

**SUPPLEMENT S02
TO THE AIRPLANE FLIGHT MANUAL
DA 42 NG**

ICE PROTECTION SYSTEM

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0.1 RECORD OF REVISIONS

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1	OÄM 42-298/a	All	All, except Cover Page	28-Feb-2018	Rev.1 to AFM Supplement S02 to AFM Doc. No. 7.01.16-E is approved under the authority of DOA No. EASA 21J.052	06-Apr-2018		
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1. GENERAL

1.1 INTRODUCTION

This Supplement to the Airplane Flight Manual contains all necessary information to operate the ice protection system of the DA 42 NG.

The DA 42 NG can be equipped with an optional ice protection system in accordance with the Optional Design Change Advisory OÄM 42-298. It distributes a thin film of de-icing fluid on the wings, vertical stabilizer, horizontal stabilizer, propellers and canopy. This prevents the formation and accumulation of ice.

NOTE

The ice protection system is not a "de-icing" system in the usual sense. It can remove only small accumulations of ice. Its main purpose is to *prevent* the accretion of ice.

1.5 DEFINITIONS AND ABBREVIATIONS

(b) Meteorological terms

De-ice or de-icing: The periodic shedding or removal of ice accumulations from a surface, by destroying the bond between the ice and the protection surface.

Icing conditions: An icing condition is defined as visually detected ice, or the presence of visible moisture in any form at an indicated outside air temperature (OAT) of +3 °C (37.4 °F) or below.

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(i) Miscellaneous

Protected Surface: A surface containing ice protection, typically located at the surface's leading edge.

Residual Ice: Ice that remains on a protected surface immediately following the actuation of a deicing system.

2. OPERATING LIMITATIONS

NOTE

There is no change in existing operating limitations of the airplane. The following information is exclusively to reflect the new indications and information related to the ice protection system.

2.1 INTRODUCTION

2.1.1 USE OF THE AUTOPILOT

Use of the autopilot is prohibited when any ice is observed forming aft of the protected surfaces of the wing, or when unusual lateral trim requirements or autopilot trim warnings are encountered.

NOTE

The autopilot may mask tactile cues that indicate adverse changes in handling characteristics; therefore, the pilot should consider not using the autopilot when any ice is visible on the airplane.

2.6 WARNING, CAUTION AND ADVISORY ALERTS

2.6.1 WARNING, CAUTION AND ADVISORY ALERTS ON THE G1000

NOTE

The alerts described in the following are displayed on the Garmin G1000. Section 7.10 includes a detailed description of the alerts.

The following table shows the color and significance of the warning, caution and advisory alert lights on the G1000.

Color and significance of the caution alerts on the G1000

Caution alerts (amber)	Meaning / Cause
DEIC PRES LO	De-icing pressure is low.
DEIC PRES HI	De-icing pressure is high.
DEICE LVL LO	De-icing fluid level is low.

2.13 KINDS OF OPERATION

General

CAUTION

The system provides protection against icing when the pilot has inadvertently entered icing conditions. Flights into known or forecast icing conditions are prohibited.

Take-off

Take-off with ice or snow accumulation on the airplane is prohibited.

NOTE

The airplane must be completely cleared of ice, snow and similar accumulations. For approved de-icing fluids refer to the main part of the AFM, Section 8.7 - DE-ICING.

2.15 LIMITATION PLACARDS

On the door of the RH nose baggage compartment

DE-ICING FLUID
Refer to AFM for approved fluids.

Next to the filler cap

**DE-ICING
FLUID**
Max. 31.5 liters (8.3 US gal).
Usable 30 liters (7.9 US gal).
Refer to AFM for approved fluids.

2.17 DE-ICING FLUIDS FOR SYSTEM OPERATION

Approved de-icing fluids for use in the Ice Protection System are:

- AL-5 (DTD 406B)
- Aeroshell Compound 07

WARNING

The approved de-icing 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 supplier of the de-icing fluid.

CAUTION

The use of other fluids will provide a correspondingly lower standard of ice protection or may cause damage to the ice protection system.

NOTE

The maximum usable tank capacity is 30 liters (7.9 US gal).
The maximum tank capacity is 31.5 liters (8.3 US gal).
Maximum system operating times with maximum usable quantity of de-icing fluid:

NORM mode 2 hrs. 30 min.

HIGH mode 1 hr.

MAX mode 30 min.

3. EMERGENCY PROCEDURES

3.5 G1000 FAILURES

3.5.7 ERRONEOUS OR LOSS OF DE-ICING FLUID DISPLAY

If the de-icing fluid quantity is known, the remaining system operating time can be estimated based on the durations given in Section 2.17 - DE-ICING FLUIDS FOR SYSTEM OPERATION.

3.12 OTHER EMERGENCIES

3.12.4 UNINTENTIONAL FLIGHT INTO ICING

WARNING

If ice is observed forming aft of the protected surfaces of the wing, or if unusual lateral trim requirements or autopilot trim warnings are encountered, accomplish the following:

- * The flight crew should reduce the angle of attack by increasing speed as much as the airplane configuration and weather allow, without exceeding design maneuvering speed.
- * If the autopilot is engaged, hold the control stick firmly and disengage the autopilot. Do not re-engage the autopilot until the airframe is clear of ice.
- * Leave the icing area immediately by changing altitude or turning back or even continuing on the same course if clear air is known to be immediately ahead; and
- * Report these weather conditions to air traffic control.

CAUTION

Do not delay activation of the Ice Protection System if icing conditions are encountered. For best operation, the system should be activated prior to accumulation of ice on protected surfaces.

During Climb and Cruise

1. DE-ICE HIGH
2. MAX press push button, to dissipate
ice build-up
3. Pitot heating ON
4. ICE LIGHT ON, as required
5. Cabin heat & defrost ON
6. WINDSHIELD press push button, as required

if the system does not work properly:

Continue with Section 3.13.1 - FAILURE OF THE ICE PROTECTION SYSTEM.

if the system works properly, proceed as follows:

7. Leave the icing area (by changing altitude or turning back or even continuing on the same course if clear air is known to be immediately ahead).
8. De-icing fluid level check periodically
9. DE-ICE NORM, HIGH or MAX, as
required. Monitor ice build-up.

after leaving icing conditions:

10. DE-ICE OFF
11. Pitot heating OFF, as required
12. ICE LIGHT OFF, as required
13. Cabin heat & defrost OFF, as required

END OF CHECKLIST

During Approach and Landing

1. DE-ICE HIGH
2. MAX press push button if no shedding
in HIGH mode.
Repeat as required.

NOTE

The MAX push button activates the maximum possible system flow rate for 120 seconds.

CAUTION

If ice fails to shed, proceed with Section 3.13.1 - FAILURE OF THE ICE PROTECTION SYSTEM.

3. ICE LIGHT ON, as required
4. WINDSHIELD press push button, as required

NOTE

De-icing fluid will remain on the windshield for a period after operating windshield de-ice. For an unobstructed view, do not operate the windshield de-ice within 30 seconds prior to landing.

5. FLAPS UP or APP, as required

NOTE

Do not set the flaps to the LDG position. Otherwise the climb performance may not be sufficient for go-around.

END OF CHECKLIST

3.13 ICE PROTECTION SYSTEM EMERGENCIES

3.13.1 FAILURE OF THE ICE PROTECTION SYSTEM

A "failure" of the ice protection system is any condition in which the system fails to remove ice from protected surfaces including the propellers.

1. Leave the icing area (by changing altitude or turning back or even continuing on the same course if clear air is known to be immediately ahead).
2. Flap extension is limited to the APP position.

WARNING

With an inoperative ice protection system, set both POWER levers to MAX and leave icing conditions as soon as possible. In heavy icing conditions, it may not be possible to maintain altitude or proper glide path on approach; in this case, it is imperative that a safe airspeed be maintained, the stall warning system may not function and there may be little or no pre-stall buffet with heavy ice loads on the wing leading edges.

- I 3. Increase landing distance from Section 5.3.11 in the main part of the AFM by a factor of 1.4.

END OF CHECKLIST

4A. NORMAL OPERATING PROCEDURES

4A.6 CHECKLISTS FOR NORMAL OPERATING PROCEDURES

4A.6.1 PRE-FLIGHT INSPECTION

I. Cabin check

Ice Protection System

- a) ELECT MASTER ON
- b) DEICE FLUID check quantity
- c) Canopy closed
- d) WINDSHIELD press push button
- e) Spraybar evidence of de-icing fluid

NOTE

If the system has been inoperative for a while, has been drained or has run dry, trapped air - suspected in the feeder lines to the main pumps - can be removed from the feeder lines to the main pumps by activating the windshield pumps several times.

NOTE

Do not operate the main pumps with an empty de-icing fluid tank. Operating the main system pumps with an empty de-icing fluid tank can cause a future system malfunction. To re-establish full system function special maintenance action is required.

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f) ANNUN-TEST ON

NOTE

The ANNUN-TEST mode activates the DEICE LVL LO caution immediately if the de-ice fluid quantity is low and the DEIC PRES LO caution after 120 seconds.

- g) DEIC PRES HI verify NOT ILLUMINATED
- h) DEICE LVL LO check (must be annunciated if de-icing fluid quantity is below 6.0 liters (1.59 US gal))
- i) DEIC PRES LO check, ILLUMINATED (refer to NOTE)
- j) DE-ICE HIGH
- k) DEIC PRES LO verify NOT ILLUMINATED

NOTE

In HIGH mode the system pressure may not get high enough to disable the DEIC PRES LO warning if the ambient temperature is above 10 °C (50 °F). Disabling the DEIC PRES LO warning may take up to 20 seconds in HIGH- mode.

- l) ICE LIGHT ON
- m) Ice lights visual inspection, check
- n) DEIC PRES HI verify NOT ILLUMINATED
- o) DEIC PRES LO verify NOT ILLUMINATED

CONTINUED

NOTE

In HIGH mode the system pressure may not get high enough to disable the DEIC PRES LO warning if the ambient temperature is above 10 °C (50 °F).

- p) DE-ICE OFF
- q) ICE LIGHT OFF
- r) ANNUN-TEST OFF
- s) ELECT MASTER OFF

END OF CHECKLIST

II. Walk-around check, visual inspection

Ice Protection System

- a) De-icing fluid tank visually check quantity through transparent tank (in RH baggage compartment);
remove carpet if necessary
- b) Filler cap check secure
- c) Deflector and spraybar visually check, free from dirt
- d) Porous panels on wings visually check no damage and no holes blocked,
evidence of de-icing fluid
- e) Porous panels on horizontal and vertical tail visually check no damage and no holes blocked,
evidence of de-icing fluid
- f) Slinger rings and/or nozzle at propeller visually check no damage and no holes blocked,
evidence of de-icing fluid
- g) Wing, tail, propellers, windshield verify free from ice

END OF CHECKLIST

4A.6.5 TAXIING

NOTE

De-icing fluid will remain on the windshield for a while after operating windshield de-ice. For an unobstructed view, do not operate the windshield de-ice during taxiing.

4A.6.13 AFTER LANDING

- 1. DE-ICE OFF
- 2. ICE LIGHT OFF

4A.6.15 EXIT AIRPLANE

CAUTION

When the ice protection system has been enabled in flight, the walkways on the inner wings may be slippery.

4A.6.17 PARKING

NOTE

When the ice protection system has been enabled in flight, special care must be taken when touching the airframe structure or canopy as they may be partially contaminated with de-icing fluid.

Clean the de-icing fluid from the canopy and the porous panels. Refer to Chapter 8 for appropriate procedures.

4B. ABNORMAL OPERATING PROCEDURES**NOTE**

The Abnormal Operating Procedures of this Supplement describe Operation of the Ice Protection System on the occurrence of Cautions on the G1000. Nevertheless, flight in icing conditions is no approved kind of operation.

4B.4 CAUTION-ALERTS ON THE G1000**4B.4.15 DE-ICE PRESS LOW**

DEIC PRES LO	De-icing pressure is low.
---------------------	---------------------------

1. DE-ICE HIGH

if DEIC PRES LO indication does not extinguish on the G1000:

2. PUMP1 / PUMP2 select other main pump

NOTE

Activate the WINDSHIELD pump to prime the alternate main pump if necessary.

if DEIC PRES LO indication still does not extinguish on the G1000:

3. ALTERNATE switch on de-ice panel open guard, toggle switch

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if DEIC PRES LO indication still does not extinguish on the G1000:

- I 4. Proceed with Section 3.13.1 - FAILURE OF THE ICE PROTECTION SYSTEM.

if DEIC PRES LO indication extinguishes on the G1000 and normal operation is achieved:

- I 5. Proceed with Section 3.12.4 - UNINTENTIONAL FLIGHT INTO ICING

CAUTION

At temperatures above 10 °C (50 °F) the DEIC PRES LO caution will not extinguish in HIGH mode. Upon switching to MAX mode the caution should extinguish.

END OF CHECKLIST

4B.4.16 DE-ICE PRESSURE HIGH

DEIC PRES HI	De-icing pressure is high.
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- 1. Icing conditions leave the icing area as soon as possible

NOTE

Reduced system performance may occur. Unscheduled maintenance is required.

4B.4.17 DE-ICE LEVEL LOW

DEICE LVL LO	De-icing fluid level is low.
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Maximum remaining system operating times after first annunciation of the DEICE LVL LO caution message:

NORM mode	30 min.
HIGH mode	15 min.

4B.4.18 FAILURE OF INDICATION LIGHTS

The indication lights (MAX, NORM, HIGH) on the de-ice panel are only used to indicate the selected operating mode. Failure to illuminate does not indicate a malfunction of the system.

1. Continue flight according Section 3.12.4 - UNINTENTIONAL FLIGHT INTO ICING.
2. Unscheduled maintenance is required after flight.

4B.4.19 FAILURE OF THE WINDSHIELD DE-ICE

A "failure" of the windshield de-ice is any condition in which the system fails to remove ice from the windshield.

1. Continue flight according Section 3.12.4 - UNINTENTIONAL FLIGHT INTO ICING by viewing through the unobstructed areas on the side of the canopy. Open the emergency window if necessary.

5. PERFORMANCE

5.1 INTRODUCTION

Airplane performance and stall speeds in clear air are unchanged with the installation of the Ice Protection System.

CAUTION

Significant climb and cruise performance degradation, range reduction, as well as buffet and stalling speed increase must be expected if ice accumulates on the airframe.

Residual ice on the protected surfaces and ice accumulation on the unprotected areas of the airplane can cause noticeable performance losses, even with the Ice Protection System operating.

6. MASS AND BALANCE**6.4 FLIGHT MASS AND CENTER OF GRAVITY****6.4.1 MOMENT ARMS**

Item	Lever Arm	
	[m]	[in]
De-icing fluid tank	1.00	39.4

The mass (weight) of the de-icing fluid is obtained as follows:

Multiply the fluid quantity in liters by 1.1 to obtain kilograms (kg), or
multiply the fluid quantity in US gallons by 9.2 to obtain pounds (lb).

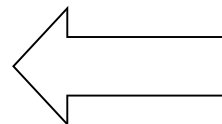
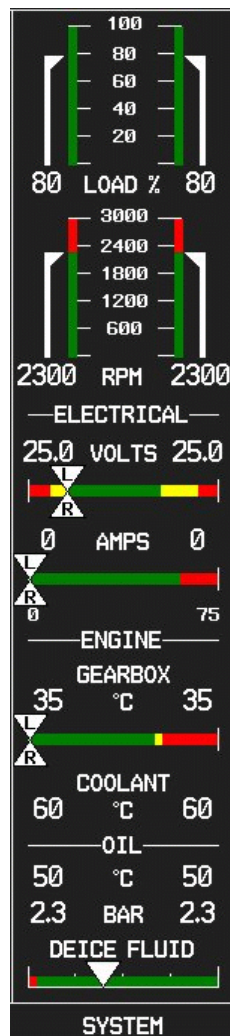
7. DESCRIPTION OF THE AIRPLANE AND ITS SYSTEMS

7.9 POWER PLANT

7.9.4 ENGINE INSTRUMENTS

On the Garmin G1000 MFD the de-icing fluid level indication is displayed on the system page. Indication markings indicate (from left to right) 1/4, 2/4, 3/4 and 4/4 of the usable fluid quantity (30 liters or 7.9 US gal).

Display when pushing the SYSTEM button:



7.10 ELECTRICAL SYSTEM

7.10.3 WARNING, CAUTION AND ADVISORY ALERTS

CAUTION ALERTS

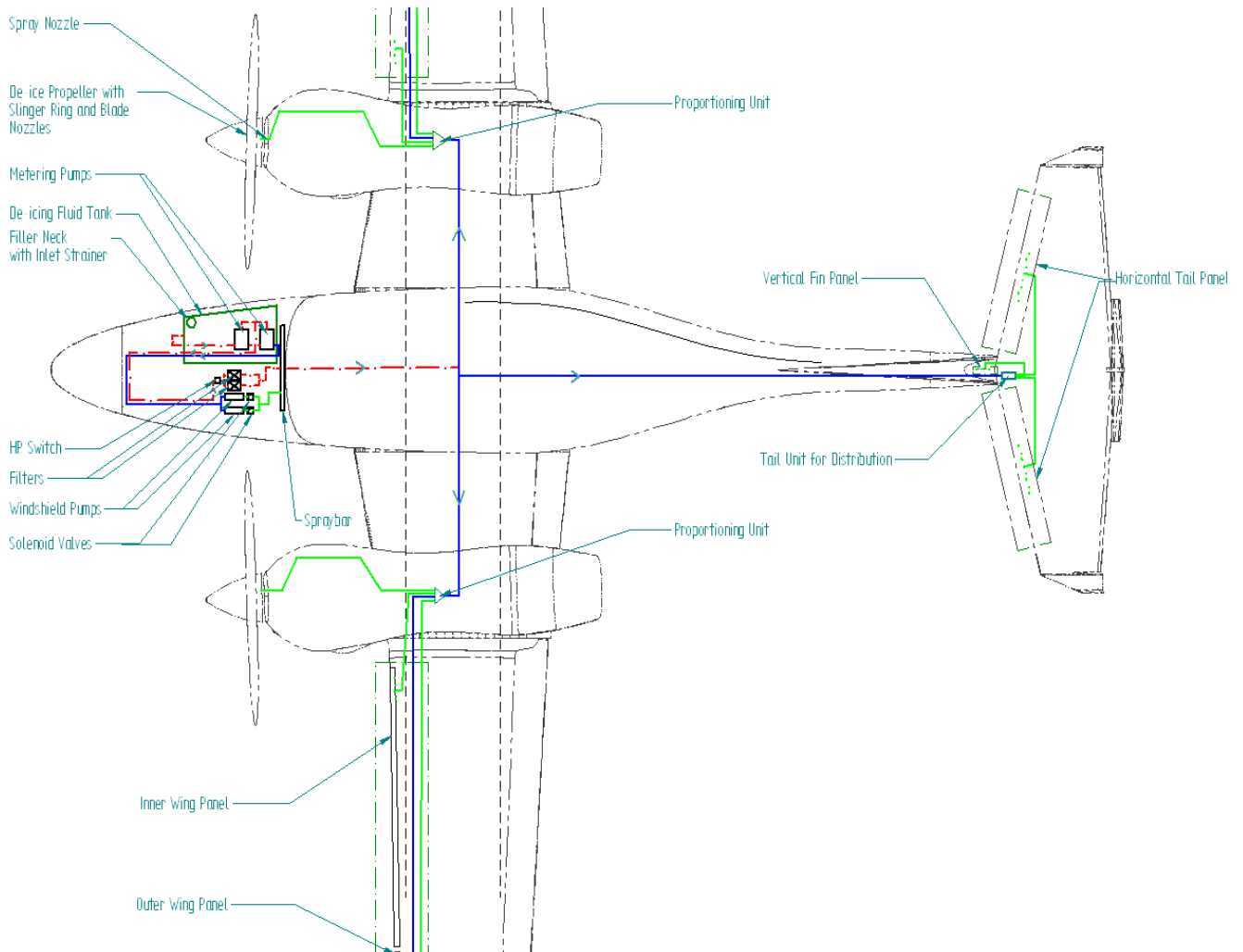
Caution alerts (amber)	Meaning / Cause
DEIC PRES LO	System pressure upstream of the porous panels on the horizontal or vertical tail is too low.
DEIC PRES HI	System pressure upstream of the de-icing fluid filter is too high.
DEICE LVL LO	De-icing fluid level in the tank is below 6.0 liters (1.59 US gal).

7.15 DE-ICING SYSTEM

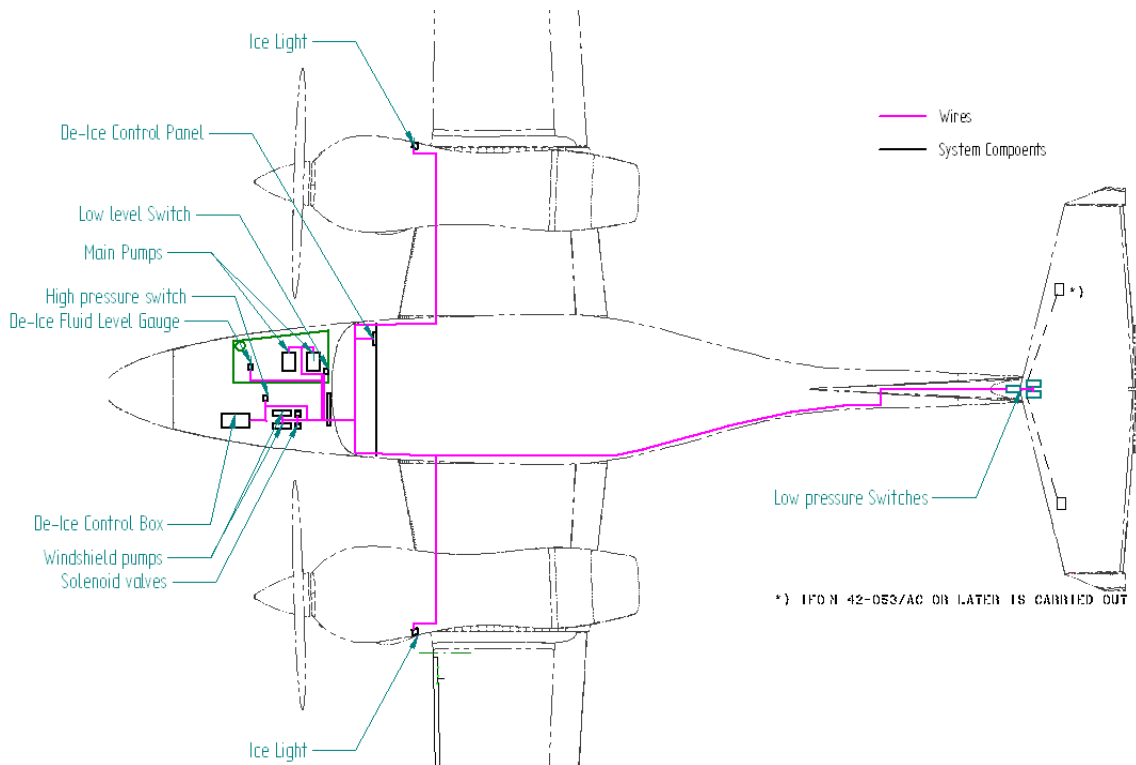
Description

The ice protection system is electrically operated. It is supplied with power via the XFR PUMP/DE-ICE circuit breaker. 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.

Mechanical Overview



Electrical Overview



The system consists of the following main components:

- * De-icing fluid tank with an integrated filler neck, which has an inlet strainer. The tank has a capacity of 30 liters (7.9 US gal) and is installed in the nose compartment of the airplane, on the RH side. The de-icing fluid is glycol-based. It has an approx. mass density of 1.1 kg/liter (9.2 lb/US gal).

A low level sensor in the tank provides indication of low de-icing fluid level.

A fluid level gauge provides data for de-icing fluid level indication on the G1000 System.

- * Two main pumps, installed in the nose compartment of the airplane, under an inspection lid on the RH side.

The pumps take de-icing fluid from the tank and feed it to :

- the airframe ice protection system (see below), and
- the windshield de-icing system (see below).

In the NORM mode both main pumps run simultaneously and are cycled on and off by two time delay relays.

In the HIGH mode only the selected main pump runs continuously.

In the MAX mode both pumps run simultaneously and continuously.

A switch in the cockpit selects the modes NORM and HIGH. In the HIGH mode the MAX mode can be engaged by pressing a push button on the de-ice panel in the cockpit. This mode is activated for 2 minutes.

The information which mode is currently in use is indicated by three lights on the ice protection control unit on the instrument panel.

- * The airframe/propeller ice protection system consists of the following components:
 - Two de-icing fluid filters, installed in the nose compartment of the airplane, under an inspection lid on the LH side. The active main pump feeds the de-icing fluid through the filters to the proportioning units. The filters prevent the proportioning units from fouling.

- Proportioning units in each nacelle (between the main spars) and in the upper vertical tail (forward of the front spar). The proportioning units regulate the flow of de-icing fluid to the porous panels and to the propeller slinger rings by means of capillaries.
- Porous Titanium panels are fitted to the leading edge of the outer wings, the vertical tail, and the horizontal tail. The porous panels weep the fluid at a low rate through fine holes.
- Nozzles and slinger rings on the propellers. The nozzle sprays fluid into the slinger ring which is mounted to the spinner backplate. The fluid is then distributed to the propeller blades by centrifugal force through notches in the slinger ring.
- Three low pressure sensors which detect malfunctions of the system. Refer to Section 7.10 in this Supplement.
- One high pressure sensor which activates an indication when the filter cartridges need to be replaced. Refer to Section 7.10 in this Supplement.

* The windshield ice protection system consists of:

- Two windshield de-icing pumps with solenoid valves, installed in the nose compartment of the airplane, under an inspection lid on the LH side. The active windshield de-icing pump supplies the fluid to the spraybar.

Only one windshield de-icing pump is operative at a time. A switch in the cockpit selects the active pump (PUMP1/PUMP2). The second pump is installed for redundancy.

- One de-icing fluid spraybar for the canopy.

Unlike the airframe de-icing system, the windshield de-icing system does not spray fluid continuously, but is activated for 5 seconds by operating a push button, even when the main switch of the Ice Protection System is in the OFF position.

- * The electrical system consists of:
 - An ice protection control box which is mounted under the LH baggage compartment floor. The ice protection control box contains all necessary relays to operate and cycle the pumps.
 - A de-ice panel, mounted on the RH side of the instrument panel, enables the complete control of the whole de-icing system.
 - Two ice lights, one for each wing, are installed for monitoring ice accretion on the wings in low lighting conditions.

Replenishing

Refer to Section 2.17 in this Supplement for approved de-icing fluids.

NOTE

The de-icing fluid must be considered for the mass and balance calculations. Refer to Chapter 6 in this Supplement.

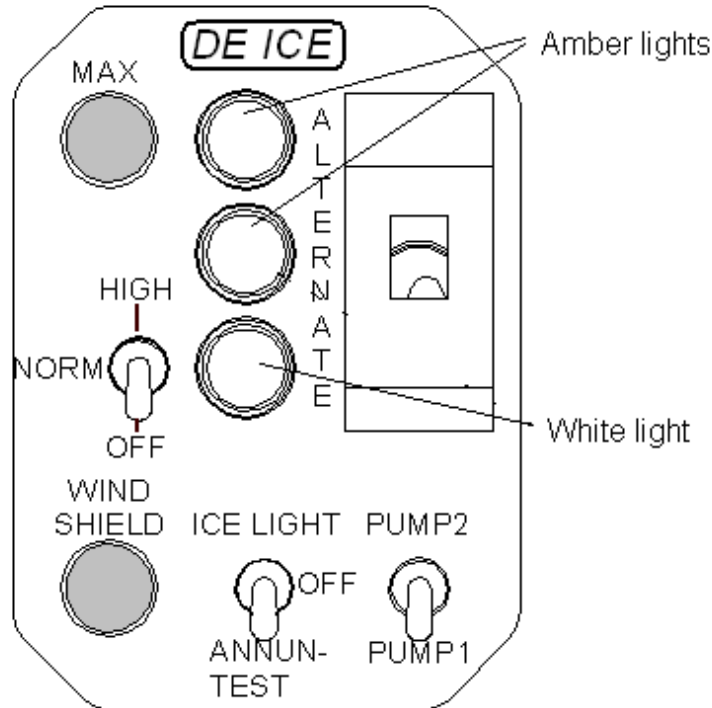
De-icing fluid is replenished through the filler which is located in the fuselage nose on the RH side, aft of the nose baggage door. The tank has a usable capacity of 30 liters (7.9 US gal).

Operation

The system is operated through four toggle switches and two push buttons located on the ice protection control unit in the RH section of the instrument panel.

The current operating mode is indicated by the following indication lights:

- NORM : lower white light only
- HIGH : center amber light only
- MAX : both (top and center) amber lights

OFF/NORM/HIGH Switch

The OFF/NORM/HIGH switch operates the selected main pump and thus activates the system. It has 3 positions:

Down position: OFF.

Center position: NORM (normal). The main pumps produce a cycled fluid flow: the main pumps provide fluid to the system for 30 seconds, followed by a 90 seconds break. This mode is designed to cover the more frequent but less severe known icing conditions as defined by CS 25/FAR Part 25, Appendix C, and is selected when icing conditions are encountered and prior to ice formation. Maximum system operating time is approximately 2 hours and 30 minutes.

Up position: HIGH. The active main pump produces a continuous fluid flow. This mode is designed to cover all known icing conditions as defined by CS 25/FAR Part 25, Appendix C, and is selected when icing conditions are more demanding or if ice has already accumulated. Maximum system operating time is approximately 1 hour.

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 designed to provide maximum possible protection for conditions outside the icing envelope as defined by CS 25/FAR Part 25, Appendix C, and is only active for 2 minutes after each activation. In this mode both pumps are active simultaneously and provide fluid to the system. Maximum system operating time with continuous MAX mode activation is approximately 30 minutes.

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 no. 1 is selected as the active pump in HIGH mode. Pump no. 2 is standby. Also windshield pump no. 1 is selected in case the windshield switch is activated. Windshield pump no. 2 is inoperative.

Up position: PUMP 2. Main pump no. 2 is selected as the active pump in HIGH mode. Pump no. 1 is standby. Also windshield pump no. 2 is selected in case the windshield switch is activated. Windshield pump no. 1 is inoperative.

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 OFF. Purging air from the ice protection system is also provided from these pumps by continuously pressing the WINDSHIELD push button.

ALTERNATE Switch

The ALTERNATE switch connects the main pump no. 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.

ANNUN-TEST/OFF/ICE LIGHT

This switch activates either both ice-lights or the annunciation test procedure (refer to Section 4A.6.1).

8. AIRPLANE HANDLING, CARE AND MAINTENANCE

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

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.

NOTE

The ice protection system should be checked for excessive de-icing fluid leaks after each use. Due to the dihedral wing small amounts of de-icing fluid can evaporate from the inner wing panels over a period of several days. Contamination precautions must be done if the airplane is stored in a hangar.

8.4 SERVICING

8.4.5 REPLENISHMENT OF THE DE-ICING TANK

For approved de-icing fluids refer to Chapter 2 LIMITATIONS. The tank is located in the baggage compartment and the filler cap is on top of the filler neck of the tank, accessible via the open RH baggage door.

To preclude the possibility of contaminated fluid do not remove the inlet strainer, always clean the top of the fluid tank before replenishing. Secure the filler cap immediately after replenishment.

8.4.6 PROLONGED OUT OF SERVICE OR SYSTEM RUN DRY OF THE DE-ICING SYSTEM

To avoid the need to reprime the system and to provide a quick response when turned to service, maintain at least 2 liters (0.5 US gal) in the tank. To ensure that all system components are filled with fluid, operate the system at least once in a month. If necessary, operate the pumps until all air is purged from components and pipelines.

Priming of the main pumps

The main pumps may not be self priming and are primed, when required, by the operation of either windshield pump. Windshield pump 1 or 2 will prime main pump 1 or 2.

Priming of the porous panels

in flight:

WARNING

Priming of the porous panels in icing conditions is not permitted.

Priming of the porous panels is best done during climb or descent, at ambient temperatures up to 4 °C (39 °F). To prime the porous panels, activate the MAX mode. Repeat the procedure in intervals of approximately 5 minutes until fluid dissipates from all porous panels.

by special maintenance:

At ambient temperatures above 4 °C (39 °F), special maintenance may be required to prime the porous panels.