Diamond AIRCRAFT

AIRPLANE FLIGHT MANUAL
FOR THE POWERED SAILPLANE
HK 36 TS

Engine : Rotax 912 A3
Model : HK 36 TS
S/N : _____

Doc. No. : 3.01.06
Date of Issue : January 1996

Pages identified by "ACG-appr." in the List of Effective Pages are approved by:

Signature: Winkler AUSTRO CONTROL GmbH 640

Authority: _____

AUSTRO CONTROL GmbH
Abteilung Flugtechnik
Zentrale
A-1030 Wien, Schnirchgasse 11

Stamp: _____

Original date of approval: 6. März 1996

This powered sailplane is to be operated in compliance with the information and limitations contained herein.

Prior to operating the powered sailplane, the Pilot must take notice of all the information contained in this Airplane Flight Manual.

This powered sailplane manual is FAA approved for U.S. registered aircraft in accordance with the provisions of 14 CFR, Section 21.29, and is required by FAA Type Certificate Data Sheet No. G07CE.

PREFACE

Congratulations on your choice of the HK 36 TS powered sailplane. Skillful operation of an airplane will ensure your safety and provide you with hours of enjoyment. Therefore, you should take the time to get familiar with your new HK 36 TS.

We ask you to read this manual thoroughly and to pay attention to the recommendations given in it. If you do, you can expect many hours of incident-free flight operation from your powered sailplane.

0.1 RECORD OF REVISIONS

Any revision of the present manual, except current weighing data, must be recorded in the following table and in the case of approved sections endorsed by the responsible airworthiness authority.

The new or amended text in the revised page will be indicated by a black vertical line in the left hand margin, and the Revision No. and the date will be shown on the bottom of the page.

If you have purchased a second hand HK 36 TS, please let us know your address so that we can supply you with the publications you need for safe operation of the powered sailplane.

Rev. No.	Aff. Sec.	Affected Pages	Date, Source	Approval	Date of Approval	Date inserted	Signature
1	0	II through IV	Jun 1997	[approved by Ing. Andreas Winkler for ACG]	6 Jun 1997		
	1	1-6					
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	4	4-8, 4-10 through 4-24					
	6	6-4					
	7	7-5, 7-11					
2	0	Cover, II through IV	25 Aug 1997	[approved by Ing. Andreas Winkler for ACG]	04 Sep1997		
	2	2-16					
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3	0	II through IV	28 Oct 1998	[approved by Ing. Andreas Winkler for ACG]	29 Oct 1998		
	7	7-11					
4*	All	All except cover page	29 Mar 2024	Revision 4 of the AFM Doc. No. 3.01.06 is approved under the authority of DOA No. EASA. 21J.052.	27 May 2024		

* Following information has been incorporated in Revision No. 4: MÄM 36-219, MÄM 36-225, MÄM 36-450, MÄM 36-476, OÄM 36-359, OÄM 36-369, OÄM 36-374, SB64/1, RSB36-77, MSB36-080, MSB36-083/1.

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*formerly “ACG-approved”, now “approved” by EASA.

0.3 TABLE OF CONTENTS

SECTION

SECTION 1
GENERAL

Page No.

1.1 INTRODUCTION

The powered sailplane Flight Manual has been prepared to provide pilots and instructors with information for the safe and efficient operation of the powered sailplane.

This manual includes the material required to be furnished to the pilot by JAR-22. It also contains supplementary data supplied by the powered sailplane manufacturer.

This Flight Manual conforms to the actual version of the customer's airplane. However, any optional equipment (COM, NAV, etc.) is not considered. For their operation, the operation manual of the respective manufacturer must be followed.

This must always be kept onboard the airplane.

Modification	**Source**	**Installed**	
Alternative Coolant	MÄM 36-225	☐ **yes**	☐ **no**
Change from CHT to Coolant Temperature Measurement	MÄM 36-450	☐ **yes**	☐ **no**
Larger Main Landing Gear Tires	OÄM 36-369	☐ **yes**	☐ **no**

If OÄM 36-359 is installed, an additional cooling baffle increases the airflow across the engine water cooler. The coolant baffle reduces the engine coolant temperature and is installed to the Cowling by Camlocs.

For cold weather operation of the airplane (below 0° C / below 32° F OAT on ground), the additional cooling baffle must be removed.

1.2 CERTIFICATION BASIS

The HK 36 TS powered sailplane has been approved by Austro Control GmbH (ACG) in accordance with JAR-22 for sailplanes and powered sailplanes including amendments 22/90/1 and 22/91/1 (change 4), and the Type Certificate No. SF 3/82 has been issued.

Category of Airworthiness: Utility.

1.3 WARNINGS, CAUTIONS AND NOTES

The following definitions apply to warnings, cautions and notes used in the Flight Manual.

WARNING

Means that the non-observation of the corresponding procedure leads to an immediate or important degradation of the flight safety.

CAUTION

Means that the non-observation of the corresponding procedure leads to a minor or to a more or less long term degradation of the flight safety.

NOTE

Draws the attention on any special item not directly related to safety but which is important or unusual.

1.4 EXPLANATIONS

1.4.1 ABBREVIATIONS

ACG	Austro Control GmbH
CG	Center of gravity
CFRP	Carbon fiber reinforced plastic
EASA	European Aviation Safety Agency
GFRP	Glass fiber reinforced plastic
OAT	Outside Air Temperature
IAS	Indicated Airspeed (read on airspeed indicator without any correction of errors).
TAS	True Airspeed (IAS corrected by errors due to instrument, system, altitude and temperature)

1.4.2 PHYSICAL UNITS

	SI units	US units	conversions
length	[mm] millimeters [m] meters	[in.] inches [ft.] feet	[mm] / 25.4 = [in.] [m] / 0.3048 = [ft.]
velocity	[km/h] kilometers per hour [m/s] meters per second	[kts.] knots [mph] miles per hour [fpm] feet per minute	[km/h] / 1.852 = [kts.] [km/h] / 1.609 = [mph] [m/s] * 196.85 = [fpm]
revol. speed	[min^{-1}] revolutions per minute	[RPM] revolutions per minute	[min^{-1}] = [RPM]
mass	[kg] kilograms	[lbs.] pounds	[kg] * 2.2046 = [lbs.]
force, weight	[N] Newtons	[lbs.] pounds	[N] * 0.2248 = [lbs.]
pressure	[hPa] Hectopascal [mbar] millibar [bar] bar	[inHg] inches mercury column [psi] pounds per square inch	[hPa] / 33.86 = [inHg] [bar] * 14.504 = [psi] [hPa] = [mbar]

1.4.3 SPECIAL TERMS

Pressure altitude — Altitude indicated by the altimeter when the subscale is adjusted to 1013.25 mbar (or 1013.25 hPa)

Service ceiling — Maximum altitude that can be reached with a climb rate of at least 0.5 m/s (approx. 100 ft./min.)

Take-off roll — Distance between the start of the take-off run and the lift-off point

Take-off distance — Distance between the start of the take-off run and the point above which the airplane is able to clear a 15 m (approx. 50 ft.) obstacle

Non-lifting parts — Fuselage, rudder, horizontal tail surfaces and useful load

Useful load — Crew, baggage and fuel

1.5 DESCRIPTIVE DATA

The HK 36 TS is a two-seated powered sailplane in fiber-composite structure, designed in compliance with JAR-22; Category of Airworthiness: Utility.

It is a low wing airplane with T-tail, side-by-side seating configuration, tail wheel landing gear and Schempp-Hirth type air brakes in the wings' upper surface.

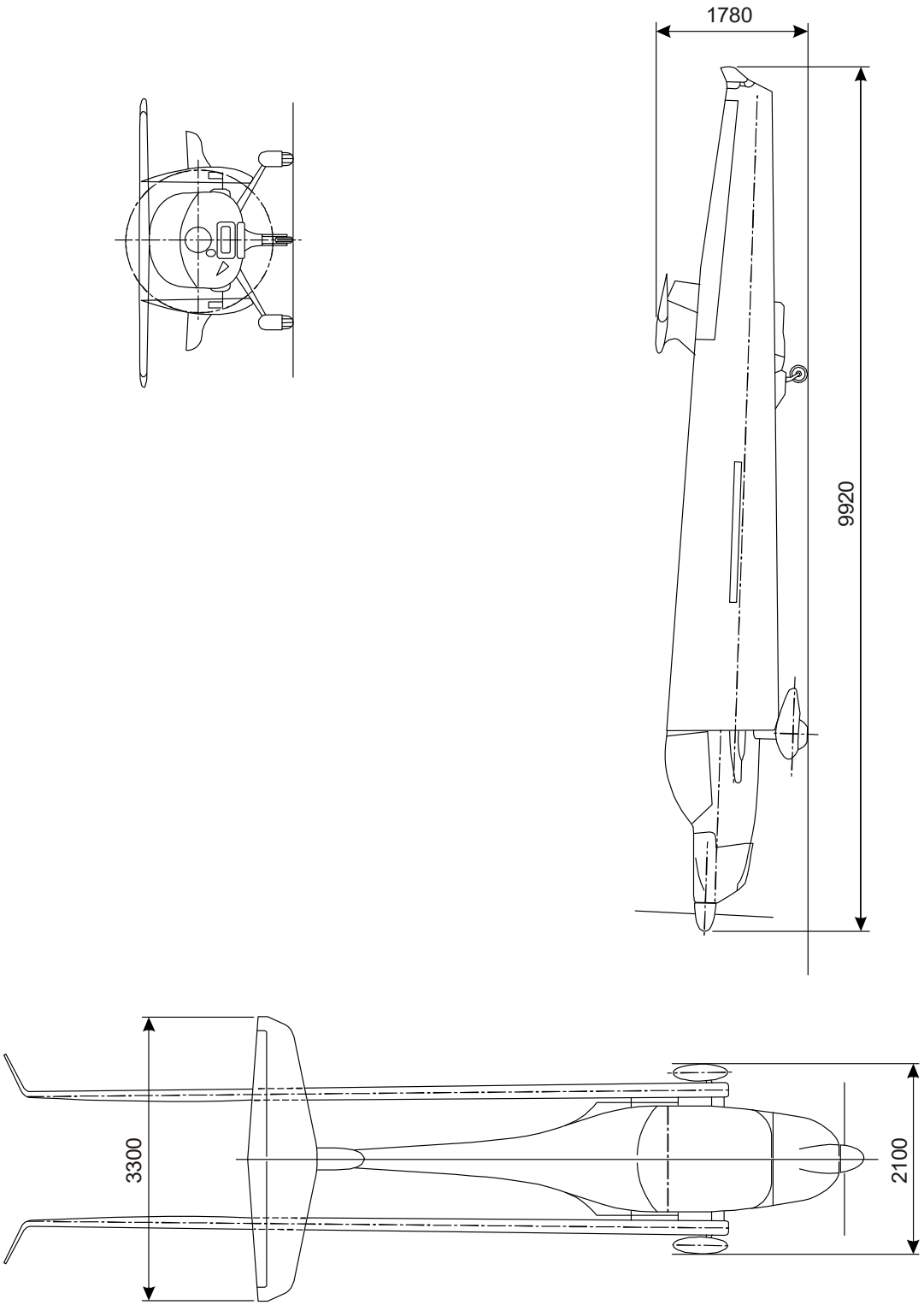
In order to enable a fast disassembly and a space-saving storage the airplane can be furnished with a wing folding mechanism.

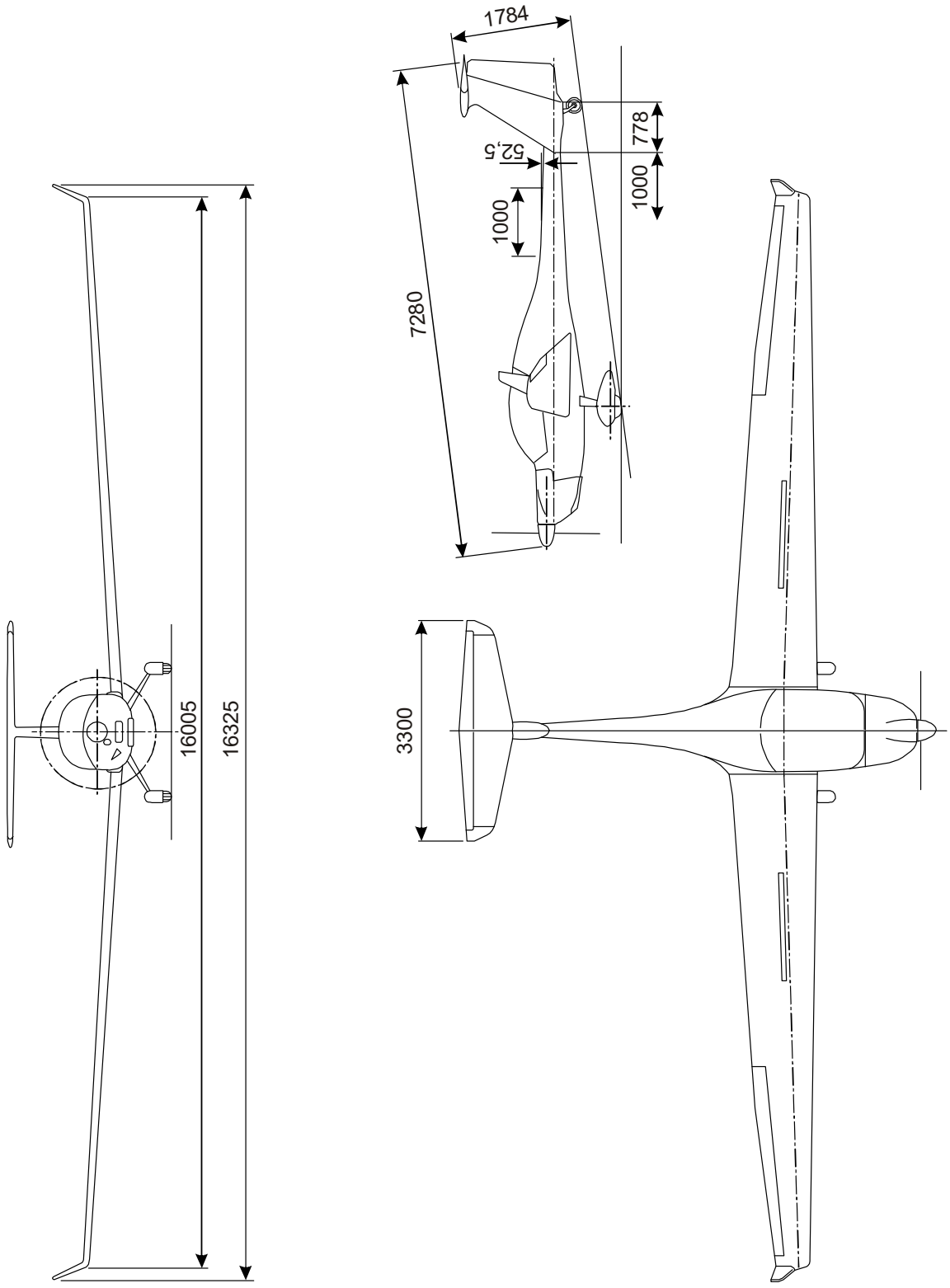
The power plant is a Rotax 912 A3 engine with an mt-propeller MTV-21-A-C-F/CF175-05 hydro-mechanically variable pitch propeller.

Span	with winglets	: 16.33 m	54	ft.
	without winglets	: 16.01 m	53	ft.
Length		: 7.28 m	24	ft.
Height		: 1.78 m	70	in.
MAC		: 1.004 m	39.5	in.
Wing area		: 15.30 m^2	165	sq.ft.
Max. wing loading		: 50.30 kg/m^2	10.3	lbs./sq.ft.
Aspect ratio		: 17.11		
Airfoil		: Wortmann FX 63-137		

1.6 THREE-VIEW DRAWINGS

| (dimensions in millimeters; conversion to inches see 1.4.2)

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SECTION 2
LIMITATIONS

Page No.

2.1 INTRODUCTION

Section 2 includes operating limitations, instrument markings, and basic placards necessary for safe operation of the powered sailplane, its engine, standard systems and standard equipment.

The limitations included in this section and in Section 9 have been approved by Austro Control GmbH (ACG) or by EASA.

WARNING

All operation values must be kept within the limits stated herein during flight.

2.2 AIRSPEED

NOTE

The airspeeds shown below must be understood as IAS.

Airspeed limitations

Airspeed limitations and their operational significance are shown below:

Airspeed		IAS			Remark
		km/h	kts.	mph	
v_{NE}	Never exceed speed	261	141	162	Do not exceed this speed in any operation and do not use more than 1/3 of control deflection. (Do not use more than 1/3 of the travel between position of the controls for unaccelerated flight and deflection to stop.)
v_{RA}	Rough air speed	210	113	130	Do not exceed this speed except in smooth air, and then only with caution. Examples of rough air are lee-wave rotors, thunderclouds, etc.
v_{A}	Maneuvering speed	176	95	109	Do not make full or abrupt control movements above this speed, because under certain conditions the powered sailplane may be overstressed by full control movement.
v_{ABf}	Maximum admissible speed with air brakes fixed in half extended position	150	81	93	Above this speed the air brakes can be extended inadvertently over the half extended position by aerodynamic forces.

The WARNINGS on the following page must be complied with.

WARNING

At speeds beyond the rough air speed the airplane may be overstressed by heavy gusts (lee-wave rotors, thunderclouds, whirlwinds and turbulence at close range to mountain ridges).

WARNING

For reasons of flutter safety, the never exceed speed (V_{NE}) is limited at altitudes above 2000 meters (6500 ft.) (see sub-paragraph 4.5.7).

WARNING

The maneuvering speed stated on the previous page applies to the maximum T/O mass (max. T/O weight) of 770 kg / 1698 lbs. At lower flight masses, the following limits must be applied:

T/O mass	T/O weight	Maneuvering speed v_A		
kg	lbs.	km/h	kts.	mph
700	1543	168	91	104
650	1433	162	87	101
600	1323	155	84	96

WARNING

These speeds are not marked on the airspeed indicator. Simultaneous full deflection of elevator and rudder can overstress the airplane even at speeds below v_A.

Diverse airspeeds

Airspeed		IAS			Remark
		km/h	kts.	mph	
v_y	Best rate of climb speed	105	57	65	At this airspeed the airplane climbs with the maximum possible rate of climb.
v_x	Best angle of climb speed	95	51	59	This airspeed is not marked on the airspeed indicator. At this airspeed the airplane climbs with the maximum possible angle of climb.
	Recommended lowest airspeed for approach	105	57	65	See NOTE below.

NOTE

Conditions like strong headwind, danger of wind shears, turbulence, or wet wings require a higher approach speed

Stalling speeds

see paragraph 5.2.2

2.3 AIRSPEED INDICATOR MARKINGS

Airspeed indicator markings and their color-code significance are shown below:

Marking	Value or Range (IAS)			Significance
	km/h	kts.	mph	
Green arc	86 - 210	46 - 113	53 - 130	Normal Operating Range. Lower limit is max. mass (weight) 1.1 v_{S1} at most forward c.g. with air brakes retracted. Upper limit is rough air speed.
Yellow arc	210 - 261	113 - 141	130 - 162	Maneuvers must be conducted with caution and only in smooth air.
Red line	261	141	162	Maximum speed for all operations v_{NE}.
Blue line	105	57	65	Best rate-of-climb speed v_y.
Yellow triangle	105	57	65	Approach speed at max. flight mass (weight).

2.4 POWER-PLANT

Engine Manufacturer : Bombardier Rotax
Engine Model : Rotax 912 A3

NOTE

The engine drives the propeller through a speed-reducing gear with a gear ratio of 2.273:1. The built-in tachometer indicates the propeller speed. Consequently, all speeds given in this manual are propeller speeds (in contrast to the engine manual).

Max. T/O power (5 minutes) : 59.6 kW / 81 DIN hp.
Max. T/O RPM : 2550

Max. continuous power : 58 kW / 79 DIN hp.
Max. continuous RPM : 2420

Idle RPM : 650
Power check RPM : 2500 ± 50

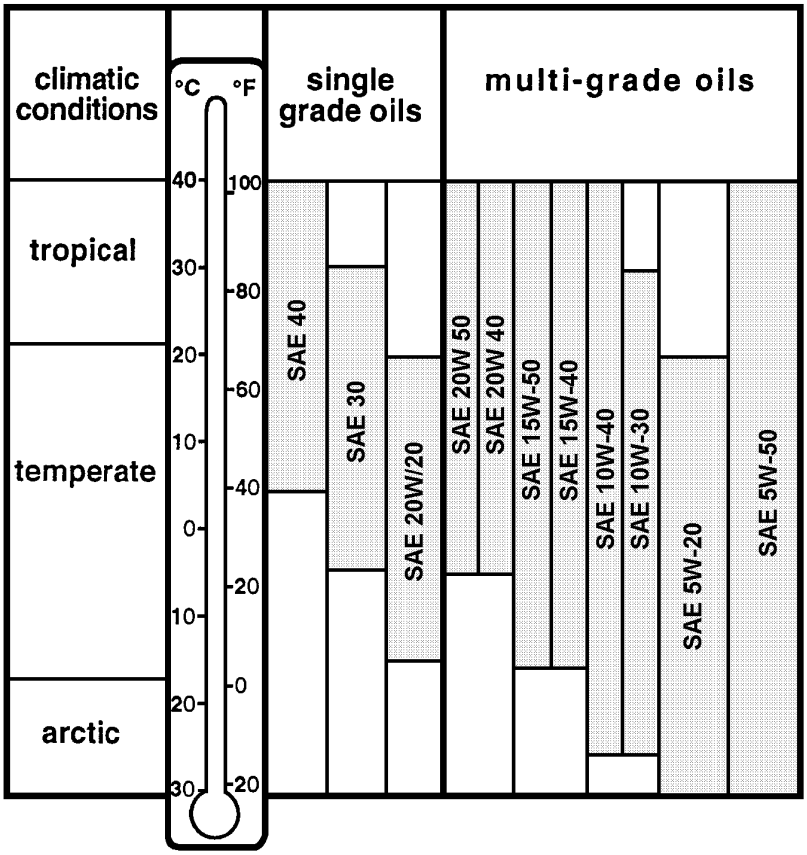
Maximum Oil Temperature : 140° C (284° F)
Minimum Oil Temperature : 50° C (122° F)

Minimum oil pressure : 1.5 bar (22 psi) at 1250 RPM

Maximum oil pressure : 5 bar (73 psi)

Max. oil pressure in case of cold-start (short-term) : 7 bar (102 psi)

Oil grade : Automotive lubricants for Otto-engines with SAE ratings compatible with seasonal temperatures (see chart). The lubricant quality rating according to the API system must be "SF" or "SG".



CAUTION

Under no circumstances should Aviation Grade oil be used!

| Oil quantity minimum : 3.0 liters (3.2 US quarts)

| maximum : 3.4 liters (3.6 US quarts)

Approved Coolant:

	Coolant	Temperature Measurement	Max. Temperature
If MÄM 36-225 is installed	EVANS NPG+ or equivalent	Cylinder Head Temperature	150 °C (302 °F)
If MÄM 36-450 is installed	ethylene glycol based antifreeze concentrate (e.g. BASF Glysantin Protect Plus/G48) + water (1:1)	Coolant Temperature	120 °C (248 °F)

NOTE

Coolant should be a low silicate and nitrite free formula. Follow coolant manufacturer directions regarding mixture percentages etc.

NOTE

The Supplement No. 5, Winterization Kit (latest Revision) must be incorporated into the AFM (if applicable).

NOTE

Coolant exchange must be performed by authorized personnel.

Propeller manufacturer : mt-propeller, Straubing, Germany

Propeller model : Hydraulically variable pitch propeller
MTV-21-A-C-F/CF175-05

2.5 POWER-PLANT INSTRUMENT MARKINGS

Power-plant instrument markings and their color-code signification are shown below:

Indicator	Red Line Minimum Limit	Green Arc Normal Operating Range	Yellow Arc Caution Range	Red Line Maximum Limit
RPM indicator	-	650 - 2420 RPM	2420 - 2550 RPM	2550 RPM
Oil temperature indicator	50° C	50° - 140° C	-	140° C
Cylinder head temperature indicator	-	-	-	150° C
Coolant temperature indicator (if MÄM 36-450 is installed)	-	-	-	120° C
Oil pressure indicator (for engine serial nos. up to 4.410.266)	1.5 bar	1.5 - 5 bar	5 - 7 bar	7 bar
Oil pressure indicator (for engine serial nos. 4.410.267 and higher)	0.8 bar	2 - 5 bar	0.8 bar - 2 bar 5 bar - 7 bar	7 bar
Fuel quantity indicator	-	-	-	-

2.6 MASS (WEIGHT)

Maximum take-off mass (max. T/O weight)	: 770 kg	1698 lbs.
Maximum landing mass	: 770 kg	1698 lbs.
Maximum mass of all non-lifting parts		
Serial numbers below 36.517	: 590 kg	1301 lbs.
Serial numbers 36.517 and subsequent	: 610 kg	1345 lbs.
Maximum mass in baggage compartment	: 12 kg	26 lbs.
Maximum useful load (including fuel)	: see paragraph 6.7	
Maximum useful load on right seat	: 110 kg	243 lbs.
Maximum useful load on left seat	: 110 kg	243 lbs.

WARNING

Any exceeding of the mass limits can lead to overstressing of the airplane and to a degradation of flying characteristics and flight performance.

2.7 CENTER OF GRAVITY

The reference datum plane for the center of gravity (CG) specifications is tangent to the leading edge of the wing at the root rib. It is vertical when the fuselage tube lies horizontal. Procedures for a horizontal alignment and empty mass CG specifications can be found in the Maintenance Manual, Section 4.

The permissible flight CG range is:

Maximum forward CG : 318 mm (12.52 in.) aft of reference datum

Maximum rearward CG : 430 mm (16.93 in.) aft of reference datum

WARNING

A flight CG which lies outside the permissible range deteriorates the controllability and stability of the airplane.

The procedure for checking the CG position is included in Section 6.

2.8 APPROVED MANEUVERS

This powered sailplane is certified in the Utility category.

NOTE

Aerobatics and spinning are forbidden!

2.9 MANEUVERING LOAD FACTORS

Table of maximum permissible load factors:

	v_A	v_{NE}
positive	5.30	4.00
negative	-2.65	-1.50

WARNING

Any exceeding of the maximum permissible load factors may overstress the airplane.

2.10 FLIGHT CREW

Solo flights must be conducted from the left seat!

2.11 KINDS OF OPERATION

The HK 36 TS is certified for DAY-VFR operation. Night VFR operation - if permitted by the competent authority - requires additional equipment in accordance with national regulations.

IFR, flights in clouds, flights into known icing conditions and aerobatics are forbidden.

2.12 FUEL

Fuel capacity

Standard tank	: 55 liters	14.5 US gal.
Long range tank	: 79 liters	20.9 US gal.

Usable fuel

Standard tank	: 54 liters	14.3 US gal.
Long range tank	: 77 liters	20.3 US gal.

Approved fuel grades

- Aviation Grade 100 LL
- MOGAS, leaded, min. octane rating: 96 ROZ
- Automotive Super, min. octane rating: 95 ROZ, leaded or unleaded

NOTE

Due to its high lead concentration, AVGAS causes increased wear of valve seats and produces more residue in the combustion chambers. It should therefore only be used at high ambient temperatures (to prevent vapor bubbles) or when other fuel grades are not available.

2.13 AEROTOW, WINCH AND AUTOTOW LAUNCHING

The powered sailplane is designed for self-take-off only.

2.14 OTHER LIMITATIONS

Limitations for soaring when using a battery with a capacity of 18 Amp-hours (Ah):

The capacity of the lead-accumulator is very much dependent on the temperature. Therefore, the length of a continuous soaring at low temperatures is restricted to:

4 hours at 0° C (32° F)

2 hours at -10° C (14° F),

good maintenance condition and charge of the battery provided. Average intensity of current: 0.3 Amps.

There are no such limitations when a 30 Ah battery is installed.

2.15 LIMITATION PLACARDS

The following placard is attached to the instrument panel, left side:

Manoeuvring speed at maximum gross weight	v_A = 176 km/h
Minimum seat payload, full tank, no baggage	[redacted]
Minimum seat payload, full tank, 12 kg baggage	[redacted]
Maximum permissible useful load	[redacted]

The following placard is attached to the canopy frame, left side (US registered S/N's only):

This airplane must be operated as a utility category airplane in compliance with the operating limitations as stated in the form of placards, markings, and manuals.

MAXIMUMS:	MANEUVERING SPEED (IAS)	176 km/h (95 kts. / 109 mph)
	GROSS WEIGHT	770 kg (1698 lbs.)
	FLIGHT LOAD FACTOR	+5.3/-2.65

No acrobatic maneuvers, including spin, approved. Altitude loss in a stall recovery: 20 m (65 ft.). Flight into known icing conditions prohibited. This airplane is certified for the following flight operations as of date of original airworthiness certificate: DAY-VFR.

The following placard is attached to the canopy frame, left side (US and Canadian registered S/N's only):

Altitude		v_{NE} (IAS)		
[m]	[ft.]	[km/h]	[kts.]	[mph]
2000	6500	261	141	162
3000	9800	246	133	153
4000	13100	233	126	145
5000	16400	221	119	137
6000	19600	210	113	130

The following placard is attached to the center section of the instrument panel:

Use air brake fixture (hands off) only up to 150 km/h!
A/B may extend beyond fixture at higher speeds.

The placard is attached to the Cowling next to the Air Inlet:

The Cooling Baffle (OÄM 36-359) must be removed at Outside Air Temperatures on ground below 0° C (32° F)

SECTION 3

EMERGENCY PROCEDURES

Page No.

3.1 INTRODUCTION

Section 3 provides checklists and recommended procedures for coping with emergencies that may occur.

Since it is impossible to foresee all kinds of emergencies and consider them in the Flight Manual, it is absolutely necessary for the pilot to know the airplane and to have knowledge and experience in solving problems that may occur.

3.2 CANOPY JETTISON

1. Strongly swing red canopy locks (left and right) 180° rearward
2. Place both hands above your head against canopy, push up and rearward

3.3 BAILING OUT

1. Jettison canopy
2. Release seat harness
3. Evacuate the airplane

NOTE

When using a manual parachute release, wait two seconds after exiting the airplane before activating parachute.

3.4 STALL RECOVERY

3.4.1 BEHAVIOR WITH POWER OFF

Under all loading conditions, air brakes applied or retracted, wings level flight or banked flight, the HK 36 TS goes through a horizontal stall. The ailerons keep their effectiveness even with maximum elevator deflection.

A partial loss of positive control in the stick and pedals, buffeting, and pitch angle of 20° to 30° occur during this condition.

NOTE

During the horizontal stall, IAS rises to approximately 85 km/h (46 kts. / 53 mph).

3.4.2 BEHAVIOR WITH POWER ON

See behavior with power off.
Only at 50 % to 100 % power, wings level flight, and maximum rearward center of gravity, the airplane may perform a stall dive over the left or right wing after entering the horizontal stall if the control stick is pulled even further.

3.4.3 RECOVERY

The horizontal stall can be terminated immediately by relaxing the force on the elevator control.

NOTE

If the airplane performs a stall dive, immediately relax the force on the elevator control and pull out the airplane smoothly. If the stick is pulled further, the airplane may start to spin.

* Altitude loss resulting from stationary horizontal stall described above: approximately 10 - 20 m (33 - 65 ft.).
* Altitude loss resulting from stall dive over a wing: approximately 40 m (130 ft.).

3.5 SPIN RECOVERY

1. Apply full rudder opposite to spin direction, push stick forward, bring ailerons into the neutral position.
2. After spin movement has stopped, bring rudder to neutral position, pull airplane out smoothly.

3.6 SPIRAL DIVE RECOVERY

There is no tendency to a spiral dive.
The standard procedure for recovering from a spiral dive is:

1. Apply full rudder opposite to spiral dive rotation
2. Apply full aileron opposite to spiral dive rotation
3. Pull out the airplane smoothly

3.7 ENGINE FAILURE (Carburetor Icing)

3.7.1 ENGINE FAILURE DURING TAKE-OFF

1. Fuel valve . . . . . check if OPEN
2. Electric fuel pump . . . . . check if ON
3. Propeller speed control . . . . . TAKE-OFF
4. Ignition switch . . . . . BOTH
5. Choke . . . . . OFF

WARNING

If the troubles cannot be eliminated immediately, and the engine refuses to deliver enough power, a straight-in landing must be performed under 80 m (260 ft.) of altitude.
Before touchdown:
- Fuel valve . . . . . CLOSED
- Ignition. . . . . OFF
- Master switch. . . . . OFF

3.7.2 ENGINE RESTART WITH A DISCHARGED BATTERY (During Flight)

1. Electrical consumers . . . . . OFF
2. Fuel valve . . . . . OPEN
3. Master switch . . . . . ON
4. Mode select switch . . . . . POWER FLIGHT
5. Choke . . . . . as required
6. Throttle control . . . . . IDLE
7. Ignition switch . . . . . BOTH
8. Airspeed . . . . . increase to 160 to 180 km/h
   (86 - 97 kts. / 100 - 112 mph)
9. Propeller speed control . . . . . slowly move from FEATHER to TAKE-OFF
10. Oil pressure. . . . . should be available within 10 seconds
11. Choke . . . . . re-adjust if required
12. RPM and throttle . . . . . as required to continue flight

CAUTION

Ensure adequate altitude reserve for engine warm-up after prolonged soaring periods.

13. Electrical consumers . . . . . ON
14. Continue flight normally
15. Determine reason for battery discharge

CAUTION

The engine is started due to windmilling. Because of the high airspeed required for this process, an altitude loss of up to 300 m (1000 ft.) must be expected. The maximum admissible airspeeds must not be exceeded.

3.7.3 PROPELLER STUCK IN FEATHERED POSITION

NOTE

The propeller requires hydraulic pressure for pitch reduction. The hydraulic pressure is supplied through a pressure accumulator. When this accumulator is empty, the pressure must be built up by the oil pump of the engine. The engine is started with the propeller in feathered pitch and the throttle control in idle position.

1. Electrical consumers . . . . . OFF
2. Fuel valve . . . . . OPEN
3. Master switch . . . . . ON
4. Mode select switch . . . . . POWER FLIGHT
5. Electric fuel pump . . . . . ON
   Check whether the red warning light extinguishes after build-up of fuel pressure
6. Choke . . . . . as required
7. Throttle control . . . . . IDLE
8. Ignition switch . . . . . BOTH
9. Propeller speed control . . . . . TAKE-OFF
10. Ignition switch . . . . . turn clockwise to start engine until the propeller adopts the working position

CAUTION

It is possible to start the engine with the propeller in the feathered position, although this significantly increases engine wear.

11. Oil pressure. . . . . should be available within 10 seconds
12. Choke . . . . . re-adjust as required
13. RPM and throttle . . . . . as required to continue flight
14. Electric fuel pump . . . . . OFF
15. Electrical consumers . . . . . ON
16. Continue flight normally
17. After landing, ascertain the reason for the loss of oil pressure and rectify the problem.

3.7.4 ENGINE FAILURE DURING CRUISE

1. Fuel valve . . . . . check if OPEN
2. Electric fuel pump . . . . . ON
3. Choke . . . . . check if OFF
4. Carburetor heat . . . . . ON at outside temperatures below 10° C (50° F)
5. Ignition . . . . . check if switch is in BOTH position
6. Fuel quantity . . . . . check

NOTE

If you cannot eliminate the troubles and the engine refuses to deliver enough power, proceed as follows:

1. Throttle control . . . . . IDLE
2. Ignition . . . . . OFF
3. Propeller . . . . . FEATHER
4. Fuel valve. . . . . CLOSED
5. Master switch . . . . . OFF
6. Airspeed. . . . . speed of best glide ratio
   105 km/h, 57 kts., 65 mph
7. Look for a suitable landing field
8. Cowl flap . . . . . CLOSE

3.7.5 CARBURETOR ICING

NOTE

Carburetor icing can be recognized by a drop in the engine speed and/or irregular running of the engine without a change in the throttle control position, the choke position, the propeller setting, the airspeed, or the altitude.

1. Carburetor heat . . . . . ON

NOTE

The engine output will slightly drop due to the intake air heating, and fuel consumption will slightly increase.

2. Carburetor heat . . . . . OFF as required

3.8 FIRE

3.8.1 CARBURETOR FIRE

1. Fuel valve . . . . . CLOSED
2. Throttle control . . . . . FULL
3. Cabin air . . . . . CLOSE
4. Cabin heat . . . . . OFF

3.8.2 ELECTRICAL FIRE

1. Master switch . . . . . OFF

3.9 OTHER EMERGENCIES

3.9.1 MALFUNCTION OR FAILURE OF PROPELLER SPEED CONTROL

1. RPM . . . . . keep in admissible range with throttle control
2. Airspeed . . . . . reduce

3.9.2 ICING

1. Leave icing area
2. Continue to move controls to prohibit lockage from ice
3. If the canopy is iced over: open weather window, open cabin heat fully

3.9.3 FUEL PRESSURE WARNING LIGHT ILLUMINATES

1. Electric fuel pump - ON
   * If the light extinguishes . . . . . land on nearest airfield, determine reason for illumination
   * If the light does not extinguish. . . . lack of fuel pressure may result in engine failure See NOTE in 3.7.4 - Engine Failure During Cruise.

3.9.4 EMERGENCY LANDING ON WATER

Emergency landings on water should be performed only in extreme emergency situations. Due to trials with sailplanes it is assumed that the airplane will submerge immediately after touching the water and then surface again.

1. Parachute harness . . . . . open
2. Seat harness . . . . . tighten
3. Airspeed . . . . . normal approach speed
4. Touchdown . . . . . with minimum speed and air brakes retracted

NOTE

Conditions like strong headwind, danger of wind shears, turbulence, or wet wings require a higher approach speed.

WARNING

On touchdown protect your face with one arm!

5. Seat harness . . . . . release
6. Red canopy locks (LH and RH) . . . . swing 180° rearward, push canopy away
7. Evacuate airplane as fast as possible

SECTION 4

NORMAL PROCEDURES

Page No.

4.1 INTRODUCTION

Section 4 provides checklists and amplified procedures for the conduct of normal operation. Normal procedures associated with optional systems can be found in Section 9.

4.2 RIGGING AND DE-RIGGING

4.2.1 GENERAL

The wings are connected to the fuselage with three bolts each. The two main bolts are placed in the middle of the spar tunnel. They are accessible between the backrests and can be inserted from the front side. A spring loaded hook is placed over the bolt handles to secure the bolts.

The A- and B-bolts are fixed to the fuselage at the wing root. The A-bolt is placed in front of the spar tunnel, the B-bolt lies near the trailing edge. Self locking units are screwed onto the B-bolts, which are accessible through handholes on the wings' upper surface. Locking rings are integrated in the B-bolt locking units which therefore do not require any further safety device.

The horizontal stabilizer is attached to the vertical stabilizer by means of three bolts. The two bolts in the rear are fixed to the mount in the vertical stabilizer. The threaded bolt placed in front is provided with a hexagonal socket. When screwed in, it is automatically secured by means of a locking ring integrated into the horizontal stabilizer.

4.2.2 WING INSTALLATION (WING FOLDING MECHANISM NOT PROVIDED)

1. Clean all bolts and bushes and the B-bolt locking unit and apply a light coat of grease.

2. Lift one wing (two persons at the root rib, one at the wing tip) and insert spar stump into spar tunnel. Ensure the smooth insertion of the A- and B-bolts. Connect position and strobe lights (optional) when the gap between fuselage and wing is just wide enough to reach the wires.

3. Insert main bolt while moving the wing tip in small circles. The aileron and air brake control systems are automatically connected. Do not release the wing before the main bolt has been completely inserted.
   The wide track of the landing gear allows the attached wing to support itself, no outside support is required.

4. Screw the B-bolt locking unit onto the B-bolt and tighten it by hand.

5. Install the other wing in a similar manner.

6. Tighten both B-bolt locking units with wrench (size 17 mm) applying moderate hand force (approximately 6 Nm/4.5 ft.lbs.).

7. Secure main bolts with spring loaded hook.

8. Apply water resistant adhesive tape to the gap between fuselage and wing.

4.2.3 WING INSTALLATION (WING FOLDING MECHANISM PROVIDED)

1. Clean all bolts, bushes and the B-bolt locking unit and apply a light coat of grease, remove lid over B-bolt handhole.
2. Unhook one wing from its hanging mount, pull it rearward to the stop. A second person should stand between the wing and fuselage and relieve the load on the telescopic tube by lifting the wing at the spar stump.
3. Walk forward until the wing is 90° from line of flight; rotate the wing until the root ribs are parallel; keep wing in its correct position.
4. Introduce spar stump into spar tunnel while ensuring the smooth insertion of A- and B-bolts. Connect position and strobe lights (optional) when the gap between the fuselage and wing is just wide enough to reach the wires.
5. Insert main bolt. The aileron and air brake control systems are automatically connected. Do not release the wing before the main bolt has been completely inserted.
   The wide track of the landing gear allows the attached wing to support itself, no outside support is required.
6. Screw the B-bolt locking unit onto the B-bolt and tighten it by hand.
7. Install the other wing in a similar manner.
8. Tighten both B-bolt locking units with a wrench (size 17 mm) applying moderate hand force (approximately 6 Nm/4.5 ft.lbs.).
9. Secure main bolts with the spring loaded hook.
10. Apply water resistant adhesive tape to the gap between fuselage and wing.

4.2.4 WING REMOVAL

To remove the wings reverse the procedure.

4.2.5 WINGLET INSTALLATION

1. Clean the bolts and bushes if necessary.

CAUTION

Do not lubricate the threaded bolts!

2. Install winglet with washers and self locking nuts.
3. Tighten self locking nuts with moderate hand force (appr. 6 Nm / 4.5 ft.lbs.)
4. Apply water resistant adhesive tape to the gap.

4.2.6 WINGLET REMOVAL

To remove the winglet reverse the procedure.

4.2.7 HORIZONTAL STABILIZER INSTALLATION

1. Clean all bushes and bolts and apply a slight coat of grease.
2. Move the trim knob to full NOSE DOWN position.
3. Remove the Pitot tube.
4. Position the horizontal stabilizer over the stabilizer mount; the elevator control rod must be connected by a second person.

WARNING

The elevator control system is not connected automatically!

5. Slip the horizontal stabilizer onto the rearward bolts.
6. Screw in the fastening bolt to the stop with an 8 mm hexagon key applying moderate hand force (approximately 6 Nm / 4.5 ft.lbs.).
7. Check the horizontal stabilizer for secure attachment, and inspect load transmission of elevator control system.
8. Install the Pitot tube.
9. Apply water resistant adhesive tape to the gap between the horizontal stabilizer and the vertical stabilizer.

4.2.8 HORIZONTAL STABILIZER REMOVAL

To remove the horizontal stabilizer reverse the procedure.

4.3 DAILY INSPECTION

WARNING

Master switch OFF, ignition OFF!

1. Fuel tank drain check: drain off about 1/8 liter (approx. 1/8 US quart) of fuel using a transparent drain cup (see paragraph 7.10). Inspect for dirt or water.

NOTE

In order to prevent the water deposited in the tank from dispersing, the airplane should not be agitated prior to the drain check.

2. Ensure completeness of the onboard documents and ensure that the operation time that is left before the next scheduled inspection (100, 200, 1000 or 6000 hrs.) allows for the intended flight.
3. Inspect left fuselage skin for damage or cracks.
4. Inspection of vertical stabilizer:
   - Check skin for damage or cracks.
   - Check rudder for improper or insecure mounting.
   - Check for excessive play.
   - Check rudder control system for improper connection and interference.
   - Remove Pitot tube cover.
   - Check Pitot tube for improper mounting and blockage of bores.
5. Inspection of horizontal stabilizer:
   - Check horizontal stabilizer and tips for improper mounting, insecure attachment, and inspect skin for damage and cracks.
   - Check elevator for improper mounting, play, damage and cracks.
   - Check elevator control system for improper connection, lack of load transmission and interference.

6. Inspection of tail wheel assembly:
   - Check for damage.
   - Ensure correct inflation (3.1 bar / 45 psi).
7. Check right fuselage skin for damage and cracks.
8. Inspection of right wing:
   - Check wing, aileron and winglet for improper or insecure mounting, excessive play, damage, and cracks.
   - Check aileron control system for improper connection, lack of load transmission and interference.
   - Check air brakes for incomplete retraction; ensure flushness with the wing surface.
   - If OÄM 36-369 is installed: check the lower wing surface for stone chips damage, cracks and dents in the landing gear area.
9. Inspection of right main landing gear:
   - Check landing gear strut for damage and cracks.
   - Check wheel fairing for damage and looseness.
   - Visually check tires and brakes.
   - Ensure correct inflation (2.1 bar / 30 psi).
     If OÄM 36-369 is installed: 1.2 bar (17 psi)
10. Inspection of propeller:
    - Check propeller blades for damage, cracks and excessive play.
    - Check spinner for damage and insecure mounting.
11. Cowling Air Inlet
    - If the Cooling Baffle (OÄM 36-359) is installed:
      Remove, if Outside Air Temperature on ground is below 0° C (32° F).
12. Oil and coolant check:
    - Check oil level.

| **NOTE**

| Prior to the oil level check, remove the oil tank cap and turn the propeller by hand in the direction of normal rotation to transfer all the oil from the engine crankcase to the oil tank. The process is finished when crankcase air can be heard being forced back to the oil tank. This will be noticed as a gurgle sound, coming from the oil tank with the cap removed, verifying the crankcase is purged of residual oil.

| **CAUTION**

| The Propeller must not be turned in reverse of the normal direction of rotation.

- Ensure coolant level in equalizing reservoir is more than 1/3.

| **NOTE**

| Ensure coolant level in equalizing reservoir is not more than 2/3.

- Check engine compartment for obvious defects.
- Check coolers for obstruction.

| 13. Inspection of left main landing gear:
- Check landing gear strut for damage and cracks.
- Check wheel fairing for damage and looseness.
- Check tires and brake for damage.
- Ensure correct inflation (2.1 bar / 30 psi)

| If OÄM 36-369 is installed: 1.2 bar (17 psi)

| 14. Inspection of left wing:
- Check wing, aileron and winglet for improper or insecure mounting, excessive play, damage, and cracks.
- Check aileron control system for improper connection, lack of load transmission, and interference.
- Check air brakes for incomplete retraction; ensure flushness with the wing surface.
| - If OÄM 36-369 is installed: check the lower wing surface for stone chips damage,
| cracks and dents in the landing gear area.

| 15. Check in the cabin:
- Check if loading is admissible (refer to Section 6).

NOTE

Ensure observation of loading restrictions by changing and/or rearranging the useful load.

- Master switch. . . . . ON
- Mode select switch . . . . . POWER FLIGHT
- All circuit breakers . . . . . ON
- Fuel quantity . . . . . check using fuel quantity indicator and log book entries; refuel if necessary

NOTE

Usable fuel and approved fuel grades: see paragraph 2.12.

- Master switch. . . . . OFF
- Cabin . . . . . check for foreign bodies and loose equipment
- Canopy . . . . . check for dirt and damage
- Cowl flap . . . . . check for improper operation
- Main bolts . . . . . verify that bolts are properly secured

| 16. Check of propeller feathered pitch position:

- Rudder pedals . . . . . adjust
- Canopy . . . . . locked
- Fuel valve . . . . . OPEN
- Parking brake . . . . . set
- Electrical consumers . . . . . OFF
- Master switch. . . . . ON
- Mode select switch . . . . . POWER FLIGHT
- Propeller speed control . . . . . TAKE-OFF
- Cowl flap . . . . . OPEN
- Electric fuel pump . . . . . ON; verify red light extinguishes after build up of fuel pressure
- Throttle control. . . . . IDLE
- Choke . . . . . ON if engine is cold

WARNING

People must stay clear of the propeller danger zone!

| - Ignition switch . . . . . turn clockwise to start engine
- Throttle control. . . . . adjust to approximately 1000 RPM
- Oil pressure . . . . . must reach green range within 10 seconds

CAUTION

If oil pressure is too low, turn off engine immediately!

NOTE

When the powered sailplane is parked for long periods, or the hydraulic pressure accumulator is emptied for any other reason, a loss of oil pressure may occur after oil pressure build up in the area of the oil pressure sensor. The reason for this is the filling process of the accumulator. The oil pressure indicator may drop to zero for a maximum of 15 seconds.

- Choke . . . . . push forward as required
- Electric fuel pump . . . . . OFF
- At increased idle speed (appr. 1000 RPM), switch ignition OFF and simultaneously move the propeller speed control over the cam to the FEATHER position.

NOTE

If the propeller speed control is not operated simultaneously with the ignition switch, the propeller will remain in the TAKE-OFF position. Propeller feathering is only possible at RPMs above 500 (see sub-paragraph 7.9.5, Propeller Speed Control).

- Propeller speed control . . . . . TAKE-OFF

NOTE

If the propeller remains in the feathered pitch position, the according emergency procedure (see sub-paragraph 3.7.3, Propeller Stuck in Feathered Position) must be applied.

- Master switch. . . . . OFF
- Mode select switch . . . . . SOARING

4.4 PREFLIGHT INSPECTION

The following checklist with the most important items is placed where it is well visible for either pilot:

CAUTION

The propeller must not be turned more than 360° against the normal direction of rotation. Otherwise extensive maintenance work may become necessary.

START CHECK

1. Mass & Balance checked
2. Main bolts secured
3. Fuel valve OPEN
4. Fuel quantity checked
5. Canopy locked
6. Seat harness on and secure
7. Propeller check
8. Magneto check
9. Carburetor heat OFF
10. Controls free
11. Trim neutral
12. Parking brake released
13. Air brakes locked
14. Fuel pump ON

4.5 NORMAL PROCEDURES AND RECOMMENDED SPEEDS

4.5.1 LAUNCH/ENGINE STARTING, RUN UP & TAXIING PROCEDURES

1. Rudder pedals . . . . . adjust
2. Seat harnesses . . . . . fasten
3. Canopy . . . . . lock
4. Fuel valve . . . . . OPEN
5. Controls . . . . . free
6. Air brakes . . . . . verify proper operation; lock

7. Parking brake . . . . . set
8. Electrical consumers . . . . . OFF
9. Master switch . . . . . ON
10. Mode select switch . . . . . POWER FLIGHT
11. Propeller speed control . . . . . TAKE-OFF
12. Fuel quantity . . . . . check
13. Cowl flap . . . . . OPEN
14. Electric fuel pump . . . . . ON; verify red light extinguishes after build up of fuel pressure
15. Throttle control . . . . . IDLE
16. Choke . . . . . ON in case of cold start

WARNING

People must stay clear of the propeller danger zone!

| 17. Ignition switch . . . . . turn clockwise to start engine
18. Throttle control . . . . . adjust to approx. 1000 RPM
19. Oil pressure. . . . . must reach green range within 10 seconds

CAUTION

If the oil pressure is too low, turn off engine immediately!

NOTE

When the powered sailplane is parked for long periods, or the hydraulic pressure accumulator is emptied for any other reason, a loss of oil pressure may occur after oil pressure build up in the area of the oil pressure sensor. The reason for this is the filling process of the accumulator. The oil pressure indicator may drop to zero for a maximum of 15 seconds.

20. Choke . . . . . push forward as required

WARNING

If the engine is warm, the activated choke will considerably cut the engine output!

21. Electrical consumers . . . . . ON as required
22. Altimeter . . . . . adjust

23. Oil temperature . . . . . check

CAUTION

Before loading the engine, allow the oil temperature to rise to 50° C (122° F) with the cowl flap open at 1000 to 1500 RPM (taxiing is allowable).

24. Choke . . . . . OFF

25. Check Ignition circuits at 1700 RPM, drop should be 50 to 150 RPM. The difference between circuits 1 and 2 should not exceed 50 RPM.

CAUTION

If RPM drop is too high at low outside temperatures, repeat check with the carburetor heat ON.

26. Check carburetor heat at 2000 RPM, drop: 20 RPM

27. Propeller check: - adjust to 2000 RPM with throttle control. Select CRUISE position with propeller speed control (pull back until resistance distinctly increases) wait until speed drops to approx. 1800 RPM. Then reset to TAKE-OFF position. Repeat procedure at least three times.

CAUTION

Without repeating the procedure it is not ensured that the pitch change mechanism is operative.

28. Check speed at full throttle (ignition switch - BOTH): 2500 ± 50

29. Check power plant instruments - all must stay within the green range

4.5.2 TAKE-OFF AND CLIMB

1. Cowl flap . . . . . OPEN
2. Electric fuel pump . . . . . ON
3. Propeller speed control . . . . . TAKE-OFF
4. Throttle . . . . . FULL (2500 ± 50 RPM)
5. Start take-off run with control stick slightly pressed forward, keep direction with rudder.
6. Lift tail wheel; airplane will lift off by itself at approximately 90 km/h (49 kts. / 56 mph).
7. Perform climb with at least 95 km/h (51 kts. / 59 mph); monitor oil pressure, oil temperature and cylinder head temperature or coolant temperature (if MÄM 36-450 is installed) which all must stay within the green range.
8. At a height of 100 m (330 ft.) above ground level: Electrical fuel pump OFF. If the fuel system is intact, the red warning lamp must not illuminate, since the engine-driven pump maintains the fuel pressure.

For best angle of climb adjust airspeed to 95 km/h (51 kts. / 59 mph), for best rate of climb to 105 km/h (57 kts. / 65 mph). Figures apply to maximum T/O mass (max. gross weight).

4.5.3 CRUISE (INCLUDING IN-FLIGHT ENGINE STOP/START PROCEDURES)

NOTE

Economic power settings can be found in paragraph 5.3.7.

NOTE

| During flight below the approach speed of 105 km/h (57 kts. / 65 mph) it is recommended to keep the canopy windows closed and to ventilate the cockpit via the air vents as necessary.

In-flight engine stop

1. Throttle control . . . . . IDLE
2. Electrical consumers . . . . . OFF

WARNING

Engine start can become impossible:

- After prolonged soaring with several electrical consumers switched on (mis-operation of mode select switch)
- | In extreme cold (see Chapter 2-14)
- If the battery is in a poorly maintained condition or barely charged

3. Ignition . . . . . OFF
4. Propeller . . . . . FEATHER
5. Mode select switch . . . . . SOARING

CAUTION

The propeller rotates after ignition shut-off due to windmilling. Feathering will occur with the propeller rotating.

6. Cowl flap . . . . . CLOSE

In-flight engine start

1. Electrical consumers . . . . . OFF
2. Master switch . . . . . ON
3. Mode select switch . . . . . POWER FLIGHT
4. Propeller speed control . . . . . TAKE-OFF
5. Cowl flap . . . . . OPEN
6. Choke . . . . . ON in case of cold start
7. Electric fuel pump . . . . . ON
8. Throttle control . . . . . IDLE
9. Ignition switch . . . . . BOTH, start engine
10. Oil pressure . . . . . check

NOTE

The hydraulic pressure accumulator is not full after the propeller pitch change. After pressure build-up, there might be a loss of pressure in the area of the oil pressure sensor. The reason for this is the filling process of the pressure accumulator. The oil pressure indicator may drop to zero for a maximum of 15 seconds.

11. Choke . . . . . OFF if necessary
12. Electrical consumers . . . . . ON as required
13. Oil temperature . . . . . check
14. Propeller check: - adjust to 2000 RPM with throttle control. Select CRUISE position with propeller speed control (pull back until resistance distinctly increases) wait until speed drops to approx. 1800 RPM. Then reset to TAKE-OFF position. Repeat procedure at least three times.

CAUTION

Without repeating the procedure it is not ensured that the pitch change mechanism is operative.

Sideslips

The speed range in which sideslips can be performed depends on the strength of the pilot, because significant rudder control forces are required at higher airspeeds. Usually the upper limit is approximately 150 km/h (81 kts. / 93 mph).

A control force reversal can appear when the rudder is fully deflected and the ailerons are deflected opposite to the rudder. To recover, either release the aileron control or apply approximately 30 N (7 lbs.) to the pedal to overcome the control force reversal.

4.5.4 APPROACH

1. Throttle . . . . . reduce as required
2. Carburetor heat . . . . . ON if required
3. Trim . . . . . adjust as required
4. Air brakes . . . . . apply as required

4.5.5 LANDING

Power-on landing

1. Propeller speed control . . . . . TAKE-OFF
2. Electric fuel pump . . . . . ON
3. Throttle . . . . . reduce
4. Carburetor heat . . . . . ON
5. Cowl flap . . . . . OPEN
6. Trim . . . . . adjust as required
7. Air brakes . . . . . apply as required

NOTE

The air brake lever catches when the air brakes are extended half way. With slightly increased force, this position can be overtraveled in either direction. With the air brakes locked in half extended position it is possible to control the glide path with the throttle control. The maximum airspeed for air brakes fixed in the half extended position (v_{ABF}) must not be exceeded.

8. Sideslip . . . . . possible but not necessary
9. Approach speed . . . . . 105 km/h (57 kts. / 65 mph) during final approach

NOTE

Conditions like strong headwind, danger of wind shears, turbulence, or wet wings require a higher approach speed.

10. Touchdown . . . . . in three point position

CAUTION

In case of airplanes without toe-brakes, avoid touch-down with air brake lever pulled to the stop, since the wheel brakes are Coupled with the air brake system and lock-up of the wheels may result.

11. Wheel brakes . . . . . apply as required (by operating toe brakes or by pulling the air brake lever, depending on brake system)

12. Electric fuel pump . . . . . OFF

Balked landing with the engine running

1. Air brakes . . . . . retract
2. Throttle . . . . . FULL

WARNING

When approaching with the air brakes fixed in the half extended position, one hand on the control stick and the other on the throttle control, FIRST select full throttle, then retract the air brakes.

NOTE

Climbing is possible with the air brakes fixed in the half extended position.

3. Perform climb with at least 95 km/h (51 kts./59 mph). Monitor oil pressure, oil temperature, and cylinder head temperature or coolant temperature (if MÄM 36-450 is installed). These must stay within the green range.

4. At a height of 100 m (330 ft.) above ground level: Electrical fuel pump OFF.
   If the fuel system is intact, the red warning lamp must not illuminate, since the engine-driven pump maintains the fuel pressure.

Power-off landing

NOTE

If the propeller is feathered, the approach must have enough altitude to ensure the landing field is reached, since starting the engine takes too much time during final approach!

1. Trim . . . . . adjust as required
2. Air brakes . . . . . apply as required
3. Approach speed . . . . . 105 km/h (57 kts. / 65 mph) during final approach

NOTE

Conditions like strong headwind, danger of wind shears, turbulence, or wet wings require a higher approach speed.

4. Touchdown . . . . . in three point position

CAUTION

In case of airplanes without toe-brakes, avoid touch-down with air brake lever pulled to the stop, since the wheel brakes are Coupled with the air brake system and lock-up of the wheels may result.

5. Wheel brakes . . . . . apply as required (by operating toe brakes or by pulling the air brake lever, depending on brake system)

4.5.6 (omitted)

4.5.7 HIGH ALTITUDE FLIGHT

Above 2000 meters (6500 ft.) of altitude following limitations to the never exceed speed V_{NE} must be observed:

Pressure altitude		Never exceed speed (v_{NE})		
meters	**feet**	**km/h**	**kts.**	**mph**
0 to 2000	0 to 6500	261	141	162
2000 to 3000	6500 to 9800	246	133	153
3000 to 4000	9800 to 13100	233	126	145
4000 to 5000	13100 to 16400	221	119	137
5000 to 6000	16400 to 19600	210	113	130

4.5.8 FLIGHT IN RAIN

NOTE

Flight performance changes for the worse in rain. The impact on the flying characteristics is minor. Flight in rain should be avoided because of the reduced visibility.

| **WARNING**

| No lightning protection installed.

4.5.9 AEROBATICS

NOTE

Aerobatics and spinning are forbidden.

4.5.10 ENGINE SHUT-DOWN

1. Propeller speed control . . . . . TAKE-OFF
2. Throttle . . . . . IDLE
3. Parking brake . . . . . set
4. Electric fuel pump . . . . . OFF
5. Electrical consumers . . . . . OFF
6. Ignition . . . . . OFF

NOTE

In case of post-ignition in hot weather conditions and when using MOGAS fuel, switch on ignition again, pull choke, cut off ignition after 3 seconds.

7. Master switch . . . . . OFF
8. Mode select switch . . . . . SOARING
9. Air brakes . . . . . lock

4.5.11 PARKING

When parking for a short time, the airplane should be oriented in headwind direction with the parking brake set and the air brakes fixed in the extended position.

In case of longer unattended parking or in unpredictable wind conditions, the airplane should be moored or stored in a hangar.

CAUTION

Avoid outdoor parking for prolonged periods of time!

NOTE

The powered sailplane should not be parked with the propeller in the feathered pitch position. With an empty oil pressure accumulator, the propeller cannot assume the take-off position. Starting the engine with the propeller in feathered pitch is possible, but significantly increases engine wear.

SECTION 5
PERFORMANCE

Page no.

5.1 INTRODUCTION

Section 5 provides approved data for airspeed calibration, stall speeds and take-off performance and non-approved additional information.

The data in the charts has been computed from actual flight tests with the powered sailplane and engine in good condition, wheel fairings installed and using average piloting techniques.

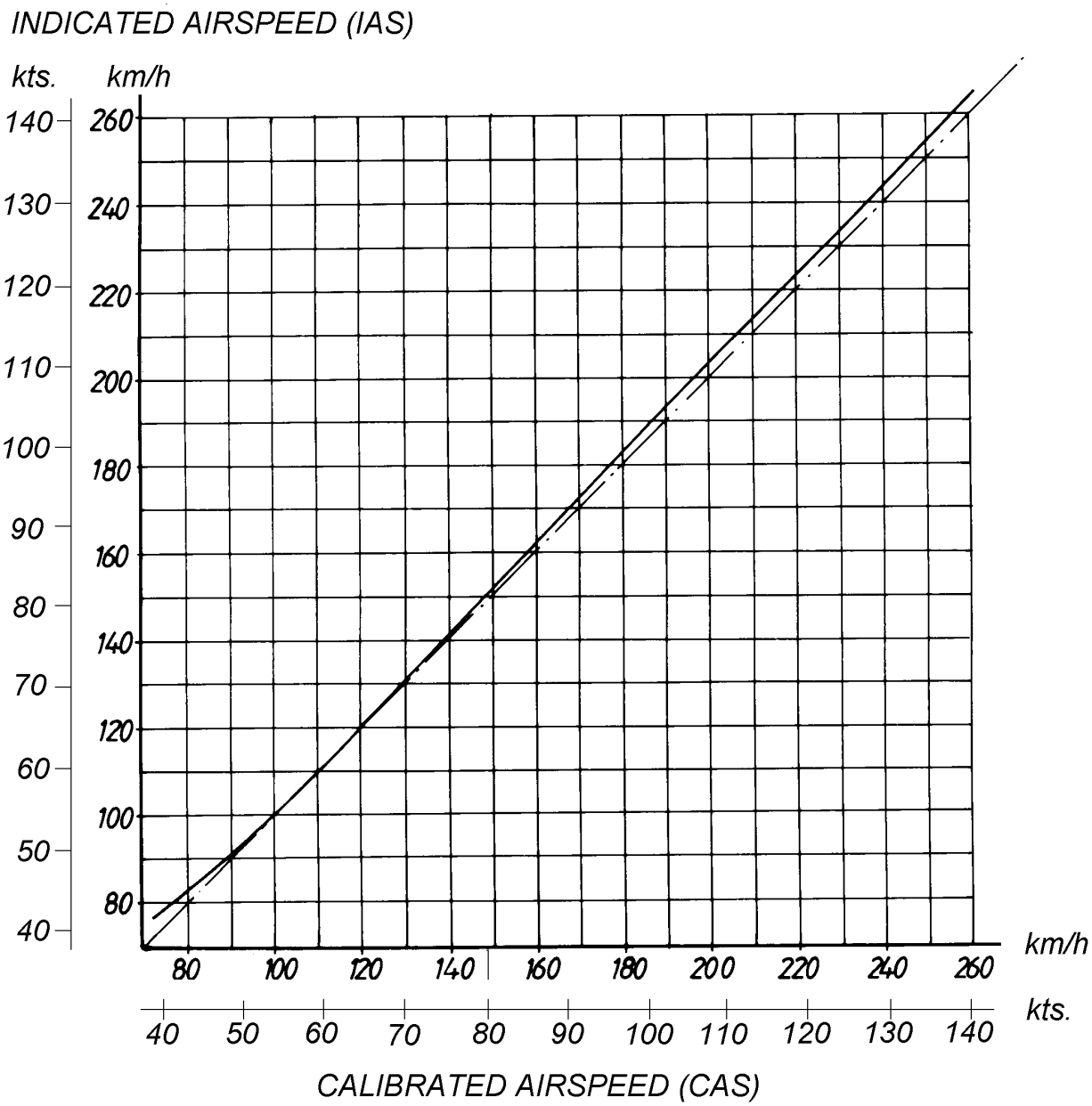
The specified airspeeds must be understood as IAS. The performance data has been evaluated applying the normal procedures described in Section 4.

NOTE

A poor maintenance condition of the airplane and unfavorable external circumstances (high temperature, rain) can considerably deteriorate the specified performance values.

5.2 APPROVED DATA

5.2.1 AIRSPEED INDICATOR SYSTEM CALIBRATION



5.2.2 STALL SPEEDS

Stall speeds at different bank angles in **km/h**:

Air brakes		**Bank angle**			
		0°	**30°**	**45°**	**60°**
retracted	v_{SO}	78 km/h	84 km/h	93 km/h	110 km/h
extended	v_{S1}	81 km/h	87 km/h	96 km/h	115 km/h

Stall speeds at different bank angles in **kts.**:

Air brakes		**Bank angle**			
		0°	**30°**	**45°**	**60°**
retracted	v_{SO}	42 kts.	45 kts.	50 kts.	60 kts.
extended	v_{S1}	44 kts.	47 kts.	52 kts.	62 kts.

Stall speeds at different bank angles in **mph**:

Air brakes		**Bank angle**			
		0°	**30°**	**45°**	**60°**
retracted	v_{SO}	48 mph	52 mph	58 mph	69 mph
extended	v_{S1}	50 mph	54 mph	60 mph	71 mph

NOTE

Conditions like turbulence, wet wings, or high load factors increase the stall speeds.

5.2.3 TAKE-OFF PERFORMANCE

Conditions:
- Outside air temperature: 15° C (59° F)
- Atmospheric pressure: 1013 hPa (1013 mbar)
- Calm
- Full throttle
- Maximum flight mass (max. gross weight)
- Propeller setting: TAKE-OFF
- Lift-off speed approx. 90 km/h (49 kts. / 56 mph)
- Speed during climb approx. 95 km/h (51 kts. / 59 mph)
- Level runway, asphalt surface

Take-off roll	: 161 m (528 ft.)
Take-off distance to clear a 15 m (50 ft.) obstacle	: 306 m (1004 ft.)

NOTE

For take-off distances under circumstances different from those described above refer to the charts in paragraph 5.3.3.

NOTE

Poor maintenance condition of the airplane, deviation from the procedures prescribed in this manual and unfavorable outward circumstances (high temperature, rain, unfavorable wind influence, and in particular high grass) can considerably extend the take-off distance.

5.3 ADDITIONAL INFORMATION

5.3.1 DEMONSTRATED CROSSWIND PERFORMANCE

Take-off : 30 km/h (16 kts. / 19 mph)
Landing : 30 km/h (16 kts. / 19 mph)

5.3.2 GLIDE PERFORMANCE AND FLIGHT POLAR

Conditions: - maximum flight mass (max. gross weight)

Minimum rate of descent : 1.14 m/s (224 ft./min) at 95 km/h (51 kts. / 59 mph)

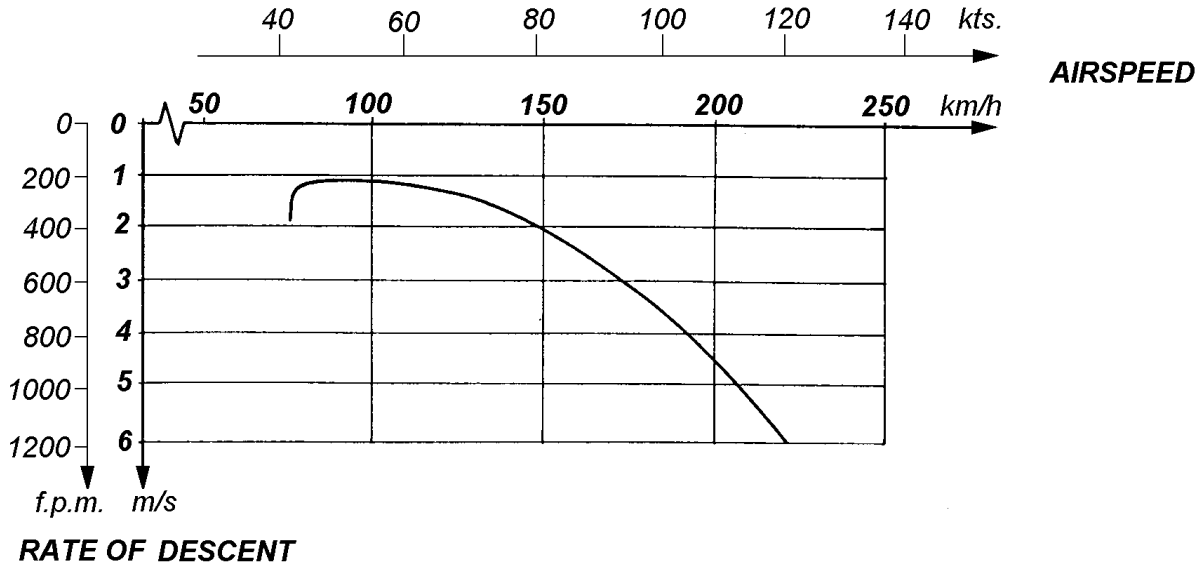
| If OÄM 36-369 is installed:

| Minimum rate of descent : 1.18 m/s (232 ft./min) at 95 km/h (51 kts. / 59 mph)

Maximum lift drag ratio : 28 at 105 km/h (57 kts. / 65 mph)

Flight polar:

Condition: propeller feathered



5.3.3 TAKE-OFF CHARTS

Conditions:
- Full throttle
- Maximum flight mass (max. gross weight)
- Propeller setting: TAKE-OFF
- Lift-off speed approx. 90 km/h (49 kts. / 56 mph)
- Speed during climb approx. 95 km/h (51 kts. / 59 mph)
- Level runway, asphalt surface

s_1 = Take-off roll

s_2 = Take-off distance to clear a 15 m (50 ft.) obstacle

Head-wind comp. [kts.]	OAT [°C]	Pressure altitude above MSL [m] / QFE [hPa]							
		0/1013		400/966		800/921		1200/877	
		s_1 [m]	s_2 [m]	s_1 [m]	s_2 [m]	s_1 [m]	s_2 [m]	s_1 [m]	s_2 [m]
0	0	142	275	160	302	179	335	201	371
	15	161	306	182	338	204	375	229	417
	30	182	340	205	377	230	419	260	466
5	0	114	232	128	256	144	285	162	317
	15	130	258	147	288	165	320	187	357
	30	147	290	166	323	189	359	213	401
10	0	88	194	100	214	113	239	129	267
	15	101	217	115	243	131	270	150	301
	30	116	243	132	272	150	303	172	340
15	0	65	157	75	175	86	197	99	221
	15	77	177	87	199	101	223	115	251
	30	88	200	101	225	116	253	134	285

Head-wind comp. [kts.]	OAT [°F]	Pressure altitude above MSL [ft.] / QFE [inHg]							
		0/29.9		1310/28.5		2620/27.2		3940/25.9	
		s_1 [ft.]	s_2 [ft.]	s_1 [ft.]	s_2 [ft.]	s_1 [ft.]	s_2 [ft.]	s_1 [ft.]	s_2 [ft.]
0	32	466	902	525	991	587	1099	659	1217
	59	528	1004	597	1109	669	1230	751	1368
	86	597	1115	673	1237	755	1375	853	1529
5	32	374	761	420	840	472	935	531	1040
	59	427	846	482	945	541	1050	614	1171
	86	482	951	545	1060	620	1178	699	1316
10	32	289	636	328	702	371	784	423	876
	59	331	712	377	797	430	886	492	988
	86	381	797	433	892	492	994	564	1115
15	32	213	515	246	574	282	646	325	725
	59	253	581	285	653	331	732	377	823
	86	289	656	331	738	381	830	440	935

WARNING

A grass surface will extend the take-off distances by at least 20 %, depending on the characteristics of the ground (softness, grass height).

5.3.4 NOISE DATA

The evaluation of noise emission was carried out according to the Noise Regulations of ICAO,
| Annex 16.

| Annex 16, Chapter 10: 61.4 dB(A)

| Annex 16, Chapter 10, for airplanes registered in EASA member states:
| 65.0 dB(A)

5.3.5 CLIMB PERFORMANCE

Maximum rate of climb:

Conditions:
- Sea level
- Full throttle
- Max. flight mass (max. gross weight)
- Airspeed: v_y = 105 km/h (57 kts. / 65 mph)
- Propeller speed: 2420 RPM

max. rate of climb = 4.1 m/s (807 ft./min)

| If OÄM 36-369 is installed:
| Max. rate of climb = 4.0 m/s (787 ft./min)

5.3.6 SERVICE CEILING

Service ceiling is above 5000 m (16400 ft.).

5.3.7 FUEL CONSUMPTION, CRUISING SPEED, MAXIMUM FLIGHT DURATION, RANGE

NOTE

The specifications for maximum flight duration and range apply to a full tank and do not include any reserve. The range specifications apply to flight in still air with a well-maintained and correctly adjusted airplane.

Conditions: - Propeller speed: 2200 RPM
- Pressure altitude: 1500 meters (4900 ft.)

manif. press.	fuel consumption		cruising speed			max. duration	range			fuel tank
in. Hg	l/h	US gal. per hr.	km/h	kts.	mph	h:min	km	naut. miles	stat. miles	
23	15	4.0	170	92	106	3:36	612	330	380	55 l
						5:08	873	471	542	79 l
22	13	3.4	160	86	99	4:09	665	359	413	55 l
						5:55	948	512	589	79 l

NOTE

It is generally recommended for a fast cruise that the propeller speed is set at 2400 RPM and that the manifold pressure is at least 0.7 inHg under the maximum obtainable. This reduces the fuel consumption considerably whilst hardly affecting the cruising speed.

For an economical cruise it is recommended that the RPM is set between 2300 and 2200 and manifold pressure 1 to 2 inHg under the maximum obtainable.

In order to keep engine wear at a minimum, permanent revolutions under 1900 RPM are not recommended.

SECTION 6
MASS (WEIGHT) AND BALANCE / EQUIPMENT LIST

Page No.

6.1 INTRODUCTION

This section describes the range of loading in which the HK 36 TS can be operated safely.

Descriptions of the weighing procedure, the computation of the admissible CG range, and a list of the equipment that must be present in the airplane during the weighing process are included in the Airplane Maintenance Manual, Section 4.

WARNING

Exceeding the maximum mass (maximum gross weight) can overstress the airplane! Falling short of the minimum seat payload (payload on both seats together) leads to a deterioration of controllability and stability.

6.2 WEIGHING PROCEDURES

The weighing procedures are described in the Airplane Maintenance Manual, paragraph 4.2. The purpose of weighing the airplane is to evaluate the empty mass (empty weight) and the corresponding CG lever arm (i.e. CG position). It may be carried out by authorized personnel only.

6.3 WEIGHING REPORT

The Weighing Report shows the current empty mass (empty weight) and the corresponding CG position. The Weighing Report is preserved in the Aircraft Maintenance Log.

NOTE

After equipment changes, repairs, repainting, etc. the airplane must be reweighed in compliance with the Airplane Maintenance Manual by an authorized person, and the new empty mass (empty weight) CG position must be computed. The results must be entered in the Mass and Balance Form, and the new limits must be drawn on a new Mass and Balance Diagram.

6.4 BASIC EMPTY MASS AND MOMENT

| The empty mass (empty weight) CG limitations are defined in the Airplane Maintenance Manual, Section 4.

These limitations guarantee that solo-pilots with a mass (weight) of at least 70 kg (154 lbs.) will not overstep the maximum rearward CG when flying with a full tank and no baggage.

The CG will not exceed the maximum forward position if 220 kg (485 lbs.) seat payload and 10 kg (22 lbs.) of fuel for a half hour flight are aboard.

6.5 MASS OF ALL NON-LIFTING PARTS

The maximum mass (weight) of all non-lifting parts:

- Serial numbers below 36.517 . . . . . 590 kg (1301 lbs.)
- Serial number 36.517 and subsequent. . . . . 610 kg (1345 lbs.)

| A list of all non-lifting parts is included in the Airplane Maintenance Manual, paragraph 4.2.

NOTE

Due to the design of the HK 36 TS, the mass (weight) of all non-lifting parts will not be exceeded unless the maximum flight mass (max. gross weight) of 770 kg / 1698 lbs. is overstepped.

6.6 MASS (WEIGHT) AND BALANCE FORM

The Mass and Balance Form on page 6-6 shows the following values:

- current empty mass
- current empty mass CG position
- current maximum useful load including parachute, seat cushions, fuel, and baggage
- minimum seat payload for solo flights with full tank and no baggage
- minimum seat payload for solo flights with full tank and maximum baggage mass

Furthermore, the Mass and Balance Form is a record of all weighings carried out.

The Mass and Balance Form must be updated by an authorized person in compliance with the currently effective Weighing Report. The corresponding instructions can be found in the | Airplane Maintenance Manual, Paragraph 4.2.

In addition to the Mass and Balance Form, a new Mass and Balance Diagram is filled out upon | each weighing. The corresponding instructions are given in the Airplane Maintenance Manual, | Paragraph 4.2.

NOTE

Weighing is done in accordance with the Equipment Inventory which includes the winglets. Airplane operation without winglets is permissible. The influence on the empty mass (weight) and the corresponding moment is negligible.

MASS AND BALANCE FORM

Serial No.: _____ Call sign: _____

Date of Weighing	Empty mass (weight)	Empty mass CG pos.	Max. useful load	Minimum Seat payload with full tank		A.M.E. 's Signature
				No Baggage	Baggage 12 kg / 26 lbs.	
	[kg] / [lbs.]	[mm] / [in.]	[kg] / [lbs.]	[kg] / [lbs.]	[kg] / [lbs.]	

6.7 USEFUL LOADS

6.7.1 MAXIMUM USEFUL LOAD

The useful load includes the masses (weights) of the crew, baggage, and fuel. The maximum permissible useful load is shown in the Mass and Balance Form, in the Mass and Balance Diagram, and on the placard on the instrument panel.

NOTE

The total crew mass comprises of the mass of the passengers and parachutes.

6.7.2 SEAT PAYLOAD

Minimum seat payload

The Mass and Balance Form and the placard in the cockpit (left hand section of instrument panel) show the following data:

- Minimum seat payload for solo flights with a full tank and no baggage;
- Minimum seat payload for solo flights with a full tank and maximum baggage mass (12 kg / 26 lbs.).

The minimum seat payload is never less than 55 kg (121 lbs.).

NOTE

Pilots with a mass (a weight) between 55 kg (121 lbs.) and the minimum seat payload shown on the placard in the cockpit must install a trim weight in case of solo flights.

Trim weights

If the minimum seat payload exceeds 55 kg, a trim weight fixture must be installed on the center console 400 mm (15.75 in.) behind the firewall. A seat payload deficit should be equalized using the following table.

Seat payload deficit		Trim mass (weight)	
[kg]	[lbs.]	[kg]	[lbs.]
5	11	1.7	3.75
10	22	3.4	7.5
15	33	5.1	11.24

Maximum seat payload

The useful load on one seat must not exceed 110 kg (243 lbs.).

Lever arm of seat payload

A lever arm of 143 mm (5.63 in.) aft of reference datum is assumed for all CG computations.

6.7.3 USEFUL LOAD IN BAGGAGE COMPARTMENT

The maximum useful load in the baggage compartment is 12 kg (26 lbs.). For the preparation of the Mass and Balance Diagram, the lever arm of the baggage was assumed to be equal to the lever arm of the fuel tank (i.e. 727 mm or 28.62 in. for the standard tank, 824 mm or 32.44 in. for the long range tank).

NOTE

When taking baggage aboard, do not exceed the maximum permissible useful load.

6.7.4 FUEL LOAD

Fuel capacity

The fuel capacity is given in paragraph 2.12.

NOTE

When refueling, make sure not to exceed the maximum permissible useful load.

Lever arm of the fuel tank

A lever arm of 727 mm / 28.62 in. (standard tank) or 824 mm / 32.44 in. (long range tank) aft of reference datum is assumed for all CG computations.

6.8 MASS / C.G. ENVELOPES

The Mass and Balance Diagram is a supplement to the Mass and Balance Form. It gives the pilot the information whether a loading is permissible, taking maximum permissible useful load and minimum seat payload into account. It shows the permissible mass (weight) of fuel and baggage for a given seat payload.

The diagram applies to one specific airplane. It is based on the data provided by the Mass and Balance Form and must be redrawn by an authorized person upon each weighing, using the broken subsidiary lines.

The corresponding instructions are laid down in the Airplane Maintenance Manual.

Use of the diagram

The forbidden combinations of seat payload and total mass (weight) of fuel and baggage are represented by the hatching.

Beside the diagram there is a scale for the conversion of the fuel quantity in liters or US gallons to the fuel mass (weight) in kilograms or pounds. The following sample problems show how to use the Mass and Balance Diagram.

Example A:
* Pilot: 70 kg / 154 lbs., copilot: 82 kg / 181 lbs.
  total: 152 kg / 335 lbs.
* Long range tank: full (60 kg / 132 lbs.), no baggage

The corresponding point in the diagram does not touch any boundary, hence the loading is permissible.

Example B:
* Pilot: 65 kg / 143 lbs., solo-flight
* Long range tank: full (60 kg / 132 lbs.), baggage: 12 kg / 26 lbs.
  total: 72 kg / 159 lbs.

The loading oversteps the maximum rearward CG position. The pilot must remove 15 kg / 33 lbs. (20 liters / 5.3 US gal.) of fuel.

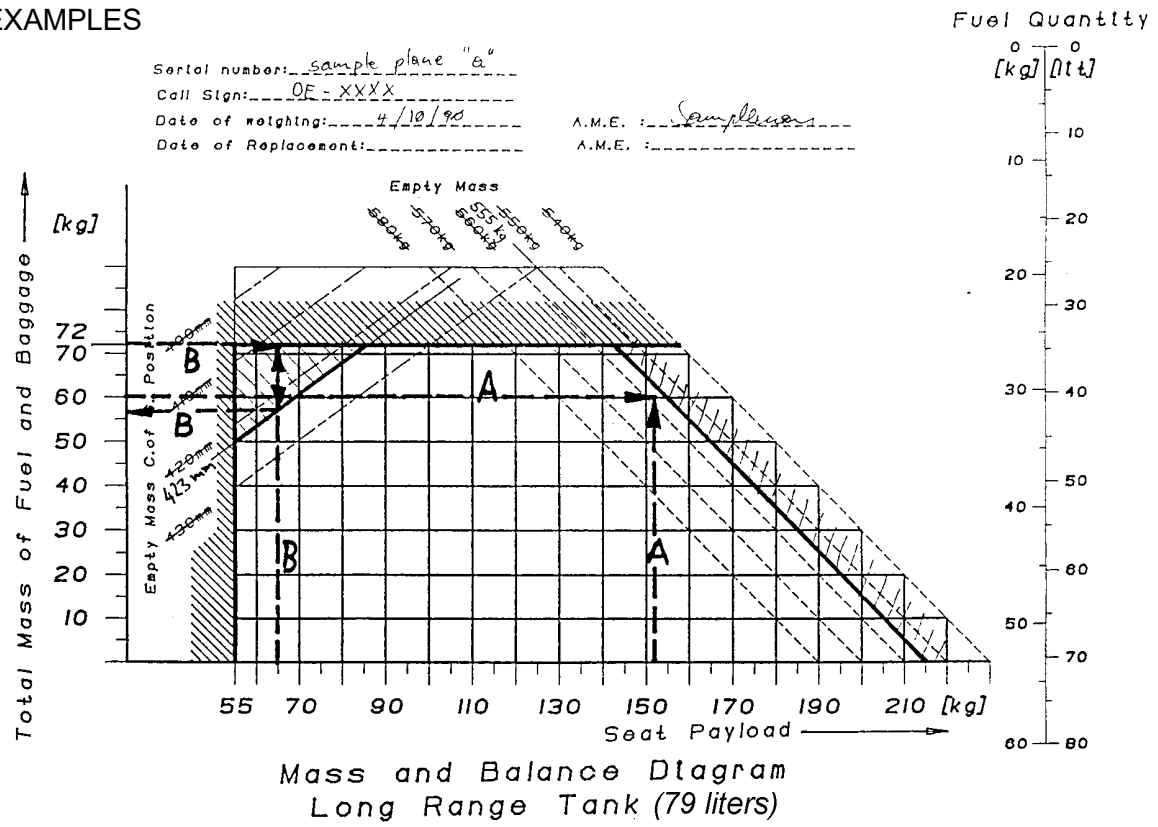
Example C:
* Pilot: 92 kg / 203 lbs., copilot: 105 kg / 231 lbs.
  total: 197 kg / 434 lbs.
* Standard tank

In case they do not take any baggage aboard, they may take off with 27 kg / 60 lbs. (36 l / 9.5 US gal.) of fuel.

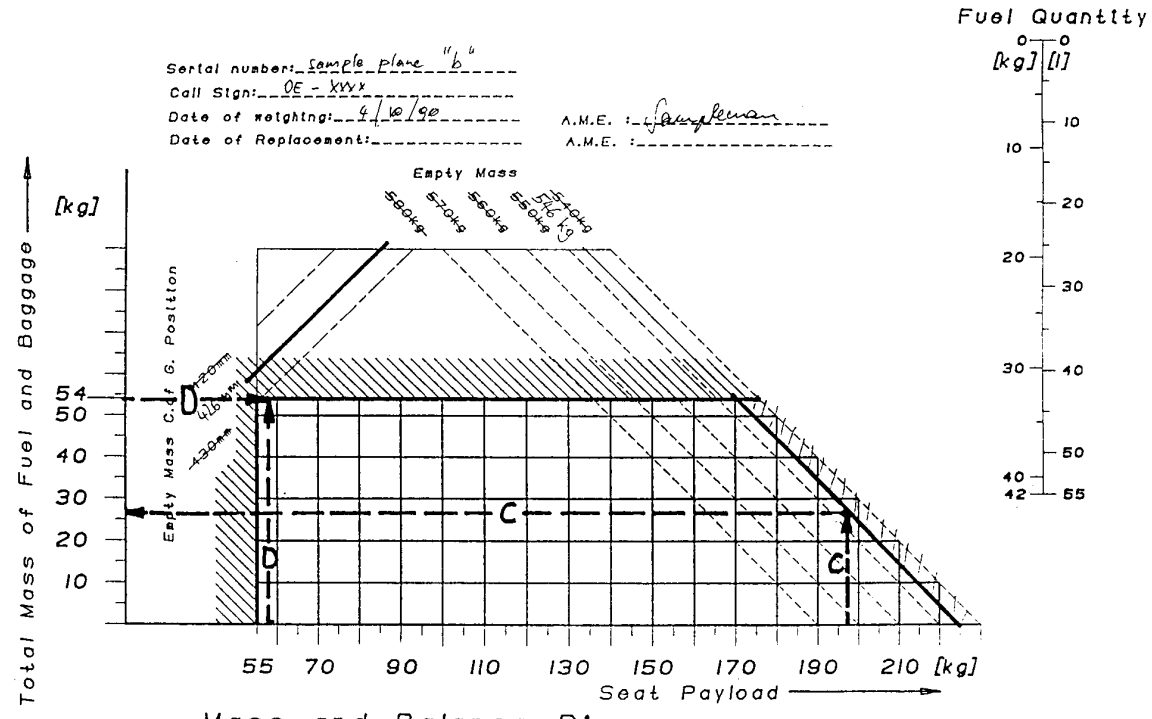
Example D:
* Pilot: 57 kg / 126 lbs., no copilot
* Standard tank: full (42 kg / 93 lbs.), baggage: 12 kg / 26 lbs
  total: 54 kg / 119 lbs.

Since the maximum rearward CG position is not effective in sample airplane "b", the pilot may exploit the maximum mass (weight) of fuel plus baggage, which amounts to 54 kg/119 lbs.

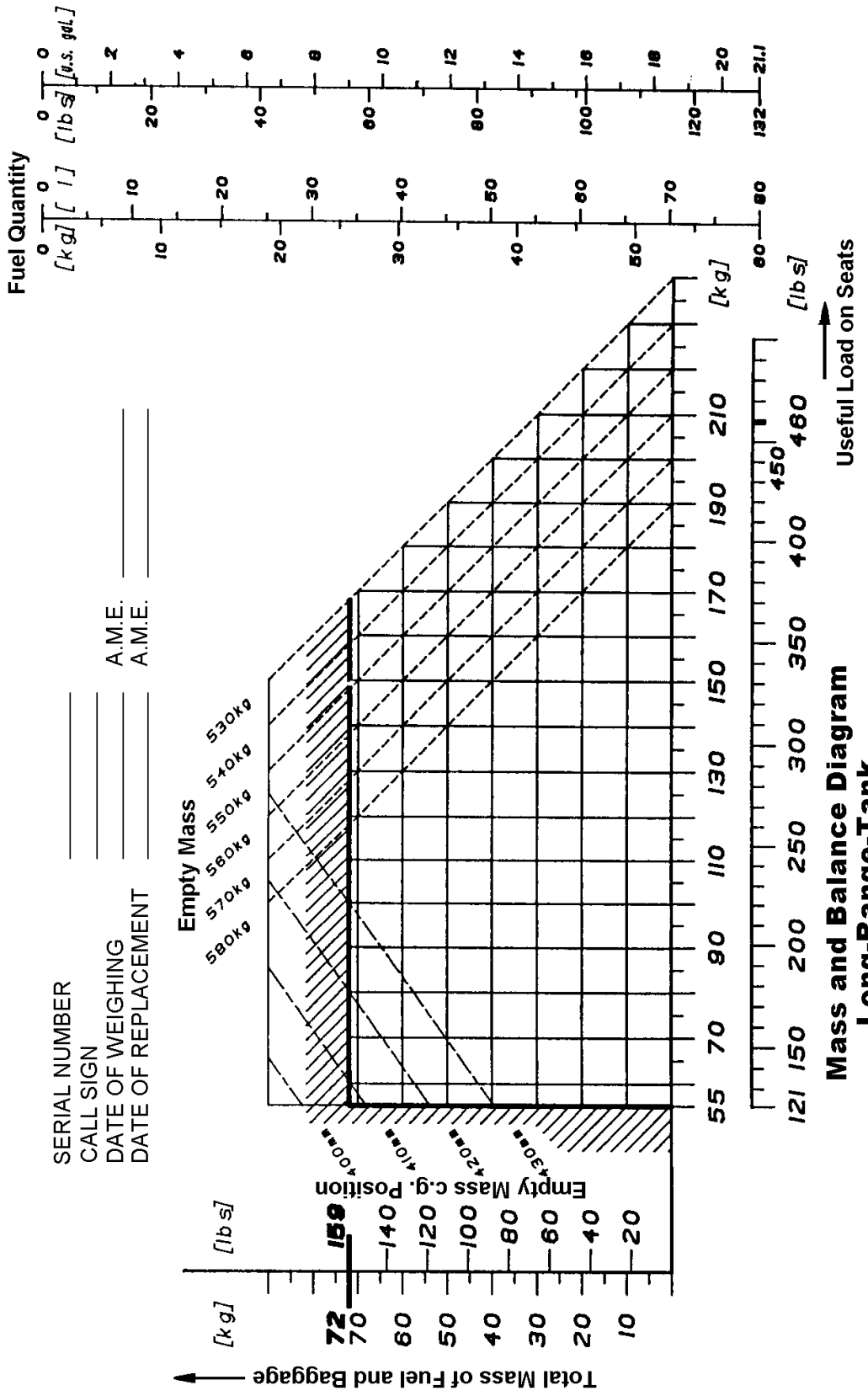
EXAMPLES



Mass and Balance Diagram
Long Range Tank (79 liters)



Mass and Balance Diagram
Standard Tank (55 liters)


Mass and Balance Diagram
Long-Range-Tank
Useful Load on Seats
[kg]
[lbs]
Empty Mass
530kg
540kg
550kg
560kg
570kg
580kg
Empty Mass c.g. Position
Total Mass of Fuel and Baggage
Fuel Quantity
SERIAL NUMBER
CALL SIGN
DATE OF WEIGHING
DATE OF REPLACEMENT
A.M.E.
A.M.E.

6.9 EQUIPMENT LIST

Minimum equipment (VFR)

1 Altimeter
1 Airspeed indicator
1 Magnetic compass
1 RPM indicator
1 Running time meter
1 Manifold pressure indicator
1 Oil pressure indicator
1 Oil temperature indicator
| 1 Cylinder head temperature indicator (if MÄM 36-450 is NOT installed)
| 1 Coolant temperature indicator (if MÄM 36-450 is installed)
1 Fuel quantity indicator
1 Ammeter
1 Deviation table
1 Fuel pressure warning lamp

Additional equipment

A list of the currently installed equipment is provided in the Equipment Inventory which is
| preserved in the Airplane Maintenance Log.

SECTION 7

POWERED SAILPLANE & SYSTEMS DESCRIPTION

Page No.

7.1 INTRODUCTION

This section provides description and operation of the powered sailplane and its systems. Refer to Section 9, Supplements, for details of optional systems and equipment.

7.2 AIRFRAME

7.2.1 WINGS

The GFRP wings are manufactured in half-shell sandwich construction. The ailerons are made of CFRP and are attached to the wing by means of five hinges, also made of CFRP. Schempp-Hirth type air brakes are provided in the wings' upper surface. They may be extended at all speeds up to v_{NE}. The air brakes have oil dampers but must be locked. This is performed by pushing the lever to the forward stop overcoming the resistance occurring after the air brake is retracted. The air brake lever catches when the air brakes are extended half way.

The wings are connected to the fuselage with three bolts each.

The winglets are manufactured from CFRP and are attached to the wings with 2 threaded bolts each.

NOTE

Airplane operation is also permissible without winglets. The flight characteristics and performance are not significantly affected.

7.2.2 FUSELAGE

The GFRP fuselage is manufactured in half-shell sandwich construction. A fire-resistant fabric is sandwiched between a stainless steel barrier and the firewall. The main bulkhead is made of CFRP/GFRP.
The instrument panel is made of GFRP. The maximum permissible mass (weight) of the instrument panel including the instruments installed is 17 kg (37.5 lbs.).

7.2.3 TAIL PLANE

Rudder, elevator and horizontal stabilizer are manufactured in half-shell sandwich construction. The folded-top antenna for the COM equipment and the Pitot tube mount are placed in the vertical stabilizer. The horizontal tail surfaces are attached with two bolts and a fastening screw.

7.3 FLIGHT CONTROLS

7.3.1 PRIMARY CONTROLS

Ailerons and elevator are driven by push-rods, the rudder is driven through control cables. Elevator control forces can be compensated by means of a spring trim system.
The aileron and air brake control systems are automatically connected when the wing is installed. However, the strobe and position lights (optional equipment) must be connected. The elevator control system must be connected by hand.

7.3.2 ELEVATOR TRIM SYSTEM

The green colored trim knob is located in the center console behind the throttle quadrant. To trim the airplane unlock the knob by pulling up, then move it to the desired position. The knob is spring-loaded and catches when it is released.

Knob forward = NOSE DOWN

7.3.3 RUDDER PEDAL ADJUST

NOTE

The rudder pedals must be adjusted on the ground!

The pedals are unlocked by pulling the black T-grip in front of the control stick.

Move forward: Push pedals forward with your heels while pulling the grip. Release the grip, let the pedals catch perceptibly.

Move rearward: Pull pedals rearward with the grip. Release the grip, use your feet to push the pedals forward until they catch.

7.4 AIR BRAKE SYSTEM

There is a blue air brake lever on either side panel. By pulling the lever rearward the air brakes are unlocked and extended.

The air brake lever catches when the air brakes are extended half way. This position can be over-traveled in either direction with slightly increased force.

By pushing the lever forward the air brakes are retracted. To lock the air brakes the lever must be pushed to the forward stop overcoming the resistance occurring after the air brake is retracted.

WARNING

The maximum admissible speed with the air brakes fixed in the half extended position v_{ABf}, must not be exceeded.
The extension of the air brakes produces a nose down moment which is more intense at higher airspeeds.
At v_{NE}, the air brakes must be extended slowly in order to avoid too high negative acceleration.

7.5 LANDING GEAR SYSTEM

7.5.1 GENERAL

The landing gear consists of a resilient main landing gear with disk brakes and a tail wheel which is steerable and also resilient. The two 15 inch (19 inch if OÄM 36-369 is installed) wheels of the main undercarriage are fixed to GFRP struts with steel brackets. Optional fairings reduce drag. The 9-inch tail wheel can be deflected 45° to either side with the rudder pedals. For ground handling, a deflection of 60° can be acquired by shoving sidewards.

7.5.2 WHEEL BRAKE

There are two versions of the wheel braking system.

Wheel braking system with toe brakes:
The main wheels are equipped with hydraulically actuated disk brakes which are individually operated through toe pedals.

Wheel braking system without toe brakes:
The main wheels are equipped with hydraulically actuated disk brakes. The wheel brake system is coupled to the air brake lever. It is activated in the last quarter of the lever travel.

7.5.3 PARKING BRAKE

The draw-button is located on the center console behind the trim knob. The parking brake is released when the button is in the inserted position.

To set the parking brake, draw the button to the stop and actuate the brake pedals a few times. To release the parking brake, actuate the wheel brakes again in order to relieve the shut-off valve and simultaneously push the button in.

CAUTION

Pushing the button in without actuating the wheel brakes leads to an overstress of the operating circuit. Excessive wear may result.

7.6 SEATS AND SAFETY HARNESSES

The seat shells are removable in order to permit maintenance and inspection of the control system parts beneath. Jackets on the control sticks and on the air brake levers prevent foreign bodies from falling into the area of the control gear.

The seats are furnished with removable cushions. Parachutes with manual release can be used instead of the cushions. There is no fixture for the release cord of parachutes with automatic release. Therefore these parachutes cannot be used.

Each seat is provided with a four-part harness. To fasten the harness, the end pieces must be inserted into the lock. To open the harness, turn the twist handle on the lock.

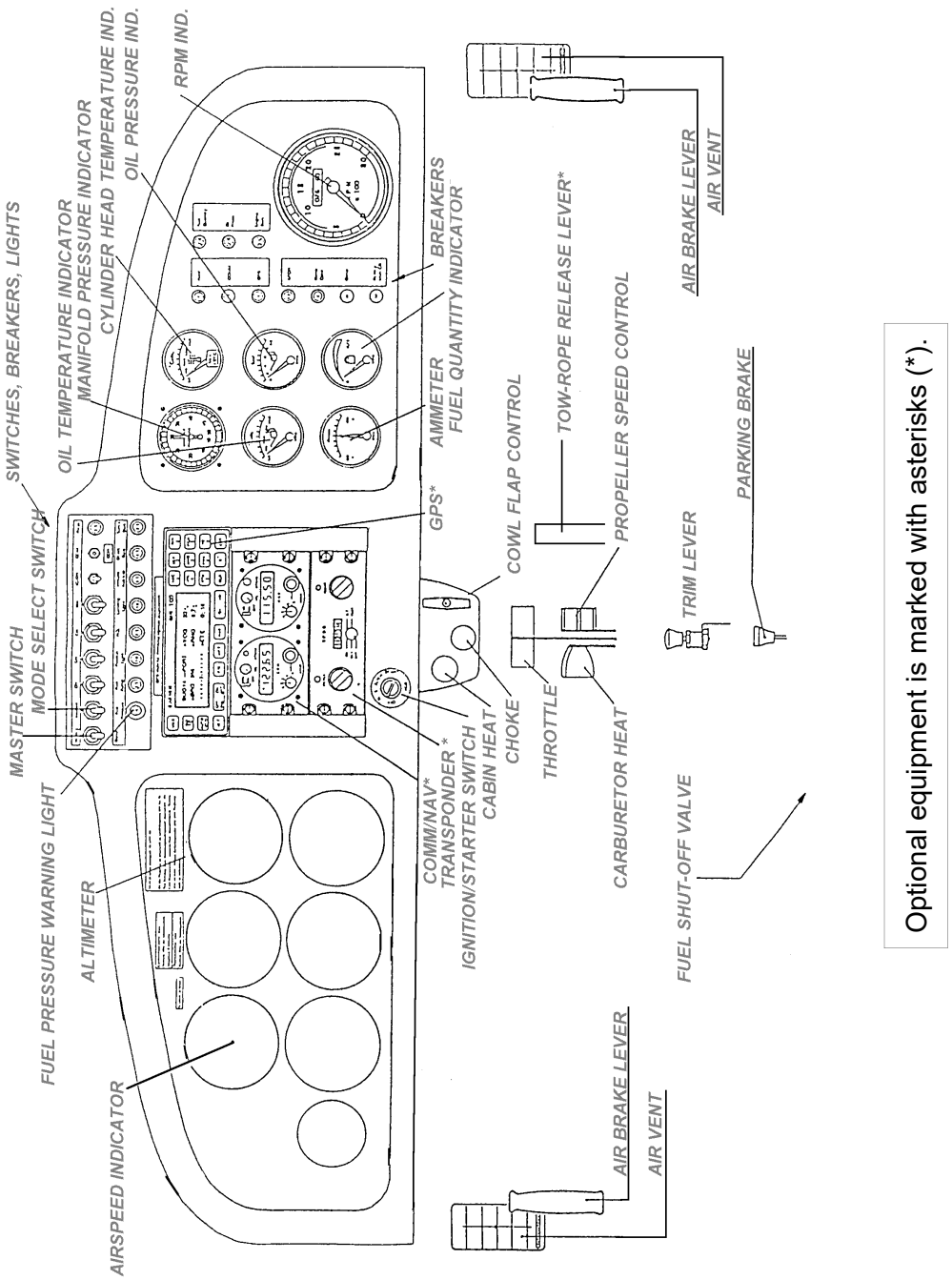
7.7 BAGGAGE COMPARTMENT

The baggage compartment is located behind the backrest above the fuel tank. Baggage pieces should be distributed evenly over the compartment. For safety reasons, the baggage pieces must be tied down.

CAUTION

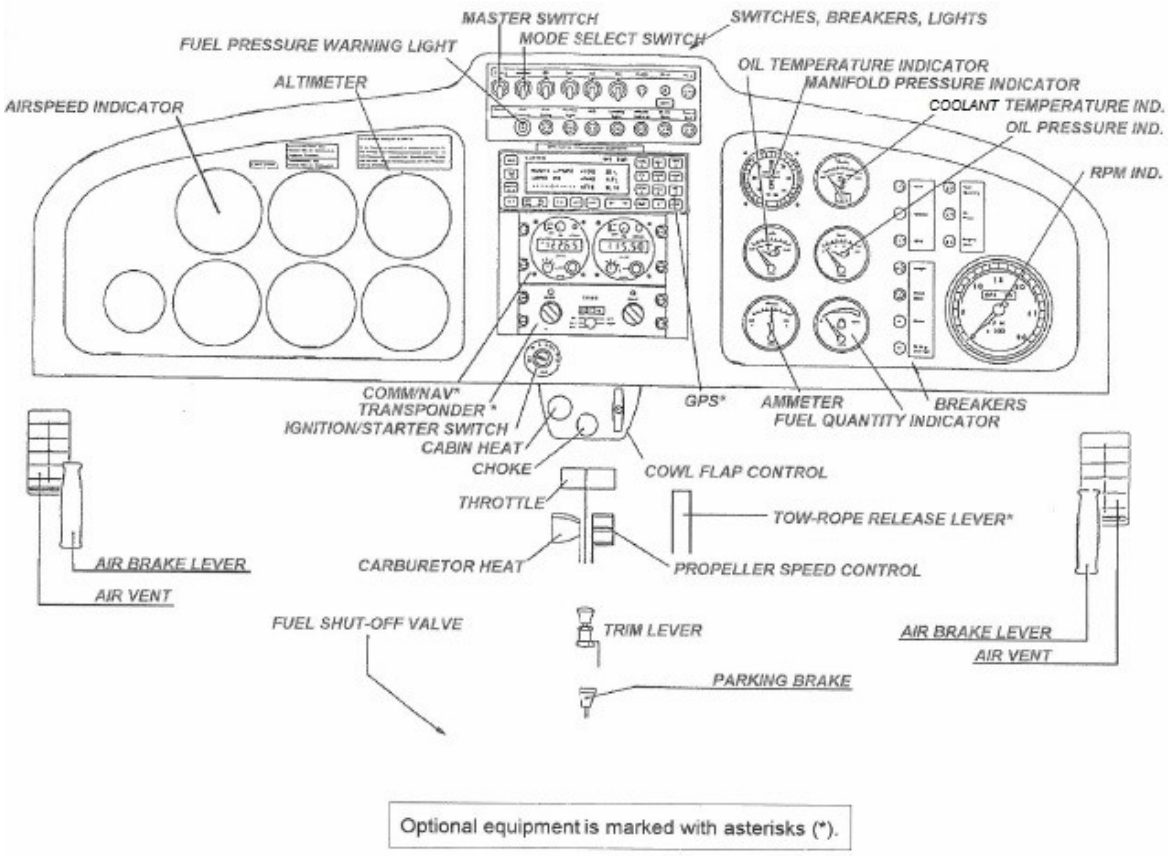
Before loading the baggage compartment, pay attention to the maximum useful load or, in case of solo flights, the minimum seat payload. Refer to the Mass and Balance Form and/or the Mass and Balance Diagram.

7.8 COCKPIT


RPM IND.
OIL PRESSURE IND.
CYLINDER HEAD TEMPERATURE IND.
MANIFOLD PRESSURE INDICATOR
OIL TEMPERATURE INDICATOR
SWITCHES, BREAKERS, LIGHTS
MASTER SWITCH
MODE SELECT SWITCH
FUEL PRESSURE WARNING LIGHT
ALTIMETER
AIRSPEED INDICATOR
BREAKERS
FUEL QUANTITY INDICATOR
AMMETER
GPS*
COMM/NAV* TRANSPONDER*
IGNITION/STARTER SWITCH
CABIN HEAT
CHOKE
THROTTLE
COWL FLAP CONTROL
TOW-ROPE RELEASE LEVER*
PROPELLER SPEED CONTROL
CARBURETOR HEAT
TRIM LEVER
PARKING BRAKE
FUEL SHUT-OFF VALVE
AIR BRAKE LEVER
AIR VENT
AIR BRAKE LEVER
AIR VENT
Optional equipment is marked with asterisks (*).

NOTE

If MÄM 36-450 is installed, the item “CYLINDER HEAD TEMPERATURE INDICATOR “ is replaced by “COOLANT TEMPERATURE INDICATOR”



Optional equipment is marked with asterisks (*).

7.8.1 MODE SELECT SWITCH

If the mode select switch is in SOARING position only the COM equipment is provided with battery power. All other electrical consumers are switched off.

7.8.2 INSTRUMENTS

The flight instruments are installed in the left hand section of the instrument panel. The power-plant instruments are installed in the right hand section.

7.8.3 CABIN HEAT AND CABIN AIR

The draw-button for the cabin heat is located in the center console under the instrument panel. Pull the button to turn the cabin heat on.

The cabin can be aerated through the swivelling nozzles on the side panels. The two sliding/knockout windows in the canopy can be opened for additional aerating.

7.8.4 CANOPY

Canopy lock

To close the canopy, pull shut with the black grips located on the front of the canopy frame. The canopy is locked by pushing forward the two red levers attached to the frame on either side. To open the canopy reverse the sequence.

CAUTION

Before starting the engine, close and lock the canopy!

Canopy jettison

By strongly swinging the red levers 180° rearward, the canopy is disconnected from the brackets. Then the pilot must place both hands above his head against the canopy and push it away in upward direction.

7.9 POWER-PLANT

7.9.1 ENGINE

Liquid-cooled 4 cylinder four stroke engine Rotax 912 A3. Crankshaft speeds in parentheses.

Displacement : 1.211 liters

Max. output power (5 min) : 59.6 kW (81 DIN-hp.) at 2550 RPM (5800 RPM)

Max. continuous power : 58 kW (79 DIN-hp.) at 2420 RPM (5500 RPM)

For further specifications refer to the Operator's Manual for the engine.

The ignition switch is operated with a key. To switch on the ignition turn the key clockwise until it catches. The starter is engaged by simultaneously pushing the button and turning the key clockwise to the stop.

7.9.2 POWER PLANT CONTROLS

Throttle control, propeller speed control and carburetor heat, are combined in a unit on the center console.

Throttle control: Large round lever

Lever full forward = FULL THROTTLE

Carburetor heat: Small rectangular lever

Lever full rearward = CARBURETOR HEAT ON

The carburetor heat is normally OFF (lever fully forward)

Propeller speed control: Black star shaped lever

Lever full forward = MAX. RPM

Lever back to restriction = MIN. CRUISING RPM

Lever full rearward = SOARING POSITION

The choke button is installed in the center console under the instrument panel.

Choke button pulled = CHOKE ACTIVATED

7.9.3 COWL FLAP

For the operation of the manual cowl flap there is a T-grip on the center console next to the cabin heat button. To arrest the T-grip turn it 90° clockwise.

T-grip pulled = COWL FLAP CLOSED

The cowl flap is closed during soaring in order to reduce drag. At outside temperatures below 0 °C (32 °F), partial closing of the cowl flap avoids continuous operation with an oil temperature below 80 °C (176 °F).

NOTE

Continuous operation with oil temperatures below 80 °C (176 °F) may lead to increased accumulation of condensation, which can be recognized by white foam in the oil tank.

CAUTION

Leave the cowl flap at least half open while the engine is running in order to avoid overheating. Pay special attention to the engine temperatures.

7.9.4 PROPELLER & GOVERNOR

Hydraulically controlled constant speed propeller with feathered pitch, mt-propeller MTV-21-A-C-F/CF175-05

Governor : Woodward A-210790 or McCauley DCFU290D17B/T1.

7.9.5 PROPELLER SPEED CONTROL

NOTE

The propeller speed control works differently from the usual systems in so far as hydraulic pressure is needed to reduce the blade pitch.

Small pitch is achieved by applying hydraulic pressure supplied by the governor. A spring moves the propeller to the feathered pitch position.

Propeller adjustment is done through the propeller speed control lever installed into the center console next to the throttle control. Pulling the control back to the point where the resistance increases causes an RPM reduction. The governor keeps the selected RPM constant, independent of airspeed and throttle control position. If the engine power selected with the throttle control is not sufficient to maintain the selected RPM, the propeller blades will move to the lowest possible pitch (maximum RPM at this power setting).

If the propeller speed control is moved fully rearward over the resistance (feathered pitch position) and if the propeller speed exceeds 500 RPM, the blades will move into the feathered pitch position. At too low RPM's, claws controlled by centrifugal force extend and keep the blades in low pitch position. Thus it is impossible to feather the propeller at engine standstill. During flight the propeller keeps rotating due to windmilling, even with the ignition switched off. The propeller stops rotating only when it is feathered. Therefore a propeller brake is not required.

The propeller governor is flanged to the engine. It is driven directly by the engine. The propeller control circuit is part of the engine oil circuit.

In case of defects in the oil system, the propeller is supplied with oil by the pressure accumulator and thus stays operative for at least two minutes without oil being supplied by the engine. As soon as the oil pressure in the pressure accumulator is used up, the propeller blades will move into the feathered pitch position.

CAUTION

The propeller speed control must not be moved over the resistance to the feathered pitch position as long as the engine is running!

7.10 FUEL SYSTEM

7.10.1 GENERAL

The aluminum tank is located behind the backrest beneath the baggage compartment. The standard version holds 54 liters (14.3 US gal.), the long range version 77 liters (20.3 US gal.) of usable fuel. At its lowest spot, the tank is connected to the drain on the bottom side of the fuselage.

The fuel passes through a finger filter before it reaches the electric fuel pump with integrated filter, from there it goes to the fuel shut-off valve, the engine-driven fuel pump and finally to the float chambers of the two carburetors.

7.10.2 FUEL SHUT-OFF VALVE

The fuel shut-off valve is located on the left side of the center console near the pilot's feet.

Tap in flight direction = valve OPEN

7.10.3 TANK DRAIN

To drain the tank sump, activate the spring loaded drain by pushing the brass tube in with a drain cup. The brass tube protrudes appr. 30 mm (1.2 in.) from the fuselage contour and is located on the left hand side of the fuselage bottom, approximately at the same station as the fuel filler.

7.10.4 FUEL QUANTITY INDICATOR

The fuel quantity indicator is adjusted for flight attitude. A slightly low indication is therefore possible on the ground.

7.11 ELECTRICAL SYSTEM

The master switch is a toggle type. The mode select switch is situated to the right of the master switch.

CAUTION

Starting the engine is only possible if the mode select switch is in POWER FLIGHT position.
In SOARING position, all electrical consumers except for the COM equipment and the electric vertical speed indicator (optional) are currentless.

The NAV and COM equipment is located in the center section of the instrument panel. The transmit button for the radio is integrated into the control stick. The radio loudspeaker is installed in the baggage compartment. A backrest-mounted connection set for two headsets is optional.

7.12 PITOT AND STATIC SYSTEM

Static pressure, total head and the pressure for the compensation of the vertical speed indicator are measured by means of a Pitot tube which is mounted to the vertical stabilizer. The tube is removable. A safe connection of the lines is established automatically when the Pitot tube is inserted to the stop in the mount.

The lowest spot of the Pitot and static lines is bridged by means of bypass lines. Water that might have entered the system can accumulate there. Removal of water must be done during scheduled inspections (refer to the Airplane Maintenance Manual).

7.13 MISCELLANEOUS EQUIPMENT

For the operation of additional avionics, refer to the manuals of the respective manufacturers.

7.14 PLACARDS / INSCRIPTIONS

The limitation placards are presented in paragraph 2.15. A list of all placards and inscriptions is included in the Airplane Maintenance Manual.

SECTION 8
POWERED SAILPLANE HANDLING, CARE AND MAINTENANCE

Page No.

8.1 INTRODUCTION

This section contains manufacturer's recommended procedures for proper ground handling and servicing of the powered sailplane. The Airplane Maintenance Manual identifies certain inspection and maintenance requirements which must be followed if the powered sailplane is to retain that new-plane performance and dependability. It is wise to adhere to the Lubrication Schedule and perform preventive maintenance based on climatic and flying conditions encountered.

8.2 POWERED SAILPLANE INSPECTION PERIODS

Inspections are scheduled every 100, 200, 1000 and 6000 hours. The respective inspection checklists are prescribed in the Airplane Maintenance Manual, paragraph 3.1.

8.3 POWERED SAILPLANE ALTERATIONS OR REPAIRS

Alterations or repairs of the powered sailplane may only be carried out as prescribed in the Airplane Maintenance Manual and only by authorized personnel.

8.4 GROUND HANDLING / ROAD TRANSPORT

For ground handling a draw tongue which is hooked to the tail wheel should be used. Road transport using a trailer is described in the Airplane Maintenance Manual, paragraph 1.2.

8.5 CLEANING AND CARE

It is recommendable to remove insects with water and sponge after the day's flying is ended.

CAUTION

Extreme dirt accumulation deteriorates flight performance!

Refer to the Airplane Maintenance Manual, paragraph 1.4, for further care measures.

SECTION 9

SUPPLEMENTS

At this time, the following Supplements are available:

| Supplement No. 1, Rev. 3
Use as Tow-Plane

Supplement No. 2
Differential Braking System

Supplement No. 3
Electrical Power Outlet for Additional Equipment

|

| Supplement No. 11
| Additional Performance Data

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