SUPPLEMENT S03
TO THE AIRPLANE FLIGHT MANUAL

DA 62
ICE PROTECTION SYSTEM
FOR FLIGHT INTO KNOWN ICING

Doc. No. : **11.01.05-E**

Date of Issue of the Supplement : **31-Jan-2019**

Design Change Advisories : **OÄM 62-003**

This supplement to the DA 62 Airplane Flight Manual is approved in accordance with the Canadian Aviation Regulations.

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Date of Approval : June 26, 2025

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0.1 RECORD OF REVISIONS

Rev. No.	Reason	Chap-ter	Page(s)	Date of Revision	Approval Note	Date of Approval	Date Inserted	Signature
1	OÄM 62-003/c	0, 4B, 5, 7	9-S03-45, 9-S03-62, 9-S03-72, 9-S03-73	25-Mar-2025		26-Jun-2025		

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1. GENERAL

1.1 INTRODUCTION

This supplement to the AFM contains all necessary information to operate the ice protection system of the DA 62 in known icing conditions.

The DA 62 can be equipped with an optional ice protection system in accordance with the Optional Design Change Advisory OÄM 62-003. It distributes a thin film of de-icing fluid on the wings, vertical stabilizer, horizontal stabilizer, propellers, and windscreen. 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 (anti-icing).

WARNING

Known icing conditions are defined by CS 25/FAR Part 25, Appendix C. These conditions do not include, nor were tests conducted in, all icing conditions that may be encountered (e.g., freezing rain, freezing drizzle, mixed phase icing conditions, or conditions defined as severe). Flight in these conditions must be avoided. Some icing conditions not defined in CS 25/FAR part 25 have the potential of producing hazardous ice accumulations, which (1) exceed the capabilities of the airplane's ice protections equipment, and/or (2) create unacceptable airplane performance. Inadvertent operation in these conditions may be detected by heavy ice accumulation on the windshield, or when ice forms on the side areas of the door windows. Another indication is the rapid formation and shedding of bars of ice (6 mm (1/4 in) thickness or larger) from the porous panels. If these conditions are encountered, the pilot should take immediate action to select HIGH/MAX flow rate and leave these conditions by changing altitude, turning back, or even continuing on the same course if clear air is known to be immediately ahead.

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.

Freezing Drizzle: Drizzle is precipitation on the ground or aloft in the form of liquid water drops that have diameters less than 0.5 mm, and greater than 0.05 mm (50 µm to 500 µm, 0.002 in to 0.02 in). Freezing drizzle is drizzle in liquid form that exists in air temperatures less than 0 °C (32 °F), i.e. supercooled water, and freezes upon contact with objects on the surface or airborne.

Freezing Rain: Rain is precipitation on the ground or aloft in the form of liquid water drops which have diameters greater than 0.5 mm (0.02 in). Freezing rain is rain in liquid form that exists at air temperatures less than 0 °C (32 °F), i.e. supercooled water, and freezes upon contact with objects on the surface or airborne.

FIKI: Flight into known icing.

Ice Crystals: Any one of a number of macroscopic, crystalline forms in which ice appears. Examples are hail and snow.

Icing Conditions: An icing condition is defined as visually detected ice, or the presence of visible moisture in any form at or below an indicated outside air temperature (OAT) of +5 °C (41 °F).

LWC: Liquid water content. The total mass of water contained in liquid drops within a unit volume of air.

Mixed Phase Icing Conditions:

A homogeneous mixture of supercooled water drops and ice crystals existing within the same cloud environment.

Supercooled Water: Liquid water at a temperature below the freezing point of 0 °C (32 °F).

(c) Flight Performance and Flight Planning

Continuous Operation:

Typical continuous operations in icing conditions are holding and cruise.

(i) Miscellaneous

CS 25/FAR Part 25, Appendix C:

Certification icing condition standard for approving ice protection provisions on airplanes. The conditions are specified in terms of altitude, temperature, LWC, representative droplet size, and cloud horizontal extent.

ICTS: Ice contaminated tailplane stall.

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

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, or periodically disconnect the autopilot and check for free movement of all controls (elevator, aileron, and rudder).

2.1.2 METEOROLOGICAL CONDITIONS

Flight in meteorological conditions described as freezing rain or freezing drizzle, as determined by the following visual cues, is prohibited:

(1) Unusually extensive ice accreted on the airframe in areas not normally observed to collect ice.

(2) Accumulation of ice on the upper surface of the wing aft of the protected area.

(3) Accumulation of ice on the propeller spinner further back than normally observed.

(4) Ice formation on side window areas.

If the airplane encounters conditions that are determined to contain freezing rain or freezing drizzle, the pilot must immediately exit the freezing rain or freezing drizzle conditions by changing altitude, turning back, or even continuing on the same course if clear air is known to be immediately ahead.

NOTE

The prohibition on flight in freezing rain or freezing drizzle is not intended to prohibit purely inadvertent encounters with the specified meteorological conditions; however, pilots should make all reasonable efforts to avoid such encounters and must immediately exit the conditions if they are encountered.

2.2 AIRSPEED

Airspeed	IAS	Remarks
Minimum airspeed for continuous operation in icing conditions above 1999 kg (4407 lb)	96 KIAS	These limitations do not apply for landing.
Minimum airspeed for continuous operation in icing conditions up to 1999 kg (4407 lb)	89 KIAS	
Maximum airspeed for continuous operation in icing conditions.	154 KIAS *172 KTAS*	

WARNING

If minimum icing speed cannot be maintained, Paragraph 2.1.2 applies.

NOTE

Typical continuous operations in icing conditions are holding and cruise.

2.6 WARNING, CAUTION, AND ADVISORY ALERTS

2.6.1 WARNING, CAUTION, AND ADVISORY ALERTS ON THE G1000

NOTE

The alerts described below are displayed on the Garmin G1000. Section 7.10 - ELECTRICAL SYSTEM 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 OPERATIONS

Provided that national operational requirements are met, the following kinds of operation are approved:

* Flights into known or forecast icing conditions

2.15 LIMITATION PLACARDS

Next to the Filler Cap, Installed on the Fuselage Nose LH

DE-ICING FLUID

Max. 37 liters (9.8 US gal).
Usable 36 liters (9.5 US gal).
Refer to AFM for approved fluids.

Left of the Instrument Panel

2.16 OTHER LIMITATIONS

2.16.13 OPERATION IN ICING CONDITIONS

General

The DA 62 is approved for flight into known or forecast icing conditions as defined by CS 25/FAR Part 25, Appendix C “Continuous Maximum and Intermittent Icing Envelope” only if the ice protection system is installed and is serviceable.

In icing conditions, the airplane must be operated and its ice protection systems used as described in the operating procedures sections of this manual. Where specific operational speeds and performance information have been established for such conditions, this information must be used.

Temperature Limitation

Minimum operation temperature for the ice protection system is -30 °C (-22 °F).

Take-Off

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

Flight into Known or Forecast Icing Conditions

Setting flaps to the LDG position is prohibited:

* During flights in icing conditions
* With residual ice on any visible surfaces

Setting flap to LDG or T/O is prohibited in case of a failure of the ice protection system.

Intentional single-engine operation during flights under known or forecast icing conditions is prohibited.

NOTE

The flaps and landing gear should only be extended and retracted for landing.

Minimum Operational Equipment (Serviceable)

Flight into known or forecast icing conditions requires the following equipment to be installed and serviceable:

* Ice protection system installed in accordance with the Optional Design Advisory OÄM 62-003.

NOTE

The wing ice inspection lights must be operative prior to flight into known or forecast icing conditions at night. This supersedes any relief provided by the table given in AFM Section 2.13 - KINDS OF OPERATION.

2.17 DE-ICING FLUIDS FOR SYSTEM OPERATION

The TKS fluid tank must be serviced with fluid conforming to British Specification DTD 406B.

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.

2.17.1 MINIMUM DE-ICING FLUID QUANTITY FOR DISPATCH

The minimum de-icing fluid quantity for dispatch is 27 liter (7.2 US gal). This amount corresponds to an indication of 3/4 full on the G1000.

NOTE

This minimum allows more than 90 minutes of ice protection with NORM selected. The pilot must ensure adequate fluid quantity before each flight.

NOTE

The maximum tank capacity is 37 liter (9.8 US gal). The maximum usable tank capacity is 36 liter (9.5 US gal).

3. EMERGENCY PROCEDURES

3.1 INTRODUCTION

3.1.2 CERTAIN AIRSPEEDS IN EMERGENCIES

If icing conditions do exist:

Event		
One engine inoperative speed for best rate of climb v_{YSE}	Up to 1999 kg (4407 lb)	89 KIAS
	Above 1999 kg (4407 lb)	97 KIAS

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 7.16 - DE-ICING SYSTEM.

1. Icing conditions . . . . . leave the icing area as soon as practicable

END OF CHECKLIST

3.7 ONE ENGINE INOPERATIVE PROCEDURES

3.7.6 ENGINE FAILURES IN FLIGHT

If icing conditions do exist:

1. Leave the icing area (by changing altitude, turning back, or even continuing on the same course if clear air is known to be immediately ahead).
2. DE-ICE . . . . . HIGH
3. Proceed in accordance with following procedures.

CONTINUED

(a) Engine Failure During Initial Climb

WARNING

As the climb is a flight condition which is associated with high power settings, airspeeds lower than v_{MCA} = 76 KIAS (flaps UP) or 70 KIAS (flaps T/O) should be avoided, as a sudden engine failure can lead to loss of control. In this case, it is very important to reduce the asymmetry in thrust to regain directional control.

1. Rudder . . . . . maintain directional control
2. Airspeed . . . . . v_{YSE}:
   89 KIAS up to 1999 kg (4407 lb)
   97 KIAS above 1999 kg (4407 lb)
3. Operative engine . . . . . increase power as required, if directional control has been established

Establish minimum/zero sideslip condition. (Approx. half ball towards good engine; 3° to 5° bank.)

4. Inoperative engine . . . . . secure according to AFM Section 3.7.3 - ENGINE SECURING (FEATHERING) PROCEDURE

Land as soon as possible according to AFM Section 3.7.7 - LANDING WITH ONE ENGINE INOPERATIVE. If a diversion is required before landing, continue according to AFM Section 3.7.9 - FLIGHT WITH ONE ENGINE INOPERATIVE.

END OF CHECKLIST

(b) Engine Failure During Flight

1. Rudder . . . . . maintain directional control
2. Airspeed . . . . . v_{YSE}:
   89 KIAS up to 1999 kg (4407 lb)
   97 KIAS up to 1999 kg (4407 lb)

CONTINUED

3. Operative engine . . . . . increase power up to 95% load

Establish minimum/zero sideslip condition. (Approx. half ball towards good engine, 3° to 5° bank.)

4. Inoperative engine . . . . . secure according to AFM Section 3.7.3 - ENGINE SECURING (FEATHERING) PROCEDURE

Land as soon as possible according to 3.7.7 - LANDING WITH ONE ENGINE INOPERATIVE. If a diversion is required before landing, continue according to AFM Section 3.7.9 - FLIGHT WITH ONE ENGINE INOPERATIVE.

END OF CHECKLIST

3.7.7 LANDING WITH ONE ENGINE INOPERATIVE

No change to the main part of the AFM, except for the approach speed as follows. With residual ice on protected surfaces, and/or ice accumulation on the unprotected areas of the airplane, or if icing conditions do exist:

Final approach speed:

Up to 1999 kg (4407 lb)	97 KIAS (v_{REF}/FLAPS UP)
	90 KIAS (v_{REF}/FLAPS T/O)
Above 1999 kg (4407 lb)	101 KIAS (v_{REF}/FLAPS UP)
	96 KIAS (v_{REF}/FLAPS T/O)

NOTE

FLAPS LDG is prohibited.

3.7.8 GO-AROUND/BALKED LANDING WITH ONE ENGINE INOPERATIVE

No change to the main part of the AFM, except for the airspeed as follows. With residual ice on protected surfaces, and/or ice accumulation on the unprotected areas of the airplane, or if icing conditions do exist:

Airspeed:

Up to 1999 kg (4407 lb) . . . . . 97 KIAS (v_{REF}/FLAPS UP)
90 KIAS (v_{REF}/FLAPS T/O)

Above 1999 kg (4407 lb) . . . . . 101 KIAS (v_{REF}/FLAPS UP)
96 KIAS (v_{REF}/FLAPS T/O)

NOTE

FLAPS LDG is prohibited.

3.11 FAILURES IN THE ELECTRICAL SYSTEM

3.11.1 COMPLETE FAILURE OF THE ELECTRICAL SYSTEM

1. Leave the icing area immediately (by changing altitude, turning back, even continuing on the same course if clear air is known to be immediately ahead).
2. Proceed in accordance with the procedure given in AFM Section 3.11.1 - COMPLETE FAILURE OF THE ELECTRICAL SYSTEM.

3.15 ICE PROTECTION SYSTEM EMERGENCIES

3.15.1 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, and any system malfunction not covered in the abnormal operating procedures given in Chapter 4B of this supplement.

1. AUTOPILOT. . . . . hold control stick firmly and disengage

CONTINUED

2. Leave the icing area (by changing altitude, turning back, or even continuing on the same course if clear air is known to be immediately ahead).
3. Airspeed . . . . . maintain:
   89 KIAS up to 1999 kg (4407 lb)
   96 KIAS above 1999 kg (4407 lb) to 154 KIAS or 172 KTAS until landing

WARNING

With an inoperative ice protection system, set both POWER levers to 95% or max. 2200 RPM, 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.

Before landing

4. FLAPS . . . . . UP
5. Final approach speed:
   Up to 1999 kg (4407 lb) . . . . . min. 97 KIAS
   Above 1999 kg (4407 lb) . . . . . min. 101 KIAS

END OF CHECKLIST

3.15.2 INADVERTENT ICING ENCOUNTER & EXCESSIVE ICE ACCUMULATION

1. DE-ICE . . . . . HIGH
2. MAX. . . . . press push button to dissipate ice build-up

CONTINUED

NOTE

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

3. Pitot heating . . . . . check 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 3.15.1 - FAILURE OF THE ICE PROTECTION SYSTEM.

If the system works properly, proceed as follows

7. De-icing fluid level . . . . . check periodically
8. DE-ICE . . . . . NORM or HIGH as required. Monitor ice build-up.

END OF CHECKLIST

3.15.3 PROCEDURES FOR EXITING THE FREEZING RAIN/FREEZING DRIZZLE ENVIRONMENT

These procedures are applicable to all flight phases from take-off to landing. Monitor the outside air temperature. While ice may form in freezing drizzle or freezing rain at temperatures as cold as -18 °C (0 °F), increased vigilance is warranted at temperatures around freezing, if visible moisture is present. If the visual cues specified above for identifying possible freezing rain or freezing drizzle conditions are observed, accomplish the following:

(1) Exit the freezing rain or freezing drizzle icing conditions immediately, to avoid extended exposure to flight conditions outside of those for which the airplane has been certificated for operation. Asking for priority to leave the area is fully justified under these conditions.

(2) Avoid abrupt and excessive maneuvering that may exacerbate control difficulties.

(3) Do not engage the autopilot. The autopilot may mask unusual control system forces.

(4) If the autopilot is engaged, hold the control stick firmly, and disengage the autopilot.

(5) Periodically move all controls gently to check for and prevent frozen (stuck) control surfaces.

(6) If an unusual roll response or uncommanded control movement is observed, reduce the angle of attack by increasing airspeed or rolling wings level (if in a turn), and apply additional power, if needed.

(7) Avoid extending flaps during prolonged operation in icing conditions. Operation with flaps extended can result in a reduced wing angle of attack, with ice forming on the upper surface further aft on the wing than normal, possibly aft of the protected area.

(8) If the flaps are extended, do not retract them until the airframe is clear of ice.

(9) Report these weather conditions to air traffic control.

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4A. NORMAL OPERATING PROCEDURES

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 the 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, turning back, or even continuing on the same course if clear air is known to be immediately ahead.

WARNING

Flight in freezing rain, freezing drizzle, or mixed phase icing conditions (supercooled water and ice crystals) may result in hazardous ice build-up on protected surfaces exceeding the capability of the ice protection system, or may result in ice forming aft of the protected surfaces. This ice may not be shed using the ice protection systems, and it may seriously degrade the performance and controllability of the airplane.

WARNING

The autopilot will not maintain airspeed with ice on the airplane. Monitor speed closely.

CAUTION

Do not delay activation of the ice protection system if icing conditions are encountered. The system must be activated prior to accumulation of ice on protected surfaces.

Identification of Icing Conditions

The following indications shall be used to identify icing conditions:

Visible moisture at or below an indicated outside air temperature of 5 °C (41 °F).

The earliest indication of ice formation on the airplane are:

(1) Spinner.

(2) Vortex generators.

(3) Center wing leading edge.

(4) Windshield.

Secondary indications are:

(1) Wing leading edge.

(2) Winglet leading edge.

(3) Engine inlet (RH side).

At night, the ice light is used to illuminate the outer wing leading edge, and the vortex generators.

Identification of Freezing Rain/Freezing Drizzle Icing Conditions

The following shall be used to identify freezing rain/freezing drizzle icing conditions:

(1) Unusually extensive ice accreted on the airframe in areas not normally observed to collect ice.

(2) Accumulation of ice on the upper surface of the wing, aft of the protected area.

(3) Accumulation of ice on the propeller spinner farther back than normally observed.

(4) Ice accretion on the side window areas.

Identification of Possible Freezing Rain/Freezing Drizzle Conditions

The following may be used to identify possible freezing rain/freezing drizzle conditions:

(1) Visible rain at temperatures below +5 °C (41 °F) outside air temperature (OAT).

(2) Droplets that splash or splatter on impact at temperatures below +5 °C (41 °F) OAT.

(3) Performance losses larger than normally encountered in icing conditions. It is possible to experience severe ice accretions not visible to the flight crew, such as wing lower surface accretion or propeller blade accretion.

NOTE

Procedures for exiting freezing rain/freezing drizzle conditions are given in Section 3.15.3 - PROCEDURES FOR EXITING THE FREEZING RAIN/FREEZING DRIZZLE ENVIRONMENT.

4A.2 AIRSPEEDS FOR NORMAL OPERATING PROCEDURES

With residual ice on protected surfaces and/or ice accumulation on the unprotected areas of the airplane:

	Flaps	Speed [KIAS]	
		up to 1999 kg (4407 lb)	above 1999 kg (4407 lb)
Reference landing approach speed	UP	97 KIAS	101 KIAS
	T/O	90 KIAS	96 KIAS
Final approach speed	T/O	90 KIAS	96 KIAS

4A.6 CHECKLISTS FOR NORMAL OPERATING PROCEDURES

CAUTION

It is extremely important to visually inspect each TKS panel for proper fluid distribution across the active area of each panel prior to flight into known icing.

4A.6.1 PRE-FLIGHT INSPECTION

I. Cabin Check

Ice protection system

1. ELECT. MASTER . . . . . ON
2. DE-ICE FLUID . . . . . check quantity
3. Doors . . . . . closed

WARNING

De-icing fluids are harmful. For proper handling, refer to the Material Safety Data Sheets, which are available from the supplier of the de-icing fluid.

4. WINDSHIELD . . . . . press push button
5. 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 reestablish full system function, special maintenance action is required.

6. ANNUN-TEST . . . . . ON

NOTE

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

7. DEIC PRES HI. . . . . verify NOT ILLUMINATED
8. DEICE LVL LO. . . . . check, must be annunciated if de-icing fluid quantity is below 11 liter (2.9 US gal)
9. DEIC PRES LO . . . . . check, ILLUMINATED (refer to NOTE below)
10. ANNUN-TEST . . . . . OFF
11. PUMP 1 . . . . . select
12. DE-ICE . . . . . HIGH
13. DEIC PRES LO . . . . . verify NOT ILLUMINATED

CONTINUED

NOTE

The ice protection system is approved for operation with de-icing fluid that has a very temperature dependant viscosity characteristic. The viscosity decreases with rising temperature above 0 °C (32 °F) and passes through the porous membrane of the panels with less resistance. This decrease in pressure drop reduces the pressure in the panel reservoir, which may not be adequate to wet-out the entire panel active area if the preflight inspection is performed at warmer outside temperatures.

NOTE

If at ambient temperatures above 10 °C (50 °F) and below 20 °C (68 °F) DEIC PRES LO warning appears in HIGH mode, switch to MAX mode to cancel the warning. Above 20 °C (68 °F) ambient temperature, warning cancellation may not be possible.

14. PUMP 2 . . . . . select
15. ICE LIGHT . . . . . ON
16. Ice lights . . . . . visual inspection, check
17. DEIC PRES HI . . . . . verify NOT ILLUMINATED
18. DEIC PRES LO . . . . . verify NOT ILLUMINATED
19. DE-ICE . . . . . OFF
20. ICE LIGHT . . . . . OFF
21. ELECT. MASTER . . . . . OFF

END OF CHECKLIST

II. Walk-Around Check, Visual Inspection

Ice protection system

1. De-icing fluid tank . . . . . visually check quantity through filler cap on top of the LH fuselage nose (baggage compartment)
2. Filler cap . . . . . secure
3. Inspection door . . . . . check closed
4. Deflector and spraybar . . . . . visually check, no holes blocked
5. Porous panels on wings . . . . . visually check no damage, and no holes blocked, evidence of de-icing fluid along entire porous panel active area

NOTE

If required, activate DE-ICE on MAX until fluid is evident along entire porous panel active area.

6. Porous panels on horizontal & vertical tail . . . visually check no damage, and no holes blocked, evidence of de-icing fluid along entire porous panel active area
7. Slinger rings, and/or nozzle at propeller . . . . . visually check no damage, and no holes blocked, evidence of de-icing fluid on slinger ring
8. 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 taxi.

4A.6.6 BEFORE TAKE-OFF

If icing conditions are anticipated immediately after take-off

1. DE-ICE . . . . . NORM
2. Pitot heating . . . . . ON
3. ICE LIGHT . . . . . ON, as required
4. Cabin heat & defrost . . . . . ON

END OF CHECKLIST

4A.6.8 CLIMB

Before entering icing conditions, or if icing conditions do exist

1. DE-ICE . . . . . NORM, monitor ice build-up, HIGH if no shedding, or to prevent excessive ice build-up

If no shedding in HIGH mode

2. Proceed with AFM Section 3.15.2 - INADVERTENT ICING ENCOUNTER & EXCESSIVE ICE ACCUMULATION.

CONTINUED

While in icing conditions

3. Airspeed . . . . . maintain:
   89 KIAS up to 1999 kg (4407 lb)
   96 KIAS above 1999 kg (4407 lb)
4. Pitot heating. . . . . check ON
5. ICE LIGHT . . . . . ON, as required
6. Cabin heat & defrost . . . . . check ON
7. WINDSHIELD . . . . . press push button, as required
8. De-icing fluid level . . . . . check periodically

NOTE

The autopilot may be used in icing conditions. However, every 10-15 minutes, the autopilot should be disconnected to detect any out-of-trim conditions caused by ice build-up. If significant out of trim conditions are detected, the autopilot should remain off for the remainder of the icing encounter so that the pilot may monitor for additional force build-up.

After leaving icing conditions

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

END OF CHECKLIST

4A.6.9 CRUISE

Before entering icing conditions, or if icing conditions do exist

1. DE-ICE . . . . . NORM, monitor ice build-up, HIGH if no shedding, or to prevent excessive ice build-up

If no shedding in HIGH mode

2. Proceed with AFM Section 3.15.2 - INADVERTENT ICING ENCOUNTER & EXCESSIVE ICE ACCUMULATION.

While in icing conditions

3. Pitot heating . . . . . check ON
4. ICE LIGHT . . . . . ON, as requried
5. Cabin heat & defrost . . . . . check ON
6. WINDSHIELD . . . . . press push button, as required
7. De-icing fluid level . . . . . check periodically
8. Airspeed . . . . . maintain:
   89 KIAS up to 1999 kg (4407 lb)
   96 KIAS above 1999 kg (4407 lb)
   to 154 KIAS or 172 KTAS

WARNING

When disconnecting the autopilot with ice accretions on the airplane, the pilot should be alert for out-of-trim forces. Pilot control stick input should be applied as required to prevent potential undesired flight path deviations.

CONTINUED

NOTE

The autopilot may be used in icing conditions. However, every 10-15 minutes, the autopilot should be disconnected to detect any out-of-trim conditions caused by ice build-up. If significant out-of-trim conditions are detected, the autopilot should remain off for the remainder of the icing encounter so that the pilot may monitor for additional force build-up.

After leaving icing conditions

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

END OF CHECKLIST

4A.6.11 APPROACH AND LANDING

Before entering icing conditions, or if icing conditions do exist

1. DE-ICE . . . . . NORM, monitor ice build-up, HIGH if no shedding, or to prevent excessive ice build-up

If no shedding in HIGH mode

2. Proceed with AFM Section 3.15.2 - INADVERTENT ICING ENCOUNTER & EXCESSIVE ICE ACCUMULATION.

While in icing conditions

3. ICE LIGHT . . . . . ON, as required

CONTINUED

4. WINDSHIELD . . . . . press push button, as required

NOTE

De-icing fluid will remain on the windshield for a period after operating windshield de-ice. Stop operating the windshield de-ice 30 seconds before landing for an unobstructed view.

5. Airspeed up to 1999 kg (4407 lb) . . . . . minimum:
   97 KIAS (FLAPS UP)
   90 KIAS (FLAPS T/O)
   Airspeed above 1999 kg (4407 lb) . . . . . minimum:
   101 KIAS (FLAPS UP)
   96 KIAS (FLAPS T/O)
6. FLAPS . . . . . UP or T/O, as required
7. PITOT HEAT . . . . . ON

Before landing

8. FLAPS . . . . . T/O
9. Final approach speed . . . . . minimum:
   90 KIAS up to 1999 kg (4407 lb)
   96 KIAS above 1999 kg (4407 lb)

END OF CHECKLIST

4A.6.13 AFTER LANDING

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

END OF CHECKLIST

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 doors, as they may be partially contaminated with de-icing fluid.

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

Intentionally left blank.

4B. ABNORMAL OPERATING PROCEDURES

4B.3 CAUTION-ALERTS ON THE G1000

4B.3.6 L/R ALTN FAIL

L/R ALTN FAIL	Left/Right engine alternator has failed.

(a) One Alternator Failed

1. Icing conditions . . . . . leave the icing area as soon as practicable
2. Proceed in accordance with the procedure given in AFM Section 4B.3.6 - L/R ALTN FAIL.

4B.3.15 DEIC PRES LO

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

CONTINUED

If DEIC PRES LO indication still does not extinguish on the G1000

4. Proceed with Section 3.15.1 - FAILURE OF THE ICE PROTECTION SYSTEM.

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

5. DE-ICE fluid flow in ALTERNATE similar to HIGH mode.
6. Ice protection system . . . . . monitor operation
7. De-icing fluid level . . . . . check periodically

CAUTION

If at ambient temperature above 10 °C (50 °F) and below 20 °C (68 °F) DEIC PRES LO warning appears in HIGH mode, switch to MAX mode to cancel the warning. Above 20 °C (68 °F) ambient temperature, warning cancellation may not be possible.

END OF CHECKLIST

4B.3.16 DEIC PRES HI

DEIC PRES HI	De-icing pressure is high.

1. Icing conditions . . . . . leave the icing area as soon as possible

NOTE

Reduced system performance may occur. Unscheduled maintenance is required.

4B.3.17 DEICE LVL LO

DEICE LVL LO	De-icing fluid level is low.

Maximum remaining system operating times after first annunciation of the DEICE LVL LO caution message:

NORM mode . . . . . 45 min.
HIGH mode . . . . . 20 min.

4B.3.18 FAILURE OF THE 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.
2. Unscheduled maintenance is required after flight.

4B.3.19 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 viewing through the unobstructed areas on the side of the door windows. Open the emergency window if necessary.
2. Use DEFROST to clear light ice formation.

4B.4 FAILURES IN FLAP OPERATING SYSTEM

Failure in Position Indication or Function

1. FLAPS position . . . . . check visually
2. FLAPS switch . . . . . re-check flap positions

END OF CHECKLIST

Modified Approach Procedure Depending on the Available Flap Setting

NOTE

Refer to the Landing Distance - Abnormal Flap Position tables under AFM Section 5.3.12 - LANDING DISTANCES, and increase the distances by 30%.

Before landing, with residual ice on any visible surfaces, or if icing conditions do exist

Airspeed up to 1999 kg (4407 lb) . . . . . min. 97 KIAS
Airspeed above 1999 kg (4407 lb) . . . . . min. 101 KIAS

Land at a flat approach angle, use power lever to control airplane speed and rate of descent.

END OF CHECKLIST

5. PERFORMANCE

5.1 INTRODUCTION

Airplane performance and stall speeds in clear air are unchanged with the installation of the ice protection system.

Significant climb and cruise performance degradation, range reduction, 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 beyond those stated in this section, even with the ice protection system operating.

5.3 PERFORMANCE TABLES AND DIAGRAMS

The performance data in this supplement is valid for ice accumulation on unprotected surfaces in the maximum continuous icing conditions defined by CS 25/FAR Part 25, Appendix C.

NOTE

Known icing conditions are defined by CS 25/FAR Part 25, Appendix C. These conditions do not include, nor were tests conducted in all icing conditions that may be encountered (e.g. supercooled clouds, freezing rain, freezing drizzle, mixed phase icing conditions, or conditions defined as severe). Flight in these conditions must be avoided. Some icing conditions not defined in CS 25/FAR part 25 have the potential of producing hazardous ice accumulations, which (1) exceed the capabilities of the airplane's ice protection equipment, and/or (2) create unacceptable airplane performance.

5.3.4 STALLING SPEEDS

Airspeeds in KIAS at idle power:

1999 kg (4407 lb)		Bank Angle							
		0°		30°		45°		60°	
Gear	Flaps	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
UP	UP	73	72	79	78	87	86	103	102
DOWN	T/O	70	68	76	74	82	81	98	97

2300 kg (5071 lb)		Bank Angle							
		0°		30°		45°		60°	
Gear	Flaps	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS	KIAS	KCAS
UP	UP	76	75	82	81	91	90	108	107
DOWN	T/O	74	72	79	78	87	86	103	102

5.3.8 CLIMB PERFORMANCE - CRUISE CLIMB

Cruise Climb with 45 Min. Ice Accretion							
Flaps: UP						**Power: 95%**	
V_{climb}: 95 KIAS (up to 1999 kg)						**Gear: retracted**	
V_{climb}: 101 KIAS (above 1999 kg)							
Weight [kg] / [lb]	**Press. Alt. [ft]**	**Press. Alt.** [m]	**Rate of Climb - [ft/min]**				
			Outside Air Temperature - [°C] / [°F]				**ISA**
			-20 -4	**-10** 14	**0** 32	**10** 50	
2300 / 5071	**SL**		880	870	860	850	849
	2000	610	830	810	800	790	791
	4000	1219	760	750	740	730	732
	6000	1829	700	690	680	670	674
	8000	2438	640	620	610	590	610
	10000	3048	570	550	540	520	543
	12000	3658	490	480	460	420	475
	14000	4267	380	350	310	250	360
	16000	4877	230	200	150	90	220
	18000	5486	70	40	0	-50	70
	20000	6096	-80	-110	-150	-210	-66
2200 / 4850	**SL**		940	930	920	910	908
	2000	610	880	870	860	850	848
	4000	1219	820	810	790	780	787
	6000	1829	750	740	730	720	727
	8000	2438	690	670	660	640	660
	10000	3048	620	600	580	570	591
	12000	3658	540	520	500	460	521
	14000	4267	420	390	350	290	402
	16000	4877	270	240	190	120	257
	18000	5486	100	70	20	-30	100
	20000	6096	-50	-80	-120	-190	-41

Cruise Climb with 45 min. Ice Accretion							
Flaps: UP					**Power: 95%**		
V_{climb}: 95 KIAS (up to 1999 kg)					**Gear: retracted**		
V_{climb}: 101 KIAS (above 1999 kg)							
Weight [kg] / [lb]	**Press. Alt. [ft]**	**Press. Alt. [m]**	**Rate of Climb - [ft/min]**				
			Outside Air Temperature - [°C] / [°F]				**ISA**
			-20 -4	**-10** 14	**0** 32	**10** 50	
2100 / 4630	**SL**		1000	1000	990	980	971
	2000	610	940	930	920	910	909
	4000	1219	880	870	850	840	846
	6000	1829	810	800	790	770	783
	8000	2438	740	730	710	700	715
	10000	3048	670	650	640	620	643
	12000	3658	590	570	550	510	571
	14000	4267	470	440	390	330	446
	16000	4877	310	270	220	150	295
	18000	5486	130	100	50	0	132
	20000	6096	-30	-60	-100	-170	-15
1999 / 4407	**SL**		1110	1100	1100	1090	1085
	2000	610	1050	1040	1040	1030	1027
	4000	1219	990	980	970	960	961
	6000	1829	920	910	900	890	895
	8000	2438	850	840	830	810	827
	10000	3048	780	770	750	740	758
	12000	3658	700	690	660	620	685
	14000	4267	580	550	510	450	557
	16000	4877	420	390	340	270	407
	18000	5486	240	210	170	120	246
	20000	6096	80	60	20	-50	97

Cruise Climb with 45 min. Ice Accretion							
Flaps: UP					**Power: 95%**		
V_{climb}: 95 KIAS (up to 1999 kg) **V_{climb}: 101 KIAS (above 1999 kg)**					**Gear: retracted**		
Weight [kg] / [lb]	**Press. Alt. [ft]**	**Press. Alt.** [m]	**Rate of Climb - [ft/min]**				
			Outside Air Temperature - [°C] / [°F]				**ISA**
			-20 -4	**-10** 14	**0** 32	**10** 50	
1900 / 4189	**SL**		1190	1180	1170	1160	1158
	2000	610	1120	1110	1110	1100	1097
	4000	1219	1060	1050	1040	1020	1028
	6000	1829	990	980	960	950	960
	8000	2438	920	900	890	870	889
	10000	3048	840	820	810	790	817
	12000	3658	760	740	720	670	741
	14000	4267	630	600	550	490	607
	16000	4877	460	430	380	310	451
	18000	5486	280	250	200	150	282
	20000	6096	110	90	40	-20	126
1800 / 3968	**SL**		1260	1260	1250	1240	1237
	2000	610	1200	1190	1180	1170	1174
	4000	1219	1130	1120	1110	1100	1102
	6000	1829	1060	1050	1030	1020	1030
	8000	2438	980	970	950	940	956
	10000	3048	900	890	870	860	881
	12000	3658	820	800	780	730	802
	14000	4267	680	650	610	540	661
	16000	4877	510	480	420	350	497
	18000	5486	320	280	240	180	320
	20000	6096	140	110	70	0	156

Dark shaded areas indicate a climb rate of less than 50 ft/min.
For the rate of climb in [m/s] divide by 196.8 or multiply by 0.00508.

5.3.9 ONE ENGINE INOPERATIVE CLIMB PERFORMANCE

With residual ice on protected surfaces, and/or ice accumulation on the unprotected areas of the airplane, or if icing conditions do exist.

NOTE

Due to ice build-up on unprotected areas and/or residual ice on the airplane, a positive rate of climb cannot be expected.

One Engine Inoperative Climb with 45 min. Ice Accretion							
Flaps: UP					**Power: 95%**		
v_Y: 89 KIAS (up to 1999 kg) **v_Y: 97 KIAS (above 1999 kg)**					**Gear: retracted**		
Weight [kg] / [lb]	**Press. Alt. [ft]**	**Press. Alt.** [m]	**Rate of Climb - [ft/min]**				
			Outside Air Temperature - [°C] / [°F]				
			-20 -4	**-10** 14	**0** 32	**10** 50	**ISA**
2300 / 5071	**SL**		-55	-65	-80	-90	-93
	2000	610	-75	-90	-100	-115	-116
	4000	1219	-100	-115	-130	-140	-139
	6000	1829	-130	-145	-160	-175	-164
	8000	2438	-160	-175	-195	-210	-193
	10000	3048	-195	-215	-235	-255	-225
	12000	3658	-235	-255	-280	-325	-259
	14000	4267	-315	-345	-390	-445	-336
	16000	4877	-425	-460	-505	-575	-435
	18000	5486	-550	-585	-630	-685	-545
	20000	6096	-665	-700	-745	-810	-648

One Engine Inoperative Climb with 45 min. Ice Accretion

Flaps: UP **Power: 95%**

v_Y: 89 KIAS (up to 1999 kg)

v_Y: 97 KIAS (above 1999 kg) **Gear: retracted**

Weight [kg] / [lb]	Press. Alt. [ft]	Press. Alt. [m]	Rate of Climb - [ft/min]				
			Outside Air Temperature - [°C] / [°F]				ISA
			-20 -4	**-10** 14	**0** 32	**10** 50	
2200 / 4850	**SL**		15	5	-5	-15	-20
	2000	610	-5	-15	-25	-40	-41
	4000	1219	-25	-40	-55	-65	-62
	6000	1829	-55	-65	-80	-100	-86
	8000	2438	-80	-100	-115	-135	-114
	10000	3048	-115	-135	-155	-170	-145
	12000	3658	-155	-175	-200	-240	-177
	14000	4267	-235	-265	-305	-365	-255
	16000	4877	-345	-380	-430	-495	-355
	18000	5486	-470	-505	-555	-610	-468
	20000	6096	-590	-625	-670	-735	-571
2100 / 4630	**SL**		90	80	70	65	59
	2000	610	75	65	55	40	40
	4000	1219	55	40	30	15	19
	6000	1829	30	15	0	-15	-3
	8000	2438	0	-15	-30	-50	-30
	10000	3048	-30	-50	-70	-85	-60
	12000	3658	-70	-90	-115	-155	-90
	14000	4267	-150	-175	-220	-280	-169
	16000	4877	-260	-295	-345	-410	-270
	18000	5486	-385	-425	-470	-525	-385
	20000	6096	-505	-540	-585	-655	-490

One Engine Inoperative Climb with 45 Min. Ice Accretion							
Flaps: UP					**Power: 95%**		
v_Y: 89 KIAS (up to 1999 kg) **v_Y: 97 KIAS (above 1999 kg)**					**Gear: retracted**		
Weight [kg] / [lb]	**Press. Alt. [ft]**	**Press. Alt.** [m]	**Rate of Climb - [ft/min]**				
			Outside Air Temperature - [°C] / [°F]				
			-20 -4	**-10** 14	**0** 32	**10** 50	**ISA**
1999 / 4407	**SL**		130	125	120	110	106
	2000	610	120	110	100	90	91
	4000	1219	100	90	85	70	74
	6000	1829	85	70	60	45	53
	8000	2438	60	45	30	15	32
	10000	3048	30	15	-5	-20	4
	12000	3658	-5	-20	-45	-85	-25
	14000	4267	-80	-105	-150	-210	-100
	16000	4877	-185	-220	-270	-335	-198
	18000	5486	-315	-345	-395	-450	-310
	20000	6096	-430	-460	-505	-575	-413
1900 / 4189	**SL**		215	215	210	200	195
	2000	610	210	200	190	185	183
	4000	1219	190	185	175	165	167
	6000	1829	175	165	150	140	148
	8000	2438	150	140	125	110	128
	10000	3048	125	110	95	80	102
	12000	3658	95	75	55	15	75
	14000	4267	20	-10	-50	-110	-1
	16000	4877	-90	-125	-175	-240	-101
	18000	5486	-220	-250	-300	-355	-216
	20000	6096	-335	-370	-415	-485	-320

One Engine Inoperative Climb with 45 min. Ice Accretion

Flaps: UP **Power: 95%**

v_Y: 89 KIAS (up to 1999 kg)

v_Y: 97 KIAS (above 1999 kg) **Gear: retracted**

Weight [kg] / [lb]	Press. Alt. [ft]	Press. Alt. [m]	Rate of Climb - [ft/min]				
			Outside Air Temperature - [°C] / [°F]				
			-20 -4	**-10** 14	**0** 32	**10** 50	**ISA**
1800 / 3968	**SL**		310	305	305	295	292
	2000	610	305	295	290	285	282
	4000	1219	290	280	275	265	268
	6000	1829	275	265	255	245	251
	8000	2438	255	245	230	215	232
	10000	3048	230	215	200	185	208
	12000	3658	200	185	160	125	182
	14000	4267	125	100	55	-5	106
	16000	4877	15	-20	-70	-140	3
	18000	5486	-115	-150	-200	-255	-114
	20000	6096	-235	-270	-315	-385	-220

Dark shaded areas indicate a climb rate of less than 50 ft/min.

For the rate of climb in [m/s] divide by 196.8 or multiply by 0.00508.

5.3.10 TIME, FUEL, AND DISTANCE TO CLIMB

NOTE

Performance information not published for icing conditions.

5.3.11 CRUISE PERFORMANCE

With residual ice on protected surfaces, and/or ice accumulation on the unprotected areas of the airplane, or if icing conditions do exist:

Cruise Performance up to 1999 kg (4407 lb)									
Press. Alt. [ft] / [m]	Outside Air Temperature - [°C]								
	ISA-10			ISA			ISA+10		
	Pwr [%]	FF [US gal/h]	TAS [kt]	Pwr [%]	FF [US gal/h]	TAS [kt]	Pwr [%]	FF [US gal/h]	TAS [kt]
2000 610	95	19.3	146	95	19.3	147	95	19.3	149
	75	14.8	132	75	14.8	134	75	14.8	135
	60	11.8	121	60	11.8	122	60	11.8	123
	45	9.0	105	45	9.0	106	45	9.0	107
4000 1219	95	19.3	148	95	19.3	150	95	19.3	152
	75	14.8	135	75	14.8	136	75	14.8	138
	60	11.8	123	60	11.8	124	60	11.8	125
	45	9.0	107	45	9.0	108	45	9.0	109
6000 1829	95	19.3	151	95	19.3	153	95	19.3	155
	75	14.8	137	75	14.8	139	75	14.8	140
	60	11.8	125	60	11.8	126	60	11.8	128
	45	9.0	108	45	9.0	109	45	9.0	110
8000 2438	95	19.3	154	95	19.3	156	95	19.3	158
	75	14.8	140	75	14.8	141	75	14.8	143
	60	11.8	127	60	11.8	129	60	11.8	130
	45	9.0	110	45	9.0	111	50	9.8	119
10000 3048	95	19.3	157	95	19.3	159	95	19.3	161
	75	14.8	143	75	14.8	144	75	14.8	146
	60	11.8	129	60	11.8	131	60	11.8	132
	45	8.9	112	50	9.8	120	50	9.8	121
12000 3658	95	19.3	160	95	19.3	162	95	19.2	163
	75	14.8	145	75	14.8	147	75	14.8	148
	60	11.8	132	60	11.8	133	60	11.8	135
	50	9.7	121	50	9.7	122	50	9.7	123
14000 4267	95	18.7	161	95	18.5	162	95	18.1	163
	75	14.8	148	75	14.8	150	75	14.8	151
	60	11.8	134	60	11.8	136	60	11.8	137
	50	9.7	122	50	9.7	124	50	9.7	125
16000 4877	95	17.3	161	87	17.1	162	85	16.7	162
	75	14.8	151	75	14.8	152	75	14.8	154
	60	11.8	136	60	11.8	138	60	11.8	139
	50	9.7	124	50	9.7	125	55	10.7	133
18000 5486	80	15.7	158	80	15.7	159	80	15.7	161
	75	14.8	153	75	14.8	155	75	14.8	157
	60	11.8	139	60	11.8	140	60	11.8	141
	55	10.7	133	55	10.7	134	55	10.7	135
20000 6096	75	14.8	156	75	14.8	158	70	13.9	155
	60	11.8	141	60	11.8	142	60	11.8	144

Cruise Performance above 1999 kg (4407 lb) up to 2300 kg (5071 lb)									
Press. Alt. [ft] / [m]	Outside Air Temperature - [°C]								
	ISA-10			ISA			ISA+10		
	Pwr [%]	FF [US gal/h]	TAS [kt]	Pwr [%]	FF [US gal/h]	TAS [kt]	Pwr [%]	FF [US gal/h]	TAS [kt]
2000 610	95	19.3	144	95	19.3	145	95	19.3	147
	75	14.8	130	75	14.8	131	75	14.8	133
	60	11.8	117	60	11.8	118	60	11.8	119
	45	9.0	99	45	9.0	100	45	9.0	101
4000 1219	95	19.3	146	95	19.3	148	95	19.3	149
	75	14.8	132	75	14.8	134	75	14.8	135
	60	11.8	119	60	11.8	120	60	11.8	121
	45	9.0	101	45	9.0	101	45	9.0	102
6000 1829	95	19.3	149	95	19.3	151	95	19.3	152
	75	14.8	134	75	14.8	136	75	14.8	137
	60	11.8	121	60	11.8	122	60	11.8	123
	45	9.0	102	45	9.0	102	45	9.0	103
8000 2438	95	19.3	152	95	19.3	153	95	19.3	155
	75	14.8	137	75	14.8	138	75	14.8	140
	60	11.8	123	60	11.8	124	60	11.8	125
	45	9.0	103	45	9.0	103	50	9.8	112
10000 3048	95	19.3	154	95	19.3	156	95	19.3	158
	75	14.8	139	75	14.8	141	75	14.8	142
	60	11.8	125	60	11.8	126	60	11.8	127
	45	8.9	104	50	9.8	113	50	9.8	114
12000 3658	95	19.3	157	95	19.3	159	95	19.2	160
	75	14.8	142	75	14.8	143	75	14.8	144
	60	11.8	127	60	11.8	128	60	11.8	129
	50	9.7	113	50	9.7	114	50	9.7	115
14000 4267	95	18.7	158	95	18.5	159	95	18.1	160
	75	14.8	144	75	14.8	146	75	14.8	147
	60	11.8	129	60	11.8	130	60	11.8	131
	50	9.7	114	50	9.7	115	50	9.7	115
16000 4877	95	17.3	157	87	17.1	158	85	16.7	158
	75	14.8	146	75	14.8	148	75	14.8	149
	60	11.8	131	60	11.8	132	60	11.8	132
	50	9.7	115	50	9.7	116	55	10.7	125
18000 5486	80	15.7	153	80	15.7	155	80	15.7	156
	75	14.8	149	75	14.8	150	75	14.8	151
	60	11.8	132	60	11.8	133	60	11.8	134
	55	10.7	125	55	10.7	126	55	10.7	126
20000 6096	75	14.8	151	75	14.8	153	70	13.9	148
	60	11.8	134	60	11.8	135	60	11.8	135

5.3.12 LANDING DISTANCES

With residual ice on the protected surfaces and/or ice accumulation on the unprotected areas of the airplane, or if icing conditions do exist:

* Power lever . . . . . both IDLE
* Flaps . . . . . T/O

Use the abnormal flap position information from the main part of the AFM.

5.3.13 GO-AROUND CLIMB PERFORMANCE

Go-Around Climb Performance							
Flaps: T/O					**Power: MAX**		
V_{ref}: 90 KIAS (up to 1999 kg) : 96 KIAS (above 1999 kg)					**Gear: extended**		
Weight [kg] / [lb]	**Press. Alt. [ft]**	**Press. Alt.** [m]	**Rate of Climb - [ft/min]**				
			Outside Air Temperature - [°C] / [°F]				**ISA**
			-20 -4	**-10** 14	**0** 32	**10** 50	
2300 / 5071	**SL**		495	480	470	455	448
	2000	610	470	455	440	425	425
	4000	1219	440	425	410	395	402
	6000	1829	410	395	380	360	372
	8000	2438	380	360	340	310	340
	10000	3048	340	315	280	240	301
2200 / 4850	**SL**		540	525	510	495	489
	2000	610	510	495	480	465	466
	4000	1219	480	465	450	440	442
	6000	1829	455	435	415	400	411
	8000	2438	420	395	380	350	379
	10000	3048	375	355	315	275	340
2100 / 4630	**SL**		585	570	555	540	533
	2000	610	555	540	525	510	509
	4000	1219	525	510	495	480	485
	6000	1829	495	480	460	440	454
	8000	2438	460	440	420	390	421
	10000	3048	420	395	355	315	380
For the rate of climb in [m/s] divide by 196.8 or multiply by 0.00508.							

Go-Around Climb Performance							
Flaps: T/O					**Power: MAX**		
V_{ref}: 90 KIAS (up to 1999 kg) : **96 KIAS (above 1999 kg)**					**Gear: extended**		
Weight [kg] / [lb]	**Press. Alt. [ft]**	**Press. Alt.** [m]	**Rate of Climb - [ft/min]**				
			Outside Air Temperature - [°C] / [°F]				**ISA**
			-20 -4	**-10** 14	**0** 32	**10** 50	
1999 / 4407	**SL**		715	705	695	685	677
	2000	610	700	685	670	655	654
	4000	1219	670	655	640	625	631
	6000	1829	640	625	610	595	606
	8000	2438	610	595	580	550	580
	10000	3048	580	560	515	475	541
1900 / 4189	**SL**		770	760	750	740	731
	2000	610	750	740	725	710	708
	4000	1219	725	710	695	680	684
	6000	1829	695	680	665	645	658
	8000	2438	665	645	630	605	632
	10000	3048	630	610	565	525	592
1800 / 3968	**SL**		830	820	810	795	790
	2000	610	810	795	780	765	766
	4000	1219	785	765	750	735	741
	6000	1829	750	735	720	705	715
	8000	2438	720	705	685	660	688
	10000	3048	685	665	620	575	646
For the rate of climb in [m/s] divide by 196.8 or multiply by 0.00508.							

5.3.15 SYSTEM OPERATING TIMES AND FLUID CONSUMPTION

The maximum system fluid consumption and operation times with the maximum usable quantity of de-icing fluid are at least:

NORM mode: max. 14.4 L/h (3.8 US gal/h): 150 min.

HIGH mode: max. 28.8 L/h (7.6 US gal/h): 75 min.

The de-icing fluid consumption per activation is approximately:

MAX mode: 1.8 L (0.5 US gal)

WINDSHIELD: 40 mL (1.5 fl. oz.)

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 (if OÄM 62-003 is carried out)	0.90	35.4

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)

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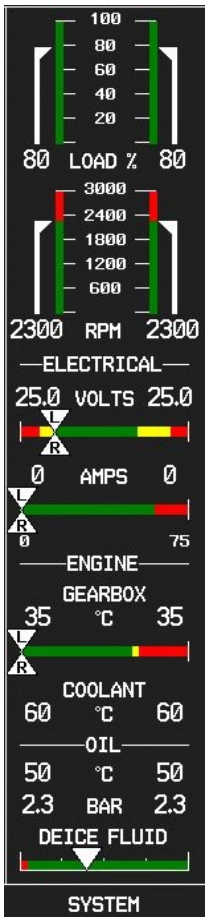
7. DESCRIPTION OF THE AIRPLANE AND ITS SYSTEMS

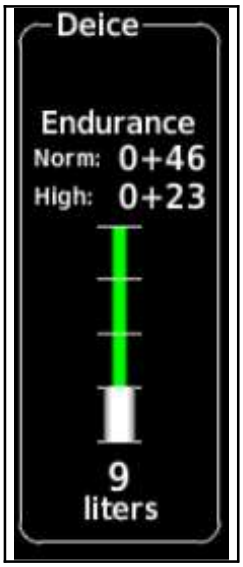
7.9 POWER PLANT

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 (36 liters or 9.5 US gal).

Displayed by pushing the SYSTEM button:





Left: if MÄM 62-254 is NOT installed. Right: If MÄM 62-254 and OÄM 62-003 are installed. Displayed on the second page.

7.10 ELECTRICAL SYSTEM

7.10.3 WARNING, CAUTION, AND ADVISORY MESSAGES

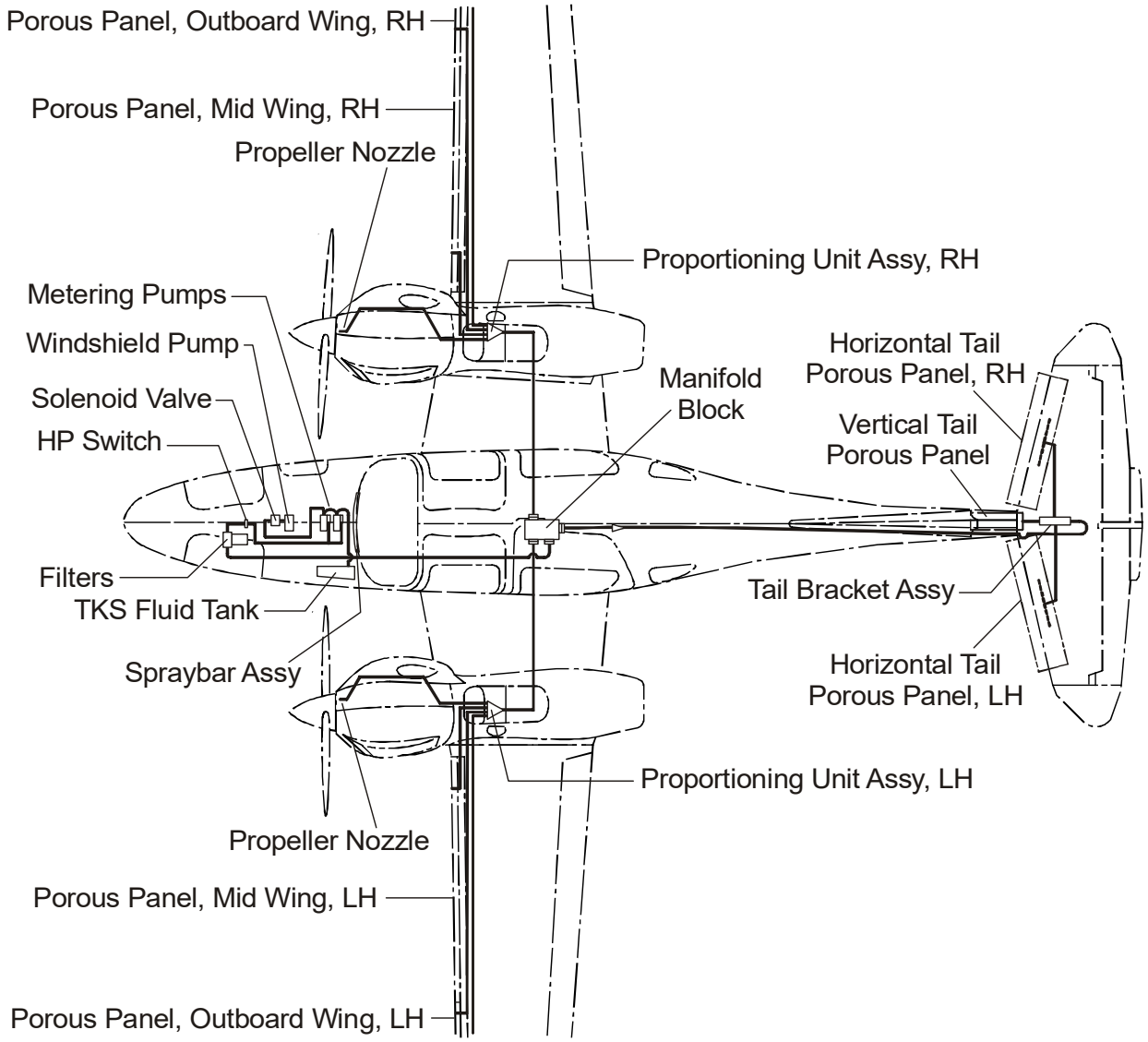
Caution Alerts on the G1000

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 11 liters (2.9 US gal).

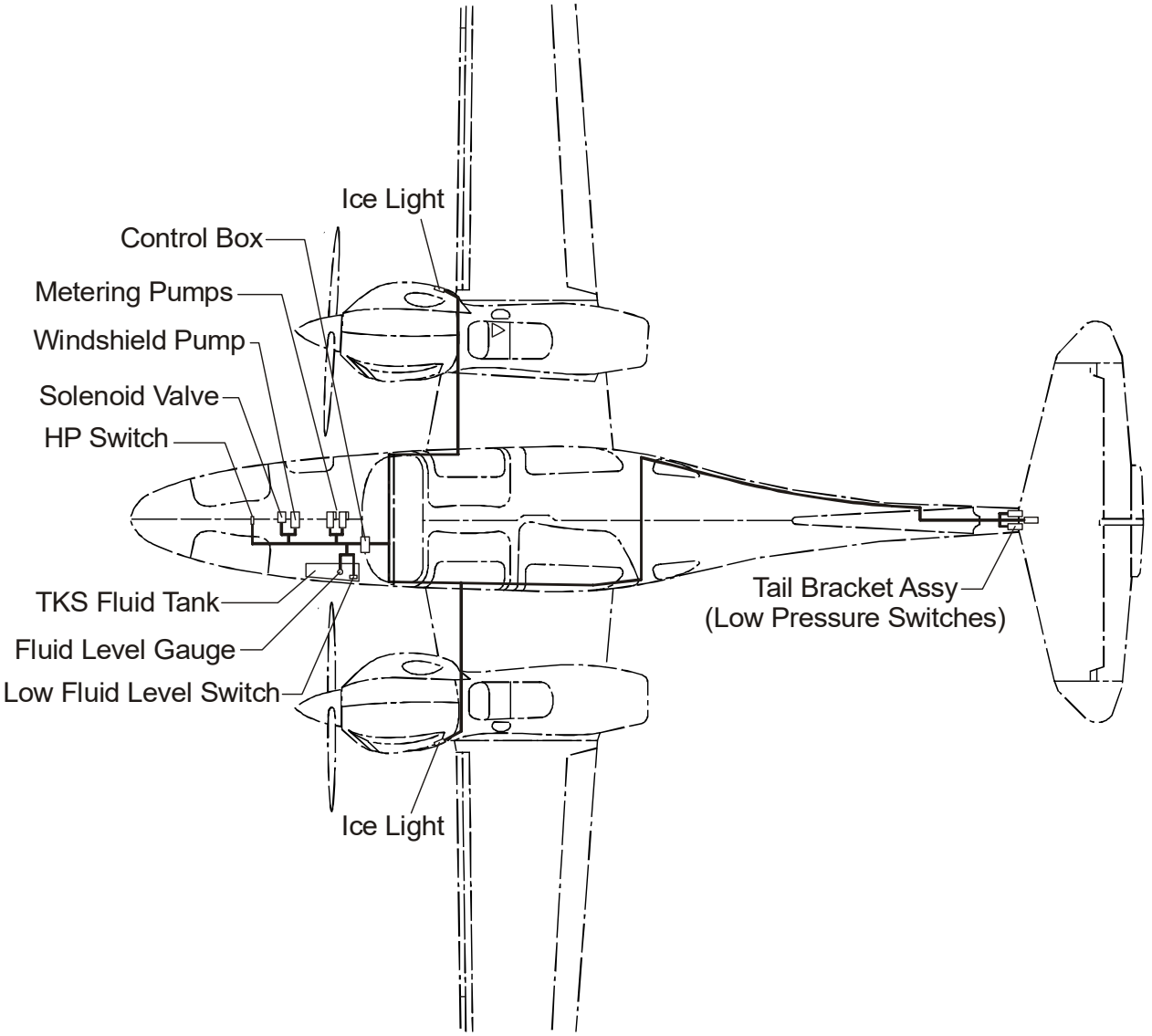
7.16 DE-ICING SYSTEM

Description

The ice protection system is electrically operated. It is supplied with power via the 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 37 liters (9.8 US gal) and is installed in the nose compartment of the airplane, on the LH 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 fluid level gauge provides data for the de-icing fluid level indication on the G1000 system.

An independent low level sensor in the tank provides indication of low fluid level (11 L) and max remaining system operation time, depending on the system mode.

* Two main pumps, installed in the nose compartment of the airplane, under an inspection lid on the LH 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 mode 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:

- The de-icing fluid filter, installed in the nose compartment of the airplane next to fluid tank mounted on the frame. The active main pump feeds the de-icing fluid through the filter to the proportioning units. The filters prevent the proportioning units from contamination.
- 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. Each panel contains a porous membrane and a cavity aloing the porous front plate (active area) that serves as a reservoir. 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 of this supplement.

- One high pressure sensor which activates an indication when the filter cartridges need to be replaced. Refer to Section 7.10 of this supplement.

* The windshield ice protection system consists of:

- One windshield de-icing pump with a solenoid valve, 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.

- One de-icing fluid spraybar for the windshield.

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 on the compartment side of the frame below the instrument panel. The ice protection control box contains all necessary relays to operate and cycle the pumps.

- A de-ice panel, mounted on the LH 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 - DE-ICING FLUIDS FOR SYSTEM OPERATION of 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 of this supplement.

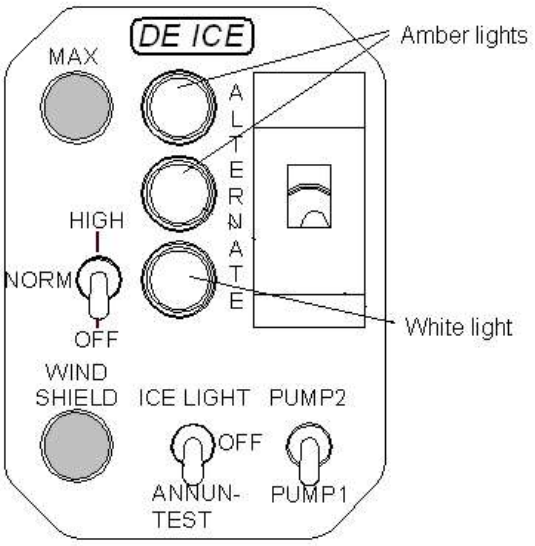
De-icing fluid is replenished through the filler, which is located on the fuselage LH side in front of the windshield. The tank has a usable capacity of 36 liters (9.5 US gal).

Operation

The system is operated through four toggle switches, and two push buttons located on the ice protection control unit in the LH 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 second 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. It has a flow rate of 0.24 L/min (3.8 US gal/h). Maximum system operating time is approximately 150 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. It has a flow rate of 0.48 L/min (7.6 US gal/h). Maximum system operating time is approximately 75 minutes.

MAX push button

The upper push button activates the MAX mode of the ice protection system when the system is 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. Each activation consumes approximately 1.8 L (0.5 US gal).

PUMP1/PUMP2 switch

The RH bottom switch selects one of the two main 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.

Up position: PUMP 2. Main pump no. 2 is selected as the active pump in HIGH mode. Pump no. 1 is standby.

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 windshield. Each activation consumes approximately 40 mL (0.011 US gal/1.5 fl. oz.).

The windshield de-icing works even when the OFF/NORM/HIGH switch of the ice protection system is set to OFF. The purging of air from the ice protection system is also provided by this pump 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 in a manner 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 - PRE-FLIGHT INSPECTION).

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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. For further information, refer to Airplane Maintenance Manual Chapter 30.

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, small amounts of de-icing fluid can evaporate from the inner wing panels over a period of several days. Contamination precautions must be taken if the airplane is stored in a hangar.

8.4 SERVICING

8.4.5 REPLENISHMENT OF THE DE-ICING FLUID TANK

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

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 DE-ICING SYSTEM RUN DRY

To avoid the need to reprime the system, and to provide a quick response when returned 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 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 the windshield pump. The windshield pump will prime main pump 1 or 2.