector has been set to DOWN. The related leg green indicator will also not be lit.

Push the TEST switch to make sure that the red and green indicators are serviceable and to test the landing gear audible warning horn.

B. Weight-on-Wheels Switches

The LH main landing gear leg has a weight-on-wheel switch (squat switch). When the airplane is on the ground the weight of the airplane causes the trailing arm to move up and compress the damper. This movement of the trailing arm causes the weight-on-wheels switch to open. With these switches open the electrical power to the solenoid valves of the hydraulic supply and control system is isolated. This over-rides the position of the landing gear selector handle and selects the landing gear to the DOWN position when the airplane is on the ground.

C. Folding-Stay Switches

Each landing gear leg has a folding-stay. When the landing gear leg is fully down the folding-stay will lock in the unfolded position to hold the leg locked down. When the folding-stay is locked the related folding-stay switch (LDG Gear Down) is closed and an electrical ground is supplied for the related green indicator. The green indicator for the related gear leg will be illuminated.

D. Landing Gear Retracted Switches

Each landing gear leg has landing gear retracted switch (LDG Gear Up) located in the top of the landing gear bay. When the landing gear has fully retracted the switch will open and isolate the electrical ground for the red UNSAFE indicator. If all 3 switches are open the red UNSAFE indicator will not be illuminated.

E. Engine Power Lever Switches

Switches sense the position of the left and the right engine power levers. When both engine power levers are moved towards the IDLE position the engine power lever switches close. If one switch is closed and the GEAR selector is set to UP the landing gear audible warning horn will operate. If both engine power levers are moved towards TAKE-OFF or the GEAR selector is set to DOWN the audible warning horn will not operate.

F. Control Relay and Circuit-Breakers

The position and warning system has these relays and circuit-breakers:

– ‘Unsafe’ control relay. The ‘unsafe’ control relay is energized when the GEAR selector is set to DOWN. When energized the relay gives an electrical ground for the red UNSAFE indicator through the folding stay switch in the ‘open’ position (folding-stay not locked). When the GEAR selector is set to UP the relay is de-energized. The de-energized relay gives an electrical ground for the red UNSAFE indicator through the landing gear retracted switches in the ‘closed’ position (landing gear not retracted).

– The GEAR and GEAR ANNUN. circuit-breakers give circuit protection to the ‘unsafe’ control relay and the position indicating and warning systems.

Trouble-Shooting

1. General

This table gives you the trouble-shooting data for the position and warnings system. Refer to Section 32-10 fro trouble-shooting the main landing gear. Refer to Section 32-20 for trouble-shooting the nose landing gear. Refer to Section 32-30 for trouble-shooting the extension and retraction system.

If you find the trouble given in Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
The red UNSAFE indicator stays lit when the landing gear is retracted.	One of the landing gear retracted switches is defective.	Replace the related landing gear retracted switch.
The red UNSAFE indicator stays lit when the landing gear is down. All green indicators are lit.	Control relay defective.	Replace the control relay.
The red UNSAFE indicator stays lit when the landing gear is down. One of the 3 green indicators not lit.	The folding-stay switch is not adjusted properly.	Adjust the folding-stay switch properly.
	The folding-stay switch defective for the landing gear leg for which the green indicator is not lit.	Replace the related folding-stay switch.
	The green indicator led is unserviceable and the control relay is defective.	Check the light bulb and replace as necessary. Replace the control relay.

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Maintenance Practices

1. General

This Section tells you how to remove/install the major components of the position and warning system. It also tells you how to adjust some of the switches. Refer to these Sections for data about other landing gear systems:

– Section 32-10. Main landing gear.

– Section 32-20. Nose landing gear.

– Section 33-30. Extension and retraction system.

Refer to Chapter 92-00 for the wiring diagrams of the electrical circuits.

Figures 2 thru 4 show the locations of the position and warning switches.

2. Remove/Install an Engine Power Lever Switch

A. Remove an Engine Power Lever Switch

	Detail Steps/Work Items	Key Items/References
(1)	Pull the GEAR and GEAR ANNUN/ELEV LIMIT circuit-breakers.	Instrument panel. Right side.
(2)	Release the engine control quadrant and lift it clear of the center console.	Refer to Chapter 76-00.
(3)	Remove an engine power lever switch:	
	– Move both the engine power levers to TAKE-OFF.	To move the switch operating rod clear of the switches.
	– Disconnect the electrical cables to the switch that you will remove.	At the in-line connector.
	– Remove the 2 nuts, washers and bolts that attach the switch that you will remove to the structure.	Take care to retain the nuts, washers and bolts. Hold the switch.
	– Move the switch clear of the engine control quadrant.	

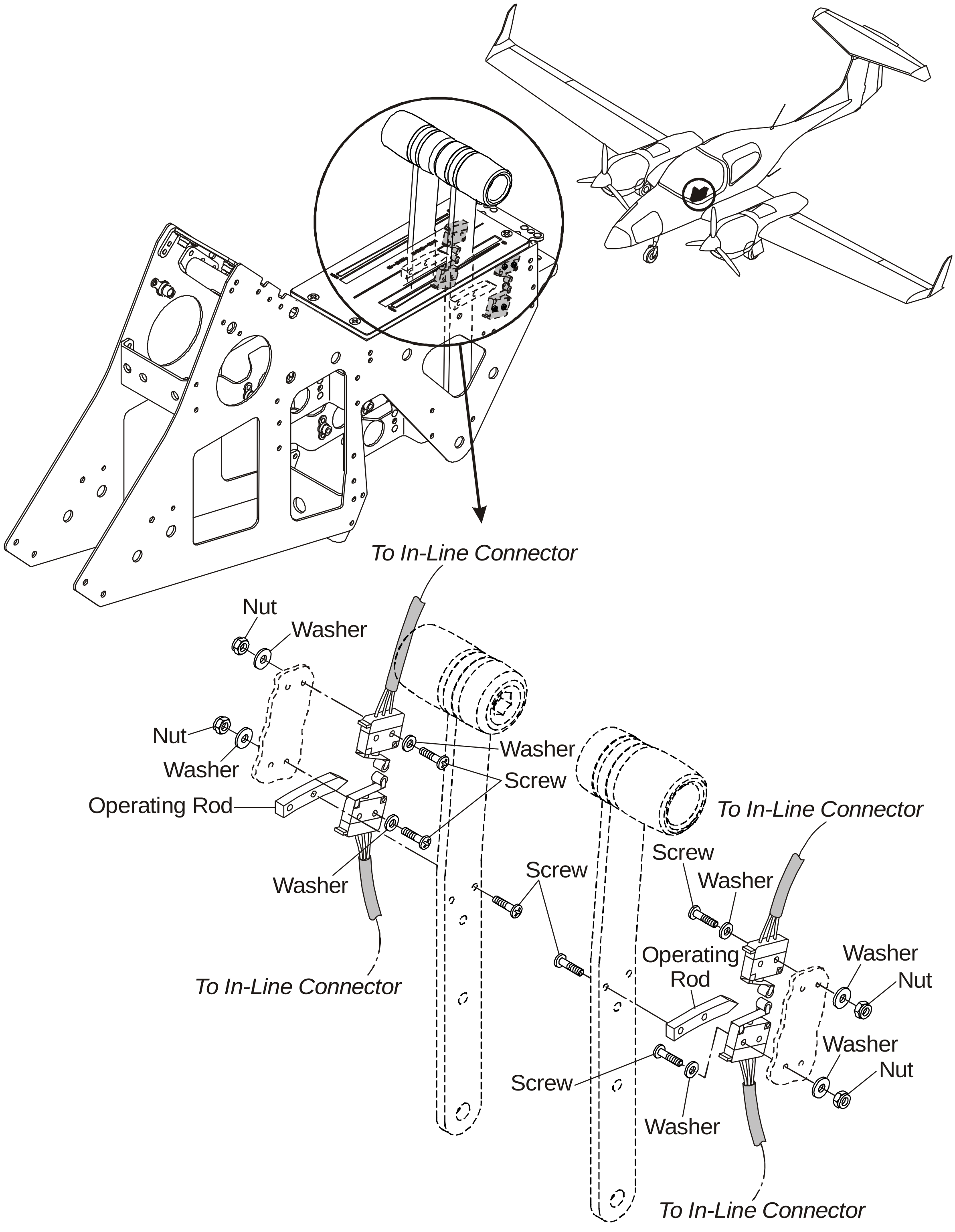

Figure 2: Engine Power Lever Switch Installation

B. Install an Engine Power Lever Switch

	Detail Steps/Work Items	Key Items/References
(1)	Install the switch: – Move the switch into position in the engine control quadrant. – Install the 2 screws, washers and nuts that attach the switch to the structure. – Connect the electrical cables for the switch.	
(2)	Install the engine control quadrant.	Refer to Chapter 76-00.
(3)	Reset the GEAR and GEAR ANNUN/ELEV LIMIT circuit-breakers.	Instrument panel. Right side.
(4)	Do a test of the landing gear position and warning system.	Refer to Paragraph 5.

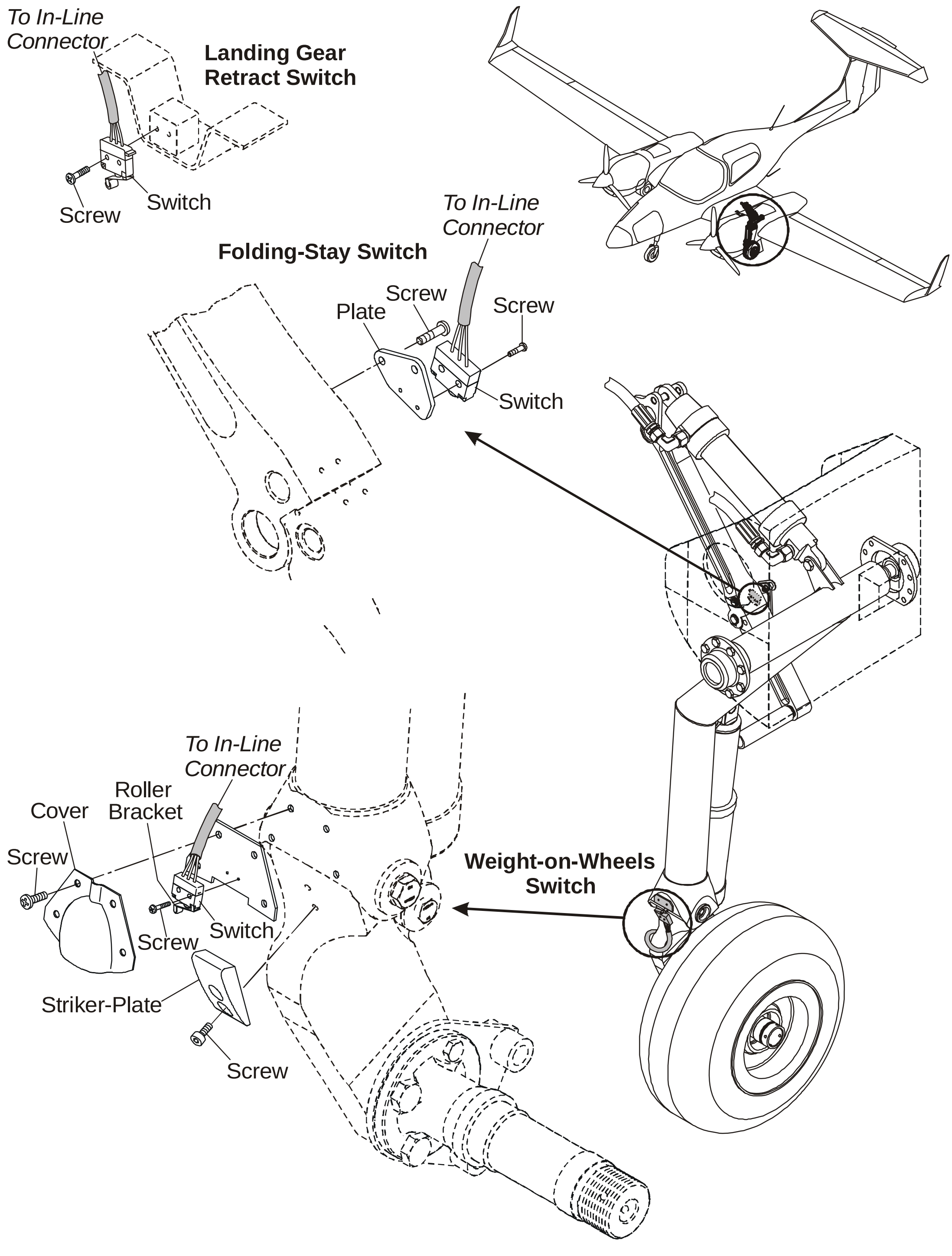

Figure 3: Position and Warning Switches - Main Landing Gear, S/N up to 42.007

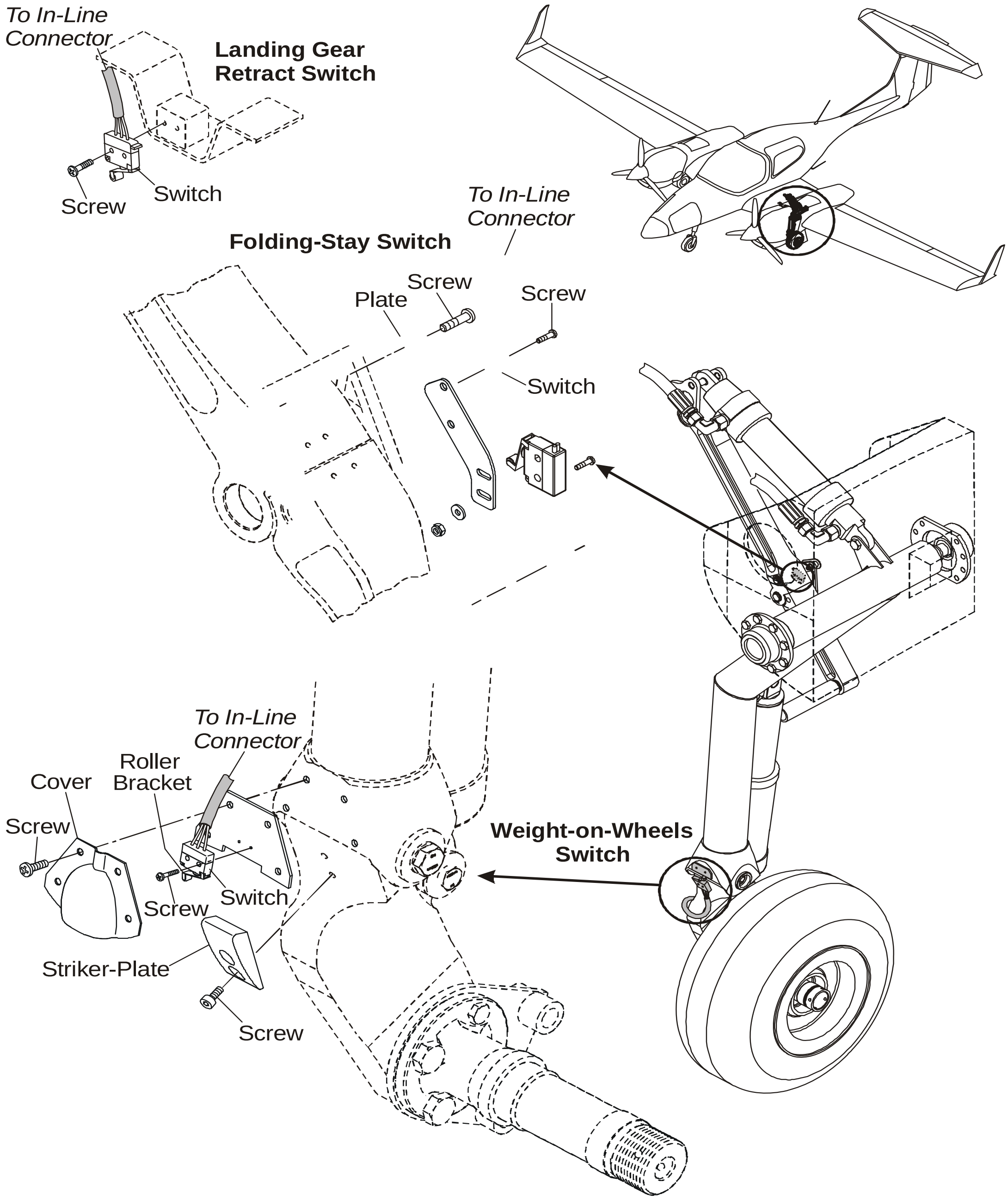

Figure 4: Position and Warning Switches - Main Landing Gear, S/N above 42.007

3. Replace a Landing Gear Switch (excluding the Nose Gear Folding Stay Switch)

Use this procedure for the following landing gear switches:

- Main gear folding stay switch.
- Main gear retract switch.
- Main gear weight on wheels switch.
- Nose gear differential switch.
- Nose gear retract switch.

The table will tell you where procedures are different for some switches.

A. Replace a Landing Gear Switch

	Detail Steps/Work Items	Key Items/References
(1)	Pull the GEAR and GEAR ANNUN/ELEV LIMIT circuit-breakers.	Instrument panel. Right side.
(2)	Locate the switch that you will replace.	Refer to Figure 3.

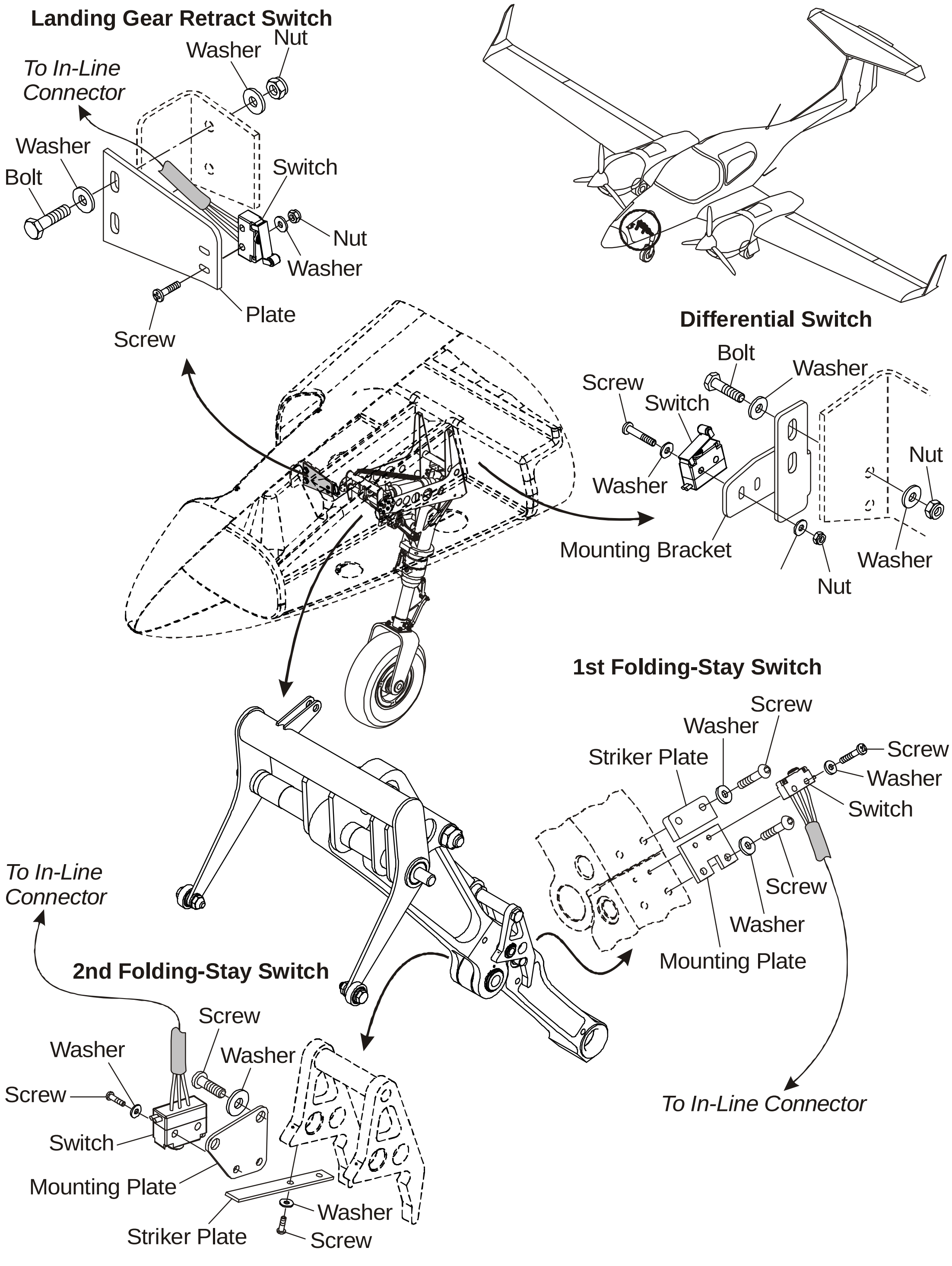

Figure 5: Position and Warning Switches - Nose Landing Gear

	Detail Steps/Work Items	Key Items/References
(3)	Replace the switch: – Remove any cable-ties that may secure the electrical cables for the switch to the structure. – Remove the protective cover for the switch. – Disconnect the electrical cables for the switch. – Remove the 2 screws and washers that attach the switch. – Remove the roller bracket. – Move the old switch clear of the mounting. – Move the new switch into position in the mounting. – Install the roller bracket. – Install the 2 screws and washers that attach the switch. – Adjust Landing Gear switch. – Reconnect the electrical cables for the switch. – Install the cable-ties that attach the electrical cables for the switch to the structure. – Install the protective cover for the switch.	Note the position of the cable-ties.
(4)	Reset the GEAR and GEAR ANNUN/ELEV LIMIT circuit-breakers.	Instrument panel. Right side.
(5)	Do a test of the landing gear position and warning system.	Refer to Paragraph 5.

4. Replace a Nose Gear Folding Stay Switch

Use the following procedure for the nose gear folding stay switch.

A. Replace a Nose Gear Folding Stay Switch

	Detail Steps/Work Items	Key Items/References
(1)	Pull the GEAR and GEAR ANNUN/ELEV LIMIT circuit-breakers.	Instrument panel. Right side.
(2)	Locate the switch that you will replace.	Refer to Figure 5.
(3)	Replace the switch:	
	– Remove any cable-ties that may secure the electrical cables for the switch to the structure.	Note the position of the cable-ties.
	– Disconnect the electrical cables for the switch.	At the in-line connector.
	– Remove the 2 screws and washers that attach the switch.	
	– Move the old switch clear of the mounting.	
	– Move the new switch into position .	
	– Install the 2 screws and washers that attach the switch.	
	– Reconnect the electrical cables for the switch.	At the in-line connector.
	– Install the cable-ties that attach the electrical cables for the switch to the structure.	At the positions noted.
(4)	Reset the GEAR and GEAR ANNUN/ELEV LIMIT circuit-breakers.	Instrument panel. Right side.
(5)	Do a test of the landing gear position and warning system.	Refer to Paragraph 5.

5. Adjust Landing Gear Indication Micro Switches (excluding Nose Gear Folding Stay Switch)

A. Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.

The following landing gear switches can be adjusted with this procedure:

– Main gear folding stay switch (LH and RH).

– Main gear retract switch (LH and RH).

– Main gear weight on wheels switch (LH and RH).

– Nose gear differential switch.

– Nose gear retract switch.

B. Adjust Main/Nose Gear Retract Switches and Differential Switch

	Detail Steps/Work Items	Key Items/References
	WARNING: TAKE PRECAUTIONS BY SECURING THE AREA AROUND THE AIRPLANE BEFORE YOU PERFORM MAINTENANCE ON THE LANDING GEAR. THE LANDING GEAR RETRACTION SYSTEM CAN CAUSE SERIOUS INJURY TO PERSONS IF OPERATED ACCIDENTALLY.	
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(3)	Connect an external power supply to the airplane.	Refer to Section 24-40.
(4)	Remove the main/nose gear doors to get access to the landing gear.	Refer to Section 32-10 or 32-20.
(5)	Reset the GEAR circuit breaker.	

	Detail Steps/Work Items	Key Items/References
(6)	Set the ELECT. MASTER switch to ON.	
(7)	Retract the landing gear.	Refer to Section 32-30.
(8)	Adjusting the micro switches: – Open the two screws which hold the micro switch in position. – Adjust the micro switch so that the gap between the micro switch lever and the micro switch body is approx. 1 - 2 mm (0.04 - 0.08 in). – Tighten the two screws on the micro switch.	Refer to Figures 3, 4 and 5 to see where the micro switches are located. The gap of 1 - 2 mm (0.04 - 0.08 in) ensures that the lever is far enough away from the switch point and that it is not overstretched which can cause the lever to break.
(9)	Extend the landing gear.	Refer to Section 32-30.
(10)	Set the ELECT. MASTER switch to OFF.	
(11)	Pull the GEAR circuit breaker.	
(12)	Install the main/nose gear doors.	Refer to Section 32-10 or 32-20.
(13)	Move the wing and rear fuselage trestles clear of the airplane.	
(14)	Lower the airplane with the jacks.	Make sure that the area around the airplane is clear.
(15)	Re-set the GEAR circuit-breaker.	Right side of instrument panel.

C. Adjust Landing Gear Folding Stay and Weight on Wheel Switch.

	Detail Steps/Work Items	Key Items/References
(1)	Pull the GEAR circuit-breaker.	Right side of instrument panel.
(2)	This step is only necessary for adjusting the weight on wheels switch: Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 7-10.
(3)	Adjusting of the micro switches: – Open the two screws which hold the micro switch in position. – Adjust the micro switch so that the gap between the micro switch lever and the micro switch body is approx. 1 - 2 mm (0.04 - 0.08 in). – Tighten the two screws on the micro switch.	Refer to Figures 3, 4 and 5 to see where the micro switches are located. For the weight on wheels switch remove the protection cover. The gap of 1 - 2 mm (0.04 - 0.08 in) ensures that the lever is far enough away from the switch point and that it is not overstretched which can cause the lever to break.
(4)	Move the wing and rear fuselage trestles clear of the airplane and lower the airplane with the jacks.	Make sure that the area around the airplane is clear.
(5)	Reset the GEAR circuit-breaker.	Right side of instrument panel.

D. Cleaning and Maintaining the Micro Switches

Note: In case the landing gear indicators in the cockpit are not working properly it can be that the micro switches are either not adjusted right or that the micro switches have to be cleaned. Check the micro switches and their electrical connection for damage.

6. Test the Landing Gear Position and Warning System

A. Equipment

Item	Quantity	Part Number
Airplane jacks.	3	Commercial.
Wing trestle.	2	Commercial.
Rear fuselage trestle.	1	Commercial.

B. Test the Landing Gear Position and Warning System

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT LET PERSONS NEAR THE LANDING GEAR WHEN YOU DO THE POSITION AND WARNING TEST. THE LANDING GEAR CAN CAUSE INJURY TO PERSONS. CAUTION: MAKE SURE THAT THE AREA AROUND THE AIRPLANE IS CLEAR. IF THE LANDING GEAR HITS AN OBJECT THE LANDING GEAR CAN BE DAMAGED.	
(1)	Raise the airplane on jacks and move the wing and rear fuselage trestles into position to support the airplane.	Refer to Section 07-10.
(2)	Connect an external power supply to the airplane.	Refer to Section 24-40
(3)	Set the ELECT. MASTER switch to ON.	
(4)	Set both engine power levers to 100%.	Fully forward.
(5)	Retract the landing gear: – Set the landing gear selector lever to UP and you must have these indications: – All 3 green (SAFE) leds switch off. – The red led (UNSAFE) illuminates. – The landing gear retracts. – When the gear is fully retracted: – The red led (UNSAFE) switches off.	

	Detail Steps/Work Items	Key Items/References
(6)	Do a test for the correct operation of the landing gear warning horn:	
	– Move the left engine power lever to IDLE.	The landing gear warning horn must operate.
	– Move the right engine power lever to IDLE.	The landing gear warning horn must operate.
	– Move the left engine power lever to 100%.	The landing gear warning horn must operate.
(7)	Extend the landing gear:	
	– Set the landing gear selector lever to DOWN and you must have these indications:	
	– The red led (UNSAFE) illuminates.	
	– The landing gear extends.	
	– When all the landing gear legs are fully extended and locked:	
	– The red led (UNSAFE) switches off.	
	– All 3 green (SAFE) leds illuminate.	

7. Replace a Bulb of the Landing Gear Selector

	Detail Steps/Work Items	Key Items/References
(1)	Remove the lens cover.	Use a small screwdriver.
(2)	Remove the bulb: – Pull the bulb straight out.	Use a small hose, heat shrink, or equivalent.
(3)	Install the new bulb: – Push the bulb straight in.	Do not damage the bulb.
(4)	Install the lens cover.	
(5)	Test by pressing the Test button.	

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CHAPTER 33

LIGHTS

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CHAPTER 33
LIGHTS

1. General

This Chapter tells you about the cockpit and exterior lighting of the DA 42. Section 33-10 tells you about the flight compartment lighting and Section 33-40 tells you about the exterior lighting.

Note: Refer to Section 20-90 before starting maintenance work in the center wing area.

2. Description

Figure 1 shows the location of the lights.

The DA 42 has these flight compartment lights:

– Map/Reading lights.

– Placard lights.

Some avionic equipment has internal lighting. Refer to the related Section and the equipment manufacturers handbook for the equipment in your airplane. A combined ON/OFF and dimmer switch for the placard lighting is located in the instrument panel, top left.

The DA 42 has these exterior lights in one light unit at each wing tip:

– Left and right position lights. The front part of the light has a red (left) or green (right) lens. The light can only be seen from the front and the side. If OÄM 42-222 is installed, the lenses are clear and the LEDs provide the coloration.

– Rear position lights. The aft part of each wing tip light unit has a clear lens. The lights can be seen only from the rear of the airplane.

– Strobe light. The middle part of each wing tip light unit has a clear lens. The filament gives a high intensity flash. The strobe light can be seen from all directions. If OÄM 42-222 is NOT installed, a separate power unit for each strobe light is mounted in the wing-tip.

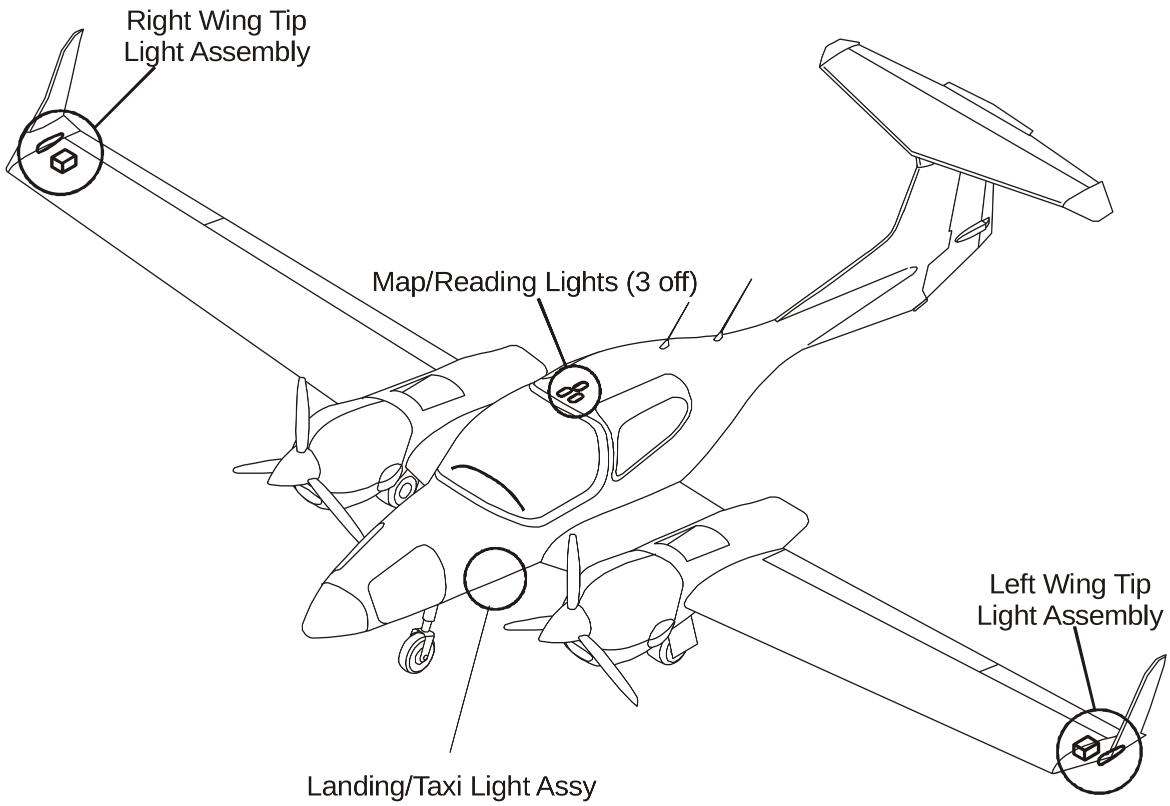

Figure 1: Flight Compartment

The DA 42 has these exterior lights mounted in a unit under the center fuselage:

- Landing light. The landing light has a clear lens and a 35 watt filament. It is located in a recess located under the center fuselage, next to the taxi light.
- Taxi light. The taxi light has an optic lens and a 35 watt filament. It is located in a recess located under the center fuselage, next to the landing light.

The switches for the landing and taxi lights are in the top left of the instrument panel. The landing and taxi lights each have electronic controllers for the xenon filaments. The electronic controllers are located on the center section floor, below the pilots' seats.

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Section 33-10
Lights - Flight Compartment

1. General

This Section tells you about the flight compartment lights of the DA 42 airplane. Refer to Chapter 92 for the wiring diagrams.

2. Description

The DA 42 has these flight compartment lights:

– Map/Reading lights.

– Instrument panel flood lighting.

– Instrument lights (placard lights).

Some avionic equipment has internal lighting. Refer to the related Section and the equipment manufacturers handbooks for the equipment installed in your airplane. Combined ON/OFF and dimmer switches for the placard lights and the flood light are located in the instrument panel, top-left side.

A. Map/Reading Lights

Map/Reading lights are located in the roof of the cockpit. The 2 lights at the front are directed towards the pilots' seats and the light at the rear is directed towards the passenger seats. Each light assembly has an integral switch and a directional beam. The system is protected by a circuit breaker located in the right side of the instrument panel.

Note: Map/Reading lights become very hot in service.

B. Instrument Panel Flood Lighting

A 115V AC foil type light strip makes the instrument panel flood light. The intensity of the light is controlled by a combined ON/OFF dimmer switch located on the top left of the instrument panel. Turn the dimmer switch fully counterclockwise to turn the flood light off. Turn the dimmer switch clockwise to turn the flood on and to set the level of lighting that you require. The strip light is held in place under the instrument panel cover with double-sided pressure sensitive tape. A solid state inverter supplies the 115V AC current and the system is protected by a circuit-breaker located on the right side of the instrument panel.

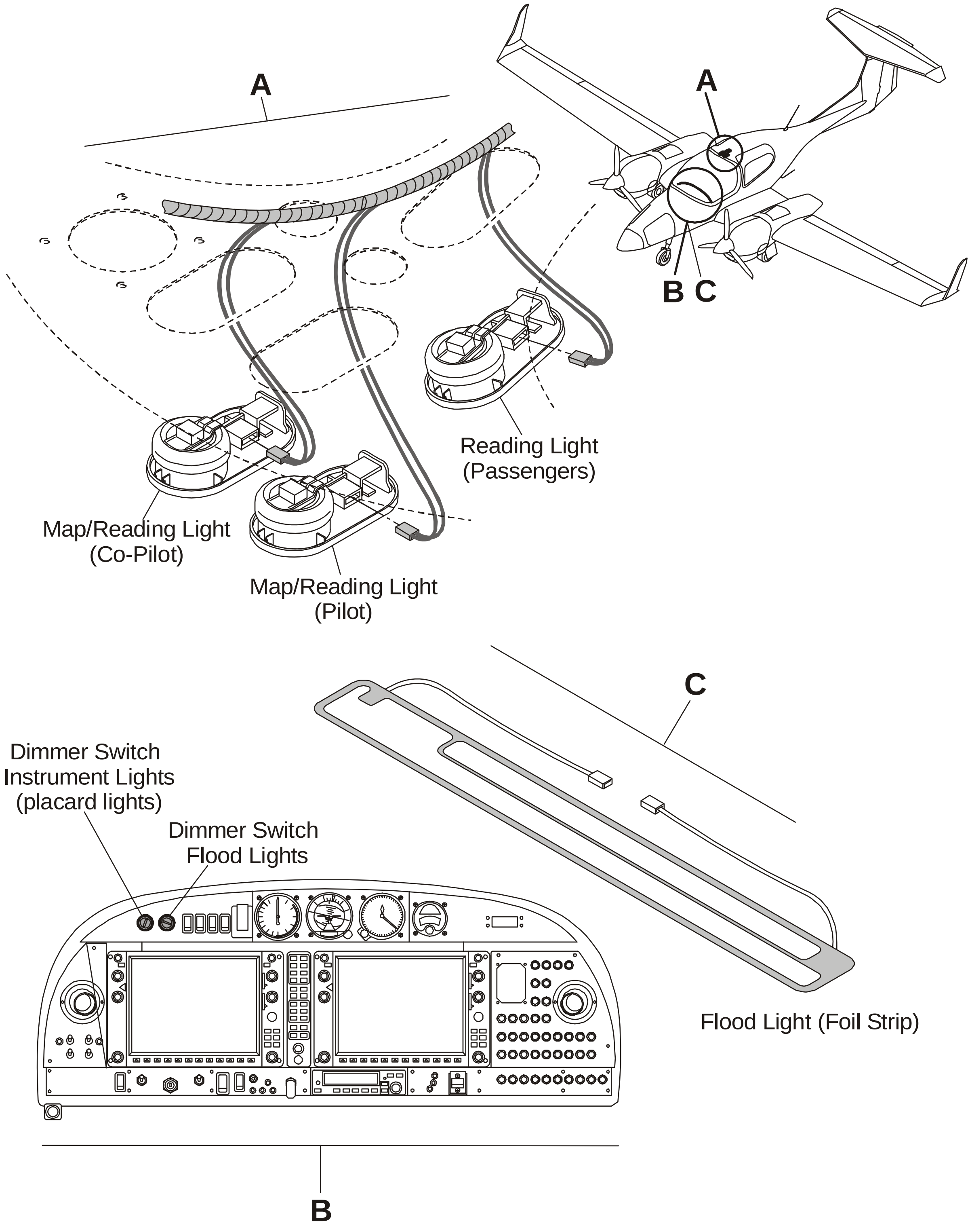

Figure 1: Flight Compartment Lights

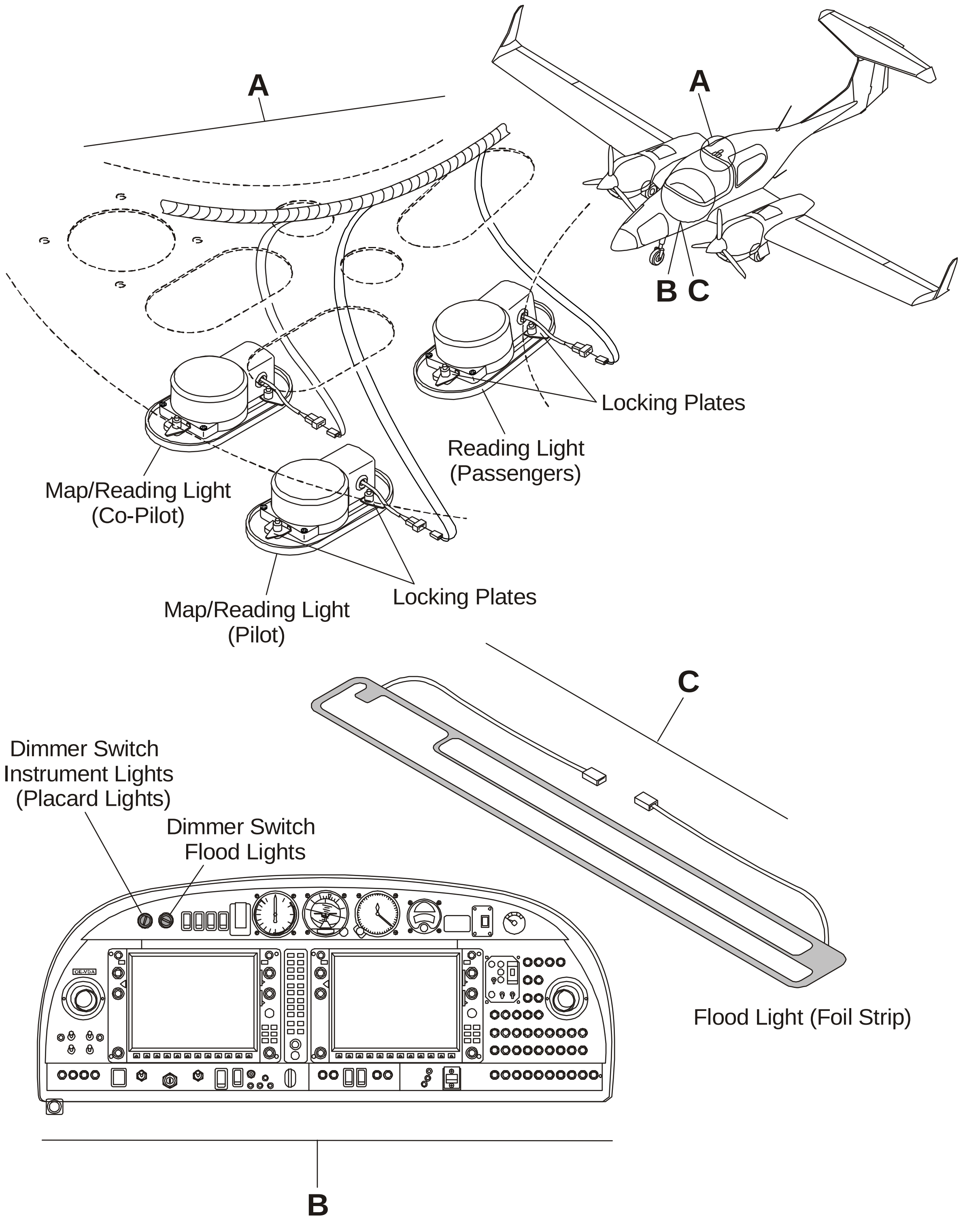

Figure 2: Flight Lights (if MÄM 42-1024 is installed)

C. Instrument Lights (Placard Lights)

The DA 42 has placards that are etched onto panels. There are 7 placard panels on the DA 42 instrument panel. Each placard panel has a dedicated light source. When the light source is switched on the placards are illuminated. The intensity of the light sources are controlled by a single ON/OFF dimmer switch located on the top left of the instrument panel. Turn the dimmer switch fully counter clockwise to turn the placard lights off. Turn the dimmer switch clockwise to turn the placard lights on and to set the level of lighting that you require.

All placard panels are attached to the instrument panel with screws. You can replace a placard panel.

Refer to Section 11-30 for more data about the placard panels.

Trouble-Shooting

1. General

This Section lists some defects you could have with the flight compartment lighting system. If you have the trouble shown in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
One of the map/reading lights does not operate.	Defective filament. Defective light unit.	Replace the filament. Replace the light unit.
The instrument panel flood light does not operate correctly.	Circuit-breaker not set. Dimmer switch defective. Solid state inverter defective. Light strip defective. Wiring defective.	Reset the circuit-breaker. Replace the dimmer switch. Replace the solid state inverter. Replace the light strip. Do a continuity test of the wiring. Repair/replace defective wiring. Refer to Chapter 92 for the wiring diagrams.
The instrument lights (placard lights) do not operate correctly. One or more light panels not operating correctly.	Circuit-breaker not set. One or more light panels defective. Dimmer switch defective. Wiring defective.	Reset the circuit-breaker. Replace defective light panel(s). Replace the dimmer switch. Do a continuity test of the wiring. Repair/replace defective wiring. Refer to Chapter 92 for the wiring diagrams.

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Maintenance Practices

1. General

These Maintenance Practices tell you how to remove/install the main components of the flight compartment lighting system. Refer to Chapter 92 for the wiring diagrams.

2. Remove/Install a Map/Reading Light Assembly (if MÄM 42-1024 is not installed)

A. Remove a Map/Reading Light Assembly

	Detail Steps/Work Items	Key Items/References
(1)	Pull the TAXI/MAP/ACL circuit-breaker.	Instrument panel, right side.
(2)	Remove the light assembly: – Release the spring clip that holds the light assembly in position. – Lower the light assembly from the cabin roof and disconnect the electrical cables. – Move the light assembly clear of the airplane.	At the switch end of the assembly. At the inline connector.

B. Install a Map/Reading Light Assembly

	Detail Steps/Work Items	Key Items/References
(1)	Move the light assembly into position in the airplane cabin.	Hold the light assembly.
(2)	Connect the electrical cables to the light assembly.	At the inline connector.
(3)	Move the light assembly into position, lamp end first, then push the switch end up into position until the spring clip engages.	Make sure that the light assembly is correctly installed and that the spring clip is fully engaged.
(4)	Reset the TAXI/MAP/ACL circuit-breaker.	
(5)	Do a test for the correct function of the light assembly.	

3. Replace a Filament in a Map/Reading Light Assembly (if MÄM 42-1024 is not installed)

	Detail Steps/Work Items	Key Items/References
(1)	Pull the TAXI/MAP/ACL circuit-breaker.	Instrument panel, right side.
(2)	Remove the light assembly.	Refer to Paragraph 2A.
(3)	Remove the filament holder from the back of the light assembly.	
(4)	Replace the filament.	
(5)	Install the filament holder to the rear of the light assembly.	
(6)	Install the light assembly.	Refer to Paragraph 2B.
(7)	Reset the TAXI/MAP/ACL circuit-breaker.	
(8)	Do a test for the correct function of the light assembly.	

4. Remove/Install a Map/Reading Light Assembly (if MÄM 42-1024 is installed)

A. Remove a Map/Reading Light Assembly

	Detail Steps/Work Items	Key Items/References
(1)	Pull the TAXI/MAP/ACL circuit breaker.	Instrument panel, right side.
(2)	Remove the light assembly:	
	– Loosen the three screws which hold the light assembly in position.	Slightly open the screws to prevent the locking plate from falling into the area behind the map lights.
	– Lower the light assembly from the cabin roof and disconnect the electrical cables.	At the in-line connector.
	– Move the light assembly clear of the airplane.	

B. Install a Map/Reading Light Assembly

	Detail Steps/Work Items	Key Items/References
(1)	Open the screws, so that the threads of the locking plates are just screwed in.	Make sure that no locking plate falls down.
(2)	Install the map light seal (self adhesive) on the map light frame.	
(3)	Move the light assembly into position in the airplane cabin.	Hold the light assembly.
(4)	Connect the electrical cables to the light assembly.	At the in-line connector.
(5)	Install the map light seal for emergency lever on the emergency exit lever that recess in the frame is covered.	
(6)	Move the light assembly into position.	Make sure that the light assembly is correctly positioned.
	CAUTION: THE LOCKING PLATES MUST BE IN CORRECT POSITION.	
(7)	Tighten the screws to fully engaged.	
(8)	Reset the TAXI/MAP/ACL circuit breaker.	
(9)	Do a test for the correct function of the light assembly.	

5. Replace a Filament in a Map/Reading Light Assembly (if MÄM 42-1024 is installed)

	Detail Steps/Work Items	Key Items/References
(1)	Pull the TAXI/MAP/ACL circuit breaker.	Instrument panel, right side.
(2)	Remove the light assembly.	Refer to Paragraph 4.
(3)	Open the black plastic cover.	Loosen three screws (M3x10).
(4)	Pull the cable with the socket out of the lamp.	
(5)	Open the nut and take out the LED lamp.	
(6)	Install a new LED lamp, tighten the nut and connect the plug.	
(7)	Close the light cover.	
(8)	Install the light assembly.	Refer to Paragraph 4.
(9)	Reset the TAXI/MAP/ACL circuit breaker.	
(10)	Do a test for the correct function of the light assembly.	

6. Remove/Install a Dimmer Switch

Use this procedure for both the FLOOD light dimmer switch and the INSTRUMENT lights dimmer switch.

A. Remove a Dimmer Switch

	Detail Steps/Work Items	Key Items/References
(1)	Disconnect the airplane main battery.	Refer to Section 24-31.
(2)	Remove the instrument panel cover.	Refer to Section 25-10.
(3)	Remove the knob from the dimmer switch that you will remove: – Loosen the grub screw that attaches the knob to the switch spindle. – Pull the knob off the switch spindle.	
(4)	Disconnect the electrical cables from the rear of the dimmer switch.	Make a note of the connections.
(5)	Remove the nut and washer from the front of the dimmer switch.	Hold the dimmer switch.
(6)	Move the dimmer switch forward and clear of the instrument panel.	

B. Install a Dimmer Switch

	Detail Steps/Work Items	Key Items/References
(1)	Move the dimmer switch into position in the instrument panel.	From the forward side of the panel. Make sure that the locating peg on the switch engages with the hole in the instrument panel.
(2)	Install the washer and nut that attaches the dimmer switch to the instrument panel.	Make sure that the dimmer switch is installed with the correct orientation.
(3)	Connect the electrical cables to the rear of the dimmer switch.	Refer to Chapter 92 for the wiring diagrams. Use the note that you made at Paragraph 4A step (4).
(4)	Install the knob to the front of the dimmer switch: – Align the flat on the switch spindle with the flat in the bore of the knob. – Push the knob onto the switch spindle. – Tighten the grub screw that holds the knob onto the switch spindle.	
(5)	Install the instrument panel cover.	Refer to Section 25-10.
(6)	Connect the airplane main battery.	Refer to Section 24-31.
(7)	Do a test for the correct operation of the dimmer switch: – Set the ELECT. MASTER switch to ON. – Rotate the dimmer switch clockwise. – Rotate the dimmer switch fully clockwise. – Rotate the dimmer switch fully counter-clockwise to the OFF position. – Set the ELECT. MASTER switch to OFF.	 The system light(s) must come on. The intensity of the light(s) must increase. The light(s) must go off.

7. Replace the Flood Light/Instrument Light Strip

You cannot remove the flood light/instrument light strip without causing damage to the strip. Only remove the flood light/instrument light strip if it is defective.

	Detail Steps/Work Items	Key Items/References
(1)	Disconnect the airplane main battery.	Refer to Section 24-31.
(2)	Remove the instrument panel cover and place on a clean work bench.	Refer to Section 25-10.
(3)	Remove the light strip from the inside of the instrument panel cover: – Peel the light strip away from the panel cover.	
(4)	Install the new flood light/instrument light strip to the inside of the instrument panel cover: – Make sure that the area where the light strip attaches to the instrument cover is clean. – Apply double-sided tape to the back of the light strip. – Position the flood light/instrument light strip and firmly press into place.	Use a commercial solvent. Obey the solvent manufacturer’s directions. Use the tape specified in the DA 42 Illustrated Parts Catalog or that is supplied with the flood light strip.
(5)	Install the instrument panel cover.	Refer to Section 25-10.
(6)	Connect the airplane main battery.	Refer to Section 24-31.

	Detail Steps/Work Items	Key Items/References
(7)	Do a test for the correct operation of the flood light/instrument light panel:	
	– Set the ELECT. MASTER switch to ON.	
	– Rotate the FLOOD light/INSTRUMENT light dimmer switch fully clockwise.	The light strip must come on bright.
	– Rotate the FLOOD light/INSTRUMENT light dimmer switch a small amount counter-clockwise.	The light strip must go dimmer.
	– Rotate the FLOOD light/INSTRUMENT light dimmer switch fully counter-clockwise.	The light strip must go off.
	– Set the ELECT. MASTER switch to OFF.	

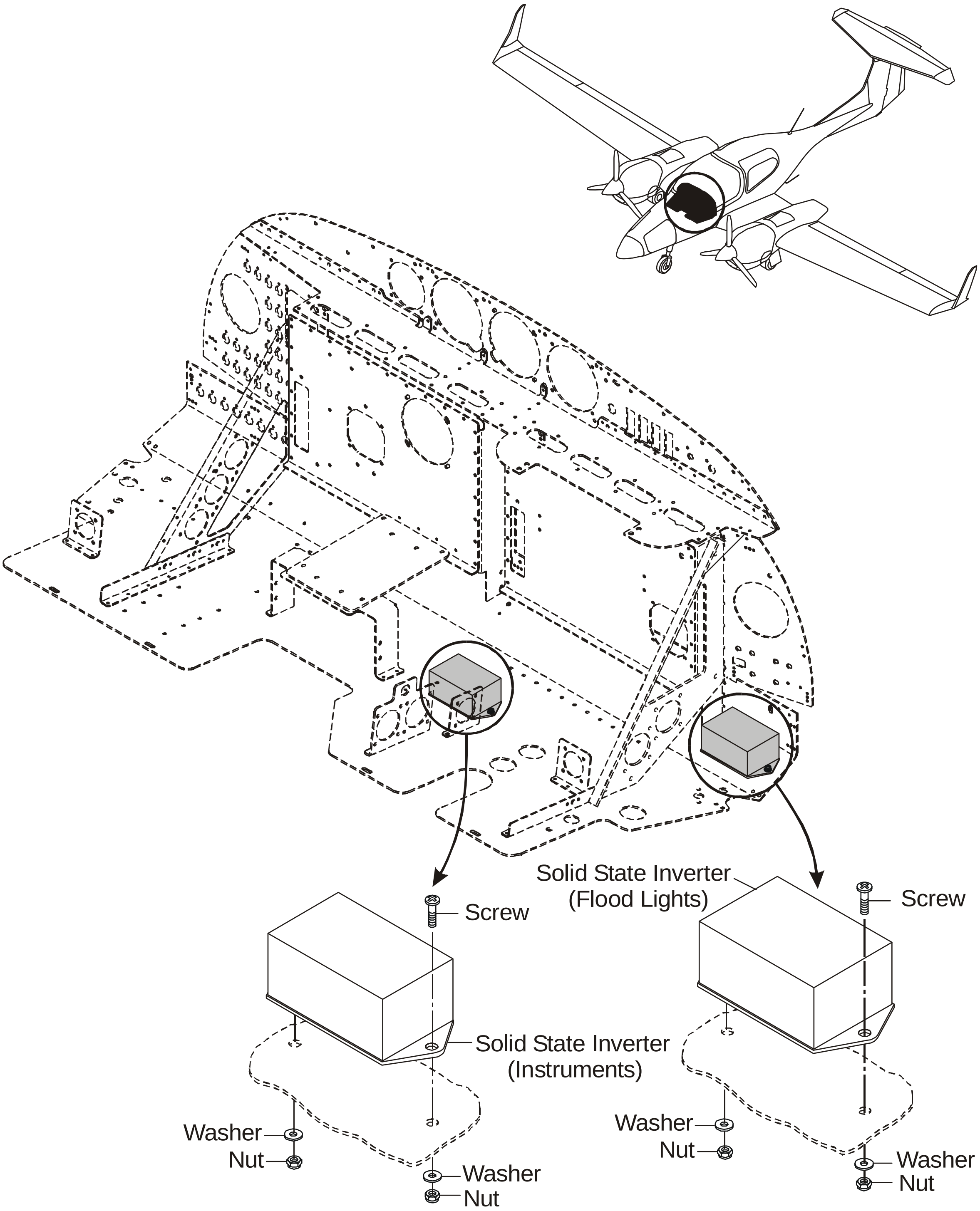

Figure 2: Solid State Inverters for the Instrument and Flood Lights

8. Remove/Install a Solid State Inverter for the Flood Light/Instrument Lights

Use this procedure for both the flood light inverter and the instrument lights inverter.

A. Remove a Solid State Inverter

	Detail Steps/Work Items	Key Items/References
(1)	Disconnect the airplane main battery.	Refer to Section 24-31.
(2)	Remove the instrument panel cover.	Refer to Section 25-10.
(3)	Disconnect the electrical cables from the inverter.	At the in-line connector.
(4)	Remove the inverter: – Remove the 2 screws, washers and nuts that attach the inverter to the instrument panel floor. – Move the inverter clear of the instrument panel.	

B. Install a Solid State Inverter

	Detail Steps/Work Items	Key Items/References
(1)	Install the inverter: – Move the inverter into position on the instrument panel floor. – Install the 2 washers, screws and nuts that attach the inverter to the instrument panel floor.	
(2)	Connect the electrical cables to the inverter.	At the inline connector.
(3)	Install the instrument panel cover.	Refer to Section 25-10.
(4)	Connect the airplane main battery.	Refer to Section 24-31.

	Detail Steps/Work Items	Key Items/References
(5)	Do a test for the correct operation of the inverter:	
	– Set the ELECT. MASTER switch to ON.	
	– Rotate the related dimmer switch clockwise.	The system light(s) must come on.
	– Rotate the related dimmer switch fully clockwise.	The intensity of the light(s) must increase.
	– Rotate the dimmer switch fully counter-clockwise to the OFF position.	The light(s) must go off.
	– Set the ELECT. MASTER switch to OFF.	

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Section 33-40
Exterior Lights

1. General

This Section tells you about the exterior lights of the DA 42. The DA 42 has these exterior lights:

- Position lights.
- Strobe lights.
- Landing light.
- Taxi light.

2. Description

The DA 42 has the position lights and the strobe lights in a single light unit in each wing tip. The taxi and landing lights are located below the fuselage. Figure 1 and 2 show the wing tip light unit and Figure 3 shows the landing and taxi lights.

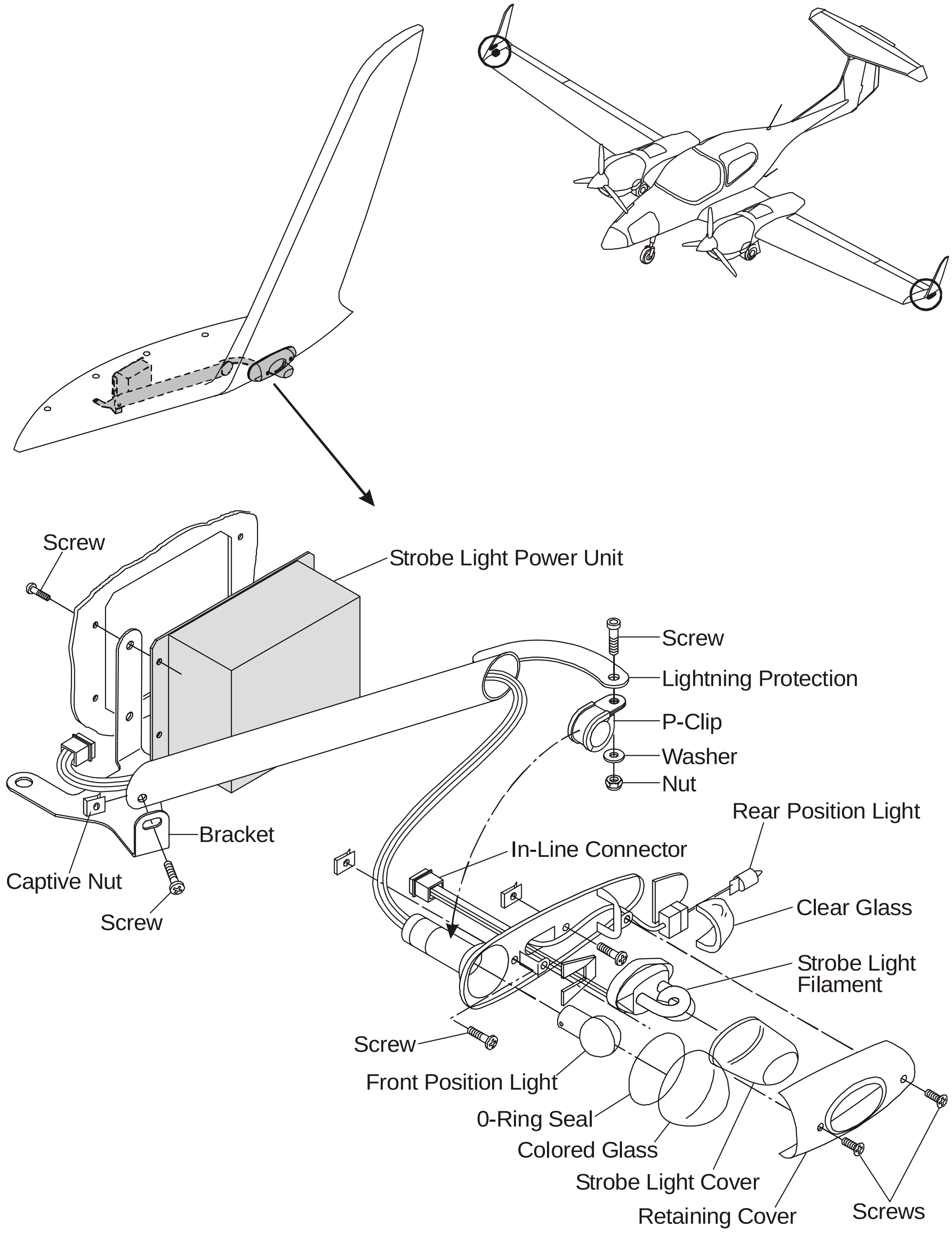

Figure 1: Wing Tip Light Unit and Strobe Power Unit

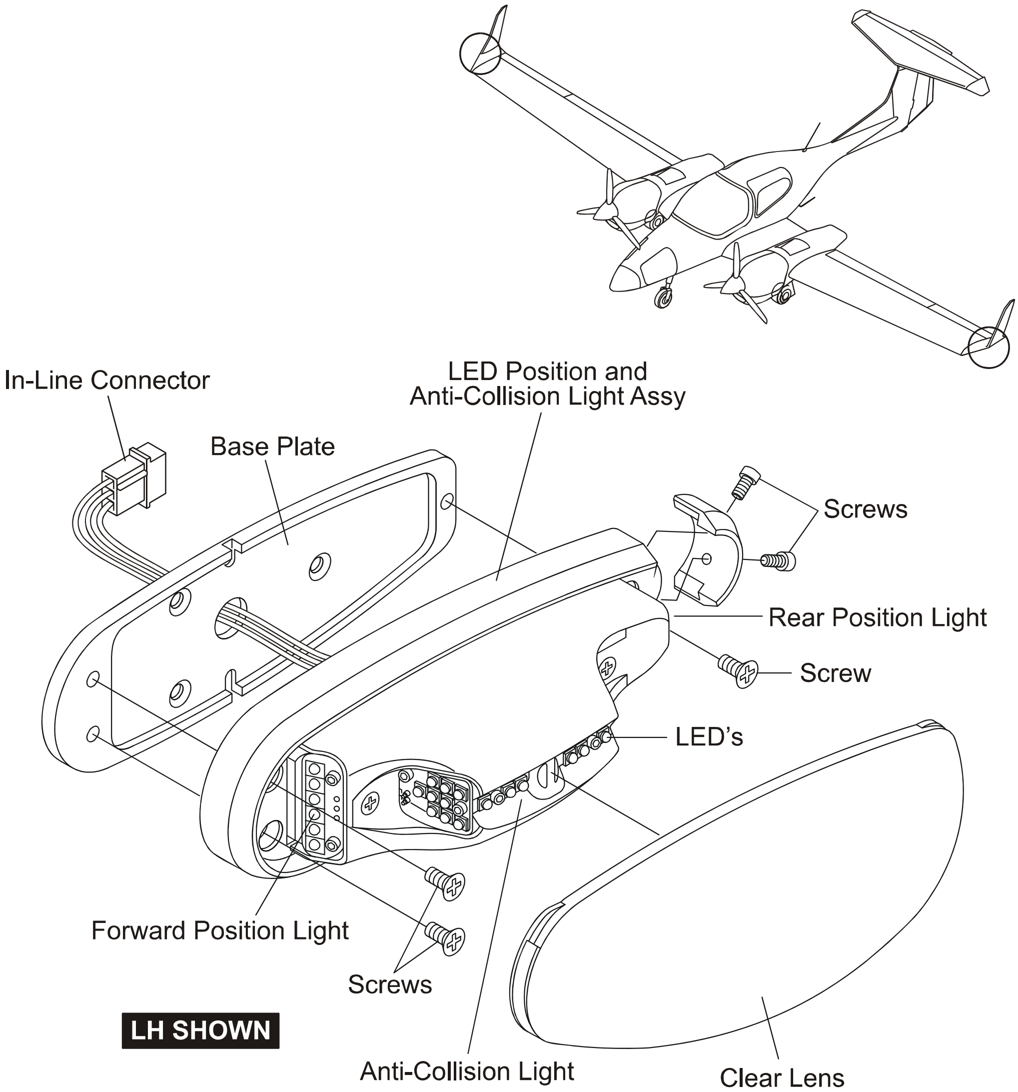

Figure 2: Wing Tip Light Unit (if OÄM 42-222 is installed)

A. Position Lights (if OÄM 42-222 is NOT installed)

The DA 42 has left and right position lights. The front part of each light unit has a red (left) lens or green (right) lens. The light can only be seen from the front or the side of the airplane.

Each light unit also has an aft light. Each aft light has a clear lens. The light can only be seen from the rear of the airplane.

A switch on the top left of the instrument panel controls the position lights and a circuit-breaker protects the system.

B. Strobe Light (Anti-Collision Light - ACL) (if OÄM 42-222 is NOT installed)

The middle part of each wing tip light unit has a clear optic lens for a strobe light. The filament gives a high intensity flash. This is followed immediately by a less bright flash. The double-flashes occur about 50 times per minute. The strobe lights can be seen from all round the airplane.

A separate power unit for each strobe light is mounted in the wing tip. A switch on the top left of the instrument panel controls both the strobe lights and the system is protected by a circuit-breaker.

The power unit generates an electrical impulse of approximately 600 Volts. The pulse ionizes the gas in the strobe light which causes a bright flash. A second less powerful pulse occurs immediately after the main pulse to give the lower intensity second flash.

C. LED Position and Anti-Collision Light (if OÄM 42-222 is installed)

The DA 42 has left and right LED position and anti-collision light assemblies. The position and anti-collision lights are installed on a base plate covered by a clear lens. The LEDs provide the coloration. The forward position light is covered with red (left) or green (right) LEDs. The rear position light is designed with two white LEDs. The anti-collision light is designed with 24 white LEDs. If one of the LEDs fails, the unit must be replaced.

The position lights and the anti-collision lights are controlled by separate switches and are protected by individual circuit breakers.

D. Landing Light

The landing light is located in a housing below the center fuselage, on the left. The landing light has a clear lens and Xenon filament. The landing light has an electronic controller located on the wing center section floor, below the pilots' seats. A switch on the top left of the instrument panel controls the landing light and a circuit-breaker protects the system.

E. Taxi Light

The taxi light is located in a housing below the center fuselage, on the right. The taxi light has optic lens and Xenon filament. The taxi light has an electronic controller located on the wing center section floor, below the pilots' seats. A switch on the top left of the instrument panel controls the taxi light and a circuit-breaker protects the system.

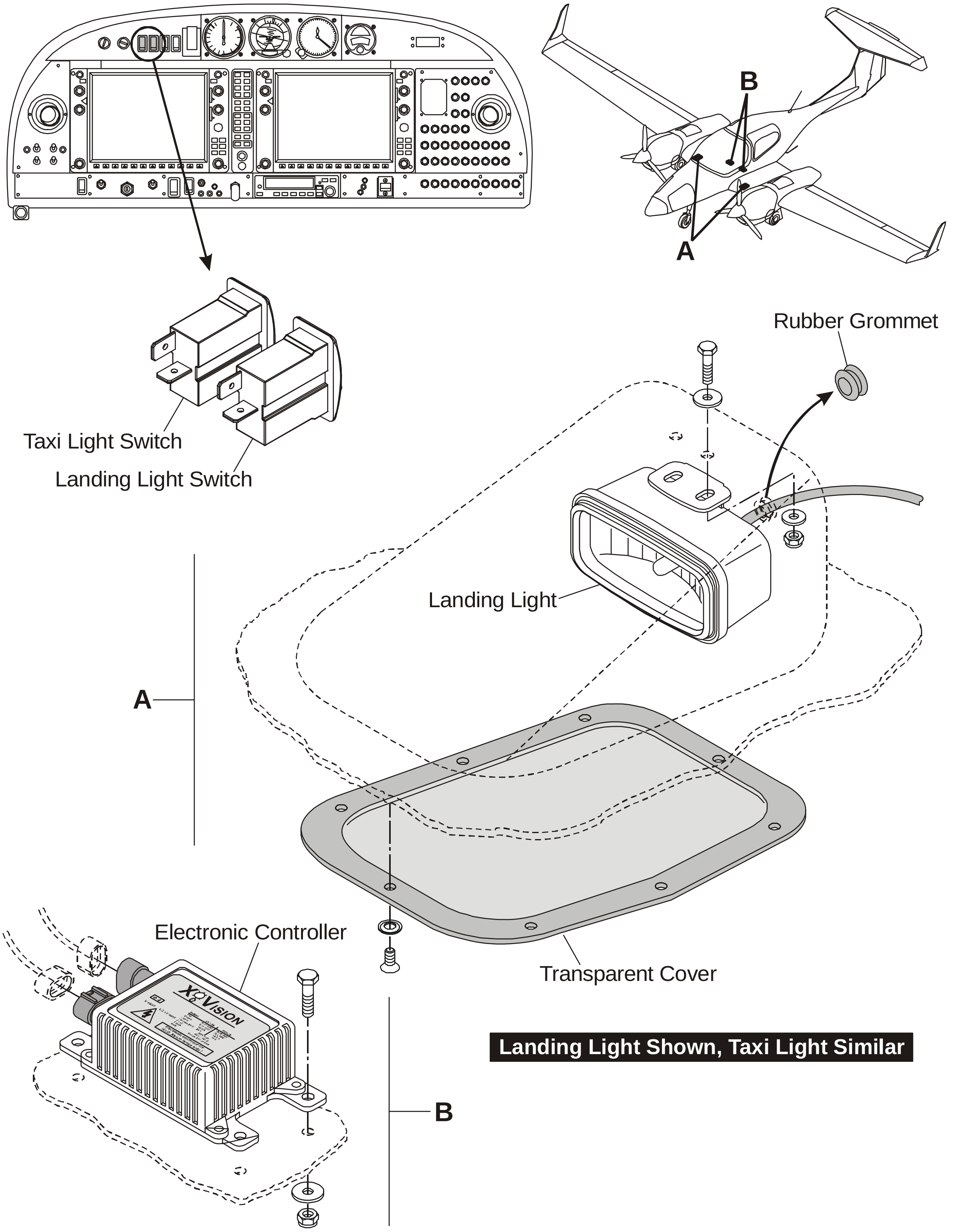

Figure 2: Landing and Taxi Light Installation

Trouble-Shooting

1. General

This Section lists some defects you could have with the exterior lighting system. If you have the trouble shown in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Both position lights do not operate.	Circuit-breaker not set or defective.	Reset/replace circuit-breaker.
	Defective position light switch.	Replace the switch.
	Defective wiring.	Do a continuity test of the wiring. Repair/replace defective wiring. Refer to Chapter 92 for the wiring diagrams.
One position light does not operate.	Defective filament.	Replace the filament.
	Defective wiring.	Do a continuity test of the wiring. Repair/replace defective wiring. Refer to Chapter 92 for the wiring diagrams.
Both strobe lights do not operate.	Circuit-breaker not set or defective.	Reset/replace circuit-breaker.
	Defective strobe light switch.	Replace the switch.
	Defective wiring.	Do a continuity test of the wiring. Repair/replace defective wiring. Refer to Chapter 92 for the wiring diagrams.

Trouble	Possible Cause	Repair
One strobe light does not operate.	Defective power supply unit (if OÄM 42-222 is NOT installed).	Replace the power supply unit.
	Defective strobe unit or LED.	Replace the strobe unit or the light assembly.
	Defective wiring.	Do a continuity test of the wiring. Repair/replace defective wiring. Refer to Chapter 92 for the wiring diagrams.
Strobe and position light does not operate on one side.	Connector at outer wing to center section disconnected.	Connect the connector.
Landing light or taxi light does not operate.	Defective light unit.	Replace the defective light unit.
	Defective electronic controller.	Replace the defective electronic controller.
	Circuit-breaker not set or defective.	Reset/Replace circuit-breaker.
	Defective landing light or taxi light switch.	Replace the defective switch.
	Loose connector at the light unit.	Connect the connector correctly.
	Defective wiring.	Do a continuity test of the wiring. Repair/replace defective wiring. Refer to Chapter 92 for the wiring diagrams.

Maintenance Practices

1. General

These Maintenance Practices tell you how to remove/install defective filaments and light units. They also tell you how to remove/install the major components of the exterior lighting system. Refer to Chapter 92 for the wiring diagrams.

WARNING: DO NOT OPERATE THE STROBE LIGHTS WHEN PERSONS ARE CLOSE TO THE AIRPLANE. DO NOT LOOK AT THE LIGHT WHEN IT OPERATES. STROBE LIGHTS CAN CAUSE EYE DAMAGE.

WARNING: AFTER YOU SET THE AIRPLANE POWER OFF YOU MUST WAIT A MINIMUM OF 5 MINUTES BEFORE YOU DO WORK ON THE STROBE LIGHTS. THE POWER SUPPLIES TO THE STROBE LIGHTS GENERATE HIGH VOLTAGES. HIGH VOLTAGES CAN CAUSE INJURY OR DEATH TO PERSONS.

2. Remove/Install the Taxi Light

A. Remove the Taxi Light

	Detail Steps/Work Items	Key Items/References
(1)	Set the ELECT. MASTER switch to OFF.	Instrument panel.
(2)	Set the TAXI light switch to OFF.	Top left of instrument panel.
(3)	Set the TAXI/MAP/ACL circuit-breaker open.	Pull.
(4)	Remove the co-pilot’s seat.	Refer to Section 25-10.
(5)	Remove the taxi light cover from below the center fuselage: – Remove the 8 screws and washers that attach the light cover to the housing. – Move the light cover clear of the housing.	Refer to Figure 3.
(6)	Remove the 2 nuts, washers and bolts that attach the taxi light unit to the structure.	
(7)	Hold the taxi light and move out a small way from the housing and disconnect the electrical cables. Move the taxi light clear of the housing.	At the in-line connector.

B. Install the Taxi Light

	Detail Steps/Work Items	Key Items/References
(1)	Install the taxi light unit: – Move the light unit into position by the housing. – Connect the electrical connections to the light unit. – Move the light unit fully into position in the housing. – Install the 2 bolts, washer and nuts that attach the light unit to the structure.	Refer to Figure 3. At the in-line connector.
(2)	Install the light cover: – Move the light cover into position below the fuselage. – Install the 8 screws and washers that attach the light cover to the light housing.	
(3)	Reset the TAXI/MAP/ACL circuit-breaker.	Instrument panel, right side.
(4)	Set the ELECT. MASTER switch to ON.	Instrument panel.
(5)	Do a test for the correct operation of the taxi light: – Set the TAXI light switch to ON. – The taxi light must come on. – Set the TAXI light switch to OFF. – The taxi light must go off.	
(6)	Set the ELECT. MASTER switch to OFF.	Instrument panel.
(7)	Install the co-pilot's seat.	Refer to Section 25-10.

3. Remove/Install the Landing Light

A. Remove the Landing Light

	Detail Steps/Work Items	Key Items/References
(1)	Set the ELECT. MASTER switch to OFF.	Instrument panel.
(2)	Set LANDING light switch to OFF.	Top left of instrument panel.
(3)	Set the LDG LT/START circuit-breaker open.	Pull.
(4)	Remove the pilot’s seat.	Refer to Section 25-10.
(5)	Remove the landing light cover from below the center fuselage: – Remove the 8 screws and washers that attach the cover to the light housing. – Move the light cover clear of the housing.	Refer to Figure 3.
(6)	Remove the 2 nuts, washers and bolts that attach the landing light unit to the structure.	
(7)	Hold the landing light and move out a small way from the housing and disconnect the electrical cables. Move the landing light clear of the housing.	At the in-line connector.

B. Install the Landing Light

	Detail Steps/Work Items	Key Items/References
(1)	Install the landing light unit: – Move the light unit into position by the housing. – Connect the electrical connections to the light unit. – Move the light unit fully into position in the housing. – Install the 2 bolts, washers and nuts that attach the light unit to the structure.	Refer to Figure 3. At the inline connector.
(2)	Install the light cover onto the housing: – Move the light cover into position at the housing. – Install the 8 screws and washers that attach the light cover to the light housing.	
(3)	Reset the LDG LT/START circuit-breaker.	Instrument panel, right side.
(4)	Set the ELECT. MASTER switch to ON.	Instrument panel.
(5)	Do a test for the correct operation of the landing light: – Set the LANDING light switch to ON. – The landing light must come on. – Set the LANDING light switch to OFF. – The landing light must go off.	
(6)	Set the ELECT. MASTER switch to OFF.	Instrument panel.
(7)	Install the pilot's seat.	Refer to Section 25-10.

4. Remove/Install an Electronic Controller

Use this procedure for both the landing light and taxi light electronic controllers. Refer to Figure 3.

A. Remove an Electronic Controller

	Detail Steps/Work Items	Key Items/References
(1)	Set the ELECT. MASTER switch to OFF.	Instrument panel.
(2)	Set LANDING/TAXI light switch to OFF.	Top left of instrument panel.
(3)	Set the LDG LT/START or TAXI/MAP/ACL circuit-breaker open as necessary.	Pull. Right side of instrument panel.
(4)	Remove the pilot's/co-pilot's seat as required.	Refer to Section 25-10.
(5)	Remove the electronic controller: – Disconnect the electrical cables form the controller. – Remove the nuts, washers, bolts and bonding wire lead that attach the controller to the structure. – Move the controller clear of the airplane.	Refer to Figure 3. Note the position of the wire bonding lead.

B. Install an Electronic Controller

	Detail Steps/Work Items	Key Items/References
(1)	Install the electronic controller: – Move the controller into position under the pilots' seats. – Install the 2 bolts, washers, wire bonding lead and nut that attaches the controller to the airplane structure.	
(2)	Connect the electrical cables to the controller.	At the in line connectors.
(3)	Do a test for the correct operation of the LANDING/TAXI light: – Set the LDG LT/START or TAXI/MAP/ACL circuit-breaker as necessary. – Set the ELECT. MASTER switch to ON. – Set the LANDING/TAXI light switch to ON. – Set the LANDING/TAXI light switch to OFF. – Set the ELECT. MASTER switch to OFF.	 Push the circuit-breaker in. Right side of instrument panel. Instrument panel, lower. The related light must come on. The related light must go off.
(4)	Install the pilot's/co-pilot's seat as required.	Refer to Section 25-10.

5. Replace a Filament in the Wing Tip Light Unit (OÄM 42-222 is NOT installed)

A. Replace a Position Light Filament in the Wing Tip

	Detail Steps/Work Items	Key Items/References
(1)	Set the ELECT. MASTER switch to OFF.	
WARNING:	**AFTER YOU SET THE POWER TO OFF YOU MUST WAIT A MINIMUM OF 5 MINUTES BEFORE YOU DO WORK ON THE STROBE LIGHTS. THE POWER SUPPLIES TO THE STROBE LIGHTS GENERATE HIGH VOLTAGE. HIGH VOLTAGE CAN CAUSE DEATH OR INJURY TO PERSONS.**	
(2)	Set these circuit-breakers open: – INST LT/NAV LT. – TAXI/MAP/ACL.	
(3)	Remove the light unit cover and the lamp glasses from the wing tip unit: – Remove the 2 screws that attach the cover to the unit. – Remove the cover. – Remove the glasses and seals.	Refer to Figure 1. Hold the cover and glasses.
(4)	Replace the defective filament.	
(5)	Install the lamp glasses and light unit cover: – Move the glasses into position with the seals. – Move the light unit cover into position. – Install the 2 screws that attach the cover to the light unit.	 Make sure that the seals are correctly located.

	Detail Steps/Work Items	Key Items/References
(6)	Set these circuit-breakers: – INST LT/NAV LT. – TAXI/MAP/ACL.	
(7)	Do a test for the correct operation of the position light: – Set the ELECT. MASTER switch to ON. – Set the POSITION light switch to ON. – Set the POSITION light switch to OFF. – Set the ELECT. MASTER switch to OFF.	 The position lights must all come on. The position lights must all go off.

B. Replace a Strobe Light Filament in the Wing Tip

	Detail Steps/Work Items	Key Items/References
(1)	Set the ELECT. MASTER switch to OFF.	
	WARNING: AFTER YOU SET THE POWER TO OFF YOU MUST WAIT A MINIMUM OF 5 MINUTES BEFORE YOU DO WORK ON THE STROBE LIGHTS. THE POWER SUPPLIES TO THE STROBE LIGHTS GENERATE HIGH VOLTAGE. HIGH VOLTAGE CAN CAUSE DEATH OR INJURY TO PERSONS.	
(2)	Set these circuit-breakers open: – INST LT/NAV LT. – TAXI/MAP/ACL.	

	Detail Steps/Work Items	Key Items/References
(3)	Remove the light unit cover and the lamp glasses from the wing tip unit:	Refer to Figure 1.
	– Remove the 2 screws that attach the cover to the unit.	Hold the cover and glasses.
	– Remove the cover.	
	– Remove the glasses and seals.	
(4)	Replace the strobe light filament.	Disconnect/connect the electrical cables at the inline connector.
(5)	Install the lamp glasses and light unit cover:	
	– Move the glasses into position with the seals.	Make sure that the seals are correctly located.
	– Move the light unit cover into position.	
	– Install the 2 screws that attach the cover to the light unit.	
(6)	Set these circuit-breakers:	
	– INST LT/NAV LT.	
	– TAXI/MAP/ACL.	
(7)	Do a test for the correct operation of the strobe light:	
	– Set the ELECT. MASTER switch to ON.	
	– Set the STROBE light switch to ON.	The strobe lights must both operate.
	– Set the STROBE light switch to OFF.	The strobe lights must all go off.
	– Set the ELECT. MASTER switch to OFF.	

6. Remove/Install a Wing Tip Light Unit

A. Remove a Wing Tip Light Unit

	Detail Steps/Work Items	Key Items/References
(1)	Set the ELECT. MASTER switch to OFF.	
	WARNING: AFTER YOU SET THE POWER TO OFF YOU MUST WAIT A MINIMUM OF 5 MINUTES BEFORE YOU DO WORK ON THE STROBE LIGHTS. THE POWER SUPPLIES TO THE STROBE LIGHTS GENERATE HIGH VOLTAGE. HIGH VOLTAGE CAN CAUSE DEATH OR INJURY TO PERSONS.	
(2)	Set these circuit-breakers open: – INST LT/NAV LT. – TAXI/MAP/ACL.	
(3)	Remove the light unit cover and the lamp glasses from the wing tip unit: – Remove the 2 screws that attach the cover to the unit. – Remove the cover. – Remove the glasses and seals.	Refer to Figure 1 and 2. Hold the cover and glasses.
(4)	Remove all the filaments from the light unit (if OÄM 42-222 is NOT installed).	Make sure that you disconnect the strobe light filament at the connector.

	Detail Steps/Work Items	Key Items/References
(5)	Remove the light unit from the wing tip: – Remove the nut, washer, bolt and P-clamp that attach the bonding strip to the light unit. – Remove the screws that attach the light unit to the wing tip. – Carefully move the light unit out from the wing tip. – Disconnect the 2 electrical inline connectors from the rear of the light unit. – Move the light unit clear of the airplane.	

B. Install a Wing Tip Light Unit

	Detail Steps/Work Items	Key Items/References
(1)	Install the light unit: – Move the light unit into position at the wing tip. – Connect the 2 electrical connectors at the rear of the light unit. – Move the light unit into the wing tip. – Install the screws that attach the light unit to the wing tip. – Install the P-clamp, bolt, washer and nut that attach the bonding strip to the light unit.	Refer to Figure 1.
(2)	Install all the filaments into the light unit (if OÄM 42-222 is NOT installed).	Make sure that you connect the strobe light filament at the connector.
(3)	Install the lamp glasses and light unit cover: – Move the glasses into position with the seals. – Move the light unit cover into position. – Install the 2 screws that attach the cover to the light unit.	Make sure that the seals are correctly located.
(4)	Set these circuit-breakers: – INST LT/NAV LT. – TAXI/MAP/ACL.	

WARNING: DO NOT OPERATE THE STROBE LIGHTS WHEN PERSONS ARE CLOSE TO THE AIRPLANE AND DO NOT LOOK AT THE LIGHT WHEN THE LIGHT OPERATES. HIGH INTENSITY STROBE LIGHTS CAN CAUSE EYE DAMAGE.

	Detail Steps/Work Items	Key Items/References
(5)	Do a test for the correct operation of the strobe light: – Set the ELECT. MASTER switch to ON. – Set the STROBE light switch to ON. – Set the STROBE light switch to OFF.	 The strobe lights must both operate. The strobe lights must all go off.
(6)	Do a test for the correct operation of the position light: – Set the POSITION light switch to ON. – Set the POSITION light switch to OFF. – Set the ELECT. MASTER switch to OFF.	 The position lights must all come on. The position lights must all go off.

7. Remove/Install a Strobe Power Unit in the Wing Tip (if OÄM 42-222 is NOT installed)

A. Remove a Strobe Power Unit from the Wing Tip

	Detail Steps/Work Items	Key Items/References
(1)	Set the ELECT. MASTER switch to OFF.	
	WARNING: **AFTER YOU SET THE POWER TO OFF YOU MUST WAIT A MINIMUM OF 5 MINUTES BEFORE YOU DO WORK ON THE STROBE LIGHTS. THE POWER SUPPLIES TO THE STROBE LIGHTS GENERATE HIGH VOLTAGE. HIGH VOLTAGE CAN CAUSE DEATH OR INJURY TO PERSONS.**	
(2)	Set these circuit-breakers open: – INST LT/NAV LT. – TAXI/MAP/ACL.	

	Detail Steps/Work Items	Key Items/References
(3)	Remove the wing-tip from the wing: – Remove the screws that attach the wing tip to the wing. – Move the wing tip just clear of the wing and disconnect the electrical connectors. – Move the wing tip clear of the airplane.	
(4)	Disconnect the electrical cables from the power unit.	At the inline connector at the power unit.
(5)	Remove the power unit from the wing tip: – Remove the 4 screws that attach the power unit to the structure. – Move the power unit clear of the wing tip.	

B. Install a Strobe Power Unit into a Wing Tip

	Detail Steps/Work Items	Key Items/References
(1)	Install the power unit into the wing tip: – Move the power unit into position in the wing tip. – Install the 4 screws that attach the power unit to the structure.	
(2)	Connect the power cables to the power unit.	At the inline connector at the power unit.
(3)	Install the wing tip onto the wing: – Move the wing tip into position near the wing. – Connect the electrical connections to the wing tip. – Move the wing tip fully into position and install the screws that attach the wing tip to the wing.	 At the connector.

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT OPERATE THE STROBE LIGHTS WHEN PERSONS ARE CLOSE TO THE AIRPLANE AND DO NOT LOOK AT THE LIGHT WHEN THE LIGHT OPERATES. HIGH INTENSITY STROBE LIGHTS CAN CAUSE EYE DAMAGE.	
(4)	Set these circuit-breakers: – INST LT/NAV LT. – TAXI/MAP/ACL.	
(5)	Do a test for the correct operation of the strobe light: – Set the ELECT. MASTER switch to ON. – Set the STROBE light switch to ON. – Set the STROBE light switch to OFF.	 The strobe lights must both operate. The strobe lights must all go off.
(6)	Do a test for the correct operation of the position light: – Set the POSITION light switch to ON. – Set the POSITION light switch to OFF. – Set the ELECT. MASTER switch to OFF.	 The position lights must all come on. The position lights must all go off.

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CHAPTER 34

NAVIGATION

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CHAPTER 34
NAVIGATION

1. General

This Chapter tells you about the navigation systems in the airplane. It only tells you about the installation in the airplane. Refer to the equipment manufacturers' manuals for more data about the equipment and refer to the Wiring Diagrams in Chapter 92 for more data about the electrical wiring for the navigation systems.

Refer to Section 23-10 for more data about the NAV system which is part of the speech communication system.

The DA 42 has these navigation systems. Refer to these Sections for data about the systems:

– Section 34-10. Flight environment data (Pitot/static/OAT/flight instruments).

– Section 34-20. Attitude and direction (compass/artificial horizon).

– Section 34-30. Landing and taxiing aids (localizer).

– Section 34-40. Independent position determining.

– Section 34-50. Dependent positioning determining (VOR/transponder/altitude encoder/GPS).

Note: Refer to Section 20-90 before starting maintenance work in the center wing area.

2. Description

A. Flight Environment Data

The DA 42 has the usual flight environment data systems. It has a Pitot static system. The Pitot static system has a Pitot static probe located under the left wing. The Pitot probe has an electric heater. The heater is controlled by a switch on the left side of the instrument panel, at the bottom. Flexible plastic hoses connect the Pitot static probe to the airplane instruments.

The airplane has a static system. The normal static vents are integral with the Pitot probe. If OÄM 42-102 (GFC 700) is installed, the static ports are on the rear fuselage. An alternate static vent is located in the cockpit, under the instrument panel, on the left side. The pilot opens the alternate static vent by turning a valve on the vent.

The Pitot static system connects to these flight instruments and systems:

– Altimeter.

– Airspeed indicator.

– Integrated cockpit system.

The DA 42 also has an electronic outside air temperature (OAT) indicator. The indicator is integral with the ICS. Refer to Section 31-40 for more data about the ICS. The probe for the OAT is located below the nose baggage compartment.

B. Attitude and Direction

The DA 42 has a magnetic compass mounted in the instrument panel, on the right side, at the top. The airplane is also equipped with an attitude gyro (artificial horizon) mounted at the top of the instrument panel, centrally arranged.

C. Landing and Taxiing Aids

The DA 42 has a localizer system which is part of the ICS. Refer to Section 31-40 for more data about the landing and taxiing aids which are part of the ICS.

D. Independent Positioning Determining

The DA 42 may be equipped with the following independent position determining systems:

– A stormscope system, consisting of stormscope processor and stormscope antenna, (OÄM 42-057 carried out).

– A traffic advisory system, consisting of a processor, two antennas and a transponder coupler, (OÄM 42-094 carried out).

E. Dependent Positioning Determining

The DA 42 has these dependent position determining systems that are integral with the ICS:

– VOR/LOC.

– Global positioning system (GPS).

– Transponder.

– DME.

– ADF.

– Beacon receiver.

Refer to Section 31-40 for more data about the integrated cockpit system.

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Section 34-10
Flight Environment Data

1. General

This Section tells you about the Pitot static system and the OAT sensor. It does not tell you about the OAT indication. The OAT indication is integral with the ICS. Refer to Section 31-40 for more data about the ICS.

Refer to Section 22-10 for information on the static pressure supplied to the autopilot system.

2. Description

– Figures 1, 2 and 3 show the Pitot static schematic diagram.

– Figure 4 shows the component locations.

A. Pitot static System

The Pitot static system supplies Pitot pressure and static pressure to the air data instruments and the ICS. A Pitot static probe mounted below the left wing senses both Pitot and static pressures. If OÄM 42-102 (GFC 700) is installed, the static ports on the rear fuselage sense the static pressure. An alternate static vent is located under the instrument panel, left side. The alternate static vent is normally closed. The pilot can open the alternate static vent by operating a valve-lever.

The Pitot probe has a heater element to prevent icing. A switch on the instrument panel controls the Pitot heater and a circuit-breaker protects the system. The Pitot heater status is shown on the ICS.

Flexible hoses connect the Pitot static probe and the alternate static vent to the air data instruments and the ICS. Pitot hoses are green and the static hoses are blue/purple or red (if OÄM 42-102 is installed). Push fit plastic connectors make the connections in the flexible hoses. Plastic T-pieces make junctions in the hoses.

Both Pitot and static hoses have water traps at the lowest parts of the hose run. T-pieces divide the hoses into 2 runs. The top runs go directly to the instruments. The bottom runs form sumps before joining the top-runs at T-pieces.

Serial numbers with MÄM 42-049 not carried out have water traps for the Pitot static hoses at the inboard end of the left outer wing and also under the pilot’s seat. Serial numbers with MÄM 42-049 carried out only have the water traps under the pilot’s seat.

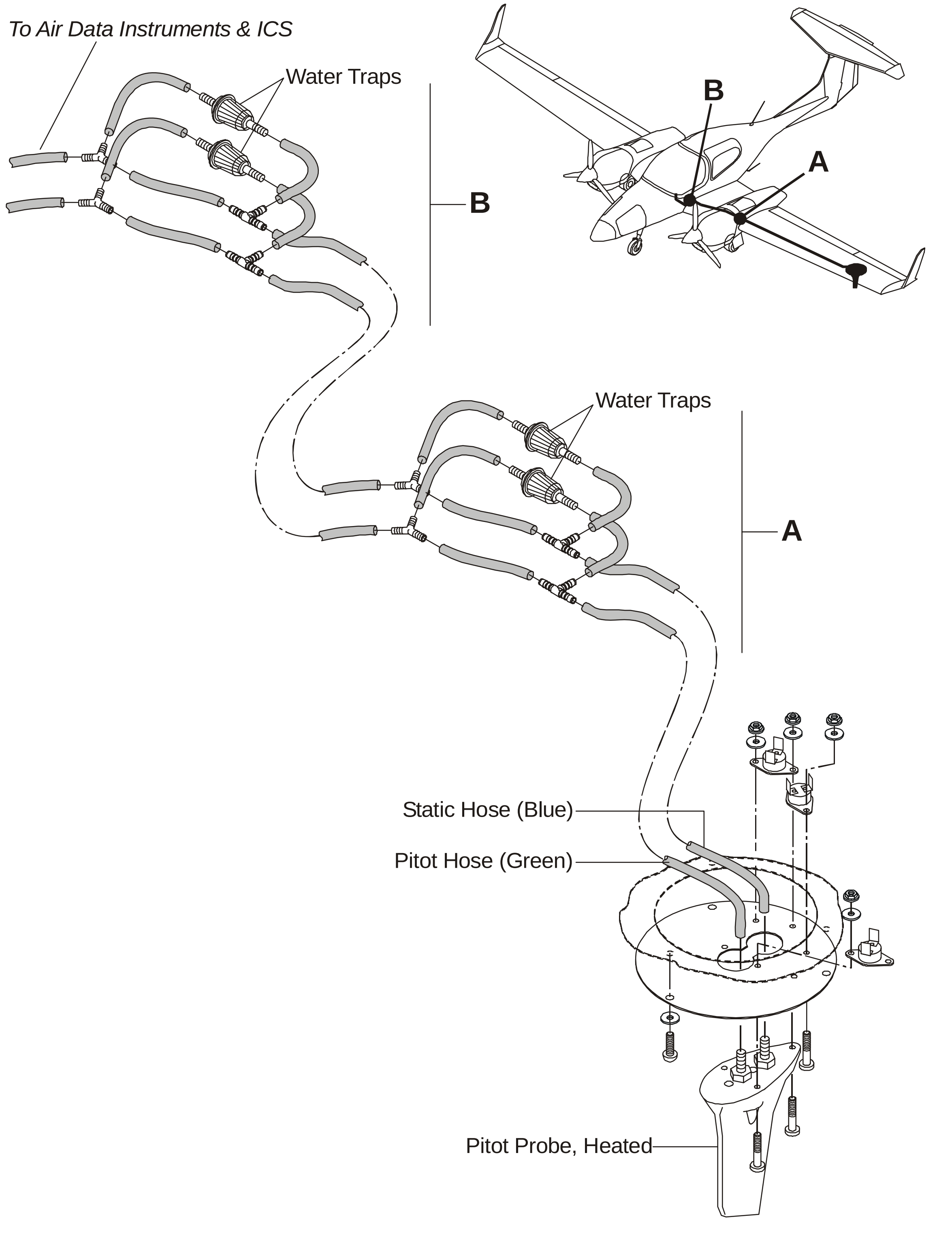

Figure 1: Pitot Static Probe and Hoses (MÄM 42-049 NOT carried out)

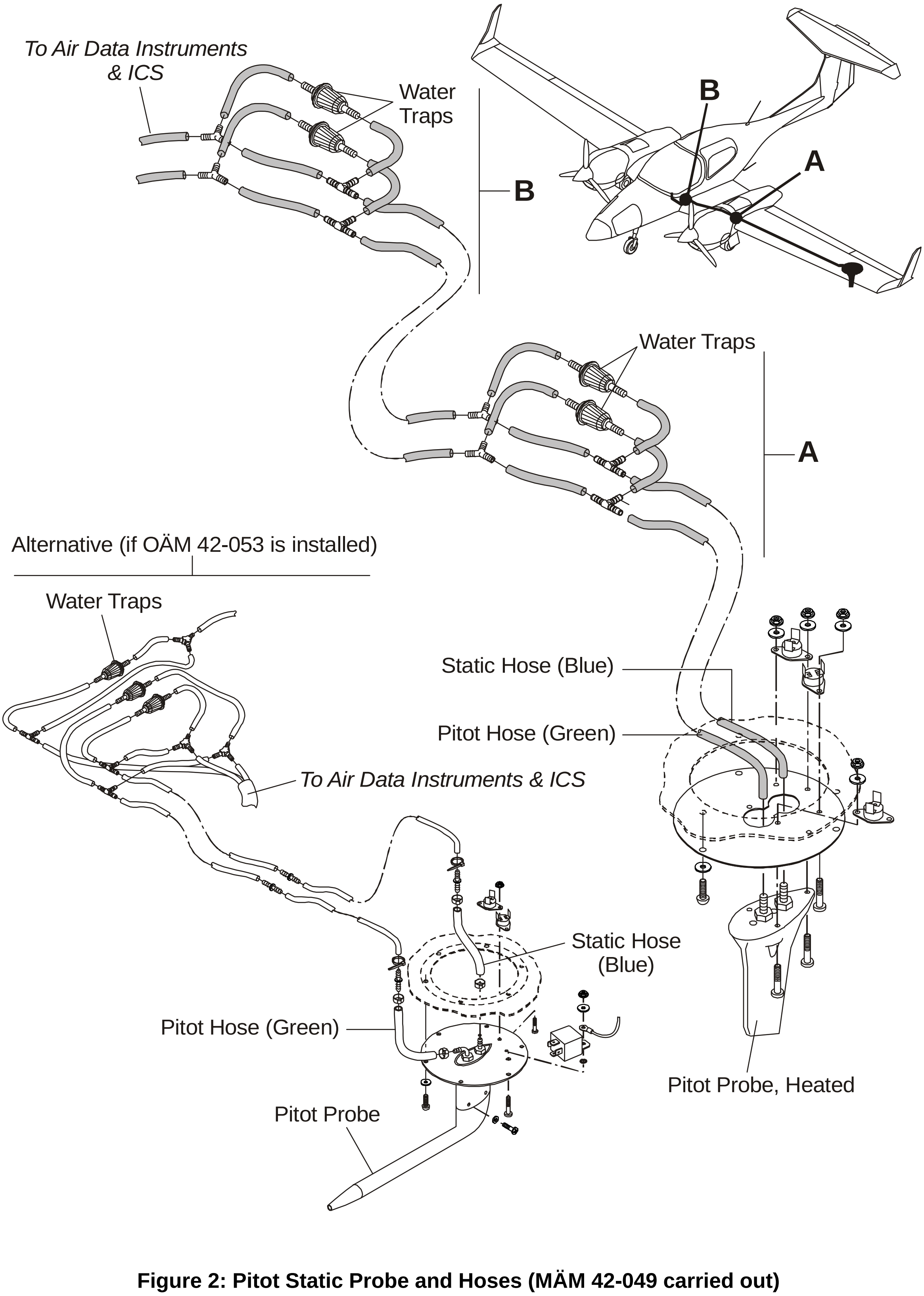

Figure 2: Pitot Static Probe and Hoses (MÄM 42-049 carried out)

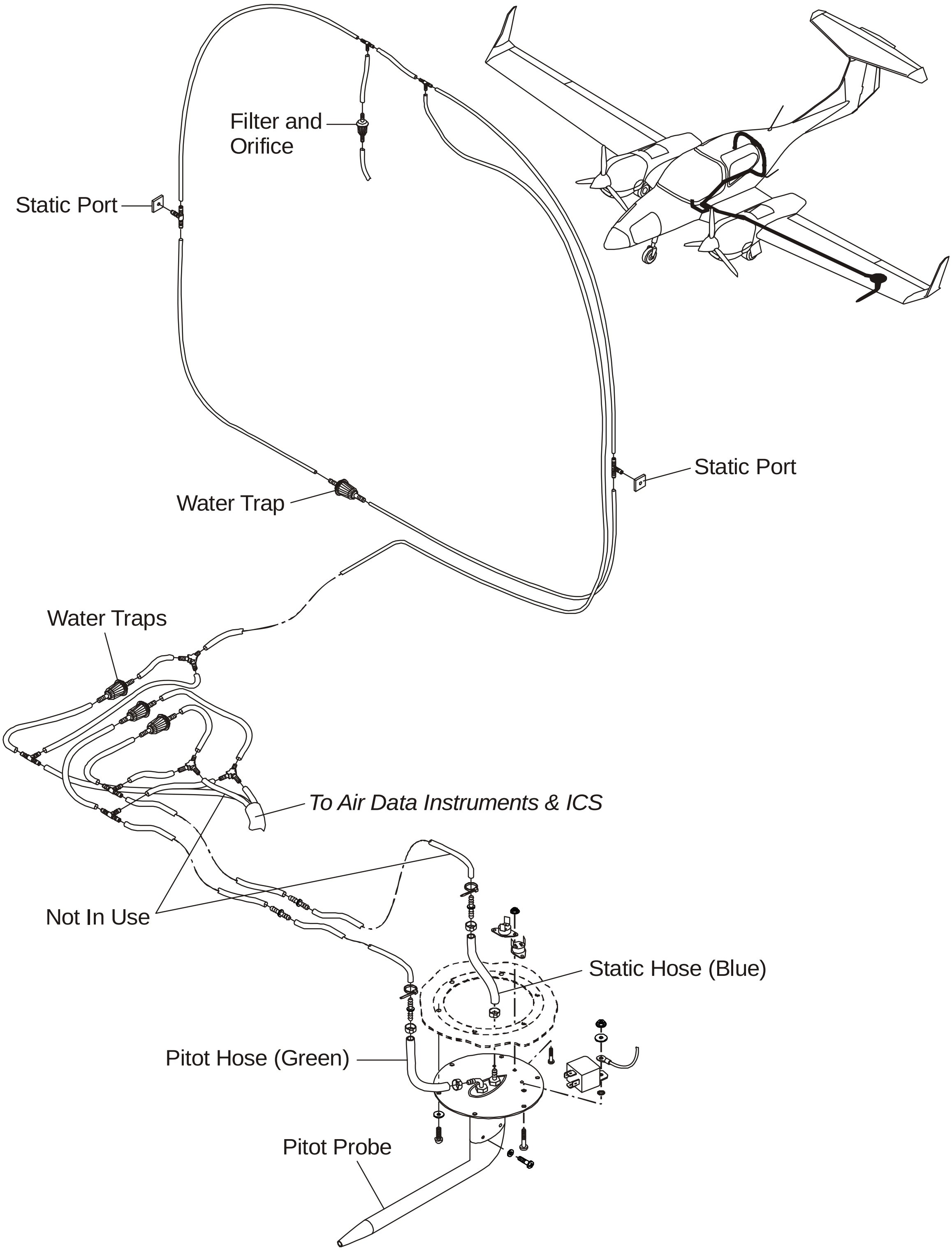

Figure 3: Pitot Static Probe and Hoses (OÄM 42-102 (GFC 700) is installed)

B. Outside Air Temperature (OAT) Probe

The OAT indicator is integral with the ICS. The OAT sensor is located below the nose baggage compartment. The ICS supplies the power for the OAT probe. Refer to Section 31-40 for more data about the ICS.

C. Air Speed Indicator (ASI)

The DA 42 has the usual mechanical ASI with an analogue display as well as the speed indication displayed on the G1000's PFD.

The mechanical ASI shows the speed of the airplane relative to the ambient airmass. It does not show ground speed. Dynamic air pressure from the Pitot system acts on the inside of a bellows assembly and ambient air pressure from the static system acts on the outside of the bellows assembly. One end of the bellows assembly is fixed and the other end is connected to a gear drive assembly. The movement of the bellows assembly is translated into rotary movement of indicator arm(s) on the analogue display of the ASI. The indicator arms show the airspeed of the airplane in knots.

The airspeed indicator integral with the ICS displays airspeed on a rolling number gauge using a moving tape. Speed ranges, speed references and an airspeed trend vector are also displayed on the PFD. Refer to the G1000 system installation manual and the airplane flight manual for particular information on the ICS implemented airspeed indicator.

D. Altimeter

The DA 42 has the usual mechanical altimeter with an analogue display as well as the altimeter displayed on the G1000's PFD.

The mechanical altimeter shows the relative altitude of the airplane above a defined pressure altitude. The altimeter is a mechanical instrument. Pressure from the airplane static system acts on a sealed bellows assembly. If the altitude of the airplane increases the static pressure decreases and the bellows assembly expands. If the altitude of the airplane decreases the static pressure increases and the bellows assembly contracts.

One end of the bellows assembly is fixed and the other end is connected to a gear drive assembly. The movement of the bellows assembly is translated into rotary movement of indicator arm(s) on the analog display of the altimeter. The indicator arms show the relative altitude of the airplane in feet. The initial setting of the altimeter can be adjusted by turning a small thumb-wheel located on the front of the instrument. This allows the instrument to be compensated for regional barometric variations and to be adjusted to indicate altitude above ground level or sea level.

The altimeter integral with the ICS displays barometric altitude values on a rolling number gauge using a moving tape. Refer to the G1000 system installation manual and the airplane flight manual for particular information on the ICS implemented altimeter.

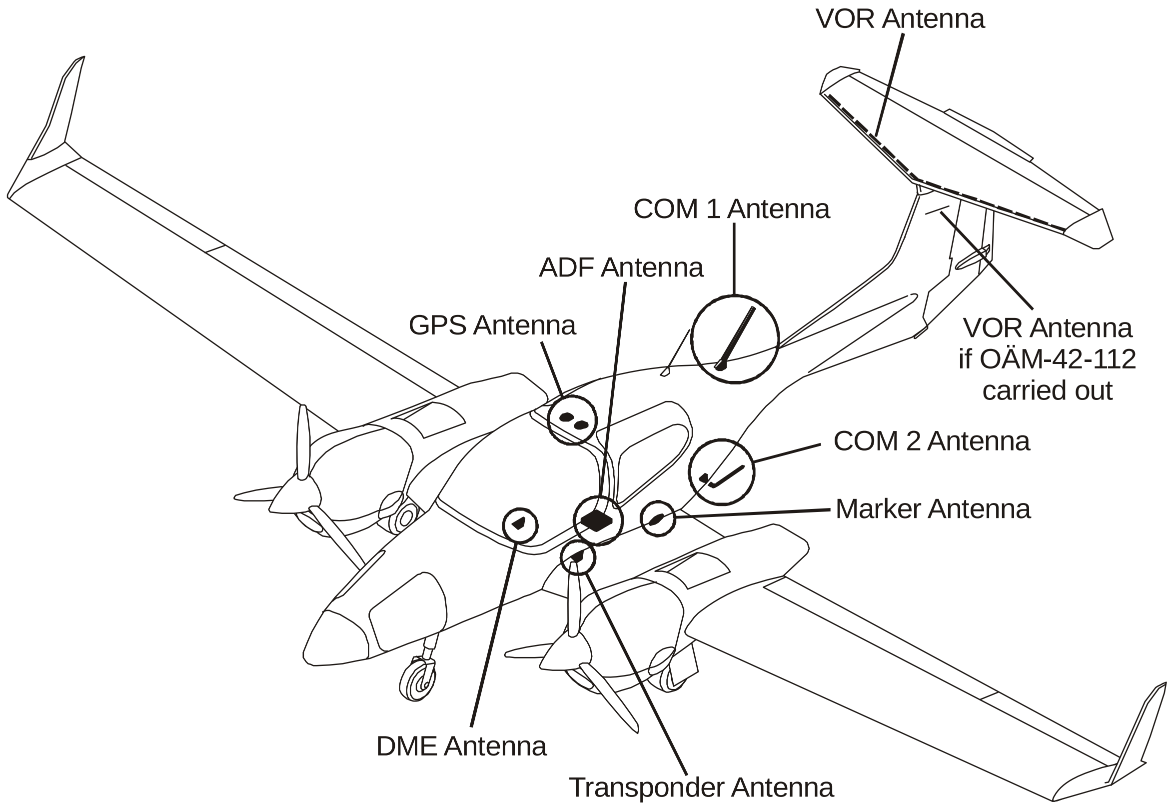

Figure 4: Flight Environment Data - Component Locations

Trouble-Shooting

1. General

The table below lists the trouble you could have with the flight environment data system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Altimeter lags or reads incorrectly. VSI (on ICS) reads incorrectly.	Faulty altimeter.	Replace altimeter.
	Blocked or kinked static hose.	Clear/straighten the hose.
	Water in static system.	Drain the static system.
Airspeed indication incorrect (low).	Faulty indicator.	Replace ASI.
	Blocked or kinked Pitot hose.	Clear/straighten the hose.
	Water in the system.	Drain the Pitot system.
	Leak in Pitot hose.	Do a Pitot static leak check.
Pitot heater does not operate.	Pitot circuit-breaker open.	Close the circuit-breaker. If the circuit-breaker opens again, do a test for a short-circuit in the Pitot Heat wiring system.
	Pitot circuit-breaker defective.	Replace the circuit-breaker.
	Pitot heat wiring open-circuit.	Do a continuity test of the Pitot heat wiring system. Repair or replace defective wiring. Refer to Chapter 92 for the Wiring Diagrams.
	Pitot probe defective.	Replace the Pitot probe.
OAT indication (on ICS) incorrect.	OAT probe defective.	Replace the OAT probe.

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Maintenance Practices

1. General

These Maintenance Practices tell you how to replace the main components of the environmental data system. It also tells you how to test the Pitot static system. Refer to the equipment manufacturers' manuals for more data about the equipment.

2. Remove/Install an ASI or Altimeter

A. Remove an ASI or Altimeter

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the ELECT. MASTER switch is set to OFF.	
(2)	Remove the instrument panel cover.	Refer to Section 25 -10.
(3)	Disconnect the Pitot static hose(s) from the rear of the indicator.	
(4)	Remove the screws that attach the indicator to the instrument panel.	Hold the indicator!
(5)	Remove the indicator from the instrument panel and clear of the airplane.	Fit dust caps to all open connections.

B. Install an ASI or Altimeter

	Detail Steps/Work Items	Key Items/References
(1)	Remove the dust-cover(s) from all open connections.	If necessary, install the dust covers from the new indicator onto the indicator that you removed.
(2)	If necessary, install Pitot static hose connections onto the new indicator.	Use the connections from the indicator that you removed.
(3)	Move the indicator into position at the instrument panel.	Hold the indicator!
(4)	Install the screws that attach the indicator to the instrument panel.	
(5)	Connect the Pitot static hose(s) to the rear of the indicator.	
(6)	Do a low-range static leak check.	Paragraph 4.

	Detail Steps/Work Items	Key Items/References
(7)	For the ASI only: – Do a Pitot static leak check.	Paragraph 4.
(8)	Install the instrument panel cover.	Refer to Section 25-10.

3. Remove/Install the Pitot Static Probe

A. Remove the Pitot Static Probe

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the ELECT. MASTER switch is set to OFF.	Instrument panel, left side.
(2)	Open the PITOT circuit-breaker.	Instrument panel, right side.
(3)	Remove the Pitot probe access panel (with the Pitot probe) from the lower surface of the left wing.	Refer to Section 52-40.
(4)	Disconnect the electrical cables from the Pitot probe.	At the inline connector.
(5)	Disconnect the Pitot and static hose connections.	Identify the connections and install dust caps on the hoses.
(6)	Disconnect the bonding-wire-assembly.	Note the position of the bonding-wire-assembly connection.
(7)	Remove the Pitot probe: – Remove the nuts and washers that attach the probe to the access panel. – Move the probe clear of the airplane.	Hold the probe!

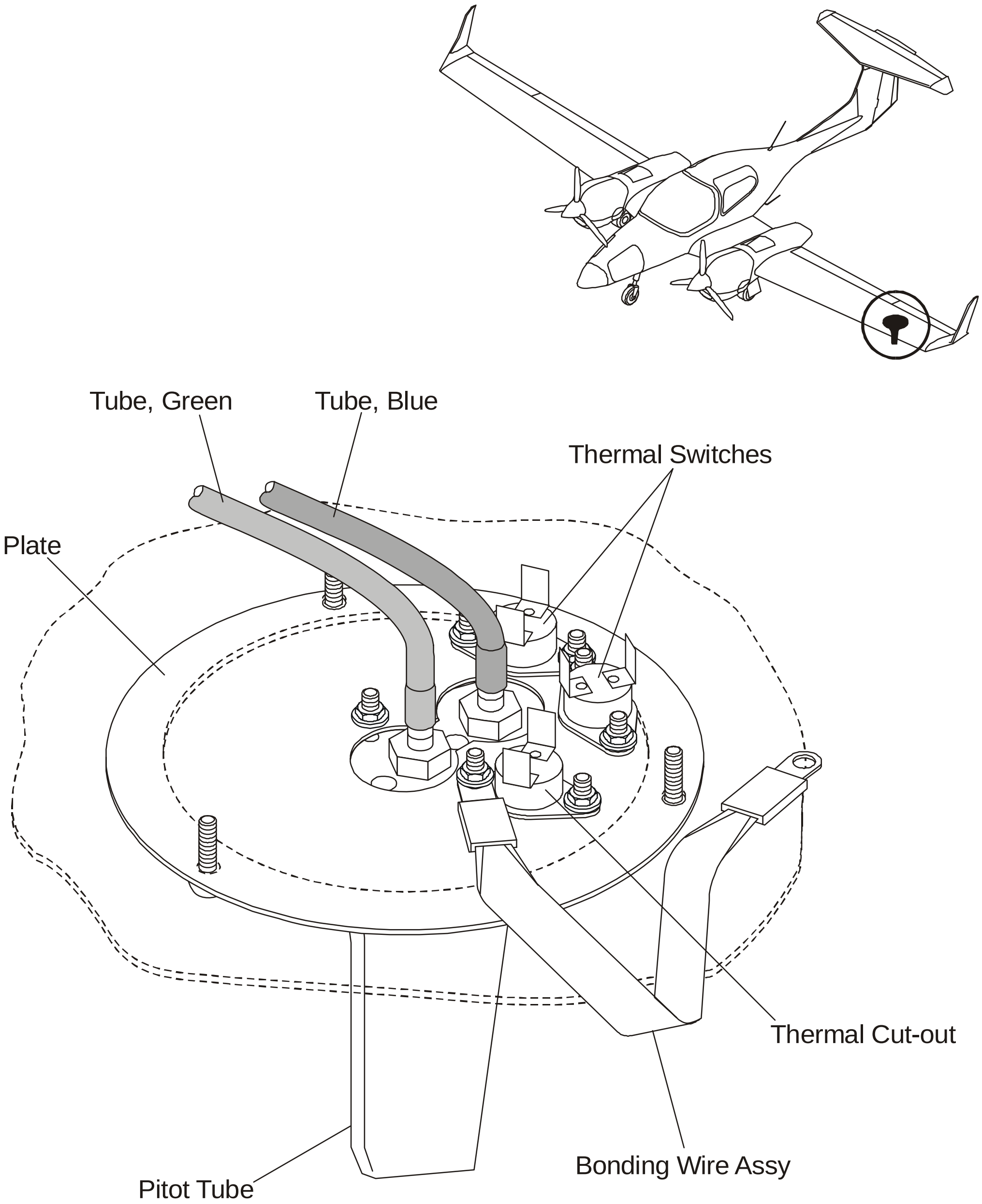

Figure 5: Pitot Static Probe Installation

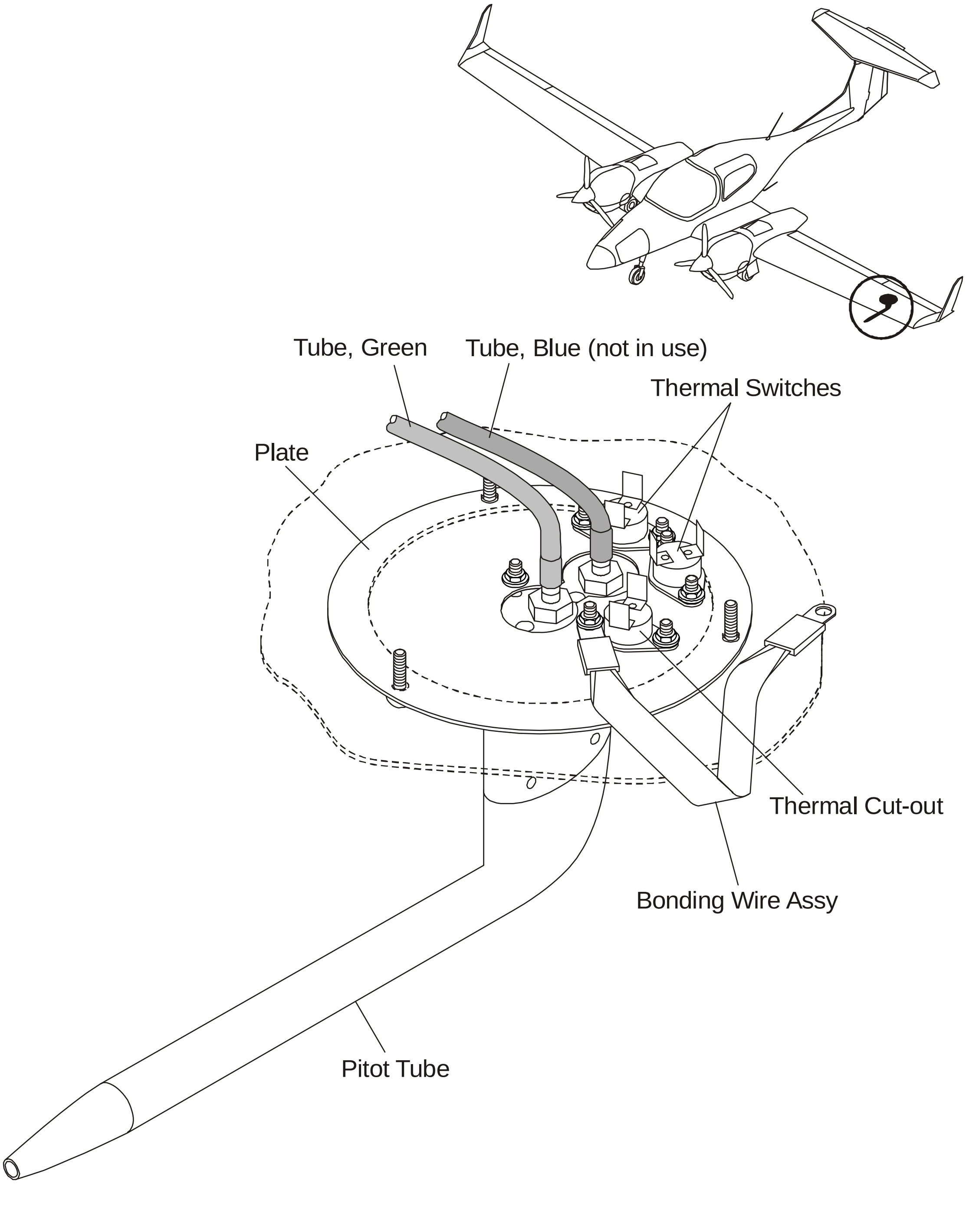

Figure 6: Pitot Static Probe Installation (if OÄM 42-102 (GFC 700) is installed)

B. Install the Pitot Static Probe

	Detail Steps/Work Items	Key Items/References
(1)	Move the Pitot probe into position at the wing.	
(2)	Install the probe onto the access panel: – Move the probe into position at the access panel. – Connect the bonding-wire-assembly. – Install the bolts, washers and nuts that attach the probe to the access panel.	 Install the bonding-wire-assembly at the position noted in Paragraph 3 A (6).
(3)	Connect the Pitot and static hoses to the probe.	At the positions marked at Paragraph 3 A (5).
(4)	Connect the electrical cables to the probe.	At the in-line connector.
(5)	Install the Pitot probe access panel: – Move the panel up into position on the lower surface of the wing. – Install the 3 or 6 screws and washers that attach the access panel to the wing.	Refer to Section 52-40.
(6)	Do a test of the Pitot probe heat system: – Set the ELECT. MASTER switch to ON. – Reset the PITOT circuit-breaker. – Set the PITOT switch to ON. – The Pitot probe must get warm. – Set the PITOT switch to OFF. – The Pitot probe must cool down. – Set the ELECT. MASTER switch to OFF.	 Instrument panel, left side. Instrument panel, right side. Instrument panel, left side.
(7)	Do a low range static leak test.	Paragraph 4.
(8)	Do a Pitot static leak test.	Paragraph 4.

	Detail Steps/Work Items	Key Items/References
(9)	Install a cover with a red pennant onto the Pitot probe.	

4. Remove/Install an Altimeter Orifice

A. Remove an Altimeter Orifice

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the ELECT. MASTER switch is set to OFF.	Instrument panel, left side.
(2)	Remove the instrument panel cover.	Refer to Section 25-10.
(3)	Remove the static hose (blue) from the rear of the altimeter.	
(4)	Disconnect this part of static hose (blue) from the next T-fitting.	Hold the T-fitting.
(5)	Carefully warm up the section around the orifice.	Use a heat gun.
(6)	Use an edgeless object to press out the orifice.	Use a screwdriver.

B. Install an Altimeter Orifice

	Detail Steps/Work Items	Key Items/References
(1)	Carefully warm up 50 mm (2 in.) from one end of the hose.	Use a heat-gun.
(2)	Press the orifice in the static hose.	Use a screwdriver to press in the orifice.
(3)	Connect the hose to the static T-fitting.	Hold the T-fitting.
(4)	Connect the other end of the hose to the altimeter.	

5. Pitot and Static System Leak Tests

Always do a Pitot leak-test after you do maintenance on the Pitot system and always do a low-range static leak-test after you do maintenance on the static system.

CAUTION: OBEY THE FOLLOWING PRECAUTIONS WHEN YOU DO A PITOT OR STATIC LEAK-TEST. IF YOU DO NOT OBEY THE PRECAUTIONS YOU CAN DAMAGE THE AIR DATA INSTRUMENTS.

A. Precautions

– The pressure in the Pitot system must always be equal to (or greater than) the pressure in the static equipment.

– Reversal of the Pitot and static hoses can cause damage to the air data instruments.

– The applied pressure (and the rate of change of pressure) must not be greater than the design limits of the equipment that you will test.

– After doing the test, you must always return the system to usual operating conditions.

B. Equipment

Item	Quantity	Part Number
Pitot static probe adaptor.	1	65797-07.
Pitot static leak tester.	1	Commercial.
Pitot-static probe adaptor (if OÄM 42-102 (GFC 700) is installed).	1	PS 49742M-3-4, or equivalent.
Static port adaptor (if OÄM 42-102 (GFC 700) is installed).	2	SKA 100-4.

C. Low-Range Static Leak Test

Follow the Pitot static leak tester manufacturer's instructions for the use of the test-set. Obey the safety precautions for Pitot static leak-testing at all times.

	Detail Steps/Work Items	Key Items/References
	CAUTION: THE G1000 CONFIGURATION MODE CONTAINS CERTAIN PAGES AND SETTINGS THAT ARE CRITICAL TO AIRPLANE OPERATION AND SAFETY. THESE PAGES ARE PROTECTED AND CAN NOT BE MODIFIED, UNLESS THE TECHNICIAN IS PROPERLY AUTHORIZED AND EQUIPPED. HOWEVER, MOST PROTECTED PAGES ARE VIEWABLE TO ALLOW SYSTEM AWARENESS FOR TROUBLESHOOTING.	
(1)	Remove the blanking cap from the Pitot static probe and connect the Pitot static leak tester to the probe.	Use the test set adaptor.
(2)	Make sure that the alternate static port is fully closed.	Under the instrument panel, left side.
(3)	If OÄM 42-102 (GFC 700) is installed: Remove the aft baggage compartment.	Refer to Section 25-50.
(4)	If OÄM 42-102 (GFC 700) is installed: Block the static line.	At the water trap on top of the fuselage.

	Detail Steps/Work Items	Key Items/References
(5)	Prepare the G1000 system for the test: – Allow the unit to warm up for 15 minutes before performing the following tests. – Start the G1000 system in normal mode. – Turn PFD power off. – Turn the PFD on in Configuration Mode by pressing and holding the ENT key on the PFD while applying power. – Release the ENT key after ‘INITIALIZING SYSTEM’ appears on the upper left corner of the PFD. – Using the outer FMS knob on the PFD turn to the GRS page group, use the B ALT field for all CFR Part 43 Appendix E tests for G1000 altitude. – Place the MFD in Reversionary Mode by pressing the red ‘DISPLAY BACKUP’ button on the GMA 1347 Audio Panel. Baro settings can then be read from the MFD for the CFR Part 43 Appendix E tests.	Only required for airplanes for which 14 CFR §91.411 and 14 CFR §91.411part 43 Appendix E is applicable.
(6)	Apply a partial vacuum to the static port until you get a pressure altitude of 1000 ft above the ambient pressure altitude.	Note the altitude.
(7)	Let the pressure stabilize.	
(8)	Monitor the system pressure.	The system pressure change must not be more than 100 ft/min.
(9)	Compare the test equipment altimeter and the airplane altimeter.	The indication error must be less than shown in Table 1.
(10)	Slowly adjust the system pressure to the ambient pressure.	
(11)	Return both the MFD and PFD to Normal Mode.	Only required for airplanes for which 14 CFR §91.411 and 14 CFR §91.411part 43 Appendix E is applicable.

	Detail Steps/Work Items	Key Items/References
(12)	Disconnect the Pitot static probe adaptor and install a blanking cap, with pennant, onto the airplane Pitot static probe.	
(13)	If OÄM 42-102 (GFC 700) is installed: Remove the blockage of the static line.	At the water trap on top of the fuselage.
(14)	If OÄM 42-102 (GFC 700) is installed: Install the aft baggage compartment.	Refer to Section 25-50.

Table 1: Altimeter Indication Error

Altitude	Permissible Error
-1000 ft.*	±20 ft.*
Sea level	±20 ft.
4,000 ft.	±35 ft.
8,000 ft.	±60 ft.
12,000 ft.	±90 ft.
16,000 ft.	±110 ft.
20,000 ft.	±130 ft.

* Only required for airplanes for which 14 CFR §91.411 and 14 CFR §91.411 part 43 Appendix E is applicable.

D. Pitot Leak Test

Follow the Pitot static leak tester manufacturer’s instructions for the use of the test set. Obey the safety precautions for Pitot static leak testing at all times.

	Detail Steps/Work Items	Key Items/References
(1)	Remove the blanking cap from the Pitot static probe and connect the Pitot static leak tester to the probe.	Use the test-set adaptor.
(2)	Slowly apply a pressure to the Pitot port that gives an indication of 150 kts on the ASI.	
(3)	Let the pressure stabilize.	
(4)	Monitor the system pressure.	The leak rate must not be more than 10 kts/min.
(5)	Compare the test equipment ASI and the airplane ASI.	The indication error must be less than shown in Table 2.
(6)	Slowly release the system pressure.	
(7)	Disconnect the Pitot static probe adaptor and install a blanking cap, with pennant, onto the airplane Pitot static probe.	

Table 2: ASI Indication Error

Airspeed	Permissible Error
160 kts	±4 kts
100 kts	±4 kts
40 kts	±1.7 kts

6. Clean the Pitot Static System

CAUTION: OBEY THE FOLLOWING PRECAUTIONS WHEN YOU CLEAN THE PITOT STATIC SYSTEM. IF YOU DO NOT OBEY THE PRECAUTIONS YOU CAN DAMAGE THE AIR DATA INSTRUMENTS.

A. Precautions

– Never apply pressurized air to the air data instruments. Always apply compressed air to the hoses from the inboard end to the outboard end.

– Do not apply excessive pressure (above 1 bar/14.5 PSI) to the Pitot and static hoses.

– Do not use compressed air without oil separator.

– Reversal of the Pitot and static hoses can cause damage to the air data instruments.

– After cleaning the system, you must always return the system to usual operating conditions.

B. Equipment

Item	Quantity	Part Number
Compressed air equipment with oil separator and pressure regulator.	1	Commercial.

C. Cleaning Procedure

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the ELECT. MASTER switch is set to OFF.	
(2)	Remove the instrument panel cover.	Refer to Section 25-10.
(3)	Remove the pilot's seat.	Refer to Section 25-10.
(4)	Disconnect the Pitot static hoses from the rear of the backup instruments.	
(5)	Disconnect the Pitot static hoses from the air data computer (ADC).	
(6)	Disconnect the Pitot static hoses from the Pitot static probe.	

	Detail Steps/Work Items	Key Items/References
(7)	Disconnect the Pitot static hoses from the water traps.	2 at the inboard end of the left outer wing, 2 under the pilot’s seat.
(8)	Blow compressed air through each of the Pitot static hoses from the inboard end to the outboard end.	Maximum pressure: 1 bar (14.5 PSI).
(9)	Check the water traps for dirt. Replace if necessary.	
(10)	Re-connect the Pitot static hoses to the water traps.	2 at the inboard end of the left outer wing, 2 under the pilot’s seat.
(11)	Re-connect the Pitot static hoses to the Pitot static probe.	
(12)	Re-connect the Pitot static hoses to the air data computer (ADC).	
(13)	Reconnect the Pitot static hoses to the rear of the backup instruments.	
(14)	Do a low-range static leak test.	Paragraph 4.
(15)	Do a Pitot static leak test.	Paragraph 4.
(16)	Install the pilot’s seat.	Refer to Section 25-10.
(17)	Install the instrument panel cover.	Refer to Section 25-10.

7. Remove/Install the OAT Probe

A. Remove the OAT Probe

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the ELECT. MASTER switch is set to OFF.	Instrument panel, left side.
(2)	Open the right nose baggage compartment door.	
(3)	Remove the baggage compartment carpeting and the rear access panel on the compartment floor.	
(4)	Disconnect the electrical cables from the OAT probe.	At the in-line connector located on the instrument panel frame in the LH corner below the nose baggage compartment.
(5)	Remove the nut and the sealing washer that attach the OAT probe to the airplane surface.	Located on the lower surface of the fuselage nose, on the RH side of the nose landing gear bay.
(6)	Move the OAT probe clear of the nose baggage compartment.	Note the position of the bonding wire.

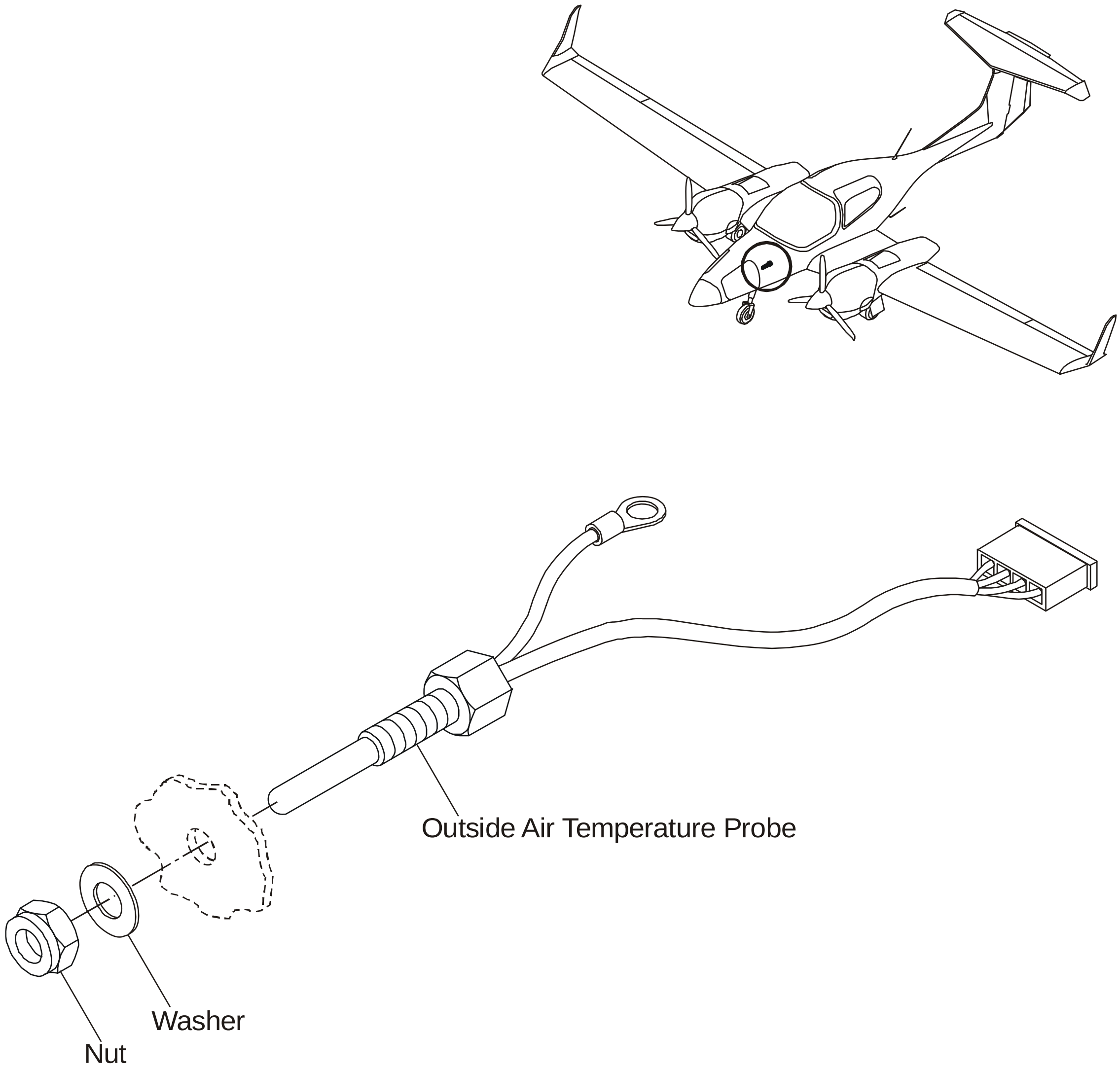

Figure 5: OAT Probe Assembly

B. Install the OAT Probe

	Detail Steps/Work Items	Key Items/References
(1)	Connect the bonding wire to the OAT Probe.	Install the bonding wire as noted in Paragraph 7 A, step (6).
(2)	Move the OAT probe into position below the nose baggage compartment.	Slide the probe from the inside outwards though the hole beside the nose landing gear bay.
(3)	Install the sealing washer and the nut that attach the probe to the airplane surface.	On the lower surface of the fuselage nose, on the RH side of the nose landing gear bay.
(4)	Connect the electrical cables from the OAT probe.	At the inline connector located on the instrument panel frame in the LH corner below the nose baggage compartment.
(5)	Close the rear access hole on the nose baggage compartment floor and install the compartment carpeting.	
(6)	Set the ELECT. MASTER switch to ON.	Instrument panel, left side.
(7)	Do a nominal/actual value comparison with a reliable digital or mercury thermometer to test the serviceability of the OAT probe.	Read the OAT indication on the ICS.

Section 34-20
Attitude and Direction

1. General

This Section tells you about the attitude and direction systems installed in the DA 42 airplane. The main attitude and direction systems are integral with the Integrated Cockpit System (ICS) that is installed in the DA 42 airplane. Refer to Section 31-40 for more data about the ICS.

The DA 42 has the usual magnetic compass. The magnetic compass is installed in the instrument panel at the top, on the right hand side. There is also an artificial horizon installed in the instrument panel at the top, arranged centrally.

2. Description and Operation

A. Magnetic Compass

The magnetic compass shows the heading of the airplane related to magnetic north. Fluid in the compass bowl gives damping. Each graduation of the compass is 5°.

A compass deviation card is located next to the compass on the instrument panel. You must do a test for the correct operation of the compass (compass swing):

– After replacing a major component.

– After replacing the compass.

– After a major modification to the airplane.

– After a lightning strike has been reported.

– If the airplane has been parked for more than 90 days.

B. Attitude Gyro (Artificial Horizon)

The artificial horizon is an electrically powered gyroscopic instrument. It operates when the essential bus is powered and the AH circuit-breaker is closed. It can also receive power from the emergency battery, see Section 24-32. A warning flag drops into view to indicate that the gyro motor is not receiving sufficient power to operate.

The artificial horizon incorporates a moving display that simulates the earth's horizon and provides the pilot with a real time visual indication of the airplane pitch and roll attitude relative to the indicator symbolic airplane. The instrument can function as a primary or standby indicator.

The attitude gyro incorporates pitch and roll displays that are mechanically linked to a spinning mass gyroscope. The horizon bar moves behind the symbolic airplane. Precession error is corrected by the internal erection system or by pulling the PULL TO CAGE knob.

The artificial horizon employs an efficient electrically driven internal vertical gyroscope assembly incorporating a special air erection mechanism. This mechanism simultaneously erects the pitch and roll axes of the gyroscope. Movement of the airplane generates a reaction of the display that simulates the visual reference seen by the pilot when looking outside at the earth's true horizon line.

Trouble-Shooting

1. Magnetic Compass

The table below lists the defects you could have with the magnetic compass. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Magnetic compass damping fluid leaking.	Defective compass housing.	Replace the compass.
Compass deviation more than 10°.	Residual magnetism of a metal component in the airplane.	Do a test for residual magnetism using a hand-held compass. If necessary, degauss the component.
	Defective compass.	Replace the compass.
	Compass out of calibration.	Do a compass swing.

2. Attitude Gyro (Artificial Horizon)

The table below lists the defects you could have with the artificial horizon. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Warning flag in view. Indication of instrument not reliable.	AH circuit-breaker open or defective.	Close or replace the circuit-breaker.
	Power supply wiring defective.	Do a test for the correct voltage at the instrument. Repair the power supply wiring/connector.
	Ground connection defective.	Do a test for correct ground connection. Repair the ground wiring/connector.
	Instrument defective.	Replace the instrument.
Instrument is sluggish.	Mechanism worn or dirty.	Replace the instrument.

Maintenance Practices

1. General

This Section tells you how to remove/install the magnetic compass as well as the attitude gyro (artificial horizon). It also tells you how to test and adjust the magnetic compass (compass swing).

2. Remove/Install the Magnetic Compass

A. Remove the Magnetic Compass

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the ELECT. MASTER switch is set to OFF.	Instrument panel, left side.
(2)	Remove the instrument panel cover.	Refer to Section 25-10.
(3)	Disconnect electrical cables.	At the inline connector.
(4)	Remove the 4 screws that attach the compass to the instrument panel.	Hold the compass!
(5)	Move the compass forward and clear of the instrument panel.	Remove and discard the compass deviation table.

B. Install the Magnetic Compass

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the ELECT. MASTER switch is set to OFF.	Instrument panel, left side.
(2)	Move the magnetic compass into position at the instrument panel.	Hold the compass in position.
(3)	Install the 4 screws that attach the compass to the instrument panel.	
(4)	Connect electrical cables.	At the inline connector.
(5)	Install the instrument panel cover.	Refer to Section 25-10.
(6)	Do a compass swing.	Refer to Paragraph 3.

3. Test/Adjust the Magnetic Compass (Compass Swing)

You must do a test for correct operation of the compass (compass swing):

– After replacing a major component.

– After replacing the compass.

– After a major modification to the airplane.

– After a lightning strike has been reported.

– If the airplane has been parked for more than 90 days.

CAUTION: USE ONLY NON-MAGNETIC TOOLS TO ADJUST THE COMPASS.

CAUTION: DO NOT WEAR OR CARRY METALLIC OBJECTS (WATCHES, BRACELETS ETC) WHEN YOU ADJUST THE COMPASS COMPENSATING MAGNETS OR OPERATE THE LAND COMPASS. METALLIC OBJECTS NEAR THE COMPASS CAN CAUSE ERRORS.

Note: If possible, use a compass swing area that has been tested for magnetic interference. In any case, you must use a level area that is away from metal structures, underground pipes, reinforced concrete, other airplane and ground servicing equipment.

A. Equipment

Item	Quantity	Part Number
Calibrated land compass.	1	Commercial.

B. Compass Swing

	Detail Steps/Work Items	Key Items/References
(1)	Adjust the compensating magnets in the compass to a neutral position.	Refer to the compass manufacturer’s instructions.
(2)	Start the engine and set all electrical loads to ON.	Refer to the Airplane Flight Manual.
(3)	Use the land compass to align the airplane to magnetic north.	Adjust the N-S compensator magnet so that the airplane compass indicates a heading of 0°.

	Detail Steps/Work Items	Key Items/References
(4)	Use the land compass to align the airplane to magnetic east.	Adjust the E-W compensator magnet so that the airplane compass indicates a heading of 90°.
(5)	Use the land compass to align the airplane to magnetic south.	Adjust the N-S compensator magnet to remove half of the error between the indicated heading and 180°.
(6)	Use the land compass to align the airplane to magnetic west.	Adjust the E-W compensator magnet to remove half of the error between the indicated heading and 270°.
(7)	Turn the airplane through 360°, record the deviation at each 30° radial. Prepare a deviation table that shows the corrections that must be applied to each of the 30° radials.	If large deviations occur when you operate electrical equipment/systems, the deviation table must also show the corrections to apply to each 30° radial when that particular equipment/system is operating.
(8)	Install the new deviation table in the compass card holder next to the compass.	

4. Remove/Install the Attitude Gyro (Artificial Horizon)

CAUTION: GYROS ARE DELICATE AND CAN NOT WITHSTAND THE SHOCK OF BEING DROPPED, JARRED OR STRUCK BY PIECES OF EQUIPMENT. DO NOT PLACE GYROS ON ANY HARD SURFACE. PAD WITH GENEROUS FOAM.

A. Precautions

To prevent damage to a gyro, the instrument should be transported to and from the airplane in its original shipping container. If this is impractical, the gyro should be hand carried carefully in an upright position.

A gyro should never be removed while it is spinning or running down. The instrument normally operates at high RPM and may take 10 minutes or longer to run down. If it is removed while running and tilted more than 20 degrees, the gyro can develop a gimbal lock. The gimbal will tumble and start to spin. If gimbal lock occurs while the rotor is turning, the gimbal may spin fast enough to damage the gimbal bearings, requiring overhaul.

A malfunctioning gyro should be handled with the same care given a new instrument. Most malfunctioning instruments can be repaired and returned to service. Using proper handling procedures during removal prevents additional damage and helps ensure possible reuse.

B. Remove the Attitude Gyro

	Detail Steps/Work Items	Key Items/References
(1)	Pull the AH circuit-breaker.	Instrument panel, right side.
(2)	Remove the instrument panel cover.	Refer to Section 25-10.
(3)	Dis-connect the connector at the rear of the instrument.	
(4)	Remove the screws which attach the instrument to the instrument panel.	Hold the instrument!
(5)	Remove the instrument from the instrument panel.	Handle with care.

C. Install the Attitude Gyro

	Detail Steps/Work Items	Key Items/References
(1)	Insert the indicator into the instrument panel cutout.	Upper instrument panel, arranged centrally.
(2)	Install the screws which attach the instrument to the instrument panel.	
(3)	Connect the connector at the rear of the instrument.	
(4)	Install the instrument panel cover.	Refer to Section 25-10.
(5)	Set the AH circuit-breaker.	Instrument panel, right hand side.

Section 34-30
Landing and Taxiing Aids

1. General

This Section tells you about the landing and taxiing aids that can be installed in the DA 42.

Refer to the equipment manufacturers' manuals for more data about other options of landing and taxiing aids.

2. Description

The DA 42 has the following landing and taxiing aids:

– A localizer system which is part of the G1000 integrated avionics system. Refer to Section 31-40 for more data about the G1000 integrated avionics system.

– A glideslope system which is part of the G1000 integrated avionics system. Refer to Section 31-40 for more data about the G1000 integrated avionics system.

– A marker beacon receiver which is part of the G1000 integrated avionics system. Refer to Section 31-40 for more data about the G1000 integrated avionics system.

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Section 34-40
Independent Positioning Determining

1. General

This Section tells you about the independent position determining systems that can be installed in the DA 42. Refer to these Sections for data about the systems:

– Section 34-41. Stormscope system (OÄM 42-057).

– Section 34-42. Traffic advisory system (TAS) (OÄM 42-094).

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Section 34-41
Stormscope System

1. General

This Section tells you about the stormscope system that can be installed in the DA 42. Refer to the manufacturer’s manual for more data about the equipment.

The stormscope system consists of the following items:

– Stormscope processor.

– Stormscope antenna.

2. Description and Operation

The WX-500 is a passive sensor that listens for electromagnetic signals with a receiving antenna. The antenna detects intra-cloud, inter-cloud, or cloud-to-ground electrical discharges within a 200 nm radius of the airplane and sends the resulting 'discharge signals' to the processor. The processor digitizes, analyzes, and converts the discharge signals into range and bearing data. This information is stored in the storm buffer.

A. Stormscope Processor

The stormscope processor is tray mounted and is located under the passengers' seat.

The avionics bus supplies power to the stormscope system. The ELECT. MASTER switch and the AV MASTER switch must be set to ON to supply power through the WX-500 circuit breaker to the stormscope system.

The processor houses the lightning data acquisition circuitry as well as the circuitry necessary to process heading information and communicate with the G1000 system. All WX-500 functions are controlled through the MFD of the G1000 system.

B. Stormscope Antenna

The NY-163 stormscope antenna is located on the horizontal stabilizer. The antenna is a combined cross-loop and sense antenna. The antenna is sealed against environmental extremes and is non-repairable.

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Trouble-Shooting

1. General

The table below lists the defects you could have with the stormscope system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Stormscope does not operate.	Circuit-breaker not set.	Set the circuit-breaker.
	Faulty cables/connectors.	Do a test for continuity on each cable. Do a test for short circuit to ground and between cables. Replace defective cables.

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Maintenance Practices

1. General

This Section tells you how to remove/install the components of the stormscope system. It also tells you how to test the stormscope system.

2. Remove/Install the Stormscope Processor

A. Remove the Stormscope Processor

	Detail Steps/Work Items	Key Items/References
(1)	Remove the passengers seat.	Refer to Section 25-10.
(2)	Open the WX-500 circuit breaker.	
(3)	Loosen the screw that attaches the processor to its mounting tray.	
(4)	Remove the stormscope processor from the mounting tray.	

A. Install the Stormscope Processor

	Detail Steps/Work Items	Key Items/References
(1)	Put the stormscope processor in position in the mounting tray.	
(2)	Tighten the screw that attaches the processor to its mounting tray.	
(3)	Install the passengers seat.	Refer to Section 25-10.
(4)	Close the WX-500 circuit breaker.	
(5)	Do a test of the stormscope system.	Refer to Paragraph 4.

3. Remove/Install the Stormscope Antenna

A. Remove the Stormscope Antenna

	Detail Steps/Work Items	Key Items/References
(1)	Remove the horizontal stabilizer fairing.	Refer to Section 55-10.
(2)	Open the WX-500 circuit breaker.	
(3)	Disconnect the connector of the stormscope antenna.	
(4)	Remove the screws which attach the stormscope antenna to the mounting bracket.	Hold the antenna!
(5)	Remove the stormscope antenna from the horizontal stabilizer.	

B. Install the Stormscope Antenna

	Detail Steps/Work Items	Key Items/References
(1)	Put the stormscope antenna in position on the horizontal stabilizer.	
(2)	Install the screws which attach the stormscope antenna to the mounting bracket.	
(3)	Connect the connector of the stormscope antenna.	
(4)	Close the WX-500 circuit breaker.	
(5)	Install the horizontal stabilizer fairing.	Refer to Section 55-10.
(6)	Do a test of the stormscope system.	Refer to Paragraph 4.

4. Test of the Stormscope System

Perform the installation checkout as outlined in Goodrich Stormscope WX-500 Installation Manual P/N 009-11500-001 Chapter 3 'Installation Checkout'.

Section 34-42
Traffic Advisory System

1. General

This Section tells you about the traffic advisory system that can be installed in the DA 42. Refer to the manufacturer's manual for more data about the equipment.

The TAS consists of the following items:

- Processor.
- Transponder coupler.
- Top antenna.
- Bottom antenna.

2. Description and Operation

The Ryan/Avidyne Traffic Advisory Systems (collectively known as TAS) are actively interrogating on-board air traffic detection systems used to identify potential collision threats. The TAS computes relative altitude and range of threats from nearby transponder-equipped airplanes. Airplanes with non-Mode C transponders can provide range information. The TAS does not detect airplanes without an operating transponder.

A. Processor

The TAS processor is tray mounted and is located behind the first ring frame.

The avionics bus supplies power to the traffic advisory system. The ELECT. MASTER switch and the AV MASTER switch must be set to ON to supply power through the TAS circuit breaker to the traffic advisory system.

The TAS processor communicates to the Garmin G1000 system which indicates nearby traffic on the MFD. All functions of the TAS are controlled through the MFD.

B. Transponder Coupler

The transponder coupler is mounted on the remote avionic box of the Garmin G1000 system. The transponder coupler supplies the processor with a signal indicating the on-board transponder is transmitting a reply.

C. Antennas

The TAS has two directional antennas. The top antenna is located on top of the fuselage behind the cabin between the COM and the ELT antennas, and the bottom antenna is located on the fuselage bottom between the taxi - and landing lights.

Trouble-Shooting

1. General

The table below lists the defects you could have with the traffic advisory system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
TAS does not operate.	Circuit breaker not set.	Set the circuit breaker.
	Faulty cables/connectors.	Do a test for continuity on each cable. Do a test for short circuit to ground and between cables. Replace defective cables.
The TAS bearing shows opposite to the traffic forward and aft, and it shows correctly left and right.	The antenna coaxes for the top antenna are backwards.	Check antenna connections.
The TAS bearing shows opposite to the traffic left and right, and it shows correctly forward and aft.	The antenna coaxes for the bottom antenna are backwards.	Check antenna connections.

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Maintenance Practices

1. General

This Section tells you how to remove/install the components of the traffic advisory system.

2. Remove/Install the TAS Processor

A. Remove the TAS Processor

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the ELECT. MASTER switch is set to OFF.	Instrument panel, left side.
(2)	Remove the aft baggage compartment.	Refer to Section 25-50.
(3)	Open the TAS circuit breaker.	Instrument panel, right side.
(4)	Disconnect the connectors and antenna cables from the TAS processor.	
(5)	Loosen the diagonal retaining screws that attaches the processor to its mounting tray.	
(6)	Slide the TAS processor out of its mounting tray and clear of the airplane.	Along the rails.

B. Install the TAS Processor

	Detail Steps/Work Items	Key Items/References
(1)	Slide the TAS processor into its mounting tray.	Along the rails.
(2)	Tighten the diagonal retaining screws that attached the processor to its mounting tray.	
	CAUTION: WRONG CONNECTION OF THE ANTENNA CABLES WILL LEAD TO A WRONG INDICATION.	
(3)	Connect the connectors and antenna cables to the TAS processor.	
(4)	Close the TAS circuit breaker.	
(5)	Install the aft baggage compartment.	
(6)	Do a test of the traffic advisory system.	Refer to the TAS Installation Manual.

3. Remove/Install the Transponder Coupler

A. Remove the Transponder Coupler

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the ELECT. MASTER switch is set to OFF.	Instrument panel, left side.
(2)	Remove the aft baggage compartment.	Refer to Section 25-50.
(3)	Open the TAS circuit breaker.	Instrument panel, right side.
(4)	Disconnect the antenna cables from the transponder coupler.	
(5)	Remove the screws that attach the transponder coupler to the remote avionics box.	Hold the transponder coupler!
(6)	Remove the transponder coupler from the remote avionics box and clear of the airplane.	Fit dust caps to all connections.

B. Install the Transponder Coupler

	Detail Steps/Work Items	Key Items/References
(1)	Remove the dust-cover(s) from all connections.	If necessary, install the dust covers from the new transponder coupler onto the transponder coupler that you removed.
(2)	Move the transponder coupler into position on the remote avionics box.	Hold the transponder coupler!
(3)	Install the screws that attach the transponder coupler to the remote avionics box.	
(4)	Connect the antenna cables to the transponder coupler.	
(5)	Close the TAS circuit breaker.	
(6)	Install the aft baggage compartment.	Refer to Section 25-50.
(7)	Do a test of the traffic advisory system.	Refer to the TAS Installation Manual.

4. Remove/Install a TAS Antenna

A. Remove a TAS Antenna

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the ELECT. MASTER switch is set to OFF.	Instrument panel, left side.
(2)	Open the TAS circuit-breaker.	Instrument panel, right side.
(3)	Remove the aft baggage compartment if you will replace the top mounted antenna. Remove the pilot's seat if you will replace the bottom mounted antenna.	Refer to Section 25-50. Refer to Section 25-10.
(4)	Disconnect the co-axial cables from the antenna that you will replace.	At the antenna.
(5)	Remove the antenna: – Remove the 4 screws that attach the antenna to the structure. – If necessary, use a knife to carefully remove the sealant that seals the antenna to the airplane outer surface. – Move the antenna clear of the airplane.	 Hold the antenna. Take care not to damage the airplane surface!

B. Install a TAS Antenna

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the contact surfaces of the antenna and the ground plane where the antenna will be installed are clean and free of grease.	
(2)	Move the antenna into position.	
(3)	Install the 4 screws that attach the antenna to the airplane.	
(4)	Seal the outer edge of the antenna where it contacts the airplane surface with sealant.	Refer to 34-50, Paragraph 4 for an approved sealant.
(5)	Remove the excess sealant that has been forced out of the joint between the antenna and the airplanes surface.	
CAUTION: WRONG CONNECTION OF THE ANTENNA CABLES WILL LEAD TO A WRONG INDICATION.		
(6)	Connect the co-axial cables to the antenna.	At the antenna.
(7)	Install the aft baggage compartment or seat that you removed in Paragraph A.	Refer to Section 25-10 or 25-50.
(8)	Reset the TAS circuit-breaker.	Instrument panel, right side.
(9)	Do a test of the traffic advisory system.	Refer to the TAS Installation Manual.

Section 34-43

Garmin GWX 68 Weather Radar System

1. General

This Section tells you about the weather radar system that can be installed in the DA 42 . Refer to the manufacturer's manual for more data about the equipment.

2. Description and Operation

(1) Radar Nose Cone

The radar nose cone is made of GFRP and protects the GWX 68 weather radar system mechanically and is transparent for the transmitted microwaves. For lightning protection 4 strips are mounted to the surface and connected to the airplanes lightning protection system with a lightning plate.

(2) Garmin GWX 68 Weather Radar System

The Garmin GWX 68 weather radar system provides information about precipitation conditions ahead of the airplane. The system consists of a combined microwave transmitter and receiver system in the nose cone, mounted to the radar bulkhead via the GWX 68 bracket. The system is connected to the electrical system of the airplane via a circuit breaker on the instrument panel. The processed data of the GWX 68 system is displayed on the Garmin G1000 MFD. Refer to the Garmin G1000 Pilot's Guide for more information about operation of the system.

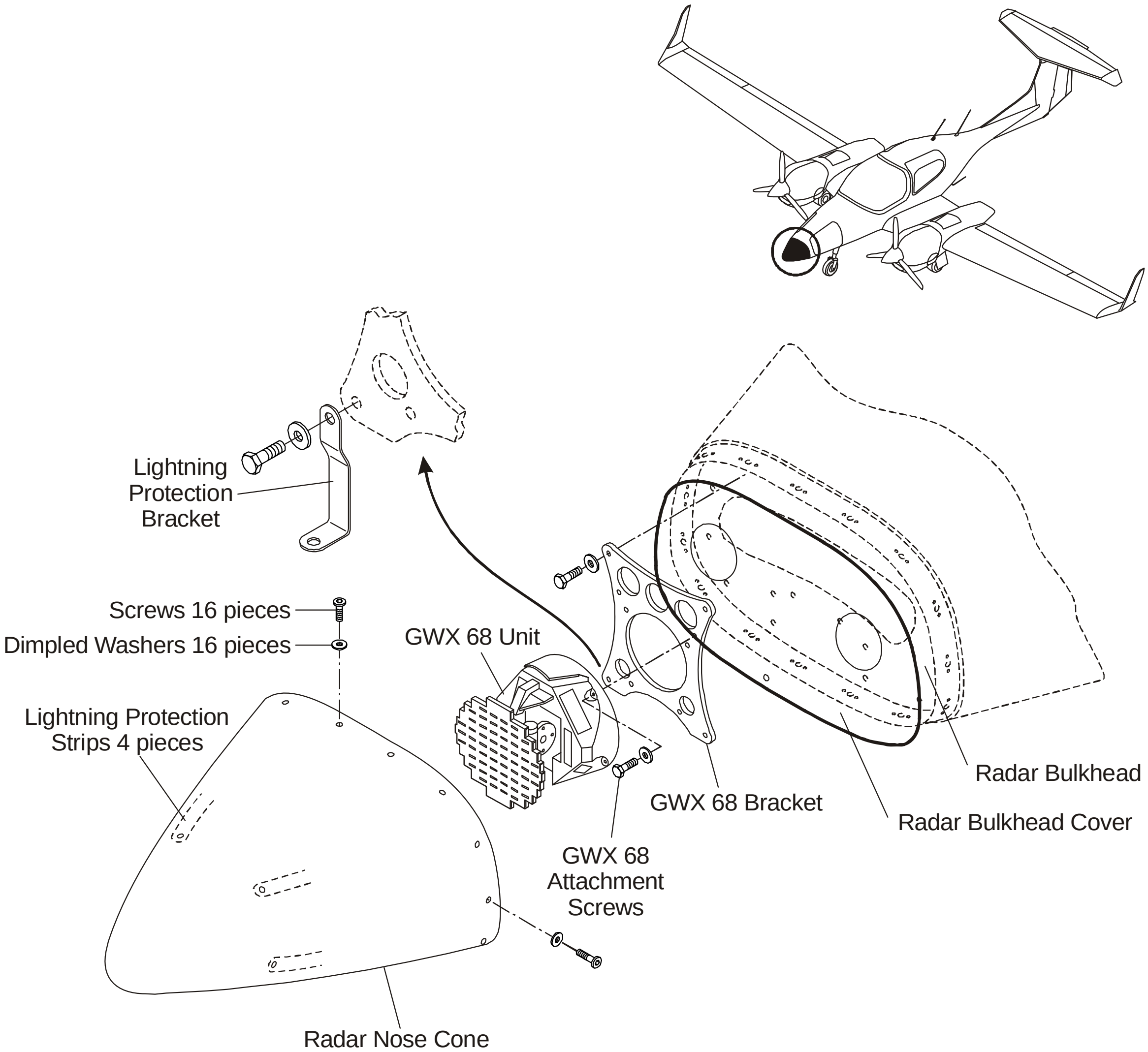

Figure 1: Installation of the Garmin GWX 68 Weather Radar System

Trouble Shooting

1. General

The table below lists the trouble you could have with the Garmin GWX 68 weather radar system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Weather radar does not operate.	Circuit breaker not set. Faulty cables / connectors.	Set the circuit breaker. Do a test for continuity test of the weather radar system. Repair or replace defective wiring. Refer to Chapter 92 for the wiring diagrams.
Weather radar shows poor image quality.	Radome damaged / scratched.	Replace radome.

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Maintenance Practices

1. General

These Maintenance Practices tell you how to replace the Garmin GWX 68 weather radar system. Refer to the equipment manufacturers' manuals for more data about the equipment.

2. Remove/Install the Garmin GWX 68 Weather Radar System

A. Remove the Garmin GWX 68 Weather Radar System

Note: Special care must betaken to avoid any contact between tools that could become magnetized and the magnetron. Use of non-magnetic tools (e.g. beryllium copper or titanium) is recommended when installing or servicing the GWX 68 system.

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the ELECT. MASTER switch is set to OFF.	
	Note: The inner and outer surface of the radar nose cone (radome) effects the function and image quality of the weather radar system significantly. Make sure to avoid any scratches and contamination of the inner and outer surfaces of the radome and do not touch the antenna face of the GWX 68 unit.	
(2)	Remove the radar nose cone:	
	– Protect the surface of the fuselage and the radar nose cone with a protective cover.	
	– Cut the sealant between the fuselage and the radar nose cone.	Use a plastic spattle.
	– Clean the sealed gap between fuselage and the radar nose cone.	
	– Remove the 16 screws which attach the radar nose cone to the fuselage.	Hold and support the radar nose cone.
	– Move the radar nose cone straight forward.	
(3)	Disconnect the electrical connector.	

	Detail Steps/Work Items	Key Items/References
(4)	Remove the GWX 68 unit: – Remove the 4 screws which attach the GWX 68 unit to the GWX 68 bracket on the radar bulkhead. – Move the GWX 68 unit free of the airplane.	Hold and support the GWX 68 unit on the mounting plate. Do not touch the delicate radar antenna.

B. Install the Garmin GWX 68 Weather Radar System

	Detail Steps/Work Items	Key Items/References
	Note: The inner and outer surface of the radar nose cone (radome) effects the function and image quality of the weather radar system significantly. Make sure to avoid any scratches and contamination of the inner and outer surfaces of the radome and do not touch the antenna face of the GWX 68 unit.	
(1)	Install the GWX 68 unit: – Move the GWX 68 unit in place in front of the GWX 68 bracket. – Install the 4 screws which attach the GWX 68 unit to the GWX 68 bracket on the radar bulkhead.	Hold and support the GWX 68 unit on the mounting plate. Do not touch the delicate radar antenna.
(2)	Connect the electrical connector.	
(3)	Install the radar nose cone: – Move the radar nose cone towards the fuselage. – Install the 16 screws which attach the radar nose cone to the fuselage.	Do not touch the delicate radar antenna.

	Detail Steps/Work Items	Key Items/References
(4)	Seal the joint between fuselage and the radar nose cone:	
	– Apply thin red adhesive tape and the masking tape on both sides of the joint.	Refer to Figure 2.
	– Fill the joint with sealant.	
	– Use plastic or rubber spattle to remove excess sealant.	Use Terostat MS 9380 white sealant. Maximum time for sealing process: 10 min.
	– Spray the joint with water / cleaning solvent solution and create smooth surface by hand.	Use gloves to protect the skin.
	– Remove all adhesive and masking tapes.	
	– Allow the sealant to cure for at least 12 hrs.	
Note: Before energizing the equipment make sure microwave radiation safety precautions including both fuel and personnel safety considerations are observed. These include clearing all personnel to an area beyond the maximum permissible exposure level (MPEL) boundary. The MPEL for the GWX 68 is 3 m (10 ft).		
(5)	Switch the ELECT. MASTER switch and the AV. MASTER switch to ON and test the weather radar system. Refer to the manufacturer’s manual for more information.	

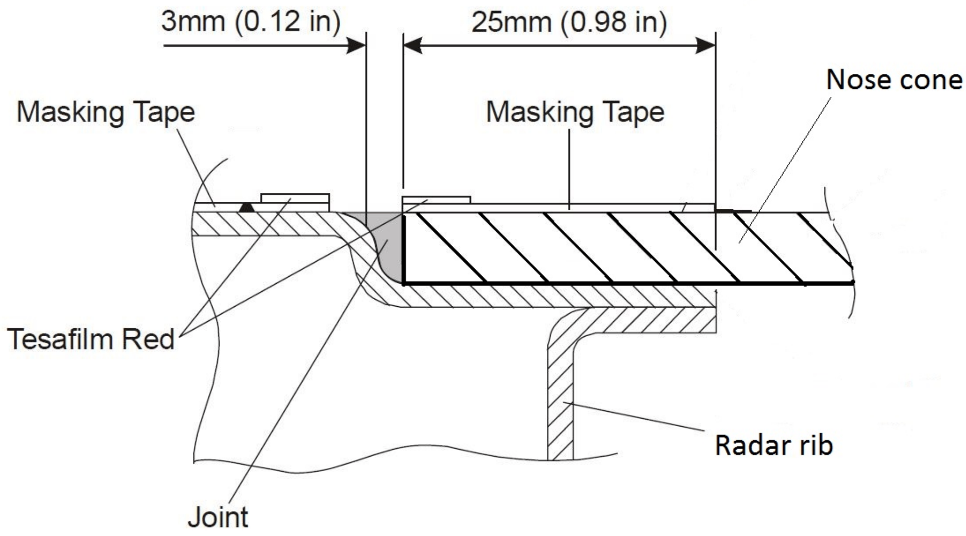

Figure 2: Radar Nose Cone Sealed Joint

Section 34-50
Dependent Positioning Determining

1. General

The DA 42 has an integrated cockpit system (ICS). The ICS has all the usual dependent position determining systems. Refer to Section 31-40 for more data about the dependent positioning determining systems that are integral with the ICS.

This Section tells you how to replace the antennas for the dependent position determining systems.

2. Description

The DA 42 has these dependent position determining systems and antennas:

– Transponder.

– DME.

– GPS (2x).

– ADF.

– Marker.

– VOR/G/S.

Flexible co-axial cables connect the antennas to their related equipment. You can replace the co-axial cables. The antennas are all attached to the surface of the airplane and can be replaced.

Refer to Section 31-40 for more data about the dependent position determining systems and their related displays.

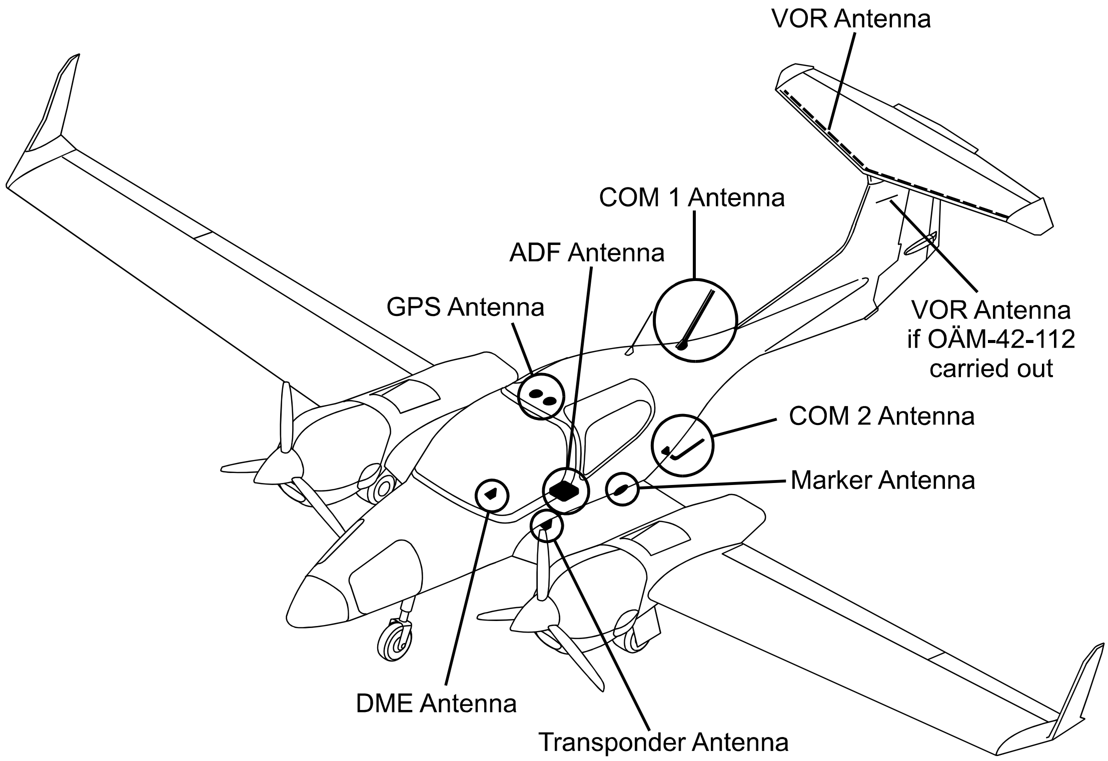

Figure 1: Antenna Locations

Trouble-Shooting

1. General

The table below lists the defects you could have with the dependent positioning determining system antennas. Refer to Section 31-40 for trouble-shooting data for the dependent positioning determining systems.

If you have the trouble listed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
ATC reports no transponder reply. Transponder reply symbol operates.	Low output power.	Examine and repair/replace defective antenna connections. Replace antenna.
ATC reports no transponder reply. Transponder reply symbol not operating.	Poor received signal.	Examine and repair/replace defective antenna connections. Replace antenna.
DME/GPS/ADF/MARKER/ VOR/G/S systems give poor performance.	Poor received signal.	Examine and repair/replace related defective antenna connections. Replace related antenna.

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Maintenance Practices

1. General

The Maintenance Procedures in this Section tell you how to replace the antennas of the dependent position determining systems. Refer to Section 31-40 for more data about the dependent position determining systems. Refer to Paragraph 3 for more information on the used types of co-axial cables. Further particulars on the antenna sealant are given in Paragraph 4.

2. Replace a Dependent Position Determining System Antenna

A. Replace the Transponder or DME Antenna

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the ELECT. MASTER switch is set to OFF.	Instrument panel, left side.
(2)	Open the XPDR/DME circuit-breaker.	Instrument panel, right side.
(3)	Remove the pilots seat if you will replace the transponder antenna. Remove only the co-pilot’s seat if you will replace the DME antenna.	Refer to Section 25-10.
(4)	Disconnect the co-axial cable from the antenna that you will replace.	At the antenna.
(5)	Remove the antenna:	
	– Remove the 2 nuts and washers that attach the antenna to the structure.	Hold the antenna.
	– If necessary, use a knife to carefully remove the sealant that seals the antenna to the airplane outer surface.	Take care not to damage the airplane surface!
	– Move the antenna clear of the airplane.	

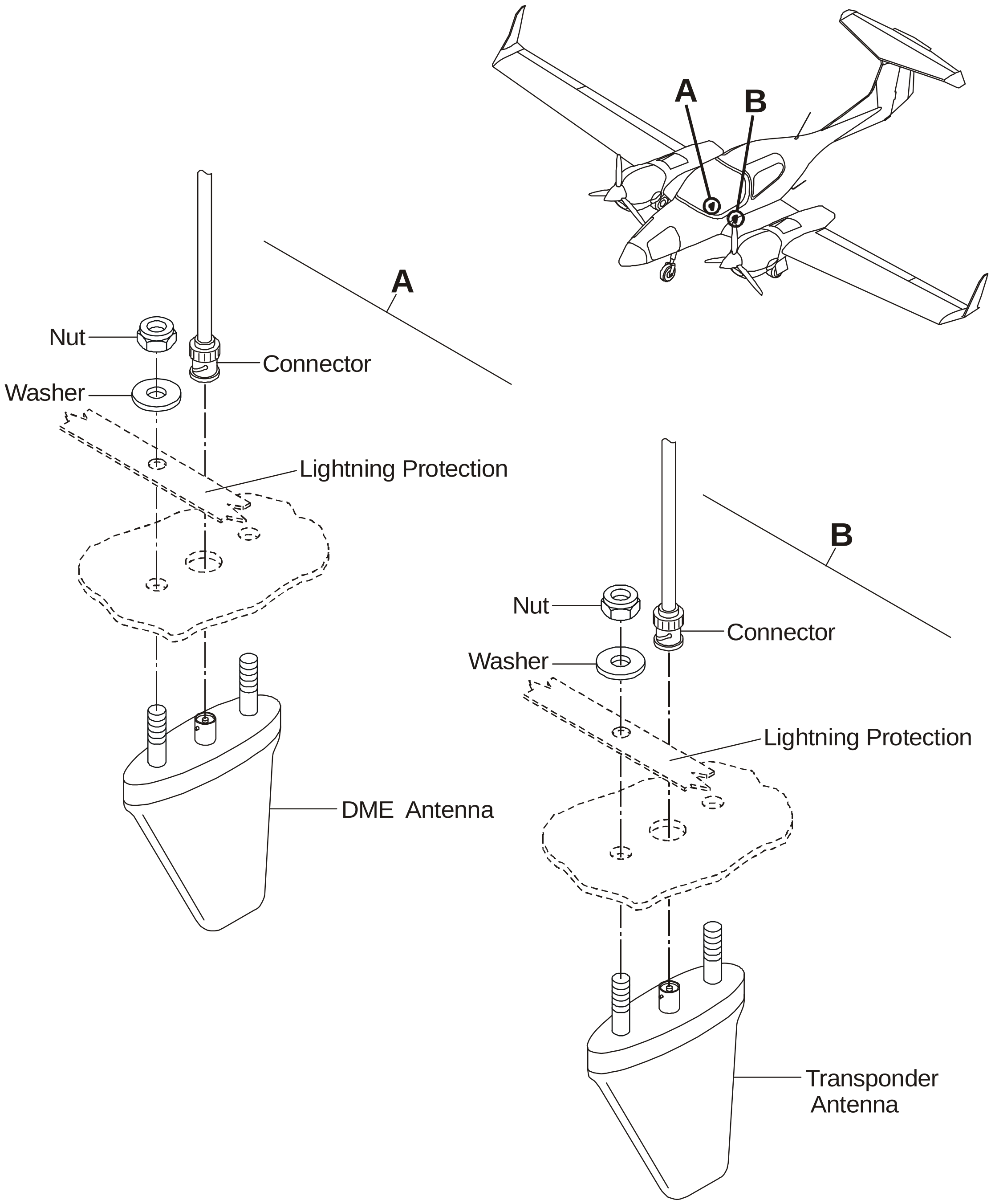

Figure 2: Transponder and DME Antenna Installation

	Detail Steps/Work Items	Key Items/References
(6)	Install the antenna: – Make sure that the contact surfaces of the antenna and the airplane surface where the antenna will be installed are clean and free of grease. – Move the antenna into position under the fuselage. – Seal the outer edge of the antenna where it contacts the airplane surface with sealant. – Install the 2 washers and nuts that attach the antenna to the airplane structure. – Remove the excess sealant that has been forced out of the joint between the antenna and the airplane surface.	Use sealant. Refer to Paragraph 4.
(7)	Connect the co-axial cable to the antenna.	At the antenna.
(8)	Install the seat(s) that you removed at step 3.	Refer to Section 25-10.
(9)	Reset the XPDR/DME circuit-breaker.	Instrument panel, right side.
(10)	Do a test of the transponder.	Only if you replaced the transponder antenna.
(11)	Do an operational test of the DME on the next flight.	Only if you replaced the DME antenna.

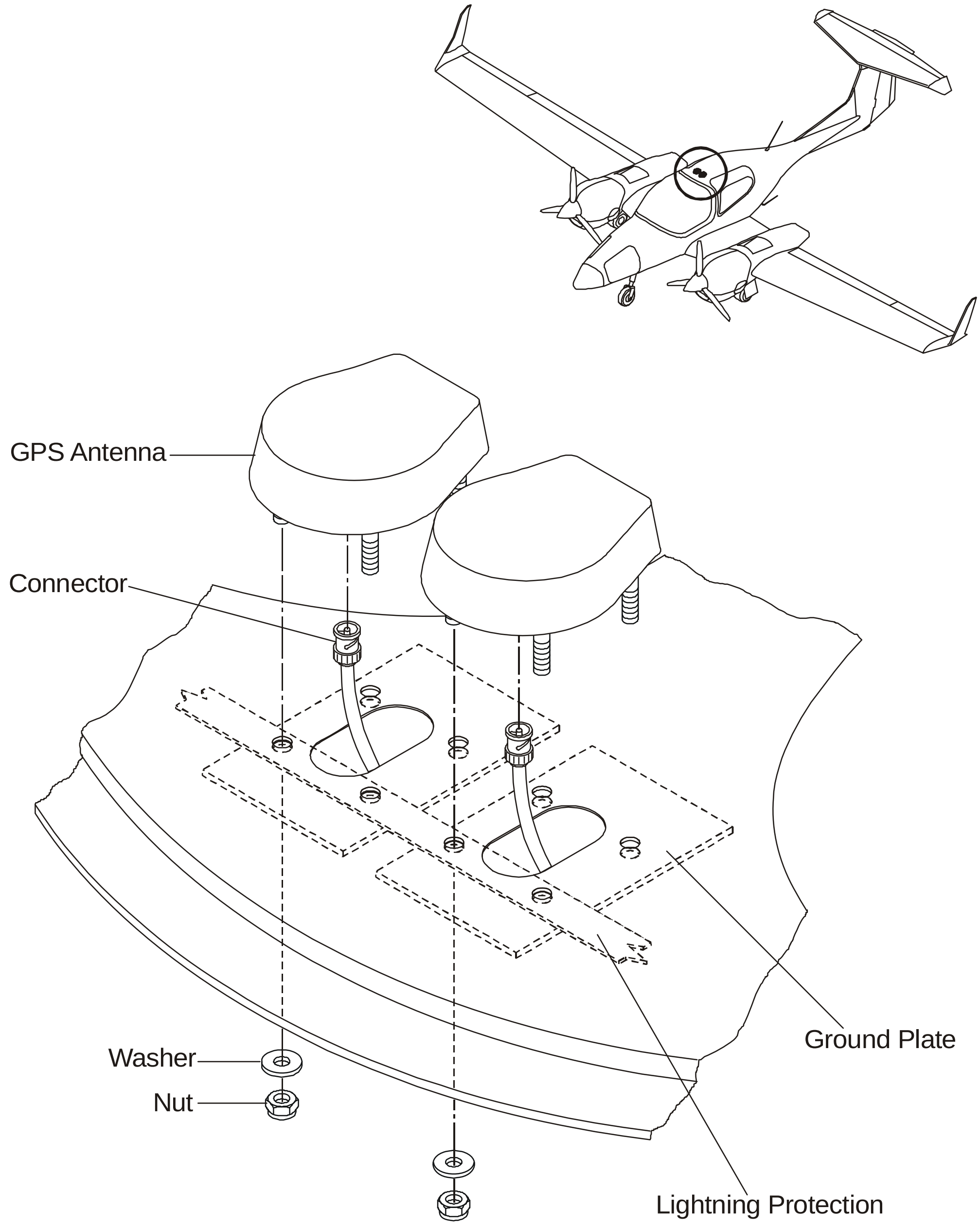

Figure 3: Replace a GPS Antenna

B. Replace a GPS Antenna

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the ELECT. MASTER switch is set to OFF.	Instrument panel, left side.
(2)	Open the GPS/NAV1 and/or GPS/NAV2 circuit breaker.	Instrument panel, right side.
(3)	Remove the reading/map light(s) as necessary to gain access to the antenna that you will replace.	Refer to Section 33-10.
(4)	Disconnect the co-axial cable from the antenna that you will replace.	At the antenna.
(5)	Remove the antenna:	
	– Remove the 4 nuts and washers that attach the antenna to the airplane.	Hold the antenna.
	– Remove the ground-plate.	
	– If necessary, use a knife to carefully remove the sealant that seals the antenna to the airplane outer surface.	Take care not to damage the airplane surface!
	– Move the antenna clear of the airplane.	From the outside.
(6)	Install the antenna:	
	– Make sure that the contact surfaces of the antenna and the airplane surface where the antenna will be installed are clean and free of grease.	
	– Move the antenna into position on the top of the fuselage.	
	– Seal the outer edge of the antenna where it contacts the airplane surface with sealant.	Use sealant. Refer to Paragraph 4.
	– Install the ground plate.	
	– Install the 4 washers and nuts that attach the antenna to the airplane.	

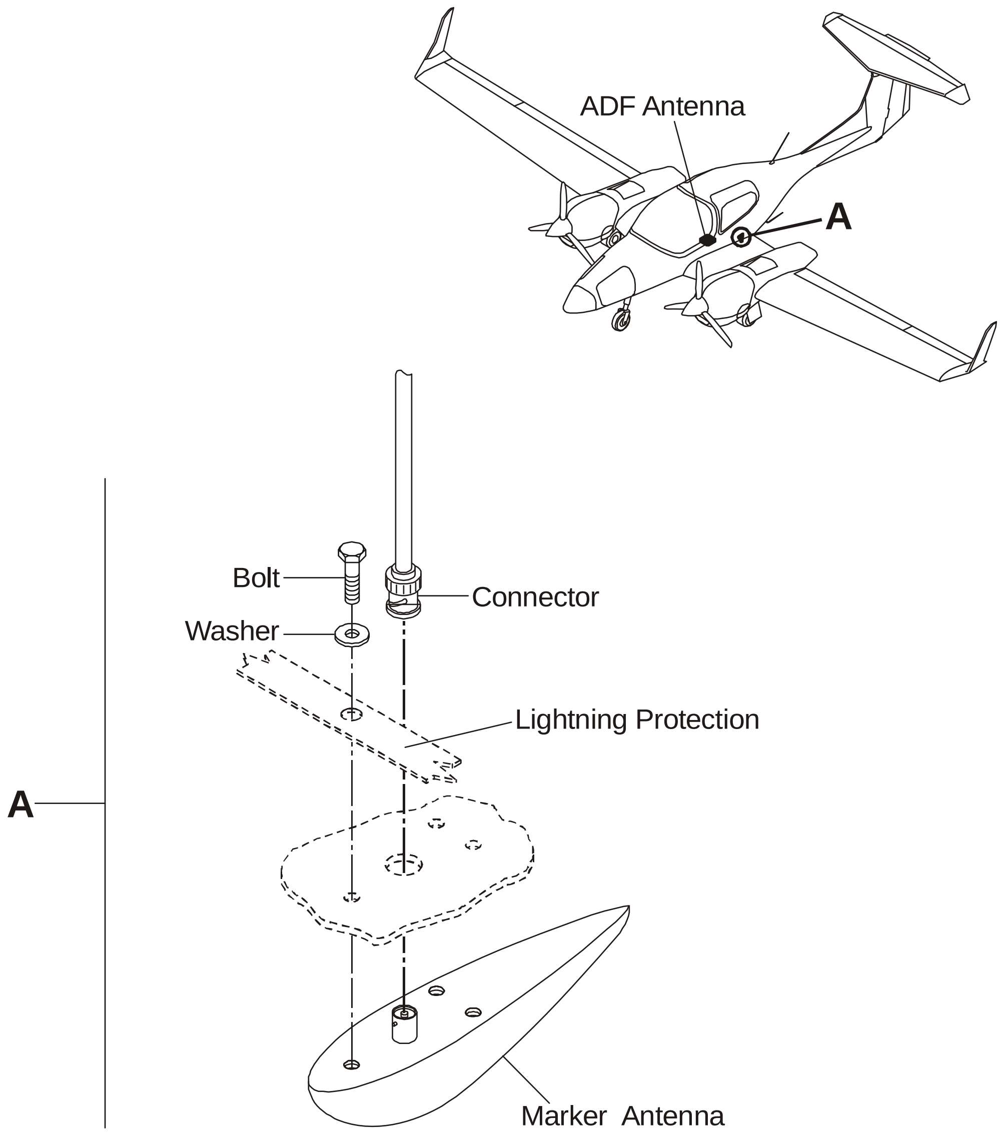

Figure 4: Replace a Marker Antenna

	Detail Steps/Work Items	Key Items/References
(7)	Connect the co-axial cable to the antenna.	At the antenna.
(8)	Install the reading/map light(s) that you removed at step 3.	
(9)	Set the GPS/NAV1 and/or GPS/NAV2 circuit breaker.	Instrument panel, right side.
(10)	Do a test of the GPS system(s).	Refer to Section 31-40.

C. Replace a Marker or ADF Antenna

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the ELECT. MASTER switch is set to OFF.	Instrument panel, left side.
(2)	Remove the passengers seat.	Refer to Section 25-10.
(3)	Disconnect the co-axial cable from the antenna that you will replace.	At the antenna.
(4)	Remove the antenna:	
	– Remove the 2 or 3 screws, nuts and washers that attach the antenna to the airplane.	Hold the antenna.
	– Remove the ground plate.	
	– If necessary, use a knife to carefully remove the sealant that seals the antenna to the airplane outer surface.	Take care not to damage the airplane surface!
	– Move the antenna clear of the airplane.	From the outside.

	Detail Steps/Work Items	Key Items/References
(5)	Install the antenna: – Make sure that the contact surfaces of the antenna and the airplane surface where the antenna will be installed are clean and free of grease. – Move the antenna into position on the bottom of the fuselage. – Seal the outer edge of the antenna where it contacts the airplane surface with sealant. – Install the ground plate. – Install the 2 or 3 screws, washers and nuts that attach the antenna to the airplane.	Use sealant. Refer to Paragraph 4.
(6)	Connect the co-axial cable to the antenna.	At the antenna.
(7)	Install the passengers seat.	Refer to Section 25-10.
(8)	Do a post installation operational test of the ADF system.	Only if you replaced the AF antenna. Refer to Paragraph 5.
(9)	Do an operational test of the marker system on the next flight.	Only if you replaced the marker antenna.

D. Replace a NAV/G/S Antenna (if OÄM 42-112 is carried out)

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the ELECT. MASTER switch is set to OFF.	Instrument panel, left side.
(2)	Open the GPS/NAV1 and/or GPS/NAV2 circuit-breaker.	Instrument panel, right side.
(3)	Remove the rudder to gain access to the NAV G/S antenna via the hole in the stabilizer spar.	Refer to Section 27-20.
(4)	Disconnect the co-axial cable from the antenna that you will replace.	At the antenna.
(5)	Remove the antenna:	
	– Remove the 4 nuts and washers that attach the antenna to the airplane.	Hold the antenna.
	– If necessary, use a knife to carefully remove the sealant that seals the antenna to the airplane outer surface.	Take care not to damage the airplane surface!
	– Move the antenna clear of the airplane.	From the outside.
(6)	Install the antenna:	
	– Make sure that the contact surfaces of the antenna and the airplane surface where the antenna will be installed are clean and free of grease.	
	– Move the antenna and the NAV antenna base in to position on the side of the stabilizer.	
	– Install the 4 washers and nuts that attach the antenna to the airplane.	
	– Seal the outer edge of the antenna where it contacts the NAV antenna base and the edge between the airplane and the NAV antenna base.	Use sealant. Refer to Paragraph 4.
(7)	Install the rudder.	Refer to Section 27-20.

3. Used Types of flexible Co-Axial Cables

	Antenna/Receiver	Co-Axial Cable
(1)	Transponder	RG 142
(2)	DME	RG 142
(3)	GPS	RG 400
(4)	ADF	RG 400
(5)	Marker	RG 400

4. Sealant Specification

Use an adhesive bonding compound on the basis of modified polymers or polyurethane to seal the antennas to the airplane outer surface. Make sure the sealant is free of silicone and it is temperature resistant from - 40 °C (- 40 °F) to +60 °C (+ 140 °F).

5. Post-Installation Check of the ADF System

A. General

After installing the equipment, check the indicator reading is correct and determine whether or not quadrantal error correction is necessary. If so, correction should be first carried out on the ground, then in the air. It is also necessary to establish whether any equipment in the airplane electrical system is generating interference.

B. Operational Check

	Detail Steps/Work Items	Key Items/References
(1)	Locate the airplane on the correction platform and using the bearing compass point the nose of the airplane to a radio beacon in boundary range.	
(2)	Switch on the ADF, adjust to the correct frequency and observe the indication in the ADF operating mode.	The indicator should read 0 relative bearing.
(3)	Turn the airplane about its vertical axis to a larger heading.	The indicator should move to the left.
(4)	Turn the airplane about its vertical axis to a smaller heading.	The indicator should move to the right.

Note: If the reading is incorrect or if the indicator moves in the wrong direction, check the wiring of the equipment for agreement with the wiring diagram and correct if necessary.

Note: If the airplane is accurately aligned with the NBD beacon, but a relative bearing reading of 0° is not indicated, this is an indication that the antenna has been wrongly installed. Recheck the antenna for agreement with the centerline of the airplane and correct if necessary.

Refer to the manufacturer's manual for detailed information on the quadrantal error correction.

Note: It is obliging to proceed in accordance with FAA AC 43-13-1A and FAA AC 43.13-2A requirements.

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Section 34-56
Transponder (XPDR)

1. General

The DA 42 has a transponder system which is an integral part of the Garmin G1000 system.

Refer to the ‘G1000 Line Maintenance and Configuration Manual', Doc.# 190-00303-04, latest revision for more details about the transponder (XPDR) system of the DA 42 airplane.

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CHAPTER 35

OXYGEN SYSTEM

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Pressure Gauge and Oxygen System

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Note: The Oxygen System is optional equipment (OÄM 42-055 carried out).

CHAPTER 35
OXYGEN SYSTEM

1. General

This Chapter tells you about the optional continuous flow oxygen system installed in the DA 42 airplane. This Chapter contains general, trouble-shooting and maintenance information on the system.

2. Description

This oxygen system supplies supplemental oxygen which is required in an altitude above 12,500 ft. Each pilot or passenger can connect a mask or cannula to the oxygen system via 4 outlet ports. The operation of the oxygen system is controlled via a single ON/OFF switch installed below the instrument panel on the pilot's side. Information concerning the endurance of the system, which is in direct relation to the cylinder pressure, is indicated on a pressure gauge installed on the upper right side of the instrument panel.

A pressure gauge is installed on the RH side of the instrument panel. This gauge shows the amount of remaining oxygen by means of the current oxygen pressure in the cylinder. Two marks (REFILL=red color and FULL=green color) show the limits within which the system can be operated.

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Section 35-10
Pressure Gauge and Oxygen System

1. General

This oxygen system supplies supplemental oxygen which is required at altitudes above 12,500 ft. Each pilot or passenger can connect a mask or cannula to the oxygen system via 4 outlet ports. The operation of the oxygen is controlled via a single ON/OFF switch installed below the instrument panel on the pilot's side. Information concerning the endurance of the system, which is in direct relation to the cylinder pressure, is indicated on a pressure gauge installed on the upper right side of the instrument panel.

An oxygen system overview is given in Figure 1.

The system consists of 5 main sections:

- Pressure gauge on the instrument panel.
- Oxygen cylinder.
- Regulator valve assembly.
- Filling block.
- Outlet ports.

To enable proper ventilation the nose baggage compartment is divided into 3 vented compartments:

- Battery/relay-box compartment.
- Oxygen compartment.
- De-icing compartment (including de-icing fluid tank; optional equipment).

Not shown in Figure 1:

- Instrument panel pressure gauge lighting.
- Interfaces: masks, cannulas.

The high pressure system components are connected with copper tubing (filling block to regulator valve assembly; regulator valve assembly to instrument panel pressure gauge). The low pressure system components are connected via PFA tubing.

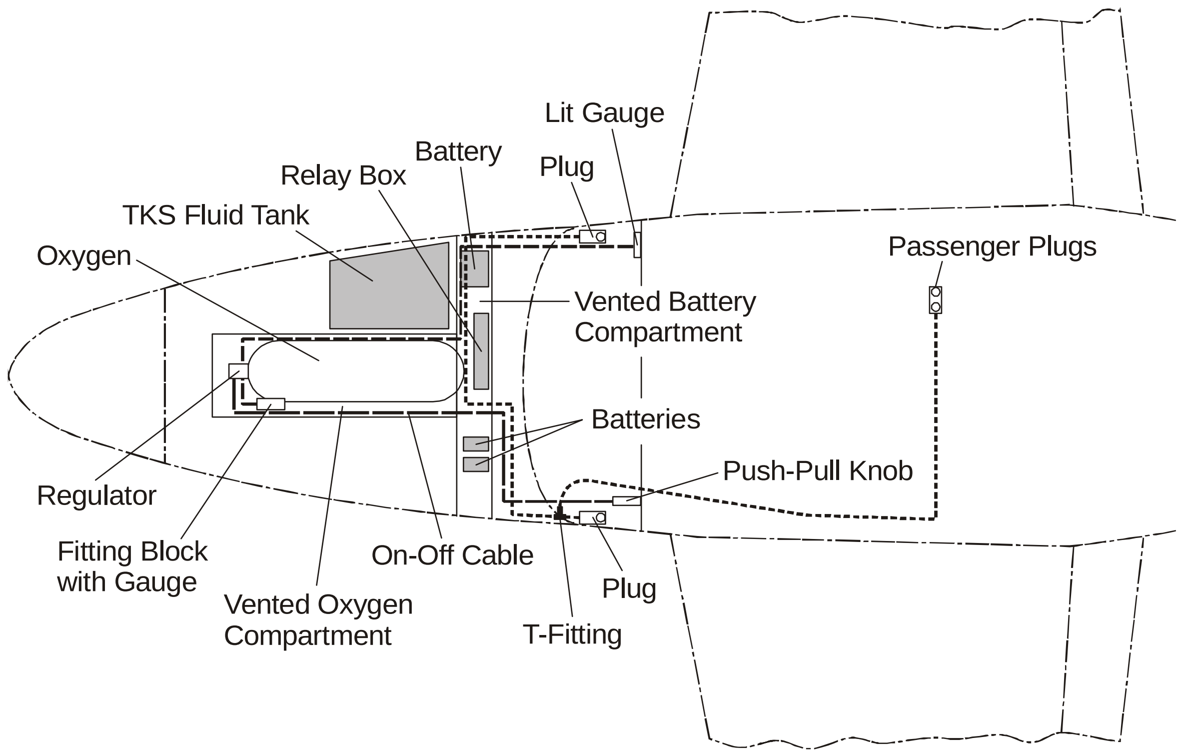

Figure 1: AEROX Oxygen System

2. Description

A. Pressure Gauge

The oxygen pressure gauge is installed on the RH side of the instrument panel. The gauge shows the current pressure in the oxygen cylinder. The oxygen pressure is directly related to the remaining amount of oxygen.

The lighting of the instrument panel pressure gauge is the only electrical item of the oxygen system. There are no indications and warning lamps of the oxygen system connected to the Garmin G1000 system.

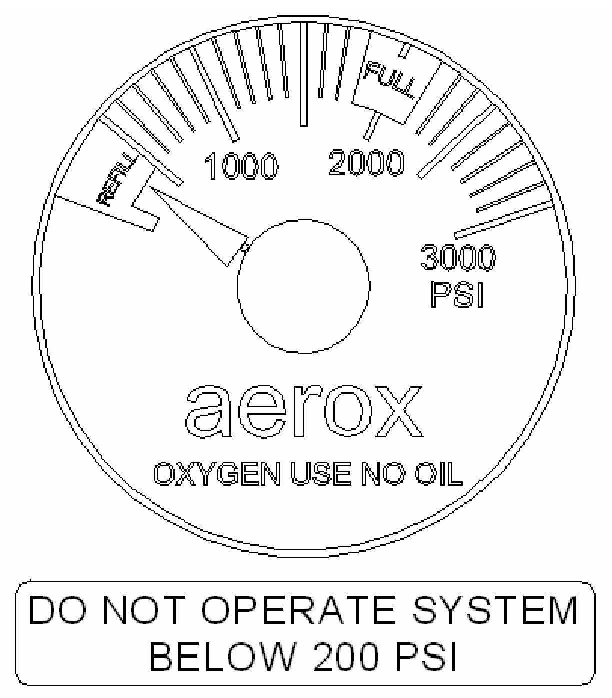

Figure 2: Oxygen Pressure Gauge

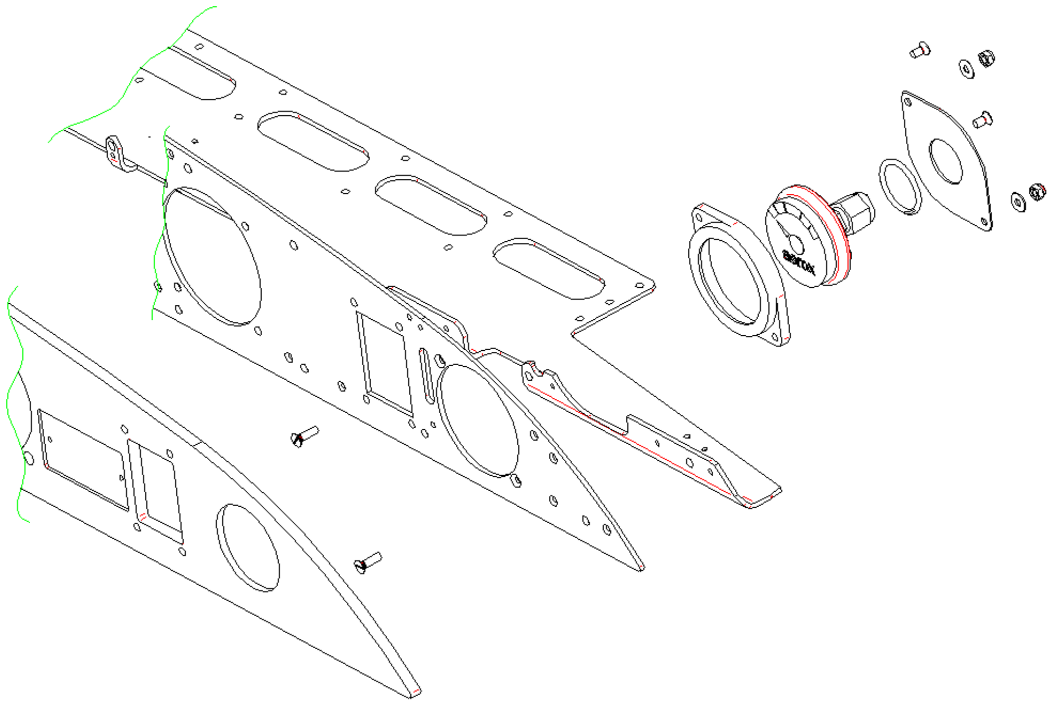

Figure 3: Pressure Gauge Installation on the Instrument Panel

B. Oxygen Cylinder

The Kevlar oxygen cylinder is installed in the front baggage compartment in its own vented compartment. The cylinder capacity is 10.7 liters (650 cu.in.). This represents an uncompressed capacity of 1419 liters (50.1 cu.ft.) of oxygen at 128 bar (1850 PSI).

C. Regulator Valve Assembly

The oxygen flow is controlled by a regulator valve assembly which is switched by a push/pull knob Bowden cable assembly. The main task of the regulator valve is to reduce the oxygen pressure to 3.4 bar (50 PSI). Each mask or cannula is equipped with its own adjustable pressure regulator, therefore each user can adjust the amount of supplemental oxygen.

D. Filling Block

Refilling of the oxygen cylinder, which is firmly installed in the airplane, is done via the filling block assembly which is installed on the LH side of the oxygen compartment. It is accessible via a small cover on the LH side of the oxygen compartment. It consists of a damper valve and a pressure gauge. Refer to Section 12-10 for filling procedure of the continuous flow oxygen system.

WARNING: OIL, GREASE OR OTHER LUBRICANTS IN CONTACT WITH OXYGEN CREATES A SERIOUS HAZARD. SUCH CONTACT MUST BE AVOIDED WHEN HANDLING OXYGEN EQUIPMENT.

CAUTION: WHEN HANDLING WITH OXYGEN EQUIPMENT, ELECTRICALLY GROUND THE AIRPLANE.

E. Outlet Ports

Each pilot and each passenger has his own outlet port to which the mask or cannulas including their regulators can be connected. The outlet ports are interconnected via PFA-tubing to the low pressure side of the regulator.

3. Operation

WARNING: OIL, GREASE OR OTHER LUBRICANTS IN CONTACT WITH OXYGEN CREATES A SERIOUS HAZARD. SUCH CONTACT MUST BE AVOIDED WHEN HANDLING OXYGEN EQUIPMENT.

A four-place oxygen system provides the supplementary oxygen necessary for continuous flight at high altitude. An oxygen cylinder is located in the center section of the forward baggage compartment, in its own enclosed, vented compartment. A combined pressure regulator/shut-off valve attached to the cylinder automatically reduces pressure to the delivery pressure required for the operating altitude. The oxygen cylinder filler valve is located on the LH side of the oxygen compartment next to the cylinder in the forward baggage compartment.

The 50 cubic feet (1.41 cubic meters) capacity oxygen cylinder may be filled to 1850 PSI (128 bar) while installed in the airplane. The system has a pressure gauge located next to the filler valve to indicate the amount of oxygen in the cylinder. An identical gauge is located on the upper RH side of the instrument panel (above the circuit breaker panel).The oxygen supply shut-off control is located on the LH side below the instrument panel. It is cable connected to the oxygen regulator valve, controlling the oxygen system by pulling the green control knob out for "ON" and pushing the same knob in for system supply "OFF." The system should be left "OFF" when not in use.

The oxygen ports are located (1 each) in the map pocket recess for the pilot and co-pilot. The passengers' oxygen ports are located overhead in the "roll-over bar" next to the cabin speaker. The individual cannula or mask supply tubes are plug-in connected to each port and contain the individual flow adjustments (flow meter-needle valve) for each occupant. Note that these ports are serviced directly from the oxygen regulator valve.

The oxygen cylinder, when fully charged, contains 50 cubic feet (1.41 cubic meters) of aviator's breathing oxygen under a pressure of 1850 PSI (128 bar) at 21 °C (70 °F). Filling pressures will vary due to the ambient temperatures in the filling area and the rise of temperature resulting from the compression of the oxygen. Due to these factors merely filling the cylinder to 1850 PSI will not result in a properly filled cylinder. Fill oxygen cylinders to the pressures indicated in the table shown below, based on the filling area's ambient temperature.

The oxygen system pressure is limited and rated to 1850 PSI.

Ambient Temperature °C (°F)	**Filling Pressure PSI**	**Ambient Temperature °C (°F)**	**Filling Pressure PSI**
-18 (0)	1650	10 (50)	1875
-12 (10)	1700	16 (60)	1925
-7 (20)	1725	21 (70)	1975
-1 (30)	1775	27 (80)	2000
4 (40)	1825	32 (90)	2050

Trouble-Shooting

1. General

The table below lists the defects you could have with the oxygen system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
No oxygen comes out of the connected masks and cannulas.	False adjustment of flow meter-needle valve.	Adjust the valve.
	Flow meter needle valve defective.	Replace the valve.
	Outlet port defective.	Replace the outlet port.
	Regulator valve assembly defective.	Replace the regulator valve assembly.

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Maintenance Practices

1. General

These Maintenance Practices tell you how to perform an operational test of the oxygen system. They also tell you how to remove and install the main components of the oxygen system.

2. Operational Test

	Detail Steps/Work Items	Key Items/References
(1)	Ground the airplane electrically.	
(2)	Fill up the oxygen cylinder to a max. pressure of 128 bar (1850 PSI).	Do not use oxygen with a lower purity grade than prescribed by MIL-PRF-27210.
(3)	Check each plug-in outlet port.	Use the flow meter-needle valve assembly; open every needle valve completely and make sure the ball floats to the top of the flow meter. Make sure that every plug in is fully opened.
(4)	Check pressure gauges by comparing the one attached on the filling block with the pressure gauge installed in the instrument panel.	If the difference between both pressure indications is more than 100 PSI exchange inaccurate pressure gauge. Use a calibrated gauge connected to the filling valve to determine the inaccurate gauge.
(5)	Remove the ground cable from the airplane.	

3. Empty the Oxygen System

	Detail Steps/Work Items	Key Items/References
(1)	Place airplane outside of hangar.	
(2)	Ground the airplane electrically.	
(3)	Open the canopy.	
(4)	Check that the ON/OFF knob is in the OFF position.	
(5)	Plug in one connection tube in the pilot's outlet port. Plug in only the connection tube-including the flow meter needle valve assembly.	
(6)	Pull ON/OFF knob in ON position and adjust the needle valve to maximum flow.	
(7)	Confirm that the outlet of the flow meter needle valve assembly does not point towards oil or grease (engine).	
(8)	The cylinder is depleted when the flow meter ball shows no flow.	
(9)	Remove the ground cable from the airplane.	

4. Remove/Install the Instrument Panel Pressure Gauge

A. Remove the Instrument Panel Pressure Gauge

	Detail Steps/Work Items	Key Items/References
(1)	Ground the airplane electrically.	
(2)	Confirm that the oxygen cylinder is empty.	
(3)	Remove instrument panel cover.	
(4)	Disconnect the high pressure tube from the pressure gauge.	
(5)	Remove the screws of the panel-overlay and remove the placard.	
(6)	Remove the 2 nuts and washers from the rear clamp sheet metal.	

	Detail Steps/Work Items	Key Items/References
(7)	Remove the clamp sheet metal and pull the indicator backwards out of its frame.	
(8)	Remove the ring from the indicator.	
(9)	Remove the ground cable from the airplane.	

B. Install the Instrument Panel Pressure Gauge

	Detail Steps/Work Items	Key Items/References
(1)	Ground the airplane electrically.	
(2)	Place the oxygen indicator in the frame.	
(3)	Attach the ring and the clamp sheet metal to the rear of the indicator.	
(4)	Install this assembly in the designated cutout on the RH side of the instrument panel.	Take care that no washer or nut falls into the instrument panel.
(5)	Install the RH panel overlay.	
(6)	Connect the high pressure copper tube to the gauge.	
(7)	Fix the tube which surrounds the copper tube by using cable ties.	Take care that the cable ties do not clamp this plastic tube.
(8)	Install the instrument panel cover.	
(9)	Remove the ground cable from the airplane.	

5. Remove/Install the Oxygen Cylinder

A. Remove the Oxygen Cylinder

	Key Items/References	Detail Steps/Work Items
(1)	Ground the airplane electrically.	
(2)	Empty the oxygen cylinder.	Refer to Paragraph 3.
(3)	Check both oxygen pressure gauges and check the ON/OFF knob is in OFF position.	
(4)	Open both doors to the nose baggage compartment.	
(5)	Remove the LH and RH oxygen compartment cover.	
(6)	Remove one PFA tubing.	
(7)	Pull ON/OFF knob in ON position and confirm that the cylinder is empty.	
(8)	Disconnect all other lines and the Bowden cable from the regulator.	
(9)	Open the clamp which fixes the oxygen cylinder.	
(10)	Remove the LH battery cover.	For easier removal of the oxygen cylinder.
(11)	Remove the cylinder.	
(12)	Remove the ground cable from the airplane.	

B. Install the Oxygen Cylinder

	Key Items/References	Detail Steps/Work Items
(1)	Ground the airplane electrically.	
(2)	Confirm that no oil, greases or any accumulations of oil based substances are in or near the oxygen compartment.	
(3)	Install the regulator on the cylinder. Seal the thread with Teflon tape and a rubber ring.	
(4)	Install the cylinder in its designated position.	Regulator points forward.
(5)	Fix the cylinder by using the silicon protection ring and a clamp.	
(6)	Connect all pressure lines and the Bowden cable to the regulator.	
(7)	Install the LH battery cover and both oxygen compartment covers.	
(8)	Perform an operational test.	
(9)	Remove the ground cable from the airplane.	

6. Remove/Install the Oxygen Regulator

A. Remove the Oxygen Regulator

	Key Items/References	Detail Steps/Work Items
(1)	Ground the airplane electrically.	
(2)	Empty the oxygen cylinder.	Refer to Paragraph 3.
(3)	Check both oxygen pressure gauges; verify that the ON/OFF knob is in the OFF position.	
(4)	Open both doors to the nose baggage compartment.	
(5)	Remove the LH and RH oxygen compartment cover.	
(6)	Remove one PFA tubing.	
(7)	Pull ON/OFF knob in ON position and confirm that the cylinder is empty.	

	Key Items/References	Detail Steps/Work Items
(8)	Disconnect all other lines and the Bowden cable from the regulator.	
(9)	Open the clamp which fixes the oxygen cylinder.	
(10)	Remove the LH battery cover.	For easier removal of the oxygen cylinder.
(11)	Remove the cylinder.	
(12)	Remove the regulator from the cylinder.	
(13)	Remove the ground cable from the airplane.	

B. Install the Oxygen Regulator

	Key Items/References	Detail Steps/Work Items
(1)	Ground the airplane electrically.	
(2)	Confirm that no oil, greases or any accumulations of oil based substances are in or near the oxygen compartment.	
(3)	Install the regulator on the cylinder. Seal the thread with Teflon tape and a rubber ring.	
(4)	Install the cylinder in its designated position.	Regulator points forward.
(5)	Fix cylinder with the silicon protection ring and a clamp.	
(6)	Connect all pressure lines and the Bowden cable to the regulator.	
(7)	Install the LH battery cover and both oxygen compartment covers.	
(8)	Perform an operational test.	
(9)	Remove the ground cable from the airplane.	

7. Remove/Install the Filling Block Assembly

A. Remove the Filling Block Assembly

	Key Items/References	Detail Steps/Work Items
(1)	Ground the airplane electrically.	
(2)	Empty the oxygen cylinder.	Refer to Paragraph 2.
(3)	Check both oxygen pressure gauges and check the ON/OFF knob is in OFF position.	
(4)	Open both doors to the nose baggage compartment.	
(5)	Remove the LH oxygen compartment cover.	
(6)	Remove one PFA tubing.	
(7)	Pull ON/OFF knob in ON position and confirm that the cylinder is empty.	
(8)	Carefully disconnect the high pressure filling copper line from the regulator.	
(9)	Remove filling block assembly screws and pull out the filling block.	
(10)	Remove the ground cable from the airplane.	

B. Install the Filling Block Assembly

	Key Items/References	Detail Steps/Work Items
(1)	Ground the airplane electrically.	
(2)	Thread in the high pressure copper filling line in the grommet installed in front of the forward oxygen base. Mount the filling block assembly in the forward base by using 4 screws.	Use a new compression ring in the fitting of the regulator.
(3)	Install the LH oxygen compartment cover.	
(4)	Perform an operational test.	
(5)	Remove the ground cable from the airplane.	

8. Remove/Install the Pilot/Co-Pilot Outlet Manifold

A. Remove the Pilot/Co-Pilot Outlet Manifold

	Key Items/References	Detail Steps/Work Items
(1)	Ground the airplane electrically.	
(2)	Confirm that the oxygen system is switched OFF.	
(3)	Remove the side pocket and disconnect the PFA tubing from the outlet manifold.	
(4)	Open the threaded ring of the outlet manifold and remove the outlet manifold.	
(5)	Remove the ground cable from the airplane.	

B. Install the Pilot/Co-Pilot Outlet Manifold

	Key Items/References	Detail Steps/Work Items
(1)	Ground the airplane electrically.	
(2)	Install the outlet manifold in the side pocket by using the threaded ring after attaching the placard. Confirm that 2 PA rings (one between the side pocket and the outlet manifold and the other between the side pocket and the placard) are on the manifold.	
(3)	Connect the outlet manifold to the PFA tubing.	
(4)	Install the side pocket and check operation of the manifold.	
(5)	Remove the ground cable from the airplane.	

9. Remove/Install the Passengers' Dual Outlet Manifold

A. Remove the Passengers' Dual Outlet Manifold

	Key Items/References	Detail Steps/Work Items
(1)	Ground the airplane electrically.	
(2)	Confirm that the oxygen system is switched OFF.	
(3)	Remove both forward lights and the speaker from the roll-over bar.	
(4)	Remove both threaded rings of the dual outlet manifold and push it in the roll-over bar.	
(5)	Remove the cable ties from the oxygen line and pull on the oxygen line to extract the dual manifold.	Take care that the PA rings on the outlet manifold do not fall into the roll bar.
(6)	Disconnect the PFA tubing from the dual outlet manifold.	
(7)	Protect open end of the PFA tubing against debris with tape.	
(8)	Remove the ground cable from the airplane.	

B. Install the Passengers' Dual Outlet Manifold

	Key Items/References	Detail Steps/Work Items
(1)	Ground the airplane electrically.	
(2)	Put the 2 PA rings (one at each outlet) on the dual outlet manifold.	Use a small amount of adhesive to fix it.
(3)	Place the dual outlet manifold in the roll bar under the GPS antennas.	
(4)	Connect the PFA tubing with the outlet manifold.	
(5)	Place the outlet manifold in position and fix it with 2 threaded rings. Clamp the oxygen placard between the roll bar and the ring.	
(6)	Use cable ties to fix the oxygen line on the bonding strip.	
(7)	Perform an operational check and reinstall the forward cabin lights and the speaker.	
(8)	Remove the ground cable from the airplane.	

CHAPTER 51

STANDARD PRACTICES/STRUCTURES

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STANDARD PRACTICES/STRUCTURES

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CHAPTER 51
STANDARD PRACTICES/STRUCTURES

1. General

The DA 42 is a twin engine, low wing monoplane of composite construction. The airplane has a standard T-tail and vertical stabilizer with a tail skid. It has retractable tricycle landing gear with a nose wheel that can be steered.

The DA 42 fuselage has a semi-monocoque structure. Two carbon fiber reinforced plastic (CFRP) half-shells make the fuselage skin. The fuselage shells have many layers of carbon cloth. Rigid foam inserts give stiffness to the fuselage shells where necessary. All of the main structural components are CFRP or GFRP rigid moldings. Many layers of carbon or glass cloth bond together to make each molding. Carbon fiber cloth gives more strength and stiffness.

The vertical stabilizer is part of the fuselage. The aft part of the left and right fuselage shells make the left and right shells of the vertical stabilizer.

The DA 42 has a wing center section and the left and right wings attach to the wing center section. The wing center-section also supports the 2 engine nacelles. The wing center section is divided into 3 areas, these are the engine nacelles, wing stubs and center section.

The flight loads from the wings are transferred to 2 spar bridges running laterally through the wing center-section. The wings are connected to the center section with spar stubs that extend into the wing center-section. Each wing is attached to the center section with 4 main bolts and 2 auxiliary bolts.

Each wing has top and bottom shells. It has front and rear spars and a wing root rib made in 3 parts. Each shell has a carbon fiber reinforced plastic (CFRP) outer skin, a rigid foam core and a GFRP inner skin.

Each wing has two I-section spars. The front spar on one side is the same as the rear spar on the other side. Many layers of uni-directional carbon fiber make the spar caps. The number of layers in the spar caps decreases from root to tip. Each spar has a shear web. The shear web has GFRP skins and a rigid foam core. Glass cloth fillets attach the spar caps to the shear web.

A rear web closes the trailing edge of the wing. An end rib closes the outboard end of the wing. A removable winglet attaches to the wing shells and outer rib with screws.

The flaps and ailerons have top and bottom shells. Each shell has a mixture of CFRP and GFRP cloth. The shells have rigid foam cores and bond together.

The horizontal stabilizer has top and bottom shells. Each shell has GFRP skins. The horizontal stabilizer has a front spar and a rear spar. Three pairs of ribs give strength to the central area. The elevator has top and bottom shells. Each shell has GFRP skins with a rigid foam core.

The rudder has left and right shells. Each shell has GFRP skins with a rigid foam core. The shells bond together at a flange.

The canopy is a CFRP molding with inner and outer frames that bond together. The canopy has a large one-piece acrylic transparency. The passenger door is a CFRP molding with inner and outer frames. The frames bond together. The door has an acrylic transparency.

A polyurethane paint finish protects the outer skins of the airplane from ultraviolet rays and humidity.

2. Types of Structure

The DA 42 is constructed from 2 main types of composite structure.

A. Glass Fiber Reinforced Plastic (GFRP)

GFRP is very thin glass fibers bonded together by resin. The glass fibers give most of the strength and the resin maintains the shape. The resin also bonds to other structural components such as metal attachment brackets or metal bushings.

The glass fibers are woven to make glass cloth. The orientation and the weave of the glass in the cloth affects the structural strength of the cloth. A component can have many layers of cloth bonded together with resin. This is called lamination.

GFRP has very good properties. It is strong and flexible. It is very resistant to chemical attack and very little maintenance of GFRP laminates is necessary.

B. Carbon Fiber Reinforced Plastic (CFRP)

CFRP is very thin carbon fibers bonded together by resin. The carbon gives most of the strength and the resin maintains the shape. The resin also bonds to other structural components such as metal attachment brackets or metal bushings.

CFRP is very similar to GFRP. The main advantage of CFRP is that it is stronger and more rigid than GFRP.

3. Laminated Components

A laminated component has 2 or more layers of glass/carbon cloth. The direction of the fibers in the cloth give the properties of each layer. Extra layers are bonded to some areas to give more strength.

4. Sandwich Construction

Many of the components in the DA 42 have a sandwich of 2 skins and a core. GFRP or CFRP make the skins and rigid foam makes the core.

The skins must bond to the core of a sandwich structure completely. If the skins do not bond to the core the component can fail.

5. Bonded Components

A number of components can bond together to make a larger component. Special thick resin bonds these components together and fills the gap in a joint.

6. Repair Limitations

Repairs which are categorized as ‘Class 1' in accordance with Section 51-10, Paragraph 2, may only be carried out in accordance with a repair scheme which has been approved by Diamond Aircraft Industries. Such repairs are not described in the Airplane Maintenance Manual (AMM).

Repair work on these components is not permitted:

– Radome (nose cone, if OÄM 42-119 is installed).

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Section 51-10
Investigation

1. General

This Section tells you how to assess the class of damage. It also tells you how to inspect glass fiber reinforced plastic (GFRP), carbon fiber reinforced plastic (CFRP) composite structures and debris protection composite and adhesive foil structures. Damage assessment and repairs must be carried out by approved persons.

Refer to Section 51-00 for the types of structures used in the DA 42 and for repair limitations. Refer to Section 51-20 for general repair procedures. Refer to Chapter 53 for more information about the debris protection system.

2. Damage Classification

Damage is divided into the classes described below. If you are not sure about the classification of any damage, you must refer to the airplane manufacturer.

A. Class 1 Damage

Any damage, that is not Class 2 through 4 damage is counted among Class 1.

B. Class 2 Damage

Damage to primary structural components (fuselage, wings, empennage) and control surfaces (dimensions <150 mm [5.9 in] in either direction) as well as holes and cracks passing through both skins of a sandwich construction component. The core damage must be able to be covered by a 75 mm (3 in) diameter circle.

C. Class 3 Damage

Small holes or cracks in the outer skin of primary structural components (fuselage, wings, empennage) and control surfaces where there is no internal damage to the component, the sandwich material or the inner skin.

D. Class 4 Damage

Minor scratches, abrasions or similar damage which is not a puncture or crack in the airplane skin as well as any sort of damage to non-load-bearing structures (e.g. fairings, cowlings, carpetings, canopies).

3. Types of Damage

There are 2 basic types of damage that can occur in composite structures and which can not be readily found with visual examination:

– Disbonding.

– Delamination.

Disbonding is the failure of the bonding between 2 or more components. For example between the wing skin and a wing rib. Or between a metal component and a composite component. Or between a composite skin and a sandwich core material.

Delamination is the failure of a bond between one or more layers of glass/carbon cloth in a laminated component.

There are also 2 main types of cracks that can occur in composite structures:

– Micro cracks.

– Major cracks.

Micro cracks occur in the surface of the resin and do not affect the integrity of the cloth.

Major cracks have broken fibers in the cloth. Major cracks do not occur with normal flight loads or normal landing loads. You must carefully examine the areas around major cracks for indications of further damage which can transmitted into other components.

You must repair all major cracks. If you are not sure how to proceed with further inspections of major cracks you should contact the airplane manufacturer for advice.

4. Inspection Techniques

A. Visual Examination

Use this method to find all types of damage to composites. Use a bright light to examine visually the inside of a component. GFRP must be green or brown in color. If it has white areas, then it may be damaged. Look specially where components bond to the GFRP.

CFRP must be black in color. Apply a small load to the area where you expect a damage, e.g. by pushing slightly on it. Check for abnormal flexibility or noises. Broken lamination often crackles under load. Look specially in areas where components bond to the CFRP.

Look carefully at the outer surface of a component. If the paint has cracks or bubbles, then the composite below may be damaged. Refer to Paragraph 5 in this Section.

Also look for dents and deformation. Look specially in the areas where stones can hit the fuselage and wings below the airplane. Look specially in the areas of the wing walkways.

B. Light Test

Use the light test to find delamination. Use this test on components which do not have rigid foam cores.

CAUTION: DO NOT LET THE COMPOSITE GET HOT. HEAT CAN CAUSE DAMAGE TO COMPOSITES.

Point a very bright light at the surface and look at the surface from the opposite side to the light source. Damage usually shows as dark areas in the component. You can point the light from the inside of the component or the outside of a component.

Note: You can use the light test on thick sections of GFRP but it is difficult to use on CFRP.

C. Coin Tap Test

Use the coin tap test to find delamination and disbonding. Tap a coin on the laminate surface across the area you will test. The sound of the coin tapping on the surface of the laminate will change as you move the coin over damaged laminate.

Look specially in the area around the damage for secondary damage, which can remain undetected.

5. Further Inspection

If you find damage to the paint when you examine a composite structure then do this further inspection.

Find a way to see the inside of the structure or component. If necessary, remove panels (or other components), or you can use remote viewing equipment. For example, remove a winglet to see inside the wing. If you can see damage inside the component or structure you must do a repair.

Remove the paint coat in the area that you think is damaged. Remove the paint coat carefully, you must not damage the surface under the paint coat.

Look carefully at the surface under the paint coat. Push the middle of the area to be tested with your thumb. If you can feel the skin hitting against the core of the sandwich (or other layer/component) then the skin is disbonded and you must repair the structure.

In some cases you may need to cut inspection holes in the structure to do the test correctly. If you must make inspection holes then you must contact Diamond Aircraft Industries for advice.

6. Debris Protection Inspection (OÄM 42-088a, OÄM 42-089a, OÄM 42-090a)

A. Single and Triple Layer Adhesive Foil Debris Protection (OÄM 42-088a, OÄM 42-089a)

Even small holes or buckling deeper than 1.5 mm in this layer have an adverse effect on its tensile strength. A proper protection of the fuselage cannot be ensured and therefore the debris protection must be replaced. Visually inspect the fuselage skin underneath during replacement. Refer to Section 51-10 for classification and repair of a probable fuselage damage. Scratches and little damages in the border area are acceptable. If damage occurs outside of the debris protection check position or contact the airplane manufacturer.

A replacement by a composite debris protection is possible.

B. Composite Debris Protection (OÄM 42-090a)

The composite debris protection should be replaced if damage occurs. If damage exceeds 50 mm (2 in) in diameter, the debris protection must be replaced and the fuselage skin underneath must be inspected. Refer to Section 51-10 for classification and repair of a probable fuselage damage.

A replacement by adhesive foil debris protection is possible.

Section 51-20
Repair Processes

1. General

Note: On certain serial numbers the engine cowlings are manufactured with a resin that is different from the usual resin. Refer to Section 51-30.

This Section tells you how to repair composite structures. Repairs must be carried out by approved persons. Refer to Section 51-00 for data about the types of structure. Refer to Section 51-10 for data about the classification of damage and inspection techniques. Refer to Section 51-30 for data about approved repair materials.

2. Center of Gravity Limits

When you repair an airplane you change the weight of the airplane. If you change the weight of an airplane then you change the center of gravity. The further the distance of a repair from the center of gravity, the greater the effect of the repair will have on the center of gravity. You must always weigh the airplane after a large repair and calculate the center of gravity. Refer to Section 08-10 for data about weighing the airplane and calculating the center of gravity.

3. Control Surface Balancing

When you repair a control surface it becomes heavier. Make an estimate of the new weight of the control surface if you were to carry out the repair. (Weigh the materials that you will use to do the repair and add the weight to the actual weight of the control surface). If the post repair weight is greater than the permitted weight then do not do the repair. You must install a new control surface. Refer to Section 06-00 for data about the weight and balance of control surfaces.

When you repair a control surface and/or apply a new paint coat you must weigh the control surface and check the balance of the control surface. Section 51-60 tells you how to check the balance of a control surface. Refer to Chapter 06-00 for data about the weight and balance of control surfaces.

4. Drain/Vent Holes

You must keep all drain and vent holes in the structure of the DA 42 open. If you close a drain or vent hole during a repair you must make a new hole in the same position after the repair is complete.

5. Holding a Component During a Repair

You must hold a component in the correct position when you do a repair. If you do not hold a component correctly it may move during the repair and cause further damage. It can also change the airplane alignment.

Hold the component in a special device (jig/fixture) before you cut out the damaged area. If necessary, lift the airplane on jacks and level the airplane. Refer to Section 07-10 for more data about lifting the airplane on jacks and refer to Section 08-20 for data about leveling the airplane.

6. Safety Precautions

Moist resins can cause skin disease. When you use resins/hardeners use a protective barrier cream on all exposed skin, specially your hands. You must always wear protective gloves.

WARNING: DO NOT GET RESIN ON YOUR SKIN. RESIN CAN CAUSE SKIN DISEASE.

The resins, hardeners and solvents used for composite repairs are poisonous. You must not take food or drinks into the work area. Use a mask to protect your face and use eye protection.

WARNING: DO NOT GET RESINS, HARDENERS OR SOLVENTS IN YOUR MOUTH OR IN YOUR EYES. THESE CHEMICALS CAN CAUSE DISEASE.

When you grind composites you make small particles of composite dust. These particles can irritate the skin and eyes. If you breathe these particle they can cause lung disease.

When you grind composite you must always use a protective cream on all exposed skin, specially your hands. Wear overalls that seal; at the neck, sleeves and ankles. You must always wear protective gloves and if necessary, change them often. Use a suitable mask to protect your face and lungs. Always wear safety goggles to protect your eyes.

If your skin comes into contact with composite dust, then wash it off with clean flowing water. Do not rub your skin while there is dust on it.

WARNING: DO NOT GET COMPOSITE DUST PARTICLES IN YOUR EYES, OR IN YOUR MOUTH, OR ON YOUR SKIN. THESE PARTICLES CAN CAUSE DISEASE.

7. Workshop Conditions

Keep the workshop clean and free from dust. Remove grinding dust as it occurs. The working area must not be affected by draughts.

The workshop temperature must be maintained between 18 °C and 27 °C (65 °F - 77 °F) and must not fall below 15 °C (59 °F). The relative humidity during mixing, applying or curing resins must not be allowed to rise above 80%.

Maintain the workshop temperature as near to 25 °C (77 °F) as possible during curing.

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Maintenance Practices

1. General

These Maintenance Practices tell you about composite repair processes and how to repair Class 2, 3 and 4 damage to the composite structure. Refer to Section 51-10 for data about damage classification. Class 1 damage may only be repaired in accordance with a repair scheme which must be approved in accordance with the procedures established by the competent certifying authority. All repairs must only be carried out by approved persons. Refer to the manufactures for support.

You must only use the materials approved by the manufacturer when repairing the airplane. Refer to Section 51-30 for data about approved materials.

Inspect the damaged area(s). Look specially at the adjacent structure. Damage can go a long way under the surface of a composite. Use the techniques given in Section 51-10.

You must take care to do the repair correctly. The outer shell of a composite structure is stressed. Improper repairs can cause structural failure.

2. Resin

You must use the correct quantity of mixed resin for the repair. Weigh all the cloth patches that you will use for the repair. The ratio for glass cloth to resin mix is 100 : 70. For example, 100 grams of dry cloth require 70 grams of mixed resin. The ratio for carbon cloth to mixed resin is 100 : 85. For example, 100 grams of dry carbon cloth requires 85 grams of mixed resin.

Measure the quantities of resin and hardener accurately (± 0.5% by weight). Mix the resin and hardener thoroughly before laminating, or adding fillers or other additives.

Always use clean containers for mixing resin and only mix as much resin as you can use within its ‘working life’.

When using large quantities of resin put it shallow containers. This will increase the ratio surface area to volume which will reduce the risk of an exothermic reaction.

3. Glass and Carbon Cloth

You must always use the correct cloth for the repair. Refer to the lay-up drawing of the repair area for data about the type of cloth you must use for the repair. The lay-up drawing will tell you:

- The correct type of cloth.
- The fiber direction.
- The dimensions of the layer.

Make sure that the fibers in each layer of cloth point in the direction given by the lay-up drawing. This gives the correct strength to the laminate.

Only use sharp shears or scissors to cut the cloth to size. Make sure that the fibers in the cut cloth point in the correct relative direction. Make sure that the fiber strands are not broken or damaged. The cloth must be free of any damage or contamination.

4. Core Material

You must always use the correct sandwich core for the repair. Refer to the lay-up drawing of the repair area for data about the core material that you must use.

Make sure that the core material is not damaged or contaminated.

Use a sharp knife to cut the core to the exact size for the repair. The edges of the cut must be clean so that the core will bond correctly. You can profile the core by cutting or sanding.

Small damages of the core (diameter $\leq$ ½ in) may be repaired by resin thickened with microballoons or Q-Cell.

5. Laminating

A prescribed stack of resin impregnated cloth makes a laminate. A laminate which is used to repair an airplane becomes an integral part of the airplane structure once the laminate has hardened and fully cured.

You can make a laminate in place on the airplane or you can make a laminate on a work bench and then apply the wet laminate to the airplane repair. When you make the laminate on a work bench:

- It is easier to do.
- It is easier to control and correct the laminating process.
- You can make sure that the cloth layers in the stack are correct before you apply the resin.
- You can make the repair neater.
- You do not have to work upside down to make the laminate.

A. Laminating Directly on the Airplane

	Detail Steps/Work Items	Key Items/References
(1)	Prepare the damaged area for laminating: – Make sure that the repair is clean and free of contamination. – Do not touch the area to be repaired. Especially particles of skin protecting cream on your hands may act as a separating agent within the lamination.	Refer to the relevant repair procedure in this Section.
(2)	Prepare the layers of cloth that you will use for the repair.	Refer to the lay-up drawing.
(3)	Protect the area of the structure around the repair from contamination by the repair materials.	Use plastic/polythene sheeting held in place by self-adhesive tape.
	WARNING: DO NOT GET RESIN ON YOUR SKIN. RESIN CAN CAUSE SKIN DISEASE. **WARNING: DO NOT GET RESINS, HARDENERS OR SOLVENTS IN YOUR MOUTH OR IN YOUR EYES. THESE CHEMICALS CAN CAUSE DISEASE.**	
(4)	Apply a thin coat of resin to the repair.	
(5)	Apply the first layer (the biggest one) of cloth to the repair and trim to the correct size.	Make sure that the fibers in the cloth point in the correct direction.
(6)	Use a roller, squeegee and a stipple brush to remove all trapped air. Make sure that the cloth is completely impregnated with resin. If necessary, add more resin.	
(7)	When the excess resin has been brought to the surface with the rolling and stippling process. Apply the next layer of cloth. Trim the cloth to the correct size.	Make sure that the fibers in the cloth point in the correct direction.
(8)	Do steps 6 and 7 as necessary until all the layers of cloth are in place.	

	Detail Steps/Work Items	Key Items/References
(9)	Use the roller and squeegee to remove the excess resin.	
(10)	Put a layer of peel ply over the laminate.	
(11)	If necessary, apply a vacuum bag to the laminate.	Refer to the lay-up drawing and/or repair drawing.
	WARNING: DO NOT PUT HOLLOW COMPONENTS COMPLETELY INTO A VACUUM BAG. YOU MAY DESTROY THEM.	

B. Laminating on a Work-Bench

	Detail Steps/Work Items	Key Items/References
(1)	Prepare the damaged area for laminating: – Make sure that the repair is clean and free of contamination.	Refer to the relevant repair procedure in this Section.
(2)	Prepare the layers of cloth that you will use for the repair.	Refer to the lay-up drawing.
(3)	Put a layer of clean transparent plastic/polythene sheeting over the repair area and hold in place with self-adhesive tape.	
(4)	Use an indelible ink marker to: – Trace onto the plastic sheet the extreme outline of the repair. – Trace onto the plastic sheet the contour lines of each layer of cloth in the structure.	The outer layer of the structure must be tapered to avoid stress risers and to give a good finish.
(5)	Remove the transparent sheet from the repair area and place it upside down on a work-bench.	
	Note: The cloth layers are laid in reverse order when you laminate on a table. You must take care to put the cut cloth layers in the correct order and that the fibers in each cloth layer point in the correct direction.	

	Detail Steps/Work Items	Key Items/References
(6)	Cut the layers of cloth to fit the contour lines that you traced onto the transparent sheet.	

WARNING: DO NOT GET RESIN ON YOUR SKIN. RESIN CAN CAUSE SKIN DISEASE.

WARNING: DO NOT GET RESINS, HARDENERS OR SOLVENTS IN YOUR MOUTH OR IN YOUR EYES. THESE CHEMICALS CAN CAUSE DISEASE.

	Detail Steps/Work Items	Key Items/References
(7)	Apply a thin coat of resin to the transparent sheet.	
(8)	Apply the first inner layer of cloth to the transparent sheet and trim to the correct size.	Make sure that the fibers in the cloth point in the correct direction.
(9)	Use a roller squeegee and a stipple brush to remove all trapped air. Make suer that the cloth is completely impregnated with resin. If necessary, add more resin.	
(10)	When the excess resin has been brought to the surface with the rolling and stippling process. Apply the next layer of cloth. Trim the cloth to the correct size.	Make sure that the fibers in the cloth point in the correct direction.
(11)	Do steps 9 and 10 as necessary until all the layers of cloth are in place.	
(12)	Apply a thin coat of resin to the area of the repair on the airplane structure where you will attach the laminate patch.	
(13)	Put the laminate patch carefully into position on the airplane structure using the transparent sheet.	Make sure that the fibers in the cloths point in the correct direction.
(14)	Carefully remove the transparent sheet from the patch.	
(15)	Use the roller and squeegee to remove the excess resin.	
(16)	Put a layer of peel ply over the laminate.	

	Detail Steps/Work Items	Key Items/References
(17)	If necessary, apply a vacuum bag to the laminate.	Refer to the lay-up drawing and/or repair drawing.

6. Bonding Paste (Thickened Resin)

CAUTION: FOR BONDING OF PARTS WHICH ARE MADE WITH SELF EXTINGUISHING RESIN, THE BONDING PASTE MUST ALSO BE MIXED FROM SELF EXTINGUISHING RESIN. REFER TO SECTION 51-30.

Use bonding paste to bond GFRP/CFRP components together and in the repair of sandwich cores. Resin and thickening filers make the bonding paste. Table 1 gives you the proportion by weight of resin to thickening fillers. You can change the proportion of Aerosil and Microballoons relative to each other but you must keep the total weight of the Aerosil/Microballoon mix constant.

Table 1- Bonding Paste Mixing Proportions

Material	Weight in Grams								
Mixed Resin	50	100	150	200	250	300	350	400	450
Cotton Flakes	6	11.5	17	23	29	34.5	40	46	52
Aerosil	1.4	2.8	4.2	5.5	6.9	8.3	9.7	11.1	12.5

7. Curing

You must cure a composite structure to make it strong. If you do not cure a composite structure correctly it may fail. Curing is a 2 part process, pre curing and post curing. The following procedure gives a typical curing process. You must follow the resin manufacturers instructions for the resin that you are using.

	Detail Steps/Work Items	Key Items/References
(1)	Maintain the temperature of the repair at 20 to 25 °C (68 to 77 °F) for at least 24 hours to pre-cure the repair.	If you do not have an oven or a warming room you can make a temporary enclosure around the repair to trap the heat from a flame proof air heater.
	CAUTION: DO NOT ALLOW THE TEMPERATURE TO GET TOO HIGH DURING THE CURE. A TEMPERATURE THAT IS TOO HIGH CAN DAMAGE THE COMPOSITE STRUCTURE.	
(2)	After 24 hours raise the temperature of the repair to at least 65 °C (149 °F) for a minimum of 6 hours to complete the first stage of the post-cure.	Monitor the temperature every 15 minutes for the first hour then hourly.
(3)	After a minimum of 6 hours raise the temperature of the repair to at least 80 °C (176 °F). Maintain this temperature for a minimum of 14 hours to complete the final post-cure.	The final stage post cure time can be divided into sections but you must make sure that the repair has a minimum total of 14 hours at post cure temperature.
	CAUTION: DO NOT HEAT UP ABOVE 85 °C (185 °F). THE FOAM CORE MIGHT BE DESTROYED.	

8. Exterior Paint Finish

A. Paint Color Scheme

CAUTION: YOU MUST PAINT THE AIRPLANE TO THE PAINT COLOR SCHEME. IF YOU DO NOT PAINT THE AIRPLANE TO THE PAINT COLOR SCHEME YOU MAY CAUSE DAMAGE TO THE AIRPLANE STRUCTURE.

Since full strength of the fiber composite structure has only been shown up to temperature 54 °C (129 °F), the outer surface of the airplane must be painted white in accordance with Chapter 04 of this manual.

Exceptions are registration markings and warning markings, trim or striping which are subject to the following restrictions (refer to Figure 1):

Zone No registration markings or warning markings, trim or striping may be applied here, except for the placards in accordance with Section 11 - 20.

Zone 1a This zone has the same restrictions as Zone 1, except that registration marks may be applied here which comply with the restrictions of Zone 2.

Zone 2 Registration markings and warning markings, trim or striping may be applied here. They may be any shape and color, provided that the average absorption coefficient of each area measuring 200 mm by 200 mm (8 in by 8 in) does not exceed 0.5. Examples which meet this criterion are:

- Registration markings and warning markings, trim or striping of any shape, provided that colors with a solar absorptivity not exceeding 0.5 (e.g. light yellow or light green) are used.

- Registration markings and warning markings, trim or striping of any color, provided that no area measuring 200 mm by 200 mm (8 in by 8 in) is covered by more than 50%. One consequence is that the width of decoration stripes must not exceed 100 mm (4 in).

Zone 3 Registration markings and warning markings, trim or striping of any shape and color may be applied here without restrictions.

If the Garmin GWX 68 weather radar system (OÄM 42-119) is installed, a special GFRP radar nose cone is installed. The radar nose cone is coated with a special paint. You must replace the radar nose cone if the surface affects the weather radar system’s image quality.

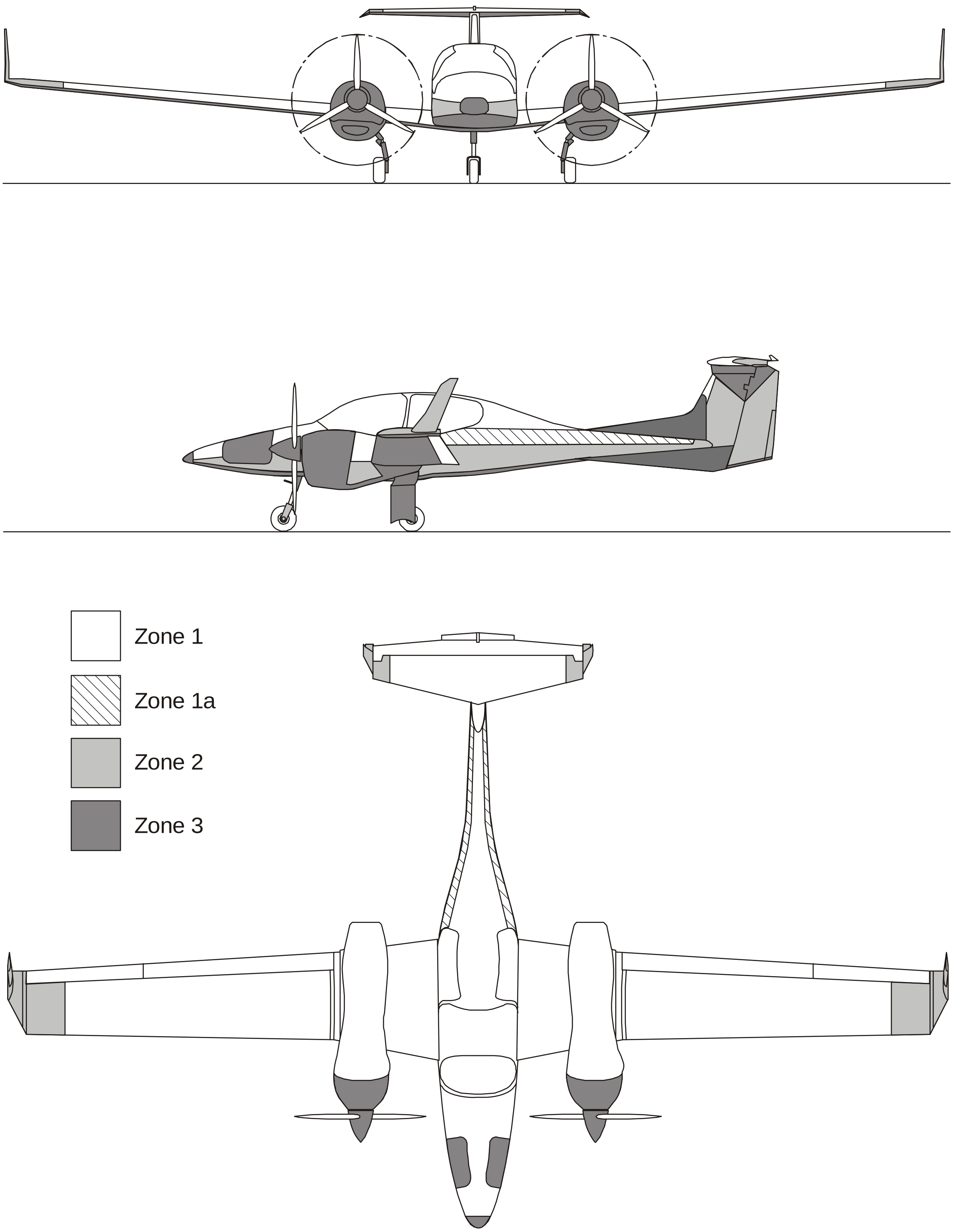

Figure 1: Paint Color Scheme

B. Painting a Large Repair Area

This procedure must be followed when the diameter of the area which must be painted is larger than 200 mm (8 in).

	Detail Steps/Work Items	Key Items/References
(1)	Carefully scarf the edges of the existing paint finish.	Refer to Figure 2. Do not sand through the existing antistatic filler. Minimum scarf length: 25 mm (1 in). To ensure the at the antistatic filler of the existing paint is electrically connected to the antistatic filler of the new paint.

WARNING: DO NOT GET ACETONE, FILLER, OR PAINT ON YOUR SKIN. ACETONE, FILLER, AND PAINT CAN CAUSE SKIN DISEASE.

WARNING: DO NOT BREATHE ACETONE, FILLER, OR PAINT FUMES. ACETONE, FILLER, AND PAINT FUMES CAN CAUSE DISEASE.

CAUTION: THERE MUST BE NO GREASE OR DUST ON THE REPAIR AREA. GREASE AND DUST PREVENT A GOOD BOND.

(2)	Make sure that the area to be repaired is clean and free from any contaminants.	If necessary, use acetone and re-sand the area.
(3)	Apply HS filler to the repair area.	Obey the filler manufacturer’s instructions.
(4)	Allow the HS filler to cure.	2 hours at 45 °C (113 °F).
(5)	Lightly sand the HS filler with 320 grit sanding paper.	
(6)	Make sure that the area to be repaired is clean and free from any contaminants.	If necessary, use acetone and re-sand the area.
(7)	Apply two layers of anti-static spray filler to the repair area.	Obey the filler manufacturer’s instructions.
(8)	Allow the anti-static filler to dry.	At 60 °C (140 °F).
(9)	Carefully sand the HS filler with 320 grit sanding paper.	Remove as little antistatic filler as possible. Do not sand through the edges.

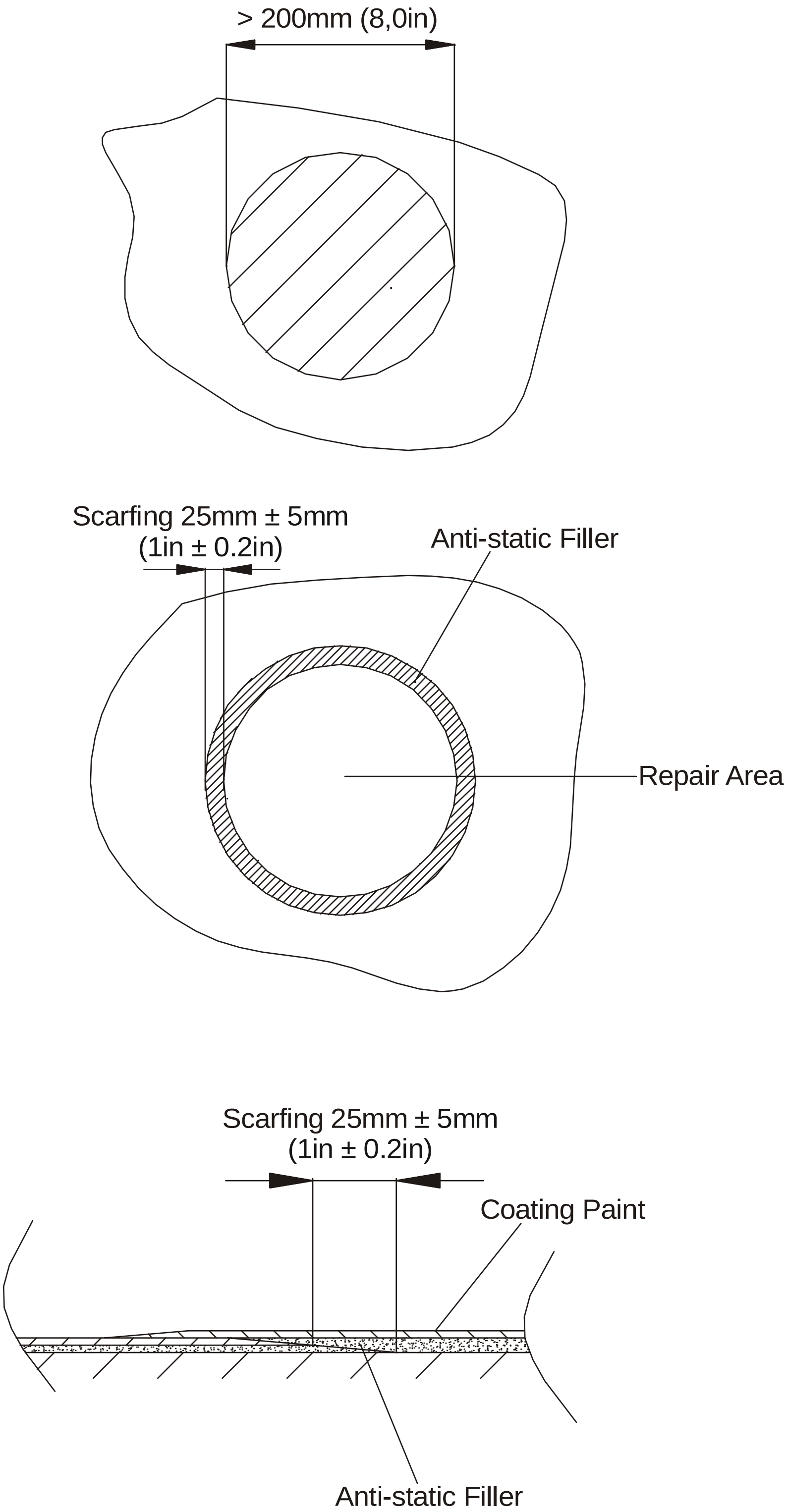

Figure 2: Scarfing the Paint Coat

	Detail Steps/Work Items	Key Items/References
(10)	Make sure that the area to be repaired is clean and free from any contaminants.	If necessary, use acetone and re-sand the area.
(11)	Apply the paint coat.	Obey the paint manufacturer's instructions.
(12)	Allow the paint coat to dry.	90 minutes at 45 °C (113 °F), then 2 days at 20 °C (68 °F).

C. Painting a Small Repair Area

This procedure must be followed when the diameter of the area which you will paint is 200 mm (8 in) or less.

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT GET ACETONE, FILLER, OR PAINT ON YOUR SKIN. ACETONE, FILLER, AND PAINT CAN CAUSE SKIN DISEASE. **WARNING: DO NOT BREATHE ACETONE, FILLER, OR PAINT FUMES. ACETONE, FILLER, AND PAINT FUMES CAN CAUSE DISEASE.** CAUTION: THERE MUST BE NO GREASE OR DUST ON THE REPAIR AREA. GREASE AND DUST PREVENT A GOOD BOND.	
(1)	Make sure that the area to be repaired is clean and free from any contaminants.	If necessary, use acetone and re-sand the area.
(2)	Apply 2 layers of HS filler to the repair area.	Obey the filler manufacturer's instructions.
(3)	Allow the HS filler to cure.	2 hours at 45 °C (113 °F).
(4)	Lightly sand the HS filler with 320 grit sanding paper.	
(5)	Make sure that the area to be repaired is clean and free from any contaminants.	If necessary, use acetone and re-sand the area.
(6)	Apply the paint coat.	Obey the paint manufacturer's instructions.
(7)	Allow the paint coat to dry.	90 minutes at 45 °C (113 °F), then 2 days at 20 °C (68 °F).

D. Coated Safety Walk Repair (OÄM 42-187 carried out)

(1) Equipment

Item	Quantity	Part Number
Safety walk substrate sprinkler.	1	DAI-9011-20-03_LV.
Plastic spattle.	1	Commercial.

(2) Material

Item	Quantity	Part Number
Safety walk cover LH.	1	D60-1120-20-01_LV.
Safety walk cover RH.	1	D60-1120-20-02_LV.
Fill-in 2 K 400 ml RAL 7038.	3	22101980.
Safety walk substrate.	0.5 kg	DAI-9011-20-03.

(3) Repair Procedure

	Detail Steps/Work Items	Key Items/References
	WARNING: WHEN HANDLING CHEMICALS ALWAYS OBSERVE HEALTH AND SAFETY REGULATIONS GIVEN BY THE MANUFACTURER OF THE CHEMICALS.	
(1)	Clean the entire area between fuselage and nacelle. Use water to remove dirt from the surface. If necessary, add a mild cleaning agent.	Refer to Section 12-30.
(2)	Use a commercial solvent to remove grease from the surface. The surface must be totally clean from grease or dirt.	
(3)	Place the safety walk cover on the center wing and mark the position with a pencil on the middle wing surface.	Refer to Figure 3.
(4)	Make sure that the safety walk cover orientation is parallel to flight direction.	
(5)	Remove the protective layer from the safety walk cover .	
(6)	Place the safety walk cover corresponding to the marks on center wing (don’t use soap water) and remove the transfer foil smoothly.	
(7)	Remove air bubbles from the edges of the cutouts with a plastic spattle.	
(8)	Prepare the surface at the cutouts of the safety walk cover: – Carefully roughen the paint with sandpaper (grit 320), for the ends of strips use red Scotch-Brite.	
(9)	Clean the surface at the safety walk cutouts with a vacuum cleaner and silicon remover.	

	Detail Steps/Work Items	Key Items/References
(10)	Cover the airplane’s surface around the safety walk cover.	
(11)	Prepare lacquer P/N 22101980 in acc. with the technical information sheet. Shake 2 minutes before and after operating the red button. Press red button with the ball of your hand until stop is reached.	
(12)	Spray a thick film at the cutouts of the safety walk cover.	
(13)	Use safety walk substrate sprinkler to apply safety walk substrate evenly over cutouts.	
(14)	Apply a second layer of lacquer: – Make sure the whole substrate is evenly covered with a sufficient amount of paint.	
(15)	Carefully pull off the safety walk cover starting from one edge. Remove the cover in direction of the strips within 15 minutes.	
(16)	Let the system dry for 12h in a dry and weather protected area at temperatures from 20 to 30°C (68 to 86 °F).	
(17)	Remove the cover from the airplane surface.	

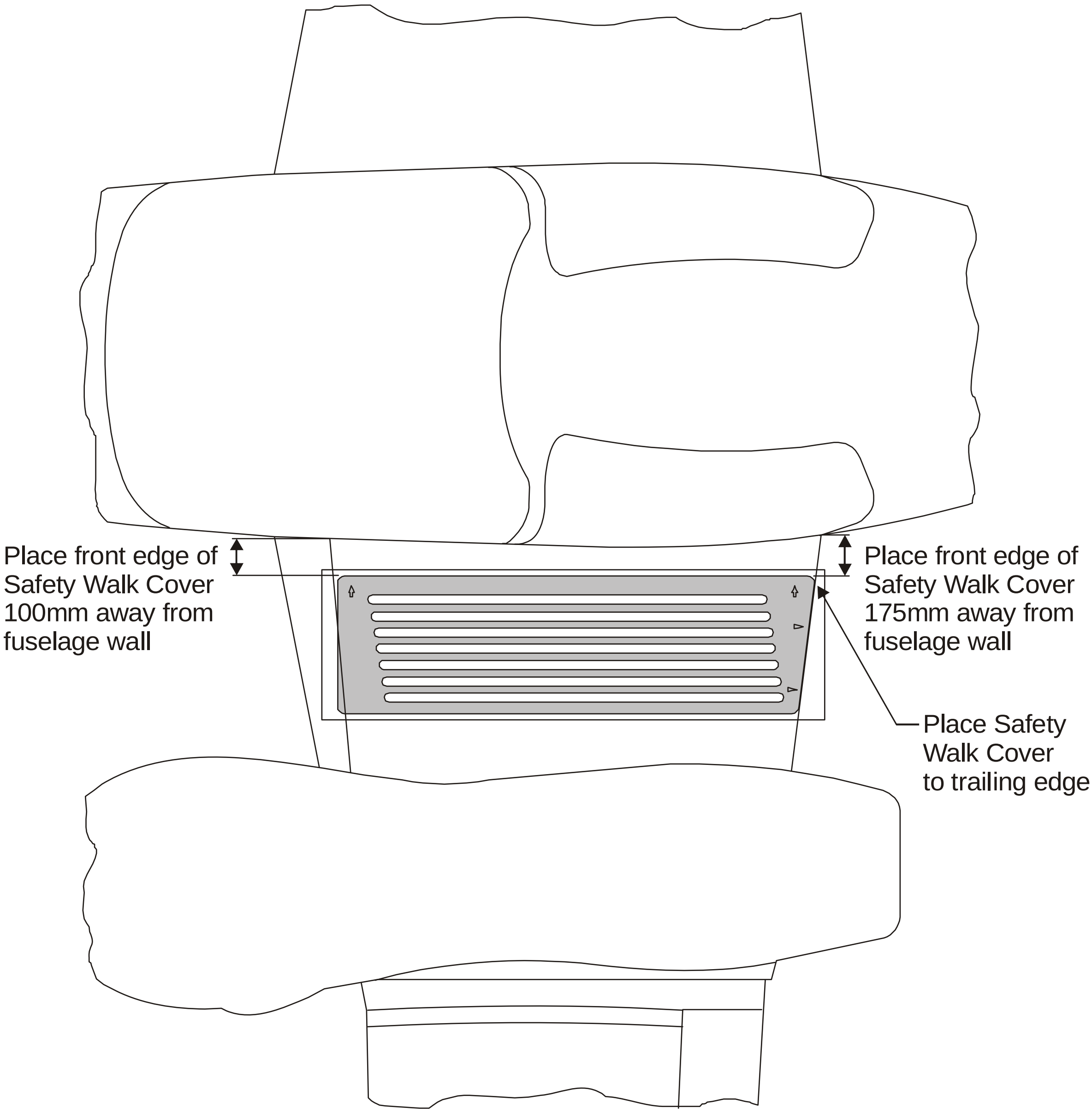

Figure 3: Safety Walk Cover Positioning

9. Repairs

A. Class 4 Repairs

The repair of minor scratches, abrasions or similar damage which is not a crack or a puncture in the skin.

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT GET ACETONE, FILLER OR PAINT ON YOUR SKIN. ACETONE, FILLER AND PAINT CAN CAUSE SKIN DISEASE. **WARNING: DO NOT BREATHER ACETONE, FILLER OR PAINT FUMES. ACETONE, FILLER AND PAINT FUMES CAN CAUSE DISEASE.**	
(1)	Sand the repair area with 150 grit sanding paper.	
(2)	Make sure that the area to be repaired is clean and free from any contaminants.	If necessary, use acetone.
(3)	Apply putty to the repair area to fill any damage.	Obey the putty manufacturer's instructions. Fill to the original contour of the structure.
(4)	Allow the putty to cure.	5 to 20 minutes.
(5)	Lightly sand the putty with 150 grit sanding paper.	
(6)	Apply filler(s) and paint coat.	Refer to Paragraph 8.

B. Class 3 Repairs

Small holes or cracks in the outer skin where there is no internal damage to the component, the sandwich material, or the inner skin.

Refer to Figure 3 for an example of a typical class 3 repair scheme.

<table>
<tr><th></th><th>Detail Steps/Work Items</th><th>Key Items/References</th></tr>
<tr><td>(1)</td><td>Make sure that the area around the damage is clean.</td><td></td></tr>
<tr><td>(2)</td><td>Carefully examine the area around the damage. Look specially for disbonding between the inner laminate layers and any core material.</td><td>Do a coin tap test to find the extent of any disbonding or delamination.</td></tr>
<tr><td>(3)</td><td>Remove damaged/loose laminate until the edges of the laminates are bonded together and to any core material.</td><td>Refer to Figure 3.
Use a sharp knife or grinding disk.</td></tr>
<tr><td>(4)</td><td>Scarf the edges of the repair area with a grinding disk or block.</td><td>Scarf glass cloth at 50:1 (50x cloth thickness) minimum and carbon cloth at 100:1 (100x cloth thickness) minimum.</td></tr>
<tr><td>(5)</td><td>Count the layers of fabric that you will need to replace.</td><td>Refer to the lay-up drawing for the related structure for data about the cloth type and orientation.</td></tr>
<tr><td colspan="3">WARNING: DO NOT GET ACETONE, FILLER OR PAINT ON YOUR SKIN. ACETONE, FILLER AND PAINT CAN CAUSE SKIN DISEASE.

WARNING: DO NOT BREATHER ACETONE, FILLER OR PAINT FUMES. ACETONE, FILLER AND PAINT FUMES CAN CAUSE DISEASE.

CAUTION: THERE MUST BE NO GREASE OR DUST ON THE REPAIR AREA. GREASE AND DUST PREVENT A GOOD BOND.</td></tr>
<tr><td>(6)</td><td>Clean the area of the repair.</td><td>If you use acetone to remove any grease or dirt then you must lightly re-sand the repair area.</td></tr>
</table>

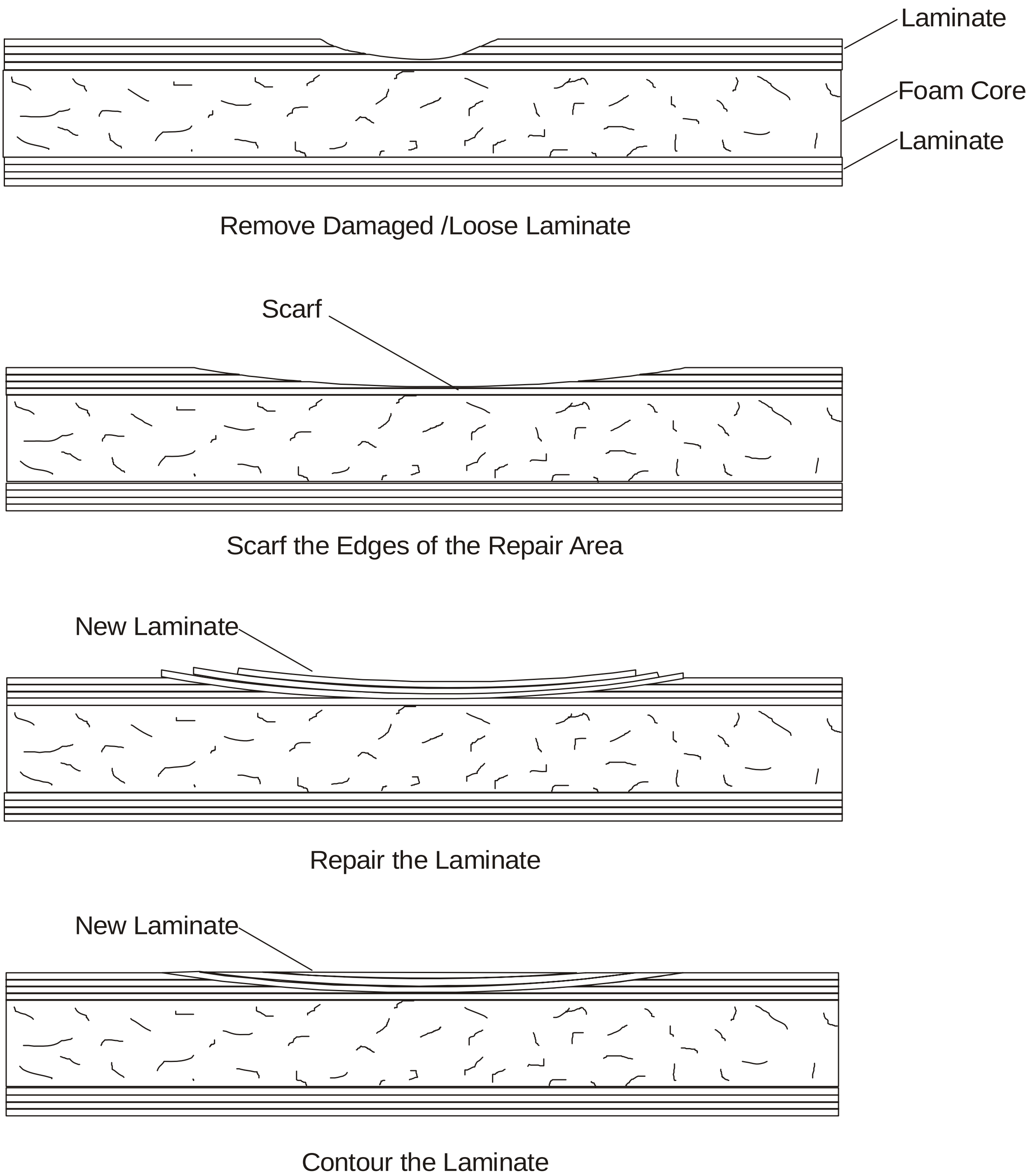

Figure 3: Typical Class 3 Repair

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT GET RESIN ON YOUR SKIN. RESIN CAN CAUSE SKIN DISEASE. **WARNING: DO NOT GET RESINS, HARDENERS OR SOLVENTS IN YOUR MOUTH OR IN YOUR EYES. THESE CHEMICALS CAN CAUSE DISEASE.**	
(7)	Repair the laminate.	Use one of the 2 methods given in Paragraph 5 (7).
(8)	Precure the repair.	Refer to Paragraph 7.
(9)	Postcure the repair.	Refer to Paragraph 7.
(10)	When the repair is fully post cured, remove the peel ply and sand smooth the surface of the repair.	
(11)	Contour the repair so that the final surface level of the repair is slightly lower than the original surrounding area.	Use 150 grit sanding paper. To allow for the paint coat.
(12)	Apply filler(s) and paint coat.	Refer to Paragraph 8.

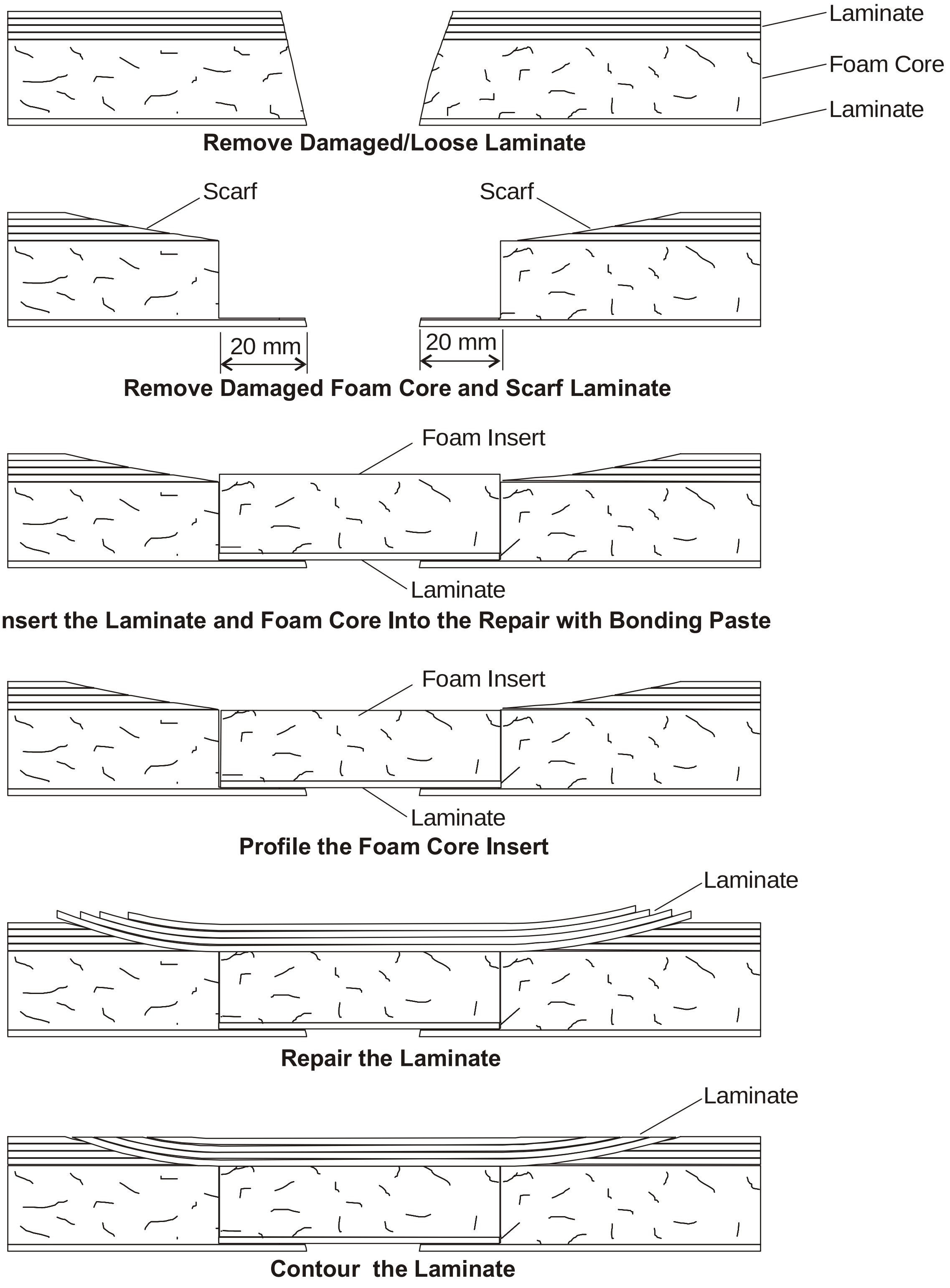

Figure 4: Typical Class 2 Repair

C. Class 2 Repairs

Holes and cracks passing through both skins of a sandwich construction component. The core damage must be able to be covered by a 75 mm (3 in) diameter circle.

Refer to Figure 4 for an example of a typical class 2 repair scheme.

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the area around the damage is clean.	
(2)	Carefully examine the area around the damage. Look specially for disbonding between the inner laminate layers and any core material.	Do a coin tap test to find the extent of any disbonding or delamination.
(3)	Remove damaged/loose laminate until the edges of the laminates are bonded together and to any core material.	Refer to Figure 4. Use a sharp knife or grinding disk.
(4)	Remove the damaged foam core.	Remove sufficient foam core to give a minimum of 20 mm (0.8 in) edge around the outside of the damaged area. Refer to Figure 4.
(5)	Scarf the edges of the external laminate repair area with a grinding disk or block.	Scarf glass cloth at 40:1 (40 x cloth thickness) minimum and carbon cloth at 60:1 (60 x cloth thickness) minimum.
WARNING:	**DO NOT GET ACETONE, FILLER OR PAINT ON YOUR SKIN. ACETONE, FILLER AND PAINT CAN CAUSE SKIN DISEASE.**	
WARNING:	**DO NOT BREATHER ACETONE, FILLER OR PAINT FUMES. ACETONE, FILLER AND PAINT FUMES CAN CAUSE DISEASE.**	
CAUTION:	THERE MUST BE NO GREASE OR DUST ON THE REPAIR AREA. GREASE AND DUST PREVENT A GOOD BOND.	
(6)	Clean the area of the repair.	Use acetone only if any grease or dirt comes to the surface of the repair.
(7)	Cut and shape a piece of foam core to replace the damaged foam core that you removed in step 4.	Use a sharp knife to cut the foam.

	Detail Steps/Work Items	Key Items/References
(8)	Prepare the layers of cloth that you will need to laminate on the inner surface of the foam core.	Refer to the lay-up drawing for the related structure for data about the cloth type and orientation.
	WARNING: DO NOT GET RESIN ON YOUR SKIN. RESIN CAN CAUSE SKIN DISEASE. **WARNING: DO NOT GET RESINS, HARDENERS OR SOLVENTS IN YOUR MOUTH OR IN YOUR EYES. THESE CHEMICALS CAN CAUSE DISEASE.**	
(9)	Prepare the foam core for inserting in the repair: – Apply a thin coat of resin to the foam core. – Apply a coat of thickened resin to the foam core. – Laminate the inner layers of cloth onto the inner surface of the foam core. Make sure that the fibers of the cloth point in the correct direction.	 Refer to Paragraph 6. Use one of the 2 methods given in Paragraph 5.
(10)	Apply a thin coat of resin to the area to be repaired.	
(11)	Put the foam core and inner laminate into position in the repair.	
(12)	Pre-cure the repair.	Refer to Paragraph 7.
(13)	Use a sanding disk or block to contour the foam core of the repair.	Refer to Figure 4.
(14)	Clean the repair.	
(15)	Apply a coat of thickened resin to the foam core of the repair.	
(16)	Apply a thin coat of resin to the scarfed edges of the outer laminate of the repair.	
(17)	Repair the outer laminate.	Use one of the 2 methods given in Paragraph 5.
(18)	Pre cure the repair.	Refer to Paragraph 7.

	Detail Steps/Work Items	Key Items/References
(19)	Post cure the repair.	Refer to Paragraph 7.
(20)	When the repair is fully post cured, remove any peel ply and sand smooth the surface of the repair.	
(21)	Contour the repair so that the final surface level of the repair is lower than the original surrounding area.	Use 150 grit sanding paper. To allow for the paint coat.

Section 51-30
Materials

1. General

You must only use approved materials from approved sources to repair the DA 42 airplane.

2. Approved Materials

A. Resin System

Resin : L285
Hardener : H286
Mixture : 100 parts resin and 40 ±2 parts of hardener (by weight)

Supplier : Hexion Specialty Chemicals Stuttgart GmbH
Am Ostkai 21/22
D-70327 Stuttgart, Germany
Phone: +49-711-389800-0
Fax: +49-711-389800-11

B. Self- Extinguishing Resin System

CAUTION: THE SELF-EXTINGUISHING RESIN SYSTEM MAY ONLY BE USED FOR THE REPAIR OF ENGINE COWLINGS WHICH WERE MADE WITH THAT RESIN SYSTEM (OÄM 42-061)

Resin : L940

Hardener : H286

Mixture : 100 parts resin and 21 ±2 parts of hardener (by weight)

Supplier : Hexion (see above)

C. Glass Fiber Cloth

WLB No. (German Aviation Standard)	Weave	Weight per unit area [g/m²]	Interglas Type	Porcher Type
8.4548.60	2/2 twill	163	92110	917
8.4551.60	2/2 twill	280	92125	3063
8.4554.60	2/2 twill	390	92140	1989
8.4520.60	UD	220	92145	
8.4525.60	UD	425	92146	

All cloth types consist of alkali free E-glass with I 550 or PT 55 finish and comply with LN9169 (German Aviation Standard).

Supplier for Interglas cloth: Rudolf Usner GmbH
Am Ausferngenufer 4
A-5400 Hallein, Austria
Phone: +43-6245-81516
Fax: +43-6245-81516-40

Supplier for Porcher cloth: Porcher Industrietextilien GmbH
Holzgraben 13/15
D-52062 Aachen, Germany
Phone: +49-241-48225
Fax: +49-241-48229

D. Carbon Fiber Cloth

WLB No. (German Aviation Standard)	**Weave**	**Mass per unit area [g/m²]**	**Interglas Type**	**ECC Type**	**SGL Type**
8.3520.80	2/2 twill	200	98141	CCC 452	
	2/2 twill with aluminum fibers	220		CCC 459 Al	
	UD tape	380			Sigratex KDU 1034

The cloth complies with LN9169 (German Aviation Standard).

Supplier for Interglas cloth: Rudolf Usner GmbH (Refer to Paragraph 2(B))

Supplier for Cramer cloth:
ECC GmbH + Co KG
Weberstrasse 21
D-48619 Heek-Nienborg, Germany
Phone: +49-2568-3883-34
Fax: +49-2568-3883-97

Supplier for SGL tape:
SGL Technik GmbH
Werner von Siemens-Str. 8
D-86405 Meitingen, Germany
Phone: +49-8271-832152
Fax: +49-8271-831427

E. Peel Ply

Type:	PA20-63, compliant with LN98690
Supplier:	Strübel Vertriebs GbR Herrlingerstr. 36/1 D-89081 Ulm, Germany Phone: +49-731-388577-1, -2 Fax: +49-731-39387353

F. Sandwich Core Material

Type:	PVC rigid foam Divinycell H 60
Thickness:	3 mm, 6 mm, 8 mm
Supplier:	Conti Tech Kautschuk- und KunststoffvertriebsgesmbH Industriestr. 31 A-2353 Guntramsdorf, Austria Phone: +43-2236-49101-0 Fax: +43-2236-49101-49

G. Fillers for Resin

Type:	Cotton flakes FB1/035
Supplier:	Rudolf Usner GmbH (see above)
Type:	Silcell 300
Supplier:	Joh. Klinglhuber & Söhne Handelsgesellschaft mbH Wallgasse 21 A-1060 Vienna, Austria Phone: +43-1-5974712-0 Fax: +43-1-5974712-16
Type:	Aerosil 380
Supplier:	Polychem HandelsgesmbH Markt Allhau Nr. 463 A-7411 Markt Allhau, Austria Phone: +43-3356-20444 Fax: +43-3356-20445 E-Mail: chemie@polychem.at

H. Exterior Painting Materials

(1) Putty:

(a) Sikkens Polysoft or

(b) ICI P551-1052

Manufacturer:

(a) Akzo Nobel

(b) ICI Paints, Berkshire, Great Britain

Supplier :

(a) Akzo Nobel Coatings GesmbH
Baudißg.10
A-1110 Vienna, Austria
Phone: +43-1-7674488
Fax: +43-1-7674488-33

(b) ICI Autocolor der PPG Austria Handels GmbH
Siezenheimerstrasse 31
A-5020 Salzburg, Austria
Phone: +43-1-662-420425-0
Fax: +43-1-662-435640

(2) EP Filler — ICI P580-2100

Manufacturer: ICI Paints, Berkshire, Great Britain

Supplier: ICI Autocolor (see above)

(3) Anti-Static Filler: — Streicolor 2K PU ESD-Leitlack, matt

Manufacturer: Streicolor AG

Supplier:

Streicolor AG
Niederwil
CH-8502 Frauenfeld, Switzerland
Phone: +41–52-7232150
Fax: +41-52-7232169

(4) Coating Paint

ICI :	ICI Turbo Plus P488-1111; Color RAL 9016 (white) or Color RAL 7001(silver grey)
Manufacturer:	ICI Paints, Berkshire, Great Britain
Supplier:	ICI Autocolor der PPG Austria Handels GmbH Siezenheimerstrasse31 A-5020 Salzburg, Austria Phone: +43-662-420425-0 Fax: +43-662-435640

I. Interior Painting Materials

(1) Putty:	(a) Sikkens Polysoft or (b) ICI P551 - 1052.
Manufacturer:	(a) Akzo Nobel (b) ICI Paints, Berkshire, Great Britain
Supplier:	(a) Akzo Nobel Coatings GesmbH (see above) (b) ICI Autocolor der PPG Austria Handels GmbH (see above)

(2) Coating Paint

Glare shield:	Nuvovern DS 10/1 + Nuvovern ACR
Inst. Panel cover:	Nuvovern DS 10/1 + Nuvovern ACR
General:	Nuvovern DS 10/1
Manufacturer:	Mäder Lacke AG, Killwangen, Switzerland
Supplier:	Walter Mäder GmbH Wiener Str.99 A-2514 Traiskirchen, Austria Phone: +43-2252-53038 Fax: +43-2252-52297

J. Fire Retardant Paint

(1) PPG Aerospace

Fire retardant paint:	PPG 7330BP0802
Finishing varnish:	CA9008B0900D-DESOTHANE HS buffable
Hardener:	9008B
Thinner:	9008CR
Supplier:	PRC-DeSoto Deutschland GmbH PPG Aerospace Hein-Saß- Weg 29 D-21129 Hamburg, Germany Phone: +49-40-742193-10 Fax: +49-40-742139-69

(2) Hensel

Fire retardant paint:	Hensotherm 2 KS (white)
Coating paint:	Hensotop 84f
Supplier:	Rudolf Hensel GmbH Lack- und Farbenfabrik Lauenburger Landstrasse 11 D-21039 Börnsen, Germany Phone: +49-40-72106210 Fax: +49-40-72106252

K. Acrylic Glass Cement

Acrylic glass cement:	Polymerization Cement Acrifix 92
Manufacturer:	Röhm D-64275 Darmstadt, Germany Phone: +49-6151-1801 Fax: +49-6151-1802
Supplier:	Röhm Austria GmbH & Co. KG Lamezanstrasse 17 1239 Wien, Austria Phone: +43-1616-7510-0 Fax: +43-1616-7510-33

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Section 51-40
Fasteners

1. General

This Section tells you about the fasteners used to attach panels and cowlings on the DA 42 airplane.

2. Description

The DA 42 uses 2 main types of fasteners. It has quick release cam lock fasteners for panels which you remove often, for example, engine cowlings, and it has screws for all other access panels.

Figure 1 shows the quick release camlock fastener. The fastener has 3 parts, a receptacle with a cam track, a grommet and a stud. Rivets attach the receptacle to the structure or base panel. A spring ring attaches the stud assembly to the access panel and a compression spring holds the stud in the stud assembly.

The T shaped end of the stud locates in the slot of the receptacle. When you turn the stud clockwise through 90° it engages the cam-track in the receptacle and pulls the access panel into position. When the stud is turned fully 90° clockwise the T-shaped end of the stud engages in a small indent in the cam-track. The compression spring in the stud assembly holds the stud in position in the detent.

There are different length studs. Short studs for thin panels and longer studs for thicker panels. Not all airplane serial numbers have the same length studs in the same positions. This is because composite structures and components can vary in thickness. If you must replace a fastener, make sure that the new fastener that you install has the correct length stud. You can replace a stud in a stud assembly.

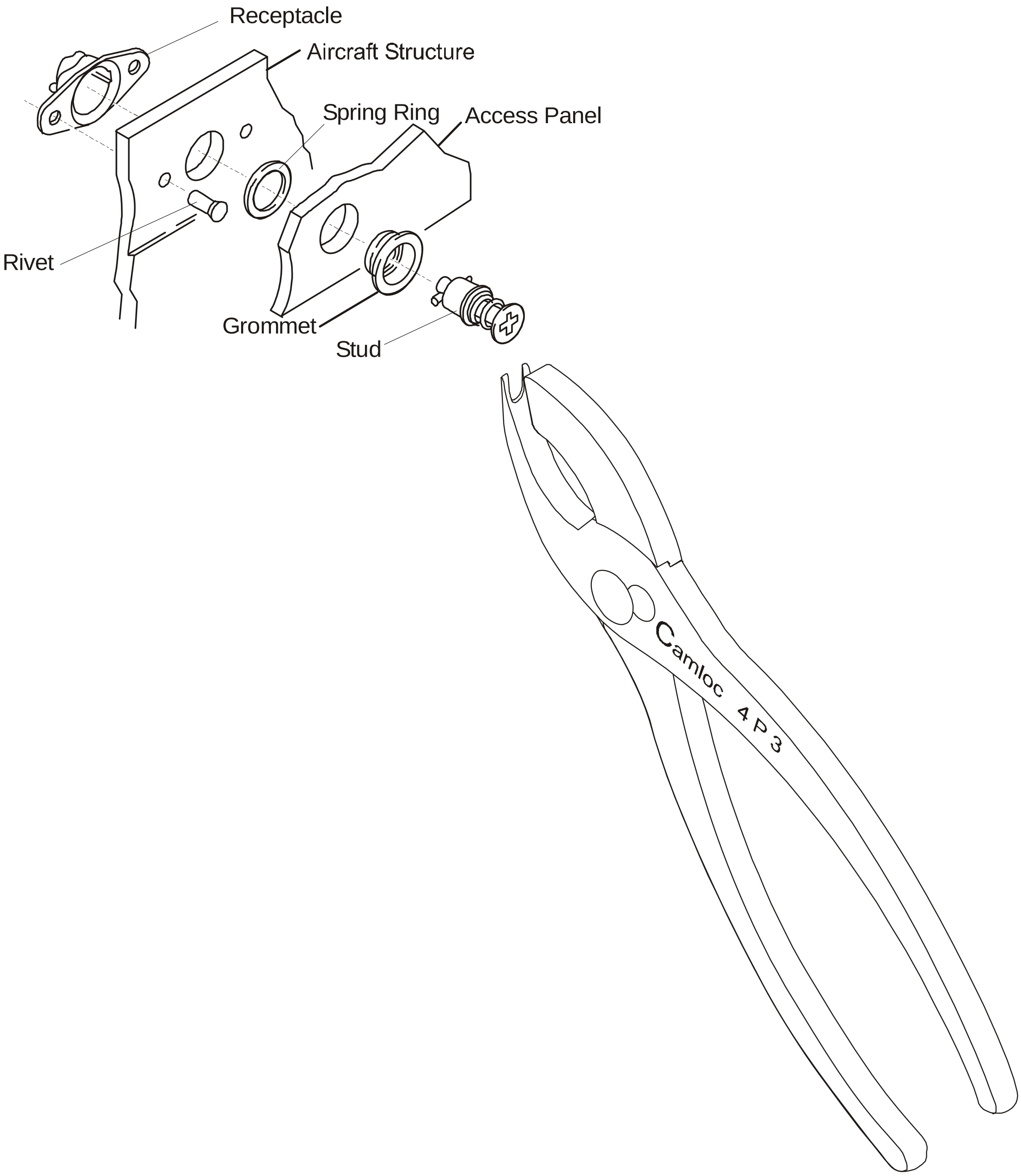

Figure 1: Quick Release Fastener Assembly

Maintenance Practices

1. General

This Section tells you how to replace a quick release fastener stud in an access panel.

2. Replace a Quick Release Fastener Stud

A. Equipment

Item	Quantity	Part Number
Stud pliers.	1	Camloc 4 P 3.

B. Procedure

	Detail Steps/Work Items	Key Items/References
(1)	Remove the damaged stud assembly:	If installed.
	– Turn the stud 90° counter clockwise to release it from the receptacle.	
	– Move the U jaw of the stud pliers into position under the rim of the stud assembly.	Refer to Figure 1.
	– Compress the stud assembly with the stud pliers and remove the stud assembly from the grommet.	Turn the stud assembly approximately 30° off-axis.
(2)	Install the new stud assembly:	
	– Select the correct length stud assembly.	
	– Put the stud assembly into the U jaw of the stud pliers.	
	– Compress the stud assembly and move the stud assembly into position in the grommet and then release the stud assembly.	Turn the stud assembly approximately 30° off-axis.
	– Engage the stud in the receptacle and turn the stud 90° clockwise to lock the stud.	Make sure that the panel is pulled fully into position and that the stud is in the detent of the receptacle.

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Section 51-60
Control Surface Balancing

1. General

This Section tells you how to weigh and measure the residual moment of the control surfaces. Figure 1 thru 4 show typical Weights and Residual Moments Reports for the DA 42 airplane.

WARNING: YOU MUST WEIGH AND CHECK THE BALANCE OF A CONTROL SURFACE AFTER ANY WORK WHICH COULD AFFECT ITS WEIGHT OR ITS BALANCE. AN OUT OF BALANCE CONTROL SURFACE CAN FLUTTER AND CAUSE STRUCTURAL FAILURE.

Correct control surface balance is critical to flight safety. You must remove a control surface to weigh it and check its balance after:

– Any repair to the control surface.

– Painting the control surface.

– Any report of control vibration or flutter in flight.

You can use any convenient method to weigh a control surface. If you use anything to connect the control surface to the weighing device then you must weigh the device, (for example, a sling) separately and deduct its weight from the total value. For example, you use a rope sling to weigh an aileron with a spring balance:

– Weight of aileron and the rope sling	= 3.8 kg (8.378 lbs).
– Weight of rope sling	= 0.7 kg (1.543 lbs).
– Weight of aileron	= (3.8 kg - 0.7 kg) = 3.1 kg (6.835 lbs).

When you do a test for the correct balance of a control surface, the pivot angle of the control must be as shown in the Weights and Residual Moments Report.

We recommend that for balancing the flaps, aileron, elevator and elevator trim tab, you put a suitable size rod through the hinge bearings. Support the rod at 2 points to keep it horizontal.

To balance the rudder it must be supported at the top pivot pin and the bottom mounting bracket. The center line of the rudder must be horizontal.

<table>
<tr><td colspan="2">DA42 Twin Star
SN:</td><td>Rudder</td><td>Rudder Trim</td><td>Elevator</td><td>Elevator Trim Tab</td></tr>
<tr><td rowspan="2">Weight incl. mass balance</td><td>Limits [kp]</td><td>6.6 to 8.25</td><td>0.28 to 0.39</td><td>5.3 to 6.35</td><td>0.28 to 0.39</td></tr>
<tr><td>Actual [kp]</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Mass Balance [kg]</td><td>Upper Rudder Horn [800g]

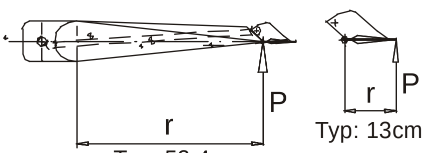
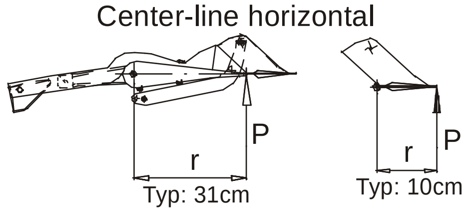
Lower Rudder Horn</td><td></td><td>Centre:
Push Rod:
L: R:</td><td></td></tr>
<tr><td colspan="2">P [kp]</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="2">r [cm]</td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">Static Moment</td><td>Limits [kp cm]</td><td>23.0 to 33.1</td><td>1.3 to 2.15</td><td>1.0 to 7.6</td><td>1.0 to 1.5</td></tr>
<tr><td>Actual [kp cm]</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="2">M = P*r
P in [kp]
r in [cm]</td><td colspan="2">Center-line horizontal

Rudder trim tab and push rod</td><td colspan="2">Center-line horizontal

Elevator trim tab and push rod</td></tr>
</table>

Figure 1: Typical Weights and Residual Moments Report - DA 42 Airplane - Sheet 1 (Metric Dimensions)

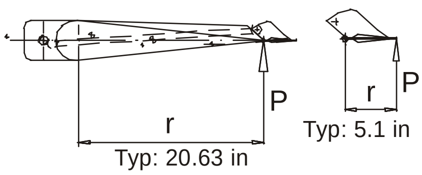
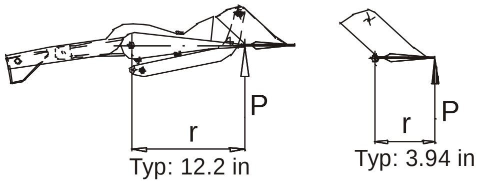
<table>
<tr><td colspan="2">DA42 Twin Star
SN:</td><td>Rudder</td><td>Rudder Trim</td><td>Elevator</td><td>Elevator Trim Tab</td></tr>
<tr><td rowspan="2">Weight incl. mass balance</td><td>Limits [lbf]</td><td>14.6 to 18.2</td><td>0.62 to 0.86</td><td>11.7 to 14.0</td><td>0.62 to 0.86</td></tr>
<tr><td>Actual [lbf]</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Mass Balance [lb]</td><td>Upper Rudder Horn
[1.76 lb]
Lower Rudder Horn</td><td></td><td>Centre:
Push Rod:
L: R:</td><td></td></tr>
<tr><td colspan="2">P [lbf]</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="2">r [in]</td><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="2">Static Moment</td><td>Limits [lbf in]</td><td>20.0 to 28.7</td><td>1.13 to 1.87</td><td>0.87 to 6.60</td><td>0.87 to 1.30</td></tr>
<tr><td>Actual [lbf in]</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="2">M = P*r
P [lbf]
r [in]</td><td colspan="2">Center-line horizontal

Rudder trim tab and push rod</td><td colspan="2">Center-line horizontal

Elevator trim tab and push rod</td></tr>
</table>

Figure 2: Typical Weights and Residual Moments Report - DA 42 Airplane - Sheet 1 (Imperial Dimensions)

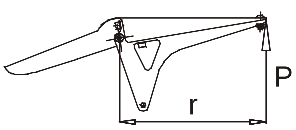
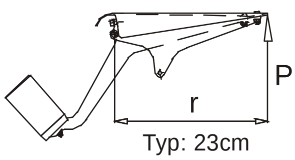
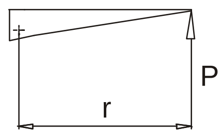
DA42 Twin Star SN:		Aileron		Outer Flap		Inner Flap	
		Left	Right	Left	Right	Left	Right
Weight incl. mass balance	Limits [kp]	2.28 to 2.77		3.4 to 3.96		2.3 to 2.84	
	Actual [kp]						
Mass Balance [kg]							
P [kp]							
r [cm]							
Static Moment	Limits [kp cm]	0 to 2.5		24.5 to 33.1		25.5 to 32.6	
	Actual [kp cm]						
M = P*r P in [kp] r in [cm]		Upper surface horizontal  Typ: LH 17cm Typ: RH 19cm		Upper surface horizontal  Typ: 23cm		Upper surface horizontal  Typ: 30cm	

Figure 3: Typical Weights and Residual Moments Report - DA 42 Airplane - Sheet 2 (Metric Dimensions)

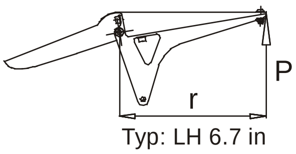
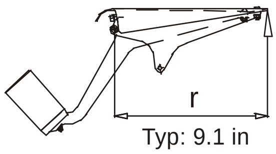
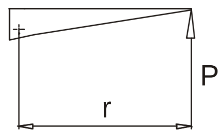
DA42 Twin Star SN:		Aileron		Outer Flap		Inner Flap	
		Left	Right	Left	Right	Left	Right
Weight incl. mass balance	Limits [lbf]	5.03 to 6.10		7.50 to 8.73		5.07 to 6.26	
	Actual [lbf]						
Mass Balance [lb]							
P [lbf]							
r [in]							
Static Moment	Limits [lbf in]	0 to 2.17		21.3 to 28.7		22.1 to 28.3	
	Actual [lbf in]						
M = P*r P [lbf] r [in]		Upper surface horizontal  		Upper surface horizontal  		Upper surface horizontal  	

Figure 4: Typical Weights and Residual Moments Report - DA 42 Airplane - Sheet 2 (Imperial Dimensions)

2. Rudder Static Balance

Refer to Figure 1 for the weight and residual moment.

Use any suitable method to support the rudder horizontally at the pivot axis. The rudder must be able to rotate freely around the pivot axis.

Remove the stop bolts from the lower mounting bracket before weighing and balancing.

The residual moment is tail heavy.

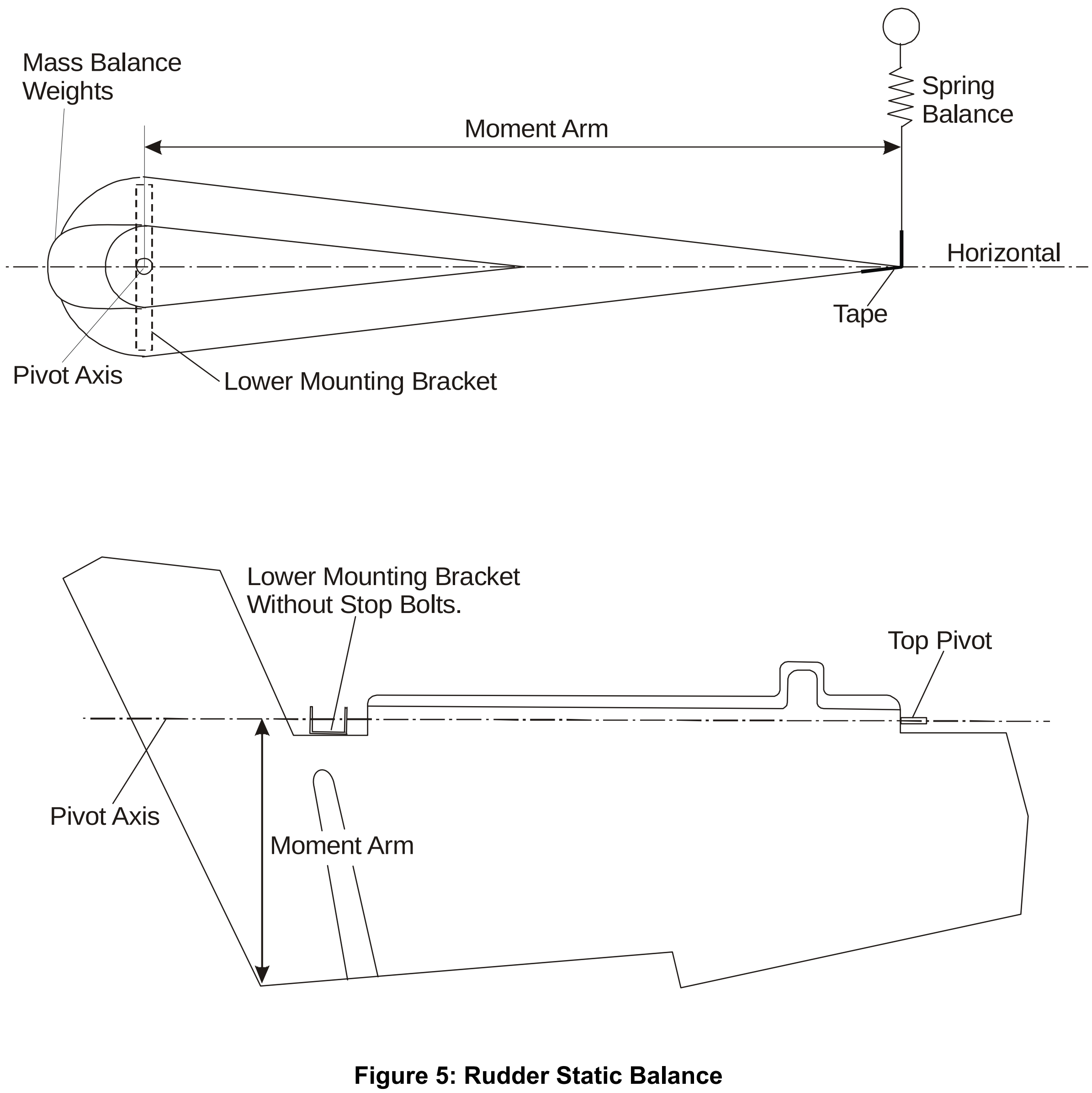


Figure 5: Rudder Static Balance

3. Rudder Trim Tab Static Balance

Refer to Figure 1 for the weight and residual moment.

Use any suitable method to support the trim tab horizontally at the pivot axis. The trim tab must be able to rotate freely around the pivot axis.

The residual moment is tail heavy.

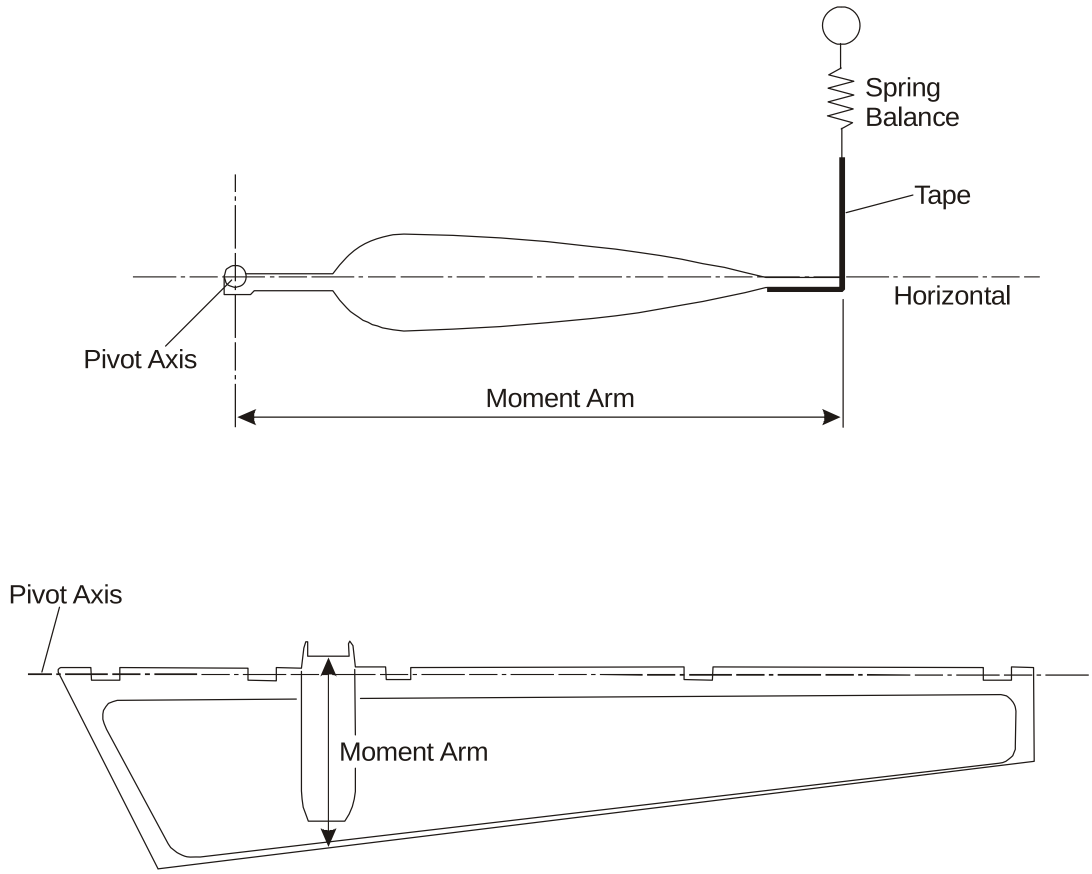


Figure 6: Rudder Trim Tab Static Balance

4. Elevator Static Balance

Refer to Figure 1 for the weight and residual moment.

Use any suitable method to support the elevator horizontally at the pivot axis. The elevator must be able to rotate freely around the pivot axis.

The balance includes the trim tab, trim tab control rod and horn.

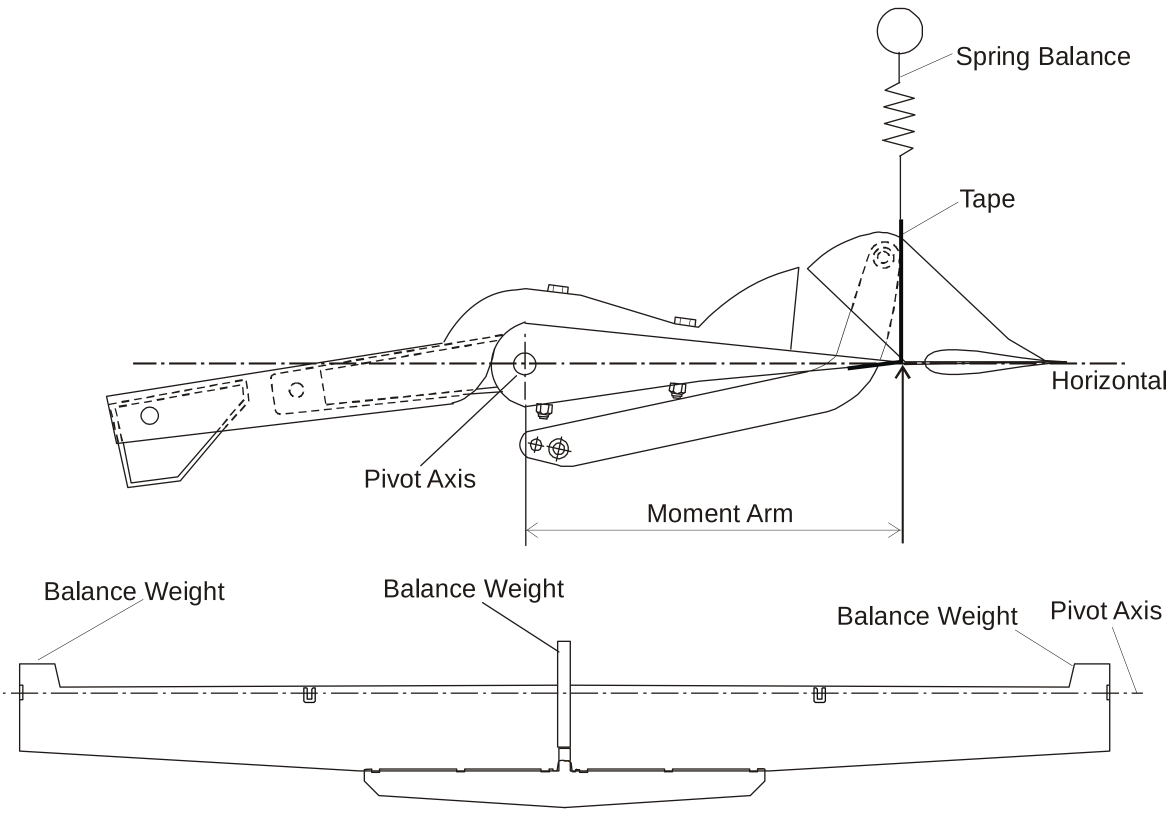


Figure 7: Elevator Static Balance

5. Elevator Trim Tab Static Balance

Refer to Figure 1 for the weight and residual moment.

Use any suitable method to support the elevator trim tab horizontally at the pivot axis. The elevator trim tab must be able to rotate freely around the pivot axis.

The residual moment is tail heavy.

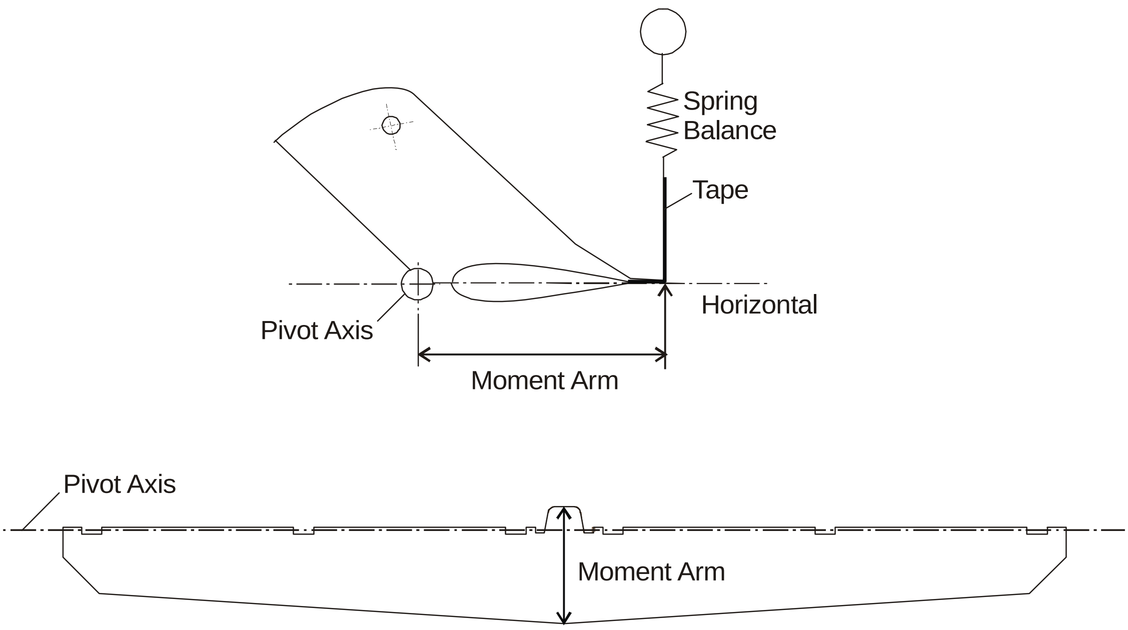


Figure 8: Elevator Trim Tab Static Balance

6. Aileron Static Balance

Refer to Figure 2 for the weight and residual moment.

Use any suitable method to support the aileron horizontally at the pivot axis. The aileron must be able to rotate freely around the pivot axis.

The balance includes the horn, trim plate and hinges.

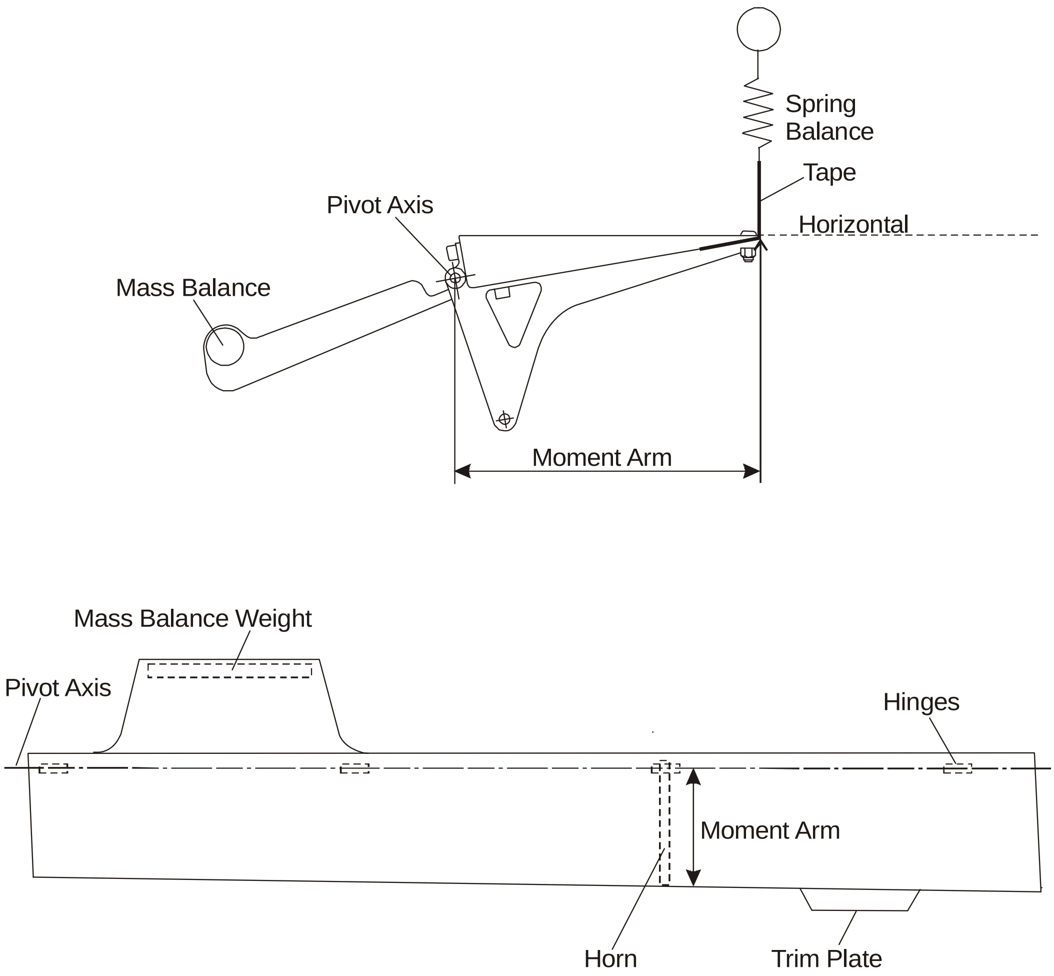


Figure 9: Aileron Static Balance

7. Wing Outer Flap Static Balance

Refer to Figure 2 for the weight and residual moment.

Use any suitable method to support the outer flap horizontally at the pivot axis. The outer flap must be able to rotate freely around the pivot axis.

The balance includes the horn and hinges.

The residual moment is tail heavy.

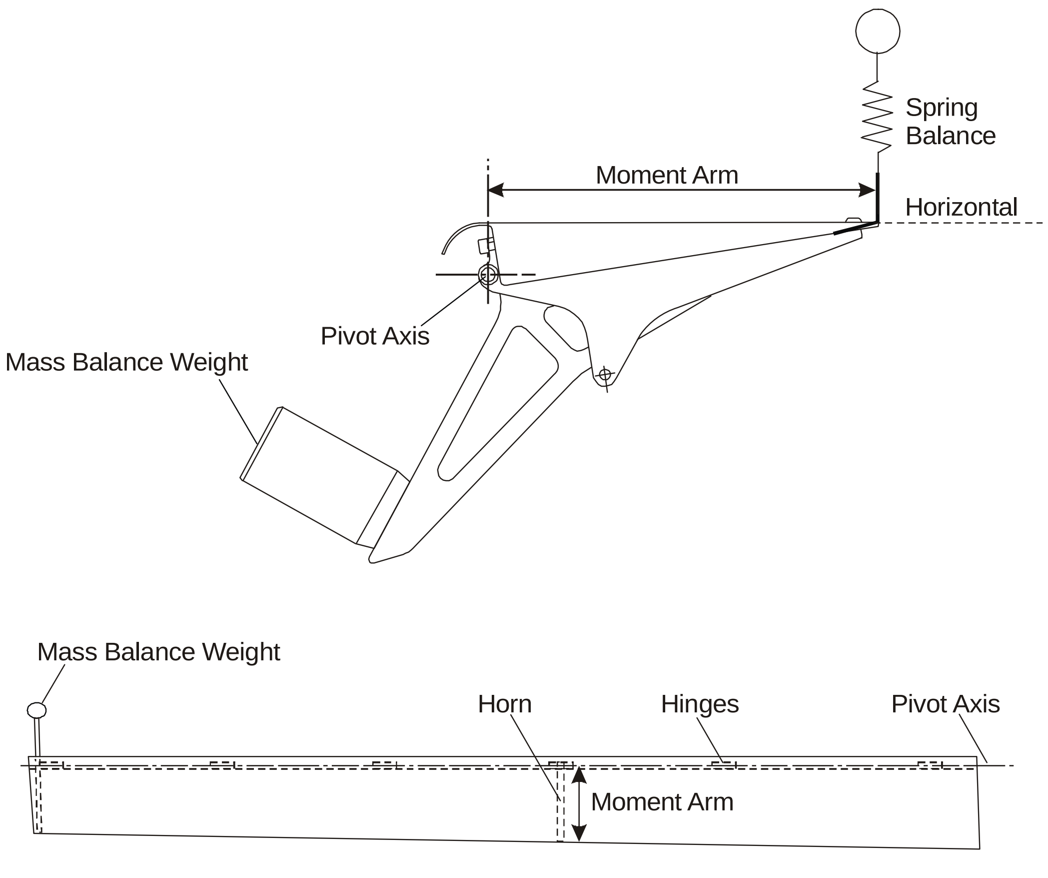


Figure 10: Wing Outer Flap Static Balance

8. Wing Inner Flap Static Balance

Refer to Figure 2 for the weight and residual moment.

Use any suitable method to support the inner flap horizontally at the pivot axis. The inner flap must be able to rotate freely around the pivot axis.

The balance includes the horn and hinges.

The residual moment is tail heavy.

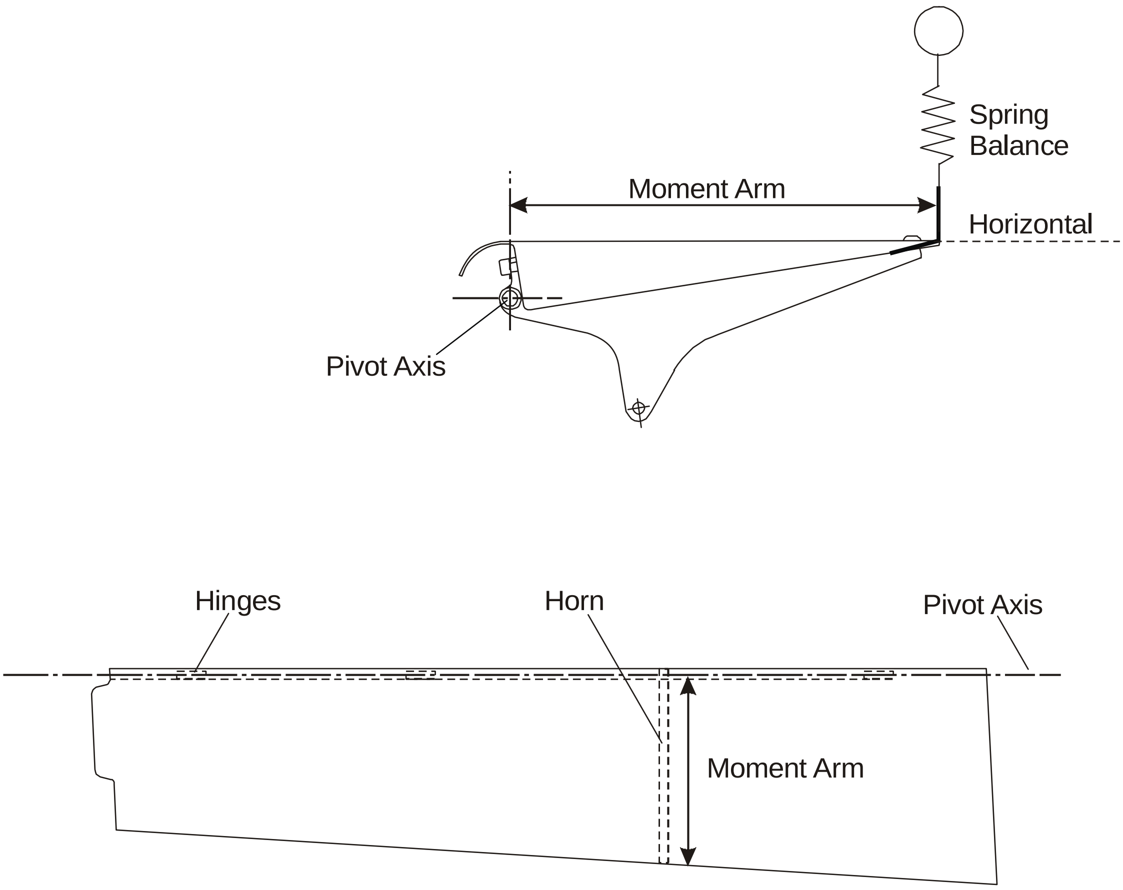


Figure 11: Wing Inner Flap Static Balance

Section 51-80
Lightning Protection

1. General

Lightning protection for the DA 42 is provided by the airplane bonding system. A special bonding system is necessary for the composite structure of the DA 42. Without this special system, the composite structure would not sufficiently conduct electricity.

Refer to Section 23-60 for data about the static discharge wicks.

2. Description

Figure 1 shows the simplified bonding system schematic diagram.

The lightning conductor system is the main part of the bonding system. High capacity aluminum alloy tubes and strips make the basis of the lightning conductor system.

The lightning conductor system has a longitudinal system and a lateral system. The longitudinal system runs from the front rib of the fuselage, through both sides and center of the wing center section, through the left side of the rear fuselage and up into the vertical stabilizer. From the vertical stabilizer aluminum strips and braids connect to the horizontal stabilizer, the elevator and trim tab.

The lateral system runs from the wing tips, through the front of the wing, across the engine nacelles and through the center wing section where it connects to the longitudinal system. Aluminum strips and braids connect the propellers, engines, fuel tanks and other metal components installed along the wings to the main lateral system.

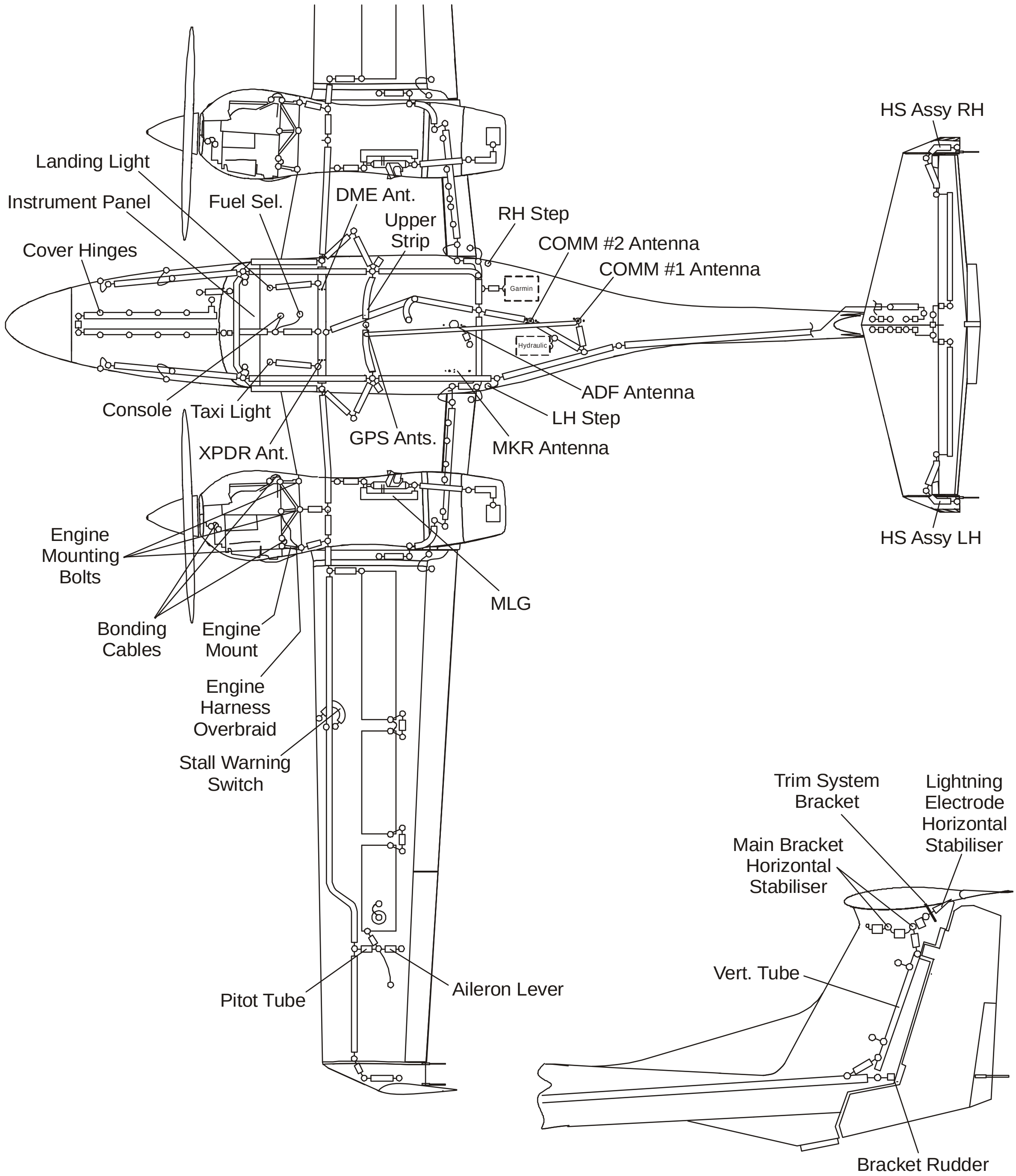


Figure 1: Lightning Protection System Schematic Diagram

The following design features also add to the lightning protection system:

- The aluminum tubes of the lightning protection system also provide the conduit system for electrical cables.
- Carbon fiber material is used for parts of the wing and fuselage skins. Carbon fiber material is conductive and is used to form part of the lightning protection system.
- Carbon fiber material with interwoven aluminum fibers is used on the upper wing skin, the fuselage and the engine cowlings. Carbon fiber material with interwoven aluminum fibers is conductive.
- A lightning conductor strip is integrated into the horizontal stabilizer.
- The propeller blades are non-conductive (except for the blade sheaths), therefore currents cannot flow in structural parts of the propeller.

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Maintenance Practices

1. General

This Section tells you how to do a test of the electrical bonding system.

2. Test the Electrical Bonding System

The resistance measurements on the DA 42 are divided into 3 categories:

– Very low resistance measurements for conduits in the direct lightning path and electrical power grounds.

– Low resistance measurements for bonding of controls.

– High resistance measurements for the static discharge wicks.

Do the low resistance bonding measurements with a milliohmmeter and Kelvin probes. The test current must be approximately 2 amps.

Do the high resistance measurements with a high voltage megaohmmeter. Measure the static discharge wicks and the precautions against static charge of the airplane.

All measurements are referenced to the negative terminal of the airplane main battery. The airplane must be serviceable during the tests and the engine cowlings must be removed.

A. Very Low Resistance Measurements

Item	Attachment Point	Max Allowable (mΩ)	Measured L / R (mΩ)	Passed
ENGINE COMPARTMENTS				
Firewall		6.0	/	
Engine mount		6.0	/	
Engine	Propeller bearing, front	6.0	/	
Heat-exchanger	Case	6.0	/	
Oil cooler	Case	6.0	/	
Water radiator	Case	6.0	/	
Intercooler	Case	6.0	/	
Engine breather (TAE 125-01 only)	Tube	10.0	/	
NACELLE COMPONENTS				
Electrical junction box	Sheet metal	5.0	/	
Fuel cooler	Mounting screw	10.0	/	
Aux fuel tank (optional)	Drain	10.0	/	
Aux fuel tank refill (optional)	Tube	10.0	/	
FUSELAGE COMPONENTS				
External power connector	Outer large pin	5.0		
Instrument panel	Above co-pilot’s left knee	3.0		
Taxi light	Mounting screw	4.0		
Landing light	Mounting screw	4.0		
Remote avionic box	Case	4.0		
Hydraulic module	Sheet metal tray	4.0		

Item	Attachment Point	Max Allowable (mΩ)	Measured L / R (mΩ)	Passed
Nose LDG gear door hinge	LH/RH front hinge	10.0	/	
Nose baggage door lock	LH/RH front lock	10.0	/	
TKS spray bar (optional)	Center	5.0		
Radar nose cone lightning strips (4 pieces, optional).	Mounting screws	8.0		
EXTERNAL CONDUCTIVE PARTS				
LH step	Mounting screw	5.0		
RH step	Mounting screw	5.0		
OAT sensor		10.0		
Front LDG gear	Yoke exposure, mounting screw	10.0		
Main LDG gear LH	Axle mounting screw	10.0		
Main LDG gear RH	Axle mounting screw	10.0		
ANTENNAS				
COM 1 antenna (top)	Mounting screws	6.0		
COM 2 antenna (bottom)	Mounting screws	6.0		
ELT antenna	Mounting screws	6.0		
Top TAS antenna (optional)	Mounting screws	6.0		
Bottom TAS antenna (optional)	Mounting screws	5.0		

Item	Attachment Point	Max Allowable (mΩ)	Measured L / R (mΩ)	Passed
STABILIZER				
Vertical lightning protection tube.	Upper end	7.0		
LH horizontal stabilizer lightning strap	Tip	15.0		
RH horizontal stabilizer lightning strap	Tip	15.0		
Rudder hinge	Rudder side	10.0		
Vertical stabilizer fairing	Front left-side attachment screw	12.0		
Vertical stabilizer fairing	Front right-side attachment screw	12.0		
Horizontal stabilizer	Front bracket	10.0		
Horizontal stabilizer	Rear bracket	10.0		
Horizontal stabilizer TKS panel (optional)	LH inner panel section	15.0		
Horizontal stabilizer TKS panel (optional)	LH outer panel section	15.0		
Horizontal stabilizer TKS panel (optional)	RH inner panel section	15.0		
Horizontal stabilizer TKS panel (optional)	RH outer panel section	15.0		
Vertical stabilizer TKS panel (optional)	Upper panel section	25.0		
Vertical stabilizer TKS panel (optional)	Bottom panel section	25.0		
TKS low pressure switches (optional)	Mounting plate	20.0		

Item	Attachment Point	Max Allowable (mΩ)	Measured L / R (mΩ)	Passed
LH WING				
Fuel tank drain	Drain	5.0		
Tank refill	Ring	5.0		
Tank vent	Plate	10.0		
Pitot tube base	Tube base	6.0		
Tip light assembly	Base plate	8.0		
Aileron push-rod attachment	Bonding wire lead connection	50.0		
Outer flaps push-rod attachment	Bonding wire lead connection	50.0		
Inner flap push-rod attachment.	Bonding wire lead connection	50.0		
Stall warning switch	Mounting screw	10.0		
Inner TKS panel	Inner panel section	15.0		
Outer TKS panel	Inner panel section	15.0		
Outer TKS panel	Outer panel section	10.0		
RH WING				
Fuel tank drain	Drain	5.0		
Tank refill	Ring	5.0		
Tank vent	Plate	10.0		
Tip light assembly	Base plate	8.0		
Aileron push-rod attachment	Bonding wire lead connection	50.0		
Outer flaps push-rod attachment	Bonding wire lead connection	50.0		
Inner flap push-rod attachment.	Bonding wire lead connection	50.0		
Inner TKS panel	Inner panel section	15.0		
Outer TKS panel	Inner panel section	15.0		
Outer TKS panel	Outer panel section	10.0		

B. Low Resistance Measurements in Control System

Item	Attachment Point	Max Allowable (mΩ)	Measured (mΩ)	Passed
Pilot stick	Tube	50.0		
Co-pilot stick	Tube	50.0		
Trim wheel assembly	Frame	5.0		
Levers	Frame	300.0		
Pilot pedal assembly		150.0		
Co-pilot pedal assembly		150.0		
Canopy hinge LH	Tube tip	100.0		
Canopy hinge RH	Tube tip	100.0		

C. High Resistance Measurements

Use a wet sponge to get a constant electrical connection to the static dischargers.

Item	Attachment Point	Max Allowable (MΩ)	Measured IN/OUT (MΩ (500V))	Passed
STATIC DISCHARGE WICKS				
LH wing tip		200.0	/	
RH wing tip		200.0	/	
Rudder		200.0		
Horizontal stabilizer, LH		200.0		
Horizontal stabilizer, RH		200.0		
TIRES				
Nose wheel		100.0		
LH main wheel		100.0		
RH main wheel		100.0		

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CHAPTER 52

DOORS

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CHAPTER 52
DOORS

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Section 52-40
Access Panels

CHAPTER 52
DOORS

1. General

The DA 42 has 3 types of doors. Section 52-10 tells you about the canopy and the passenger access door. Section 52-30 tells you about the front baggage compartment doors and Section 52-40 tells you about the maintenance access panels.

2. Description

The canopy is a CFRP molding with inner and outer frames. The frames bond together. The canopy has a large one-piece acrylic glass window. The window has direct vision panels on both sides. You can open the direct vision panels in flight. Refer to Chapter 56 for data about the window.

The canopy attaches to a tubular steel frame at the front. The frame attaches to two hinges on the rear face of the instrument panel frame. The canopy moves up and forward to open.

A handle on the left of the canopy operates two locking bolts. The handle is black on the inside of the canopy and red on the outside. The locking bolts are at the bottom rear corners of the canopy.

The passenger door is a CFRP molding with inner and outer frames. The frames bond together. The door has a acrylic glass window.

Two hinges attach the door to the top of the fuselage near the center-line. A gas strut attaches to the rear of the door and the fuselage. The gas strut holds the door open.

A handle on the left of the door operates two locking bolts. The handle is black on the inside of the door and red on the outside. The locking bolts are at the bottom front and rear corners of the door.

The DA 42 has a large baggage compartment in the nose of the airplane. An access door on each side of the airplane gives access to the baggage compartment. The baggage compartment doors have hinges at the top and locking handles at the bottom. Gas struts hold the doors up when they are in the open position.

The DA 42 has a small number of access panels. Panels which must be used often (for example, engine cowlings) have quick release fasteners. Other panels have the usual screws.

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Section 52-10
Canopy and Passenger Door

1. General

This Section tells you about the structure, operation and maintenance of the canopy and the passenger door. Refer to Chapter 56-00 for data about the windows in the canopy and the passenger door.

2. Canopy Description and Operation

Figure 1 shows the canopy installation.

The canopy is a CFRP molding with inner and outer frames. The frames bond together with thickened resin. Each part of the frame has layers of carbon cloth and one layer of glass cloth. Areas of high stress have extra layers of carbon cloth. Mounting bushes for the handle and locking bolts bond to the inside of the frame with thickened resin.

The canopy has a large one-piece acrylic glass window. A special flexible adhesive bonds the window to the canopy frame. A flexible filler seals the small gap between the edge of the window and the frame.

The window has a direct vision panels on each side. You can open the direct vision panels in flight. Refer to Chapter 56-00 for data about the window.

The canopy attaches to a tubular steel frame at the front (the hinge frame). The frame attaches to two hinges on the rear face of the instrument panel frame. A gas spring strut attaches to the hinge frame and the bottom of the instrument panel frame. The canopy moves up and forward to open. The gas spring strut holds the canopy open.

The canopy has two tubular brackets on the front edge of the canopy frame. Two bolts attach each bracket to the canopy frame. You can remove the canopy by removing these bolts.

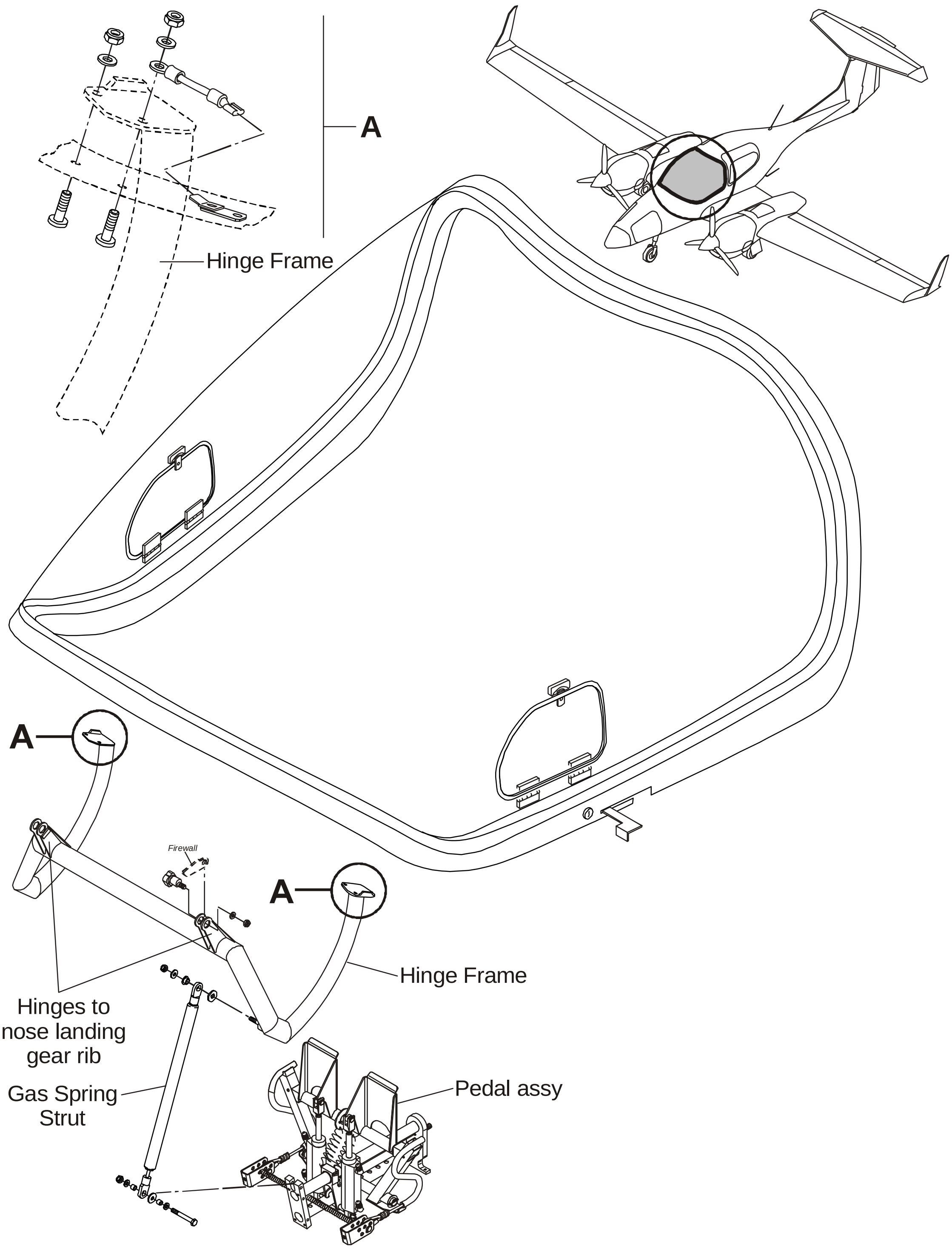

Figure 1: Canopy Installation

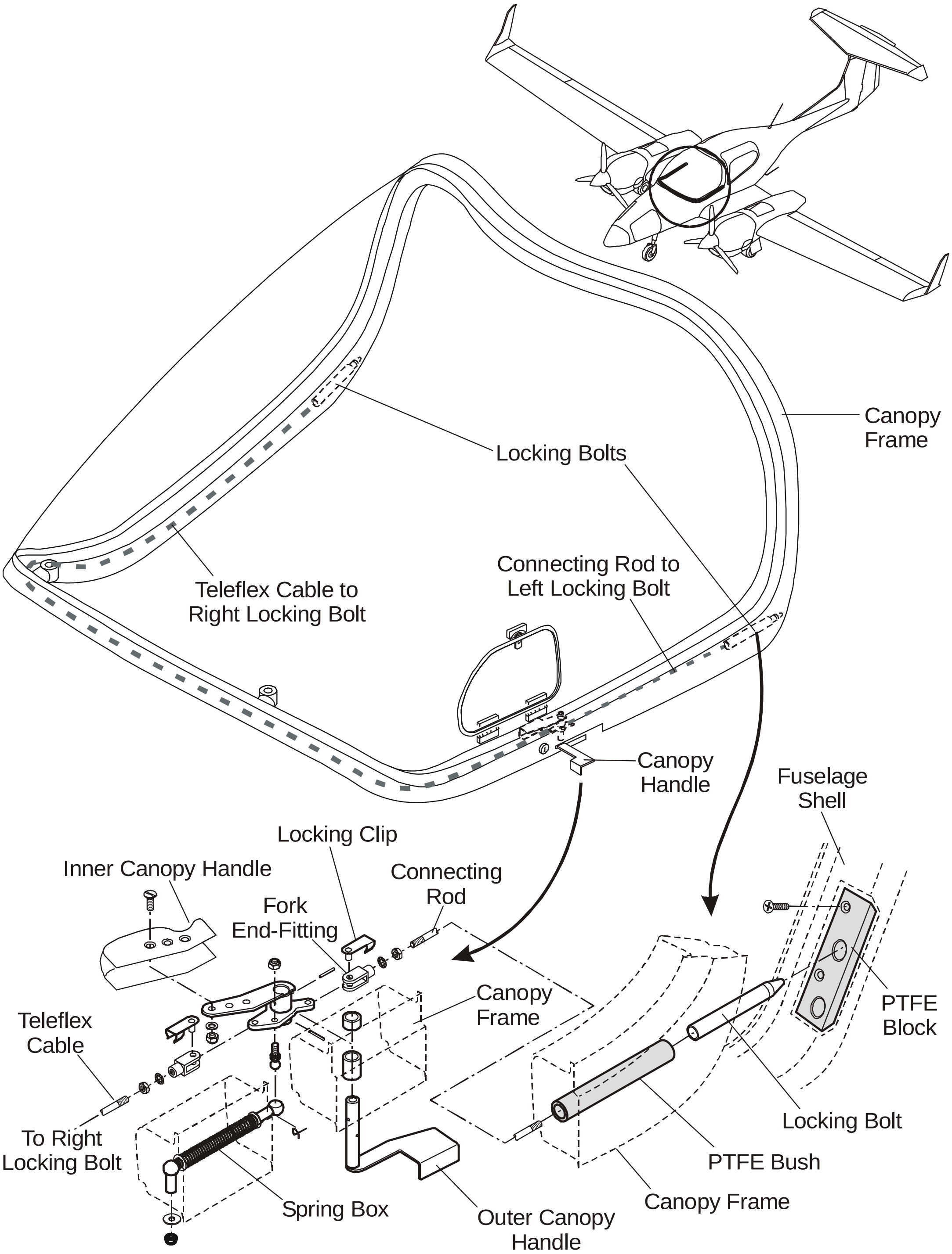

Figure 2: Canopy Locking Mechanism (MÄM 42-097 not implemented)

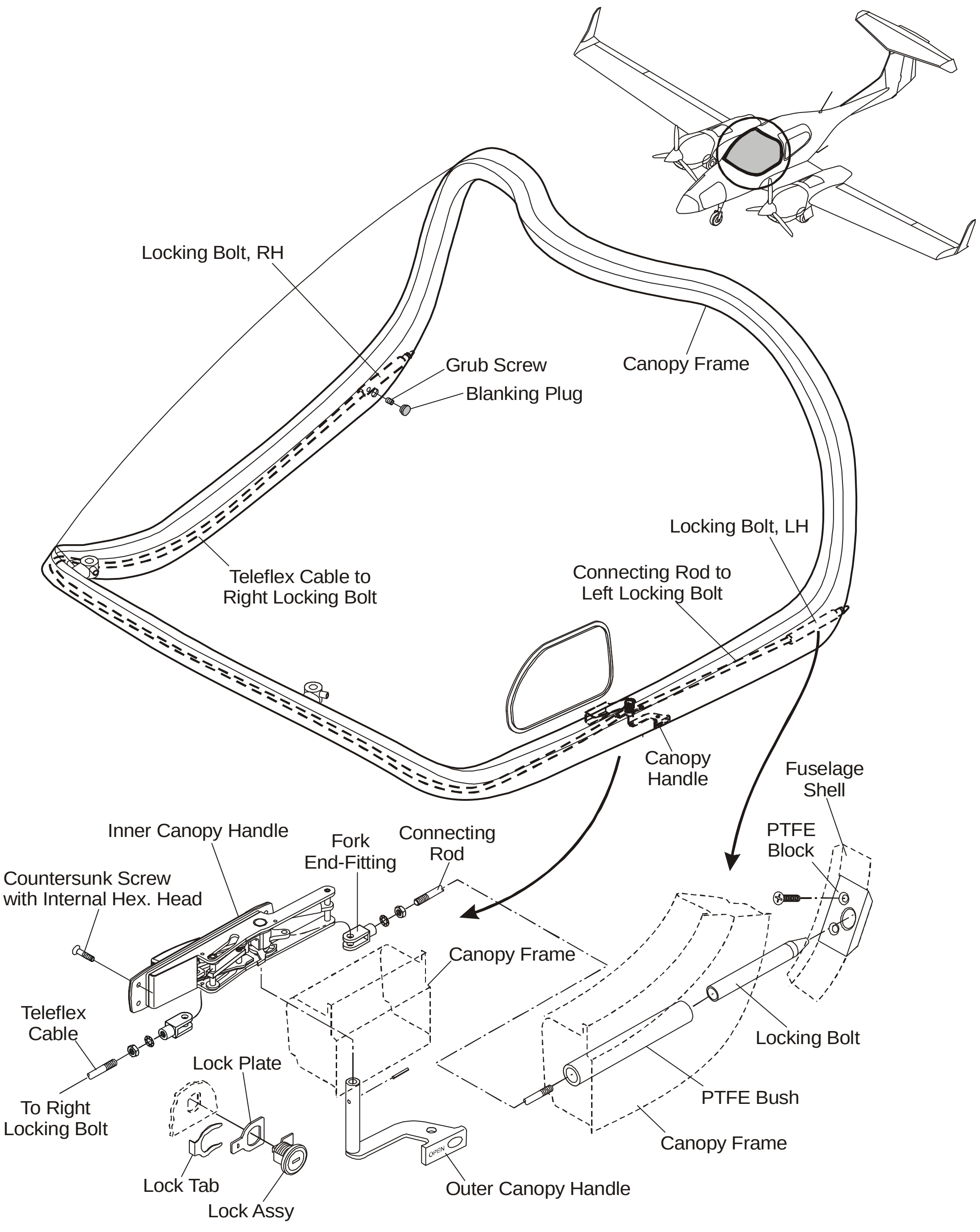

Figure 3: Canopy Locking Mechanism (MÄM 42-097 implemented)

A. MÄM 42-097 not implemented

Figure 2 shows the canopy locking mechanism.

A handle on the left of the canopy operates two locking bolts. The handle has a spring assisted over-center lock which holds the handle in the closed position. The locking bolts are at the bottom rear corners of the canopy.

The handle has two parts. The inner handle is black and has a double lever. The outer handle is red and attaches to the inner handle with two roll pins. A connecting rod attaches to the rear of the double lever. The other end of the connecting rod attaches to the inside of the left locking bolt.

A teleflex cable attaches to the front of the double lever. The teleflex cable goes inside the front of the canopy frame to the right locking bolt. If you pull the canopy handle away from the canopy frame, these things happen:

– The double lever turns to pull the connecting rod and the teleflex cable.

– The connecting rod pulls the left locking bolt forward.

– The teleflex cable pulls the right locking bolt forward. The forward movement of the locking bolt operates the door unlocked warning micro-switch in the left side fuselage shell.

The canopy can be pushed up and forward to open.

With the canopy fully closed, push the canopy handle towards the canopy frame. This engages the locking bolts in the fuselage holes. The spring assisted over-center lock holds the handle in the closed position. The right locking bolt operates the micro-switch for the DOOR warning caption. When the handle is flush with the canopy frame, the canopy is locked. Push up on the rear of the canopy frame to make sure that it is locked. A key operated lock can be used to secure the canopy in the closed position when the airplane is parked.

B. MÄM 42-097 implemented

Figure 3 shows the canopy locking mechanism with MÄM 42-097 implemented.

A handle on the left of the canopy operates two locking bolts. The handle has a spring assisted over-center lock which holds the handle in the closed position. The locking bolts are at the bottom rear corners of the canopy.

The handle has two parts. The inner handle is red and has a double lever. The outer handle is red and attaches to the inner handle with a roll pin. A connecting rod attaches to the rear of the double lever. The other end of the connecting rod attaches to the inside of the left locking bolt.

A teleflex cable attaches to the front of the double lever. The teleflex cable goes inside the front of the canopy frame to the right locking bolt. It can be removed for servicing. If you pull the canopy handle away from the canopy frame, these things happen:

- The double lever turns to pull the connecting rod and the teleflex cable.
- The connecting rod pulls the left locking bolt forward.
- The teleflex cable pulls the right locking bolt forward. The forward movement of the locking bolt operates the door unlocked warning microswitch in the right side fuselage shell.

The canopy can be pushed up and forward to open.

With the canopy fully closed, push the canopy handle towards the canopy frame. This engages the locking bolts in the fuselage holes. The spring assisted over-center lock holds the handle in the closed position. The right locking bolt operates the microswitch for the door unlocked warning light (DOOR or DOORS). When the handle is flush with the canopy frame, the canopy is locked. Push up on the rear of the canopy frame to make sure that it is locked. A key operated lock can be used to secure the canopy in the closed position when the airplane is parked.

3. Passenger Door Description and Operation

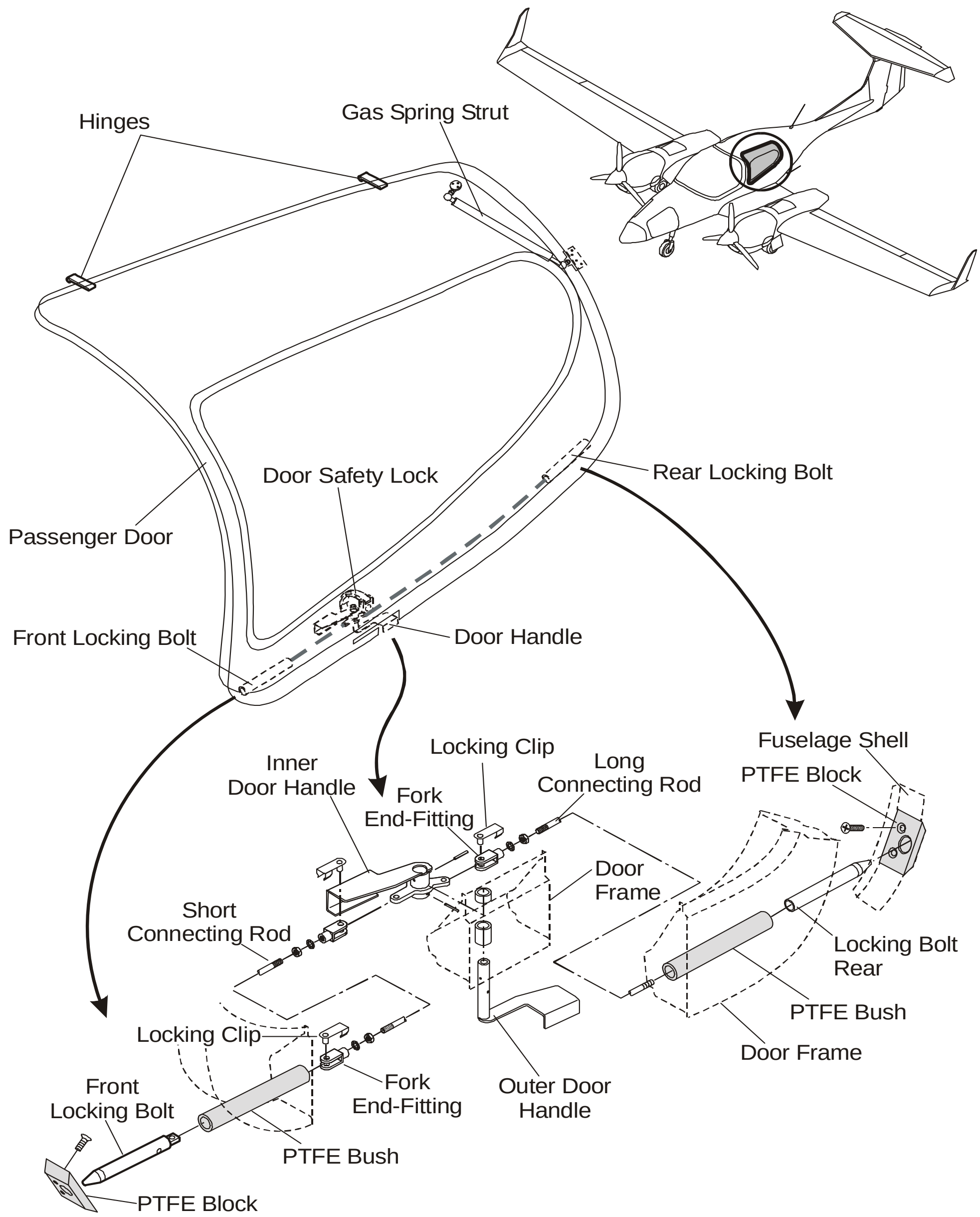

Figure 4: Passenger Door (MÄM 42-097 not implemented)

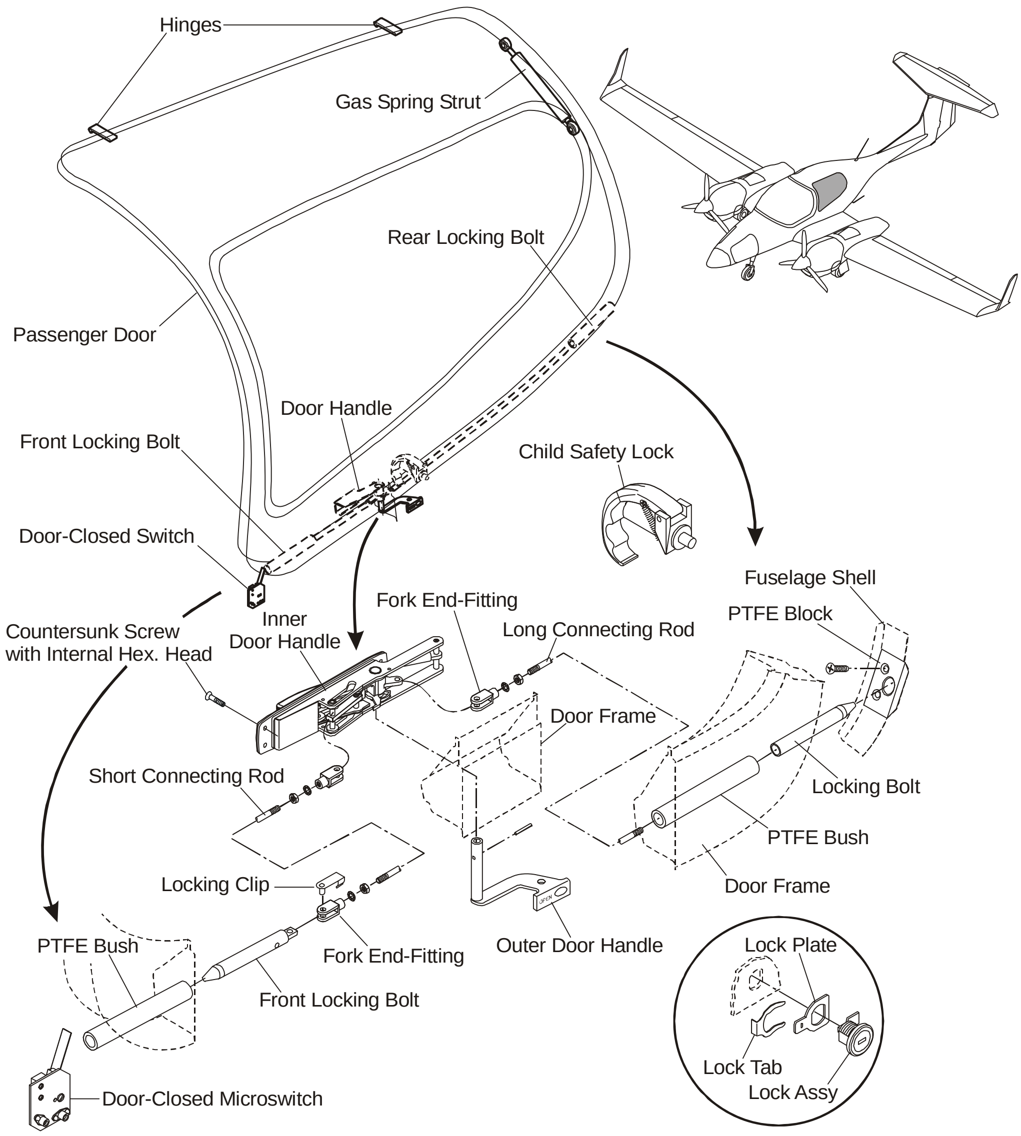

Figure 5: Passengers Door (MÄM 42-097 implemented)

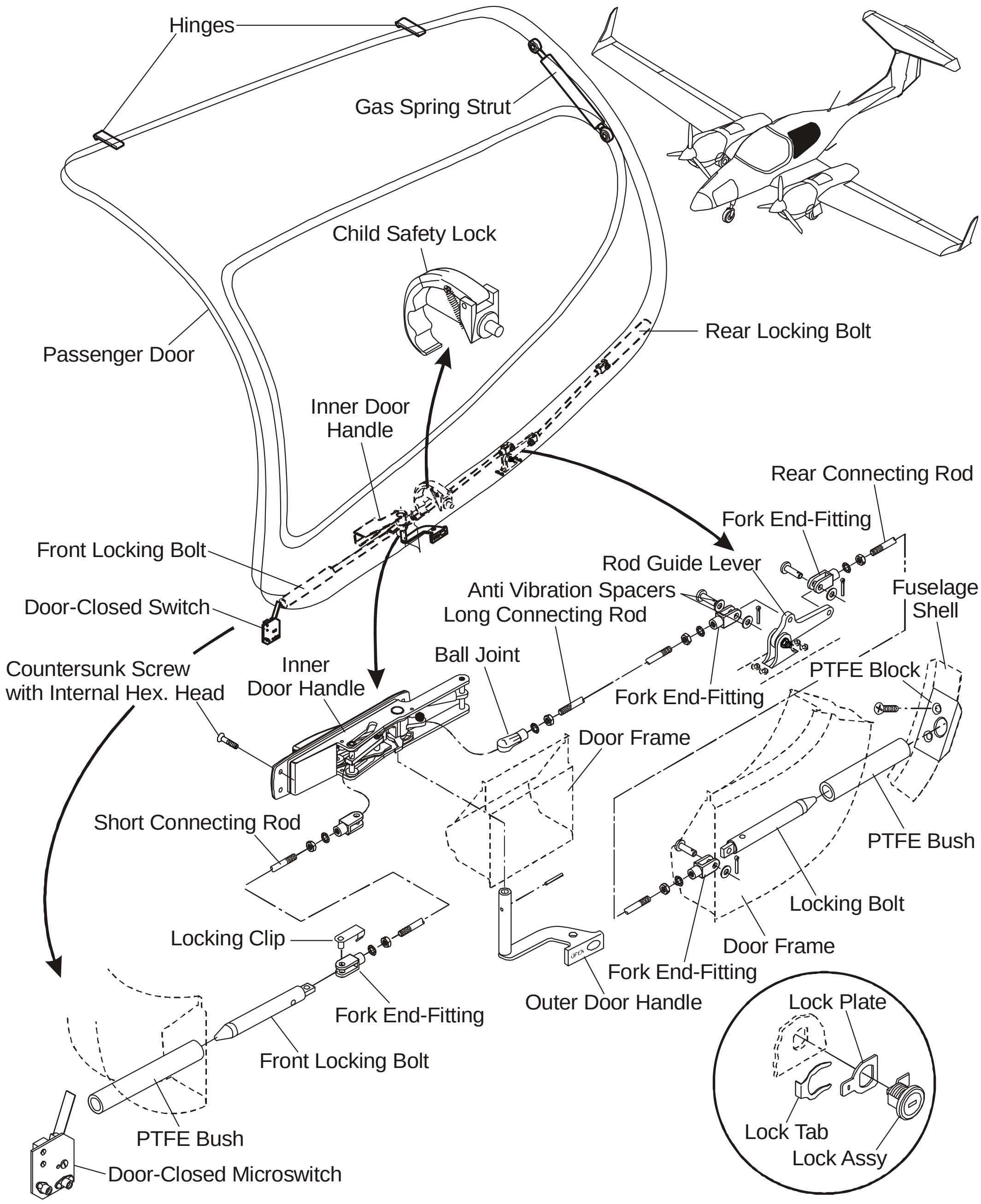

Figure 6: Passengers Door (if MÄM 42-687 is installed)

A. MÄM 42-097 not implemented

Figure 4 shows the passenger door installation and locking mechanism.

The passenger door is a CFRP molding with inner and outer frames. The frames bond together with thickened resin. Each part of the frame has layers of carbon cloth and one layer of glass cloth. Areas of high stress have extra layers of carbon cloth. Mounting bushes for the handle and locking bolts bond to the inside of the frame with thickened resin.

The door has a acrylic glass window. A special flexible adhesive bonds the window to the door frame. A flexible filler seals the small gap between the edge of the window and the frame.

Two hinges attach the door to the top of the fuselage near the center-line. The hinges bolt to the door frame. The front hinge can be removed from inside of the cabin in an emergency. With the front hinge removed, the passenger door can be forced open from the top. A gas strut attaches to a bracket at the rear of the door and to the fuselage. The gas strut holds the door open. A door unlocked warning caption on the ICS display operates when the door is unlocked.

A handle on the left of the door operates two locking bolts. The locking bolts are at the bottom front and rear corners of the door.

The handle has two parts. The inner handle is black and has a double lever. The outer handle is red and attaches to the inner handle with two roll pins. A long connecting rod attaches to the rear of the double lever. The other end of the long connecting rod attaches to the inside of the rear locking bolt. A safety lock is fitted to prevent accidental movement of the handle.

You must lift the safety handle before you can operate the black handle from inside the passenger compartment. To operate the red handle from the outside you must push the button next to the red handle to lift the inner safety lock.

A short connecting rod attaches to the front of the double lever. The short connecting rod goes to the front locking bolt. If you pull the canopy handle away from the canopy frame, these things happen:

- The double lever turns to pull the both of the connecting rods.
- The long connecting rod pulls the rear locking bolt forward.
- The short connecting bolt pulls the front locking bolt aft. The aft movement of the locking bolt operates a micro switch for the warning caption located on the ICS.

The door can be pushed up and out to open.

With the door fully closed, push the door handle towards the door frame. This engages the locking bolts in the fuselage holes. The forward locking bolt operates the door unlocked micro switch. When the handle is flush with the door frame, the door is locked. Push outwards on the bottom of the door frame to make sure that it is locked. A key operated lock can be used to secure the door in the closed position when the airplane is parked.

B. MÄM 42-097 implemented

Figure 5 shows the passenger door installation and locking mechanism when the design change MÄM 42-097 is implemented.

The passenger door is a CFRP molding with inner and outer frames. The frames bond together with thickened resin. Each part of the frame has layers of carbon cloth and one layer of glass cloth. Areas of high stress have extra layers of carbon cloth. Mounting bushes for the locking bolts bond to the inside of the frame with thickened resin.

The door has an acrylic glass window. A special flexible adhesive bonds the window to the door frame. A flexible filler seals the small gap between the edge of the window and the frame.

Two hinges attach the door to the top of the fuselage near the center-line. The hinges bolt to the door frame. The front hinge can be removed from inside of the cabin in an emergency. With the front hinge removed, the passenger door can be forced open from the top. A gas strut attaches to a bracket at the rear of the door and to the fuselage. The gas strut holds the door open. A door unlocked warning caption on the ICS display operates when the door is unlocked.

A handle on the left of the door operates two locking bolts. The locking bolts are at the bottom front and rear corners of the door.

The handle has two parts. The inner handle is red and has a double lever. The outer handle is red and attaches to the inner handle with two roll pins. A long connecting rod attaches to the rear of the double lever. The other end of the long connecting rod attaches to the inside of the rear locking bolt. A safety lock is fitted to prevent accidental movement of the handle.

You must lift the safety handle before you can operate the red handle from inside the passenger compartment. To operate the red handle from the outside you must push the button next to the red handle to lift the inner safety lock.

A short connecting rod attaches to the front of the double lever. The short connecting rod goes to the front locking bolt. If you pull the canopy handle away from the canopy frame, these things happen:

– The double lever turns to pull the both of the connecting rods.

– The long connecting rod pulls the rear locking bolt forward.

– The short connecting bolt pulls the front locking bolt aft. The aft movement of the locking bolt operates a micro switch for the warning caption located on the ICS.

The door can be pushed up and out to open.

With the door fully closed, push the door handle towards the door frame. This engages the locking bolts in the fuselage holes. The forward locking bolt operates the door unlocked micro switch. When the handle is flush with the door frame, the door is locked. Push outwards on the bottom of the door frame to make sure that it is locked. A key operated lock can be used to secure the door in the closed position when the airplane is parked.

Trouble-Shooting

1. General

The table below lists the defects you could have with the canopy and passenger door. If you have the trouble detailed in the Trouble column, read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Canopy/door is difficult to move.	Canopy/door frame damaged. Canopy/door hinges damaged. Gas spring strut defective.	Replace the canopy/door. Replace the damaged parts. Replace the gas spring strut.
Canopy/door handle is difficult to move.	Locking bolts damaged. Handle bushes damaged.	Replace the damaged bolt. Replace the canopy/door.
Canopy handle is difficult to move.	Teleflex cable defective.	Replace the teleflex cable.
Incorrect operation of door warning caption on the ICS display.	Canopy/door micro-switch incorrectly adjusted. Canopy/door micro-switch defective. Defective wiring.	Adjust the canopy/door micro switch. Replace the defective micro switch. Do a continuity test of the wiring. Refer to Chapter 92 for the wiring diagrams.
Red button operating the safety hook mechanism is stuck in pushed position.	Poor lubrication.	Lubricate. Refer to Section 12-20.

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Maintenance Practices

1. General

These Maintenance Practices tell you how to remove and install the canopy and the passenger door. They also tell you how to adjust and test the locking mechanism.

2. Remove/Install the Canopy

A. Remove the Canopy

	Detail Steps/Work Items	Key Items/References
(1)	Open the canopy: – Pull the canopy handle away from the canopy frame. – Lift the canopy open.	Refer to Figure 2 or 3.
(2)	Remove the 2 nuts, 2 washers and 2 bolts on either side that attach the canopy tubular brackets to the hinge frame.	Refer to Figure 1. Note the position of the bonding wire cable. Hold the canopy!
(3)	Lift the canopy clear of the airplane.	2 persons needed.

B. Install the Canopy

	Detail Steps/Work Items	Key Items/References
(1)	Move the canopy into position on the airplane.	2 persons needed.
(2)	Align the canopy mountings with the canopy frame and: – Install the 2 nuts, 2 washers and 2 bolts on either side that attach the canopy tubular brackets to the canopy frame. – Install the bonding wire cable onto the canopy.	Refer to Figure 1. At the location noted in Paragraph 2.
(3)	Close the canopy.	

	Detail Steps/Work Items	Key Items/References
(4)	Operate the canopy lock: – Hold the canopy closed. – Push the canopy handle towards the canopy frame. – Push up on the rear of the canopy frame.	When the canopy is locked, the canopy handle must be flush with the canopy frame. To make sure that the canopy is locked.

3. Remove/Install the Canopy Door Handle (if MÄM 42-097 is installed)

A. Remove the Canopy Door Handle

	Detail Steps/Work Items	Key Items/References
(1)	Remove the canopy.	Refer to Paragraph 2.
(2)	Put the canopy on a stable surface and secure it against movement.	Protect the canopy surface.
(3)	Remove the outside door handle: – Open the inside door handle for access to the spring pin. – Push the spring pin through the inside door handle. – Pull the outside door handle out.	Use punch 4 mm (0.16 in).
(4)	Remove the 4 screws from the inside door handle.	
(5)	Pull out the handle and disconnect the front fork head from the slide axle. Remove the circlip and move the axle out.	
(6)	Disconnect the rear fork head from the inside lever.	
(7)	Remove the inside door handle from the canopy shell.	
(8)	Remove the spring pin from the canopy door handle.	

B. Install the Canopy Door Handle

	Detail Steps/Work Items	Key Items/References
(1)	Install the inside door handle to the canopy door shell: – Pre fit the door handle. – Connect the rear fork head to the inside lever.	
(2)	Connect the front fork head. Install the slide axle and secure the axle with circlip.	
(3)	Install the inside door handle. Install the 4 screws.	
(4)	Install the outside door handle: – Push the outside door handle into the door shell to the inside door handle.	
(5)	Install the spring pin through the inside door handle.	Use punch 4 mm (0.16 in).
(6)	Install the canopy.	Refer to Paragraph 2.

4. Remove/Install the Gas Spring Strut for the Canopy

A. Remove the Gas Spring Strut for the Canopy

	Detail Steps/Work Items	Key Items/References
(1)	Remove the canopy.	Refer to Paragraph 2.
(2)	Remove instrument panel cover.	Take care that no washer or nut falls into the instrument panel.
(3)	Remove the nut and washer that attach the strut to the hinge frame.	Refer to Figure 1.
WARNING:	**MAKE SURE THAT THE STRUT IS FULLY EXTENDED BEFORE YOU DISCONNECT IT FROM THE HINGE FRAME.**	
(4)	Pull the top of the strut away from the hinge frame.	Remove and retain the bush and second washer.
(5)	Remove these items that attach the bottom of the strut: – Nut washer and bolt. – Bush. – Two spacers.	
(6)	Remove the strut from the airplane.	

B. Install the Gas Spring Strut for the Canopy

	Detail Steps/Work Items	Key Items/References
(1)	Move the strut into position in the airplane.	The cylinder goes to the top.
(2)	Install the bolt, washer and self-locking nut at the bottom attachment to the instrument panel frame.	Torque 6.4 Nm (4.7 lbf.ft.). Use a new self-locking nut.
(3)	Put the washer and bush into position on the hinge frame.	
(4)	Move the top eye end of the of the strut over the bush on the hinge frame.	
(5)	Install the washer and self-locking nut onto the hinge frame.	Torque 6.4 Nm (4.7 lbf.ft.). Use a new self-locking nut.
(6)	Install instrument panel cover.	Take care that no washer or nut falls into the instrument panel.
(7)	Install the canopy.	Refer to Paragraph 2.

5. Remove/Install the Passenger Door

A. Remove the Passenger Door

	Detail Steps/Work Items	Key Items/References
(1)	Open the passenger door: – Push and hold the safety button next to the door handle. – Pull the door handle away from the door frame. – Lift the door open.	Refer to Figure 4, 5 and 6.
(2)	Remove the gas strut: – Remove the locking clips from the gas strut top and bottom ball end fittings. – Pull the gas strut off the ball end fittings on the fuselage and clear of the airplane.	Hold the door!
(3)	Remove the passenger reading light assembly from the top of the cockpit.	For access to the front door hinge. Refer to Section 33-10.
(4)	Remove the bolts and washers which attach the front and rear door hinges to the fuselage.	Hold the door!
(5)	Lift the door clear of the airplane.	

B. Install the Passenger Door

	Detail Steps/Work Items	Key Items/References
(1)	Put the door in position in the fuselage.	
(2)	Install the bolts and washers which attach the front and rear door hinges to the fuselage.	Install door hinges with Terostat MS 9380 white sealant.
(3)	Install the passenger reading light assembly.	Refer to Section 33-10.
(4)	Install the gas strut: – Push the gas strut ball end fittings onto the fuselage gas strut mounts. – Install the locking clips which lock the ball end fittings in place.	
(5)	Close the door.	
(6)	Operate the door lock: – Hold the door closed. – Press the safety button next to the door handle and push the door handle towards the door frame. – Push outwards on the bottom of the door frame.	When the door is locked, the door handle must be flush with the door frame.
(7)	Do a test for correct operation of the DOOR warning caption. In the ICS display.	Refer to Paragraph 9.

6. Remove/Install the Passenger Door Handle (if MÄM 42-097 is installed)

A. Remove the Passenger Door Handle

	Detail Steps/Work Items	Key Items/References
(1)	Remove the passenger door.	Refer to Paragraph 5.
(2)	Fix the passenger door on a flat surface.	Protect the door surface finish.
(3)	Remove the outer door handle: – Open the inner door handle in order to gain access to the spring pin. – Push the spring pin through the inner door handle. – Remove the outer door handle.	Use a 4 mm punch.
(4)	If MÄM 42-687 is installed: Remove the rod guide base from the door shell: – Remove the 4 screws. – Move the guide base free of the door shell.	
(5)	If MÄM 42-687 is installed: Disconnect the thread rod from the rod guide lever: – Remove the cotter pin and the bolt.	
(6)	Remove the inner door handle from the passenger door shell: – Remove the 4 screws from the inner door handle.	
(7)	Lift the inner door handle and disconnect the front fork head from the slide axle.	
(8)	Remove the circlip and move the axle free of the door shell.	
(9)	Disconnect the rear fork head from the lever.	

	Detail Steps/Work Items	Key Items/References
(10)	Move the door handle free of the door shell.	
(11)	Remove the spring pin from the door handle.	

B. Install the Passenger Door Handle

	Detail Steps/Work Items	Key Items/References
(1)	Install the inner door handle of the passenger door: – Move the door handle into place. – Connect the rear fork head to the inner door handle lever.	
(2)	Connect the front fork head and install the slide axle and secure the axle with a circlip.	
(3)	If MÄM 42-687 is installed: Connect the rear thread rod to the rod guide lever.	
(4)	If MÄM 42-687 is installed: Install the rod guide base to the door shell: – Install the 4 screws.	
(5)	Install the inner handle: – Install the 4 screws.	
(6)	Install the outer door handle of the passenger door: – Align the outer door handle with the hole of the inner door handle. – Push the door handle into the inner door handle.	
(7)	Install the spring pin through the inner door handle.	Use a 4 mm punch.

7. Remove/Install the Passenger Door Locking Mechanism (if MÄM 42-687 is installed)

A. Remove the Passenger Door Locking Mechanism

	Detail Steps/Work Items	Key Items/References
(1)	Remove the door handle.	
(2)	Remove the 4 bolts from the rod guide base.	
(3)	Remove the lever bolt from the guide base.	
(4)	Remove the guide base.	
(5)	Pull the long connecting rod and the guide lever with the locking bolt to the door handle cut out.	

B. Install the Passenger Door Locking Mechanism

	Detail Steps/Work Items	Key Items/References
(1)	Install the long connecting rod and the guide lever into the door handle cutout.	
(2)	Install the rear locking bolt into the PTFE bush.	
(3)	Connect the guide lever to the guide base.	
(4)	Connect the ball cup fitting from the thread rod 2 to the door handle.	
(5)	Connect the front fork head to the slide axle.	
(6)	Pre-fit the inner door handle.	
(7)	Install the guide base.	

	Detail Steps/Work Items	Key Items/References
(8)	Adjust the rear locking bolt: – Check that the short lever arm from the guide lever position is more than 90° in the closed position. If necessary adjust long connecting rod. – Check the rear locking bolt over length in closed position 44 mm ± 1mm. If necessary adjust the locking bolt thread rod. For adjustment remove the guide base and lever. – Check the locking mechanism for release. Push with 15 kg on the rear locking bolt in the closed position. The closing mechanism has to stay locked up to a force of 15 kg. – Check the front locking bolt over length in closed position 40 mm ± 1mm. – Install the 4 guide base bolts. – Install the inner door handle.	

8. Remove/Install the Gas Spring Strut for the Passenger Door

A. Remove the Gas Spring Strut for the Passenger Door

	Detail Steps/Work Items	Key Items/References
(1)	Open the passenger door: – Push and hold the button next to the door handle. – Pull the door handle away from the door frame. – Lift the door open.	Refer to Figure 4, 5 or 6.
(2)	Remove the gas strut: – Remove the locking clips from the gas strut top and bottom ball-end fittings. – Pull the gas strut off the ball end fittings on the fuselage and clear of the airplane.	Hold the door!

B. Install the Gas Spring Strut for the Passenger Door

	Detail Steps/Work Items	Key Items/References
(1)	Open the passenger door: – Pull the door handle away from the door frame. – Lift the door open.	Refer to Figure 4, 5 or 6. Hold the door!
(2)	Install the gas strut: – Push the gas strut ball end fittings onto the fuselage gas strut mounts. – Install the locking clips which lock the ball end fittings in place.	
(3)	Close the door.	

9. Test the Canopy and Access Door Warning Lights

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that both the front canopy and the passenger door are fully closed.	Operating handles flush against the canopy/door frame.
(2)	Test the operation of the DOOR warning caption on the ICS display:	Monitor the integrated cockpit display.
	– Set the ELECT. MASTER switch to ON.	The DOOR warning caption must be off.
	– Move the passenger door operating handle towards the open position.	The DOOR warning caption must come on when the operating handle has moved away from the door frame.
	– Move the door operating handle to the fully closed position.	The DOOR warning caption must go off.
	– Move the canopy operating handle towards the open position.	The DOOR warning caption must come on when the operating handle has moved away from the door frame.
	– Move the canopy operating handle to the fully closed position.	The DOOR warning caption must go off.
	– Set the ELECT. MASTER switch to OFF.	

10. Examine the Carbon Hinges on the Passenger Door

	Detail Steps/Work Items	Key Items/References
(1)	Open the passenger door to carry out the carbon hinge inspection.	
(2)	Examine the carbon hinges for cracks and delamination on the side faces:	Refer to Figure 7.
	– Hold the passenger door frame with one hand to the left and one hand to the right of the hinge.	
	– Apply torsional test force to the hinge by alternately pulling with one hand and pushing with the other hand.	Apply test force of approx. 8 kg (18 lb) with each hand.
	– If cracks become visible on the side faces of the hinges when test force is applied, the hinge is structurally damaged due to delamination. Replace the carbon hinges.	Refer to Paragraph 12.

	Detail Steps/Work Items	Key Items/References
(3)	Cracks at the outer face of the hinges where they meet the door frame may be visible. If cracks in this area are visible, perform the following checks: – Hold the passenger door frame with one hand to the left and one hand to the right of the hinge. – Apply torsional test force to the hinge by alternately pulling with one hand and pushing with the other hand, check the cracks on the outer face of the hinge. – Push the passenger door open against the mechanical stop of the damper with care, do not use undue force. Check the cracks on the outer face of the hinge. If cracks expand extensively when applying test force, the hinges are structurally damaged. Replace the carbon hinge.	Refer to Figure 8. Apply test force of approx. 8 kg (18 lb) with each hand. Refer to Paragraph 12.

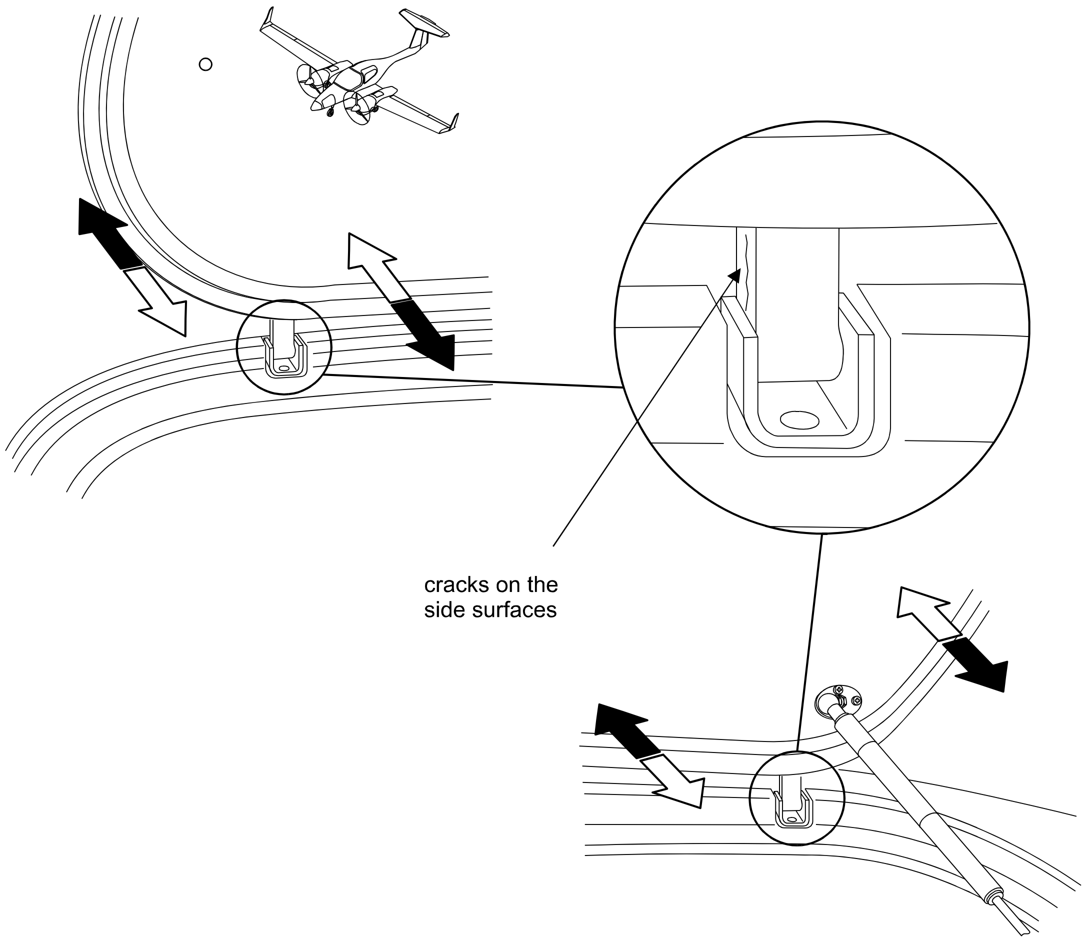

Figure 7: Passenger Door Torsional Hinge Test

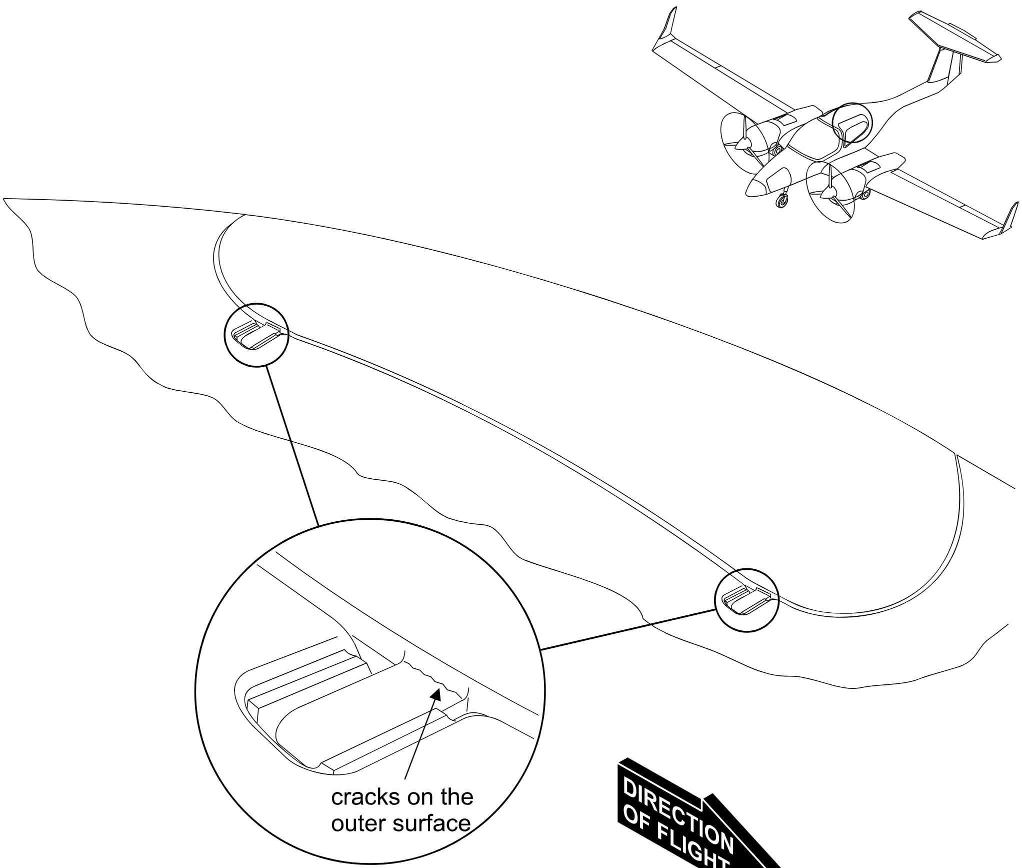

Figure 8: Passenger Door Outer Face Hinge Test

11. Inspection of the Door Locking and Safety Hook Mechanisms

	Detail Steps/Work Items	Key Items/References
(1)	Make sure the door lock mechanism works correctly: – The pins must engage in the guarding plates of the door frame correctly.	
(2)	Make sure the safety hook mechanism works correctly: – Lubricate the red button of the safety hook mechanism from outside, where it enters the door frame. – Operate the button several times. Repeat lubrication procedure until button moves smoothly. – Make sure the safety hook engages correctly into the retaining block on the fuselage when the door is closed but unlatched.	Refer to Section 12-20.

12. Replace a Passenger Door Carbon Hinge

	Detail Steps/Work Items	Key Items/References
(1)	Remove the passenger door.	Refer to Paragraph 5.
(2)	Clean the surface around the hinge on fuselage and passenger door.	
(3)	Cover the surface around the hinge with masking tape.	Use enough masking tape to prevent bonding paste touching the paint.
(4)	Remove the peel ply from the carbon hinge.	
(5)	Install and center the new carbon hinge on the fuselage side.	Use shims to keep the bearing centered.
(6)	Remove the carbon hinge from the passenger door.	Make sure not to damage to door structure.
(7)	Cover the surface around the hole for the carbon hinge with masking tape.	Use enough masking tape to prevent bonding paste touching the paint.
(8)	Put the passenger door into position for trial fit. Close door lock.	Use shims to make sure there are equal gaps and contour fit. Mark shims and positions for later use.
(9)	Remove the passenger door.	
(10)	Prepare bonding surfaces.	Refer to Section 51-20.
(11)	Coat bonding surface with mixed resin.	Refer to Section 51-20.
(12)	Fill the hole for the carbon hinge with bonding paste completely.	Refer to Section 51-20.
(13)	Put the passenger door into position. Close door lock.	Make sure there are equal gaps and contour fit.
(14)	Remove excessive bonding paste.	
(15)	Pre-cure hinges.	Refer to Section 51-20.
(16)	Remove the passenger door.	
(17)	Remove masking tape from fuselage and passenger door.	
(18)	Post-cure the carbon hinge.	Refer to Section 51-20.
(19)	Grind surface smooth.	
(20)	Paint surface.	Refer to Section 51-20.
(21)	Install passenger door.	Refer to Paragraph 5.

13. Remove/Install the Door Handle Compression Gas Spring (if MÄM 42-097 is installed)

A. Remove the Door Handle Compression Gas Spring

	Detail Steps/Work Items	Key Items/References
(1)	Remove the canopy or passenger door handle.	Refer to Paragraph 3 or 6.
(2)	If installed, remove the circlip from the gas spring tie bolt.	Protect the door surface finish.
(3)	Pull the rear end of the door handle frame approximately 4 mm apart and pull out the gas spring tie bolt. If MÄM 42-981 is installed, pull the tie bolt out axially. Caution: spring loaded!	Door handle must be in open position.
(4)	Unscrew the piston of gas spring from the door handle.	

B. Install the Door Handle Compression Gas Spring

	Detail Steps/Work Items	Key Items/References
(1)	Screw the piston of the gas spring into the door handle.	Use Loctite 243.
(2)	Adjust the length of the compression gas spring. Make sure that the polyamide bushing defines the mechanical stop of the red aluminum door handle.	The mechanical stop of the red aluminum door handle must not be defined by the internal stop of the compression gas spring.
(3)	Compress the gas spring and insert the tie bolt. Pull the rear end of the door handle frame approximately 4 mm apart and push the gas spring tie bolt in. If MÄM 42-981 is installed, push the tie bolt in axially.	
(4)	If MÄM 42-981 is installed, install the circlip on the gas spring tie bolt.	
(5)	Install the canopy or passenger door handle.	Refer to Paragraph 3 or 6.

14. Test the Passenger Door Handle Compression Gas Spring (if MÄM 42-097 is installed)

	Detail Steps/Work Items	Key Items/References
(1)	Open the passenger door.	
(2)	Move the door handle into open position. Slowly move the door handle to closed position and check, if the door handle snaps into closed position by itself at least 10 mm (measured at the outermost point of the lever) before reaching the end position.	
(3)	If the distance is less then 10 mm, replace the compression gas spring.	Refer to Paragraph 13.

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Section 52-30
Front Baggage Compartment Doors

1. General

This Section tells you about the front baggage compartment doors. The DA 42 has access doors to the front baggage compartment on each side of the fuselage.

2. Description

Figure 1 shows the front baggage compartment doors. Figure 2 shows the option with the adjustable micro switch (if MÄM 42-1129 is installed).

The doors are CFRP moldings with a foam core. Each door has a finishing layer of glass cloth. Mounting brackets for the door locking latches are bonded to the doors with resin.

Both doors are hinged at the upper edge and lift up. Door locking latches are installed at the bottom corners of the doors. Three small gas springs are integrated in each of the four hinge assemblies.

A door warning caption is displayed on the Integrated cockpit system display when a door is not locked.

3. Operation

A door locking latch on each lower corner of the door operates 2 locking bolts. A spring loading mechanism holds the door latch in the locked position. You pull the outer side of the door latch away from the door recess to unlock the latching mechanism and move the door up into the open position. The gas springs will hold the door open.

You close the door by pushing the door down against the gas spring strut until it is flush with the door surround. Hold the door in this position and push the door locking latch lever towards the door. The door locking latch lever must be flush with the door when the door is locked.

A microswitch for each door operates a door unlocked warning alert in the integrated cockpit system primary display panel.

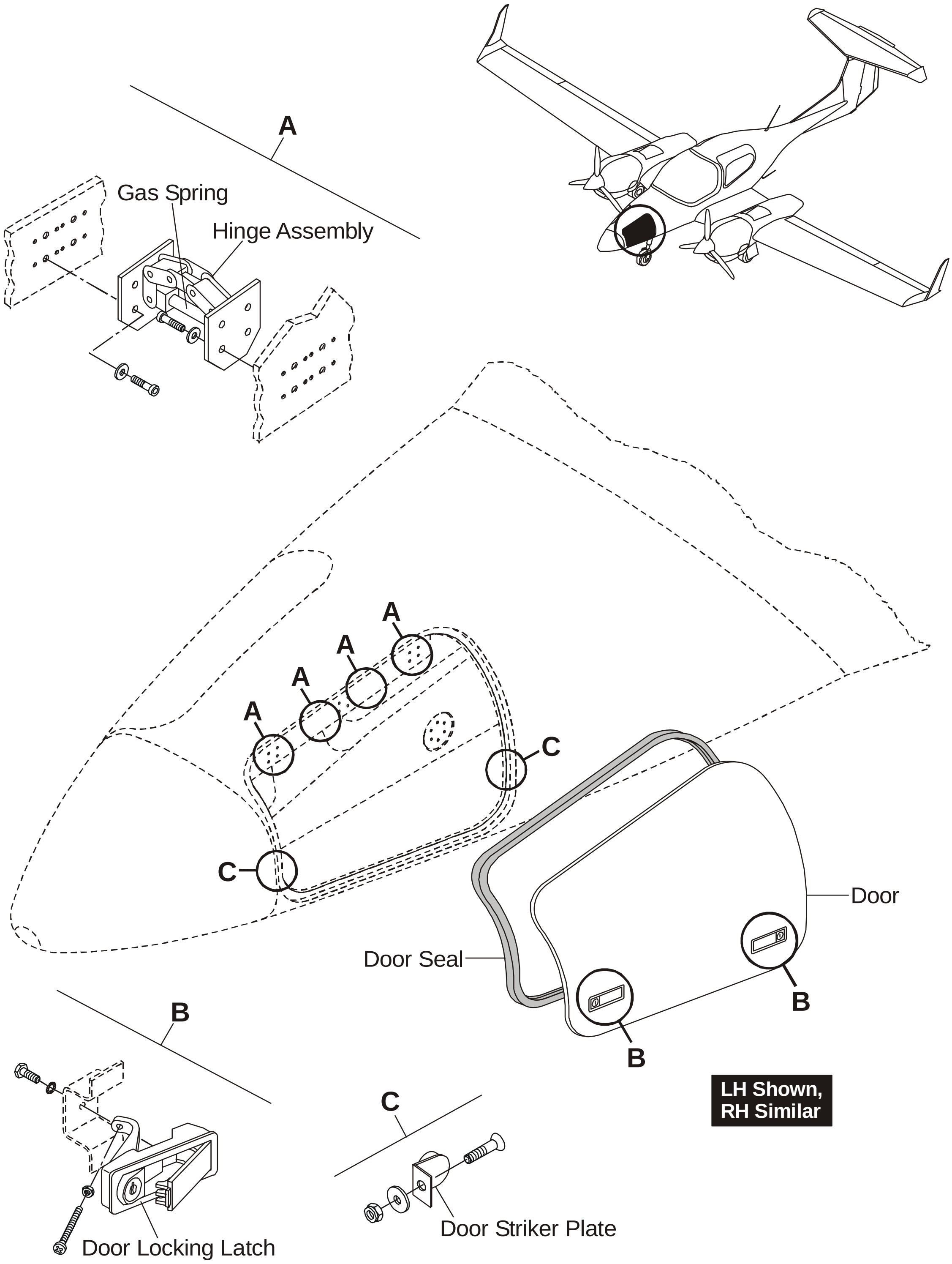

Figure 1: Front Baggage Compartment Access Doors

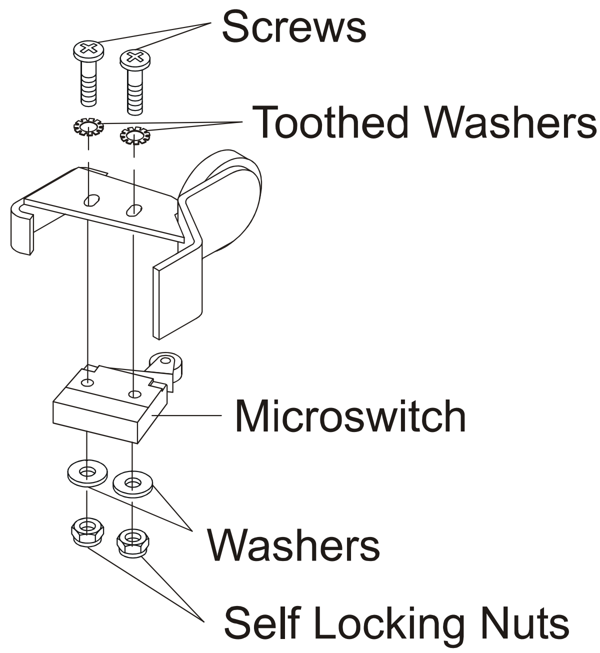

Figure 2: Front Baggage Compartment Doors Micro Switch Installation (if MÄM 42-1129 is installed)

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Trouble-Shooting

1. General

The table below lists the defects you could have with the front baggage compartment door. If you have the trouble detailed in the Trouble column, read across to the Possible Cause column. Then do the repair in the Repair column.

Trouble	Possible Cause	Repair
Access door is difficult to move.	Door damaged. Door hinges damaged. Gas springs defective.	Replace the door. Replace the damaged parts. Replace the hinge assembly.
Door handle is difficult to move.	Locking bolts damaged. Door locking mechanism defective.	Replace the damaged bolt. Replace the door locking mechanism.
Door warning light does not extinguish with closed baggage compartment doors.	Micro switch is broken. Micro switch adjustment incorrect.	Replace micro switch. Adjust micro switch.

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Maintenance Practices

1. General

These Maintenance Practices tell you how to remove and install the front baggage compartment doors, and how to remove, install and adjust a door warning micro switch.

2. Remove/Install a Front Baggage Compartment Door

A. Remove a Front Baggage Compartment Door

	Detail Steps/Work Items	Key Items/References
(1)	Open the front baggage compartment door that you will remove.	
(2)	Remove the door from the hinges: – Remove the 4 bolts and washers that attach each door hinge to the door. – Move the door clear of the airplane.	Support the door.

B. Install a Front Baggage Compartment Door

	Detail Steps/Work Items	Key Items/References
(1)	Connect the door to the door hinges: – Move the door into position at the door hinges. – Align the door with the hinge and install the 4 washers and bolts that attach each hinge to the door.	
(2)	Close the door and lock the door.	
(3)	Do a test for the correct operation of the door warning caption: – Make sure that the canopy, passenger door and both forward baggage compartment doors are closed.	
	– Set the ELECT. MASTER switch to ON.	The DOOR warning caption must be off.
	– Move the operating handle of the baggage compartment door that you replaced towards the open position.	The DOOR warning caption must come on when the operating handle has moved away from the door frame.
	– Move the door operating handle to the fully closed position.	The DOOR warning caption must go off.
	– Set the ELECT. MASTER switch to OFF.	

3. Remove, Install and Adjust a Front Baggage Compartment Micro Switch (if MÄM 42-1129 is installed)

A. Remove a Front Baggage Compartment Micro Switch

	Detail Steps/Work Items	Key Items/References
(1)	Remove the carpet on the baggage compartment floor until the plug of the switch can be disconnected.	
(2)	Cut the cable tie on the cable plug.	Mark the position of the cable.
(3)	Disconnect the plug.	
(4)	Remove the 2 self locking nuts, 2 screws, the toothed washers and washers that attach the switch to the counterbearing back.	

B. Install a Front Baggage Compartment Micro Switch

	Detail Steps/Work Items	Key Items/References
(1)	Connect the plug to the cable.	
(2)	Install the cable tie.	
(3)	Lead the cable to the correct position.	
(4)	Attach the switch to the counterbearing back, push it away from the front baggage compartment door along the hole and install the self locking nuts, screws, washers and toothed washers.	
(5)	Do a test for the correct function of the door warning light.	
(6)	Make sure that the canopy, passenger door and baggage compartment doors are closed.	
(7)	Set the ELECT. MASTER switch to ON	The door warning caption must be off.
(8)	Open the front baggage compartment door.	The door warning caption must come on when the operating handle has moved away from the door frame.
(9)	Close the front baggage compartment door.	The door warning caption must be off.
(10)	Set ELECT. MASTER switch to OFF.	

	Detail Steps/Work Items	Key Items/References
(11)	If the door warning light does not indicate correctly: Refer to Paragraph C and adjust the micro switch.	

C. Adjust a Front Baggage Compartment Micro Switch

	Detail Steps/Work Items	Key Items/References
(1)	Open the two screws which hold the micro switch in position.	
(2)	Adjust the micro switch towards the cone in a small step.	
(3)	Tighten the two screws on the micro switch.	
(4)	Perform a test of the correct function of the door warning light.	If the test fails: refer to Paragraph B, steps 5 to 11.

Section 52-40
Access Panels

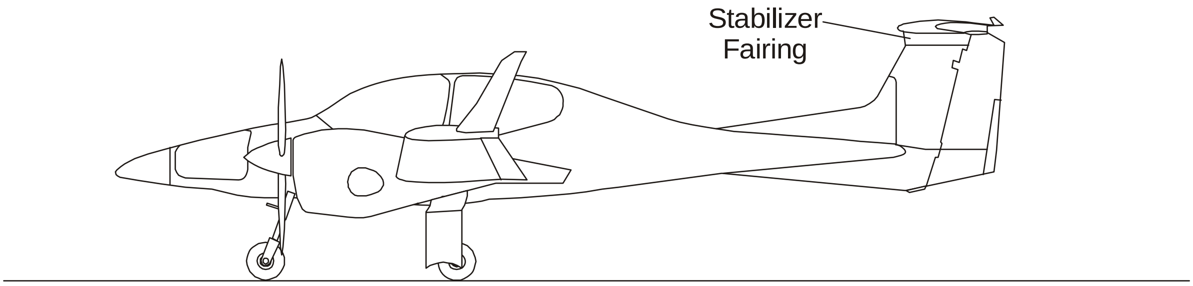
1. General

The DA 42 has access panels where needed for routine maintenance of the airplane and its systems. Panels which must be removed more often (for example, the engine cowlings) have quick-release fasteners. Other access panels have the usual screws. Refer to Section 71-20 for data about the engine cowlings.

2. Description

Figure 1 shows the location of the access panels on the airplane.

Most panels are CFRP/GFRP moldings. Screws hold the panels in position. There are no special procedures for removing the access panels. When install access panels you must make sure that the area inside the access panel has no loose objects (for example, tools or rags).



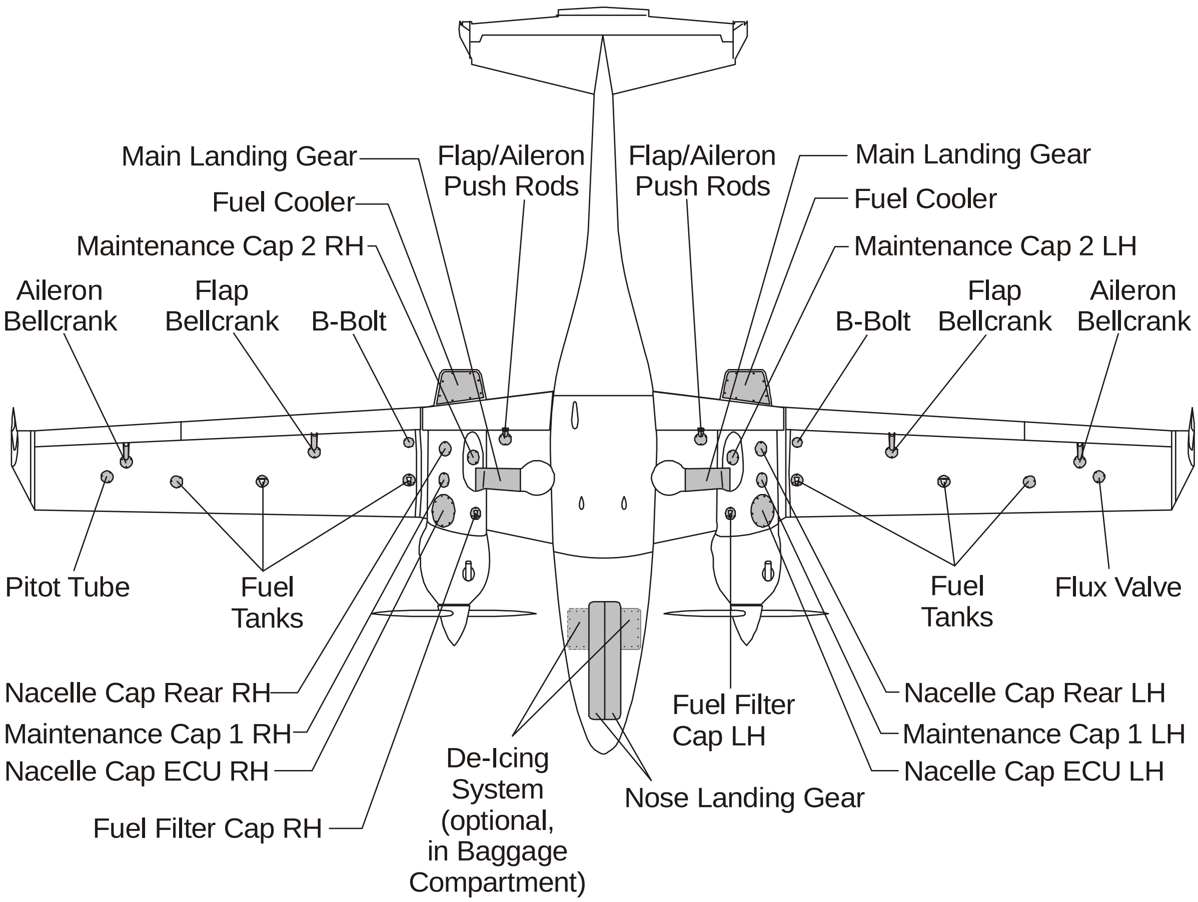


Figure 1: Access Panel Locations

CHAPTER 53

FUSELAGE

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FUSELAGE

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Fuselage Structure

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CHAPTER 53
FUSELAGE

1. General

The DA 42 fuselage has a semi-monocoque structure. Two CFRP half-shells make the fuselage skin. GFRP frames and webs give the fuselage strength and stiffness. The vertical stabilizer is an integral part of the fuselage.

The fuselage shells have many layers of carbon cloth with some layers of glass cloth. Some areas have more layers of cloth than other areas. This gives more strength and stiffness where it is needed. Rigid foam inserts give stiffness where necessary.

The frames and webs also have many layers of glass cloth. Some areas have layers of carbon fiber cloth or tape to give extra strength. Some components also have rigid inserts of GFRP for attaching brackets or other components.

In order to protect the fuselage from damages caused by ice accumulation which drops off from the rotating propellers, debris protection is installed on the fuselage. The debris protection is made from composite material (OÄM 42-090) or adhesive foil (OÄM 42-088 and OÄM 42-089).

Section 53-10 gives the data for the fuselage structure and the debris protection.

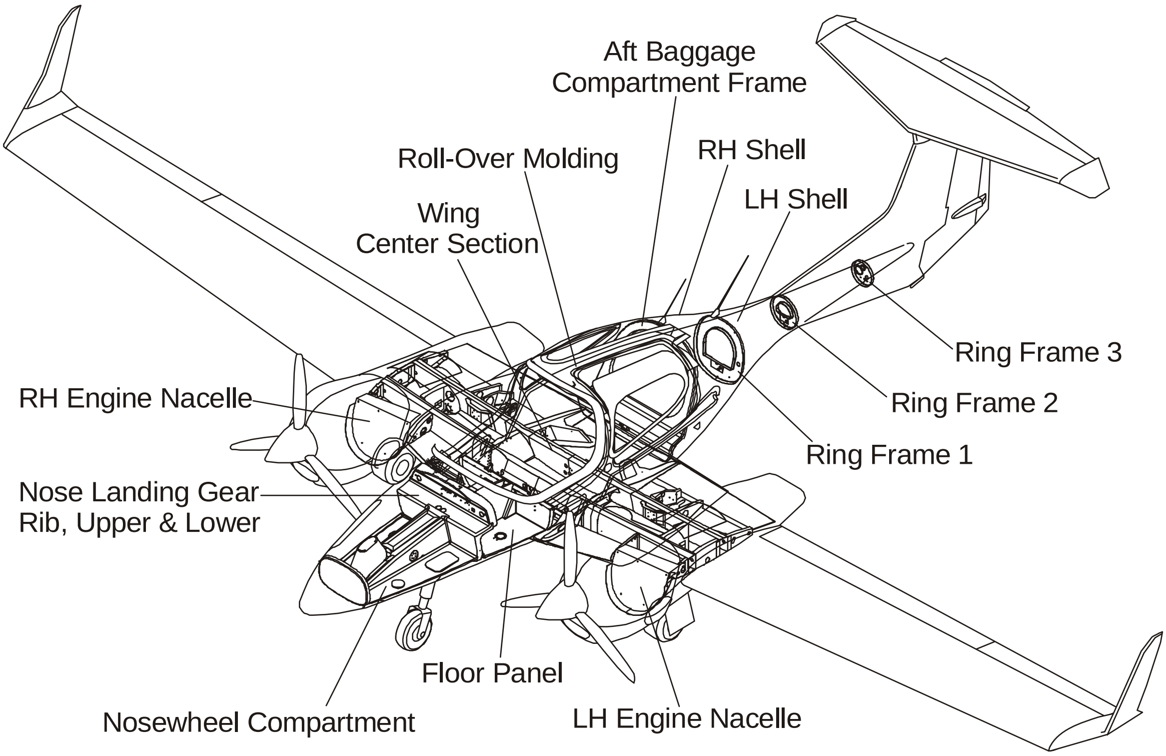

Figure 1: Fuselage Structure - Main Components

Section 53-10
Fuselage Structure

1. General

This Section gives you the data about the fuselage structure. It also includes the vertical stabilizer. See Chapter 51-00 for data about repair to the structure.

All of the main structural components are CFRP rigid moldings. Many layers of carbon cloth bond together to make each molding. Some components have more layers of carbon fiber cloth. This gives more strength and stiffness.

Most components have rigid GFRP inserts. The inserts give strength and stiffness for attaching other components such as brackets for controls.

Bonding paste (thickened resin) bonds components to other components. Most of the components in the fuselage are also bond to the fuselage shell.

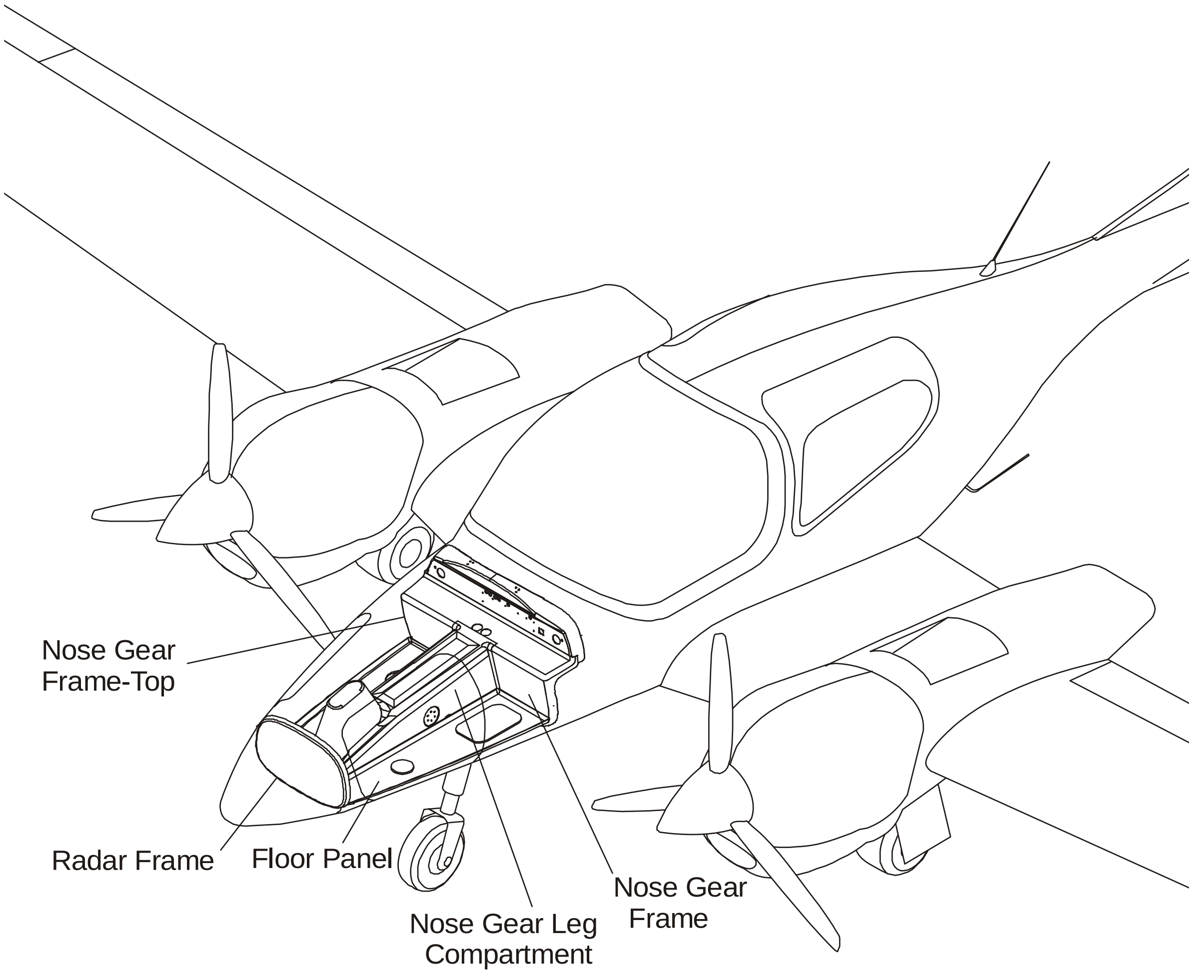

Figure 2: Fuselage Structure - Nose Section

2. Description

Figs 1 thru 5 show the structure of the fuselage.

A. Fuselage Shells

Two CFRP shells make the outer skin of the fuselage. The shells transmit structural loads. The shells bond to each other at the top and bottom of the fuselage. Each shell has many layers of carbon cloth. Some areas have of the shell have more layers to give more strength and stiffness. Some areas have rigid foam inserts to give more stiffness. The vertical stabilizer is integral with the fuselage shells.

Thickened resin bonds all other structural components to the fuselage shells. Many small components bond to the fuselage shells, these include:

– Air inlet and outlet ducts.

– Conduits for electrical wires, antenna cables and fuel pipes.

– Mountings for airplane system components.

B. Nose Section

The nose section bonds to the front of the fuselage. The nose section has a left shell and it has a right shell. The shells are made from CFRP with rigid foam inserts. Each shell has a hinged door to give access to the nose baggage compartment. Refer to Section 52-30 for more data about the front baggage compartment doors.

The nose-gear-frame-top and the nose-gear-frame close the front of the cockpit and make the rear of the nose section. The nose gear leg compartment attaches to the nose gear frame at the rear and the radar frame at the front. Left and right floor panels strengthen the nose section and make the floor for the front baggage compartment. Access holes in the floor panels give access to the nose landing gear leg mountings.

The nose cone is bonded to the nose section shell. If OÄM 42-077 (Removable Nose Cone) is carried out, the nose cone is mounted to the nose section extension by use of screws and rivet nuts.

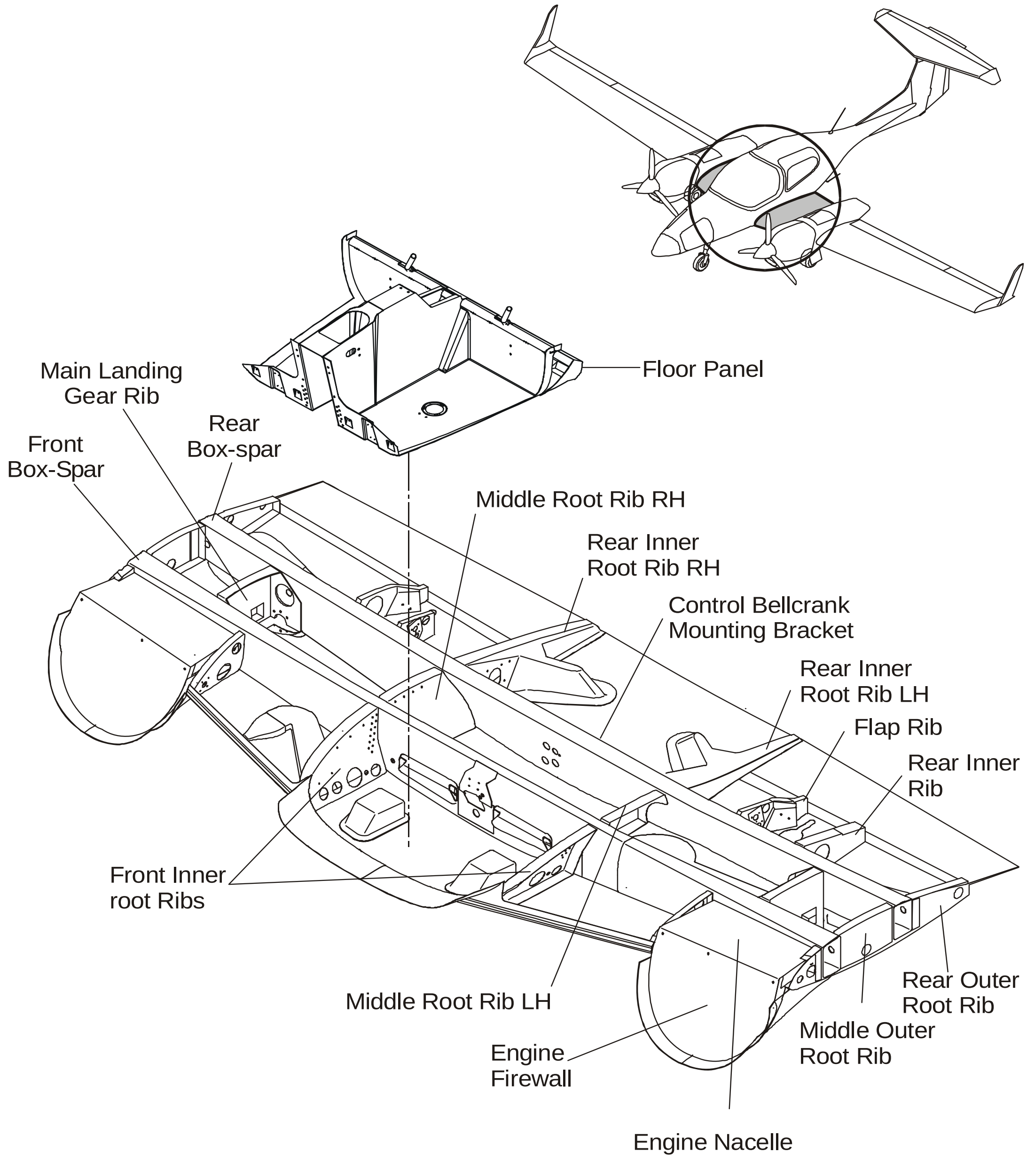

Figure 3: Fuselage Structure - Wing Center Section

C. Wing Center Section

The wing center section attaches to the fuselage shells and is an integral part of the fuselage.

The wing center section has the mountings for the wings, the engine nacelles and the main landing gear. It has a front box spar and it has a rear box spar. The box spars have the mountings for the outer wings. The spar extensions of the outer wings slide into the box spars and are secured with special bolts. The box spars are CFRP rigid moldings. The control bellcrank mounting-bracket is bonded to the rear face of the rear main bulkhead, in the center.

The engine nacelles are located at the outer ends of the wing center section. The engine nacelles bond to the box spars and provide mountings for the engine mounting frame. The forward face of the engine nacelle makes the engine firewall.

Front, middle and rear inner-root-ribs bond to the inner ends of the front and rear box spars. The ribs are rigid CFRP moldings which make the inner face of the wing center section.

Middle and rear closing ribs bond to the box spars at the outer end of the center section, to the rear of the outer end of the engine nacelles. These ribs close the end of the wing center section.

The rear inner ribs and flap ribs bond to the aft face of the rear box spar. The flap rib has the mountings for the inner flap relay lever and the rear inner gives rigidity to the rear of the wing center section.

A rigid CFRP bottom shell bonds to the lower surface of the center section and makes the bottom surface of the wing center section and fuselage. Rigid CFRP top shells bond to the top outer surface of the center section and makes the top surface of the wing center section.

D. Floor Panel

Note: Do not use surface protection except the certified!

The floor panel is a rigid GFRP molding. It bonds to the inner bottom skin of the fuselage shell and the instrument panel frame. The center part of the floor panel makes the center console.

The rear part of the floor makes the front support for the pilots' seats. It also holds the front of the control stick support brackets. The rudder pedal assembly for each pilot attaches to the floor panel.

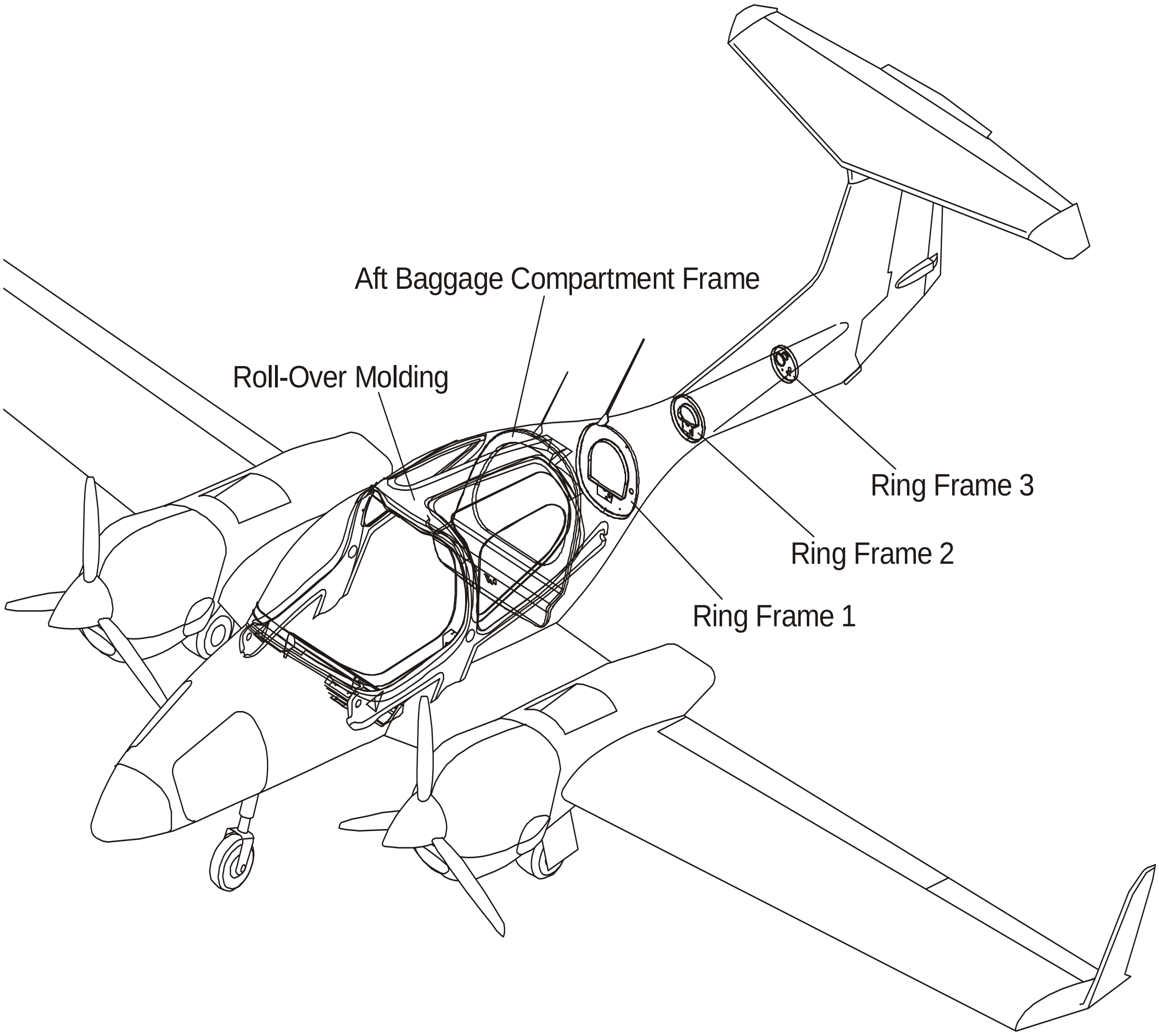

Figure 4: Rear Fuselage Structure

E. Roll Over Molding

The roll-over molding is a rigid GFRP molding. Carbon tape gives strength and stiffness to the molding. The roll over molding bonds to the inner face of the fuselage shell and around the canopy, window and passenger door cut-outs.

F. Aft Baggage Compartment Frame

The aft baggage compartment frame is a rigid GFRP molding. It closes the rear of the cockpit and makes a support for the passenger seat (rear seat pan). The frame bonds to the inner fuselage shells and the center section lower shell.

The lower part of the frame has holes for the rudder cables and trim control. It also has a control rod guide for the elevator control rod.

G. Ring Frame 1

The ring frame 1 is a rigid GFRP molding. It bonds to the fuselage shells just aft of the baggage compartment frame. It has holes for the rudder control cables and trim control. It also has a control rod guide for the elevator control rod.

H. Ring Frame 2

The ring frame 2 is a rigid GFRP molding. It bonds to the fuselage shells aft of ring frame 1. It has holes for the rudder control cables and trim control. It also has a control rod guide for the elevator control.

I. Ring Frame 3

The ring frame 3 is a rigid GFRP molding. It bonds to the fuselage shells just forward of the vertical stabilizer. It has holes for the rudder control cables and trim control.

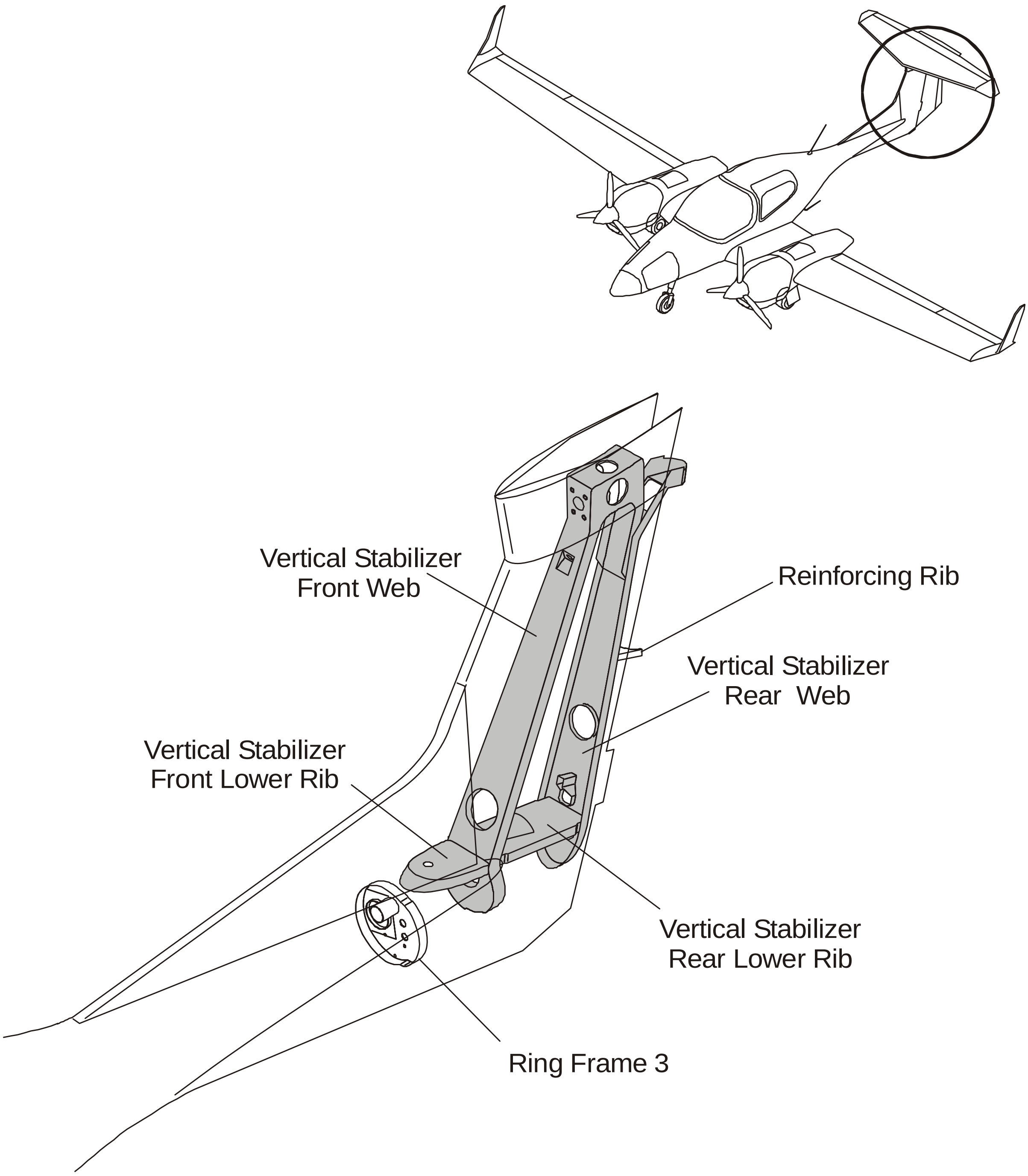

Figure 5: Fuselage Structure - Vertical Stabilizer

J. Vertical Stabilizer Front Lower Rib

The vertical stabilizer front lower rib is a rigid GFRP molding. It bonds to the fuselage shell at the bottom of the vertical stabilizer. It also bonds to the vertical stabilizer front web. It has a hole for the flexible control cable for the elevator trim tab.

K. Vertical Stabilizer Rear Lower Rib

The vertical stabilizer rear lower rib is a rigid GFRP molding. It bonds to the fuselage shell at the bottom of the vertical stabilizer. It also bonds to the vertical stabilizer front and rear webs. It has a large slot for the elevator control pushrod.

L. Vertical Stabilizer Front Web

The vertical stabilizer front web is a rigid GFRP molding. It bonds to the fuselage shell. It also bonds to the vertical stabilizer lower ribs and to the top of the rear web.

The top of the front web is a rigid channel section. GFRP inserts give strength to the area where the horizontal stabilizer mounts attach.

M. Vertical Stabilizer Rear Web

The vertical stabilizer rear web is a rigid GFRP molding. It bonds to the fuselage shell and it bonds to the vertical stabilizer front web. The top of the rear web has the top mounting for the rudder. It also has a reinforcing rib bonded to the rear face.

The vertical stabilizer rear web closes the rear of the vertical stabilizer.

3. Composite Debris Protection (OÄM 42-090)

This Section contains all necessary information concerning the composite debris protection (certified with OÄM 42-090). Refer to Paragraph 4 of this Section for information concerning the foil based debris protection (certified with OÄM 42-088 and 42-089).

The composite debris protections are installed on both sides of the forward fuselage with a silicone based adhesive. Refer to Figure 6

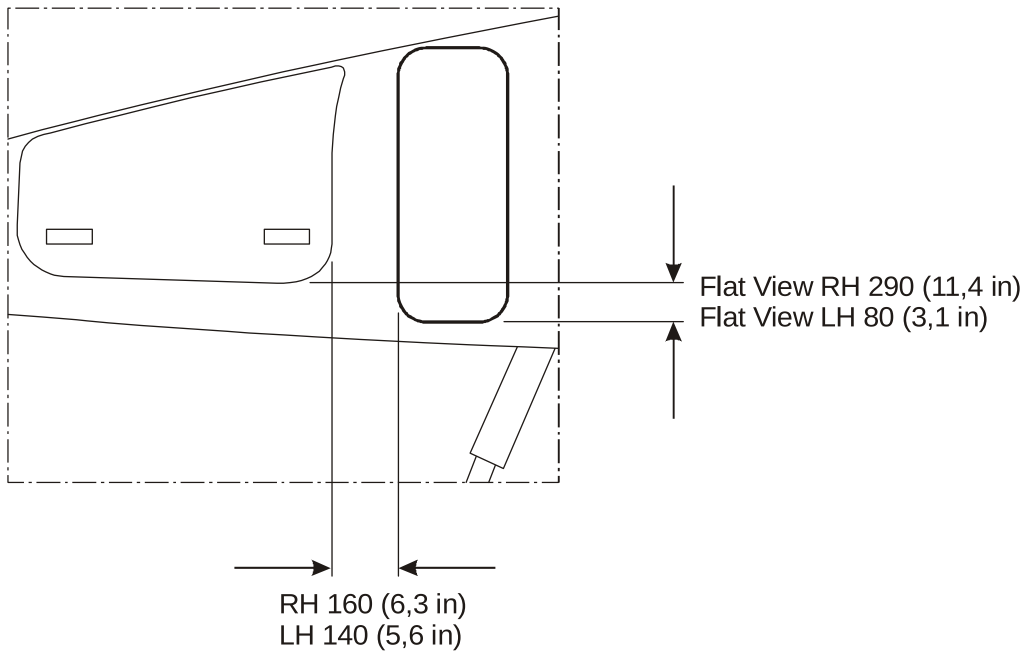

Figure 6: Composite Debris Protection (OÄM 42-090)

4. Adhesive Foil Debris Protection (OÄM 42-088 & 42-089)

A. Single Layer Debris Protection (OÄM 42-089)

Figure 7 shows the single layer debris protection (material: 3M) certified with OÄM 42-089 for installation on the DA 42.

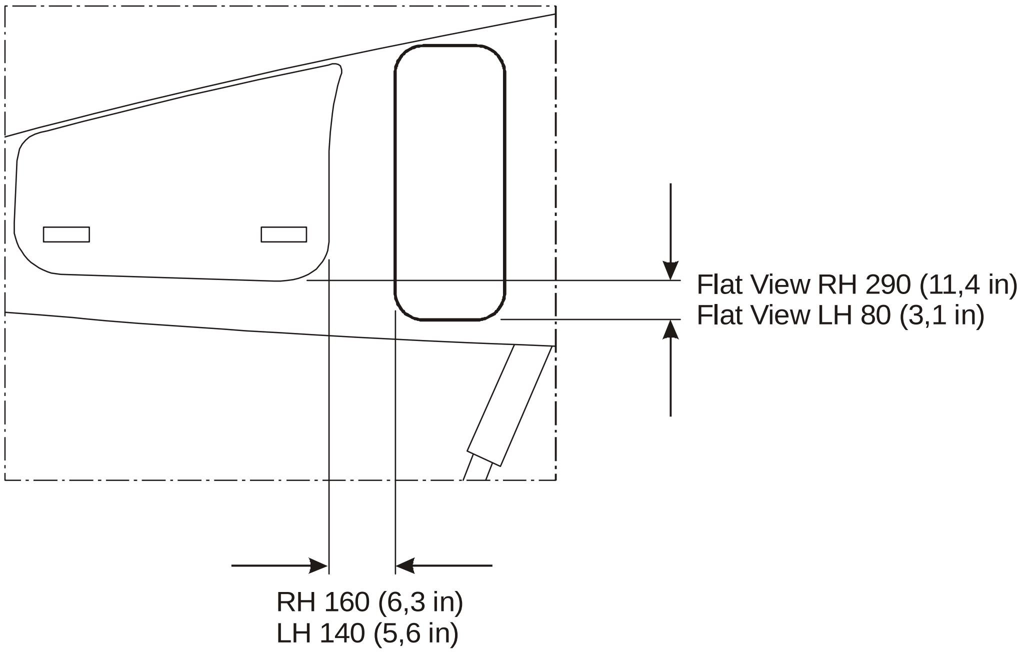

Figure 7: Single Layer Debris Protection (OÄM 42-089)

B. Triple Layer Debris Protection (OÄM 42-088)

Figure 8 shows the triple layer debris protection (material: PM) certified with OÄM 42-088 for installation on the DA 42.

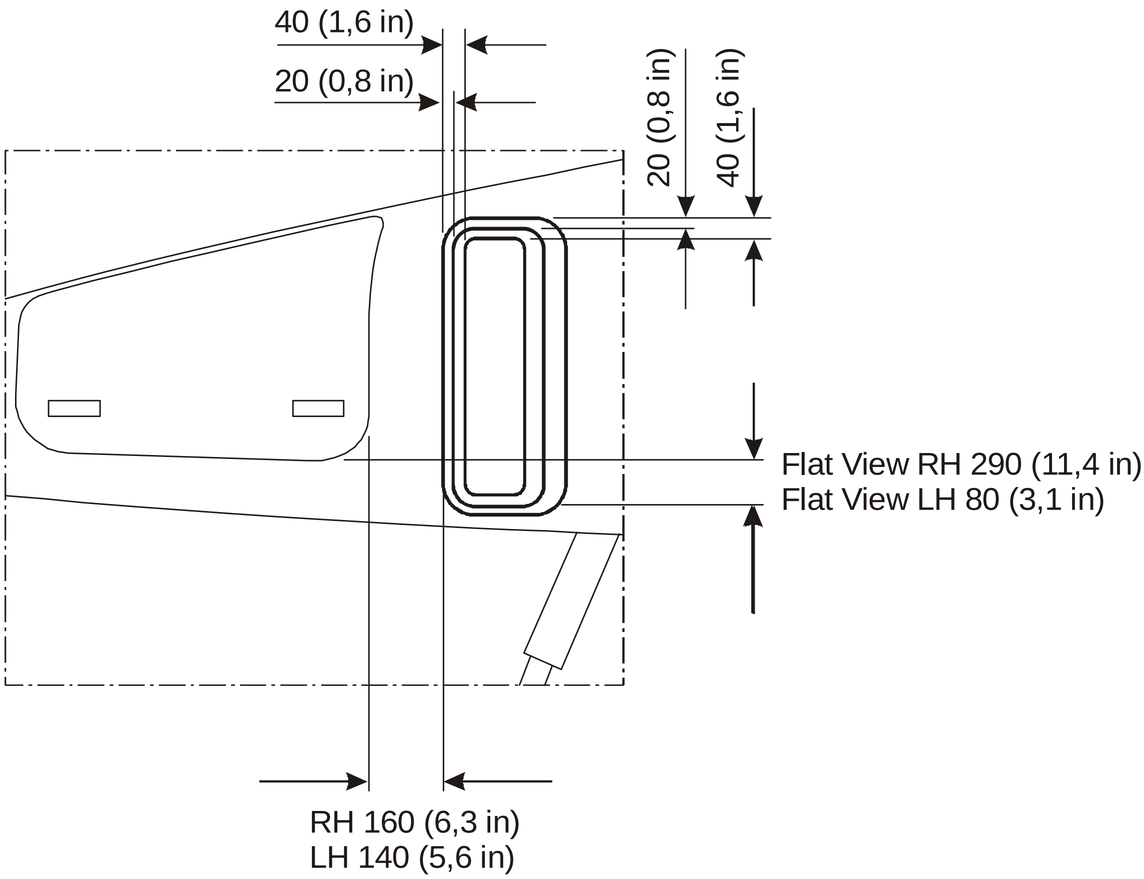

Figure 8: Triple Layer Debris Protection (OÄM 42-088)

Maintenance Practices

1. General

There are no special maintenance practices for the DA 42 fuselage. You must keep the airplane clean and you should visually examine the airplane fuselage for damage when you clean it. Refer to Section 12-30 for data about airplane cleaning.

If you find any damage you must refer to Chapter 51-10 for data about damage classification. Only authorized persons can classify and repair damage to the DA 42 airplane.

If the composite debris protection (OÄM 42-090) is installed, refer to Paragraph 2 of this Section for more information.

2. Remove/Install the Composite Debris Protection (OÄM 42-090)

A. Remove the Composite Debris Protection (OÄM 42-090)

	Detail Steps/Work Items	Key Items/References
(1)	Carefully cut around the debris protection by use of a sharp knife.	
(2)	Remove the separated silicone seal.	
(3)	Cut between the fuselage and the composite debris protection using a long sharp knife.	
(4)	Remove the debris protection.	
(5)	Visually inspect the fuselage skin.	
(6)	Remove the silicone left on the fuselage by use of a palette-knife together with silicone removal agent.	Make sure that the agent does not harm the paint finish.

B. Install the Composite Debris Protection (OÄM 42-090)

	Detail Steps/Work Items	Key Items/References
(1)	Clean fuselage surface and the rear side of the composite debris protection.	
(2)	Mark exact position of both composite debris protections on fuselage.	Refer to Figure 6.
(3)	Install the composite debris protection using Terostat MS 9380 white adhesive.	
(4)	Seal cleave around the composite debris protection with Terostat MS 9380 white.	

CHAPTER 55

STABILIZERS

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STABILIZERS

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CHAPTER 55
STABILIZERS

1. General

The DA 42 has the usual stabilizers. The vertical stabilizer is part of the fuselage. The aft part of the left and right fuselage shells make the left and right shells of the vertical stabilizer. See Section 53-10 for data on the fuselage structure.

The horizontal stabilizer has top and bottom shells. Each shell has GFRP skins. The horizontal stabilizer has a front spar and a rear spar. Both spars have mounting brackets. Three pairs of ribs give strength to the center area. Two trailing edge webs hold the hinges for the elevator.

The elevator has top and bottom shells. Each shell has GFRP skins with a rigid foam core. The bottom shell also makes the leading edge spar. The hinges attach to the bottom shell. A large horn with the mass balance weight attaches to the bottom shell at the center. The trailing edge carries a trim tab.

The lower fin is a GFRP molding. Bolts attach the lower fin to the bottom of the fuselage.

The rudder has left and right shells. Each shell has GFRP skins with a rigid foam core. The shells bond together at a flange. The hinges attach to the top face of the rudder and a flat face near the bottom of the leading edge. The horn near the top makes the rudder mass balance.

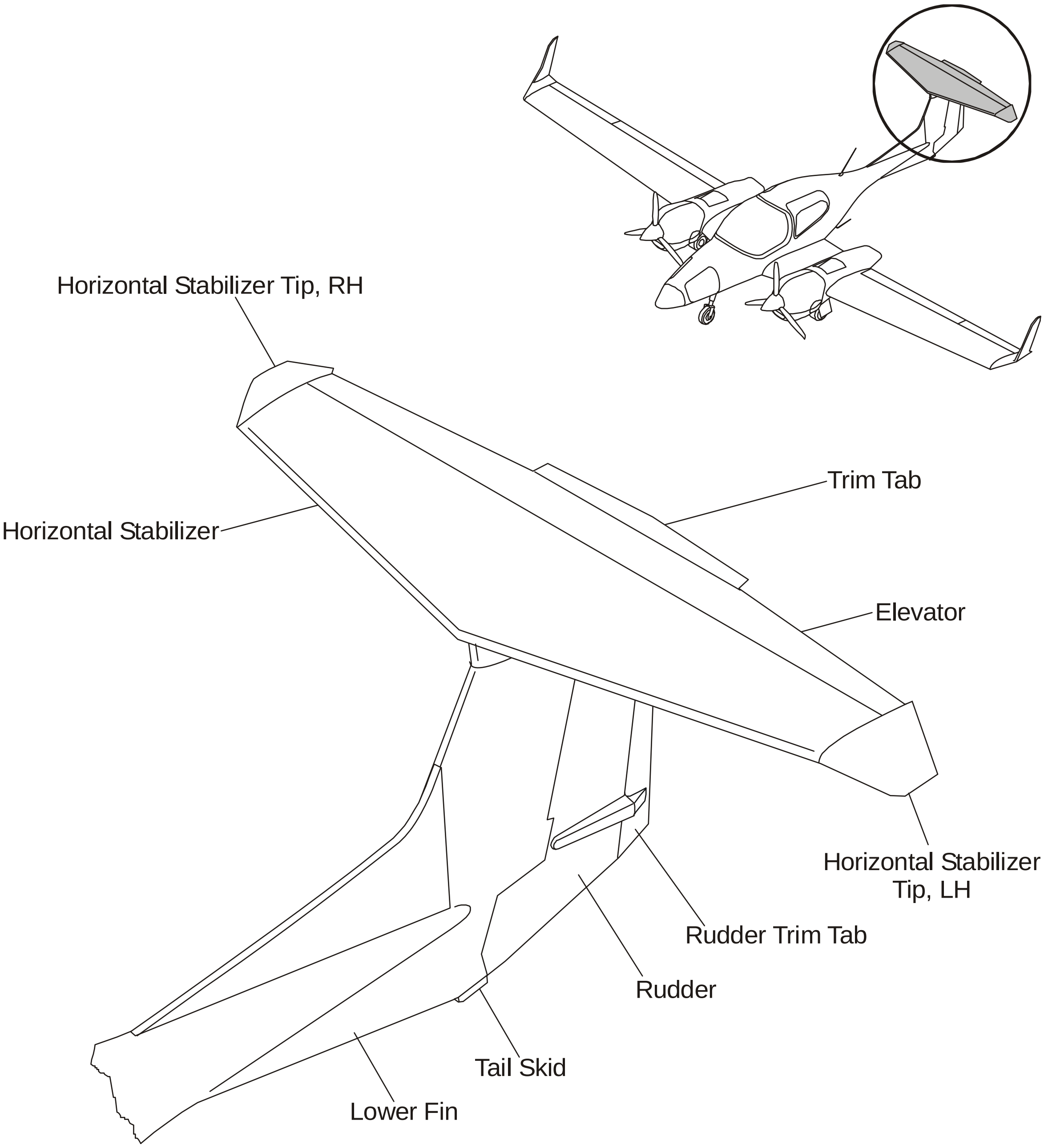

Figure 1: Stabilizers

Section 55-10
Horizontal Stabilizer

1. General

The DA 42 has the usual horizontal stabilizer. The horizontal stabilizer attaches to the top of the vertical stabilizer. The elevator attaches to the trailing edge of the horizontal stabilizer. See Section 55-20 for data about the elevator structure.

2. Description

Figure 1 shows the horizontal stabilizer structure.

The horizontal stabilizer has top and bottom shells. Each shell has GFRP skins. The top shell has no cut-outs. The bottom shell has a large cut-out at the rear for the elevator horn and mass balance. It also has two smaller holes forward and aft of the front spar.

The horizontal stabilizer has 2 spars. The spars have GFRP skins with rigid GFRP inserts at the main mounting points. They also have top and bottom caps. The ends of the front spar turn back to join the aft spar at mid span. The rear spar goes almost to the tip of the horizontal stabilizer. The spars bond to the top and bottom shells with resin.

Each spar has four holes for a mounting bracket. You can get access to the attachment bolts from below. The mounting brackets go down through the cut-outs in the bottom shell. Four more holes in the bottom part of each mounting bracket attach to the vertical stabilizer front web.

Three pairs of ribs give strength to the center area on each side of the access holes. All are rigid GFRP moldings. They bond to the other components with resin. The rear 'box' ribs make a box round the large cut-out in the bottom skin. A short rear rib at mid-span gives strength to the area between the rear spar and the trailing edge web.

The rear box rib has sides with bends and a top face which joins the sides. It closes the sides of the large cut-out in the bottom shell. The aft part has 3 holes on each side for the anchor bracket for the trim-tab mechanism.

Two trailing edge webs close the trailing edges of the top and bottom shells. The outboard end of each web is a 'J' shape which goes round the outboard balance weight of the elevator. It extends aft at the outer side to close the elevator cut-out. The webs also holds the hinges for the elevator. The webs bond to the top and bottom shells and the rear and rear 'box' ribs with resin.

A rigid GFRP fairing goes around the joint between the horizontal stabilizer and the vertical stabilizer. Four screws attach the fairing to the vertical stabilizer.

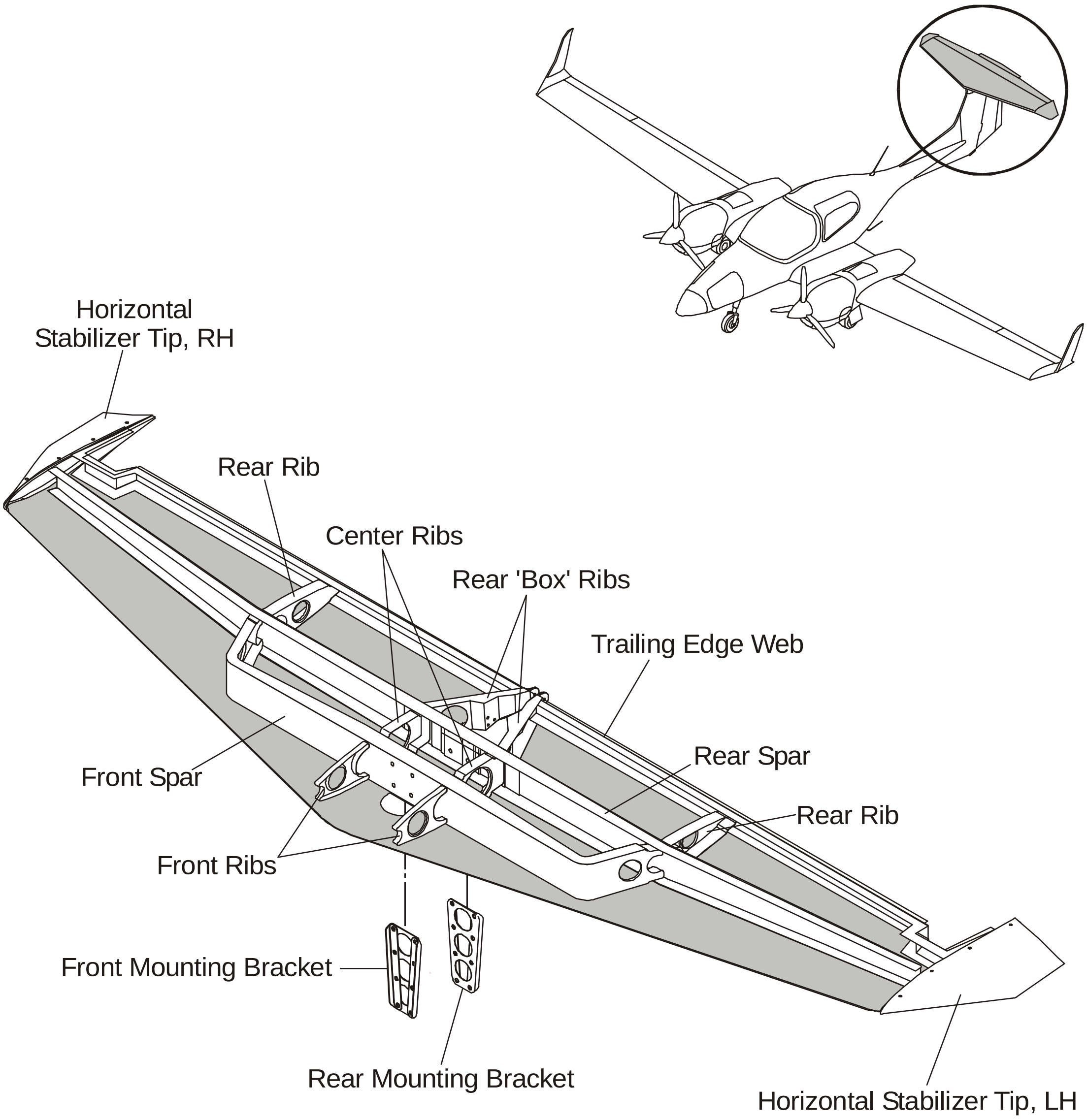

Figure 1: Horizontal Stabilizer Structure

Maintenance Practices

1. General

These Maintenance Practices tell you how to remove and install the horizontal stabilizer.

2. Remove/Install the Horizontal Stabilizer

A. Remove the Horizontal Stabilizer

Note: 2 persons are needed to remove/install the horizontal stabilizer.

	Detail Steps/Work Items	Key Items/References
(1)	Remove the horizontal stabilizer fairing. – Remove the 4 screws that attach the faring to the structure.	Hold the fairing.
(2)	Remove the rudder.	Refer to Section 55-40.
(3)	Release the 2 fork-end fittings from the trim-tab cranked actuating levers: – Remove the cotter pins from the nuts. – Remove the nuts, washers and bolts that attach the fork-ends to the cranked actuating levers.	Under the elevator.
(4)	Release the trim-tab mechanism from its mounting bracket.	Refer to Section 27-38.
(5)	Release the lightning protection strip and wire bonding cable from the trim mounting bracket: – Remove the nut, washer, spacer and bolt that attaches the lightning protection strip and wire bonding cable to the trim mounting bracket.	
(6)	Move the trim-tab mechanism forward through the hole in the vertical stabilizer web, clear of the mounting bracket.	

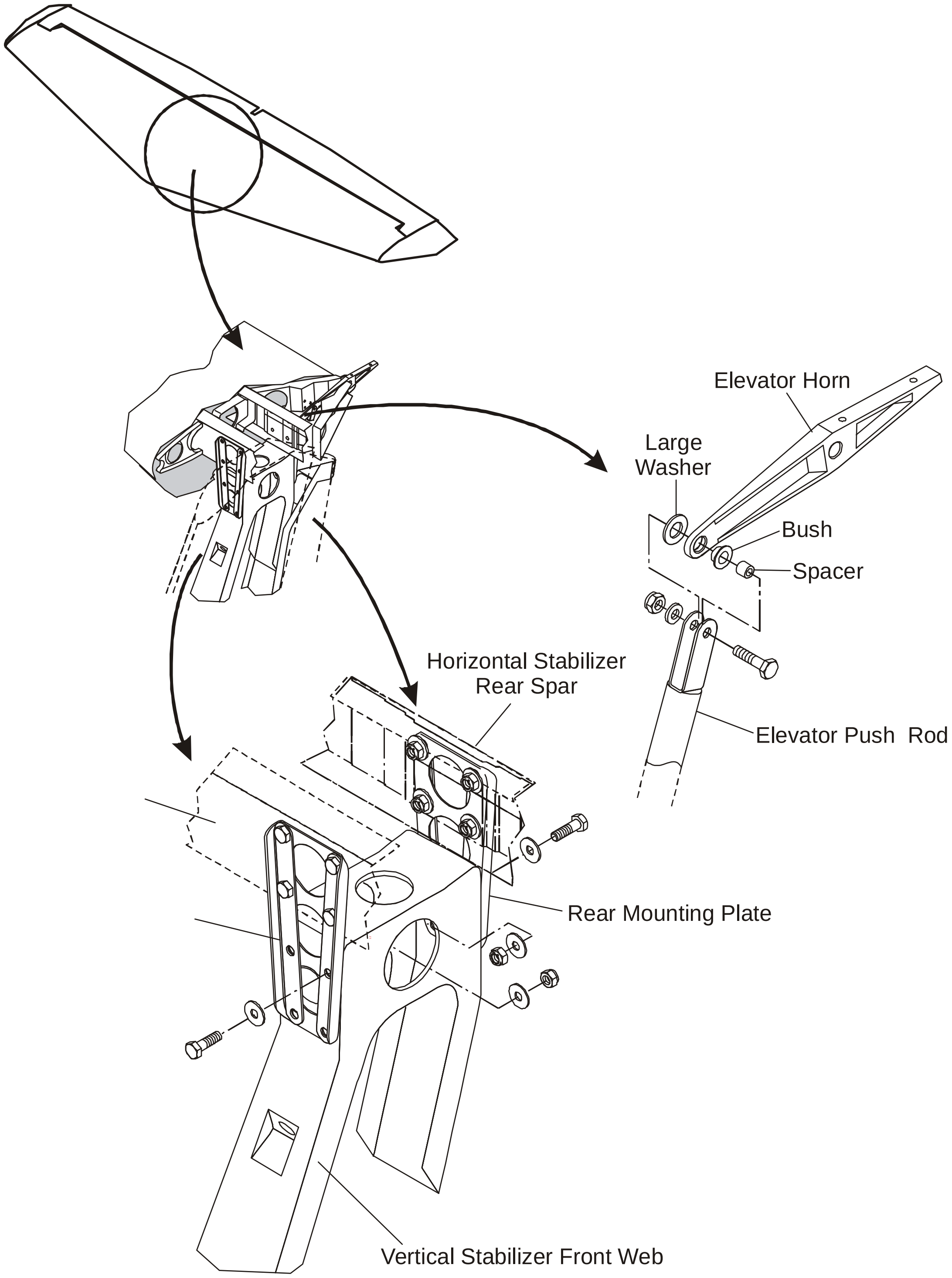

Figure 2: Horizontal Stabilizer Installation

	Detail Steps/Work Items	Key Items/References
(7)	Disconnect the elevator push-rod from the elevator horn:	
	– Loosen the 2 bolts holding the elevator mass-balance lever.	Refer to Section 55-20, Figure 2.
	– Remove the nut, bolt and washer which connects the elevator vertical push rod to the elevator horn.	Refer to Figure 2 in this Section.
	– Remove and retain the large washer, bush and spacer from the push rod to elevator horn assembly.	Note the location of the large washer, bush and spacer.
(8)	Disconnect the VOR antenna.	
(9)	Remove the 8 lower bolts which attach the horizontal stabilizer and lightning protection strip to the front and rear mounting brackets.	Hold the horizontal stabilizer.
(10)	Remove the proportion unit from the empennage (if installed).	Refer to Section 30-00.
(11)	Lift the horizontal stabilizer clear of the airplane.	

B. Install the Horizontal Stabilizer

	Detail Steps/Work Items	Key Items/References
(1)	Examine the horizontal stabilizer attachments. Look specially for: – Corrosion or wear of the bolts. – Distortion of the mounting brackets – Cracks in the mounting brackets. – Damage to the mounting holes.	
(2)	Put the horizontal stabilizer in position on the vertical stabilizer.	Hold the horizontal stabilizer.
(3)	Install the proportion unit to the empennage (if installed).	Refer to Section 30-00.
(4)	Install the 8 lower bolts, washers and nuts which attach the horizontal stabilizer and lightning protection strip to the front and rear mounting brackets.	Use new self-locking nuts. Torque: 45 Nm (33.2 lbf.ft.)
(5)	Connect the VOR antenna.	
(6)	Connect the elevator control push rod to the elevator horn: – Install the large washer, bush and spacer into the push rod to elevator horn assembly. – Install the bolt, washer and nut that attaches the elevator control push-rod to the elevator horn. – Tighten the 2 bolts holding the elevator mass-balance lever.	As noted in Paragraph 2A(6). Torque: 1.7 Nm (1.2 lbf.ft.). Use a new self-locking nut. That you loosened in Paragraph 2 A (6).
(7)	Move the trim-tab mechanism aft through the hole in the vertical stabilizer web, through the mounting bracket for the trim mechanism.	

	Detail Steps/Work Items	Key Items/References
(8)	Attach the trim-tab mechanism to its mounting bracket. – Install 2 bolts, washers and nuts.	Use new self-locking nuts.
(9)	Install the lightning protection strip and wire bonding cable to the trim mounting bracket: – Move the lightning protection strip into position at the elevator trim mount. – Move the wire bonding cable into position at the elevator trim mount. – Install the bolt, spacer, washer and nut that attaches the lightning protection strip and wire bonding cable to the trim mounting bracket.	
(10)	Connect the 2 fork-end fittings to the trim-tab cranked actuating levers: – Install the 2 bolts, washers and nuts that attach the fork-end fittings to the trim-tab actuating levers. – Secure the nuts to the bolts with cotter pins.	Under the elevator.
(11)	Do a test for correct, full and free movement of the elevator control. If necessary, adjust the elevator control.	Refer to Section 27-30.
(12)	Do a test for correct, full and free movement of the trim control. If necessary, adjust the trim control.	Refer to Section 27-38.
(13)	If necessary for your Airworthiness Authority do a duplicate inspection of the elevator control system.	
(14)	If necessary for your Airworthiness Authority do a duplicate inspection of the elevator trim control system.	
(15)	Install the rudder.	Refer to Section 55-40.

	Detail Steps/Work Items	Key Items/References
(16)	Install the horizontal stabilizer fairing. – Install the 4 screws that attach the fairing to the structure.	

Section 55-20
Elevator

1. General

The DA 42 has the usual elevator. The elevator attaches to the rear web of the horizontal stabilizer. See Section 27-30 for data about the elevator controls.

2. Description

Figure 1 shows the elevator structure. Figure 2 shows the installation of the elevator on the horizontal stabilizer. Figure 3 shows the trim tab installation.

The elevator has top and bottom shells. Each shell has GFRP skins with a rigid foam core. The leading edge of each shell has a curve. The shells bond together where the curves overlap. The shells also bond together at the ends and at the trailing edge.

The elevator has a horn rib in the middle. It is a strong box with an open front. The elevator horn goes into the horn rib. Two bolts attach the horn to the elevator.

The horn has a hole with a bush for the elevator push rod. The front of the horn has elevator mass balance weight. More mass balance weight is attached at the front of the elevator tips.

Five bearings hold the elevator. The elevator horn has a plain bearing. A bolt and spacer attach the elevator horn to the trailing edge webs of the horizontal stabilizer.

A small bearing rib at mid-span on each side holds an elevator hinge assembly. The hinge assembly has an eye-end with a plain shank. The eye-end has a spherical bearing. The shank engages in a bush in the trailing edge web.

The outer end of the elevator on each side has an end bearing. A reinforcing block holds a bonded bush. The bush aligns with a bonded bush in the horizontal stabilizer trailing edge web. A pivot pin goes through both bushes to make the outer bearing. A roll pin locks the pivot pin in the bonded bush.

A GFRP trim tab attaches to the trailing edge of the elevator. The trim tab has six GFRP hinges. The front half of each hinge bonds to the trailing edge of the elevator. The rear half of each hinge bonds to the leading edge of the trim tab. Two hinge rods go through the hinges. Lock wires hold the hinge rods in place.

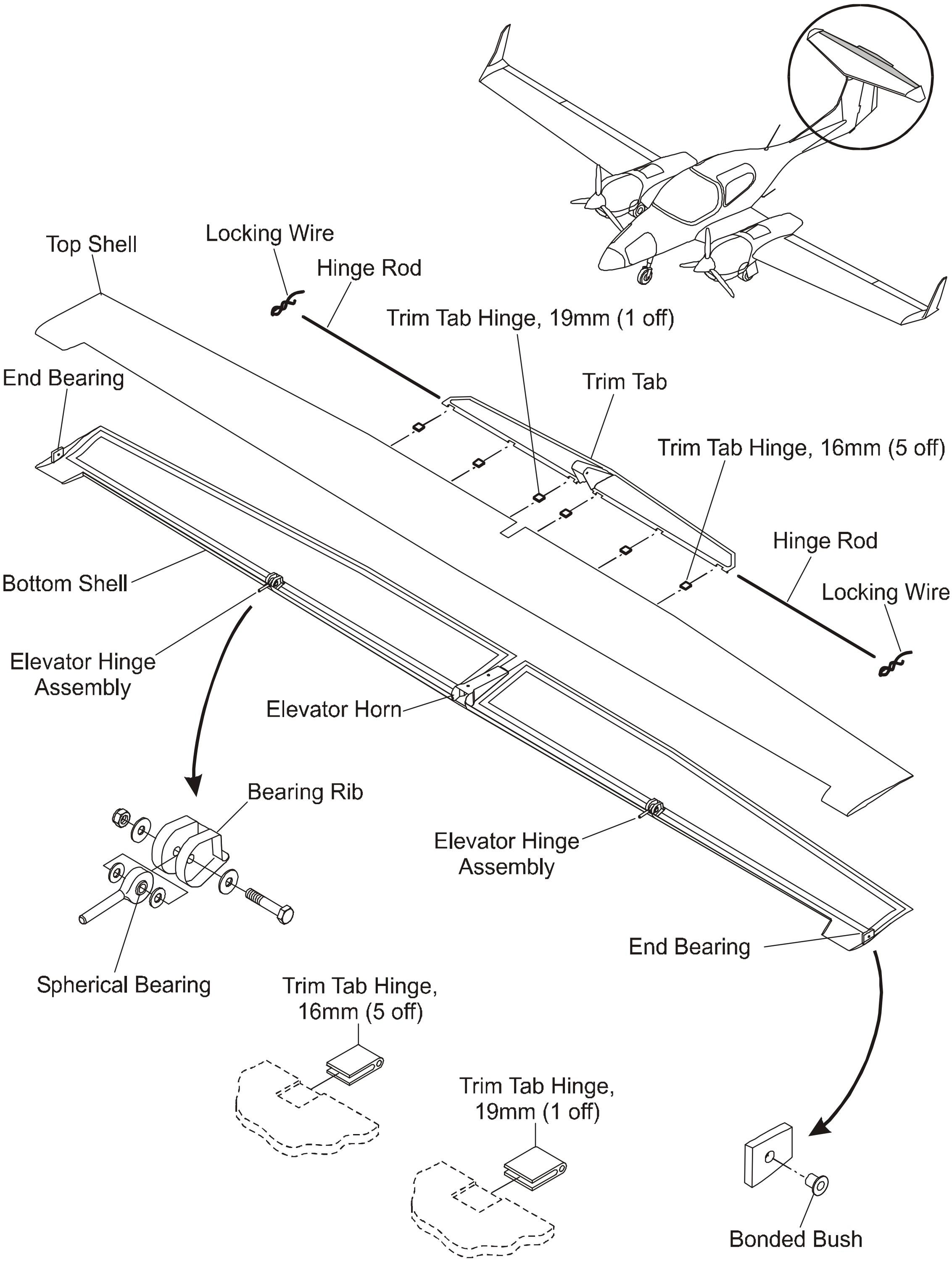

Figure 1: Elevator Structure

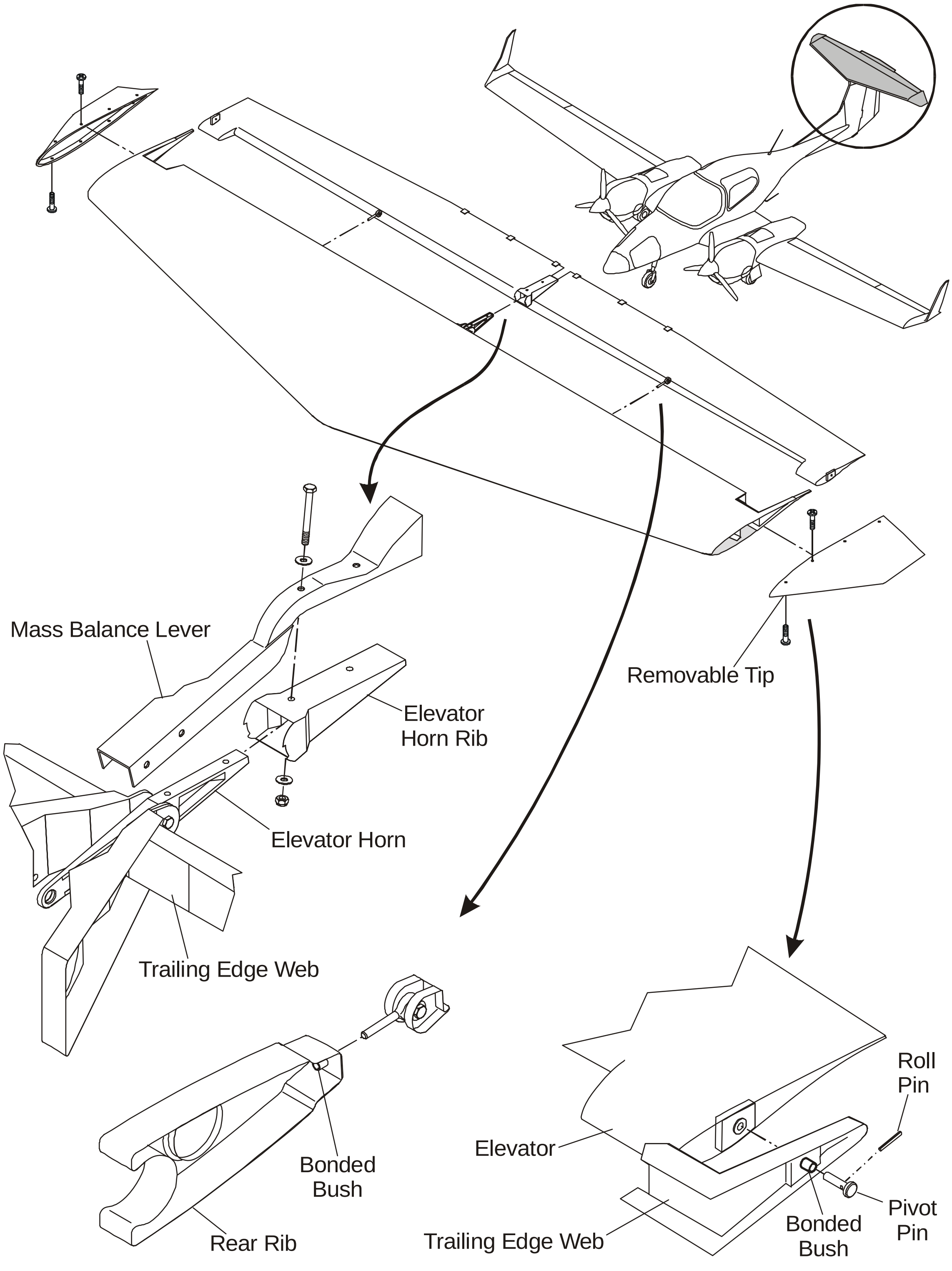

Figure 2: Horizontal Stabilizer - Elevator Installation

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Maintenance Practices

1. General

These Maintenance Practices tell you how to remove and install the elevator and trim tab. Refer to Sections 27-30 and 27-31 for data on the elevator and trim tab control setting.

2. Remove/Install the Elevator

A. Remove the Elevator

	Detail Steps/Work Items	Key Items/References
(1)	Remove the horizontal stabilizer fairing. – Remove the 4 screws that attach the fairing to the structure.	Refer to Figure 2.
(2)	Remove the horizontal stabilizer tips: – Remove the 4 screws that attach the tip to the stabilizer.	Hold the tips.
(3)	Release the 2 fork-end fittings from the trim-tab cranked actuating levers.	Under the elevator.
(4)	Remove 2 bolts, nuts and washers which attach the elevator horn rib to the elevator.	Refer to Figure 2.
(5)	Remove the pivot pins from the end bearings: – Remove the roll pin. – Pull the pivot pin out of the end bearing.	Hold the elevator.
(6)	Pull the elevator aft to release the elevator horn and hinge assemblies.	
(7)	Put the elevator in a stand or on a padded surface.	

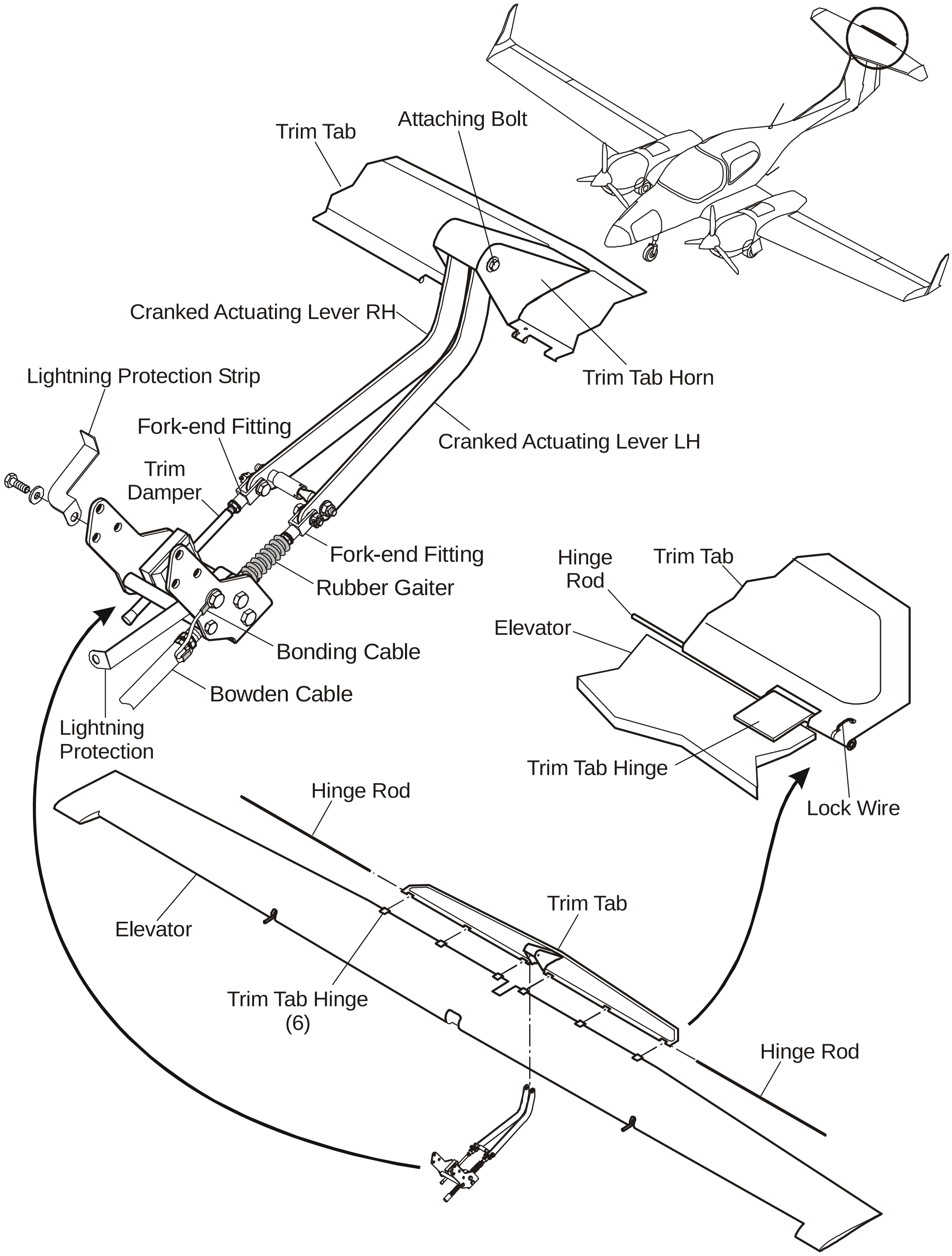

Figure 3: Trim-Tab Installation

B. Install the Elevator

	Detail Steps/Work Items	Key Items/References
(1)	Put the elevator in position aft of the horizontal stabilizer: – Align the elevator with the horn. – Move the elevator forward over the horn. – Align the shanks of the hinge assemblies at mid-span with the bushes in the trailing edge web of the horizontal stabilizer. – Push the elevator forward to engage the shanks in the bushes. – Align the end bearings with the bushes in the trailing edge spar of the horizontal stabilizer.	Refer to Figure 2.
(2)	Install the pivot pins in the end bearings and lock the pivot pins in position with a roll pin.	
(3)	Install the bolts, washers and nuts which attach the elevator to the elevator horn.	Torque: 6.4 Nm (4.7 lbf.ft.). Use new self-locking nuts.
(4)	Install the 2 fork-end fittings for the trim-tab cranked actuating levers.	Under the elevator.
(5)	Install the horizontal stabilizer tips.: – Install the 4 screws that attach the tip to the horizontal stabilizer.	
(6)	Install the horizontal stabilizer fairing: – Install 4 screws that attach the fairing to the structure.	
(7)	Do a test for correct range of movement of the elevator control.	Refer to Section 27-30.
(8)	Do a test for correct range of movement of the elevator trim control.	Refer to Section 27-38.

	Detail Steps/Work Items	Key Items/References
(9)	If necessary for your Airworthiness Authority do a duplicate inspection of the elevator trim control.	

3. Remove/Install the Elevator Trim-Tab

A. Remove the Elevator Trim-Tab

	Detail Steps/Work Items	Key Items/References
(1)	Remove the nut, washer and bolt which attaches the cranked actuating levers to the trim tab.	Refer to Figure 3.
CAUTION:	DO NOT USE FORCE TO REMOVE THE LOCK WIRE FROM THE TRIM TAB HINGE. YOU CAN DAMAGE THE GFRP HINGE.	
(2)	Remove the lock wire at the outer hinge on each side of the trim tab.	
(3)	Move the hinge rods out of the hinges.	Hold the trim tab.
(4)	Remove the trim tab from the elevator.	

B. Install the Elevator Trim-Tab

	Detail Steps/Work Items	Key Items/References
(1)	Put the trim tab in position on the elevator.	Refer to Figure 3.
(2)	Align the hinges.	
(3)	Install the hinge rods in each side.	
CAUTION: DO NOT USE FORCE TO INSTALL THE LOCK WIRE IN THE TRIM TAB HINGE. YOU CAN DAMAGE THE GFRP HINGE.		
(4)	Lock the hinge rods in position with wire.	Use new lock wire.
(5)	Align the cranked actuating levers with the trim tab.	
(6)	Install the bolt, washer and nut which attaches the cranked actuating levers to the trim tab.	
(7)	Do a test for correct range of movement of the elevator trim control.	Refer to Section 27-38.
(8)	If necessary for your Airworthiness Authority do a duplicate inspection of the elevator trim control system.	

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Section 55-30
Lower Fin

1. General

The DA 42 has a lower fin. The lower fin is a GFRP molding that is bonded to the bottom of the rear fuselage. A tail-skid is attached to the bottom of the lower fin. Refer to Section 32-70 for more data about the tail-skid.

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Section 55-40
Rudder and Trim Tab

1. General

The DA 42 has the usual rudder. The rudder attaches to the rear web of the vertical stabilizer. Refer to Section 27-20 for data about the rudder controls.

The rudder has a mechanical trim-tab. A rotary knob at the top of the cockpit center console controls the rudder trim-tab. Refer to Section 27-21 for data about the rudder trim-tab controls.

2. Description

A. Rudder

Figure 1 shows the rudder structure.

The rudder has left and right shells. Each shell has GFRP skins with a rigid foam core. The leading edge of each shell has a curve and a flange. The shells bond together at the flanges. The shells also bond together at the top, bottom and at the trailing edge. The left shell has a molded fairing for the ruder trim control rods.

The rudder has a flat face at the bottom of the leading edge. The flat face has two bonded bolts. The bolts attach the rudder to the rudder lower mounting bracket. Refer to Section 27-20 for data about the rudder lower mounting bracket.

The rudder has a mass balance weight bonded into the leading edge near the top and in its rudder horn. You cannot adjust the mass balance.

Two bearings hold the rudder. A pivot pin bonds into the leading edge near the top. It engages with a bearing attached to the rear web of the vertical stabilizer. The rudder lower mounting bracket has the bottom bearing.

B. Rudder Trim-Tab

Figure 2 shows the rudder trim-tab.

The trim-tab has left and right shells. Each shell has GFRP skins. A rigid foam insert strengthens the trim-tab at the leading edge. The leading edge of each shell has a curve and a flange. The leading edge flange has a vertical tube for the trim-tab hinge-wire. The shells bond together at the flanges. The shells also bond together at the top, bottom and at the trailing edge.

A GFRP control horn is bonded to the left side of the trim-tab. Two GFRP shells bonded together make the control horn.

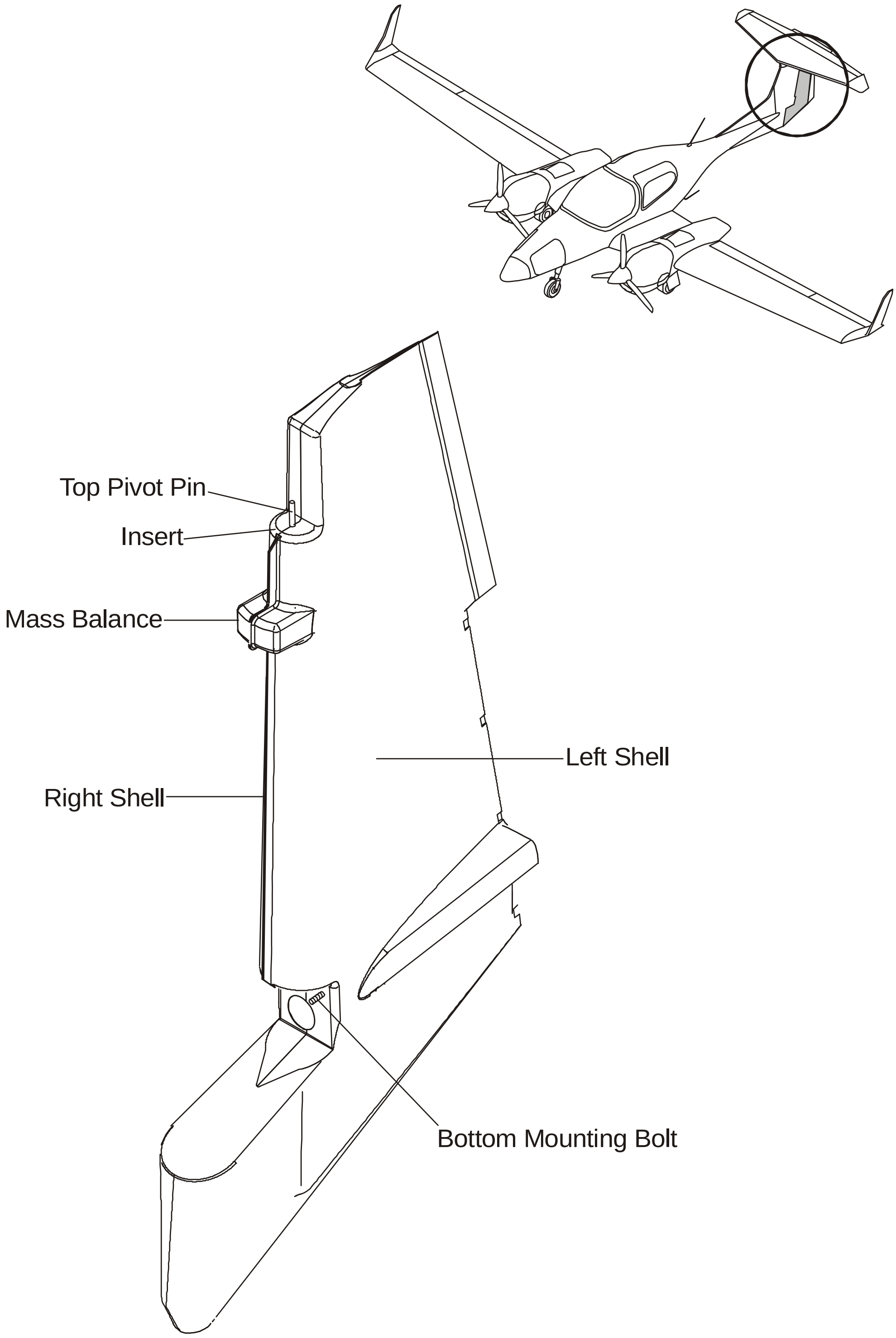

Figure 1: Rudder Assembly

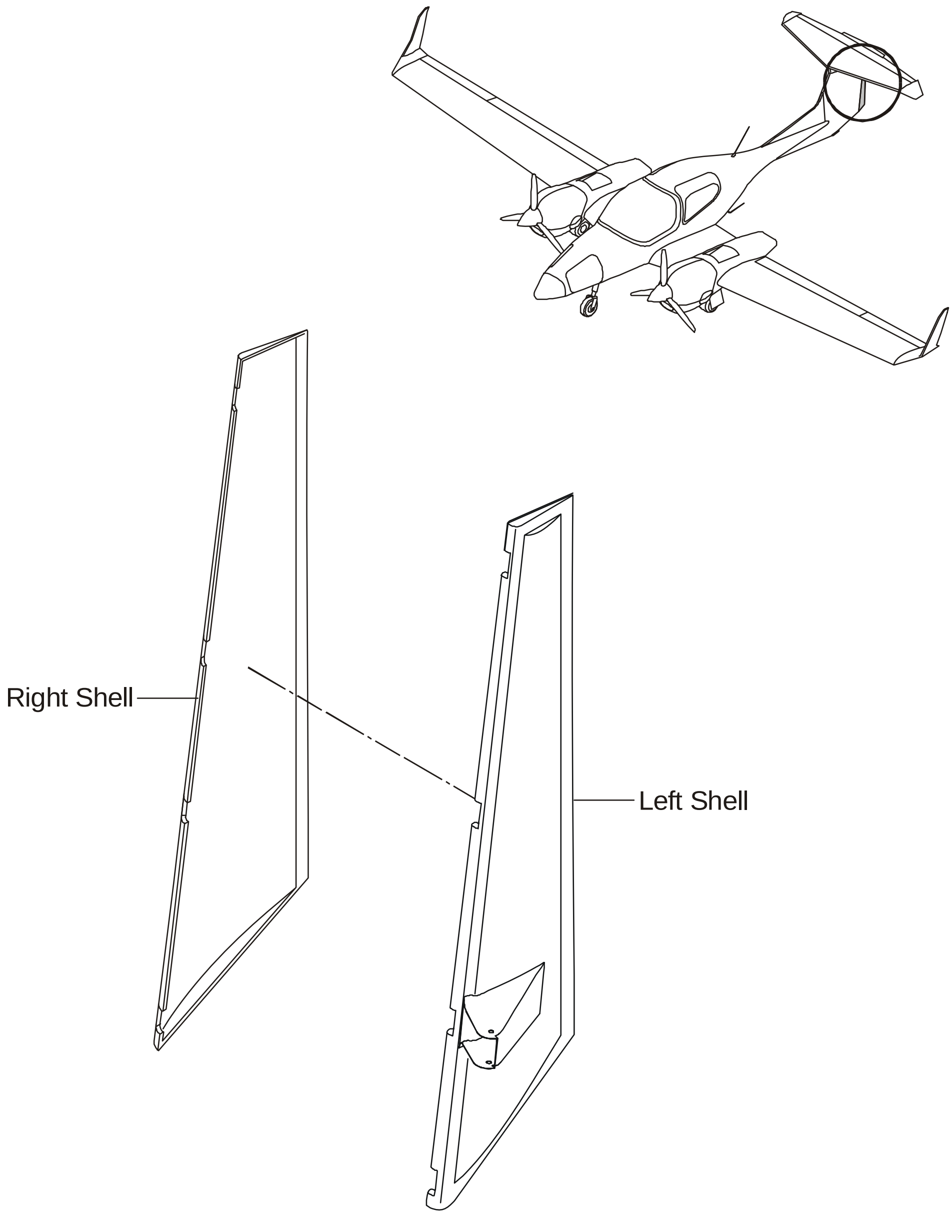

Figure 2: Rudder Trim-Tab

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Maintenance Practices

1. General

These Maintenance Practices tell you how to remove and install the rudder and the rudder trim-tab. Refer to Section 27-20 for data on the rudder control setting. And refer to Section 27-21 for the rudder trim-tab setting.

2. Remove/Install the Rudder Assembly

A. Remove the Rudder Assembly

	Detail Steps/Work Items	Key Items/References
(1)	Disconnect the 2 control rods for the rudder trim-tab: – Remove the 2 nuts, washers and bolts that attach the control rods to the trim operating lever. – Move the rods clear of the operating lever.	Refer to Figure 3. At the rudder bottom bracket.
(2)	Remove 2 nuts and washers which attach the rudder to the rudder lower mounting bracket.	Hold the rudder.
(3)	Pull the bottom of the rudder aft to disengage the bottom bolts.	
(4)	Lower the rudder to disengage the top pivot and move the rudder and trim-tab assembly clear of the airplane.	
(5)	Put the rudder in a stand or on a padded surface.	

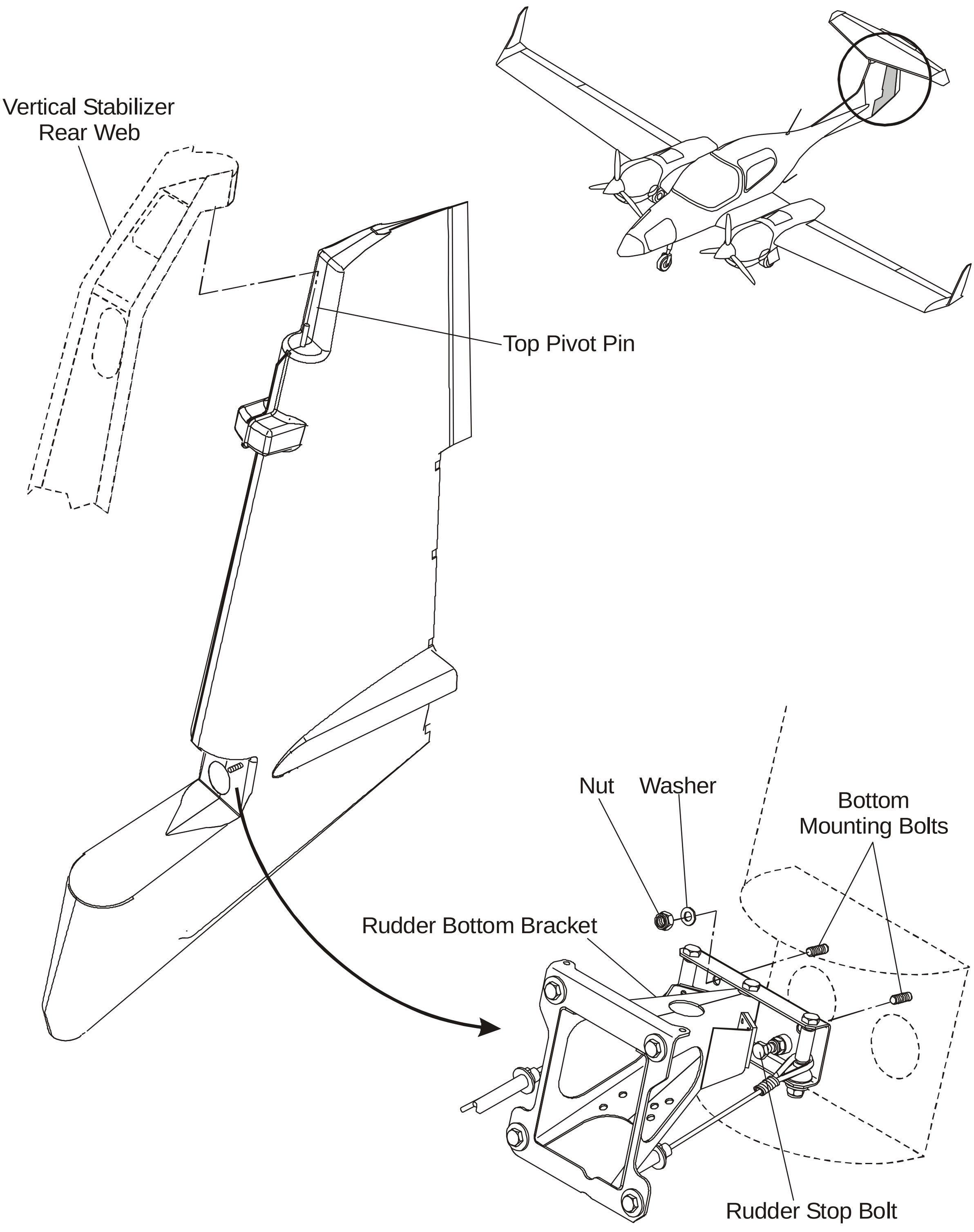

Figure 3: Rudder Assembly Installation

B. Install the Rudder Assembly

	Detail Steps/Work Items	Key Items/References
(1)	Move the rudder assembly into position at the vertical stabilizer.	
(2)	Install the rudder assembly: – Move the rudder to engage the top pivot pin in the upper pivot bearing. – Install the 2 washers and nuts that attach the rudder to the rudder mounting bracket.	Torque: 6.4 Nm (4.7 lbf.ft.). Use new self-locking nuts.
(3)	Connect the trim-tab control rods: – Align the control rod eye-ends with the trim control levers. – Install the 2 bolts, washers and nuts that attach the eye-ends to the control levers.	
(4)	Do a test for the correct range of movement of the rudder control.	Refer to Section 27-20.
(5)	Do a test for the correct range of movement of the rudder trim control.	Refer to Section 27-21.
(6)	If necessary for your Airworthiness Authority do a duplicate inspection of the rudder control system.	

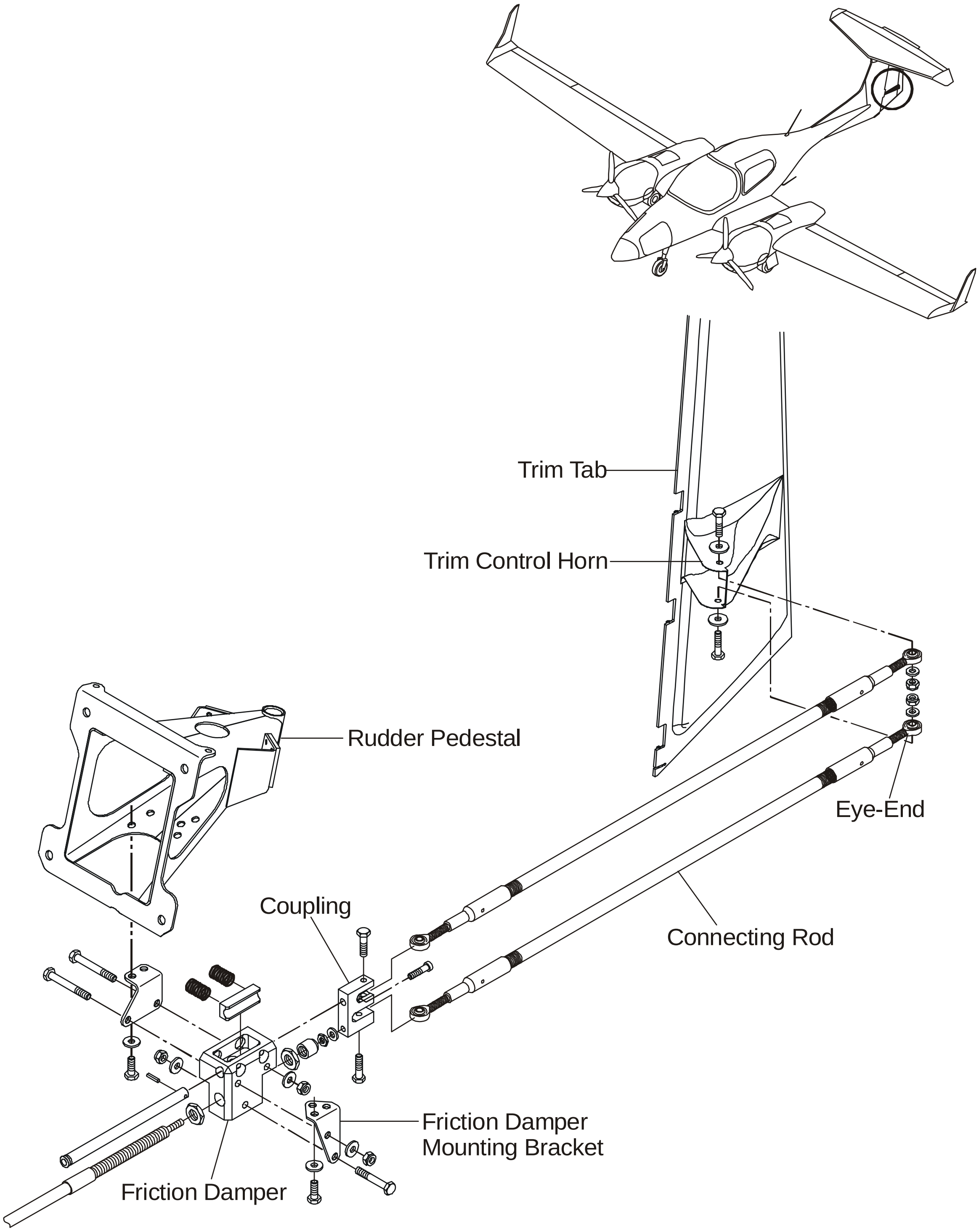

Figure 4: Rudder Trim-Tab Installation

3. Remove/Install the Rudder Trim-Tab

A. Remove the Rudder Trim-Tab

	Detail Steps/Work Items	Key Items/References
(1)	Disconnect the 2 control rods for the rudder trim-tab: – Remove the 2 nuts, washers and bolts that attach the trim control rods to the trim control horn. – Move the rods clear of the operating lever.	Refer to Figure 4. At the trim-tab control horn.
(2)	Remove the trim-tab: – Remove the locking wire that secures the hinge pin. – Remove the hinge pin from the trim-tab. – Move the trim-tab clear of the airplane.	Hold the trim-tab!

B. Install the Trim-Tab

	Detail Steps/Work Items	Key Items/References
(1)	Install the trim-tab: – Move the trim-tab into position at the rudder. – Align the hinges in the trim tab with the hinges in the rudder. – Install the hinge pin. – Secure the hinge pin with lock-wire.	Use new lock-wire.
(2)	Connect the control rods for the trim-tab: – Align the eye-ends of the control rods with the trim tab control horn. – Install the bolt, spacer, washers and nut that attaches the control rods to the control horn.	
(3)	Do a test for the correct range of movement of the rudder trim-tab control system.	
(4)	If necessary for your Airworthiness Authority do a duplicate inspection of the rudder trim control system.	

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WINDOWS

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Flight Compartment Windows

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CHAPTER 56
WINDOWS

1. General

The DA 42 has 3 windows. All of the windows are molded acrylic glass (plexiglass). The one-piece canopy window covers the pilots' cockpit. It is also the windscreen. The passenger door has a window. The right side of the fuselage has a window for the passenger compartment.

A high-performance elastic adhesive bonds each window to the structure.

Section 56-10 gives the data for all of the windows. Refer to Section 52-10 for data about the canopy and door structure.

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Section 56-10
Flight Compartment Windows

1. General

This Section tells you about the windows in the canopy, passenger door and fuselage. Refer to Section 52-10 for data about the canopy and door structure.

2. Description and Operation

Figure 1 shows the windows.

The DA 42 has 3 windows. Each window is polycast molded acrylic glass (plexiglass). This material gives good optical characteristics. It is also strong. It can be accurately formed into 3-dimensional shapes. A high-performance elastic adhesive bonds each window to the structure. A flexible white sealant fills the small gap between the edge of the window and the structure.

The one-piece canopy window covers the pilots' cockpit. It is also the windscreen. It has a small direct-vision panel in each side. The direct vision-panels have hinges. You can open the direct-vision panels in flight.

The passenger door has a window for the left side of the passenger compartment. The right side of the fuselage also has a window for the passenger compartment.

Each window has a band of white paint over the area where it bonds to the structure. The canopy window also has a screened area above the pilots' heads. This is a sun-shade. New windows are painted by the manufacturer.

As an option you can install tinted windows in the DA 42. Refer to the Illustrated Parts Catalog for data about tinted windows.

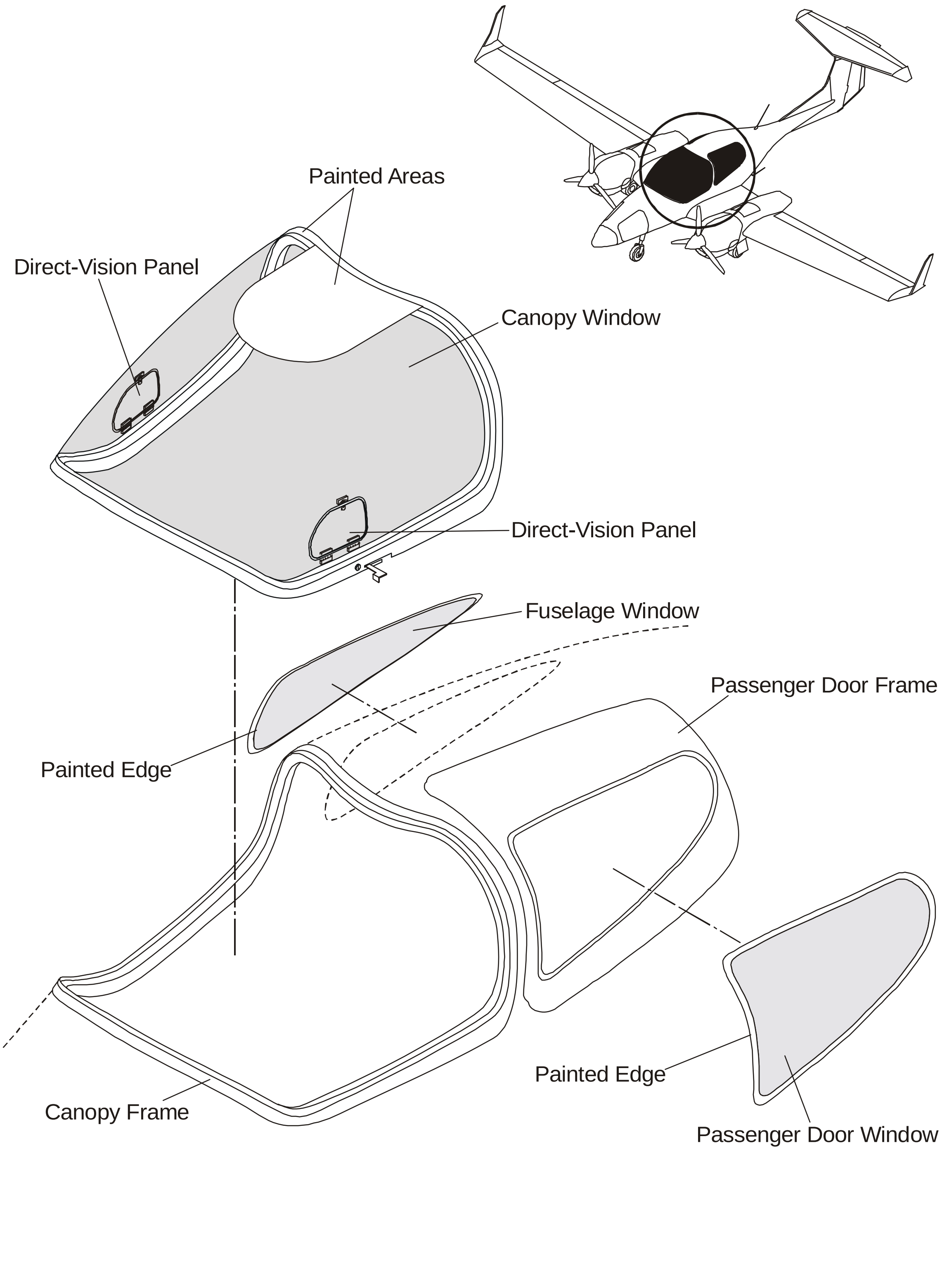

Figure 1: Windows

Maintenance Practices

1. General

This Section tells you how to replace or repair damaged windows. See Section 12-30 for data on cleaning windows.

2. Replace a Window

You must remove the window by cutting out the damaged window.

A. Equipment

Item	Quantity	Part Number
Rocker saw with non-rotating saw blade.	1	Commercial.
Adhesive.	A/R	Terostat MS 9380.
White sealant.	A/R	Terostat MS 9380.

B. Replace a Window

	Detail Steps/Work Items	Key Items/References
Note: Do not cleaning agents containing alcohol on windows and canopy bubbles.		
(1)	Remove the canopy or door. Put the canopy or door on a firm working surface.	If the canopy or door window must be replaced. Refer to Section 52-10.
(2)	Put protective covers on the inside of the cockpit.	If the right fuselage window must be replaced.
(3)	Cut the damaged window from the frame.	Use the rocker saw with non-rotating saw blade.
(4)	Grind the frame in order to remove the remaining window material and sealant.	
(5)	Put the new window in frame position. Align the 2 holes in the window (center front and back) with the holes in the frame.	
(6)	Carefully remove the protective coating from the new window/canopy bubble on the future bonding surface.	

	Detail Steps/Work Items	Key Items/References
(7)	Prepare the surfaces: – Window/canopy bubble. – Canopy frame/ fuselage. – Remove dust from the bonding surfaces and make sure to get no grease or silicone on the bonding surfaces.	 Use sand paper (grid size 320) until the surface is rough and not shiny. Use sand paper (grid size 80).
(8)	Apply thin red adhesive tape on the frame and the window/canopy bubble.	Refer to Figure 2.
(9)	Apply the dam tape to the canopy frame/fuselage.	Refer to Figure 2. Make sure to achieve a wide bonding surface.
	Note: The following bonding of the window/canopy bubble and the alignment must be finished within 10 minutes.	
(10)	Apply the sealant and follow the suggested shape and positioning around the entire canopy frame/fuselage.	Refer to Figure 2. Make sure to apply a constant amount of sealant.
	Note: It is very important that the Plexiglas is positioned within ten minutes after the sealant has been applied.	
(11)	Position the window/canopy bubble in place on the canopy frame/fuselage by use of the 2 pins.	
(12)	Push the window/canopy bubble into position. After first positioning, do not move the window again, to prevent sealant smearing.	Refer to Figure 3. Align the window/canopy bubble with the frame surface.
(13)	Use adhesive tape to hold the window/canopy bubble in place.	
(14)	Allow the sealant to cure.	Minimum 24 hrs.
(15)	Remove the 2 pins.	
(16)	Remove the adhesive tape which held the window/canopy bubble in place on the frame.	
(17)	Remove the excess sealant along the joint (1 - 2 mm deep).	Use plastic spattle.

	Detail Steps/Work Items	Key Items/References
(18)	Apply masking tape on both sides of the joint.	Refer to Figure 3.
(19)	Use sealant to fill the joint and the pinholes and smoothen the surface.	Use plastic spattle.
(20)	Spray the joint with a water/cleaning solvent solution and smooth the surface by hand.	
(21)	Remove all adhesive and masking tapes.	
(22)	Allow the sealant to cure.	Minimum 24 hrs.
(23)	Install the canopy or door.	Only if you have replaced the canopy or door window. Refer to Section 52-10.

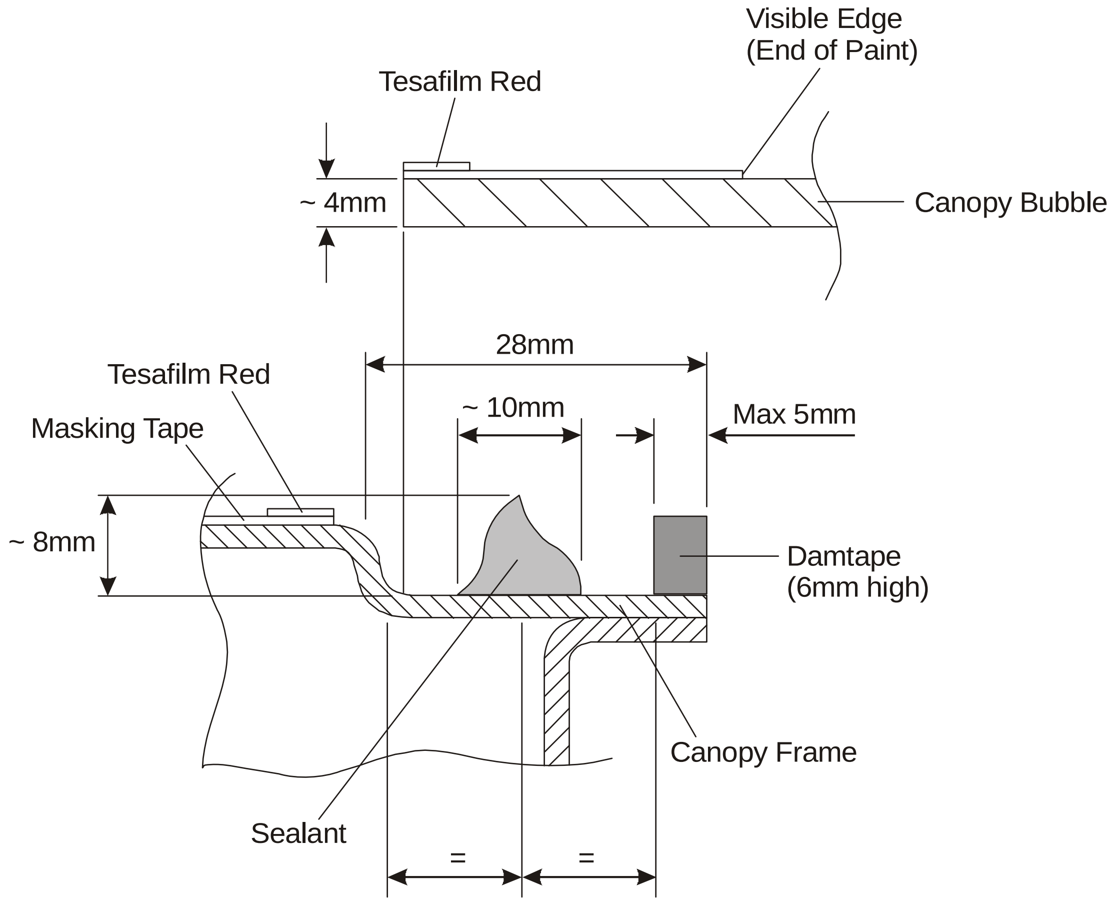

Figure 2: Position and Form of the Applied Adhesive

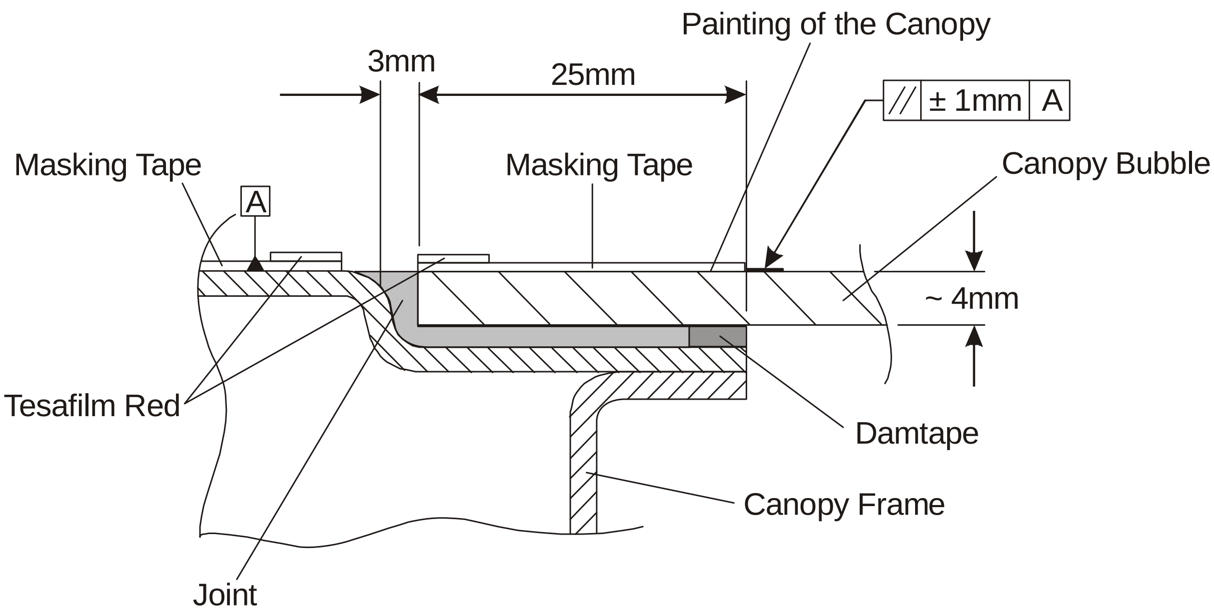

Figure 3: Filling After Placing the Glazing

3. Window Repairs

A. Damage Limits

Maximum crack length: 150 mm (6 in).

Do not repair cracks which are more than 150 mm (6 in) from the edge of the window.

B. Equipment

Item	Quantity	Part Number
Small high-speed rotary grinder.	1	Commercial.
Filler: Acryfix 92 or Tensol cement No. 70.	A/R	Commercial.
Masking tape.	A/R	Commercial.
Plastic adhesive tape.	A/R	Commercial.
Cold ultra-violet light source (only for Acryfix 92).	A/R	Commercial.

Note: Fillers become smaller when they cure. Apply enough filler to be above the level of the window surface. Cut the filler back when it has cured.

If you repair a vertical crack, keep the filler in place with plastic adhesive tape. Apply a second coat of filler after the first coat has cured.

C. Temporary Repairs to Windows

Stop-drill the ends of short cracks. Use a 2.5 mm (3/32 in) drill. Refer to Figure 4.

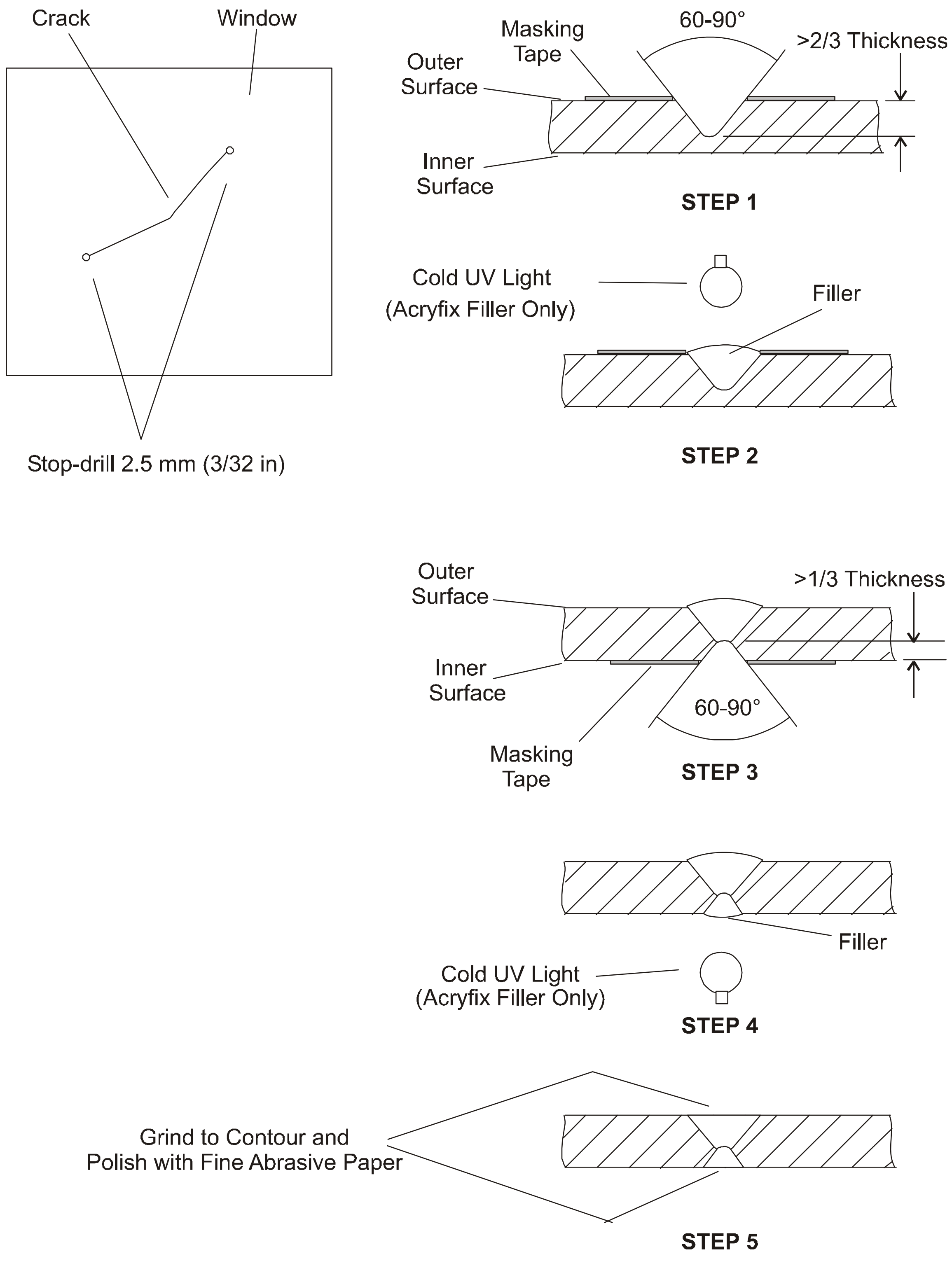

Figure 4: Window Repairs

D. Permanent Repairs to Windows

	Detail Steps/Work Items	Key Items/References
(1)	Remove the canopy or door. Put the canopy or door on a firm working surface with the crack horizontal.	Only if you will repair the canopy or door window. Refer to Section 52-10.
(2)	Put protective covers over the inside of the cockpit.	Only if you will repair the right fuselage window.
(3)	Mask the area around the crack on both inner and outer surfaces.	
(4)	Cut a groove along the crack in the outer surface of the window.	Refer to Figure 4, step 1.
(5)	Countersink temporary stop-drill holes.	
(6)	Seal the stop-drill holes on the inner surface.	Use plastic adhesive tape.
(7)	Apply filler to the groove and the stop-drill holes.	Refer to Figure 4, step 2. Use Acryfix 92 or Tensol cement no. 70.
(8)	Let the filler cure.	Refer to the manufacturer’s data.
(9)	If possible, turn the window so that the inner surface is up. Remove any plastic adhesive tape.	
(10)	Cut a groove along the crack in the inner surface of the window.	Refer to Figure 4, step 3.
	Note: This groove is less deep than the outer surface groove. It must cut into the outer layer of filler. This prevents holes in the filler.	
(11)	Countersink the filler in the stop-drill holes on the inner surface to 1 mm (0.04 in).	
(12)	Apply filler to the groove and the stop-drill holes.	Refer to Figure 4, step 4.
(13)	Let the filler cure.	Refer to the manufacturer’s data.
(14)	Remove the masking materials.	
(15)	Grind the filler to the profile of the surface.	Grind both sides. Refer to Figure 4, step 5.
(16)	Polish the repair area with fine abrasive paper.	
(17)	Verify sufficient remaining thickness of the window in the repair area.	Measure thickness, for example with an ultrasonic thickness gauge. Minimum thickness: 4.25 mm (0.167 in)

CHAPTER 57

WINGS

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CHAPTER 57
WINGS

1. General

The DA 42 is a low wing monoplane with cantilever wings. A wing center section with stub wings and the engine nacelles attaches to the fuselage. Refer to Section 53-10 for more data about the fuselage center section.

The outer wings attach to the wing center section stub wings. Each wing has a flap attached to the inboard trailing edge of the outer wing and to the trailing edge of the stub wing. An aileron attaches to the outboard trailing edge of each outer wing.

The wings have a semi-monocoque structure. Each wing has top and bottom shells. The shells have CFRP outer skins, a rigid foam core and GFRP inner skins. Each wing has two I-section spars. Uni-directional carbon fiber cloth makes the spar caps. Each wing also has GFRP ribs and webs.

The flaps and ailerons have a mixture of CFRP and GFRP cloth in the shells. The shells have rigid foam cores.

Refer to Chapter 51 for general composite repair data. Refer to Chapter 27 for data about the control systems which operate the flaps and ailerons.

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Section 57-10
Wing Structure

1. General

This Section tells you about the structure of the outer wing. Refer to Section 53-10 for data about the structure of the wing center section. Refer to Section 57-50 for data about the structure of the flaps. Refer to Section 57-60 for data about the structure of the ailerons.

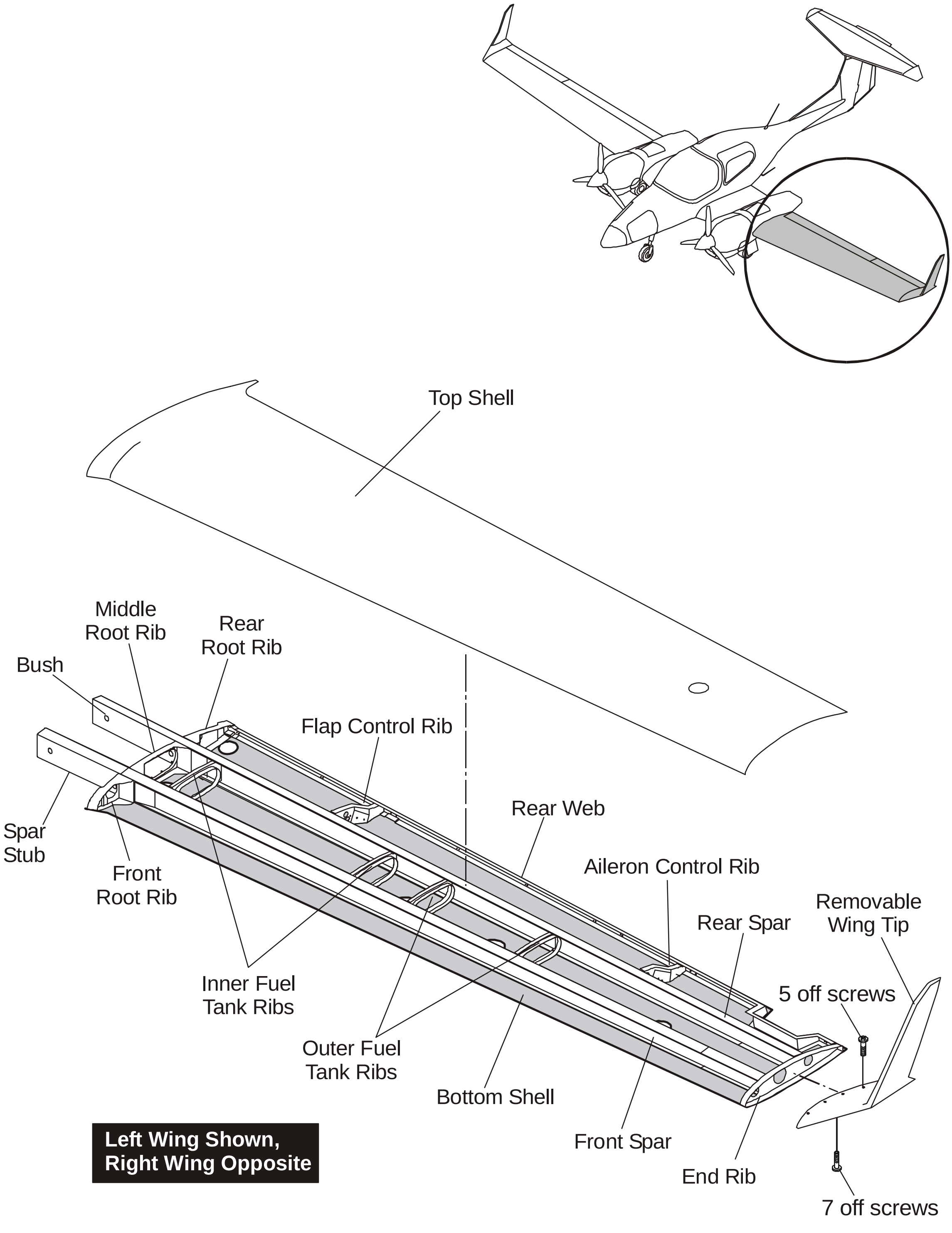


Figure 1: Wing Structure

2. Description

Figure 1 shows the wing structure. The wing has top and bottom shells. It has front and rear spars and a root rib made in three parts. Five ribs hold the fuel tanks between the spars. Flap and aileron control ribs hold the bellcranks for the control systems.

A rear web closes the trailing edge of the wing. An end rib closes the outboard end of the wing. A removable GFRP tip attaches to the wing shells and outer rib with screws.

Bonding paste (thickened resin) bonds the wing components to each other. The following Section gives more data about the main parts:

A. Wing Shells

Each wing has top and bottom shells. Each shell has a CFRP skin with a rigid foam core. The fibers in the layers of cloth which cover the whole wing run at ±45° to the lateral axis of the wing. The outer layer of the wing is carbon fiber. The inner layer of the wing is glass fiber.

Some areas have more layers of cloth to give more strength. For example, the area around each access hole has extra layers of carbon fiber cloth.

The bottom shell of each wing has 8 access holes. These give access to the flap and aileron bellcranks and fuel tanks. The top shell has a hole for the fuel cap of the outer fuel tank.

B. Spars

Each wing has two I-section spars. The front spar on one side is the same as the rear spar on the opposite side.

Many layers of uni-directional carbon fiber make the spar caps. The number of layers in the spar caps decreases from root to tip.

Each spar has a shear web. The shear web has GFRP skins and a rigid foam core. Glass cloth fillets attach the spar caps to the shear web.

The inboard end of each spar (the ‘stub’) goes past the root rib. The spar stub is a box-section with many layers of glass cloth wrapped round the spar caps. Two large bushes bond into the spar stub. The wing main bolts engage these bushes and attach the wing to the fuselage center section. The bushes and bolts transmit the wing bending loads into the center section. Figure 2 shows the main bolt installation.

C. Root Rib

Each outer wing has a three-piece root rib. Each piece is a GFRP molding with many layers of glass fiber cloth. The front root rib bonds to the top and bottom shells and the front face of the front spar. It has a housing for the A-bolt. The A-bolt transmits lift loads into the center section.

The middle part of the root rib bonds to the top and bottom shells, the aft face of the front spar and the front face of the rear spar. It has a large oval access panel for removing the fuel tanks.

The rear root rib bonds to the top and bottom shells, the aft face of the rear spar and the rear web. It has a housing for the B-bolt. The B-bolt transmits lift loads into the center section. It also has guide rollers for the flap and aileron push rods.

D. Fuel Tank Ribs

Five ribs hold the fuel tanks in each wing. Each rib is a GFRP molding with a large oval hole. The hole has a flat inner flange to hold the tank. The ribs bond to the top and bottom shells, the aft face of the front spar and the front face of the rear spar.

E. Flap and Aileron Control Ribs

Each wing has two flap and one aileron control ribs. The ribs are GFRP moldings. Each rib has a bend with a solid insert. The insert gives extra strength where the control bellcrank attaches. The ribs bond to the top and bottom shells, the aft face of the rear spar and the rear web.

F. Rear Web

Each wing has a rear web. The web closes the trailing edge of the wing. The web bonds to the top and bottom shells. It also bonds to the rear faces of the rear root rib, the flap control ribs and the aileron control rib. The rear web has extra layers where the flap and aileron hinges attach. Rivets hold anchor-nut plates to the forward face of the rear web where the hinges attach.

G. Wing End Rib

Each wing has an end rib. The end rib is a GFRP molding. The end rib has eight anchor nuts which attach the wing tip. It also has a threaded strong-point for a tie-down ring.

H. Wing Tip

The wing tip is a GFRP molding with top and bottom shells. The wing tip holds the external lights.

Maintenance Practices

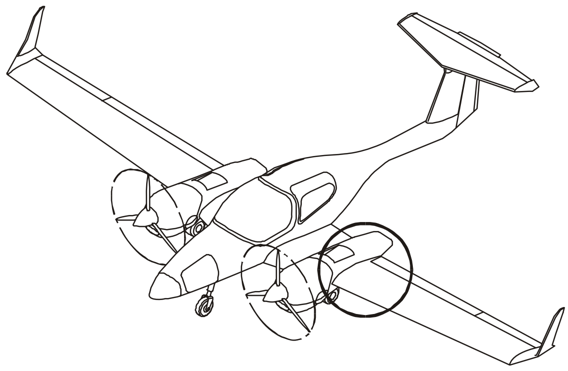
1. General

These Maintenance Practices tell you how to remove and install the outer wings. They also tell you how to remove and install the wing tips and other small components.

2. Remove/Install the Wings

A. Equipment

Item	Quantity	Part Number
Padded wing trestles.	4	Commercial.
Main bolt removal tool.	1	VR-DA4-5700-00-30.
Wing stand (not essential).	1 per wing	Commercial.



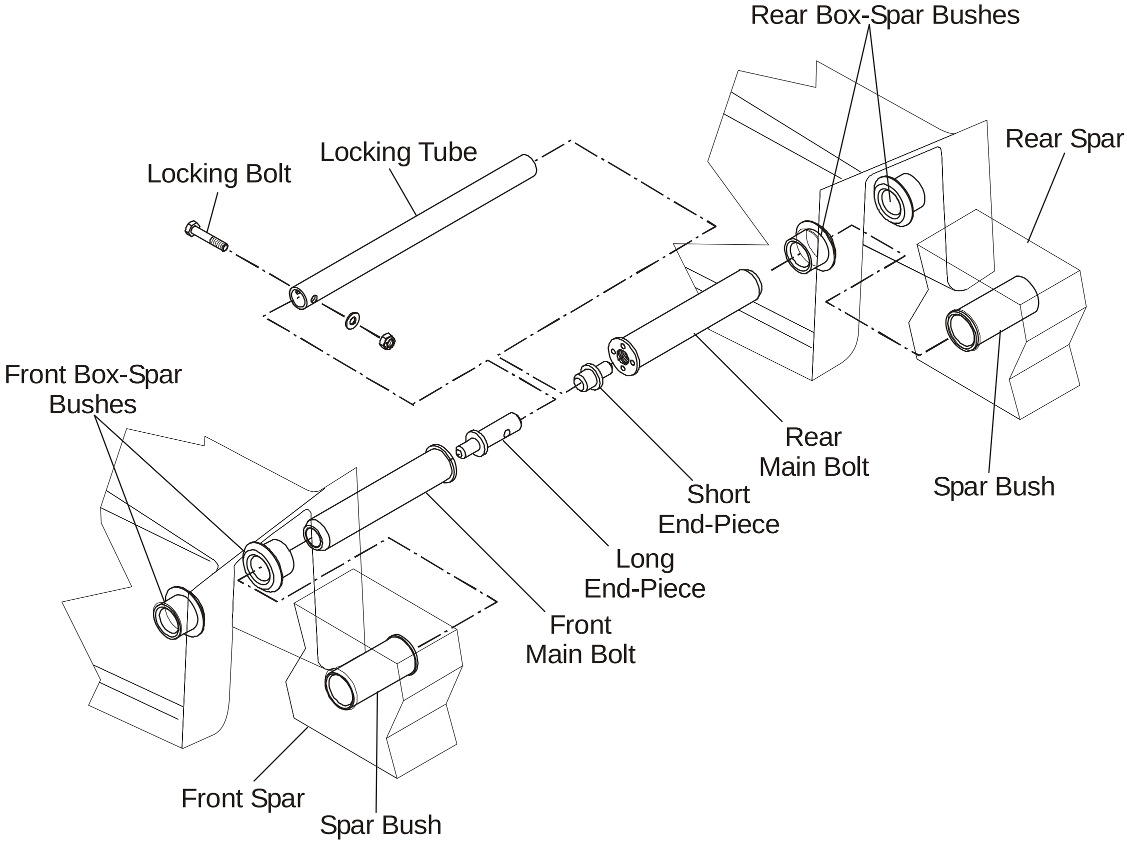


Figure 2: Wing Main Bolt Installation

B. Remove the Wings

Use this procedure to remove the left wing or the right wing. Where a part of the procedure applies to only one wing it will tell you so.

	Detail Steps/Work Items	Key Items/References
	WARNING: MAKE SURE THAT THE AREA AROUND THE FLAPS IS CLEAR OF PERSONS AND EQUIPMENT BEFORE YOU LOWER THE FLAPS. IF NOT, THE FLAPS CAN INJURE PERSONS OR BE DAMAGED BY EQUIPMENT.	
(1)	Lower the flaps.	
(2)	Disconnect the main battery.	Refer to Section 24-31.
(3)	Defuel the airplane.	Refer to Section 12-10.
(4)	Remove these items for access: – Maintenance cap 1 access panel. – Engine nacelle cap rear access panels. – Engine nacelle cap ECU.	
(5)	Put trestles under both wing tips.	Under the end rib.
(6)	Disconnect the flap push-rod: – Remove the nut, washer and bolt.	At the wing root. Through the engine nacelle rear access panels.
(7)	Disconnect the aileron pushrod: – Remove the nut, washer and bolt.	At the wing root. Through the engine nacelle rear access panels.
(8)	Disconnect these items at the wing root: – The Pitot hose. – The static hose.	Left wing only. The hose is 8 mm (5/16 in) diameter. (PVC mellow green). The hose is 8 mm (5/16 in) diameter. (PVC mellow blue).
(9)	Disconnect the wing electrical connector.	Engine nacelle cap ECU.
(10)	Disconnect the lightning protection wing-root rib assy.	Engine nacelle rear cap.

	Detail Steps/Work Items	Key Items/References
(11)	Optional disconnect the Disconnect the de-icing nylon tube.	Maintenance cap 1. Refer to Section 30-00.
	WARNING: DO NOT GET FUEL ON YOU. FUEL CAN CAUSE DISEASE. **WARNING: DO NOT ALLOW FIRE NEAR FUEL. FUEL BURNS AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.**	
(12)	Remove the locking tube from the inboard and outboard main bolts: – Remove the nut, washer and bolt. – Move the tube over the long end piece. – Remove the short end piece. – Remove the tube and the long end piece.	
	WARNING: USE 3 PERSONS TO LIFT THE WING. IF YOU DO NOT, YOU CAN CAUSE INJURY. CAUTION: DO NOT LIFT ON THE FLAP. YOU CAN DAMAGE THE FLAP.	
	Note: For the rest of this procedure, one person must lift the wing tip. One person must lift the leading edge at the root rib. One person must lift the trailing edge at the root rib.	
(13)	Remove the main bolts: – Take the weight off the wing. – For each bolt: – Install the main bolt removal tool. – Extract the bolt.	If necessary, move the wing tip a small amount up and down to help release the main bolts. Make a note of the location of each bolt.

	Detail Steps/Work Items	Key Items/References
(14)	Lift the wing away from the center section, about 15 cm (5.9 in).	Make sure that the electrical cables do not catch on the center section conduit.
	Disconnect the fuel hose from the fuel tank.	Put a container to catch a small quantity of fuel. Remove spilt fuel.
	Remove root rib top.	Use caps to protect the loose line connections from contamination.
(15)	Put the wing on trestles or a wing stand.	

Note: If you use trestles, put one trestle under the spar stubs. Put the second trestle under the wing end rib.

C. Pre-Installation Procedure

Do this check before you install the wings.

	Detail Steps/Work Items	Key Items/References
(1)	Examine the inner faces of the front and rear boxspars. Look specially for: – Damage to the main bolt bushes. – Damage to the structure round the bushes. – Looseness between the bushes and the structure. – Damage to the top and bottom shells of the center section (where the spar stubs can touch the shells during wing removal). – Delamination between the boxspars and the shells.	Refer to the manufacturer if you find damage in any of these areas. Clean the bushes.
(2)	Examine the front, middle and rear end ribs in the wing center section. Look specially for: – Damage to the A and B-bolt bushes. – Looseness between the A and B-bolt bushes and the end ribs. – Delamination between the end ribs, the boxspars and the shells.	Refer to the manufacturer if you find damage in any of these areas. Clean the bushes.
(3)	Examine the wing spar stubs. Look specially for: – Damage to the main bolt bushes. – Damage to the spar stub around the bushes. – Looseness between the bushes and the spar stub. – Delamination between the spars and the shells.	Refer to the manufacturer if you find damage in any of these areas. Clean the bushes.

	Detail Steps/Work Items	Key Items/References
(4)	Examine the wing root ribs. Look specially for:	Refer to the manufacturer if you find damage in any of these areas.
	– Damage to the A and B-bolts and bushes.	Clean the bolts and bushes.
	– Damage to the front and rear root ribs around the bushes.	
	– Looseness between the bushes and the root ribs.	
	– Delamination between the root ribs, the spars and the shells.	
(5)	Examine the main bolt assemblies. Look specially for:	Clean the main bolt assembly.
	– Corrosion of the end-pieces or tube.	Remove corrosion. Repair the surface finish. Refer to Section 51-20.
	– Corrosion of the main bolts.	No corrosion permitted.
	– Scratches on the bearing surfaces.	Maximum depth 0.1 mm (0.004 in).
	– Deformation.	No deformation permitted.
	– Damage to the threads for the removal tool.	Replace the bolt if you cannot attach the removal tool correctly.
(6)	Measure the radial play of each main bolt in the related main bulkhead bushes.	Maximum radial play 0.2 mm (0.008 in).
(7)	Measure the radial play of each main bolt in the related spar stub bush.	Maximum radial play 0.2 mm (0.008 in).
(8)	Lubricate these items:	Refer to Section 12-20.
	– Main bolts.	
	– Front and rear main bulkhead bushes.	
	– Spar bushes.	
	– A and B-bolt bushes in the end ribs.	
	– A and B-bolts in the wing root ribs.	
(9)	Examine the flap. Look specially for damage to the inner end rib.	

D. Install the Wings

Use this procedure to install the left wing or the right wing. Where a part of the procedure applies to only one wing it will tell you so.

<table>
<tr><th></th><th>Detail Steps/Work Items</th><th>Key Items/References</th></tr>
<tr><td>(1)</td><td>Do the pre-installation check.</td><td>Refer to Paragraph C.</td></tr>
<tr><td colspan="3">WARNING: USE 3 PERSONS TO LIFT THE WING. IF YOU DO NOT, YOU CAN CAUSE INJURY.

CAUTION: DO NOT LIFT ON THE FLAP. YOU CAN DAMAGE THE FLAP.

CAUTION: DO NOT LET THE SPAR STUBS TOUCH THE CENTER SECTION SHELLS. YOU CAN DAMAGE THE SHELLS.</td></tr>
<tr><td colspan="3">Note: Until you install the main bolts, one person must lift the wing tip. One person must lift the leading edge at the root rib. One person must lift the trailing edge at the root rib.</td></tr>
<tr><td>(2)</td><td>Lift the wing into position:
– Move the spar stubs part way into the front and rear boxspars.
– Optional: Put the de-icing nylon tube in position.
– Put the electrical cable, Pitot and static through the conduit in the leading edge of the center section.
– Connect the fuel hose. Look for forward and return hose.
– Install root rib top, self locking nut, washer and bonding wire.
– Align the flap inner rib with the inner flap.
– Move the wing fully into the center section to engage the A and B-bolts and the outer flap to inner flap transfer lug.</td><td>
Hold the wing in position.

Hold the wing in position. Pitot static left wing only.

Hold the wing in position.</td></tr>
</table>

	Detail Steps/Work Items	Key Items/References
(3)	Install the main bolts: – Hold the weight of the wing. – Install each bolt.	If necessary, move the wing tip a small amount up and down to help install the main bolts.
(4)	Install the locking tubes on the inboard and outboard main bolts: – Install the long end piece in one main bolt. – Move the tube over the long end piece. – Install the short end piece in the other main bolt. – Move the tube over the short end piece. – Install the bolt, washer and self-locking nut through the tube and the long end piece.	Refer to Figure 2.
(5)	Connect these items: – The Pitot hose. – The static hose.	Left wing only. The hose is 8 mm (5/16 in) diameter. (PVC mellow green). The hose is 8 mm (5/16 in) diameter. (PVC mellow blue).
(6)	Connect the electrical connector.	Engine nacelle cap ECU.
(7)	Connect the bonding connections.	Engine nacelle rear cap.
(8)	Optional: Connect de-icing nylon tube.	Refer to Section 30-00. Remove caps. Use new O-rings.
(9)	Connect the flap pushrod: – Install the bolt, washer and self-locking nut.	Engine nacelle rear cap. Torque: 6.4 Nm (4.7 lbf.ft.).
(10)	Connect the aileron pushrod: – Install the bolt, washer and self-locking nut.	Engine nacelle access panels. Torque: 6.4 Nm (4.7 lbf.ft.).
(11)	If you must also install the other wing, do items 1 to 10 again for the other wing.	
(12)	Connect the battery.	Refer to Section 24-31.

	Detail Steps/Work Items	Key Items/References
(13)	Do a test for correct operation and range of movement of the flap system. If necessary, adjust the flap system.	Refer to Section 27-50.
(14)	Do an inspection of the flap controls which you have connected or adjusted. – If necessary for your airworthiness authority, do a second inspection of the controls.	
(15)	Do a test for correct operation and range of movement of the aileron system. If necessary, adjust the aileron system.	Refer to Section 27-10.
(16)	Do an inspection of the aileron controls which you have connected or adjusted. – If necessary for your airworthiness authority, do a second inspection of the controls.	
(17)	Do a functional check of these lights: – Position lights. – Strobe lights (ACLs).	Refer to Section 33-40.
(18)	Do a Pitot and static system leak test.	Left wing only. Refer to Section 34-10.
(19)	Refuel the airplane to the unusable fuel level.	Refer to Section 12-10.
(20)	Optional: replenish the ice protection system.	Refer to Section 30-00.
(21)	Do a fuel quantity indication calibration check.	Refer to Section 28-40.
(22)	Install these items after access: – The left/right pilot’s seat. – Main landing gear access panel. – Engine nacelle access panels. – Inboard fuel tank access panel.	As necessary. Refer to Section 25-10.
(23)	Do a check flight.	Refer to the DA 42 Airplane Flight Manual.

3. Remove/Install the A- or B-Bolts

A. Remove the A- or B-Bolts

	Detail Steps/Work Items	Key Items/References
(1)	Remove the wing	Refer to Paragraph 2.
(2)	Remove the A or B bolt: – Hold the flats on the flange of the bolt with a wrench. – Remove the self-locking nut from the A or B-bolt. – Remove the A- or B-bolt.	Refer to Figure 3. Access for the A-bolt through the hole in the front root rib. Access for the B-bolt through the access panel in the bottom shell.

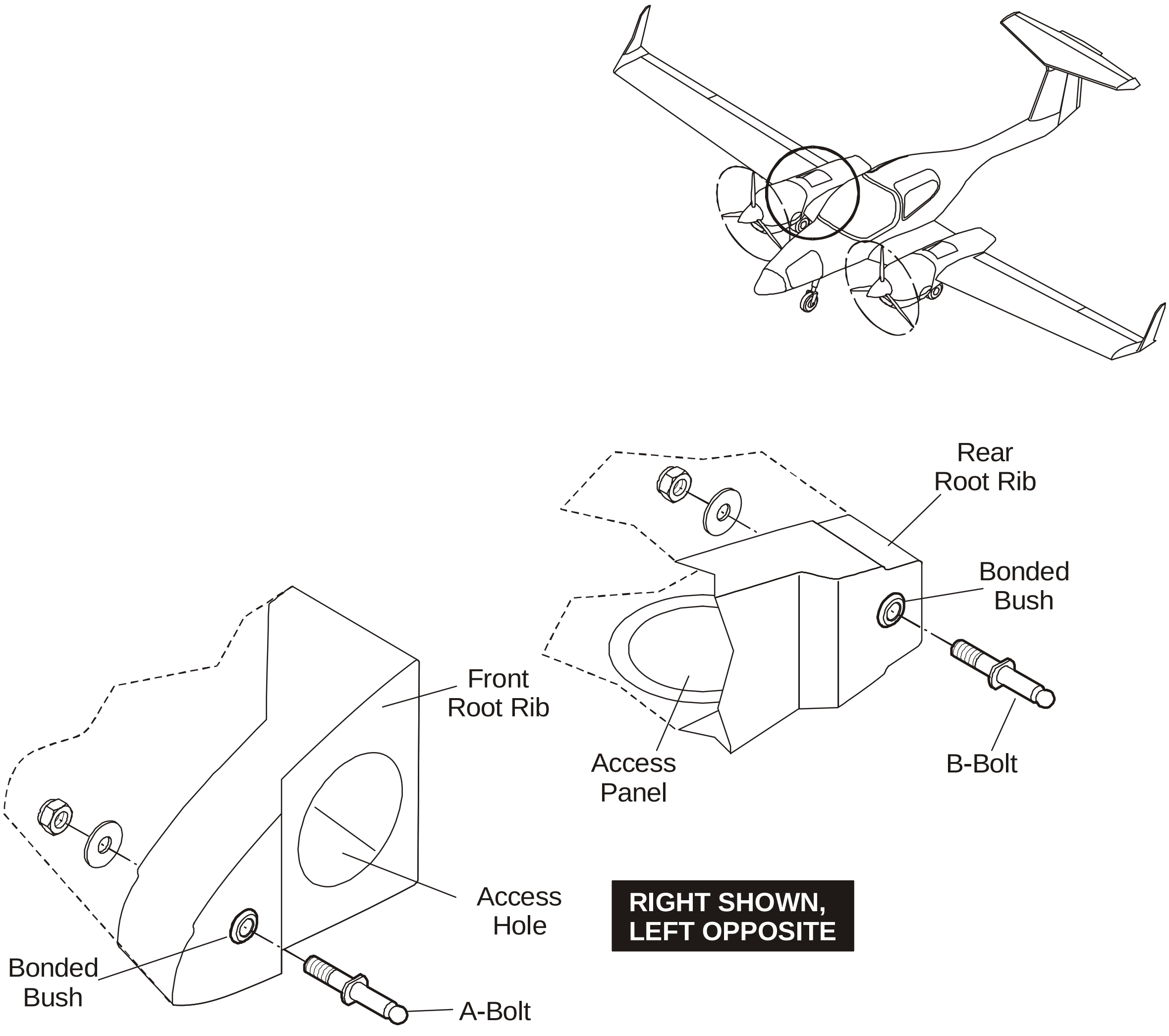


Figure 3: A and B-Bolt Installation

B. Install the A- or B-Bolt

	Detail Steps/Work Items	Key Items/References
(1)	Examine the A or B-bolt. Look specially for: – Corrosion. – Scratches on the bearing surfaces. – Deformation. – Damage to the threads.	 No corrosion permitted. Maximum depth 0.1 mm (0.004 in). No deformation permitted. No damage permitted.
(2)	Examine the A or B-bolt bush. Look specially for: – Looseness between the A or B-bolt bush and the root rib. – Damage to the root rib where the bush attaches. – Damage to the bush.	
(3)	Install the A or B-bolt: – Install the bolt in the bush. – Hold the flats on the flange of the bolt with a wrench. – Install the washer and self-locking nut.	Refer to Figure 3. Access for the A-bolt through the hole in the front root rib. Access for the B-bolt through the access panel in the bottom shell. Torque: 32 Nm (23.6 lbf.ft.).
(4)	Install the wing.	Refer to Paragraph 2.

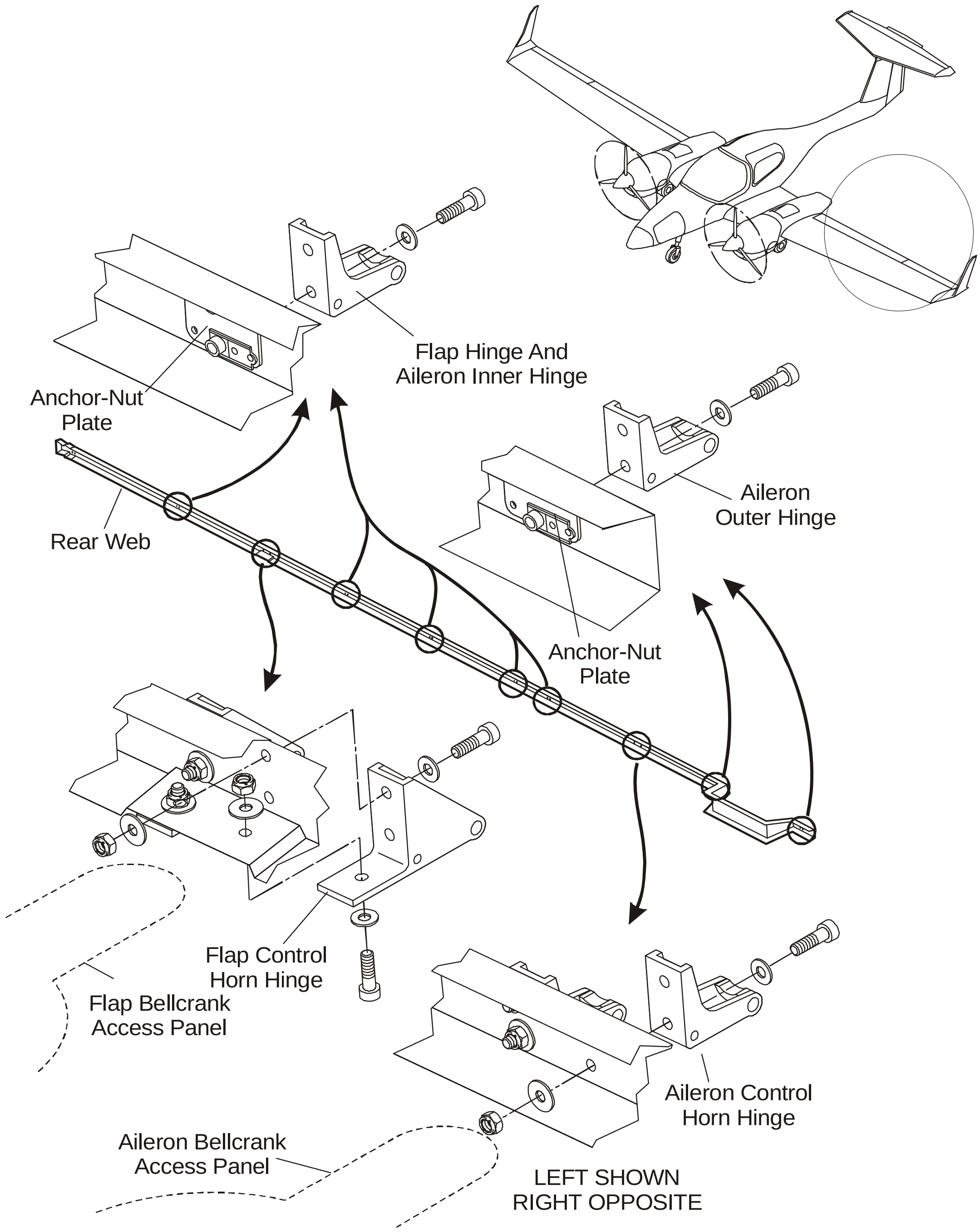


Figure 4: Control Surface Hinge Bracket Installation

4. Remove/Install Control Surface Hinge Brackets

A. Remove a Control Surface Hinge Bracket

	Detail Steps/Work Items	Key Items/References
(1)	Remove the control surface.	Refer to Sections 57-50 and 57-60.
(2)	For brackets at the control horn hinge: – Remove the control bell crank access panel under the wing. – Remove the attaching nuts and large washers. – Remove the bolts and small washers. – Remove the bracket.	The flap brackets have 3 bolts. The aileron brackets have 2 bolts. From inside of the wing.
(3)	For brackets not at the control horn hinge: – Remove the bolts and small washers. – Remove the bracket.	All brackets have 2 bolts.

B. Install a Control Surface Hinge Bracket

	Detail Steps/Work Items	Key Items/References
(1)	For brackets at the control horn hinge:	The flap brackets have 3 bolts. The aileron brackets have 2 bolts.
	– Put the bracket in position on the rear web.	
	– Install the bolts with small washers.	
	– Install the large washers and self-locking nuts.	From inside of the wing. Torque: 3.6 Nm (2.7 lbf.ft.).
	– Install the control bellcrank access panel under the wing.	
(2)	For brackets not at the control horn hinge:	All brackets have 2 bolts.
	– Put the bracket in position on the rear web.	
	– Install the bolts and small washers.	Torque: 3.6 Nm (2.7 lbf.ft.).
(3)	Install the control surface.	Refer to Sections 57-50 and 57-60.

Section 57-50
Flaps

1. General

This Section tells you about the flap of the DA 42. The DA 42 has an inner and an outer flap on each wing. The outer flap attaches to the outer wing and the inner flap attaches to the airplane wing center section. The flap selector in the cockpit controls both inner and outer flaps.

Refer to Section 27-50 for data about the flap control system.

2. Description

Figures 1 and 2 show the outer and inner flaps. Both flaps have a similar construction.

A. Outer Flap

The outer flap has a top shell and a bottom shell.

The bottom shell has inner and outer skins which bond to a foam core. The outer layer of the skins are GFRP. The inner layers are CFRP. The leading edge of the shell bends up to form a web. It then curves forward to form a shroud which seals the gap between flap and wing when the flap is down.

The outboard end of the bottom shell also bends up to close the end of the flap. The leading edge, the ends, and the area where the horn attaches have more carbon fiber cloth to give more strength and stiffness.

The top shell has inner and outer GFRP skins which bond to a foam core. The outer layer of the skins are GFRP. The inner layers are CFRP. The top shell bonds to the bottom shell and the inner end rib.

The flap has an inner end rib. The inner end rib is a CFRP molding. The rib has an recess which engages with an extension on the inner flap. The end rib bonds to the top and bottom shells.

A flap horn drives the outer flap. The flap horn is an aluminum alloy component. Three bolts attach the horn to the bottom surface of the flap. A small hole in the leading edge of the flap gives access to the front attaching nuts and washers. The horn also makes one of the flap hinges. Two flanged bushes in the front of the horn make the hinge.

Hinges attach the outer flap to the trailing edge of the outer wing. Each flap has five hinges (as well as the flap horn). Two bolts attach each hinge to the leading edge of the flap. A small hole in the middle of the hinge gives access to the attaching nuts and washers. Each hinge has a flanged bush at the inboard end. A plastic plug seals the outboard end.

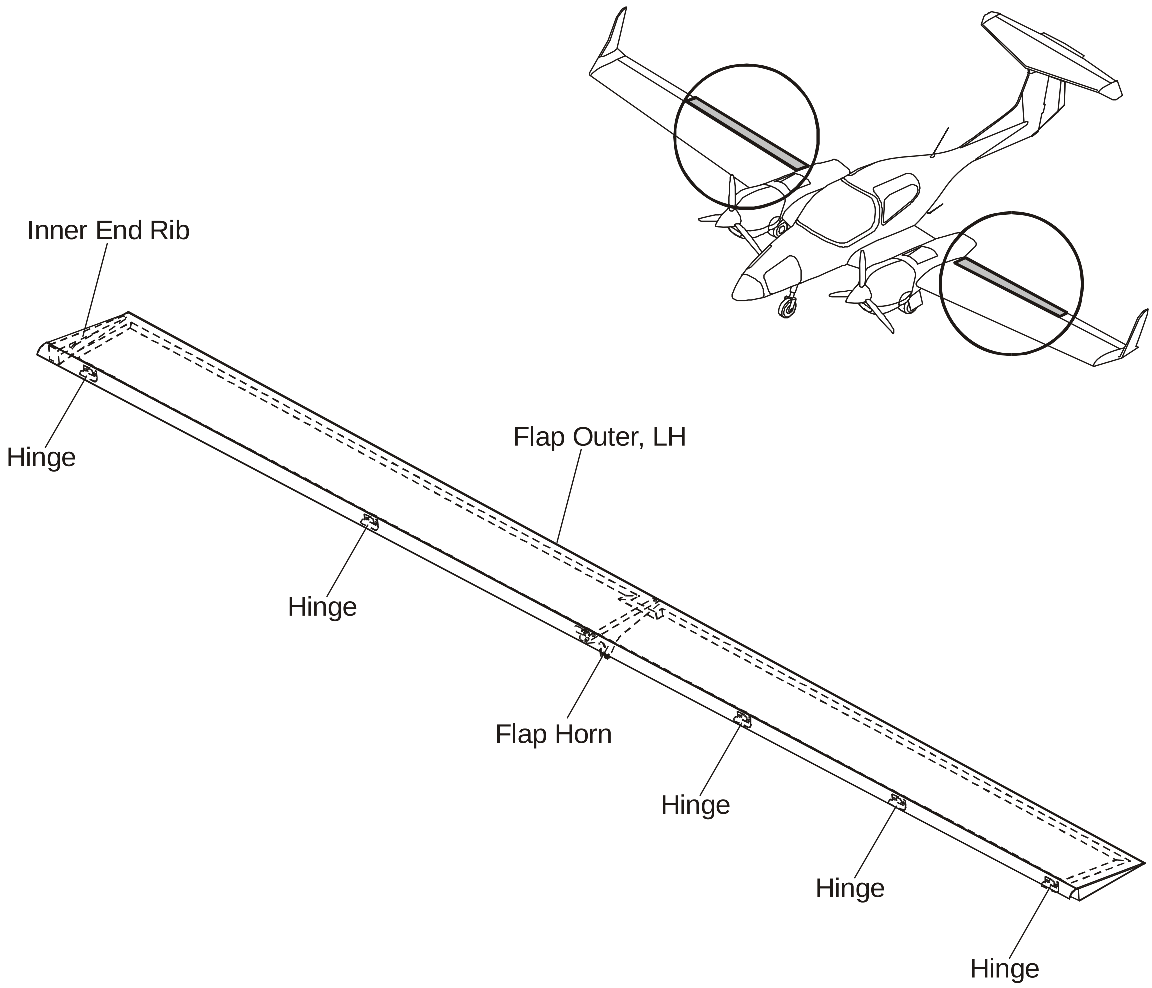


Figure 1: Outer Flap Assembly

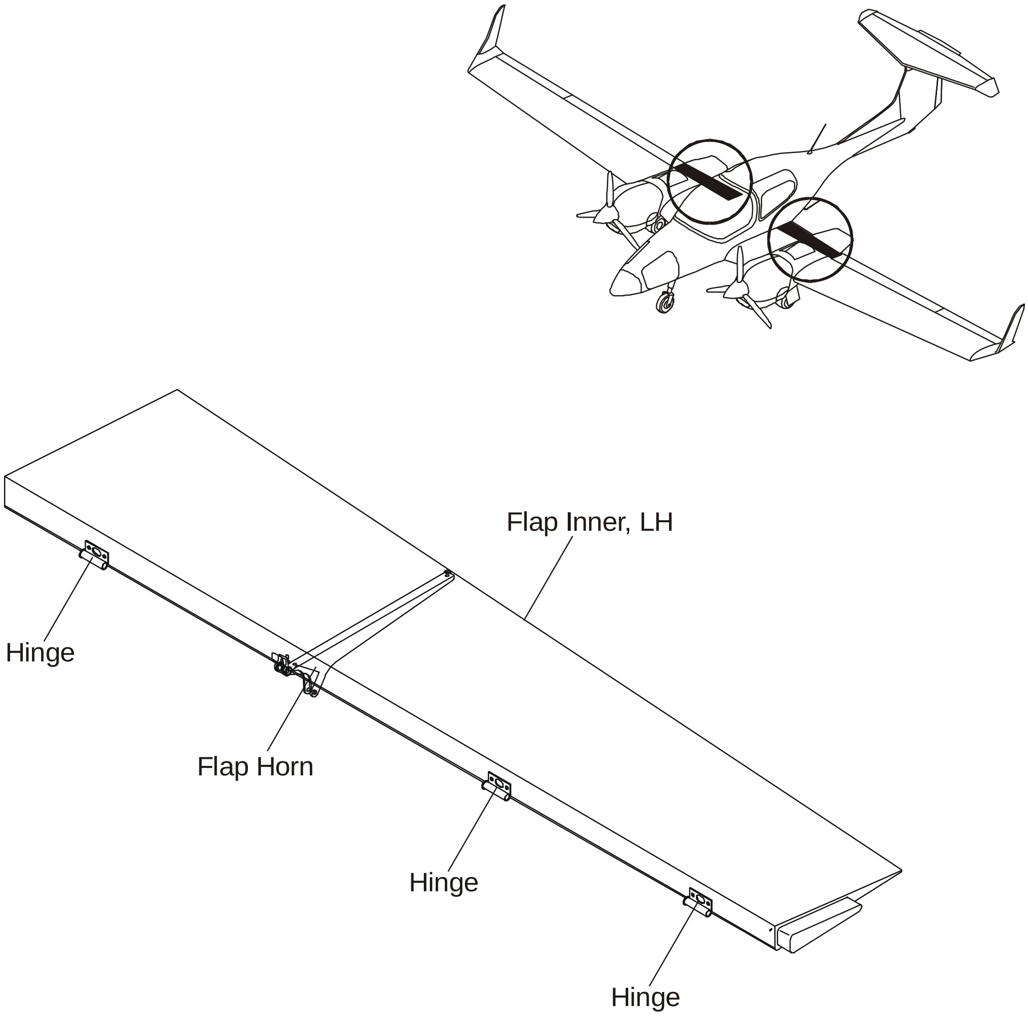


Figure 2: Inner Flap Assembly

B. Inner Flap

The inner flap has a top shell and a bottom shell.

The bottom shell has inner and outer skins which bond to a foam core. The outer layer of the skins are GFRP. The inner layers are CFRP. The leading edge of the shell bends up to form a web.

The inboard end of the bottom shell also bends up to close the end of the flap. The leading edge, the ends, and the area where the horn attaches have more carbon fiber cloth to give more strength and stiffness.

The top shell has inner and outer GFRP skins which bond to a foam core. The outer layer of the skins are GFRP. The inner layers are CFRP. The top shell bonds to the bottom shell and the inner end rib.

The flap has an outer end rib. The outer end rib is a CFRP molding. The rib has an extension which engages with a recess on the outer flap. The end rib bonds to the top and bottom shells.

A flap horn drives the inner flap. The flap horn is an aluminum alloy component. Three bolts attach the horn to the bottom surface of the flap. A small hole in the leading edge of the flap gives access to the front attaching nuts and washers. The horn also makes one of the flap hinges. Two flanged bushes in the front of the horn make the hinge.

Hinges attach the inner flap to the trailing edge of the airplane center section. Each inner flap has four hinges (as well as the flap horn). Two bolts attach each hinge to the leading edge of the flap. A small hole in the middle of the hinge gives access to the attaching nuts and washers. Each hinge has a flanged bush at the inboard end. A plastic plug seals the outboard end.

Maintenance Practices

1. General

These Maintenance Practices tell you how to remove and install the flaps. Refer to Section 27-50 for the flap setting procedure.

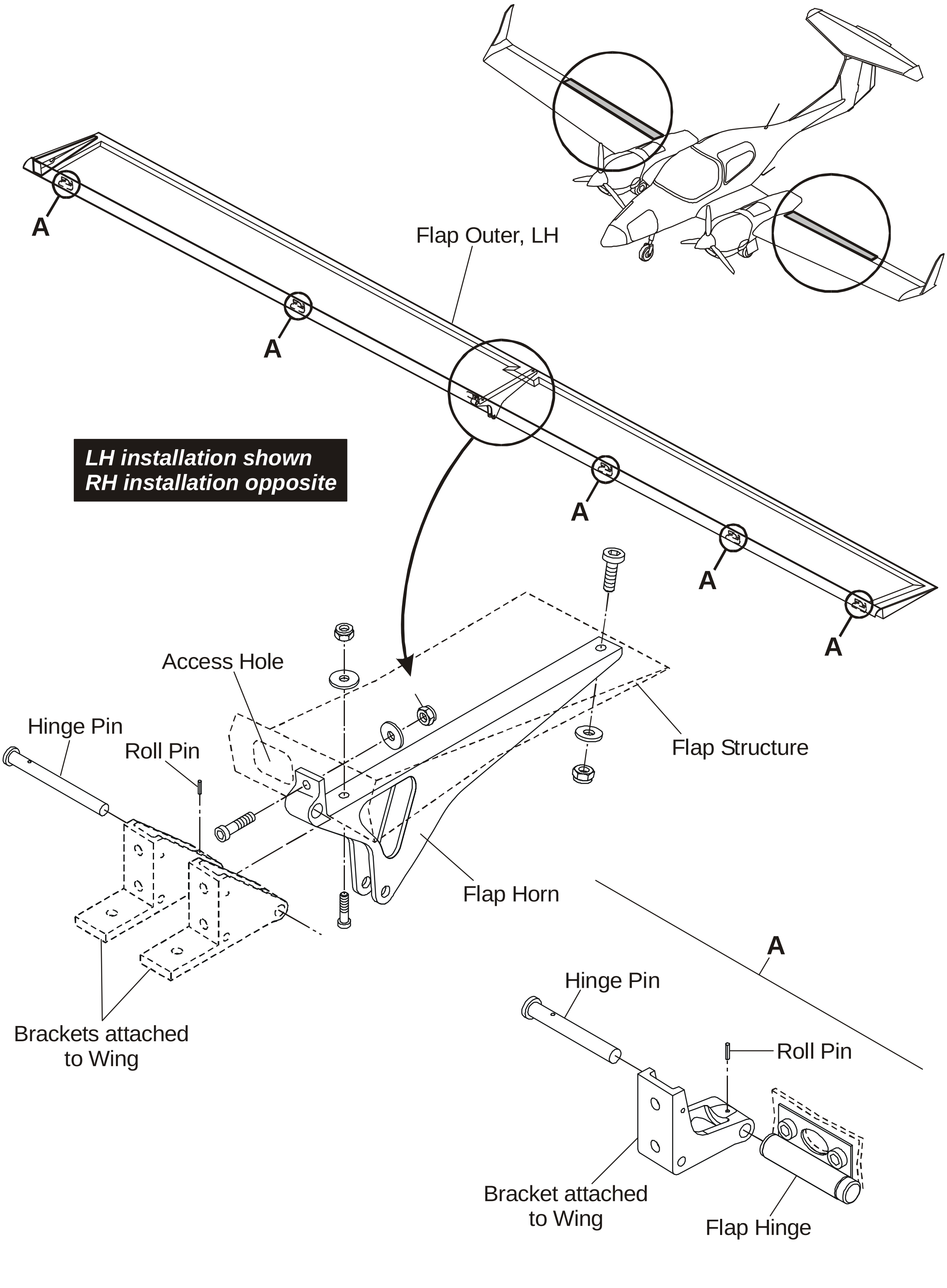


Figure 3: Outer Flap Installation

2. Remove/Install a Flap

A. Remove an Outer Flap

	Detail Steps/Work Items	Key Items/References
	WARNING: MAKE SURE THAT THE AREA AROUND THE FLAPS IS CLEAR OF PERSONS AND EQUIPMENT BEFORE YOU LOWER THE FLAPS. IF NOT, THE FLAPS CAN INJURE PERSONS OR BE DAMAGED BY EQUIPMENT.	
(1)	Lower the flaps: – Set the ELECT. MASTER switch to ON. – Set the flap selector to LDG. – When the flaps stop moving. – Set the ELECT. MASTER switch to OFF.	
(2)	Open the circuit breaker for the flap control.	Instrument panel. Right side.
(3)	Disconnect the flap push rod from the flap horn: – Remove the nut and washer from the bolt which attaches the push rod to the horn. – Remove the attachment bolt and washer from the horn. – Disconnect the bonding wire.	Refer to Figure 3. Hold the flap.
(4)	Remove the 6 hinge pins from the flap hinges and the flap horn: – Remove the roll pins which locate the flap hinge pins. – Move the hinge pins inboard, and clear of the hinges.	Support the flap assembly!
(5)	Carefully move the flap aft, and clear of the airplane.	

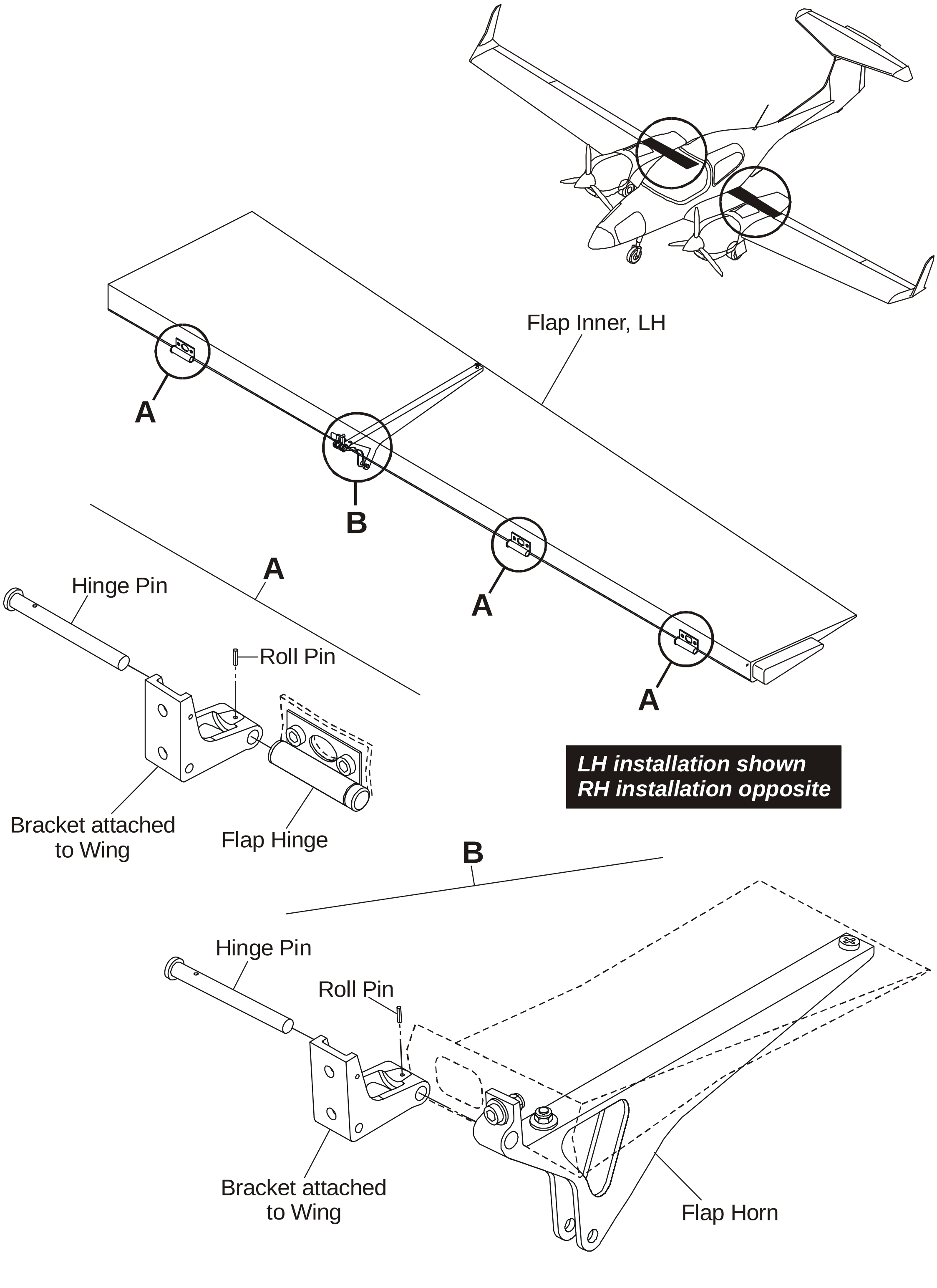


Figure 4: Inner Flap Installation

B. Remove an Inner Flap

	Detail Steps/Work Items	Key Items/References
	WARNING: MAKE SURE THAT THE AREA AROUND THE FLAPS IS CLEAR OF PERSONS AND EQUIPMENT BEFORE YOU LOWER THE FLAPS. IF NOT, THE FLAPS CAN INJURE PERSONS OR BE DAMAGED BY EQUIPMENT.	
(1)	Lower the flaps: – Set the ELECT. MASTER switch to ON. – Set the flap selector to LDG. – When the flaps stop moving. – Set the ELECT. MASTER switch to OFF.	
(2)	Open the circuit breaker for the flap control.	Instrument panel. Right side.
(3)	Disconnect the flap push rod from the flap horn: – Remove the nut and washer from the bolt which attaches the push rod to the horn. – Remove the attachment bolt and washer from the horn. – Disconnect the bonding wire.	Refer to Figure 4. Hold the flap.
(4)	Remove the 4 hinge pins from the flap hinges and the flap horn: – Remove the roll pins which locate the flap hinge pins. – Move the hinge pins inboard, and clear of the hinges.	Support the flap assembly!
(5)	Carefully move the flap aft, and clear of the airplane.	

C. Install an Outer Flap

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the hinge pins are clean and not damaged.	
(2)	Put the flap into position on the airplane.	
(3)	Install the 6 hinge pins in the hinges and flap horn: – Push the hinge pins into position from the inboard side. – Align the holes in the hinges with the holes in the hinge pins and install the roll pins.	Make sure that there is a gap of 0.5 - 2.5 mm (0.002 - 0.010 in) between the faces of the hinge at the horn and a gap of 1 - 3 mm (0.004 - 0.012 in) between the faces at the other hinges.
(4)	Install the bolt which attaches the flap push rod to the flap horn: – Install a washer on the bolt. – Push the bolt through the horn and the push rod. – Install the washer and the nut on the bolt. – Connect the bonding wire.	
(5)	Do a test for correct adjustment of the flaps.	Refer to Section 27-50.
(6)	If necessary for your Airworthiness Authority, do a second inspection of the flap controls.	

D. Install an Inner Flap

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the hinge pins are clean and not damaged.	
(2)	Put the flap into position on the airplane.	
(3)	Install the 4 hinge pins in the hinges and flap horn: – Push the hinge pins into position from the inboard side. – Align the holes in the hinges with the holes in the hinge pins and install the roll pins.	Make sure that there is a gap of 0.5 - 2.5 mm (0.002 - 0.010 in) between the faces of the hinge at the horn and a gap of 1 - 3 mm (0.004 - 0.012 in) between the faces at the other hinges.
(4)	Install the bolt which attaches the flap push rod to the flap horn: – Install a washer on the bolt. – Push the bolt through the horn and the push rod. – Install the washer and the nut on the bolt. – Connect the bonding wire.	
(5)	Do a test for correct adjustment of the flaps.	Refer to Section 27-50.
(6)	If necessary for your Airworthiness Authority, do a second inspection of the flap controls.	

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Section 57-60
Ailerons

1. General

This Section tells you about the aileron. Refer to Section 27-10 for data about the aileron control system.

2. Description

Figure 1 shows the aileron assembly.

The aileron has a bottom shell and a top shell. The bottom shell has inner and outer CFRP skins. The outer and inner layers of the skins are GFRP. The skins bond to a rigid plastic foam core. The leading edge of the shell bends up to form a web. It then curves forward to form a shroud which seals the gap between aileron and wing when the aileron moves down.

The ends of the bottom shell also bend up to close the ends of the aileron. The leading edge, the ends and the area where the horn attaches have more carbon fiber cloth to give more strength and stiffness.

The top shell has inner and outer CFRP skins. The outer and inner layers of the skins are GFRP. The skins bond to a rigid plastic foam core.

The aileron horn is an aluminum alloy component. Three bolts attach the horn to the bottom surface of the aileron. A small hole in the leading edge of the aileron gives access to the front attaching nuts and washers. The horn also makes one of the aileron hinges.

Each aileron has three hinges (as well as the aileron horn). Two bolts attach each hinge to the leading edge of the aileron. A small hole in the middle of the hinge gives access to the attaching nuts and washers. Each hinge has a flanged bush at the inboard end. A plastic plug seals the outboard end.

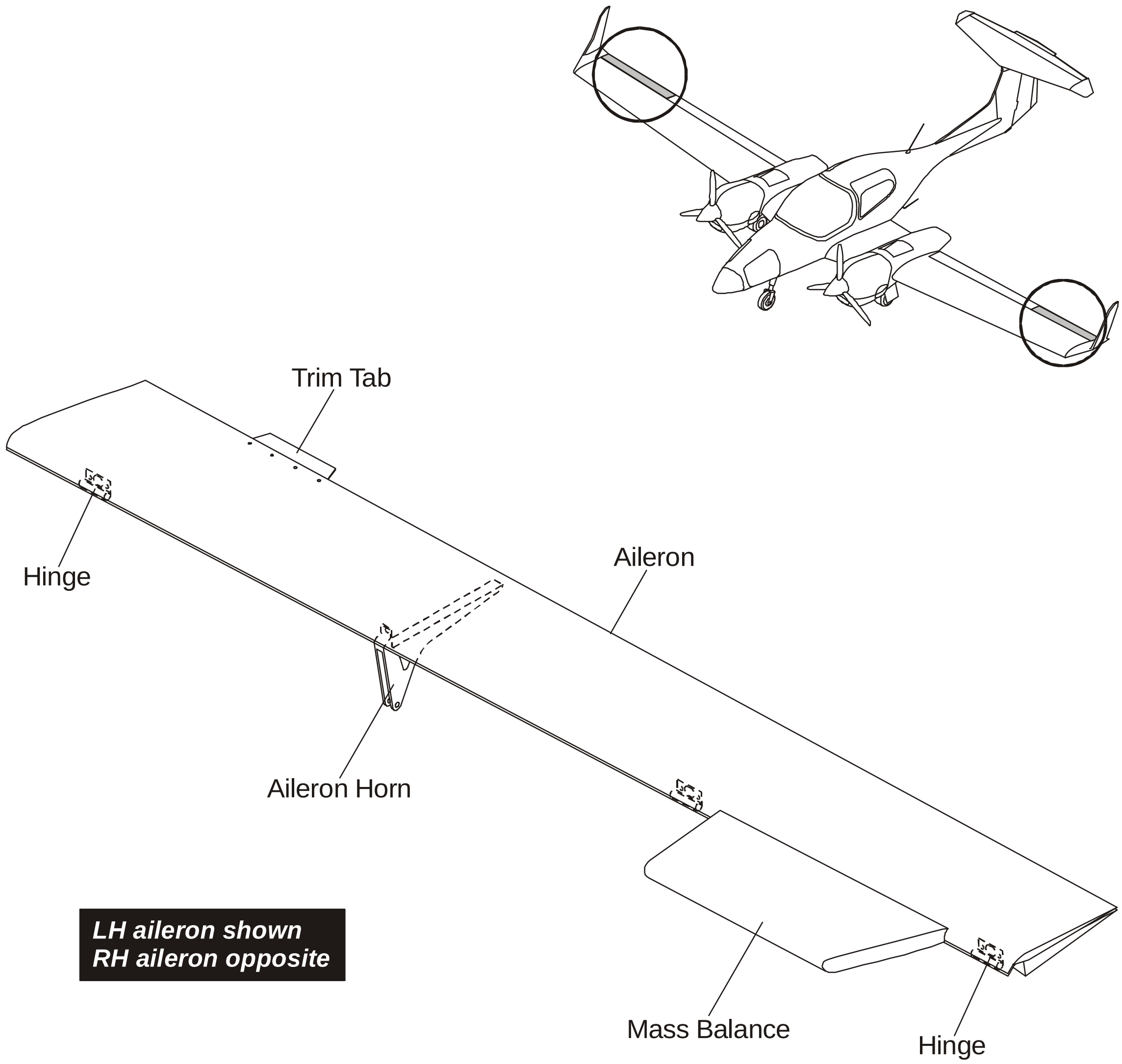

Figure 1: Aileron Assembly

Maintenance Practices

1. General

These Maintenance Practices tell you how to remove and install the ailerons. Refer to Section 27-10 for the aileron control setting procedure.

2. Remove/Install an Aileron

A. Remove an Aileron

	Detail Steps/Work Items	Key Items/References
(1)	Disconnect the aileron push rod from the aileron horn: – Remove the nut and washer from the bolt which attaches the push rod to the horn. – Remove the attachment bolt and washer from the horn.	Hold the aileron.
(2)	Remove the 4 hinge pins from the aileron hinges and the aileron horn: – Remove the roll pins which locate the aileron hinge pins. – Move the hinge pins inboard, and clear of the hinges.	Support the aileron assembly!
(3)	Carefully move the aileron aft, and clear of the airplane.	

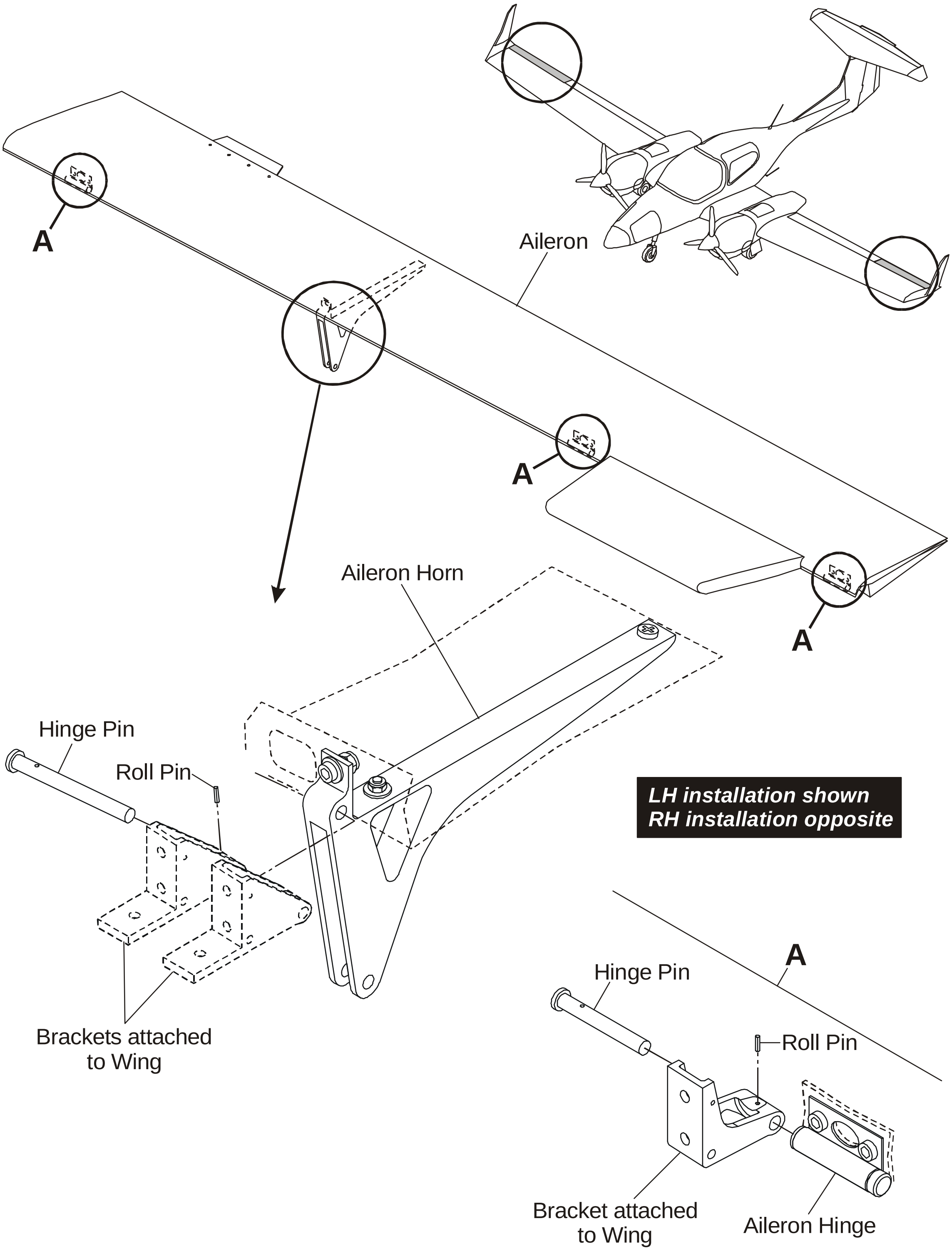

Figure 2: Aileron Installation

B. Install an Aileron

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the hinge pins are clean and not damaged.	
(2)	Put the aileron into position on the airplane.	
(3)	Install the 4 hinge pins in the hinges and aileron horn: – Push the hinge pins into position from the inboard side. – Align the holes in the hinges with the holes in the hinge pins and install the roll pins.	Make sure that there is a gap of 0.5 - 2.5 mm (0.002 - 0.010 in) between the faces of the hinge at the horn and a gap of 1 - 3 mm (0.004 - 0.012 in) between the faces at the other hinges.
(4)	Install the bolt which attaches the aileron push rod to the aileron horn: – Install a washer on the bolt. – Push the bolt through the horn and the push rod. – Install the washer and the nut on the bolt.	
(5)	Do a test for correct adjustment of the aileron.	Refer to Section 27-60.
(6)	If necessary for your Airworthiness Authority, do a second inspection of the aileron controls.	

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CHAPTER 61

PROPELLER

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CHAPTER 61
PROPELLER

1. General

This Chapter tells you about the propeller installed on the DA 42. Refer to Section 61-10 for data about the propeller and refer to Section 61-20 for data about the propeller control.

For more data on the propeller refer to the propeller manufacturer's manuals.

Note: Equipment which is certified for installation in the DA 42 is listed in Section 6.5 of the Airplane Flight Manual. Such equipment may be installed in accordance with the Airplane Maintenance Manual.

Any equipment which is not listed in Section 6.5 of the Airplane Flight Manual is called "Additional Equipment". The installation of Additional Equipment is a modification which must be handled in accordance with national regulations or a Service Bulletin.

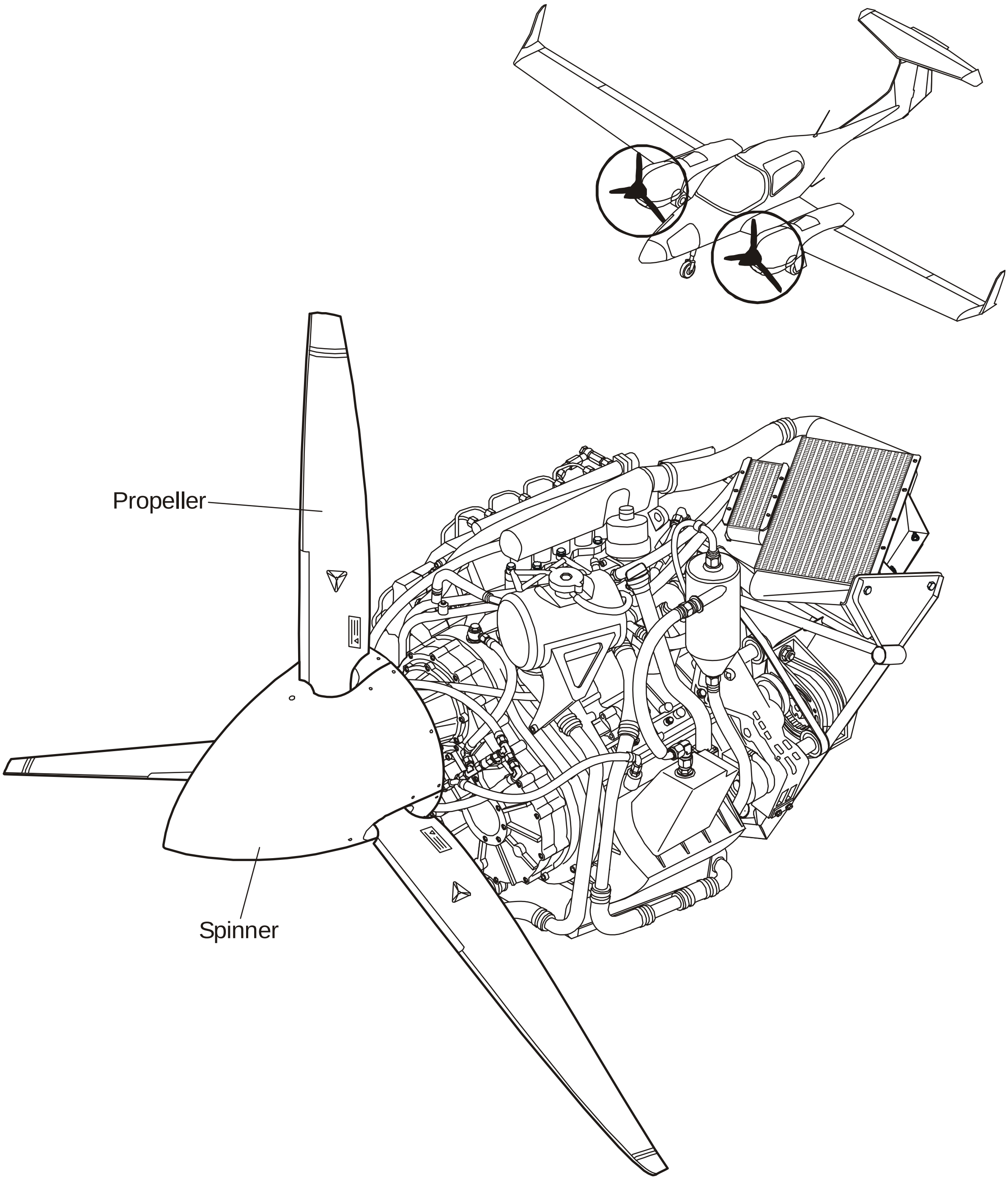

Figure : Propeller Assembly

Section 61-10
Propeller Assembly

1. General

The DA 42 has MTV-6-A-C-F/CF187-129 variable pitch and feathering propellers. Each propeller has 3 blades. The blades are made from wood and are covered with GFRP. The blades have an acrylic lacquer painted finish. The outboard leading-edges of the blades are protected from erosion by a stainless-steel sheath. The stainless-steel sheath is bonded into position. The inboard section of the leading-edge is protected by a self-adhesive rubber strip (PU tape).

This Section tells you how to remove and install the propellers and how to do a test for blade tracking. Section 61-20 tells you about the propeller governor.

Refer to the propeller manufacturer’s manuals for more data on the propeller.

2. Description

Figure 1 shows the propeller. The propeller hub has six studs on the rear face. The propeller attaches to the engine gearbox flange with six nuts and washers.

A spinner bulkhead (spinner backplate) attaches to the rear of the hub with six bolts. The bolts are locked with wire. A front support plate attaches to the front of the hub with six screws. The screws are locked with wire. A spinner which is made from composite material attaches to the aft bulkhead with screws.

When the engine is running centrifugal twisting moments make the propeller blades move towards fine pitch. The propeller of the DA 42 has counterweights attached to the propeller blades. The counterweights overcome the centrifugal twisting moment of the blades and cause the blades to move to coarse pitch.

The engine has a full authority digital engine control system (FADEC). The FADEC controls the propeller pitch hydraulically. Gearbox oil flows via the gearbox driven pump and a pressure limiter valve to the constant speed unit (CSU). The CSU consists of an electrically controlled three-way valve to control the oil pressure in the propeller pitch change mechanism. The oil pressure is increased for lower pitch angles and reduced for higher pitch angles. The oil flows from the governor to the propeller hub through the hollow propeller shaft.

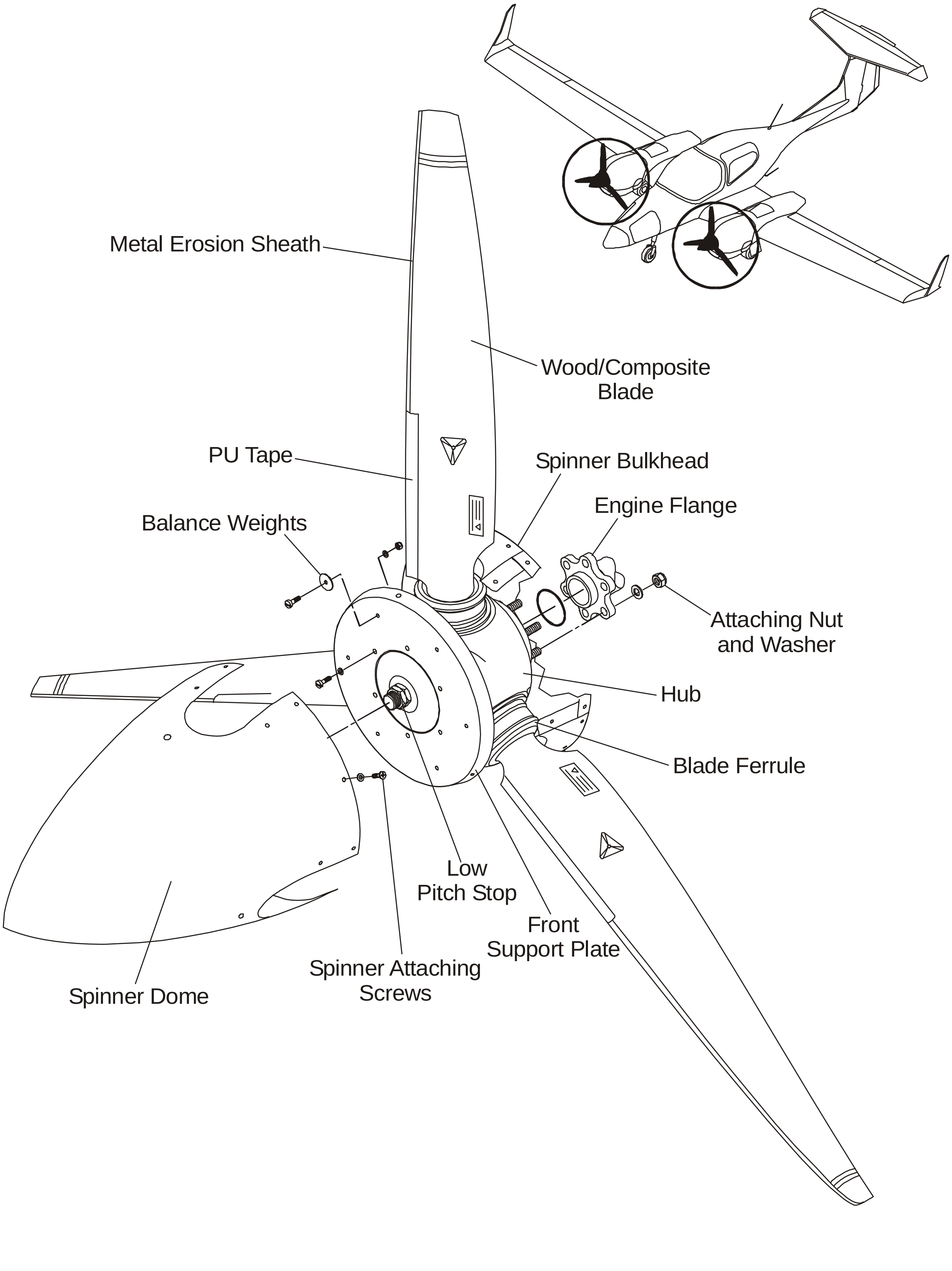

Figure 1: Propeller Assembly

3. Operation

When the propeller is turning, centrifugal twisting moments normally cause the blades to turn towards fine pitch. The propeller installed on the DA 42 has counterweights attached to each propeller blade to overcome the centrifugal twisting moments. The counterweights act in the opposite sense to the centrifugal twisting moments and move the blades towards coarse pitch.

High pressure oil is used to control the propeller pitch. Oil from the engine gearbox is pumped to the constant speed unit (CSU). The CSU directs the oil to the propeller as necessary to control the propeller pitch. Hydraulic pressure in the cylinder acts on a piston and the piston moves the blades towards fine pitch.

The propeller pitch control system is integrated into the engine FADEC system. The pitch is controlled automatically by the FADEC. Depending on the power setting the propeller pitch is adjusted so that the required RPM will be obtained as shown in Figure 2.

An pitch stop (start lock) limits the blade movement towards coarse pitch (propeller RPM below 1300 RPM). When the propeller RPM is higher than 1300 RPM the centrifugal latches (pitch stop) are disengaged and allow the propeller blades to move past the start lock position.

If the oil pressure fails during normal flight (engine RPM greater than 1300), the centrifugal latches are disengaged and the counterweights will cause the propeller to move pass the coarse-pitch-stop to the feather position.

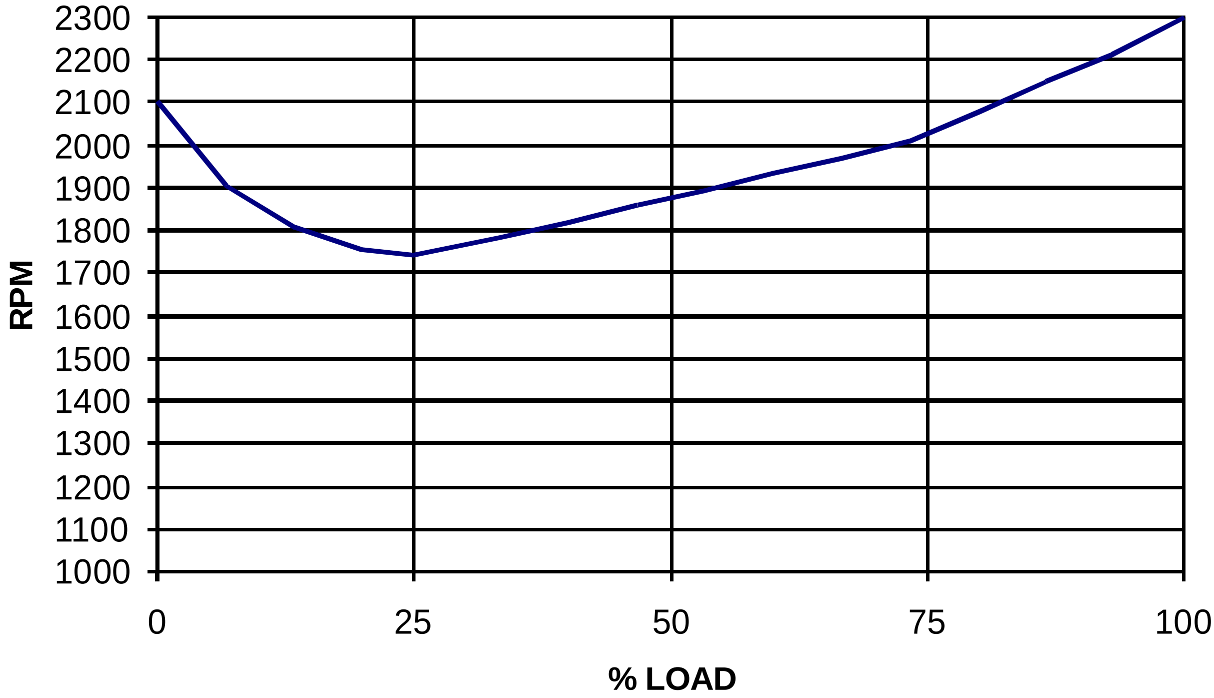

Figure 2: Propeller RPM Adjusted by the Engine FADEC System

Trouble-Shooting

1. General

The table below lists the defects you could have for the propeller. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair in the Repair column.

Trouble	Possible Cause	Repair
Engine vibration.	Propeller out of balance.	Examine the propeller. If you find damage refer to the manufacturer's Owners Manual.
	Spinner out of balance.	Replace the spinner.
	Propeller mounting loose.	Tighten the mounting nuts to the correct torque. Refer to the manufacturer's Owners Manual.
	Spinner attaching screws loose.	Tighten the attaching screws. Refer to the manufacturer's Owners Manual.
	Blade tracking not correct.	Refer to the manufacturer's Owners Manual.
Cracks in the blades.	Over-speed.	Refer to the manufacturer's Owners Manual.
Holes/nicks/dents in the blade.	Stone damage.	Repair/replace the propeller. Refer to the manufacturer's Owners Manual.

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Maintenance Practices

1. General

These Maintenance Practices tell you how to remove and install the propeller. They also tell you how to do a propeller blade tracking test.

2. Remove/Install the MTV-6-A-C-F Propeller

A. Remove the Propeller

	Detail Steps/Work Items	Key Items/References
WARNING:	**MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO ANY WORK ON THE PROPELLER. IF THE ENGINE IS TURNED, THE PROPELLER CAN CAUSE INJURY OR DEATH.**	
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the related ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Remove the engine cowlings.	Refer to Section 71-10.
Note:	Mark the propeller, spinner, front support plate and spinner bulkhead, with an index mark. This will help you install these items in the correct position.	
(3)	Remove the spinner: – Mark the spinner and spinner bulkhead with index marks to aid installation. – Release the screws holding the spinner to the spinner bulkhead and move the spinner clear of the airplane.	Refer to Figure 3.
(4)	Remove the nuts and washers which attach the propeller to the propeller shaft flange.	Hold the propeller!

	Detail Steps/Work Items	Key Items/References
(5)	Pull the propeller forward and clear of the propeller shaft flange.	

B. Install the Propeller

	Detail Steps/Work Items	Key Items/References
	WARNING: MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO ANY WORK ON THE PROPELLER. IF THE ENGINE IS TURNED, THE PROPELLER CAN CAUSE INJURY OR DEATH.	
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the related ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Make sure that the propeller shaft flange and the propeller flange are clean and dry.	
(3)	Make sure that the shipping plug is removed and check the inside of the propeller hub area for contamination.	
(4)	Make sure that a new O-ring oil seal is in place in the propeller hub. Lightly oil the seal.	Refer to Figure 3. Use clean engine oil.
(5)	Move the propeller into position on the propeller shaft flange.	Take care not to damage the propeller O-ring seal.
	Note: Make sure that the propeller is pushed into the correct position by hand. Do not use the nuts to pull the propeller into position.	
(6)	Install the 6 washers and nuts.	
(7)	When the propeller is in the correct position, fully tighten the nuts in opposing pairs.	Refer to mt-Propeller Operation and Installation manual, latest revision.
(8)	Do a test for correct blade track.	Refer to Paragraph 3.

	Detail Steps/Work Items	Key Items/References
(9)	Install the spinner: – Loosely install the screws and plastic washers which attach the spinner to the spinner bulkhead. – Tighten all the attaching screws.	Refer to mt-Propeller Operation and Installation manual, latest revision.
(10)	Install the engine cowlings.	Refer to Section 71-10.
(11)	Do an engine run-up. Do a test for correct operation of the propeller.	Refer to Section 71-00.

3. Propeller Blade Tracking Test

A. Equipment

Item	Quantity	Part Number
Tracking stand.	1	Commercial.

B. Procedure

Refer to mt-Propeller Operation and Installation manual, latest revision.

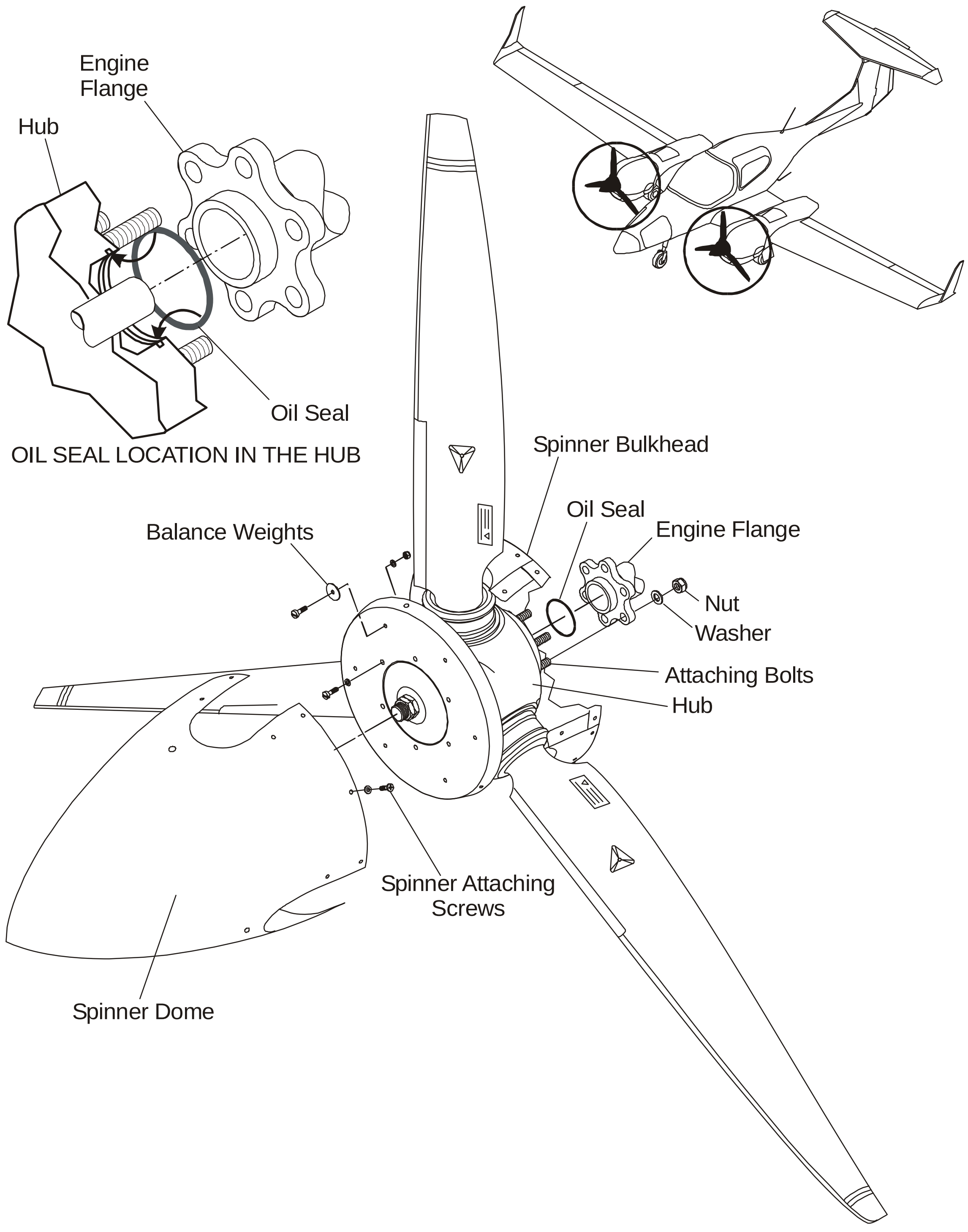

Figure 3: Propeller Installation

Section 61-20
Propeller Control

1. General

The DA 42 has MTV-6-A-C-F/CF187-129 variable pitch and feathering propellers The engines have integral constant speed units (CSUs) The CSU is controlled by the engine FADEC system. The CSU controls the engine speed by changing the propeller blade angle (pitch).

For further information about the constant speed unit refer to the TAE-125 CSUM-02-01, Issue 2 (or later).

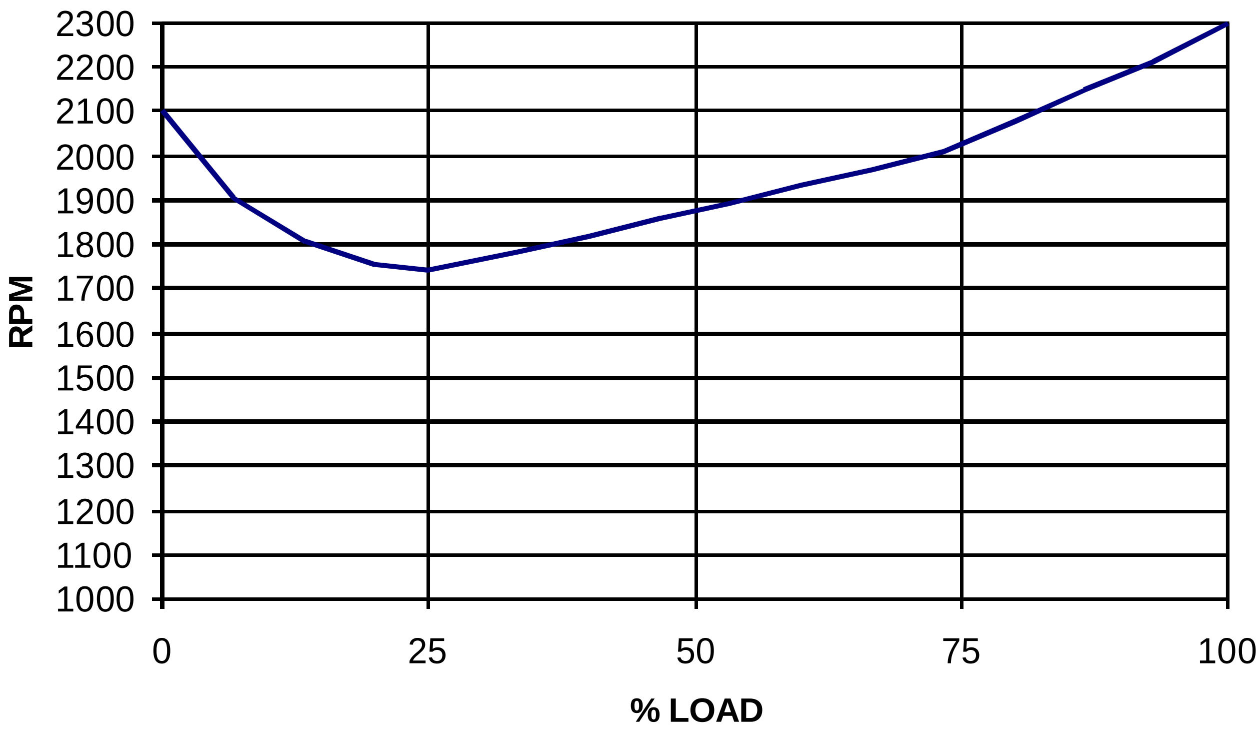

Figure 1: Propeller RPM Adjusted by the FADEC System

2. Description and Operation

The DA 42 has MTV-6-A-C-F/CF187-129 variable pitch and feathering propellers. A counterweight is fitted to each propeller blade. When the propeller is rotating the counterweight overcomes the centrifugal twisting moment and causes the blades to move towards coarse pitch. The propeller uses oil pressure to decrease the blade angle (pitch).

The CSU is an integral part of the engine control system. The engine control system measures many engine parameters. The propeller blade angle is adjusted automatically. The pilot has only one lever for each engine to control the engine performance. Figure 1 shows the propeller RPM as set by the engine FADEC system for a given load.

As with other constant speed propeller control systems, the CSU senses engine RPM and alters oil pressure to the propeller to change blade angle as necessary. Depending on the power setting the propeller pitch is adjusted so that the required RPM will be obtained as shown in Figure 1. Figure 2 shows a the propeller control system schematic diagram. A capillary tube prevents the system from failing during negative acceleration.

The inlet oil pressure at the CSU is 20 bar (290 PSI). If the engine speed is too high, the CSU operates the governor three-way-valve so that the oil flows out from the propeller. The counterweights on each blade moves the blades to a coarse pitch and increases the blade angle. This reduces the RPM.

If the engine speed is too low, the CSU operates the governor three-way-valve so that the oil flows into the propeller. The piston moves to reduce the blade angle. This increases engine RPM.

During normal operation a pre-set coarse-pitch-stop prevents the propeller blades from moving past a pre-set blade angle. A centrifugal latching mechanism disengages the coarse-pitch-stop when the propeller is rotating at speeds greater than 1300 RPM. If the engine fails in flight, or if the propeller oil supply fails in flight, the blade counterweights will increase the blade pitch angle. If the engine is rotating faster than 1300 RPM the centrifugal latching mechanism will be disengaged and the propeller blades can move to the feather position. The propeller pitch angle in feather position is 81° ± 1°.

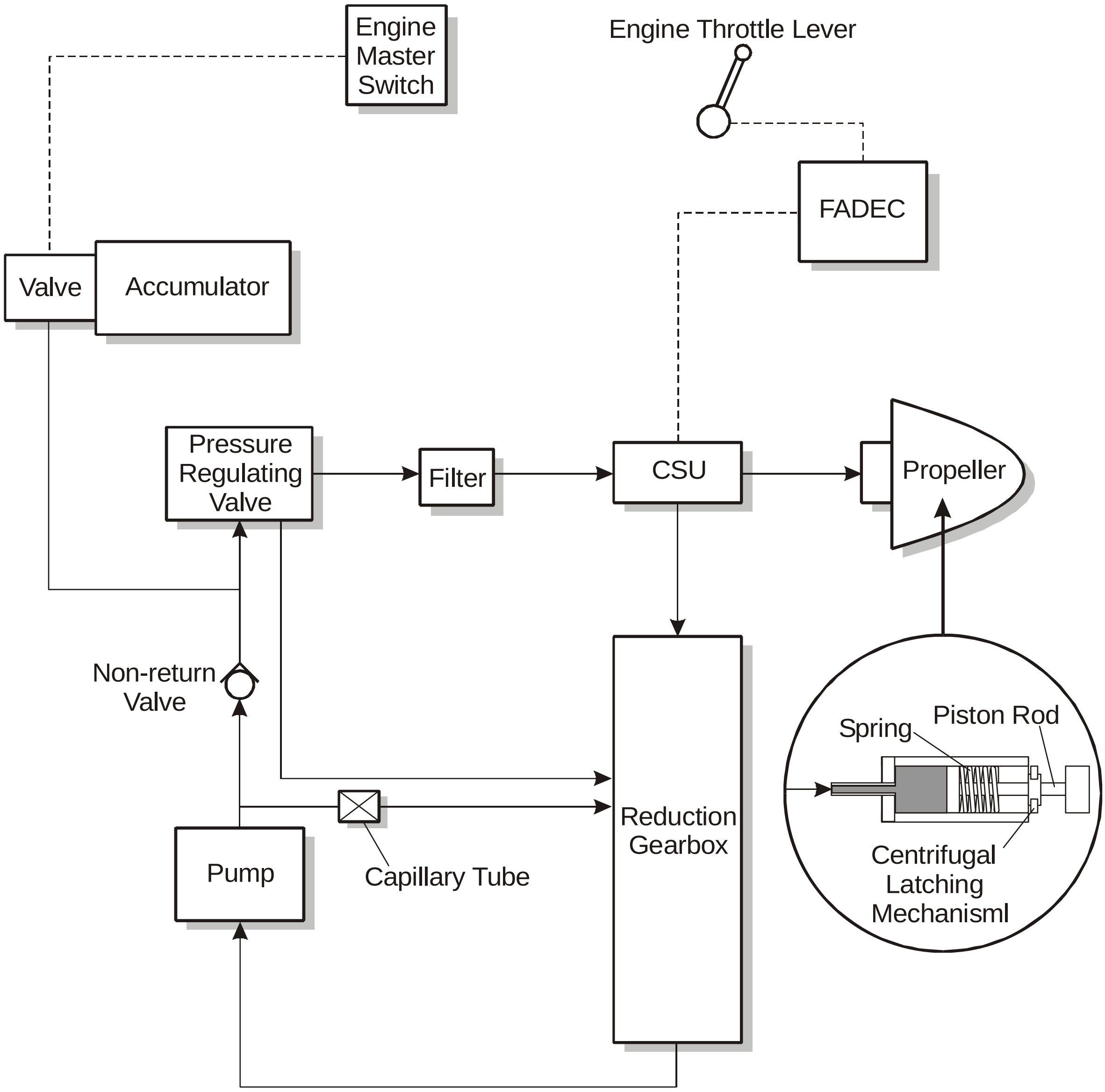

Figure 2: Propeller Control System Schematic Diagram

A nitrogen-oil type accumulator is installed in the propeller control system. Oil at system pressure can flow into the accumulator through an electrically operated shut-off valve. When the ENGINE MASTER switch is set to OFF the accumulator shut-off valve is closed. Oil is stored in the accumulator at normal system pressure.

To un-feather the propeller you must set the ENGINE MASTER switch to ON. This will open the electric valve at the accumulator and allow oil to flow under pressure from the accumulator to the propeller. The oil flowing to the propeller will cause the blades to move into low pitch position. The propeller pitch angle in low pitch position is 12° ± 0.2°. As soon as the propeller starts turning and the gearbox oil operates, the accumulator will be refilled.

The specified propeller settings are given as follows:

– Low pitch: 12° ± 0.2°

– Start lock position: 15° ± 1.5°

– Feathered position: 81° ± 1°

Trouble-Shooting

1. General

The table below lists the defects you could have for the propeller control. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair in the Repair column.

Trouble	Possible Cause	Repair
Propeller RPM erratic.	Engine gearbox oil level low.	Replenish gearbox oil level. Refer to Chapter 72.
	Engine gearbox oil contaminated.	Replace engine gearbox oil. Refer to Chapter 72.
	CSU micro-filter contaminated/partially blocked.	Replace the CSU micro-filter and replace the gearbox oil.
	Electrical connection between related engine FADEC system and CSU pressure control valve.	Do a continuity check of the wiring between the FADEC system and CSU pressure control valve. Replace/repair faulty wiring. Refer to Chapter 92 for the wiring diagrams.
	CSU defective.	Replace gearbox (with CSU).

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Maintenance Practices

1. General

This Section tells you how to replace the CSU micro-filter and how to replace the CSU. It also tells you how to replace the propeller un-feathering accumulator.

2. Remove/Install the CSU Micro-Filter

A. Remove the CSU Micro-Filter

Refer to TAE 125-01 Operation and Maintenance Manual, latest revision (if TAE 125-01 engine is installed) or TAE 125-02 Operation and Maintenance Manual, latest revision (if TAE 125-02-99 or TAE 125-02-114 engines are installed).

B. Install the Micro-Filter

Refer to TAE 125-01 Operation and Maintenance Manual, latest revision (if TAE 125-01 engine is installed) or TAE 125-02 Operation and Maintenance Manual, latest revision (if TAE 125-02-99 or TAE 125-02-114 engines are installed).

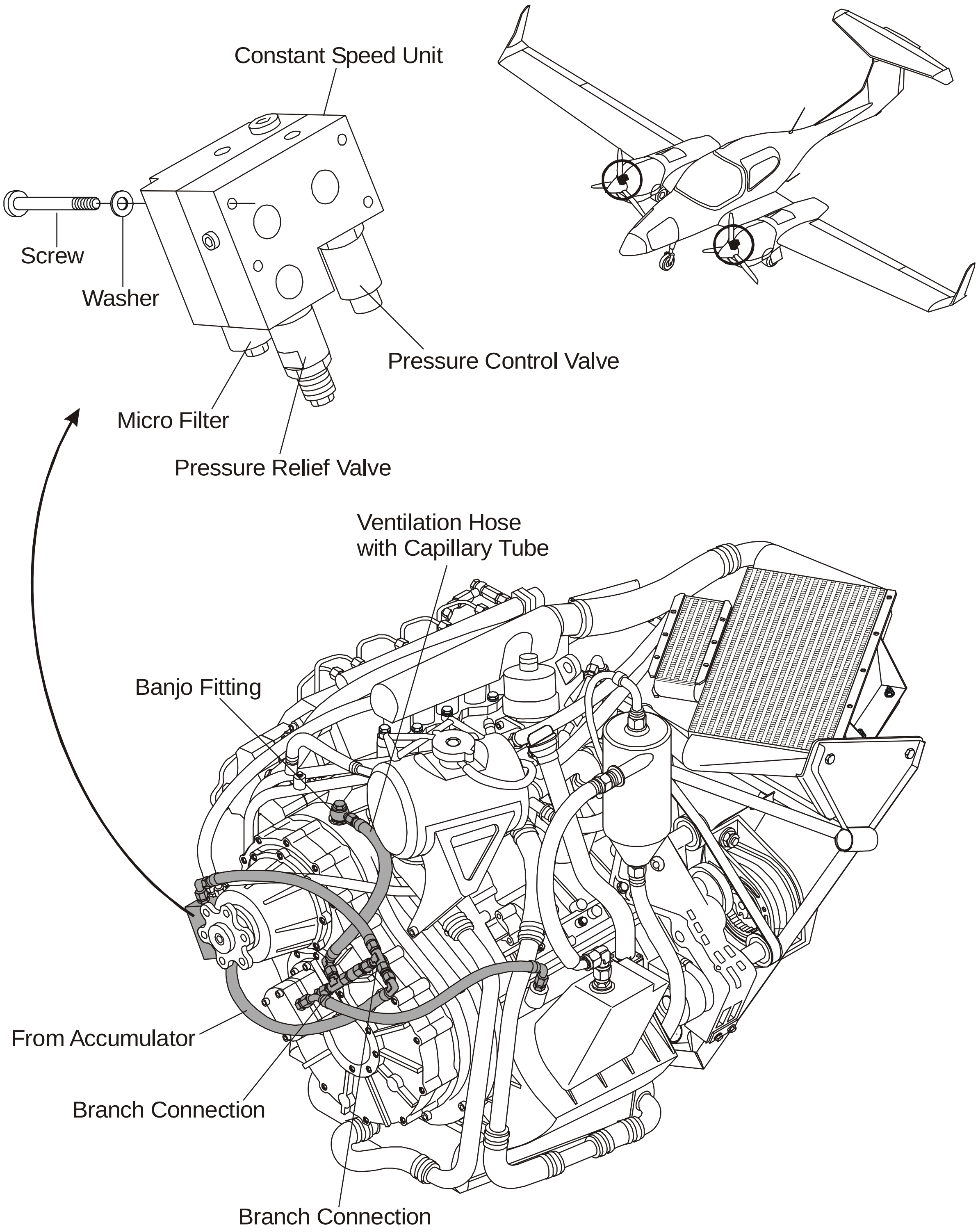

Figure 3: Propeller CSU Assembly

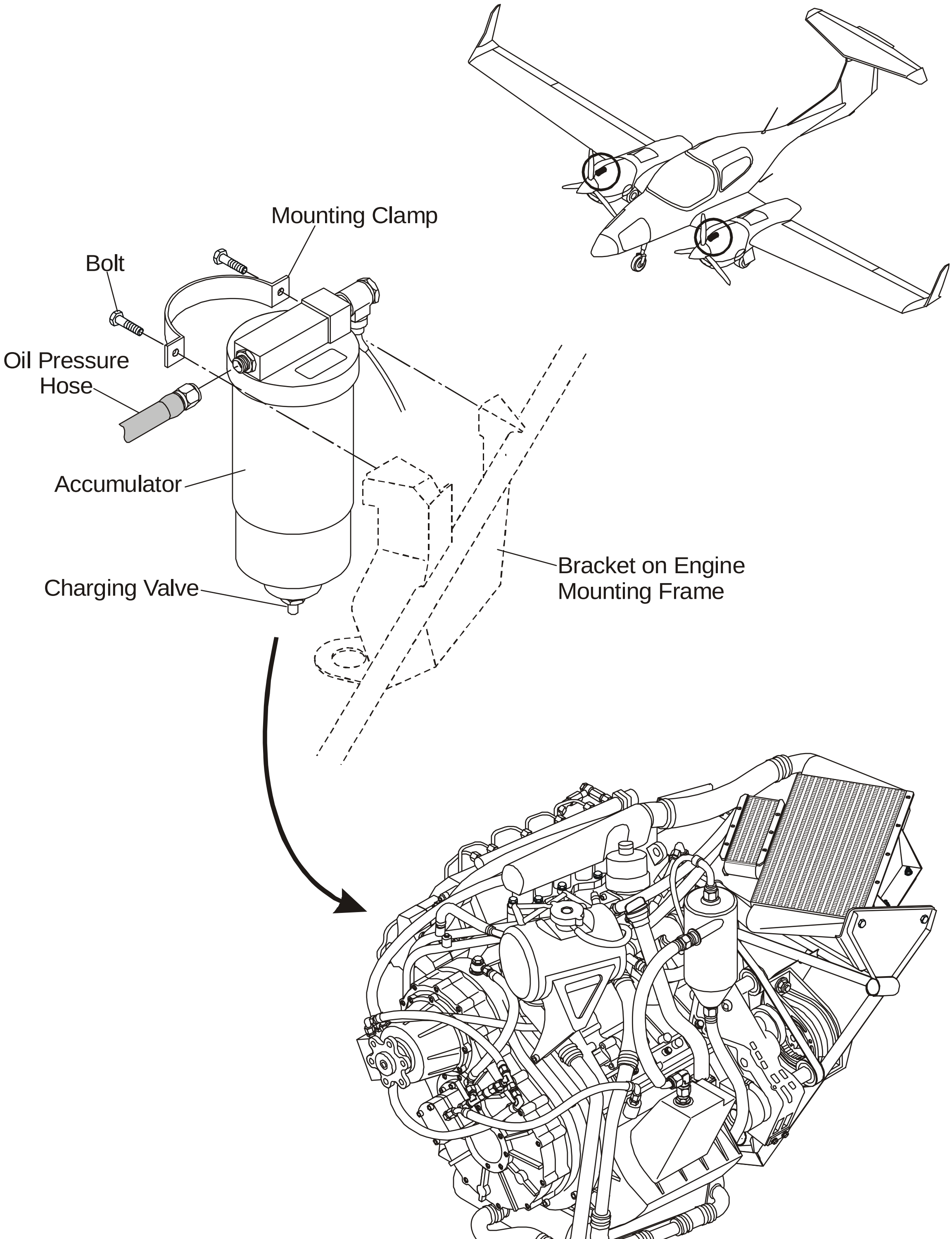

Figure 4: Propeller Un-Feathering Accumulator Installation

3. Remove/Install the Propeller Un-Feathering Accumulator

A. Remove the Propeller Un-Feathering Accumulator

	Detail Steps/Work Items	Key Items/References
	WARNING: MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO ANY WORK ON THE PROPELLER. IF THE ENGINE IS TURNED, THE PROPELLER CAN CAUSE INJURY OR DEATH.	
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the related ENGINE MASTER switch to OFF. – Set the power lever to IDLE.	
(2)	Remove the engine cowlings.	Refer to Section 71-10.
	WARNING: YOU MUST RELEASE ALL THE NITROGEN PRESSURE FROM THE ACCUMULATOR BEFORE YOU REMOVE IT. NITROGEN AT HIGH PRESSURE CAN PENETRATE THE SKIN. THIS CAN CAUSE DISEASE.	
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE SEVERE INJURY OR DEATH TO PERSONS.	

	Detail Steps/Work Items	Key Items/References
(3)	Drain the propeller un-feathering accumulator: – Set the ELECT. MASTER switch to ON. – Set the related ENGINE MASTER switch to ON. – Wait 30 seconds. – Set the related ENGINE MASTER SWITCH to OFF. – Set the ELECT. MASTER switch to OFF.	Opens the shut-off valve. Closes the shut-off valve.
(4)	Release the nitrogen pressure from the accumulator: – Release the pressure from the charging valve at the end of the accumulator.	
(5)	Disconnect the electrical cables from the shut-off valve.	At the in-line connector at the shut-off valve.
(6)	Disconnect the oil hose from the accumulator.	Use a suitable container to collect spilt oil.
(7)	Remove the accumulator: – Remove the 2 bolts on engine mount that hold the accumulator. – Remove both mounting clamps. – Lift the accumulator clear of the mounting bracket.	Support the accumulator!

B. Install the Propeller Un-Feathering Accumulator

	Detail Steps/Work Items	Key Items/References
WARNING:	**MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO ANY WORK ON THE PROPELLER. IF THE ENGINE IS TURNED, THE PROPELLER CAN CAUSE INJURY OR DEATH.**	
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the related ENGINE MASTER switch to OFF. – Set the power lever to IDLE.	
(2)	Install the accumulator: – Move the accumulator into position in the mounting bracket. – Install both mounting clamps. – Install the 2 bolts that attach the accumulator to the mounting bracket. – Tighten the bolts.	Make sure that the accumulator is orientated correctly.
(3)	Install the oil hose to the shut-off valve.	
(4)	Connect the electrical cables to the shut-off valve.	At the in-line connector at the shut-off valve.
(5)	Charge the accumulator to the correct nitrogen pressure.	Refer to Section 61-20.
(6)	Install the engine cowling.	Refer to Section 71-10.
(7)	Perform an engine test run.	Refer to Section 71-00.
(8)	Remove the engine cowlings.	Refer to Section 71-10.
(9)	Check for leakage, especially in the area of the propeller un-feathering accumulator.	
(10)	Check the gearbox oil level and refill if necessary.	Refer to Section 12-20.

	Detail Steps/Work Items	Key Items/References
(11)	Do a test for the correct operation of the un-feathering accumulator.	Refer to Section 61-20.
(12)	Install the engine cowlings.	Refer to Section 71-10.

4. Propeller Un-Feathering Test

	Detail Steps/Work Items	Key Items/References
WARNING:	**DO NOT LET PERSONS INTO THE SAFETY RANGE OF THE AIRPLANE. PROPELLERS CAN CAUSE INJURY OR DEATH.**	
(1)	Position the airplane on level ground. Make sure that: – There are no loose stones on the ground near the propeller. – The safety zone around the airplane is clear. – The airplane heads into the wind.	
(2)	Put chocks in front of each main wheel.	
(3)	Set the parking brake to ON.	
(4)	Make sure that the ENGINE FUEL SELECTOR is set to ON for both engines.	
(5)	Make sure that the passenger door is closed and locked. Close and lock the canopy.	
(6)	Set both engine power levers to 0%.	Make sure that the power levers are free to move.
(7)	Set the ELECT. MASTER key switch to ON.	
(8)	Set the alternate air control to OFF.	
(9)	Make sure the area of the propellers is clear.	
(10)	Set the related ENGINE MASTER switch to ON.	
(11)	Make sure that the engine instruments read correctly.	The RPM, LOAD and FUEL FLOW indications must be zero (0). Dashes (-) indicate a malfunction.

	Detail Steps/Work Items	Key Items/References
(12)	Turn the START key switch to the LH or RH position as required.	Do not start the engine as long as the white GLOW status light is illuminated.
(13)	When the selected engine starts: Release the START key switch.	
(14)	Leave the power lever at 0%.	Make sure that there are no warning lights on.
(15)	Monitor the oil pressure.	The oil pressure must rise to 1 bar minimum, within 3 seconds of starting the engine. If it does not, then you must shut-down the engine.
(16)	Let the engine idle at 890 RPM for 2 minutes.	Monitor the engine instruments for unusual indications.
(17)	Set the power lever to give a speed frequency of 1500 RPM.	
(18)	Shut off the engine by setting the related ENGINE MASTER switch to OFF.	The engine must stop. The propeller must feather (→ feathered position: 81°)
(19)	Reset the ENGINE MASTER switch to ON.	Do not start the engine.
(20)	Observe the change in propeller pitch angle.	The propeller must un-feather within 12 to 15 sec (→ low pitch: 12°). Check the functional efficiency of the accumulator if the propeller does not un-feather.
(21)	Set the ENGINE MASTER switch to OFF.	The propeller must remain in the un-feathered position. There is just a small change in pitch angle of 3° (→ start lock position: 15°) Check the functional efficiency of the accumulator if the propeller does not remain in the un-feathered position.
(22)	Set both engine power levers to 0%.	
(23)	Redo steps 9 thru 22 for the other engine.	
(24)	Set the ELECT. MASTER switch to OFF.	

5. Charge the Un-Feathering Accumulator

	Detail Steps/Work Items	Key Items/References
WARNING:	**MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO ANY WORK ON THE PROPELLER. IF THE ENGINE IS TURNED, THE PROPELLER CAN CAUSE INJURY OR DEATH.**	
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the related ENGINE MASTER switch to OFF. – Set the power lever to IDLE.	
(2)	Remove the cap from the charging valve and connect a suitable nitrogen supply to the charging valve.	
WARNING:	**DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER.** **IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE SEVERE INJURY OR DEATH TO PERSONS.**	
(3)	Energize the shut-off valve: – Set the ELECT. MASTER switch to ON. – Set the related ENGINE MASTER switch to ON.	Opens the shut-off valve.
(4)	Charge the accumulator to the correct pressure.	Follow the manufacturer's instruction for the nitrogen supply: mt-Propeller accumulator P/N P-893: 10.4 bar (150 PSI). Mayer accumulator P/N X11-0007-00-00: 10.5 bar (152 PSI).

	Detail Steps/Work Items	Key Items/References
(5)	Secure the engine: – Set the related ENGINE MASTER switch to OFF. – Set the ELECT. MASTER switch to OFF.	 Closes the shut-off valve.
(6)	Disconnect the nitrogen supply and install the cap onto the charging valve.	

CHAPTER 71

POWER PLANT

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CHAPTER 71
POWER PLANT

1. General

This Chapter tells you about the power plant with the TAE 125-01, the TAE 125-02-99 (MÄM 42-198 carried out) or TAE 125-02-114 (OÄM 42-252 carried out) Diesel engine installed in the DA 42. It tells you about the components that make the power plant. It also tells you how to remove/install the power plant.

For data on the engine test after installation refer to the TAE Operation and Maintenance Manual OM-02-01, latest revision, if the TAE 125-01 engine is installed. If the TAE 125-02-99 or TAE 125-02-114 engine is installed, refer to the TAE Operation and Maintenance Manual OM-02-02, latest revision. Refer to the DA 42 Airplane Flight Manual for engine start/stop procedures. For particular information on the receivable firmware refer to DAI SI 42.003.

Refer to these Chapters for data about other engine systems:

- Chapter 72. For data on the engine refer to the TAE Operation and Maintenance Manual OM-02-01, latest revision, if the TAE 125-01 engine is installed. If the TAE 125-02-99 or the TAE 125-02-114 engine is installed, refer to the TAE Operation and Maintenance Manual OM-02-02, latest revision.
- Chapter 73. Engine fuel and control. For data on the fuel injection system refer to the TAE Operation and Maintenance Manual OM-02-01, latest revision, if the TAE 125-01 engine is installed. If the TAE 125-02-99 or the TAE 125-02-114 engine is installed, refer to the TAE Operation and Maintenance Manual OM-02-02, latest revision.
- Chapter 76. Engine controls.
- Chapter 77. Engine indicating.
- Chapter 78. Exhaust system.
- Chapter 79. Oil system components installed in the airframe. For data on the engine oil system refer to the TAE Operation and Maintenance Manual OM-02-01, latest revision, if the TAE 125-01 engine is installed. If the TAE 125-02-99 or the TAE 125-02-114 engine is installed, refer to the TAE Operation and Maintenance Manual OM-02-02, latest revision.

– Chapter 80. Starter system control and installation. For data on the starter refer to the TAE Operation and Maintenance Manual OM-02-01, latest revision, if the TAE 125-01 engine is installed. If the TAE 125-02-99 or the TAE 125-02-114 engine is installed, refer to the TAE Operation and Maintenance Manual OM-02-02, latest revision.

– Chapter 81. Turbo charger.

Note: Equipment which is certified for installation in the DA 42 is listed in Section 6.5 of the Airplane Flight Manual. Such equipment may be installed in accordance with the Airplane Maintenance Manual.

Any equipment which is not listed in Section 6.5 of the Airplane Flight Manual is called "Additional Equipment". The installation of Additional Equipment is a modification which must be handled in accordance with national regulations or a Service Bulletin.

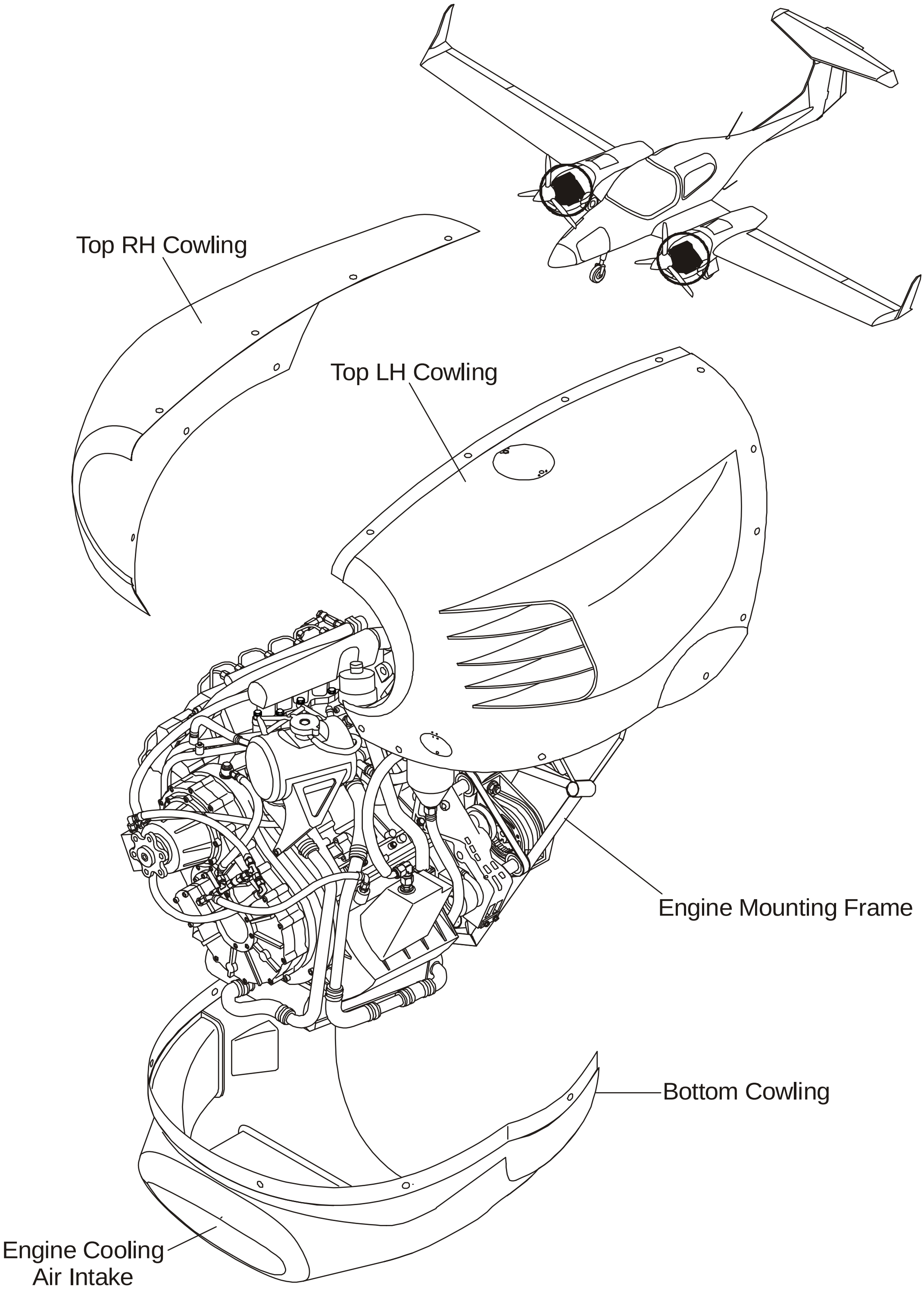

Figure 1: DA 42 Power Plant (TAE 125-01 Engine)

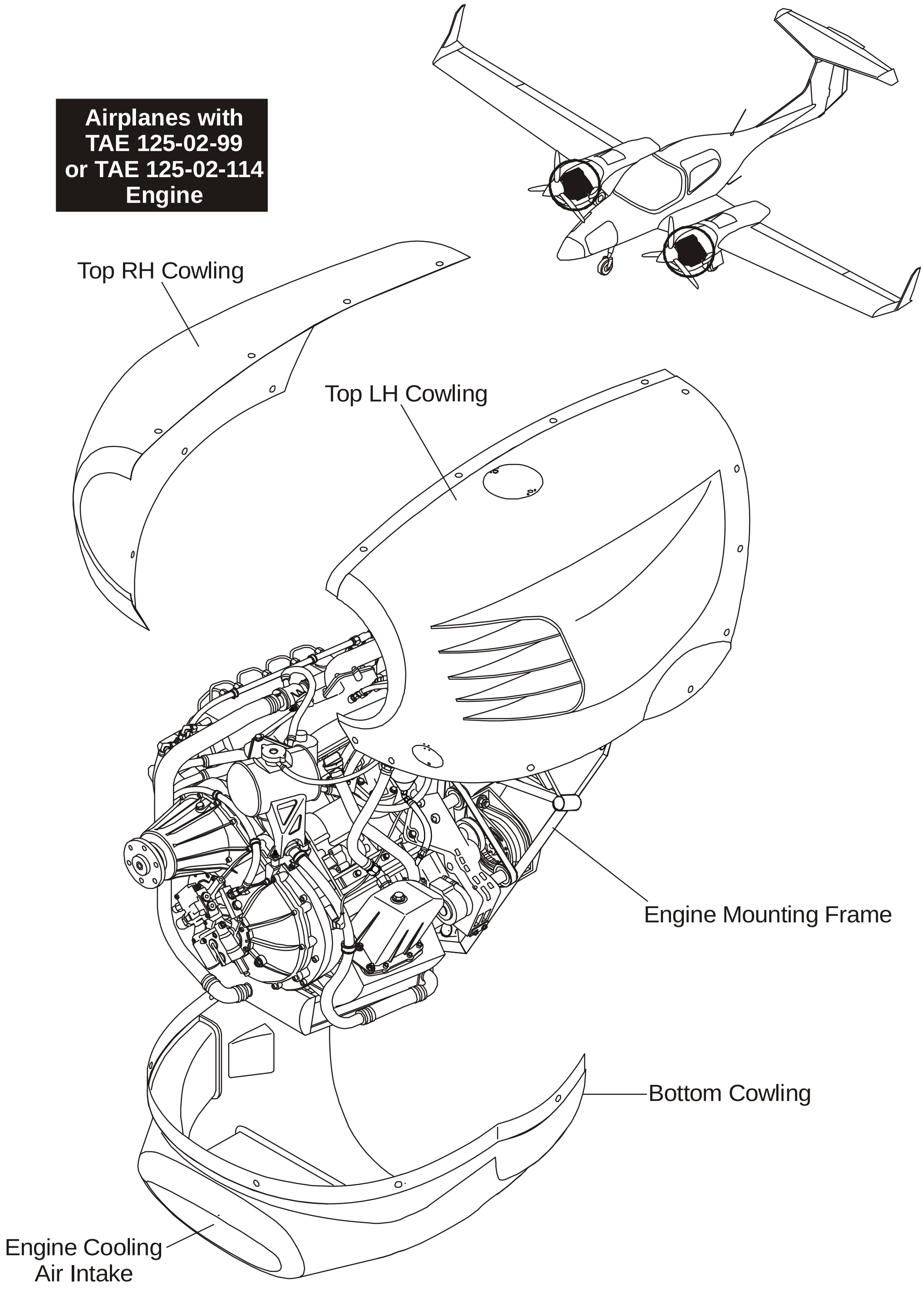

Figure 2: DA 42 Power Plant (TAE 125-02-99 Engine, MÄM 42-198 or TAE 125-02-114 Engine, OÄM 42-252 carried out)

2. Description an Operation

The DA 42 has a TAE 125-01 or a TAE 125-02-99 (MÄM 42-198 carried out) or a TAE 125-02-114 (OÄM 42-252 carried out) 4-cylinder, in line turbo-charged Diesel engine with double overhead camshafts. The engine has a reduction gear and a wet sump oil system. The TAE 125-01, the TAE 125-02-99 (MÄM 42-198 carried out) and the TAE 125-02-114 (OÄM 42-252 carried out) are liquid cooled and have a high-pressure, common-rail fuel injector system. They have an electric starter.

The TAE 125-01, the TAE 125-02-99 (MÄM 42-198 carried out) and the TAE 125-02-114 (OÄM 42-252 carried out) engines have a reduction gear. A hollow gear shaft lets oil flow to the propeller from the propeller governor. The propeller flange has 6 mounting holes. The propeller turns in a clockwise direction when viewed from the cockpit.

An electronic system the full authority digital engine control (FADEC) monitors and controls engine and propeller performance.

The power plant has these components installed:

A. Cowlings

The power plant has a left side cowling, a right side cowling and bottom engine cowling. All the cowlings attach to each other and the engine nacelle with Camloc quick release fasteners.

The bottom cowling has air intakes for the engine cooling, the cabin heat exchanger and the engine air intake.

B. Engine Mounts

The engine mount attaches to the firewall at five locations. Tubular steel makes the mounting frame. The engine attaches to the engine mount with three shock-mounts. Gel-filled rubber elements make the engine shock-mounts.

C. Electrical Harness

Electrical cables go through the firewall to connect to the engine. They give electrical supply to the engine sensors. Electrical cables from the main battery and from the generator supply electrical power to the airplane electrical system.

3. Engine Specification

Note: The engine drives the propeller through a speed-reducing gear. All RPMs are shown as propeller RPMs.

TAE 125-01 Engine Specification	
Engine manufacturer.	Thielert Aircraft Engines.
Engine model.	TAE 125-01.
Engine operating limits: – Maximum take-off power. – Maximum continuous power. – Maximum overspeed (max. 20 sec).	 99 kW (135 DIN-hp) at 2300 ± 50 RPM. 99 kW (135 DIN-hp) at 2300 ± 50 RPM. 2500 RPM.
Oil pressure (indicated values are corrected for pressure altitude).	Refer to Airplane Flight Manual.
Oil temperature.	Refer to Airplane Flight Manual.
Oil consumption: – Maximum.	 0.1 liters/hr. (0.11 US qts/hr.).
Oil quantity.	Refer to Airplane Flight Manual.
Coolant temperature.	Refer to Airplane Flight Manual.
Fuel consumption.	Refer to Airplane Flight Manual.
Gearbox oil capacity.	1 liter (1.06 US qts).
Engine weight, bare.	134 kg (295.4 lb).
Fuel grade.	Refer to Airplane Flight Manual.
Oil specification.	Refer to Airplane Flight Manual.
Coolant.	Refer to Airplane Flight Manual.
Gearbox oil.	Refer to Airplane Flight Manual.

TAE 125-02-99 Engine Specification	
Engine manufacturer.	Thielert Aircraft Engines.
Engine model.	TAE 125-02-99-(0003)-(xx).
Engine operating limits: – Maximum take-off power. – Maximum continuous power. – Maximum overspeed (max. 20 sec).	 99 kW (135 DIN-hp) at 2300 ± 50 RPM. 99 kW (135 DIN-hp) at 2300 ± 50 RPM. 2500 RPM.
Oil pressure (indicated values are corrected for pressure altitude).	Refer to Airplane Flight Manual.
Oil temperature.	Refer to Airplane Flight Manual.
Oil consumption: – Maximum.	 0.1 liters/hr. (0.11 US qts/hr.)
Oil quantity.	Refer to Airplane Flight Manual.
Coolant temperature.	Refer to Airplane Flight Manual.
Fuel consumption.	Refer to Airplane Flight Manual.
Gearbox oil capacity.	1 liter (1.06 US qts).
Engine weight, bare.	134 kg (295.4 lb).
Fuel grade.	Refer to Airplane Flight Manual.
Oil specification.	Refer to Airplane Flight Manual.
Coolant.	Refer to Airplane Flight Manual.
Gearbox oil.	Refer to Airplane Flight Manual.

TAE 125-02-114 Engine Specification	
Engine manufacturer.	Technify Motors GmbH..
Engine model.	TAE 125-02-114
Engine operating limits: – Maximum take-off power. – Maximum continuous power. – Maximum overspeed (max. 20 sec).	 114 kW (155 DIN-hp) at 2300 ± 50 RPM. 114 kW (155 DIN-hp) at 2300 ± 50 RPM. 2500 RPM.
Oil pressure (indicated values are corrected for pressure altitude).	Refer to Airplane Flight Manual.
Oil temperature.	Refer to Airplane Flight Manual.
Oil consumption: – Maximum.	 0.1 liters/hr. (0.11 US qts/hr.)
Oil quantity.	Refer to Airplane Flight Manual.
Coolant temperature.	Refer to Airplane Flight Manual.
Fuel consumption.	Refer to Airplane Flight Manual.
Gearbox oil capacity.	1 liter (1.06 US qts).
Engine weight, bare.	134 kg (295.4 lb).
Fuel grade.	Refer to Airplane Flight Manual.
Oil specification.	Refer to Airplane Flight Manual.
Coolant.	Refer to Airplane Flight Manual.
Gearbox oil.	Refer to Airplane Flight Manual.

Trouble-Shooting

1. General

The table below lists the defects you could have with the power plant. It does not give trouble shooting data for the engine or the engine systems. For engine and engine system trouble-shooting refer to the TAE Operation and Maintenance Manual OM-02-01, latest revision, if the TAE 125-01 engine is installed. If the TAE 125-02-99 or the TAE 125-02-114 engine is installed, refer to the TAE Operation and Maintenance Manual OM-02-02, latest revision.

WARNING: YOU MUST BE CAREFUL WHEN YOU DO POWER PLANT TROUBLE SHOOTING. OPERATION OF A DAMAGED ENGINE CAN CAUSE MORE DAMAGE TO THE ENGINE. THIS CAN CAUSE INJURY TO PERSONNEL.

If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Engine vibration.	Damaged shock mounts.	Replace the shock mounts.
	Propeller unbalance.	Balance the propeller.
	Engine operates with only 3 fuel injectors.	Refer to the engine manufacturer’s manuals.
Engine does not produce full power.	Engine air inlet blocked.	Examine the air inlet.
	Air filter blocked.	Examine/replace the air filter.
	Sensor signal out of limits.	Read TAE engine data with laptop computer via CAN interface. Refer to Section 72-00.

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Maintenance Practices

1. General

These Maintenance Practices tell you how to remove/install the engine.

WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS.

WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU TURN THE PROPELLER. DISCONNECT THE BATTERY.

WARNING: DO NOT GO BELOW THE ENGINE WHEN YOU LIFT THE ENGINE WITH THE HOIST. THE HOIST CAN FAIL. THIS CAN CAUSE DEATH OR INJURY TO PERSONS.

WARNING: DO NOT GET ENGINE OIL, GEAR OIL OR COOLANT ON YOU. THESE LIQUIDS CAN CAUSE SKIN DISEASE.

WARNING: DO NOT GET FUEL ON YOU. FUEL CAN CAUSE SKIN DISEASE. DO NOT ALLOW FIRE OR SPARKS NEAR FUEL. FUEL BURNS AND BURNING FUEL CAN CAUSE INJURY TO PEOPLE AND DAMAGE TO EQUIPMENT.

CAUTION: YOU MUST ATTACH CAPS TO HOLES/PIPES WHEN YOU REMOVE THE ENGINE. IF YOU DO NOT DO THIS, CONTAMINATION CAN ENTER THE HOLES/PIPES. THIS CAN CAUSE BLOCKAGE TO THE AIRPLANE SYSTEMS.

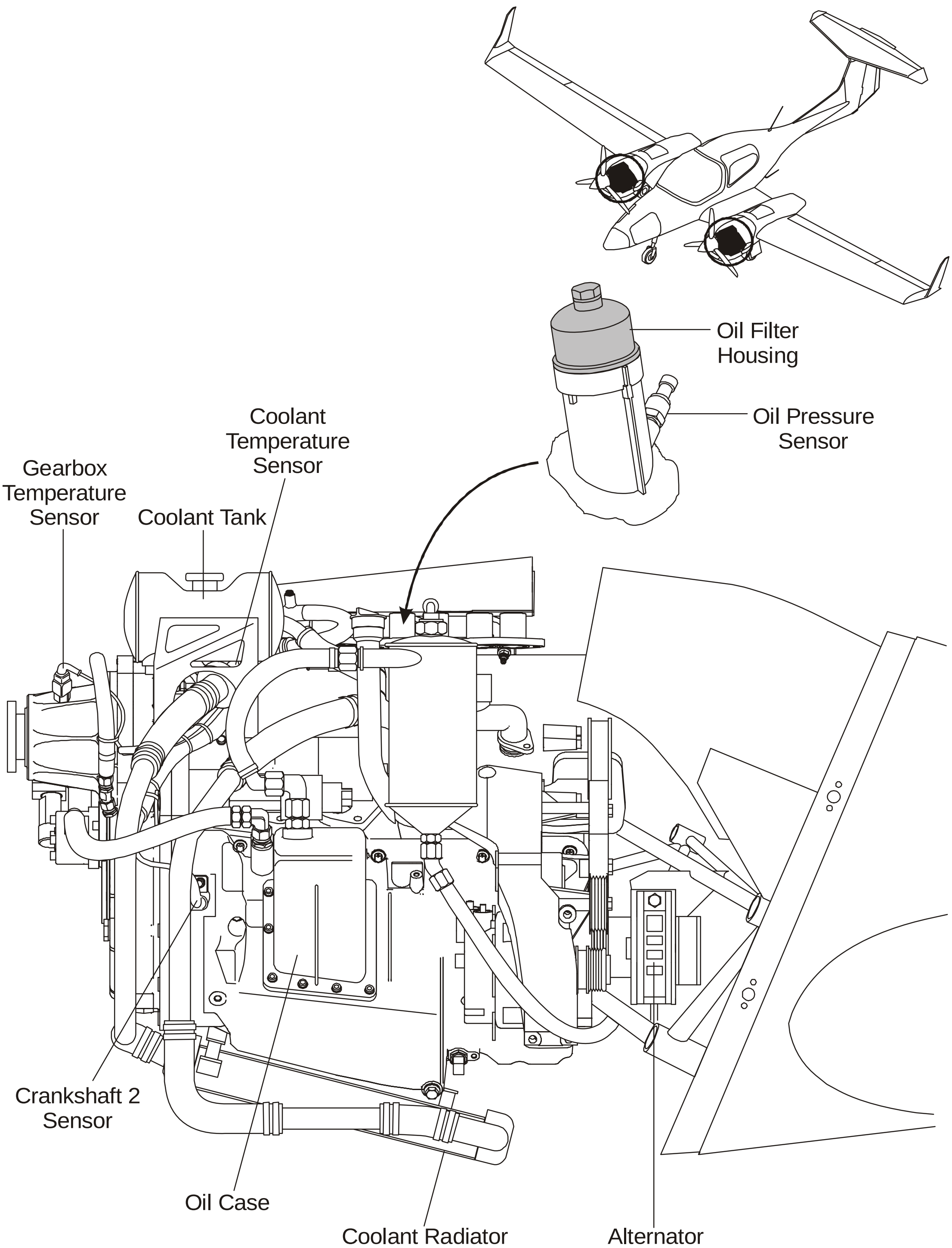

Figure 3: Left Side of Engine (TAE 125-01 Engine)

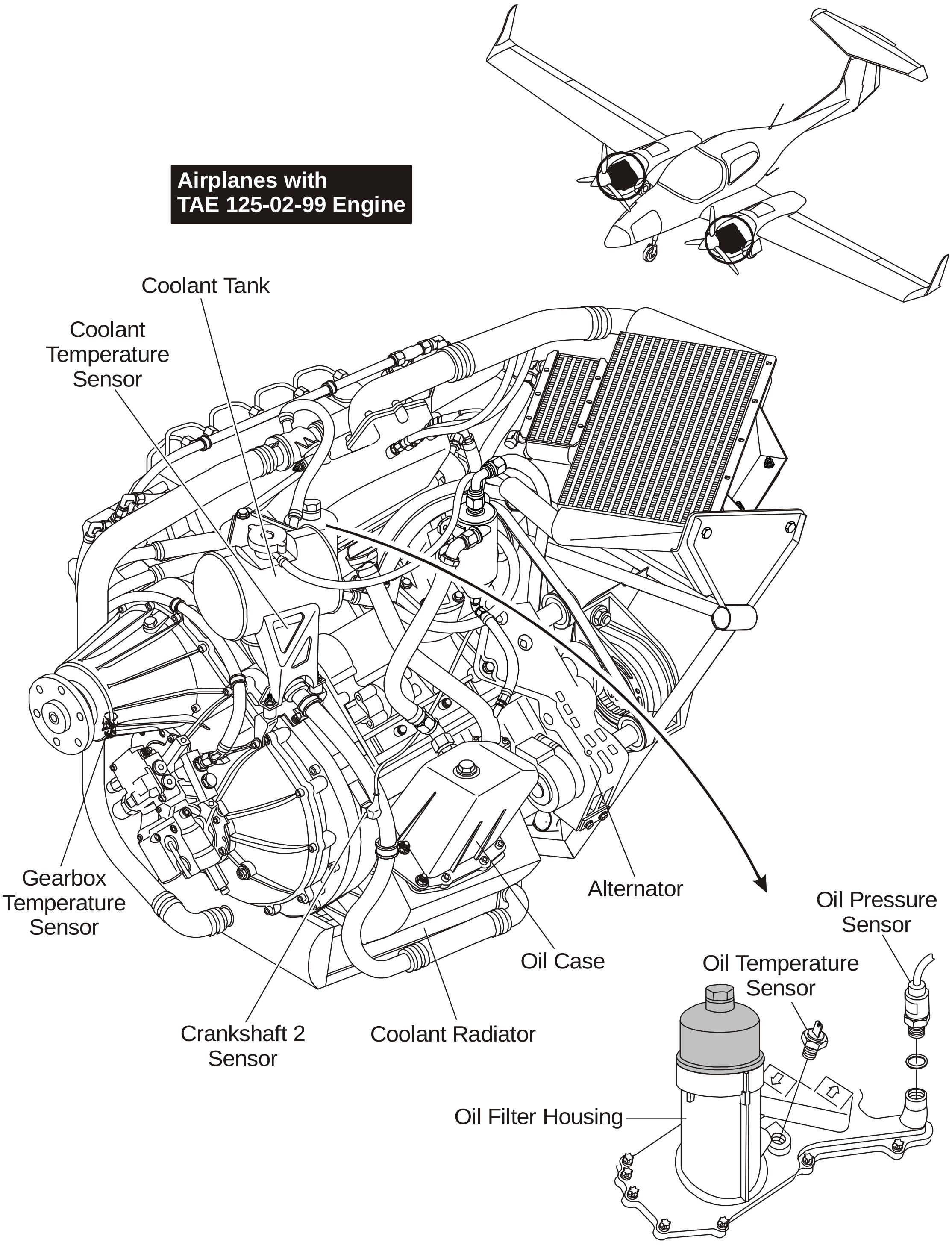

Figure 4: Left Side of Engine (TAE 125-02-99 Engine, MÄM 42-198 carried out)

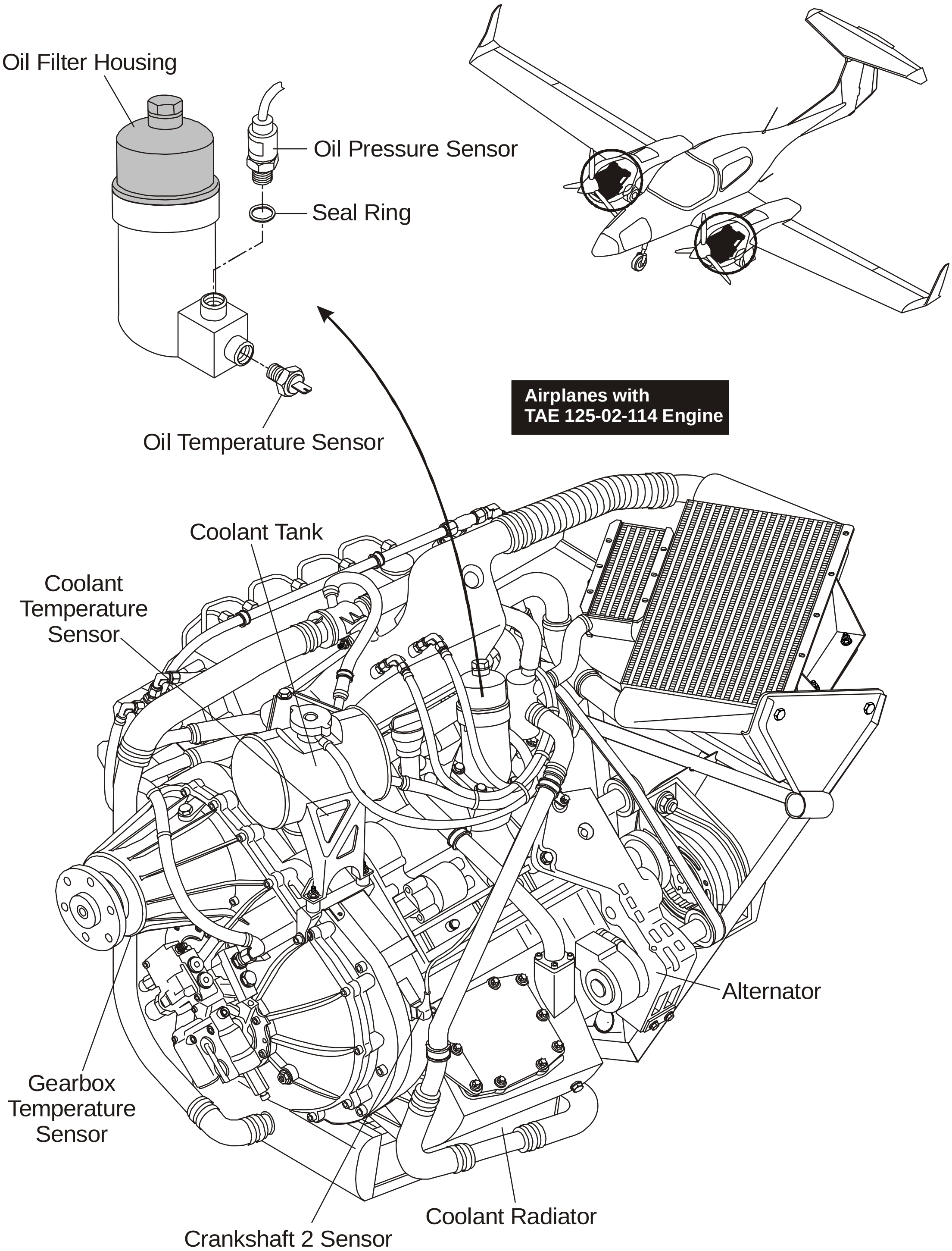

Figure 5: Left Side of Engine (TAE 125-02-114 Engine, OÄM 42-252 carried out)

2. Remove/Install the Engine

A. Equipment

Item	Quantity	Part Number
Hoist.	1	Commercial.
Engine sling.	1	Commercial.
Engine stand.	1	Commercial.
Tail trestle.	1	Commercial.

B. Remove the Engine

(1) TAE 125-01 Engine Installed

	Detail Steps/Work Items	Key Items/References
(1)	Read the engine event log.	Refer to Section 72-00.
WARNING:	**MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO ANY WORK ON THE PROPELLER. IF THE ENGINE IS TURNED, THE PROPELLER CAN CAUSE INJURY OR DEATH.**	
(2)	Set the related engine FUEL SELECTOR to OFF.	
(3)	Make sure that the engine is safe: – Set ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(4)	Remove the engine cowlings.	Refer to Section 71-10.
(5)	Disconnect the airplane main battery.	Refer to Section 24-34.
(6)	Remove the propeller.	Refer to Section 61-10.
(7)	Drain the coolant system.	Refer to Section 75-00.
(8)	Drain the engine oil.	Refer to Section 72-00.
(9)	Remove the coolant tank.	Refer to Section 75-00.

	Detail Steps/Work Items	Key Items/References
(10)	Disconnect the coolant hoses from the coolant radiator: – Remove the 8 worm-drive-clamps. – Remove the hoses.	Refer to Section 75-00. 4 on each hose.
(11)	Disconnect the coolant hoses from the heating radiator.	Refer to Section 75-00.
(12)	Disconnect the oil hose from the accumulator.	Use a suitable container to catch the oil in the tubes.
(13)	Disconnect the breather line.	At the oil pre-separator.
(14)	Disconnect the TKS line from the engine (if installed).	
(15)	Disconnect the oil hoses between the oil cooler and the engine, at the oil filter housing.	Use a suitable container to catch the oil in the tubes.
(16)	Disconnect the electrical cables on the alternator. – Release all clips and ties holding the cables to the engine.	
(17)	Disconnect the electrical cables from the starter motor. – Disconnect the two control cables at the solenoid. – Disconnect the main supply cable at the solenoid. – Release all clips and ties holding the cables to the engine.	Do not remove clips and ties on the engine mount.

	Detail Steps/Work Items	Key Items/References
(18)	Disconnect the engine wire harness and bonding cables from these electrical sensors:	
	– Crankshaft 1.	At the front right crank case.
	– Crankshaft 2.	At the front left crank case.
	– Camshaft 1.	On inlet valve cover between cyl. 3 & 4.
	– Camshaft 2.	On inlet valve cover between cyl. 1 & 2.
	– Coolant temperature.	At the thermostat valve.
	– Oil temperature.	At the bottom of the oil case.
	– Oil pressure.	At the rear side of the oil filter housing.
	– Manifold air temperature.	On the intercooler outlet pipe.
	– Fuel rail pressure regulator.	At the rear end of the fuel rail.
	– Fuel rail pressure sensor.	At the front side of the fuel rail.
	– Propeller governor.	At the right side of the reduction gear.
	– Gear temperature.	At top left of front bearing reduction gear.
	– Waste gate valve solenoid.	At the lower crankshaft cover.
	– Fuel injectors.	At each fuel injector.
	– Glow plugs.	At the lower crankshaft cover.
	– Waste gate control valve.	At the lower crankshaft cover.
(19)	Remove the hose that connects the turbo charger outlet to the inter-cooler:	Refer to Section 73-00.
	– Remove the 4 worm-drive-clamps.	
	– Remove the hose.	
(20)	Remove the exhaust.	Refer to Section 78-00.

	Detail Steps/Work Items	Key Items/References
(21)	Remove the hoses that connect the cabin-heat heat-exchanger, at the heat exchanger: – Remove the 4 worm drive clamps that attach the hoses. – Remove the 2 hoses.	Refer to Section 75-00.
(22)	Disconnect the hose from the alternate air valve to the turbo-charger inlet.	At the turbo-charger.
(23)	Release clips, ties and clamps holding the engine wire harness to the engine. Move the harness clear of the engine.	
(24)	Remove the support strut from the turbo-charger.	
(25)	Remove the oil hose from the turbo-charger cage tank to the oil return pump.	At the cage tank, front side. Use a suitable container to catch the remaining oil in the hose.
(26)	Remove the oil hose from the turbo-charger cage tank to the oil separator.	At the cage tank, rear side. Use a suitable container to catch the remaining oil in the hose.
(27)	Remove the oil separator.	Refer to Section 79-00.
(28)	Disconnect the fuel supply hose.	At the low-pressure pump. Remove clamp at the front right hoist bracket.
(29)	Disconnect the fuel return hose.	Behind the rail pressure regulator.
(30)	Remove the bonding cable at the engine near each engine shock-mount.	
(31)	Support the airplane at the tail.	Use the tail trestle. Refer to Section 07-10.

	Detail Steps/Work Items	Key Items/References
(32)	Attach the sling to the engine. Attach the sling to the hoist.	There are lifting points at: – Front right cylinder head. – Front left of the reduction gear housing. – Rear left of the cylinder head near coolant pump.
(33)	Take the weight of the engine with the hoist.	
(34)	Remove the nuts, bolts and washers that attach the engine to the engine mount.	
(35)	Lift the engine a small distance, turn it slightly to the right side and move it at the same time forward and clear of the engine mount.	Make sure that the engine does not hit the engine mount.
(36)	Attach the shipping stand to the engine.	
(37)	Install the turbo-charger support strut.	
(38)	Remove the coolant lines from the coolant bypass to the heat exchanger.	Refer to Section 75-00.
(39)	Remove the coolant bypass pipe.	Refer to Section 75-00.
(40)	Remove the oil filler tube: – Release the attaching bolts. – Remove the oil filler tube. – Put caps on the open pipes and connections.	
(41)	Put caps on the open-end pipes and connections.	
(42)	Prepare engine for shipping.	Note TT hours and reason for removal.
(43)	Clean firewall and engine mount.	
(44)	Examine the engine mount for cracks and corrosion.	
(45)	Check lifetime of the elastomer hoses and replace as necessary.	

	Detail Steps/Work Items	Key Items/References
(46)	If engine was removed because of oil system contamination: – Remove and discard oil radiator and oil hoses.	Refer to Section 79-00.

(2) TAE 125-02-99 Engine Installed (MÄM 42-198 carried out)

	Detail Steps/Work Items	Key Items/References
(1)	Read the engine event log.	Refer to Section 72-00.
	WARNING: MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO ANY WORK ON THE PROPELLER. IF THE ENGINE IS TURNED, THE PROPELLER CAN CAUSE INJURY OR DEATH.	
(2)	Set the related engine FUEL SELECTOR to OFF.	
(3)	Make sure that the engine is safe: – Set ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(4)	Remove the engine cowlings.	Refer to Section 71-10.
(5)	Disconnect the airplane main battery.	Refer to Section 24-34.
(6)	Remove the propeller.	Refer to Section 61-10.
(7)	Drain the coolant system.	Refer to Section 75-00.
(8)	Drain the engine oil.	Refer to Section 72-00.
(9)	Remove the coolant tank.	Refer to Section 75-00.
(10)	Disconnect the coolant hoses from the coolant radiator: – Remove the 8 worm-drive-clamps. – Remove the hoses.	Refer to Section 75-00. 4 on each hose.

	Detail Steps/Work Items	Key Items/References
(11)	Disconnect the coolant hoses from the heating radiator.	Refer to Section 75-00.
(12)	Disconnect the oil hose from the accumulator.	Use a suitable container to catch the oil in the tubes.
(13)	Disconnect the breather line.	At the oil pre-separator.
(14)	Disconnect the TKS line from the engine (if installed).	
(15)	Disconnect the oil hoses between the oil cooler and the engine, at the oil filter housing.	Use a suitable container to catch the oil in the tubes.
(16)	Disconnect the electrical cables on the alternator. – Release all clips and ties holding the cables to the engine.	
(17)	Disconnect the electrical cables from the starter motor: – Disconnect the two control cables at the solenoid. – Disconnect the main supply cable at the solenoid. – Release all clips and ties holding the cables to the engine.	Do not remove clips and ties on the engine mount.
(18)	Disconnect the engine wire harness and bonding cables from these electrical sensors:	
	– Fuel rail pressure regulator.	At the rear end of the fuel rail.
	– Propeller governor.	At the right side of the reduction gear.
	– Waste gate valve solenoid.	At the lower crankshaft cover.
	– Fuel injectors.	At each fuel injector.
	– Glow plugs.	At the lower crankshaft cover.
	– Waste gate control valve.	At the lower crankshaft cover.

	Detail Steps/Work Items	Key Items/References
(19)	Remove the hose that connects the turbo charger outlet to the inter-cooler: – Remove the 4 worm-drive-clamps. – Remove the hose.	Refer to Section 73-00.
(20)	Remove the exhaust.	Refer to Section 78-00.
(21)	Remove the hoses that connect the cabin-heat heat-exchanger, at the heat exchanger: – Remove the 4 worm drive clamps that attach the hoses. – Remove the 2 hoses.	Refer to Section 75-00.
(22)	Disconnect the hose from the alternate air valve to the turbo-charger inlet.	At the turbo-charger.
(23)	Release clips, ties and clamps holding the engine wire harness to the engine. Move the harness clear of the engine.	
(24)	Remove the oil separator.	Refer to Section 79-00.
(25)	Disconnect the fuel supply hose.	At the low-pressure pump. Remove clamp at the front right hoist bracket.
(26)	Disconnect the fuel return hose.	Behind the rail pressure regulator.
(27)	Remove the bonding cable at the engine near each engine shock-mount.	
(28)	Support the airplane at the tail.	Use the tail trestle. Refer to Section 07-10.

	Detail Steps/Work Items	Key Items/References
(29)	Attach the sling to the engine. Attach the sling to the hoist.	There are lifting points at: – Front right cylinder head. – Front left of the reduction gear housing. – Rear left of the cylinder head near coolant pump.
(30)	Take the weight of the engine with the hoist.	
(31)	Remove the nuts, bolts and washers that attach the engine to the engine mount.	
(32)	Lift the engine a small distance, turn it slightly to the right side and move it at the same time forward and clear of the engine mount.	Make sure that the engine does not hit the engine mount.
(33)	Attach the shipping stand to the engine.	
(34)	Remove the coolant lines from the coolant bypass to the heat exchanger.	Refer to Section 75-00.
(35)	Remove the oil filler tube: – Release the attaching bolts. – Remove the oil filler tube. – Put caps on the open pipes and connections.	
(36)	Put caps on the open-end pipes and connections.	
(37)	Prepare engine for shipping.	Note TT hours and reason for removal.
(38)	Clean firewall and engine mount.	
(39)	Examine the engine mount for cracks and corrosion.	
(40)	Check lifetime of the elastomer hoses and replace as necessary.	
(41)	If engine was removed because of oil system contamination: – Remove and discard oil radiator and oil hoses.	Refer to Section 79-00.

(3) TAE 125-02-114 Engine Installed (OÄM 42-252 carried out)

	Detail Steps/Work Items	Key Items/References
(1)	Read the engine event log.	Refer to Section 72-00.
	WARNING: MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO ANY WORK ON THE PROPELLER. IF THE ENGINE IS TURNED, THE PROPELLER CAN CAUSE INJURY OR DEATH.	
(2)	Set the related engine FUEL SELECTOR to OFF.	
(3)	Make sure that the engine is safe: – Set ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(4)	Remove the engine cowlings.	Refer to Section 71-10.
(5)	Disconnect the airplane main battery.	Refer to Section 24-34.
(6)	Remove the propeller.	Refer to Section 61-10.
(7)	Drain the coolant system.	Refer to Section 75-00.
(8)	Drain the engine oil.	Refer to Section 72-00.
(9)	Remove the coolant tank.	Refer to Section 75-00.
(10)	Disconnect the coolant hoses from the main coolant radiator: – Remove the 8 worm-drive-clamps. – Remove the hoses.	Refer to Section 75-00. 4 on each hose.
(11)	Disconnect the coolant hoses from the heating radiator and the small coolant cooler.	Refer to Section 75-00.
(12)	Disconnect the oil hose from the accumulator.	Use a suitable container to catch the oil in the tubes.
(13)	Disconnect the breather line.	At the oil pre-separator.
(14)	Disconnect the TKS line from the engine (if installed).	

	Detail Steps/Work Items	Key Items/References
(15)	Disconnect the electrical cables on the alternator. – Release all clips and ties holding the cables to the engine.	
(16)	Disconnect the electrical cables from the starter motor: – Disconnect the two control cables at the solenoid. – Disconnect the main supply cable at the solenoid. – Release all clips and ties holding the cables to the engine.	Do not remove clips and ties on the engine mount.
(17)	Disconnect the engine wire harness and bonding cables from these electrical sensors:	
	– Fuel rail pressure regulator.	At the rear end of the fuel rail.
	– Propeller governor.	At the right side of the reduction gear.
	– Waste gate valve solenoid.	At the lower crankshaft cover.
	– Fuel injectors.	At each fuel injector.
	– Glow plugs.	At the lower crankshaft cover.
	– Waste gate control valve.	At the lower crankshaft cover.
(18)	Remove the hose that connects the turbo charger outlet to the inter-cooler: – Remove the 4 worm-drive-clamps. – Remove the hose.	Refer to Section 73-00.
(19)	Remove the exhaust.	Refer to Section 78-00.

	Detail Steps/Work Items	Key Items/References
(20)	Remove the hoses that connect the cabin-heat heat-exchanger, at the heat exchanger and the small coolant cooler: – Remove the worm drive clamps that attach the hoses. – Remove the hoses.	Refer to Section 75-00.
(21)	Disconnect the hose from the alternate air valve to the turbo-charger inlet.	At the turbo-charger.
(22)	Release clips, ties and clamps holding the engine wire harness to the engine. Move the harness clear of the engine.	
(23)	Disconnect the fuel supply hose.	At the low-pressure pump. Remove clamp at the front right hoist bracket.
(24)	Disconnect the fuel return hose.	Behind the rail pressure regulator.
(25)	Remove the bonding cable at the engine near each engine shock-mount.	
(26)	Support the airplane at the tail.	Use the tail trestle. Refer to Section 07-10.
(27)	Attach the sling to the engine. Attach the sling to the hoist.	There are lifting points at: – Front right cylinder head. – Front left of the reduction gear housing. – Rear left of the cylinder head near coolant pump.
(28)	Take the weight of the engine with the hoist.	
(29)	Remove the nuts, bolts and washers that attach the engine to the engine mount.	
(30)	Lift the engine a small distance, turn it slightly to the right side and move it at the same time forward and clear of the engine mount.	Make sure that the engine does not hit the engine mount.

	Detail Steps/Work Items	Key Items/References
(31)	Attach the shipping stand to the engine.	
(32)	Remove the coolant lines from the coolant bypass to the heat exchanger.	Refer to Section 75-00.
(33)	Remove the oil filler tube: – Release the attaching bolts. – Remove the oil filler tube. – Put caps on the open pipes and connections.	
(34)	Put caps on the open-end pipes and connections.	
(35)	Prepare engine for shipping.	Note TT hours and reason for removal.
(36)	Clean firewall and engine mount.	
(37)	Examine the engine mount for cracks and corrosion.	
(38)	Check lifetime of the elastomer hoses and replace as necessary.	

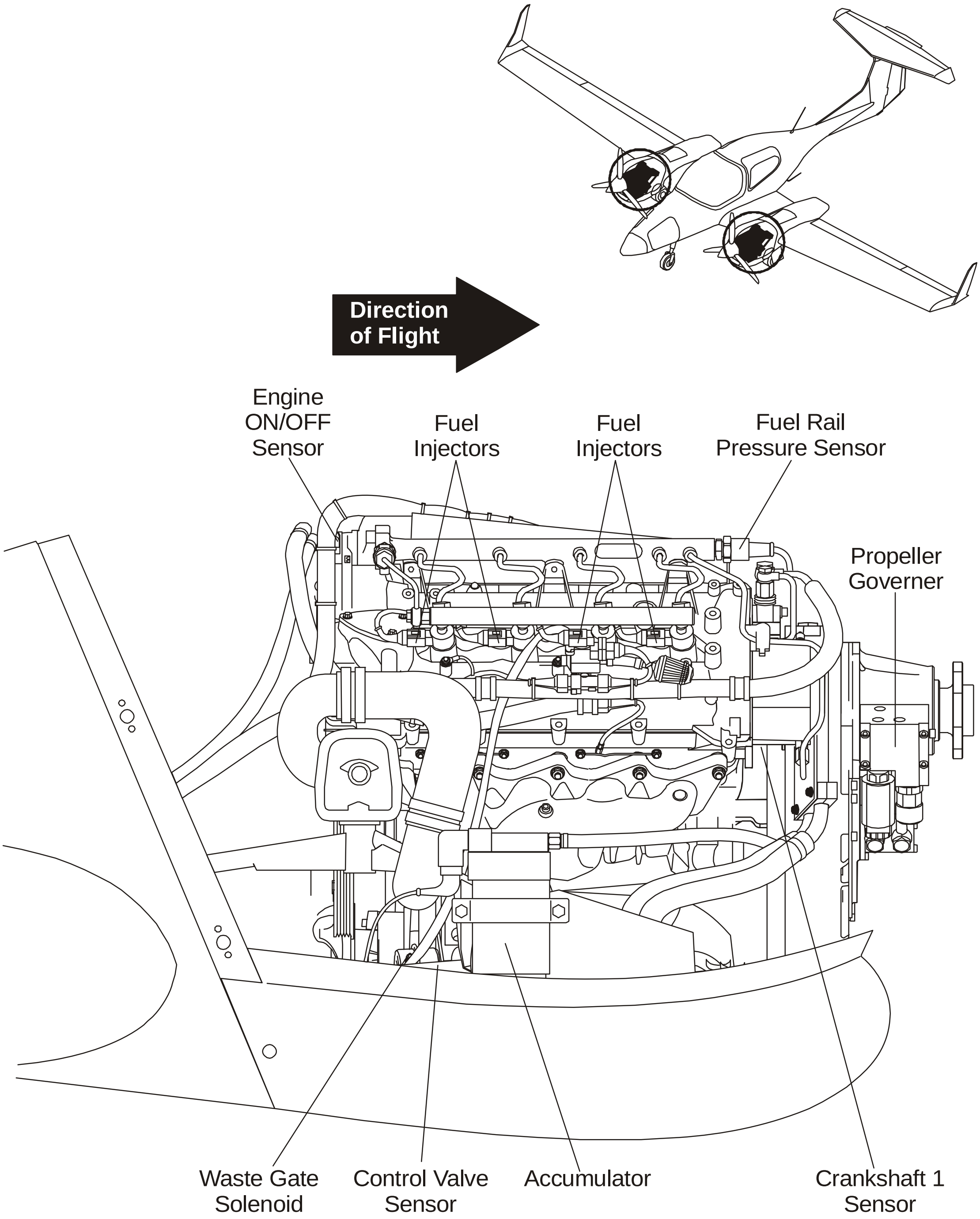

Figure 6: Right Side of Engine (TAE 125-01 Engine)

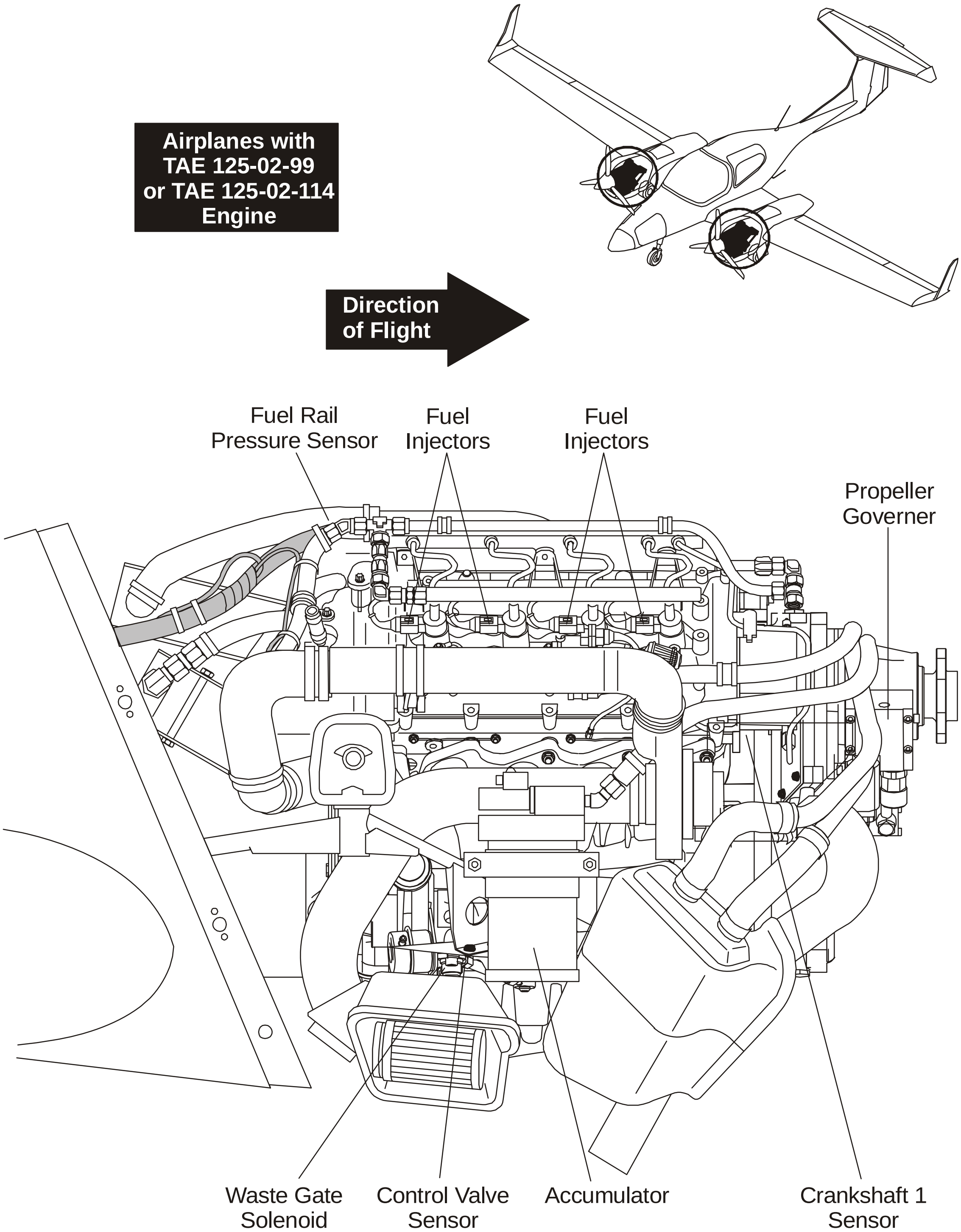

Figure 7: Right Side of Engine (TAE 125-02-99, MÄM 42-198 carried out or TAE 125-02-114, OÄM 42-252 carried out)

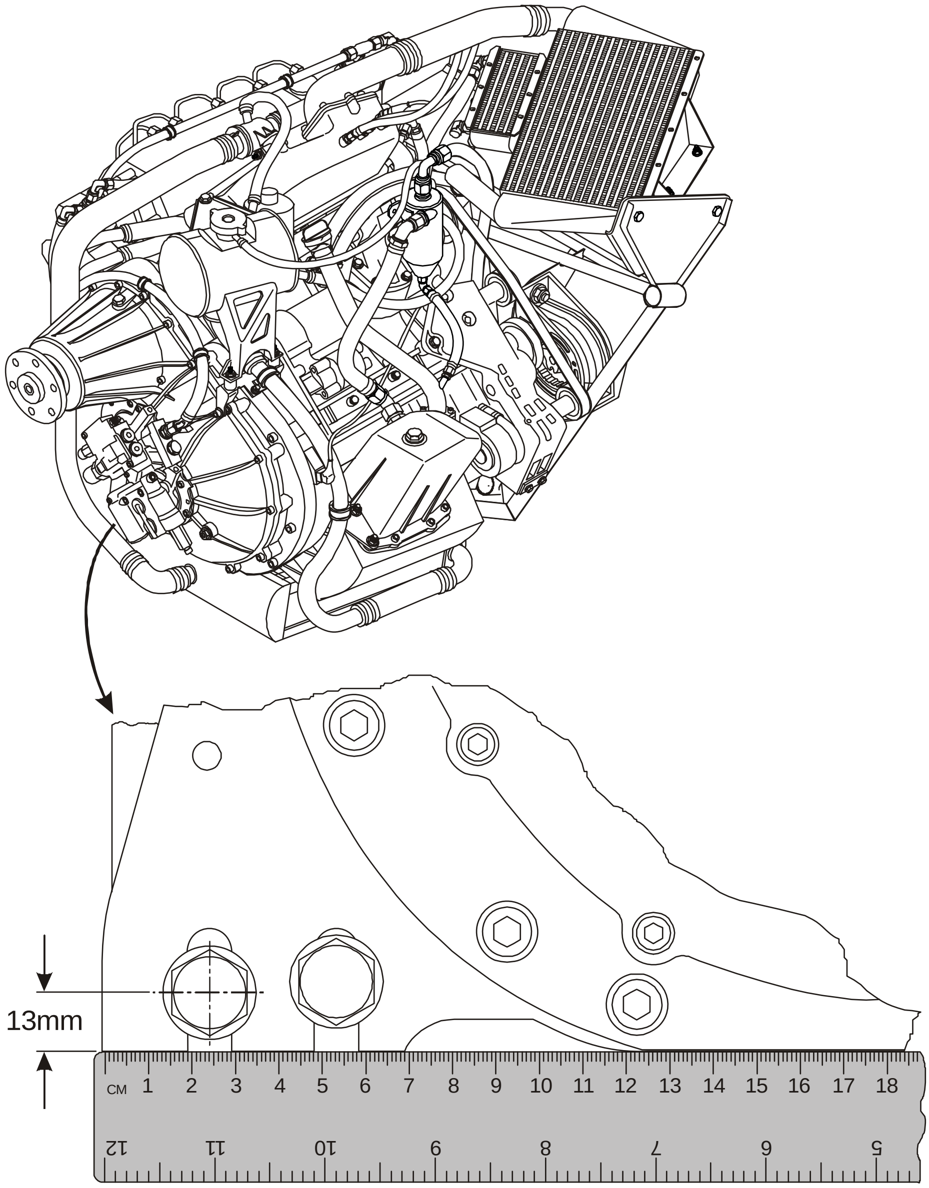

Figure 8: RH Front Engine Mounting Bolt Measurement

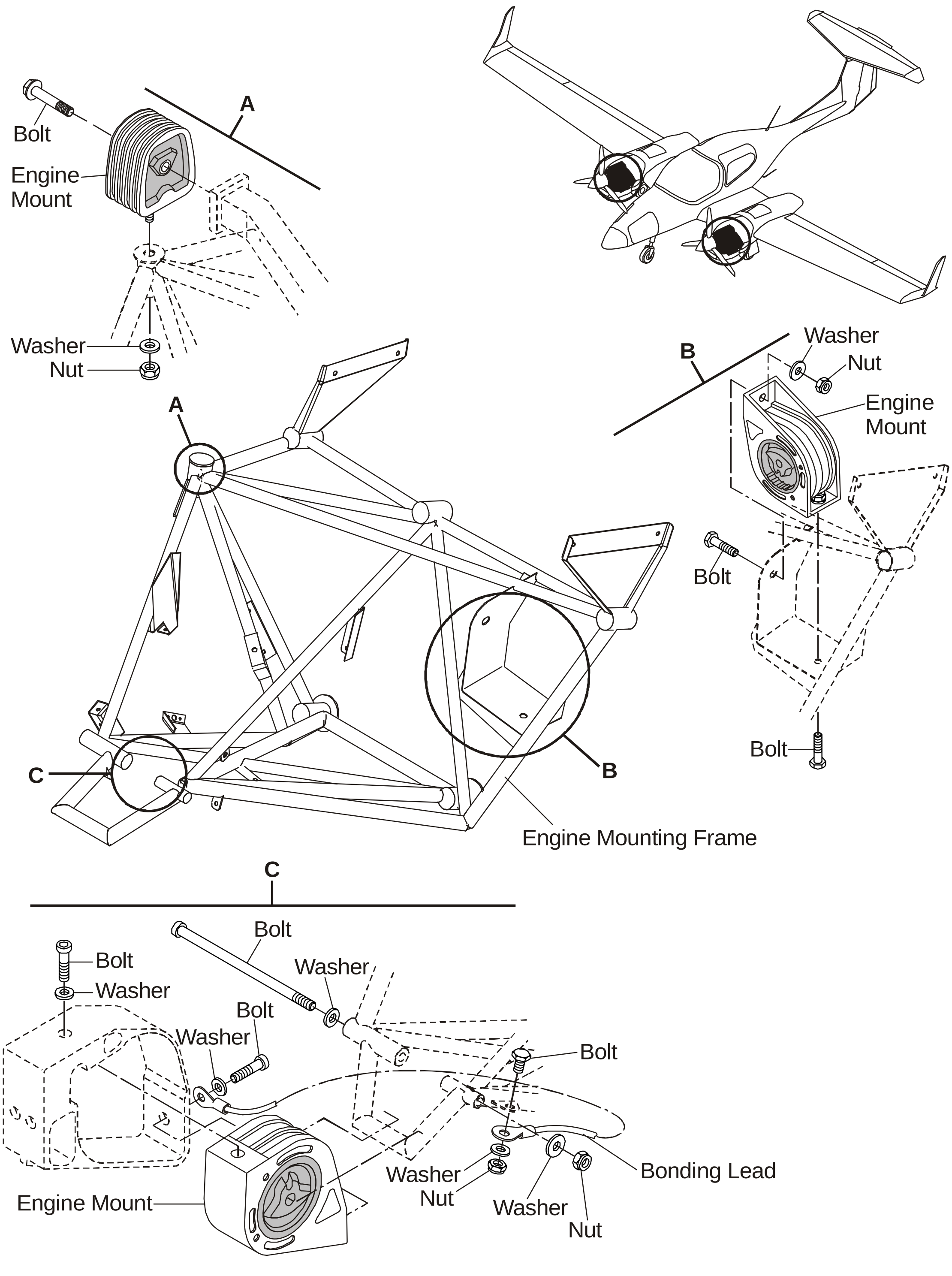

Figure 9: Engine Shock-Mounts

C. Install the Engine

(1) TAE 125-01 Engine

	Detail Steps/Work Items	Key Items/References
(1)	Attach the sling to the engine. Attach the sling to the hoist.	There are lifting points at: – Front right cylinder head. – Front left of the reduction gear housing. – Rear left of the cylinder head near coolant pump.
(2)	Remove the support strut from the turbo-charger.	
(3)	Remove the oil hose from the turbo-charger cage tank to the oil return pump.	At the cage tank, front side.
(4)	Remove the shipping stand from the engine.	
(5)	Carefully move the engine back into position in the engine mount.	Make sure that the engine does not hit the engine mount.
(6)	Install the bolts, nuts and washer that attach the engine shock-mounts to the engine mount.	Refer to Chapter 20 for torque values.
(7)	Install the bonding cable at the engine near each engine shock-mount.	
(8)	Install the turbo-charger support strut.	
(9)	Install the oil separator.	Refer to Section 79-00.
(10)	Connect the oil hose from the turbo-charger cage tank to the oil separator.	At the cage tank, rear side.
(11)	Connect the oil hose from the turbo-charger cage tank to the oil return pump.	At the cage tank, front side.
(12)	Install the coolant bypass pipe.	
(13)	Connect the oil hoses between the oil radiator and the engine.	At the oil filter housing.

	Detail Steps/Work Items	Key Items/References
(14)	Connect the electrical cables to the starter motor: – Connect the two control cables at the solenoid. – Connect the main supply cable at the solenoid. – Attach all clips and ties holding the cables to the engine.	
(15)	Connect the hose from the alternate air valve to the turbo-charger inlet.	At the turbo-charger.
(16)	Install the hoses that connect the cabin-heat heat-exchanger, at the heat exchanger: – Install the 2 hoses. – Install the 4 worm-drive-clamps that hold the hoses.	

	Detail Steps/Work Items	Key Items/References
(17)	Move the engine wire harness into position on the engine. Connect the engine wire harness and bonding cables to these electrical sensors:	
	– Crankshaft 1.	At the front right crank case.
	– Crankshaft 2.	At the front left crank case.
	– Camshaft 1.	On inlet valve cover between cyl. 3 & 4.
	– Camshaft 2.	On inlet valve cover between cyl. 1 & 2.
	– Coolant temperature.	At the thermostat valve.
	– Oil temperature.	At the bottom of the oil case.
	– Oil pressure.	At the rear side of the oil filter housing.
	– Manifold air temperature.	On the inter-cooler outlet pipe.
	– Fuel rail pressure regulator.	At the rear end of the fuel rail.
	– Fuel rail pressure sensor.	At the front side of the fuel rail.
	– Propeller governor.	At the right side of the reduction gear.
	– Gear temperature.	At top left of front bearing reduction gear.
	– Waste gate valve solenoid.	At the lower crankshaft cover.
	– Fuel injectors.	At each fuel injector.
	– Glow plugs.	At the lower crankshaft cover.
	– Waste gate control valve.	At the lower crankshaft cover.
(18)	Install clips and ties clamps holding the engine wire harness to the engine.	
(19)	Connect the fuel supply hose.	At the low-pressure pump. Install clamp at the front right hoist bracket.
(20)	Connect the fuel return hose.	Behind the rail pressure regulator.
(21)	Install the fuel return hose to the injector fuel leak rail.	
(22)	Install the coolant tank.	Refer to Section 75-00.

	Detail Steps/Work Items	Key Items/References
(23)	Install the coolant hoses to the coolant radiator: – Install the 2 hoses, at the radiator. – Install the 8 worm-drive-clamps that hold the hoses.	Refer to Section 75-00.
(24)	Install the oil filler tube: – Put the oil filler tube in position on the engine. – Install the 4 attaching bolts.	Torque: 10 - 12 Nm (7.4 - 8.9 lbf.ft.).
(25)	Connect the breather tube.	At the oil pre-separator.
(26)	Fill and bleed the cooling system.	Refer to Section 75-00.
(27)	Fill the engine with oil.	Refer to Section 12-10.
(28)	Fill the reduction gear with oil.	Refer to Section 12-10.
(29)	Connect the airplane main battery.	Refer to Section 24-34.
(30)	Install the cowlings.	Refer to Section 71-10.
(31)	Remove the tail trestle.	Refer to Section 07-10.
(32)	Do an engine test.	Refer to Paragraph 3.

(2) TAE 125-02-99 Engine (MÄM 42-198 carried out)

	Detail Steps/Work Items	Key Items/References
(1)	Attach the sling to the engine. Attach the sling to the hoist.	There are lifting points at: – Front right cylinder head. – Front left of the reduction gear housing. – Rear left of the cylinder head near coolant pump.
(2)	Remove the shipping stand from the engine.	
(3)	Carefully move the engine back into position in the engine mount.	Make sure that the engine does not hit the engine mount.
(4)	Remove the caps from the pipes and connections.	
(5)	Install the bolts, nuts and washer that attach the engine shock-mounts to the engine mount.	Refer to Chapter 20 for torque values.
(6)	Place ruler on lower flat surface of engine gearbox flange and measure distance between ruler and center of the RH front engine mounting bolt. The distance must be 13 ± 1 mm. If the distance is not 13 ± 1 mm, the engine mount must be adjusted: – Secure the engine with a hoist. – Open the two bolts. – Use the hoist to bring the engine to the correct position. – Tighten the bolts. – Mark the bolts with anti sabotage - laquer.	Refer to Figure 8.
(7)	Install the bonding cable at the engine near each engine shock-mount.	

	Detail Steps/Work Items	Key Items/References
(8)	Install the oil separator.	Refer to Section 79-00.
(9)	Connect the oil hoses between the oil radiator and the engine.	At the oil filter housing.
(10)	Connect the electrical cables to the starter motor: – Connect the two control cables at the solenoid. – Connect the main supply cable at the solenoid. – Attach all clips and ties holding the cables to the engine.	
(11)	Connect the hose from the alternate air valve to the turbo-charger inlet.	At the turbo-charger.
(12)	Install the coolant hoses that connect the cabin heat heat-exchanger, at the heat exchanger: – Install the 2 hoses. – Install the 4 worm-drive-clamps that hold the hoses.	
(13)	Move the engine wire harness into position on the engine. Connect the engine wire harness and bonding cables to these electrical sensors:	
	– Fuel rail pressure regulator.	At the front end of the fuel rail.
	– Propeller CSU.	At the right side of the reduction gear.
	– Waste gate valve solenoid.	At the lower camshaft cover.
	– Fuel injectors.	At each fuel injector.
	– Glow plugs.	At the lower camshaft cover.
	– Waste gate control valve.	At the lower camshaft cover.
	– All electrical engine sensors.	Refer to Section 71-00.

	Detail Steps/Work Items	Key Items/References
(14)	Install clips and tie clamps holding the engine wire harness to the engine.	
(15)	Connect the fuel supply hose.	At the firewall connector.
(16)	Connect the fuel return hose.	Behind the rail pressure regulator.
(17)	Install the fuel return hose to the injector fuel leak rail.	
(18)	Install the coolant tank.	Refer to Section 75-00.
(19)	Install the coolant hoses to the coolant radiator: – Install the 2 hoses, at the radiator. – Install the 8 worm-drive-clamps that hold the hoses.	Refer to Section 75-00.
(20)	Install the oil filler tube: – Put the oil filler tube in position on the engine. – Install the 4 attaching bolts.	 Torque: 10 - 12 Nm (7.4 - 8.9 lbf.ft.).
(21)	Connect the oil hose to the accumulator.	
(22)	Connect the breather tube.	At the oil pre-separator.
(23)	Install the propeller.	Refer to Section 61-10.
(24)	Fill and bleed the cooling system.	Refer to Section 75-00.
(25)	Fill the engine with oil.	Refer to Section 12-10.
(26)	Fill the reduction gear with oil.	Refer to Section 12-10.
(27)	Connect the airplane main battery.	Refer to Section 24-34.
(28)	Bleed the fuel distribution system.	Refer to Section 28-20.
(29)	Install the cowlings.	Refer to Section 71-10.
(30)	Remove the tail trestle.	Refer to Section 07-10.
(31)	Do an engine test.	Refer to Paragraph 3.

(3) TAE 125-02-114 (OÄM 42-252 carried out)

	Detail Steps/Work Items	Key Items/References
(1)	Attach the sling to the engine. Attach the sling to the hoist.	There are lifting points at: – Front right cylinder head. – Front left of the reduction gear housing. – Rear left of the cylinder head near coolant pump.
(2)	Remove the shipping stand from the engine.	
(3)	Carefully move the engine back into position in the engine mount.	Make sure that the engine does not hit the engine mount.
(4)	Remove the caps from the pipes and connections.	
(5)	Install the bolts, nuts and washer that attach the engine shock-mounts to the engine mount.	Refer to Chapter 20 for torque values.
(6)	Place ruler on lower flat surface of engine gearbox flange and measure distance between ruler and center of the RH front engine mounting bolt. The distance must be 13 ± 1 mm. If the distance is not 13 ± 1 mm, the engine mount must be adjusted: – Secure the engine with a hoist. – Open the two bolts. – Use the hoist to bring the engine to the correct position. – Tighten the bolts. – Mark the bolts with anti sabotage - laquer.	Refer to Figure 8.
(7)	Install the bonding cable at the engine near each engine shock-mount.	

	Detail Steps/Work Items	Key Items/References
(8)	Connect the electrical cables to the starter motor: – Connect the two control cables at the solenoid. – Connect the main supply cable at the solenoid. – Attach all clips and ties holding the cables to the engine.	
(9)	Connect the hose from the alternate air valve to the turbo-charger inlet.	At the turbo-charger.
(10)	Install the coolant hoses that connect the cabin-heat heat-exchanger, at the heat exchanger and the small coolant cooler: – Install the hoses. – Install the worm-drive-clamps that hold the hoses.	
(11)	Move the engine wire harness into position on the engine. Connect the engine wire harness and bonding cables to these electrical sensors:	
	– Fuel rail pressure regulator.	At the front end of the fuel rail.
	– Propeller CSU.	At the right side of the reduction gear.
	– Waste gate valve solenoid.	At the lower camshaft cover.
	– Fuel injectors.	At each fuel injector.
	– Glow plugs.	At the lower camshaft cover.
	– Waste gate control valve.	At the lower camshaft cover.
	– All electrical engine sensors.	Refer to Section 71-00.
(12)	Install clips and tie clamps holding the engine wire harness to the engine.	
(13)	Connect the fuel supply hose.	At the firewall connector.

	Detail Steps/Work Items	Key Items/References
(14)	Connect the fuel return hose.	Behind the rail pressure regulator.
(15)	Install the fuel return hose to the injector fuel leak rail.	
(16)	Install the coolant tank.	Refer to Section 75-00.
(17)	Install the coolant hoses to the coolant radiator: – Install the 2 hoses, at the radiator. – Install the 8 worm-drive-clamps that hold the hoses.	Refer to Section 75-00.
(18)	Install the oil filler tube: – Put the oil filler tube in position on the engine. – Install the 4 attaching bolts.	 Torque: 10 - 12 Nm (7.4 - 8.9 lbf.ft.).
(19)	Connect the oil hose to the accumulator.	
(20)	Connect the breather tube.	At the oil pre-separator.
(21)	Install the propeller.	Refer to Section 61-10.
(22)	Fill and bleed the cooling system.	Refer to Section 75-00.
(23)	Fill the engine with oil.	Refer to Section 12-10.
(24)	Fill the reduction gear with oil.	Refer to Section 12-10.
(25)	Connect the airplane main battery.	Refer to Section 24-34.
(26)	Bleed the fuel distribution system.	Refer to Section 28-20.
(27)	Install the cowlings.	Refer to Section 71-10.
(28)	Remove the tail trestle.	Refer to Section 07-10.
(29)	Do an engine test.	Refer to Paragraph 3.

3. Engine Test - General

For engine tests equipment and preparation, engine starting and warm-up, ECU test, propeller control test, ECU swap test and performance check refer to TAE 125-01 Operation and Maintenance Manual, latest revision (if TAE 125-01 engine is installed) or TAE 125-02 Operation and Maintenance Manual, latest revision (if TAE 125-02-99 or TAE 125-02-114 engine is installed).

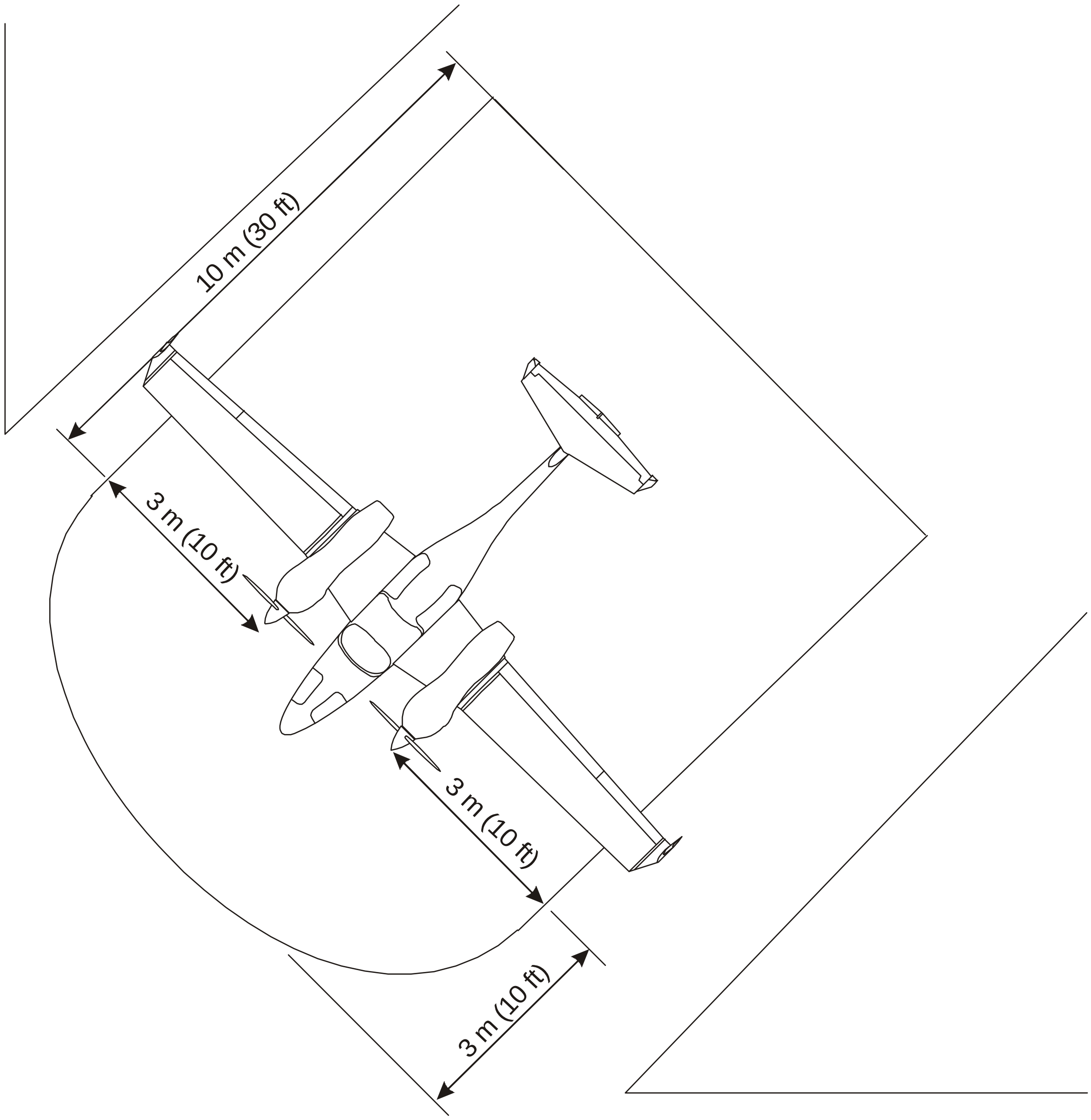

Figure 9: Engine Testing Safety Zone

Section 71-10
Engine Cowlings

1. General

The DA 42 has three carbon fiber reinforced plastic (CFRP) panels which make the engine cowlings. A top-left cowling, a top-tight cowling and a bottom cowling. CFRP is very strong and is easy to maintain. The cowlings give a good aerodynamic shape to the engine nacelles. They are very easy to remove and give good access to the engine.

Refer to Section 51-20 for repair data for the cowlings. Refer to Section 51-60 for data on the quick-release fasteners.

2. Description

Figure 1 shows the cowlings.

Camloc quick-release fasteners attach the cowlings to each other and to the engine nacelle. All the cowlings are very light and one person can hold them easily.

The bottom cowling has an air intake on the right side of the cowling and a large air intake on the bottom of the cowling at the front. The side-intake supplies air for the engine air intake. The intake at the front of the bottom cowling supplies air for the coolant radiator and the cabin heat exchanger.

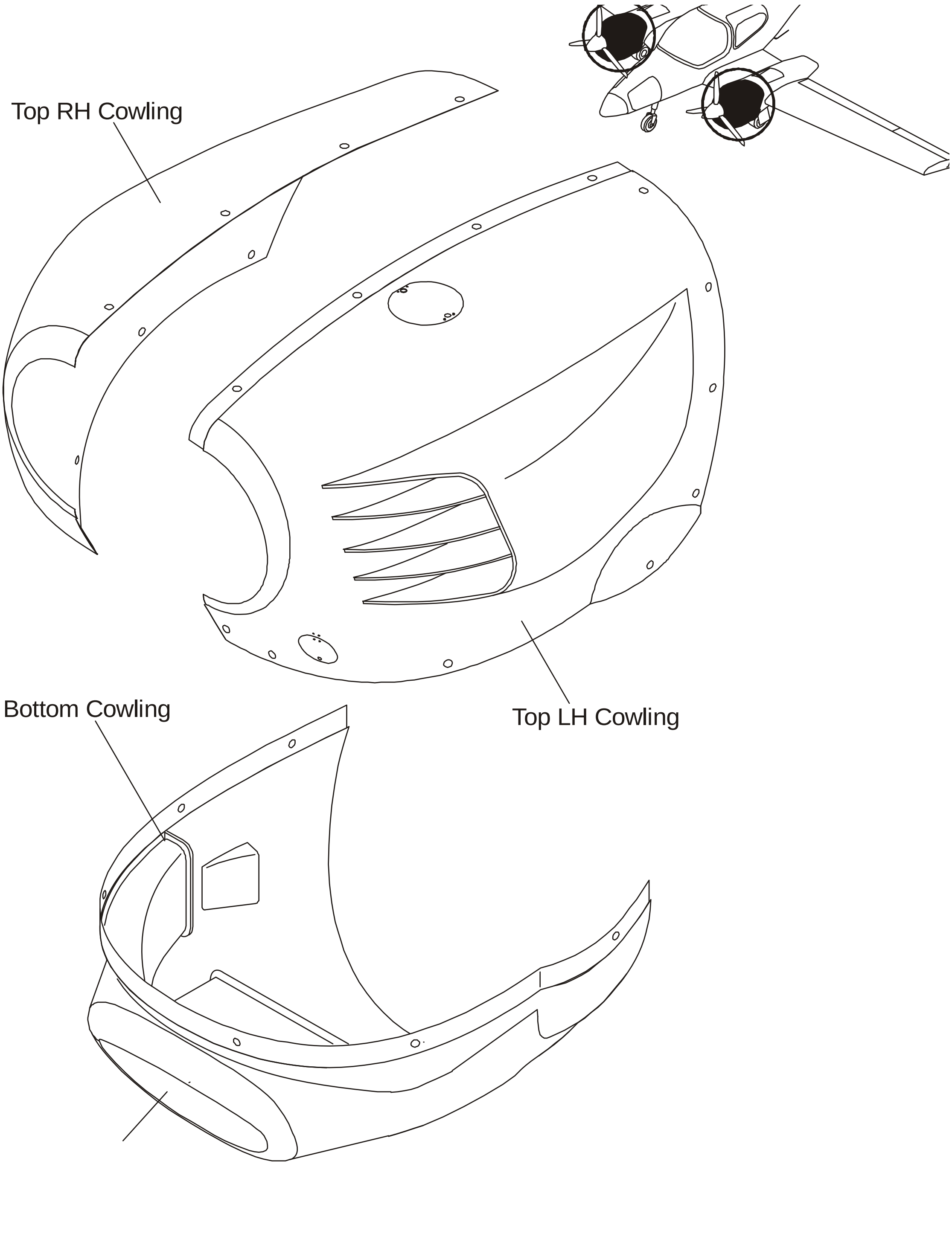

Figure 1: Engine Cowlings

Trouble-Shooting

1. General

The table below lists the defects you could have with the engine cowlings. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair in the Repair column.

Trouble	Possible Cause	Repair
Outer surface of the cowling discolored. Paint blistered. Black soot on the inner surface.	Engine overheating. Hot gas leak. Engine fire.	Examine the engine for hot gas leaks. Examine the exhaust for cracks and leaking gaskets. Replaced damage items. Repaint the cowlings.
Oil/fuel/coolant on the inner surface of the cowling.	Oil, fuel or coolant leak.	Examine the engine. Look specially for oil, fuel and coolant leaks. Correct problems which you have found. Clean the cowling.

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Maintenance Practices

1. General

This Section contains the Maintenance Practices for the cowlings. It tells you how to remove/install the cowlings. It also tells you how to clean and paint the cowlings.

2. Remove/Install the Engine Cowlings

Use these procedures for the left engine or the right engine.

A. Remove the Engine Left and Right Top Cowlings

WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU WORK NEAR TO THE PROPELLER.
- SET THE ELECT. MASTER SWITCH TO "OFF".
- SET THE ENGINE MASTER SWITCH TO "OFF".
- SET THE POWER LEVER TO "0%".

	Detail Steps/Work Items	Key Items/References
	WARNING: MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO ANY WORK ON THE COWLINGS. IF THE ENGINE IS TURNED, THE PROPELLER CAN CAUSE INJURY OR DEATH.	
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the related ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Release the fasteners that attach the top-left and top-right cowlings to each other, the bottom cowling and the engine nacelle.	Refer to Figure 1.
(3)	Pull the top of the top-right cowling up and away form the top-left cowling, the bottom cowling and clear of the engine nacelle.	Take care not to catch the cowling on the propeller!
(4)	Pull the bottom edge of top-left cowling away from the bottom cowling and clear of the engine nacelle.	Take care not to catch the cowling on the propeller!

B. Remove the Bottom Cowling

	Detail Steps/Work Items	Key Items/References
(1)	Release the quick-release fasteners which hold the bottom cowling.	Hold the bottom cowling!
(2)	Remove the bottom cowling: – Lower the rear of the cowling. – Move the cowling down and forward. – Move the cowling clear of the airplane.	Take care not to catch the cowling on the propeller!

C. Install the Bottom Cowling

	Detail Steps/Work Items	Key Items/References
(1)	Examine the bottom cowling. Make sure that : – The cowling is clean. – The cowling is not damaged. – The quick-release fasteners are not missing/damaged.	Repair any damage. Replace missing/damaged fasteners.
(2)	Lift the cowling into position: – Move the cowling upwards. – Lift the cowling fully into position. – Tighten the quick-release fasteners that attach the cowling to the engine nacelle.	Take care of the air inlets. Engage the respective shrouds

D. Install the Engine Left and Right Top Cowlings

	Detail Steps/Work Items	Key Items/References
(1)	Examine the top-left and top-right cowlings. Make sure that:	
	– The cowlings are clean.	Repair any damage.
	– The cowlings are not damaged.	Replace missing/damaged fasteners.
	– The quick-release fasteners are not missing/damaged.	
(2)	Install the top-left cowling:	
	– Move the top-left cowling into position on the engine nacelle.	Make sure that the fasteners engage correctly in the engine nacelle and bottom cowling.
	– Move the top-right cowling into position on the engine nacelle.	Make suer that the fasteners engage correctly in the top-left cowling, the engine nacelle and bottom cowling.
(3)	Tighten all the quick-release fasteners that attach the top-left and top-right cowlings to the bottom engine cowling and the engine nacelle.	

3. Cleaning and Painting

A. Clean the Cowlings

	Detail Steps/Work Items	Key Items/References
(1)	Wash the outer surface with a mixture of water and a mild detergent.	Obey the detergent manufacturer's instructions.
(2)	Wash the inner surface with a mixture of water and a mild detergent.	Obey the detergent manufacturer's instructions.
	CAUTION: DO NOT USE POLISH CONTAINING SILICONE. SILICONE MAKES CFRP REPAIR DIFFICULT.	
(3)	Polish the outer surface with wax polish.	Obey the polish manufacturer's instructions. Do not use silicone polish.

B. Paint the Insides of the Cowlings

This Paragraph gives the data for painting the inside of the engine cowlings with fire protection paint. Refer to Section 51-20 for repairs and painting the outside of the cowlings.

Note: If OÄM 42-061 has been carried out (cowling made from self extinguishing resin), do not apply fire protection paint on the inside of the cowling. Use only self extinguishing resin for repair (refer to Section 51-30).

	Detail Steps/Work Items	Key Items/References
(1)	Clean the inside of the cowling.	
(2)	Make the area rough for painting.	Use 150-320 grade wet and dry paper.
	WARNING: DO NOT GET ACETONE ON YOUR SKIN. ACETONE CAN CAUSE SKIN DISEASE. **WARNING: DO NOT BREATHE ACETONE FUMES. ACETONE FUMES CAN CAUSE ILLNESS.** CAUTION: REMOVE ACETONE AS SOON AS POSSIBLE FROM GFRP. ACETONE CAN CAUSE THE RESIN TO SOFTEN AND FAIL.	
(3)	Clean the area for painting.	Use acetone.
(4)	Paint the inside of the cowling with fire protection paint.	Obey the paint manufacturer's instructions.

Section 71-20
Engine Mounting

1. General

Tubular steel makes the engine mount. The engine mount has welded joints. Powder coating protects the frame from corrosion. Welded brackets hold components such as the coolant radiator and the inter-cooler. Rubber lined P-clamps and cable ties hold electrical cables and other items of equipment to the engine mount.

The engine mounting-frame has five small mounting pads at the rear of the frame. Bolts through the pads attach the engine mount to the engine nacelle.

The engine attaches to the engine mount at three mounting pads. Large gel-filled rubber shock-mounts go between the engine and the engine mount pads. These shock-mounts isolate the airframe from engine vibrations.

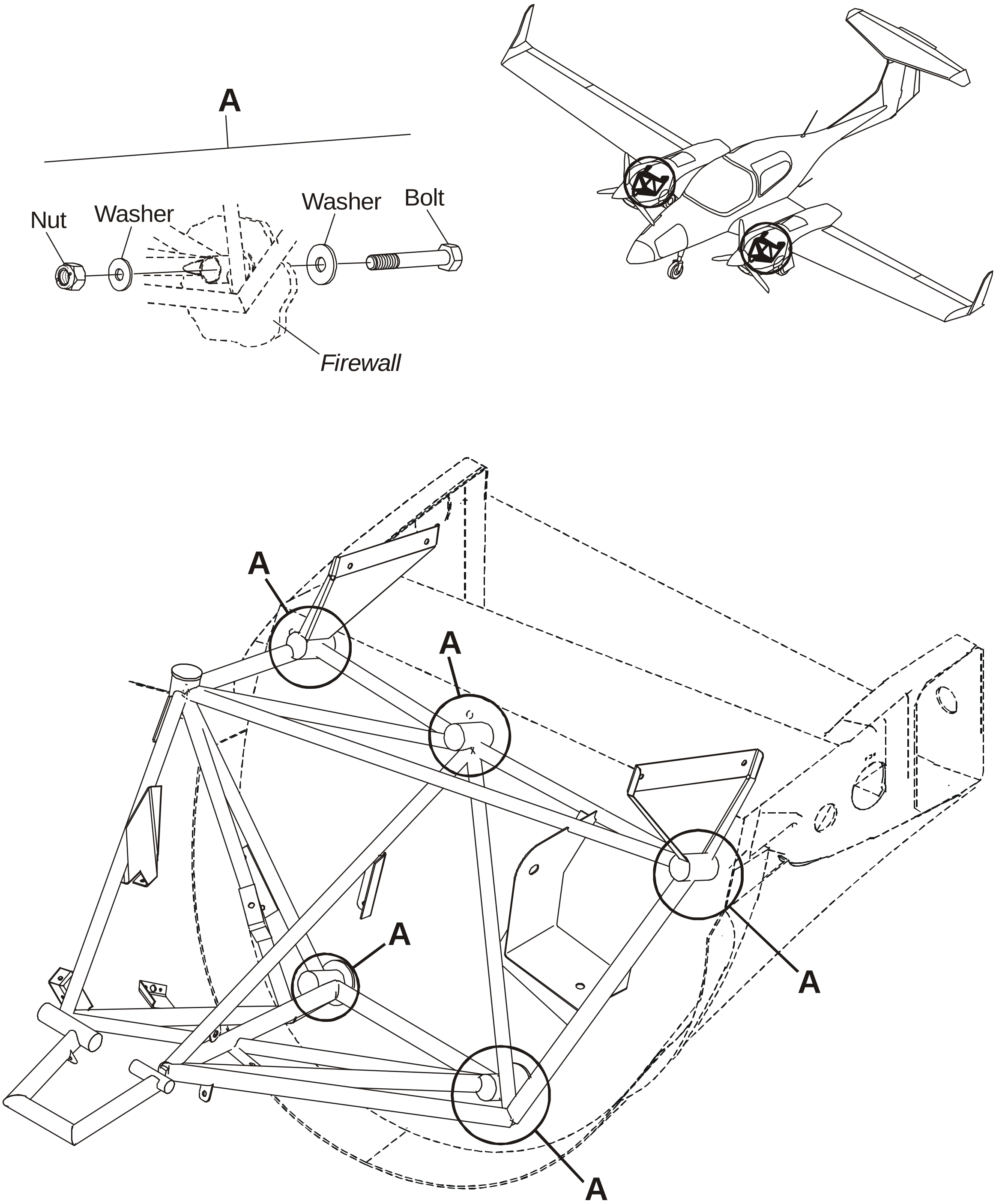

Figure 1: Engine Mount Assembly

Trouble-Shooting

1. General

The table below lists the defects you could have with the engine mounting. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair in the Repair column.

Trouble	Possible Cause	Repair
Engine vibration.	Cracked engine mount.	Do a test for cracked tubes. Look specially at the welded joints.
Defective shock mounts.	Refer to the engine manufacturer.	

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Maintenance Practices

1. General

The Maintenance Practices for the engine mount are limited to removal/installation. If the engine mount is damaged it must be repaired by an authorized repair facility.

2. Remove/Install an Engine Mount

A. Equipment

Item	Quantity	Part Number
Hoist.	1	Commercial.
Engine sling.	1	Commercial.
Engine stand.	1	Commercial.
Tail trestle.	1	Commercial.

B. Remove an Engine Mount

	Detail Steps/Work Items	Key Items/References
(1)	Remove the engine.	Refer to Section 71-00.
(2)	Release all clamps, clips and ties holding the electrical harness and hoses to the engine mount.	
(3)	Remove the un-feathering accumulator.	Refer to Section 61-20.
(4)	Remove the cabin heating heat-exchanger and shroud.	Refer to Section 21-40.
(5)	Remove the engine coolant radiator.	Refer to Section 75-00.
(6)	Remove the inter-cooler / oil-cooler shroud.	Refer to Section 81-00.
(7)	Remove the engine oil-cooler.	Refer to Section 79-00.
(8)	Remove the turbo charger inter-cooler.	Refer to Section 81-00.
(9)	Remove the inter-cooler mounting bracket.	Refer to Section 81-00.
(10)	Remove the air filter housing and alternate air valve.	Refer to Section 71-60.
(11)	Remove the 5 nuts and washers (if installed) which hold the engine mount to the engine nacelle. Push the bolts out of the mounting pads.	
(12)	Move the engine mount clear of the engine nacelle.	

C. Remove an Engine Mount (OÄM 42-252 carried out)

	Detail Steps/Work Items	Key Items/References
(1)	Remove the engine.	Refer to Section 71-00.
(2)	Release all clamps, clips and ties holding the electrical harness and hoses to the engine mount.	
(3)	Remove the un-feathering accumulator.	Refer to Section 61-20.
(4)	Remove the cabin heating heat-exchanger and shroud.	Refer to Section 21-40.
(5)	Remove the engine coolant radiator.	Refer to Section 75-00.
(6)	Remove the inter-cooler / small coolant cooler shroud.	Refer to Section 81-00.
(7)	Remove the small coolant cooler.	Refer to Section 75-00.
(8)	Remove the turbo charger inter-cooler.	Refer to Section 81-00.
(9)	Remove the inter-cooler mounting bracket.	Refer to Section 81-00.
(10)	Remove the air filter housing and alternate air valve.	Refer to Section 71-60.
(11)	Remove the 5 nuts and washers which hold the engine mount to the engine nacelle. Push the bolts out of the mounting pads.	
(12)	Move the engine mount clear of the engine nacelle.	

D. Install an Engine Mount

	Detail Steps/Work Items	Key Items/References
(1)	Move the engine mount into position on the firewall.	
(2)	Install the 5 bolts which attach the engine mount to the engine nacelle firewall:	
	– Push the bolts through the firewall and mounting pads.	Use new bolts.
	– Install the washers and self-locking nuts on the bolts.	Use new fire resistant self-locking nuts. Torque: 40 Nm (29.5 lbf.ft.).
(3)	Install the engine coolant radiator.	
(4)	Install the inter-cooler mounting bracket.	Refer to Section 81-00.
(5)	Install the turbo charger inter-cooler.	
(6)	Install the engine oil cooler.	
(7)	Install the inter-cooler / oil-cooler shroud.	
(8)	Install the engine air filter housing and alternate air valve.	
(9)	Install the cabin heating heat-exchanger and shroud.	
(10)	Install the propeller un-feathering accumulator.	
(11)	Install all the clamps, clips and ties that hold the electrical harness and hose to the engine mount.	The clamps, clips and ties that you removed in Paragraph 2 B (2).

E. Install the Engine Mount (OÄM 42-252 carried out)

	Detail Steps/Work Items	Key Items/References
(1)	Move the engine mount into position on the firewall.	
(2)	Install the 5 bolts which attach the engine mount to the engine nacelle firewall: – Push the bolts through the firewall and mounting pads. – Install the washers and self-locking nuts on the bolts.	 Use new bolts. Use new fire resistant self-locking nuts. Torque: 40 Nm (29.5 lbf.ft.).
(3)	Install the engine coolant radiator.	
(4)	Install the inter-cooler mounting bracket.	Refer to Section 81-00.
(5)	Install the turbo charger inter-cooler.	
(6)	Install the small coolant cooler.	
(7)	Install the inter-cooler / small coolant cooler shroud.	
(8)	Install the engine air filter housing and alternate air valve.	
(9)	Install the cabin heating heat-exchanger and shroud.	
(10)	Install the propeller un-feathering accumulator.	
(11)	Install all the clamps, clips and ties that hold the electrical harness and hose to the engine mount.	The clamps, clips and ties that you removed in Paragraph 2 B (2).

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Section 71-50
Electrical Cables in the Engine Compartment

1. General

Each engine compartment has a main electrical wiring harness. The harness is supplied as part of the engine installation. The harness has all of the low-power cables for the engine control system. It is integral with the engine control system. Refer to Section 76-00 for data about the main electrical wiring harness.

There are a small number of separate cables for the alternator and starter. See Chapter 24 for data about the battery and alternator wiring. See Chapter 80 for more data about the starter cables. See Chapter 92 Wiring Diagrams for data about the cables in each system.

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Section 71-60
Air Intakes

1. General

An air filter housing, air filter and alternate air valve assembly make the engine air intake system for the DA 42 airplane. The engine bottom cowling has a molded air intake duct and a flexible seal attached to the air filter housing. A lever below the instrument panel, right-side, operates both alternate air valves.

Figure 1 shows the engine air filter and alternate air valve.

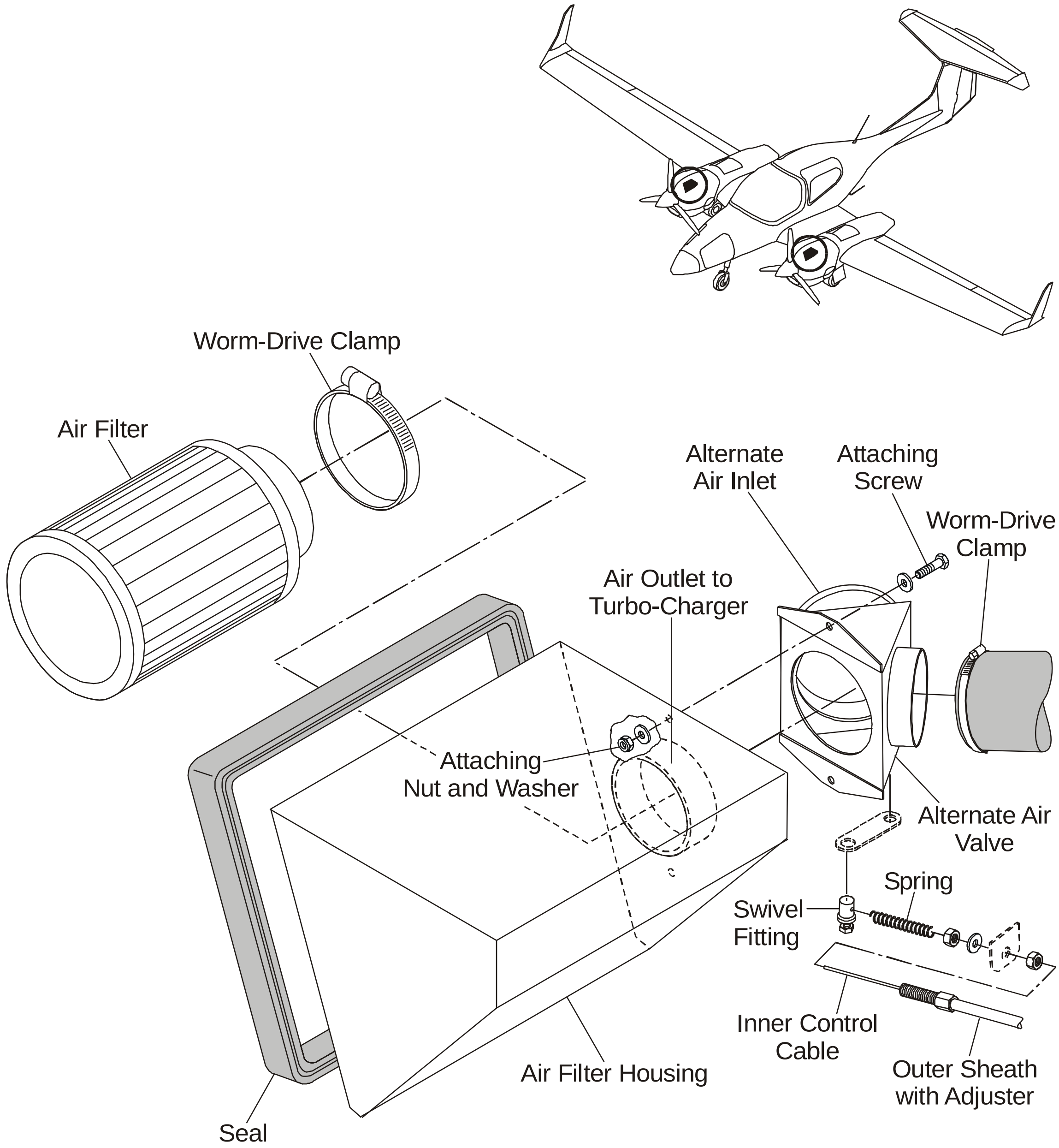

Figure 1: Air Filter and Alternate Air Assembly

2. Description

The air intake has 3 main parts:

– Alternate air valve assembly.

– Air filter housing.

– Air filter.

– Alternate air valve operating cables.

A. Alternate Air Assembly

Refer to Figure 1. The alternate air valve is attached to the aft face of the air filter housing. The air filter attaches to the front of the alternate air valve. The alternate air valve also has an inlet direct from the engine compartment. A flap in the valve can select either filtered air or warm, unfiltered air.

B. Air Filter Housing

The air filter housing is made of sheet aluminum. It has a flexible seal which makes a seal between the air intake assembly and the engine bottom cowling. Bolts attach the air filter housing to brackets on the engine mount.

C. Air Filter

Refer to Figure 1. The air filter is a K&N RB-0700 or RD-0700 high-flow air filter. The air filter locates on the air filter housing, on the right of the engine compartment, just forward of the firewall. It is held to the forward face of the alternate air valve by a worm-drive clamp.

D. Alternate Air Valve Operating Cables

A control lever on the right side of the center console, below the instrument panel operates the alternate air valves. A Bowden cable connects the control lever to a relay lever. The relay lever is mounted in the relay bracket which is located on the cockpit control bulkhead, below the pilot’s seat. Two more Bowden cables connect the relay lever to the left and right engine alternate air valve operating levers.

3. Operation

When the pilot pulls the alternate air valve control lever towards the rear of the airplane these events occur:

– The lever pulls the inner cable of the forward Bowden cable.

– The inner cable of the forward Bowden cable turns the relay lever clockwise.

– The relay lever pulls the inner cables of the left and right alternate valves.

– Both engine alternate air valves move to the alternate (unfiltered) position.

When the pilot moves the alternate air valve control lever forward both alternate air valves move back to the normal (OFF) position.

Trouble-Shooting

1. General

The table below lists the defects you could have with the air intake system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
An engine does not develop full power.	Air filter blocked/defective on related engine.	Replace air filter. For the related engine.

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Maintenance Practices

1. General

These Maintenance Practices tell you how to remove and install the air filter and the alternate air valve assembly. They also tell you how to adjust, remove and install the alternate air control cable.

For the data on the fuel injection system refer to the TAE Operation and Maintenance Manual OM-02-01, latest revision, if the TAE 125-01 engine is installed. If the TAE 125-02-99 or TAE 125-02-114 engine is installed, refer to the TAE Operation and Maintenance Manual OM-02-02, latest revision.

2. Remove/Install an Air Filter

A. Remove an Air Filter

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**	
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the related ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Remove the engine top cowlings.	Refer to Section 71-10.
(3)	Disconnect the airplane main battery.	Refer to Section 24-34.
(4)	Loosen the worm-drive clamp that holds the air filter to air filter housing.	Refer to Figure 1.
(5)	Move the air filter forward and clear of the air filter housing.	

B. Install an Air Filter

	Detail Steps/Work Items	Key Items/References
(1)	Inspect the air filter for loose rubber residues from manufacturing. If loose rubber are found, remove them carefully prior to installation of the filter.	
(2)	Make sure that the worm-drive clamp is in position on the air filter.	
(3)	Put the air filter in position on the air filter housing.	
(4)	Tighten the worm-drive clamp which holds the air filter.	Refer to Figure 1.
(5)	Connect the airplane main battery.	Refer to Section 24-34.
(6)	Install the engine top cowlings.	Refer to Section 71-10.

3. Remove/Install an Alternate Air Valve

A. Remove an Alternate Air Valve

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**	
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Remove the engine top cowlings.	Refer to Section 71-10.
(3)	Disconnect the airplane main battery.	Refer to Section 24-34.
(4)	Loosen the worm-drive clamp that holds the air filter to the air filter housing.	Refer to Paragraph 2.
(5)	Remove the bolts, nuts and washers that hold the alternate air valve to the air filter housing.	
(6)	Disconnect the alternate air control cable.	
(7)	Disconnect the hose that connects the alternate air valve to the turbo-charger inlet: – Open the worm-drive-clamp. – Pull the hose off the valve.	 At the alternate air valve.
(8)	Move the alternate air valve clear of the airplane.	

B. Install an Alternate Air Valve

	Detail Steps/Work Items	Key Items/References
(1)	Move the alternate air valve close to the engine and connect the alternate air control cable to the valve.	
(2)	Install the alternate air valve on the air filter housing.	Apply fire resistant sealant (Dow Corning 736 or equivalent) between air filter housing and alternate air valve.
(3)	Connect the hose that connects the alternate air valve to the turbo-charger inlet: – Connect the hose to the valve. – Tighten the worm-drive clamp.	At the alternate air valve.
(4)	Adjust the alternate air control cable.	Refer to Paragraph 5.
(5)	Install the air filter.	Refer to Paragraph 2.

4. Remove/Install an Alternate Air Control Inner-Cable

A. Remove an Alternate Air Control Forward Inner-Cable

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**	
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Remove the engine top cowlings.	Refer to Section 71-10.
(3)	Disconnect the airplane main battery.	Refer to Section 24-34.
(4)	Remove the pilot’s seat.	Refer to Section 25-10.
(5)	Disconnect the control cable from the relay lever at the relay bracket: – Loosen the screw on the cable swivel fitting at the relay lever. – Pull the inner control cable clear of the swivel fitting.	Refer to Figure 1. Retain the swivel fitting.
(6)	Disconnect the control cable from the alternate air control operating lever in the cockpit: – Loosen the screw on the cable swivel fitting at the operating lever. – Remove the swivel fitting from the cable.	Refer to Figure 2. Retain the swivel fitting!

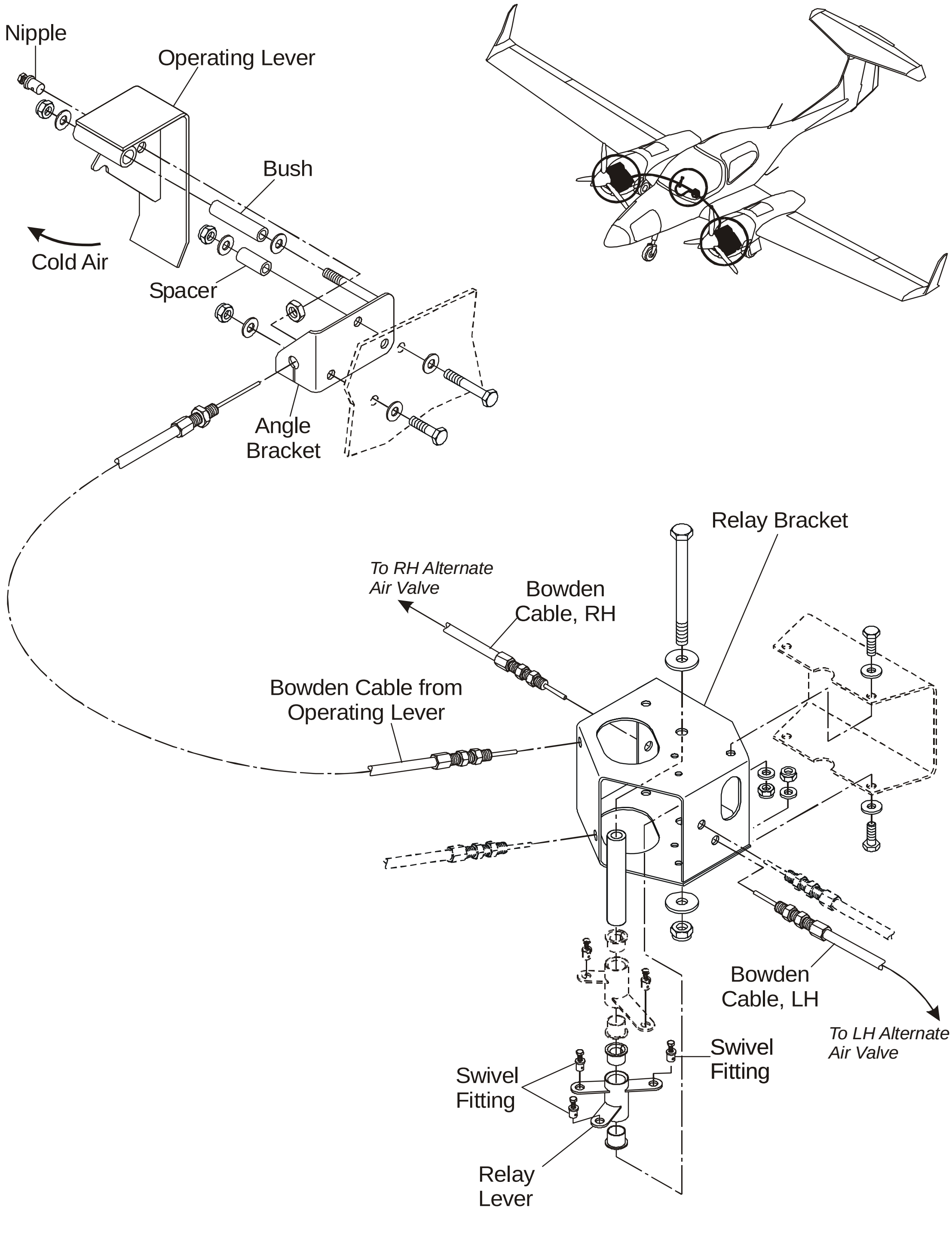

Figure 2: Alternate Air Valve Operating Cables

	Detail Steps/Work Items	Key Items/References
(7)	Remove the inner control cable form the sheath:	
	– Attach a length of suitable cord to the end of the inner cable.	The cord must be longer than the inner cable!
	– Pull the inner cable from the outer sheath and pull the length of cord into the outer sheath and clear of the airplane.	
	– Disconnect the inner cable from the length of cord.	Leave the length of cord in the outer sheath!

B. Install an Alternate Air Control Forward Inner-Cable

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the alternate air control cable outer sheath is in good condition and is not kinked.	
(2)	Make sure that the new alternate air valve forward control cable inner is clean and dry.	
(3)	Install the new alternate air valve forward control cable inner:	
	– Attach the end of the length of cord that is in the control cable outer sheath to the new control cable inner.	At the cockpit end.
	– Pull the new cable into the outer sheath with the length of cord.	From the relay lever end.
	– When the new inner cable is fully through the outer sheath:	
	– Disconnect the length of cord from the inner cable.	
(4)	Connect the alternate air forward inner cable to the operating lever in the cockpit:	Refer to Figure 2.
	– Install the swivel fitting into the operating lever.	
	– Pass the inner cable through the swivel fitting and tighten the swivel fitting.	
(5)	Connect the alternate air inner cable to the relay lever:	Refer to Figure 2.
	– Install the swivel fitting into the relay lever.	
	– Pass the inner cable through the swivel fitting and tighten the swivel fitting screw.	
(6)	Adjust the alternate air cable that you installed.	Refer to Paragraph 5.
(7)	Install the engine cowlings that you removed.	Refer to Section 71-10.

C. Remove an Alternate Air Control Forward Left/Right-Cable

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**	
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Remove the engine top cowlings.	Refer to Section 71-10.
(3)	Disconnect the airplane main battery.	Refer to Section 24-34.
(4)	Remove the pilot's seat.	Refer to Section 25-10.
(5)	Disconnect the control cable from the relay lever at the relay bracket: – Loosen the screw on the cable swivel fitting at the relay lever. – Pull the inner control cable clear of the swivel fitting.	Refer to Figure 1. Retain the swivel fitting.
(6)	Disconnect the control cable from the related alternate air valve: – Loosen the screw on the cable swivel fitting at the alternate air valve. – Pull the inner control cable clear of the swivel fitting and remove the spring from the cable.	Refer to Figure 1. Retain the swivel fitting and the spring!

	Detail Steps/Work Items	Key Items/References
(7)	Remove the inner control cable form the sheath: – Attach a length of suitable cord to the end of the inner cable. – Pull the inner cable from the outer sheath and pull the length of cord into the outer sheath and clear of the airplane. – Disconnect the inner cable from the length of cord.	The cord must be longer than the inner cable! Leave the length of cord in the outer sheath!

D. Install an Alternate Air Control Forward Left/Right-Cable

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the alternate air control cable outer sheath is in good condition and is not kinked.	
(2)	Make sure that the new alternate air valve control cable inner is clean and dry.	
(3)	Install the new alternate air valve left/right control cable inner: – Attach the end of the length of cord that is in the control cable outer sheath to the new control cable inner. – Pull the new cable into the outer sheath with the length of cord. – When the new inner cable is fully through the outer sheath: – Disconnect the length of cord from the inner cable.	At the related engine end. From the relay lever end.

	Detail Steps/Work Items	Key Items/References
(4)	Connect the alternate air inner cable to the related engine alternate air valve operating lever: – Move the spring into position over the inner cable. – Install the swivel fitting into the alternate air valve operating lever. – Pass the inner cable through the swivel fitting and tighten the swivel fitting screw.	
(5)	Connect the alternate air inner cable to the relay lever: – Install the swivel fitting into the relay lever. – Pass the inner cable through the swivel fitting and tighten the swivel fitting screw.	Refer to Figure 2.
(6)	Adjust the alternate air cable that you installed.	Refer to Paragraph 5.
(7)	Install the engine cowlings that you removed.	Refer to Section 71-10.

5. Adjust an Alternate Air Valve Control Cable

A. Adjust the Alternate Air Valve Forward Control Cable

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**	
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	If necessary, remove the engine top cowlings.	Refer to Section 71-10.
(3)	If necessary, disconnect the airplane main battery.	Refer to Section 24-34.
(4)	Move the alternate air lever in the cockpit from OFF to ON: – Make sure the lever moves freely with no restrictions.	Fully aft.
(5)	Set the alternate air lever in the cockpit to OFF and hold it in position: – Make sure that both left and right engine alternate air valves are fully closed.	Fully forward. With the alternate air valve fully closed there must be at least 3 mm (0.125 in) clearance (bounce) between the alternate air lever and the stop.

	Detail Steps/Work Items	Key Items/References
(6)	Set the alternate air lever in the cockpit to ON and hold it in position: – Make sure that both left and right engine alternate air control valves are in the fully open position.	
(7)	If necessary, adjust the alternate air control cable to get the correct settings at step 5.	At the alternate air lever.
(8)	Do steps 5 to 7 again as necessary.	
(9)	Connect the airplane battery.	Refer to Section 24-34.
(10)	Install the engine top cowlings.	Refer to Section 71-10.

B. Adjust a Left/Right Engine Alternate Air valve Control Cable

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**	
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	If necessary, remove the engine top cowlings.	Refer to Section 71-10.
(3)	If necessary, disconnect the airplane main battery.	Refer to Section 24-34.
(4)	Remove the pilot’s seat.	Refer to Section 25-10.

	Detail Steps/Work Items	Key Items/References
(5)	Move the alternate air lever in the cockpit from OFF to ON: – Make sure the lever moves freely with no restrictions.	Fully aft.
(6)	Set the alternate air lever in the cockpit to OFF and hold it in position: – Make sure that the related engine alternate air valve is fully closed.	Fully forward. With the alternate air valve fully closed there must be at least 3 mm (0.125 in) clearance (bounce) between the alternate air lever and the stop.
(7)	Set the alternate air lever in the cockpit to ON and hold it in position: – Make sure that the related engine alternate air control valve is in the fully open position.	
(8)	If necessary, adjust the related engine alternate air control cable to get the correct settings at step 6.	At the relay lever.
(9)	Do steps 5 to 8 again as necessary.	
(10)	Install the engine cowlings.	Refer to Section 71-10.
(11)	Install the pilot's seat.	Refer to Section 25-10.
(12)	If necessary, connect the airplane main battery.	Refer to Section 24-31.

Section 71-70
Engine Drains

1. General

The DA 42 has a breather for the oil separator tank and an overflow for the liquid coolant system expansion tank for each engine nacelle.

Refer to Chapter 72 for more data about the engine oil system and refer to Chapter 75 for more data about the engine liquid cooling system.

2. Description

Figure 1 shows the engine drains for the TAE 125-01 engine. Figure 2 shows the engine nacelle drains for the TAE 125-02-99 (MÄM 42-198 carried out) engine. Figure 3 shows the engine nacelle drains for the TAE 125-02-114 (OÄM 42-252 carried out) engine.

The breather hose connects to the outlet on top of the oil separator. A worm-drive-clamp secures the hose at the outlet. The other end of the breather hose passes through a guide tube at the bottom of the related engine nacelle to atmosphere. The hoses are secured to the engine mounting frame and the drain hose for the liquid cooling expansion tank with a P-clamp and cable ties.

The drain hose for the liquid cooling expansion tank connect to an outlet at the filler cap for the expansion tank. A worm-drive-clamp secures the hose at the outlet. The other end of the drain hose passes through a guide tube at the bottom of the related engine nacelle to atmosphere. The hose is secured to the engine mounting frame and the oil separator breather hose with a P-clamp and cable ties.

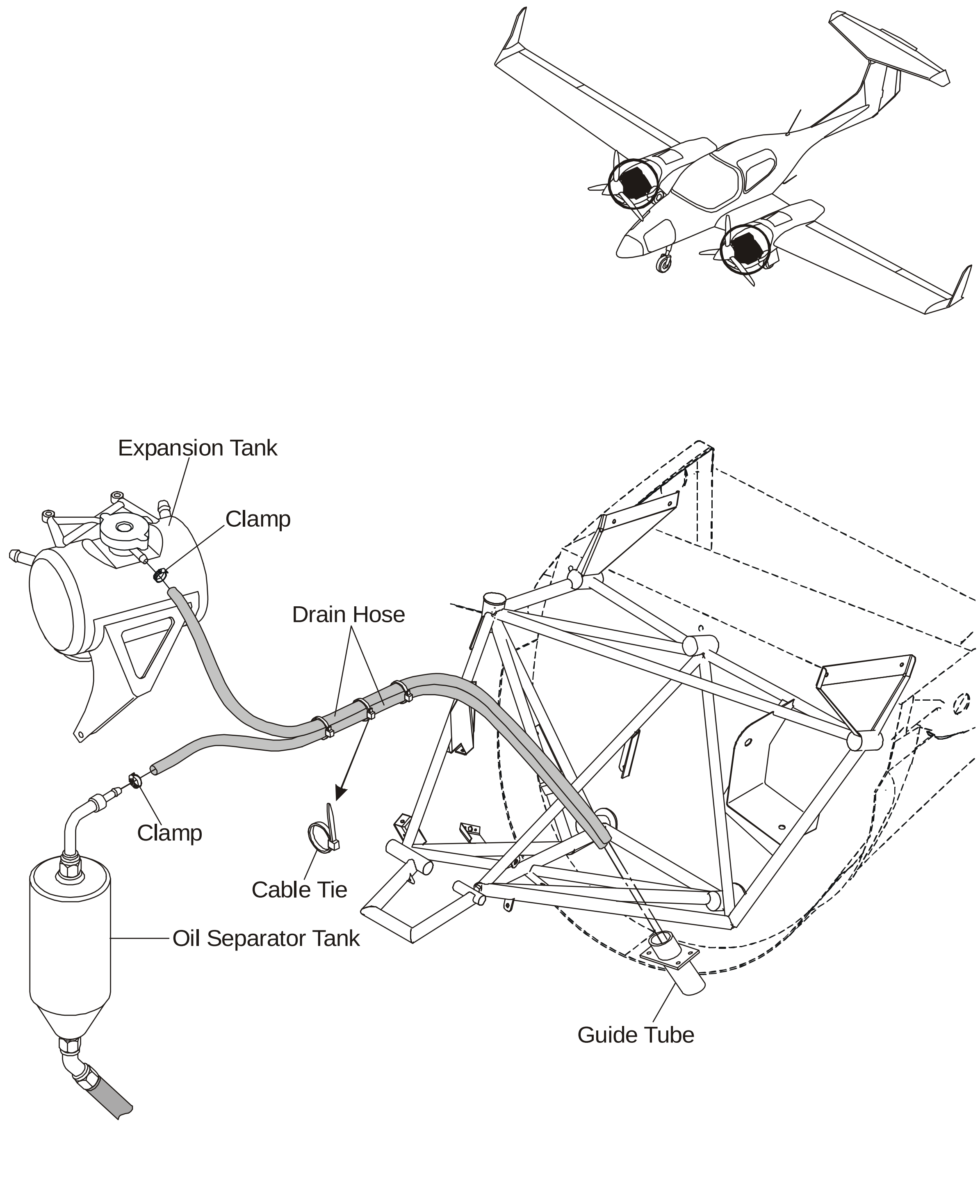

Figure 1: Engine Nacelle Drains (TAE 125-01 engine)

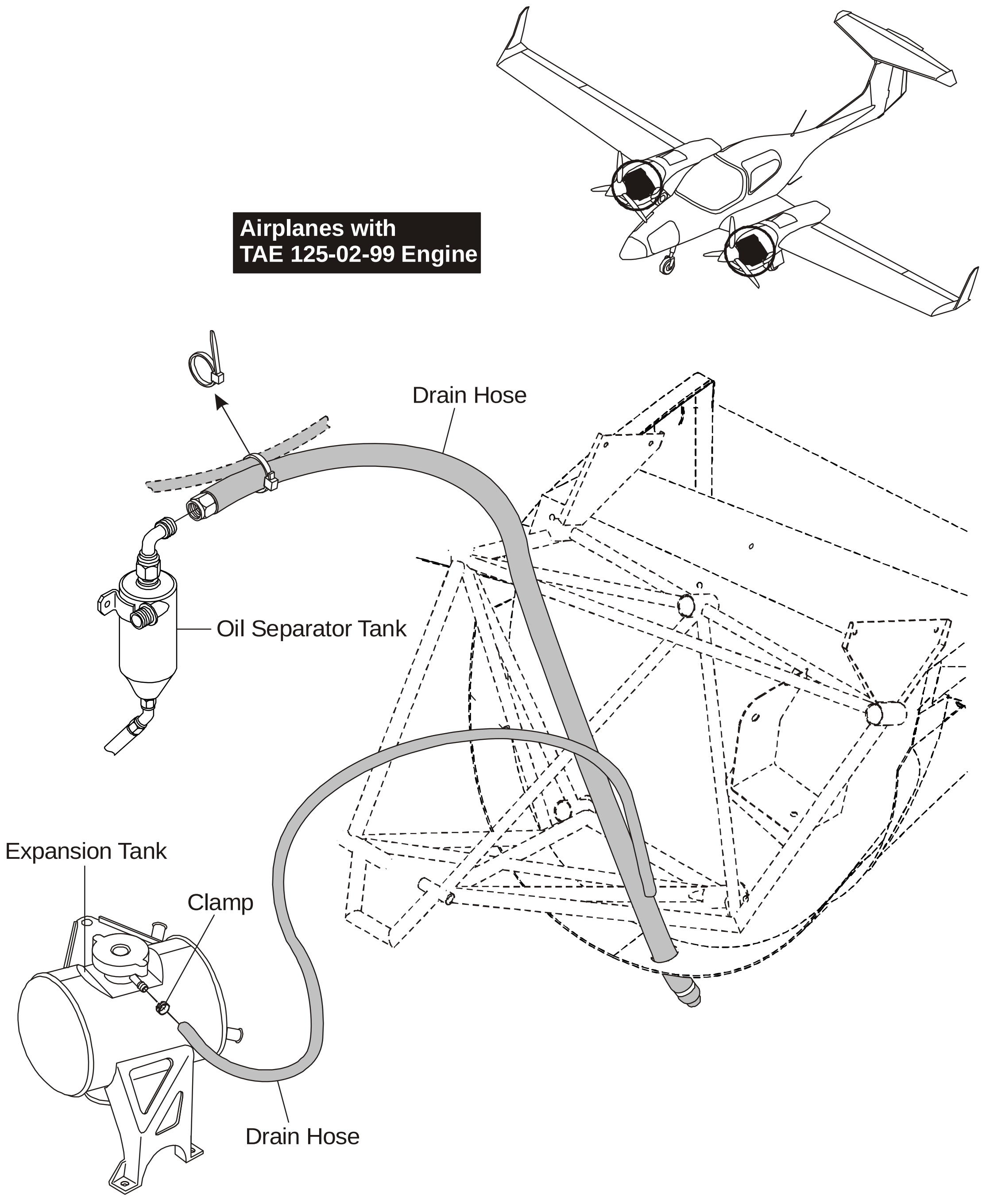

Figure 2: Engine Nacelle Drains (TAE 125-02-99 engine, MÄM 42-198 carried out)

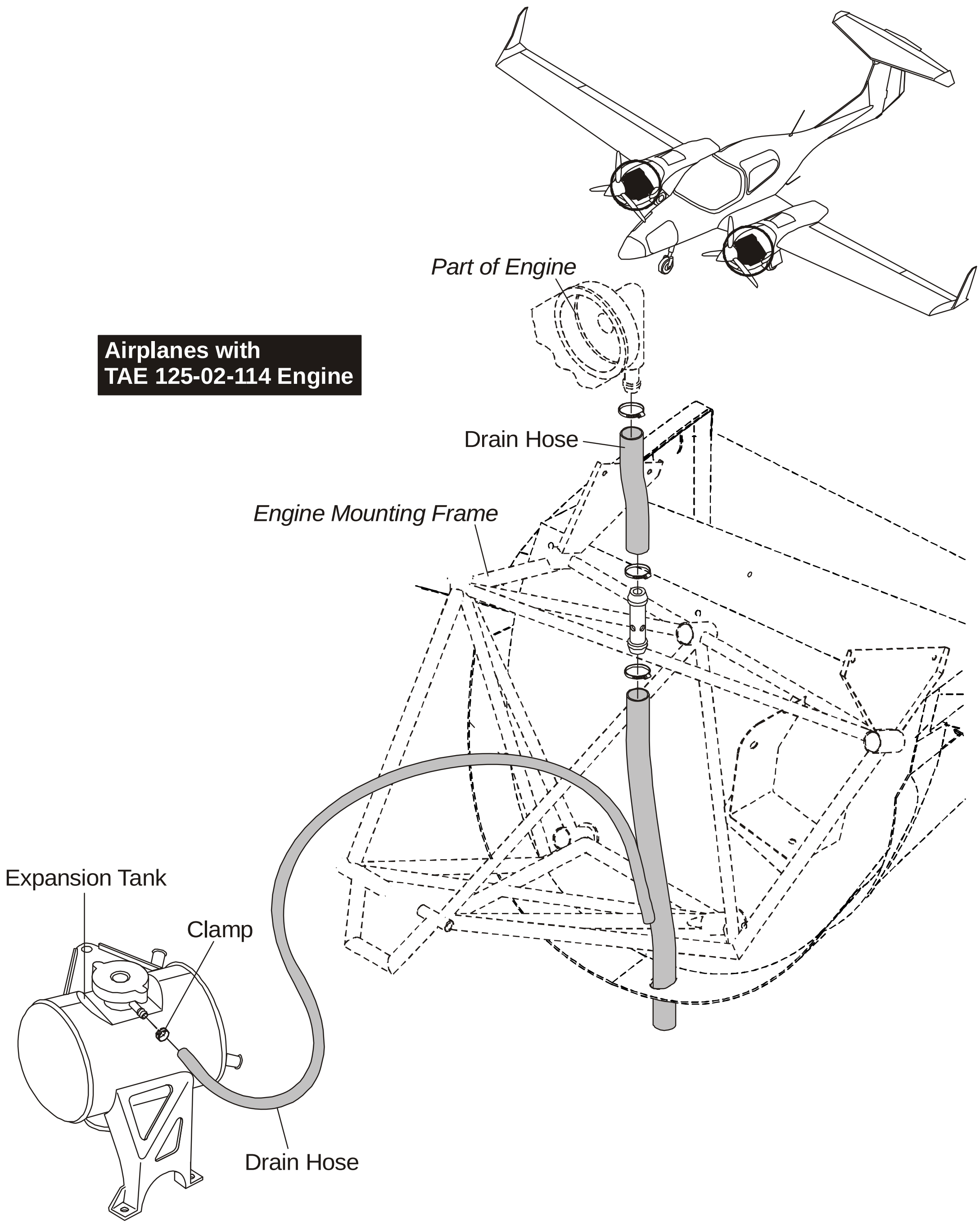

Figure 3: Engine Nacelle Drains (TAE 125-02-114 engine, OÄM 42-252 carried out)

Maintenance Practices

1. General

These Maintenance Practices tell you how to remove/install an oil separator breather hose and they tell you how to replace a liquid cooling expansion tank drain hose.

2. Remove/Install an Oil Separator Tank Breather Hose (TAE 125-01 and TAE 125-02-99 Engines)

A. Remove an Oil Separator Tank Breather Hose

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.** Note: For removing/installing the oil separator breather hose and replace the liquid cooling expansion tank drain hose use only a 6 plane spanner socket. You can find such tool at Basic Tool set CENTURION 1.7, called “oil filter wrench 27 mm (short socket)”.	
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Remove the engine cowlings.	Refer to Section 71-10.
(3)	Disconnect the airplane main battery.	Refer to Section 24-34.

	Detail Steps/Work Items	Key Items/References
(4)	Remove the cable ties and P-clamp that secure the oil separator tank breather hose to the engine mounting frame and liquid cooling expansion tank drain: – Remove the P-clamp that holds the breather hose to the engine mounting frame. – Remove the cable ties that attach the breather hose to the engine mounting frame and the liquid cooling expansion-tank-drain-hose.	Refer to Figure 1. Note the location of the cable-ties!
(5)	Remove the breather hose: – Remove the hose clamp that secures the breather hose to the outlet at the top of the separator tank. – Pull the breather hose from the outlet at the top of the separator tank. – Pull the breather hose through the guide tube at the bottom of the engine nacelle and move the breather hose clear of the engine nacelle. – Remove the spiral-wrap that protects the breather hose.	

B. Install an Oil Separator Tank Breather Hose

	Detail Steps/Work Items	Key Items/References
(1)	Install the spiral-wrap onto the new breather hose.	
(2)	Install a new hose clamp onto the breather hose and move the hose into position in the engine nacelle.	Pass the outlet end of the breather through the guide tube in the bottom of the engine nacelle.
(3)	Connect the end of the breather hose to the outlet at the top of the oil separator tank and tighten the hose clamp.	
(4)	Install the P-clamp that attaches the breather hose and the liquid cooling expansion-tank-drain-hose to the engine mount.	
(5)	Install the cable ties that attach the breather hose to the engine mounting frame and the liquid cooling expansion-tank-drain-hose.	At the positions noted in Paragraph 2 A (4).
(6)	Install the engine cowlings.	Refer to Section 71-10.

3. Remove/Install a Liquid Cooling Expansion Tank Drain Hose

A. Remove a Liquid Cooling Expansion Tank Drain Hose

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**	
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Remove the engine cowlings.	Refer to Section 71-10.
(3)	Disconnect the airplane main battery.	Refer to Section 24-34.
(4)	Remove the cable ties and P-clamp that secure the liquid cooling expansion tank hose to the engine mounting frame and oil separator tank breather hose: – Remove the P-clamp that holds the drain hose to the engine mounting frame. – Remove the cable ties that attach the drain hose to the engine mounting frame and the oil separator tank breather hose.	Refer to Figure 1. Note the location of the cable-ties!

	Detail Steps/Work Items	Key Items/References
(5)	Remove the drain hose: – Remove the hose clamp that secures the drain hose to the outlet at the top of the expansion tank. – Pull the drain hose from the outlet at the top of the separator tank. – Pull the drain hose through the guide tube at the bottom of the engine nacelle and move the drain hose clear of the engine nacelle. – Remove the spiral-wrap that protects the drain hose.	

B. Install a Liquid Cooling Expansion Tank Drain Hose

	Detail Steps/Work Items	Key Items/References
(1)	Install the spiral-wrap onto the new drain hose.	
(2)	Install a new hose clamp onto the drain hose and move the hose into position in the engine nacelle.	Pass the outlet end of the drain hose through the guide tube in the bottom of the engine nacelle.
(3)	Connect the end of the drain hose to the outlet at the top of the expansion tank and tighten the hose clamp.	
(4)	Install the P-clamp that attaches the drain hose and the breather hose to the engine mount.	
(5)	Install the cable ties that attach the drain hose to the engine mounting frame and the breather hose.	At the positions noted in Paragraph 3 A (4).
(6)	Install the engine cowlings.	Refer to Section 71-10.

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CHAPTER 72

ENGINE TAE 125

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ENGINE TAE 125

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CHAPTER 72
ENGINE TAE 125

1. General

This Section gives you background data about the TAE 125 Diesel engines installed in the DA 42 airplane. This Section also tells you about the maintenance of the oil system of the TAE 125 engine.

Refer to these Chapters for more data about the engine systems:

- Chapter 73. Engine fuel and control.
- Chapter 75. Liquid cooling system.
- Chapter 76. Engine controls.
- Chapter 77. Engine indicating.
- Chapter 78. Engine exhaust.
- Chapter 79. Oil cooling.
- Chapter 80. Engine starting.
- Chapter 81. Turbo-charger.

Note: Only TAE authorized maintenance organizations may carry out maintenance and inspection work on the TAE engine. Refer to TAE Service Bulletin No. 125-0003. Any engine malfunction must be reported to TAE.

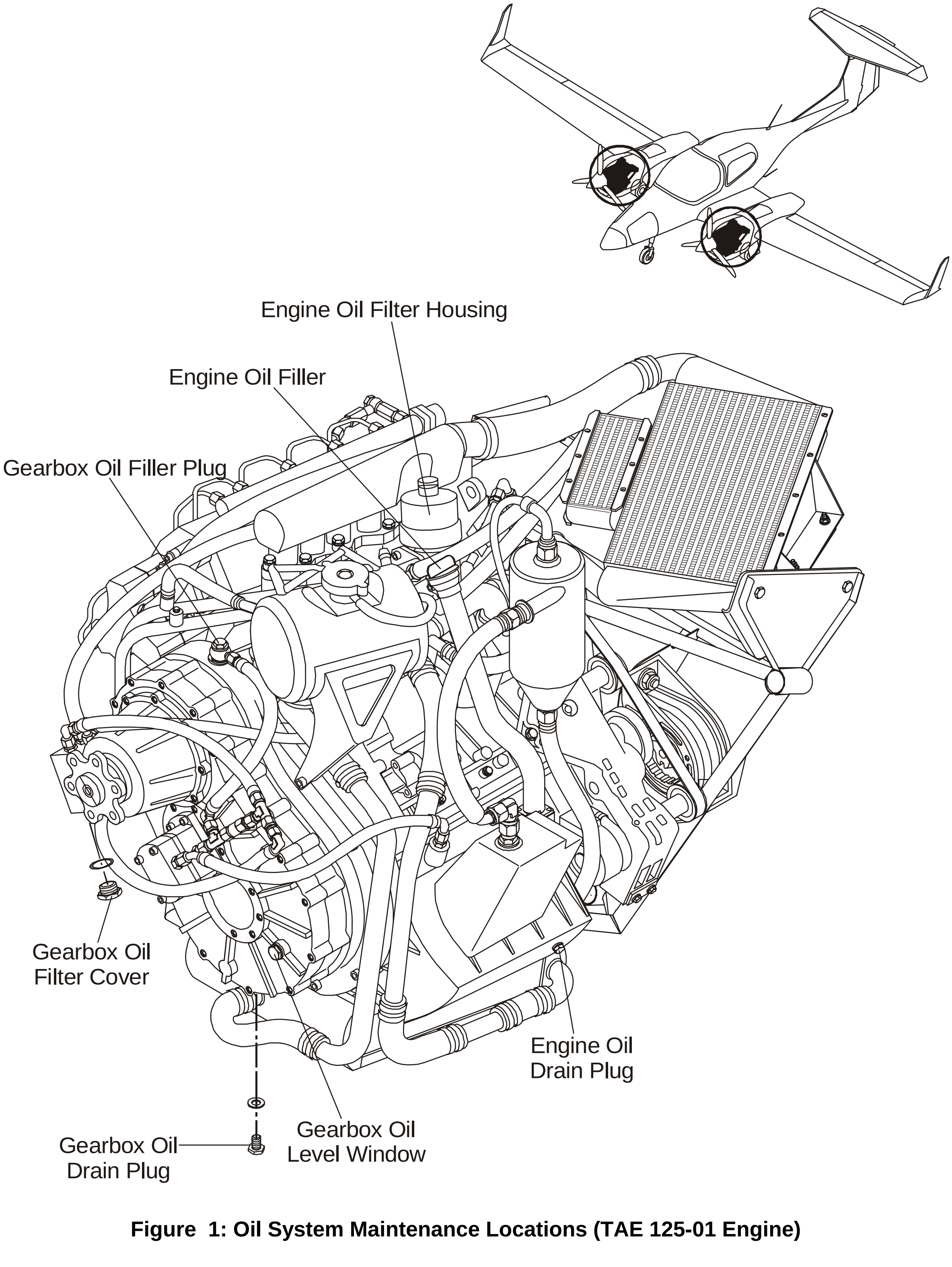

Figure 1: Oil System Maintenance Locations (TAE 125-01 Engine)

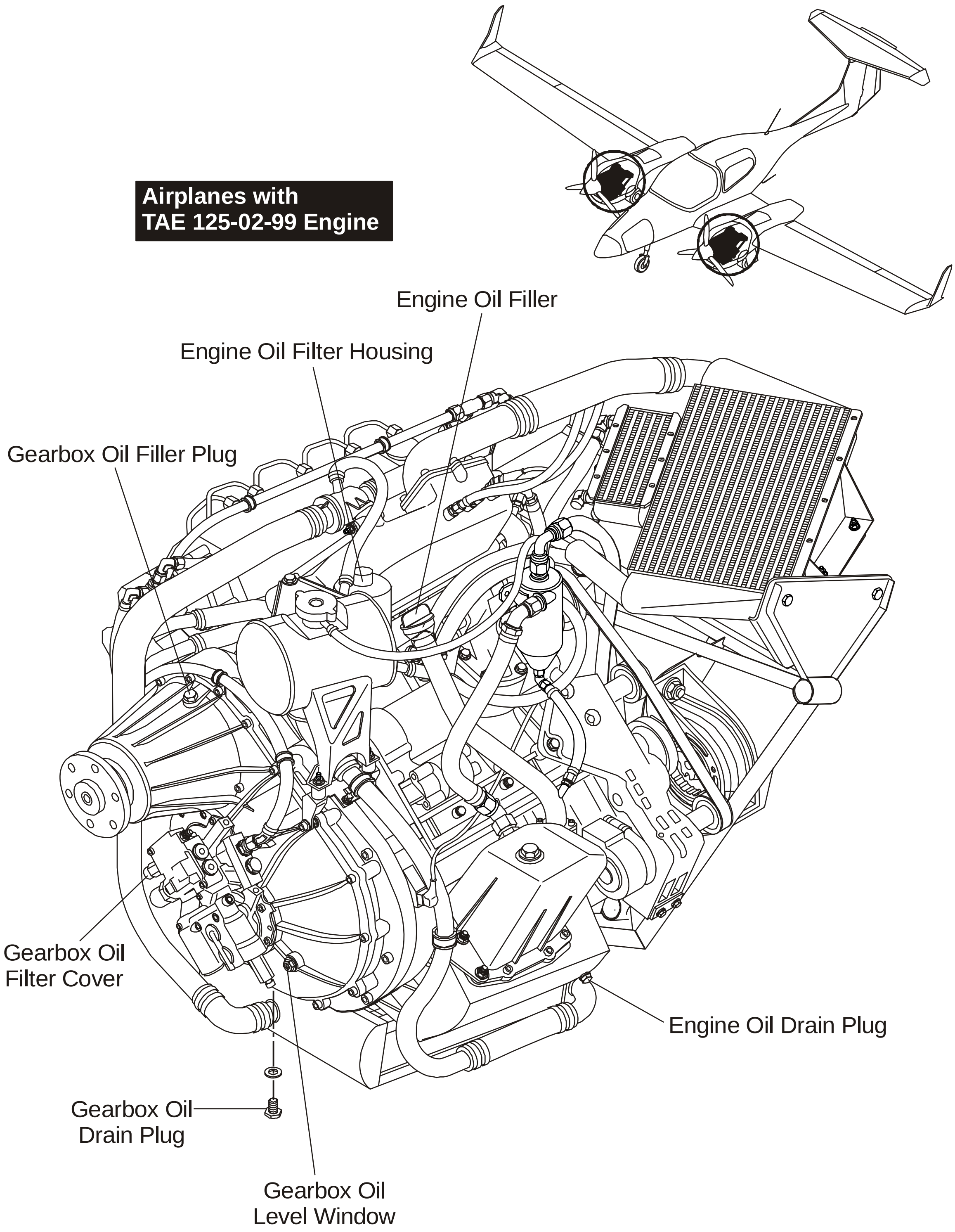

Figure 2: Oil System Maintenance Locations (TAE 125-02-99 Engine, MÄM 42-198 carried out)

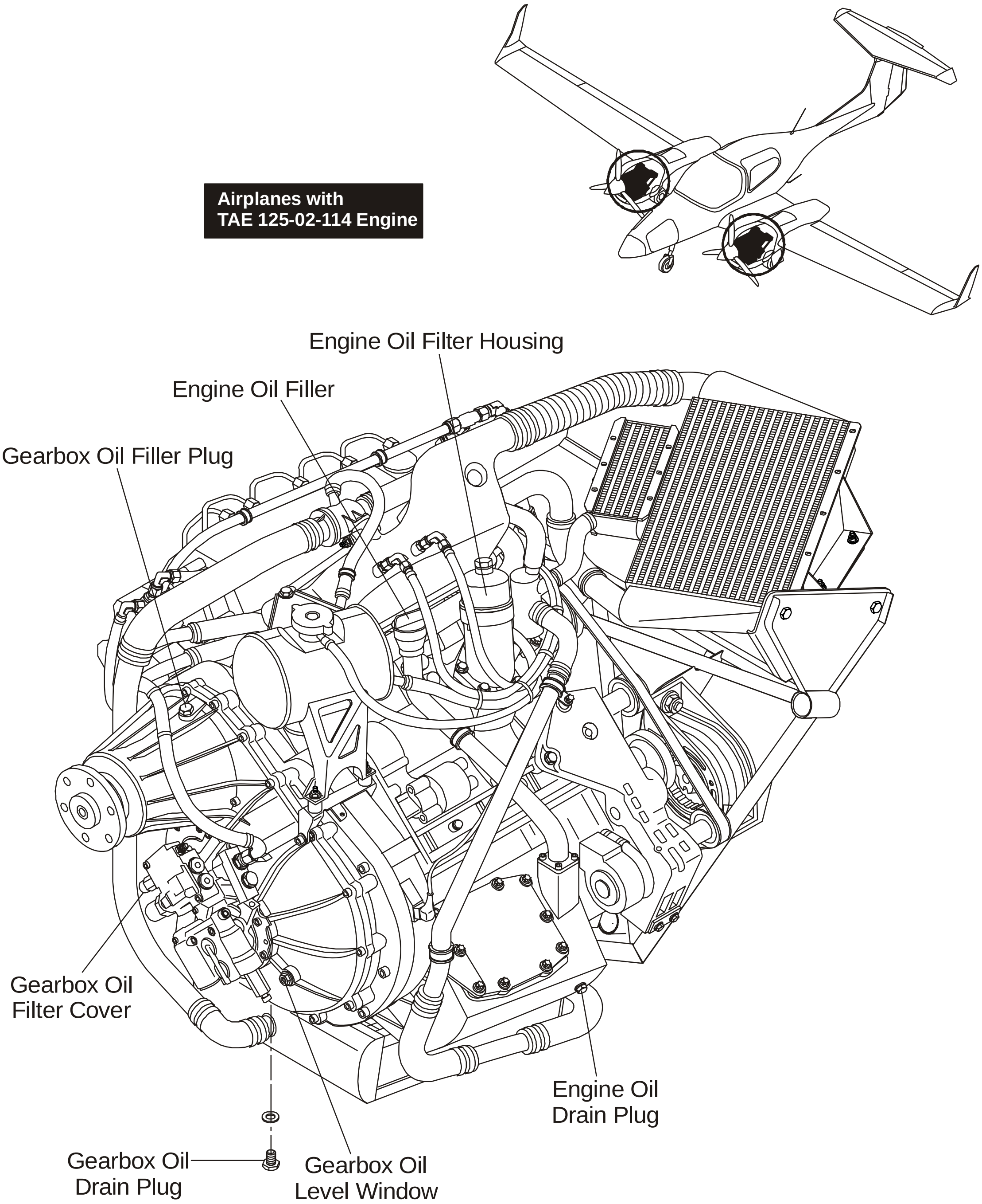

Figure 3: Oil System Maintenance Locations (TAE 125-02-114 Engine, OÄM 42-252 carried out)

2. Description

The TAE 125 is a liquid-cooled, 4-cylinder, 4-stroke inline turbo charged engine with double overhead camshafts. The engine has a direct-injection fuel system controlled by computers. A reduction gearbox with a ratio of 1.69:1 turns the propeller. The gearbox has an integral torsional vibration damper with an overload clutch or a dual mass fly-wheel. The engine has an electric starter and a generator.

The TAE 125 engine operates on the Diesel cycle. The engine has a crankcase, crankshaft, cylinders, pistons and valves like conventional piston aero-engines. However, there is no ignition system.

In the Diesel engine, air is drawn into the cylinders and compressed to a high pressure. A high pressure pump injects a metered quantity of fuel into the cylinder. The air is hot enough to ignite the fuel. The fuel burns and expands the air to force the piston down the cylinder. The air pumping cycle and valve operation is the same as in a conventional piston aero-engine.

A Full Authority Digital Engine Control (FADEC) system controls the fuel system, propeller and turbo-charger. The FADEC has 2 engine control units (ECUs) located in a sealed unit in the LH/RH airplane engine nacelles. Sensors located on the engine measure the engine parameters for the system. An electrical harness connects the system components.

The fuel injection pump supplies 4 injectors connected to a common high-pressure rail. The active ECU controls the opening of each injector to inject the correct quantity of fuel for position of the cockpit power lever.

The TAE 125 has a turbo charger to increase the efficiency and power output. Exhaust gases go through a turbine before flowing through a conventional exhaust to atmosphere. A ‘Waste Gate’ (bypass valve) in parallel with the turbine controls the volume of exhaust gas going through the turbine. The turbine turns a centrifugal compressor. The compressor supplies air to the engine through an inter cooler.

3. Engine Oil System

The engine has the usual wet sump oil system. The sump has a maximum capacity of 6 liters (6.3 US qts). Refer to the Airplane Flight Manual Chapter 2 for data about the oil types to use in the engine.

The oil pump supplies oil to all bearings and other components that require oil. Oil galleries inside the engine crankcase and cylinder head supply oil to the internal components.

Figure 1 shows the location of the items that you can maintain on the engine oil system of the TAE-125-01 engine. Figure 2 shows the location of items that you can maintain on the engine oil system of the TAE 125-02-99 engine (if MÄM 42-198 is carried out). Figure 3 shows the location of items that you can maintain on the engine oil system of the TAE 125-02-114 engine (if OÄM 42-252 is carried out). The engine has these maintenance locations:

- A full-flow oil filter located at the top left adjacent to the cylinder head. You must replace the filter at the times given in Chapter 05.
- An engine oil drain plug at the rear left of the engine sump.
- An oil filler located at the left of the crankcase.
- A gearbox oil filler plug located at the top of the gearbox.
- A gearbox oil level window located at the front of the gearbox. When the oil covers half of the inspection window, the gearbox contains the correct quantity of oil.
- A gearbox oil drain plug located at the bottom of the gearbox.

Trouble-Shooting

1. General

The trouble-shooting given in this Section is limited to those items that you are allowed to do on the engine. For all other engine troubles, you must refer to an approved TAE 125 repair facility or the engine manufacturer.

Trouble	Possible Cause	Repair
Engine oil pressure low.	Not enough oil in the engine oil sump.	Fill the engine with oil.
Oil pressure regulator valve does not operate correctly.	Refer to the engine manufacturer.	
Defective oil pump.	Refer to the engine manufacturer.	
Gearbox oil temperature high.	Not enough oil in the gearbox.	Find the reason for the loss of gearbox oil and correct the problem. Fill the gearbox with oil.

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Maintenance Practices

1. General

These Maintenance Practices tell you how to service the oil system on the engine. Further Maintenance Practices are described in the TAE Service documents. You must refer to an approved TAE 125 maintenance facility or the engine manufacturer for all other engine maintenance.

WARNING: DO NOT GET OIL ON YOU. OIL CAN CAUSE SKIN DISEASE.

CAUTION: ALWAYS PUT A CAP ON OPEN CONNECTIONS. IF YOU DO NOT PUT A CAP ON OPEN CONNECTIONS, THEN CONTAMINATION CAN GET INTO THE SYSTEM AND CAUSE DAMAGE.

CAUTION: DO NOT MIX OIL TYPES. IF YOU MIX OIL TYPES THE OIL CAN LOSE ITS PROPERTIES AND THE ENGINE WILL WEAR MORE QUICKLY.

2. Change the Engine Oil and Replace the Oil Filter

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**	
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Disconnect the airplane main battery.	Refer to Section 24-34.
(3)	Remove the engine cowlings.	Refer to Section 71-10.

	Detail Steps/Work Items	Key Items/References
(4)	Perform an engine oil change according to TAE 125-01 Operation and Maintenance Manual, latest revision (if TAE 125-01 engine is installed) or TAE 125-02 Operation and Maintenance Manual, latest revision (if TAE 125-02-99 or TAE 125-02-114 engine is installed).	
(5)	Install the engine cowlings.	Refer to Section 71-10.
(6)	Connect the airplane main battery.	Refer to Section 24-34.

3. Replace the Gearbox Oil and Replace the Gearbox Oil Filter

A. If the TAE 125-01 Engine Is Installed

	Detail Steps/Work Items	Key Items/References
	Note: For environment protection, changing the gearbox oil is only allowed on sealed surfaces. Used gearbox oil has to be disposed according to the applicable regulations. The environment and ground water must not be contaminated.	
(1)	The gearbox oil must have operation temperature.	Refer to the AFM, Chapter 2.
	WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.	
(2)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(3)	Remove the engine cowlings.	Refer to Section 71-10.
(4)	Remove the gearbox oil filler plug.	At the top of the gearbox. Remove the lock wire.
(5)	Remove the gearbox oil drain plug.	At the bottom of the gearbox. Remove the lock-wire.
(6)	Drain the gearbox oil.	Use a suitable container to catch the oil.
(7)	Remove the gearbox oil filter.	Examine the filter for signs of metal particles. If you find metal particles, refer to the engine manufacturer. Refer to the TAE Operation and Maintenance Manual, latest revision.

	Detail Steps/Work Items	Key Items/References
(8)	Prevent contamination to the surrounding area due to gearbox oil which is pressurized in the un-feathering accumulator. – Install a hose onto the gearbox filter case. – Hold the end of the hose into a suitable container to catch the oil.	The oil will spill out with pressure. Use a hose with an adequate diameter and length, e.g. SHL 16 silicone hose.
WARNING:	**DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER.** **IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE SEVERE INJURY OR DEATH TO PERSONS.**	
(9)	Drain the propeller un-feathering accumulator: – Set the ELECT. MASTER switch to ON. – Set the ENGINE MASTER switch to ON. – Set the ENGINE MASTER switch to OFF and ON 3 times.	Energizes the shut-off valve and opens it. The gearbox oil starts flowing out into the container. Wait 10 seconds between operating the ENGINE MASTER switch.
(10)	As soon as the gearbox oil has drained completely and has stopped flowing: – Set the ENGINE MASTER switch to OFF. – Set the ELECT. MASTER switch to OFF.	
(11)	Remove the hose from the filter case.	
(12)	Preserve a sample of 0.1 liter of the drained gearbox oil and the used gearbox oil filter.	Refer to the applicable TAE Operation and Maintenance Manual, latest revision.
(13)	Install a new gearbox oil filter.	Refer to the TAE Operation and Maintenance Manual, latest revision.

	Detail Steps/Work Items	Key Items/References
(14)	Install the gearbox oil drain plug: – Tighten the oil drain plug. – Secure the oil drain plug with lock wire.	Use a new seal washer. Refer to the TAE Operation and Maintenance Manual, latest revision.
CAUTION: USE ONLY THE CORRECT GEARBOX OIL. REFER TO CHAPTER 2 OF THE AIRPLANE FLIGHT MANUAL FOR THE CORRECT GEARBOX OIL SPECIFICATIONS. IF YOU DO NOT USE THE CORRECT GEARBOX OIL THE ENGINE CAN BE DAMAGED.		
(15)	Fill the gearbox with 1.3 liter (1.37 US qt) of new gearbox oil.	
(16)	If necessary, fill the gearbox oil system to the correct level.	Check oil level through gearbox oil level window.
(17)	Install the gearbox oil filler plug: – Tighten the oil filler plug. – Secure the oil filler plug with lock wire.	Use a new seal washer. Refer to the TAE Operation and Maintenance Manual, latest revision.
(18)	Install the engine cowling.	Refer to Section 71-10.
(19)	Perform an engine test run.	Refer to Section 71-00.
(20)	Remove the engine cowlings.	Refer to Section 71-10.
(21)	If necessary, correct gearbox oil level: – Remove the gearbox oil filler plug. – Fill the gearbox oil system to the correct level. – Tighten the oil filler plug. – Secure the oil filler plug with lock wire.	Check oil level through gearbox oil level window. Use a new seal washer. Refer to the TAE Operation and Maintenance Manual, latest revision.
(22)	Check for leakage, especially at the gearbox oil drain plug and gearbox oil filler plug.	
(23)	Install the engine cowlings.	Refer to Section 71-10.

B. If the TAE 125-02-99 (MÄM 42-198 carried out) or the TAE 125-02-114 (OÄM 42-252 carried out) Engine is Installed

<table>
<tr><th></th><th>Detail Steps/Work Items</th><th>Key Items/References</th></tr>
<tr><td colspan="3">Note: For environment protection, changing the gearbox oil is only allowed on sealed surfaces. Used gearbox oil has to be disposed according to the applicable regulations. The environment and ground water must not be contaminated.</td></tr>
<tr><td>(1)</td><td>The gearbox oil must have operation temperature.</td><td>Refer to the AFM, Chapter 2.</td></tr>
<tr><td colspan="3">WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.</td></tr>
<tr><td>(2)</td><td>Make sure that the engine is safe:
– Set the ELECT. MASTER switch to OFF.
– Set the ENGINE MASTER switch to OFF.
– Set the power lever to 0%.</td><td></td></tr>
<tr><td>(3)</td><td>Remove the engine cowlings.</td><td>Refer to Section 71-10.</td></tr>
<tr><td>(4)</td><td>Remove the gearbox oil filler plug.</td><td>At the top of the gearbox. Remove the lock wire.</td></tr>
<tr><td>(5)</td><td>Remove the gearbox oil drain plug.</td><td>At the bottom of the gearbox. Remove the lock-wire.</td></tr>
<tr><td>(6)</td><td>Drain the gearbox oil.</td><td>Use a suitable container to catch the oil.</td></tr>
<tr><td colspan="3">WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER.

IF THE ENGINE STARTS THE PROPELLER CAN CAUSE SEVERE INJURY OR DEATH TO PERSONS.</td></tr>
</table>

	Detail Steps/Work Items	Key Items/References
(7)	Drain the propeller un-feathering accumulator: – Set the ELECT. MASTER switch to ON. – Set the ENGINE MASTER switch to ON. – Set the ENGINE MASTER switch to OFF and ON 3 times.	Energizes the shut-off valve and opens it. The gearbox oil starts flowing out into the container. Wait 10 seconds between operating the ENGINE MASTER switch.
(8)	As soon as the gearbox oil has drained completely and has stopped flowing: – Set the ENGINE MASTER switch to OFF. – Set the ELECT. MASTER switch to OFF.	
(9)	Preserve a sample of 0.1 liter of the drained gearbox oil and the used gearbox oil filter.	Refer to the applicable TAE Operation and Maintenance Manual, latest revision.
(10)	Replace the gearbox oil filter with a new one.	Examine the filter for signs of metal particles. If you find metal particles, refer to the engine manufacturer. Refer to the TAE Operation and Maintenance Manual, latest revision.
(11)	Install the gearbox oil drain plug: – Tighten the oil drain plug. – Secure the oil drain plug with lock wire.	Use a new seal washer and a new magnetic plug. Refer to the TAE Operation and Maintenance Manual, latest revision.
	CAUTION: USE ONLY THE CORRECT GEARBOX OIL. REFER TO CHAPTER 2 OF THE AIRPLANE FLIGHT MANUAL FOR THE CORRECT GEARBOX OIL SPECIFICATIONS. IF YOU DO NOT USE THE CORRECT GEARBOX OIL THE ENGINE CAN BE DAMAGED.	
(12)	Fill the gearbox with 1.3 liter (1.37 US qt) of new gearbox oil.	
(13)	If necessary, fill the gearbox oil system to the correct level.	Check oil level through gearbox oil level window.

	Detail Steps/Work Items	Key Items/References
(14)	Install the gearbox oil filler plug: – Tighten the oil filler plug. – Secure the oil filler plug with lock wire.	Use a new seal washer. Refer to the TAE Operation and Maintenance Manual, latest revision.
(15)	Install the engine cowling.	Refer to Section 71-10.
(16)	Perform an engine test run.	Refer to Section 71-00.
(17)	Remove the engine cowlings.	Refer to Section 71-10.
(18)	If necessary, correct gearbox oil level: – Remove the gearbox oil filler plug. – Fill the gearbox oil system to the correct level. – Tighten the oil filler plug. – Secure the oil filler plug with lock wire.	Check oil level through gearbox oil level window. Use a new seal washer. Refer to the TAE Operation and Maintenance Manual, latest revision.
(19)	Check for leakage, especially at the gearbox oil drain plug and gearbox oil filler plug.	
(20)	Install the engine cowlings.	Refer to Section 71-10.

4. Read an Engine Event Log

CAUTION: ONLY TAE-AUTHORIZED PERSONNEL MAY DOWNLOAD DATA FROM THE ENGINE. REFER TO TAE SERVICE BULLETIN NO. 125-0003.

Refer to TAE 125-01 Operation and Maintenance Manual, latest revision (if TAE 125-01 engine is installed) or TAE 125-02 Operation and Maintenance Manual, latest revision (if TAE 125-02-99 or TAE 125-02-114 engine is installed) for the “Read an Engine Event Log” procedure.

CHAPTER 73

ENGINE FUEL AND CONTROL

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CHAPTER 73
ENGINE FUEL AND CONTROL

1. General

This Section tells you about the fuel system on the TAE 125 Diesel engines. It gives you general data and trouble shooting information of the system.

Refer to the engine manufacturer's manual RM-02-01, latest revision for the TAE 125-01 engine and the RM-02-02, latest revision for the TAE 125-02-99 (MÄM 42-198 carried out) or TAE 125-02-114 (OÄM 42-252 carried out) engine. You can replace components in the air intake system and the fuel filter. Refer to the engine manufacturer for data on the engine fuel system.

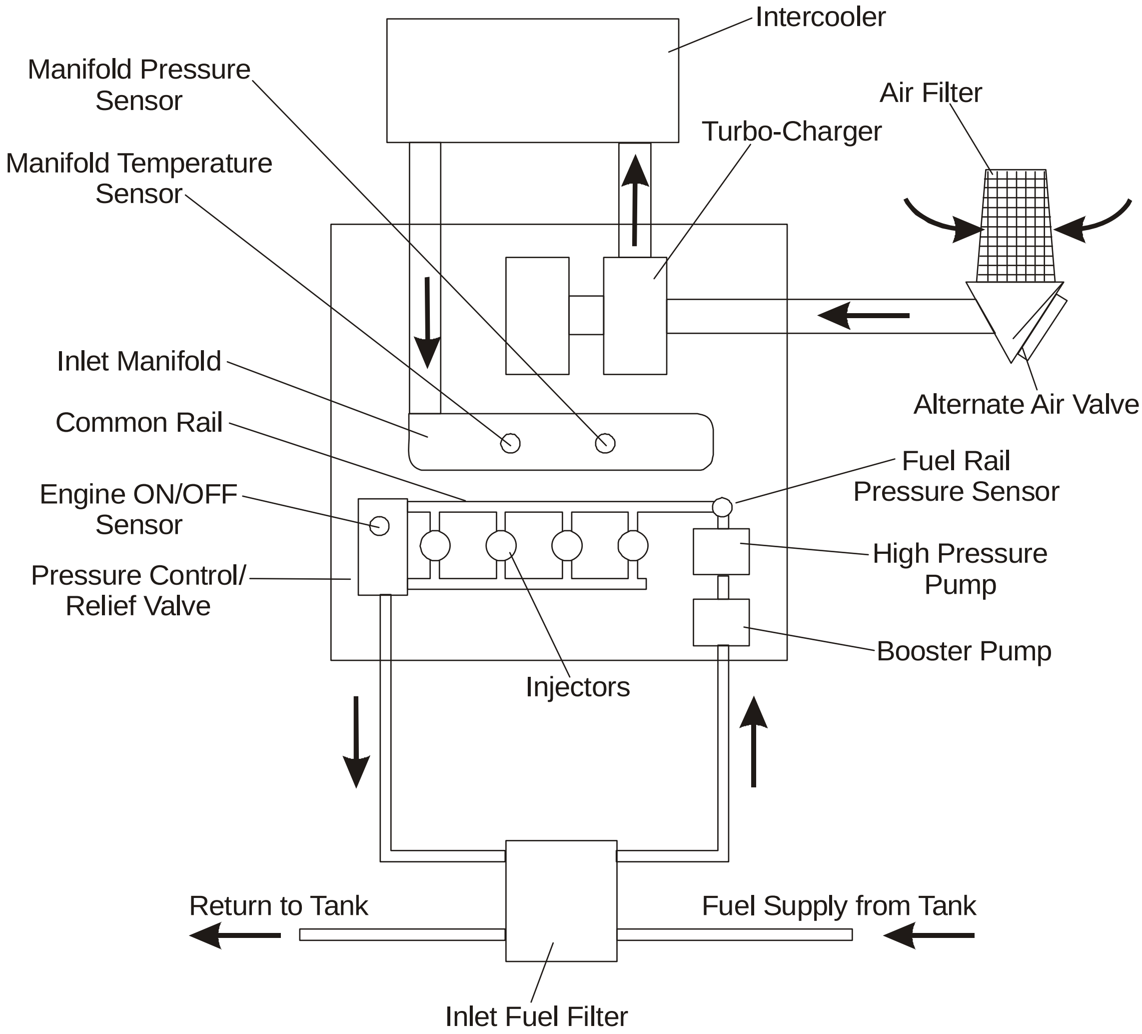

Figure 1: Engine Fuel System Schematic

2. Description and Operation

Figure 1 shows the schematic diagram for DA 42 with a TAE 125 Diesel engine. The engine fuel system has two main parts:

- An air intake system. This system supplies air from the inlet to the air filter to the engine inlet manifold.
- An engine fuel system. The engine fuel system takes fuel from the airplane fuel system and injects it into the cylinders.

A. Air Intake System

The air intake system has an air filter located on the right of each engine nacelle, just forward of the firewall. The filter attaches to the forward face of an alternate air valve. The alternate air valve also has an inlet direct from the engine compartment. A flap in the valve can select either filtered air or warm, unfiltered air. Refer to Section 71-60 for more data on the air filter and alternate air valve.

The outlet from the alternate air valve connects to the turbo charger. The outlet from the turbo-charger connects to an intercooler. The outlet from the intercooler connects to the engine inlet manifold. Refer to Chapter 81 for more data on the turbo charger and intercooler.

B. Engine Fuel System

Fuel from the airplane fuel system goes into the engine fuel filter. The fuel filter is located in the engine nacelle, aft of the firewall.

The inlet fuel goes through the filter and out to the engine-driven low-pressure fuel pump. The low-pressure fuel pump supplies fuel to the engine high-pressure pump. The high-pressure pump supplies fuel to a common rail connected to the injectors. A combined pressure relief and regulator valve at the end of the common rail controls the fuel pressure. Surplus fuel from the valve returns to the airplane main fuel system. The fuel returning from the engine is hot. The hot fuel passes through a fuel cooler located at the rear of each engine nacelle. From the fuel cooler the fuel returns to the fuel main tanks.

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Trouble-Shooting

1. General

The table below lists the defects you could have with the engine fuel and control system. It only gives you the data for the air intake, air filter and fuel filter. For more data on trouble shooting the engine fuel and control system refer to the engine manufacturer.

If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
Loss of engine power.	Blocked air intake.	Examine the air intake. Remove any obstructions. Refer to Section 71-60.
	Dirty/damaged air filter.	Replace the air filter. Refer to Section 71-60.
	Dirty/damaged fuel filter.	Replace the fuel filter. Look for contaminated fuel in the airplane fuel system. Refer to Section 28-00 and 28-20.
	Air in fuel distribution system.	Bleed the fuel distribution system. Refer to Section 28-20.

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Maintenance Practices

1. General

Only an approved TAE 125 repair shop can repair the engine fuel system. For more data on the engine fuel and control system refer to the engine manufacturer.

Refer to Section 28-20 for more data on the fuel distribution system. Refer to Section 71-60 for maintenance data on the air filter and alternate air valve. Refer to Chapter 81 for maintenance data on the turbo charging system.

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CHAPTER 75

LIQUID COOLING SYSTEM

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CHAPTER 75
LIQUID COOLING SYSTEM

1. General

This Section gives you the data for the liquid cooling system for the DA 42 airplane. It gives you the Maintenance Practices to remove/install the system components.

Figure 1 shows the liquid cooling system schematic diagram. Figure 2 shows the liquid cooling system schematics of the TAE 125-02-114 engine installation (OÄM 42-252 carried out). Figures 3 - 6 show the installation in the airplane.

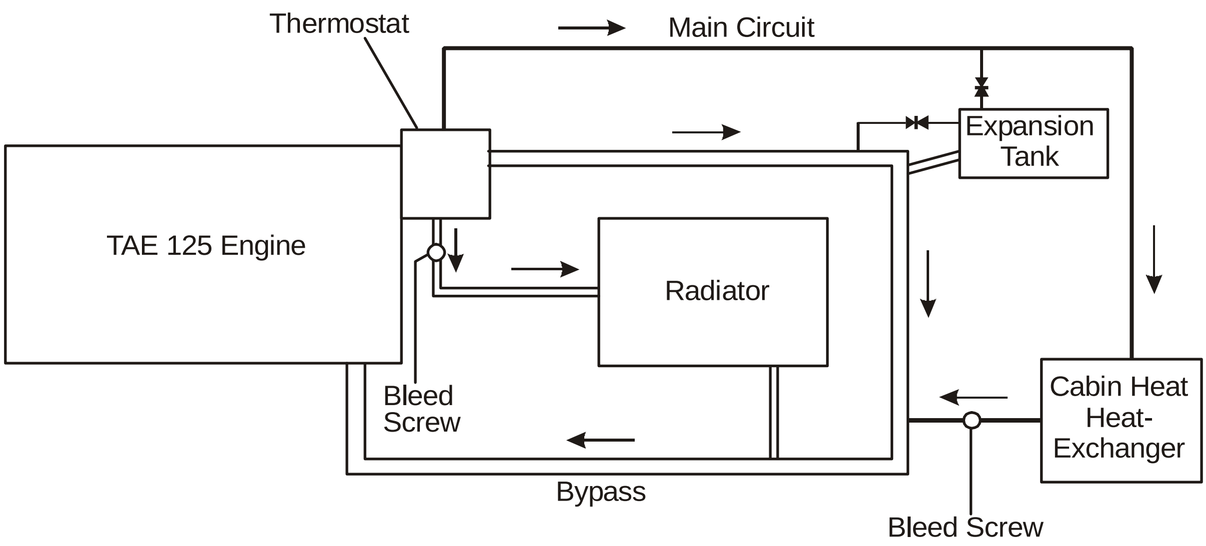

Figure 1: Liquid Cooling System Schematic Diagram for TAE 125-01 and TAE 125-2-99 (MÄM 42-198 carried out) Engines

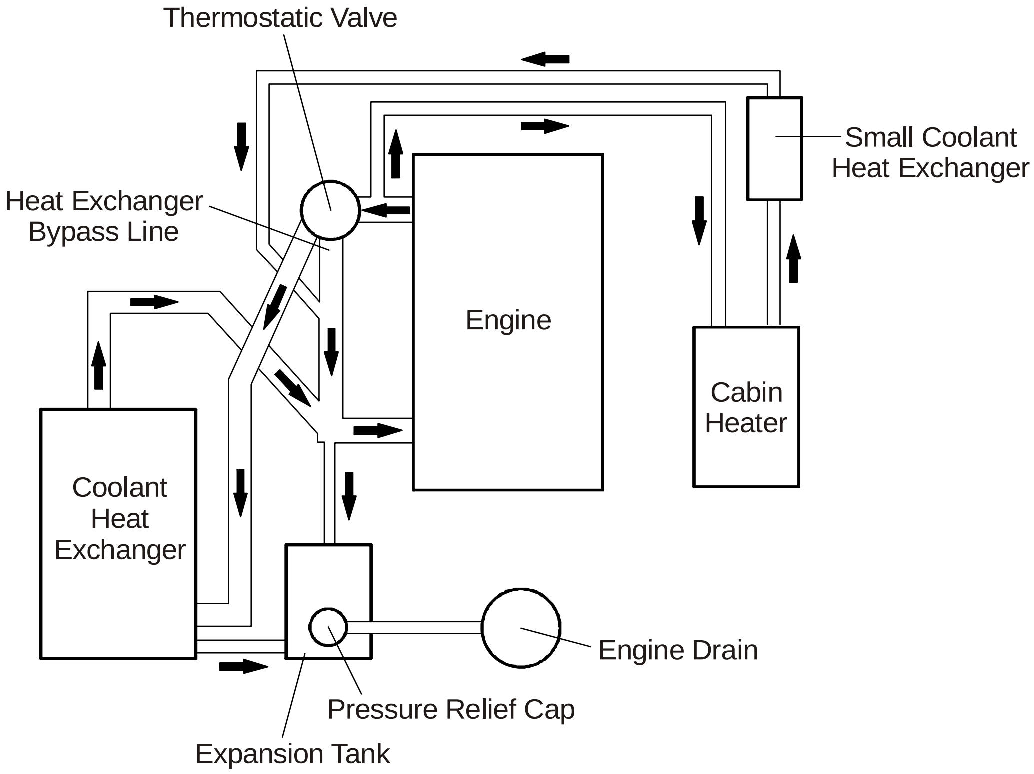

Figure 2: Liquid Cooling System for TAE 125-02-114 (OÄM 42-252 carried out) Engines

2. Description

Each engine has a water-based liquid cooling system. The liquid coolant is a mixture of water and antifreeze. Refer to the Airplane Flight Manual for approved coolants.

The engine has an integral coolant pump. The coolant pump is located at the rear of the engine, below the oil filter housing. The flat belt at the rear of the engine operates the coolant pump. An automatic tensioner keeps the belt tension at the correct value. The coolant flows through passages inside the crankcase and cylinder head and becomes hot. The coolant leaves the engine through a thermostat valve at the top, front left of the crankcase.

A temperature sensor at the rear of the thermostat valve connects to the engine control system. The integrated cockpit system (ICS) display shows the coolant temperature (COOLING TEMPERATURE).

The cooling system has 2 circuits. There is a main circuit and a bypass circuit.

For the main circuit, large diameter hoses and pipes connect the thermostat valve to the inlet of a coolant radiator. The coolant radiator is located below the engine. Large hoses and pipes connect the outlet from the coolant radiator to an inlet on the engine crankcase at the rear, left. This is the inlet to the engine coolant pump.

For the bypass circuit, large diameter hoses and pipes connect the bypass outlet from the thermostat valve to the inlet for the coolant pump.

A coolant expansion tank is located on top of the engine above the thermostat valve. This is the highest point in the system. If the TAE 125-01 engine is installed, two small diameter hoses with a capillary of a 2 mm diameter inside each hose connect the highest points of the system to the top of the coolant tank. If the TAE 125-02-99 or the TAE 125-02-114 engine is installed, a small diameter hose connects the highest point of the system to the top of the coolant tank. Another small diameter hose serves as overflow hose to the engine nacelle drain.

A small diameter hose connects the bottom of the coolant tank to the inlet to the coolant pump.

A coolant level sensor is installed in the coolant tank. It operates the WATER LEVEL caution light in the ICS.

Pipes and hoses connect the thermostat valve to the inlet of the cabin heating heat-exchanger. The return flow from the heat exchanger connects to a tapping on the bypass circuit at the top rear of the engine. If the TAE 125-02-114 (OÄM 42-252 carried out) engine is installed, a second small radiator is installed aft of the cabin heating heat exchanger.

The cabin heat pipes have a bleed point at the highest point of the cabin heat circuit, connected to the coolant tank at the highest point.

A silicate cartridge contains a replaceable silicate pouch and is situated on the bottom side of the coolant expansion tank.

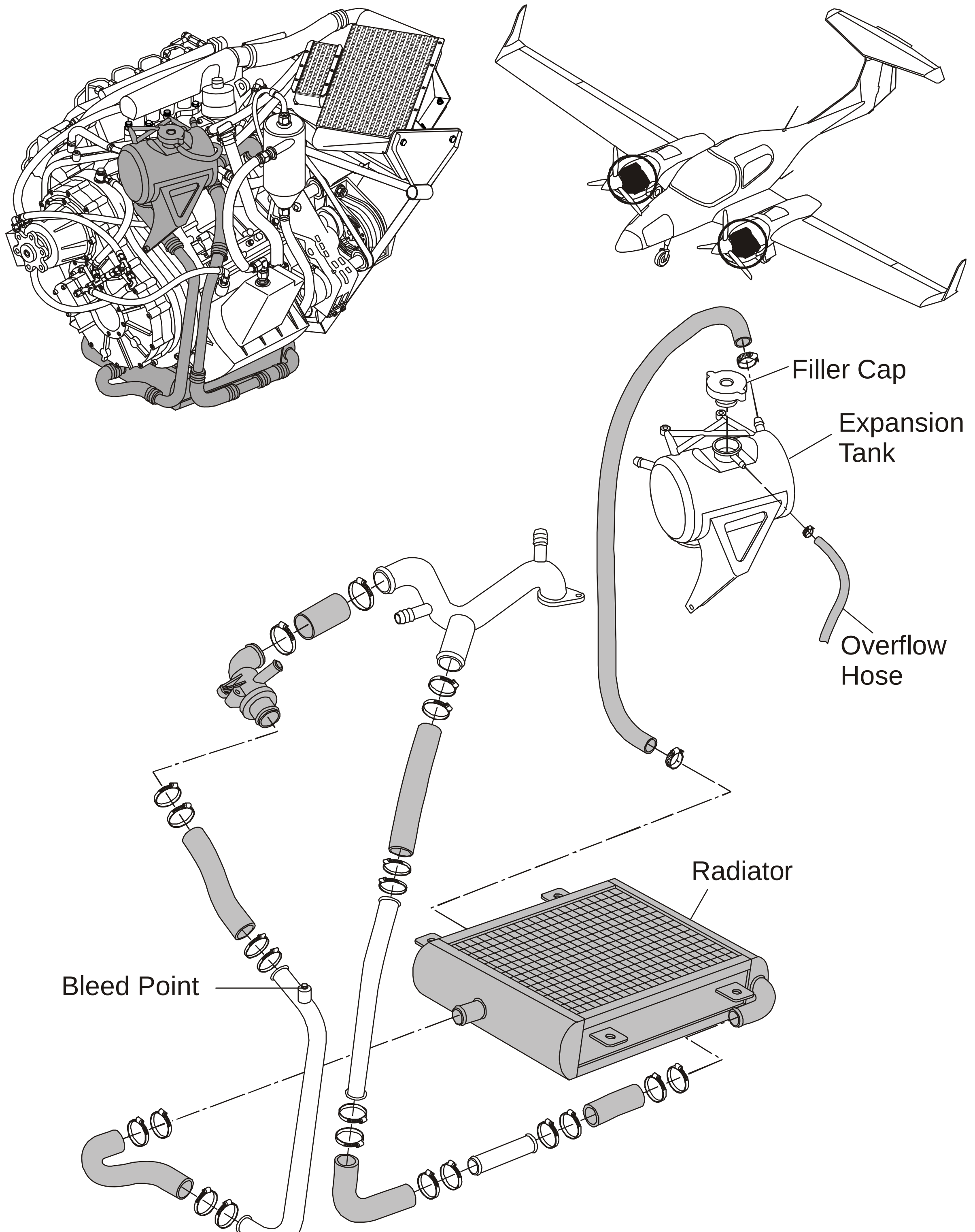

Figure 3: Liquid Cooling System Installation (MÄM 42-072 not implemented)

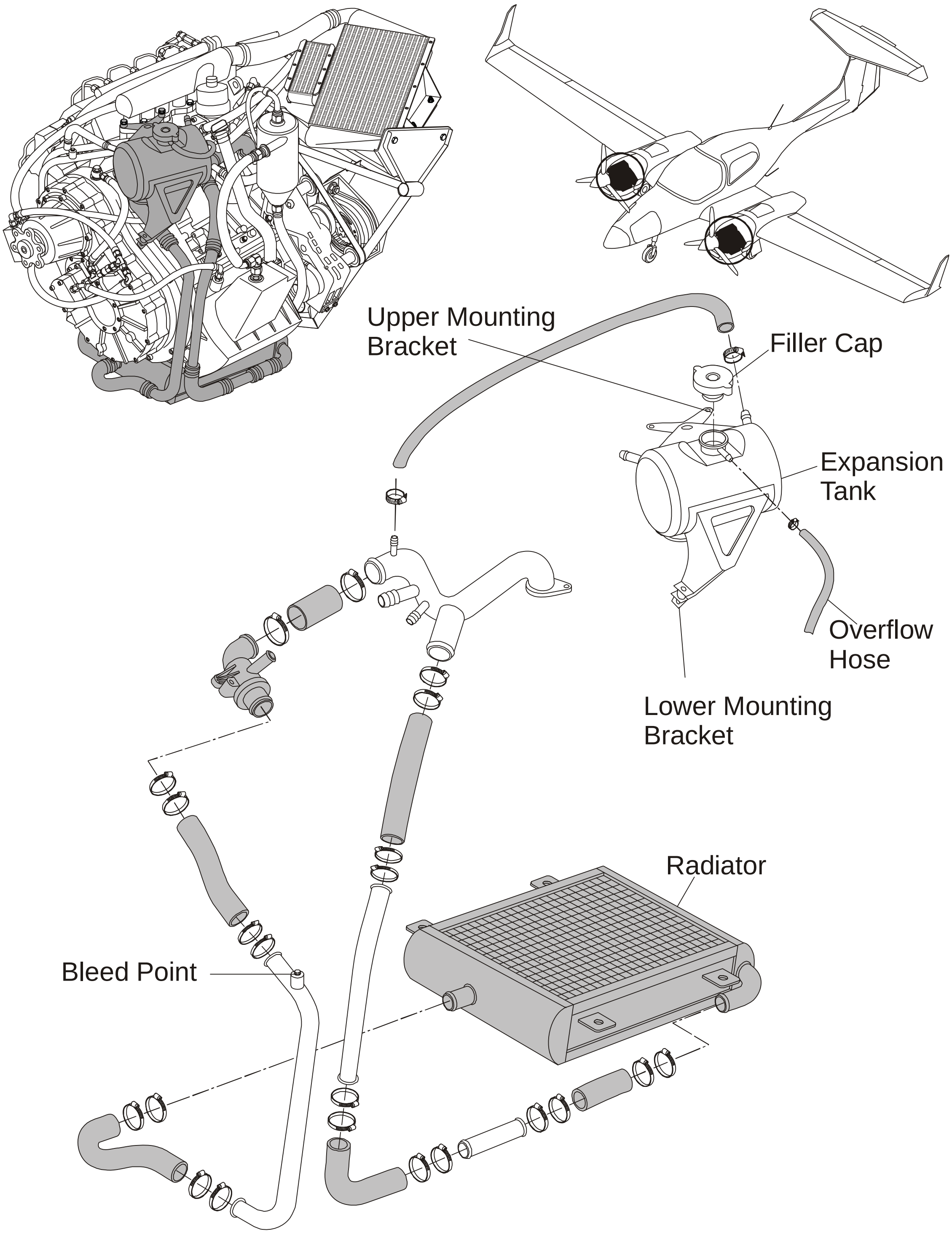

Figure 4: Liquid Cooling System (MÄM 42-072 implemented)

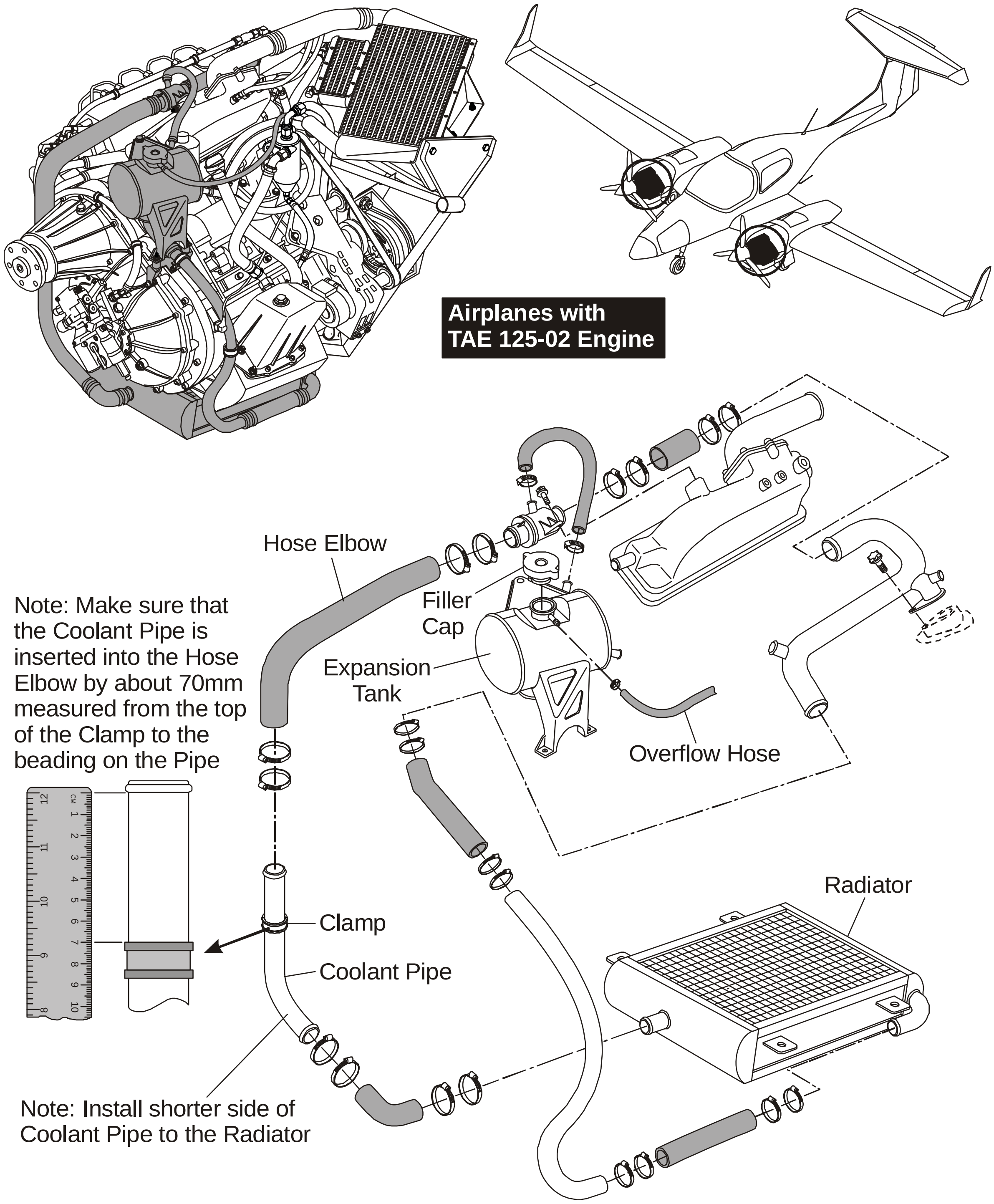

Figure 5: Liquid Cooling System Installation (TAE 125-02-99 Engine, MÄM 42-198 carried out)

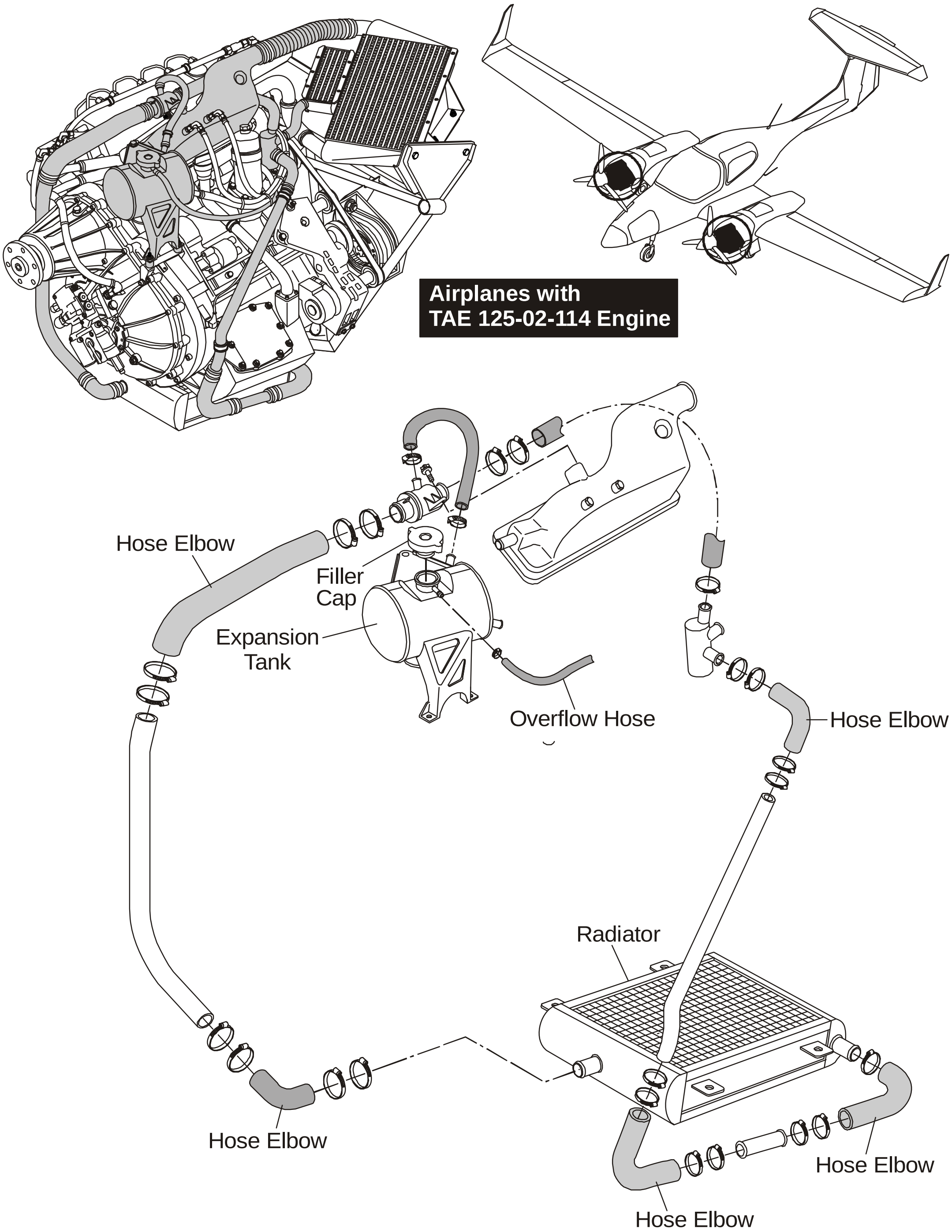

Figure 6: Liquid Cooling System Installation (TAE 125-02-114 Engine, OÄM 42-252 carried out)

When the engine is cold, the thermostat valve closes the main circulation. The coolant pump moves the coolant through the engine. The coolant becomes warm. The coolant flows out of the thermostat valve through the bypass circulation pipes directly to the inlet of the coolant pump.

As the engine becomes hot, the temperature of the coolant increases. The thermostat valve senses the increased temperature and starts to open. Some coolant goes through the bypass circulation directly to the coolant pump inlet. Some coolant goes through the main circulation through the coolant radiator. Air flowing through the coolant radiator cools the liquid coolant. The cool liquid returns to the inlet of the coolant pump and mixes with the hot coolant from the bypass circulation.

The thermostat valve adjusts the flow of coolant through the main and bypass circulations to give the correct temperature. It starts opening at 84 °C (183 °F) and opens fully at 96 °C (205 °F), allowing the coolant to flow through the coolant radiator.

The connection for the cabin heat system supplies coolant at the outlet temperature from the engine at all times, independent of the coolant temperature.

Trouble-Shooting

1. General

This table tells you how to troubleshoot the liquid cooling system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

This trouble shooting table gives only troubles to the airplane parts of the cooling system.

Trouble	Possible Cause	Repair
Engine overheats.	Flat-belt worn or broken.	Refer to the engine manufacturer.
	Coolant level low.	Fill the cooling system. Refer to Section 12-10.
	Coolant leak.	Look for leaks at all system joints. Repair or replace defective components.
	Air in cooling system.	Bleed the cooling system.
	Radiator matrix blocked by foreign objects.	Remove foreign objects and clean radiator matrix.
	Thermostat valve defective.	Refer to the engine manufacturer.
	Coolant pump defective.	Refer to the engine manufacturer.
	Defective cylinder head gasket.	Refer to the engine manufacturer.

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Maintenance Practices

1. General

This Section tells you about the Maintenance Practices for the components in the liquid cooling system.

2. Remove/Install a Coolant Expansion Tank

A. Remove a Coolant Expansion Tank

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**	
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Disconnect the airplane main battery.	Refer to Section 24-34.
(3)	Remove the engine cowlings.	Refer to Section 71-10.
	WARNING: DO NOT REMOVE THE PRESSURE CAP FROM THE COOLANT TANK IF THE ENGINE IS HOT. THE PRESSURE IN THE SYSTEM CAN FORCE HOT COOLANT TO COME OUT AND BURN YOU.	
(4)	Remove the pressure cap from the coolant tank: – Turn the cap counterclockwise a small distance to release the pressure. – When the pressure has fully released, turn the cap fully counterclockwise.	

	Detail Steps/Work Items	Key Items/References
(5)	Disconnect the drain hose (overflow) from the expansion tank: – Remove the worm-drive-clamp that secures the hose. – Pull the hose from the outlet. – Drain the coolant from the expansion tank	Refer to Figure 2. Use a suitable container to collect the coolant that will drain form the expansion tank and hoses.
(6)	Disconnect the hose that connects the expansion tank to the supply system (to the bypass, if MÄM 42-072 is implemented): – Remove the worm-drive-clamp that secures the hose. – Pull the hose from the connector at the expansion tank.	Use a suitable container to collect spilt coolant.
(7)	Disconnect both balance hoses which connect the cabin heat pipe vent and the bypass vent to the expansion tank: – Remove the worm-drive-clamp that secures the hoses. – Pull the hoses from the connector at the expansion tank.	Use a suitable container to collect spilt coolant.
(8)	Disconnect the electrical cables for the coolant level sensor.	At the inline connector, at the sensor.

	Detail Steps/Work Items	Key Items/References
(9)	Remove the expansion tank (if MÄM 42-072 is not implemented):	
	– Remove both bolts at the inlet manifold that attach one expansion tank bracket to the engine.	
	– Remove the nut and washer of the bottom bracket.	Hold the expansion tank.
	– Remove the lower starter attaching bolt.	
	– Move the expansion tank clear of the engine nacelle.	
(10)	Remove the expansion tank (if MÄM 42-072 is implemented):	
	– Remove the nut, washer and bolt at the upper mounting pin.	
	– Disconnect the expansion tank from both rubber pads at the lower mounting bracket.	
	– Move the expansion tank clear of the engine nacelle.	

B. Install a Coolant Expansion Tank

	Detail Steps/Work Items	Key Items/References
(1)	Install the expansion tank (if MÄM 42-072 is not implemented): – Remove the lower starter attaching bolt. – Remove both bolts at the inlet manifold which are necessary for attaching the expansion tank. – Move the expansion tank into position above the thermostat valve. – Install the lower starter attaching bolt. – Install the nut and washer at the lower mounting bracket. – Attach the expansion tank with both bolts at the inlet manifold.	
(2)	Install the expansion tank (if MÄM 42-072 is implemented): – Move the expansion tank into position above the thermostat valve. – Attach the expansion tank to the rubber pads of the lower mounting bracket. – Install the bolt, washer and nut at the upper mounting pin.	Plug the upper mounting pin into the rubber grommet of the upper mounting bracket.
(3)	Connect the balance hoses that connect the cabin heat pipe and the bypass vent to the expansion tank (if MÄM 42-072 is not implemented): – Push the hoses onto the connector at the expansion tank. – Install the worm-drive-clamps that secures the hose connections.	

	Detail Steps/Work Items	Key Items/References
(4)	Connect the hose that connects the expansion tank to the supply system (to the bypass, if MÄM 42-072 is implemented): – Push the hose onto the connector at the expansion tank. – Install the worm-drive-clamp that secures the hose connection.	
(5)	Connect the balance hose that connects the thermostatic valve to the expansion tank (if TAE 125-02-99 engine is installed, MÄM 42-198 carried out): – Push the hoses onto the connector at the expansion tank. – Install the worm-drive-clamps that secures the hose connections.	
(6)	Connect the drain hose (overflow) to the expansion tank: – Push the hose onto the connector at the expansion tank. – Install the worm-drive-clamp that secures the hose connection.	
(7)	Connect the electrical cables to the coolant level sensor.	At the inline connector, at the sensor.
(8)	Fill and bleed the liquid coolant system.	Refer to Paragraph 4 of this Section.
(9)	Install the engine cowlings.	Refer to Section 71-10.

3. Remove/Install a Coolant Radiator

A. Remove a Coolant Radiator

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**	
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Disconnect the airplane main battery.	Refer to Section 24-34.
(3)	Remove the engine cowlings.	Refer to Section 71-10.
	WARNING: DO NOT REMOVE THE PRESSURE CAP FROM THE COOLANT TANK IF THE ENGINE IS HOT. THE PRESSURE IN THE SYSTEM CAN FORCE HOT COOLANT TO COME OUT AND BURN YOU.	
(4)	Remove the liquid coolant expansion tank.	Refer to Paragraph 2 A.
(5)	Remove the radiator: – Remove the nuts, washers and bolts that attach the radiator to the engine mounting frame. – Move the radiator clear of the engine nacelle.	

	Detail Steps/Work Items	Key Items/References
(6)	If necessary, remove the hoses from the radiator: – Remove the worm-drive-clamps that secure the hoses. – Pull the hoses from the connectors on the radiator.	Note the position and orientation of the hoses on the radiator!

B. Install a Coolant Radiator

	Detail Steps/Work Items	Key Items/References
(1)	Install the radiator: – Move the radiator into position at the bottom of the engine nacelle. – Install the bolts, washers and nuts that attach the radiator to the engine mounting frame.	
(2)	If necessary, install the hoses onto the radiator that you removed in Paragraph 3 A (6): – Install the radiator hoses onto the radiator connections. – Secure the hoses with worm-drive-clamps.	In the position and orientation noted in Paragraph 3 A, Step 6.
(3)	Install the liquid coolant expansion tank.	Refer to Paragraph 2 B.
(4)	Fill and bleed the liquid coolant system.	Refer to Paragraph 4.
(5)	Install the engine cowlings.	Refer to Section 71-10.

4. Fill and Bleed an Engine Cooling System

A. Equipment

Item	Quantity	Part Number
Vacuum filler device for cooling system.	1	DAI-7500-10-00-ST

B. Fill and Bleed an Engine Cooling System

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**	
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Remove the engine cowlings.	Refer to Section 71-10 or 71-11.
	WARNING: DO NOT REMOVE THE PRESSURE CAP FROM THE COOLANT TANK IF THE ENGINE IS HOT. THE PRESSURE IN THE SYSTEM CAN FORCE HOT COOLANT TO COME OUT AND BURN YOU.	
(3)	Fill the cooling system: – Remove the filler cap. – Install the rubber cone of the filler device.	
(4)	Make sure that the drain plug is installed.	

	Detail Steps/Work Items	Key Items/References
(5)	Connect the filler line of the cooling system filler device with the rubber cone.	DAI-7500-10-00-ST Make sure that all valves are closed on the filler device.
(6)	Place the suction line from the filler device into a container with at least 8 liters of coolant fluid. Place container on a pedestal on engine level.	Refer to Chapter 2 of the AFM for approved coolant. Make sure, that the suction line is completely filled with coolant.
	WARNING: USE ONLY APPROVED COOLANT. A WRONG COOLANT CAN DAMAGE THE ENGINE.	
(7)	Attach a supply hose for compressed air to the compressed air connector.	
(8)	Open the air valve at the compressed air connector for approx. 2 minutes.	Make sure the filler device gauge shows -0.6 to -0.8 bar.
(9)	Close the air valve and check if the pressure on the gauge stays constant. If the pressure changes, search for leaks and repair if necessary. Repeat steps 7 and 8 until there is no detectable pressure change.	For a minimum of 30 seconds.
(10)	Open the suction line valve completely.	The filling process is finished, when there is no coolant flow in the suction line and the pressure has fully equalized. (Filler device gauge shows 0.0 bar)
(11)	Close the suction line valve and disconnect the filler device from the coolant tank.	
(12)	Perform a coolant system pressure test.	Refer to Paragraph 5.
(13)	– Fill coolant to max. Coolant level marking in the filler neck. – Install the filler cap	

	Detail Steps/Work Items	Key Items/References
(14)	Do an engine ground run: – Let the coolant temperature rise up to the point where the coolant flows from the thermostat valve through the main circuit. – After shut down, check for leaks.	Refer to the Airplane Flight Manual. To circulate and remove air. 85 °C (185 °F) Repair any leaks.
(15)	Let the engine cool down.	
	WARNING: DO NOT REMOVE THE PRESSURE CAP FROM THE COOLANT TANK IF THE ENGINE IS HOT. THE PRESSURE IN THE SYSTEM CAN FORCE HOT COOLANT TO COME OUT AND BURN YOU.	
(16)	Remove the filler cap from the coolant tank: – Turn the cap counterclockwise a small distance to release the pressure. – When the pressure has fully released, remove the cap fully.	
(17)	Check coolant level. Repeat items 13 to 16 until the fluid level in the coolant tank remains constant.	
(18)	Install the filler cap.	
(19)	Install engine cowlings.	Refer to Section 71-10 or 71-11.

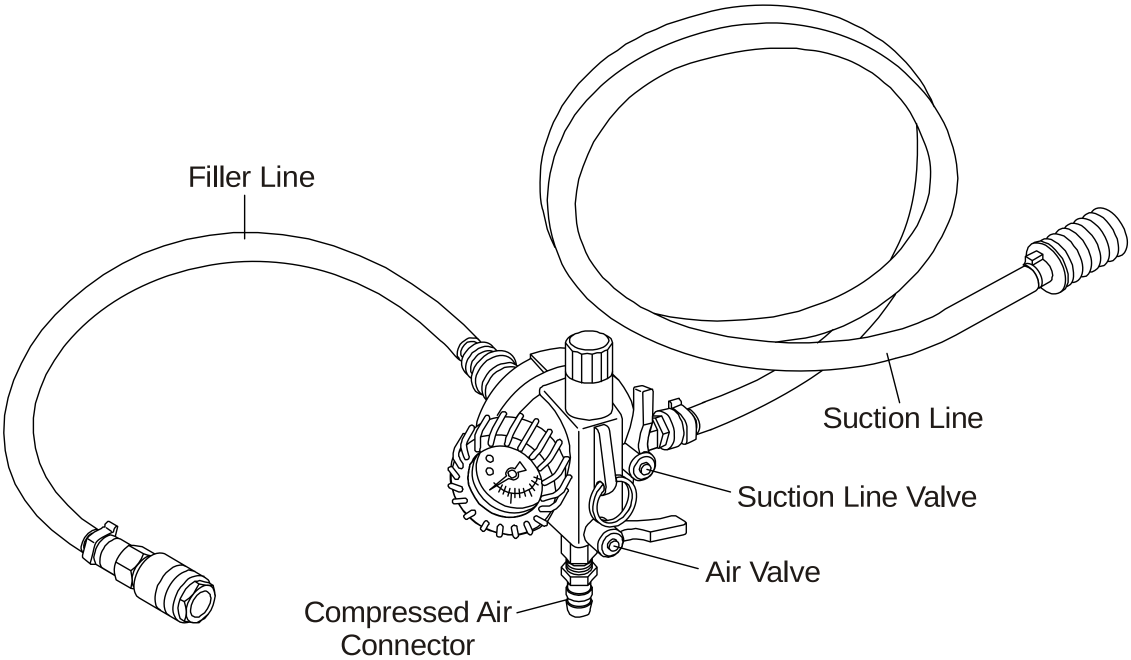

Figure 7: Vacuum Filler Device

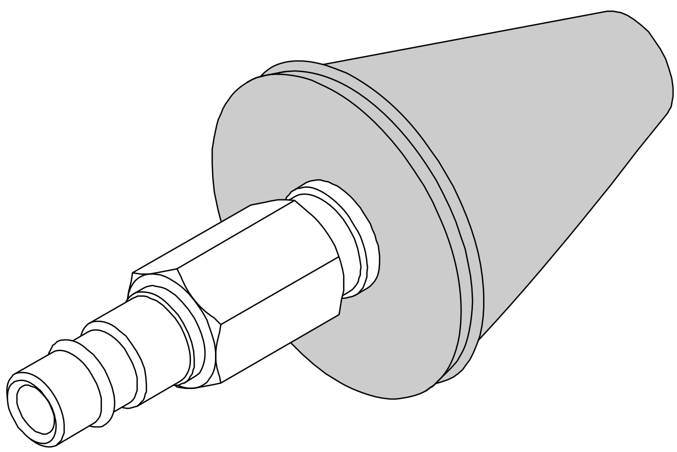

Figure 8: Rubber Cone

5. Coolant System Pressure Test

A. Equipment

Item	Quantity	Part Number
Pressure test equipment.	1	DAI-7500-02-00-ST

B. Coolant System Pressure Test

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**	
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Remove the engine cowlings.	Refer to Section 71-10.
	WARNING: DO NOT REMOVE THE PRESSURE CAP FROM THE COOLANT TANK IF THE ENGINE IS HOT. THE PRESSURE IN THE SYSTEM CAN FORCE HOT COOLANT TO COME OUT AND BURN YOU.	
(3)	Remove the pressure cap from the coolant tank and install the pressure test equipment instead.	
(4)	Pressurize the coolant system.	Apply 2.0 bar (29 PSI) relative pressure for 2 minutes.
(5)	Check the coolant system for leaks.	

	Detail Steps/Work Items	Key Items/References
(6)	Remove the pressure test equipment from the coolant tank. – Open the pressure relief valve. – Remove the test equipment carefully to relieve the remaining pressure.	 If existent.
(7)	Install the cap to the coolant tank.	
(8)	Install engine cowlings.	Refer to Section 71-10.

6. Silicate Pouch Replacement

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**	
(1)	Remove the coolant expansion tank.	Refer to Paragraph 2.
(2)	Remove the lock wire from the cartridge cap.	
(3)	Remove the cartridge cap.	
(4)	Remove the used silicate pouch and replace it with the new silicate pouch.	
(5)	Replace the used O-ring with a new O-ring.	Grease O-ring with EZ TURN lubricant.
(6)	Install the cartridge cap.	Torque: 32.5 ± 2.5 Nm (24.0 ± 1.8 lbf.ft.)
(7)	Secure the cartridge cap with lock wire.	
(8)	Install the coolant expansion tank.	Refer to Paragraph 2.
(9)	Fill and bleed the engine coolant system.	Refer to Paragraph 4.
(10)	Perform a coolant system pressure test.	Refer to Paragraph 5.

CHAPTER 76

ENGINE CONTROLS

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CHAPTER 76
ENGINE CONTROLS

1. General

This Section tells you about the DA 42 with the TAE 125 Diesel engines installed. Each engine has only one control lever. Electrical cables connect the power levers to the engine control systems.

2. Description and Operation

Figure 1 shows the schematic diagram of an engine control system. The system has a full authority digital engine control (FADEC) System. In this AMM it is called engine control system.

Each engine control system has two independent computers, either of which can provide all control functions for the engine and propeller. Each system has these main parts:

- Two digital engine control units (ECU A and ECU B located in one box in the engine nacelle).
- An electrical harness that connects the ECUs to the engine, the power lever, the annunciator panel, control buttons and some instruments.
- Sensors that measure engine parameters.
- An electrical power lever located in the center console.
- Control buttons for setting the second ECU in an emergency and testing the control system.

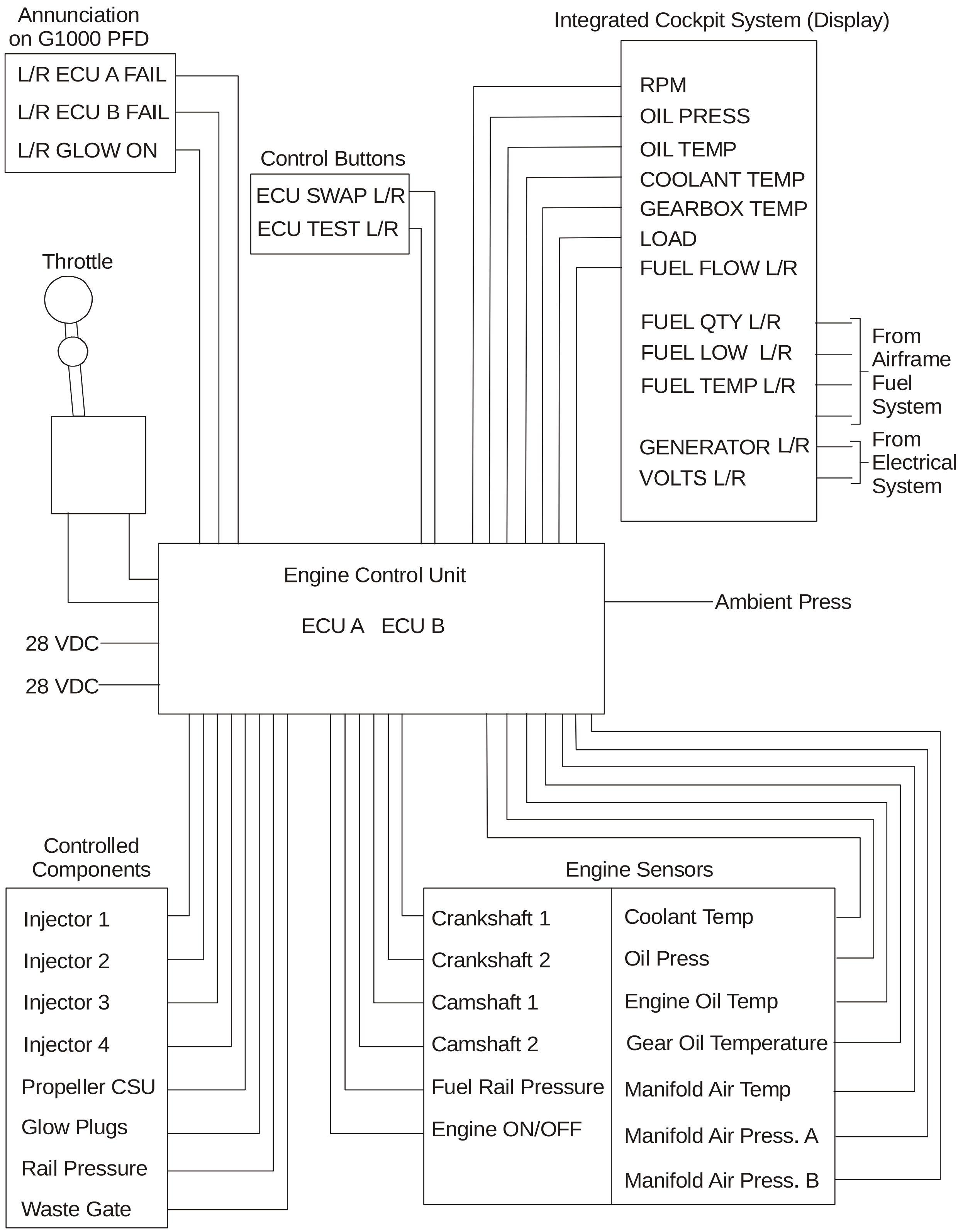

Figure 1: Engine Control System Schematic Diagram

A. Engine Control Units

The ECU A and ECU B are contained in one box located in each engine nacelle, aft of the firewall. A harness connects the box to the engine, the power lever and the integrated cockpit system (ICS).

In the usual operation, the alternator supplies power for the system. If the alternator fails, the ECU B automatically takes over and the ECU backup battery provides power. Refer to Section 24-00 for more data about the electrical supply for the engine control systems.

The annunciator panel of the ICS has two amber caution lights for the engine control system (marked ECU A and ECU B).

There are two ECU SWAP switches on the left of the instrument panel, one for each engine. For normal operation both switches are set to AUTOMATIC. Each engine is controlled by its ECU A. In case of a failure of the active engine control unit (ECU) there should be an automatic switch-over to the appropriate ECU B. If the automatic switch over fails, switch over can be done manually by switching to ECU B. This procedure should only be applied in emergency.

The ECU TEST buttons on the left of the instrument panel let you test the systems. Refer to Section 71-00 for the ECU test procedure.

B. Electrical Harness

Each engine has a dedicated engine electrical harness. The electrical harness is an engine component. The harness connects the power lever and sensors to the ECU A and ECU B. It also provides connections for the ECU buttons and the ICS.

The electrical harness comes through the engine firewall. P-clamps and ty-wraps attach the electrical harness to the engine. The harness goes forward and divides to go down both sides of the engine.

The cables on the right side pass mainly along the cylinder head. They connect to the fuel pressure regulator, fuel pressure sensor, fuel injectors and camshaft position sensors. A cable goes to the inter-cooler outlet. Cables also go forward and down to the glow plugs, waste gate, right and left crankshaft position sensors, gearbox temperature sensor, coolant temperature sensor, and propeller governor.

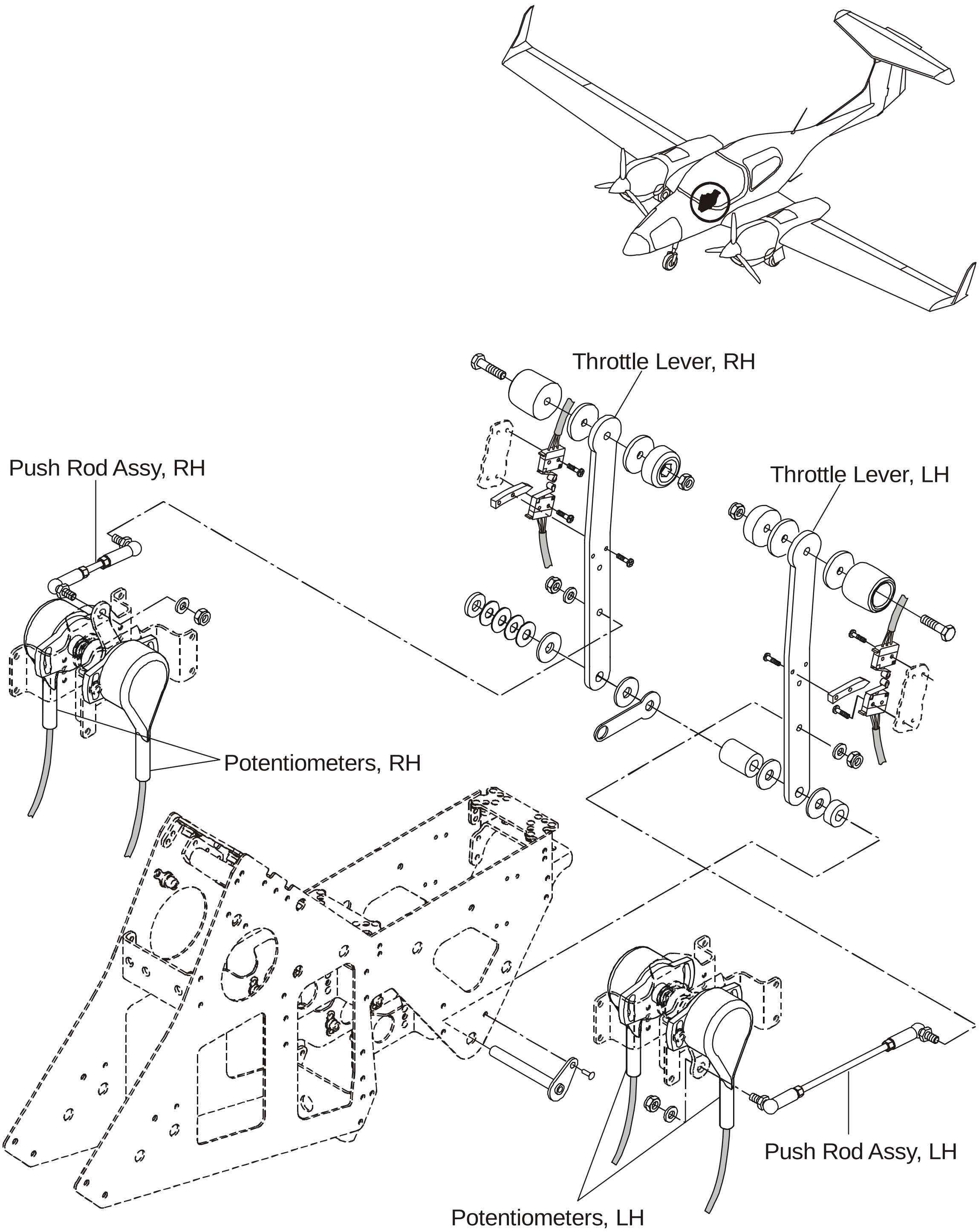

Figure 2: Engine Power Levers

The left side of the engine has cables to the sensors for oil pressure and oil temperature and cables for the starter and alternator.

The repair of the electrical harness is limited to damage that occurs near the ends of the cables, outside of the isolated section. If a cable fails within the isolated section, then you must replace the complete harness.

C. Manifold Pressure Lines

Manifold pressure is supplied to each ECU by a pressure hose.

If MÄM 42-221 is carried out:

The water separator has a horizontal inlet fitting to which the MAP-line is connected. If water droplets pass through the MAP-line, they will be collected in the separator bowl. The separator bowl has a small hole, which allows collected water droplets to leak out. The hole is closed by a valve which is provided with pressure from the MAP-line itself. The valve is closed as long as the engine is running and as long as there is over-pressure in the MAP-line, so that the system has no influence on the pressure measurement.

If the engine is not operating, the hollow ball floats upwards and the water can leak out of the separator bowl.

D. Power Levers

Each engine has a dedicated power level. Figure 2 shows the installation of the engine power levers. Each power lever is located in the center console. The power levers assemble as a unit to the engine control assembly in the center console.

Each power lever has two separate and independent electrical systems. One system provides signals to the ECU A. The other system provides signals to the ECU B. Either system can control the engine.

The levers operate electrical potentiometers that give signals in proportion to the power lever position. The signals are used by the engine control system to set the power output. The control system also sets the propeller constant speed unit to give best RPM for the power setting. Refer to Section 61-20 for more data on the propeller control function.

Push rods connect the throttle levers to the potentiometers. You can adjust the relative position of each power lever relative to its potentiometer by adjusting the length of the related push rod. You can make this adjustment so that the power levers align with each other when the engines are giving the same power output.

E. Sensors

Both ECUs of each engine get data about engine performance from the following sensors mounted on each engine:

Sensor	Location
Crankshaft 1.	Front, right of the crankcase.
Crankshaft 2.	Front, left of the crankcase.
Camshaft 1.	Front between camshafts.
Camshaft 2.	Aft between camshafts.
Coolant temperature.	Rear of the thermostat valve.
Oil temperature.	On the connection block for the oil cooler hoses.
Oil pressure.	Behind the oil filter.
Manifold air temperature.	On the inter-cooler outlet pipe.
Manifold air pressure.	On the inter-cooler outlet pipe.
Fuel rail pressure.	At the front of the fuel rail.
Gearbox temperature.	At the top left of the front bearing of the reduction gear.

Trouble-Shooting

1. General

The table below lists the defects you could have with the engine control system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

For all other engine control trouble, refer to the engine manufacturer.

Trouble	Possible Cause	Repair
An ECU caution light comes ON.	The related ECU defective.	Read engine event log (refer to Section 72-00). Refer to the engine manufacturer.
An engine does not respond correctly to power lever movement.		Run Diagnostic routine in "ECU Operator" software (refer to Section 72-00). Refer to the engine manufacturer.

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Maintenance Practices

1. General

These Maintenance Practices tell you how to remove and install the main components in an engine control system. All other work on the engine control systems can only be done by a TAE approved maintenance shop or the manufacturer.

2. Remove/Install a Power Lever Potentiometer

A. Remove a Power Lever Potentiometer

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the engines are safe: – Set the ELECT. MASTER switch to OFF. – Set both the ENGINE MASTER switches to OFF. – Set the power lever to 0%.	
(2)	Lift the power lever control quadrant from the center console: – Remove the 4 screws that attach the top covers to the power lever quadrant. – Remove the 2 top cover plates from the power lever quadrant. – Remove the 2 screws that attach the aft end of the power lever quadrant to the fuel selector mounting.	

	Detail Steps/Work Items	Key Items/References
(3)	Remove a control lever potentiometer: – Lift the complete power lever quadrant assembly out of the center console and support the quadrant. – Disconnect the electrical cables for the potentiometer that you will remove. – Remove the 2 bolts and washers that attach the potentiometer that you will remove to the power lever quadrant. – Pull the potentiometer of its drive-shaft and clear of the quadrant.	The flexible cables attached to the other control levers in the quadrant and the electrical cables for the potentiometer are long enough for you to just lift the quadrant clear of the center console.

B. Install a Power Lever Potentiometer

	Detail Steps/Work Items	Key Items/References
(1)	Install the potentiometer: – Move the new potentiometer into position at the power lever quadrant. – Make sure that the drive of the potentiometer aligns with the quadrant drive-shaft. – Push the potentiometer onto the quadrant drive-shaft. – Install the 2 washers and bolts that attach the potentiometer to the quadrant.	
(2)	Connect the electrical cables for the potentiometer.	At the inline connector.

	Detail Steps/Work Items	Key Items/References
(3)	Install the power lever quadrant into the center console: – Lower the quadrant into position in the center console. – Install the 2 screws that attach the aft end of the quadrant to the fuel selector mounting.	Make sure that all the flexible cables and the electrical cables are in the correct position and orientation.
(4)	Start the engines and allow to reach normal operating temperatures:	Refer to Section 71-00.
	– Make sure that the power control levers align:	
	– Set both engines to give 1800 RPM.	
	– Both power levers must align ±2 mm	
	– If they do not align, make a note of the mis-alignment.	Use the power lever for which you did NOT replace the potentiometer as the datum.
	– Set both engine to 0%.	
	– Stop the engines.	Refer to Section 71-00.
(5)	If necessary, adjust the power lever alignment:	
	– Lift the power lever control quadrant from the center console.	Refer to Paragraph 2 A (2) in this Section.
	– Loosen the 2 jam nuts on the potentiometer link rod for the potentiometer that you replaced.	
	– Turn the drive rod to adjust the length of the link rod to align the power levers.	Hold the input lever to the potentiometer stationary and turn the control rod to move the power lever the distance noted in step 4 of this procedure.
	– Tighten the jam-nuts on the potentiometer link rod.	
	– Install the power lever control quadrant into the center section.	Refer to step 3 in this procedure.

	Detail Steps/Work Items	Key Items/References
(6)	Repeat steps 4 and 5 of this procedure as necessary, until the power levers align correctly.	
(7)	Install the top covers on the power lever quadrant: – Move the top covers into position on the power lever control quadrant. – Install the 4 screws that attach the top covers to the power lever control quadrant.	
(8)	Do a full test of the engine for which you replaced the power lever potentiometer.	Refer to Section 71-00.

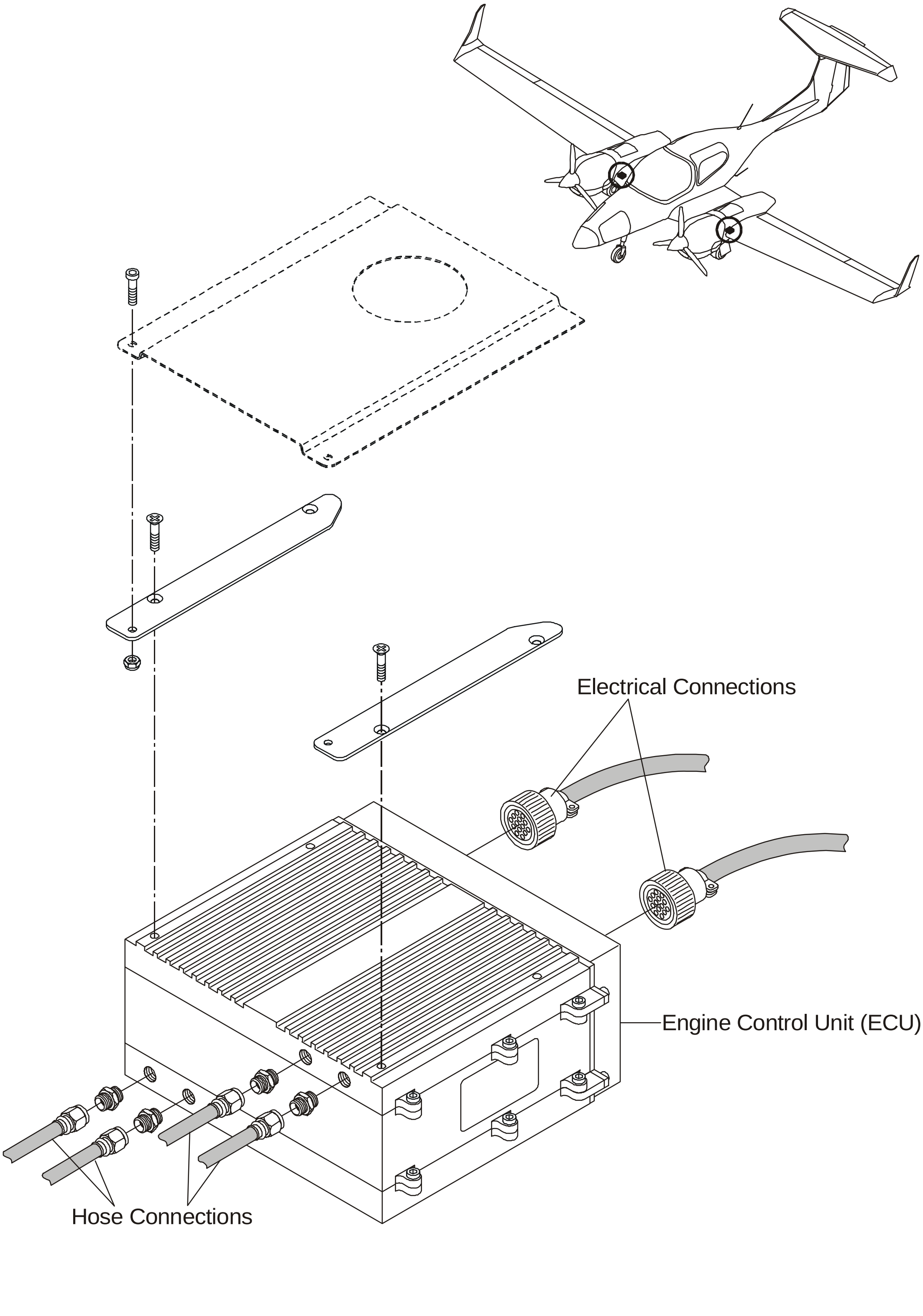

Figure 3: ECU Installation

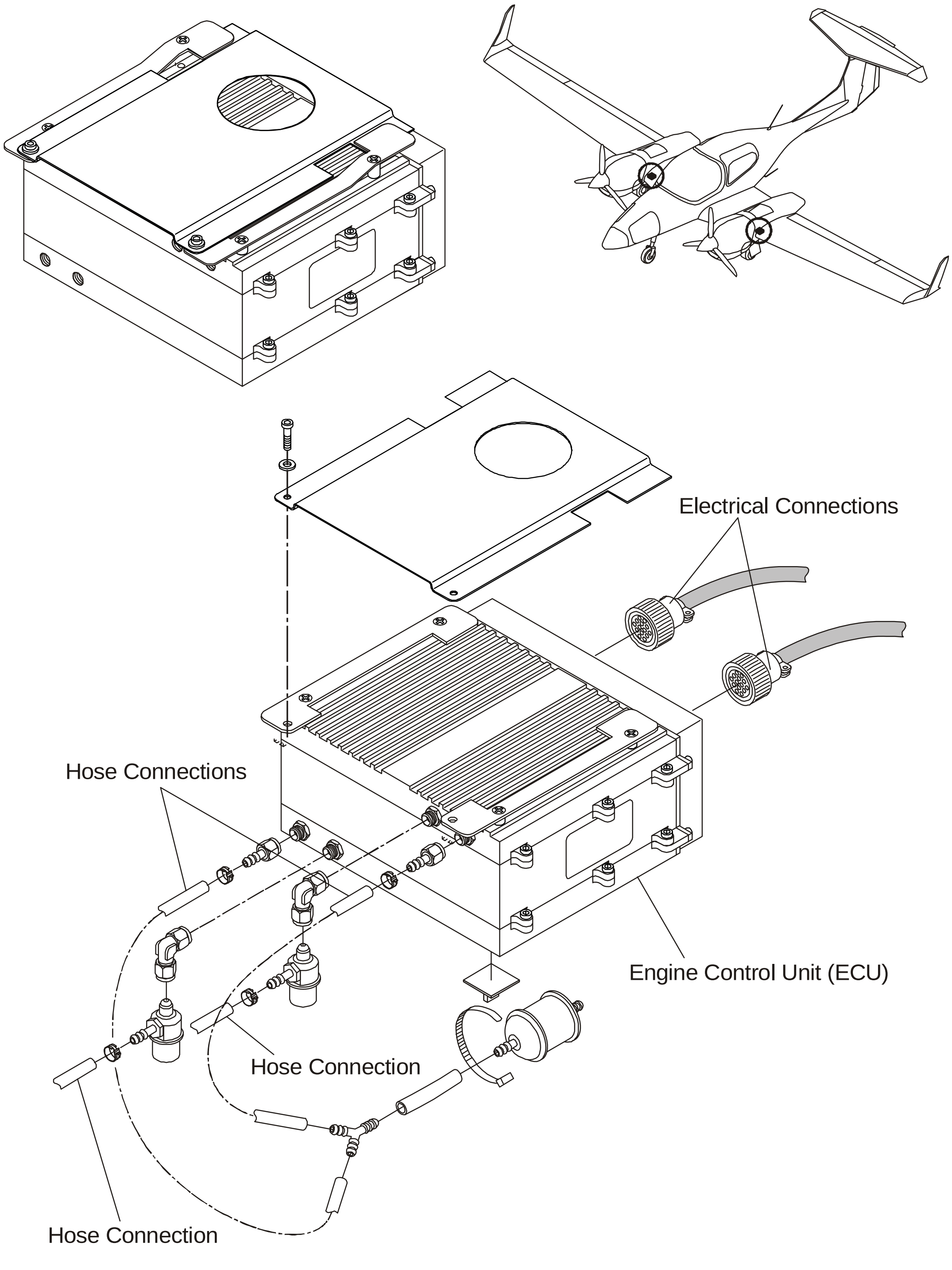

Figure 4: ECU Installation (OÄM 42-121 carried out)

3. Remove/Install an Engine Control Unit (ECU)

A. Remove an Engine ECU

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**	
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Disconnect the airplane main battery.	Refer to Section 24-34.
(3)	Remove the access panel for the ECU on the related engine nacelle.	Refer to Section 52-40.
(4)	Release the 2 electrical connectors from the ECU.	Refer to Figure 4.
(5)	Release the 4 hose connections from the ECU.	
(6)	Remove the ECU from the mounting bracket: – Release the 2 bolts and washers that hold the ECU to the mounting bracket. – Slide the ECU forward until it comes free of the bracket.	Refer to Figure 4.

B. Install an Engine ECU

CAUTION: YOU MUST CONTACT THE ENGINE MANUFACTURER BEFORE YOU INSTALL A NEW ECU.

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Install the ECU: – Move the ECU into position in the related engine nacelle by sliding the ECU into the bracket. – Install the 2 washers and bolts that attach the ECU to the mounting bracket and use Loctite 243 to secure the bolts.	Refer to Figure 4.
(3)	Connect the 4 hoses to the ECU.	
(4)	Connect the 2 electrical connectors to the ECU.	Refer to Figure 4.
(5)	Install the access panel that you removed from the engine nacelle.	Refer to Section 52-40.
(6)	Remove the ECU from the mounting bracket: – Release the 2 bolts and washers that hold the ECU to the mounting bracket. – Slide the ECU forward until it comes free of the bracket.	Refer to Figure 4.

4. Remove/Install an Engine Control System Electrical Harness

A. Remove an Engine Control System Electrical Harness

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**	
(1)	Make sure that the engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Disconnect the airplane main battery.	Refer to Section 24-34.
(3)	Remove the access panel for the ECU on the related engine nacelle.	Refer to Section 52-40.
(4)	Release the 2 electrical connectors from the ECU.	Refer to Figure 3.
(5)	Remove the related engine access panels.	Refer to Section 71-10.
(6)	Release the cable connections at the related ECU relay panel.	In the engine nacelle, aft of the firewall.

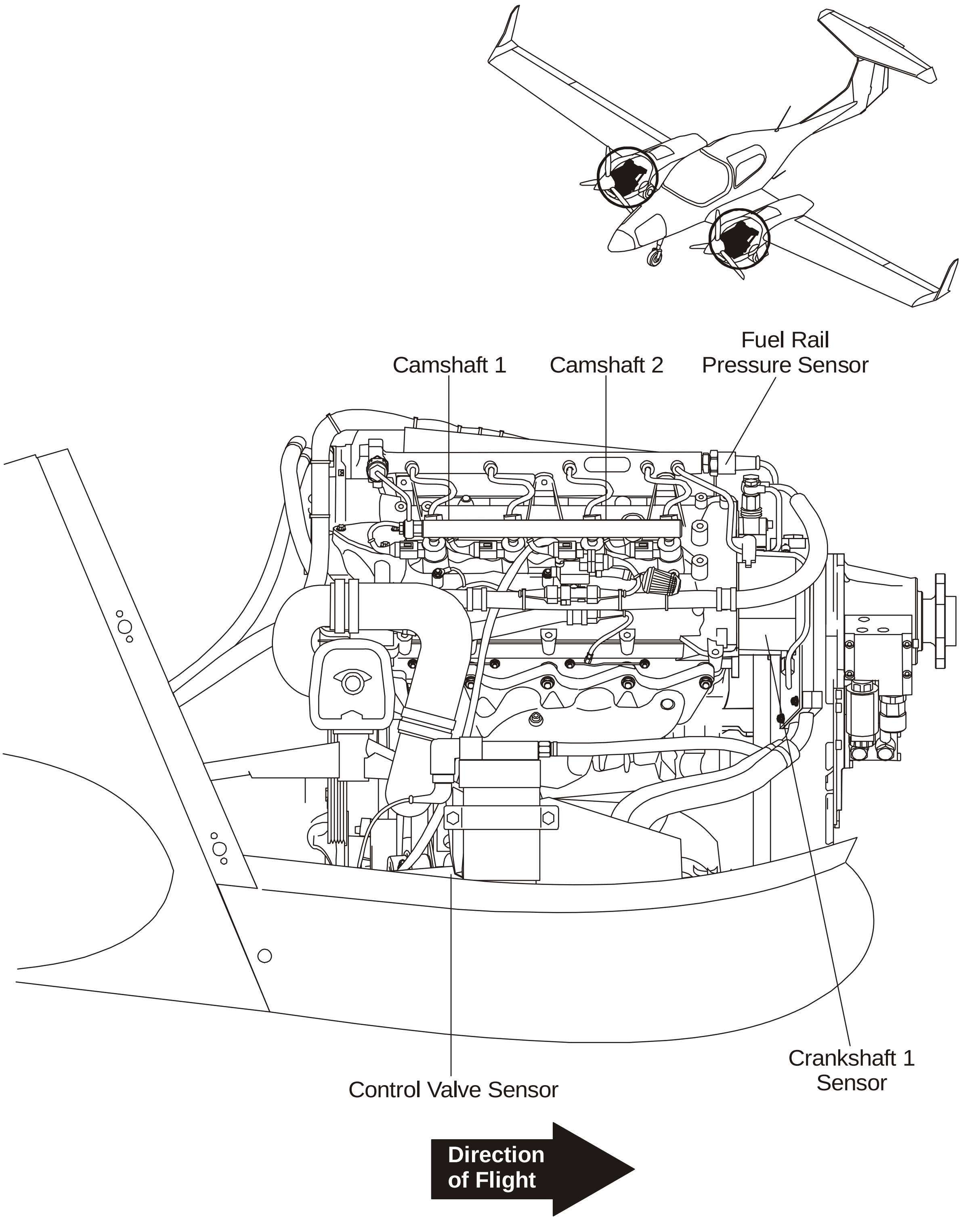

Figure 5: Engine Sensors - RH Side of Engine (if TAE 125-01 Engine is installed)

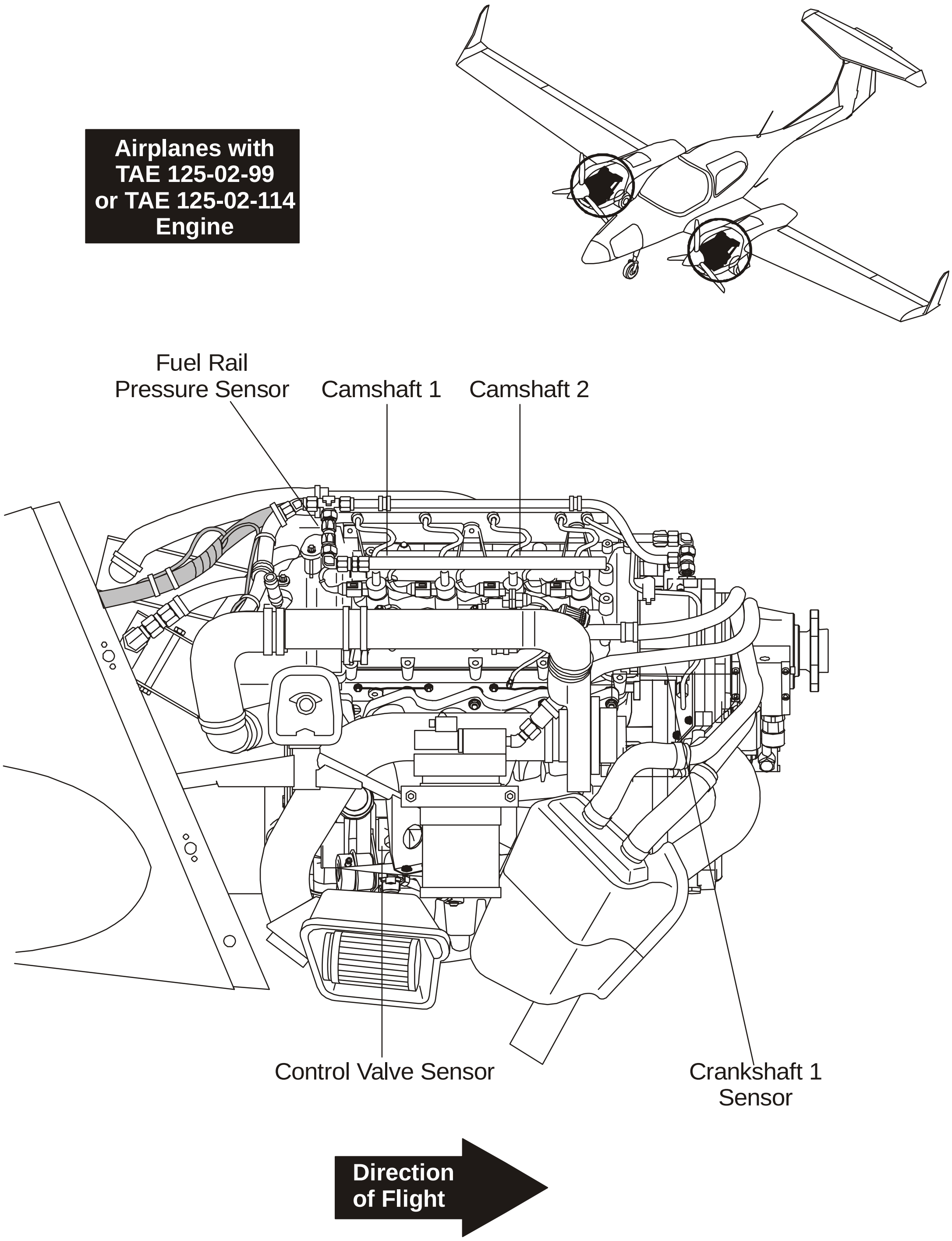

Figure 6: Engine Sensors - RH Side of Engine (if TAE 125-02-99, MÄM 42-198 carried out or TAE 125-02-114, OÄM 42-252 carried out)

	Detail Steps/Work Items	Key Items/References
(7)	Disconnect the engine wire harness and bonding cables from these electrical sensors:	
	– Crankshaft 1.	At the front right crank case.
	– Crankshaft 2.	At the front left crank case.
	– Camshaft 1.	On inlet valve cover between cyl. 3 and 4.
	– Camshaft 2.	On inlet valve cover between cyl. 1 and 2.
	– Coolant temperature.	At the thermostat valve.
	– Oil temperature.	At the bottom of the oil case.
	– Oil pressure.	At the rear side of the oil filter housing.
	– Manifold air temperature.	On the inter-cooler outlet pipe.
	– Fuel rail pressure regulator.	At the rear end of the fuel rail.
	– Fuel rail pressure sensor.	At the front side of the fuel rail.
	– Propeller governor.	At the right side of the reduction gear.
	– Gear temperature.	At top left of front bearing reduction gear.
	– Waste gate valve solenoid.	At the lower crankshaft cover.
	– Fuel injectors.	At each fuel injector.
	– Glow plugs.	At the lower crankshaft cover.
	– Waste gate control valve.	At the lower crankshaft cover.
(8)	Remove the cable ties and clamps that attach the cable harness to the engine and structure.	Make a note of the type and location of each attachment.
(9)	Remove the shields for the feed-through at the firewall.	
(10)	Carefully move the harness aft through the firewall.	Take care not to damage the connectors.
(11)	Remove the harness from the nacelle.	

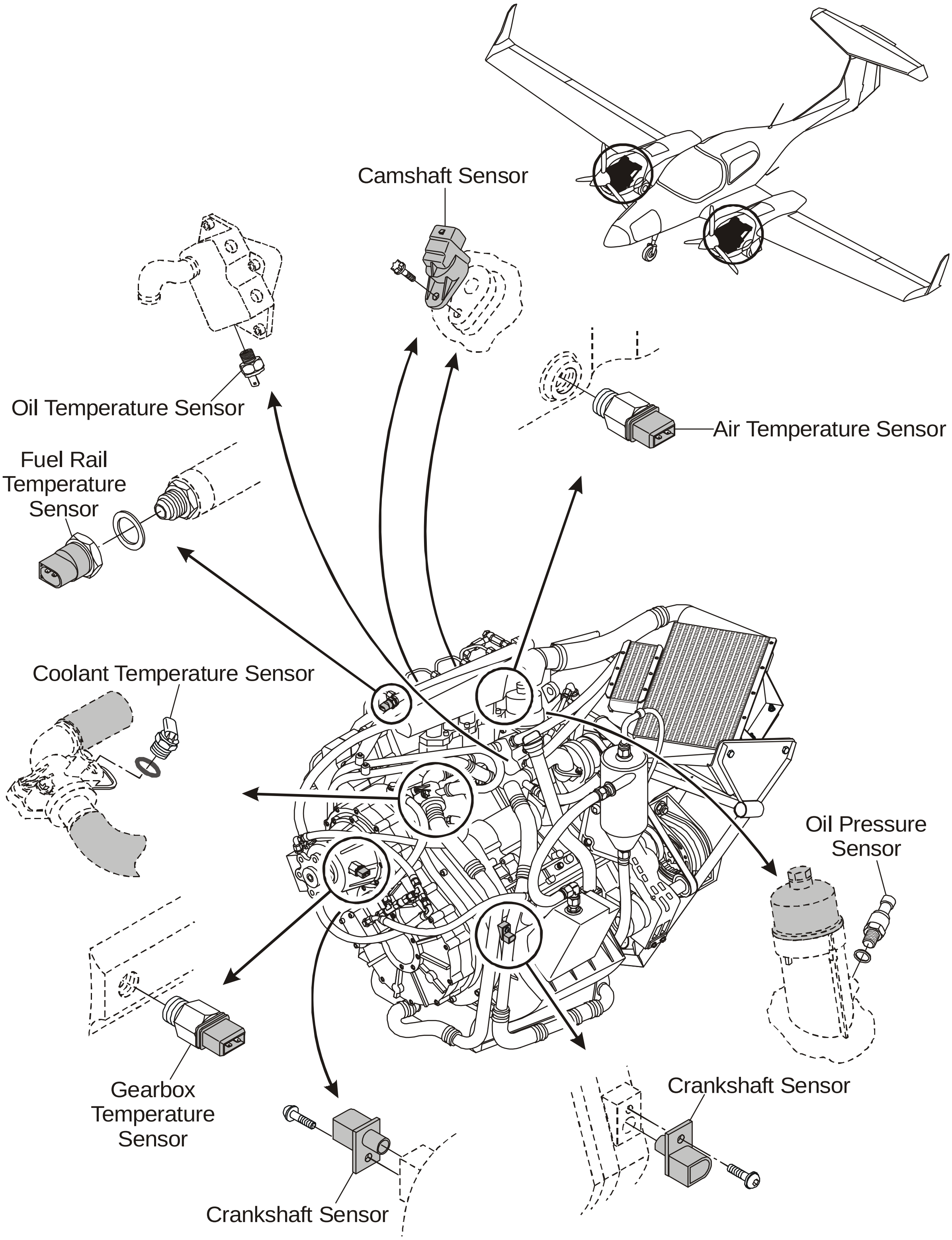

Figure 7: Engine Sensors - LH Side of Engine (if TAE 125-01 engine is installed)

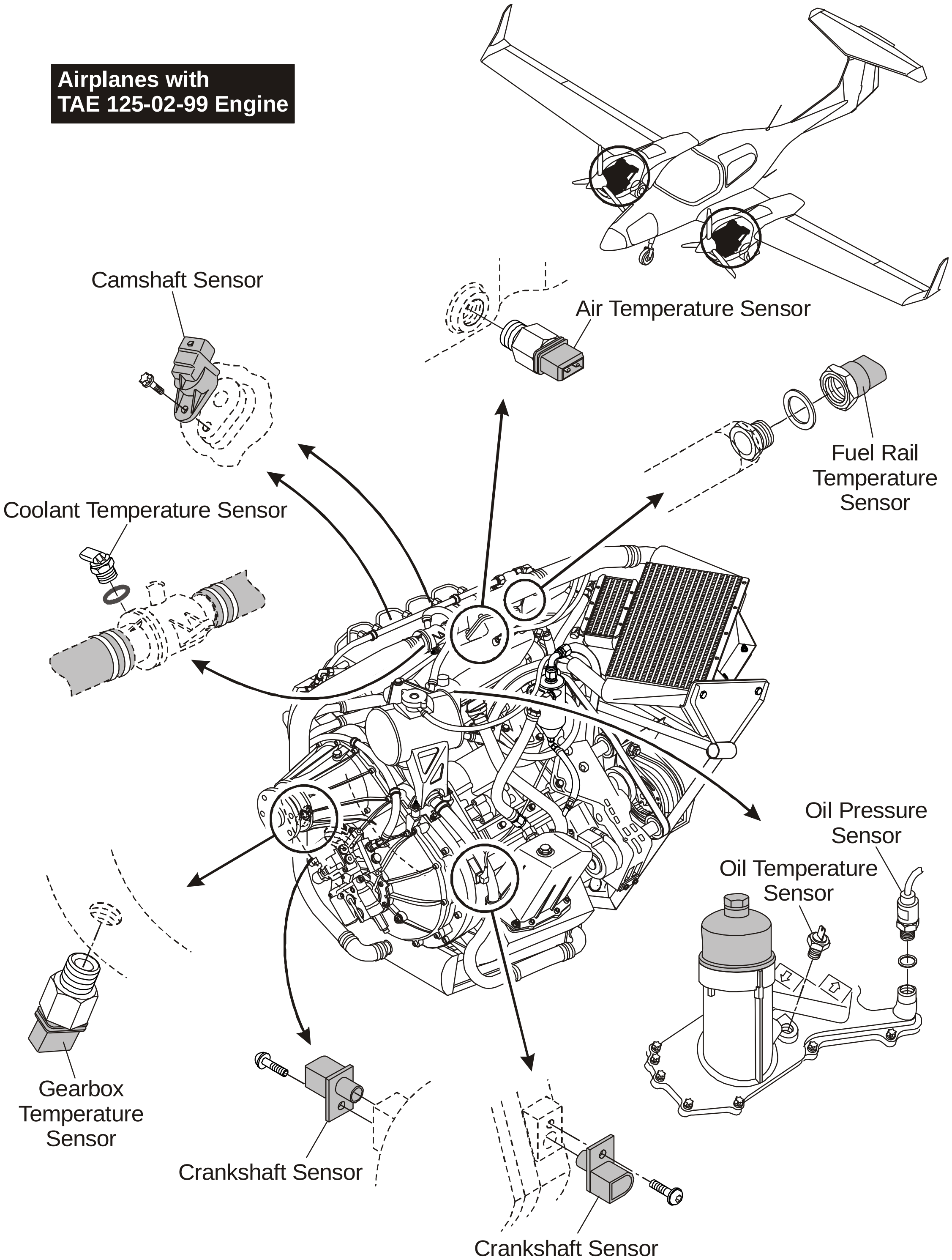

Figure 8: Engine Sensors - LH Side of Engine (if TAE 125-02-99 Engine is installed, MÄM 42-198 carried out)

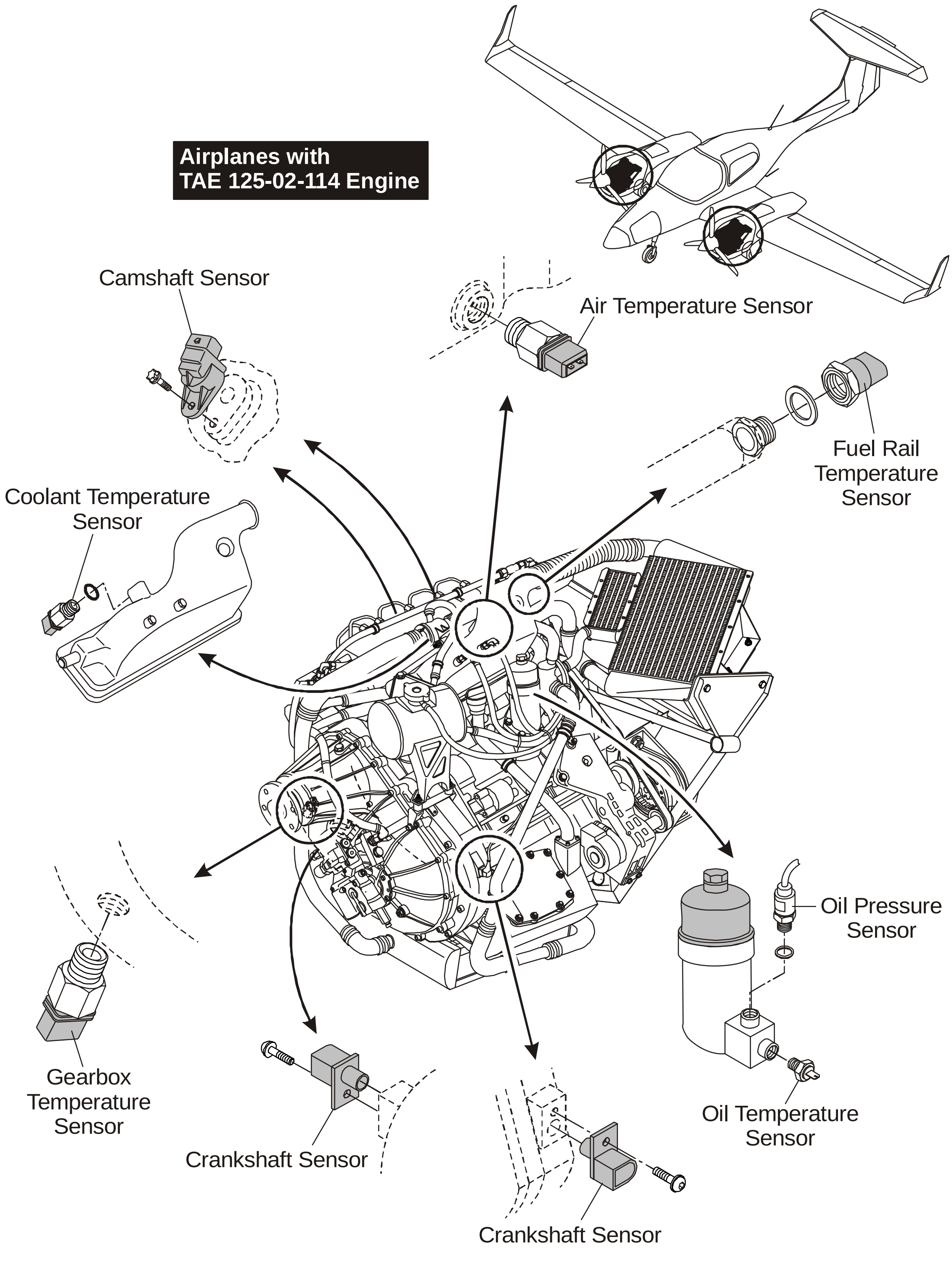

Figure 9: Engine Sensors - LH Side of Engine (if TAE 125-02-114, OÄM 42-252 carried out)

B. Install the Engine Control System Electrical Harness

	Detail Steps/Work Items	Key Items/References
(1)	Carefully move the engine end of the harness forward through the firewall.	Take care not to damage the connectors. Adjust the harness position so that all connections can be made without stress.
(2)	Connect the engine wire harness and bonding cables to these electrical sensors:	
	– Crankshaft 1.	At the front right crank case.
	– Crankshaft 2.	At the front left crank case.
	– Camshaft 1.	On inlet valve cover between cyl. 3 and 4.
	– Camshaft 2.	On inlet valve cover between cyl. 1 and 2.
	– Coolant temperature.	At the thermostat valve.
	– Oil temperature.	At the bottom of the oil case.
	– Oil pressure.	At the rear side of the oil filter housing.
	– Manifold air temperature.	On the intercooler outlet pipe.
	– Fuel rail pressure regulator.	At the rear end of the fuel rail.
	– Fuel rail pressure sensor.	At the front side of the fuel rail.
	– Propeller governor.	At the right side of the reduction gear.
	– Gear temperature.	At top left of front bearing reduction gear.
	– Waste gate valve solenoid.	At the lower crankshaft cover.
	– Fuel injectors.	At each fuel injector.
	– Glow plugs.	At the lower crankshaft cover.
	– Waste gate control valve.	At the lower crankshaft cover.

	Detail Steps/Work Items	Key Items/References
(3)	Connect the cables at the related ECU relay panel.	In the engine nacelle, aft of the firewall.
(4)	Connect the 2 electrical connectors to the ECU.	Refer to Figure 3. Make sure that the bayonet locks are correctly engaged.
(5)	Install the cable-ties and clamps that attach the cable harness to the engine and structure.	Refer to the notes that you made during removal for the type and location of each attachment.
(6)	Install the shields for the feed-through at the firewall.	Seal with PR 812 or equivalent.
(7)	Install the engine cowlings.	Refer to Section 71-10.
(8)	Install the access panels in the engine nacelle.	Refer to Section 52-40.
(9)	Connect the main airplane battery.	Refer to Section 24-34.
(10)	Do an engine run up of the engine for which you replaced the control system electrical harness.	Refer to Section 71-00.

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CHAPTER 77

ENGINE INDICATING

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CHAPTER 77
ENGINE INDICATING

1. General

This Section tells you about the engine indicating system for the DA42 airplane with the TAE 125 Diesel engines installed. An integrated cockpit system (ICS) with 2 large display screens located in the instrument panel show all engine related indications.

Engine control units (ECUs) provide most of the indications for the engine. Figure 1 shows a schematic diagram of the engine control and indication system. Refer to Section 76-00 for data about the engine control system. The ICS also shows airframe fuel system data. Refer to Section 28-40 for data about the airframe parts of the system.

2. Description and Operation

The ICS gives all engine indications. The ICS displays are located in the left and right sides of the instrument panel. Each display has a combination of digital and analogue displays.

Either display can show all the engine indications. Refer to Section 77-40 for more data about the system sensors. Refer to Section 31-40 for more data about the ICS.

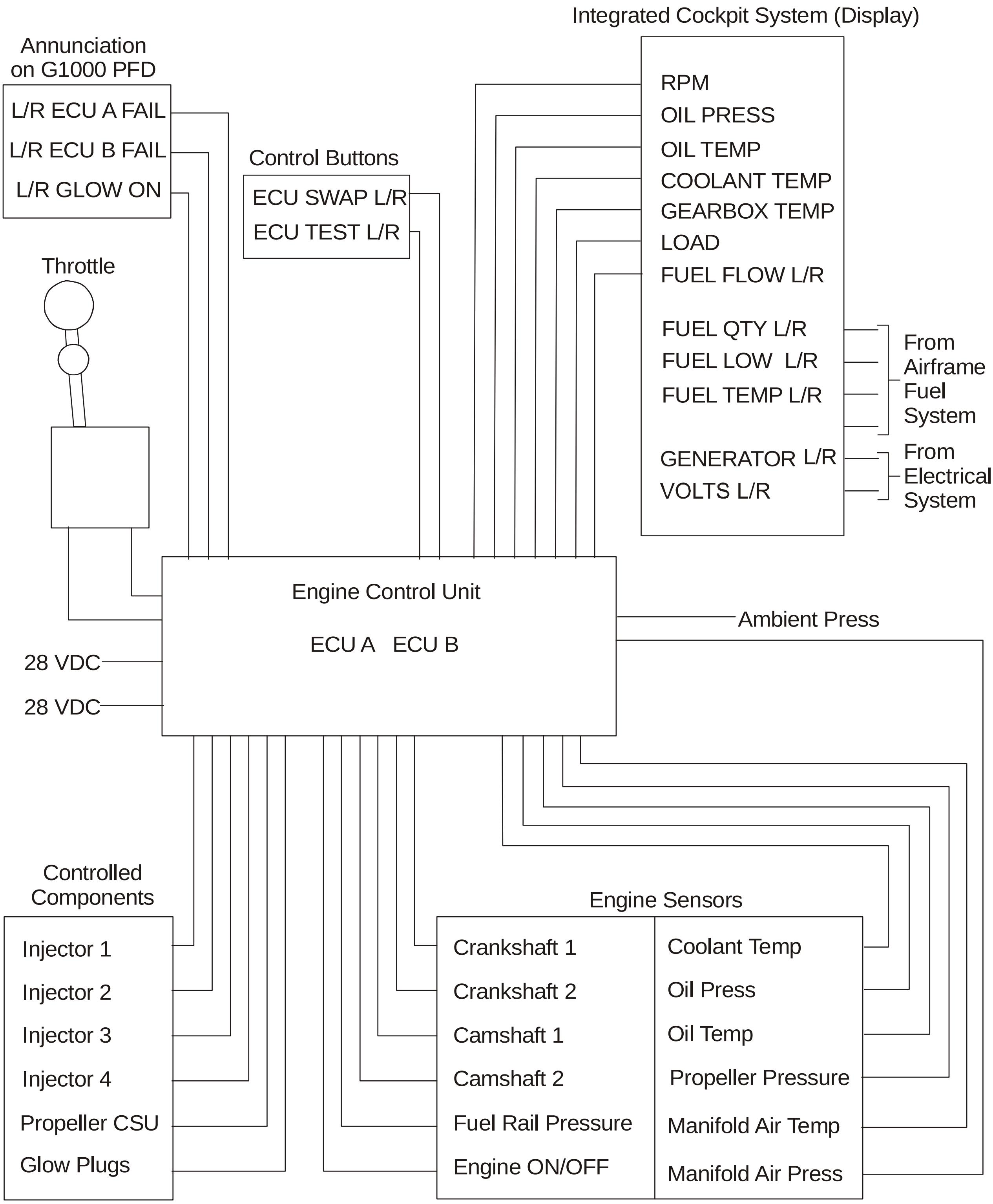

Figure 1: Engine Control and Indication Schematic Diagram

Section 77-40
Engine Indicating System

1. General

This Section tells you about the engine indicating system for the DA 42 airplane with the TAE 125 Diesel engines installed. The integrated cockpit system (ICS) display screens which are located in the instrument panel give all engine and related airplane system indications. For normal operations the left display is the primary flight display (PFD) and the right is the multi-function display (MFD). Both displays are similar.

Refer to Section 31-40 for more data about the ICS.

The engine control units (ECU) provide most of the indications for the engines. Refer to Section 76-00 for data about the engine control system. The ICS also shows fuel and systems data. Refer to Section 28-40 for data about the airframe parts of the system.

2. Description and Operation

The ICS displays the engine indications for both engines on the MFD screen. The MFD gives the following engine indications:

– LH and RH engine load. Indicates the engine loads from 0 to 100%.

– LH and RH engine RPM. Indicates the engine RPM from 0 to 2500 RPM.

– LH and RH engine gearbox temperature in °C.

– LH and RH engine coolant temperature in °C.

– LH and RH engine oil temperature in °C.

– LH and RH engine oil pressure in bar.

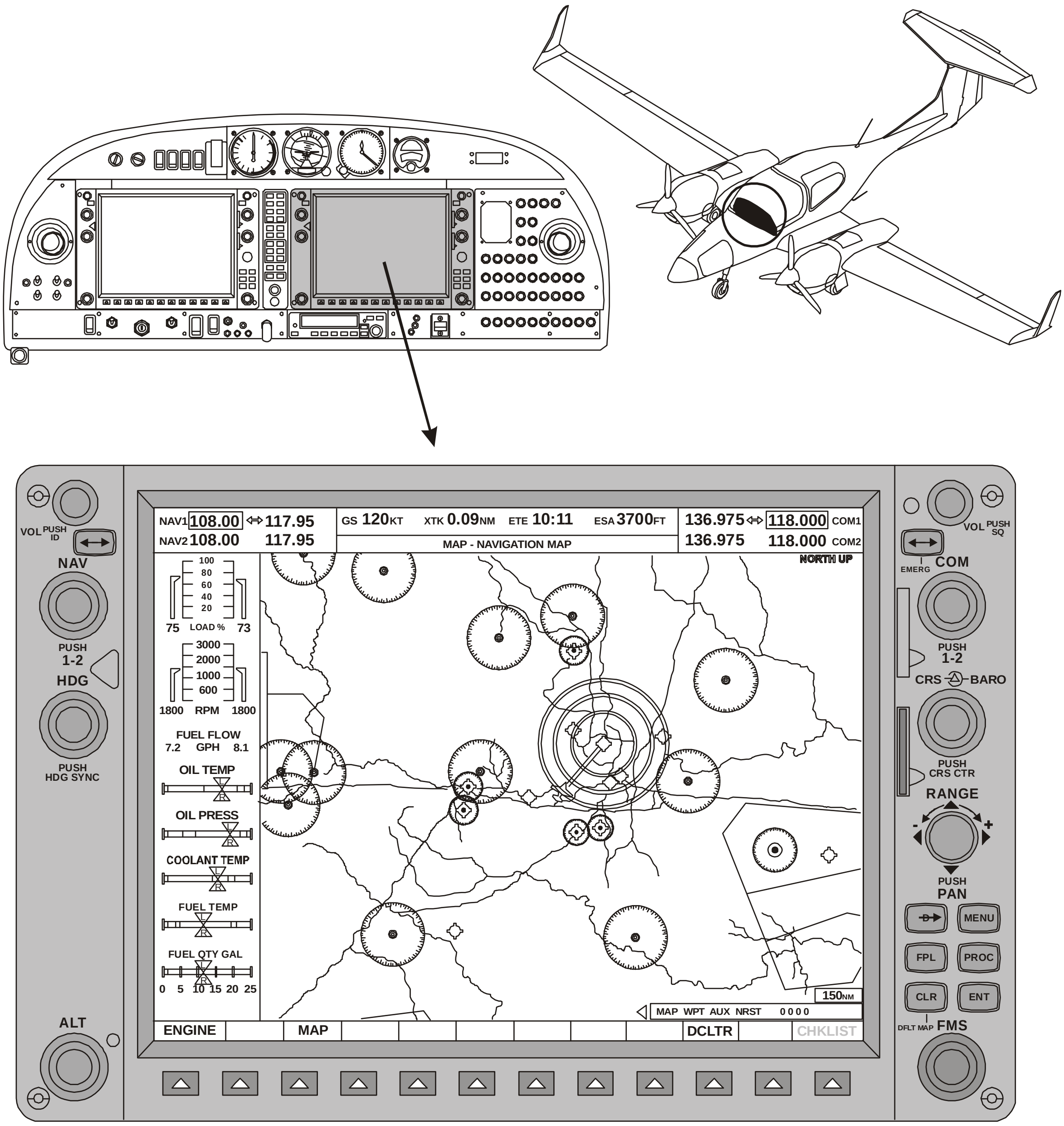

Figure 1: Display Screen - Integrated Cockpit System

The MFD also gives these auxiliary displays with the engine displays:

– LH and RH engine voltages.

– LH and RH engine generator output, in AMPS.

The MFD can also display the following fuel system information:

– LH and RH main fuel tank quantity (Refer to Section 28-40).

– LH and RH main fuel tank temperature in °C (Refer to Section 28-40).

– LH and RH engine fuel flow in galls/hour (Refer to Section 28-40).

Engine alerts are given on the PFD screen. A flashing warning annunciator appears in the PFD when an alert is activated. Pressing the WARNING softkey at the bottom of the PFD opens an alert window in the PFD. The alerts window gives more details of the alert. The ICS alert system gives alerts and warning captions for both engine and airplane systems. Refer to Section 31-40 for more data about the ICS.

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Trouble–Shooting

1. General

The table below lists the defects you could have with the engine indication system. For more data on the system refer to the equipment manufacturer's manual.

If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
One of the indicators in an integrated instrument does not indicate correctly.	Sensor/transducer defective.	Do a test for continuity of the cables for the relevant sensor. If the cables are serviceable, then refer to the engine manufacturer. Refer to Section 28-40 for the fuel quantity indicating system. Refer to Section 76-00 for the location of engine sensors.

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Maintenance Practices

1. General

These Maintenance Practices tell you how to replace the following sensors:

– Crankshaft (RPM).

– Gearbox oil temperature.

– Liquid coolant temperature.

– Engine oil temperature.

– Engine oil pressure.

Refer to the related Chapter for maintenance data on the sensors.

Where the engine control system provides data for the engine indicating system, only the engine manufacturer or a TAE-approved maintenance shop can replace sensors.

2. Replace/Install a Sensor

Figures 2 through 13 show the sensors for the engine indications.

Use the following general procedure for replacing all of the sensors on both engines. If any of the sensors has a different procedure then the procedure will be described.

A. Replace a Sensor

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**	

	Detail Steps/Work Items	Key Items/References
(1)	Make sure that the related engines is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switches to OFF. – Set the power lever to 0%.	
(2)	Disconnect the airplane main battery.	Refer to Section 24-34.
(3)	Remove the engine cowlings.	Refer to Section 71-10.
(4)	Locate the sensor that you will replace.	Refer to Figures 2 thru 13.
(5)	Disconnect the electrical cables for the sensor.	At the sensor or in-line connector.
(6)	Replace the sensor: – Remove the screw that attaches the sensor to the sensor mounting. – Unscrew the sensor from the sensor mounting. – Discard the O-ring seal or washer. – Install a new O-ring seal or washer. – Screw the sensor into the sensor mounting. – Move the sensor into position at the mounting and install the screw that attaches the sensor.	Crankshaft sensor only. Use a wrench on the hexagonal section of the sensor. Crankshaft sensor only.
(7)	Connect the electrical cables to the sensor.	At the sensor or in-line connector.
(8)	Install the engine cowlings.	Refer to Section 71-10.
(9)	Connect the airplane main battery.	Refer to Section 24-31.
(10)	Do a ground test of the related engine and monitor the related engine indication.	Refer to Section 71-00.

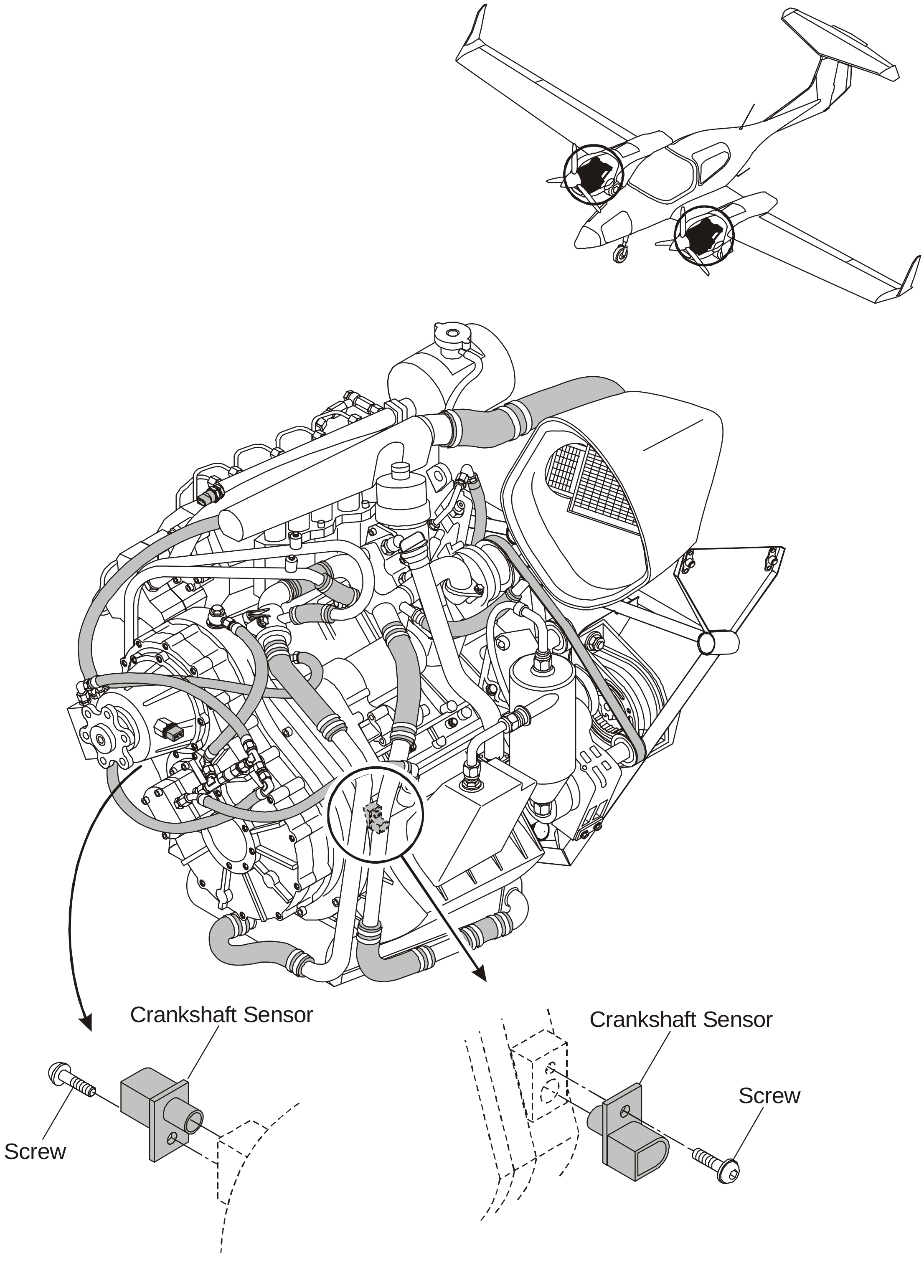

Figure 2: Crankshaft (RPM) Sensor Installation for the TAE 125-01 Engine

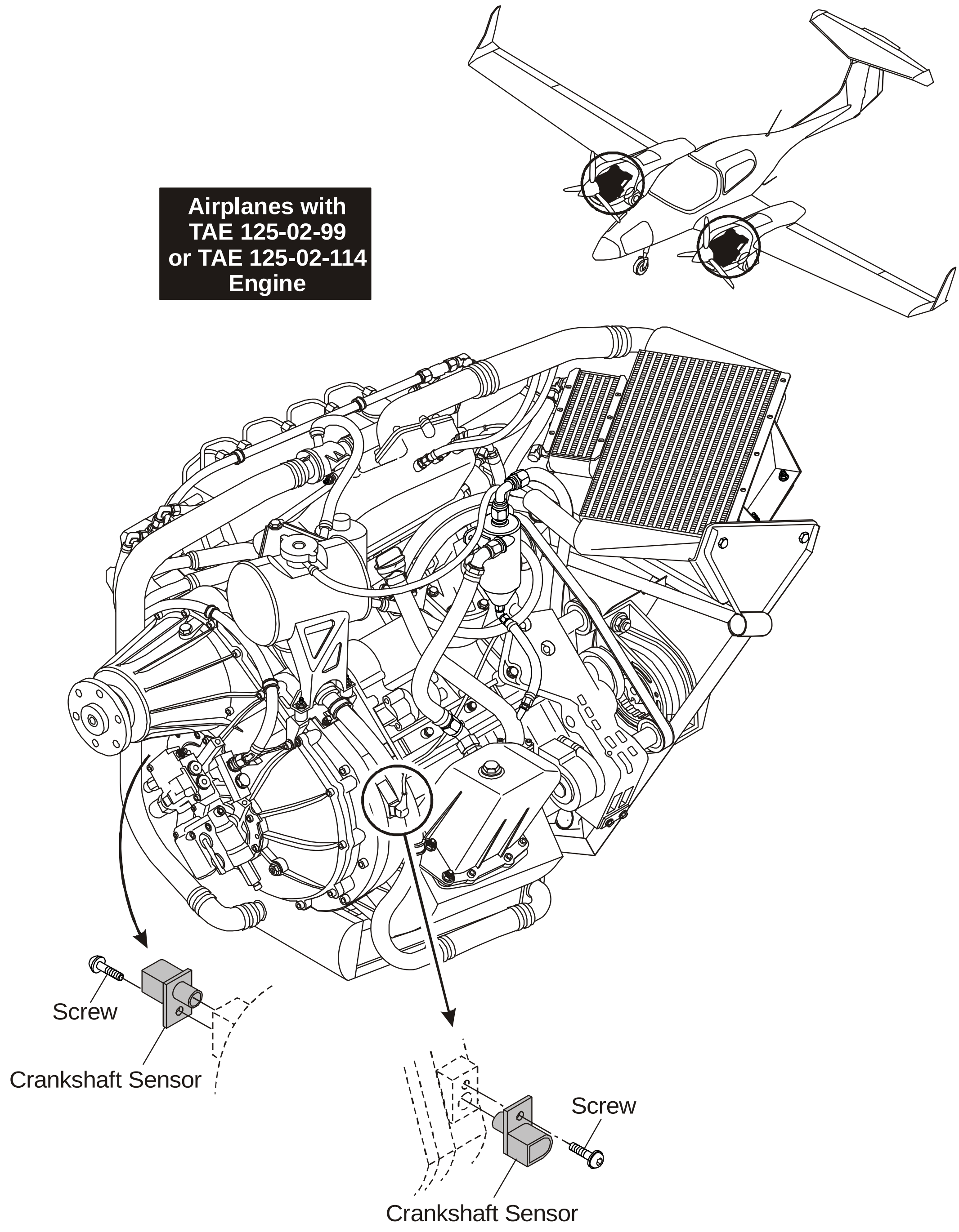

Figure 3: Crankshaft (RPM) Sensor Installation for the TAE 125-02-99 (MÄM 42-198 carried out) or TAE 125-02-114 Engine (OÄM 42-252 carried out)

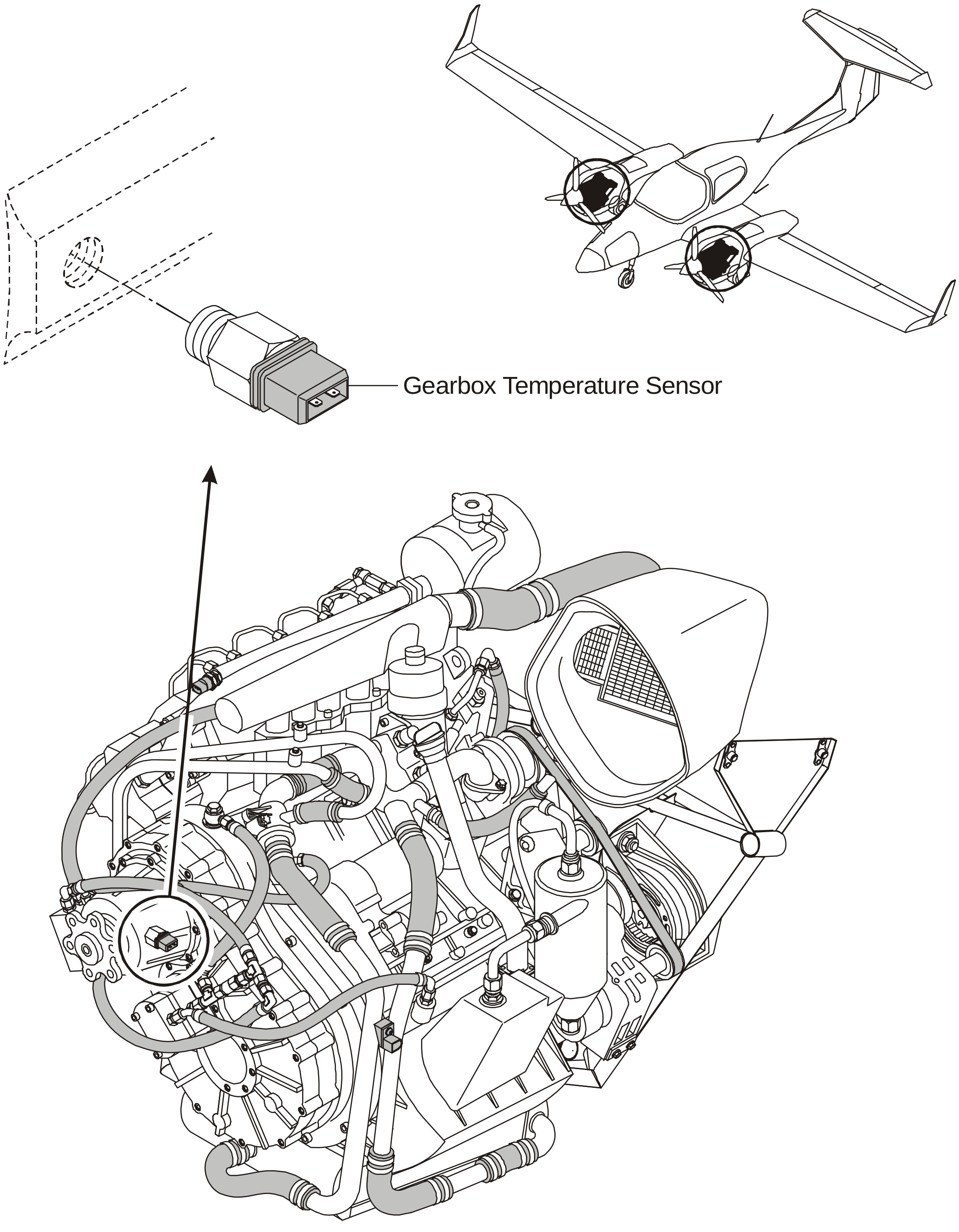

Figure 4: Gearbox Temperature Sensor Installation for the TAE 125-01 Engine

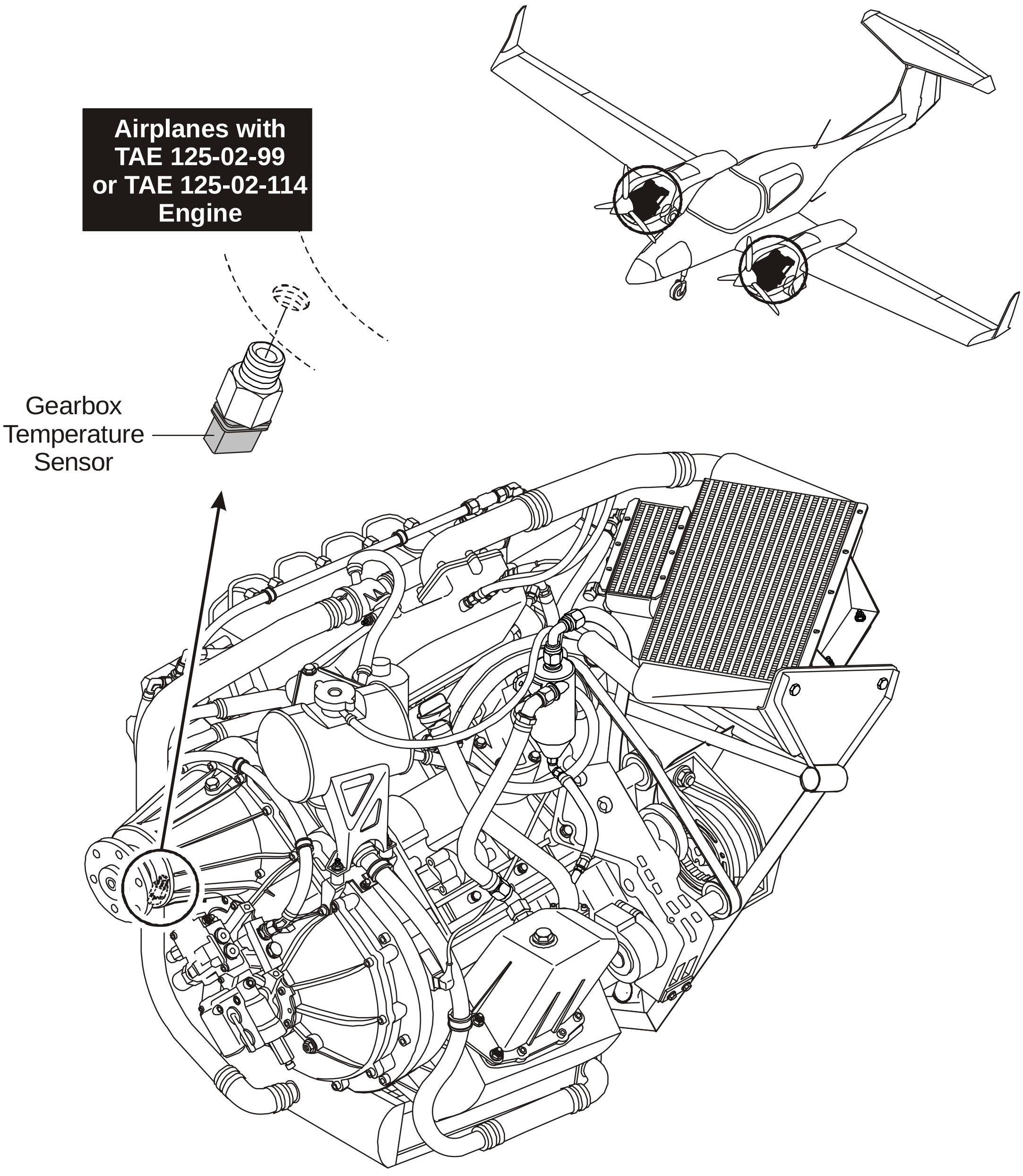

Figure 5: Gearbox Temperature Sensor Installation for the TAE 125-02-99 (MÄM 42-198 carried out) or TAE 125-02-114 Engine (OÄM 42-252 carried out)

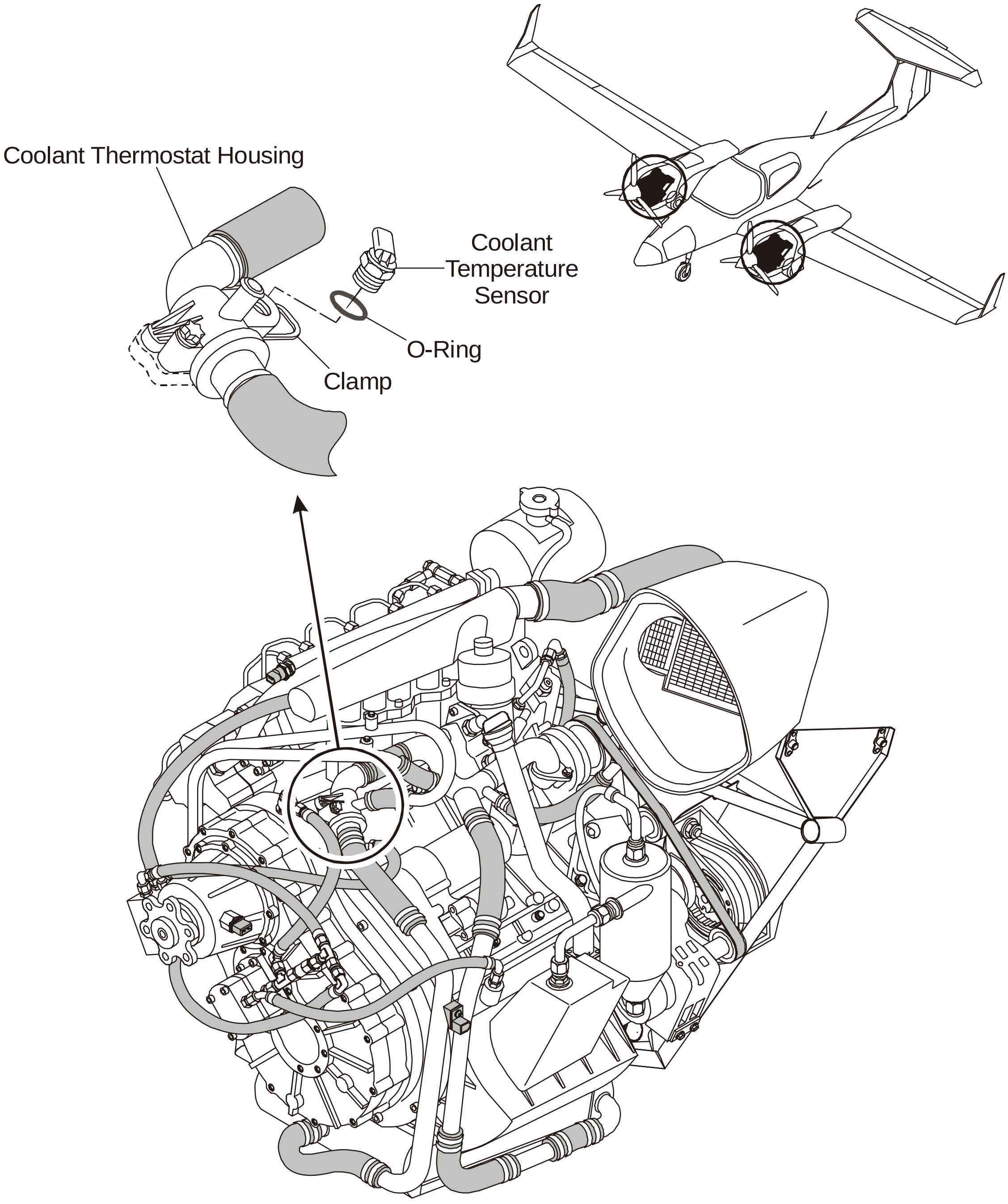

Figure 6: Engine Coolant Temperature Sensor Installation for the TAE 125-01 Engine

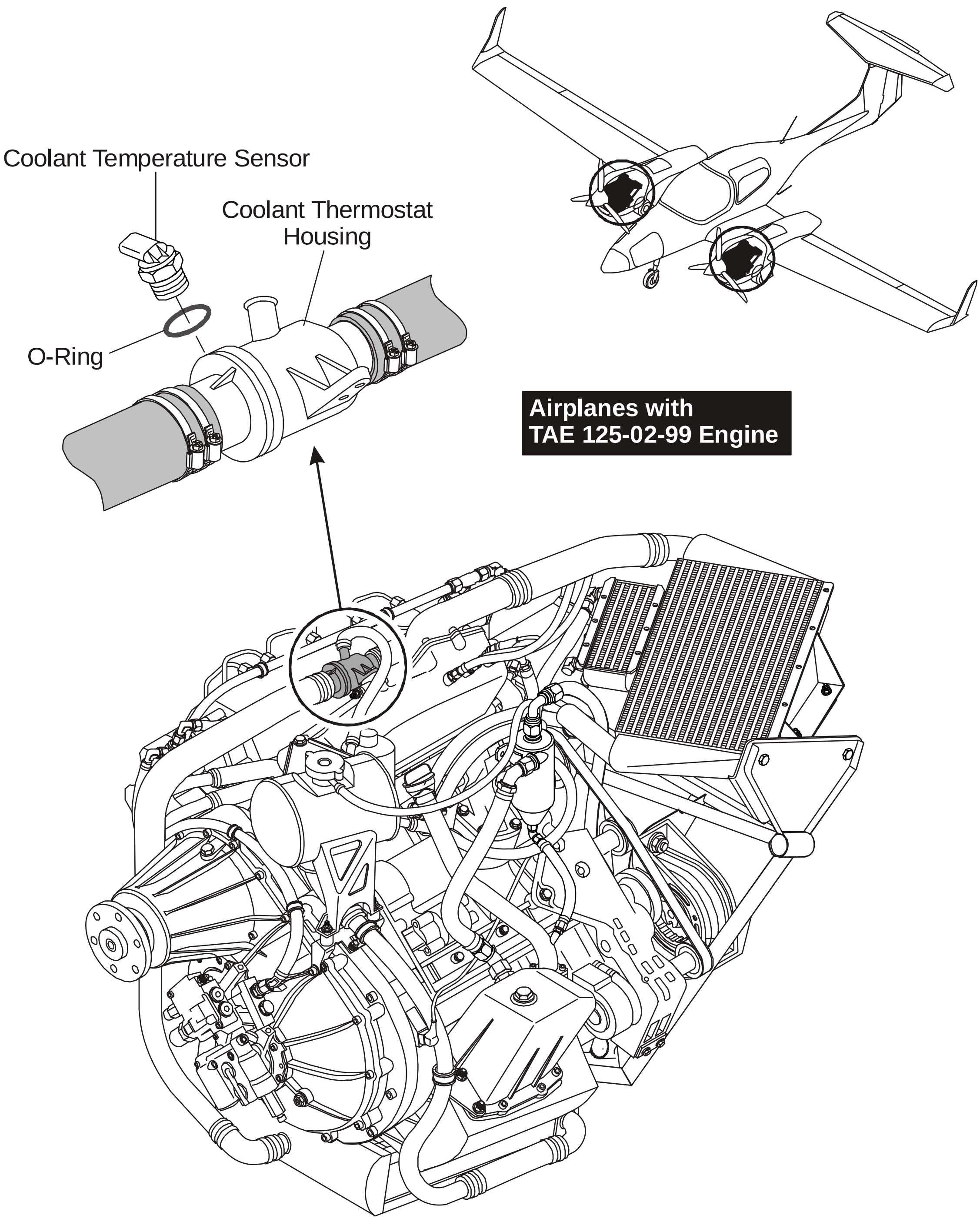

Figure 7: Engine Coolant Temperature Sensor Installation for the TAE 125-02-99 Engine (MÄM 42-198 carried out)

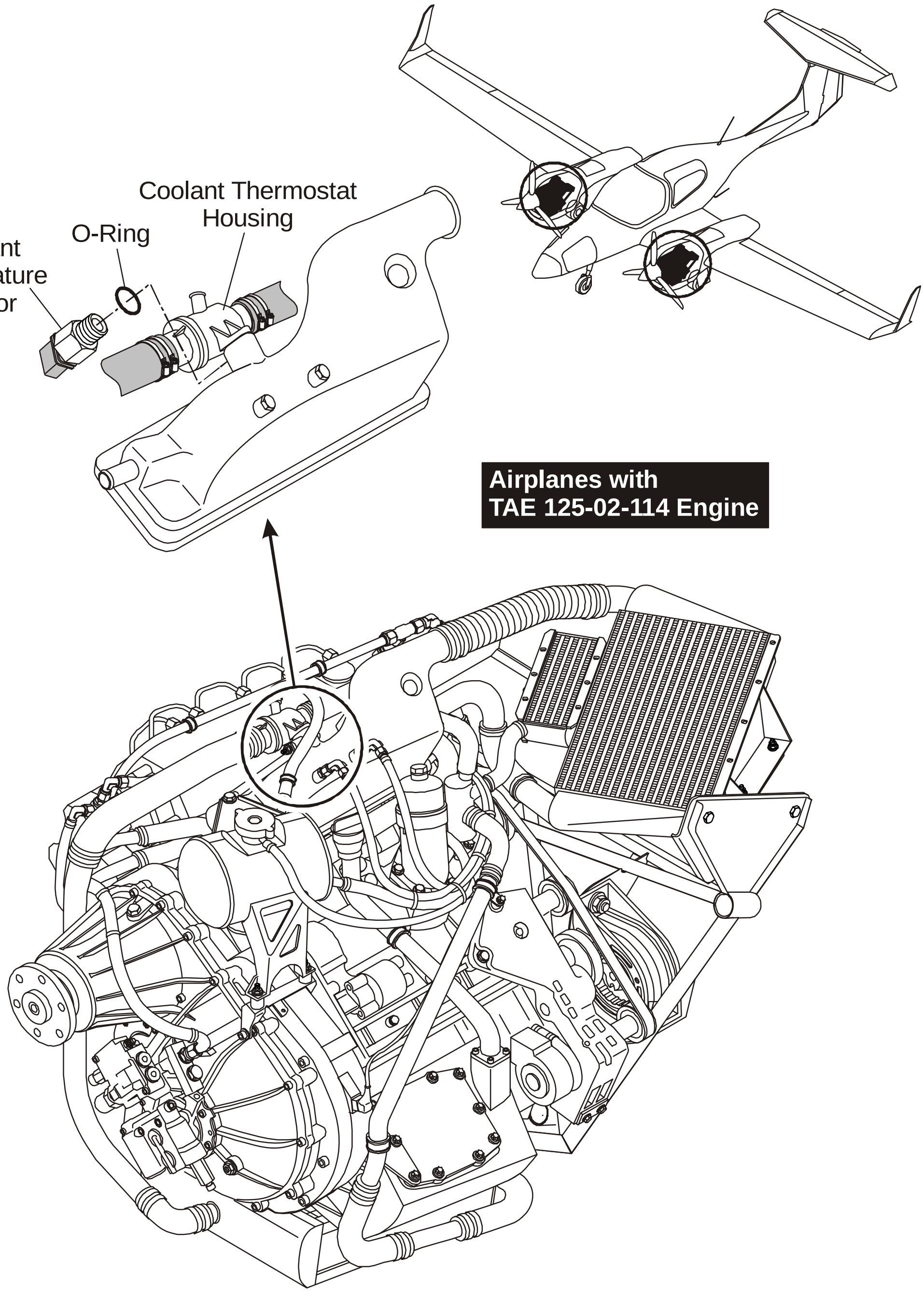

Figure 8: Engine Coolant Temperature Sensor for the TAE 125-02-114 Engine (OÄM 42-252 carried out)

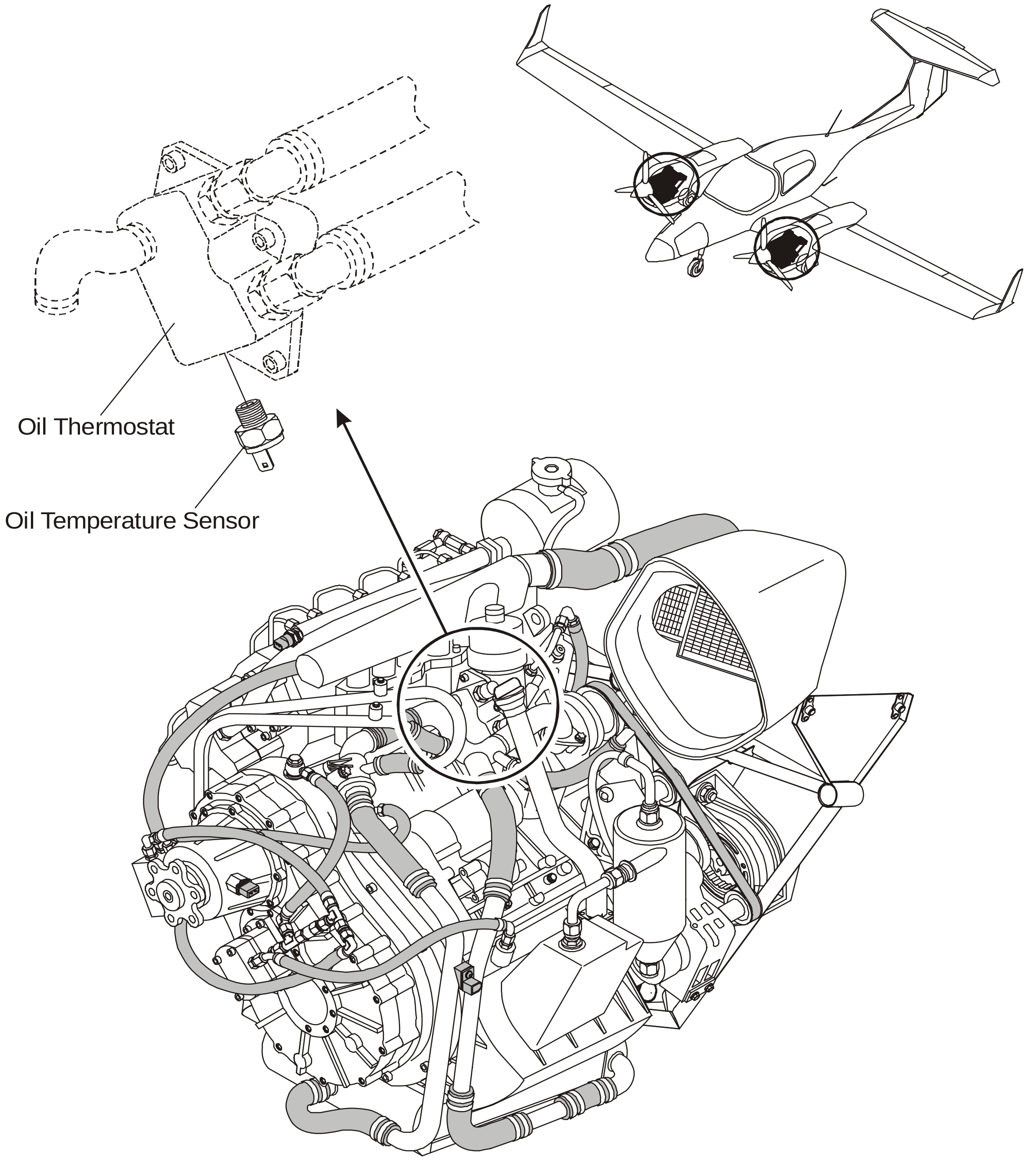

Figure 9: Engine Oil Temperature Sensor Installation for the TAE 125-01 Engine

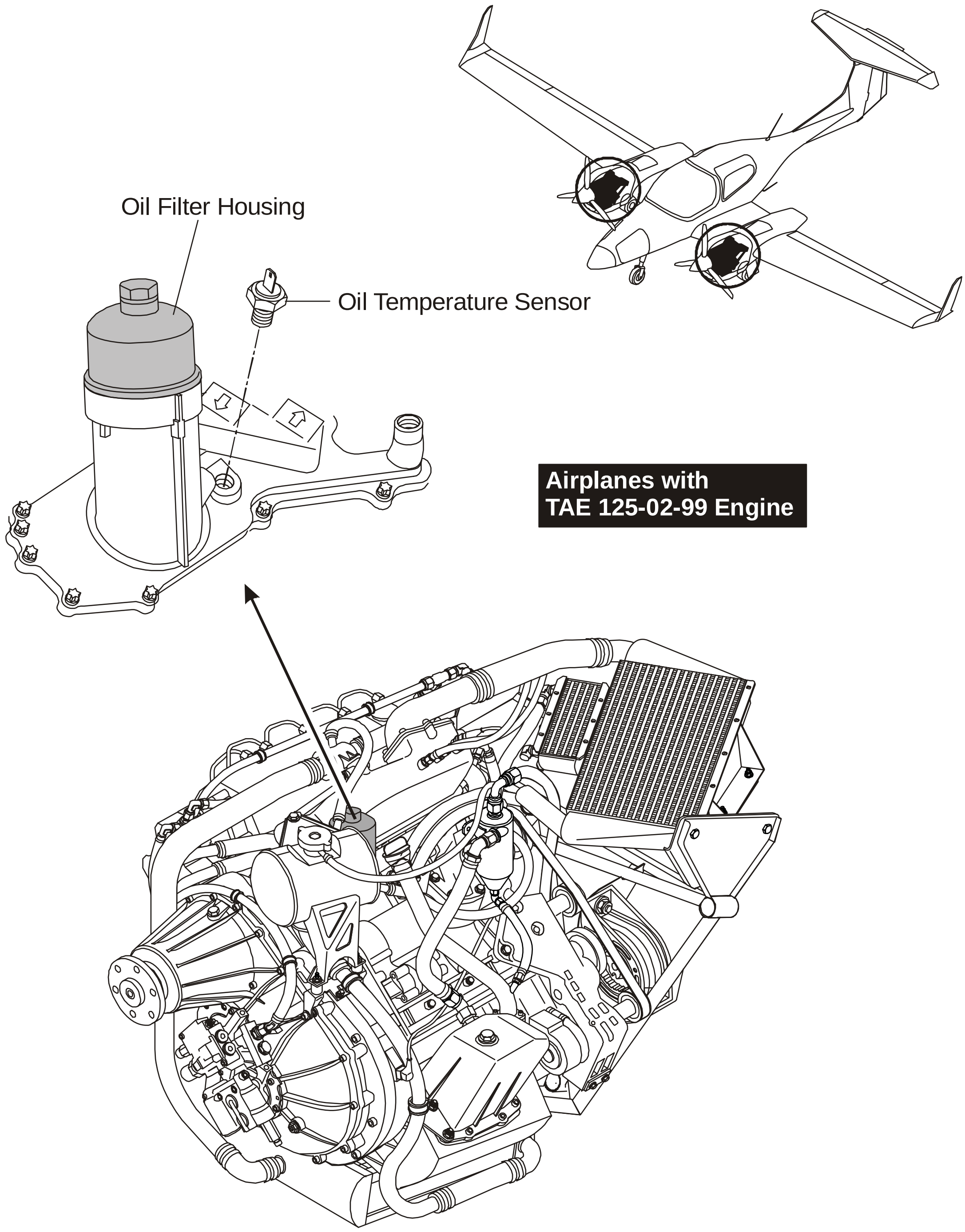

Figure 10: Engine Oil Temperature Sensor Installation for the TAE 125-02-99 Engine (MÄM 42-198 carried out)

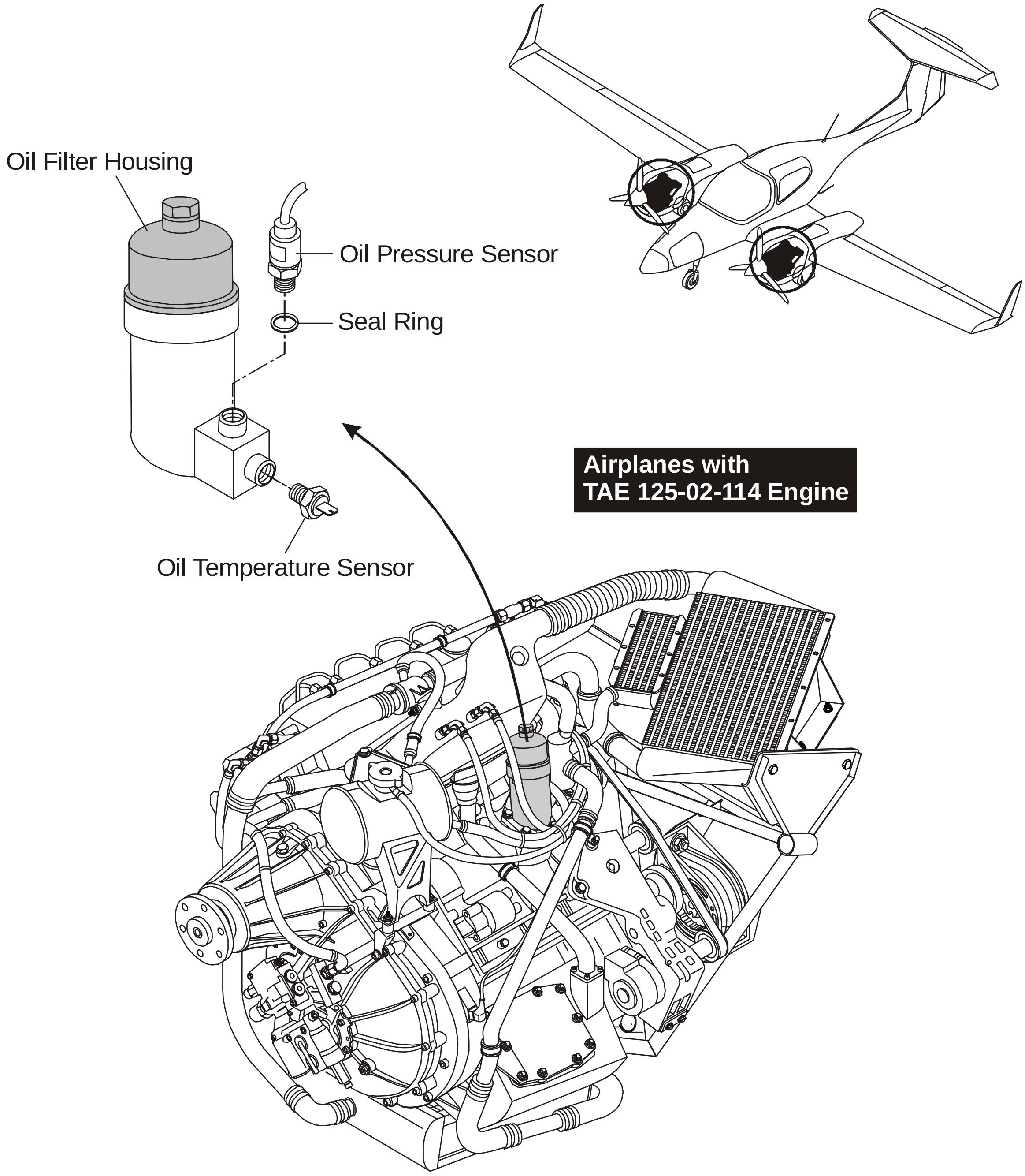

Figure 11: Engine Oil Temperature Sensor Installation for the TAE 125-02-114 Engine (OÄM 42-252 carried out)

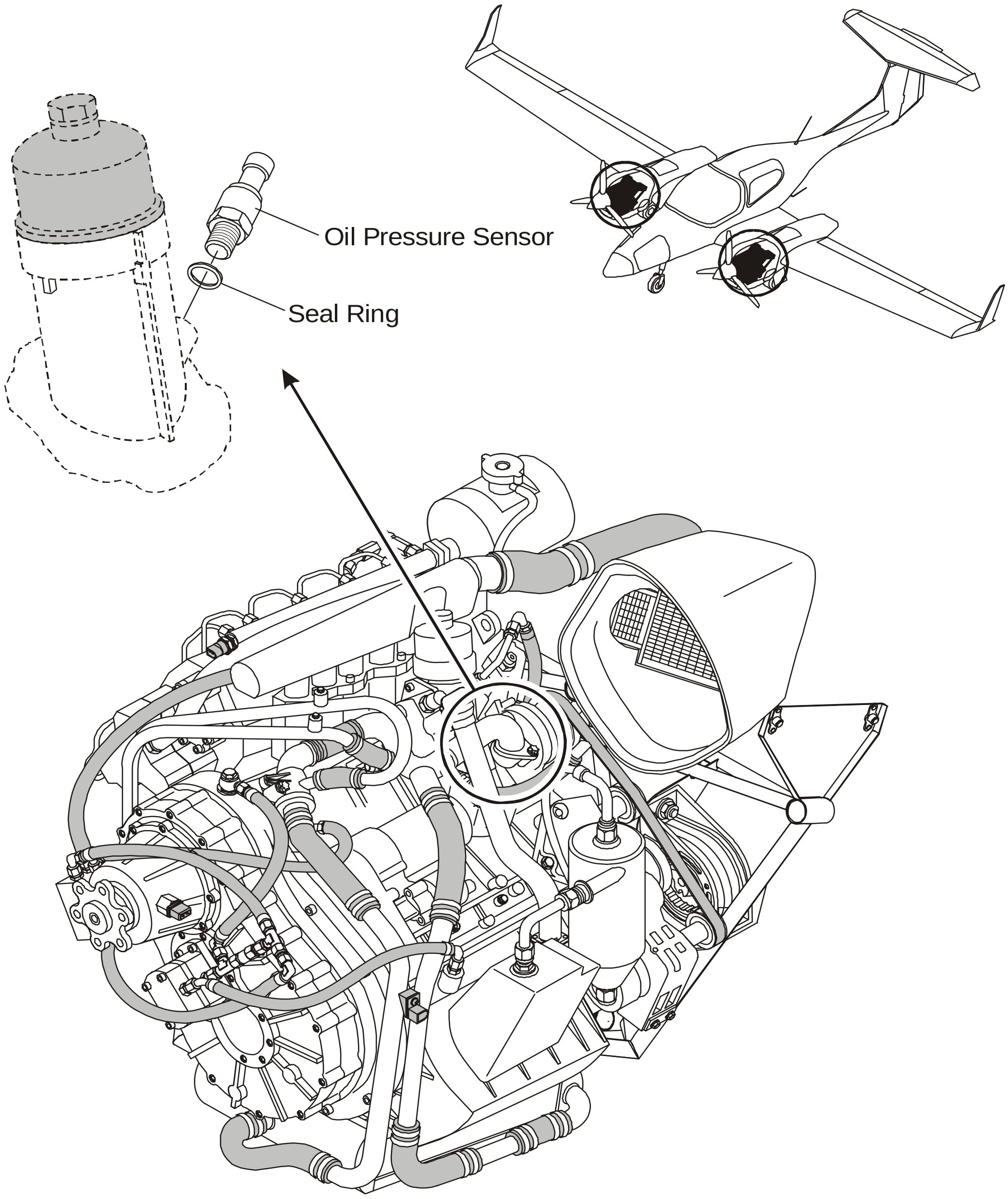

Figure 12: Engine Oil Pressure Sensor Installation for the TAE 125-01 Engine

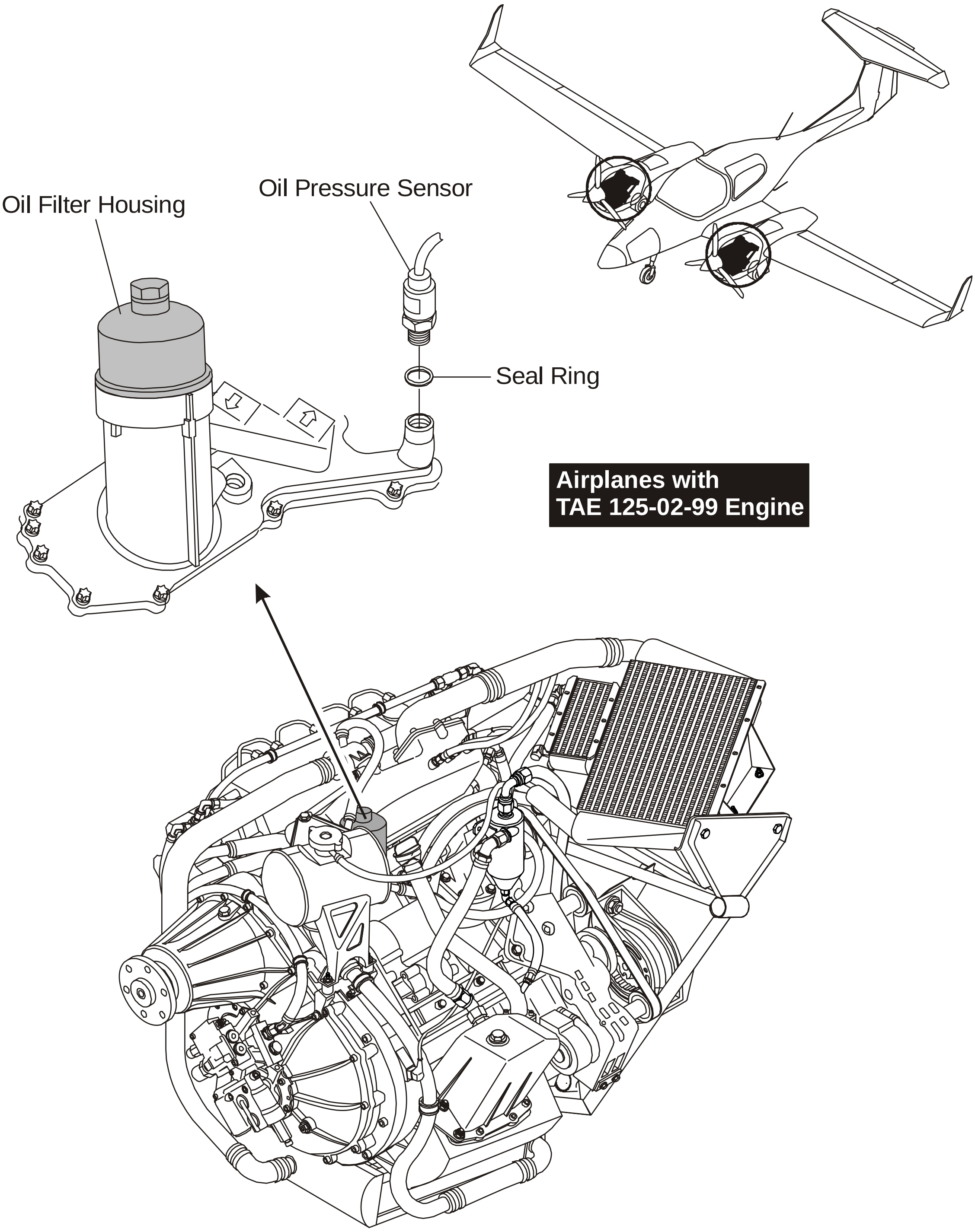

Figure 13: Engine Oil Pressure Sensor Installation for the TAE 125-02-99 Engine (MÄM 42-198 carried out)

CHAPTER 78

EXHAUST

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CHAPTER 78
EXHAUST

1. General

The DA 42 has a simple exhaust systems for the engines. Each engine has a single short exhaust pipe that bolts to the turbo charger outlet and passes through the engine cowling at the bottom.

2. Description

Figure 1 shows the engine exhaust system. The exhaust has an inner tube and an outer shroud. Four distance pieces hold the inner tube central in the shroud. The inner tube and the shroud are welded together where the exhaust pipe bolts to the turbo-charger outlet.

As an option an exhaust end pipe may be installed (if OÄM 42-130 is carried out).

The exhaust pipe does not have a muffler.

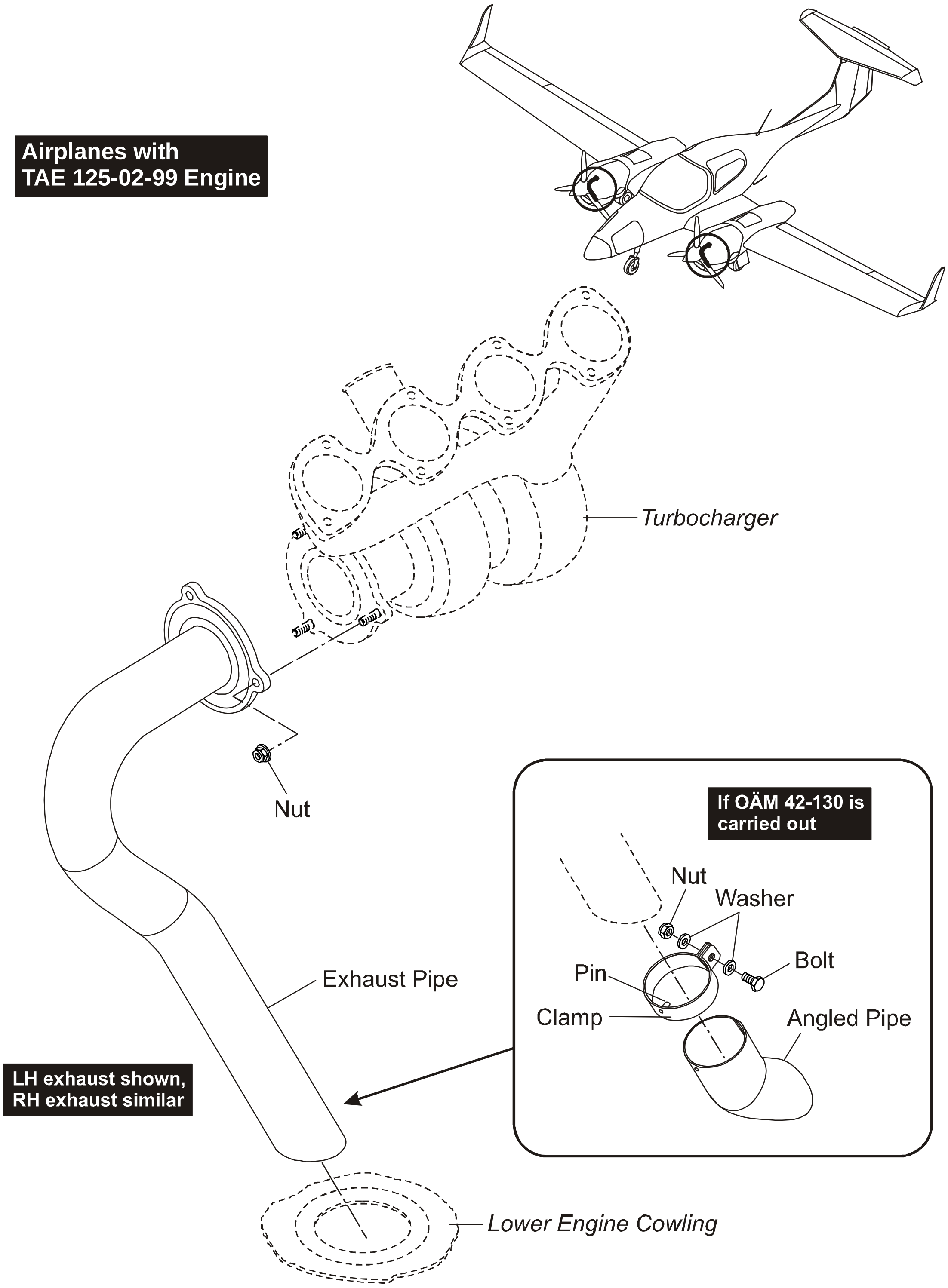

Figure 1: Exhaust System Installation

Trouble-Shooting

1. General

The table below lists the defects you could have with the exhaust system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
More noise than usual.	Exhaust pipe cracked.	Look for signs of exhaust gas leaks. Replace cracked pipes.
	Exhaust end pipe (if installed) cracked.	Replace cracked end pipes.
	Exhaust end pipe (if installed) loose.	Check pin and fasten end pipe clamps.
	Exhaust end pipe (if installed) lost.	Install new exhaust end pipe.
Signs of exhaust gas leaks in the engine compartment.	Exhaust pipe cracked.	Look for signs of exhaust gas leaks. Replace cracked pipes.

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Maintenance Practices

1. General

These Maintenance Practices tell you how to remove and install an engine exhaust pipe. Refer to Section 81-00 for data about the turbo-chargers.

2. Remove/Install an Engine Exhaust Pipe

WARNING: MAKE SURE THAT THE EXHAUST SYSTEM IS COOL BEFORE YOU TOUCH IT. THE EXHAUST SYSTEM CAN BE VERY HOT, THIS CAN CAUSE INJURY TO PERSONS.

A. Remove an Engine Exhaust Pipe

	Detail Steps/Work Items	Key Items/References
WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**		
	Make sure that the related engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(1)	Disconnect the airplane main battery.	Refer to Section 24-34.
(2)	Remove the engine cowlings.	Refer to Section 71-10.

	Detail Steps/Work Items	Key Items/References
(3)	Remove the exhaust pipe: – If MÄM 42-911 is installed: open the clamp screw and remove the clamp from the exhaust pipe. – Remove the 3 special nuts that attach the exhaust pipe to the turbo charger. – Move the exhaust pipe forward and down, then clear of the engine nacelle.	

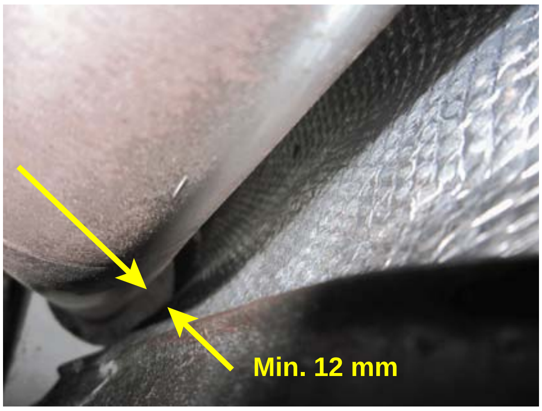
B. Install an Engine Exhaust Pipe

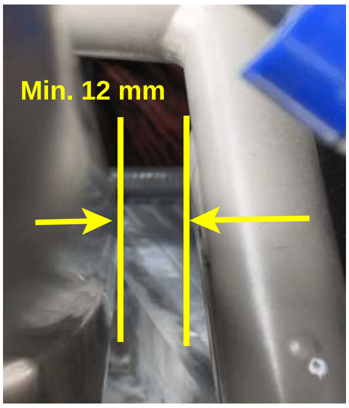
	Detail Steps/Work Items	Key Items/References
(1)	Install the exhaust pipe: – Move the exhaust pipe into position in the engine nacelle. – Move the exhaust pipe flange over the studs on the turbo charger outlet. – Install the 3 special nuts that attach the exhaust pipe to the turbo charger outlet.	Use new nuts.
(2)	Install the engine cowlings.	Refer to Section 71-10.
(3)	Do an engine ground run-up and then check the exhaust pipe for leaks.	Specially around the gasket at the turbo charger outlet.

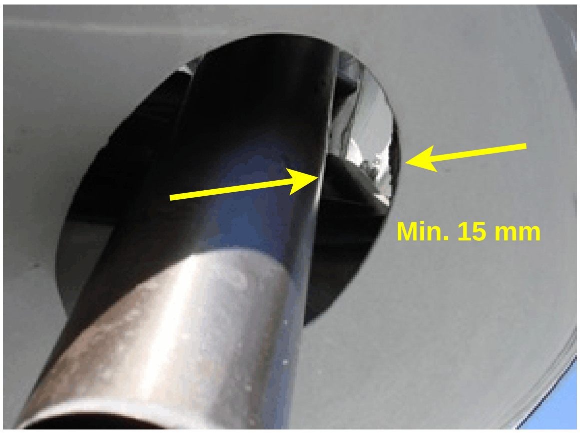
C. Install an Engine Exhaust Pipe (if MÄM 42-911 is installed)

	Detail Steps/Work Items	Key Items/References
(1)	Install the exhaust pipe: – Move the exhaust pipe into position in the engine nacelle. – Move the exhaust pipe flange over the studs on the turbo charger outlet. – Install the 3 special nuts that attach the exhaust pipe to the turbo charger outlet.	Use new nuts. Do not tighten nuts.
(2)	Install the lower engine cowling.	Refer to Section 71-10.
(3)	Align the exhaust pipe and make sure the minimum clearances according the pictures below are met: – Minimum clearance between the air inlet duct of the lower cowling and the exhaust tube is 12 mm (0.5 in). The circle in the picture below marks the area, where the exhaust tube approaches the air inlet duct and where the distance has to be measured. – Minimum clearance between upper edge of the lower cowling and the exhaust tube is 15 mm (0.6 in). – Minimum clearance between engine mount and exhaust tube is 12 mm (0.5 in).	

	Detail Steps/Work Items	Key Items/References





	Detail Steps/Work Items	Key Items/References
(4)	Tighten the 3 special nuts.	
(5)	Adjust clearance between exhaust tube and cowling cut out. – Make sure, that the minimum circumferential clearance between the cowling cut out and the exhaust tube is 15 mm (0.6 in). – If the distance is less than 15 mm (0.6 in) rework the cowling cut out. Do not change the position of the exhaust tube. The minimum distance of 12 mm (0.5 in) between the exhaust tube and the air inlet duct, which was adjusted in the previous item is essential. 	
(6)	Install the clamp without pretension and tighten the clamp screw. Make sure, that the exhaust mounting brackets are installed on the engine shock mounts.	Use new clamp. Torque: Refer to Section 20-10.
(7)	Install the upper engine cowlings.	Refer to Section 71-10.
(8)	Do an engine ground run-up and then check the exhaust pipe for leaks.	Specially around the gasket at the turbo charger outlet.

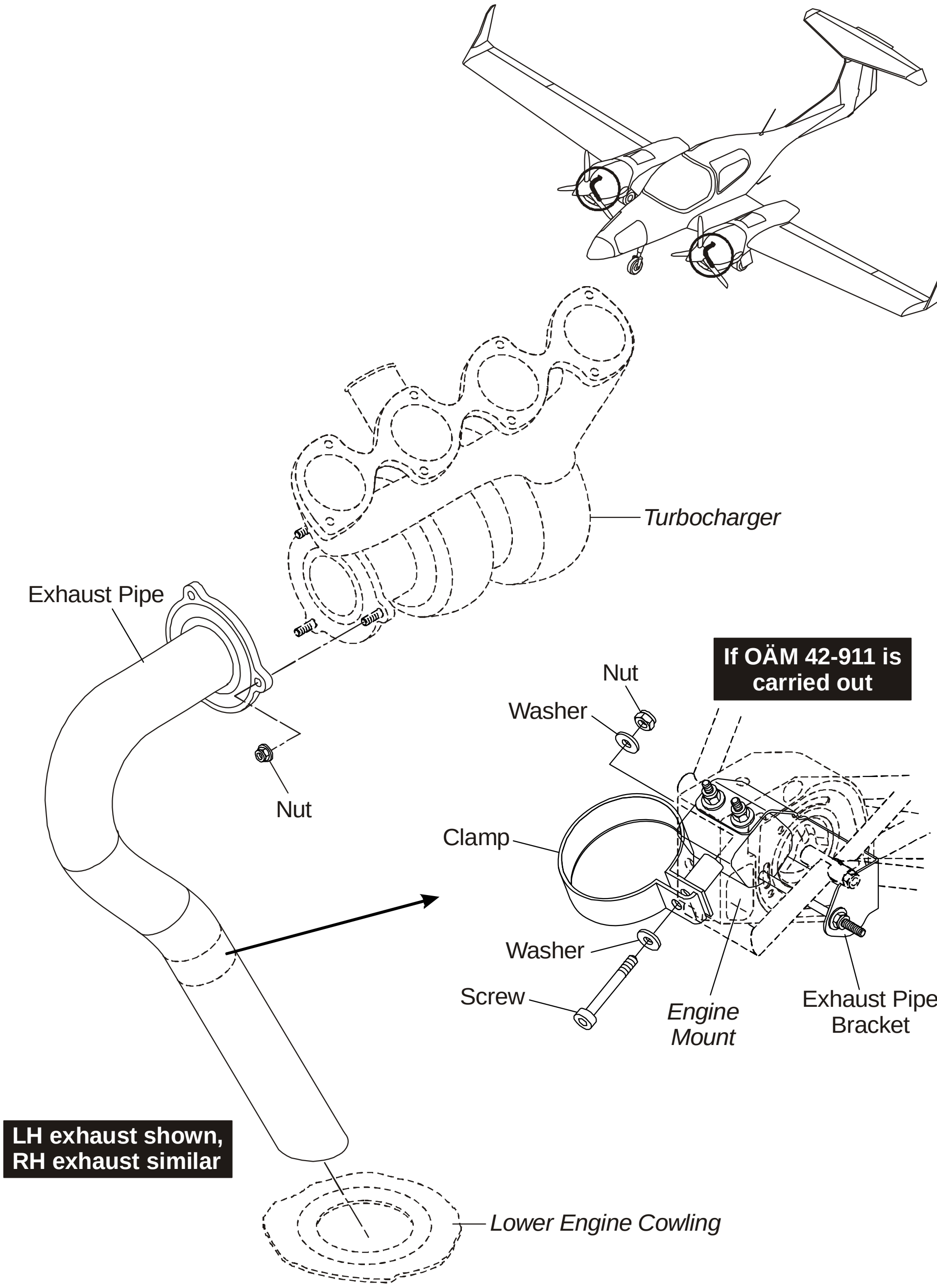


Figure 2: Engine Exhaust Clamp (if OÄM 42-911 is installed)

3. Remove/Install an Exhaust End Pipe (if OÄM 42-130 is carried out)

WARNING: MAKE SURE THAT THE EXHAUST SYSTEM IS COOL BEFORE YOU TOUCH IT. THE EXHAUST SYSTEM CAN BE VERY HOT, THIS CAN CAUSE INJURY TO PERSONS.

A. Remove an Exhaust End Pipe

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**	
(1)	Make sure that the related engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Disconnect the airplane main battery.	Refer to Section 24-34.
(3)	Remove the exhaust end pipe: – Open the clamp screw and remove the clamp from the exhaust end pipe. – Move the exhaust end pipe down and off the exhaust pipe.	

B. Install an Exhaust End Pipe

	Detail Steps/Work Items	Key Items/References
(1)	Install the exhaust end pipe: – Move the exhaust end pipe over the exhaust pipe. Position the hole for the clamp pin of the end pipe over the according hole in the exhaust pipe. – Install the clamp and fasten the clamp screw.	 Use new clamp.
(2)	Do an engine ground run-up and then check the exhaust end pipe for proper installation**.**	

CHAPTER 79

OIL COOLING

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OIL COOLING

1. General

This Section tells you about the airframe parts of the engine oil system. These are the only parts that you can replace except the engine and gearbox oil filters. Refer to Chapter 72 for data about the oil filters.

2. Engine Oil System

Figure 1 shows the oil system schematic diagram for TAE 125-01 and TAE 125-02-99 (MÄM 42-198 carried out) engines. Figure 2 shows the oil system schematic diagram for the TAE 125-02-114 (OÄM 42-252 carried out) engine. Figure 3 shows the component locations. Each engine has the usual wet-sump lubrication system. The bottom part of the engine crankcase makes the sump. An oil filler tube with a screw cap connects to the crankcase on the left of the engine.

Two flexible hoses adjacent to the engine oil filter housing connect to the oil radiator. The oil cooler is located to the rear of the engine nacelle, at the top. If the TAE 125-02-114 (OÄM 42-252 carried out) engine is installed the engine oil is cooled via an integrated oil/coolant heat exchanger.

The oil breather system has an oil pre-separator located on the engine crankcase adjacent to the oil filler. A flexible hose connects the oil pre-separator to the oil separator. The oil separator is located at the left of the engine behind the oil filter tube. A flexible hose from the top of the oil separator vents blow-by gases and any remaining oil mist overboard. If the TAE 125-02-114 (OÄM 42-252 carried out) engine is installed the oil separator is an integral part of the engine (see Figure 2). A small flexible hose connects the bottom of the oil separator to the turbo charger cage tank. An oil pump at the gear box pumps the oil from the turbo charger cage tank to the engine sump.

An oil pump in the engine takes oil from the sump. The oil flows through a filter and oil thermostat to the oil cooler. Air passing through the oil cooler cools the oil. The cool oil returns to the engine. Oil galleries in the engine take the oil to all bearings. If the oil is colder than 80 °C, the oil thermostat sends the oil directly to the engine oil galleries.

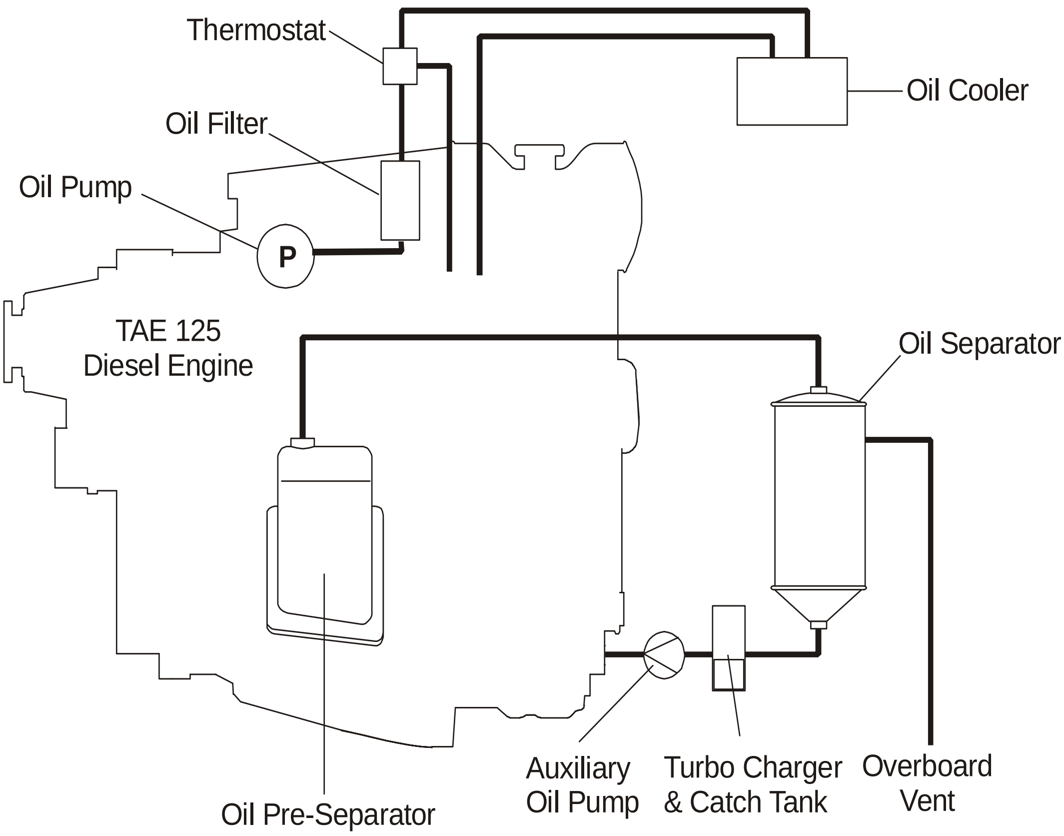

Figure 1: Engine Oil System Schematic Diagram for TAE 125-01 and TAE 125-02-99 (MÄM 42-198 carried out) Engines

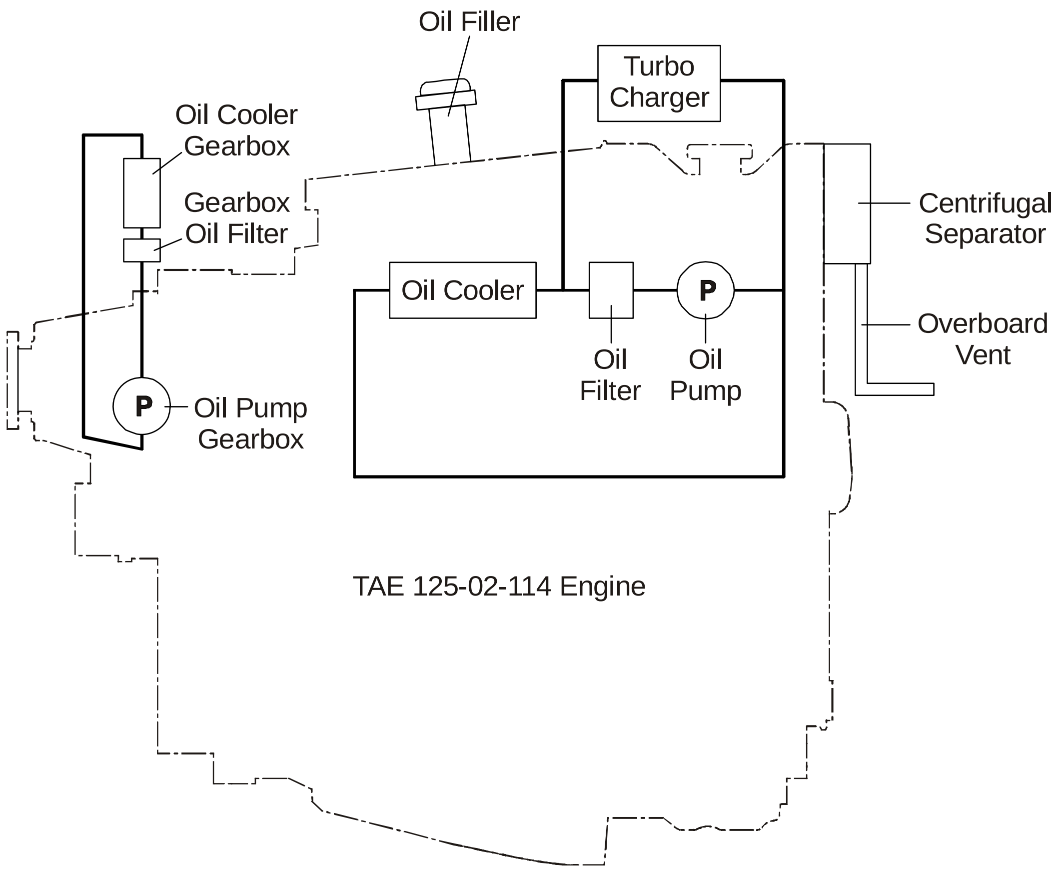

Figure 2: Engine Oil System Schematic Diagram for TAE 125-02-114 (OÄM 42-252 carried out) Engine

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Trouble-Shooting

1. General

The table below lists the defects you could have with the oil system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
An engine oil temperature is too high.	Air inlet to oil cooler blocked.	Remove obstruction.
	Oil cooler matrix dirty/blocked.	Clean oil cooler matrix.
	Oil cooler blocked internally.	Remove oil cooler and flush with clean engine oil. Replace oil cooler.
	Low oil level.	Refill oil. Refer to Section 12-10.
An engine oil pressure too high.	Defective oil pressure sensor.	Refer to the TAE Operation and Maintenance Manual OM-02-01, latest revision, if the TAE 125-01 engine is installed. If the TAE 125-02-99 or TAE 125-02-114 engine is installed, refer to the TAE Operation and Maintenance Manual OM-02-02, latest revision.
An engine oil pressure too low at normal operating temperatures.	Low oil level.	Replenish oil system. Refer to Section 12-10.
	Defective oil pressure sensor.	Refer to the TAE Operation and Maintenance Manual OM-02-01, latest revision, if the TAE 125-01 engine is installed. If the TAE 125-02-99 or TAE 125-02-114 engine is installed, refer to the TAE Operation and Maintenance Manual OM-02-02, latest revision.

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Maintenance Practices

1. General

These Maintenance Practices tell you how to remove/install an engine oil cooler. Use this procedure for both the left and the right engine oil coolers.

2. Remove/Install an Engine Oil Cooler (for TAE 125-01 and TAE 125-02-99, MÄM 42-198 carried out)

WARNING: DO NOT GET OIL ON YOU. OIL CAN CAUSE SKIN DISEASE.

CAUTION: ALWAYS PUT A CAP ON OPEN CONNECTIONS. IF YOU DO NOT PUT A CAP ON OPEN CONNECTIONS, THEN CONTAMINATION CAN GET INTO THE SYSTEM AND CAUSE DAMAGE.

CAUTION: DO NOT MIX OIL TYPES. IF YOU MIX OIL TYPES THE OIL CAN LOSE ITS PROPERTIES AND THE ENGINE WILL WEAR MORE QUICKLY.

A. Remove an Engine Oil Cooler

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**	
(1)	Make sure that the related engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Disconnect the airplane main battery.	Refer to Section 24-34.
(3)	Remove the engine cowlings.	Refer to Section 71-10.
(4)	Remove the inter-cooler / oil-cooler shroud.	Refer to Section 81-00.

	Detail Steps/Work Items	Key Items/References
(5)	Disconnect the 2 flexible hoses that connect the oil cooler to the engine.	Refer to Figure 3. At the oil cooler. Use a suitable container to catch spilt oil. Install blanking caps on all open connections.
(6)	Disconnect the oil hoses from the inter-cooler.	Refer to Section 81-00.
(7)	Remove the nuts and washers that attach the inter-cooler to the vibration dampers at the mounting bracket.	
(8)	Remove the nuts and washers that attach the oil-cooler mounting bracket to the vibration dampers.	
(9)	Move the oil-cooler and inter-cooler package clear of the engine nacelle.	
(10)	Remove the bolts and washers that connect the oil-cooler the inter-cooler.	
(11)	Remove the oil-cooler mounting bracket.	
(12)	Remove the bolts and washers, nuts and spacers.	

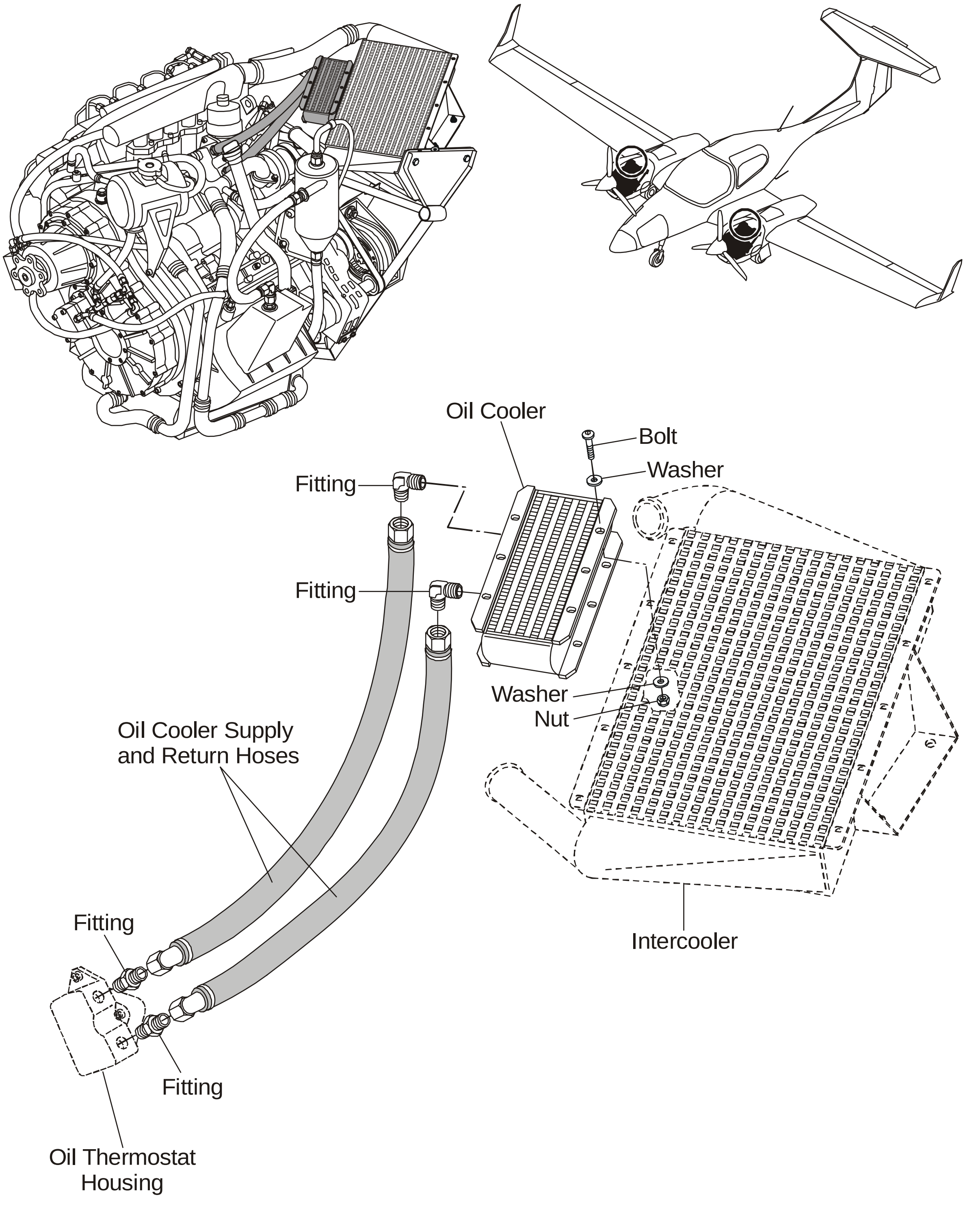

Figure 3: Oil-Cooler Installation for the TAE 125-01 Engine

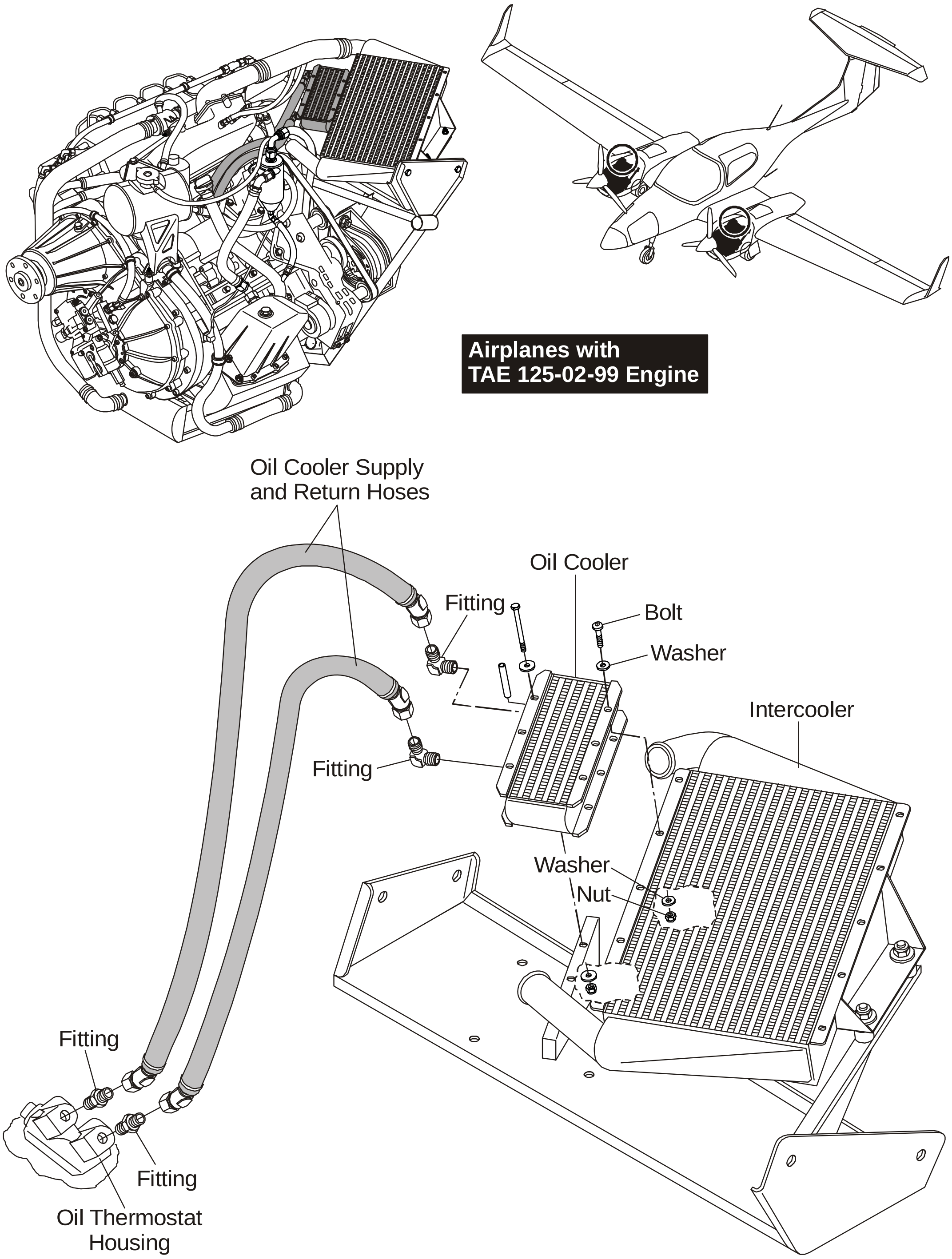

Figure 4: Oil-Cooler Installation for the 125-02-99 Engine (MÄM 42-198 carried out)

B. Install an Engine Oil-Cooler

	Detail Steps/Work Items	Key Items/References
(1)	Install the oil-cooler mounting bracket.	
(2)	Connect the oil-cooler to the inter-cooler.	
(3)	Move the oil-cooler / inter-cooler package into position within the engine nacelle.	
(4)	Attach the oil-cooler mounting bracket to the vibration dampers.	
(5)	Attach the inter-cooler to the vibration dampers.	
(6)	Connect the air hoses to the inter-cooler.	Refer to Section 81-00.
(7)	Connect the flexible hoses to the oil-cooler.	Remove al blanking caps.
(8)	Replenish the engine oil system.	Refer to Section 12-10.
(9)	Install the engine cowlings.	Refer to Section 71-10.
(10)	Do an engine ground run-up. Monitor the oil temperature for the related engine. Then stop the engine.	The oil temperature indicator must show the relevant oil temperature. Refer to the DA 42 Airplane Flight Manual.
(11)	Look for oil leaks:	
	– Remove the engine top cowlings.	Refer to Section 71-10.
	– Look for oil leaks, specially around the oil hose connections to the oil-cooler.	
	– If necessary, replenish the engine oil system.	Refer to Section 12-10.
	– Install the engine cowlings.	Refer to Section 71-10.

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CHAPTER 80

STARTING

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CHAPTER 80
STARTING

1. General

This Section tells you about the system that cranks the TAE 125 Diesel engine for starting.

Refer to Section 24-60 for more data on the electrical supplies to the system Refer to Section 76-00 for data about the engine control system.

2. Description and Operation

Figure 1 shows the simplified schematic diagram of the starter system. The system operates off a 24 Volts DC supply.

The TAE 125 Diesel engine has a small, high-powered electric starter. The starter motor is located on the left side of the engine near the front. It has an integral solenoid to connect the starter motor to the relay junction box bus. Either the airplane battery or the external power system can supply the bus for the starter.

The ELECT. MASTER rocker switch is located on the bottom left of the instrument panel. Push the rocker to supply power to the main left and right bus bars.

LEFT ENGINE and RIGHT ENGINE switches located on the bottom left of the instrument panel controls the ground connection for the related engine starter relays. This switch must be set to ON for the starter system to operate. A key operated START switch located between the LEFT ENGINE and RIGHT ENGINE master switches operates the related engine starter. Turn the key to LEFT START or RIGHT START to operate the related engine starter. A spring returns the key to the neutral position when the key is released.

A START warning light on the ALERT panel of the integrated cockpit display comes ON when there is power to the starter. If this light stays on after the engine has started, set the LEFT ENGINE/RIGHT ENGINE MASTER switch to OFF.

If necessary during starting, the engine control unit operates the glow plugs to heat intake air for the engine.

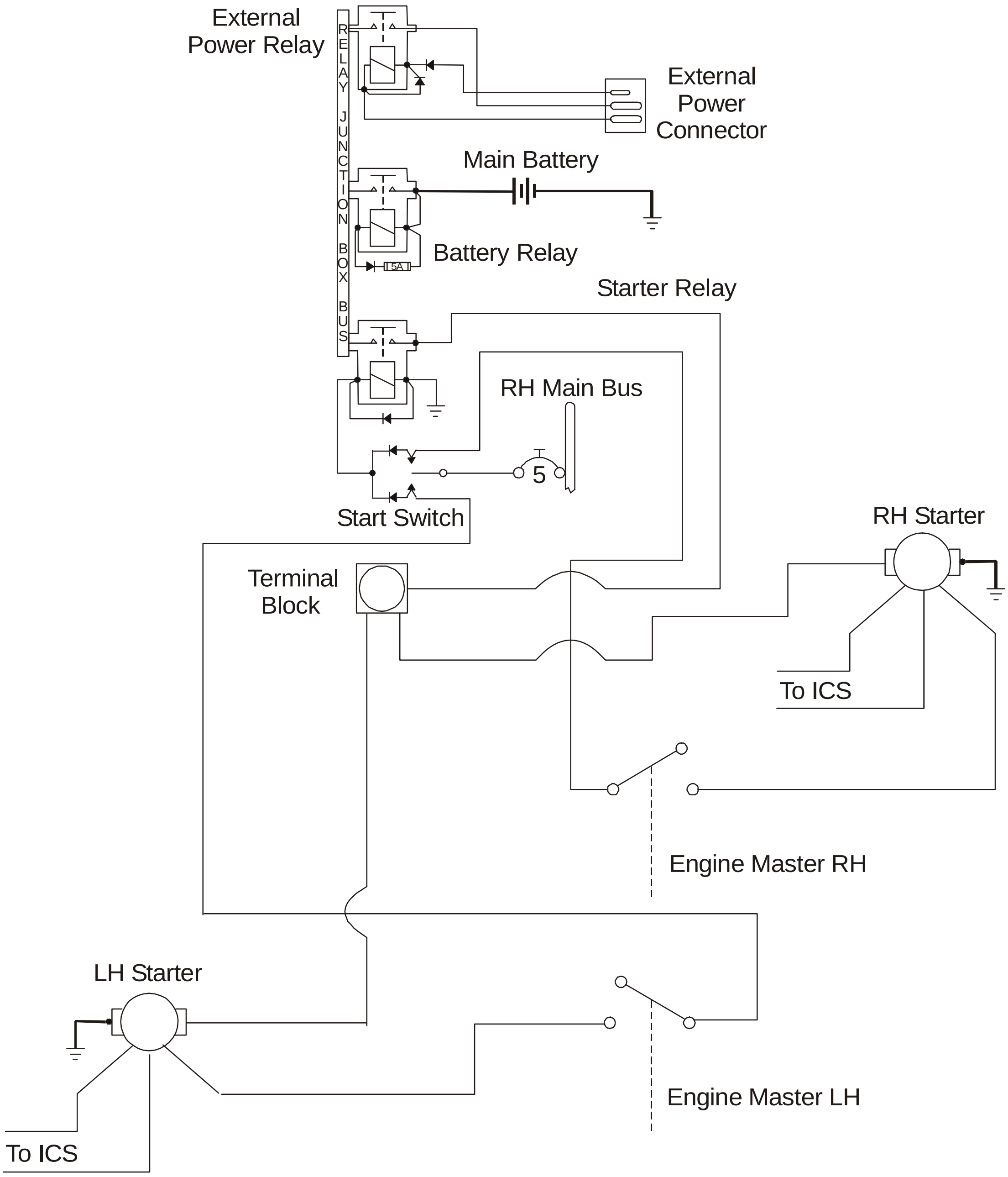

Figure 1: Engine Starter System Schematic Diagram

Trouble-Shooting

1. General

The table below lists the defects you could have with the starting system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

WARNING: DO NOT ALLOW PERSONS TO ENTER THE DANGER AREA OF A PROPELLER. THE PROPELLER MAY TURN AND CAUSE INJURY TO PERSONS.

WARNING: DISCONNECT AND ISOLATE THE STARTER POWER CABLES BEFORE DOING TESTS IN THIS SECTION. THE ENGINE MAY TURN AND CAUSE INJURY TO PERSONS.

Trouble	Possible Cause	Repair
The starter does not operate when the ELECT. MASTER switch is set to ON, the related ENGINE MASTER and the related engine START key switch is set to START LEFT or START RIGHT.	The airplane main battery is discharged.	Charge airplane main battery or apply external power.
	The related ENGINE MASTER switch is defective.	Replace the related ENGINE MASTER switch.
	The ENGINE START key switch is defective.	Replace the ENGINE START key switch.
	The related starter relay is defective.	Replace the related starter relay.
	The related engine starter motor assembly is defective.	Replace the related engine starter motor assembly.
	A cable in the related engine start system is defective.	Do a test of the electrical cables. Refer to Chapter 92 for the wiring diagrams. Repair/Replace the defective cable. Refer to Section 71-50 for repair limits of the engine harness.

Trouble	Possible Cause	Repair
A starter Power-On light stays on after the key is released from the START LEFT/START RIGHT position.	The related starter relay is defective. The related starter solenoid is defective.	Replace the related starter relay. Refer to the engine manufacturer.
Difficult cold starting.	Related glow relay defective. Glow plugs worn. Glow fuse defective.	Replace the related glow relay. Replace the glow plugs. Refer to the engine manufacturer. Replace the fuse.

Maintenance Practices

1. General

This Section gives you only Maintenance Practices for the airplane part of the starter system. No repairs are permitted on the TAE 125 Diesel engine. Only a TAE authorized repair shop or the manufacturer can repair the engine part of the system.

2. Remove/Install an Engine Master Switch

A. Remove an Engine Master Switch

Use this procedure for both left and right engine switches.

	Detail Steps/Work Items	Key Items/References
	WARNING: MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO ANY WORK ON THE STARTER SYSTEM. IF THE ENGINE STARTS THE PROPELLER CAN CAUSE INJURY OR DEATH.	
(1)	Disconnect the airplane main battery, the ECU backup battery and the alternator excitation batteries.	Refer to Section 24-30 and 24-31.
(2)	Remove the instrument panel cover.	Refer to Section 25-10.
(3)	Remove the lower placard panel from the instrument panel.	Refer to Section 11-30.
(4)	Remove the related MASTER SWITCH: – Remove the nut and washer from the front of the instrument panel. – Move the switch forward and clear of the instrument panel. – Hold the switch and disconnect the electrical cables. – Move the switch clear of the instrument panel.	Refer to Figure 2. Note the position of the cables.

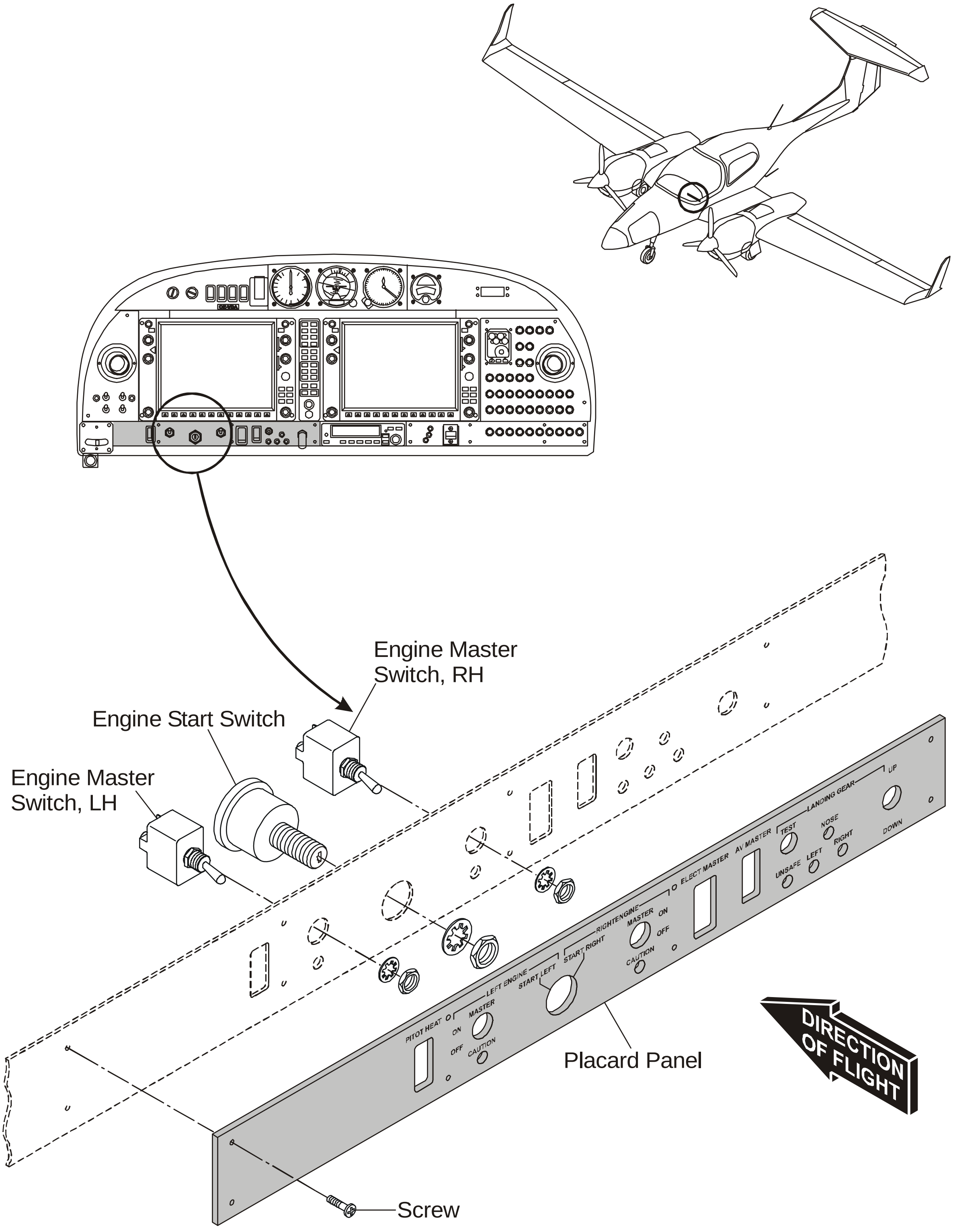

Figure 2: Engine Master Switch and Start Switch Installation

B. Install an Engine Master Switch

	Detail Steps/Work Items	Key Items/References
(1)	Install the switch: – Move the switch into position by the instrument panel and hold the switch. – Connect the electrical cables to the terminals on the switch. – Move the switch fully into position in the instrument panel. – Install the washer and nut onto the front of the switch.	Refer to Chapter 92 for the wiring diagrams. Make sure that the switch is correctly orientated.
(2)	Install the lower placard panel onto the instrument panel.	Refer to Section 11-30.
(3)	Install the instrument panel cover and connect the alternator excitation batteries and the ECU backup battery.	Refer to Section 24-30 and 25-10.
(4)	Connect the airplane main battery.	Refer to Section 24-31.
(5)	Do an engine ground run-up and do a test for the correct operation of the related engine MASTER SWITCH and the lower placard panel.	Refer to Section 71-00.

3. Remove/Install the Engine Start Switch

A. Remove the Engine Start Switch

	Detail Steps/Work Items	Key Items/References
WARNING:	**MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO ANY WORK ON THE STARTER SYSTEM. IF THE ENGINE STARTS THE PROPELLER CAN CAUSE INJURY OR DEATH.**	
(1)	Disconnect the airplane main battery.	Refer to Section 24-31.
(2)	Remove the instrument panel cover.	Refer to Section 25-10.
(3)	Remove the lower placard pane from the instrument panel.	Refer to Section 11-30.
(4)	Remove the START SWITCH: – Remove the nut and washer from the front of the instrument panel. – Move the switch forward and clear of the instrument panel. – Hold the switch and disconnect the electrical cables. – Move the switch clear of the instrument panel.	Refer to Figure 2. Note the position of the cables.

B. Install the Engine Start Switch

	Detail Steps/Work Items	Key Items/References
(1)	Install the switch: – Move the switch into position by the instrument panel and hold the switch. – Connect the electrical cables to the terminals on the switch. – Move the switch fully into position in the instrument panel. – Install the washer and nut onto the front of the switch.	 Refer to Chapter 92 for the wiring diagrams. Make sure that the switch is correctly orientated.
(2)	Install the lower placard panel onto the instrument panel.	Refer to Section 11-30.
(3)	Install the instrument panel cover.	Refer to Section 25-10.
(4)	Connect the airplane main battery.	Refer to Section 24-31.
(5)	Do an engine ground run-up and do a test for the correct operation of the related engine START switch and the lower placard panel.	Refer to Section 71-00.

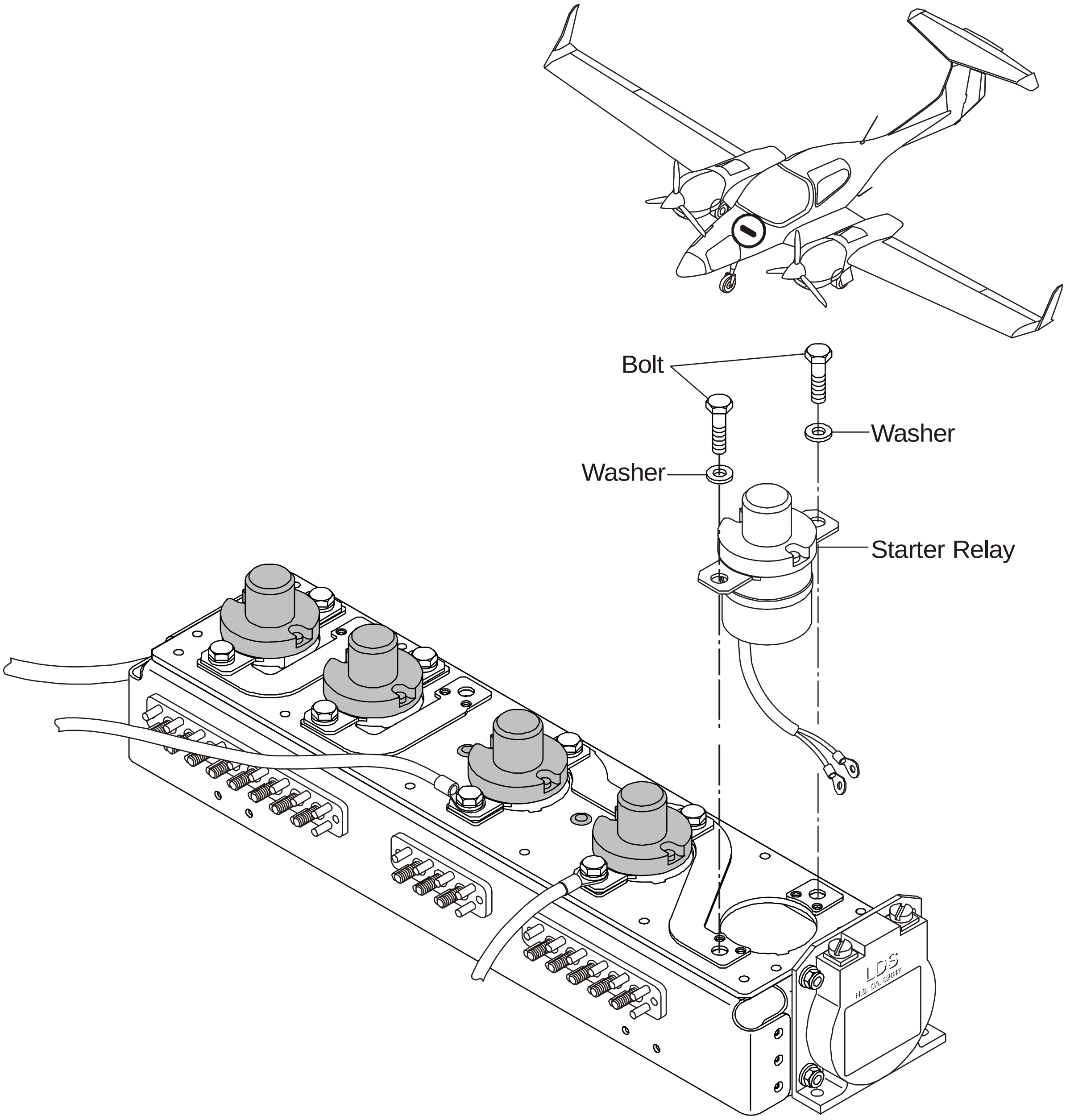

Figure 3: Engine Starter Relay Installation

4. Remove/Install an Engine Start Relay

A. Remove an Engine Start Relay

	Detail Steps/Work Items	Key Items/References
	WARNING: MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO ANY WORK ON THE STARTER SYSTEM. IF THE ENGINE STARTS THE PROPELLER CAN CAUSE INJURY OR DEATH.	
(1)	Disconnect the airplane main battery.	Refer to Section 24-31.
(2)	Open the front baggage compartment door, left side for access to the relay panel.	Refer to Figure 3.
(3)	Disconnect the control cables from the starter relay.	At the terminal block.
(4)	Remove the starter relay: – Remove the 2 bolts and washers that attach the relay to the relay panel. – Move the relay up and clear of the relay panel and the airplane.	

B. Install an Engine Start Relay

	Detail Steps/Work Items	Key Items/References
(1)	Install the starter relay: – Move the new relay into position in the relay panel. – Install the 2 washers and bolts that attach the relay to the relay panel.	
(2)	Connect the control cables to the relay.	At the terminal block.
(3)	Connect the airplane main battery.	Refer to Section 24-31.
(4)	Close and secure the front baggage compartment door.	
(5)	Start the related engine and do a test for the correct operation of the engine starting system.	Refer to Section 71-00.

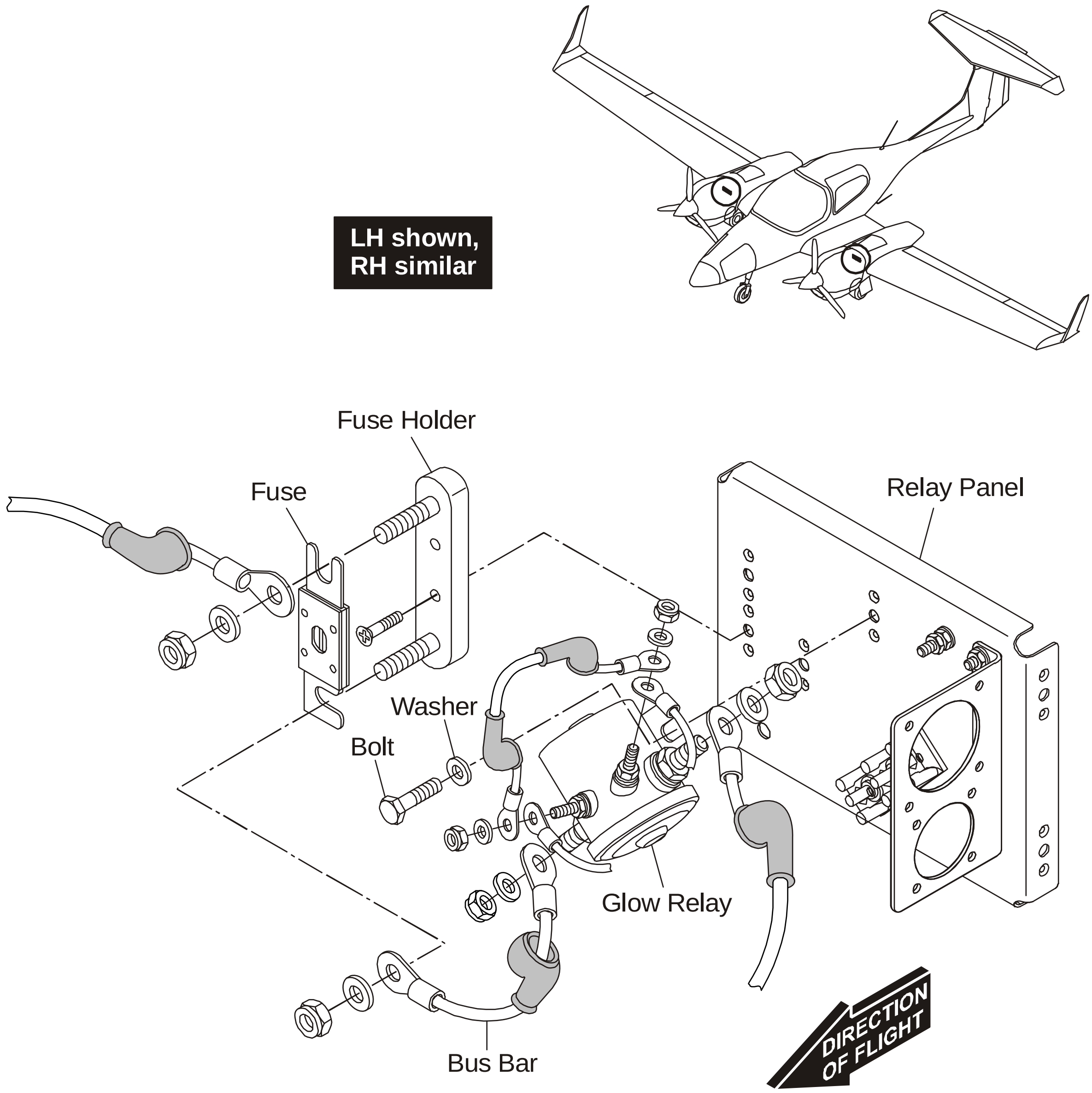

Figure 4: Engine Glow Relay Installation

5. Remove/Install an Engine Glow Relay

A. Remove an Engine Glow Relay

	Detail Steps/Work Items	Key Items/References
	WARNING: MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO ANY WORK ON THE STARTER SYSTEM. IF THE ENGINE STARTS THE PROPELLER CAN CAUSE INJURY OR DEATH.	
(1)	Disconnect the airplane main battery.	Refer to Section 24-31.
(2)	Remove the relay panel access panel from the related engine nacelle.	Refer to Section 52-40.
(3)	Remove the glow relay: – Disconnect the control cables from the relay. – Disconnect the cable from the relay to the fuse. – Disconnect the cable from the relay to the engine harness. – Remove the 2 bolts and washers that attach the relay to the relay panel. – Move the relay clear of the relay panel.	

B. Install an Engine Glow Relay

	Detail Steps/Work Items	Key Items/References
(1)	Install the relay: – Move the new relay into position on the relay panel. – Install the 2 washers and bolts that attach the relay to the relay panel. – Connect the cable from the fuse to the relay. – Connect the cable from the engine harness to the relay. – Connect the control cables to the relay.	Refer to Chapter 92 for the wiring diagrams.
(2)	Install the relay panel access panel.	Refer to Section 52-40.
(3)	Connect the airplane main battery.	Refer to Section 24-31.
(4)	Do an engine ground run-up and make sure that the glow plugs operate correctly.	Refer to Section 71-00.

6. Replace the Glow Fuse

	Detail Steps/Work Items	Key Items/References
	WARNING: MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO ANY WORK ON THE STARTER SYSTEM. IF THE ENGINE STARTS THE PROPELLER CAN CAUSE INJURY OR DEATH.	
(1)	Disconnect the airplane main battery.	Refer to Section 24-31.
(2)	Remove the relay panel access panel from the related engine nacelle.	Refer to Section 52-40.
(3)	Remove the fuse: – Loosen the nut that attaches the electrical cable and fuse to the fuse holder. – Loosen the nut that attaches the bus bar link and fuse to the fuse holder. – Lift the left side of the fuse and pull the fuse clear of the fuse holder.	Refer to Figure 4. Left side. Do not remove the nut. Right side. Do not remove the nut.
(4)	Install a new fuse: – Move the new fuse into position at the fuse holder. – Push the right side of the fuse (the slotted end) into position over the fuse holder stud and under the bus bar link. – Lower the left end of the fuse (the hooked end) over the fuse holder stud and under the cable connector. – Tighten the 2 nuts.	
(5)	Install the relay panel access panel onto the related engine nacelle.	Refer to Section 52-40.
(6)	Connect the airplane main battery.	Refer to Section 24-31.
(7)	Do an engine ground run-up and make sure that the glow plugs operate correctly.	Refer to Section 71-00.

CHAPTER 81

TURBO CHARGER

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CHAPTER 81
TURBO CHARGER

1. General

This Chapter tells you about the turbo-charging system of the TAE 125 Diesel engine.

2. Description

Each engine air intake system has an air filter located on the right side of each engine nacelle. The filter attaches to the front face of the alternate air valve. The alternate air valve also has an inlet which takes air from the engine nacelle. A flap in the alternate air valve can be set to take air into the air inlet system through the filter or it can be set to take unfiltered air directly from the engine nacelle. Refer to Section 71-60 for more data about the air filter and the alternate air valve.

The outlet from the alternate air valve connects to the turbo charger inlet. The turbo charger compresses the air. This makes the air hot. The outlet from the turbo charger connects to the intercooler.

The intercooler is located at the rear of the engine nacelle, at the top. It attaches to the engine mounting frame. The outlet from the intercooler connects to the engine inlet manifold. A manifold pressure sensor and manifold air temperature sensor are attached to the engine inlet manifold.

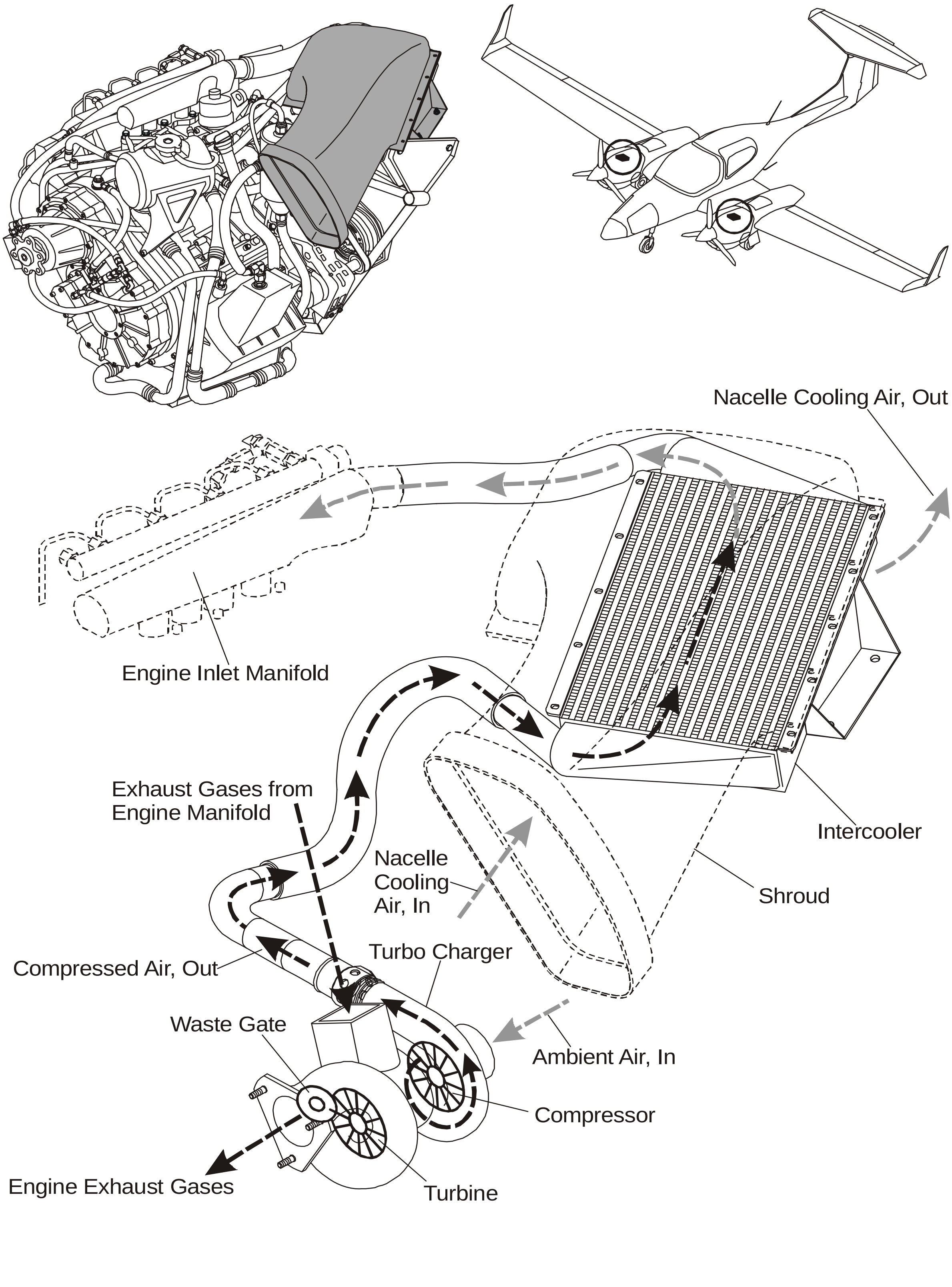

Figure 1: Engine Turbo Charger Schematic Diagram for the TAE 125-01 Engine

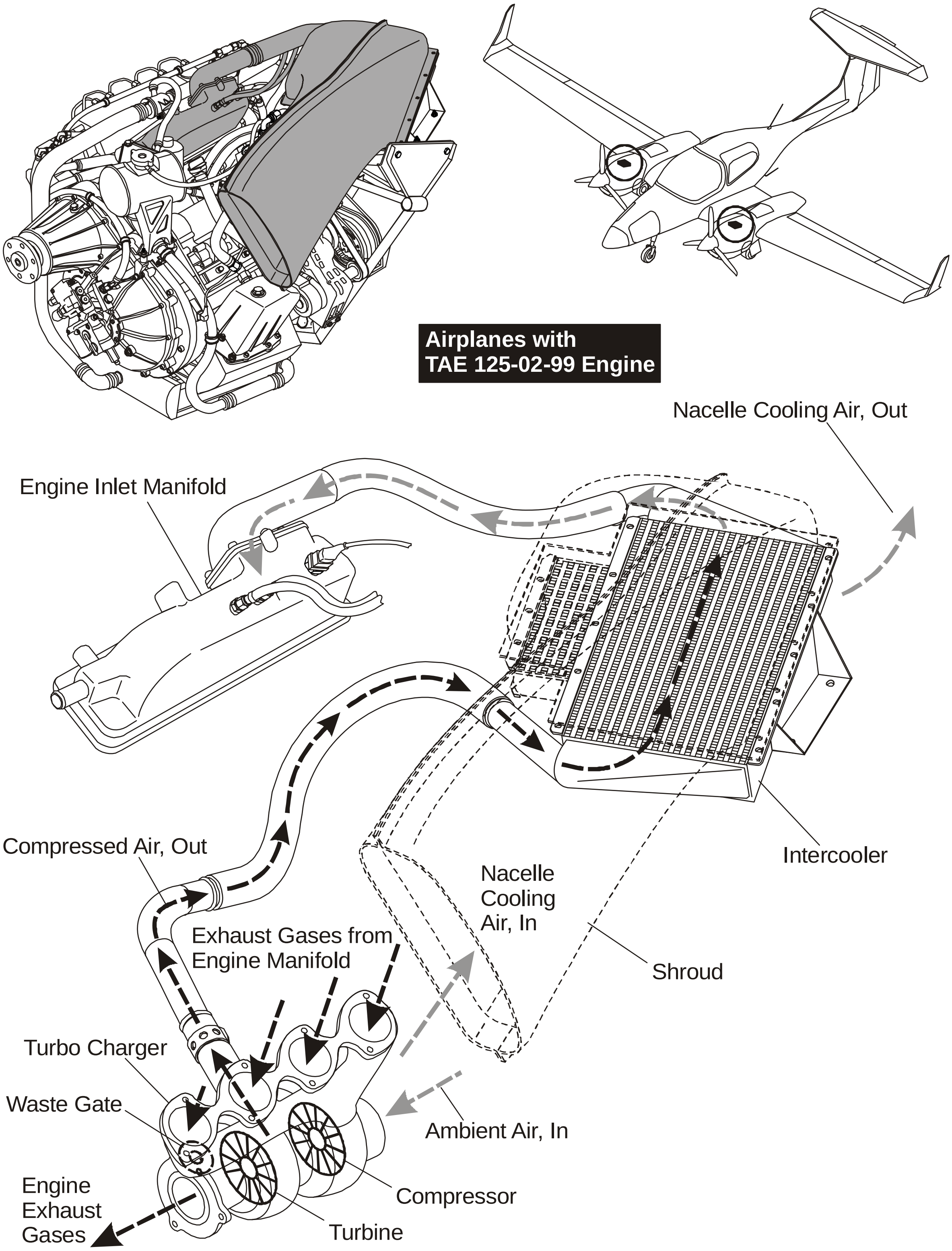

Figure 2: Engine Turbo Charger Schematic Diagram for the TAE 125-02-99 Engine (MÄM 42-198 carried out)

3. Operation

Figure 1 shows the turbo charger system schematic diagram.

When the engine is running the exhaust gases from the engine flow through a manifold to the turbo charger turbine. A waste gate in the turbo charger turbine inlet can open to allow some of the exhaust gases from the engine to bypass the turbine and flow directly in to the engine exhaust pipe. The waste gate opening is controlled by the engine FADEC system.

Ambient air flows through the air filter (normal operation) or from the engine nacelle (alternate air operation) into the turbo charger compressor. The air gains heat while being compressed in the turbo charger. The hot compressed air flows through a flexible hose to the intercooler.

The hot compressed air flows through the matrix of the intercooler. Cooling air is guided from the left side of the nacelle to the intercooler and flows around the intercooler matrix. The hot compressed air is cooled. The cooled compressed air from the intercooler matrix flows through a flexible hose to the engine air inlet manifold.

The cooling air from around the intercooler matrix flows to the cooling air outlet at the rear of the engine nacelle.

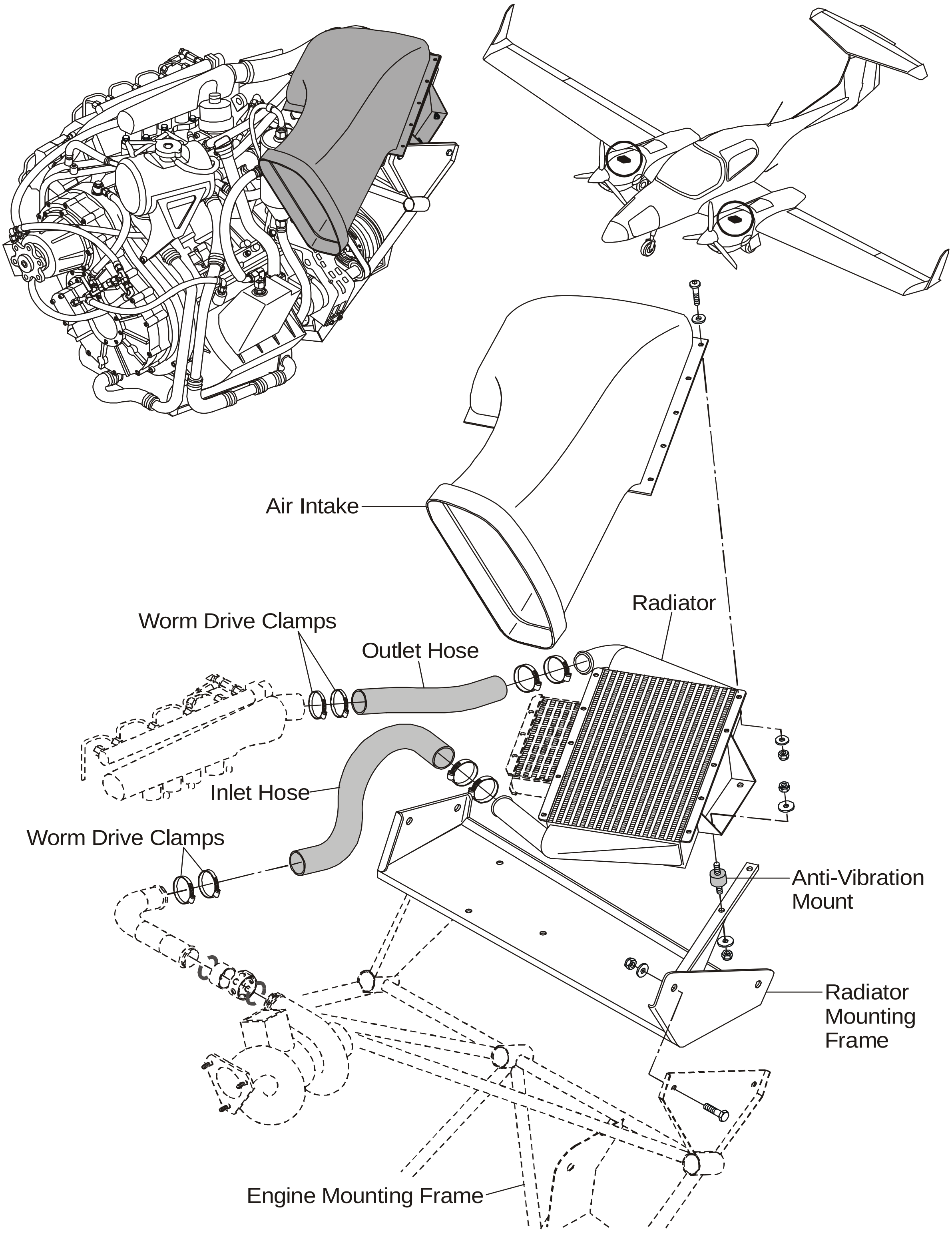

Figure 3: Intercooler Installation for the TAE 125-01 Engine

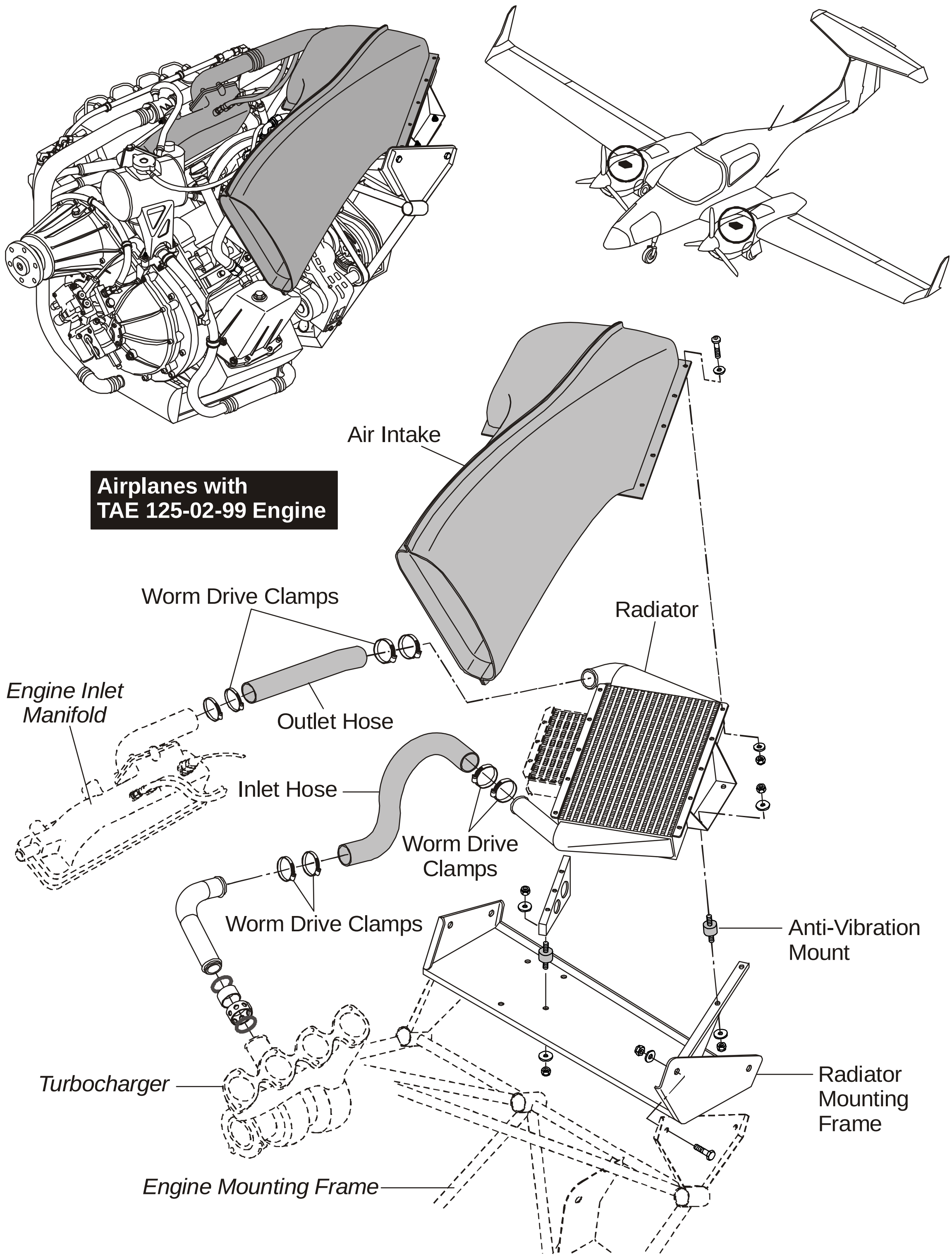

Figure 4: Intercooler Installation for the TAE 125-02-99 Engine (MÄM 42-198 carried out)

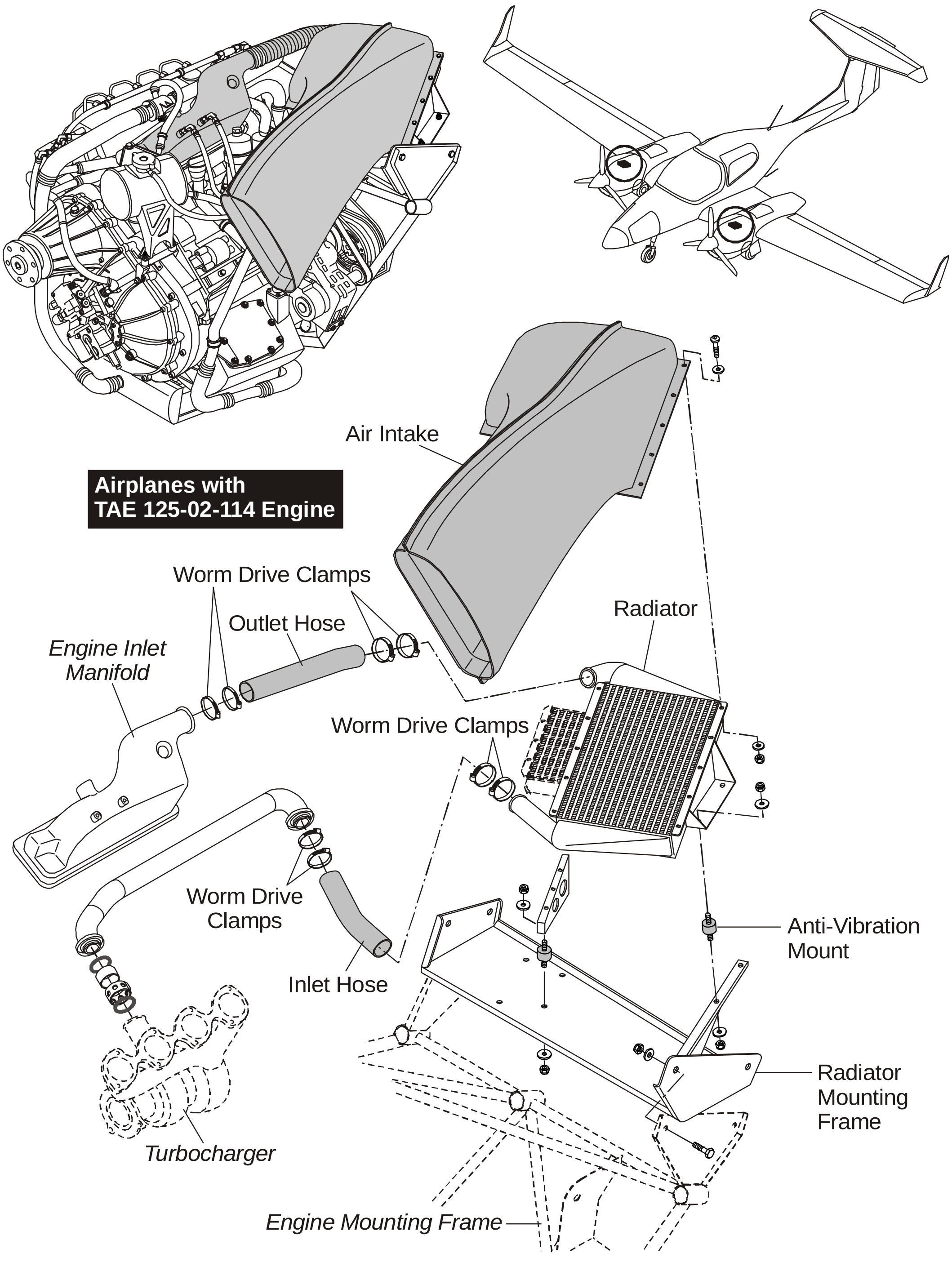

Figure 5: Intercooler Installation for the TAE 125-02-114 Engine (OÄM 42-252 carried out)

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Trouble-Shooting

1. General

The table below lists the defects you could have with the turbo charging system. If you have the trouble detailed in the Trouble column read across to the Possible Cause column. Then do the repair given in the Repair column.

Trouble	Possible Cause	Repair
An engine inlet manifold pressure is too low/ too high.	Gate valve defective.	Refer to the engine manufacturer.
Inlet air temperature too high.	Intercooler matrix blocked/damaged.	Clear intercooler matrix of obstructions. Replace intercooler if necessary.

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Maintenance Practices

1. General

This Section tells you how to remove/install the intercooler.

CAUTION: YOU CANNOT DO MAINTENANCE ON THE INTERCOOLER.

CAUTION: DO NOT TRY TO ADJUST THE WASTE GATE CONTROL PUSH ROD. ANY ADJUSTMENT WILL AFFECT THE CHARACTERISTICS OF THE ELECTRONIC CONTROL SYSTEM.

Refer to Section 71-60 for maintenance data on the air filter and the alternate air valve.

2. Remove/Install an Engine Intercooler

A. Remove an Engine Intercooler

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**	
(1)	Make sure that the related engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Disconnect the airplane main battery.	Refer to Section 24-34.
(3)	Remove the engine cowlings.	Refer to Section 71-10.
(4)	Remove the intercooler / oil cooler shroud: – Remove the bolts and washers that attach the shroud to the cooler package. – Move the shroud clear of the engine nacelle.	

	Detail Steps/Work Items	Key Items/References
(5)	Disconnect the flexible hoses that connect the intercooler to the turbo charger and engine air inlet manifold: – Remove the worm-drive-clamps. – Pull the hoses off the intercooler connectors.	Refer to Figure 3. At the intercooler.
(6)	Disconnect the oil hoses at the oil cooler.	Refer to Section 79-00.
(7)	Remove the intercooler: – Remove the nuts, washers and bolts that attach the intercooler to the engine mount. – Move the intercooler clear of the engine nacelle.	 Take care not to damage the intercooler matrix!

B. Install an Engine Intercooler

	Detail Steps/Work Items	Key Items/References
(1)	Connect the oil cooler to the intercooler.	
(2)	Install the oil cooler / intercooler package.	Refer to Section 79-00.
(3)	Connect the flexible hoses that connect the intercooler to the turbo charger and engine air inlet manifold: – Move the worm-drive-clamps into position on the flexible hoses. – Push the flexible hoses onto the intercooler connectors. – Move the worm-drive-clamps into the correct position and tighten the worm-drive-clamps.	Do not tighten the worm-drive-clamps!
(4)	Connect the oil hoses to the oil cooler.	Refer to Section 79-00.
(5)	Install the oil cooler / intercooler shroud: – Move the shroud into position. – Install bolts and washers to attach the shroud on the cooler package.	
(6)	Install the engine cowlings.	Refer to Section 71-10.
(7)	Do an engine ground run-up and do a test for the correct operation of the engine intercooler.	Refer to Section 71-00.

3. Remove/Install a Turbo Charger Clamp (if MÄM 42-879 is installed)

A. Remove a Turbo Charger Clamp

	Detail Steps/Work Items	Key Items/References
	WARNING: DO NOT STAND WITHIN THE DANGER AREA OF THE PROPELLER. IF THE ENGINE STARTS, THE PROPELLER CAN CAUSE DEATH OR INJURY TO PERSONS. **WARNING: YOU MUST MAKE SURE THAT THE ENGINE IS SAFE BEFORE YOU DO WORK ON THE ENGINE CONTROLS. IF THE PROPELLER TURNS IT CAN CAUSE INJURY TO PERSONS.**	
(1)	Make sure that the related engine is safe: – Set the ELECT. MASTER switch to OFF. – Set the ENGINE MASTER switch to OFF. – Set the power lever to 0%.	
(2)	Disconnect the airplane main battery.	Refer to Section 24-34.
(3)	Remove the engine cowlings.	Refer to Section 71-10.
(4)	Remove the 2 safety wires from the 4 hexagon socket head screws on the turbo charger clamp.	Refer to Figure 6.
(5)	Remove the 4 hexagon socket head screws on the turbo charger clamp.	Hold the two half shells.
(6)	Remove the two half shells of the turbo charger clamp.	
(7)	Remove the 2 O-rings and the Wiggins fluid coupling from the turbo pipe and move them off the airplane.	Refer to Figure 6.

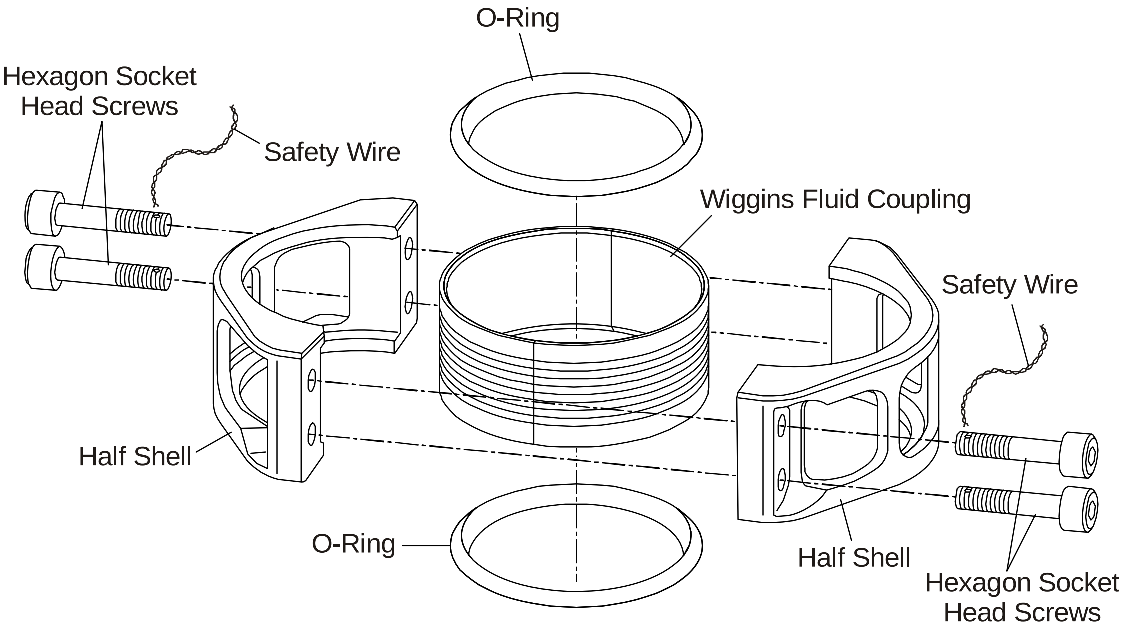

Figure 6: Turbo Charger Clamp (if MÄM 42-879 is installed)

B. Install a Turbo Charger Clamp

	Detail Steps/Work Items	Key Items/References
	Note: Use lubricant Type 2 for installation of the O-rings and the couplings. Check correct fit.	
(1)	Attach one O-ring to the notch at the flange of the turbo charger.	
(2)	Attach the second O-ring to the notch at the turbo pipe.	
(3)	Connect the turbo pipe to the turbo charger and secure with the Wiggins fluid coupling and the two half shells of the turbo charger clamp using 4 hexagon socket head screws.	Refer to Figure 6.
(4)	Tighten the hexagon socket head screws.	Torque: Refer to Section 20-10.
	Note: Tension at the turbo charger clamp or misalignment of turbo pipe and turbo charger can lead to deformation and damage.	
(5)	Check if the clamp can be moved easily.	
(6)	Secure the hexagon socket head screws with safety wire.	Refer to Figure 6.
(7)	Install the engine cowlings.	Refer to Section 71-10.
(8)	Do an engine ground run-up and do a test for the correct operation of the engine intercooler.	Refer to Section 71-00.

CHAPTER 92

WIRING DIAGRAMS

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WIRING DIAGRAMS

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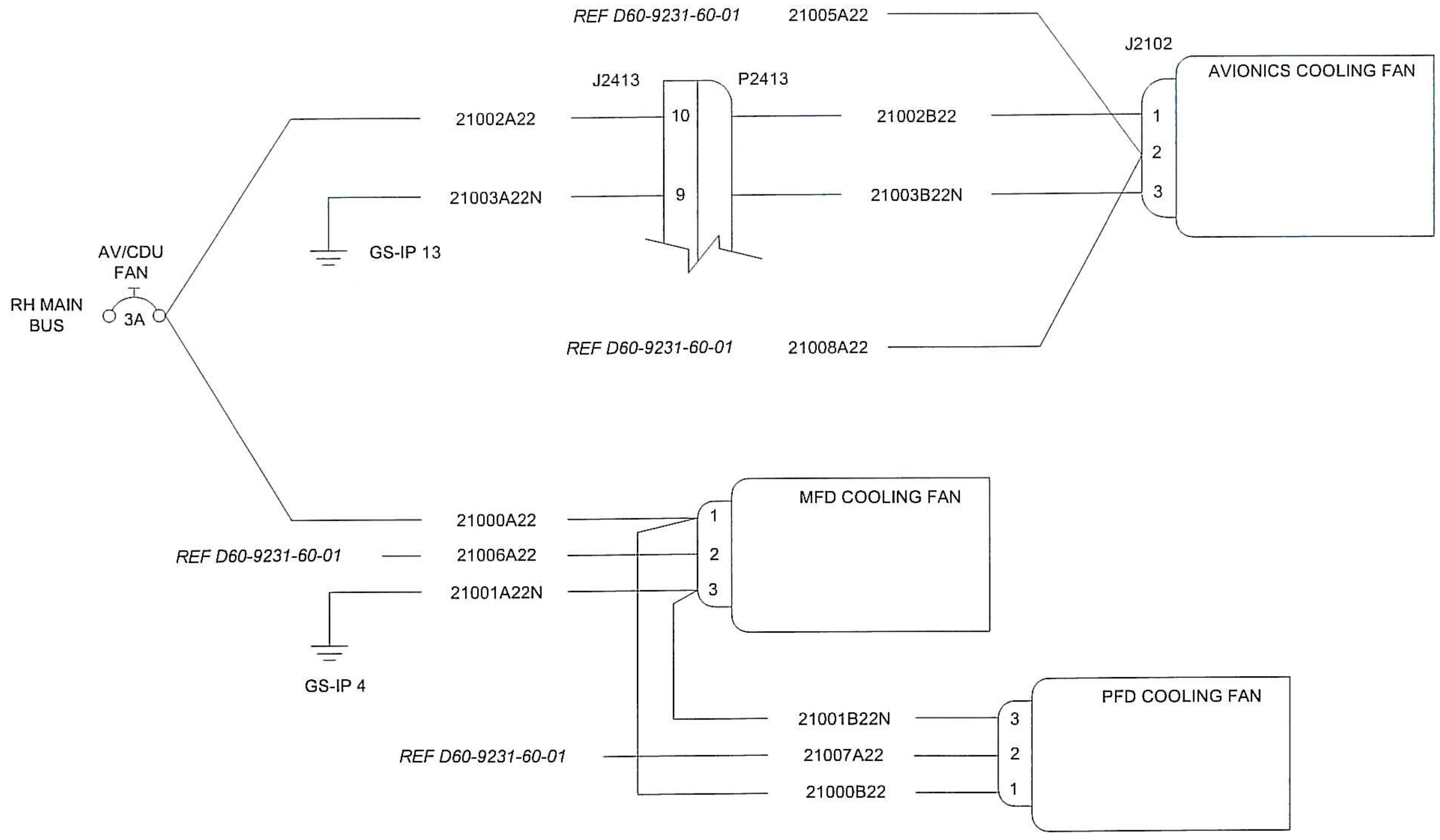
CHAPTER 92
WIRING DIAGRAMS

1. General

This Chapter contains the wiring diagrams for each system. The wiring diagrams use the ATA Chapter/Section numbering system.

Title	Drawing No.	Rev. No.	No. of Sheets
Twin Equipment Cooling	D60-9221-20-01	-	1
KAP 140, Autopilot, G1000 Interface	D60-9222-10-01	E	1
GFC 700 Wiring	D60-9222-10-02	-	1
Electrical System	D60-9224-30-01	H	2
Electrical System, TAE 125-02	D60-9224-30-01_01	A	2
Electrical System, TAE 125-02	D60-9224-30-01_02	A	2
Electrical System	D60-9224-30-01-SB	-	2
Electrical System w/o GPC	D60-9224-30-02	B	2
Electrical System w/o GPC	D60-9224-30-02-SB	-	2
Electrical System, TAE 125-02-99 [FAA]	D60-9224-30-03	-	2
Supressor Diodes at ECU Relays	D60-9224-30-04	-	1
MPP Basic Wiring	D62-9225-00-00	B	1
Emergency Power Package	D60-9225-60-01	B	1
ELT Wiring	D60-9225-60-02	-	1
ELT ME406 Wiring	D60-9225-60-02X01	A	1
Removable Co-Pilot Stick Wiring	D60-9227-03-00	-	1
Rudder Pedals Adj. Wiring	D60-9227-20-01	A	1
Stick Limiter Wiring	D60-9227-30-01	D	1
Stick Limiter Wiring, TAE 125-02-114	D60-9227-30-01x01	-	1
Flaps Wiring	D60-9227-50-01	C	1
LH Aux Fuel Wiring	D60-9228-10-01	F	1
RH Aux Fuel Wiring	D60-9228-11-01	D	1
Stall Warning Wiring	D60-9230-00-01	-	1

Title	Drawing No.	Rev. No.	No. of Sheets
Pitot and Stall Heat Wiring	D60-9230-30-01	E	1
Wiring, De-Ice Control System	D60-9230-40-01	D	1
Wiring, Door Warning Switches	D60-9231-00-01	-	1
Wiring, De-Ice Warning System	D60-9231-00-02	A	1
FDR Wiring	D60-9231-30-01	D	1
G1000	D60-9231-60-01	N	6
G1000	D60-9231-60-01_01	-	6
G1000, Optional GDL 69	D60-9231-60-02	B	6
G1000, Optional GDL 69	D60-9231-60-02_01	-	6
G1000, GFC700	D60-9231-60-03	-	6
G1000, GFC700	D60-9231-60-03_01	-	6
Landing Gear Wiring	D60-9232-00-01	M	1
Flood Light Wiring	D60-9233-10-01	-	1
Dimming Regulator and Placard	D60-9233-10-07	C	1
Map/Reading Light Wiring	D60-9233-20-01	A	1
Map/Reading Lights, LED	D60-9233-20-01_02	-	1
Exterior Light Wiring	D60-9233-40-01	D	1
LED Position / Anti-Collision Lights	D60-9233-40-01x01	-	1
Attitude Gyro Wiring	D60-9234-10-01	C	1
Drum Altimeter	D60-9234-20-01	-	1
GWX 68 Weather Radar Wiring	D60-9234-40-01	-	1
ADF Wiring	D60-9234-50-01	B	1
Feathering System Wiring	D60-9261-20-01	A	1
LH ECU Wiring	D60-9277-40-02	B	1
RH ECU Wiring	D60-9277-40-03	B	1



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Rev.	Änderung	Datum	Name	

Nächster Zusammenbau : **D60-9200-00-00**

Diamond AIRCRAFT Industries GmbH

DA42 Twin Star

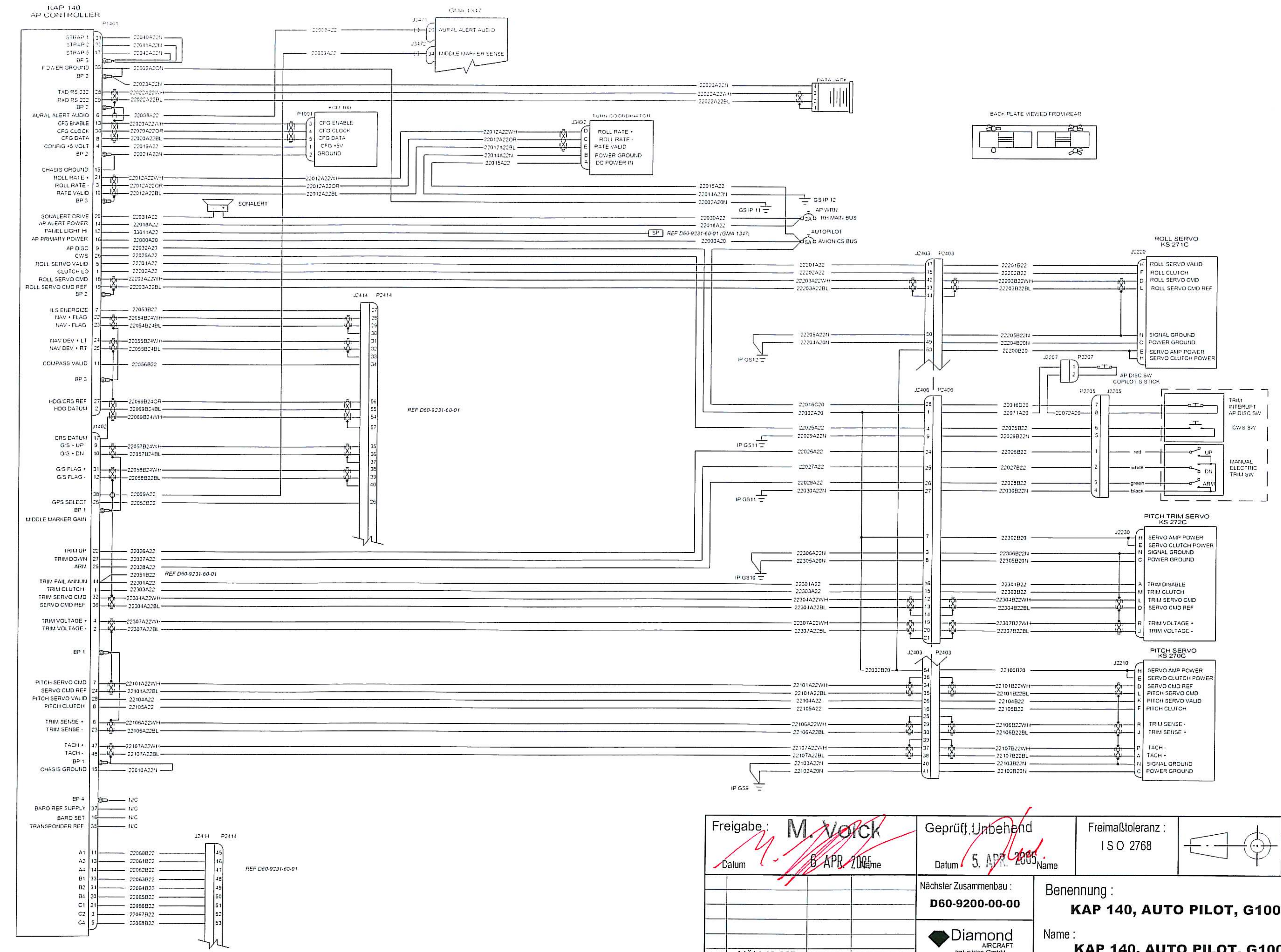
Benennung : **Schematik, Twin Ausrüstungskühlung**

Name : **Schematic, Twin Equipment Cooling**

Zeichnungs Nr.: **D60-9221-20-01**

Blatt **1** von **1**

Gespeichert unter : **D60-9221-20-01.dft**



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Datum 6. APR. 2005 Name	Datum 5. APR. 2005 Name			

Rev.	Änderung	Datum	Name
"e"	MÄM 42-067	23.03.05	Kowarsch
"d"	MÄM 42-029	22.09.04	Kowarsch
"c"	MÄM 42-021	26.08.04	Kowarsch
"b"	Erstausgabe	24.02.04	Kowarsch

Nächster Zusammenbau : D60-9200-00-00

Diamond AIRCRAFT Industries GmbH

DA42 Twin Star

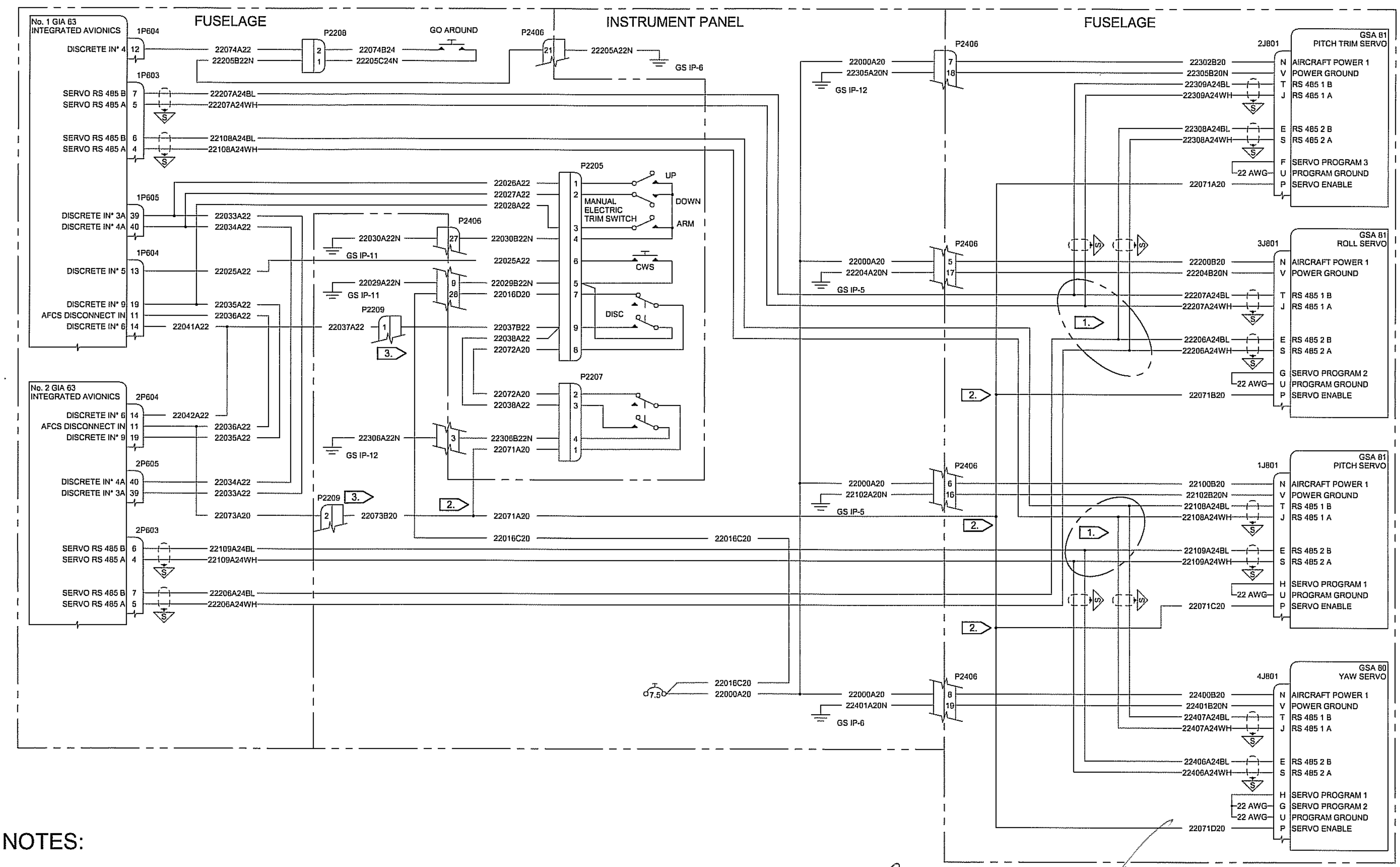
Benennung : **KAP 140, AUTO PILOT, G1000 INTERFACE**

Name : **KAP 140, AUTO PILOT, G1000 INTERFACE**

Zeichnungs Nr.: **D60-9222-10-01**

Blatt 1 von 1

Gespeichert unter : D60-9222-10-01e.dft



NOTES:

1. TERMINATED AT GIA CONNECTORS.
2. TERMINATED AT CONNECTOR J2207.
3. LOCATED IN FUSELAGE.

Weight:	N/A
Calculated Weight:	N/A

REVISIONS

Rev.	Zone	Description
"_"	-	New drawing, does not supersede another drawing.

Rev.	Change	Date	Name
"_"	OÄM 42-102	12.11.07	Kowarsch

Approved: C. Jütte — Date 19 FEB. 2008 — Name

Checked: M. Kowarsch — Date 14 FEB. 2008 — Name

General Tolerance: ISO 2768 medium

Scale: NTS

Next Higher Assembly: N/A

Diamond AIRCRAFT Industries GmbH

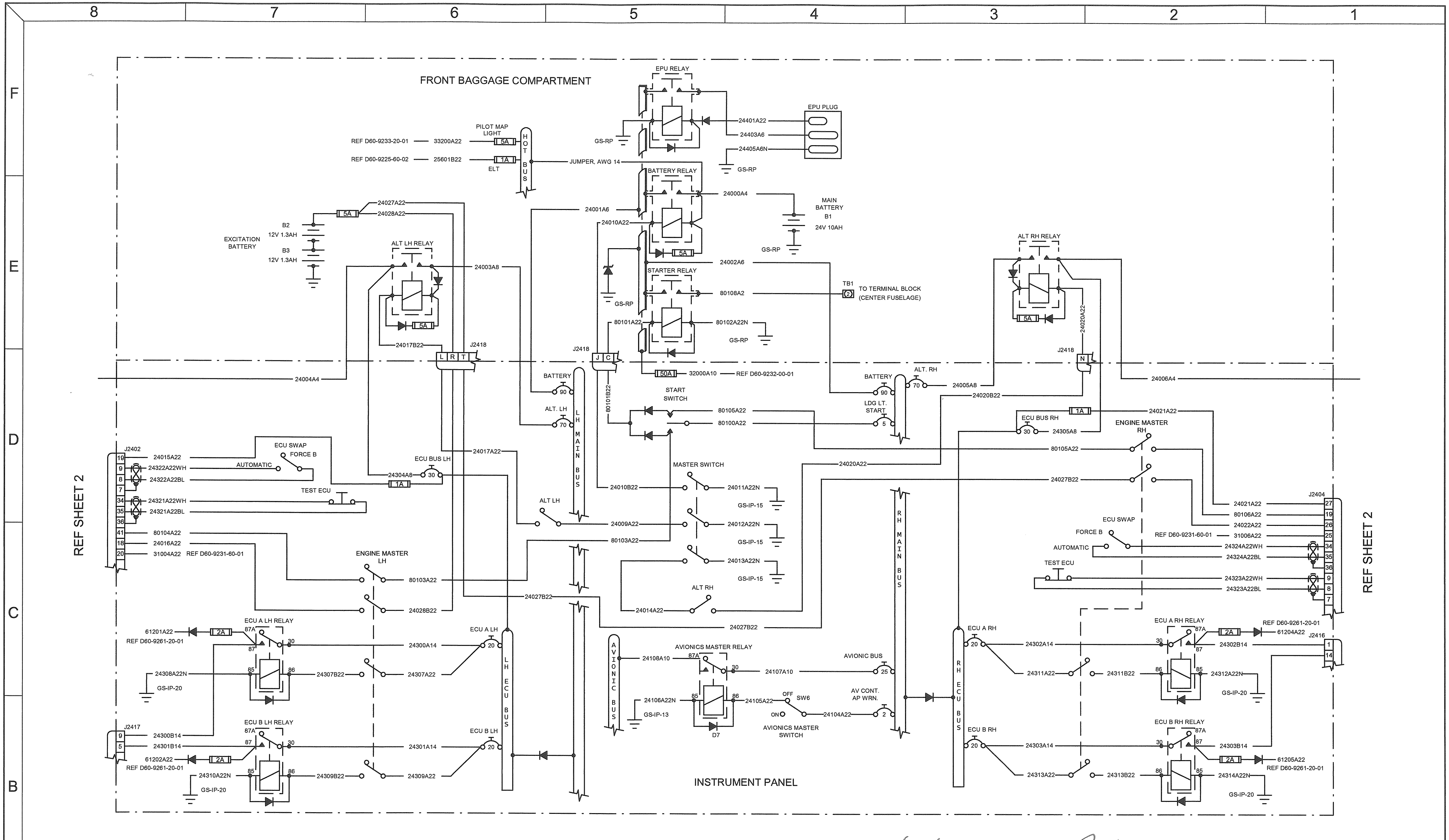
Title: **Schematic, GFC700 Wiring**

DA 42 Twin Star

Drawing Number: **D60-9222-10-02**

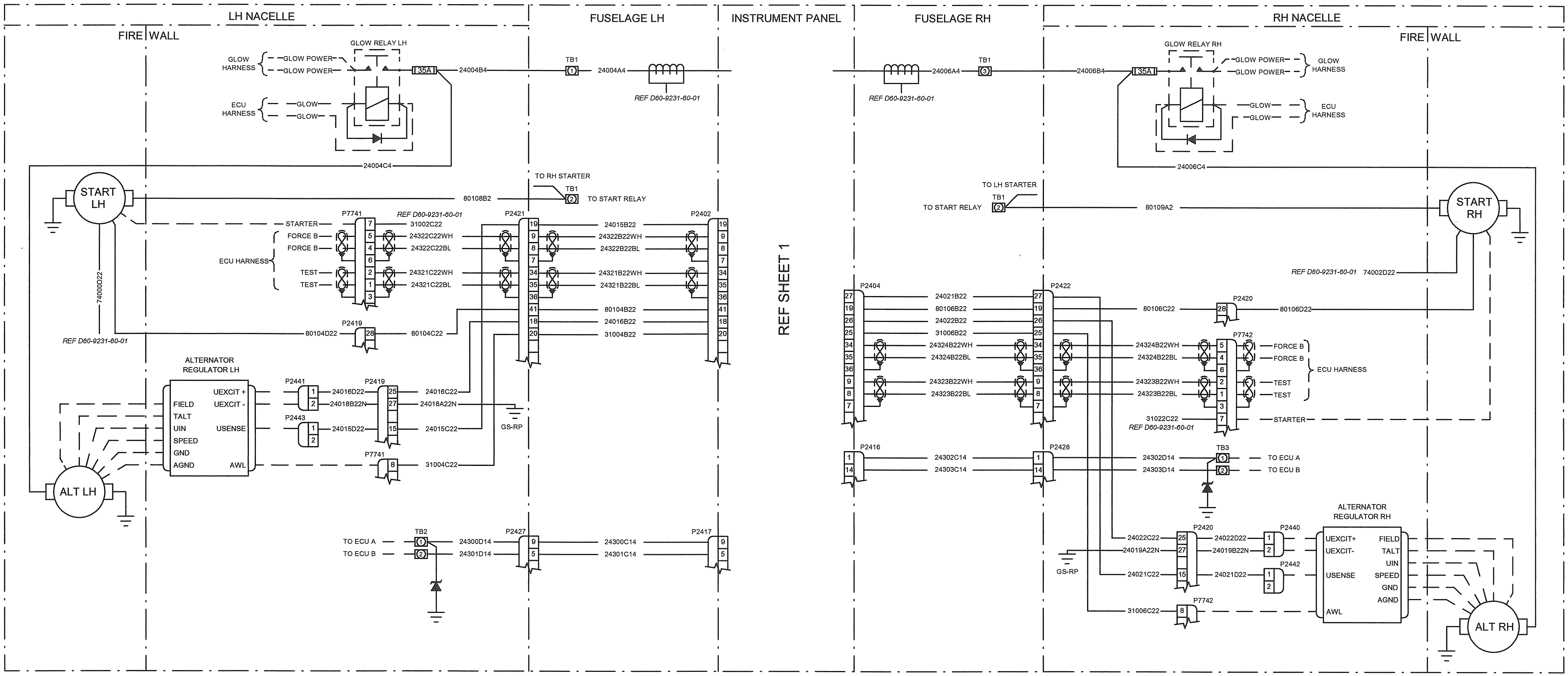
Sheet 1 from 1

Saved under: D60-9222-10-02.dft



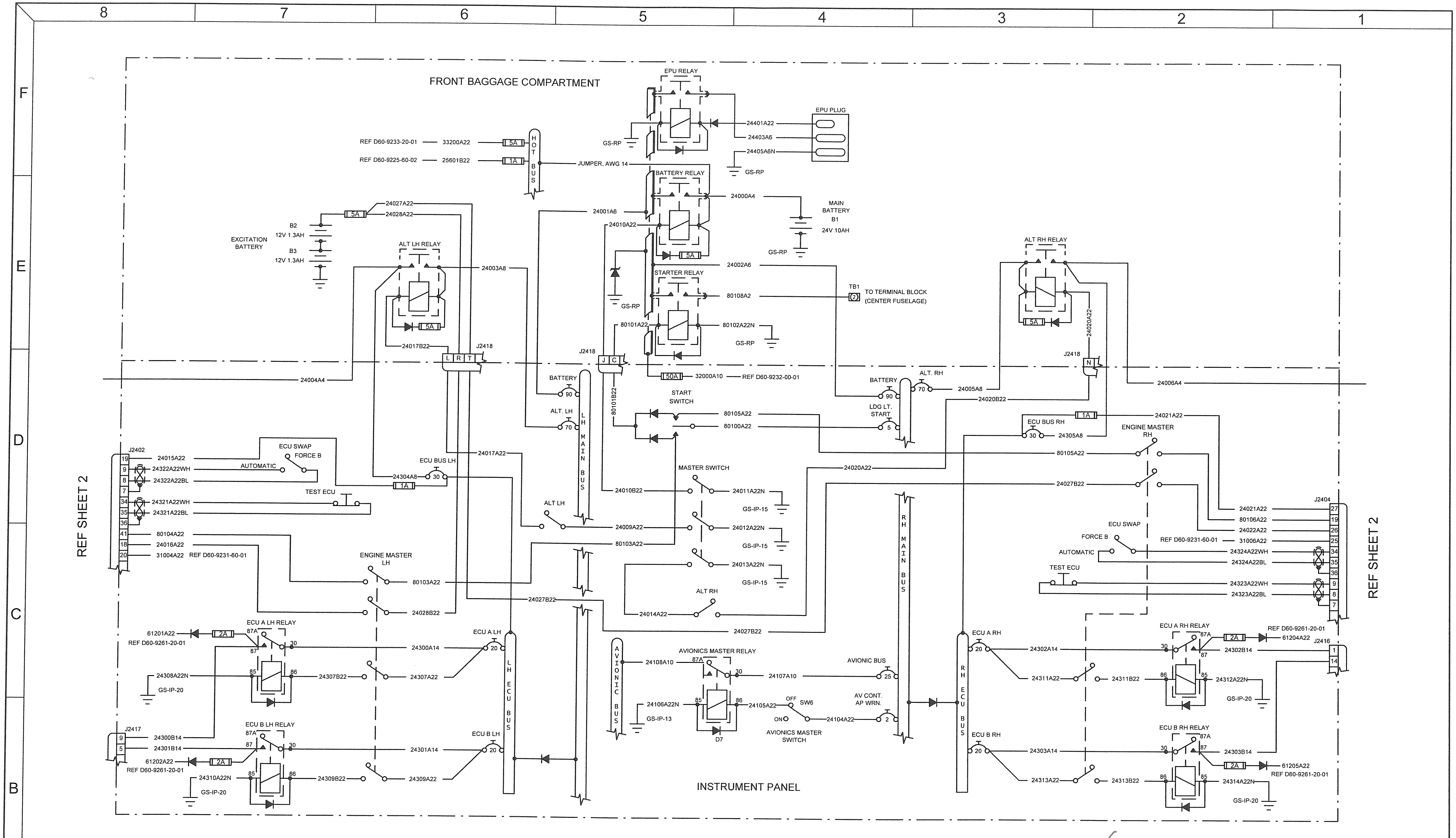
Replaced by new design.
To be used only for spare parts.

Approved:		Date 19 MRZ 2007	Name	Checked B. Jäger	Date 16 MRZ 2007 Name	General Tolerance: ISO 2768	Scale: NTS
"h"	MÄM 42-232	26.02.07	Schuster	Next Higher Assembly: D60-9200-00-00	Title: Schematic, Electrical System		
"g"	MÄM 42-127	10.10.05	Mandl	Diamond AIRCRAFT Industries GmbH			
"f"	MÄM 42-093	06.06.05	Kowarsch				
"e"	MÄM 42-075	13.04.05	Kowarsch				
"d"	MÄM 42-030	27.10.04	Kowarsch	DA 42 Twin Star	Drawing Number: D60-9224-30-01	Sheet 1 from 2	
"c"	MÄM 42-028	16.08.04	M. Scheikl				
"b"	First Edition	18.02.04	Kowarsch				
Rev.	Change	Date	Name	Saved under:	D60-9224-30-01h.dft		



Approved : C. [signature]			Checked B. Jäger	General Tolerance : ISO 2768	Scale: NTS
Date 19 MRZ 2007		Name	Date 16 MRZ 2007 Name		
"h"	MÄM 42-232	26.02.07	Schuster	Next Higher Assembly : D60-9200-00-00	Title : Schematic, Electrical System
"g"	MÄM 42-127	10.10.05	Mandl		
"f"	MÄM 42-093	06.06.05	Kowarsch	Diamond AIRCRAFT Industries GmbH	
"e"	MÄM 42-075	13.04.05	Kowarsch		
"d"	MÄM 42-030	27.10.04	Kowarsch	DA 42 Twin Star	Drawing Number: D60-9224-30-01 Sheet 2 from 2
"c"	MÄM 42-028	16.08.04	M. Scheikl		
"b"	First Edition	18.02.04	Kowarsch		
Rev.	Change	Date	Name	Saved under :	D60-9224-30-01h.dft

Replaced by new design.
To be used only for spare parts.



Approved : B. Jäger		Checked : M. Kowarsch		General Tolerance : ISO 2768		Scale: NTS
Date 11. APR. 2007	Name	Date 11. APR. 2007	Name			

Next Higher Assembly : D60-9200-00-00

Diamond AIRCRAFT Industries GmbH

Title : **Schematic, Electrical System, TAE 125-02**

Rev.	Change	Date	Name
"a"	MÄM 42-198a	09.04.06	Kowarsch
"-"	MÄM 42-198	29.11.06	Kowarsch

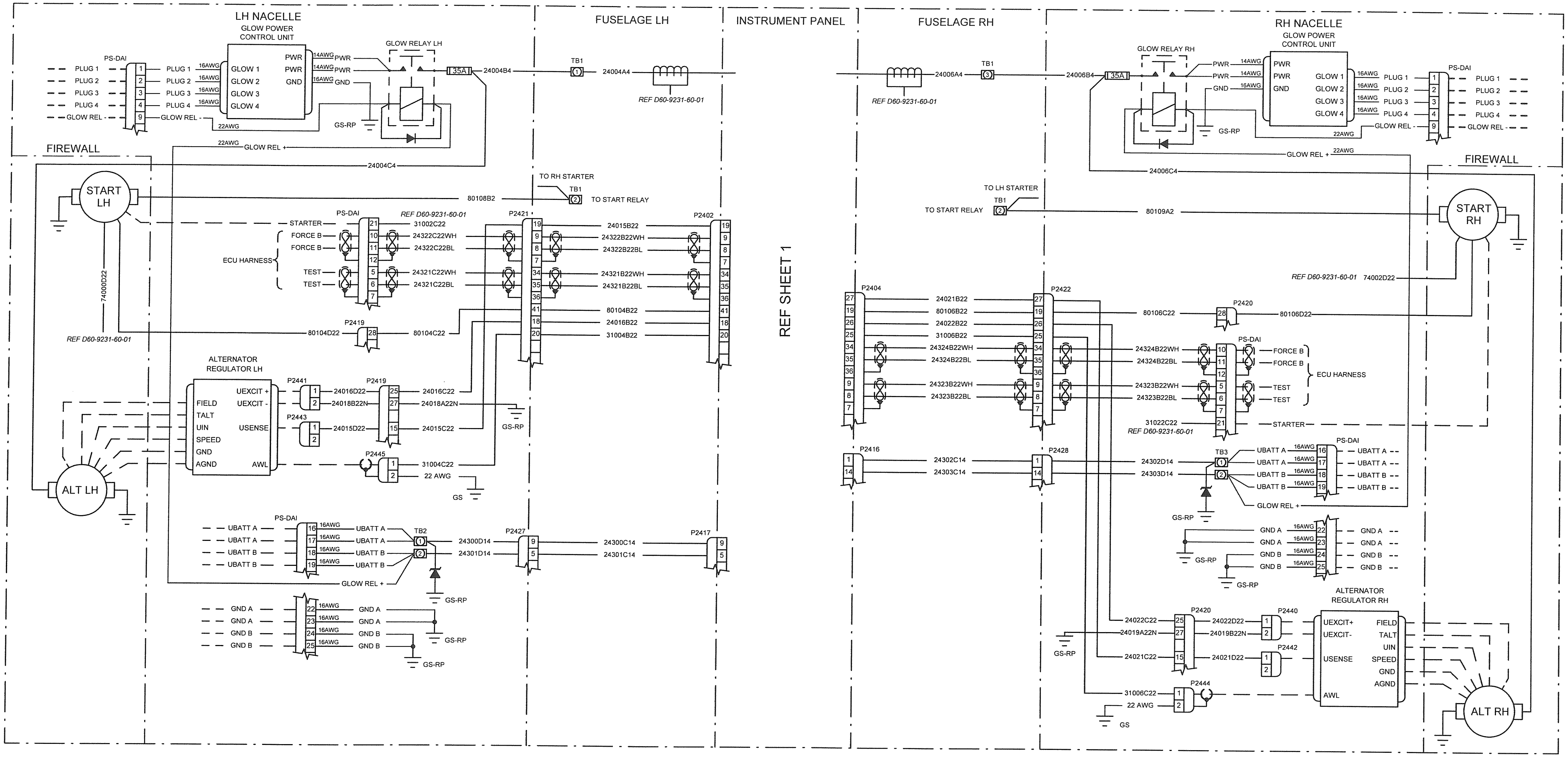
DA 42 Twin Star

Drawing Number: **D60-9224-30-01_01**

Sheet 1 from 2

Saved under : D60-9224-30-01_01a.dft

Weight: N/A
Calculated Weight: N/A



NOTES:

1. DASHED LINES INDACTE A THIELERT HARNESS.

Approved : B. Jager	Checked : M. Kowarsch	General Tolerance : ISO 2768	Scale: NTS
Date 11. APR. 2007 Name	Date 11. APR. 2007 Name		

Next Higher Assembly : D60-9200-00-00

Diamond AIRCRAFT Industries GmbH

Title : **Schematic, Electrical System, TAE 125-02**

DA 42 Twin Star

Drawing Number: **D60-9224-30-01_01**

Sheet 2 from 2

Saved under : D60-9224-30-01_01a.dft

Rev.	Change	Date	Name
"a"	MÄM 42-198a	09.04.06	Kowarsch
"-"	MÄM 42-198	29.11.06	Kowarsch

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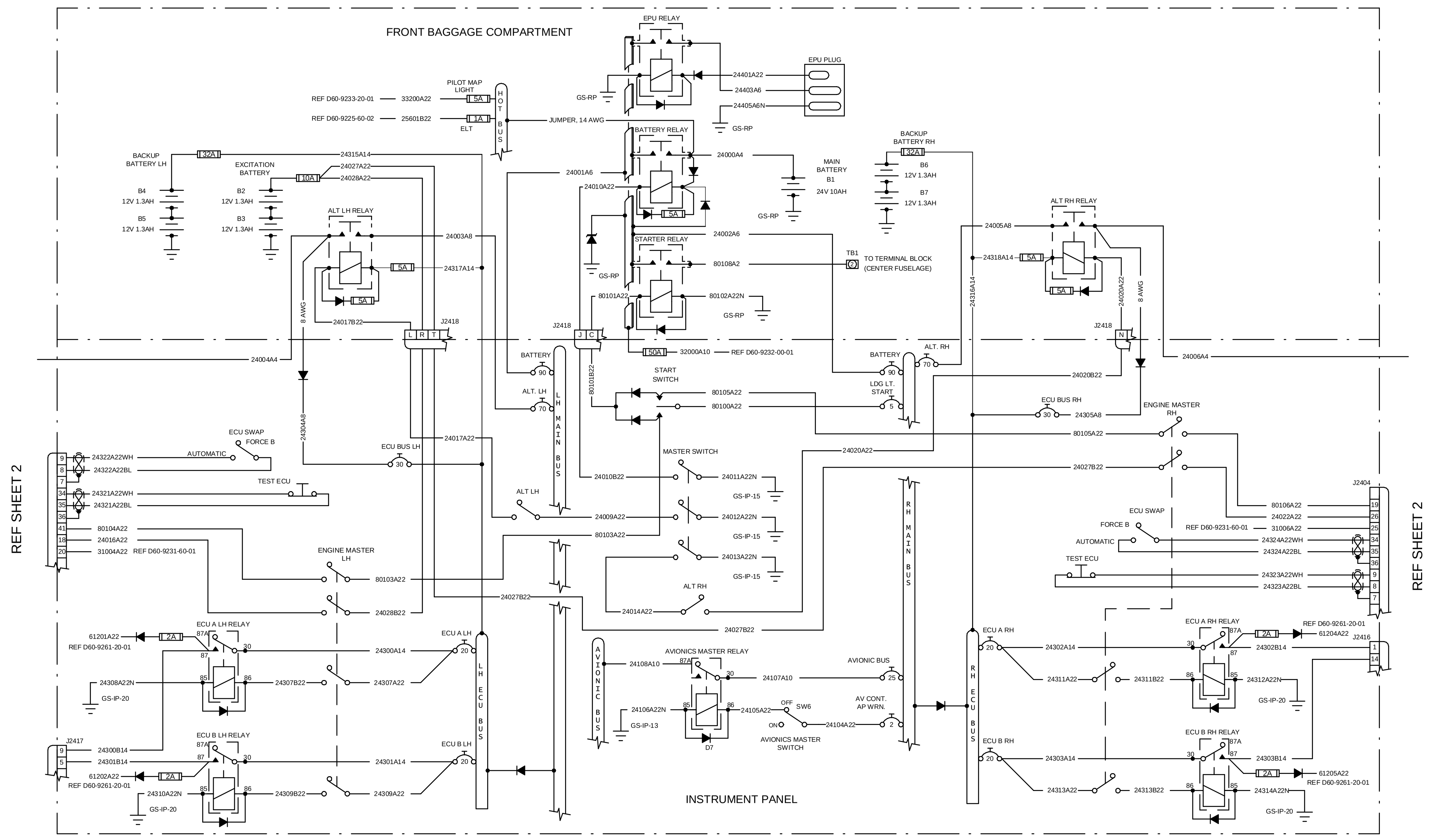
Calculated Weight:	N/A



Approved :		Checked :		General Tolerance : ISO 2768		Scale: NTS
Date	Name	Date	Name			

Rev.	Change	Date	Name
"a"	MÄM 42-240	23.04.07	Kowarsch
"-"		16.04.07	Kowarsch

Next Higher Assembly : **D60-9200-00-00**

Diamond AIRCRAFT Industries GmbH

DA 42 Twin Star

Title :

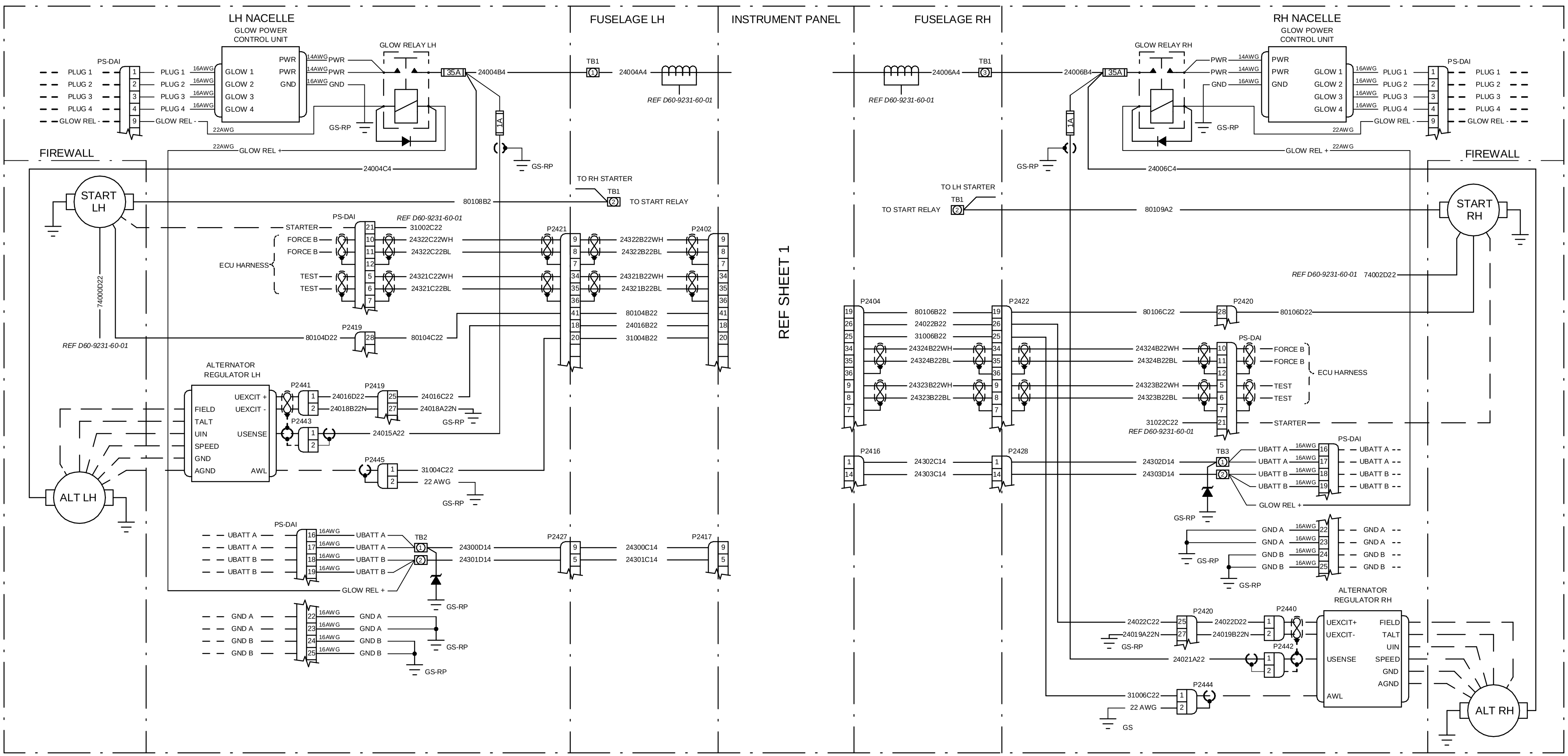
Schematic, Electrical System, TAE 125-02

Drawing Number: **D60-9224-30-01_02**

Sheet **1** from **2**

Saved under : **D60-9224-30-01_02a.dft**

Weight: N/A
Calculated Weight: N/A



NOTES:

1. DASHED LINES INDACTE A THIELERT HARNESS.

Weight:	N/A
Calculated Weight:	N/A

Approved :		Checked :		General Tolerance : ISO 2768	Scale: NTS
Date	Name	Date	Name		

Rev.	Change	Date	Name
"a"	MÄM 42-240	23.04.07	Kowarsch
"-"		16.04.07	Kowarsch

Next Higher Assembly : **D60-9200-00-00**

Diamond AIRCRAFT Industries GmbH

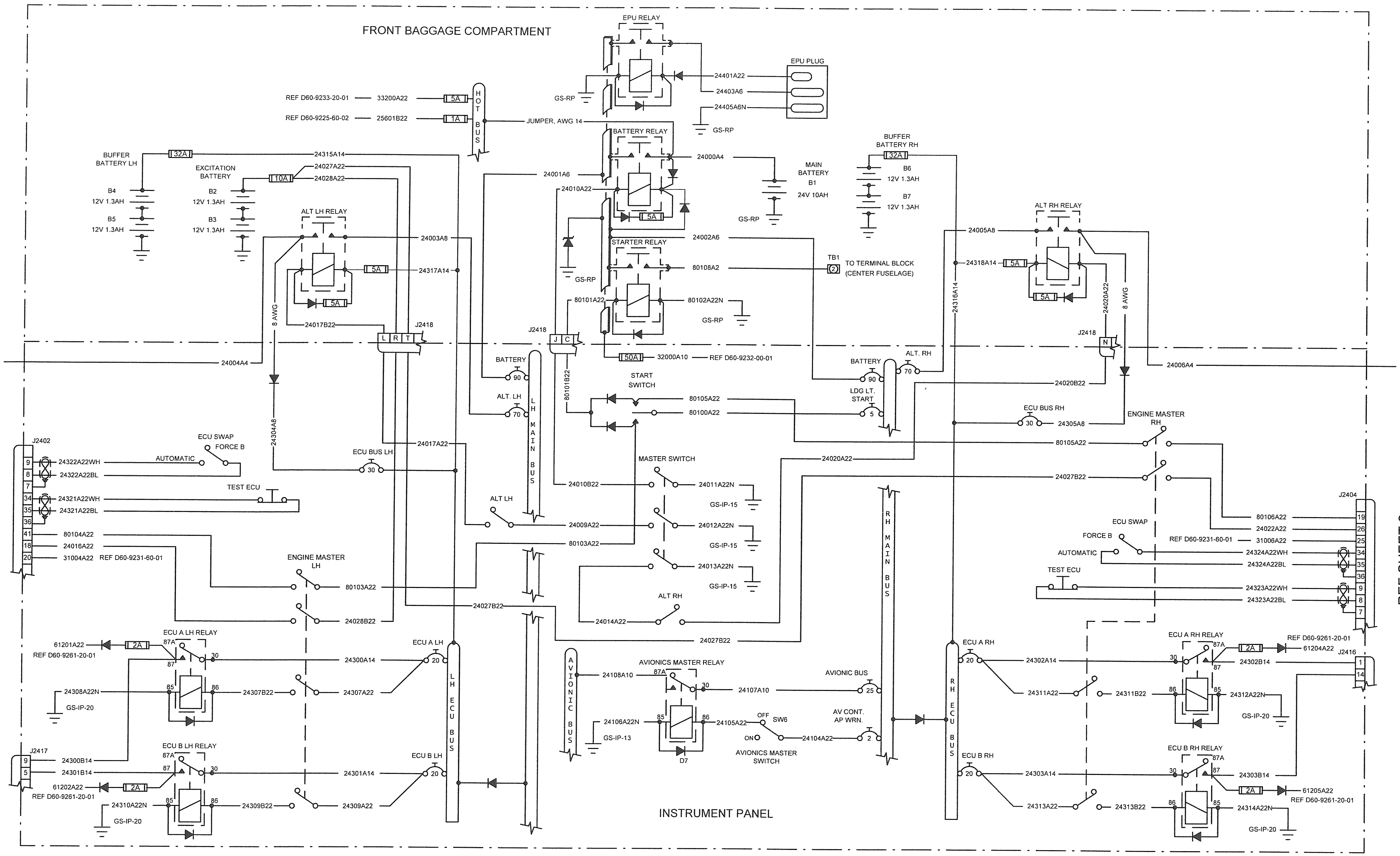
Title : **Schematic, Electrical System, TAE 125-02**

DA 42 Twin Star

Drawing Number: **D60-9224-30-01_02**

Sheet **2** from **2**

Saved under : **D60-9224-30-01_02a.dft**



Approved : B. Jäger	Checked M. Kowarsch	General Tolerance : ISO 2768	Scale: NTS
Date 21. JUNI 2007 Name	Date 20. JUNI 2007 Name		

Next Higher Assembly : D60-9200-00-00

Diamond AIRCRAFT Industries GmbH

Title : **Schematic, Electrical System**

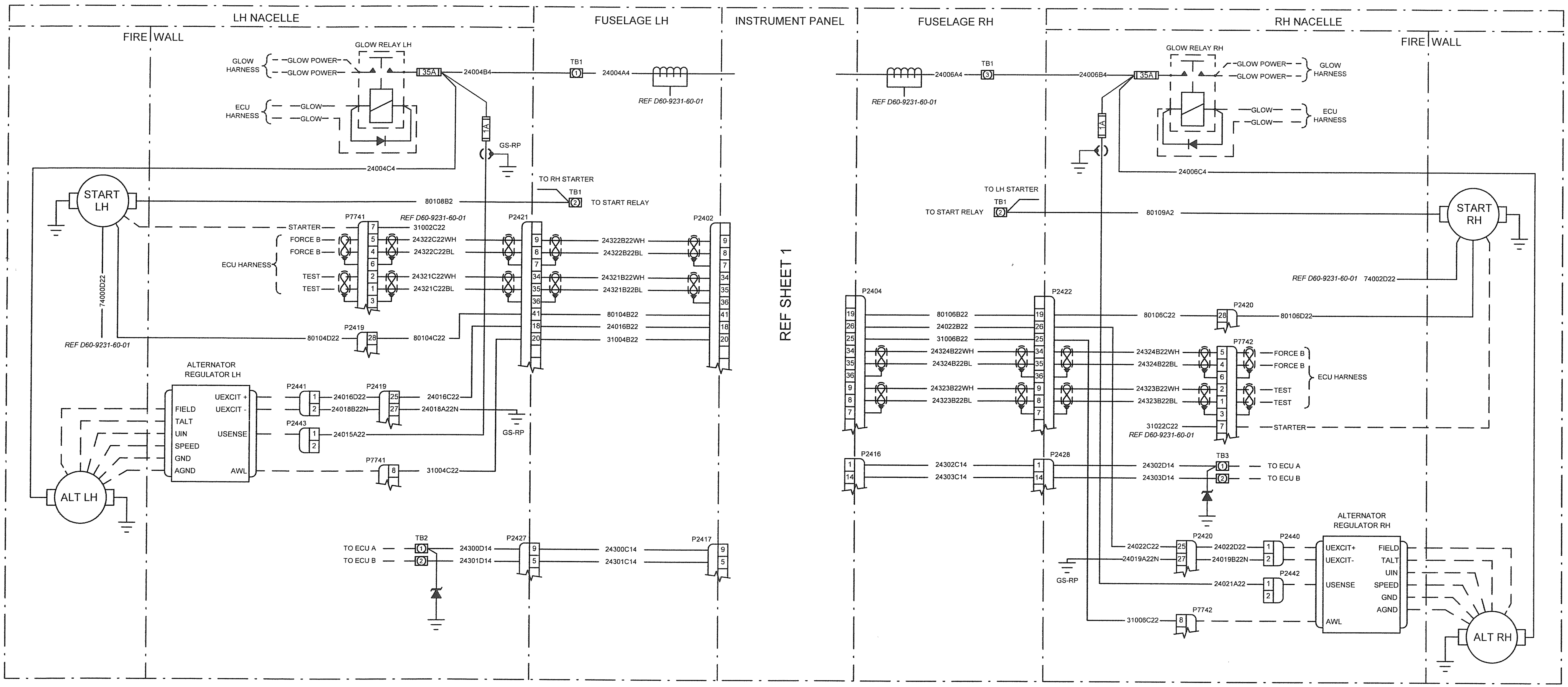
DA 42 Twin Star

Drawing Number: **D60-9224-30-01-SB**

Sheet 1 from 2

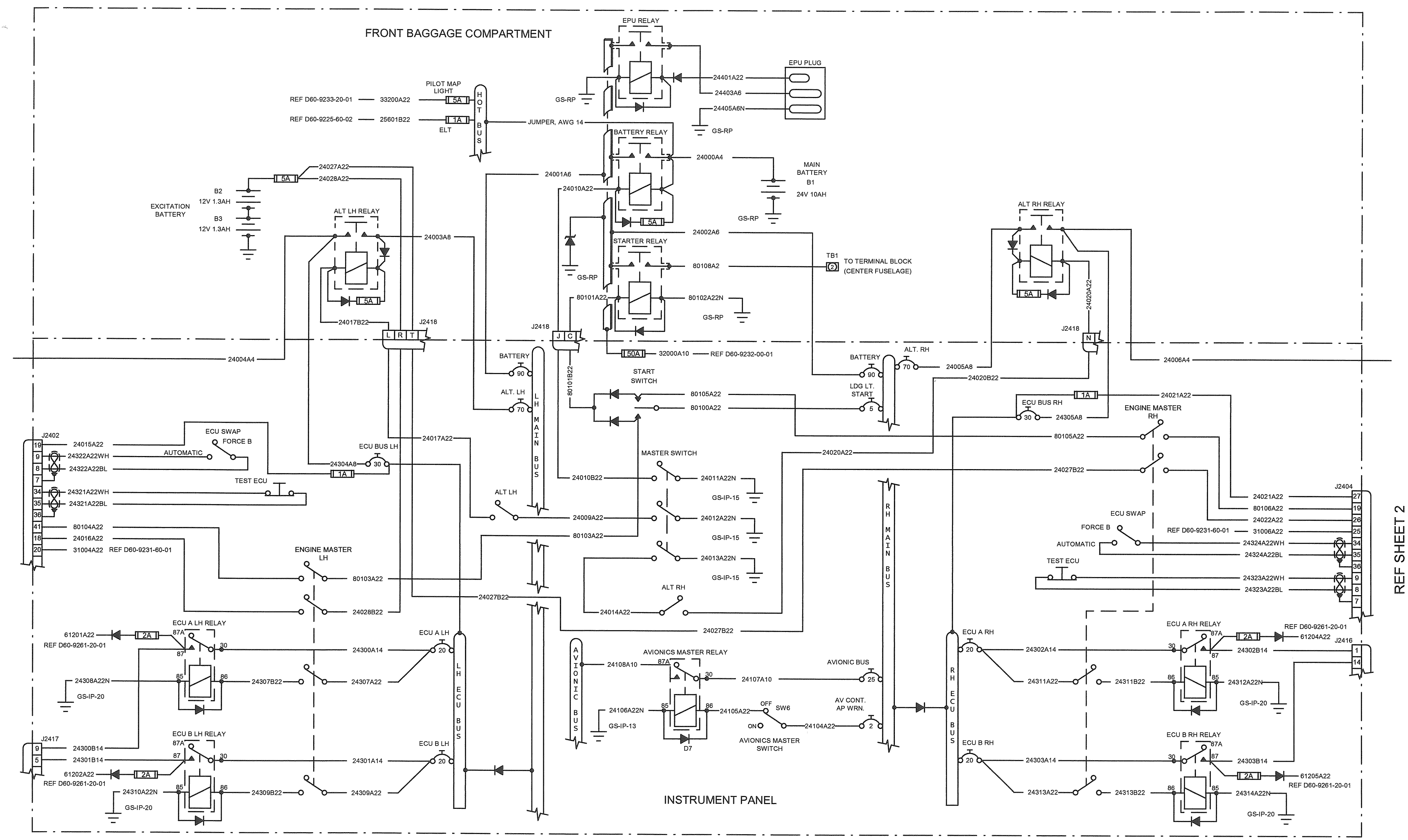
Rev.	Change	Date	Name
"-"	MÄM 42-240	16.04.07	Kowarsch

Saved under : D60-9224-30-01-SB.dft



Approved			Checked M. Kowarsch		General Tolerance : ISO 2768	Scale: NTS
Date	21. JUNI 2007	Name	Date	20. JUNI 2007 Name		
			Next Higher Assembly : D60-9200-00-00	Title : Schematic, Electrical System		
"-"	MÄM 42-240	16.04.07	Kowarsch	DA 42 Twin Star	Drawing Number: D60-9224-30-01-SB	Sheet 2 from 2
Rev.	Change	Date	Name	Saved under :	D60-9224-30-01-SB.dft	

Diamond AIRCRAFT Industries GmbH



Replaced by new design.
To be used only for spare parts.

Rev.	Change	Date	Name
"b"	MÄM 42-144	26.02.07	Schuster
"a"	MÄM 42-202	10.07.06	Kowarsch
"-"	MÄM 42-144	27.10.05	Kowarsch

Approved : C. Jütte Date 19. MRZ 2007 Name

Checked : B. Jäger Date 16. MRZ 2007 Name

General Tolerance : ISO 2768

Scale: NTS

Next Higher Assembly : D60-9200-00-00

Diamond AIRCRAFT Industries GmbH

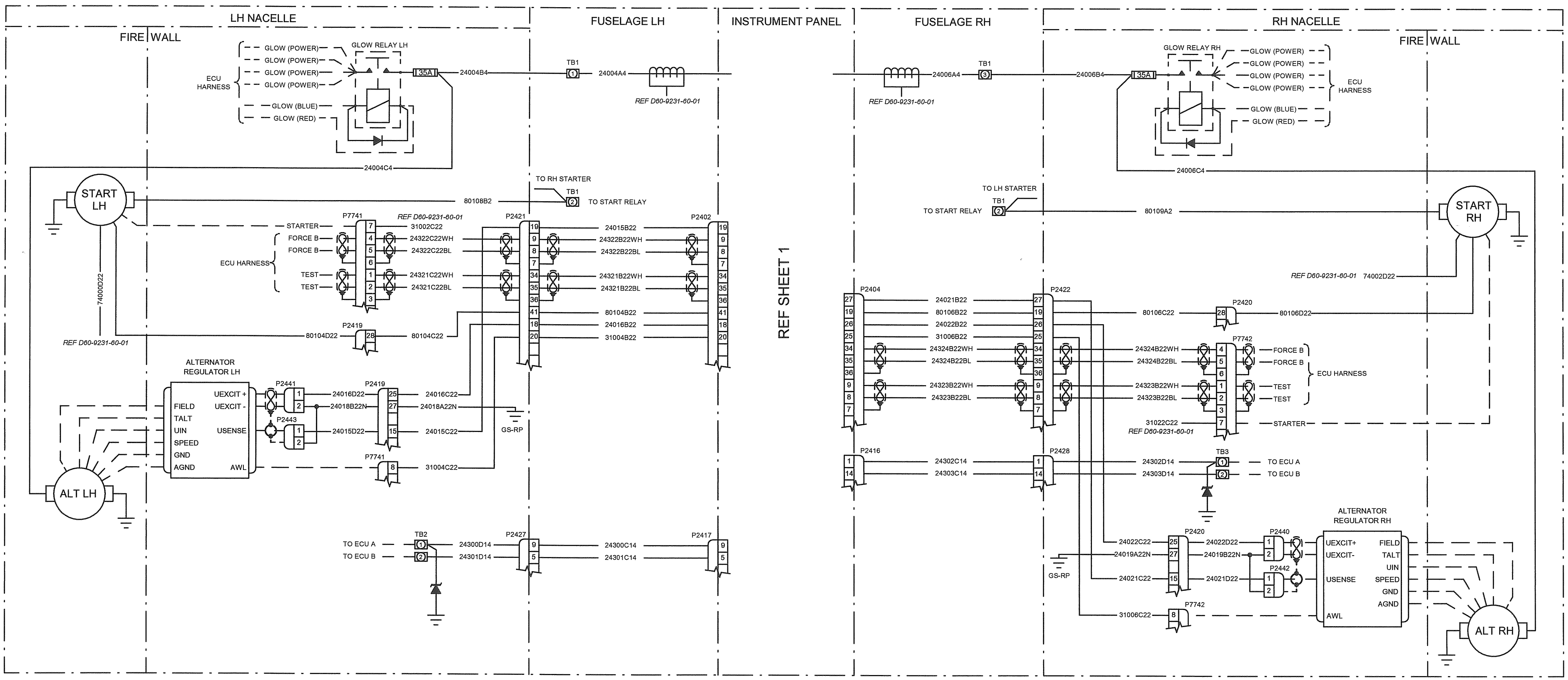
Title : **Schematic, Electrical System w/o GPC**

DA 42 Twin Star

Drawing Number: **D60-9224-30-02**

Sheet 1 from 2

Saved under : D60-9224-30-02b.dft



Replaced by new design.
To be used only for spare parts.

Approved : C. Jüde	Date 19. MRZ 2007	Checked B. Jäger	Date 16. MRZ 2007

General Tolerance : ISO 2768

Scale: NTS

Next Higher Assembly : D60-9200-00-00

Title : **Schematic, Electrical System w/o GPC**

Diamond AIRCRAFT Industries GmbH

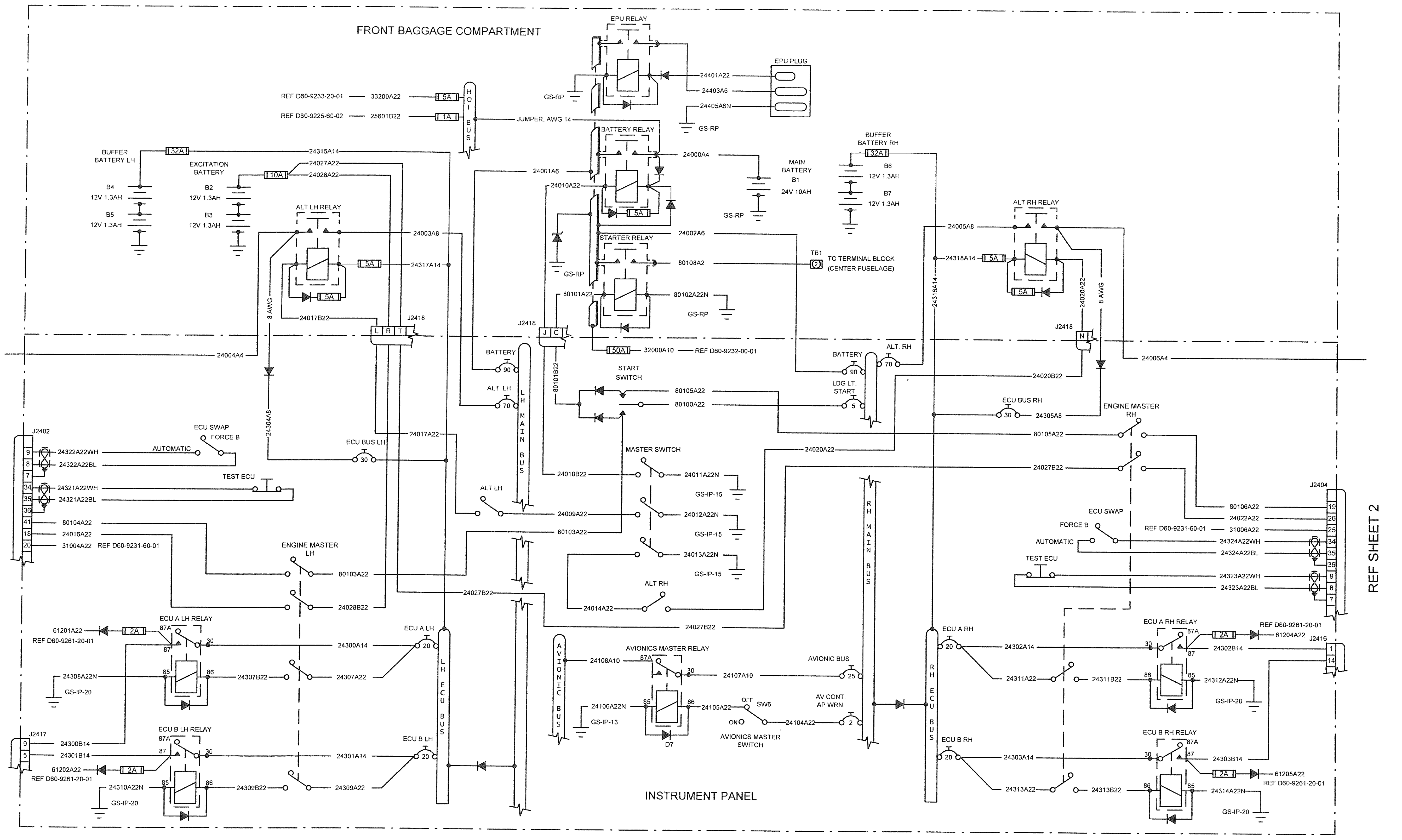
DA 42 Twin Star

Drawing Number: **D60-9224-30-02**

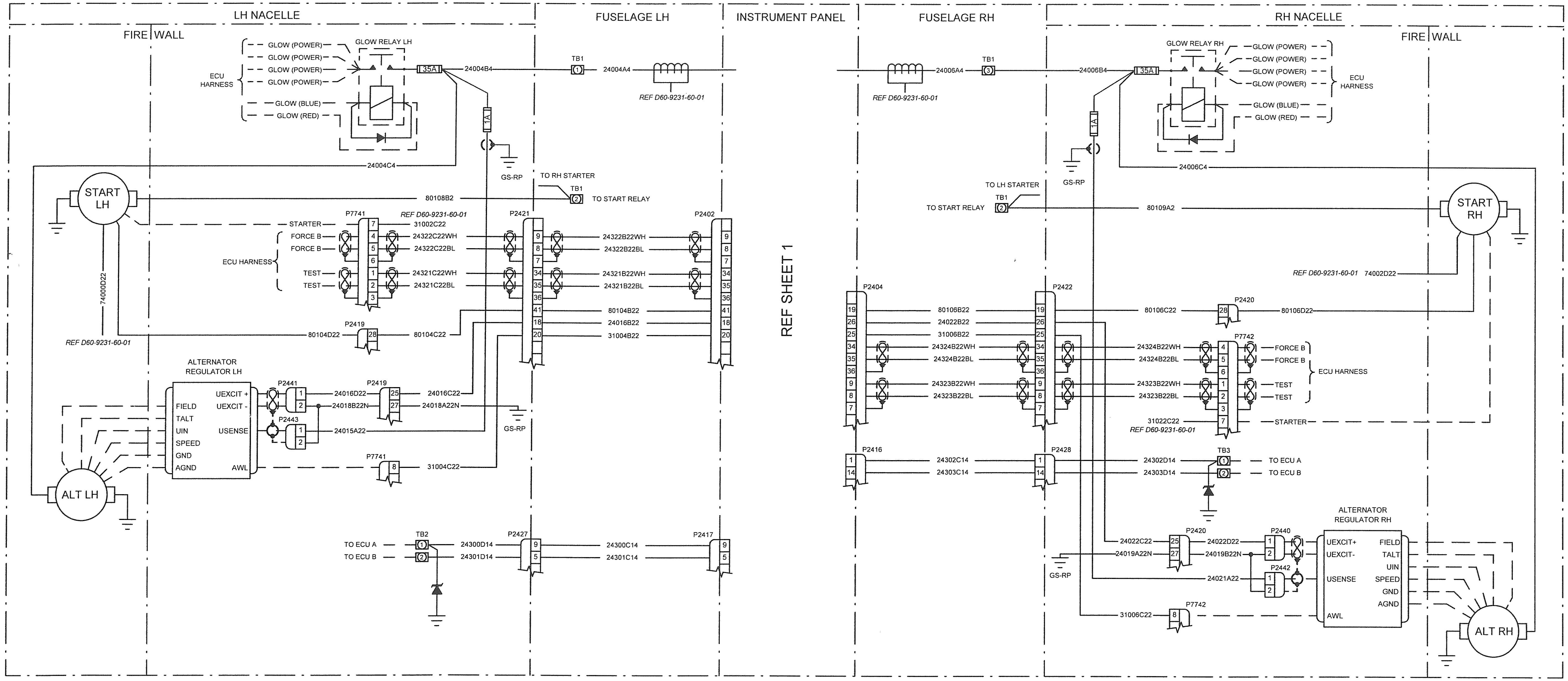
Sheet 2 from 2

Rev.	Change	Date	Name
"b"	MÄM 42-144	26.02.07	Schuster
"a"	MÄM 42-202	10.07.06	Kowarsch
"-"	MÄM 42-144	27.10.05	Kowarsch

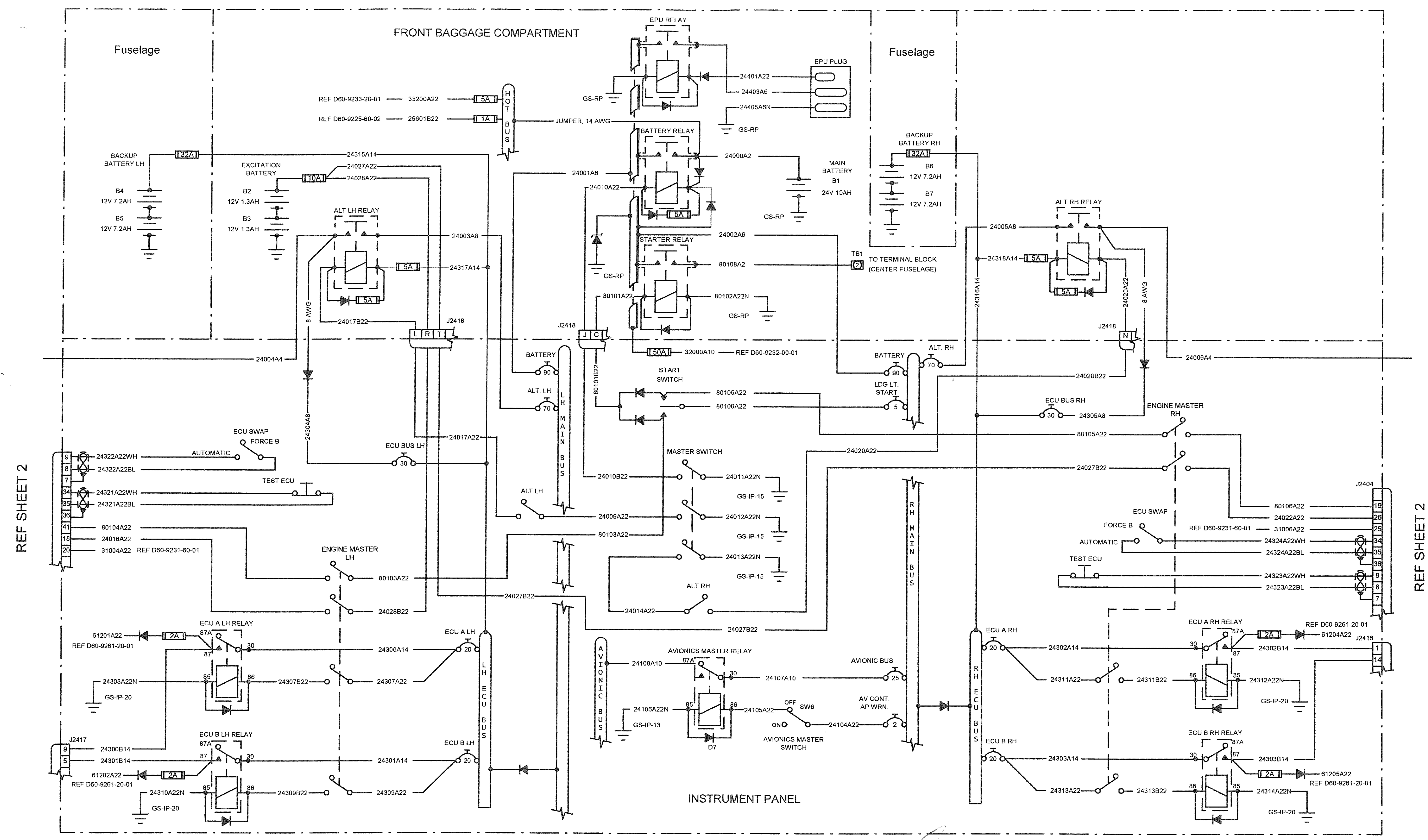
Saved under : **D60-9224-30-02b.dft**



Approved : B. Jäger			Checked: M. Kowarsch	General Tolerance : ISO 2768	Scale: NTS
Date	21. JUNI 2007	Name	Date 20. JUNI 2007 Name		
			Next Higher Assembly : D60-9200-00-00	Title : Schematic, Electrical System w/o GPC	
			Diamond AIRCRAFT Industries GmbH		
"-"	MÄM 42-240	16.04.07 Kowarsch	DA 42 Twin Star	Drawing Number: D60-9224-30-02-SB	Sheet 1 from 2
Rev.	Change	Date Name	Saved under :	D60-9224-30-02-SB.dft	



Approved : Jäger		Date 21. JUNI 2007	Name	Checked M. Kowarsch	Date 20. JUNI 2007	General Tolerance : ISO 2768	Scale: NTS
				Next Higher Assembly : D60-9200-00-00		Title : Schematic, Electrical System w/o GPC	
				Diamond AIRCRAFT Industries GmbH			
"-"	MÄM 42-240	16.04.07	Kowarsch	DA 42 Twin Star		Drawing Number: D60-9224-30-02-SB	Sheet 2 from 2
Rev.	Change	Date	Name	Saved under :		D60-9224-30-02-SB.dft	



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Diamond Aircraft Industries GmbH

Weight:	N/A
Calculated Weight:	N/A

Approved: R. Kremnitzer — Date: 27. JULI 2007 — Name

Checked: M. Kowarsch — Date: 27. JULI 2007 — Name

General Tolerance: ISO 2768

Scale: NTS

Rev.	Change	Date	Name
"-"	OÄM 42-129	03.07.07	M. Scheikl

Next Higher Assembly: D60-9200-00-00

Diamond AIRCRAFT Industries GmbH

DA 42 Twin Star

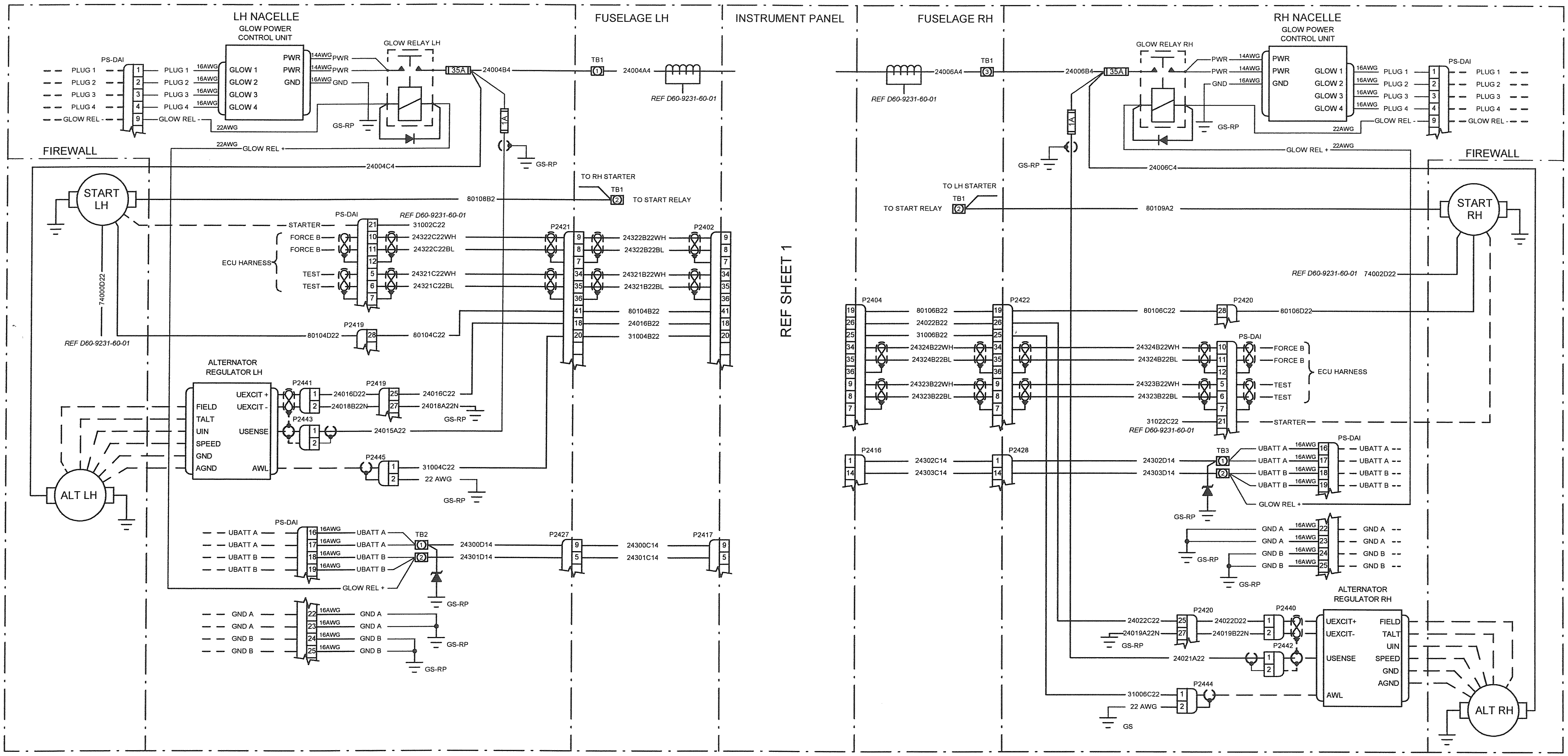
Title:

Schematic, Electrical System, TAE 125-02 [FAA]

Drawing Number: D60-9224-30-03

Sheet 1 from 2

Saved under: D60-9224-30-03.dft



NOTES:

1. DASHED LINES INDACTE A THIELERT HARNESS.

Approved: R. Kremnitzer	Date 27. JULI 2007	Name	Checked: M. Kowarsch	Date 27. JULI 2007	Name
General Tolerance: ISO 2768				Scale: NTS	
Next Higher Assembly: D60-9200-00-00			Title: Schematic, Electrical System, TAE 125-02 [FAA]		
"-"	OÄM 42-129	03.07.07	M. Scheikl	DA 42 Twin Star	
Rev.	Change	Date	Name	Drawing Number: D60-9224-30-03	Sheet 2 from 2
Saved under: D60-9224-30-03.dft					

Weight: N/A

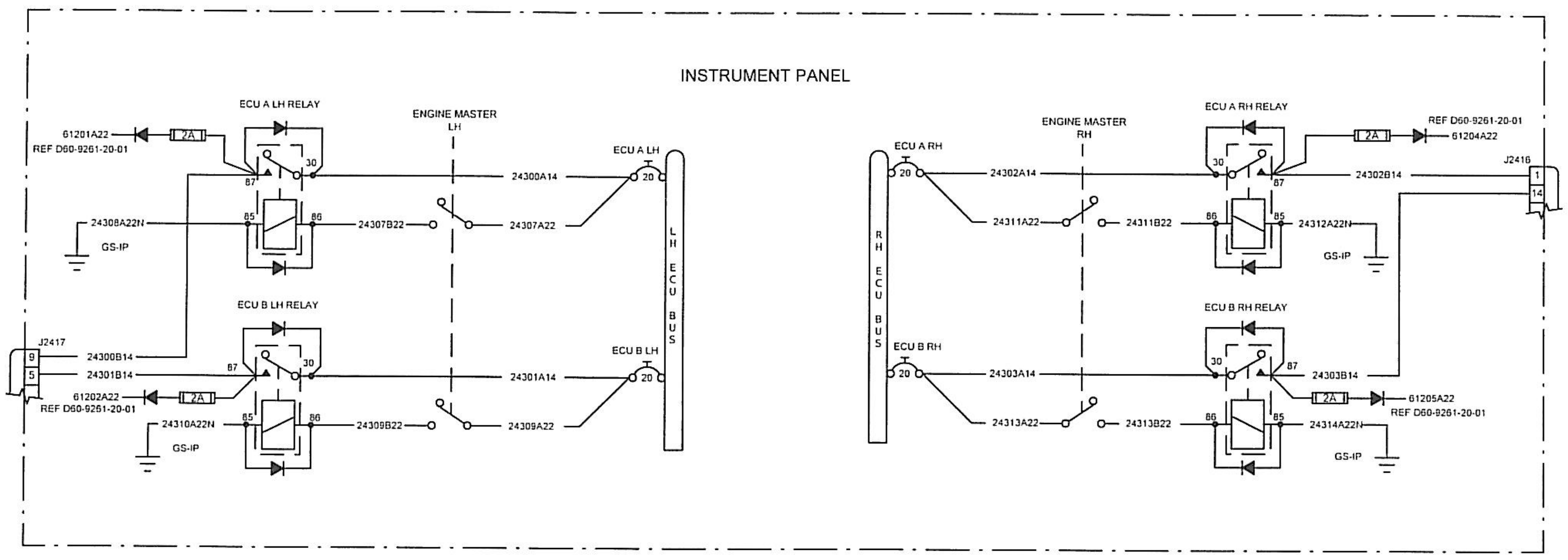
Calculated Weight: N/A

Diamond AIRCRAFT Industries GmbH

Confidential

REV	SH	ZONE	DESCRIPTION	DATE	APPROVAL
-	01	ALL	OÄM 42-190 FIRST RELEASE	24.03.10	SEE TB

REVISION



GENERAL NOTES

1. THIS DRAWING IS ONLY SUPPLEMENTAL TO THE ELECTRICAL SCHEMATICS OF THE DA 42. FOR ITEMS/CONNECTIONS NOT SHOWN ON THIS DRAWING, REFER TO DRAWINGS D60-9224-30-0X

DIMENSIONS	METRIC		
FIRST ANGLE PROJECTION	FORMAT A3		
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM			
DIMENSION TOLERANCES	3.2		
2 DECIMAL	±0,25		
1DECIMAL	±0,5		
DECIMAL	±1		
ANGLE	±1°		
RAD	±0,5	FINISH IN MICRO-METER	

IDENTIFICATION MARKINGS	DE-S-10-00003
CLASSIFICATION:	NONE
INTERCHANGEABLE PART	NO
THIS DRAWING WAS PRODUCED USING SOFTWARE:	SOLID EDGE V18
FILENAME	D60-9224-30-04.dft

Diamond Aircraft Industries GmbH

Diamond Aircraft Industries

N. A. Otto-Straße 5
A-2700 Wiener Neustadt

DEPARTMENT		SIGN	DATE
DRAWN	Kowarsch		24.03.10
CHECKED:	Kowarsch		25.03.10
QA:	N/A		
STRESS:	N/A		
MANUF.:	N/A		
SYSTEM:	N/A		
APPROVED:	TL		1. April

PROJECT: DA 42, DA 42 M

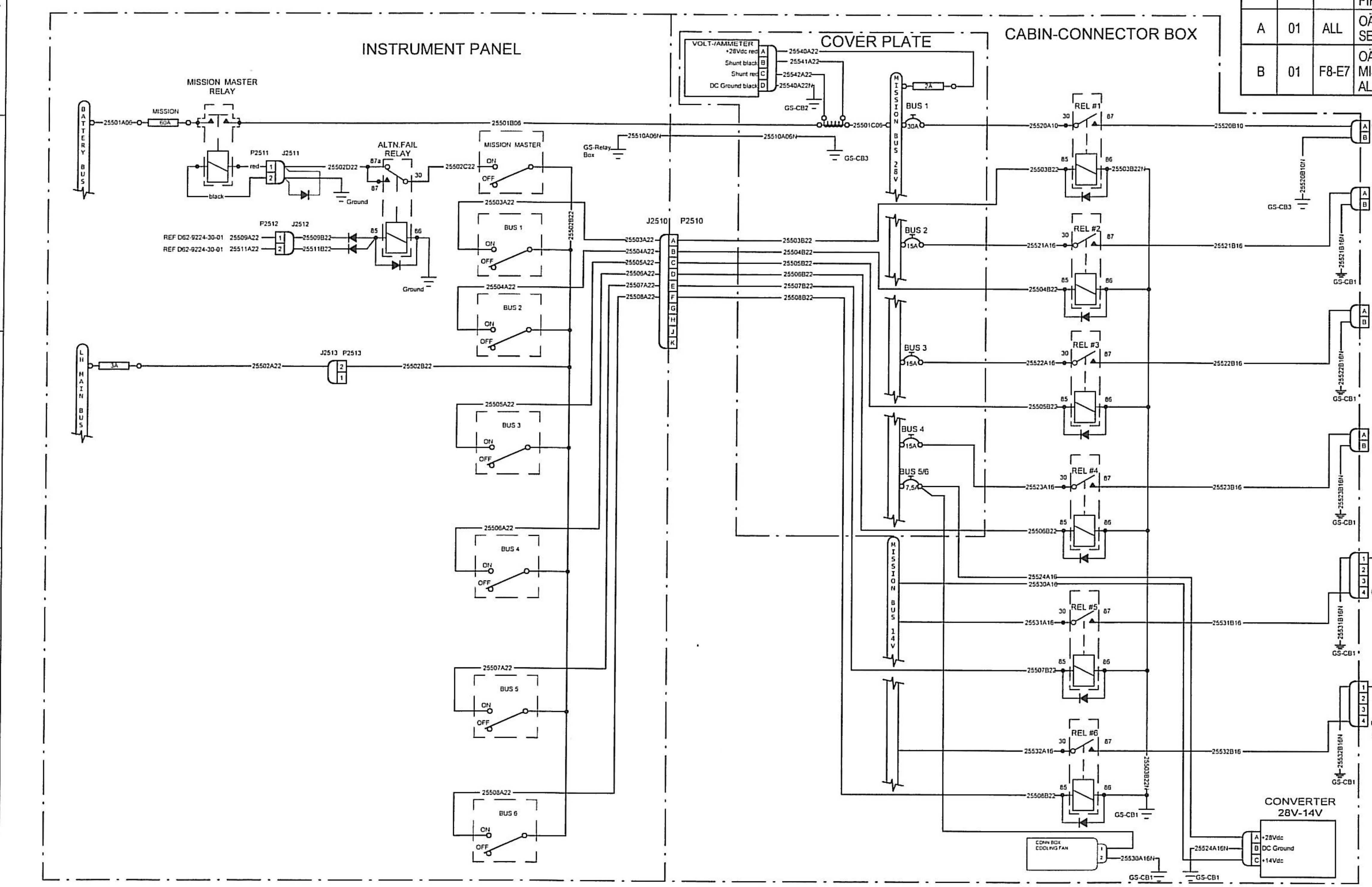
TITLE: **Schematic, Suppressor diodes at ECU Relays**

DWG.ORIG.	DWG.NO.	REV
DAIA	D60-9224-30-04	"-"
CODE 710197	SCALE NTS	SH 01 OF 01

Confidential

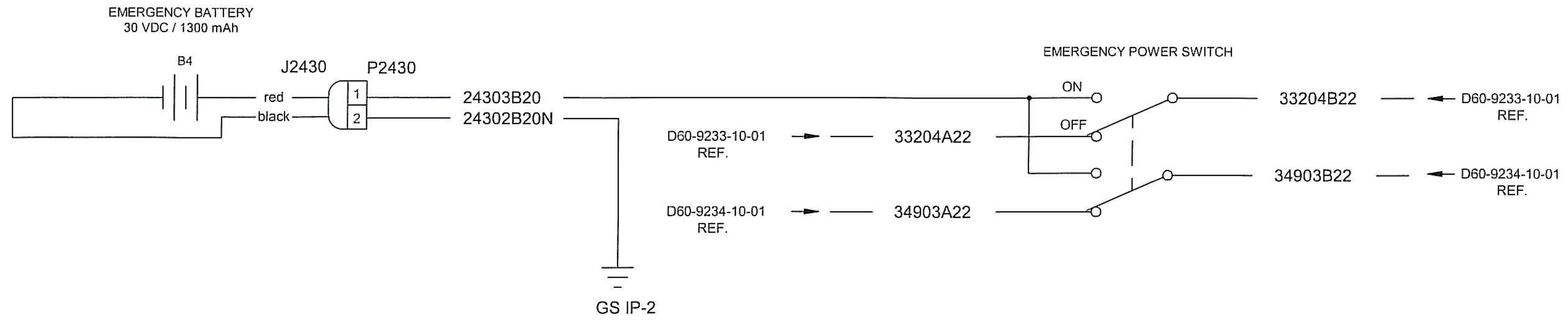
Confidential

REVISION					
REV	SH	ZONE	DESCRIPTION	DATE	APPROVAL
-	01	ALL	OÄM 42-074 FIRST RELEASE	09.03.07	DRAWN: WEIS
A	01	ALL	OÄM 42-074/a SECOND RELEASE	10.07.07	DRAWN: WEIS
B	01	F8-E7	OÄM 42-074/f MISSION MASTER AND ALTN. FAIL RELAY CORRECTED	29.07.09	SEE TB



DIMENSIONS **METRIC**		IDENTIFICATION MARKINGS	**DE-S-10-00003**	Diamond Aircraft Industries GmbH	Diamond Aircraft Industries — N. A. Otto-Straße 5, A-2700 Wiener Neustadt
FIRST ANGLE PROJECTION	FORMAT **A3**	CLASSIFICATION: **NONE**		DEPARTMENT / SIGN / DATE	PROJECT **DA 42 M**
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM		INTERCHANGEABLE PART **NO**		DRAWN **WAHA** — 19.07.09	TITLE **MPP BASIC WIRING**
DIMENSION TOLERANCES 3.2		THIS DRAWING WAS PRODUCED USING		CHECKED: **KOWARSCH** — 01.09.2010	
2 DECIMAL ±0,25	FINISH IN MICRO-METER	SOFTWARE: **SOLID EDGE V18**		QA: **N/A**	
1DECIMAL ±0,5				STRESS: **N/A**	
DECIMAL ±1				MANUF.: **N/A**	DWG.ORIG. **DAIA**
ANGLE ±1°		FILENAME		SYSTEM: **N/A** — M.Volck	DWG.NO. **D62-9225-00-00** — REV **B**
RAD ±0,5		**D62-9225-00-00.dft**		APPROVED: **TL** — 27 OKT. 2010	CODE **710197** — SCALE NTS — SH **01** OF **01**

Confidential



Freigabe :	J.Unbehend	Geprüft :	Freimaßtoleranz : ISO 2768		Maßstab : NTS
Datum 13. DEZ. 2004	Name	Datum 13.12.04 Name			

Rev.	Änderung	Datum	Name
"b"	MÄM 42-030	14.10.04	Kowarsch
"a"	MÄM 42-028	16.09.04	M. Scheikl
"-"	Erstausgabe	18.02.04	Kowarsch

Nächster Zusammenbau : D60-9200-00-00

Diamond AIRCRAFT Industries GmbH

DA42 Twin Star

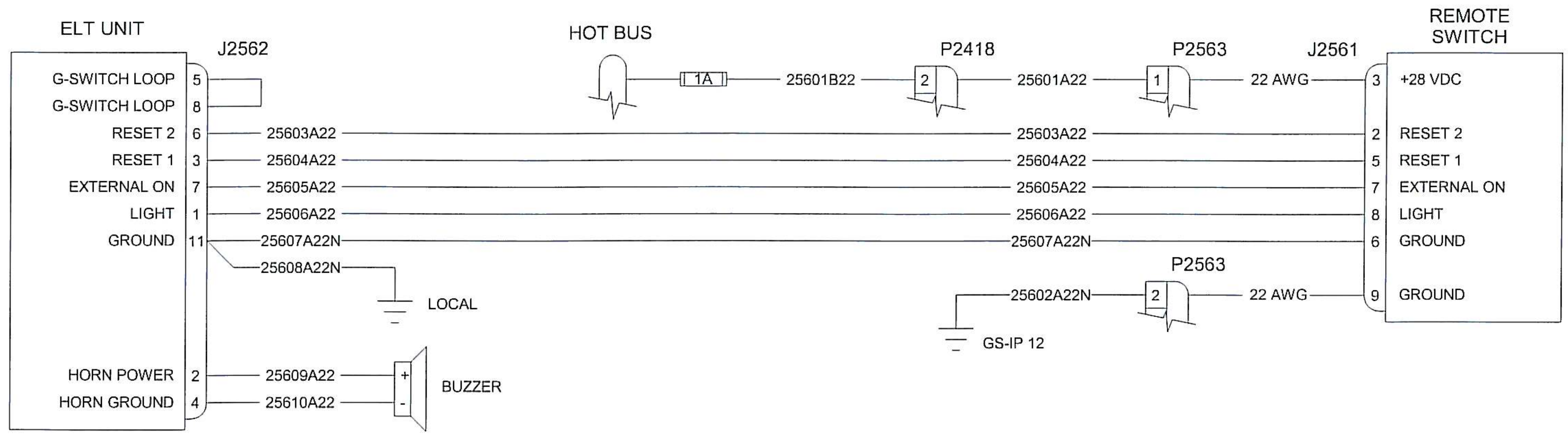
Benennung : **Emergency Power Package**

Name : **Emergency Power Package**

Zeichnungs Nr.: **D60-9225-60-01**

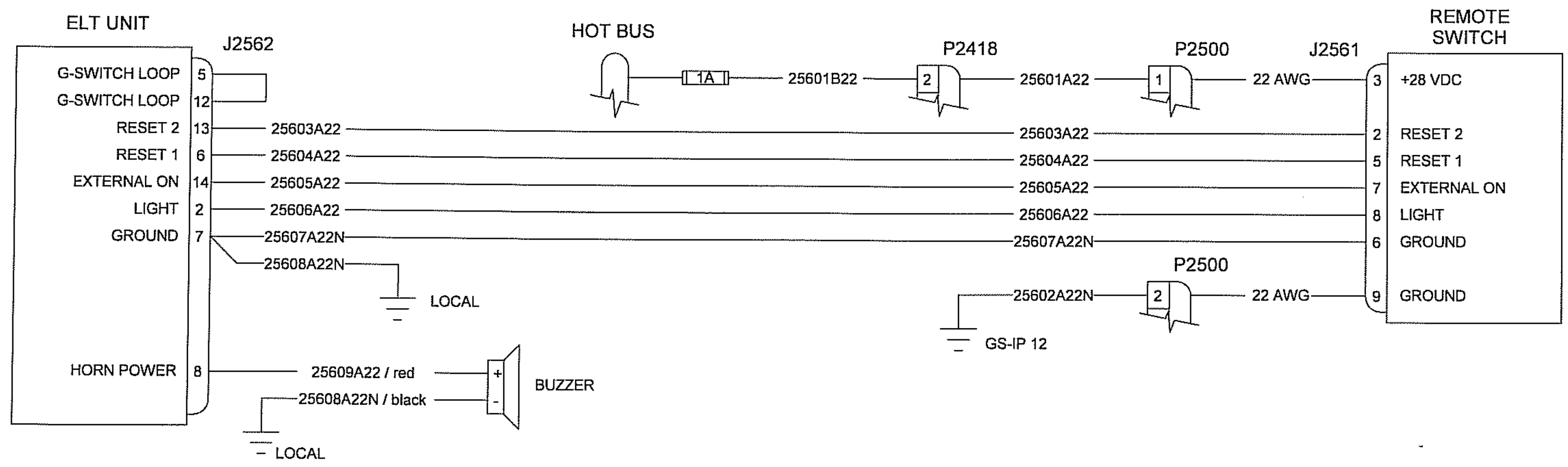
Blatt **1** von **1**

Gespeichert unter : **D60-9225-60-01b.dft**



Freigabe: J.Unbehend Datum 13. DEZ. 2004	Geprüft: 13.12.04 Datum Name	Freimaßtoleranz: ISO 2768	Maßstab: NTS
Nächster Zusammenbau: D60-9200-00-00	Benennung: **Schematik, ELT Verkabelung**	Name: **Schematic, ELT Wiring**	
Diamond AIRCRAFT Industries GmbH			
DA42 Twin Star	Zeichnungs Nr.: **D60-9225-60-02**	Blatt 1 von 1	
"-" MÄM 42-030 14.10.04 Kowarsch	Gespeichert unter: D60-9225-60-02.dft		
Rev. Änderung Datum Name			

REVISIONS		
Rev.	Zone	Description
"-"	all	new drawing
"a"	D6	wire numbers at buzzer added
	E3, D3	corrected connector label from P2563 to P2500.

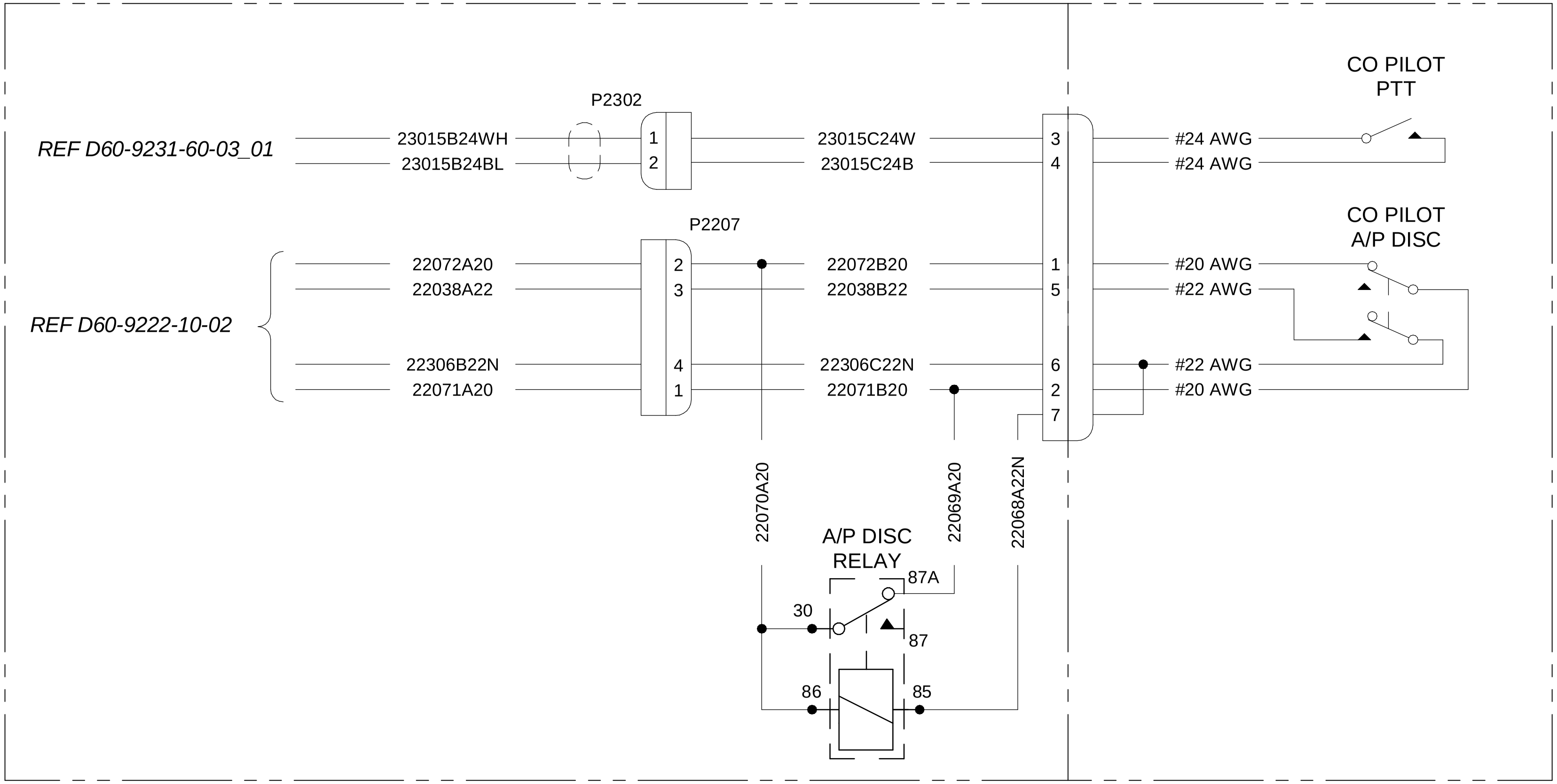


Approved : C. Jütte	Date 6. FEB. 2008 Name	Checked M. Kowarsch	Date 14. JAN. 2008 Name	General Tolerance : ISO 2768	Scale: 1:1
"a"	MÄM 42-269	14.01.08	Kowarsch	Next Higher Assembly : D60-9200-00-00	Title : Schematic, ELT ME406, Wiring
"-"	ÖAM 42-080	12.12.05	Kowarsch	Diamond AIRCRAFT Industries GmbH — DA 42 Twin Star	Drawing Number: D60-9225-60-02x01 — Sheet 1 from 1
Rev.	Change	Date	Name	Saved under :	D60-9225-60-02x01a.dft

Weight: N/A
Calculated Weight: N/A

REVISION

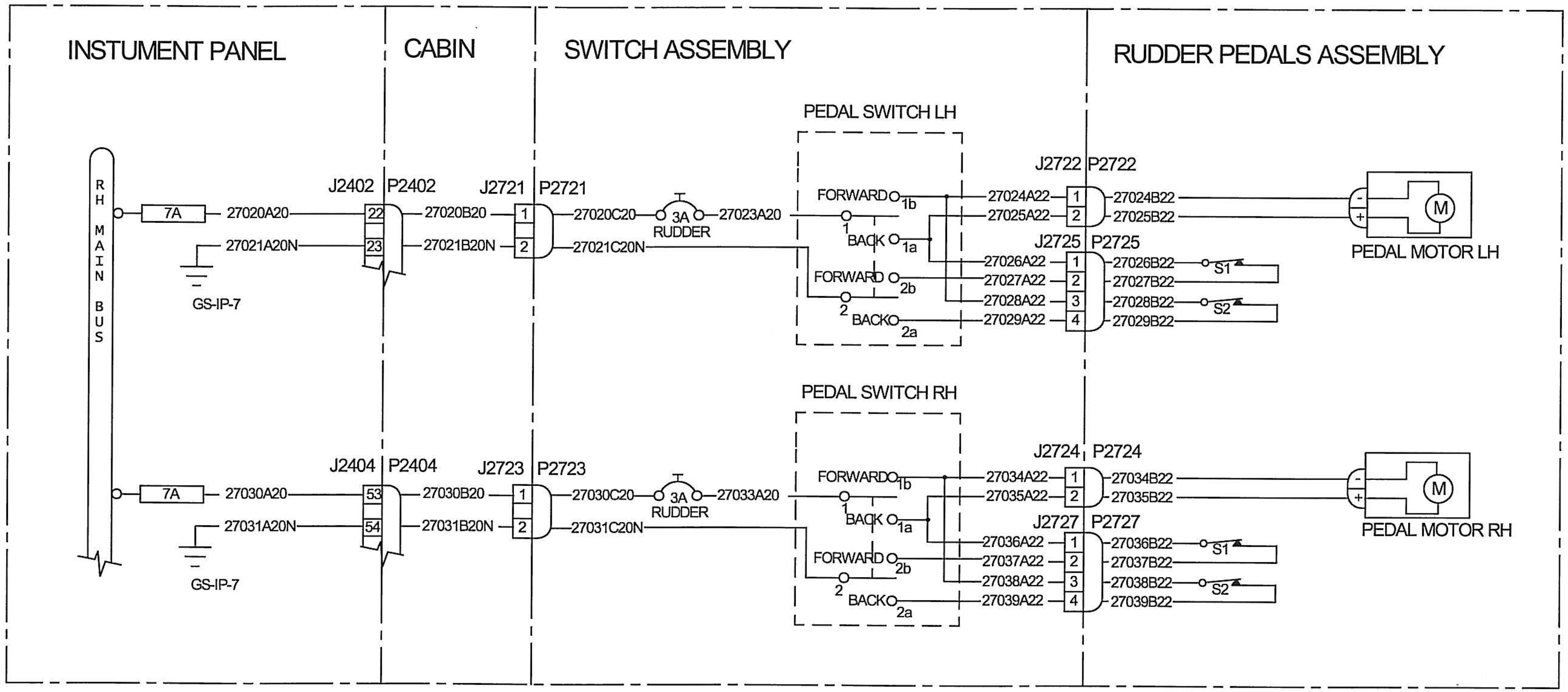
REV	SH	ZONE	DESCRIPTION	DATE
-	01	ALL	OÄM 42-283 NEW DRAWING, DOES NOT SUPERSEDE ANOTHER DRAWING.	15.07.2015



DIMENSIONS **METRIC**	IDENTIFICATION MARKINGS **DP-S-17-00001**	Diamond Aircraft Industries	N. A. Otto-Straße 5 A-2700 Wiener Neustadt
FIRST ANGLE PROJECTION	FORMAT **A3**	CLASSIFICATION: **NONE**	PROJECT **DA 42**
IF NOT OTHERWISE SPECIFIED GEOMETRIC DIMENSIONING AND TOLERANCING ACC. TO **ISO 2768-mK**	FINISH IN MICRO-METER	INTERCHANGEABLE PART **NO**	TITLE **SCHEMATIC, REMOVABLE CO-PILOT STICK WIRING**
DIMENSIONS IN **mm**		THIS DRAWING WAS PRODUCED USING SOFTWARE **SOLID EDGE ST6**	DWG.ORIG. **DAIA**
		FILENAME **D60-9227-03-00.dft**	DWG.NO. **D60-9227-03-00** REV **-**

NAME / SIGN / DATE	
DRAWN	
CHECKED:	
RELEASED:	

CODE **710197** SCALE NTS SH **01** OF **01**



Weight:	N/A		
Calculated Weight:	N/A		

Approved : M. Reichel
Date 28. JUNI 2006 Name

Checked : J.Unbehend
Date 27. JUNI 2006 Name

General Tolerance : ISO 2768 medium

Scale: NTS

Rev.	Change	Date	Name
"a"	OAM 42-070/d	29.05.06	Mandl
"-"	OAM 42-070	02.11.05	Mandl

Next Higher Assembly : D60-9200-00-00

Diamond AIRCRAFT Industries GmbH

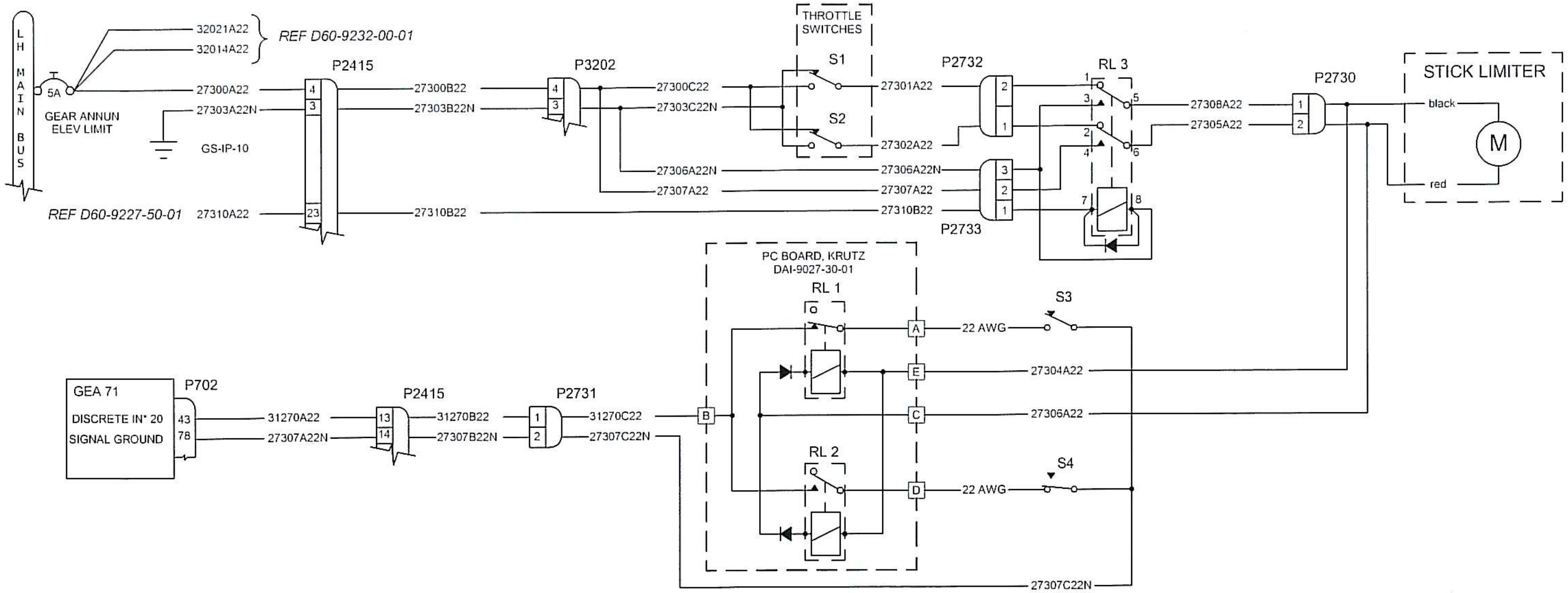
DA 42 Twin Star

Title : **Schematic, Rudder Pedals Adj. Wiring**

Drawing Number: **D60-9227-20-01**

Sheet 1 from 1

Saved under : **D60-9227-20-01a.dft**



NOTES:

1. WIRING SHOWN WITH STICK LIMITER DEACTIVATED (THROTTLE IN IDLE POSITION), POWERED AND FLAPS SWITCH IN LDG POSITION.

Freigabe: Unbehend	Datum 13. DEZ. 2004	Name	
Geprüft:	Datum 13.12.04	Name	
Freimaßtoleranz: ISO 2768		Maßstab: NTS	

Rev.	Änderung	Datum	Name
"d"	MÄM 42-030	22.11.04	Kowarsch
"c"	MÄM 42-014	23.06.04	Kowarsch
"b"	MÄM 42-001	07.05.04	Kowarsch
"a"		03.03.04	Kowarsch
"-"	Erstausgabe	18.02.04	Kowarsch

Nächster Zusammenbau: D60-9200-00-00

Diamond AIRCRAFT Industries GmbH

DA42 Twin Star

Benennung: **Schematik, Stick Limiter Verkabelung**

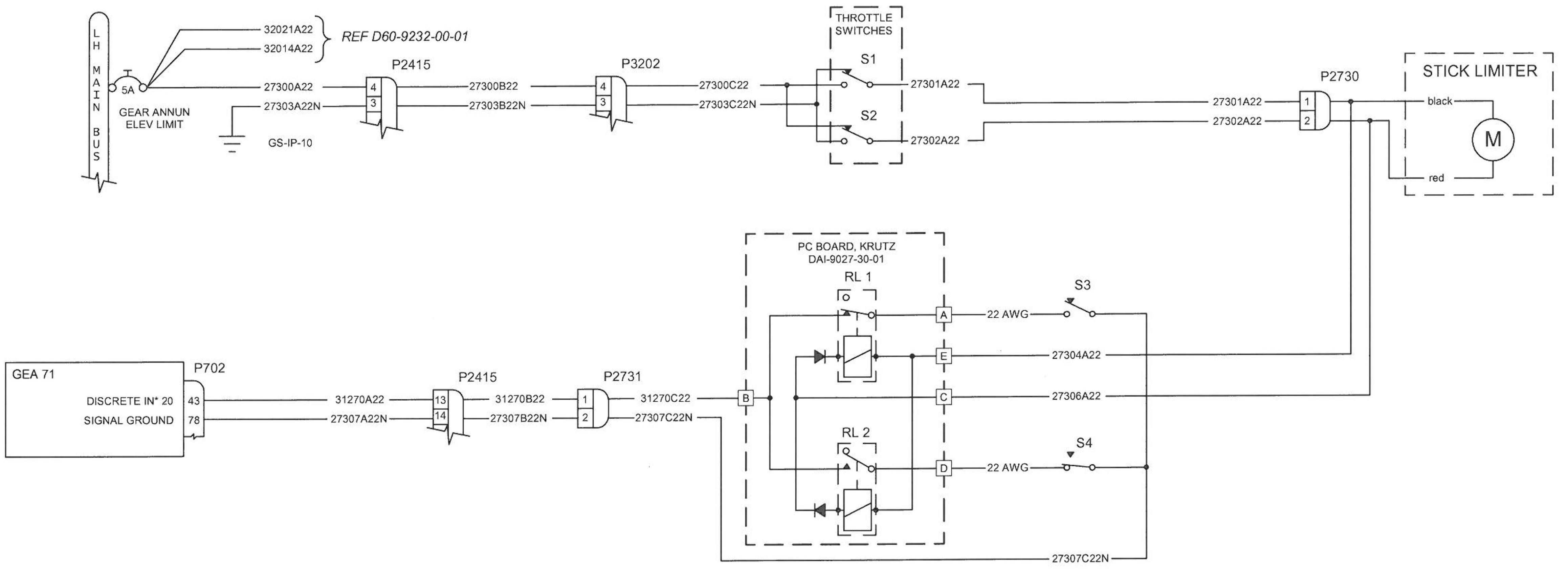
Name: **Schematic, Stick Limiter Wiring**

Zeichnungs Nr.: **D60-9227-30-01**

Blatt 1 von 1

Gespeichert unter: D60-9227-30-01d.dft

REVISION					
REV	SH	ZONE	DESCRIPTION	DATE	APPROVAL
-	01	ALL	OÄM 42-252 New drawing	24.07.14	SEE TB



GENERAL NOTES

1. WIRING SHOWN WITH STICK LIMITER DEACTIVATED (THROTTLE IN IDLE POSITION) AND POWERED.

DIMENSIONS	METRIC
FIRST ANGLE PROJECTION	FORMAT A3
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM	
DIMENSION TOLERANCES	3.2 FINISH IN MICRO-METER
2 DECIMAL	±0,25
1DECIMAL	±0,5
DECIMAL	±1
ANGLE	±1°
RAD	±0,5

IDENTIFICATION MARKINGS	DP-S-17-00001
CLASSIFICATION:	NONE
INTERCHANGEABLE PART	NO
THIS DRAWING WAS PRODUCED USING SOFTWARE:	SOLID EDGE V18
FILENAME	D60-9227-30-01x01.dft

Diamond Aircraft Industries GmbH — Diamond Aircraft Industries
N. A. Otto-Straße 5
A-2700 Wiener Neustadt

DEPARTMENT		SIGN	DATE
DRAWN	Kowarsch		24.07.14
CHECKED:	Kowarsch		24.07.2014
QA:	N/A		
STRESS:	N/A		
MANUF.:	N/A		
SYSTEM:	N/A		
APPROVED:	TL		08-01-2015

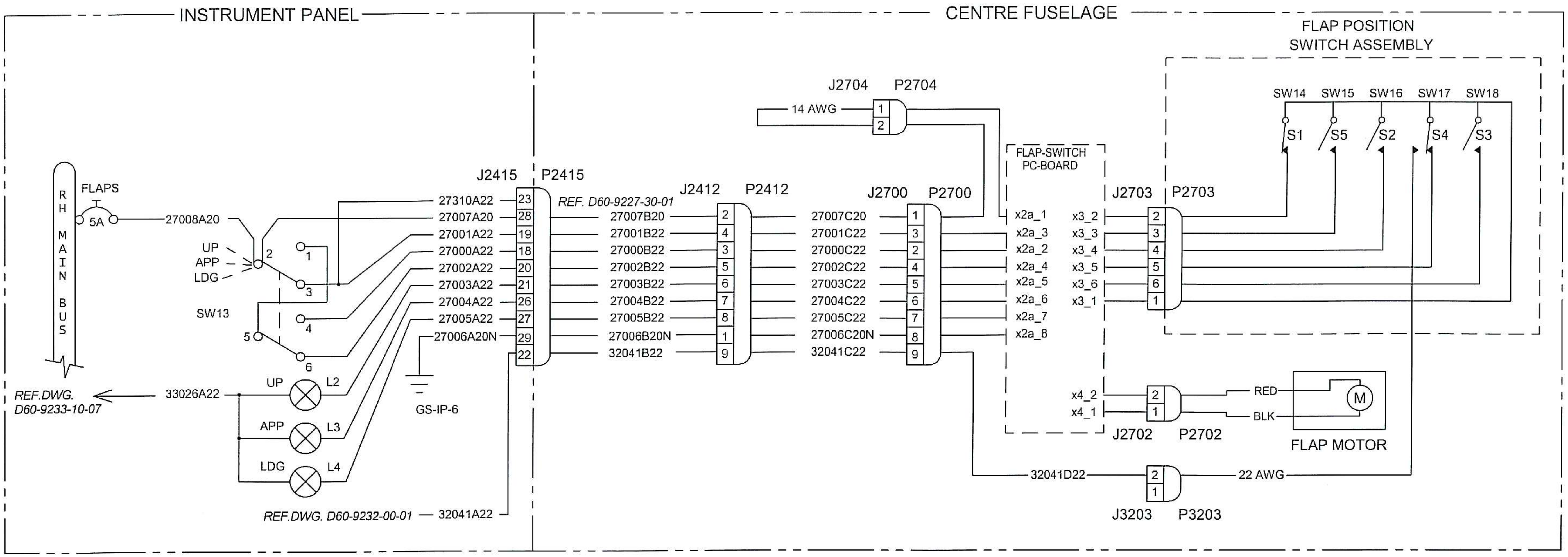
PROJECT DA 42

TITLE

Schematic, Stick Limiter Wiring, TAE125-02-114

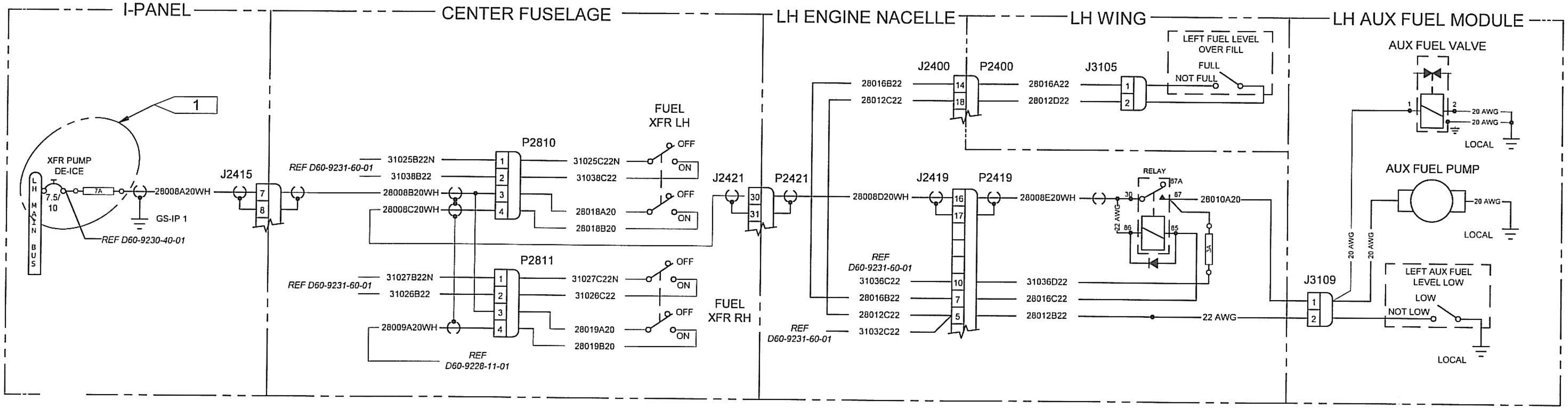
DWG.ORIG.	DWG.NO.	REV
DAIA	D60-9227-30-01x01	"-"
CODE 710197	SCALE NTS	SH 01 OF 01

Confidential



Freigabe: Unbehend 13. DEZ. 2004	Geprüft: 13.12.04	Freimaßtoleranz: ISO 2768		Maßstab: 1:1
Datum / Name	Datum / Name			
	Nächster Zusammenbau: D60-9200-00-00	Benennung: Schematik, Klappensteuerung Verkabelung		
	Diamond AIRCRAFT Industries GmbH	Name: Schematic, Flaps Wiring		
"c" MÄM 42-030 05.10.04 Kowarsch	DA42 Twin Star	Zeichnungs Nr.: D60-9227-50-01		Blatt 1 von 1
"b" MÄM 42-001 08.04.04 Kowarsch				
"a" Erstausgabe 18.02.04 Kowarsch				
Rev. Änderung Datum Name	Gespeichert unter: D60-9227-50-01c.dft			

REV	SH	ZONE	DESCRIPTION	DATE	APPROVAL
F	01	ALL	OÄM 42-056/p, CB value changed and Flag Note clarified, new standard	18.11.10	SEE TB



FLAG NOTES

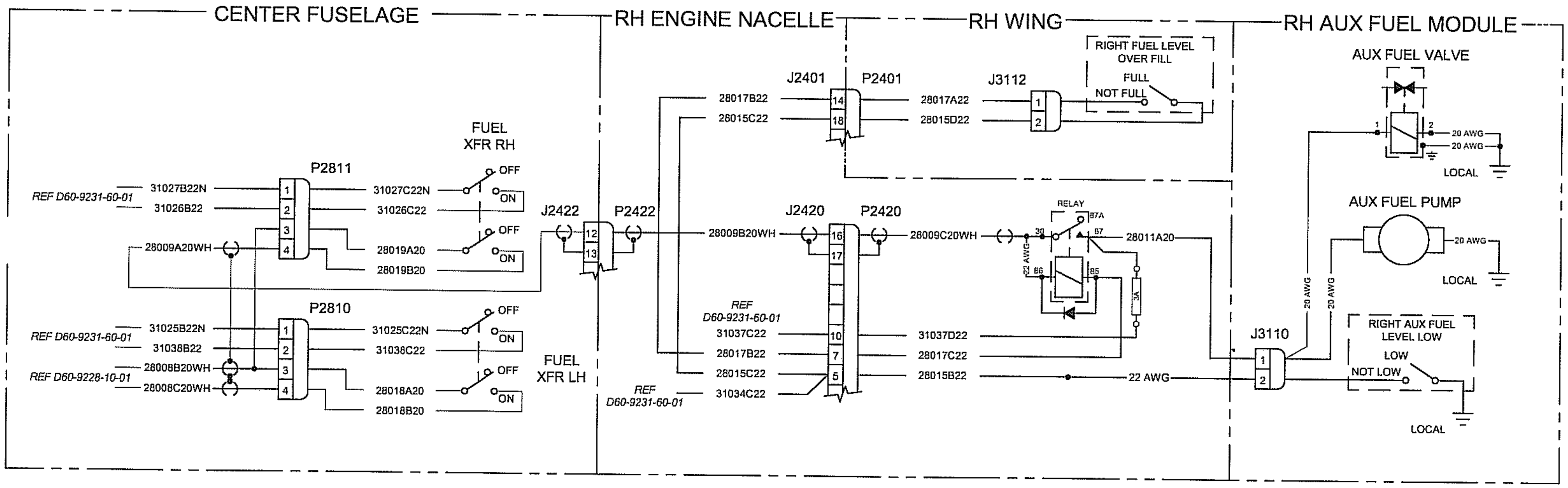
1. DEPENDING ON THE INSTALLED OPTIONS, THE INSTALLATION OF THE CIRCUIT PROTECTIVE DEVICES IS DIFFERENT.

AUX FUEL SYSTEM ONLY: 7.5A CIRCUIT BREAKER, NO FUSE

AUX FUEL SYSTEM AND DE-ICE SYSTEM: 10A CIRCUIT BREAKER AND 7A SLOW BLOW FUSE FOR THE AUX FUEL SYSTEM.

DIMENSIONS METRIC	IDENTIFICATION MARKINGS DP-S-17-00001	Diamond Aircraft Industries GmbH	Diamond Aircraft Industries, N. A. Otto-Straße 5, A-2700 Wiener Neustadt
FIRST ANGLE PROJECTION	FORMAT A3	CLASSIFICATION: NONE	DEPARTMENT / SIGN / DATE	PROJECT DA 42 / M
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM	INTERCHANGEABLE PART NO	DRAWN Kowarsch — 18.11.10	TITLE **Schematic, LH Aux Fuel Wiring**
DIMENSION TOLERANCES: 2 DECIMAL ±0,25; 1DECIMAL ±0,5; DECIMAL ±1; ANGLE ±1°; RAD ±0,5	THIS DRAWING WAS PRODUCED USING SOFTWARE: SOLID EDGE V18	CHECKED: Kowarsch — 22.11.2010	DWG.ORIG. DAIA
FINISH IN MICRO-METER 3.2	FILENAME D60-9228-10-01f.dft	QA: N/A; STRESS: N/A; MANUF.: N/A; SYSTEM: N/A	DWG.NO. D60-9228-10-01, REV "F"
		APPROVED: TL — 03. DEZ. 2010	CODE 710197, SCALE 1:1, SH 01 OF 01

REVISIONS		
Rev.	Zone	Description
"-" to "c"	-	See ÄM
"d"	-	Changed wiring for solenoid valve, connectors P2811 and P2810 added.



Approved :	Date 29. JAN 2008
Checked : M. Kowarsch	Date 18. JAN 2008
General Tolerance : ISO 2768 medium	Scale: NTS

Next Higher Assembly : D60-9200-00-00

Title : **Schematic, RH Aux Fuel Wiring**

Rev.	Change	Date	Name
"d"	OÄM 42-056i	11.01.08	Kowarsch
"c"	MÄM 42-202	05.07.06	Kowarsch
"b"	OÄM 42-056	09.05.05	Mandl
"a"		14.03.05	Kowarsch
"-"		05.12.03	C.Wood

Diamond AIRCRAFT Industries GmbH

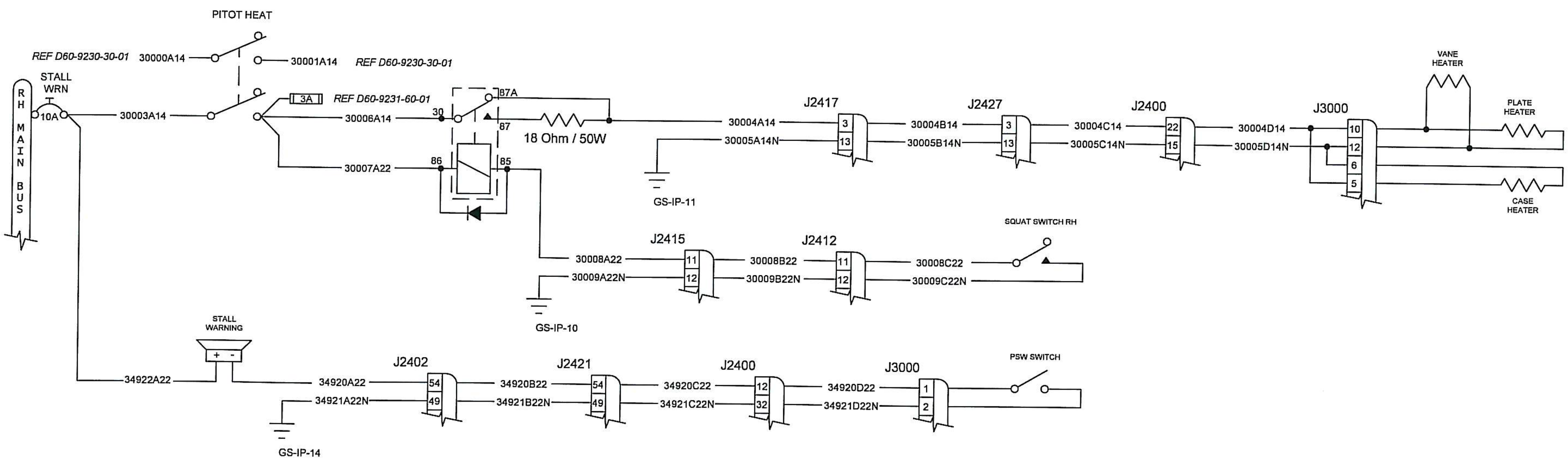
DA 42 Twin Star

Drawing Number: **D60-9228-11-01**

Sheet 1 from 1

Saved under : **D60-9228-11-01d.dft**

Weight:	N/A
Calculated Weight:	N/A



Freigabe : M. Volck

Datum 29. SEP. 2005 Name

Geprüft: J. Urbahn

Datum 28. SEP. 2005 Name

Freimaßtoleranz : ISO 2768

Maßstab : 1:1

Rev.	Änderung	Datum	Name
"-"	OÄM 42-053	20.02.04	Kowarsch

Nächster Zusammenbau : D60-9200-00-00

Diamond AIRCRAFT Industries GmbH

DA42 Twin Star

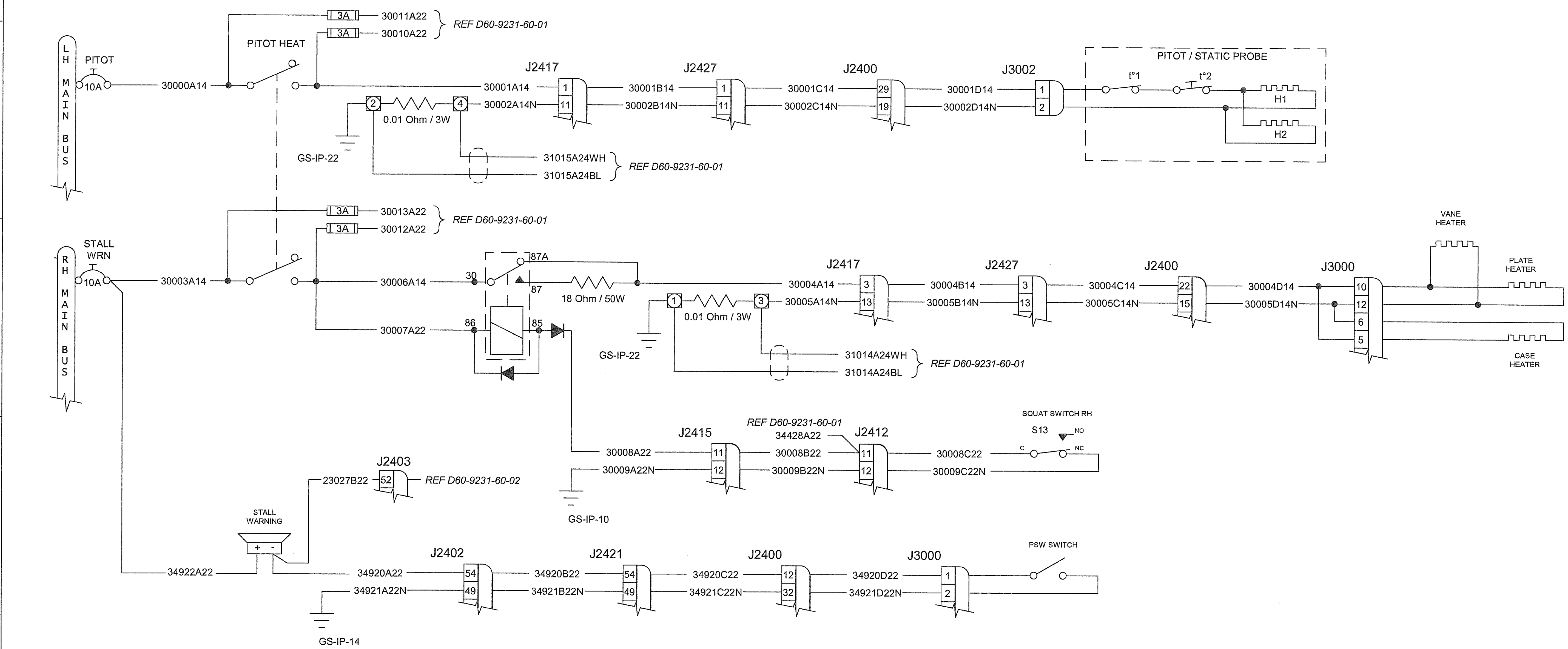
Benennung : **Schematik, Verkabelung der Überziehwarnung**

Name : **Schematic, Stall Warning Wiring**

Zeichnungs Nr.: **D60-9230-00-01**

Blatt 1 von 1

Gespeichert unter : Technikserver\DAI Zeichnun\...\D60-9230\D60-9230-00-01.dft



1. WIRING SHOWN WITH AIRPLANE ON GROUND AND NOT POWERED.

2. S13 OPENED WHEN THE AIRPLANE IS AIRBORNE, PSW SWITCH WILL CLOSE WHEN AIRPLANE STALLS.

Weight:	N/A
Calculated Weight:	N/A

Rev.	Change	Date	Name
"e"	MÄM 42-245	26.06.07	Schuster
"d"	MÄM 42-229	05.12.06	C. Wood
"c"	OÄM 42-094	03.04.06	Kowarsch
"b"	MÄM 42-061	14.03.05	Kowarsch
"a"	MÄM 42-001	07.05.04	Kowarsch
"-"		17.11.03	C. Wood

Approved : Date 12 JUL 2007 Name

Checked: M. Kowarsch Date 11. JULI 2007 Name

General Tolerance : ISO 2768 medium

Scale: NTS

Next Higher Assembly : D60-9200-00-00

Diamond AIRCRAFT Industries GmbH

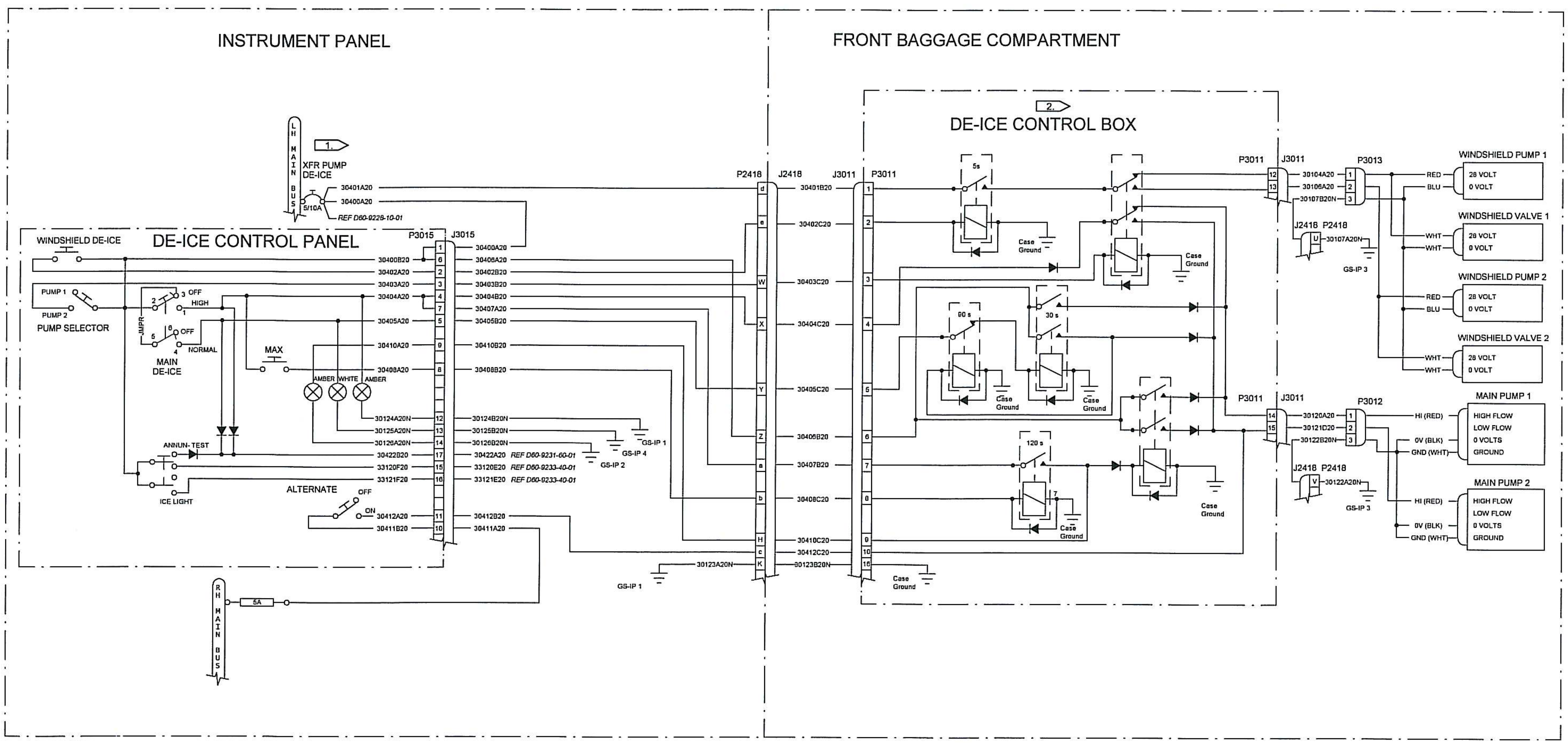
DA 42 Twin Star

Title : **Schematic, Pitot and Stall Heat Wiring**

Drawing Number: **D60-9230-30-01**

Sheet 1 from 1

Saved under : D60-9230-30-01e.dft



NOTE:

1. 10 A CB IS REQUIRED IF BOTH SYTEMS, THE DE ICE SYSTEM AND THE FUEL TRANSFER SYSTEM ARE INSTALLED.
2. SUPPLIED BY KRUTZ MESSTECHNIK

Approved: M. Voick	Date: 24. FEB. 2006	Checked: J. Unterhehend	24. FEB. 2006
General Tolerance: ISO 2768 N/A		Scale: NTS	
Next Higher Assembly: D60-9200-00-00		Title: Wiring, De-Ice Control System	

Rev.	Change	Date	Name
"d"	MÄM 42-172	01.02.06	Kowarsch
"c"	MÄM 42-106	25.08.05	Kowarsch
"b"		07.06.05	Kowarsch
"a"	OÄM 42-053	18.02.05	MANDL
"-"		13.10.04	Kowarsch

Diamond Aircraft Industries GmbH

DA 42 Twin Star

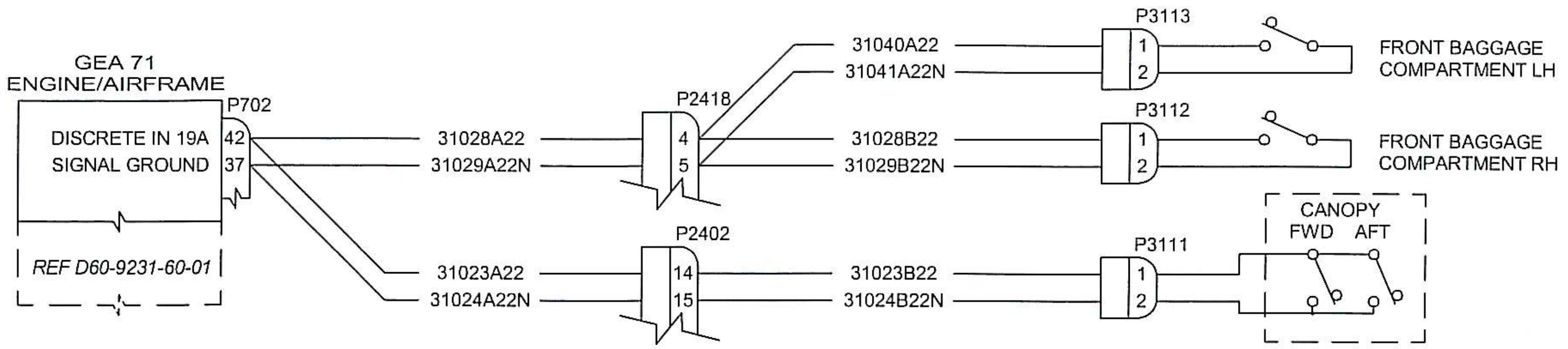
Drawing Number: D60-9230-40-01

Sheet 1 from 1

Saved under: D60-9230-40-01d.dft

Weight: N/A

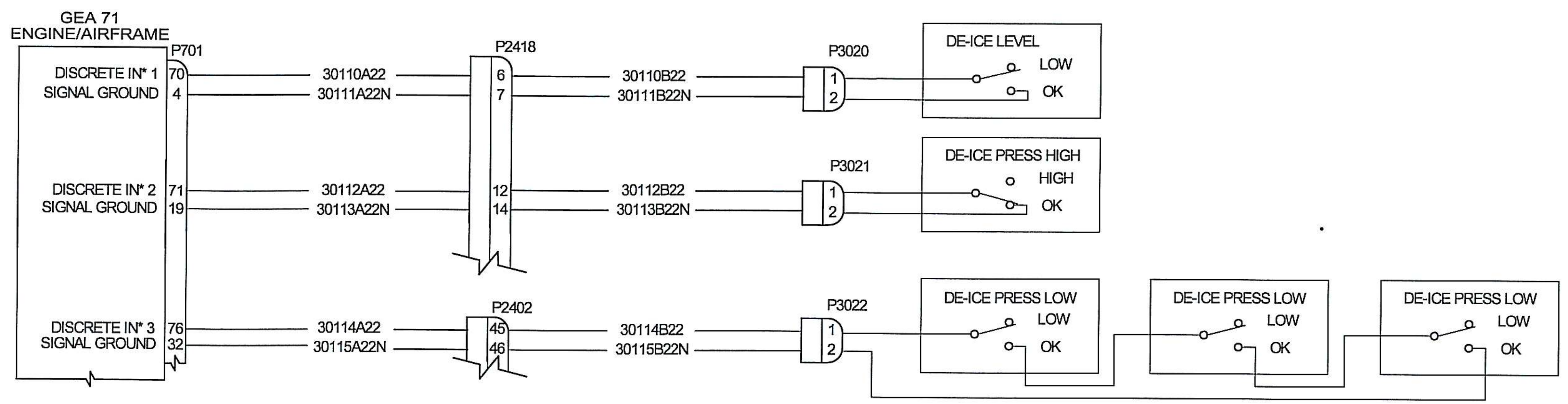
Calculated Weight: N/A



Freigabe M. Volck		Geprüft :	Freimaßtoleranz : ISO 2768		Maßstab : 1:1
Datum 01. JUNI 2004	Name	Datum / Name			
Nächster Zusammenbau : D60-9200-00-00		Benennung : **Verkabelung, Door Warning Schalter**			
Diamond AIRCRAFT Industries GmbH		Name : **Wiring, Door Warning Switches**			
DA42 Twin Star		Zeichnungs Nr.: **D60-9231-00-01**			Blatt **1** von **1**

Rev.	Änderung	Datum	Name
"-"	MÄM 42-001	11.03.04	Kowarsch

Gespeichert unter : **Technikserver\DAI Zeichnun\...\D60-9231\D60-9231-00-01.dft**



NOTES:

1. SWITCHES SHOWN IN UNPOWERED STATE AND NO FLUID IN DE-ICE TANK

Freigabe: M. Voick	Datum 10. NOV. 2005	Name	
"a"	ÖAM 42-053b	21.10.05	Mandl
"-"	ÖAM 42-053	15.02.05	Mandl
Rev.	Änderung	Datum	Name

Geprüft: J. Unbehend — Datum 10. NOV. 2005 — Name

Freimaßtoleranz: ISO 2768

Maßstab: 1:1

Nächster Zusammenbau: D60-9200-00-00

Diamond AIRCRAFT Industries GmbH

DA42 Twin Star

Benennung: **Verkabelung, De- Ice Warning System**

Name: **Wiring, De- Ice Warning System**

Zeichnungs Nr.: **D60-9231-00-02**

Blatt 1 von 1

Gespeichert unter: D60-9231-00-02a.dft

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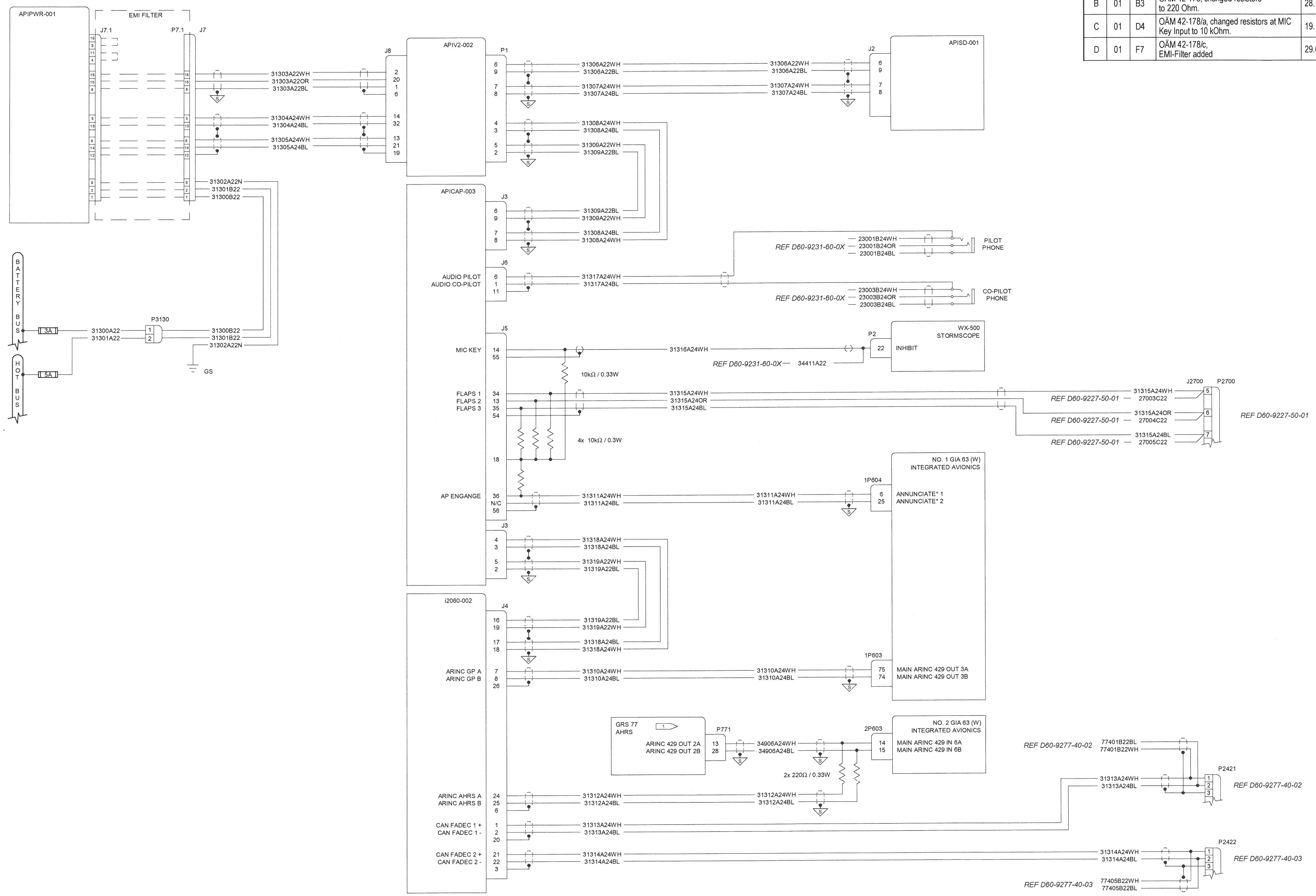
REVISION					
REV	SH	ZONE	DESCRIPTION	DATE	APPROVAL
A	01	B5	changed AHRS connection at i2060 to Pins 9 and 10	22.10.09	SEE TB
B	01	B3	OÄM 42-178, changed resistors to 220 Ohm.	28.10.09	SEE TB
C	01	D4	OÄM 42-178/a, changed resistors at MIC Key Input to 10 kOhm.	19.11.09	SEE TB
D	01	F7	OÄM 42-178/c, EMI-Filter added	29.03.12	SEE TB



FLAG NOTES

1 GRS 77 SHOWN FOR REFERENCE ONLY.

DIMENSIONS METRIC		
FIRST ANGLE PROJECTION	FORMAT A2	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM		
DIMENSION TOLERANCES	3.2	
2 DECIMAL ±0,25		
1DECIMAL ±0,5		
DECIMAL ±1	FINISH IN MICRO-METER	
ANGLE ±1°		
RAD ±0,5		

IDENTIFICATION MARKINGS
DE-S-10-00003
CLASSIFICATION: NONE
INTERCHANGEABLE PART NO
THIS DRAWING WAS PRODUCED USING
SOFTWARE: SOLID EDGE V18
FILENAME D60-9231-30-01d.dft

Diamond Aircraft Industries GmbH

Diamond Aircraft Industries — N. A. Otto-Straße 5, A-2700 Wiener Neustadt

DEPARTMENT		SIGN	DATE
DRAWN	Dostal		29.03.12
CHECKED:	Kowarsch		30.03.2012
QA:	N/A		
STRESS:	N/A		
MANUF.:	N/A		
SYSTEM:	N/A		
APPROVED:	TL		02-04-2012

PROJECT DA 42 NG
TITLE **Schematic, FDR Wiring**
DWG.ORIG. DAIA — DWG.NO. D60-9231-30-01 — REV "D"
CODE 710197 — SCALE NTS — SH 01 OF 01

Confidential

8	7	6	5	4	3	2	1

REVISIONS

Rev.	Zone	Description
"-" to "m"	-	See ÄM
"n"	-	Revision level raised due to changes on sheet 4.

F

E

D

C

B

A

NOTES:

1. UNLESS OTHERWISE NOTED, ALL STRANDED WIRE MUST CONFORM TO MIL-W-22759/16 OR EQUIVALENT
2. UNLESS OTHERWISE NOTED, ALL SHIELDED WIRE MUST CONFORM TO MIL-C-27500 OR EQUIVALENT
3. UNLESS OTHERWISE NOTED, ALL WIRES ARE 24 GAUGE MINIMUM.
4. SYMBOL DESIGNATIONS
   - TWISTED SHIELDED SINGLE CONDUCTOR SHIELD TERMINATED TO GROUND
   - TWISTED SHIELDED SINGLE CONDUCTOR SHIELD FLOATS
   - TWISTED SHIELDED PAIR SHIELD TERMINATED TO GROUND
   - TWISTED SHIELDED PAIR SHIELD FLOATS
   - TWISTED SHIELDED 3 CONDUCTOR SHIELD TERMINATED TO GROUND
   - TWISTED SHIELDED 3 CONDUCTOR SHIELD FLOATS
   - TWISTED SHIELDED 4 CONDUCTOR SHIELD TERMINATED TO GROUND
   - TWISTED SHIELDED 4 CONDUCTOR SHIELD FLOATS
   - AIRCRAFT GROUND
   - GARMIN (SHIELD BLOCK) GROUND REFER TO DOC. 190-00313-09
   - WIRE SPLICE CONNECTION
   - COAXIAL CABLE
   - N/C = NO CONNECTION

5. UNLESS OTHERWISE NOTED, ALL SHIELD GROUNDS MUST BE MADE TO THE RESPECTIVE UNIT BACKSHELLS. ALL OTHER GROUNDS SHOULD BE TERMINATED TO AIRCRAFT GROUND AS CLOSE TO THE RESPECTIVE UNIT AS POSSIBLE.

7. USE AIRCRAFT GRADE CATEGORY 5 ETHERNET CABLE.

MANUFACTURER	P/N
PIC WIRE AND CABLE	E10422 (22 GAUGE)
PIC WIRE AND CABLE	E10424 (24 GAUGE)
ELECTRONIC CABLE SPECIALIST	392404 (24 GAUGE)

8. INSTALLATION INSTRUCTIONS FOR OAT PROBE, GMU44, GND HARNESS, CONFIGURATION MODULES, AND THERMOCOUPLES.

DESCRIPTION	DRAWING NUMBER
INSTR SHEET, OAT PROBE	190-00313-00
INSTR SHEET, GMU44	190-00313-04
INSTR SHEET, CONFIG MODULE	190-00313-02
INSTR SHEET, THERMOCOUPLE	190-00313-01

9. FOR FAN FAIL OUTPUT: OPEN = ACTIVE = FAN FAIL, GROUND = INACTIVE = FAN OK
10. FOR TRIM FAIL OUTPUT: GROUND = ACTIVE = TRIM FAIL, OPEN = INACTIVE = TRIM OK

19. RELATED DOCUMENTS
    190-00295-27 UNIT INTERCONNECT SUMMARY.
    190-00295-28 UNIT POWER.
    190-00295-29 INTERCONNECT.

21. FOR GROUNDING PROCEDURE REFER TO GARMIN DOCUMENTS 190-00313-00 AND 190-00313-04. ADDITIONAL FOR IFR OPERATION, REFER TO GARMIN DOCUMENT 190-00313-09.

21. NOTE THE FOLLOWING PIN DIFFERENCES IN REV 2 AND REV 3 GIA P603:

PIN NAME	REV 2 PIN	REV 3 PIN
CAN BUS 1 TERMINATION	35	34
CAN BUS 2 HI	29	32

REV 2 UNITS HAVE SERIAL NUMBERS LESS THAN 46901600
REV 3 UNITS HAVE SERIAL NUMBERS OF 46901600 OR GREATER

Approved : C. Jütte
Date 29. JAN. 2008 Name

Checked : M. Kowarsch
Date 18. JAN. 2008 Name

General Tolerance : ISO 2768

Scale: NTS

Next Higher Assembly: D60-9200-00-00

Title : **Schematic, G1000**

Rev.	Change	Date	Name
"n"	OÄM 42-056i	11.01.08	Kowarsch
"m"	OÄM 42-094b	08.01.07	Kowarsch
"l"	MÄM 42-202	06.07.06	Kowarsch
"k"	OÄM 42-094	18.05.06	Kowarsch
"i"	MÄM 42-178	16.03.06	Kowarsch
"h"	MÄM 42-156	11.01.06	Mandl
"g"	MÄM 42-089	17.05.05	Kowarsch

Diamond AIRCRAFT Industries GmbH

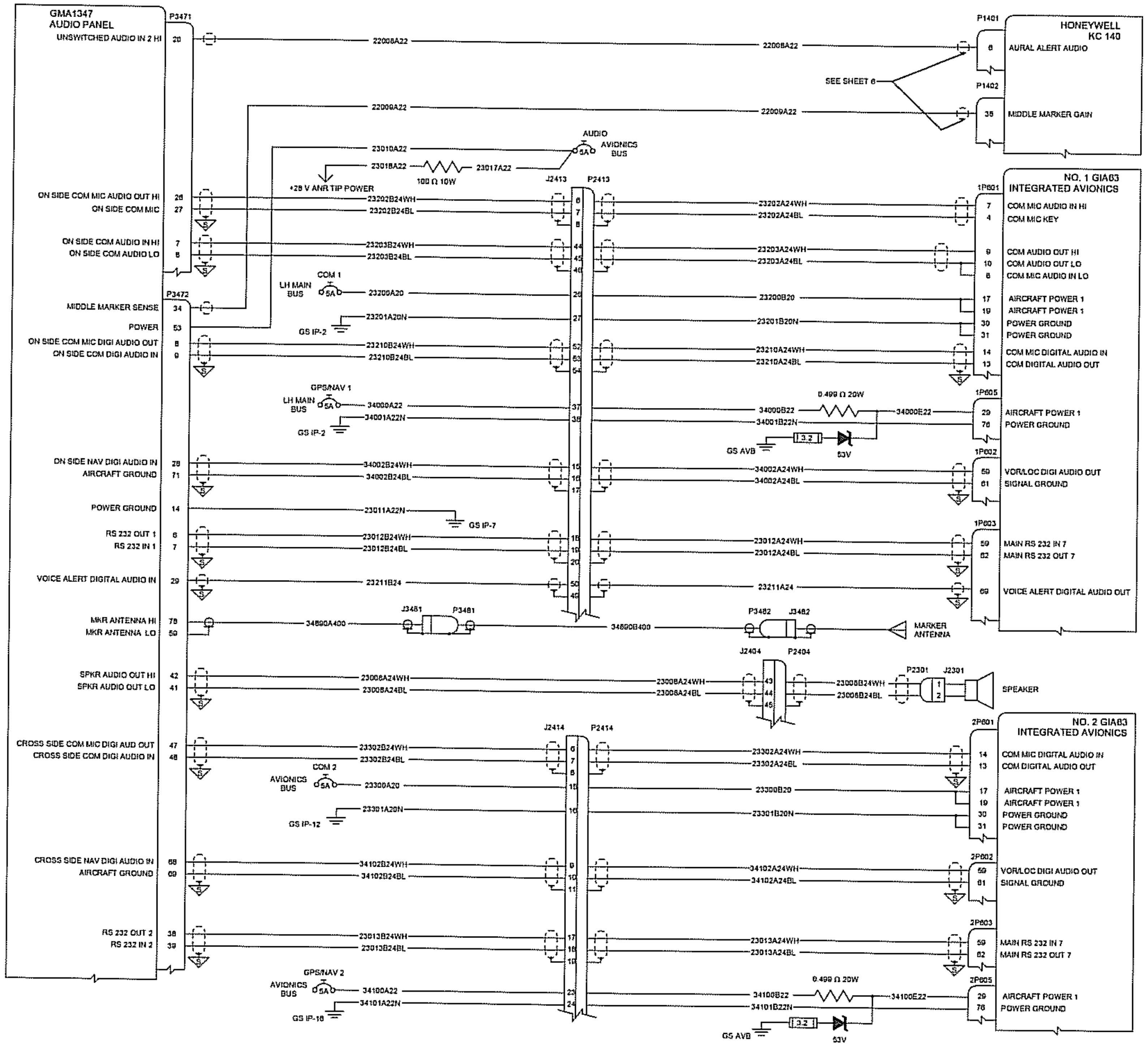
DA 42 Twin Star

Drawing Number: **D60-9231-60-01**

Sheet 1 from 6

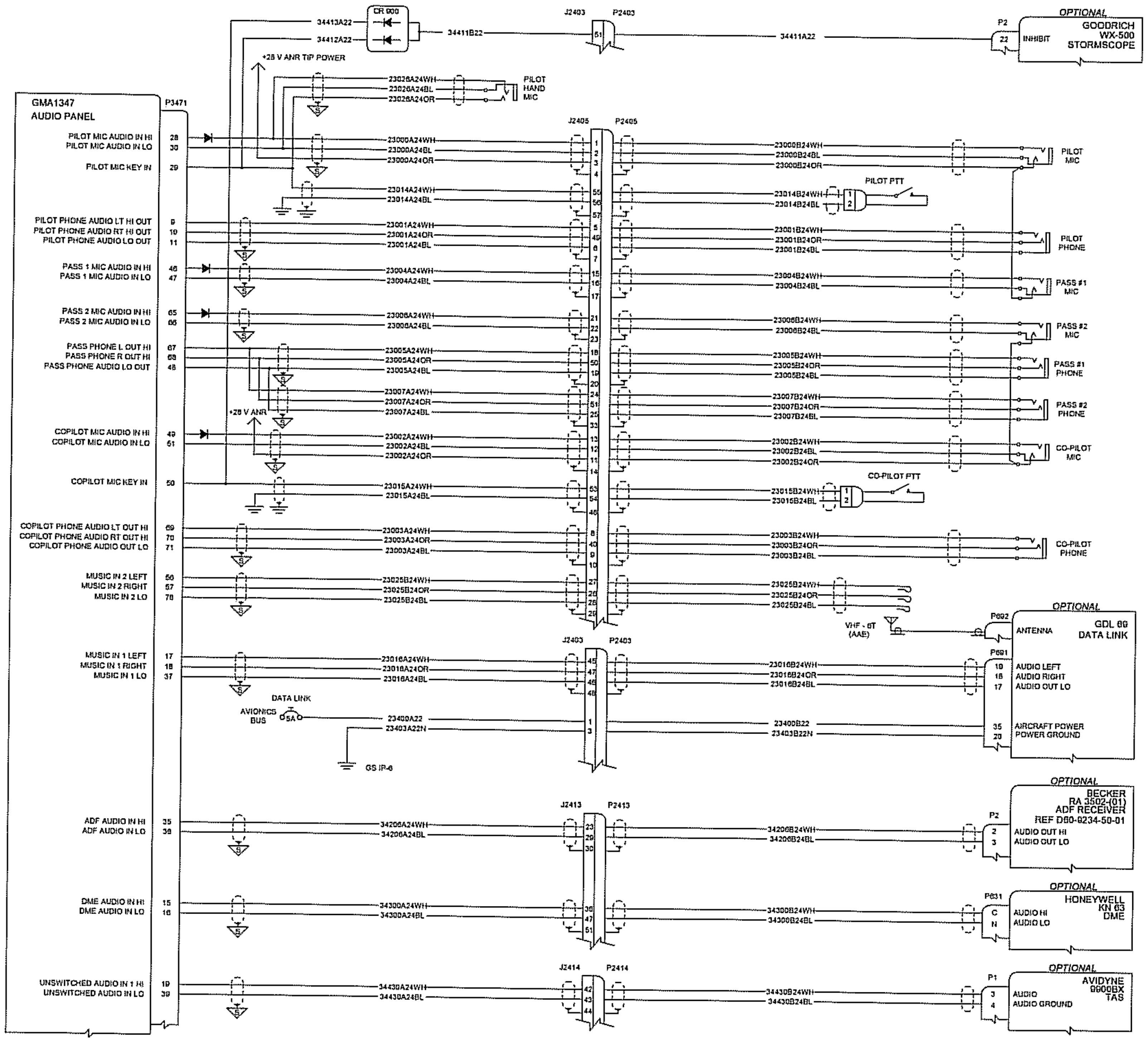
Saved under : **D60-9231-60-01n.dft**

Rev.	Zone	Description
"-" to "m"	-	See ÄM
"n"	-	Revision level raised due to changes on sheet 4.

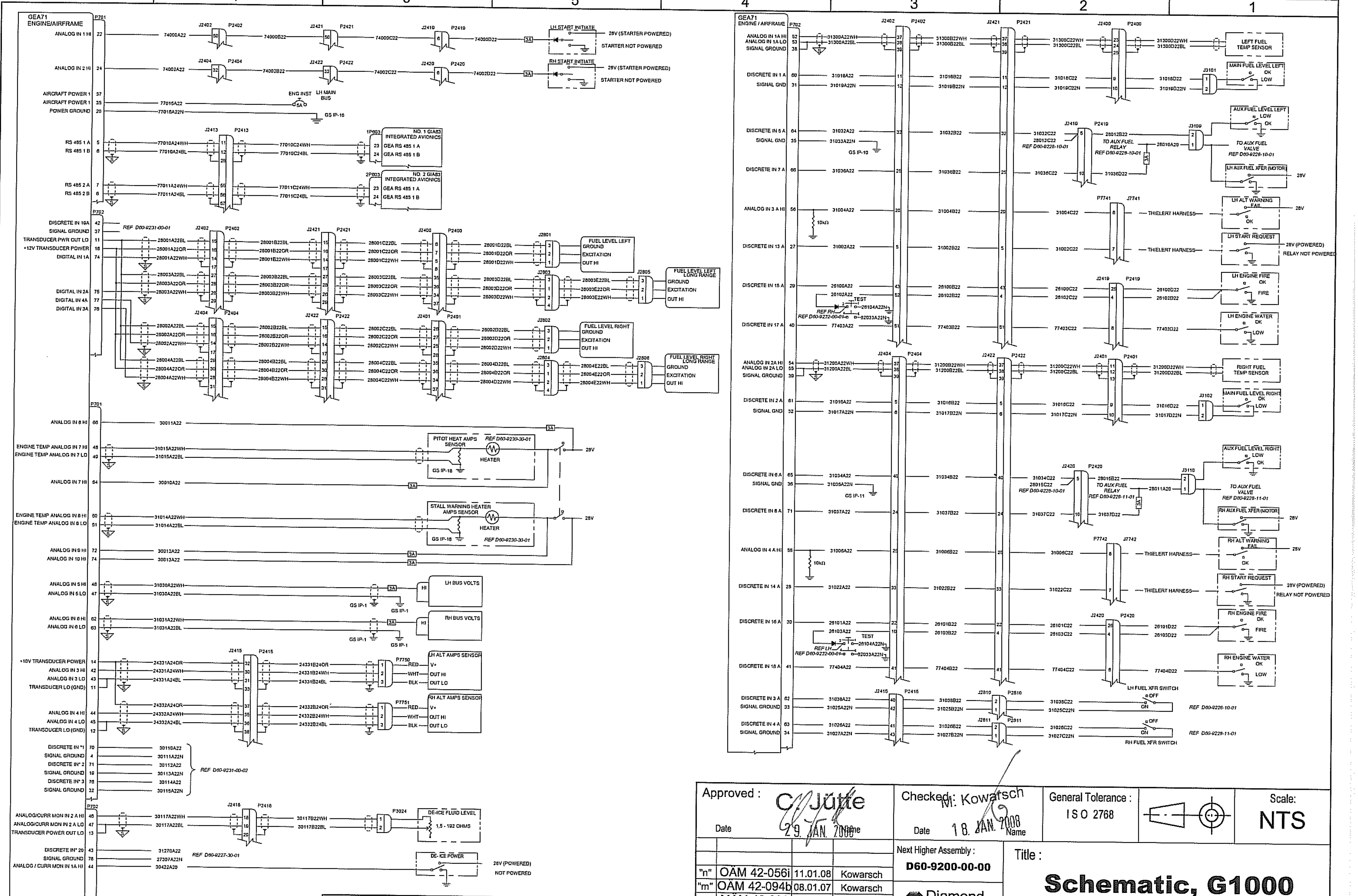


Approved : C. Jütte				Checked: M. Kowarsch	General Tolerance : ISO 2768	Scale: NTS
Date 29. JAN. 2008				Date 18. JAN. 2008		
"n"	OÄM 42-056i	11.01.08	Kowarsch	Next Higher Assembly : D60-9200-00-00	Title : Schematic, G1000	
"m"	OÄM 42-094b	08.01.07	Kowarsch	Diamond AIRCRAFT Industries GmbH		
"l"	MÄM 42-202	06.07.06	Kowarsch			
"k"	OÄM 42-094	18.05.06	Kowarsch			
"i"	MÄM 42-178	16.03.06	Kowarsch	DA 42 Twin Star	Drawing Number: D60-9231-60-01	Sheet 2 from 6
"h"	MÄM 42-156	11.01.06	Mandl			
"g"	MÄM 42-089	17.05.05	Kowarsch			
Rev.	Change	Date	Name	Saved under :	D60-9231-60-01n.dft	

REVISIONS		
Rev.	Zone	Description
"i" to "m"	-	See ÄM
"n"	-	Revision level raised due to changes on sheet 4.



Approved : C. Jütte				Checked : M. Kowarsch	General Tolerance : ISO 2768	Scale: NTS
Date 29. JAN. 2008			Name	Date 18. JAN. 2008 Name		
				Next Higher Assembly : D60-9200-00-00	Title : Schematic, G1000	
"n"	OÄM 42-056i	11.01.08	Kowarsch	Diamond AIRCRAFT Industries GmbH		
"m"	OÄM 42-094b	08.01.07	Kowarsch			
"l"	MÄM 42-202	06.07.06	Kowarsch			
"k"	OÄM 42-094	18.05.06	Kowarsch			
"i"	MÄM 42-178	16.03.06	Kowarsch	DA 42 Twin Star	Drawing Number: D60-9231-60-01	Sheet 3 from 6
"h"	MÄM 42-156	11.01.06	Mandl			
"g"	MÄM 42-089	17.05.05	Kowarsch			
Rev.	Change	Date	Name	Saved under :	D60-9231-60-01n.dft	



Approved :	C. Jütte	Checked :	M. Kowarsch	General Tolerance : ISO 2768	Scale: NTS
Date	29. JAN. 2008 Name	Date	18. JAN. 2008 Name		

Next Higher Assembly : **D60-9200-00-00**

Title : **Schematic, G1000**

Diamond AIRCRAFT Industries GmbH

DA 42 Twin Star

Drawing Number: **D60-9231-60-01**

Sheet 4 from 6

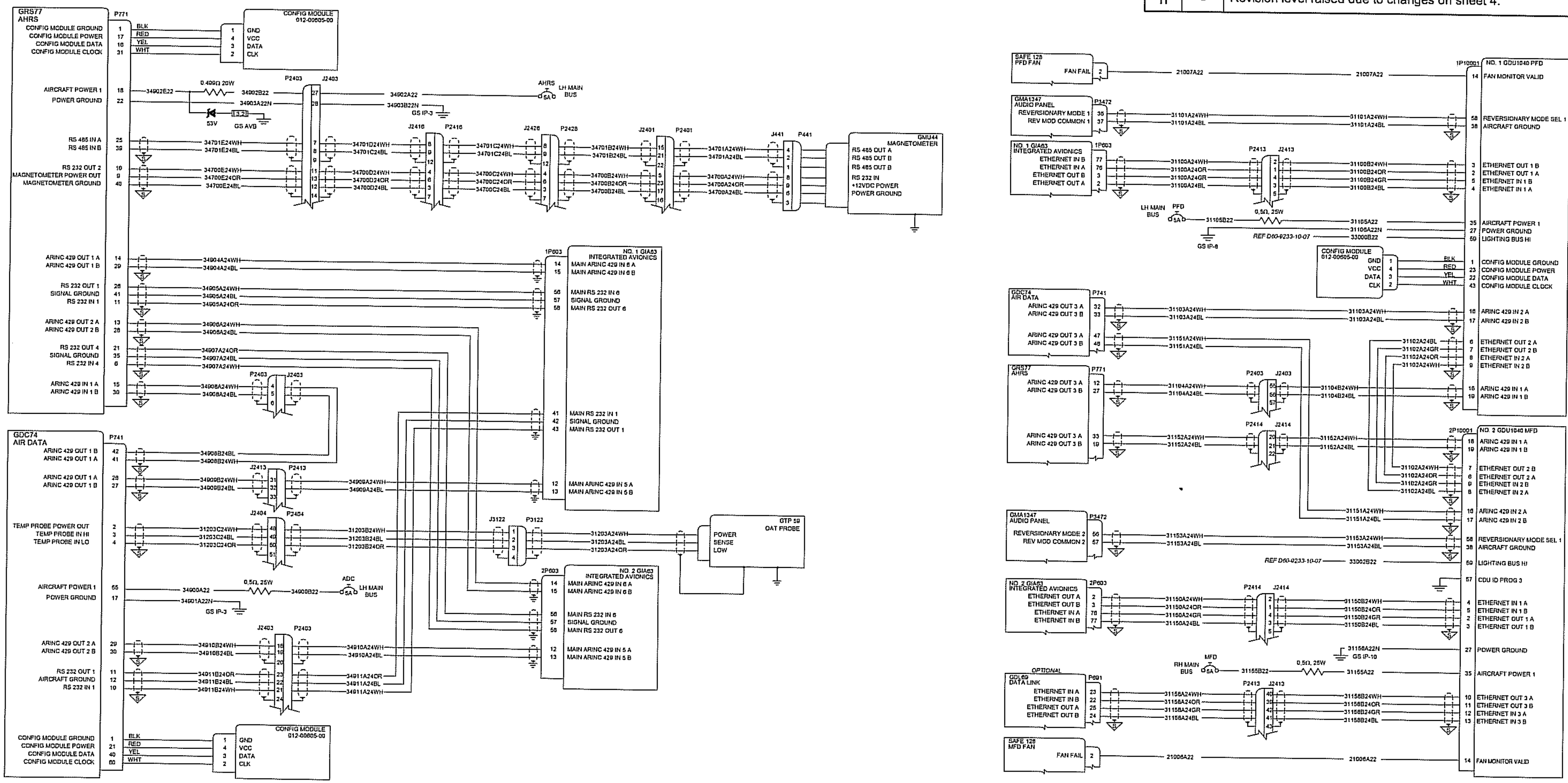
Saved under : **D60-9231-60-01n.dft**

Rev.	Change	Date	Name
"n"	OÄM 42-056i	11.01.08	Kowarsch
"m"	OÄM 42-094b	08.01.07	Kowarsch
"l"	MÄM 42-202	06.07.06	Kowarsch
"k"	OÄM 42-094	18.05.06	Kowarsch
"i"	MÄM 42-178	16.03.06	Kowarsch
"h"	MÄM 42-156	11.01.06	Mandl
"g"	MÄM 42-089	17.05.05	Kowarsch

REVISIONS

Rev.	Zone	Description
"i" to "m"	-	See ÄM
"n"	-	Updated fuel xfer wiring.

REVISIONS		
Rev.	Zone	Description
"_" to "m"	-	See ÄM
"n"	-	Revision level raised due to changes on sheet 4.

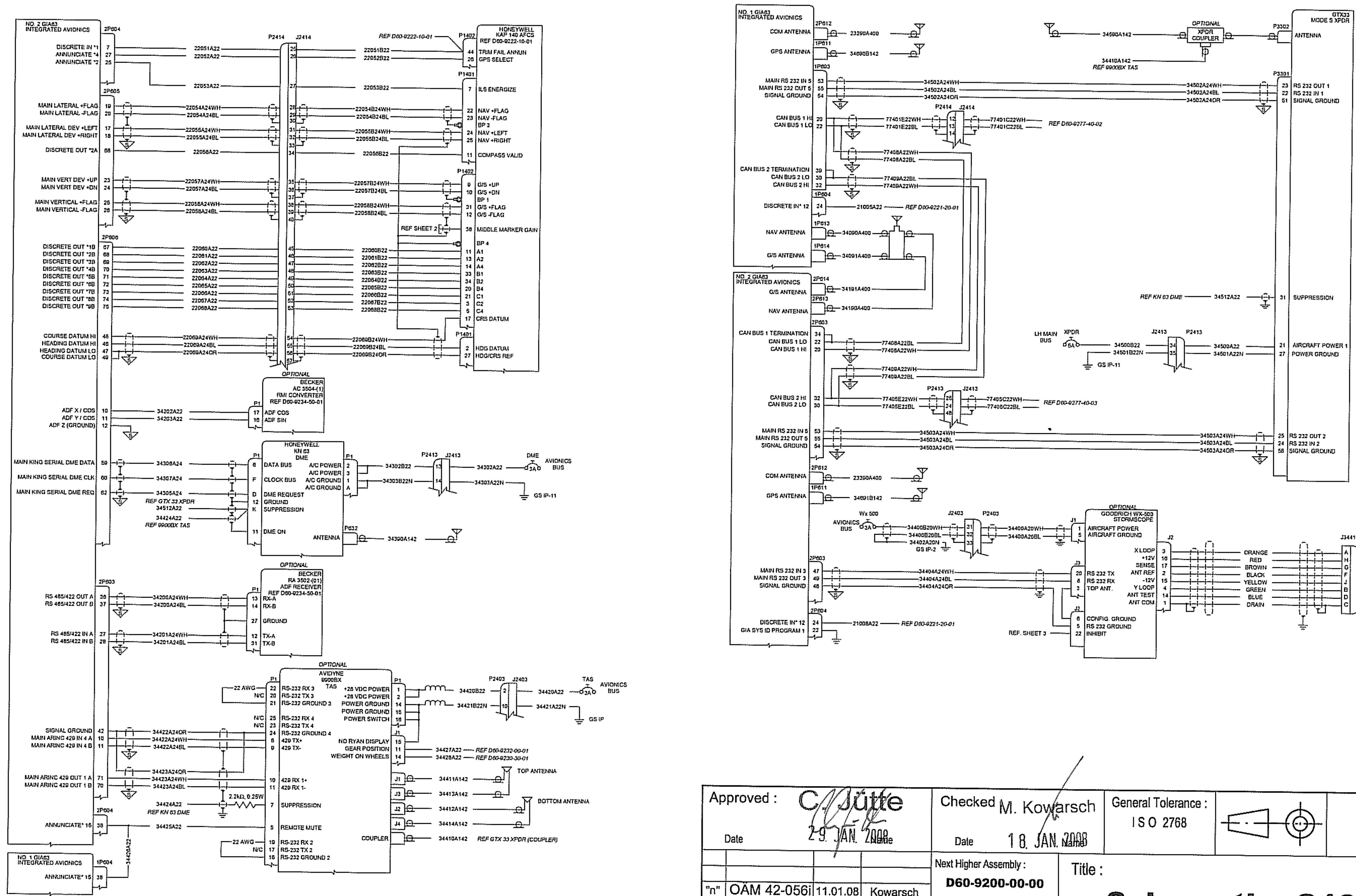


Approved : C. Jütte				Checked : M. Kowarsch	General Tolerance : ISO 2768	Scale: NTS
Date	29. JAN. 2008	Name		Date 10. JAN. 2008 Name		
				Next Higher Assembly : D60-9200-00-00	Title : Schematic, G1000	
"n"	OÄM 42-056i	11.01.08	Kowarsch	Diamond AIRCRAFT Industries GmbH		
"m"	OÄM 42-094b	08.01.07	Kowarsch			
"l"	MÄM 42-202	06.07.06	Kowarsch			
"k"	OÄM 42-094	18.05.06	Kowarsch			
"i"	MÄM 42-178	16.03.06	Kowarsch	DA 42 Twin Star	Drawing Number: D60-9231-60-01	Sheet 5 from 6
"h"	MÄM 42-156	11.01.06	Mandl			
"g"	MÄM 42-089	17.05.05	Kowarsch			
Rev.	Change	Date	Name	Saved under :	D60-9231-60-01n.dft	

8	7	6	5	4	3	2	1

REVISIONS

Rev.	Zone	Description
"" to "m"	-	See ÄM
"n"	-	Revision level raised due to changes on sheet 4.



Approved : C. Jütte				Checked M. Kowarsch	General Tolerance : ISO 2768		Scale: NTS
Date 29. JAN. 2008				Date 18. JAN. 2008			
				Next Higher Assembly: D60-9200-00-00	Title :		
"n"	OÄM 42-056i	11.01.08	Kowarsch		**Schematic, G1000**		
"m"	OÄM 42-094b	08.01.07	Kowarsch	Diamond AIRCRAFT Industries GmbH			
"l"	MÄM 42-202	06.07.06	Kowarsch				
"k"	OÄM 42-094	18.05.06	Kowarsch				
"i"	MÄM 42-178	16.03.06	Kowarsch	**DA 42** Twin Star	Drawing Number: **D60-9231-60-01**		Sheet 6 from 6
"h"	MÄM 42-156	11.01.06	Mandl				
"g"	MÄM 42-089	17.05.05	Kowarsch				
Rev.	Change	Date	Name	Saved under :	**D60-9231-60-01n.dft**		

F	E	D	C	B	A

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REVISION					
REV	SH	ZONE	DESCRIPTION	DATE	APPROVAL
-	01	ALL	MÄM 42-587 FIRST RELEASE	17.11.11	SEE TB

NOTES:

1. SYMBOL DESIGNATIONS
   - TWISTED SHIELDED SINGLE CONDUCTOR SHIELD TERMINATED TO GROUND
   - TWISTED SHIELDED SINGLE CONDUCTOR SHIELD FLOATS
   - TWISTED SHIELDED PAIR SHIELD TERMINATED TO GROUND
   - TWISTED SHIELDED PAIR SHIELD FLOATS
   - TWISTED SHIELDED 3 CONDUCTOR SHIELD TERMINATED TO GROUND
   - TWISTED SHIELDED 3 CONDUCTOR SHIELD FLOATS
   - TWISTED SHIELDED 4 CONDUCTOR SHIELD TERMINATED TO GROUND
   - TWISTED SHIELDED 4 CONDUCTOR SHIELD FLOATS
   - AIRCRAFT GROUND
   - GARMIN (SHIELD BLOCK) GROUND REFER TO DOC. 190-00313-09
   - WIRE SPLICE CONNECTION
   - COAXIAL CABLE
   - N/C = NO CONNECTION

2. NOTE THE FOLLOWING PIN DIFFERENCES IN REV 2 AND REV 3 GIA P603:

PIN NAME	REV 2 PIN	REV 3 PIN
CAN BUS 1 TERMINATION	35	34
CAN BUS 2 HI	29	32

REV 2 UNITS HAVE SERIAL NUMBERS LESS THAN 46901600
REV 3 UNITS HAVE SERIAL NUMBERS OF 46901600 OR GREATER

DIMENSIONS METRIC		IDENTIFICATION MARKINGS DP-S-17-00001	- / -
FIRST ANGLE PROJECTION	FORMAT A3	CLASSIFICATION: NONE	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM		INTERCHANGEABLE PART	NO
DIMENSION TOLERANCES 2 DECIMAL ±0,25; 1DECIMAL ±0,5; DECIMAL ±1; ANGLE ±1°; RAD ±0,5	3.2 FINISH IN MICRO-METER	THIS DRAWING WAS PRODUCED USING SOFTWARE: SOLID EDGE V18	
		FILENAME D60-9231-60-01_01.dft	

Diamond Aircraft Industries GmbH — Diamond Aircraft Industries, N. A. Otto-Straße 5, A-2700 Wiener Neustadt

DEPARTMENT		SIGN	DATE
DRAWN	Kowarsch		17.11.11
CHECKED:	Kowarsch		21.11.2011
QA:	N/A		
STRESS:	N/A		
MANUF.:	N/A		
SYSTEM:	N/A		
APPROVED:	TL		26-11-2011

PROJECT DA 42

TITLE

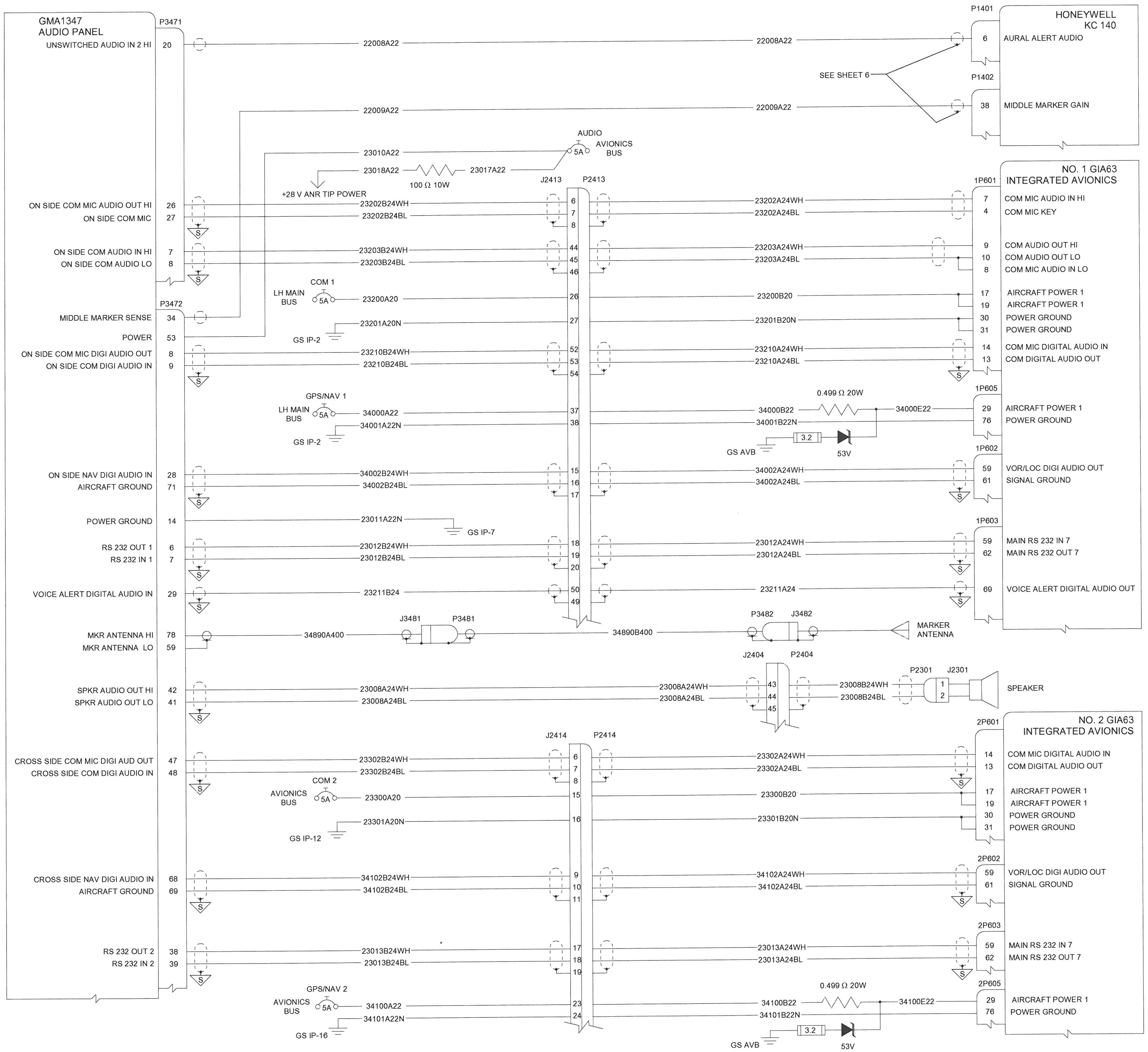
Schematic, G1000

DWG.ORIG.	DWG.NO.	REV
DAIA	D60-9231-60-01_01	"-"

CODE 710197 | SCALE NTS | SH 01 OF 06

Confidential

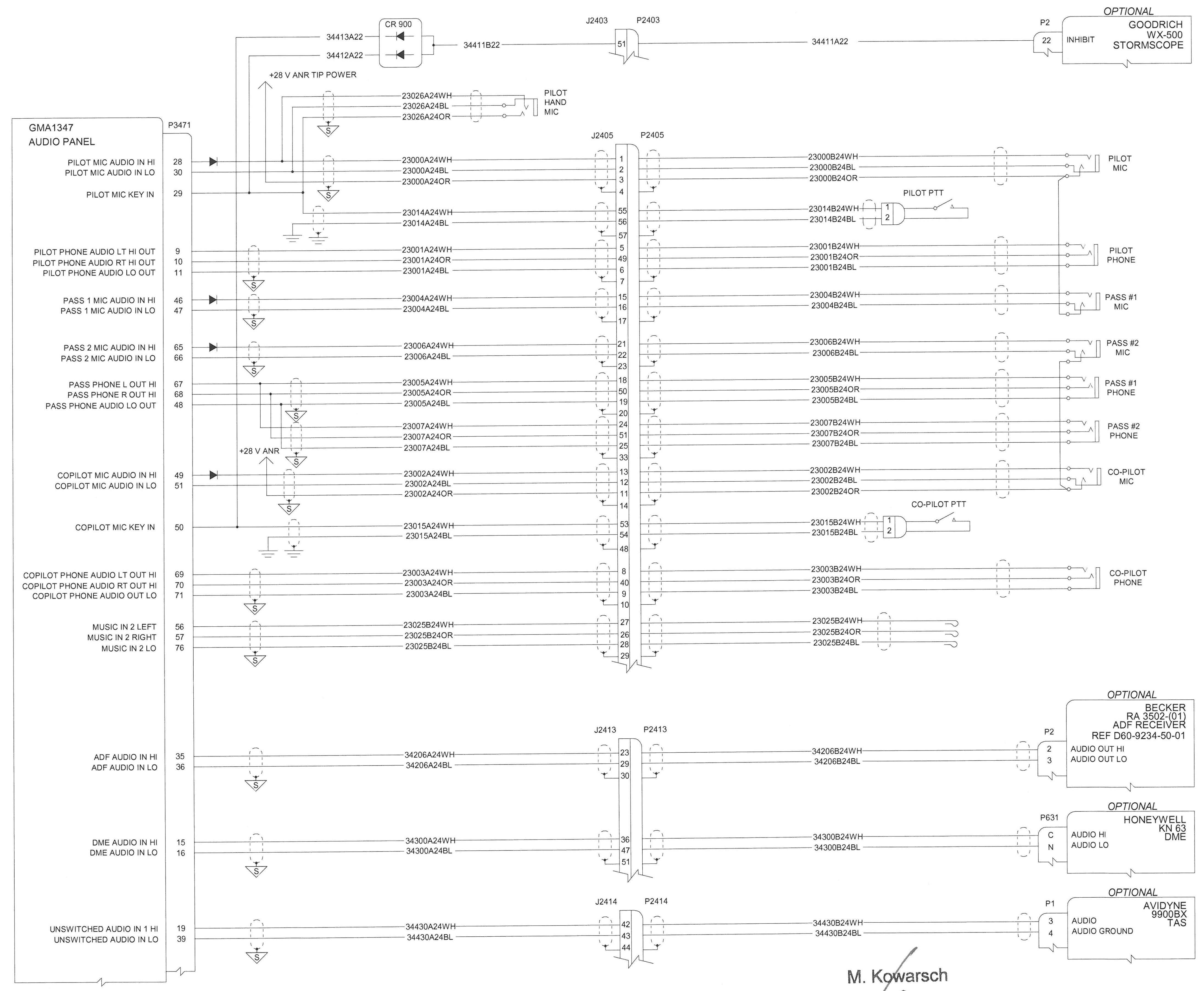
Confidential



M. Kowarsch
21 NOV 2011

Diamond Aircraft Industries GmbH	PROJECT DA 42	TITLE Schematic, G1000	DWG.ORIG. DAIA
Diamond Aircraft Industries	N. A. Otto-Straße 5 A-2700 Wiener Neustadt		DWG.NO. D60-9231-60-01_01 REV "-"
			CODE 710197 SCALE SH 02 OF 06

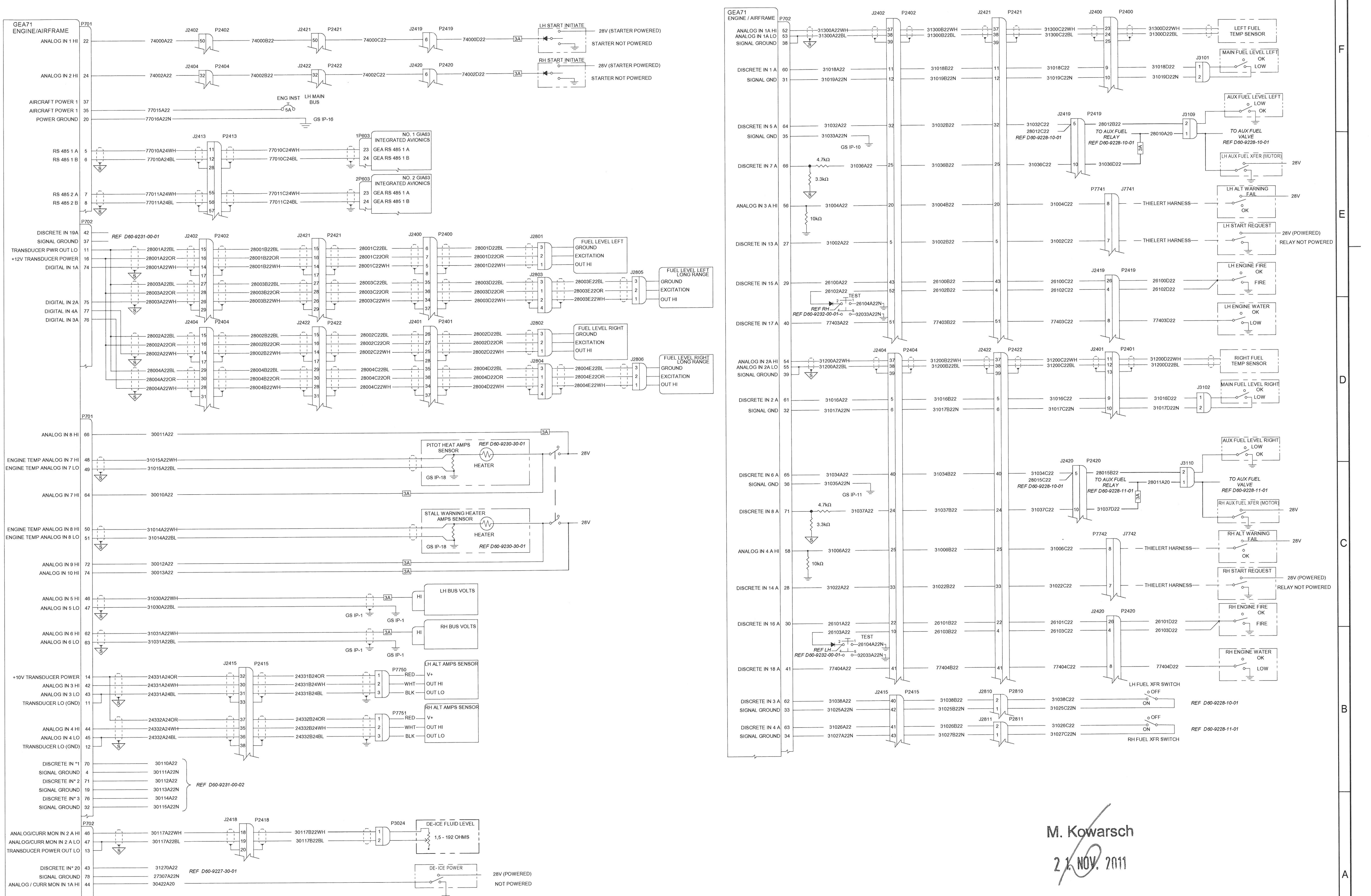
Confidential



M. Kowarsch
21. NOV. 2011

Diamond Aircraft Industries GmbH	PROJECT DA 42	TITLE	DWG.ORIG.	DWG.NO.	REV
Diamond Aircraft Industries	N. A. Otto-Straße 5 A-2700 Wiener Neustadt	Schematic, G1000	DAIA	D60-9231-60-01_01	-.-
			CODE 710197	SCALE	SH 03 OF 06

Confidential

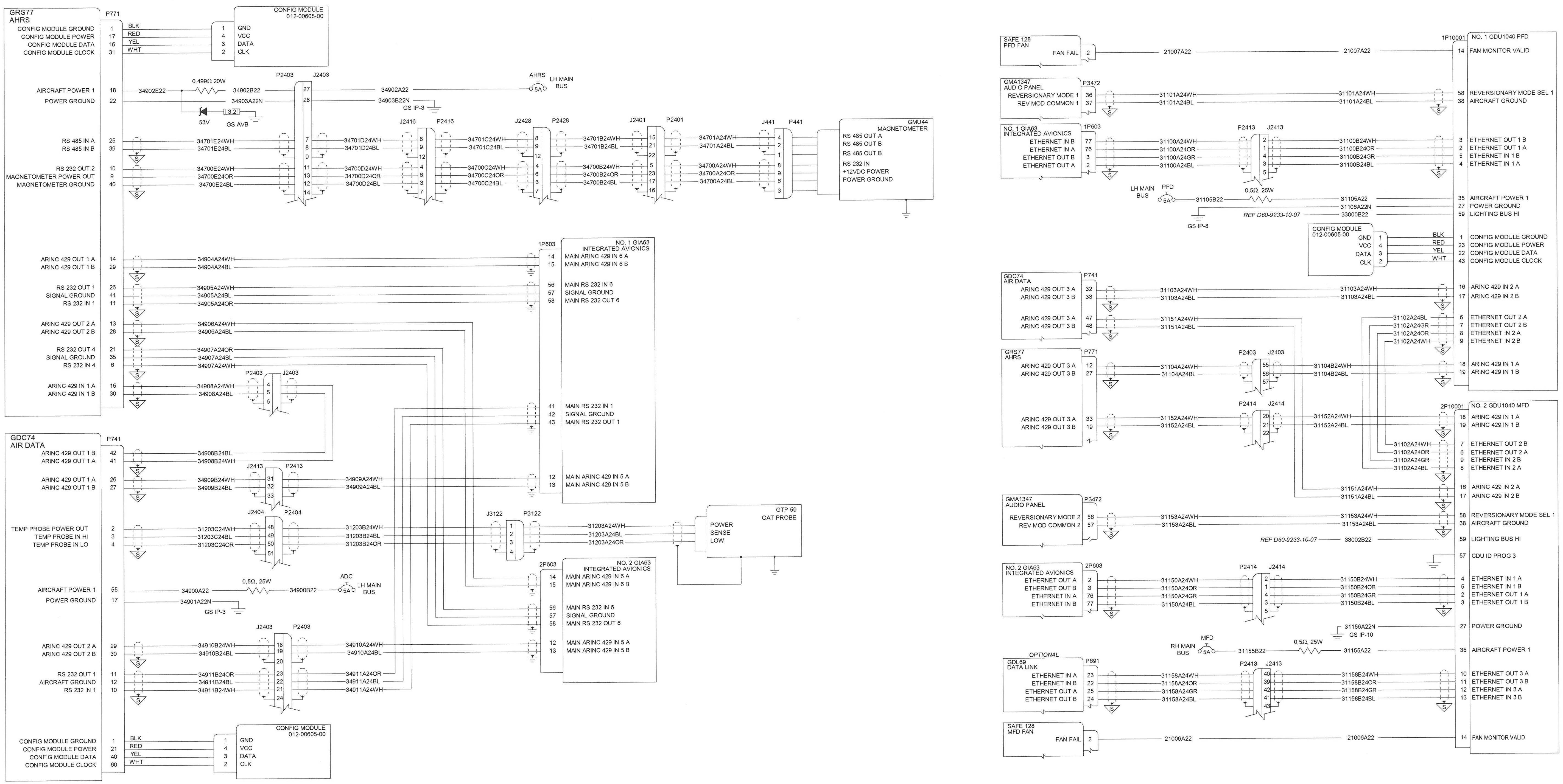


M. Kowarsch
21. NOV. 2011

Diamond Aircraft Industries GmbH	PROJECT	DA 42	TITLE	DWG.ORIG.	DWG.NO.	REV
Diamond Aircraft Industries	N. A. Otto-Straße 5 A-2700 Wiener Neustadt		Schematic, G1000	DAIA	D60-9231-60-01_01	"-"
				CODE 710197	SCALE	SH 04 OF 06

Confidential

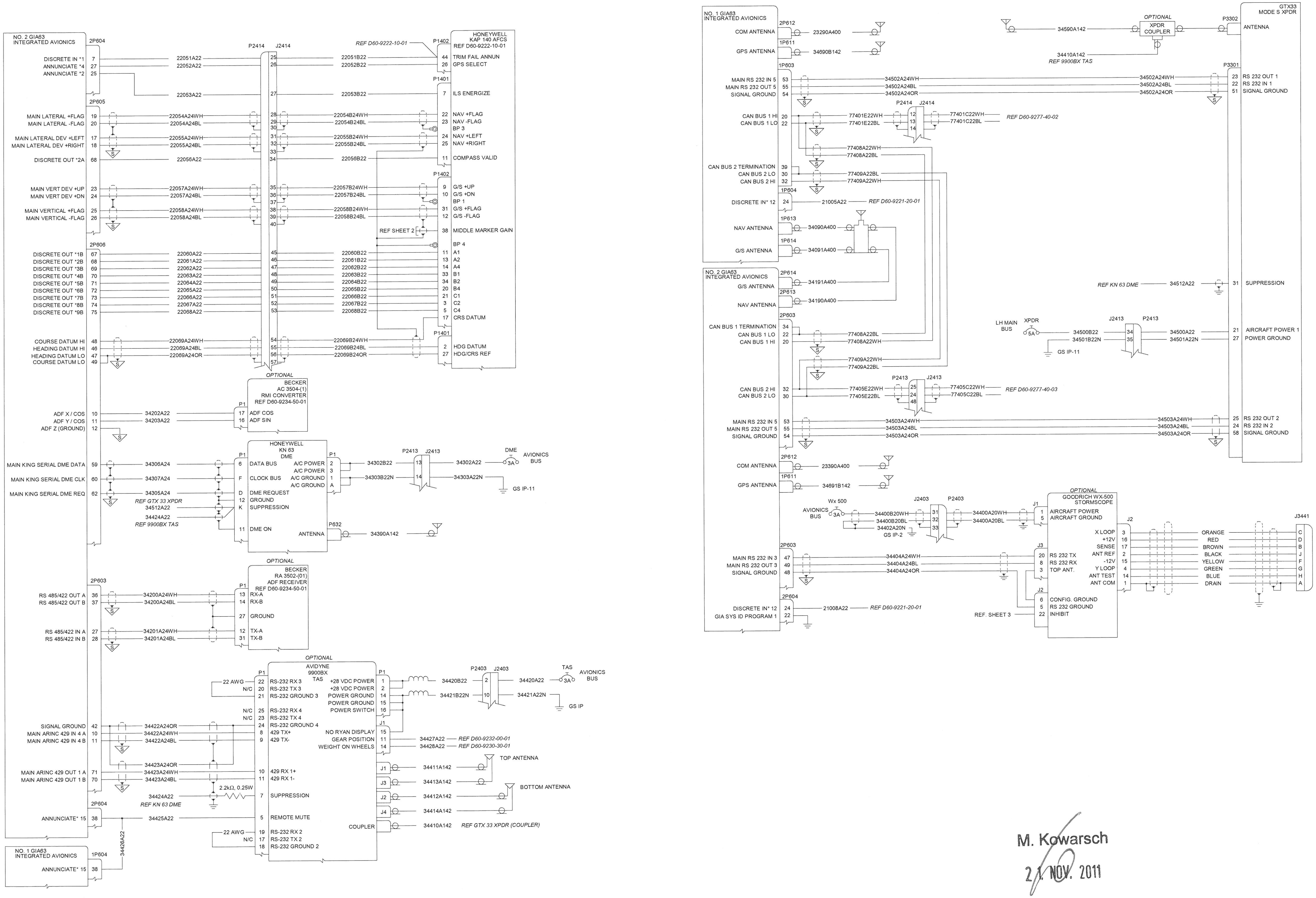
Confidential



M. Kowarsch
21. NOV. 2011

Diamond Aircraft Industries GmbH	PROJECT DA 42	TITLE	DWG.ORIG.	DWG.NO.	REV
Diamond Aircraft Industries	N. A. Otto-Straße 5 A-2700 Wiener Neustadt	Schematic, G1000	DAIA	D60-9231-60-01_01	"-"
			CODE 710197	SCALE	SH 05 OF 06

Confidential

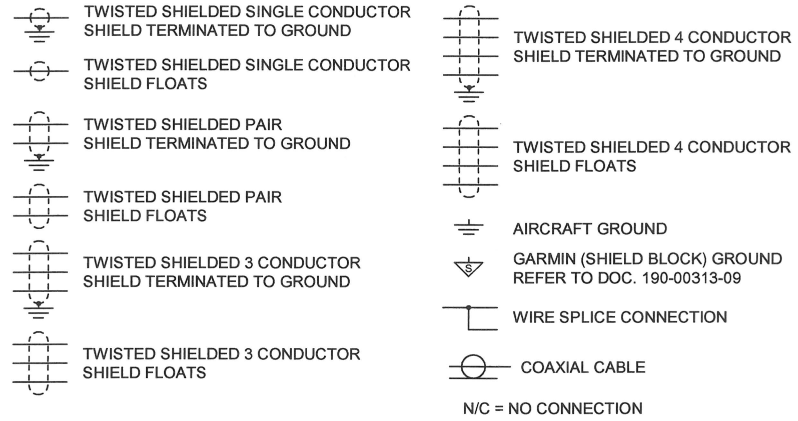


M. Kowarsch
21. NOV. 2011

Diamond Aircraft Industries GmbH	PROJECT DA 42	TITLE	DWG.ORIG. DAIA
Diamond Aircraft Industries	N. A. Otto-Straße 5 A-2700 Wiener Neustadt	Schematic, G1000	DWG.NO. D60-9231-60-01_01
			REV "-"
			CODE 710197 · SCALE · SH 06 OF 06

NOTES:

1. UNLESS OTHERWISE NOTED, ALL STRANDED WIRE MUST CONFORM TO MIL-W-22759/16 OR EQUIVALENT
2. UNLESS OTHERWISE NOTED, ALL SHIELDED WIRE MUST CONFORM TO MIL-C-27500 OR EQUIVALENT
3. UNLESS OTHERWISE NOTED, ALL WIRES ARE 24 GAUGE MINIMUM.
4. SYMBOL DESIGNATIONS



5. UNLESS OTHERWISE NOTED, ALL SHIELD GROUNDS MUST BE MADE TO THE RESPECTIVE UNIT BACKSHELLS.
   ALL OTHER GROUNDS SHOULD BE TERMINATED TO AIRCRAFT GROUND AS CLOSE TO THE RESPECTIVE UNIT AS POSSIBLE.

7. USE AIRCRAFT GRADE CATEGORY 5 ETHERNET CABLE.

MANUFACTURER	P/N
PIC WIRE AND CABLE	E10422 (22 GAUGE)
PIC WIRE AND CABLE	E10424 (24 GAUGE)
ELECTRONIC CABLE SPECIALIST	392404 (24 GAUGE)

8. INSTALLATION INSTRUCTIONS FOR OAT PROBE, GMU44, GND HARNESS, CONFIGURATION MODULES, AND THERMOCOUPLES.

DESCRIPTION	DRAWING NUMBER
INSTR SHEET, OAT PROBE	190-00313-00
INSTR SHEET, GMU44	190-00313-04
INSTR SHEET, CONFIG MODULE	190-00313-02
INSTR SHEET, THERMOCOUPLE	190-00313-01

9. FOR FAN FAIL OUTPUT: OPEN = ACTIVE = FAN FAIL, GROUND = INACTIVE = FAN OK
10. FOR TRIM FAIL OUTPUT: GROUND = ACTIVE = TRIM FAIL, OPEN = INACTIVE = TRIM OK

19. RELATED DOCUMENTS
    190-00295-27 UNIT INTERCONNECT SUMMARY.
    190-00295-28 UNIT POWER.
    190-00295-29 INTERCONNECT.

21. FOR GROUNDING PROCEDURE REFER TO GARMIN DOCUMENTS 190-00313-00 AND 190-00313-04.
    ADDITIONAL FOR IFR OPERATION, REFER TO GARMIN DOCUMENT 190-00313-09.

21. NOTE THE FOLLOWING PIN DIFFERENCES IN REV 2 AND REV 3 GIA P603:

PIN NAME	REV 2 PIN	REV 3 PIN
CAN BUS 1 TERMINATION	35	34
CAN BUS 2 HI	29	32

REV 2 UNITS HAVE SERIAL NUMBERS LESS THAN 46901600
REV 3 UNITS HAVE SERIAL NUMBERS OF 46901600 OR GREATER

Approved : 14. FEB. 2007 (Date)	(Name)	Checked : 14.02.07 (Date)	(Name)
General Tolerance : ISO 2768		Scale: NTS	

Rev.	Change	Date	Name
"b"	OÄM 42-116	01.02.07	Wood
"a"		06.12.06	Wood

Next Higher Assembly : D60-9200-00-00

Diamond AIRCRAFT Industries GmbH

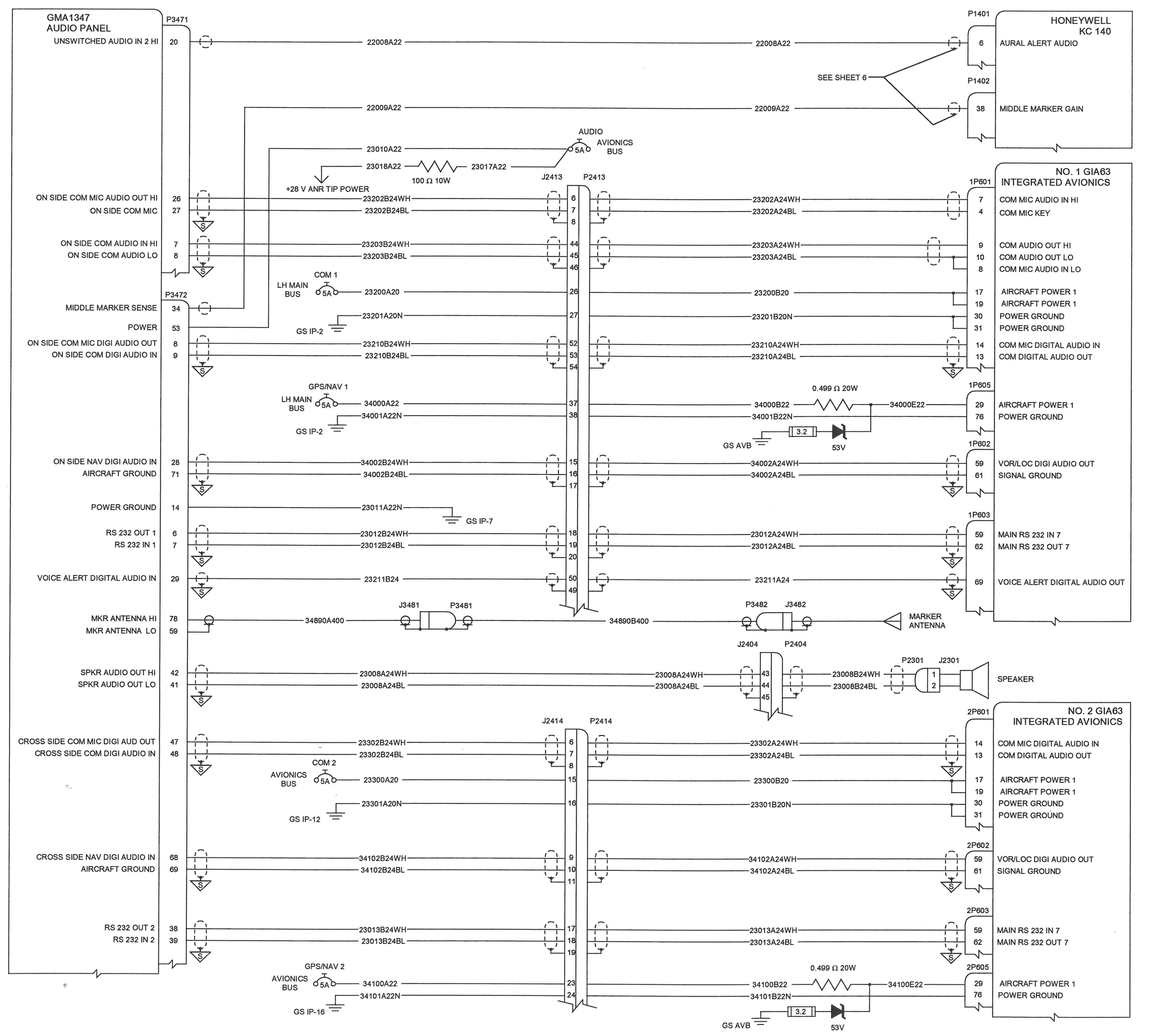
DA 42 Twin Star

Title : **Schematic, G1000 Optional GDL69**

Drawing Number: **D60-9231-60-02**

Sheet 1 from 6

Saved under : D60-9231-60-02.dft



Approved :			Checked :		General Tolerance : ISO 2768	Scale: NTS
Date	14. FEB. 2007	Name	Date	Name		

Next Higher Assembly : **D60-9200-00-00**

Diamond AIRCRAFT Industries GmbH

Title :

Schematic, G1000 Optional GDL69

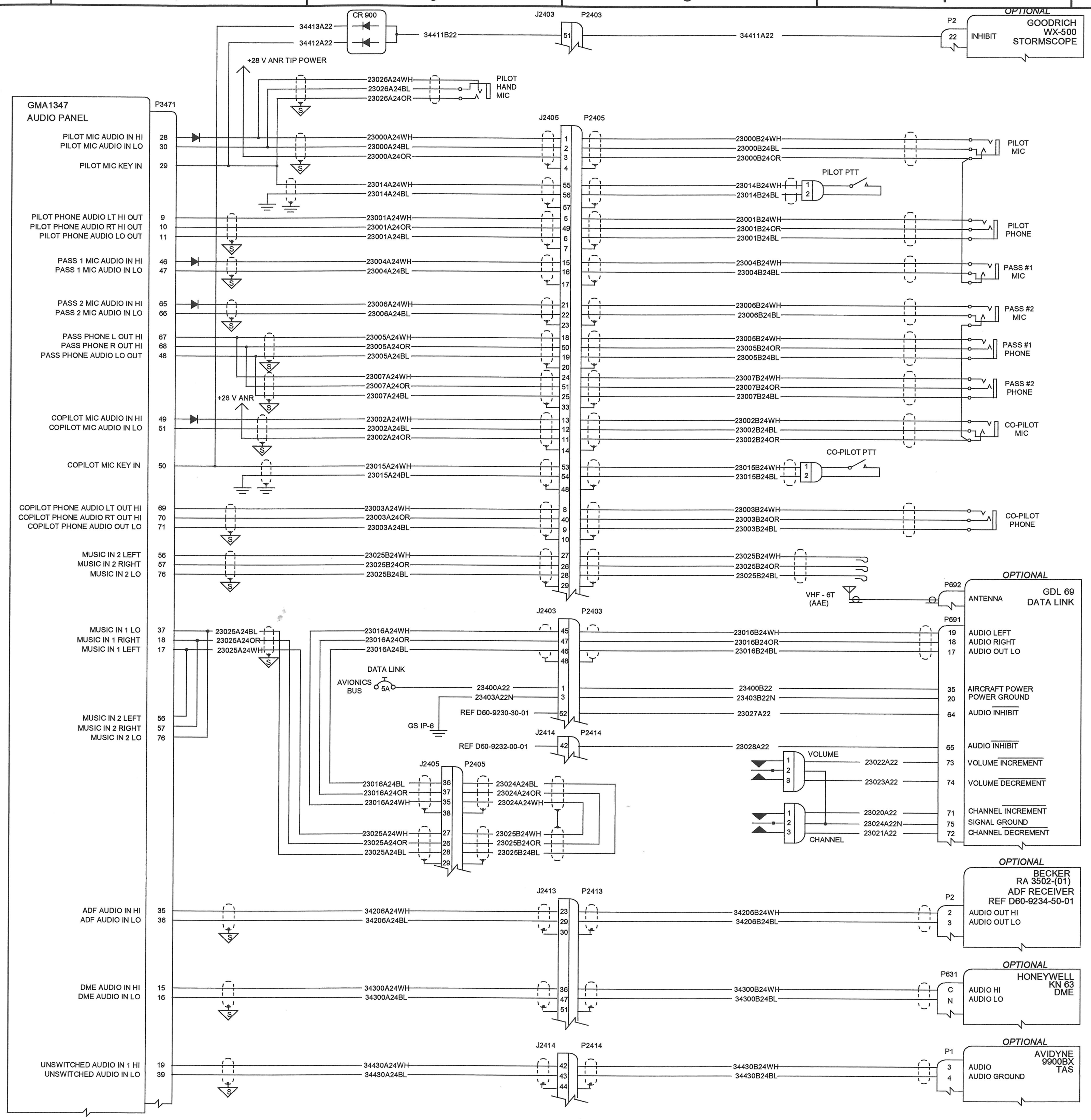
Rev.	Change	Date	Name
"b"	OÄM 42-116	01.02.07	Wood
"a"		06.12.06	Wood

DA 42 Twin Star

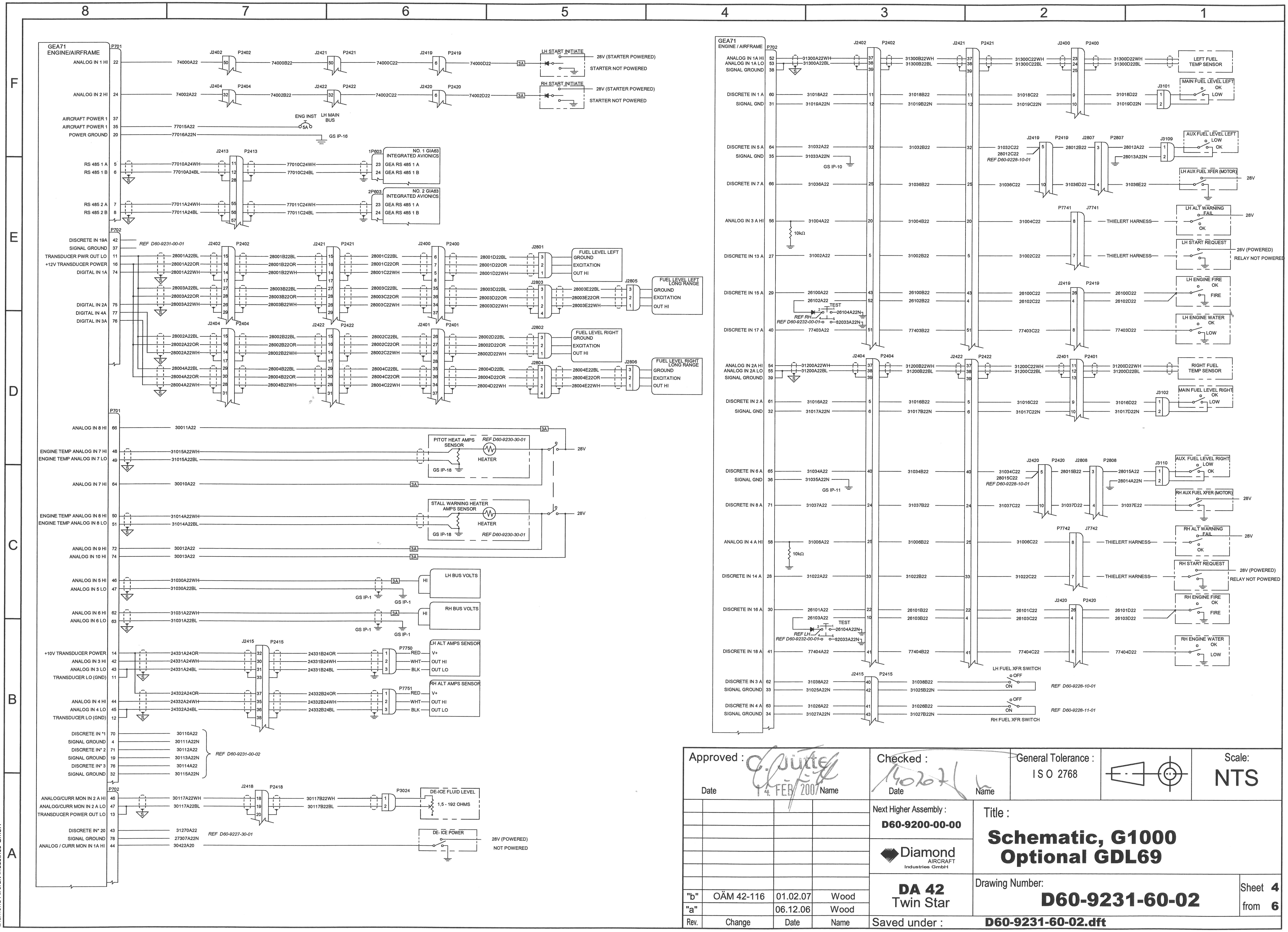
Drawing Number: **D60-9231-60-02**

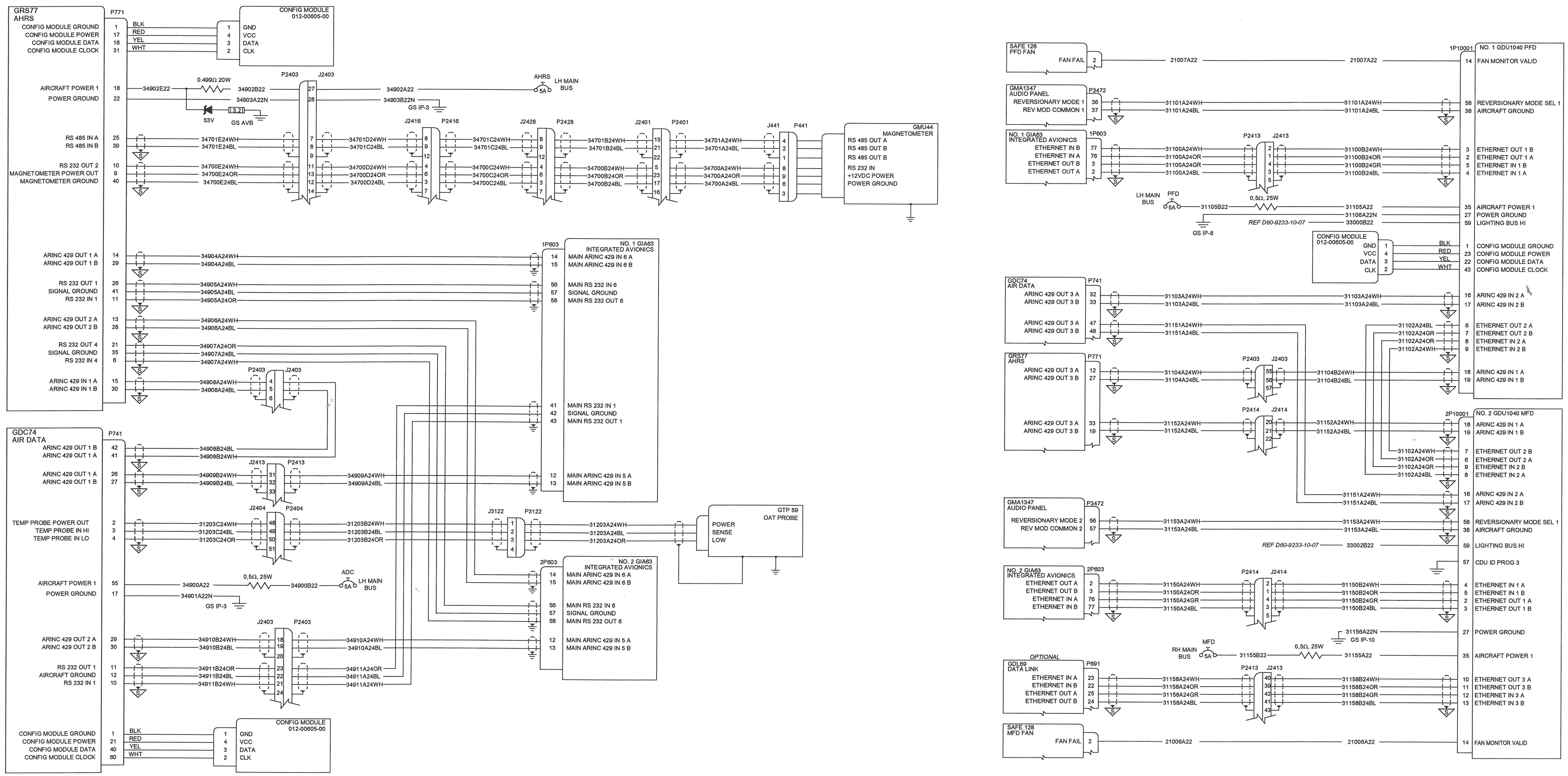
Sheet **2** from **6**

Saved under : **D60-9231-60-02.dft**



Approved :	Date 14. FEB. 2007	Name C. Jütte	Checked :	Date 14.02.07	Name	General Tolerance : ISO 2768	Scale: NTS
				Next Higher Assembly : D60-9200-00-00		Title : **Schematic, G1000 Optional GDL69**
				Diamond AIRCRAFT Industries GmbH		
"b"	OÄM 42-116	01.02.07	Wood	**DA 42** Twin Star	Drawing Number: **D60-9231-60-02**	Sheet 3 from 6
"a"		06.12.06	Wood			
Rev.	Change	Date	Name	Saved under :	**D60-9231-60-02.dft**	


Schematic, G1000
Optional GDL69
Drawing Number:
D60-9231-60-02
Sheet 4
from 6
Scale:
NTS
General Tolerance :
ISO 2768
Next Higher Assembly :
D60-9200-00-00
Diamond AIRCRAFT Industries GmbH
DA 42
Twin Star
Saved under :
D60-9231-60-02.dft
Approved :
Date
Name
Checked :
Date
Name
"b" ÖAM 42-116 01.02.07 Wood
"a" 06.12.06 Wood
Rev. Change Date Name
GEA71
ENGINE/AIRFRAME



Approved :				Checked :	General Tolerance : ISO 2768		Scale: NTS
Date	14. FEB. 2007	Name		Date	Name		
				Next Higher Assembly : D60-9200-00-00	Title : Schematic, G1000 Optional GDL69		
				Diamond AIRCRAFT Industries GmbH			
"b"	ÖÄM 42-116	01.02.07	Wood	DA 42 Twin Star	Drawing Number: D60-9231-60-02		Sheet 5 from 6
"a"		06.12.06	Wood				
Rev.	Change	Date	Name	Saved under :	D60-9231-60-02.dft		

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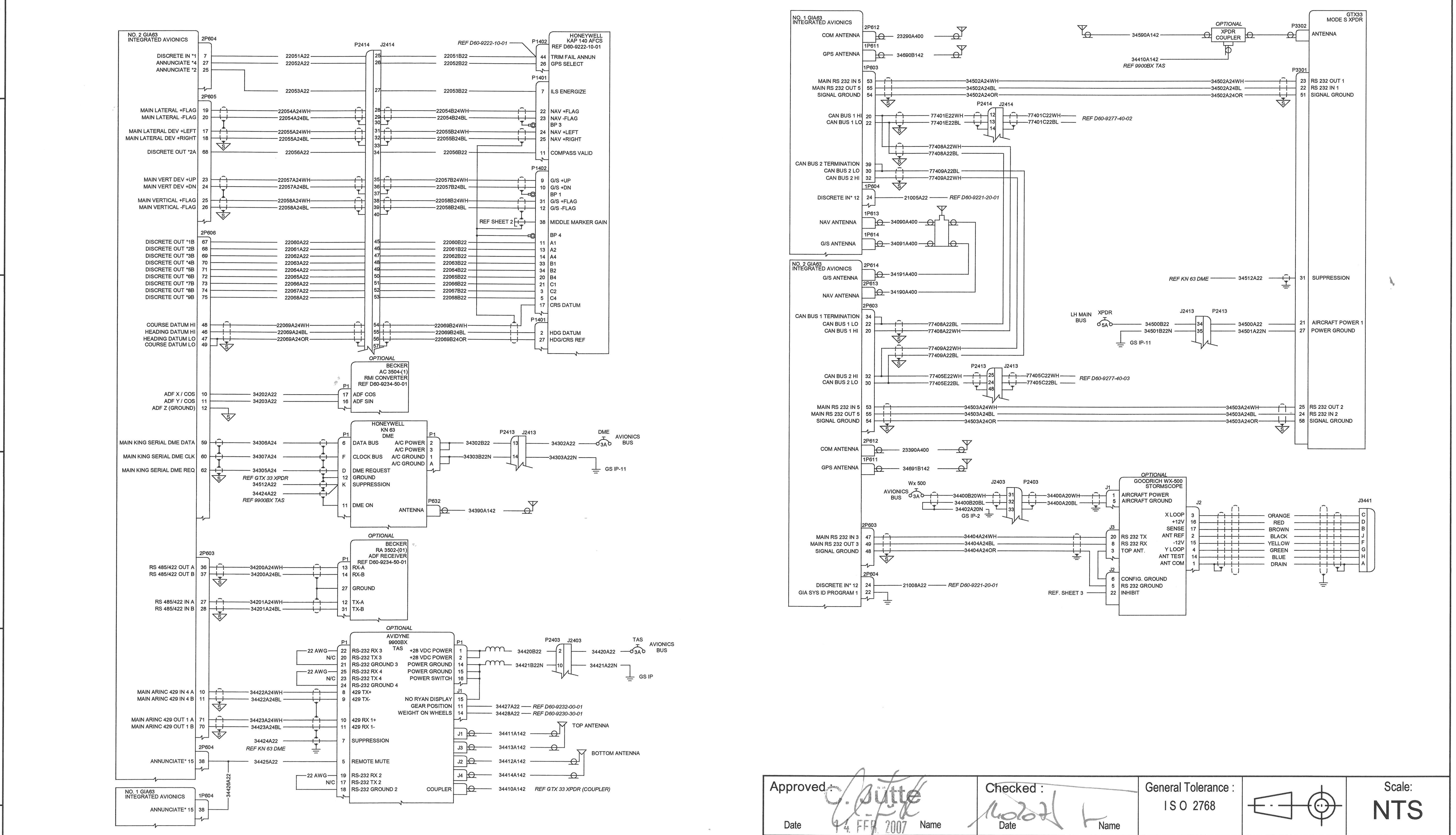
Diamond Aircraft Industries GmbH



Approved: C. Jütte				Checked:		General Tolerance: ISO 2768	Scale: NTS
Date 14. FEB 2007			Name	Date	Name		
				Next Higher Assembly: D60-9200-00-00	Title: Schematic, G1000 Optional GDL69		
				Diamond AIRCRAFT Industries GmbH			
"b"	OÄM 42-116	01.02.07	Wood	DA 42 Twin Star	Drawing Number: D60-9231-60-02		Sheet 6 from 6
"a"		06.12.06	Wood				
Rev.	Change	Date	Name	Saved under:	D60-9231-60-02.dft		

REVISION					
REV	SH	ZONE	DESCRIPTION	DATE	APPROVAL
-	01	ALL	MÄM 42-587 FIRST RELEASE	17.11.11	SEE TB

NOTES:

1. SYMBOL DESIGNATIONS
   - TWISTED SHIELDED SINGLE CONDUCTOR SHIELD TERMINATED TO GROUND
   - TWISTED SHIELDED SINGLE CONDUCTOR SHIELD FLOATS
   - TWISTED SHIELDED PAIR SHIELD TERMINATED TO GROUND
   - TWISTED SHIELDED PAIR SHIELD FLOATS
   - TWISTED SHIELDED 3 CONDUCTOR SHIELD TERMINATED TO GROUND
   - TWISTED SHIELDED 3 CONDUCTOR SHIELD FLOATS
   - TWISTED SHIELDED 4 CONDUCTOR SHIELD TERMINATED TO GROUND
   - TWISTED SHIELDED 4 CONDUCTOR SHIELD FLOATS
   - AIRCRAFT GROUND
   - GARMIN (SHIELD BLOCK) GROUND REFER TO DOC. 190-00313-09
   - WIRE SPLICE CONNECTION
   - COAXIAL CABLE

   N/C = NO CONNECTION

2. NOTE THE FOLLOWING PIN DIFFERENCES IN REV 2 AND REV 3 GIA P603:

PIN NAME	REV 2 PIN	REV 3 PIN
CAN BUS 1 TERMINATION	35	34
CAN BUS 2 HI	29	32

REV 2 UNITS HAVE SERIAL NUMBERS LESS THAN 46901600
REV 3 UNITS HAVE SERIAL NUMBERS OF 46901600 OR GREATER

DIMENSIONS	METRIC
FIRST ANGLE PROJECTION	FORMAT A3
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM	
DIMENSION TOLERANCES	3.2 FINISH IN MICRO-METER
2 DECIMAL	±0,25
1DECIMAL	±0,5
DECIMAL	±1
ANGLE	±1°
RAD	±0,5

IDENTIFICATION MARKINGS	DP-S-17-00001
CLASSIFICATION:	NONE
INTERCHANGEABLE PART	NO
THIS DRAWING WAS PRODUCED USING SOFTWARE:	SOLID EDGE V18
FILENAME	D60-9231-60-02_01.dft

Diamond Aircraft Industries GmbH — Diamond Aircraft Industries

N. A. Otto-Straße 5
A-2700 Wiener Neustadt

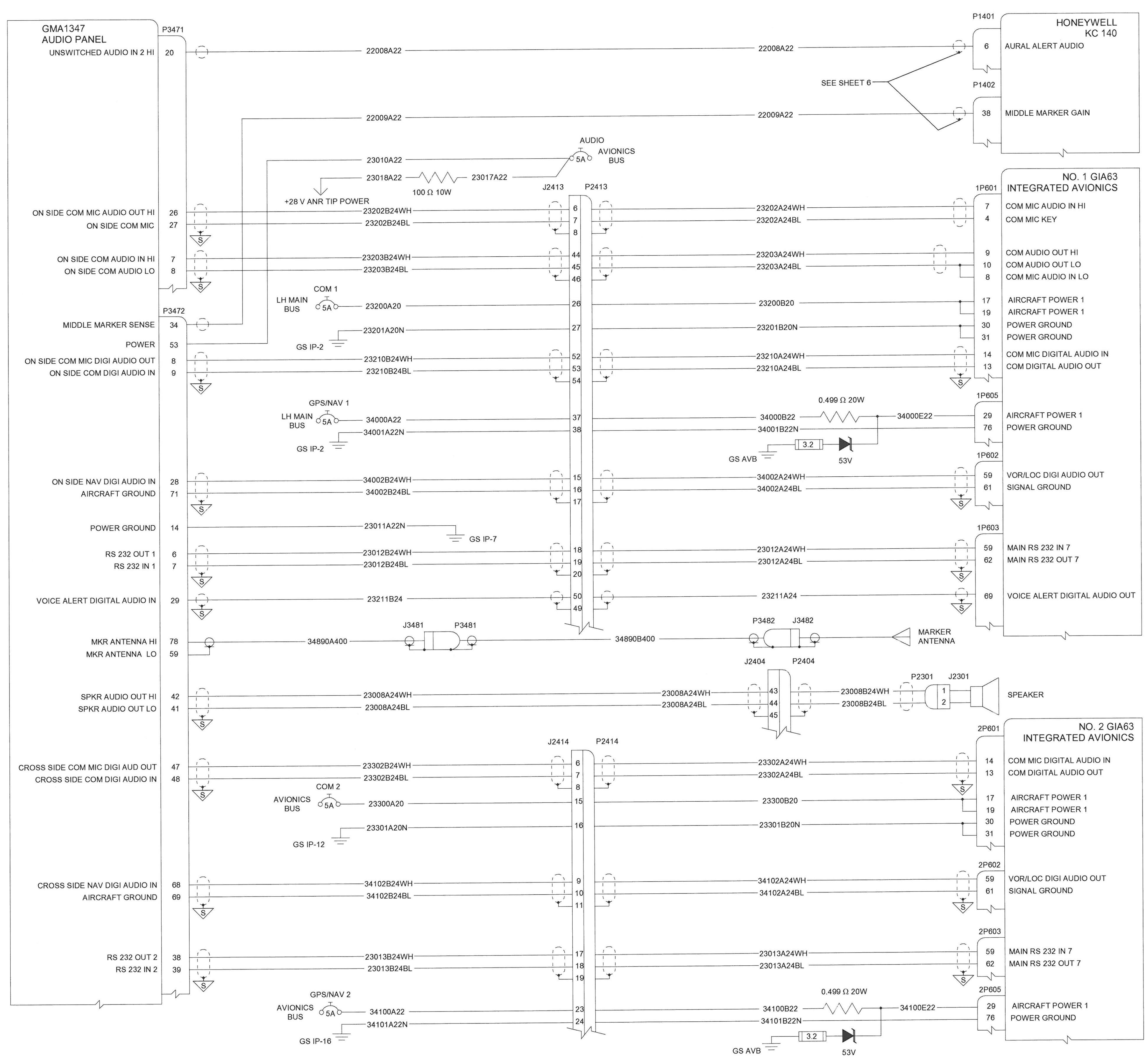
DEPARTMENT		SIGN	DATE
DRAWN	Kowarsch		17.11.11
CHECKED:	Kowarsch		21. 11. 2011
QA:	N/A		
STRESS:	N/A		
MANUF.:	N/A		
SYSTEM:	N/A		
APPROVED:	TL		26-11-2011

PROJECT: DA 42

TITLE: **Schematic, G1000 Optional GDL69**

DWG.ORIG.	DWG.NO.	REV
DAIA	D60-9231-60-02_01	"-"
CODE 710197	SCALE NTS	SH 01 OF 06

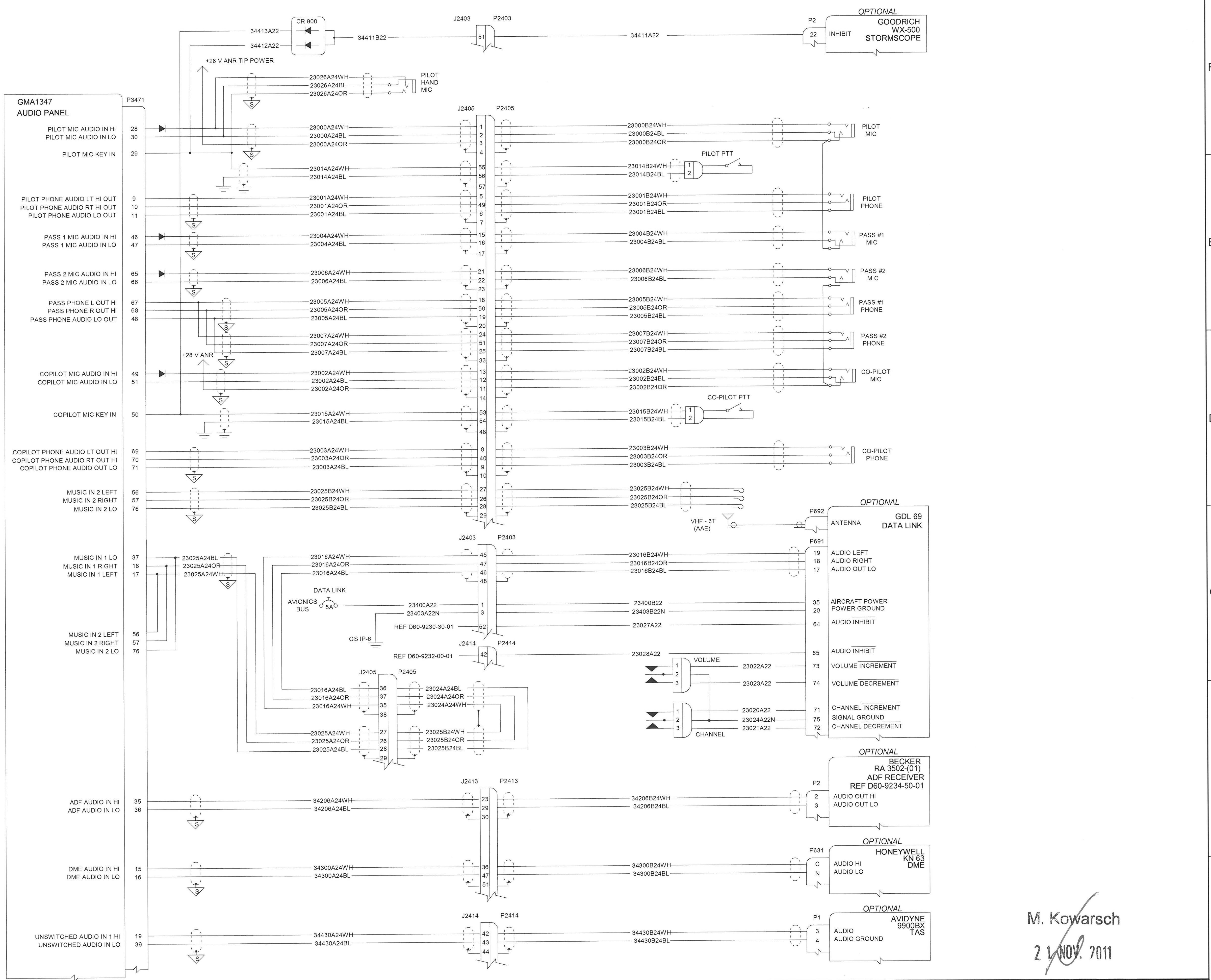
Confidential



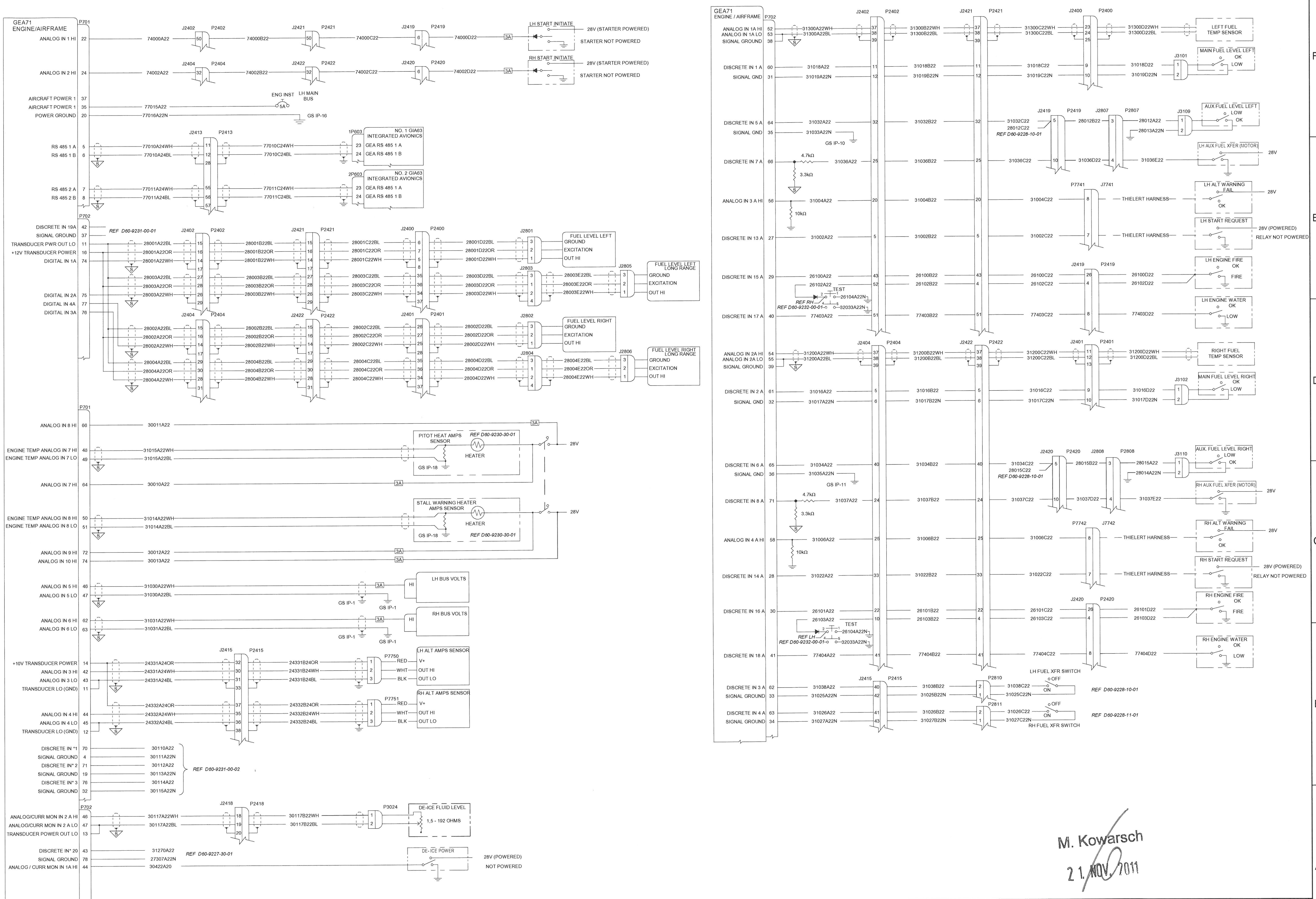
M. Kowarsch
21 NOV. 2011

Diamond Aircraft Industries GmbH	PROJECT DA 42	TITLE Schematic, G1000 Optional GDL69	DWG.ORIG. DAIA	DWG.NO. D60-9231-60-02_01	REV "-"
Diamond Aircraft Industries	N. A. Otto-Straße 5 A-2700 Wiener Neustadt		CODE 710197	SCALE	SH 02 OF 06

Confidential



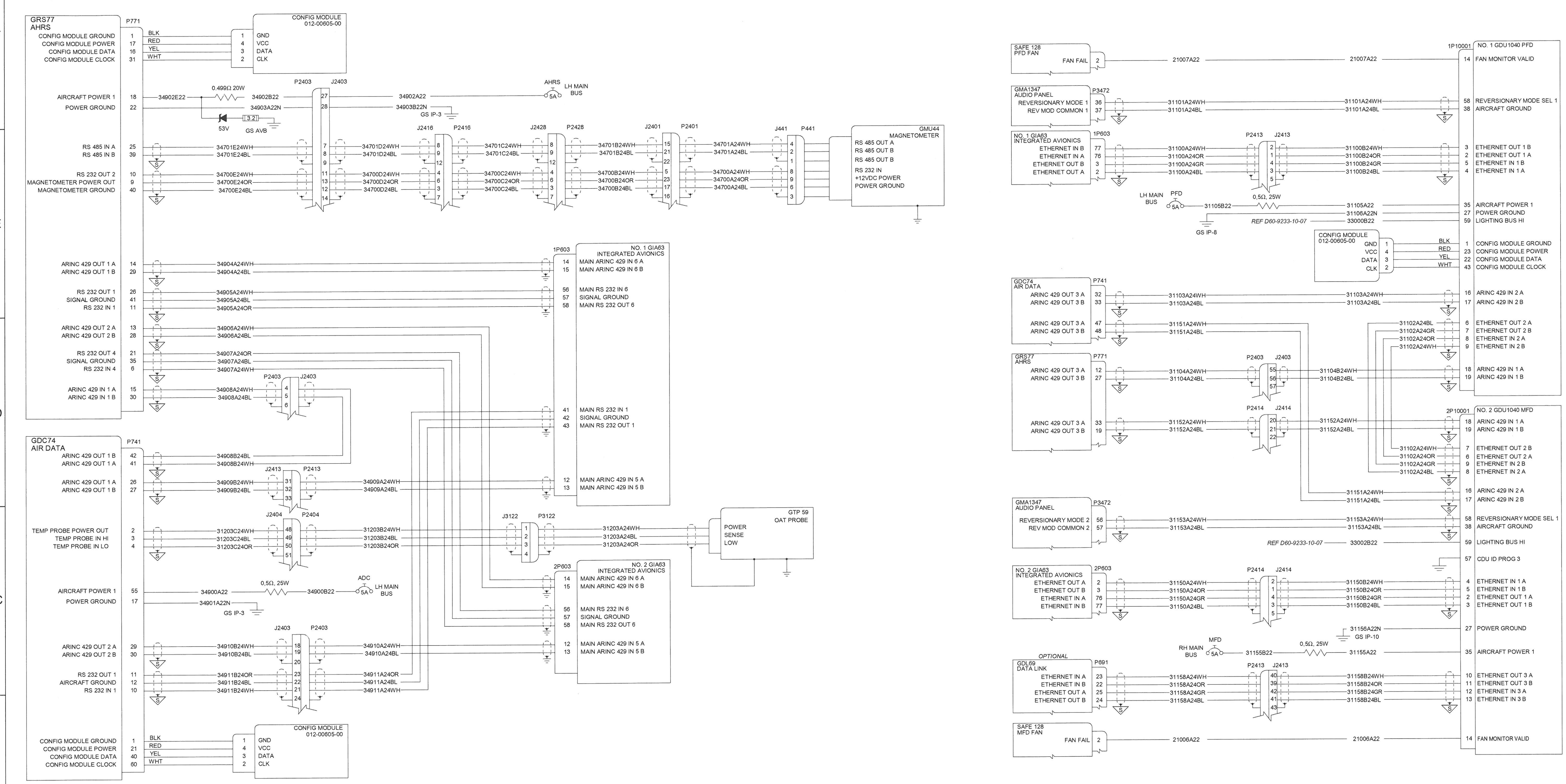
Diamond Aircraft Industries GmbH	PROJECT DA 42	TITLE **Schematic, G1000 Optional GDL69**	DWG.ORIG. DAIA / DWG.NO. D60-9231-60-02_01 / REV "-"
Diamond Aircraft Industries	N. A. Otto-Straße 5, A-2700 Wiener Neustadt		CODE 710197 / SCALE / SH 03 OF 06



M. Kowarsch
21. NOV. 2011

Diamond Aircraft Industries GmbH	PROJECT DA 42	TITLE Schematic, G1000 Optional GDL69	DWG.ORIG. DAIA
Diamond Aircraft Industries	N. A. Otto-Straße 5, A-2700 Wiener Neustadt		DWG.NO. D60-9231-60-02_01
			REV "-"
			CODE 710197
			SCALE
			SH 04 OF 06

Confidential

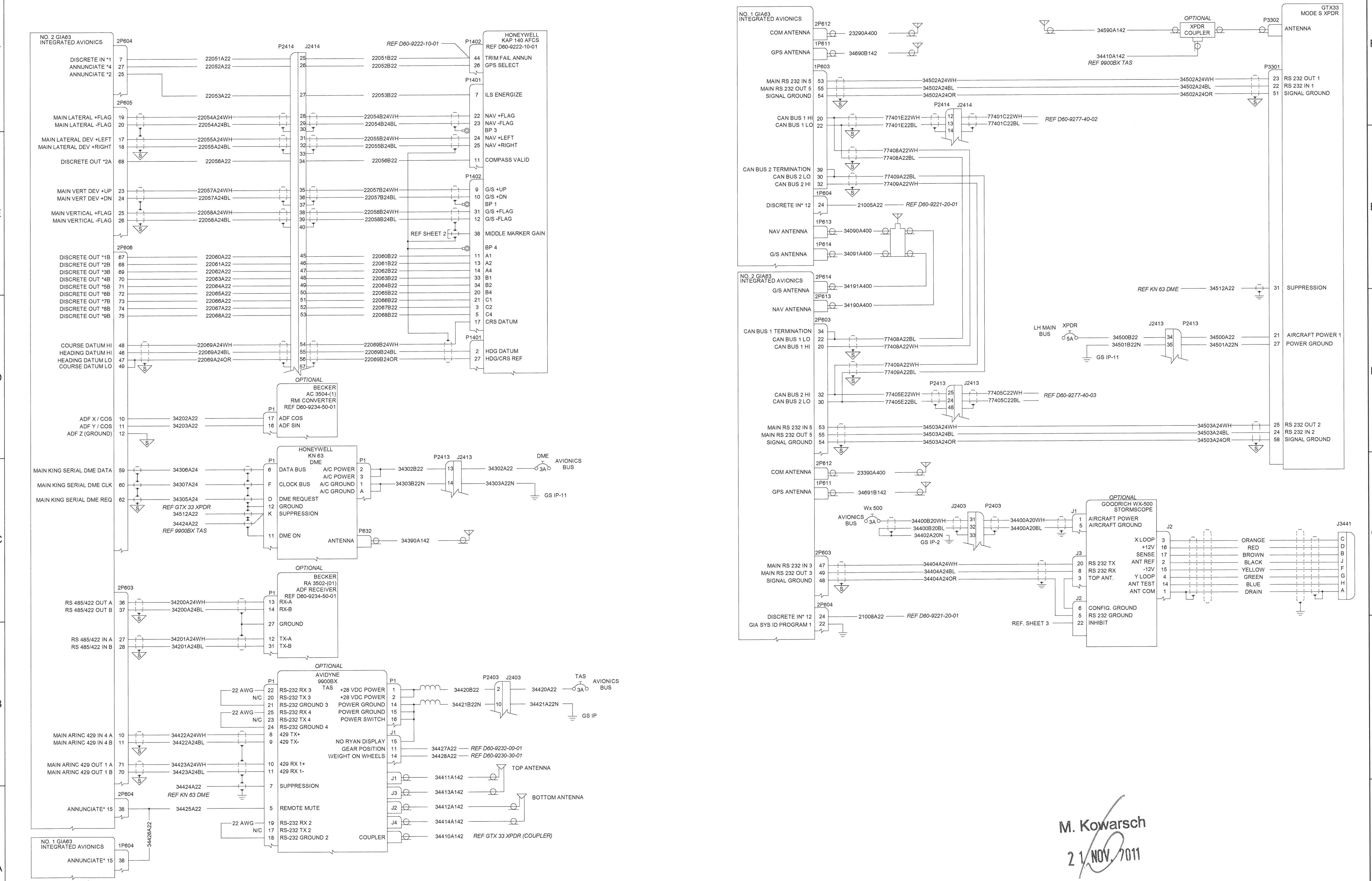


M. Kowarsch
21 NOV 2011

Diamond Aircraft Industries GmbH	PROJECT DA 42	TITLE	DWG.ORIG. DAIA	DWG.NO. D60-9231-60-02_01	REV "-"
Diamond Aircraft Industries	N. A. Otto-Straße 5, A-2700 Wiener Neustadt	Schematic, G1000 Optional GDL69	CODE 710197	SCALE	SH 05 OF 06

Confidential

Confidential



M. Kowarsch
21 NOV. 2011

Diamond Aircraft Industries GmbH	PROJECT	DA 42	TITLE	DWG.ORIG.	DWG.NO.		REV
Diamond Aircraft Industries	N. A. Otto-Straße 5, A-2700 Wiener Neustadt		**Schematic, G1000 Optional GDL69**	DAIA	D60-9231-60-02_01		"-"
				CODE 710197	SCALE	SH 06 OF 06	

Confidential

8	7	6	5	4	3	2	1

REVISIONS

Rev.	Zone	Description
"-"	-	New drawing, does not supersede another drawing.

NOTES:

1. SYMBOL DESIGNATIONS
   - TWISTED SHIELDED SINGLE CONDUCTOR SHIELD TERMINATED TO GROUND
   - TWISTED SHIELDED SINGLE CONDUCTOR SHIELD FLOATS
   - TWISTED SHIELDED PAIR SHIELD TERMINATED TO GROUND
   - TWISTED SHIELDED PAIR SHIELD FLOATS
   - TWISTED SHIELDED 3 CONDUCTOR SHIELD TERMINATED TO GROUND
   - TWISTED SHIELDED 3 CONDUCTOR SHIELD FLOATS
   - TWISTED SHIELDED 4 CONDUCTOR SHIELD TERMINATED TO GROUND
   - TWISTED SHIELDED 4 CONDUCTOR SHIELD FLOATS
   - AIRCRAFT GROUND
   - GARMIN (SHIELD BLOCK) GROUND REFER TO DOC. 190-00313-09
   - WIRE SPLICE CONNECTION
   - COAXIAL CABLE

   N/C = NO CONNECTION

2. NOTE THE FOLLOWING PIN DIFFERENCES IN REV 2 AND REV 3 GIA P603:

PIN NAME	REV 2 PIN	REV 3 PIN
CAN BUS 1 TERMINATION	35	34
CAN BUS 2 HI	29	32

REV 2 UNITS HAVE SERIAL NUMBERS LESS THAN 46901600
REV 3 UNITS HAVE SERIAL NUMBERS OF 46901600 OR GREATER

3. USE DOUBLE-SHIELDED WIRING: BOTH SHIELDS SHOULD BE GROUNDED ON THE RECEIVING SIDE; ON THE TRANSMITTING SIDE, ONLY THE OUTER SHIELD SHOULD BE GROUNDED, WHILE THE INNER SHIELD SHOULD FLOAT.

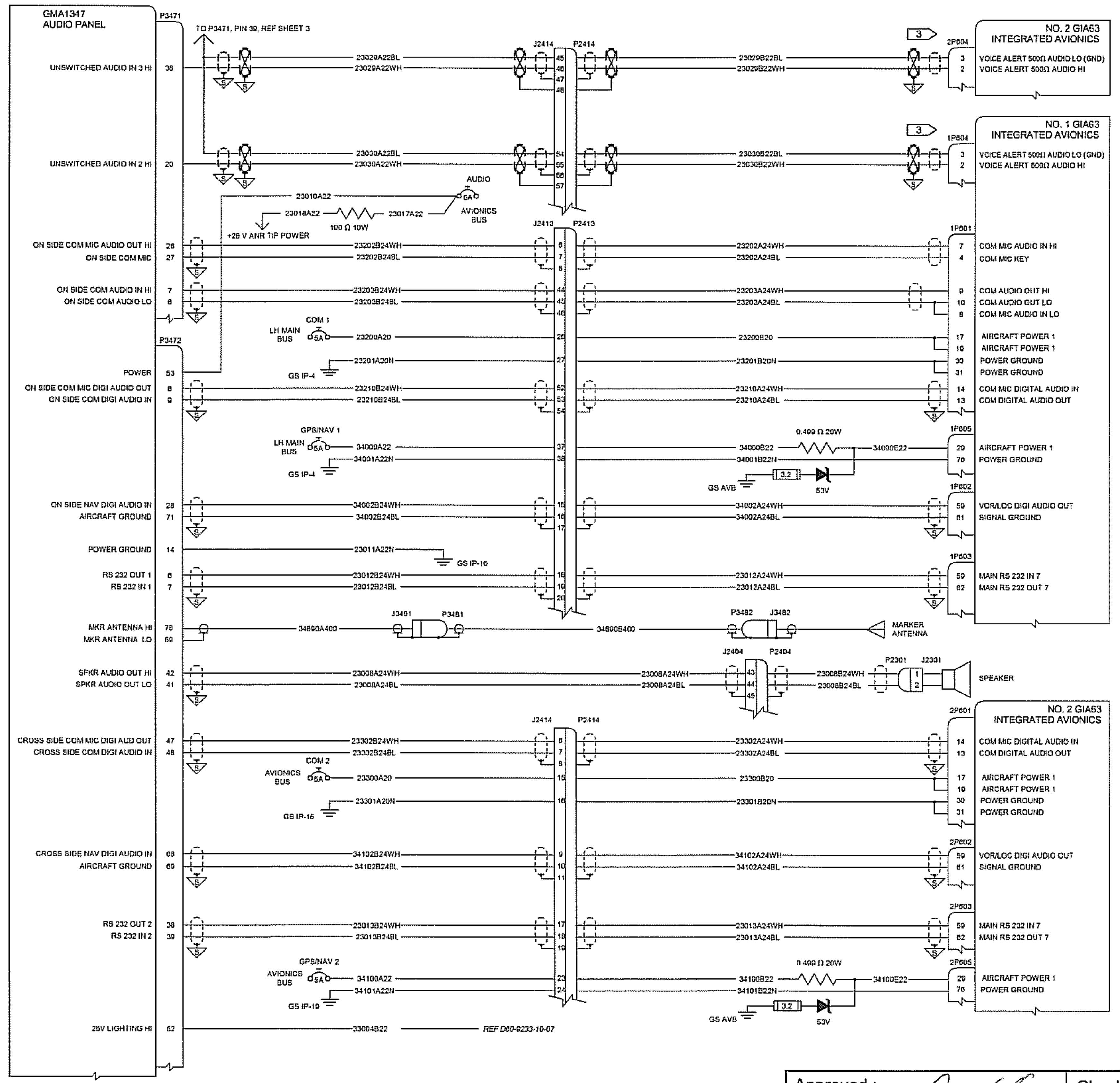
Approved : C. Jütte	Date 19. FEB. 2008	Checked: H. Kowarsch	Date 14. FEB. 2008	General Tolerance : ISO 2768	Scale: NTS
"-" OÄM 42-102	19.11.07	Kowarsch	Next Higher Assembly : D60-9200-00-00	Title : **Schematic, G1000, GFC700**
Rev. Change	Date	Name	DA 42 Twin Star	Drawing Number: **D60-9231-60-03**	Sheet 1 from 6
			Saved under : D60-9231-60-03.dft	

Diamond AIRCRAFT Industries GmbH

A	B	C	D	E	F

REVISIONS

Rev.	Zone	Description
"-"	-	New drawing, does not supersede another drawing.



Approved : C. Jütte		Checked : M. Kowarsch		General Tolerance : ISO 2768		Scale: NTS
Date 19 FEB 2008	Name	Date 14 FEB 2008	Name			

Next Higher Assembly : D60-9200-00-00

Title : **Schematic, G1000, GFC700**

Diamond AIRCRAFT Industries GmbH

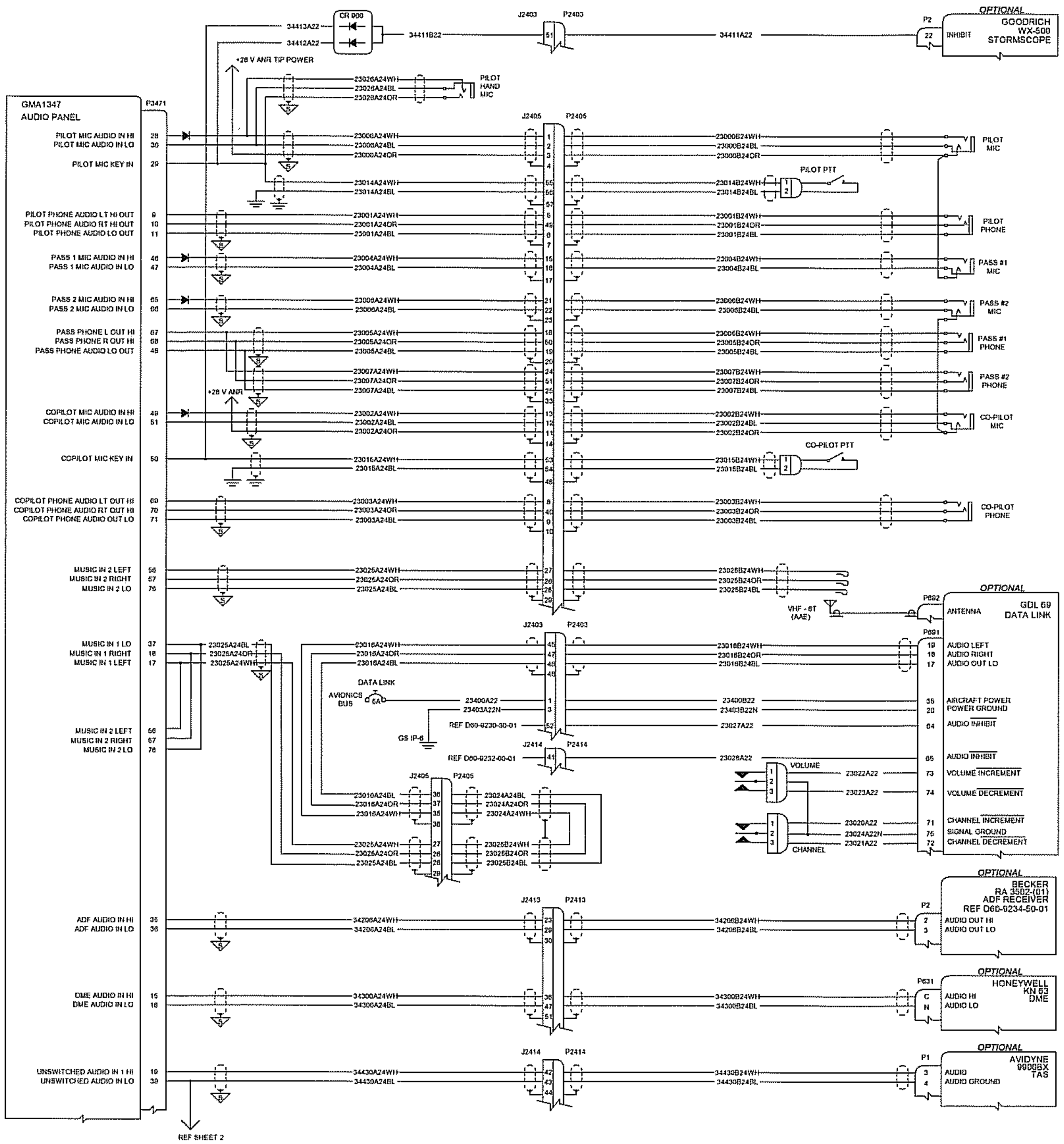
DA 42 Twin Star

Rev.	Change	Date	Name
"-"	OÄM 42-102	19.11.07	Kowarsch

Drawing Number: **D60-9231-60-03**

Sheet 2 from 6

Saved under : D60-9231-60-03.dft



REVISIONS

Rev.	Zone	Description
"_"	-	New drawing, does not supersede another drawing.

Approved :	Date 19. FEB. 2008	Name	
Checked M. Kowarsch	Date 14 FEB 2008	Name	
General Tolerance : ISO 2768		Scale: NTS	
Next Higher Assembly : D60-9200-00-00			

Title :

Schematic, G1000, GFC700

Diamond AIRCRAFT Industries GmbH

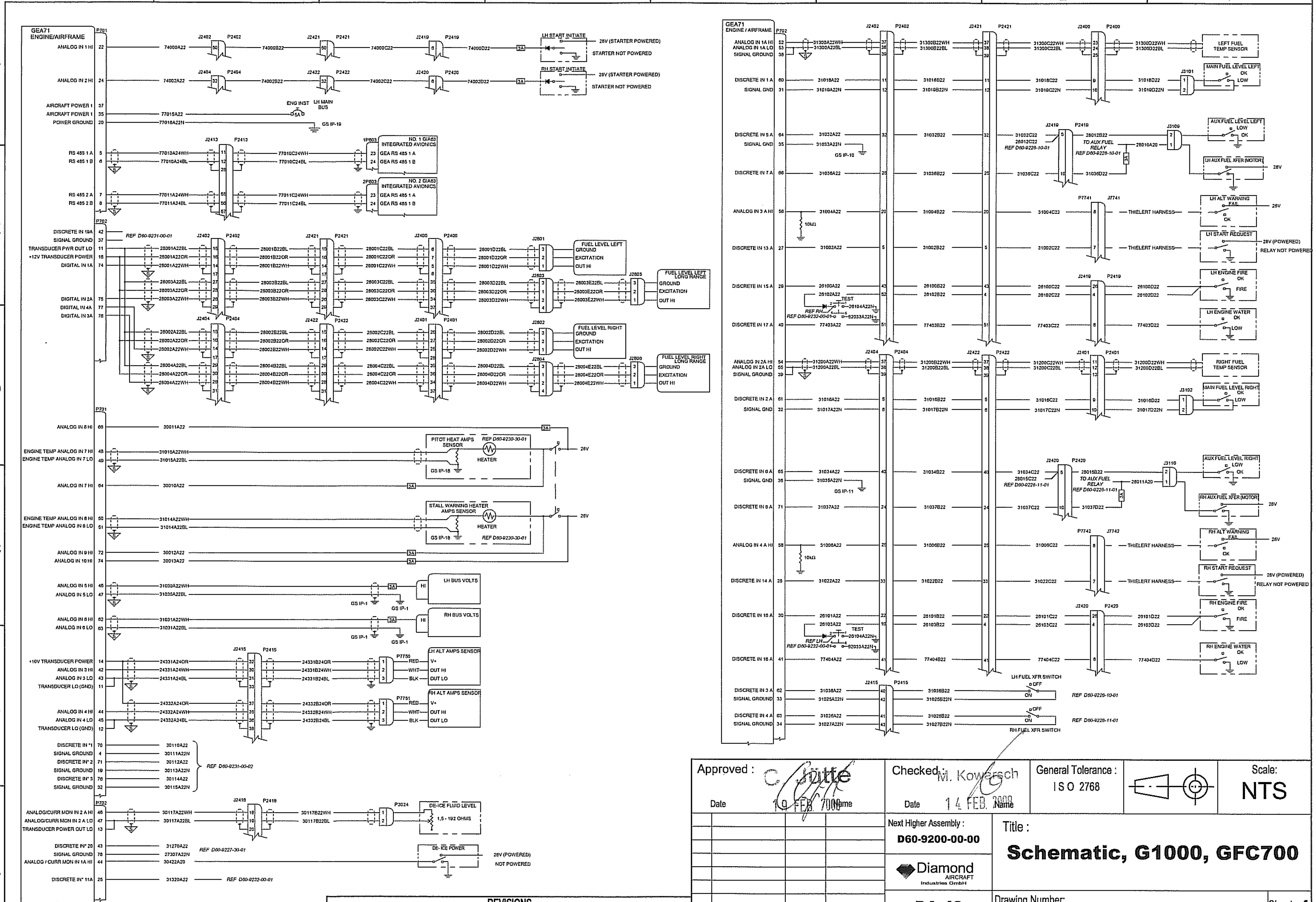
DA 42 Twin Star

Drawing Number: **D60-9231-60-03**

Sheet 3 from 6

Rev.	Change	Date	Name
"_"	OÄM 42-102	19.11.07	Kowarsch

Saved under : **D60-9231-60-03.dft**



Approved :	C. Jütte	Checked :	M. Kowarsch	General Tolerance :		Scale:
Date	19 FEB 2008	Date	14 FEB 2008	ISO 2768		NTS

Next Higher Assembly : D60-9200-00-00

Title : **Schematic, G1000, GFC700**

Diamond AIRCRAFT Industries GmbH

DA 42 Twin Star

Drawing Number: **D60-9231-60-03**

Sheet 4 from 6

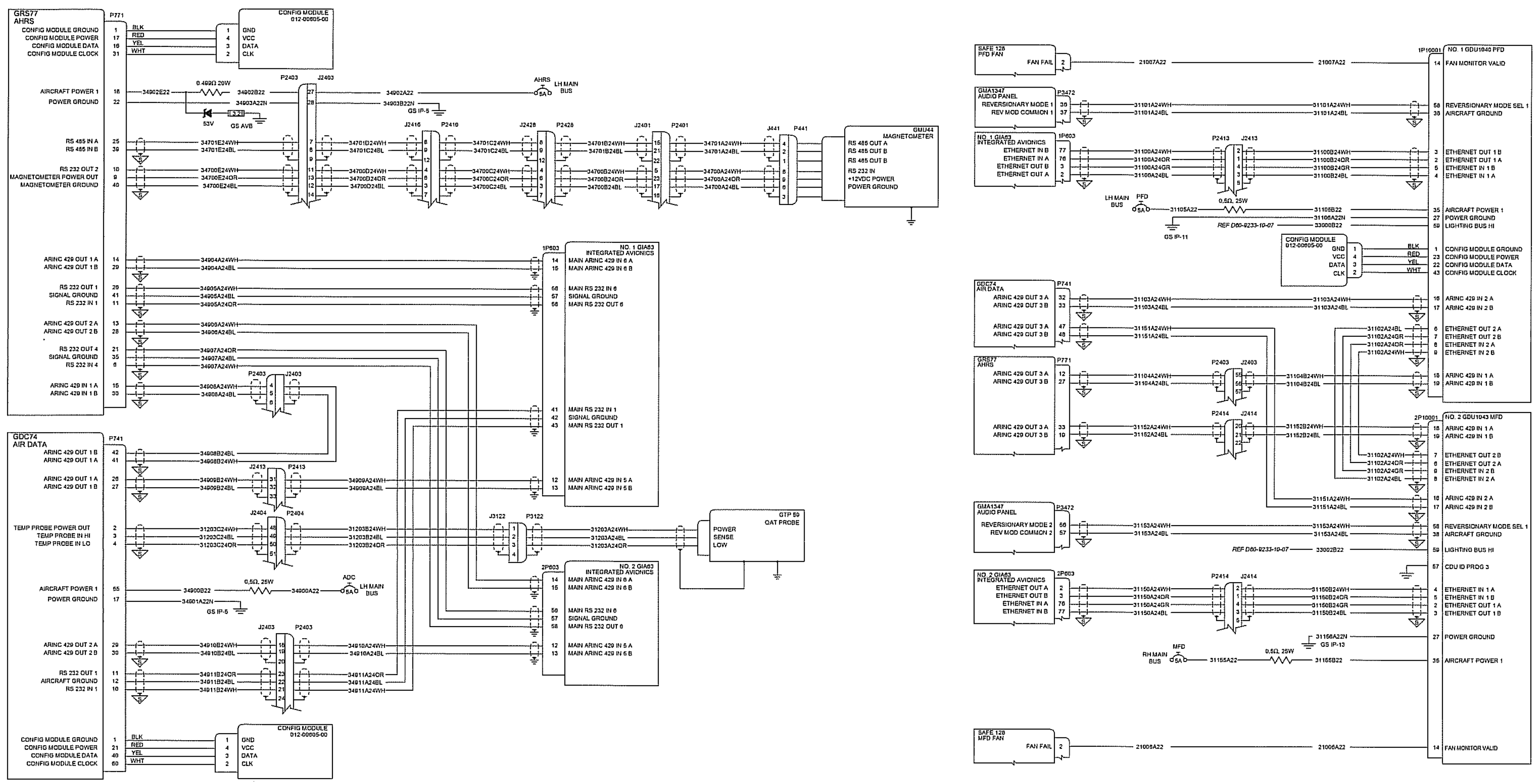
Rev.	Change	Date	Name
"_"	OÄM 42-102	19.11.07	Kowarsch

Saved under : D60-9231-60-03.dft

REVISIONS

Rev.	Zone	Description
"_"	-	New drawing, does not supersede another drawing.

REVISIONS		
Rev.	Zone	Description
"-"	-	New drawing, does not supersede another drawing.



Approved : C. Jütte	Date 19 FEB. 2008	Checked: M. Kowarsch	Date 14 FEB. 2008

General Tolerance : ISO 2768

Scale: NTS

Next Higher Assembly: D60-9200-00-00

Title : **Schematic, G1000, GFC700**

Diamond AIRCRAFT Industries GmbH

DA 42 Twin Star

Drawing Number: **D60-9231-60-03**

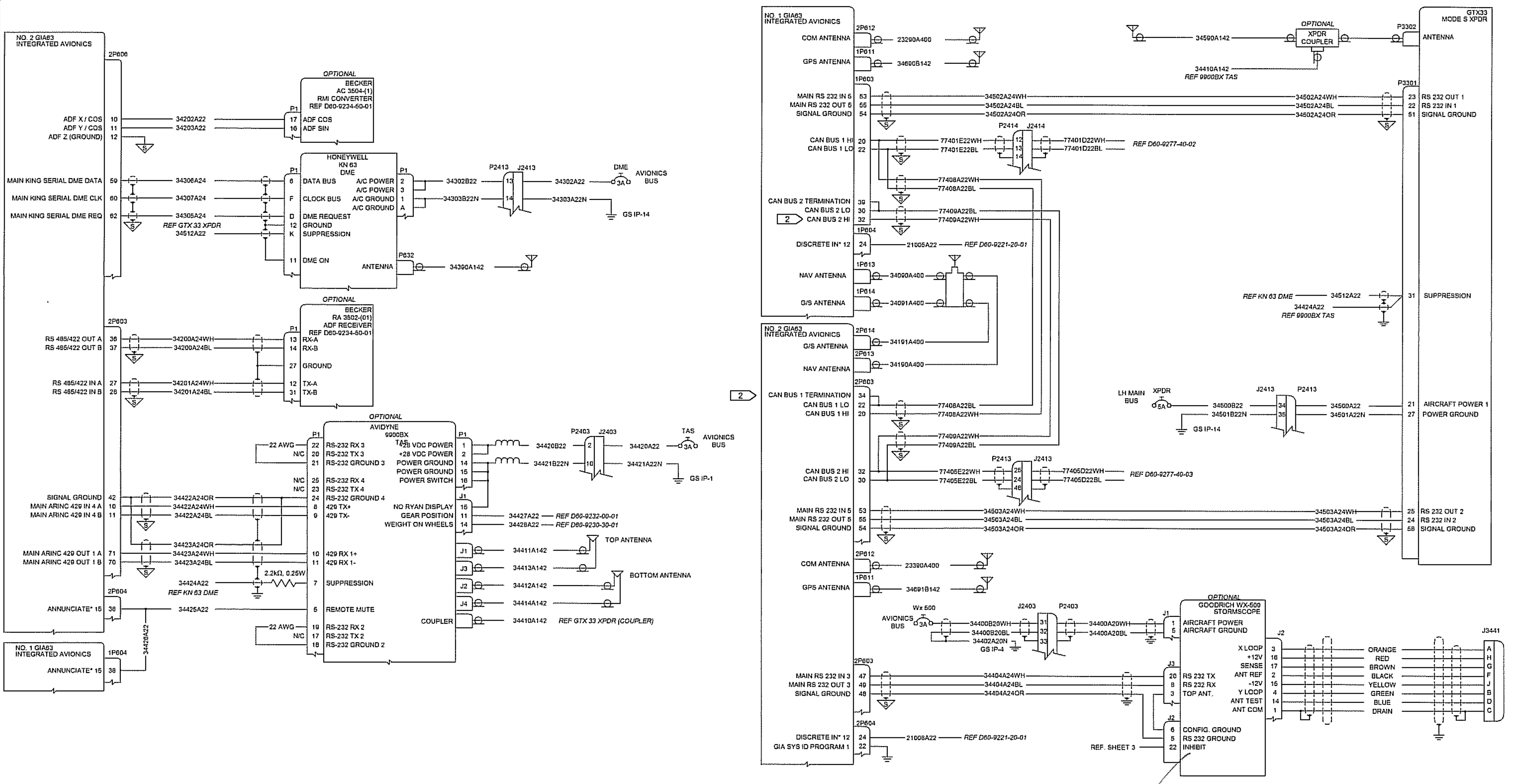
Sheet 5 from 6

Rev.	Change	Date	Name
"-"	OÄM 42-102	19.11.07	Kowarsch

Saved under : D60-9231-60-03.dft

REVISIONS

Rev.	Zone	Description
"-"	-	New drawing, does not supersede another drawing.



Approved : C. Jütte	Date 19 FEB. 2008	Name	
Checked M. Kowarsch	Date 14 FEB. 2008	Name	
General Tolerance : ISO 2768		Scale: NTS	

Next Higher Assembly : **D60-9200-00-00**

Title : **Schematic, G1000, GFC700**

Diamond AIRCRAFT Industries GmbH

DA 42 Twin Star

Drawing Number: **D60-9231-60-03**

Sheet 6 from 6

Rev.	Change	Date	Name
"-"	OÄM 42-102	19.11.07	Kowarsch

Saved under : **D60-9231-60-03.dft**

Confidential

REVISION					
REV	SH	ZONE	DESCRIPTION	DATE	APPROVAL
-	01	ALL	XÄM XX-XXX FIRST RELEASE	XX.XX.XX	SEE TB

NOTES:

1. SYMBOL DESIGNATIONS
   - TWISTED SHIELDED SINGLE CONDUCTOR SHIELD TERMINATED TO GROUND
   - TWISTED SHIELDED SINGLE CONDUCTOR SHIELD FLOATS
   - TWISTED SHIELDED PAIR SHIELD TERMINATED TO GROUND
   - TWISTED SHIELDED PAIR SHIELD FLOATS
   - TWISTED SHIELDED 3 CONDUCTOR SHIELD TERMINATED TO GROUND
   - TWISTED SHIELDED 3 CONDUCTOR SHIELD FLOATS
   - TWISTED SHIELDED 4 CONDUCTOR SHIELD TERMINATED TO GROUND
   - TWISTED SHIELDED 4 CONDUCTOR SHIELD FLOATS
   - AIRCRAFT GROUND
   - GARMIN (SHIELD BLOCK) GROUND REFER TO DOC. 190-00313-09
   - WIRE SPLICE CONNECTION
   - COAXIAL CABLE

   N/C = NO CONNECTION

2. NOTE THE FOLLOWING PIN DIFFERENCES IN REV 2 AND REV 3 GIA P603:

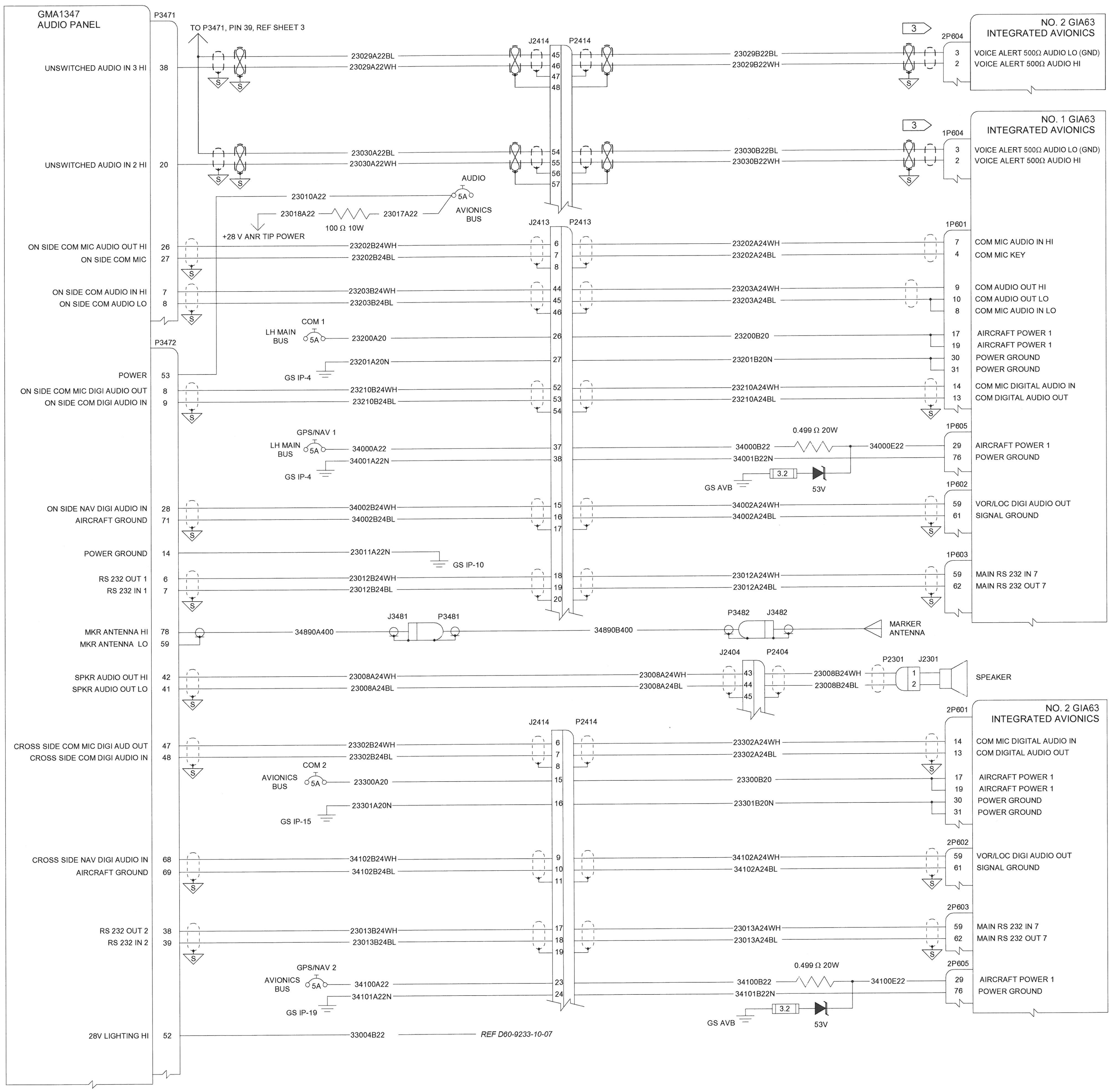
PIN NAME	REV 2 PIN	REV 3 PIN
CAN BUS 1 TERMINATION	35	34
CAN BUS 2 HI	29	32

REV 2 UNITS HAVE SERIAL NUMBERS LESS THAN 46901600
REV 3 UNITS HAVE SERIAL NUMBERS OF 46901600 OR GREATER

3. USE DOUBLE-SHIELDED WIRING: BOTH SHIELDS SHOULD BE GROUNDED ON THE RECEIVING SIDE; ON THE TRANSMITTING SIDE, ONLY THE OUTER SHIELD SHOULD BE GROUNDED, WHILE THE INNER SHIELD SHOULD FLOAT.

DIMENSIONS **METRIC**	IDENTIFICATION MARKINGS **DP-S-17-00001**	Diamond Aircraft Industries GmbH	Diamond Aircraft Industries — N. A. Otto-Straße 5, A-2700 Wiener Neustadt
FIRST ANGLE PROJECTION / FORMAT **A3**	CLASSIFICATION: **NONE**	DEPARTMENT / SIGN / DATE	PROJECT **DA 42**
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM	INTERCHANGEABLE PART **NO**	DRAWN **Kowarsch** / 17.11.11	TITLE **Schematic, G1000, GFC700**
DIMENSION TOLERANCES 3.2	THIS DRAWING WAS PRODUCED USING	CHECKED: **Kowarsch** / 21.11.2011	
2 DECIMAL ±0,25; 1DECIMAL ±0,5; DECIMAL ±1; ANGLE ±1°; RAD ±0,5	SOFTWARE: **SOLID EDGE V18**	QA: **N/A**; STRESS: **N/A**; MANUF.: **N/A**; SYSTEM: **N/A**	DWG.ORIG. **DAIA** / DWG.NO. **D60-9231-60-03_01** / REV "-"
FINISH IN MICRO-METER	FILENAME **D60-9231-60-03_01.dft**	APPROVED: **TL** / 26-11-2011	CODE **710197** / SCALE NTS / SH **01** OF **06**

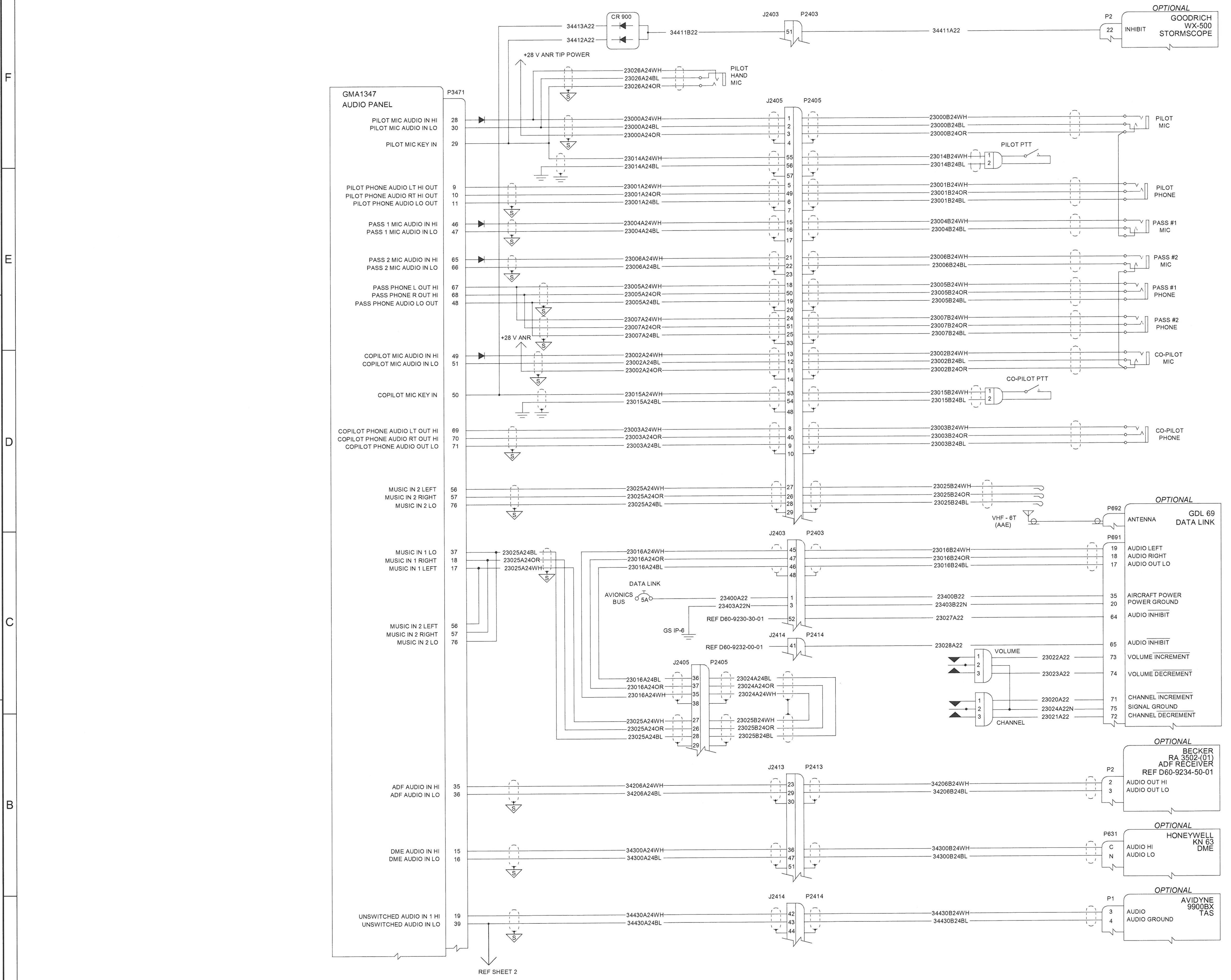
Confidential



2 1. NOV. 2011

M. Kowarsch

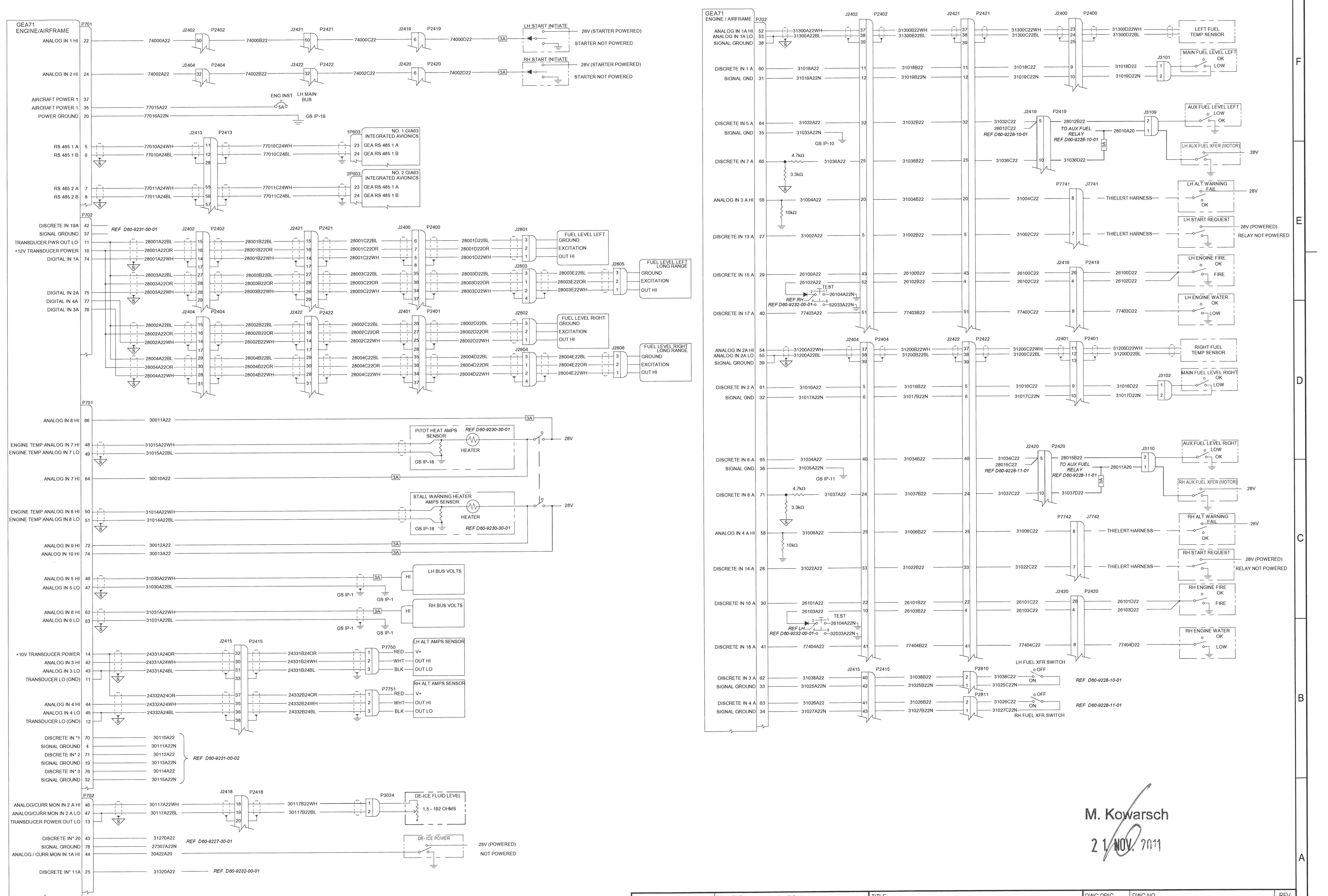
Diamond Aircraft Industries GmbH	PROJECT DA 42	TITLE	Schematic, G1000, GFC700	DWG.ORIG. DAIA	DWG.NO. D60-9231-60-03_01		REV "-"
Diamond Aircraft Industries	N. A. Otto-Straße 5, A-2700 Wiener Neustadt			CODE 710197	SCALE	SH 02 OF 06	



M. Kowarsch
21 NOV. 2011

Diamond Aircraft Industries GmbH	PROJECT DA 42	TITLE Schematic, G1000, GFC700	DWG.ORIG. DAIA / DWG.NO. D60-9231-60-03_01 / REV "-"
Diamond Aircraft Industries	N. A. Otto-Straße 5, A-2700 Wiener Neustadt		CODE 710197 / SCALE / SH 03 OF 06

Confidential

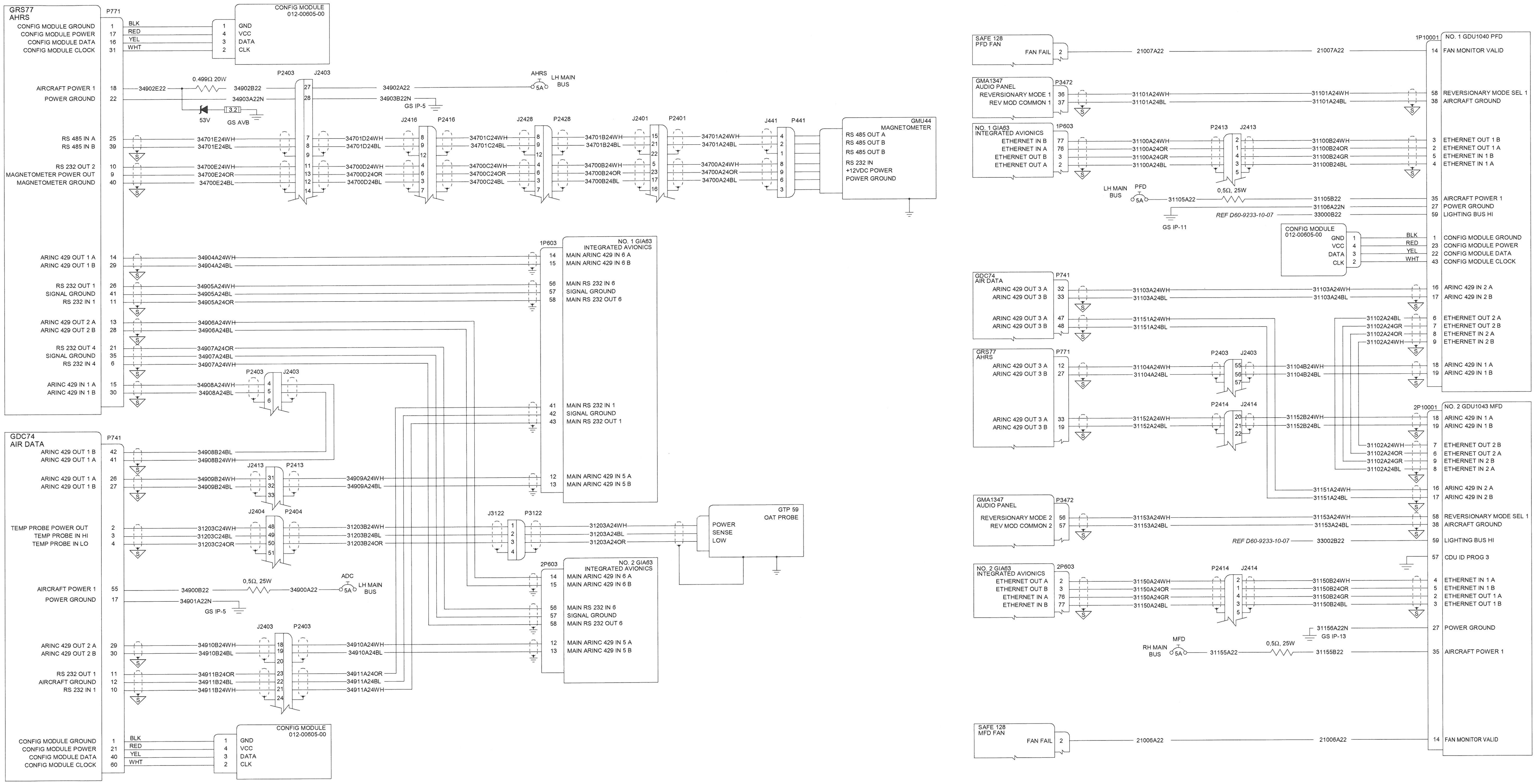


M. Kowarsch
21 NOV. 2011

Diamond Aircraft Industries GmbH	PROJECT	DA 42	TITLE	DWG.ORIG.	DWG.NO.	REV
Diamond Aircraft Industries	N. A. Otto-Straße 5, A-2700 Wiener Neustadt		Schematic, G1000, GFC700	DAIA	D60-9231-60-03_01	"-"
				CODE 710197	SCALE	SH 04 OF 06

Confidential

Confidential



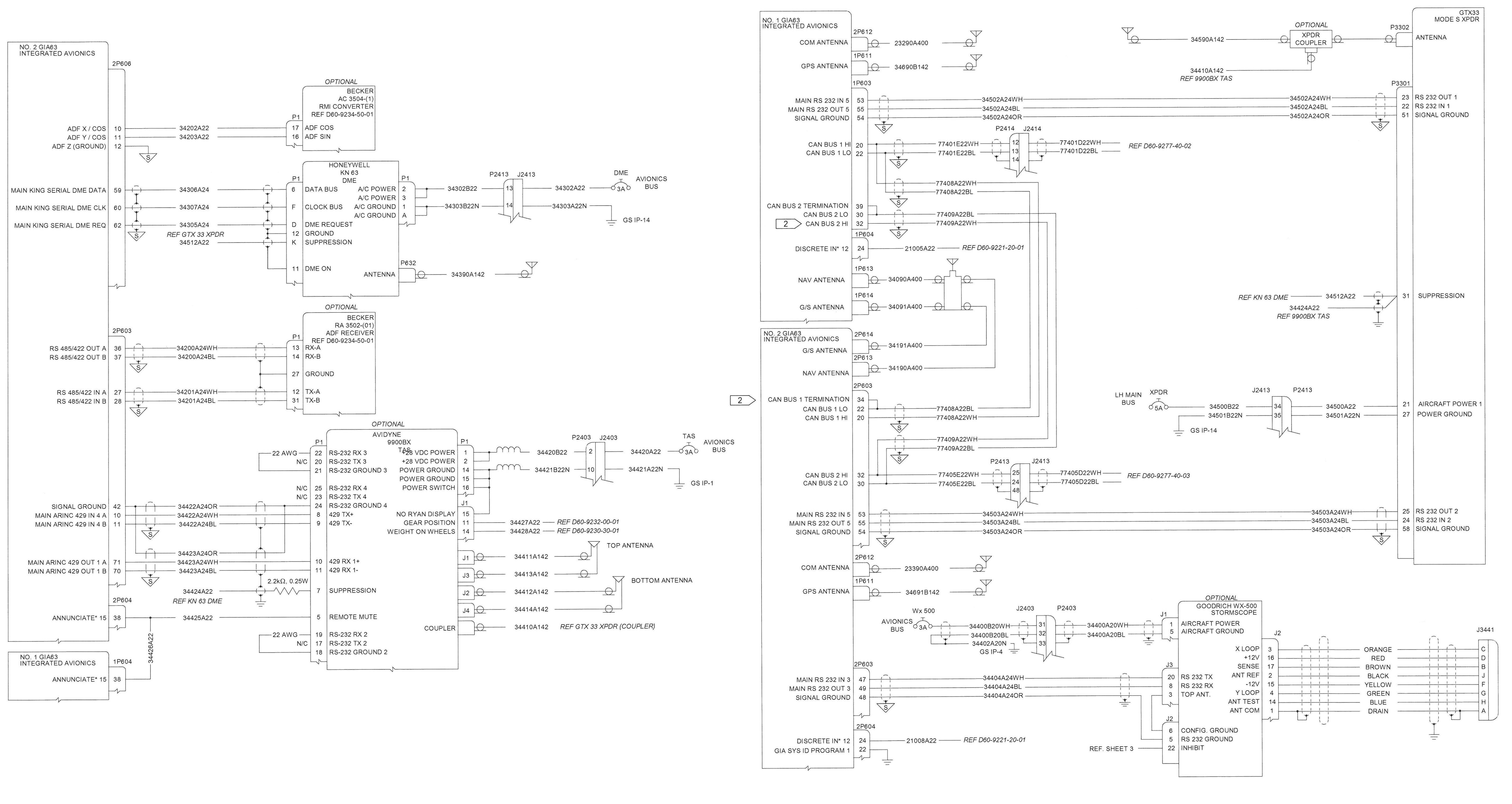
M. Kowarsch

21 NOV 2011

Diamond Aircraft Industries GmbH	PROJECT DA 42	TITLE	DWG.ORIG.	DWG.NO.	REV
Diamond Aircraft Industries	N. A. Otto-Straße 5 A-2700 Wiener Neustadt	Schematic, G1000, GFC700	DAIA	D60-9231-60-03_01	"-"
			CODE 710197	SCALE	SH 05 OF 06

Confidential

Confidential



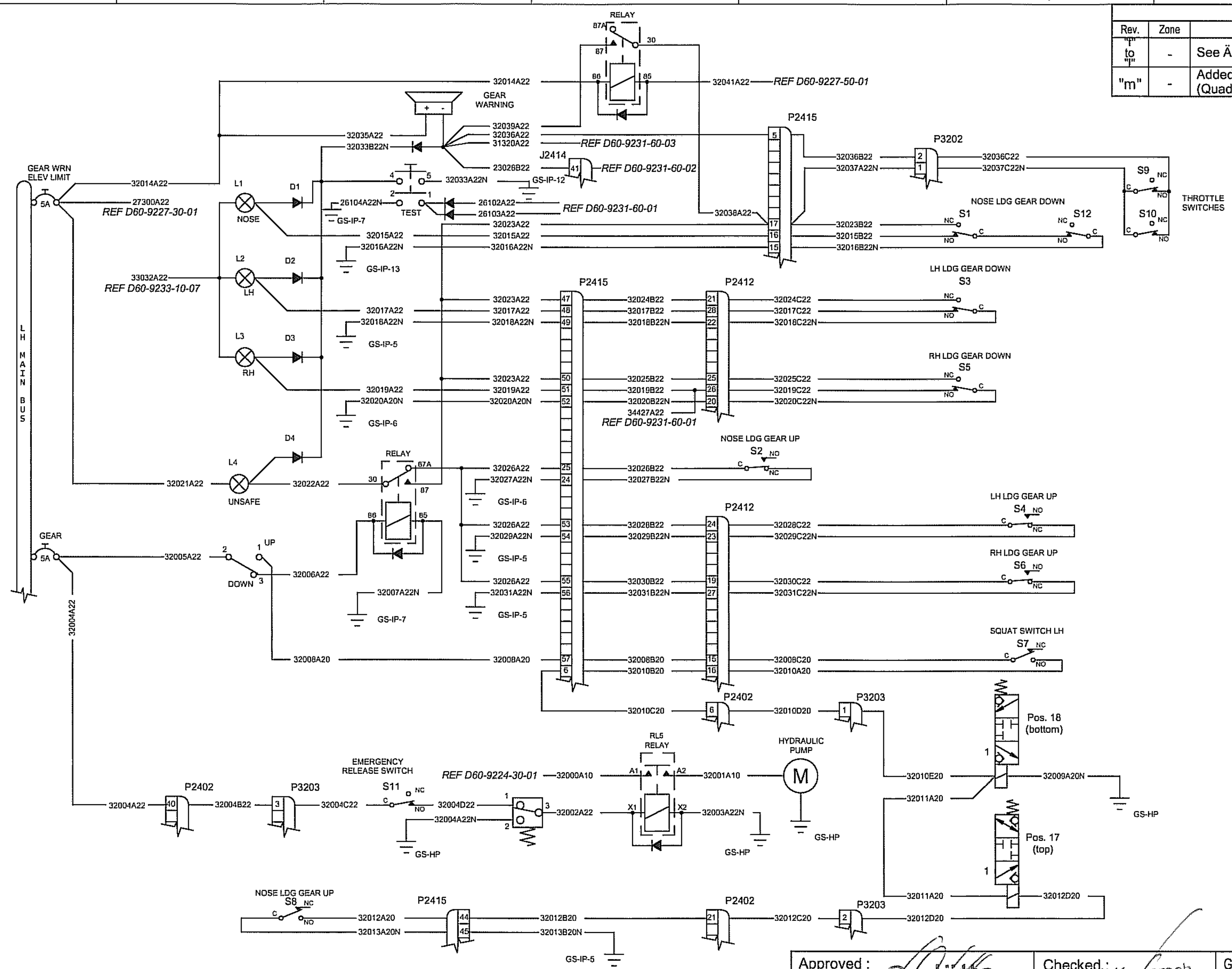
M. Kowarsch
21. NOV. 2011

Diamond Aircraft Industries GmbH	PROJECT DA 42	TITLE Schematic, G1000, GFC700	DWG.ORIG. DAIA / DWG.NO. D60-9231-60-03_01 / REV "-"
Diamond Aircraft Industries	N. A. Otto-Straße 5, A-2700 Wiener Neustadt		CODE 710197 / SCALE / SH 06 OF 06

Confidential

REVISIONS

Rev.	Zone	Description
"f" to "l"	-	See ÄM
"m"	-	Added wire 31320A22 at landing gear warning buzzer (Quadrant F-6).



1. WIRING SHOWN WITH LANDING GEARS DOWN AND LOCKED, THROTTLE ON IDLE AND NOT POWERED.
2. S1, S3, S5, S12 CLOSED WHEN LANDING GEARS DOWN AND LOCKED, S7 OPENED WHEN AIRPLANE ON GROUND, S2, S4, S6 OPENED WHEN LANDING GEARS UP AND LOCKED, S7 CLOSED WHEN AIRPLANE AIRBORN. S8 OPENED WHEN NOSE LANDING GEAR DOWN, S8 CLOSED WHEN NOSE LANDING GEAR UP. S9 AND S10 CLOSED WHEN BOTH POWER LEVERS ARE IN IDLE POSITION.
3. TEST SWITCH WIRED NORMALLY OPEN.

Weight: N/A
Calculated Weight: N/A

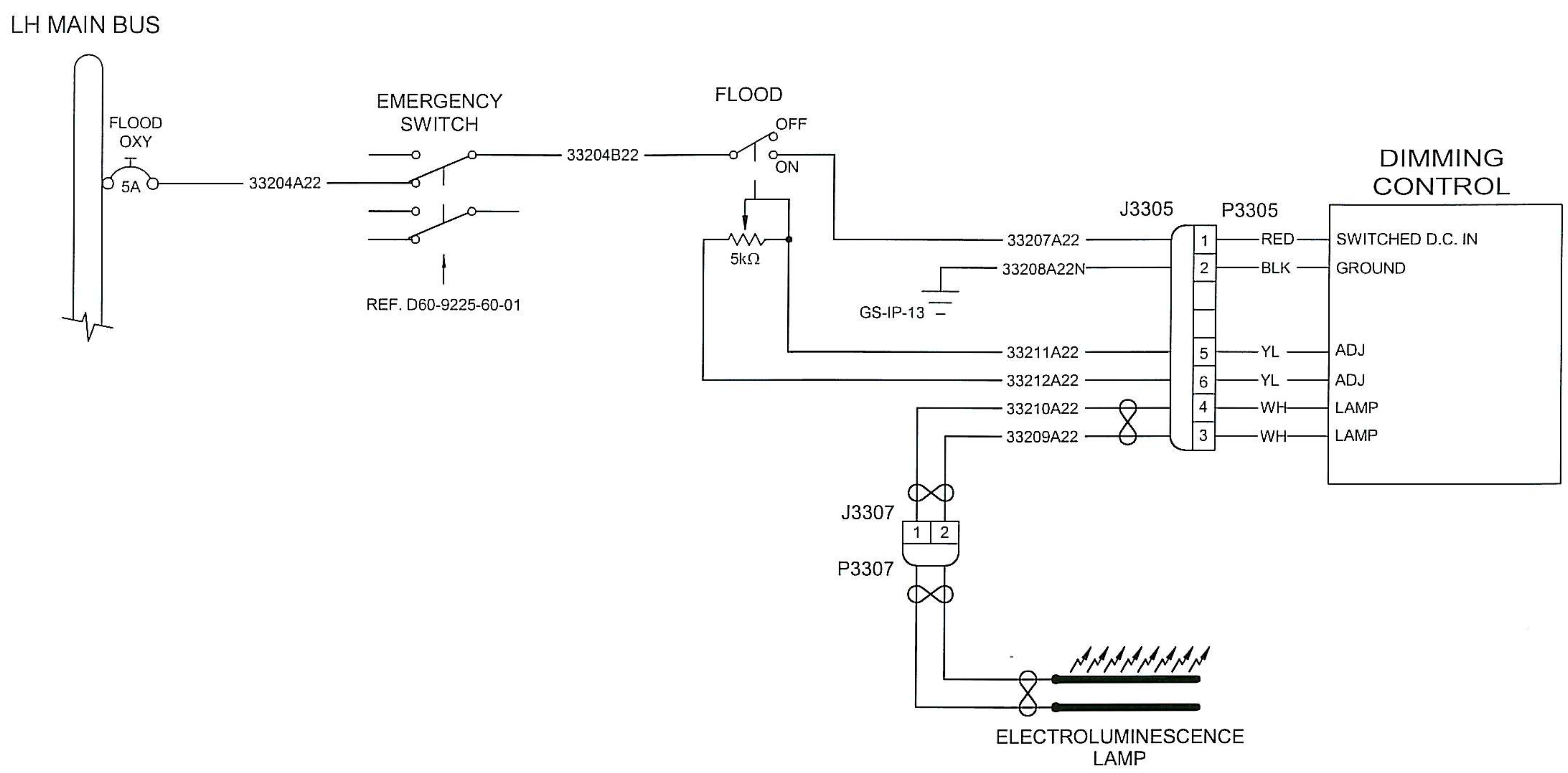
Approved: Jütte — Date 19 FEB 2008
Checked: M. Kowarsch — Date 14 FEB 2008

Rev.	Change	Date	Name
"m"	OÄM 42-102	16.11.07	Kowarsch
"l"	MÄM 42-229	05.12.06	Wood
"k"	OÄM 42-094	03.04.06	Kowarsch
"i"	MÄM 42-084	27.05.05	Mandl
"h"	MÄM 42-030	29.09.04	Kowarsch
"g"	MÄM 42-020	16.08.04	Kowarsch
"f"	MÄM 42-001	08.04.04	Kowarsch
"e"		31.03.04	Kowarsch
"d"	First Edition	18.02.04	Kowarsch

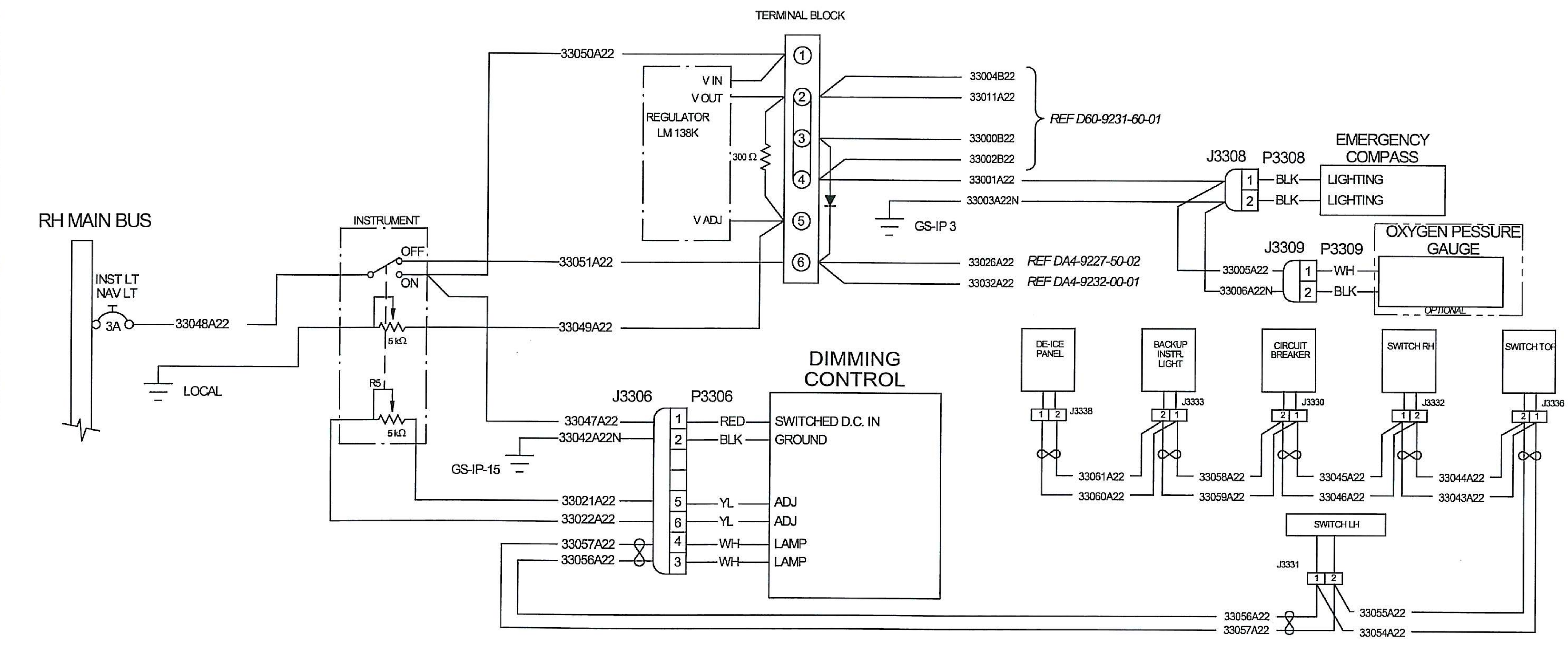
General Tolerance: ISO 2768 medium
Scale: 1:1
Next Higher Assembly: D60-9200-00-00
Diamond AIRCRAFT Industries GmbH
DA 42 Twin Star

Title: **Schematic, Landing Gear Wiring**

Drawing Number: **D60-9232-00-01**
Sheet 1 from 1
Saved under: D60-9232-00-00m.dft



Freigabe : M. Volck Datum 18 NOV. 2004 Name	Geprüft : J.Unbehend Datum 14. OKT. 2004 Name	Freimaßtoleranz : ISO 2768	Maßstab : 1:1
"-" MÄM 42-029 22.09.04 Kowarsch Rev. Änderung Datum Name	Nächster Zusammenbau : D60-9200-00-00 Diamond AIRCRAFT Industries GmbH DA42 Twin Star	Benennung : **Schematik, Flood-Licht Verkabelung** Name : **Schematic, Flood Light Wiring** Zeichnungs Nr.: **D60-9233-10-01**	Blatt 1 von 1
	Gespeichert unter : D60-9233-10-01.dft		



Approved : M. Volck	Date 24. FEB 2006	Name	
"c"	MÄM 42-172	24.01.06	Mandl
"b"	OAM 42-053	22.08.05	Kowarsch
"a"	MAM 42-030	29.09.04	Kowarsch
"-"	MAM 42-001	01.08.03	Sturge
Rev.	Change	Date	Name

Checked : J. Unbehend

Date 24. FEB. 2006 Name

General Tolerance : ISO 2768

Scale: NTS

Next Higher Assembly : D60-9200-00-00

Diamond AIRCRAFT Industries GmbH

DA 42 TWIN STAR

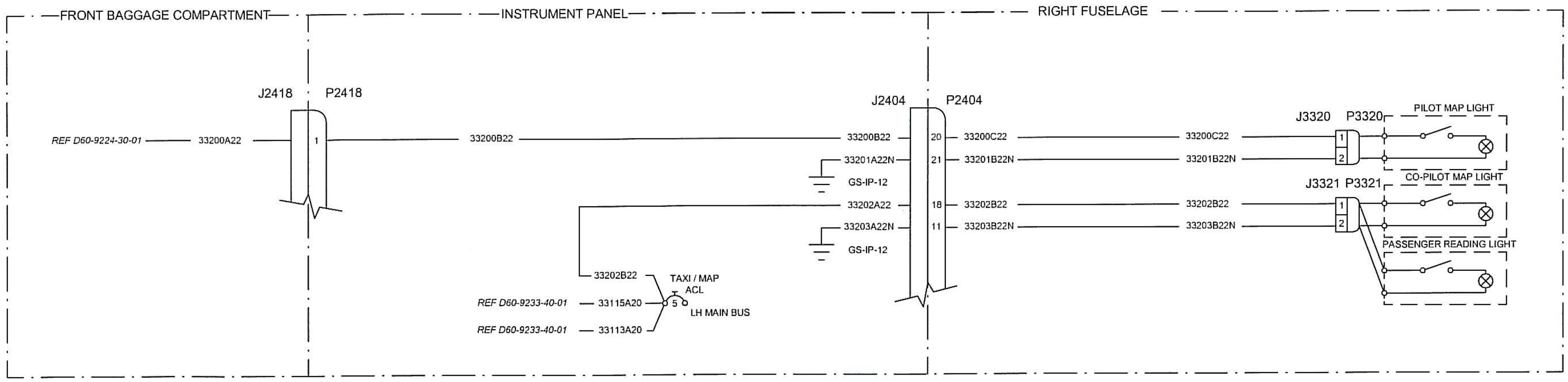
Title :

Schematic, dimming regulator & placards

Drawing Number: **D60-9233-10-07**

Sheet 1 from 1

Saved under : **D60-9233-10-07c.dft**



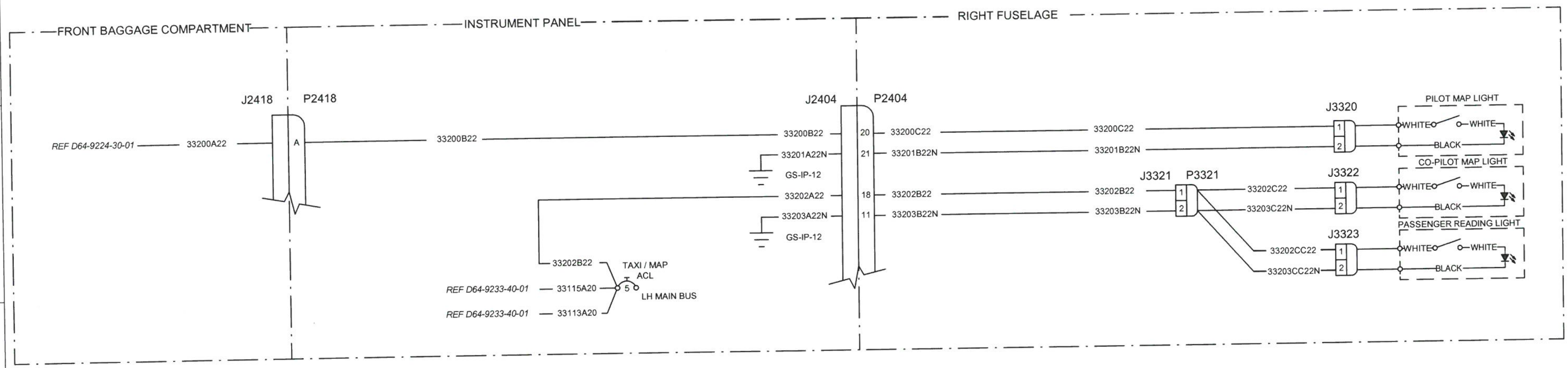
Freigabe : M. Volck			Geprüft :		Freimaßtoleranz : ISO 2768	Maßstab : 1:1
Datum 01. JUNI 2004		Name	Datum	Name		
			Nächster Zusammenbau : D60-9200-00-00	Benennung : Schematik, Karten/Leselicht Verkabelung		
			Diamond AIRCRAFT Industries GmbH	Name : Schematic, Map/Reading Light Wiring		
		020604				
"a"	MÄM 42-001	10.05.04	Kowarsch	DA42 Twin Star	Zeichnungs Nr.: D60-9233-20-01	Blatt 1 von 1
"-"	Erstausgabe	18.02.04	Kowarsch			
Rev.	Änderung	Datum	Name	Gespeichert unter : **Technikserver\DAI Zeichnun\...\D60-9233\D60-9233-20-01a.dft**		

DAIA
DWG.ORIG. CODE: 710197

Confidential

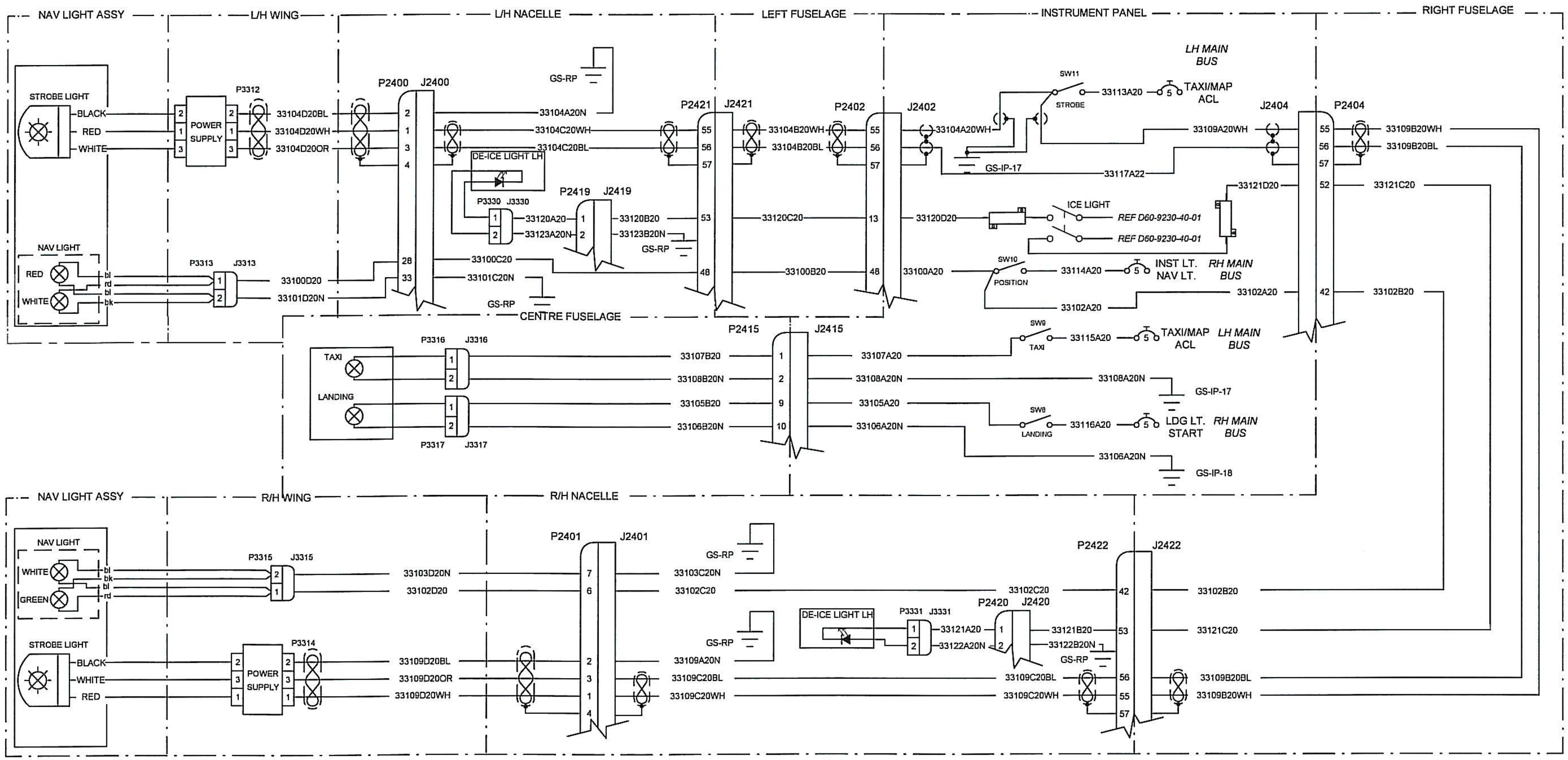
REVISION

REV	SH	ZONE	DESCRIPTION	DATE
-	01	ALL	MÄM 42-1024 NEW DRAWING SUPERSEDE D60-9233-20-01b.	22.11.2017



IDENTIFICATION MARKINGS **DP-S-17-00001**	FIRST ANGLE PROJECTION	DIMENSIONS **METRIC / mm**	PROJECT **DA 42**	**Diamond Aircraft** Industries GmbH
CLASSIFICATION: **NONE**		NAME / SIGN / DATE	WEIGHT: NA	INTERCHANGEABLE PART **No**
IF NOT OTHERWISE SPECIFIED GEOMETRIC DIMENSIONING AND TOLERANCING ACC. TO 3.2	DRAWN:	T. Zsutty 22 NOV 17	TITLE **Schematic, Map/Reading Lights, LED**	
SCALE 1:1	CHECKED:	M. Kowarsch 06 FEB 18	DWG.NO. **D60-9233-20-01_02**	REV -
FORMAT **A3** **SOLID EDGE** PDM N	RELEASED:	M. Schekl 27 JAN 18	NEXT HIGHER ASSY	
			FILENAME **D64-9233-20-01_02.dft**	SH **01** OF **01**

Confidential



Freigabe : M. Volck	Geprüft Unbehend	Freimaßtoleranz : ISO 2768	Maßstab : NTS
Datum 29. SEP 2005 Name	Datum 29. SEP. 2005 Name		

"d"	OÄM 42-053	26.04.05	Mandl
"c"	MÄM 42-030	13.12.04	Kowarsch
"b"	MÄM 42-028	16.09.04	M. Scheikl
"a"	Erstausgabe	19.02.04	Kowarsch
Rev.	Änderung	Datum	Name

Nächster Zusammenbau : D60-9200-00-00

Diamond AIRCRAFT Industries GmbH

DA42 Twin Star

Benennung : **Schematik, Außenbeleuchtung Verkabelung**

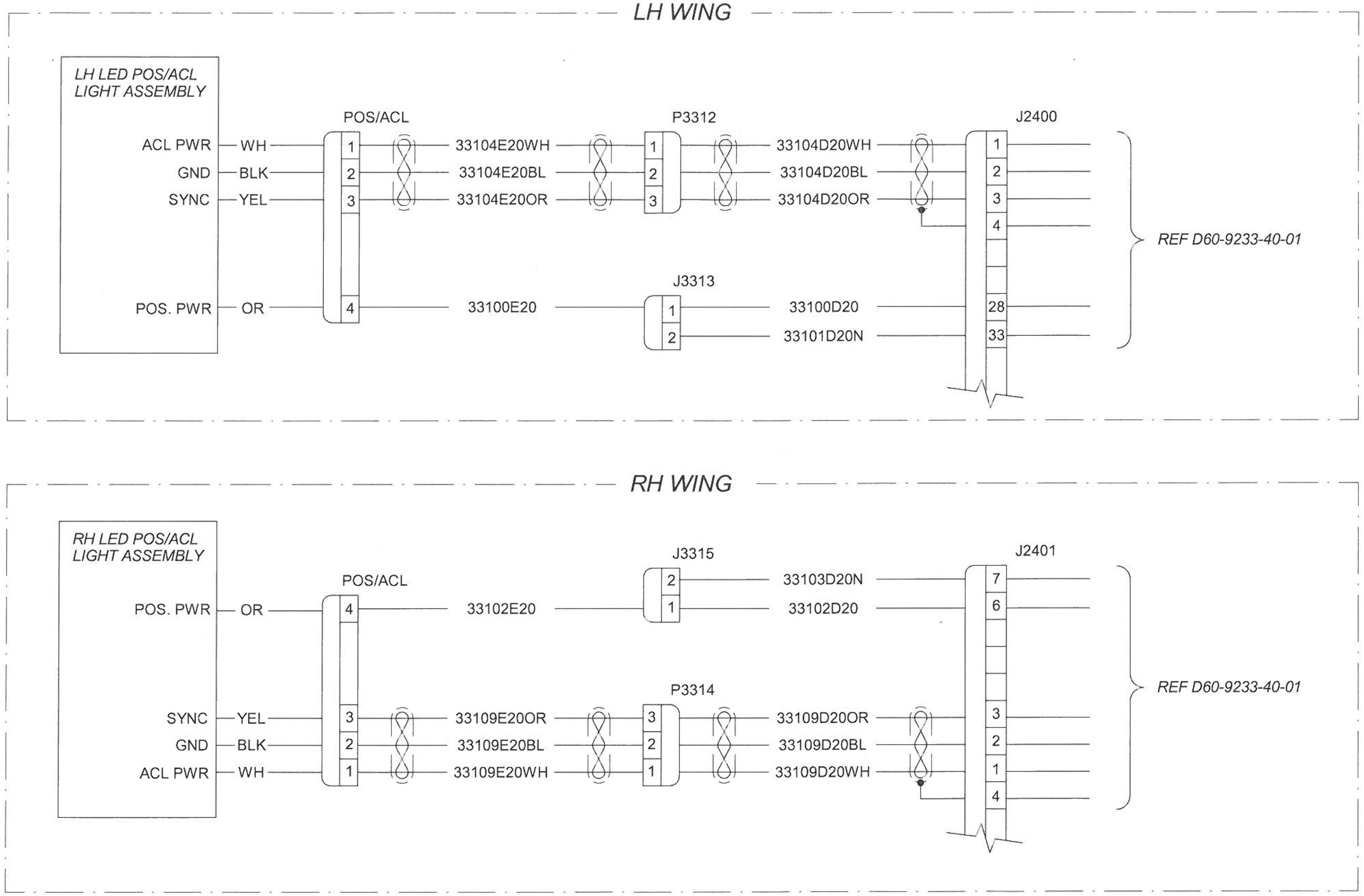
Name : **Schematic, Exterior Light Wiring**

Zeichnungs Nr.: **D60-9233-40-01**

Blatt 1 von 1

Gespeichert unter : D60-9233-40-01d.dft

REVISION				
REV	SH	ZONE	DESCRIPTION	DATE
-	01	ALL	OÄM 42-222/a NEW DRAWING, DOES NOT SUPERSEDE ANOTHER DRAWING.	01.06.16



DIMENSIONS **METRIC**		IDENTIFICATION MARKINGS **DP-S-17-00001**	- / -
FIRST ANGLE PROJECTION	FORMAT **A3**	CLASSIFICATION: **NONE**	
IF NOT OTHERWISE SPECIFIED GEOMETRIC DIMENSIONING AND TOLERANCING ACC. TO **ISO 2768-mK**	**3.2** FINISH IN MICRO-METER	INTERCHANGEABLE PART **NO**	
DIMENSIONS IN **mm**		THIS DRAWING WAS PRODUCED USING SOFTWARE: **SOLID EDGE ST6**	
		FILENAME **D60-9233-40-01x01.dft**	

Diamond Aircraft Industries GmbH — Diamond Aircraft Industries

N. A. Otto-Straße 5
A-2700 Wiener Neustadt

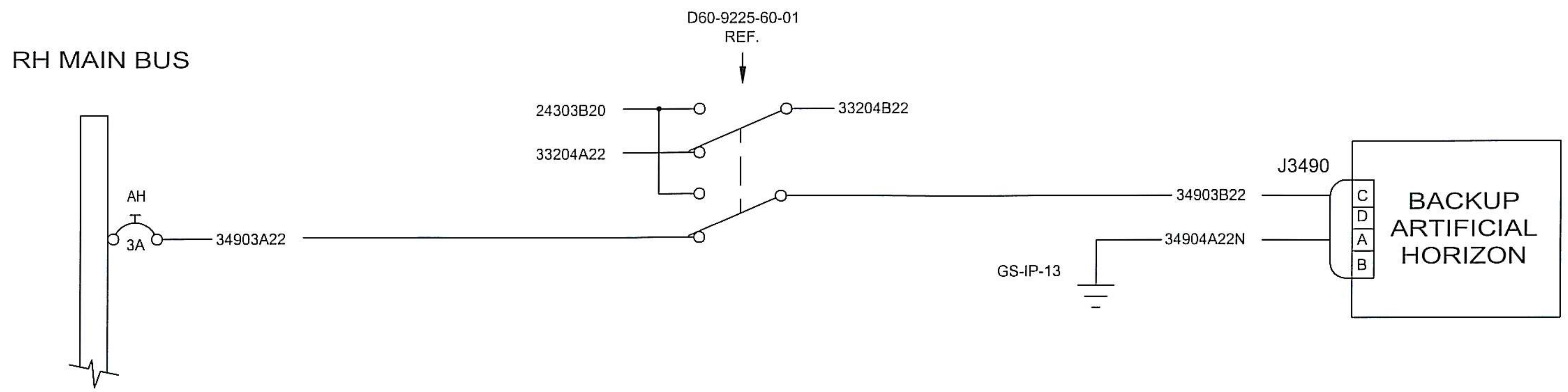
	NAME / SIGN / DATE	
DRAWN:	C. Dworak 01 JUN 16	
CHECKED:	M. Kowarsch 01 JUN 16	
RELEASED:	M. Schelk 01 JUNI 2016	

PROJECT **DA 42**

TITLE

Schematic, LED Position / Anti-Collision Lights

DWG.ORIG.	DWG.NO.	REV
DAIA	**D60-9233-40-01x01**	"-"
CODE **710197**	SCALE NTS	SH **01** OF **01**



Rev.	Änderung	Datum	Name
"c"	MÄM 42-030	14.10.04	Kowarsch
"b"	MÄM 42-028	16.09.04	M. Scheikl
"-"	Erstausgabe	18.02.04	Kowarsch

Freigabe: J.Unbehend
Datum: 13. DEZ. 2004
Name

Geprüft: 13.12.04
Datum
Name

Freimaßtoleranz: ISO 2768

Maßstab: 1:1

Nächster Zusammenbau: D60-9200-00-00

Diamond AIRCRAFT Industries GmbH

DA42 Twin Star

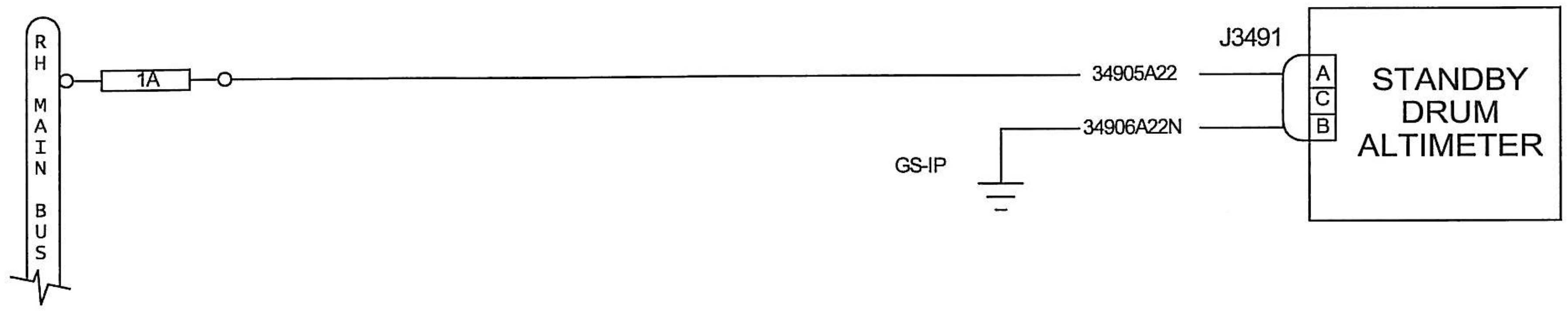
Benennung: **Schematik, künstlicher Horizont Verkabelung**

Name: **Schematic, Attitude Gyro Wiring**

Zeichnungs Nr.: **D60-9234-10-01**

Blatt **1** von **1**

Gespeichert unter: **D60-9234-10-01c.dft**



Approved : M. Reichel
Date 27. JUNI 2006 Name

Checked : 28.03.06
Date Name

General Tolerance : ISO 2768

Scale: 1:1

Next Higher Assembly : D60-9200-00-00

Diamond AIRCRAFT Industries GmbH

Title : **Shematic drum- altimeter**

DA 42 Twin Star

Drawing Number: **D60-9234-20-01**

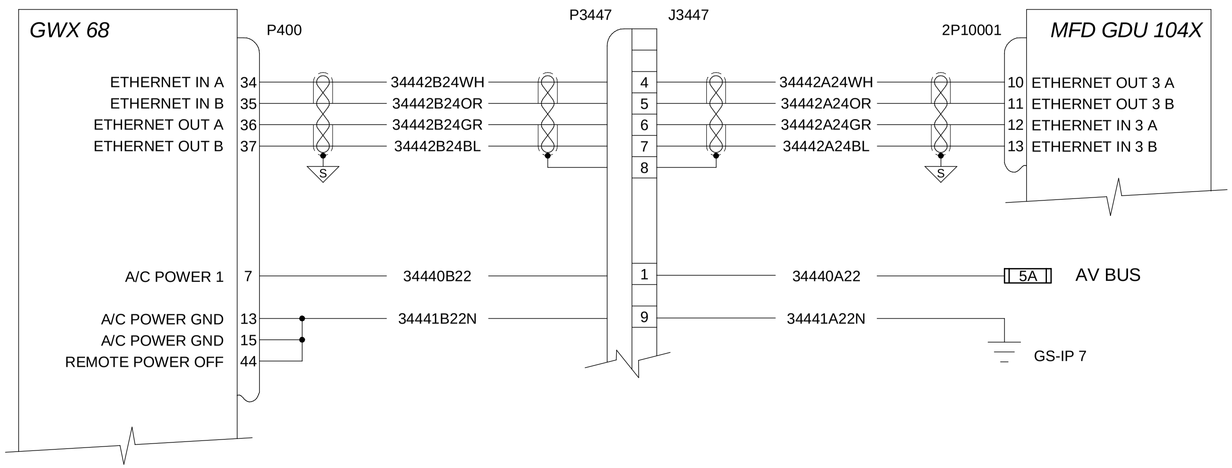
Sheet 1 from 1

Rev.	Change	Date	Name
"-"	ÖAM 42-095	24.03.06	Mandl

Saved under : D60-9234-20-01.dft

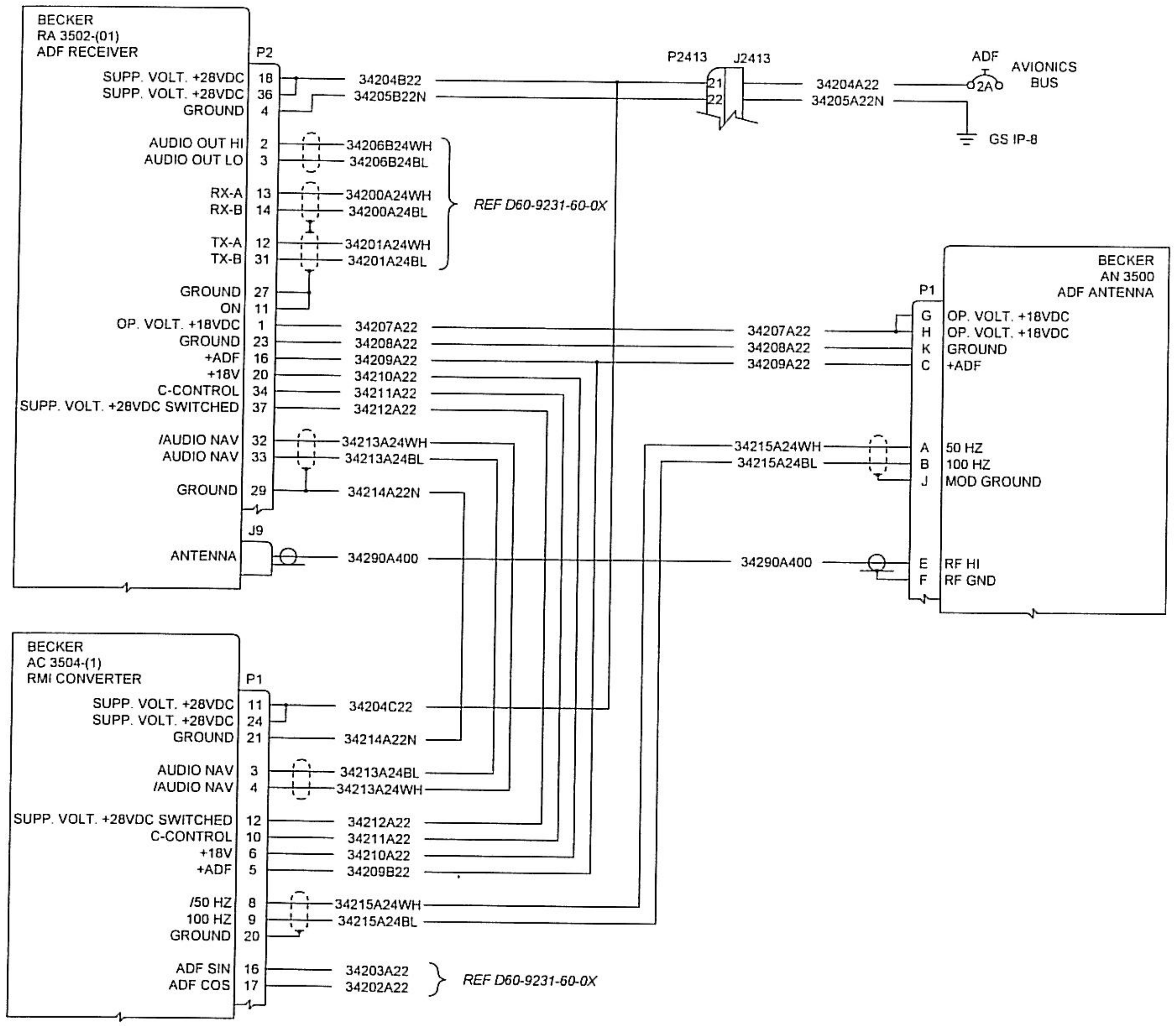
REVISION

REV	SH	ZONE	DESCRIPTION	DATE	APPROVAL
-	01	ALL	ÖÄM 42-119/b FIRST RELEASE	13.01.14	SEE TB



DIMENSIONS **METRIC**	IDENTIFICATION MARKINGS **DP-S-17-00001**	**Diamond Aircraft** Industries GmbH	Diamond Aircraft Industries — N. A. Otto-Straße 5, A-2700 Wiener Neustadt
FIRST ANGLE PROJECTION — FORMAT **A3**	CLASSIFICATION: **NONE**	DEPARTMENT / SIGN / DATE	PROJECT **DA 42**
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM	INTERCHANGEABLE PART **NO**	DRAWN — 13.01.14	TITLE **Schematic, GWX 68 Weather Radar Wiring**
DIMENSION TOLERANCES 3.2	THIS DRAWING WAS PRODUCED USING SOFTWARE: **SOLID EDGE V18**	CHECKED:	
2 DECIMAL u0,25; 1DECIMAL u0,5; DECIMAL u1; ANGLE u1°; RAD u0,5 — FINISH IN MICRO-METER	FILENAME **D60-9234-40-01.dft**	QA: **N/A**; STRESS: **N/A**; MANUF.: **N/A**; SYSTEM: **N/A**; APPROVED: **TL**	DWG.ORIG. **DAIA** — DWG.NO. **D60-9234-40-01** — REV "-"
			CODE **710197** — SCALE NTS — SH **01** OF **01**

REVISION					
REV	SH	ZONE	DESCRIPTION	DATE	APPROVAL
- to A	01	ALL	SEE REV. A	17.05.05	SEE REV. A
B	01	ALL	MÄM 42-373, CHANGED REFERENCES, CORRECTED CO-AX WIRE NUMBER, NEW STANDARD.	11.08.09	SEE TB



DIMENSIONS	METRIC	IDENTIFICATION MARKINGS	
FIRST ANGLE PROJECTION	FORMAT A3	DE-S-10-00003	- / -
		CLASSIFICATION: NONE	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM		INTERCHANGEABLE PART	NO
DIMENSION TOLERANCES	3.2	THIS DRAWING WAS PRODUCED USING	
2 DECIMAL ±0,25		SOFTWARE:	SOLID EDGE V18
1DECIMAL ±0,5	FINISH IN MICRO-METER	FILENAME	
DECIMAL ±1		D60-9234-50-01b.dft	
ANGLE ±1°			
RAD ±0,5			

Diamond Aircraft Industries GmbH

Diamond Aircraft Industries

N. A. Otto-Straße 5
A-2700 Wiener Neustadt

DEPARTMENT		SIGN	DATE
DRAWN	Kowarsch		11.08.09
CHECKED:	Kowarsch		12.08.09
QA:	N/A		
STRESS:	N/A		
MANUF.:	N/A		
SYSTEM:	N/A		
APPROVED:	Volck		22. MRZ. 2011

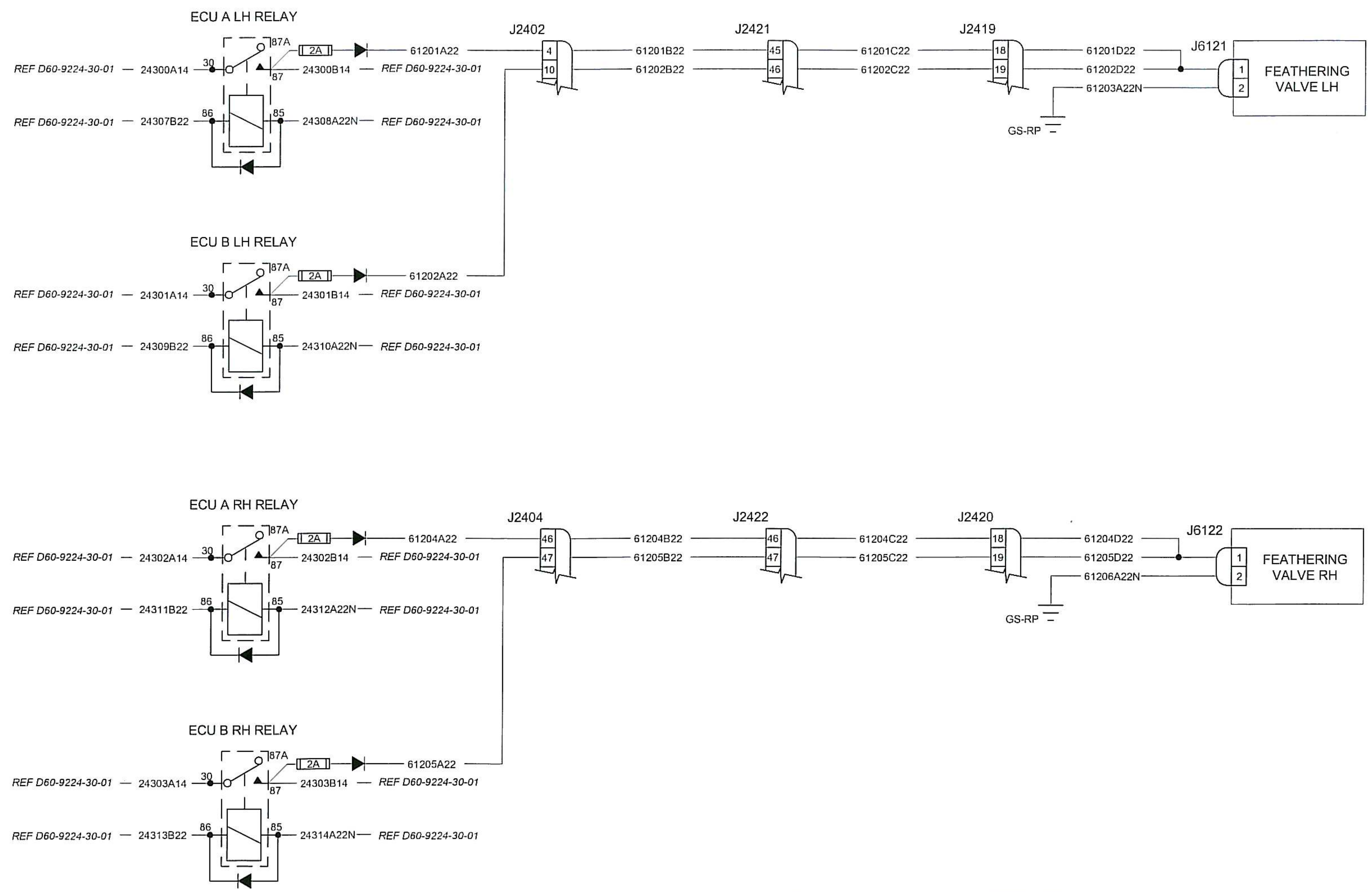
PROJECT **DA 42**

TITLE

Schematic, ADF Wiring

DWG.ORIG.	DWG.NO.	REV
DAIA	D60-9234-50-01	"B"

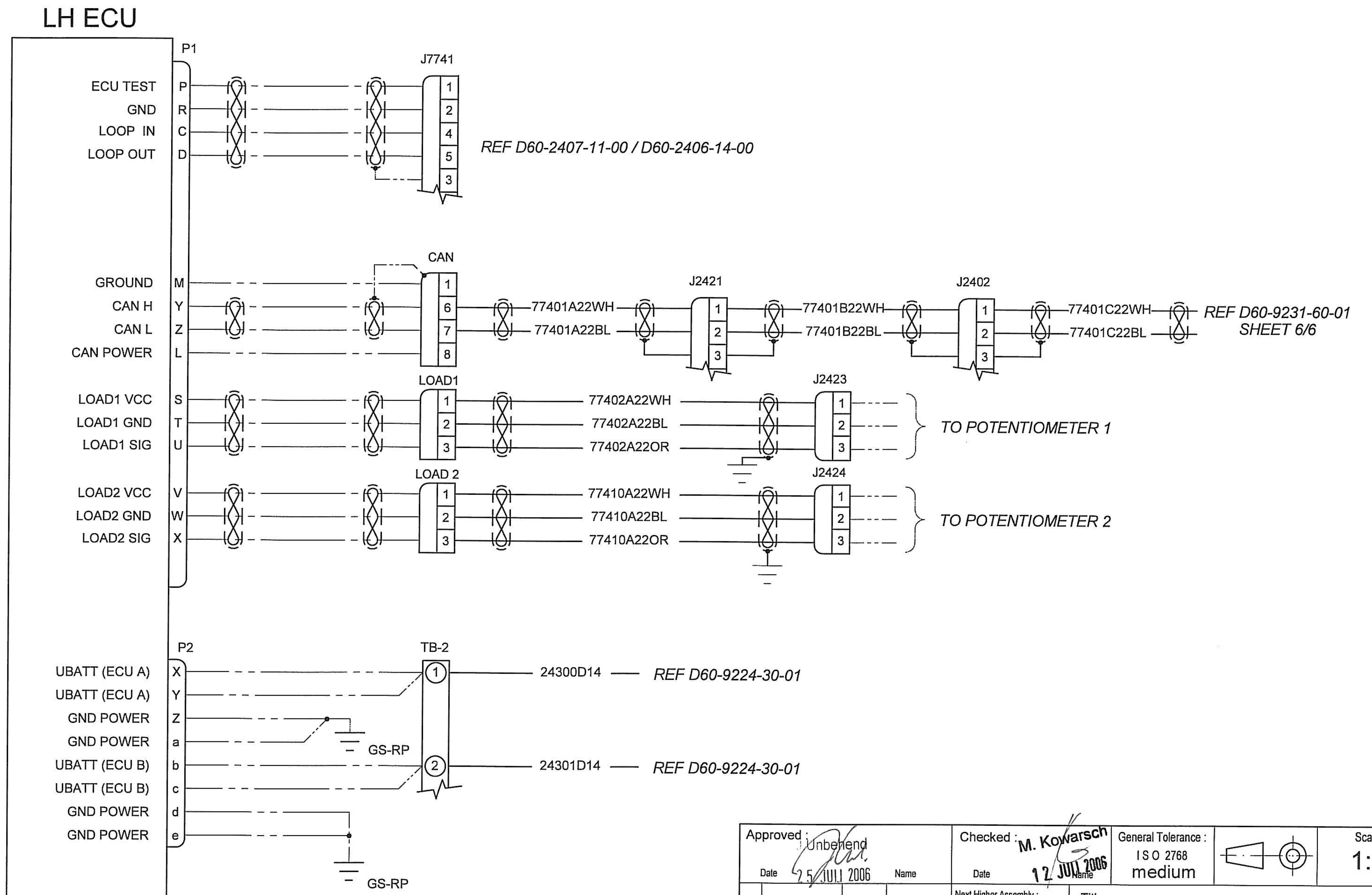
CODE 710197	SCALE NTS	SH 01 OF 01



Freigabe: M. Voick	Datum: 01. JUNI 2004	Name	Geprüft:	Freimaßtoleranz: ISO 2768	Maßstab: NTS
"a"	MÄM 42-001	25.05.04	Kowarsch	Nächster Zusammenbau: D60-9200-00-00	Benennung: Schematik, Verkabelung des Feathering-Systems
"-"	Erstausgabe	25.02.04	Kowarsch	Diamond AIRCRAFT Industries GmbH	Name: Schematic, Feathering System Wiring
Rev.	Änderung	Datum	Name	DA42 Twin Star	Zeichnungs Nr.: D60-9261-20-01 — Blatt 1 von 1

Gespeichert unter: Technikserver\DAI Zeichnun\...\D60-9261\D60-9261-20-01a.dft

020604



NOTE

1. PHANTOM LINES INDICATE THIELERT HARNESS.

Weight:	N/A
Calculated Weight:	N/A

Approved: Unbehend
Date 25 JULI 2006 Name

Checked: M. Kowarsch
Date 12 JULI 2006 Name

General Tolerance: ISO 2768 medium

Scale: 1:1

Next Higher Assembly: D60-9200-00-00

Diamond AIRCRAFT Industries GmbH

Title: **Schematic, LH ECU Wiring**

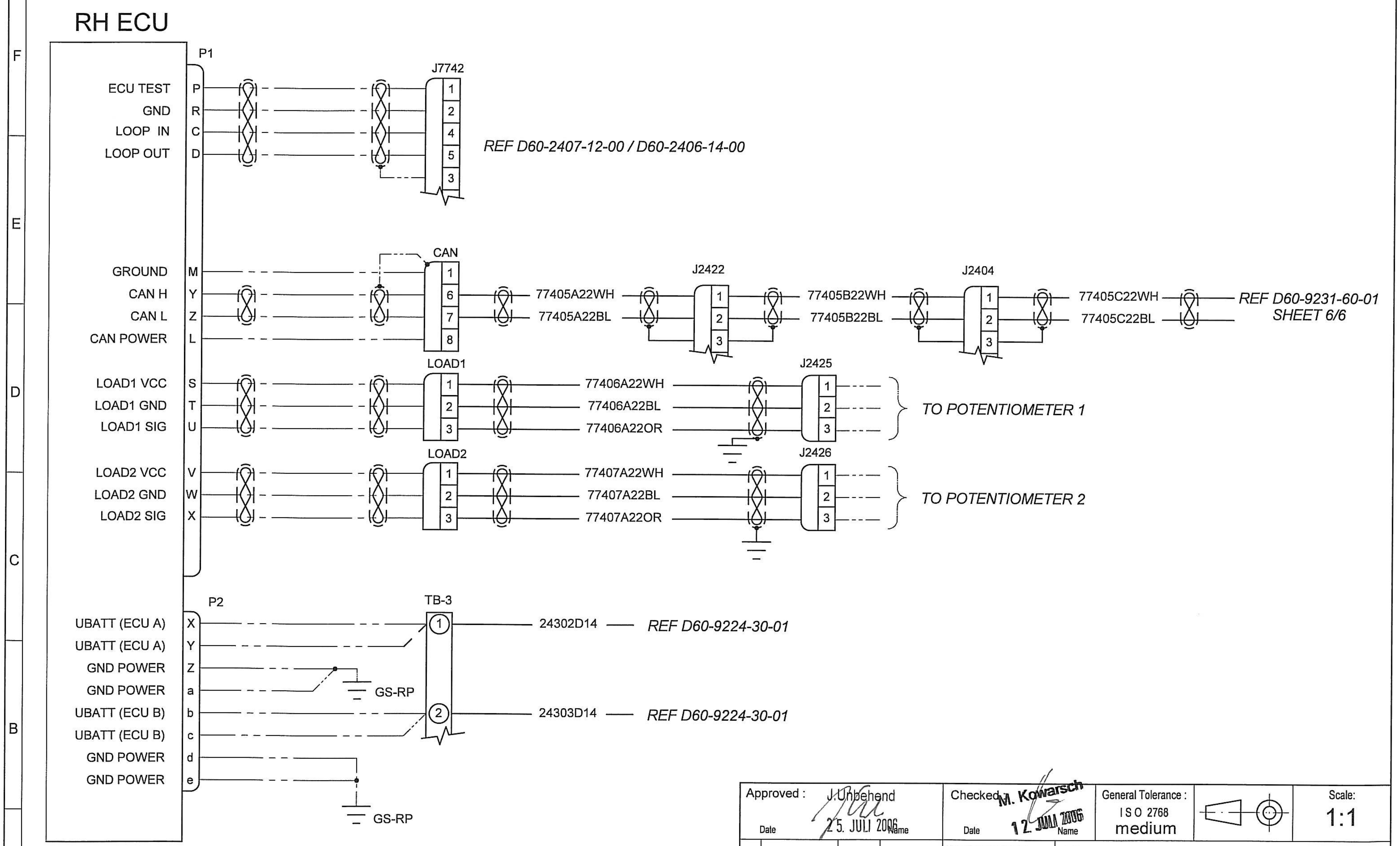
DA 42 Twin Star

Drawing Number: **D60-9277-40-02**

Sheet 1 from 1

Rev.	Change	Date	Name
"b"	MÄM 42-202	06.07.06	Kowarsch
"a"	MÄM 42-108	23.09.05	Mandl
"-"	First Edition	04.04.03	Kowarsch

Saved under: **D60-9277-40-02b.dft**



NOTE

1. PHANTOM LINES INDICATE THIELERT HARNESS.

Weight:	N/A
Calculated Weight:	N/A

Approved : J.Unbehend	Date 25. JULI 2006 Name	Checked: M. Kowarsch	Date 12. JULI 2006 Name
General Tolerance : ISO 2768 medium		Scale: 1:1	
Next Higher Assembly : D60-9200-00-00		Title : Schematic, RH ECU Wiring	
Diamond AIRCRAFT Industries GmbH		DA 42 Twin Star	
Drawing Number: D60-9277-40-03		Sheet 1 from 1	
Saved under : D60-9277-40-03b.dft			

Rev.	Change	Date	Name
"b"	MÄM 42-202	06.07.06	Kowarsch
"a"	MÄM 42-108	23.09.05	Mandl
"-"	First Edition	04.04.03	Kowarsch