(9) If necessary, install the copilot's seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices, Removal, Installation and Adjustment of the Front Seats.

B. The Firewall Shutoff Valve does not change position when the Touch Screen Controller 570 (UI405) (GTC 570) touchkeys are operated for one of the two settings, an increase or a decrease in temperature. Do the steps that follow:

(1) Select the GTC 570 ECS diagnostic page and record fault text messages and the firewall shutoff valve (mixing valve) position. Refer to Temperature and Air Control (T240) - Description and Operation.

(a) If a fault(s) show on the diagnostic page not applicable to the servo motor:

1 Troubleshoot and repair the fault. Refer to the applicable chapter/section of the maintenance manual.

(2) If the fault continues do the steps that follow:

(a) If a faults show on the diagnostic page that is applicable to the servo motor, or no faults show, operate the firewall shutoff valve cable.

1 Make sure that the firewall shut off valve moves freely.

(3) If the firewall shutoff valve does not operate freely:

(a) Check the route and installation of the firewall shut off cable.

1 If necessary, correct the cable installation. Refer to Firewall Shutoff Valve - Removal/Installation

(b) Replace the valve. Refer to Firewall Shutoff Valve - Removal/Installation

(c) Check the operation again.

(4) If the fault continues:

(a) Remove external electrical power from the airplane.

(b) Set the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) to the OFF position.

(c) Remove the copilot's seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices, Removal, Installation and Adjustment of the Front Seats.

(5) Disconnect the electrical connector (J320) from electrical connector (P56) at the firewall shutoff valve assembly (UB100).

(6) Visually inspect the connectors to make sure that there are no bent or damaged pins.

(a) Repair any damage

(b) Check the operation again.

(7) Check the wiring for continuity from electrical connector (J320) to electrical connector (J310) at the ECU/Blower module assembly (UK100) and the electrical connector (P610) at the small parts module (UI006).

(a) Repair any wiring faults

(b) Check the operation again.

(8) If the fault continues:

(a) Replace the small parts module (UI006). Refer to Servo Motor - Removal/Installation

(b) Check the operation again.

(9) If necessary, install the copilot's seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices, Removal, Installation and Adjustment of the Front Seats.

4. Cabin Fan Troubleshooting

A. The Cabin Fan (MB100) does not operate in AUTO and/or Manual mode. Do the steps that follow:

(1) Make sure that the ECS, AIR COND, and ECS CTRL DOOR SEAL circuit breakers are engaged, found on the cockpit circuit breaker panel.

(a) If one or each of the three circuit breakers are not engaged, engage the circuit breaker(s) and check the cabin fan operation again.

(2) If the fault continues, select the GTC 570 ECS diagnostic page and record fault text messages that show on the page. Refer to Temperature and Air Control (T240) - Description and Operation.

(3) Select the GTC 570 ECS diagnostic page and record fault text messages that show on the page. Refer to Temperature and Air Control (T240) - Description and Operation.

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(a) If a fault(s) show on the diagnostic page not applicable to the cabin fan:

1 Troubleshoot and repair the fault. Refer to the applicable chapter/section of the maintenance manual.

(4) If a fault shows on the diagnostic page applicable to the cabin fan or no fault shows:

(a) Remove external electrical power from the airplane

(b) Set the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) to the OFF position.

(5) Remove the copilot seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices.

(6) Disconnect electrical connector (J50) from electrical connector (P50) at the fan assembly (MB100).

(7) Visually inspect the connectors to make sure that there are no bent or damaged pins.

(a) Repair any damage

(b) Check the operation again.

(8) If the fault continues:

(a) Check the wiring for continuity between electrical connector (P50) and electrical connector (J301) at the relay module (UK101) and electrical connector (J310) at the ECU/Blower module assembly (UK100).

1 Repair any wiring faults

2 Check the operation again.

(9) If the fault continues, replace the cabin fan. Refer to Cabin Fan - Removal/Installation.

(a) Check the operation again.

(10) If necessary, install the copilot's seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices, Removal, Installation and Adjustment of the Front Seats.

5. Defrost Floor Valve Troubleshooting

A. The Defrost Floor Valve (VB100) does not operate or operates incorrectly. Do the steps that follow:

(1) Select the GTC 570 ECS diagnostic page and record fault text messages that show on the page. Refer to Temperature and Air Control (T240) - Description and Operation.

(a) If a fault shows on the diagnostic page not applicable to the defrost floor valve (VB100):

1 Troubleshoot and repair the fault. Refer to applicable chapter/section of maintenance manual.

(2) If fault shows on the diagnostic page applicable to the cabin fan or no fault shows:

(a) Remove external electrical power from the airplane

(b) Set the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) to the OFF position.

(3) Remove the copilot seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices.

(4) Disconnect electrical connector (J308) from electrical connector (P308) at the floor valve (VB100).

(5) Visually inspect the connectors to make sure that there are no bent or damaged pins.

(a) Repair any damage

(b) Check the operation again.

(6) Check the wiring for continuity between electrical connector (J308) and electrical connector (J310) at the ECU/Blower module assembly (UK100), and electrical connector (PFD02) at the RH GND Block.

(a) Repair any wiring faults

(b) Check the operation again.

(7) If the fault continues, replace the Defrost Floor Valve. Refer to Defrost Floor Valve - Removal/Installation.

(a) Check the operation again.

(8) If necessary, install the copilot's seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices, Removal, Installation and Adjustment of the Front Seats.

6. Cabin Temperature Sensor Troubleshooting

A. ECS not operating correctly. Do the steps that follow:

(1) Select the GTC 570 ECS diagnostic page and record fault text messages that show on the page. Refer to

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Temperature and Air Control (T240) - Description and Operation.

(a) If a fault shows on the diagnostic page not applicable to the cabin temperature sensor (UC015):

1 Troubleshoot and repair the fault. Refer to the applicable chapter/section of the maintenance manual.

(2) If a fault shows on the diagnostic page applicable to the cabin temperature sensor or no fault shows:

(a) Remove external electrical power from the airplane

(b) Set the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) to the OFF position.

(3) At the forward center console, disconnect electrical connector (P307) from electrical connector (J307).

(4) Visually inspect the connectors to make sure that there are no bent or damaged pins.

(a) Repair any damage

(b) Check the operation again.

(5) If the fault continues:

(6) Check the wiring for continuity:

(a) Between electrical connector (J307) at the cabin temperature sensor and electrical connector (J310) at the ECU/Blower module assembly (UK100)

(b) Between electrical connector (J307) at the cabin temperature sensor and electrical connector (PFD02) at the RH GND Block

(c) Between electrical connector (J307) at the cabin temperature sensor and electrical connector (P61) at the cockpit circuit breaker panel.

1 Repair any wiring faults.

2 Check the operation again.

7. Air Temperature Sensor Troubleshooting

A. ECS not operating correctly. Do the steps that follow:

(1) Select the GTC 570 ECS diagnostic page and record fault text messages that show on the page. Refer to Temperature and Air Control (T240) - Description and Operation.

(a) If a fault shows on the diagnostic page not applicable to the air temperature sensor (UC001):

1 Troubleshoot and repair the fault. Refer to the applicable chapter/section of the maintenance manual.

(2) If a fault shows on the diagnostic page applicable to the air temperature sensor or no fault shows:

(a) Remove external electrical power from the airplane

(b) Set the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) to the OFF position.

(3) Remove the air temperature sensor. Refer to Garmin GTP 59 Outside Air temperature Probe (T240) - Removal/Installation.

(4) Disconnect the electrical connector (P319) from electrical connector (J319).

(5) Visually inspect the connectors to make sure that there are no bent or damaged pins.

(a) Repair any damage

(b) Check the operation again.

(6) Check the wiring for continuity between electrical connector (J319) and electrical connector (J310) at the ECU/Blower module assembly (UK100).

(a) Repair any wiring faults.

(7) Install the air temperature sensor. Refer to Garmin GTP 59 Outside Air temperature Probe (T240) - Removal/Installation.

(a) Check the operation again.

8. Evaporator Temperature Sensor Troubleshooting

A. ECS not operating correctly. Do the steps that follow:

(1) Select the GTC 570 ECS diagnostic page and record fault text messages that show on the page. Refer to

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Temperature and Air Control (T240) - Description and Operation.

(a) If a fault shows on the diagnostic page not applicable to the evaporator temperature sensor (UK102):

1 Troubleshoot and repair the fault. Refer to the applicable chapter/section in the maintenance manual.

(2) If a fault shows on the diagnostic page applicable to the evaporator temperature sensor or no fault shows:

(a) Remove external electrical power from the airplane

(b) Set the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) to the OFF position.

(3) Get access to the sensor. Remove the baggage shelf carpet. Refer to Chapter 25, Interior Panels - Maintenance Practices Removal of the Baggage Floor Carpet.

(4) Remove the screws that attach the Evaporator/Blower Assembly cover and the elevator interconnect cover to the floor structure. Refer to, Automatic Climate Control System (ACCS) - Maintenance Practices Figure 210.

(5) Disconnect the electrical connector (J313) from electrical connector (P313) at the evaporator blower assembly (MK100).

(6) Visually inspect the connectors to make sure that there are no bent or damaged pins.

(a) Repair any damage

(b) Check the operation again.

(7) If the fault continues:

(a) Check the wiring for continuity between electrical connector (J313) and electrical connector (J310) at the ECU/Blower module assembly (UK100).

1 Repair any wiring faults.

2 Check the operation again.

(8) If fault continues, replace the evaporator assembly. Refer to Chapter 21, Automatic Climate Control System (ACCS) - Maintenance Practices Evaporator/Blower Assembly.

(9) If necessary, install the evaporator/blower assembly cover and the elevator interconnect cover to the floor structure. Refer to, Automatic Climate Control System (ACCS) - Maintenance Practices Figure 210.

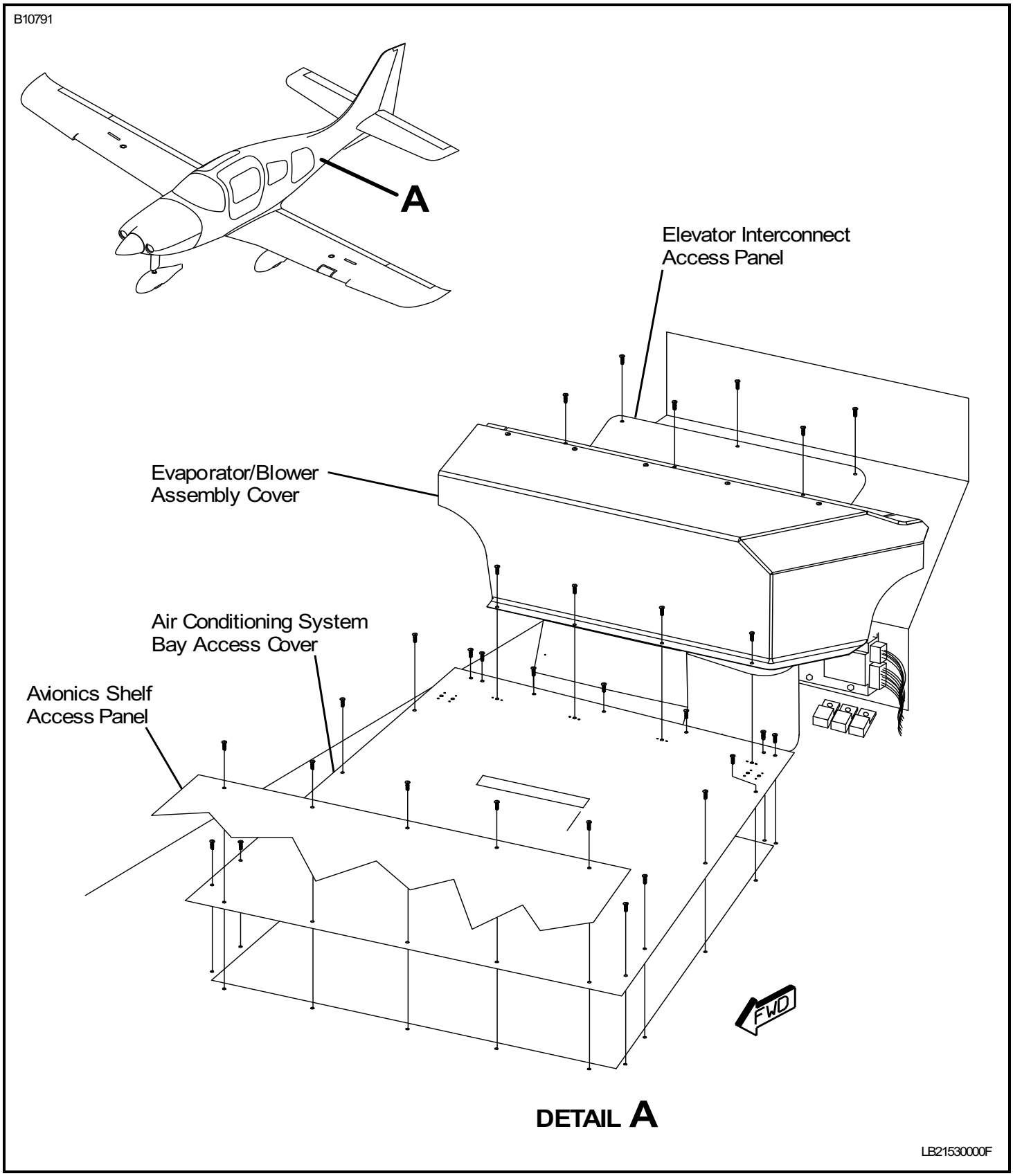
(a) Put the evaporator/blower assembly cover and the elevator interconnect cover in its correct position on the floor structure.

1 Install the screws that attach the cover to the floor structure.

(10) Install the baggage shelf carpet. Refer to Chapter 25, Interior Panels - Maintenance Practices Removal of the Baggage Floor Carpet

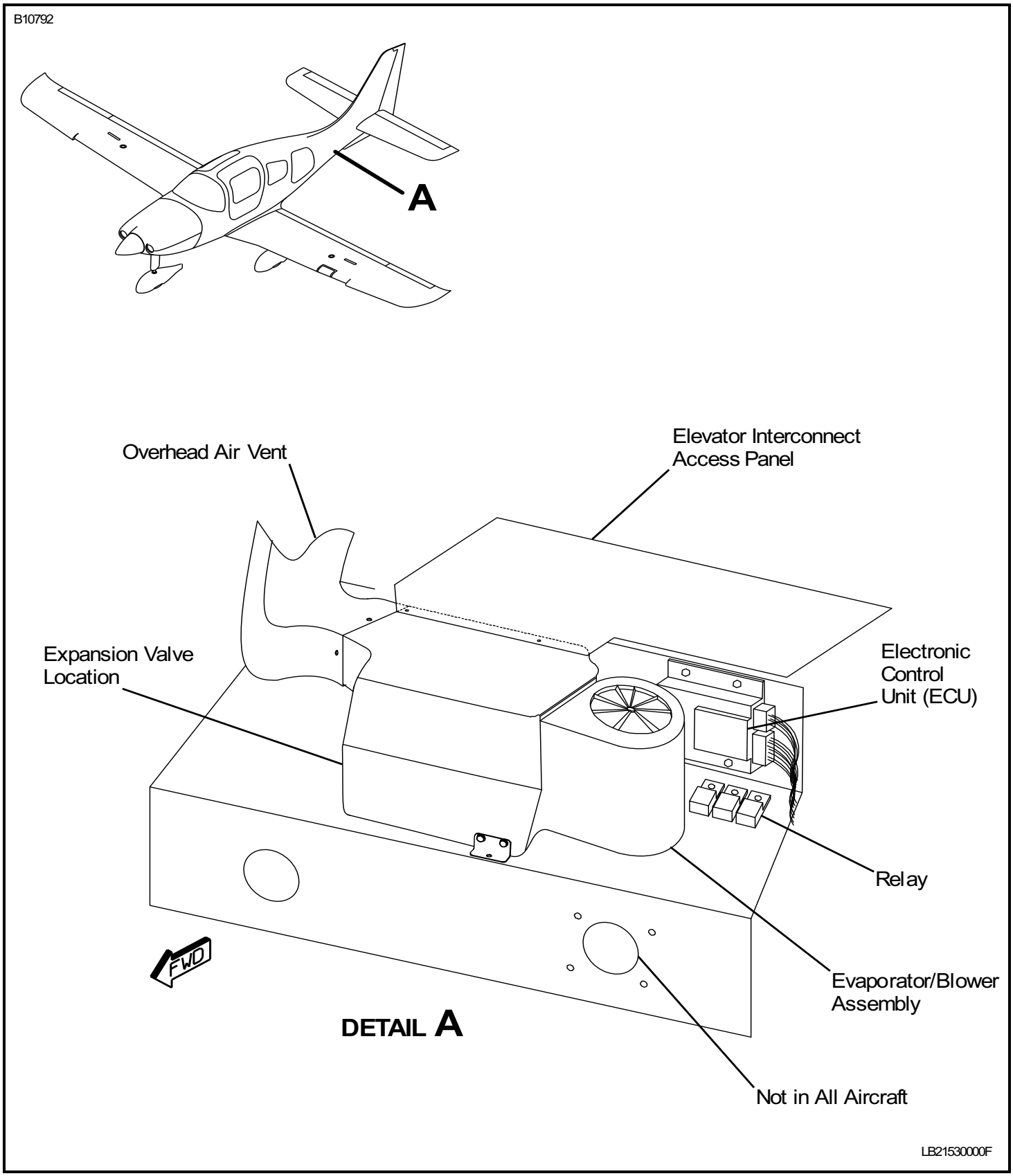
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Figure 210 : Sheet 1 : Access Panels and Covers and Evaporator/Blower Assembly Installation



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Figure 210 : Sheet 2 : Access Panels and Covers and Evaporator/Blower Assembly Installation



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ENVIRONMENTAL CONTROL SYSTEM COMPONENTS (T240) - ADJUSTMENT/TEST

1. General

A. This section gives the test procedures for the Environmental Control System (ECS). The Model T240 ECS is controlled with the Garmin G2000 GTC 570 Touchscreen Controller (UI405). The GTC 570 is found in the center console. For a general description applicable to the GTC 570 refer to Chapter 34, Garmin G2000 - Description and Operation.

2.

A. Do the ECS Test

(1) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(2) Supply external power to the airplane.

(3) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(4) Set the AVIONICS MASTER switch (SW04) to the ON position.

(5) Set the CROSS TIE switch (SW03) to the ON position.

(6) When the initial startup sequence is complete, push the Multifunction Display (MFD) ENT soft key.

(a) The startup screen clears.

(7) On the GTC 570 Touchscreen Controller Home page do as follows:

(a) Push the Aircraft Systems touchkey.

1 The ECS page shows

2 The Actual and Selected temperature fields populate.

(b) Make sure that the Actual temperature that shows is between 65°F and 85°F.

(c) Touch the black area of the ECS page for approximately 5 seconds.

1 The DIAG touchkey shows on the display.

(d) Push the DIAG touchkey.

1 Make sure that not faults show in the FAULTS field.

(8) Select the fan Manual mode touchkey.

(a) Select the "-" and then the "+" Fan Control touchkey.

1 Make sure that the fan speed decreases and then increases in 10% increments.

2 Make sure that air blows out from the eyeball vents near the engine control panel.

(b) Select the Slider control and set it to decrease and increase fan speed.

1 Make sure that the fan speed decreases and then increases.

(c) Select the DEFOG touchkey.

1 Make sure that a high airflow rate is present at the windshield.

2 Make sure that air no longer blows out from the eyeball vents near the engine control panel.

(d) Select the DEFOG touchkey again.

1 Make sure that a high airflow rate is no longer present at the windshield.

2 Make sure that air blows out from the eyeball vents near the engine control panel.

(9) Set the Fan Speed to LO.

(10) Set the selected temperature to 95°F.

(11) Pull the ECS firewall shutoff cable knob aft (to extended position).

(12) Decrease the selected temperature in one degree increments at five second intervals and make sure that:

(a) Incremental movement of the heater temperature actuator (ECS control valve) is heard

(b) The firewall shutoff knob moves smoothly forward in increments.

(c) Make sure that the firewall shutoff valve position shows the valve movement on the ECS component reading field.

(13) Set the selected temperature to 55°F.

(14) Increase the selected temperature in one degree increments at five second intervals and make sure that:

(a) Incremental movement of the heater temperature actuator (ECS control valve) is heard

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(b) The firewall shutoff knob can be pulled smoothly to the extended position.

(c) Make sure that the firewall shutoff valve position shows the valve movement on the ECS component reading field.

(15) Set the master BATT switches (left SW01 and right SW02) to the OFF position.

(16) Set the AVIONICS MASTER switch (SW04) to the OFF position.

(17) Set the CROSS TIE switch (SW03) to the OFF position.

(18) Disconnect external power from the airplane.

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AIR DISTRIBUTION - MAINTENANCE PRACTICES

1. DISTRIBUTION SYSTEM

A. The components in the distribution system depend upon whether Avidyne avionics, the Garmin G1000 or the Garmin 2000 system is installed in the aircraft.

(1) **Avidyne Option without Air Conditioning** - The distribution system includes the fan, ECS control valve, servo motor, defrost plenum, control panel, and eyeball and floor vents.

(2) **Avidyne Option with Air Conditioning** - The distribution system includes the fan, ECS control valve, servo motor, ECS shut-off valve assembly, defrost/floor valve assembly, defrost plenum, control head, and eyeball and floor vents

(3) **Garmin G1000 Option with or without Air Conditioning** - The distribution system includes the fan, ECS control valve, servo motor, ECS shut-off valve assembly, defrost/floor valve assembly, defrost plenum, control head, and eyeball and floor vents.

(4) **NOTE: The ECS shut-off valve is not a component of the Model T240 Garmin G2000 ECS installation.**
Model T240 with or without Air Conditioning - For maintenance procedures refer to the sections that follow:

- Cabin Fan - Removal/Installation
- Servo Motor - Removal/Installation
- Defrost Floor Valve - Removal/Installation
- Eyeball Vents - Removal/Installation
- Firewall Shutoff Valve - Removal/Installation
- Firewall Shutoff Cable - Removal/Installation
- Equipment Cooling Fans (T240) - Removal/Installation

2. ECS Fan

A. **Avidyne Option without Air Conditioning**

(1) **Fan Removal**

(a) Unplug the electrical connector plug, then cut and remove the plastic tie straps located at the inlet and outlet ports of the fan.

(b) Pull the flexible ducting away from the fan.

(c) Loosen and disconnect the main mounting clamp until the fan can be freed from the cradle housing.

(d) Remove the fan by pulling it out from underneath the instrument panel. (Refer to Figure 203.)

(2) **Fan Installation**

(a) Position the fan in the cradle leaving enough room between the heater control box and the fan inlet port for flexible ducting.

(b) Connect and tighten the main mounting clamp around the fan motor housing.

(c) Slide the flexible ducting over the inlet and outlet ports of the fan, and secure using plastic tie straps.

(d) Reconnect the ELC connector.

(e) Turn on the power, and test the fan for proper operation.

B. **Garmin G1000 Option or Avidyne Option with Air Conditioning**

(1) **Fan Removal**

(a) Unplug the electrical connector plug, then cut and remove the plastic tie straps at the inlet port and remove the hose clamp at the outlet port of the fan.

(b) Pull the ECS shut-off valve assembly away from the outlet port of the fan. (Refer to Figure 203 and Figure 204.)

(c) Pull the flexible ducting away from the fan.

(d) Loosen and disconnect the main mounting clamp until the fan can be freed from the cradle housing.

(e) Remove the fan by pulling it out from underneath the instrument panel.

(2) **Fan Installation**

(a) Position the fan in the cradle.

(b) Connect and tighten the main mounting clamp around the fan motor housing.

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(c) Slide the flexible ducting over the inlet port of the fan, and secure using plastic tie straps.

(d) Slide the end of the ECS shut-off valve assembly over the outlet port of the fan. Apply RTV5818 silicone all around and secure with a hose clamp. (Refer to Figure 204.)

(e) Reconnect the ELC connector.

(f) Turn on the power, and test the fan for proper operation.

C. **Fan Maintenance** - The electrically controlled ECS fan is a self-contained unit and requires only a periodic check for proper operation.

3. Servo Motor

A. **Servo Motor Removal**

(1) With power on, adjust the temperature knob in the instrument panel to the full cold position, then turn power off.

(2) Remove the ECS control valve per Section 21-40-00, Heating and Heater Control Valve, of this manual.

(3) Remove the servo motor to ECS control valve attachment screws, washers, and nuts.

(4) Pull the servo motor back and away from the ECS control valve until the servo motor drive arm to linear drive rod clevis is exposed.

(5) Remove the cotter pin, washer, and clevis pin, and remove the servo motor from the ECS control valve.

B. **Servo Motor Installation**

(1) With the servo motor arm in the fully extended position, install the servo motor drive arm into the linear actuator clevis, and reinstall the clevis pin, washer, and a new cotter pin.

(2) Align the mounting holes in the servo motor with the mounting holes in the ECS control valve. Install screws, washers, and nuts only tight enough so that servo motor can be pushed forward by hand.

(3) With the ECS control valve secured, hand push the servo motor forward until the silicone sealing cushion inside of ECS control valve is fully seated against metal sealing ring. Tighten the servo mounting hardware.

C. **Servo Motor Maintenance** - The ECS servo motor is a self-contained unit and requires only a periodic check for proper operation.

4. ECS Shut-Off Valve Assembly (Avidyne and Garmin G1000)

A. The ECS shut-off valve assembly is only present with the Garmin G1000 option or the Avidyne option with air conditioning.

B. **ECS Shut-Off Valve Removal**

(1) Unplug the electrical connector plug.

(2) Remove the hose clamps at the inlet and outlet ports of the ECS shut-off valve. (Refer to Figure 203 and Figure 204.)

(3) Pull the flexible ducting away from the outlet port.

(4) Pull the ECS shut-off valve assembly away from the outlet port of the ECS fan.

C. **ECS Shut-Off Valve Installation**

(1) Apply RTV5818 silicone all around the outlet port of the ECS fan and the outlet port of the ECS shut-off valve.

(2) Slide the inlet port of the ECS shut-off valve over the outlet port of the ECS fan. Rotate the valve as required to clear the rudder pedal tubes and ECS servo motor actuator screw and secure with a hose clamp.

(3) Slide the flexible ducting over the outlet port of the ECS shut-off valve, and secure with a hose clamp.

(4) Reconnect the electrical connector.

(5) Turn on the power, and test the ECS shut-off valve for proper operation.

D. **ECS Shut-Off Valve Maintenance** - The ECS shut-off valve assembly is a self-contained unit and requires only a periodic check for proper operation.

5. Defrost/Floor Valve Assembly

A. The defrost/floor valve assembly is only present with the Garmin G1000 option or the Avidyne option with air conditioning.

B. **Defrost/Floor Valve Removal**

(1) Unplug the electrical connector plug.

(2) Remove the hose clamps at the inlet and outlet ports of the defrost/floor valve. (Refer to Figure 203 and Figure 204.)

(a) On Garmin G1000 aircraft, the defrost/floor valve assembly may be attached directly to the defrost channel. With

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this condition, remove the hose clamp and an MS51861-25C screw. There is a length of silicone sheeting between the defrost/floor valve and the defrost channel.

(3) Pull the flexible ducting away from the inlet and outlet ports.

(4) Remove the defrost/floor valve.

C. **Defrost/Floor Valve Installation**

(1) Defrost/floor valve attached directly to the defrost channel.

(a) Fill the gap between the inner diameter of the valve flange and the outer diameter of the defrost channel flange with .062-inch or .093-inch AMS3320 silicone sheet.

(b) When installing a new defrost/floor valve, match drill a 0.166-inch diameter (No. 32) hole in the valve flange.

(c) Install a MS51861-25C screw through the valve flange, the defrost channel flange, and the silicone sheet. Dry torque hand tight plus quarter turn.

(d) Apply RTV5818 silicone all around the inlet port, install flexible ducting, and secure with a hose clamp.

(e) Reconnect the electrical connector.

(f) Turn on the power, and test the defrost/floor valve for proper operation.

(2) Defrost/floor valve not attached directly to the defrost channel.

(a) Apply RTV5818 silicone all around the inlet and outlet ports of the defrost/floor valve.

(b) Slide the flexible ducting over the inlet and outlet ports of the defrost/floor valve. Rotate the valve as required to clear the rudder pedal tubes and ECS servo motor actuator screw, and secure with hose clamp.

(c) Reconnect the electrical connector.

(d) Turn on the power, and test the defrost/floor valve for proper operation.

D. **Defrost/Floor Valve Maintenance** – The defrost/floor valve assembly is a self-contained unit and requires only a periodic check for proper operation.

6. Defrost Plenum

A. **Defrost Plenum Removal/Installation** – The defrost plenum is an integral part of the fuselage and contains no moving parts; therefore, no removal is required.

B. **Defrost Plenum Maintenance** – The defrost plenum is an integral part of the fuselage, therefore, no maintenance is required.

7. Eyeball Vents (Instrument Panel)

A. **Eyeball Vent Removal** – To remove the left and/or right eyeball vent(s) from the instrument panel use the following instructions. Steps 1 and 2 do not apply for the Garmin G1000 system instrument panel.

(1) Remove the left side instrument panel and/or the right side kidney panel screws.

(2) Gently pull the left side instrument panel and/or the right side kidney panel away from the main panel until the eyeball vent flexible ducting can be seen.

(3) Remove the cable tie securing the tubing to the back of the plenum cap. For the Garmin G1000 system, the back of the vent may be accessed from underneath the instrument panel.

(4) Loosen the clamp securing the plenum cap to the backside of the eyeball vent, and gently pull away from the vent.

(5) Loosen and remove the threaded eyeball vent retaining collar from the backside of the panel.

(6) Pull the eyeball vent out from the front of the panel. Refer to Figure 201 for a schematic of the eyeball vent.

B. **Eyeball Vent Installation** - To install the left and/or right eyeball vent(s) into the instrument panel use the following instructions. Step 5 does not apply to the Garmin G1000 system instrument panel.

(1) Insert the eyeball vent(s) into the front of the side instrument panel, into the front of the right kidney panel, or into the lower instrument panel (Garmin G1000 system), as applicable.

(2) Install the threaded eyeball vent retaining collar to the backside of eyeball vent.

(3) Press the plastic plenum cap onto the backside of the eyeball vent, and secure with clamp. When the clamp is secured, the screw housing must remain at the 10 to 12 o'clock position for the left eyeball vent and at the 12 to 3 o'clock position for the right eyeball vent, as viewed from the rear.

(4) Slide the tubing over the back of the plenum cap and secure with a new cable tie.

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(5) Install the instrument panel and/or the kidney panel to the main panel with screws.

8. Eyeball Vents (Rear Interior Side Panels)

A. **RISP Eyeball Vent Removal** – To remove the rear interior side panel eyeball vents use the following instructions.

(1) Remove the rear interior panel attachment screws, then gently pull the interior side panel up and away from the fuselage until access is gained to the rear of the eyeball vent.

(2) Loosen and remove the threaded eyeball vent retaining collar from the backside of the panel.

(3) Pull the eyeball vent out from the front of the panel.

B. **RISP Eyeball Vent Installation** - To install eyeball vents into the rear interior side panel use the following instructions.

(1) Insert the eyeball vent into the side panel hole.

(2) Install the threaded eyeball vent retaining ring to the backside of the eyeball vent.

(3) Press the panel back into place ensuring the vent is seated in the ducting channel.

(4) Install the rear interior panel to the fuselage, and attach it with screws.

C. **RISP Eyeball Vent Maintenance** - The rear interior side panel eyeball vents are self-contained, therefore, no maintenance is required.

9. Floor Vent (Front)

A. **Front Floor Vent Removal/Installation** – The front floor vent is an integral part of the radio rack frame with no moving parts; therefore, no removal is required.

B. **Front Floor Vent Maintenance** – The front floor vent is self-contained; therefore, no maintenance is required.

10. Floor Vent (Rear)

A. **Rear Floor Vent Removal** – To remove the rear floor vent use the following instructions. (Refer to Figure 202.)

(1) Gently pull the center console panel out and away from the main console.

(2) With the rear heat vent flexible ducting exposed, loosen the clamp securing the plastic plenum cap to the backside of the eyeball vent, and gently pull the plastic housing away from vent.

(3) Loosen and remove the threaded eyeball vent retaining collar from the backside of the panel.

(4) Pull the eyeball vent out from the front of the panel.

B. **Rear Floor Vent Installation** – To install eyeball vents onto the center console, use the following instructions.

(1) Insert the eyeball vent into the side panel hole.

(2) Install the threaded eyeball vent retaining collar to the backside of the eyeball vent.

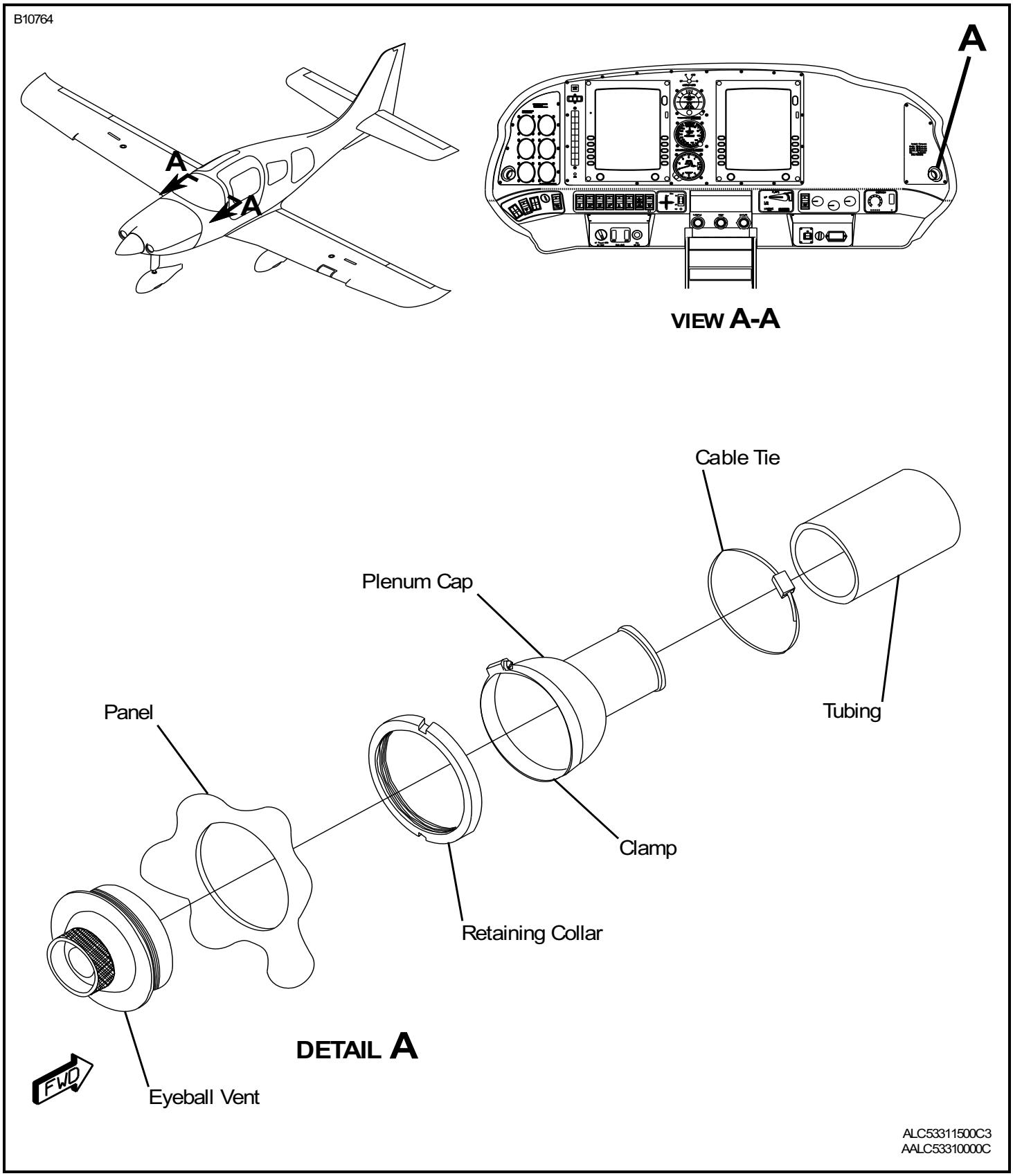
(3) Press the plastic plenum cap onto the backside of the eyeball vent, and secure with a clamp.

(4) Install the center console panel onto the main panel until the duel lock stripping is fully engaged.

C. **Rear Floor Vent Maintenance** – The rear floor vent is self-contained; therefore, no maintenance is required.

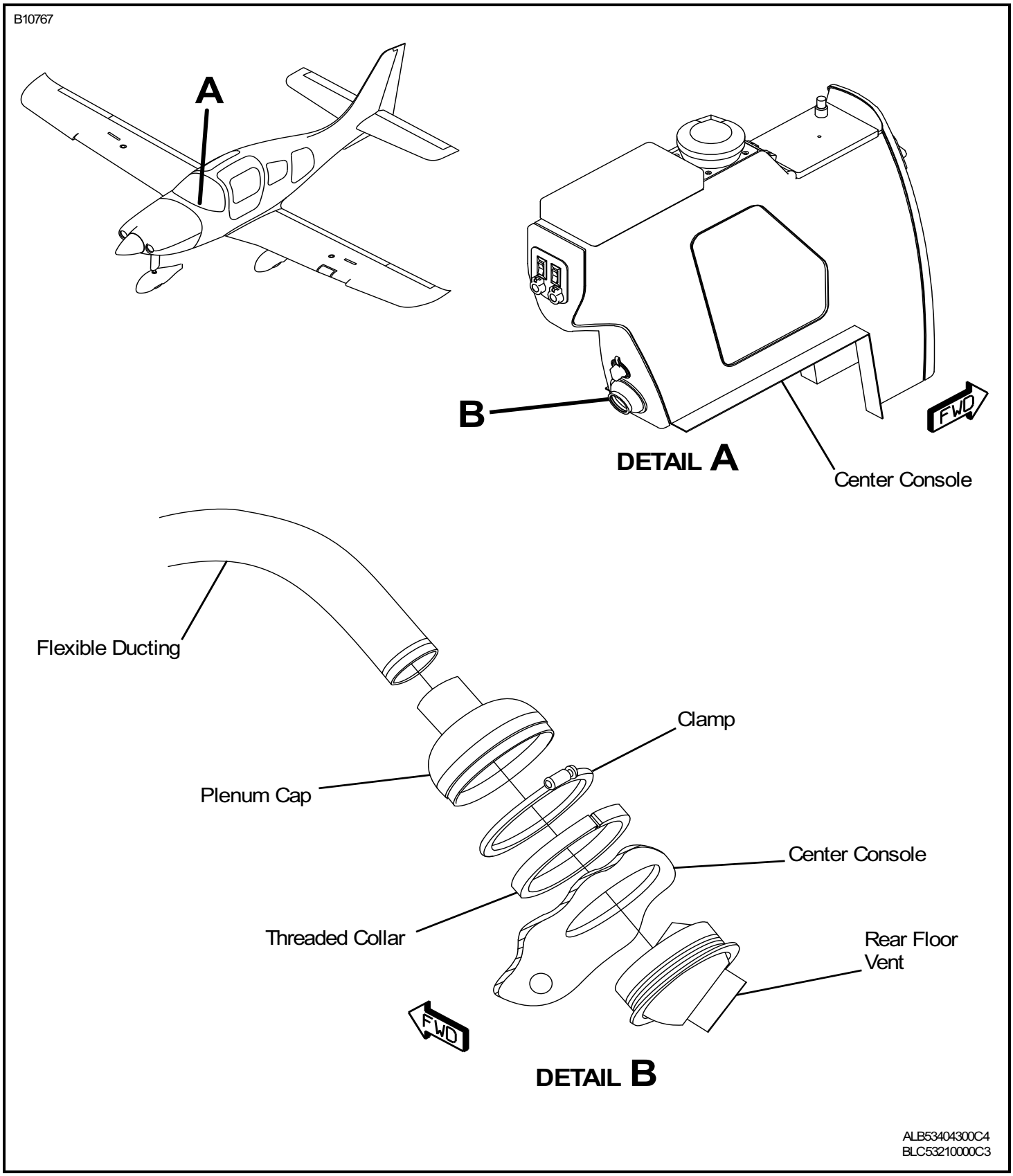
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Figure 201 : Sheet 1 : Eyeball Vent Installation



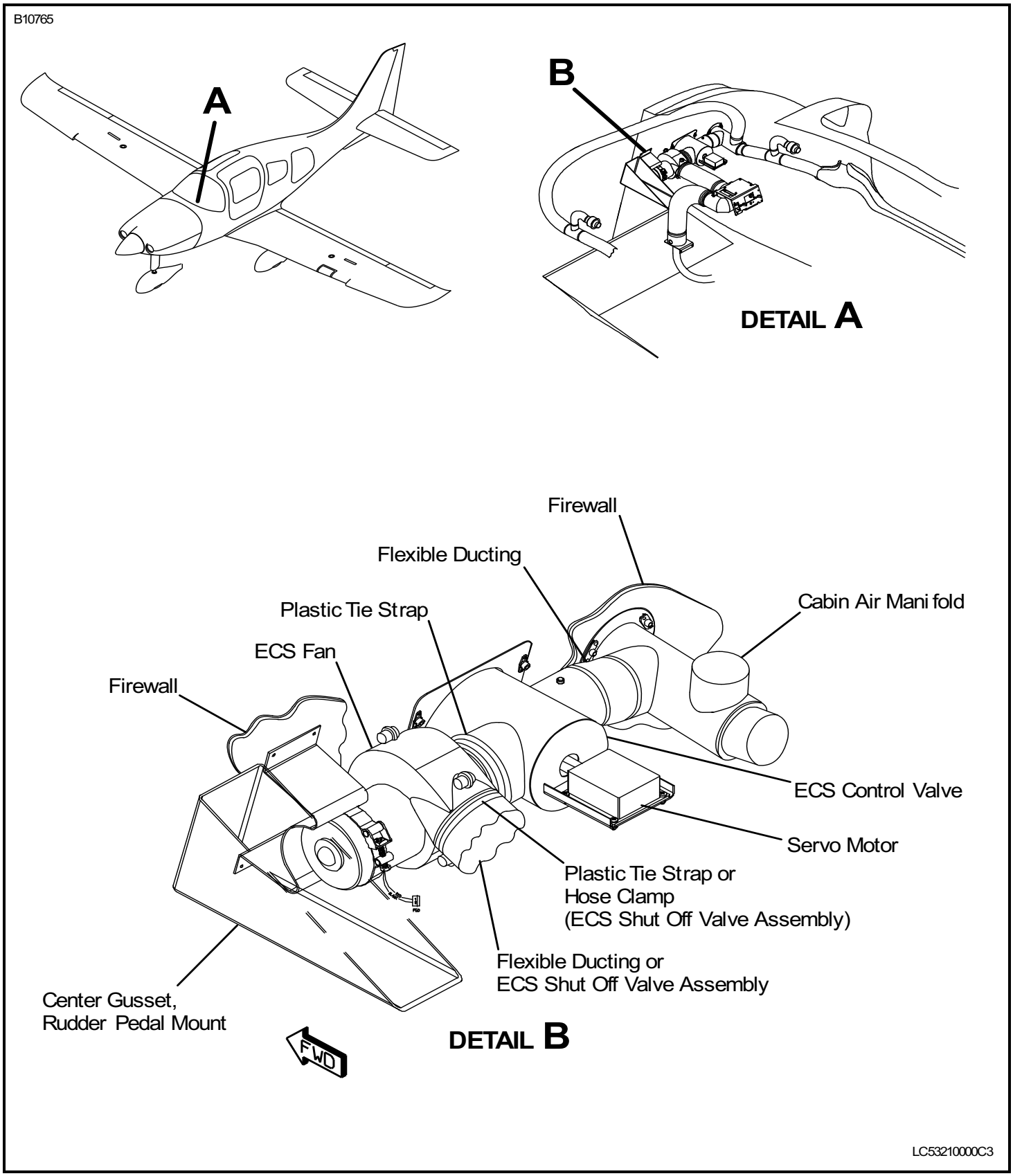
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Figure 202 : Sheet 1 : Rear Floor Vent



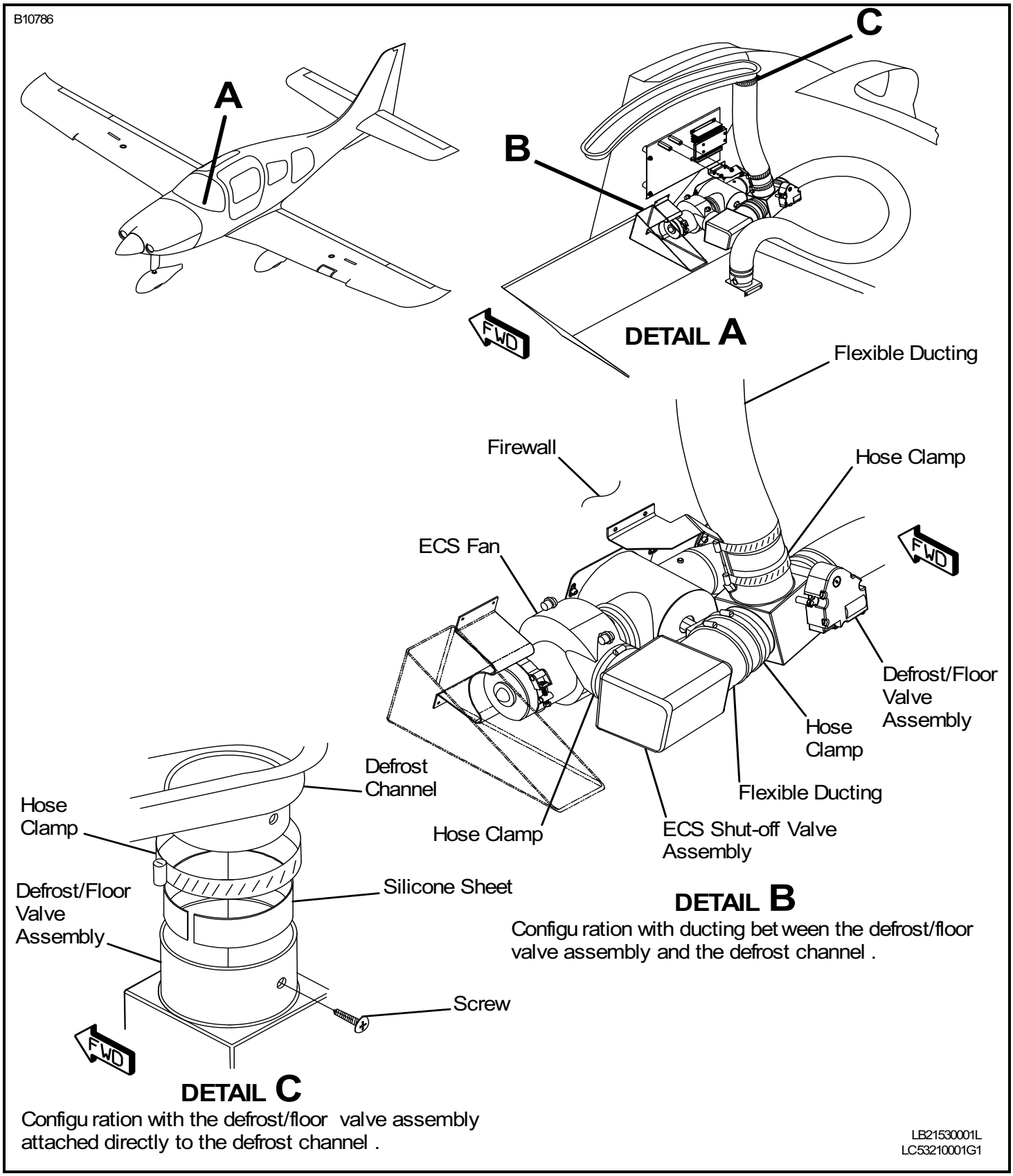
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Figure 203 : Sheet 1 : ECS System Attachment (Avidyne and Garmin G1000)



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Figure 204 : Sheet 1 : ECS Shut-Off Valve and Defrost/Floor Valve Assemblies (Avidyne and G1000)



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CABIN FAN (T240) - REMOVAL/INSTALLATION

1. General

A. This section gives the removal and installation procedures for the Model T240 Cabin Fan.

B. For the Avidyne and Garmin G1000 options cabin fan maintenance procedures, refer to Air Distribution - Maintenance Practices ECS Fan.

2. Tools and Equipment

A. No special tools or equipment are required for this procedure.

3. Cabin Fan Removal/Installation

A. Remove the Cabin Fan (MB100) (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Disengage the ECS circuit breaker found on the cockpit circuit breaker panel.

(5) Remove the copilot seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices.

(6) Disconnect electrical connector P50 from electrical connector J50.

NOTE: Get access to the fan from below the copilot side of the instrument panel.

(7) Remove the tie straps at the inlet port of the fan.

(8) Remove the hose clamp at the outlet port of the fan.

(9) Pull the flexible ducts away from the fan.

(10) Loosen and disconnect the mounting clamp.

(11) Remove the fan from the airplane.

B. Install the Cabin Fan (MB100) (Refer to Figure 401).

(1) Put the fan in its correct position.

(2) Install the mounting clamp around the fan motor housing but do not tighten it.

(3) Slide the flexible ducts over the inlet and outlet ports of the fan.

(4) Tighten the mounting clamp around the fan.

(5) Apply a bead of RTV-81409 around the end of the duct and the outlet port to create a leak proof seal.

(6) Install the hose clamp at the outlet port of the fan.

(7) Install the tie straps at the inlet port of the fan.

(8) Connect electrical connector P50 to electrical connector J50.

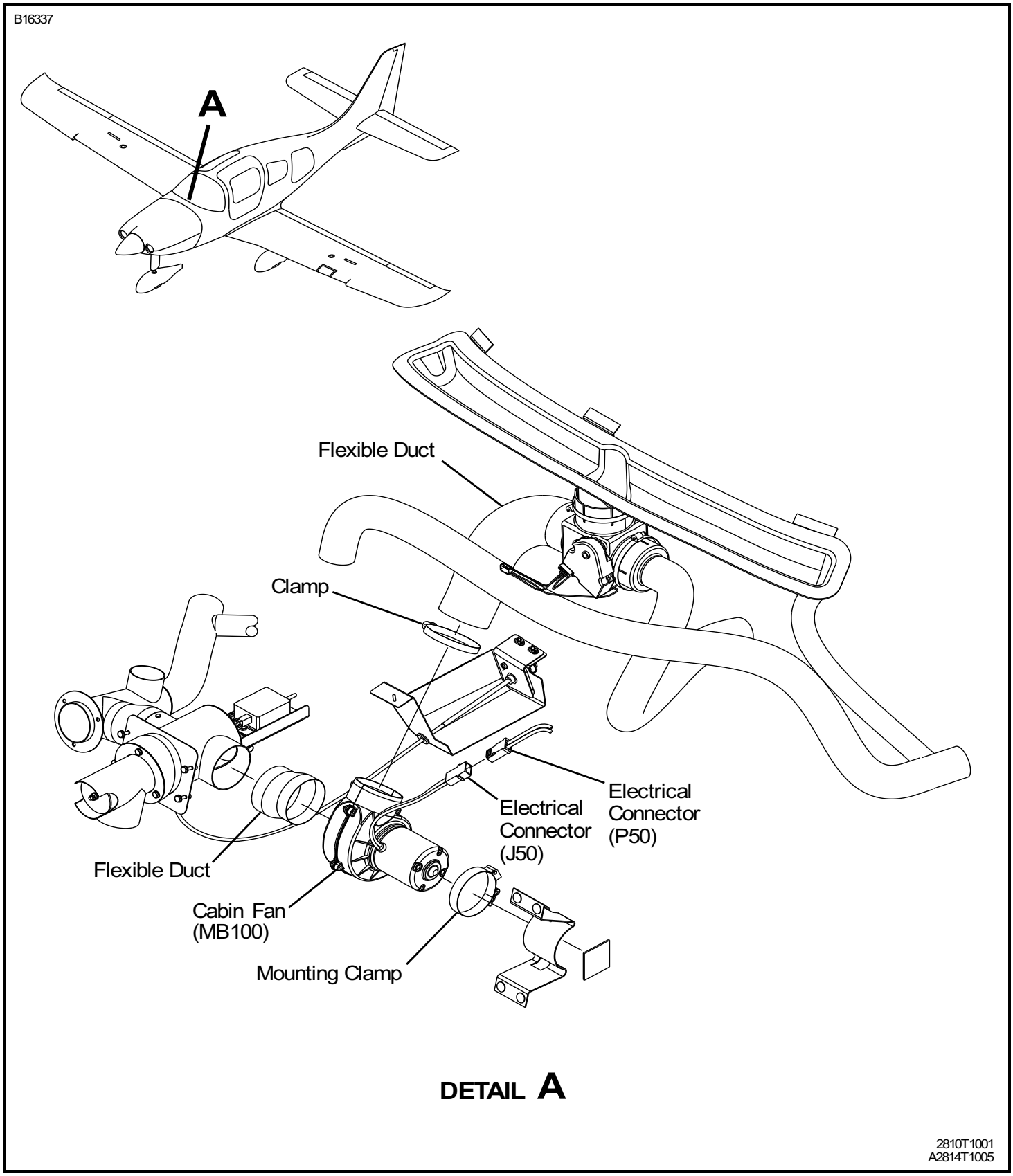
(9) Engage the ECS circuit breaker found on the cockpit circuit breaker panel.

(10) Do a check of the fan operation. Refer to Environmental Control System Components - Adjustment/Test.

(11) Install the copilot seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices.

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Figure 401 : Sheet 1 : Cabin Fan Installation



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SERVO MOTOR (T240) - REMOVAL/INSTALLATION

1. General

A. This section gives the removal and installation procedures for the Model T240 Servo Motor (UB100).

B. For the Avidyne and Garmin G1000 options servo motor maintenance procedures, refer to Air Distribution - Maintenance Practices Servo Motor.

2. Tools and Equipment

A. No special tools or equipment are required for this procedure.

3. Servo Motor Removal/Installation

A. Remove the Servo Motor (UB100) (Refer to Figure 401).

(1) Apply external electrical power to the airplane.

(2) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(3) Set the AVIONICS MASTER switch (SW04) to the ON position.

(4) Set the CROSS TIE switch (SW03) to the ON position.

(5) On the GTC 570 Touchscreen Controller Home page do as follows:

(a) Push the Aircraft Systems button.

(b) Push the ECS button.

(c) Push the ECS On button.

1 The valve is in the full cold position.

(6) Remove external electrical power from the airplane.

(7) Set the master BATT switches (left SW01 and right SW02) to the OFF position.

(8) Set the AVIONICS MASTER switch (SW04) to the OFF position.

(9) Set the CROSS TIE switch (SW03) to the OFF position.

(10) Remove the copilot's seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices, Removal, Installation and Adjustment of the Front Seats.

(11) If necessary, cut tie wraps and carefully move wire bundles away from the servo motor to get access to the electrical connector.

(12) Disconnect the electrical connector (J320) from the servo motor electrical connector (P56).

(13) Remove and discard the cotter pin from the pin that connects the servo motor to the firewall shutoff valve.

(a) Remove the washer and pin.

(14) Remove the screws and washers that connect the servo motor to the tray.

(15) Remove the servo motor from the airplane.

B. Install the Servo Motor (UB100) (Refer to Figure 401).

(1) Align the mounting holes in the servo motor with the mounting holes in the tray.

(a) Install the screws and washers that connect the servo motor to the tray.

(b) Tighten the screws until the servo motor slides smoothly on the tray with no free play.

(2) Install the washer, pin, and a new cotter pin to connect the servo motor to the firewall shutoff valve.

(3) Visually inspect the connectors to make sure that there are no bent or damaged pins.

(a) Repair any damage.

(4) Connect the electrical connector (J320) to the servo motor electrical connector (P56).

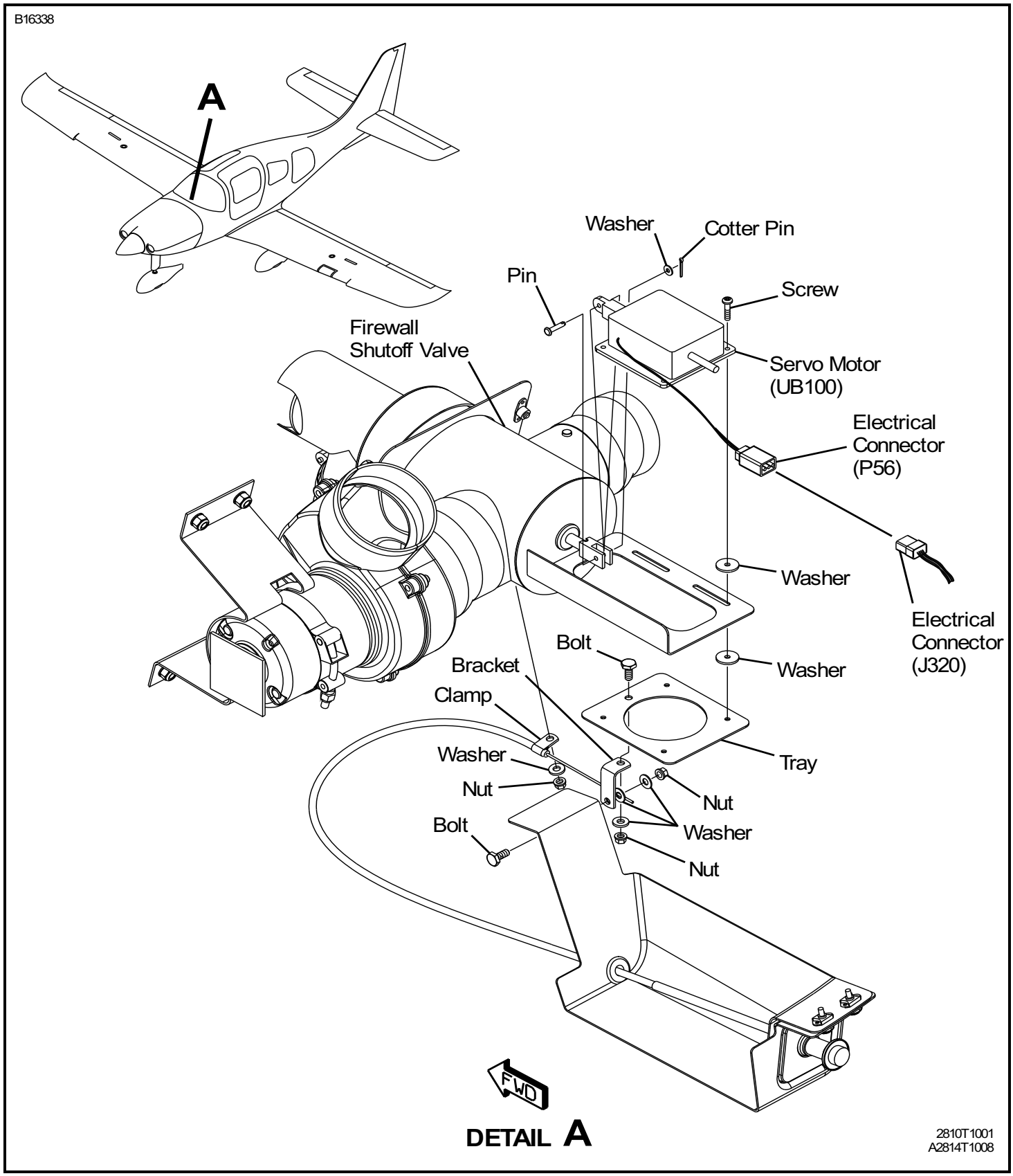
(5) If necessary, carefully move wire bundles to their correct position and install tie wraps.

(6) Install the copilot's seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices, Removal, Installation and Adjustment of the Front Seats.

(7) Do a check of the servo motor. Refer to Environmental Control System Components - Adjustment/Test.

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Figure 401 : Sheet 1 : Servo Motor Installation



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DEFROST/FLOOR VALVE (T240) - REMOVAL/INSTALLATION

1. General

A. This section gives the removal and installation procedures for the Model T240 Defrost/Floor Valve.

B. For the Avidyne and Garmin G1000 options Defrost/Floor Valve maintenance procedures, refer to Air Distribution - Maintenance Practices Defrost/Floor Valve.

2. Tools and Equipment

A. No special tools or equipment are required for this procedure.

3. Defrost/Floor Valve

A. Remove the Defrost/Floor Valve (VB100) (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Disengage the PP/DR SL ECS CTRL ECS circuit breaker found on the cockpit circuit breaker panel.

(5) Remove the copilot seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices.

(6) Disconnect electrical connector J308 from electrical connector P308.

(7) Remove the hose clamps at the inlet and outlet ports of the defrost/floor valve.

(8) Pull the ducts away from the inlet and outlet ports.

(9) Remove the defrost/floor valve.

B. Install the Defrost/Floor Valve (VB100) (Refer to Figure 401).

(1) Put the defrost/floor valve in its correct position on the defrost duct.

(a) Apply a bead of RTV-81409 around the end of the defrost duct and the defrost/floor valve to create a leak proof seal.

(b) Install the hose clamp on the defrost/floor valve.

(2) Install the ducts on the inlet and outlet ports of the defrost/floor valve.

(a) Apply a bead of RTV-81409 around the end of the ducts and the inlet and outlet ports to create a leak proof seal.

(b) Install the hose clamps on the ducts.

(3) Connect electrical connector J308 to electrical connector P308.

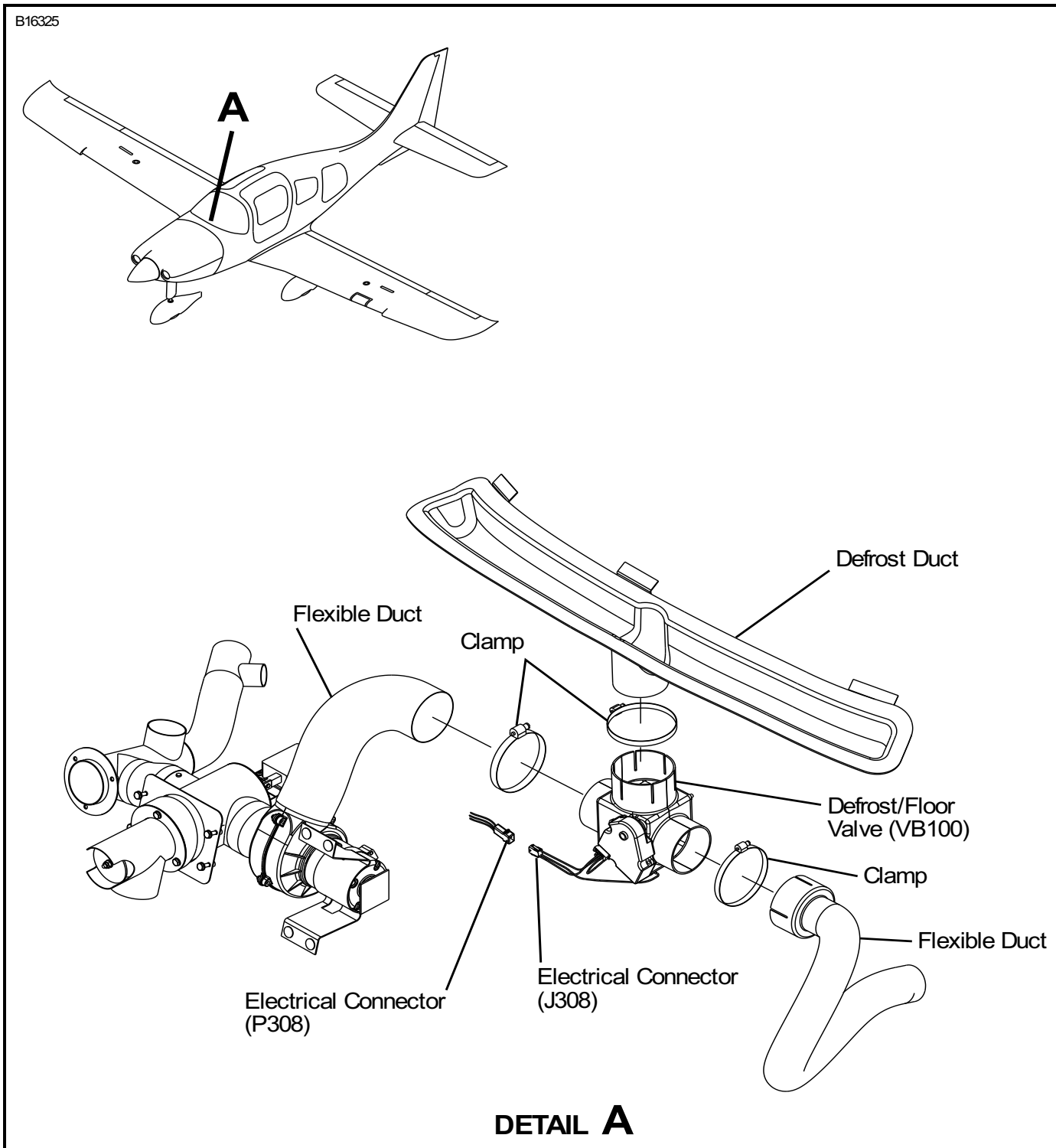
(4) Engage the PP/DR SL ECS CTRL circuit breaker found on the cockpit circuit breaker panel.

(5) Do a check of the defrost/floor valve. Refer to Environmental Control System Components - Adjustment/Test.

(6) Install the copilot seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices.

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Figure 401 : Sheet 1 : Defrost/Floor Valve Installation



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EYEBALL VENTS (T240) - REMOVAL/INSTALLATION

1. General

A. This section gives the removal and installation procedures for the Model T240 Eyeball Vents.

B. For the Avidyne and Garmin G1000 options Eyeball Vents maintenance procedures, refer to Air Distribution - Maintenance Practices Eyeball Vents.

2. Tools and Equipment

A. No special tools or equipment are required for this procedure.

3. Instrument Panel Vents

A. Remove the Instrument Panel Vents (Refer to Figure 401).

(1) Remove the tie strap that secures the duct to the back of the plenum cap.

(2) Loosen the clamp that secures the plenum cap to the backside of the vent, and gently pull away from the vent.

(3) Loosen and remove the threaded vent retaining collar from the backside of the panel.

(4) Pull the vent out from the front of the panel.

B. Install the Instrument Panel Vents (Refer to Figure 401).

(1) Insert the vent(s) into the front of the instrument panel.

(2) Install the threaded vent retaining collar to the backside of vent.

(3) Press the plastic plenum cap onto the backside of the vent, and secure with clamp.

NOTE: When the clamp is secured, the screw housing must remain at the 10 to 12 o'clock position for the left vent and at the 12 to 3 o'clock position for the right vent, as viewed from the rear.

(4) Slide the duct over the back of the plenum cap and secure it with a tie strap.

4. Side Panel Vents

A. Remove the Side Panel Vents (Refer to Figure 402).

(1) Remove the rear interior panel attachment screws, then gently pull the interior side panel up and away from the fuselage until access is gained to the rear of the vent.

(2) Remove the threaded vent retaining collar from the backside of the side panel.

(3) Pull the vent out from the front of the side panel.

B. Install the Side Panel Vents (Refer to Figure 402).

(1) Insert the vent into the side panel hole.

(2) Install the threaded vent retaining collar to the backside of the vent.

(3) Put the side panel in position.

(4) Make sure that the vent is seated in the duct channel.

(5) Install the rear interior panel to the fuselage, and attach it with the screws.

5. Floor Vent

A. Remove the Floor Vent (Refer to Figure 403).

(1) Gently pull the center console access panel out and away from the main console.

(2) With the rear heat vent flexible ducts exposed, loosen the clamp that secures the plastic plenum cap to the backside of the vent.

(3) Gently pull the plastic plenum cap away from the vent.

(4) Remove the threaded vent retaining collar from the backside of the vent.

(5) Pull the vent out from the front of the panel.

B. Install the Floor Vent (Refer to Figure 403).

(1) Insert the vent into the center console.

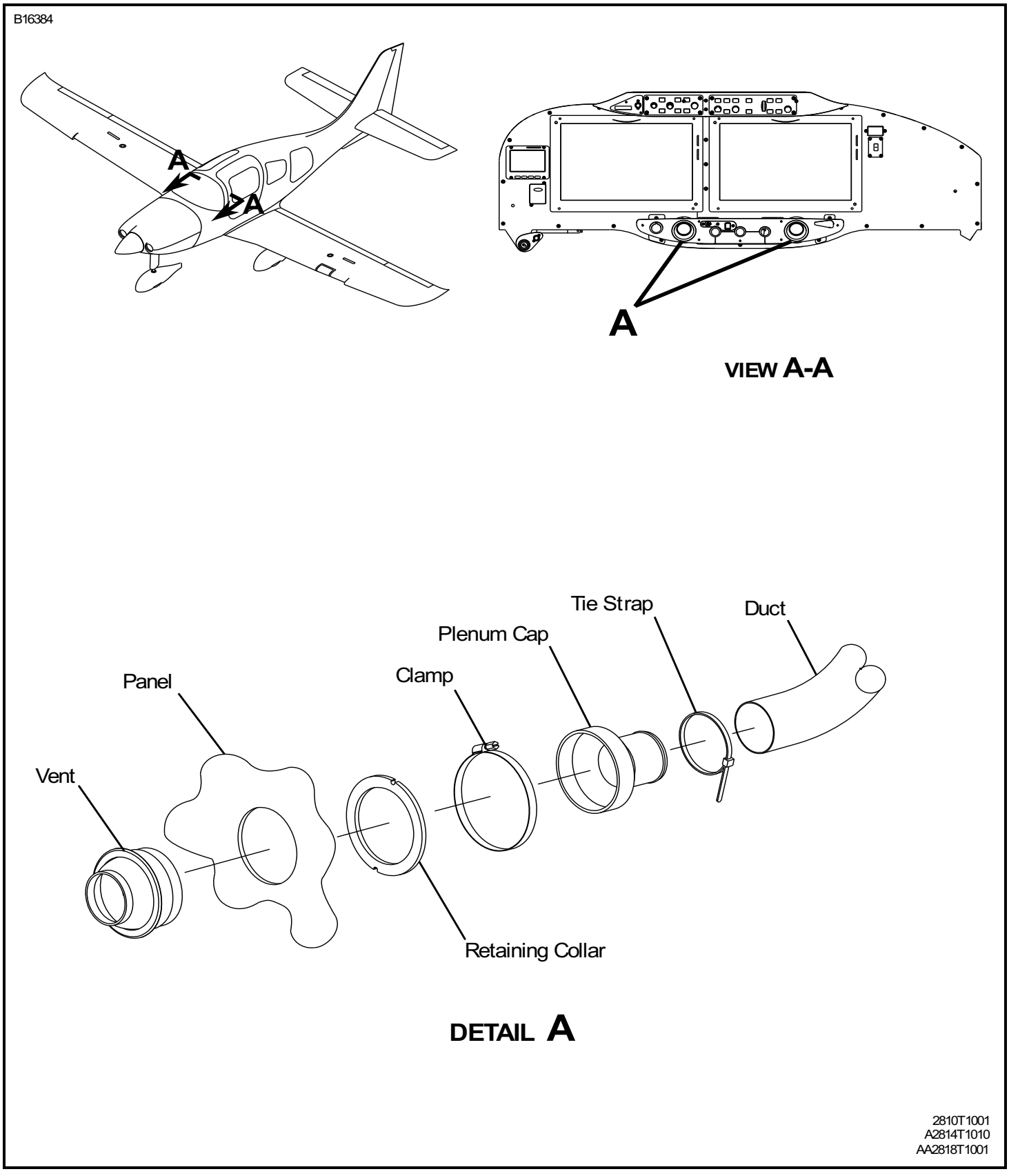
(2) Install the threaded vent retaining collar to the backside of the vent.

(3) Press the plastic plenum cap onto the backside of the vent, and secure it with a clamp.

(4) Install the center console access panel.

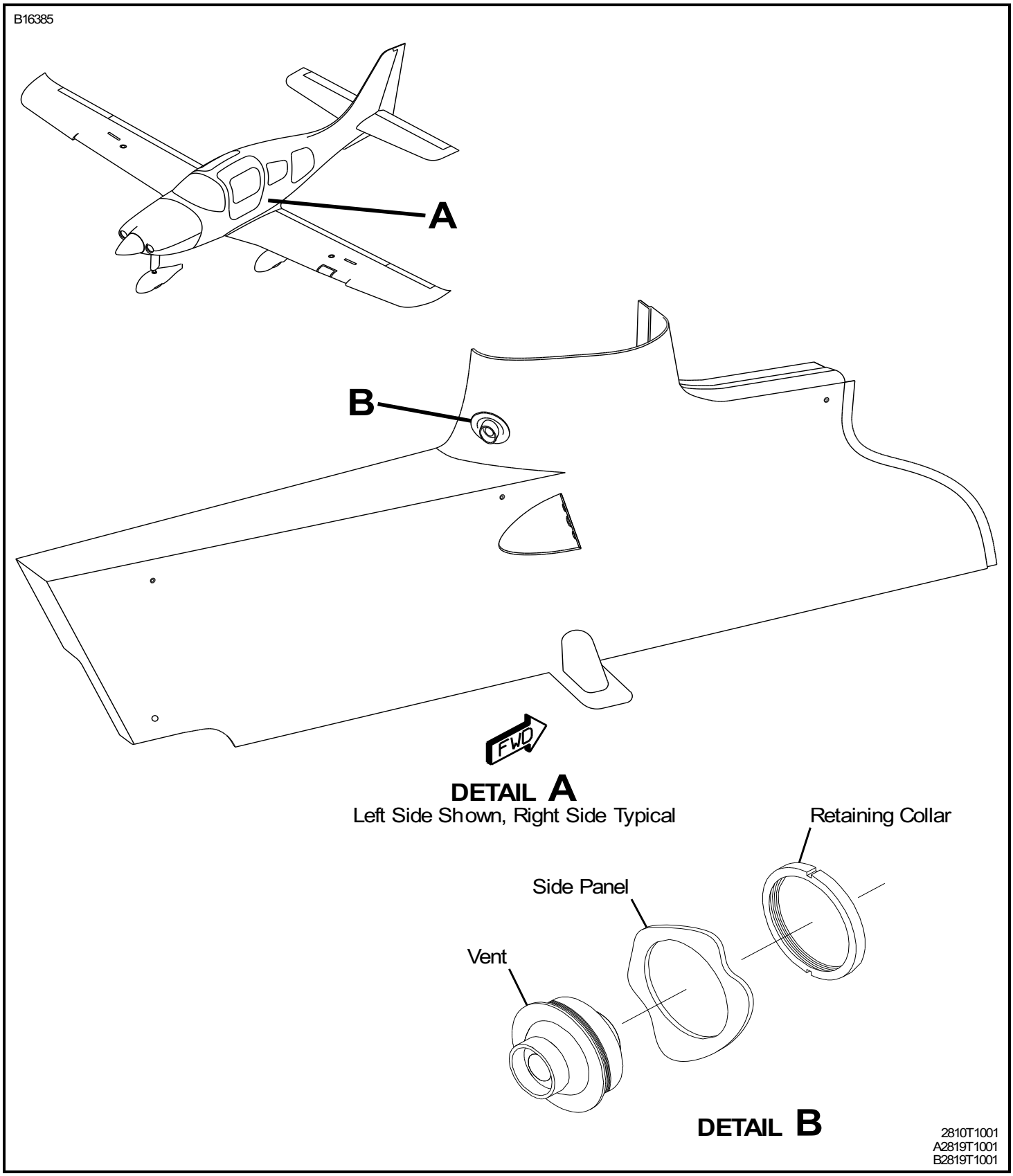
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Figure 401 : Sheet 1 : Instrument Panel Vents Installation



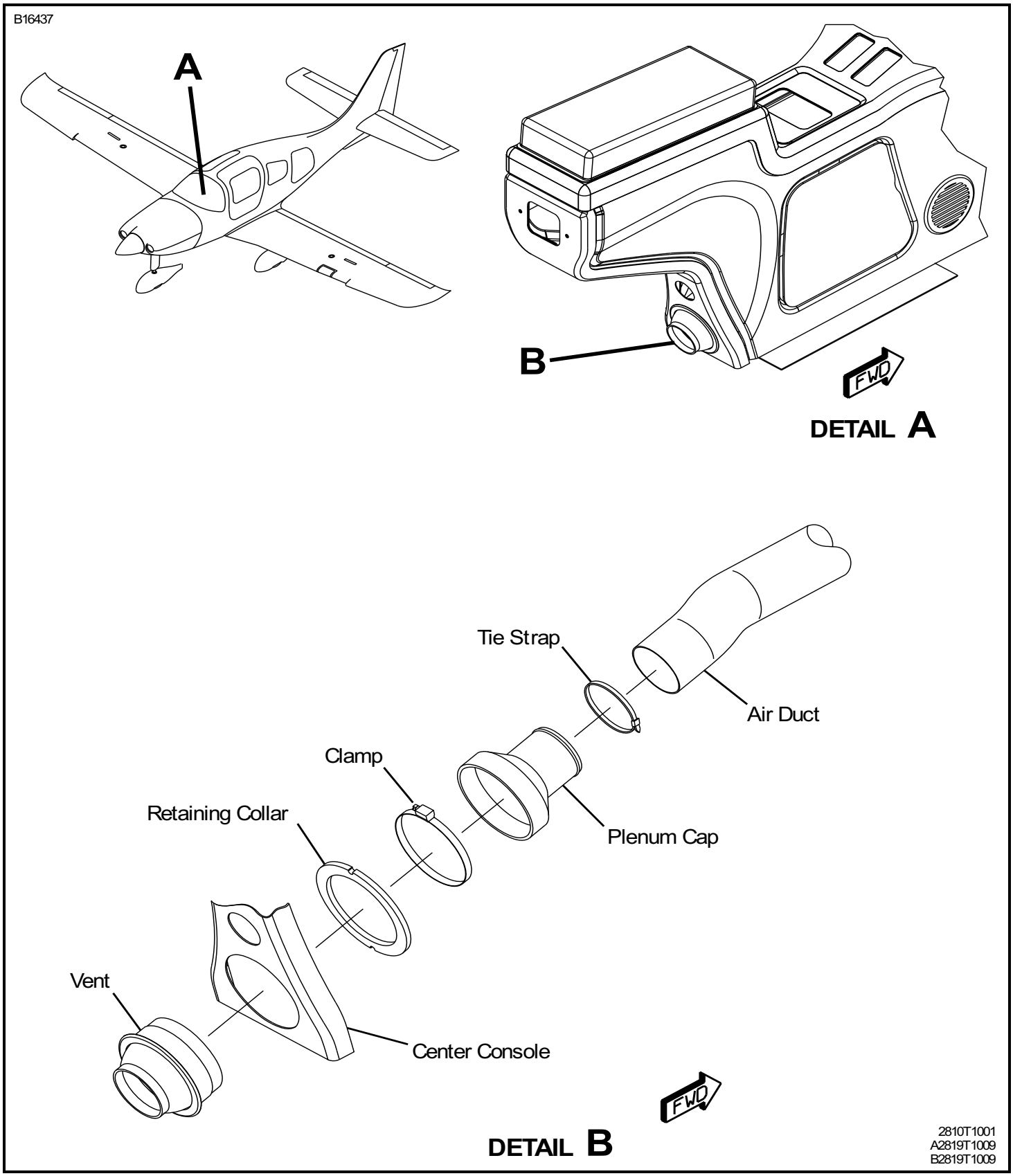
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Figure 402 : Sheet 1 : Side Panel Vents Installation



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Figure 403 : Sheet 1 : Floor Vent Installation



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FIREWALL SHUTOFF VALVE (T240) - REMOVAL/INSTALLATION

1. General

A. This section gives the removal and installation procedures for the T240 Firewall Shutoff Valve.

B. For the Avidyne and Garmin G1000 options ECS Valve Assembly maintenance procedures refer to, Heating and Heater control Valve - Maintenance Practices.

2. Tools and Equipment

A. No special tools or equipment are required for this procedure.

3. Firewall Shutoff Valve Removal/Installation

A. Remove the Firewall Shutoff Valve (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) are in the OFF position.

(3) If necessary, remove the copilot's seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices, Removal, Installation and Adjustment of the Front Seats.

(4) Remove the engine cowlings. Refer to Engine Cowling - Maintenance Practices.

(5) Remove the cabin fan and duct. Refer to Cabin Fan (T240) - Removal/Installation.

(6) Disconnect the electrical connector (P56) from the servo motor.

(7) Remove the tie straps from the inlet and outlet ducts of the valve.

(8) Pull the ducts away from the inlet and outlet ports of the valve.

(9) Remove the firewall shutoff cable. Refer to Firewall Shutoff Cable (T240) - Removal/Installation.

(10) Remove the bolts that connect the forward body weldment to the valve.

(11) Remove the bolts that connect the valve to the firewall.

(12) Remove the valve from the airplane.

B. Install the Firewall Shutoff Valve (Refer to Figure 401).

(1) Place the valve on a bench or other suitable work surface and do as follows:

(a) Connect the firewall shutoff cable to the valve.

(b) Operate the valve to the open and closed position.

(c) Make sure that the valve operates smoothly.

(d) If the valve does not operate smoothly do as follows:

1 Lubricate the servo motor tray with Molykote 321R dry film lubricant.

2 Loosen the screws on the servo motor tray until the washers spin freely. Refer to Servo Motor (T240) - Removal/Installation.

(2) Put the valve in position.

(3) Install the bolts that connect the valve to the firewall.

(4) Install the bolts that connect the forward body weldment to the valve.

(5) Install the firewall shutoff cable. Refer to Firewall Shutoff Cable (T240) - Removal/Installation.

(6) Install the cabin fan and duct. Refer to Cabin Fan (T240) - Removal/Installation.

(7) Slide the flexible ducts over the inlet and outlet ports of the valve.

(8) Install the tie straps on the inlet and outlet ducts of the valve.

(9) Connect the electrical connector (P56) to the servo motor.

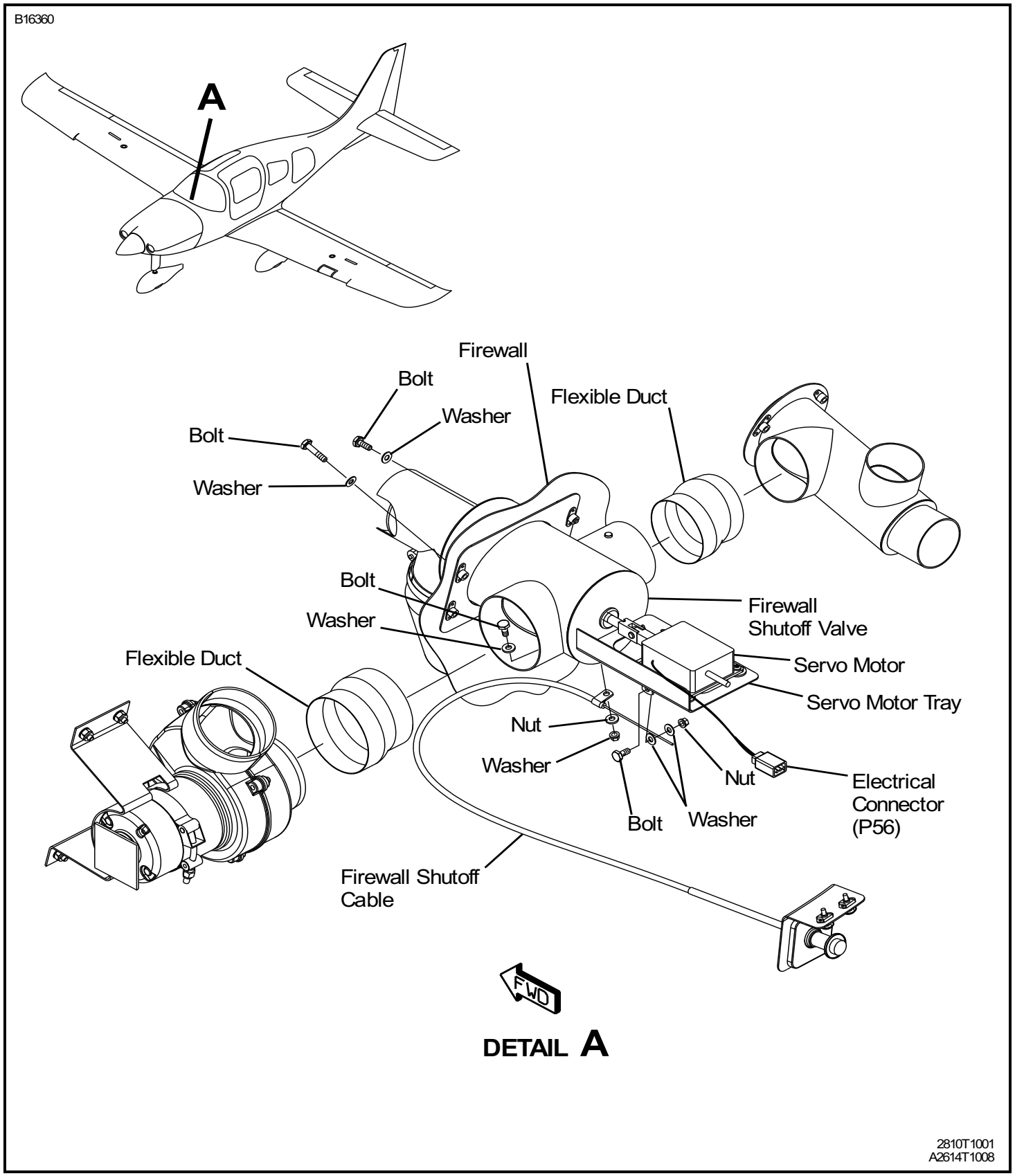
(10) If necessary, install the copilot's seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices, Removal, Installation and Adjustment of the Front Seats.

(11) Install the engine cowlings. Refer to Engine Cowling - Maintenance Practices.

(12) Do a check of the Firewall Shutoff Valve. Refer to Environmental Control System Components - Adjustment/Test.

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Figure 401 : Sheet 1 : Firewall Shutoff Valve Installation



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FIREWALL SHUTOFF CABLE (T240) - REMOVAL/INSTALLATION

1. General

A. This section gives the removal and installation procedures for the Model T240 Firewall Shutoff Cable.

2. Tools and Equipment

A. No special tools or equipment are required for this procedure.

3. Firewall Shutoff Cable Removal/Installation

A. Remove the Firewall Shutoff Cable (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Disengage the AIR COND (if installed) ECS, and ECS CTRL DOOR SEAL circuit breakers found on the cockpit circuit breaker panel.

(5) Remove the copilot seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices.

(6) Remove the cabin fan and duct to get access to the bolt. Refer to Cabin Fan (T240) - Removal/Installation.

(7) Remove the nut, washers, and bolt that attach the cable to the servo motor tray bracket.

(8) Remove the nut, washers, and bolt that attach the cable clamp to the firewall shutoff valve.

(9) Remove the screws and washers that attach the firewall shutoff bracket to the instrument panel.

(10) Remove the nut that attaches the cable to the firewall shutoff bracket.

(11) Remove the cable from the firewall shutoff bracket.

(12) Remove the cable from the airplane.

B. Install the Firewall Shutoff Cable (Refer to Figure 401).

(1) Install the cable through the firewall shutoff bracket, and nut.

(2) Install the nut that attaches the cable to the firewall shutoff bracket.

(3) Put the cable and firewall shutoff bracket in position under the instrument panel.

(4) Install the screws and washers that attach the firewall shutoff bracket to the instrument panel.

(5) Make sure that the cable is in the stowed position.

(6) Install the nut, washers, and bolt that attach the cable to the servo motor tray bracket.

(7) Install the nut, washers, and bolt that attach the cable clamp to the firewall shutoff valve.

(8) Install the cabin fan and duct. Refer to Cabin Fan (T240) - Removal/Installation.

C. Firewall Shutoff Cable Operational Check

(1) Apply external power to the airplane.

(2) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(3) Set the AVIONICS MASTER switch (SW04) to the ON position.

(4) Engage the AIR COND (if installed) ECS, and ECS CTRL DOOR SEAL circuit breakers found on the cockpit circuit breaker panel.

(5) On the GTC 570 Touchscreen Controller Home page do as follows:

(a) Push the Aircraft Systems button.

(b) Push the ECS button.

(c) Push the ECS On button.

(d) Push the right arrow button to drive the valve to the full hot position.

(e) Push the left arrow button to drive the valve to the full cold position.

(6) Make sure that the firewall shutoff valve opens and closes smoothly.

(7) Push the right arrow button to drive the valve to the full hot position.

(8) Pull the firewall shutoff cable to manually move the valve to the full cold position.

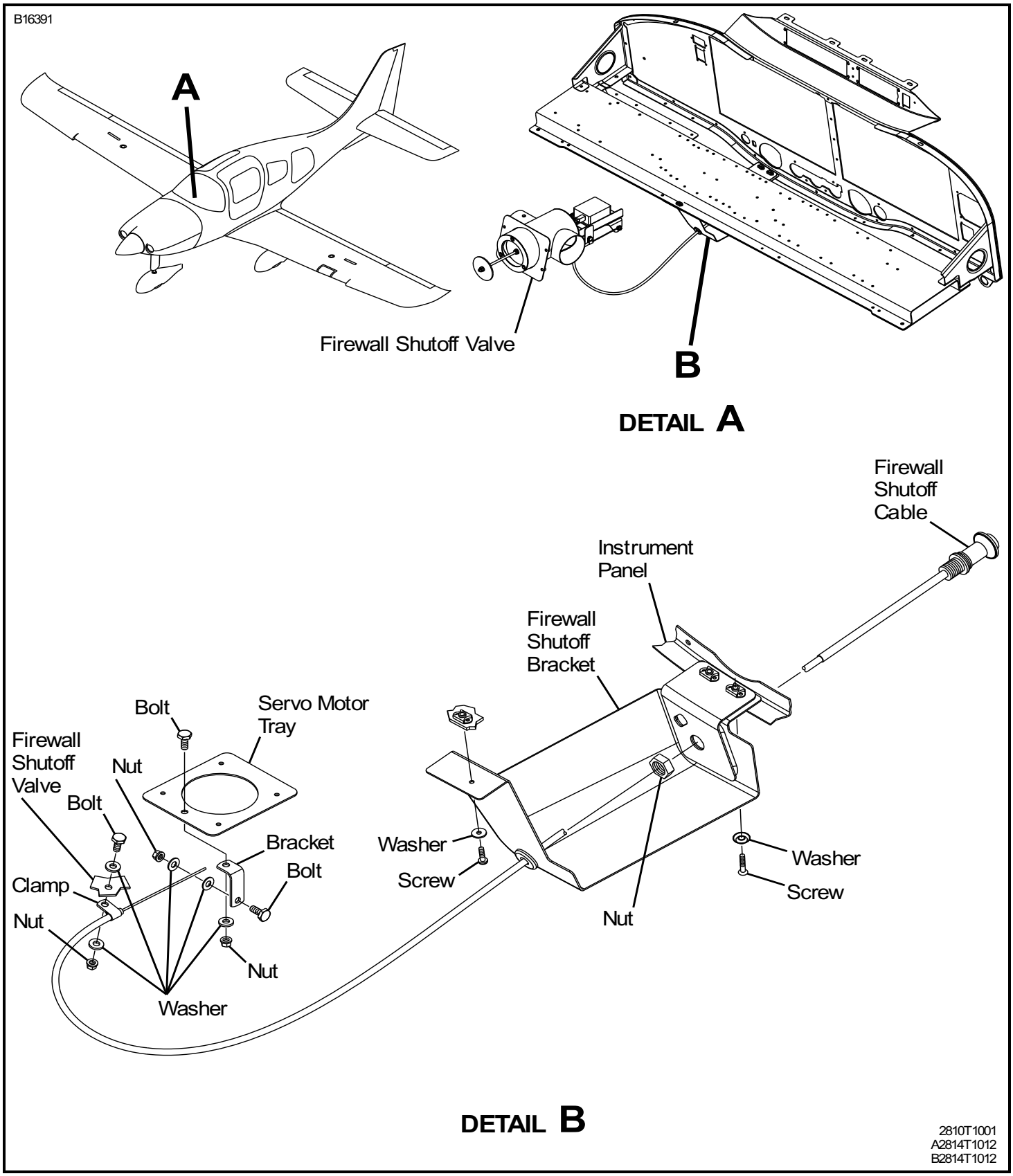
(9) Make sure that the firewall shutoff valve operates smoothly.

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(10) If the valve does not operate smoothly do as follows:
  (a) Check the firewall shutoff cable for sharp bends.
  (b) Lubricate the servo motor tray with Molykote 321R dry film lubricant.
  (c) Loosen the screws on the servo motor tray until the washers spin freely. Refer to Servo Motor (T240) - Removal/Installation.
(11) Set the AVIONICS MASTER switch (SW04) to the OFF position.
(12) Set the master BATT switches (left SW01 and right SW02) to the OFF position.
(13) Disconnect external power from the airplane.
(14) Install the copilot seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices.

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Figure 401 : Sheet 1 : Firewall Shutoff Cable Installation



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EQUIPMENT COOLING FANS (T240) - TROUBLESHOOTING

1. General

A. This section gives the troubleshooting procedures for the Avionics Cooling Fan, the Center Console Cooling Fan, and the Avionics Shelf Cooling Fan.

B. Use the Model T240 Wiring Diagram Manual with the procedures in this section.

2. Tools and Equipment

A. No special tools or equipment are necessary to do the procedures in this section.

3. Avionics Cooling Fan Troubleshooting

A. The avionics cooling fan (UC903) does not operate when power is applied to the avionics bus. A crew alert system (CAS) message shows a fan fault on the Multi-Function Display (MFD). Do the steps that follow:

(1) Make sure that the AVIONICS FANS circuit breaker, found on the cockpit circuit breaker panel, is engaged,

(a) If the circuit breaker is not engaged, engage the circuit breaker and check the instrument panel fan operation again.

(2) If the fan does not operate:

(a) Remove external electrical power from the airplane

(b) Make sure that the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) are in the OFF position.

(3) At the instrument panel cooling fan, disconnect electrical connector (P687) from electrical connector (J1).

(4) Visually inspect the connectors to make sure that there are no bent or damaged pins.

(a) Repair any damage.

(5) If the connectors are good, check the wiring continuity as follows:

(a) Between pin 1 on electrical connector (P687) and pin 16 on electrical connector (P62) at the cockpit circuit breaker panel

(b) Between pin 2 on electrical connector (P687) and pin F on electrical connector PCD02 at the LH GND BLK

(c) Repair any wiring faults

(d) Check the fan operation again.

(6) If the fan does not operate, replace the instrument panel cooling fan. Refer to Equipment Cooling Fans (T240) - Removal/Installation.

(a) Check the fan operation again.

4. Center Console Cooling Fan Troubleshooting

A. The center console cooling fan (UZ100) does not operate when power is applied to the avionics bus. A crew alert system (CAS) message shows a fan fault on the Multi-Function Display (MFD). Do the steps that follow:

(1) Make sure that the AVIONICS FANS circuit breaker found on the cockpit circuit breaker panel, is engaged,

(a) If the circuit breaker is not engaged, engage the circuit breaker and check the instrument panel fan operation again.

(2) If the fan does not operate:

(a) Remove external electrical power from the airplane.

(b) Make sure that the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) are in the OFF position.

(3) At the center console cooling fan, disconnect electrical connector (PC100) from electrical connector (JC100).

(4) Visually inspect the connectors to make sure that there are no bent or damaged pins.

(a) Repair any damage.

(5) If the connectors are good, check the wiring as follows:

(a) Between pin 1 on electrical connector (P687) and pin 16 on electrical connector (P62) at the cockpit circuit breaker panel

(b) Between pin 2 on electrical connector (P687) and pin NN on electrical connector PCD02 at the LH GND BLK

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(c) Repair any wiring faults

(d) Check the fan operation again.

(6) If the does not operate, replace the center console cooling fan. Refer to Equipment Cooling Fans (T240) - Removal/Installation.

(a) Check the fan operation again.

5. Avionics Shelf Cooling Fan Troubleshooting

A. The avionics shelf cooling fan (UZ102) does not operate when power is applied to the avionics bus. A crew alert system (CAS) message shows a fan fault on the Multi-Function Display (MFD). Do the steps that follow:

(1) Make sure that the AVIONICS FANS circuit breaker, found on the cockpit circuit breaker panel, is engaged,

(a) If the circuit breaker is not engaged, engage the circuit breaker and check the avionics shelf cooling fan operation again.

(2) If the fan does not operate:

(a) Remove external electrical power from the airplane.

(b) Make sure that the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) are in the OFF position.

(3) At the avionics shelf cooling fan, disconnect the fan electrical connector (JI102) from the wiring bundle electrical connector (PI012).

(4) Visually inspect the connectors to make sure that there are no bent or damaged pins.

(a) Repair any damage.

(5) If the connectors are good, check the wiring as follows:

(a) Between pin 1 on electrical connector (JI012) and pin 16 on electrical connector (P62) at the cockpit circuit breaker panel

(b) Between pin 2 on electrical connector (JI012) and pin F on electrical connector PCD02 at the LH GND BLK

(c) Repair any wiring faults.

(d) Check the fan operation again.

(6) If the the avionics shelf cooling fan does not operate replace it. Refer to Equipment Cooling Fans (T240) - Removal/Installation.

(a) Check the fan operation again.

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EQUIPMENT COOLING FANS (T240) - REMOVAL/INSTALLATION

1. General

A. This section gives the removal and installation procedures for the Model T240 Equipment Cooling Fans.

B. For the Avidyne and Garmin G1000 options equipment cooling fan maintenance procedures (Refer to Chapter 34, GPS and Transponder - Maintenance Practices Avionics Cooling Fan).

2. Tools and Equipment

A. No special tools or equipment are required for this procedure.

3. Avionics Cooling Fan

A. Remove the Avionics Cooling Fan (UC903) (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) are in the OFF position.

(3) Disengage the AVIONICS FANS circuit breaker found on the cockpit circuit breaker panel.

(4) If necessary, remove the pilot's seat. Refer to Chapter 25 Airplane Seats - Maintenance Practices, Removal, Installation and Adjustment of the Front Seats.

(5) Disconnect electrical connector P687 from the fan electrical connector (J1).

(6) Loosen the clamps that connect the ducts to the fan.

(a) Remove the ducts from the fan.

(7) Remove the screws that attach the fan to the avionics shelf.

(8) Remove the fan from the airplane.

B. Install the Avionics Cooling Fan (UC903) (Refer to Figure 401).

(1) Put the fan in its correct position to the bottom of the avionics shelf.

(2) Install the screws that attach the fan to the avionics shelf.

(3) Attach the ducts to the fan.

(a) Tighten the clamps that connect the ducts to the fan.

(4) Connect electrical connector P687 to the fan electrical connector (J1).

(5) Engage the AVIONICS FANS circuit breaker found on the cockpit circuit breaker panel.

(6) Do a test of the Avionics Cooling Fan. Refer to Equipment Cooling Fans Operational Test.

(7) If necessary, install the pilot's seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices, Removal, Installation and Adjustment of the Front Seats.

4. Center Console Cooling Fan

A. Remove the Center Console Cooling Fan (UZ100) (Refer to Figure 402).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) are in the OFF position.

(3) Disengage the AVIONICS FANS circuit breaker found on the cockpit circuit breaker panel.

(4) Remove the Touchscreen Controller. Refer to Chapter 34 Garmin GTC 570 Touchscreen Controller (G2000) - Removal/Installation.

(5) Disconnect the fan electrical connector PC100 from electrical connector JC100.

(6) Remove the screws that attach the fan to the fan bracket.

(7) Remove the fan from the airplane.

B. Install the Center Console Cooling Fan (UZ100) (Refer to Figure 402).

(1) Put the fan in its correct position on the fan bracket.

(2) Install the screws that attach the fan to the fan bracket.

(3) Connect the fan electrical connector PC100 to electrical connector JC100.

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(4) Install the Touchscreen Controller. Refer to Chapter 34 Garmin GTC 570 Touchscreen Controller (G2000) - Removal/Installation.

(5) Engage the AVIONICS FANS circuit breaker found on the cockpit circuit breaker panel.

(6) Do a test of the Equipment Cooling Fans. Refer to Equipment Cooling Fans Operational Test.

5. Avionics Shelf Cooling Fan Removal and Installation

A. Remove the Avionics Shelf Cooling Fan (UZ102) (Refer to Figure 403).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) are in the OFF position.

(3) Disengage the AVIONICS FANS circuit breaker found on the cockpit circuit breaker panel.

(4) Remove the glare shield. Refer to Chapter 25 Glareshield (T240) - Removal/Installation.

(5) If necessary to get access to the fan electrical connectors, remove the copilot's seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices, Removal, Installation and Adjustment of the Front Seats.

(6) Disconnect the airplane wiring bundle electrical connector (JI012) from the fan electrical connector (PI012).

(7) Remove the screws that attach the fan to the fan bracket.

(a) Remove the fan from the airplane.

B. Install the Avionics Shelf Cooling Fan (UZ102) (Refer to Figure 403).

(1) Put the fan in its correct position on the fan bracket.

(2) Install the screws that attach the fan to the bracket.

(3) Connect the airplane wiring bundle electrical connector to the fan electrical connector.

(4) Engage the AVIONICS FANS circuit breaker found on the cockpit circuit breaker panel.

(5) Do a test of the Equipment Cooling Fans. Refer to Equipment Cooling Fans Operational Test.

(6) Install the glare shield. Refer to Chapter 25 Glareshield (T240) - Removal/Installation.

(7) If necessary, install the copilot's seat. Refer to Chapter 25 Airplane Seats - Maintenance Practices, Removal, Installation and Adjustment of the Front Seats.

6. Equipment Cooling Fans Operational Test

A. Do the Equipment Cooling Fans Operational Test.

(1) Apply external electrical power to the airplane.

(2) Set the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) to the ON position.

(3) Set the CROSS TIE switch (SW03) to the ON position.

(4) Make sure that the fans that follow operate correctly:

- Avionics Cooling Fan
- Center Console Cooling Fan
- Avionics Shelf Cooling Fan.

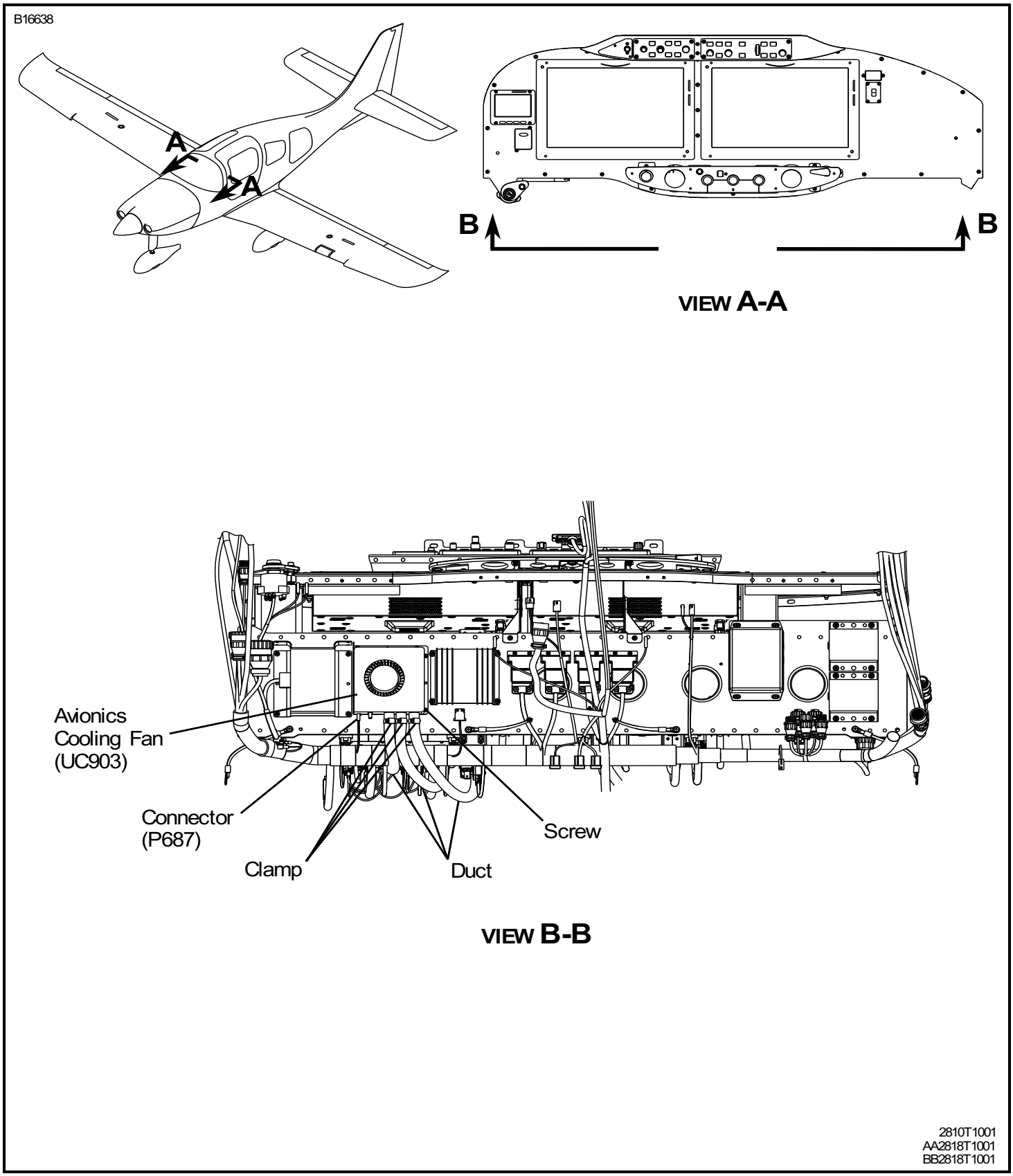
(5) Set the master BATT switches (left and right) and the AVIONICS MASTER switch to the OFF position.

(6) Set the CROSS TIE switch to the OFF position.

(7) Remove external electrical power from the airplane.

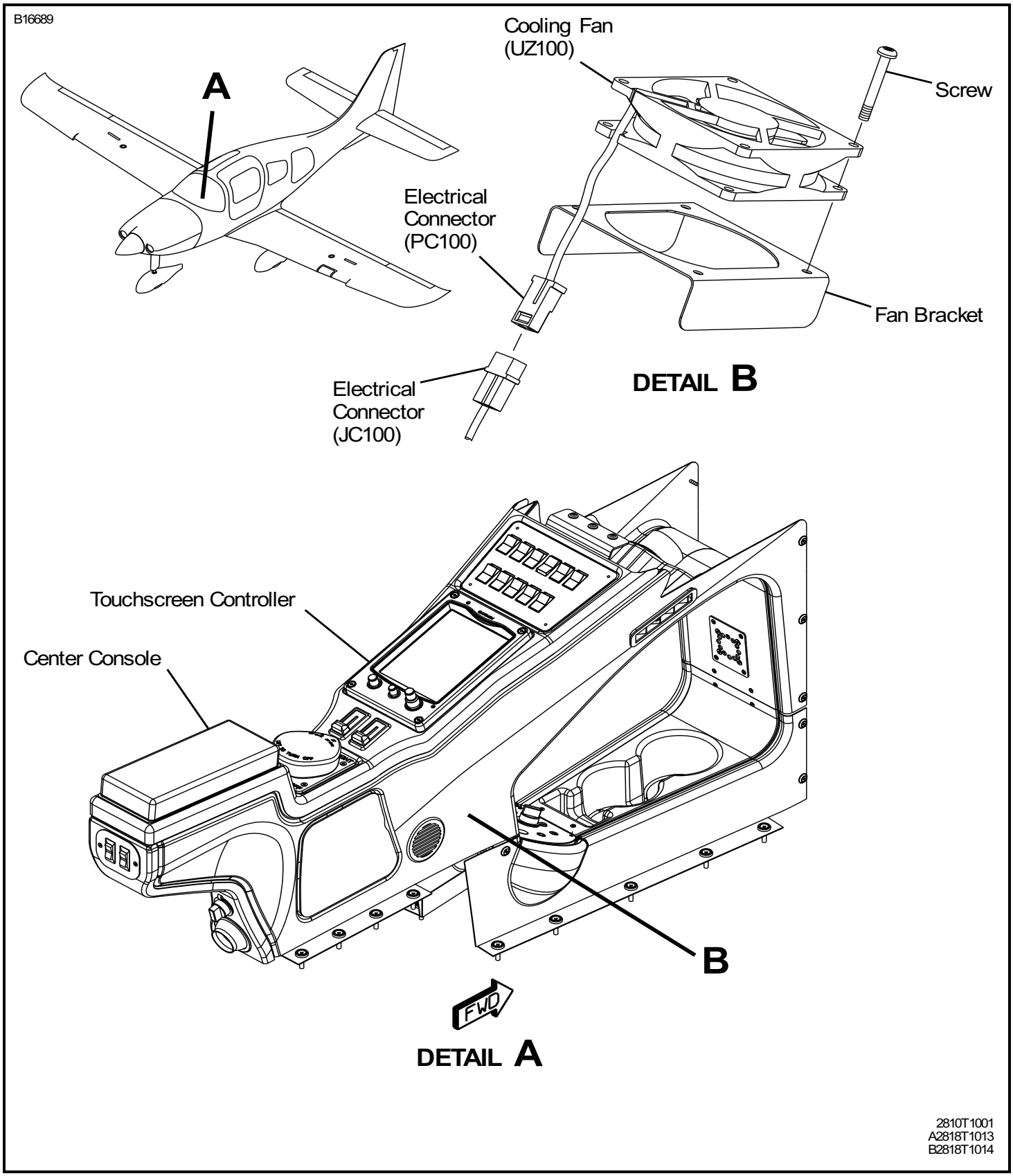
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Figure 401 : Sheet 1 : Avionics Cooling Fan Removal/Installation



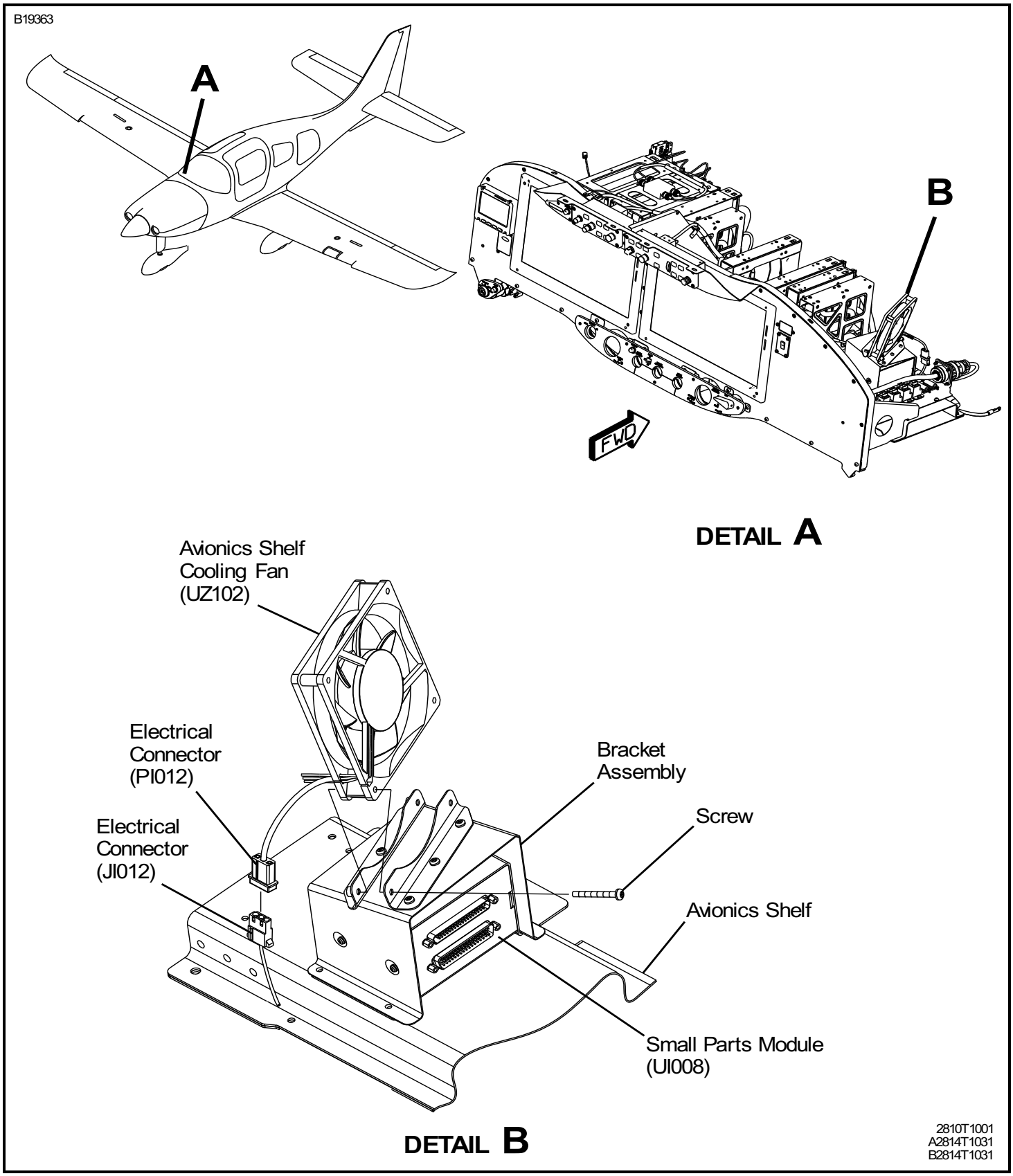
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Figure 402 : Sheet 1 : Center Console Cooling Fan Removal/Installation



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Figure 403 : Sheet 1 : Avionics Shelf Cooling Fan Removal/Installation



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HEATING AND HEATER CONTROL VALVE - MAINTENANCE PRACTICES

1. Heating And ECS Control Valve

A. The following procedures are applicable to the heater and ECS control valve.

B. For the Model T240 control valve installation maintenance procedures refer to Firewall Shutoff Valve (T240) - Removal/Installation.

2. ECS Control Valve

A. **ECS Control Valve Removal** - To remove the ECS control valve from the airplane, use the following instructions.

(1) Loosen the steel clamp securing the ECS adapter to the ECS control valve inlet tube located in the engine compartment. The ECS adapter may now be pulled away from the tube. The ECS adapter may have to be worked free because it was installed with a thin application of high temperature silicone. Refer to Figure 201.

(2) Cut and remove the plastic tie straps from the inlet and outlet tubes of the ECS control valve, and pull the flexible ducting away from the tubes. Refer to Section 21-20-00, Figure 204.

(3) Disconnect the heater control valve servo motor ELC plug.

(4) Remove the faceplate screws and washers, and pull the faceplate outward until the inner plunger seal can be seen.

(5) Remove the control box bolts and washers. Pull the control box out from under the instrument panel (refer to Figure 202).

B. **ECS Control Valve Installation** - To install the heater control box use the following instructions:

(1) Insert the control box into the opening in the firewall from inside of the cabin area with the servo motor facing up.

(2) Install the control valve mounting bolts and washers from the engine compartment side of the firewall.

(3) Install the faceplate onto the front of the control box, then install the faceplate mounting screws and washers.

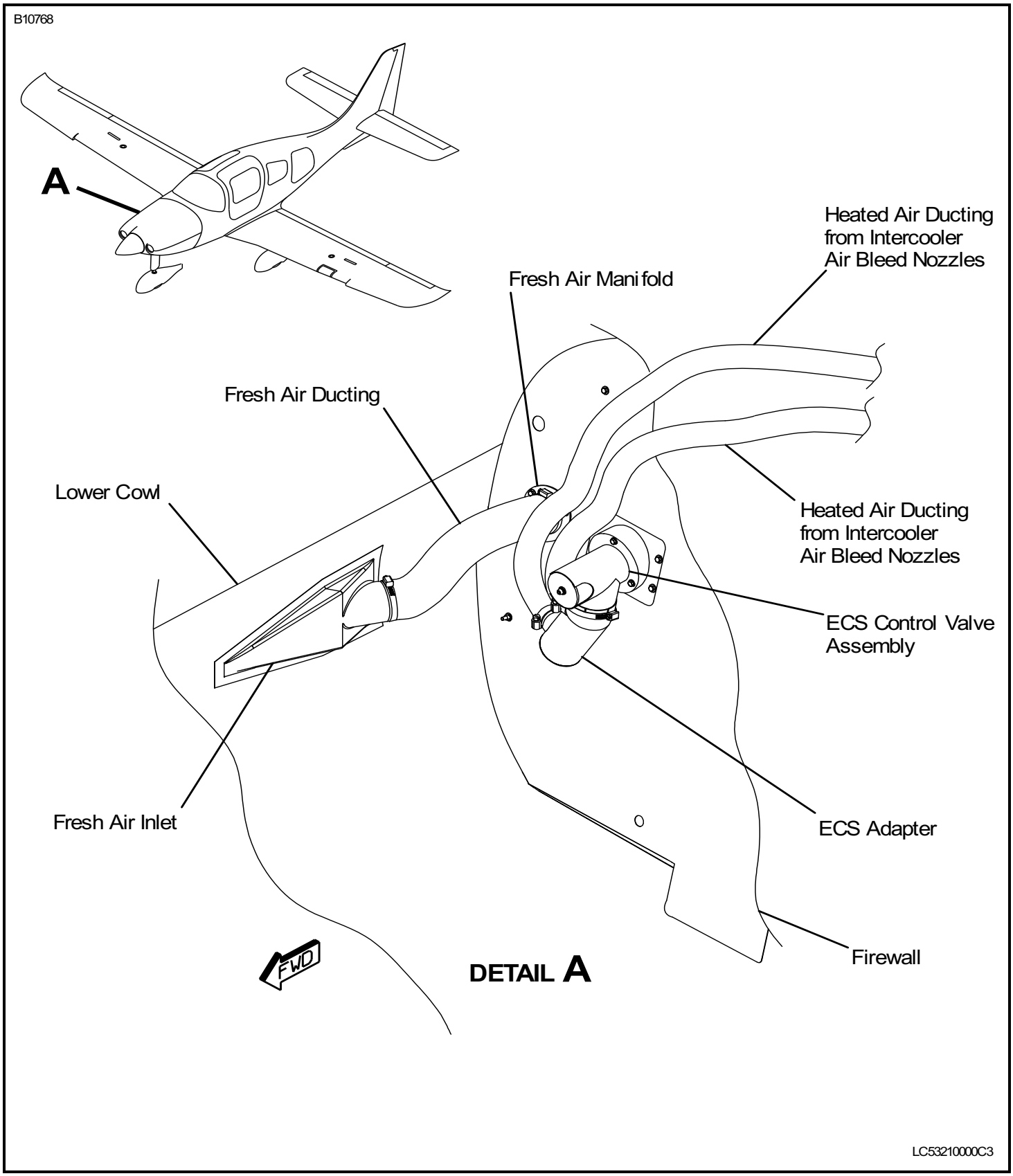
(4) Apply a bead of high temperature silicone to the inside rim of the ECS adapter and reattach it to the faceplate inlet tube with a steel clamp.

(5) Turn on the power and test the heater control box for proper valve operation and adjust the servo motor per the Servo Motor section, if necessary.

C. **ECS Control Valve Maintenance** - The heater control box is a self-contained unit. Only a periodic check for proper valve operation is required.

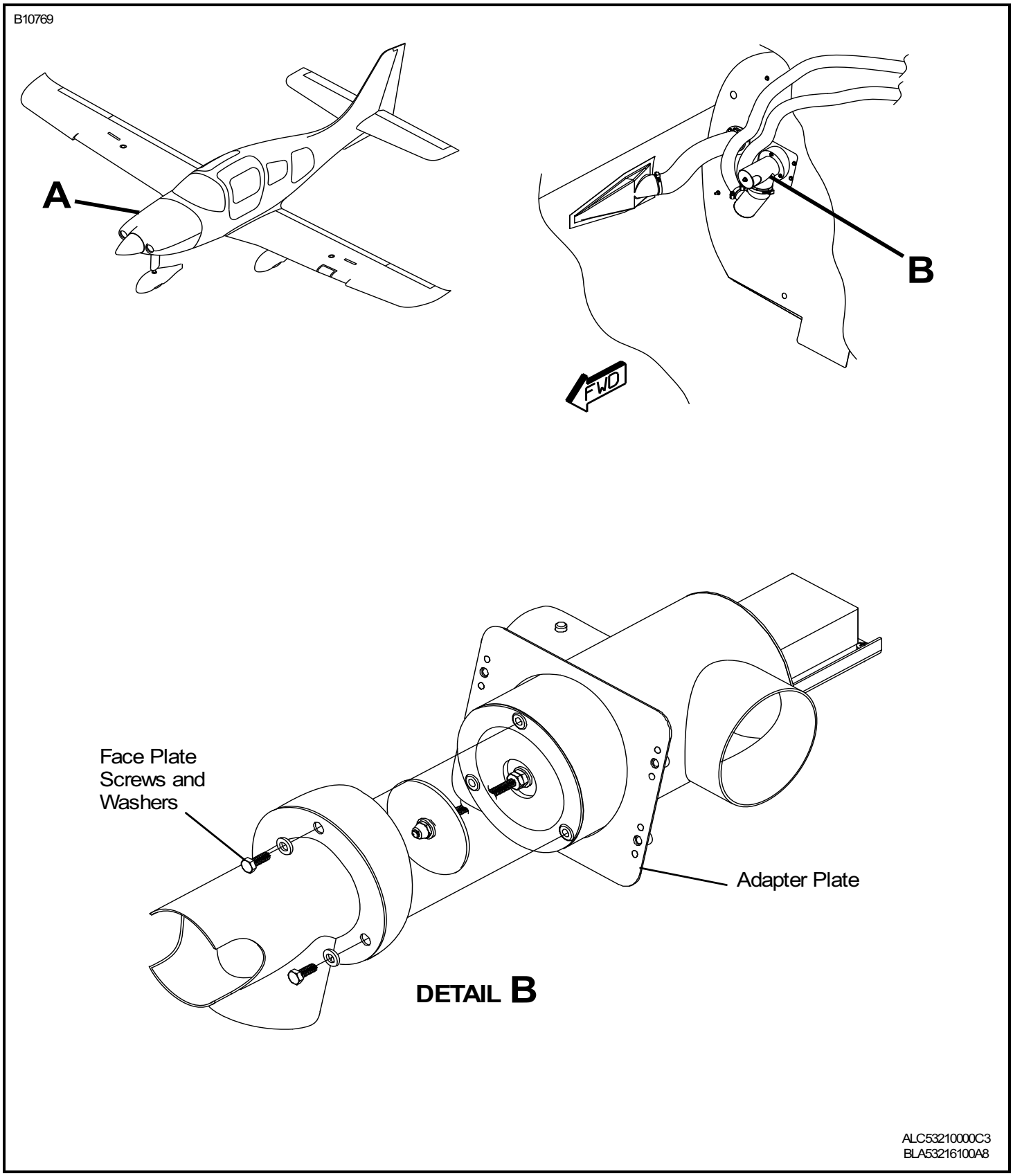
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Figure 201 : Sheet 1 : ECS Assembly in Engine Compartment



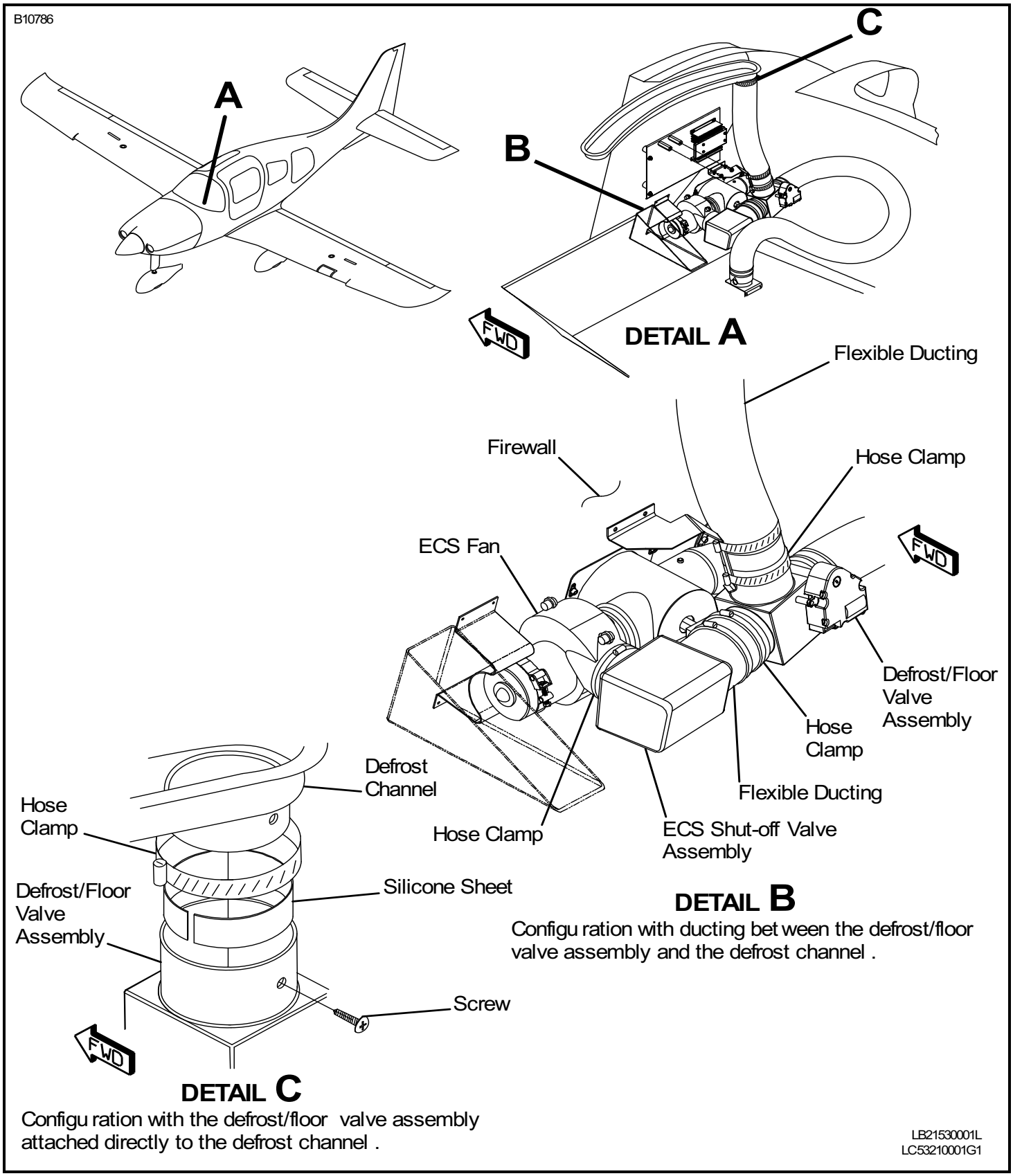
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Figure 202 : Sheet 1 : ECS Control Valve and Faceplate Attachment



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Figure 204 : Sheet 1 : ECS Shut-Off Valve and Defrost/Floor Valve Assemblies (Avidyne and G1000)



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AIR CONDITIONING SYSTEM (T240) - ADJUSTMENT/TEST

1. General

A. This section gives the test procedures for the Model T240 air conditioning system. The Model T240 air conditioning system is controlled with the Garmin G2000 GTC 570 Touchscreen Controller (UI405). The GTC 570 is found in the center console. For a description of the Model T240 GTC 570 temperature control functions refer to, Temperature and Air Control (T240) - Description and Operation. For a general description applicable to the GTC 570 refer to Chapter 34, Garmin G2000 - Description and Operation.

2.

A. Do the Air Conditioning Test

(1) Start the engine. Refer to the Model T240 POH.

(2) Make sure that the circuit breakers that follow are engaged:

(a) AIR COND

(b) ECS FAN

(c) ECS CTRL DOOR SEAL

(3) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(4) Set the AVIONICS MASTER switch (SW04) to the ON position.

(5) Set the CROSS TIE switch (SW03) to the ON position.

(6) When the initial startup sequence is complete, push the Multifunction Display (MFD) ENT softkey.

(a) The startup screen clears.

(7) On the GTC 570 Touchscreen Controller Home page do as follows:

(a) Push the Aircraft Systems touchkey.

1 The ECS page shows

2 The Actual and Selected temperature fields populate.

(b) Push the ECS touchkey.

(c) Make sure that the Actual temperature that shows is between 65°F and 85°F.

(d) Touch the black area of the ECS page for approximately 5 seconds.

1 The DIAG touchkey shows on the display.

(e) Push the DIAG touchkey.

1 Make sure that not faults show in the FAULTS field.

(8) On the GTC 570 Home page do as follows:

(a) Push the Aircraft Systems touchkey.

(b) Push the ECS touchkey

(c) Push the A/C touchkey.

(9) Push the Fan Mode touchkey.

(a) Make sure that Auto mode is selected.

(10) On the GTC 570 move the temperature fully to the left (Cold).

(a) Make sure that cold air blows out of the eyeball vents near the engine control panel.

(11) Push the Fan Mode touchkey.

(a) Make sure that the Manual fan mode is selected.

(12) On the GTC 570 move the fan speed control.

(a) Make sure that the fan speed changes with the manual control movement.

(13) On the GTC 570 push the DEFOG touchkey.

(a) Make sure that air blows out from the windshield vents.

(b) Make sure that air no longer blows out from the eyeball vents near the engine control panel.

(14) On the GTC 570 push the DEFOG touchkey again.

(a) Make sure that air no longer blows out of the windshield vents.

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(b) Make sure that air blows out from the eyeball vents near the engine control panel.

(15) Do the engine shutdown. Refer to the Model T240 POH.

(16) Set the master BATT switches (left SW01 and right SW02) to the OFF position.

(17) Set the AVIONICS MASTER switch (SW04) to the OFF position.

(18) Set the CROSS TIE switch (SW03) to the OFF position.

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TEMPERATURE AND AIR CONTROL - MAINTENANCE PRACTICES

1. General

A. One of three types of temperature and air control units will be present in the aircraft depending upon avionics installed (basic and Avidyne, Garmin G1000 or Garmin G2000, when the optional Automatic Climate Control System (ACCS) is installed on the airplane). For airplanes with Garmin G1000 avionics and without ACCS, the temperature and air control unit is similar to the control head of the ACCS with identical removal and installation procedures.

(1) The Model T240 ACCS system utilizes the Garmin Touchscreen Controller (GTC) 570 to operate the ACCS system. For more data applicable to the touch screen controller refer to Chapter 34, Garmin G2000 - Description and Operation.

(2) For aircraft with optional ACCS, refer to Automatic Climate Control System (ACCS) - Maintenance Practices.

(3) For aircraft with basic instruments only or Avidyne avionics, and without ACCS, see below.

2. Air Control Unit Removal and Installation (Basic Instruments and Avidyne Installations)

A. **Removal of Air Control Unit** - To remove the temperature and air control unit use the following instructions.

(1) Turn the power off and remove the temperature and air control knobs from the control unit faceplate located on the instrument panel by removing the set screws at the bottom of each knob. Refer to Figure 201.

(2) Remove the fan rocker switch by gently squeezing together the locking tabs located on the outer perimeter of the switch from behind the instrument panel.

(3) Carefully pull the rocker switch away from the instrument panel until wiring is exposed.

(4) Disconnect the wiring from the back side of the rocker switch, and remove the switch.

(5) Disconnect the ELC plug between the motor control card and the heater control box servo motor.

(6) Cut the plastic tie straps located at the air control unit inlet and outlet tube locations.

(7) Pull the flexible ducting away from the air control unit.

(8) Remove the four 6-32 self-locking nuts and washers attached to the Pem studs on the face of the air control unit. Refer to Figure 202.

(9) From the back side of the instrument panel, remove the nuts and washers securing the air control unit tray to the back side of the instrument panel as shown in Figure 202 and Figure 203.

(10) Pull the air control unit forward (toward the firewall) and away from the instrument panel until the knob shafts are behind the instrument panel.

(11) Remove the air control unit by pulling it out from underneath the instrument panel.

B. **Installation of the Air Control Unit** - To install the air control unit, use the following instructions.

(1) Place the unit onto the cover panel studs from the backside of the instrument panel, and secure with nuts and washers.

(2) Slide the flexible ducting onto the air control unit inlet and outlet tubes, and secure using plastic tie straps.

(3) Reconnect the motor control card to the servomotor ELC connector.

(4) Reconnect wiring to the backside of the fan rocker switch, and gently press the switch into the opening until the switch locking tabs are fully engaged.

(5) Install the temperature and air control knobs to the control shafts, checking for free knob rotation. Install set screws at bottom of knobs as shown in Figure 201.

(6) Turn the power on, and check for proper fan and heater control valve operation.

C. **Air Control Unit Maintenance** - The temperature and air control unit is self-contained. A periodic check for fan, air control unit butterfly valve, and heater control valve operation is required. A functional check should be completed at each 100 hour or annual inspection using the following procedure. Refer to Section 21-00-00 for a description of control operation.

(1) With cabin fan off, check adequacy of airflow for the front floor vents, rear floor vent, and defroster.

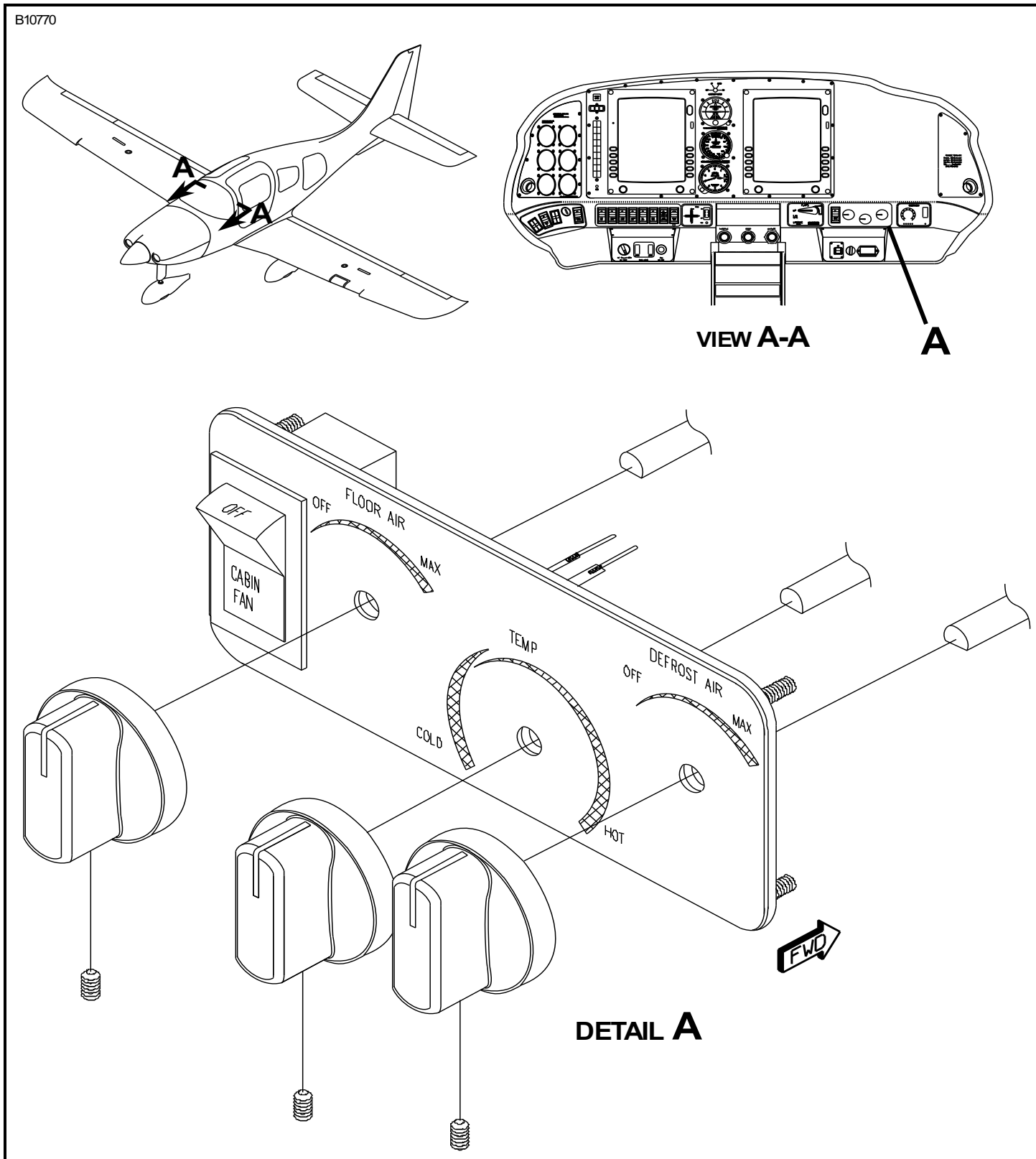
(2) Check for proper operation of the air volume control, temperature control, and air output control.

(3) Evaluate eyeball fresh air vents for proper operation.

(4) Evaluate the adequacy of the system in terms of crew and passenger comfort, as well as the defroster’s ability to control fogging of the windscreen.

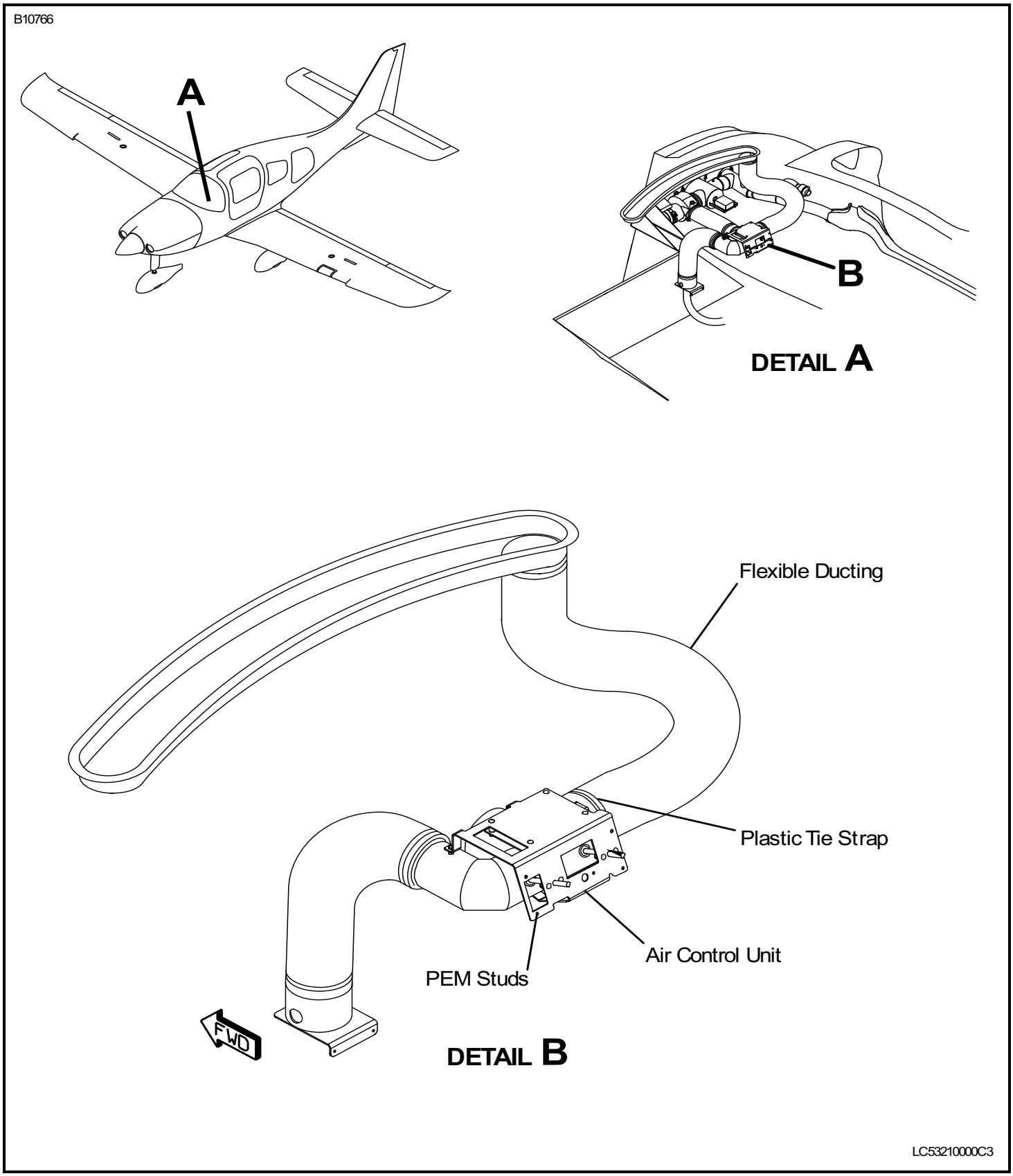
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Figure 201 : Sheet 1 : ECS Faceplate



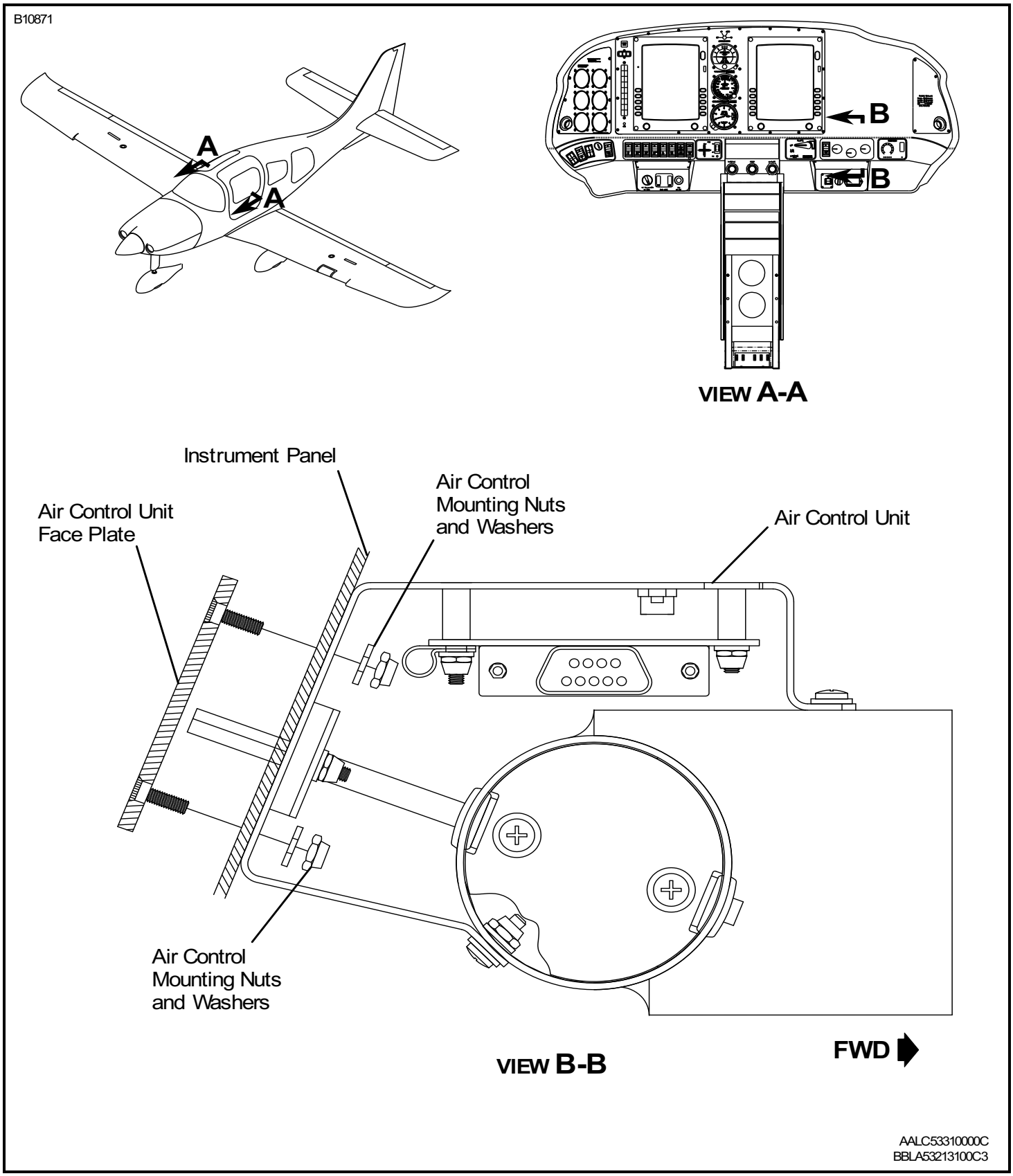
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Figure 202 : Sheet 1 : Air Control Unit Attachment



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Figure 203 : Sheet 1 : Air Control Unit Attachment



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AUTOMATIC CLIMATE CONTROL SYSTEM (ACCS) - MAINTENANCE PRACTICES

1. General

A. Description

(1) The Automatic Climate Control System (ACCS) is a fully automatic system than can be operated manually. The system has the components that follow: a control head or touchscreen controller, Electronic Control Unit (ECU), temperature sensors, a Vapor Cycle System (VCS) air conditioning system, valves, hoses, and tubing. The air conditioning system has the components that follow: a compressor, a condenser with fans, a receiver-dryer with a trinary pressure switch and an evaporator with an expansion valve and an evaporator coil temperature sensor. Barrier hoses connect the components. A mix of steel and aluminum type fittings are used. Refer to Figure 201.

(a) The Avidyne and G1000 ACCS installations utilizes a control head to operate the system. For more data applicable to the refer to, Control Head.

(b) The Model T240 ACCS system utilizes the Garmin G2000 Touchscreen Controller (GTC) 570 (UI405) to operate the ACCS system. For data applicable to the GTC 570 control of the ACCS, refer to Temperature and Air Control (T240) - Description and Operation.

(2) In manual or automatic operation, the system manual or auto choices for heater and air conditioning blower speed.

B. Ground Power Operation of the ACCS

(1) On 28 VDC aircraft with ACCS equipped with the optional electric compressor, pre-cooling of the aircraft cabin is possible using a ground power supply. For ground power operation of the air conditioning a ground power source that can deliver 100 amps during use is necessary.

(2) After connecting a ground power source and switching the unit on, the ACCS can be operated by pushing the external switch found near the ground power receptacle. When operated the aircraft power grid is disabled and the electric compressor and evaporator blower will run continuously while the condenser fans automatically cycle as needed. The external ACCS switch does not function when a battery master is on. The ACCS control panel is disabled during external power air conditioning operation and the ACCS cools at max capability. External power ACCS operation can be deactivated by pushing the external switch, removing the ground power source, or turning on either battery master switch. With a battery master on, the ACCS will be fully functional with the exception of the electric compressor, which will be off. An Electric A/C Interlock Assembly allows this integration of the ACCS with the airplane's electrical system. Refer to Chapter 24 for removal and installation of the interlock assembly.

(3) The Avidyne and G1000 ACCS installations have self-diagnostic capabilities that show on the control head display. Refer to Table 201.

(4) The Model T240 ACCS installation uses the GTC 570 Touchscreen Controller for its self-diagnostic function. For more data applicable to the GTC 570 ACCS diagnostic function, refer to Temperature and Air Control (T240) - Description and Operation.

2. Tools and Equipment

A. The tools and equipment that follow are necessary for leak testing, evacuating, and charging the refrigerant system:

- Gaseous dry nitrogen, regulated source (0-500 psig or 0-35 bar)
- R-134a refrigerant
- Refrigerant oil, Ester RL-500S
- R-134a refrigerant charging manifold with gauges and hoses with quick-disconnect couplers. The coupler has a knob on top which is used to engage and disengage the Schrader valve in the aircraft service ports.
- R-134a charging station and recovery/recycling station (SAE standard J2210)
- Air conditioning vacuum pump
- Hose adapter, for nitrogen bottle (.50 inch male acme to .25 inch SAE female flare)
- Hose adapter for vacuum pump (.50 inch male acme to .25 inch SAE female flare)
- Electronic leak detector
- Burroughs tool No. BT-33-73F (or equivalent) belt tension gauge
- Torque wrench capable of reading inch-pounds or N-m
- Small hand tools and socket set.
- Thermometer, 0-150° F
- Thermometer, 0-150° F
- Service light or flashlight
- Service light or flashlight

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- Weight scale, 0-50 lbs (0-25 kg) capable of 0.1 lb (5 gram) precision.

3. Air Distribution

A. For the Avidyne or Garmin G1000 installations air distribution are controlled by the ACCS with pilot, or co-pilot, input through the control head (Refer to Figure 202).

B. The Model T240 G2000 ACCS installation uses a touch screen controller for air distribution operation (Refer to Figure 202). For more data applicable to the touch screen controller refer to Garmin G2000 - Description and Operation.

C. Air Distribution Operation

(1) Air Conditioning - When air conditioned air is necessary, the evaporator blower is actuated and air is distributed through the overhead ceiling console vents and associated flood ducts.

(2) Heat - When heat is necessary, the ACCS shuts off the compressor and evaporator blower and regulates the heater/defog blower in the forward cabin. Heated air is distributed approximately 90 percent to the floor ducts with the remaining air being diverted to the windscreen defog ducts.

(3) Defog - When the Defog mode is selected on the control head /touchscreen controller, the heater/defog blower is activated at maximum speed and all air is distributed to the windscreen. Temperature selection on the control head/touchscreen controller regulates the temperature of the defog air.

4. Diagnostics

A. For the Avidyne and G1000 installations, to show the Diagnostics Fault Code on the display, turn on the ACCS (or ECS on Garmin G1000 equipped aircraft) and depress the ON button three times in succession. The digital display shows all active fault codes. When you push the ON button again and again the digital display scrolls through the active codes. Each code displayed should be addressed in turn until the "No Faults" code E00 is displayed. (Refer to Table 201). For the Model T240 Garmin G2000 installation diagnostic data, refer to Garmin G2000 - Description and Operation.

(1) With the Garmin G1000 option and no ACCS, fault codes E04 and E08 always displays due to the absence of an evaporator temperature sensor or OAT sensor in the system. In this case ignore the E04 and E08 codes.

Table 201. Fault Display Codes

Fault Code	Information	Correction
E00	No Faults	-
E01	Cabin Temp Sensor - Shorted	Check cabin temp sensor wiring and sensor for correct operation. Refer to Figure 203.
E02	Cabin Temp Sensor - Open	Check cabin temp sensor wiring and sensor for correct operation. Refer to Figure 203.
E03	Evap Temp Sensor - Shorted	Check evaporator coil temp sensor wiring and sensor for correct operation. Refer to Figure 205.
E04	Evap Temp Sensor - Open	Check evaporator coil temp sensor wiring and sensor for correct operation. Refer to Figure 205.
E05	Not Currently Used	-
E06	Not Currently Used	-
E07	OAT Sensor - Shorted	Check OAT sensor wiring and sensor for correct operation. Refer to Figure 204.
E08	OAT Sensor - Open	Check OAT sensor wiring and sensor for correct operation. Refer to Figure 204.
E09	Not Currently Used	-
E10	Heater Blend Air Actuator-Open	Check actuator sensor wiring and sensor for correct operation.
E17	No Communication with ECU	Check ECU wiring and system circuit breakers for correct operation.

B. The Advanced Diagnostics display mode is activated by pressing and holding the "ON" button for five seconds while the Fault Code display is active.

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Press the "ON" button to cycle through the following displays:

"CAb" Cabin Temperature Sensor temperature reading

"EUAP" Evaporator Coil Temperature Sensor temperature reading

"HEAt" ECS mixing valve position (percentage open)

"A-C" VCS compressor command (ON or OFF)

"FAn" Blower Speed-Evaporator or Heater/Defog (percentage of max)

Press the "OFF" button to return to the normal display mode.

C. The Firmware Version display mode is activated by pressing and holding the "ON" button for five seconds while the Advanced Diagnostics display is active.

Press the "ON" button to cycle through the following displays:

"ECU" ECU Module Firmware Version

"CtrL" Firmware Version

Press the "OFF" button to return to the normal display mode.

D. The parameter function is activated by pressing and holding the "OFF" button for five seconds while the advanced diagnostics display mode is active.

(1) Press the FAN "+" or the FAN "-" buttons to select configuration (config) setting: "Pf-x" ("x" can be displayed as 0,1, or 2 depending on setting).

(2) Press the TEMP "+" or the TEMP "-" buttons to change the selected config setting to : "Pf-1".

(3) Exit and save the settings in the programming mode by pressing the "OFF" button.

NOTE: Do not change any other settings within the configuration screen or damage to the system can occur.

5. Safety and System Service Precautions

A. Cabin Sealing

(1) You must seal the items that follow to make sure carbon monoxide does not enter the cabin of the aircraft. Use McMaster-Carr foam tape P/N 8512K24 or LP Aero Plastic foam tape P/N SP-FT114, 3M 425 foil tape, and PR 1428 B1/2 or RTV5818 sealant as indicated.

(a) Make sure that the foam tape is intact around the edges of the two clear access panels. When reinstalling the panels apply foam tape to form an airtight seal. When reinstalling the plug, apply Wacker Elastosil 952, Dow Corning 732, or GE RTV-108 sealant.

(b) Components penetrating the forward condenser bay bulkhead, and hollow shank rivets in the condenser compartment - Apply sealant as necessary.

(c) Lower corners of condenser compartment and gear member seals - Apply sealant as necessary.

(d) Between gearbox and fuselage on exterior near forward side of gear leg attachment - Apply sealant as necessary.

(e) At the air conditioning system bay perimeter, make sure that the foam tape is intact and installed on both sides of the attachment holes. Apply foam tape as necessary.

(f) At the air conditioning system bay access cover make sure that you seal the air conditioning system bay access cover to the floor using foil tape to create a leak proof seal.

B. Warnings and Cautions for R134a Refrigerant

WARNING: Eye contact with refrigerant can cause serious eye injury. If eye contact is made, get medical attention immediately.

(1) Avoid breathing R-134a refrigerant, lubricant vapor, or mist. Exposure can irritate eyes, nose, and throat. Wear eye protection when servicing the air conditioning system.

WARNING: Large amounts of R-134a refrigerant displaces oxygen and can cause suffocation.

(2) If accidental system discharge occurs, ventilate the work area before you start the servicing again. Do the servicing only in well ventilated areas.

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WARNING: Do not heat refrigerant containers above 125°F or expose refrigerant to open flame. Do not use open flame to heat refrigerant containers.

WARNING: Do not intentionally drop, puncture, or incinerate refrigerant containers.

WARNING: If R-134a refrigerant comes in contact with any part of the body, severe frostbite and personal injury can result. Flush exposed zone immediately with cold water and obtain prompt medical assistance.

(3) The evaporation rate of R-134a refrigerant at average temperature and altitude is extremely high. As a result, anything that comes in contact with the refrigerant will freeze. Always protect skin or delicate objects from direct contact with refrigerant. For personal protection, you must wear, goggles and protective gloves. When you do work that includes opening the refrigerant system wrap clean cloth around fittings, valves and connections.

WARNING: R-134a service equipment or aircraft air conditioning system should not be pressure tested or leak tested with compressed shop air. Though R-134a is considered non-flammable, some mixtures of air and R-134a have been shown to be combustible at elevated pressures. These mixtures are potentially dangerous and can result in fire or explosion.

WARNING: Never add R-134a refrigerant to a system that has not been evacuated to 29 in. Hg. vacuum pressure.

CAUTION: Liquid refrigerant is corrosive to metal surfaces. Follow the operation instructions supplied with equipment being used.

CAUTION: Never add R-12 refrigerant to an air conditioning system designed to use R-134a. Damage to the system can result.

CAUTION: R-12 compressor oil must not be mixed with the R-134a compressor oil. They are NOT compatible

CAUTION: Do NOT use R-12 servicing equipment or parts on an R-134a air conditioning system.

C. System Service Precautions

(1) Never open or loosen a connection before discharging the system refrigerant.

(2) Do not open a refrigerant system or uncap a replacement component unless its temperature is as close as possible to room temperature. This will prevent condensation from forming inside of a component which is cooler than the surrounding air.

(3) Before disconnecting a component from the system, clean the outside of the fittings thoroughly.

(4) Immediately after disconnecting a component from the system, seal the open fittings with a cap or plug.

(5) Before connecting an open fitting always install a new seal or gasket designed for the specific component. Coat the fitting and seal with clean refrigerant oil before connecting.

(6) Do not remove the sealing caps from a replacement component until ready to install.

(7) When installing a refrigerant line avoid bends which produce radii smaller than specified in Table 202 for the hose being installed.

Table 202. Minimum Bend Radii For Specified Hose Sizes

Hose Size	Minimum Bend Radius
1/2 in 13 mm (No. 10)	3.0 inches
13/32 in 10 mm (No. 8)	2.5 inches
5/16 in 8 mm (No. 6)	2.0 inches

(8) Position refrigerant lines to avoid exhaust components, flight controls, or items which can chafe the line. Refer to A.C. 43-13, *Acceptable Methods, Techniques, and Practices - Aircraft Inspection and Repair* for compliant methods of installation.

(9) Apply a light coat of Ester RL-500S (engine driven compressor) or FVC68D (PVE) (electric compressor) refrigerant oil to the o-rings of all fittings. Tighten fittings only to the specified torque listed in Table 203. Use an anti-torque back-up wrench on each of the component fittings. The refrigerant fittings must not be tighten too much.

Table 203. Torque Values For Specified Fitting Sizes

Tube O.D.	Thread Size	Torque foot-pounds. (N-m)

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0.375 inch	5/8-18	11-13 (14.9-17.6)
0.500 inch	3/4-16	15-20 (20.3-23.0)
0.625 inch	7/8-14	21-27 (28.4-36.6)

NOTE: Trinary Switch Torque: 7 foot-pounds (9.4 N-m).

(10) When you disconnect a fitting, you must use a wrench on each of the two halves. This prevents twisting of the refrigerant lines or tubes.

(11) Refrigerant oil will absorb moisture from the atmosphere if left uncapped. Do NOT open an oil container until ready to use and install the cap immediately after using. Store the oil only in a clean moisture-free container.

(12) Keep service tools and the work area clean. You must avoid careless work habits to prevent Contamination of the VCS air conditioning system.

(13) Plumbing systems in aircraft are subject to vibration and extreme temperature and atmospheric pressure changes. Thus, you must obey procedures and use the correct material.

(14) There is either POE or PVE refrigerant oil used in the air conditioning system depending upon the type of compressor installed on the airplane. POE refrigerant oil is used with the engine driven compressor and PVE refrigerant oil is used with the electrically driven compressor. It is important to have the correct amount of oil in the air conditioning system. This makes sure that the compressor is lubricated correctly.. Too little oil will result in damage to the compressor. Too much oil will reduce the cooling capacity of the system.

(15) The oil used in the system is either Ester RL-500S (POE) which is wax-free synthetic ester refrigerant oil or FVC68D (PVE) which is a polyvinylether refrigerant oil. Do NOT use any other oil when servicing or repairing the system. The oil container should be kept tightly capped until it is ready for use and then capped immediately after use to prevent contamination. Refrigerant oil will quickly absorb any moisture it comes in contact with.

(16) When an air conditioning system is assembled at the factory all components except the compressor are refrigerant oil-free. After the system has been charged and operated, the oil in the compressor is dispersed through the system. The evaporator, condenser, receiver/dryer, and compressor keeps a significant amount of oil.

(17) When a receiver/dryer, condenser, or evaporator core is replaced, you must add 1 fluid oz. (29 cc) of refrigerant oil.

(18) When the compressor is replaced, the new compressor is factory filled with the correct amount of oil. It is not necessary to check the oil level in the compressor or to add oil unless there has been an oil loss. This can be due to a rupture or leak from a line, shaft seal, evaporator, or condenser. Oil loss at a leak point will be evident by the presence of a wet shiny surface around the leak.

(19) The VCS air conditioning compressor will be either engine driven or electrical, depending upon the configuration of the aircraft.

6. Engine Driven Compressor

A. The engine driven compressor is a swash or wobble plate axial compressor with a displacement of 147 cubic centimeters. The compressor cycles to regulate cabin temperature and to avoid evaporator coil freeze-up. The compressor is engaged by a magnetic clutch driven by a V-Belt off the accessory drive at the back of the engine. The magnetic clutch is switched off during air conditioning operation when the refrigerant system pressure drops below 29 psi (2 bar) at the trinary switch or anytime the high-pressure side of the refrigerant system rises above 397 psi (27 bar). Refer to Figure 206, Sheet 1 (rear view) and Sheet 2 (top view).

B. Remove the Engine Driven Compressor

(1) Remove the upper and lower engine cowling. Refer to Chapter 71.

(2) Remove the baggage floor and the baggage shelf carpet. Refer to Chapter 25.

(3) Remove the evaporator/blower assembly cover. Refer to Figure 210.

(4) Evacuate the air conditioning system. Refer to System Evacuation Procedure.

(5) Remove the belt guard.

(6) Loosen the V-belt idler sheave and remove the V-belt.

(7) Disconnect the two refrigerant hoses from the compressor and seal all open fittings with a cap or plug.

(8) Remove 3 AN6-16A bolts, washers, and self-locking nuts attaching the compressor to the engine.

(9) Remove the compressor.

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C. Install the Engine Driven Compressor

(1) Attach the compressor to the engine using 3 AN6-16A bolts, washers, and self-locking nuts. Torque 20 to 25 foot-pounds., (27.1 to 33.8 N-m).

(2) Place the V-belt onto the compressor pulley.

(3) Install the belt guard using AN6H-10A and AN6H-14A bolts, and washers. Torque 275 to 325 inch-pounds, (31.0 to 36.7 N-m). Safety wire the bolts.

(4) Loosen the jam nut on the adjusting bolt, the adjusting bolt, and the idler pulley. The idler pulley slide nut should be loosened only enough to allow the slide to move freely. The adjusting bolt should be turned out far enough to allow installation of the belt.

CAUTION: Do Not tighten the belt too much. After approximately 5 hours of initial operation, recheck the belt tension and adjust as necessary.

(5) Install the belt.

(6) Slide the idler pulley snugly against the belt and tighten the adjusting bolt finger tight into its socket. The idler pulley should be rotatable by hand under the belt.

(7) Tighten the adjusting bolt two full turns, secure the adjusting bolt jam nut. Torque 275 to 325 inch-pounds, (31.0 to 36.7 N-m), and attach the idler pulley slide nut. Torque 300 to 350 inch-pounds, (33.8 to 39.5 N-m).

(8) Tighten the adjusting bolt two full turns, secure the adjusting bolt jam nut. Torque 275 to 325 inch-pounds, (31.0 to 36.7 N-m), and attach the idler pulley slide nut. Torque 300 to 350 inch-pounds, (33.8 to 39.5 N-m).

(9) Use the methods that follow to make sure that the belt tension is 50 to 70 lbs. (222.4 to 311.3 N):

(a) Use a direct reading belt tension gage such as Burroughs Tool No. BT-33-73F.

(b) Measure belt deflection under a 5 lb. load at the center of the longest belt span. Belt deflection should be 0.3 to 0.4 inch.

(10) If belt tension is not within the above tolerance, loosen the adjusting bolt jam nut and the idler pulley slide nut, and readjust the tension. One full turn of the adjusting bolt results in approximately a 10 lbs. (44.4 N) change in belt tension.

(11) Connect the two refrigerant hoses to the compressor.

(12) Replace the receiver/dryer, if necessary. Refer to Removal of the Receiver/Dryer and/or the Trinary Switch procedure.

(13) Evacuate and charge the system. Refer to System Evacuation Procedure and the System Charging Procedure

(14) Replace the evaporator/blower assembly cover.

(15) Replace the upper and lower engine cowling. Refer to Chapter 71.

(16) Replace the baggage floor and the baggage shelf carpet. Refer to Chapter 25.

D. Compressor Maintenance.

(1) The compressor is self-contained and maintenance is not necessary. Inspection of the drive belts and pulleys should be completed at each 100 hour or annual inspection.

E. Engine Drive Compressor Inspection

CAUTION: Do NOT tighten the belt too much. After approximately 5 hours of initial operation, recheck the belt tension and adjust as necessary.

(1) Inspect the compressor drive belt for chafing and/or wear. You must replace the belt if there is an indication of fraying or dry rot. Check the belt tension and adjust as necessary to maintain 50 to 70 lbs (222.4 to 311.3 N) of belt tension.

(2) Inspect the compressor drive belt pulleys for security, tightness, rotational smoothness, and freedom.

7. Electrical Compressor

A. The electric compressor is a brushless, hermetic DC variable speed compressor. The compressor operates at a fixed high speed determined by an electronic motor controller which cycles the compressor between high speed and idle speed, depending on requirements of the system. Electric power to operate the compressor is supplied by an accessories alternator mounted on the aft of the engine. The compressor is protected by the trinary switch which senses out of limit system pressures. When the system pressure drops below 29 psi or rises above 397 psi, the compressor is shut down. Refer to Figure 207.

B. Remove the Electrical Compressor

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(1) Remove the baggage floor and the baggage shelf carpet. Refer to Chapter 25, Removal of the Baggage Floor Carpet.

(2) Remove the Elevator Interconnect Access Panel. Refer to Chapter 25, Removal of the Elevator Interconnect Access Panel.

(3) Remove the Evaporator/Blower Assembly cover. Refer to Figure 210.

(4) Evacuate the air conditioning system. Refer to System Evacuation Procedure.

(5) Disconnect the electrical connections to the compressor.

(6) Disconnect each of the two refrigerant hoses from the compressor.

(a) Seal open fittings with a cap or plug.

(7) Remove the AN4-10 bolts, washers, isolation ring, isolation bushing, and bolt sleeve spacer that attach the compressor to the shelf.

(8) Remove the compressor.

C. Install the Electrical Compressor

(1) Make sure that the wet weight of the compressor is 14.68 lbs. when installed in a dry system. Add refrigerant oil as necessary.

(2) Install the AN4-10 bolt, washers, isolation ring, isolation bushing, and bolt sleeve spacer that attach the compressor to the shelf .

(3) Connect the two refrigerant hoses to the compressor.

(4) Connect all electrical connections to the compressor.

(5) Replace the receiver/dryer, if necessary. Refer to Removal of the Receiver/Dryer and/or the Trinary Switch procedure.

(6) Evacuate and charge the system. Refer to System Charging Procedure and the System Evacuation Procedure.

(7) Replace the Evaporator/Blower Assembly cover.

(8) Replace the Elevator Interconnect Access Panel. Refer to Chapter 25.

(9) Replace the baggage floor and the baggage shelf carpet. Refer to Chapter 25.

D. Electrical Compressor Maintenance.

(1) The VCS Compressor is self-contained and maintenance is not necessary.

8. Condenser/Fan Assembly

A. The condenser receives high-temperature, high-pressure vapor from the compressor. The vapor enters at the upper fitting of the condenser. As the vapor flows through the condenser, it releases heat to the cooler ambient air flowing over the condenser. As the vapor releases heat it changes to a liquid. Under average load, two-thirds of the condenser contains refrigerant vapor and the other third contains liquid refrigerant. The liquid refrigerant in the condenser has lost much of its heat, but still remains at a relatively high temperature and pressure. The assembly is located beneath the baggage compartment floor with vents for inlet and outlet directly below, through the belly of the aircraft. Refer to Figure 208.

B. Remove the Condenser/Fan Assembly

(1) Remove the baggage floor and the baggage shelf carpet. Refer to Chapter 25.

(2) Remove the evaporator/blower assembly cover, the avionics shelf access panel and the air conditioning system bay access cover. Refer to Figure 210.

(3) Evacuate the air conditioning system. Refer to System Evacuation Procedure.

(4) Disconnect the wiring harness.

(5) Disconnect the two refrigerant hoses from the Condenser/Fan assembly and seal all open fittings with a cap or plug.

(6) Remove 5 screws and 3 bolts mounting the Condenser/Fan assembly to the fuselage bulkheads.

(7) Remove 5 screws and 3 bolts mounting the Condenser/Fan assembly to the fuselage bulkheads

(8) Remove the Condenser/Fan assembly.

C. Install the Condenser/Fan Assembly.

(1) Install PR1428 B1/2 or RTV5818 sealant, as necessary, at all openings between the air conditioning bay and the cabin area (including underlying floors) to completely seal off the cabin area from the air conditioning bay.

(2) Install McMaster-Carr foam tape P/N 8512K24, as necessary, around the perimeter of the air conditioning system

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bay.

(3) Replace the Condenser/Fan assembly in the compartment.

(4) Reinsert the 5 screws and 3 bolts mounting the Condenser/Fan assembly to the fuselage bulkheads.

(5) Reconnect the wiring harness.

(6) Remove caps and plugs from any openings that were sealed and reconnect the two refrigerant hoses from the Condenser/Fan assembly.

(7) Install a .25 in +/- bead of PR1428 B1/2 or RTV5818 sealant between the baggage floor and the aft condenser attachment.

(8) Replace the receiver/dryer, if necessary, per the Removal of the Receiver/Dryer and/or the Trinary Switch procedure.

(9) Evacuate and charge the system per the System Evacuation Procedure and the System Charging Procedure. Add 1 fluid oz (29 cc) of refrigerant oil when installing a new Condenser/Fan assembly.

(10) Replace the air conditioning system bay access cover. Seal the air conditioning system bay access cover to the floor using 3M 425 adhesive foil tape to create a leak-proof seal.

(11) Replace the avionics shelf access panel, and the Evaporator/Blower Assembly cover.

(12) Replace the baggage floor and the baggage shelf carpet. Refer to Chapter 25.

D. Condenser/Fan Assembly Maintenance.

(1) The condenser/fan a is self-contained and maintenance is not necessary.

9. Expansion Valve

A. The expansion valve is located at the inlet to the evaporator. It is the connection point between the high-pressure and low-pressure side of the refrigeration system. The expansion valve determines the flow rate of the refrigerant and provides a pressure drop, reducing pressure on the liquid refrigerant before it enters the evaporator. Refer to Figure 209.

B. Remove the expansion Valve

(1) Remove the baggage floor and the baggage shelf carpet per instructions in Chapter 25.

(2) Remove the Evaporator/Blower Assembly cover. Refer to Figure 210.

(3) Evacuate the air conditioning system per instructions in the System Evacuation Procedure.

(4) Disconnect the refrigerant hose from the Expansion Valve and the Expansion Valve from the Evaporator/Blower Assembly, and seal all open fittings with a cap or plug.

(5) Remove the expansion valve.

C. Install the Expansion Valve

(1) Put the expansion valve in its correct position in the airplane.

(2) Connect the Expansion Valve to the Evaporator/Blower Assembly and connect the refrigerant hose to the Expansion Valve. Torque the fittings. Refer to Table 203 .

(3) Replace the receiver/dryer, if necessary. Refer to Receiver/Dryer with Trinary Switch procedure.

(4) Evacuate and charge the system. Refer to System Evacuation Procedure and the System Charging Procedure.

(5) Replace the Evaporator/Blower Assembly cover.

(6) Replace the baggage floor and the baggage shelf carpet. Refer to Chapter 25.

D. Expansion Valve Maintenance.

(1) The Expansion Valve is a self-contained unit and maintenance is not necessary.

10. Evaporator/Blower Assembly

A. The evaporator uses a plate and fin evaporator coil. The tubing is hydraulically expanded into the fins to make sure that there is good thermal conductivity. The evaporator removes heat and moisture from air entering the aircraft cabin. Low-pressure liquid refrigerant from the expansion valve enters the evaporator. Due to the reduced pressure, the refrigerant boils into a vapor. The boiling refrigerant absorbs the heat from the incoming air as it changes from a liquid to a vapor. The unit is located under a cover against the aft wall of the baggage compartment. Refer to Figure 210

B. Remove the Evaporator/Blower Assembly

(1) Remove the baggage floor and the baggage shelf carpet. Refer to Chapter 25.

(2) Remove the Evaporator/Blower Assembly cover and the elevator interconnect cover. Refer to Figure 210.

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(3) Evacuate the air conditioning system. Refer to System Evacuation Procedure.
(4) Disconnect all electrical connections to the Evaporator/Blower Assembly.
(5) Remove the Expansion Valve. Refer to Removal of the Expansion Valve procedure.
(6) Disconnect the low-pressure refrigerant hose from the Evaporator/Blower Assembly and seal all open fittings with a cap or plug.
(7) Remove 2 screws and washers connecting the overhead air duct to the Evaporator/Blower Assembly.
(8) Remove 3 screws attaching the evaporator/blower assembly to the aircraft.
(9) Remove the Evaporator/Blower Assembly.

C. Install the Evaporator/Blower Assembly
(1) Slide the evaporator/blower assembly outlet into the overhead air duct.
(2) Install 3 screws attaching the evaporator/blower assembly to the aircraft.
(3) With 2 screws and washers, attach the overhead air duct to the evaporator/blower assembly.
(4) Install the Expansion Valve. Refer to Installation of the Expansion Valve procedure.
(5) Attach the low-pressure refrigerant hose to the Evaporator/Blower.
(6) Reconnect all electrical connections to the evaporator/blower assembly.
(7) Replace the receiver/dryer, if necessary. Refer to Removal of the Receiver/Dryer and/or the Trinary Switch procedure.
(8) Evacuate and charge the system. Add 1 fluid oz. (29 cc) of refrigerant oil when installing a new Evaporator/Blower Assembly.
(9) Evacuate the system. Refer to System Evacuation Procedure
(10) Charge the system. Refer to System Charging Procedure
(11) Replace the elevator interconnect cover and evaporator/blower assembly cover.
(12) Replace the baggage floor and the baggage shelf carpet. Refer to Chapter 25.

D. Evaporator/Blower Assembly Maintenance.
(1) The evaporator/blower assembly is a self-contained unit and maintenance is not necessary.

11. Receiver/Dryer with Trinary Switch

A. The receiver/dryer acts as a storage and filter unit for refrigerant oil. The trinary switch serves two functions. One portion of the switch cycles the condenser fans once the refrigerant pressure reaches 235 psi (16 bar) and turns off the fans at 190 psi (13 bar). The other portion of the switch protects the system from damage due to low refrigerant or excessive pressures by turning off the compressor. Power to the compressor is interrupted once the refrigerant pressure drops below 29 psi (2 bar) or exceeds 397 psi (27 bar) at the trinary switch. The trinary switch automatically resets once pressures are restored to a safe level.
(1) The receiver/dryer must be replaced on the conditions that follow:
(a) Compressor replaced due to failure or contamination.
(b) Evaporator module replaced due to contamination.
(c) Condenser replaced due to contamination.
(d) Any hose or line replaced due to contamination.
(e) Expansion valve replaced due to contamination.
(f) The system has been opened to the ambient environment for more than 24 hours, e.g., components were not capped or plugged to preclude moisture contamination during service Generally, replace the receiver/dryer whenever a contamination event occurs or if the system has been opened and exposed to ambient environment for more than 24 hours.
(2) The trinary switch is considered an LRU (Line Replaceable Unit) which allows it to be replaced independently of the receiver/dryer assembly. The switch is sealed with an O-ring on the receiver/dryer and releases a Schrader valve upon removal thus allowing replacement without evacuating the refrigeration system. It is important to note that the 14VDC switch and the 28VDC switch, although identical electrically, have different electrical interface connectors. The correct switch must be ordered based on the configuration (14VDC or 28VDC) of the aircraft being serviced.
(3) The receiver/dryer assembly is attached to the landing gear tab located beneath the baggage compartment, forward

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of the condenser bay on the co-pilot's side. Refer to Figure 211.

B. Remove the Trinary Switch (Refer to Figure 211).
   (1) Remove the Evaporator/Blower Assembly cover and the avionics shelf access panel. Refer to Figure 208.
   (2) Disconnect the electrical connections from the trinary switch.
   (3) Turn the trinary switch to remove it and O-ring from the receiver/dryer assembly.
   (4) Remove the trinary switch.
   NOTE: You can remove the Trinary Switch without evacuating the system.

C. Install the Trinity Switch (Refer to Figure 211).
   (1) Put the trinary switch and O-ring in their correct position on the receiver/dryer assemble.
   NOTE: Inspect and replace the O-ring if necessary.
   (2) Turn in the trinary switch in the receiver/dryer assembly.
      (a) Torque to 7 foot-pounds (9.4 N-m).
   (3) Connect the electrical connections to the Trinary Switch.
   (4) Replace the avionics shelf access panel and the Evaporator/Blower Assembly cover.
   (5) Replace the baggage floor and the baggage shelf carpet. Refer to Chapter 25.

D. Remove the Receiver/Dryer Assembly (Refer to Figure 211).
   (1) Evacuate the air conditioning system. Refer to System Evacuation Procedure.
   (2) Disconnect the refrigerant hoses from the receiver/dryer and seal all open fittings with a cap or plug.
   (3) Remove the 2 bolts, washers, and self locking nuts that attach the receiver/dryer to the landing gear tab.
      (a) Remove the receiver/dryer.

E. Install the Receiver/Dryer Assembly (Refer to Figure 211).
   (1) Put the receiver/dryer in its correct position on the landing gear tab.
      (a) Install the two bolts, washers, and self-locking nuts that attach the receiver/dryer to the landing gear tab.
   (2) Attach the refrigerant hoses to the receiver/dryer.
   (3) Connect the electrical connections to the trinary switch.
   (4) Evacuate the system. Refer to System Evacuation Procedure
   (5) Charge the system. Refer to System Charging Procedure.
   NOTE: Add 1 fluid oz. (29 cc) of refrigerant oil when installing a new receiver/dryer.
   (6) Replace the avionics shelf access panel and the evaporator/blower assembly cover.
   (7) Replace the baggage floor and the baggage shelf carpet. Refer to Chapter 25.

F. Receiver/Dryer and Trinity Switch Maintenance.
   (1) The receiver/dryer with trinary switch assembly is a self-contained unit and maintenance is not necessary.

12. Cabin Temperature Sensor

A. The cabin temperature sensor assembly contains a calibrated thermistor and fan used to draw cabin air over the thermistor. The sensor assembly is controlled by the ECU. Cabin temperature is determined by comparing the inside temperature of the aircraft with the desired cabin temperature setting. The temperature is regulated by cycling the compressor and regulating the evaporator blower speed during cooling requirements and by regulating the heater temperature door and heater/defogger blower speed during heating requirements. If the sensor fails, a fault will be noted in the ACCS and manual temperature control is necessary utilizing the control head/touchscreen controller.
   (1) For the Avidyne installation the sensor assembly is located behind the copilot's knee bolster. Refer to Figure 212.
   (2) For S/N 41001 thru 41033, 41035 thru 41533, 41651 Incorporating SEB-21-01, the Avidyne sensor assembly is located in the centre console assembly. Refer to Figure 212.
   (3) For the Garmin G1000 system installation is installed, the sensor assembly is at the bottom of the instrument panel below the MFD or mounted behind the headset holder at the front face of the Tower. Refer to Figure 213.
   (4) For the Model T240 maintenance data , refer to Cabin Temperature Sensor (T240) - Removal/Installation.

B. Remove the Cabin Temperature Sensor (Refer to Figure 213).

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(1) For the Avidyne installation, remove the right knee bolster per instructions in Chapter 25.

(2) For the G1000 installation, get access to the sensor from underneath the instrument panel or by removing the tower per Chapter 25, as necessary.

(3) Disconnect the electrical connection from the cabin temperature sensor.

(4) Remove 4 screws attaching the cabin temperature sensor to the top of the Right Knee Bolster, to the sensor mounting plate, or to the headset holder, as applicable.

(5) Remove the cabin temperature sensor, spacer, and screen.

C. Install the Temperature Sensor (Refer to Figure 213).

(1) Put the cabin temperature sensor, spacer, and screen in their correct position, as applicable.

(2) Install the 4 screws that attach the cabin temperature sensor to the top of the Right Knee Bolster, to the sensor mounting plate, or to the headset holder, as applicable.

(3) Connect the electrical connection to the cabin temperature sensor.

D. Cabin Temperature Maintenance.

(1) The cabin temperature sensor is a self-contained unit and maintenance is not necessary.

13. Outside Air Temperature (OAT) Sensor

A. The OAT temperature sensor continuously measures the temperature of the air passing by the outside of the aircraft. The sensor is used as a basic variable for temperature regulation. The ECU also uses the signal from this sensor to calculate the temperature for the OAT indication on the display. For the Avidyne and G1000 installations, the temperature sensor is located in the condenser bay on the forward bulkhead. Refer to Figure 214.

B. For the Model T240 OAT sensor installation data, refer to Garmin GTP 59 Outside Air Temperature Probe (G2000) - Removal/Installation.

C. Remove the OAT Sensor (Refer to Figure 214).

(1) Remove the baggage floor and the baggage shelf carpet. Refer to Chapter 25.

(2) Remove the Evaporator/Blower Assembly cover, the avionics shelf access panel and the air conditioning system bay access cover. Refer to Figure 210.

(3) Disconnect the electrical connection to the OAT.

(4) Remove the "C" clip attaching the OAT sensor to the bulkhead and remove the sensor.

(5) Remove the OAT.

D. Install the OAT Sensor (Refer to Figure 214).

(1) Install PR1428 B1/2 or RTV5818 sealant, as necessary, at all openings between the air conditioning bay and the cabin area (including underlying floors) to completely seal off the cabin area from the air conditioning bay

(2) Install McMaster-Carr foam tape P/N 8512K24, as necessary, around the perimeter of the air conditioning system bay.

(3) Replace the air conditioning system bay access cover. Seal the air conditioning system bay access cover to the floor using 3M 425 adhesive foil tape to create a leak proof seal

(4) Replace the avionics shelf access panel, and the Evaporator/Blower Assembly cover.

(5) Replace the baggage floor and the baggage shelf carpet. Refer to Chapter 25.

E. OAT Sensor Maintenance.

(1) The OAT Sensor is a self-contained unit and maintenance is not necessary.

14. Electronic Control Unit (ECU)

A. The ECU is the control unit of the ACCS incorporating all the electronic circuitry and utilizing digital processing logic. The ECU also contains the blower control unit which regulates the evaporator and the 11 heater blower speeds.

B. For airplanes with the Avidyne or G1000 installations, the ECU receives signals from the and supplies outputs accordingly. Voltage at the blowers is reported back to the . For Airplane serials 41002 to 41562, the ECU is located on the pilot's side, beneath the evaporator cover, in the baggage compartment. Refer to Figure 210. For Airplane serials 41563 and on, and Model T240, the ECU is mounted on the fuselage skin under the baggage bulkhead access panel.

C. The Model T240 Garmin G2000 ACCS installation is controlled by the GTC 570 Touchscreen Controller found on the

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center console. For more data applicable to the touchscreen controller, refer to Garmin G2000 - Description and Operation.

D. Remove the Electronic Control Unit (Refer to Figure 210).
   (1) Remove the baggage floor and the baggage shelf carpet. Refer to Chapter 25.
   (2) Remove the applicable panels to get access to the ECU as follows:
      (a) For Airplane serials 41002 to 41562, remove the Evaporator/Blower Assembly cover. Refer to Figure 210.
      (b) For Airplane serials 41563 and On, and Model T240, remove the baggage bulkhead access panel.
   (3) Disconnect all electrical connections to the ECU.
   (4) Remove the ECU attach hardware as follows:
      (a) For Airplane serials 41002 to 41562, remove the 3 screws.
      (b) For Airplane serials 41563 and on and Model T240, remove the 4 self-locking nuts and washers.

E. Install the Electronic Control Unit (Refer to Figure 210).
   (1) Put the ECU in its correct position in the air conditioning system bay.
   (2) Install the ECU attach hardware as follows:
      (a) For Airplane serials 41002 to 41562, install the 3 screws.
      (b) For Airplane serials 41563 and on and Model T240, install the 4 self-locking nuts and washers.
   (3) Connect all electrical connections to the ECU.
   (4) Install the applicable panels as follows:
      (a) For Airplane serials 41002 to 41562, install the Evaporator/Blower Assembly cover. Refer to Figure 210.
      (b) For Airplane serials 41563 and On, and Model T240 install the baggage bulkhead access panel.
   (5) Install the baggage floor and the baggage shelf carpet. Refer to Chapter 25.

F. ECU Maintenance.
   (1) The ECU is a self-contained unit and maintenance is not necessary.

15. Control Head

A. For the Avidyne option, the control head is located to the right of the flap panel. For the Garmin G1000 option the control head is located in the tower assembly. The control head receives inputs from the pilot, or co-pilot, and the ACCS components. It is the user interface for the ACCS. Fault codes generated by the ACCS are displayed on the control head LED screen for troubleshooting.

B. The Model T240 ACCS installation is controlled by the Touchscreen Control Panel found on the center console. For more data applicable to the Touchscreen Control Panel, refer to Garmin G2000 - Description and Operation.

C. Remove the Control Head (Refer to Figure 215).
   (1) Remove electrical power from the airplane.
   (2) Disconnect the wiring harness from the back of the Control Head.
   (3) From the rear of the instrument panel remove the four nuts and keeper clamp that attach the Control Head to the instrument panel.
   (4) Carefully pull the control head aft from the instrument panel.

D. Install the Control Head (Refer to Figure 215).
   (1) Carefully put the control head in its control head in the instrument panel.
   (2) Install the four nuts and keeper clamp that attach the Control Head to the instrument panel.
   (3) Disconnect the wiring harness from the back of the Control Head.

E. Control Head Maintenance.
   (1) The Control Head is a self-contained unit. A periodic check for defog/floor vent assembly, ECS shut-off valve assembly, and heater temperature actuator operation is necessary. A functional check should be completed at each 100 hour or annual inspection.

F. Control Head Inspection
   (1) Evaluate the adequacy of the system in terms of crew and passenger comfort, as well as the defroster's ability to

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control fogging of the windscreen.

(2) Inspect the compressor drive belt pulleys for security, tightness, rotational smoothness, and freedom.

(3) Check for proper operation of the fresh air, air conditioning, heat, defog, air volume control, temperature control, and air output control.

(4) Evaluate the eyeball vents for proper operation.

16. System Leak Check Procedure.

A. System leak check is necessary whenever the air conditioning system is not cooling properly, there is a system component replacement or a loss of R-134a refrigerant charge.

B. Make sure that you obey all safety precautions. Refer to Safety and System Service Precautions.

C. Tools and Equipment.

(1) For tools and equipment necessary for the leak check procedure, refer to Tools and equipment .

D. Do the Leak Check Procedure

(1) Determine if the system is fully charged. Refer to Figure 216.

(2) If the system is empty do the steps that follow:

(a) Evacuate the system. Refer to System Evacuation Procedure.

(b) Charge the system with 0.6 lbs (296 grams) of R-134a refrigerant. Refer to System Charging Procedure.

(3) Position the aircraft in a wind free work area.

(4) Remove the engine cowling per instructions in Chapter 71.

(5) Remove the baggage floor and the baggage shelf carpet. Refer to Chapter 25.

(6) Remove the evaporator/blower assembly cover, the avionics shelf access panel and the air conditioning system bay panel.

(7) Operate the aircraft engine with the air conditioning on for 5 to 10 minutes until the operating temperature and pressures are achieved based on the existing refrigerant charge.

(8) You must keep the airplane cabin doors and the baggage compartment door open during the test operation.

(9) Shutdown the aircraft engine.

(10) Examine for leaks utilizing a R-134a electronic leak detector and as follows:

(a) Move the probe slowly along the bottom side of lines and fittings.

NOTE: R-134a is heavier than air

(b) Examine fittings, lines, or components that appear to be oily.

NOTE: Oily areas usually are the site of a refrigerant leak.

(11) Examine the evaporator core for leaks as follows:

(a) Make sure that the airplane engine is not operating.

(b) Set the ACCS temperature to 55° F (13° C)

(c) Set the blower speed to the "LO" position.

(d) Examine the air conditioning outlet vents for leaks.

(e) Examine the evaporator drain tube outlet for the presence of refrigerant oil.

CAUTION: Do not tighten the plumbing connections too much. Stripped threads or cracked flanges can result.

(12) Tighten or repair joints as necessary to stop leaks.

17. Tools and Equipment

A. The tools and equipment that follow are necessary for leak testing, evacuating, and charging the refrigerant system:

- Gaseous dry nitrogen, regulated source (0-500 psig or 0-35 bar)
- R-134a refrigerant
- Refrigerant oil, Ester RL-500S
- R-134a refrigerant charging manifold with gauges and hoses with quick-disconnect couplers. The coupler has a knob on top which is used to engage and disengage the Schrader valve in the aircraft service ports.

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- R-134a charging station and recovery/recycling station (SAE standard J2210)
- Air conditioning vacuum pump
- Hose adapter, for nitrogen bottle (.50 inch male acme to .25 inch SAE female flare)
- Hose adapter for vacuum pump (.50 inch male acme to .25 inch SAE female flare)
- Electronic leak detector
- Burroughs tool No. BT-33-73F (or equivalent) belt tension gauge
- Torque wrench capable of reading in.-lbs or N-m.
- Small hand tools and socket set.
- Thermometer, 0-150° F
- Thermometer, 0-150° F
- Service light or flashlight
- Service light or flashlight
- Weight scale, 0-50 lbs (0-25 kg) capable of 0.1 lb (5 gram) precision.

18. System Evacuation Procedure

A. If the air conditioning system has been open to the atmosphere, it must be evacuated before the system can be charged. Moisture and air mixed with refrigerant will raise the compressor head pressure above acceptable operating levels. This will reduce the performance of the air conditioning system and damage the compressor. Moisture will also boil at near room temperature when exposed to vacuum.R-134a refrigerant is a hydro fluorocarbon (HFC) that does not contain chlorine. An R-134a refrigerant Recovery/Recycling Station that meets SAE standard J2210 must be used to evacuate the refrigerant system. Refer to the operating instructions provided with the equipment for proper operation.

B. Make sure that you obey all safety precautions. Refer to Safety and System Service Precautions.

C. Tools and Equipment.

(1) For tools and equipment necessary for the evacuation procedure, refer to Tools and equipment .

D. Do the Evacuation Procedure.

CAUTION: Any change in vacuum pressure, or failure to achieve a system pressure of 25 to 27 in. Hg (635 to 685 mm Hg) vacuum indicates the presence of a plumbing leak. Repeat the leak check procedure. Locate and repair all leaks.

(1) Connect the charging manifold to the service ports.

(2) Connect the manifold charging (yellow) hose to the vacuum pump and turn on the pump.

(3) Open both valves of the charging manifold gauge set.

(4) Open both valves of the charging hose quick connect fittings.

(5) Observe the charging manifold gauges to verify vacuum.

(6) Evacuate the system until 25 to 27 in. Hg (635 to 685 mm Hg) or greater vacuum is obtained.

(7) Close all valves and turn off the vacuum pump.

(8) If the system maintains the specified vacuum for 30 minutes, start the vacuum pump, open the suction and discharge valves, and evacuate the system for an additional 40 minutes, minimum.

(9) If the specified vacuum is not maintained, locate and repair the refrigeration system leak before continuing.

(10) Close all valves and turn off the vacuum pump.

(11) Disconnect the manifold service hose from the vacuum pump. The system is now ready for refrigerant charging.

19. System Charging Procedure

A. There are various methods of charging refrigerant into the air conditioning system. These include using a refrigerant recovery/recycle unit (refer to the manufacturer's instruction manual). The use of manifold pressure gauges, R-134a cylinder, and a weight scale is outlined in this section. Only R-134a refrigerant is to be used. Other refrigerants will damage the system. Overcharging of the system will result in reduced performance, reduced service life, and/or damage to the system components.

B. Make sure that you obey all safety precautions. Refer to Safety and System Service Precautions.

C. Do the Charging Procedure.

(1) Leak check and evacuate the system. Refer to Leak Check Procedure and the System Evacuation Procedure.

(2) Connect the yellow manifold charging hose to the R-134a cylinder and open the valve.

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(3) Crack open the charge hose fitting at the manifold gauge set and vent air from the hose until refrigerant is evidently escaping.

(4) Place the refrigerant bottle on a 0-50 lb. (0-25 kg) scale and record the weight.

(5) Open both manifold gauge set valves. Add refrigerant to the system until pressure stabilizes.

(6) Close the manifold valves and verify that system pressure is 50 psig (3.4 bar) or greater.

NOTE: The system pressure must be above 50 psig (3.4 bar) to close the low-pressure cutoff switch. Otherwise the compressor will not turn on.

CAUTION: Do not use open flame to warm the refrigerant bottle. Do not heat the bottle above 125° F (51° C).

(7) If necessary, warm the refrigerant bottle by immersion in warm water.

(8) Move the aircraft to a run-up area.

(9) Start the aircraft engine. Select "AUTO" on the ACCS and set the temperature to 55° F (13° C). Idle the aircraft engine at 1200 to 1800 RPM.

CAUTION: Do not open the high-pressure (red) valve on the manifold gauge set.

(10) With the system operating, observe the system discharge and suction pressures.

(11) With the R-134a cylinder connected to the charging hose, charging container shutoff valve open and hose purged of air, slowly open the suction (blue) manifold valve. The suction pressure will increase to 60 to 70 psig (4.1 to 4.8 bar).

NOTE: As refrigerant enters the compressor, a slight increase in compressor discharge pressure will be noticed.

(12) Continue to add refrigerant until 24 oz. (680 grams) of refrigerant has been added.

(13) Close the suction manifold valve (blue) and let the system operate for 5 to 10 minutes to evaluate performance.

CAUTION: Do NOT overcharge the air conditioning system. Overcharging will cause excessive compressor head pressure, loss of cooling, noise and system failure.

NOTE: Letting the system stabilize is necessary until the expansion valve can stabilize the system pressure.

NOTE: System charge is approximately 24 oz. (680 grams) of R-134a refrigerant.

(14) With the system fully charged and operating, observe the suction and discharge pressures. Typical values at various ambient temperatures, with hot cabins, are shown below. These values should be used as a reference for troubleshooting, not as a sole source. Refer to Table 204 and Figure 216 for pressure values at various temperatures. Table 205 lists possible performance issues and methods for correcting them.

Table 204. Typical Suction and Discharge Pressure

Ambient Temperature	21° C(70° F)	27° C(80° F)	32° C(90° F)	38° C(100° F)	43° C (110° F)
Air Temperature At Evaporator Outlet	7-9° C(45-48° F)	8-13° C(46-55° F)	11-16° C(52-61° F)	14-20° C (57-68° F)	17-25° C(63-77° F)
Low Side Service Port Pressure	18	20	22	25	26
	psi	psi	psi	psi	psi
	30	35	39	43	47
High Side Service Port Pressure	150	160	220	250	280
	psi	psi	psi	psi	psi
	220	235	310	320	340

(15) Allow the system to operate for 10 minutes, then shut down.

NOTE: After shutdown, both suction and discharge pressures will begin to equalize.

(16) Close the refrigerant container shutoff valve. Record the refrigerant container final weight and calculate the system refrigerant charge.

(17) Turn the knob on the suction and discharge charging hose quick coupler to closed position and disconnect the hoses from the service ports.

(18) Remove the yellow charging hose from the refrigerant container and store the manifold gauge set.

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(19) Install the service port caps.

20. System Flushing

A. System flushing can be successfully done to systems where there is insignificant or no evidence of debris or FOD in the system. Failure to follow the actions and direction below will void all Seamech warranty considerations.

B. You must not do system flushing to the complete system where a compressor has overheated and failed. The industry term for this type of failure is "Black Death" and is usually the result of low amounts of compressor lubricating oil in the system. This type of failure burns the remaining oil in the system and, combined with the polymers in the compressor forms a hard, carbonized and not possible to remove buildup. The buildup is primarily in the receiver dryer and condenser. In this case, the hoses between the compressor and evaporator module, as well as the receiver dryer and condenser must be replaced. The expansion valve and evaporator module should be removed and inspected for evidence of black carbonized buildup. If black buildup exists, the expansion valve and/or evaporator module must also be replaced. If no evidence of black carbonized buildup exists, the expansion valve and evaporator module can be flushed using the techniques below.

C. If a contamination event is the result of an internal compressor mechanical failure or other debris in the system, and there is evidence of metal or debris in the VCS components, then all of the VCS hoses and components must be disconnected and inspected. High efficiency condenser and evaporator coils are difficult to clean of all debris. These coils are parallel flow devices with deep wells on the manifolds where debris can and flushing material can pool making debris removal by flushing impossible. If there is evidence of debris in these devices, it is recommended that they be replaced to make sure that the system can operate debris free when reassembled and serviced. In the event of a compressor mechanical failure, it is likely that the receiver/dryer, condenser and perhaps the evaporator module can require replacement. Hoses and other components of the system should be able to be flushed with success.

D. Make sure that you obey all safety precautions. Refer to Safety and System Service Precautions.

E. Do the System flushing.

(1) If flushing can be done, only DuPont(TM) Mobile AC Flush Fluid is authorized on Seamech systems. For additional data about the fluid and where it can be obtained is available refer to, http://refrigerants.dupont.com/Suva/en_US/products/suva_mobile_flush.html . High-pressure and flow-flushing equipment is necessary. Traditional flush guns, aerosol flushes and pour in flush methods do not produce the velocity necessary to force contaminates out of the affected component.

CAUTION: It is very important that all of the flush be removed from the condenser. Flush remaining in the condenser can cause the compressor to fail after an unusually short time. If there is any doubt as to whether there is flush in the condenser, it is strongly advised that the condenser be replaced. Evidence of flush in a failed compressor will void any compressor warranties.

CAUTION: You must do the flushing in the reverse flow direction (low side to high side) to push contaminates back out of the affected components on a component by component basis. This means when an evaporator coil is flushed, the thermal expansion valve (TXV) must be removed and flushing material must enter into the down stream or suction side fitting of the evaporator coil. In a similar way, flushing material must be applied to the bottom or discharge fitting of the condenser. Use gravity to assist in the cleaning.

CAUTION: Compressors must not be flushed. Flushing materials damage the compressor and displace any oil in the unit. Do not flush compressors.

(2) You must remove the thermal expansion valve from the evaporator module and thoroughly clean it. Any contaminates in the expansion valve can cause the valve to operate incorrectly.

(3) The receiver/dryer can never be flushed because it is not possible to remove all of the flushing compounds. The receiver/dryer contains desiccant, which will absorb the flushing compound. You must replace the receiver/dryer if there was any type of contamination event.

(4) All system hoses should be disconnected and flushed independently, opposite the direction of normal system refrigerant flow.

(5) Once all of the affected components of the system have been flushed, all components must be blown dry with clean and very dry filtered shop air or nitrogen. VERY IMPORTANT - using air or nitrogen that is not dry will introduce moisture into the system components. This will cause internal corrosion over time.

(6) It is vitally important to remove all of the flushing chemicals from all of the components. This can mean the components have to be rotated, shaken, or tilted to make sure that all of the flushing material has been removed.

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Residual flushing material can absorb the compressor oils and can lead to premature failure of the compressor and degraded cooling performance. Repeat the "blow out" and removal of the flushing compounds until you are confident that all contamination debris and flushing chemicals have been removed.

(7) Hose O-rings must be replaced and the system reassembled per this maintenance manual.

(8) Follow the correct procedures for servicing the system with oil. Only Ester RL-500S system oil can be used. If a new compressor is used, they usually contain the necessary amount of oil internal to the compressor. The VCS can then be serviced again using the maintenance manual procedures.

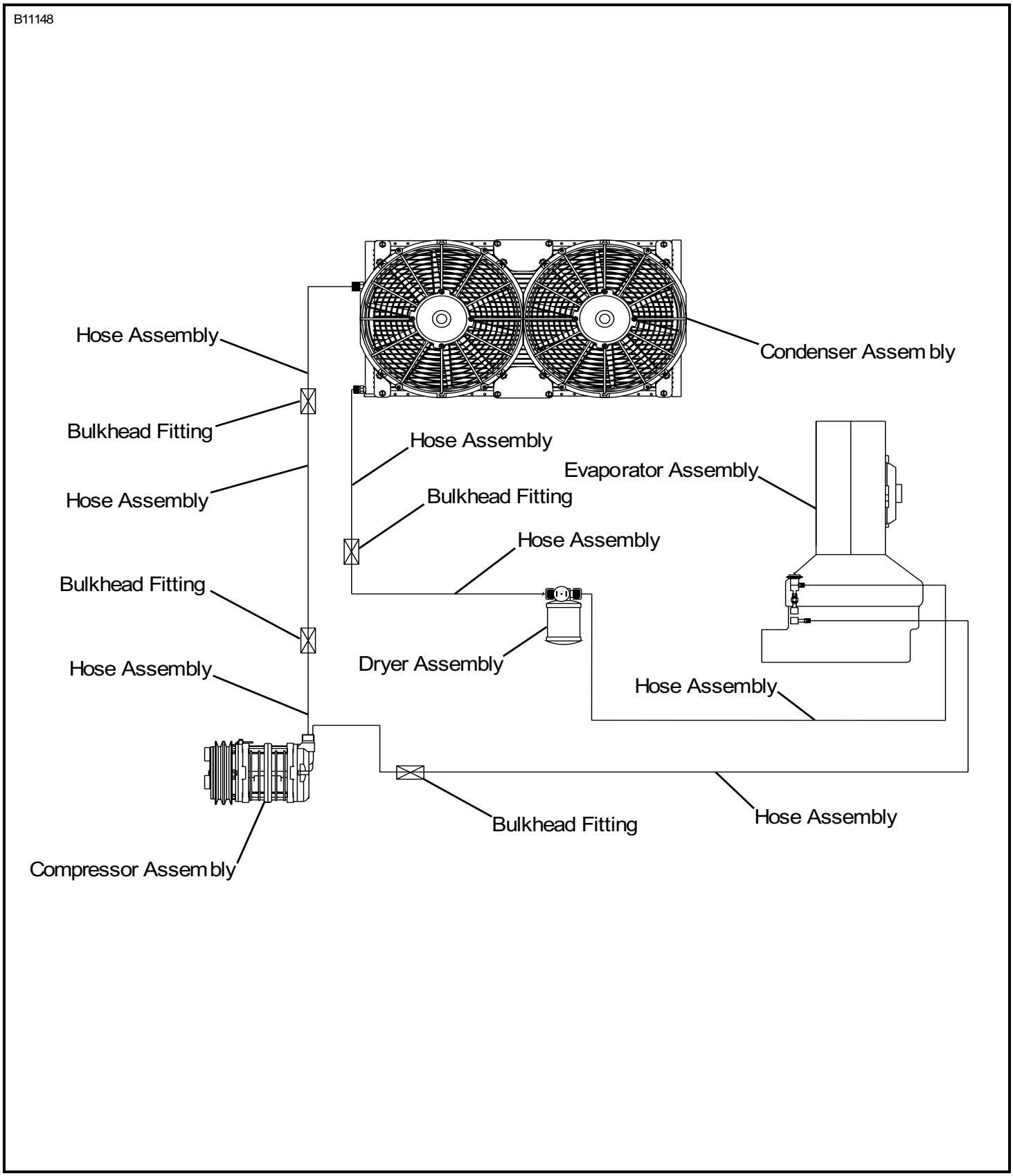
F. Pressure and Performance Diagnosis

Table 205. Pressure and Performance Diagnosis

Condition	Possible Cause	Correction
Low side and high side pressure low	1. System refrigerant is low	1. Discharge, evacuate, leak test charge system.
Low side pressure high and high side pressure low	1. Internal leak in compressor2. Drive belt slipping	1. Replace compressor.2. Tension or replace belt.
Low side and high side pressure high	1. Condenser fins obstructed2. Air in refrigeration system3. Condenser fans inoperative. Refrigerant system overcharged	1. Clean condenser fins. 2. Evacuate, leak test and charge system.3. Troubleshoot condenser fans. 4. Recover refrigerant and recharge.
Low side pressure low and high side pressure high	1. Restriction in refrigerant hose2. Restriction in receiver-dryer3. Restriction in condenser4. Expansion valve is defective	1. Check hoses for kinks and replace if necessary.2. Replace receiver/dryer.3. Replace condenser.4. Replace expansion valve.
Low side and high side pressures normal (inadequate cooling)	1. Check for correct cooling at evaporator assembly outlet	1. If temperature is correct, check for obstruction or leak in cabin ducting.
Compressor noise	1. Internal compressor damage2. Refrigerant system overcharged3. Loose compressor mounting4. Loose or worn compressor drive belt	1. Replace compressor.2. Recover refrigerant and recharge.3. Tighten compressor mounting bolts to correct torque values.4. Tension or replace belt.
Excessive vibration	1. Incorrect belt tension2. Compressor loose3. Refrigerant system overcharged4. Drive or idler pulley worn	1. Tension or replace belt.2. Tighten compressor mounting bolts to correct torque values.3. Recover refrigerant and recharge.4. Replace defective pulley.
Condensation leaking inside aircraft	1. Evaporator drain plugged or kinked	1. Clean drain hose and check for proper installation.
Frozen evaporator coil	1. Faulty evap. temp sensor2. Obstructed evaporator coil	1. Replace evap. temp sensor. 2. Remove obstruction.

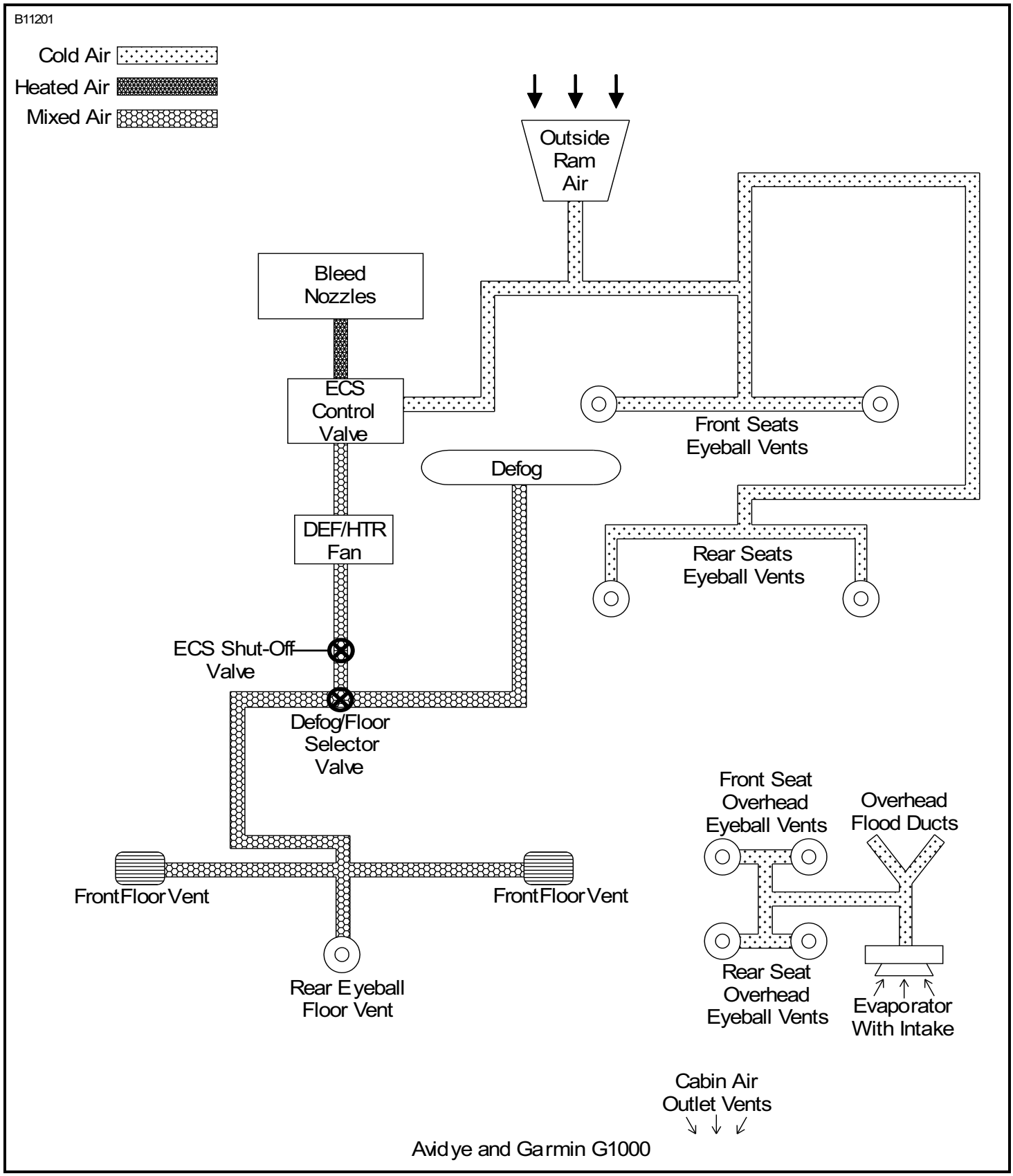
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Figure 201 : Sheet 1 : Vapor Cycle System (VCS) Air Conditioning



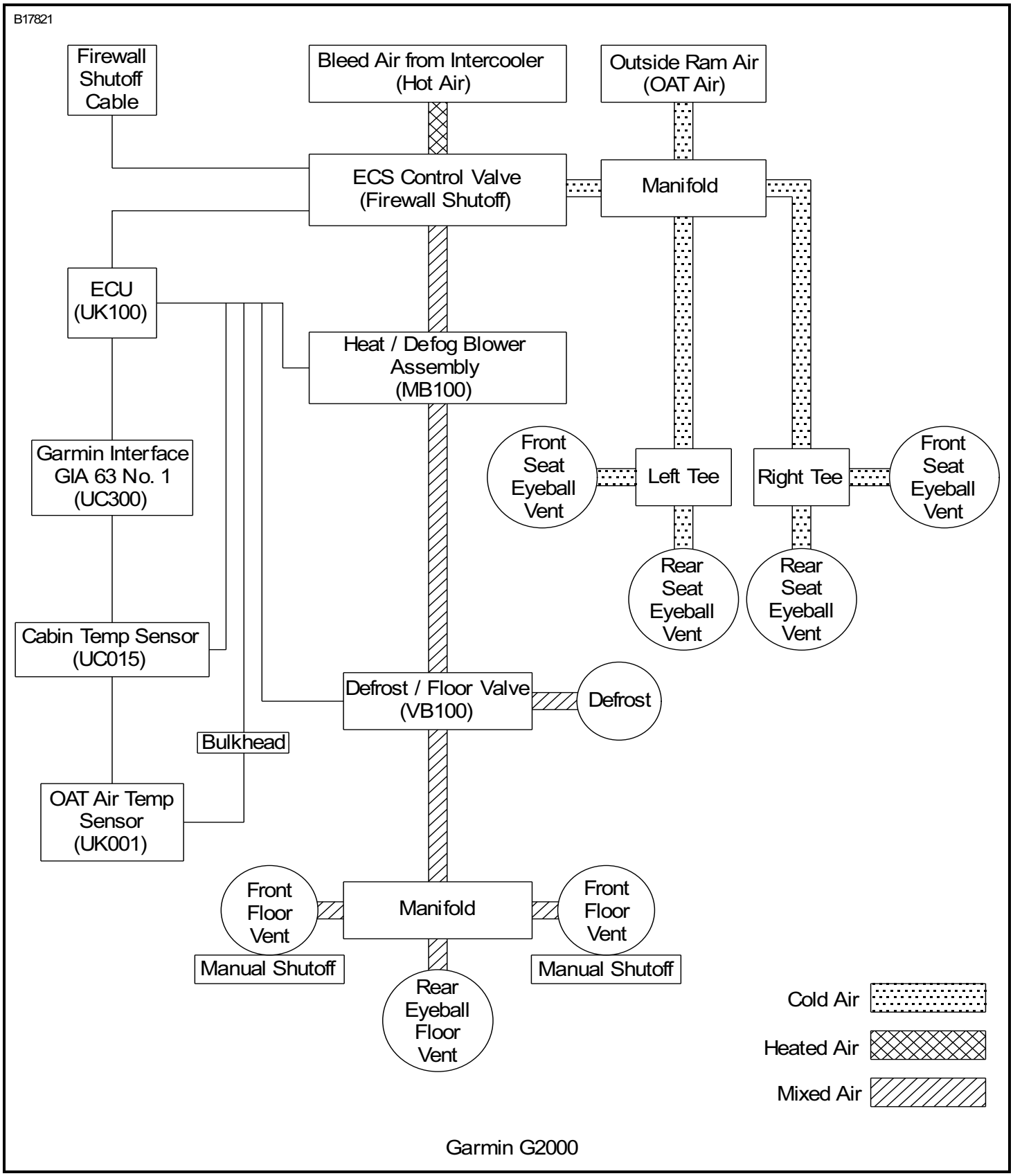
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Figure 202 : Sheet 1 : Airflow Diagram



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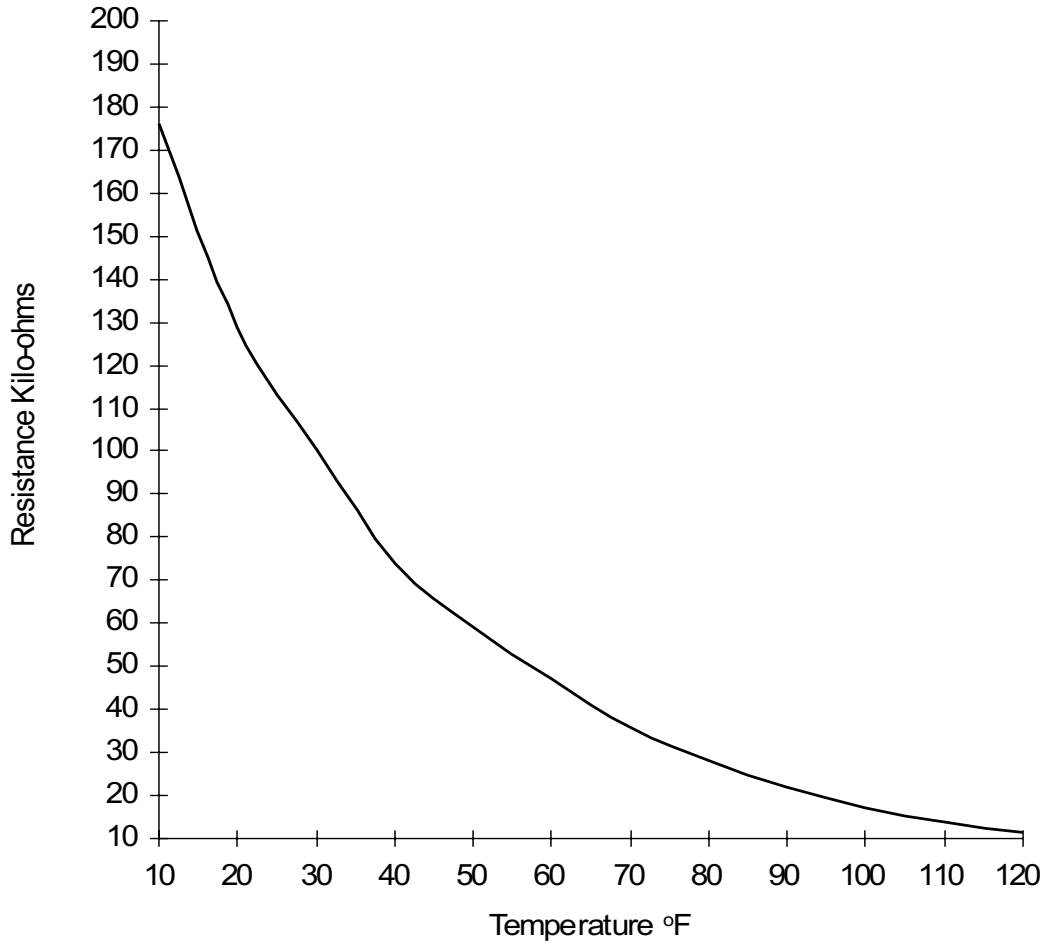
Figure 202 : Sheet 2 : Airflow Diagram



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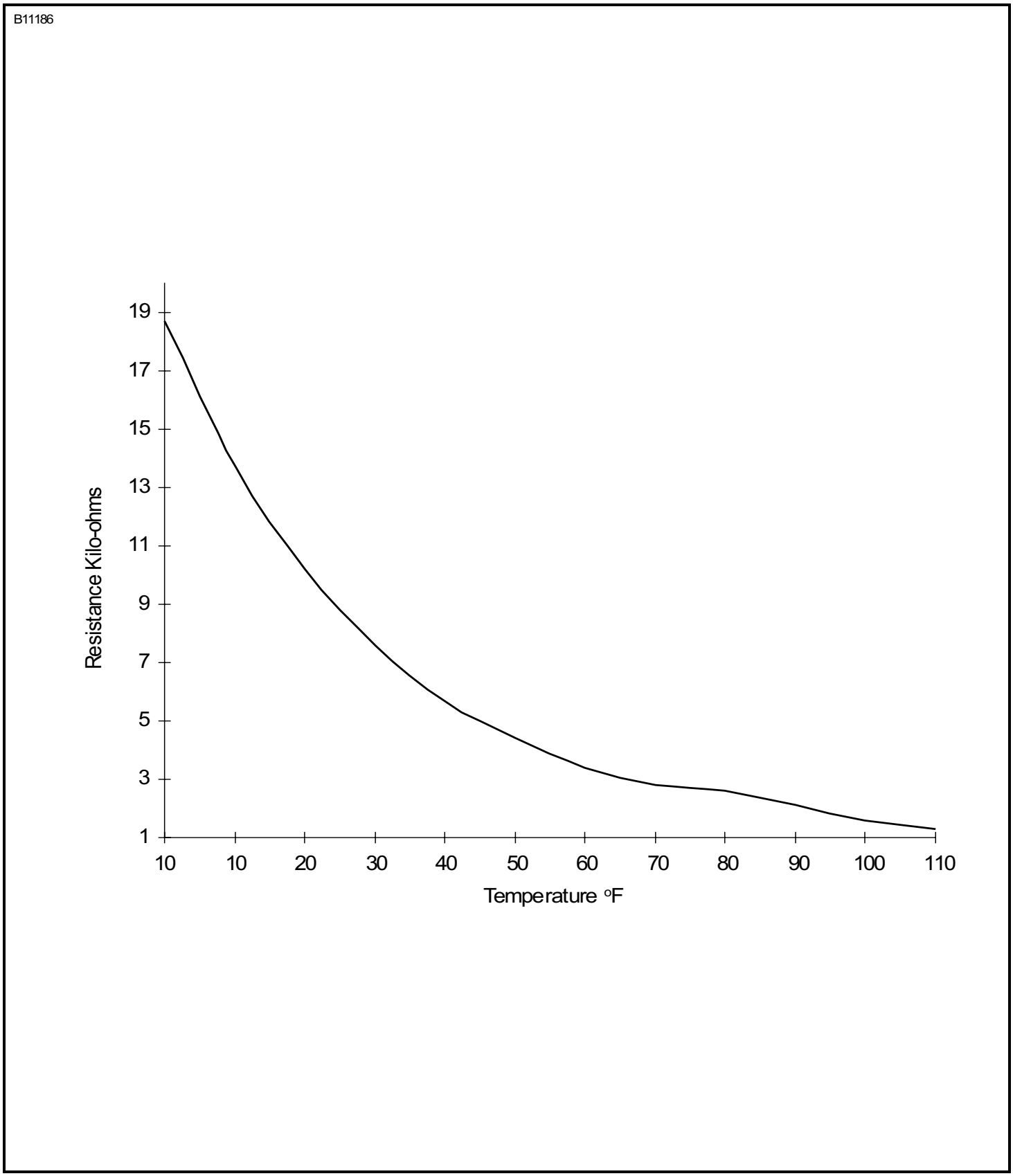
Figure 203 : Sheet 1 : Cabin Temperature Sensor Resistance vs. Temperature Curve

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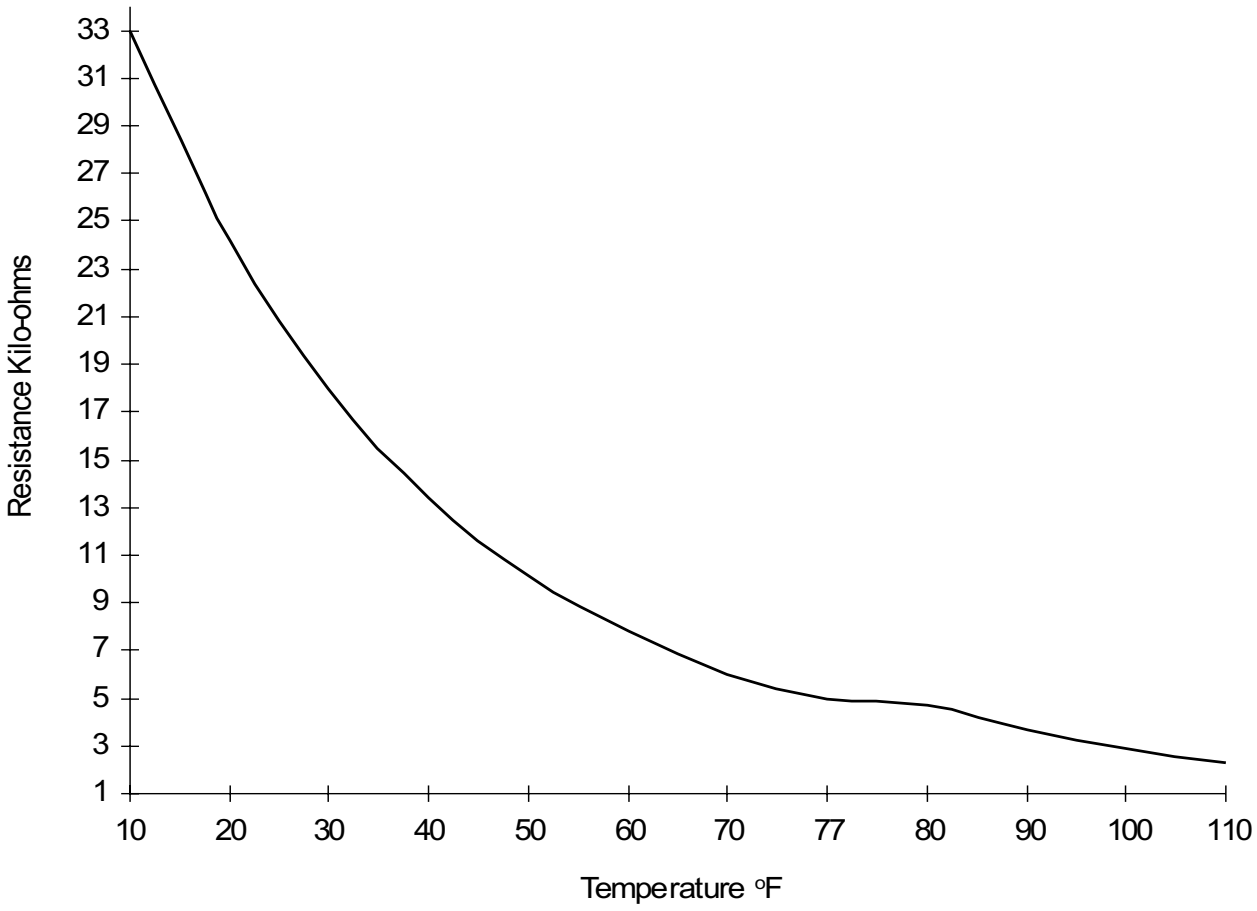
Figure 204 : Sheet 1 : OAT Sensor Resistance vs. Temperature Curve



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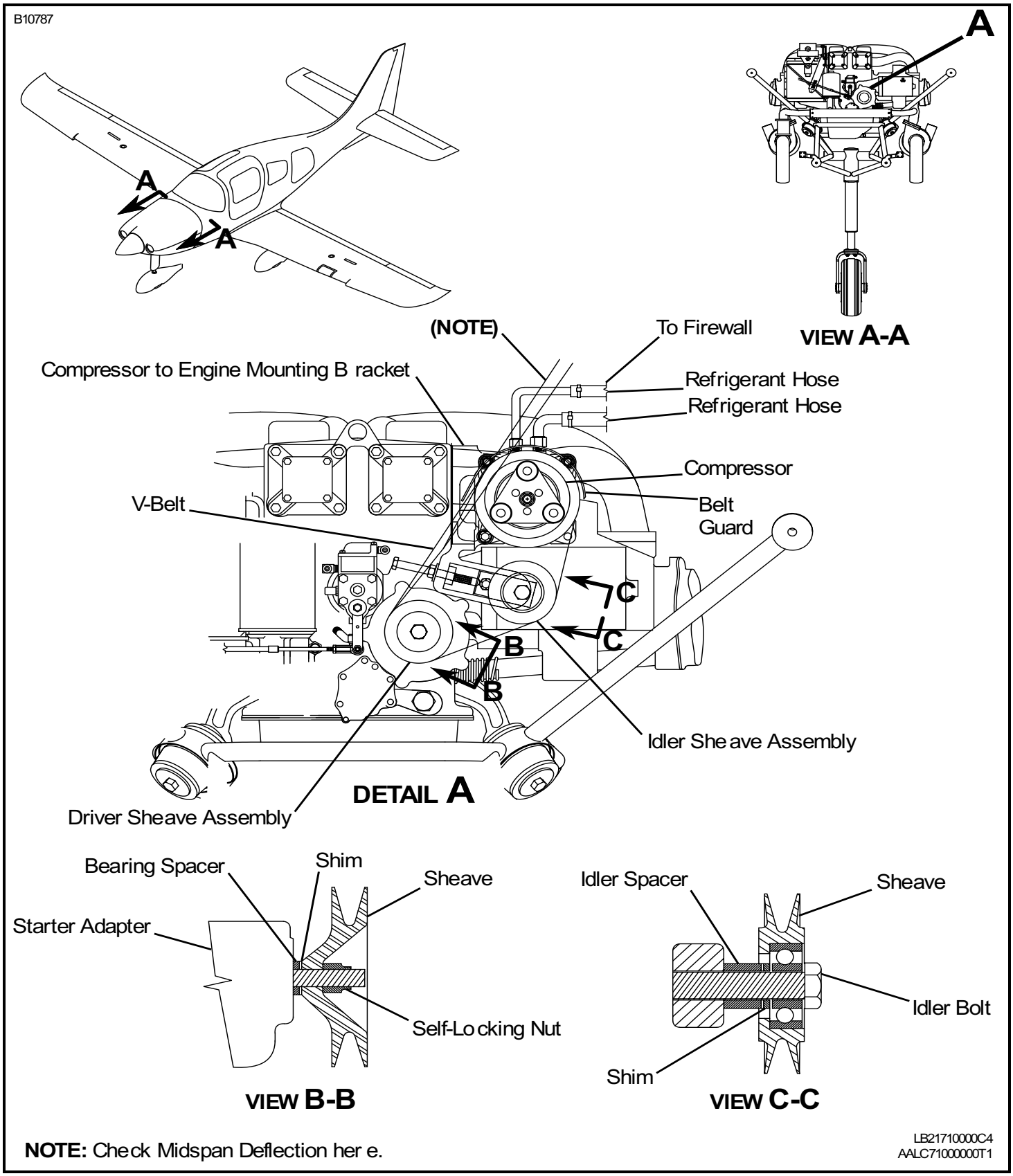
Figure 205 : Sheet 1 : Evaporator Coil Temperature Sensor Resistance vs. Temperature Curve

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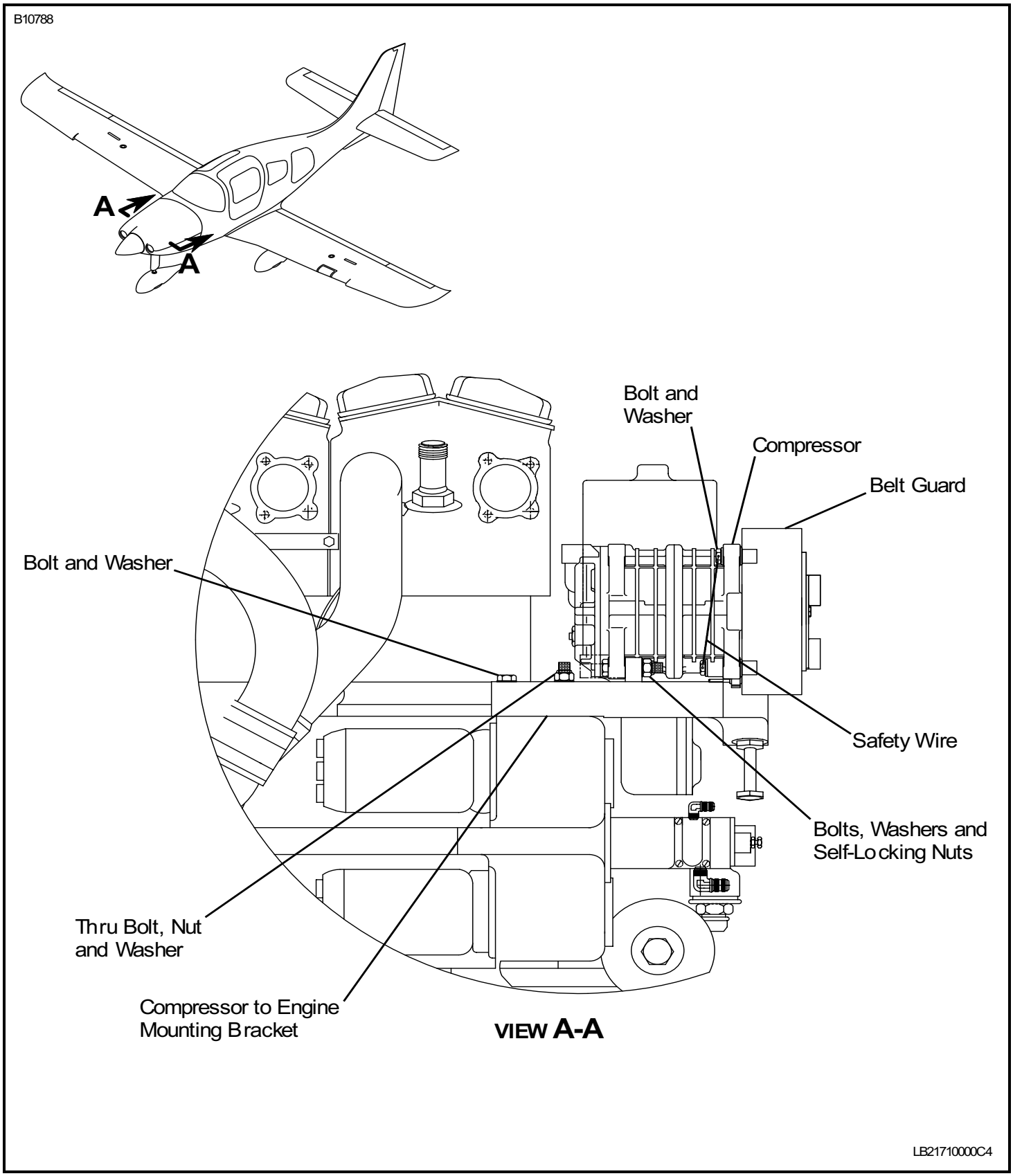
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Figure 206 : Sheet 1 : Engine Driven Compressor



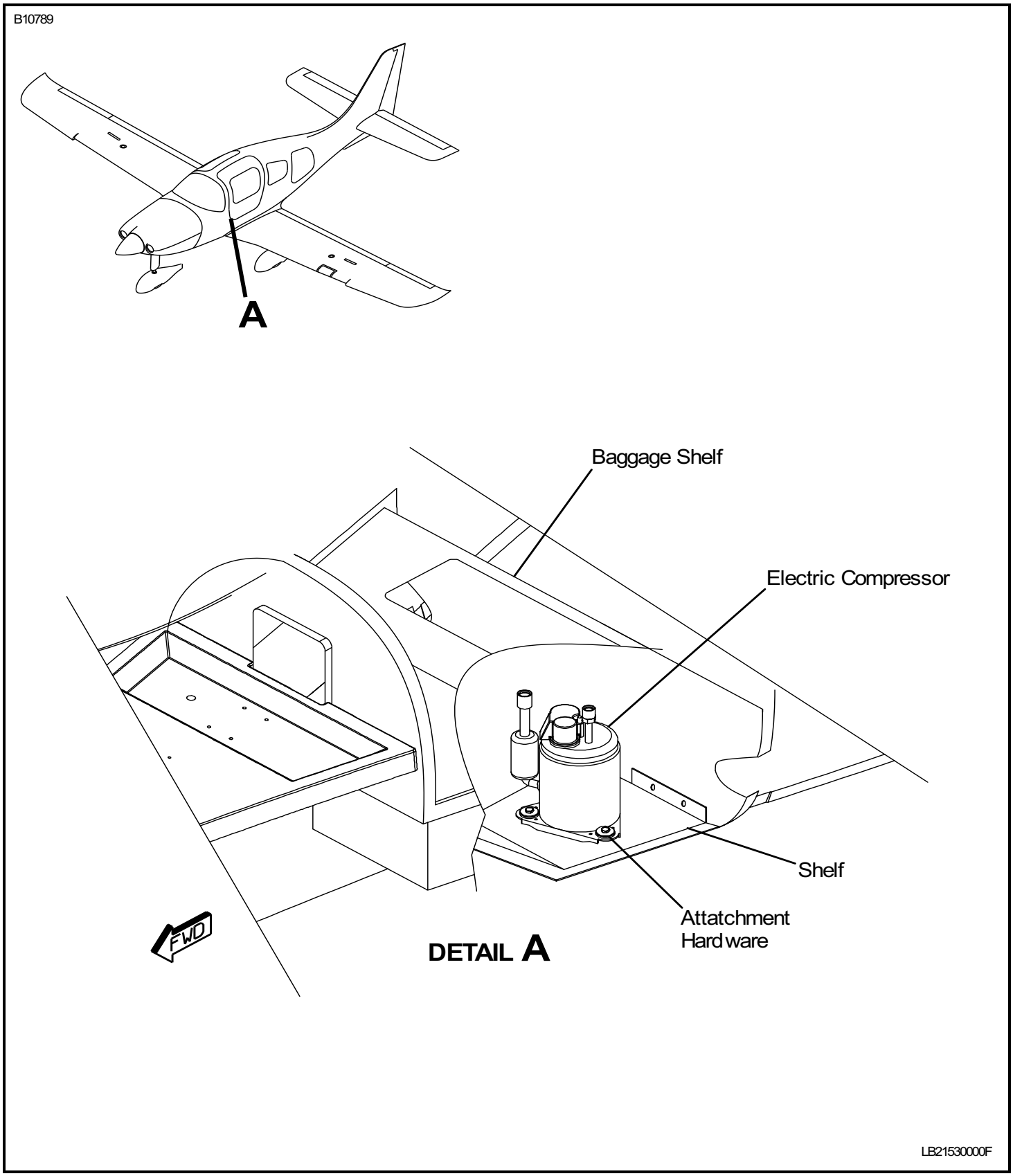
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Figure 206 : Sheet 2 : Engine Driven Compressor



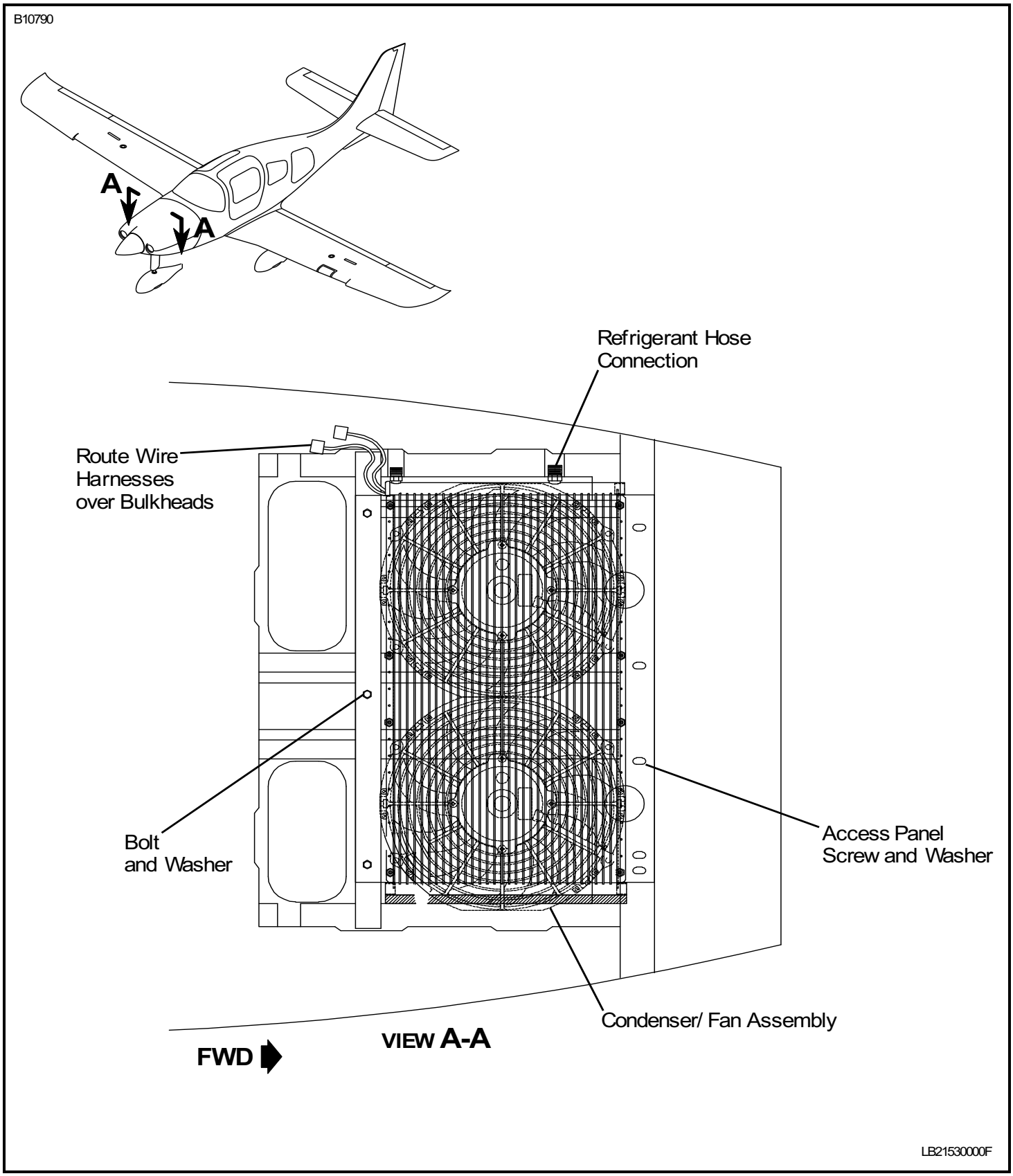
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Figure 207 : Sheet 1 : Electrical Compressor



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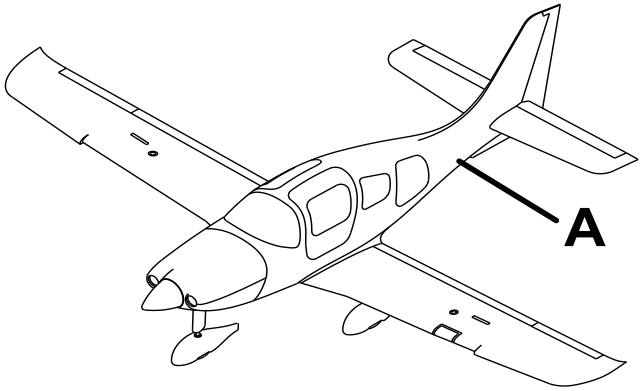
Figure 208 : Sheet 1 : Condenser/Fan Assembly

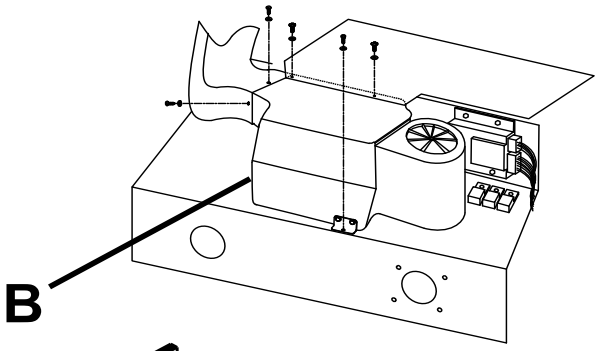


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Figure 209 : Sheet 1 : Expansion Valve

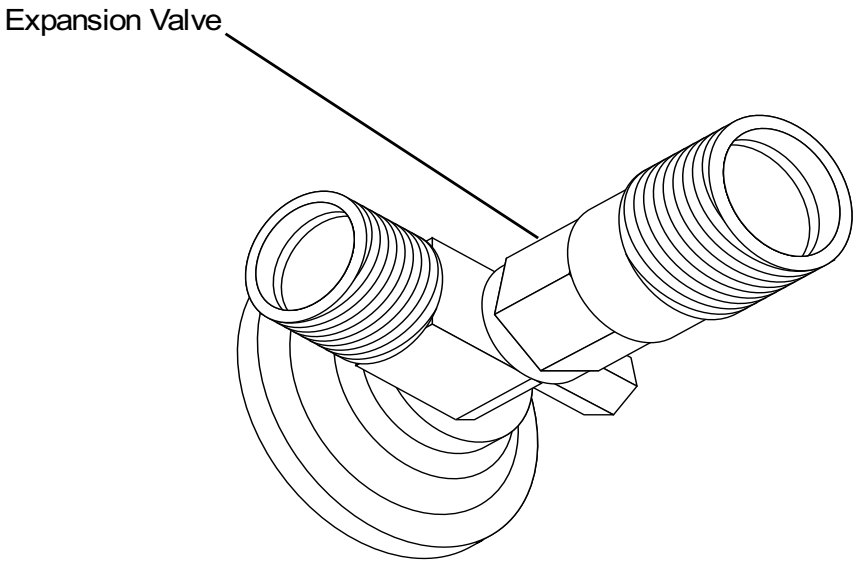
B11180







DETAIL A

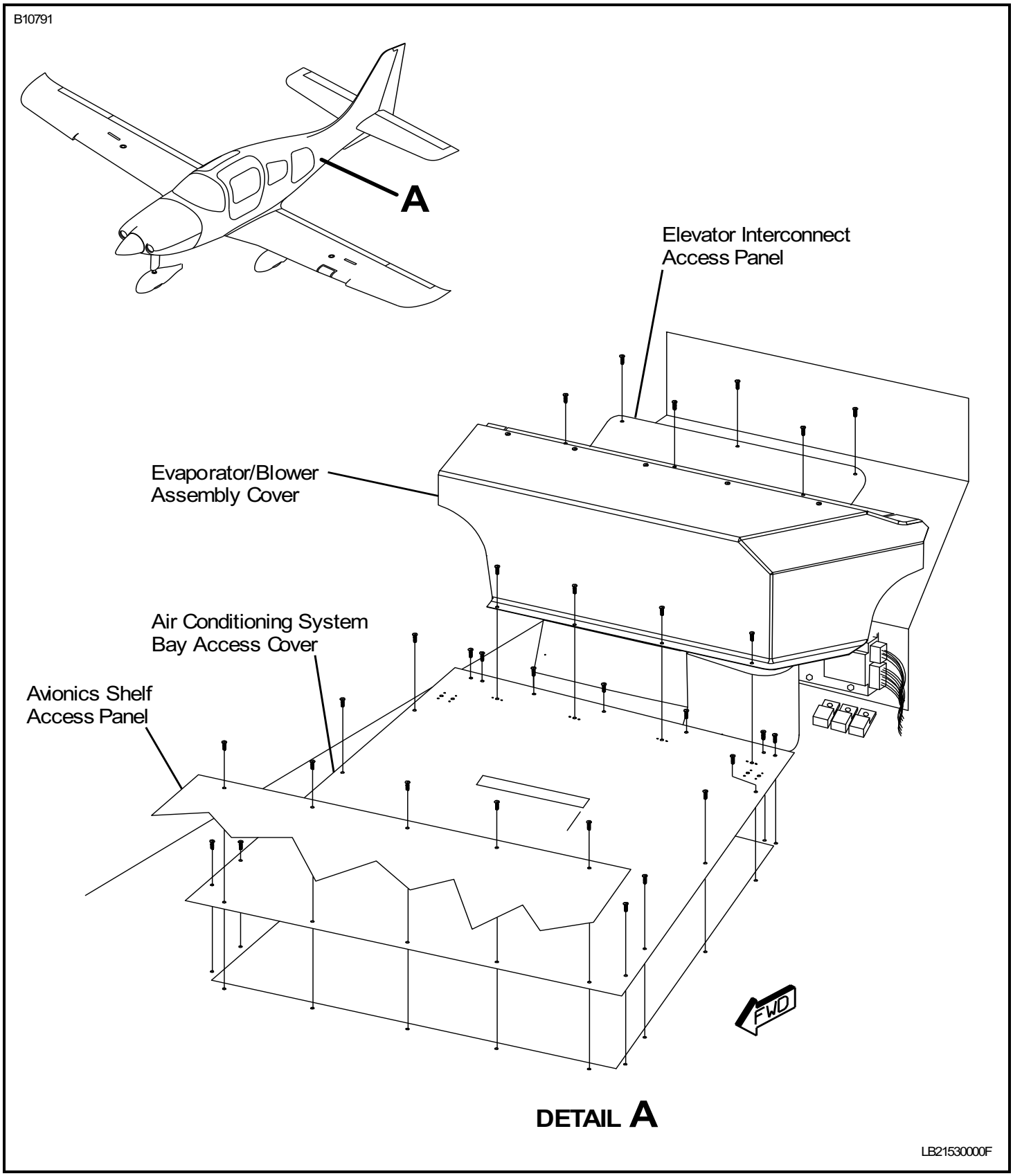


DETAIL B

LB21530000F

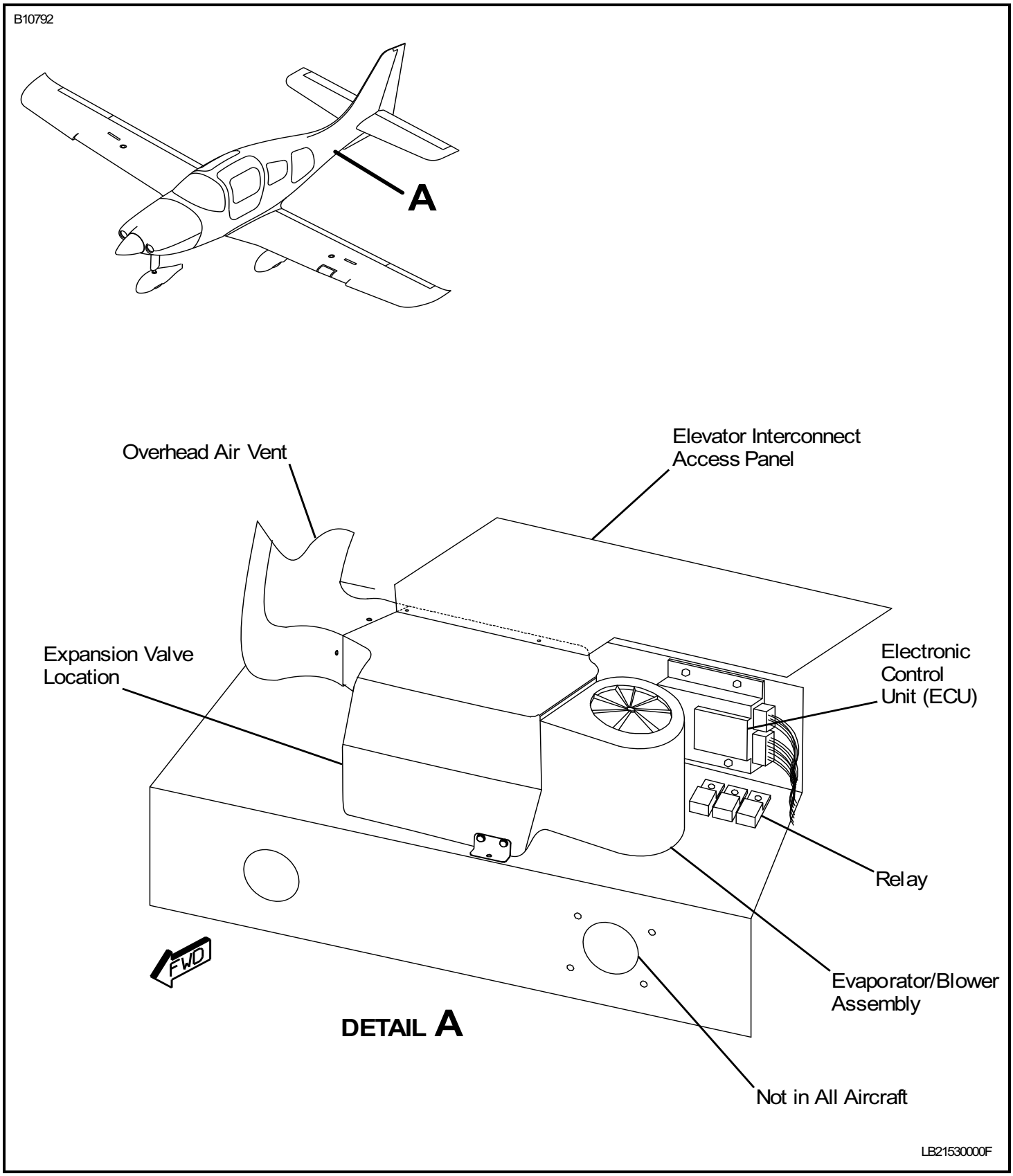
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Figure 210 : Sheet 1 : Access Panels and Covers and Evaporator/Blower Assembly Installation



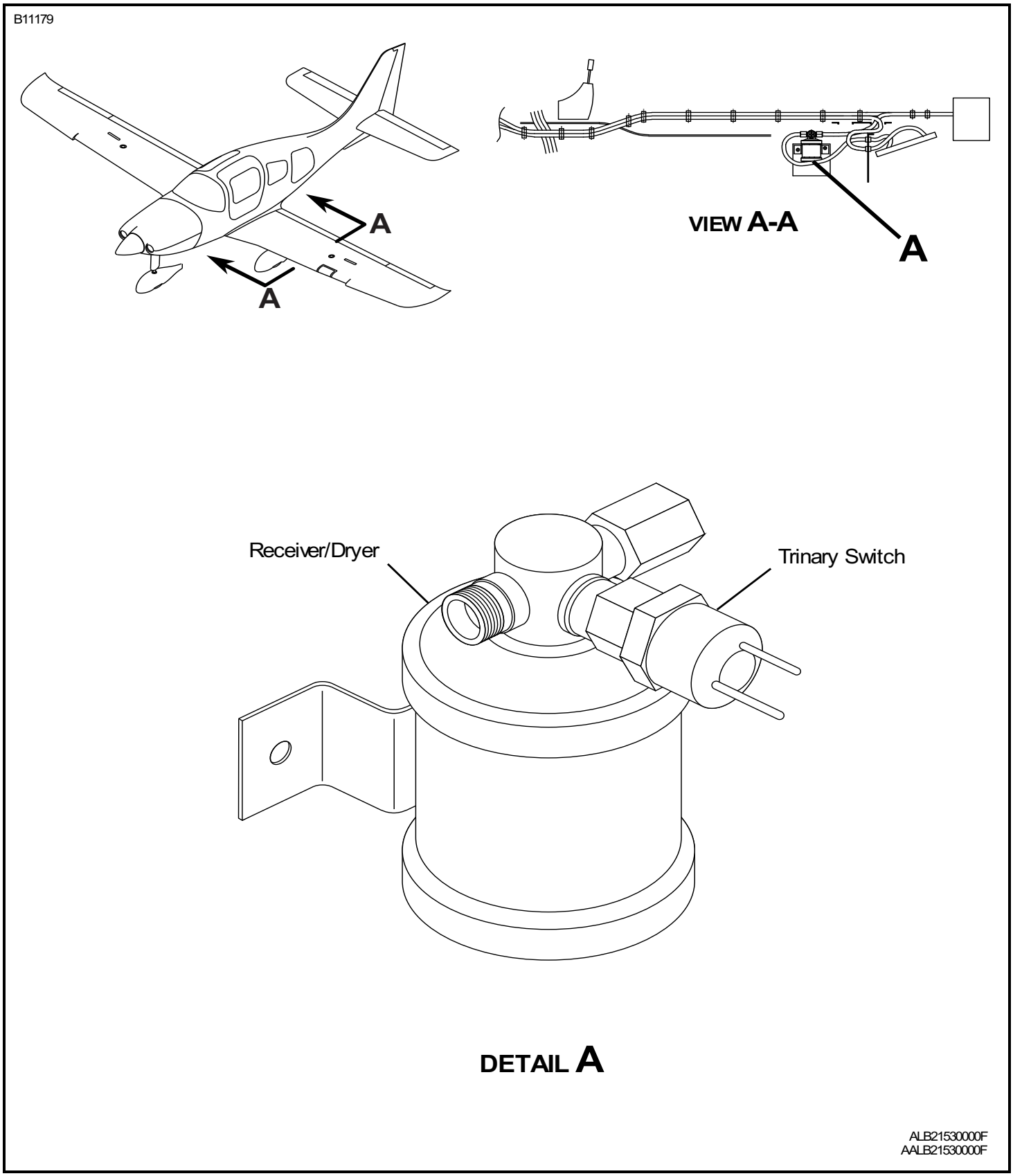
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Figure 210 : Sheet 2 : Access Panels and Covers and Evaporator/Blower Assembly Installation



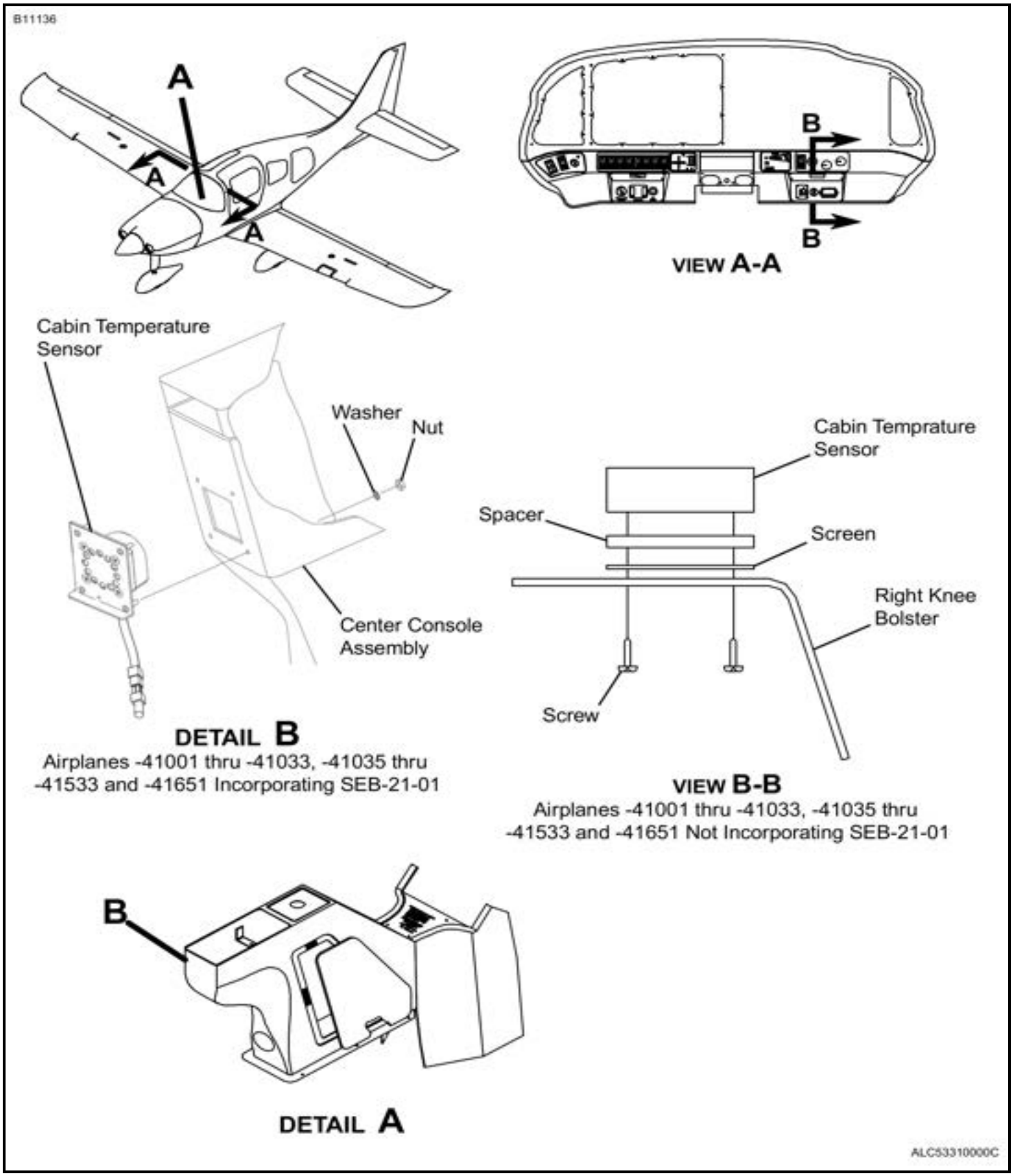
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Figure 211 : Sheet 1 : Receiver/Dryer with Trinary Switch



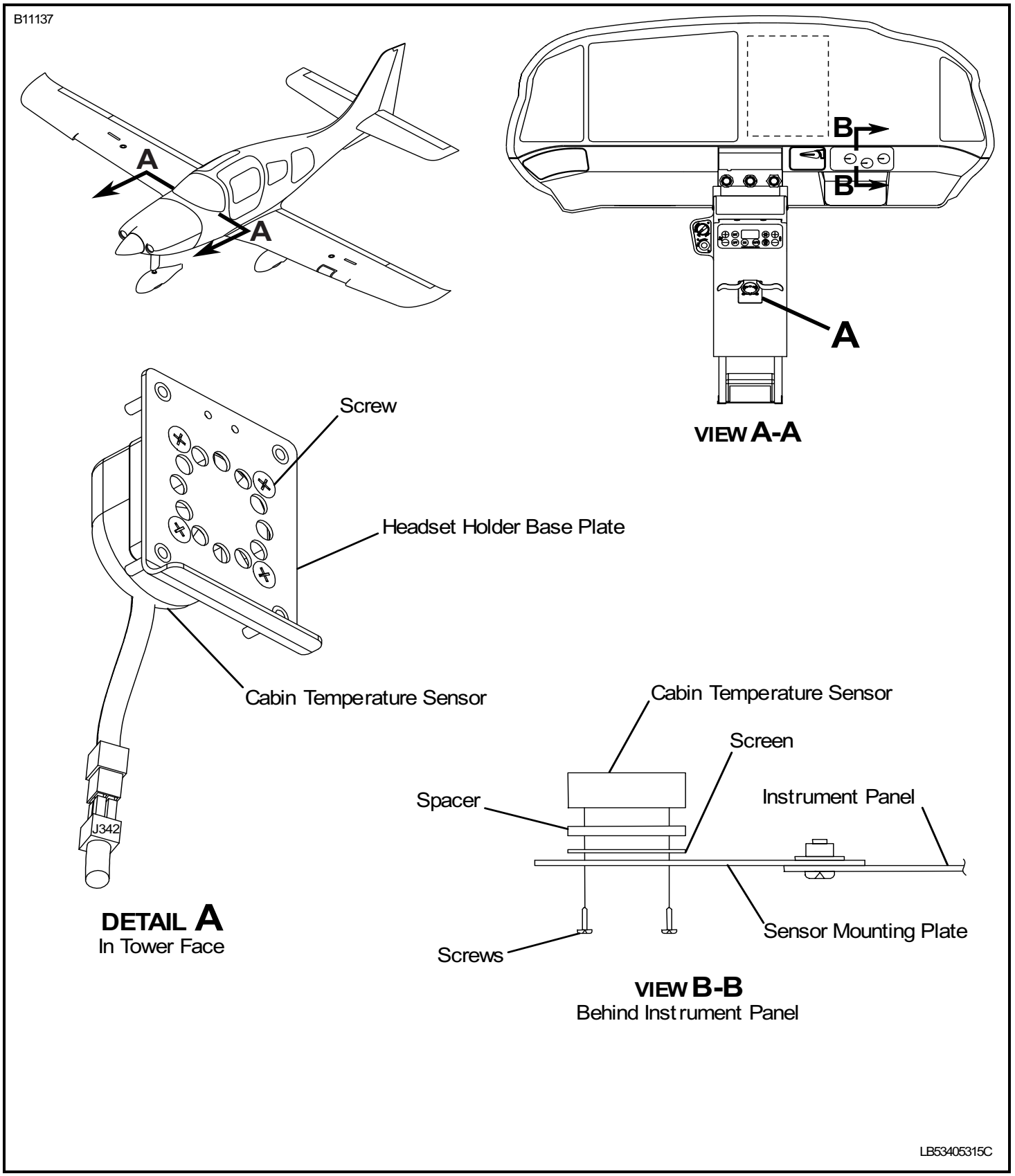
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Figure 212 : Sheet 1 : Cabin Temperature Sensor (Avidyne Option)



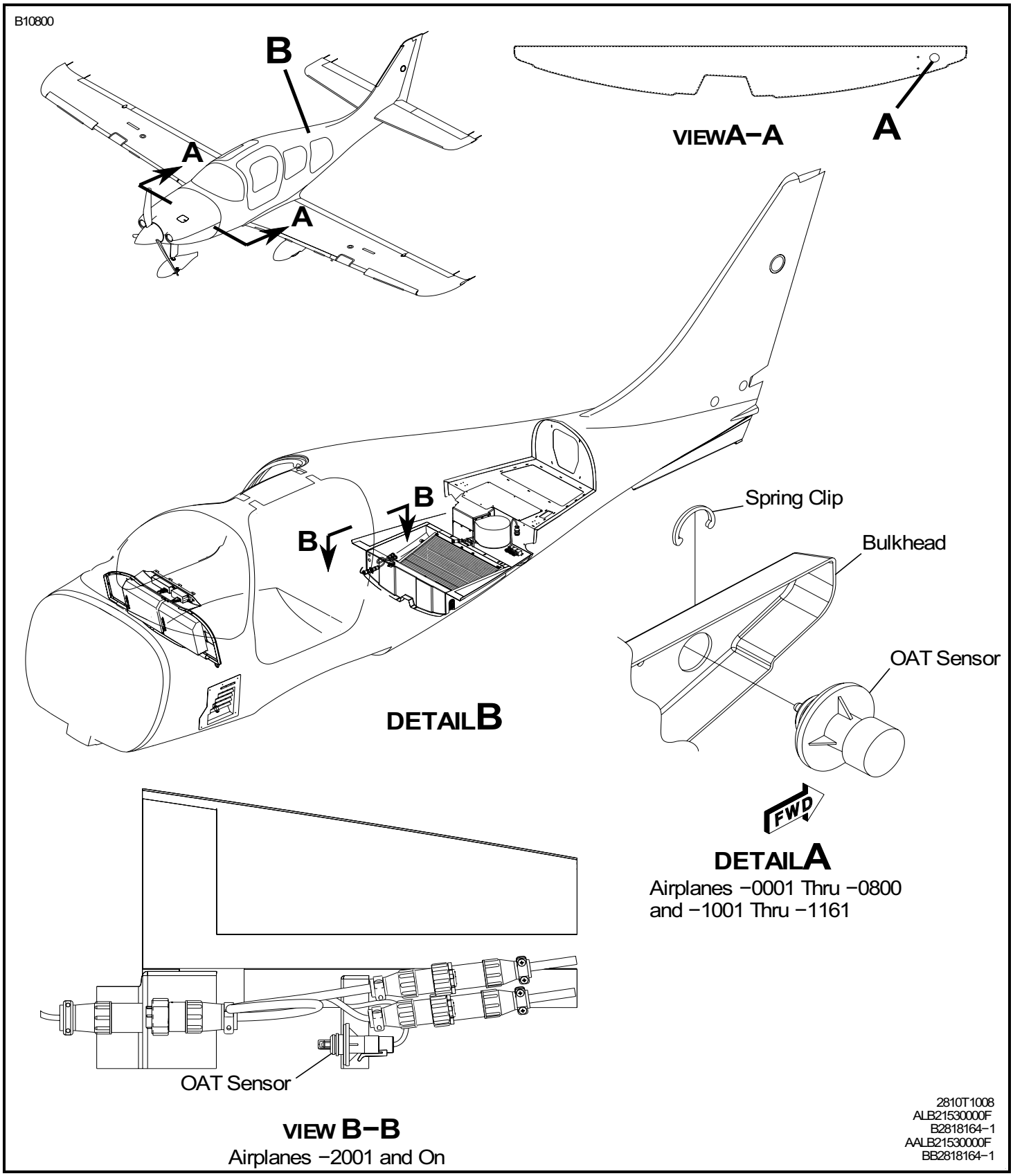
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Figure 213 : Sheet 1 : Cabin Temperature Sensor (Garmin G1000 Option)



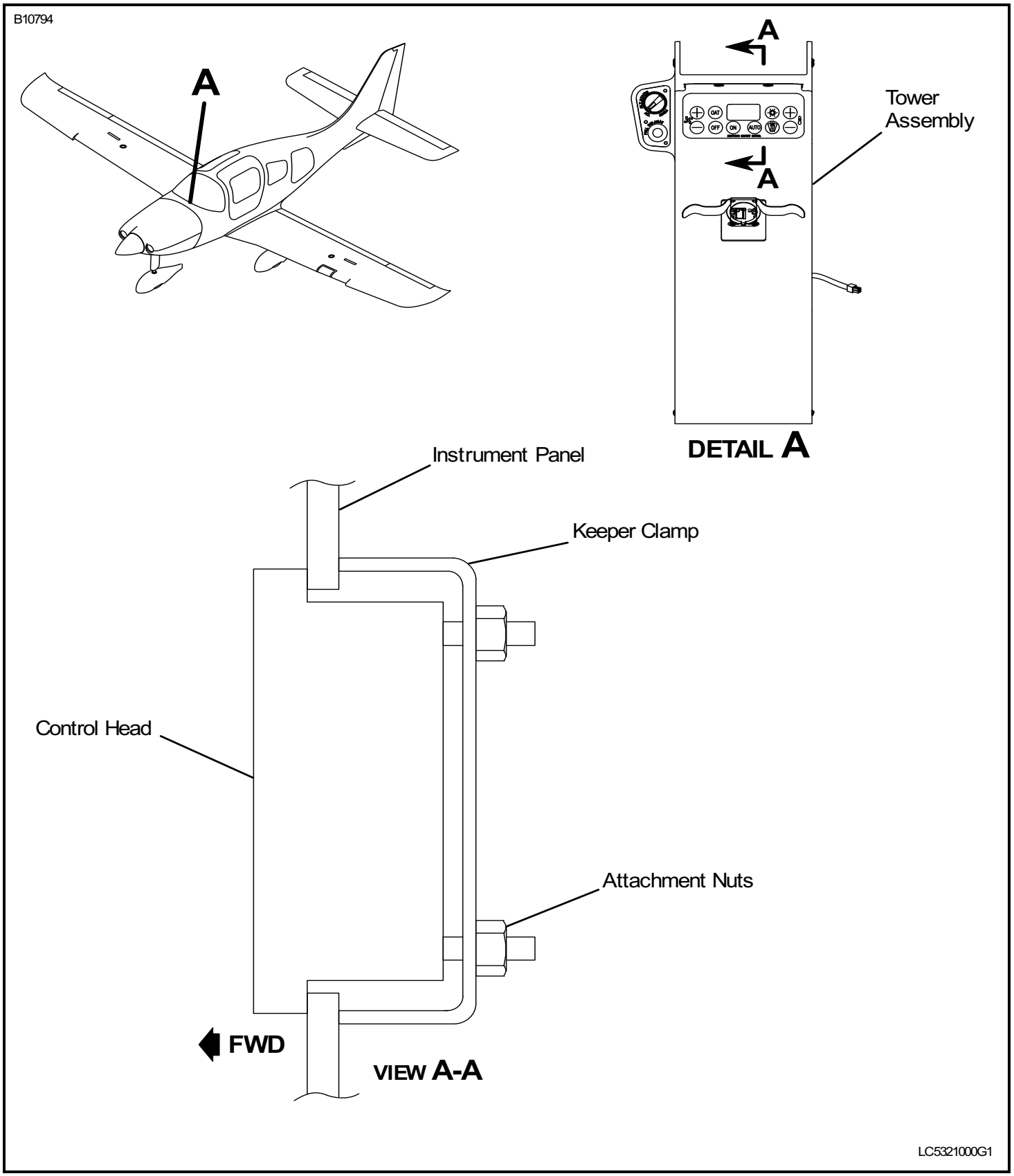
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Figure 214 : Sheet 1 : OAT Sensor



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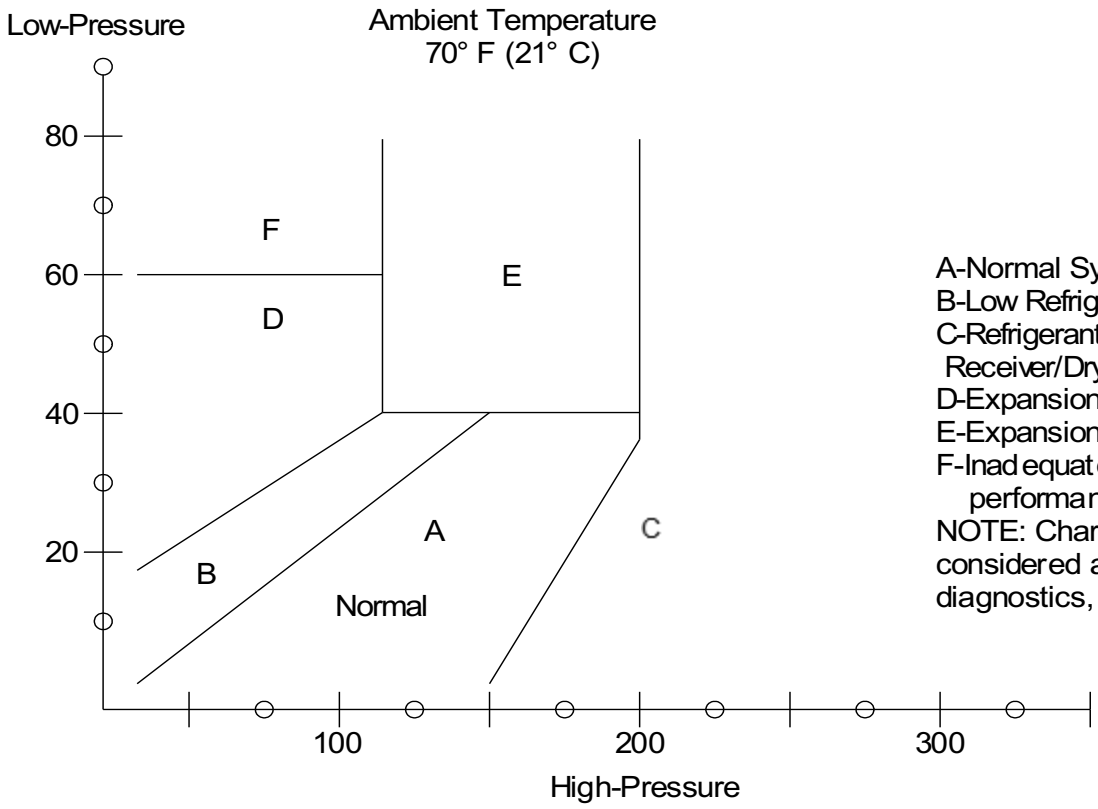
Figure 215 : Sheet 1 : Control Head Attachment



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Figure 216 : Sheet 1 : Pressure and Performance

B11151

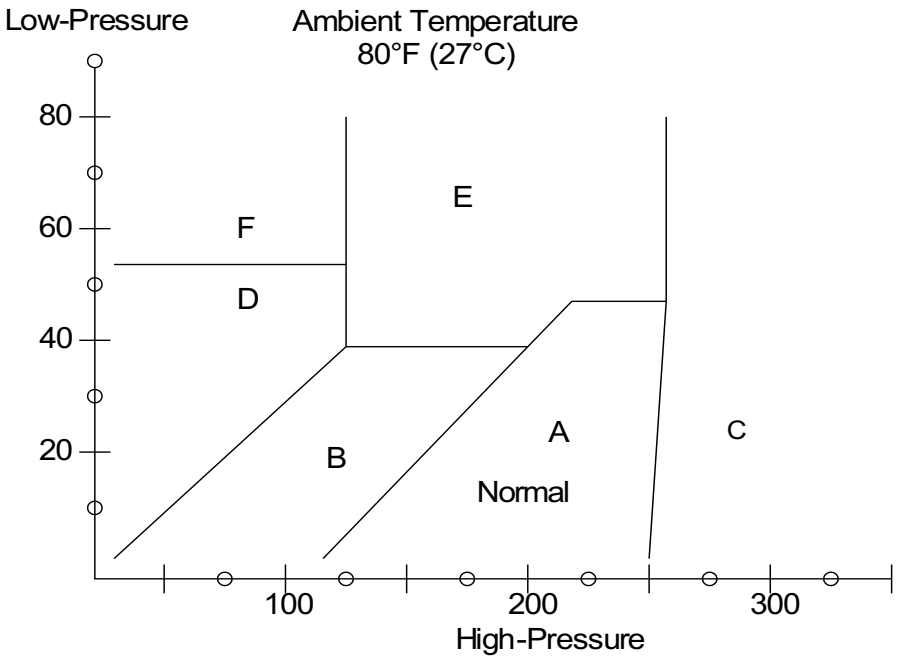


A-Normal System
B-Low Refrigerant Charge
C-Refrigerant overcharge or Receiver/Dryer restricted
D-Expansion Valve closed
E-Expansion Valve stock open
F-Inadequate Compressor performance
NOTE: Chart should be considered as an aid to diagnostics, not a single source.

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Figure 216 : Sheet 2 : Pressure and Performance

B11152



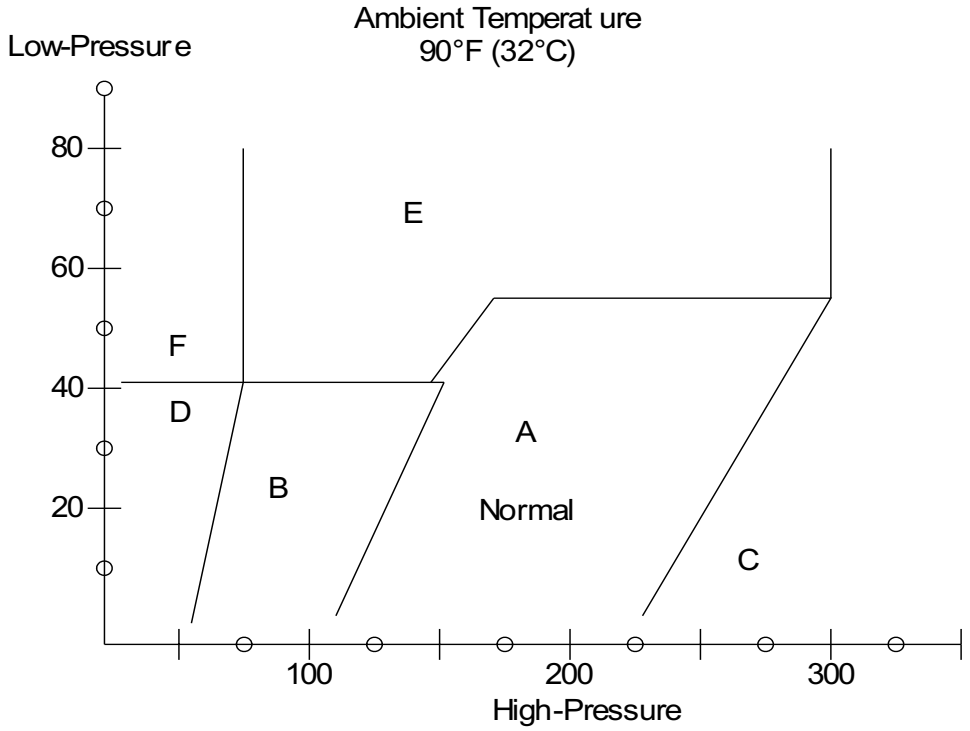
A-Normal System
B-Low Refrigerant Charge
C-Refrigerant overcharge or Receiver/Dryer restricted
D-Expansion Valve closed
E-Expansion Valve stuck open
F-Inadequate Compressor performance

NOTE: Chart should be considered as an aid to diagnostics, not a single source.

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Figure 216 : Sheet 3 : Pressure and Performance

B11153



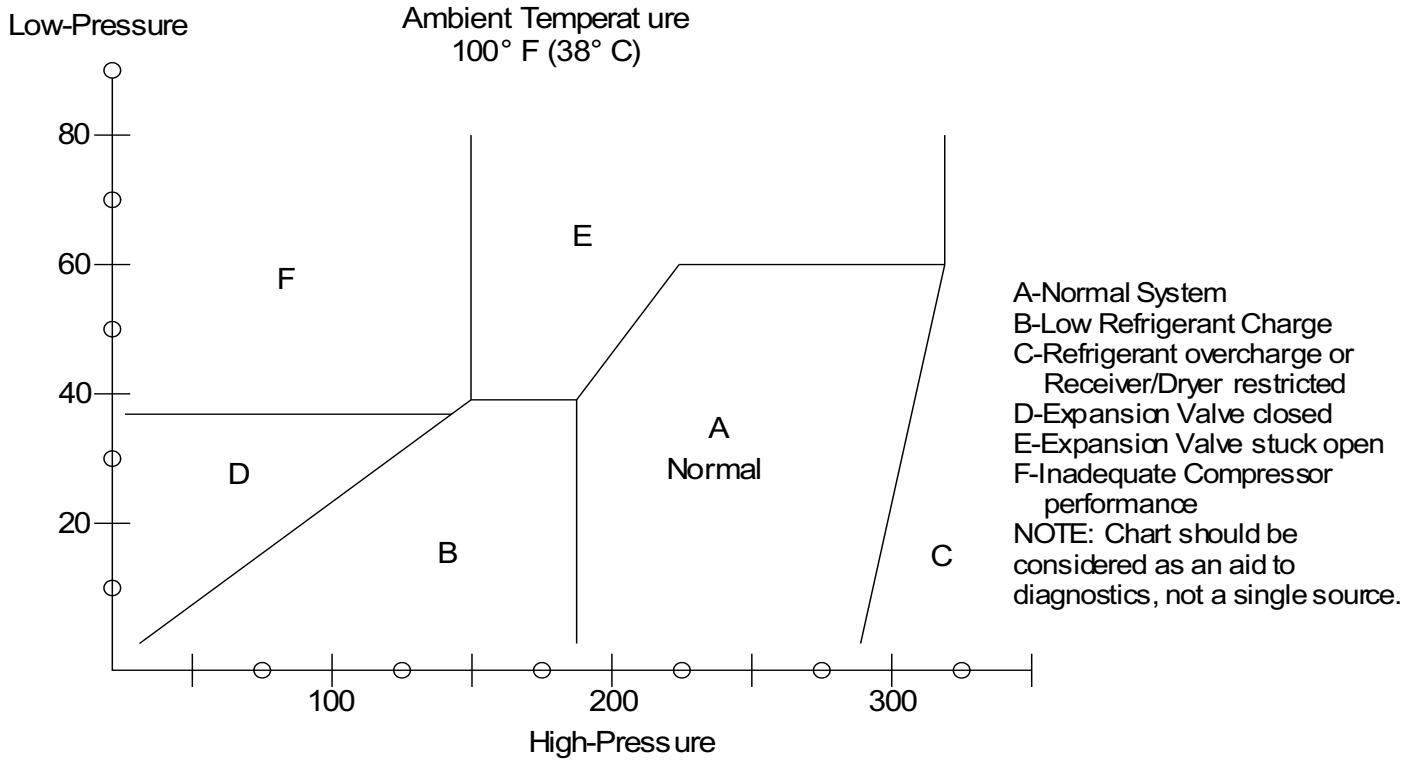
A-Normal System
B-Low Refrigerant Charge
C-Refrigerant overcharge or Receiver/Dryer restricted
D-Expansion Valve closed
E-Expansion Valve stuck open
F-Inadequate Compressor performance

NOTE: Chart should be considered as an aid to diagnostics, not a single source.

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Figure 216 : Sheet 4 : Pressure and Performance

B11154



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TEMPERATURE AND AIR CONTROL (T240) - DESCRIPTION AND OPERATION

1. Description

A. The Cessna Model T240 Environmental Control System (ECS) and the optional air conditioning system (also known as the Automatic Climate Control System (ACCS) are controlled with the Garmin G2000 GTC 570 Touchscreen Controller (UI405). The GTC 570 is found in the center console. The GTC 570 uses infrared sensor activated touchkeys to control the system. Alternate action (on/off) touchkeys have a vertical light bar that comes on when the key is selected on. The GTC 570 gives an ECS diagnostic function to help with necessary maintenance actions. For a general description applicable to the GTC 570 refer to Chapter 34, Garmin G2000 - Description and Operation. For maintenance data applicable to the ACCS, refer to Automatic Climate Control System (ACCS). For a description of the ECS refer to Environmental Control System - General.

2. Operation

A. The ECS control page is used to control the interior cockpit temperature and airflow. The airplane can have two possible ECS configurations, one with the optional air conditioning system and one without air conditioning. The ECS control page is accessed by selecting the Systems touchkey on the Home page of the GTC 570 controller. The configuration page for airplanes that do not have the air conditioning system installed does not show the A/C touchkey. Refer to Figure 1.

B. When the AUTO mode is not selected the ECS continues temperature regulation (except for the fan control). When the air conditioning option is not installed, the ECS only circulates outside ram air for the cooling function in the auto or manual mode. When AUTO mode is cancelled, the fan control mode is then manual (MAN) and the fan speed is the previously set manual speed value. When AUTO mode is on, the MAN fan control is selected by touching the - or + keys the initial fan speed is one increment higher or lower (depending on key used) than the previously manual speed value. When AUTO mode is on, the MAN fan control is selected by touching the Fan Speed Bar Graph, the initial fan speed equals the value touched on the Bar Graph. For the GTC 570 controller touchkey controls and functions refer to Table 1, Table 2 and Table 3.

Table 1. Alternate Action Touchkeys (On/Off)

Touchkey Label	Function
ECS	Sets the ECS on or off. When set to on, starts the previously used mode and selected temperature. Except for the ECS touchkey, when the ECS is selected off, all the page imagery shows grayed-out.
MODE	Selects between Auto and Fan modes. All functions are controlled automatically. When Auto is selected all previously selected manual settings are cancelled.
DEFOG	Sets the DEFOG mode on or off. Directs the majority of airflow (at maximum fan speed) to the windscreen defog outlets. The Set temperature is regulated but the AC compressor (optional) operation is prevented.
AC MODE	Sets the AC Compressor mode on and off. When on, the AC compressor system is available to operate if commanded by the ECU (it does not indicate the AC compressor is on). If the air conditioning system option is not installed on the airplane, the A/C mode touchkey does not show on the GTC 570 controller.

Table 2. Momentary Action Touchkeys

Touchkey Label	Function
-1°	Decreases the SET temperature in 1° increments for each key selection.
+1°	Increases the SET temperature in 1° increments for each key selection.
-	Decreases fan speed in single increments for each key selection. The selections are: LO, 10, 20, 30, 40, 50, 60, 70, 80, 90, and HI. If previously on, selection of this touchkey overrides AUTO mode. The numerical values show asa percentage.
+	Increases fan speed in single increments for each key selection. The selections are: LO, 10, 20, 30, 40, 50, 60, 70, 80, 90, and HI. If previously on, selection of this touchkey overrides AUTO mode. The numerical values show as a percentage.

Table 3. Digital and Graphical Displays

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Touchkey Label	Function
Actual	Shows actual cabin temperature on the GTC 570 controller display. (°F or °C as selected)
Selected	Shows the desired cabin temperature (°F or °C as selected). The temperature can be selected from 55°F to - 55°F (13°C to - 35°C). Use the TEMP Bar Graph and/or the -1° or +1° touchkeys.
Temperature	Temperature Bar Graph. Lets you use touch selection to set the desired temperature. The selected value shows on the display as an Actual value.
Fan	Fan Speed Bar Graph. Shows fan speed (manual only) and mode (Auto or Manual). Lets you use touch selection for the desired manual fan speed. If you us the Bar Graph or the - or + touchkeys to select fan speed, it commands the manual fan speed and if selected, prevents Auto mode operation. Refer to Table 2 for fan speed range values.

3. Diagnostic Function

A. When electrical power is initially supplied and the GTC 570 controller ECS configuration page is first accessed, the DIAG touchkey does not show on the page. To show the DIAG touchkey the lower left area of the page must be touched for a period of approximately five seconds. When the DIAG touchkey shows, you must push it again to access the diagnostic page. The page shows until the avionics power is reset. The ECS Diagnostic page shows the data that follows: ECS component readings, ESC module firmware version, and active ECS fault text messages. The Fault Text Message area lets you view many messages simultaneously. You can scroll through the page to get access to each message. Refer to Figure 1.

B. The Diagnostic page shows the ECU Module Firmware as: Firmware Version (with the installed firmware digital value).

C. For the ECS Components Readings refer to Table 4.

Table 4. ECS Component Readings

Component Reading	Function
Cabin Temp Sensor	Shows temperature value as °F or °C
Evap Coil Temp Sensor	Shows temperature value as °F or °C (Note)
ECS Mixing Valve Position	Shows valve position in a percentage of open
VCS Compressor Command	Shows ON or OFF (Note)
Blower speed	Shows the speed as a percentage of maximum

NOTE: On the ECS page, the A/C touchkey area is grayed-out or does no show on non-air conditioning configuration airplanes. Refer to Figure 1.

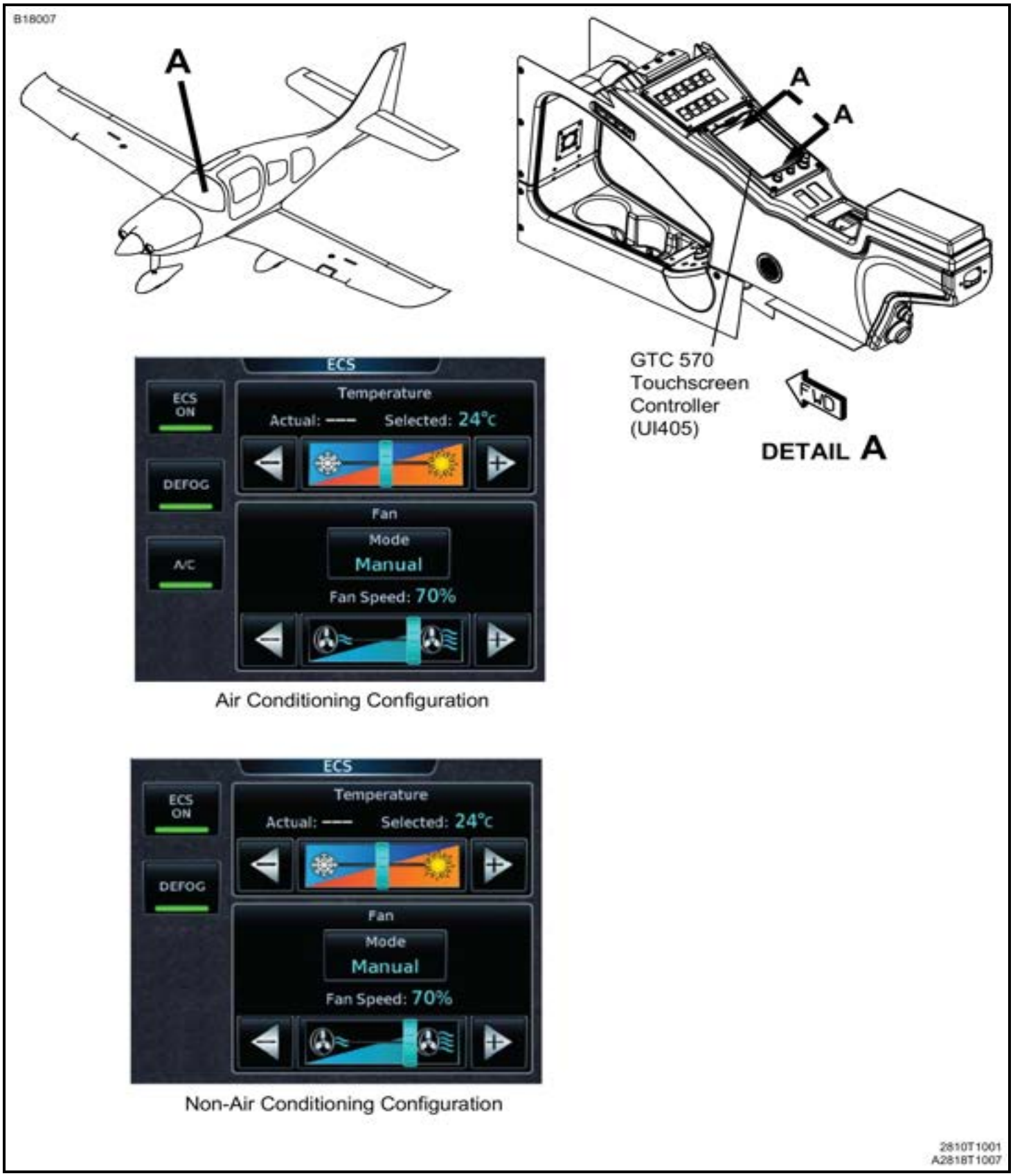
D. The Fault Text Messages show on the page as follows:

- No Faults
- Cabin Temp Sensor-Shorted
- Cabin Temp Sensor-Open
- Evap Temp Sensor-Shorted (Note)
- Evap Temp Sensor-Open (Note)
- OAT Sensor-Shorted
- OAT Sensor-Open
- Heater Blend Air Actuator-Open
- No Communication with ECU.

NOTE: Ignore for non-air conditioning configuration.

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Figure 1 : Sheet 1 : ECS Touchscreen Controller Pages



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Figure 1 : Sheet 2 : ECS Touchscreen Controller Pages

B18008



Air Conditioning Configuration



Non-Air Conditioning Configuration

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CABIN TEMPERATURE SENSOR (T240) - REMOVAL/INSTALLATION

1. General

A. This section gives the removal and installation procedures for the Model T240 Cabin Temperature Sensor.

B. The Cabin Temperature Sensor contains a calibrated thermistor and fan used to draw cabin air over the thermistor. The sensor provides inputs to the ECU/Blower Module Assembly. The cabin temperature is determined by comparing the inside temperature of the aircraft with the desired cabin temperature setting entered into the GTC 570 Touchscreen Controller. If the sensor fails, a fault will be noted on the diagnostic page of the touchscreen controller. The sensor is found in the forward section of the center console. Refer to Figure 401.

2. Tools and Equipment

A. No special tools or equipment are required for this procedure.

3. Cabin Temperature Sensor

A. Remove the Cabin Temperature Sensor (UC015) (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) are in the OFF position.

(3) Disengage the ECS CTRL DOOR SEAL circuit breaker found on the cockpit circuit breaker panel.

(4) Remove the screws that attach the temperature sensor plate to the center console.

(5) Carefully pull the plate and sensor from the center console.

(6) Disconnect electrical connector P307 from electrical connector J307.

(7) If necessary, remove the sensor from the plate.

(a) Remove the screws that attach the sensor to the plate.

(8) Remove the sensor from the airplane.

B. Install the Cabin Temperature Sensor (UC015) (Refer to Figure 401).

(1) If necessary, attach the sensor to the temperature sensor plate.

(a) Install the screws that attach the sensor to the plate.

(2) Connect electrical connector P307 to electrical connector J307.

(3) Carefully put the plate in its correct position to the center console.

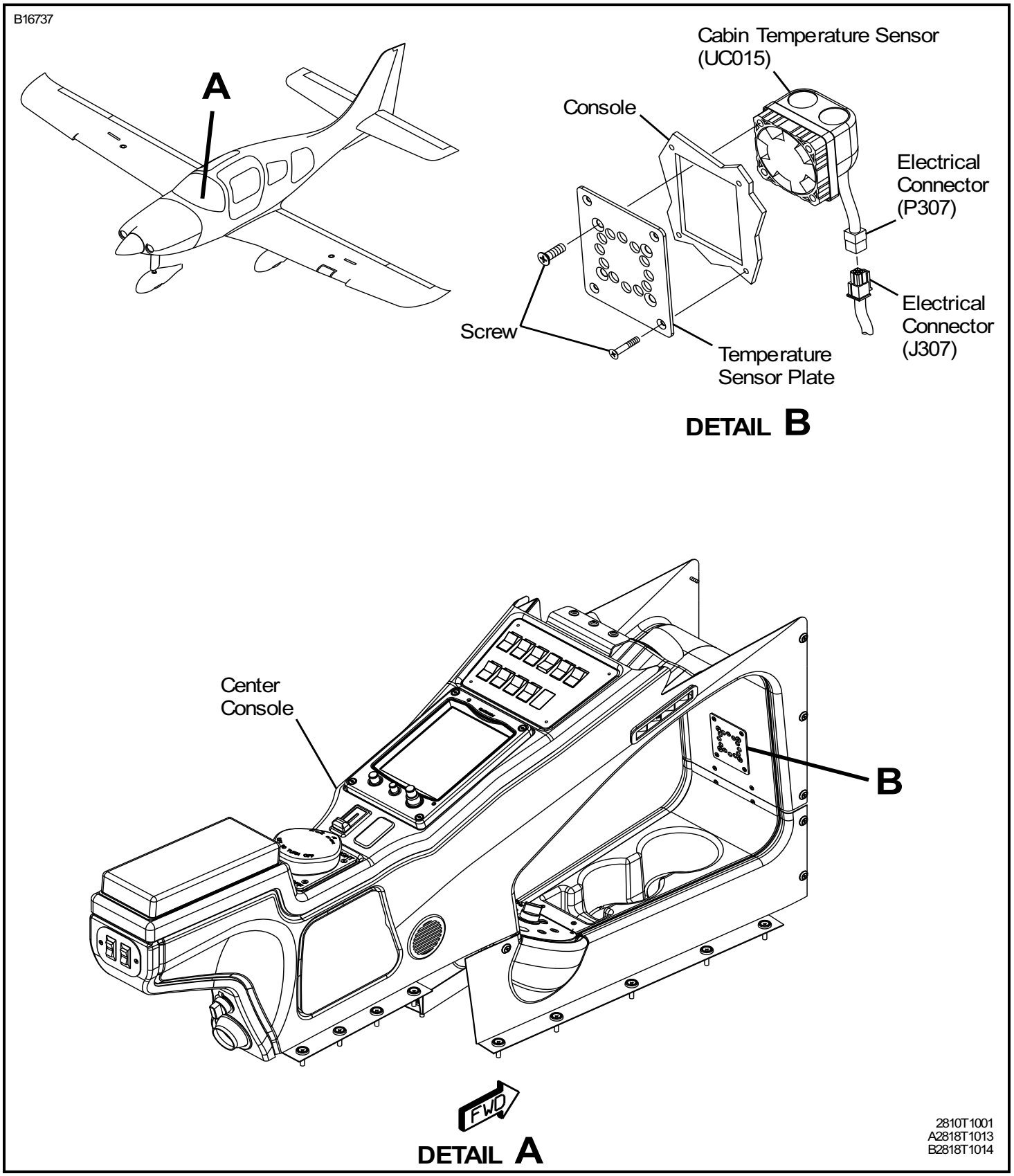
(4) Install the screws that attach the plate to the center console.

(5) Engage the ECS CTRL DOOR SEAL circuit breaker found on the cockpit circuit breaker panel.

(6) Do a check of the defrost/floor valve. Refer to Air Conditioning (T240) - Adjustment/Test.

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Figure 401 : Sheet 1 : Cabin Temperature Sensor Installation



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ELECTRICAL POWER - GENERAL

1. Electrical System - General

A. **Electrical Power System** - The electrical system in this aircraft consists of two independent buses, which are referred to as the left bus and right bus. Two alternators provide charging power for the batteries, as well as system power. The batteries will also provide additional power in the event of an over-demand situation where the requirements on the system are greater than what can be provided by the alternator. The left and right buses in turn feed the avionics and essential buses. A summary of the busses, equipment powered by each bus, and circuit breaker protection is shown as follows:

(1) Table 1 (Avidyne).

(2) Table 2 (Garmin G1000).

(3) Table 3 (Garmin G2000).

B. A functional diagram of the electrical system is shown as follows:

(1) Figure 1 (Avidyne).

(2) Figure 2 (Garmin G1000).

(3) Figure 3 (Garmin G2000).

C. Five current limiters protect the alternators and bus outputs. In addition, the left and right buses are physically isolated inside the aft avionics bay. Left and right bus controls, grounds, and outputs are routed through separate holes, connectors, and cable runs so any failure on one bus does not affect the operation of the other bus.

D. Control of the buses is with the master switch panel located on the lower left portion of the instrument panel (Avidyne) or in the cockpit overhead (Garmin G1000) and (G2000). There is also a CROSS TIE switch on this panel, which will restore power in the event of failure of the right or left systems. For example, if the alternator or some other component on the left side should fail, the CROSS TIE switch will restore power to the electrical items on the left bus by connecting the left bus to the right bus.

E. The essential bus is never affected, provided power from at least one bus (left or right) is available. The essential bus is diode fed that allows current to flow only in one direction, from both the right bus and the left bus that allows the essential equipment to have two sources of power.

(1) Airplanes -2096 and On and airplanes incorporating SEB-24-04, the essential bus is further protected by two 20amp in-line fuses between the left and the right bus.

F. **Avionics Bus**

(1) **Avidyne Option** - The avionics bus provides power to the Audio/Voice, GPS 1, GPS 2, Nav/Com 1, Com 2, and Transponder/Encoder/Equipment Fan. These devices are protected by their own circuit breakers. The circuit breaker ratings are: Audio/Voice, GPS 1, GPS 2, Nav/Com 1, Com 2, Transponder/Encoder/Equipment Fan, Traffic, Autopilot, MFD, and Weather .

(2) **Garmin G1000 Option** - The avionics bus provides power to the Audio/MKR, Integrated Avionics No. 2, Com No. 2, Transponder, Avionics Fan, Traffic, Autopilot, MFD, and Weather.

(3) **Garmin G2000 Installation** - The avionics bus provides power to the Audio, ADF/DME, Transponder, Avionics Fans, Traffic, Iridium DL, A/P Controller, MFD, AHRS NO. 2, XM DL, and Lightning Detection.

G. **Left Bus**

(1) **Avidyne Option** - The left bus provides power for the Aileron Trim, Pitot Heat, Engine Instruments, Rudder Hold, Position Lights, Landing Light, Left Voltage Regulator, Clock, Cabin Fan, and PFD Power.

(2) **Garmin G1000 Option** - The left bus provides power for the Aileron Trim, Pitot Heat, SpeedBrakes, Rudder Hold, Position Lights, Landing Light, Left Voltage Regulator, and Fan.

(3) **Garmin G2000 Installation** - The left bus provides power for the Anti-Ice (Inadvertent), W/S Anti-Ice (FIKI), Anti-Ice Pump 1 (FIKI), Wing Inspection Lights(FIKI), CO Detector, 12 Volt power, Oxygen System, ADC, Com No. 1, Nav No. 1, Flaps, PFD, PFD Controller, Pitot Heat, Panel lights, NAV Lights, Landing Light, Left Alt Controller, and AHRS No.1.

H. **Right Bus**

(1) **Avidyne Option** - The right bus provides power for the Strobe Lights, Taxi Light, Right Voltage Regulator, Door Seal/Power Point, PFD Power, and Elevator Trim.

(2) **Garmin G1000 Option** - The right bus provides power for the Strobe Lights, Taxi Light, Right Voltage Regulator,

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Door Seal/Power Point, Carbon Monoxide Detector, Oxygen, Display Keypad, and Air Conditioning.

(3) **Garmin G2000 Installation** - The right bus provides power for the Anti-Ice Pump 2 (FIKI), Stall Heat, Com No. 2, Nav No. 2, Standby Instrument, Strobe Lights, Taxi Light, Right Alt Controller, ECS CTRL/Door Seal, GTC, Air Conditioning, and ECS Fan.

I. **Essential Bus**

(1) **Avidyne Option** - The essential bus is diode fed from either the right or the left bus and provides power for the Attitude Horizon, Turn Coordinator, Panel Lights, Annunciators, Left Bus Relays, Fuel Pump, Stall Warning, Flaps, and the Right Bus Relays.

(2) **Garmin G1000 Option** - The essential bus is diode fed from either the right or the left bus and provides power for the PFD, Elevator Trim, Panel Lights, AHRS, Air Data Computer, Engine Airframe, Integrated Avionics No. 1, Com No. 1, Left Bus Relays, Fuel Pump, Stall Warning, Flaps, Standby ADI, and the Right Bus Relays.

(3) **X-Feed Bus, Garmin G2000 Installation** - The X-Feed bus is diode fed from either the right or the left bus and provides power for the Roll Trim/RDR Hold, Pitch Trim, Engine Airframe, Auto Pilot Servos, Fuel Pump, Stall Warning, and Speed Brakes.

(4) Airplanes -2096 and On and airplanes incorporating SEB-24-04, the essential/X-Feed bus is further protected by two 20amp in-line fuses between the left and the right bus.

J. **Battery Bus**

CAUTION: For extended service life, disconnect the batteries to prevent them from being continuously charged by external power when the aircraft is in maintenance.

CAUTION: Do not replace the sealed lead acid batteries with wet lead acid batteries.

CAUTION: Never "jump-start" an aircraft that has a "dead" or discharged battery. It takes approximately three hours to recharge a fully discharged battery with the aircraft generating system or external power.

(1) **Avidyne Option** - Four items are connected to the battery bus. These items will operate even if the left and right buses are turned off since they are directly connected to the either the left or right battery. The Nav/Com bypass switch, Hobbs Meter, and ELT, are connected to the right battery and the courtesy lights/flip lights are connected to the left battery. The Hobbs Meter, ELT, and courtesy lights/flip lights are each protected by a 3 amp fuse which is not accessible from the cockpit.

(2) **Garmin G1000 Option and G2000 Installation** - Four items are connected to the battery bus. These items are directly wired to the battery shunts located on the Power Grid Assembly in the Aft Avionics Bay, but the term battery bus is used for consistency. These items will operate even if the left and right buses are turned off since they are directly connected to the right or left battery. The items directly wired to the right battery shunt include the Hobbs Meter, and ELT. The courtesy lights/flip lights are directly wired to the left battery shunt. A 3-amp fuse protects each component and is not accessible from the cockpit. The Prop Heat is directly wired to the left battery shunt for the G1000 Option and directly wired to the right battery shunt for the G2000 Option. A 20-amp fuse protects the Prop Heat components and is not accessible from the cockpit.

K. **Avidyne Option Nav/Com Bypass Circuit** - The Nav/Com bypass switch is an alternate action device that activates when depressed and needs to be depressed again to cycle off. Activation of the Nav/Com bypass switch turns on the GPS 1, Com No. 1 , and Nav No. 1 by connecting them directly to the right battery, bypassing the power grid, circuit breaker panel, and associated wiring. The Nav/Com bypass switch is protected by two 5 amp fuses.

Table 1. Summary of Buses and Equipment (Avidyne Option)

SUMMARY OF BUSES, AVIDYNE OPTION		
Bus	**Bus Component**	**Circuit Breaker**
Avionics Bus	Audio/Voice	5 amp
	GPS 1	5 amp
	GPS 2	5 amp
	Nav/Com No. 1	10 amp
	Com No. 2	10 amp
	Transponder/Encoder and Equipment Fan	5 amp

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	Traffic	4 amp
	Autopilot	5 amp
	MFD	10 amp
	Weather	5 amp
Left Bus	Aileron Trim	1 amp
	Pitot Heat	10 amp
	SpeedBrakes™	3 amp
	Engine Instruments	3 amp
	Carbon Monoxide Detector	2 amp
	Oxygen	3 amp
	Position Lights	10 amp
	Landing Light	4 amp
	Left Voltage Regulator	5 amp
	Cabin Fan	7.5 amp
	PFD L Power	10 amp
	Air Conditioning	20 amp
Right Bus	Strobe Lights	10 amp
	Taxi Light	4 amp
	Right Voltage Regulator	5 amp
	Door Seal/Power Point	5 amp
	PFD R Power	10 amp
	Elevator Trim	1 amp
	Air Conditioning	15 amp
Essential Bus	Attitude Horizon	3 amp
	Turn Coordinator	3 amp
	Panel Lights	3 amp
	Annunciators	3 amp
	Left Bus Relays	5 amp
	Fuel Pump	10 amp
	Stall Warning	5 amp
	Flaps	10 amp
	Right Bus Relays	5 amp
Battery Bus	Nav/Com Bypass Switch	Two 5 amp
	Hobbs Meter	3 amp
	ELT	3 amp
	Courtesy Lights	3 amp

Table 2. Summary of Buses and Equipment (Garmin G1000 Option)

SUMMARY OF BUSES FOR GARMIN G1000		
Bus	**Bus Component**	**Circuit Breaker**
	Audio/MKR	5 amp
	Integrated Avionics No. 2	5 amp

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Avionics Bus	Com No. 2	5 amp
	Transponder	5 amp
	Avionics Fan	3 amp
	Traffic	3 amp
	Autopilot	5 amp
	MFD	5 amp
	Weather	3 amp
Left Bus	Aileron Trim or Rudder Hold/Aileron Trim	2 amp
	Pitot Heat	7.5 amp
	SpeedBrakes™	3 amp
	Position Lights	5 amp
	Landing Light	5 amp
	Left Voltage Regulator	5 amp
	Fan	5 amp
Right Bus	Strobe Lights	5 amp
	Taxi Light	5 amp
	Right Voltage Regulator	5 amp
	Door Seal/Power Point	5 amp
	Carbon Monoxide Detector	2 amp
	Oxygen	3 amp
	Display Keypad	2 amp
	Air Conditioning	15 amp
Essential bus	AHRS	5 amp
	Elevator Trim	2 amp
	Panel Lights	7.5 amp
	Air Data Computer	5 amp
	PFD	5 amp
	Engine Airframe	5 amp
	Integrated Avionics No. 1	5 amp
	Com No. 1	5 amp
	Left Bus Relays	1 amp
	Fuel Pump	5 amp
	Stall Warning	2 amp
	Flaps	10 amp
	Standby ADI	3 amp
	Right Bus Relays	1 amp
Battery Bus	Hobbs Meter (Right Bus)	3 fuse
	ELT (Right Bus)	3 fuse
	Courtesy Lights (Left Bus)	3 fuse
	Prop Heat (Left Bus)	20 fuse

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Table 3. Summary of Buses and Equipment (Garmin G2000 Installation)

SUMMARY OF BUSES FOR GARMIN G2000		
Bus	**Bus Component**	**Circuit Breaker**
Avionics Bus	MFD	5 amp
	A/P Controller	5 amp
	Audio	5 amp
	Transponder	5 amp
	AHRS No. 2	5 amp
	ADF/DME	5amp
	Traffic	5 amp
	XM DL	3 amp
	Iridium DL	5 amp
	Lightning Detect	2 amp
	Avionics Fans	5 amp
Left Bus	Flaps	7.5 amp
	ADC	5 amp
	Oxygen	3 amp
	AHRS No. 1	5 amp
	Com No. 1	5 amp
	Nav No. 1	5 amp
	PFD CTRL	5 amp
	PFD	5 amp
	12 V Power	2 amp
	CO Detect	2 amp
	Panel Lights	5 amp
	Nav Lights	5 amp
	Landing Light	5 amp
	L Alt Controller	5 amp
	Anti-Ice (Inadvertent)	5 amp
	Anti-Ice Pump 1 (FIKI)	5 amp
	W/S Anti-Ice (FIKI)	5 amp
	Wing Insp Lights(FIKI)	2 amp
	Pitot Heat	7.5 amp **NOTE 1**
Right Bus	Stby Instr	3 amp
	GTC	3 amp
	Nav No. 2	5 amp
	Com No. 2	5 amp
	Strobe Lights	5 amp
	Taxi Light	5 amp
	R Alt Controller	5 amp

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	Air Cond	15 amp
	ECS Fan	7.5 amp
	Anti-Ice Pump 2 (FIKI)	5 amp
	Stall Heat	10 amp
	ECS CTRL/Door Seal	5 amp
X-Feed Bus	Engine Airframe	5 amp
	Fuel Pump	5 amp
	Stall Warning	2 amp
	Speed Brakes	3 amp
	A/P Servos	5 amp
	Roll Trim/RDR Hold	2 amp
	Pitch Trim	2 amp
Battery Bus	Hobbs Meter (Right Bus)	3 fuse
	ELT (Right Bus)	3 fuse
	Prop Heat (Right Bus)	20 fuse
	Courtesy Lights (Left Bus)	3 fuse

NOTE 1:

15 amp for Pitot Heat, for Airplanes 02049 and On.

2. Troubleshooting Procedures For The Electrical System

A. **Symptom** - System does not charge or discharge showing on ammeter.

B. **Probable Cause** - Bad alternator, voltage regulator, or system short.

C. **Action** - Charging system problems associated with an alternator should be analyzed in the manner of: Pre-Voltage Regulator Checks, Voltage Regulator Checks, and Post Voltage Regulator Checks.

D. **Pre-Voltage Regulator Checks** - Check the affected alternator switch, voltage regulator circuit breaker, wires, and terminals for contact resistance build-up. Resistance should be less than 0.1 ohms.

E. **Voltage Regulator Check** - Check that there is power coming into and going out of the voltage regulator. The fault/function indicator on the unit is designed to alert the user to the condition of the alternator/voltage regulator.

(1) A red light on the unit, with the affected master switch on means there is a ground short in the alternator field circuit or the voltage regulator's field control transistor is shorted.

(2) A green steady light on the unit with the engine running means there is power coming out of the voltage regulator, but the alternator field or field wire to the voltage regulator is open.

(3) A green fast flickering light on the unit with the engine running means power input devices (like circuit breaker, switch, etc.), and the field systems are functioning correctly.

(4) A green slow flickering light on the unit with the engine running means the power input devices (like switch, etc.) are defective or have higher than normal resistance.

(5) No light on the unit with the affected master switch on means that one power input device (like switch, circuit breaker, or wiring) or the voltage regulator is defective.

F. **Post-Voltage Regulator Checks**

(1) Check the affected alternator by measuring the resistance of the field. Resistance from field to ground on the alternator should be from 3.5 to 5.0 ohms. Check the resistance of the meter leads before measuring field.

(2) Check for "flying" short and other intermittent problems by slowly rotating the affected alternator while measuring the field resistance. A drop below 3.0 ohms could indicate a bad alternator that might damage the voltage regulator.

(3) Check the condition of the alternator's field, terminals, and wires connecting it to the voltage regulator and the aircraft charging system.

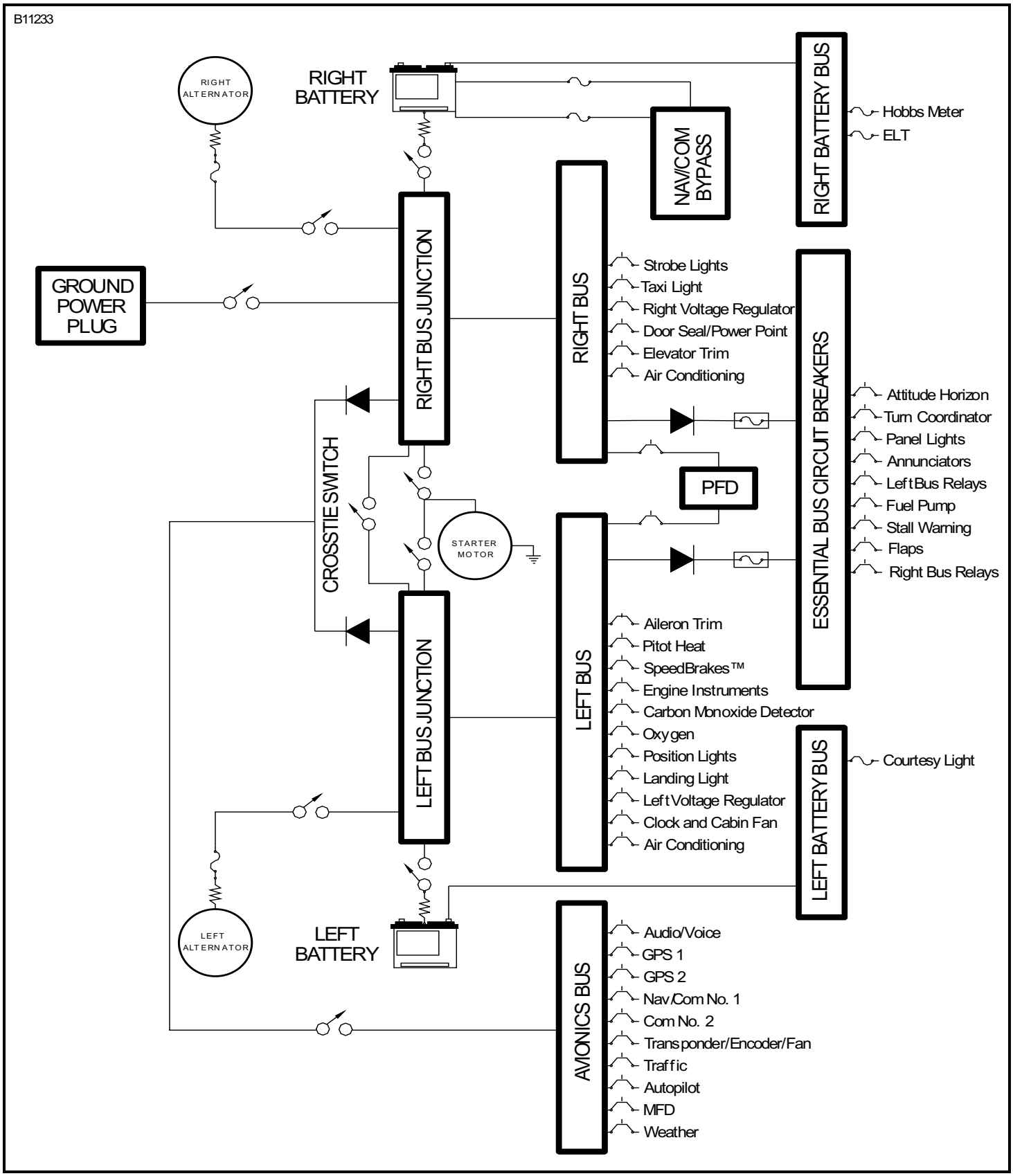
(4) Check the batteries' relays for proper operation and connections.

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(5) Check the affected alternator relay for proper operation and connections.

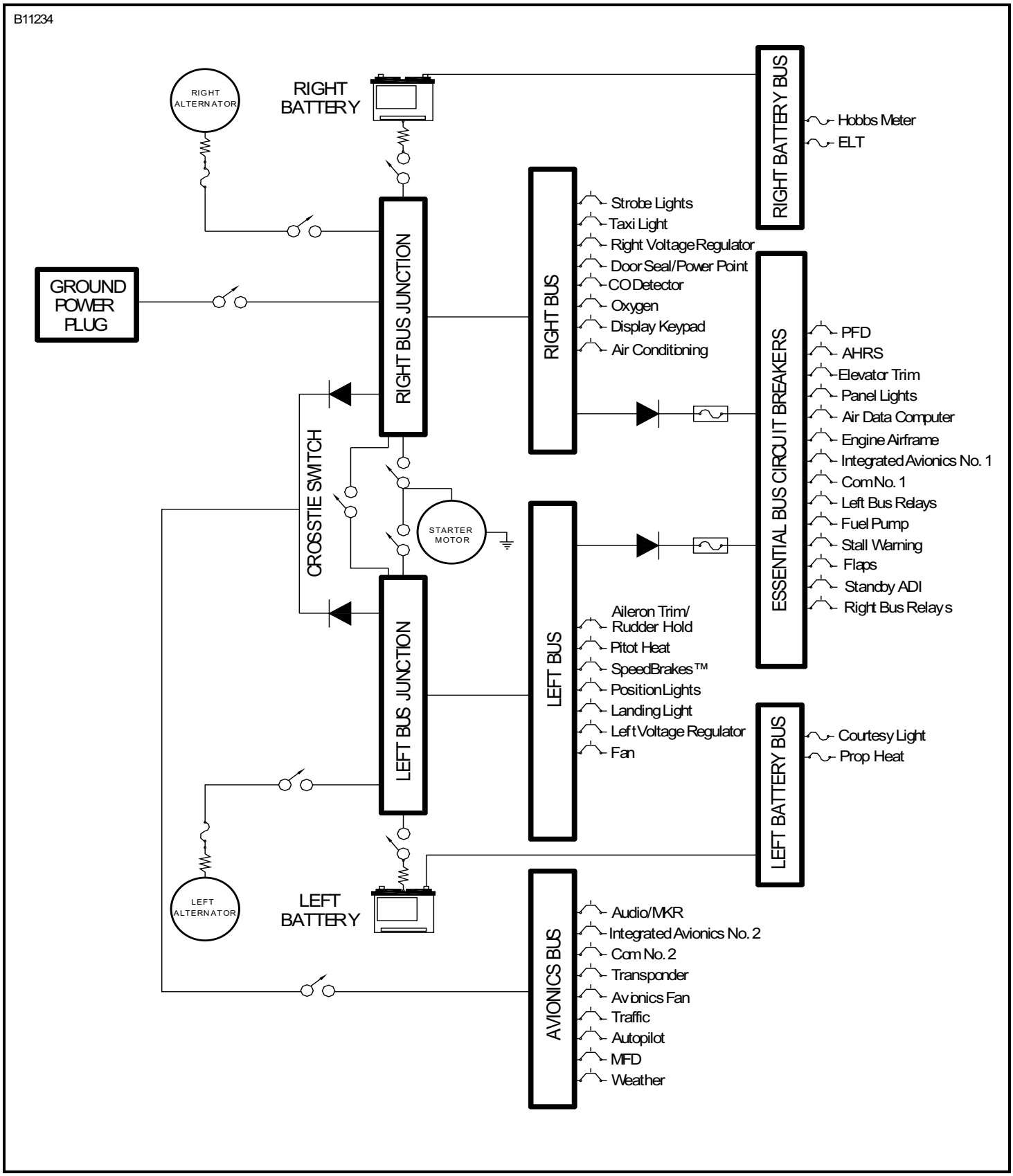
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Figure 1 : Sheet 1 : Electrical System (Avidyne Option)



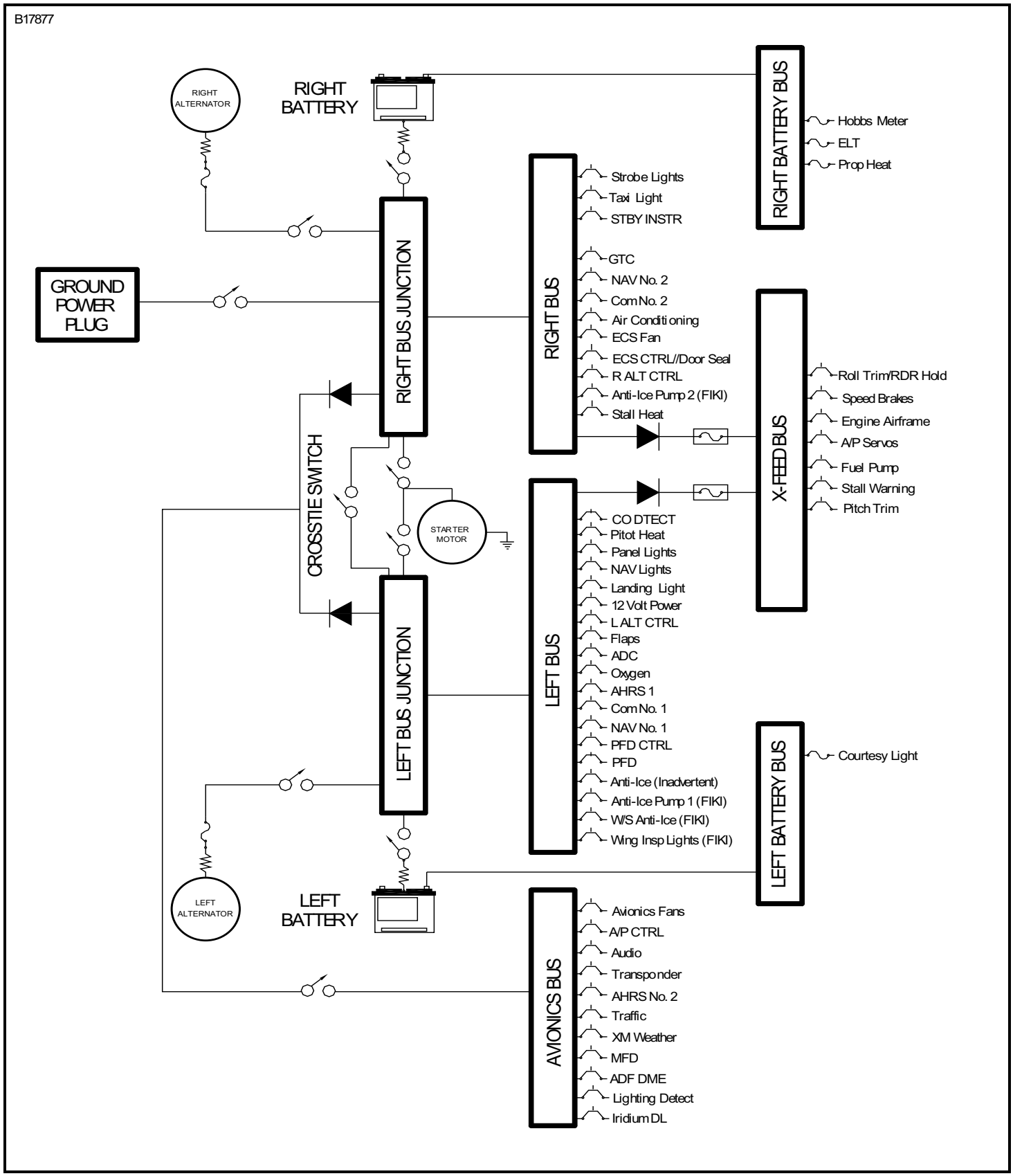
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Figure 2 : Sheet 1 : Electrical System (Garmin G1000 Option)



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Figure 3 : Sheet 1 : Electrical System (Garmin G2000 Installation)



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DC GENERATION - MAINTENANCE PRACTICES

1. DC Generation

A. The Cessna 400 electrical system requires two alternators for the operation of electrical equipment. The No. 1 alternator comes with the engine, is located at the front, right of the engine, and runs the right bus. The No. 2 alternator, the added alternator, is located on the front, left of the engine, and runs the left bus. A third alternator may be installed on the aircraft, as required, for optional equipment. This alternator is located at the right, rear of the engine. Some airplanes have the TWX670 Lightning Detect System option installed. The TWX670 alternator filter support bracket assembly uses two of the right alternator mounting studs for its installation. You must remove the filter support bracket assembly to remove the right alternator.

B. No. 1 (Right) Alternator (Airplanes with the TWX670 option) - Refer to Figure 201.

(1) No. 1 Alternator Removal (Airplanes with the TWX670 option)

(a) Disconnect both aircraft batteries.

(b) Disconnect each of the two ring terminals from the alternator.

(c) Remove the alternator filter assembly support bracket assembly as follows:

1 Disconnect the left and right battery ring terminals from their related filter.

2 Identify the electrical wires and their installation point on the terminal board, found on the top of the support bracket assembly.

3 Disconnect the electrical wiring from the terminal board.

4 Remove the screws that attach the terminal board to the support bracket.

5 Remove the terminal board.

6 Remove each of the applicable stud nuts, plain washers, and lock washers from the right alternator mounting studs that attach the support bracket assembly.

7 Remove the bolt on the top of the support bracket assembly that also has a cable clamp installed.

8 Remove the support bracket assembly from the airplane.

(d) Remove the plain washer, lock washer, and stud nut from the two remaining alternator mounting studs.

(e) Discard the lock washers removed from each of the four mounting studs.

(f) Remove the alternator from the mounting studs.

(g) Remove the gasket from the mounting studs.

(2) No. 1 Alternator Installation (Airplanes with the TWX670 option)

(a) Install the plain washers, new lock washers, new gasket, and plain nuts on the alternator mounting studs that are not used to install the support bracket assembly.

1 Tighten the stud nuts with your hand.

(b) Put the support bracket in its correct position on the alternator mounting studs.

(c) Install the plain washers, new lock washers, and plain nuts on the alternator mounting studs that are used to install the support bracket assembly.

1 Tighten the nuts with your hand.

(d) Install the bolt with the cable clamp that attaches the support bracket assembly to the top of the engine.

(e) Torque the alternator mounting stud nuts between 180 to 220 in-lbs.

(f) Connect each of the two cable connectors to the alternator.

(g) Connect the left and right battery cable connectors to their related alternator filter.

(h) Put the terminal board in its correct position on the sport bracket.

1 Install the screws that attach the terminal board to the support bracket.

(i) Identify and connect the electrical wiring to their correct installation point on the terminal board.

(j) Connect both aircraft batteries, start the aircraft, and check the alternator for proper operation.

C. No. 1 (Right) Alternator (Airplanes that do not have the TWX670 option) - Refer to Figure 201.

(1) No. 1 Alternator Removal (Airplanes that do not have the TWX670 option)

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(a) Disconnect both aircraft batteries.
(b) Disconnect the two connectors attached to the alternator.
(c) Remove the plain washer, lock washer, and nut from the four mounting studs.
(d) Discard the lock washers.
(e) Remove the alternator from the mounting studs.
(f) Remove the gasket from the mounting studs.

(2) No. 1 Alternator Installation (Airplanes that do not have the TWX670 option)
(a) Install a new gasket on the alternator.
(b) Install the alternator assembly on the mounting studs with four plain washers, four new lock washers, new gasket, and four plain nuts.
(c) Torque nuts 180 to 220 in-lbs.
(d) Connect two connectors to the alternator.
(e) Reconnect both aircraft batteries, start the aircraft, and check the alternator for proper operation.

(3) No. 1 Alternator Maintenance Procedures
(a) The torque required to slip a new elastomer coupling must be a minimum of 180 in-lbs. (15 ft-lbs.) torque measured after 45 degrees of revolution at a rate of 1 to 2 degrees per second. If you can hand-turn the gear relative to the black housing, it is below the requirements, and the coupling assembly must be replaced. Refer to Figure 202.
(b) Slippage must occur at the outside diameter of the elastomer with no damage to the elastomer.
(c) On couplings that have been in service for more than 25 hours, slippage torque must not be less than 140 in-lbs. (11.7 ft-lbs.) torque. If you can hand-turn the gear relative to the black housing, it is below the requirements, and the drive hub assembly must be replaced. (Refer to Figure 202.)

(4) Alternator Brushes - Every 1000 hours inspect the alternator brushes. The alternator must be replaced if the brushes are worn more than 75 percent.
(a) Disconnect both aircraft batteries.
(b) Disconnect the battery wires connected to the alternator.
(c) Remove the alternator.
(d) Remove the brush assembly per the latest revision of Teledyne Continental Motors, Inc. Form No. X30531-3.
(e) Inspect the brushes.
(f) Reinstall the brush assembly and reassemble the alternator per Teledyne Continental Motors, Inc. Form No. X30531-3.
(g) Install the alternator
(h) Connect the battery wires. Reconnect both aircraft batteries, start the aircraft, and check the alternator for proper operation.

D. No. 2 (Left) Alternator - Refer to Figure 203.

(1) No. 2 Alternator Removal
(a) Disconnect both aircraft batteries.
(b) Disconnect the wires attached to the alternator.
(c) Remove the two bolts (one bolt with Plane Power alternator), washers, and alternator tension plate attaching the alternator to the banana bracket.
(d) Remove the belt from the alternator pulley.
(e) Remove the self locking nut, bolt, washers, and pivot spacer connecting the alternator to the mounting bracket. Note the position of the washers for reinstallation.
(f) Remove the alternator.
(g) Retain all hardware for use in reinstallation.

(2) No. 2 Alternator Installation

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(a) Attach the alternator to the mounting bracket. Ensure the washers are installed so that the edge of the belt is parallel to the face of the drive pulley by ±1.0 degree.

(b) Install the alternator belt.

(c) Insert the alternator tension plate into the banana bracket and hand tighten the hardware attaching the assembly to the alternator.

(d) Connect a torque wrench to the alternator pulley retention nut. With an assistant holding the propeller, to prevent the engine crank shaft from rotating, tighten the alternator tension plate until the belt no longer slips on the alternator pulley and force applied to the torque wrench is 13 to 17 ft.-lbs. Do not over tighten the belt. Torque the alternator tension plate bolt(s) 12 to 15 ft.-lbs. (Kelly alternator) or 165 to 180 in-lbs (Plane Power alternator); ensure that a minimum of two threads extend past the Kelly alternator body, or the bolt does not bottom out in the Plane Power alternator (McMaster-Carr 90108A415 washers as required). Safety wire the Plane Power alternator tension plate bolt to the bracket.

NOTE: To help achieve required belt alignment, install banana bracket spacer (P/N LB71844007-1 or LB71844007-2). Use washers NAS1149F0616P, NAS1149F0632P or NAS1149F0663P or a combination of all three to achieve correct pulley alignment. Install washers between lower bracket and spacer.

(e) After the belt tension has been fully adjusted, torque the nut attaching the banana bracket to the propeller governor bracket and the nut attaching the alternator to the mounting bracket 15 to 20 ft.-lbs.

(f) Wiring Connections

1 Kelly Alternator

a Connect the wires to the alternator and torque the attachment nuts 10 to 12 in-lbs.

2 Plane Power Alternator

a Install the battery wire with the MS25171-2S terminal nipple onto the 6 mm output terminal and torque to 50 in-lbs.

b Install the ground wire to any of the three 5 mm studs on the rear of the alternator and torque to 35 in-lbs.

c Install the field wire with the MS25171-1S terminal nipple to the F1 terminal on the rear of the alternator and torque to 20 in-lbs.

NOTE: NOTE: The F2 terminal is to remain grounded with the ground strap UNLESS the aircraft voltage regulator is a type "A" regulator using a 2- wire field circuit. In this case, remove and discard the ground strap from the F2 terminal, connect wiring from the voltage regulator to the F1 and F2 terminals, and torque to 20 in-lbs.

d If the aircraft is equipped with an "alternator out light" circuit, connect that wire to the AUX terminal and torque to 20 in-lbs. Otherwise leave the AUX terminal open.

(g) Reconnect both aircraft batteries, start the aircraft, and check the alternator output for proper operation.

WARNING: Ensure that there is a minimum clearance of .50 inch between the upper cowling skin and the alternator case, fan, belt, and pulley after final assembly.

(3) Alternator Pulley

(a) Alternator Pulley Removal

1 Disconnect both aircraft batteries.

2 Disconnect the battery wires attached to the alternator.

3 Remove the bolts attaching the alternator tension plate to the banana bracket and remove the belt from the alternator pulley.

4 Remove the pulley retention nut and washer from the alternator drive shaft.

5 Remove the pulley.

(b) Alternator Pulley Installation

1 Kelly Alternator

a Installation of the pulley is the reverse of removal.

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b Torque the pulley retention nut 35 to 45 ft-lbs.

2 Plane Power Alternator

a Apply Loctite 272 to the threads and shaft.

b Install the pulley retention nut and washer, and torque to 55 ±4 ft-lbs.

3 Reinstall and tension the alternator belt as described in the Left Alternator Installation section above.

4 Connect the battery wires to the alternator.

5 Reconnect both aircraft batteries, start the aircraft, and check the alternator output for proper operation.

(4) Drive Pulley Removal and Installation

(a) Drive pulley removal and installation as described in Chapter 61.

E. Accessories Alternator (Refer to Figure 204.)

(1) Accessories Alternator Removal

(a) Disconnect both aircraft batteries

(b) Disconnect the wires attached to the alternator.

(c) Loosen the adjustment rod and remove the belt from the alternator pulley. The adjustment rod ends are threaded such that rotating the rod itself will loosen or tighten the ends equally.

(d) Remove the bolt and washer connecting the adjustment rod to the alternator.

(e) Remove the nut, bolt, and washer connecting the alternator to the mounting bracket. Remove the belt cutter.

(f) Retain all hardware for use in reinstallation.

(2) Accessories Alternator Installation

(a) Ensure the alternator cooling fan kit, spacer, and alternator drive pulley are installed on the alternator. Verify the nut is torqued 350 to 400 in-lbs.

(b) Place the alternator into the alternator bracket on the rear of the engine. Insert the bolt through the alternator pivot. Place the belt cutter, washer, and nut onto the pivot bolt. Do not tighten at this time.

(c) Align the belt onto drive pulley and alternator pulley.

(d) Ensuring that the adjustment rod ends are assembled into the rod equal distance, attach the adjustment rod to the alternator. Tighten the bolts. For the bolt attaching the alternator to the adjustment rod, protrusion of two bolt threads is not required and no visible female threads on the alternator are allowed; lockwire the bolt.

NOTE: Alternator drive and driven pulleys must be aligned by installing steel washers of various thickness forward or behind alternator pivot boss. Use washers NAS1149F0616P, NAS1149F0632P or NAS1149F0663P or a combination of all three to achieve correct pully alignment. Correct alignment is achieved when the large pulleys grooves are lined up with the alternators pulley grooves within +0.05 or -0.05 inch (+1.27 or -1.27 mm).

CAUTION: Do not use the alternator drive nut to check belt tension. Use Kelly Aerospace tool to check alternator belt breakaway torque.

(e) Tighten, or loosen, the adjustment rod until the breakaway (slip) torque at the alternator drive pulley is 440 to 480 in-lbs. on a new belt. After the belt has been run for a few hours the minimum belt tension should not be below 300 in-lbs. After final belt adjustment has been made the torque jam nuts on the adjustment rod to hold the proper adjustment.

(f) Connect the wires to the alternator.

(g) Reconnect both aircraft batteries, start the aircraft, and check the alternator output for proper operation.

(3) Alternator Pulley

(a) Alternator Pulley Removal

1 Disconnect the battery wires attached to the alternator.

2 Loosen the adjustment bracket and remove the belt from the alternator pulley.

3 Remove the pulley retention nut and washer from the alternator drive shaft.

4 Remove the pulley.

(b) Alternator Pulley Installation

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1 Installation of the pulley is the reverse of removal.
2 Torque the pulley retention nut 350 to 400 in.-lbs.
3 Connect the battery wires to the alternator.
4 Reinstall and tension the alternator belt per the Left Alternator Installation instructions above.
5 Reconnect both aircraft batteries, start the aircraft, and check the alternator output for proper operation.

(4) Drive Pulley Removal and Installation
  (a) Remove the nut and lock washer from the starter adaptor drive shaft.
  (b) Remove the alternator drive pulley.
  (c) Installation is the reverse of removal. Torque the nut 700 to 720 in-lbs. Ensure a minimum clearance of 0.050 in. between the drive pulley and the end of the starter adapter stud.

F. Pulley Maintenance Procedures
  (1) The pulleys should be free from large nicks, scratches and excessive warpage. If warping exceeds 0.050 in. the pulley must be replaced. No shimming is permissible. Small scratches and nicks are acceptable as long as they do not present a hazard to the belt. Blending and burnishing of small scratches and nicks is permissible.
  (2) The drive pulley for the No. 2 alternator must be replaced if elongated screw holes are present. The maximum elongation permissible is 1/4 diameter where run out is within 0.050 in. maximum (0.025 in. either way).
  (3) If there is excessive black, sooty residue on the pulleys or surrounding area, immediately remove the belt from service and assure that the pulleys are properly aligned.
  (4) The belt must be replaced if there is any evidence of fraying or dryrot.
  (5) Do not apply "belt treatments" spray or otherwise to the belt. Any spillage of ester based oils, turbine oils or MIL-H-5606 hydraulic fluid on the belt must be immediately removed with hot soapy water (household dishwashing soap or equivalent).

G. Alternator Brushes - Every 1000 hours inspect the alternator brushes. The Kelly alternator must be replaced if the brushes are worn more than 75 percent. Replace the Plane Power alternator brush assembly if the brushes extend less than 0.250 in. from the edge of the brush holder case.
  (1) Disconnect the battery wires connected to the alternator.
  (2) Remove the bolts attaching the alternator tension plate to the banana bracket and remove the belt from the alternator pulley.
  (3) Loosen the self locking nut connecting the alternator to the mounting bracket and rotate the alternator upward allowing access to the alternator brush block.
  (4) Remove the two brush block retainer screws and washers.
  (5) Remove the brush block. The brushes are spring loaded and may fly out of the brush block.
  (6) Inspect the brushes.
  (7) Reinsert the brushes into the brush block. Depress the brushes, thus loading the springs, and insert a rod or wire through the hole above the brush seats to hold the brushes in place.
  (8) Install the brush block into the alternator.
  (9) Withdraw the rod or wire and listen for a "click" to indicate the brush has properly seated. There should be one click per brush.
  (10) Repeat the following until the brushes seat properly:
    (a) Reinsert the brushes into the brush block. Depress the brushes, thus loading the springs, and insert a rod or wire through the hole above the brush seats to hold the brushes in place.
    (b) Install the brush block into the alternator.
    (c) Withdraw the rod or wire and listen for a "click" to indicate the brush has properly seated. There should be one click per brush.
  (11) Replace the retaining screws and washers and torque per alternator manufacturer's specifications.
  (12) Connect the battery wires to the alternator.
  (13) Reinstall and tension the alternator belt per the Left Alternator Installation instructions above.

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2. DC Indicating Instruments

A. The following information applies to aircraft equipped with the Avidyne avionics option only. DC monitoring for aircraft equipped with the Garmin G1000 option is displayed on the MFD.

B. Dual Ammeter/Loadmeter Description of Operation - The ammeter is in the engine instrument panel in the center-left position. The ammeter is a dual presentation gauge that measures the condition of both batteries and alternators in terms of charging or discharging.The ammeter is selectable to show either the condition of the batteries or the alternators. When power is first applied, the indicator defaults to the "BATT" indicator. When the button on the lower left side of the instrument is pressed, the indicator switches to the "ALT" indicator. Pressing the button will toggle between each indication. When the battery mode is selected, "BATT" is illuminated by a white light. When the alternator mode is selected, "ALT" is illuminated by a white light. The range of the indications runs from +60 amps to -100 amps in 30 amp increments. While there is no placarded operating range, under most conditions the instrument should indicate a positive charging state. The master switches for the left and right bus systems must be on for the ammeter to operate.

(1) Removal of Dual Ammeter/Loadmeter

(a) Remove the engine instrument panel per instructions in Chapter 25.

(b) Unplug the cable going into the back of the ammeter.

(c) Unscrew the four screws surrounding the ammeter.

(2) Installation of Dual Ammeter/Loadmeter

(a) Put the ammeter in its slot, and screw in the four screws attaching the instrument to the engine instrument panel.

(b) Plug the cable into the back of the ammeter.

(c) Install the engine panel per instructions in Chapter 25.

C. Voltmeter Description of Operation (S/N 41002 to 41500) - The voltmeter is located in the top left corner of the flight instrument panel. This instrument contains three separate indications: a voltage reading, an outside air temperature provided by the top window, and a multi function timepiece in the lower window. The voltmeter displays the left system's bus voltage only, and under normal conditions should indicate about 14.2 volts. At 16 volts, the voltage regulator will take the left alternator off-line, and at approximately 8 volts, electrical equipment connected to the left bus will cease to operate or will operate erratically. The voltmeter is electrically powered and will not operate if the left master switch is turned off. Refer to Chapter 31 for a drawing of the voltmeter. This voltmeter is not present on aircraft S/N 41501 and On.

(1) Removal of Voltmeter

(a) Remove the glare shield, and remove the connector installed into the back of the unit.

(b) Unscrew the four screws surrounding the voltmeter, and remove it.

(c) Slide the unit out of the flight instrument panel.

(2) Installation of Voltmeter

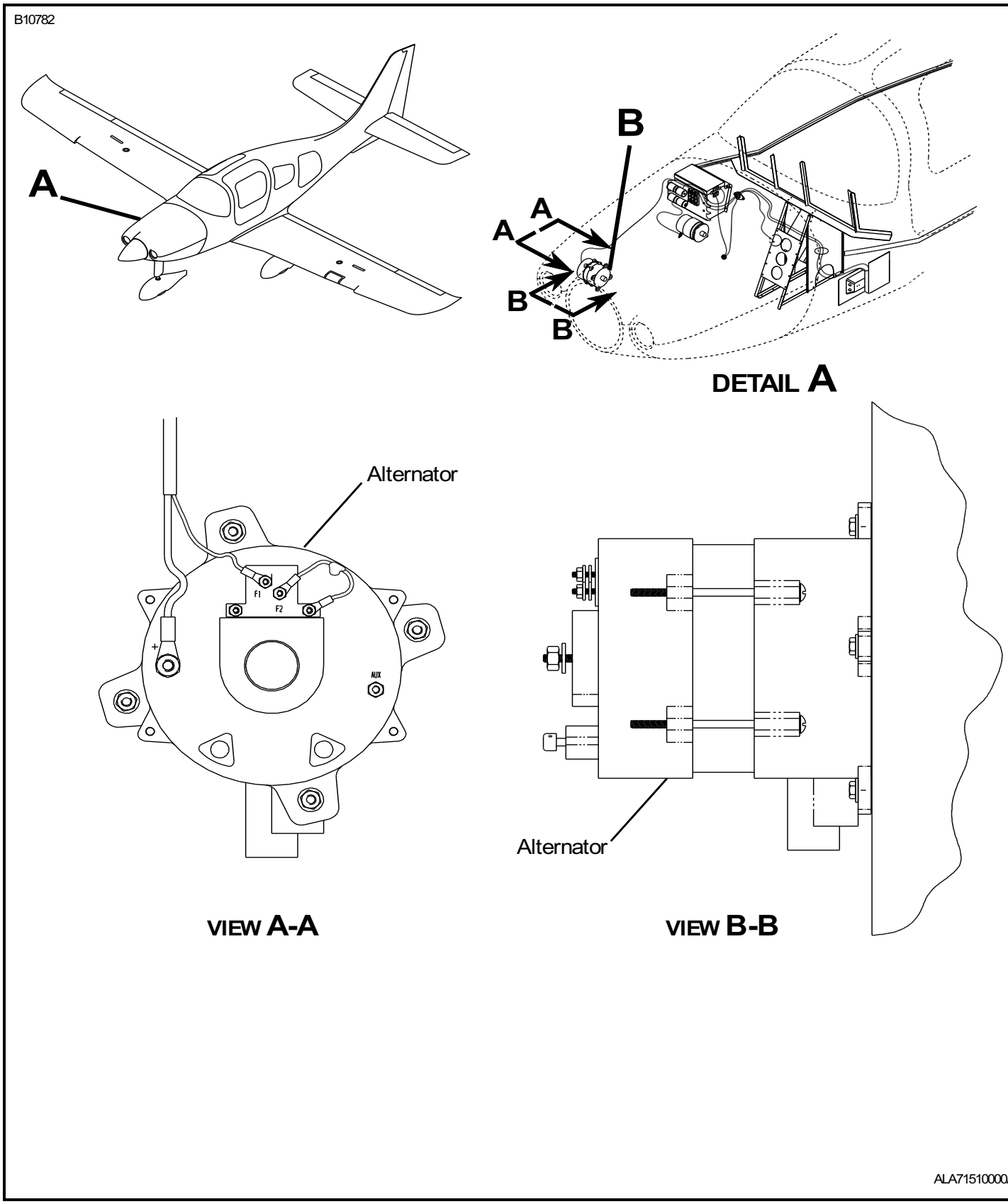
(a) Install the connector into the back of the voltmeter.

(b) Slide the unit into its slot in the flight instrument panel, and screw in the four screws.

(c) Install the glare shield.

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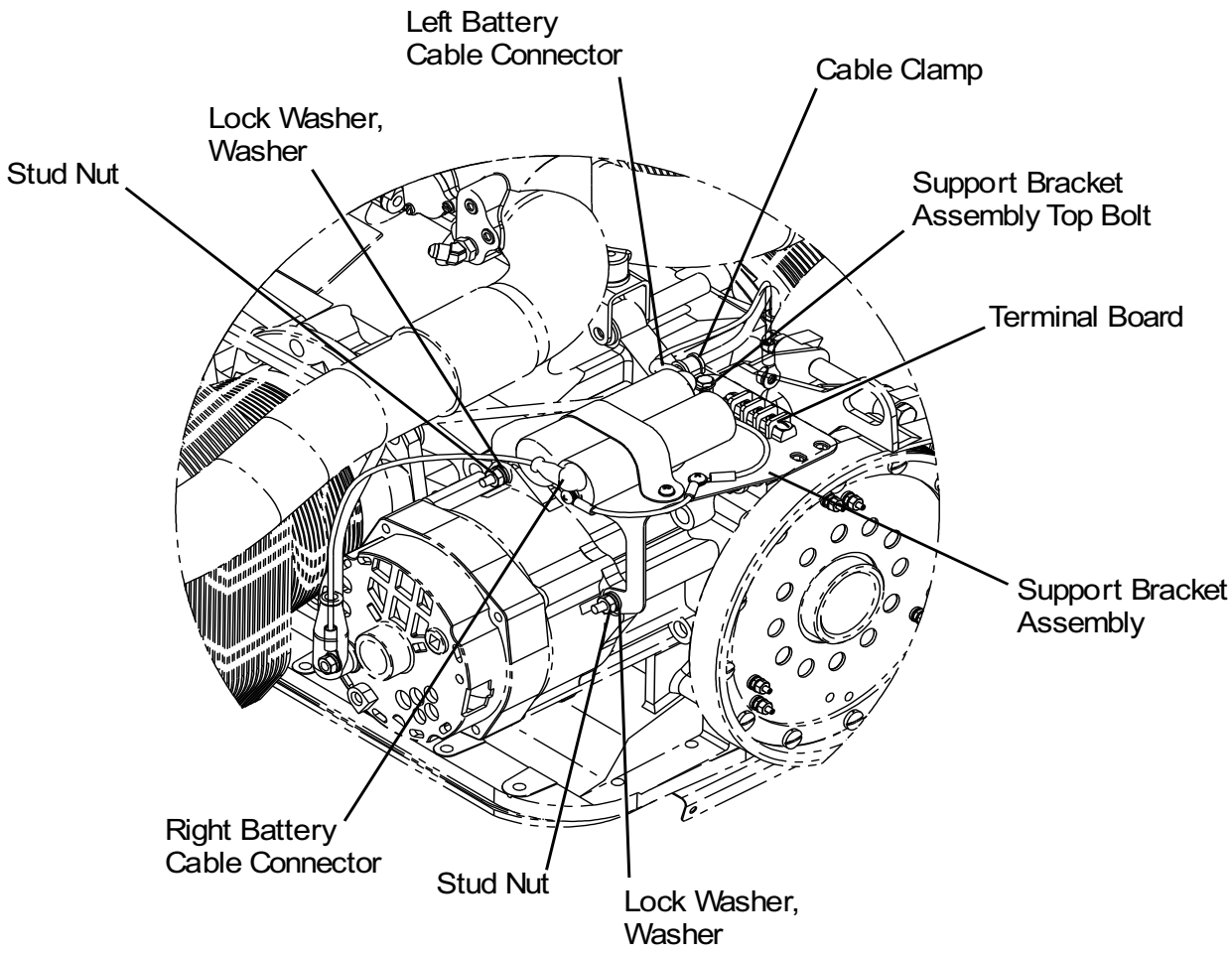
Figure 201 : Sheet 1 : No. 1 (Right) Alternator



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Figure 201 : Sheet 2 : No. 1 (Right) Alternator

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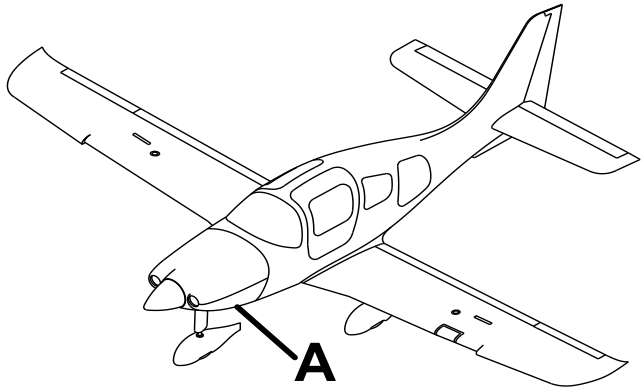
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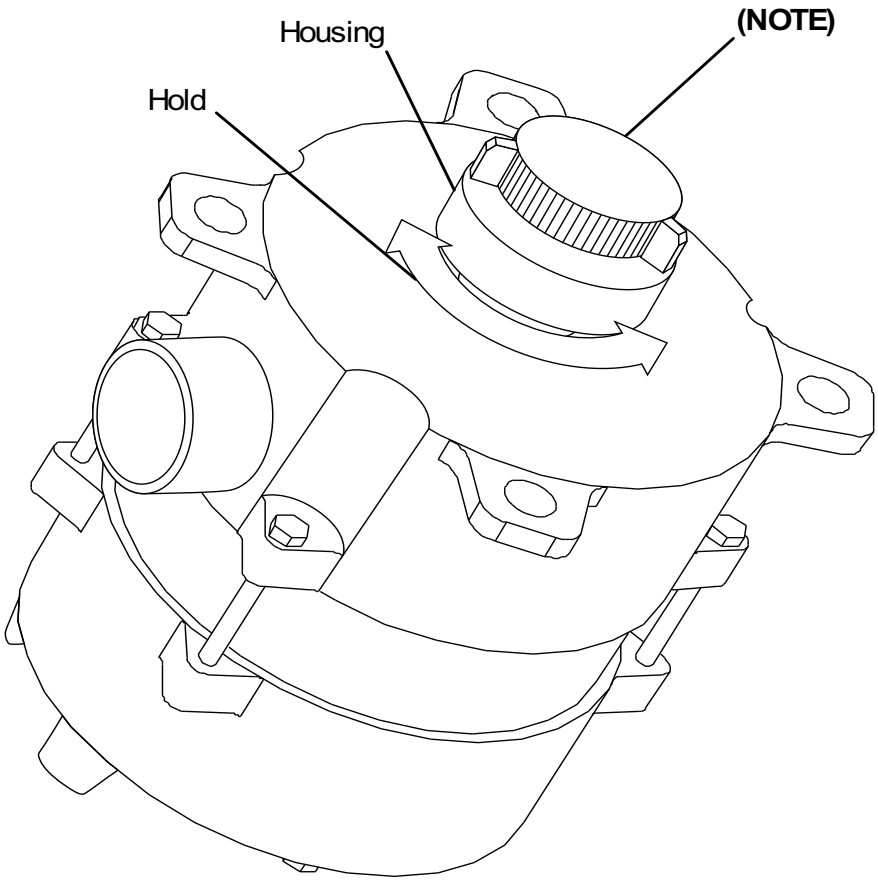
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Figure 202 : Sheet 1 : Alternator Drive Hub

B10783



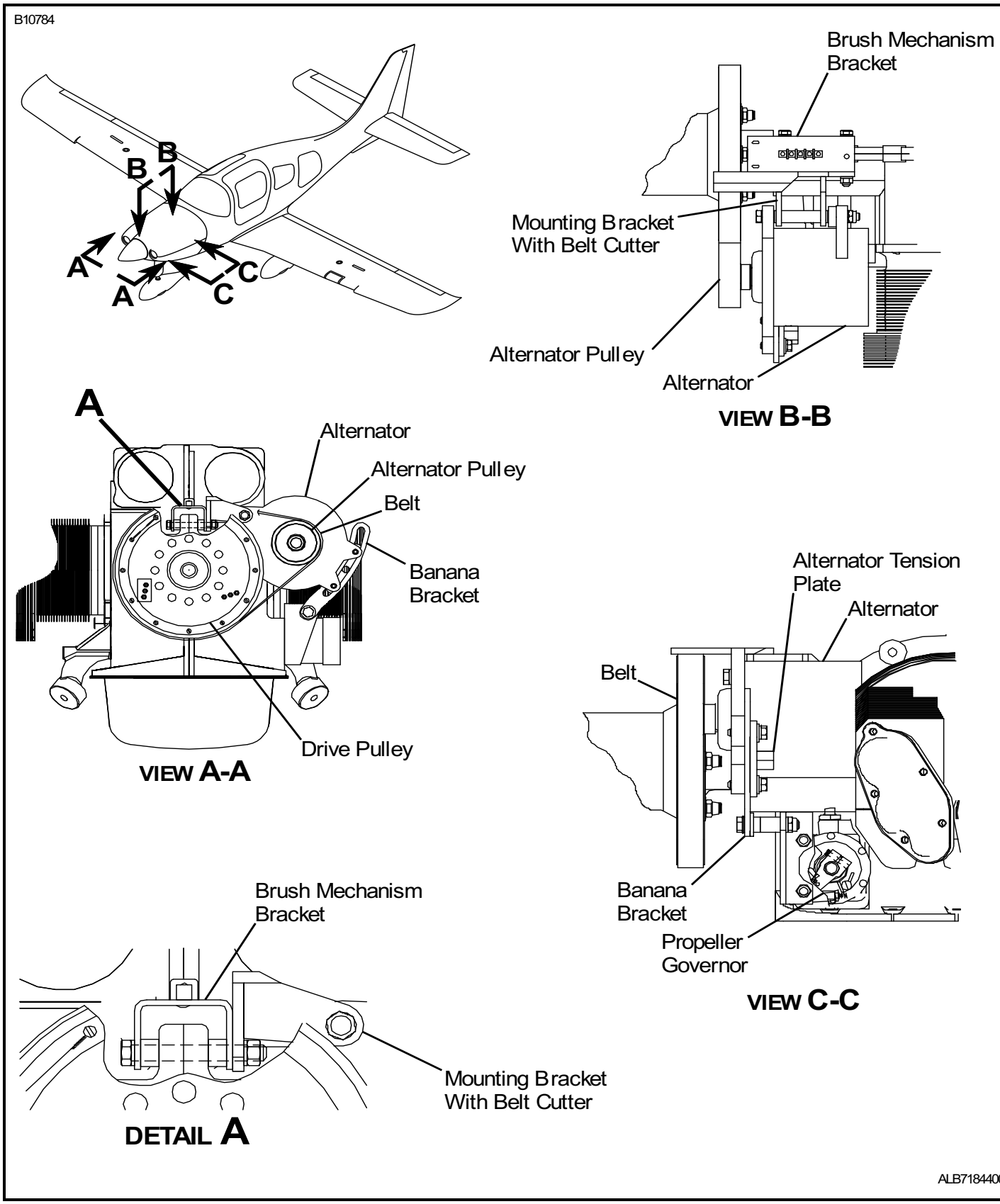


DETAIL A

NOTE: Turn gear while holding housing .

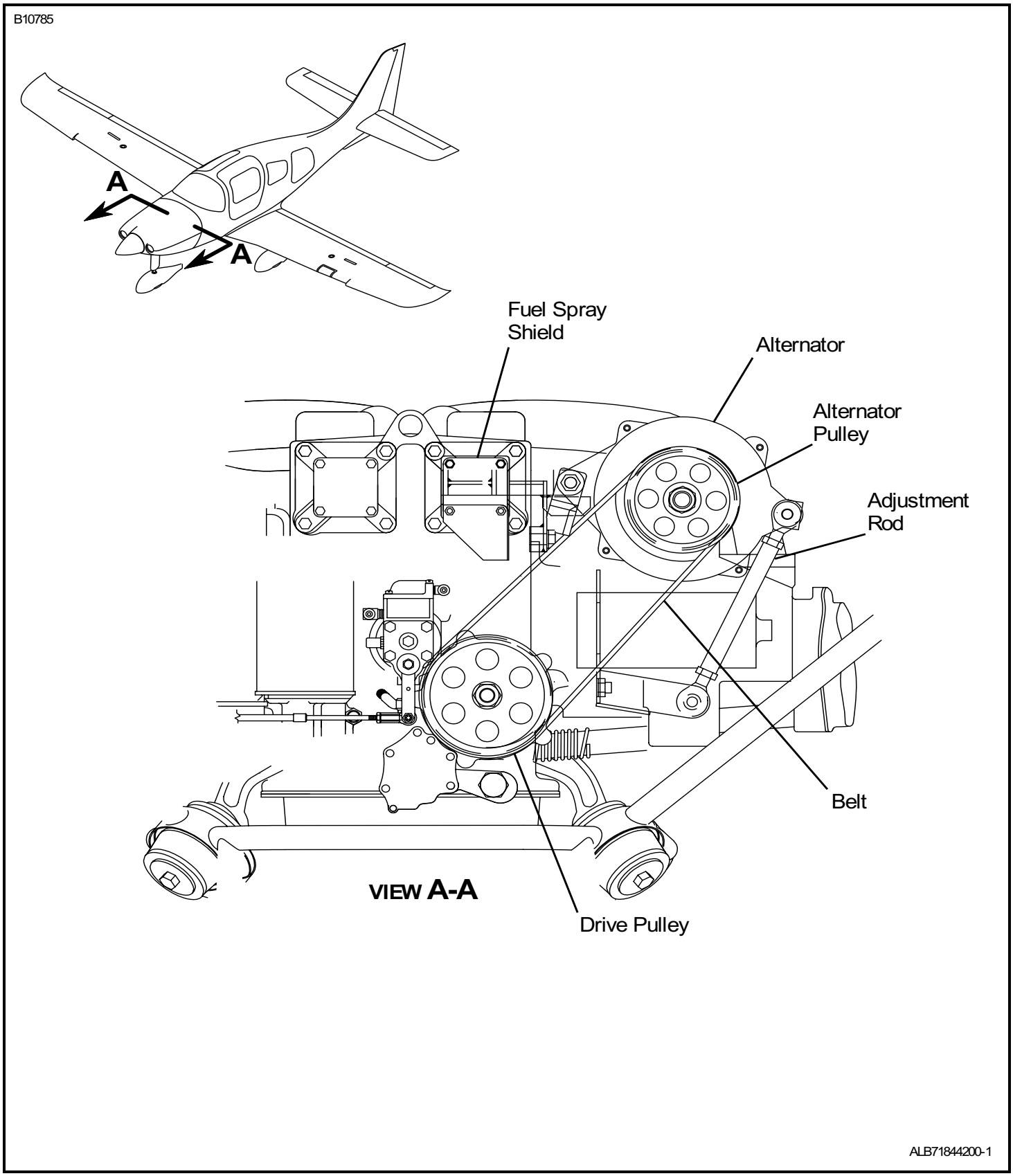
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Figure 203 : Sheet 1 : No. 2 (Left) Alternator



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Figure 204 : Sheet 1 : Accessories Alternator



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ALTERNATOR CONTROLLER (T240) - REMOVAL/INSTALLATION

1. General

A. This section gives the removal and installation for the Model T240 left and right Alternator Controllers. The controllers are installed on the bottom of the avionics shelf, below the right side of the instrument panel. The controllers each supply several functions that include, a voltage regulator, an over-voltage protection relay, a low and over voltage sensors, and an alternator field-to-ground short protection circuit. There is a small difference on the location where the alternator controllers are installed on the airplane between Model T240 airplanes that can be configured for the FIKI option and those airplanes that can not.

B. For the maintenance procedures for the other electrical load distribution components and airplanes that have the Avidyne option or the Garmin G1000 option installed alternator controller (voltage regulator) refer to, Electrical Load Distribution - Maintenance Practices.

2. Alternator Controller Removal/Installation

A. Remove the Alternator Controller (ACU) (UI001) right, (UI002) left (UC305) (Refer to Figure 401).

NOTE: The removal procedures for the right and left alternator controllers are similar.

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Disengage the L ALT CTRL or R ALT CTRL circuit breaker as applicable, found on the cockpit circuit breaker panel.

(5) Remove the screws that attach the ACU to the bottom of the avionics shelf.

(a) If necessary, remove the copilot seat to get access to the ACU. Refer to Chapter 25, Airplane Seats - Maintenance Practices.

(6) Disconnect the electrical connectors as follows:

(a) For the right ACU, disconnect the electrical connector (J65) from electrical connector (P65)

(b) For the left ACU, disconnect the electrical connector (J64) from electrical connector (P64)

(7) Remove the ACU from the airplane.

B. Install the Alternator Controller (UI001) right, (UI002) left (UC305) (Refer to Figure 401).

(1) Put the ACU in its correct position below the avionics shelf.

(2) Install the screws that attach the ACU to the avionics shelf.

(3) Visually inspect the connectors to make sure there are no bent or damaged pins.

(a) Repair any damage.

(4) Connect the electrical connectors as follows:

(a) For the right ACU, connect the electrical connector (J65) to electrical connector (P65)

(b) For the left ACU, connect the electrical connector (J64) to electrical connector (P64)

(5) If removed, install the copilot seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices.

(6) Engage the L ALT CTRL or R ALT CTRL circuit breaker as applicable, found on the cockpit circuit breaker panel.

(7) Do a test of the Alternator Controller. Refer to Alternator Controller - Operational Test.

C. Alternator Controller Operational Test

NOTE: You must do the Alternator Controller Operational Test with the airplane outside and engine operating.

(1) Start the engine. Refer to the Model T240 POH.

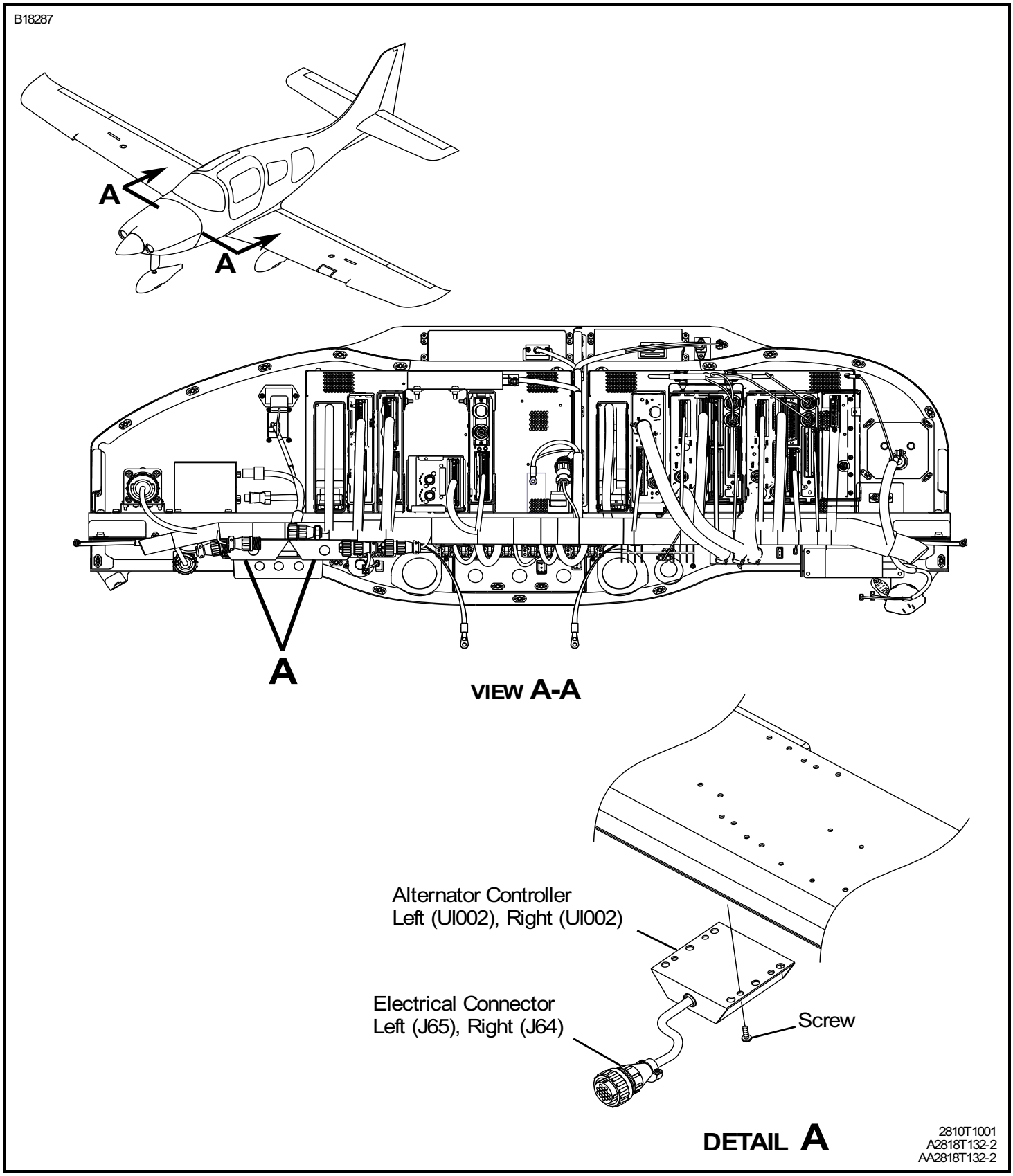
(2) Make sure the L ALT CTRL and R ALT CTRL found on the cockpit circuit breaker panel, are engaged.

(3) Set the master ALT/BATT switches (left SW01 and right SW02) to the ON position.

(4) When the Multifunctional Display is in normal mode, make sure that on the MFD, the left and right voltage reads approximately 28 Vdc.

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Figure 401 : Sheet 1 : Alternator Controller Installation



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BATTERY - MAINTENANCE PRACTICES

1. Normal Battery System (S/N 41002 to 41500)

A. **Applicability** - This procedure is based on the Concorde™ RG-1215 batteries. Refer to battery manufacturer's instructions for batteries other than the one specified.

B. **Removing Battery** - Refer to Figure 201.

CAUTION: To reduce the chance of personal injury and possible equipment damage, remove the negative wires before removing the positive wires.

(1) Remove the hat rack carpet per instructions in Chapter 25.

(2) Remove the screws securing the battery box access panel and remove the panel.

(3) Disconnect the negative connector, then the positive connector for each battery. Refer to detail of battery cable attachment in Figure 202.

(4) Remove the battery.

C. **Installing Battery**

(1) Place the battery in the battery box.

WARNING: Failure to reconnect the battery connectors properly could result in reversing the polarity of the battery.

CAUTION: Do not replace the sealed lead acid batteries with wet lead acid batteries

(2) Reconnect positive connector, then connect the negative connector for each battery. Refer to detail of battery cable attachment in Figure 202.

(3) Replace the battery box access panel and secure with screws.

(4) Replace the hat rack carpet per instructions in Chapter 25.

NOTE: Do not use any type of material or sealant to seal the open area formed where battery wiring passes through a grommet. This space must remain clear to ensure ventilation of the batteries.

D. **Test Procedure for Reserve or Emergency Capacity**

(1) Make sure the battery is charged.

(2) With the battery temperature above 59 °F, discharge the battery at the 80-85 percent test rate (refer to FAR 23.1309, 23.1351, 23.1353(h)).

(3) The minimum end point after one hour of the time established for the airframe essential power requirement of discharge must be 9 volts. If the battery fails to deliver the above rated ampere-hour capacity, it has reached its end of life. The battery is no longer considered airworthy and must be replaced.

(4) Allow the battery to cool to room temperature before recharging.

E. **Maintenance Procedures for Battery**

(1) The batteries must be boost charged every 90 days when in storage.

(2) Batteries that have not been recharged every 90 days are to be conditioned. First discharge the battery at the test rate. Recharge with a constant current charge at the C/10 rate (.10 of the C rate amperes) for eighteen hours or until the battery voltage reaches 2.5 volts per cell. Allow the battery to rest for at least one hour and re-test per the Test Procedure for Reserve or Emergency Capacity.

(3) The battery should be recharged when the open circuit voltage is below 2.08 volts per cell.

(4) The battery should be recharged at .50 of the C rate with a constant potential (CP) or constant voltage charger regulated at 2.35 volts per cell. The battery is charged when the charge current stabilizes for one hour.

(5) It is recommended the emergency capacity test procedure be performed after twelve months or six hundred hours of operation, whichever comes first. To ensure continued airworthiness, another emergency capacity test should be performed every twelve months or every two hundred hours.

2. Normal Battery System (S/N 41501 and On)

A. **Applicability** - This procedure is based on batteries approved by Cessna. Refer to battery manufacturer's instructions for batteries other than those approved by Cessna. A battery charging circuit has been added to the power grid on aircraft built mid 2007, or is available for retrofit (S/N 41563 and on), that will energize the battery relays and allow ground power

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charging of flat or discharged batteries without removing the battery(ies) from the aircraft. Batteries will start charging when the ground power unit is connected and the master and crosstie switches are ON. The master and crosstie switches must be turned off before removing the ground power plug; if the switches are on, the cables to the plug will stay energized. Flat or discharged batteries on aircraft without the battery charging circuit must be removed from the aircraft before charging. The circuit does not affect the operation of the master and crosstie switches.

NOTE: Batteries that are suspected to be unserviceable must be removed from the aircraft and serviced or replaced.

B. **Removing Battery** - Refer to Figure 203.

CAUTION: To reduce the chance of personal injury and possible equipment damage, remove the negative wires before removing the positive wires.

(1) Remove the hat rack carpet per instructions in Chapter 25.

(2) Remove the screws securing the battery box access panel and remove the panel.

(3) Disconnect the negative connector, then the positive connector for each battery. Refer to detail of battery cable attachment in Figure 204.

(4) Remove the battery.

C. Installing Battery

(1) Place the battery in the battery box.

WARNING: Failure to reconnect the battery connectors properly could result in reversing the polarity of the battery.

CAUTION: Do not replace the sealed lead acid batteries with wet lead acid batteries

(2) Reconnect positive connector, then connect the negative connector for each battery. Torque nut or bolt, as applicable, 36 to 40 in.-lbs. Refer to detail of battery cable attachment in Figure 204.

(3) Replace the battery box access panel and secure with screws.

(4) Replace the hat rack carpet per instructions in Chapter 25.

NOTE: Do not use any type of material or sealant to seal the open area formed where battery wiring passes through a grommet. This space must remain clear to ensure ventilation of the batteries.

D. **Battery Charging** - Use this procedure if the aircraft is not equipped with the battery charging circuit, is equipped with the circuit but ground power is not available, or the battery requires bench charging.

(1) Remove the battery from the aircraft.

(2) Using an AA Portable Power Corp. Smart Charger 24V 1.5 Amp. constant current/constant voltage 3 stage battery charger Model No. CH-LA2415, or equivalent, connect the charger to the battery ensuring correct polarity.

(3) Connect the charger to AC power. The following will result:

- The green LED will turn orange.
- When the LED is orange the battery is charging.

CAUTION: Ensure the battery does not overheat. The battery temperature, measured at the case surface, should not exceed 100 °F.

(4) When the LED turns green the battery is fully charged.

(5) The Smart Charger may be left on the battery after the battery is full charged.

(6) After the battery is fully charged, turn off the Smart Charger by removing the AC power plug.

(7) Disconnect the battery.

(8) Allow the battery to cool down to room temperature.

E. **Battery Discharge Test**

(1) Fully bench charge the battery.

(2) Prior to connecting to the battery, ensure that the load tester is off.

(3) The battery should be discharged at the 1 hour rate (check the battery amphour rating) to an end voltage of 1.67 volts per cell or 20 volts. Measure the time. The battery must achieve at least 80 percent of the rated time (or 48 minutes at the 1 hour rate). If the first discharge time is less than 48 minutes, repeat the cycle one more time.

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(4) If the second discharge fails to deliver at least 48 minutes, the battery should be rejected. Return the battery to the vendor for servicing or replacement, if the warranty is still valid. If not, scrap the battery.

(5) Once the battery has passed all required inspections and after it is fully recharged, the battery is ready for installation.

F. **Battery Maintenance**

WARNING: The battery must be removed from the installation and serviced in a well ventilated designated area. During servicing, the battery will generate oxygen and hydrogen gases, which can be explosive under the right conditions.

(1) After initial installation, a capacity check of the battery is required at 800 hours, or 11 ±1 months, whichever comes first, with subsequent capacity checks performed every 400 hours or 6 ± 1 months.

(2) Visually inspect the battery for any signs of cracks, corrosion, unusual terminal pin wear or discoloration on the pins.

WARNING: These batteries contain sulfuric acid, which is highly corrosive and which can cause serious physical injury if it comes in contact with skin or if inhaled. It can also cause serious eye injury or blindness if it comes into contact with the eyes. Caution must be exercised to avoid damage to the exterior case which could allow the contents to escape or come in physical contact with external materials or personnel. If a battery case is found to be damaged, handle the battery with care and avoid contact with the skin. Inspect all areas adjacent to the battery for evidence of corrosion.

(3) Before reconnecting to the aircraft, ensure the terminals have not worn or become loose.

G. **Battery Reconditioning** - Delaying the recharge of even a partially discharged battery can make it resist the charger for some time. When put on a charger, the displays may indicate that the battery is fully charged, but when you attempt to use it again, it acts as if completely discharged. Recharging immediately after use will significantly increase the service life of the battery. It is recommended that the battery be recharged within 24 hours of being discharged, the amount of capacity regained with each cycle will eventually level out, and this stabilization is an accurate indication of the battery's useful capacity,

(1) Constant Current (CI) Charge the battery for 16-24 hours at the C/10 rate to ensure that it has gone through a complete charging cycle.

(2) Perform a discharge test.

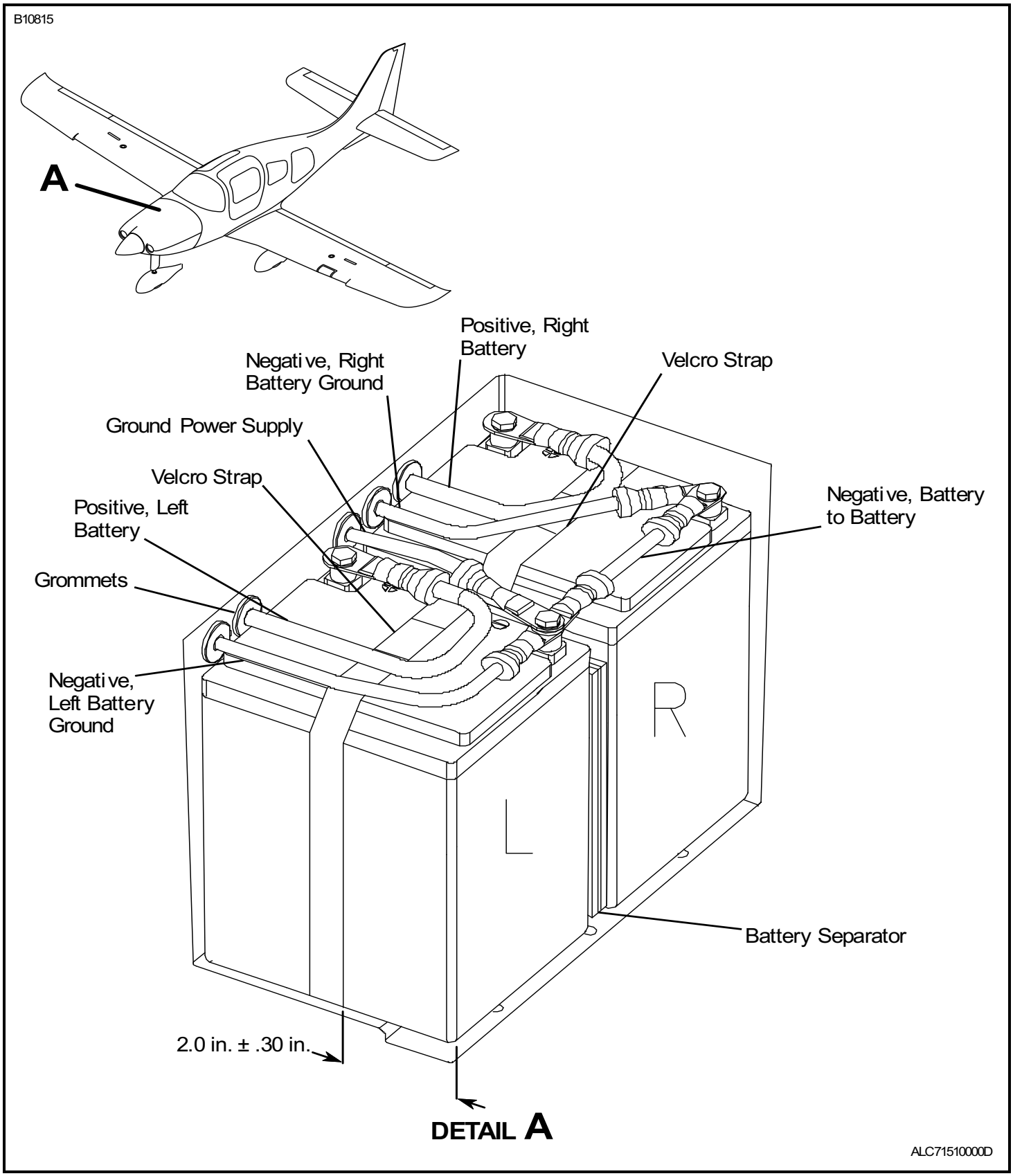
(3) If the battery fails the discharge test, CI condition charge the battery again for 16-24 hours.

(4) Perform a discharge test.

(5) Repeat this charge/discharge process up to 3 times. The capacity of the battery should increase appreciably with 1-3 CI conditioning charge/discharge cycles. If the battery still fails to measure up to capacity, return the battery to the vendor for replacement if the warranty is still valid. If not, scrap the battery.

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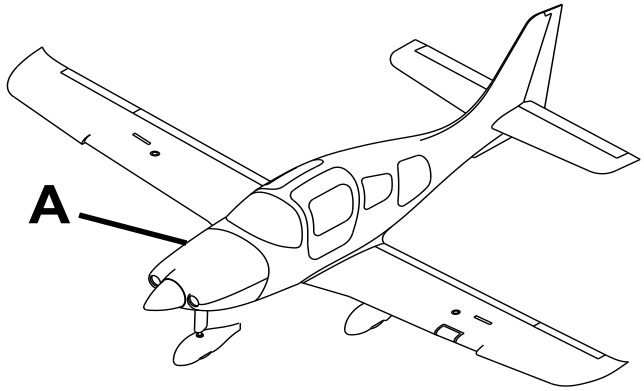
Figure 201 : Sheet 1 : Battery Installation (S/N 41002 to 41500)

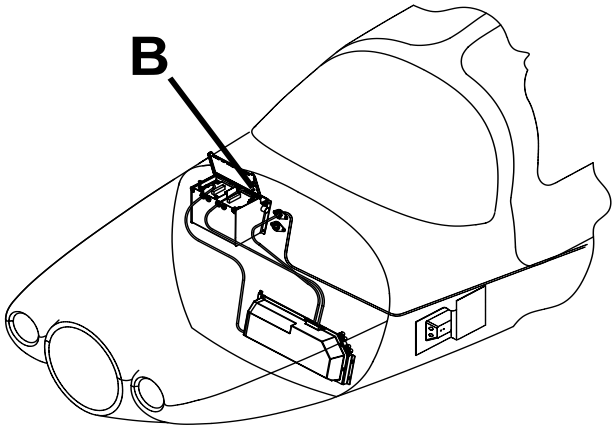


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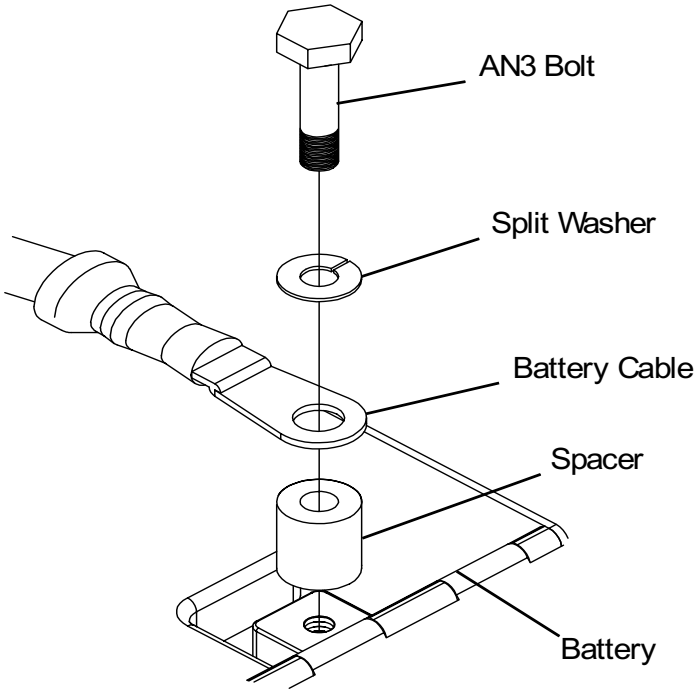
Figure 202 : Sheet 1 : Battery Cable Attachment (S/N 41002 to 41500)

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DETAIL A

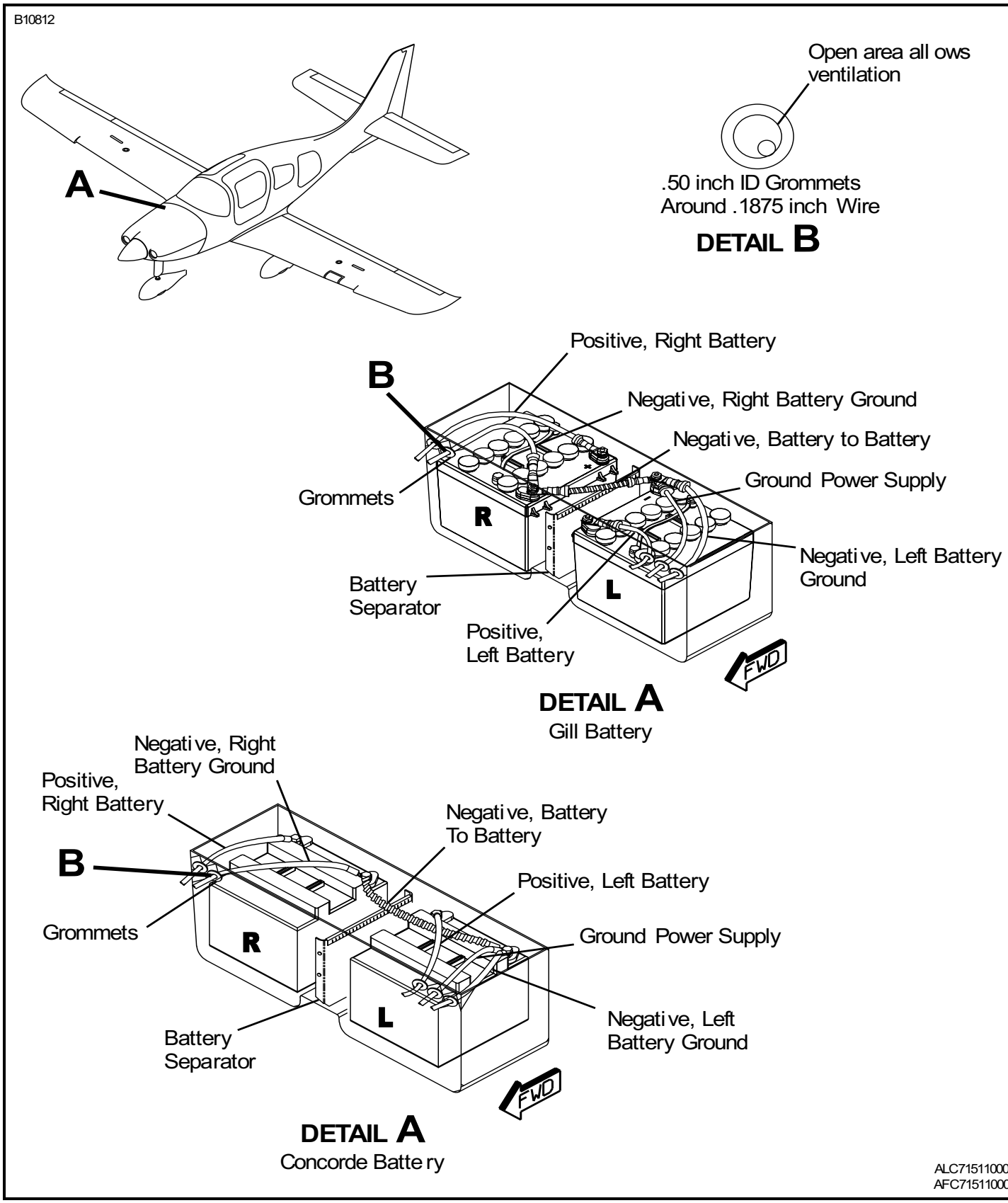


DETAIL B

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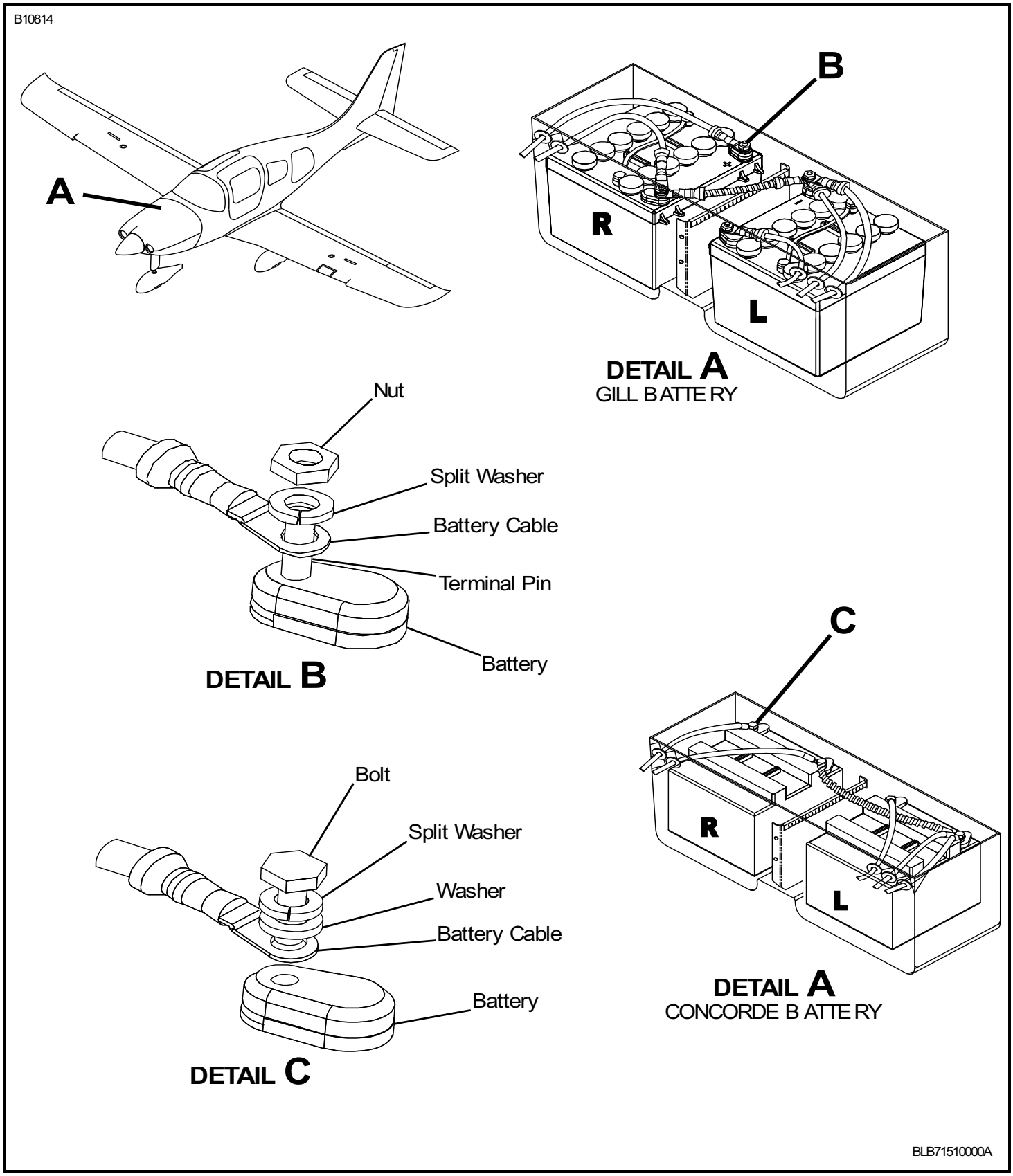
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Figure 203 : Sheet 1 : Battery Installation (S/N 41501 and on)



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Figure 204 : Sheet 1 : Battery Cable Attachments



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GROUND POWER - MAINTENANCE PRACTICES

1. Ground Power Plug

A. Removal and Replacement of the Ground Plug Relay

(1) Remove the cover from the power grid by removing the two 8-32 pan head screws and washers.
(2) Verify that the aircraft power is off.
(3) Remove the large power cables and mark the location.
(4) Remove the relay.
(5) Install a new transorb (surge suppressor) on the new relay.
(6) Move the reverse current diode to the new relay.
(7) Reassemble in the reverse order.

B. Removal and Replacement of the Power Plug Receptacle (S/N 41002 to 41500)

(1) Turn the aircraft master switch on and fully extend the flaps.
(2) Turn the aircraft master switch off and placard "Do Not Turn On Power".
(3) Remove the four 8-32 screws attaching the step cover, and remove the cover.
(4) Remove two 1/4 -28 screws, washers, and self-locking nuts attaching the receptacle. Refer to Figure 201.
(5) Pull the power plug receptacle down to gain access to the solder joint.
(6) Unsolder with a propane torch adjusted to low.
(7) Re-solder a new plug, and slide the boot over the solder joint.
(8) Reassemble in reverse order. Torque attachment screws 140 to 180 in.-lbs.

C. Removal and Replacement of the Power Plug Receptacle (S/N 41501 and On)

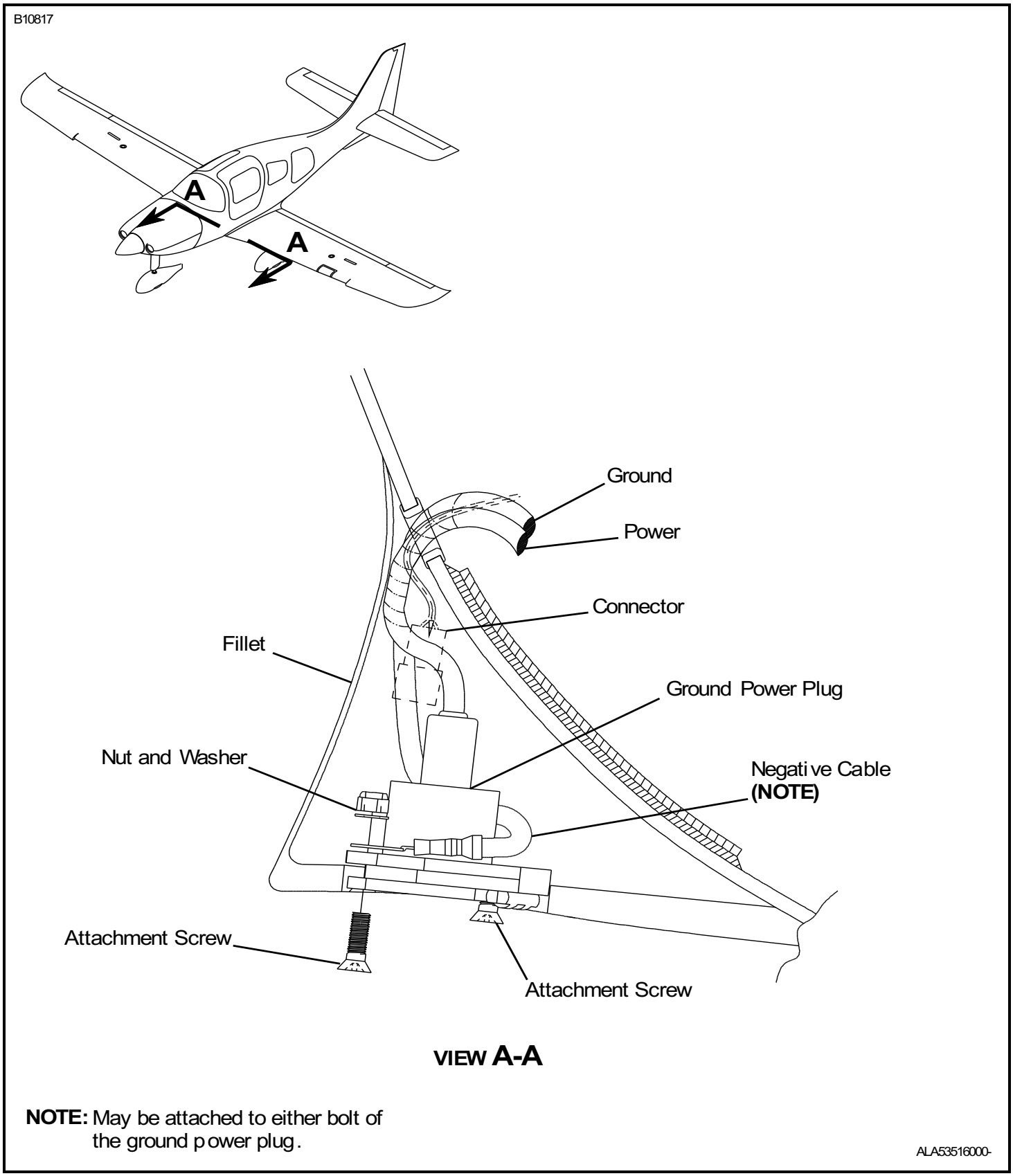
(1) Turn the aircraft master switch off and placard "Do Not Turn On Power".
(2) Remove the hat rack carpet per instructions in Chapter 25.
(3) Remove the screws securing the baggage bulkhead access panel and remove the panel.
(4) Remove the nuts, lock washers, and washers attaching the cables to the receptacle. Refer to Figure 202.
(5) Remove the four 6-32 pan head screws and washers, attaching the receptacle. Refer to Figure 202. Note the location of the washers for reinstallation. The purpose of the washers is to align the receptacle outer door flush with the fuselage.
(6) Reassemble in reverse order. Torque 6-32 screws 10 in.-lbs.

D. Ground Power Plug Troubleshooting

(1) If the ground power plug relay will not engage:
    (a) The reverse current diode mounted on the relay may be open or have loose connections. Replace the relay or tighten the connections.
    (b) The transorb (surge suppressor) is shorted. Replace transorb.
    (c) Ground at the power plug or at the engine block is disconnected or loose. Reconnect or tighten the ground.
    (d) Contamination in the ground power plug does not allow the connector to go in all the way. Replace plug.
    (e) Ground Power relay windings are open. Replace relay.
(2) Ground power relay will not disengage.
    (a) Relay contacts are welded together internally. Replace relay.
    (b) BATT switches are turned on. Turn off BATT switches.

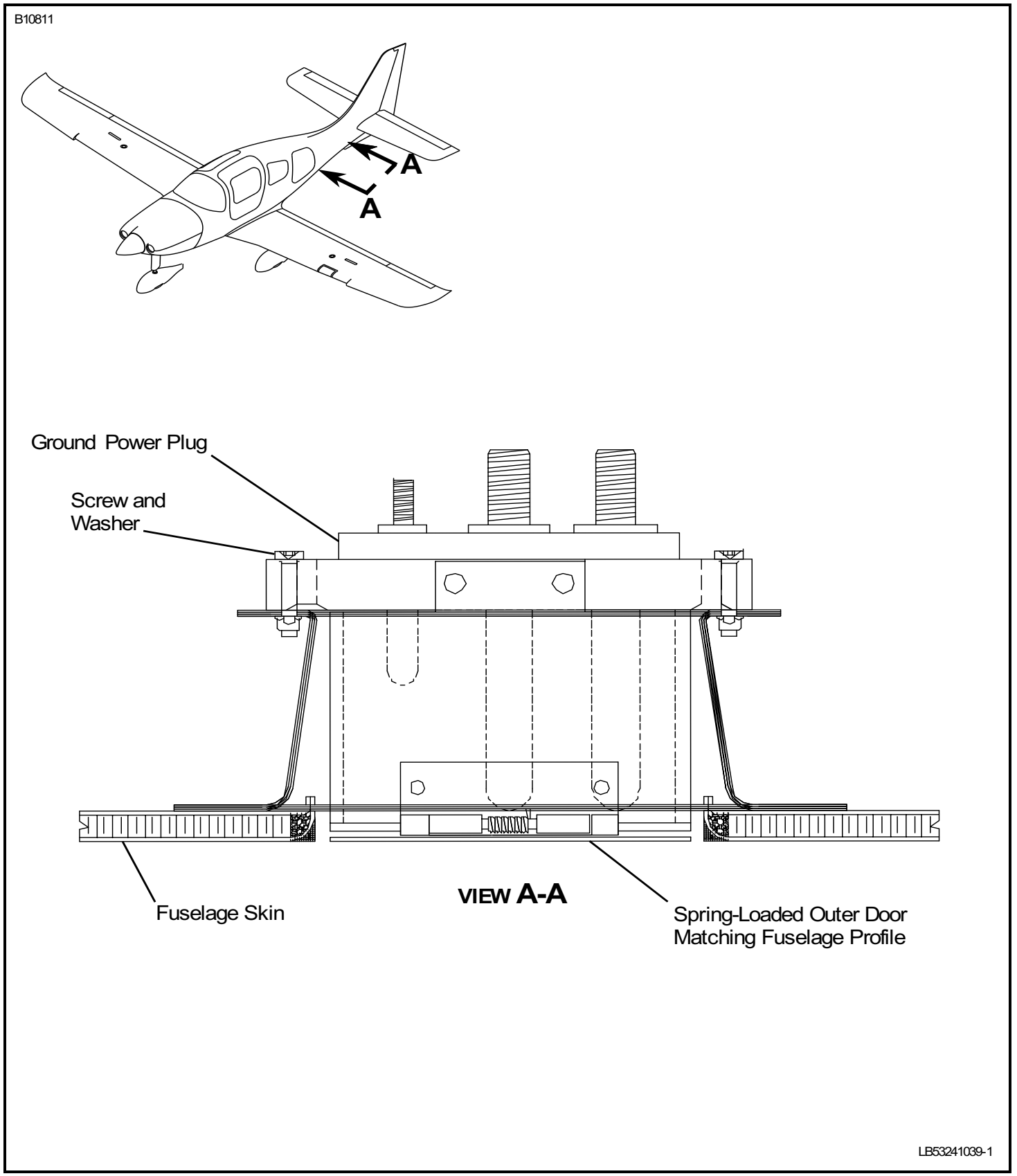
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Figure 201 : Sheet 1 : Ground Power Plug Installation (S/N 41002 to 41500)



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Figure 202 : Sheet 1 : Ground Power Plug Installation (S/N 41501 and On)



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ELECTRICAL LOAD DISTRIBUTION - MAINTENANCE PRACTICES

1. General

A. The voltage controllers (alternator controllers) each supply several functions that include, a voltage regulator, an over-voltage protection relay, a low and over voltage sensors, and an alternator field-to-ground short protection circuit.

B. On airplanes with the Avidyne option installed, the voltage regulators are attached to each other and a metal plate connected to the inside firewall on the copilot's side. On airplanes with the Garmin G1000 option installed, the voltage regulators are installed below the right side of the instrument panel. For the Model T240/G2000 installation removal and installation maintenance procedures refer to, Alternator Controller (T240) - Removal/Installation.

2. Electrical Load Distribution

A. **Removal of Voltage Regulator**

(1) To access the voltage regulator, remove the glare shield.

(2) Unhook the wires connected to the voltage regulators.

(3) Remove the three pan-head screws attaching the top voltage regulator to the bottom voltage regulator, and remove the top voltage regulator.

(4) Remove the three standoffs securing the bottom voltage regulator to the metal plate, and remove the voltage regulator from its mounting. Refer to Figure 201 and Figure 202.

B. **Installation of Voltage Regulator**

(1) Place the bottom voltage regulator in its mounting.

(2) Install the three standoffs to secure the bottom voltage regulator to the plate. The standoffs must protrude through the nutplate flush or better.

(3) Place the top voltage regulator over the standoffs and install the three pan-head screws and six washers.

(4) Reconnect the wires to the voltage regulator.

C. **Removal of Rocker and Master Switch Panels** - Steps for the removal of the rocker and master switch panels can be found in Chapter 25.

D. **Installation of Rocker and Master Switch Panels** - Steps for the installation of the rocker and master switch panels can be found in Chapter 25.

3. Circuit Breaker Panel

A. Steps for the removal and installation of the circuit breaker panel can be found in Chapter 25.

4. Power Grid

A. The power grid is locate directly aft of the avionics shelf under the baggage compartment floor. To gain access to the power grid remove the carpet and access panel from the baggage compartment floor. The power grid does not require any service or maintenance. However, it should be visually inspected every 1000 hours for frayed or chafed wiring and for evidence of corrosion and/or overheating,

5. Electric A/C Interlock Assembly

A. The Electric A/C Interlock Assembly, located under the left side of the baggage shelf, is a component of the air conditioning system (ACCS); when the system has the optional electrically driven compressor. Refer to Figure 203 or Figure 204. Refer to Chapter 21 for description of the ACCS.

(1) **Removal of the Electric A/C Interlock Assembly**

(a) Remove the baggage shelf carpet per instructions in Section 25-301-00, Interior Panels.

(b) Remove the Elevator Interconnect Access Panel and/or the Electronics Bay Access Panel per instructions in Section 25-31-00, Access Panels.

(c) Disconnect all electrical connections to the interlock assembly.

(d) Disconnect the .75 inch interlock cooling SCAT tube attached to the interlock assembly.

(e) Remove 4 screws and washers attaching the interlock assembly bracket to the shelf.

(f) Remove the interlock assembly.

(2) **Installation of the Electric A/C Interlock Assembly** - Installation is the reverse of removal.

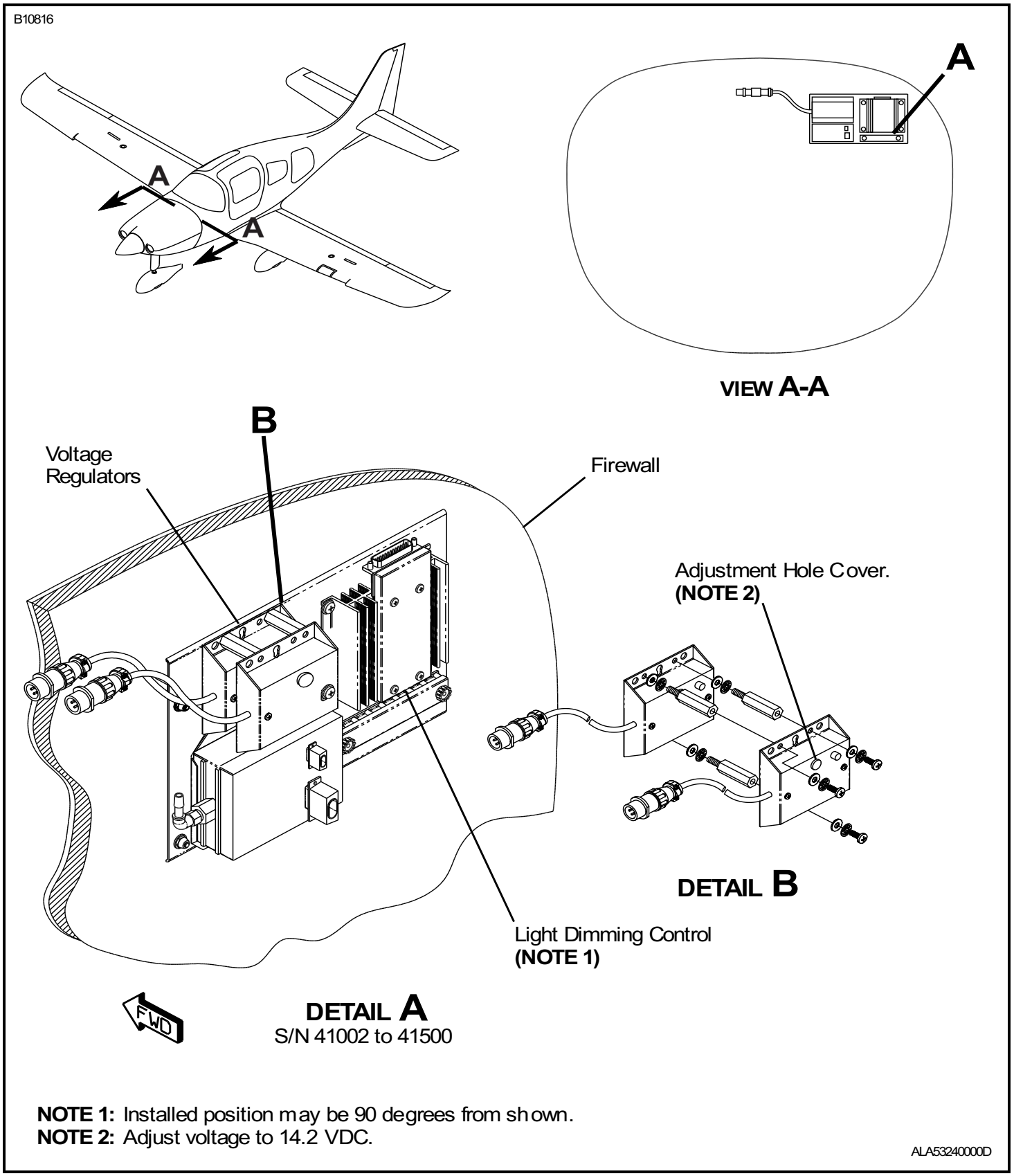
(3) **Maintenance of the Electric A/C Interlock Assembly** - The Electric A/C Interlock Assembly does not require

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maintenance.

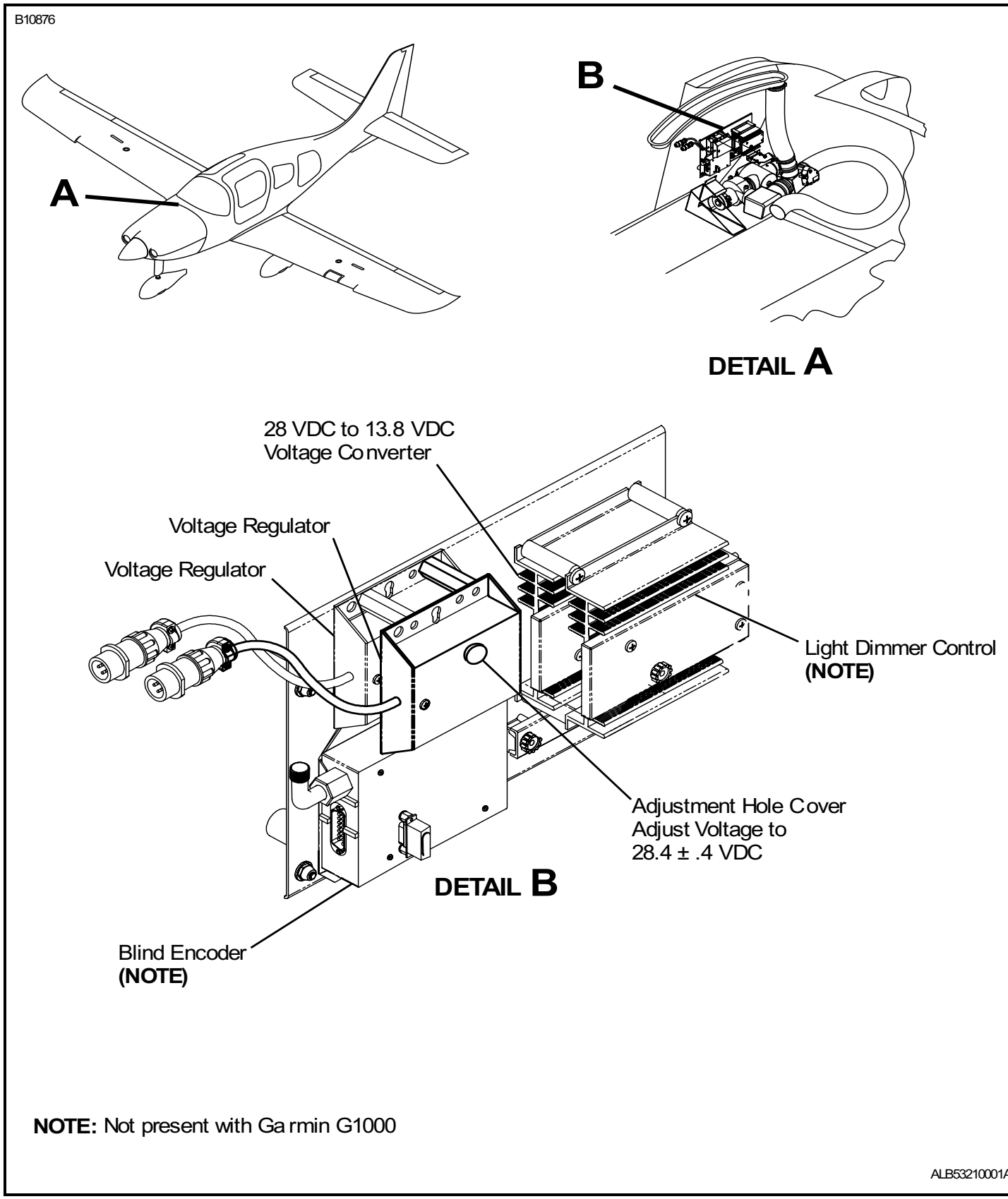
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Figure 201 : Sheet 1 : Voltage Regulator Installation (S/N 41002 to 41500)



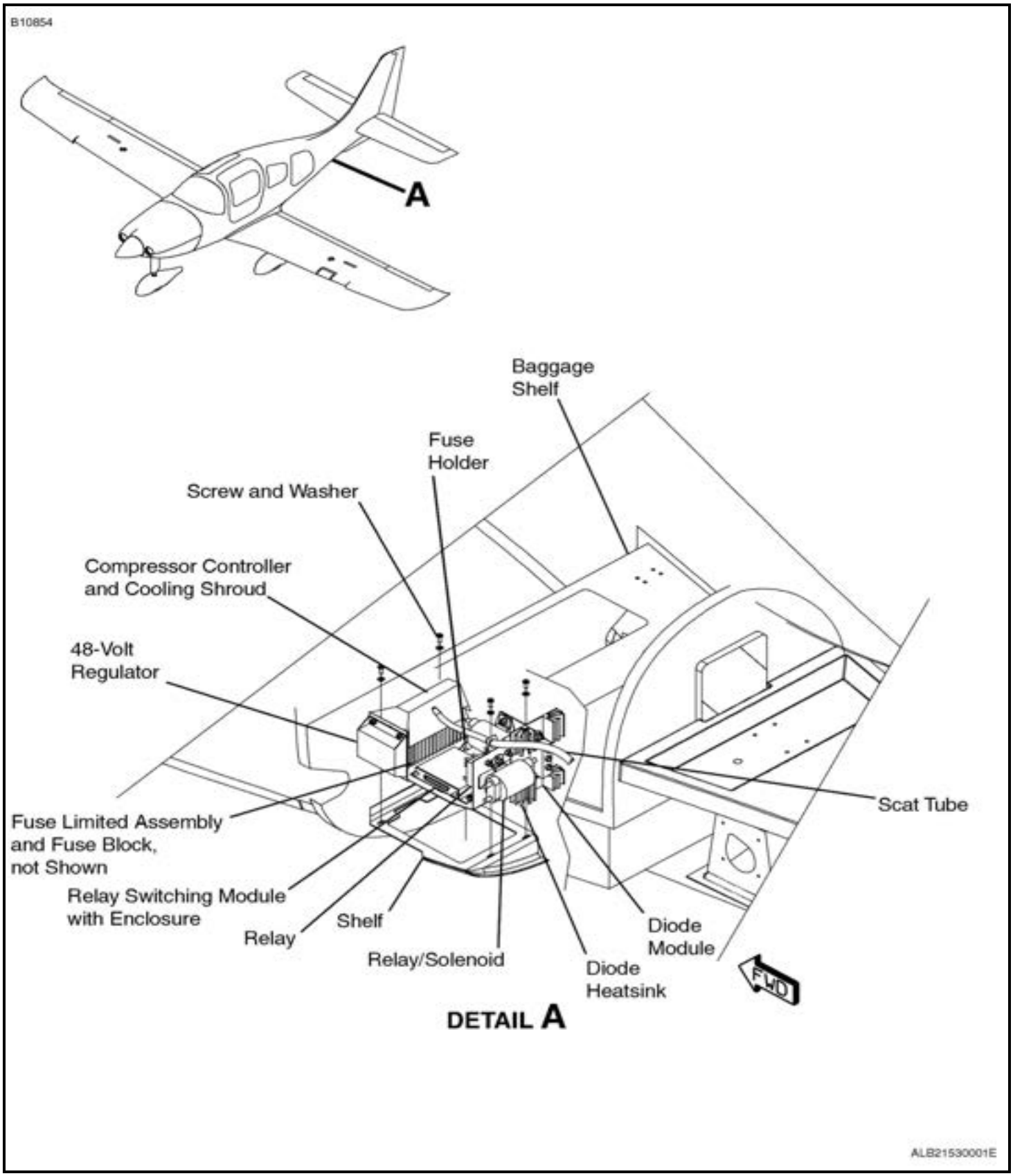
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Figure 202 : Sheet 1 : Voltage Regulator Installation (S/N 41501 and On)



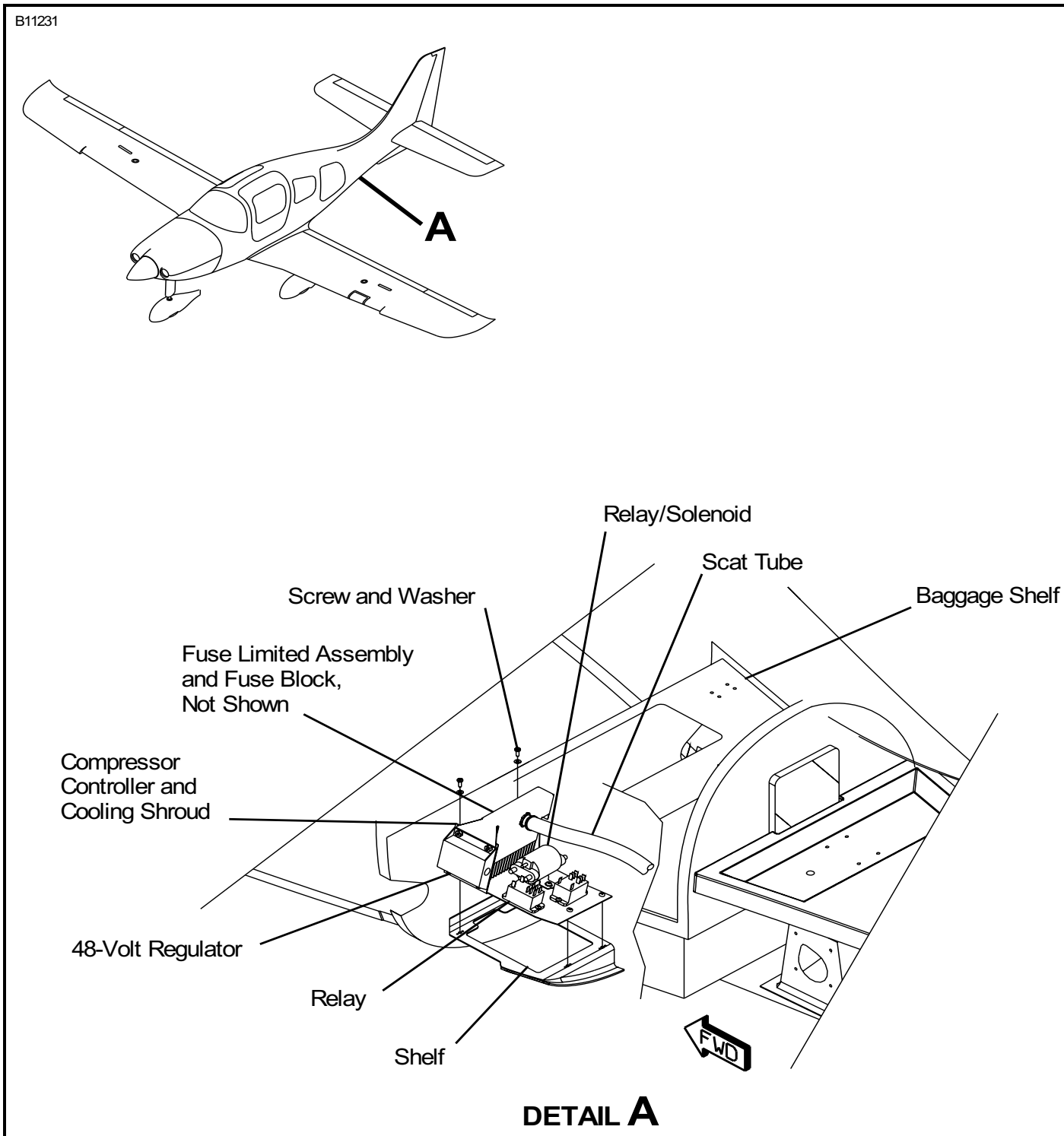
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Figure 203 : Sheet 1 : Electric A/C Interlock Assembly, 28 V



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Figure 204 : Sheet 1 : Electric A/C Interlock Assembly, 14 V



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VOLTAGE CONVERTOR (T240) - REMOVAL/INSTALLATION

1. General

A. This section gives the removal and installation for the Model T240 Voltage Convertor. The convertor is installed on the bottom of the avionics shelf, below the left side of the instrument panel. The convertor decreases 28 Vdc to 14 Vdc. The 14 Vdc is supplied to the Aux Relay Assembly (UI009) that operates with the environmental control system.

2. Voltage Convertor Removal/Installation

A. Remove the Voltage Convertor (UF903) (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Disengage the 12V PWR circuit breaker, found on the cockpit circuit breaker panel.

(5) Disconnect the electrical connector (P68) from the convertor's electrical connector (P401).

(6) Remove the screws that attach the convertor to the bottom of the avionics shelf.

(a) If necessary, remove the pilot's seat to get access to the trim adapter. Refer to Chapter 25, Airplane Seats - Maintenance Practices.

(7) Remove the convertor from the airplane.

B. Install the Voltage Convertor (UF903) (Refer to Figure 401).

(1) Put the convertor in its correct position below the avionics shelf.

(2) Install the screws that attach the convertor to the avionics shelf.

(3) Visually inspect the connectors to make sure that there are no bent or damaged pins.

(a) Repair any damage.

(4) Connect the electrical connector (P68) to the convertor's electrical connector (P401).

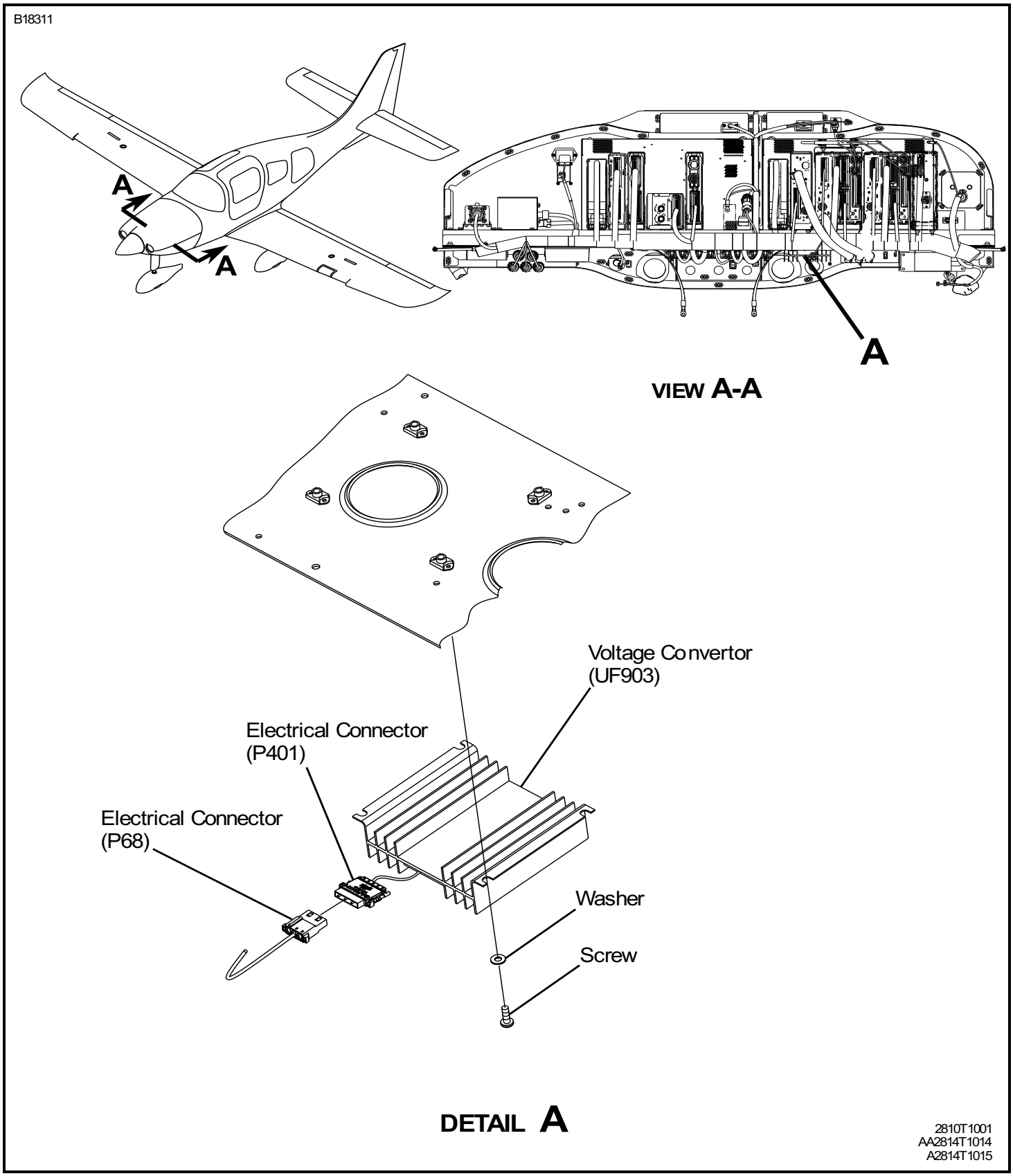
(5) If removed, install the pilot's seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices.

(6) Engage the 12V PWR circuit breaker, found on the cockpit circuit breaker panel.

(7) Do a test of the environmental control system as necessary. Refer to Chapter 21, Environmental Control System Components- Adjustment/Test, Rigging and Adjustment.

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Figure 401 : Sheet 1 : Voltage Convertor Installation



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POWER RELAY PANEL - MAINTENANCE PRACTICES

1. General

A. This section gives the removal and installation procedures for the components on the power relay panel. The power relay panel is found in the aft avionics bay below the baggage compartment floor.

B. Use the Model T240 Wiring Diagram Manual with the procedures in this section.

2. Preliminary Procedures

A. Do the component removal preliminary procedures.

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Disconnect the battery connections. Refer to the applicable steps in Battery - Maintenance Practices.

(a) Attach maintenance warning tags to the battery and external power receptacle that have "DO NOT CONNECT ELECTRICAL POWER - MAINTENANCE IN PROGRESS" written on them.

(5) Get access to the relay power panel through the Aft Cabin Floor Access Panel in the baggage compartment floor.

(a) Remove the access panel. Refer to Chapter 25, Access Panels - Maintenance Practices.

3. Relay Removal/Installation

NOTE: The removal procedures for the relays is typical.

A. Remove the relay from the power relay panel (refer to Figure 201).

(1) Do the component removal Preliminary Procedures in this section.

(2) Remove the nuts and washers that attach the wires to the relay.

(a) Identify and mark the wires.

(b) Remove the wires from the relay.

(3) If the relay is to be replaced remove the diode assembly.

(a) Make a note of the diode orientation.

(b) Remove the diode assembly.

(c) Visually examine the diode for any damage, broken leads, or obvious signs of failure.

1 Replace the diode if it is not serviceable.

(d) Keep the diode assembly for installation.

(4) Remove the nuts that attach the strap(s) to the relay.

(a) Remove the strap(s) from the relay.

(5) Remove the screws and washers that attach the relay to the panel.

(6) Remove the relay from the airplane.

B. Install the relay on the power relay panel (refer to Figure 201).

NOTE: The installation procedures for the relays is typical.

(1) Put the relay in its correct position on the panel.

(a) Install the screws and washers that attach the relay to the panel.

(2) If necessary install the diode assembly on the relay.

(a) Put the diode assembly in position on the relay.

1 Make sure that the diode is in the correct orientation.

(3) Identify and put the wires in position on the relay.

(a) Install the nuts and washers that attach the wires to the relay.

(4) Put the strap(s) in position on the relay.

(a) Install the nuts that attach the strap(s) to the relay.

(5) Connect the battery connections. Refer to the applicable steps in Battery - Maintenance Practices.

(6) Do an operational test on the system related to replaced component. Refer to the applicable section of this manual.

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(7) If no more procedures are to be done at this time, return the airplane to its original condition. Refer to Restore the Airplane in this section.

4. Block Fuse Removal/Installation

NOTE: The removal procedures for the block fuses is typical.

A. Remove the block fuse from the power relay panel (refer to Figure 201).

(1) Do the component removal Preliminary Procedures in this section.

(2) Remove the nuts and washers that attach the wires to the block fuse.

(a) Identify and mark the wires.

(b) Remove the wires from the block fuse.

(3) Remove the nuts that attach the strap(s) to the block fuse.

(a) Remove the strap(s) from the block fuse.

(4) Remove the nuts and washers that attach the block fuse to the fuse block (mounting block).

(5) Remove the block fuse from the airplane.

B. Install the block fuse on the power relay panel (refer to Figure 201).

NOTE: The installation procedures for the block fuse is typical.

(1) Put the block fuse in its correct position on the fuse block (mounting block).

(a) Install the nuts and washers that attach the block fuse to the fuse block (mounting block).

(2) Identify and put the wires in position on the block fuse.

(a) Install the nuts and washers that attach the wires to the block fuse.

(3) Put the strap(s) in position on the block fuse.

(a) Install the nuts that attach the strap(s) to the block fuse.

(4) Connect the battery connections. Refer to the applicable steps in Battery - Maintenance Practices.

(5) Do an operational test on the system related to replaced component. Refer to the applicable section of this manual.

(6) If no more procedures are to be done at this time, return the airplane to its original condition. Refer to Restore the Airplane in this section.

5. Shunt Removal/Installation

NOTE: The removal procedures for the shunts is typical.

A. Remove the shunt from the power relay panel (refer to Figure 201).

(1) Do the component removal Preliminary Procedures in this section.

(2) Remove the nuts and washers that attach the wires to the shunt.

(a) Identify and mark the wires.

(b) Remove the wires from the shunt.

(3) Remove the nuts that attach the strap(s) to the shunt.

(a) Remove the strap(s) from the shunt.

(4) Remove the screws that attach the shunt to the panel.

(5) Remove the shunt from the airplane.

B. Install the shunt on the power relay panel (refer to Figure 201).

NOTE: The installation procedures for the shunts is typical.

(1) Put the shunt in its correct position on the panel.

(a) Install the screws that attach the shunt to the panel.

(2) Identify and put the wires in position on the shunt.

(a) Install the nuts and washers that attach the wires to the shunt.

(3) Put the strap(s) in position on the shunt.

(a) Install the nuts that attach the strap(s) to the shunt.

(4) Connect the battery connections. Refer to the applicable steps in Battery - Maintenance Practices.

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(5) Do an operational test on the system related to replaced component. Refer to the applicable section of this manual.

(6) If no more procedures are to be done at this time, return the airplane to its original condition. Refer to Restore the Airplane in this section.

6. Restore the Airplane

A. Put the airplane back to its original condition.

(1) Install the access panel. Refer to Chapter 25, Access Panels - Maintenance Practices.

(2) Remove external electrical power from the airplane.

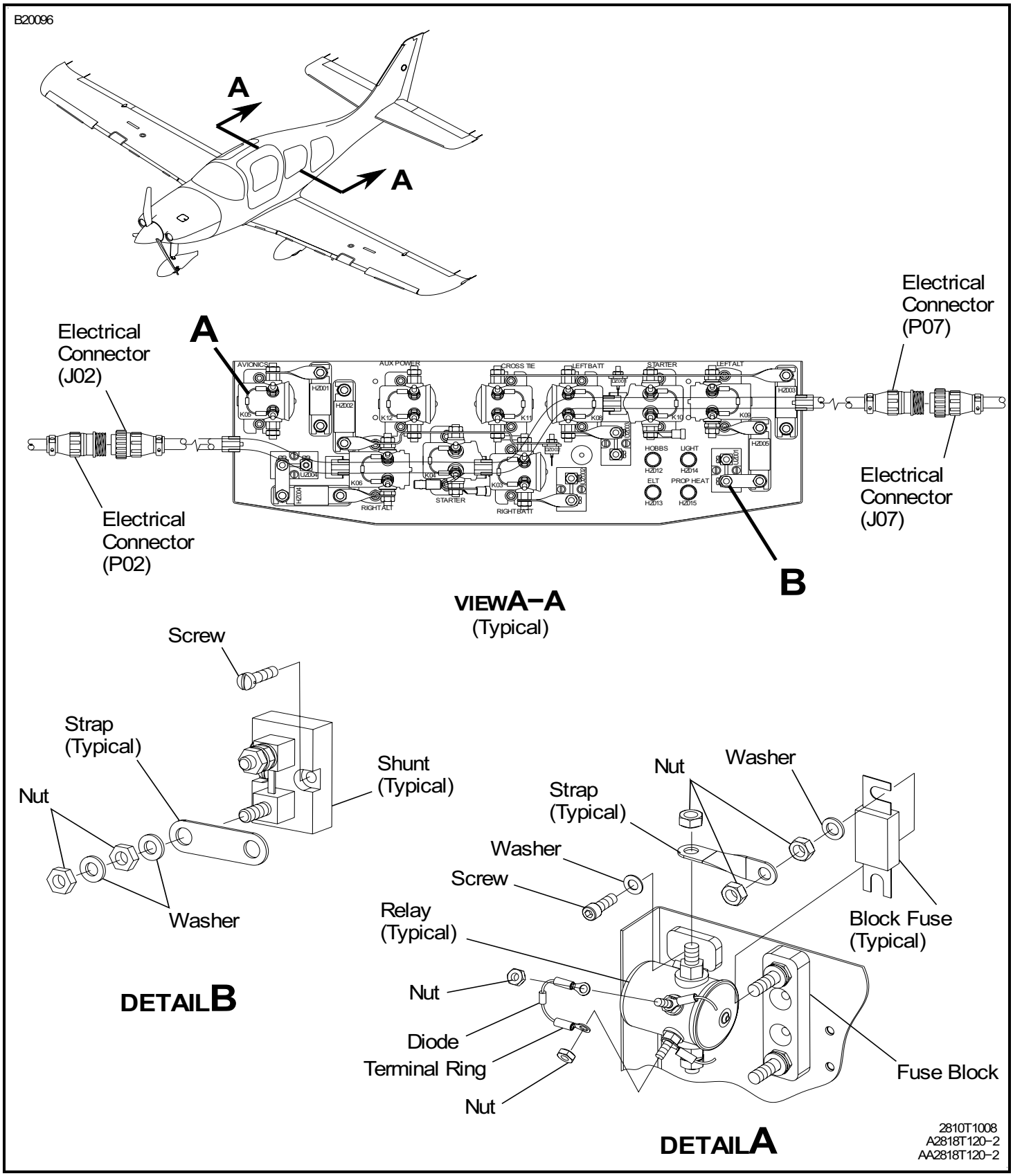
(3) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(4) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(5) Remove the maintenance warning tags from the battery and external power receptacle.

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Figure 201 : Sheet 1 : Component Installation



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AUX RELAY ASSEMBLY (T240) - MAINTENANCE PRACTICES

1. General

A. This section gives the removal and installation procedures for the AUX Relay Assembly and the relays. The AUX Relay Assembly is installed on the right side of the avionics shelf forward of the instrument panel. Stall heat, pitot heat and oxygen system relays are installed on the assembly for airplanes with the FIKI option available and oxygen system relays only on airplanes the FIKI option is not available.

2. Tools and Equipment

A. No special tools or equipment are required for this procedure.

3. Aux Relay Assembly Removal and Installation

A. Remove the AUX Relay Assembly (UI009) (Refer to Figure 201).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are set to the OFF position.

(3) Make sure that the AVIONICS MASTER switch (SW04) is set to the OFF position.

(4) Remove the glare shield. Refer to Glareshield (T240) - Removal/Installation.

(5) Disconnect the electrical connector (PI009) from the assembly electrical connector (JI009).

(6) Remove the screws that attach the assembly to the avionics shelf.

(7) Remove the assembly from the airplane.

B. Install the AUX Relay Assembly (UI009) (Refer to Figure 201).

(1) Visually inspect the PI009 electrical connector and pins for signs of damage.

(a) Repair any damage.

(2) Put the assembly in its correct position on the avionics shelf.

(a) Install the screws that attach the assembly to the avionics shelf.

(3) Connect the electrical connector (JI009) to the assembly electrical connector (PI009).

(4) Install the glare shield. Refer to Glareshield (T240) - Removal/Installation.

(5) Supply external electrical power to the airplane.

(6) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(7) Set the AVIONICS MASTER switch (SW04) to the ON position.

(8) Make sure that the relays operate correctly. Refer to the applicable systems that follow:

(a) Chapter 28, Fuel Distribution - Maintenance Practices

(b) Chapter 35, Oxygen- Maintenance Practices

(c) Chapter 34, Pitot/Static Systems (T240) - Adjustment/Test Pitot and Stall Vane Heat Test.

(9) Set the master BATT switches (left SW01 and right SW02) to the OFF position.

(10) Set the AVIONICS MASTER switch (SW04) to the OFF position.

(11) Remove external electrical power from the airplane.

4. Aux Relay Assembly Relays Removal and Installation

A. Remove the AUX Relay Assembly Relay (Refer to Figure 201).

NOTE: The removal procedure for each of the relays are identical.

(1) Remove the AUX Relay Assembly (UI009). Refer to Remove the Aux Relay Assembly (UI009).

(2) Identify and remove the electrical wires from the relay's electrical terminals.

(3) Remove the screws that attach the relay to the aux relay assembly.

(a) Remove the relay from the assembly.

B. Install the Aux Relay Assembly Relay (Refer to Figure 201).

NOTE: The installation procedure for each of the relays are identical.

(1) Put the relay in its correct position on the aux relay assembly.

(a) Install the screws that attach the relay to the assembly.

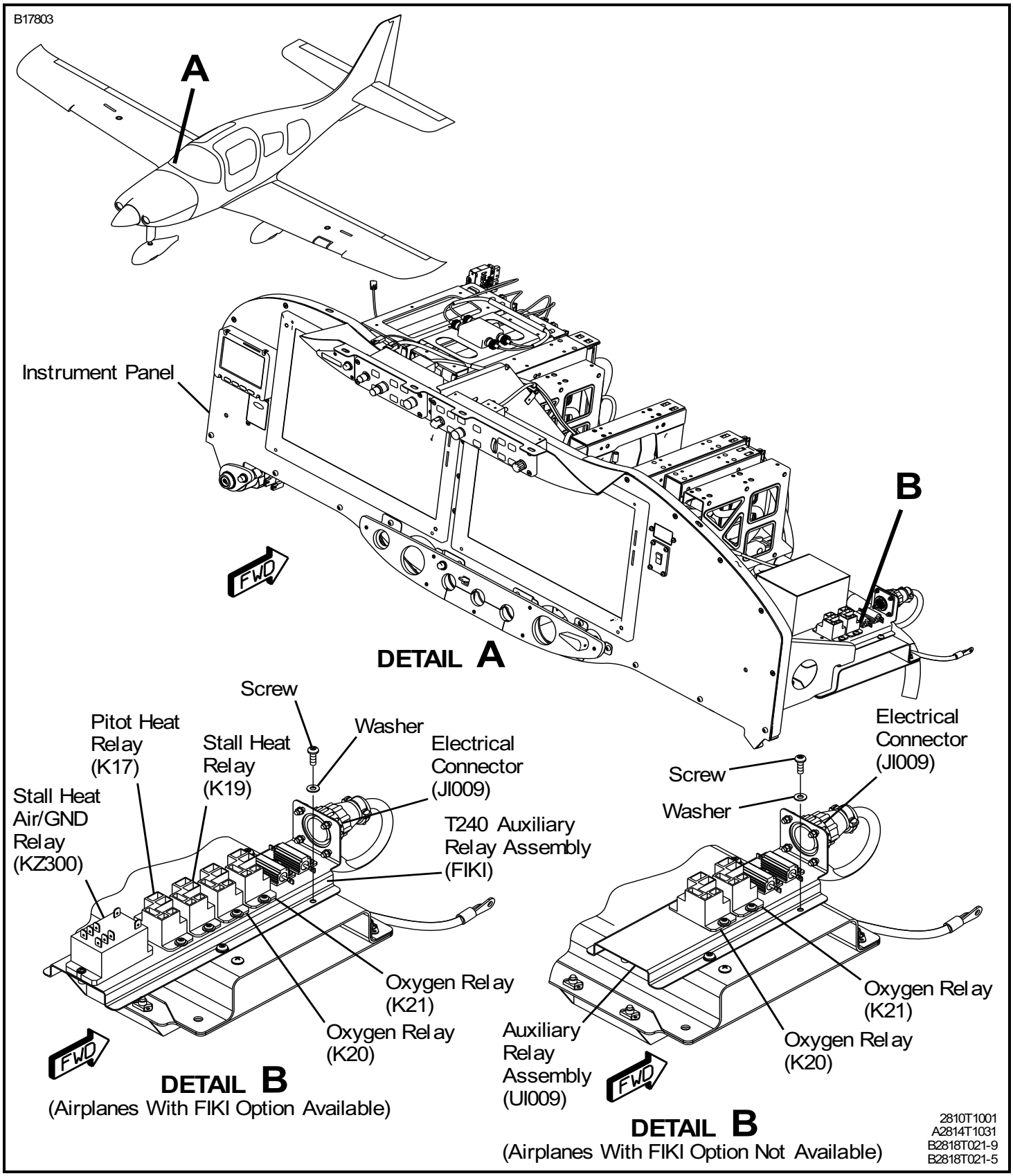
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(2) Connect the electrical connector wires to the relay electrical terminals.

(3) Install the AUX Relay Assembly (UI009). Refer to Remove the Aux Relay Assembly (UI009).

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Figure 201 : Sheet 1 : Aux Relay Assembly Installation



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SMALL PARTS MODULE (T240) - REMOVAL/INSTALLATION

1. General

A. This section gives the removal and installation procedures for the Small Parts Module. The Small Parts Module is installed on the right side of the avionics shelf forward of the instrument panel. Oxygen, fuel, audio, air distribution, and rudder hold system relays are installed on the assembly. The Avionics Shelf Cooling Fan (UZ102) is installed on a bracket assembly that is above the Small Parts Module.

2. Tools and Equipment

A. No special tools or equipment are required for this procedure.

3. Small Parts Module Removal and Installation

NOTE: You must remove the Avionics Shelf Cooling Fan (UZ102) and bracket assembly before the Small Parts Module is removed. The cooling fan and the bracket assembly can be removed as one assembly.

A. Remove the Small Parts Module (UI008) (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are set to the OFF position.

(3) Make sure that the AVIONICS MASTER switch (SW04) is set to the OFF position.

(4) Remove the glare shield. Refer to Chapter 25, Glareshield (T240) - Removal/Installation.

(5) Disconnect the avionics shelf cooling fan electrical connector from the airplane wiring bundle electrical connector. Refer to Chapter 21, Equipment Cooling Fans (T240) - Removal/Installation, Avionics Shelf Cooling Fan - Removal/Installation.

(6) Disconnect the electrical connector (PI008) from the assembly electrical connector (J1).

(7) Disconnect the electrical connector (P610) from the assembly electrical connector (J2).

(8) Remove the screws that attach the small parts module and the avionics shelf cooling fan bracket assembly to the avionics shelf.

(9) Remove the small parts module and the avionics shelf cooling fan assembly from the airplane.

B. Install the Small Parts Module (UI008) (Refer to Figure 401).

(1) Visually inspect the PI008 electrical connector and pins for signs of damage.

(a) Repair any damage.

(2) Put the small parts module and the avionics shelf cooling fan assembly in their correct position on the avionics shelf.

(a) Install the screws that attach the assembly to the avionics shelf.

(3) Visually inspect the PI009 and P610 electrical connectors and pins for signs of damage.

(a) Repair any damage.

(4) Connect the electrical connector (PI008) to the assembly electrical connector (J1).

(5) Connect the electrical connector (P610) to the assembly electrical connector (J2).

(6) Connect the avionics shelf cooling fan electrical connector to the airplane wiring bundle electrical connector. Refer to Chapter 21, Equipment Cooling Fans (T240) - Removal/Installation, Avionics Shelf Cooling Fan - Removal/Installation.

(7) Install the glare shield. Refer to Glareshield (T240) - Removal/Installation.

(8) Supply external electrical power to the airplane.

(9) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(10) Set the AVIONICS MASTER switch (SW04) to the ON position.

(11) Set the CROSS TIE switch (SW03) to the ON position.

(12) Make sure that the Small Parts Module operates correctly. Refer to the applicable systems that follow:

(a) Chapter 21, Temperature and Air Control - Maintenance Practices.

(b) Chapter 22, Garmin GFC 700 Auto Pilot (G2000) - Adjustment/Test Trim Operational Test.

(c) Chapter 23, Garmin GMA 36 Remote Audio Panel (G2000) - Adjustment/Test

(d) Chapter 27, Rudder Hold System (G2000) - Adjustment/Test.

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(e) Chapter 28, Fuel Indicating System - Maintenance Practices.

(13) Do an test of the avionics shelf fan. Refer to Chapter 21, Equipment Cooling Fans (T240) - Removal/Installation, Equipment Cooling Fans Operational Test.

(14) Set the master BATT switches (left SW01 and right SW02) to the OFF position.

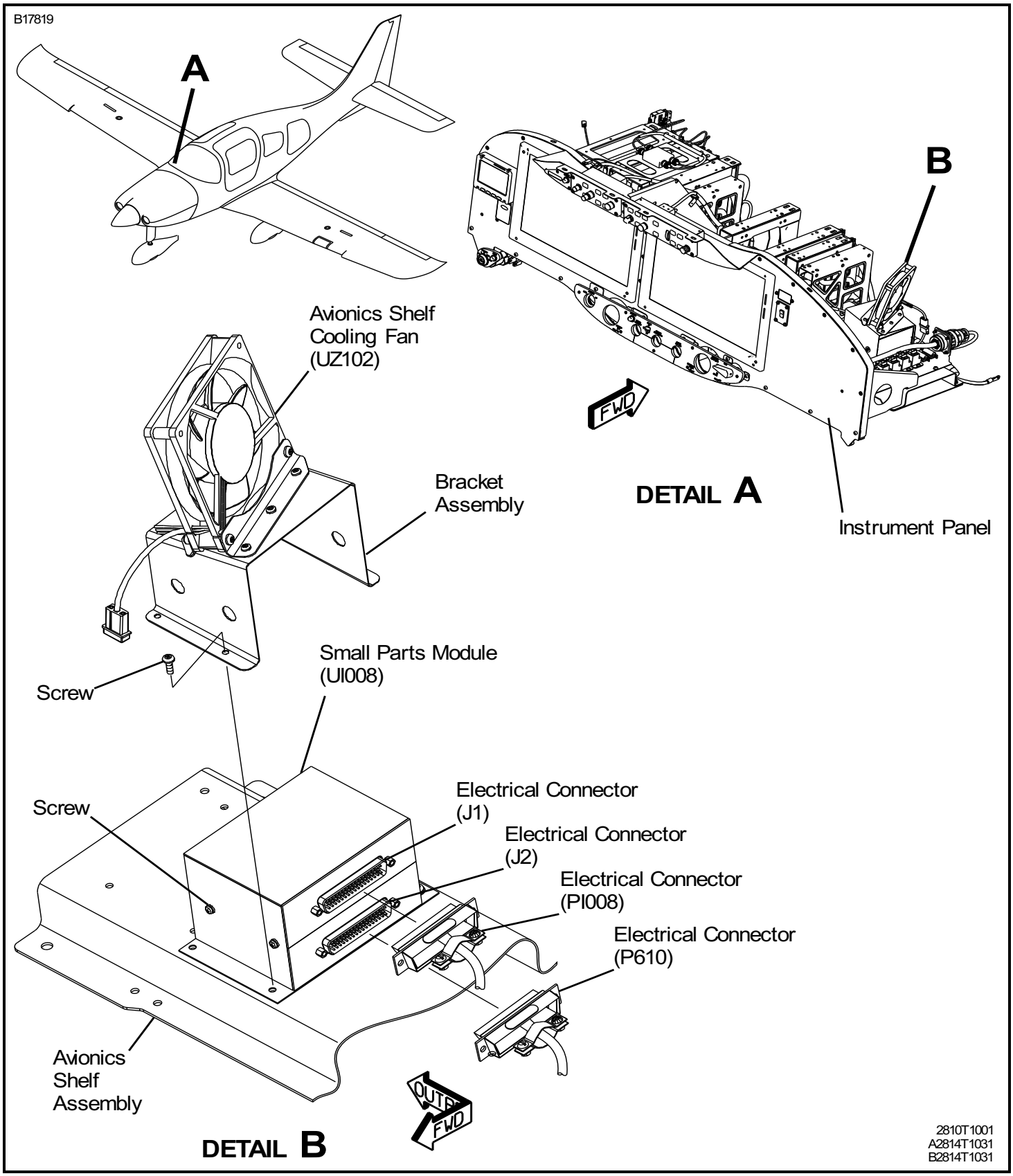
(15) Set the AVIONICS MASTER switch (SW04) to the OFF position.

(16) Set the CROSS TIE switch (SW03) to the OFF position.

(17) Remove external electrical power from the airplane.

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Figure 401 : Sheet 1 : Small Parts Module Installation



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EQUIPMENT/FURNISHINGS - GENERAL

1. General

WARNING: Do not remove seats from the airplane with the seat belts buckled or the AMSAFE Aviation Inflatable Restraint electronic module assembly connected to the cable interface assembly. Damage can occur to the system and an accidental deployment of the system can cause injury.

WARNING: Seat cushions are designed to crush to absorb loads in a crash situation. In the event of any incident or accident with a downward force component that results in damage to the aircraft, the seat cushions should be replaced.

WARNING: Do not place anything under the seat pans. The hollow area under the seat is designed for the crush of the seat to absorb energy in the event of a crash. Placing items in this area will prevent the proper operation of the seats.

A. **Front Seats** - Two individual, adjustable, tubular frame seats provide the front seating for the pilot and passenger. The base of the tubular seat frame is covered with sheet aluminum, and the seat cushions are attached to the aluminum through a series of Velcro strips. The seat backs on the front seats fold forward to permit access to the aft seating area. The seat cushions and seat backs are foam-filled and covered with natural leather and ultra-leather. For added protection, both the front and rear seats incorporate a special rigid, energy absorbing foam near the bottom of the cushion. The cushion is designed for the loads applied by a seated passenger, and it is possible to damage the seat if concentrated loads are applied. Care must be taken to avoid stepping on the seats or placing heavy objects on the seat. For care and maintenance of the seats refer to Chapter 25, Airplane Seats.The front seats are adjustable fore and aft through a range of approximately 7 inches.

   (1) The seat adjustment control for the non-Oregon Areo front seats is located below the seat cushion on the left side. To adjust the position of either seat, move the control lever towards the middle until the seat unlocks from the seat track, and adjust the seat to the desired position.

   (2) The Oregon Areo front seats are adjusted using the adjustment lever, found on the left side of the seat. To adjust the position of one of the two seats, move the applicable adjustment lever up that allows the seatback to move. When in the necessary position, release the lever.

B. **Rear Seats** - The rear seats are a split bench-type design and are nonadjustable. The bench seat frame is composite construction and bolted to the interior of the fuselage. The foam-filled seat and seat back cushions are covered with natural leather and ultra-leather and attached to the seat bench with Velcro fasteners. There are two non-locking headrests inserted into the top of the seat back. The headrest can be removed by grasping it on each side and pushing up.

C. **Seat Belts and Shoulder Harnesses** - The seat belts and shoulder harnesses are an integrated three-point restraint type of design. With this type of restraint, the lap belt and diagonal harness are one continuous piece of belt webbing. The webbing is anchored on each side of the seat for the lap belt restraint and then on the side of the fuselage for the harness restraint.

D. **Inflatable Restraint System** - The Model T240 has an inflatable restraint system installed for the front seats and can have an optional system installed for the rear seats. The seat belts and shoulder harnesses for the inflatable restraint system are installed in the airplane identical to the non-inflatable seat belts and restraints. If an inflatable restraint system is installed the system must be disarmed before you do maintenance on the seats.

E. **Interior Panels** - Most of the interior panels are covered with ultra-leather and are secured with screws, PEM (Penn Engineering and Manufacturing) studs, Shuler clips, Velcro, or standard clips. When all the fasteners are removed, care must be taken when removing the panel so as not to damage the finish. Care and maintenance of the panels is discussed in Chapter 12. The panels are classified according to their location, i.e., forward, middle, aft, center, upper, lower, etc. The following is a brief discussion of each panel and the accompanying abbreviation. Refer to Figure 1.

   (1) **Forward and Aft Center Overhead Light Panel (FCOLP and ACOLP)** - This panel is located in the center portion of the main cabin area and contains the electrical lights and speaker.

   (2) **Forward Overhead Side Panels Left and Right (FOSPL and FOSPR)** - The forward panels to the left and right of the COLP are referred to as the left and right overhead side panels.

   (3) **Aft Overhead Side Panels Left and Right (AOSPL and AOSPR)** - These side panels are just aft of the FOSPL and FOSPR.

   (4) **Forward Lower Side Panels Left and Right (FLSPL and FLSPR)** - These panels are located on the left and right side of the airplane and cover each side of the airplane from about the rudder pedals aft to a location near the

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backrests of the front seats.

(5) **Middle Lower Side Panels Left and Right (MLSPL and MLSPR)** - These panels are located on each side of the airplane, between the front and rear seat backs.

(6) **Baggage Lower Side Panels Left and Right (BLSPL and BLSPR)** - These panels are located on the left and right side of the baggage compartment, near the floor, and are also referred to as the left and right push-pull tube channel covers.

F. **Engine, Flight Instrument, and Electrical Panels**

(1) **Model T240** - The instrument panel is installed forward of the pilot. Many of the switch panels have LED light panels installed. The lower section of the instrument panel has a bolster assembly installed. Refer to Table 1 and Figure 4 for a list of the instrument panel components. The circuit breaker panel is larger with more capacity for added circuit breakers than installed with the Avidyne and Garmin G1000 options. The circuit breaker panel has LED light panels installed for each of the circuit breaker sections of the panel. The circuit breaker panel also has surge suppressors and current sensors installed as part of the assembly.

Table 1. Instrument Panel Components

L-3 Standby Indicator	Carbon Monoxide Detector
Primary Flight Display (PFD)	Flaps Switch
DISPLAY REVERSION Switch Panel	Air Vent
GCU 275 Controller Unit	Engine Controls Panel
GMC 720 AFCS Mode Controller	SPD BRK Switch
Multifunctional Display (MDF)	GO AROUND Switch
Hourmeter	ALT STATIC
ELT Switch	Ignition Switch Panel

(2) **Avidyne Option** - The flight instrument panel is located directly in front of the pilot, and the engine instrument panel is to the left of the flight instrument panel and is canted at about 30 degrees. On the right side of the airplane there is a kidney panel located in an approximate mirrored location in relation to the engine instrument panel. Below the instrument panel are a series of electrical panels, which contain the master switch, rocker switch, trim, flap, and ECS panels. Below the electrical panels are the left and right knee bolsters. Above the instrument panels is the glare shield. Figure 2 shows the location of each panel.

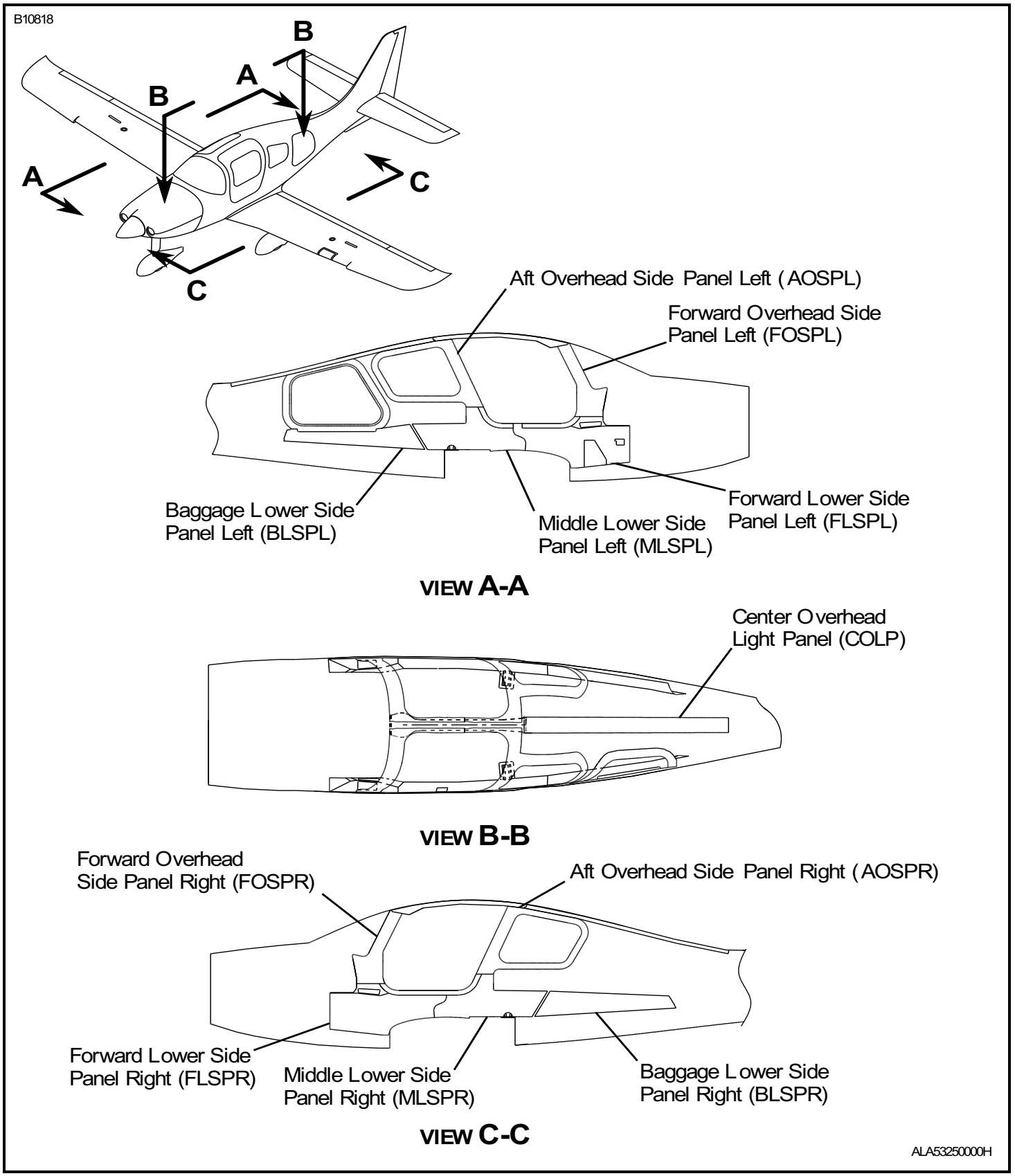
(3) **Garmin G1000 Option** - The instrument panel is located directly in front of the pilot. Integral to the instrument panel are the 5 Pack switches, backup airspeed indicator, backup attitude indicator, backup altimeter, PFD, audio panel, and MFD. Below the instrument panel are the flap panel, engine controls, and ECS or ACCS panels. Above the instrument panel is the glare shield. Refer to Figure 3.

2. General Maintenance

A. Performing maintenance on the various components and systems in the airplane will frequently involve the removal of interior panels. Special tools are not needed. Most work can be performed with screw drivers, wrenches, sockets, torque wrenches, and adapters. To avoid over-torquing when using an adapter on a torque wrench, refer to Chapter 20, Torque Data - Maintenance Practices.

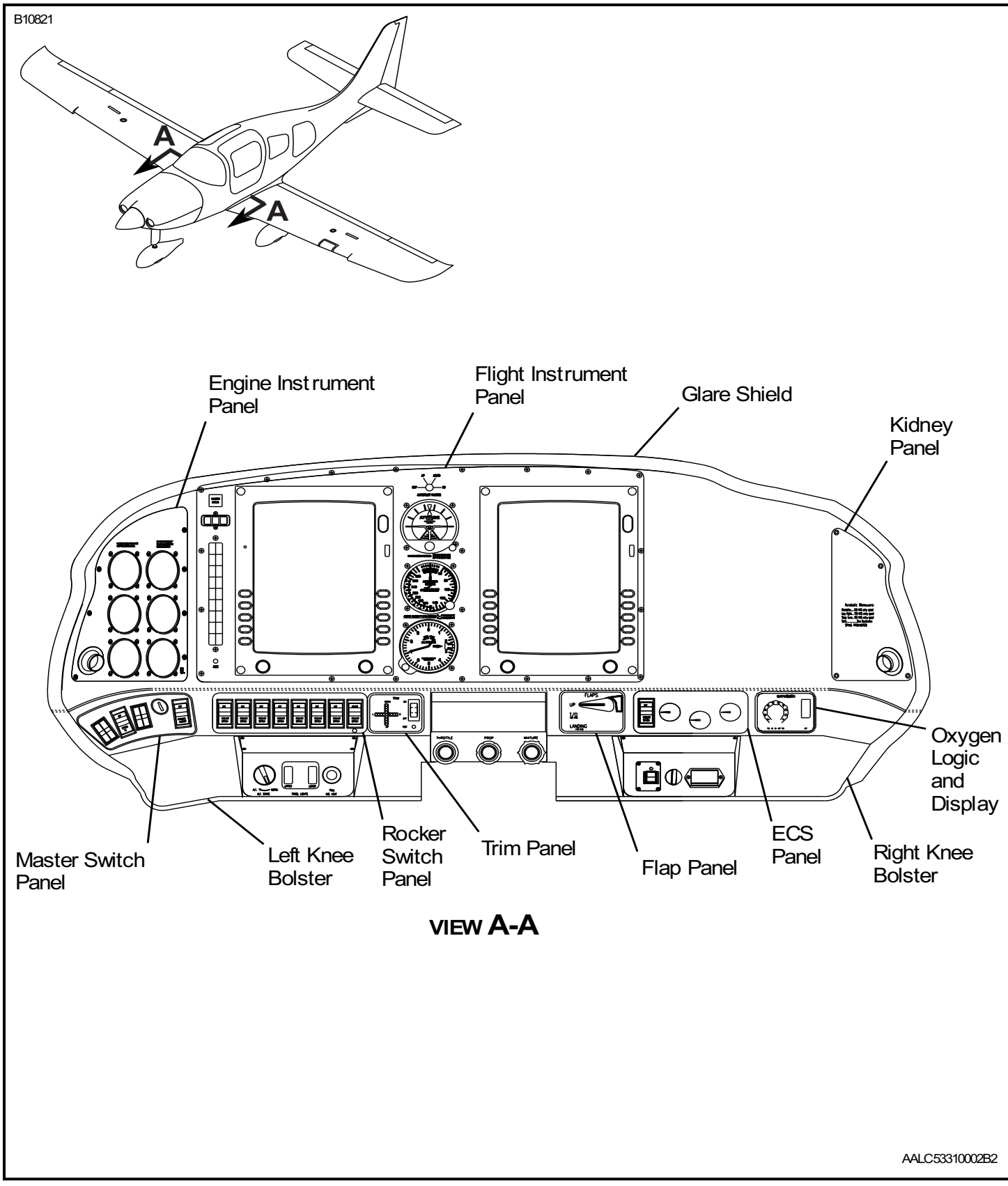
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Figure 1 : Sheet 1 : Interior Panel Locations



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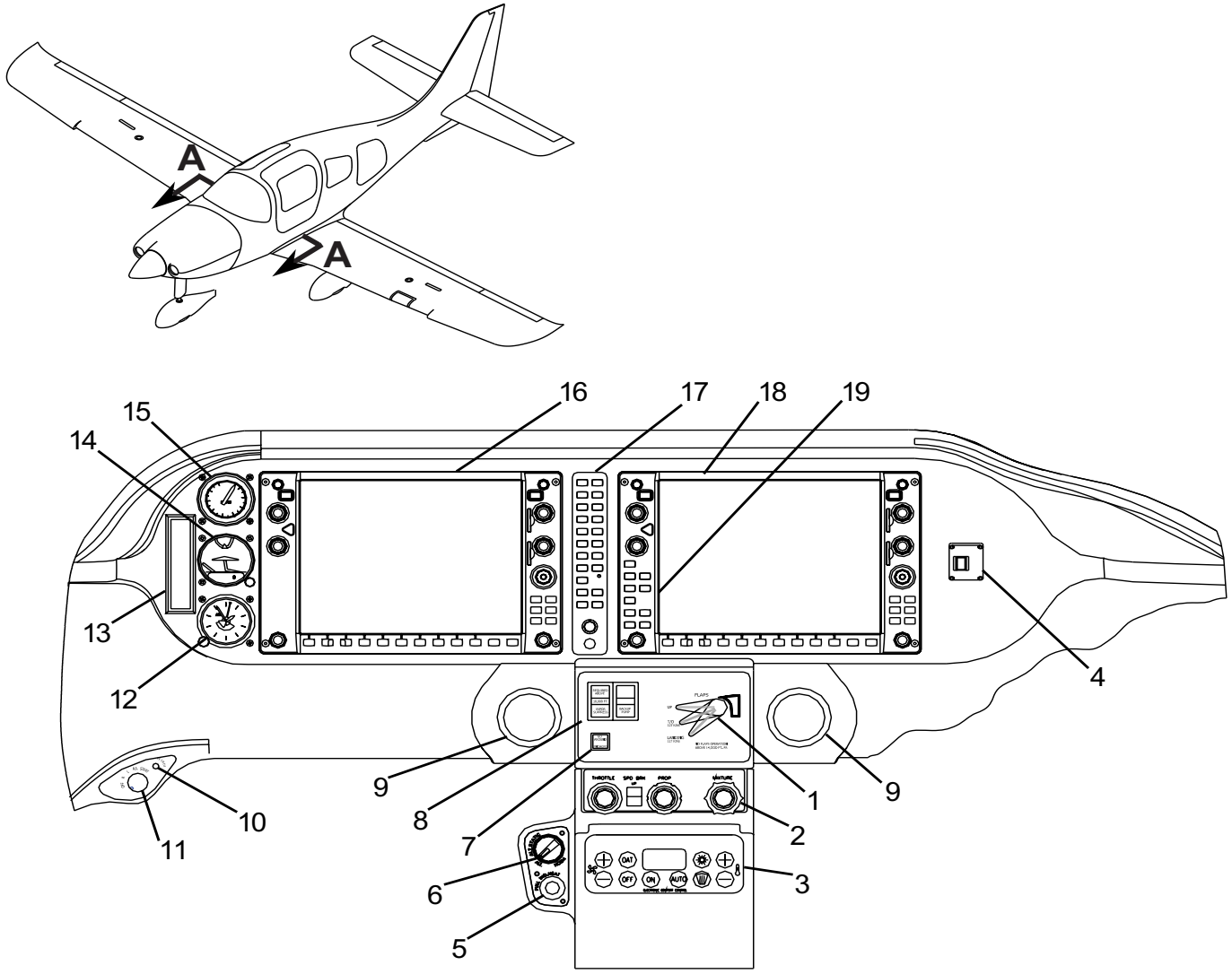
Figure 2 : Sheet 1 : Panel Locations (Avidyne Option)



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Figure 3 : Sheet 1 : Panel Locations (Garmin G1000 Option)

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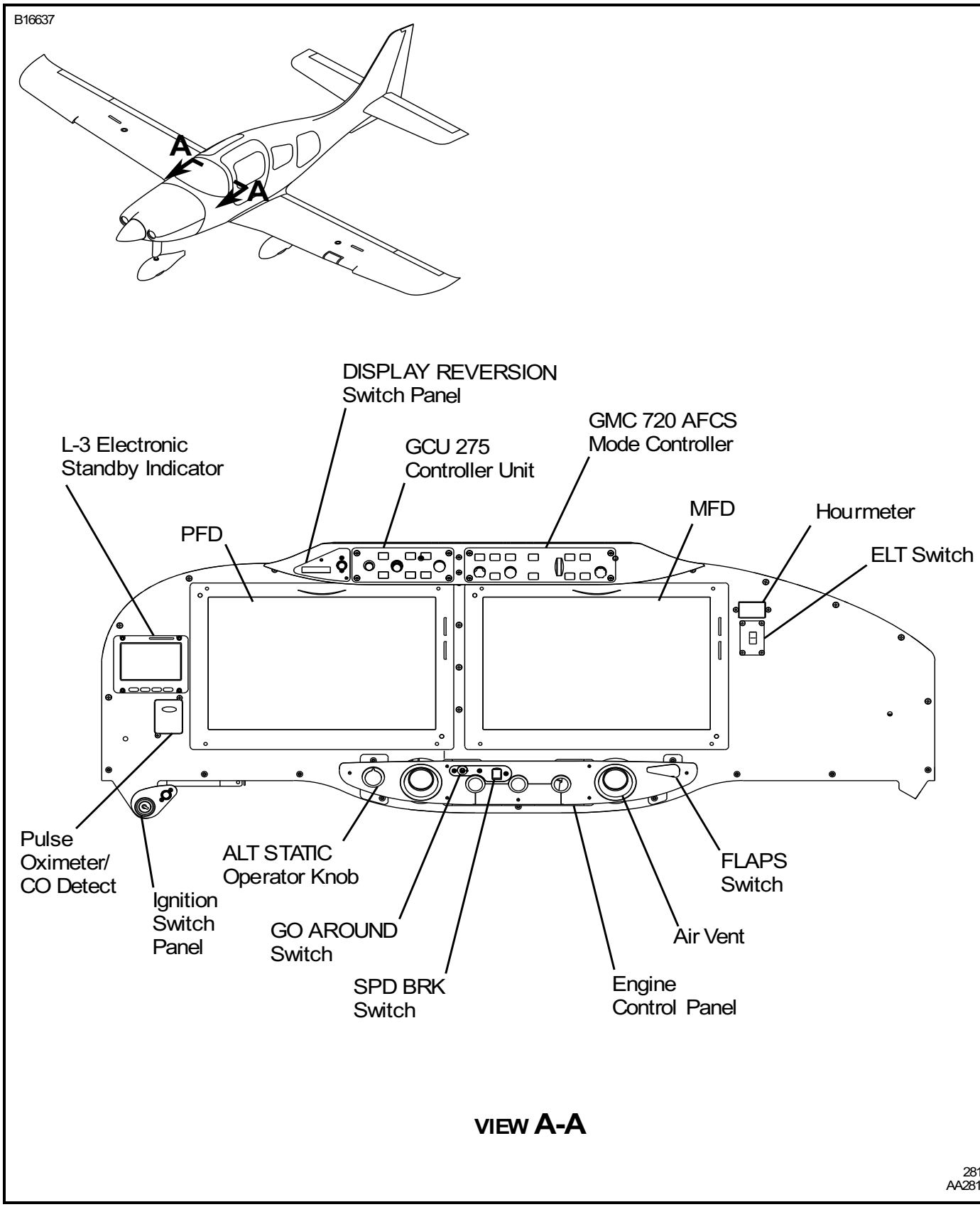


VIEW A-A

1. Flap Panel - Flap Switch and Annunciator
2. Engine Controls
3. Environment Control System (ECS) Panel or Automatic Climate Control System (ACCS) Panel
4. ELT Remote Switch
5. Heated Induction Air
6. Alternate Static Air
7. Go Around Switch
8. Rocker Switches: Backup Boost Pump and Vapor Suppression
9. Air Vents
10. Primer Switch
11. Ignition Switch
12. Altimeter
13. Pitot Heat, Door Seals, and Optional Switches
14. Attitude Indicator
15. Airspeed Indicator
16. Primary Flight Display
17. Audio Panel
18. Multi-Function Display (MFD)
19. Autopilot Controls

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Figure 4 : Sheet 1 : Model T240 Panel Locations



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AIRPLANE SEATS - MAINTENANCE PRACTICES

1. General

A. This section gives the maintenance procedures for the front seats, rear seats and related components.

B. If your airplane has the AMSAFE inflatable restraint system, do not do maintenance on the seats or the seat restraint system unless you first obey all applicable precautions and instructions in the E508804 Supplemental Amsafe Maintenance Manual and this Maintenance Manual. Refer to Inflatable Restraint System - Maintenance Practices.

2. Removal, Installation and Adjustment of the Front Seats (Non-Oregon Aero Seats)

WARNING: If the airplane has AMSAFE inflatable restraints, do not do maintenance on the crew seats, seat rails, seat belts, or shoulder harnesses until you first look at and obey all applicable precautions and instructions supplied in AMSAFE publications and this maintenance manual. If you do not obey these instructions and safety precautions, damage to equipment and harm to personnel can occur.

A. **Removal of the Front Seats** - The front seat cushions and seatbacks are interchangeable, i.e., the cushions or seatbacks are identical on the pilot's and copilot's side. The following procedure is used to remove the front seats. (Refer to Figure 201).

WARNING: If the airplane has AMSAFE inflatable restraints, do not remove seats with the seat belts buckled or the Electronics Module Assembly (EMA) connected. Damage can occur to the system and an accidental deployment of the system can cause injury.

(1) If the airplane has AMSAFE inflatable restraint system installed, disarm the AMSAFE inflatable restraints. Refer to Inflatable Restraint System - Maintenance Practices, AMSAFE Inflatable Restraint Disarm/Arm.

(2) **Cushion** - The front seat bottom cushions are attached to the seat pan with Velcro and are removed by grasping the cushion near its forward base and pulling up on it.

(3) **Seatback** - Removal of the front seatback is accomplished by removing the cotter pin and washer on each side of the seat pan. The clevis pin is captured inside the seat pan and cannot be removed; however, it can be rotated. Use the following steps for removal of the seatback:

(a) Move the seat to the forward position. This is necessary to access the outboard cotter pins.

(b) Remove the left and right cotter pins from their clevises.

(c) Simultaneously, apply an outward pressure (away from the seat pan) on each seatback attachment bracket until the hole in each bracket is free of the clevis.

(d) When each bracket's holes are free from their clevis, gently pull up on the seatback until both brackets are clear of the clevis pins.

NOTE: Once a cotter pin is removed, it must be discarded. Do not reuse a cotter pin on the seat mechanism or on any other part in the airplane.

(4) **Seat Pan** - The seat pan is removed using the following steps.

(a) Slide the seat fully back, and remove the two socket head screws holding the rails to the cabin floor.

(b) Slide the seat fully forward, and remove the two socket head screws by inserting an Allen wrench through each of two small holes in the seat pan.

(5) **Alternate Seatback Removal Technique** - It is also permissible to remove the seatback by first removing the four bolts on the seat pan and then removing the seat assembly from the airplane. When the seatback is attached to the seat pan, it is a bit more awkward to maneuver, and care must be take not to damage the interior. However, access to the outboard cotter pins is facilitated.

CAUTION: When the seat cushions are installed, they limit the forward travel of the seatback. However, with the cushion removed, the seatback will fold forward until its headrest touches the instrument panel or glare shield. When moving the seatback with the seat cushion removed, hold on to the seatback until it is touching the instrument panel. Do not move the seatback past its center of balance and then release it, because this can cause damage to the seat, glare shield, flight instruments, or flight instrument panel. In addition, when the seatback is resting on the instrument panel or glare shield, ensure no additional pressures are applied to the seatback.

(6) **Adjusting the Seatback** - The tilt of the seatbacks can be adjusted fore and aft, depending on the position of two course-threaded 3/8 inch bolts located in the aft portion of the seat pan. The bolts are held in place by two jam nuts. To adjust the seat, use the following procedure:

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WARNING: There is a limitation on the forward tilt of the seat. When adjusting the tilt of the seatback, at least 6 1/2 threads of the course-threaded 3/8 inch bolts must be inserted into the seat pan.

(a) Remove the seat cushion, and move the seatback to the full forward position.

(b) Loosen both jam nuts enough to allow for the anticipated adjustment.

(c) Raise or lower both course-threaded 3/8 inch bolts, depending on whether the seatback is to be adjusted fore or aft. Ensure that the bolts on each side are adjusted an equal number of turns.

(d) At this point the seat cushion can be installed, and the person for whom the adjustment is being made can test the position of the seatback.

(e) When the seatback is in the desired position, tighten the jam nuts against the base of the seat pan and torque 72 to 84 in.-lbs.

B. **Installation of the Front Seats** - Installation of the front seats and their related parts is performed by reversing steps (1) and (4) of the Front Seat Removal procedure above. During the installation process, remember the following points:

(1) The seatback attachment brackets must be temporarily flexed outward (widened slightly) by applying an outward pressure as they are slipped on to the clevis.

(2) There are four washers for each seatback, two for each seatback attachment bracket. The washers should be positioned on each side of the bracket. To make the bracket sandwich, use the following steps.

(a) Insert one washer over each clevis.

(b) Install the seatback.

(c) Install the second washer over each clevis.

(d) Install the cotter pin.

(e) The bolt on the seat pan should be torqued 30 to 36 in.-lbs.

(3) If necessary, arm the AMSAFE inflatable restraints. Refer to Inflatable Restraint System - Maintenance Practices AMSAFE Inflatable Restraint Disarm/Arm.

C. **Seat Slide Rails** - The slide rails, under normal conditions, should last for many years, and the likelihood of replacement is remote. Moreover, access to the removal hardware is difficult and requires significant disassembly. If problems do occur with the slide rails that necessitate removal, contact Cessna Aircraft Company for specific instructions.

3. Removal, Installation and Adjustment of the Front Seats (Oregon Aero Seats)

WARNING: If the airplane has AMSAFE inflatable restraints, do not do maintenance on the crew seats, seat rails, seat belts, or shoulder harnesses until you first look at and obey all applicable precautions and instructions supplied in AMSAFE publications and this maintenance manual. If you do not obey these instructions and safety precautions, damage to equipment and harm to personnel can occur.

A. **Remove the Front Seats** (Refer to Figure 201).

WARNING: If the airplane has AMSAFE inflatable restraints, do not remove seats with the seat belts buckled or the EMA connected. Damage can occur to the system and an accidental deployment of the system can cause injury.

(1) If the airplane has AMSAFE inflatable restraint system installed, disarm the AMSAFE inflatable restraints. Refer to Inflatable Restraint System - Maintenance Practices, AMSAFE Inflatable Restraint Disarm/Arm.

(2) Remove the front seat as follows:

(a) Remove the front seat cushion by grasping the cushion near its forward base and pulling up on it

(b) Remove the bolts from the front of the seat that attach it to the floor nutplates

(c) Move the seat as necessary to get access to the screws that attach the rear of the seat to the floor

(d) Remove the screws from the rear of the seat that attach it to the floor nutplates.

(3) Remove the seat from the airplane.

B. **Installation of the Front Seats** (Refer to Figure 201).

(1) Install the front seats as follows:

(a) Put the seat in it correct position on the floor and forward on the seat rails, to get access to the rear seat nutplates.

(b) Install the screws that attach the rear of the seat to the floor nutplates.

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(c) Move the seat to the rear position on the seat rails to get access to the front bolt nutplates.

(d) Install the bolts that attach the front of the seat to the floor nutplates.

(2) Arm the AMSAFE inflatable restraints. Refer to Inflatable Restraint System - Maintenance Practices AMSAFE Inflatable Restraint Disarm/Arm.

(3) **Adjusting the Seatback** - Pull up on the seatback adjustment lever to move the seatback to the necessary position. When in necessary position, release the adjustment lever to lock the seat back in position.

C. **Seat Slide Rails** - The slide rails, under normal conditions, should last for many years, and the likelihood of replacement is remote. Moreover, access to the removal hardware is difficult and requires significant disassembly. If problems do occur with the slide rails that necessitate removal, contact Cessna Aircraft Company for specific instructions.

4. Removal and Installation of the Rear Seats and Crossbar

NOTE: The installation and removal of the non-Oregon Aero and the Oregon Aero rear seats is identical.

A. **Removal of the Rear Seats and Crossbar** - The rear seat cushions are not interchangeable because of the outboard cutout in each seat. Technically, the rear seatbacks are interchangeable; however, the holes for the quick-release pins may not match perfectly from left to right, and it is recommended that the location of each seatback be tagged before removal. To remove the seats, use the following steps. Refer to Figure 202.

WARNING: If the airplane has AMSAFE inflatable restraints, do not remove seats with the seat belts buckled or the EMA connected. Damage can occur to the system and an accidental deployment of the system can cause injury.

(1) If the airplane has AMSAFE inflatable restraint system installed, disarm the AMSAFE inflatable restraints. Refer to Inflatable restraint System - Maintenance Practices, AMSAFE Inflatable Restraint Disarm/Arm.

(2) The rear seat bottom cushions are attached to the composite seat bench with Velcro and are removed by grasping the cushion near its forward base and pulling up.

(3) Remove the four quick-release pins from the seatbacks.

(4) Pull the seat forward until the seatback pin bracket is clear of the crossbar, and lift the seatback out of the composite sockets in the floor.

(5) To remove the crossbar, remove the two outboard quick-release pins. If the retention clip affixed to the pin bracket becomes dislodged, reinstall it with the smaller hole on the bottom side of the bracket, the open end of the clip facing outboard, and the body of the clip facing inboard.

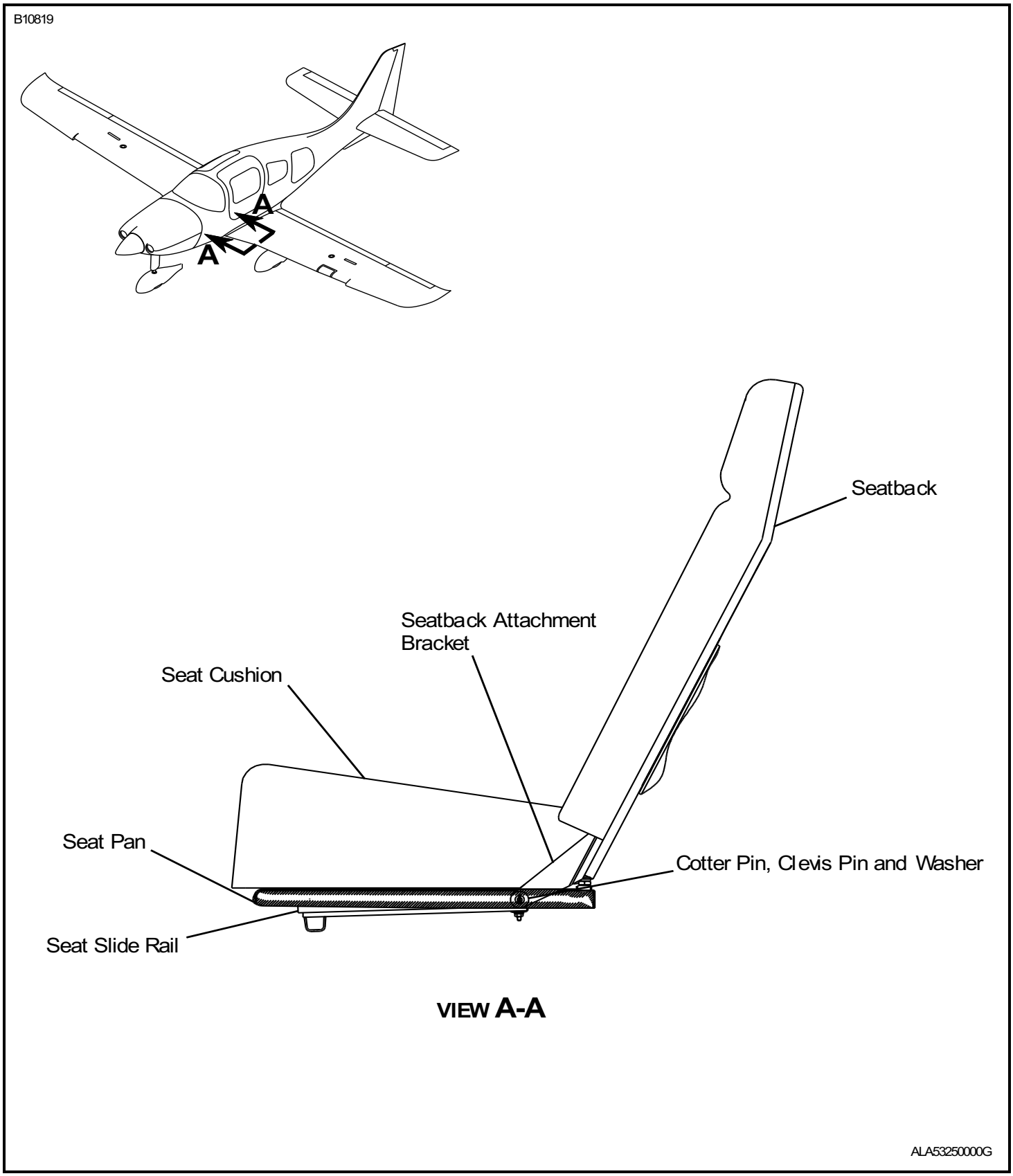
B. **Installation** - Reverse the Rear Seat Removal procedure above for reinstallation of the rear seat seatbacks, cushions, and crossbar.

NOTE: Make sure the flanged bushing is installed from the bottom of the seatback flange.

(1) Arm the AMSAFE inflatable restraints. Refer to Inflatable restraint System - Maintenance Practices, AMSAFE Inflatable Restraint Disarm/Arm.

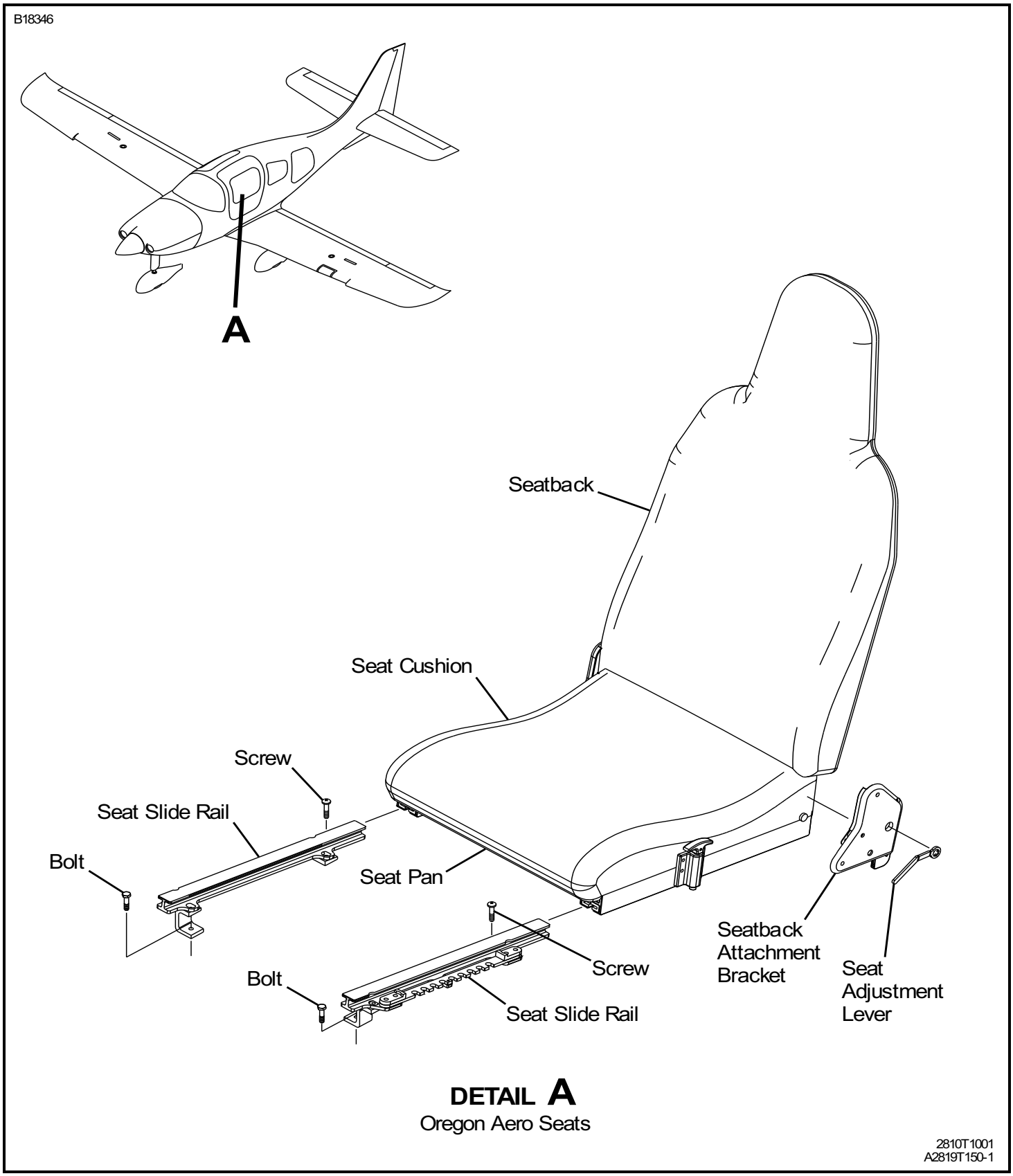
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Figure 201 : Sheet 1 : Front Seat



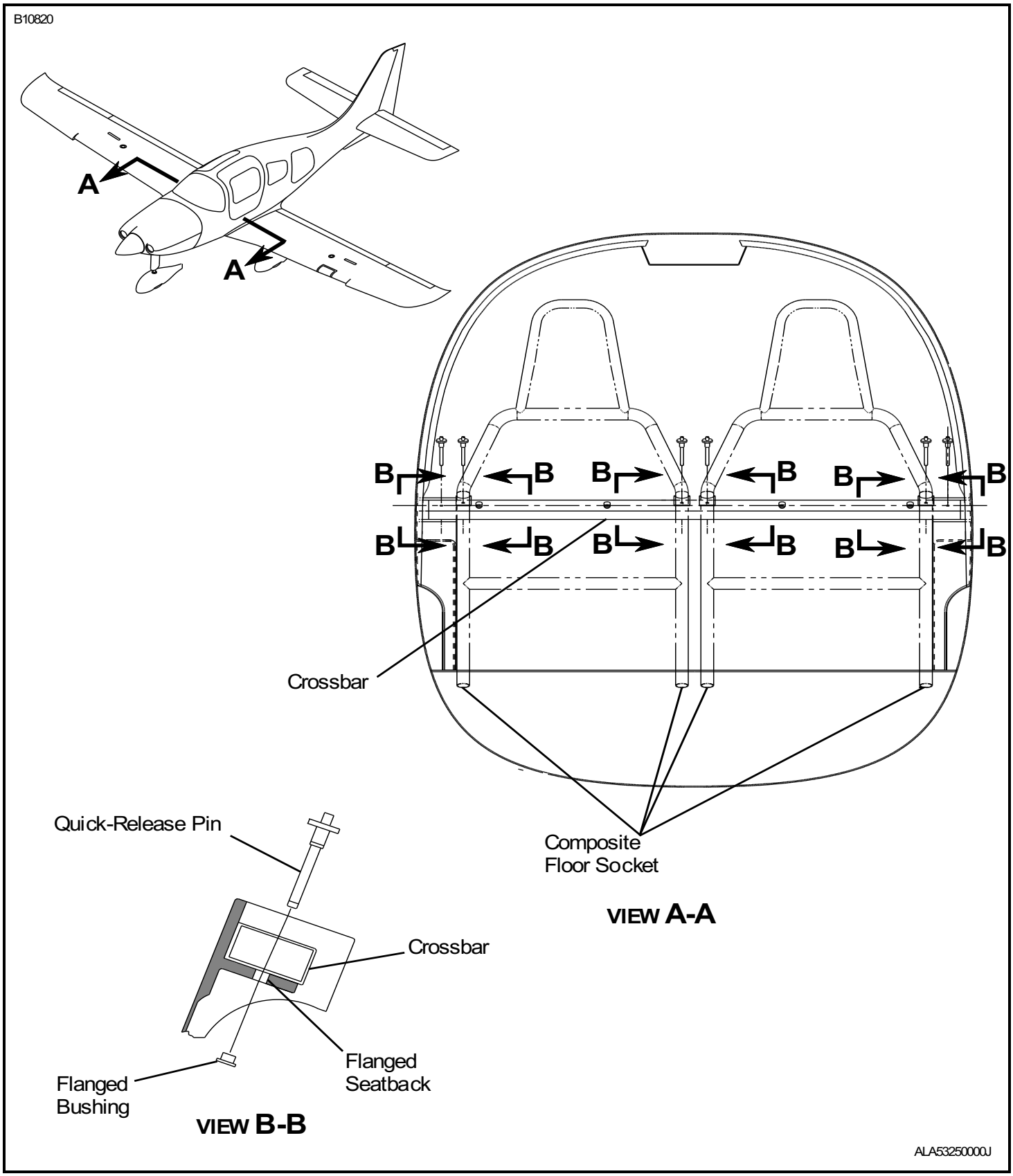
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Figure 201 : Sheet 2 : Front Seat



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Figure 202 : Sheet 1 : Rear Seats



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INSTRUMENT PANELS AND ELECTRICAL PANELS - MAINTENANCE PRACTICES

1. Instrument Panels and Electrical Panels

A. **Flight Items** - This section includes the procedures for the removal and installation of the line replaceable units (LRU's) that follow. Refer to, Equipment Furnishings.

(1) Glare shield and glare shield extension

(2) Engine instrument panel

(3) Flight instrument panel

(4) Left and right knee bolsters

(5) Kidney panel

B. **Electrical Panels** - In addition, removal procedures of related electrical panels LRU's are in this section. These include:

(1) Circuit breaker panel

(2) Master switch panel

(3) Rocker switch panel

(4) Trim panel

(5) ECS Panel

(6) Flap Panel

(7) Oxygen Logic and Display Panel

CAUTION: Use a non-magnetic screwdriver when working on or around the instrument or electrical panels including the glare shield.

C. **Model T240** - For applicable Model T240 instrument panel and electrical panels maintenance procedures, refer to the sections that follow:

(1) Glareshield (T240) - Removal/Installation.

(2) Circuit Breaker Panel (T240/FIKI) - Removal/Installation

(3) Instrument Panel (T240) - Removal/Installation.

(4) Pulse Oximeter/CO Detect (T240) - Maintenance Practices.

2. Glare Shield

A. **Avidyne Option**

(1) **Glare Shield Extension** - The removal of the glare shield extension is accomplished by pulling aft on the curved lip of the extension shield until it stops. Using both hands, simultaneously bend the outer edges down on both sides to clear the stops, and then pull free. Installation is the reverse of the above.

(2) **Glare Shield Removal and Installation** - Use the following steps to remove and install the glare shield.

(a) Remove the three flat head, 8-32 screws and washers from the underside of the panel.

(b) Tilt the glare shield up to gain access to the wiring for light. Disconnect this wiring.

(c) Slide the glare shield aft out of the clips bonded in the defrost channels at the base of the windshield.

(d) Installation is the reverse of the above. Tighten glare shield screws until snug.

B. **Garmin G1000 Option**

(1) **Glare Shield Removal**

(a) Remove the Garmin GDU 1040 PFD and GDU 1042/GDU 1044 MFD per Chapter 34.

(b) Remove the six washer head, 8-32 screws from the underside of the panel.

(c) Tilt the glare shield up to gain access to the wiring for light. Disconnect this wiring.

(d) Slide the glare shield aft out of the clips bonded in the defrost channels at the base of the windshield.

(2) **Glare Shield Installation** - Installation is the reverse of removal. Tighten glare shield screws until snug.

3. Instrument Panel

A. **Removal and Installation of the Instrument Panel (Avidyne Option)** - Removal of the instrument panel is a major task and is not likely to ever be needed as access to areas behind the instrument panel can be gained from removing the

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panels within the instrument panel. The instructions for removal are only for removing the instrument panel when the same panel is to be replaced. If a new instrument panel is required, contact Cessna Aircraft Company for further instructions. The instrument panel and radio rack should be removed and installed as a unit.

(1) Remove or disconnect all instruments in the instrument panel.

(2) Remove the center console, center overhead console, upper and lower forward side panels, and glare shield per instructions in Chapter 25. Disconnect the ventilation tubing to the eyeball vents and main heater control valve per instructions in Chapter 21.

(3) Disconnect the control cables at the throttle quadrant per instructions in Chapter 76.

(4) Remove the hex head bolt, washer, and self-locking nut that attaches the center brace at the top of the instrument panel to the firewall shown in Figure 201 and Figure 202.

(5) Remove the 8-32 pan head bolt and washer from the threaded insert that attaches the left side brace of the instrument panel to the fuselage as shown in Figure 201 and Figure 203.

(6) Remove the 8-32 pan head bolt and washer from the threaded insert that attaches the right side brace of the instrument panel to the fuselage as shown in Figure 201 and Figure 204.

(7) Remove the two 8-32 pan head screws, washers, and nuts attaching the instrument panel to the fuselage mount on both the left and right side. One screw on each side goes through an additional grounding strap and washer. Refer to Figure 205.

(8) Remove the 10, 10-32 hex head bolts and washers attaching the radio rack to the floor, and remove the instrument panel and radio rack from the airplane.

(9) Installation is a direct reversal of removal. Torque fasteners per Section 20-00-00, Torque Data - Maintenance Practices.

B. **Removal and Installation of the Instrument Panel (Garmin G1000 Option)** - Removal of the instrument panel is a major task and is not likely to ever be needed as access to areas behind the instrument panel can be gained by removing the Garmin GDU 1040 PFD, GDU 1042/GDU 1044 MFD, and the LRUs within the instrument panel. The instructions for removal are only for removing the instrument panel when the same panel is to be replaced. If a new instrument panel is required, contact Cessna Aircraft Company for further instructions.

(1) Remove or disconnect all instruments in the instrument panel.

(2) Remove the glare shield, lower instrument panel closeout, left and right instrument panels, and upper and lower forward side panels per instructions in Chapter 25.

(3) Remove the flap panel per instructions in Chapter 25.

(4) Disconnect the ventilation tubing to the eyeball vents per instructions in Chapter 21.

(5) Disconnect the control cables at the throttle quadrant per instructions in Chapter 76.

(6) Remove the four screws and washers at the top of the tower attaching it to the instrument panel. Refer to Figure 206.

(7) Remove the two bolts, washers, and nuts attaching the instrument panel to the fuselage mount on both the left and right side. Refer to Figure 206. One bolt on each side goes through an additional grounding strap and washer.

(8) Installation is a direct reversal of removal. Torque fasteners per Section 20-00-00, Torque Data - Maintenance Practices.

4. Engine Instrument Panel (Avidyne Option)

A. **Removal and Installation of the Engine Instrument Panel** - The engine instrument panel assembly is secured to the instrument panel with six flat head 6-32 screws along the perimeter of the panel. Removal of these screws allows the panel to be tilted forward for access to the instruments. Refer to the appropriate chapter for removal and installation of a specific instrument, control, switch, or light. When installing the engine instrument panel screws, torque 10 to 12 in.-lbs.

5. Flight Instrument Panel (Avidyne Option)

A. **Removal and Installation of the Flight Instrument Panel** - The flight instrument panel is secured to the instrument panel with 14 flat head 6-32 screws along the perimeter of the panel. Removal of these screws allows the panel to be tilted forward for access to the instruments. Refer to the appropriate chapter for removal and installation of a specific instrument, control, switch, or light. When installing the flight instrument panel screws, tighten until the metal panel is tight against the fabric.

6. Left and Right Knee Bolster (Avidyne Option)

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A. **Removal and Installation of the Knee Bolsters** - The knee bolsters are attached to the instrument panel at the top of the bolster by two screws and at the side with either two self-locking nuts and washers or two nuts with integral toothed washer that attach to the studs. Refer to Figure 207. Torque hardware per Section 20-05-00, Torque Data - Maintenance Practices.

7. Kidney Panel (Avidyne Option)

A. **Removal and Installation** - The kidney panel is secured to the instrument panel with four flat head 6-32 screws along the perimeter of the panel. Removal of these screws allows the panel to be tilted forward for access behind it. When installing the kidney panel screws, torque 10 to 12 in.-lbs.

8. Circuit Breaker Panel

A. **Removal and Installation of the Circuit Breaker Panel (Avidyne Option)** - The circuit breaker panel assembly is secured by five pan head 6-32 screws around the perimeter of the panel. Refer to Figure 208. To gain access to these screws, remove the left forward lower side panel first. Refer to Section 25-30-00, Removal of FCOLP. Removal of these screws allows the panel to be rotated out for access to the circuit breakers and wiring. Refer to the appropriate chapter for removal and installation of a specific circuit breaker, switch, or light. When installing the circuit breaker panel screws, torque 12 to 15 in.-lbs.

B. **Removal and Installation of the Circuit Breaker Panel (Garmin G1000 Option)** - The master switch panel faceplate has four threaded 6-32 studs that protrude through mating holes into the backside of the FCOLP. Four self-locking 6-32 nuts with washers (or nuts with integral toothed washer), screw onto these studs to secure the master switch panel to the FCOLP. Remove the FCOLP per Section 25-30-00, Removal of FCOLP. Removal of the nuts with washers allows the master switch panel to slide out for access to the switches. Refer to the appropriate chapter for removal and installation of a specific switch or light.

9. Master Switch Panel

A. **Removal and Installation of the Master Switch** - The master switch panel faceplate has four threaded 6-32 studs that protrude through mating holes into the backside of the instrument panel. Refer to Figure 207. Four self-locking 6-32 nuts with washers (or nuts with integral toothed washer), accessible from the backside of the instrument panel, screw onto these studs to secure the master switch panel to the instrument panel. Removal of the nuts with washers allows the master switch panel to slide out for access to the switches. Refer to the appropriate chapter for removal and installation of a specific switch or light. Removal of the left knee bolster (refer to Knee Bolster Removal and Installation) makes accessing the nuts securing the master switch panel easier. When installing the master switch panel nuts, torque 7 to 10 in-lbs.

10. Rocker Switch Panel (Avidyne Option)

A. **Removal and Installation of the Rocker Switch Panel** - The rocker switch panel faceplate has four threaded 6-32 studs that protrude through mating holes into the backside of the instrument panel. Refer to Figure 209. Four self-locking 6-32 nuts with washers (or nuts with integral toothed washer), accessible from the backside of the instrument panel, screw onto these studs to secure the rocker switch panel to the instrument panel. Removal of the nuts with washers allows the rocker switch panel to slide out for access to the switches. Refer to the appropriate chapter for removal and installation of a specific switch or light. Removal of the left knee bolster (refer to Knee Bolster Removal and Installation) makes accessing the nuts securing the rocker switch panel easier. When installing the rocker switch panel nuts, torque 7 to 10 in.-lbs.

11. Trim Panel (Avidyne Option)

A. **Removal and Installation of the Trim Panel** - The trim panel faceplate has four threaded 6-32 studs that protrude through mating holes into the backside of the instrument panel. Refer to Figure 209. Four self-locking 6-32 nuts with washers (or nuts with integral toothed washer), accessible from the backside of the instrument panel, screw onto these studs to secure the trim panel to the instrument panel. Removal of the nuts with washers allows the trim panel to slide out for access to the trim controls and indicator. Refer to the appropriate chapter for removal, service, and installation of the trim control and indicator. Removal of the left knee bolster (refer to Knee Bolster Removal and Installation) makes accessing the nuts securing the trim panel easier. When installing the trim panel nuts, torque 7 to 10 in.-lbs.

12. ECS Panel

A. **Removal and Installation of the ECS Panel** - Refer to Chapter 21 for removal and installation instructions.

13. Flap Panel

A. **Removal and Installation of the Flap Panel (Avidyne Option)** - The flap panel faceplate has four threaded 6-32 studs that protrude through mating holes into the backside of the instrument panel. Refer to Figure 209. Four self-locking 6-32

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nuts with washers (or nuts with integral toothed washer), accessible from the backside of the instrument panel, screw onto these studs to secure the flap panel to the instrument panel. Removal of the nuts with washers allows the flap panel to slide out for access to the flap controls and indicator. Refer to the appropriate chapter for removal, service, and installation of the flap control and indicator. Removal of the right knee bolster (refer to Knee Bolster Removal and Installation) makes accessing the nuts securing the flap panel easier. When installing the flap panel nuts, torque 7 to 10 in.-lbs.

B. **Removal and Installation of the Flap Panel (Garmin G1000 Option)** - The flap panel faceplate has three 6-32 ball studs that fit into mating ball stud speed clips mounted on the instrument panel. To remove the flap panel firmly grasp the edges of the panel and pull aft. Removal of the flap panel allows access to the flap controls and indicator, backup pump switch, vapor suppression switch, and go around switch. Refer to the appropriate chapter for removal, service, and installation of the flap control and indicator, backup pump switch, vapor suppression switch, and go around switch. Installation of the flap panel is the reverse of removal.

14. Oxygen Logic and Display Panel

A. **Removal and Installation** - Refer to Chapter 35 for removal and installation instructions.

15. Annunciator Panel (Avidyne Option)

A. **Removal and Installation of the Annunciator Panel** - The annunciator panel is secured by two flat head 6-32 screws. Two washers and self-locking nuts, accessible from the backside of the instrument panel, attach onto the screws. To remove the panel, disconnect the electrical connector from the backside of the panel, remove the screws, nuts, and washers, and slide out the panel. Installation is the reverse of removal. Tighten screws snug.

16. Aural Warning System (Avidyne Option)

A. **Removal and Installation of the Acknowledge Switch or Acknowledge/Traffic Switch (with Ryan TCAD)** - The acknowledge switch is located directly below the annunciator panel.

(1) Acknowledge Switch without Ryan TCAD

(a) Remove the Primary Flight Display per instructions in Chapter 34.

(b) Disconnect the two-pin plug at the back of the switch.

(c) Loosen the nut around the switch in front of the flight instrument panel, and remove the nut, washer, and placard. The nut on the rear of the flight instrument panel around the switch does not need to be removed in order to remove the switch.

(d) Remove the switch.

(e) Replace with the new switch, and reassemble in reverse order.

(2) Acknowledge/Traffic Switch with Ryan TCAD

(a) Remove the Avidyne Primary Flight Display per instructions in Chapter 34.

(b) Disconnect the two plugs at the back of the switch.

(c) Pull the press-fit switch out of its housing at the back of the instrument panel.

(d) Remove the switch.

(e) Replace with the new switch, and reassemble in reverse order.

B. **Removal and Installation of the Aural Warning Box** (Refer to Figure 210.)

(1) Remove the center console side panels per instructions in Section 25-12-00.

(2) Remove the four 6-32 pan head screws, then remove the box.

(3) Replace the aural warning box, and reassemble in reverse order. Torque per Section 20-00-00, Torque Data - Maintenance Practices.

C. **Aural Warning Troubleshooting**

(1) No Audio Output

(a) Check that the audio panel and the avionics master switch is turned on.

(b) Check that the speaker is connected and is not defective.

(c) Check that the audio panel circuit breaker is not defective.

(d) Check that the connector on the remote aural warning box is not loose.

(e) Check that the ground for the aural warning box is being activated by the oil pressure switch on the engine.

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(f) Check that the audio adjustment is turned up high enough on the aural warning box.

(2) No Audio Output from One of the Seven Warnings (Except "Door is Open")

(a) Check for a broken wire or a pushed-back pin.

(b) Temporarily ground the input pin for the inoperative channel, and test the aural warning box. You should hear the audio if the oil pressure switch is activated or jumpered.

(3) No Audio Output from the "Door is Open" Warning

(a) If the tachometer is working, check that the wire going to the rear of the tachometer is not broken. Check that the connector does not have a pushed-back pin.

(b) If the tachometer is not working, check the tachometer system. Refer to Section 77-10-00, Tachometer.

(c) Check that the RPM adjustment is within tolerance.

(d) Check for a broken wire or pushed back pin on the aural warning box.

(4) Alarm Will Not Cancel

(a) Check that the acknowledge switch is connected.

(b) The acknowledge switch may be defective.

(c) Check for a broken wire or pushed back pin at the connector.

17. Carbon Monoxide Detector (Optional)

A. The carbon monoxide detector is designed to detect, measure, and provide a visual and audible alert before the level of carbon monoxide (CO) reaches a critical level. The CO detector installation consists of the CO detector, a test/reset button (Avidyne option only), an annunciator panel light (Avidyne option only) and an interface to the aural warning system.

B. **Removal and Installation of the CO Detector Test/Reset Switch** - The test/reset switch is located on the left side of the engine instrument panel.

(1) Remove the engine instrument panel. Refer to Removal and Installation of the Engine Instrument Panel.

(2) Disconnect the two-pin plug at the back of the switch.

(3) Loosen the nut around the switch in front of the flight instrument panel, and remove the nut, and washer. The nut on the rear of the flight instrument panel around the switch does not need to be removed in order to remove the switch.

(4) Remove the switch.

(5) Replace with the new switch, and reassemble in reverse order.

C. **Removal and Installation of the CO Detector** - The carbon monoxide detector is mounted to a bracket affixed to a gusset on the firewall behind the instrument panel. Refer to Figure 211. On some Garmin G1000 aircraft, the CO detector is mounted on a shelf inside the tower.

(1) For the Avidyne option remove the Primary Flight Display per instructions in Chapter 34. For the Garmin G1000 option access the CO detector from under the instrument panel or remove the tower (refer to Tower Removal and Installation), as applicable.

(2) Disconnect the plug at the back of the detector.

(3) Remove the two screws and washers holding the detector to the mounting bracket.

(4) Remove the detector.

(5) Replace the detector, and reassemble in reverse order. Torque per section 20-00-00, Torque Data - Maintenance Practices.

(6) For the Avidyne option reinstall the Primary Flight Display per instructions in Chapter 34.

D. **CO Detector Testing**

(1) **Avidyne Option** - When power is applied to the CO detector, a self-test routine begins. The test checks for functionality of the CO sensor, temperature sensor, and the integrity of the total CO detector system.

WARNING: If the CO detect light in the annunciator panel flashes every four seconds, there is a failure of the CO sensor, temperature sensor or the microcontroller. If the failure condition continues after resetting of the CO detector, the detector must be removed and returned to CO Guardian LLC for repair or replacement. No field repair or service is allowable other than to the wiring harness, test/reset switch, and circuit breaker.

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(2) **Garmin G1000 Option** - Refer to Garmin G1000 Cockpit Reference Guide.

18. Tower

A. The tower is a component of the Garmin G1000 System interior and houses the Fuel Mixture Control Panel, Alternate Static control, and the ECS or ACCS Control Head.

B. **Tower Removal and Installation**

(1) Remove the eight 8-32 screws attaching the tower to the instrument panel and the cabin floor. Refer to Figure 212.

(2) Tilt and slide the tower out from underneath the instrument panel.

(3) Disconnect the ECS or the ACCS Control Head, as applicable, per the instructions in Section 21-65-00, Removal of the Control Head.

(4) Disconnect any hoses.

(5) Remove the tower.

(6) Installation is the reverse of removal.

19. Floor Duct

A. The floor duct is a component of the Garmin G1000 System. It serves as both hot air duct and electrical wiring race.

B. **Removal and Installation of the Floor Duct**

(1) Remove the center console per Section 25-12-00, Center Console.

(2) Remove the tower per the Tower Removal and Installation procedures.

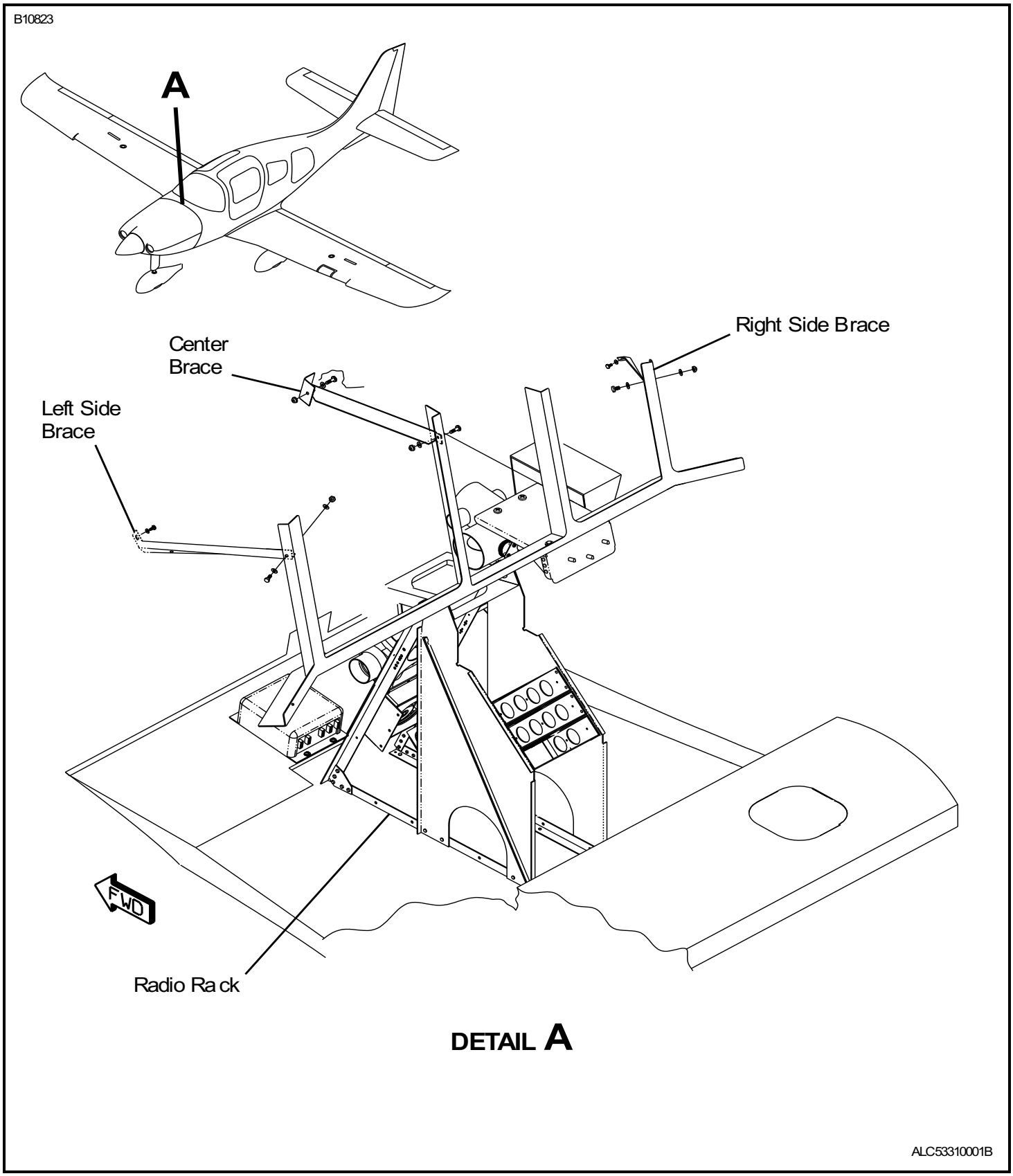
(3) Remove the six bolts and washers attaching the duct to the cabin floor. Refer to Figure 212.

(4) Remove the floor duct.

(5) Installation is the reverse of removal.

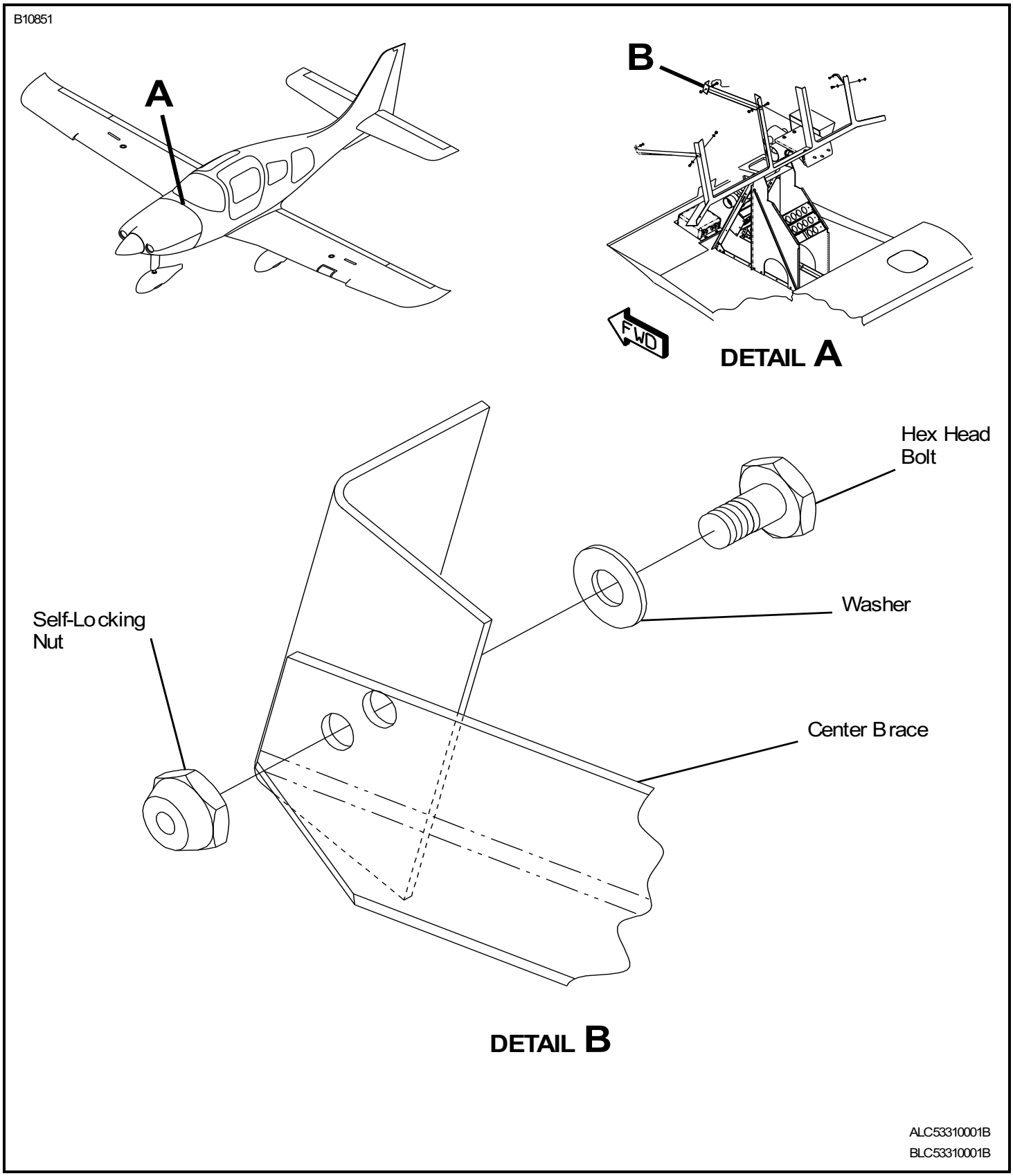
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Figure 201 : Sheet 1 : Instrument Panel Brace Locations



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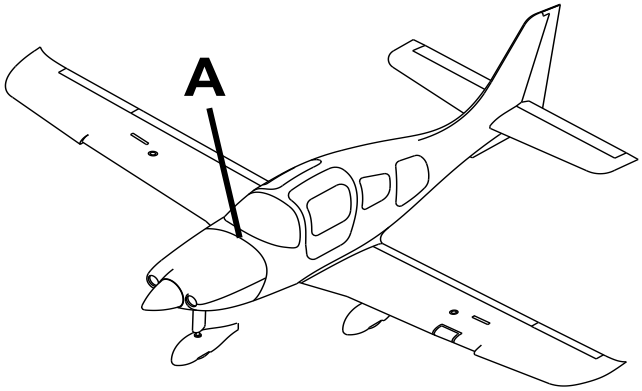
Figure 202 : Sheet 1 : Instrument Panel Center Brace

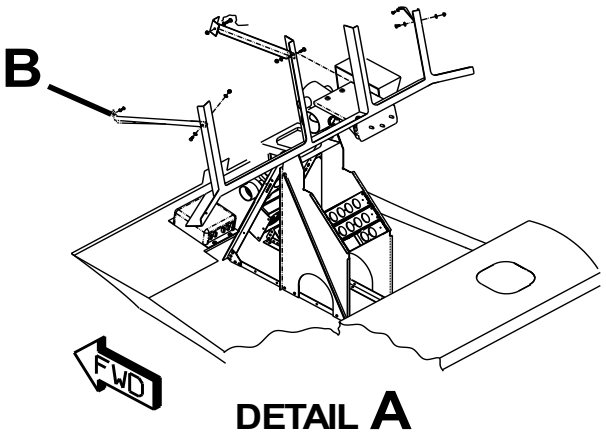


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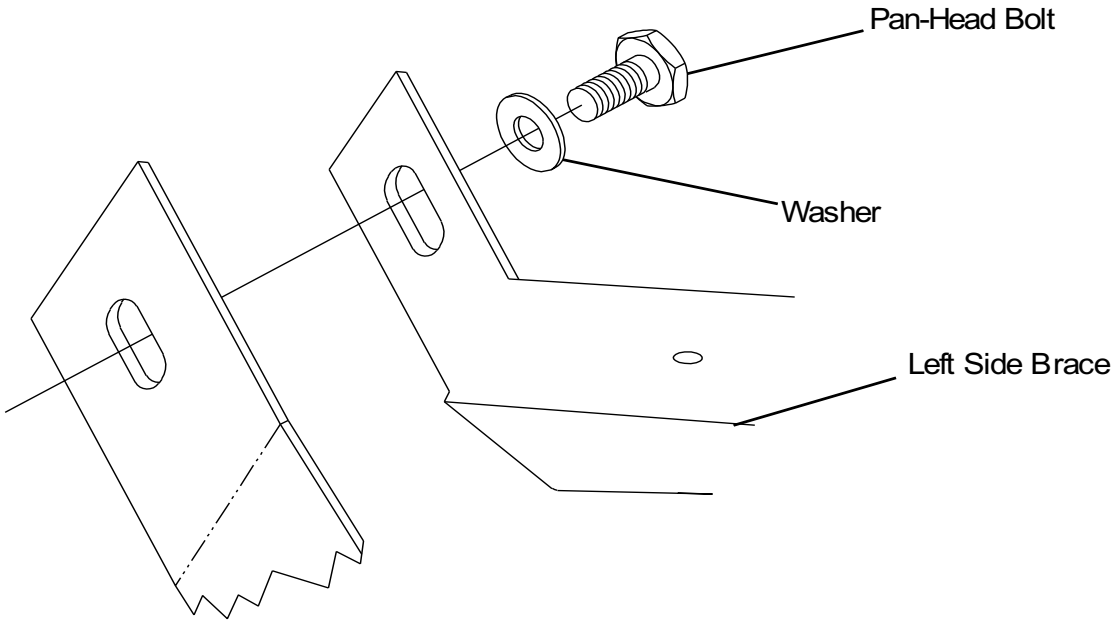
Figure 203 : Sheet 1 : View of Left Side Brace

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DETAIL A

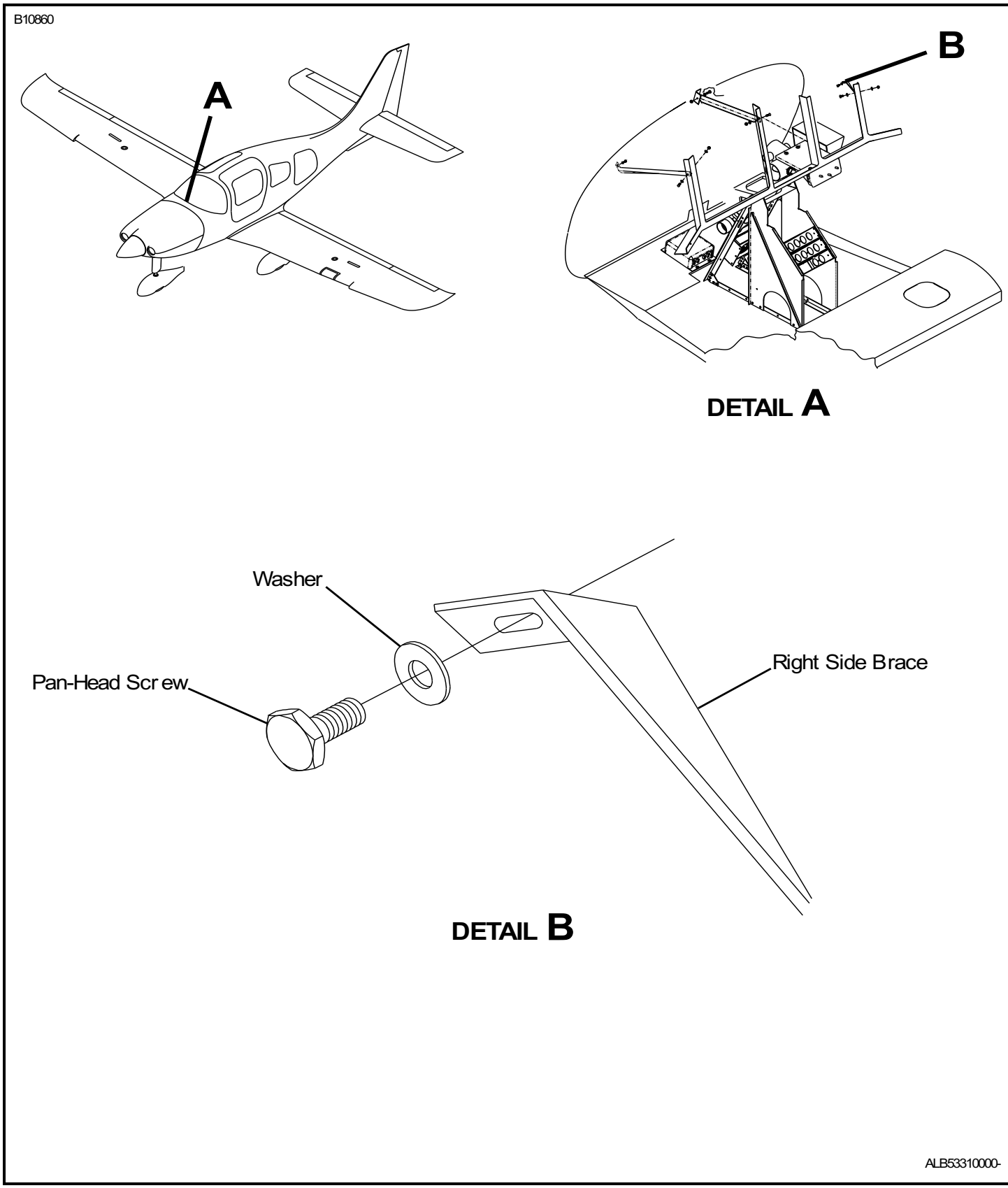


DETAIL B

ALC53310001B
BLC53310001B

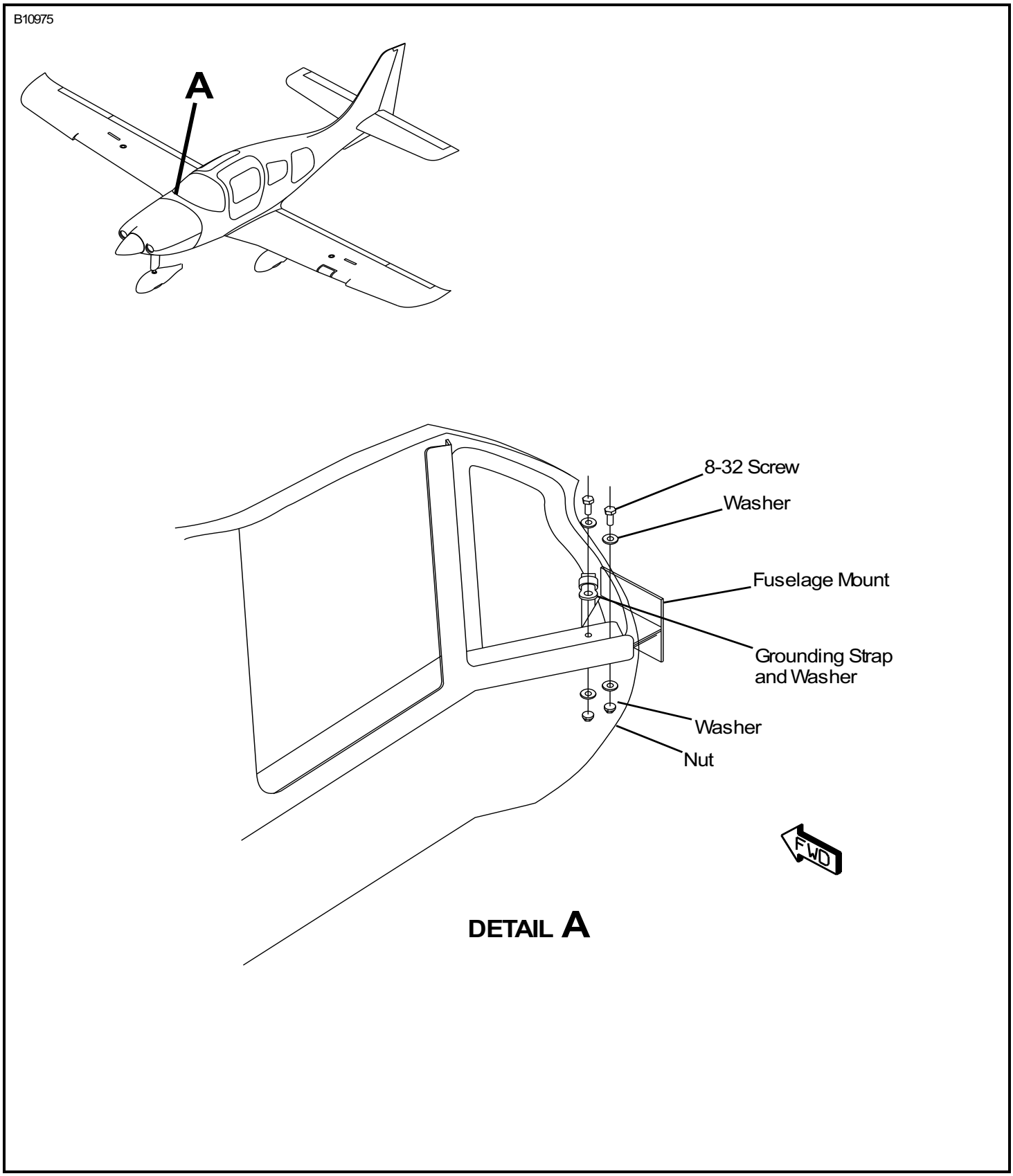
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Figure 204 : Sheet 1 : View of Right Side Brace



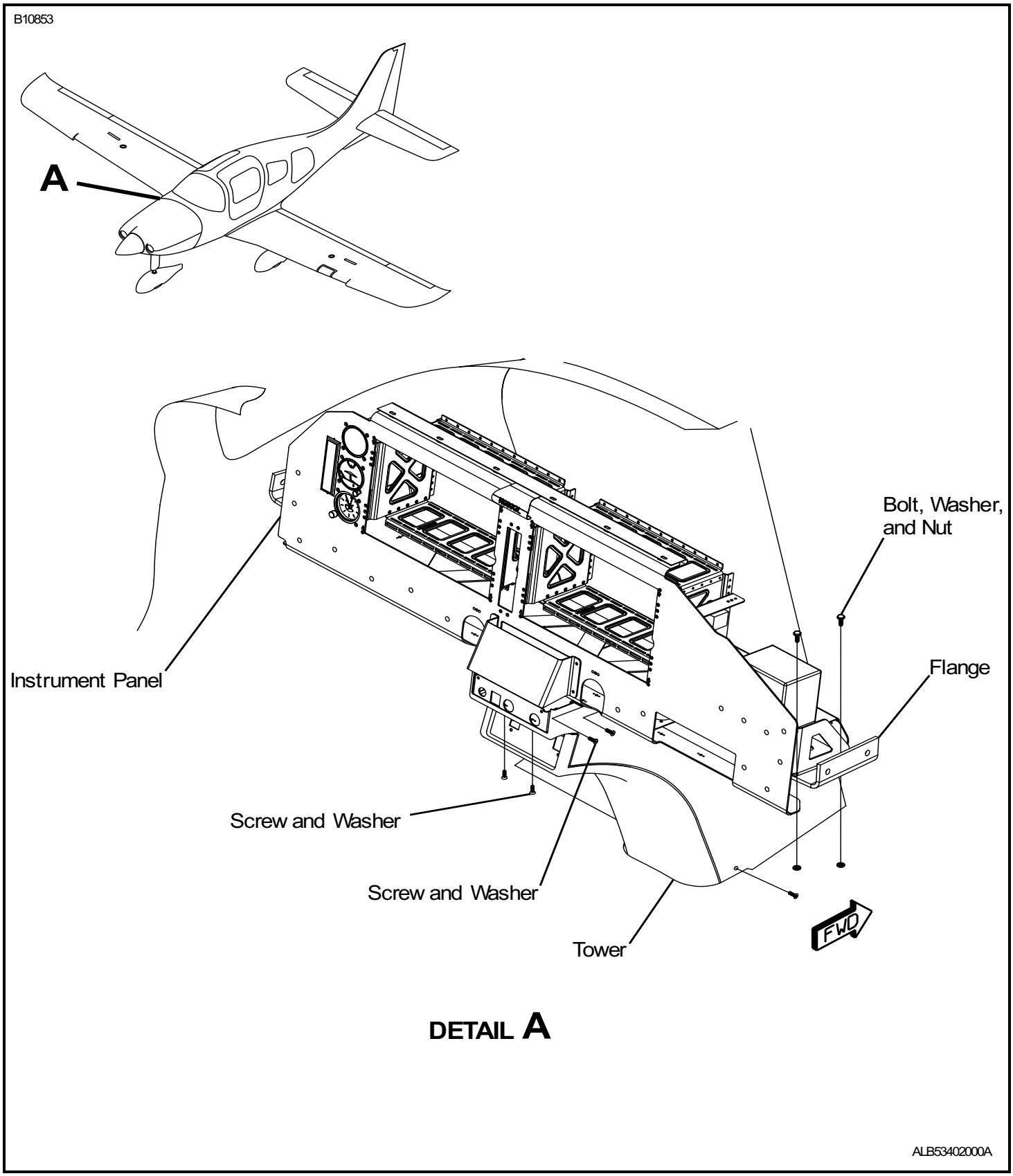
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Figure 205 : Sheet 1 : Instrument Panel Fuselage Mount



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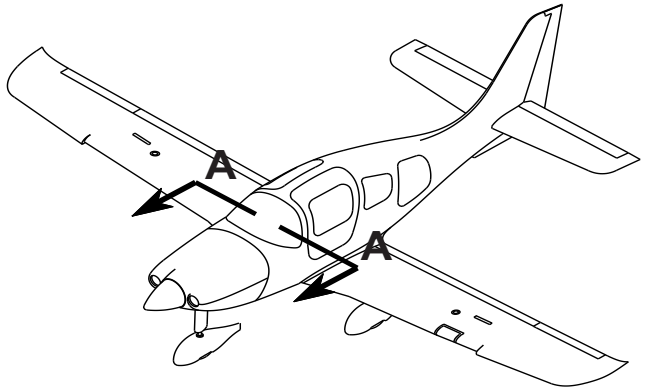
Figure 206 : Sheet 1 : Instrument Panel Fuselage Mount

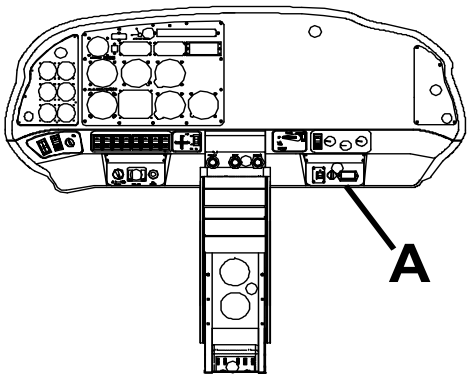


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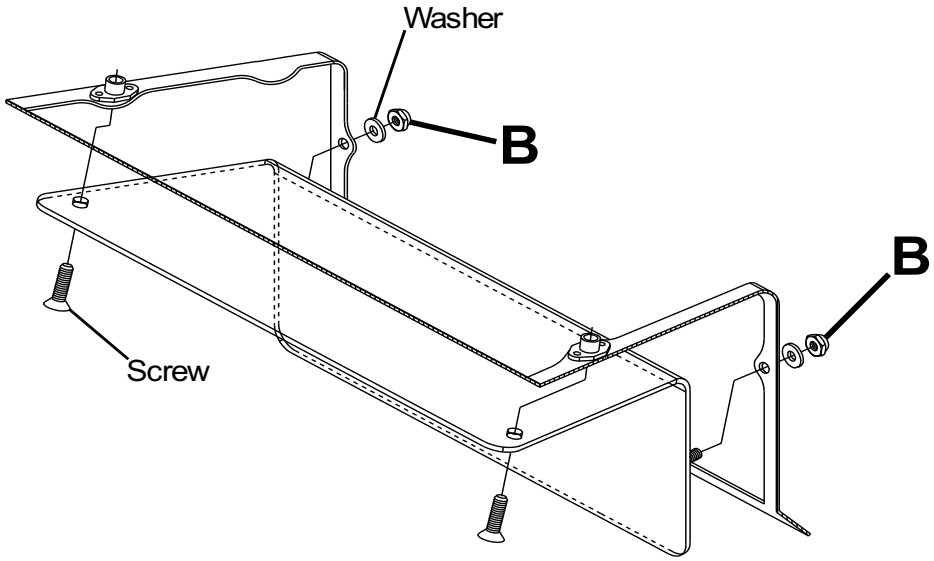
Figure 207 : Sheet 1 : Knee Bolster to Instrument Panel Attachment

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VIEW A-A



DETAIL A



DETAIL B
Option 1

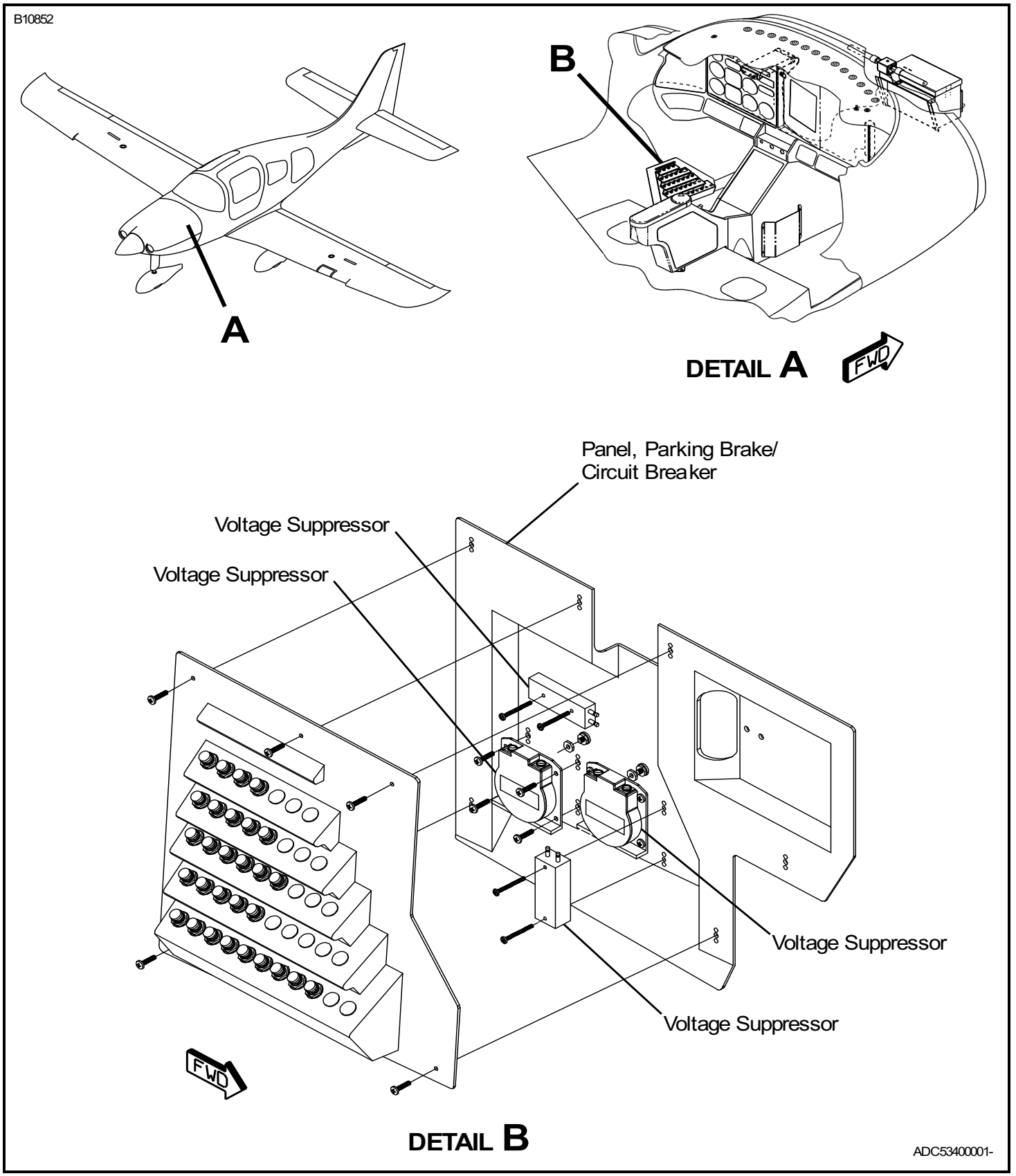


DETAIL B
Option 2

ALA53310000Q1
BLA53313000D4

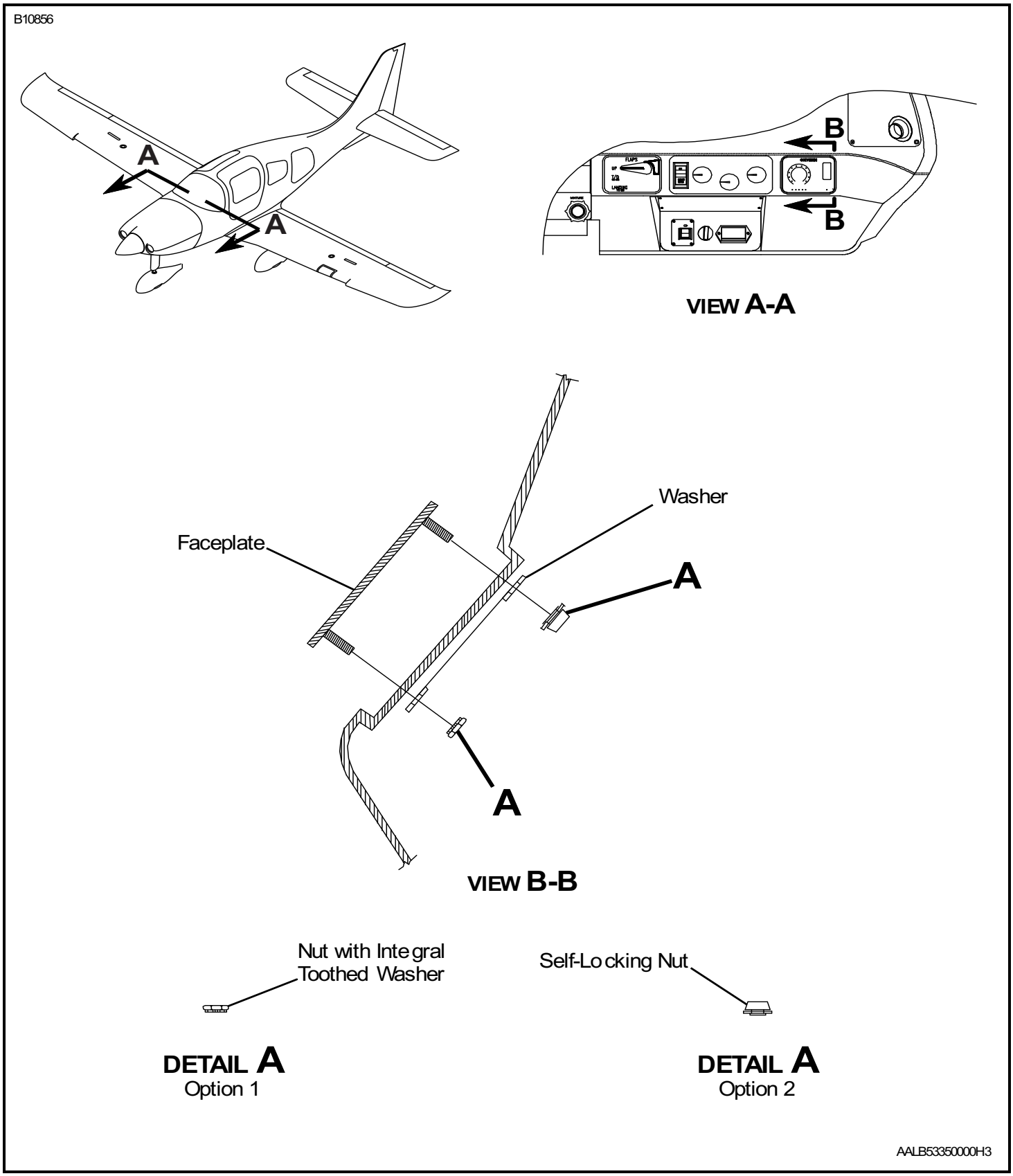
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Figure 208 : Sheet 1 : Circuit Breaker Panel



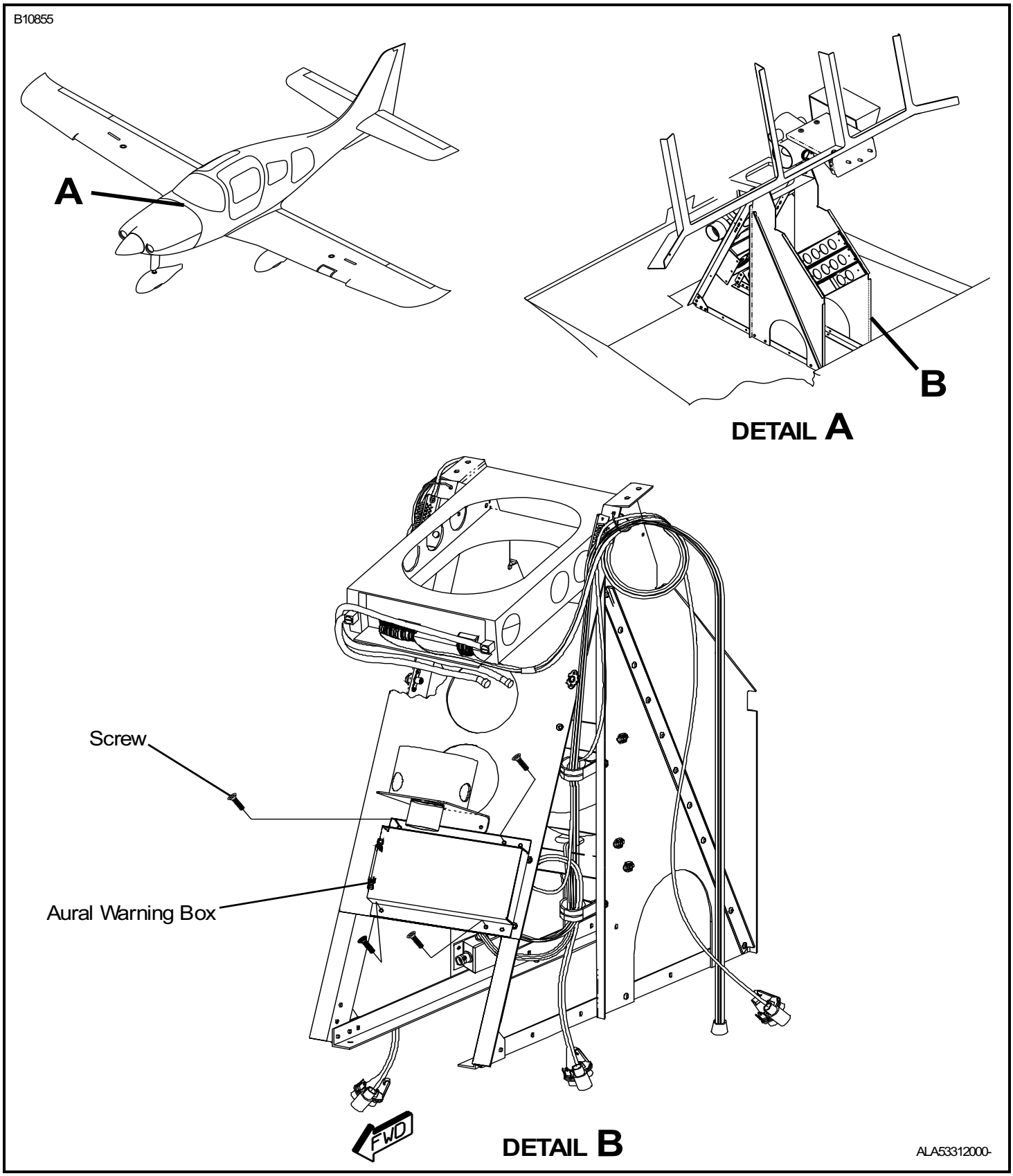
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Figure 209 : Sheet 1 : Panel and Faceplate



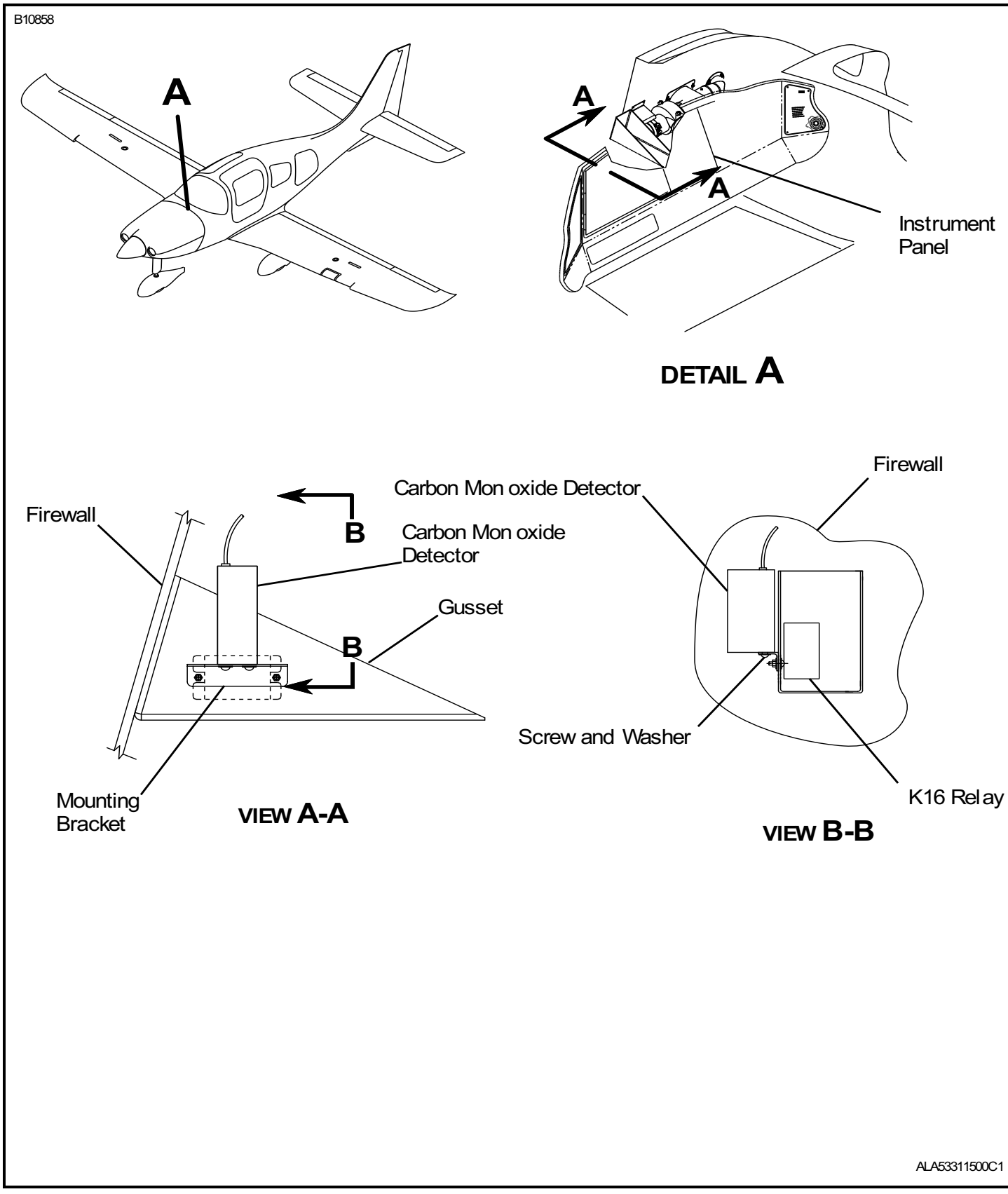
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Figure 210 : Sheet 1 : Aural Warning Installation



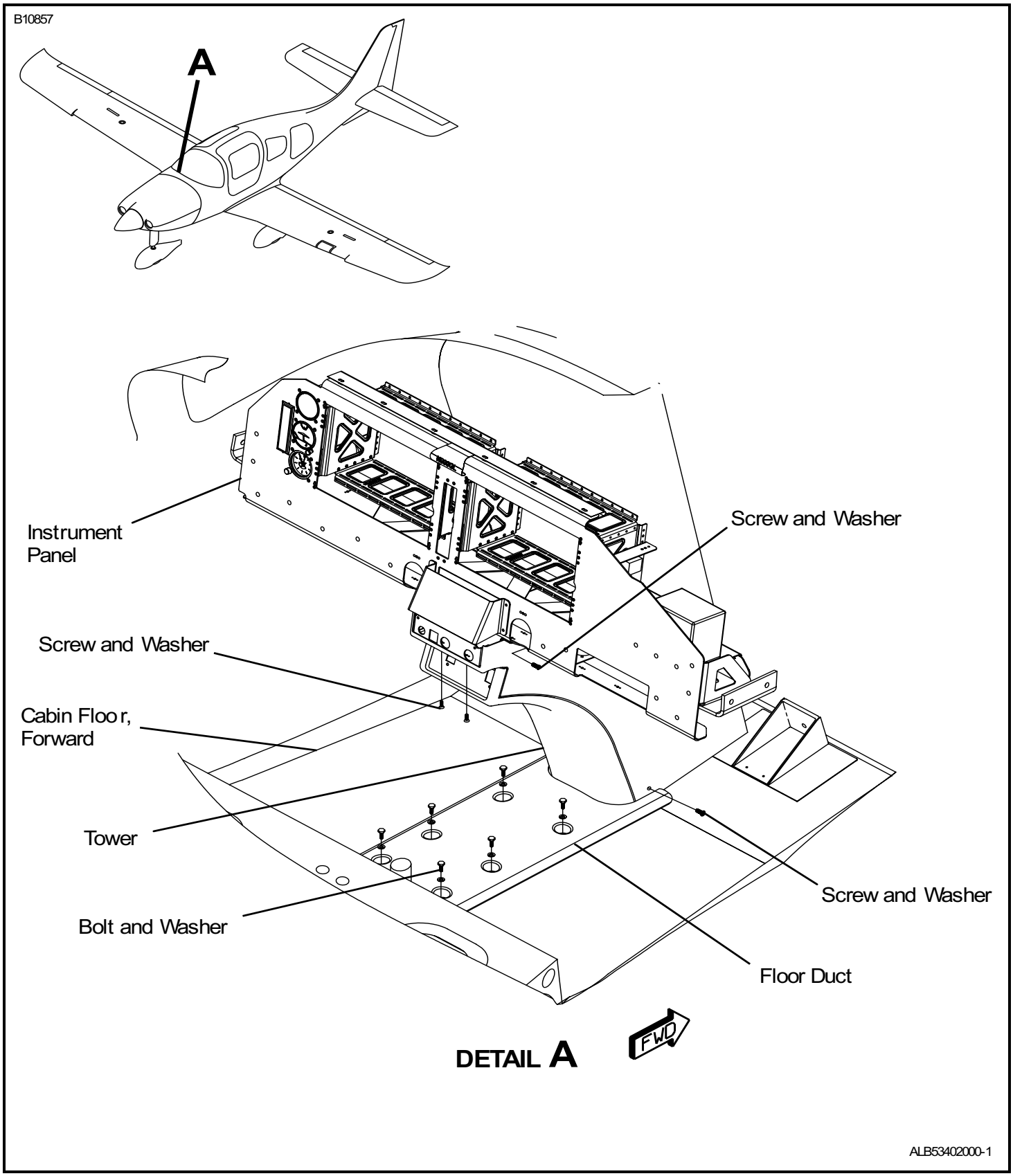
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Figure 211 : Sheet 1 : Carbon Monoxide Detector



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Figure 212 : Sheet 1 : Tower and Floor Duct



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GLARESHIELD (T240) - REMOVAL/INSTALLATION

1. General

A. This section gives the removal and installation procedures for the Model T240 glareshield installation. For a general description of the Glareshield refer to Equipment/Furnishings - General.

B. For the Avidyne and Garmin G1000 options glareshield maintenance procedures, refer to Instrument Panels and Electrical Panels - Maintenance Practices.

2. Tools and Equipment

A. No special tools or equipment are required for this procedure.

3. Glare Shield

A. Remove the Glareshield (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) are in the OFF position.

(3) Disengage the PANEL LIGHTS circuit breaker found on the cockpit circuit breaker panel.

(4) Remove the four screws and washers from the glareshield found above the GCU 275 Controller Unit (UI404) and the GMC 720 AFCS Mode Controller (UI302) on the instrument panel.

(5) Remove the Primary Flight Display (PFD) (UI407) and the Multifunction Display (MFD) (UI406) GDU 1400 displays, refer to Garmin GDU 1400 Displays (G2000) - Removal/Installation.

(6) Get access to the screw and washer behind the instrument panel through the PFD instrument panel location.

CAUTION: Use care when you do work behind the instrument panel so that you do not disturb components, drop tools or hardware that could damage the electrical components.

(7) Remove the two screws and washers behind the instrument panel that secure the glareshield to the airplane structure.

(8) Find the wiring connector for the glareshield light strip behind the instrument panel on the pilot's side.

(a) Disconnect electrical connector P154 from electrical connector J154 for the glareshield light strip (FI004).

CAUTION: Carefully feed the wiring connector harness through the instrument panel when you remove the glareshield so that you do not damage the harness or glareshield light strip.

(9) Slide the glareshield aft out of the clips bonded in the defrost channels at the base of the windshield.

(10) Remove the glareshield from the airplane.

B. Install the Glare Shield (Refer to Figure 401).

(1) Put the glareshield in position above the instrument panel and carefully feed the wire harness for the glareshield light strip through the instrument panel.

(2) Connect electrical connector P154 to electrical connector J154 for the glareshield light strip (FI004).

(3) Push the glareshield forward and make sure that the glareshield is installed in the defrost channel bonded clips.

(4) Install the four screws and washers above the GCU 275 Controller Unit and the GMC 720 AFCS Mode Controller.

CAUTION: Use care when you do work behind the instrument panel so that you do not disturb components, drop tools or hardware that could damage the electrical components.

(5) Install the two screws and washers behind the instrument panel.

(6) Install the PFD and the MFD GDU 1400 displays, refer to Garmin GDU 1400 Displays (G2000) - Removal/Installation.

(7) Engage the PANEL LIGHTS circuit breaker found on the cockpit circuit breaker panel.

(8) Apply external electrical power to the airplane.

(9) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(10) Set the AVIONICS MASTER switch (SW04) to the ON position.

(11) Set the CROSS TIE switch (SW03) to the ON position.

(12) Set the slide FLOOD DIMMER switch (SW18) in the center of the overhead panel to the full ON position.

(a) Make sure that the glareshield flood light comes on.

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(13) Set the master BATT switches (left SW01 and right SW02) to the OFF position.

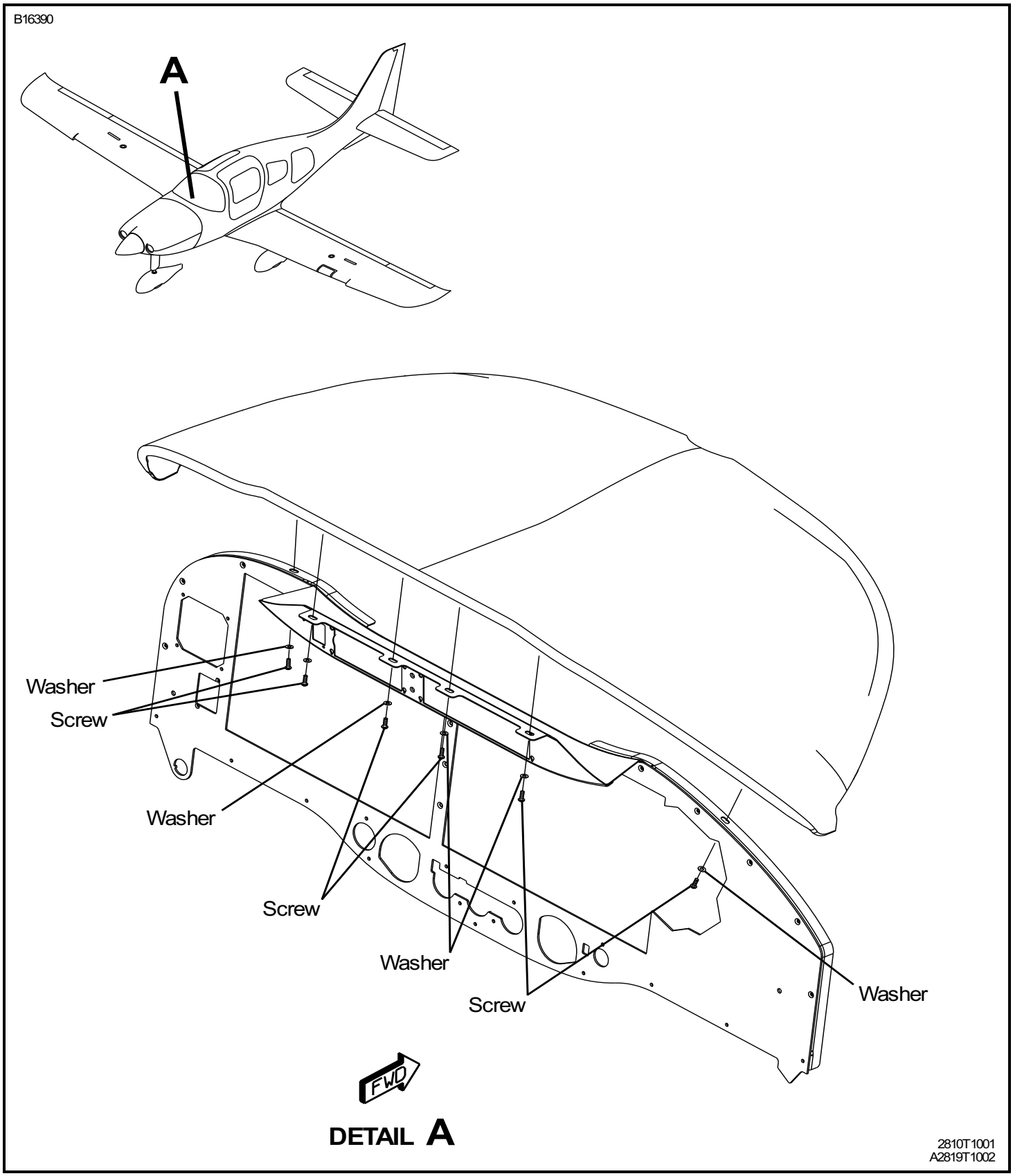
(14) Set the AVIONICS MASTER switch (SW04) to the OFF position.

(15) Set the CROSS TIE switch (SW03) to the OFF position.

(16) Remove external electrical power from the airplane.

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Figure 401 : Sheet 1 : Glareshield Removal/Installation



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CIRCUIT BREAKER PANEL (T240) - MAINTENANCE PRACTICES

1. General

A. This section gives the removal and installation procedures for the Model T240 Circuit Breaker Panel and the current sensors. This circuit breaker panel and the two current sensors are installed on airplanes configured with the FIKI option is available. For a general description of the Circuit Breaker Panel, refer to Equipment/Furnishings - General.

B. The circuit breaker panel is install on the pilot side of the forward outboard side panel. There are two current sensors mounted on the back of the forward area of the circuit breaker panel assembly, the Stall Heat Current Sensor and the Pitot Heat Current Sensor.

2. Tools and Equipment

A. No special tools or equipment are required for this procedure.

3. Circuit Breaker Panel Removal/Installation

A. Remove the Circuit Breaker Panel. For Airplanes 2049 and On refer to Figure 201. For Airplanes 2001 thru 2048 refer to Figure 202.

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are set to the OFF position.

(3) Make sure that the AVIONICS MASTER switch (SW04) is set to the OFF position.

(4) Disconnect the battery electrical terminals. Refer to Chapter 24, Battery - Maintenance Practices.

(5) Remove the left forward lower side panel (FLSPL). Refer to Forward Lower Side Panels, Left (FLSPL) and Right (FLSPR).

(6) Remove the screws that attach the circuit breaker panel to the bracket.

(7) Carefully move the switch panel out from the bracket sufficiently to get access to the panel's electrical connectors.

(a) Disconnect each of the three the electrical connectors (J61, J62, and J63), from the circuit breaker panel.

(8) Remove the circuit breaker panel from the airplane.

B. Install the Circuit Breaker Panel. For Airplanes 2049 and On (Refer to Figure 201). For Airplanes 2001 thru 2048 (Refer to Figure 202).

(1) Visually inspect the electrical connectors to make sure there are no bent or damaged pins.

(a) Repair any damage.

(2) Set the circuit breaker panel near its correct position sufficiently to get access to the airplane wiring bundles.

(a) Connect each of the three the electrical connectors (J61, J62, and J63), to the circuit breaker panel.

(3) Carefully put the circuit breaker panel in its correct position on the bracket.

(4) Install the screws that attach the circuit breaker panel to the bracket.

(5) Install the left forward lower side panel (FLSPL). Refer to Forward Lower Side Panels, Left (FLSPL) and Right (FLSPR).

(6) Connect the battery electrical terminals. Refer to Chapter 24, Battery - Maintenance Practices.

(7) Refer to the applicable chapter/section to make sure the systems and functions the circuit breaker panel supplies electrical power to operate correctly.

4. Circuit Breaker Panel Crossfeed Fuse Removal/Installation

A. Remove the Circuit Breaker Panel Crossfeed Fuse. For Airplanes 2049 and On refer to Figure 201. For Airplanes 2001 thru 2048 refer to Figure 202.

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are set to the OFF position.

(3) Make sure that the AVIONICS MASTER switch (SW04) is set to the OFF position.

(4) Disconnect the battery electrical terminals. Refer to Chapter 24, Battery - Maintenance Practices.

(5) Remove the left forward lower side panel (FLSPL). Refer to Forward Lower Side Panels, Left (FLSPL) and Right (FLSPR).

(6) Remove the screws that attach the circuit breaker panel to the bracket.

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(7) Carefully move the circuit breaker panel out from the bracket sufficiently to get access to the panel's electrical connectors.

(8) Remove the cover from the fuse holder (HC 901 or HC 902).

(9) Remove the fuse (HC 901 or HC 902) from the fuse holder.

B. Install the Circuit Breaker Panel Crossfeed Fuse. For Airplanes 2049 and On refer to Figure 201. For Airplanes 2001 thru 2048 refer to Figure 202.

(1) Install the fuse (HC 901 or HC 902) into the fuse holder.

(2) Install the cover for the fuse holder (HC 901 or HC 902).

(3) Set the circuit breaker panel near its correct position sufficiently to get access to the airplane wiring bundles.

(4) Carefully put the circuit breaker panel in its correct position on the bracket.

(5) Install the screws that attach the circuit breaker panel to the bracket.

(6) Install the left forward lower side panel (FLSPL). Refer to Forward Lower Side Panels, Left (FLSPL) and Right (FLSPR).

(7) Connect the battery electrical terminals. Refer to Chapter 24, Battery - Maintenance Practices.

(8) Refer to the applicable chapter/section to make sure the systems and functions the circuit breaker panel supplies electrical power to operate correctly.

5. Current Sensor Removal and Installation (FIKI Option)

NOTE: The removal and installation of each of the two current sensors is identical. The two current sensors are the Stall Heat (KC301) and the Pitot Heat (KC300).

A. Remove the Current Sensor (Refer to Figure 201).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are set to the OFF position.

(3) Make sure that the AVIONICS MASTER switch (SW04) is set to the OFF position.

(4) Disconnect the battery electrical terminals. Refer to Chapter 24, Battery - Maintenance Practices.

(5) Remove the left forward lower side panel (FLSPL). Refer to Forward Lower Side Panels, Left (FLSPL) and Right (FLSPR).

(6) Remove the screws that attach the circuit breaker panel to the bracket.

(7) Carefully tilt the circuit breaker inboard to get access to the current sensors.

(a) If necessary to get access to the current sensors, remove the circuit breaker panel from the airplane. Refer to Circuit Breaker Panel Removal/Installation in this section.

(8) Identify and remove the wires from the current sensor terminal block.

(9) Remove the screws, washers and nuts that attach the current sensor to the circuit breaker panel assembly.

(a) Remove the current sensor from the circuit breaker panel assembly.

B. Install the current sensor.

(1) Put the current sensor in its correct position on the circuit breaker panel assembly.

(2) Install the screws, washers and nuts that attach the current sensor to the circuit breaker panel assembly.

(3) Identify and connect the wires to the current sensor terminal block.

(4) If necessary, install the circuit breaker panel in the airplane. Refer to Circuit Breaker Panel Removal/Installation in this section.

(5) If the circuit breaker panel was not removed, carefully put it in its correct position on the bracket.

(6) Install the screws that attach the circuit breaker panel to the bracket.

(7) Install the left forward lower side panel (FLSPL). Refer to Forward Lower Side Panels, Left (FLSPL) and Right (FLSPR).

(8) Connect the battery electrical terminals. Refer to Chapter 24, Battery - Maintenance Practices.

(9) Do the test of the applicable system that follows:

(a) Do a check of the Stall Warning System. Refer to Chapter 34, Stall Warning System (Airplanes 2049 and On) -

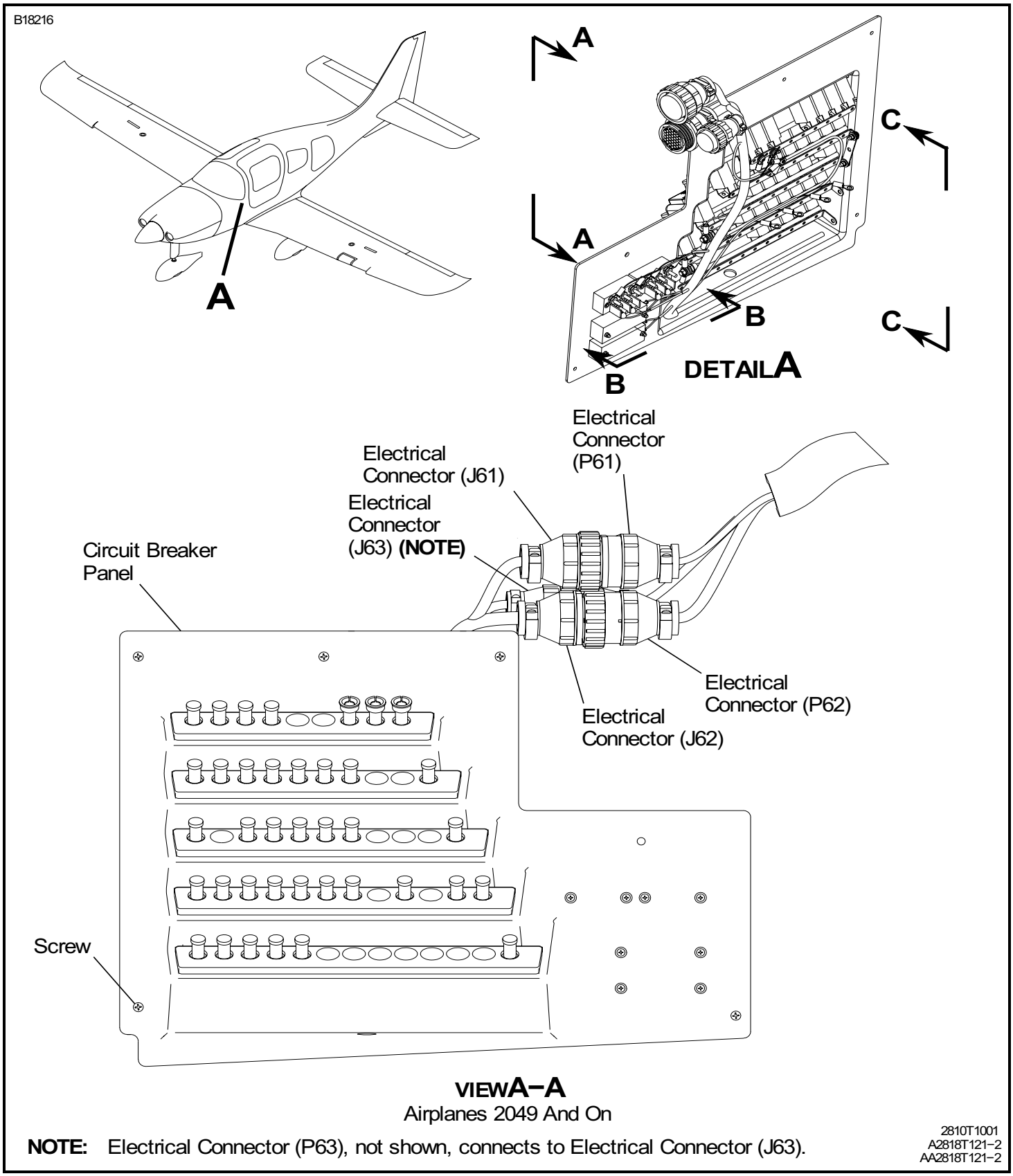
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Adjustment/Test.

(b) Do a check of the pitot heat . Refer to Chapter 34 Pitot-Static System (T240) - Adjustment/Test, Do the Pitot Heat Test.

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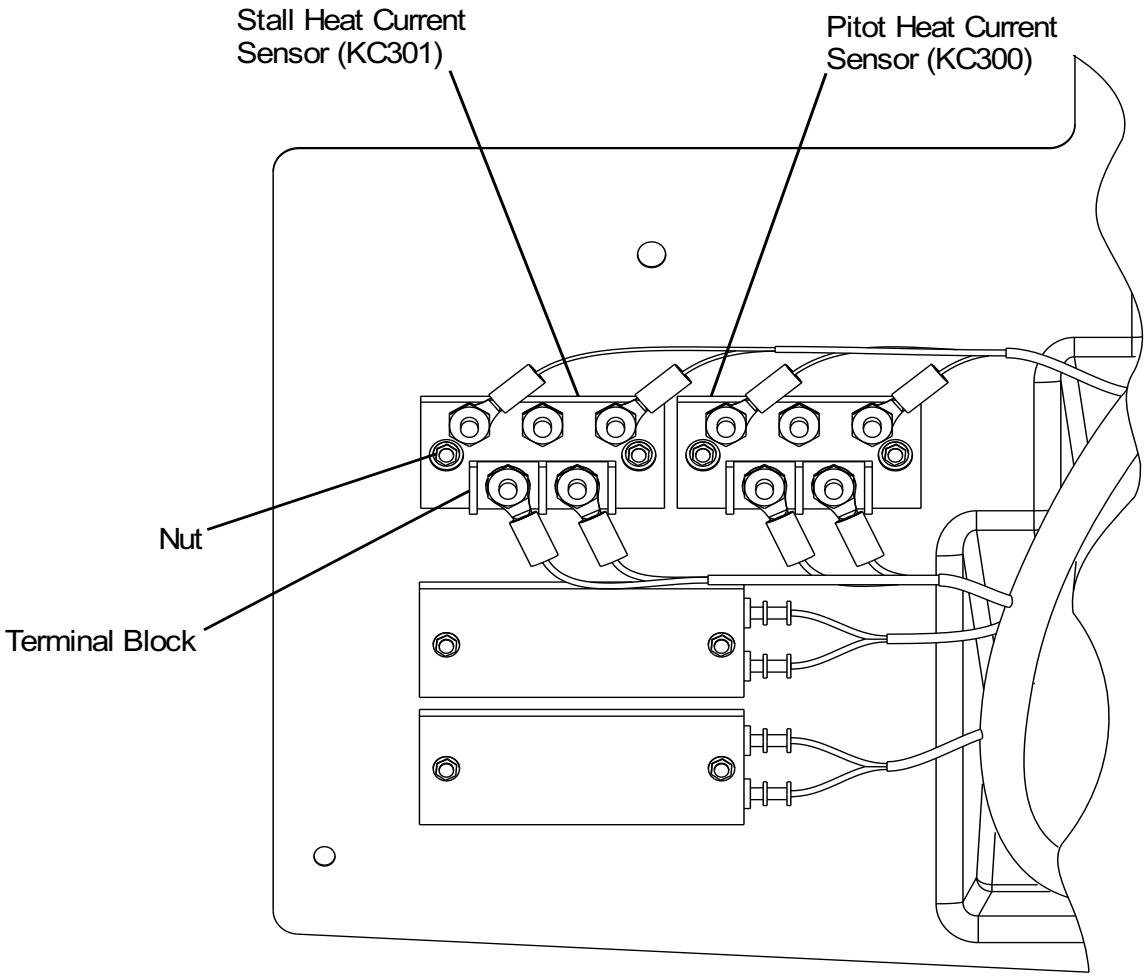
Figure 201 : Sheet 1 : Circuit Breaker Panel Installation (Airplanes 2049 and On)



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Figure 201 : Sheet 2 : Circuit Breaker Panel Installation (Airplanes 2049 and On)

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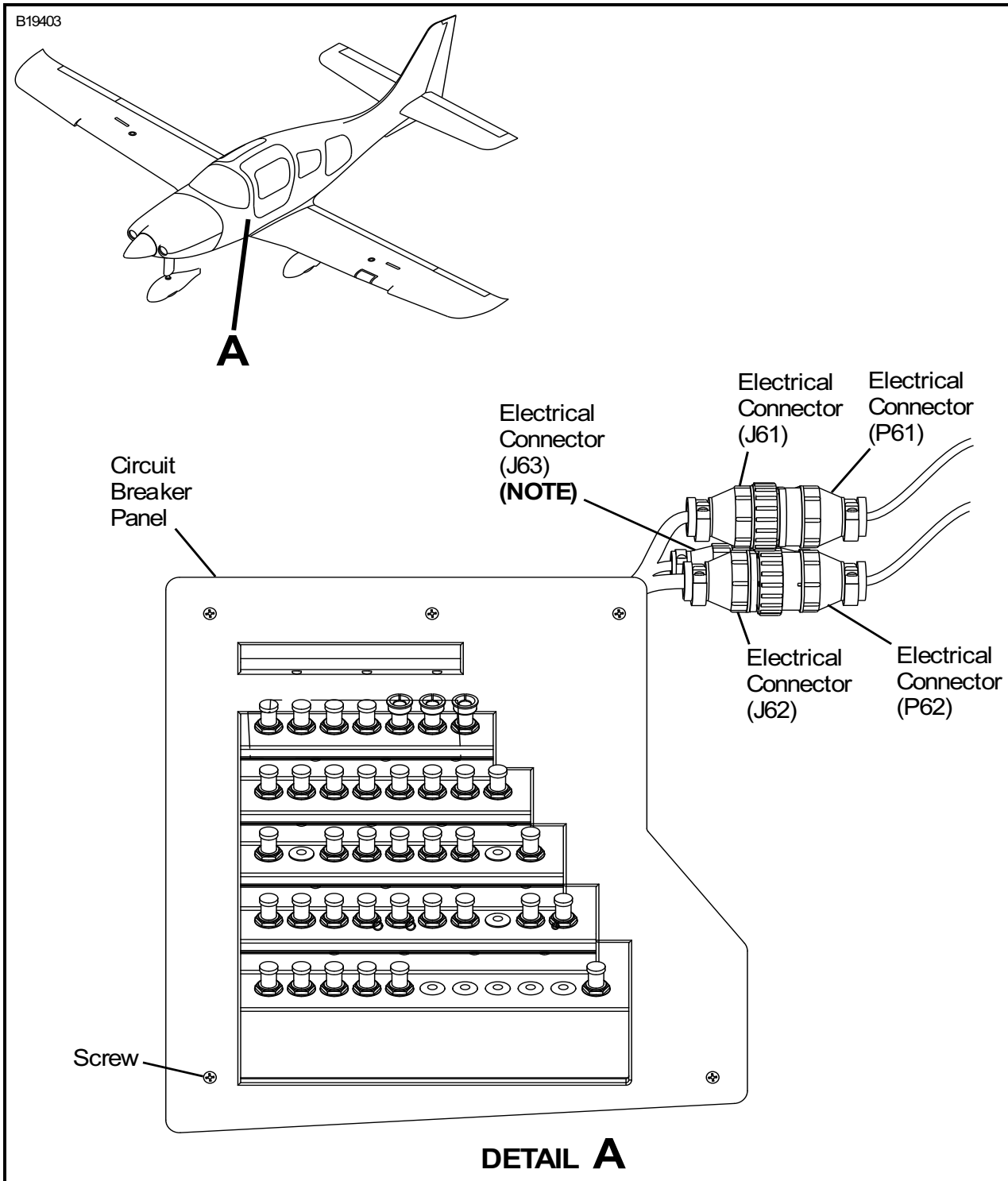


VIEW B-B
Airplanes 2049 And On

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Figure 202 : Sheet 1 : Circuit Breaker Panel Installation (Airplanes 2001 thru 2048)

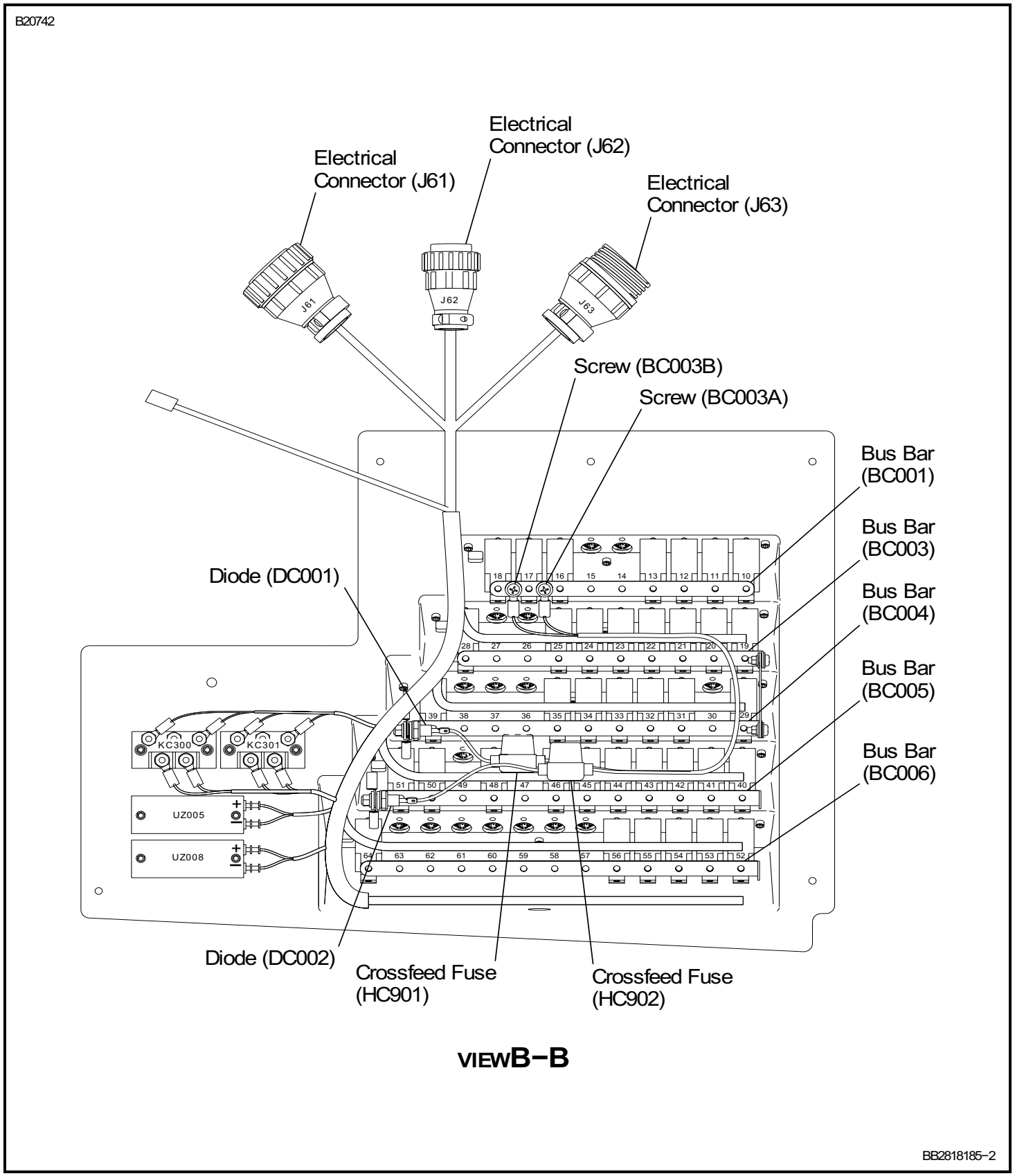


NOTE: Electrical Connector (P63), not sh own, connects to Electrical Connector (J63) .

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Figure 202 : Sheet 2 : Circuit Breaker Panel Installation (Airplanes 2001 thru 2048)



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CENTER CONSOLE - MAINTENANCE PRACTICES

1. General

A. This section gives the maintenance procedures for the center console installations that follow:

(1) The Avidyne Option installation

(2) The Garmin G1000 Option

B. For the Model T240 center console maintenance procedures, refer to Center Console (T240) - Removal/installation.

2. Center Console

A. Avidyne Option

(1) **Removal and Installation of the Center Console** - The center console does not normally have to be removed. An access panel on the right side below the fuel selector is provided for routine inspection and maintenance. In addition, the left and right panels in the footwell may be removed independently of the rest of the console. Refer to Figure 201.

(a) **Armrest Assembly** - The armrest assembly, including pencil box, is attached to the center console with one truss head screw. This screw is visible after the cushion in the bottom of the pencil box is removed. An optional stereo audio input jack may be installed within the pencil box and must be disconnected before removal of the armrest or the console. The armrest assembly does not have to be removed to remove the center console.

(b) **Drink Holder** - The drink holder is located on the aft end of the center console, flush with the top of the console and below the armrest. It is attached with four AAP43 rivets. The rivets may be accessed once the armrest assembly has been removed. The drink holder does not have to be removed to remove the center console. Should the drink holder need to be replaced, carefully drill out the four attachment rivets to remove the drink holder. Obtain a new drink holder, part number 588220-1, from the manufacturer and reinstall with four new rivets of the same type and size. Take care when drilling out rivets so as not to enlarge holes. Refer to Figure 202.

(c) **Left Side Panel** - The left side panel is attached to the center console by two flat head screws and washers. The panel is attached to the floor with a flat head screw and washer through a bracket and J-nut near the firewall. Removing the screws allows the panel to be removed. Removal of the left knee bolster may be necessary for added clearance to remove the left side panel on the center console.

(d) **Right Forward and Aft Side Panel** - The right forward and aft side panels are attached to the center console by two flat-head screws and washers, and a velcro strip. The panels are attached to the floor with a flat-head screw and washer through a bracket and J-nut near the firewall. Removing the screws allows the panels to be removed. Removal of the right knee bolster may be necessary for added clearance to remove the right side panel on the center console.

(e) **Access Panel** - The access panel is secured with Velcro and can be removed by lifting at one corner and continuing to lift around the panel. Removal of the right seat cushion (refer to Section 25-10-00, Removal, Installation, and Adjustment of the Front Seats) allows better visibility of the access panel and the inside of the center console.

(f) **Heater Ventilation Tubing** - The heater ventilation can be removed by clipping the tie wraps that hold the tubing to the eyeball vent and sliding the tubing off the eyeball vent. Since the tie wrap is cut (destroyed) during removal, a new tie wrap must be used when reassembling the heater ventilation tubing.

(g) **Fuel Selector** - Refer to Chapter 28.

(h) **Fuel Selector Knob** - Refer to Chapter 28.

(i) **Console** - After completing steps (c) through (h) above, use the following steps to remove the console. Refer to Figure 201.

1 Remove the two flat head 10-32 screws located at the aft of the center console under the carpet on each side.

2 Disconnect the headphone/intercom jacks, microphone plugs, and optional stereo audio input jack (if present). Refer to Chapter 23.

3 Take precaution to ensure that the splined rod connecting the fuel tank selector to the fuel selector knob is protected from damage. This is especially important if the center console is to be removed without removing the fuel tank selector.

(2) **Assembly and Installation of the Center Console** - To assemble and install the center console, reverse the above

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procedure.

B. **Garmin G1000 Option**

(1) **Removal and Installation of the Center Console** - The center console does not normally have to be removed. An access panel on the right side below the fuel selector is provided for routine inspection and maintenance. Refer to Figure 203.

(a) **Armrest Assembly** - The armrest assembly, including pencil box, is attached to the center console with one screw. The armrest assembly does not have to be removed to remove the center console.

(b) **Access Panel** - The access panel is secured with Velcro and can be removed by lifting at one corner and continuing to lift around the panel. Removal of the right seat cushion (refer to Section 25-10-00, Removal, Installation, and Adjustment of the Front Seats) allows better visibility of the access panel and the inside of the center console.

(c) **Heater Ventilation Tubing** - The heater ventilation can be removed by clipping the tie wraps that hold the tubing to the eyeball vent and sliding the tubing off the eyeball vent. Since the tie wrap is cut (destroyed) during removal, a new tie wrap must be used when reassembling the heater ventilation tubing.

(d) **Fuel Tank Selector** - Refer to Chapter 28.

(e) **Fuel Selector Knob** - Refer to Chapter 28.

(f) **Console Wiring** - Disconnect the wiring harness connectors P603 and P604. Refer to Figure 204.

(g) **Console** - After completing the previous five steps above, use the following steps to remove the console (refer to Figure 203):

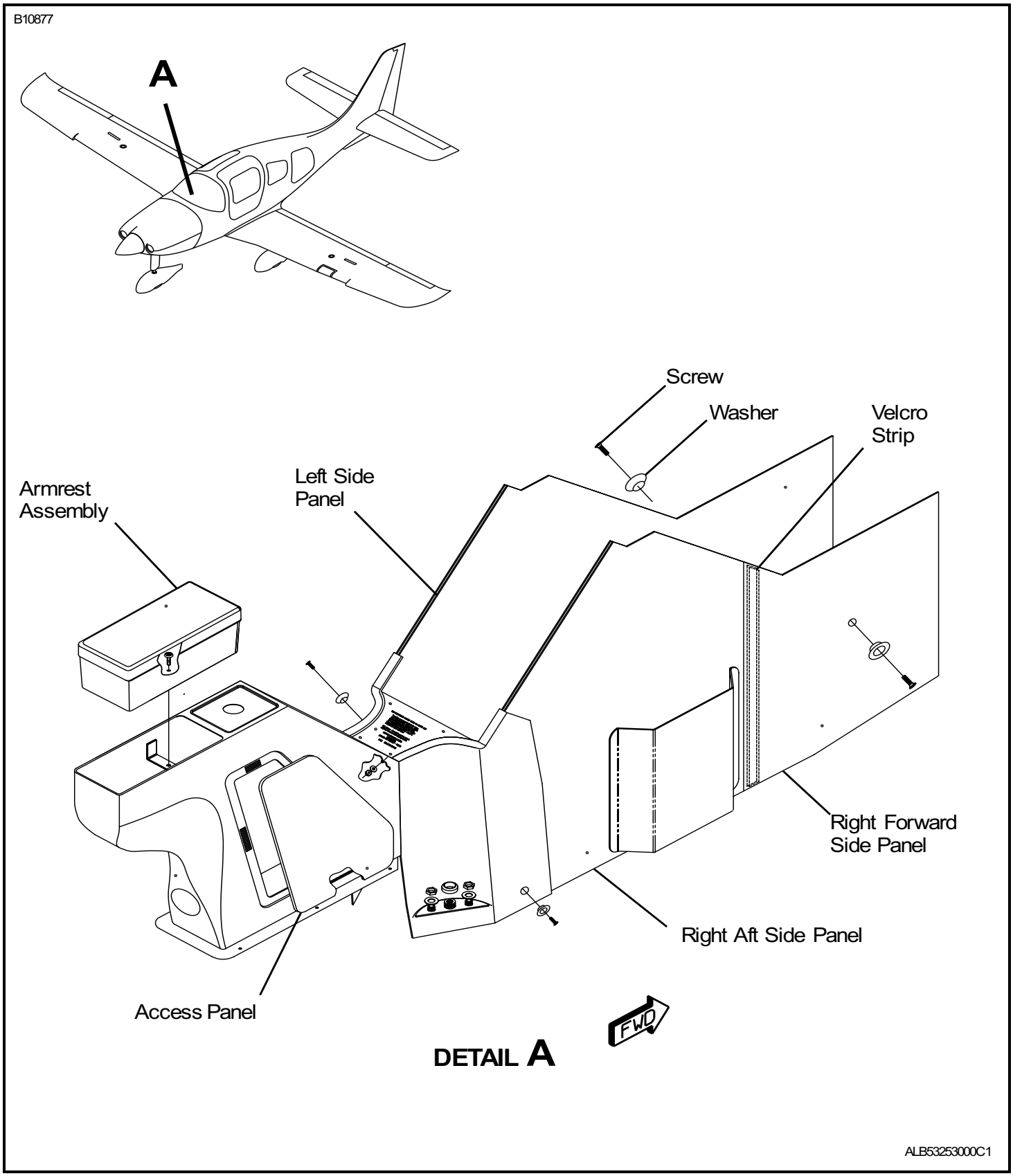
1 Remove the three flat head 10-32 screws and countersunk finishing washers located at the aft of the center console under the carpet on each side.

2 Take precaution to ensure that the splined rod connecting the fuel tank selector to the fuel selector knob is protected from damage. This is especially important if the center console is to be removed without removing the fuel tank selector.

(2) **Assembly and Installation of the Center Console** - To assemble and install the center console, reverse the above procedure. Torque the six console-to-floor installation screws to 31 in-lbs.

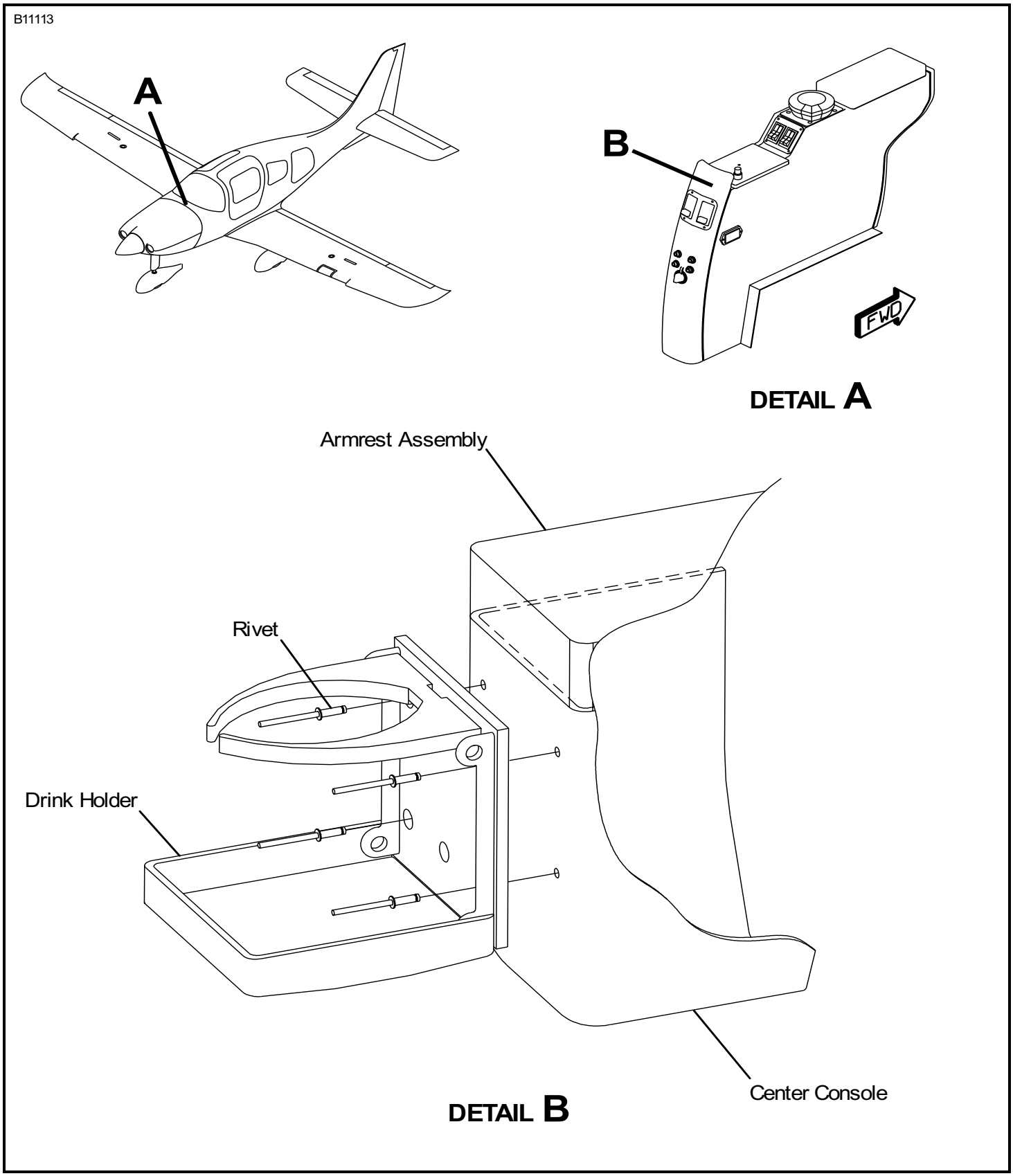
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Figure 201 : Sheet 1 : Center Console



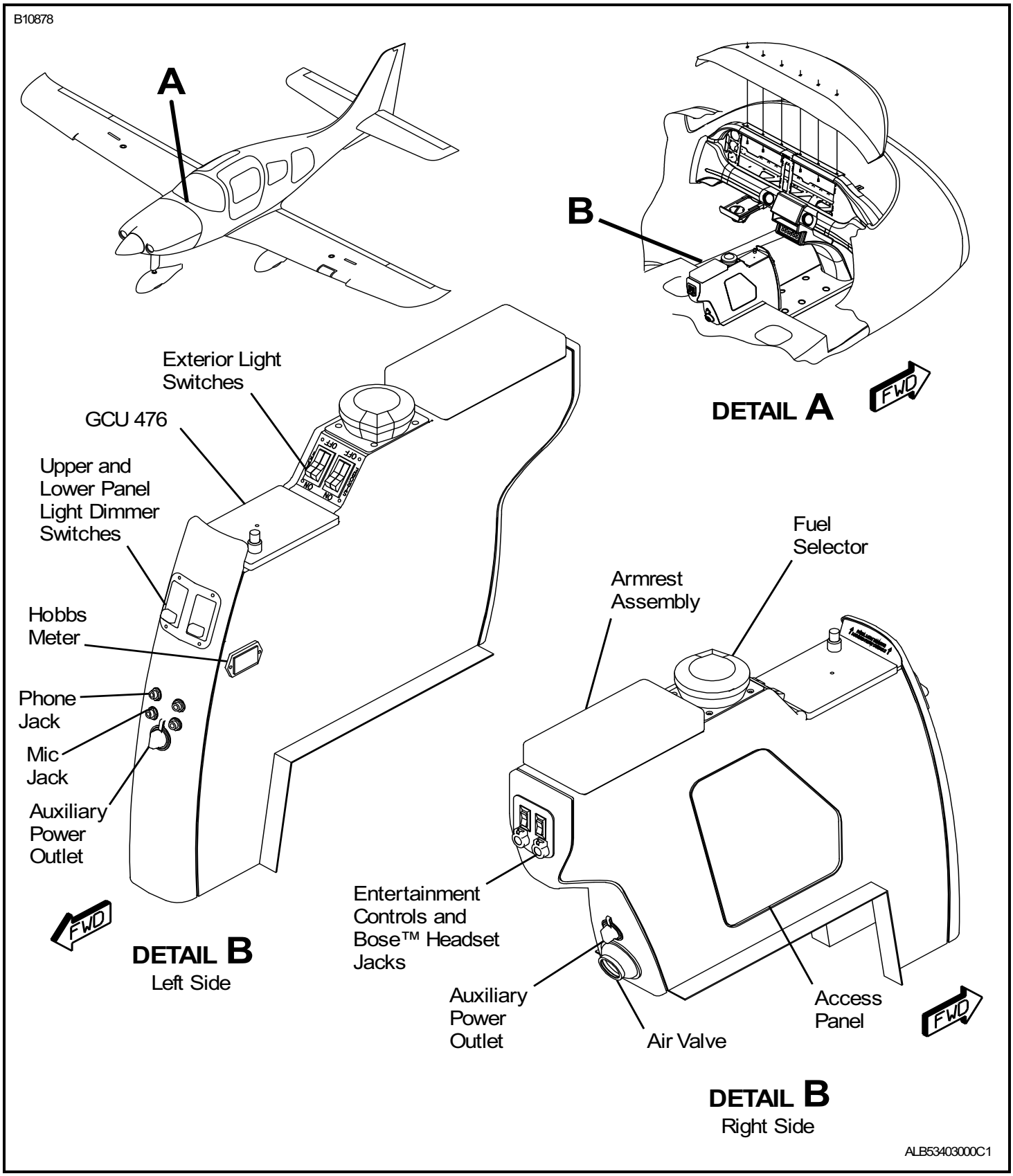
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Figure 202 : Sheet 1 : Drink Holder



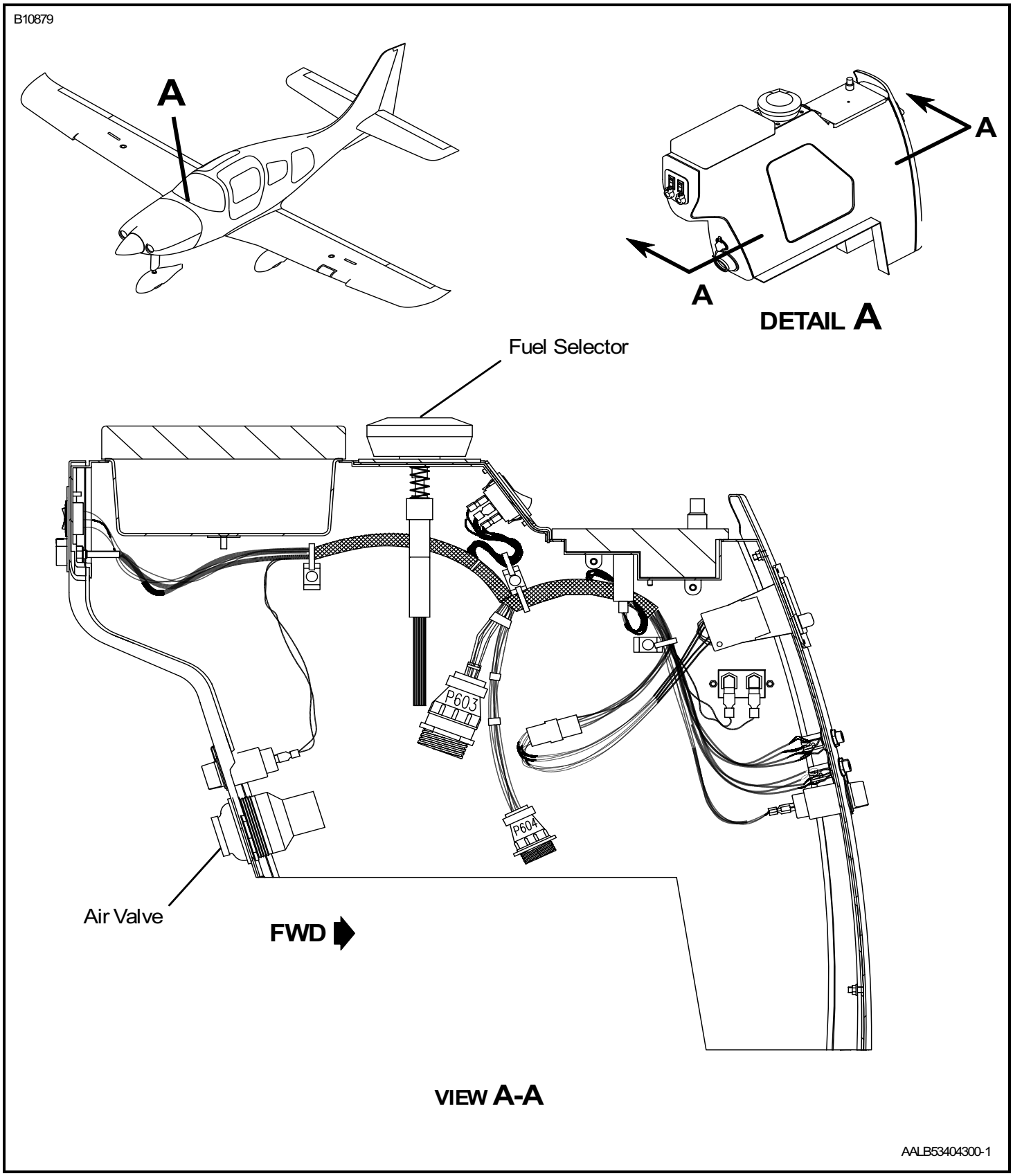
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Figure 203 : Sheet 1 : Center Console (Garmin G1000 Option)



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Figure 204 : Sheet 1 : Center Console Wiring (Garmin G1000 Option)



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SEAT BELTS AND RESTRAINTS - MAINTENANCE PRACTICES

1. Seat Belts and Restraints

CAUTION: The seat belts are not interchangeable front to rear or left to right. Properly identify seat belts and shoulder harnesses when removing for correct installation later.

CAUTION: Do not remove the bolts that hold the seat belt bracket (located at the front side panel) to the floor, as these bolts are also used for wing attachment.

NOTE: Once a cotter pin is removed, it must be discarded. Do not reuse a cotter pin on the seat belt retaining bolts or on any other part in the airplane.

A. Removal of the Front Seat Belt and Shoulder Harness

(1) Detach the lower seat belt mounts, buckle, and lap belt that are attached with 5/16-24 bolts, castellated nuts, cotter pins, and cap plug (on the right side of the center bracket). Removal of the front seat bottom cushions will make accessing these mounts easier. Refer to Section 25-10-00, Removal, Installation, And Adjustment Of The Front Seats.

(2) Remove the front shoulder belt guide by unsnapping the guide cover, and remove the 1/4-28 bolt and washer.

(3) After removal of the middle lower side panel. Refer to Section 25-30-00, Middle Lower Side Panels, detach the shoulder belt retractors that are located behind the lower side panels just aft of the front seats. The retractors are attached with four screws, washers, and 10-32 nuts.

B. Installation of the Front Seat Belt and Shoulder Harness - Installation is the reverse of the above with the following additions:

(1) Torque the 10-32 screws attaching the shoulder belt retractors 30 to 36 in.-lbs.

(2) Torque the 1/4-28 bolts securing the shoulder belt guides to 72 to 84 in.-lbs.

(3) When securing the lower seat belt mount located at aircraft centerline, assemble the 5/16-24 bolts and castellated nuts hand tight until all side play is eliminated. If the notch in the castellated nut does not align with the hole in the 5/16-24 bolt, preventing the cotter pin from being installed, tighten the castellated nut until the next available notch aligns with the hole in the 5/16-24 bolt, then install a new cotter pin. Fill a new MS-3 cap plug half full with Wacker SWS-951 sealant, and install over the nut with the cotter pin.

(4) When securing the lower seat belt mount located at the front side panel, assemble the 5/16-24 bolts and castellated nuts hand tight until all side play is eliminated. If the notch in the castellated nut does not align with the hole in the 5/16-24 bolt, preventing the cotter pin from being installed, back off the castellated nut until the next available notch aligns with the hole in the 5/16-24 bolt. Install a new cotter pin as shown in Figure 201.

C. Removal of the Rear Seat Belt and Shoulder Harness

(1) Detach the lower seat belt mounts, buckle, and lap belt that are attached with 5/16-24 bolts, castellated nuts, and cotter pins. Removal of the rear seat bottom cushions will make accessing these mounts easier. Refer to Section 25-10-00, Removal, Installation, and Adjustment of the Rear Seats and Crossbar.

(2) The rear seat shoulder belt retractor is mounted on a stud protruding from the fuselage and held in place with a 3/8-24 self-locking nut and two special washers. Refer to Figure 202. The stud has a recess for a 5/32 Allen wrench so that the stud can be prevented from rotating when removing or installing the self-locking nut.

CAUTION: The stud must be prevented from rotating. Failure to prevent rotation may result in cracked or chipped paint on the exterior of the fuselage at the rear shoulder belt retractor location.

D. Installation of the Rear Seat Belt and Shoulder Harness - Installation is the reverse of the above with the following additions:

(1) Install the special washers as shown in Figure 202.

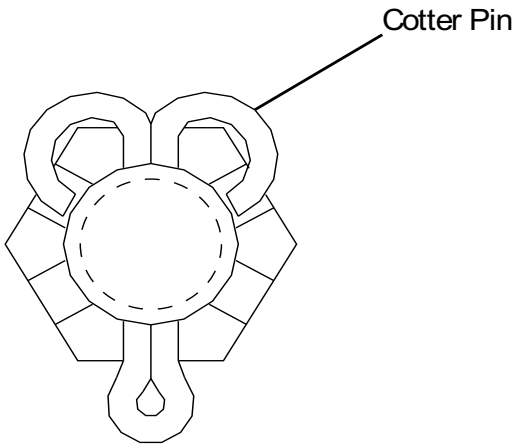
(2) Torque the self-locking nut 140 to 180 in.-lbs. **As previously stated, the stud must be prevented from rotating. Failure to prevent rotation may result in cracked or chipped paint on the exterior of the fuselage at the rear shoulder belt retractor location.**

(3) When securing the lower seat belt mounts, assemble the 5/16-24 bolts and castellated nuts hand tight until all side play is eliminated. If the notch in the castellated nut does not align with the hole in the 5/16-24 bolt, preventing the cotter pin from being installed, tighten the castellated nut until the next available notch aligns with the hole in the 5/16-24 bolt, then install a new cotter pin.

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Figure 201 : Sheet 1 : Cotter Pin Installation

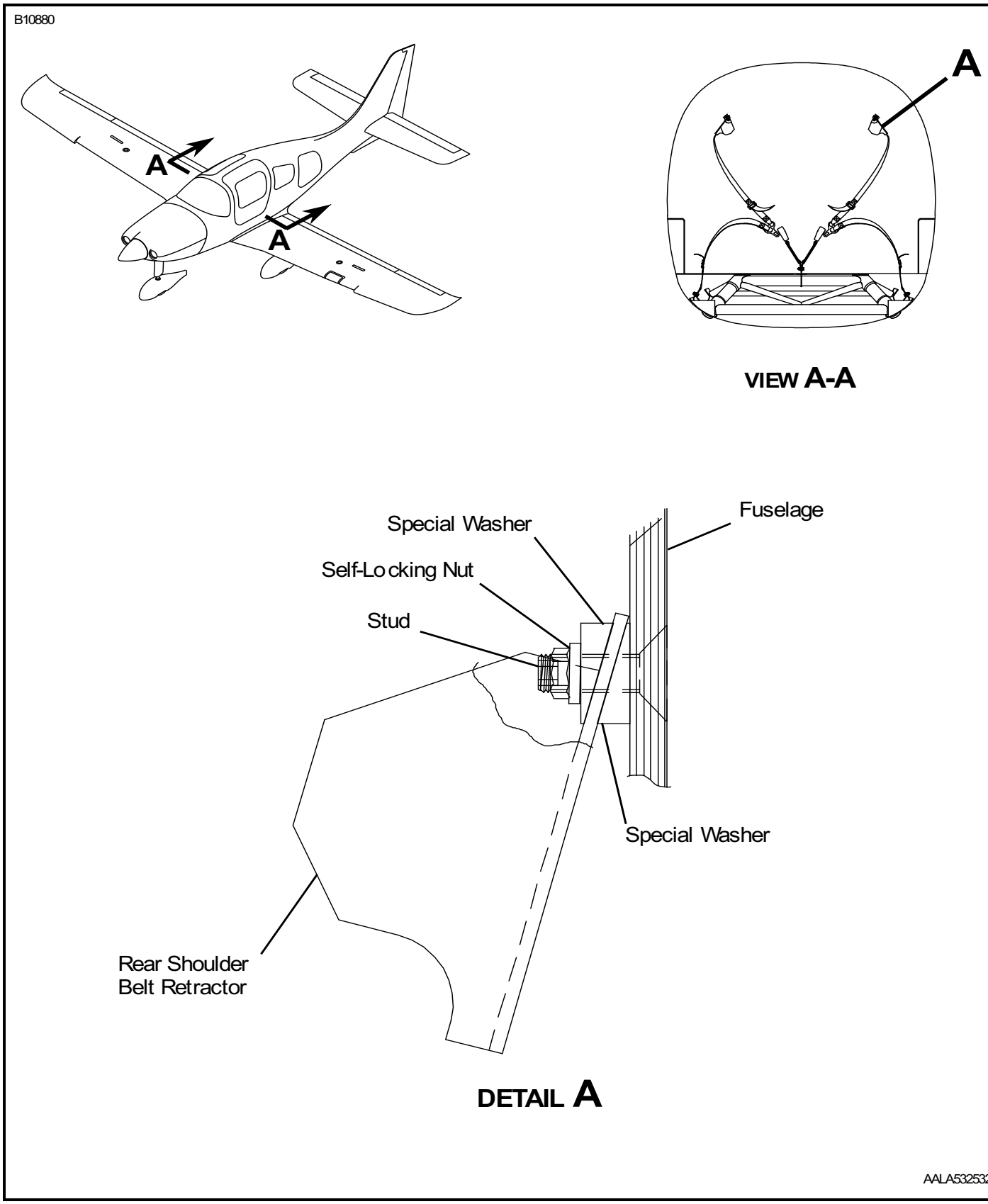
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Figure 202 : Sheet 1 : Rear Seat Belt Attachment



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INFLATABLE RESTRAINT SYSTEM - DESCRIPTION AND OPERATION

1. General

A. This section gives the general description and operation of the AMSAFE Aviation Inflatable Restraint (AAIR) system. The AAIR is a self-contained, modular, three-point restraint system that will help to protect occupants from head-impact injury during an accident. The AAIR system has four core components: the air bag assembly, the inflation assembly, the electronics module assembly (EMA), and the cable interface assembly. The forward AAIR is standard on the Model T240. The aft AAIR is optional. The forward seat AAIR has one EMA that controls the system operation The aft seat has its own independent EMA that controls the aft seat AAIR system operation. Refer to, Figure 1 and Figure 2.

WARNING: Do not try to open the inflator assembly. Do not apply an electric current to the electronics connection. The inflator assembly is a stored, gas/energetic material device and can cause injury if accidentally deployed.

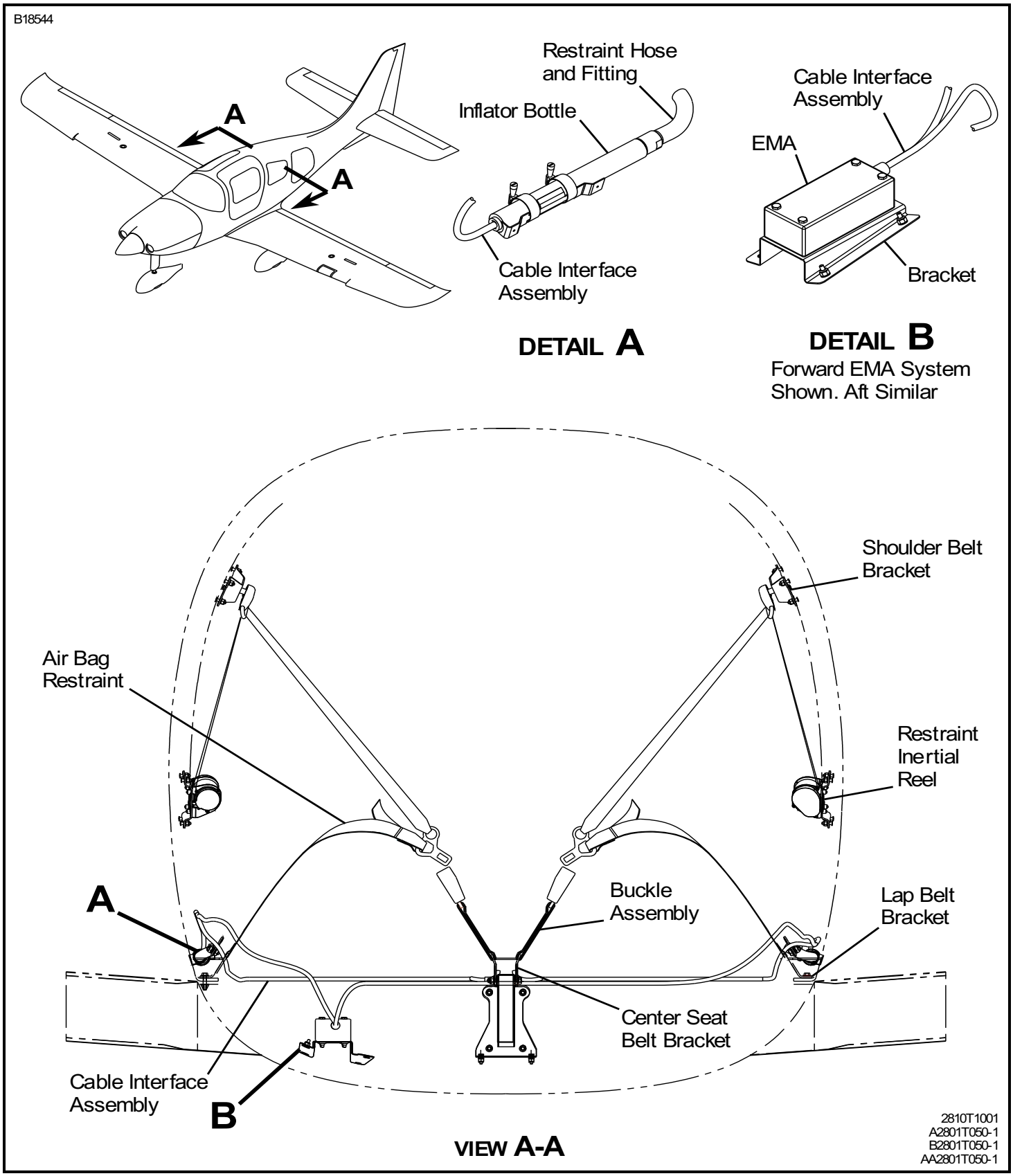
B. The cable interface assembly connects the seat belt assembly electrically to the EMA and inflator bottle. The cable interface assembly supplies a diagnostic tool connector for system functional tests. The EMA(s) are installed on a bracket behind the left middle side panel. When only the standard forward AAIR system is installed there is only one EMA. When the optional aft AAIR system is installed there are two EMA's installed on the airplane. The aft EMA is installed on top of the forward EMA. The forward AAIR system inflator bottles are installed behind the forward left and right side panels. The aft AAIR system inflator bottles are installed behind the baggage compartment left and right side panels. The aft center seat belt bracket assembly includes two buckles for the aft AAIR system and two buckles to install a child seat. The aft AAIR system is not serviceable when the child seat buckles are used to install a child seat on the aft seat.

2. Operation

A. When an airplane accident occurs, the EMA does an analysis of the crash pulse in milliseconds. The EMA then supplies a crash pulse to the gas inflator bottle. The air bags inflate rapidly and get in a position between the forward airplane movement and the seat occupant. The air deflates after deployment to prevent an obstruction to egress from the airplane. The parameters of the crash sensors prevents inadvertent deployment of the AAIR system for normal operations such as: hard landings, vibration, or turbulence. When the seat belts are not buckled they are in the safe condition. When the seat buckle is connected, the system is serviceable.

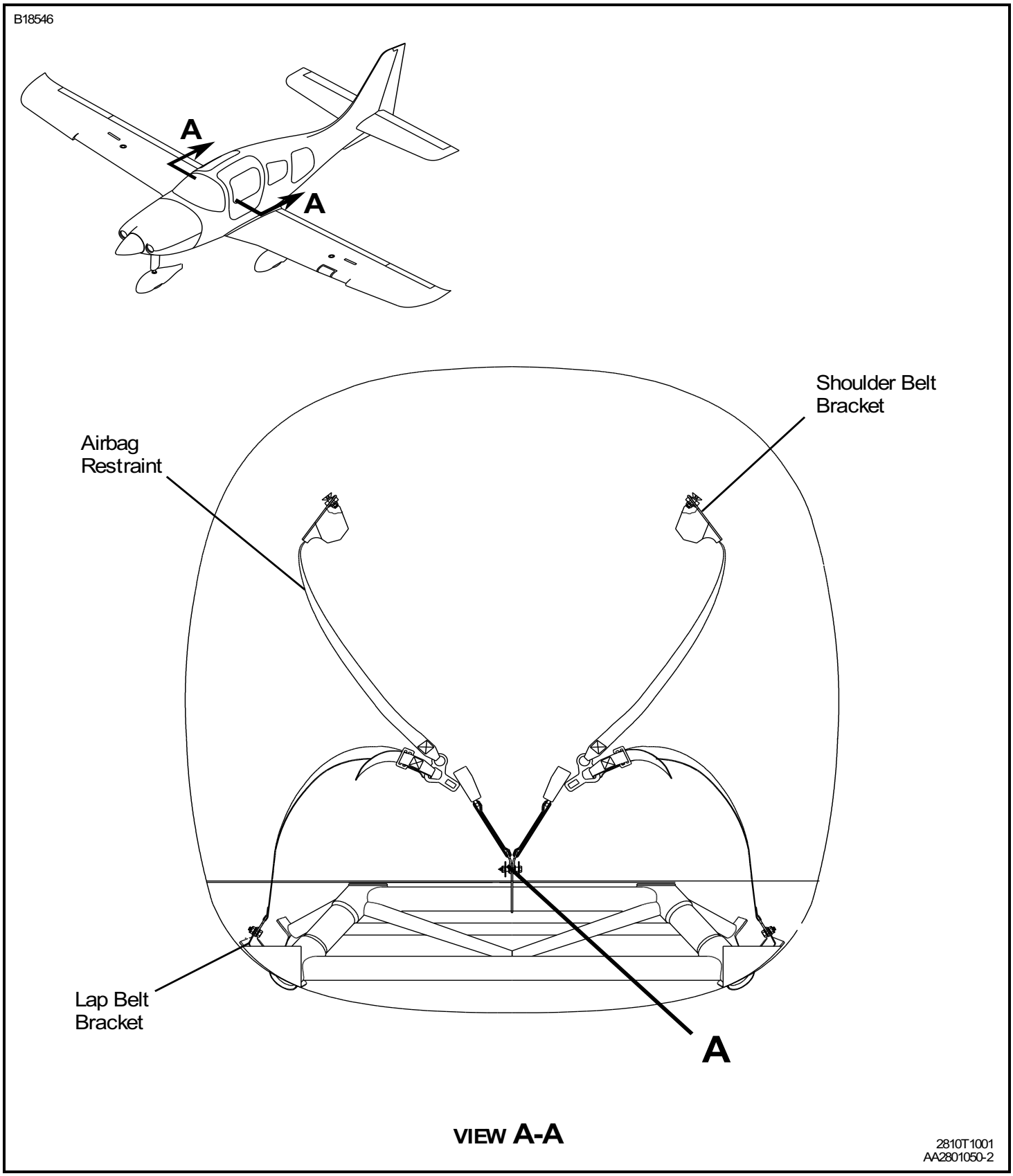
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Figure 1 : Sheet 1 : AAIR Forward Restraint System Installation



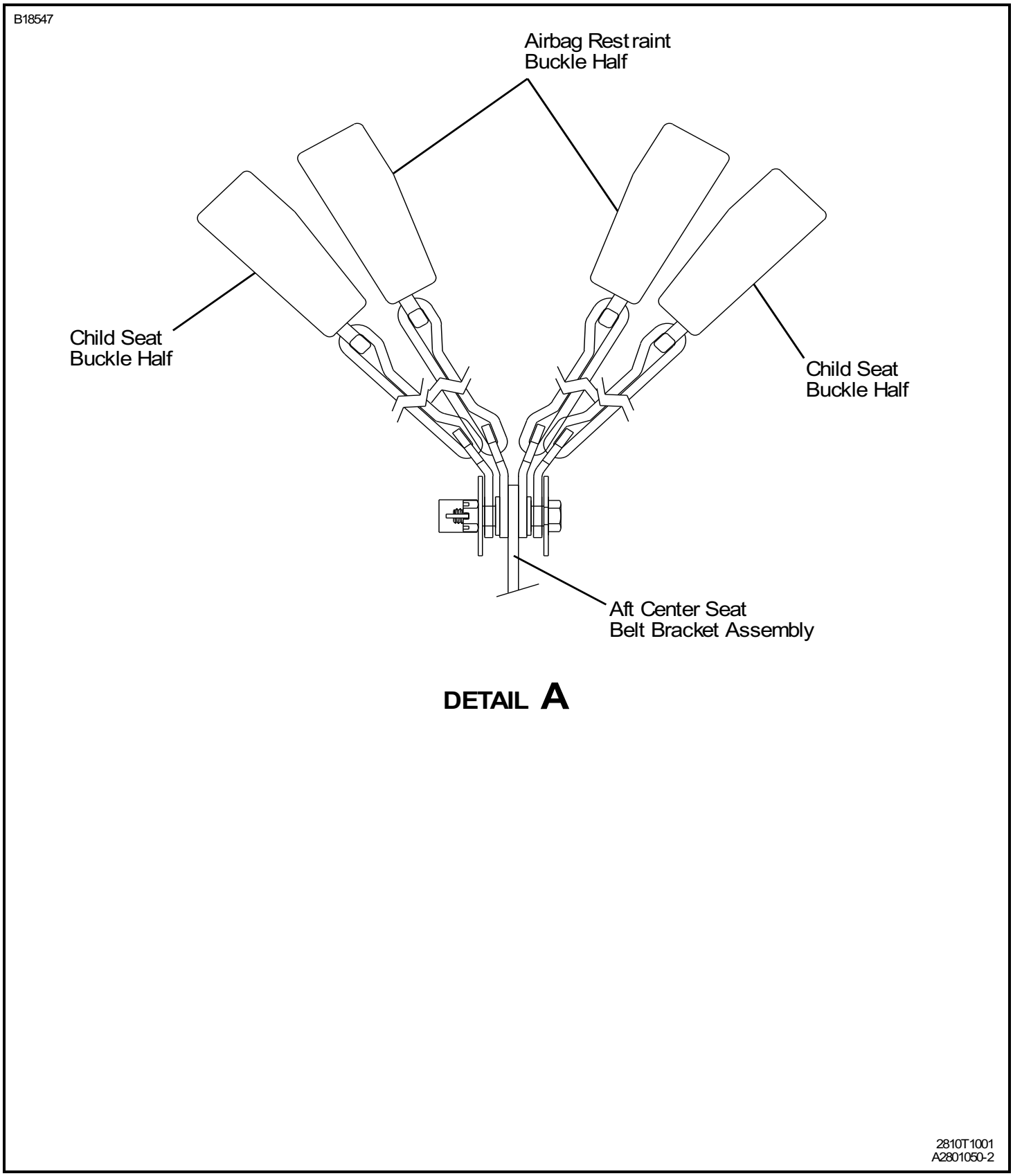
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Figure 2 : Sheet 1 : AAIR Aft Restraint System Installation



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Figure 2 : Sheet 2 : AAIR Aft Restraint System Installation



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INFLATABLE RESTRAINT SYSTEM - MAINTENANCE PRACTICES

1. General

A. This section gives the maintenance data for the AMSAFE Aviation Inflatable Restraint (AAIR). The AAIR system has four core components: the air bag assembly, the inflation assembly, the electronics module assembly (EMA), and the cable interface assembly. The forward AAIR is standard on the Model T240. The aft AAIR is optional. The forward seat AAIR has one EMA that controls the system operation. For a general description of the AAIR system refer to Inflatable Restraint System - Description and Operation

WARNING: Do not try to open the inflator assembly. Do not apply an electric current to the electronics connection. The inflator assembly is a stored, gas/energetic material device and can cause injury if accidentally deployed.

2. Tools and Equipment

A. Table 1 gives a list of tools and equipment used to complete some of the inflatable restraint system maintenance procedures in this section.

Table 201. Table 201 Tools and equipment

Name	Number	Manufacturer	Use
V23 System Diagnostic Tool	8668-201	AmSafe Aviation	Testing Inflatable Restraints
Torque Wrench	inch-pound type	Commercially Available	To the install the Inflatable Restraint System components
Tie Wrap Tool	GS2B or similar	Panduit Corporation	To install tie wraps

3. Inflatable Restraint System Component Cleaning

A. AMSAFE recommends that the AAIR components be cleaned on a regular (annual) basis. Buildup of dirt and unwanted material can cause problems with system operation, decrease the life of the system, and help cause corrosion of the metal parts in the system. Clean the belt assembly, hoses, cables, inflation device/cap assembly, and the EMA.

CAUTION: Use care to keep contamination and cleaning agents away from the hardware assemblies.

CAUTION: Do not let any part of the AAIR soak in any solution. This can cause damage to the AAIR system. Do not use too much water when you clean the AAIR parts. Too much water can cause damage to the internal components and cause them to be unserviceable.

CAUTION: Only use sufficient cleaning agent to make minimal suds. Excess soap must be removed before the part is installed in the system. Do not dry the belt assembly in sunlight or near any source of heat. Do not dry clean the belt assembly. Do not put the belt assembly fully into water.

CAUTION: Keep the isopropyl alcohol away from the webbing, air bag cover, and the gas hose material.

CAUTION: Do not use soap or water on metal parts.

(1) Clean non-metallic parts with warm water and a household soap/laundry detergent and a moist cloth.

(2) Flush the parts with clear water on a clean cloth.

(3) Use a soft brush, and cold soap solution to clean the webbing, air bag cover, and gas hose by hand. Use a household liquid soap or detergent.

(4) Let the belt assembly dry by air.

(5) Clean any spacers, washers, nuts, or bolts with a lint-free cloth and isopropyl alcohol.

(6) Cover the cable opening into the EMA with pieces of cloth. Clean the inflator and cables by hand with a lint-free cloth and a cold water and mild soap solution.

4. Storage of Spares

A. Inflator Assembly.

NOTE: The maximum continuous storage time for the inflator assembly is seven years from the date of manufacture. After seven years, send the inflator assembly to AMSAFE Aviation for inspection and repair.

(1) Keep the inflator assembly in a cool and dry area. The permitted temperature range is -30° C to +55° C.

(2) Keep the inflator assembly away from sunlight, dust, moisture, and other contamination.

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(3) Keep the inflator assembly away from high electromagnetic, radio frequency, and electrostatic environments.

(4) Obey all local storage regulations.

B. Electronics Module Assembly (EMA).

NOTE: The maximum continuous storage time for the EMA is seven years from the date of manufacture. After seven years, send the EMA to AMSAFE Aviation for inspection and repair.

(1) Keep the EMA assembly in a cool and dry area. The permitted temperature range is -30° C to +55° C.

(2) Make sure that the EMA is kept away from sunlight, dust, moisture, and other contamination.

(3) Keep the inflator away from EMI/RFI/ESD environments.

(4) Obey all local storage regulations.

C. Air Bag Assembly.

(1) Keep the air bag assembly in a cool and dry area. The permitted temperature range is -30° C to +55° C.

(2) Make sure that the air bag assembly is kept away from sunlight, dust, moisture, and other contamination.

5. AMSAFE Inflatable Restraint Disarm/Arm

A. Disarm the AMSAFE Inflatable Restraints.

(1) Make sure that each seat belt is unbuckled.

(2) Find the end-release connector at the seat base.

(3) Remove the tie straps that attach the cable and end-release connector.

(4) Disconnect the end-release connector to disable the inflatable restraint.

B. Arm the AMSAFE Inflatable Restraints.

(1) Connect the end-release connector.

(2) Attach the cable and end-release connector to the seat frame with tie wraps.

(a) Use an approved tool to install the tie wraps.

6. Inflatable Restraint Assembly Removal and Installation

A. Remove the Inflatable Restraint assembly.

NOTE: The Inflatable Restraint assembly includes the air bag restraint and the buckle assembly.

(1) Disarm the AMSAFE inflatable restraints. Refer to AMSAFE Inflatable Restraint Disarm/Arm.

(2) Remove the air bag belt and buckle assembly. Refer to Seat Belts and Restraints - Maintenance Practices.

B. Install the Inflatable Restraint and Buckle Assembly.

(1) Install the air bag belt and buckle assembly. Refer to Seat Belts and Restraints - Maintenance Practices.

(2) Remove and discard the end cap plug (if new) from the three-point air bag belt hose.

(a) Do not remove the safety cable tie for the air bag connector tongue.

NOTE: If the three-point air bag belt is not new and the inflator is new, apply a thin layer of Loctite 242 thread locking compound on the hose barb threads before you attach the inflator assembly.

(3) Make sure that the three-point seat belt air bag belt is correctly aligned.

NOTE: When the seat belt air bag belt is aligned correctly, the gas hose is on top of the seat belt attachment hardware. The label shows on the aft side of the belt.

(4) If the pilot's and/or the copilot's air bag belt was replaced do a seat operation test on the pilot's and/or copilot's seat as follows:

(a) Move the seat-back aft and forward to its maximum travel.

(b) Move the seat-base up an down to its maximum travel.

(c) Move the seat-base aft and forward to its maximum travel.

(5) Arm the AMSAFE inflatable restraints. Refer to AMSAFE Inflatable Restraint Disarm/Arm.

(6) Do a functional test of the AAIR system. Refer to Inflatable Restraint System Adjustment/Test.

7. Cable Interface Assembly Removal and Installation

A. Remove the Cable Interface Assembly.

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NOTE: Removal of the forward and/or aft AAIR system interface cable is typical.

(1) Disarm the AMSAFE inflatable restraints. Refer to AMSAFE Inflatable Restraint Disarm/Arm.

(2) Remove the forward or aft left side panels as necessary to get access to the inflator bottle(s). Refer to, Removal of the FLSPL and FLSPR , Middle Lower Side Panels, Left (MLSPL) and Right (MLSPR) Removal of the BLSPL and BLSPR.

(3) Disconnect the squib connector from the inflator assembly.

(4) Disconnect the applicable EMA cable interface assembly electrical connector.

(a) Push down on the locking clip on the EMA connector and pull on the connector.

(5) Remove the cable interface assembly from the airplane.

B. Remove the Cable Interface Assembly.

NOTE: Installation of the forward and/or aft AAIR system interface cable is typical.

(1) Connect the applicable EMA cable interface assembly electrical connector.

(a) Align the cable interface assembly EMA connector key correctly with the EMA electrical connector.

(b) Push the connectors together until the connectors lock.

(2) Attach the squib connector to the inflator assembly.

(3) Arm the AMSAFE inflatable restraints. Refer to AMSAFE Inflatable Restraint Disarm/Arm.

(4) Attach the cable where applicable with tie wraps.

(a) Use an approved tool to install the tie wraps.

(5) Do a functional test of the AAIR system. Refer to Inflatable Restraint System Adjustment/Test.

8. Inflator Bottle Removal and Installation

A. Remove the Inflator Bottle (Refer to, Figure 201).

NOTE: There are two bottles installed for the forward AAIR system. There are two bottles installed for the optional aft AAIR system. The removal of each of the four the bottles are typical.

(1) Disarm the AMSAFE inflatable restraints. Refer to AMSAFE Inflatable Restraint Disarm/Arm.

(2) Remove the forward or aft left side panels as necessary to get access to the inflator bottle(s). Refer to, Removal of the FLSPL and FLSPR , Middle Lower Side Panels, Left (MLSPL) and Right (MLSPR) Removal of the BLSPL and BLSPR.

(3) Disconnect the squib connector from the inflator assembly.

(4) Disconnect the gas hose from the inflator assembly.

NOTE: The gas hose barb has a layer of Loctite and is tightly attached to the fitting. Use soft-grip channel locks to hold the barb while you disconnect the hose.

(5) Loosen the clamps on the inflator-assembly mounting bracket.

(6) Remove the inflator assembly from the mounting bracket.

(7) Put shipping caps on the inflator-hose connector fitting. Refer to Table 201.

B. Install the Inflatable Bottle

NOTE: There are two bottles installed for the forward AAIR system. There are two bottles installed for the optional aft AAIR system. The installation of each of the four of the bottles are typical.

(1) Remove the shipping caps from the inflator-hose connector fitting.

NOTE: The shipping caps can be used again.

(2) Put the Inflator bottle in its correct position on the bracket.

(a) Make sure that the forward end of the bottle is correctly installed in the bracket.

(b) Do not tighten the clamps on the mounting bracket clamps at this time.

(3) Put the gas hose in its correct position on the inflater assembly.

(a) Torque the inflator hose connector fitting between 100 and 130 inch-pounds.

(4) Connect the gas hose from the three-point air bag belt to the inflator assembly with the correct torque.

NOTE: The inflator hose connector fitting is a pressure fitting which must be fully extended onto the

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gas hose barb to make an airtight connection.

(5) Attach the squib connector to the inflator assembly.

(6) Tighten the clamps on the mounting bracket to between 21 and 25 inch-pounds of torque.

(7) As necessary install the forward or aft left side panels. Refer to, Removal of the FLSPL and FLSPR , Middle Lower Side Panels, Left (MLSPL) and Right (MLSPR) Removal of the BLSPL and BLSPR.

(8) Remove the safety cable tie from the air bag buckle tongue.

(9) Arm the AMSAFE inflatable restraints. Refer to AMSAFE Inflatable Restraint Disarm/Arm.

(10) Do a seat operation test on the pilot's and copilot's seat.

(a) Move the seat-back aft and forward to its maximum travel.

(b) Move the seat-base up an down to its maximum travel.

(c) Move the seat-base aft and forward to its maximum travel.

(11) Do a functional test of the AAIR system. Refer to Inflatable Restraint System Adjustment/Test.

9. EMA Removal/Installation

WARNING: Keep all magnetic fields away from the electronics module assembly (EMA) during the removal and installation procedure. Accidental deployment of the system can cause injury.

WARNING: Do not remove seats from the airplane with the seat belts buckled or the EMA connected. Damage can occur to the system and an accidental deployment of the system can cause injury.

WARNING: Do not connect the EMA to the cable interface assembly unless the EMA is first mounted to the airplane structure. Accidental deployment can cause injury.

A. Remove the EMA (Refer to, Figure 202).

NOTE: When only the standard (forward) AAIR system is installed there is only one EMA installed on the airplane. When the optional aft seat AAIR system is installed there are two EMA's installed on the airplane. The forward EMA is installed on a bracket behind the left middle side panel. The optional aft EMA is installed on the top of the forward EMA. The removal of each of the two EMA's is similar.

(1) Disarm the AMSAFE inflatable restraints. Refer to AMSAFE Inflatable Restraint Disarm/Arm.

(2) Remove the left middle side panel (MLSPL). Refer to, Middle Lower Side Panels, Left (MLSPL) and Right (MLSPR).

(3) If the forward EMA is to be removed, disconnect each of the two EMA's cable interface assembly electrical connectors.

(a) Push down on the locking clip on the EMA connector and pull on the connector.

(4) If the aft EMA is to be removed disconnect the aft (top) EMA electrical cable interface assembly connector only.

(5) Remove the bolts that connect the EMA's to the bracket assembly.

(6) If the only the aft EMA is to be removed, remove it from the airplane.

(7) To remove the forward EMA (bottom), you must remove the aft EMA (top) first and then the forward EMA.

B. Install the EMA (Refer to, Figure 202).

(1) Put the EMA's, as applicable, in the correct position on the bracket.

(2) Install the bolts that attach the EMA(s) to the bracket assembly.

(3) Connect the cable interface assembly electrical connectors to the EMA(s), as applicable.

(4) Make sure that the cables and hoses of the AAIR are clear of the height-adjustment crank, the seat lock handle, and the seat-back adjustment lever.

(5) Install the left middle side panel (MLSPL). Refer to, Middle Lower Side Panels, Left (MLSPL) and Right (MLSPR).

(6) Arm the AMSAFE inflatable restraints. Refer to AMSAFE Inflatable Restraint Disarm/Arm.

(7) Do a functional test of the AAIR system. Refer to Inflatable Restraint System Adjustment/Test.

10. Inflatable Restraint System Adjustment/Test

A. The AAIR diagnostic check gives a system functional test of the AAIR circuits. To find problems in system components, use a replace-and-test procedure. There are two seats in each AAIR system. The 1 LED light will show an indication for the first seat on the AAIR system circuit. The 2 LED light will show an indication for the second seat on the AAIR system circuit. Once the V23 system diagnostic tool (SDT) is connected to the airplane, a check of the system is done one seat at

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a time. For more data applicable to the V23 system functional test, refer to the AMSAFE Aviation AAIR Supplemental Maintenance Manual, V23 System Diagnostic Tool - Operation and Maintenance Manual.

B. The V23 system diagnostic tool uses a 9-volt battery that can be replaced. A check of the diagnostic tool must be done yearly. The label on the back of the diagnostic tool will show when a check of the tool needs to be done. The diagnostic tool must only be sent to AMSAFE to be calibrated.

CAUTION: Calibrate the V23 system diagnostic tool again before use if it is hit, shaken, or if it falls to the floor.

C. Before the V23 system diagnostic tool is connected to the airplane, do the steps that follow:

(1) Set the SDT ON/OFF Switch to the ON position.

(2) Look at the Tool Battery Indicator LED light.

(a) If the LED light is green, the battery condition is satisfactory.

(b) If the LED light is red, replace the 9-volt battery on the back of the SDT.

D. Do the System Functional Test.

NOTE: There are two seats in each AAIR system. This functional test must be completed for each AAIR system on the airplane.

(1) Make sure that the safety cable tie from the air bag buckle tongue is removed.

(2) Make sure that the seat belt safety buckles are not attached.

(3) Remove the protective cap from the cable interface assembly.

(4) Connect the V23 system diagnostic tool to the diagnostic connector.

(5) Set the SDT ON/OFF Switch to the ON position.

(6) Look at the Seat Position PASS/FAIL LED light.

(7) If the 1 and 2 LED lights are amber, do the steps that follow:

(a) Connect the air bag safety buckle on the seat.

(b) If the 1 LED light is green, the AAIR system for that seat is satisfactory.

(c) If there is an amber LED light indication, a red indication, or no indication, troubleshoot the system. Refer to Inflatable Restraint System Troubleshooting.

(d) Disconnect the air bag safety buckle.

(e) Do the system functional test again for the second seat location.

NOTE: For the second seat location, the 2 LED light will be used to give an indication.

(8) Set the SDT ON/OFF Switch to the OFF position.

(9) Disconnect the V23 system diagnostic tool from the diagnostic connector.

(10) Put the protective cap on the cable interface assembly.

11. Inflatable Restraint System Troubleshooting

A. The procedures in this section must be done if the V23 system diagnostic tool gives an unserviceable indication for the seats in the AAIR System Adjustment/Test. An unserviceable indication by the seat LED light can be an amber indication, red indication, or no indication. If the V23 system diagnostic tool gives a serviceable indication after the replacement of the individual components, stop the troubleshooting procedure.

(1) If an unserviceable indication is given before the safety buckle is connected, do the steps that follow:

(a) Do a check of all connections and tighten loose connections that are found. Do the Adjustment/Test procedure again if there are loose connections found.

(b) Replace the cable interface assembly. Do the Adjustment/Test procedure again.

(c) Replace the EMA. Do the Adjustment/Test procedure again.

(d) Replace the inflator. Do the Adjustment/Test procedure again.

(2) If an unserviceable indication is given after the safety buckle is connected, do the steps that follow:

(a) Replace the cable interface assembly. Do the Adjustment/Test procedure again.

(b) Replace the air bag safety buckle. Do the Adjustment/Test procedure again.

(c) Replace the EMA. Do the Adjustment/Test procedure again.

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(d) Replace the inflator. Do the Adjustment/Test procedure again.

12. Inflatable Restraint System Inspection

NOTE: The AMSAFE Aviation Inflatable Restraint (AAIR) must be examined in accordance with the time intervals in Chapter 5, Time Limits and Inspections. The AMSAFE Aviation Inflatable Restraint (AAIR) assemblies have a time life associated with them. Refer to Chapter 5, Time Limits and Inspections.

A. Do an inspection of the AAIR system parts.

(1) Air bag assembly.

(a) Make sure that the attachments are tightly connected.

(b) Do a visual inspection for dirt, oil, grease or other unwanted material.

(c) Do a check for wear on the edges of the belt.

(d) Do a check for damage on stitching or fabric threads.

(e) Do a check for holes or rub marks on the air bag cover.

(f) Do a check of the end fittings, buckle and connector for cracks, dents, or corrosion.

(2) Inflator hose.

(a) Do a check for fraying, wear, or tears.

(3) Cable interface assembly.

(a) Make sure all attachments are tightly connected.

(4) Inflator assembly.

(a) Do a check for loose mounting hardware.

(b) Do a check of the hose connection.

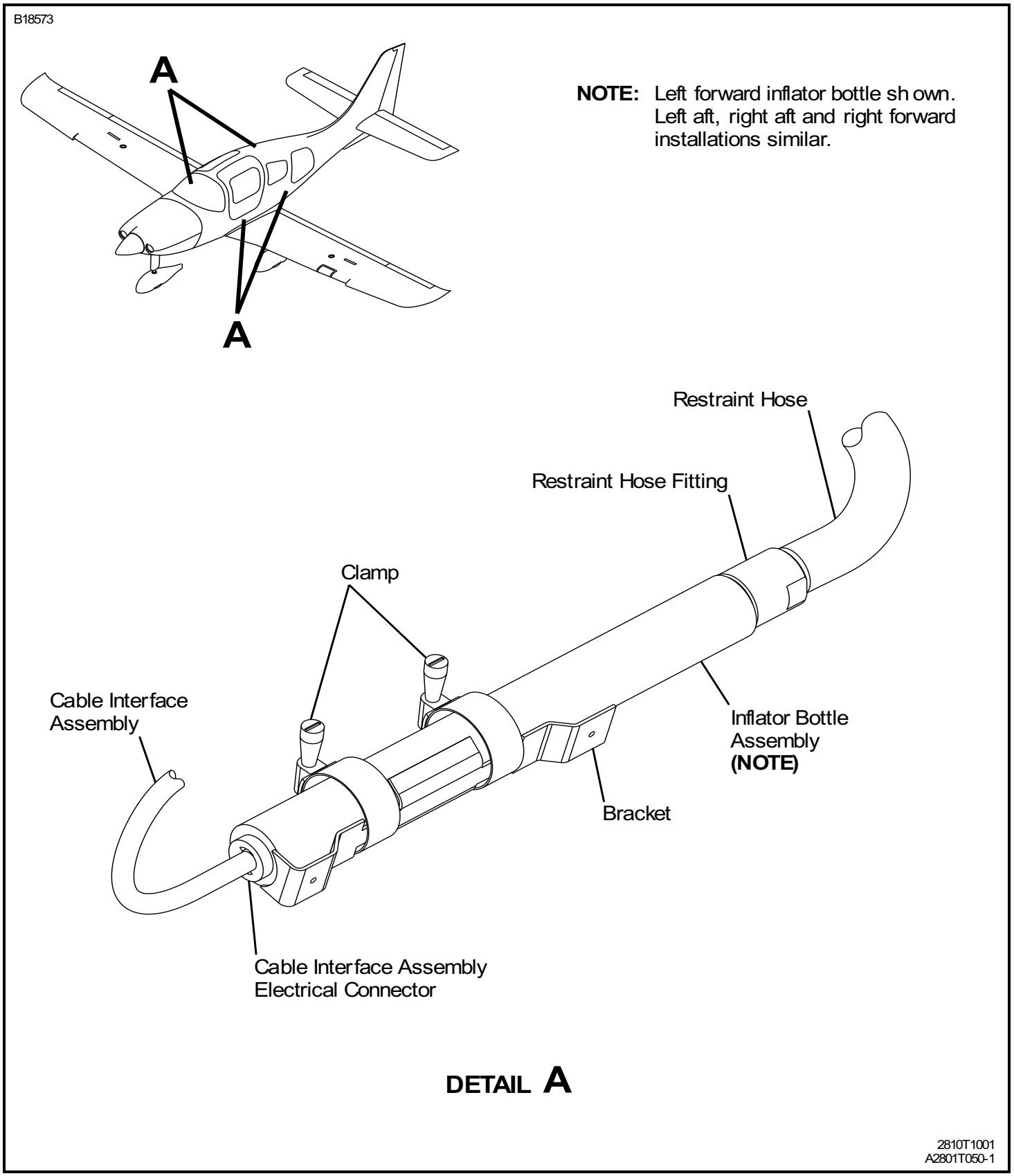
(c) Do a check of the electrical connection.

(5) Electronics module assembly (EMA).

(a) Do a check for loose connections and mounting hardware.

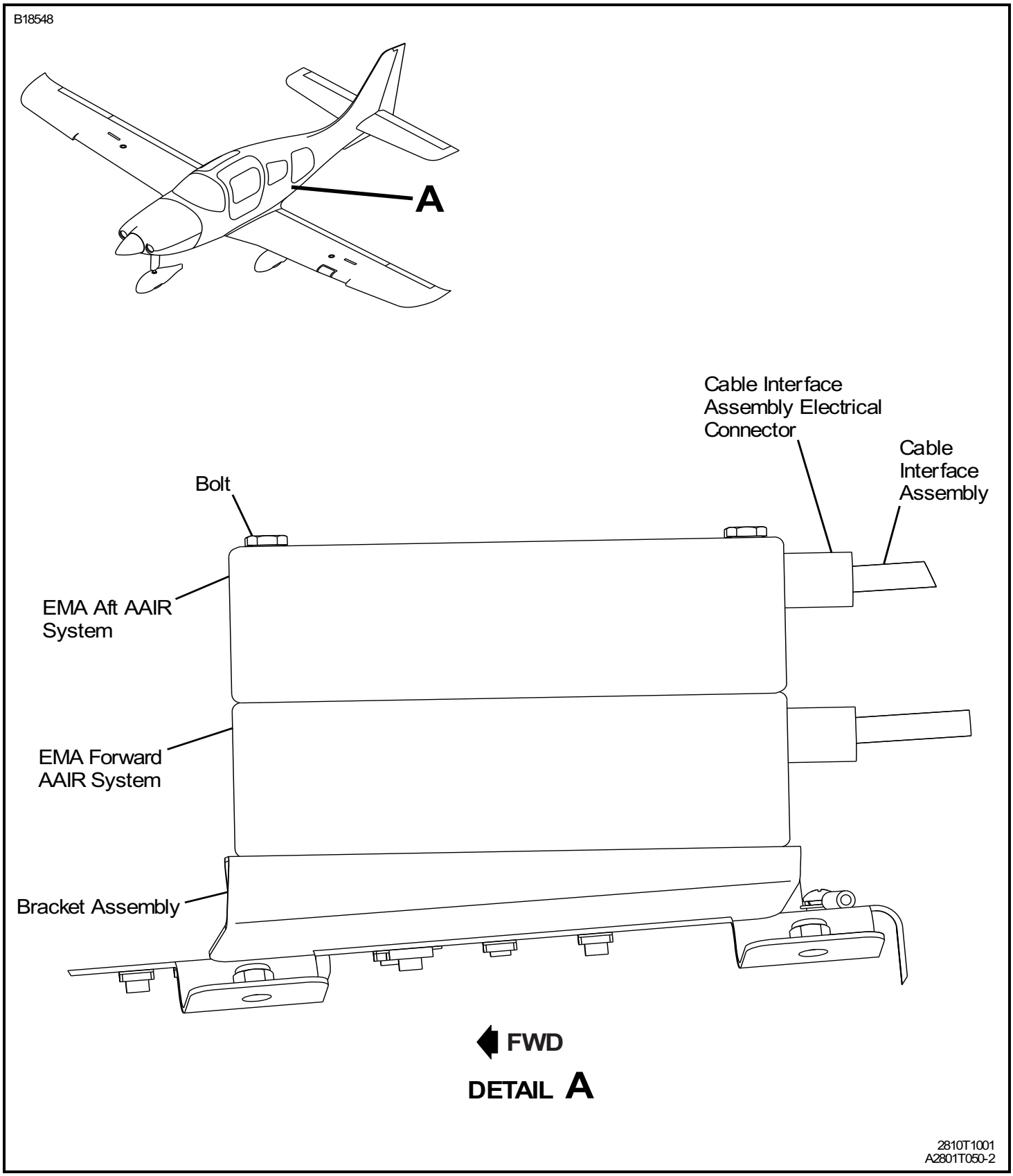
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Figure 201 : Sheet 1 : Inflator Bottle Installation



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Figure 202 : Sheet 1 : EMA Installation



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INSTRUMENT PANEL (T240) - REMOVAL/INSTALLATION

1. General

A. Removal of the instrument panel for the Model T240 with the Garmin G2000 system installed is a major task and is not likely to ever be needed. Access to areas behind the instrument panel is done by the removal of the Garmin GDU 1400 Primary Flight Display (PFD), GDU 1400 Multifunction Display (MFD), and the LRUs within the instrument panel. The instructions for removal are only for removing the instrument panel when the same panel is to be replaced. If a new instrument panel is required, contact Cessna for further instructions.

B. This section includes the procedures to remove and replace the instrument panel and the components that follow:

(1) Components removed and replaced in this section:

(a) The Instrument panel

(b) The Hourmeter

(c) The ELT Switch.

(2) Components removed and replaced in referenced sections:

(a) The L-3 Electronic Standby Indicator

(b) The GDU 1400 Primary Flight Display (PFD)

(c) The GDU 1400 Multi-Functional Display (MFD)

(d) The GCU 275 Controller Unit

(e) The GMC 720 AFCS Mode Controller

(f) The Carbon Monoxide Detector

(g) The DISPLAY REVERSION LED Panel

(h) The Engine Controls LED Panel

(i) The Ignition Switch LED Panel

(j) The instrument Panel Bolster Upholstery Assembly.

(k) The Glare Shield

C. For Avidyne and G1000 options instrument and electrical panel maintenance practices refer to Instrument Panels and Electrical Panels - Maintenance Practices.

2. Instrument Panel Removal/Replacement

A. Remove the Instrument Panel (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Remove the components that follow:

(a) The Glareshield. Refer to Chapter 25, Glareshield (T240) - Removal/Installation.

(b) The Display Reversion LED Panel. Refer to Chapter 33, Interior LED Panels (T240) - Maintenance Practices.

(c) The L-3 Electronic Standby Indicator. Refer to Chapter 34, L-3 Electronic Standby Indicator - Removal/Installation.

(d) The GDU 1400 Primary Flight Display (PFD). Refer to Chapter 34, Garmin GDU 1400 Displays (G2000) - Removal/Installation.

(e) The GDU 1400 Multi-Functional Display (MFD). Refer to Chapter 34, Garmin GDU 1400 Displays (G2000) - Removal/Installation.

(f) The GCU 275 Controller Unit. Refer to Chapter 34, Garmin GCU 275 Controller Unit (G2000) - Removal/Installation.

(g) The GMC 720 AFCS Mode Controller. Refer to Chapter 22, Garmin GMC 720 AFCS Mode Controller (G2000) - Removal/Installation.

(h) The Hourmeter. Refer to Hourmeter Removal/Installation in this section.

(i) The ELT switch. Refer to Garmin ELT Switch Removal/Installation in this section.

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(j) The Carbon Monoxide Detector. Refer to Pulse Oximeter/CO Detect (T240) - Maintenance Practices, Pulse Oximeter/CO Detect Removal/Installation.

(k) The Engine Controls LED Panel. Refer to Chapter 33, Interior LED Panels (T240) - Maintenance Practices.

(l) The Ignition Switch LED Panel. Refer to Chapter 33, Interior LED Panels (T240) - Maintenance Practices.

(m) The instrument panel bolster upholstery assembly. Refer to Bolster Upholstery Assembly (T240) - Removal/Installation.

(5) Remove the screws from the shelf assembly, the gusset assembly and the frame assembly that attaches the instrument panel to the aircraft structure.

(6) Remove the instrument panel from the airplane.

B. Install the Instrument Panel (Refer to Figure 401).

(1) Put the instrument panel in its correct position on the airplane structure.

(2) Install the screws that attaches the instrument panel to the aircraft structure in the shelf assembly, the gusset assembly and the frame assembly.

(3) Install the components that follow:

(a) The Display Reversion LED Panel. Refer to Chapter 33, Interior LED Panels (T240) - Maintenance Practices.

(b) The L-3 Electronic Standby Indicator. Refer to Chapter 34, L-3 Electronic Standby Indicator (T240) - Removal/Installation.

(c) The GDU 1400 PFD. Refer to Chapter 34, Garmin GDU 1400 Displays (G2000) - Removal/Installation.

(d) The GDU 1400 MFD. Refer to Chapter 34, Garmin GDU 1400 Displays (G2000) - Removal/Installation.

(e) The GCU 275 Controller Unit. Refer to Chapter 22, Garmin GCU 275 Controller Unit (G2000) - Removal/Installation.

(f) The GMC 720 AFCS Mode Controller. Refer to Chapter 22, Garmin GMC 720 AFCS Mode Controller (G2000) - Removal/Installation.

(g) The Hourmeter. Refer to Hourmeter Removal/Installation in this section.

(h) The ELT switch. Refer to Garmin ELT Switch Removal/Installation in this section.

(i) The Carbon Monoxide Detector. Refer to Pulse Oximeter/CO Detect (T240) - Maintenance Practices, Pulse Oximeter/CO Detect Removal/Installation.

(j) The instrument panel bolster upholstery assembly. Refer to Bolster Upholstery Assembly (T240) - Removal/Installation.

(k) The Engine Controls LED Panel. Refer to Chapter 33, Interior LED Panels (T240) - Maintenance Practices.

(l) The Ignition Switch LED Panel. Refer to Chapter 33, Interior LED Panels (T240) - Maintenance Practices.

(m) The Glareshield. Refer to Glareshield (T240) - Removal/Installation.

3. Instrument Panel Components Removal/Installation

A. Hourmeter Removal/Installation

(1) Remove the Hourmeter (UI004) (Refer to Figure 402).

(a) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(b) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(c) Remove the screws and nuts that attach the Hourmeter to the instrument panel.

(d) Remove the Hourmeter from the instrument panel and move it aft sufficiently to get access to the rear of the unit.

(e) If you cannot move the Hourmeter aft sufficiently to get access to the rear of the unit, remove the GDU 1400 MFD. Refer to Garmin GDU 1400 Displays (G2000) - Removal/Installation.

(2) Install the Hourmeter (UI004) (Refer to Figure 402).

(a) Put the Hourmeter near its correct position in the instrument panel.

(b) Connect the electrical connector (PI004) to the rear of the Hourmeter.

(c) Put the Hourmeter in its correct position in the instrument panel.

(d) Install the screws and nuts that attach the Hourmeter to the instrument panel.

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(e) If necessary, install the GDU 1400 MFD. Refer to Garmin GDU 1400 Displays (G2000) - Removal/Installation.

B. Garmin ELT Switch Removal/Installation.

(1) Remove the ELT switch (SI500) (Refer to Figure 402).

(a) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(b) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(c) Remove the screws and nuts that attach the ELT switch to the instrument panel.

(d) Remove the ELT switch from the instrument panel and move it aft sufficiently to get access to the rear of the unit.

(e) If you cannot move the ELT switch aft sufficiently to get access to the rear of the unit, remove the GDU 1400 MFD. Refer to Garmin G2000 Displays - Removal/Installation.

(f) Disconnect the electrical connector (P31) from the rear of the ELT switch.

(2) Install the ELT switch (SI500) (Refer to Figure 402).

(a) Put the ELT switch near its correct position in the instrument panel.

(b) Connect the electrical connector (P31) to the rear of the ELT switch.

(c) Install the screws and nuts that attach the ELT switch to the instrument panel. Refer to Chapter 20 Standard Practices - Airframe Torque Data - Maintenance Practices.

(d) If necessary, install the GDU 1400 MFD. Refer to Garmin GDU 1400 Displays (G2000) - Removal/Installation.

(3) After the switch installation do the steps that follow:

(a) Apply external power on the airplane

(b) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(c) Set the AVIONICS MASTER switch (SW04) to the ON position.

(d) Set the CROSS TIE switch (SW03) to the ON position.

(e) Make sure that the ELT is not transmitting.

(4) If the ELT is transmitting do the applicable step that follows:

(a) Reset the Artex 200 by turning the unit OFF, then back to ARM. If the ELT does not reset, turn the unit OFF, remove, and service

(b) Reset the Artex ME406 by turning the unit ON, then back to ARM.

(5) Set the master BATT switches (left and right) to the OFF position.

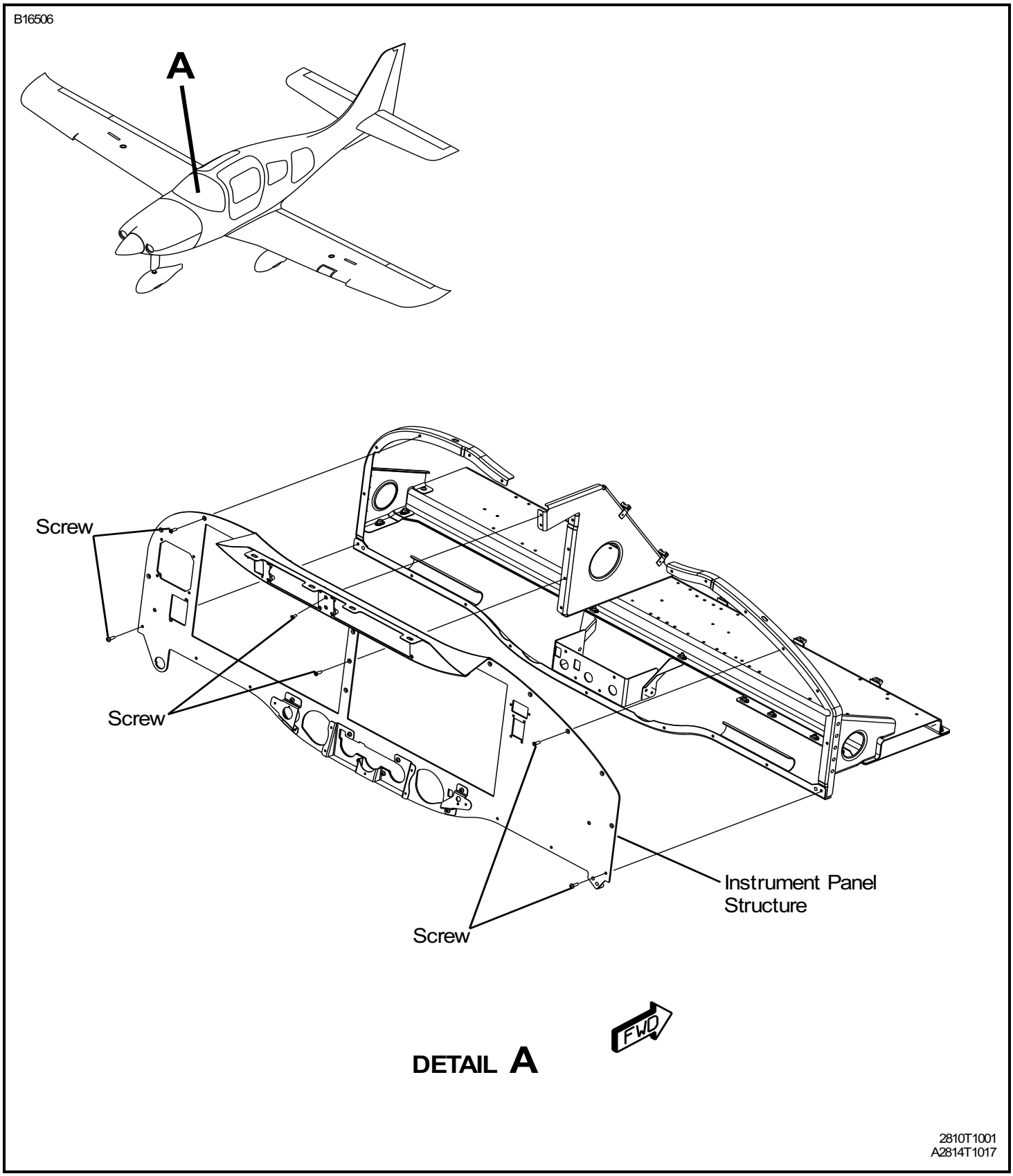
(6) Set the AVIONICS MASTER switch to the OFF position.

(7) Set the CROSS TIE switch (SW03) to the OFF position.

(8) Remove external electrical power from the airplane.

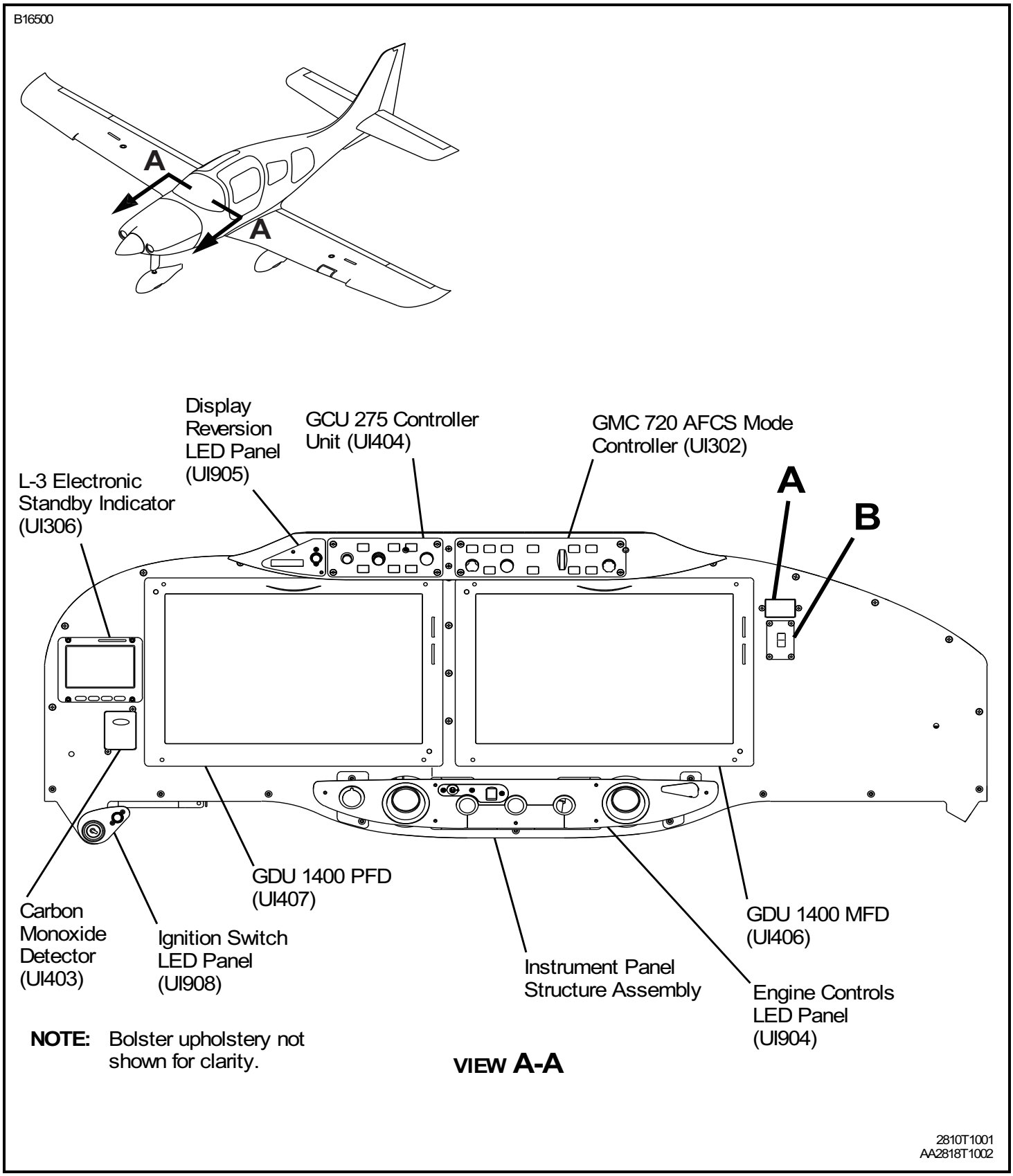
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Figure 401 : Sheet 1 : Instrument Panel Installation



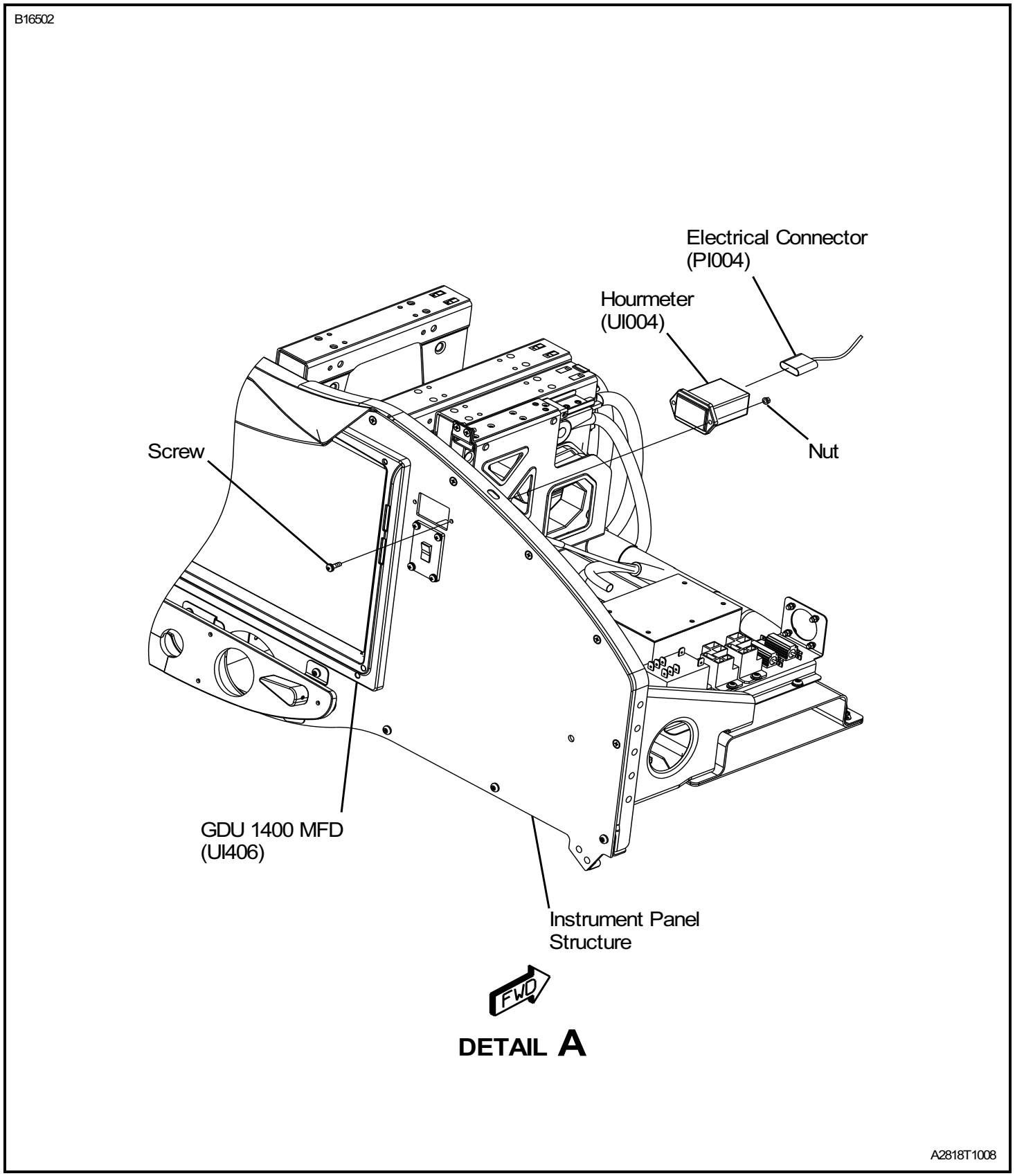
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Figure 402 : Sheet 1 : Instrument Panel Components Installation



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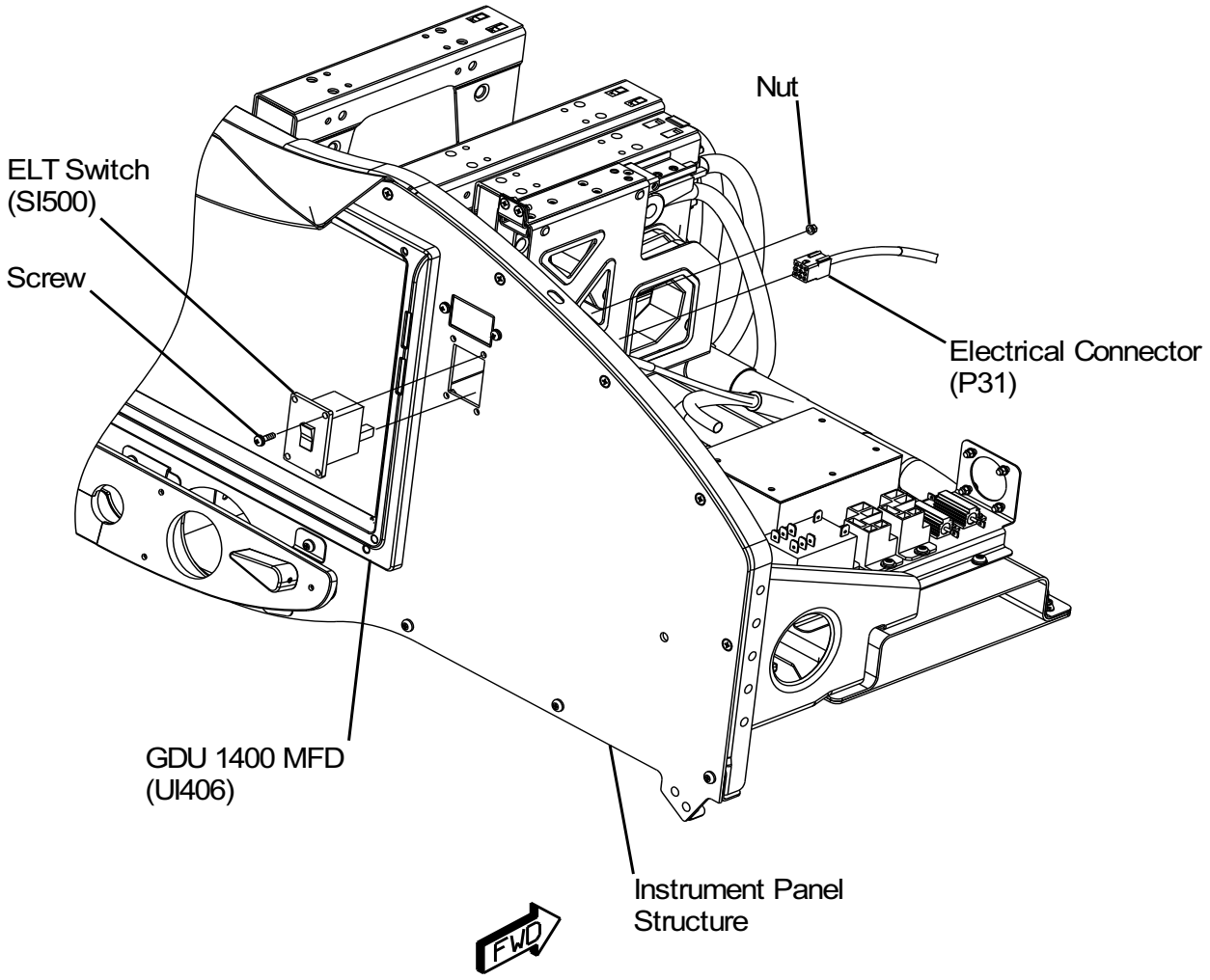
Figure 402 : Sheet 2 : Instrument Panel Components Installation



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Figure 402 : Sheet 3 : Instrument Panel Components Installation

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DETAIL B

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BOLSTER UPHOLSTERY ASSEMBLY (T240) - REMOVAL/INSTALLATION

1. General

A. This section gives the procedures for the removal and installation of the instrument panel Bolster Upholstery Assembly for airplanes that have the Garmin G2000 system installed.

2. Bolster Upholstery Assembly Removal/Installation

A. Remove the Bolster Upholstery Assembly (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the off position.

(4) If necessary, remove the Multifunction Display (MFD). Refer to Chapter 34, Garmin GDU 1400 Displays (G2000) - Removal/Installation.

NOTE: When the MFD is removed from the instrument panel there is easier access to the electrical connectors that must be disconnected/connected as applicable, to remove and/or install the bolster assembly.

(5) Remove the Ignition Switch LED Panel. Refer to Interior LED Panels (T240) - Removal/Installation, Ignition Switch LED Panel - Removal/Installation.

(6) Remove the Engine Control LED Panel. Refer to Interior LED Panels (T240) - Removal/Installation - Removal/Installation, Engine Control LED Panel - Removal/Installation.

(7) On the left and right outboard sides of the bolster panel, remove the nuts, and washers that attach the Bolster Upholstery Assembly to the instrument panel, frame assembly, and bolster bracket.

(8) Remove the Bolster Upholstery Assembly from the airplane.

B. Install the Bolster Upholstery Assembly (Refer to Figure 401).

(1) Put the Bolster Upholstery Assembly in its correct position on the instrument panel, frame assembly and bolster bracket.

(2) Install the nuts, and washers that attach the Bolster Upholstery Assembly to the instrument panel, frame assembly, and bolster bracket.

NOTE: If necessary, use tie straps to hold wire bundles and air ducts in their correct position.

(3) Install the Ignition Switch LED Panel. Refer to Interior LED Panels (T240) - Removal/Installation, Ignition Switch LED Panel - Removal/Installation.

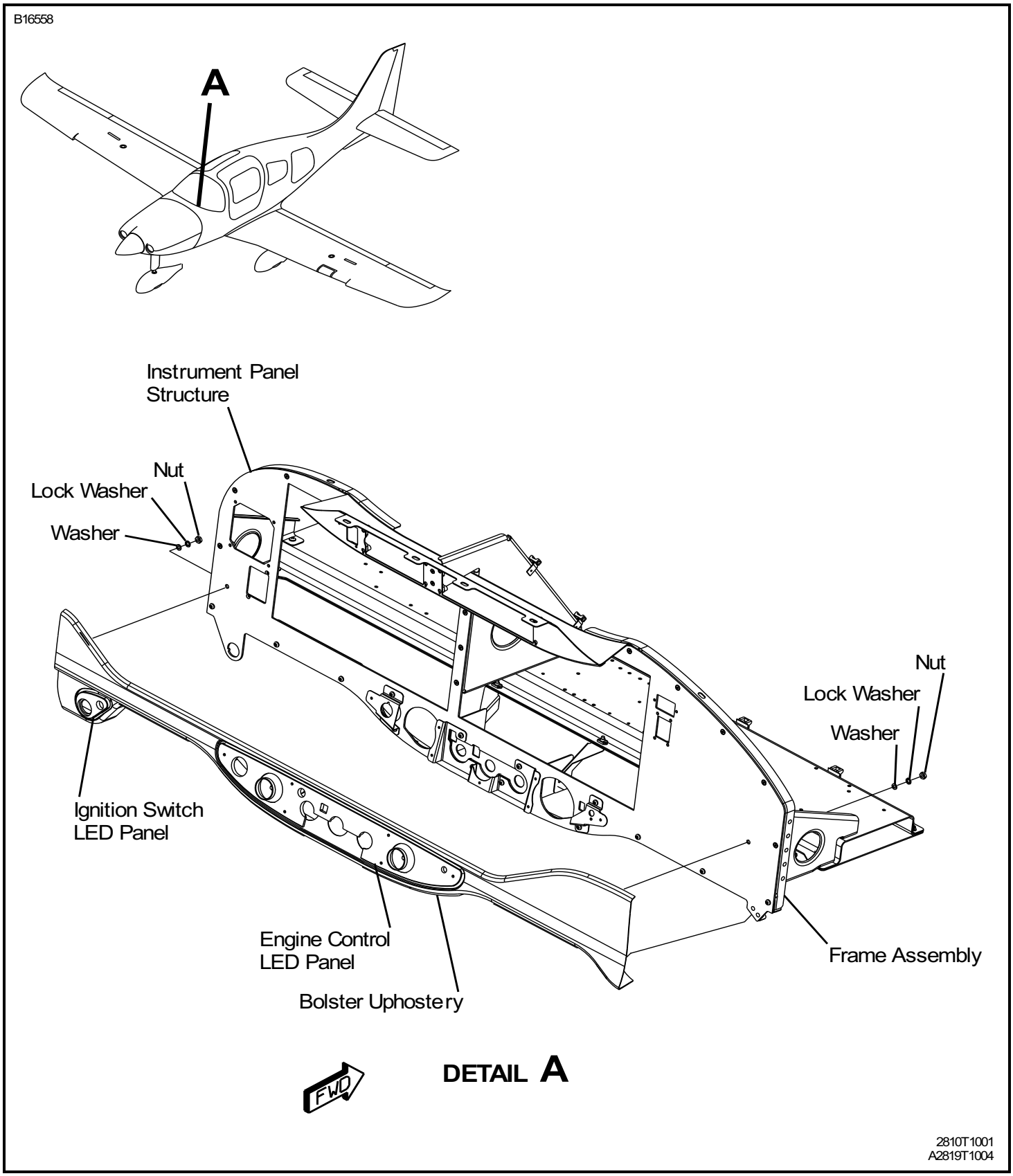
(4) Install the Engine Control LED Panel. Refer to Interior LED Panels (T240) - Removal/Installation - Removal/Installation, Engine Control LED Panel - Removal/Installation.

(5) If necessary, install the Multifunction Display (MFD). Refer to Chapter 34, Garmin GDU 1400 Displays (G2000) - Removal/Installation.

(6) If necessary, install instrument panel components. Refer to Instrument and Electrical Panels (G2000) - Removal/Installation.

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Figure 401 : Sheet 1 : Bolster Upholstery Assembly Installation



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CENTER CONSOLE (T240) - REMOVAL/INSTALLATION

1. General

A. This section gives the removal and installation procedures for the center console. For a general description of the center console, refer to Equipment/Furnishings - General.

2. Tools and Equipment

A. No special tools or equipment are required for this procedure.

3. Center Console

A. Remove the Center Console (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) are in the OFF position.

(3) Remove the touchscreen controller. Refer to Chapter 34, Garmin G2000 Touchscreen Controller - Removal/Installation.

(4) Remove the right GDU 1400. Refer to Chapter 34, Garmin GDU 1400 Displays (G2000) - Removal/Installation.

(5) Remove the pilot and copilot seats.

(6) Remove the carpet around the center console.

(7) Remove the center console access panel.

NOTE: The access panel is attached to the console with fabric fasteners. To remove, lift at one corner and continue to lift around the panel.

(8) Remove the tie straps from the duct that is attached to the plenum on the upper center console.

(a) Pull the duct away from the plenum.

(9) Disconnect electrical connectors JI508, JI507, J307, and PC006.

(10) Remove the cotter pin, washer, and pin from the bottom of the fuel selector shaft.

(11) Remove the screws and washers that attach the upper center console to the instrument panel.

(12) Remove the screws that attach the upper center console to the lower console.

(13) Remove the screws and washers that attach the upper console to the Attitude Heading Reference System (AHRS) shelf.

(14) Remove the screws and washers that attach the upper center console to the floor.

(15) Carefully remove the upper center console from the airplane.

(16) Remove the screws and washers that attach the lower console to the Attitude Heading Reference System (AHRS) shelf.

(17) Remove the screws and washers that attach the lower center console to the floor.

(18) Carefully remove the lower center console from the airplane.

B. Install the Center Console (Refer to Figure 401).

(1) Carefully put the lower center console in position.

(2) Carefully put the upper center console in position while you align the fuel selector shaft with the fuel selector valve.

(3) Install the screws that attach the upper center console to the lower console.

(4) Install the screws and washers that attach the lower center console to the floor.

(5) Install the screws and washers that attach the lower center console to the AHRS shelf.

(6) Install the screws and washers that attach the upper center console to the floor.

(7) Install the screws and washers that attach the upper center console to the instrument panel.

(8) Install the screws and washers that attach the upper center console to the AHRS shelf.

(9) Install the pin, washer, and cotter pin in the bottom of the fuel selector shaft. Refer to Chapter 20, Safetying - Maintenance Practices.

(10) Visually inspect the connectors to make sure there are no bent or damaged pins.

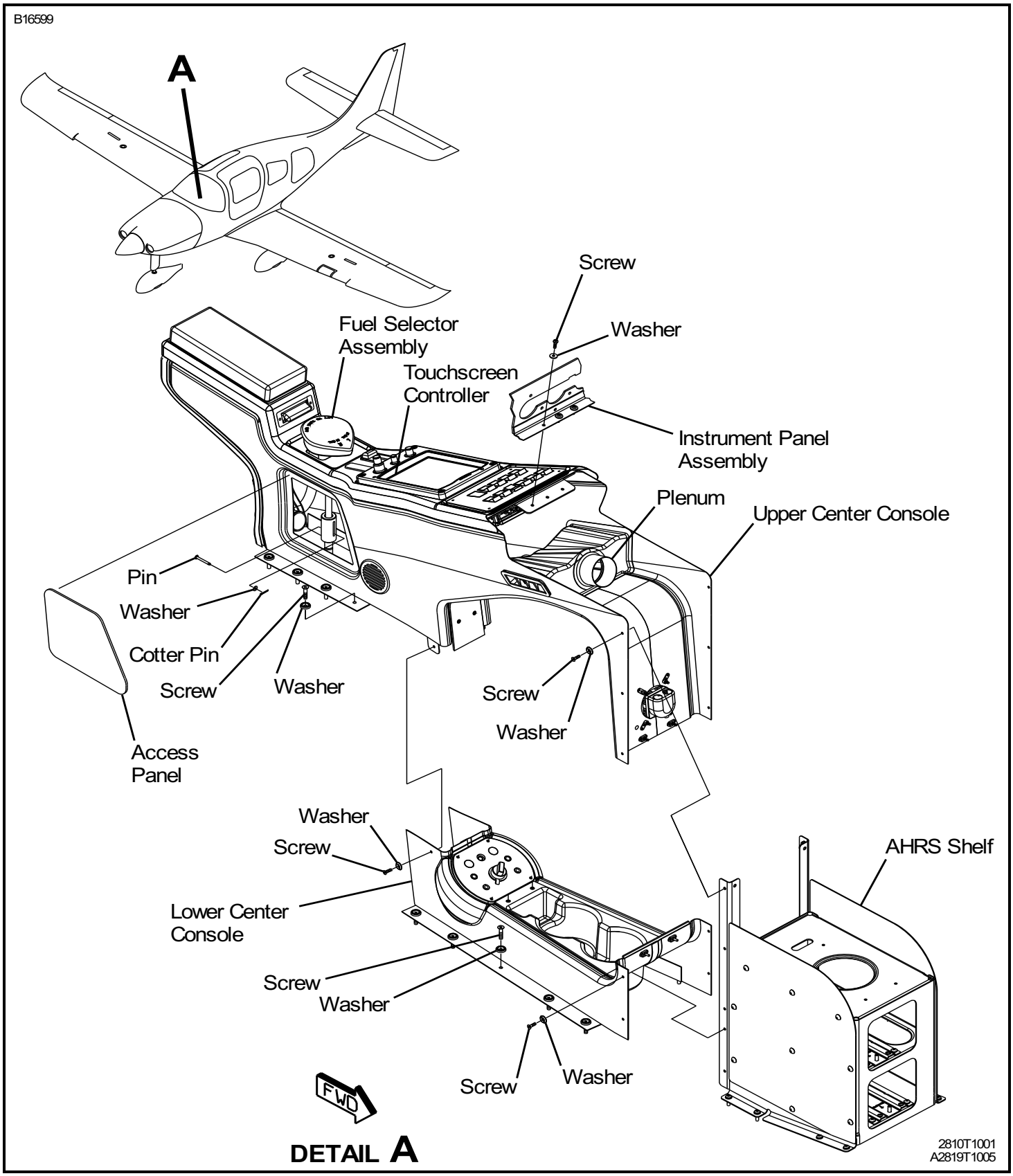
(a) Repair any damage.

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(11) Connect electrical connectors JI508, JI507, J307, and PC006.
(12) Install the duct on the plenum.
    (a) Install the tie straps that attach the duct to the plenum on the upper center console.
(13) Install the center console access panel.
(14) Install the carpet around the center console.
(15) Install the pilot and copilot seats.
(16) Install the touchscreen controller. Refer to Chapter 34, Garmin G2000 Touchscreen Controller - Removal/Installation.
(17) Install the right GDU 1400. Refer to Chapter 34, Garmin G2000 Displays - Removal/Installation.
(18) Apply external electrical power on the airplane.
(19) Set the master BATT switches (left SW01 and right SW02) to the ON position.
(20) Set the AVIONICS MASTER switch (SW04) to the ON position.
(21) Set the CROSS TIE switch (SW03) to the ON position.
(22) Make sure that all components operate correctly.
(23) Set the master BATT switches (left SW01 and right SW02) to the OFF position.
(24) Set the AVIONICS MASTER switch (SW04) to the OFF position.
(25) Set the CROSS TIE switch (SW03) to the OFF position.
(26) Remove external electrical power from the airplane.

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Figure 401 : Sheet 1 : Center Console Installation



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CENTER CONSOLE DIMMER SWITCH (T240) - REMOVAL/INSTALLATION

1. General

A. This section gives the removal and installation procedures for the each of the two center console dimmer switches, CB/SW (SW24) and FLT INST (SW23). The CB/SW dimmer controls the interior LED panels lighting intensity. The FLT INST dimmer controls the Primary Flight Display, Multifunctional Display and the GTC 570 Touchscreen Controller displays light intensity. The switches are found aft of the GTC 570 Touchscreen controller on the center console. For a general description of the center console dimmer switches refer to Lighting - General. To troubleshoot LED panel or flight display lighting problems refer to Interior LED Panel and Display Lighting (T240) - Troubleshooting.

2. Tools and Equipment

A. No special tools or equipment are required for this procedure.

3. Center Console Dimmer Switch Removal/Installation

A. Remove the Center Console Dimmer Switch (Refer to Figure 401).

NOTE: The removal procedures for each of the two center console dimmer switches are typical.

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are set to the OFF position.

(3) Make sure that the AVIONICS MASTER switch (SW04) is set to the OFF position.

(4) Remove the access panel on the copilot's side of the center console.

(a) If necessary, remove the copilot's seat or seat cushion. Refer to Airplane Seats - Maintenance Practices.

(5) Disconnect the applicable electrical connector as follows:

(a) For the CB/SW (SW24) dimmer (left) disconnect the dimmer electrical connector JI007 from the dimmer electrical connector PI007.

(b) For the FLT INST (SW23) dimmer (right) disconnect the wiring bundle electrical connector JI006 from the dimmer electrical connector PI006.

(6) On the applicable dimmer assembly, carefully push in on each of the assemblies retaining clips at the same time, and pull the switch dimmer from the center console.

(7) Remove the dimmer switch from the airplane.

B. Install the Center Console Dimmer Switch (Refer to Figure 401).

NOTE: The installation procedures for each of the two center console dimmer switches are typical.

(1) Visually inspect the connectors to make sure there are no bent or damaged pins.

(a) Repair any damage.

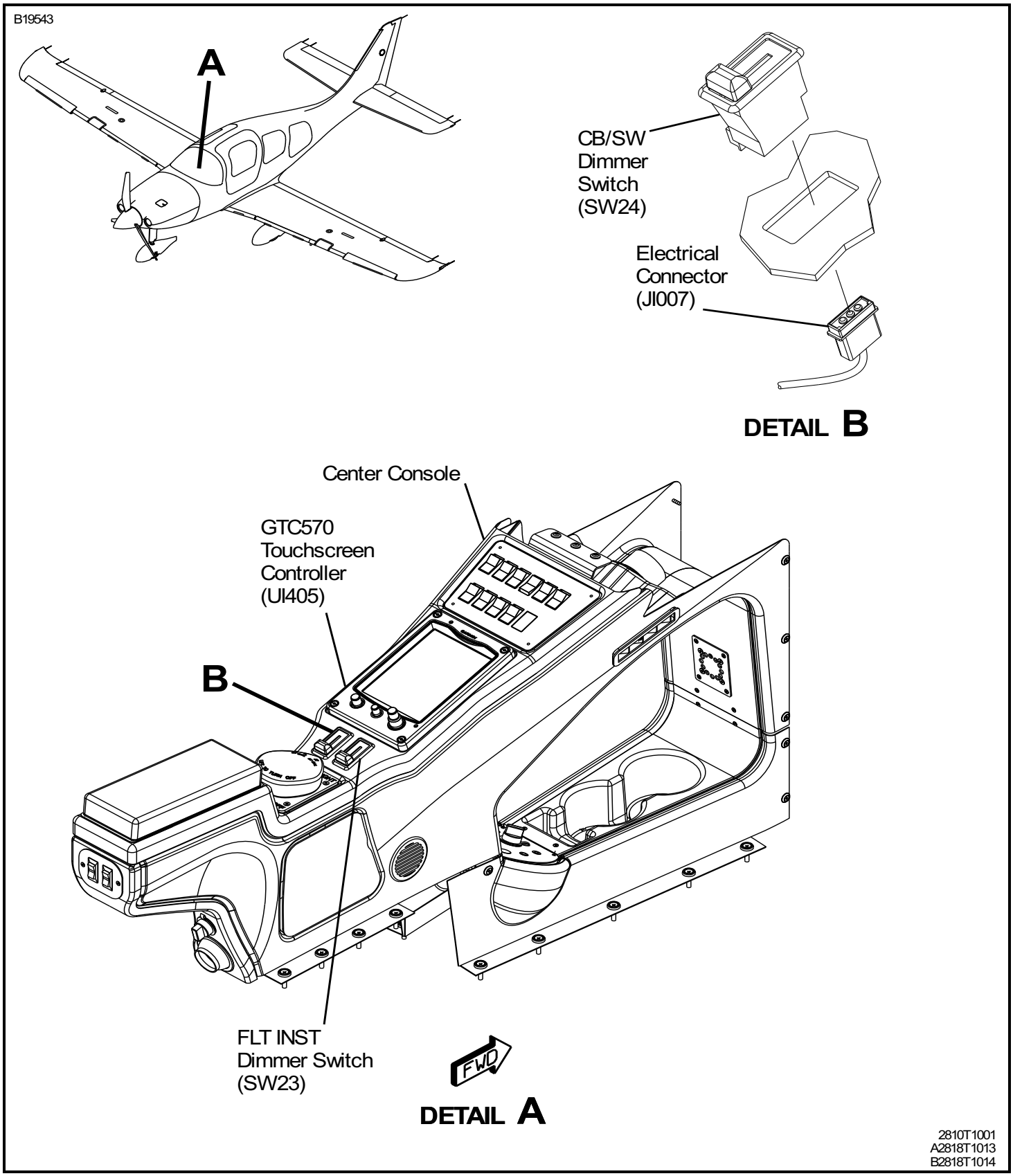
(2) Put the switch dimmer in its correct position on the center console and carefully push it in the console dimmer opening until the retaining clips are locked in place.

(3) Connect the applicable wiring bundle electrical connector to the dimmer switch electrical connector.

(4) Do a check of the dimmer operation. Refer to Interior LED Panel and Flight Displays Lighting (T240) - Adjustment/Test.

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Figure 401 : Sheet 1 : Center Console Dimmer Switch Installation



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CENTER CONSOLE SWITCH PANEL (T240) - REMOVAL/INSTALLATION

1. General

A. This section gives the removal and installation procedures for the center console switch panel. For a general description of the Center Console Switch Panel, refer to Equipment/Furnishings - General.

2. Tools and Equipment

A. No special tools or equipment are required for this procedure.

3. Center Console Switch Panel Removal/Installation

A. Remove the Center Console Switch Panel (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the AVIONICS MASTER switch (SW04) is set to the OFF position.

(3) Make sure that the master BATT switches (left SW01 and right SW02) are set to the OFF position.

(4) Remove the screws that attach the switch panel to the center console.

(5) Carefully pull the switch panel away from the console.

(6) Disconnect the electrical connector from the switch panel.

NOTE: PC006 for Airplane 01159 and Airplanes 02001 thru 02048; PC001 and PC006 for Airplanes 02049 and On.

(7) Remove the switch panel from the airplane.

B. Install the Center Console Switch Panel (Refer to Figure 401).

(1) Visually inspect the connector to make sure there are no bent or damaged pins.

(a) Repair any damage.

(2) Connect the electrical connector to the switch panel.

NOTE: PC006 for Airplane 01159 and Airplanes 02001 thru 02048; PC001 and PC006 for Airplanes 02049 and On.

(3) Carefully put the switch panel in position on the center console.

(4) Install the screws that attach the switch panel to the center console.

(5) Apply external electrical power on the airplane.

(6) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(7) Set the AVIONICS MASTER switch (SW04) to the ON position.

(8) Set the CROSS TIE switch (SW03) to the ON position.

(9) Make sure that all switches operate correctly. Refer to the applicable systems for a check of the switches.

(10) Set the AVIONICS MASTER switch (SW04) to the OFF position.

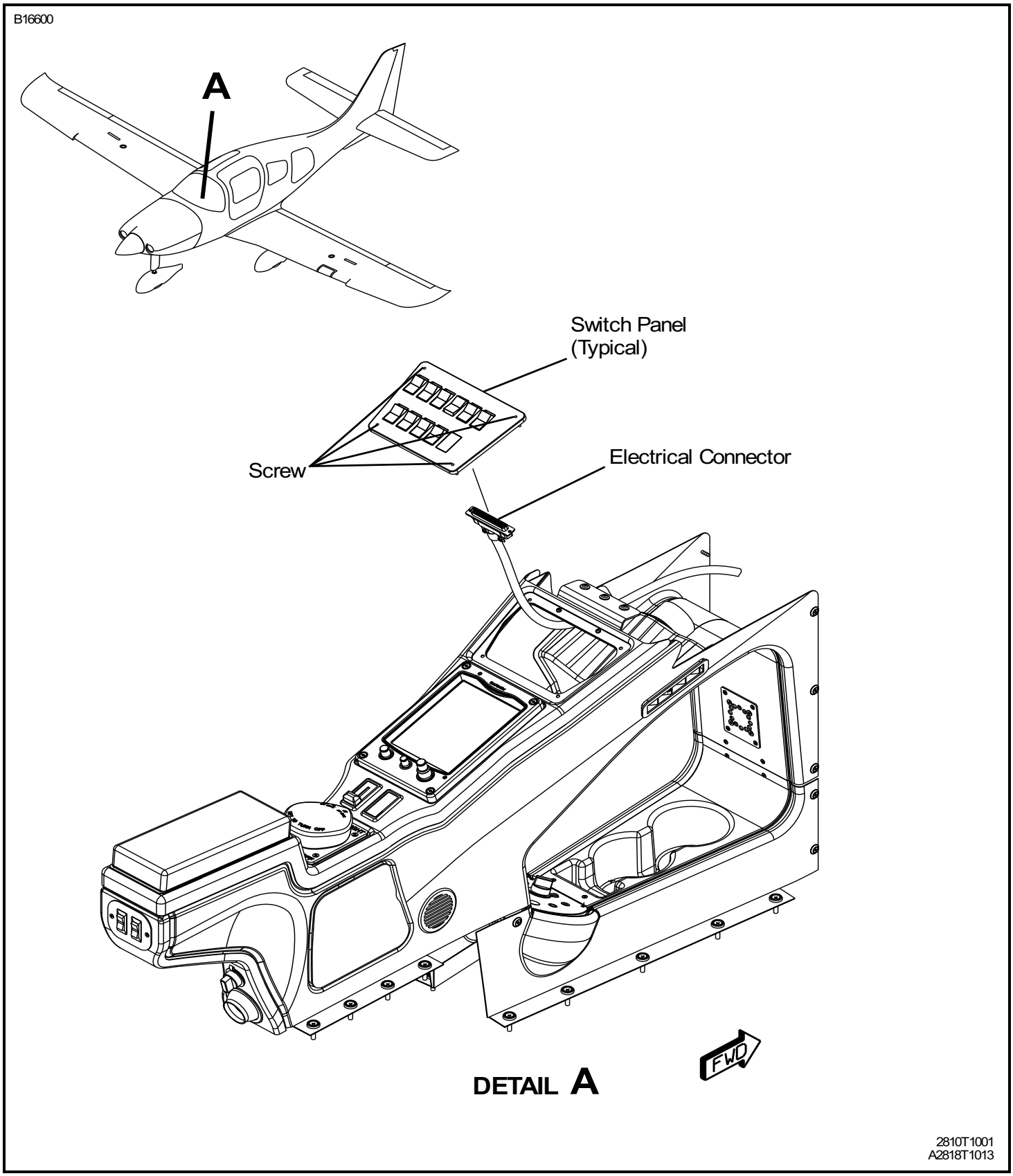
(11) Set the master BATT switches (left SW01 and right SW02) to the OFF position.

(12) Set the CROSS TIE switch (SW03) to the OFF position.

(13) Remove external electrical power from the airplane.

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Figure 401 : Sheet 1 : Center Console Switch Panel Installation



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SWITCH PANEL ROCKER SWITCH (T240) - REMOVAL/INSTALLATION

1. General

A. This section gives the removal and installation procedures for the center console switch panel rocker switches. The switches are installed in the center console switch panel. If an optional system or systems are installed in the airplane, the configuration of the panel and number of switches installed will be different. The removal and installation procedures for the switches is identical. For a general description of the Center Console Switch Panel, refer to Equipment/Furnishings - General.

2. Tools and Equipment

A. No special tools or equipment are required for this procedure.

3. Switch Panel Rocker Switch Removal and Installation

A. Remove the Switch Panel Rocker Switch (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are set to the OFF position.

(3) Make sure that the AVIONICS MASTER switch (SW04) is set to the OFF position.

(4) Remove the center console switch panel. Refer to Center Console Switch Panel (T240) - Removal/Installation.

(5) Identify the electrical wires connected to the rocker switch assembly electrical terminals.

(a) Remove the wires from the switch assembly.

(6) Remove the screws that attach the switch assembly to the rear of the switch panel backplate.

(a) Remove the switch from the switch panel backplate.

NOTE: The switch is removed from the rear of the backplate.

B. Install the Switch Panel Rocker Switch (Refer to Figure 401).

(1) Before you install the switch, use best shop practices at the rear of the assembly to mark the electrical terminals 1 through 4. Use the removed switch as a reference.

(2) Put the switch in its correct position in the switch panel backplate.

NOTE: The switch is installed from the rear of the backplate.

(a) Make sure that the switch is aligned in the backplate for the applicable system correct on and off operation.

(b) Install the screws that connect the switch assembly to the backplate.

(3) Identify and connect the electrical wires to the switch assembly electrical terminals.

(4) Install the center console switch panel. Refer to Center Console Switch Panel (T240) - Removal/Installation .

(5) Supply external electrical power to the airplane.

(6) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(7) Set the AVIONICS MASTER switch (SW04) to the ON position.

(8) Set the CROSS TIE switch (SW03) to the ON position.

(9) Make sure that the switch operates correctly. Refer to the applicable system for a check of the switch.

(10) Set the master BATT switches (left SW01 and right SW02) to the OFF position.

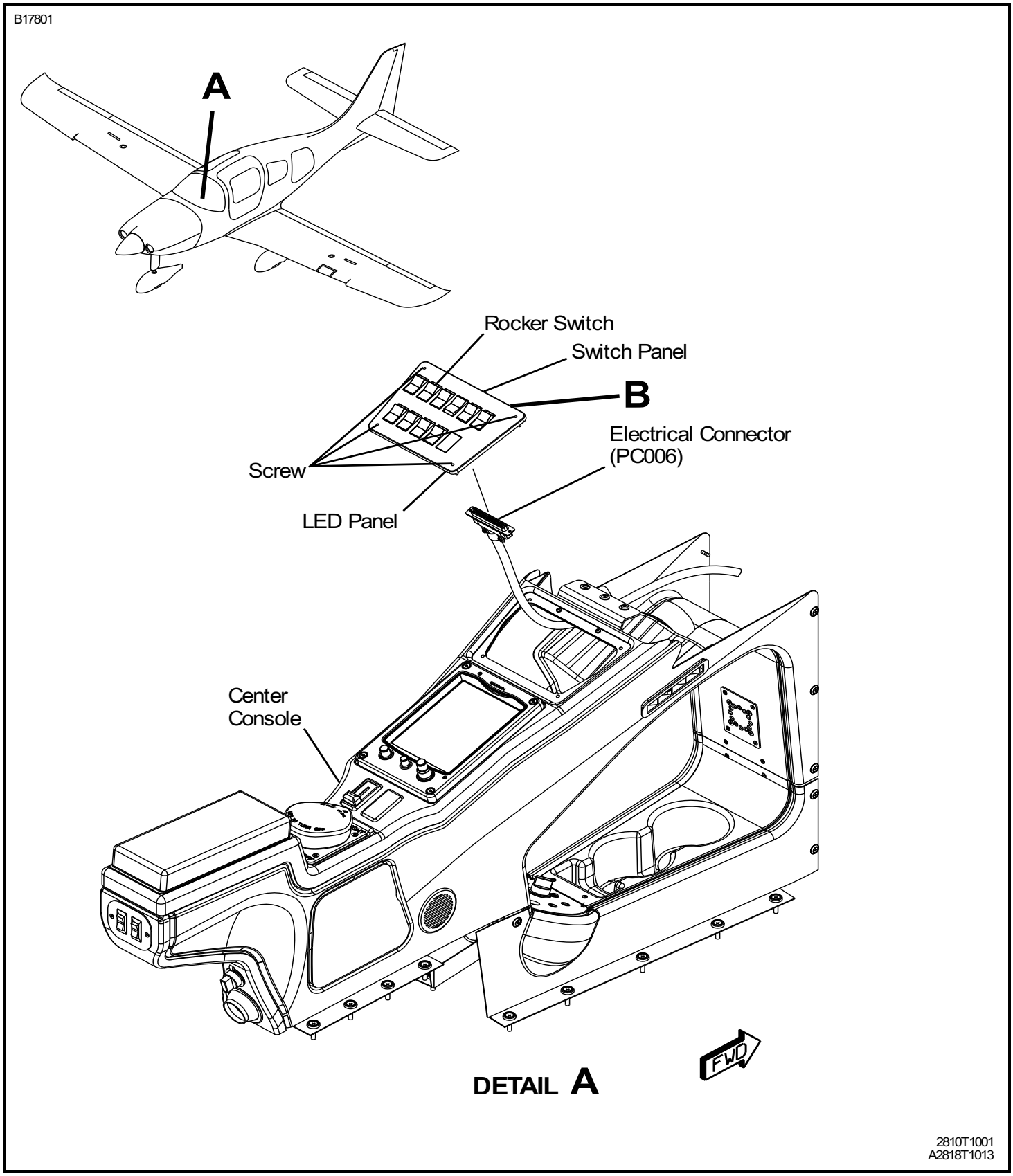
(11) Set the AVIONICS MASTER switch (SW04) to the OFF position.

(12) Set the CROSS TIE switch (SW03) to the OFF position.

(13) Remove external electrical power from the airplane.

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Figure 401 : Sheet 1 : Switch Panel Rocker Switch Installation

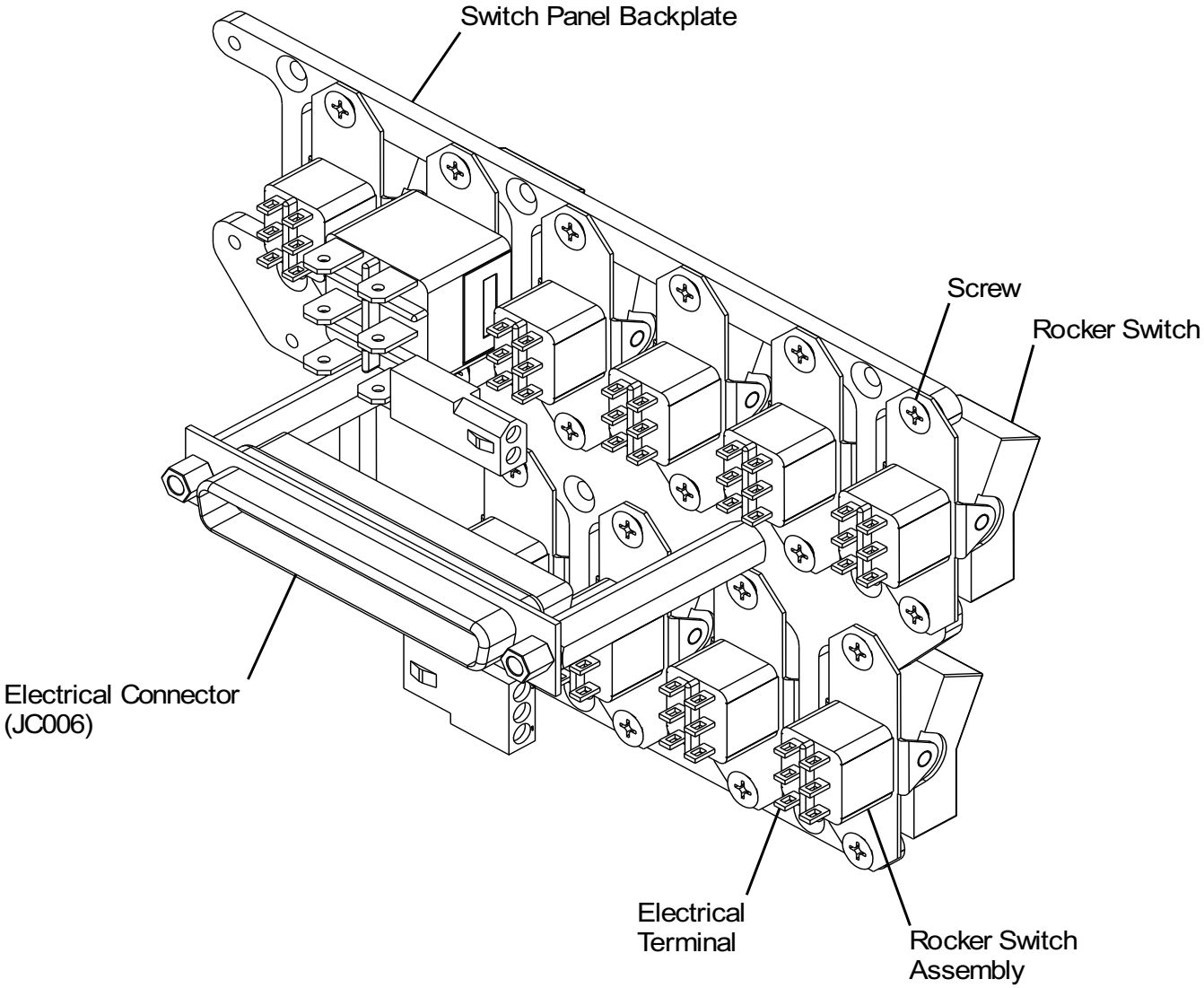


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Figure 401 : Sheet 2 : Switch Panel Rocker Switch Installation

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NOTE: Switch Panel Assembly shown with LED Panel removed for clarity.



DETAIL B

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DOORS AND SIDE PANELS - DESCRIPTION AND OPERATION

1. Doors and Side Panels

A. The cabin doors and baggage door removal and installation are covered in Section 52-10-00, Cabin and Baggage Doors.

B. **Cabin Door Armrest** - The door armrest is attached to the door with three 8-32 screws and washers accessible through the bottom of the door. Torque these nuts 20 to 25 in.-lbs. when reinstalling.

C. **Baggage Door Surround** - Removal of the baggage door surround panel is covered in Section 52-10-00, Cabin and Baggage Doors.

D. **Baggage Door Interior Panel** - Removal and installation of the baggage door interior panel is covered in Section 52-10-00, Cabin and Baggage Doors.

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INTERIOR PANELS - MAINTENANCE PRACTICES

1. General

A. This section gives the maintenance practices for the Forward Center Overhead Light Panel, Aft Center Overhead Light Panel, Left and Right Instrument Upholstered Panel (Garmin G1000 Option), Lower Upholstered Instrument Panel, Door Tread, Forward Lower Side Panels, Middle Lower Side Panels, and Forward and Aft Overhead Side Panels. The section also gives maintenance practices for the left and right Baggage Lower Side Panels, Aileron Torque Arm Cover, Hat Rack Cushion, Hat Rack Carpet, and Baggage Floor Carpet. Cargo Compartment components include the cargo net and the forward cargo net.

B. For the T240 Instrument panel upholstered panel procedures, refer to Bolster Upholstery Assembly (T240) - Removal/Installation.

2. Forward Center Overhead Light Panel (FCOLP)

A. Removal of the FCOLP

(1) Removal of the FCOLP - Airplanes -41002 thru -41039

(a) Remove the four overhead swivel lights and courtesy light. Refer to Chapter 33, Interior Lighting - Maintenance Practices.

(b) Remove the nut and washer attaching the low pressure oxygen shut off valve switch guard to the overhead panel and remove the guard.

(c) Remove the two pan head Phillips screws adjacent to the oxygen system cabin manifold.

(d) While supporting the forward center overhead light panel, remove the flat head 6-32 screw behind each overhead swivel light and the two flat head screws behind the courtesy light. Refer to Figure 201, Sheet 1.

(e) Lower the forward center overhead light panel, and disconnect the wiring.

(2) Removal of the FCOLP - Airplanes -41040 and On

(a) Remove the four overhead swivel lights and courtesy light. Refer to Chapter 33, Interior Lighting - Maintenance Practices.

(b) While supporting the forward center overhead light panel, remove the flat head 6-32 screw behind each overhead swivel light and the two flat head screws behind the courtesy light. Refer to Figure 201, Sheet 2.

(c) Carefully lower the forward center overhead light panel, and disconnect the wiring and the flexible oxygen hose (if built-in oxygen system is present). Immediately plug or cap both ends of the flexible oxygen hose quick disconnect fitting. Do not kink, stretch or damage the flexible oxygen hose. Refer to Chapter 35 for specific procedures.

CAUTION: Do not disconnect the flexible oxygen hose connecting the cabin distribution manifold and the low-pressure oxygen manual shutoff valve to the quick disconnect fitting without first consulting the procedures and requirements in Chapter 35.

B. Installation of the FCOLP - Installation is the reverse of the above. Torque the screws behind the lights 30 to 36 in.-lbs. Torque the screws near the oxygen system cabin manifold 10 to 12 in.-lbs.

3. Aft Center Overhead Light Panel (ACOLP)

NOTE: The removal and installation of the ACOLP for airplanes that are non-air conditioning ready, that are air conditioning ready and airplanes with the air conditioning option installed are similar.

A. Removal of the ACOLP (Refer to Figure 201).

(1) Remove the forward center overhead light panel. Refer to Removal of FCOLP above.

(2) Remove the hat rack cushion.

(3) Remove the courtesy light per instructions in Chapter 33.

(4) While supporting the aft center overhead light panel, remove the two pan head 10-32 screws at the forward bracket and the pan head 10-32 screw behind the courtesy light.

(5) Slide the panel forward off the clip located on the rear bulkhead behind the hat rack cushion.

B. Installation of the ACOLP - Installation is the reverse of the above. Torque the screws 30 to 36 in.-lbs.

4. Left Instrument Upholstered Panel (Garmin G1000 Option)

A. Removal of the Left Instrument Upholstered Panel (Refer to Figure 202).

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(1) Remove the glareshield as follows:

(a) For the Garmin G1000 glareshield maintenance procedures, refer to Instrument Panels and Electrical Panels - Maintenance Practices.

(2) Remove the lower instrument panel per the Lower Upholstered Instrument Panel removal instructions below.

(3) Remove the two 8-32 pan head screws, three 8-32 flat head screws and washers, and remove the left instrument panel.

B. Installation of the Left Upholstered Instrument Panel - Installation is the reverse of removal.

5. Right Instrument Upholstered Panel (Garmin G1000 Option)

A. Removal of the Right Instrument Upholstered Panel (Refer to Figure 202).

(1) Remove the glare shield as follows:

(a) For the Garmin G1000 glareshield maintenance procedures, refer to Instrument Panels and Electrical Panels - Maintenance Practices.

(2) Remove the lower instrument upholstered panel per the Lower Instrument Upholstered Panel removal in this section.

(3) Remove the two 8-32 pan head screws, three 8-32 flat head screws and washers, and remove the right instrument panel.

B. Installation of the Right Upholstered Instrument Panel - Installation is the reverse of removal.

6. Lower Instrument Upholstered Panel (Garmin G1000 Option)

A. Removal of the Lower Instrument Upholstered Panel (Refer to Figure 202).

(1) Remove the two air valves (eyeball vents) as follows:

(a) For the Garmin G1000 air valves refer to Chapter 21, Air Distribution - Maintenance Practices.

(2) Slide out and remove the lower instrument upholstered panel.

B. Installation of the Lower Upholstered Instrument Panel - Installation is the reverse of removal.

7. Door Tread

A. Removal of the Door Tread

(1) Remove the five pan head 6-32 screws and washers located on the exterior side of the door joggle. Refer to Figure 204.

(2) Lift off the door tread that rests on the MLSPL and FLSPL. Refer to Figure 203.

B. Installation of the Door Tread - Installation is the reverse of above.

(1) Torque fasteners snug.

8. Forward Lower Side Panels, Left (FLSPL) and Right (FLSPR)

A. Removal of the FLSPL and FLSPR

(1) Remove the door tread per the Removal of the Door Tread procedure.

(2) Remove the two flat head 6-32 screws at the top of the panel that were previously covered by the door tread. Refer to Figure 204.

(3) Remove the flat head 10-32 screw and finishing washer located at the lower aft end of the panel.

(4) Detach the control stick boot from the FLSP. The boot is attached to the panel with Velcro.

B. Installation of the FLSPL and FLSPR - Installation is basically the reverse of the above with the following exception to attach the control stick boot to the panel:

(1) Slide the FLSP part-way down over the control stick.

(2) With the top of the panel as far inboard as possible against the control stick, reach behind the panel, from the top, and attach the outboard portion of the control stick boot to the panel.

(3) Tilt the lower edge of the panel as far inboard as possible, and reach up under the panel to finish attaching the control stick boot (forward, inboard, and aft) to the panel.

(4) Assure that the panel is not preloaded (the panel should not move out after the attachment screws are removed) so if the screw were to loosen, there would be no interference with the rudder controls.

(5) Torque fasteners snug.

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9. Middle Lower Side Panels, Left (MLSPL) and Right (MLSPR)

A. Removal of the MLSPL and MLSPR

(1) Remove the door tread per the Removal of the Door Tread procedure.

(2) Remove the two flat head 6-32 screws at the top of the panel that were previously covered by the door tread. Refer to Figure 204.

(3) Remove the flat head 10-32 screw and finishing washer located at the lower forward end of the panel.

(4) Disconnect the vent by clipping the tie wrap that holds the tubing to the eyeball vent and sliding the tubing off the eyeball vent. Since the tie wrap is cut (destroyed) during removal, a new tie wrap must be used when reassembling the heater ventilation tubing.

(5) Disconnect the headphone/intercom jacks and microphone plugs per instructions in Chapter 23.

B. Installation of the MLSPL and MLSPR - Installation is the reverse of the above. Torque fasteners snug.

10. Forward Overhead Side Panels, Left (FOSPL) and Right (FOSPR)

A. Removal of the FOSPL and FOSPR

(1) Remove the FCOLP per the Removal of the FCOLP instructions.

(2) Remove the door tread per the Removal of the Door Tread procedure.

(3) Remove the six flat head 6-32 screws attaching the FOSP to the door joggle. Refer to Figure 205.

B. Installation of the FOSPL and FOSPR - Installation is the reverse of the above. Torque screws snug.

11. Aft Overhead Side Panels, Left (AOSPL) and Right (AOSPR)

A. Removal of the AOSPL and AOSPR

(1) Remove the FCOLP per the Removal of FCOLP instructions.

(2) Remove the front shoulder belt guide per removal instructions in Section 25-13-00, Seat Belts and Restraints.

(3) Remove the rear seat shoulder belt retractor per removal instructions in Section 25-13-00, Seat Belts and Restraints.

(4) Remove the door tread per the Removal of Door Tread procedure.

(5) Remove the five flat head 6-32 screws attaching the AOSP to the door joggle.

B. Installation of the AOSPL and AOSPR - Installation is the reverse of above. Torque the flat head screws snug.

12. Baggage Lower Side Panel, Left (BLSPL) and Right (BLSPR)

A. **Removal of the BLSPL and BLSPR**

(1) Remove the two flat head 10-32 screws located on the topside of the baggage lower side panel at the forward and aft end.

(2) Lift the baggage lower side panel straight up off the four locating brackets bonded to the floor.

B. Installation of the BLSPL and BLSPR- Installation is the reverse of the above. Torque the flat head screws snug.

13. Aileron Torque Arm Cover

A. Removal of the Aileron Torque Arm Cover (Refer to Figure 206).

(1) Remove the left or right rear seat bottom cushion as required per instructions in Section 25-10-00, Removal And Installation Of The Rear Seats And Crossbar.

(2) Remove the two flat head 6-32 screws.

B. Installation of the Aileron Torque Arm Cover - Installation is the reverse of the above. Torque the flat head screws snug.

14. Hat Rack Cushion

A. The hat rack cushion is a friction fit against the rear bulkhead. Slip fingers between the cushion and the carpet and pull on the cushion to remove. Push into position to replace. The ELT label must face forward.

15. Hat Rack Carpet

A. Removal of the Hat Rack Carpet - The hat rack carpet is secured to the hat rack floor by the hat rack baggage net. Remove the hat rack baggage net (refer to the Hat Rack Baggage Net item) to lift out the hat rack carpet.

B. Installation of the Hat Rack Carpet - Installation is the reverse of the above.

16. Baggage Floor Carpet

A. On some aircraft, the baggage floor carpet contains a flap allowing removal of the access panel beneath, without having to

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remove the carpet. Use the following procedures if baggage floor carpet removal is required.

B. Removal of the Baggage Floor Carpet

(1) Remove the two baggage net cinch strap loops per the Baggage Net Cinch Strap Loop item.

(2) Remove the four baggage net anchor plates per the Baggage Net Anchor Plate item.

(3) Remove the left and right baggage lower side panels per the Removal of BLSPL and BLSPR procedure.

(4) Remove the hat rack carpet per the Removal of Hat Rack Carpet procedure .

(5) Remove the rear seat backs per instructions in Section 25-10-00, Removal and Installation of the Rear Seats and Crossbar.

(6) Pull up on the carpet to remove.

C. Installation of the Baggage Floor Carpet - Installation is the reverse of the above.

17. Cargo Compartment

A. Upper Hat Rack Baggage Net Tie Down Bracket - The upper hat rack baggage net tie down bracket is attached to the fuselage with a hex head 1/4-28 bolt and washer. Apply Permatex Form-A-Gasket No. 2 to the first two threads on the bolt prior to installation. Torque the hex head bolt 72 to 84 in.-lbs. Locate the bracket with the bent ears forward.

B. Hat Rack Baggage Net - The hat rack baggage net is attached to the hat rack shelf with two hex head 1/4-28 bolts and washers. The bolt goes through a spacer to prevent crushing of the carpet foam. Torque the hex head bolt 72 to 84 in.-lbs. Locate the permanently attached baggage net brackets with the bent ears forward.

C. Baggage Net Cinch Strap Loop - Each baggage net cinch strap loop is attached to the baggage floor with two pan head 10-32 screws and washers. Torque the pan head screws 30 to 36 in.-lbs. when installing.

D. Baggage Net - The baggage net is attached to the floor at each corner with quick release fittings. Lift the locking block, and slide the post and locking block inward to detach.

E. Baggage Net Anchor Plate - The four baggage net anchor plates, located in the corners of the cargo compartment, are attached to the floor with two each flat head 10-32 screws. Torque the flat head screws 30 to 36 in.-lbs.

F. The cargo barrier net is attached to seven floor and fuselage with quick release end fittings. The cargo barrier net is removed and stored when not needed. To remove the net push in on the locking lever and remove each end fitting from the related net anchor. Refer to Figure 207.

18. Control Sticks

A. **Removal of the Control Stick**

(1) Lift the control stick handle up far enough to gain access to the metal collar inside. If necessary, cut the tie-wraps at the base of the stick to release the attaching wires. If difficulty is still encountered, apply a light to moderate amount of heat (such as from a heat gun) to help in the handle removal.

(2) Clean the adhesive from the mating surfaces.

(3) Surface prep the mating surfaces with alcohol, acetone, or equivalent.

(4) Apply a new adhesive (Hysol 9321 or equivalent) to the top and sides of the shaft collar and to the inside wall of the grip, taking care not to allow adhesive to overlap threaded hole

(5) The set screw for the control stick grip should face generally forward to hide the screw hole from view, but minor adjustments can be made to suit individual pilots.

(6) After functionally testing the grip switches, install a new tie wrap at the base of the stick for continued security of wires.

B. Control Stick Clearance Inspections - The following inspections should be done when any maintenance is done to the control stick or if interior panels around the control stick are removed and replaced.

(1) Inspection No. 1 - While sitting in the left seat, grasp the control stick below the grip, and move it throughout its entire range of travel, i.e., control stop to control stop. Ensure that neither the left of right stick grips make any contact with either of the side panels. If interference is noted, contact Cessna Aircraft Company immediately.

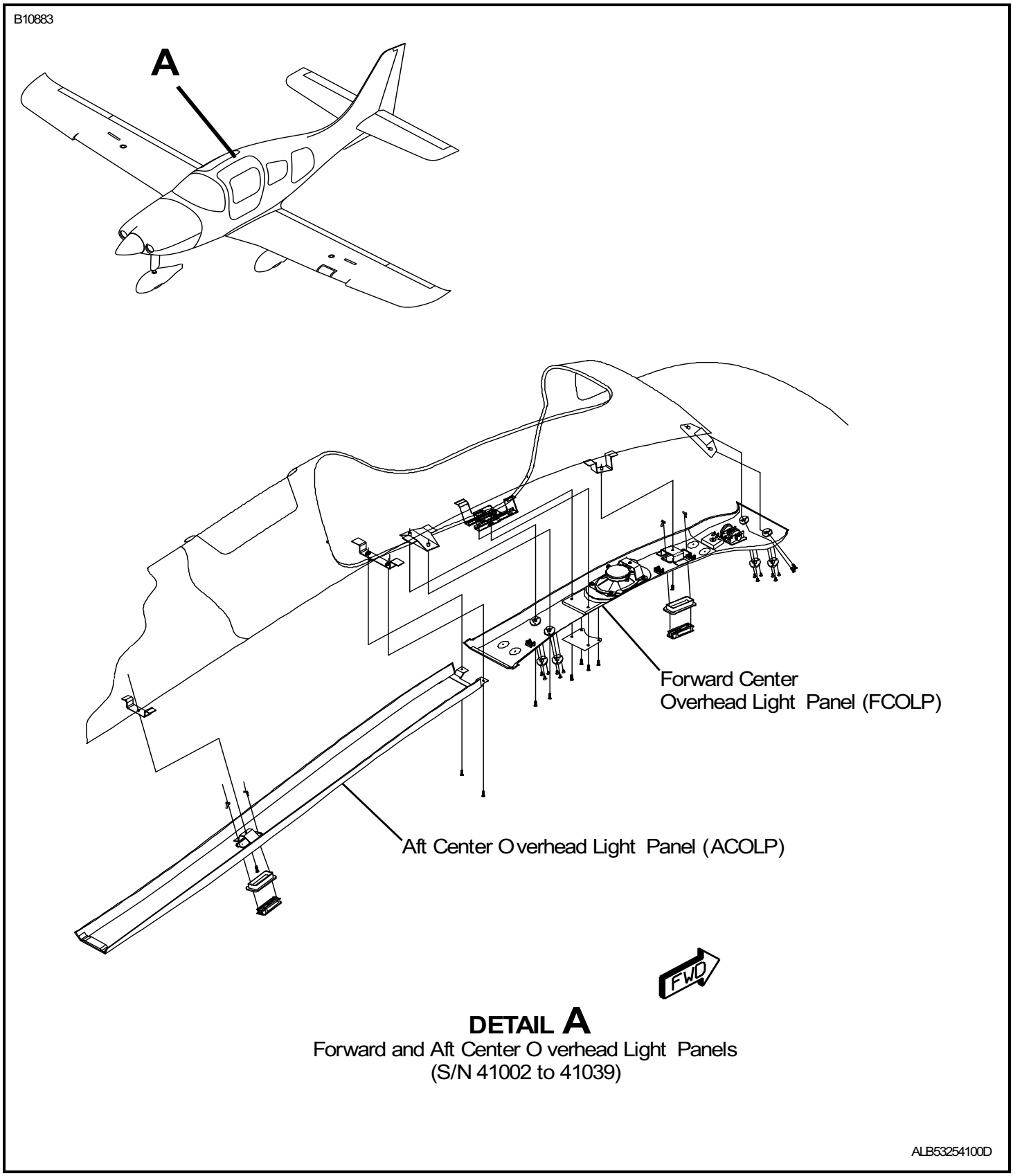
(2) Inspection No. 2 - While sitting in the left seat, grasp the left control stick grip normally, and move it to the full left aileron position. Next, while maintaining the full left aileron position, move the stick to the full aft elevator position. Ensure that the left hand does not interfere with the full aft travel of the stick. The left hand may brush the side panel; however, if the left aileron does not move, the clearance is adequate. If interference is noted, contact Cessna Aircraft Company immediately.

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(3) Inspection No. 3 - While sitting in the right seat, grasp the right control stick grip normally, and move it to the full right aileron position. Next, while maintaining the full right aileron position, move the stick to the full aft elevator position. Ensure that the right hand does not interfere with the full aft travel. The right hand may brush the side panel; however, if the right aileron does not move, the clearance is adequate. If interference is noted, contact Cessna Aircraft Company immediately.

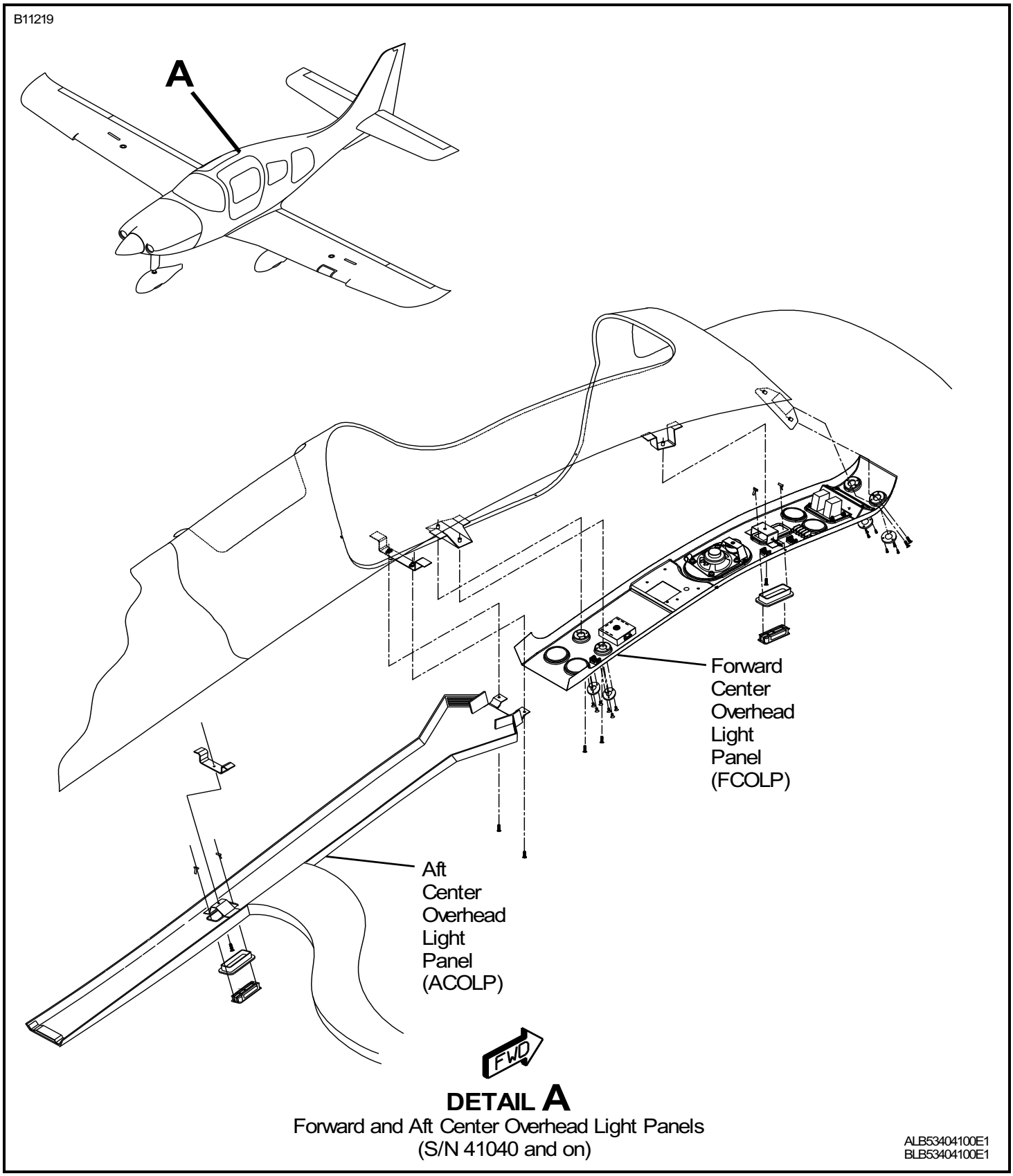
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Figure 201 : Sheet 1 : FCOLP & ACOLP



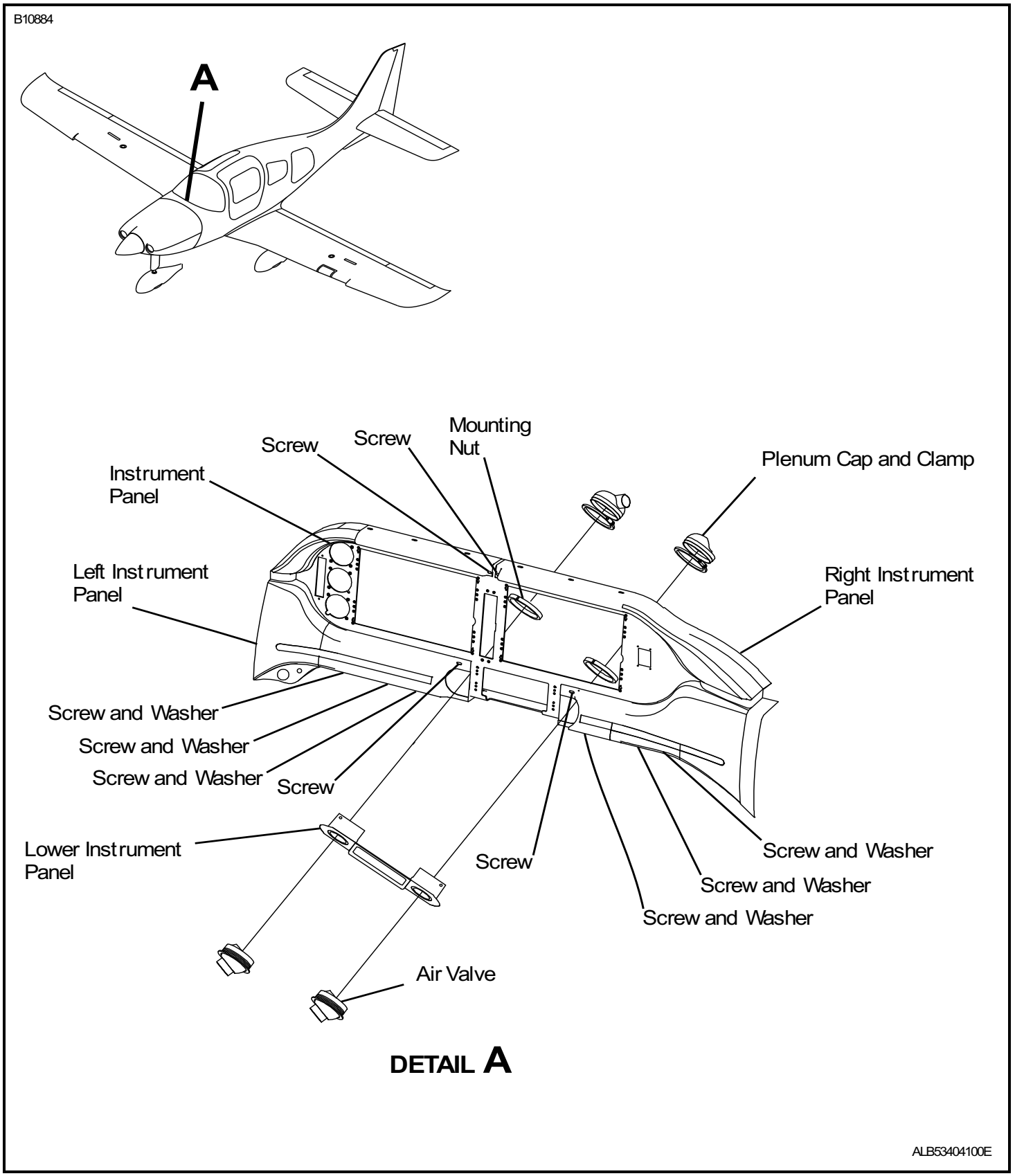
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Figure 201 : Sheet 2 : FCOLP & ACOLP



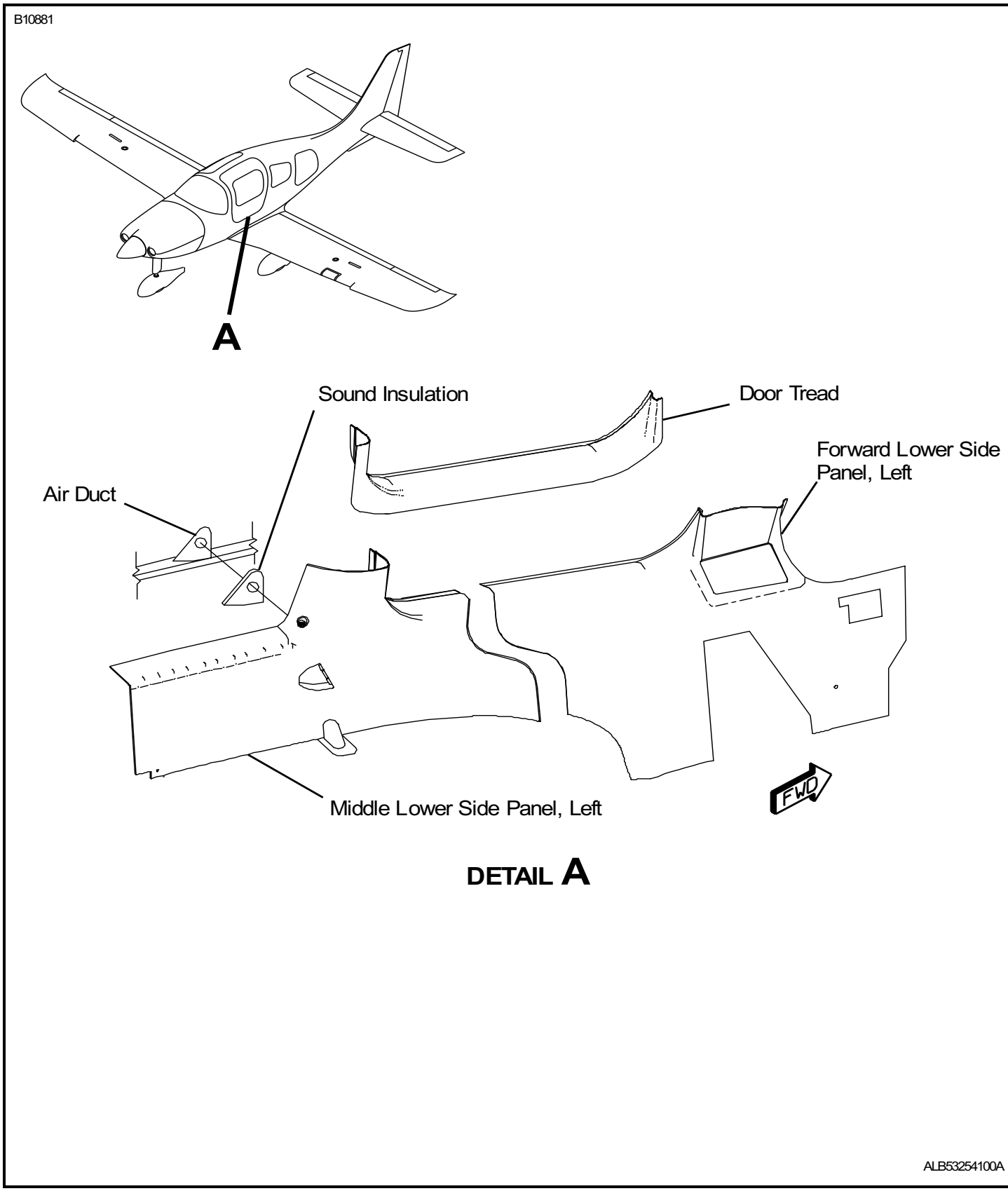
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Figure 202 : Sheet 1 : Upholstered Instrument Panels (Garmin G1000 Option)



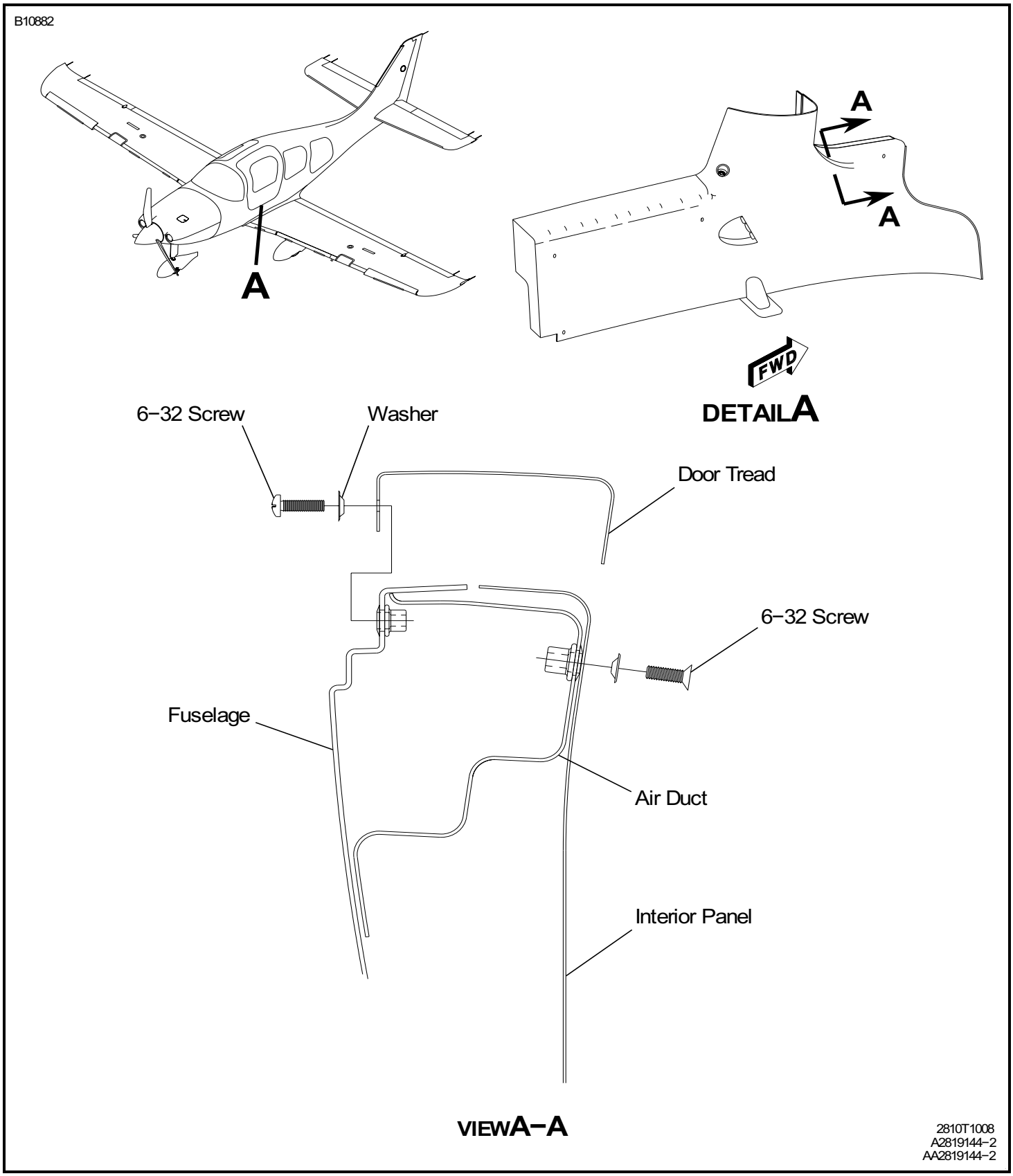
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Figure 203 : Sheet 1 : Door Tread, FLSPL, and MLSPL



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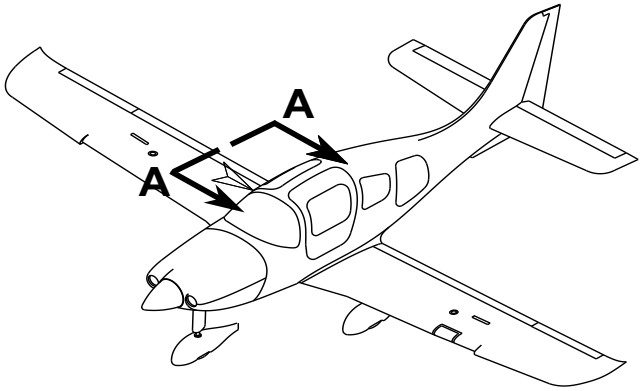
Figure 204 : Sheet 1 : Side Detail of Door Tread Installation

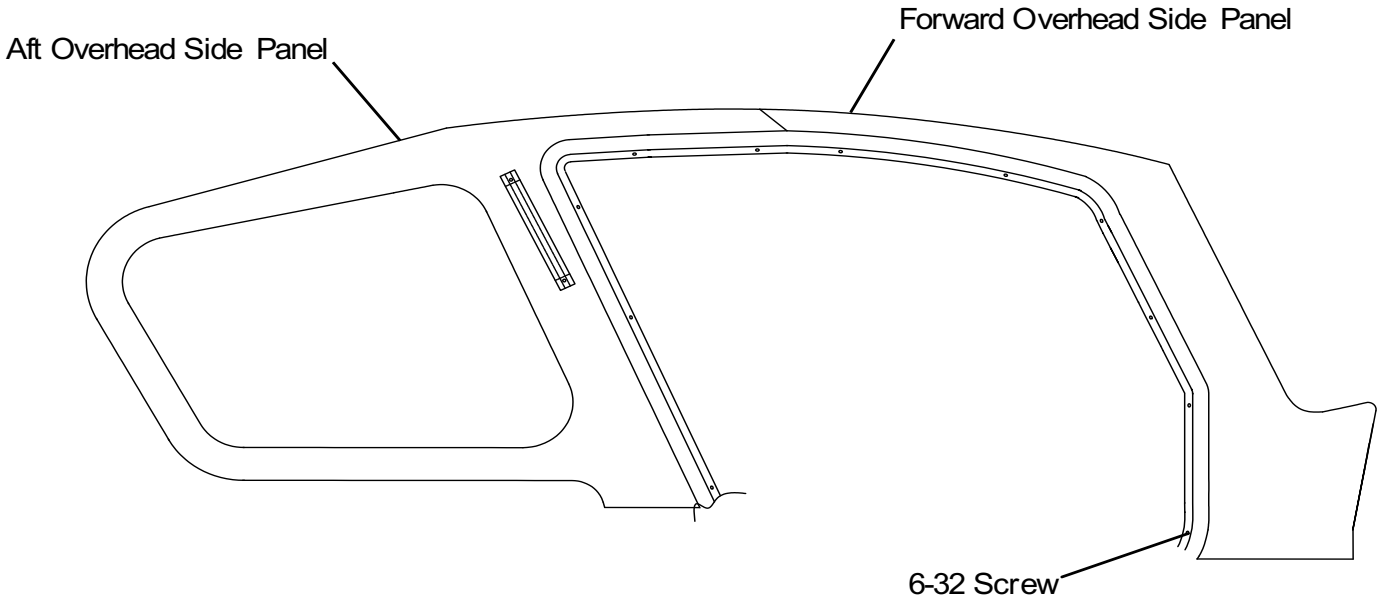


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Figure 205 : Sheet 1 : FOSPL/FOSPR and AOSPL/AOSPR Installation

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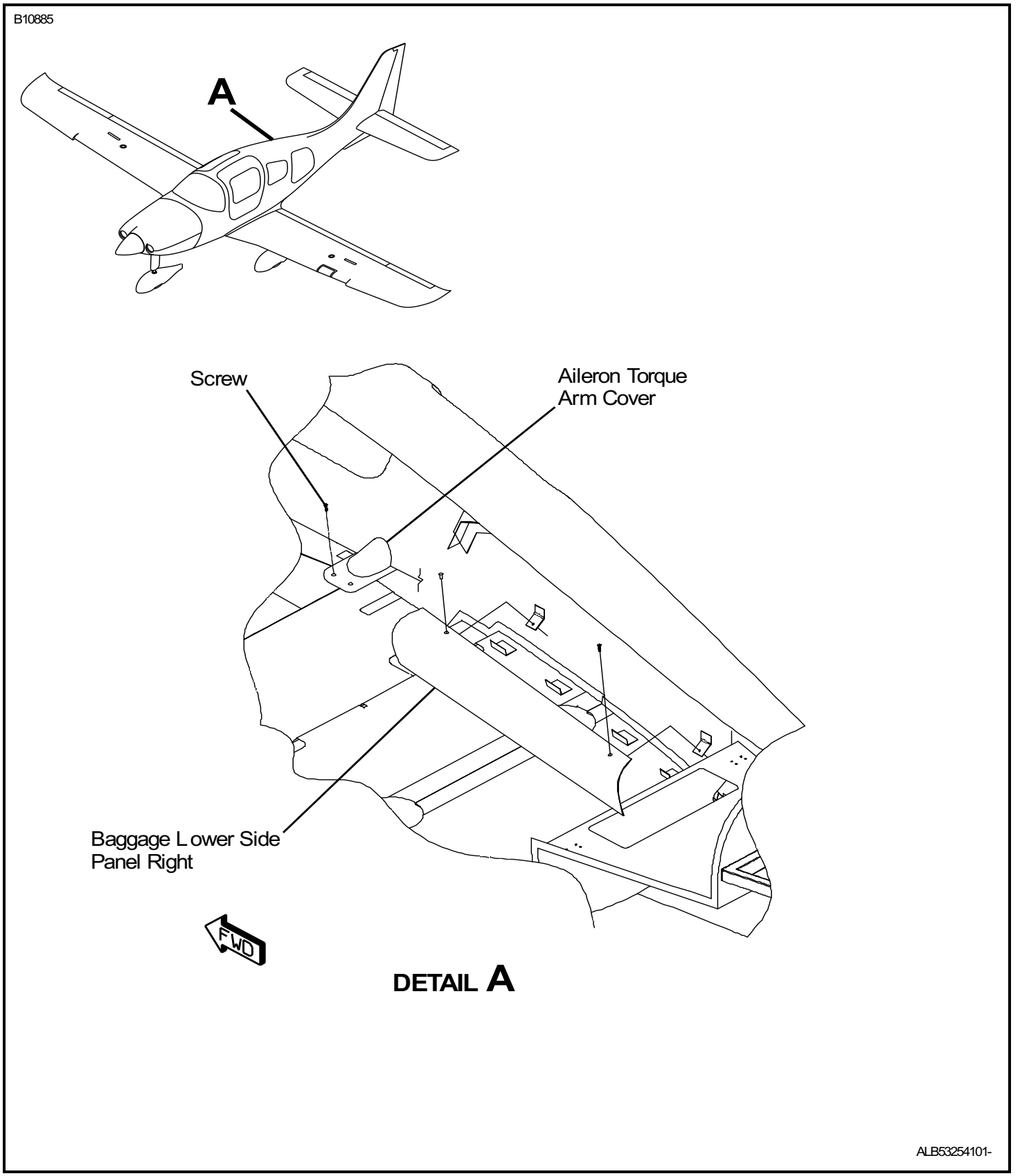


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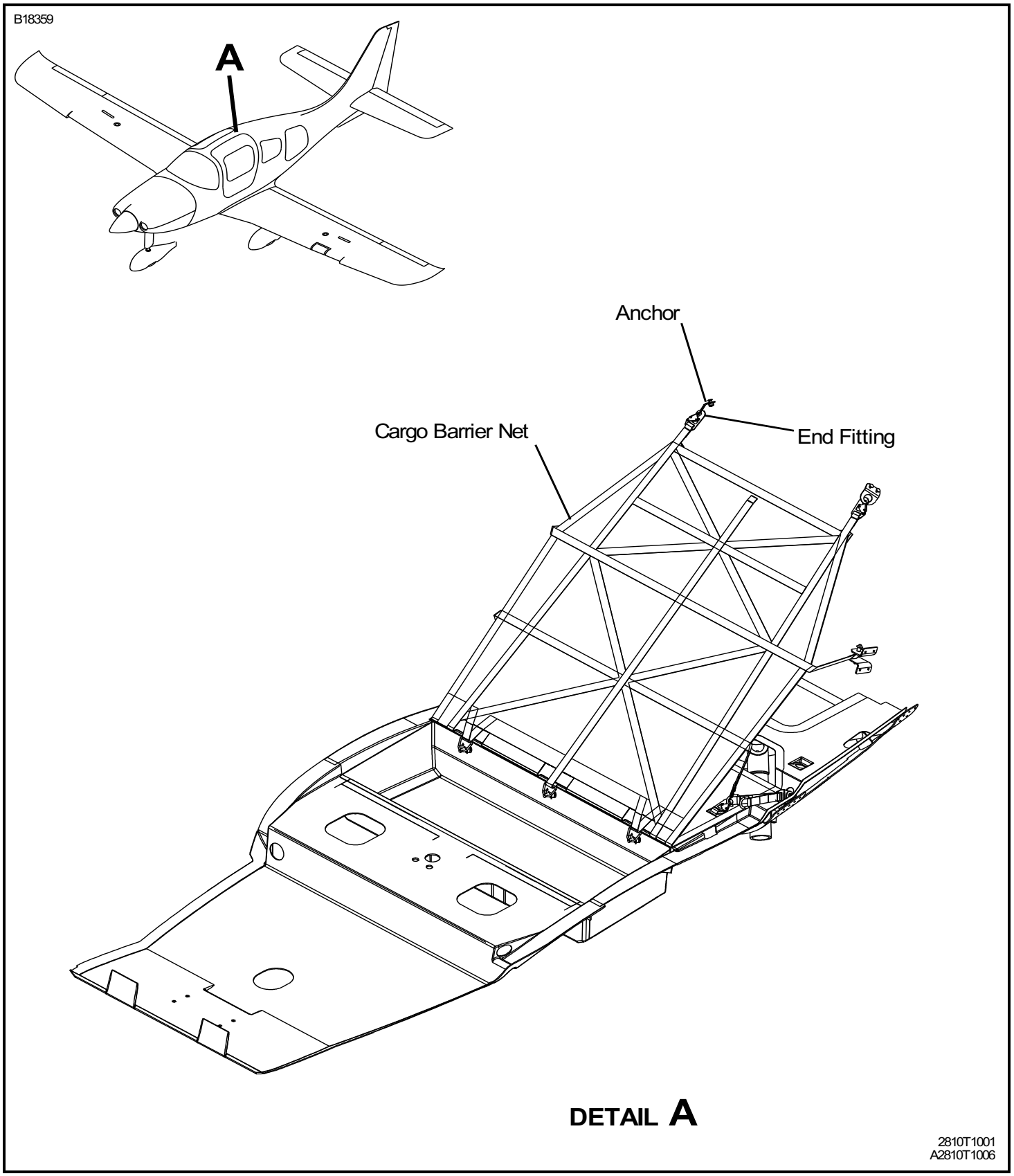
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Figure 206 : Sheet 1 : BLSPR and Aileron Torque Arm Cover



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Figure 207 : Sheet 1 : Cargo Barrier Net



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ACCESS PANELS - MAINTENANCE PRACTICES

1. Forward Wing Saddle Access Panel, Left and Right

A. **Removal of the Wing Saddle Access Panels**

(1) Remove the left or right front seat pan as required per instructions in Section 25-10-00, Removal and Installation of the Front Seats.

(2) Remove the four truss head 8-32 screws securing the panel to the floor. Refer to Figure 201.

B. **Installation of the Wing Saddle Access Panels** - Installation is the reverse of the removal procedure. Torque the truss head screws 30 to 36 in.-lbs.

2. Forward Gearbox Access Panel, Left And Right

A. **Removal of the Forward Gearbox Access Panel**

(1) Remove the rear seats per the instructions in Section 25-10-00, Removal and Installation of the Rear Seats and Crossbar.

(2) Remove the baggage floor carpet per the instructions in Section 25-00-00, Removal of the Baggage Floor Carpet.

(3) Remove the four truss head 8-32 screws securing the panel to the floor. Refer to Figure 201.

B. **Installation of Forward Gearbox Access Panel** - Installation is the reverse of the removal procedure. Torque the truss head screws 30 to 36 in.-lbs.

3. Aft Cabin Floor Access Panel

A. **Removal of the Aft Cabin Floor Access Panel**

(1) Remove the baggage floor carpet per the instructions in Section 25-00-00, Removal of the Baggage Floor Carpet.

(2) Remove the 13 truss head 8-32 screws securing the panel to the floor. Refer to Figure 201.

B. **Installation of the Aft Cabin Floor Access Panel** - Installation is the reverse of the removal procedure. Torque the truss head screws 30 to 36 in.-lbs.

4. Elevator Interconnect Access Panel

A. **Removal of the Elevator Interconnect Access Panel**

(1) Remove the hat rack carpet per the instructions in Section 25-30-00, Removal of the Hat Rack Carpet.

(2) Remove the 6 truss head 8-32 screws securing the panel to the floor. Refer to Figure 201.

B. **Installation of the Elevator Interconnect Access Panel** - Installation is the reverse of the removal procedure. Torque the truss head screws 30 to 36 in.-lbs.

5. Antenna Bulkhead Panel

A. **Removal of the Antenna Bulkhead Panel**

(1) Remove the hat rack cushion per the instructions in Section 25-30-00, Removal of the Hat Rack Cushion.

(2) Remove the hat rack carpet per the instructions in Section 25-30-00, Removal of the Hat Rack Carpet.

(3) Remove the four truss head 8-32 screws securing the panel to the aft bulkhead.

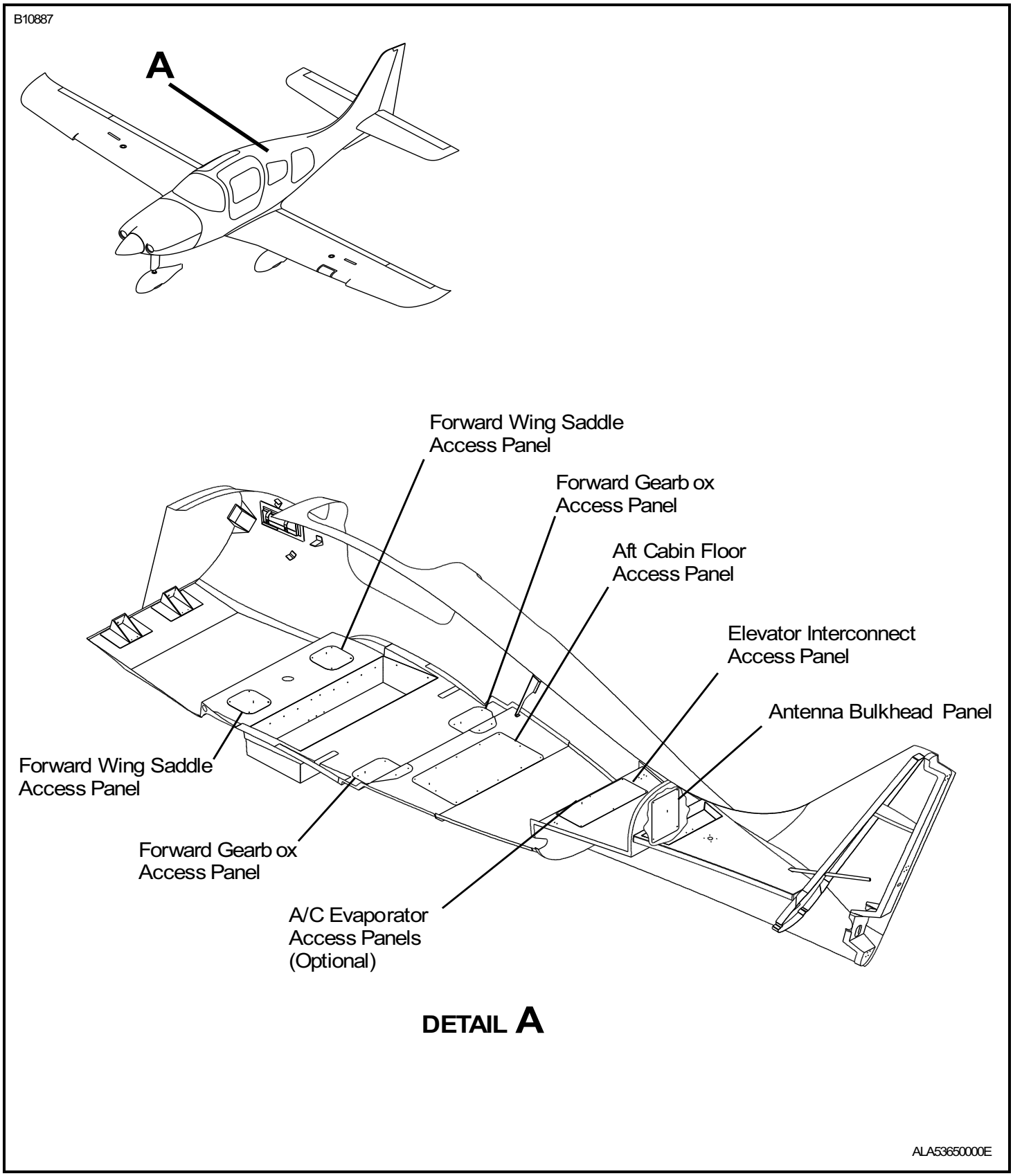
B. **Installation of the Antenna Bulkhead Panel** - Installation is the reverse of the removal procedure. Torque the truss head screws 30 to 36 in.-lbs.

6. A/C Evaporator Access Panel

A. **Removal and Installation** - Refer to Chapter 53 for removal and installation instructions.

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Figure 201 : Sheet 1 : Access Panel Locations



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EMERGENCY LOCATOR TRANSMITTER (ELT) - MAINTENANCE PRACTICES

1. Emergency Locator Transmitter (ELT)

A. Removal of the ELT

(1) Remove the electronics bay access panel per the instructions in Chapter 25,Antenna Bulkhead Panel.

(2) For the Artex 200 move the ELT switch from the ARM position to the OFF position. The Artex ME406 ELT switch does not have an OFF position.

(3) Disconnect the ELT antenna cable from the ELT.

(4) Disconnect the ELT remote switch cable from the ELT.

(5) Release the ELT retaining buckle, or Velcro strap as applicable, to free the transmitter from the mounting bracket.

B. Installation of the ELT - Installation is the reverse of above with the following exceptions:

(1) After ensuring that the switch in the ARM position, make sure the ELT is not transmitting. If the ELT is transmitting:

(a) Reset the Artex 200 by turning the unit OFF, then back to ARM. If the ELT does not reset, turn the unit OFF, remove, and service.

(b) Reset the Artex ME406 by turning the unit ON, then back to ARM.

(c) For additional information concerning the emergency locator transmitter, refer to the Artex ME406 Description, Operation, Installation and Maintenance Manual in the Supplier Publication List.

(2) Do a check of the ELT system. Refer to Artex ME406 Emergency Locator Transmitter System - Adjustment/Test.

2. Emergency Locator Transmitter Antenna

A. Removal of the ELT Antenna

(1) Remove the electronics bay access panel per the instructions in Chapter 25, Removal of Antenna Bulkhead Panel.

(2) For the Artex 200 move the ELT switch from the ARM position to the OFF position. The Artex ME406 ELT switch does not have an OFF position.

(3) Disconnect the antenna cable from the ELT antenna.

(4) Unscrew the antenna mounting nut and washer from the antenna mounting stud (lower part of antenna).

B. Installation of the ELT Antenna - Installation is the reverse of above with the following exceptions:

(1) After ensuring that the switch in the ARM position (Artex ME406) or OFF position (Artex 200), make sure the ELT is not transmitting. If the ELT is transmitting:

(a) Reset the Artex 200 by turning the unit OFF, then back to ARM. If the ELT does not reset, turn the unit OFF, remove, and service.

(b) Reset the Artex ME406 by turning the unit ON, then back to ARM.

(c) For additional information concerning the ELT antenna, consult the ELT manufacturer's manual that came with the aircraft, or call the factory.

(2) Do a check of the ELT system. Refer to Artex ME406 Emergency Locator Transmitter System - Adjustment/Test.

3. Emergency Locator Transmitter Remote Switch

A. The Emergency Locator Transmitter Remote switch is installed as follows:

(1) For the Avidyne avionics option the switch is found in the right knee bolster

(2) For the Garmin G1000 avionics option is found to the right of the MFD.

(3) For the Garmin Model T240 remote switch installation, refer to Instrument Panel (T240) - Removal/Installation

B. Removal of the ELT Remote Switch

(1) Remove the right knee bolster. Refer to, Left and Right Knee Bolster, or reach under the instrument panel, as applicable.

(2) Disconnect the wiring from the remote switch.

(3) Remove the remote switch by removing the four pan head 4-40 screws that attach through the switch faceplate. The screws are secured with nuts and washers.

C. Installation of the ELT Remote Switch - Installation is the reverse of the above with the following exceptions:

(1) After switch installation, make sure the ELT is not transmitting. If the ELT is transmitting:

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(a) Reset the Artex 200 by turning the unit OFF, then back to ARM. If the ELT does not reset, turn the unit OFF, remove, and service.

(b) Reset the Artex ME406 by turning the unit ON, then back to ARM.

(2) Do a check of the ME406 ELT system. Refer to Artex ME406 Emergency Locator Transmitter System - Adjustment/Test.

D. For additional information concerning the ELT remote switch, consult the ELT manufacturer's manual that came with the aircraft, or call the factory.

4. Emergency Locator Transmitter Battery

A. **Artex 200 ELT**

(1) **Removal of the ELT Battery**

(a) Remove the ELT per the instructions in the Removal of ELT procedure.

(b) Remove the eight screws from the top ELT cover using a 3/32 Allen wrench.

(c) Gently pull the circuit board up until the slot with the battery pack wires is above the top of the ELT case.

(d) Unplug the battery from the circuit board.

(e) Lift the battery pack (the large rectangular box with the wires protruding from it as shown in Figure 201) out of the ELT case.

(2) **Inspection and Testing of the ELT Battery**

(a) Inspect the battery pack for leakage or corrosion. Replace with a new battery pack if any is found.

(b) Check the battery pack voltage under load. Replace if the voltage under load is less than 9.0 VDC.

(c) Measure the current drain. The ELT will need to be armed and not transmitting. Measured current should be less than 10 microamps.

(d) Further inspection and testing procedures, if needed, can be found by consulting the ELT manufacturer's manual that came with the aircraft or by calling the factory.

(3) **Installation of the ELT Battery**

(a) Plug the battery into the circuit board.

(b) Route the battery pack wires through the circuit board slot, and push the circuit board back into place.

(c) Route the battery pack wires into the notch in the center divider between the circuit board and the battery pack compartment.

(d) When installing the top cover screws, do not exceed 5 in.-lbs. of torque.

(e) Enter pertinent battery replacement information in the aircraft log book and fill out any other documentation required by local authority.

(f) Reinstall the emergency locator transmitter.

(g) Make sure the ELT is not transmitting. If the ELT is transmitting, reset by turning the switch OFF, then back to ARM. If the ELT does not reset, turn the unit OFF, remove, and service.

B. **Artex ME406 ELT**

(1) **Removal of the ELT Battery**

NOTE: The battery pack contains static sensitive parts; take electrostatic discharge precautions before handling.

(a) Remove the ELT per the instructions in the Removal of ELT procedure.

(b) Remove the eight screws from the battery-side cover. Refer to Figure 202. Battery pack is identified by the embossed text: "BATTERY ACCESS ON THIS SIDE".

(c) Carefully lift the battery cover (battery pack) away from the ELT and unplug the flex-cable connected to the pack. Do not pull on the flexible portion of the cable - use the rigid section of the flex circuit at the connector as a handle.

(d) Inspect the battery pack and ELT chassis. The battery cells, components and connectors should be free of corrosion. Inspect flex-circuit for broken connections or damage. Ensure the battery housing is free of cracks or other visible damage.

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(2) **Installation of the ELT Battery**

(a) Lay the battery pack on the work surface with the batteries facing up.

(b) Install a replacement seal in the slot along the perimeter of the housing.

(c) Leaving the battery as it is, position the ELT over the battery pack with one hand and plug the flex-cable connector into the battery assembly using the other. The cable should not be twisted and the connector should 'click' into place. The battery connector is keyed to prevent incorrect installation.

(d) Mate the ELT to the battery, making sure that the seal is positioned correctly during the process.

(e) Replace the 8 securing screws and torque to 10-12 inch-lbs.

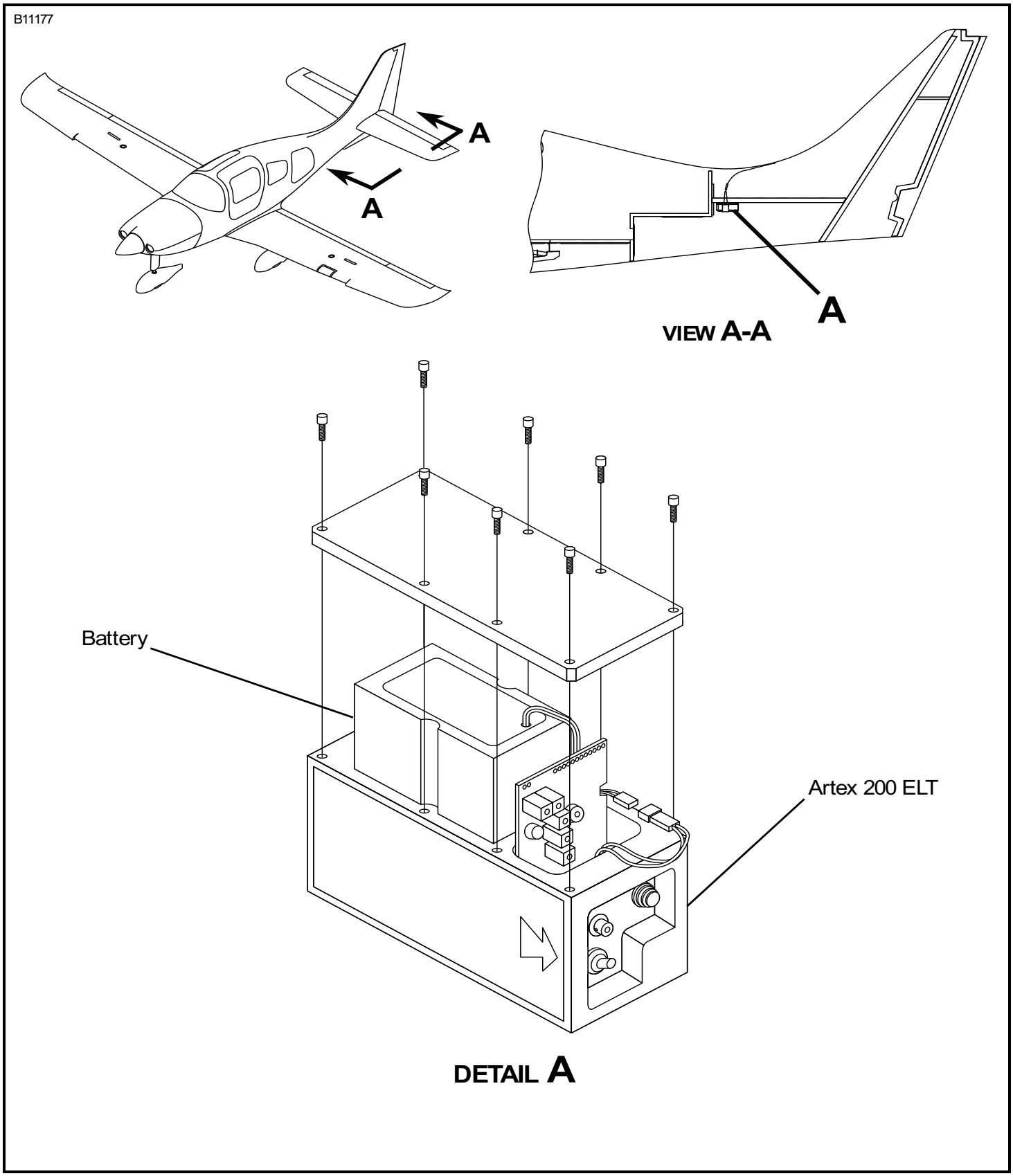
(f) Enter pertinent battery replacement information in the aircraft log book and fill out any other documentation required by local authority.

(g) Reinstall the emergency locator transmitter.

(h) Make sure the ELT is not transmitting. If the ELT is transmitting, reset by turning the switch ON, then back to ARM.

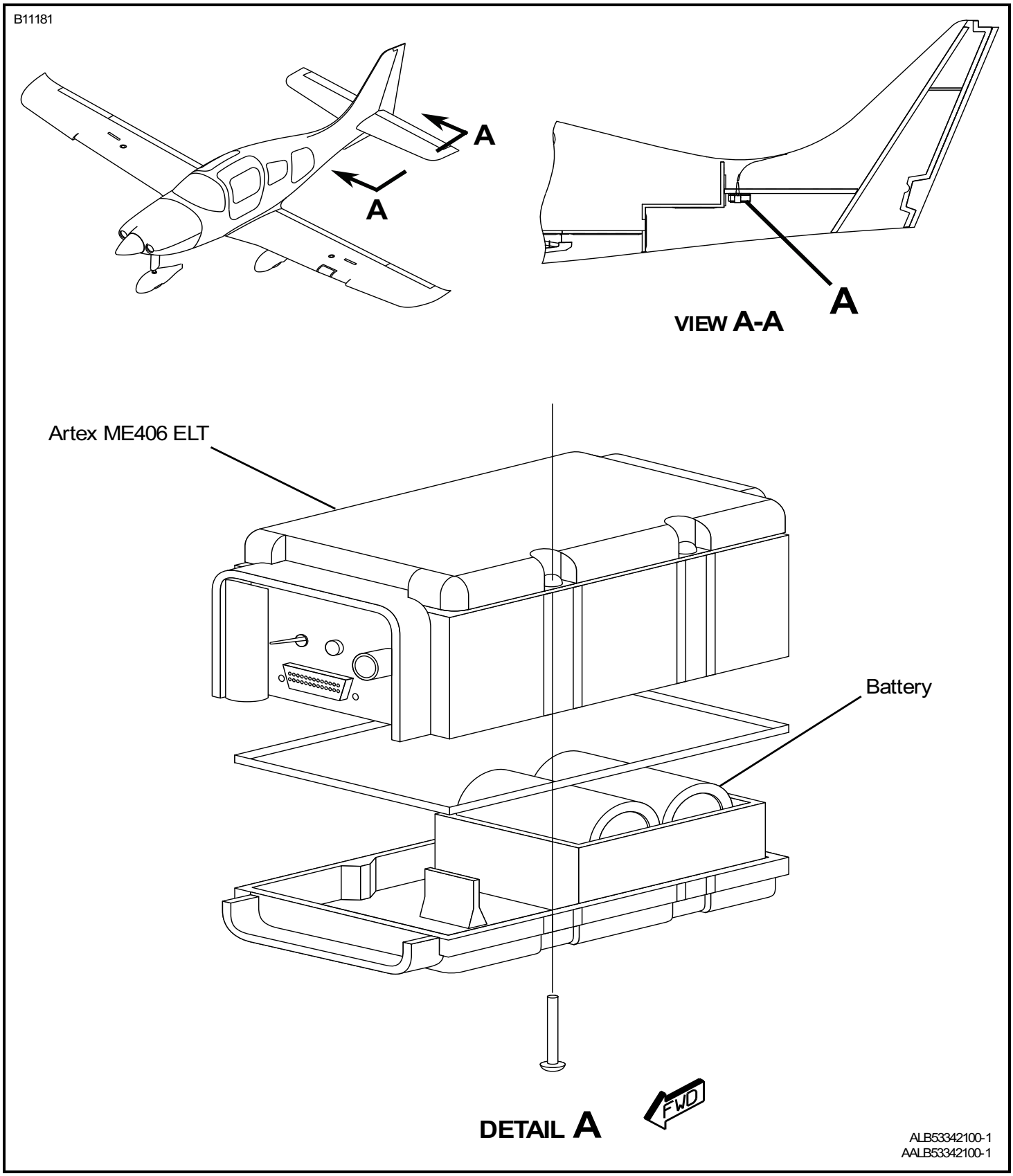
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Figure 201 : Sheet 1 : Artex 200 ELT Battery



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Figure 202 : Sheet 1 : Artex ME406 ELT Battery



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ARTEX ME406 EMERGENCY LOCATOR TRANSMITTER SYSTEM - TROUBLESHOOTING

1. General

A. This section gives the procedures to complete the self test for the ARTEX ME406 Emergency Locator Transmitter (ELT) system. The system transmits on two frequencies at the same time.

2. Tools and Equipment

A. NAV/COMM/ELT Ramp Test Set - Aeroflex IFR 4000 or equivalent.

3. ME406 Emergency Locator Transmitter Troubleshooting

CAUTION: Operate the emergency locator transmitter (ELT) system only during the first five minutes of each hour. If you must complete the functional test at a time other than the first five minutes of the hour, you must do the test with a direct connection to the ELT and a 30 dB attenuator. Refer to the FAA Advisory Circular AC-91-44A.

CAUTION: Do not operate the emergency locator transmitter (ELT) for more than five seconds at a time. Do not operate the ELT again for 15 seconds. The ELT will transmit a 406.028 MHz signal after the ELT is active for approximately 50 seconds. This signal is identified as a distress signal.

A. Prepare the ME406 Emergency Locator Transmitter for Troubleshooting.

(1) Complete the ME406 transmitter test. Refer to Artex ME406 Emergency Locator Transmitter Test.

(2) Use the troubleshooting chart to determine the maintenance procedures necessary to correct the unserviceable ELT system. Refer to the ME406 Troubleshooting Chart Table 101

Table 101. ME406 Troubleshooting Chart

LED Flash Indication	Corrective Action
One Flash	System is Operational
Three Flashes	Shows an open or short condition on the antenna output or cable. Do the steps that follow: 1. Make sure that the coaxial cable is connected and in good condition 2. Do a continuity check of the center conductor and shield 3. Make sure that the cable is not shorted. 4. Make sure that the cable does not have an intermittent connection 5. Make sure that the antenna is installed correctly. If this error code persists, use a VSWR meter to examine the antenna for opens, shorts, and a resistive ground plane connection.
Four Flashes	Shows that there is a low power condition. Check for the conditions that follow: 1. The output power is below approximately 33 dBm (2 watts) for the 406.028 MHz signal, or 17 dBm (50mW) for the 121.5 MHz signal 2. The 406.028 MHz signal is off frequency. For this error code the ELT must be sent back for repair or replacement. Follow the manufacturers instructions to replace it.
Five Flashes	The ELT has not been programmed, however this does not show erroneous or corrupted programmed data.

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Six Flashes	The G-switch loop between pins 5 and 12 at the D-sub connector is not installed. and the ELT will not activate during a crash. Do the steps that follows: 1. Do a resistance test of the harness to make sure the D-sub jumper is installed 2. There must be less than 1 ohm of resistance between pins 5 and 12.
Seven Flashes	The ELT battery has too much accumulated operation time and must be replaced to meet FAA specifications. If the battery must be replaced, follow the manufacturers instructions to replace it.

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ARTEX ME406 EMERGENCY LOCATOR TRANSMITTER SYSTEM - ADJUSTMENT/TEST

1. General

A. This section gives the procedures that are necessary to do the inspection and operational checks necessary to comply with 14 CFR 91.207, for the Artex ME406 Emergency Locator Transmitter (ELT) System. The system transmits on two frequencies. The 121.5 MHz frequency has the standard swept tone that rescue personnel can follow to the source. The other frequency is 406.028 MHz and is used to activate a satellite tracking system. The 406.028 MHz frequency includes other information such as the country code of the airplane, the aircraft identification beacon serial number, the 24-bit address, the tail number, or other identification.

2. Tools and Equipment

A. NAV/COMM/ELT Ramp Test Set - Aeroflex IFR 4000 or equivalent.

3. Artex ME406 Emergency Locator G-Switch Functional Test

NOTE: If possible, do the test procedure for the emergency locator transmitter inside a metal hangar with the doors closed to decrease the signal transmission from the ELT unit during the test.

A. Do a G-Switch Operational Test (Refer to Figure 501).

CAUTION: Operate the Emergency Locator Transmitter (ELT) system only during the first five minutes of each hour. If you must complete the functional test at a time other than the first five minutes of the hour, you must do the test with a direct connection to the ELT and a 30 dB attenuator. Refer to the FAA Advisory Circular AC-91-44A.

CAUTION: Do not operate the Emergency Locator Transmitter (ELT) for more than five seconds at a time. Do not operate the ELT again for 15 seconds. The ELT will transmit a 406.028 MHz distress signal after it is activated for approximately 50 seconds.

(1) Remove the ELT from the airplane. Refer to Emergency Locator Transmitter (ELT) - Maintenance Practices, Removal of the ELT.

(2) Install a jumper wire between pins 5 and 12 on the electrical connector of the ELT.

CAUTION: It is recommended that an experienced technician do this procedure because of the potential physical damage that can occur if the jumper wire is not installed correctly.

NOTE: The ELT will not activate with the G-switch unless electrical pins 5 and 12 have a jumper wire installed between them (this happens automatically when the ELT is locked into the mount tray with the electrical connector in position).

(3) Supply external electrical power to the airplane.

(4) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(5) Set the AVIONICS MASTER switch (SW04) to the ON position.

(6) Make sure the ELT switch is in the ARM position.

(7) On the GTC 570 Touchscreen Controller (UI405) found in the center console, do the steps that follow:

(a) Tune COMM 1 to 121.5 MHz

(b) Push the COMM 1 and SPKR buttons

(c) Make sure that the aural sweep tone is heard on the overhead speaker.

(8) Hold the ELT transmitter tightly in one hand and make a throwing movement followed by an opposite movement of the ELT transmitter.

(9) Make sure that the G-switch operates and that the aural warning sweep tone is heard on the overhead speaker.

(10) Set the ELT switch to the ON position and then back to the ARM position to reset the G-switch.

(11) Set the master BATT switches (left SW01 and right SW02) to the OFF position.

(12) Set the AVIONICS MASTER switch (SW04) to the OFF position.

(13) Remove external electrical power to the airplane.

(14) Remove the jumper wire from electrical pins 5 and 12 on the electrical connector of the ELT.

(15) Install the emergency locator transmitter in the airplane. Refer to Emergency Locator Transmitter (ELT) - Maintenance Practices, Removal of the ELT.

4. Artex ME406 Emergency Locator Transmitter Test

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A. Do a Transmitter Test of the Artex ME406 Emergency Locator Transmitter (ELT) System.

CAUTION: Operate the Emergency Locator Transmitter (ELT) system only during the first five minutes of each hour. If you must complete the functional test at a time other than the first five minutes of the hour, you must do the test with a direct connection to the ELT and a 30 dB attenuator. Refer to the FAA Advisory Circular AC-91-44A.

CAUTION: Do not operate the Emergency Locator Transmitter (ELT) for more than five seconds at a time. Do not operate the ELT again for 15 seconds. The ELT will transmit a 406.028 MHz distress signal after it is activated for approximately 50 seconds.

(1) Make sure the BATTERY switch and the AVIONICS switches are in the OFF position.

(2) Supply external electrical power to the airplane.

(3) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(4) set the AVIONICS MASTER switch (SW04) to the ON position.

(5) Set the CROSS TIE switch (SW03) to the ON position.

(6) Make sure that the ELT remote switch found on the right side of the instrument panel, is in the ARM position.

(7) On the GTC 570 Touchscreen Controller (UI405) found in the center console, do the steps that follow:

(a) Tune COMM 1 to 121.5 MHz

(b) Push the COMM 1 and SPKR buttons

(c) Make sure that the aural sweep tone is heard on the overhead speaker.

(8) Set the communication unit to the airplane speakers at an audio level loud enough to be heard.

NOTE: The IFR 4000 tester must have a line-of-sight to the ELT antenna.

NOTE: If it is necessary to do the transmitter test after the first five minutes of the hour, the IFR 4000 is connected directly to the ELT with a coaxial cable and a 30 dB attenuator. You will not hear the sweep tone from the ELT on the airplane speakers with the attenuator installed.

(9) Turn on the IFR 4000 and connect the 75 MHz antenna (black) to the test set.

(10) Push the SETUP key on the test set .

(a) Select the PORT: ANT option.

(11) Push the MODE key until the 406 BCN screen shows.

(12) Set the ELT remote switch on the right panel to the ON position.

(a) The ELT LED immediately starts to flash two times per second.

(b) The sweep tone is heard on the overhead speaker.

(13) Let the ELT make three to six sweeps on the overhead speaker.

NOTE: This will take one to two seconds.

(14) Set ELT switch to ARM and monitor the LED.

(15) Set the ELT remote switch back to the ARM position and monitor the LED.

(a) Make sure that the LED shows only one flash.

NOTE: If the IFR 4000 tester did not receive a 406.028 MHz signal and the ELT remote switch LED does not show a transmitter problem, do the test again.

(16) If the LED continues to flash, record the number of flashes and refer to Artex ME406 Emergency Locator Transmitter System - Troubleshooting.

(17) Set the ELT switch to the ON position.

(a) Make sure that the warning buzzer in the tail is heard outside the airplane.

(18) Set the ELT switch to the ARM position.

(19) Make sure the that the data on the ELT placard agrees with the data shown on the IFR 4000 tester screen.

- FREQ - 406.028 MHz + 2 kHz to - 5 kHz (between 406.023 and 406.030 MHz)
- BEACON ID - 15 digit hexadecimal series (must match the identification number on the ELT product label)
- COUNTRY - 3 digit code of registration country
- USER PROTOCOL - (must match protocol used in configuration procedures)

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- BCH-1 - 6 digit "Valid" hexadecimal series
- MSG - 22 digit hexadecimal series
- RADIO-LOCATING - 121.5 MHz.

NOTE: When ownership of an aircraft is transferred within the same country, the ME406 ELT should be reregistered with the applicable authority. When an aircraft with a ME406 ELT changes tail number or country registration, the ELT will need to have the new identification data entered. The ELT will also need to be registered with the applicable authority.

(20) Set the master BATT switches (left SW01 and right SW02) to the OFF position.

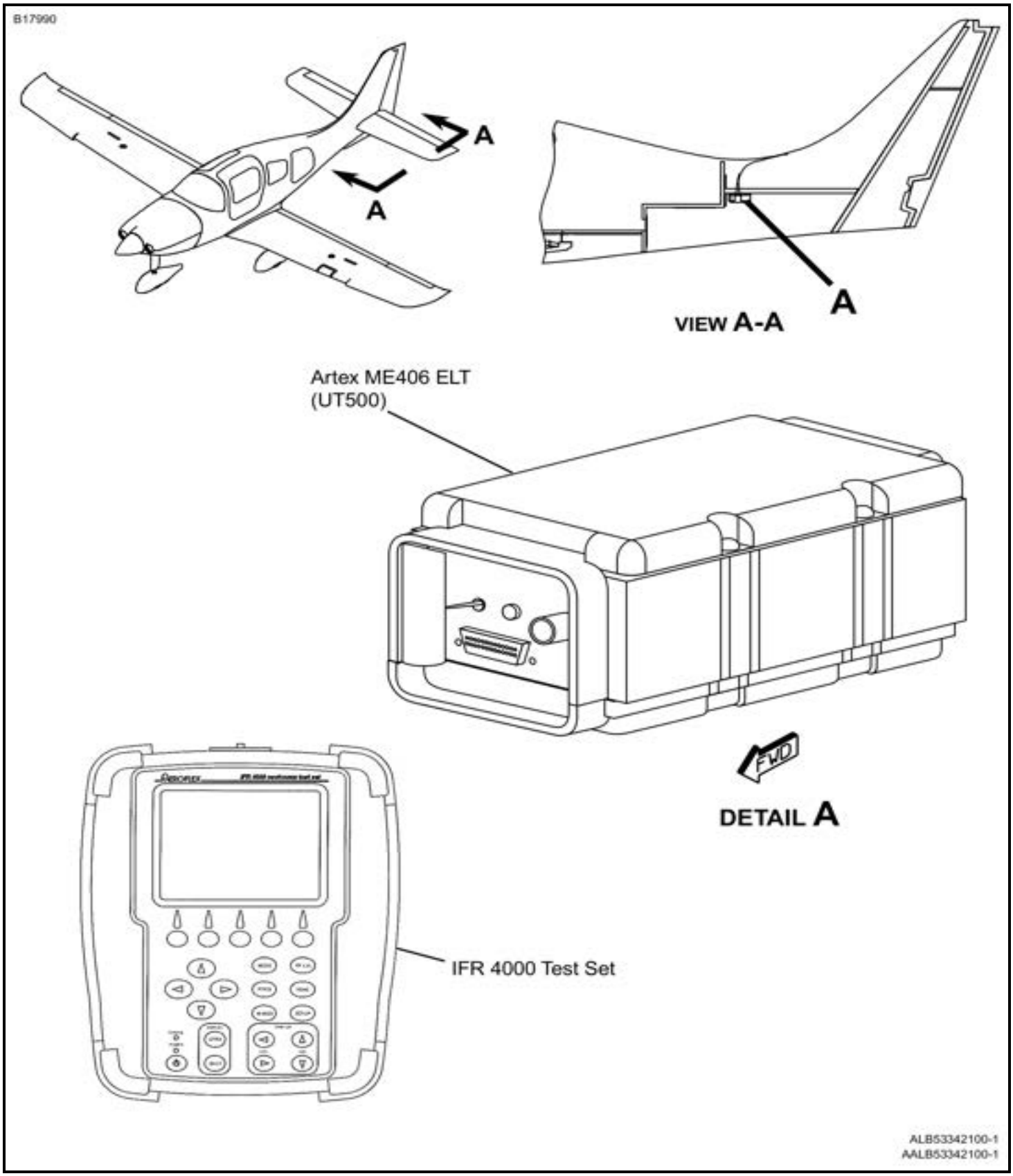
(21) set the AVIONICS MASTER switch (SW04) to the OFF position.

(22) Set the CROSS TIE switch (SW03) to the OFF position.

(23) Remove external electrical power to the airplane.

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Figure 501 : Sheet 1 : Artex ME406 Emergency Locator Installation



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PULSE OXIMETER/CO DETECT (T240) - DESCRIPTION AND OPERATION

1. General

A. The Aero-455 Carbon Monoxide Detection system consists of an instrument panel mounted SPO2/CO sensor, Audio Panel and the CO DETECT 2 Amp circuit breaker. The Aero-455 Pulse Oximeter and Carbon Monoxide Detector is a compact instrument panel mounted on the left side of the instrument panel. The carbon monoxide (CO) detector constantly monitors the cabin air for CO and gives a visual and aural alert to the crew before the CO reaches a critical level. As a Pulse Oximeter, the unit monitors pilot's blood oxygen levels (SPO2), heart rate statistics, CO Level, Cabin temperature and Cabin Altitude. For more maintenance data applicable to the CO Detector refer to the CO Guardian Owners Manual Pulse Oximeter and Carbon Monoxide Detector Model Aero-455 Rev A in the Supplier Publication List.

B. The CO Guardian Owners Manual Pulse Oximeter and Carbon Monoxide Detector Model Aero-455 must be returned to CO Guardian at the end of the 5 year service life for replacement.

2. Description

A. Pulse Oximeter/CO Detect (Reference Figure 1).

(1) As a Pulse Oximeter, the pilot inserts an index finger into the front of the sensor and receives readouts that determine general physical and environmental conditions. The Aero-455 transmits the pilot's blood oxygen levels (SPO2) and heart rate statistics to the No.2 GIA (UF300). The signal is then sent to the MFD display through a RS-232 bus. The MFD sends the signal by HSDB to the PFD to show on the CAS window display.

(2) As a Carbon Monoxide Detector, the sensor samples cabin air continuously and initiates a visual and audible alarm of the CO content should it rise above 50 ppm. During an alarm cycle the Test/Reset button monitors system integrity and the alarm will repeat as long as CO is present. The Aero-455 reminds the pilot when he/she passes 10K and every 30 minutes above 10K to check pilot's blood oxygen levels and heart rates. The unit transmits cabin CO level, cabin temperature and cabin altitude to the MFD display unit through an RS-232 output.

B. Audio Panel

(1) The audio panel receives a 500 ohm audio tone from the Aero-455 sensor to provide the pilot with an aural warning when CO content rises above 50 ppm. The alarm level is calibrated to give a visual alert on the PFD in or less than 5 minutes when the 50 ppm is reached. The PFD CAS alert will remain until the CO level drops below the 50 ppm.

C. 2 Amp Circuit Breaker

(1) The 2 amp CO DETECT circuit breaker is dedicated only for use by the Aero-455 Pulse Oximeter and Carbon Monoxide Detector system.

3. Operation

A. Aero-455 Pulse Oximeter/CO Detect Sensor

(1) When the airplane master battery switch is selected ON, the Aero-455 Pulse Oximeter and Carbon Monoxide Detector system goes through a self-test routine. The self-test checks for functionality of critical components including CO sensor, temperature sensor, pressure sensor, and the general integrity of the system. When the CO Detector is energized there is a three-minute delay to stabilize the sensor before the unit accurately senses CO levels.

(2) When the CO Detector is energized, the detector goes through a self-test. The self-test checks for the functionality of critical components that follow:

(a) CO Detector

(b) Temperature Sensor

(c) Pulse Oximeter.

(3) When the test sequence is initiated the CO LVL HIGH (red) message flashes twice on the PFD and then remains OFF except if there is a CO LVL HIGH, a failure of the unit, or until another self-test is done by the unit.

(4) If the CO level reaches a critical level the CO LVL HIGH CAS alert will show on the PFDCAS window.

(5) If the GTC MSG flashes on the PFD, the GTC 570 will also show a GTC MSG that flashes. Touch the GTC 570 MSG button and the applicable message that follows will show on the GTC display:

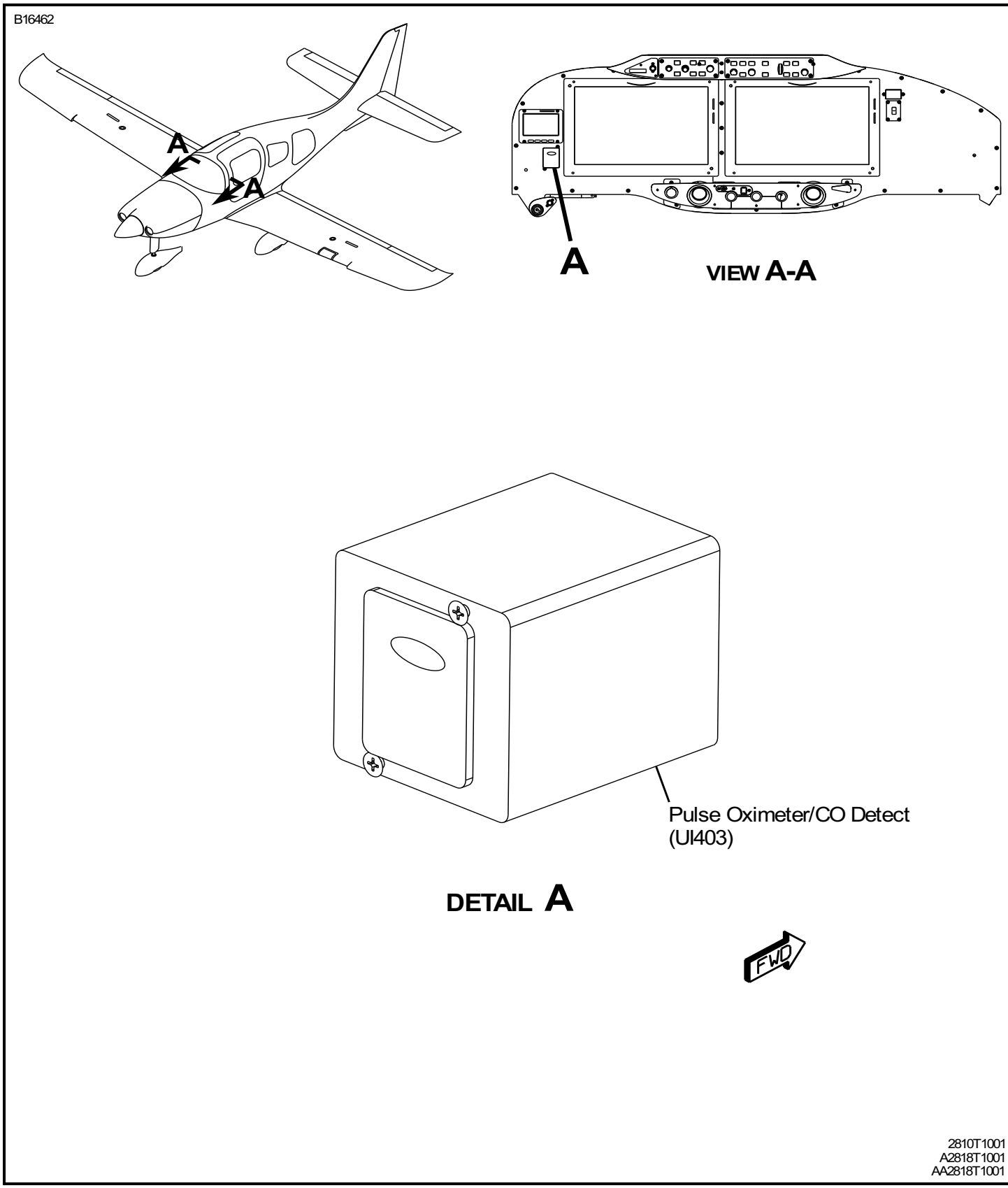
(a) CO DET SRVC

(b) CO DET FAIL.

(6) If the Aero-455 has an alert and does not reset it must be returned to CO Guardian for servicing.

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Figure 1 : Sheet 1 : Carbon Monoxide Detector



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PULSE OXIMETER/CO DETECT (T240) - MAINTENANCE PRACTICES

1. General

A. This section gives the removal and installation, self-test and troubleshooting procedures for the Aero-455 Pulse Oximeter and Carbon Monoxide Detector Sensor (UI403). For a general description of the Pulse Oximeter/CO Detect, refer to Pulse Oximeter/CO Detect (T240) - Description and Operation.

2. Pulse Oximeter/CO Detect Removal/Installation

A. Remove the Pulse Oximeter/CO Detect (UI403) (Refer to Figure 201).
   (1) Remove external electrical power from the airplane.
   (2) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.
   (3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.
   (4) Disengage the CO DETECT circuit breaker found on the cockpit circuit breaker panel.
   (5) Remove the GDU 1400 Primary Flight Display (PFD) (UI407). Refer to Garmin GDU 1400 Displays (G2000) - Removal/Installation, to get access to the Pulse Oximeter/CO Detect electrical connector (P190).
   (6) Disconnect the electrical connector (P190) at the rear of the detector.
   (7) Support the detector and remove the screws that attach it to the instrument panel.
   (8) Remove the detector from the airplane.

B. Install the Pulse Oximeter/CO Detect (UI403) (Refer to Figure 201).
   (1) Visually inspect the connector to make sure there are no bent or damaged pins.
      (a) Repair any damage.
   (2) Put the detector in its correct position in the instrument panel.
   (3) Support the detector and install the screws that attach it to the instrument panel.
   (4) Connect the electrical connector (P190) at the rear of the detector.
   (5) Install the GDU 1400 PFD (UI407). Refer to Garmin GDU 1400 Displays (G2000) - Removal/Installation.
   (6) Engage the CO DETECT circuit breaker found on the cockpit circuit breaker panel.
   (7) Do a test of the Pulse Oximeter/CO Detect. Refer to Pulse Oximeter/CO Detect Self-Test.

C. Pulse Oximeter/CO Detect Self-Test
   (1) Apply external electrical power on the airplane.
   (2) Set the master BATT switches (left SW01 and right SW02) to the ON position.
   (3) Set the AVIONICS MASTER switch (SW04) to the ON position.
   (4) Make sure that the PFD does not show a CO LVL HIGH CAS message.
   (5) Make sure that the GTC 570 Touch Screen Controller message advisory text does not show:
      (a) A CO DET FAIL message
      (b) A CO DET SRVC message.

D. Pulse Oximeter/CO Detect Operational Test
   (1) Apply external electrical power on the airplane.
   (2) Set the master BATT switches (left SW01 and right SW02) to the ON position.
   (3) Set the AVIONICS MASTER switch (SW04) to the ON position.
   (4) Disengage the CO DETECT circuit breaker found on the cockpit circuit breaker panel.
   (5) Make sure that the CO DET FAIL message shows on the GTC 570.
   (6) Engage the CO DETECT circuit breaker.
   (7) Cycle the GTC 570 message screen.
      (a) Make sure that the CO DET FAIL message no longer shows on the display.
   (8) Put your index finger in the correct position in the CO Detector.
      (a) Make sure that the pulse and percent oxygen data shows in the Multifunction Display (MFD) EIS display.

3. Pulse Oximeter/CO Detect Troubleshooting

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A. Do the Pulse Oximeter/CO Detect Troubleshooting.

NOTE: If can be necessary for you to remove some of the G2000 components to complete the procedures that follow. Refer to the applicable Chapter/Section for the removal and installation procedures.

(1) If the CO LVL HIGH alert shows on the PFD, the CO ppm level at a critical level.

(a) Do the applicable emergency procedures. Refer to the Model T240 POH.

(2) If the CO DET SRVC message shows on the GTC 570, the Pulse Oximeter/CO Detect sensor needs servicing.

(a) Return the Pulse Oximeter/CO Detect unit to CO Guardian for servicing.

(3) If the CO DET FAIL message shows on the GTC 570 do the steps that follow:

(a) Make sure that the CO DETECT circuit breaker, found on the cockpit circuit breaker panel, is engaged.

1 If necessary, engage the CO DETECT circuit breaker and check the Pulse Oximeter/CO Detect self-test again. Refer to, Pulse Oximeter/CO Detect Self-Test in this section.

(b) Make sure that a CAS PFD and/or GIA No.2 alert does not show on the PFD.

1 If a CAS PFD and/or the GIA No.2 alert show(s) on the PFD refer to Chapter 34, Garmin (G2000) - Troubleshooting.

(c) If the MFD and/or the GIA No.2 do not have a unit fault but have a communication fault, check the components that follow and repair any damage as necessary:

1 The HSDB wiring bundle between the Pulse Oximeter/CO Detect unit and the MFD

2 The HSDB wiring bundle between the GIA No.2 and the MFD

3 The CO Detect unit electrical connector and the wiring bundle electrical connector (P190)

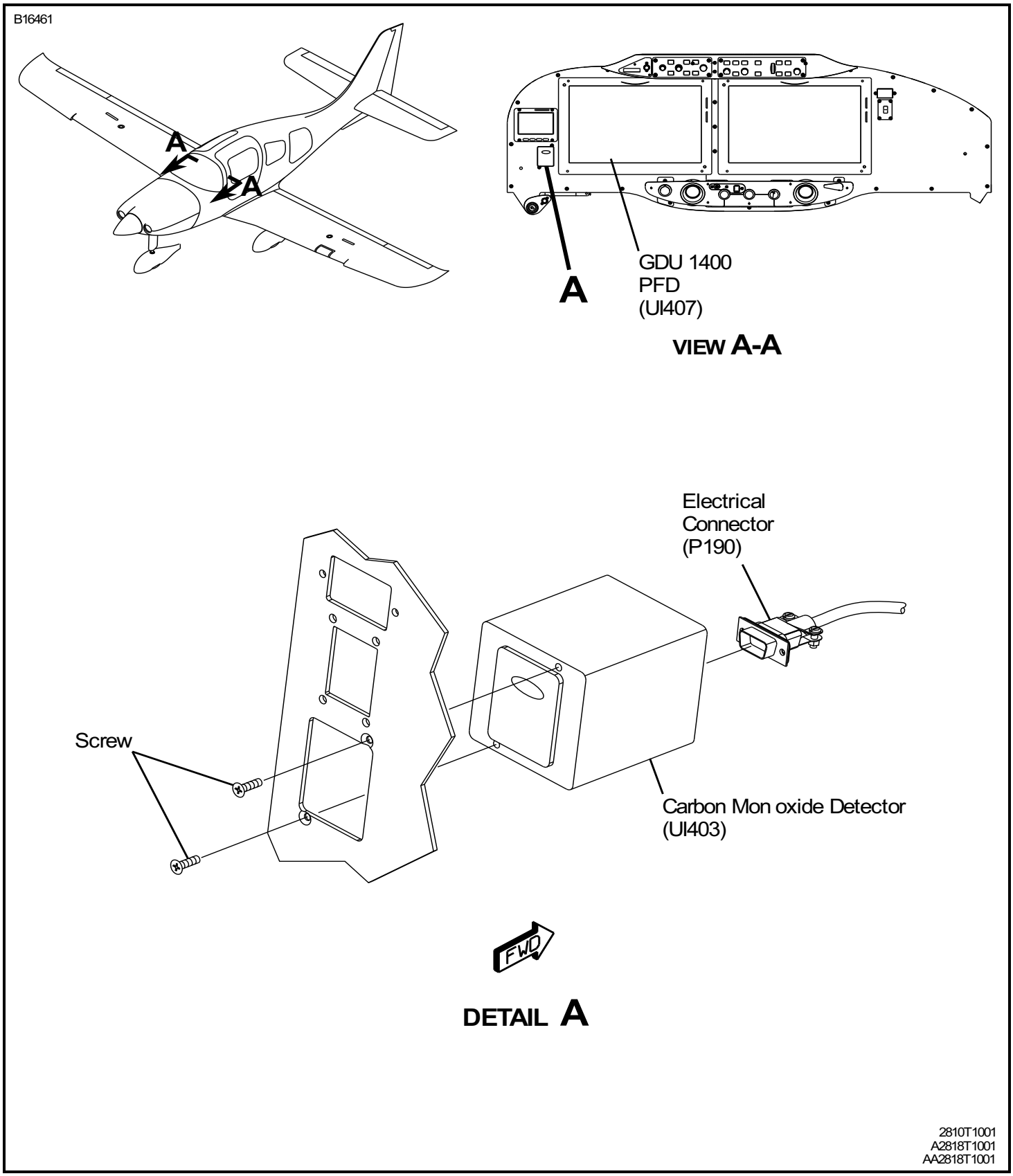
4 The MFD electrical connector (PI2001) and the wiring bundle electrical connector (PI401)

5 The GIA No.2 electrical connector (P603) and the wiring bundle electrical connector (P662).

(d) If the wiring bundle and electrical connectors check good, replace the Pulse Oximeter/CO Detect unit. Refer to Pulse Oximeter/CO Detect Removal/Installation in this section.

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Figure 201 : Sheet 1 : Pulse Oximeter/CO Detect Installation



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SOUNDPROOFING AND INSULATION - DESCRIPTION AND OPERATION

1. Soundproofing and Insulation

A. Firewall and Footwell

(1) The soundproofing material on the firewall and in the footwells is constructed of fire-resistant foam with a permanent adhesive backing. The adhesive backing results in destruction of the material if removed; therefore, the material cannot be repaired, but must be replaced if damaged. However, the entire panel does not have to be replaced. Only the damaged section has to be replaced, provided it can be cleanly removed without damaging the surrounding area. The adhering surfaces must be cleaned with an approved cleaner and method for composite materials before applying a new part. Large areas to be covered may be cut into smaller pieces for easier installation. Each panel must be trimmed to fit prior to installation. The precision of installation is critical, as the adhesive is so tenacious it is not possible to reposition afterwards. Avoid adhesive contacting skin. Avoid covering the mountings of maintenance items. Consult Cessna Aircraft Company if needed.

B. Aft of Doors

(1) The soundproofing material aft of the doors and in the cargo area (headliner and sides) is a one piece, cloth covered, fire-resistant foam with a permanent adhesive backing. The adhesive backing results in destruction of the material if removed; therefore, the material cannot be repaired, but must be replaced if damaged. The one-piece design necessitates the removal or partial removal of all of the following interior components prior to stripping off of the old material:

NOTE: After stripping the old material off, the adhering surfaces must be cleaned with an approved cleaner and method for composite materials before applying the replacement part. The precision of installation is critical, as the adhesive is so tenacious it is not possible to reposition afterwards. Avoid adhesive contacting skin. Avoid covering the mountings of maintenance items. Consult Cessna Aircraft Company if needed.

(a) Rear seats. Refer to Section 25-10-00, Removal and Installation of the Rear Seats and Crossbar.

(b) Front seat belts. Refer to Section 25-13-00, Seat Belts and Restraints.

(c) Rear seat belts. Refer to Section 25-13-00, Seat Belts and Restraints.

(d) Baggage door surround. Refer to Chapter 52.

(e) Forward center overhead light panel. Refer to Section 25-30-00, Forward Center Overhead Light Panel (FCOLP).

(f) Aft center overhead light panel. Refer to Section 25-30-00, Aft Center Overhead Light Panel (ACOLP).

(g) Middle lower side panels, left and right. Refer to Section 25-30-00, Middle Lower Side Panels, Left (MLSPL) and Right (MLSPR).

(h) Aft overhead side panels, left and right. Refer to Section 25-30-00, Aft Overhead Side Panels, Left (AOSPL) and Right (AOSPR).

(i) Baggage lower side panel, left and right. Refer to Section 25-30-00, Baggage Lower Side Panel, Left (BLSPL) and Right (BLSPR).

(j) Hat rack cushion. Refer to Section 25-30-00, Hat Rack Cushion.

(k) Hat rack carpet. Refer to Section 25-30-00, Hat Rack Carpet.

(l) Upper hat rack baggage net tie down bracket. Refer to Section 25-30-00, Upper Hat Rack Baggage Net Tie Down Bracket.

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EMERGENCY EXIT HATCHET - MAINTENANCE PRACTICES

1. Emergency Exit Hatchet

A. The emergency exit hatchet is located on the vertical face of the floor under the pilot's seat. The blade of the hatchet points down and is inserted in an aluminum sheath, and the unit is secured with Velcro strips.

B. **Removal of Hatchet and Brackets**

(1) Remove the Velcro strips, and remove the hatchet.

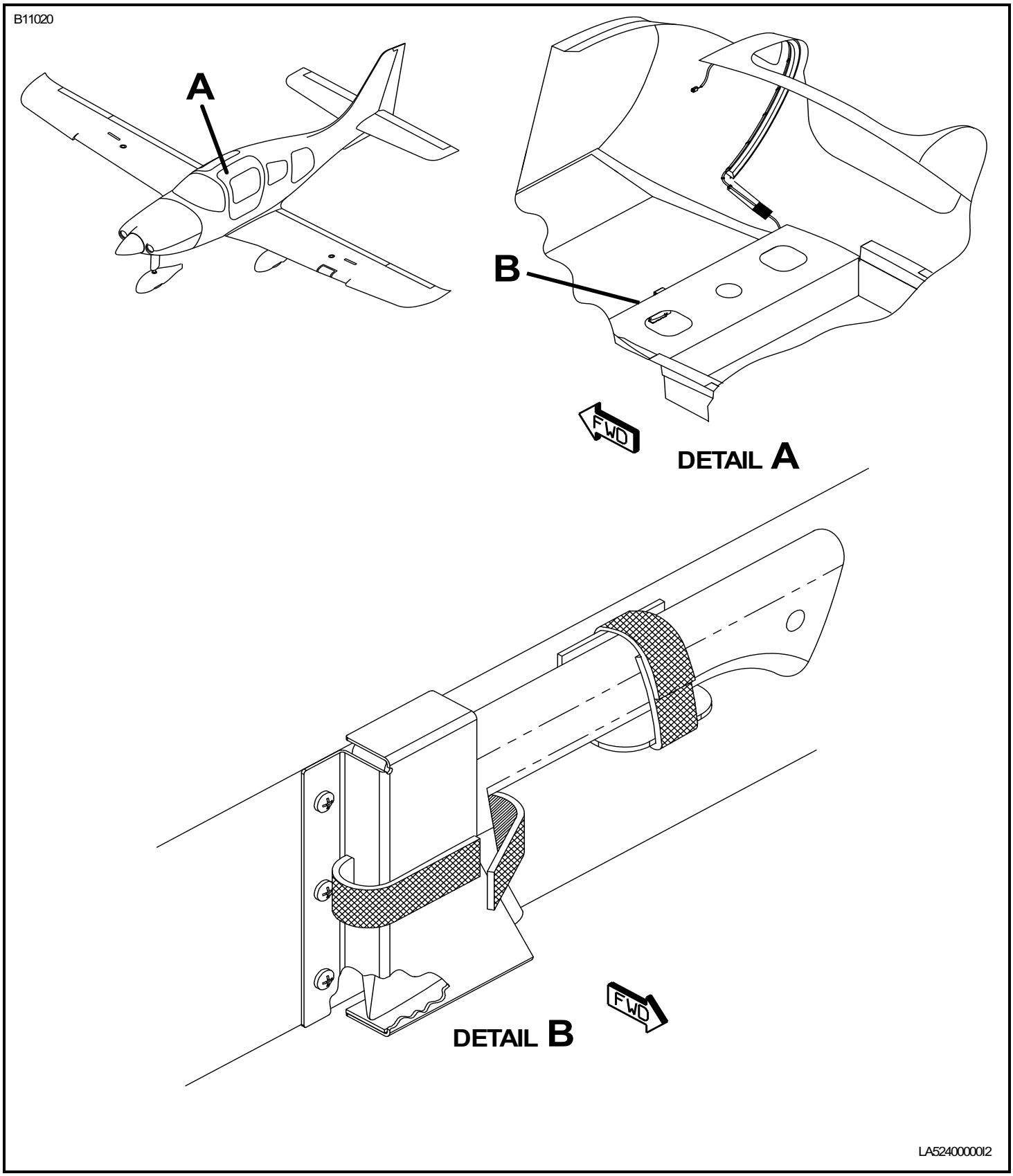
(2) If removal of the brackets is required, remove the two 8-32 flat head screws, washers, and self-locking nuts on the handle bracket.

(3) Remove the three 8-32 flat head screws, washers, and self-locking nuts on the blade bracket.

C. **Installation of Hatchet and Bracket** - Installation is the direct reversal of removal. Torque all screws 20 to 25 in.-lbs. Route the handle Velcro strap behind the bracket and around the handle as shown in Figure 201. Route the blade Velcro strap through the slot and under the blade as shown in Figure 201.

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Figure 201 : Sheet 1 : Emergency Exit Hatchet



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CUPHOLDER (GARMIN G1000 OPTION) - MAINTENANCE PRACTICES

1. Cupholder (Garmin G1000 Option)

A. On aircraft equipped with the Garmin G1000, two retractable cupholders may be installed underneath the instrument panel - one left of the tower and one right of the tower. For the cupholder installed for Avidyne aircraft, refer to Section 25-12-00, Center Console.

B. **Removal and Installation of the Cupholder**

(1) Remove the two 8-32 x 1 inch MS51957-49 pan head screws and NAS1149FN832P washers affixing the cupholder to the bottom flange of the instrument panel. Refer to Figure 201.

(2) Remove the cupholder.

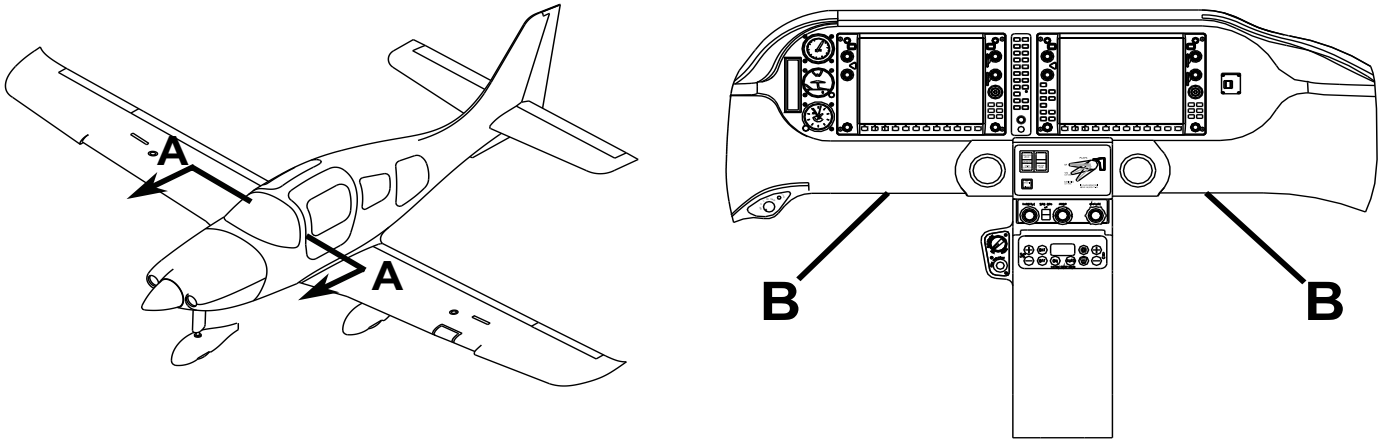
(3) Installation is the reverse of removal. Dry torque the screws 17 to 21 in.-lbs.

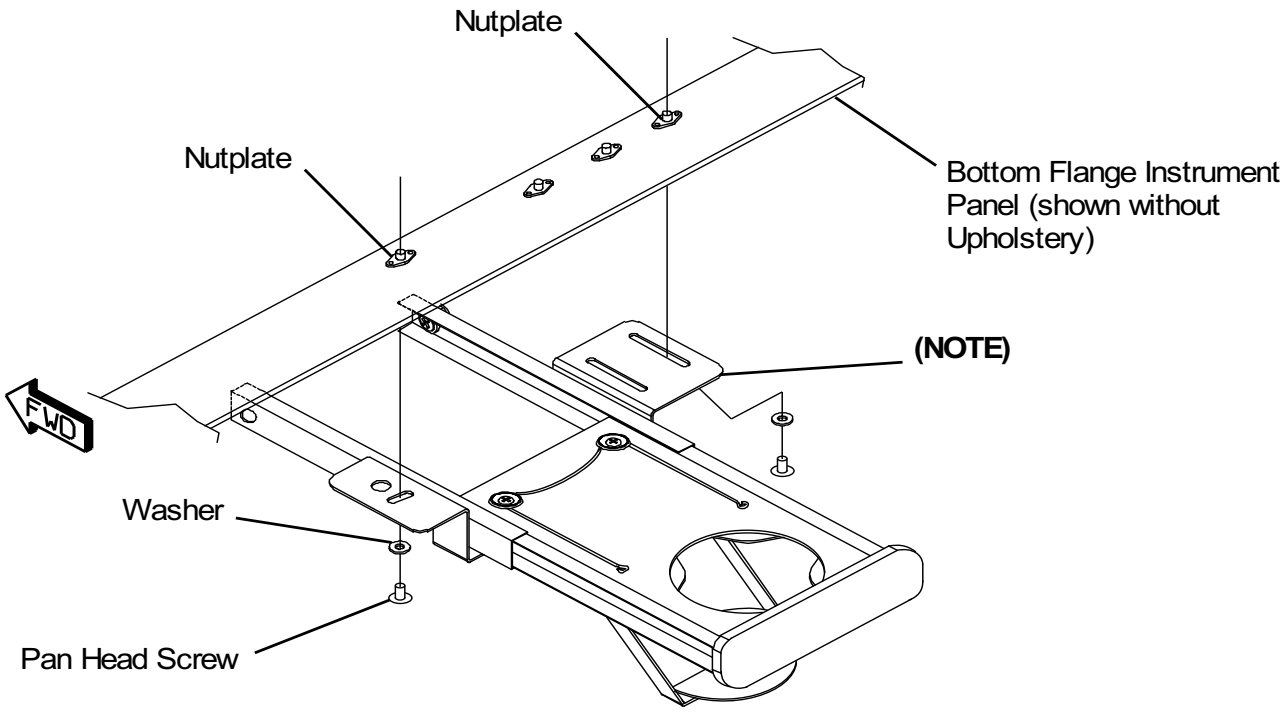
C. **Service and Maintenance** – The cupholders do not require any service or maintenance.

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Figure 201 : Sheet 1 : Cupholder

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DETAIL A

NOTE: Left side installation uses this mounting plate.

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FOOTWELL - MAINTENANCE PRACTICES

1. Footwell

A. The footwell is a structural member of the fuselage and contains the front seat belt attachment bracket. It is installed with AN526C1032R10 screws and NAS1149F0363P washers (AN960-10). The length of these screws should be appropriate for the attachment.

B. **Removal**

(1) Remove all four seats.

(2) Lift the carpet in the footwell, and remove the screws and washers connecting the footwell to the flanges.

(3) Remove the footwell from the plane.

C. **Installation**

(1) Place the footwell within the flanges and install the screws and washers. Torque the screws 30 to 36 in.-lbs.

(2) Install the carpet.

(3) Install the four seats.

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ROSEN SUNVISOR - MAINTENANCE PRACTICES

1. Rosen Sunvisor

A. Rosen sunvisor assemblies are of optical quality lens material that provides protection from 99.9 percent of UV rays (A/B) mounted on a pivoting slide. The assemblies provide stable and easy adjustment of the sunvisor with a secure stowing position.

B. **Sunvisor Removal and Installation**

(1) Remove the No. 8-32 x .625 hex socket cap screw and lock washer that attaches the sunvisor assembly to the mounting bracket on the aircraft cabin overhead.

(2) Remove the sunvisor assembly.

(3) To disassemble the sunvisor and slide from the mounting block, remove the No. 8-32 x .750 hex socket cap screw and lock washer.

(4) Remove the mounting block.

(5) Retain all hardware for reinstallation.

(6) Installation is the reverse of removal. Tighten the hex screws at the pivot points so that the sunvisor moves freely but not loosely.

C. **Sunvisor Maintenance** – Maintenance for continued airworthiness should only be performed when the aircraft is on the ground and is as follows:

(1) Periodically clean the lenses with Rosen Plastic Cleaner, Polisher and Protectant, a soft cloth, mild soap and water, or an approved aviation grade windscreen cleaner. Do not use abrasives on the lens.

(2) Periodically adjust the pivot tensions on the visor assemblies.

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FIRE PROTECTION - DESCRIPTION AND OPERATION

1. General - Fire Extinguisher Description and Limitations

A. The airplane fire extinguisher is located below the copilot's seat in a metal bracket and is mounted horizontally. The extinguisher is stored with the top of the unit near the middle of the airplane so that it is accessible from the pilot's seat. Refer to Figure 1

B. Airplanes with a 2.5 lbs. portable fire extinguisher will have one of the below types:

NOTE: The label on the fire extinguisher provides the most accurate description.

(1) The extinguisher is filled with a 1211/1301 Halon mixture (commonly called Halonaire) that chemically interrupts the combustion chain reaction rather than physically smothering the fire. The hand extinguisher is intended for use on Class B (flammable liquids, oil, grease, etc.) and Class C (energized electrical equipment) type fires.

(2) The installed fire extinguisher is an H3R, Inc. Halon blend model RTA1200. The unit has a 5B:C U/L rating and contains 2.5 lbs.of recycled Halon with a 14-16 second discharge time. It has been demonstrated that 2.5 lbs. of extinguishing agent, when totally discharged at one time within the cabin of the airplane during flight, can be safely ventilated from the cabin within an FAA prescribed time period. The ventilation time period is important since Halon has some levels of toxicity. For this reason, using other types of fire extinguishers, with different extinguishing agents, or greater weights of Halon is not approved.

C. Airplanes with a 1.25 lbs. portable fire extinguisher will have one of the below types:

NOTE: The label on the fire extinguisher provides the most accurate description.

(1) The extinguisher is filled with a 1211 Halon that chemically interrupts the combustion chain reaction rather than physically smothering the fire. The hand extinguisher is intended for use on Class B (flammable liquids, oil, grease, etc.) and Class C (energized electrical equipment) type fires.

(2) The installed fire extinguisher is an Amerex Corp. Halon 1211 model A3447. The unit has a 2B:C U/L rating and contains 1.25 lbs. of recycled Halon with a 10 second discharge time. It has been demonstrated that 1.25 lbs. of extinguishing agent, when totally discharged at one time within the cabin of the airplane during flight, can be safely ventilated from the cabin within an FAA prescribed time period. The ventilation time period is important since Halon has some levels of toxicity. For this reason, using other types of fire extinguishers, with lower U/L ratings, different extinguishing agents is not approved.

D. **Temperature Limitations** - The fire extinguisher has temperature storage limitations that may need to be considered depending on the operating environment of the airplane. If it is anticipated that the cabin temperature will exceed the extremes shown in the table below, Table 1, the extinguisher must be removed and stored in a more temperate location.

Table 1. Cabin Temperature Extremes

Temperature Extremes	Maximum/Minimum Temperatures
Lowest Cabin Temperature	2.5 lbs. portable fire extinguisher -40 °F (-40 °C)
	1.25 lbs. portable fire extinguisher -65 °F (-54 °C)
Highest Cabin Temperature	120 °F (49 °C)

2. Portable Fire Extinguisher Inspection

A. Complete a Portable Fire Extinguisher (Weight) Functional Check.

NOTE: Since the fire extinguisher does not have a pressure gage to indicate its charge, it must be weighed at the annual or 100 hour inspection intervals to ensure there is an adequate amount of extinguishing agent.

NOTE: All portable fire extinguishers have a permanent placard with the NFPA or UL specifications of the bottle.

(1) Remove the portable fire extinguisher from the airplane.

(2) Make sure that the portable fire extinguisher has a correctly installed permanent placard with the information that follows:

NOTE: The specifications for the weight and pressure of the portable fire extinguishers can be different because the extinguishers are from different manufacturers.

(a) Make sure that the NFPA or UL specifications are put on the placard on the portable fire extinguisher.

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(b) Make sure that you can read the placard on the portable fire extinguisher.

(3) Weigh the portable fire extinguisher.

NOTE: The portable fire extinguisher is weighed to make sure that the fill gage is correct. The fill gage can show that the portable fire extinguisher is full when some of the agent is missing.

(a) Make sure that the measured weight agrees with the NFPA or UL specification placard.

1 Make sure that the fill gage shows the correct indication and is within the tolerance given on the placard.

(4) If the measured weight and the placard weight do not agree with the tolerance on the placard, fill or replace the portable fire extinguisher, as necessary.

(5) Install the portable fire extinguisher in the airplane.

B. Fire Extinguisher General Visual Inspection

(1) Check the following items on the fire extinguisher and then reinstall in the airplane.

(a) Check condition of tamper seal for security.

(b) Check for damage to the discharge lever.

(c) Check condition of the valve nozzle.

(d) Check legibility and security of instructions decal.

(e) Ensure there are no dents or deformation to the cylinder.

(f) Note the extinguisher's gross weight on the 100 hour or annual inspection form.

C. Fire Extinguisher Mounting Bracket Inspection

(1) Inspect the bracket mounting screw holes for evidence of fatigue and pull-through.

(2) Inspect the clamp mechanism for evidence of fatigue, and look for bends or crimps in the circular band. Install the extinguisher.

(3) Ensure the latching mechanism functions properly. Tug on the extinguisher a few times. The extinguisher should remain in place even when a moderate force is applied. If the extinguisher has a tendency to break out of the bracket when a moderate force is applied to the unit, replacement of the bracket is required.

3. Removal and Installation of the Fire Extinguisher Bracket

A. The fire extinguisher bracket is mounted to the aft side of the footwell on the copilot’s side of the airplane. It is attached with two 1/4 - 28 screws, two flat head washers, and two 1/4 - 28 self-locking nuts. Refer to Figure 1.

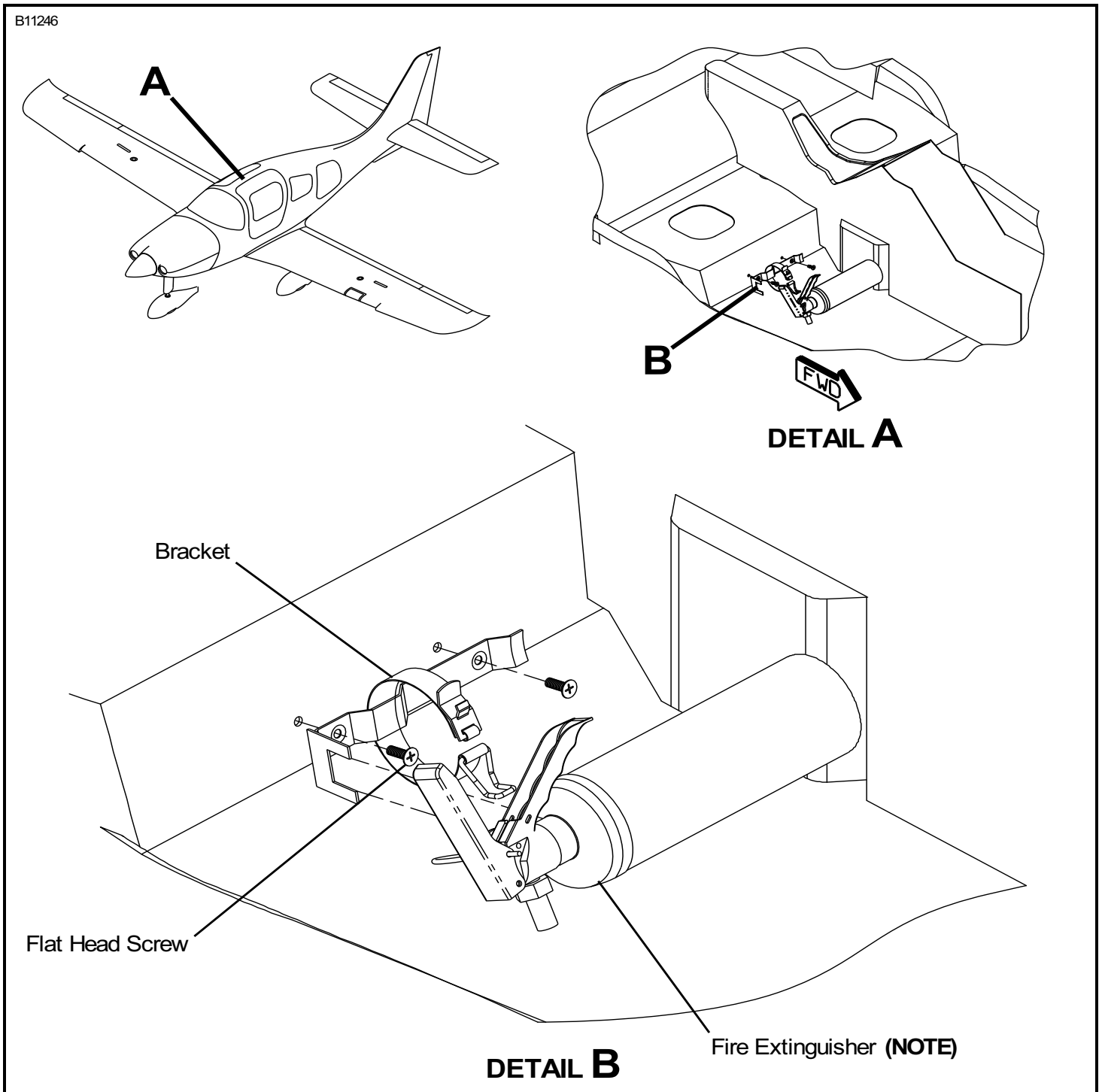
(1) The bracket is mounted by inserting the screws into the countersunk portion of the bracket and then inserting it through the pre-drilled holes in the panel of the footwell. The washer and self-locking nut are applied to the back side of the panel and torqued to 72 in.-lbs.

(2) The bracket is uninstalled by removing the two 1/4 - 28 self-locking nuts and flat head washers on the backside of the mounting panel.

B. Access to the back side of the mounting panel is available from two locations. There is an access panel under the copilot’s seat, which requires removal of the seat (refer to Section 25-10-00, Removal of the Front Seats) and an access panel on the underside of the airplane below the copilot’s seat. While access is more convenient using the panel under the airplane, the removal and installation of the bracket requires two people.

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Figure 1 : Sheet 1 : Fire Extinguisher



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TKS ANTI-ICE SYSTEM (INADVERTENT) - DESCRIPTION AND OPERATION

1. General

A. This section gives a description and operation of the TKS Anti-Ice System (Inadvertent). The TKS anti-ice system is a fluid anti-ice system to prevent ice formation on the leading edges of the wings and horizontal stabilizers. The TKS anti-ice system includes the TKS ANTI-ICE switch, the equipment pack, the tail proportioning unit, the fluid tank, the left and right wing porous panels, and the left and right horizontal stabilizers porous panels. Refer to Figure 1 for a general view of the TKS anti-ice system.

B. The TKS system uses a monoethylene glycol/isopropyl alcohol/deionized water solution for the anti-ice solution for the airframe surfaces in flight. The fluid solution is a freezing point depressant that is swept rearward over the surfaces and prevents ice buildup. For a list of approved TKS anti-icing fluids refer to Chapter 12, Replenishing - Servicing.

2. Description

A. The TKS equipment pack is located in the fuselage under the copilot seat. To access the equipment pack, remove the fuel system access panel and/or the footwell panels as needed. The equipment pack consists of a pump, filter, and the wing proportioning unit. Refer to Figure 2.

(1) A filter is installed downstream of the metering pump. The filter contains a replaceable element. The filter ports are marked IN and OUT for correct plumbing connection.

B. Proportioning units are installed in two different locations on the airplane. A six place proportioning unit is found on the equipment pack. Only five places are used in this installation. A two-place proportioning unit is found in the tail aft of the baggage compartment. The proportioning units are metering units which supply anti-icing fluid at a predetermined flow rate for each individual porous leading edge panel. The proportioning units incorporate a manifold with calibrated capillary tubes which meter the fluid through the outlet ports. The equipment pack proportioning unit outlets are marked 1, 2, 3, 4, 5, and 6. The tail proportioning unit outlets are marked 1 and 2. Plumbing to the outlet ports must be connected as specified for proper operation. Refer to Figure 2 and Figure 3.

C. The system is configured with a metering pump. The pump gives the delivery mechanism for all modes of operation of the system. The modes of operation are NORM and MAX.

(1) The MAX mode is a flow rate that is used for maximum icing condition, and occurs when the pump is run continuously.

(a) The MAX flow rate is 6.2 gal/hr (392 ml/min).

(2) NORM mode is a flow rate for intermittent icing conditions.

(a) The NORM flow rate is 3.1 gal/hr (196 ml/min).

D. The fluid tank assembly is installed in the left inboard wing. Refer to Figure 1.

(1) The tank anti-ice fluid level is monitored with an indication on the MFD. The fluid level monitor device shows the total fluid available for operation of the anti-ice system. The tank fluid level monitor devices are electrically operated and receive inputs from a level sender probe in the fluid tank. Refer to Figure 5.

(2) There is a strainer installed between the fluid tank and the input to the metering pump.

E. Laser-drilled titanium panels are mounted to the leading edges of the wings, and horizontal stabilizers that give TKS ice protection for the airplane. Refer to Figure 1 and Figure 3.

(1) Anti-ice fluid solution comes out of the airframe anti-ice system through laser drilled titanium leading edge panels on the wings and horizontal stabilizers. The airframe anti-ice system applies anti-icing fluid to the wing leading edges and the horizontal stabilizer leading edges. The system provides full coverage of the leading edge of the wings and horizontal stabilizer.

(a) The outer skin of the ice protection panels are manufactured with titanium, 0.9 mm thick. Titanium provides excellent strength, durability, light weight, and corrosion resistance.

(b) The panel skin is perforated by laser drilled holes, 0.0025 inches in diameter, 800 per square inch. The porous area of the titanium panels is designed to cover the stagnation point travel on the appropriate leading edge over a normal operating environment.

(c) The back plates of the porous panels are manufactured with 0.7 mm thick titanium. They are formed to create reservoirs for the ice protection fluid to supply the entire porous area. A porous membrane between the outer skin and the reservoir gives even flow and distribution through the entire porous area of the panel.

(d) The porous panels are bonded as a cuff over a leading edge. Panels are bonded to the airframe with a two-part

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flexible adhesive.

F. Fluid is supplied to the panels by a positive displacement, constant volume metering pump. The pump give various flow rates to the panels. The pump gives a timed pumping operation or a MAX rate for applicable icing conditions.

G. The fluid passes through a microfilter before it gets to the porous panels. The filter removes contaminants from the fluid which helps to prevent panel blockage. A system of nylon tubing carries the fluid from the fluid tank to the proportioning units that divide the flow into the volumetric requirements of each panel or device supplied through the unit. The proportioning units are located at the equipment pack and the tail of the aircraft and feed the panels through nylon tubing.

H. The system has a fluid tank that gives a minimum ice protection endurance when filled. The tank assembly is installed in the left inboard wing. Refer to Figure 1 and Figure 3.

(1) The fluid tank has a fluid level sender that gives a fluid quantity level that shows on the MFD.

(2) The filler port for the fluid tank is on the top inboard of the left wing. Refer to Chapter 12, Replenishing - Description and Operation.

I. The system is operated by a three-position rocker type switch. All modes of operation and selection for the metering pump are controlled with this switch. Refer to Figure 1.

J. The operational state can be monitored with CAS messages on the PFD and fluid quantity indication on the MFD.

3. Operation

A. Operation of the TKS anti-ice system is controlled by a three-position ANTI-ICE (SI018) rocker switch on the center console switch panel. The switch positions are MAX, NORM and OFF. Refer to Figure 4. When the TKS anti-ice system is in operation, the PFD shows CAS messages on its display and the MFD shows TKS anti-ice fluid quantity on its display. Refer to Figure 5.

(1) When the switch is in the MAX position, the metering pump operates continuously.

(a) The PFD will show the CAS message A-ICE MAX (white).

(2) When the switch is in the NORM position the metering pump operates for 30 seconds and then stops for 30 seconds on a continuous cycle.

(a) The PFD will show the CAS message A-ICE NORM (white).

(b) The anti-ice fluid quantity shows on the MFD display.

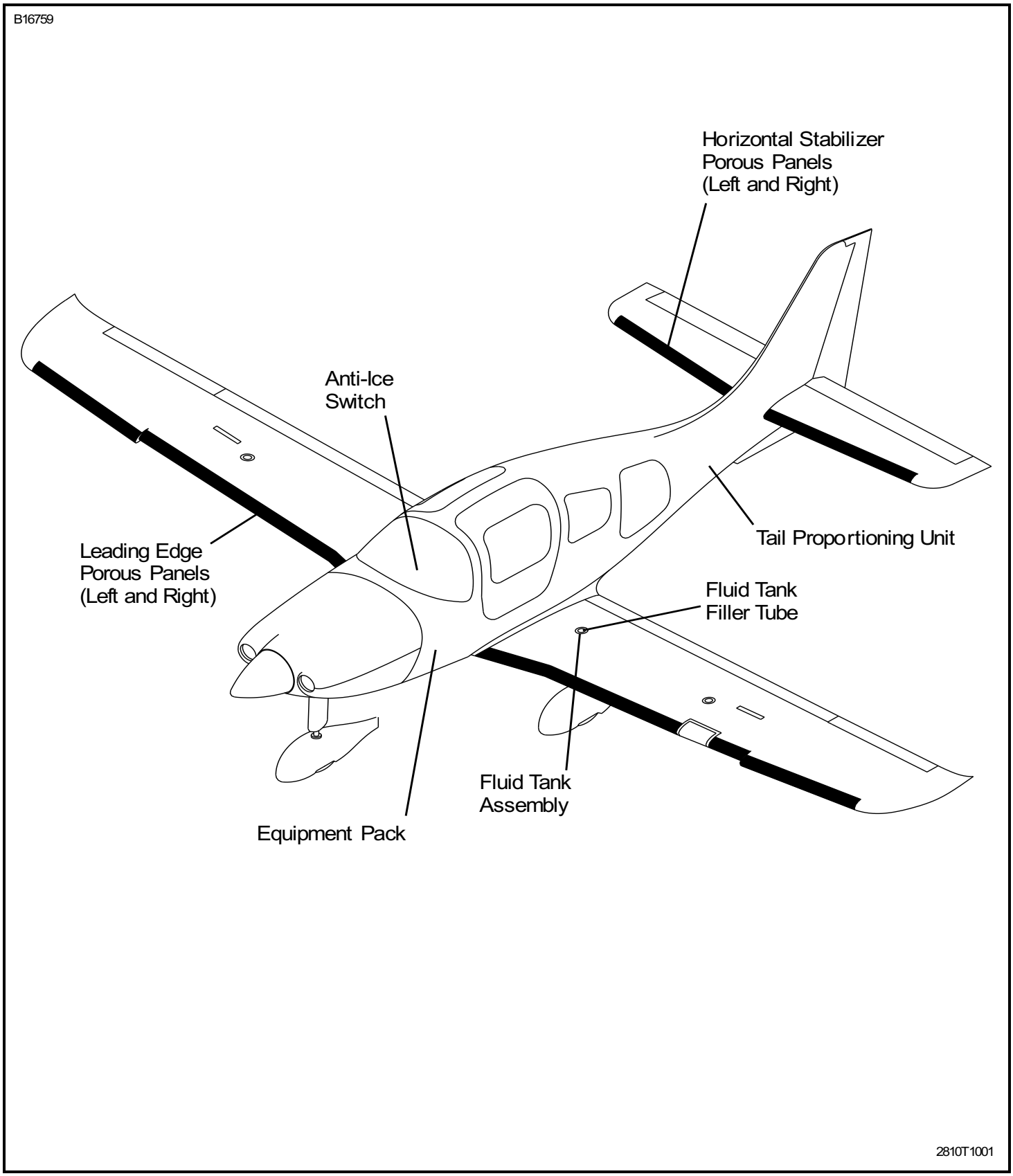
(3) When the system is operating the metering pump provides the anti-ice fluid to the filter assembly. The filter assembly removes contaminants from the fluid to prevent the porous panels from blockage.

(4) The anti-ice fluid flows from the filter assembly to the wing and tail proportioning units.

(5) The system of nylon tubing supplies the anti-ice fluid to the left and right wing porous panels and the left and right horizontal stabilizers.

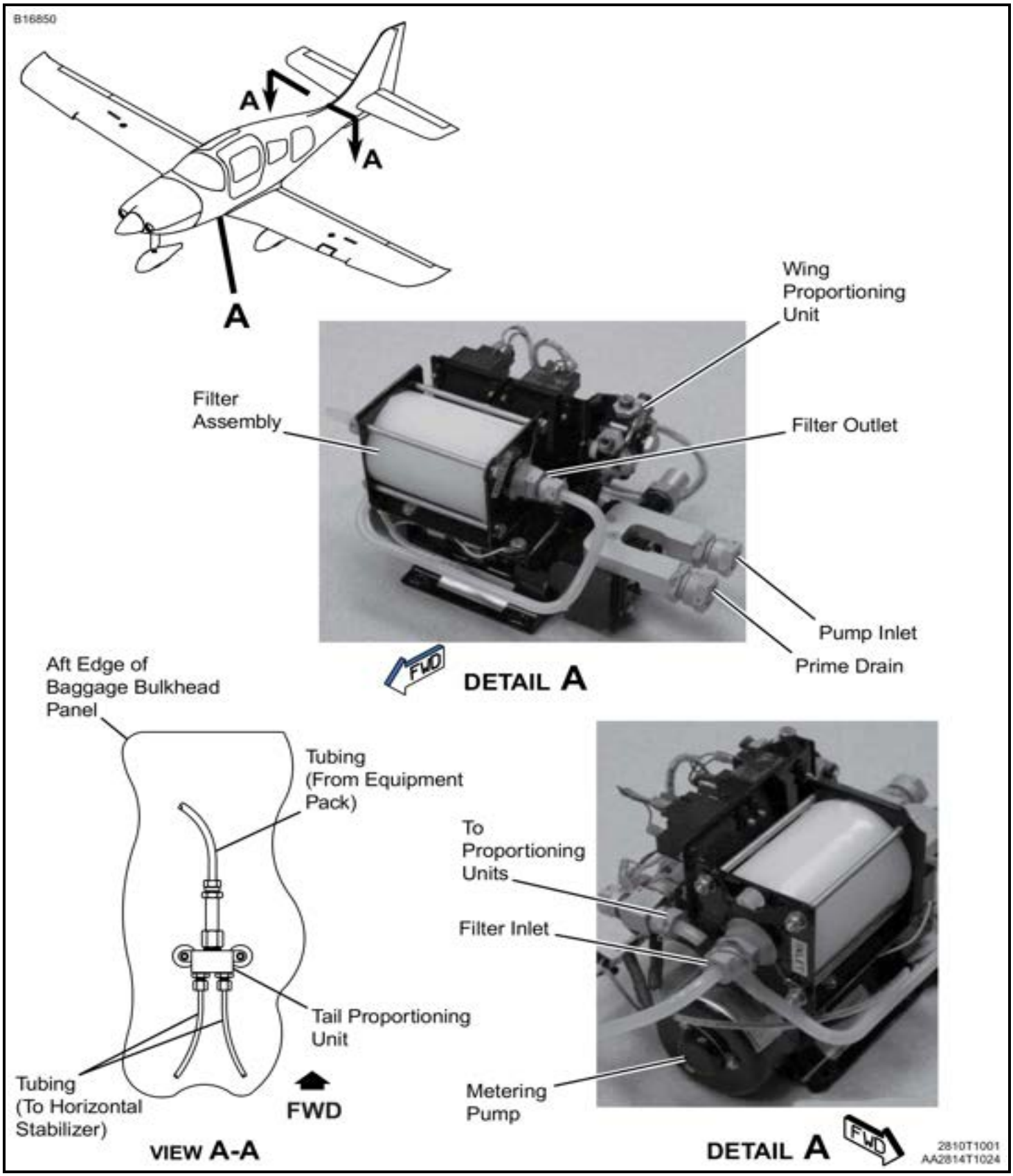
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Figure 1 : Sheet 1 : TKS System Installation



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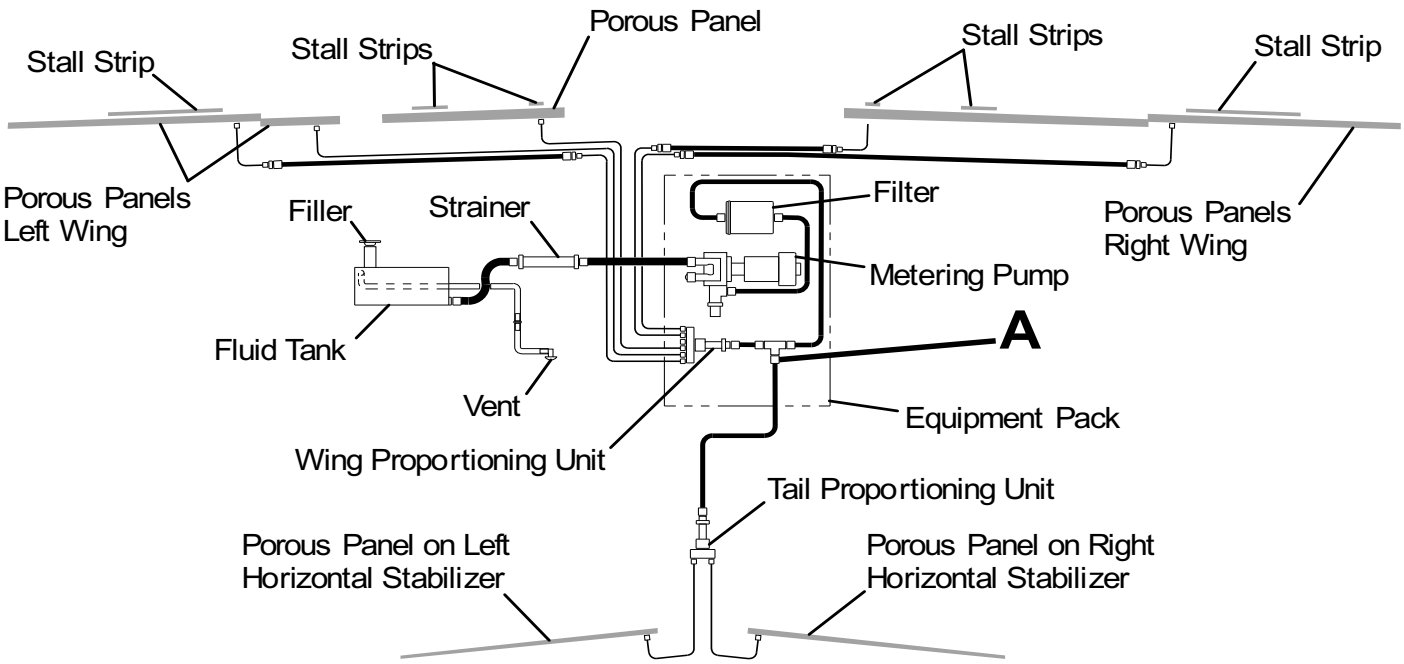
Figure 2 : Sheet 1 : TKS Equipment Pack



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Figure 3 : Sheet 1 : TKS System Flow Diagram

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LEGEND	
	3/16 Inch O.D. Nylon
	5/16 Inch O.D. Nylon
	1/2 Inch O.D. Nylon
	13 mm O.D. PVC
	Porous Panels

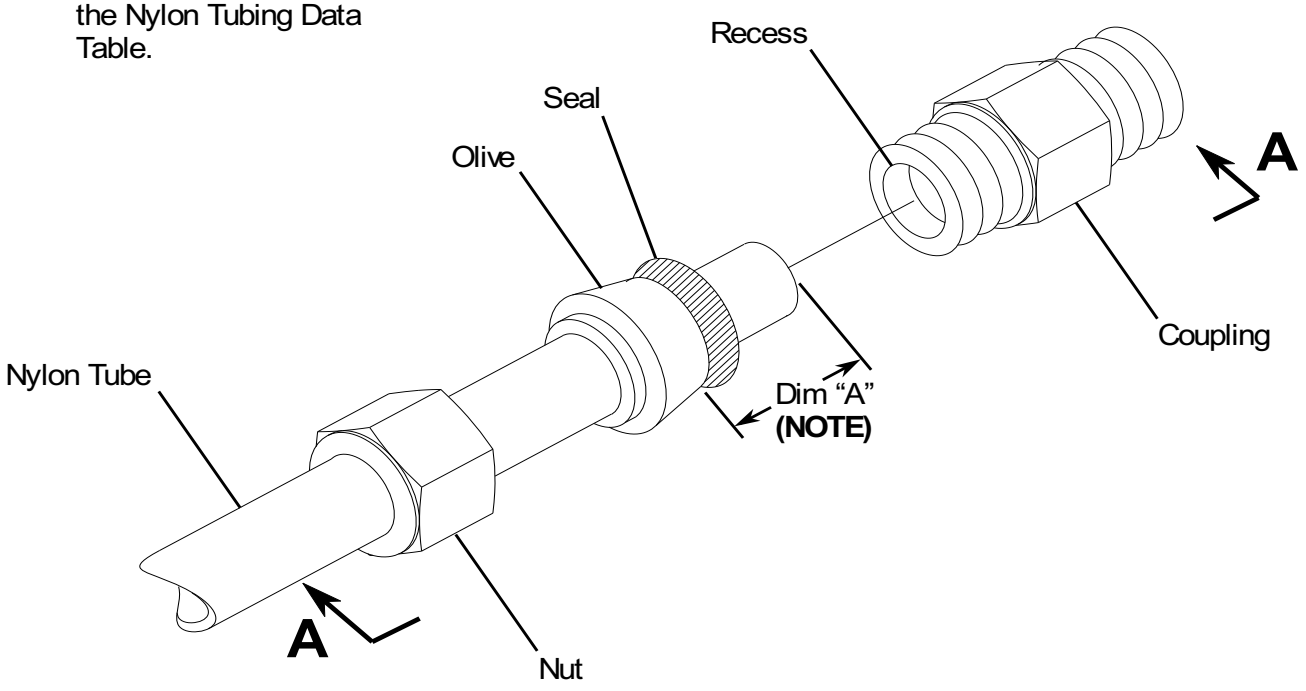
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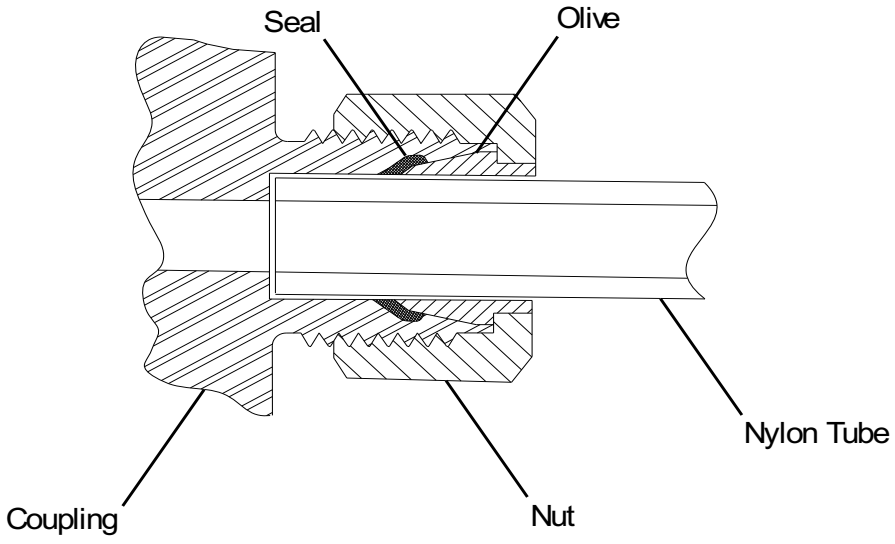
Figure 3 : Sheet 2 : TKS System Flow Diagram

B16237

NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)

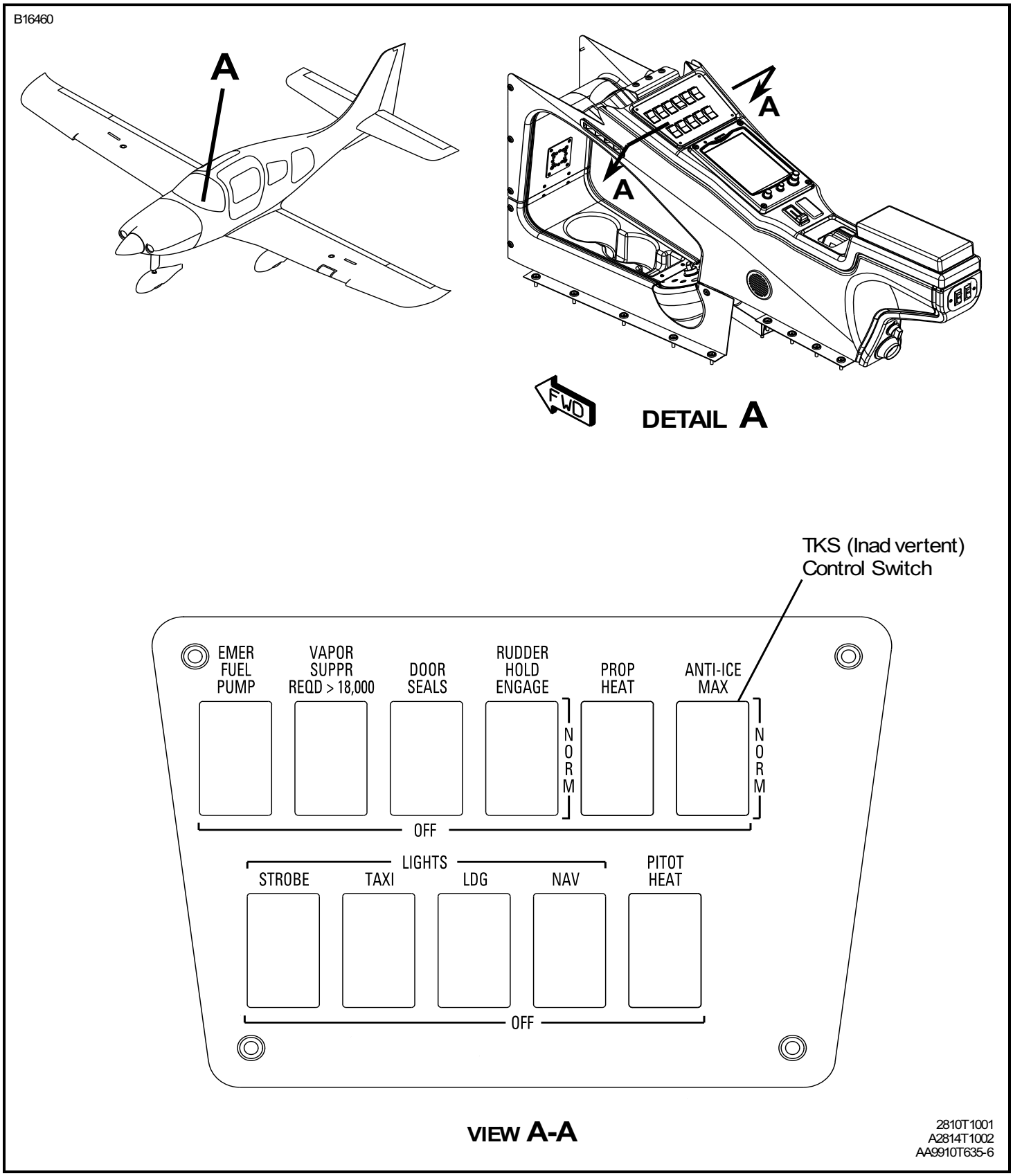


VIEW A-A

2678T1003
AA2678T1003

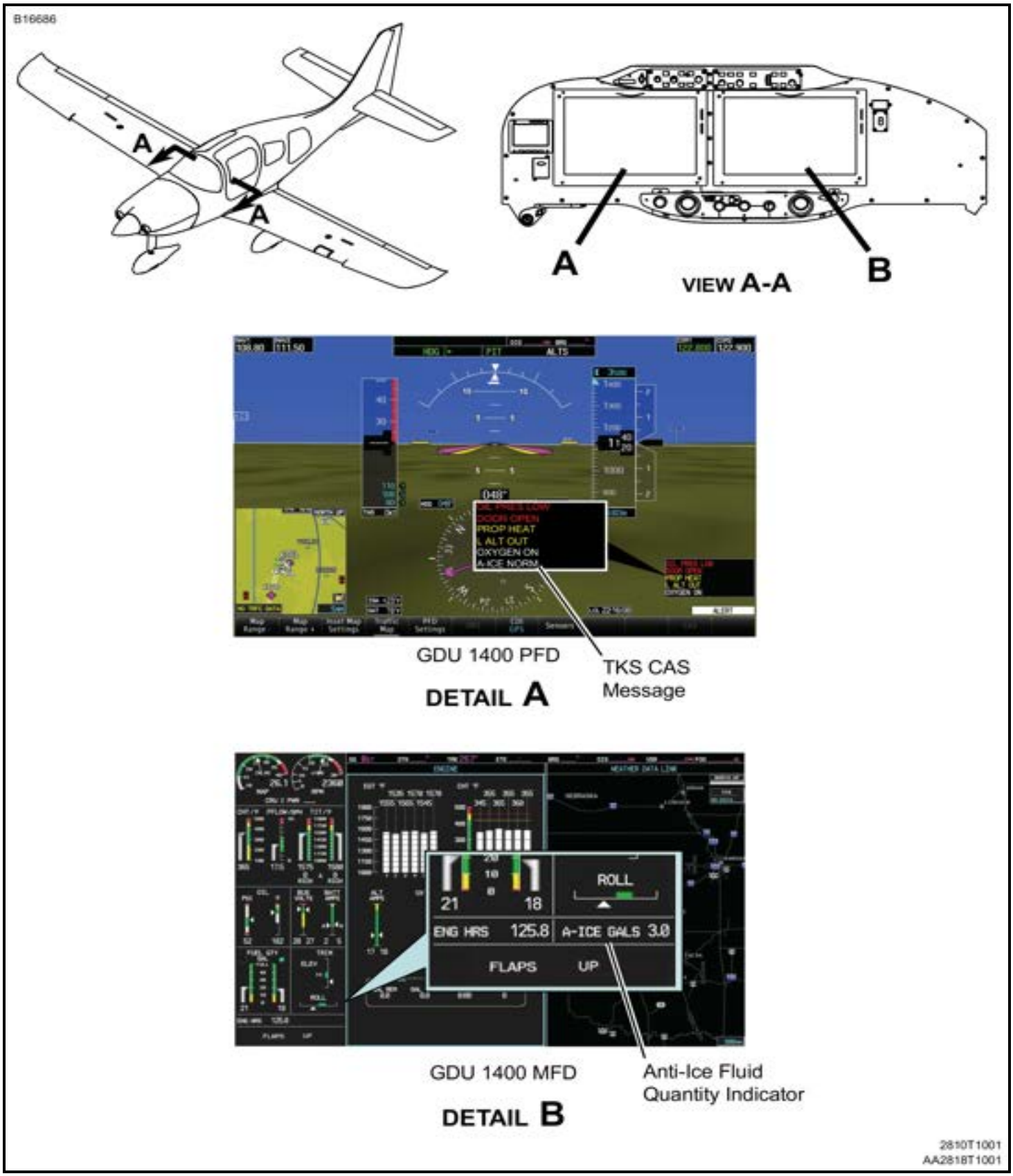
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Figure 4 : Sheet 1 : ANTI-ICE Switch Installation



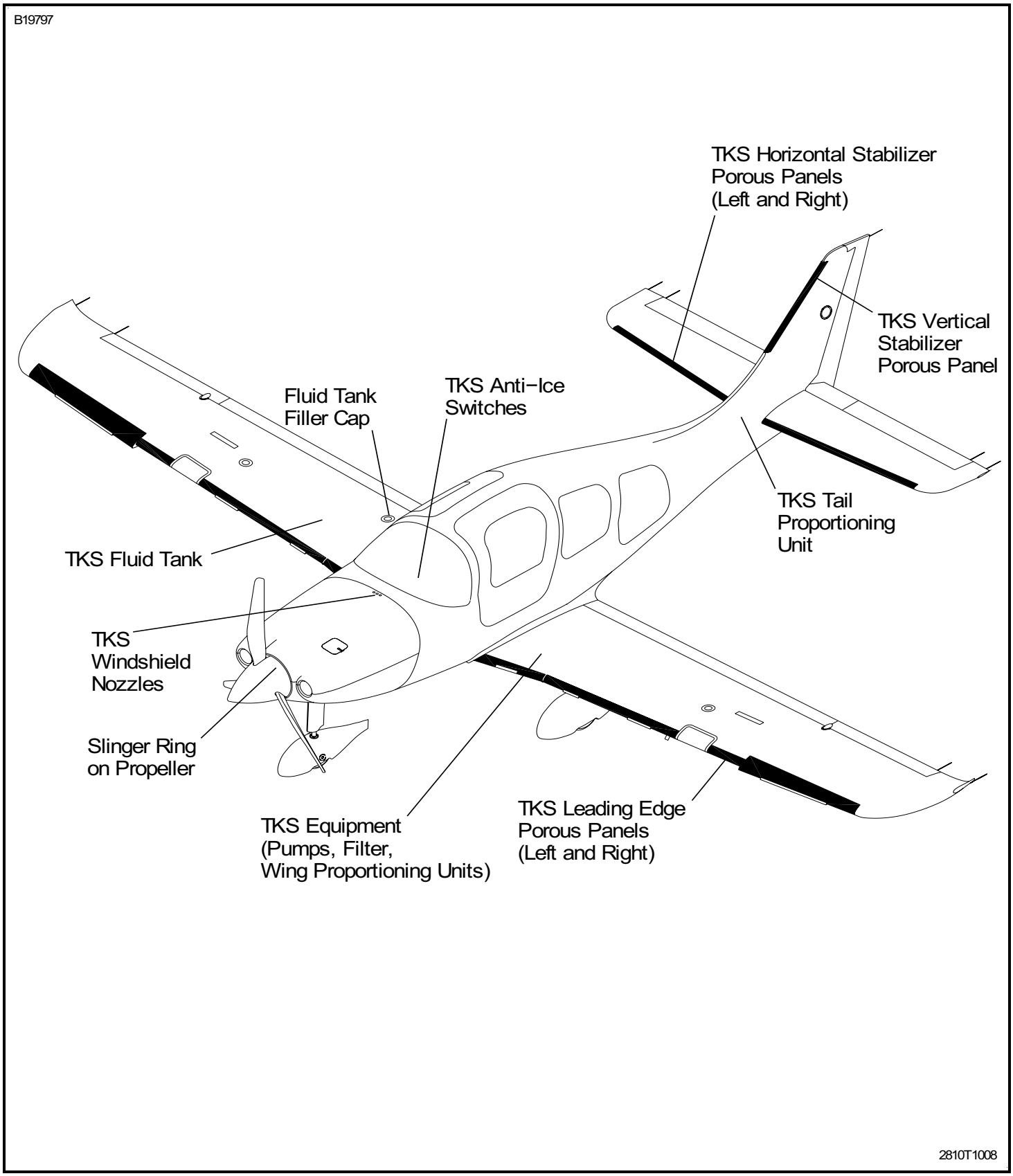
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Figure 5 : Sheet 1 : GDU 1400 PFD/MFD Monitoring



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Figure 1 : Sheet 1 : TKS Anti-Ice System (FIKI)



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TKS ANTI-ICE SYSTEM (INADVERTENT) - TROUBLESHOOTING

1. General

A. This section gives to troubleshoot procedures for the TKS Anti-Ice System (Inadvertent). Logic troubleshooting charts in this section will guide you to the most likely cause and to some recommended actions for repair.

2. Troubleshooting Description

A. The TKS system is controlled by a three position rocker switch on the center console switch panel. The switch positions are MAX, NORM and OFF. The Garmin G2000 system Multifunction Display (MFD) and the Primary Flight Display (PFD) Crew Alerting System (CAS) shows the TKS system status, warnings, cautions, and fluid quantity information.

B. A good understanding of the TKS system is important. To get more detailed information about the TKS system refer to TKS Anti-Ice System - Description and Operation in this chapter.

C. A good understanding of the discrepancy is also very helpful. There are three different categories of TKS discrepancies. This section has an extensive set of troubleshooting procedures to use. You can begin your troubleshooting at any procedure that is appropriate.

(1) The first category is the display category. This is any display that shows on the G2000 display units that was not expected, or an unexpected anti-ice quantity indication.

(a) If the anti-ice quantity is incorrect, you can test the system using the appropriate test procedure. Refer to TKS Anti-Ice System (G2000), TKS Fluid Level Sender Operational Test.

(b) If there is a message shown on one of the G2000 display units, you can troubleshoot each one individually using the correct procedure from this section.

(2) The second category is the fluid flow category. This section has the procedures to correct the distribution and flow of the fluid across the porous panels.

(3) The third category is the pump category. This means that there is an incorrect operation of the anti-ice pump.

(a) The check procedures for these discrepancies are found in this section of the troubleshooting.

(b) If the pump is not operating correctly, it is recommended that you begin your troubleshooting at the pump section procedures first.

3. Troubleshooting Preliminary

A. Visual Inspections.

NOTE: It is recommended that you do a visual inspection of the anti-ice components before you do the troubleshooting procedures. The visual inspections in this section do not need to be done in a specific order. You can look at the most likely parts and components as necessary. It is recommended that you do all of these inspections when possible.

(1) Look at all of the nylon tube connections. Examine the condition of the nut, olive, and seal or O-ring. If you must replace a part, refer to the Model 400 Illustrated Parts Catalog.

CAUTION: The length of the nylon tube is important. Refer to the Model 400 Illustrated Parts Catalog for the correct part number. A tube with an incorrect length can make the anti-ice system operate incorrectly.

(2) Inspect the nylon tubing for fluid leaks or evidence of obstructions. Make sure there are no cuts, holes, or kinks in the tubing.

B. Preliminary Set Up.

(1) Make sure that the TKS, MFD, PFD, and PFD CTRL circuit breakers found on the cockpit circuit breaker panel are engaged.

(2) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(3) Set the AVIONICS MASTER switch (SW04) to the ON position.

(4) Set the ANTI-ICE MAX/NORM switch (SI018) to the OFF position.

(5) Make sure the G2000 is operating correctly. Make sure that the display units are operating. You can cycle the power to individual equipment until all of the equipment is operating correctly.

(6) Make sure that no TKS fault messages are displayed on the PFD. If a TKS fault message is shown on the PFD refer to the troubleshooting charts for the procedure to correct the problem. Refer to Table 101 to find the message or condition and the related troubleshooting chart.

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4. Troubleshooting Charts

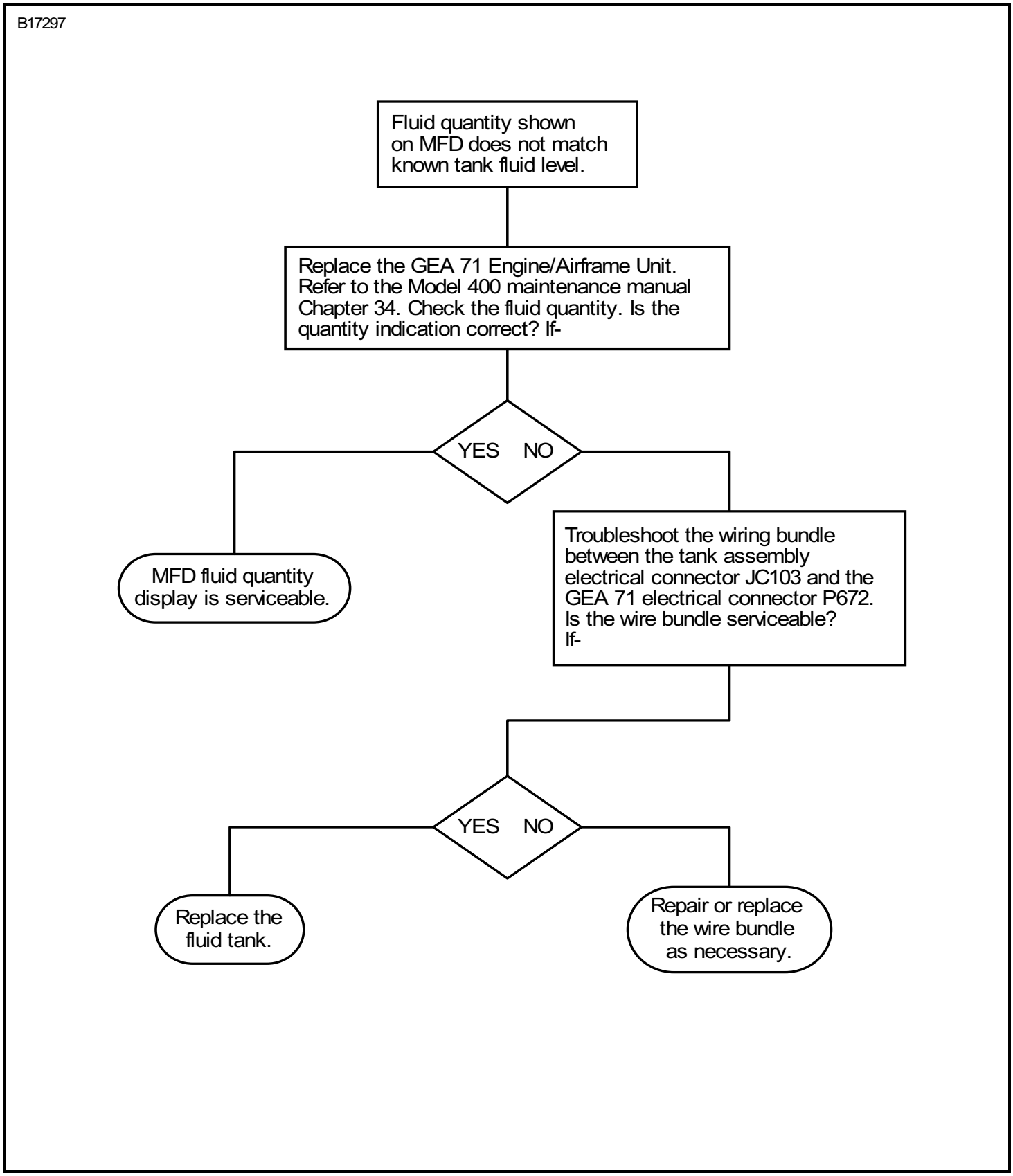
A. There is an extensive set of troubleshooting charts for some of the most common problems for the anti-ice system. The table below is an index between the suspected trouble and the corresponding troubleshooting chart.

Table 101. TKS Anti-Ice System Troubleshooting and G2000 Messages Index

TROUBLE	REFER TO:
The TKS fluid level does not show or is incorrectly shown on the G2000 MFD.	Figure 101
The A-ICE MAX message does not show or is incorrectly shown on the G2000 PFD.	Figure 102
The A-ICE NORM message does not show or is incorrectly shown on the G2000 PFD.	Figure 103
No or little fluid flow on the horizontal stabilizers leading edge.	Figure 104
No or little fluid flow on an individual horizontal stabilizer porous panel.	Figure 105
No or little fluid flow on the wing leading edges.	Figure 106
No or little fluid flow on an individual wing porous panel.	Figure 107
There is an uneven distribution of the anti-ice fluid at the porous panels.	Figure 108
The TKS pump does not operate when the ANTI-ICE MAX/NORM switch is set to the NORM or MAX positions.	Figure 109
The TKS pump does not operate when the ANTI-ICE MAX/NORM switch is set to the NORM position.	Figure 110
The TKS pump does not operate when the ANTI-ICE MAX/NORM switch is set to the MAX position.	Figure 111
TKS pump does not operate on for 30 seconds and then off for 30 seconds in a continuous cycle when the ANTI-ICE MAX/NORM switch is set to the NORM position.	Figure 112

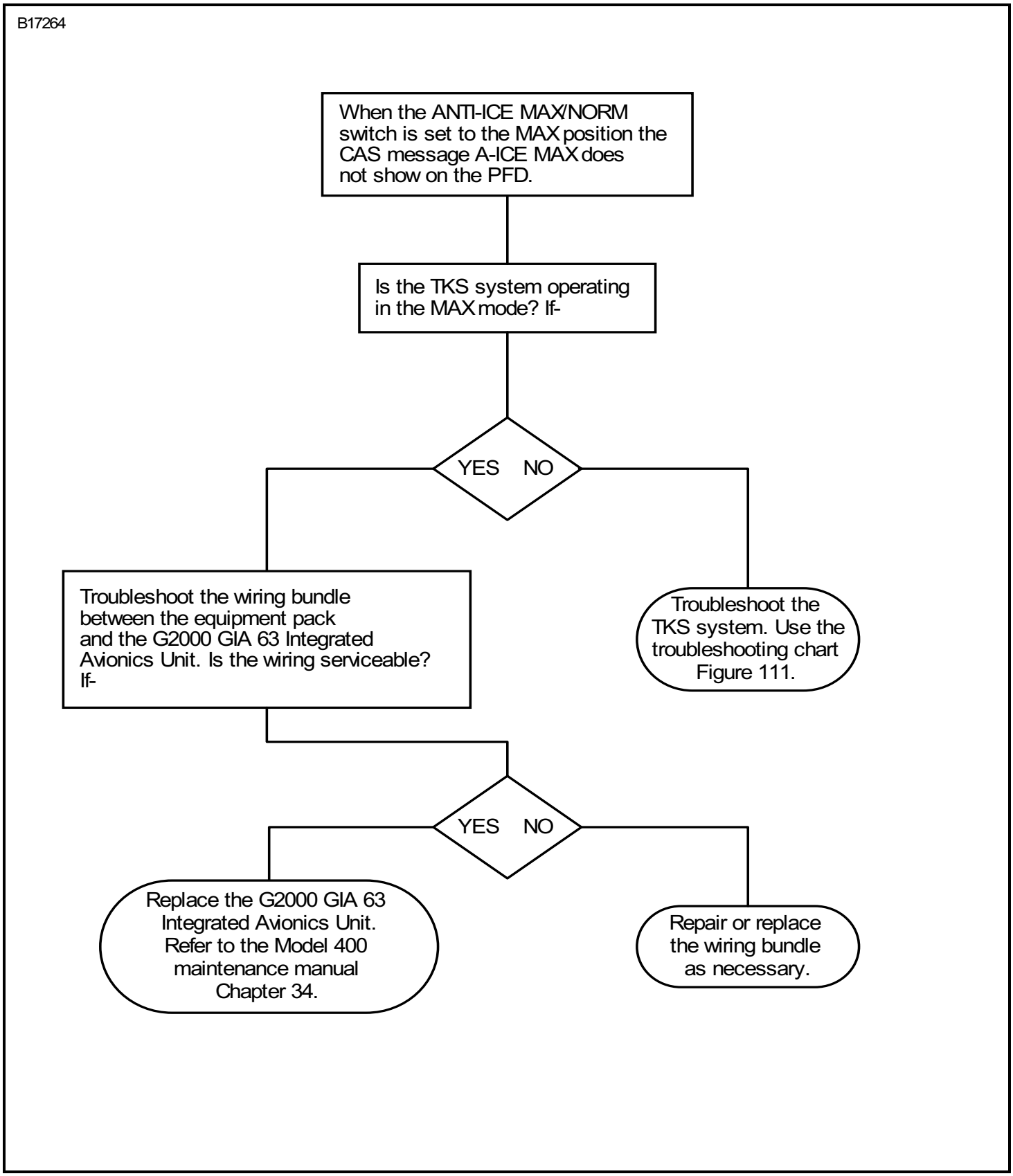
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Figure 101 : Sheet 1 : TKS Anti-Ice System Troubleshooting



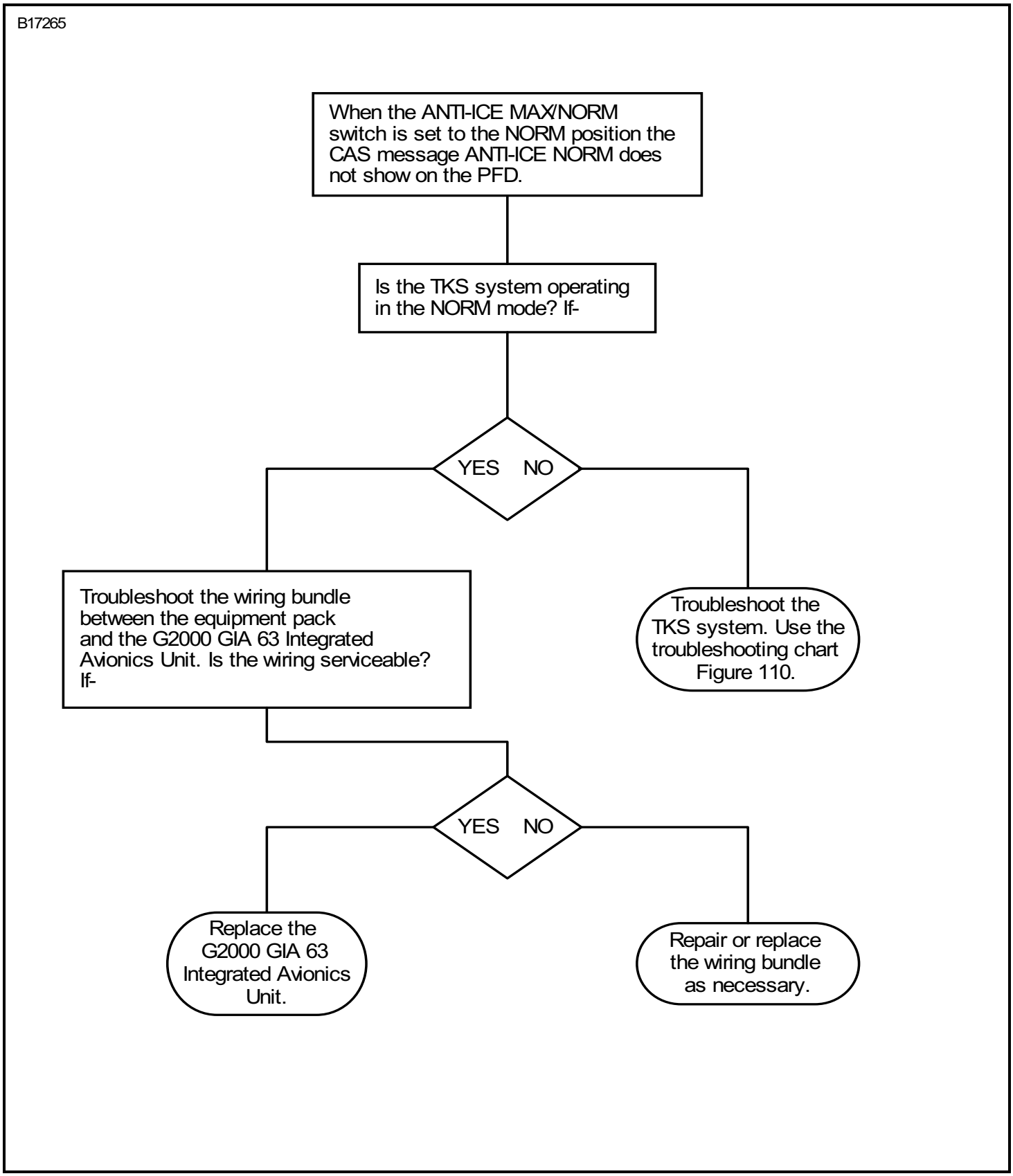
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Figure 102 : Sheet 1 : TKS Anti-Ice System Troubleshooting



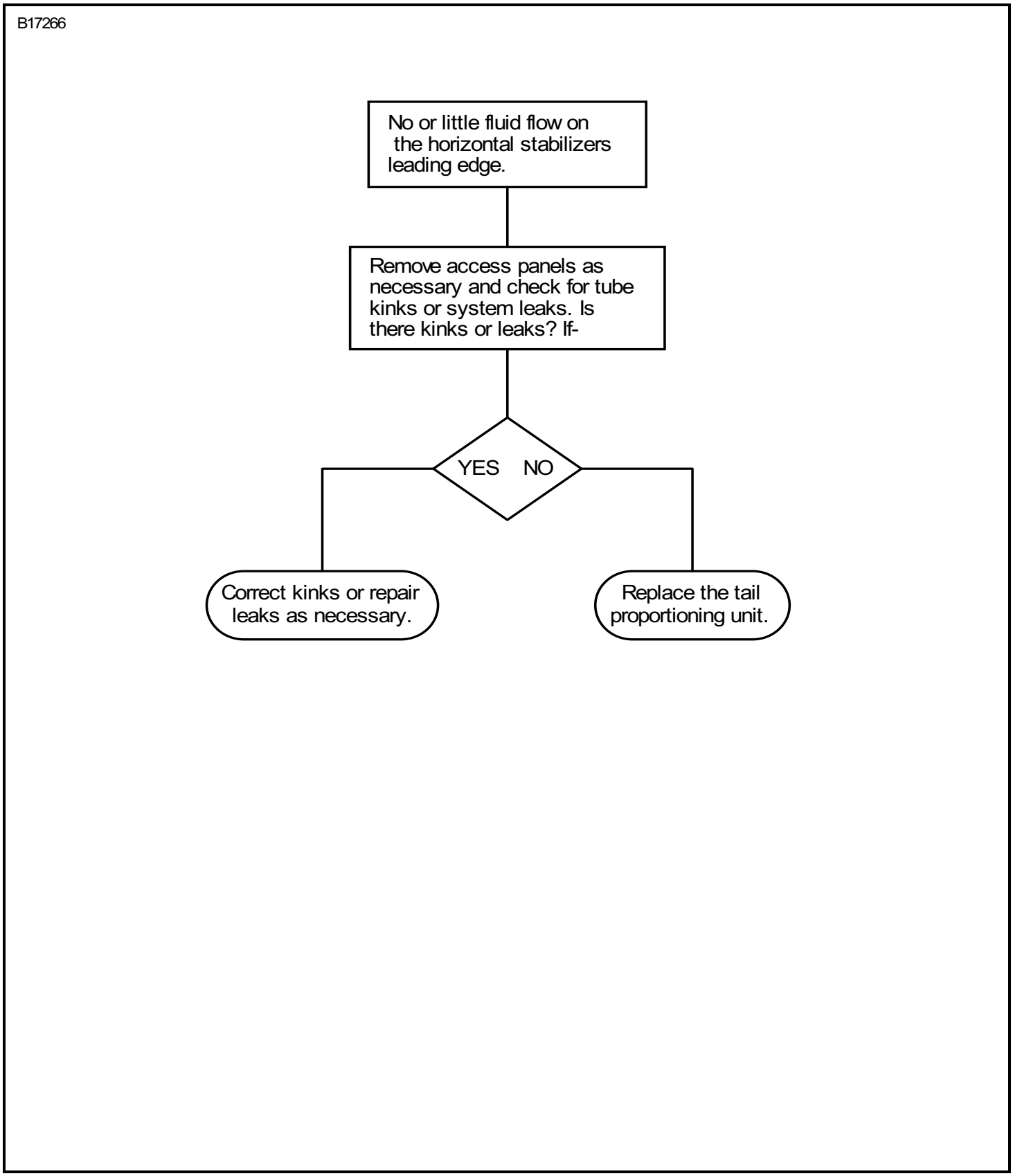
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Figure 103 : Sheet 1 : TKS Anti-Ice System Troubleshooting



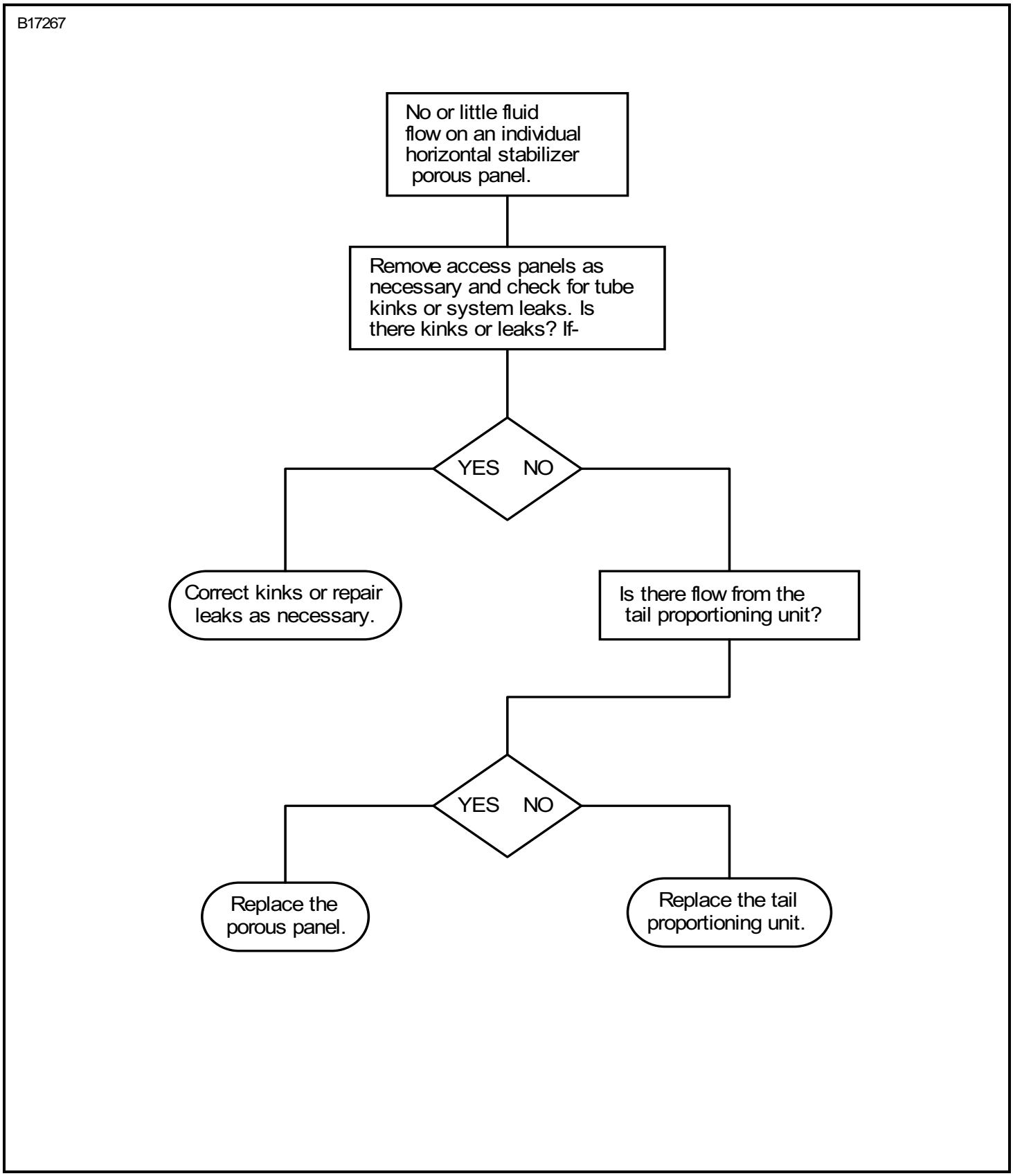
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Figure 104 : Sheet 1 : TKS Anti-Ice System Troubleshooting



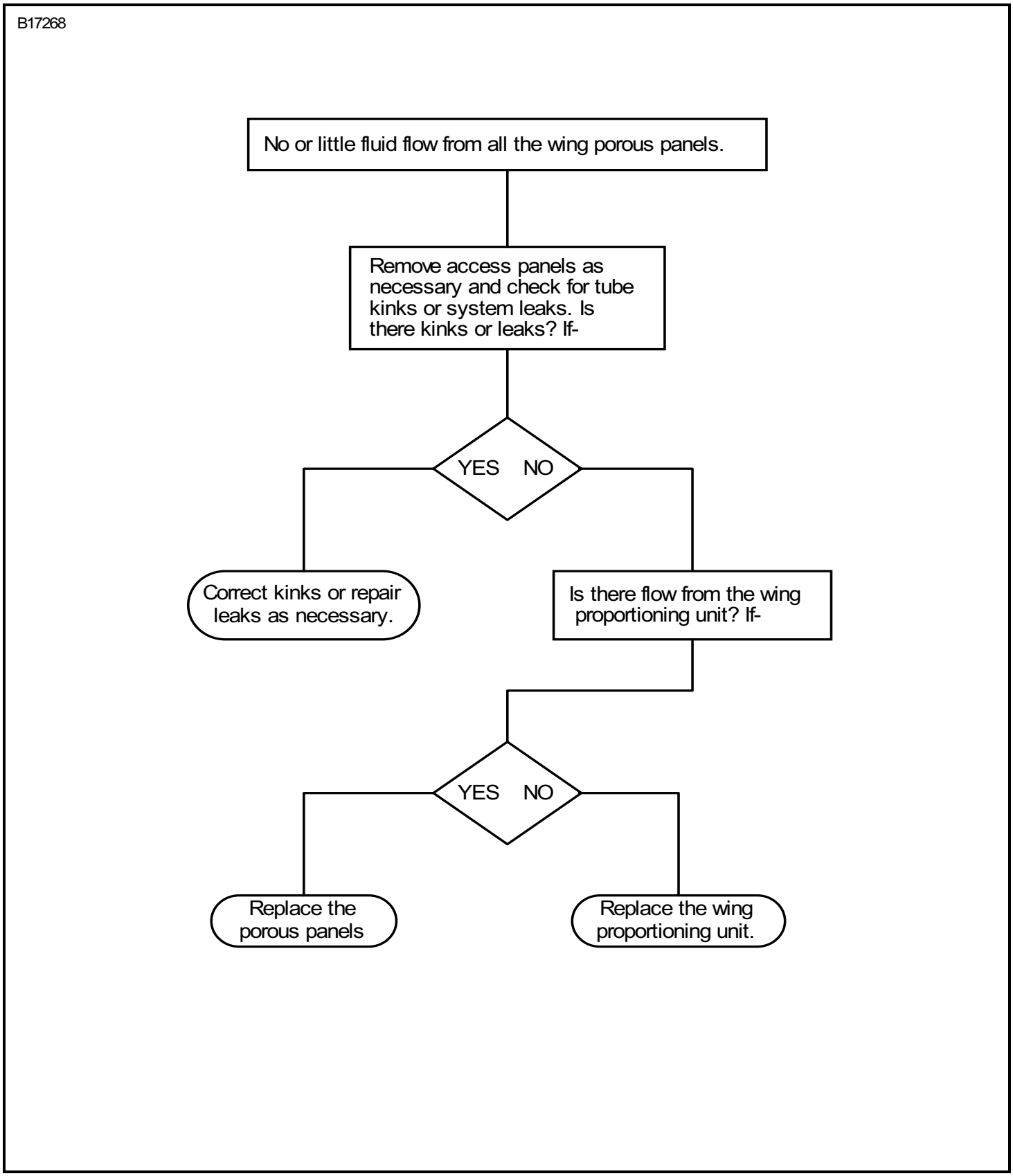
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Figure 105 : Sheet 1 : TKS Anti-Ice System Troubleshooting



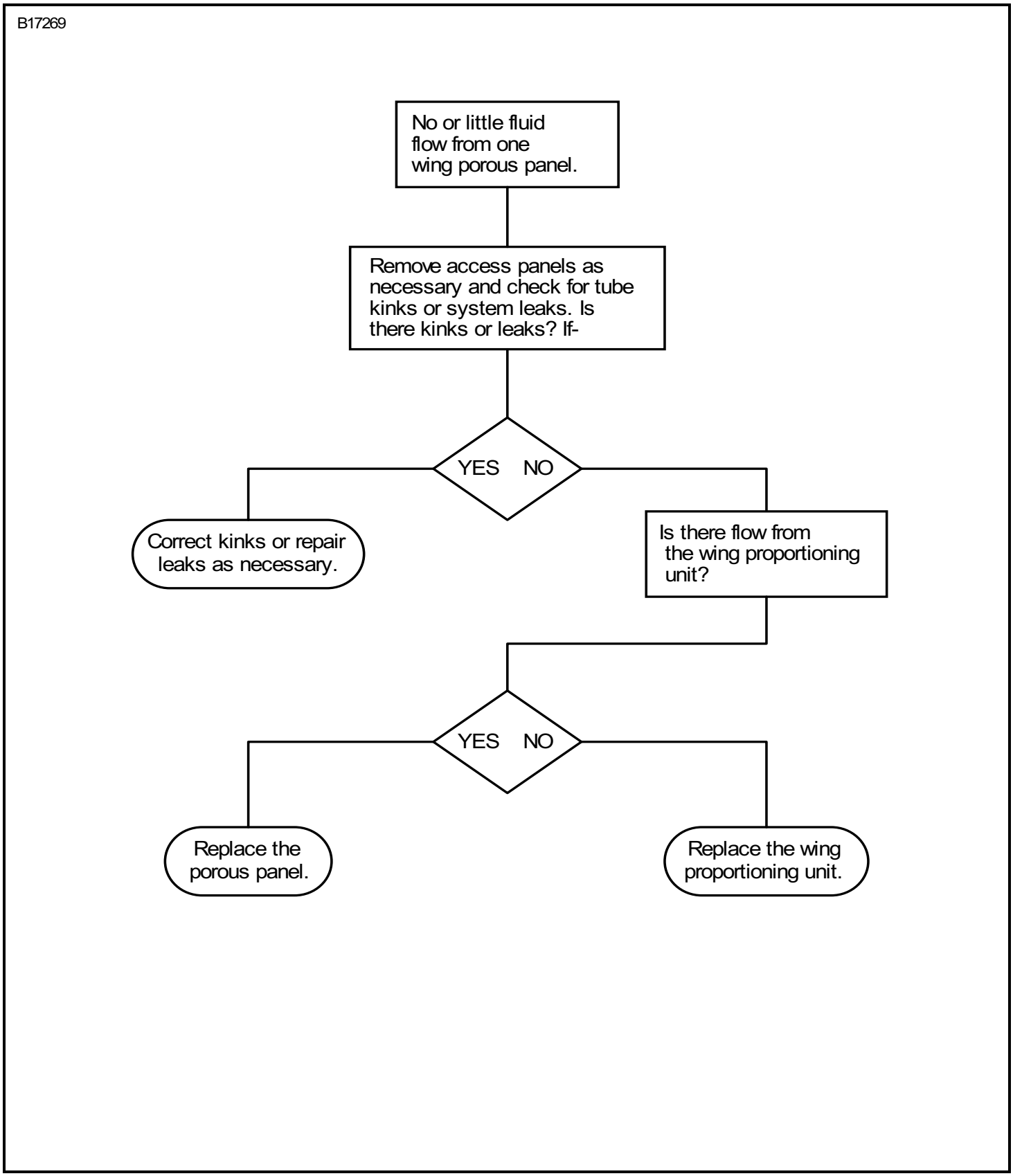
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Figure 106 : Sheet 1 : TKS Anti-Ice System Troubleshooting



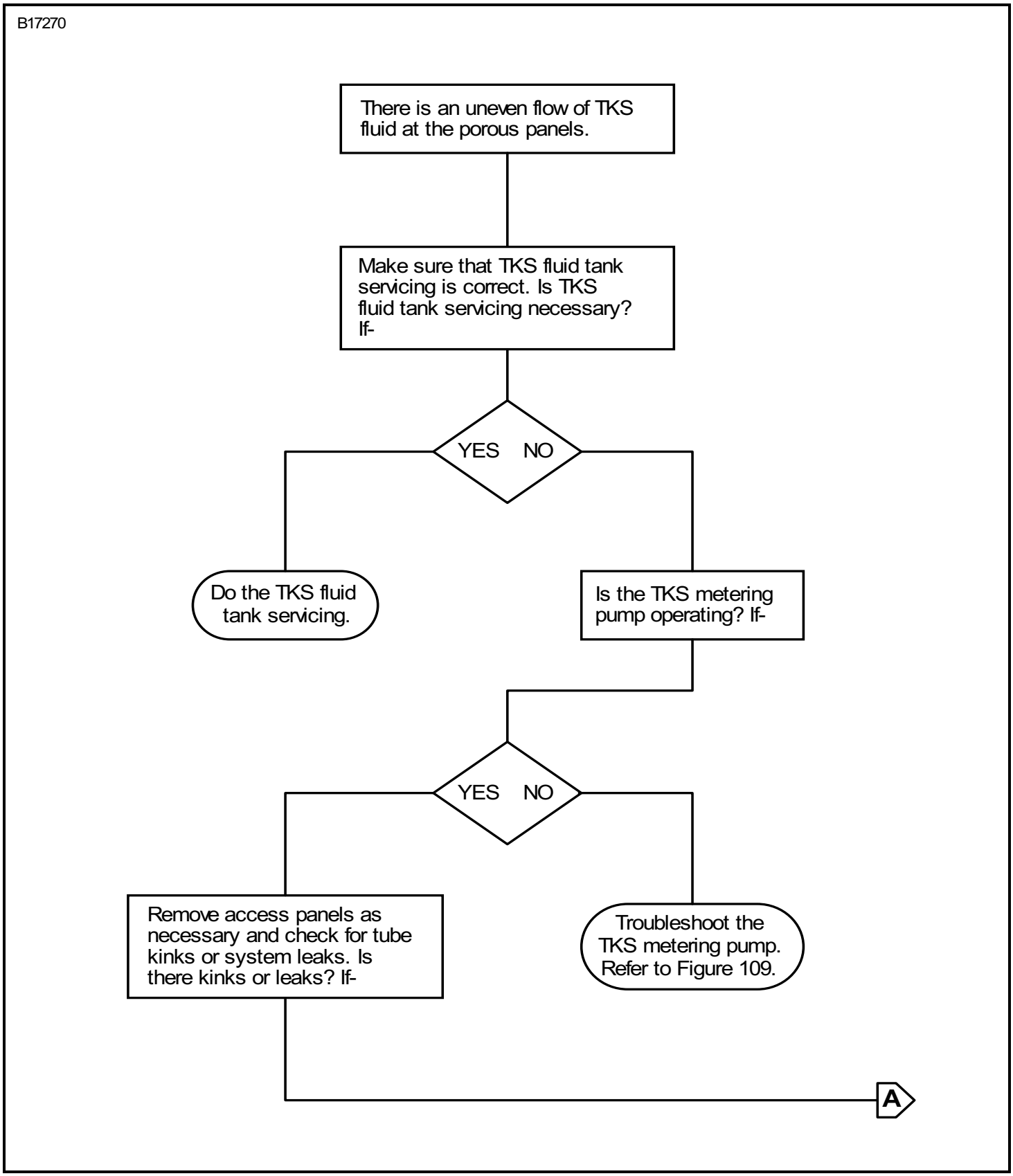
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Figure 107 : Sheet 1 : TKS Anti-Ice System Troubleshooting



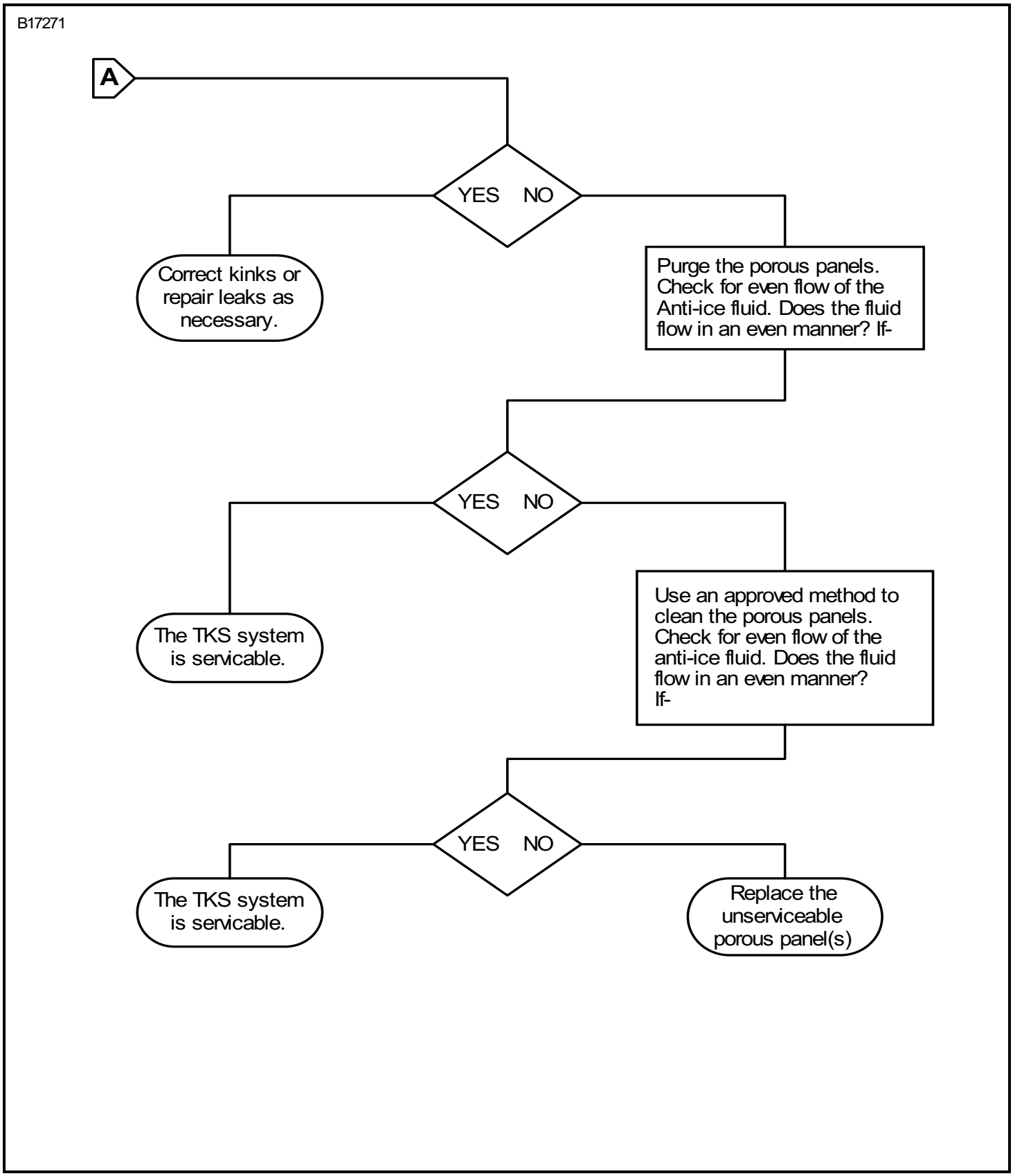
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Figure 108 : Sheet 1 : TKS Anti-Ice System Troubleshooting



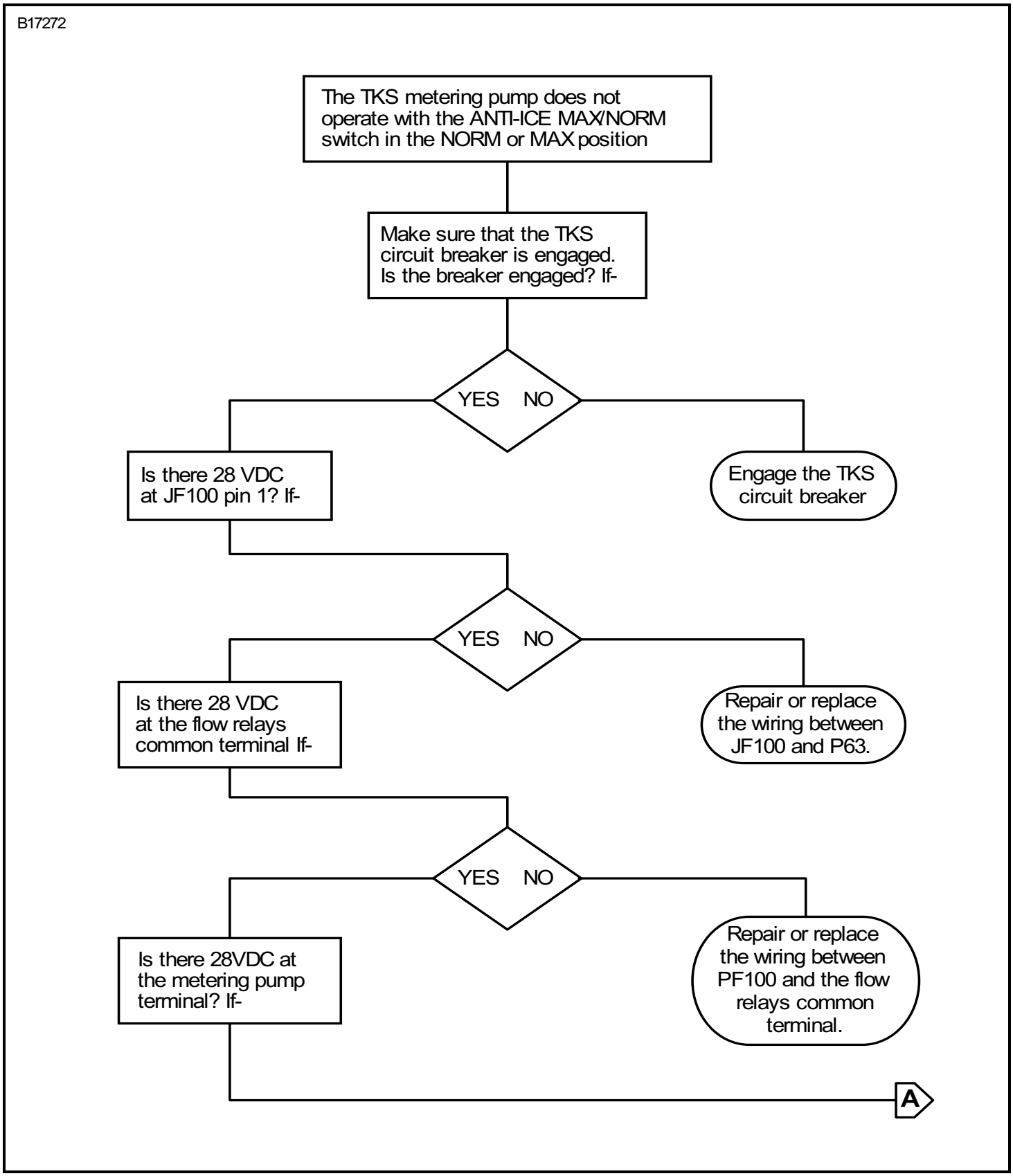
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Figure 108 : Sheet 2 : TKS Anti-Ice System Troubleshooting



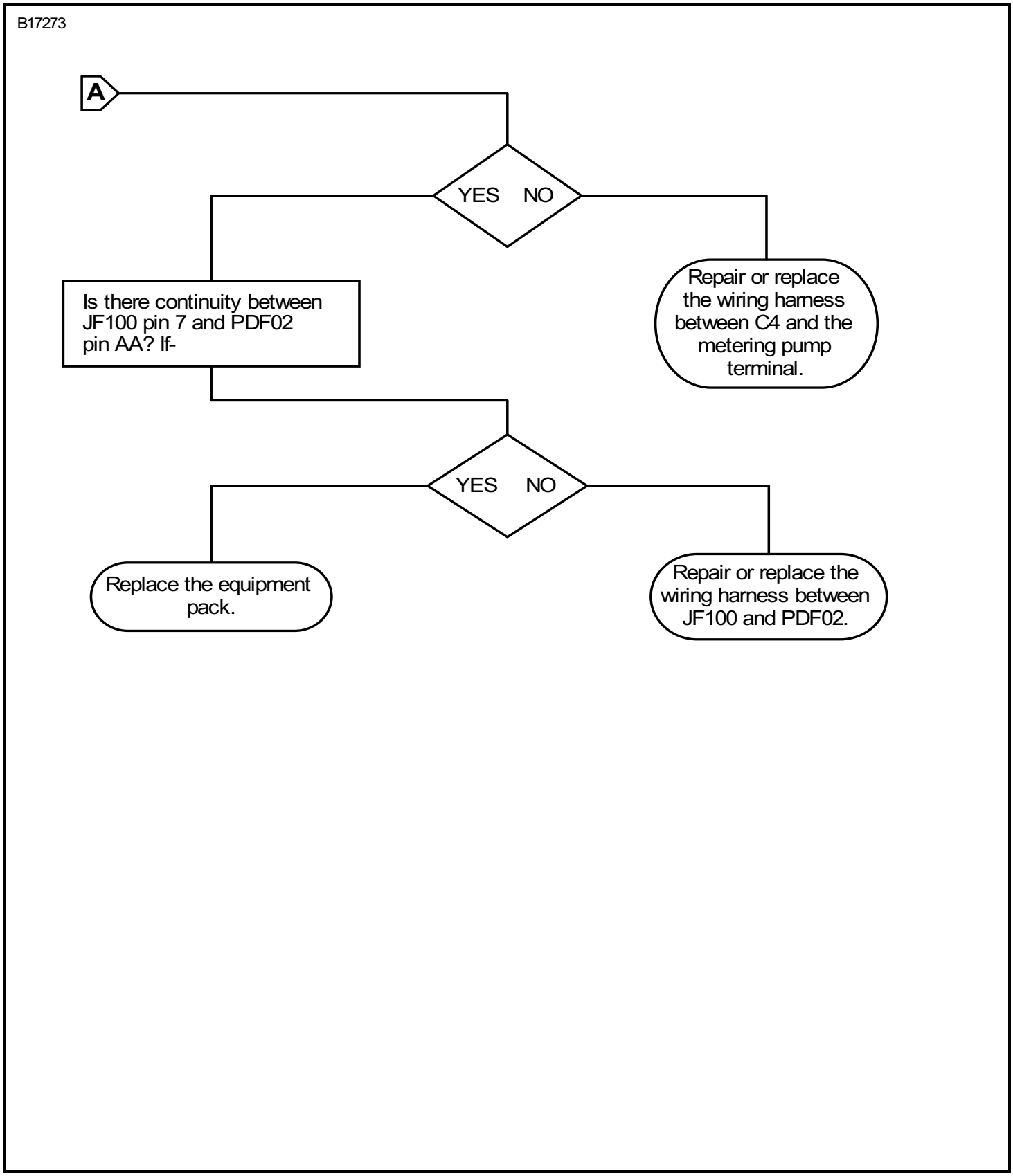
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Figure 109 : Sheet 1 : TKS Anti-Ice System Troubleshooting



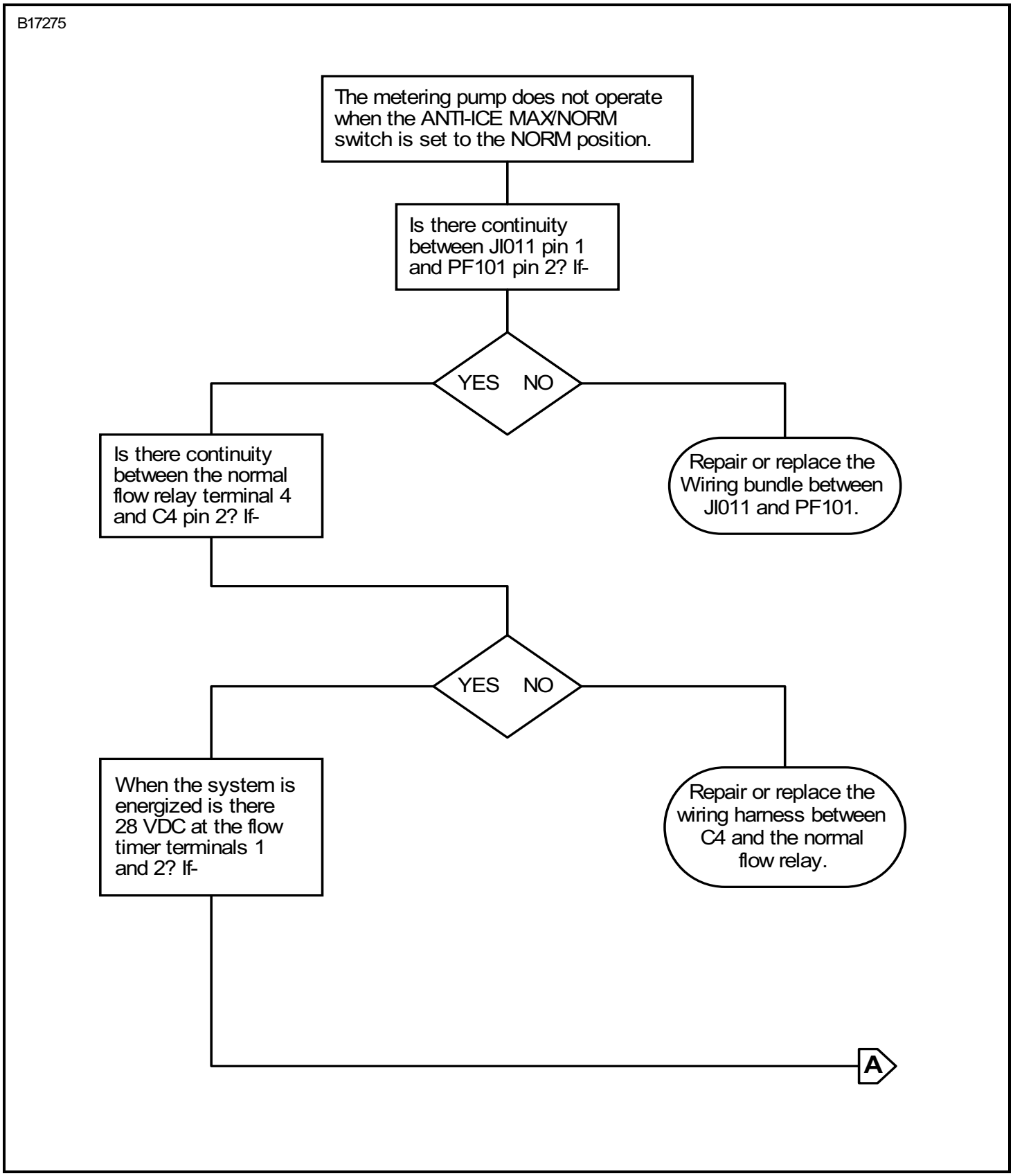
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Figure 109 : Sheet 2 : TKS Anti-Ice System Troubleshooting



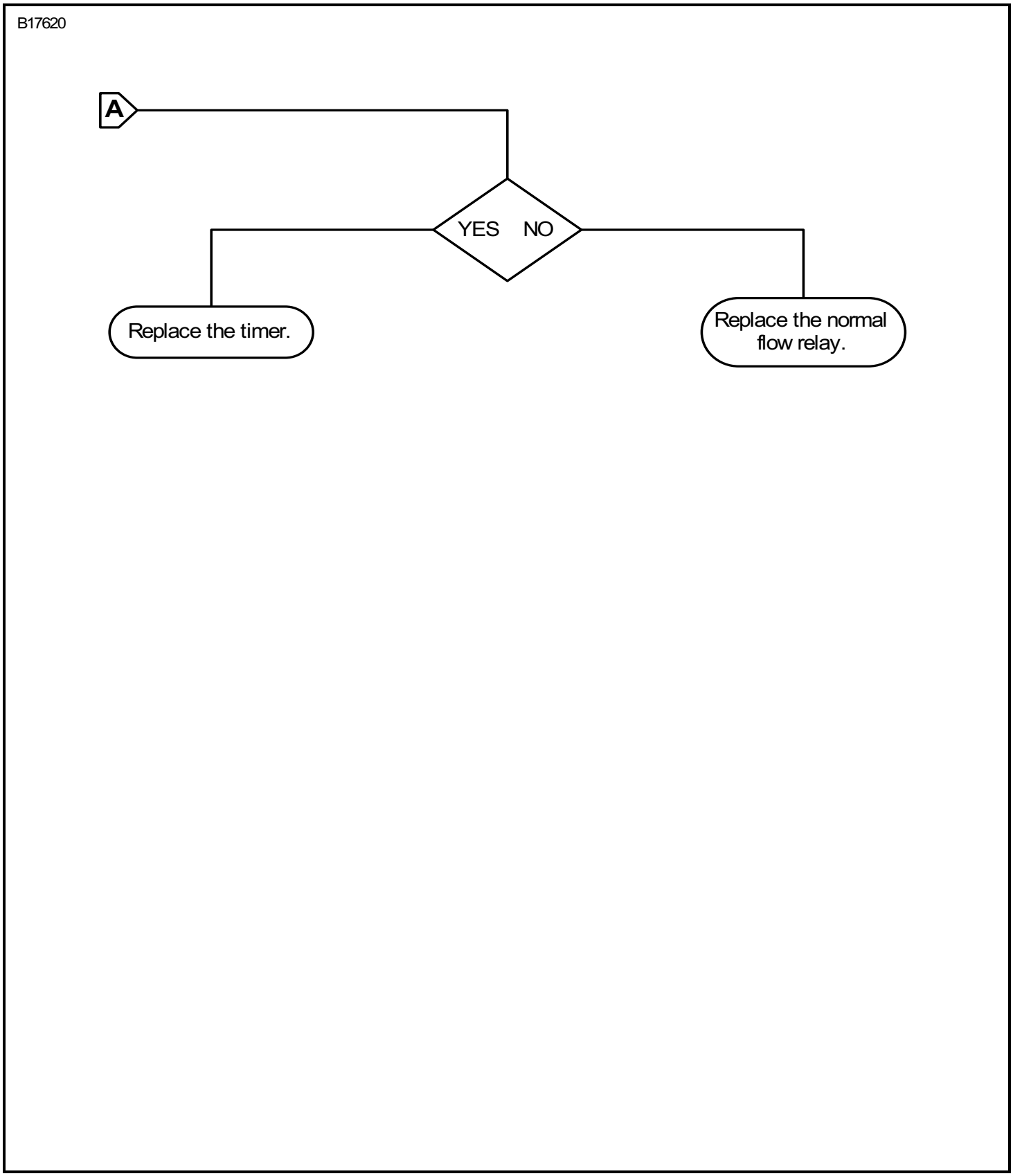
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Figure 110 : Sheet 1 : TKS Anti-Ice System Troubleshooting



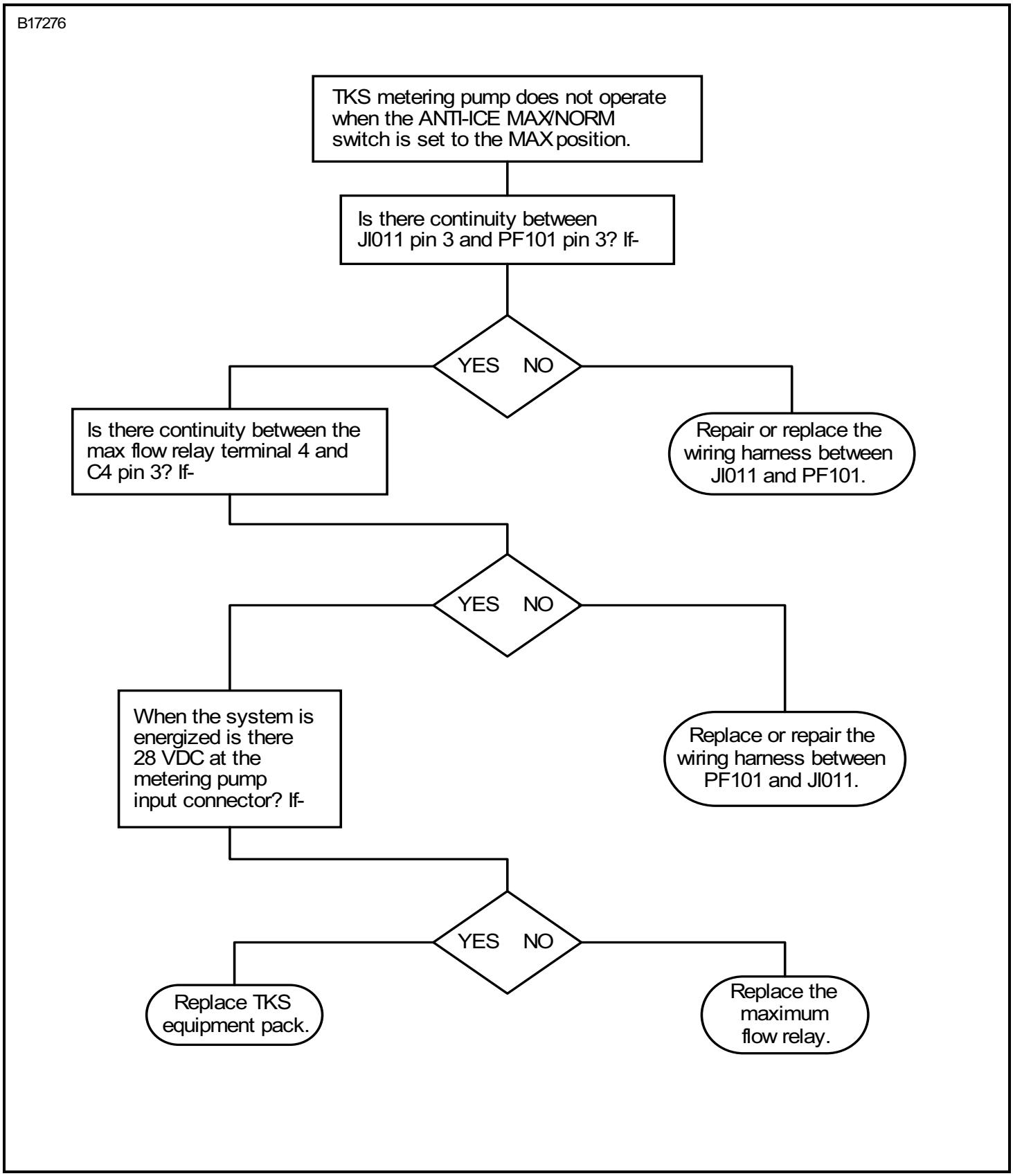
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Figure 110 : Sheet 2 : TKS Anti-Ice System Troubleshooting



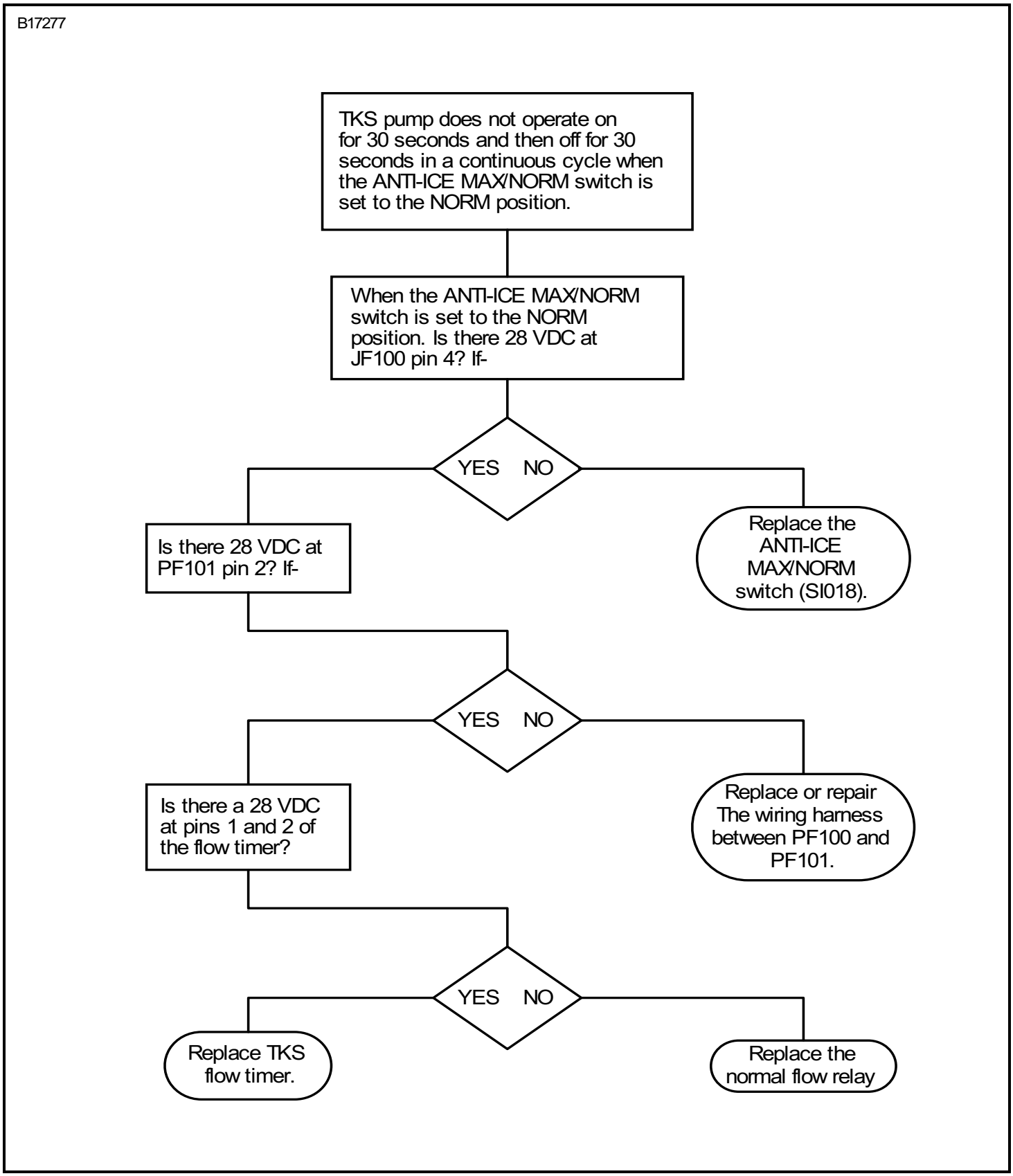
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Figure 111 : Sheet 1 : TKS Anti-Ice System Troubleshooting



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Figure 112 : Sheet 1 : TKS Anti-Ice System Troubleshooting



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TKS ANTI-ICE SYSTEM (INADVERTENT) - TROUBLESHOOTING

1. General

A. This section gives to troubleshoot procedures for the TKS Anti-Ice System (Inadvertent). Logic troubleshooting charts in this section will guide you to the most likely cause and to some recommended actions for repair.

2. Troubleshooting Description

A. The TKS system is controlled by a three position rocker switch on the center console switch panel. The switch positions are MAX, NORM and OFF. The Garmin G2000 system Multifunction Display (MFD) and the Primary Flight Display (PFD) Crew Alerting System (CAS) shows the TKS system status, warnings, cautions, and fluid quantity information.

B. A good understanding of the TKS system is important. To get more detailed information about the TKS system refer to TKS Anti-Ice System - Description and Operation in this chapter.

C. A good understanding of the discrepancy is also very helpful. There are three different categories of TKS discrepancies. This section has an extensive set of troubleshooting procedures to use. You can begin your troubleshooting at any procedure that is appropriate.

(1) The first category is the display category. This is any display that shows on the G2000 display units that was not expected, or an unexpected anti-ice quantity indication.

(a) If the anti-ice quantity is incorrect, you can test the system using the appropriate test procedure. Refer to TKS Anti-Ice System (G2000), TKS Fluid Level Sender Operational Test.

(b) If there is a message shown on one of the G2000 display units, you can troubleshoot each one individually using the correct procedure from this section.

(2) The second category is the fluid flow category. This section has the procedures to correct the distribution and flow of the fluid across the porous panels.

(3) The third category is the pump category. This means that there is an incorrect operation of the anti-ice pump.

(a) The check procedures for these discrepancies are found in this section of the troubleshooting.

(b) If the pump is not operating correctly, it is recommended that you begin your troubleshooting at the pump section procedures first.

3. Troubleshooting Preliminary

A. Visual Inspections.

NOTE: It is recommended that you do a visual inspection of the anti-ice components before you do the troubleshooting procedures. The visual inspections in this section do not need to be done in a specific order. You can look at the most likely parts and components as necessary. It is recommended that you do all of these inspections when possible.

(1) Look at all of the nylon tube connections. Examine the condition of the nut, olive, and seal or O-ring. If you must replace a part, refer to the Model 400 Illustrated Parts Catalog.

CAUTION: The length of the nylon tube is important. Refer to the Model 400 Illustrated Parts Catalog for the correct part number. A tube with an incorrect length can make the anti-ice system operate incorrectly.

(2) Inspect the nylon tubing for fluid leaks or evidence of obstructions. Make sure there are no cuts, holes, or kinks in the tubing.

B. Preliminary Set Up.

(1) Make sure that the TKS, MFD, PFD, and PFD CTRL circuit breakers found on the cockpit circuit breaker panel are engaged.

(2) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(3) Set the AVIONICS MASTER switch (SW04) to the ON position.

(4) Set the ANTI-ICE MAX/NORM switch (SI018) to the OFF position.

(5) Make sure the G2000 is operating correctly. Make sure that the display units are operating. You can cycle the power to individual equipment until all of the equipment is operating correctly.

(6) Make sure that no TKS fault messages are displayed on the PFD. If a TKS fault message is shown on the PFD refer to the troubleshooting charts for the procedure to correct the problem. Refer to Table 101 to find the message or condition and the related troubleshooting chart.

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4. Troubleshooting Charts

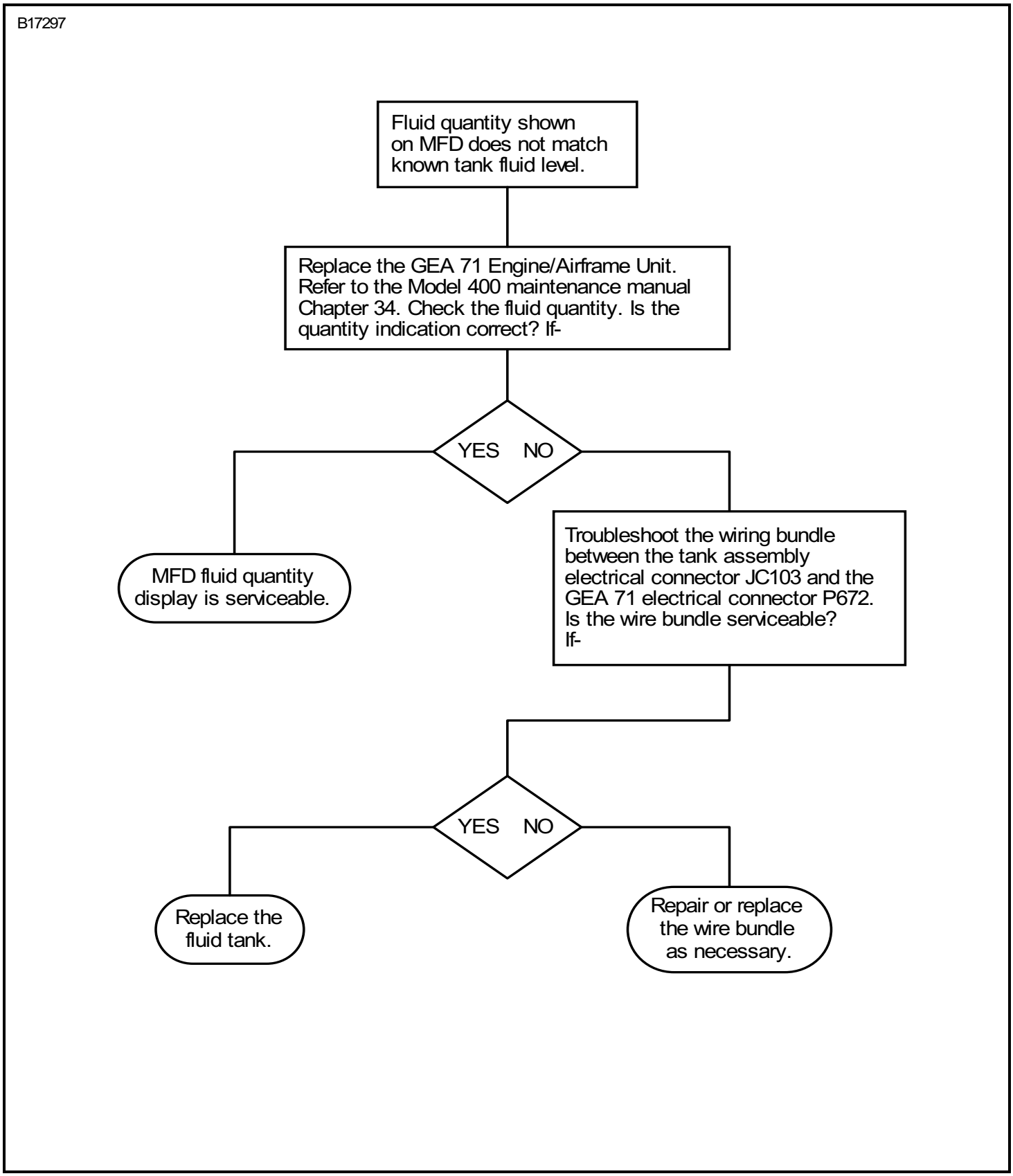
A. There is an extensive set of troubleshooting charts for some of the most common problems for the anti-ice system. The table below is an index between the suspected trouble and the corresponding troubleshooting chart.

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No or little fluid flow on an individual horizontal stabilizer porous panel.	Figure 105
No or little fluid flow on the wing leading edges.	Figure 106
No or little fluid flow on an individual wing porous panel.	Figure 107
There is an uneven distribution of the anti-ice fluid at the porous panels.	Figure 108
The TKS pump does not operate when the ANTI-ICE MAX/NORM switch is set to the NORM or MAX positions.	Figure 109
The TKS pump does not operate when the ANTI-ICE MAX/NORM switch is set to the NORM position.	Figure 110
The TKS pump does not operate when the ANTI-ICE MAX/NORM switch is set to the MAX position.	Figure 111
TKS pump does not operate on for 30 seconds and then off for 30 seconds in a continuous cycle when the ANTI-ICE MAX/NORM switch is set to the NORM position.	Figure 112

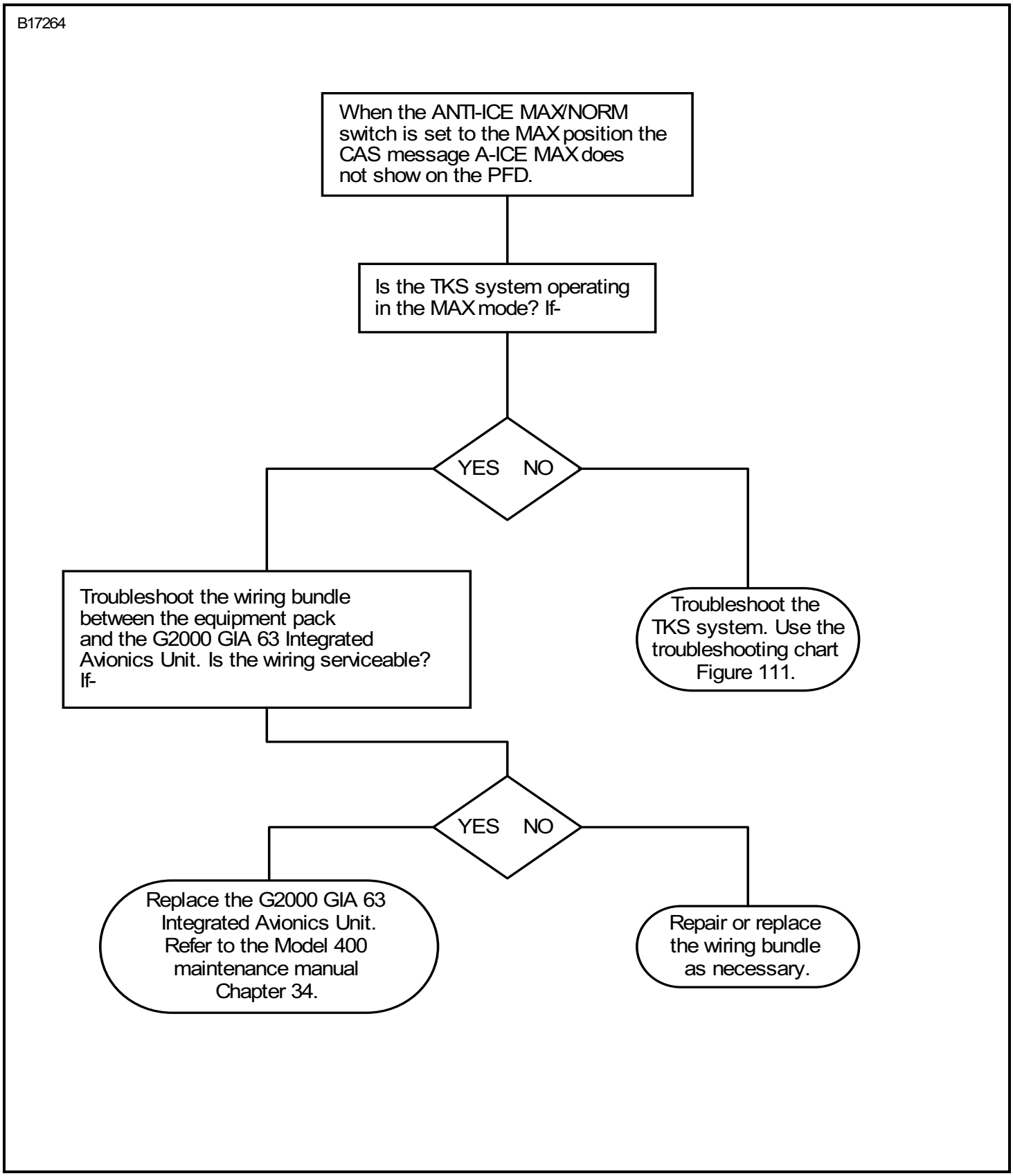
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Figure 101 : Sheet 1 : TKS Anti-Ice System Troubleshooting



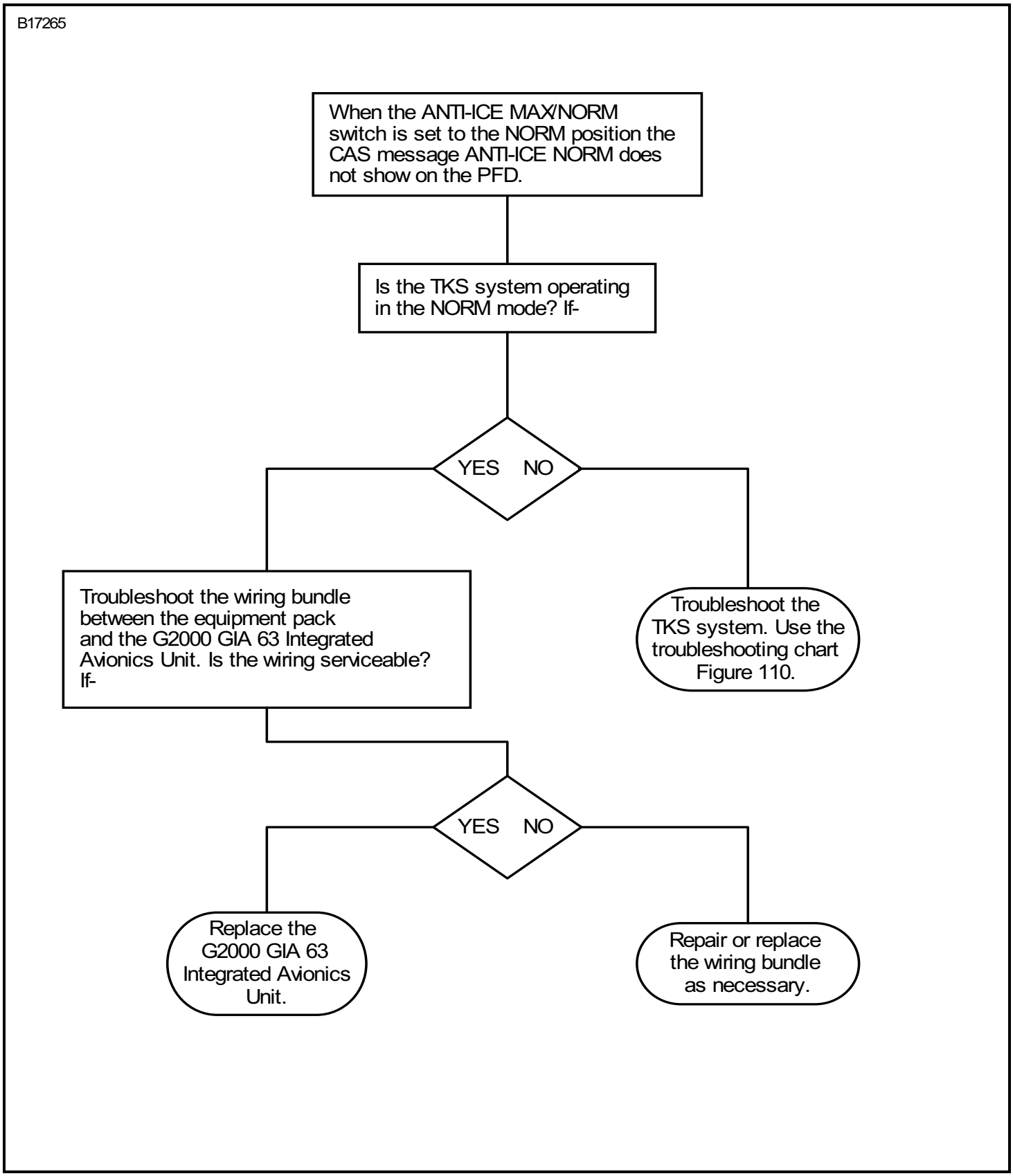
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Figure 102 : Sheet 1 : TKS Anti-Ice System Troubleshooting



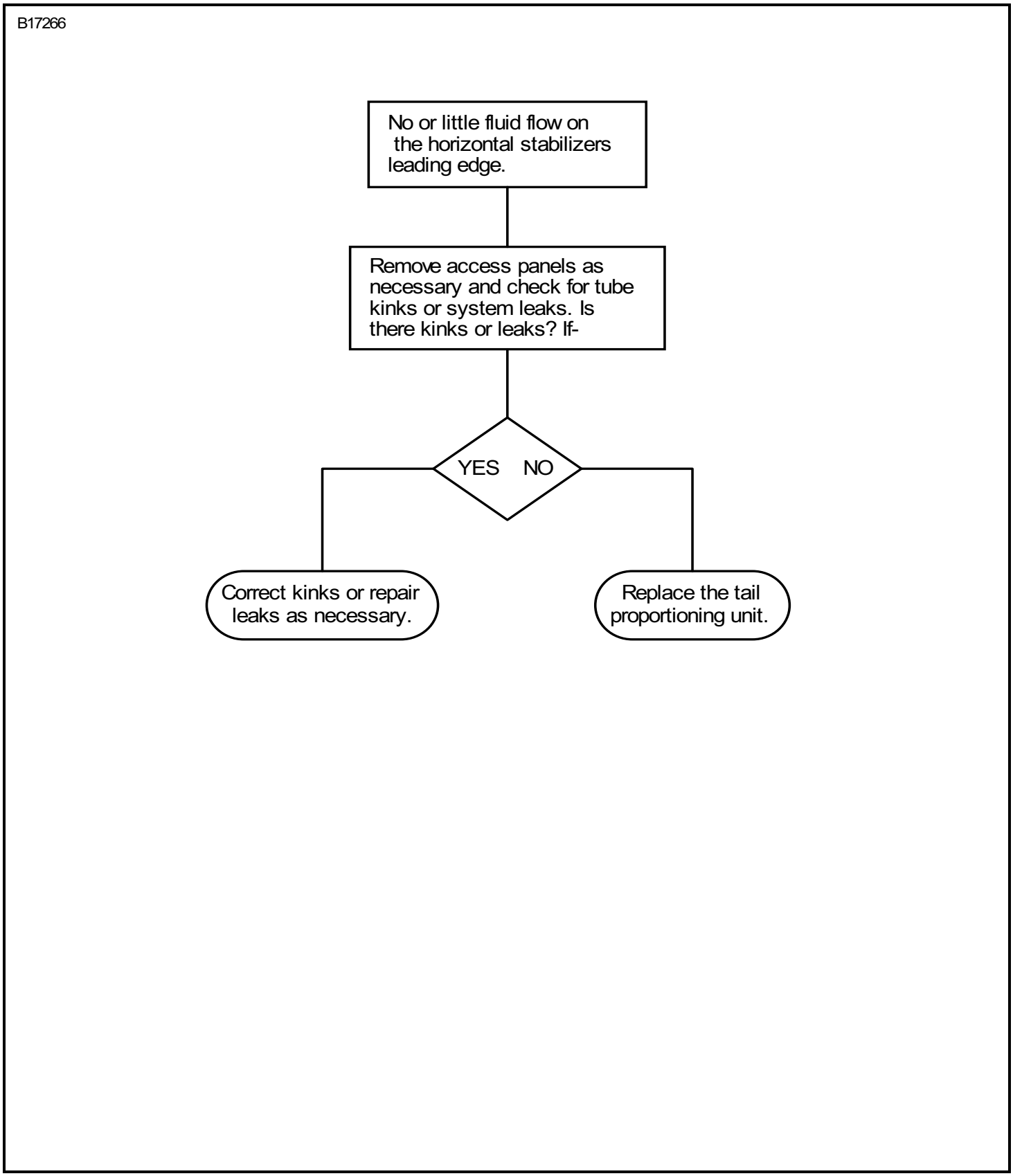
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Figure 103 : Sheet 1 : TKS Anti-Ice System Troubleshooting



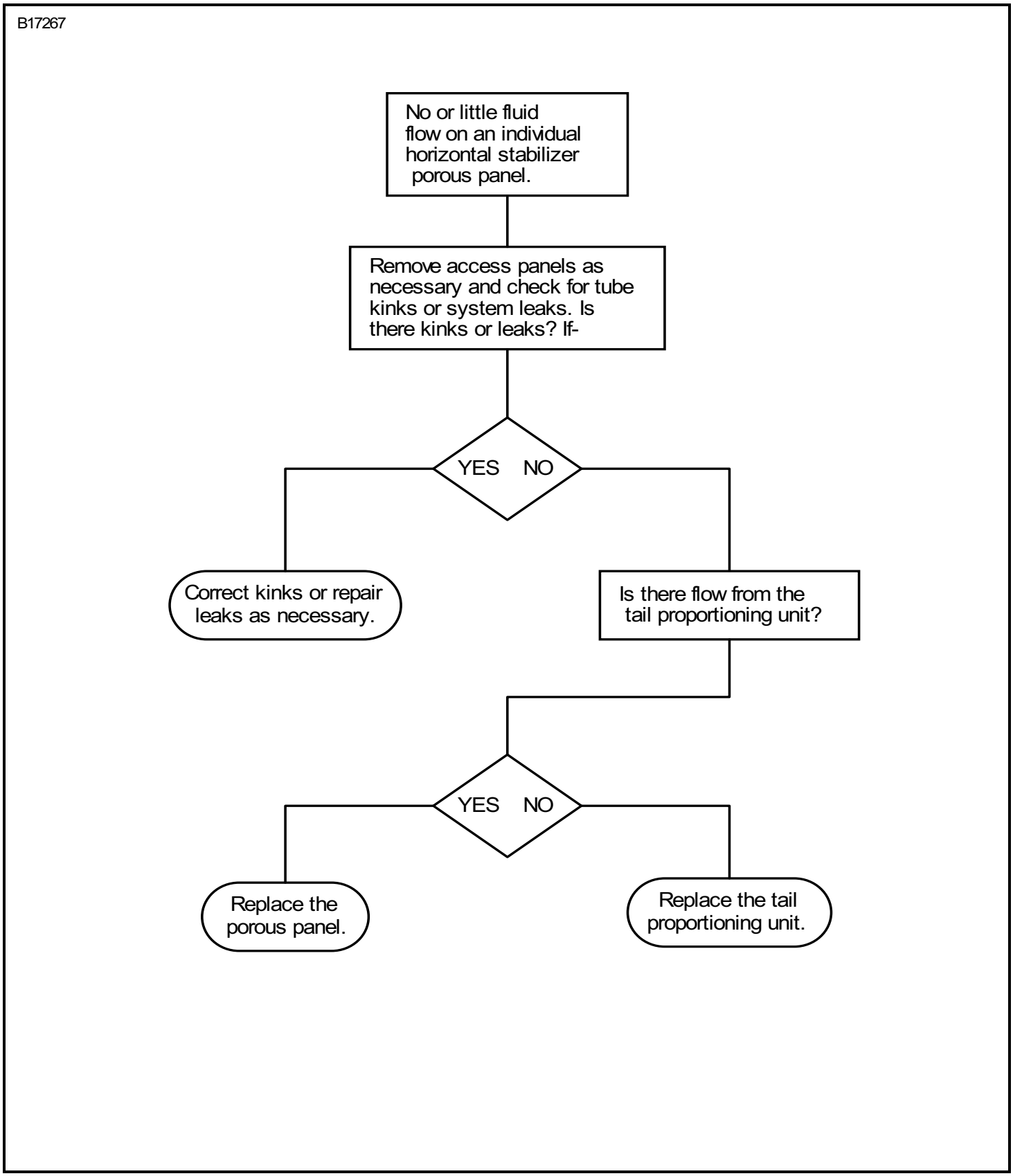
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Figure 104 : Sheet 1 : TKS Anti-Ice System Troubleshooting



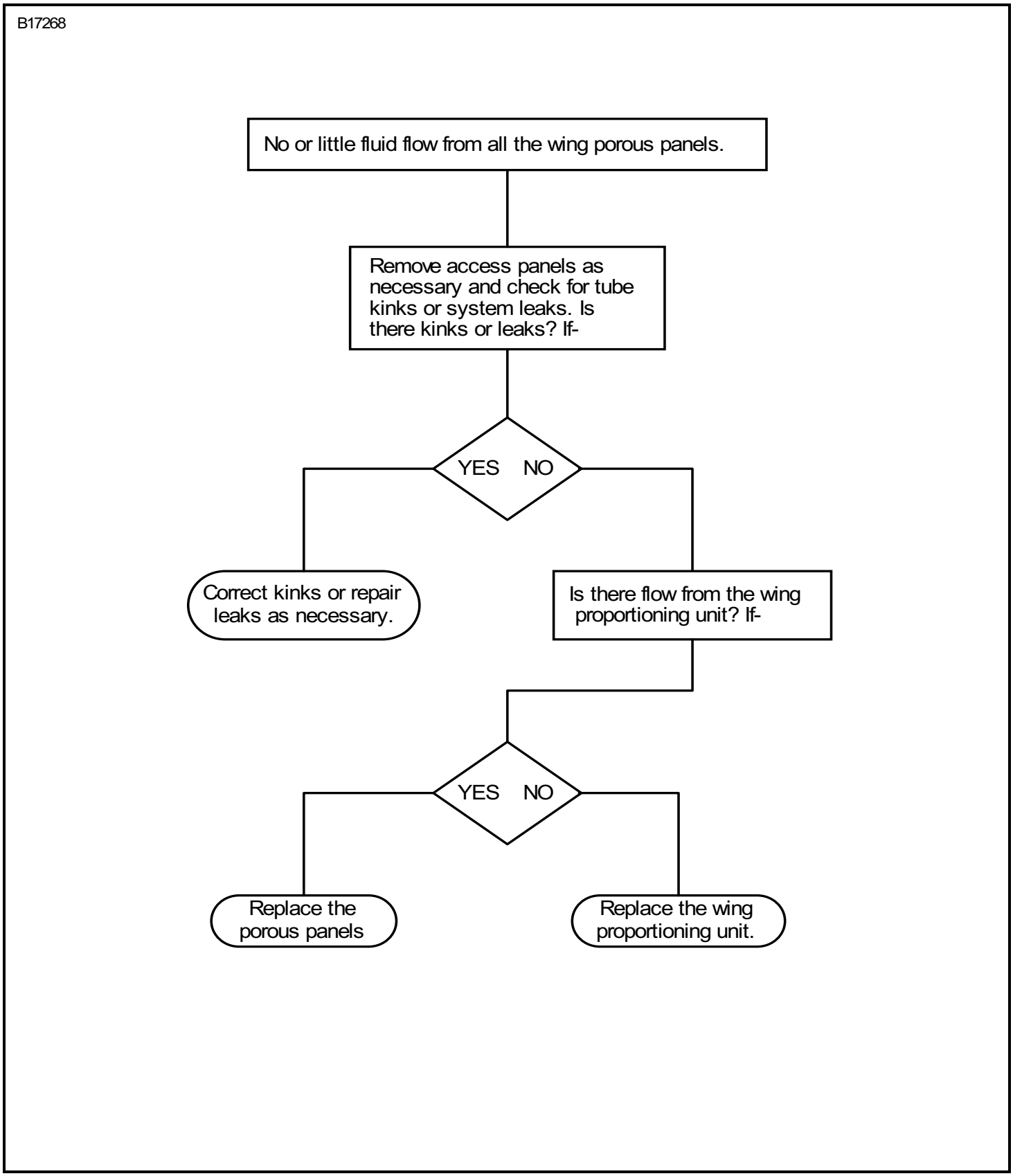
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Figure 105 : Sheet 1 : TKS Anti-Ice System Troubleshooting



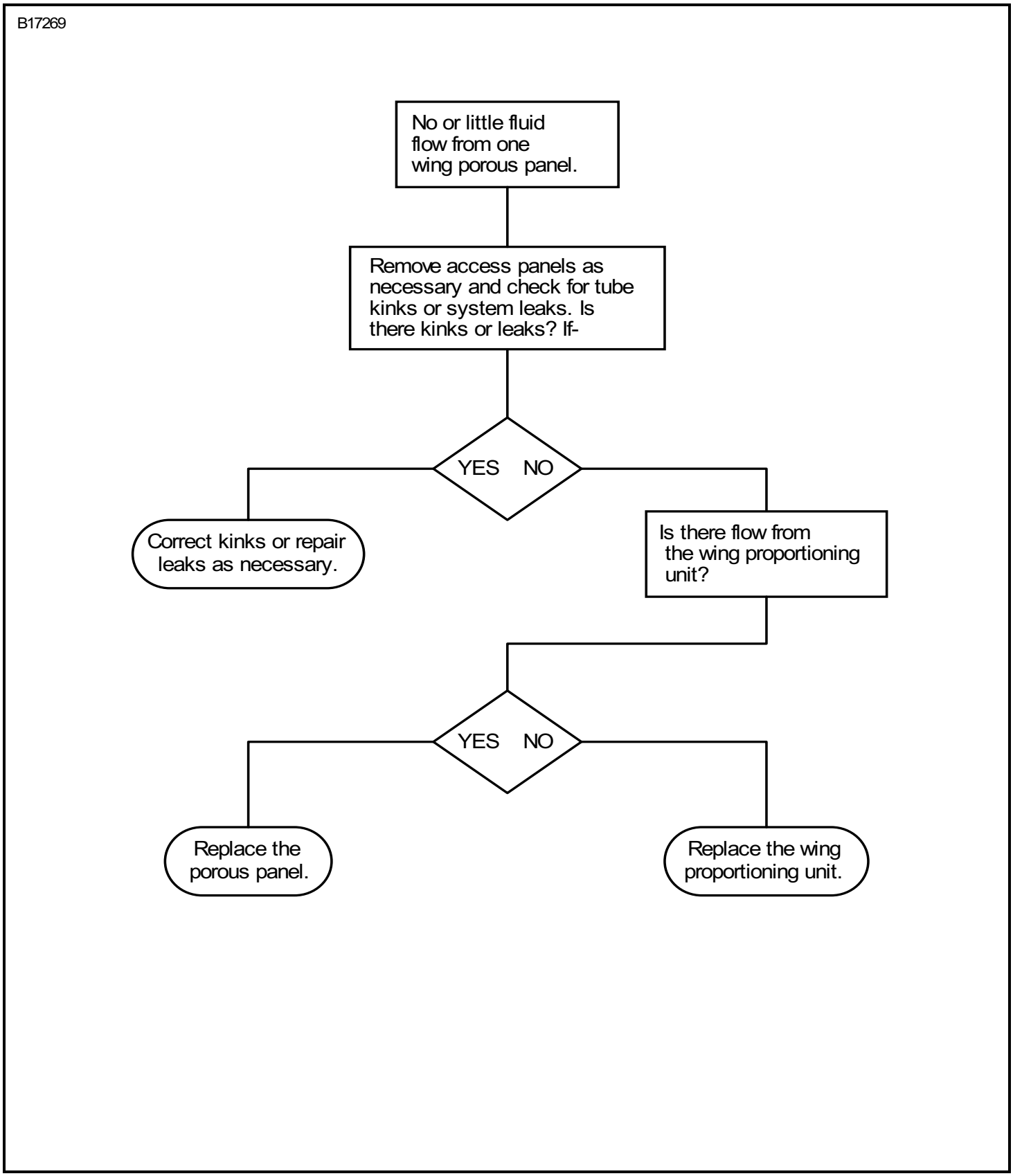
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Figure 106 : Sheet 1 : TKS Anti-Ice System Troubleshooting



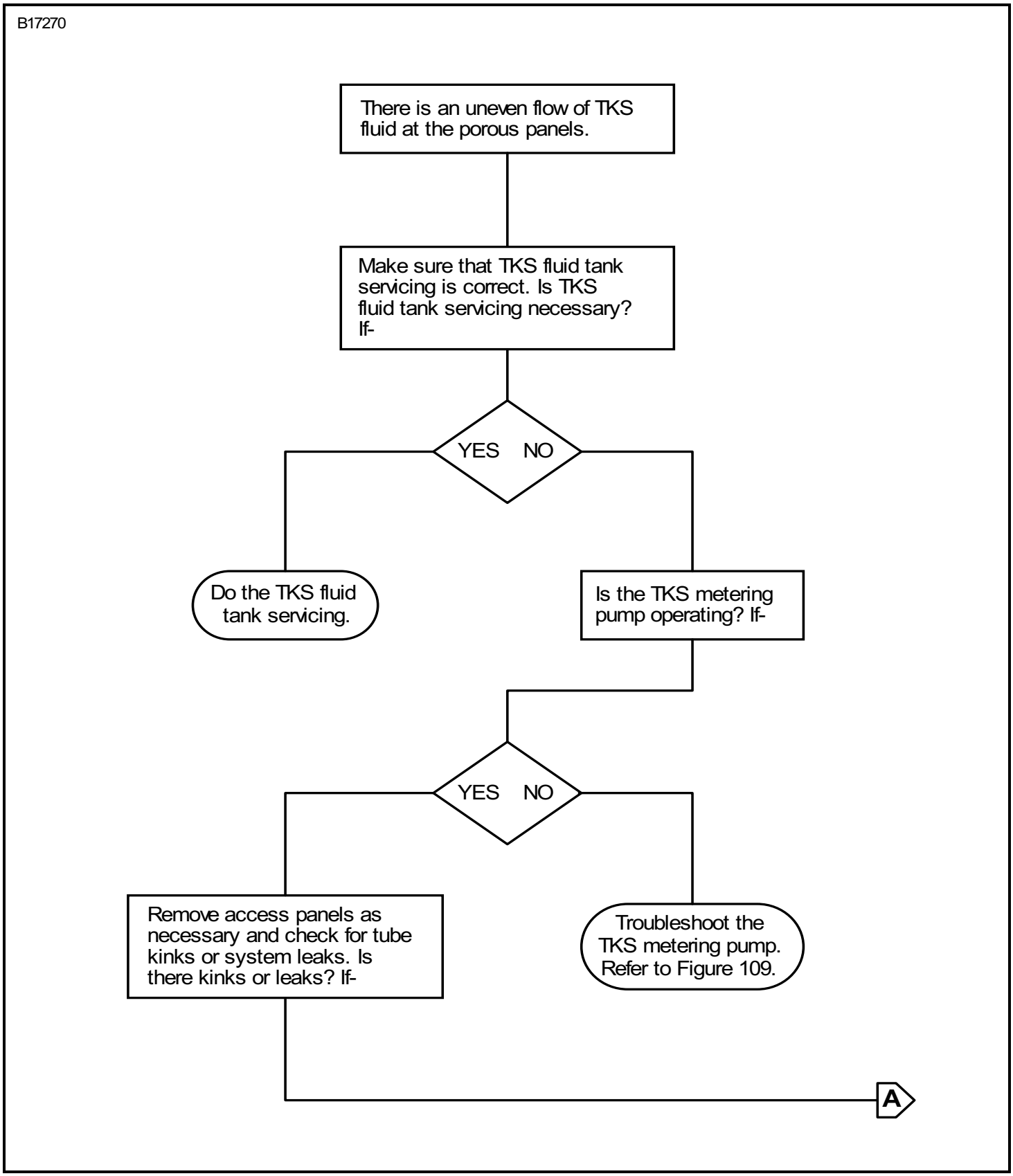
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Figure 107 : Sheet 1 : TKS Anti-Ice System Troubleshooting



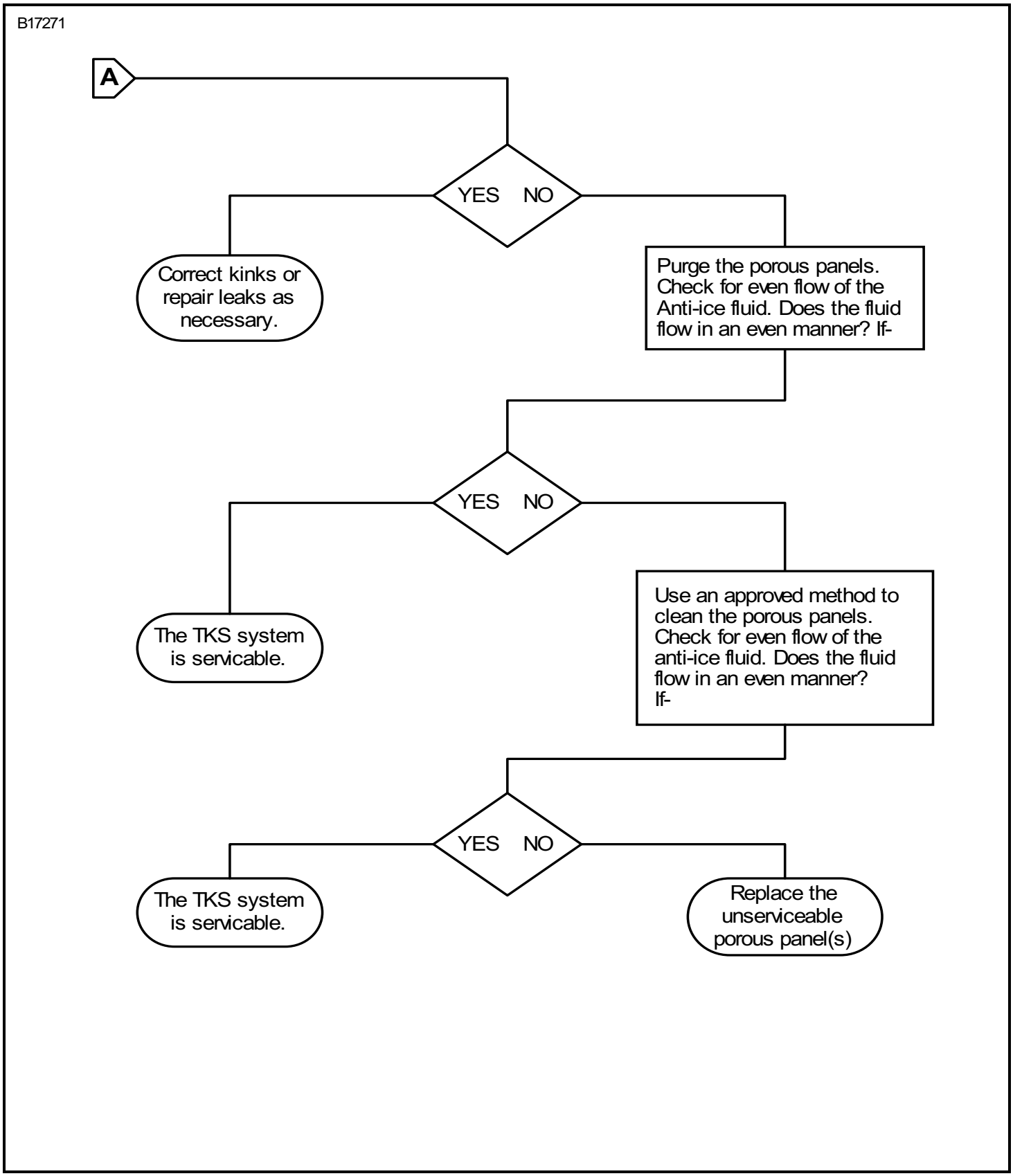
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Figure 108 : Sheet 1 : TKS Anti-Ice System Troubleshooting



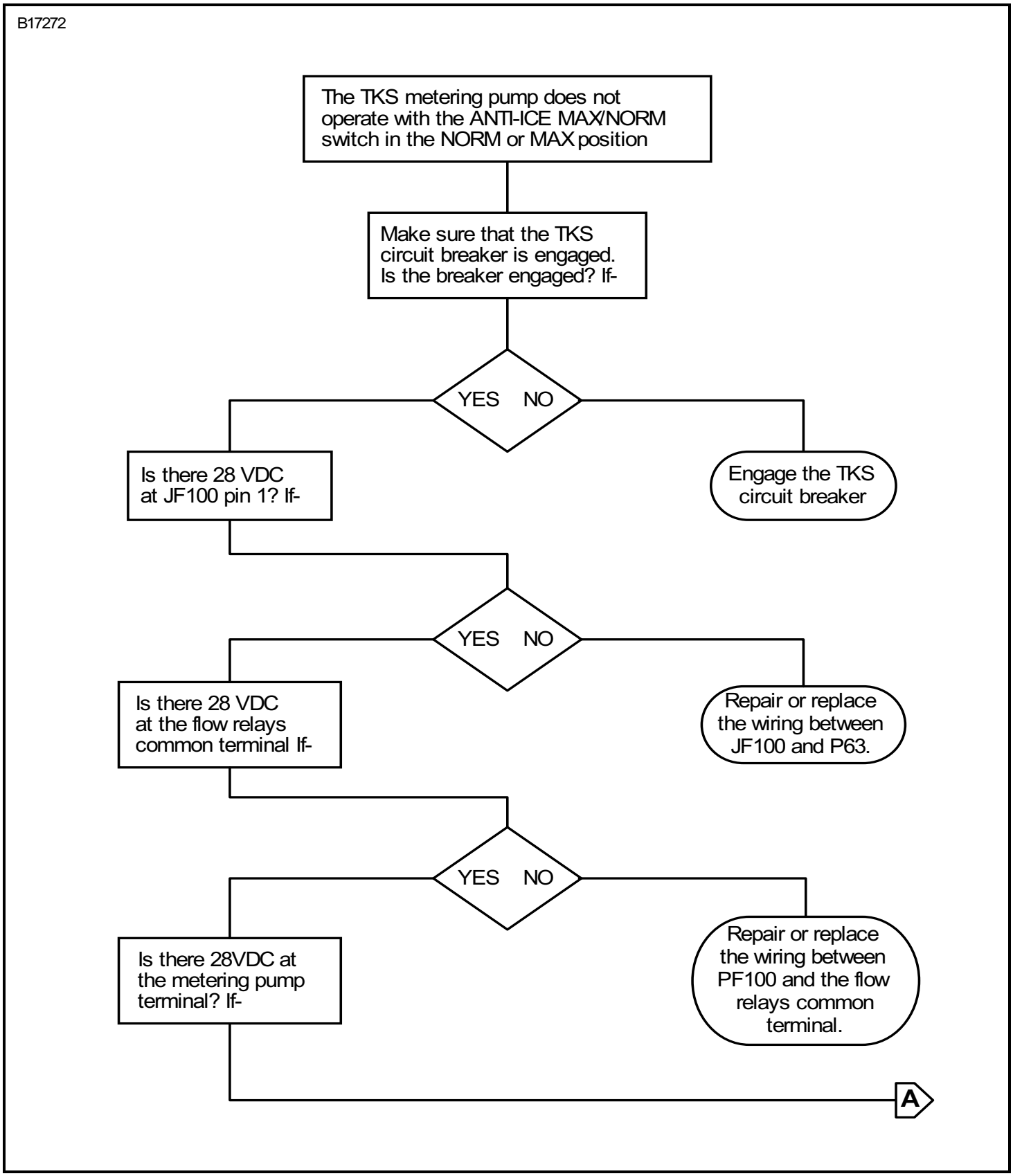
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Figure 108 : Sheet 2 : TKS Anti-Ice System Troubleshooting



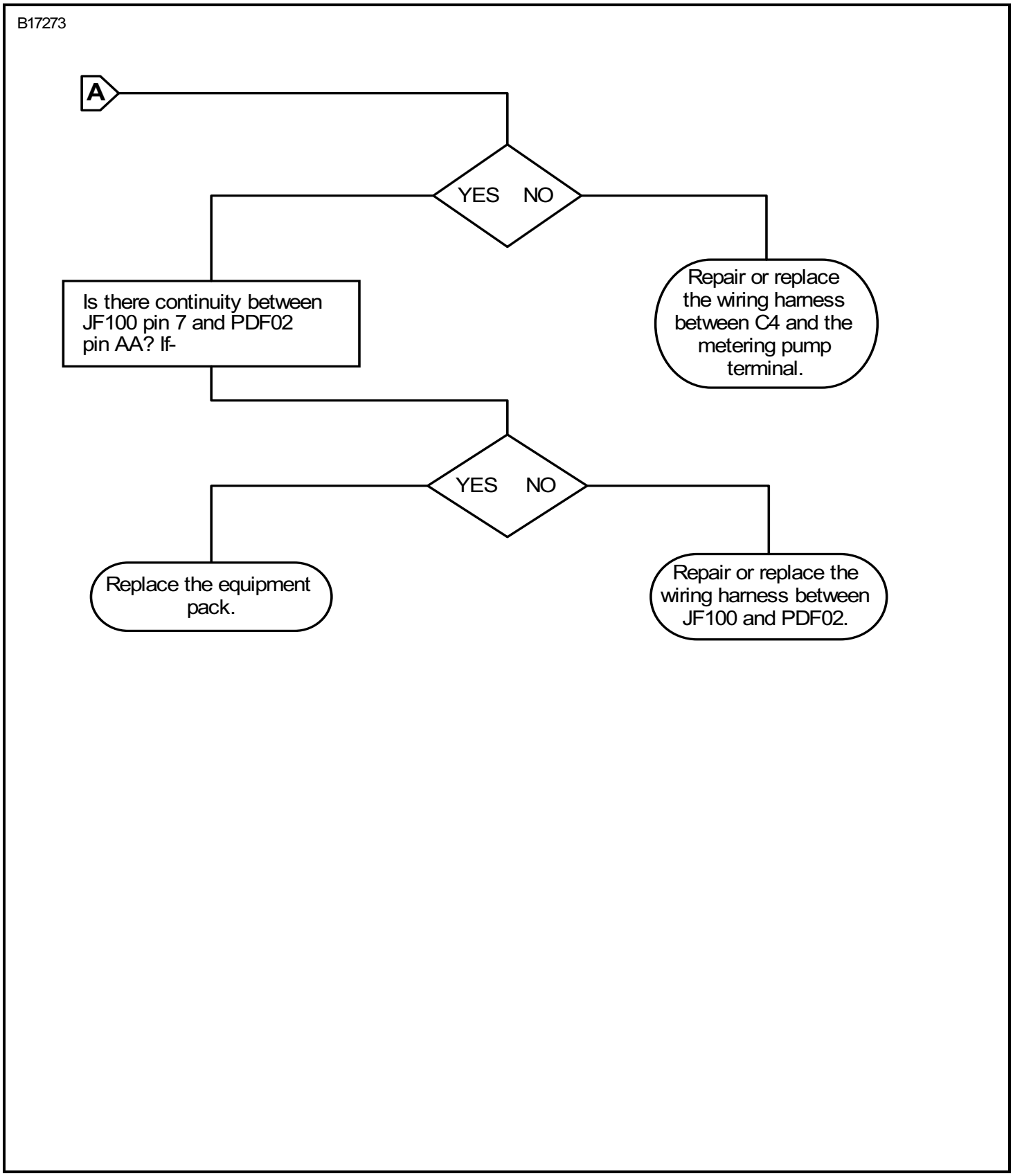
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Figure 109 : Sheet 1 : TKS Anti-Ice System Troubleshooting



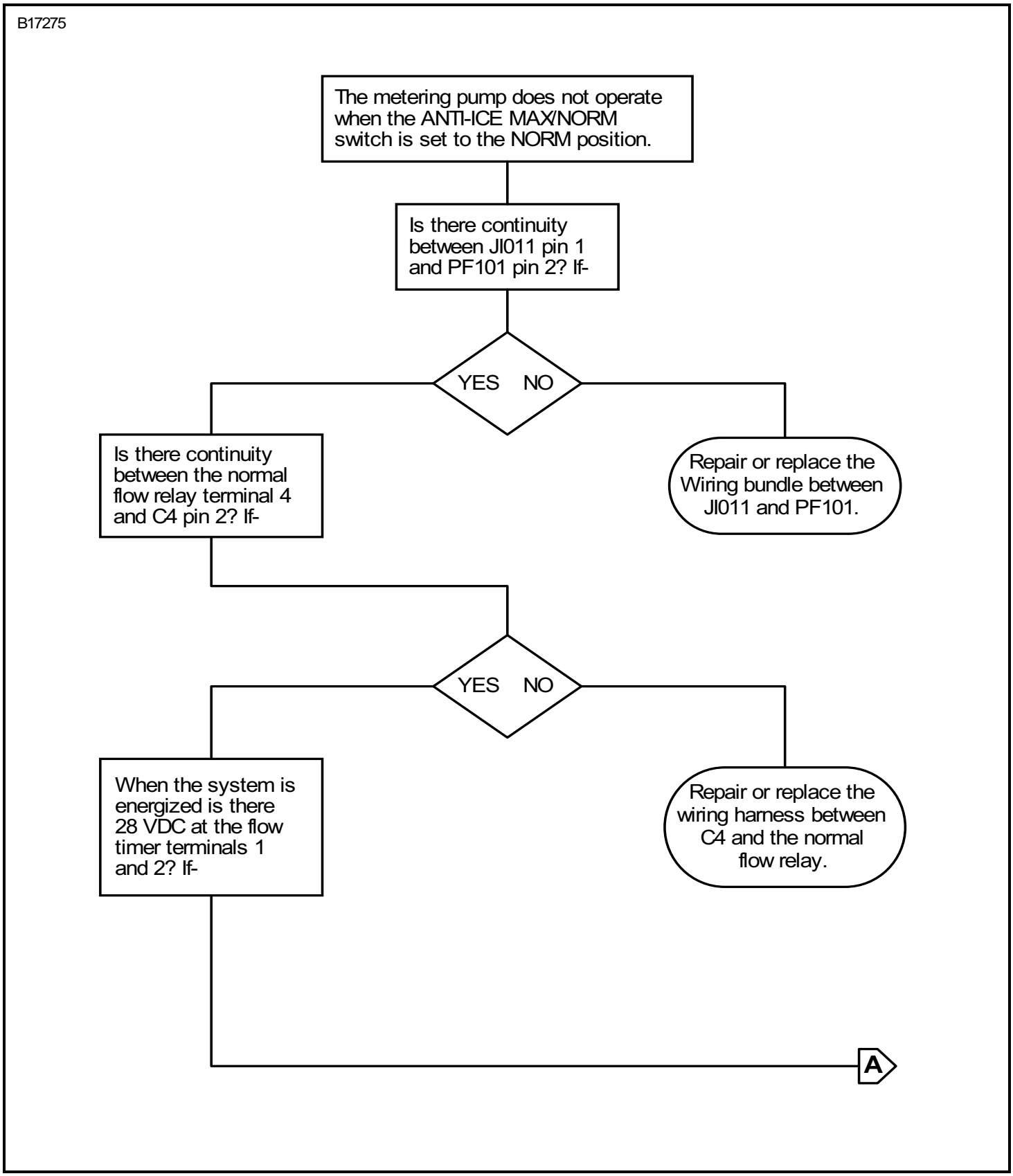
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Figure 109 : Sheet 2 : TKS Anti-Ice System Troubleshooting



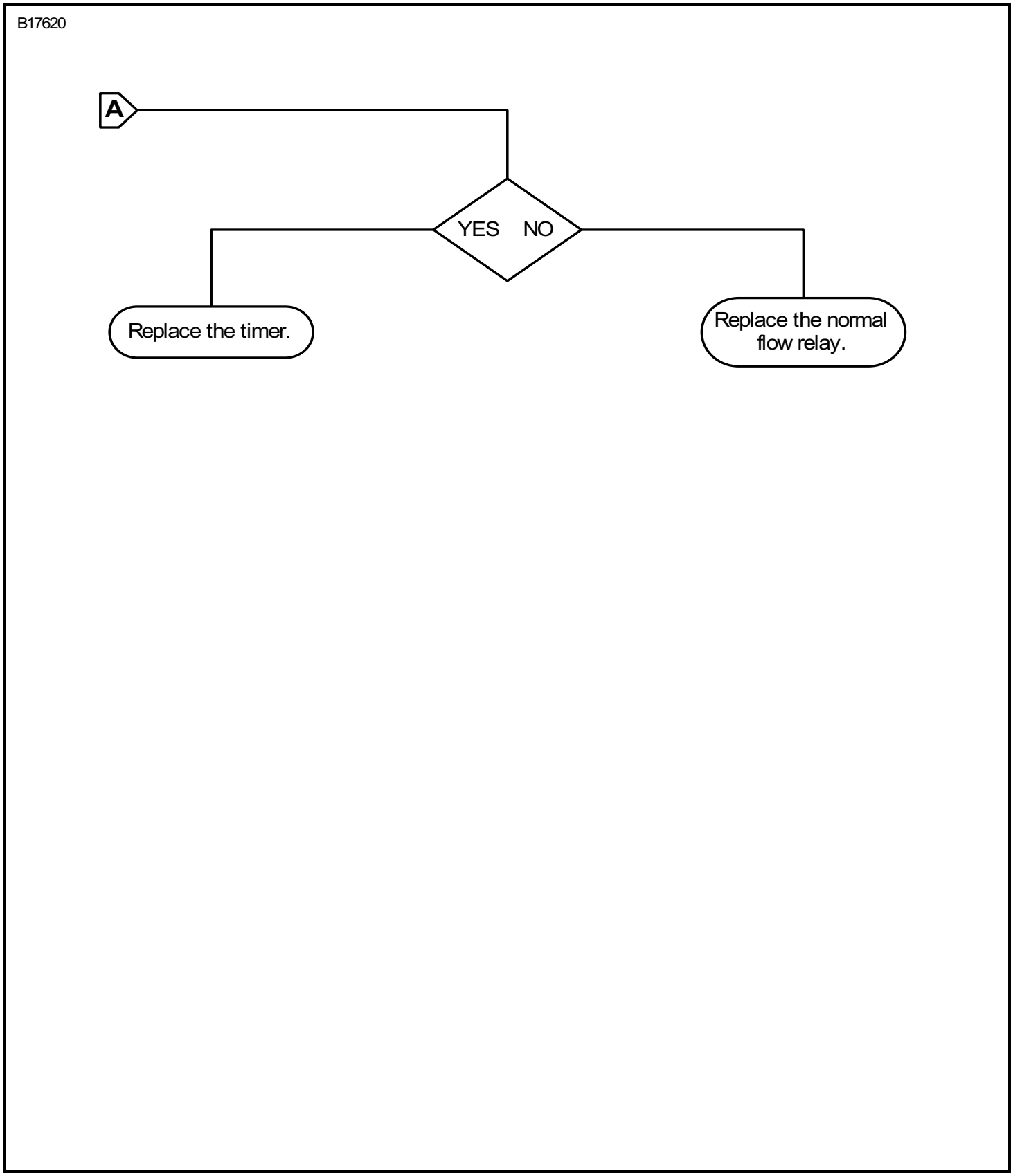
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Figure 110 : Sheet 1 : TKS Anti-Ice System Troubleshooting



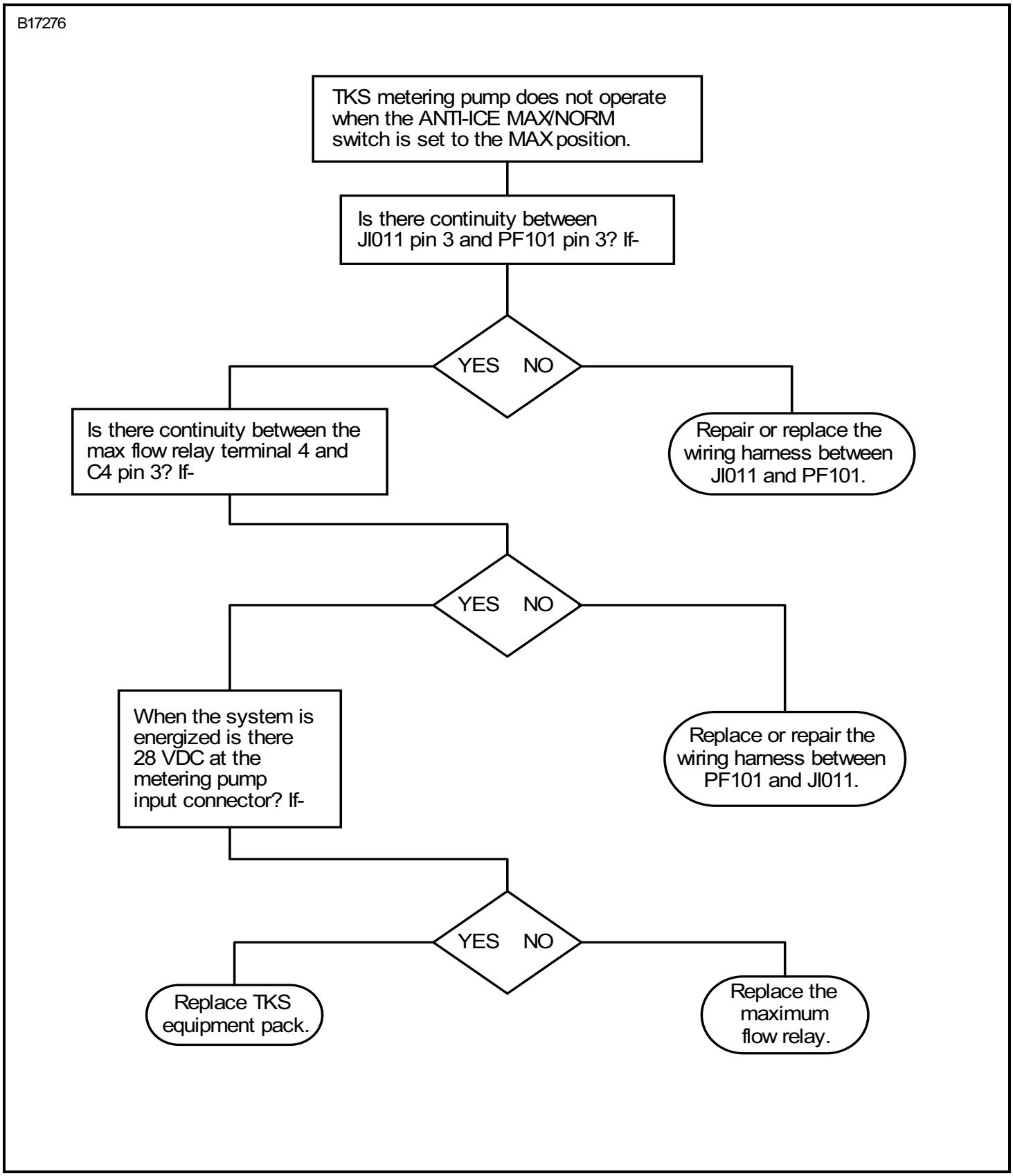
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Figure 110 : Sheet 2 : TKS Anti-Ice System Troubleshooting



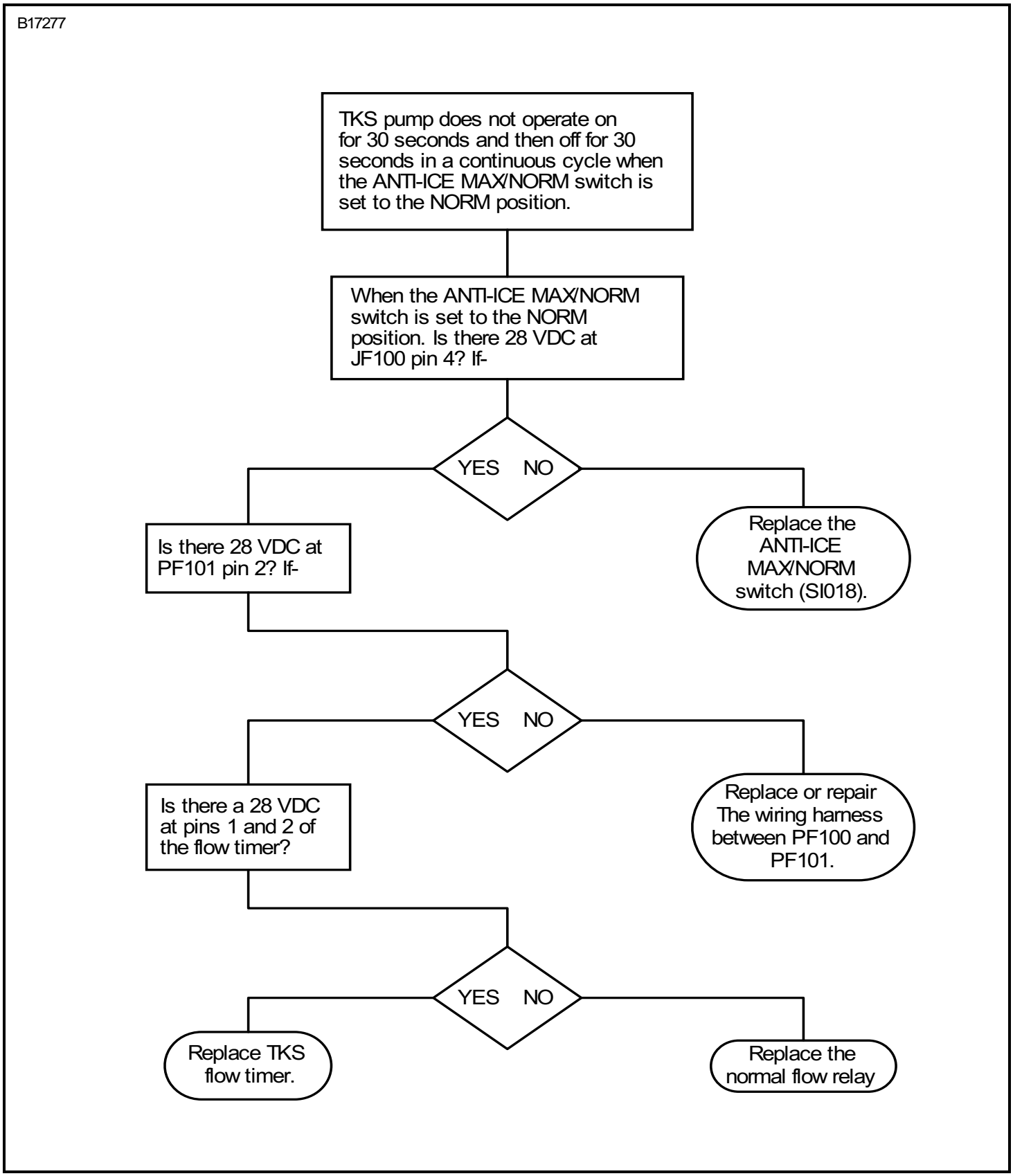
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Figure 111 : Sheet 1 : TKS Anti-Ice System Troubleshooting



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Figure 112 : Sheet 1 : TKS Anti-Ice System Troubleshooting



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TKS ANTI-ICE SYSTEM (INADVERTENT) - MAINTENANCE PRACTICES

1. General

A. This section contains the removal and installation procedures for the TKS Anti-Ice System (Inadvertent) fluid distribution system and the removal of TKS anti-ice system fluid contamination.

B. Recommended maintenance for the TKS system is as follows:

- Operate the pumps monthly, or as necessary, in the NORM mode until the air is removed from the fluid system.
- Keep the TKS system operational at all times to keep air pockets out of the system.
- If the fluid tank is removed and installed or replaced, do the porous panel purge and test procedures.

2. Tools, Equipment, and Materials

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. Nylon Tubing Repair/Replacement

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: You must loosen fluid line connections of the TKS anti-ice system slowly. It is possible that high pressure is still in the system. System pressure of 120 psi-gage is possible.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Do not use MEK, acetone, paint thinner, or similar chlorinated solvents on the porous panels. To prevent damage, only use water and detergent, isopropyl alcohol, and/or approved anti-ice fluid on the porous panel surfaces.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube coupling. Replace the 3/16-inch and 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube coupling. Examine the seal for damage and make sure that it is in the correct position in the coupling. Refer to, Figure 201. This will help to prevent fluid leakage from the coupling.

A. All plumbing used in the fluid anti-ice system is flexible nylon tubing connected with special compression-type couplings. Three different sizes of tubing are used.

B. The couplings used to connect sections of nylon tubing are metallic compression-type couplings, which include a machined coupling end, an olive (ferrule), a nut, and an elastomeric sealing ring (refer to Figure 201). The couplings used to connect the tubing to all the anti-ice porous panels are stainless steel. All other couplings used to connect the fluid anti-ice system components are made of aluminum. To help prevent electrolytic corrosion, aluminum couplings must be assembled only to aluminum couplings and stainless steel couplings must be assembled only to stainless steel or titanium couplings. The compression-type couplings used in the fluid anti-ice system are not interchangeable with standard-type couplings (AN or MS). To make sure that the correct couplings are used, refer to the Model 400 Illustrated Parts Catalog to find the correct coupling.

C. When you do maintenance of the fluid distribution system, examine all tubing for kinks, cuts, abrasion, crushing, or other indications of damage. The nylon tubing can discolor to a light straw color with age. Discoloration of the tubing is normally not a cause for rejection. Any damaged or deteriorated tubing found must be replaced with tubing and couplings of the correct size and type (aluminum or stainless steel). Additionally, when the tube couplings are disconnected from components or other couplings, it is recommended to install a new seal in the coupling.

D. Minimum bend radii for fluid tubing at ambient temperature is shown in Table 201. In some areas of the airplane, tighter bend radii is necessary. In these areas, you can use a heat gun to bend the tubing as follows:

Table 201. Minimum Bend Radii for Fluid Tubing (At Ambient Temperature)

TUBING OUTSIDE DIAMETER	MINIMUM BEND RADII
1/2 Inch	3.0 Inches

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5/16 Inch	2.0 Inches
3/16 Inch	1.5 Inches

(1) Put the tubing in position to find the necessary bend radius.

NOTE: You can use a piece of soft wire as a pattern.

CAUTION: Be careful not to overheat, burn, or collapse the tubing, which can prevent the correct flow of fluid and/or fluid leakage.

(2) Hold the tubing and carefully apply heat to the area where the bend will be.

NOTE: The tube will become flexible at approximately 300°F.

(3) After the radius is correct, hold the tube in that position and let it become cool (ambient temperature).

(4) When the tube is at ambient temperature, carefully examine it to make sure that it has not been heated too much (burned) and that there is no restriction of fluid flow through the tubing.

CAUTION: Do not use the coupling to clench the olive to the fluid tubing. Use only specified clenching tools to do the clenching operation. Also, do not torque the couplings too much during the repair or replacement procedure. If the couplings leak, install new seals as necessary.

E. When tubing repair or replacement is necessary, the olive must always be clenched (swaged) to the tubing as a separate operation. Use approved clenching tools before you assemble the coupling. For clenching tools, refer to Ice and Rain Protection - General.

F. When installing a new olive and/or fitting, refer to Table 202, Nylon Tubing Data and Figure 201.

Table 202. Nylon Tubing Data

Aluminum Alloy/Stainless Steel Fittings on Nylon Tubes				
Tube Outside Diameter (OD) in Inches	**Olive Distance (Dimension A) (+0.05 inch or - 0.05 inch)**	**Olive Clenching Torque with Aluminum Fittings (+10% or -10%) (inch pounds)**	**Olive Clenching Torque with Steel Fittings (+10% or -10%) (inch pounds)**	**Tightening Torque (Reference) (+10% or -10%) (inch pounds)**
3/16	0.22	70	90	28
5/16	0.22	120	200	48
1/2	0.38	250	N/A	63

G. The recommended procedure for replacement of damaged or deteriorated fluid tubing is to replace the full length of tubing from coupling to coupling. However, in areas of the airplane where this type of replacement is not possible, it is permitted to do a tube repair as an alternative to complete tubing replacement. Repair tubing as follows:

(1) Remove access panels as necessary to repair the damaged tubing.

(2) Cut out the damaged area.

(3) Put a strong adhesive tape on the ends of the tube.

NOTE: This will limit fluid leakage.

(4) Connect the new tubing to the other tube ends with straight couplings.

(5) Attach tubing with tie wraps or equivalent method.

(6) All new connections used in the repair must be tested for leaks. Operate the system before you install the access panels.

NOTE: If bulk tubing is installed, it is necessary to attach an identification tag to each end of the tube with the tube part number labeled on it for tube identification.

4. TKS Anti-Ice Fluid Removal

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: You must loosen fluid line connections of the TKS anti-ice system slowly. It is possible that high pressure is still in the system. System pressure of 120 psi-gage is possible.

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WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Before you operate the TKS system during this procedure put plastic sheets or absorbent cloths under the porous panels to keep the TKS fluid off the floor. This will help to prevent injury to personnel.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube nut. Replace the 3/16-inch and 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube fitting. Examine the seal for damage and make sure that it is in the correct position in the fitting. Refer to Figure 201. This will help to prevent fluid leakage from the fitting.

A. Remove the TKS Anti-Ice Fluid (Refer to Figure 202).

(1) Remove external electrical power from the airplane.
(2) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.
(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.
(4) Make sure that the CROSS TIE switch (SW03) is in the OFF position.
(5) Remove the fuel system access panel.
(6) Put a container with a capacity of approximately 3 to 5 gallons below the metering pump drain outlet.
(7) Remove the safety wire from the metering pump drain outlet fitting.
(8) Remove the fitting and blanking ball.
(9) Drain the fluid into the container.
(10) Install the blanking ball and fitting and safety with wire. Refer to Safetying - Maintenance Practices.
(11) Check the MFD TKS fluid quantity indicator.
(a) The MFD TKS fluid quantity indicator must show zero when the TKS fluid tank is empty.
(12) Fill the TKS fluid tank. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid (Inadvertent).
(13) If the system ran dry or was drained, refer to TKS System Priming in this section.

5. TKS System Priming

A. Prime the TKS System (Refer to Figure 202).

(1) Open the fuel system access panel.
(2) Put a container with a capacity of approximately 3 to 5 gallons below the metering pump drain outlet.
(3) Remove the safety wire from the metering pump drain outlet fitting.
(4) Remove the fitting and blanking ball.
(5) Supply external electrical power to the airplane.
(6) Engage the TKS circuit breaker.
(7) Make sure that the master BATT switches (left SW01 and right SW02) are set to the ON position.
(8) Make sure that the AVIONICS MASTER switch (SW04) is set to the ON position.
(9) Put the ANTI-ICE MAX/NORM switch (SI018) to the NORM position.
(10) Operate the system until there is no evidence of air bubbles for a minimum of three seconds.
(11) Put the ANTI-ICE MAX/NORM switch to the OFF position.
(12) Disengage the TKS circuit breaker.
(13) Set the master BATT switches (left and right) and AVIONICS MASTER switch to the OFF position.
(14) Remove external electrical power from the airplane.
(15) Install the blanking ball and fitting and safety with wire. Refer to Chapter 20, Safetying - Maintenance Practices.

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(16) Service the TKS system as needed. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid (Inadvertent).

6. TKS Fluid Contamination Removal

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: You must loosen fluid line connections of the TKS anti-ice system slowly. It is possible that high pressure is still in the system. System pressure of 120 psi-gage is possible.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Before you operate the TKS system during this procedure put plastic sheets or absorbent cloths under the porous panels to keep the TKS fluid off the floor. This will help to prevent injury to personnel.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube nut. Replace the 3/16-inch and 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube fitting. Examine the seal for damage and make sure that it is in the correct position in the fitting as shown in Figure 201. This will help to prevent fluid leakage from the fitting.

A. Remove the TKS Fluid Contamination (Fuel).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(3) Make sure that the AVIONICS MASTER (SW04) is in the OFF position.

(4) Disengage the TKS circuit breaker.

(5) Remove the fluid tank. Refer to TKS Anti-Ice System Fluid Tank and Components (Inadvertent) - Removal/Installation, TKS Anti-Ice Fluid Tank Removal/Installation.

(6) Fill the fluid tank with a water and mild detergent mixture.

(7) Drain the water and mild detergent mixture from the fluid tank.

(8) Fill the fluid tank with water.

(9) Drain the water from the fluid tank.

(10) Remove the strainer assembly. Refer to TKS Anti-Ice System Fluid Tank and Components (Inadvertent) - Removal/Installation, Fluid Strainer Assembly Removal/Installation.

(11) Examine the strainer assembly. Refer to TKS Anti-Ice System Fluid Tank and Components (Inadvertent) - Removal/Installation, Inspect/Clean Fluid Strainer Assembly.

(12) Install the fluid tank. Refer to TKS Anti-Ice System Fluid Tank and Components (Inadvertent) - Removal/Installation.

(13) If the TKS system was operated with fluid contamination, remove the equipment pack. Refer to TKS Anti-Ice System Equipment Pack (Inadvertent) - Removal/Installation.

NOTE: If there was fuel contamination in the fluid, but system was not operated, it is not necessary to replace the filter pack.

(14) Remove the filter assembly. Refer to TKS Anti-Ice System Filter (Inadvertent) - Removal/Installation.

(15) Install new filter assembly. Refer to TKS Anti-Ice System Filter (Inadvertent) - Removal/Installation.

(16) Install the equipment pack. Refer to TKS Anti-Ice System Equipment Pack (Inadvertent) - Removal/Installation.

(17) Install the fluid tank. Refer to TKS Anti-Ice system Fluid Tank and Components (Inadvertent) - Removal/Installation.

(18) Install the strainer assembly. Refer to TKS Anti-Ice system Fluid Tank and Components (Inadvertent) - Removal/Installation Fluid Strainer Assembly Removal/Installation.

(19) Add 1 gallon (3.78 liters) of TKS fluid to the fluid tank.

(20) Supply external electrical power to the airplane.

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(21) Set the master BATT switches (left and right) and the AVIONICS MASTER switch the ON position.

(22) Engage the TKS circuit breaker.

(23) Disconnect the output tube of the metering pump.

(24) Remove the seal from the input tube and discard. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.

(25) Connect a temporary tube to the metering pump outlet fitting and put the end in a container with a capacity of approximately 3 to 5 gallons. Refer to Figure 202.

(26) Put the ANTI-ICE MAX/NORM switch to the NORM position to start the metering pump operation.

(a) Let the TKS fluid flow in the container at the metering pump outlet for one full cycle of approximately 2 minutes of metering pump operation.

(27) Put the ANTI-ICE MAX/NORM switch to the OFF position.

(28) Set the master BATT switches (left and right) and the AVIONICS MASTER switch the OFF position.

(29) Disengage the TKS circuit breaker.

(30) Remove external electrical power from the airplane.

(31) Install a new seal in the input tube. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.

(a) Make sure that the seal touches the tube fitting olive.

(32) Put the outlet tube in the outlet fitting of the metering pump. Refer to Figure 202.

(33) Tighten the nut and safety with wire. Refer to Chapter 20, Safetying - Maintenance Practices.

(34) Supply external electrical power to the airplane.

(35) Set the master BATT switches (left and right) and the AVIONICS MASTER switch the ON position.

(36) Engage the TKS circuit breaker.

(37) Put the ANTI-ICE MAX/NORM switch (SI018) to the NORM position to start the metering pump.

(a) Let the system operate for approximately 5 minutes until there are no air bubbles in the TKS fluid flow from the porous panels on the wing and horizontal stabilizer leading edges.

NOTE: If necessary, you can let the system operate for more than 5 minutes until the fluid flow is normal across all porous panels.

(b) If the fluid flow at any of the porous panels does not become normal, do the porous panel purge and test procedure for the applicable porous panel(s). Refer to TKS Anti-Ice System Leading Edge Porous Panel (Inadvertent) - Adjustment/Test.

(38) Put the ANTI-ICE MAX/NORM switch to the MAX position.

(a) Let the TKS fluid flow from the porous panels on the wing and horizontal stabilizer leading edges for one full cycle of approximately 2 minutes.

NOTE: If necessary, you can do more MAX FLOW cycles until the fluid flow is normal across all porous panels.

(b) If fluid flow at any of the porous panels does not become normal, do the porous panel purge and test procedure for the applicable porous panel(s). Refer to TKS Anti-Ice System Leading Edge Porous Panel (Inadvertent) - Adjustment/Test.

(39) Put the ANTI-ICE MAX/NORM switch to the OFF position.

(40) Set the master BATT switches (left and right) and the AVIONICS MASTER switch the OFF position.

(41) Remove external electrical power from the airplane.

(42) Do the fluid tank servicing. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid (Inadvertent).

(43) Make sure that the floor and the airplane surfaces are clean.

7. TKS Fluid Contamination (Water) Removal

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Before you operate the TKS system during this procedure put plastic sheets or absorbent cloths under

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the porous panels to keep the TKS fluid off the floor. This will help to prevent injury to personnel.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

A. Remove the TKS Fluid Contamination (Water).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(3) Make sure that the AVIONICS MASTER (SW04) switch is in the OFF position.

(4) Disengage the TKS circuit breaker.

(5) Drain the TKS fluid from the fluid tank. Refer to TKS Anti-Ice system Fluid Tank and Components (Inadvertent) - Removal/Installation.

(6) Do the fluid tank servicing. Refer to Chapter 12, TKS Anti-Ice System - Servicing.

(7) Supply external electrical power to the airplane.

(8) Set the master BATT switches (left and right) and the AVIONICS MASTER switch to the ON position.

(9) Engage the TKS circuit breaker.

(10) Put the ANTI-ICE MAX/NORM switch to the MAX position to start the metering pump.

(a) Let the TKS fluid flow from the porous panels on the wing and horizontal stabilizer leading edges for one full cycle of approximately 2 minutes.

(11) If fluid flow at any of the porous panels is not normal, do the porous panel purge and test procedure for the applicable porous panel(s). Refer to TKS Anti-Ice System Leading Edge Porous Panel (Inadvertent) - Adjustment/Test.

(12) Put the ANTI-ICE MAX/NORM switch to the OFF position.

(13) Set the master BATT switches (left and right) and the AVIONICS MASTER switch to the OFF position.

(14) Remove external electrical power from the airplane.

(15) Make sure that the fluid tank servicing is correct. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid (Inadvertent).

(16) Make sure that the floor and the airplane surfaces are clean.

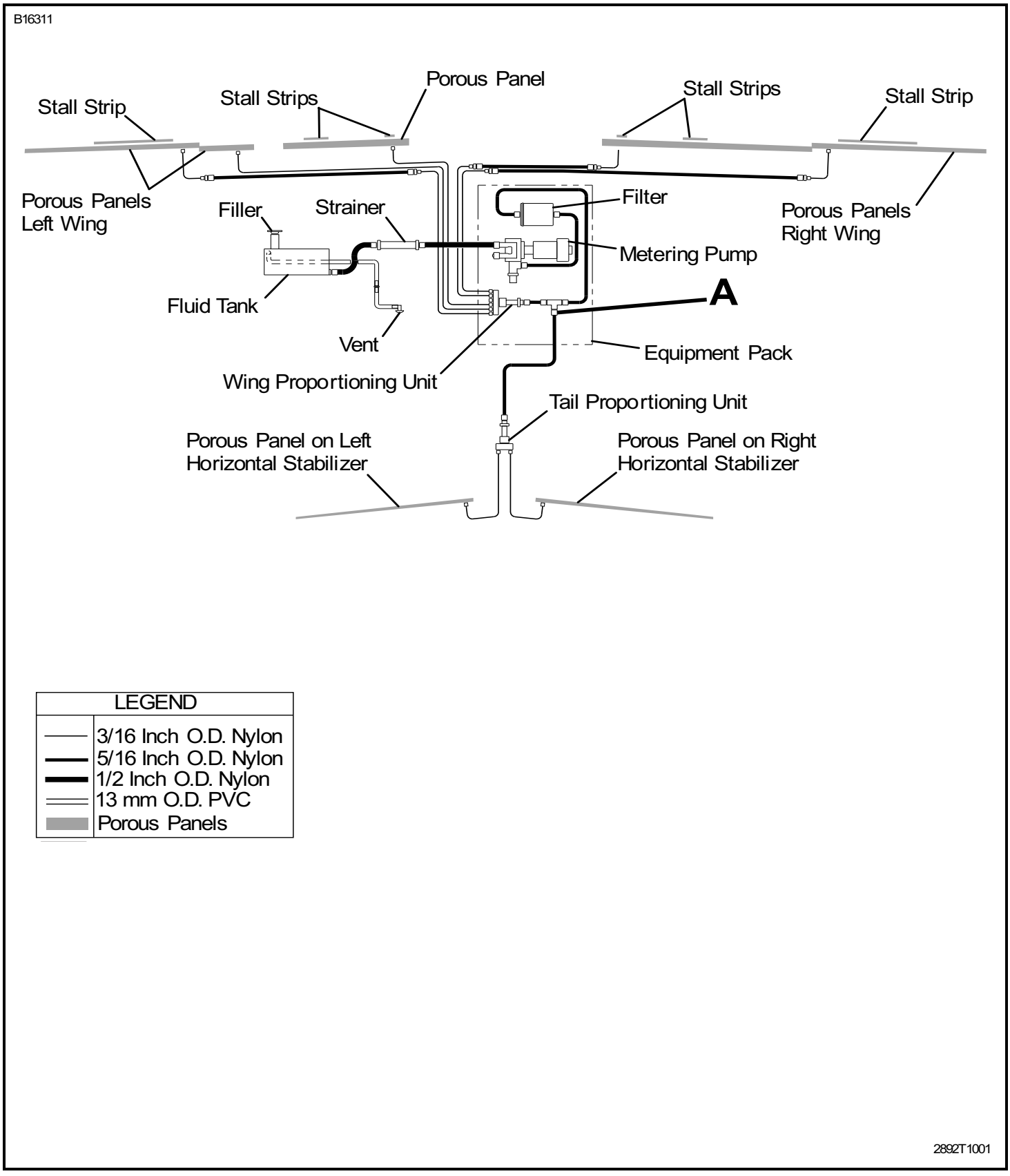
8. TKS Fluid Contamination (Solids) Removal

A. TKS Fluid Contamination (Solids) Removal

(1) If the TKS fluid contamination is a solid material, contact Cessna Aircraft Company.

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Figure 201 : Sheet 1 : TKS Nylon Tubing Installation

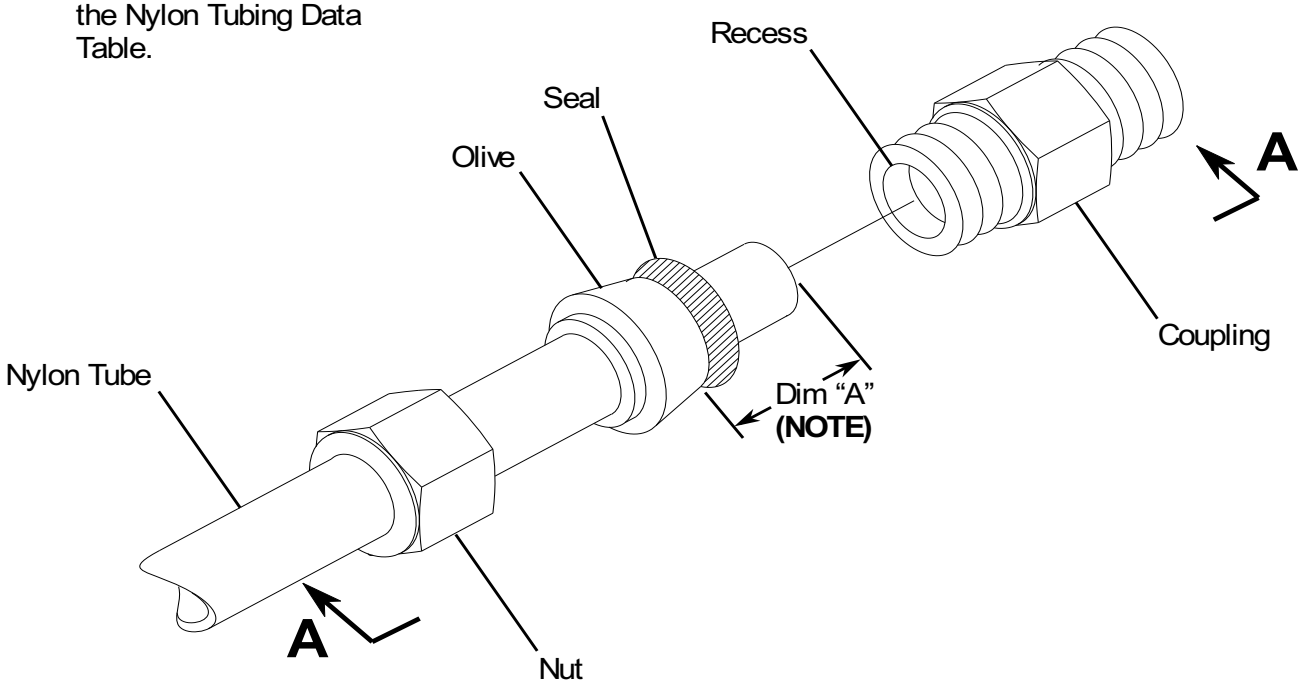


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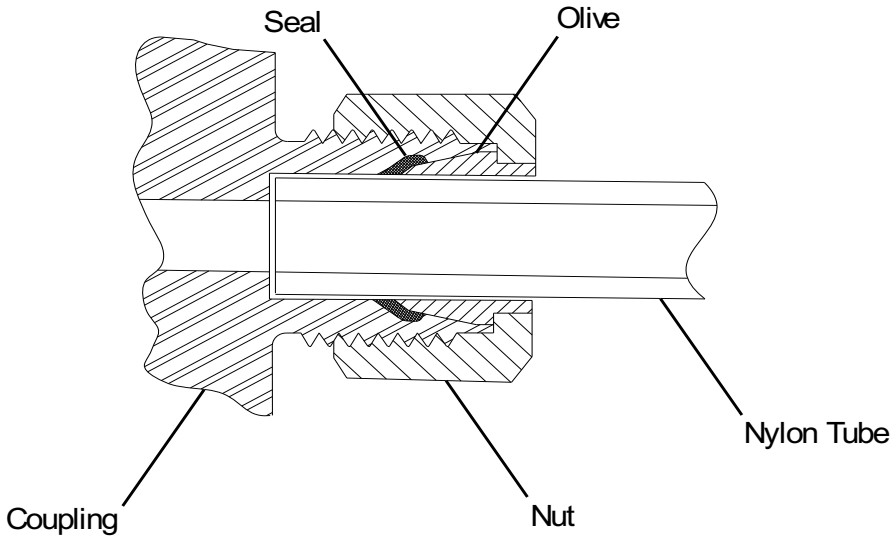
Figure 201 : Sheet 2 : TKS Nylon Tubing Installation

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NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)

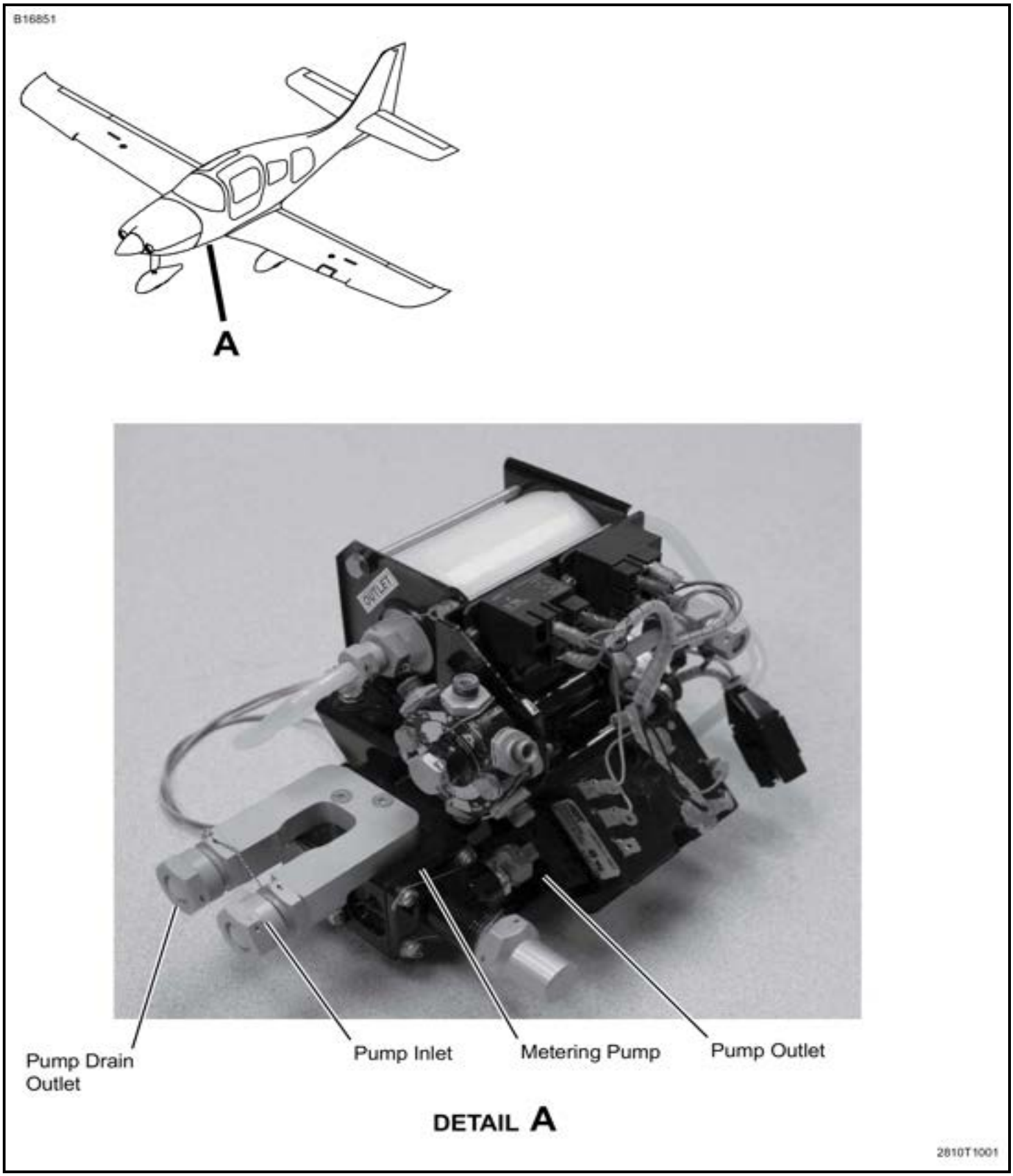


VIEW A-A

2678T1003
AA2678T1003

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Figure 202 : Sheet 1 : Metering Pump Outlet/Inlet Ports



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TKS ANTI-ICE SYSTEM (INADVERTENT) - ADJUSTMENT/TEST

1. General

A. This section contains the test procedures that are necessary to do after the replacement of TKS Anti-Ice System (Inadvertent) fluid tank, timer box, and/or metering pump.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. TKS Anti-Ice System Operational Test

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

WARNING: You must loosen fluid line connections of the TKS anti-ice system slowly. It is possible that high pressure is still in the system. System pressure of 120 psi-gage is possible.

CAUTION: Do not use MEK, acetone, paint thinner, or similar chlorinated solvents on the porous panels. To prevent damage, only use water and detergent, isopropyl alcohol, and/or approved anti-ice fluid on the porous panel surfaces.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube coupling. Replace the 3/16-inch and 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube coupling. Examine the seal for damage and make sure that it is in the correct position in the coupling. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the coupling.

NOTE: You can fabricate a fluid collector system and install it on and below the porous panels, which will contain the fluid and keep it off the floor. Recommended materials you can use are plastic sheets, tubing, aluminum tape, and rigid aluminum and/or plastic gutter material.

NOTE: It is easier for two persons to do this test. One to monitor the cockpit and one to monitor the equipment pack.

A. Do the TKS System Operational Test.

(1) Remove the panels that follow:

(a) Remove rear cabin access panels as necessary. Refer to Chapter 25, Access Panels - Maintenance Practices.

(b) Remove the fuel line access panels below each wing to get access to TKS panels input line connections.

(c) Open the fuel access panel.

(d) Open tail panels as necessary to get access to the horizontal TKS panels input line connections.

(2) Install a fluid collector system on the airplane.

(3) Apply external electrical power to the airplane.

(4) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(5) Set the AVIONICS MASTER switch (SW04) to the ON position.

(6) Set the CROSS TIE Switch (SW03) to the ON position.

(7) Make sure that the TKS, MFD and PFD circuit breakers are engaged.

(a) Record the TKS fluid level shown on the MFD display.

(b) Make sure that there is enough fluid in the tank to keep the pump from running dry during the test procedure.

(8) Put the ANTI-ICE MAX/NORM switch (SI018) to the MAX position.

(a) Make sure that the A-ICE MAX (white) CAS message shows on the PFD.

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(9) When you operate the TKS make sure that the TKS porous panel input connections and the equipment pack line connections do not leak.

(a) If there are TKS leaks, repair the leaks as necessary. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices.

(10) Make sure that there is consistent flow at each of the porous panels. If the flow is not correct do the porous panel purge procedure. Refer to TKS Anti-Ice System Leading Edge Porous Panel (Inadvertent) - Adjustment/Test.

NOTE: It can be necessary to operate the TKS a minimum of 5 minutes for TKS fluid flow to show at one or all of the porous panels.

(11) Put the ANTI-ICE MAX/NORM switch to the NORM position.

(a) Make sure that the A-ICE NORM (white) CAS message shows on the PFD.

(12) Operate the system for 3 cycles.

(a) Make sure that the system operates for 30 seconds on and is off for 30 seconds.

(b) At the third cycle, make sure that fluid flows correctly across each of the panels. If the flow is not correct do the porous panel purge procedure. Refer to TKS Anti-Ice System Leading Edge Porous Panel (Inadvertent) - Adjustment/Test.

(13) Put the ANTI-ICE MAX/NORM switch to the OFF position.

(a) Make sure that the A-ICE NORM (white) CAS message no longer shows on the PFD.

(b) Make sure that the TKS fluid level shown on the MFD decreases from the level recorded at the start of TKS system operation.

(14) Set the master BATT switches (left SW01 and right SW02) to the OFF position.

(15) Set the AVIONICS MASTER switch (SW04) to the OFF position.

(16) Set the CROSS TIE Switch (SW03) to the OFF position.

(17) Remove external electrical power from the airplane.

(18) Install the panels as necessary that follow:

(a) Install rear cabin access panels. Refer to Chapter 25, Access Panels - Maintenance Practices.

(b) Install the panels below each wing.

(c) Install the fuel line access panel.

(d) Install tail panels as necessary .

(19) If necessary, remove the fluid collector system from the airplane.

(20) Clean the floor and the airplane surfaces as necessary.

4. TKS Fluid Delivery Test

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

WARNING: You must loosen fluid line connections of the TKS anti-ice system slowly. It is possible that high pressure is still in the system. System pressure of 120 psi-gage is possible.

CAUTION: Do not use MEK, acetone, paint thinner, or similar chlorinated solvents on the porous panels. To prevent damage, only use water and detergent, isopropyl alcohol, and/or approved anti-ice fluid on the porous panel surfaces.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube coupling. Replace the 3/16-inch and 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube coupling.

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Examine the seal for damage and make sure that it is in the correct position in the coupling. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the coupling.

NOTE: You can fabricate a fluid collector system and install it on and below the porous panels, which will contain the fluid and keep it off the floor. Recommended materials you can use are plastic sheets, tubing, aluminum tape, and rigid aluminum and/or plastic gutter material.

NOTE: It is easier for two persons to do this test. One to monitor the cockpit and one to monitor the equipment pack.

A. Do the TKS System Fluid Delivery Test.

(1) Do the fluid tank servicing. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid.

(2) Install a fluid collector system on the airplane.

(3) Apply external electrical power to the airplane.

(4) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(5) Set the AVIONICS MASTER switch (SW04) to the ON position.

(6) Set the CROSS TIE Switch (SW03) to the ON position.

(7) Make sure that the TKS, MFD and PFD circuit breakers are engaged.

(8) Set the ANTI-ICE MAX/NORM switch (SI018) to the MAX position for a timed period not to exceed 20 minutes.

(a) Make sure that the A-ICE MAX (white) CAS message shows on the PFD.

(b) Record the TKS fluid level shown on the MFD display.

(9) Put the ANTI-ICE MAX/NORM switch to the OFF position.

(a) Make sure that the A-ICE NORM (white) CAS message no longer shows on the PFD.

(b) Make sure that the TKS fluid level shown on the MFD decreases from the level recorded at the start of TKS system operation.

(10) Set the master BATT switches (left SW01 and right SW02) to the OFF position.

(11) Set the AVIONICS MASTER switch (SW04) to the OFF position.

(12) Set the CROSS TIE Switch (SW03) to the OFF position.

(13) Remove external electrical power from the airplane.

(14) Do the fluid tank servicing and record the quantity of fluid necessary to fill tank to equal the level at the start of the check. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid.

(15) Calculate the flow rate.

NOTE: The permitted flow rate is 13.26 ounces/min, +0.34 or -0.0 ounces/min (392 ml/min, +10.0ml or -0.0 ml/min).

(16) If necessary, remove the fluid collector system from the airplane.

(17) Clean the floor and the airplane surfaces as necessary.

5. TKS Fluid Level Sender Functional Test

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

WARNING: You must loosen fluid line connections of the TKS anti-ice system slowly. It is possible that high pressure is still in the system. System pressure of 120 psi-gage is possible.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

A. Do a Test of the Fluid Level Sender.

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(1) Level the airplane. Refer to Chapter 8, Leveling and Weighing - General.
(2) Apply external electrical power to the airplane.
(3) Set the master BATT switches (left SW01 and right SW02) to the ON position.
(4) Set the AVIONICS MASTER switch (SW04) to the ON position.
(5) Set the CROSS TIE Switch (SW03) to the ON position.
(6) Make sure that the TKS, MFD and PFD circuit breakers are engaged.
(7) Drain the tank. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices
  (a) Make sure that a fluid quantity indication of A-ICE GAL 0.0 shows on the MFD display as applicable.
(8) Add 1 gallon, +10 or -10 fluid ounces, to the tank. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid.
  (a) Let the fluid stabilize for I minute.
  (b) Make sure that a fluid quantity indication of A-ICE GAL 1.0 shows on the MFD display as applicable.
  (c) If the fluid quantity indication does not change, do the steps that follow:
    1 Carefully move the float inside the TKS tank up and down.
    2 Let the fluid stabilize for I minute.
    3 Make sure that a fluid quantity indication of A-ICE GAL 1.0 shows on the MFD display as applicable.
(9) Add 2 gallons, +10 or -10 fluid ounces, to the tank. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid.
  (a) Let the fluid stabilize for 1 minute.
  (b) Make sure that a fluid quantity indication of A-ICE GAL 3.0 shows on the MFD display as applicable.
(10) Set the master BATT switches (left SW01 and right SW02) to the OFF position.
(11) Set the AVIONICS MASTER switch (SW04) to the OFF position.
(12) Set the CROSS TIE Switch (SW03) to the OFF position.
(13) Remove external electrical power from the airplane.

6. Metering Pump Functional Test

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

WARNING: You must loosen fluid line connections of the TKS anti-ice system slowly. It is possible that high pressure is still in the system. System pressure of 120 psi-gage is possible.

CAUTION: Do not use MEK, acetone, paint thinner, or similar chlorinated solvents on the porous panels. To prevent damage, only use water and detergent, isopropyl alcohol, and/or approved anti-ice fluid on the porous panel surfaces.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube coupling. Replace the 3/16-inch and 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube coupling. Examine the seal for damage and make sure that it is in the correct position in the coupling. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the coupling.

NOTE: You can fabricate a fluid collector system and install it on and below the porous panels, which will contain the fluid and keep it off the floor. Recommended materials you can use are plastic sheets, tubing, aluminum tape, and rigid aluminum and/or plastic gutter material.

NOTE: It is easier for two persons to do this test. One to monitor the cockpit and one to monitor the equipment pack.

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A. Do the Metering Pump Functional Test.

(1) Make sure that the fluid tank serviced correctly. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid (Inadvertent).

(2) Put a container with a capacity of approximately 3 to 5 gallons below the metering pump outlet fitting.

(3) Remove the safety wire from the metering pump outlet fitting.

(4) Connect a test line to the metering pump outlet fitting and put the free end in the collection bucket or appropriate container.

(5) Apply external electrical power to the airplane.

(6) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(7) Set the AVIONICS MASTER switch (SW04) to the ON position.

(8) Set the CROSS TIE Switch (SW03) to the ON position.

(9) Make sure that the TKS, MFD and PFD circuit breakers are engaged.

(10) Set the ANTI-ICE MAX/NORM switch (SI018) to the NORM position.

(a) Make sure that the A-ICE (white) CAS message shows on the PFD.

(b) Make sure that the system operates for 30 seconds on and is off for 30 seconds.

(11) Disengage the ANTI-ICE circuit breaker found on the cockpit circuit breaker panel.

(a) Make sure that the A-ICE NORM (white) CAS message no longer shows on the PFD.

(b) Make sure that the operation stops.

(12) Set the ANTI-ICE MAX/NORM switch (SI018) to the OFF position.

(13) Engage the ANTI-ICE circuit breaker.

(14) Set the ANTI-ICE MAX/NORM switch (SI018) to the MAX position.

(a) Make sure that the A-ICE MAX (white) CAS message shows on the PFD.

(b) Make sure that the pump operates for two minutes continuously.

(15) Set the ANTI-ICE MAX/NORM switch to the OFF position.

(a) A-ICE MAX (white) CAS message no longer shows on the PFD.

(16) Set the master BATT switches (left SW01 and right SW02) to the OFF position.

(17) Set the AVIONICS MASTER switch (SW04) to the OFF position.

(18) Set the CROSS TIE Switch (SW03) to the OFF position.

(19) Remove external electrical power from the airplane.

(20) Do the fluid tank servicing. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid (Inadvertent).

(21) Remove the test line from the metering pump outlet fitting.

(22) Install a new seal in the outlet tube. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.

(a) Make sure that the seal touches the tube fitting olive.

(23) Put the outlet tube in the outlet fitting of the metering pump. Refer to Figure 202.

(24) Tighten the nut and safety with wire. Refer to Chapter 20, Safetying - Maintenance Practices.

(25) Clean the floor and the airplane surfaces as necessary.

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TKS ANTI-ICE SYSTEM FLUID TANK AND COMPONENTS (INADVERTENT) - REMOVAL/INSTALLATION

1. General

A. This section contains the removal and installation procedures for the TKS anti-ice fluid tank, filler tube assembly, and strainer assembly. This section also gives the procedures to inspect and clean the strainer assembly.

B. After you remove and install or replace the fluid tank, it is necessary to do the panel purge and test procedures. Refer to TKS Anti-Ice System Leading Edge Porous Panel (Inadvertent) - Adjustment/Test.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. TKS Anti-Ice Fluid Tank Removal/Installation

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: You must loosen fluid line connections of the TKS anti-ice system slowly. It is possible that high pressure is still in the system. System pressure of 120 psi-gage is possible.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Before you operate the TKS system during this procedure put plastic sheets or absorbent cloths under the porous panels to keep the TKS fluid off the floor. This will help to prevent injury to personnel.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube nut. Replace the 3/16-inch and 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube fitting. Examine the seal for damage and make sure that it is in the correct position in the fitting. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the fitting.

A. Remove the Anti-Ice Fluid Tank (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Disengage the TKS circuit breaker.

(5) Remove the anti-ice fluid from the fluid tank. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices TKS Anti-Ice Fluid Removal.

(6) Open the fuel system access panel on the lower surface of the wing.

(7) Remove the footwell. Refer to Chapter 25, Footwell - Maintenance Practices.

(8) Identify and disconnect the level sender electrical connector (C6) from the equipment pack electrical connector (JF100).

(9) Remove the fluid filler tube.

(a) Carefully remove sealant from the edge filler tube flange.

(b) Remove the six screws from the filler tube flange.

(c) Unscrew the filler tube from the fluid tank assembly.

(10) Remove the vent tube.

(a) On the bottom of the wing under the fluid tank, remove the nut from the vent tube outlet fitting.

(b) Loosen the vent line coupling.

(c) Carefully disconnect the two sections of the vent tube.

(11) Remove the outlet tube.

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(a) Remove the safety wire on the outlet fitting nut.
(b) Loosen the nut on the outlet fitting.
(c) Carefully remove the tube from the tank.
(d) Put caps on all openings and tube ends to keep FOD out of the fluid system.
(e) Remove the seal from the outlet tube and discard. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.

(12) Carefully move the fluid tank from the wing and out of the false rib.

B. Install the Anti-Ice Fluid Tank (Refer to Figure 401).

CAUTION: When you install the fluid tank in its position make sure that the vent line, and the fluid quantity harness stay in the tank indent area. If this is not done damage to the components can occur.

(1) Put the fluid tank assembly through the false rib and into position in the lower inboard wing.
(2) Identify and connect the tank fluid level sender electrical connector (C6) to the equipment pack electrical connector (JC103).
(3) Install the fluid tank filer tube.
(a) Screw the filler tube flange in the filler tube assembly.
(b) Install the six filler tube flange screws.
(c) Seal the edge of the filler tube flange with U064042 sealant.
(4) Install the outlet tube.
(a) Remove the caps from the tubing.
(b) Install new seals at the tank outlet fitting. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.
1 Make sure that the seal touches the connector olive.
(c) Carefully tighten the outlet fitting nut.
(d) Safety all the tube nuts. Refer to Chapter 20, Safetying - Maintenance Practices.
(5) Install the vent tube.
(a) Remove the caps from the vent tube and the airplane vent tube fitting.
(b) Insert the outlet section of the vent tube in the vent tube coupling.
(c) Put the vent line stud fitting through the airplane skin.
(d) Carefully tighten the vent tube coupling.
(e) Install the nut on the vent tube outlet stud.
(f) Where necessary, attach vent tube with a tie-wrap.
(6) Install the fuel system access panel.
(7) Install the footwell. Refer to Chapter 25, Footwell - Maintenance Practices.
(8) Do the fluid tank servicing. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid (Inadvertent).
(9) Do a test of the TKS system. Refer to TKS Anti-Ice System (Inadvertent) - Adjustment/Test.
(10) Do the panel purge and test procedures. Refer to TKS Anti-Ice Leading Edge Porous Panel - Adjustment/Test.
(11) Remove external electrical power from the airplane.

4. Strainer Assembly Removal/Installation

A. Remove the Strainer Assembly (Refer to Figure 402).
(1) Remove external electrical power from the airplane.
(2) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.
(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.
(4) Disengage the TKS circuit breaker.
(5) Remove the footwell. Refer to Chapter 25, Footwell - Maintenance Practices.
(6) Identify the correct strainer assembly and flow direction arrow installation and record the direction of the arrow.

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(7) Remove the tubing from each end of the strainer assembly.
(a) Remove the safety wire from each of the two strainer assembly tube fitting nuts.
(b) Loosen the tube fitting nuts.
(c) Remove the tubes from each end of the strainer assembly.
(d) Remove the seal from each tube and discard. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.
(e) Put caps on the openings and tube ends to keep FOD out of the fluid system.
(8) Remove the strainer assembly from the airplane.
(9) If necessary, inspect the strainer. Refer to Inspect/Clean Strainer Assembly in this section.

B. Install the Strainer Assembly (Refer to Figure 402).
(1) Put the strainer assembly in its correct position.
(a) Make sure the flow direction arrow is installed as recorded when it was removed.
(b) Make sure that the strainer assembly is installed so the footwell can be installed again and the fluid tank vent tube is not damaged.
(2) Install the tubing to each end the strainer assembly.
(a) Remove caps on the openings and tube ends.
(b) Install new seals on the tubes. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.
(c) Install the tubes in the ends of the strainer assembly.
(d) Tighten the fitting nuts at each end of the strainer assembly and safety with wire. Refer to Safetying - Maintenance Practices.
(3) Use tie wraps to install the strainer assembly to prevent chaffing.
(4) Install the footwell. Refer to Chapter 25, Footwell - Maintenance Practices.
(5) Engage the TKS circuit breaker.
(6) If necessary to do the strainer inspection, refer to Inspect/Clean Strainer Assembly in this section.

5. Inspect/Clean Strainer Assembly

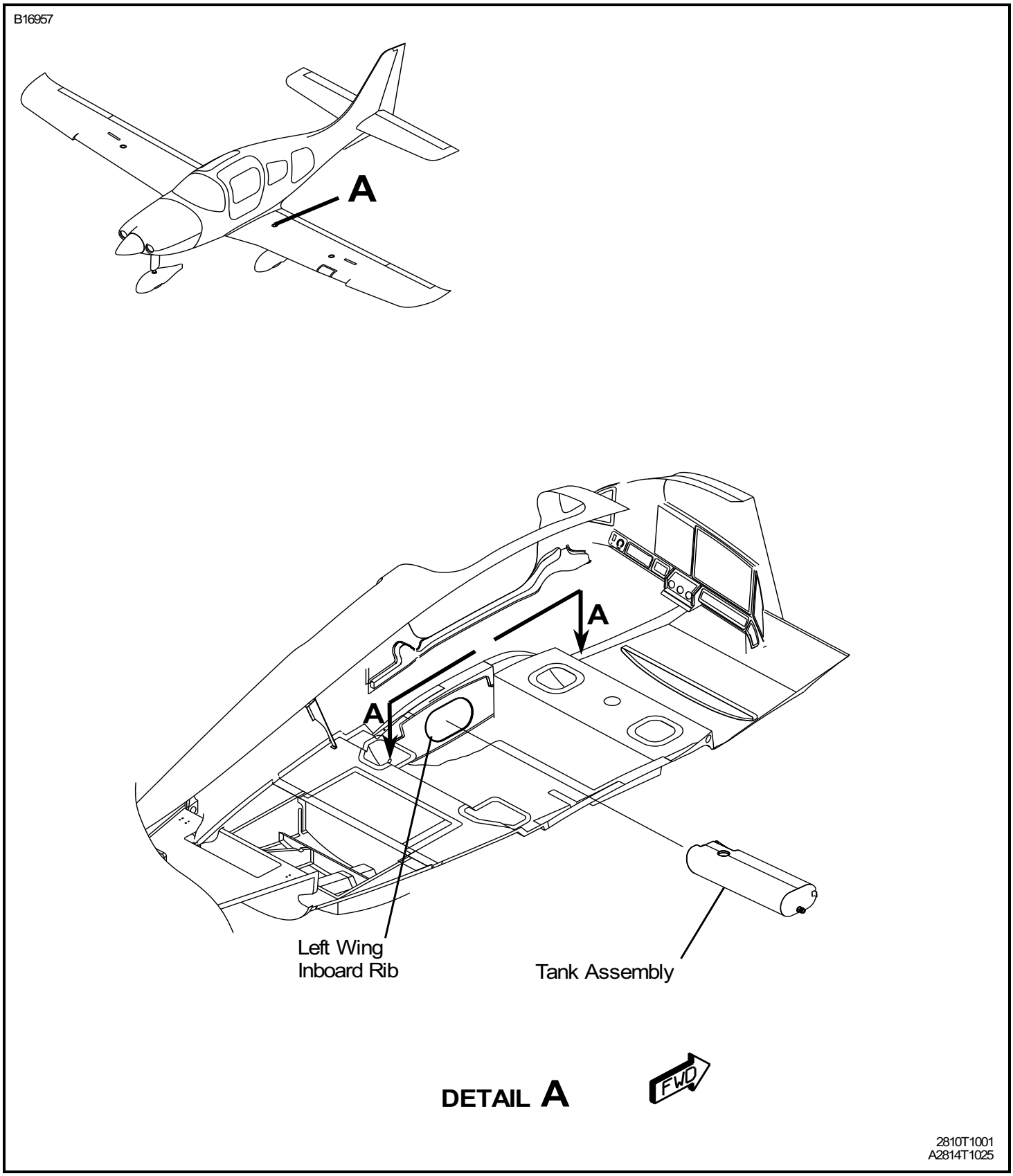
A. Disassemble the Strainer Assembly (Refer to Figure 402).
(1) Remove the strainer assembly from the airplane. Refer to Strainer Assembly Removal/Installation in this section.
(2) Remove the strainer from the housing.
(a) Remove the safety wire from strainer fitting.
(b) Loosen the strainer fitting.
(c) Remove the strainer from the housing.
(d) Remove the old O-ring from the strainer and discard.

B. Inspect and Clean the Strainer Assembly (Refer to Figure 402).
(1) Examine the screen for unwanted materials.
(a) Clean the screen thoroughly with water to remove all unwanted materials.
(b) Air dry the strainer.
(2) Examine the interior of the housing for unwanted materials.
(a) Flush the housing thoroughly with water to remove all unwanted materials.
(b) Air dry the strainer assembly.

C. Assemble the Strainer Assembly (Refer to Figure 402).
(1) Install a new O-ring on the strainer.
(2) Screw the strainer into the housing and tighten with your fingers.
(3) Tighten the strainer and safety with wire. Refer to Chapter 20, Safetying - Maintenance Practices.
(4) Install the strainer assembly in the airplane. Refer to Strainer Assembly Removal/Installation in this section.

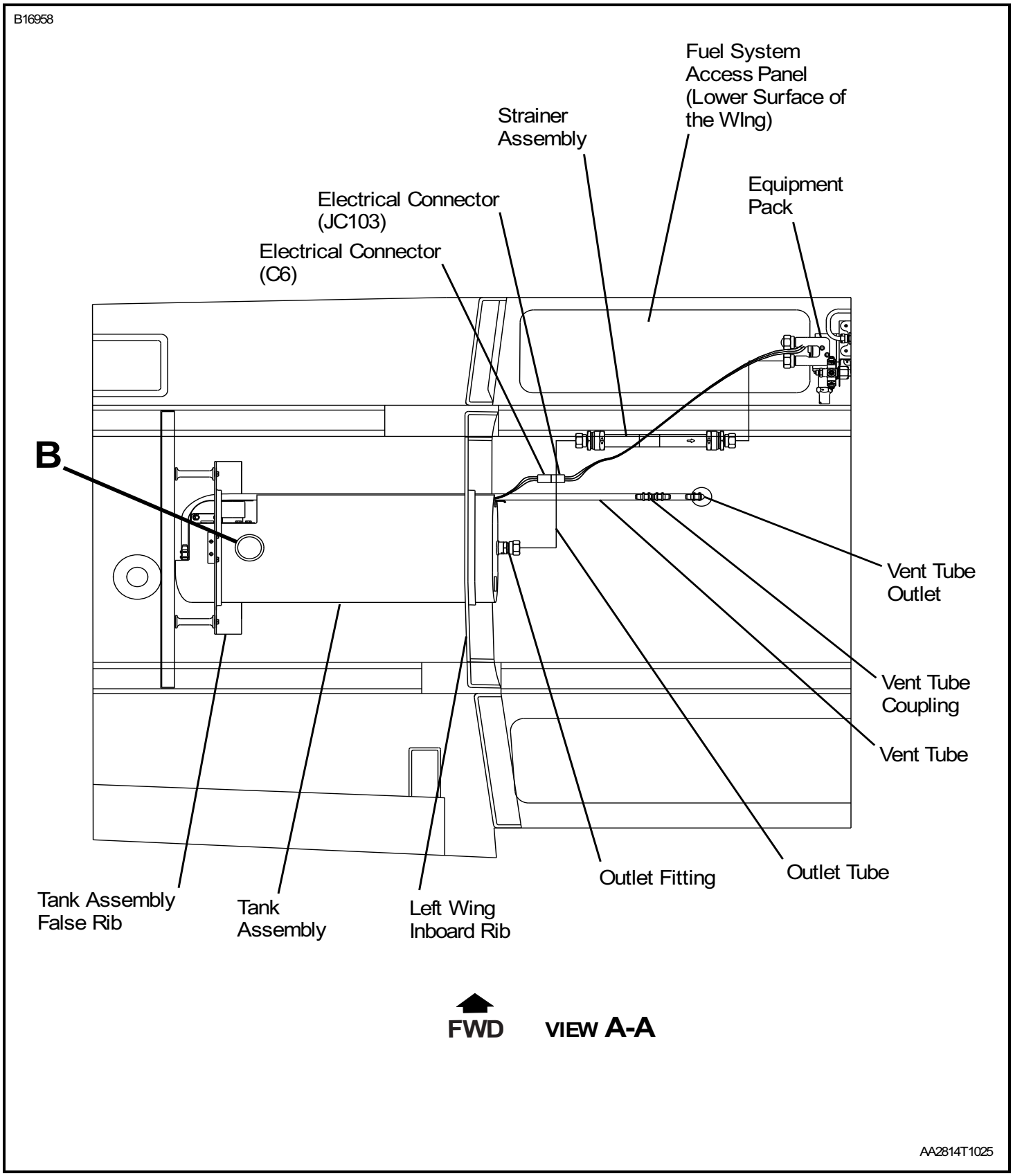
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Figure 401 : Sheet 1 : Fluid Tank Installation



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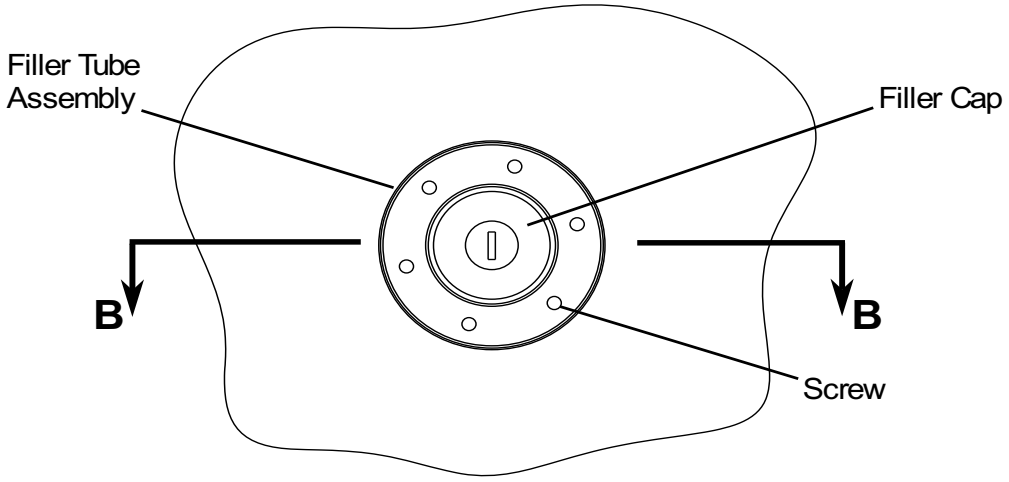
Figure 401 : Sheet 2 : Fluid Tank Installation



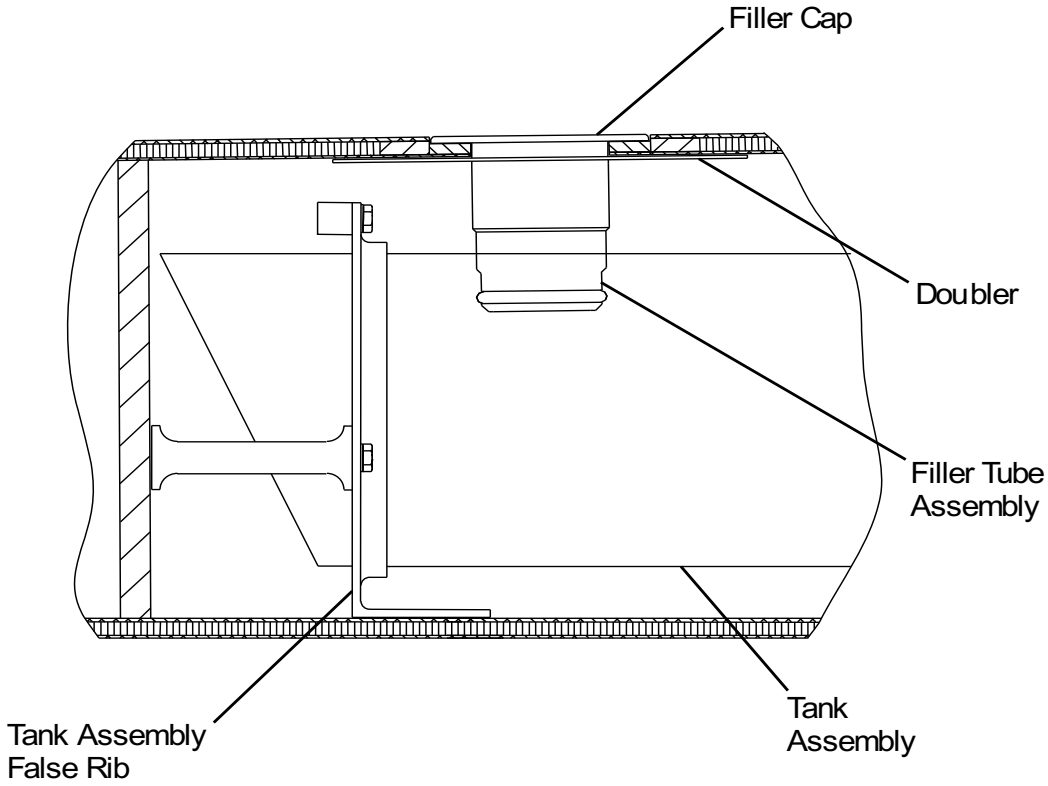
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Figure 401 : Sheet 3 : Fluid Tank Installation

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DETAIL B

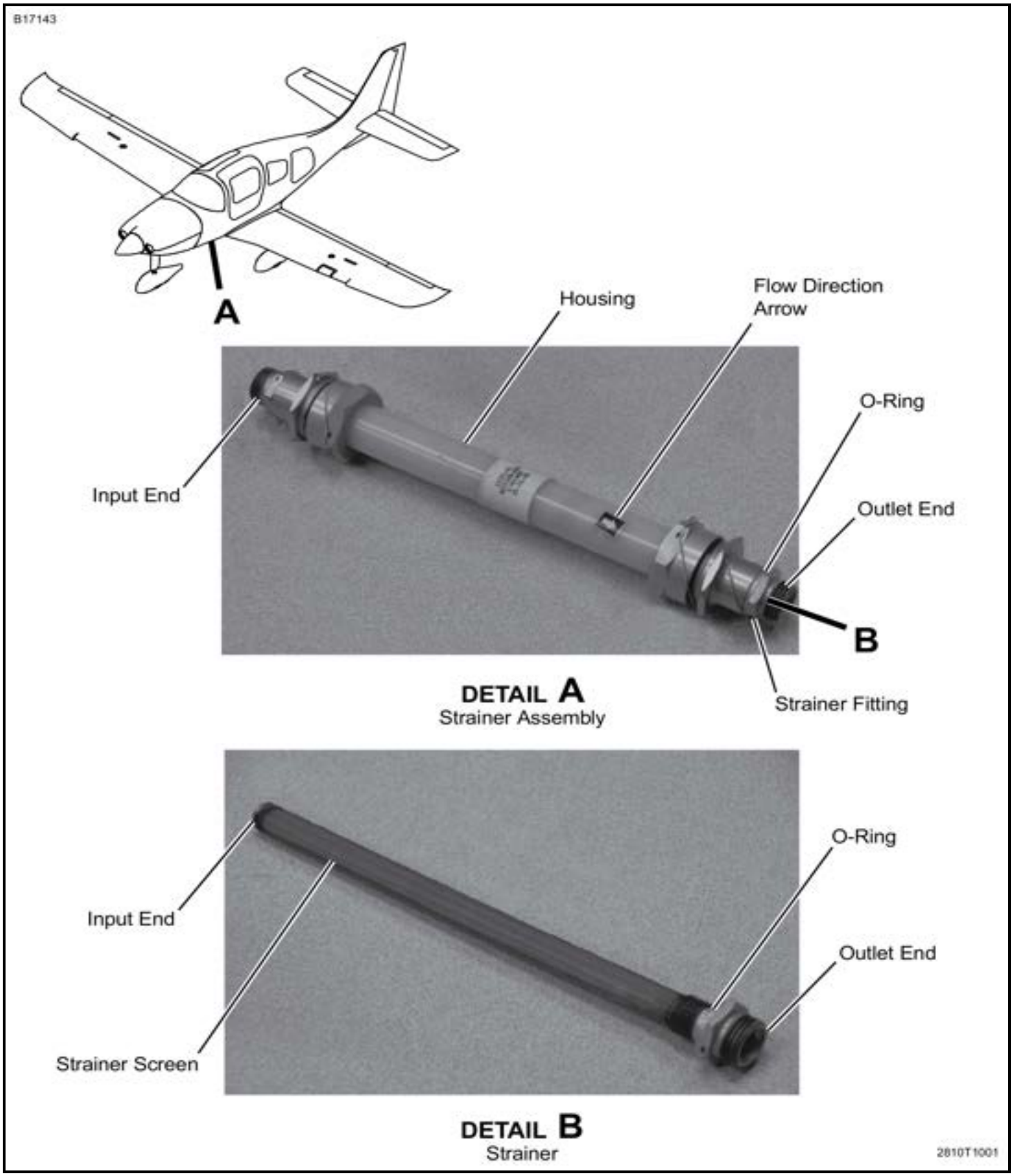


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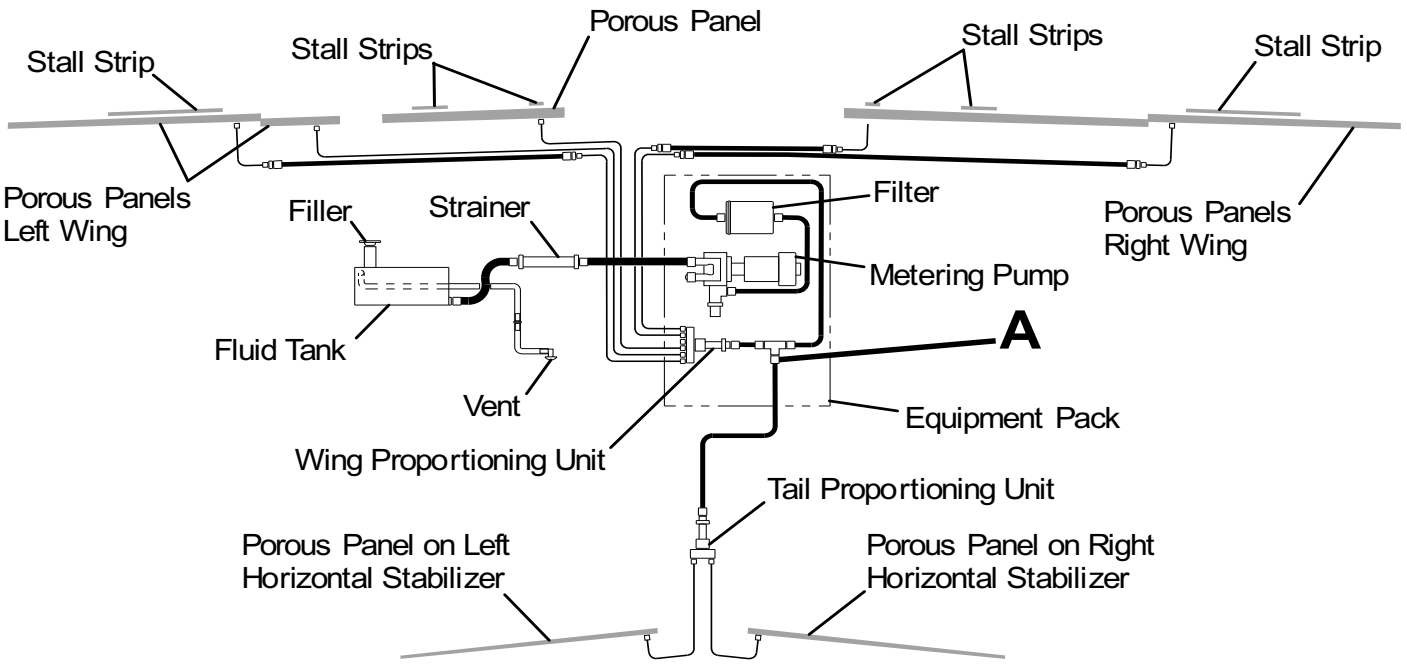
Figure 402 : Sheet 1 : Fluid Strainer Installation



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Figure 201 : Sheet 1 : TKS Nylon Tubing Installation

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LEGEND	
	3/16 Inch O.D. Nylon
	5/16 Inch O.D. Nylon
	1/2 Inch O.D. Nylon
	13 mm O.D. PVC
	Porous Panels

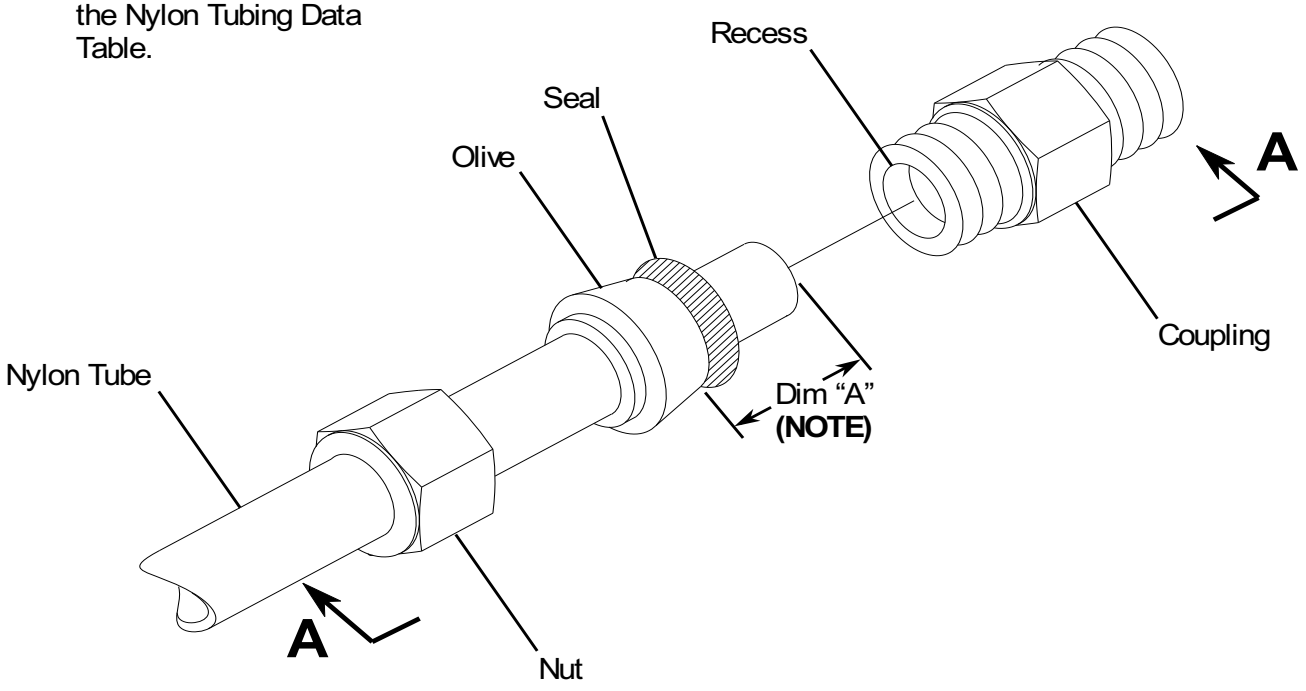
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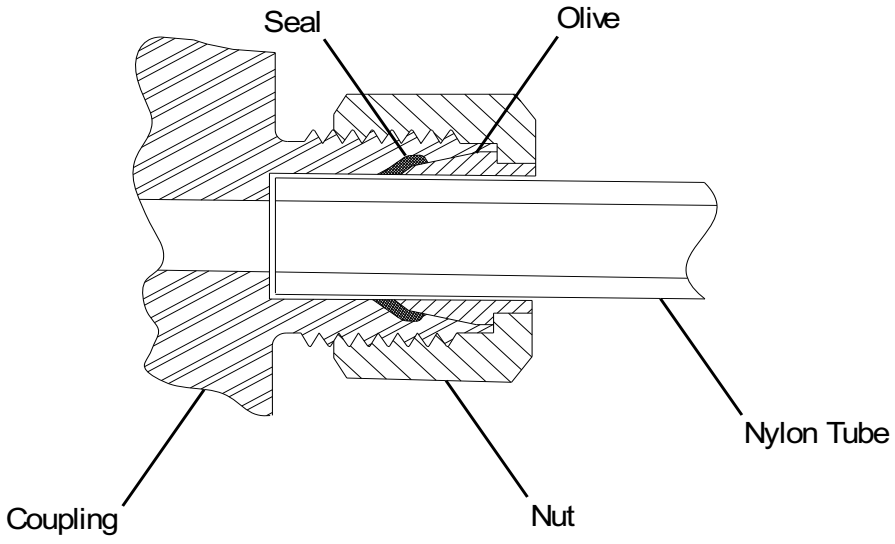
Figure 201 : Sheet 2 : TKS Nylon Tubing Installation

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NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)



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TKS ANTI-ICE SYSTEM EQUIPMENT PACK (INADVERTENT) - REMOVAL/INSTALLATION

1. General

A. This section contains the removal and installation procedures for the TKS Anti-Ice System (Inadvertent) equipment pack. The equipment pack is installed in the lower forward fuselage area. To get access to the equipment pack, remove the fuel system access panel. The equipment pack includes the wing proportioning unit, filter pack, and metering pump.

B. Operate the metering pump each month, or when necessary, in the NORM mode to remove the air from the fluid system.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. TKS Anti-Ice System Equipment Pack Removal/Installation

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: You must loosen fluid line connections of the TKS anti-ice system slowly. It is possible that high pressure is still in the system. System pressure of 120 psi-gage is possible.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Before you operate the TKS system during this procedure put plastic sheets or absorbent cloths under the porous panels to keep the TKS fluid off the floor. This will help to prevent injury to personnel.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube nut. Replace the 3/16-inch and 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube fitting. Examine the seal for damage and make sure that it is in the correct position in the fitting. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the fitting.

A. Remove the TKS Equipment Pack (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(3) Make sure that the AVIONICS MASTER switch (SW04) is set to the OFF position.

(4) Disengage the TKS circuit breaker.

(5) Remove the fuel system access panel on the lower surface of the wing.

(6) Disconnect the equipment pack electrical connector (C4) from the airplane wiring electrical connector (PF101).

(7) Remove the wing proportioning unit outlet tubes.

(a) Identify the five outlet tubes connected to the wing proportioning unit.

NOTE: Outlet number 4 of the wing proportioning unit is not used and is capped.

(b) Remove the safety wire from each nut of the proportioning units outlet tube fittings.

(c) Loosen the tube fitting nut.

(d) Disconnect the tubes from the proportioning unit.

(e) Remove and discard the old seals from the proportioning unit outlet tubes.

(f) Put caps on all openings and tube ends to keep FOD out of the fluid system.

(8) Remove the tail proportioning unit supply tube.

(a) Remove the safety wire from the tail proportioning unit supply fitting nut.

(b) Disconnect the tail proportioning supply tube from the supply fitting.

(c) Remove and discard the old seal from the tail proportioning supply tube.

(d) Put caps on all openings and tube ends to keep FOD out of the fluid system.

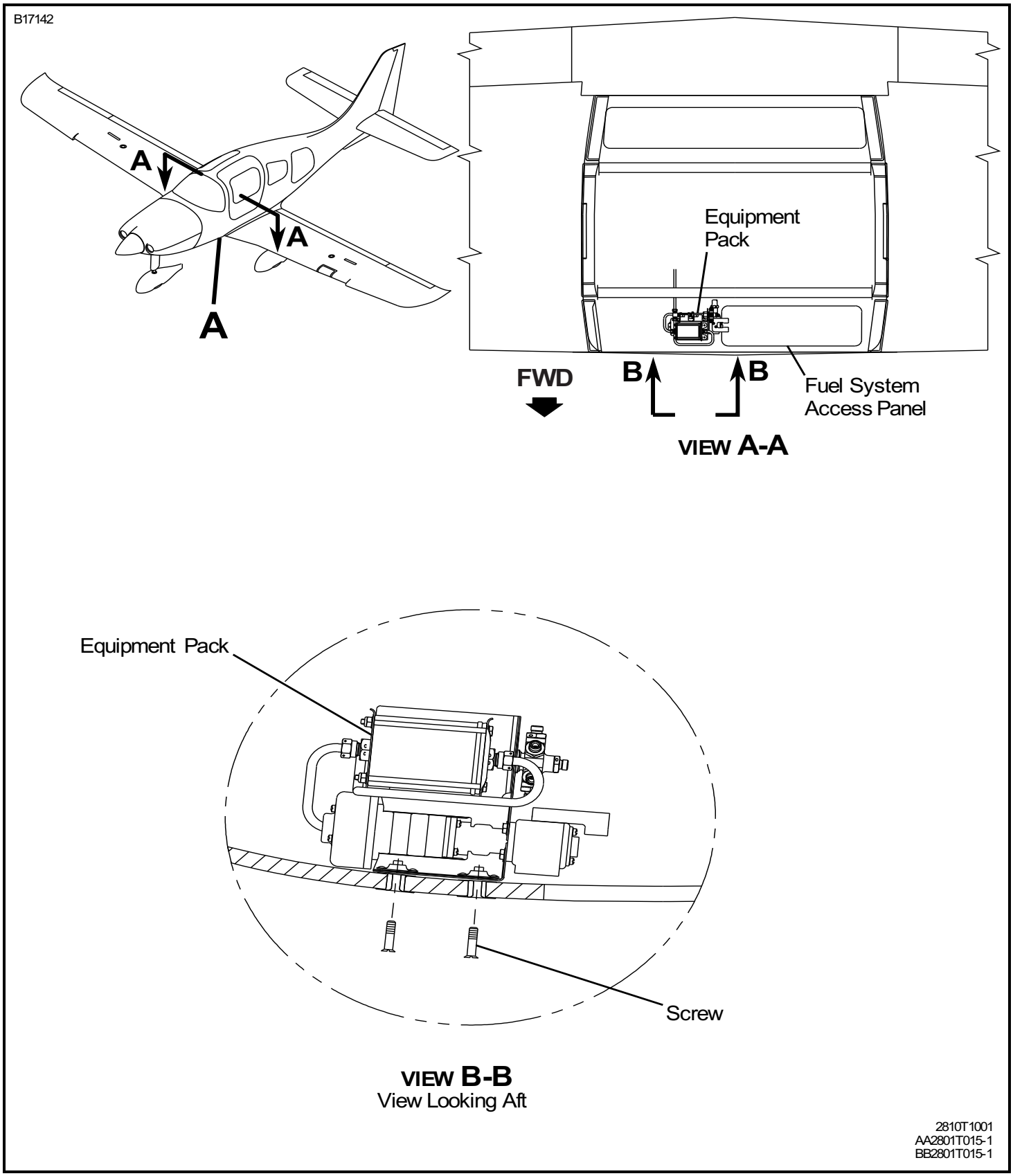
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(9) Remove the metering pump inlet tube.
  (a) Remove the safety wire from the metering pump inlet tube fitting nut.
  (b) Loosen the inlet tube fitting nut and remove the inlet tube from the metering pump.
  (c) Remove and discard the old seal from the metering pump inlet tube.
  (d) Put caps on all openings and tube ends to keep FOD out of the fluid system.
(10) Remove the four screws that attach the equipment pack to the lower fuselage.
(11) Remove the equipment pack from the airplane.

B. Install the TKS Equipment Pack (Refer to Figure 401).
(1) Put the equipment pack in its correct position in the lower fuselage.
  (a) Install the four screws that attach the equipment pack to the fuselage.
(2) Install the metering pump inlet tube.
  (a) Remove the cap from the metering pump inlet tube.
  (b) Install a new seal on the metering pump input tube. Refer to TKS Anti-Ice System - Maintenance Practices, Figure 201.
  (c) Put the metering pump input tube in its correct position on the metering pump fitting.
  (d) Tighten the metering pump inlet tube fitting nut and safety with wire. Refer to Chapter 20, Safetying - Maintenance Practices.
(3) Install the tail proportioning unit supply tube.
  (a) Remove the cap from the tail proportioning unit supply tube.
  (b) Install a new seal on the tail proportioning unit supply tube. Refer to TKS Anti-Ice System - Maintenance Practices, Figure 201.
  (c) Put the tail proportioning supply tube in its correct position on the supply fitting.
  (d) Tighten the supply fitting nut and safety with wire. Refer to Chapter 20, Safetying - Maintenance Practices.
(4) Install the wing proportioning unit output tubes.
  (a) Remove the caps from the wing proportioning unit output tubes.
  (b) Install new seals on the proportioning unit output tube. Refer to TKS Anti-Ice System - Maintenance Practices, Figure 201.
  (c) Identify and put the tubes in their correct position on the proportioning units tube fittings.
    NOTE: Outlet number 4 of the wing proportioning unit is not used and is capped.
  (d) Tighten each of the proportioning units outlet tube fitting nuts and safety with wire. Refer to Chapter 20, Safetying - Maintenance Practices.
(5) Connect the equipment pack electrical connector (C4) to the airplane wiring electrical connector (PF101).
(6) Install the fuel system access panel.
(7) Do a check of the TKS Anti-Ice System. Refer to TKS Anti-Ice System - Adjustment/Test.

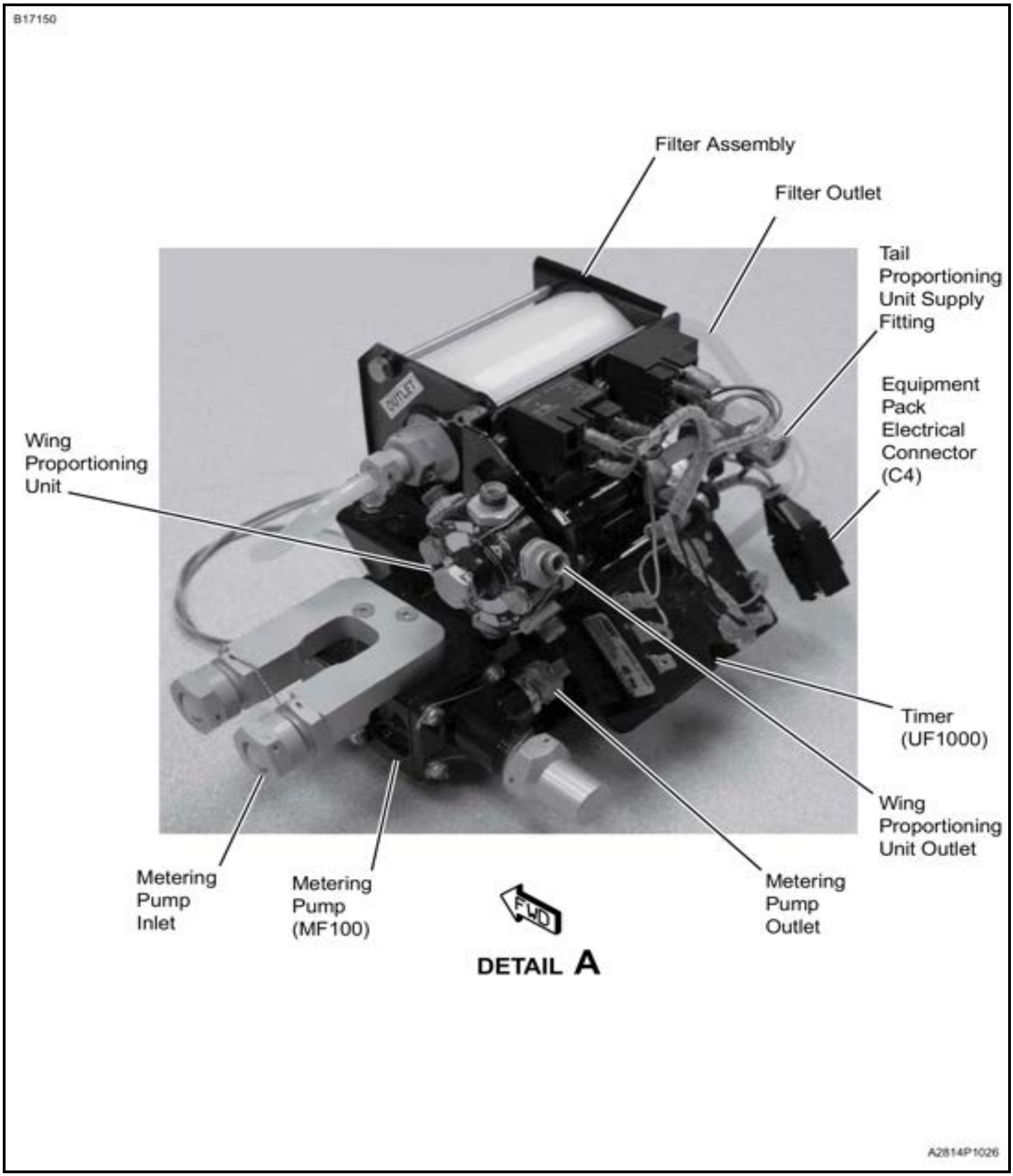
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Figure 401 : Sheet 1 : TKS Anti-Ice System Equipment Pack Installation



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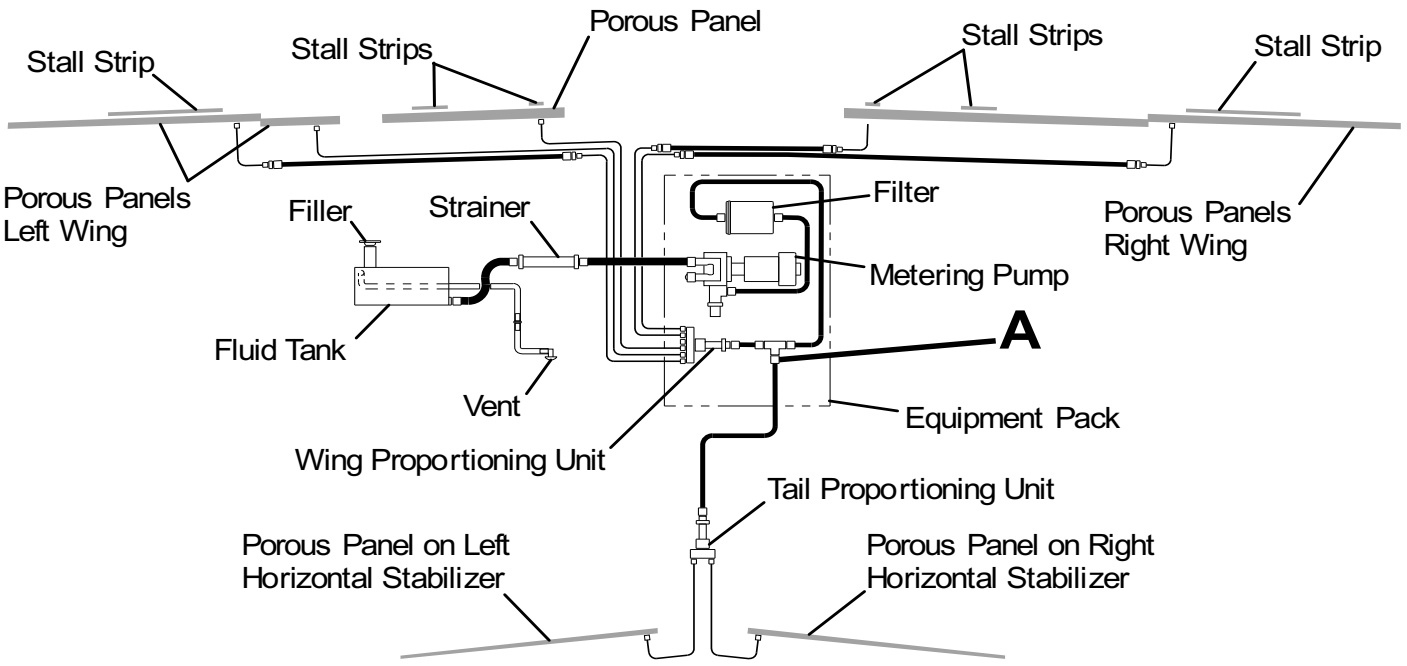
Figure 401 : Sheet 2 : TKS Anti-Ice System Equipment Pack Installation



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Figure 201 : Sheet 1 : TKS Nylon Tubing Installation

B16311



LEGEND	
	3/16 Inch O.D. Nylon
	5/16 Inch O.D. Nylon
	1/2 Inch O.D. Nylon
	13 mm O.D. PVC
	Porous Panels

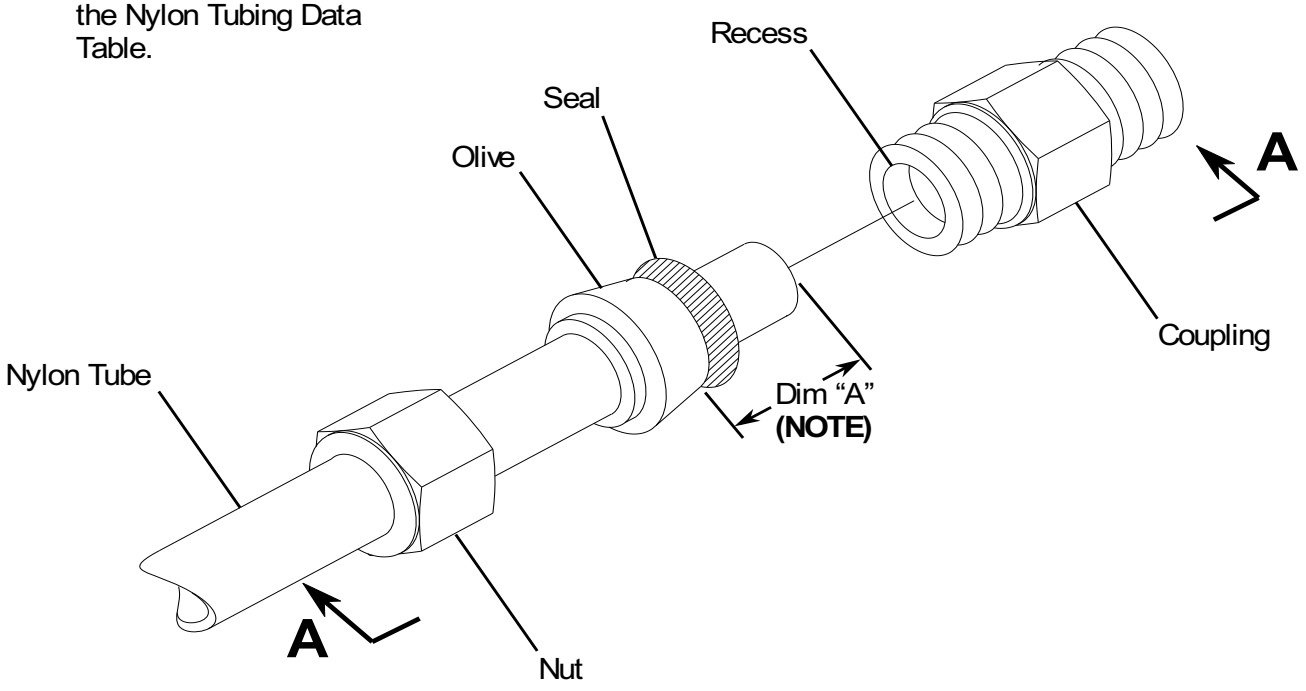
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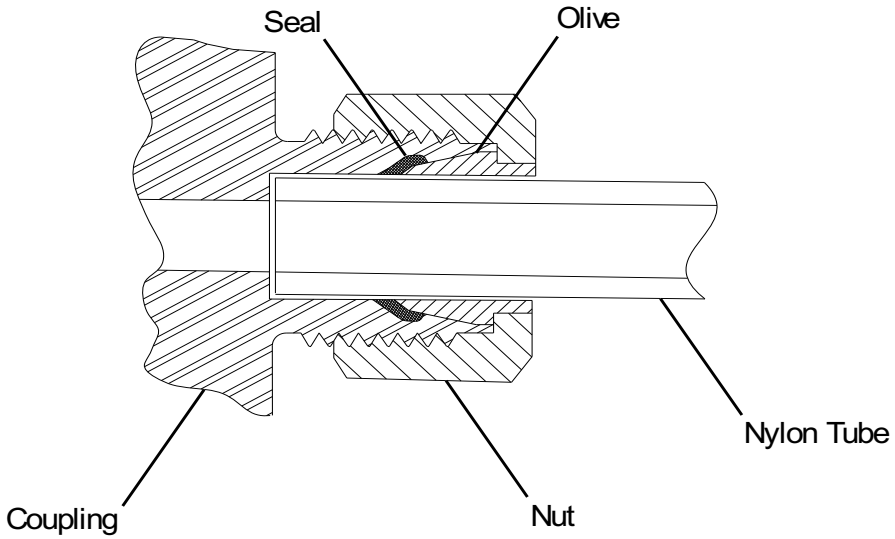
Figure 201 : Sheet 2 : TKS Nylon Tubing Installation

B16237

NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)



VIEW A-A

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TKS ANTI-ICE SYSTEM METERING PUMP (INADVERTENT) - REMOVAL/INSTALLATION

1. General

A. This section contains the removal and installation procedures for the TKS Anti-Ice System (Inadvertent) Metering Pump.

B. The equipment pack must be removed from the airplane to remove and replace the metering pump.

C. Operate the metering pump each month, or when necessary, in the NORM mode to remove the air from the fluid system.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. Metering Pump Removal/Installation

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: You must loosen fluid line connections of the TKS anti-ice system slowly. It is possible that high pressure is still in the system. System pressure of 120 psi-gage is possible.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Before you operate the TKS system during this procedure put plastic sheets or absorbent cloths under the porous panels to keep the TKS fluid off the floor. This will help to prevent injury to personnel.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube nut. Replace the 3/16-inch and 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube fitting. Examine the seal for damage and make sure that it is in the correct position in the fitting. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the fitting.

A. Remove the Metering Pump (MF100) (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) are in the OFF position.

(3) Disengage the TKS circuit breaker.

(4) Remove the equipment pack. Refer to TKS Anti-Ice System Equipment Pack (Inadvertent) - Removal/Installation.

(5) Identify and disconnect the electrical wiring connectors from the metering pump.

(6) Remove outlet tube from metering pump.

(a) Remove the safety wire from the outlet tube nut.

(b) Slowly loosen the nut and remove the outlet tube from the fitting.

(c) Remove and discard the old seal from the outlet tube.

(d) Put caps on all openings and tube ends to keep FOD out of the fluid system.

(7) Loosen the screws on the pump mounting clamps that attach the pump to the equipment pack bracket.

(8) Remove the pump from the equipment pack.

B. Install the Metering Pump (MF100) (Refer to Figure 401).

(1) Put the pump in its correct position in the pump bracket.

(2) Tighten the mounting clamp screws that attach the pump to the equipment pack bracket.

(3) Install the outlet tube to the metering pump.

(a) Remove the caps from the tube end.

(b) Install new seals on the outlet tube. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.

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(c) Put the outlet tube in its correct position on the metering pump inlet fitting.

(d) Carefully tighten the outlet tube fitting nut.

(e) Safety the outlet tube fitting nut. Refer to Chapter 20, Safetying - Maintenance Practices.

(4) Identify and connect the electrical wiring connectors to the metering pump.

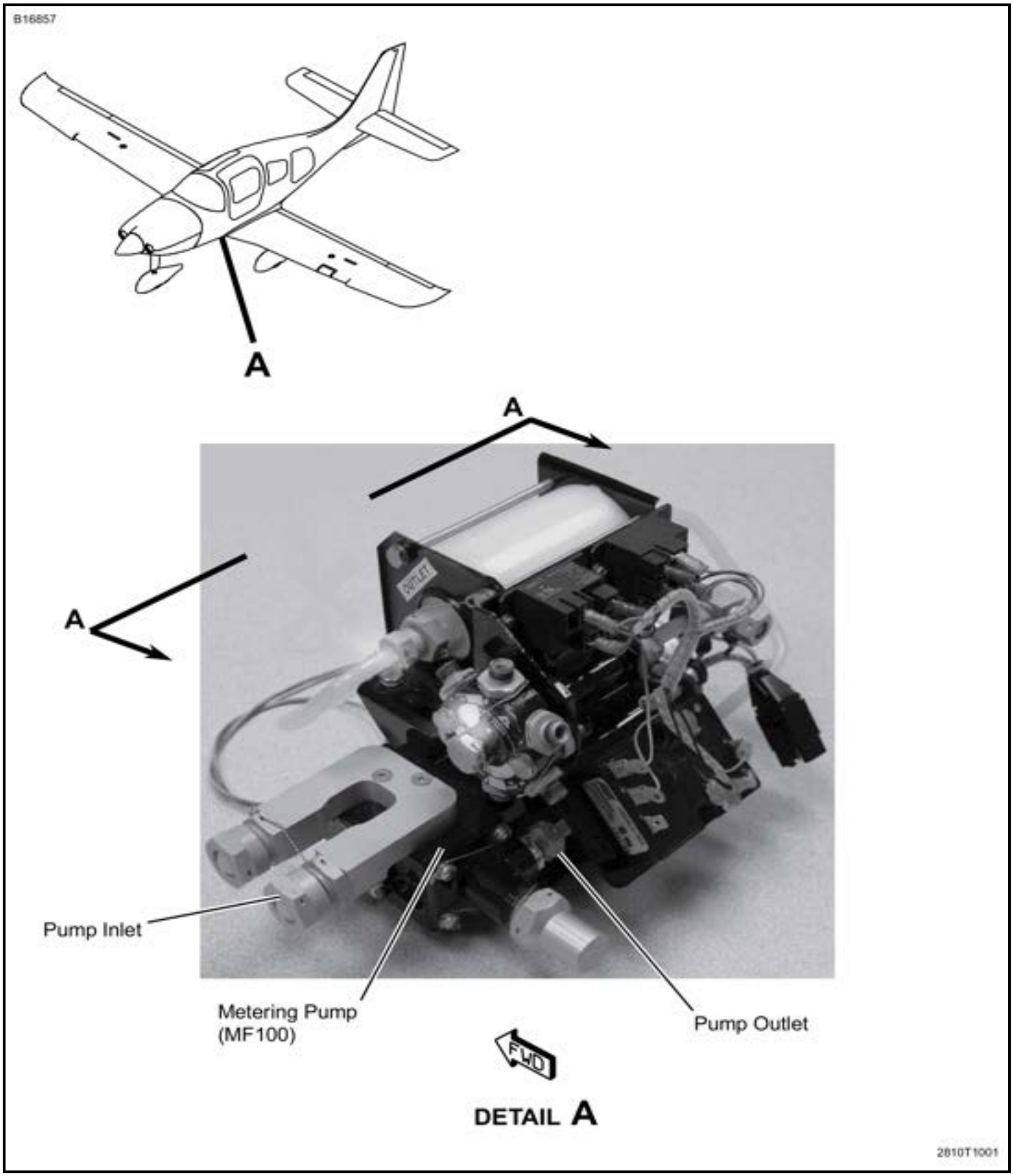
(5) Install the equipment pack. Refer to TKS Anti-Ice System Equipment Pack (Inadvertent) - Removal/Installation.

(6) Do the fluid tank servicing. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid.

(7) Do a check of the TKS system. Refer to the, TKS Anti-Ice System (Inadvertent) - Adjustment/Test.

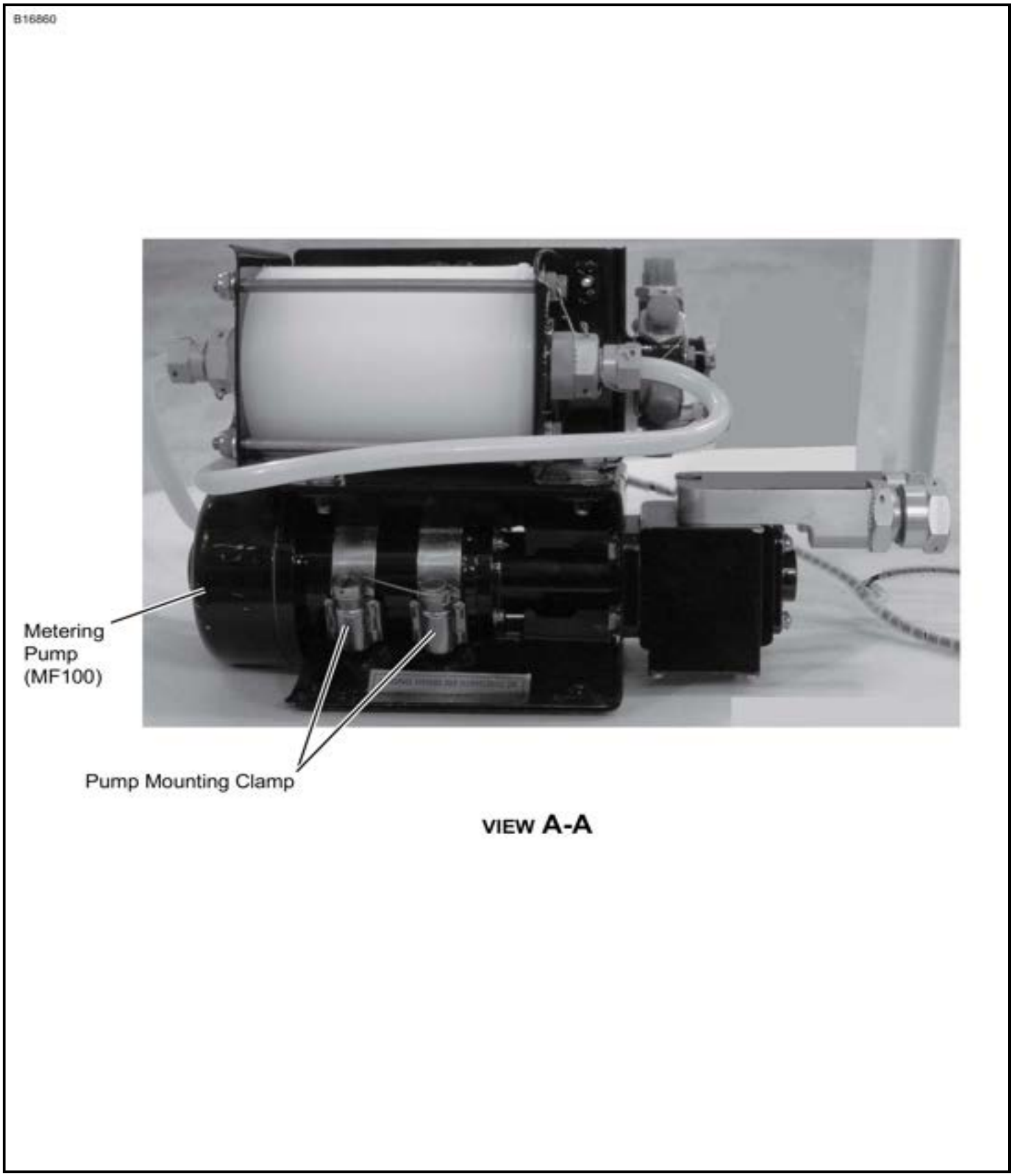
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Figure 401 : Sheet 1 : Metering Pump Installation



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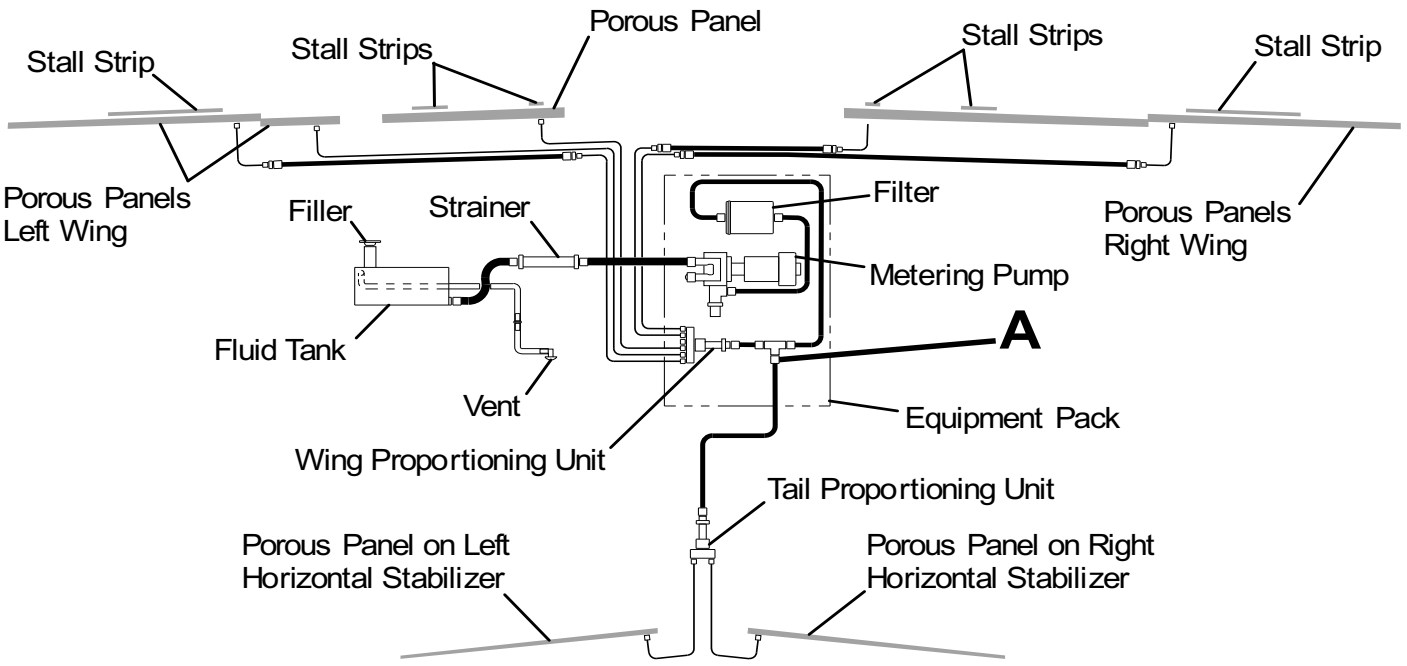
Figure 401 : Sheet 2 : Metering Pump Installation



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Figure 201 : Sheet 1 : TKS Nylon Tubing Installation

B16311



LEGEND	
	3/16 Inch O.D. Nylon
	5/16 Inch O.D. Nylon
	1/2 Inch O.D. Nylon
	13 mm O.D. PVC
	Porous Panels

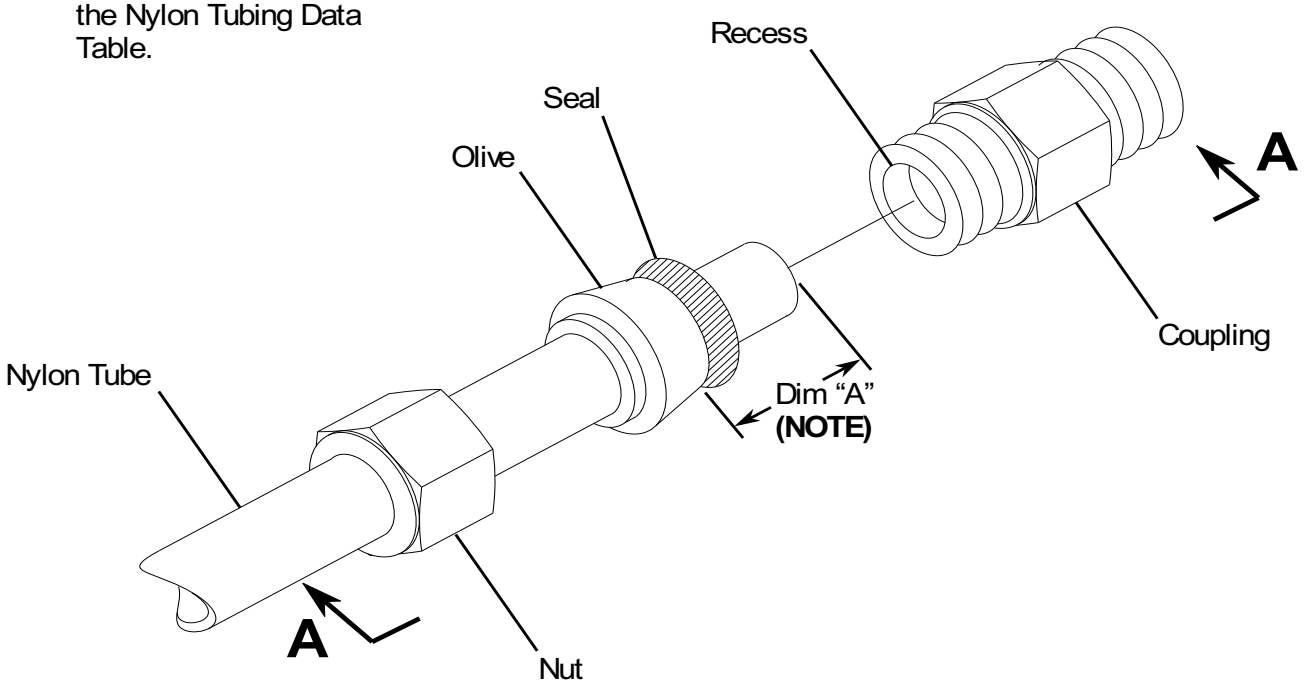
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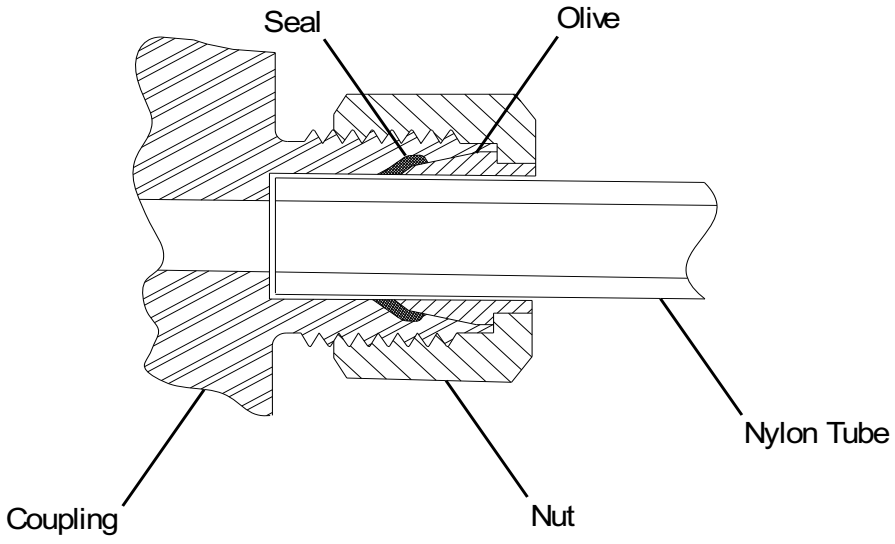
Figure 201 : Sheet 2 : TKS Nylon Tubing Installation

B16237

NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)



VIEW A-A

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TKS ANTI-ICE SYSTEM PROPORTIONING UNITS (INADVERTENT) - REMOVAL/INSTALLATION

1. General

A. This section contains the removal and installation procedures for the TKS Anti-Ice System (Inadvertent) proportioning units.

B. The wing proportioning unit is installed on the equipment pack. The tail proportioning unit is installed aft of the baggage compartment aft bulkhead panel.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. Wing Proportioning Unit Removal/Installation

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: You must loosen fluid line connections of the TKS anti-ice system slowly. It is possible that high pressure is still in the system. System pressure of 120 psi-gage is possible.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Do not use MEK, acetone, paint thinner, or similar chlorinated solvents on the porous panels. To prevent damage, only use water and detergent, isopropyl alcohol, and/or approved anti-ice fluid on the porous panel surfaces.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube coupling. Replace the 3/16-inch and 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube coupling. Examine the seal for damage and make sure that it is in the correct position in the coupling. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the coupling.

A. Remove the Wing Proportioning Unit (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) are in the OFF position.

(3) Disengage the TKS circuit breaker.

(4) Remove the equipment pack. Refer to TKS Anti-Ice System Equipment Pack (Inadvertent) - Removal/Installation.

(5) Remove the inlet tube from the proportioning unit.

(a) Remove the safety wire from the inlet tube fitting.

(b) Slowly loosen the inlet tube fitting and remove the inlet tube.

(c) Put a cap on the tube end to keep FOD out of the fluid system.

(d) Remove the seal from the inlet tube and discard. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.

(6) Remove the outlet tubes from the proportioning unit.

(a) Identify the each of the five outlet tubes and the fittings they attach to.

(b) Remove the safety wire from each of the outlet tube fittings.

(c) Slowly loosen and disconnect each of the outlet tubes.

(d) Remove each of the outlet tubes from the proportioning unit.

(e) Put caps on the outlet tube ends to keep FOD out of the fluid system.

(f) Remove the seals from the outlet tubes and discard. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.

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(7) Remove the two bolts and washers that attach the proportioning unit to the bracket on the equipment pack.
(8) Remove the grounding jumper from the bolt.
(9) Remove the proportioning unit from the equipment pack.
(10) Remove the nut and nylon ball from port four of the removed proportioning unit.

B. Install the Wing Proportioning Unit (Refer to Figure 401).
(1) Install the nylon ball and nut from the removed proportioning unit on port four of the new unit.
(2) Put the proportioning unit in its correct position on the bracket.
(3) Put the grounding jumper on the correct bolt to attach it to the bracket.
(4) Install the two bolts and washers that attach the proportioning unit to the bracket on the equipment pack.
(5) Attach the inlet tube to the proportioning unit.
(a) Remove the cap from the inlet tube.
(b) Install new seal on the inlet tube. Refer to TKS Anti-Ice System - Maintenance Practices, Figure 201.
1 Make sure that the seal touches the inlet tube olive.
(c) Put the inlet tube in its correct position on the proportioning unit inlet fitting.
(d) Carefully tighten the nut on the inlet tube fitting and safety with wire. Refer to Chapter 20, Safetying - Maintenance Practices.
(6) Attach the outlet tubes to the proportioning unit.
(a) Install new seals on the outlet tubes. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.
1 Make sure on each of the outlet tubes that the seal touches the outlet tube olive.
(b) Identify each of the five outlet tubes and put them in their correct position on the outlet fittings of the proportioning unit.
(c) Carefully tighten the nuts on the outlet tube fittings and safety with wire. Refer to Chapter 20, Safetying - Maintenance Practices.
(7) Install the equipment pack. Refer to TKS Anti-Ice System Equipment Pack (Inadvertent) - Removal/Installation
(8) Engage the TKS circuit breaker.
(9) Apply external electrical power on the airplane.
(10) Set the master BATT switches (left and right) and the AVIONICS MASTER switch to the ON position.
(11) Put the ANTI-ICE MAX/NORM switch (SI018) to the NORM position.
(a) Make sure that there is no fluid leakage from the proportioning unit fittings.
(12) Put the ANTI-ICE MAX/NORM switch to the OFF position.
(13) Set the master BATT switches (left and right) and the AVIONICS MASTER switch to the OFF position.
(14) Remove external electrical power from the airplane.
(15) Do a test of the wing porous panels. Refer to TKS Anti-Ice System Leading Edge Porous Panel (Inadvertent) - Adjustment/Test.
(16) If necessary, do the fluid tank servicing. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid.

4. Tail Proportioning Unit Removal/Installation

A. Remove the Tail Proportioning Unit (Refer to Figure 401).
(1) Remove external electrical power from the airplane.
(2) Make sure that the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) are in the OFF position.
(3) Disengage the TKS circuit breaker.
(4) Remove rear cabin access panels as necessary. Refer to Chapter 25, Access Panels - Maintenance Practices.
(5) Remove the inlet tube from the proportioning unit.
(a) Remove the safety wire from the inlet tube fitting.

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(b) Slowly loosen and disconnect the inlet tube fitting.

(c) Put a cap on the tube end to keep FOD out of the fluid system.

(d) Remove the seal from the inlet tube and discard. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.

(6) Remove the outlet tubes from the proportioning unit.

(a) Identify each of the two outlet tubes and the fittings they attach to.

(b) Slowly loosen and disconnect the outlet tubes.

(c) Remove the outlet tubes from the proportioning unit.

(d) Put caps on the outlet tubes ends to keep FOD out of the fluid system.

(e) Remove the seals from the outlet tube and discard. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.

(7) Remove the two nuts and washers that attach the proportioning unit to the mounting studs.

(8) Remove the proportioning unit from the airplane.

B. Install the Tail Proportioning Unit (Refer to Figure 401).

(1) Put the proportioning unit in its correct position on the mounting studs.

(a) Install the two nuts and washers that attach the proportioning unit to the mounting studs.

(2) Attach the outlet tubes to the proportioning unit.

(a) Remove the caps from the outlet tubes.

(b) Install new seals on each of the two outlet tubes. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.

1 Make sure on each of the outlet tubes that the seal touches the outlet tube olive.

(c) Identify each of the two the outlet tubes and put them in their correct position on the outlet fittings of the proportioning unit.

(d) Tighten the nuts on the outlet tube fittings and safety with wire. Refer to Chapter 20, Safetying - Maintenance Practices.

(3) Attach the inlet tube to the proportioning unit.

(a) Install a new seal on the inlet tube. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.

1 Make sure that the seal touches the inlet tube olive.

(b) Put the inlet tube in its correct position on the proportioning unit inlet fitting.

(c) Tighten the nut on the inlet tube fitting and safety with wire. Refer to Chapter 20, Safetying - Maintenance Practices.

(4) Engage the TKS circuit breaker.

(5) Put external electrical power on the airplane.

(6) Set the master BATT switches (left and right) and the AVIONICS MASTER switch to the ON position.

(7) Put the ANTI-ICE MAX/NORM switch to the NORM position.

(a) Make sure that there is no fluid leakage from the proportioning unit fittings.

(8) Installed removed rear cabin access panels as necessary. Refer to Chapter 25, Access Panels - Maintenance Practices.

(9) Put the ANTI-ICE MAX/NORM switch to the OFF position.

(10) Set the master BATT switches (left and right) and the AVIONICS MASTER switch to the OFF position.

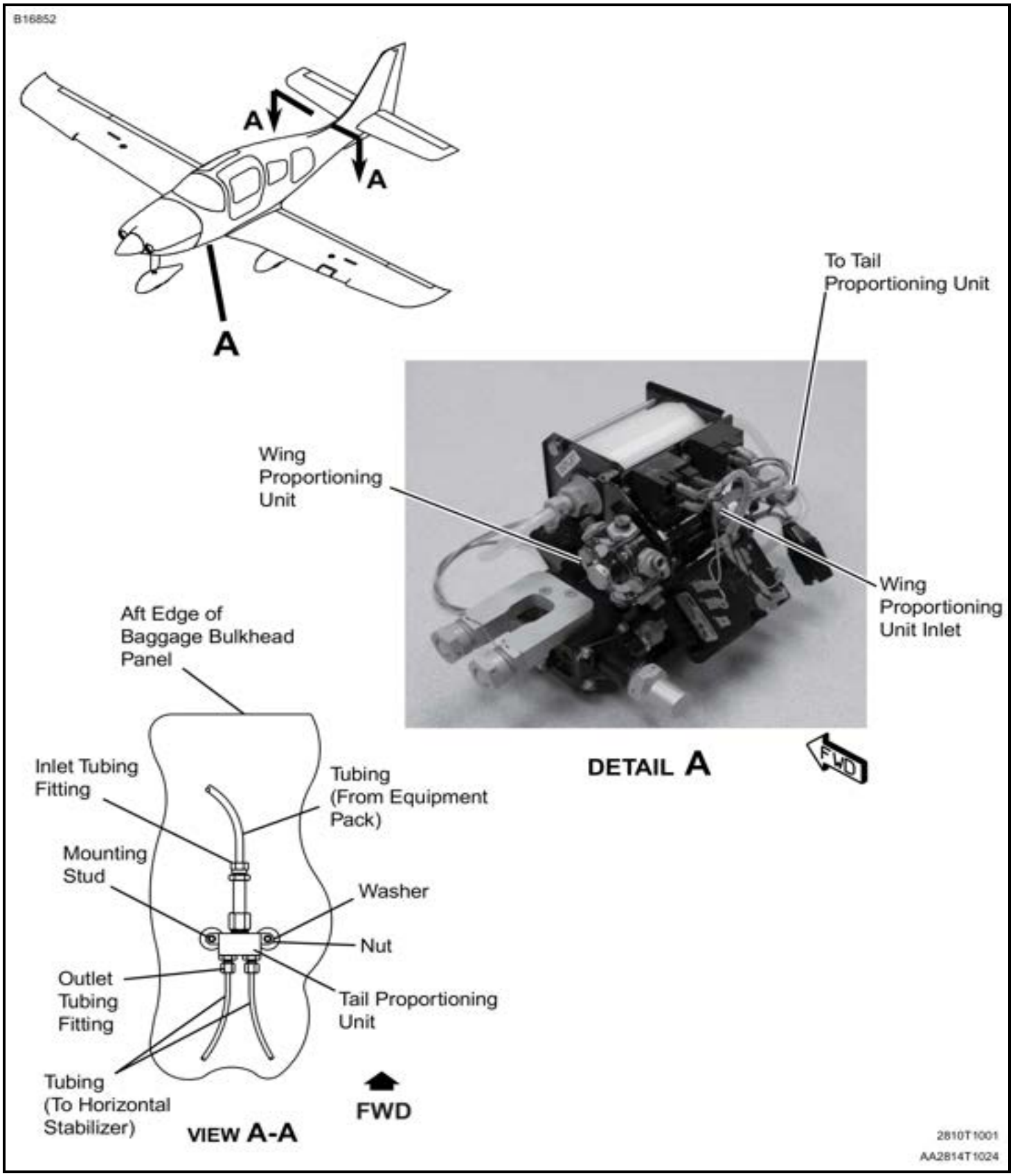
(11) Remove external electrical power from the airplane.

(12) Do a test of the horizontal stabilizer porous panels. Refer to TKS Anti-Ice System Leading Edge Porous Panel (Inadvertent) - Adjustment/Test.

(13) If necessary, do the fluid tank servicing. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid.

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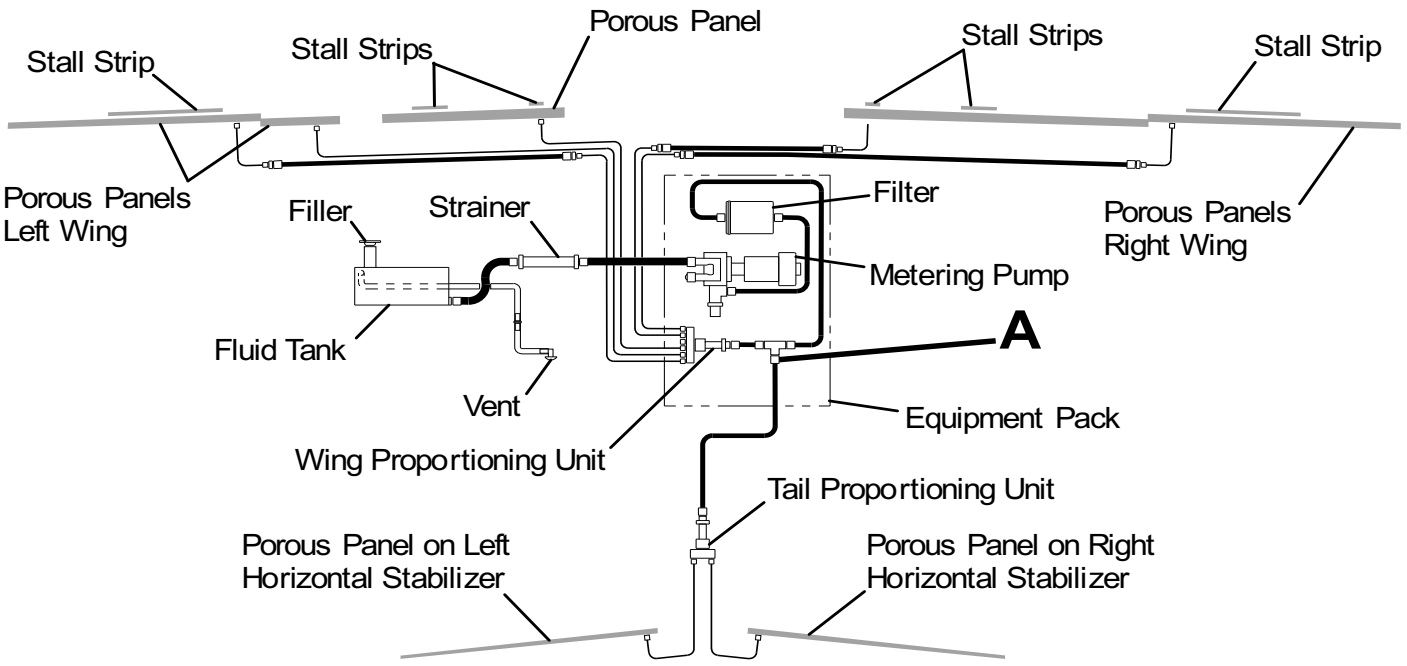
Figure 401 : Sheet 1 : Proportioning Unit Installation



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Figure 201 : Sheet 1 : TKS Nylon Tubing Installation

B16311



LEGEND	
	3/16 Inch O.D. Nylon
	5/16 Inch O.D. Nylon
	1/2 Inch O.D. Nylon
	13 mm O.D. PVC
	Porous Panels

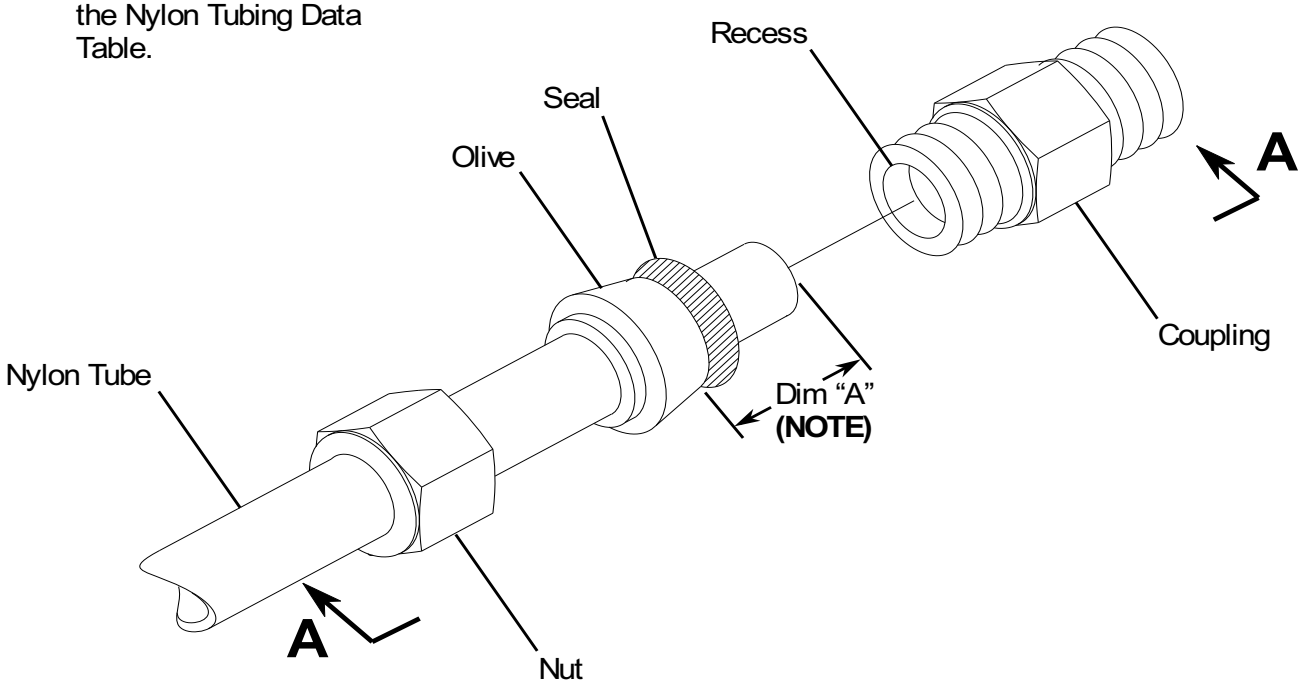
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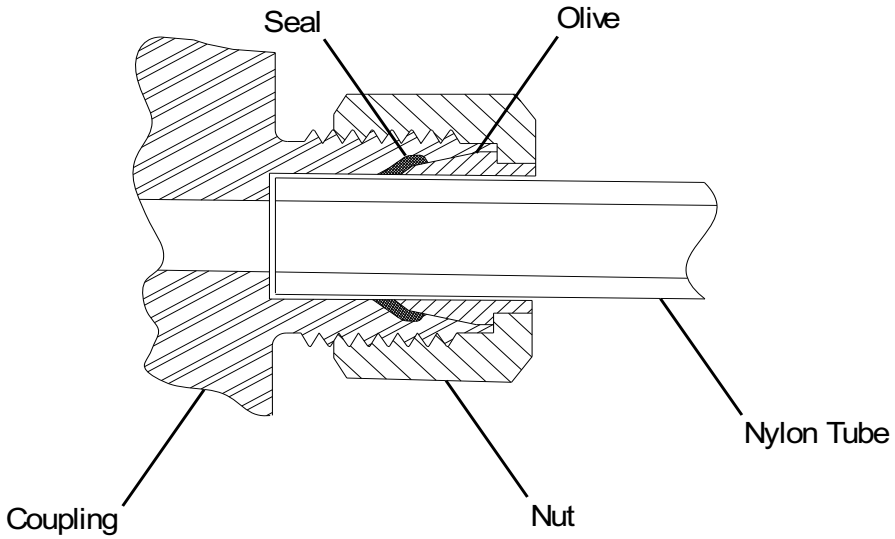
Figure 201 : Sheet 2 : TKS Nylon Tubing Installation

B16237

NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)



VIEW A-A

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TKS ANTI-ICE SYSTEM PROPORTIONING UNITS (INADVERTENT) - REMOVAL/INSTALLATION

1. General

A. This section contains the removal and installation procedures for the TKS Anti-Ice System (Inadvertent) proportioning units.

B. The wing proportioning unit is installed on the equipment pack. The tail proportioning unit is installed aft of the baggage compartment aft bulkhead panel.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. Wing Proportioning Unit Removal/Installation

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: You must loosen fluid line connections of the TKS anti-ice system slowly. It is possible that high pressure is still in the system. System pressure of 120 psi-gage is possible.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Do not use MEK, acetone, paint thinner, or similar chlorinated solvents on the porous panels. To prevent damage, only use water and detergent, isopropyl alcohol, and/or approved anti-ice fluid on the porous panel surfaces.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube coupling. Replace the 3/16-inch and 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube coupling. Examine the seal for damage and make sure that it is in the correct position in the coupling. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the coupling.

A. Remove the Wing Proportioning Unit (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) are in the OFF position.

(3) Disengage the TKS circuit breaker.

(4) Remove the equipment pack. Refer to TKS Anti-Ice System Equipment Pack (Inadvertent) - Removal/Installation.

(5) Remove the inlet tube from the proportioning unit.

(a) Remove the safety wire from the inlet tube fitting.

(b) Slowly loosen the inlet tube fitting and remove the inlet tube.

(c) Put a cap on the tube end to keep FOD out of the fluid system.

(d) Remove the seal from the inlet tube and discard. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.

(6) Remove the outlet tubes from the proportioning unit.

(a) Identify the each of the five outlet tubes and the fittings they attach to.

(b) Remove the safety wire from each of the outlet tube fittings.

(c) Slowly loosen and disconnect each of the outlet tubes.

(d) Remove each of the outlet tubes from the proportioning unit.

(e) Put caps on the outlet tube ends to keep FOD out of the fluid system.

(f) Remove the seals from the outlet tubes and discard. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.

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(7) Remove the two bolts and washers that attach the proportioning unit to the bracket on the equipment pack.
(8) Remove the grounding jumper from the bolt.
(9) Remove the proportioning unit from the equipment pack.
(10) Remove the nut and nylon ball from port four of the removed proportioning unit.

B. Install the Wing Proportioning Unit (Refer to Figure 401).
(1) Install the nylon ball and nut from the removed proportioning unit on port four of the new unit.
(2) Put the proportioning unit in its correct position on the bracket.
(3) Put the grounding jumper on the correct bolt to attach it to the bracket.
(4) Install the two bolts and washers that attach the proportioning unit to the bracket on the equipment pack.
(5) Attach the inlet tube to the proportioning unit.
(a) Remove the cap from the inlet tube.
(b) Install new seal on the inlet tube. Refer to TKS Anti-Ice System - Maintenance Practices, Figure 201.
1 Make sure that the seal touches the inlet tube olive.
(c) Put the inlet tube in its correct position on the proportioning unit inlet fitting.
(d) Carefully tighten the nut on the inlet tube fitting and safety with wire. Refer to Chapter 20, Safetying - Maintenance Practices.
(6) Attach the outlet tubes to the proportioning unit.
(a) Install new seals on the outlet tubes. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.
1 Make sure on each of the outlet tubes that the seal touches the outlet tube olive.
(b) Identify each of the five outlet tubes and put them in their correct position on the outlet fittings of the proportioning unit.
(c) Carefully tighten the nuts on the outlet tube fittings and safety with wire. Refer to Chapter 20, Safetying - Maintenance Practices.
(7) Install the equipment pack. Refer to TKS Anti-Ice System Equipment Pack (Inadvertent) - Removal/Installation
(8) Engage the TKS circuit breaker.
(9) Apply external electrical power on the airplane.
(10) Set the master BATT switches (left and right) and the AVIONICS MASTER switch to the ON position.
(11) Put the ANTI-ICE MAX/NORM switch (SI018) to the NORM position.
(a) Make sure that there is no fluid leakage from the proportioning unit fittings.
(12) Put the ANTI-ICE MAX/NORM switch to the OFF position.
(13) Set the master BATT switches (left and right) and the AVIONICS MASTER switch to the OFF position.
(14) Remove external electrical power from the airplane.
(15) Do a test of the wing porous panels. Refer to TKS Anti-Ice System Leading Edge Porous Panel (Inadvertent) - Adjustment/Test.
(16) If necessary, do the fluid tank servicing. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid.

4. Tail Proportioning Unit Removal/Installation

A. Remove the Tail Proportioning Unit (Refer to Figure 401).
(1) Remove external electrical power from the airplane.
(2) Make sure that the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) are in the OFF position.
(3) Disengage the TKS circuit breaker.
(4) Remove rear cabin access panels as necessary. Refer to Chapter 25, Access Panels - Maintenance Practices.
(5) Remove the inlet tube from the proportioning unit.
(a) Remove the safety wire from the inlet tube fitting.

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(b) Slowly loosen and disconnect the inlet tube fitting.

(c) Put a cap on the tube end to keep FOD out of the fluid system.

(d) Remove the seal from the inlet tube and discard. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.

(6) Remove the outlet tubes from the proportioning unit.

(a) Identify each of the two outlet tubes and the fittings they attach to.

(b) Slowly loosen and disconnect the outlet tubes.

(c) Remove the outlet tubes from the proportioning unit.

(d) Put caps on the outlet tubes ends to keep FOD out of the fluid system.

(e) Remove the seals from the outlet tube and discard. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.

(7) Remove the two nuts and washers that attach the proportioning unit to the mounting studs.

(8) Remove the proportioning unit from the airplane.

B. Install the Tail Proportioning Unit (Refer to Figure 401).

(1) Put the proportioning unit in its correct position on the mounting studs.

(a) Install the two nuts and washers that attach the proportioning unit to the mounting studs.

(2) Attach the outlet tubes to the proportioning unit.

(a) Remove the caps from the outlet tubes.

(b) Install new seals on each of the two outlet tubes. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.

1 Make sure on each of the outlet tubes that the seal touches the outlet tube olive.

(c) Identify each of the two the outlet tubes and put them in their correct position on the outlet fittings of the proportioning unit.

(d) Tighten the nuts on the outlet tube fittings and safety with wire. Refer to Chapter 20, Safetying - Maintenance Practices.

(3) Attach the inlet tube to the proportioning unit.

(a) Install a new seal on the inlet tube. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.

1 Make sure that the seal touches the inlet tube olive.

(b) Put the inlet tube in its correct position on the proportioning unit inlet fitting.

(c) Tighten the nut on the inlet tube fitting and safety with wire. Refer to Chapter 20, Safetying - Maintenance Practices.

(4) Engage the TKS circuit breaker.

(5) Put external electrical power on the airplane.

(6) Set the master BATT switches (left and right) and the AVIONICS MASTER switch to the ON position.

(7) Put the ANTI-ICE MAX/NORM switch to the NORM position.

(a) Make sure that there is no fluid leakage from the proportioning unit fittings.

(8) Installed removed rear cabin access panels as necessary. Refer to Chapter 25, Access Panels - Maintenance Practices.

(9) Put the ANTI-ICE MAX/NORM switch to the OFF position.

(10) Set the master BATT switches (left and right) and the AVIONICS MASTER switch to the OFF position.

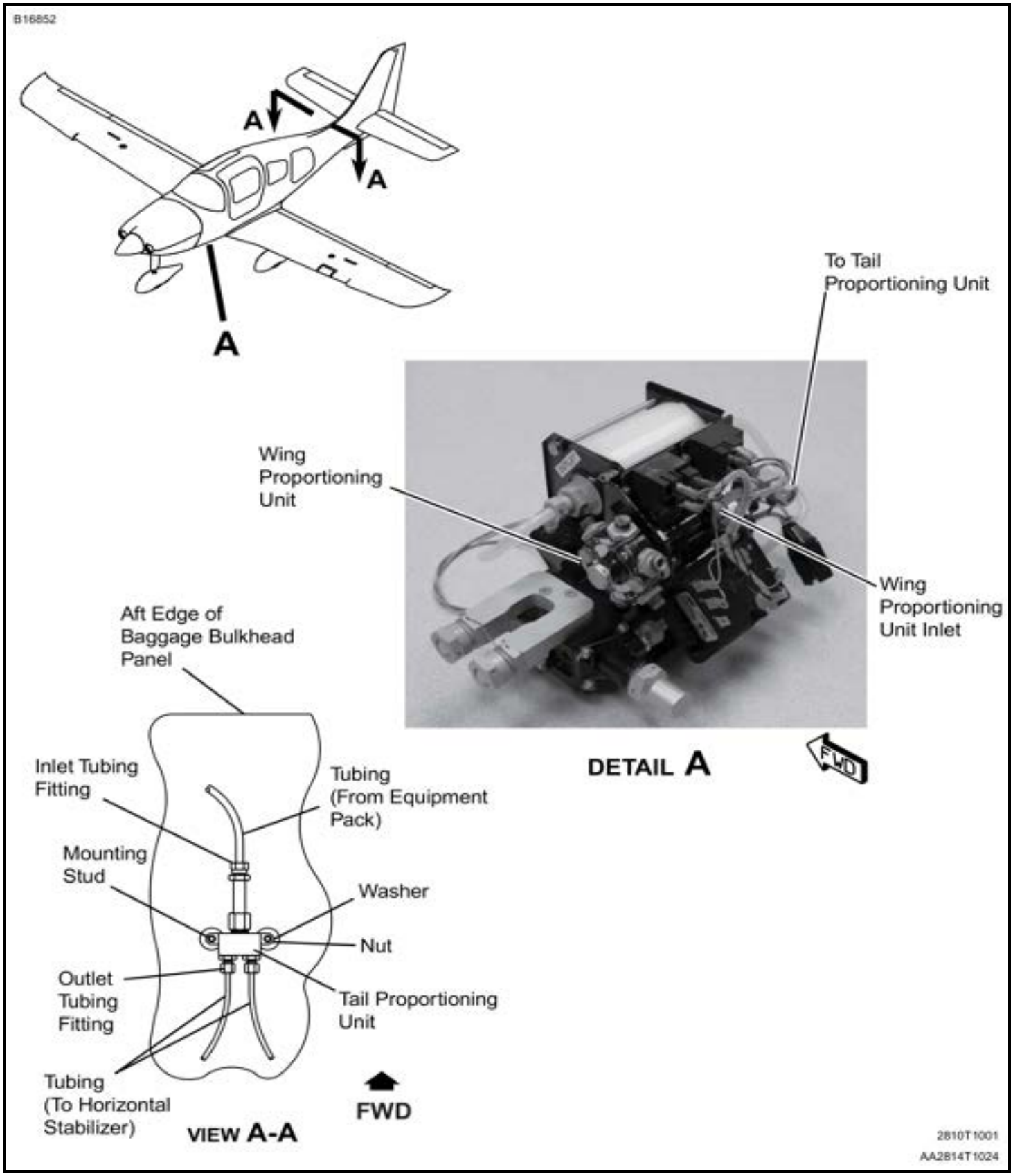
(11) Remove external electrical power from the airplane.

(12) Do a test of the horizontal stabilizer porous panels. Refer to TKS Anti-Ice System Leading Edge Porous Panel (Inadvertent) - Adjustment/Test.

(13) If necessary, do the fluid tank servicing. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid.

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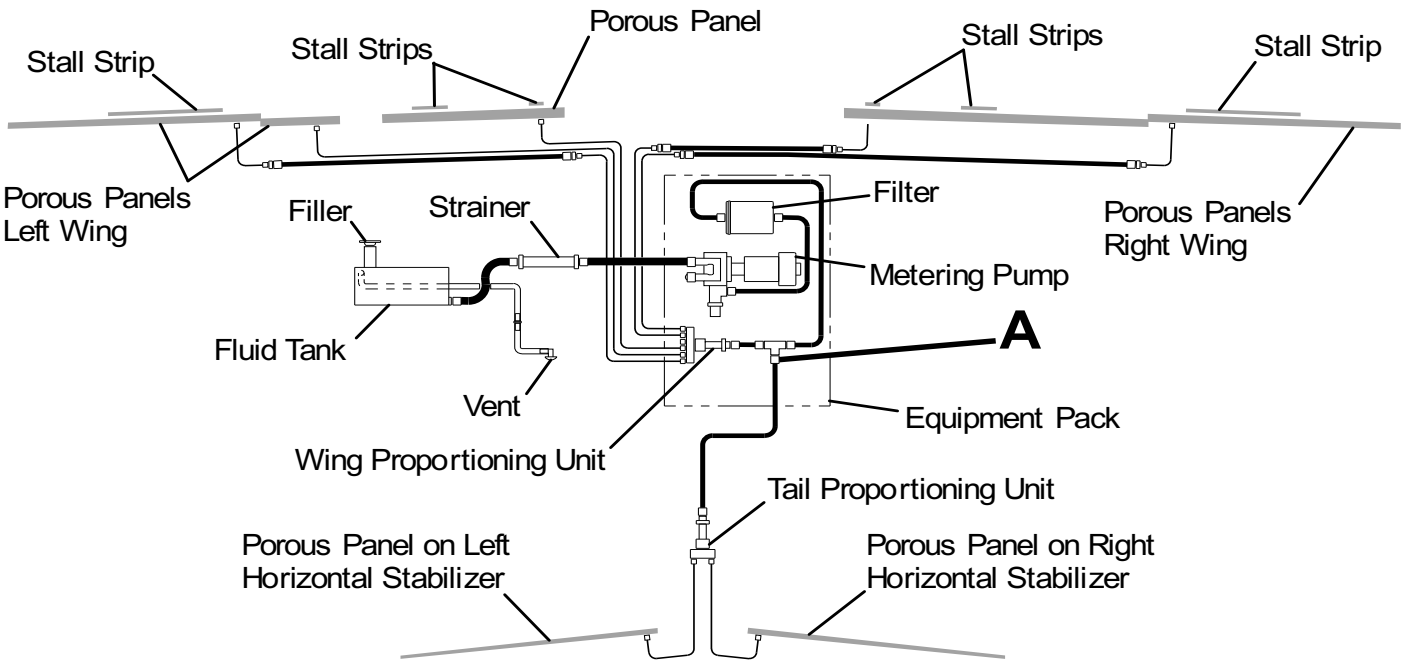
Figure 401 : Sheet 1 : Proportioning Unit Installation



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Figure 201 : Sheet 1 : TKS Nylon Tubing Installation

B16311



LEGEND	
	3/16 Inch O.D. Nylon
	5/16 Inch O.D. Nylon
	1/2 Inch O.D. Nylon
	13 mm O.D. PVC
	Porous Panels

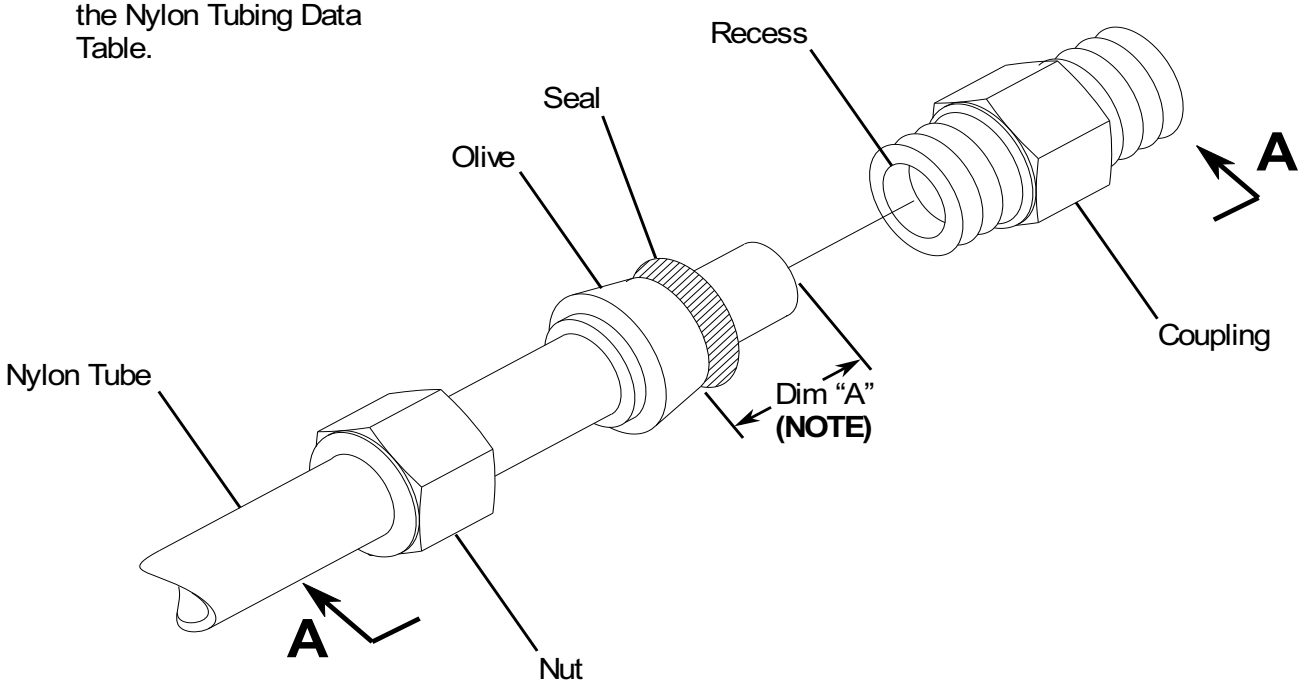
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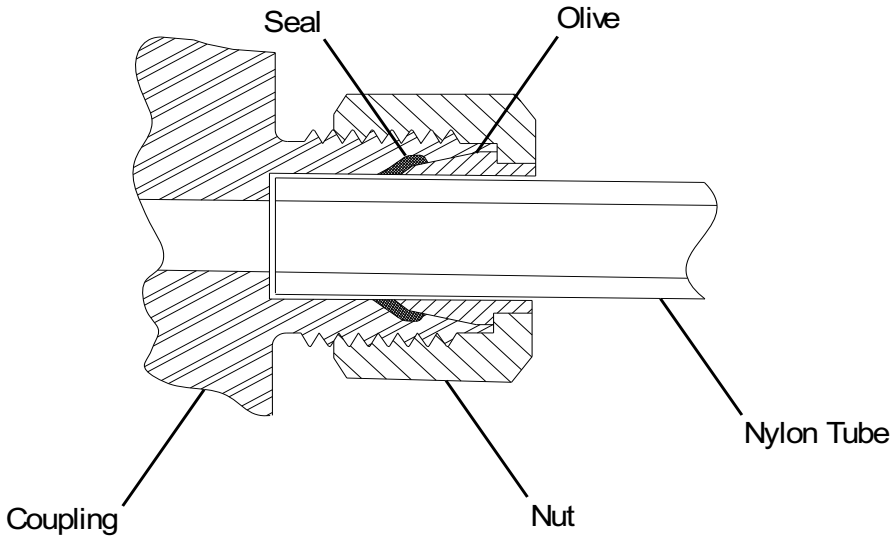
Figure 201 : Sheet 2 : TKS Nylon Tubing Installation

B16237

NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)



VIEW A-A

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TKS ANTI-ICE SYSTEM FILTER ELEMENT (INADVERTENT) - REMOVAL/INSTALLATION

1. General

A. This section contains the removal and installation procedures for the TKS Anti-Ice System (Inadvertent) Filter Element.

B. The TKS Anti-Ice System Equipment Pack must be removed to remove and replace the filter.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. Filter Element Removal/Installation

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: You must loosen fluid line connections of the TKS anti-ice system slowly. It is possible that high pressure is still in the system. System pressure of 120 psi-gage is possible.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Do not use MEK, acetone, paint thinner, or similar chlorinated solvents on the porous panels. To prevent damage, only use water and detergent, isopropyl alcohol, and/or approved anti-ice fluid on the porous panel surfaces.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube coupling. Replace the 3/16-inch and 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube coupling. Examine the seal for damage and make sure that it is in the correct position in the coupling. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the coupling.

NOTE: You can fabricate a fluid collector system and install it on and below the porous panels, which will contain the fluid and keep it off the floor. Recommended materials you can use are plastic sheets, tubing, aluminum tape, and rigid aluminum and/or plastic gutter material.

A. Remove the Filter Element (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Disengage the TKS circuit breaker.

(5) Remove the equipment pack. Refer to TKS Anti-Ice System Equipment Pack (Inadvertent) - Removal/Installation.

(6) Remove the filter outlet tube.

(a) Remove the safety wire from the outlet tube nut.

(b) Loosen the outlet tube nut and remove the tube.

(c) Remove and discard the old seal from the outlet tube.

(d) Put caps on all openings and tube ends to keep FOD out of the fluid system.

(7) Remove the filter inlet tube.

(a) Remove the safety wire from the input tube nut.

(b) Loosen the inlet tube nut and remove the tube.

(c) Remove and discard the old seal from the inlet tube.

(d) Put caps on all openings and tube ends to keep FOD out of the fluid system.

(8) Remove the nut and washer that attaches the hose clamp to the inlet bracket.

(9) Remove the four bolts, washers, two lock wire tabs, and remaining three nuts from the filter brackets.

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(10) Remove the two bolts, and washers that attach the outlet bracket to the equipment pack.

NOTE: For correct installation later identify and record the flow direction of the filter.

(11) Remove the filter from the input filter bracket.

(12) Use the correct procedure to discard the old filter element.

B. Install the Filter Element (Refer to Figure 401).

(1) Put the filter in its correct position in the inlet filter bracket.

(a) Make sure the filter bleed valve is installed in the upper hole on the inlet side of the bracket.

(2) Put the outlet filter bracket in its correct position on the equipment pack.

(3) Make sure the bonding strap is on the correct bolt.

(4) Install the two bolts and washers that attach the outlet filter bracket to the equipment pack.

(5) Install the four bolts and washers in the outlet bracket.

(6) Put the hose clamp on the correct bracket bolt.

(7) Install the washers, nuts, and the two lock wire tabs on the filter bracket bolts.

(8) Attach the filter inlet tube.

(a) Remove the cap from the inlet tube.

(b) Install a new seal on the input tube. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.

(c) Put the inlet tube on the filter inlet fitting.

(d) Carefully tighten the inlet tube nut and safety with wire. Refer to Chapter 20, Safetying - Maintenance Practices.

(9) Attach the filter outlet tube.

(a) Remove the cap from the outlet tube.

(b) Install a new seal on the outlet tube. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.

(c) Put the outlet tube on the filter outlet fitting.

(d) Carefully tighten the outlet tube nut and safety with wire. Refer to Chapter 20, Safetying - Maintenance Practices.

(10) Install the equipment pack. Refer to TKS Anti-Ice System Equipment Pack (Inadvertent) - Removal/Installation.

(11) Do the fluid tank servicing as necessary. Refer to Chapter 12, TKS Anti-Ice System - Servicing.

(12) Install a fluid collector system on the airplane.

(13) Apply external electrical power on the airplane.

(14) Set the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) to the ON position.

(15) Engage the TKS circuit breaker.

(16) Put the ANTI-ICE MAX/NORM switch (SI018) to the NORM position.

(a) Make sure that there is no fluid leakage from the filter fittings.

(17) Do the fluid tank servicing as necessary. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid (Inadvertent).

(18) Put the ANTI-ICE MAX/NORM switch to the OFF position.

(19) Set the master BATT switches (left and right) and the AVIONICS MASTER switch to the OFF position.

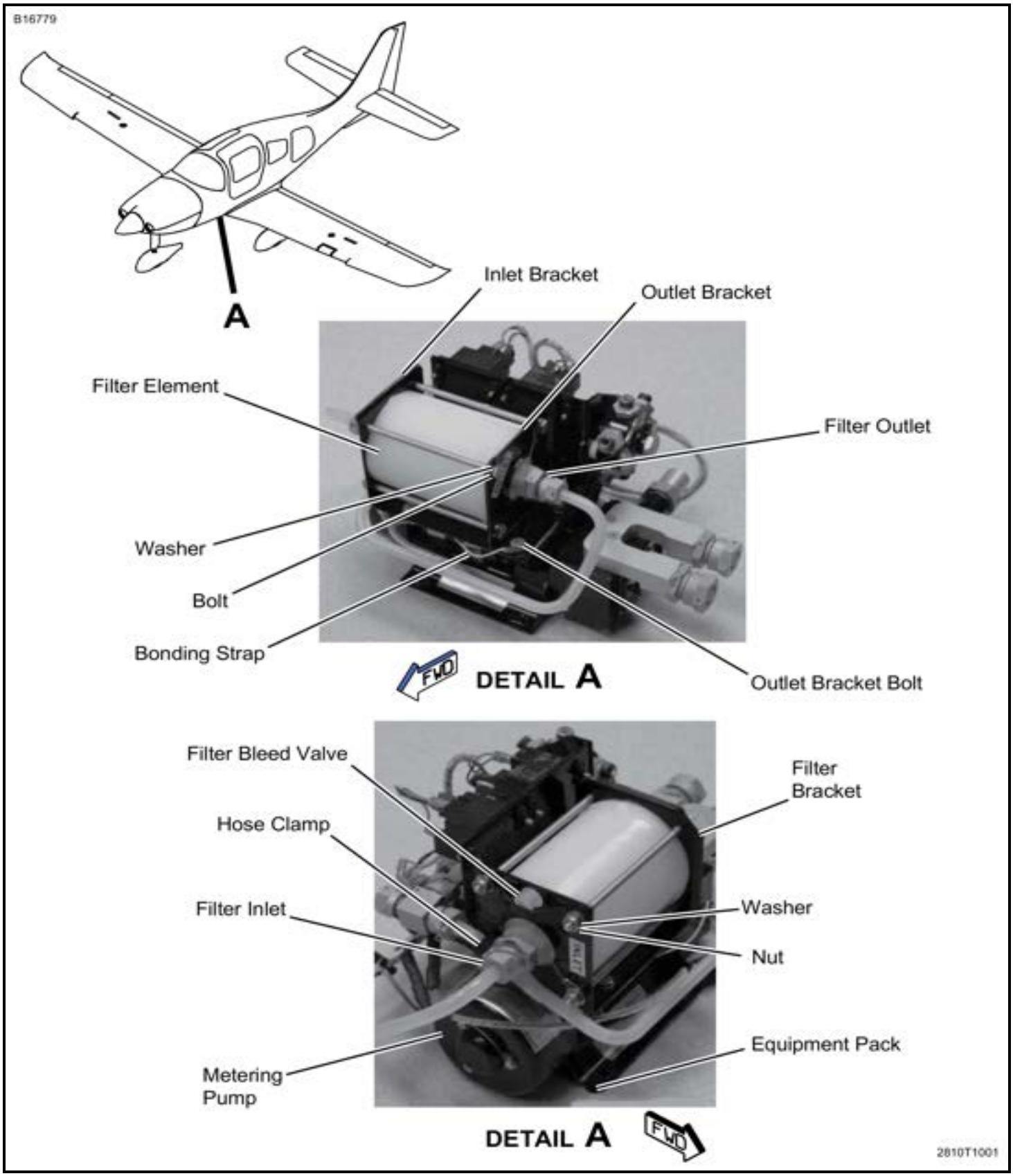
(20) Remove external electrical power from the airplane.

(21) If necessary, remove the fluid collector system from the airplane.

(22) Clean the floor and the airplane surfaces as necessary.

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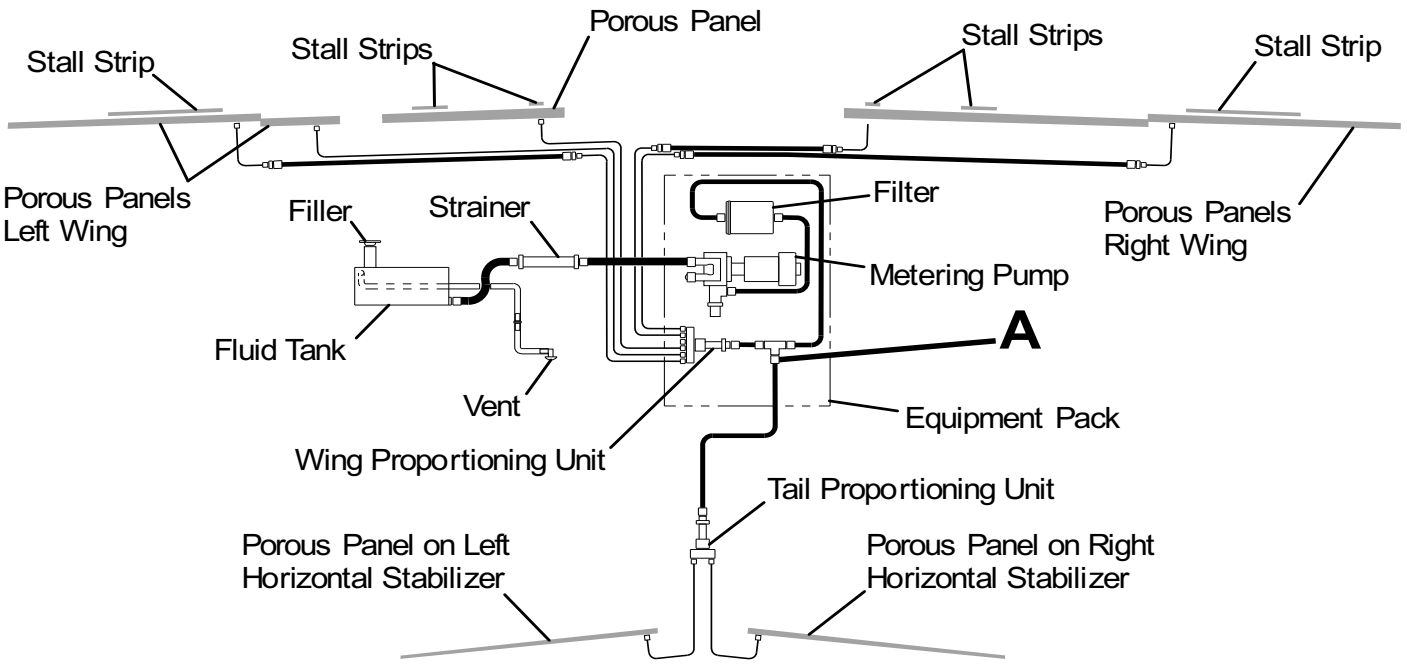
Figure 401 : Sheet 1 : Filter Element Installation



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Figure 201 : Sheet 1 : TKS Nylon Tubing Installation

B16311



LEGEND	
	3/16 Inch O.D. Nylon
	5/16 Inch O.D. Nylon
	1/2 Inch O.D. Nylon
	13 mm O.D. PVC
	Porous Panels

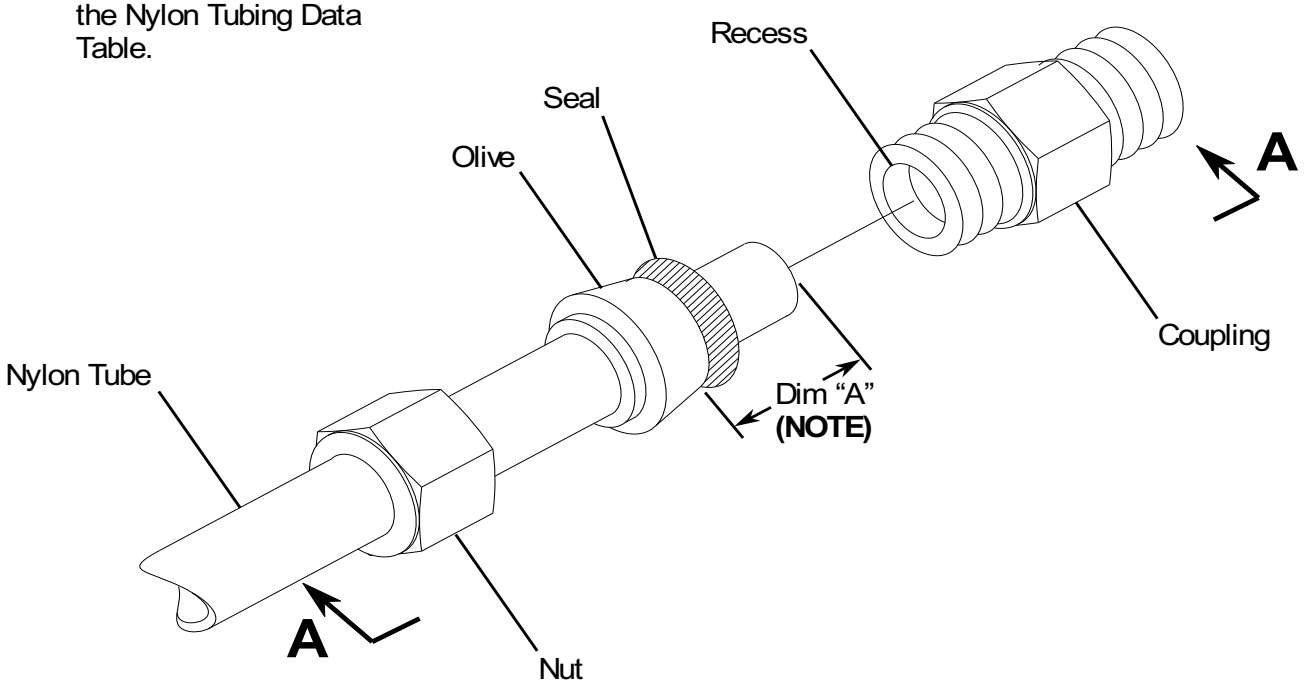
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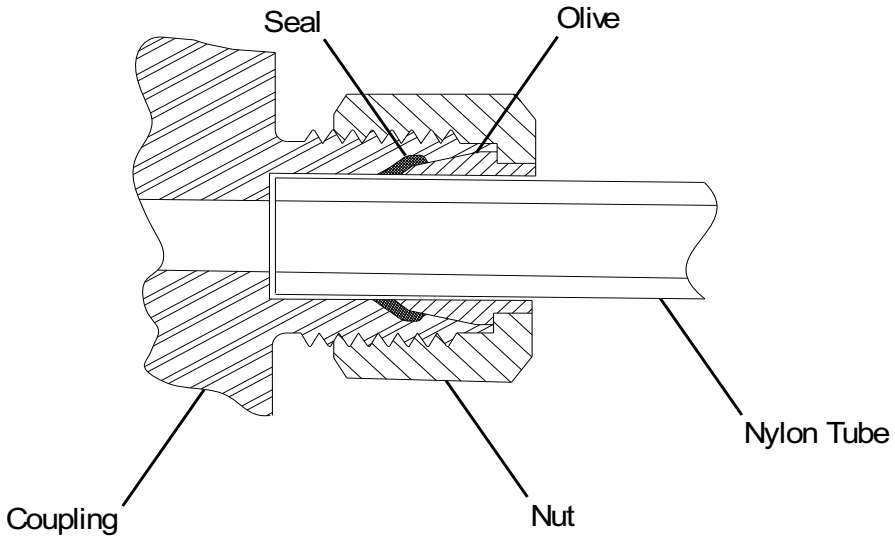
Figure 201 : Sheet 2 : TKS Nylon Tubing Installation

B16237

NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)



VIEW A-A

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AA2678T1003

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TKS ANTI-ICE SYSTEM TIMER (INADVERTENT) - REMOVAL/INSTALLATION

1. General

A. This section contains the removal and installation procedures for the TKS Anti-Ice System (Inadvertent) timer.

B. The TKS anti-ice system equipment pack must be removed from the airplane to remove and replace the timer.

2. Tools and Equipment

A. None.

3. TKS Timer Removal/Installation

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: You must loosen fluid line connections of the TKS anti-ice system slowly. It is possible that high pressure is still in the system. System pressure of 120 psi-gage is possible.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Before you operate the TKS system during this procedure put plastic sheets or absorbent cloths under the porous panels to keep the TKS fluid off the floor. This will help to prevent injury to personnel.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube nut. Replace the 3/16-inch and 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube fitting. Examine the seal for damage and make sure that it is in the correct position in the fitting. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the fitting.

A. Remove the TKS Timer (UF100) (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) and the AVIONICS MASTER switch (SW04) are in the OFF position.

(3) Disengage the TKS circuit breaker.

(4) Remove the equipment pack. Refer to TKS Anti-Ice System Equipment Pack (Inadvertent) - Removal/Installation.

(5) Identify and disconnect the electrical wiring connectors from the timer.

(6) Remove the bolts, nuts and washers that attaches the timer to the equipment pack.

(7) Remove the grounding jumper from the bolt.

(8) Remove the timer from the equipment pack.

B. Install the TKS Timer (UF100) (Refer to Figure 401).

(1) Put the timer in its correct position on the equipment pack.

(2) Put the grounding jumper on the correct bolt to attach it to the bracket.

(3) Install the bolts, nuts, and washers that attach the timer to the equipment pack.

(a) Make sure that there is a good electrical bond.

(4) Identify and connect the electrical wiring connectors to the timer.

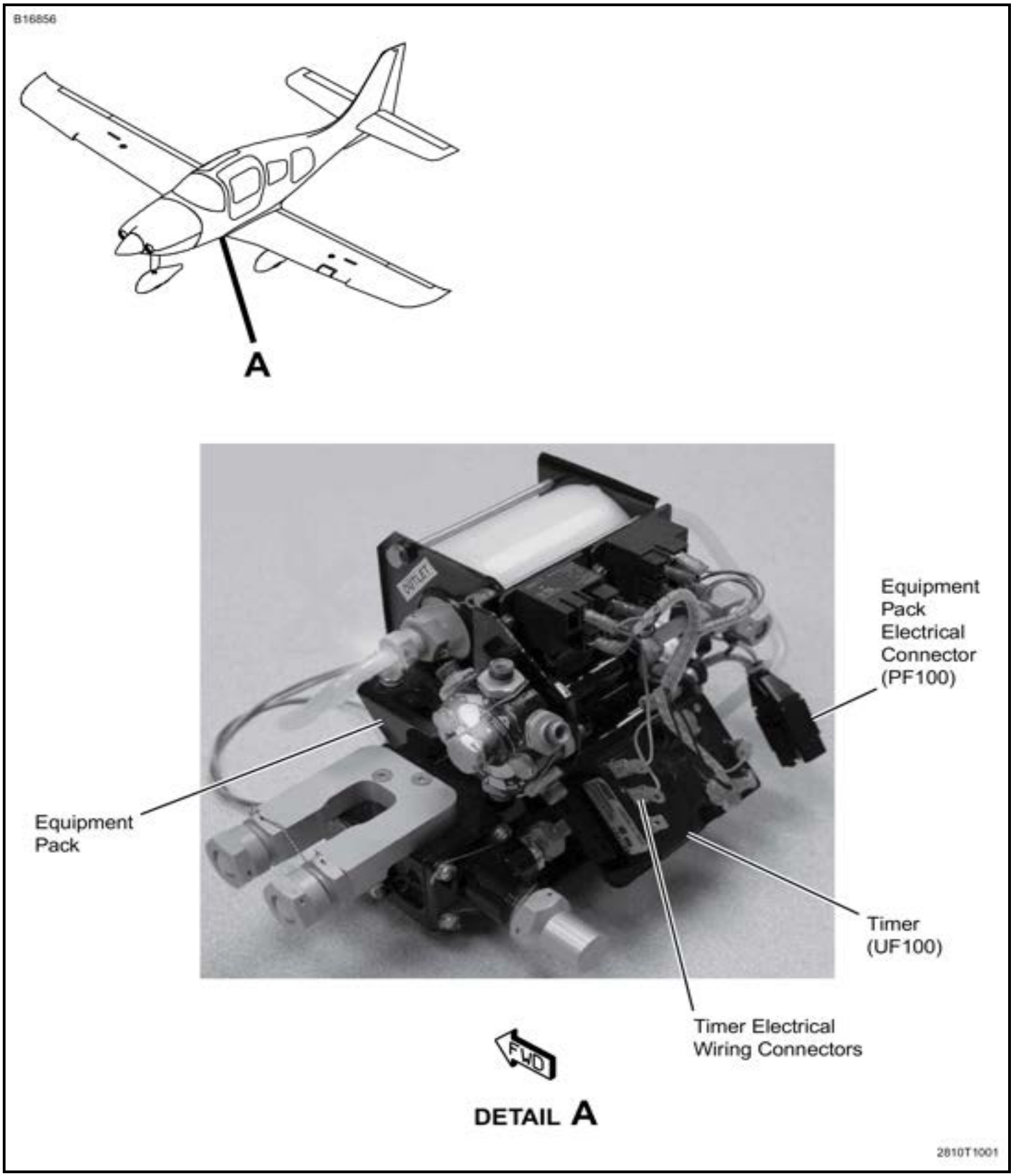
(5) Install the equipment pack. Refer to TKS Anti-Ice System Equipment Pack (Inadvertent) - Removal/Installation.

(6) Engage the TKS circuit breaker.

(7) Do a test of the timer. Refer to TKS Anti-Ice System (Inadvertent) - Adjustment/Test, TKS Anti-Ice System Operational Test.

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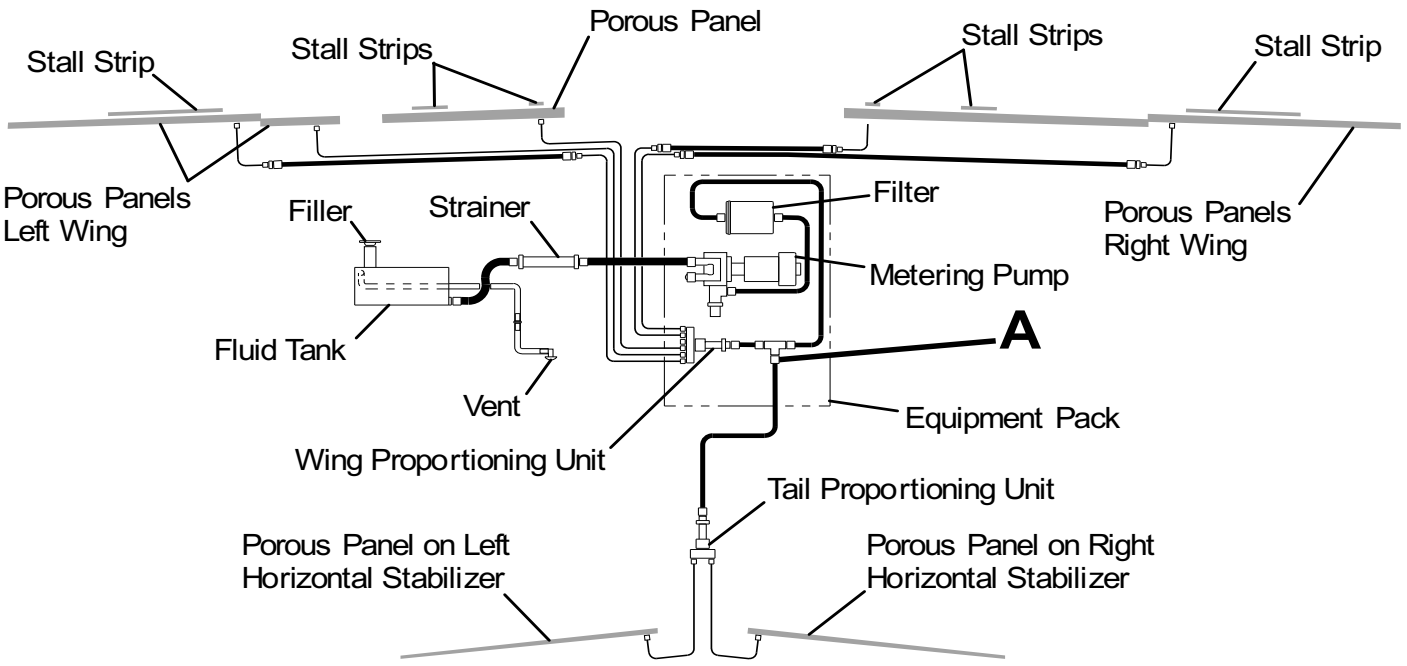
Figure 401 : Sheet 1 : TKS Timer Installation



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Figure 201 : Sheet 1 : TKS Nylon Tubing Installation

B16311



LEGEND	
	3/16 Inch O.D. Nylon
	5/16 Inch O.D. Nylon
	1/2 Inch O.D. Nylon
	13 mm O.D. PVC
	Porous Panels

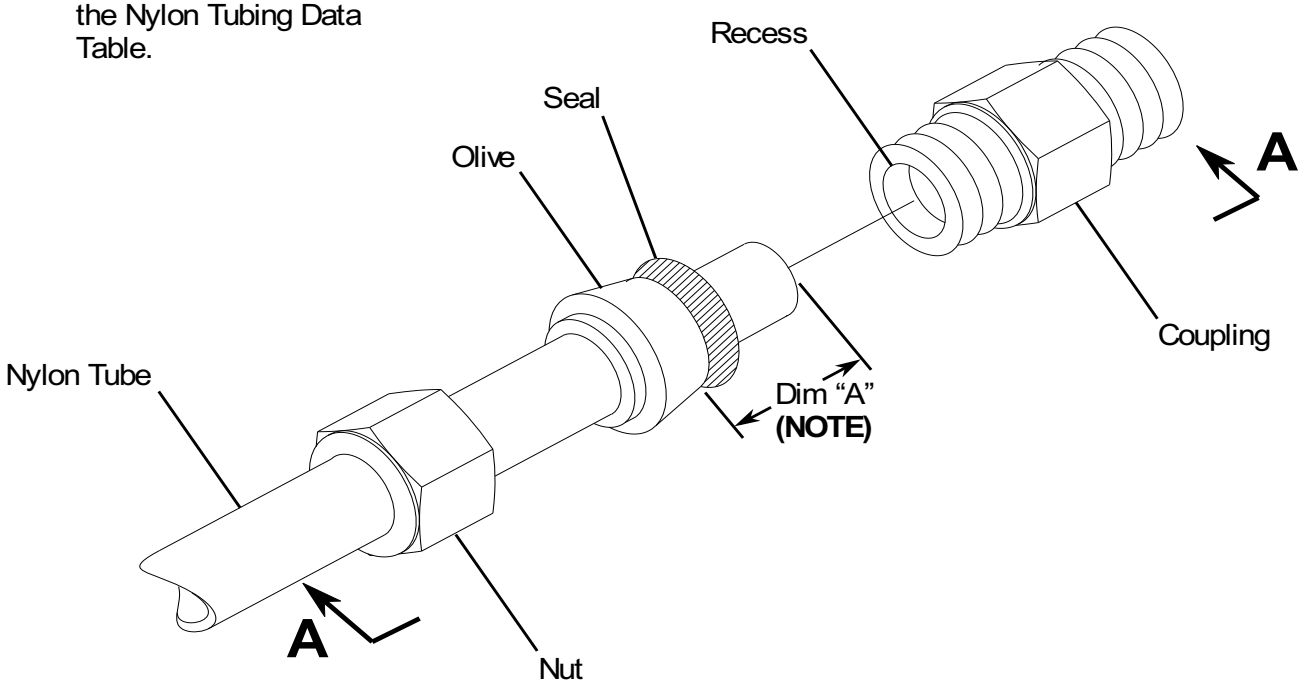
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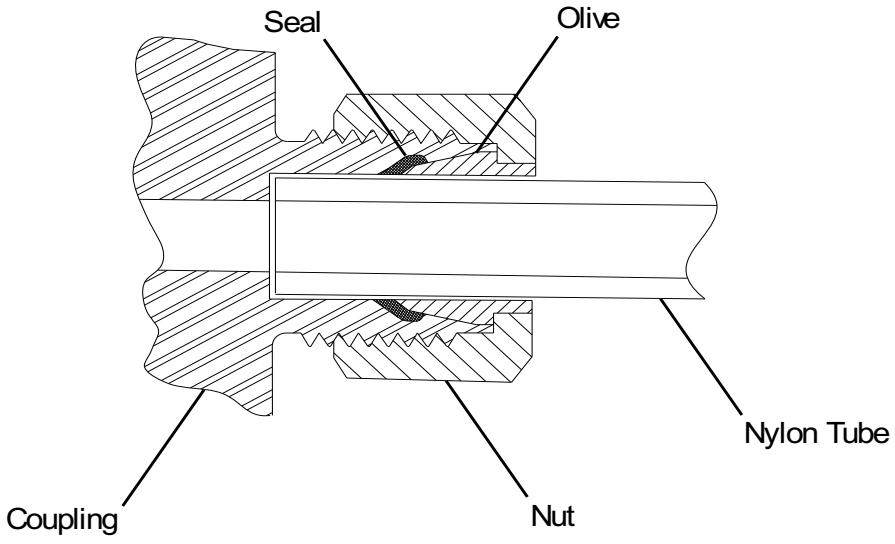
Figure 201 : Sheet 2 : TKS Nylon Tubing Installation

B16237

NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)



VIEW A-A

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TKS ANTI-ICE SYSTEM LEADING EDGE POROUS PANEL (INADVERTENT) - REMOVAL/INSTALLATION

1. General

A. This section contains the removal and installation procedures for the TKS Anti-Ice System (Inadvertent) porous panels, which include the wing and horizontal stabilizer leading edges. The sealing procedures for the porous panels are also included in this section.

B. After a porous panel is replaced, it is necessary to do the purge and test procedures. Those procedures are in TKS Anti-Ice System Leading Edge Porous Panel - Adjustment/Test.

2. Tools, Equipment, and Materials

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. Porous Panel Removal/Installation

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: You must loosen fluid line connections of the TKS anti-ice system slowly. It is possible that high pressure is still in the system. System pressure of 120 psi-gage is possible.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Do not use MEK, acetone, paint thinner, or similar chlorinated solvents on the porous panels. To prevent damage, only use water and detergent, isopropyl alcohol, and/or approved anti-ice fluid on the porous panel surfaces.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube coupling. Replace the 3/16-inch and 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube coupling. Examine the seal for damage and make sure that it is in the correct position in the coupling. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the coupling.

CAUTION: After you remove and before you install a porous panel, apply low-adhesive tape on the panel to give it protection.

CAUTION: Before you remove or install a porous panel, apply low-adhesive tape on the skin adjacent to the panel to give the skin protection.

CAUTION: Be careful when you remove and install the porous panels. The panels are easily damaged. Use nonmetallic tools, if possible, to prevent tears, gouges, scratches, and other damage.

A. Remove the Porous Panel (Refer to Figure 401).

NOTE: The panel purge and test procedures are only necessary after you install a replacement porous panel.

NOTE: The removal and installation of the porous panels on the wing and horizontal stabilizer leading edges are typical.

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Disengage the TKS circuit breaker.

CAUTION: Before you remove or install a porous panel, apply low-adhesive tape on the skin adjacent to the panel to give the skin protection.

(5) Remove the porous panel from the wing.

(a) Apply tape on the leading edge next to the sealant along the panel edges.

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NOTE: The tape is used as a guide to where the new sealant needs to be applied.

(b) Remove the rivets that attach the panel to the leading edge.

(c) Carefully remove the sealant along the panel edges.

NOTE: If necessary use a sharpened putty knife to remove the sealant. Be careful to not damage the paint or wing surface.

(d) Carefully use a flexible-blade knife (putty knife) and your hands to pull the panel away from the leading edge.

CAUTION: While pulling the panel away from the leading edge, be careful not to damage the leading edge by prying against it.

(e) Carefully remove the panel from the leading edge sufficiently to access the fluid tubing fitting.

(6) Disconnect the TKS fluid tube.

(a) Remove safety wire from the tube fitting nut.

(b) Loosen the tube fitting nut.

(c) Remove the TKS fluid tubes from the porous panel fittings.

(d) Remove and discard the seals from the porous panel inlet tubes. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.

(e) Install caps on all tube ends to keep FOD out of the TKS system.

(7) Remove the porous panel form the airplane.

(8) Remove all remaining sealant from the leading edge.

(a) Use a plastic or phenolic scraper to remove cured sealant from the leading edge surface.

(b) Use medium or finer ScotchBrite scuff pad to remove the sealant not removed with the scraper.

(c) Clean the leading edge with isopropyl alcohol or other approved cleaner.

(9) If necessary, paint the leading edge. Refer to Chapter 51, Paint Repair and Painting - Maintenance Practices.

B. Install the Porous Panel (Refer to Figure 401).

NOTE: For some airplanes the left wing inboard panel can have the panel installed over (around) the lift detector. To fit the panel around the lift detector, it is necessary to cut an opening in the outboard part of the porous panel that is not TKS functional. You must trim the panel to make sure that there is a flush fit around the lift detector. Use the removed panel as a pattern for the opening. For airplanes where the lift detector is installed more outboard on the wing (closer to the landing light installation), the porous panel is not installed with this procedure. For this installation you must trim the entire outboard edge of the panel to make sure that it does not touch the lift detector.

(1) To prepare the panel bonding surfaces for installation do the steps that follow:

(a) Use isopropyl alcohol to clean and degrease the bonding surfaces of the panels and leading edges.

(b) In areas where the TKS panels will be installed, use a ScotchBrite scuff pad to lightly abrade the airplane leading edges.

(c) Use isopropyl alcohol and a sponge, or a short-bristle brush, to scrub the area of the leading edge where the panel will be installed.

1 Use a clean, lint-free cloth to dry the area before the cleaning solution evaporates.

2 Use a clean, lint-free cloth wet with isopropyl alcohol to do this step again.

(d) Use a clean, lint-free cloth wet with isopropyl alcohol and a ScotchBrite scuff pad to clean the aft surface of the TKS panel.

1 Use a clean, lint-free cloth to remove the debris and contaminants from the surface of the panel.

(e) Use a clean, lint-free cloth wet with isopropyl alcohol to clean the panel in approximately 12 to 15 inch sections again.

1 Immediately use a clean, lint-free cloth to dry each section before the isopropyl alcohol evaporates.

(f) Use a clean, white, lint-free cloth to wipe the surface of the panel.

1 Examine the cloth for indications of debris or contaminants.

2 If the cloths shows indications of debris or contaminants, do again the panel cleaning steps above.

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(2) Put the panel in its correct position on the leading edge.

(3) Use your hand to install the panel in its correct position on the leading edge.

(a) If necessary, close or open the panel to get the correct installation of the leading edge.

(4) Drill the rivet holes at the lower surface corners of the porous panel to match the existing hole locations on the leading edge.

(a) Remove panel and deburr the holes.

(5) Install the fluid tubing to the porous panel.

(a) Remove the caps from the tube ends.

(b) Install new seals in the tubing ends. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201.

(c) Hold the panel in position near the leading edge and put the tubing on the panel fitting.

1 Turn the nut with your fingers until it is tight.

2 Continue to tighten the nut with a wrench approximately 180 degrees more and safety with wire.

(d) Apply U470592 Type I B-2 sealant to each tube connection hole and air bleed check valve.

(e) Apply sealant to the fluid tube fitting threads, nut and tubing for a minimum of 0.50 inch past the fitting nut.

(6) Install the porous panel to the wing.

(a) Apply a 0.375 inch bead of U470592 Type I B-2 adhesive to the back surface edges of the panel.

(b) Align the panel to the correct position.

(c) Push the panel against the leading edge with enough pressure to cause the sealant to squeeze out along the edges.

(d) Make sure that the panels fit closely around the leading edge with the top and bottom of the panel in light contact with the skin.

NOTE: Panels can be squeezed closed or opened slightly for best fit.

(e) Install temporary fasteners to hold the panel in position.

CAUTION: To spread the load where ratcheting straps are used, use metal angles to protect the trailing edge. Place blankets or foam between the metal angles and the trailing edge. Do not use too much force when you tighten the straps.

(f) Keep applying pressure until the tape strips or ratcheting straps are applied to hold the panel in position.

1 Make sure that the panel edges are against the leading edge skin.

(g) After the sealant is cured, remove all tape and ratcheting straps.

(h) Install the rivets that attach the panel to the leading edge.

1 Examine the rivet heads for correct installation.

(i) Use U470638 Type I, Class B 1/2 sealant to fillet seal and fair around all panel edges.

(7) Do a leak check of the porous panels. Do the procedures that follow:

(a) Apply external electrical power to the airplane.

(b) Set the master BATT switches (left SW01 and right SW02) switches and AVIONICS MASTER switch (SW04) to the ON position.

(c) Engage the TKS circuit breaker.

(d) Put the ANTI-ICE MAX/NORM switch to the NORM position.

1 Make sure that there is no fluid leakage from the couplings.

(e) Set the ANTI-ICE MAX/NORM switch to the OFF position.

(f) Set the master BATT (left and right) switches and AVIONICS MASTER switch to the OFF position.

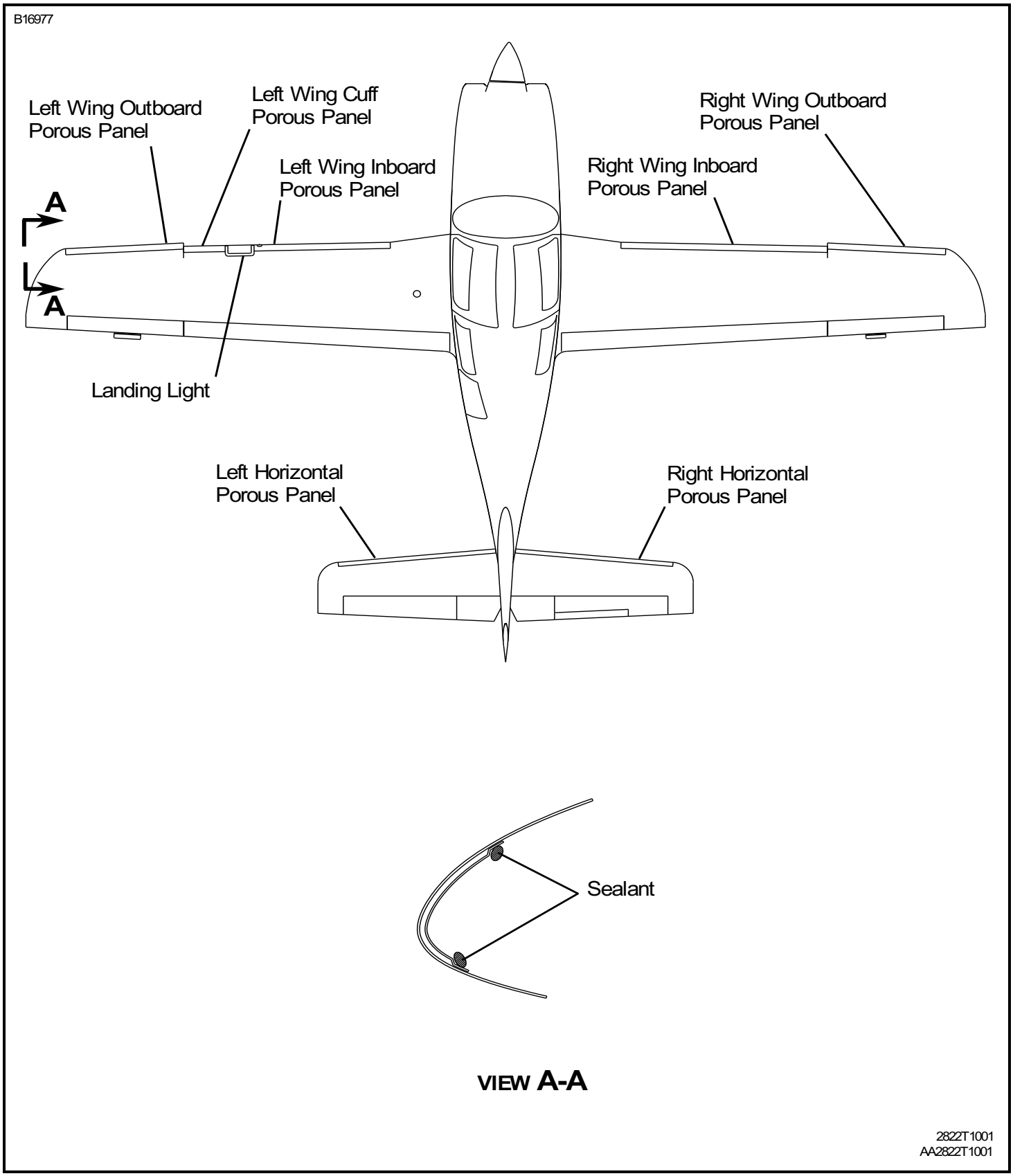
(8) Remove external electrical power from the airplane.

(9) Do the panel purge and test procedures. Refer to TKS Anti-Ice Leading Edge Porous Panel (Inadvertent) - Adjustment/Test.

(10) Clean the floor and the airplane surfaces as necessary.

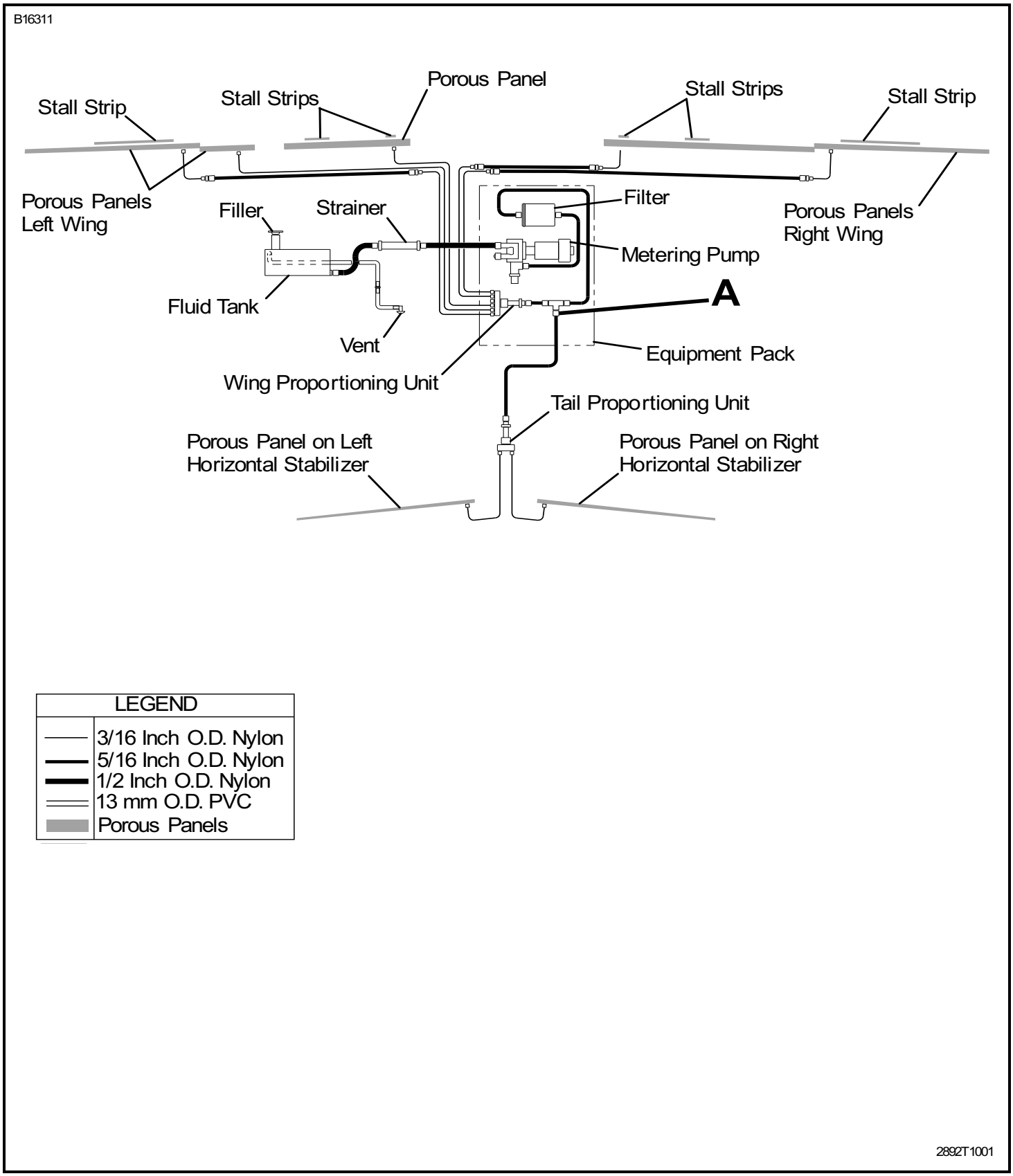
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Figure 401 : Sheet 1 : TKS Porous Panel Installation



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Figure 201 : Sheet 1 : TKS Nylon Tubing Installation

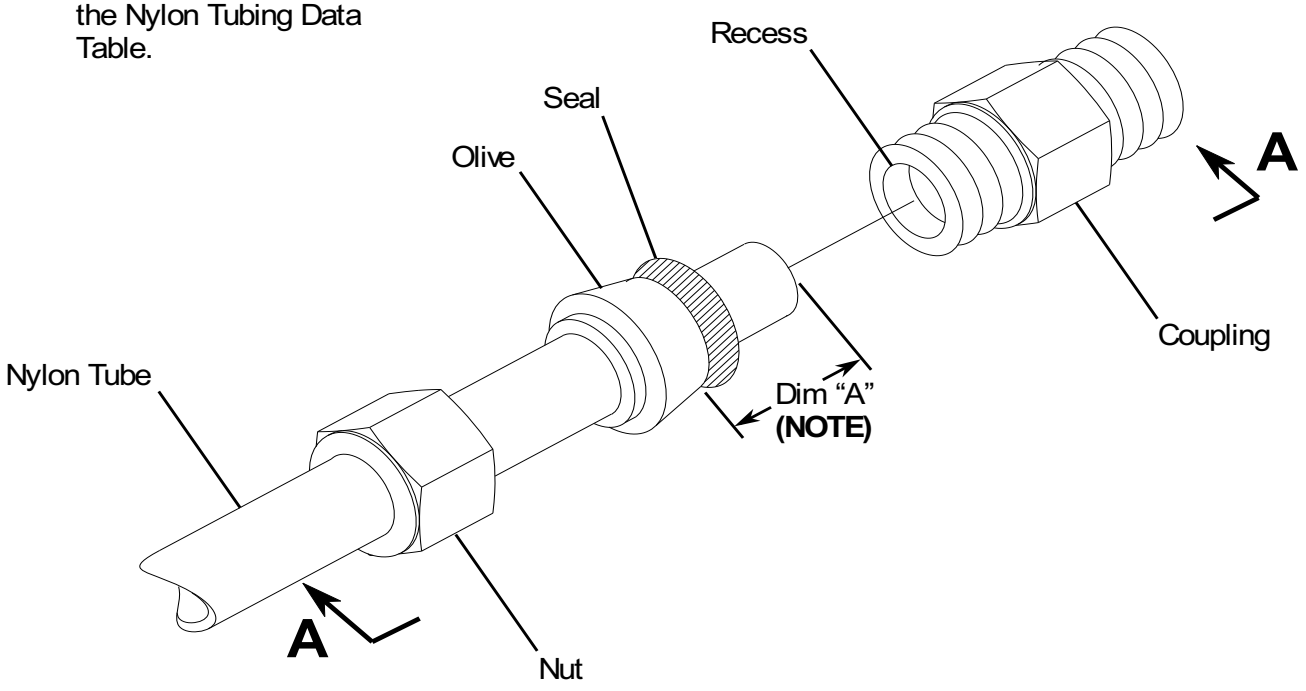


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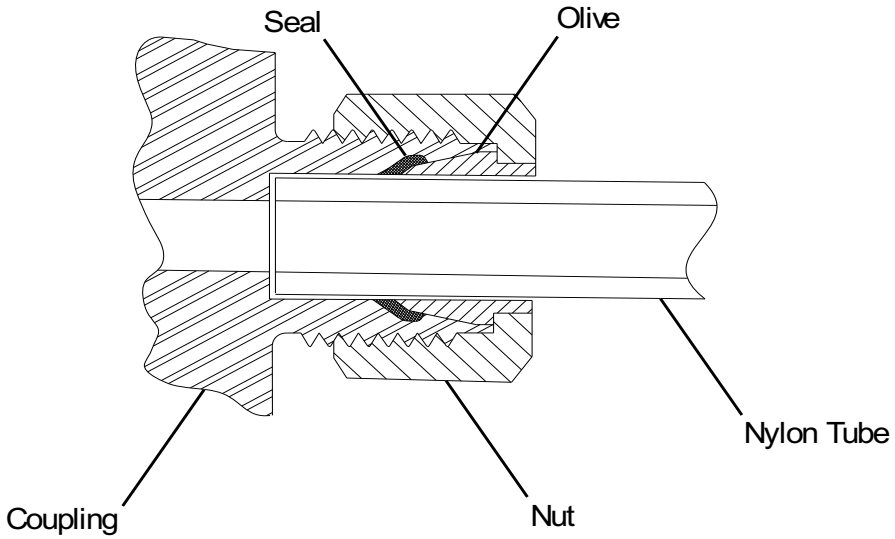
Figure 201 : Sheet 2 : TKS Nylon Tubing Installation

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NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)



VIEW A-A

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TKS ANTI-ICE SYSTEM (FIKI) - DESCRIPTION AND OPERATION

1. General

A. This section gives a description and operation of the TKS Anti-Ice System (FIKI). The TKS Anti-Ice System is a fluid anti-ice system to prevent ice formation on the leading edges of the wings, vertical stabilizer, horizontal stabilizers, propeller, and windshield. The TKS anti-ice system includes the integral wing TKS fluid reservoir, TKS filler neck assembly, TKS fluid level sender, TKS low fluid level switch, finger strainer, pumps (two main metering pumps for redundancy and independently operated windshield pump), timer box, TKS System control switches, windshield solenoid valve, high pressure switch, filter, flow transducer, left, right, and tail proportioning units, left and right wing, left and right horizontal stabilizer, and vertical stabilizer porous panels, and five low pressure switches. The operational condition can be monitored with CAS messages on the Primary Flight Display (PFD) and fluid quantity indication on the Multi-Function Display (MFD). When the TKS Anti-Ice System (FIKI) option is installed on the airplane, a left and right wing inspection light is also installed. For wing inspection light maintenance data, refer to Chapter 33, LED Wing Inspection Light - Removal/Installation. For a general view of the TKS Anti-Ice System, refer to Figure 1.

B. The TKS system uses a monoethylene glycol/isopropyl alcohol/deionized water solution for anti-icing the airframe surfaces in flight. The fluid solution is a freezing point depressant that is swept rearward over the surfaces and prevents ice buildup. For a list of approved TKS anti-icing fluids refer to Chapter 12, Replenishing - Servicing.

2. Description

A. The TKS equipment found in the left wing at WS 46.00 and inboard and between FS 107.70 and FS 126.62 includes the line replaceable units that follow:

- Metering Pump 1 (UC101)
- Metering Pump 2 (UC102)
- Windshield Pump (WC103)
- High Pressure switch (SC100)
- Flow Transducer (UC100)
- Windshield Solenoid Valve (WC100)
- Filter.

(1) To get access to the equipment, remove the TKS equipment access panel, on the lower surface of the left wing, and/or the footwell panels as necessary. Refer to Chapter 57, Wing - Maintenance Practices, Location of Inspection Covers (Access Panels) and Chapter 25, Footwell - Maintenance Practices.

(2) There are two metering pumps installed on brackets attached to the lower wing skin. The pumps have common input and outlet TKS tubing. Metering Pump 1 has the Windshield Pump mounted on the top. The metering pump 1 and windshield pump are usually removed and installed as an assembly. The pumps give the delivery mechanism for all modes of operation of the system. There are three basic modes of TKS system operation: NORM, HIGH and MAX. The system is operated by three-position rocker type switches found on the center console switch panel under the ANTI-ICE FLUID CTRL label, the PRIMARY HIGH/NORM switch (SI011), and MAX FLOW AIRFRAME/WINDSHIELD switch (SI012).

(3) The high pressure switch is installed on the outlet side of the metering pumps and on a bracket on the inlet side of the filter. The high pressure switch monitors the fluid flow pressure of the TKS system and sends a discrete to cause a CAS message to show on the PFD if pressure is higher than normal operation.

(4) The filter assembly is installed on brackets downstream of the metering pumps and the high pressure switch. The filter contains a replaceable element. The filter head is marked with an arrow for correct plumbing connection.

(5) The flow transducer is installed on a bracket near the filter at FS 128.82. The flow transducer monitors the fluid flow of the TKS system and sends a discrete to cause a CAS message to show on the PFD if the fluid flow is not above the appropriate threshold for normal operation.

(6) The windshield solenoid is installed on the left inboard wing rib at BL 23.25. The windshield pump and solenoid valve operate when the WINDSHIELD (SI012) switch found on the center console switch panel, is selected in the ON position.

B. The TKS fluid tank is a wet wing installation found in the right inboard wing. The tank has a capacity of 10 gallons (37.8 l). The tank has a level sender and low level switch installed and an access panel for maintenance. The level sender is installed at FS 119.08, WL 82.85, and BL 23.25. The low level switch is installed at FS 110.67, WL 80.92, and BL 23.25. Refer to Figure 1.

(1) The tank must be drained, the footwell removed, and the TKS fluid access panel removed to replace the level sender

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and low level switch. Refer to Chapter 25, Footwell - Maintenance Practices and Chapter 57, Wing - Maintenance Practices, Location of Inspection Covers (Access Panels).

(2) The filler port for the fluid tank is on the top inboard of the right wing. Refer to Chapter 12, Replenishing - Servicing.

(3) There is a strainer assembly installed in the output of the fluid tank. The strainer helps protects the TKS system from contamination.

(4) The fuel switch access panel is installed on the outboard side of the fluid tank. This panel gives access for the removal and installation of the low fuel level switch. When you install the fuel switch access panel, use Type IX, fluorosilicone sealant to apply a fay seal to the panel. (Silastic 730, Dow or equivalent)

C. There are three proportioning units. The two wing proportioning units are installed near WS 0.00, FS 105.70 of the wing. The tail proportioning unit is installed in the vertical stabilizer near the aft fuselage access panels. Refer to Figure 2.

(1) The proportioning units are metering units that supply anti-icing fluid at a predetermined flow rate for each individual porous leading edge panel and the propeller slinger ring. The proportioning units incorporate a manifold with calibrated capillary tubes which meter the fluid through the outlet ports. The left wing proportioning unit uses five of the outlets and the right wing proportioning unit uses four of the outlets. The tail proportioning unit uses five of the outlets. The propeller slinger ring is fed fluid by the left wing proportioning unit. Plumbing to the outlet ports must be connected as specified for proper operation.

D. Laser-drilled titanium panels mounted to the leading edges of the wings, vertical stabilizers, and horizontal stabilizers give TKS ice protection for the airplane. Refer to Figure 1 and Figure 2.

(1) The airframe anti-ice system applies anti-icing fluid to the wing leading edges, vertical stabilizer and the horizontal stabilizer leading edges. Anti-ice fluid solution flows out of the airframe anti-ice system through flush-fitting laser drilled titanium leading edge panels on the wings and stabilizers.

(a) The outer skin of the ice protection panels are manufactured using 0.9-mm thick titanium. Titanium provides excellent strength, durability, light weight, and corrosion resistance.

(b) The panel skin is perforated by laser drilled holes, 0.0025 inches in diameter, 800 per square inch. The porous area of the titanium panels is designed to cover the stagnation point travel on the appropriate leading edge over a normal operating environment.

(c) The back plates of the porous panels are manufactured using 0.7-mm thick titanium. They are formed to create reservoirs for the ice protection fluid to supply the entire porous area. A porous membrane between the outer skin and the reservoir gives even flow and distribution through the entire porous area of the panel.

(d) The porous panels are bonded as a cuff over a leading edge. Panels are bonded to the airframe with a two-part flexible adhesive.

(2) A system of nylon tubing carries the fluid from the fluid tank to the metering pumps and associated equipment and then to the proportioning units that divide the flow into the volumetric requirements of each panel or device supplied through the unit.

(3) The fluid passes through a microfilter before it gets to the proportioning units and porous panels. The filter removes contaminants from the fluid which helps to prevent panel blockage.

E. TKS Mode Flow Rate

(1) The maximum fluid tank capacity is 10 gallons (37.83 l). This quantity will last 2.5 hours in the normal mode (NORM).

(2) The minimum dispatch fluid quantity is 6.0 gallons (22.70 l). With this quantity the fluid will last with the applicable switch set to the position as follows:

(a) NORM - 212ml/min for 90 minutes

(b) PRIMARY HIGH - 424ml/min for 45 minutes

(c) MAX FLOW AIRFRAME - 848ml/min when MAX FLOW AIRFRAME/WINDSHIELD switch is set to the MAX FLOW AIRFRAME position. No endurance time is specified for this flow rate because this mode is not intended for continuous operation

NOTE: The two metering pumps operate simultaneously for two minutes after the MAX FLOW AIRFRAME switch is pressed. After the two minute cycle is over, the pumps return to the previously selected PRIMARY operation mode: NORM or HIGH.

F. There are five low pressure switches found in the empennage section. These switches monitor the fluid flow pressure of the TKS system and send a discrete to cause a CAS message to show on the PFD if pressure is lower than normal

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operation.

3. Operation

A. Operation of the TKS Anti-Ice system is controlled by three-position rocker switches on the center console switch panel. The switches are under the ANTI-ICE FLUID CTRL label, PRIMARY HIGH/NORM switch (SI011), and MAX FLOW AIRFRAME/WINDSHIELD switch (SI012). Refer to Figure 3. When the TKS anti-ice system is in operation, the PFD shows TKS system status with CAS messages on its display. The MFD shows TKS anti-ice fluid quantity on its display. Refer to Figure 4.

(1) When you select the switch in the MAX FLOW AIRFRAME position, the two metering pumps operate continuously for two minutes.

NOTE: The MAX FLOW AIRFRAME/ WINDSHIELD switch is a momentary switch, returning to the OFF position when released. The time the pumps are on in this mode is not affected by holding the switch in the MAX FLOW AIRFRAME position--the pumps cycle off two minutes after the MAX FLOW position is initially selected. After the two minute MAX mode has timed out, MAX FLOW can be selected again by the selecting MAX FLOW AIRFRAME/WINDSHIELD again.

(a) There is no CAS message status message for MAX Mode; the status message displayed will correspond to the PRIMARY mode that is selected for the system: NORM or HIGH. Refer to Figure 4.

(2) When the switch is in the NORM position the metering pumps operate for 30 seconds and then stop for 90 seconds on a continuous cycle.

(a) The PFD will show the CAS message A-ICE NORM (white).

(3) When the PRIMARY HIGH switch is set to the HIGH position metering pump 1 operates continuously.

(4) When the MAX FLOW AIRFRAME/WINDSHIELD switch (SI012) is selected in the WINDSHIELD position, fluid flows to the windshield nozzles.

(5) If the system fails to operate, you can set the BACKUP switch (SI013) to the BACKUP position. When in this position, metering pump 2 operates continuously.

(6) When the system is operating the metering pump(s) provide the anti-ice fluid to the filter assembly. The filter assembly removes contaminants from the fluid to prevent the porous panels from blockage.

(7) The high pressure switch is installed on the outlet side of the metering pumps and on the inlet side of the filter. The switch sends a discrete to the GEA 71 Engine/Airframe Unit when the system pressure is higher than normal operating parameters. The GEA 71 sends the discrete to the GIA 63 to create a CAS message to show on the PDF.

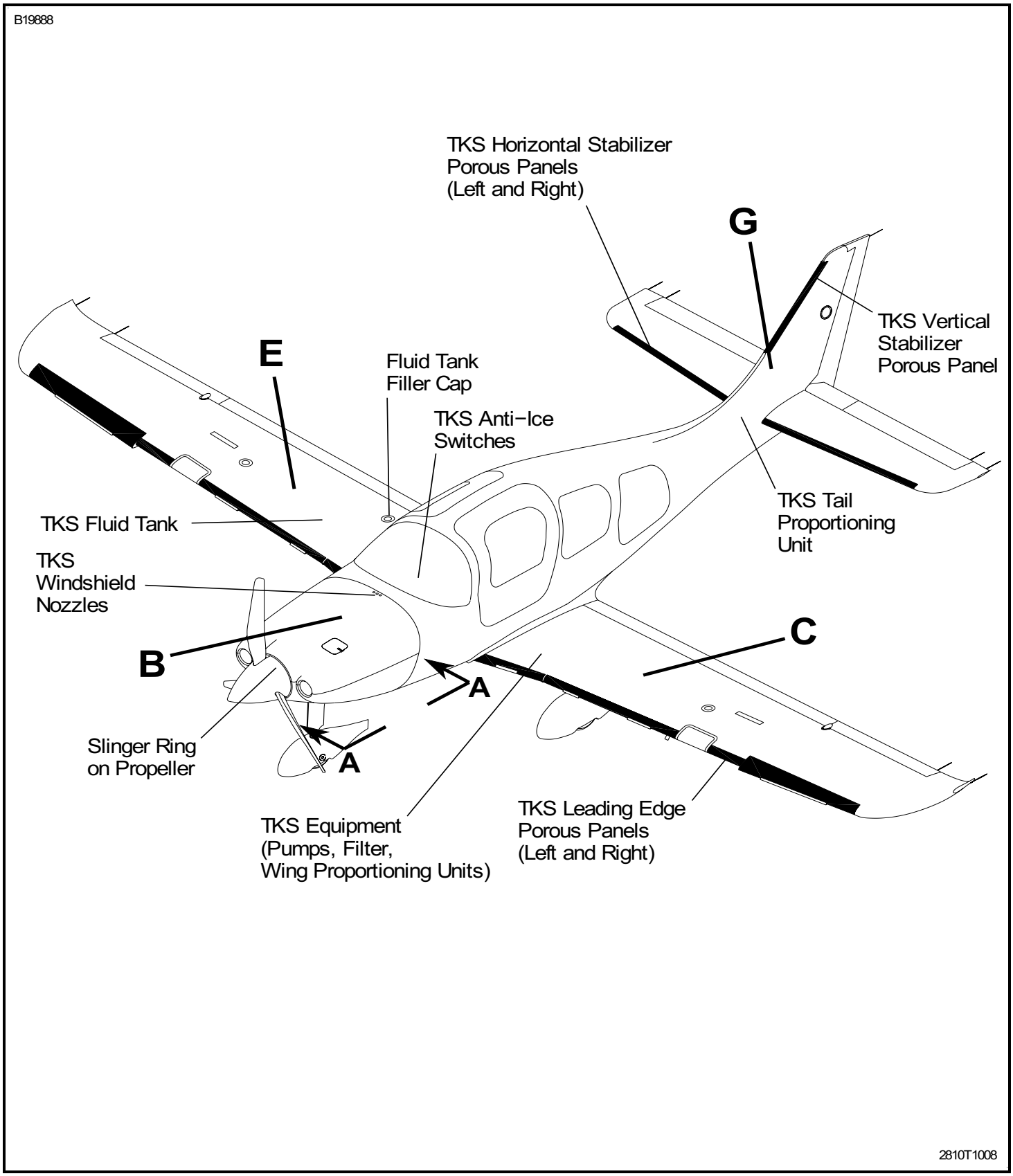
(8) The flow transducer monitors the fluid flow and sends a constant output to the GEA 71 Engine/Airframe Unit which translates it to a flow rate. The G2000 will post a CAS message when the flow rate is found to be too low for the selected mode of system operation (NORM or HIGH).

(9) The anti-ice fluid flows from the filter assembly to the left and right wing and tail proportioning units.

(10) The system of nylon tubing supplies the anti-ice fluid to the porous panels.

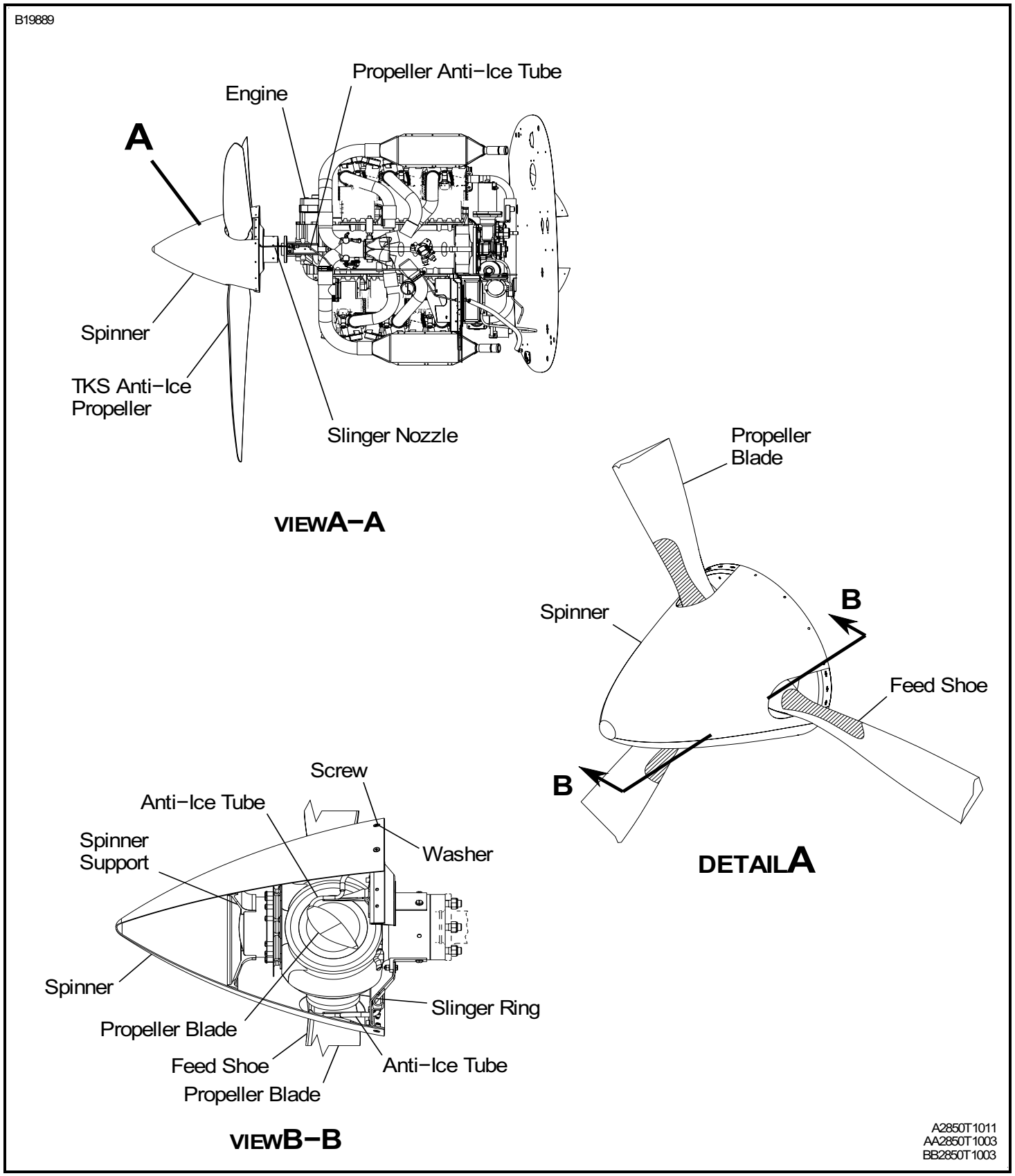
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Figure 1 : Sheet 1 : TKS System Installation



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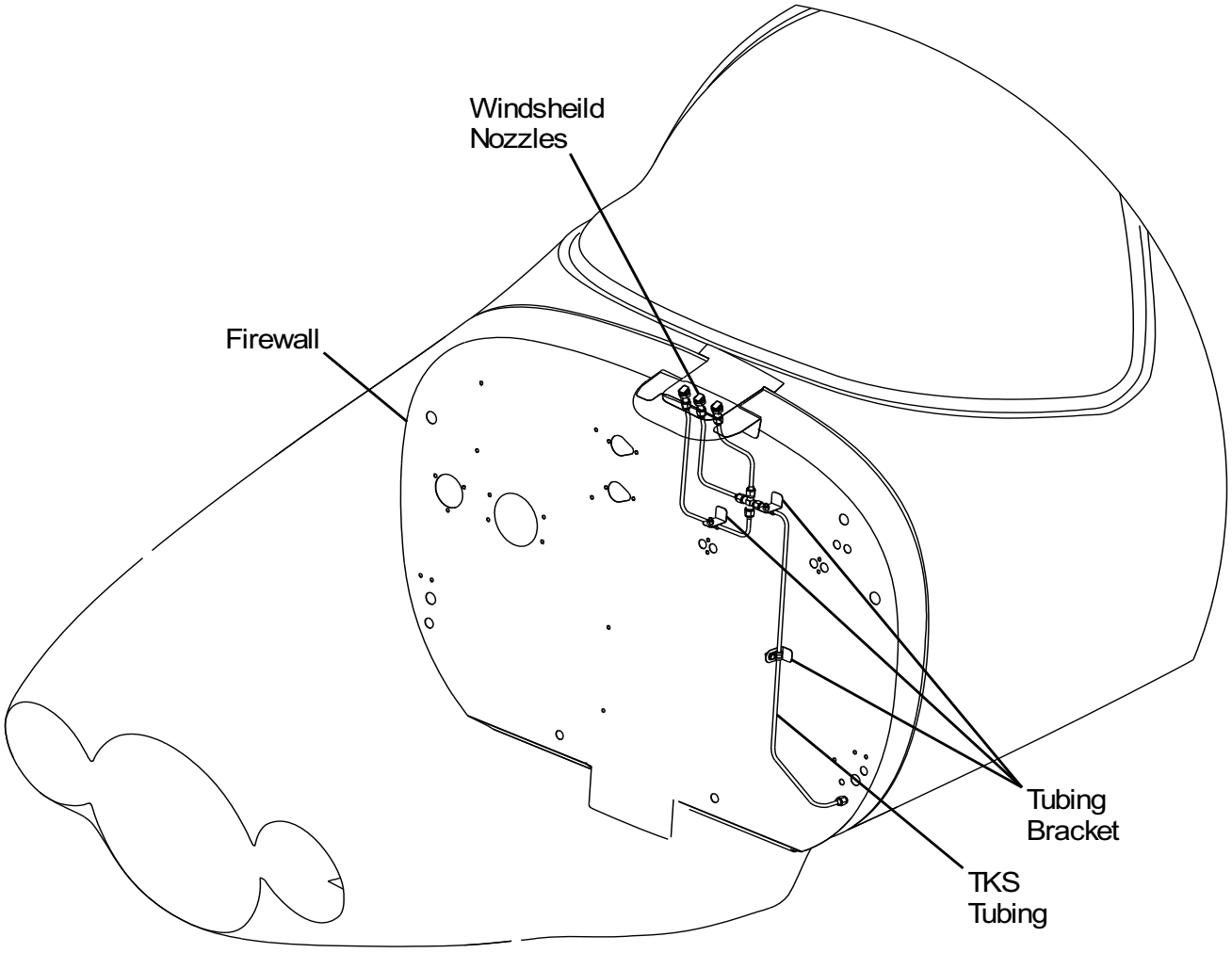
Figure 1 : Sheet 2 : TKS System Installation



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Figure 1 : Sheet 3 : TKS System Installation

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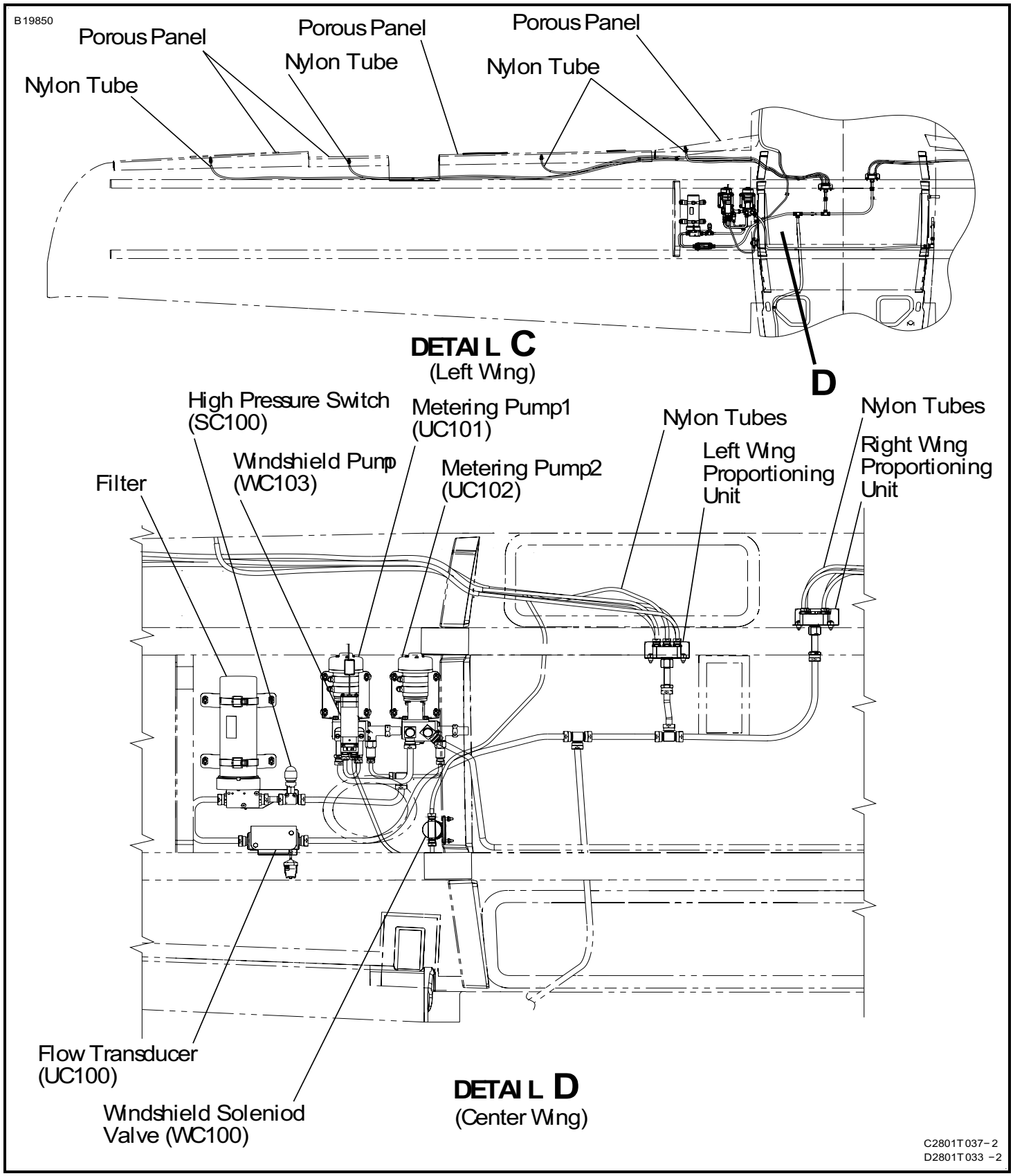


DETAIL B

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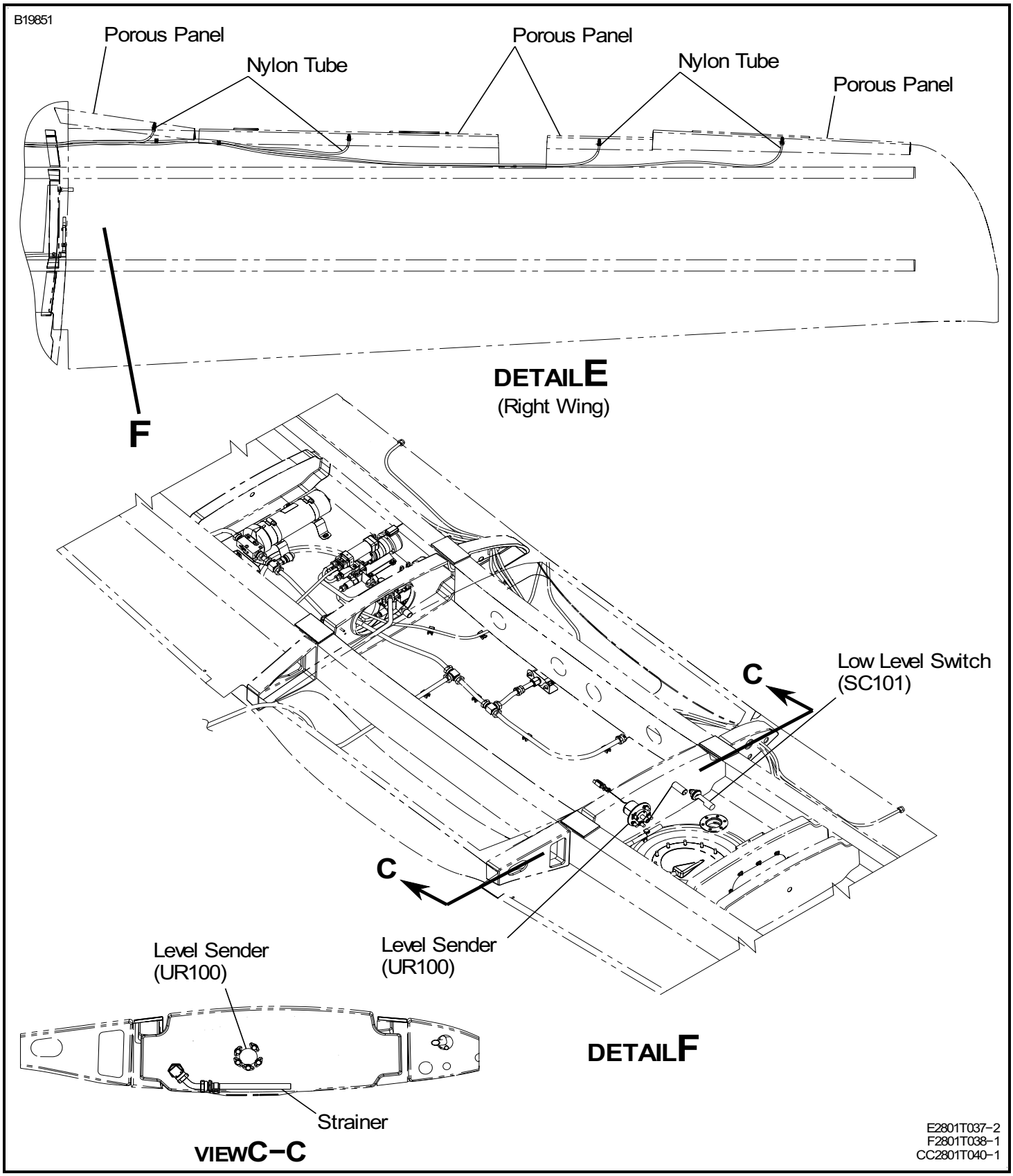
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Figure 1 : Sheet 4 : TKS System Installation



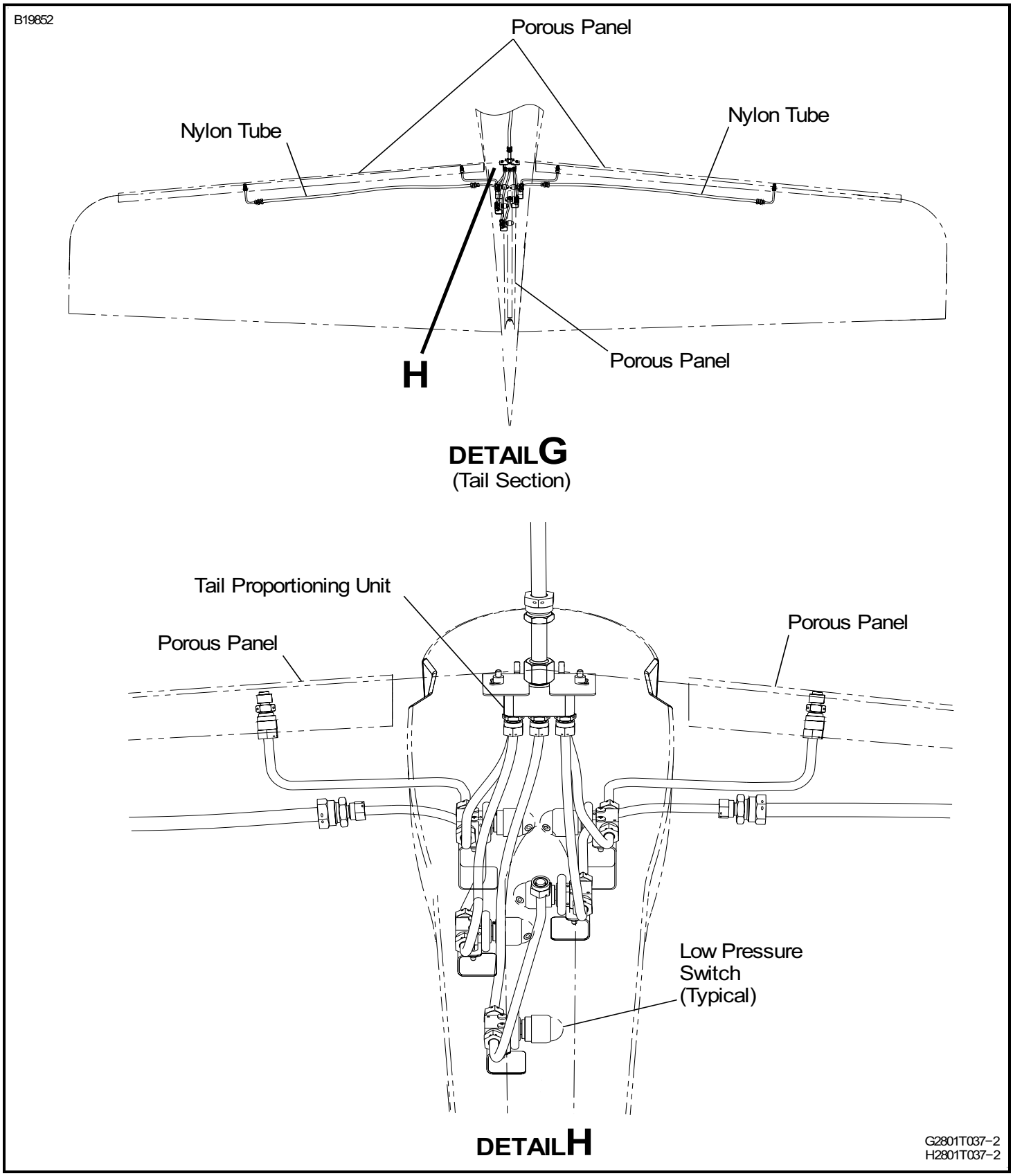
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Figure 1 : Sheet 5 : TKS System Installation



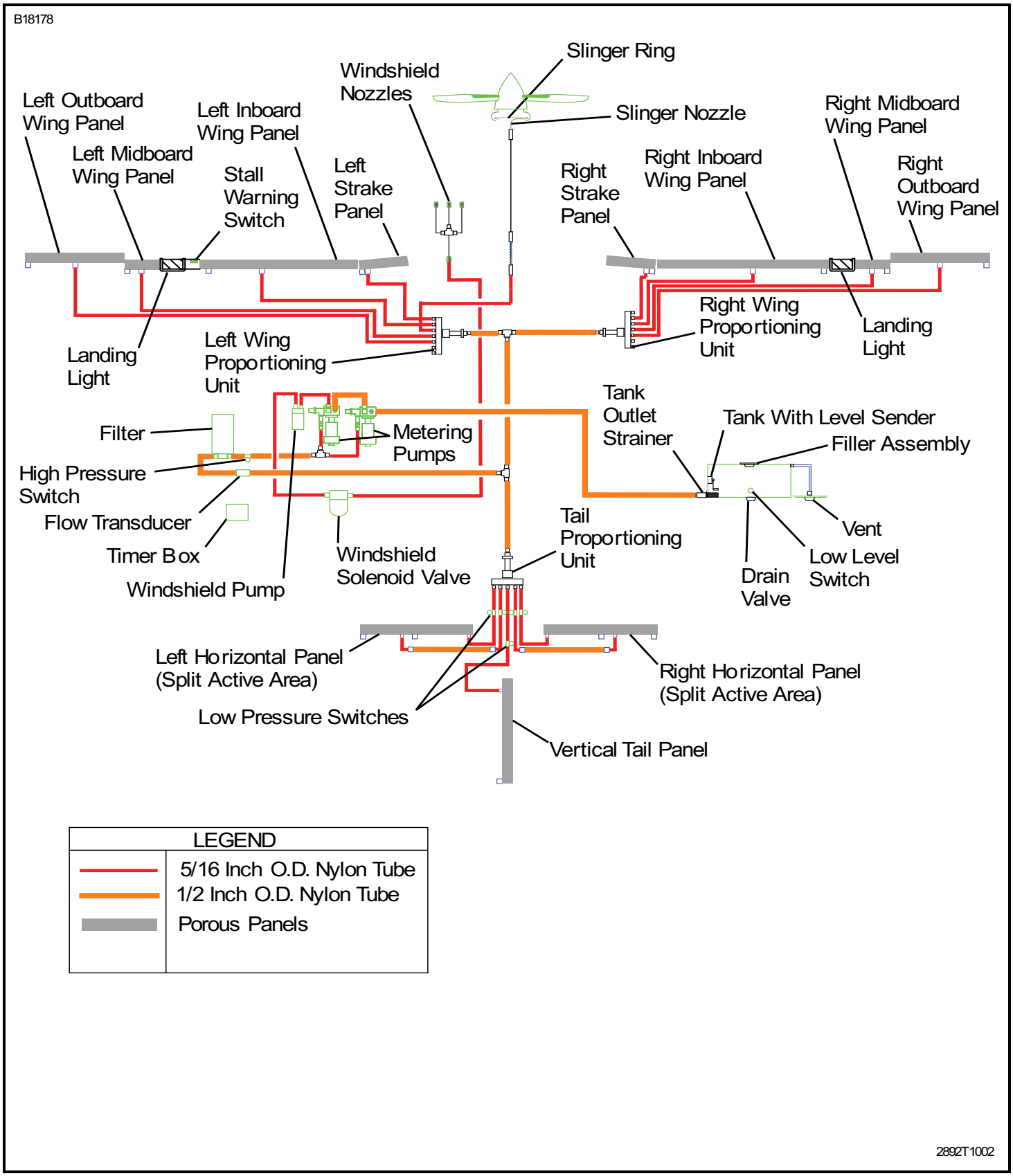
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Figure 1 : Sheet 6 : TKS System Installation



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Figure 2 : Sheet 1 : TKS System Flow Diagram

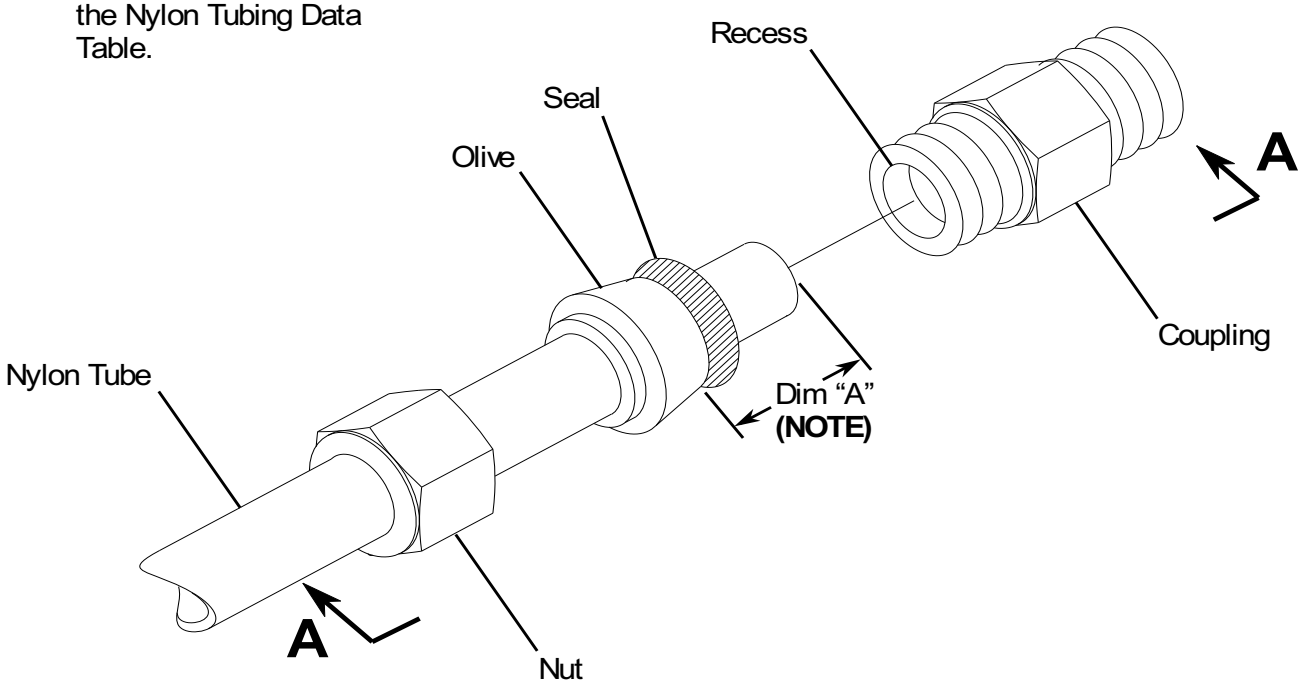


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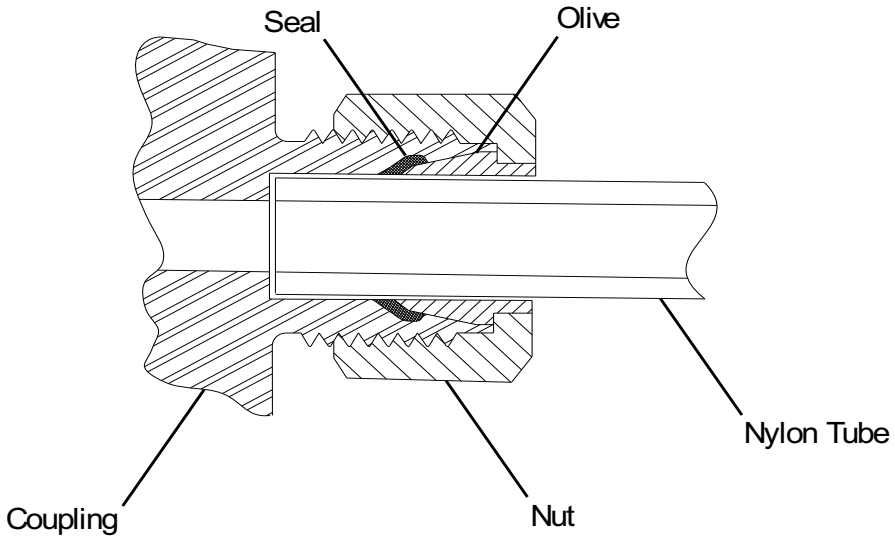
Figure 2 : Sheet 2 : TKS System Flow Diagram

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NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)



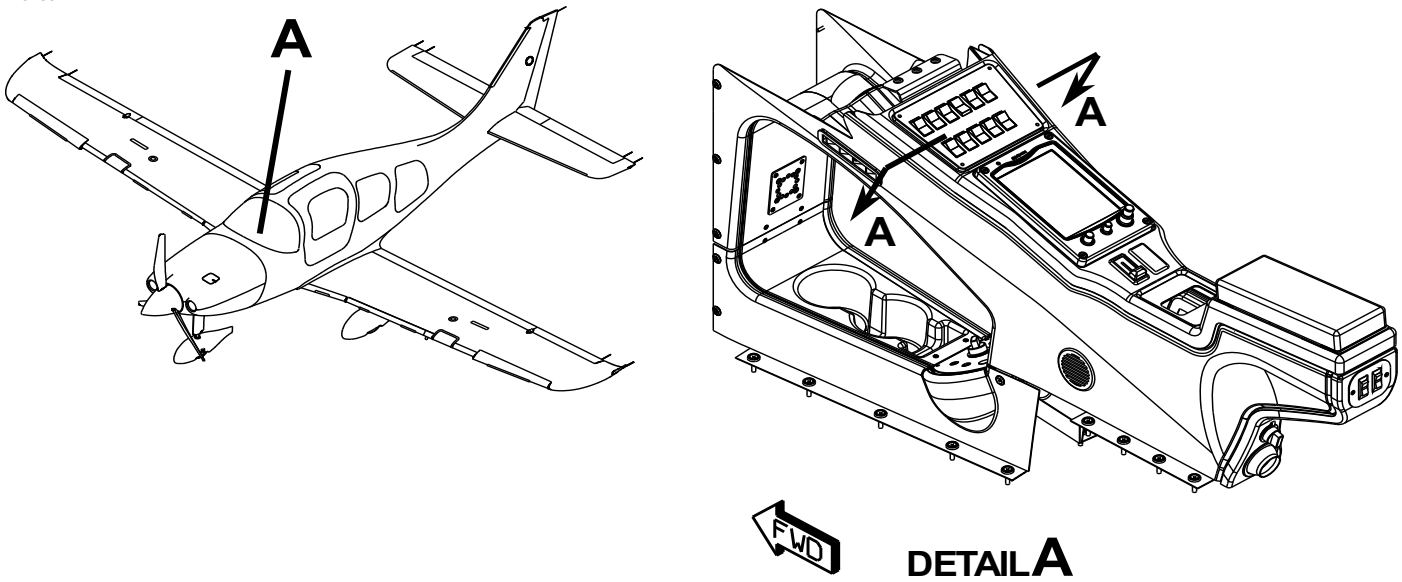
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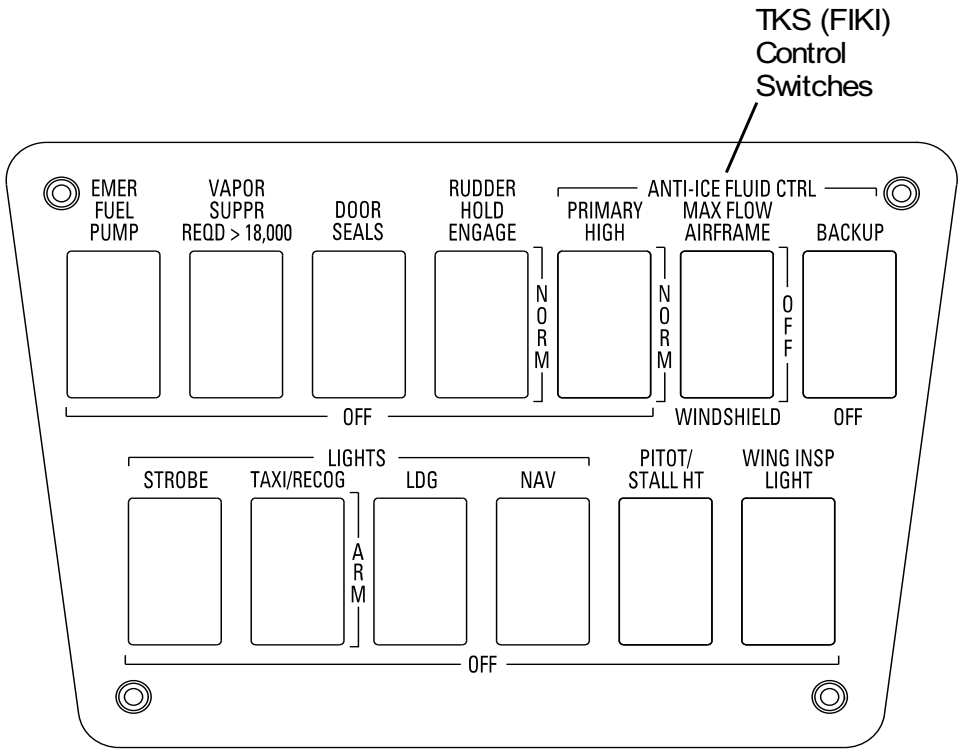
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Figure 3 : Sheet 1 : ANTI-ICE FLUID CTRL Switch Installation

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DETAIL A

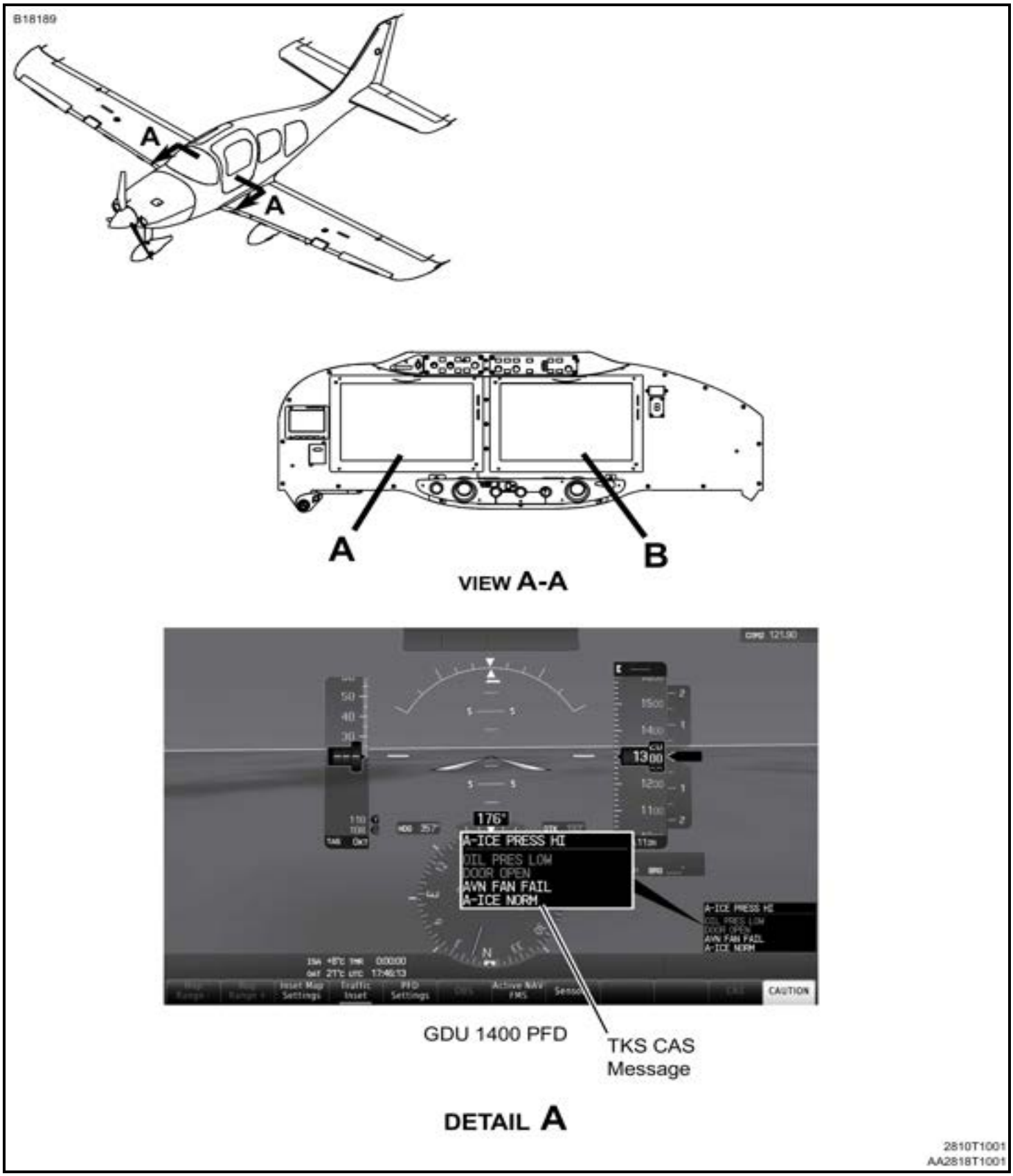


VIEW A-A

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Figure 4 : Sheet 1 : GDU 1400 PFD/MFD Monitoring



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Figure 4 : Sheet 2 : GDU 1400 PFD/MFD Monitoring

B18224



GDU 1400 MFD

Anti-Ice Fluid Quantity Indicator

DETAIL B



Anti-Ice Time Remaining Indicator

GDU 1400 MFD

DETAIL B

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TKS ANTI-ICE SYSTEM (FIKI) - TROUBLESHOOTING

1. General

A. This section gives troubleshooting procedures for the FIKI TKS anti-ice system. There are logic troubleshooting charts in this section to guide you to the most likely cause and to recommended actions to return the TKS system to a serviceable condition.

B. The TKS system has control switches found on the center console switch panel. The fluid level indication is shown on the multifunction display (MFD) EIS strip. Warning and caution crew alert system (CAS) messages are shown on the primary flight display (PFD) CAS window.

2. Troubleshooting Preliminary

A. Visual Inspections.

NOTE: It is recommended that you do a visual inspection of the anti-ice components before you do the troubleshooting procedures. The visual inspections in this section do not need to be done in order; you may look at the most likely parts and components as necessary. It is recommended that you do all of these inspections when possible.

(1) Look at all of the nylon tube connections. Look at the condition of the nut, olive, and seal or O-ring. If you must replace a part, refer to the Model T240 Illustrated Parts Catalog.

CAUTION: The length of the nylon tube is important. Refer to the Model T240 Illustrated Parts Catalog for the correct part number. A tube with an incorrect length can make the anti-ice system not operate properly.

(2) Inspect the nylon tubing for fluid leaks or evidence of obstructions. Make that sure there are no cuts, holes, or kinks in any of the tubing.

(3) Do an inspection of the windshield nozzles. Examine the system for unserviceable or damaged components.

B. Preliminary Set Up.

(1) Make sure that the TKS test cart is serviceable.

(a) Make sure the test cart filters are clear.

1 If necessary, replace the filters.

(b) Make sure there is sufficient TKS fluid for the test procedures you are going to complete.

1 If necessary, add fluid to the cart.

(c) Make sure that there is sufficient shop air supplied to the test cart.

(2) Make sure that the circuit breakers ANTI-ICE PUMP 1, ANTI-ICE PUMP 2 and W/S ANTI-ICE are engaged.

(3) Make sure the G2000 is operating correctly and is powered up. Make sure the display units are operating. You can cycle the power to individual equipment until proper operation of all the equipment is operating correctly.

(4) Make sure that the anti-ice messages are not displayed on PFD CAS window. If an anti-ice message is shown on the PFD, refer to Table 104. From this table you can find the message and the troubleshooting chart that matches your trouble.

3. Troubleshooting Chart Index

A. There is an extensive set of troubleshooting charts for some of the most common problems for the anti-ice system. Refer to the tables that follow for troubleshooting procedures. When you troubleshoot the FIKI system, refer to the Model T240 Wiring Diagram Manual.

B. Refer to the tables that follow to troubleshoot specific TKS system fault conditions:

- TKS Airframe Pump Fault Conditions
- TKS Windshield Pump Fault Conditions
- TKS Fluid Flow Fault Conditions
- TKS G2000 Indication Fault Conditions

Table 101. TKS Airframe Pump Fault Conditions

FAULT CONDITION	REFER TO:
One of the two metering pumps (pump 1 or pump 2) does not operate when the PRIMARY switch is in the NORM position.	Figure 101

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Metering pump 2 does not operate when the BACKUP switch is in the BACKUP position.	Figure 102
The two metering pumps (pump 1 or pump 2) do not operate when the PRIMARY switch is in the NORM or HIGH position and the MAX FLOW switch is in the AIRFRAME position.	Figure 103
One of the two metering pumps (pump 1 and pump 2) do not operate when the PRIMARY switch is in the NORM position.	Figure 104
The metering pumps (pump 1 and pump 2) do not operate when the PRIMARY switch is in the NORM position.	Figure 105
Metering pump 1 does not operate when the PRIMARY switch is in the HIGH position.	Figure 106
The metering pumps (pump 1 and pump 2) do not operate in the 30 second on and 90 second off sequence when the PRIMARY switch is in the NORM position.	Figure 107
When the MAX FLOW switch has the AIRFRAME position selected, each of the two metering pumps do not revert to the selected PRIMARY mode after operating for 120 seconds.	Figure 108
When the ANTI-ICE PUMP 1 circuit breaker is disengaged, the metering pump 1 operates in the NORM, HIGH, or MAX mode.	Figure 109
When the ANTI-ICE PUMP 2 circuit breaker is disengaged, the metering pump 2 operates in the NORM, BACKUP or MAX mode.	Figure 110

Table 102. TKS Windshield Pump Fault Conditions

FAULT CONDITION	REFER TO:
The windshield pump does not operate when the MAX FLOW switch is in the WINDSHIELD position.	Figure 111
The windshield pump does not stop operating 4 seconds after the MAX FLOW switch is released from the WINDSHIELD position.	Figure 112
When the W/S ANTI-ICE circuit breaker is disengaged, the windshield pump operates when the MAX FLOW switch is in the WINDSHIELD position.	Figure 113

Table 103. TKS Fluid Flow Fault Conditions

FAULT CONDITION	REFER TO:
No fluid comes out of the nylon tubing.	Figure 114
No fluid or uneven flow coming out of porous panels during panel purge.	Figure 115
No fluid comes out of panels during a full TKS operational test.	Figure 116
No fluid comes out of the windshield nozzles.	Figure 117

Table 104. TKS G2000 Indication Fault Conditions

FAULT CONDITION	REFER TO:
The TKS fluid indication is incorrect on the MFD TKS fluid quantity gage.	Figure 118
With the PRIMARY switch in the NORM position, the A-ICE NORM message does not show on the PFD CAS window.	Figure 119
With the PRIMARY switch in the HIGH position, the A-ICE HIGH message does not show on the PFD CAS window	Figure 120
With the BACKUP switch in the BACKUP position, the A-ICE BACKUP message does not show on the PFD CAS window	Figure 121
With the system operating correctly, the A-ICE HIGH fail message shows on the PFD CAS window.	Figure 122
With the PRIMARY switch in the HIGH position, there is A-ICE PRESS HI CAS message, but the pressure is not high.	Figure 123

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When the fluid quantity gage on the MFD shows 1 gallon or less the A-ICE FLUID LO message does not show on the PFD CAS window.	Figure 124

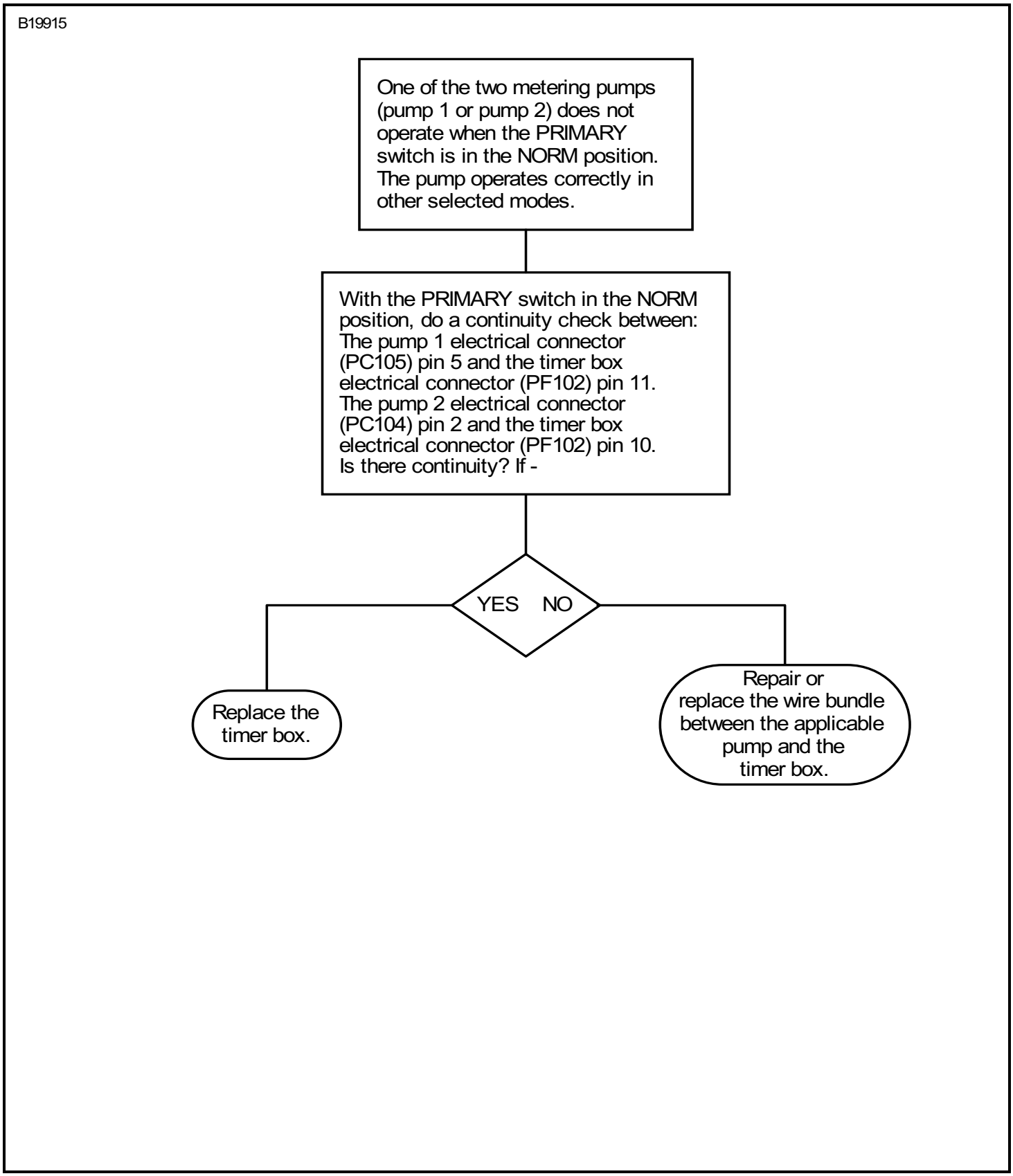
Table 105. Fluid Quantity Voltage

Voltage (+ 0.16 or - 0.16V)	Fluid (+ 0.5 or - 0.5 gal)
2.34	0.0
2.39	0.5
2.44	1.0
2.48	1.5
2.63	3.0
2.92	6.0
3.32	10.0

4. Troubleshooting Charts

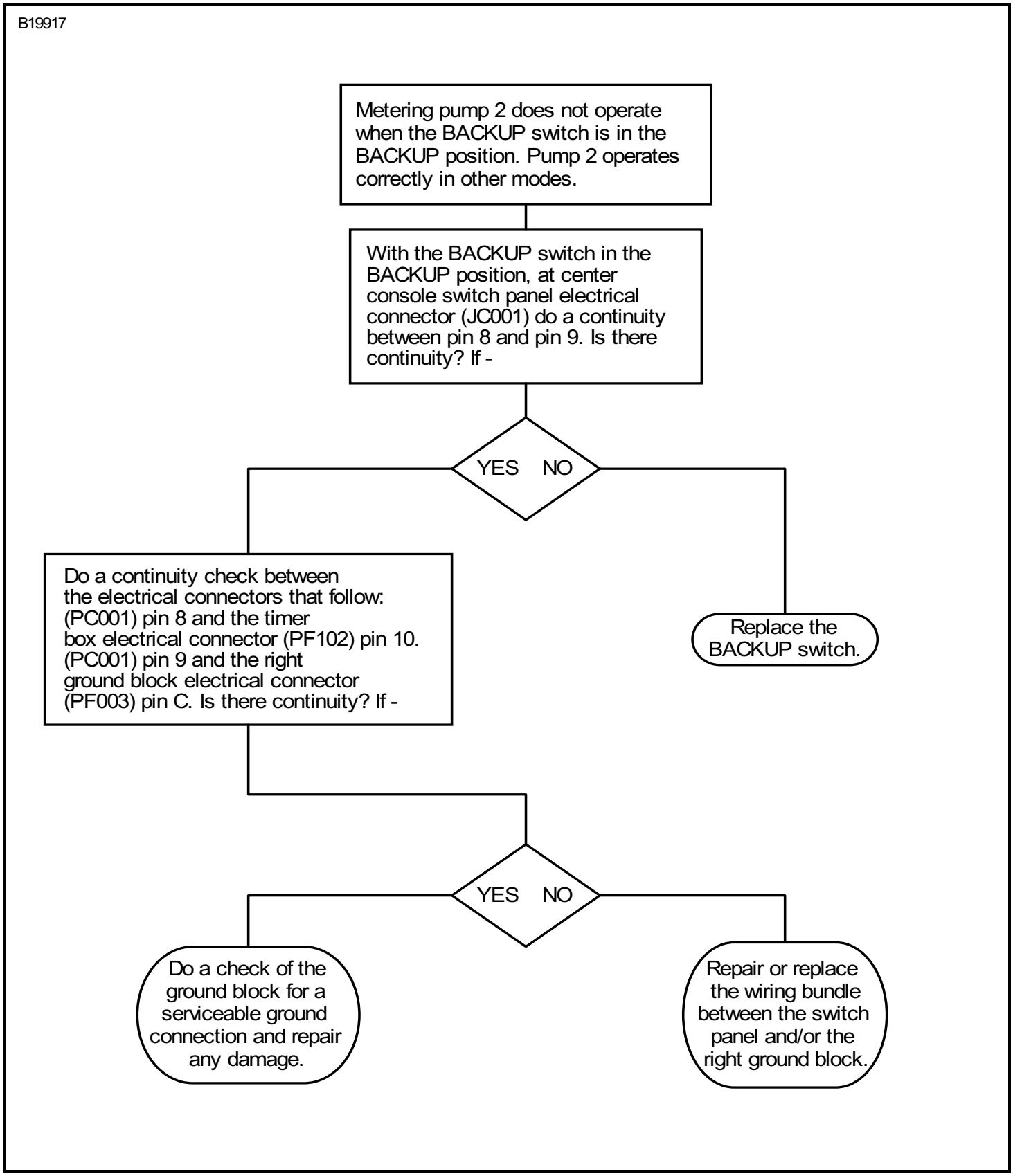
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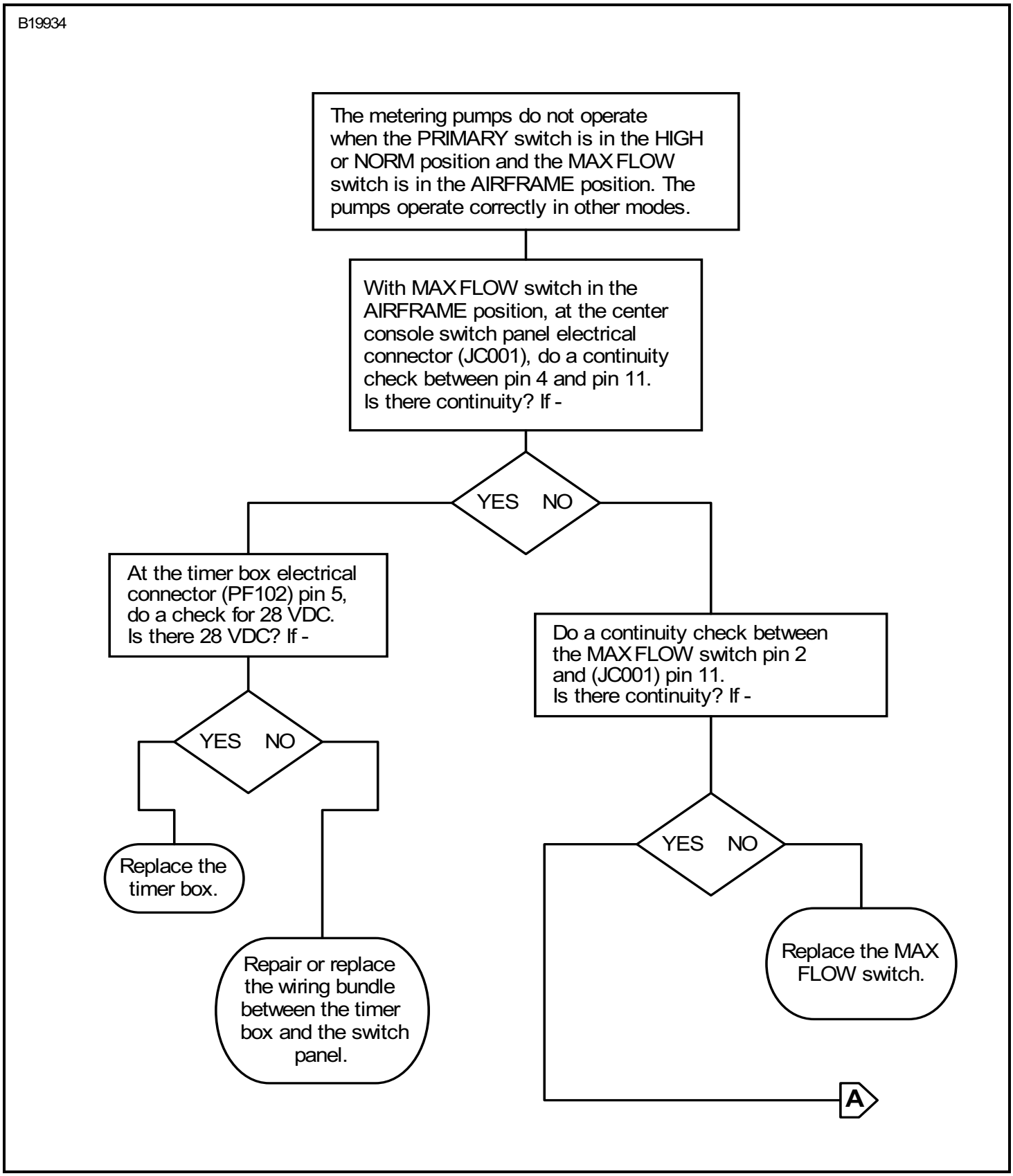
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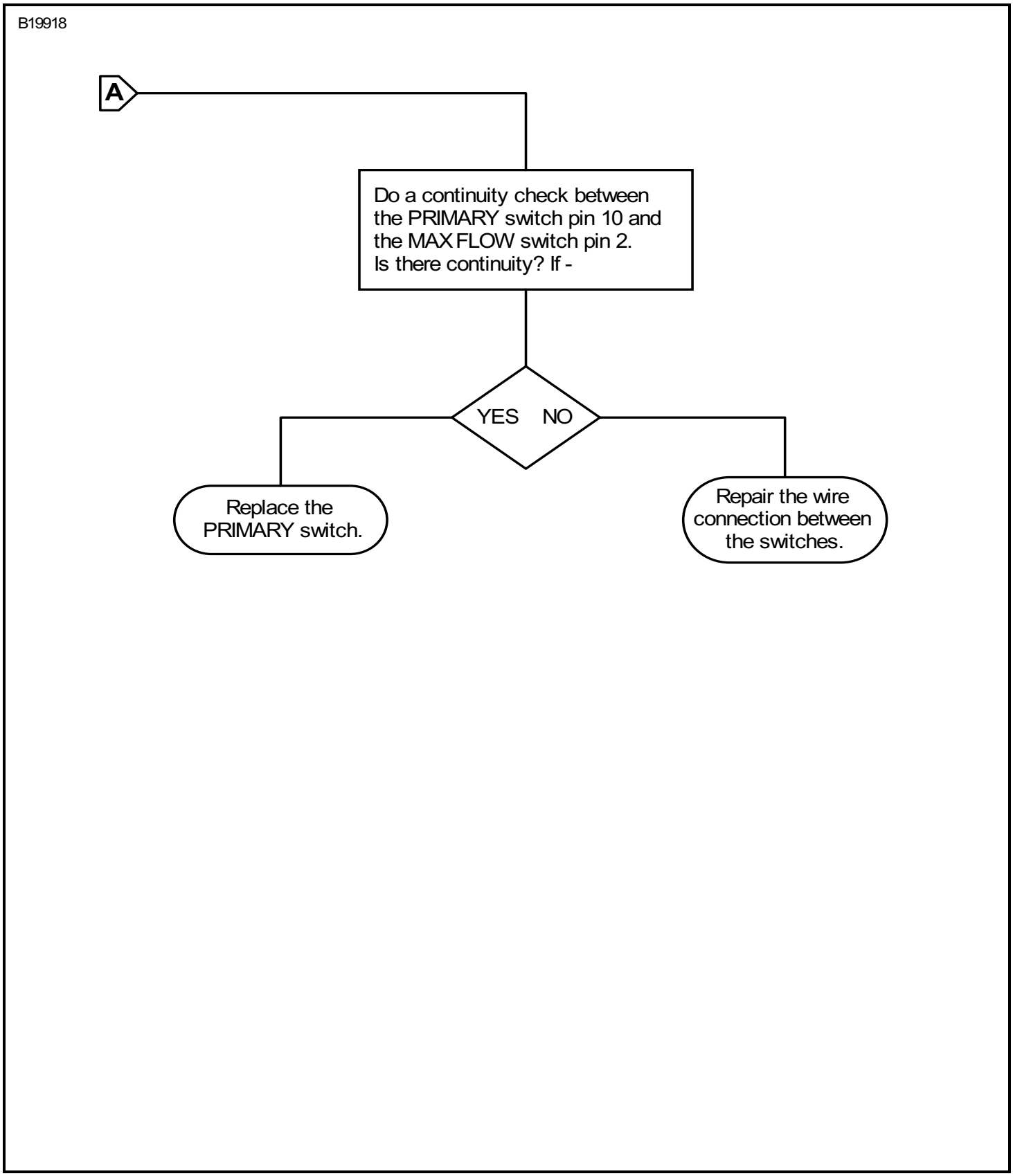
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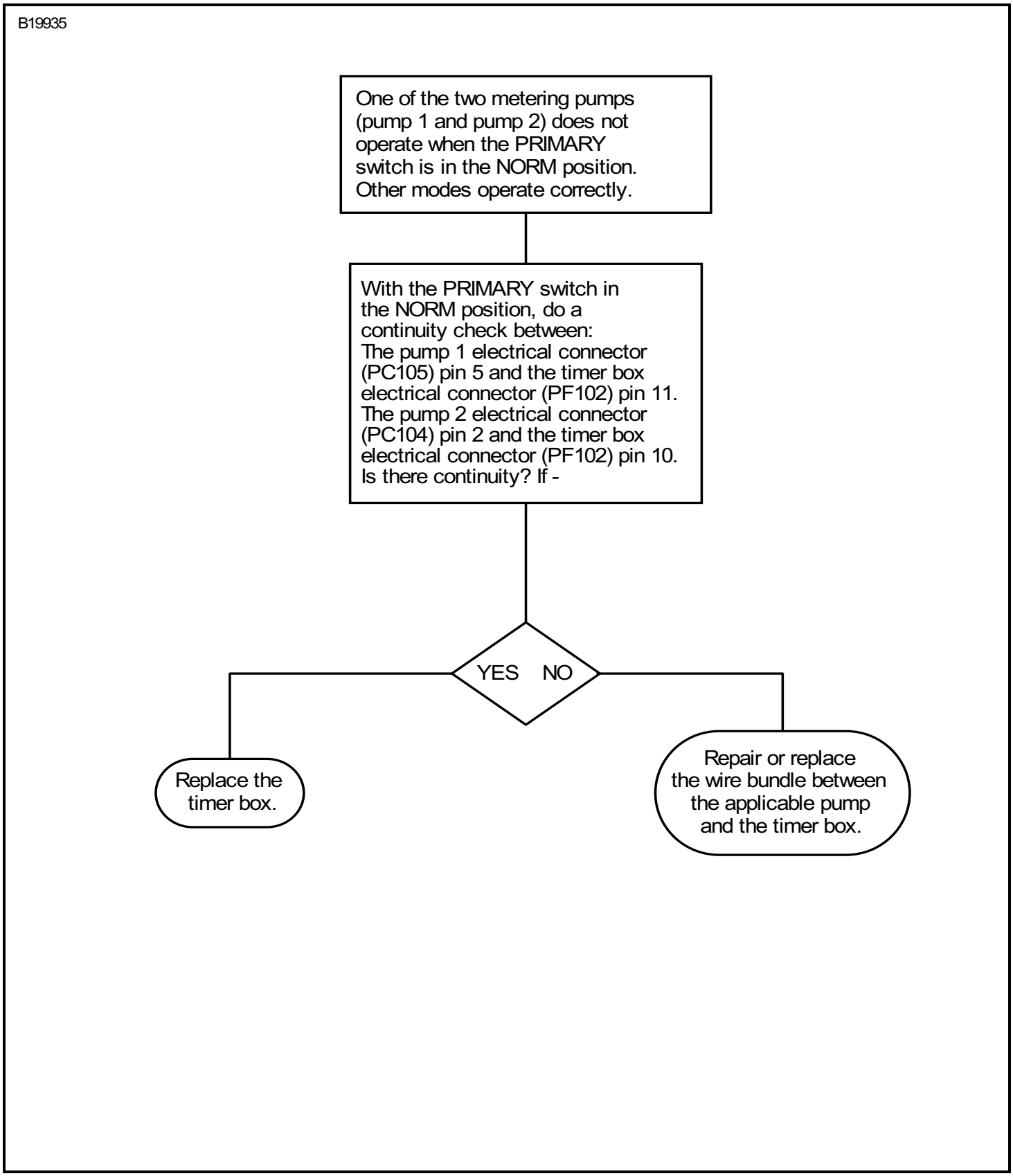
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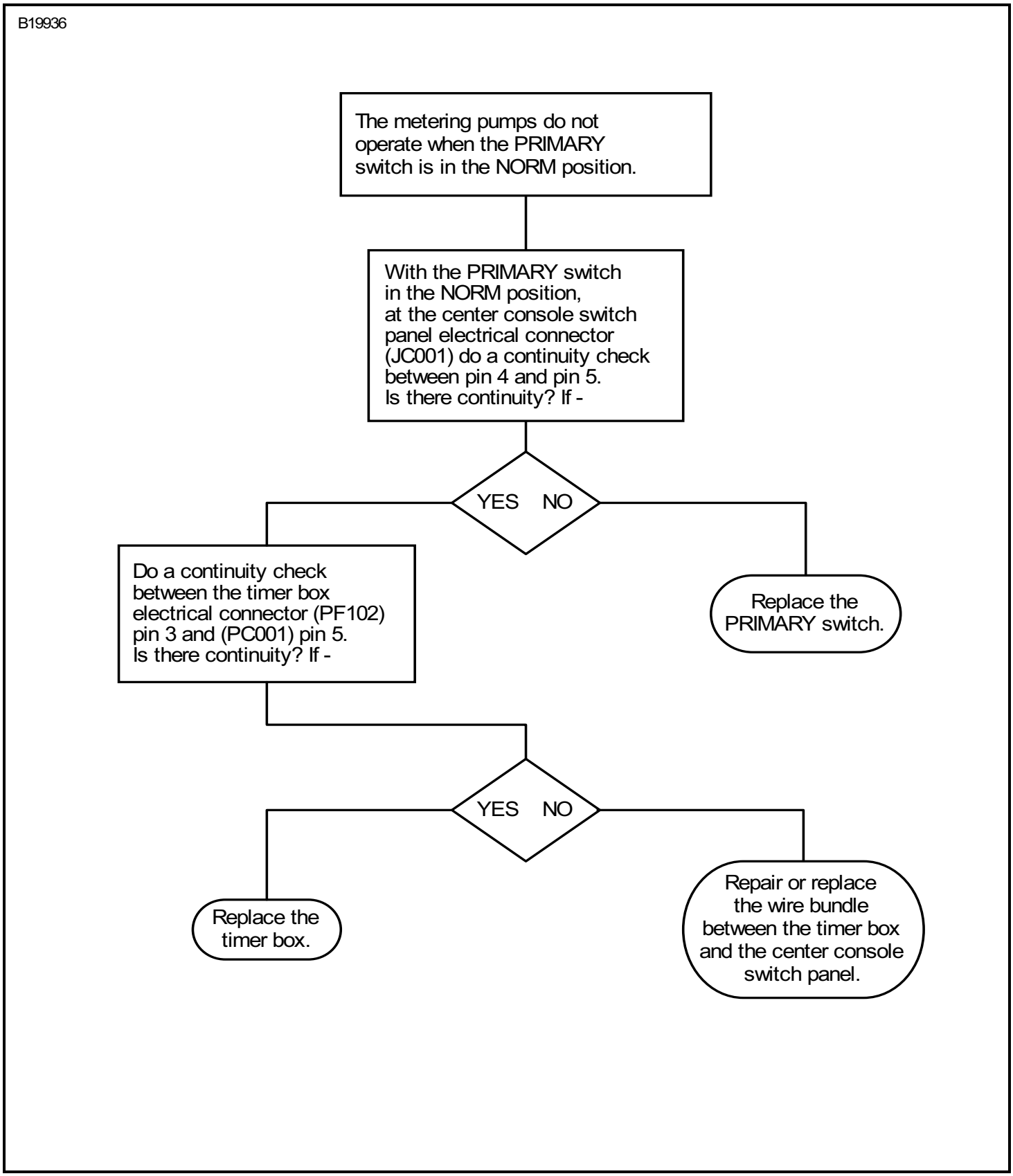
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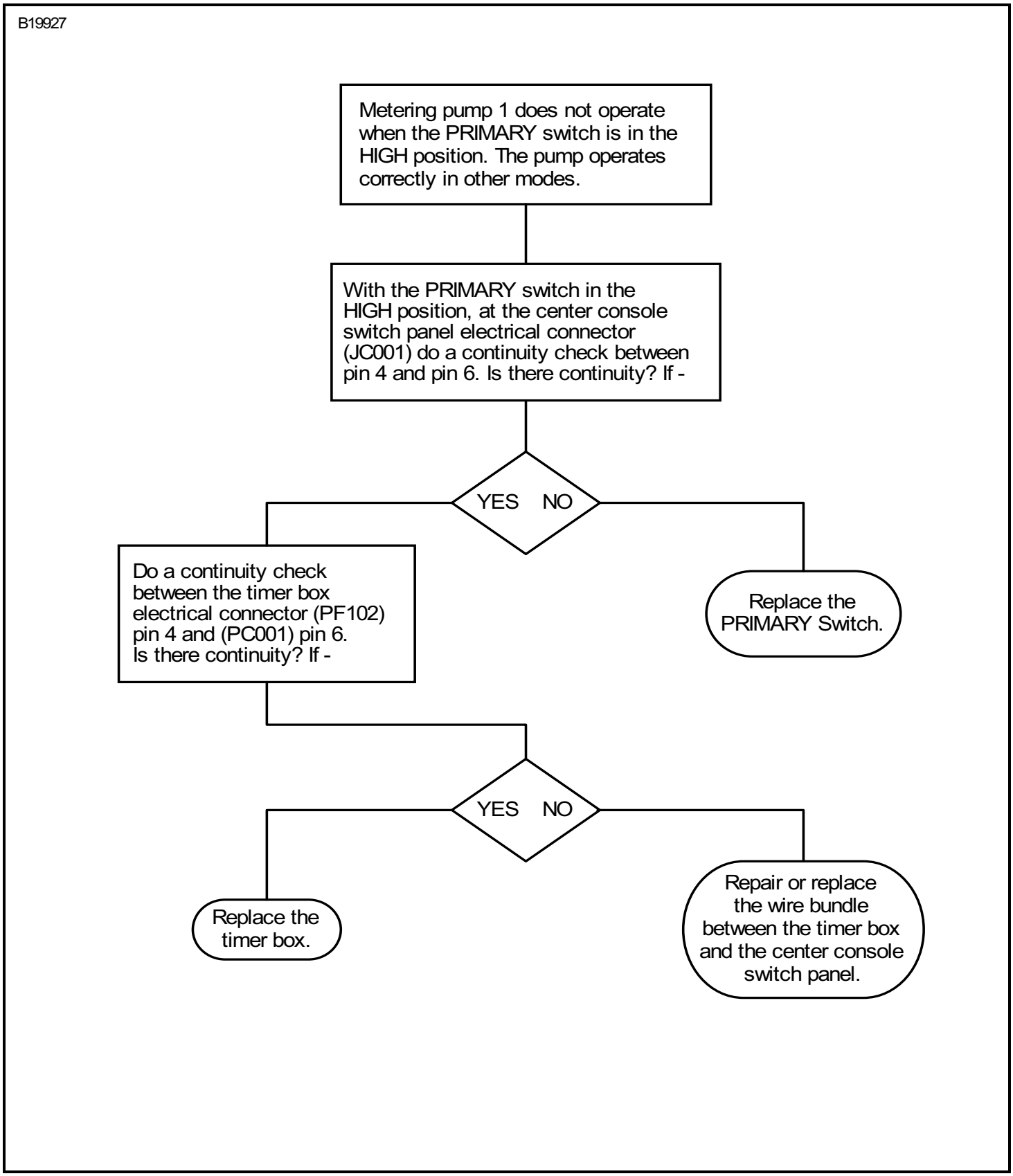
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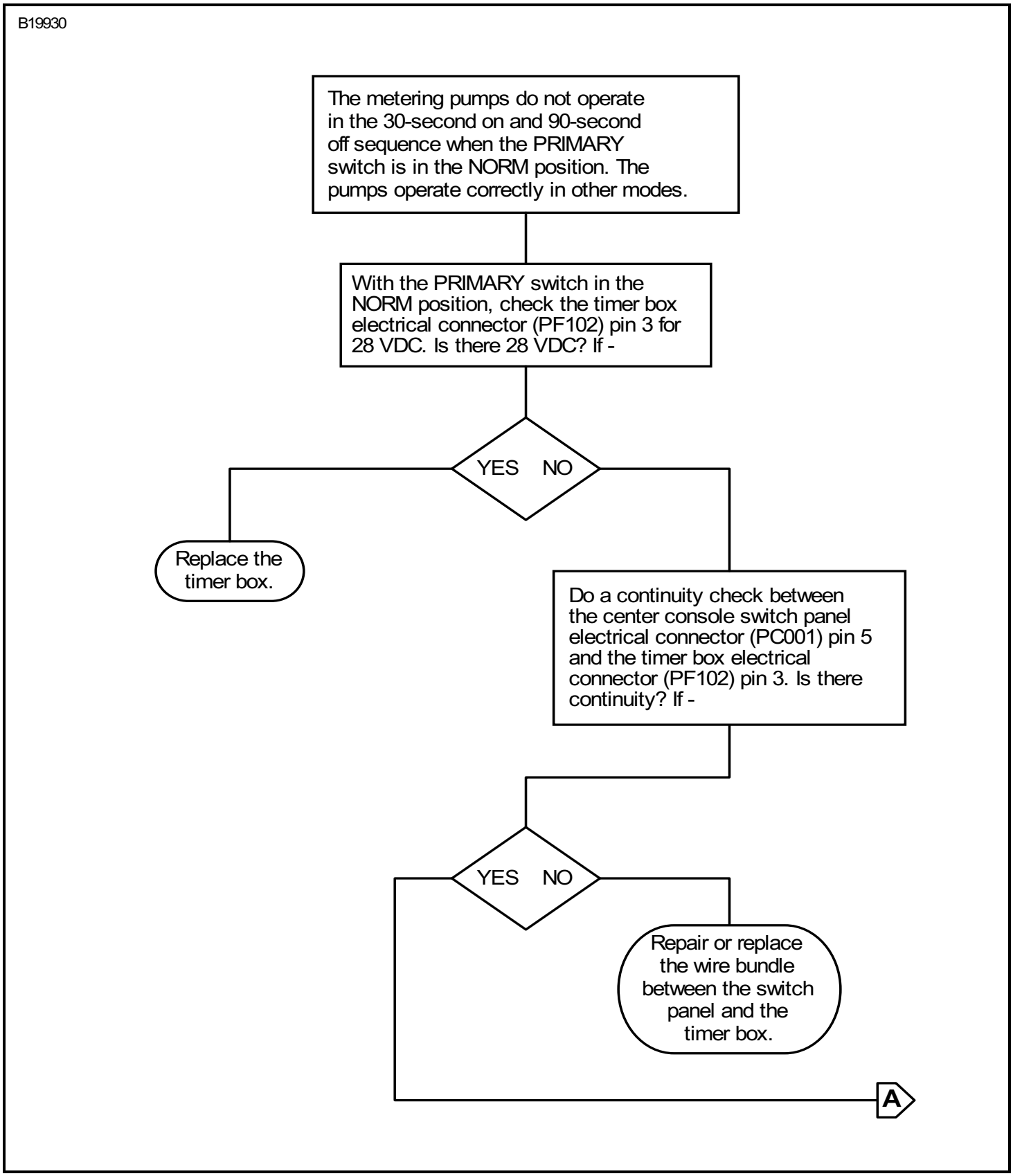
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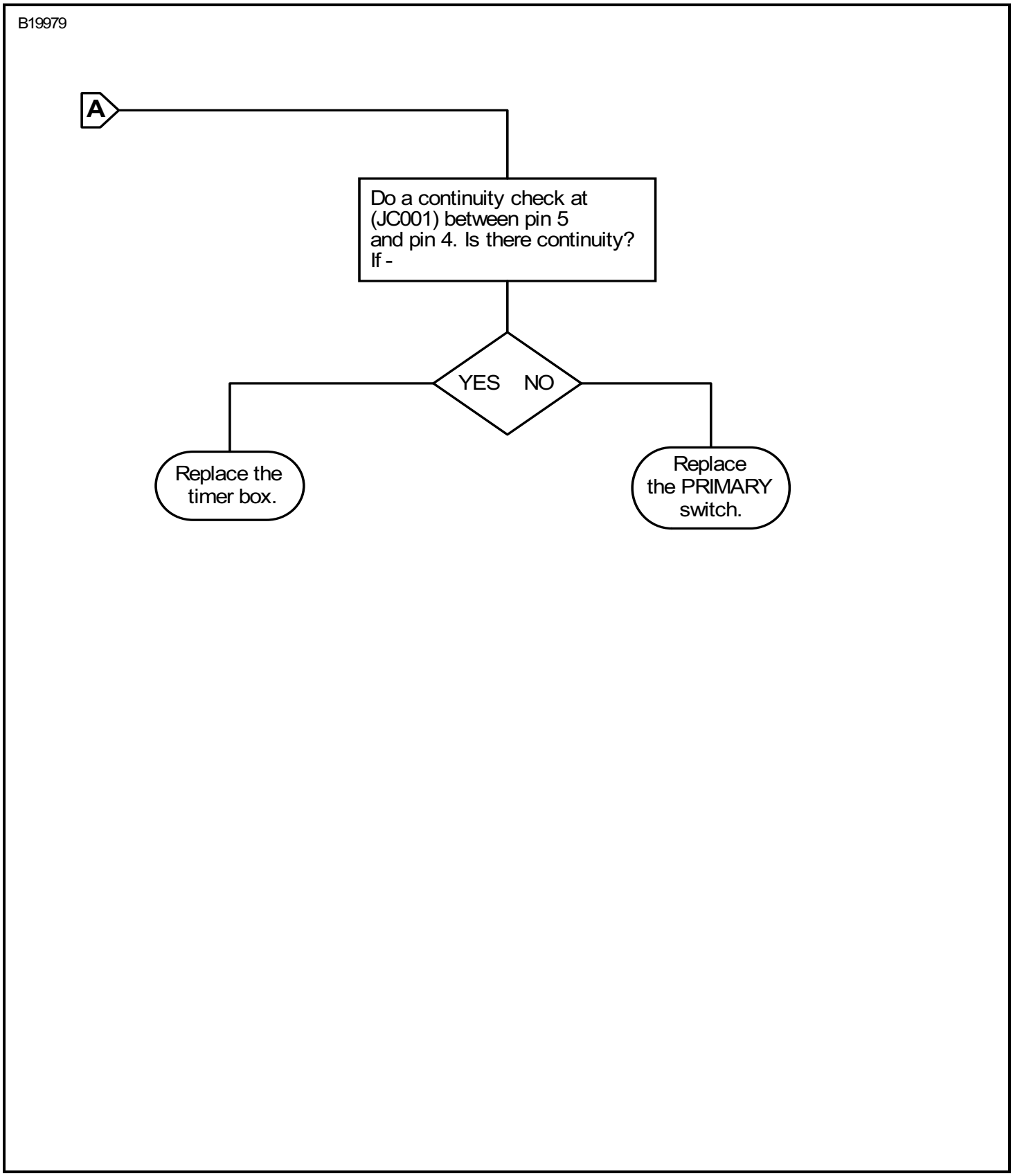
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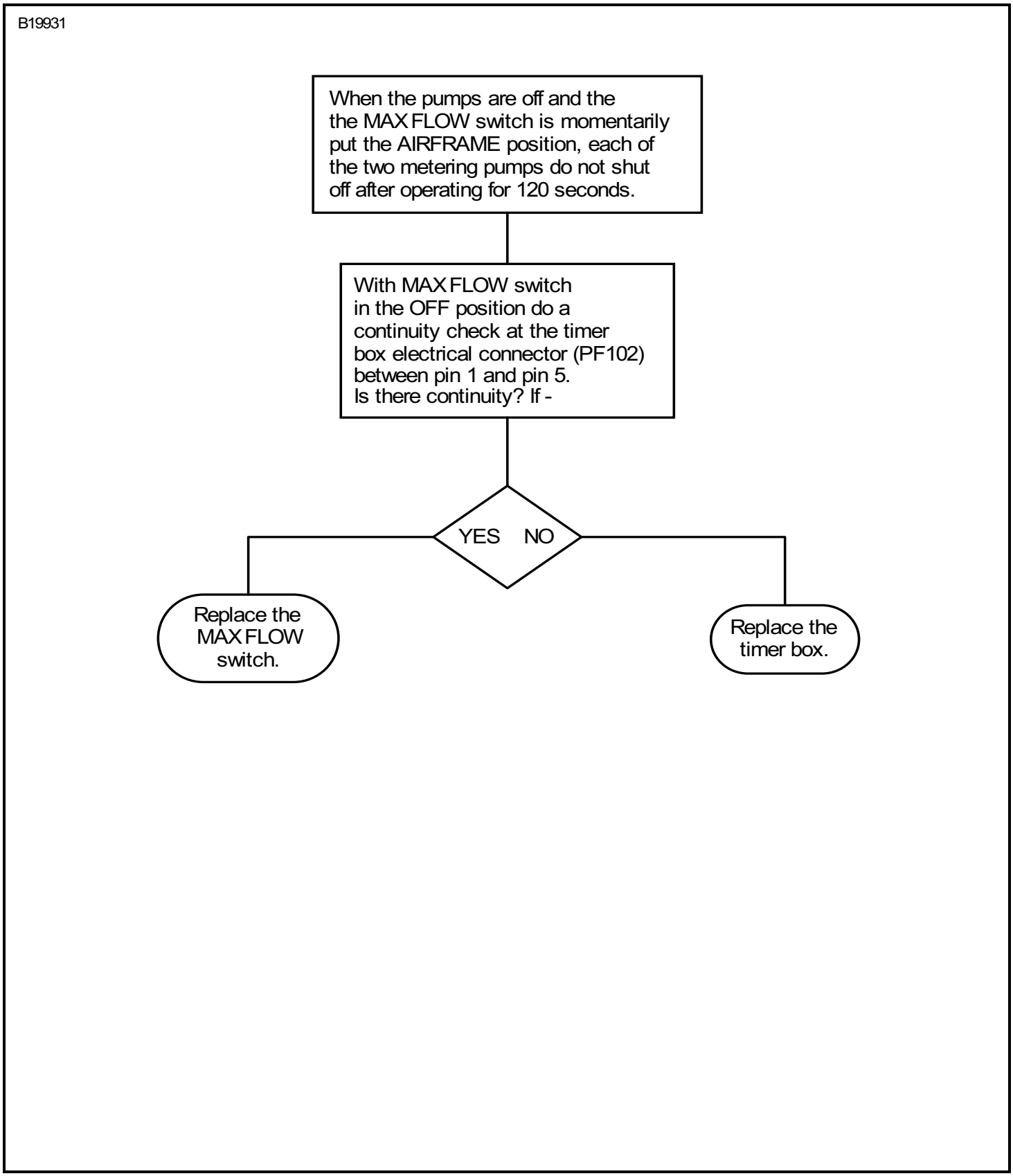
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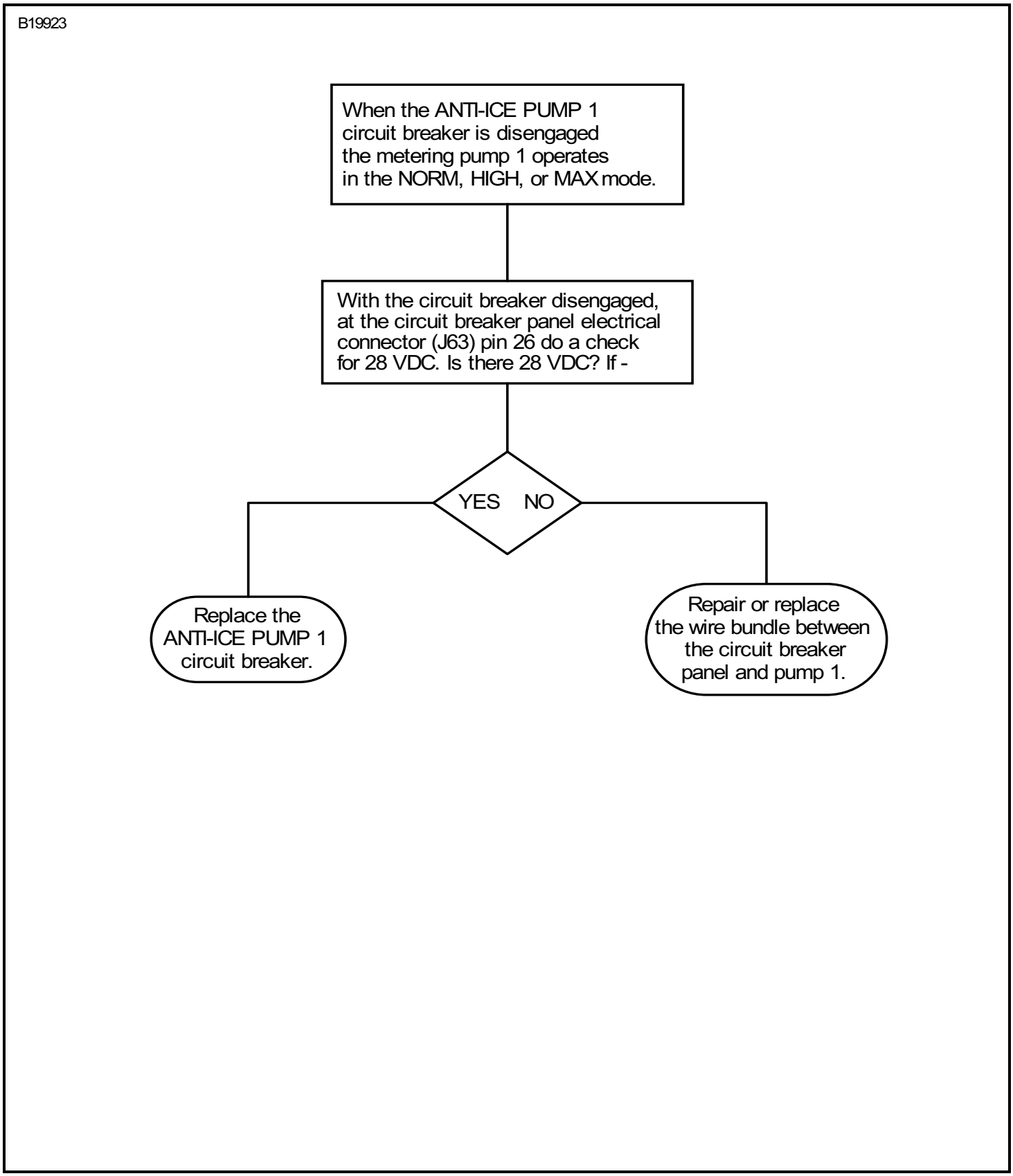
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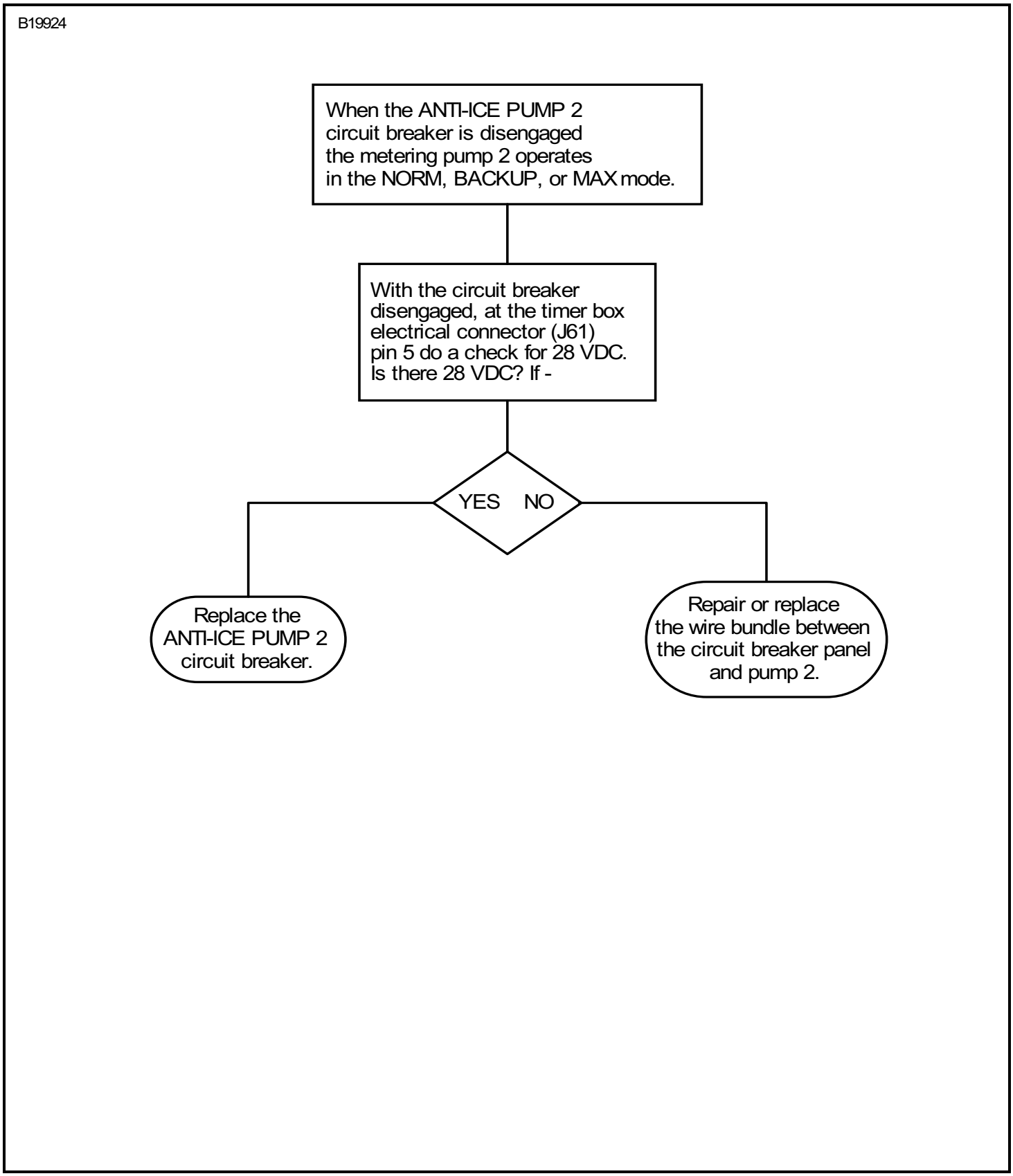
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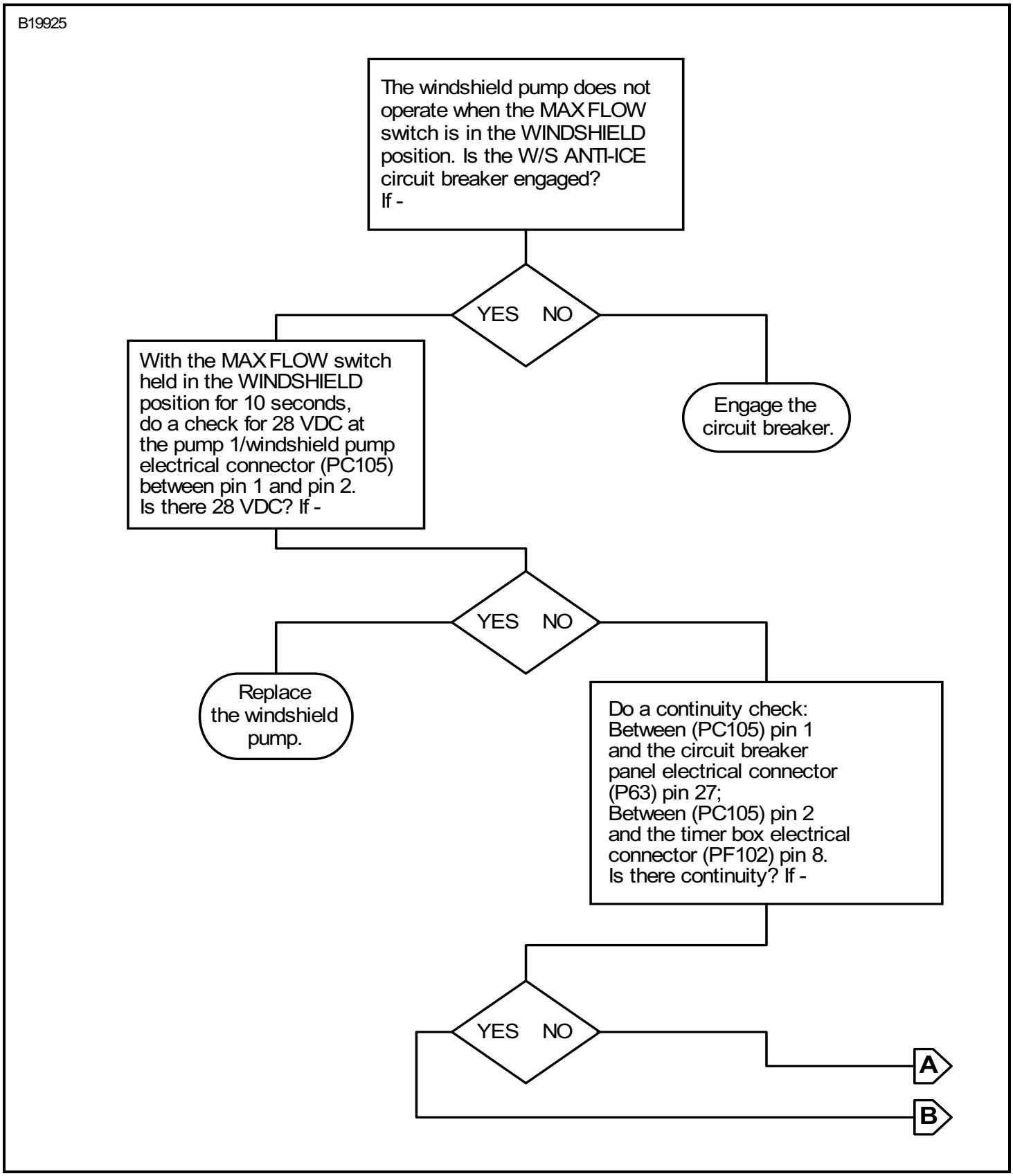
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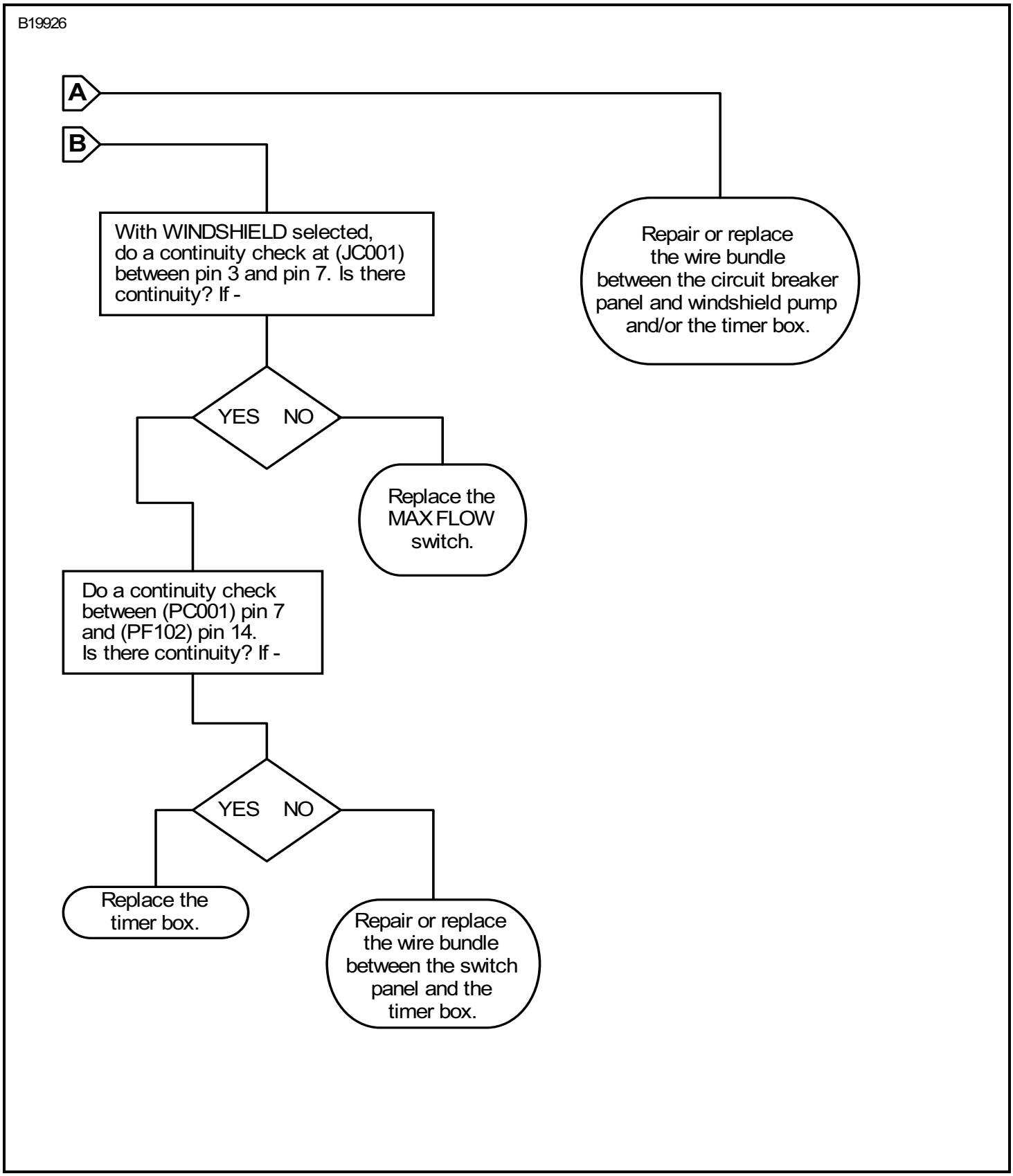
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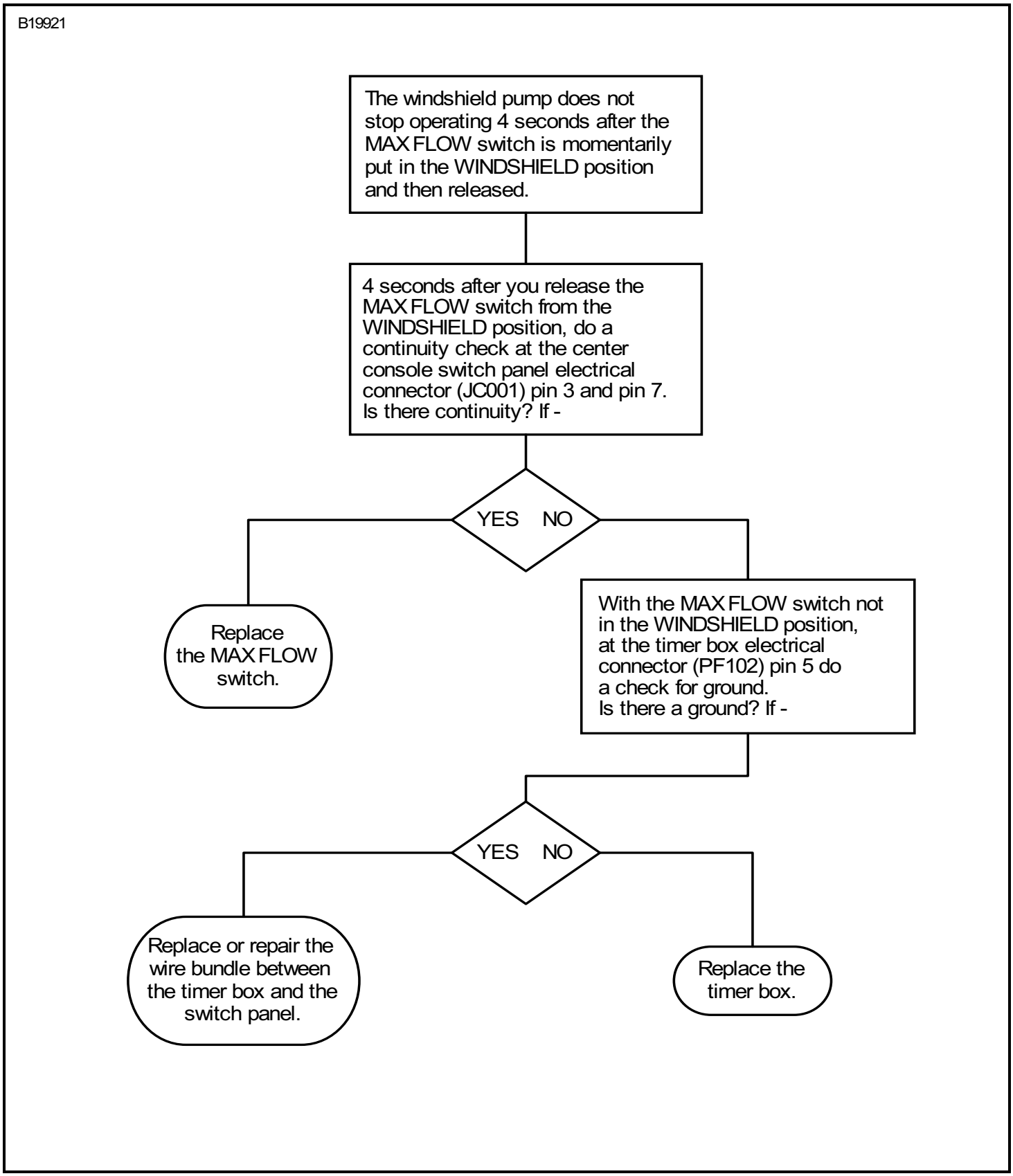
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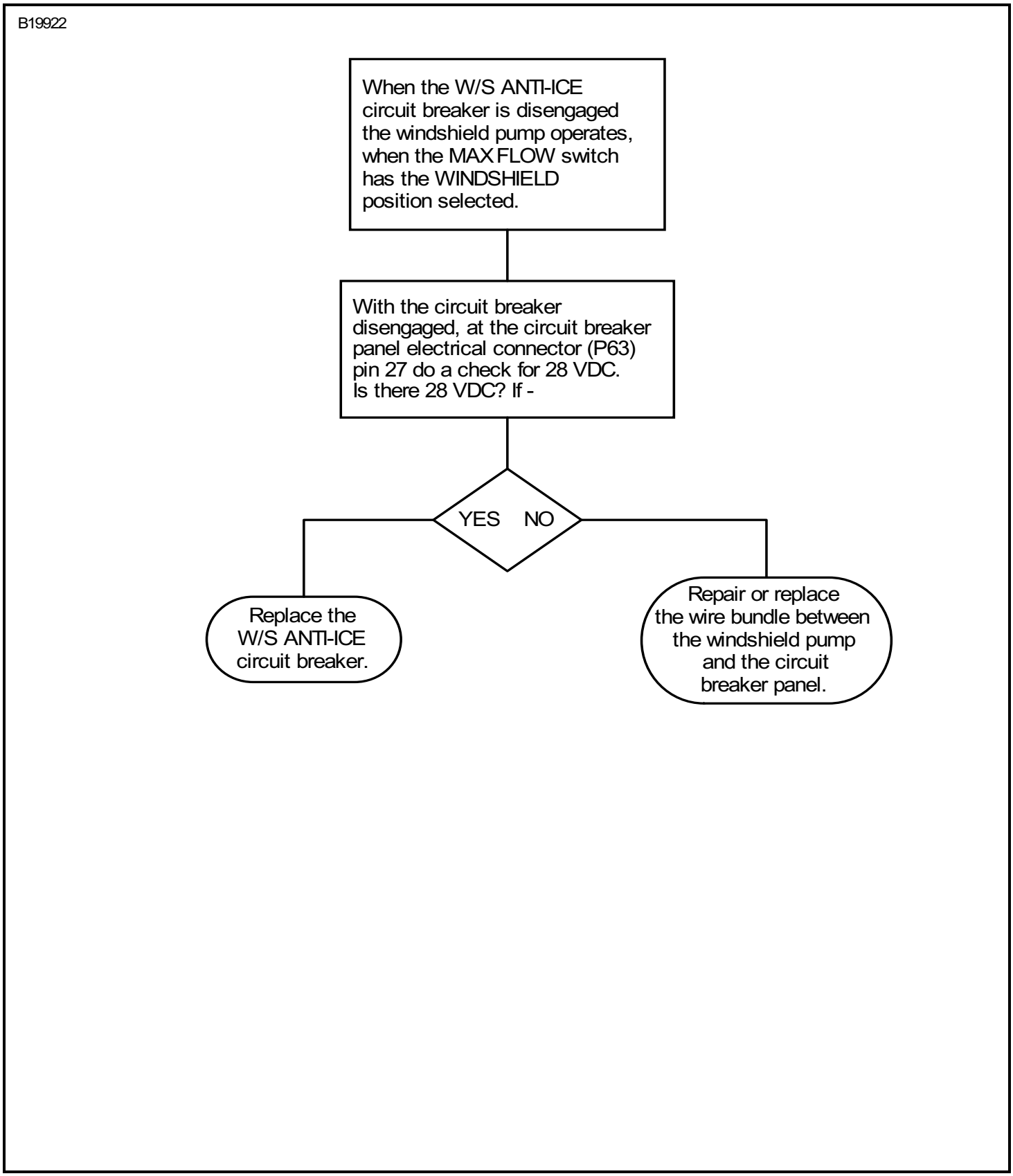
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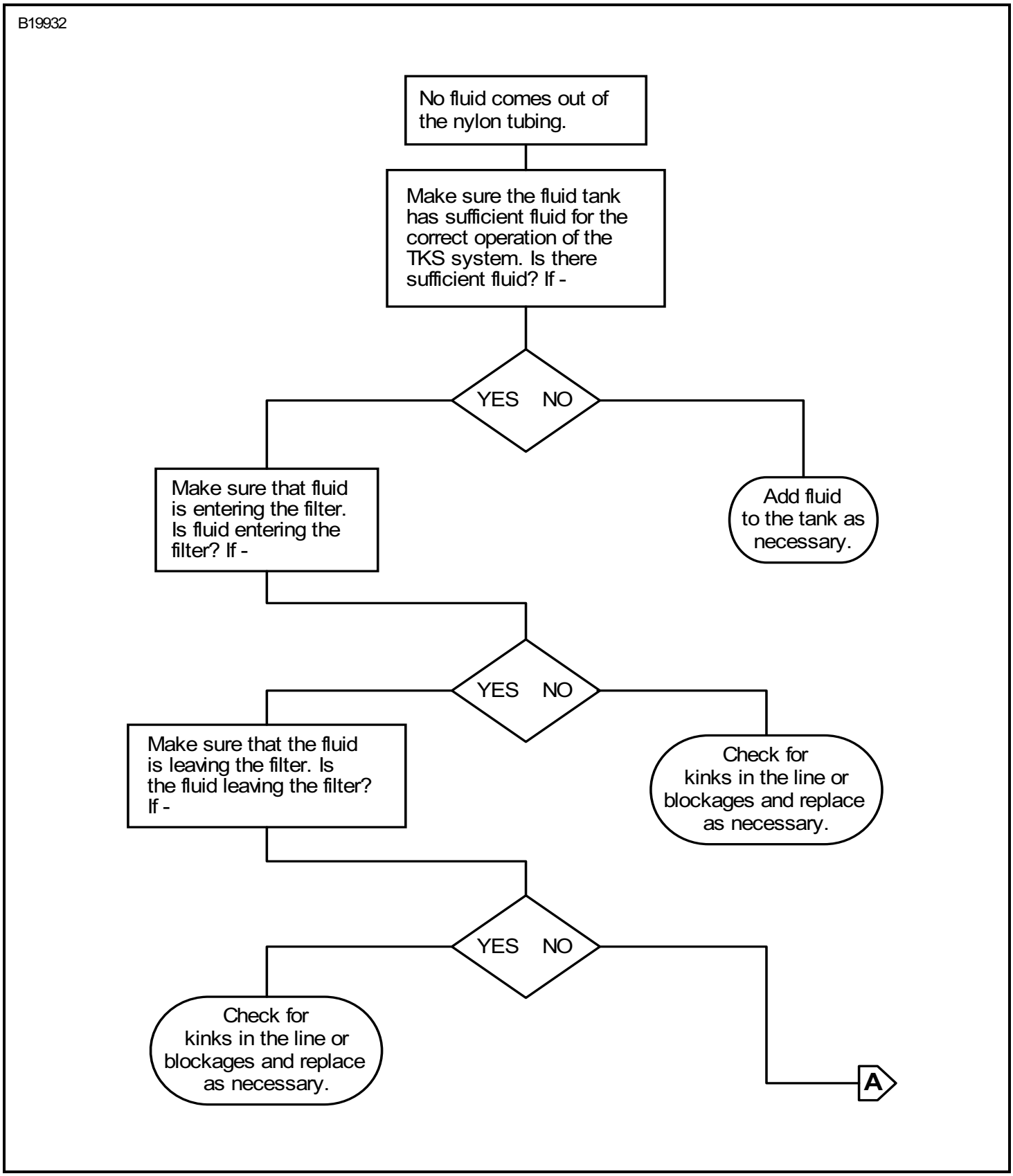
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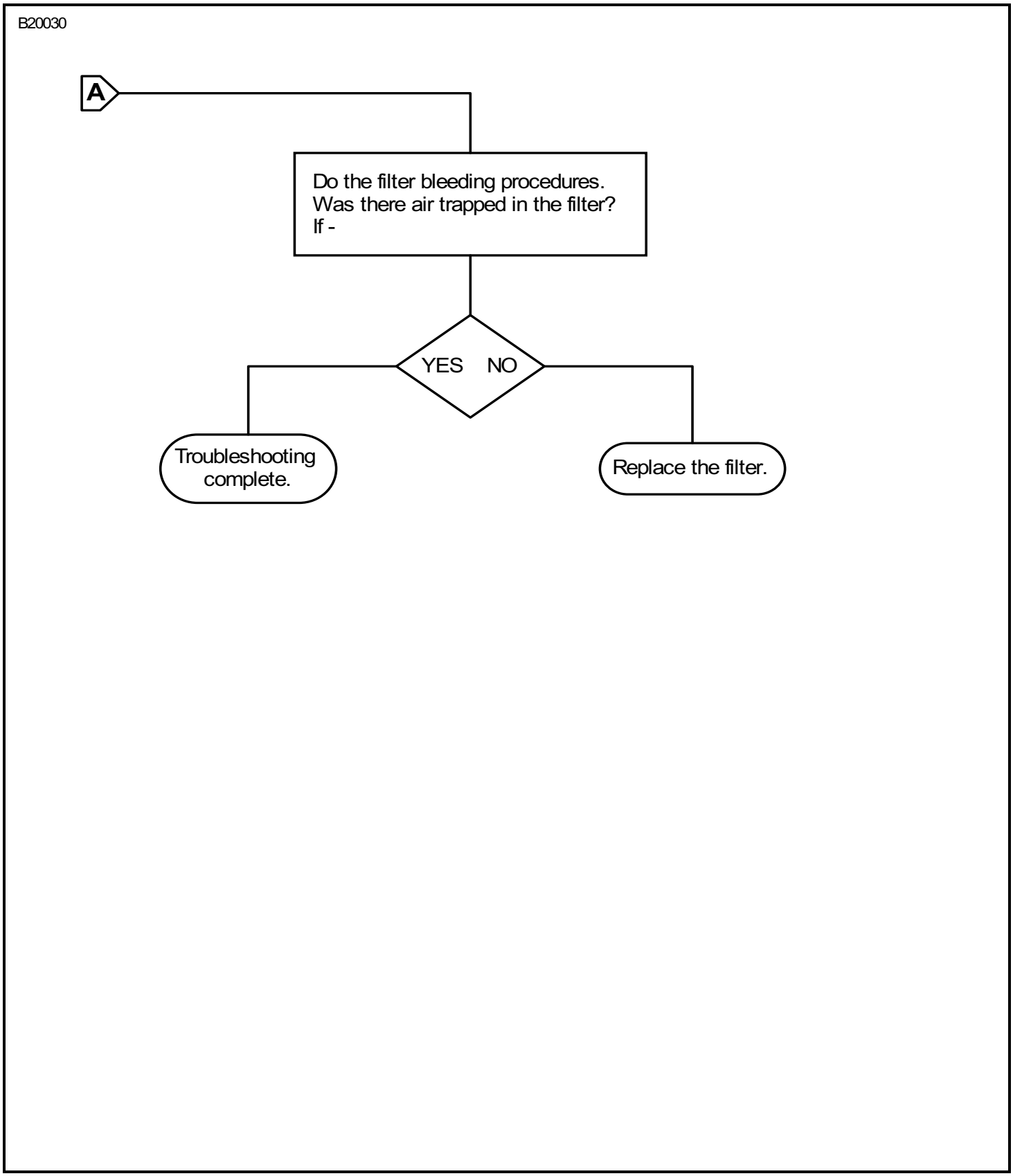
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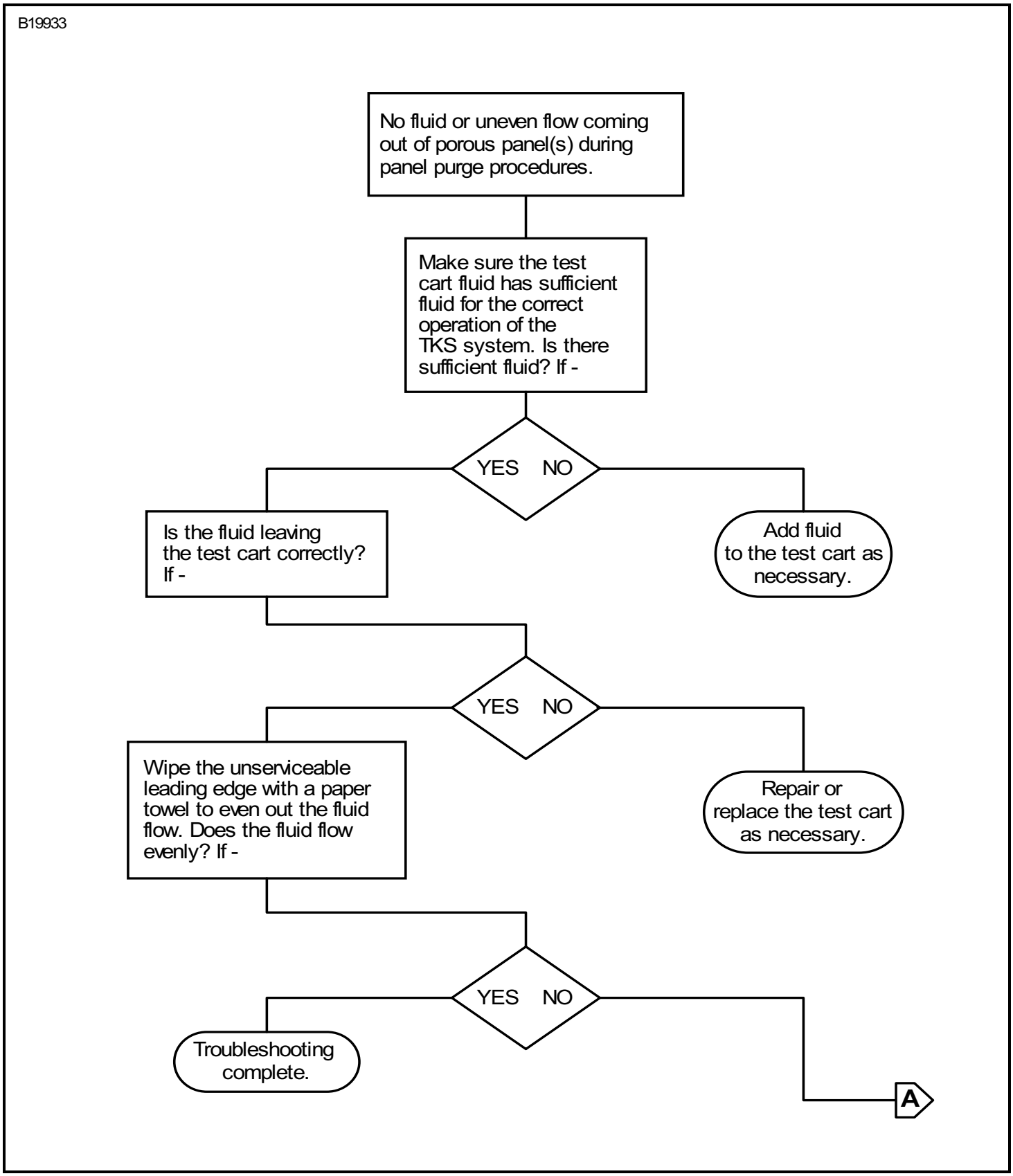
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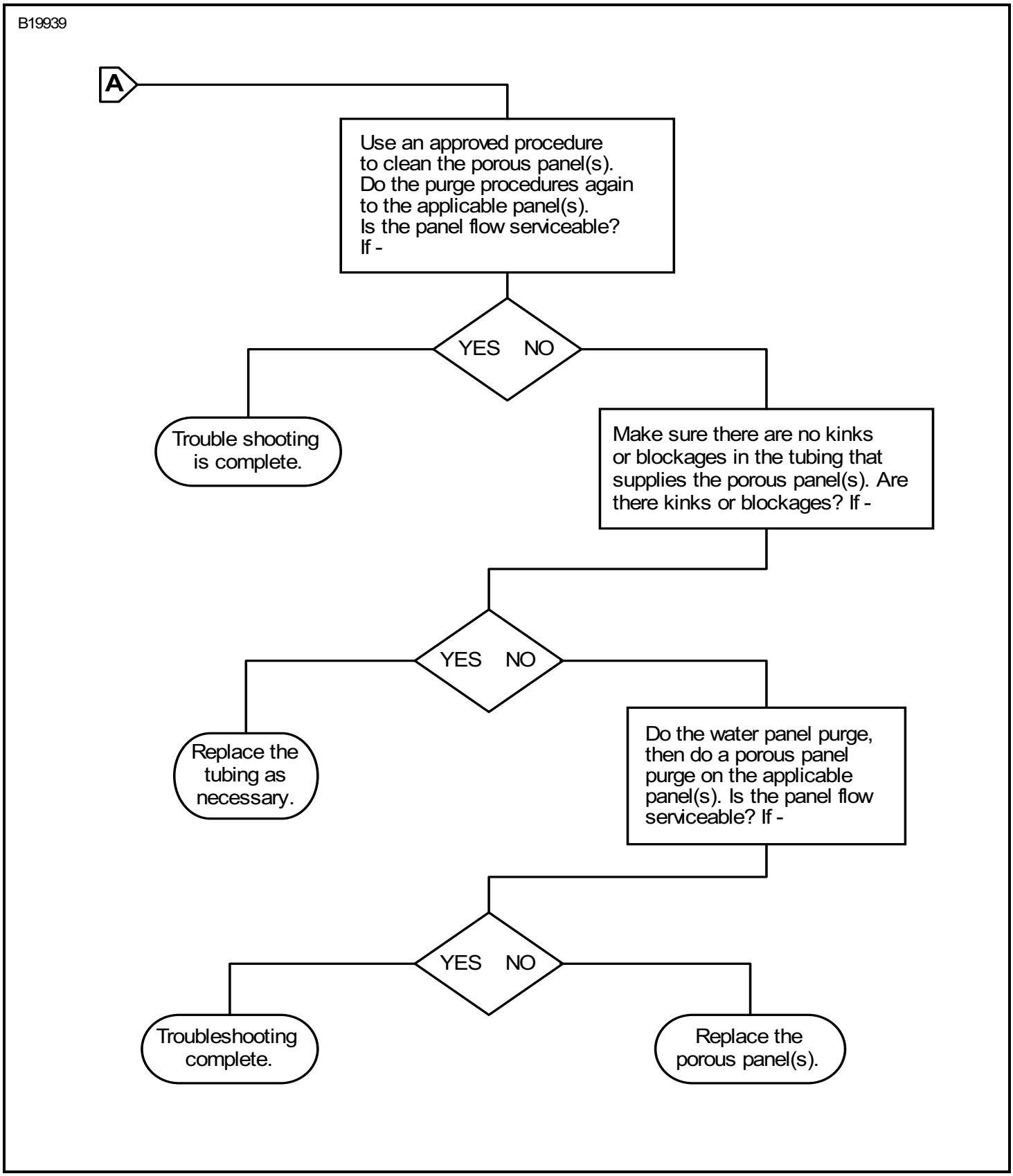
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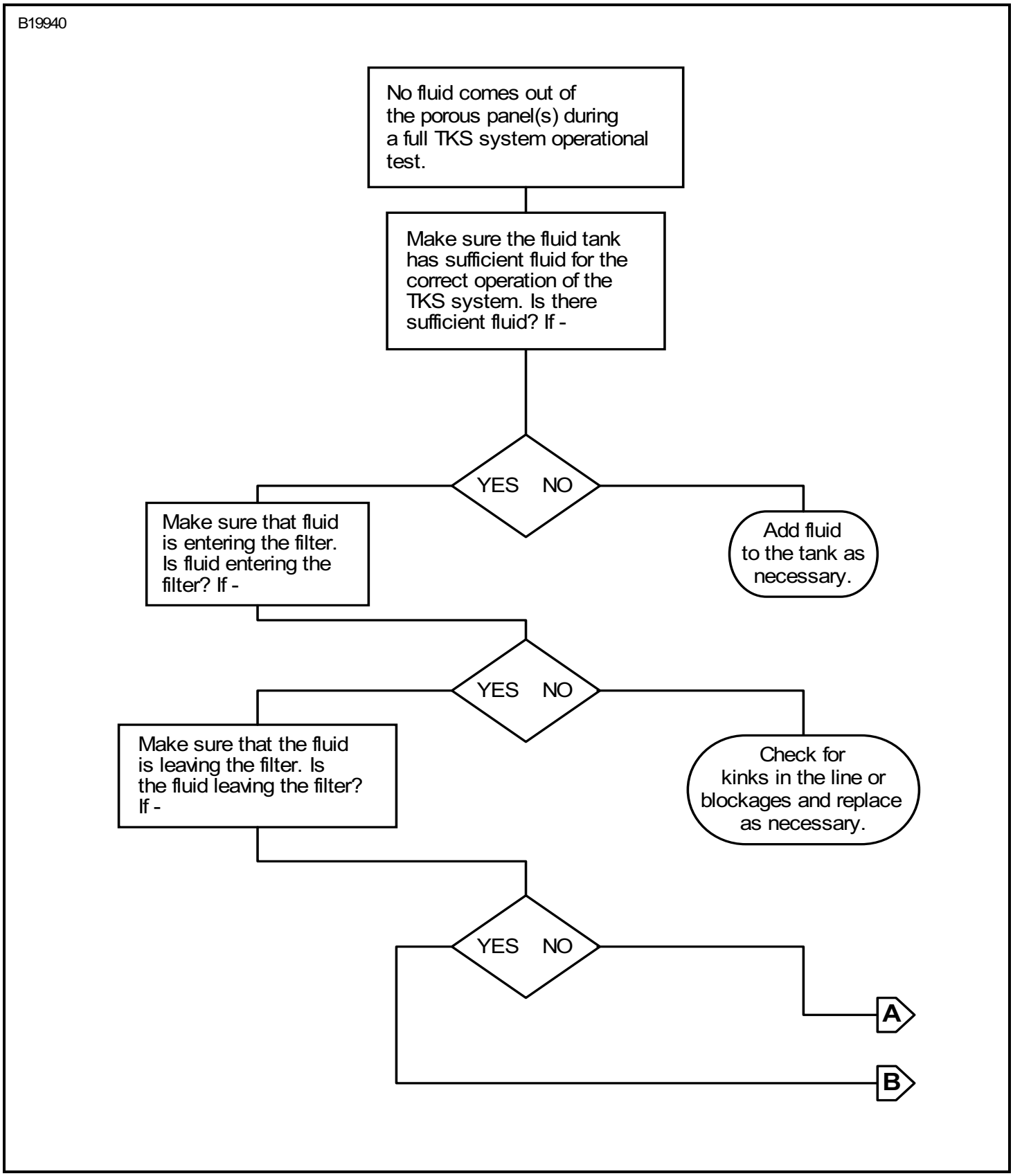
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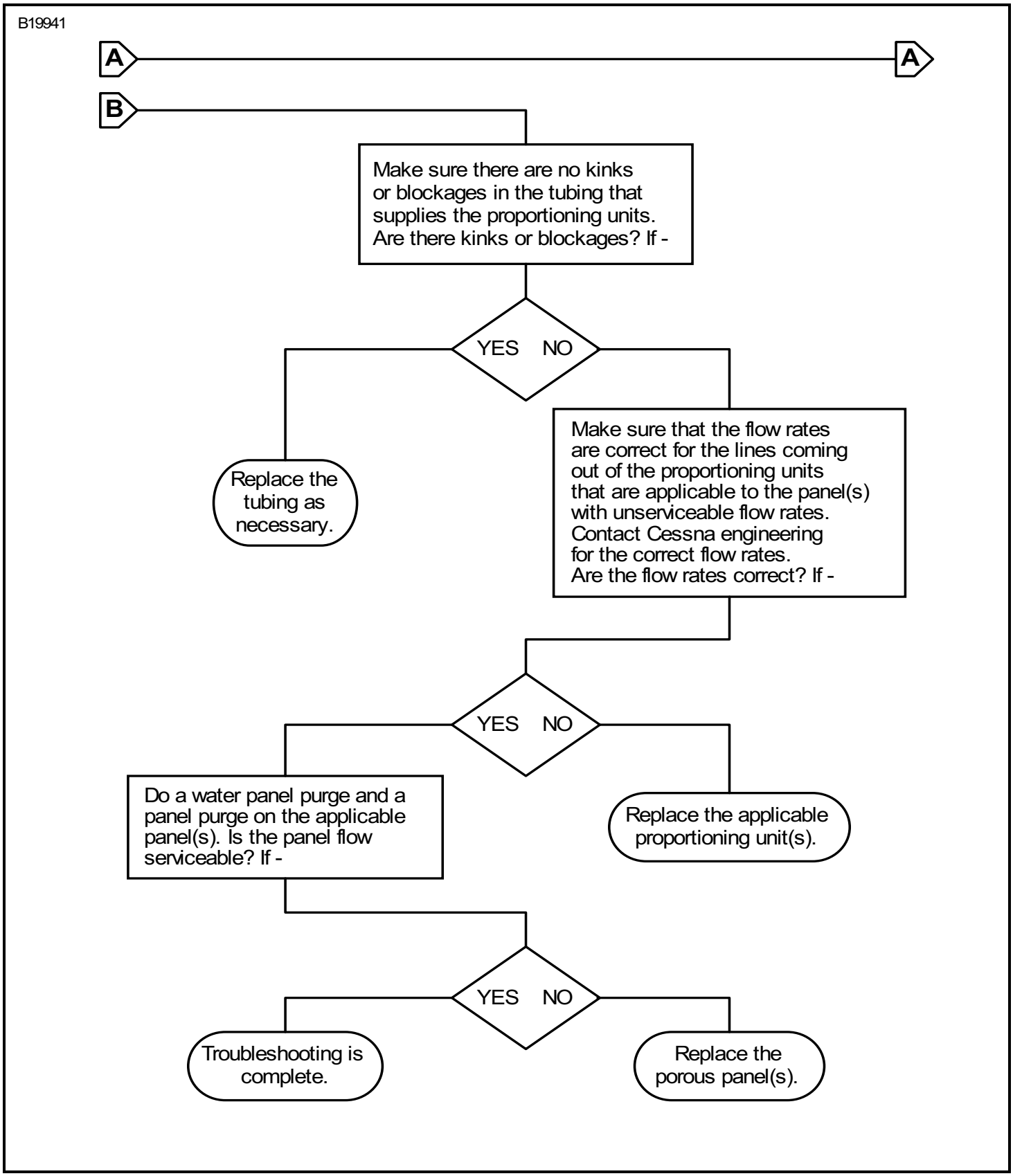
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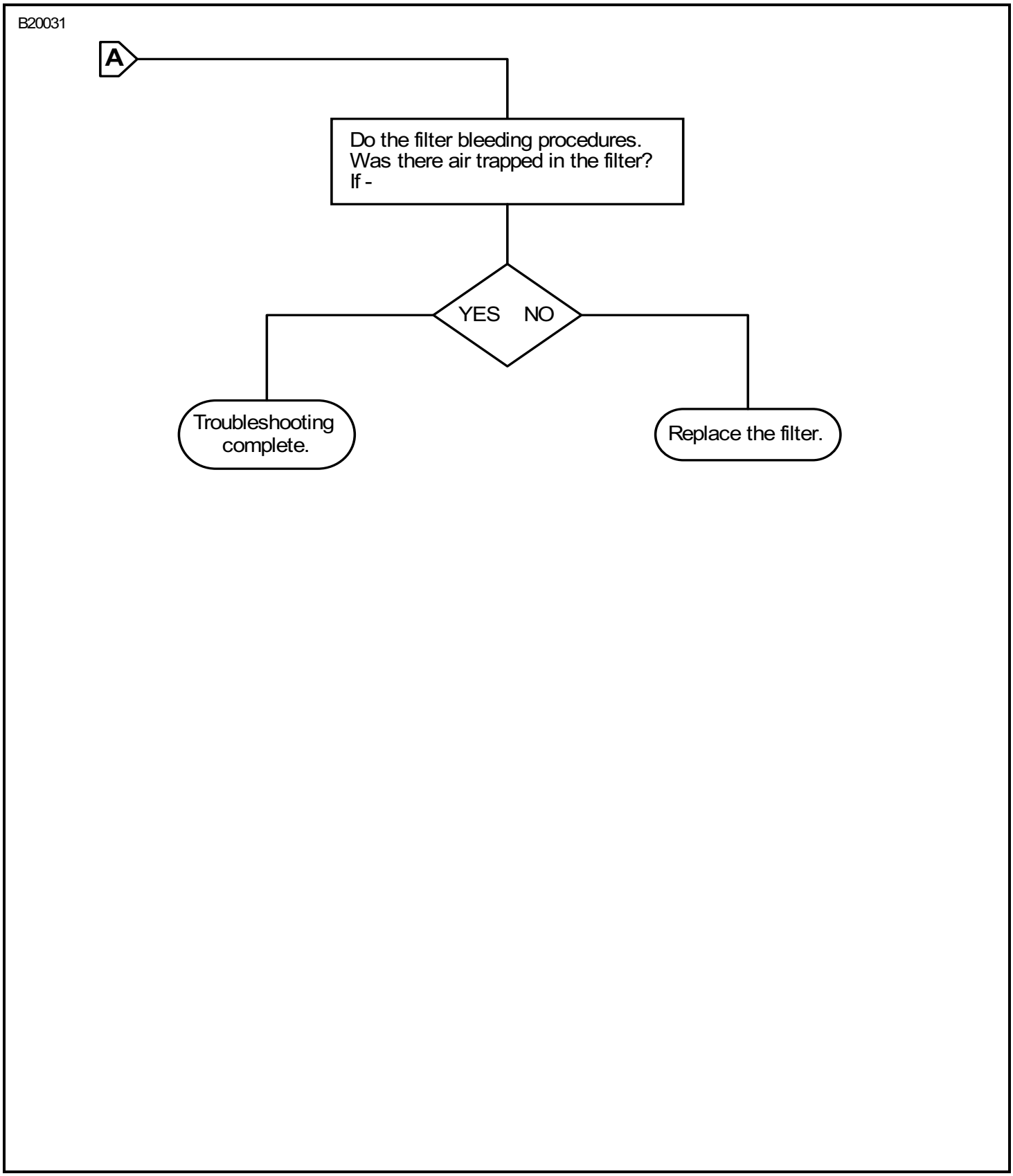
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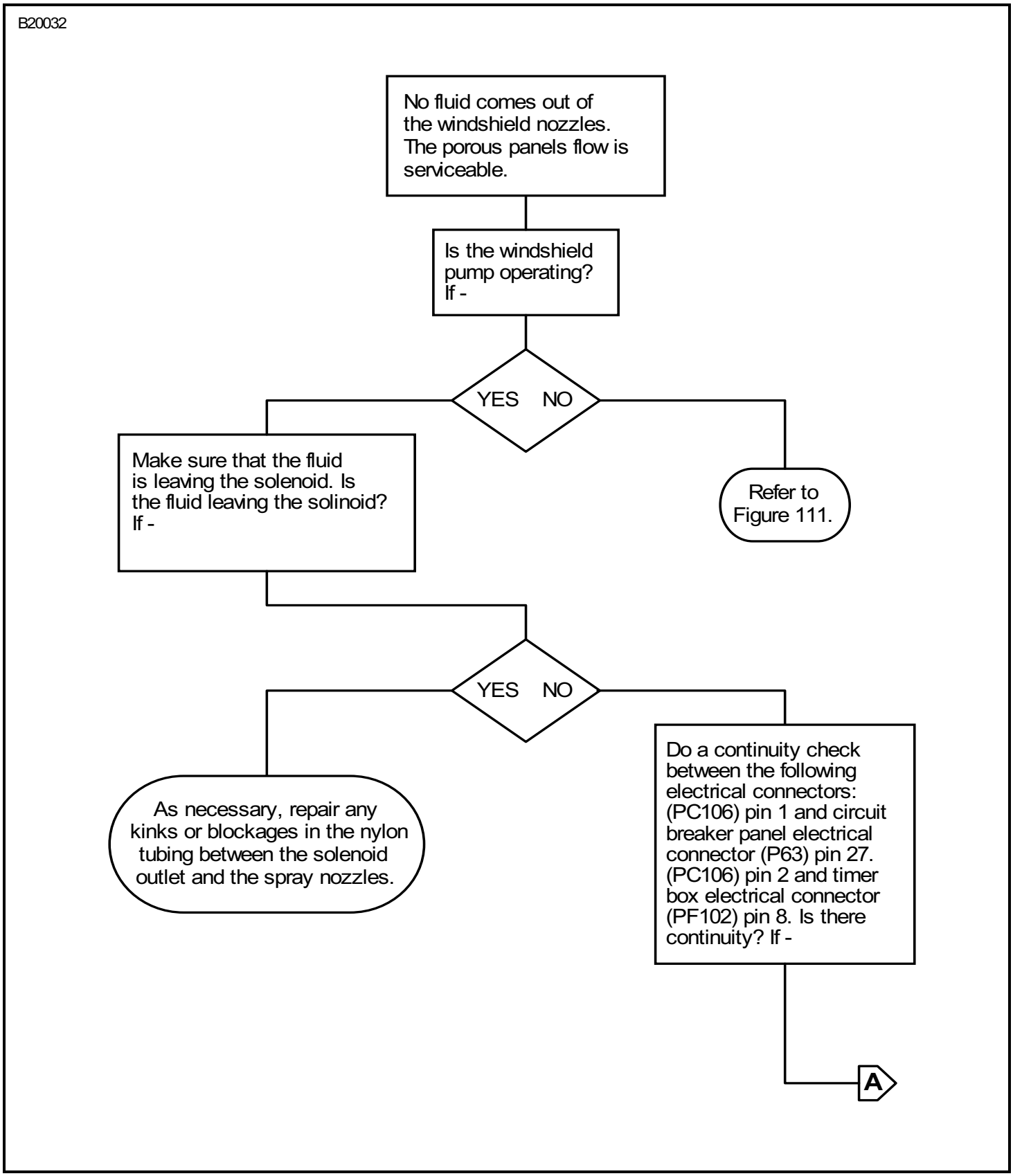
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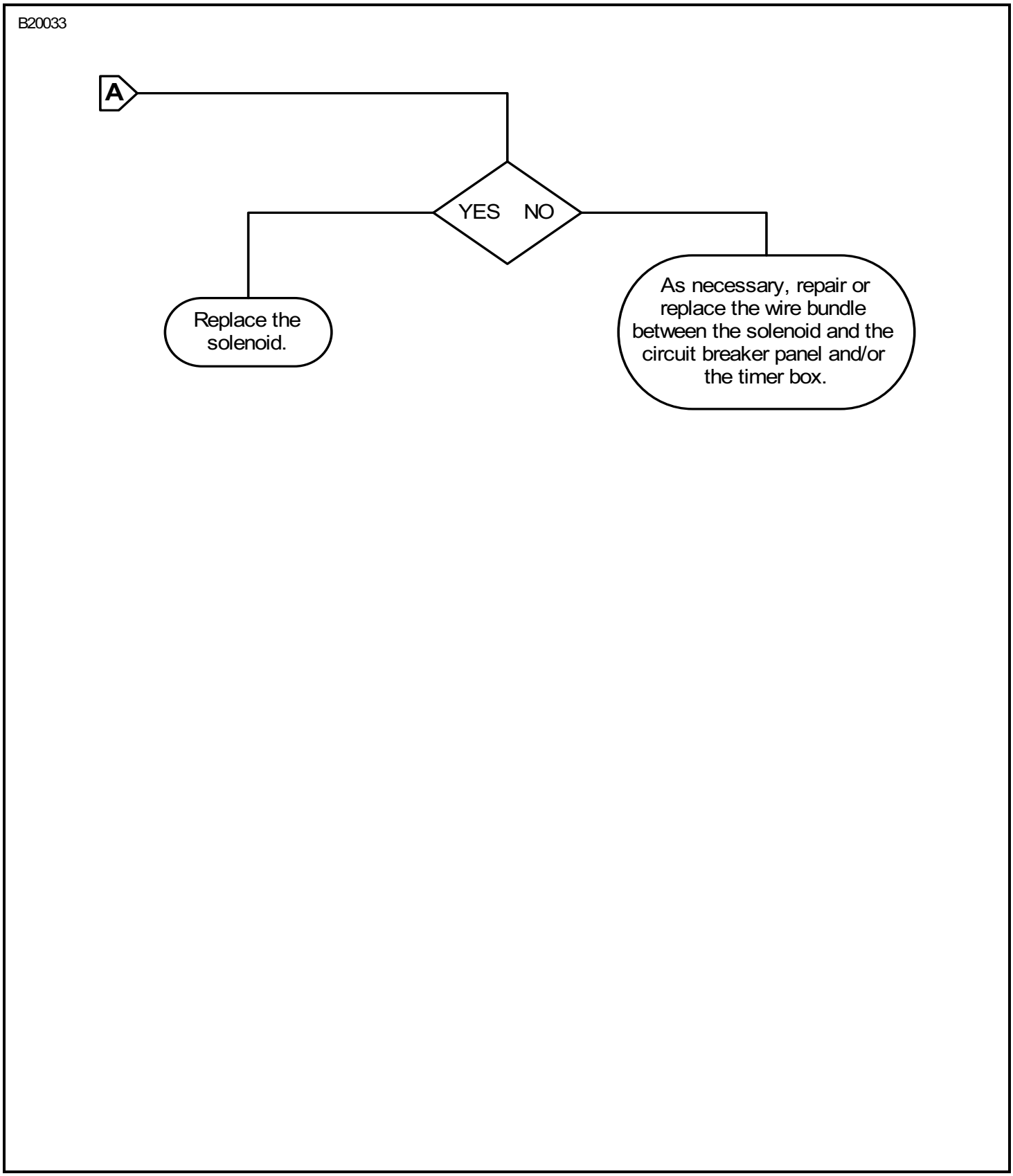
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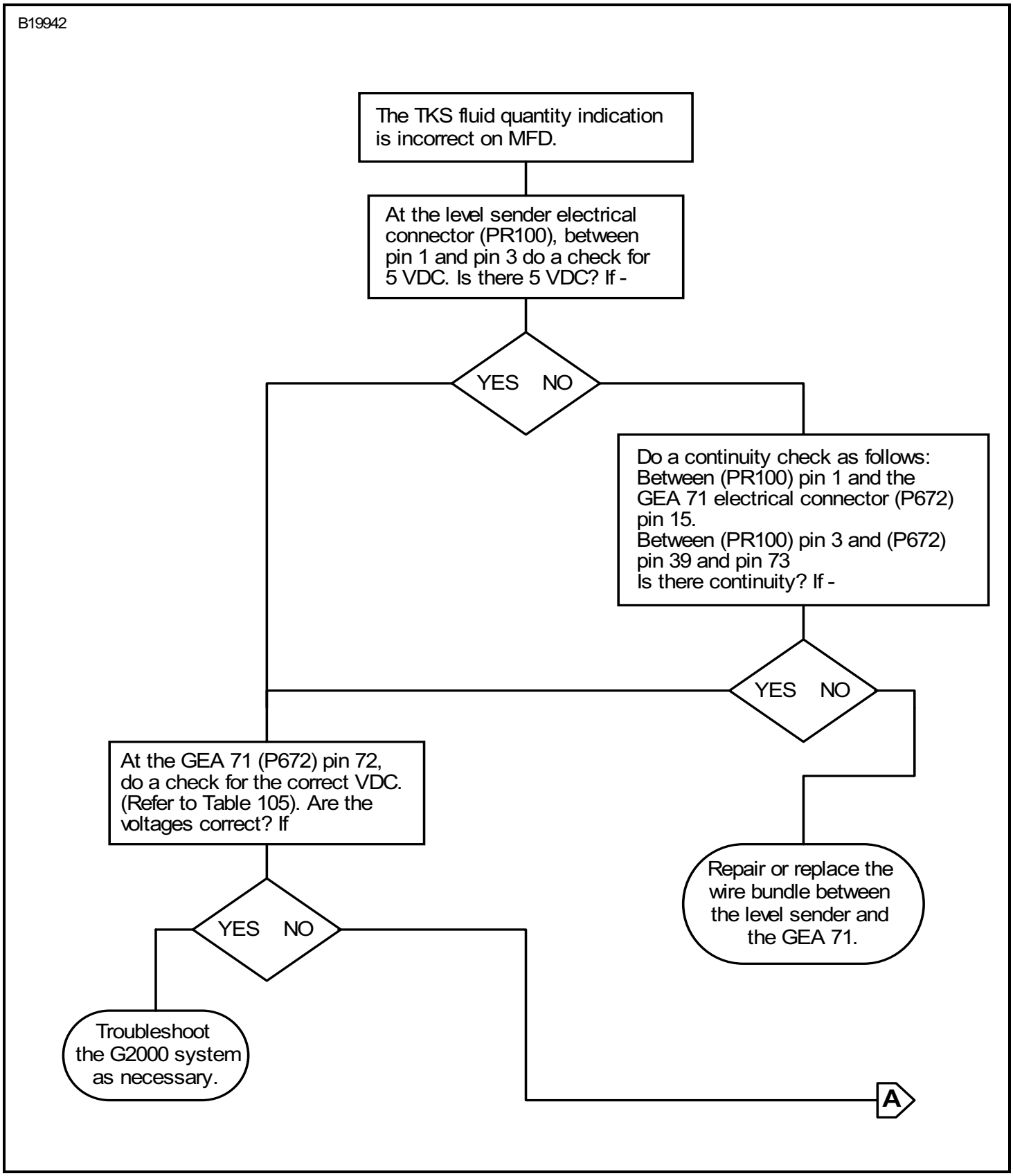
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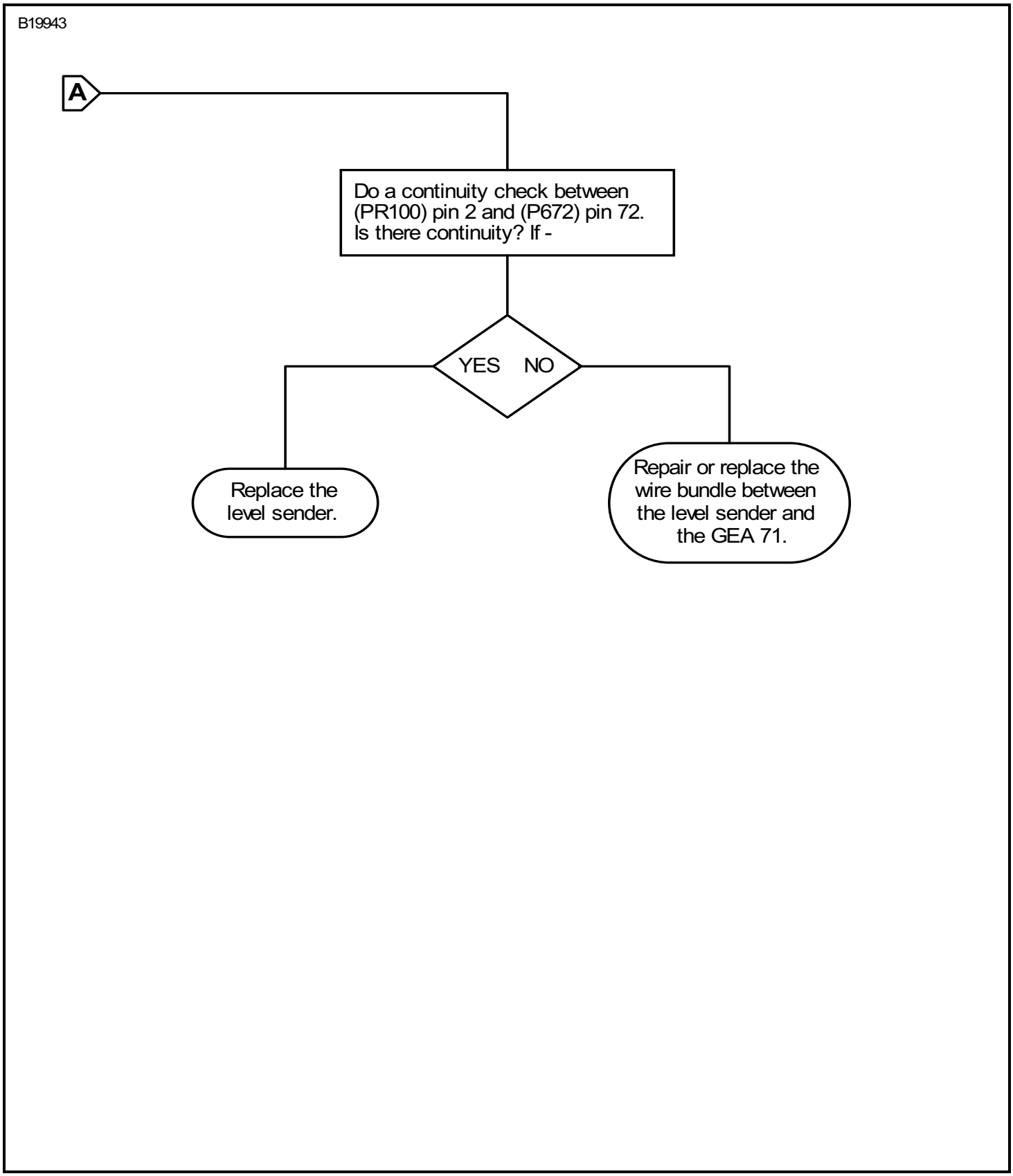
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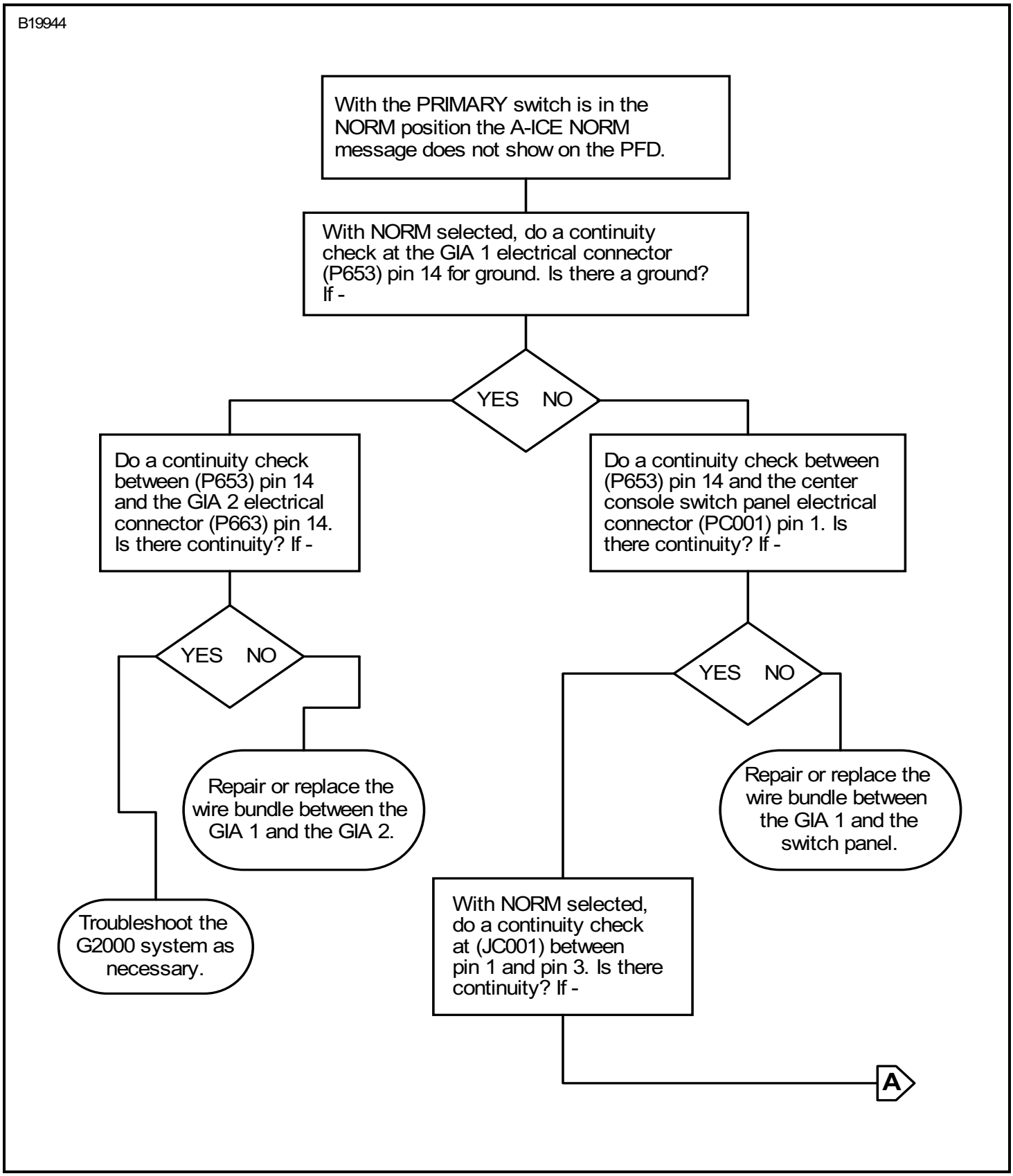
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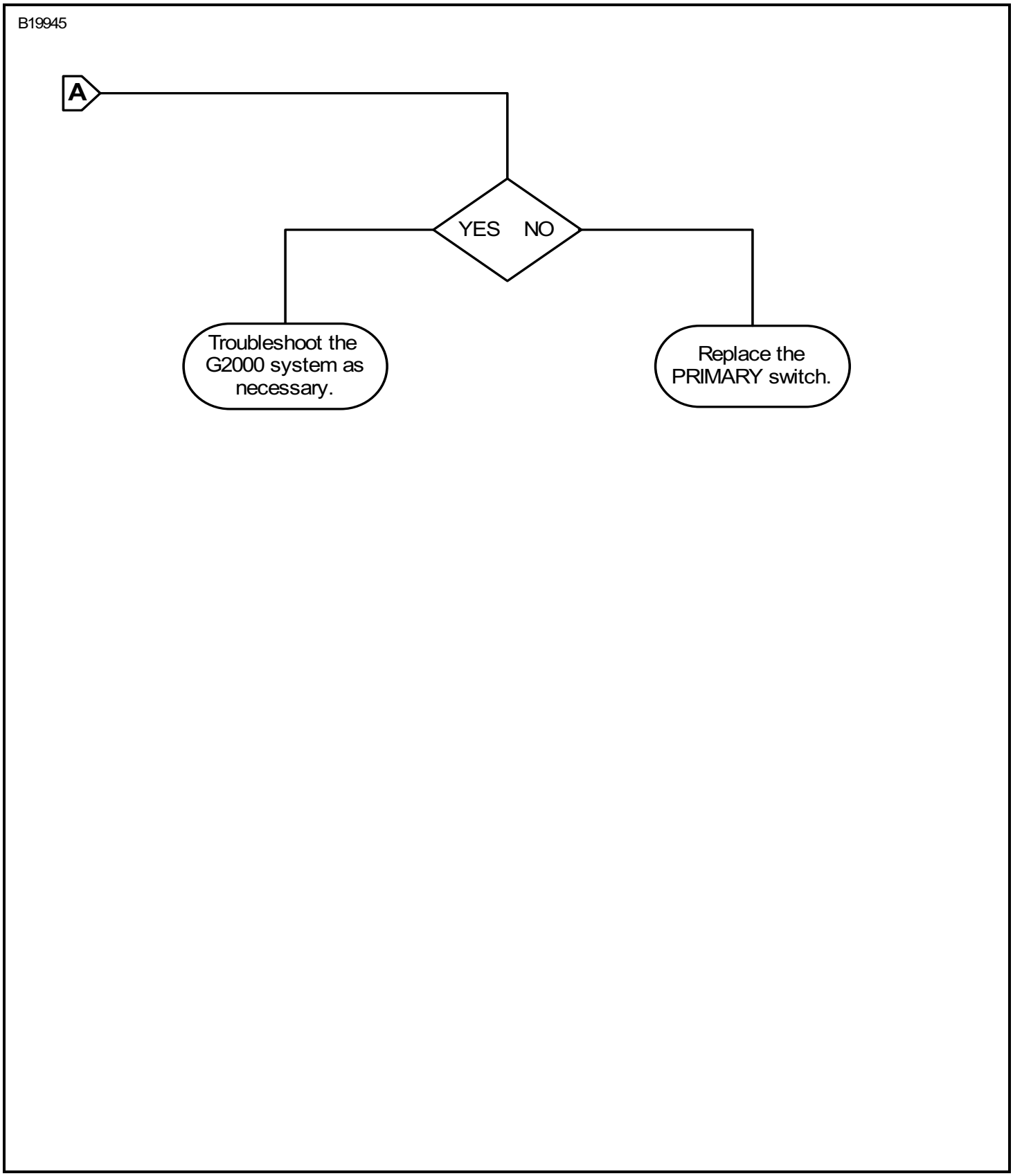
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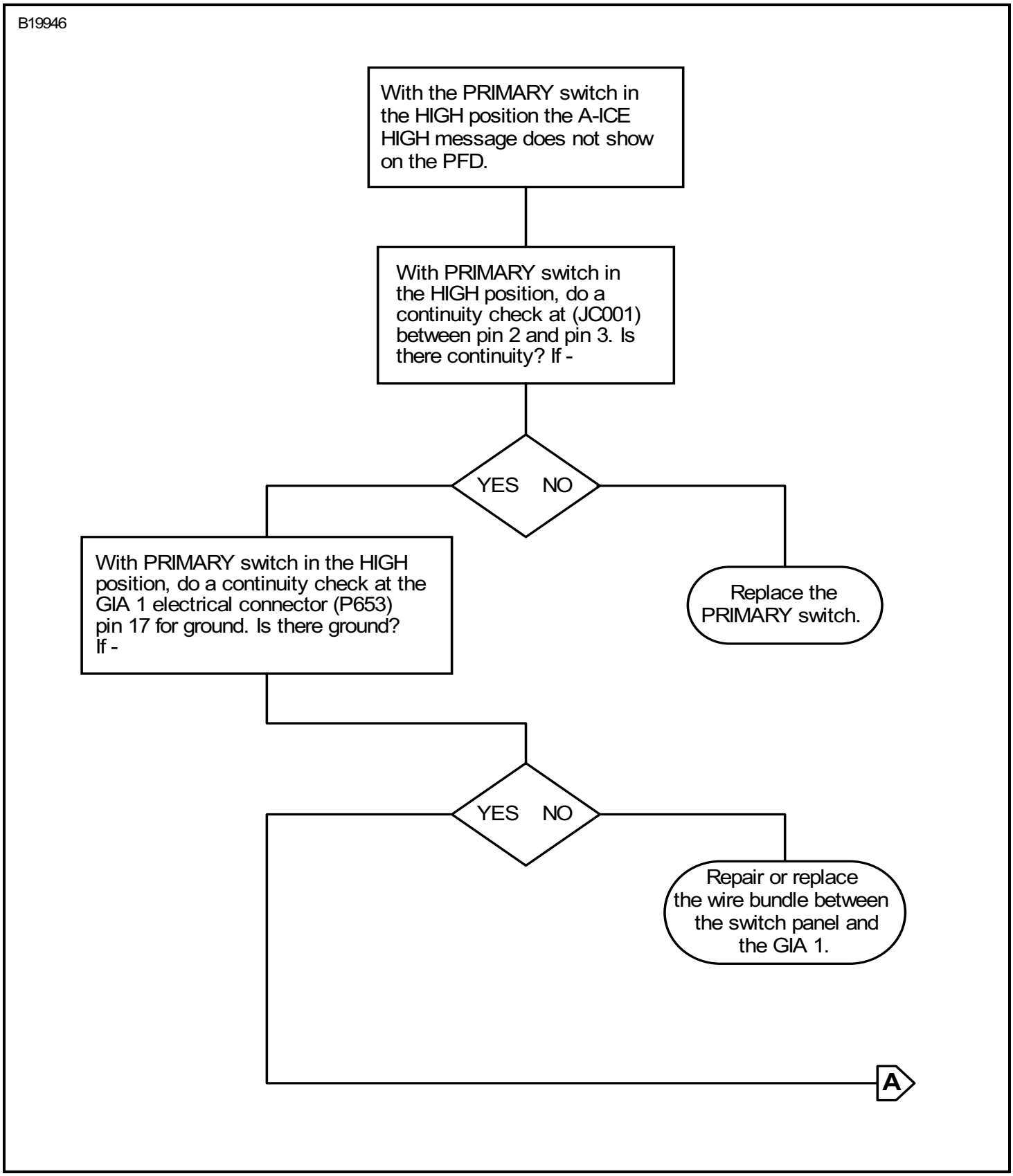
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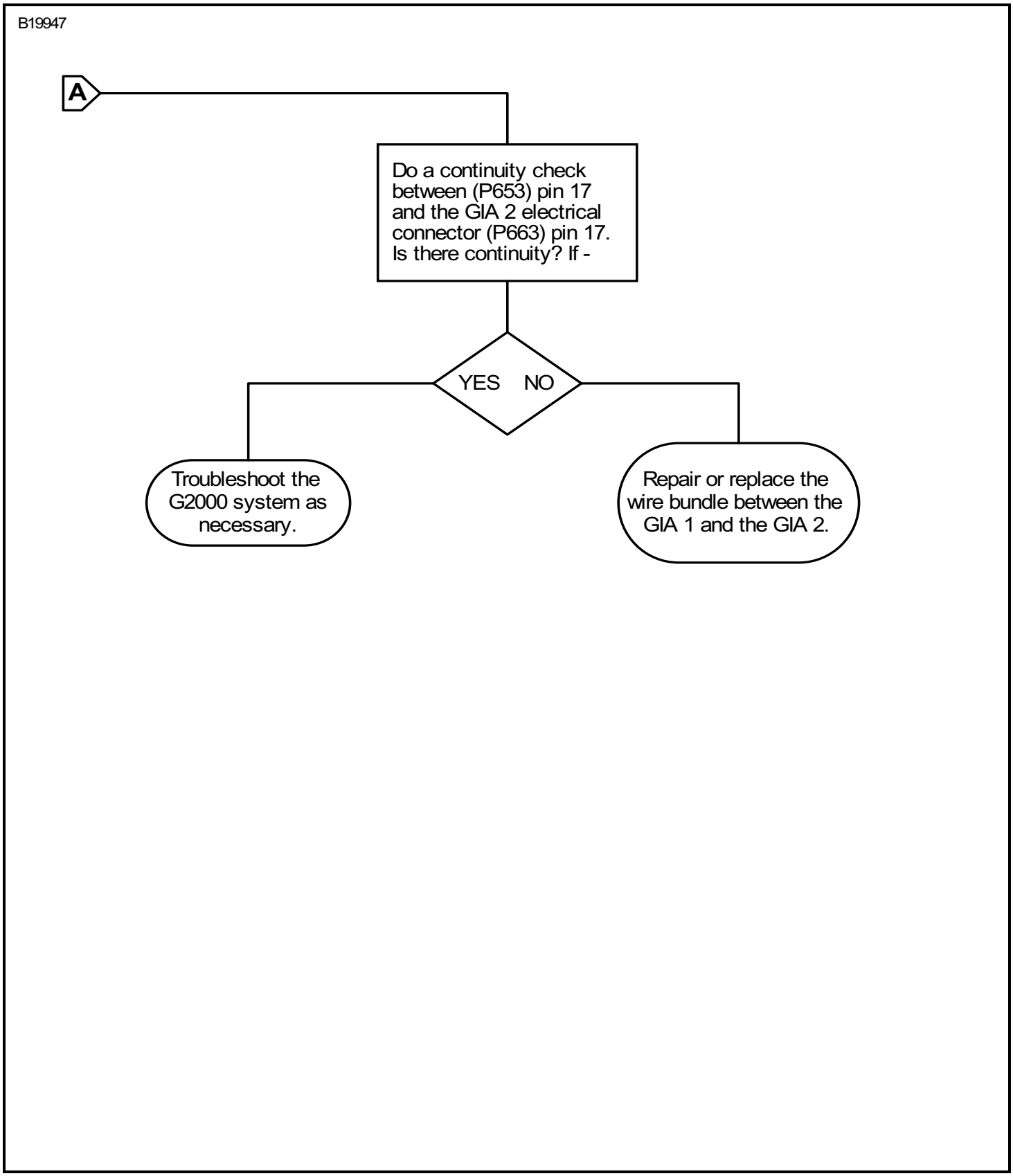
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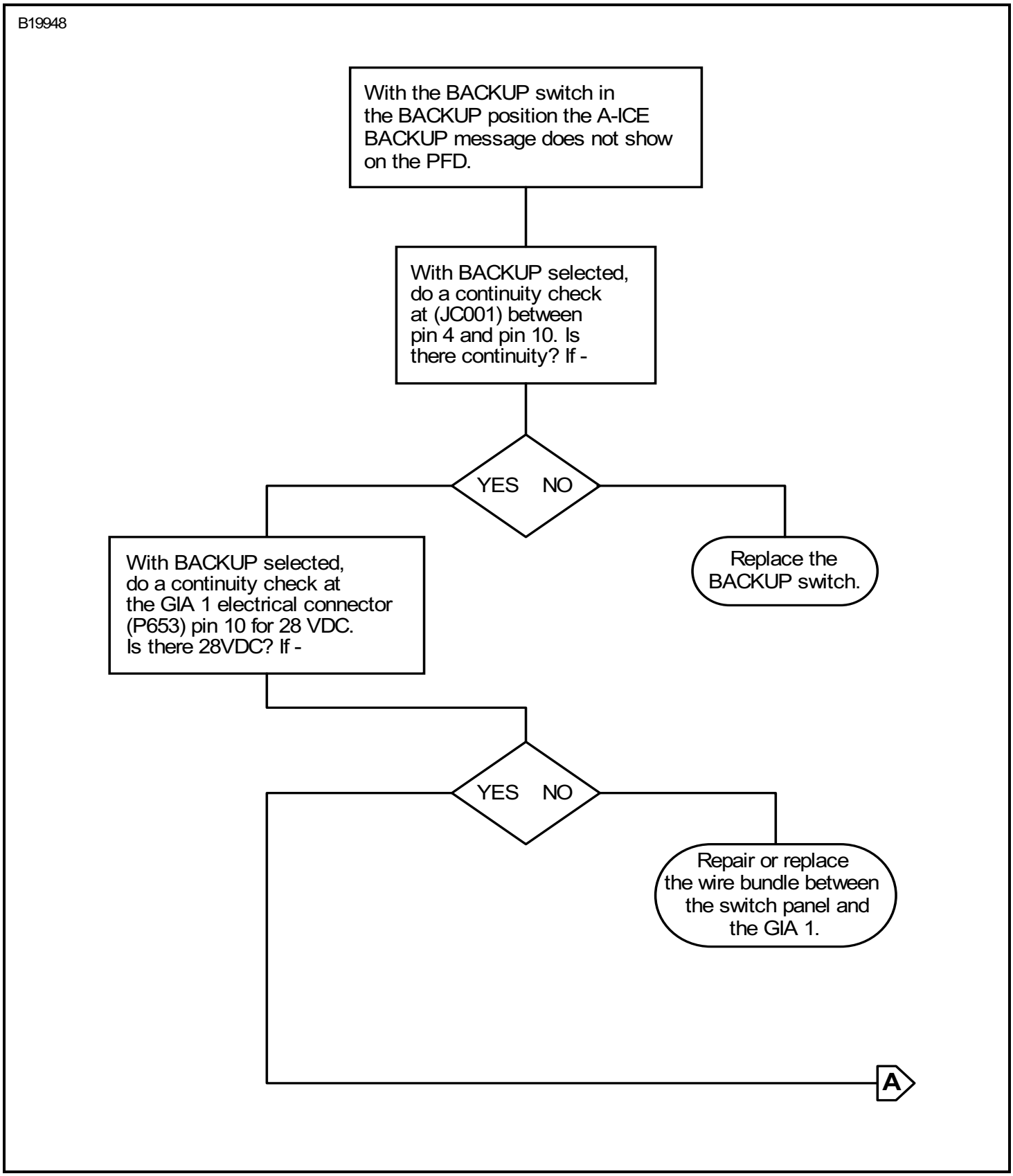
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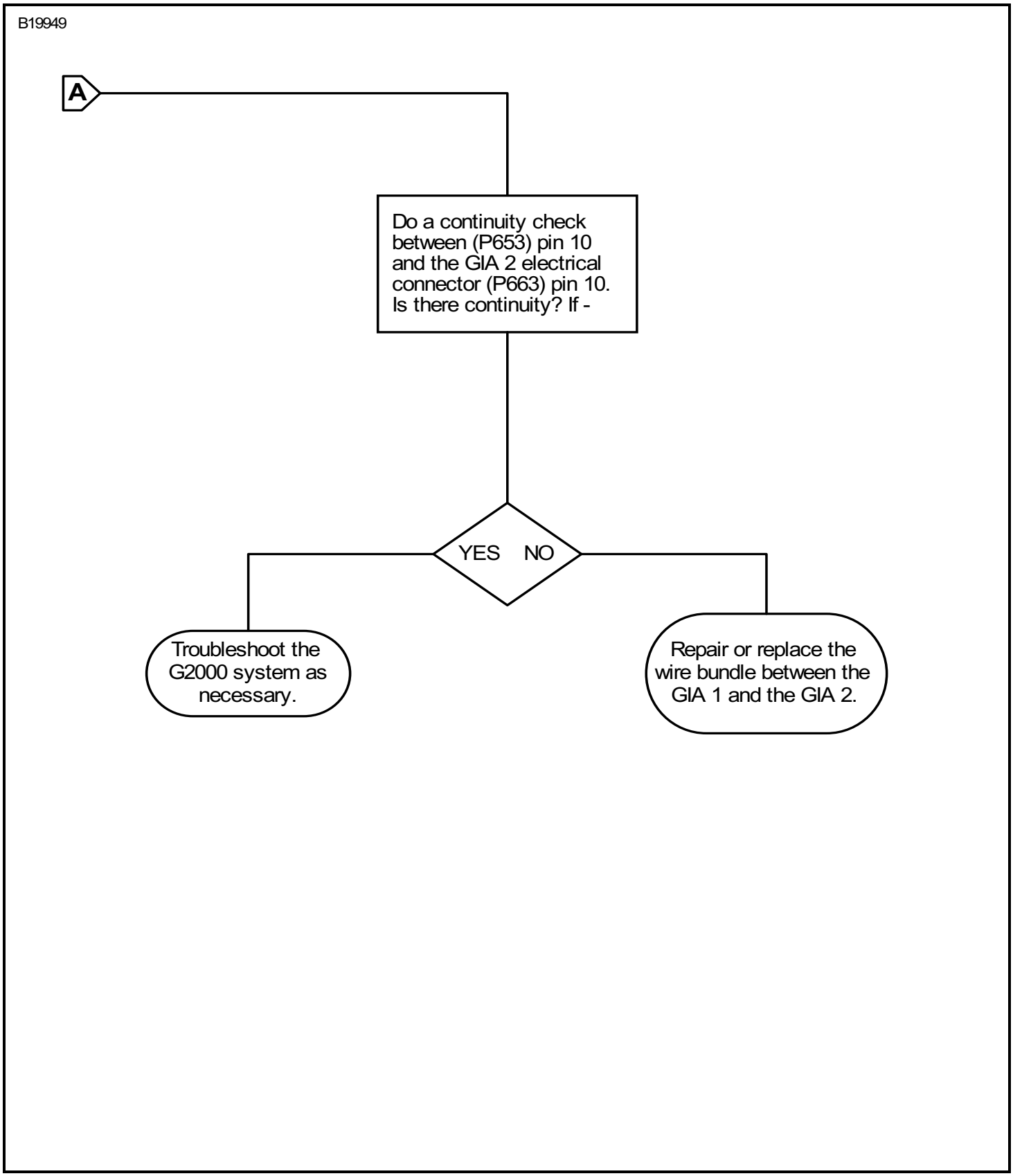
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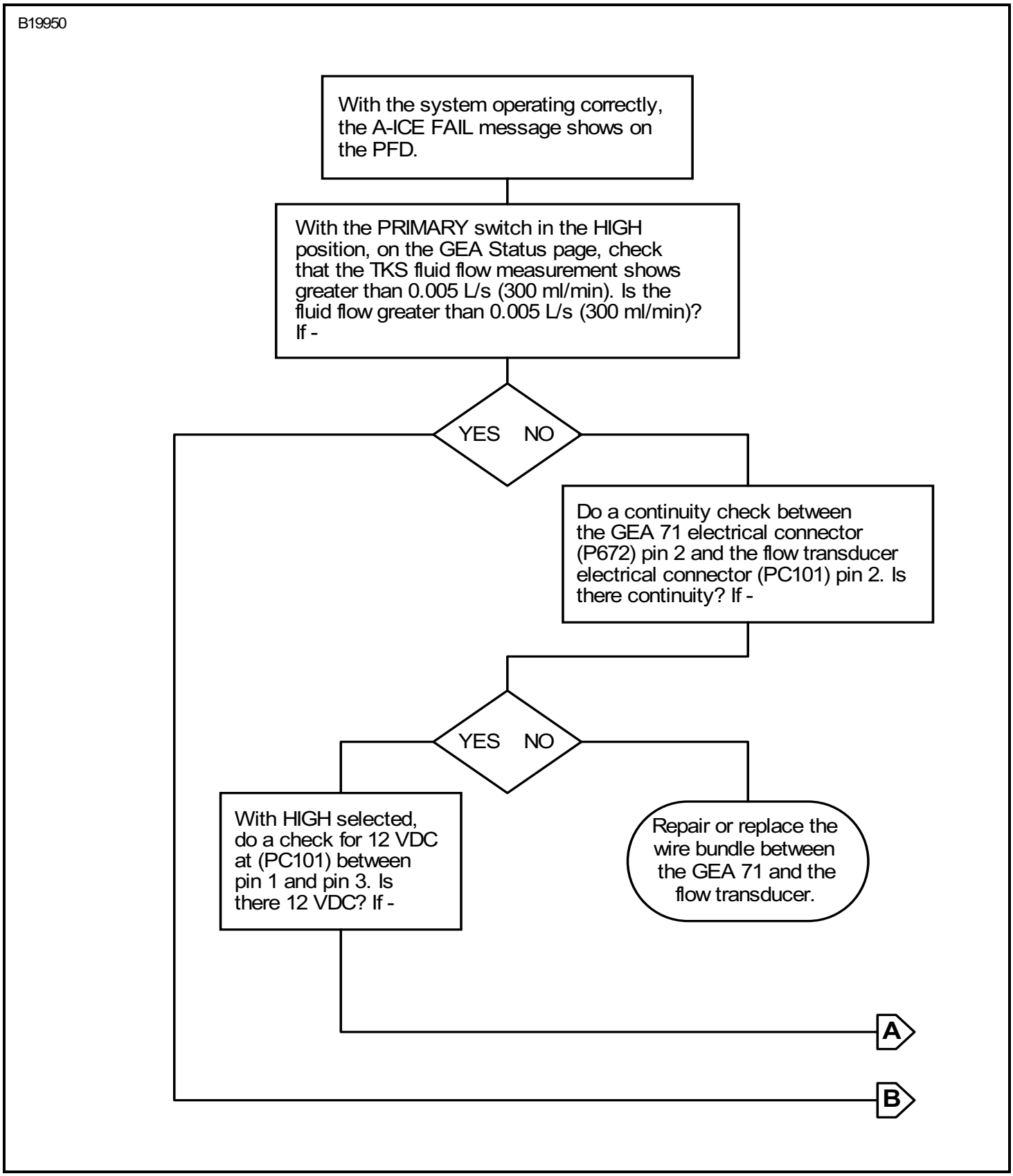
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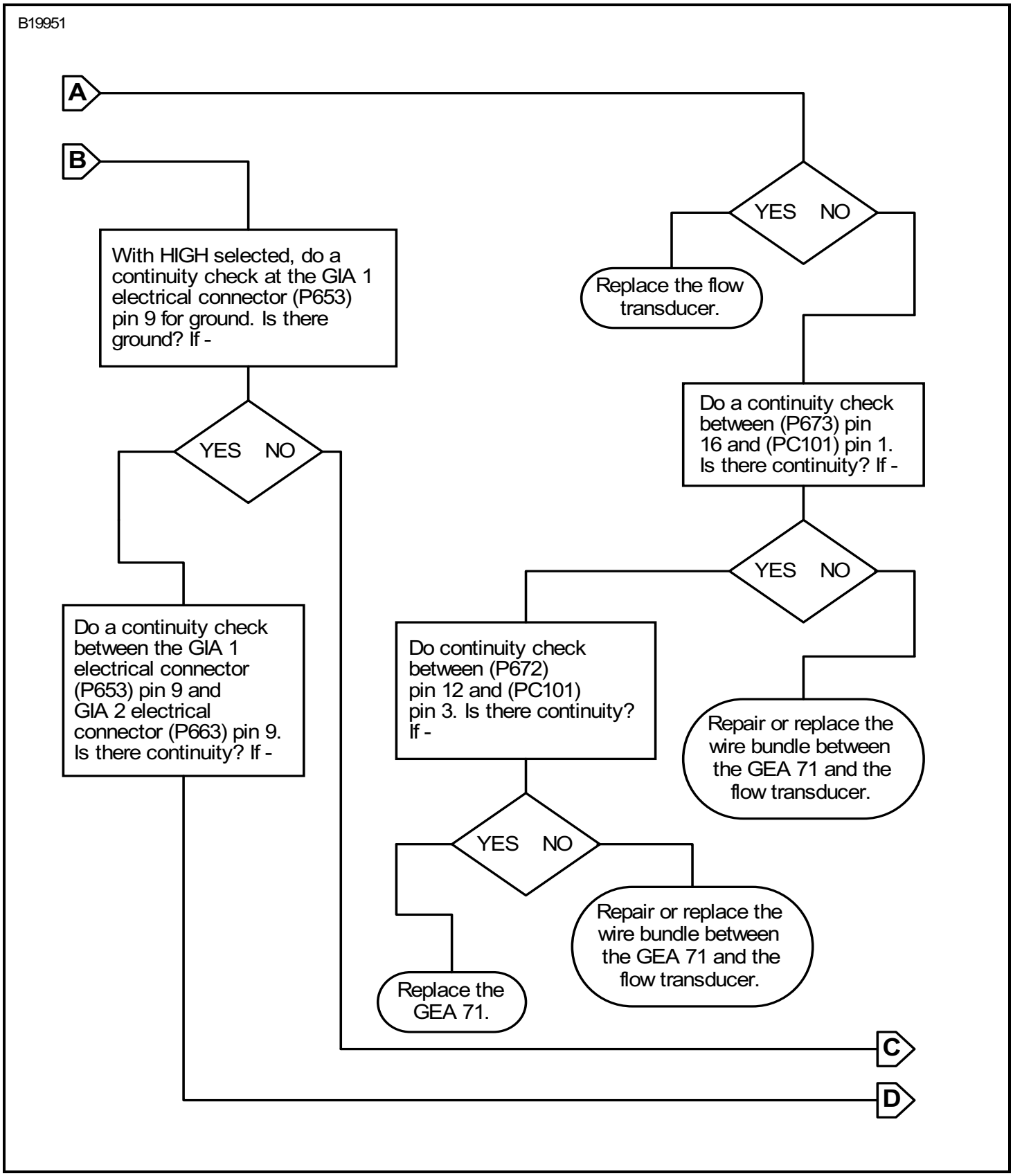
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Figure 122 : Sheet 1 :



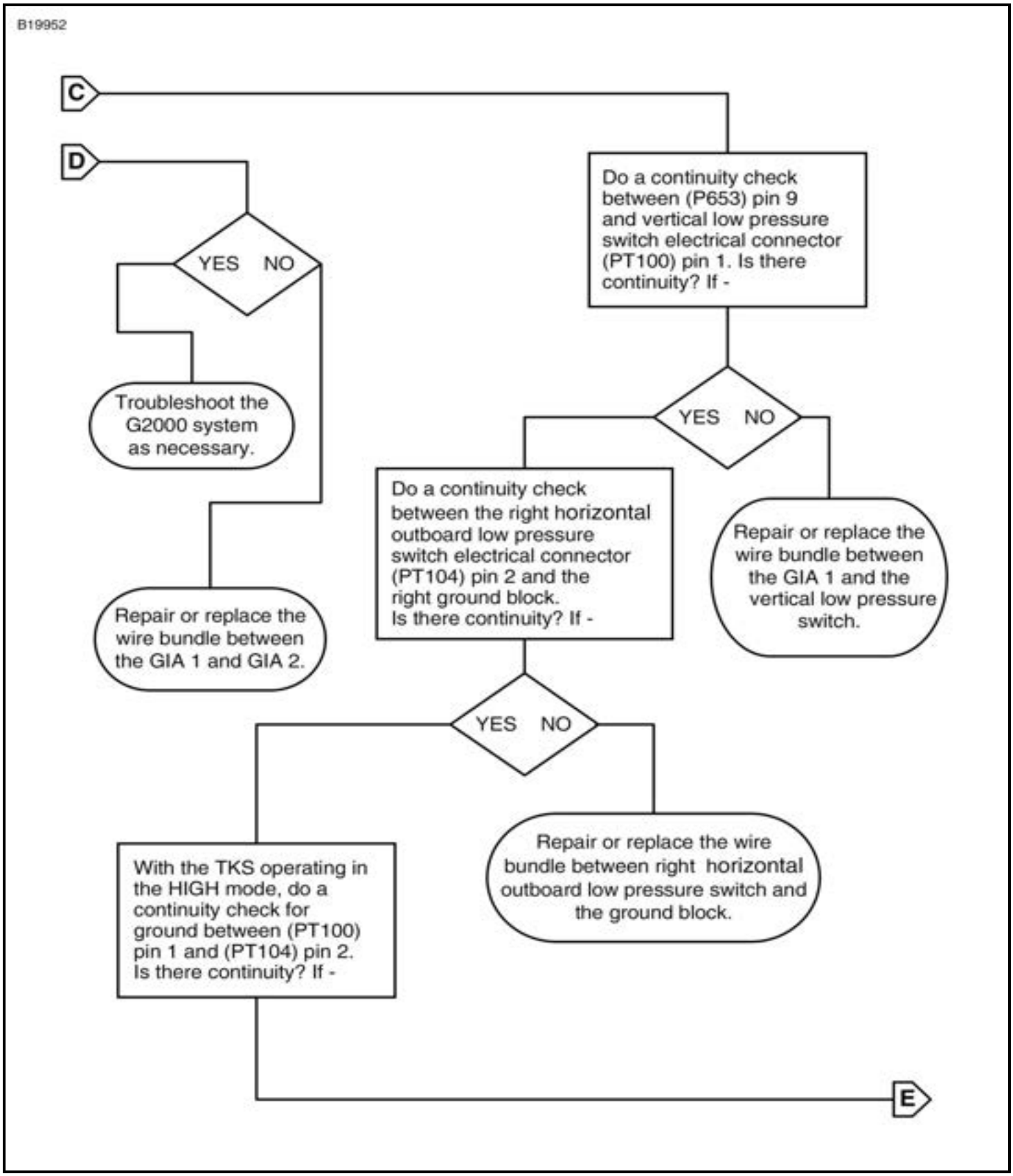
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Figure 122 : Sheet 2 :



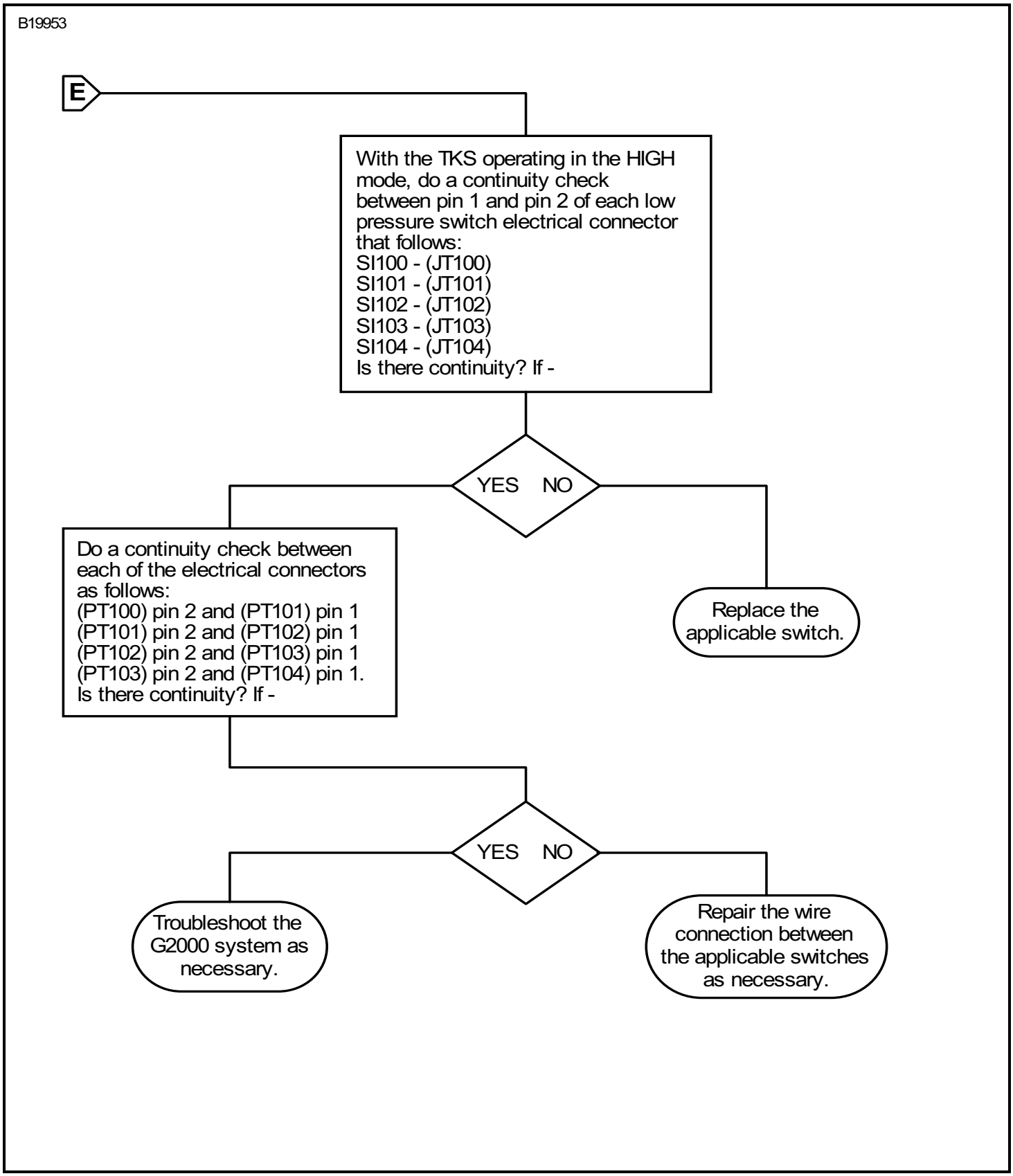
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Figure 122 : Sheet 3 :



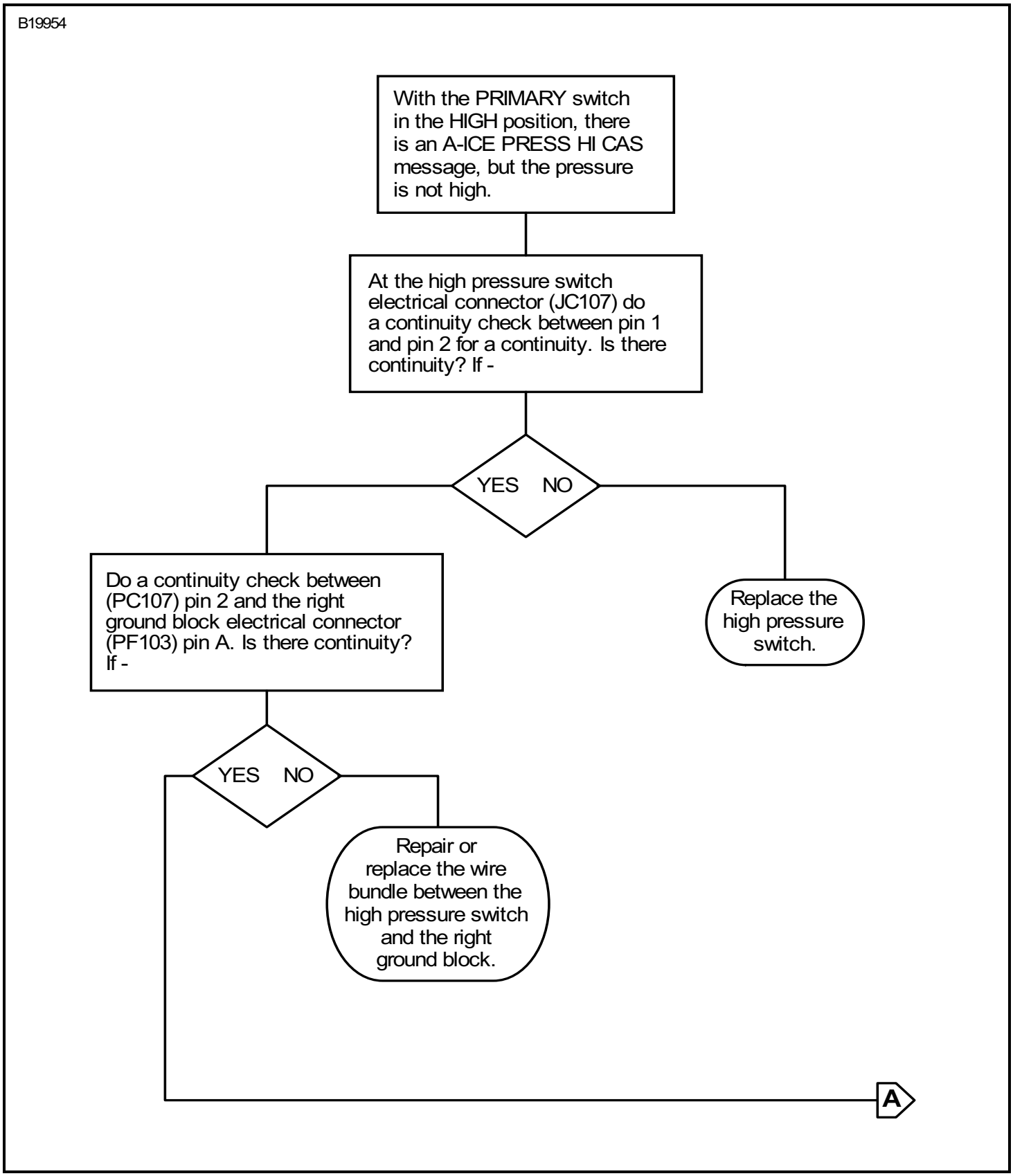
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Figure 122 : Sheet 4 :



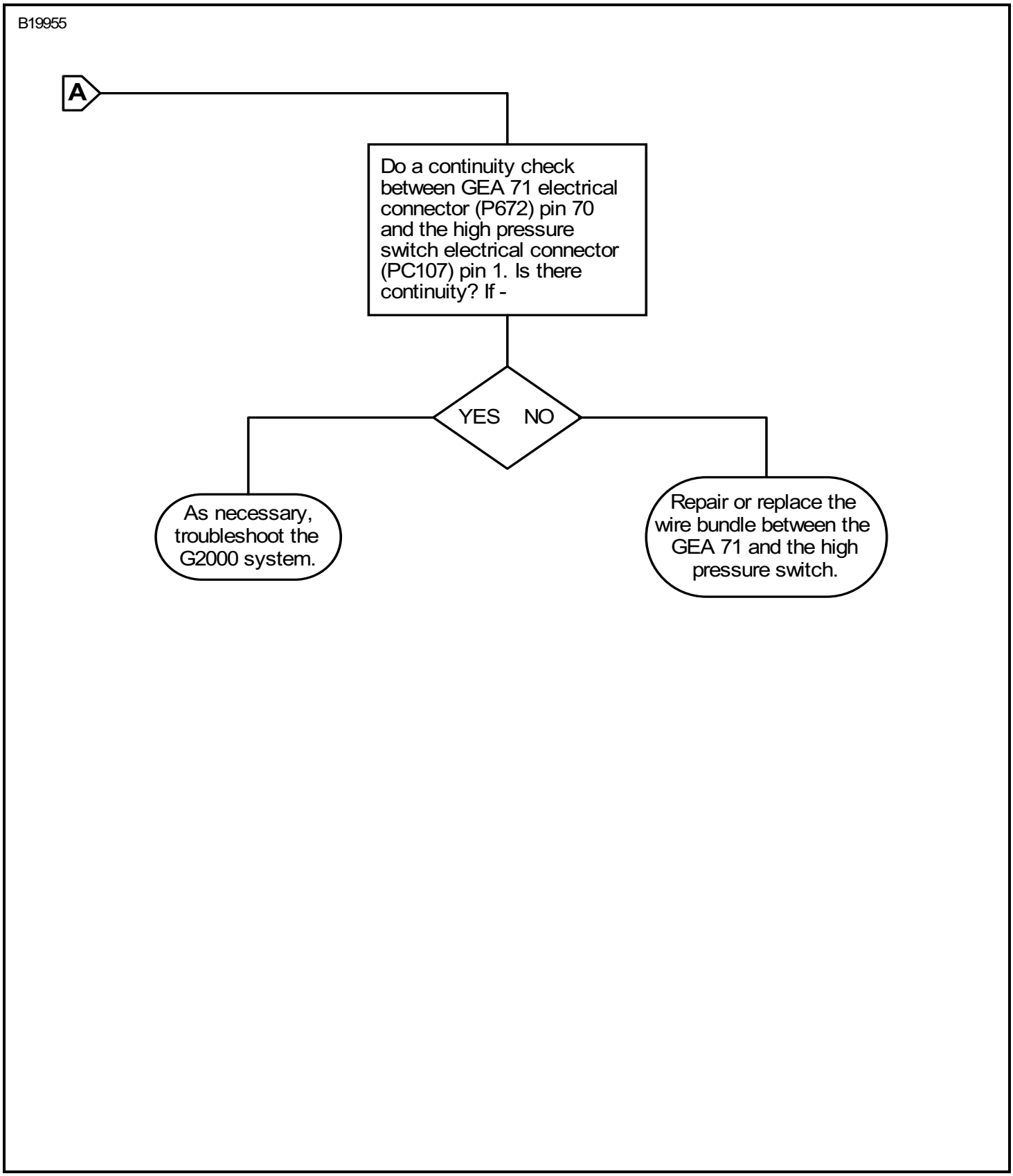
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Figure 123 : Sheet 1 :



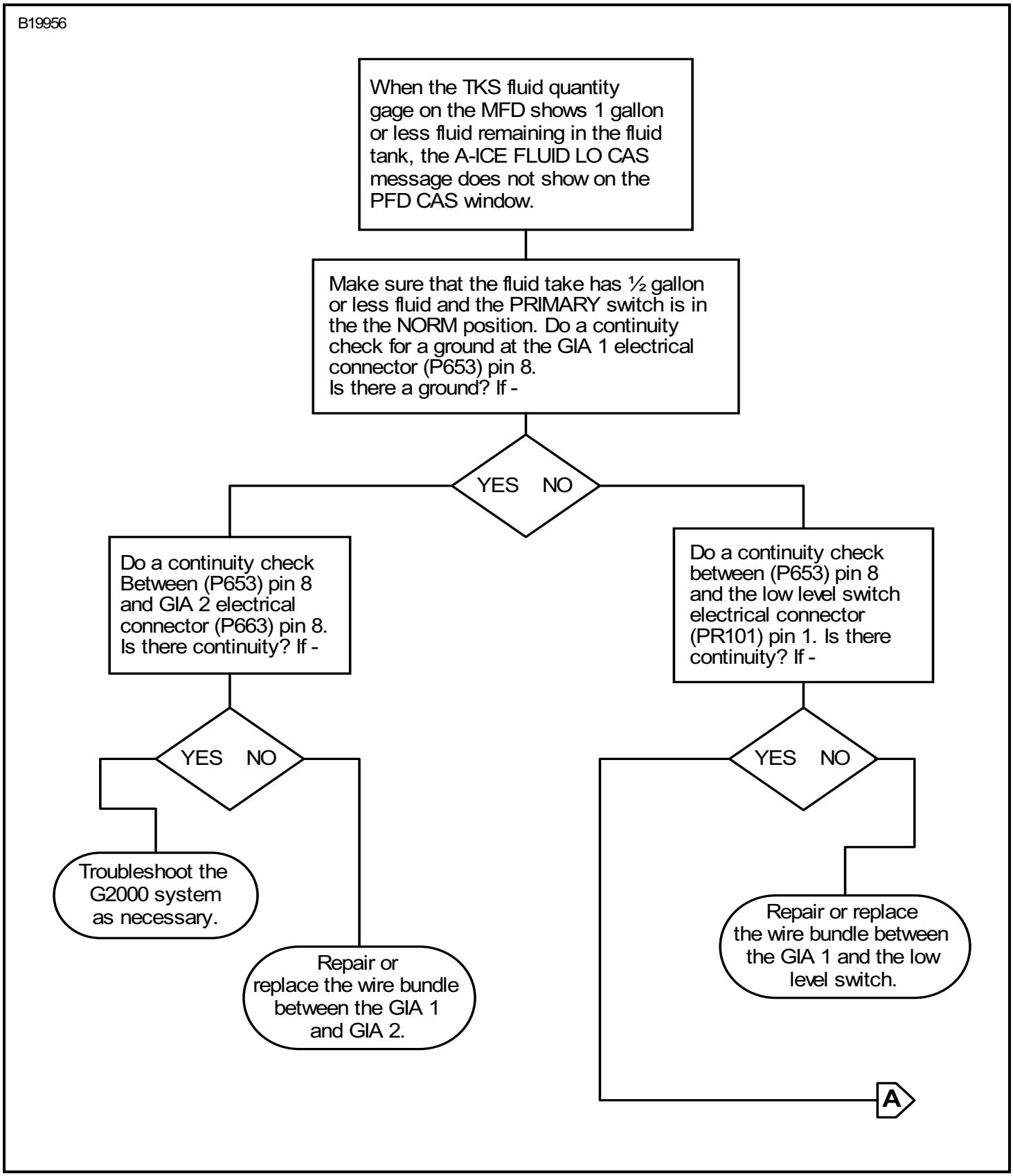
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Figure 123 : Sheet 2 :



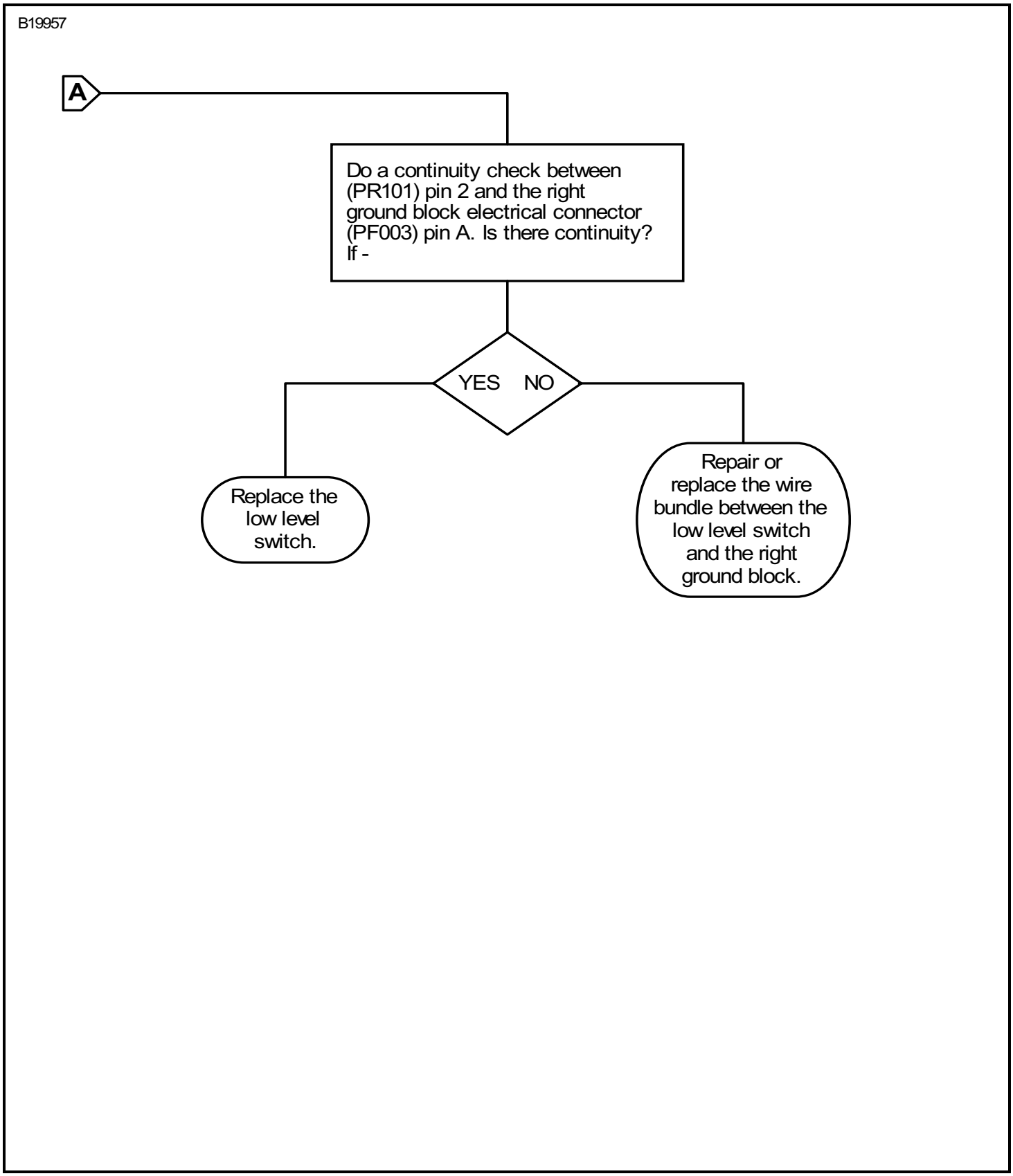
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Figure 124 : Sheet 1 :



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Figure 124 : Sheet 2 :



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TKS ANTI-ICE SYSTEM (FIKI) - MAINTENANCE PRACTICES

1. General

A. This section contains the removal and installation procedures for the TKS Anti-Ice System (FIKI) fluid distribution system and the removal of TKS Anti-Ice System fluid contamination.

B. Recommended maintenance for the TKS system is as follows:

- Operate the pumps monthly, or as necessary, in the NORM mode until the air is removed from the fluid system.
- Keep the TKS system operational at all times to keep air pockets out of the system.
- If the fluid tank is drained completely and the system was operated, do the porous panel purge and test procedures.

2. Warnings and Cautions

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Before you disconnect components of the TKS anti-ice system, slowly loosen the coupling that is connected to the component to be removed. It is possible that high pressure is still in the system.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Do not use MEK, acetone, paint thinner, or similar chlorinated solvents on the porous panels. To prevent damage, only use water and detergent, isopropyl alcohol, and/or approved anti-ice fluid on the porous panel surfaces.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube coupling. Replace the 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube coupling. Examine the seal for damage and make sure that it is in the correct position in the coupling. Refer to, Figure 201. This will help to prevent fluid leakage from the coupling.

3. Tools, Equipment, and Materials

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

4. Nylon Tubing Repair/Replacement

A. Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Warnings and Cautions found in this section.

B. All plumbing used in the fluid anti-ice system is flexible nylon tubing connected with special compression-type couplings. Two different sizes of tubing are used.

C. The couplings used to connect sections of nylon tubing are metallic compression-type couplings, which include a machined coupling end, an olive (ferrule), a nut, and an elastomeric sealing ring (refer to Figure 201). The couplings used to connect the tubing to all the anti-ice porous panels are stainless steel. All other couplings used to connect the fluid anti-ice system components are made of aluminum. To help prevent electrolytic corrosion, aluminum couplings must be assembled only to aluminum couplings and stainless steel couplings must be assembled only to stainless steel or titanium couplings. The compression-type couplings used in the fluid anti-ice system are not interchangeable with standard-type couplings (AN or MS). To make sure that the correct couplings are used, refer to the Model T240 Illustrated Parts Catalog to find the correct coupling.

D. When you do maintenance of the fluid distribution system, examine all tubing for kinks, cuts, abrasion, crushing, or other indications of damage. The nylon tubing can discolor to a light straw color with age. Discoloration of the tubing is normally not a cause for rejection. Any damaged or deteriorated tubing found must be replaced with tubing and couplings of the correct size and type (aluminum or stainless steel). Additionally, when the tube couplings are disconnected from components or other couplings, it is recommended to install a new seal in the coupling.

E. Minimum bend radii for fluid tubing at ambient temperature are shown in Table 201. In some areas of the airplane, tighter bend radii are necessary. In these areas, you can use a heat gun to bend the tubing as follows:

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Table 201. Minimum Bend Radii for Fluid Tubing (At Ambient Temperature)

TUBING OUTSIDE DIAMETER	MINIMUM BEND RADII
1/2 Inch	3.0 Inches
5/16 Inch	2.0 Inches

(1) Put the tubing in position to find the necessary bend radius.

NOTE: You can use a piece of soft wire as a pattern.

CAUTION: Be careful not to overheat, burn, or collapse the tubing, which can prevent the correct flow of fluid and/or fluid leakage.

(2) Hold the tubing and carefully apply heat to the area where the bend will be.

NOTE: The tube will become flexible at approximately 300°F.

(a) Make sure to heat the tube along the entire bend radius.

NOTE: This will help to prevent kinking in the tube.

(3) After the radius is correct, hold the tube in that position and let it become cool (ambient temperature).

(4) When the tube is at ambient temperature, carefully examine it to make sure that it has not been heated too much (burned) and that there is no restriction of fluid flow through the tubing.

CAUTION: Do not use the coupling to clench the olive to the fluid tubing. Use only specified clenching tools to do the clenching operation. Also, do not torque the couplings too much during the repair or replacement procedure. If the couplings leak, install new seals as necessary.

F. When tubing repair or replacement is necessary, the olive must always be clenched (swaged) to the tubing as a separate operation. Use approved clenching tools before you assemble the coupling. For clenching tools, refer to Ice and Rain Protection - General.

G. When installing a new olive and/or fitting, refer to Table 202, Nylon Tubing Data and Figure 201.

Table 202. Nylon Tubing Data

Aluminum Alloy/Stainless Steel Fittings on Nylon Tubes				
Tube Outside Diameter (OD) in Inches	**Olive Distance (Dimension A) (+0.05 inch or - 0.05 inch)**	**Olive Clenching Torque with Aluminum Fittings (+10% or -10%) (inch pounds)**	**Olive Clenching Torque with Steel Fittings (+10% or -10%) (inch pounds)**	**Tightening Torque (Reference) (+10% or -10%) (inch pounds)**
5/16	0.22	120	200	48
1/2	0.38	250	N/A	63

H. The recommended procedure for replacement of damaged or deteriorated fluid tubing is to replace the full length of tubing from coupling to coupling. However, in areas of the airplane where this type of replacement is not possible, it is permitted to do a tube repair splice as an alternative to complete tubing replacement. Repair tubing as follows:

(1) Remove access panels as necessary to repair the damaged tubing.

(2) Cut out the damaged area.

(3) Put a strong adhesive tape on the ends of the tube.

NOTE: This will limit fluid leakage.

(4) When you are ready to install the splice tubing, remove the adhesive tape from one end at a time.

(5) Connect the new tubing to the tubing ends to be repaired with straight couplings. Refer to Table 203.

Table 203. Couplings

TUBING OUTSIDE DIAMETER	Coupling Part Number
1/2 Inch	MN6827
5/16 Inch	MN4852

(6) Attach the tubing to the airframe with tie wraps or an equivalent method.

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(7) All new connections used in the repair must be tested for leaks. Operate the system before you install the access panels.

NOTE: If bulk tubing is installed, it is necessary to attach an identification tag to each end of the tube with the tube part number labeled on it for tube identification.

5. TKS Anti-Ice Fluid Removal

A. Remove the TKS Anti-Ice Fluid.

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Warnings and Cautions found in this section.

(2) Remove external electrical power from the airplane.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(5) Make sure that the CROSS TIE switch (SW03) is in the OFF position.

(6) Use a container with a capacity of approximately 10 to 15 gallons to collect the fluid.

(7) Use one of the following methods to remove the TKS fluid from the tank.

NOTE: There are two ways to remove the fluid from the tank: use a hand pump and clean hose through the filler neck or use the drain in the tank access panel on the lower surface of the right wing.

CAUTION: Make sure that the hose does not touch the level sender arm. This will help prevent damage to the level sender unit.

(a) Use a hand pump and clean hose to pump the fluid from tank.

NOTE: The hose and optional hand pump should be used only with TKS fluid. You should not use a hose and pump that have been used to pump other fluids.

1 Put the hose straight down into the wing tank through the filler neck.

a Make sure that the hose does not touch the internal tank level sender arm.

2 Pump the fluid into the container.

(b) Open the drain in the tank access panel.

1 Collect the fluid in the container.

(8) Check the MFD TKS fluid quantity indicator.

(a) The MFD TKS fluid quantity indicator must show zero when the TKS fluid tank is empty.

6. TKS Metering and Windshield Pumps Priming

A. Prime the TKS System Metering and Windshield Pumps. Refer to Figure 202.

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Warnings and Cautions found in this section.

(2) Supply electrical power on the airplane as follows:

(a) Apply external electrical power to the airplane.

(b) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(c) Set the AVIONICS MASTER switch (SW04) to the ON position.

(d) Set the CROSS TIE Switch (SW03) to the ON position.

(3) Check the TKS fluid quantity gage on the multifunctional display (MFD) EIS strip and make sure there is a minimum of one gallon of TKS fluid in the TKS fluid tank.

(4) If the wing tank is completely full of TKS fluid, first do the steps that follow:

NOTE: The procedures that follow use the TKS system head pressure to prime the TKS system pumps.

CAUTION: Do not run the windshield pump for more than 10 seconds at a time. Wait at least 10 seconds with the pump off before you operate it again.

(a) On the center console switch panel, put the MAX FLOW switch to the WINDSHIELD position and hold. Refer to TKS Anti-Ice System (FIKI) - Description and Operation.

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1 Listen and make sure the pump operates correctly and is not cavitating.

2 Release the switch.

CAUTION: Do not run pump 1 or pump 2 for longer than 120 seconds at a time. Wait at least 60 seconds with the pump off before you operate it again.

(b) Put the PRIMARY switch to the NORM position, to operate metering pump 1.

1 Listen and make sure the pump operates correctly and is not cavitating.

2 Put the PRIMARY switch to the OFF position.

(c) Put the BACKUP switch to the BACKUP position, to operate metering pump 2.

1 Listen and make sure the pump operates correctly and is not cavitating.

2 Put the BACKUP switch to the OFF position.

(5) If this method does not prime the system do the steps that follow:

(a) Remove the TKS equipment access panel on the lower surface of the left wing.

(b) Put absorbent shop rags below the tubing fitting of pump 2.

(c) Loosen the pump 2 inlet fitting to allow TKS fluid to fill the inlet tubing.

(d) Put the BACKUP switch to the BACKUP position, to operate metering pump 2.

1 If necessary, loosen the pump 2 outlet fitting to allow trapped air to exit the plumbing while the pump is operating.

2 When fluid drains from the loosened inlet fitting, listen and make sure the pump operates correctly and stops cavitating.

(e) Put the BACKUP switch to the OFF position.

(f) If necessary, tighten the pump 2 inlet and outlet fittings. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

(6) Bleed trapped air from the filter as follows:

(a) Loosen the filter bleed screw. Refer to TKS Filter/High Pressure Switch (FIKI) - Removal/Installation, Figure 402.

(b) Put the applicable TKS ANTI-ICE FLUID CTRL switch in the correct position to operate pump 1 or pump 2.

(c) When fluid shows at the filter, tighten the filter bleed screw.

(d) Put the applicable TKS ANTI-ICE FLUID CTRL switch in the OFF position.

(7) If this method does not prime the system, use pump 1 to do the above procedures to prime the pumps.

(8) Set the ANTI-ICE FLUID CTRL switches to the OFF position.

(9) Remove electrical power on the airplane as follows:

(a) Set the AVIONICS MASTER switch to the OFF position.

(b) Set the master BATT switches (left and right) to the OFF position.

(c) Set the CROSS TIE Switch to the OFF position.

(d) Remove external electrical power to the airplane.

(10) Safety with wire any items where safety wire was removed above. Refer to Chapter 20, Safetying - Maintenance Practices.

(11) Make sure that the TKS equipment bay is clear of foreign object debris (FOD).

(12) Install the TKS equipment access panel on the lower surface of the left wing.

(13) Service the TKS system as needed. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid.

7. TKS Fluid Contamination (Fuel) Removal

A. Remove the TKS Fluid Contamination (Fuel).

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Warnings and Cautions found in this section.

(2) Remove external electrical power from the airplane.

(3) Make sure that the AVIONICS MASTER (SW04) is in the OFF position.

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(4) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(5) Disengage the ANTI-ICE PUMP 1, W/S ANTI-ICE, and ANTI-ICE PUMP 2 circuit breakers.

(6) Drain the TKS fluid from the fluid tank. Refer to the applicable steps in TKS Anti-Ice Fluid Removal in this section.

(7) Fill the fluid tank with a water and mild detergent mixture.

(8) Drain the water and mild detergent mixture from the fluid tank.

(a) To drain the fluid from the tank use a clean hose inserted through the filler neck. Refer to the applicable steps in TKS Anti-Ice Fluid Removal found in this section.

(9) Fill the fluid tank with water.

(10) Drain the water from the fluid tank.

(a) To drain the fluid from the tank use a clean hose inserted through the filler neck. Refer to the applicable steps in TKS Anti-Ice Fluid Removal found in this section.

(11) Remove the filter assembly. Refer to TKS Filter/High Pressure Switch (FIKI) - Removal/Installation.

NOTE: If there was fuel contamination in the fluid, but the system was not operated, it is not necessary to replace the filter assembly.

(12) Install a new filter assembly. Refer to TKS Anti-Ice System Filter (FIKI) - Removal/Installation.

(13) Add 5 gallons (18.9 liters) of TKS fluid to the fluid tank.

(14) Supply external electrical power to the airplane.

(15) Set the master BATT switches (left and right) and the AVIONICS MASTER switch in the ON position.

(16) Engage the ANTI-ICE PUMP 1, W/S ANTI-ICE, and ANTI-ICE PUMP 2 circuit breakers.

(17) Remove the outlet tube from the transducer. Refer to the applicable steps in TKS Flow Transducer (FIKI) - Removal/Installation, TKS Flow Transducer Removal procedures.

(18) Connect a temporary tube to the transducer outlet fitting and put the end in a container with a capacity of approximately 10 to 15 gallons.

(19) Remove the outlet tube from the windshield pump. Refer to the applicable steps in TKS Anti-Ice System Metering Pumps (FIKI) - Removal/Installation, Metering Pump 1/Windshield Pump Assembly Removal procedures.

(20) Connect a temporary tube to the windshield pump outlet fitting and put the end in a container with a capacity of approximately 10 to 15 gallons.

(21) Put the PRIMARY switch in the HIGH position to start the metering pump 1 operation.

(22) Put the MAX FLOW switch in the AIRFRAME position, then release the switch, to start both the metering pumps operation.

(a) Let the TKS fluid flow in the container at the transducer outlet for one full cycle of approximately 2 minutes of metering pump operation.

(23) Put the MAX FLOW switch in the WINDSHIELD position, then release the switch, to start the windshield pump operation.

(a) Let the TKS fluid flow in the container at the windshield pump outlet for one full cycle of approximately 4 seconds of windshield pump operation.

(24) Set the AVIONICS MASTER switch to the OFF position.

(25) Set the master BATT switches (left and right) to the OFF position.

(26) Disengage the ANTI-ICE PUMP 1, W/S ANTI-ICE, and ANTI-ICE PUMP 2 circuit breakers.

(27) Remove external electrical power from the airplane.

(28) Remove the temporary tube from the transducer outlet fitting.

(29) Install the outlet tube on the transducer. Refer to the applicable steps in TKS Flow Transducer (FIKI) - Removal/Installation, TKS Flow Transducer Installation procedures.

(30) Remove the temporary tube from the windshield pump outlet fitting.

(31) Install the outlet tube on the windshield pump. Refer to the applicable steps in TKS Anti-Ice System Metering Pumps (FIKI) - Removal/Installation, Metering Pump 1/Windshield Pump Assembly Installation procedures.

(32) Supply external electrical power to the airplane.

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(33) Engage the ANTI-ICE PUMP 1, W/S ANTI-ICE, and ANTI-ICE PUMP 2 circuit breakers.

(34) Put the master BATT switches (left and right) and the AVIONICS MASTER switch the ON position.

(35) Put the PRIMARY switch in the HIGH position to start the metering pump 1 operation.

(36) If the filter assembly was replaced, put the BACKUP switch in the BACKUP position to start the metering pump 2 operation.

NOTE: This will let both pumps operate continuously.

(a) Let the system operate for approximately 5 minutes until there are no air bubbles in the TKS fluid flow from the porous panels on the leading edges.

NOTE: If necessary, you can let the system operate for more than 5 minutes until the fluid flow is normal across all porous panels.

(b) Monitor the level of fluid in the tank.

(c) If necessary, add more fluid to the tank so that it will not go below the usable fluid level during the procedure.

(d) Put the BACKUP switch in the OFF position.

(e) If the fluid flow at any of the porous panels does not become normal, do the porous panel purge and test procedure for the applicable porous panel(s). Refer to TKS Leading Edge Porous Panel (FIKI) - Adjustment/Test.

(37) If the filter assembly was not replaced, put the MAX FLOW switch in the AIRFRAME position, then release the switch, to start both the metering pumps operation.

(a) Let the TKS fluid flow from the leading edge porous panels for one full cycle of approximately 2 minutes.

NOTE: If necessary, you can do more MAX FLOW AIRFRAME cycles until the fluid flow is normal across all porous panels.

(b) Monitor the level of fluid in the tank.

(c) If necessary, add more fluid to the tank so that it will not go below the usable fluid level during the procedure.

(d) If the fluid flow at any of the porous panels does not become normal, do the porous panel purge and test procedure for the applicable porous panel(s). Refer to TKS Leading Edge Porous Panel (FIKI) - Adjustment/Test.

(38) Put the PRIMARY switch in the OFF position.

(39) Put the MAX FLOW switch in the WINDSHIELD position, then release the switch, to start the windshield pump operation.

NOTE: The windshield pump will start and operate when you put the spring-loaded MAX FLOW switch in the WINDSHIELD position.

(a) Do three full cycles of approximately 4 seconds each to let the TKS fluid flow from the windshield spray nozzles.

NOTE: If necessary, you can do more cycles until the fluid flow is normal from the spray nozzles.

(40) Set the AVIONICS MASTER switch to the OFF position.

(41) Set the master BATT switches (left and right) to the OFF position.

(42) Remove external electrical power from the airplane.

(43) Do the fluid tank servicing. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid.

(44) Make sure that the floor and the airplane surfaces are clean.

8. TKS Fluid Contamination (Water) Removal

A. Remove the TKS Fluid Contamination (Water).

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Warnings and Cautions found in this section.

(2) Remove external electrical power from the airplane.

(3) Make sure that the AVIONICS MASTER (SW04) switch is in the OFF position.

(4) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(5) Disengage the ANTI-ICE PUMP 1, W/S ANTI-ICE, and ANTI-ICE PUMP 2 circuit breakers.

(6) Drain the TKS fluid from the fluid tank. Refer to TKS Anti-Ice Fluid Removal found in this section.

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(7) Do the fluid tank servicing. Refer to Chapter 12, TKS Anti-Ice System - Servicing.
(8) Supply external electrical power to the airplane.
(9) Set the master BATT switches (left and right) and the AVIONICS MASTER switch to the ON position.
(10) Engage the ANTI-ICE PUMP 1, W/S ANTI-ICE, and ANTI-ICE PUMP 2 circuit breakers.
(11) Put the MAX FLOW switch in the AIRFRAME position, then release the switch, to start both the metering pumps operation.
(a) Let the TKS fluid flow from the leading edge porous panels for one full cycle of approximately 2 minutes.
NOTE: If necessary, you can do more MAX FLOW AIRFRAME cycles until the fluid flow is normal across all porous panels.
(b) Monitor the level of fluid in the tank.
(c) If necessary, add more fluid to the tank so that it will not go below the usable fluid level during the procedure.
(12) If fluid flow at any of the porous panels is not normal, do the porous panel purge and test procedure for the applicable porous panel(s). Refer to TKS Leading Edge Porous Panel (FIKI) - Adjustment/Test.
(13) Set the AVIONICS MASTER switch to the OFF position.
(14) Set the master BATT switches (left and right) to the OFF position.
(15) Remove external electrical power from the airplane.
(16) Make sure that the fluid tank servicing is correct. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid.
(17) Make sure that the floor and the airplane surfaces are clean.

9. TKS Fluid Contamination (Solids) Removal

A. TKS Fluid Contamination (Solids) Removal
(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Warnings and Cautions found in this section.
(2) If the TKS fluid contamination is a solid material, contact Cessna Customer Service, P.O. Box 7706, Wichita, Kansas 67209 USA Tele: 316-517-5800 Fax: 316-517-5802.

10. Windshield Anti-Ice Nozzle Removal

A. Remove the Windshield Anti-Ice Nozzle (Refer to Figure 203).
(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Warnings and Cautions found in this section.
(2) Make sure that the TKS fluid tank and the tubings are drained completely.
(3) Remove the external power supply to the airplane.
(4) Disengage the circuit breakers on the left circuit breaker panel that follow:
(a) W/S ANTI ICE
(b) ANTI-ICE PUMP 1
(c) ANTI-ICE PUMP 2
(5) Open the engine cowl door.
(6) Loosen the nut that attaches the nozzle to the windshield tube assembly.
(7) Remove the nozzle along with the nut and the washers from the windshield tube assembly.
(8) Remove the nut and the washers from the nozzle.
(9) Install caps on the windshield tube assembly ends to keep FOD out of the TKS system.

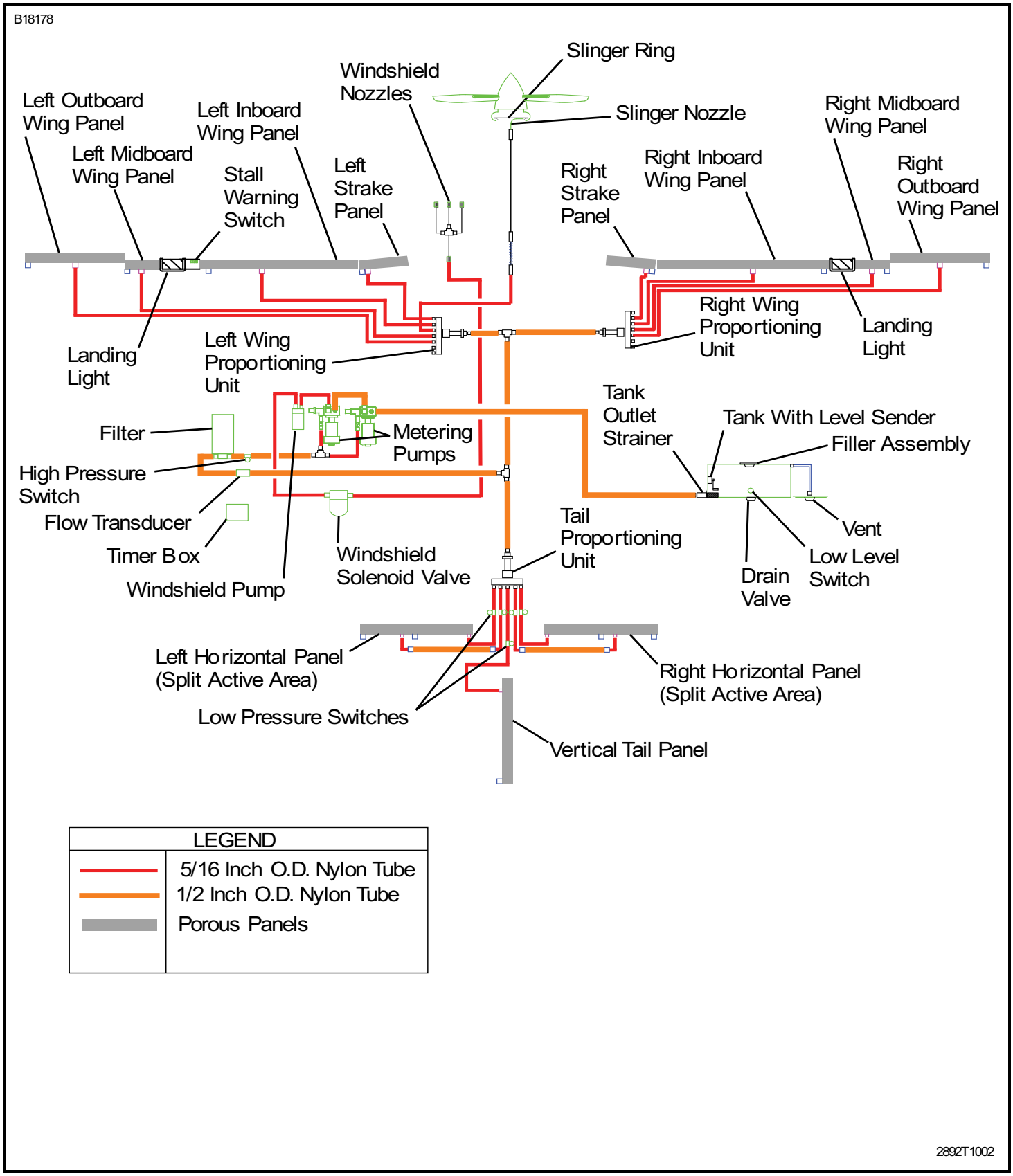
B. Install the Windshield Anti-Ice Nozzle (Refer to Figure 203).
(1) Remove the caps from the windshield tube assembly ends.
(2) Install the nut and the washers to the nozzle.
(3) Put the nozzle in its position on the windshield tube assembly.
(4) Connect the nozzle to the windshield tube assembly.
(5) Tighten the nut that attaches the nozzle to the windshield tube assembly.

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(6) Engage the circuit breakers on the left circuit breaker panel that follow:
  (a) W/S ANTI ICE
  (b) ANTI-ICE PUMP 1
  (c) ANTI-ICE PUMP 2
(7) Supply the external power to the aircraft.
(8) Clean the floor and the airplane surfaces as necessary.
(9) Close the engine cowl door.

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Figure 201 : Sheet 1 : TKS Tubing Installation

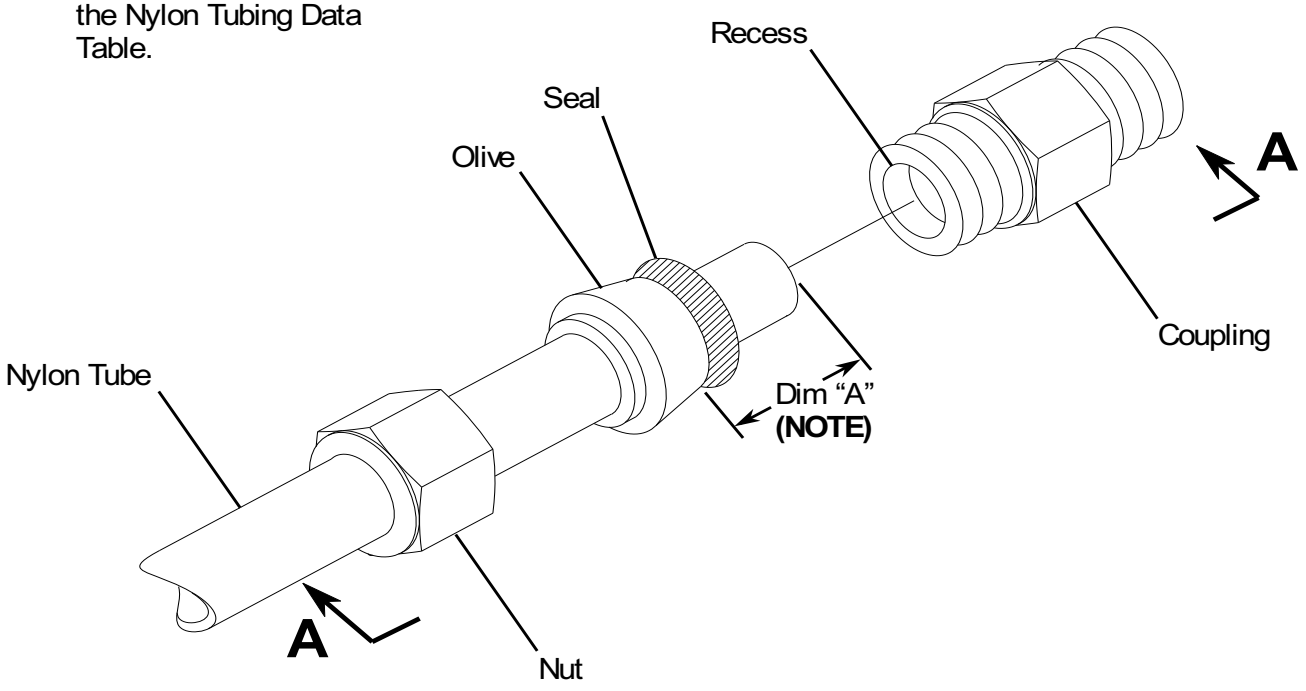


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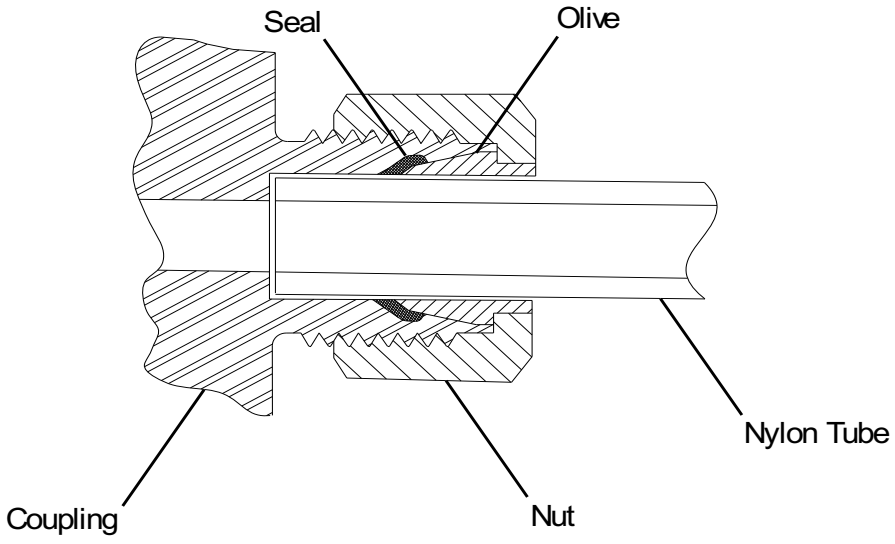
Figure 201 : Sheet 2 : TKS Tubing Installation

B16237

NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)

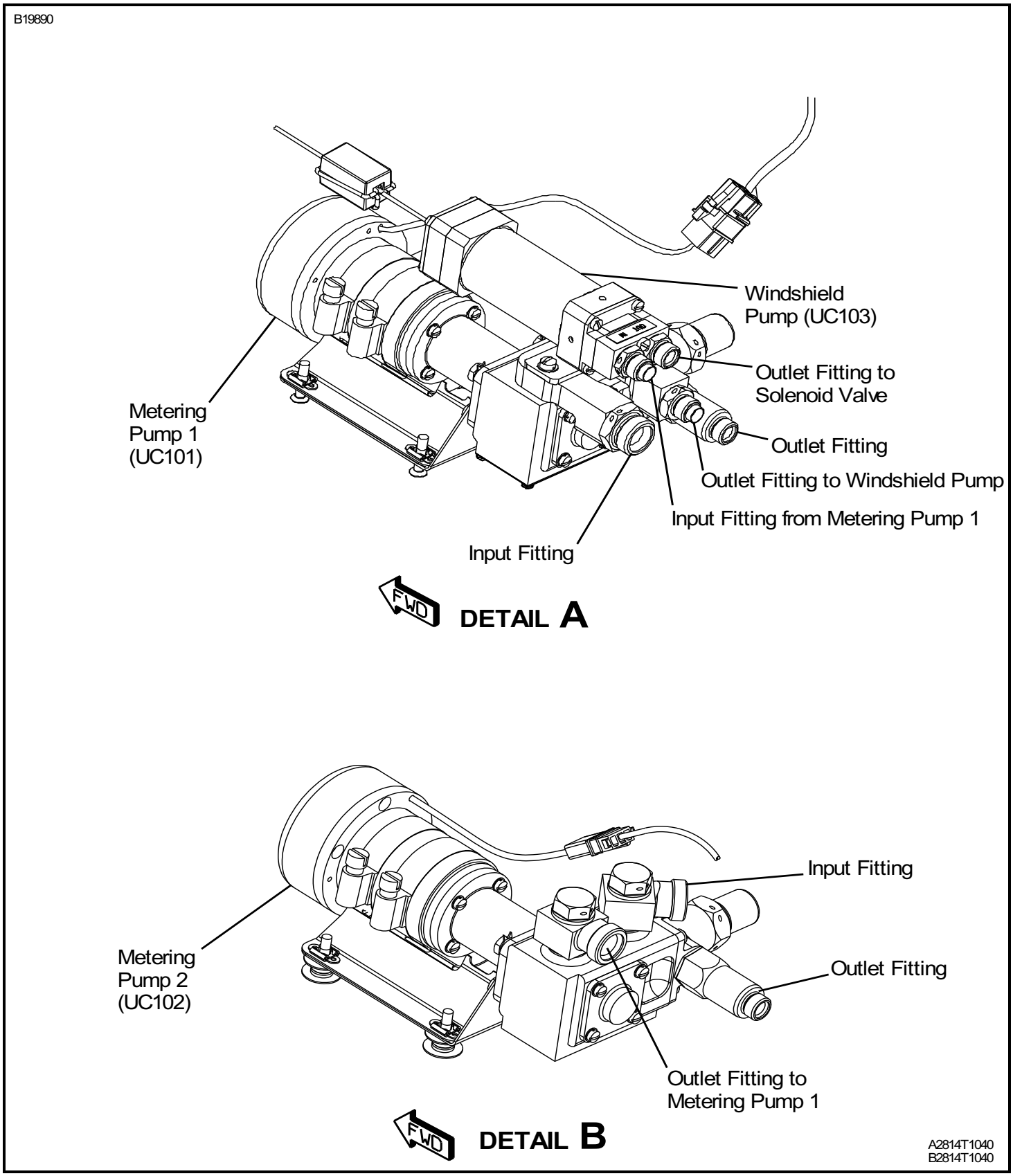


VIEW A-A

2678T1003
AA2678T1003

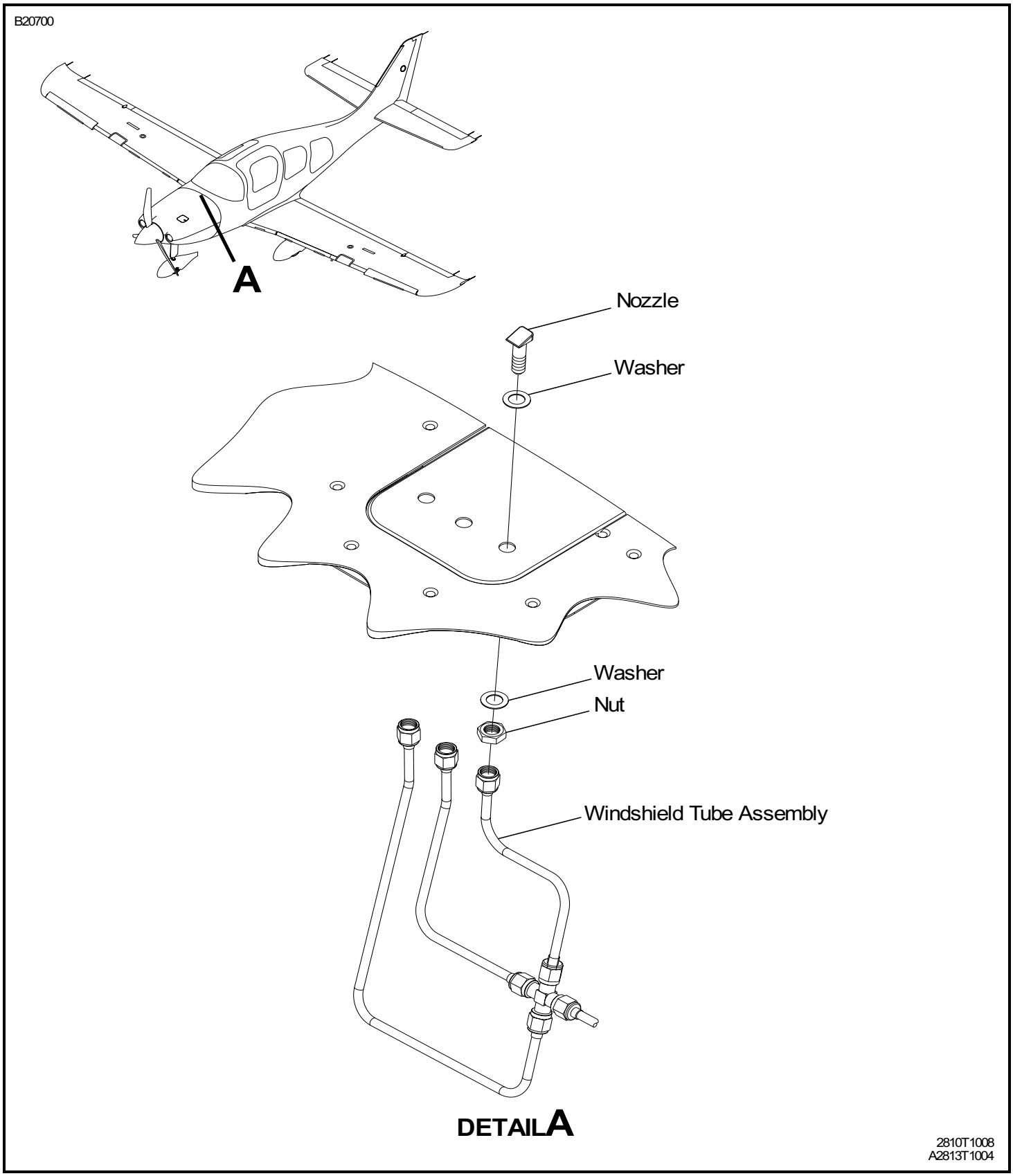
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Figure 202 : Sheet 1 : TKS Metering and Windshield Pumps



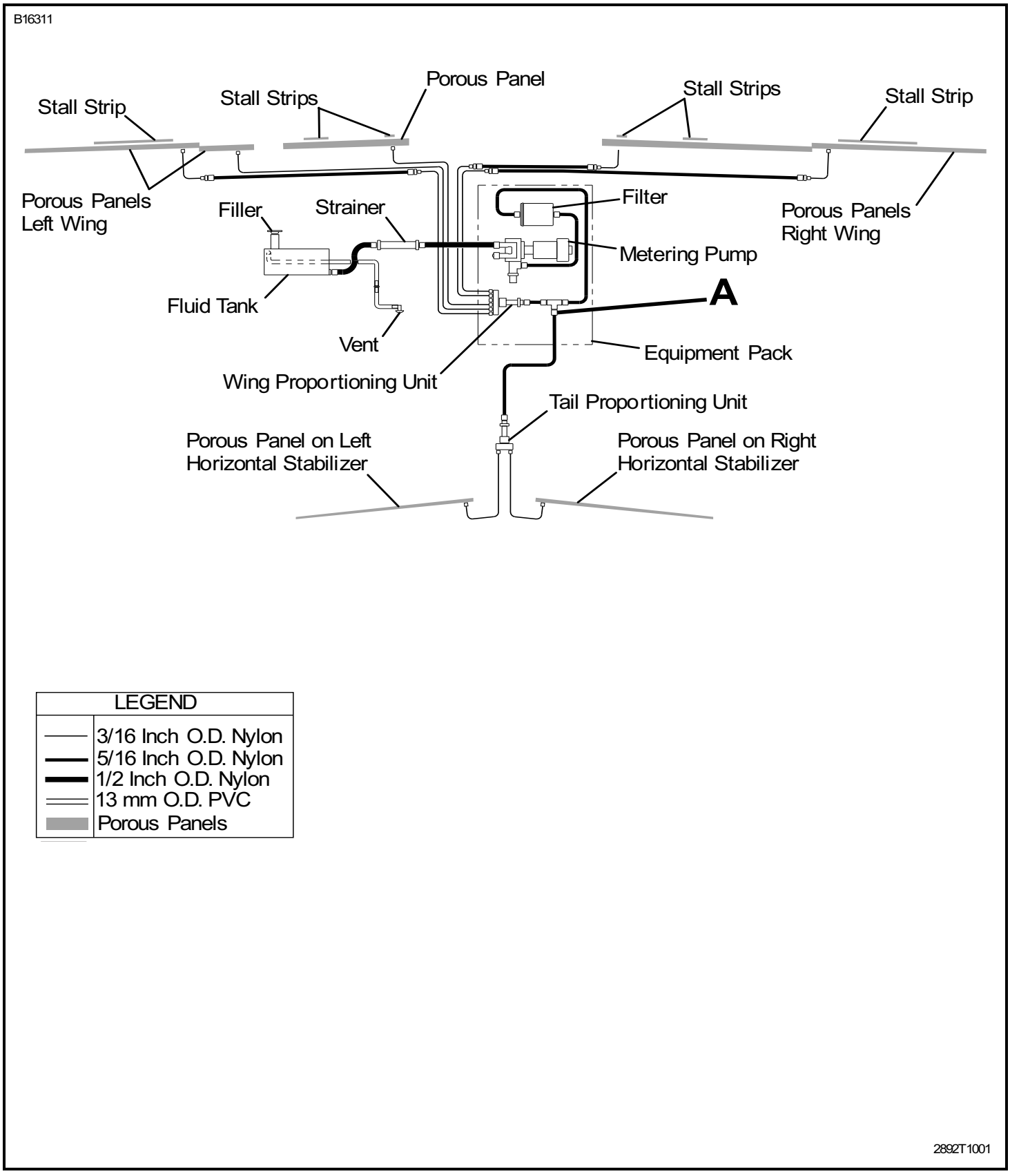
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Figure 203 : Sheet 1 : Windshield Anti-Ice Nozzle Installation



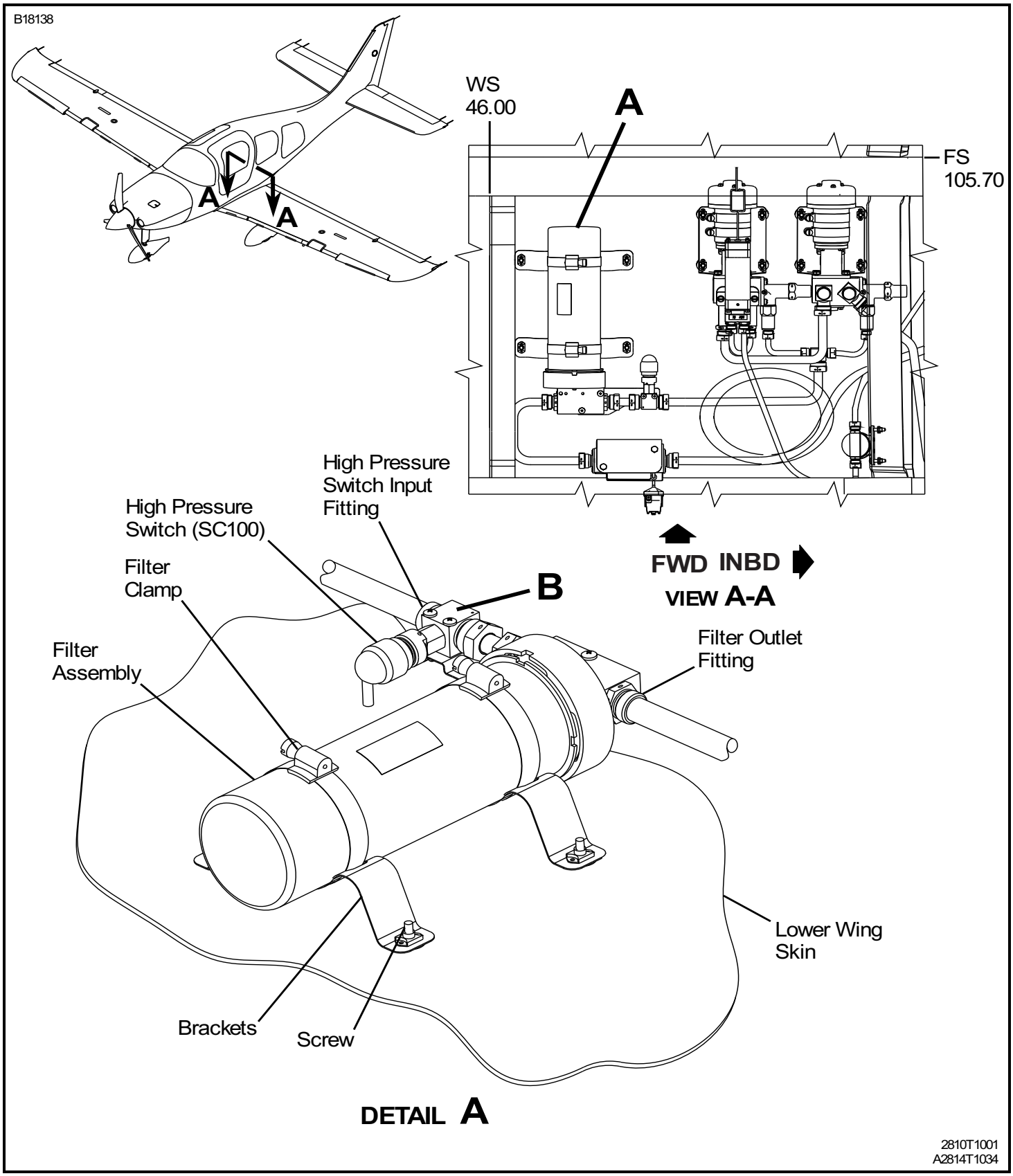
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Figure 201 : Sheet 1 : TKS Nylon Tubing Installation



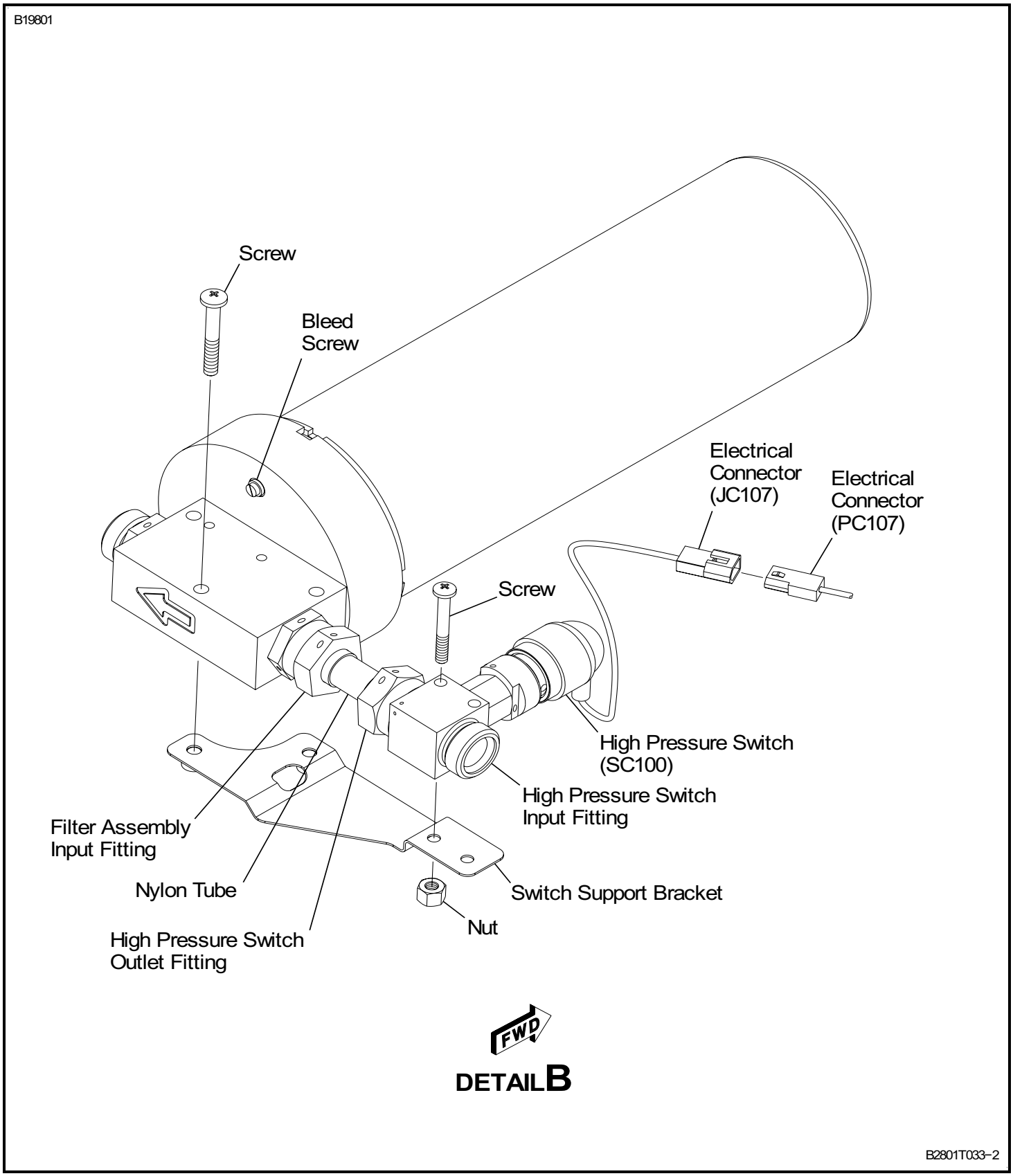
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Figure 401 : Sheet 1 : TKS Filter Assembly Installation



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Figure 401 : Sheet 2 : TKS Filter Assembly Installation



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TKS ANTI-ICE SYSTEM (FIKI) - ADJUSTMENT/TEST

1. General

A. This section contains the test procedures of TKS Anti-Ice System (FIKI). The procedures include complete system operational test and functional tests and calibration procedures for the level sender, TKS fluid quantity test, metering pumps 1 and 2 during all modes of operation, and a check of the fluid flow rates. The test also does a check of the windshield pump flow rate and CAS messages. A check for the applicable CAS messages is also included in the test procedures for the different TKS system functions and system condition.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. Warnings and Cautions

WARNING: TKS system operation pressure can reach up to 200 PSI. Misting can occur at system connections. Refer to Safety Data Sheet (SDS) for exposure to misting of mono ethylene glycol.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: If TKS fluid is leaking at fluid connections internal to the aircraft, turn the TKS anti-ice system off and correct connections. Use the correct procedures to remove leaked fluid.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

4. TKS Functional and Operational Test Preliminary Procedures

A. Electrical power preliminary procedures.

(1) On the cockpit circuit breaker panel, disengage the circuit breakers that follow:

- ANTI-ICE PUMP 1
- ANTI-ICE PUMP 2
- W/S ANTI-ICE.

(2) Make sure that the G2000 system circuit breakers are engaged.

B. TKS component access preliminary procedures.

(1) As necessary, remove the panels and components that follow to get access to the TKS pumps and plumbing:

- Remove the pilot's and/or copilot's seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices.
- Remove the left and/or right forward cabin floor panel. Refer to Chapter 53, Fuselage Access - Description and Operation.
- Remove the footwell. Refer to Chapter 25, Footwell - Maintenance Practices

(2) Level the airplane. Refer to Chapter 8, Leveling and Weighing - General.

C. Test line-1 preliminary procedures (refer to Figure 501).

(1) If necessary fabricate a test line-1. Refer to Section 30-15-02, TKS Test Lines - Maintenance Practices.

(2) Connect test line-1.

(a) Disconnect the aft tail supply tube from the aft port of the first Tee downstream of the flow transducer.

(b) Put a cap on the aft tail supply tube to keep FOD out and prevent excessive leakage of TKS fluid from the system.

(c) Connect the test line-1 nylon tube assembly to the Tee aft port.

1 Carefully tighten the tube fitting nut. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

(d) Put the open end in a 3 to 5 gallon collection bucket.

(e) Make sure that the shutoff valve is in the closed position.

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(3) Disconnect the proportioning units supply side tube from the port of the Tee.
   (a) Put a cap on the proportioning units supply tube to keep FOD out and prevent excessive leakage of TKS fluid from the system.
   (b) Put a cap on the proportioning units supply port of the Tee.

5. Level Sender Calibration Procedure, Flow Transducer and Low Level Switch Signal Checks

A. Do the level sender calibration (Refer to Figure 502).
   (1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Warnings and Cautions found in this section.
   (2) Do the TKS Functional and Operational Test Preliminary Procedures found in this section.
      (a) Make sure that test line-1 is connected (refer to Test line-1 preliminary procedure in this section).
   (3) Remove the TKS access panel on the lower surface of the left wing.
   (4) If necessary, put electrical power on the airplane as follows:
      (a) Apply external electrical power to the airplane.
      (b) Set the master BATT switches (left SW01 and right SW02) to the ON position.
      (c) Set the AVIONICS MASTER switch (SW04) to the ON position.
      (d) Set the CROSS TIE Switch (SW03) to the ON position.
   (5) Make sure that the Garmin G2000 system is serviceable.
      (a) There are no CAS messages that show the G2000 is not serviceable.
      (b) The primary flight display (PFD) and/or the multifunction display (MFD) do not show an 'X' (red or amber) on system function displays.
         NOTE: This is an indication of a G2000 or a related integrated system failure.
      (c) Make sure that the applicable TKS CAS messages show on the PFD CAS window.
      (d) If the G2000 system shows an indicated unserviceable condition, troubleshoot and repair the problem. Refer to Chapter 34, Garmin G2000 - Troubleshooting.
   (6) Make sure that the TKS fluid quantity indicator on the MFD EIS strip is serviceable (shows a fluid quantity).
      NOTE: TKS fluid quantity indication on the MFD EIS strip may not be accurate at some fluid levels. The TKS fluid quantity indicated will be equal to or less than the amount of TKS fluid added (+0.0 or -1.5 gallons).
   (7) If the tank is nearly full, remove the fluid to a level that is just below the minimum dispatch sight gauge. Refer to Figure 503 and the applicable procedures in TKS Anti-Ice System (FIKI) - Maintenance Practices, TKS Anti-Ice Fluid Removal.
   (8) If the tank is empty or almost empty, add 1 gallon, +10 or -10 fluid ounces, (3.8 liters, +296 or -296ml), to the tank. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid.
   (9) Make sure that the open end of the test line-1 is in a collection bucket.
   (10) Open the test line-1 shutoff valve.
   (11) Do the procedures to put the G2000 in the configuration mode as follows:
      (a) On the cockpit circuit breaker panel disengage the circuit breakers that follow:
         - PFD
         - MFD
         - GTC.
      (b) While you push and hold the far right MFD softkey (12), engage the MFD circuit breaker.
         1 Release the softkey when the "INITIALIZING SYSTEM" message shows on the MFD.
      (c) While you push and hold the far right PFD softkey (12), engage the PFD circuit breaker.
         1 Release the softkey when the "INITIALIZING SYSTEM" message shows on the PFD.
      (d) While you push and hold the GTC small right knob, engage the GTC circuit breaker.
         1 Release the small right knob when the "INITIALIZING SYSTEM" message shows on the GTC.

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(12) Set the GTC 570 to control the PFD as follows:

(a) When the "Config Mode" page shows on the GTC, push the "GDU Controls" button.

(b) When the "GDU Controls" page shows on the GTC, make sure the green bar shows on the bottom section of the "PFD" button.

1 If not push the "PFD" button.

(13) Select the GEA STATUS page on the PFD and then push “DIGITAL” softkey.

(14) On the cockpit circuit breaker panel, engage the ANTI-ICE PUMP 1 circuit breaker.

(15) Put the PRIMARY switch to the HIGH position.

(a) TKS fluid is pumped from the tank through test line-1 into the bucket.

(16) Make sure that the DEICE FLUID FLOW RATE value is not zero on the GEA Status page. Refer to Figure 502.

NOTE: Flow rate above zero indicates the flow transducer is serviceable.

NOTE: You can create back pressure on the system by slowly closing and opening the test line-1 shutoff valve. This can help to remove air from the system and start the flow rate indication.

(17) Continue pumping TKS fluid until fluid flow stops or pump starts to cavitate.

NOTE: This decreases fluid in the tank to the “unusable” 0.0 gallons (liters) level.

NOTE: The "ANTI-ICE SYSTEM FAIL" will sound two minutes after the pump starts. This happens because the low pressure switches have been disconnected from the fluid flow. To cancel the alert, cycle the PRIMARY switch from the HIGH position to the OFF position and then back to the HIGH position.

(a) Put the PRIMARY switch to the OFF position and immediately close the test line-1 shutoff valve.

(18) Remove the TKS filler cap and make sure the TKS fluid is at an unusable level.

(19) Install the filler cap and allow tank to stabilize for 2 minutes.

(20) On the cockpit circuit panel, disengage the ANTI-ICE PUMP 1 circuit breaker.

(21) Make sure that the ANTI-ICE PUMP 2 circuit breaker is disengaged.

(22) On the PFD, select the DAT CALIBRATION page. Refer to Figure 502.

(a) Use the PFD 275 controller large outer PFD knob to select the "CAL" tab.

(b) Use the PFD 275 controller smaller knob to select the DAT CALIBRATION page.

1 Push the small knob to acknowledge the selection.

(c) Use the PFD 275 controller large outer PFD knob to move the cursor to the “RAW POINTS” field adjacent to 0.000 (“CAL PNTS”) in DAT CAL TBL 0.

(d) On the PFD, push the CAL softkey and then push the GTC 570 controller Enter button to acknowledge the selection.

NOTE: This sets the 0.0 gallon calibration point.

(23) Measure and add 10 gallons, +8 or -8 fluid ounces, (37.9 liters, +237 or -237ml) of approved TKS fluid to the tank through the filler port.

NOTE: It is important to follow the sequence of steps as written when setting the calibration points.

(24) Tighten TKS fluid tank filler cap and allow the tank to stabilize for 2 minutes.

(25) Use the PFD 275 controller large outer PFD knob to move the cursor to “RAW POINTS” field adjacent to 36.718 (“CAL PNTS”) in DAT CAL TBL 0.

(a) On the PFD, push the CAL softkey and then push the GTC 570 controller Enter button to acknowledge the selection.

NOTE: This sets the 10.0 gallon calibration point.

(26) Use one of the following methods to remove a measured quantity of TKS fluid from the tank.

NOTE: It is important to follow the sequence of steps as written when setting the calibration points.

NOTE: There are two ways to remove the fluid from the tank: use a hand pump and clean hose through the filler neck or use the drain in the tank access panel on the lower surface of the right wing.

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CAUTION: Insert siphon hose straight down into wing tank to avoid contact with the internal tank level sender arm.

(a) Use a portable hand or electric pump to remove a measured quantity of 4 gallons, +8 or -8 fluid ounces, (15.1 liters, +237 or -237ml) of TKS fluid from the tank through the filler port into a fluid measuring container.

1 Tighten the TKS fluid tank filler cap and allow tank to stabilize for 2 minutes.

(b) Open the drain in the tank access panel and remove a measured quantity of 4 gallons, +8 or -8 fluid ounces, (15.1 liters, +237 or -237ml) of TKS fluid from the tank into a fluid measuring container.

1 Tighten the drain in the tank access panel and allow tank to stabilize for 2 minutes.

(27) Use the PFD 275 controller large outer PFD knob to move the cursor to “RAW POINTS” field adjacent to 22.712 (“CAL PNTS”) in DAT CAL TBL 0.

(a) On the PFD, push the CAL softkey and then push the GTC 570 controller Enter button to acknowledge the selection.

NOTE: This sets the 6.0 gallon calibration point.

(28) Open the TKS fluid tank filler cap and visually inspect the filler cap sight gauge to make sure that the gap between the top of the TKS fluid and the bottom of the 6 gallon filler level gauge (found inside the filler port) is between 0 and 0.15 inch. Refer to Figure 503.

NOTE: It is permissible to have more TKS fluid in the tank but not less than the 0.15 inch mark.

(a) If the gap is more than 0.15 inch, add fluid to the tank until it is between 0 and 0.15 inch.

(b) Tighten TKS fluid tank filler cap and allow tank to stabilize for 2 minutes.

(c) If you added fluid to the tank do the steps that follow:

1 Do the step above again to set the 6.0 gallon calibration point.

(29) Use one of the following methods to remove a measured quantity of TKS fluid from the tank.

(a) Use a portable hand or electric pump to remove a measured quantity of 4 gallons, +8 or -8 fluid ounces, (15.1 liters, +237 or -237ml) of TKS fluid from the tank through the filler port into a fluid measuring container.

(b) Open the drain in the tank access panel and remove a measured quantity of 4 gallons, +8 or -8 fluid ounces, (15.1 liters, +237 or -237ml) of TKS fluid from the tank into a fluid measuring container.

1 Tighten the drain in the tank access panel.

(30) Select GIA I/O CONFIGURATION page on the PFD.

(a) Use the PFD 275 controller large outer PFD knob to select the "GIA" tab.

(b) Use the PFD 275 controller smaller knob to select the GIA I/O CONFIGURATION page.

1 Push the small knob to acknowledge the selection.

(c) Make sure that there is a boxed “F” (with black background) in the DATA column next to LOW DEICE FLUID (line 2).

(31) Use one of the following methods and slowly continue to remove a measured quantity of TKS fluid from the tank.

NOTE: It is important to follow the sequence of steps as written when setting the calibration points.

(a) Use a portable hand or electric pump and slowly continue to pump out a measured quantity of 1 gallon, +8 or -8 fluid ounces, (3.8 liters, +237 or -237ml) with a portable hand or electric pump into a fluid measuring container.

1 Make sure that on the GIA I/O CONFIGURATION page on PFD, that the boxed “F” changes to boxed “T” (with green background) in the DATA column next to LOW DEICE FLUID (line 2) before the full 1 gallon has been pumped out. Refer to Figure 502.

2 Tighten the TKS fluid tank filler cap and allow tank to stabilize for 2 minutes.

(b) Open the drain in the tank access panel and slowly continue to remove a measured quantity of 1 gallon, +8 or -8 fluid ounces, (3.8 liters, +237 or -237ml) of TKS fluid from the tank into a fluid measuring container.

1 Make sure that on the GIA I/O CONFIGURATION page on PFD, that the boxed “F” changes to boxed “T” (with green background) in the DATA column next to LOW DEICE FLUID (line 2) before the full 1 gallon has been pumped out. Refer to Figure 502.

2 Tighten the drain in the tank access panel and allow tank to stabilize for 2 minutes.

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(32) Use the PFD 275 controller large outer PFD knob to move the cursor to “RAW POINTS” field adjacent to 3.785 (“CAL PNTS”) in DAT CAL TBL 0.

(a) On the PFD, push the CAL softkey and then push the GTC 570 controller Enter button to acknowledge the selection.

NOTE: This sets the 1.0 gallon calibration point.

(33) Do the steps that follow to bleed air out of the TKS filter. Refer to TKS Filter/High Pressure Switch (FIKI) - Removal/Installation, Figure 401.

(a) Operate pump 1 or pump 2.

(b) Loosen the filter bleed screw.

(c) When fluid shows, tighten the filter bleed screw.

(34) Put the TKS switches in the OFF position to stop pump operation.

(35) On the cockpit circuit breaker panel, make sure that the circuit breakers that follow are disengaged:

- PFD
- MFD
- GTC.

(36) Do the TKS Fluid Quantity and Low Level Switch CAS Message (A-ICE FLUID LO) Functional Test. Refer to the applicable steps in TKS Fluid Quantity, Low Level Switch and A-ICE FAIL CAS Message Functional Test.

(37) If no more test procedures are to be done at this time, return the airplane to its original condition. Refer to Restore the Airplane found in this section.

6. TKS Fluid Quantity, Low Level Switch and A-ICE FAIL CAS Message Functional Test

A. Do the TKS fluid quantity and low level switch CAS message functional test.

NOTE: You must do the TKS level sender calibration before you do the procedures that follow. Refer to Level Sender Calibration Procedure, Flow Transducer and Low Level Switch Signal Checks.

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Warnings and Cautions found in this section.

(2) If necessary, put electrical power on the airplane as follows:

(a) Apply external electrical power to the airplane.

(b) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(c) Set the AVIONICS MASTER switch (SW04) to the ON position.

(d) Set the CROSS TIE Switch (SW03) to the ON position.

(3) Allow the G2000 system to power on and stabilize (approximately 1 minute).

(4) Make sure that the Garmin G2000 system is serviceable.

(a) There are no CAS messages that show the G2000 is not serviceable.

(b) The primary flight display (PFD) and/or the multifunction display (MFD) do not show an 'X' (red or amber) on system function displays.

NOTE: This is an indication of a G2000 or a related integrated system failure.

(c) Make sure that the TKS fluid quantity indicator on the MFD EIS strip is serviceable (shows a fluid quantity).

(5) Make sure that each of the TKS switches on the center console switch panel, are in the OFF position.

(6) Make sure that the CAS messages that follow do not show on the PFD CAS window:

- A-ICE NORM (white)
- A-ICE HIGH (white)
- A-ICE BACKUP (white)
- A-ICE FLUID LO (amber)
- A-ICE PRESS HI (amber).

(7) On the cockpit circuit breaker panel, make sure that the circuit breakers that follow are disengaged:

- ANTI-ICE PUMP 1
- ANTI-ICE PUMP 2

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- W/S ANTI-ICE.

NOTE: In the steps that follow no TKS anti-ice fluid is pumped.

(8) On the MFD EIS display make sure that:

(a) The message 'A-ICE GALS' (white) is on.

(b) The digital quantity value (white) of 1.0 gallons shows.

NOTE: Reference only, the time value should be approximately 0:16.

1 As necessary, remove or add approved TKS fluid to the tank. Refer to the applicable procedures in TKS Anti-Ice System (FIKI) - Maintenance Practices, TKS Anti-Ice Fluid Removal and/or Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid.

(9) At the same time you put the PRIMARY switch, found on the center console switch panel, to the NORM position, start the stopwatch.

(a) Make sure that the indications that follow happen:

1 Immediately, the white A-ICE NORM CAS message appears on the PFD.

2 After approximately three seconds:

a The amber A-ICE FLUID LO CAS message shows on the PFD.

b A single aural chime is heard.

c The 'A-ICE GALS' and quantity indication on the MFD EIS Display change to amber.

d The 'A-ICE TIME REM' and digital value of time on the Engine/Systems Page change to amber.

3 After 2 minutes, the red A-ICE FAIL CAS message shows on the PFD.

4 A repeated aural chime is heard.

(10) On the PFD, push the far right softkey:

(a) The flashing 'A-ICE FAIL' (red) CAS message is acknowledged.

(b) The aural chime is silenced.

(11) Put the PRIMARY switch to the OFF position.

(12) Remove the TKS fluid tank filler cap and add approximately 9 gallons (34.1 liters) of approved TKS fluid to the TKS fluid tank.

(a) Make sure the tank is filled up to the fill port.

(13) Tighten the TKS fluid tank filler cap.

(a) Allow the fluid to stabilize for 2 minutes.

(14) On the MFD EIS display make sure that the digital value (white) of the TKS fluid quantity is 10.0 gallons, + 0.0 or - 0.5 gallons.

(a) On the ENGINE/Systems page, the approximate digital value (white) of time should show 2:40.

(15) Check the TKS fluid integral wing tank for fluid leaks.

(16) If no more test procedures are to be done at this time, return the airplane to its original condition. Refer to Restore the Airplane found in this section.

7. Metering Pumps, Windshield Pump and High Pressure Switch Functional Test

A. Do the functional test of the metering pumps.

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Warnings and Cautions found in this section.

(2) If necessary prime the metering pumps, refer to TKS Metering and Windshield Pumps Priming Procedures.

(3) Do the TKS Functional and Operational Test Preliminary Procedures found in this section.

(a) Make sure that test line-1 is connected (refer to Test line-1 preliminary procedure in this section).

(4) Connect test line-2 (refer to Figure 501).

(a) If necessary fabricate a test line-2. Refer to Section 30-15-02, TKS Test Lines - Maintenance Practices.

(b) Disconnect the windshield spray supply tube from the firewall fitting.

1 Put a cap on the windshield spray supply tube to keep FOD out and prevent excessive leakage of TKS fluid

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from the system.

2 Put the test line-2 tube fitting in its correct position on the firewall fitting.

a Carefully tighten the tube fitting nut. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

3 Put the test line-2 open end in a one gallon bucket.

4 Make sure that the shutoff valve is in the closed position.

(5) If necessary, put electrical power on the airplane as follows:

(a) Apply external electrical power to the airplane.

(b) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(c) Set the AVIONICS MASTER switch (SW04) to the ON position.

(d) Set the CROSS TIE Switch (SW03) to the ON position.

(6) Make sure that the Garmin G2000 system is serviceable.

(a) There are no CAS messages that show the G2000 is not serviceable.

(b) The primary flight display (PFD) and/or the multifunction display (MFD) do not show an 'X' (red or amber) on system function displays.

NOTE: This is an indication of a G2000 or a related integrated system failure.

(c) Make sure that the TKS fluid quantity indicator on the MFD EIS strip is serviceable (shows a fluid quantity).

(7) If the G2000 system shows an indicated unserviceable condition, troubleshoot and repair the problem. Refer to Chapter 34, Garmin G2000 - Troubleshooting.

(8) Make sure that the TKS calibration and test preliminary procedures are complete. Refer to TKS Calibration and Test Preliminary Procedures found in this section.

(9) Make sure that:

(a) Test line-1 open end is in a collection bucket.

(b) Test line-1 shutoff valve is in the open position.

(10) On the cockpit circuit breaker panel engage the circuit breakers that follow:

- ANTI-ICE PUMP 1
- ANTI-ICE PUMP 2

(11) On the center console switch panel, put the BACKUP switch to the BACKUP position and start the stopwatch.

(a) Make sure that on the PFD that the CAS message “A-ICE BACKUP” (white) comes on.

NOTE: During the test procedures, since there is no pressure supplied at the low pressure switches, after 2 minutes of pump operation the red “A-ICE FAIL” message will be displayed on the PFD with a repeating aural chime. To silence the repeating associated aural chime, push the lower right soft key on PFD.

(12) Make sure that metering Pump 2 pumps fluid continuously.

(13) After 3 minutes, put the BACKUP switch to the OFF position.

(a) Make sure that fluid quantity collected is 1.34 quarts, +0.14 or -0.14 quart. (1272 ml +128 or -128 ml).

1 Use correct procedures to discard the collected TKS fluid.

(b) Reset the stopwatch.

(14) Select PRIMARY switch to the HIGH position and start the stopwatch.

(a) Make sure that on the PFD that the CAS message “A-ICE HIGH” (white) comes on.

(15) Make sure that metering Pump 1 pumps fluid continuously.

(16) After 3 minutes, put the PRIMARY switch to the OFF position.

(a) Make sure that fluid quantity collected is 1.34 quarts, +0.14 or -0.14 quart. (1272 ml +128 or -128 ml).

1 Use correct procedures to discard the collected TKS fluid.

(b) Reset the stopwatch.

(17) Make sure that:

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(a) Test line-2 open end is in a collection bucket.

(b) Test line-2 shutoff valve is in the open position.

(18) On the cockpit circuit breaker panel, engage the W/S ANTI-ICE circuit breaker.

CAUTION: Do not operate the windshield pump for more than 10 seconds at a time. Make sure that you wait a minimum of 10 seconds with the pump off before you operate it again.

(19) Push and momentarily hold the MAX FLOW switch to the WINDSHIELD position and start the stopwatch.

(a) Make sure that the windshield TKS fluid flow stops after 4 seconds, +2 or -2 seconds.

CAUTION: Do not operate the windshield pump for more than 10 seconds at a time. Make sure that you wait a minimum of 10 seconds with the pump off before you operate it again.

(20) Push and hold down the MAX FLOW switch to the WINDSHIELD position switch in WINDSHIELD position for approximately 10 seconds.

(a) Make sure that the windshield TKS fluid is pumped continuously while switch is held down, and stops after switch is released.

(b) Use correct procedures to discard the collected TKS fluid.

(c) Reset the stopwatch.

(21) Put the PRIMARY switch to the NORM position and start the stopwatch.

(a) Make sure that the CAS message “A-ICE NORM” (white) comes on.

(b) Make sure that each of the two metering pumps (1 and 2), pump fluid for 30 to 50 seconds, then stop pumping fluid for 90 seconds, +2 or -2 seconds, then pump for 30 seconds.

(c) After two cycles are completed and the pumps are stopped, put the PRIMARY switch to the OFF position.

(d) Use correct procedures to discard the fluid.

(e) Reset the stopwatch.

(22) Put the PRIMARY switch to the HIGH position and start the stopwatch.

(23) Allow the pump to run for approximately 10 seconds.

(a) Slowly close the Test Line-1 shutoff valve to raise the system pressure until the CAS message “A-ICE PRESS HI” (amber) is flashing on PFD.

NOTE: With the valve completely closed, the fluid pressure will reach approximately 200 psi which is 50 psi above the pressure that a CAS message “A-ICE PRESS HIGH” would come on.

(24) While you continue to pump fluid with the switch in the HIGH position, slowly open the test line-1 shutoff valve.

(a) Make sure that the CAS message “A-ICE PRESS HI” (amber) goes off.

(25) Put the PRIMARY switch to the NORM position.

(26) Put the MAX FLOW switch to the AIRFRAME position and start the stopwatch.

(a) Make sure that the TKS metering pumps (1 and 2), pump fluid continuously, and stop after 2 minutes, +2 or -2 seconds.

(27) Put the MAX FLOW switch to the OFF position.

(28) Use correct procedures to discard the collected TKS fluid.

(29) Put the airplane back to its original condition. Refer to Restore the Airplane found in this section.

NOTE: Before the TKS System Operational Test procedures are done test line-1 and test line-2 must be removed and the TKS tubing put back in its original condition.

8. TKS System Operational Test

A. TKS system operational test preliminary procedures.

NOTE: Before the TKS System Operational Test procedures are done test line-1 and test line-2 must be removed and the TKS system tubing put back in its original condition.

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Warnings and Cautions found in this section.

(2) If porous panels have been replaced you must do a porous panel purge on porous panel(s) that have been replaced

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before you do the operational test procedures of the TKS system. Refer to TKS Leading Edge Porous Panel (FIKI) - Adjustment/Test.

(3) Make sure that the circuit breakers that follow, found on the cockpit circuit breaker panel, are engaged:

- ANTI-ICE PUMP 1
- ANTI-ICE PUMP 2
- W/S ANTI-ICE.

(4) Make sure that the TKS fluid tank is full.

(a) If the tank is not full add fluid until the fluid reaches the fill port.

(b) Tighten the TKS fluid tank filler cap.

(5) Attach fluid collection system to airplane as follows:

(a) A gutter and bucket system for the wing and tail porous panels.

(b) A windshield spray collection method.

(c) For the prop slinger, point one blade of the prop down toward the ground so that fluid will stream into a bucket placed on the ground below it.

NOTE: You can fabricate a fluid collector system, which will contain the fluid and keep it off the floor. Recommended materials you can use are plastic sheets, tubing, aluminum tape, and rigid aluminum and/or plastic gutter material.

B. Do the TKS system operational test (Refer to Figure 504).

NOTE: If fluid leaking is observed at any fluid connections (including TKS supply lines located in the engine compartment) turn the anti-Ice system off, correct the connections and use the correct procedures to remove leaked fluid.

(1) If necessary, put electrical power on the airplane as follows:

(a) Apply external electrical power to the airplane.

(b) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(c) Set the AVIONICS MASTER switch (SW04) to the ON position.

(d) Set the CROSS TIE Switch (SW03) to the ON position.

(2) Make sure that the Garmin G2000 system is serviceable.

(a) There are no CAS messages that show the G2000 is not serviceable.

(b) The primary flight display (PFD) and/or the multifunction display (MFD) do not show an 'X' (red or amber) on system function displays.

NOTE: This is an indication of a G2000 or a related integrated system failure.

(c) Make sure that the TKS fluid quantity indicator on the MFD EIS strip is serviceable (shows a fluid quantity).

(3) On the center console switch panel, put the PRIMARY switch to the HIGH position and start the stopwatch.

(4) After at least 2 minutes, +5 or -5 seconds, of operation, make sure that the “A-ICE FAIL” (red) CAS message is not on the PFD.

NOTE: This step makes sure of the wiring and functionality of the flow transducer. The step also makes sure that each of the five low pressure switches are in “closed” (pressurized) positions.

(5) Make sure that after approximately 5 minutes TKS fluid starts to show at a minimum of one porous panel.

(6) Continue to operate the TKS system in the HIGH mode until complete flow shows at each of the porous panels.

(a) Make sure the fluid flows from all of the porous panels correctly and shows no air bubbles. Refer to Figure 504.

NOTE: The full length of the vertical stabilizer porous panel may not be flowing due to gravity and warm temperatures.

(7) Put the PRIMARY switch to the OFF position.

(a) Reset the stopwatch.

(8) Empty the TKS fluid collection buckets and use the correct procedures to discard of the TKS fluid.

(9) Put the PRIMARY switch to the HIGH position and start the stopwatch.

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(a) Operate the TKS system for 5 minutes.

(10) Put the PRIMARY switch to the OFF position.

(11) Record the data that follows:

(a) The TKS system operation time.

(b) The quantity of the propeller slinger TKS fluid collected.

(c) The ambient temperature.

(12) Do a check of the TKS fluid collected for the left and right wing porous panels and make sure that for each side:

(a) The fluid collected is 23.7 fluid ounces, +7.1 or -4.7 fluid ounces, (700 ml, +210 or -140 ml).

(13) Do a check of the TKS fluid collected for the left and right horizontal stabilizer porous panels and make sure that for each side:

(a) The fluid collected is 6.4 fluid ounces, +2.0 or -1.4 fluid ounces, (190 ml, +60 or -40 ml).

CAUTION: Do not operate the windshield pump for more than 10 seconds at a time. Make sure that you wait a minimum of 10 seconds with the pump off before you operate it again.

(14) Push and hold the MAX FLOW switch in the WINDSHIELD switch position.

(a) Make sure that each of the 9 spray holes have steady flow streams in a correct manner.

(b) Make sure that TKS supply lines forward of the firewall are not leaking TKS fluid.

NOTE: To get fluid flowing to the windshield nozzles the MAX FLOW switch may need to be cycled to the WINDSHIELD position several times.

(15) If no more test procedures are to be done at this time, return the airplane to its original condition. Refer to Restore the Airplane in this section.

9. Restore the Airplane

A. Put the airplane back to its original condition.

NOTE: It can be necessary to complete some or all of the procedures that follow to put the airplane back to its original condition.

(1) If you cannot continue the TKS test procedures at this time or the necessary test procedures are complete, do the procedures that follow:

(a) Set the AVIONICS MASTER switch (SW04) to the OFF position.

(b) Set the master BATT switches (left SW01 and right SW02) to the OFF position.

(c) Set the CROSS TIE Switch (SW03) to the OFF position.

(d) Remove external electrical power from the airplane.

(2) Disconnect the test line-1 nylon tube assembly from the Tee.

(3) Remove the cap from the aft tail supply tube.

(a) Install a new seal in the aft Tee port outlet tube fitting. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201.

(b) Put the aft tail supply tube in its correct position on the aft Tee outlet fitting.

(c) Carefully tighten the tube fitting nut. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

(4) Remove the cap from the proportioning units supply tube.

(a) Install a new seal in the proportioning units supply tube fitting. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201.

(b) Put the proportioning units supply tube fitting in its correct position on the TEE proportioning units supply outlet port.

(c) Carefully tighten the tube fitting nut. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

(5) Disconnect the test line-2 nylon tube assembly from the firewall fitting.

(6) Remove the cap from the windshield spray supply tube.

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(a) Install a new seal in the windshield spray supply tube fitting. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201.

(b) Put the windshield spray supply tube fitting in its correct position on the firewall fitting.

(c) Carefully tighten the tube fitting nut. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

(7) If a fluid collection system was fabricated and installed on the airplane, remove it.

(a) Use the correct procedures to discard the TKS fluid that remains in the collection system components.

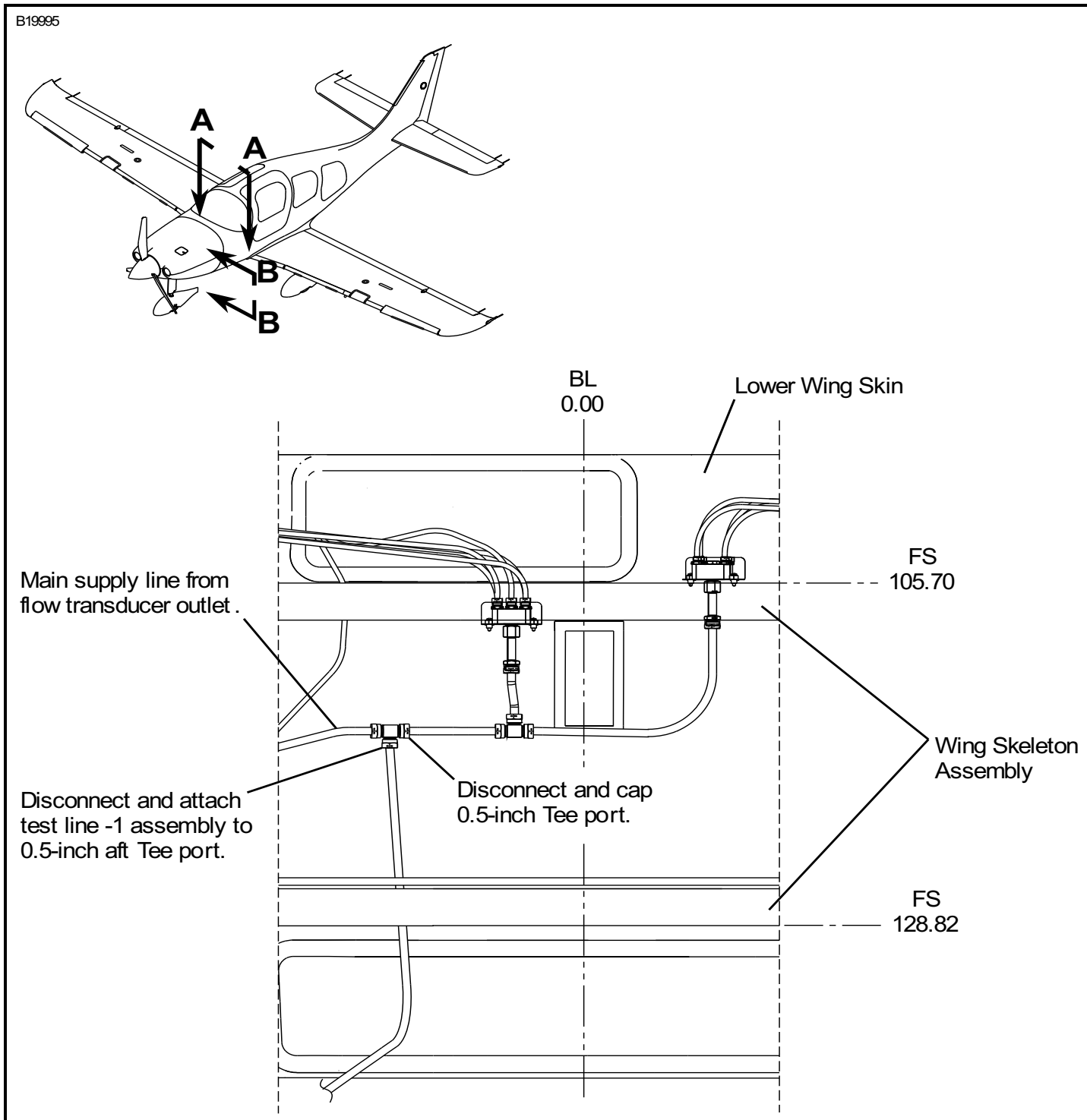
(8) Use the correct procedures to discard the TKS fluid in the collection bucket(s).

(9) As necessary, install the panels and components that follow:

- The left and/or right forward cabin floor panel. Refer to Chapter 53, Fuselage Access - Description and Operation.
- The TKS access panel on the lower surface of the left wing.
- Install the footwell. Refer to Chapter 25, Footwell - Maintenance Practices.
- The pilot's and/or copilot's seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices.

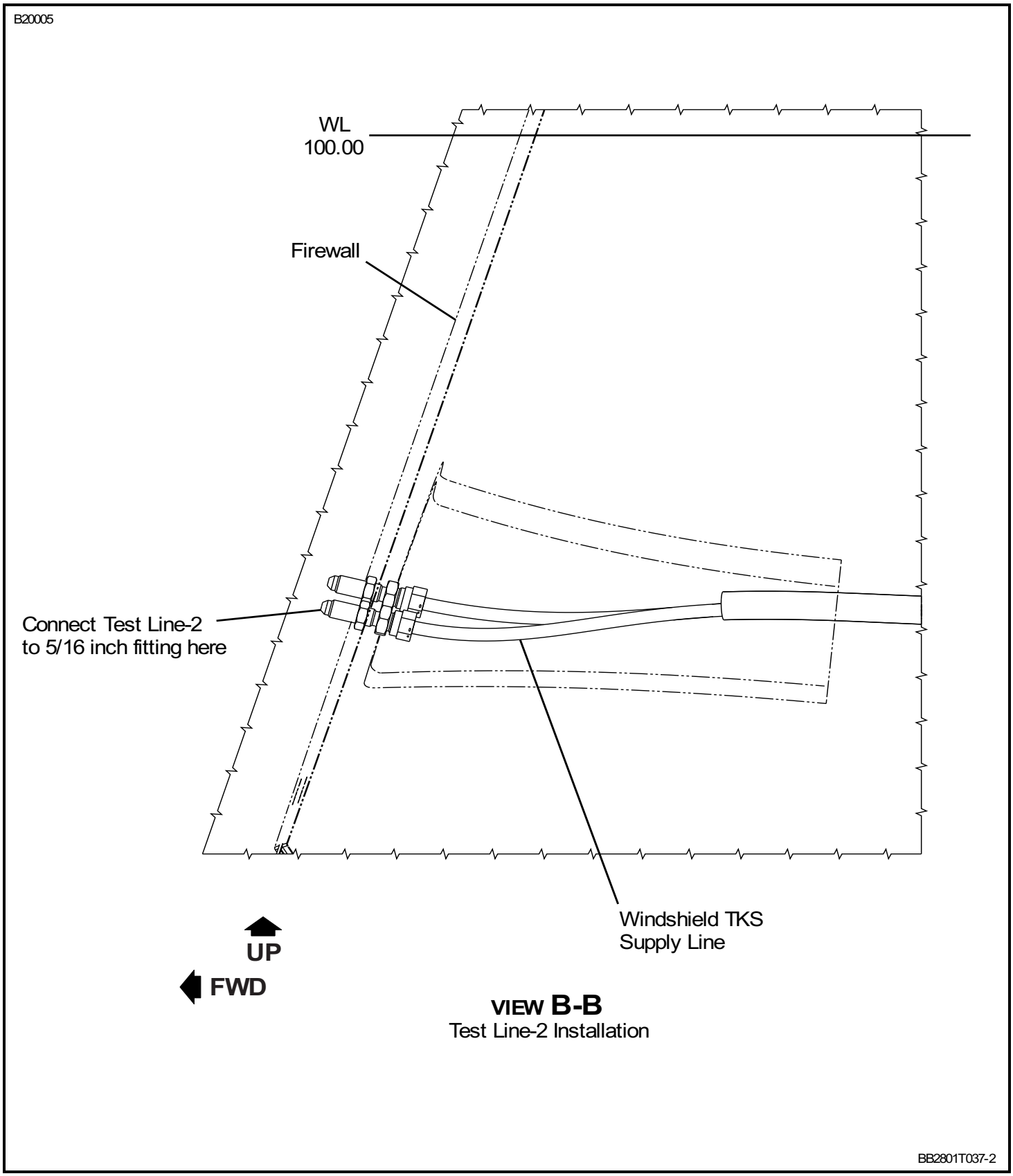
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Figure 501 : Sheet 1 : Test Line Installation



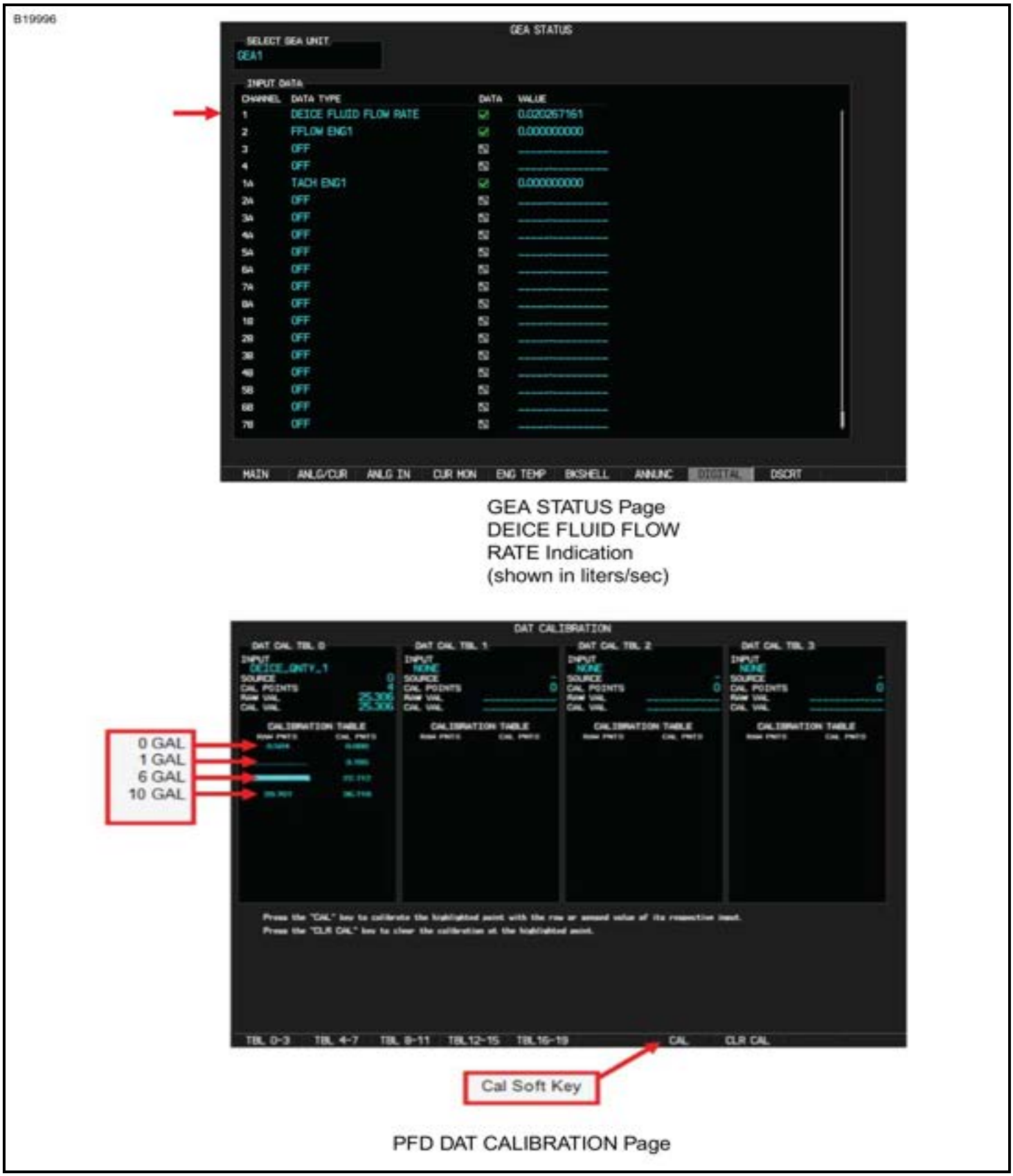
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Figure 501 : Sheet 2 : Test Line Installation



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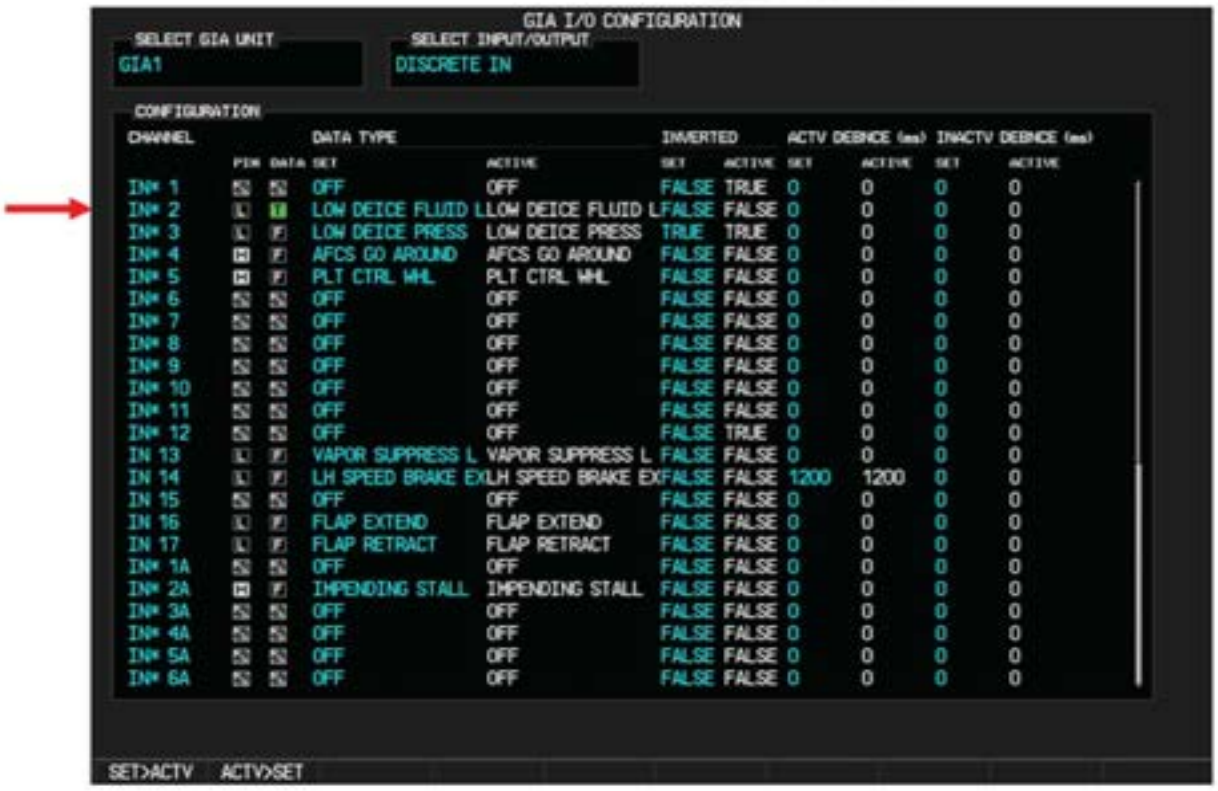
Figure 502 : Sheet 1 : TKS Tank Calibration Screen Shots



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Figure 502 : Sheet 2 : TKS Tank Calibration Screen Shots

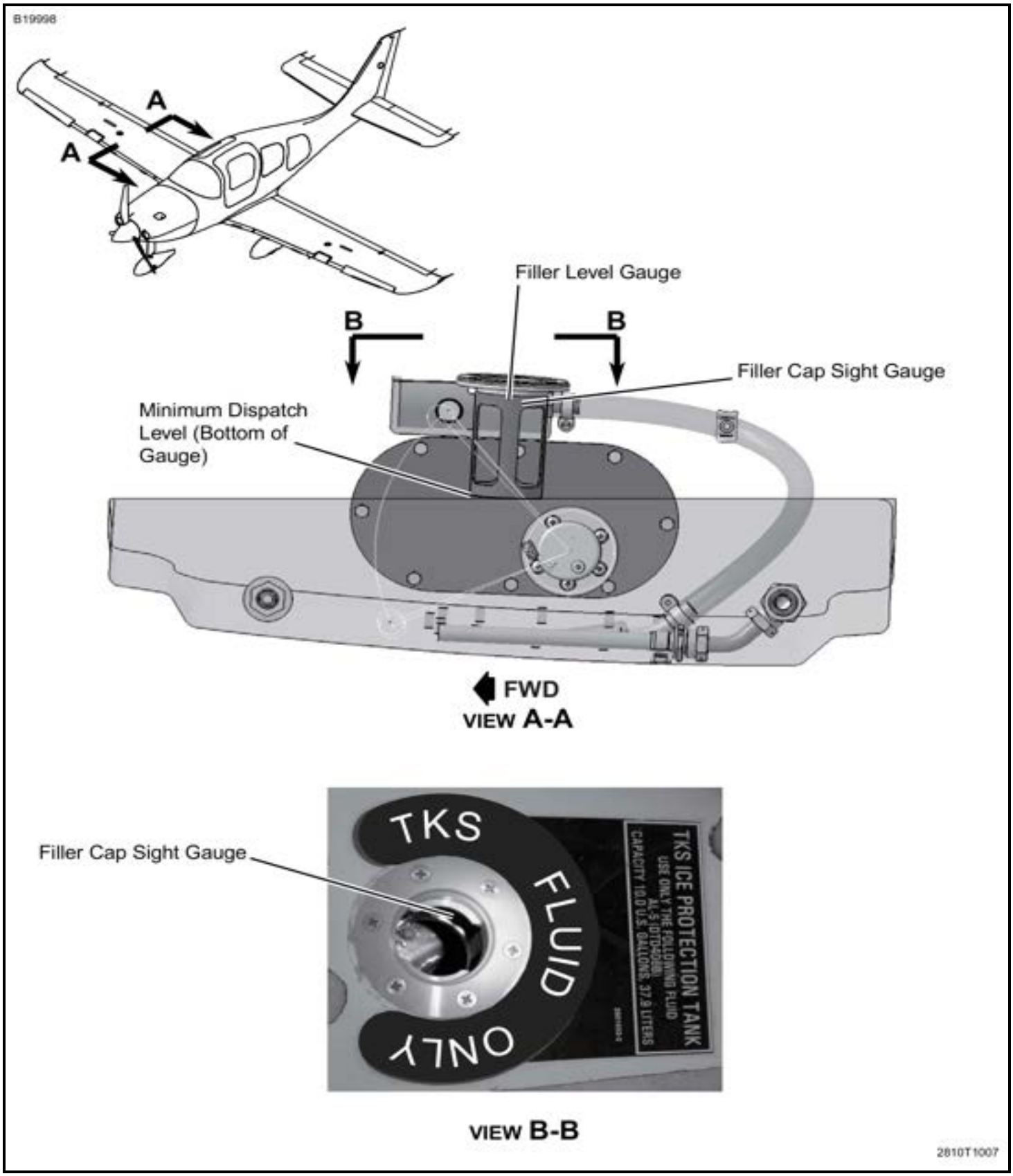
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PDF GIA I/O CONFIGURATION Page

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Figure 503 : Sheet 1 : TKS Tank Fluid Filler Level gauge



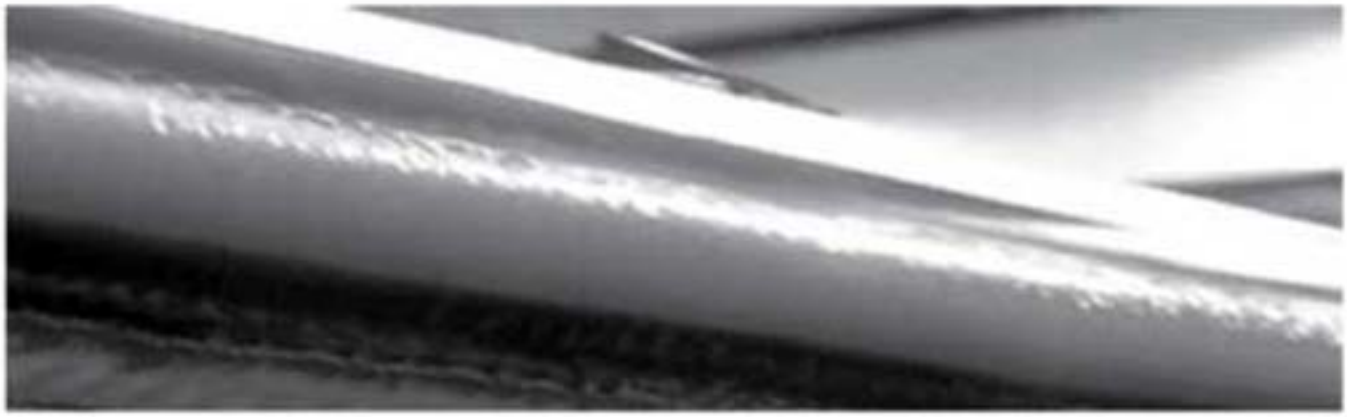
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Figure 504 : Sheet 1 : Porous Panel Flow

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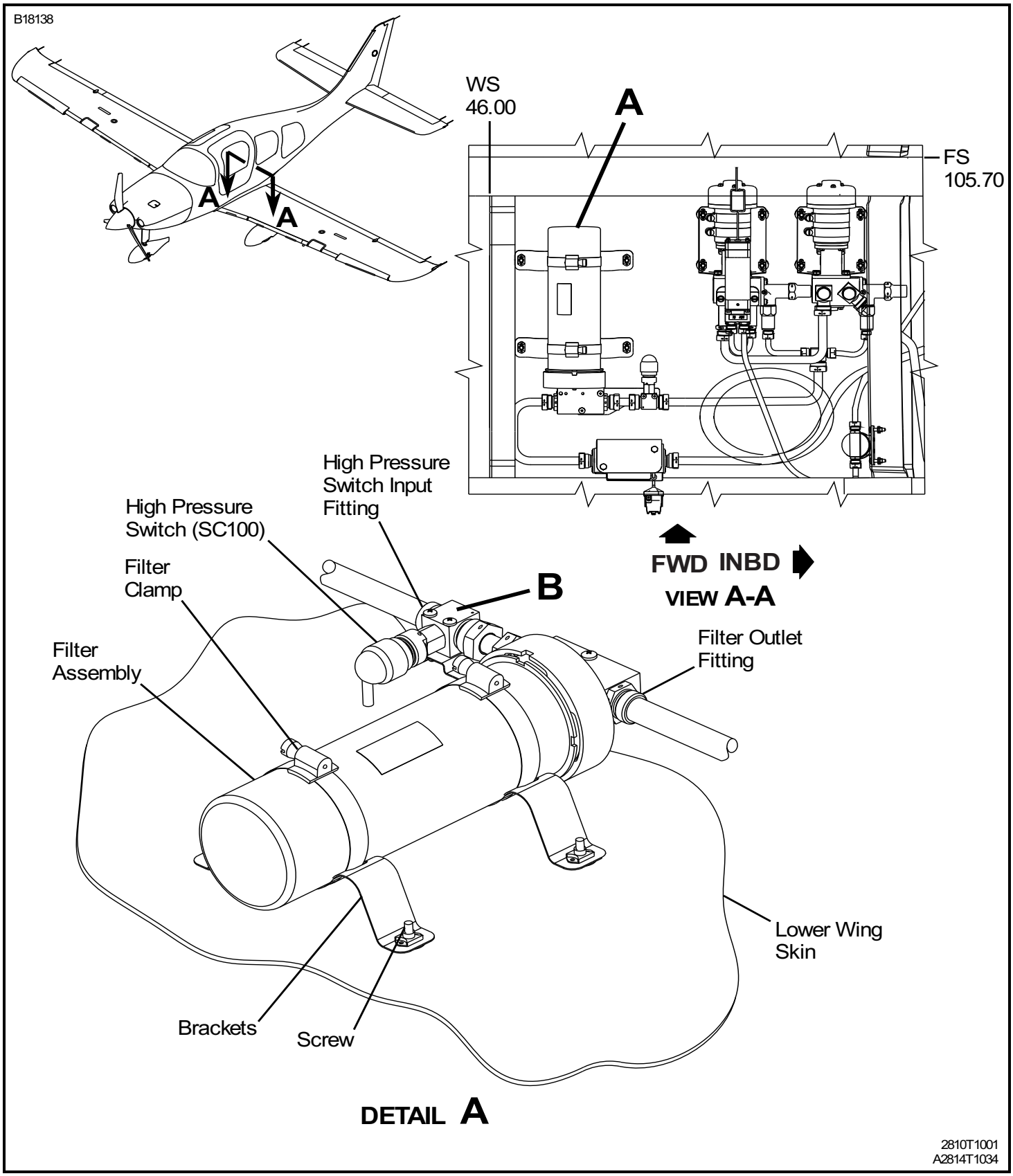
Porous Panel Incorrect TKS Fluid Flow



Porous Panel Correct TKS Fluid Flow

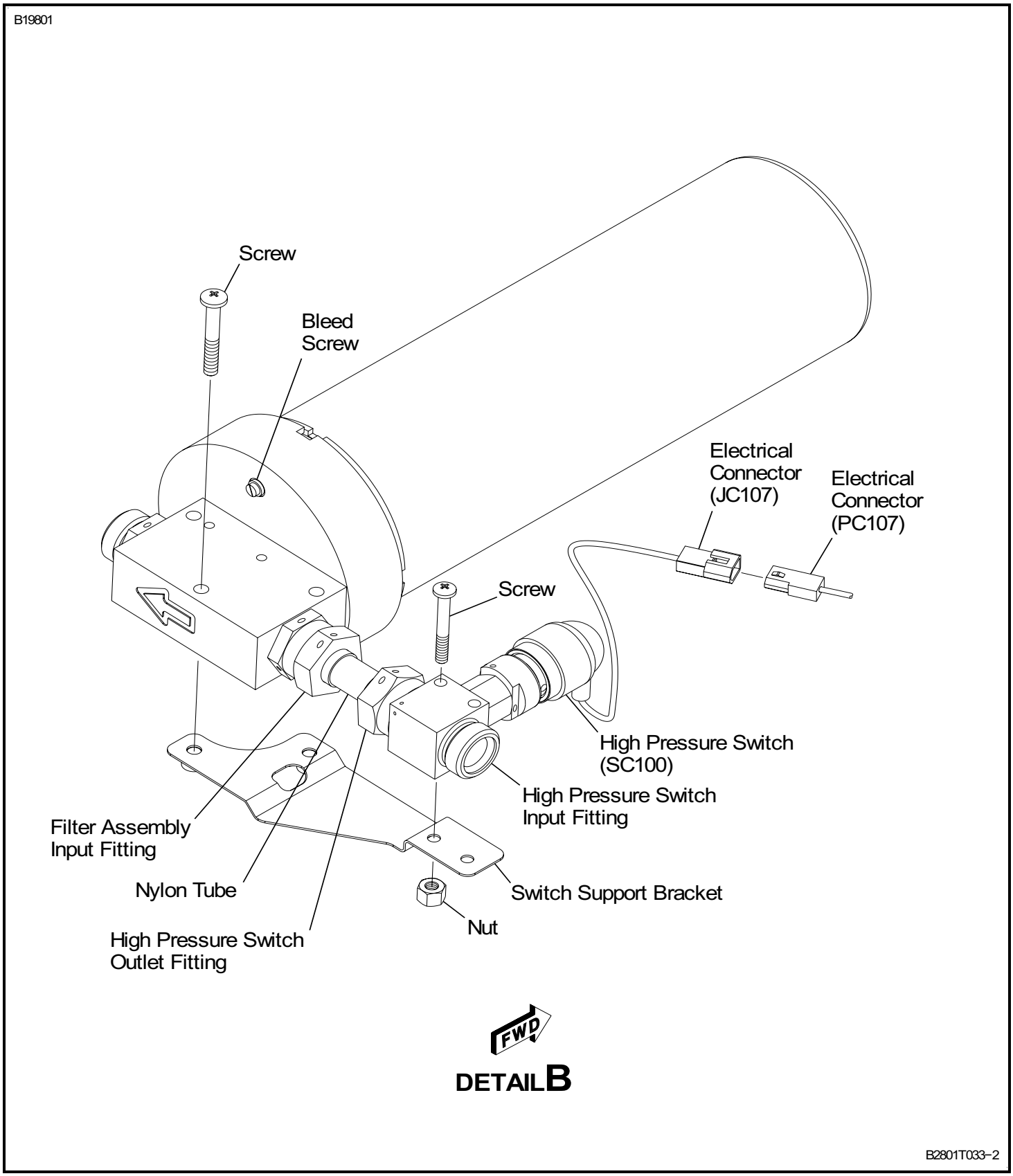
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Figure 401 : Sheet 1 : TKS Filter Assembly Installation



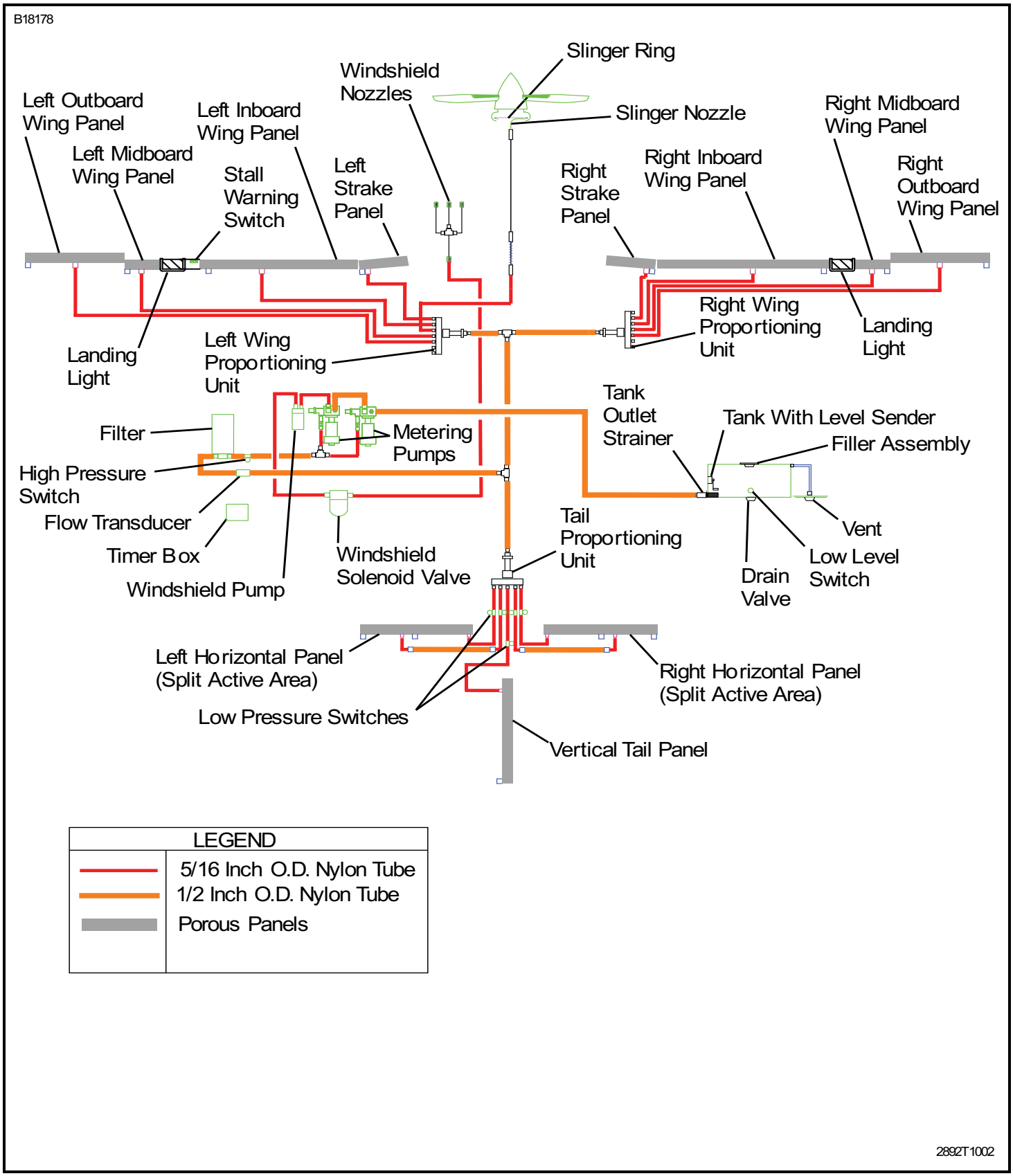
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Figure 401 : Sheet 2 : TKS Filter Assembly Installation



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Figure 201 : Sheet 1 : TKS Tubing Installation

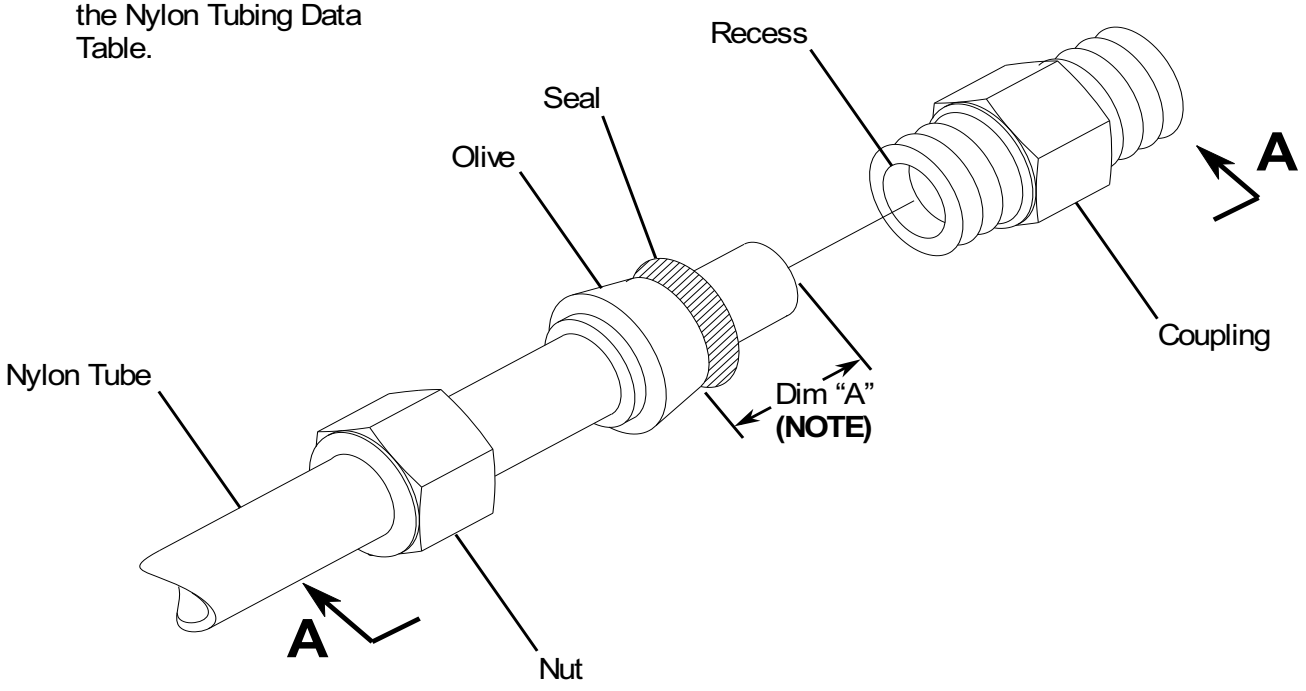


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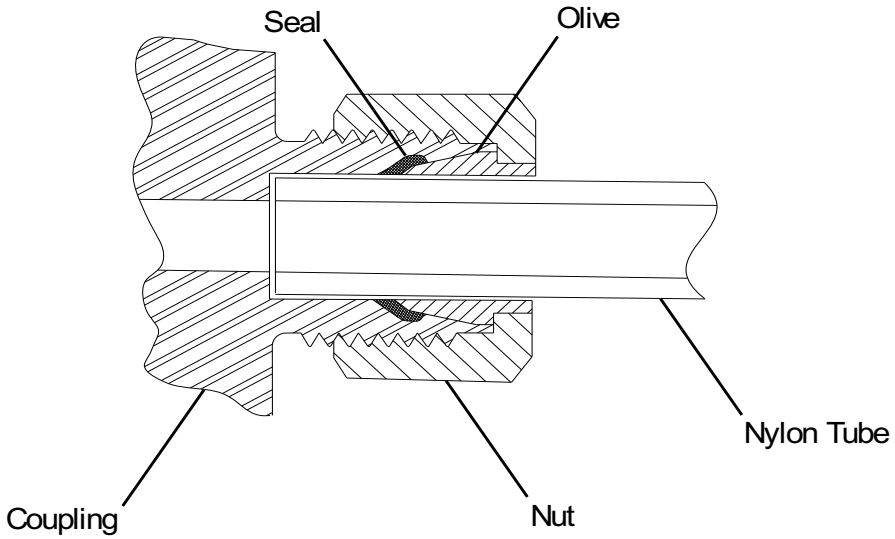
Figure 201 : Sheet 2 : TKS Tubing Installation

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NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)



VIEW A-A

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AA2678T1003

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TKS ANTI-ICE SYSTEM (FIKI) - INSPECTION/CHECK

1. General

A. This section contains the inspections and checks necessary to keep the TKS Anti-Ice System (FIKI) in a serviceable condition.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. Warnings and Cautions

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Before you disconnect components of the TKS anti-ice system, slowly loosen the coupling that is connected to the component to be removed. It is possible that high pressure is still in the system.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Do not use MEK, acetone, paint thinner, or similar chlorinated solvents on the porous panels. To prevent damage, only use water and detergent, isopropyl alcohol, and/or approved anti-ice fluid on the porous panel surfaces.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube coupling. Replace the 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube coupling. Examine the seal for damage and make sure that it is in the correct position in the coupling. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the coupling.

4. TKS Inspection/Check Preliminary Procedures

A. Electrical power preliminary procedures.

(1) On the cockpit circuit breaker panel, disengage the circuit breakers that follow:

- ANTI-ICE PUMP 1
- ANTI-ICE PUMP 2
- W/S ANTI-ICE.

(2) Make sure that the G2000 system circuit breakers are engaged.

B. TKS component access preliminary procedures.

(1) As necessary, remove the panels and components that follow to get access to the TKS pumps and plumbing:

- Remove the pilot's and/or copilot's seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices.
- Remove the left and/or right forward cabin floor panel. Refer to Chapter 53, Fuselage Access - Description and Operation.
- Remove the footwell. Refer to Chapter 25, Footwell - Maintenance Practices

(2) Level the airplane. Refer to Chapter 8, Leveling and Weighing - General.

C. Test line-1 preliminary procedures (refer to Figure 601).

(1) If necessary fabricate a test line-1. Refer to Section 30-15-02, TKS Test Lines - Maintenance Practices.

(2) Connect test line-1.

NOTE: If necessary, a TKS collection system can be fabricated and installed on the porous panels and at the propeller slinger ring as an alternative to the test line-1.

(a) Disconnect the aft tail supply tube from the aft port of the first Tee downstream of the flow transducer.

(b) Put a cap on the aft tail supply tube to keep FOD out and prevent excessive leakage of TKS fluid from the system.

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(c) Connect the test line-1 nylon tube assembly to the Tee aft port.

1 Carefully tighten the tube fitting nut. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

(d) Put the open end in a 3 to 5 gallon collection bucket.

(e) Make sure that the shutoff valve is in the closed position.

(3) Disconnect the proportioning units supply side tube from the port of the Tee.

(a) Put a cap on the proportioning units supply tube to keep FOD out and prevent excessive leakage of TKS fluid from the system.

(b) Put a cap on the proportioning units supply port of the Tee.

5. Flow Transducer Check

A. Do the flow transducer check procedures.

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Warnings and Cautions found in this section.

(2) Do the TKS Inspection/Check Preliminary Procedures found in this section.

NOTE: If necessary, a TKS collection system can be fabricated and installed on the porous panels and at the propeller slinger ring as an alternative to the test line-1 that is connected in the preliminary procedures.

NOTE: The flow transducer check procedures should be completed before the low pressure discrete wiring check procedures are done.

(a) Make sure that test line-1 is connected (refer to Test line-1 preliminary procedure in this section).

(3) On the cockpit circuit breaker panel engage the circuit breakers that follow:

- ANTI-ICE PUMP 1
- ANTI-ICE PUMP 2.

(4) If necessary, put electrical power on the airplane as follows:

(a) Apply external electrical power to the airplane.

(b) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(c) Set the AVIONICS MASTER switch (SW04) to the ON position.

(d) Set the CROSS TIE Switch (SW03) to the ON position.

(5) Make sure that the Garmin G2000 system is serviceable.

(a) There are no CAS messages that show the G2000 is not serviceable.

(b) The primary flight display (PFD) and/or the multifunction display (MFD) do not show an 'X' (red or amber) on system function displays.

NOTE: This is an indication of a G2000 or a related integrated system failure.

(c) If the G2000 system shows an indicated unserviceable condition, troubleshoot and repair the problem. Refer to Chapter 34, Garmin G2000 - Troubleshooting.

(6) Make sure that the TKS fluid quantity indicator on the MFD EIS strip shows a fluid quantity of a minimum of 0.5 gallons.

(a) If there is less than 0.5 gallons of TKS fluid shown on the EIS strip, add 1.0 gallon (3.8 liter) of approved TKS fluid to the TKS fluid tank. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid.

(7) Make sure that the open end of the test line-1 is in a collection bucket and the shutoff valve is open.

(8) Do the procedures to put the G2000 in the configuration mode as follows:

(a) On the cockpit circuit breaker panel disengage the circuit breakers that follow:

- PFD
- MFD
- GTC.

(b) While you push and hold the far right MFD softkey (12), engage the MFD circuit breaker.

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1 Release the softkey when the "INITIALIZING SYSTEM" message shows on the MFD.

(c) While you push and hold the far right PFD softkey (12), engage the PFD circuit breaker.

1 Release the softkey when the "INITIALIZING SYSTEM" message shows on the PFD.

(d) While you push and hold the GTC small right knob, engage the GTC circuit breaker.

1 Release the small right knob when the "INITIALIZING SYSTEM" message shows on the GTC.

(9) Set the GTC 570 to control the PFD as follows:

(a) When the "Config Mode" page shows on the GTC, push the "GDU Controls" button.

(b) When the "GDU Controls" page shows on the GTC, make sure the green bar shows on the bottom section of the "PFD" button.

1 If not push the "PFD" button.

(10) Select the GEA STATUS page on the PFD and then push “DIGITAL” softkey.

(11) On the center console switch panel, put the PRIMARY switch to the NORM position.

(12) Make sure that the DEICE FLUID FLOW RATE value is not zero on the GEA Status page. Refer to TKS Anti-Ice System (FIKI) - Adjustment/Test, Figure 502.

NOTE: Flow rate above zero indicates the flow transducer is serviceable.

NOTE: You can create back pressure on the system by slowly closing and opening the test line-1 shutoff valve. This can help to remove air from the system and start the flow rate indication.

(13) On the center console switch panel, put the PRIMARY switch to the OFF position.

(14) On the cockpit circuit breaker panel, make sure that the circuit breakers that follow are disengaged:

- PFD
- MFD
- GTC.

(15) If no more test procedures are to be done at this time, return the airplane to its original condition. Refer to Restore the Airplane found in this section.

6. High Pressure Switch Check

A. Do the high pressure switch check procedure.

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Warnings and Cautions found in this section.

(2) Do the TKS Inspection/Check Preliminary Procedures found in this section.

NOTE: If necessary, a TKS collection system can be fabricated and installed on the porous panels and at the propeller slinger ring as an alternative to the test line-1 that installed in the preliminary procedures.

(a) Make sure that test line-1 is connected (refer to Test line-1 preliminary procedure in this section).

(3) On the cockpit circuit breaker panel engage the circuit breakers that follow:

- ANTI-ICE PUMP 1
- ANTI-ICE PUMP 2
- W/S ANTI-ICE.

(4) If necessary, put electrical power on the airplane as follows:

(a) Apply external electrical power to the airplane.

(b) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(c) Set the AVIONICS MASTER switch (SW04) to the ON position.

(d) Set the CROSS TIE Switch (SW03) to the ON position.

(5) Make sure that the Garmin G2000 system is serviceable.

(a) There are no CAS messages that show system show that the G2000 is not serviceable.

(b) The primary flight display (PFD) and/or the multifunction display (MFD) do not show an 'X' (red or amber) on system function displays.

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NOTE: This is an indication of a G2000 or a related integrated system failure.

(c) If the G2000 system shows an indicated unserviceable condition, troubleshoot and repair the problem. Refer to Chapter 34, Garmin G2000 - Troubleshooting.

(6) If there is less than 0.5 gallons of TKS fluid shown on the EIS strip, add 1.0 gallon and 8 ounces (3.8 liter and 235 ml) of approved TKS fluid to the TKS fluid tank. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid.

(7) Make sure that the open end of the test line-1 is in a collection bucket and the shutoff valve is open.

(8) On the center console switch panel, put the PRIMARY switch to the HIGH position.

CAUTION: Slowly and cautiously close the shutoff valve. This is very important if new TKS components (nylon tube lines, olives, etc.) were installed. This will help prevent damage to the TKS components.

(9) Operate the pump for approximately 10 seconds, then slowly close the test line-1 shutoff valve until the valve is fully closed.

NOTE: Closing the valve increases the TKS system pressure. If new components were not installed correctly, they can come apart under pressure.

(a) Make sure that the CAS message A-ICE PRESS HI (amber) shows on the PFD and a single aural chime is heard.

(10) Fully open the test line-1 shutoff valve.

(a) Make sure that the CAS message A-ICE PRESS HI (amber) on the PFD goes away.

(11) Put the PRIMARY switch to the OFF position.

(12) If no more test procedures are to be done at this time, return the airplane to its original condition. Refer to Restore the Airplane found in this section.

7. Low Pressure Discrete Wiring Check

A. Do the low pressure discrete wiring check procedure.

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Warnings and Cautions found in this section.

(2) Do the TKS Inspection/Check Preliminary Procedures found in this section.

NOTE: The flow transducer check procedures should be completed before the low pressure discrete wiring check procedures are done.

(a) Make sure that test line-1 is connected (refer to Test line-1 preliminary procedure in this section).

(3) On the cockpit circuit breaker panel engage the circuit breakers that follow:

- ANTI-ICE PUMP 1
- ANTI-ICE PUMP 2.

(4) If necessary, put electrical power on the airplane as follows:

(a) Apply external electrical power to the airplane.

(b) Set the master BATT switches (left SW01 and right SW02) to the ON position.

(c) Set the AVIONICS MASTER switch (SW04) to the ON position.

(d) Set the CROSS TIE Switch (SW03) to the ON position.

(5) Make sure that the Garmin G2000 system is serviceable.

(a) There are no CAS messages that show system show that the G2000 is not serviceable.

(b) The primary flight display (PFD) and/or the multifunction display (MFD) do not show an 'X' (red or amber) on system function displays.

NOTE: This is an indication of a G2000 or a related integrated system failure.

(c) If the G2000 system shows an indicated unserviceable condition, troubleshoot and repair the problem. Refer to Chapter 34, Garmin G2000 - Troubleshooting.

(6) Make sure that the TKS fluid quantity indicator on the MFD EIS strip shows a fluid quantity of a minimum of 0.5 gallons.

(a) If there is less than 0.5 gallons of TKS fluid shown on the EIS strip, add 1.0 gallon and 8 ounces (3.8 liter and

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235 ml) of approved TKS fluid to the TKS fluid tank. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid.

(7) Make sure that the open end of the test line-1 is in a collection bucket and the shutoff valve is open.

(8) On the center console switch panel, put the PRIMARY switch to the HIGH position.

(9) Operate the pump for approximately 2 minutes.

(a) Make sure that the CAS message A-ICE FAIL (red) shows on the PFD and a continuos aural chime is heard.

(10) Put the PRIMARY switch to the OFF position.

(11) If no more test procedures are to be done at this time, return the airplane to its original condition. Refer to Restore the Airplane found in this section.

8. Restore the Airplane

A. Put the airplane back to its original condition.

NOTE: It can be necessary to complete some or all of the procedures that follow to put the airplane back to its original condition.

(1) If you cannot continue the TKS test procedures at this time or the necessary test procedures are complete, do the procedures that follow:

(a) Set the AVIONICS MASTER switch (SW04) to the OFF position.

(b) Set the master BATT switches (left SW01 and right SW02) to the OFF position.

(c) Set the CROSS TIE Switch (SW03) to the OFF position.

(d) Remove external electrical power from the airplane.

(2) Disconnect the test line-1 nylon tube assembly from the Tee.

(3) Remove the cap from the aft tail supply tube.

(a) Install a new seal in the aft Tee port outlet tube fitting. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201.

(b) Put the aft tail supply tube in its correct position on the aft Tee outlet fitting.

(c) Carefully tighten the tube fitting nut. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

(4) Remove the cap from the proportioning units supply tube.

(a) Install a new seal in the proportioning units supply tube fitting. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201.

(b) Put the proportioning units supply tube fitting in its correct position on the TEE proportioning units supply outlet port.

(c) Carefully tighten the tube fitting nut. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

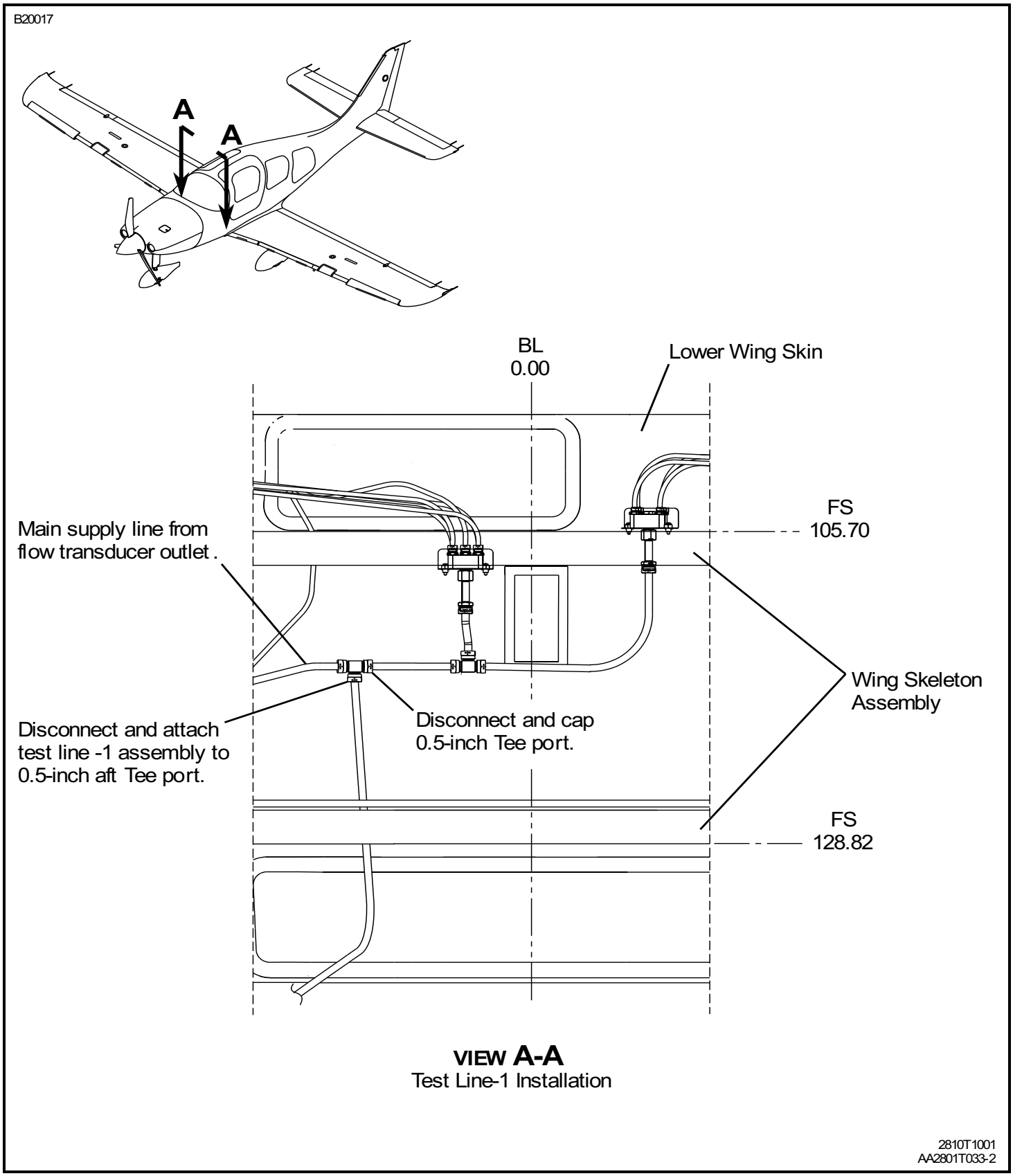
(5) Use the correct procedures to dispose of the TKS fluid in the collection bucket(s).

(6) As necessary, install the panels and components that follow:

- The left and/or right forward cabin floor panel. Refer to Chapter 53, Fuselage Access - Description and Operation.
- Install the footwell. Refer to Chapter 25, Footwell - Maintenance Practices.
- The pilot's and/or copilot's seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices.

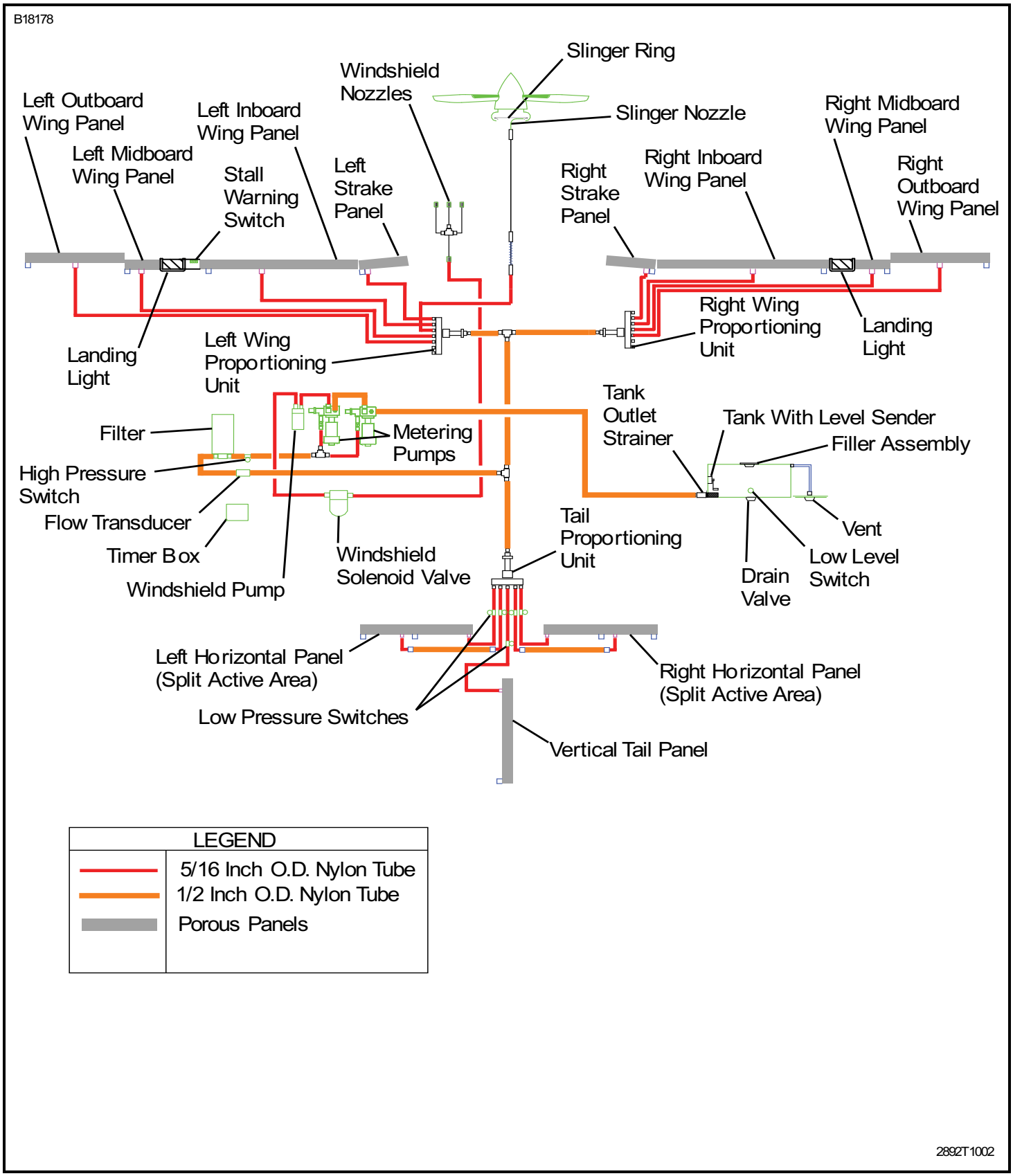
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Figure 601 : Sheet 1 : Test Line-1 Installation



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Figure 201 : Sheet 1 : TKS Tubing Installation

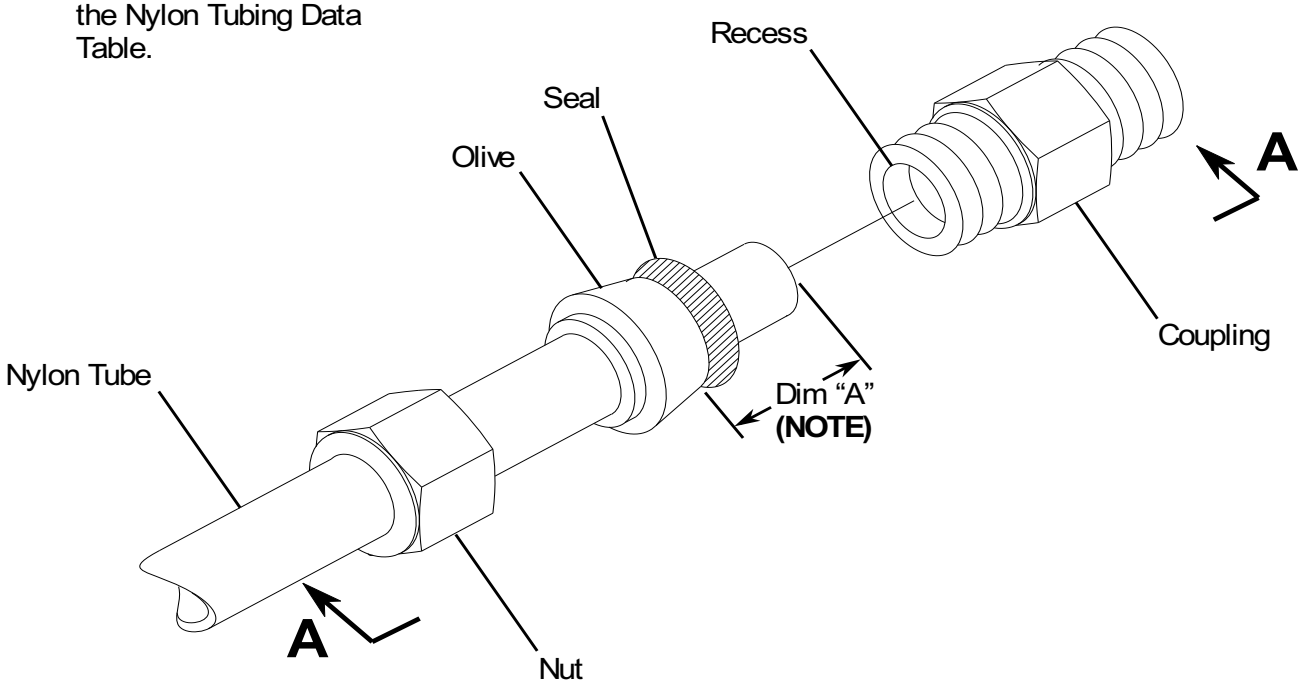


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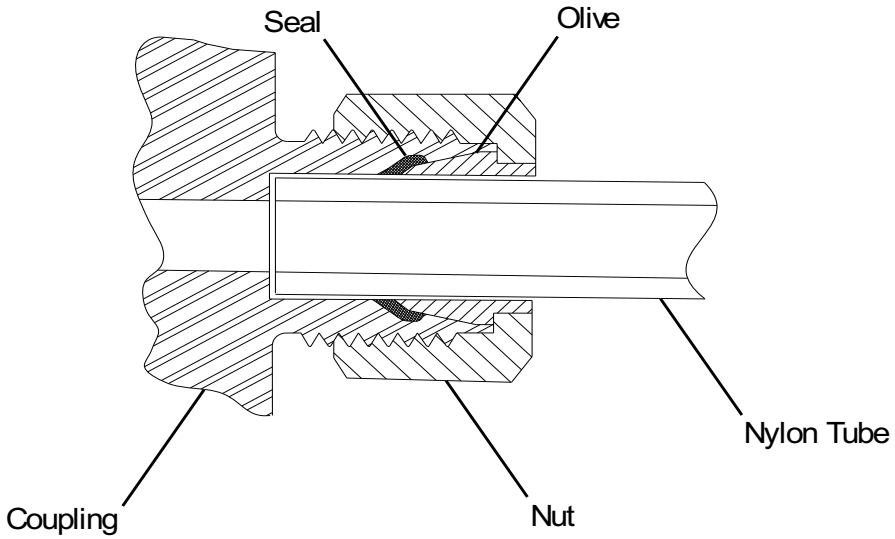
Figure 201 : Sheet 2 : TKS Tubing Installation

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NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)

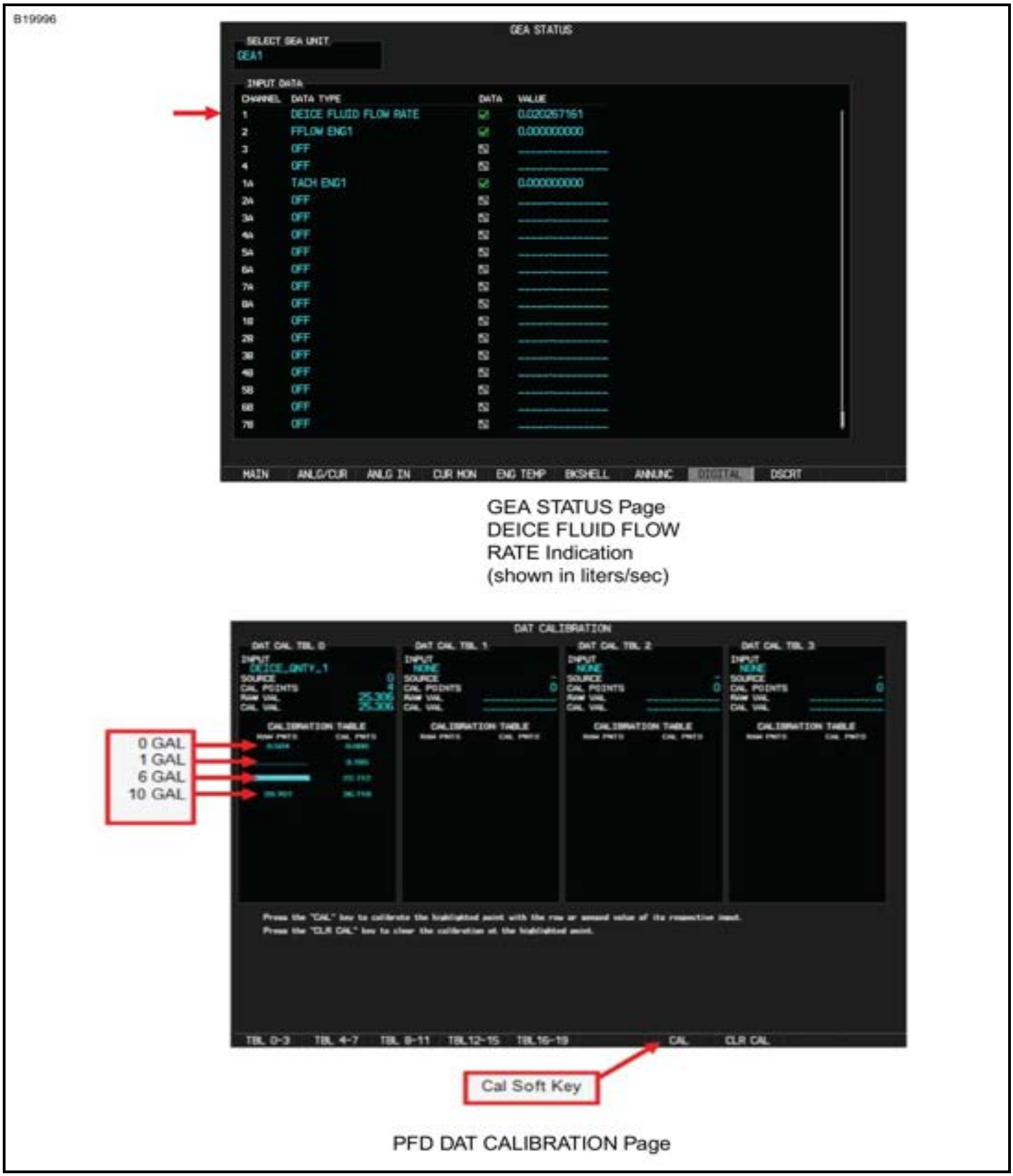


VIEW A-A

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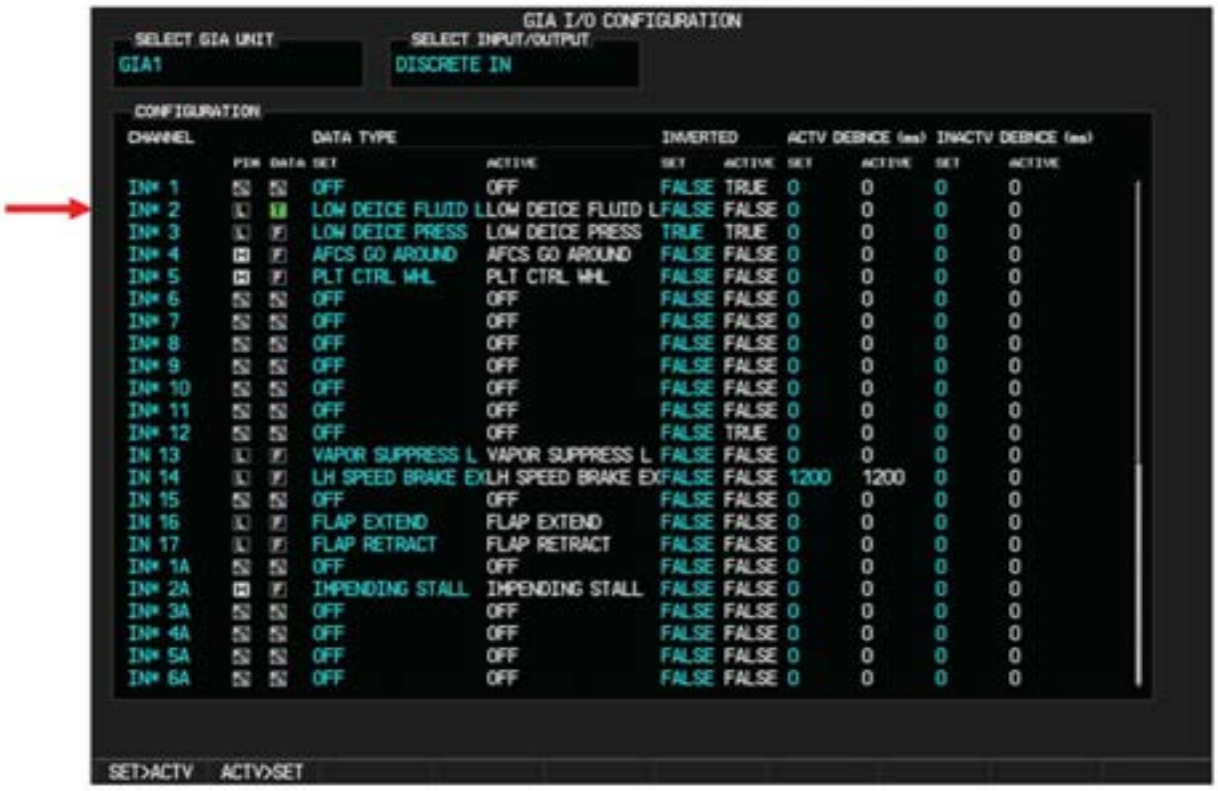
Figure 502 : Sheet 1 : TKS Tank Calibration Screen Shots



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Figure 502 : Sheet 2 : TKS Tank Calibration Screen Shots

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TKS TEST LINES - MAINTENANCE PRACTICES

1. General

A. This section contains the fabrication information for the TKS test lines. These lines are used in accordance with related TKS adjustment, test, inspection, and check procedures.

2. TKS Test Line-1 Fabrication

NOTE: Test Line-1 for attaching to the 1/2 inch main supply tees.

A. Fabricate the test line-1 nylon tube assembly (refer to Figure 201).

(1) For test line-1 fabrication parts refer to Table 201.

(2) For additional nylon tubing repair and torque information refer to section 30-15-00, TKS Anti-Ice System (FIKI) - Maintenance Practices, Nylon Tubing Repair/Replacement.

Table 201. Test Line-1 Fabrication Parts

Name	Part Number	Part Quantity
1/2 OD nylon tube	TTF135226	8 feet
Nut	MN6201	1
Olive	MN101-32	1
Seal	100-013-8810	1
Manual shutoff valve	V520P-8	1
Male connectors	W68PLP-8-8	2

3. TKS Test Line-2 Fabrication

NOTE: Test Line-2 is for attaching to the windshield fitting forward of the firewall.

A. Fabricate the test line-2 hose assembly (refer to Figure 202).

(1) For test line-2 fabrication parts refer to Table 202.

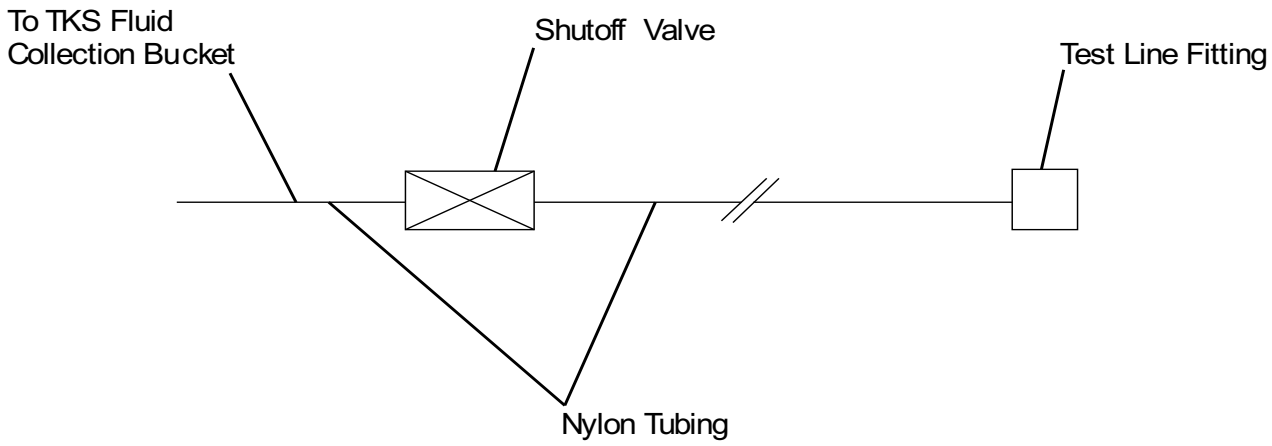
Table 202. Test Line-2 Fabrication Parts

Name	Part Number	Part Quantity
Hose	R221486	3 feet
Hose Clamp	S2357-3	1

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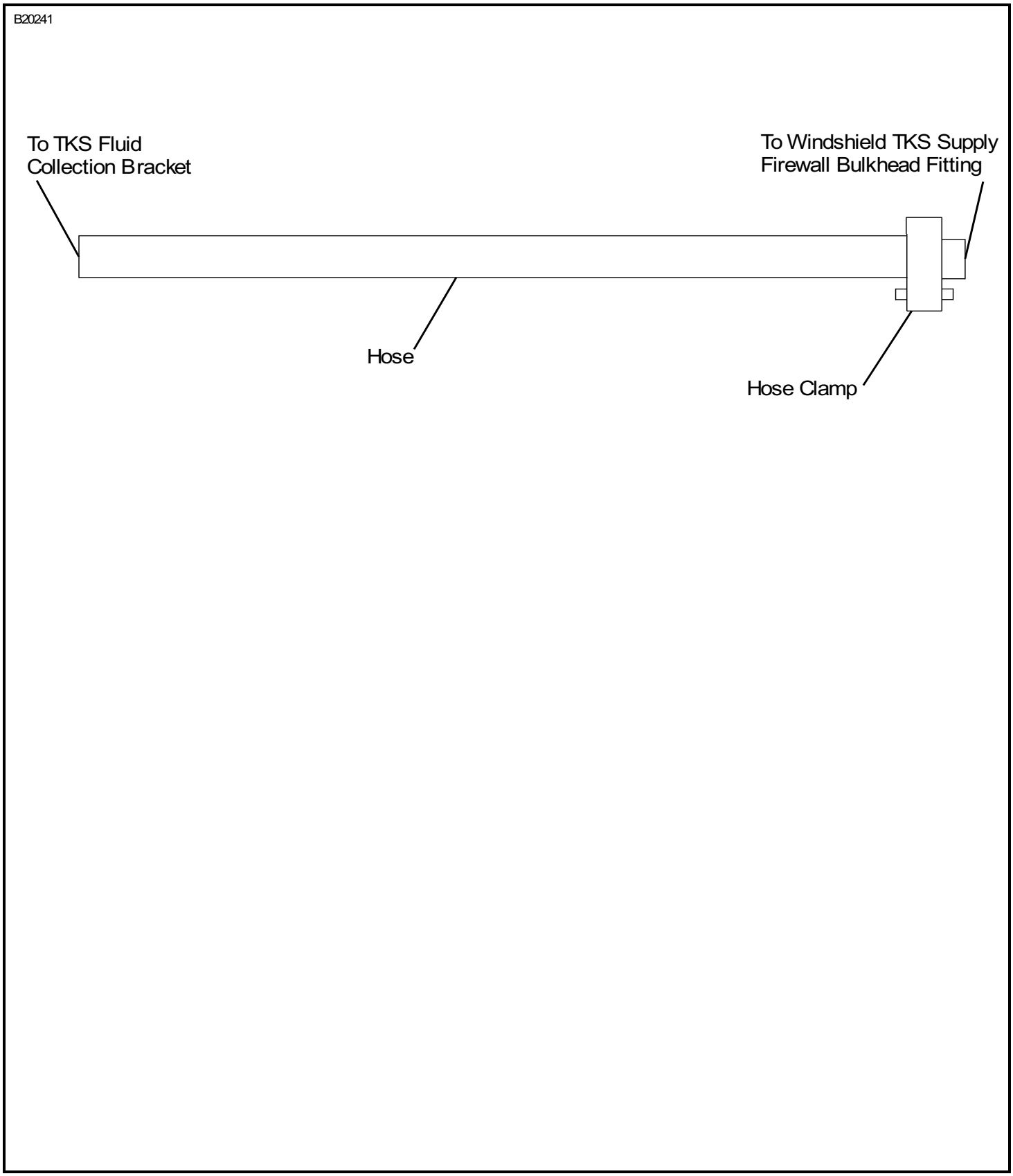
Figure 201 : Sheet 1 : Test Line-1 Fabrication Schematic

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Figure 202 : Sheet 1 : Test Line-2 Fabrication



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TKS TIMER BOX (FIKI) - REMOVAL/INSTALLATION

1. General

A. This section contains the removal and installation procedures for the TKS Timer Box. The Timer Box is installed on the avionics shelf below the right side of the instrument panel at RBL 10.22, FS 200.53.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. Timer Box Removal/Installation

A. Remove the Timer Box (UF101) (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(3) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(4) Disengage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

(c) W/S ANTI-ICE.

(5) Disconnect the electrical connector PF102 from the Timer Box electrical connector J1.

(6) While you support the timer box, remove the screws that attach it to the bottom of the avionics shelf.

(7) Remove the timer box assembly from the airplane.

B. Install the Timer Box (UF101) (Refer to Figure 401).

(1) Put the timer box in its correct position on the bottom of the avionics shelf.

(a) Install the screws that attach the timer box to the avionics shelf.

(2) Connect the electrical connector PF102 to the timer box electrical connector J1.

(3) Engage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

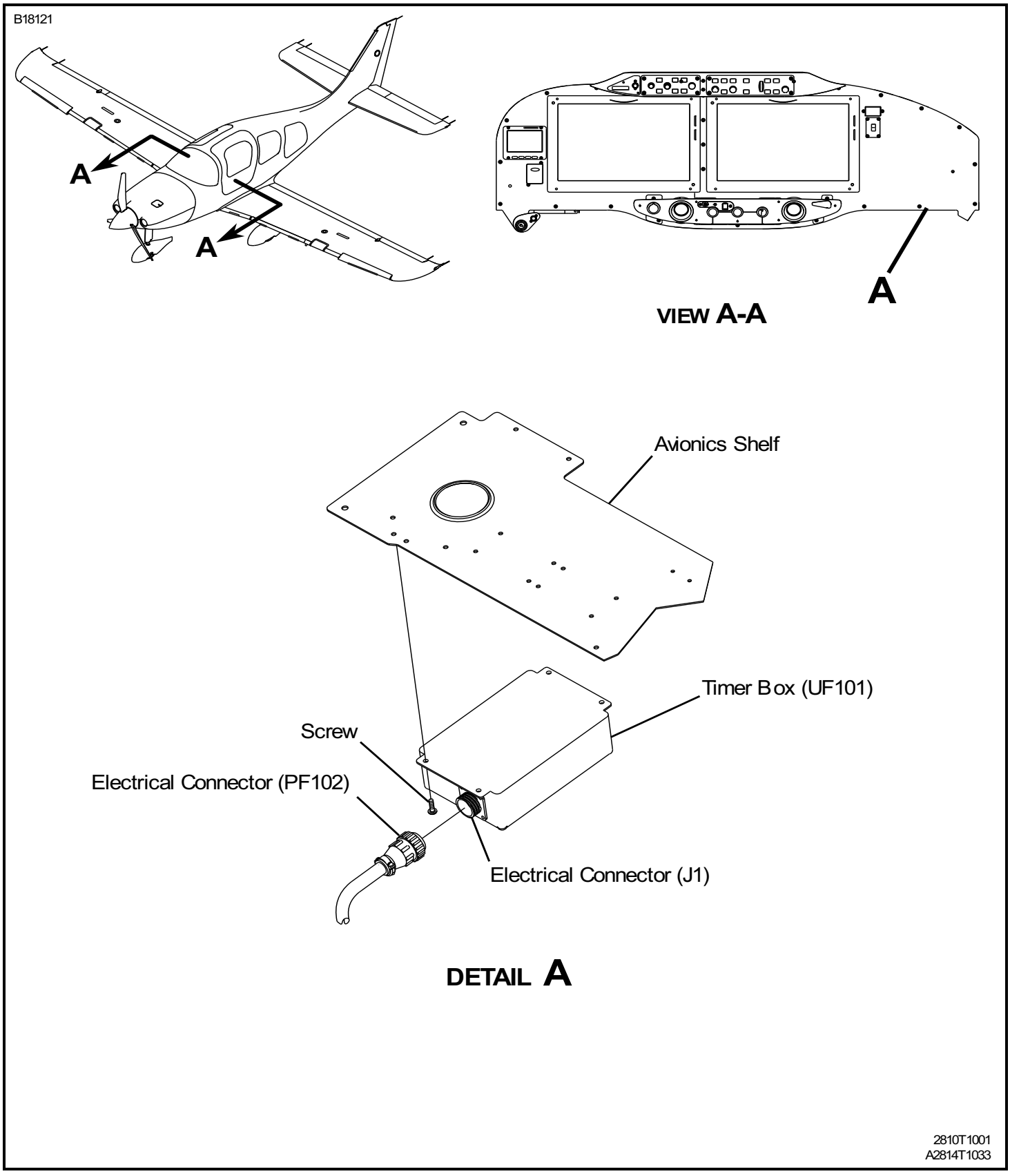
(b) ANTI-ICE PUMP 2

(c) W/S ANTI-ICE.

(4) Do a check of the timer box operation. Refer to TKS Anti-Ice System (FIKI) - Adjustment/Test.

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Figure 401 : Sheet 1 : Timer Box Installation



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TKS ANTI-ICE SYSTEM METERING PUMPS (FIKI) - REMOVAL/INSTALLATION

1. General

A. This section contains the removal and installation procedures for each of the two TKS Anti-Ice System (FIKI) Metering Pumps and the Windshield Pump. The Metering Pump 1/Windshield Pump Assembly has the windshield pump mounted on the top. To replace the Windshield or Metering Pump 1, it is necessary to remove the windshield pump from the metering pump.

B. Operate the metering pumps each month, or when necessary, in the NORM mode to maintain proper operation of the system.

C. Use the Model T240 Wiring Diagram Manual with the procedures in this section.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. Metering Pump 1/Windshield Pump Assembly Removal/Installation

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Before you disconnect components of the TKS anti-ice system, slowly loosen the nut that is connected to the component to be removed. It is possible there is still pressure in the system.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Before you operate the TKS system during this procedure put plastic sheets or absorbent cloths under the porous panels to keep the TKS fluid off the floor. This will help to prevent injury to personnel.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube nut. Replace the 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube fitting. Examine the seal for damage and make sure that it is in the correct position in the fitting. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the fitting.

A. Remove the Metering Pump 1 (UC101)/Windshield Pump (UC103) Assembly, (Refer to Figure 401).

NOTE: The Metering Pump 1, Metering Pump Bracket, and the Windshield Pump are usually removed and installed as an assembly.

NOTE: If you are to replace Metering Pump 1, you must remove the windshield pump that is installed on the metering pump. Then install the windshield pump on the new metering pump. Refer to Windshield Pump Removal/Installation.

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Metering Pump 1/Windshield Pump Assembly Removal/Installation.

(2) Remove external electrical power from the airplane.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(5) Disengage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

(c) W/S ANTI-ICE.

(6) Remove the TKS access panel on the lower surface of the left wing.

(7) Disconnect the electrical connector PC105 from the metering pump electrical connector JC105.

(8) Remove the tubes from the metering pump input and outlet fittings as follows:

(a) Slowly loosen the nuts and remove the input and outlet tubes from the metering pump fittings.

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(b) Slowly loosen the nut and remove the outlet tube from the windshield outlet fitting.

(c) Remove and discard the old seals from the input and outlet tube.

(d) Put caps on the open ends to keep FOD out of the fluid system and prevent excessive leakage of TKS fluid from the system.

NOTE: It is not necessary to install caps if you are to replace the metering pump immediately.

(9) Remove the pump bracket screws found on the bottom of the wing that attach the pump bracket to the lower wing skin.

(10) Carefully remove the pump assembly from the airplane.

(11) If you are to replace only the Windshield Pump or the Metering Pump 1, remove the windshield pump from the metering pump. Refer to Remove the Windshield Pump.

(12) If you are to replace the metering pump, loosen the screws on the pump clamps.

(a) Remove the pump from the bracket.

B. Install Metering Pump 1 (UC101)/Windshield Pump (UC103) Assembly, (Refer to Figure 401).

NOTE: The Metering Pump 1, Metering Pump Bracket, and the Windshield Pump are usually removed and installed as an assembly.

NOTE: If you are to replace Metering Pump 1, you must remove the windshield pump that is installed on the metering pump. Then install the windshield pump on the new metering pump. Refer to Install the Windshield Pump.

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Metering Pump 1/Windshield Pump Assembly Removal/Installation.

(2) If removed, install the Windshield Pump (UC103) on Metering Pump 1. Refer to, TKS Windshield Pump (FIKI) - Removal/Installation.

(3) Put the pump in its correct position on the bracket.

(a) Tighten the screws on the clamp to attach the pump to the bracket.

(4) Put the pump assembly in its correct position on the lower skin.

(a) Install the screws that attach the pump bracket to the lower wing skin.

(5) Install the outlet and input tubes to the metering pump as follows:

(a) If necessary, remove the caps from the open ends.

(b) Install new seals on the tubes. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201.

(c) Put the tubes in their correct position on the metering pump fittings and windshield pump outlet fitting.

(d) Carefully tighten the tube fitting nuts. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

(6) Connect electrical connector PC105 to the metering pump electrical connector JC105.

(7) Engage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

(c) W/S ANTI-ICE.

(8) Do a check of metering pump 1 and the windshield pump. Refer to TKS Anti-Ice System (FIKI) - Adjustment/Test.

(9) Install the TKS access panel on the lower surface of the left wing.

4. Metering Pump 2 Removal/Installation

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Before you disconnect components of the TKS anti-ice system, slowly loosen the nut that is connected to the component to be removed. It is possible there is still pressure in the system.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Before you operate the TKS system during this procedure put plastic sheets or absorbent cloths under the porous panels to keep the TKS fluid off the floor. This will help to prevent injury to personnel.

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WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube nut. Replace the 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube fitting. Examine the seal for damage and make sure that it is in the correct position in the fitting. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the fitting.

A. Remove the Metering Pump 2 (UC102) (Refer to Figure 401).

NOTE: The Metering Pump 2 and the metering pump bracket are usually removed and installed as an assembly.

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Metering Pump 2 Removal/Installation.

(2) Remove external electrical power from the airplane.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(5) Disengage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

(c) W/S ANTI-ICE.

(6) Remove the TKS access panel on the lower surface of the left wing.

(7) Disconnect electrical connector PC104 from the metering pump electrical connector JC104.

(8) Remove the tubes from the metering pump input and outlet fittings as follows:

(a) Slowly loosen the nuts and remove the input and outlet tubes from the metering pump fittings.

(b) Remove and discard the old seal from the outlet tube.

(c) Put caps on the open ends to keep FOD out of the fluid system and prevent excessive leakage of TKS fluid from the system.

NOTE: It is not necessary to install caps if you are to replace the metering pump immediately.

(9) Remove the metring pump bracket screws found on the bottom of the wing that attach the pump bracket to the lower wing skin.

(10) Carefully remove the metering pump assembly from the airplane.

(11) If you are to replace the metering pump, loosen the screws on the pump clamps.

(a) Remove the metering pump from the bracket.

B. Install Metering Pump 2 (UC102) (Refer to Figure 401).

NOTE: The Metering Pump 2 and the metering pump bracket are usually removed and installed as an assembly.

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Metering Pump 2 Removal/Installation.

(2) Put the metering pump in its correct position on the bracket.

(a) Tighten the screws on the clamp to attach the pump to the bracket.

(3) Put the metering pump assembly through the TKS access panel opening and in its correct position on the lower skin.

(a) Install the screws that attach the pump bracket to the lower wing skin.

(4) Install the outlet and input tubes to the metering pump as follows:

(a) If necessary, remove the caps from the open ends.

(b) Install new seals on the tubes. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201.

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(c) Put the tubes in their correct position on the metering pump outlet fittings.

(d) Carefully tighten the tube fitting nuts. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

(5) Connect electrical connector PC104 to the metering pump electrical connector JC104.

(6) Engage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

(c) W/S ANTI-ICE.

(7) Do a check of metering pump 2. Refer to the, TKS Anti-Ice System (FIKI) - Adjustment/Test.

(8) Install the TKS access panel on the lower surface of the left wing.

5. Windshield Pump Removal/Installation

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Before you disconnect components of the TKS anti-ice system, slowly loosen the nut that is connected to the component to be removed. It is possible there is still pressure in the system.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Before you operate the TKS system during this procedure put plastic sheets or absorbent cloths under the porous panels to keep the TKS fluid off the floor. This will help to prevent injury to personnel.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube nut. Replace the 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube fitting. Examine the seal for damage and make sure that it is in the correct position in the fitting. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the fitting.

A. Remove the Windshield Pump (UC103) (Refer to Figure 401).

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Windshield Pump Removal/Installation.

(2) Remove Metering Pump 1 (UC101) from the airplane. Refer to Remove the Metering Pump 1 (UC101)/Windshield Pump (UC103) Assembly.

(3) Slowly loosen the nuts and remove the input and outlet tubes from the windshield pump fittings.

(a) Remove and discard the old seals.

(b) Put caps on the open ends to keep FOD out of the fluid system and prevent excessive leakage of TKS fluid from the system..

(4) Disconnect the windshield pump electrical wiring as follows:

(a) Identify the wires at the splice at pin 3 of the electrical connector JC105.

NOTE: The ground wire from metering pump 1 and the windshield pump ground wire are spliced together with a wire installed in pin 3 of electrical connector JC105.

(b) Remove the splice at pin 3 of electrical connector JC105.

(c) Identify and remove pins 1 and 2 from the electrical connector JC105.

(5) Remove the screws that attach the windshield pump to Metering Pump 1.

(6) Remove the windshield pump from metering pump 1.

B. Install the Windshield Pump (UC103) (Refer to Figure 401).

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Windshield Pump

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Removal/Installation.

(2) Put the windshield pump in its correct position on Metering Pump 1.

(a) Install the screws that attach the windshield pump to Metering Pump 1.

(3) Connect the wiring as follows:

(a) Identify and splice together the ground wire from metering pump 1 and the windshield pump ground wire with the wire installed in pin 3 of electrical connector JC105.

(b) Identify and install pins 1 and 2 in electrical connector JC105.

(4) Install the input and outlet tubes to the windshield pump as follows:

(a) If necessary, remove the caps from the open ends.

(b) Install a new seal on the tubes. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201.

(c) Put the tubes in their correct positions on the windshield pump fittings.

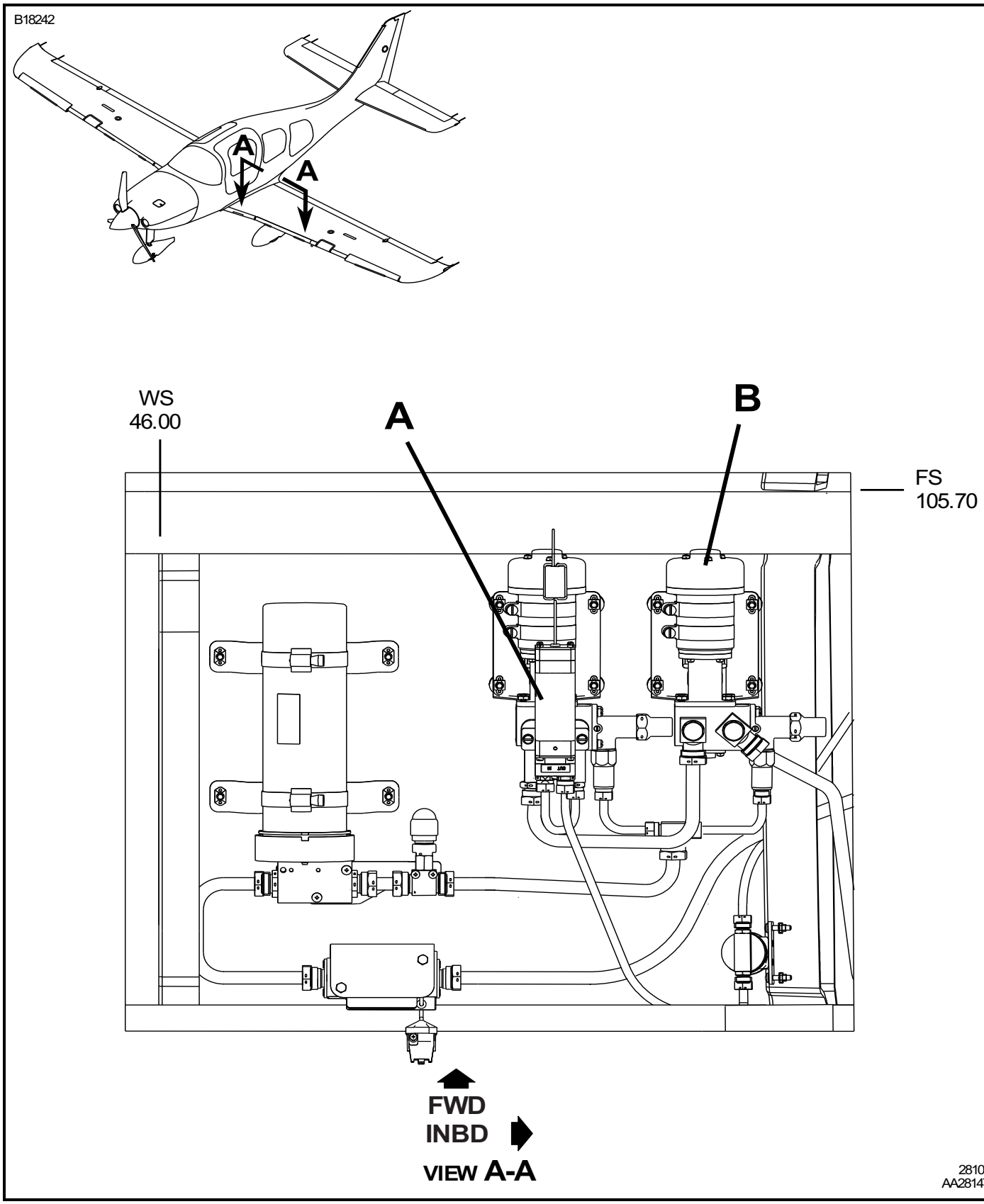
(d) Carefully tighten the tube fitting nuts.

(5) Install Metering Pump 1 (UC101) in the airplane. Refer to Install the Metering Pump 1 (UC101)/Windshield Pump (UC103) Assembly.

(6) Do a check of windshield pump. Refer to the, TKS Anti-Ice System (FIKI) - Adjustment/Test.

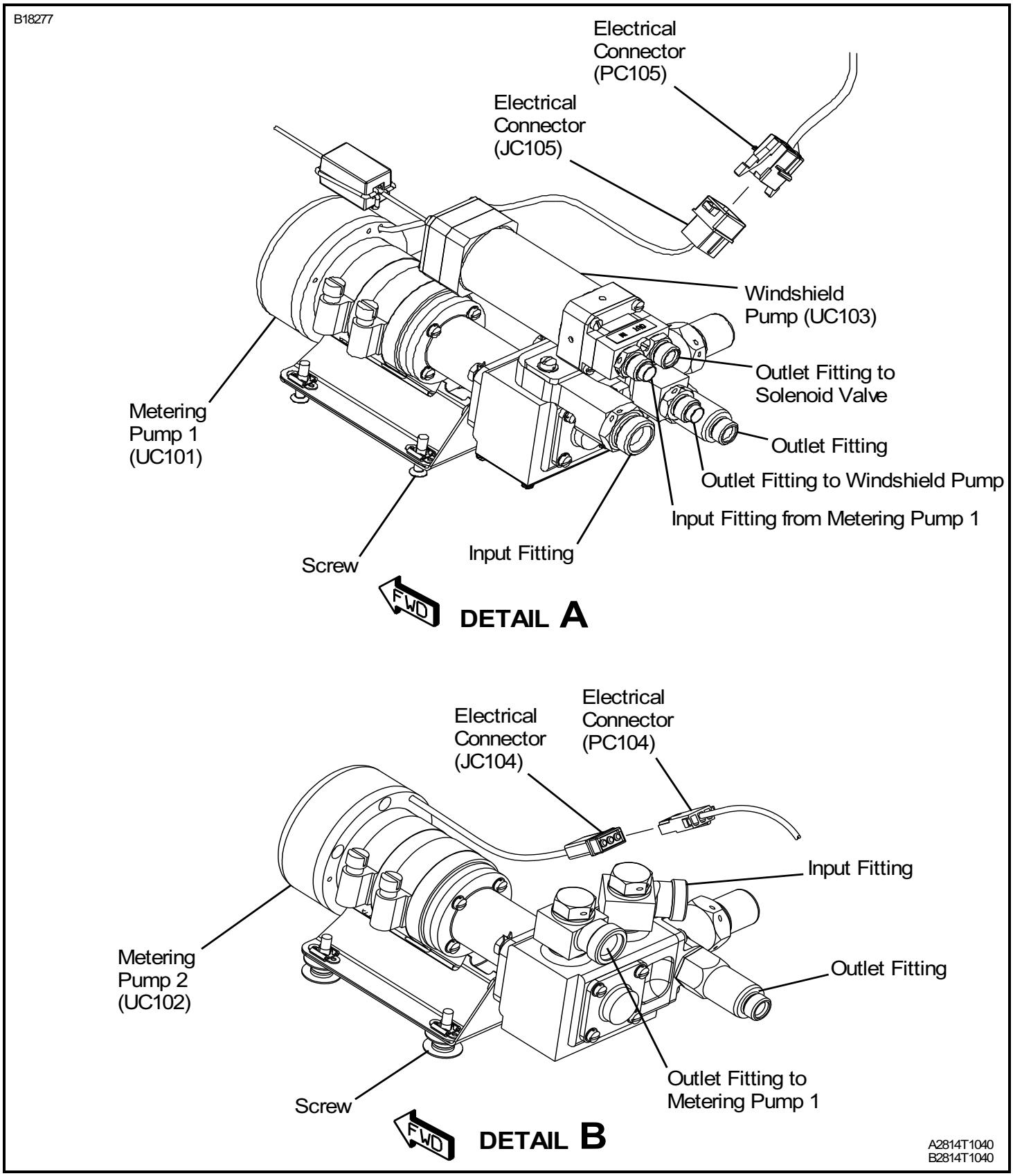
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Figure 401 : Sheet 1 : Metering Pump Installation



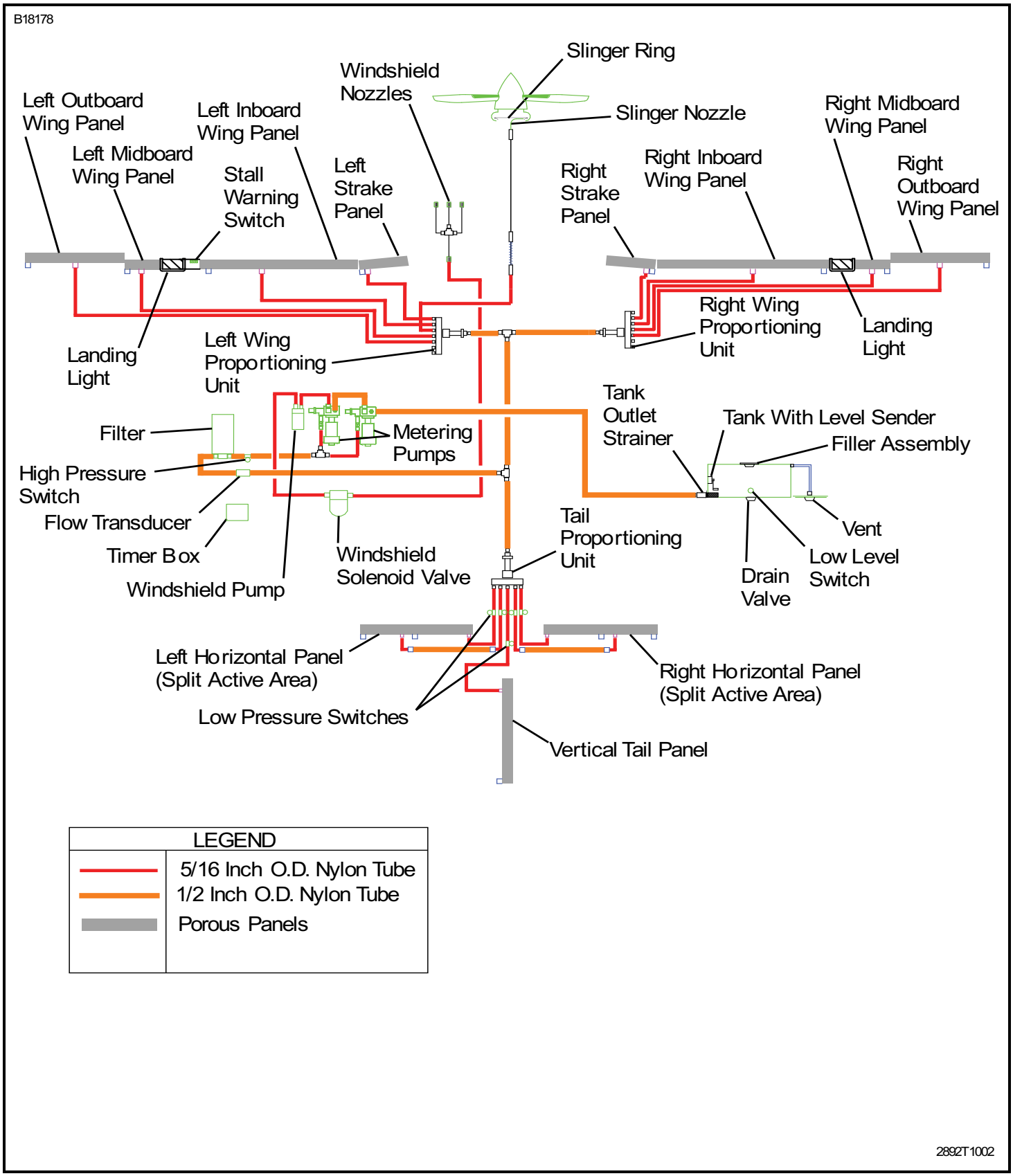
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Figure 401 : Sheet 2 : Metering Pump Installation



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Figure 201 : Sheet 1 : TKS Tubing Installation

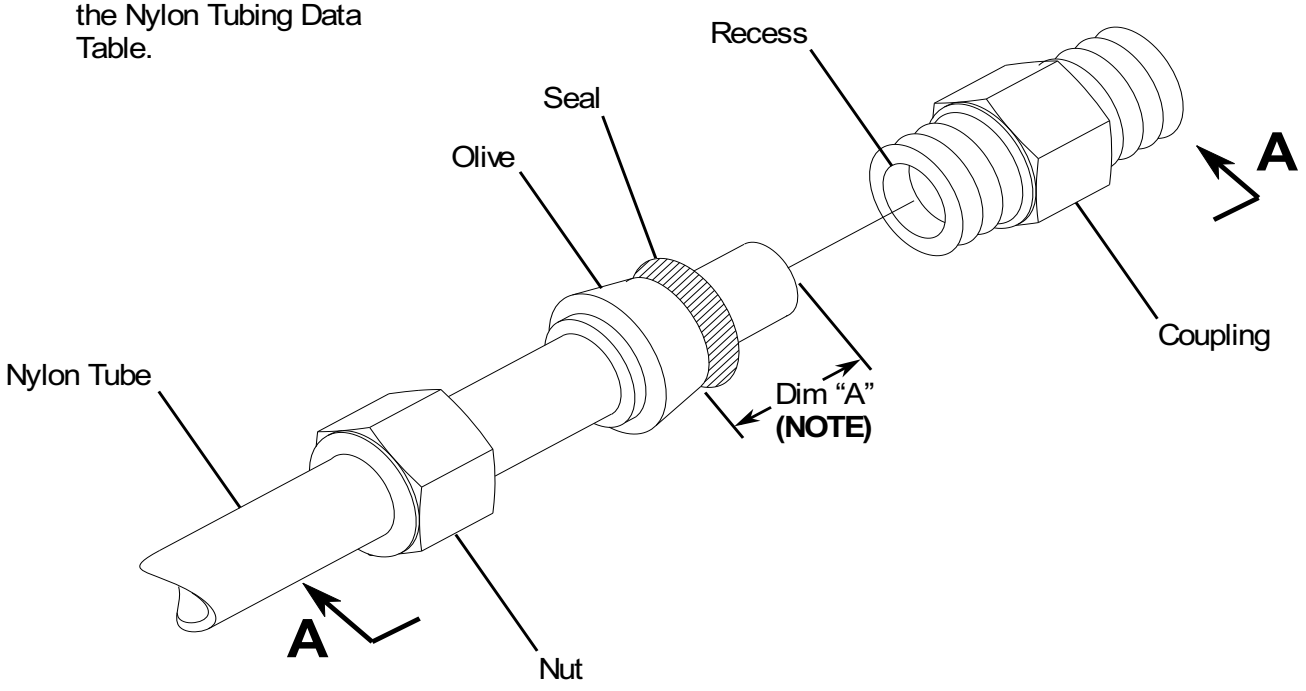


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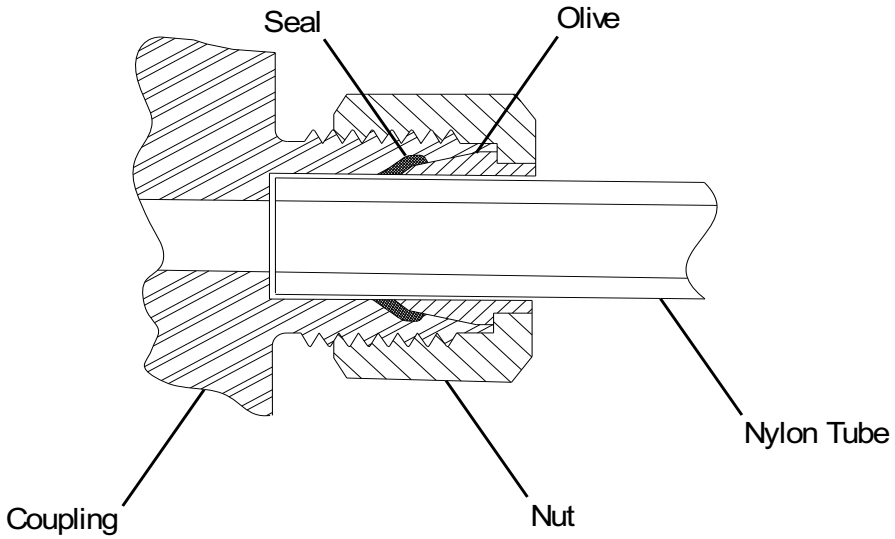
Figure 201 : Sheet 2 : TKS Tubing Installation

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NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)



VIEW A-A

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TKS LEVEL SENDER (FIKI) - REMOVAL/INSTALLATION

1. General

A. This section contains the removal and installation procedures for the TKS Level Sender. The level sender is installed in the TKS fluid tank in the right wing at FS 119.08, WS 82.85, and RBL 23.16.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. Level Sender Removal/Installation

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Before you disconnect components of the TKS anti-ice system, slowly loosen the coupling that is connected to the component to be removed. It is possible that high pressure is still in the system.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Do not use MEK, acetone, paint thinner, or similar chlorinated solvents on the porous panels. To prevent damage, only use water and detergent, isopropyl alcohol, and/or approved anti-ice fluid on the porous panel surfaces.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube coupling. Replace the 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube coupling. Examine the seal for damage and make sure that it is in the correct position in the coupling. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the coupling.

A. Remove the Level Sender (UR100) (Refer to Figure 401).

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Level Sender Removal/Installation.

(2) Remove external electrical power from the airplane.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(5) Disengage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

(c) W/S ANTI-ICE.

(6) Drain the TKS fluid tank. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, TKS Anti-Ice Fluid Removal.

(7) Remove the screws that attach the FIKI tank access panel to the wing.

(a) Carefully pull the panel from the wing skin.

(b) Hold the panel and remove the clamp that attaches the hose to the vent tube.

1 Remove the hose from the vent tube.

(c) Remove the access panel from the airplane.

(8) Use a nonmetallic scraper to carefully remove unwanted sealant from the tank and level sender (on the tank side).

(9) Remove the footwell. Refer to Footwell - Maintenance Practices.

(a) Disconnect the electrical connector JR100 from electrical connector PR100.

(b) Remove the screws that attach the level sender to the wing rib.

(10) Carefully remove the level sender from the airplane as follows:

(a) Carefully remove the arm of the level sender from the TKS tank through the mount hole of the sender.

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(b) If the removed switch is to be installed again, use a nonmetallic scraper to carefully remove unwanted sealant from the level sender.

(11) Use a nonmetallic scraper to carefully remove unwanted sealant from the wing rib.

B. Install the Level Sender (UR100) (Refer to Figure 401).

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Level Sender Removal/Installation.

(2) Apply Type IX, fluorosilicone sealant around the perimeter of the level sender installation area (hole) before you install the level sender. (Silastic 730, Dow or equivalent).

(3) While the sealant is wet, install the level sender as follows:

(a) Carefully put the arm of the level sender into the TKS tank through the mount hole of the level sender.

(b) Put the level sender in its correct position on the wing rib.

(c) Install the screws that attach the level sender to the wing rib.

(4) Use Type IX, fluorosilicone sealant to apply a fillet seal around the level sender on the tank side. (Silastic 730, Dow or equivalent).

(a) Make sure to let the fillet seal cure.

(5) Connect the electrical connector JR100 to electrical connector PR100.

(6) Install the FIKI tank access panel to the wing as follows:

(a) Use a nonmetallic scraper to carefully remove unwanted sealant from the access panel and the wing skin.

(b) Hold the access panel near its correct position and connect the hose to the vent tube.

1 Install the clamp that attaches the hose to the vent tube.

(c) To seal the access panel, apply Type IX, fluorosilicone sealant to the recessed wing skin installation area. (Silastic 730, Dow or equivalent).

(d) Put the access panel in its correct position to the wing.

(e) Install the screws that attach the access panel to the wing.

(f) Use a nonmetallic scraper to carefully remove unwanted sealant from the wing skin.

(7) Engage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

(c) W/S ANTI-ICE.

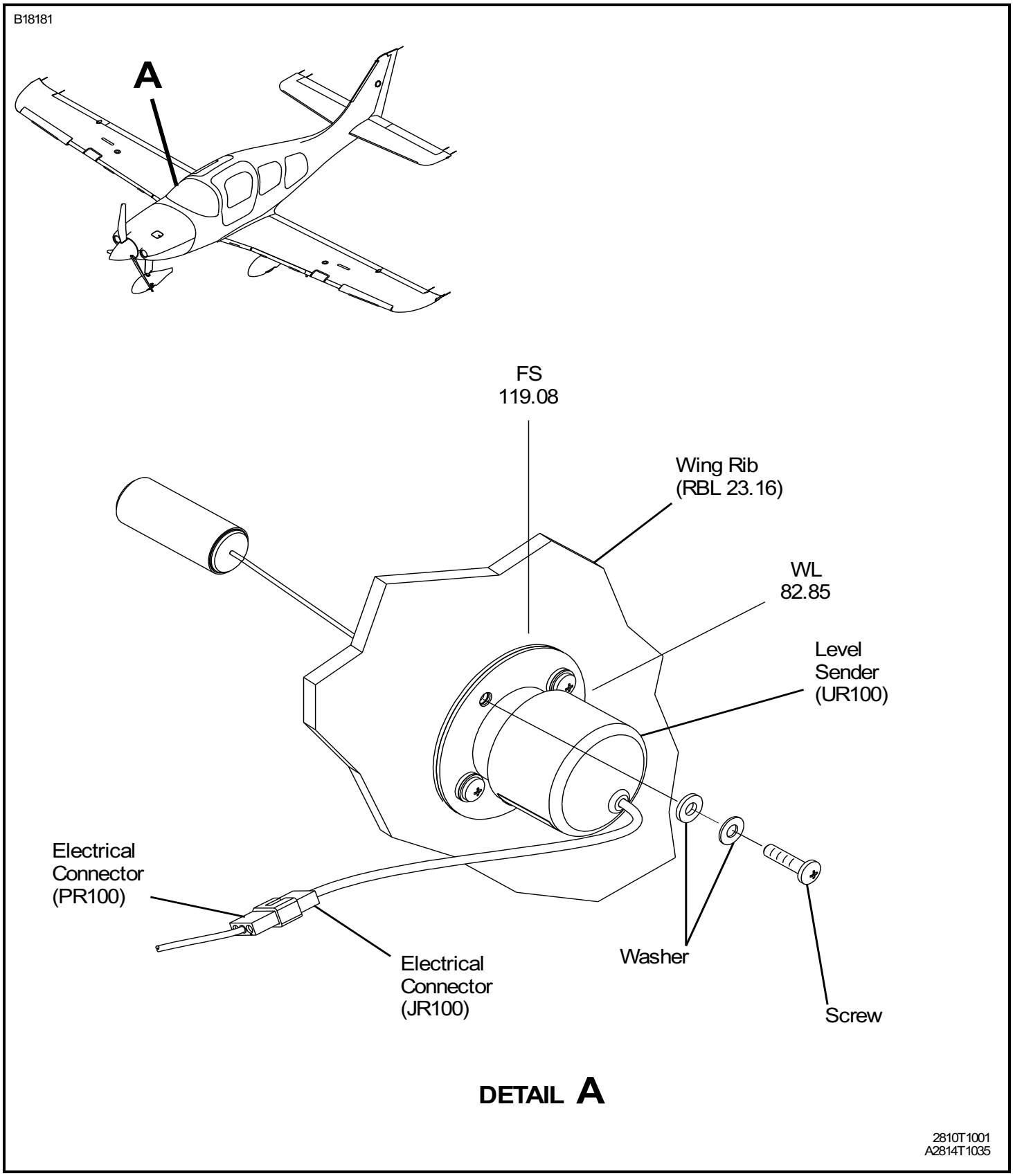
(8) Do a test of the level sender. Refer to TKS Anti-Ice System (FIKI) - Adjustment/Test.

(9) Do the fluid tank servicing. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid.

(10) Install the footwell. Refer to Footwell - Maintenance Practices.

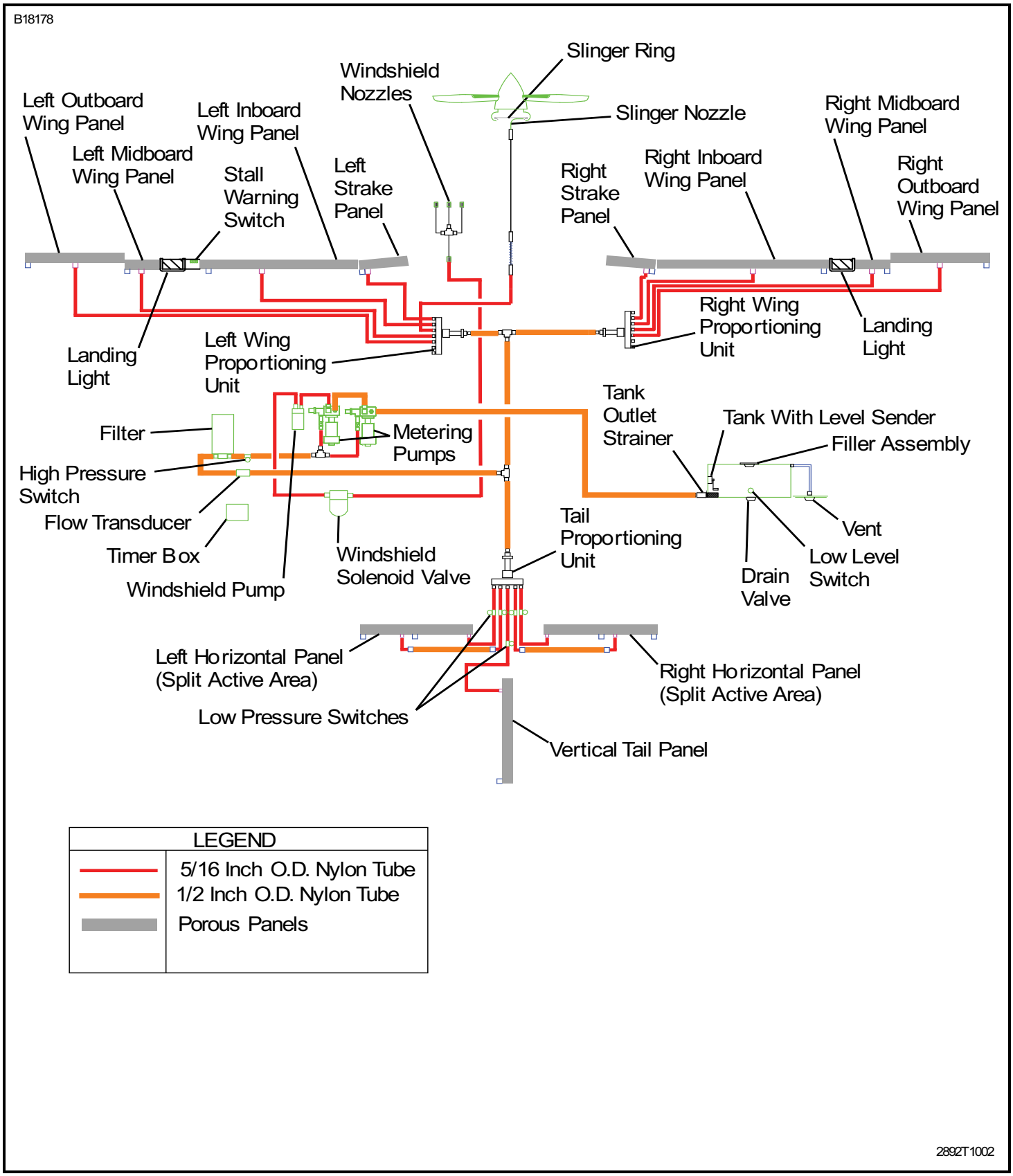
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Figure 401 : Sheet 1 : Level Sender Installation



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Figure 201 : Sheet 1 : TKS Tubing Installation

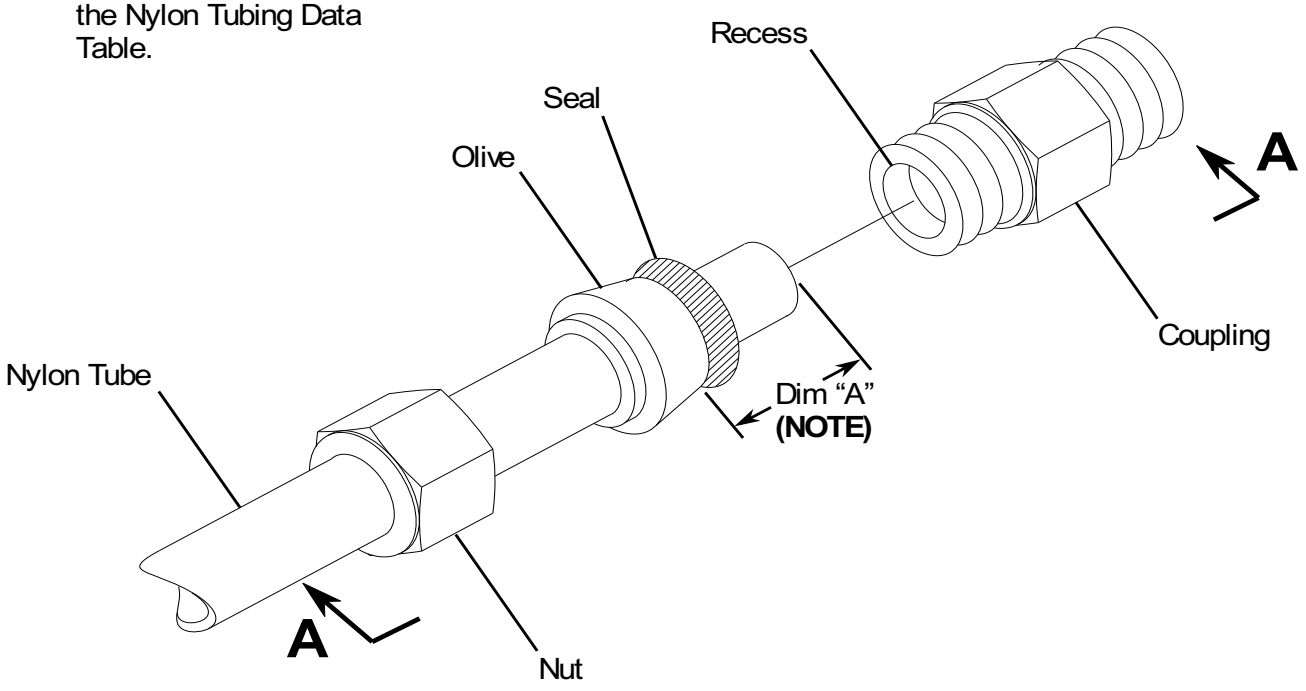


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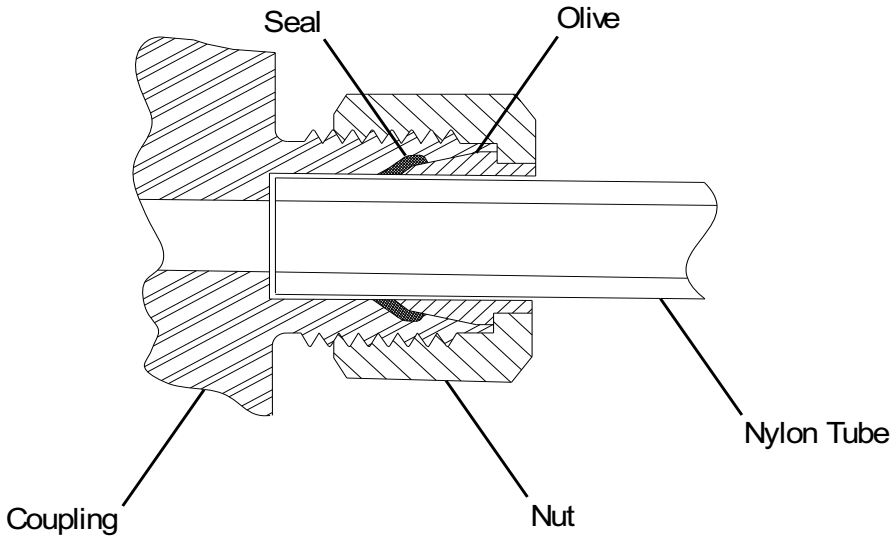
Figure 201 : Sheet 2 : TKS Tubing Installation

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NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)



VIEW A-A

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TKS FLOW TRANSDUCER (FIKI) - REMOVAL/INSTALLATION

1. General

A. This section contains the removal and installation procedures for the TKS Flow Transducer.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. TKS Flow Transducer Removal/Installation

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Before you disconnect components of the TKS anti-ice system, slowly loosen the nut that is connected to the component to be removed. It is possible there is still pressure in the system.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Before you operate the TKS system during this procedure put plastic sheets or absorbent cloths under the porous panels to keep the TKS fluid off the floor. This will help to prevent injury to personnel.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube nut. Replace the 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube fitting. Examine the seal for damage and make sure that it is in the correct position in the fitting. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the fitting.

A. Remove the Flow Transducer (UC100) (Refer to Figure 401).

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to TKS Flow Transducer Removal/Installation.

(2) Remove external electrical power from the airplane.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(5) Disengage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

(c) W/S ANTI-ICE.

(6) Remove the TKS access panel on the lower surface of the left wing.

(7) Disconnect the electrical connector (PC101) from electrical connector (JC101).

(8) Remove the input and outlet tube from the transducer as follows:

(a) Loosen each of the fitting nuts.

(b) Remove the tubes from the fittings.

(c) Remove the seal from each of the inlet tubes and discard. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201.

(d) Put caps on the open ends to keep FOD out of the fluid system and prevent excessive leakage of TKS fluid from the system.

NOTE: It is not necessary to install caps if you are to replace the transducer immediately.

(9) Remove the bolts that attach the transducer to the flow transducer bracket.

(10) Remove the transducer from the airplane.

(a) Record the flow arrow marking on the transducer.

(b) Record the orientation of the transducer for installation.

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B. Install the Flow Transducer (UC100) (Refer to Figure 401).

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to TKS Flow Transducer Removal/Installation.

(2) Put the flow transducer in its correct position on the flow transducer bracket.

(a) Make sure the flow arrow marking on the transducer and the orientation is in the correct direction.

(b) Install the bolts that attach the transducer to the bracket.

(3) Connect the electrical connector (JC101) to the electrical connector (PC101).

(4) Install the input and outlet tubes as follows:

(a) If necessary, remove the caps from the open ends.

(b) Install new seals on the tubes. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201.

(c) Install each of the tubes in the applicable fitting.

(d) Carefully tighten the tube fitting nuts. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

(5) Engage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

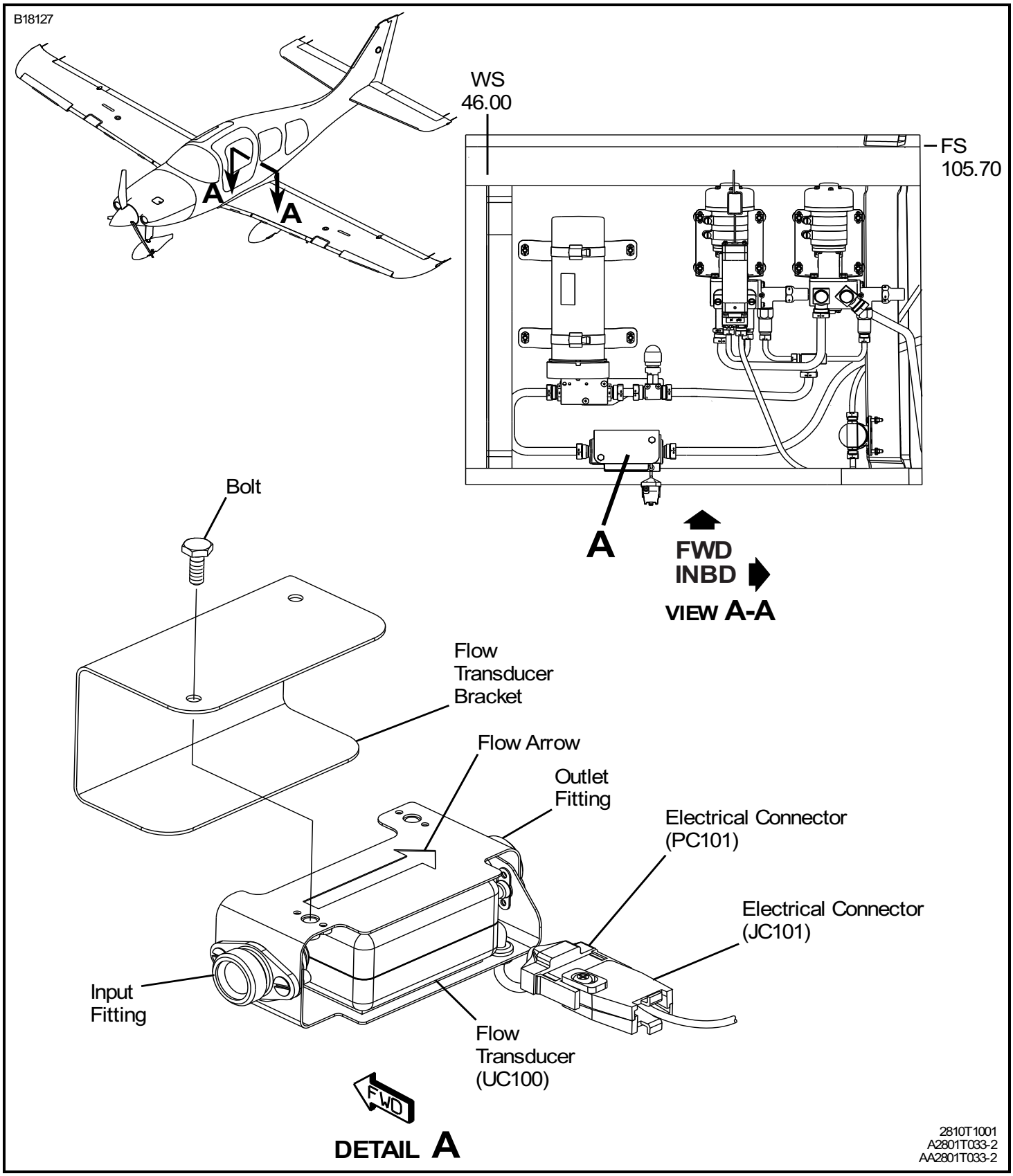
(c) W/S ANTI-ICE.

(6) Do a check of the TKS flow indication. Refer to TKS Anti-Ice System (FIKI) - Adjustment/Test.

(7) Install the TKS access panel on the lower surface of the left wing.

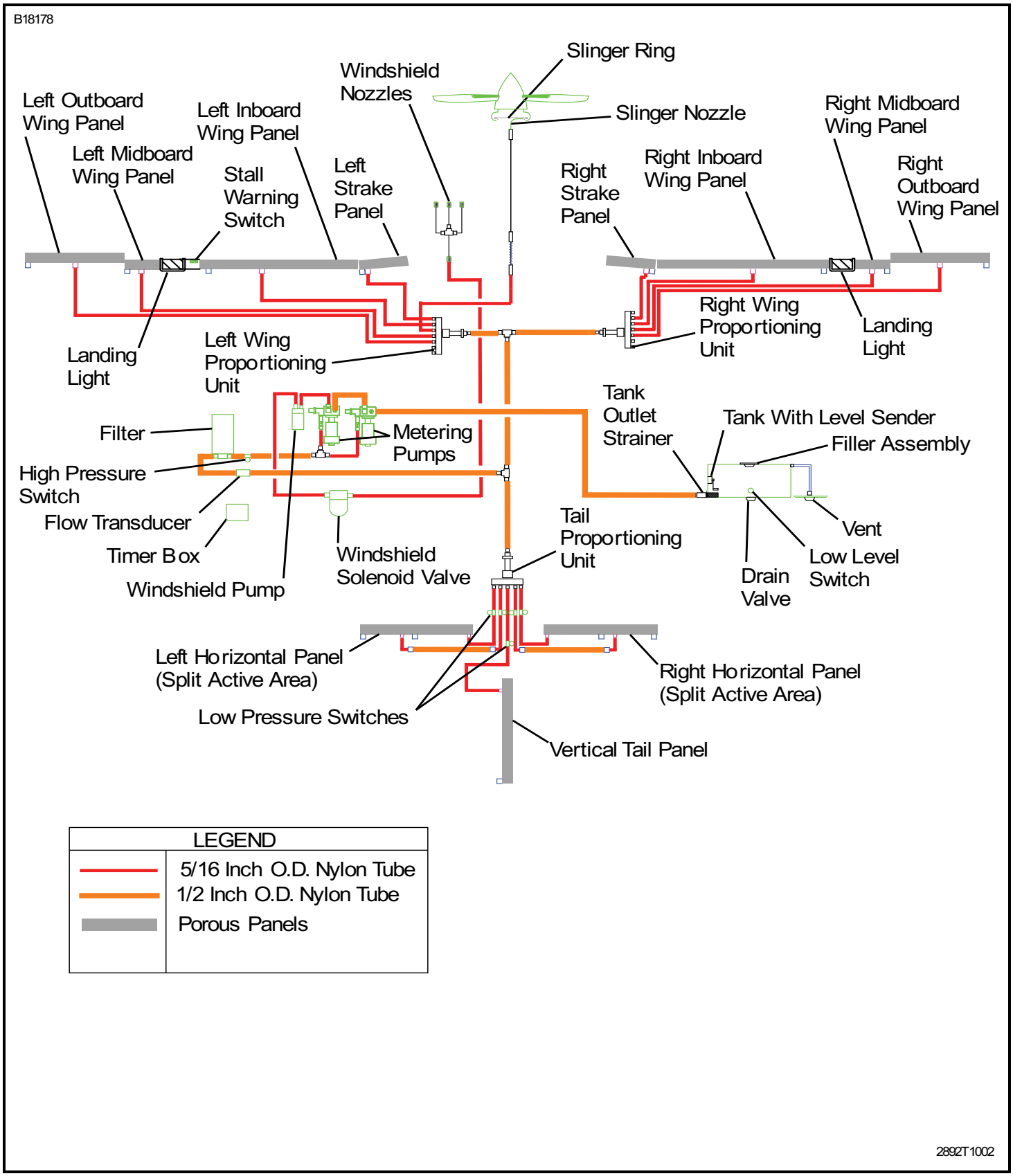
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Figure 401 : Sheet 1 : Flow Transducer Installation



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Figure 201 : Sheet 1 : TKS Tubing Installation

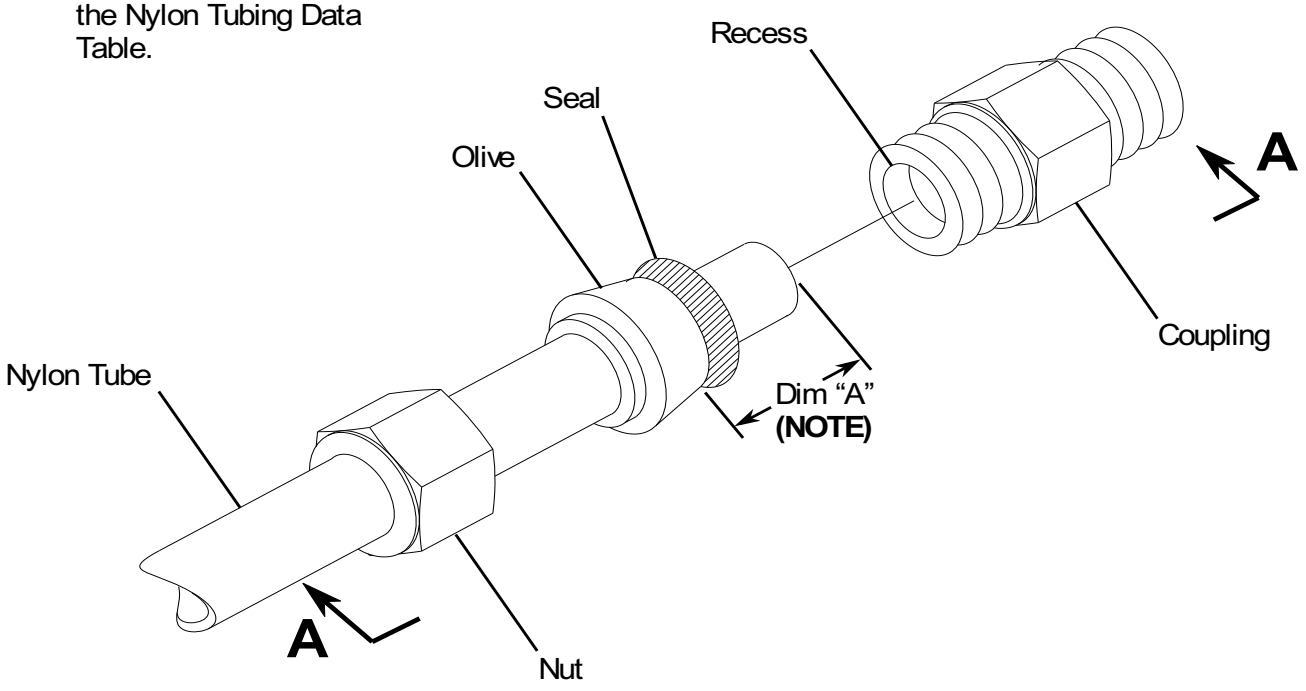


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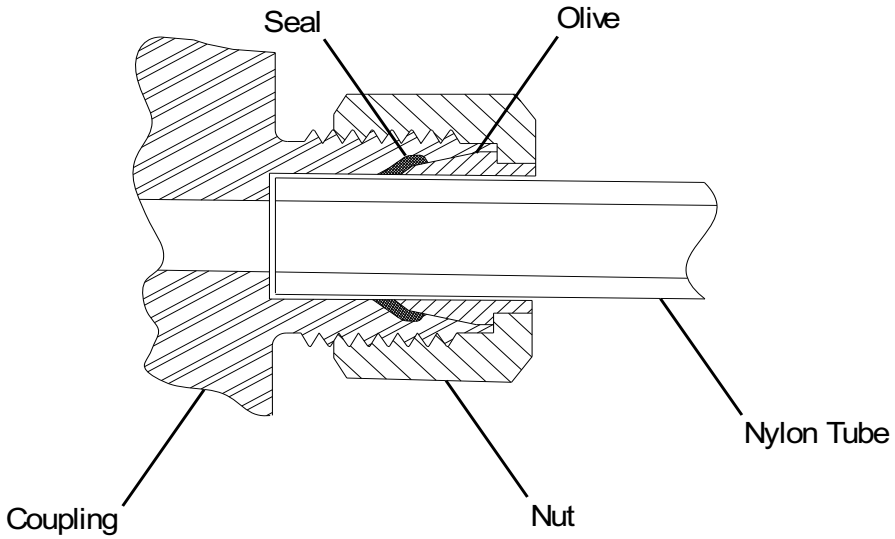
Figure 201 : Sheet 2 : TKS Tubing Installation

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NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)



VIEW A-A

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TKS FILTER ASSEMBLY ELEMENT (FIKI) - MAINTENANCE PRACTICES

1. General

A. This section contains the replacement procedures for the TKS Filter Assembly element. To replace the filter assembly element, you must first remove the filter assembly from the airplane.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. TKS Filter Assembly Element Removal and Installation

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Before you disconnect components of the TKS anti-ice system, slowly loosen the nut that is connected to the component to be removed. It is possible that pressure is still in the system.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Before you operate the TKS system during this procedure put plastic sheets or absorbent cloths under the porous panels to keep the TKS fluid off the floor. This will help to prevent injury to personnel.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube nut. Replace the 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube fitting. Examine the seal for damage and make sure that it is in the correct position in the fitting. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the fitting.

A. Remove the Filter Element (Refer to Figure 201).

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to TKS Filter Assembly Element Removal and Installation.

(2) If necessary remove the filter assembly/high pressure switch from the airplane. Refer to TKS Filter Assembly Removal/Installation.

(3) Remove the filter element from the filter bowl as follows:

(a) Remove the safety wire from the clip screws.

(b) Remove the screws and washers that attach the clip to the filter head.

1 Remove the clip from the filter assembly.

(c) Push on the filter head and turn.

1 Remove the filter head from the filter bowl.

(d) Remove the filter element from the bowl.

B. Install The Filter Element (Refer to Figure 201).

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to TKS Filter Assembly Element Removal and Installation.

(2) Install the filter element in the filter bowl.

(3) Assemble the filter assembly as follows:

(a) Put the filter head in its correct position on the filter bowl.

(b) Push and turn the filter head on the bowl to lock it in place.

(c) Put the clip in its correct position on the filter head.

1 Make sure that the clip engages with the slot in the filter head.

(d) Install the screws and washers in the clip.

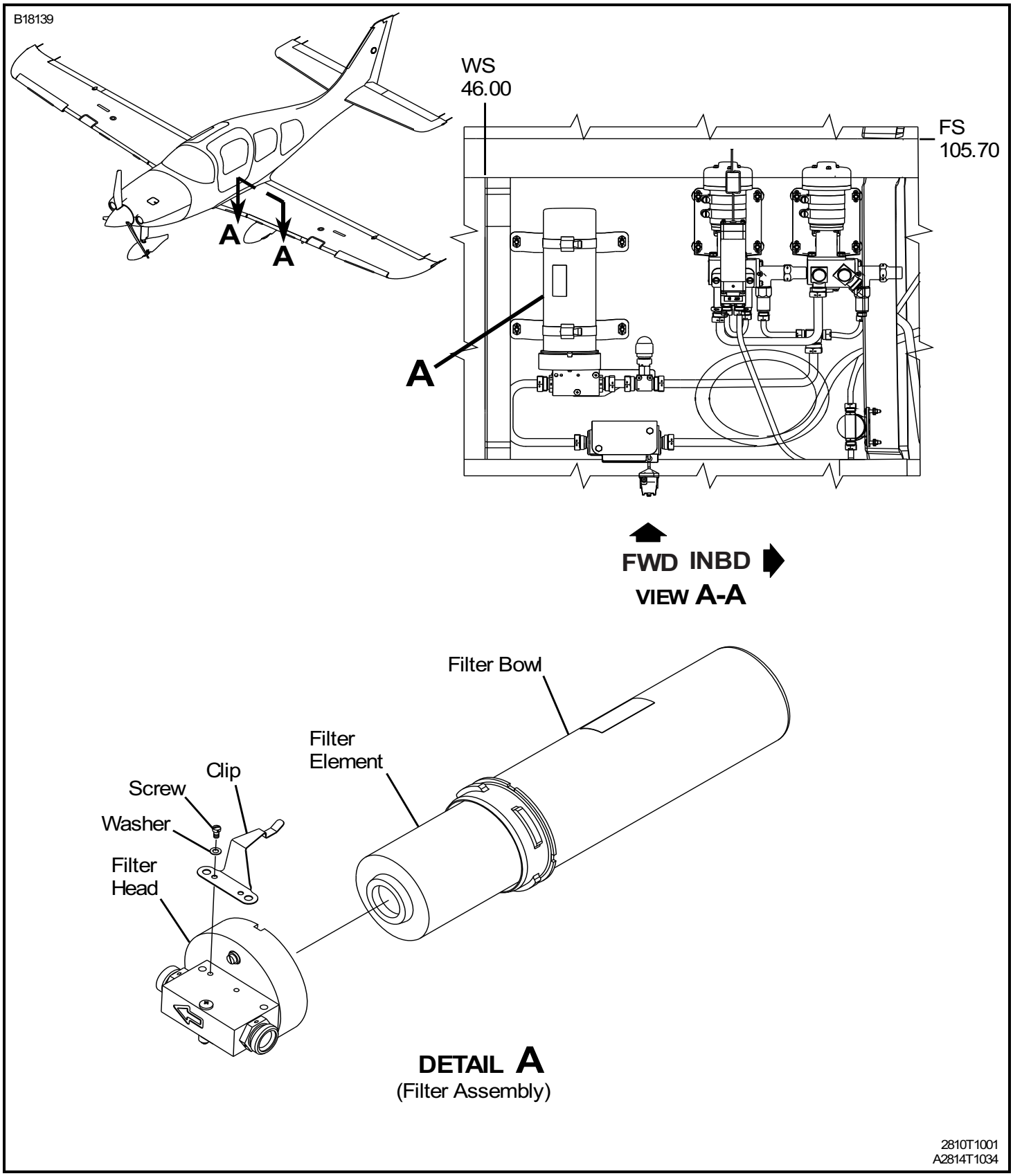
1 Safety the screws with wire. Refer to Chapter 20, Refer to Safetying - Maintenance Practices.

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C. If applicable install the filter assembly/high pressure switch in the airplane. Refer to TKS Filter Assembly Removal/Installation.

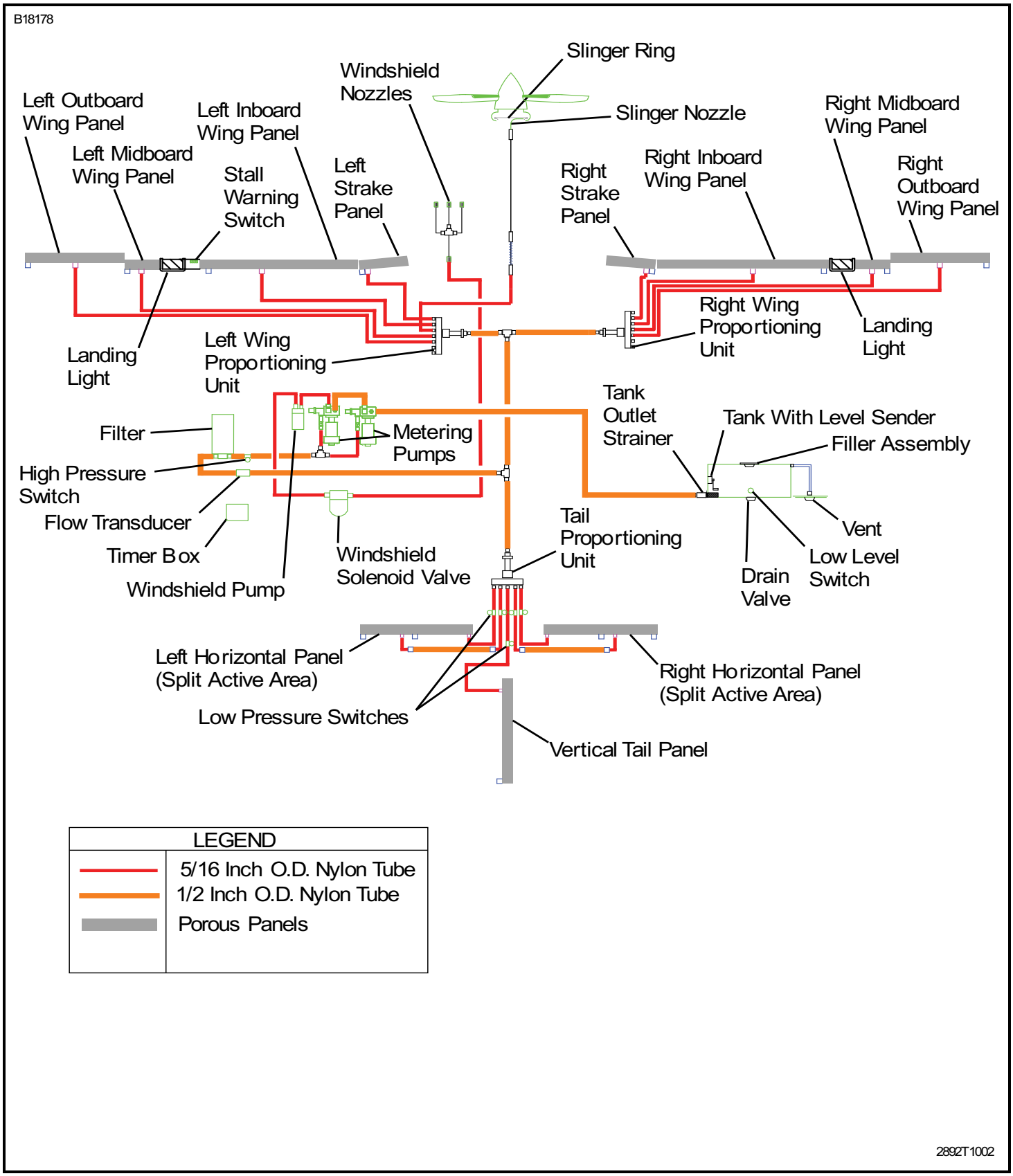
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Figure 201 : Sheet 1 : TKS Filter Assembly Element Assembly



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Figure 201 : Sheet 1 : TKS Tubing Installation

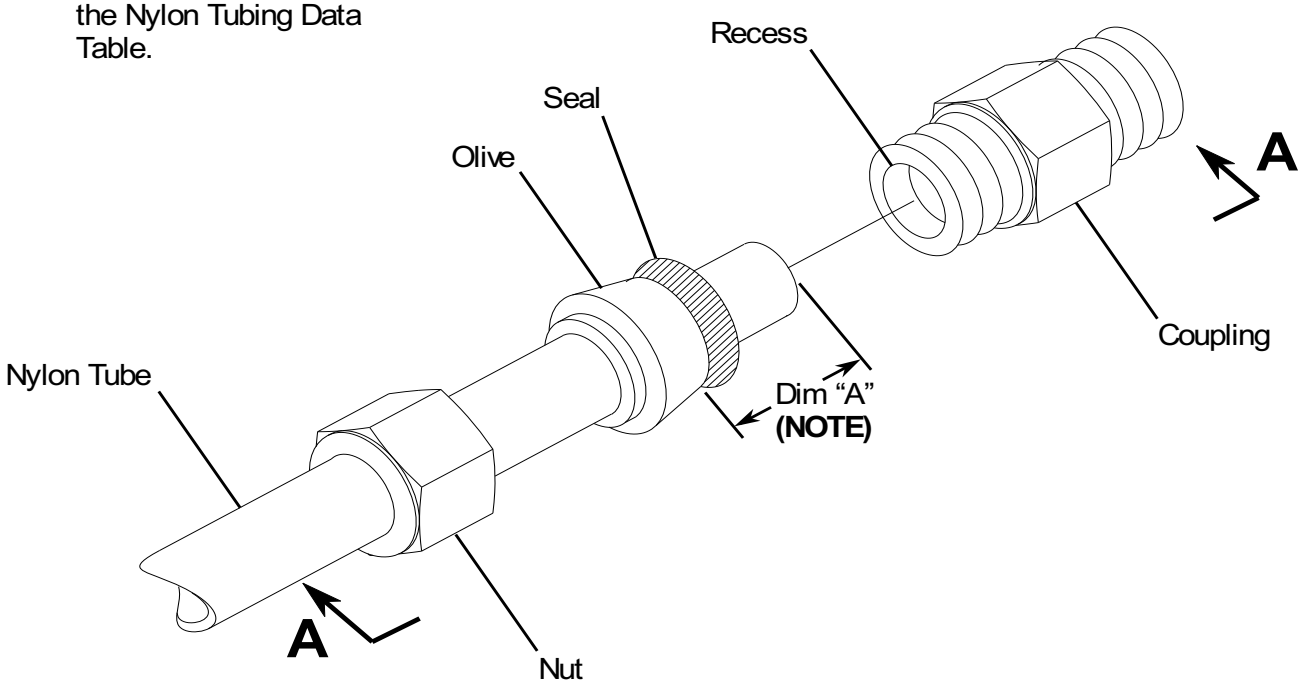


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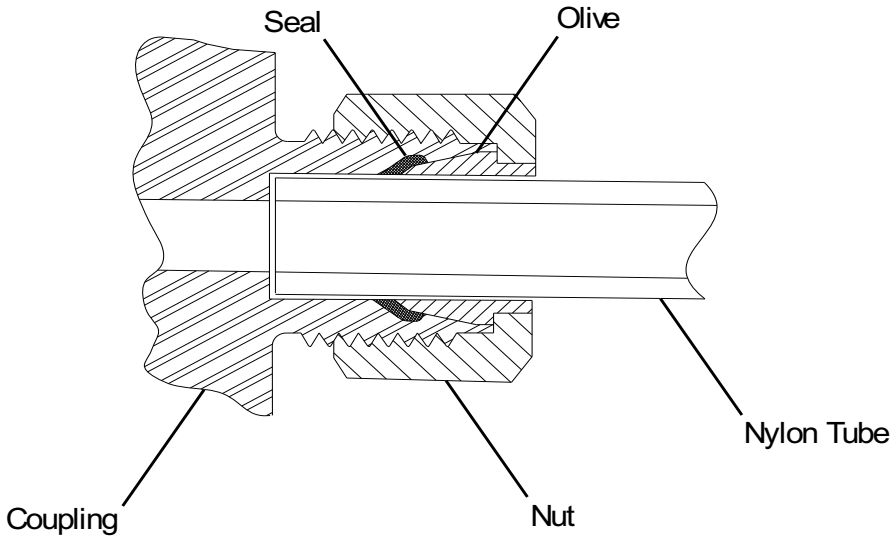
Figure 201 : Sheet 2 : TKS Tubing Installation

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NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)



VIEW A-A

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TKS FILTER/HIGH PRESSURE SWITCH (FIKI) - REMOVAL/INSTALLATION

1. General

A. This section contains the removal and installation procedures for the TKS Filter Assembly and High Pressure Switch. The filter assembly and high pressure switch are usually removed and installed as an assembly. To replace the Filter Assembly or the High Pressure switch you must disassemble the removed assembly. To replace the Filter Assembly element, you must first remove the Filter Assembly from the airplane. Refer to TKS Filter Assembly Element - Maintenance Practices.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. TKS Filter Assembly Removal/Installation

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Before you disconnect components of the TKS anti-ice system, slowly loosen the nut that is connected to the component to be removed. It is possible that pressure is still in the system.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Before you operate the TKS system during this procedure put plastic sheets or absorbent cloths under the porous panels to keep the TKS fluid off the floor. This will help to prevent injury to personnel.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube nut. Replace the 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube fitting. Examine the seal for damage and make sure that it is in the correct position in the fitting. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the fitting.

A. Remove the Filter Assembly/High Pressure Switch (SC100) (Refer to Figure 401).

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to TKS Filter Assembly Removal/Installation.

(2) Remove external electrical power from the airplane.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(5) Disengage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

(c) W/S ANTI-ICE.

(6) Remove the TKS access panel on the lower surface of the left wing.

(7) Remove the tube from the High Pressure switch (SC100) input fitting as follows:

(a) Slowly loosen the nuts and remove the input tube from the high pressure switch input fitting.

(b) Remove and discard the old seal from the input tube.

(c) Put caps on the open ends to keep FOD out of the fluid system and prevent excessive leakage of TKS fluid from the system.

NOTE: It is not necessary to install caps if you are to replace the filter assembly and switch immediately.

(8) Remove the tube from the filter assembly outlet fitting as follows:

(a) Slowly loosen the nut and remove the outlet tube from the filter assembly outlet fitting.

(b) Remove and discard the old seal from the input and outlet tube.

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(c) Put caps on the open ends to keep FOD out of the fluid system and prevent excessive leakage of TKS fluid from the system.

NOTE: It is not necessary to install caps if you are to replace the filter assembly and switch immediately.

(9) Remove the screws found on the bottom of the wing, from each of the two filter assembly brackets.

(10) Carefully remove the filter assembly/high pressure switch from the airplane.

(11) Record the direction of the flow arrow marking on the filter head.

(12) Record the position and orientation of the brackets on the filter assembly.

(13) Loosen the filter clamp screws that attach the filter to the brackets.

(a) Remove the filter assembly/high pressure switch from the brackets.

(14) If you must replace the filter assembly element, the filter assembly must be disassembled. Refer to TKS Filter Assembly Element (FIKI) - Maintenance Practices.

(15) If you must replace the filter assembly or high pressure switch, you must remove the high pressure switch from the filter assembly. Refer to TKS High Pressure Switch Removal/Installation.

B. Install the Filter Assembly/High Pressure Switch (SC100) (Refer to Figure 401).

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to TKS Filter Assembly Removal/Installation.

(2) If necessary install the high pressure switch on the filter assembly. Refer to TKS High Pressure Switch Removal/Installation in this section.

(3) Put the filter assembly in its correct position as recorded before, on each of the two the brackets.

(a) Tighten the screws on the clamps to attach the filter to the brackets.

(4) Put the filter assembly in its correct position on the lower skin.

(5) Install the screws that attach the filter brackets to the lower wing skin.

(6) Install the outlet and input tubes to the filter assembly/high pressure switch as follows:

(a) If necessary, remove the caps from the open ends.

(b) Install new seals on the tubes. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201.

(c) Put the tubes in their correct positions on the filter assembly/high pressure switch fittings.

(d) Carefully tighten the tube fitting nuts. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

(7) Engage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

(c) W/S ANTI-ICE.

(8) Do a check of the Filter Assembly and/or the High Pressure Switch as applicable. Refer to TKS Anti-Ice System (FIKI) - Adjustment/Test.

(9) Install the TKS access panel on the lower surface of the left wing.

4. TKS High Pressure Switch Removal/Installation

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Before you disconnect components of the TKS anti-ice system, slowly loosen the nut that is connected to the component to be removed. It is possible that pressure is still in the system.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Before you operate the TKS system during this procedure put plastic sheets or absorbent cloths under the porous panels to keep the TKS fluid off the floor. This will help to prevent injury to personnel.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is

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approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube nut. Replace the 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube fitting. Examine the seal for damage and make sure that it is in the correct position in the fitting. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the fitting.

A. Remove the High Pressure switch (SC100) (Refer to Figure 401).

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to TKS High Pressure Switch Removal/Installation.

(2) If necessary remove the filter assembly/high pressure switch from the airplane. Refer to TKS Filter Assembly Removal/Installation in this section.

(3) Disconnect electrical connector PC107 from electrical connector JC107.

(4) Remove the screws and nuts that attach the high pressure switch to the switch support bracket.

(a) Remove the switch from the bracket.

(5) Remove the tube from the High Pressure switch (SC100) outlet fitting as follows:

(a) Slowly loosen the nuts and remove the tube from the high pressure switch outlet fitting.

(b) Remove and discard the old seal from the input tube.

(c) Put caps on the open ends to keep FOD out of the fluid system and prevent excessive leakage of TKS fluid from the system.

NOTE: It is not necessary to install caps if you are to replace the high pressure switch immediately.

B. Install the High Pressure switch (SC100) (Refer to Figure 401).

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to TKS High Pressure Switch Removal/Installation.

(2) Install the high pressure switch as follows:

(a) If necessary, remove the cap from the filter input open end.

(b) Install new seal on the tube. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201.

(c) Put the tube in its correct position in the high pressure switch outlet fitting.

(d) Put the high pressure switch in its correct position on the switch support bracket.

1 Install the screws and nuts that attach the high pressure switch to the switch support bracket.

(e) Tighten the high pressure switch outlet fitting nut.

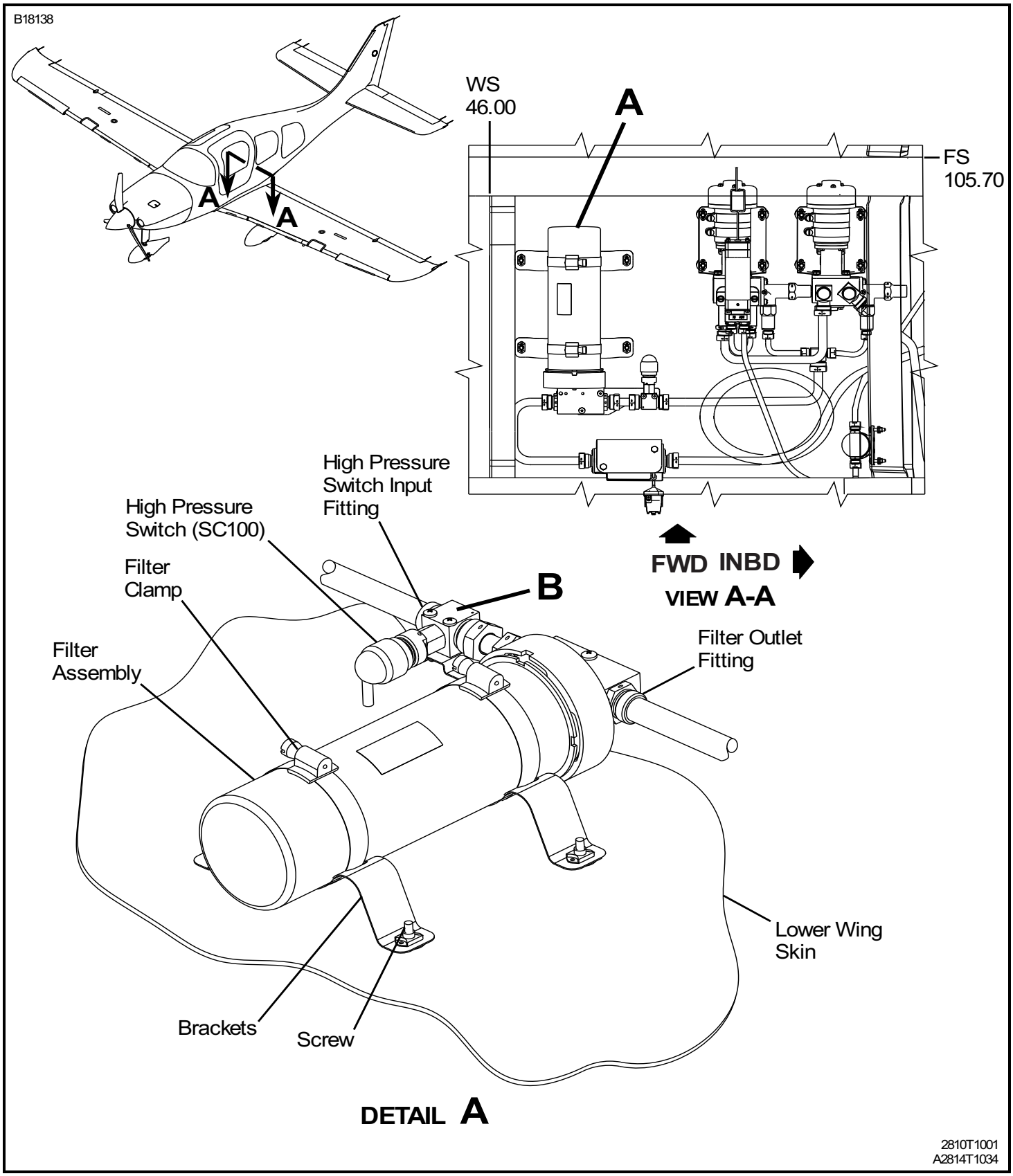
(f) Connect electrical connector PC107 to electrical connector JC107.

1 Make sure there is an appropriate clearance between the electrical connector and the TKS lines.

(3) If applicable install the filter assembly/high pressure switch in the airplane. Refer to TKS Filter Assembly Removal/Installation in this section.

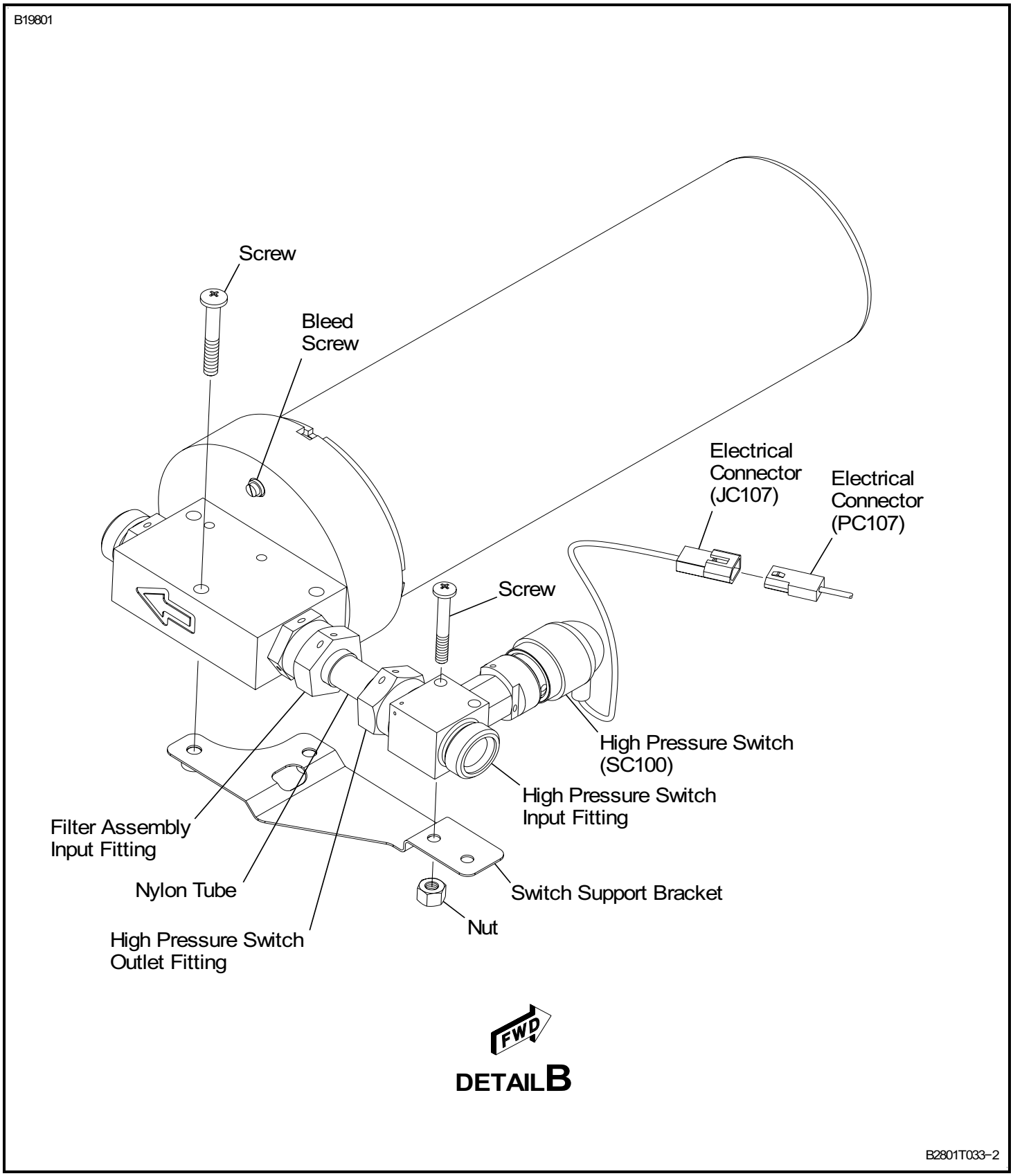
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Figure 401 : Sheet 1 : TKS Filter Assembly Installation



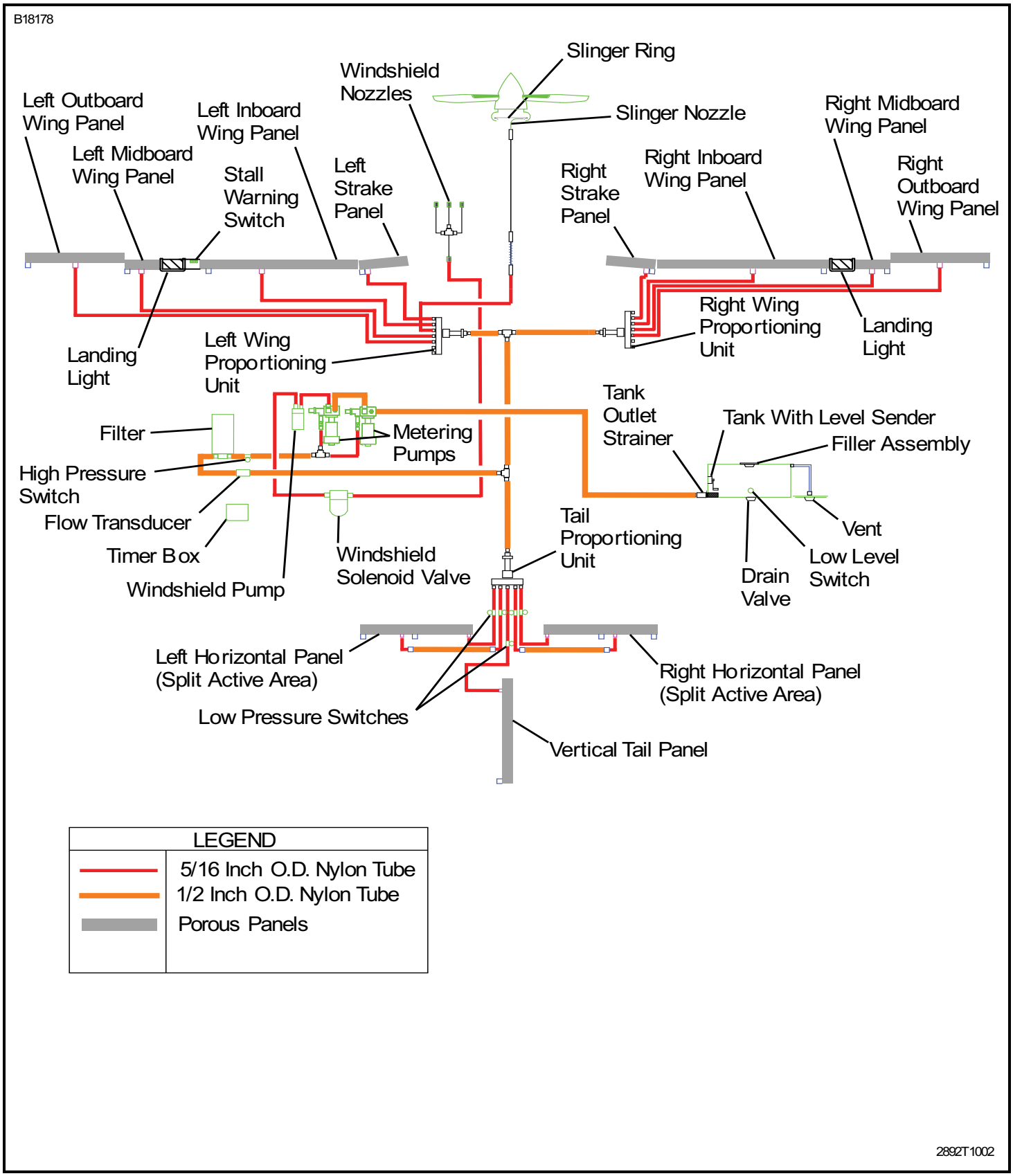
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Figure 401 : Sheet 2 : TKS Filter Assembly Installation



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Figure 201 : Sheet 1 : TKS Tubing Installation

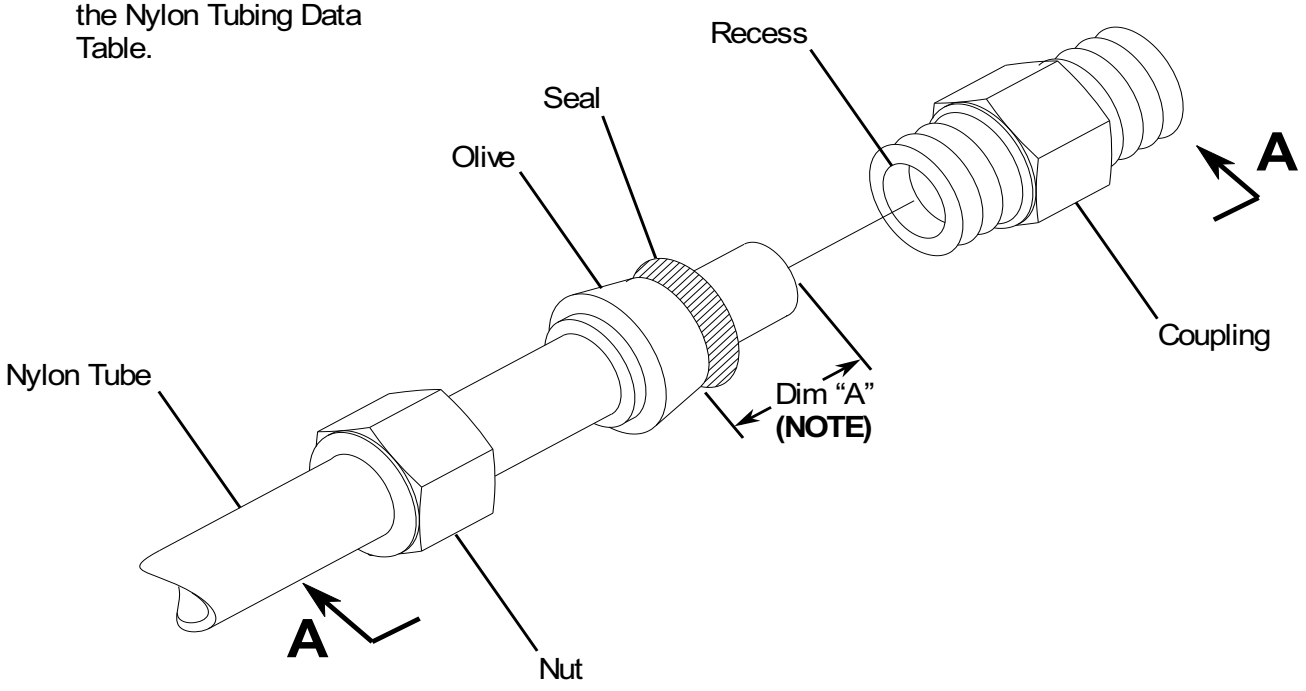


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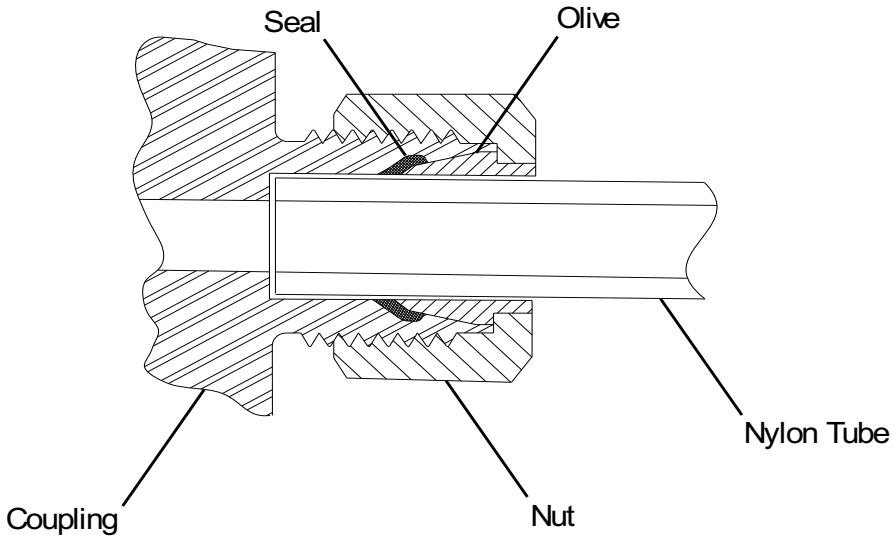
Figure 201 : Sheet 2 : TKS Tubing Installation

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NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)



VIEW A-A

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TKS WING PROPORTIONING UNITS (FIKI) - REMOVAL/INSTALLATION

1. General

A. This section contains the removal and installation procedures for the TKS (FIKI) Wing Proportioning Units. There is a separate wing proportioning unit installed for the left wing and one for the right wing.

B. The wing proportioning units are installed in the wing near WS 0.00. The left proportioning unit is installed at WS 2.60 and the right proportioning unit at WS 6.35, and each of the units at approximately FS 105.70.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. Wing Proportioning Unit Removal/Installation

A. Remove the Wing Proportioning Unit (Refer to Figure 401).

NOTE: The removal of the left and right proportioning units are similar.

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Before you disconnect components of the TKS anti-ice system, slowly loosen the coupling that is connected to the component to be removed. It is possible that high pressure is still in the system.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Do not use MEK, acetone, paint thinner, or similar chlorinated solvents on the porous panels. To prevent damage, only use water and detergent, isopropyl alcohol, and/or approved anti-ice fluid on the porous panel surfaces.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after Warnings and Cautions you loosen or disconnect a tube coupling. Replace the 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube coupling. Examine the seal for damage and make sure that it is in the correct position in the coupling. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the coupling.

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Wing Proportioning Unit Removal/Installation.

(2) Remove external electrical power from the airplane.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(5) Disengage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

(c) W/S ANTI-ICE.

(6) Remove the pilot's or copilot's seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices.

(7) Remove the left or right forward cabin floor panel. Refer to Chapter 53, Fuselage Access - Description and Operation.

(8) Remove the footwell. Refer to Chapter 25, Footwell - Maintenance Practices.

(9) Remove the tube from the proportioning unit input fitting as follows:

(a) Slowly loosen the nut and remove the input tube from the proportioning unit input fitting.

(b) Remove and discard the old seal from the input tube.

(c) Put caps on the open ends to keep FOD out of the fluid system and prevent excessive leakage of TKS fluid from

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the system.

NOTE: It is not necessary to install caps if you are to replace the proportioning unit immediately.

(10) Remove the tubes from the proportioning unit outlet fittings as follows:

(a) Identify each of the outlet tubes and the fittings they attach to.

(b) Slowly loosen and disconnect each of the outlet tubes.

(c) Remove each of the outlet tubes from the proportioning unit.

(d) Put caps on the open ends to keep FOD out of the fluid system and prevent excessive leakage of TKS fluid from the system.

NOTE: It is not necessary to install caps if you are to replace the proportioning unit immediately.

(e) Remove and discard the old seal from the outlet tubes.

(11) Remove the two screws that attach the proportioning unit to the bracket.

(12) Remove the proportioning unit from the airplane.

B. Install the Wing Proportioning Unit (Refer to Figure 401).

NOTE: The installation of the left and right proportioning units are similar.

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Wing Proportioning Unit Removal/Installation.

(2) Put the proportioning unit in its correct position on the bracket.

(3) Install the two screws that attach the proportioning unit to the bracket.

(4) Attach the input tube to the proportioning unit as follows:

(a) If necessary, remove the caps from the open ends.

(b) Install new seal on the inlet tube. Refer to TKS Anti-Ice System - Maintenance Practices, Figure 201.

(c) Put the input tube in its correct position on the proportioning unit input fitting.

(d) Carefully tighten the tube fitting nuts. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

(5) Attach the outlet tubes to the proportioning unit as follows:

(a) If necessary, remove the caps from the open ends.

(b) Install new seals on the outlet tubes. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201.

(c) Identify each of the outlet tubes and put them in their correct position on the outlet fittings of the proportioning unit.

(d) Carefully tighten the tube fitting nuts. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

(6) Engage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

(c) W/S ANTI-ICE.

(7) Do a test of the applicable porous panels and make sure that the proportioning unit fittings do not leak. Refer to TKS Leading Edge Porous Panel (FIKI) - Adjustment/Test.

(8) If necessary, do the fluid tank servicing. Refer to Chapter 12, Replenishing - Servicing, TKS Anti-Ice Fluid.

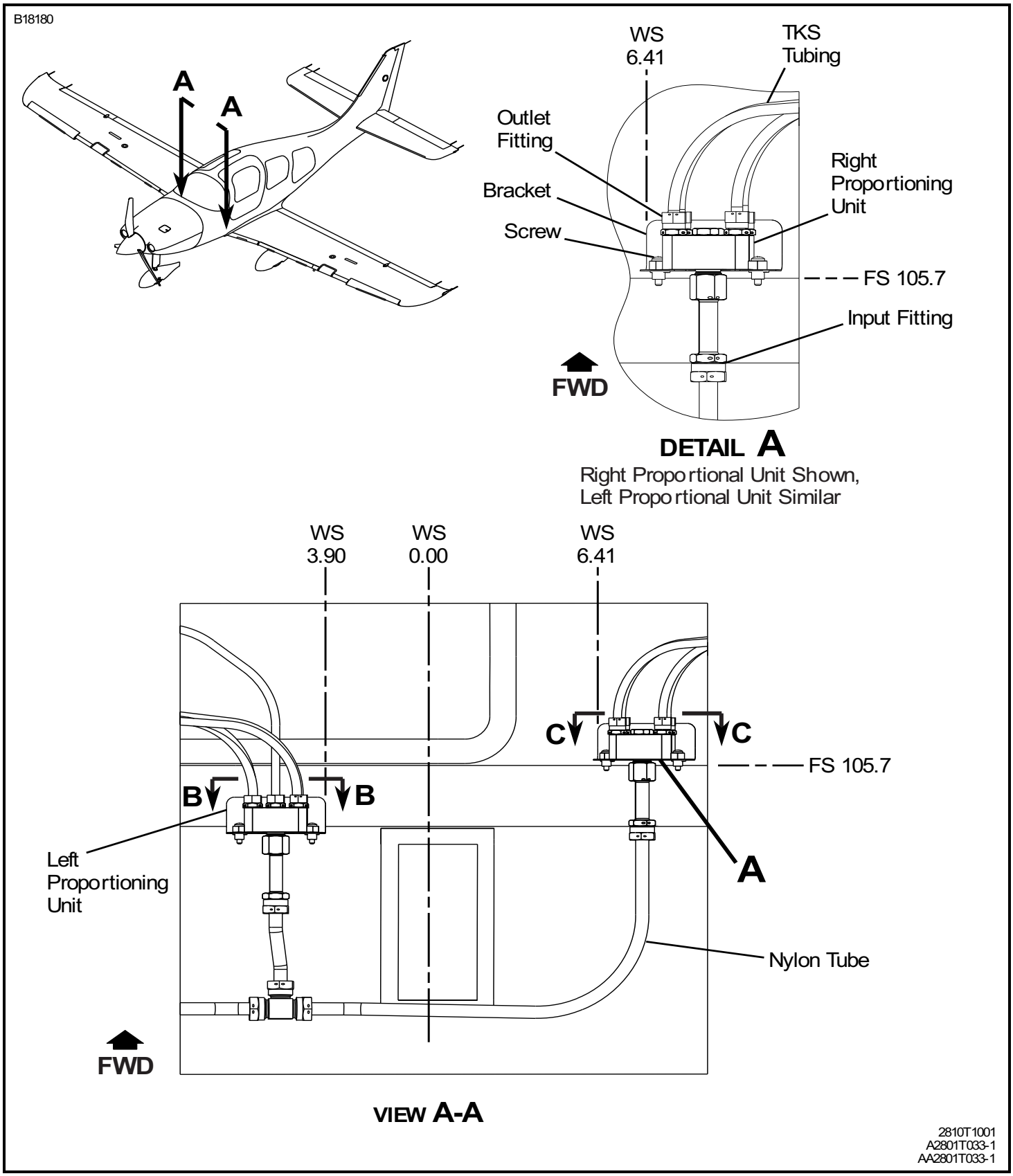
(9) Install the left or right forward cabin floor panel. Refer to Chapter 53, Fuselage Access - Description and Operation.

(10) Install the footwell. Refer to Chapter 25, Footwell - Maintenance Practices.

(11) Install the pilot's or copilot's seat. Refer to Chapter 25, Airplane Seats - Maintenance Practices.

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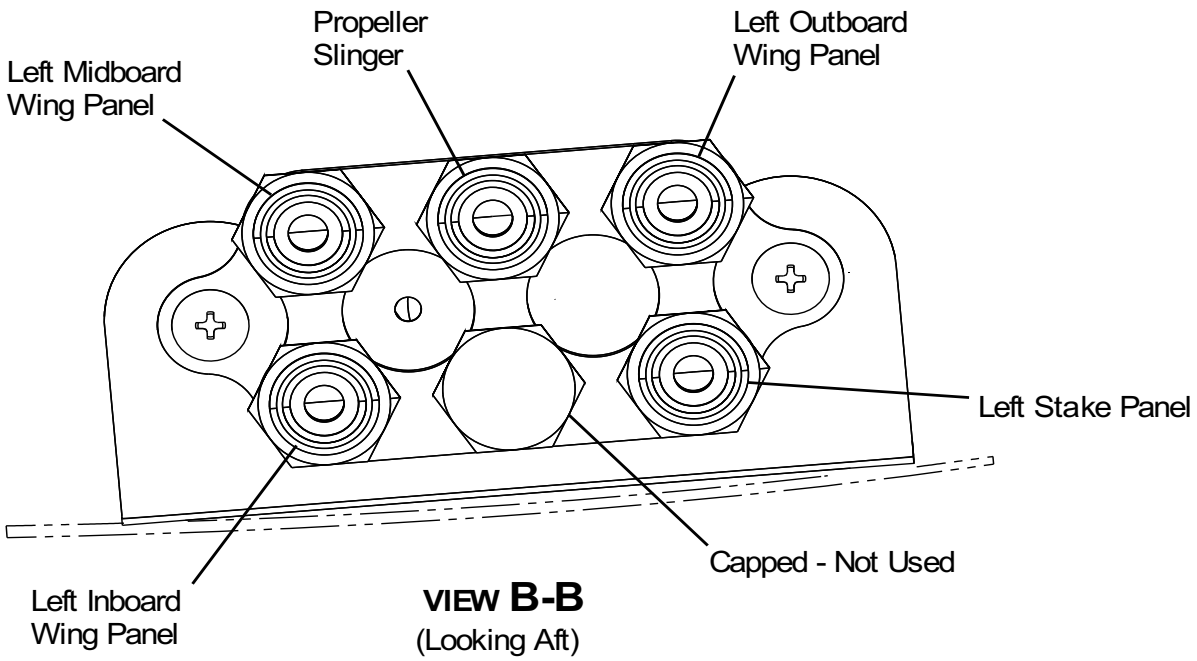
Figure 401 : Sheet 1 : Wing Proportioning Unit Installation



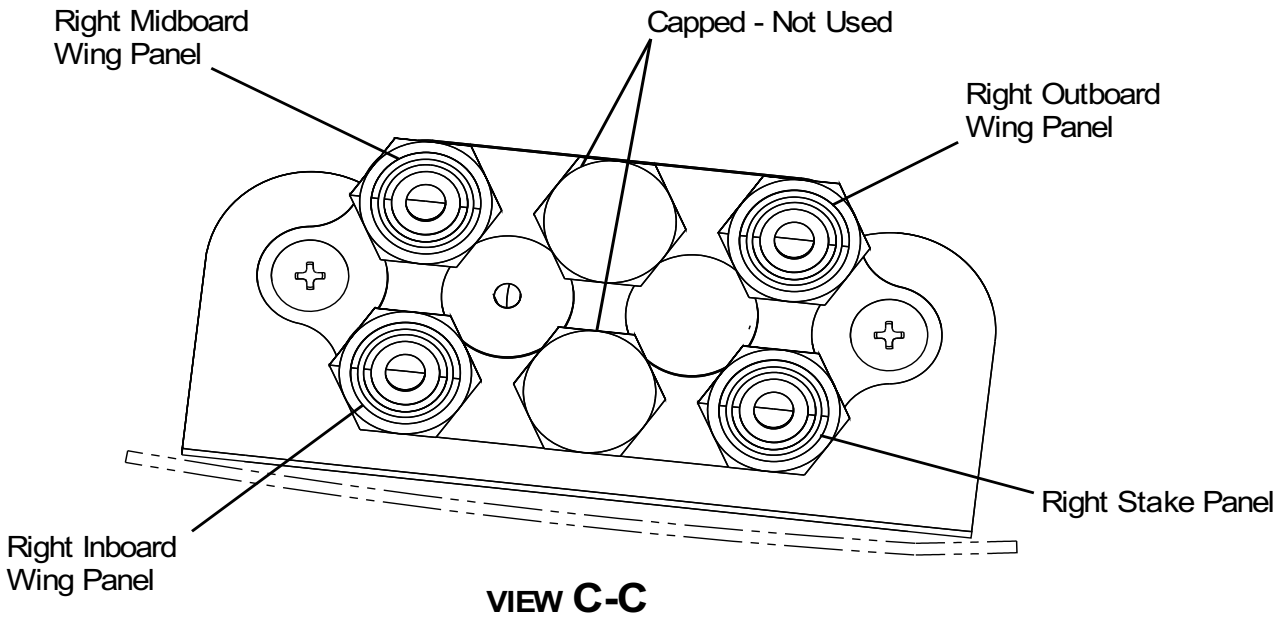
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Figure 401 : Sheet 2 : Wing Proportioning Unit Installation

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VIEW B-B
(Looking Aft)

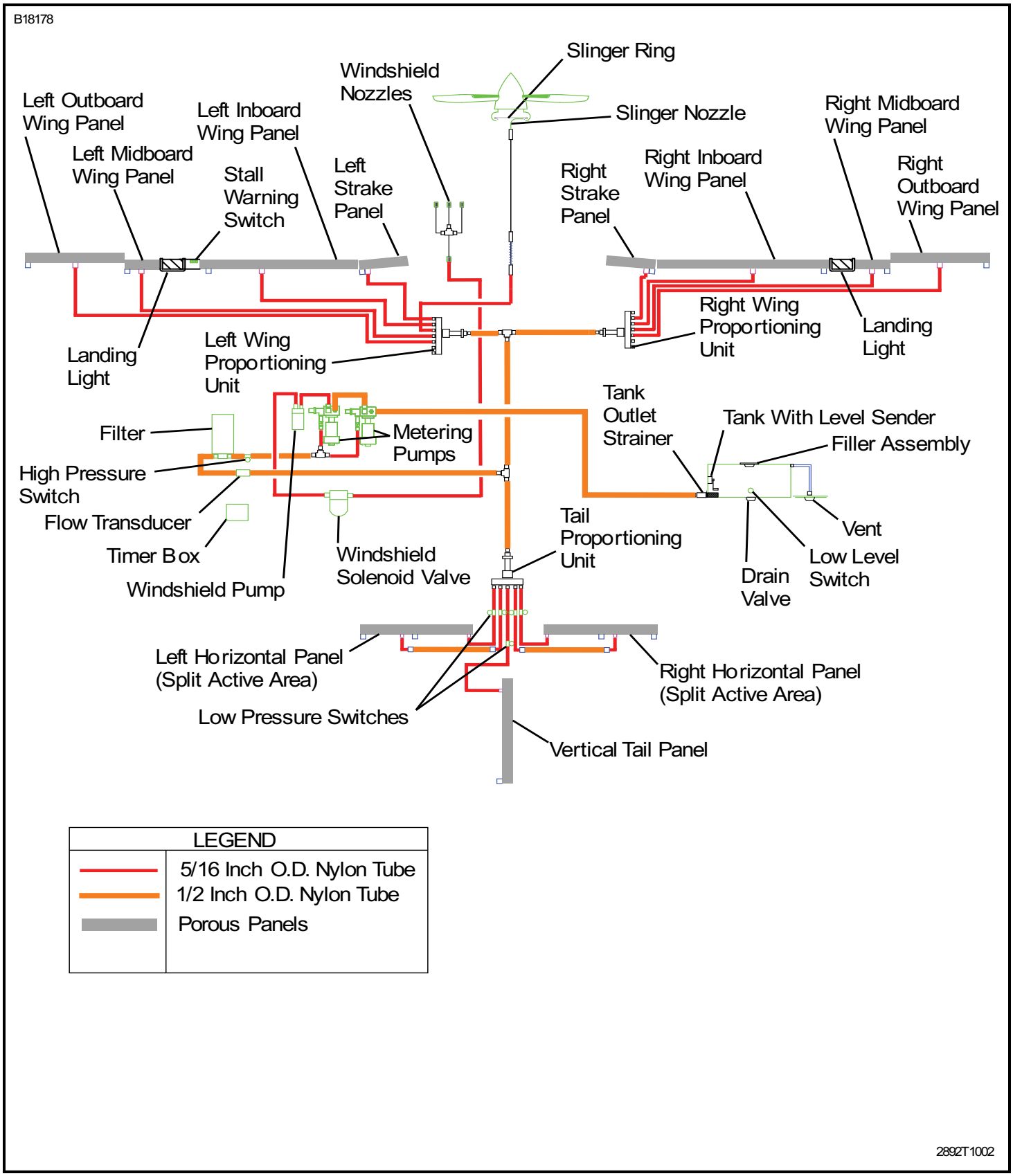


VIEW C-C
(Looking Aft)

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Figure 201 : Sheet 1 : TKS Tubing Installation

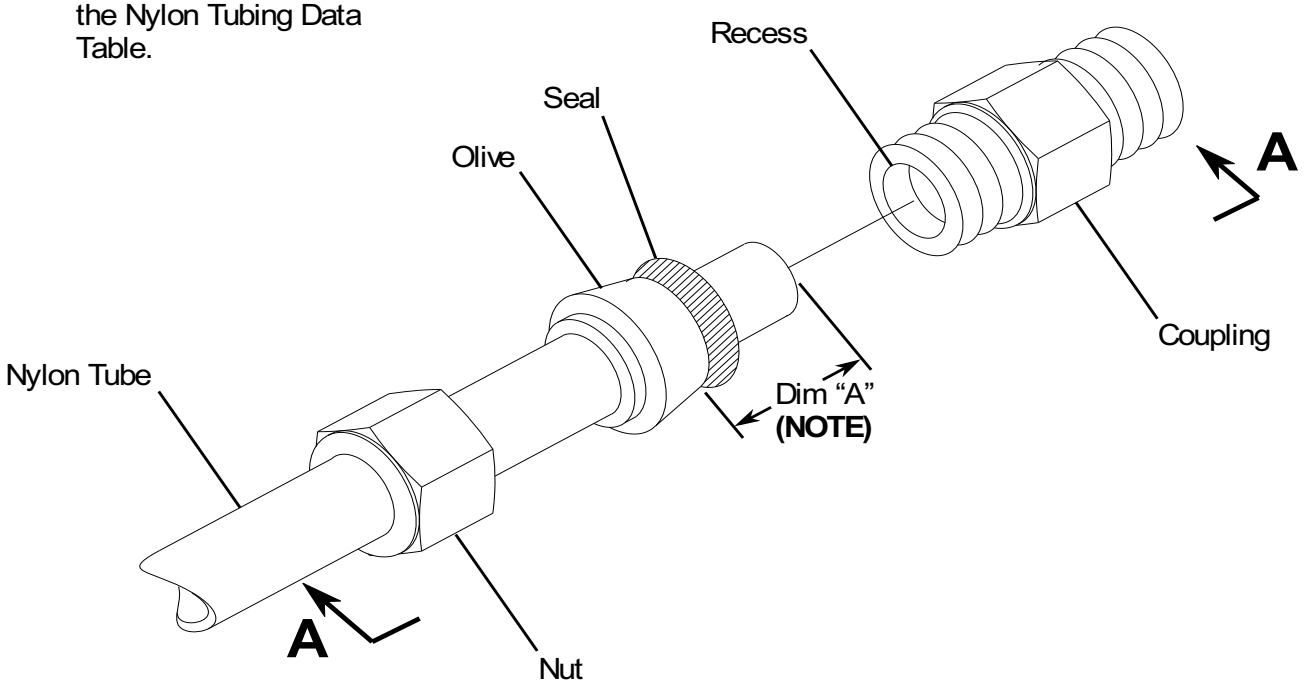


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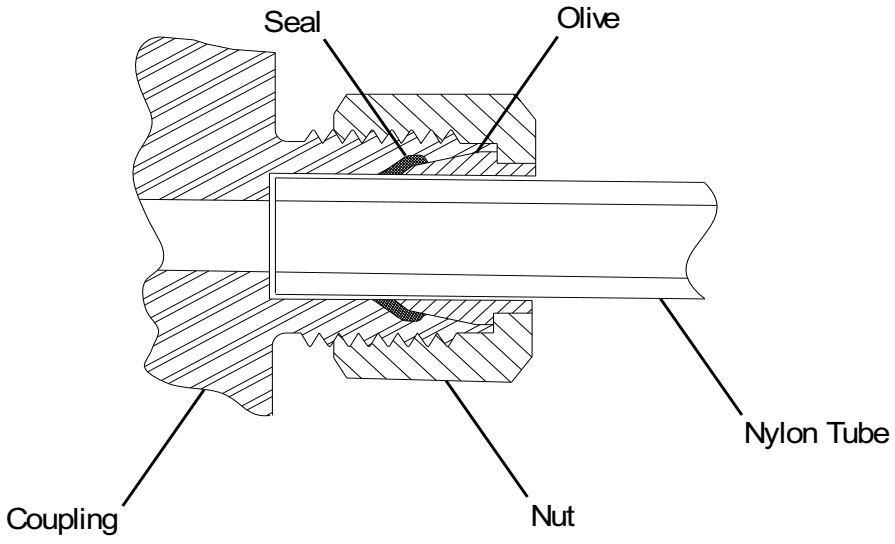
Figure 201 : Sheet 2 : TKS Tubing Installation

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NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)



VIEW A-A

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TKS TAIL PROPORTIONING UNIT (FIKI) - REMOVAL/INSTALLATION

1. General

A. This section contains the removal and installation procedures for the TKS Tail Proportioning Unit. The Tail Proportioning Unit is installed in the vertical stabilizer. You can get access to the Tail Proportioning Unit by removing the right aft fuselage access panel.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. Tail Proportioning Unit Removal/Installation

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Before you disconnect components of the TKS anti-ice system, slowly loosen the nut that is connected to the component to be removed. It is possible that pressure is still in the system.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Before you operate the TKS system during this procedure put plastic sheets or absorbent cloths under the porous panels to keep the TKS fluid off the floor. This will help to prevent injury to personnel.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube nut. Replace the 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube fitting. Examine the seal for damage and make sure that it is in the correct position in the fitting. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the fitting.

A. Remove the Tail Proportioning Unit (Refer to Figure 401).

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Tail Proportioning Unit Removal/Installation.

(2) Remove external electrical power from the airplane.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(5) Disengage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

(c) W/S ANTI-ICE.

(6) Remove the right aft fuselage access panel found on the vertical stabilizer to get access to the proportioning unit.

(7) Remove the tube from the proportioning unit input fitting as follows:

(a) Slowly loosen the nut and remove the input tube from the proportioning unit input fitting.

(b) Remove and discard the old seal from the input tube.

(c) Put caps on the open ends to keep FOD out of the fluid system and prevent excessive leakage of TKS fluid from the system.

NOTE: It is not necessary to install caps if you are to replace the proportioning unit immediately.

(8) Remove the tubes from the proportioning unit outlet fittings as follows:

(a) Identify each of the outlet tubes and the fittings they attach to.

(b) Slowly loosen and disconnect each of the outlet tubes.

(c) Remove each of the outlet tubes from the proportioning unit.

(d) Put caps on the open ends to keep FOD out of the fluid system and prevent excessive leakage of TKS fluid from

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the system.

NOTE: It is not necessary to install caps if you are to replace the proportioning unit immediately.

(e) Remove and discard the old seal from the outlet tubes.

(9) Remove the bolts that attach the tail proportioning unit to the bracket.

(10) Carefully remove the tail proportioning unit from the airplane.

B. Install the Tail Proportioning Unit (Refer to Figure 401).

(1) Make sure that you obey the Warnings and Cautions for TKS Tail Proportioning Unit procedures. Refer to Tail Proportioning Unit Removal/Installation.

(2) Put the tail proportioning unit in its correct position on the bracket.

(a) Install the bolts that attach the tail proportioning unit to the bracket.

(3) Attach the inlet tube to the proportioning unit.

(a) If necessary, remove the caps from the open ends.

(b) Install new seal on the inlet tube. Refer to TKS Anti-Ice System - Maintenance Practices, Figure 201.

(c) Put the inlet tube in its correct position on the proportioning unit inlet fitting.

(d) Carefully tighten the tube fitting nuts. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

(4) Attach the outlet tubes to the proportioning unit.

(a) If necessary, remove the caps from the open ends.

(b) Install new seals on the outlet tubes. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201.

(c) Identify each of the outlet tubes and put them in their correct position on the outlet fittings of the proportioning unit.

(d) Carefully tighten the tube fitting nuts. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

(5) Engage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

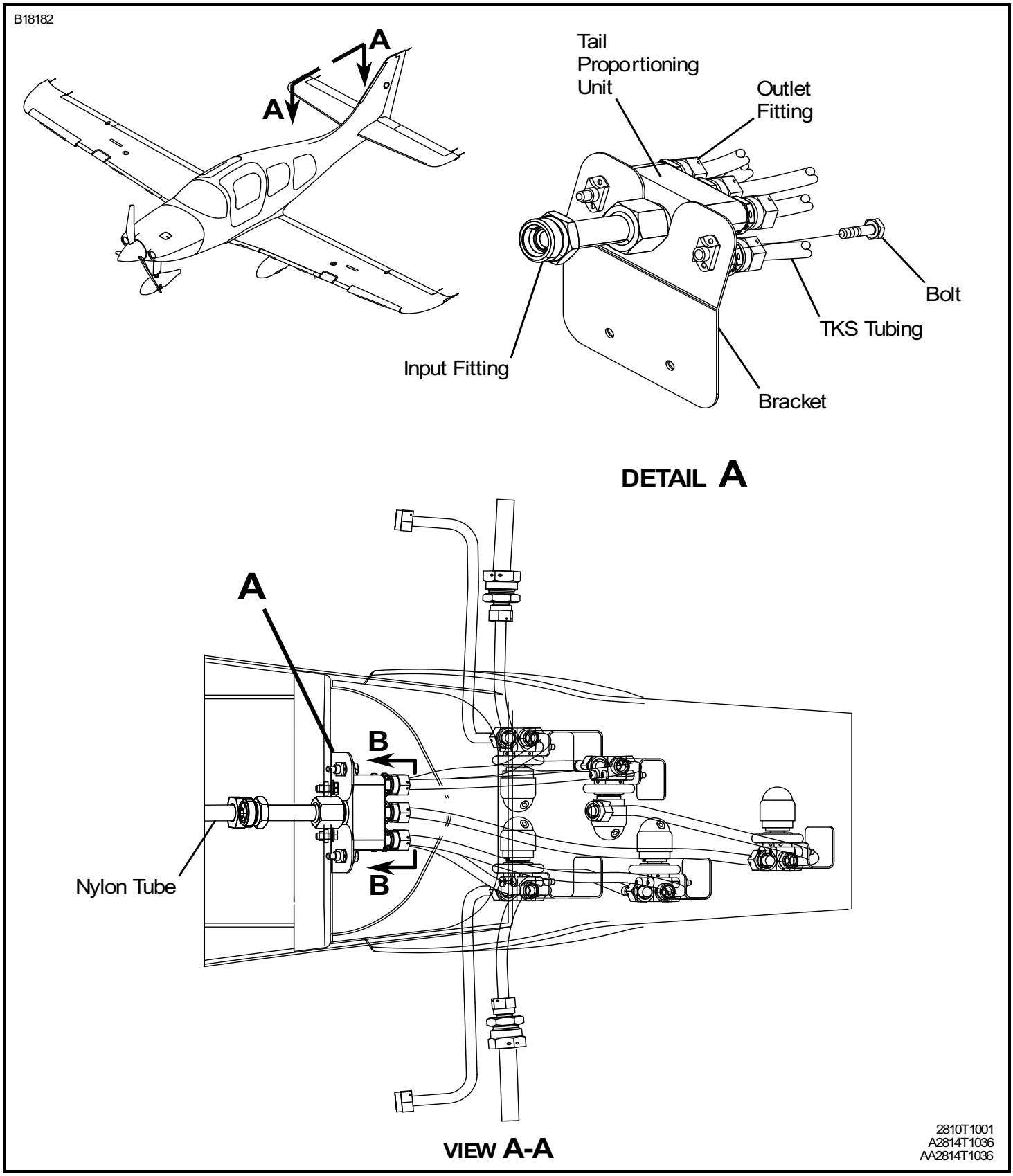
(c) W/S ANTI-ICE.

(6) Do a check of the Tail Proportioning Unit. Refer to TKS Anti-Ice System (FIKI) - Adjustment/Test.

(7) Install the right aft fuselage access panel found on the vertical stabilizer.

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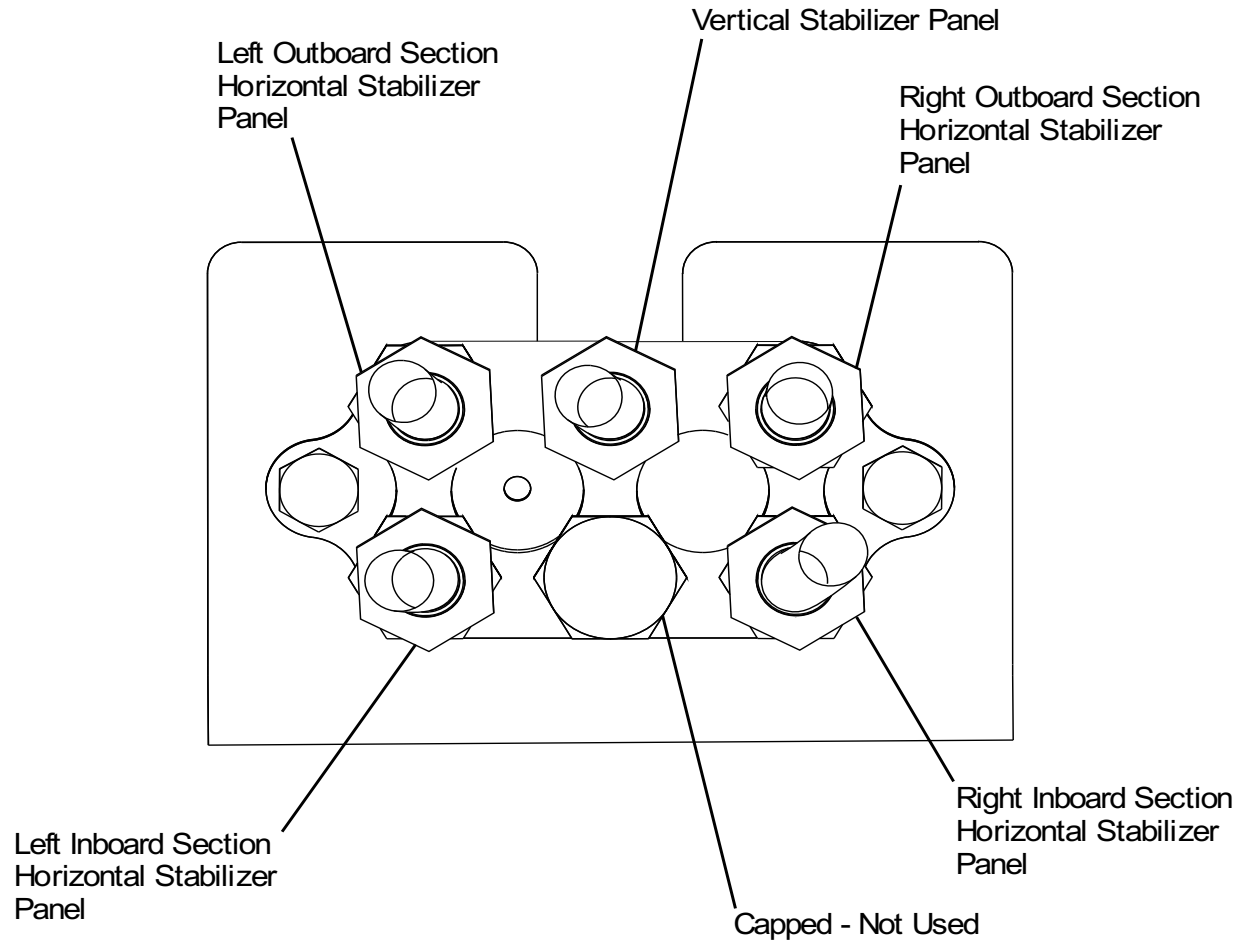
Figure 401 : Sheet 1 : Tail Proportioning Unit Installation



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Figure 401 : Sheet 2 : Tail Proportioning Unit Installation

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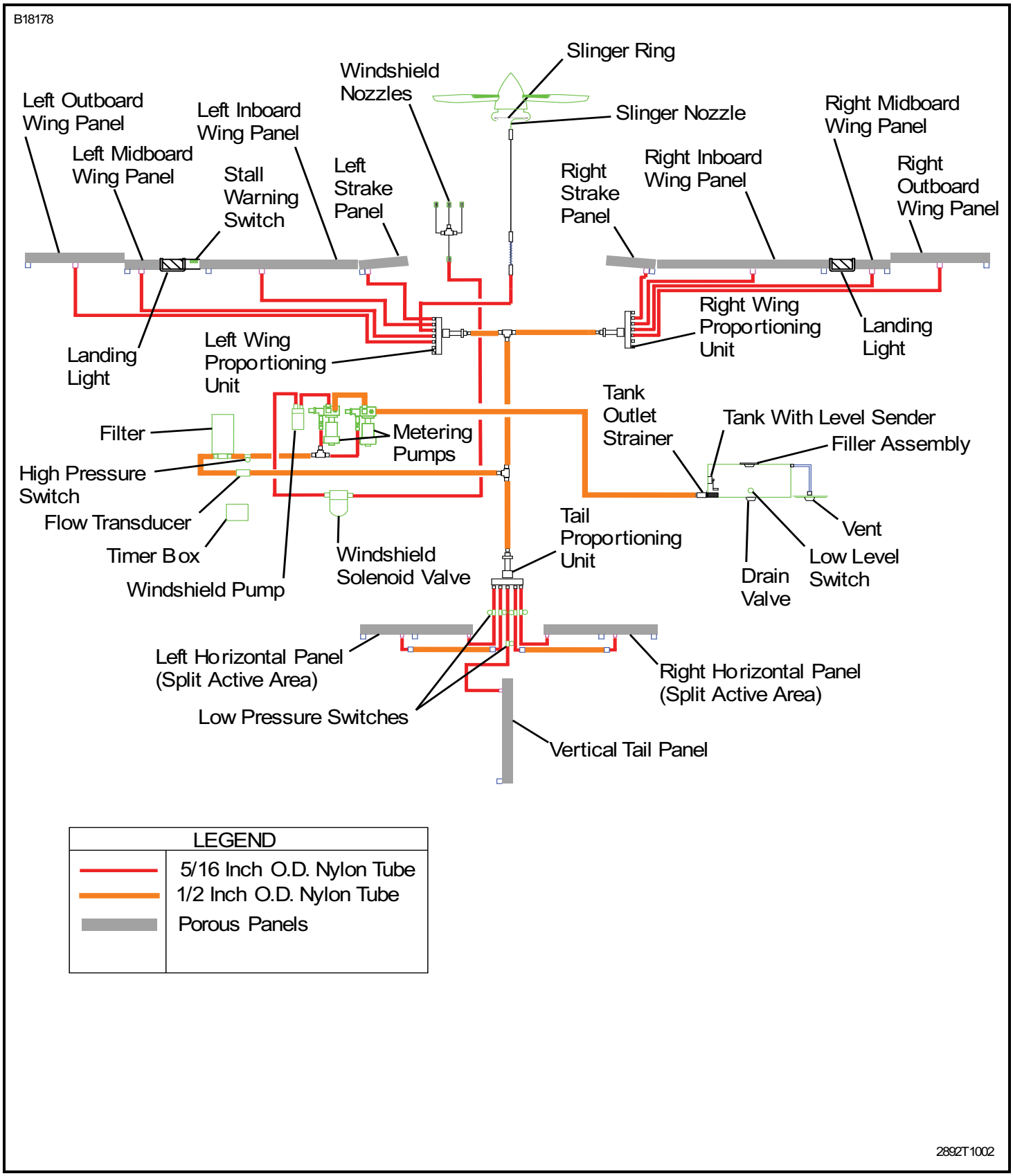


VIEW B-B
(Looking Forward)

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Figure 201 : Sheet 1 : TKS Tubing Installation

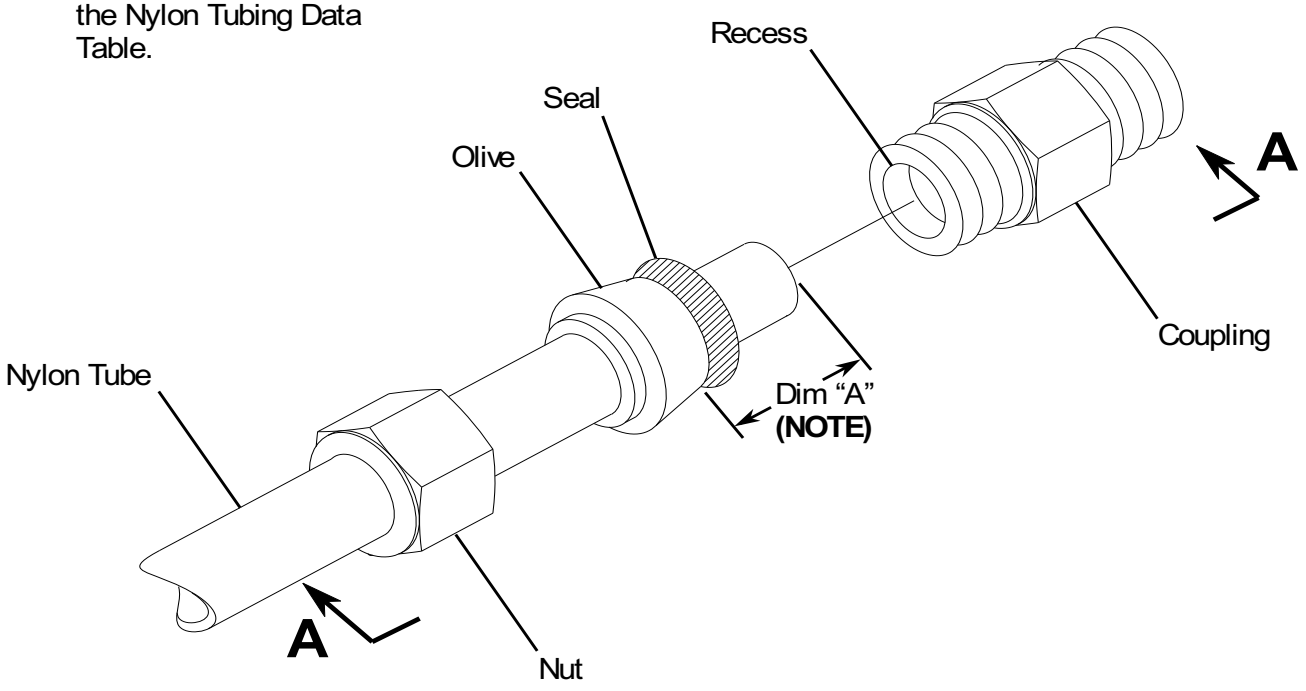


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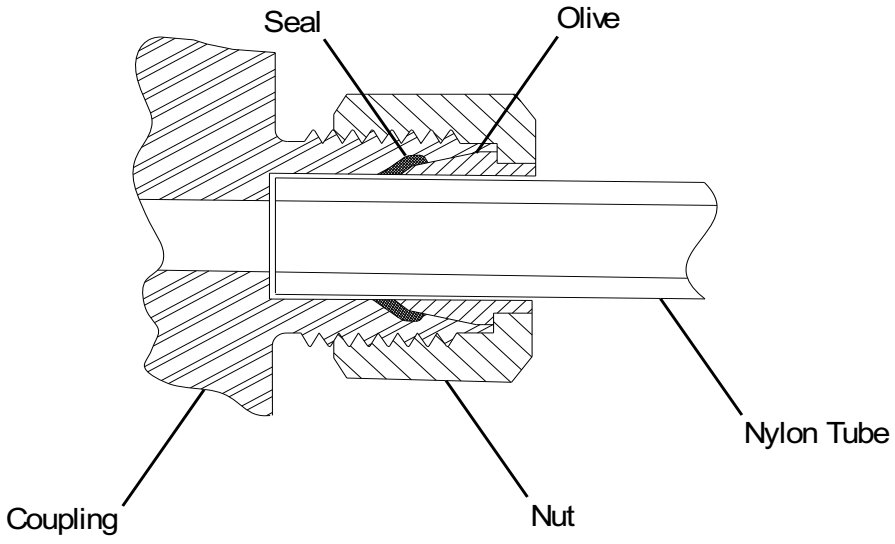
Figure 201 : Sheet 2 : TKS Tubing Installation

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NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)



VIEW A-A

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TKS LEVEL SENDER (FIKI) - REMOVAL/INSTALLATION

1. General

A. This section contains the removal and installation procedures for the TKS Level Sender. The level sender is installed in the TKS fluid tank in the right wing at FS 119.08, WS 82.85, and RBL 23.16.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. Level Sender Removal/Installation

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Before you disconnect components of the TKS anti-ice system, slowly loosen the coupling that is connected to the component to be removed. It is possible that high pressure is still in the system.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Do not use MEK, acetone, paint thinner, or similar chlorinated solvents on the porous panels. To prevent damage, only use water and detergent, isopropyl alcohol, and/or approved anti-ice fluid on the porous panel surfaces.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube coupling. Replace the 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube coupling. Examine the seal for damage and make sure that it is in the correct position in the coupling. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the coupling.

A. Remove the Level Sender (UR100) (Refer to Figure 401).

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Level Sender Removal/Installation.

(2) Remove external electrical power from the airplane.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(5) Disengage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

(c) W/S ANTI-ICE.

(6) Drain the TKS fluid tank. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, TKS Anti-Ice Fluid Removal.

(7) Remove the screws that attach the FIKI tank access panel to the wing.

(a) Carefully pull the panel from the wing skin.

(b) Hold the panel and remove the clamp that attaches the hose to the vent tube.

1 Remove the hose from the vent tube.

(c) Remove the access panel from the airplane.

(8) Use a nonmetallic scraper to carefully remove unwanted sealant from the tank and level sender (on the tank side).

(9) Remove the footwell. Refer to Footwell - Maintenance Practices.

(a) Disconnect the electrical connector JR100 from electrical connector PR100.

(b) Remove the screws that attach the level sender to the wing rib.

(10) Carefully remove the level sender from the airplane as follows:

(a) Carefully remove the arm of the level sender from the TKS tank through the mount hole of the sender.

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(b) If the removed switch is to be installed again, use a nonmetallic scraper to carefully remove unwanted sealant from the level sender.

(11) Use a nonmetallic scraper to carefully remove unwanted sealant from the wing rib.

B. Install the Level Sender (UR100) (Refer to Figure 401).

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Level Sender Removal/Installation.

(2) Apply Type IX, fluorosilicone sealant around the perimeter of the level sender installation area (hole) before you install the level sender. (Silastic 730, Dow or equivalent).

(3) While the sealant is wet, install the level sender as follows:

(a) Carefully put the arm of the level sender into the TKS tank through the mount hole of the level sender.

(b) Put the level sender in its correct position on the wing rib.

(c) Install the screws that attach the level sender to the wing rib.

(4) Use Type IX, fluorosilicone sealant to apply a fillet seal around the level sender on the tank side. (Silastic 730, Dow or equivalent).

(a) Make sure to let the fillet seal cure.

(5) Connect the electrical connector JR100 to electrical connector PR100.

(6) Install the FIKI tank access panel to the wing as follows:

(a) Use a nonmetallic scraper to carefully remove unwanted sealant from the access panel and the wing skin.

(b) Hold the access panel near its correct position and connect the hose to the vent tube.

1 Install the clamp that attaches the hose to the vent tube.

(c) To seal the access panel, apply Type IX, fluorosilicone sealant to the recessed wing skin installation area. (Silastic 730, Dow or equivalent).

(d) Put the access panel in its correct position to the wing.

(e) Install the screws that attach the access panel to the wing.

(f) Use a nonmetallic scraper to carefully remove unwanted sealant from the wing skin.

(7) Engage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

(c) W/S ANTI-ICE.

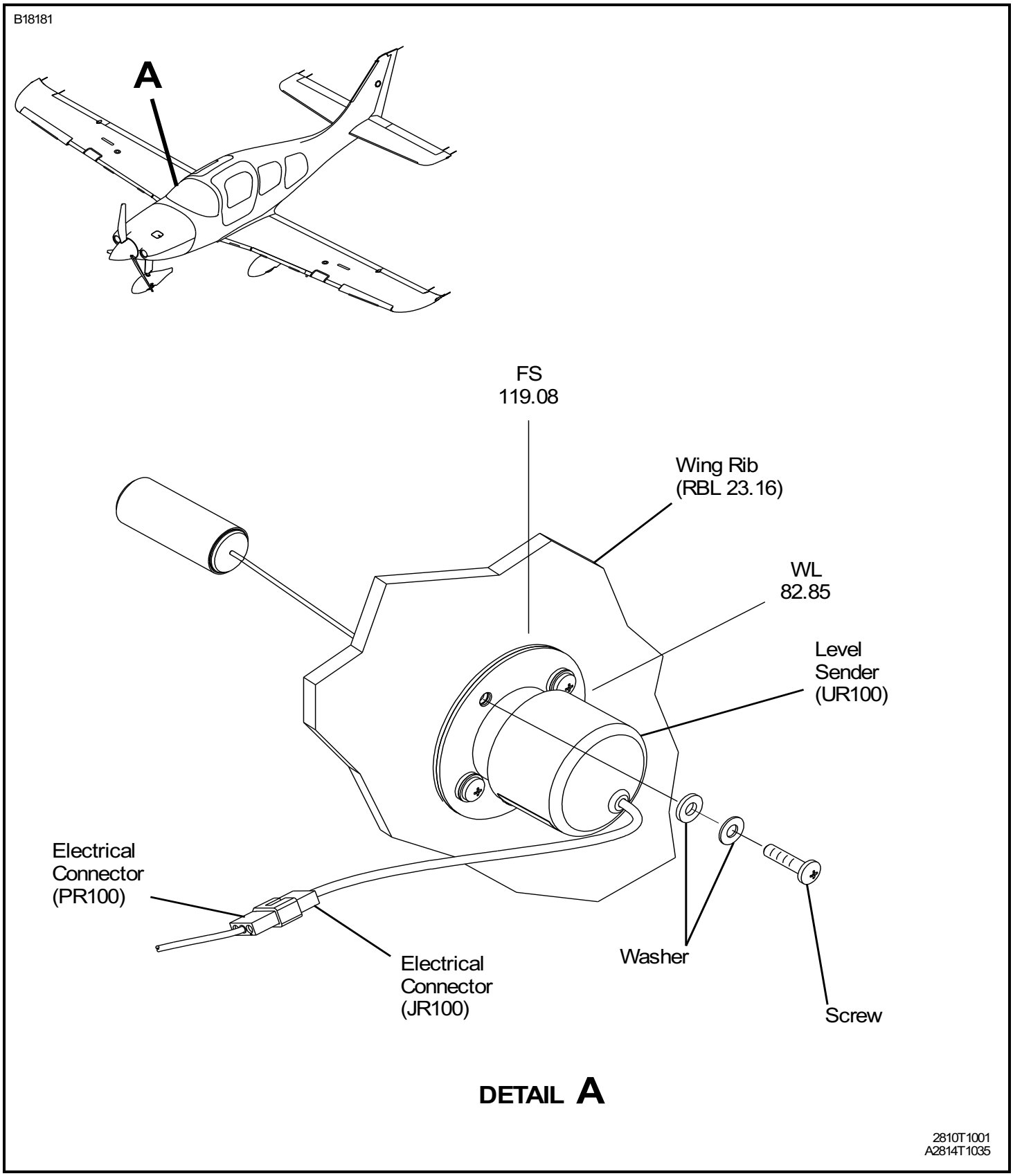
(8) Do a test of the level sender. Refer to TKS Anti-Ice System (FIKI) - Adjustment/Test.

(9) Do the fluid tank servicing. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid.

(10) Install the footwell. Refer to Footwell - Maintenance Practices.

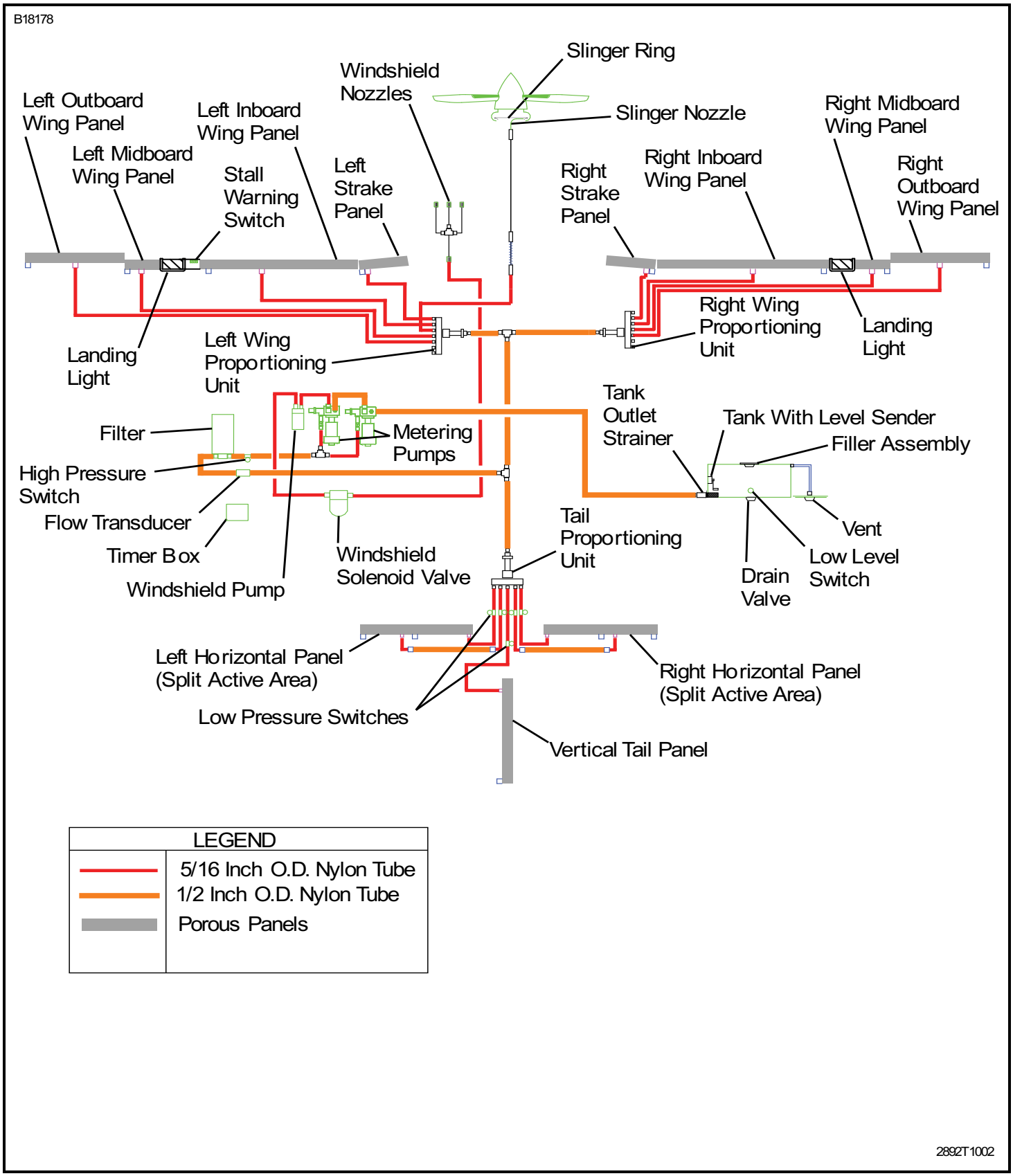
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Figure 401 : Sheet 1 : Level Sender Installation



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Figure 201 : Sheet 1 : TKS Tubing Installation

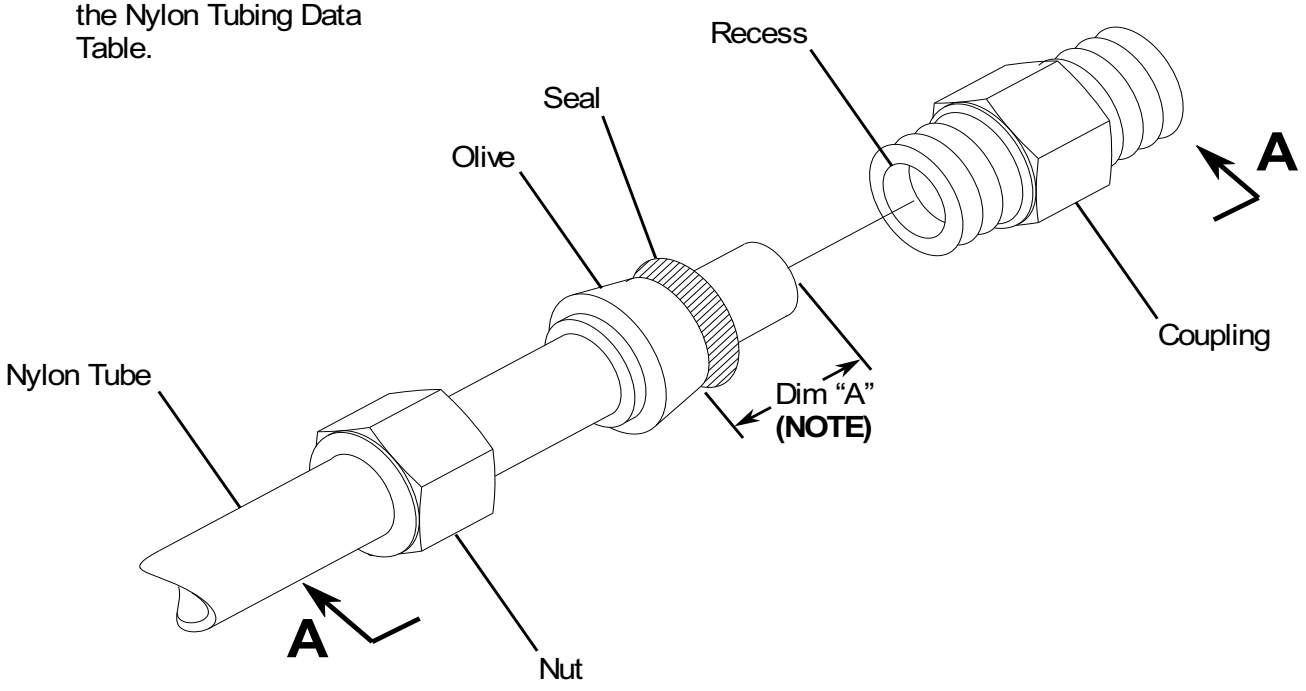


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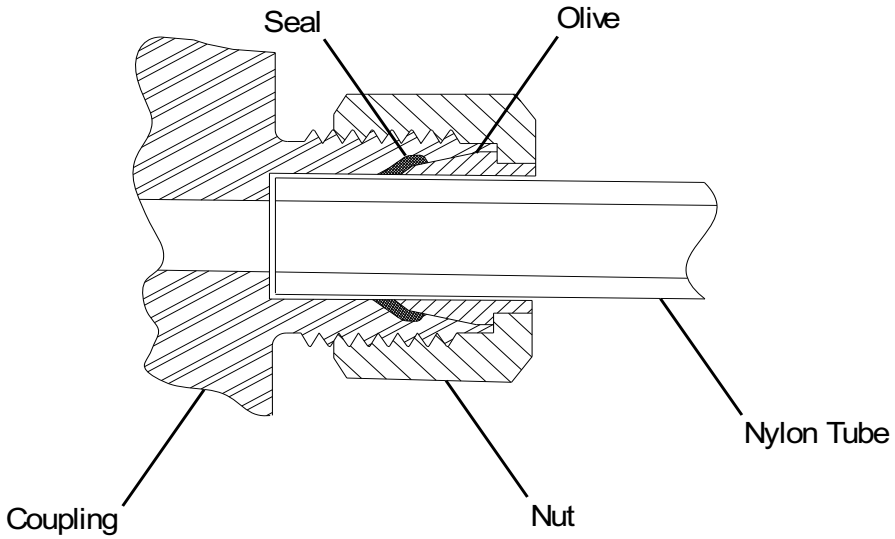
Figure 201 : Sheet 2 : TKS Tubing Installation

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NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)



VIEW A-A

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TKS LOW PRESSURE SWITCH (FIKI) - REMOVAL/INSTALLATION

1. General

A. This section contains the removal and installation procedures for each of the five TKS Low Pressure Switches. The low pressure switches are for each of the following porous panels: left horizontal outboard and inboard, right horizontal outboard and inboard, and the vertical. The switches are installed in the vertical stabilizer. You can get access to the switches by removing the left and/or right aft fuselage access panels.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. Low Pressure Switch Removal/Installation

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Before you disconnect components of the TKS anti-ice system, slowly loosen the nut that is connected to the component to be removed because it is possible that pressure is still in the system.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Before you operate the TKS system during this procedure put plastic sheets or absorbent cloths under the porous panels to keep the TKS fluid off the floor. This will help to prevent injury to personnel.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube nut. Replace the 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube fitting. Examine the seal for damage and make sure that it is in the correct position in the fitting. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the fitting.

A. Remove the Low Pressure Switch (SC100) (Refer to Figure 401).

NOTE: The removal procedures for each of the five low pressure switches are similar.

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Low Pressure Switch Removal/Installation.

(2) Remove external electrical power from the airplane.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(5) Disengage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

(c) W/S ANTI-ICE.

(6) Remove the left and/or right aft fuselage access panel found on the vertical stabilizer to get access to the applicable low pressure switch.

(7) Disconnect the applicable electrical connectors as follows:

(a) Vertical low pressure switch, electrical connector PT100 from electrical connector JT100.

(b) Left horizontal outboard low pressure switch, electrical connector PT101 from electrical connector JT101.

(c) Left horizontal inboard low pressure switch, electrical connector PT102 from electrical connector JT102.

(d) Right horizontal inboard low pressure switch, electrical connector PT103 from electrical connector JT103.

(e) Right horizontal outboard low pressure switch, electrical connector PT104 from electrical connector JT104.

(8) Remove the tube from the applicable low pressure switch input fitting as follows:

(a) Slowly loosen the nut and remove the input tube from the switch input fitting.

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(b) Remove and discard the old seal from the input tube.

(c) Put caps on the open ends to keep FOD out of the fluid system and prevent excessive leakage of TKS fluid from the system.

NOTE: It is not necessary to install caps if you are to replace the low pressure switch immediately.

(9) Remove the tube from the applicable low pressure switch outlet fittings as follows:

(a) Slowly loosen and disconnect the outlet tube.

(b) Remove the outlet tube from the switch.

(c) Put caps on the open ends to keep FOD out of the fluid system and prevent excessive leakage of TKS fluid from the system.

NOTE: It is not necessary to install caps if you are to replace the low pressure switch immediately.

(d) Remove and discard the old seal from the outlet tubes.

(10) Remove the screws that attach the low pressure switch to the bracket.

(11) Carefully remove the low pressure switch from the airplane.

B. Install the Low Pressure Switch, (Refer to Figure 401).

NOTE: The installation of each of the low pressure switches is similar.

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Low Pressure Switch Removal/Installation.

(2) Put the applicable low pressure switch in its correct position on the bracket.

(a) Install the screws that attach the switch to the bracket.

(3) Attach the applicable input tube to the low pressure switch as follows:

(a) If necessary, remove the caps from the open ends.

(b) Install new seal on the input tube. Refer to TKS Anti-Ice System - Maintenance Practices, Figure 201.

(c) Put the input tube in its correct position on the switch input fitting.

(d) Carefully tighten the tube fitting nuts. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

(4) Attach the applicable outlet tube to the low pressure switch as follows:

(a) If necessary, remove the caps from the open ends.

(b) Install new seals on the outlet tubes. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201.

(c) Put the outlet tube in its correct position on the switch outlet fitting.

(d) Carefully tighten the tube fitting nuts. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

(5) Connect the applicable electrical connectors as follows:

(a) Vertical low pressure switch, electrical connector PT100 to electrical connector JT100.

(b) Left horizontal outboard low pressure switch, electrical connector PT101 to electrical connector JT101.

(c) Left horizontal inboard low pressure switch, electrical connector PT102 to electrical connector JT102.

(d) Right horizontal inboard low pressure switch, electrical connector PT103 to electrical connector JT103.

(e) Right horizontal outboard low pressure switch, electrical connector PT104 to electrical connector JT104.

(6) Engage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

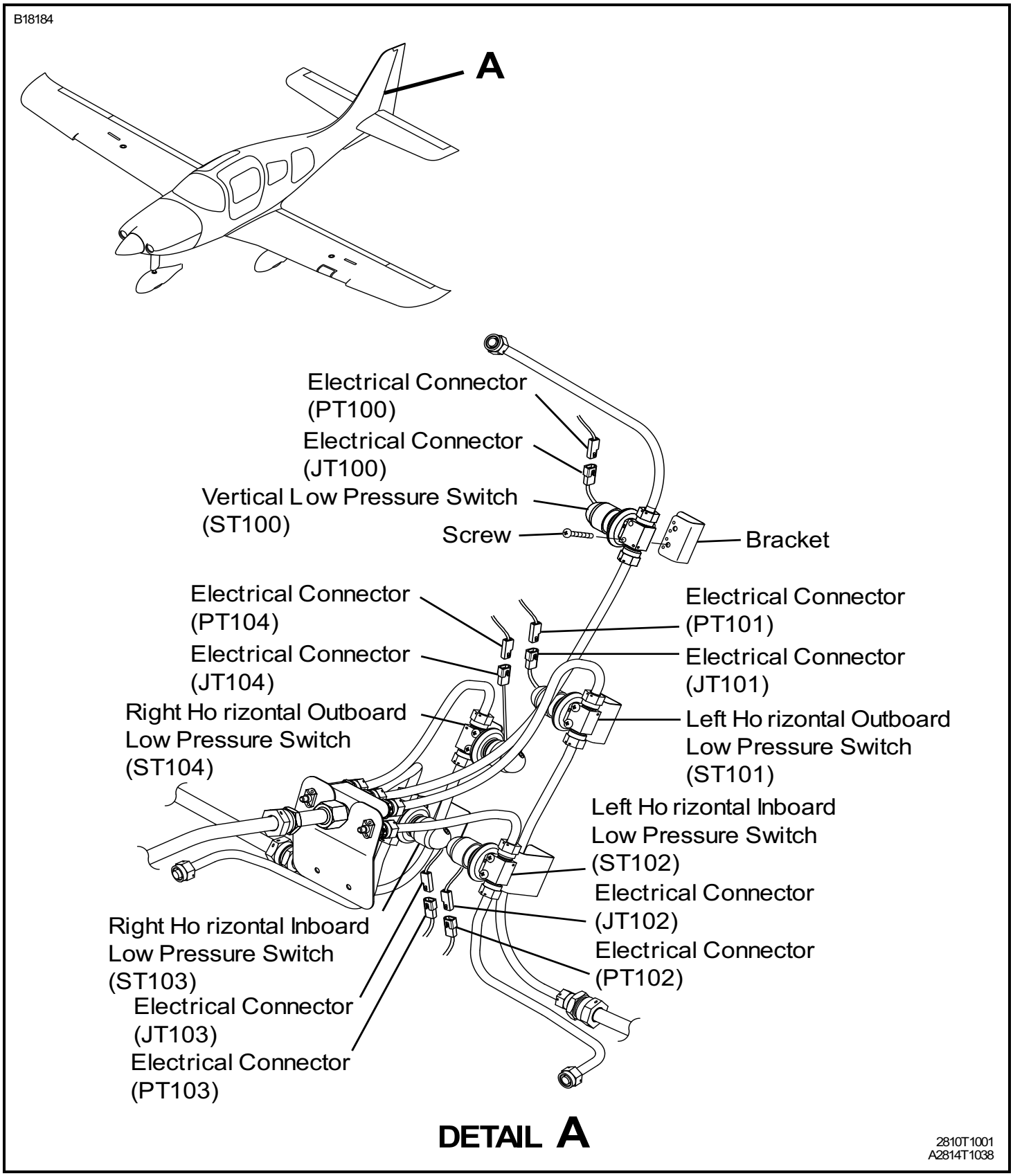
(c) W/S ANTI-ICE.

(7) Do a check of the applicable low pressure switch. Refer to the, TKS Anti-Ice System (FIKI) - Adjustment/Test.

(8) Install the left and/or right aft fuselage access panel found on the vertical stabilizer.

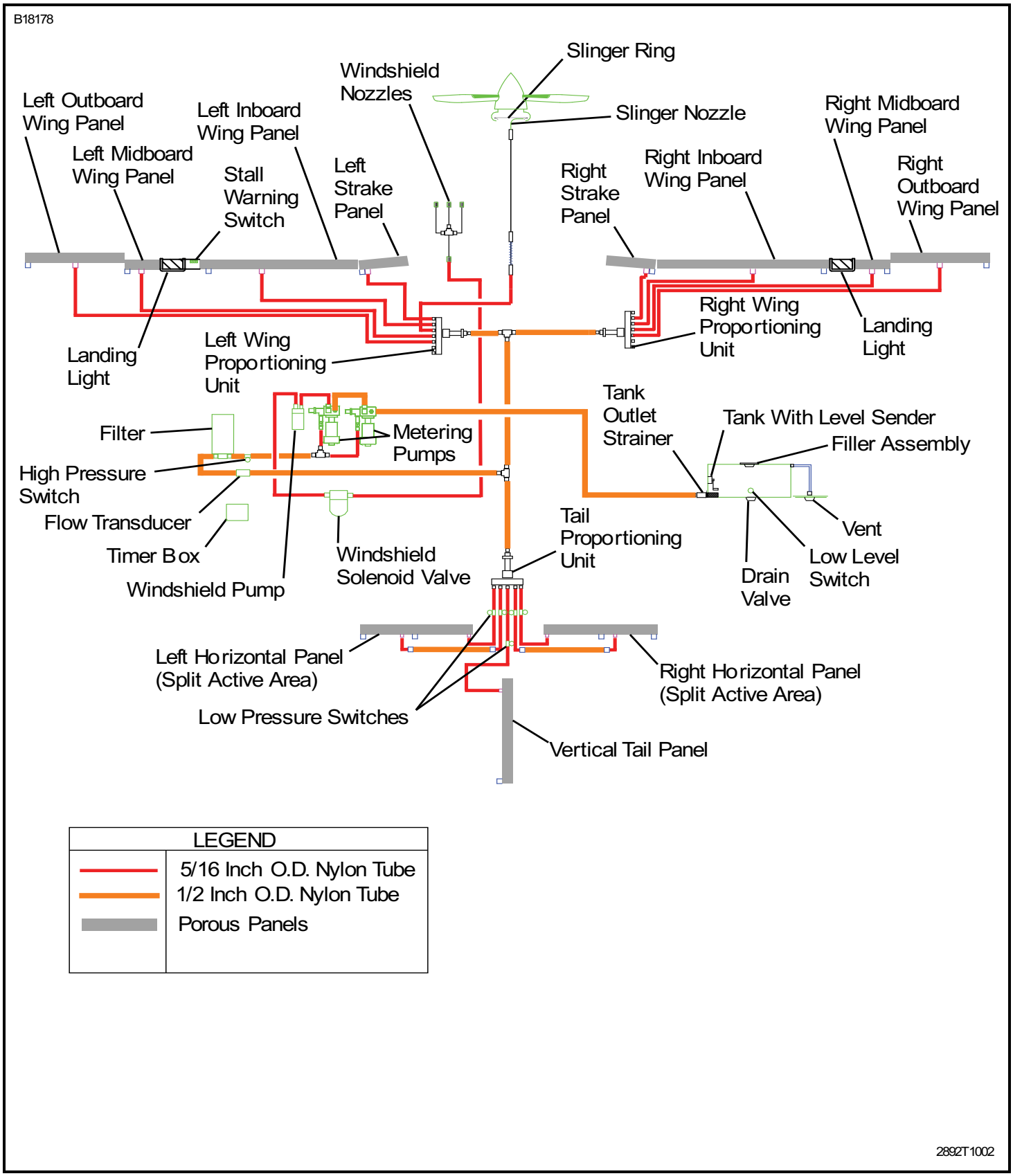
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Figure 401 : Sheet 1 : Low Pressure Switch Installation



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Figure 201 : Sheet 1 : TKS Tubing Installation

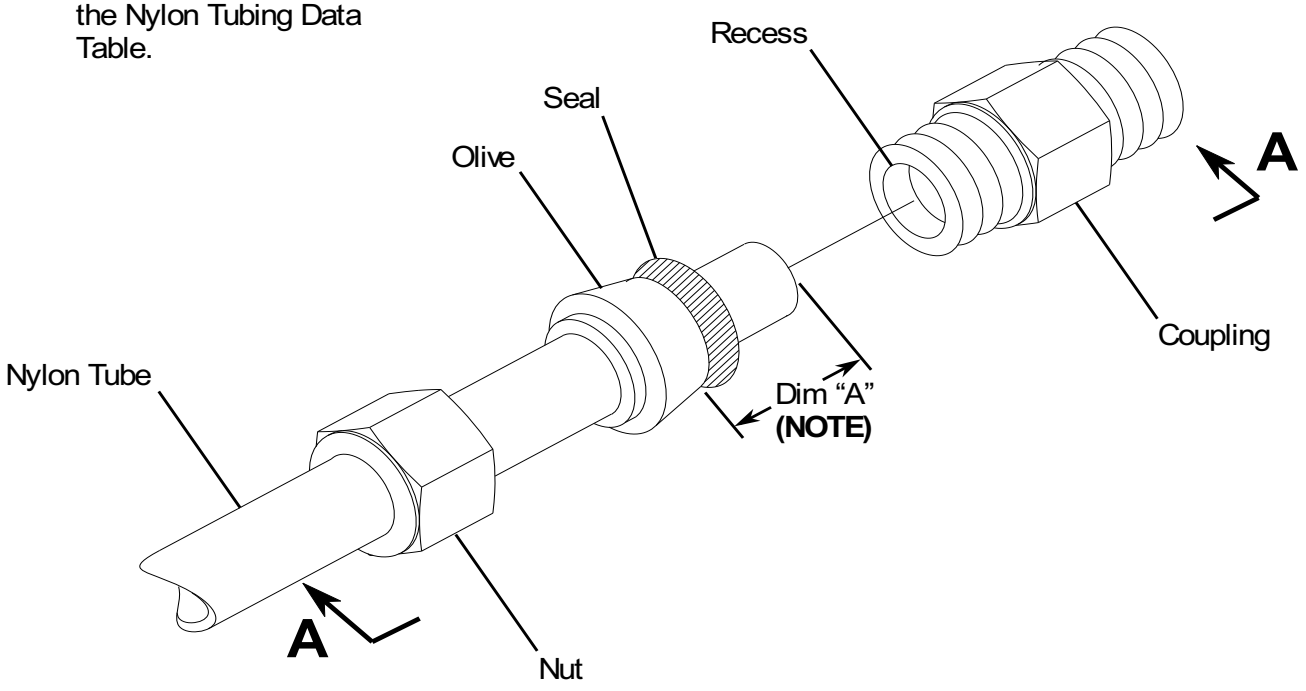


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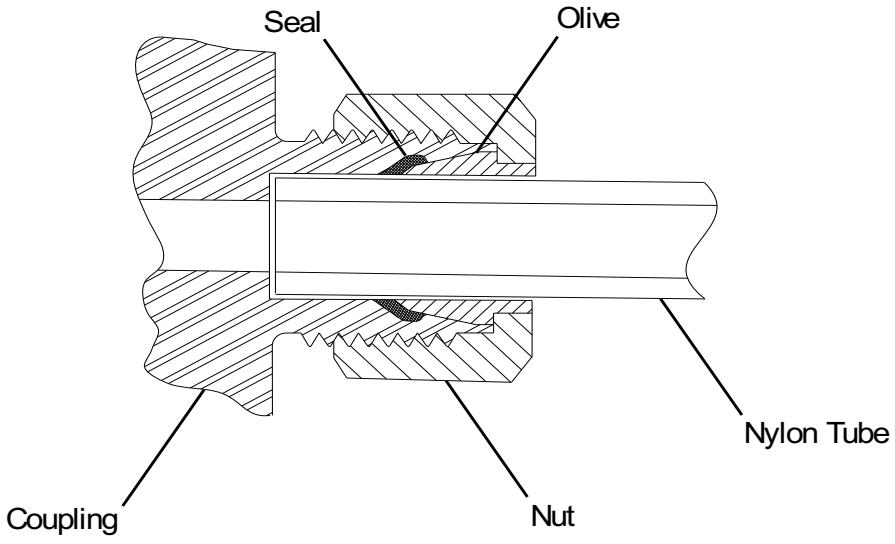
Figure 201 : Sheet 2 : TKS Tubing Installation

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NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)



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TKS LEADING EDGE POROUS PANEL (FIKI) - REMOVAL/INSTALLATION

1. General

A. This section contains the removal and installation procedures for the TKS Anti-Ice System (FIKI) porous panels, which include the wing, horizontal stabilizer and vertical stabilizer leading edges. The sealing procedures for the porous panels are also included in this section.

B. After a porous panel is replaced, it is necessary to do the purge and test procedures. Refer to TKS Leading Edge Porous Panel (FIKI) - Adjustment/Test, Porous Panel Purge and Test.

2. Tools, Equipment, and Materials

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. Porous Panel Removal/Installation

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Before you disconnect components of the TKS anti-ice system, slowly loosen the coupling that is connected to the component to be removed because it is possible that high pressure is still in the system.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Do not use MEK, acetone, paint thinner, or similar chlorinated solvents on the porous panels. To prevent damage, only use water and detergent, isopropyl alcohol, and/or approved anti-ice fluid on the porous panel surfaces.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube coupling. Replace the 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube coupling. Examine the seal for damage and make sure that it is in the correct position in the coupling. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the coupling.

CAUTION: After you remove and before you install a porous panel, apply low-adhesive tape on the panel to give it protection.

CAUTION: Before you remove or install a porous panel, apply low-adhesive tape on the skin adjacent to the panel to give the skin protection.

CAUTION: Be careful when you remove and install the porous panels. The panels are easily damaged. Use nonmetallic tools, if possible, to prevent tears, gouges, scratches, and other damage.

A. Remove the Porous Panel (Refer to Figure 401).

NOTE: The panel purge and test procedures are only necessary after you install a replacement porous panel.

NOTE: The removal and installation of the porous panels on the wing and horizontal stabilizer leading edges are typical.

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Porous Panel Removal/Installation.

(2) Remove external electrical power from the airplane.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(5) Disengage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

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(c) W/S ANTI-ICE.

CAUTION: Before you remove or install a porous panel, apply low-adhesive tape on the skin adjacent to the panel to give the skin protection.

(6) Remove the porous panel as follows:

(a) Apply low-adhesive tape on the skin around the panel.

NOTE: The tape will help to protect painted surfaces.

(b) Remove the rivets that attach the panel to the leading edge.

(c) Carefully remove the sealant along the panel edges.

NOTE: If necessary use a sharpened putty knife to remove the sealant. Be careful to not damage the paint or wing surface.

(d) Carefully use a flexible-blade knife (putty knife) and your hands to pull the panel away from the leading edge.

CAUTION: While pulling the panel away from the leading edge, be careful not to damage the leading edge by prying against it.

(e) Carefully remove the panel from the leading edge sufficiently to access the fluid tubing fitting.

(7) Disconnect the TKS fluid tube as follows:

(a) Loosen the tube fitting nut.

(b) Remove the TKS fluid tubes from the porous panel fittings.

(c) Remove and discard the seals from the porous panel inlet tubes. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201.

(d) Install caps on all tube ends to keep FOD out of the fluid system and prevent excessive leakage of TKS fluid from the system.

(8) Remove the porous panel form the airplane.

(9) Remove all remaining sealant from the leading edge.

(a) Use a plastic or phenolic scraper to remove cured sealant from the leading edge surface.

(b) Use medium or finer ScotchBrite scuff pad to remove the sealant not removed with the scraper.

(c) Clean the bonding surfaces and leading edge with isopropyl alcohol or other approved cleaner.

(10) If necessary, paint the leading edge. Refer to Chapter 51, Paint Repair and Painting - Maintenance Practices.

B. Install the Porous Panel (Refer to Figure 401).

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Porous Panel Removal/Installation.

(2) If necessary, use Plastic Welder I or II or Jeffco epoxy to build up the leading edge joggle area and form a Devcon wedge to match the loft contour. Refer to Chapter 20, Solvents, Sealants and Adhesives - Description and Operation, Table 1, Engine and General Purpose Materials.

(a) If necessary, paint the leading edge. Refer to Chapter 51, Paint Repair and Painting - Maintenance Practices.

(3) Prepare the bonding surfaces of the panels and leading edges as follows:

(a) Clean the bonding surfaces and leading edge with isopropyl alcohol or other approved cleaner.

(b) In areas where the TKS panels will be installed, lightly abrade the airplane leading edges with a ScotchBrite scuff pad.

(c) With isopropyl alcohol and a sponge or short-bristle brush, clean the area of the leading edge where the panel will be installed.

1 Use a clean lint-free cloth to dry the area before the cleaning solution evaporates.

(d) With a clean lint-free cloth wet with isopropyl alcohol, clean the area of the leading edge where the panel will be installed.

1 Use a clean lint-free cloth to dry the area before the cleaning solution evaporates.

(e) Use a clean lint-free cloth wet with isopropyl alcohol and a ScotchBrite scuff pad to clean the aft surface of the TKS panel.

1 Use a clean lint-free cloth to remove debris and contaminants from the surface of the panel.

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(f) Clean the panel again, in approximately 12 to 15 inch sections, with clean lint-free cloths wet with isopropyl alcohol.

1 Immediately use clean lint-free cloths to dry each section before the alcohol evaporates.

(g) Clean the surface of the panel with a clean white lint-free cloth.

1 Examine the cloth for evidence of debris or contaminates.

2 If the cloth shows debris or contaminates, do again the TKS panel cleaning steps above.

(4) Put the panel in its correct position on the leading edge.

(a) Use your hand to install the panel in its correct position on the leading edge.

1 If necessary, close or open the panel to get the correct installation of the leading edge.

(b) Make sure to leave a 0.1 inch gap between the panel and the Devcon wedge.

(5) Drill the rivet holes at the corners of the porous panel to match the existing hole locations on the leading edge.

(a) Remove the panel and deburr the holes.

(6) Install the fluid tubing to the porous panel as follows:

(a) Remove the caps from the tube ends.

(b) Install new seals in the tubing ends. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201.

(c) Hold the panel in position near the leading edge and put the tubing on the panel fitting.

1 Carefully tighten the tube fitting nuts. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

(d) Use Type I, Class B sealant to apply a 0.38 inch bead around each hole for tube connections and air bleed check valves. (P/S 890, PR-1440 from PRC-Desoto, or equivalent)

1 Apply the sealant to the fluid tube fitting threads, nut and tubing for a minimum of 0.50 inch past the fitting nut.

(7) Install the porous panel as follows:

(a) Use Type XV, Class B sealant to apply a 1 inch diameter fay seal near the end of the panel (by the rivet holes) on the back surface of the panel. (Chem Seal 3209 from Flamemaster Corporation, or equivalent)

1 Make sure that after the panel is installed the sealant is located on the area with the multiple/additional layers of mesh (expanded copper/aluminum foil) on the wing skin.

NOTE: This is an electrically conductive type sealant.

(b) Use Type I, Class B-2 sealant to apply a 1 inch wide fay seal along the entire trailing edges of the back surface of the panel. (P/S 890, PR-1440 from PRC-Desoto, or equivalent)

(c) Align the panel to the correct position.

1 Push the panel against the leading edge with enough pressure to align the rivet holes at the corners of the porous panel.

a Make sure that the trailing edge of the panel is flush with the Devcon wedge/airplane skin within the tolerance listed below.

- For the wings and horizontal stabilizers +0.040 or -0.040 inch.
- For the vertical stabilizer +0.060 or -0.060 inch.

NOTE: Any steps along the joint between the panel edge and Devcon wedge/airplane skin must face aft.

2 Install temporary fasteners to hold the panel in position.

CAUTION: To spread the load where ratcheting straps are used, use metal angles to protect the trailing edge. Place blankets or foam between the metal angles and the trailing edge. Do not use too much force when you tighten the straps.

3 Keep applying pressure until the tape strips or ratcheting straps are applied to hold the panel in position.

4 Make sure that the panel edges are in the correct position.

(d) Install the rivets that attach the panel to the leading edge.

1 Examine the rivet heads for correct installation.

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(e) After the sealant is cured, remove all tape and ratcheting straps.

(f) Use Type XII, Class B sealant to fill the gap between the Devcon wedge and the trailing edge of the panel. (PR-1425 or PR-1829, PPG Industries, PRC-Desoto, or equivalent)

1 Make sure sealant matches the loft contour.

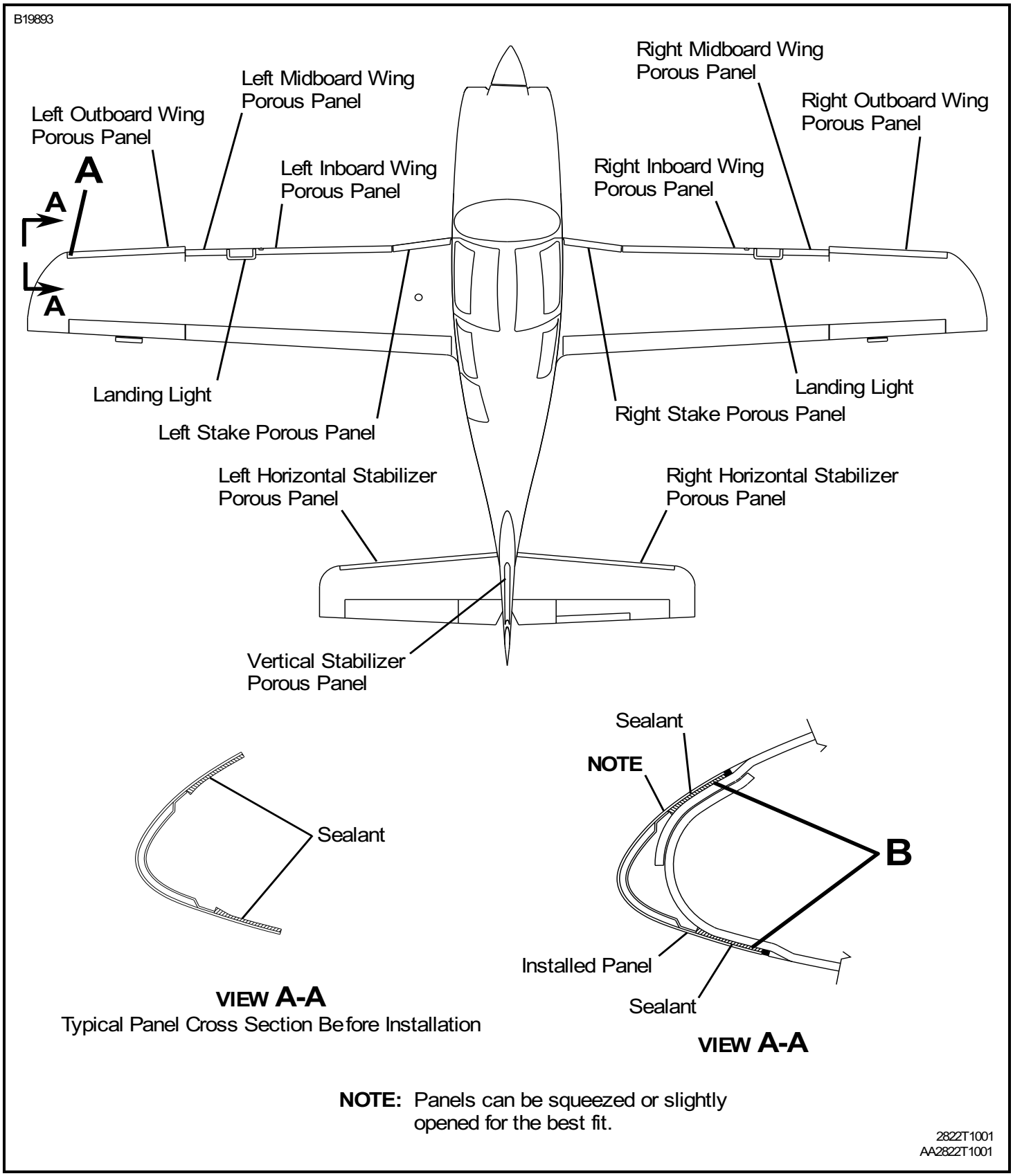
(8) After the sealant is cured, do the panel purge and test procedures. Refer to TKS Leading Edge Porous Panel (FIKI) - Adjustment/Test,Porous Panel Purge and Test.

(9) Do a TKS System Operational Test. Refer to TKS Anti-Ice System (FIKI) - Adjustment/Test.

(10) Clean the floor and the airplane surfaces as necessary.

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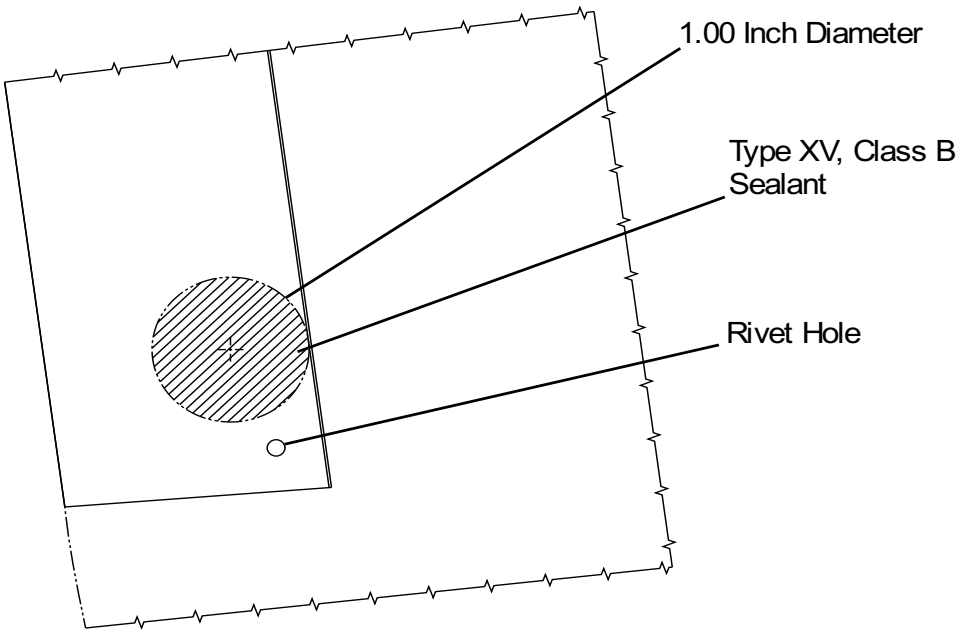
Figure 401 : Sheet 1 : TKS Porous Panel Installation



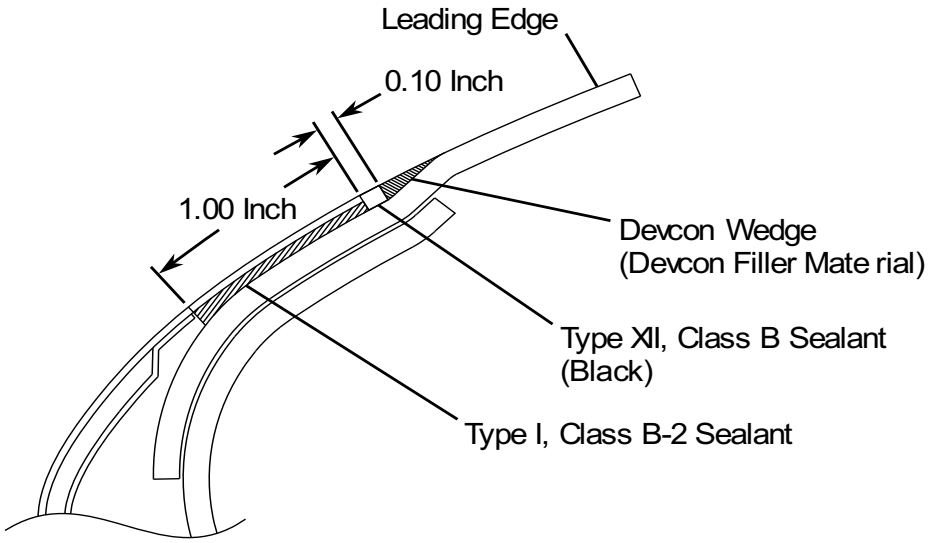
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Figure 401 : Sheet 2 : TKS Porous Panel Installation

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DETAIL A
(Typical Near Rivet Holes)

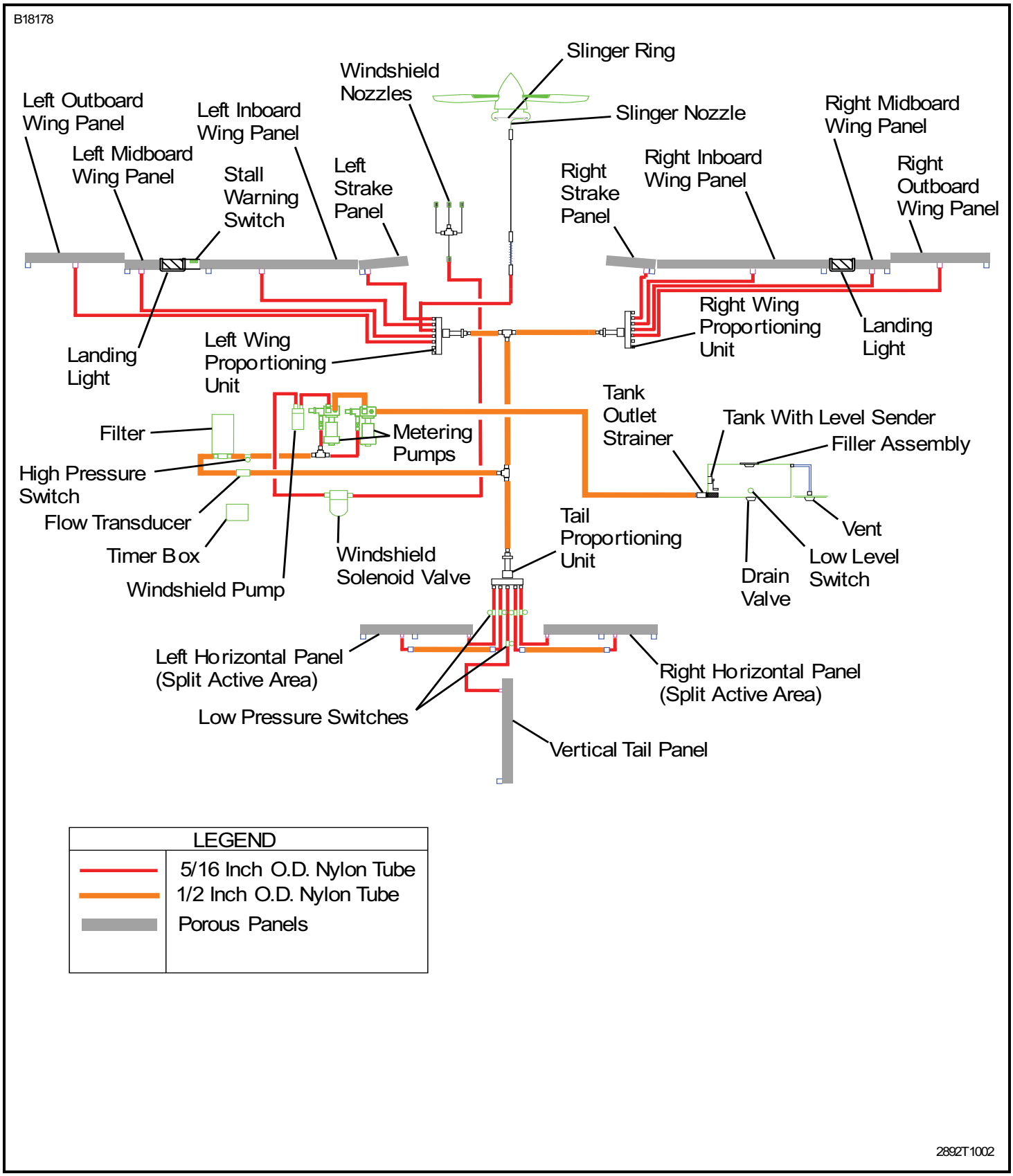


DETAIL B
(Typical For Both Sides of All Porous Panels)

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Figure 201 : Sheet 1 : TKS Tubing Installation

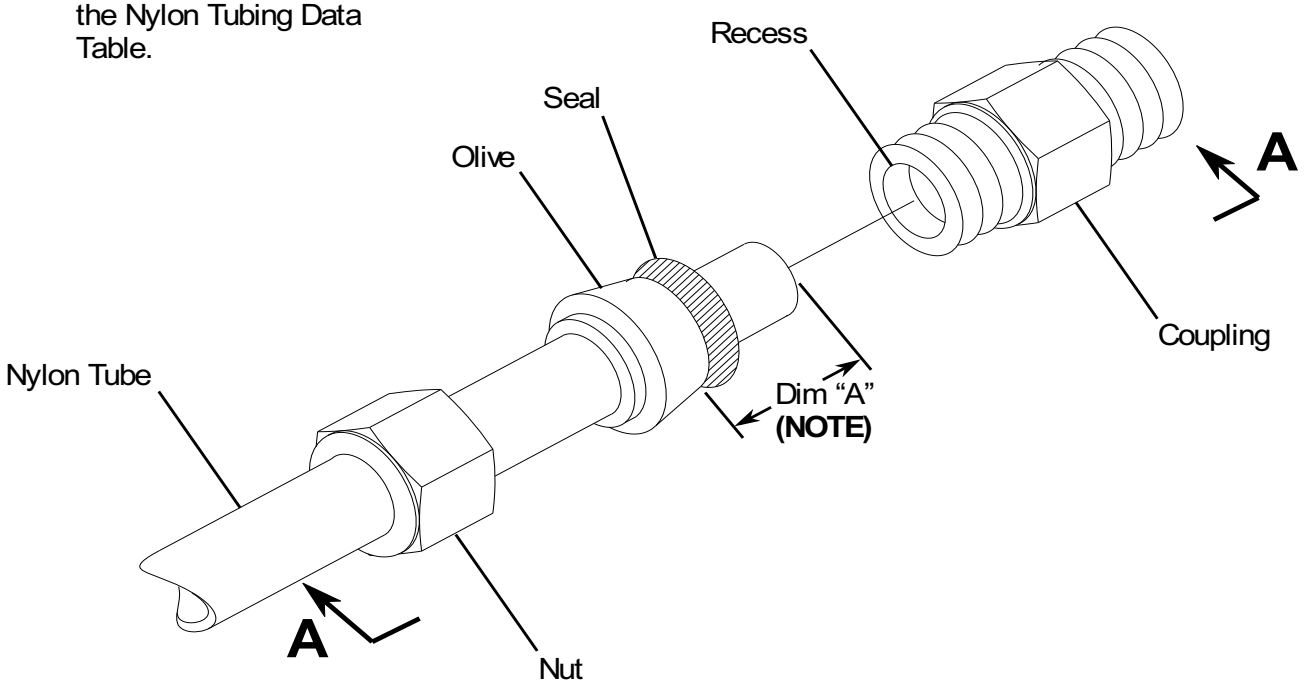


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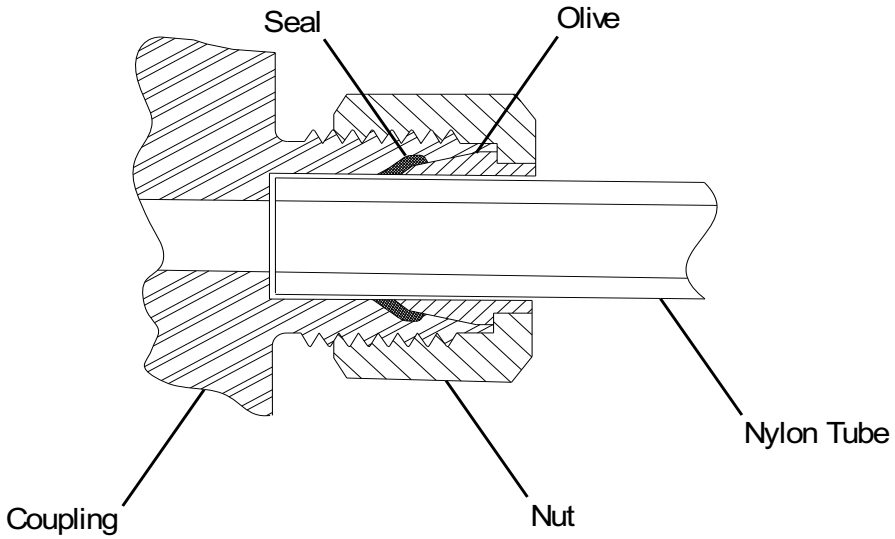
Figure 201 : Sheet 2 : TKS Tubing Installation

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NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)



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TKS LEADING EDGE POROUS PANEL (FIKI) - ADJUSTMENT/TEST

1. General

A. This section contains the procedures to remove (purge) the air from the TKS Anti-Ice System (FIKI) porous panels on the wing, horizontal and vertical stabilizer leading edges.

B. The panel purge and test procedures are only necessary after you install a replacement porous panel.

C. The function of the panel purge and test procedures is to remove most of the air and make the membrane in the panel completely wet.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. Porous Panel Purge and Test

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Before you disconnect components of the TKS anti-ice system, slowly loosen the coupling that is connected to the component to be removed. It is possible that high pressure is still in the system.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube coupling. Replace the 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube coupling. Examine the seal for damage and make sure that it is in the correct position in the coupling. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201. This helps to prevent fluid leakage from the coupling.

NOTE: It is necessary that you have access to clean dry cloths, a sufficient quantity of approved TKS fluid, a TKS system test cart with connection hardware, 90 psi filtered shop air or nitrogen bottle (to use with a test cart), and a container with a capacity of ten to fifteen gallons. It will be necessary to fill the test cart with TKS fluid at intervals during the test.

NOTE: You can fabricate a fluid collector system, which will contain the fluid and keep it off the floor. Recommended materials you can use are plastic sheets, tubing, aluminum tape, and rigid aluminum and/or plastic gutter material.

A. Do the Panel Purge and Test (Refer to Figure 501, Figure 502, Figure 503, and Table 501).

NOTE: The purge procedure for each of the porous panels is typical.

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Porous Panel Purge and Test.

(2) Remove external electrical power from the airplane.

(3) Make sure that the AVIONICS MASTER switch (SW04) is set to the OFF position.

(4) Make sure that the master BATT switches (left SW01 and right SW02) are set to the to the OFF position.

(5) Make sure that the Cross Tie switch (SW03) is set to the OFF position.

(6) Disengage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

(c) W/S ANTI-ICE.

(7) Attach a fluid collection system to the applicable panels on the airplane as follows:

(a) A gutter and bucket system for the wing and tail porous panels.

(b) A windshield spray collection method.

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(c) For the prop slinger, put one blade of the prop vertical and down with a bucket below.

NOTE: You can fabricate a fluid collector system, which will contain the fluid and keep it off the floor. Recommended materials you can use are plastic sheets, tubing, aluminum tape, and rigid aluminum and/or plastic gutter material.

(8) Remove the applicable panel(s) to get access to the porous panel supply line connected at the proportioning unit. Refer to Figure 503, Table 501, TKS Wing Proportioning Units (FIKI) - Removal/Installation, and TKS Tail Proportioning Unit (FIKI) - Removal/Installation.

Table 501. Proportioning Units

Porous Panel	Feed Line Proportioning Unit Location	Supply Line Size
Left Wing	Left Forward Cabin Floor Panel and/or Footwell	5/16 inch
Right Wing	Right Forward Cabin Floor Panel and/or Footwell	5/16 inch
Left and Right Horizontal Stabilizers	Aft Fuselage Access Panels (right and left)	5/16 inch
Vertical Stabilizer	Aft Fuselage Access Panels (right and left)	5/16 inch

(9) Identify the applicable porous panel supply line necessary to purge.

(a) Disconnect the applicable supply line from the proportioning unit.

(10) Connect the 5/16 inch outline from the test cart to the supply line tube.

(11) Attach a filtered shop air supply or nitrogen bottle to the inlet port of test cart.

(12) Follow the operation and safety instructions that are supplied with the test cart.

(a) Use the Panels Installed on Aircraft TKS Panel Test section of the TKS Ice Protection Panel Flow Check Procedure Using TKS System Test Cart publication.

(13) Monitor the fluid level in the test cart during the test.

(a) Make sure that there is sufficient fluid available in the test cart so that it is not completely depleted during the test.

NOTE: It is necessary for you to fill the cart at intervals during the panel purge procedure. Only fill the cart to 3/4 of its capacity to prevent air from entering the TKS porous panel.

(14) Slowly start the fluid flow through the panel at 10 psi.

(a) Monitor the system fittings for leaks.

1 Correct any leaks as necessary. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices.

(15) Set the supply pressure to 25 psi.

(16) As the fluid starts to come through the panel pores, increase the supply pressure 10 psi every 15 seconds until the TKS test cart pressure gage indicates 65 psi.

NOTE: It may not be necessary to reach 65 psi if the panel appears thoroughly purged. Refer to Figure 502.

(17) When fluid starts to flow from the panel pores along the entire length of the panel, inspect the flow distribution along the panel. Refer to Figure 502.

(18) Make sure that the fluid flows from the porous panels as follows:

(a) The fluid flows from the porous panels without any dry spots.

(b) The fluid flows evenly and not in streams.

(c) There are no areas with clusters of bubbles.

NOTE: The bubbles will be very small and continue to flow even after you wipe fluid across the area.

(19) Operate the TKS test cart for a maximum of 30 minutes.

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(20) Monitor the fluid level in the test cart during the test.

(a) Make sure that there is sufficient fluid available in the test cart so that it is not completely depleted during the test.

NOTE: It is necessary for you to fill the cart at intervals during the panel purge procedure. Only fill the cart to 3/4 of its capacity to prevent air from entering the TKS porous panel.

(21) Monitor the system fittings for leaks.

(a) Correct any leaks as necessary. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices.

(22) Stop the fluid supply.

(23) Wait until the fluid pressure is released.

(24) Slowly disconnect the test cart fluid supply tube from the panel supply line.

(25) Install a new sealing rings in the tube fitting. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201.

(26) Connect the panel supply line to the proportioning unit.

(a) Carefully tighten the tube fitting nuts. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

(27) Continue the test on each of the TKS porous panels until all necessary porous panels have been tested.

(28) If necessary, remove the fluid collector system from the airplane.

(29) Disconnect the filtered shop air supply from the inlet port of the test cart.

(30) Do the fluid tank servicing. Refer to Chapter 12, Replenishing - Servicing TKS Anti-Ice Fluid.

(31) Clean the floor and the airplane surfaces as necessary.

(32) Engage the circuit breakers that follow:

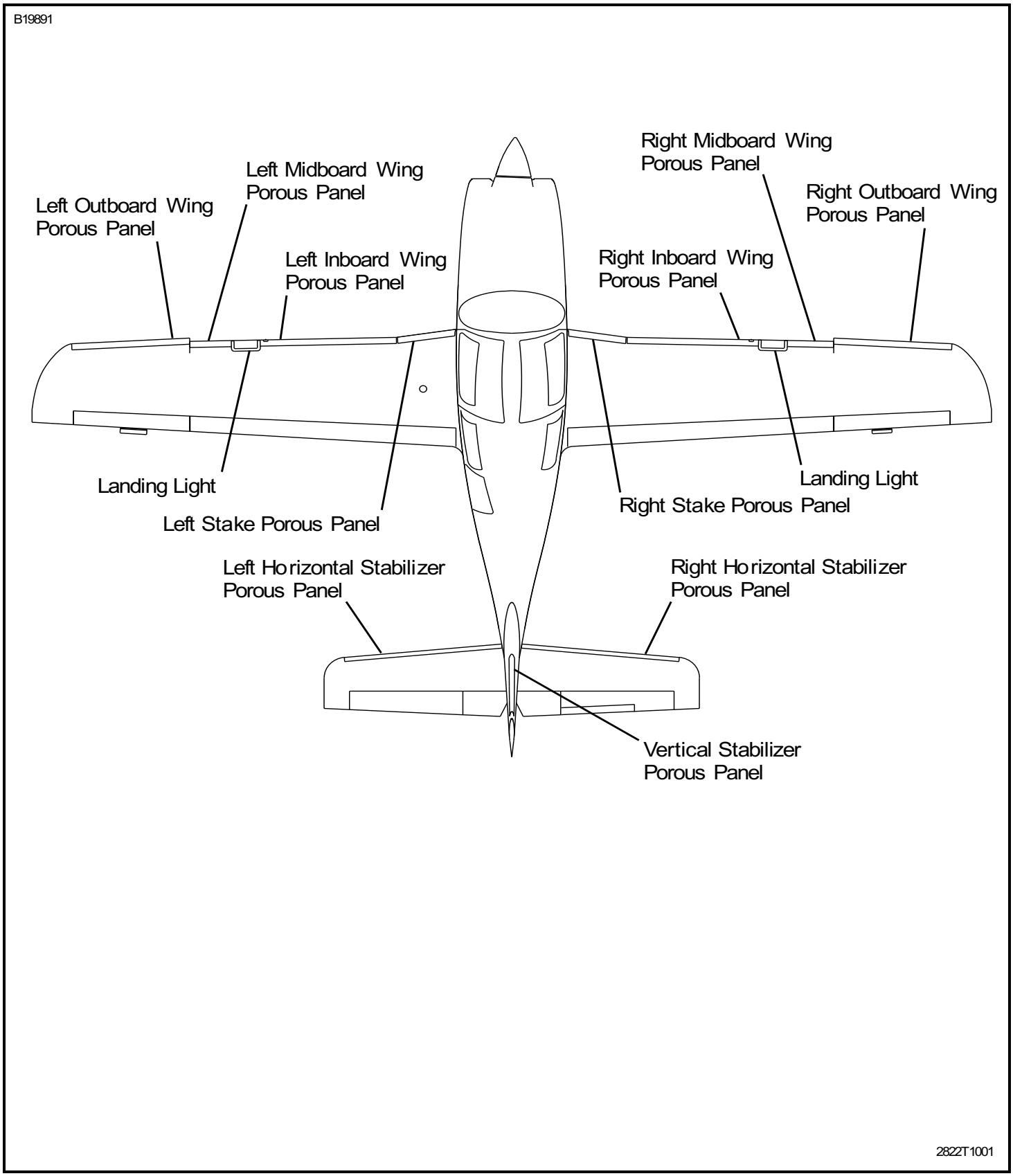
(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

(c) W/S ANTI-ICE.

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Figure 501 : Sheet 1 : Porous Panel Installation



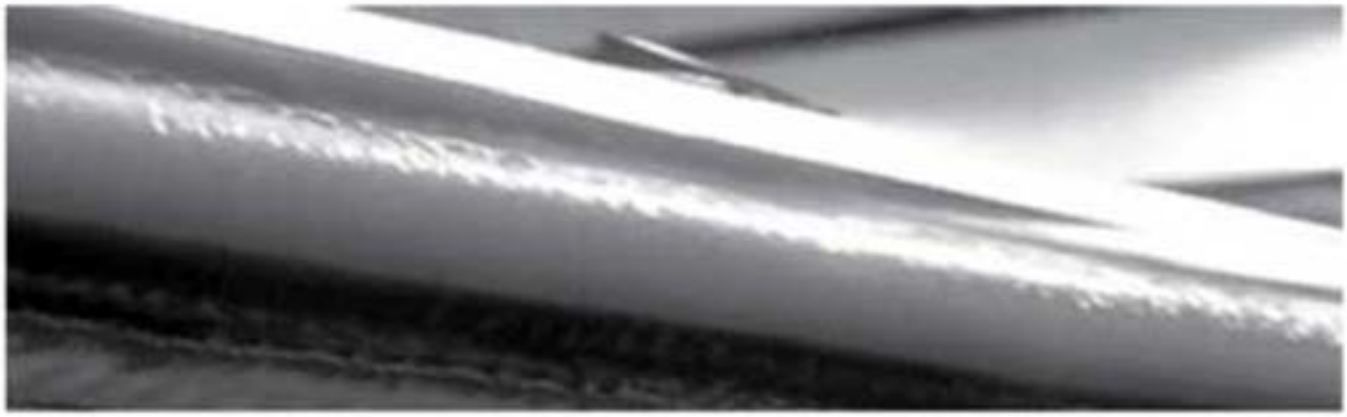
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Figure 502 : Sheet 1 : Leading Edge Porous Panel Purge

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Porous Panel Before Purging



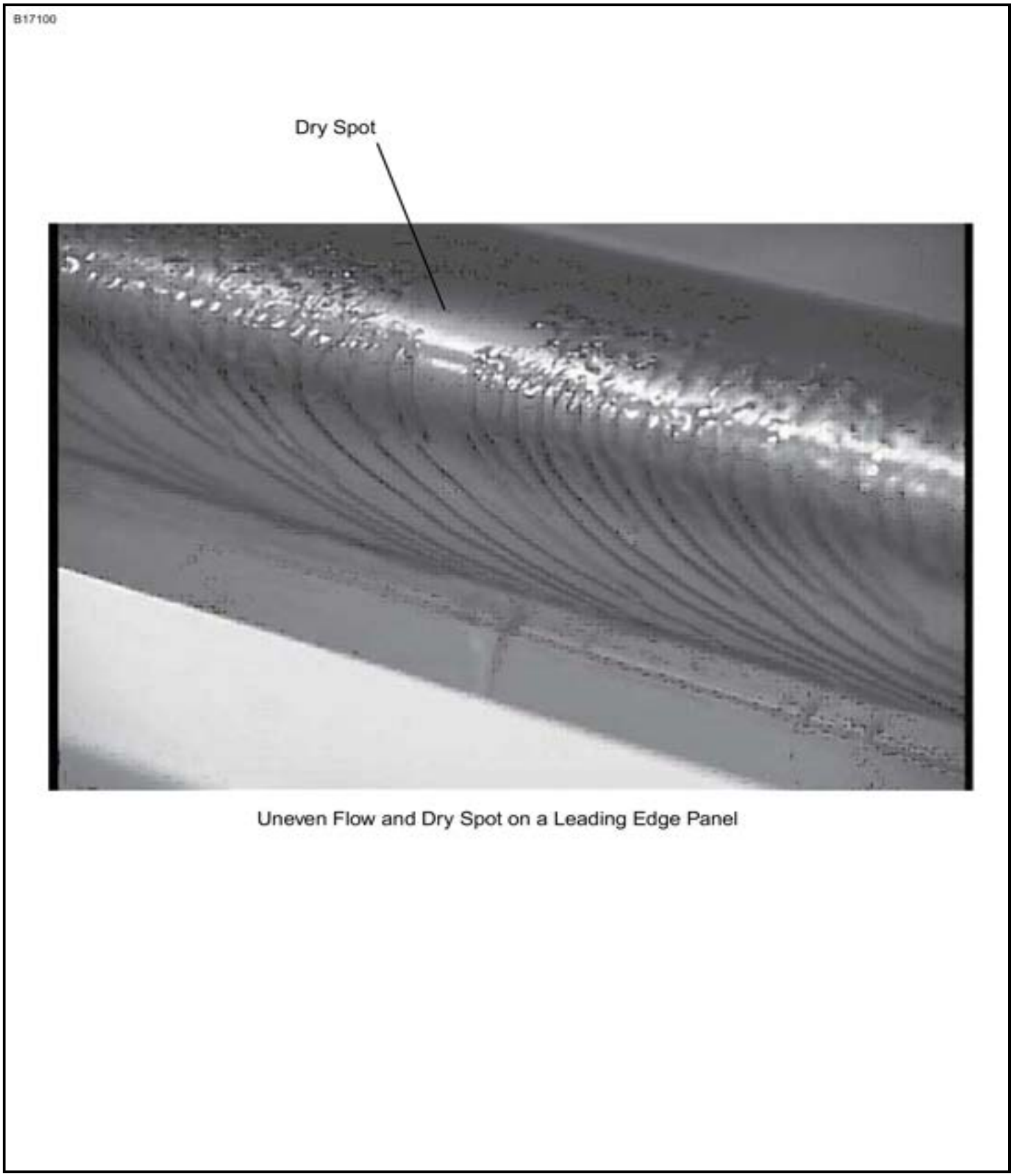
Porous Panel After Purging

NOTE 1: The porous panels have been purged correctly when the purge pressure has been applied and the statements that follow are true:

A. The fluid flows evenly and forms a continuous surface across the entire porous portion of the panel instead of flowing in streams, as shown.
B. There are no dry spots in the porous portion of the panel where fluid does not flow even after wiping fluid across the dry spot, as shown.
C. There are no areas in the porous portion of the panel where clusters of bubbles continue to come out while the rest of the panel is flowing evenly. These bubbles will be very small and will continue to come out even after you wipe fluid across the area.

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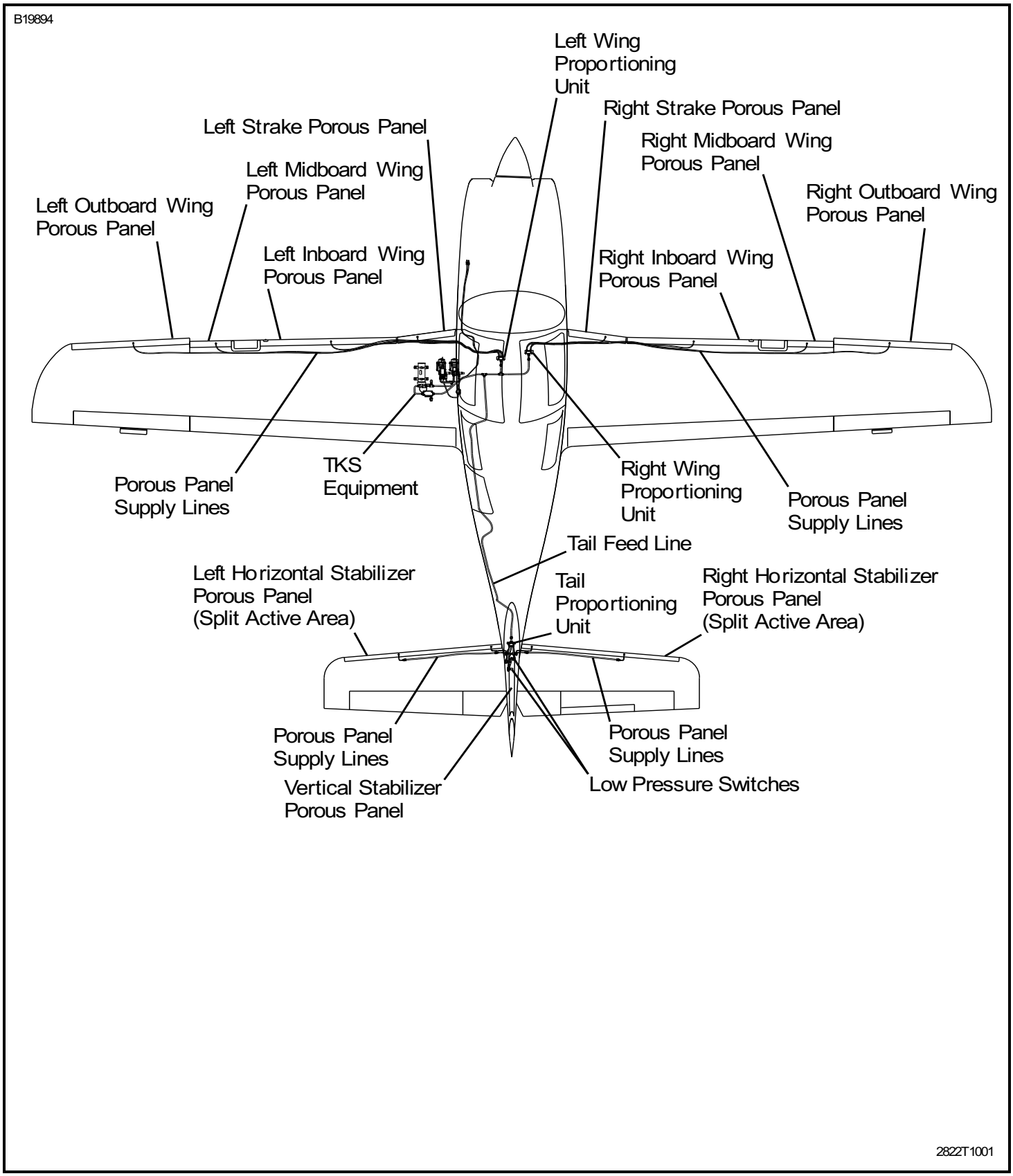
Figure 502 : Sheet 2 : Leading Edge Porous Panel Purge



Uneven Flow and Dry Spot on a Leading Edge Panel

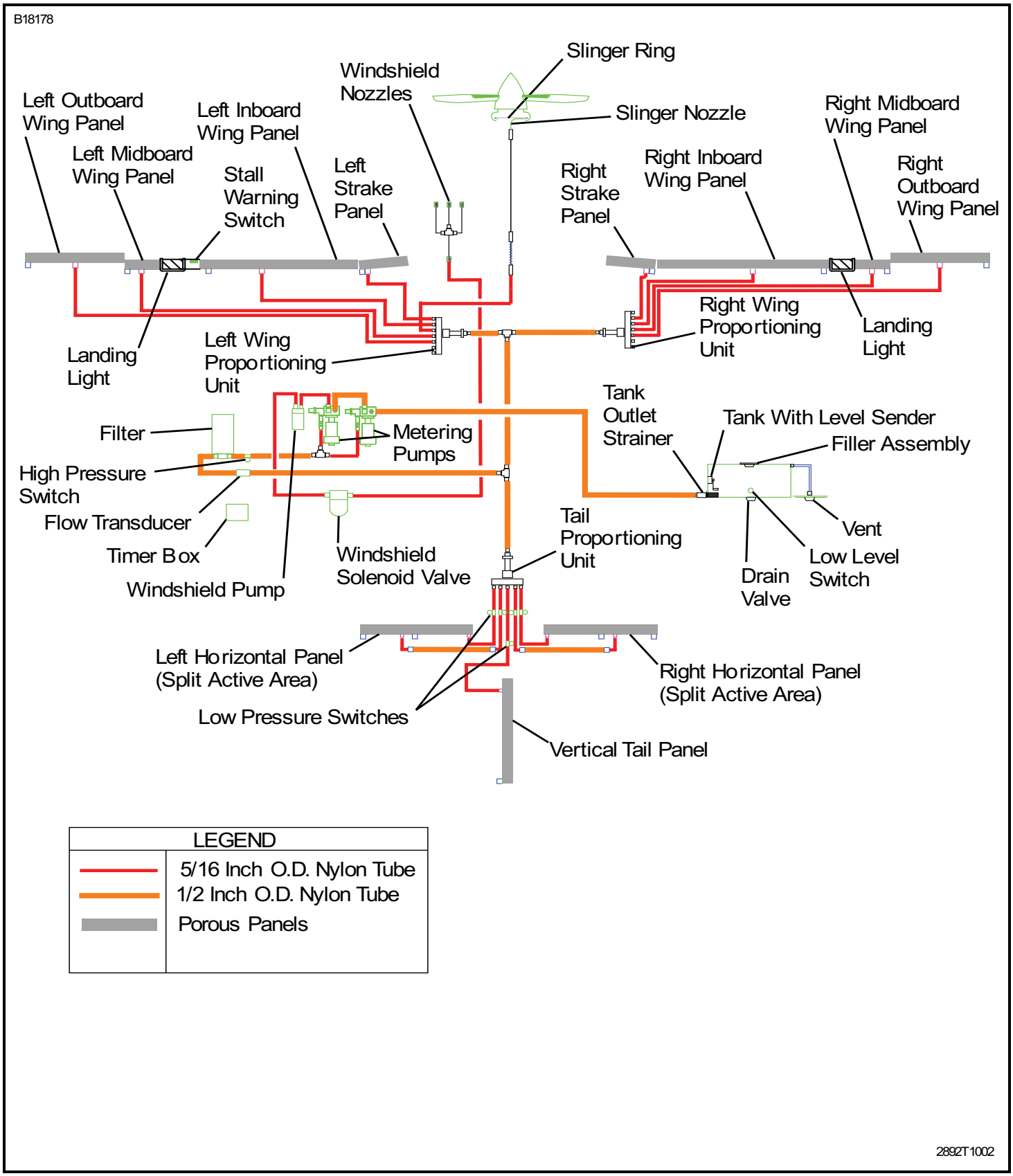
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Figure 503 : Sheet 1 : Porous Panel Plumbing



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Figure 201 : Sheet 1 : TKS Tubing Installation

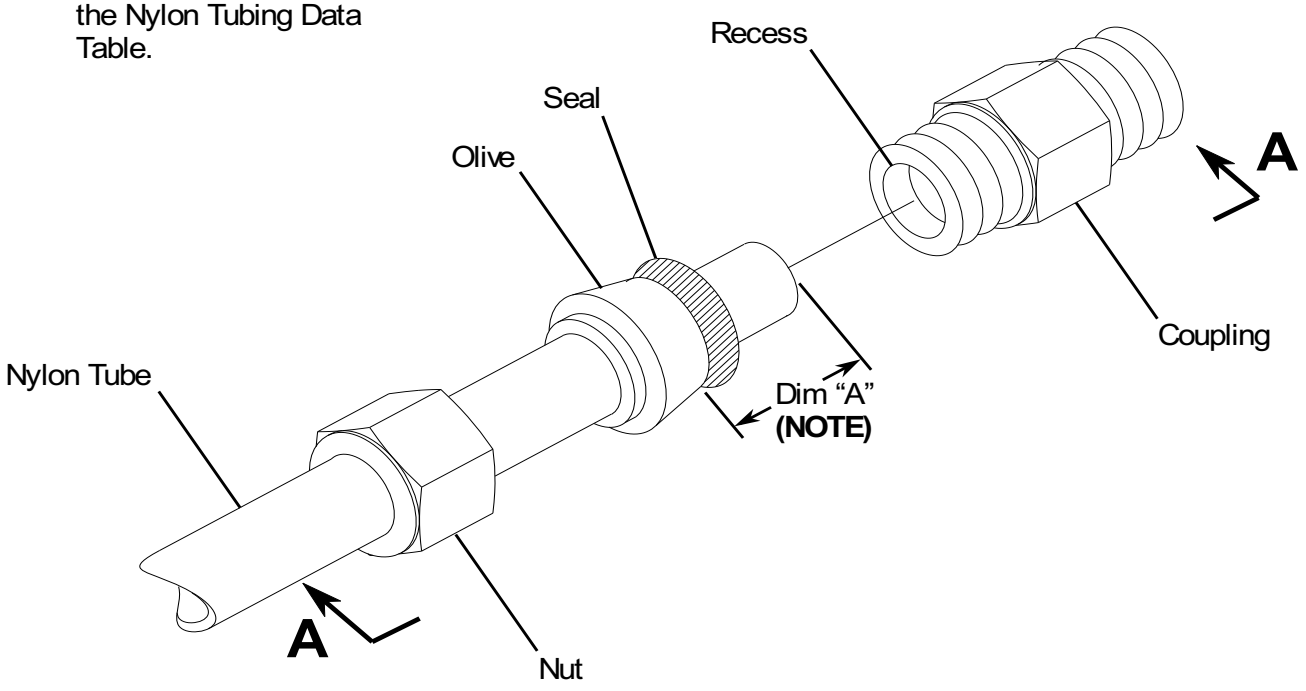


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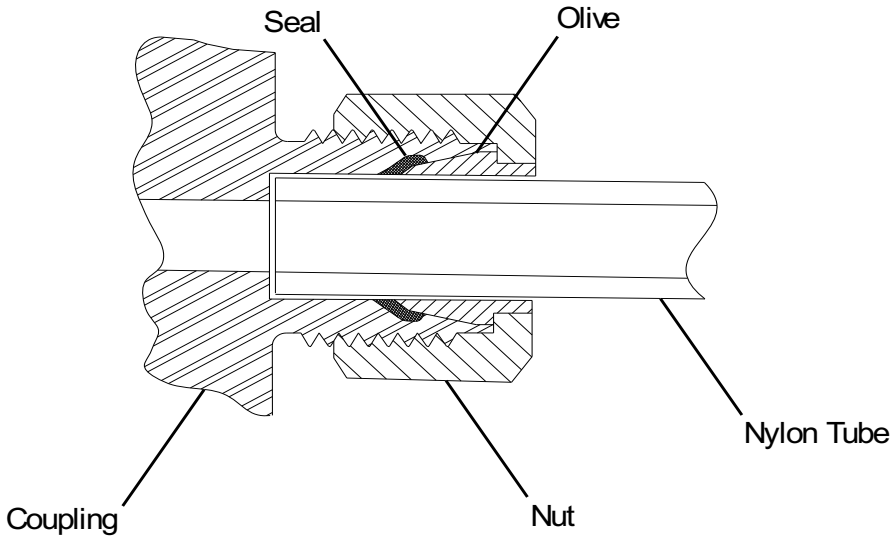
Figure 201 : Sheet 2 : TKS Tubing Installation

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NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)

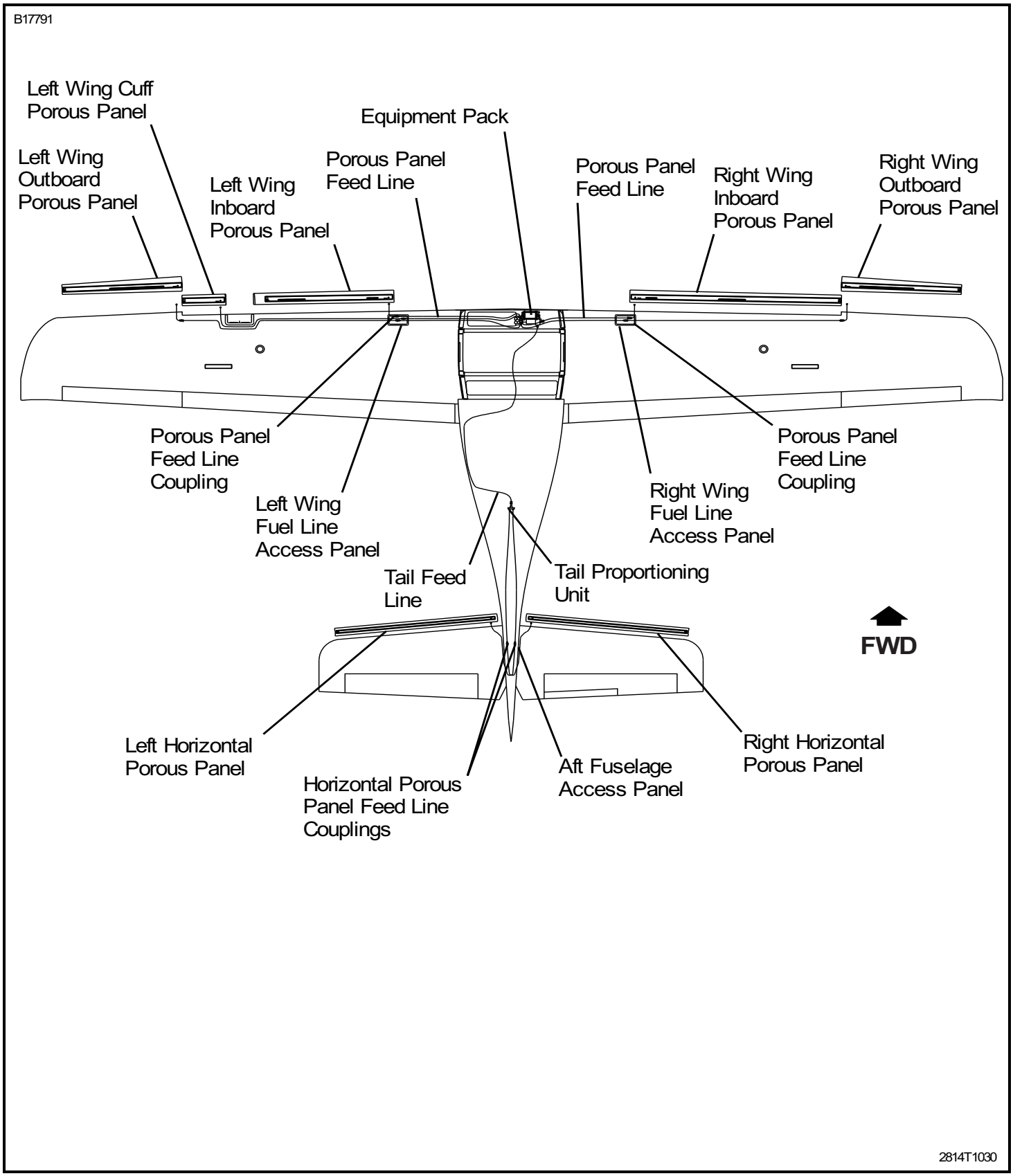


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Figure 503 : Sheet 1 : Porous Panel Couplings Locations



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TKS WINDSHIELD PUMP (FIKI) - REMOVAL/INSTALLATION

1. General

A. The Windshield Pump (UC103) is installed on the top of the Metering Pump 1 (UC101). The Metering Pump 1, Windshield Pump and metering pump bracket are usually removed from the airplane as an assembly. The procedures for the removal and installation of the windshield pump and Metering Pump 1 are very similar. Because the Windshield Pump maintenance procedures are similar, they are found in the same section as the Metering Pump 1 removal and installation procedures. Refer to TKS Anti-Ice System Metering Pump (FIKI) - Removal/Installation.

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TKS WINDSHIELD SOLENOID VALVE (FIKI) - REMOVAL/INSTALLATION

1. General

A. This section contains the removal and installation procedures for the TKS Windshield Solenoid Valve.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. Windshield Solenoid Valve Removal/Installation

WARNING: For health and environmental data, review the applicable Material Safety Data Sheet (MSDS).

WARNING: Before you disconnect components of the TKS anti-ice system, slowly loosen the nut that is connected to the component to be removed. It is possible there is still pressure in the system.

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Before you operate the TKS system during this procedure put plastic sheets or absorbent cloths under the porous panels to keep the TKS fluid off the floor. This will help to prevent injury to personnel.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

CAUTION: Do not use the seals again after you loosen or disconnect a tube nut. Replace the 5/16-inch sealing ring and/or 1/2-inch O-ring, as applicable, when you assemble a tube fitting. Examine the seal for damage and make sure that it is in the correct position in the fitting. Refer to TKS Anti-Ice System (Inadvertent) - Maintenance Practices, Figure 201. This will help to prevent fluid leakage from the fitting.

A. Remove the Windshield Solenoid Valve (WC100) (Refer to Figure 401).

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Windshield Solenoid Valve Removal/Installation.

(2) Remove external electrical power from the airplane.

(3) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(4) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(5) Disengage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

(c) W/S ANTI-ICE.

(6) Remove the TKS access panel on the lower surface of the left wing.

(7) Disconnect the electrical connector (JC106) from electrical connector (PC106).

(8) Remove the tube from the windshield solenoid valve input fitting as follows:

(a) Slowly loosen the nut and remove the input tube from the valve input fitting.

(b) Remove and discard the old seal from the input tube.

(c) Put caps on the open ends to keep FOD out of the fluid system and prevent excessive leakage of TKS fluid from the system.

NOTE: It is not necessary to install caps if you are to replace the windshield solenoid valve immediately.

(9) Remove the tubes from the windshield solenoid valve outlet fitting as follows:

(a) Slowly loosen and disconnect the outlet tube.

(b) Remove the outlet tube from the valve.

(c) Put caps on the open ends to keep FOD out of the fluid system and prevent excessive leakage of TKS fluid from the system.

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NOTE: It is not necessary to install caps if you are to replace the windshield solenoid valve immediately.

(d) Remove and discard the old seal from the outlet tubes.

(10) Remove the screws and washers that attach the valve to the wing rib.

(11) Remove the windshield solenoid valve from the airplane.

(12) Record the direction of the flow arrow marking on the valve.

B. Install the Windshield Solenoid Valve (WC100) (Refer to Figure 401).

(1) Make sure that you obey the Warnings and Cautions for TKS maintenance procedures. Refer to Windshield Solenoid Valve Removal/Installation.

(2) Put the solenoid valve in its correct position as recorded before on the wing rib.

(a) Make sure that the flow arrow marking on the valve is in the correct position.

(3) Install the screws and washers that attach the solenoid to the wing rib.

(4) Attach the input tube to the windshield solenoid valve as follows:

(a) If necessary, remove the caps from the open ends.

(b) Install new seal on the inlet tube. Refer to TKS Anti-Ice System - Maintenance Practices, Figure 201.

(c) Put the input tube in its correct position on the valve input fitting.

(d) Carefully tighten the tube fitting nuts. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

(5) Attach the outlet tubes to the windshield solenoid valve as follows:

(a) If necessary, remove the caps from the open ends.

(b) Install new seal on the outlet tube. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Figure 201.

(c) Put the outlet tube in the correct position on the outlet fitting of the valve.

(d) Carefully tighten the tube fitting nuts. Refer to TKS Anti-Ice System (FIKI) - Maintenance Practices, Table 202, Nylon Tubing Data.

(6) Connect the electrical connector (JC106) to the electrical connector (PC106).

(7) Engage the circuit breakers that follow:

(a) ANTI-ICE PUMP 1

(b) ANTI-ICE PUMP 2

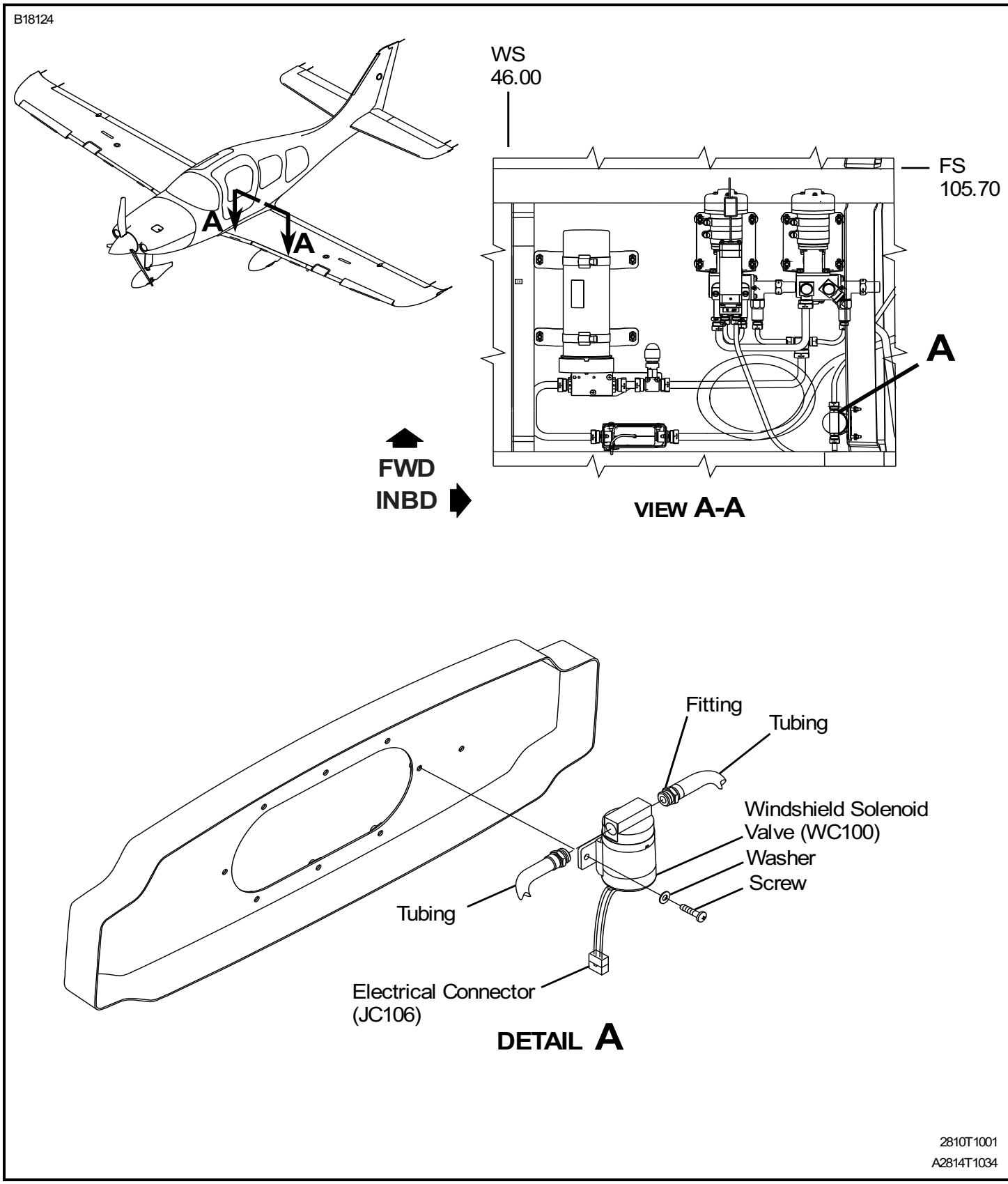
(c) W/S ANTI-ICE.

(8) Do a test of the TKS windshield spray function. Refer to TKS Anti-Ice System (FIKI) - Adjustment/Test.

(9) Install the TKS access panel on the lower surface of the left wing.

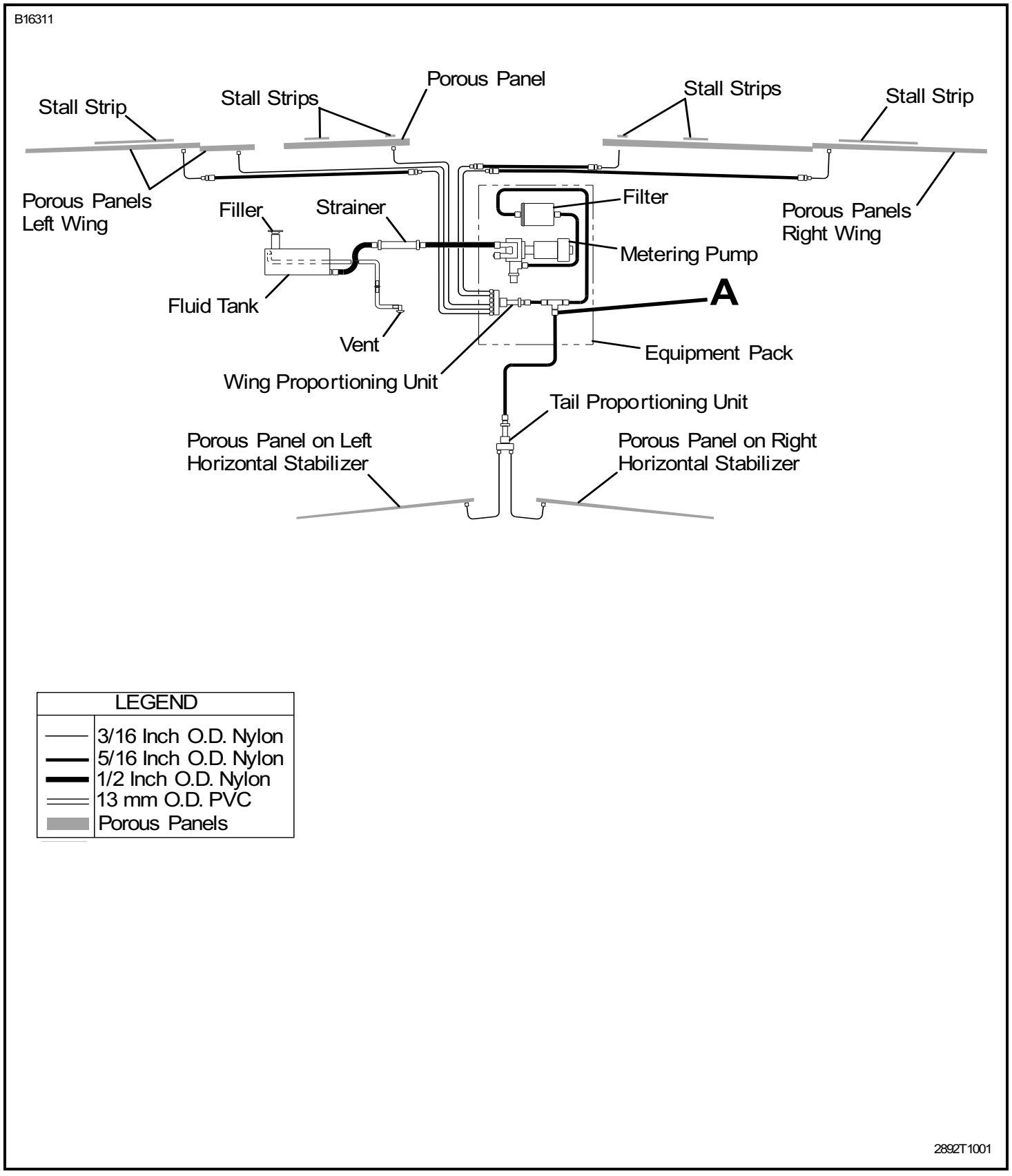
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Figure 401 : Sheet 1 : Windshield Solenoid Valve Installation



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Figure 201 : Sheet 1 : TKS Nylon Tubing Installation

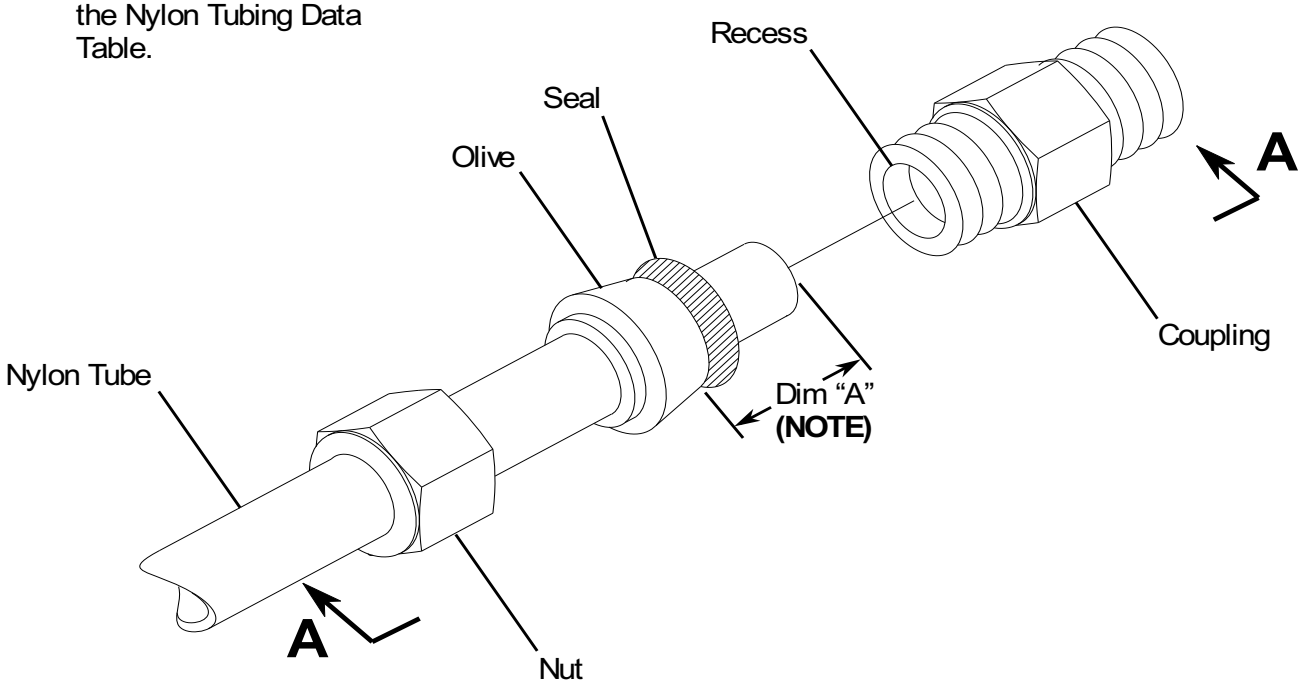


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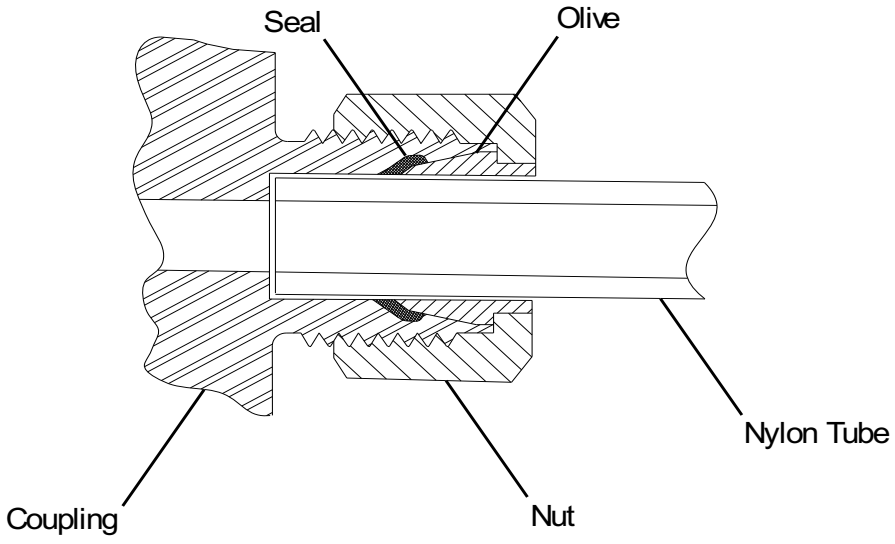
Figure 201 : Sheet 2 : TKS Nylon Tubing Installation

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NOTE: Dimension A, refer to the Nylon Tubing Data Table.



DETAIL A
(One tube connection shown, all similar)

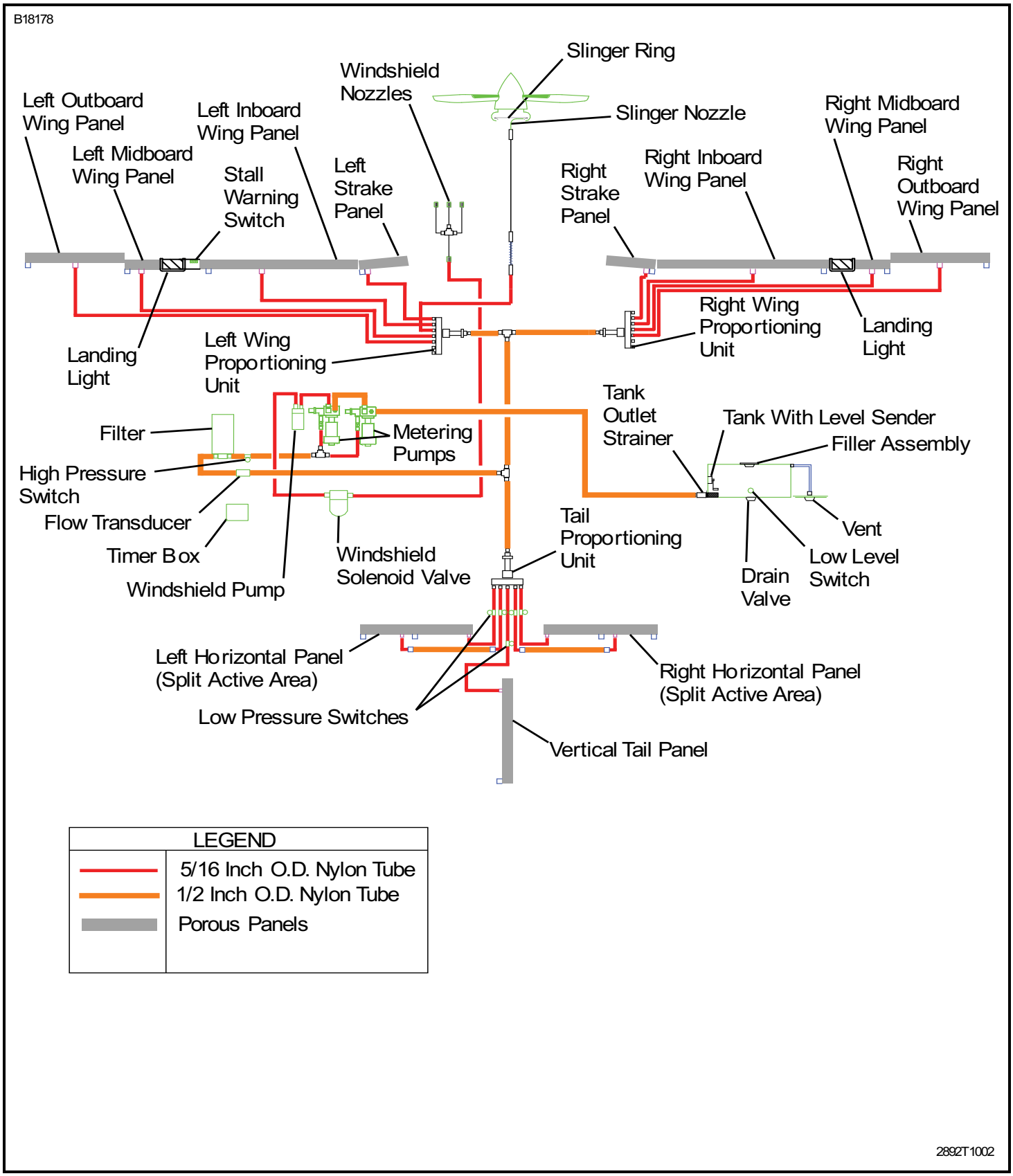


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Figure 201 : Sheet 1 : TKS Tubing Installation



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PROPELLER HEAT - MAINTENANCE PRACTICES

1. Brush Block

A. Brush Block Removal (Refer to Figure 201)

(1) Remove the top engine cowling. Refer to Chapter 71, Engine Cowling - Maintenance Practices.

(2) Remove two insulated terminal screws and star washers, and disconnect the brush leads from the insulated terminal of the brush block bracket.

(3) While holding the brush block, remove the two screws, washers, and spacers attaching the brush block to the brush block bracket.

(4) Slowly pull the brush block away from the slip ring to relieve pressure on the brushes.

(5) Remove the brush block, taking care not to damage the brushes.

B. Brush Block Installation (Refer to Figure 201)

(1) Press the brushes into the brush block.

CAUTION: Use care when handling the brushes. Skin oils may contaminate the brush material and reduce brush service life.

(2) With the brushes compressed into the brush block, wrap small tie straps around the brush block to hold the brushes in place. Refer to Figure 202.

(3) Attach the brush block to the brush block bracket using two AN-503-10-20 screws, AN960-10 or NAS1149F0363P washers, and Northcoast DI0029 spacers. Leave the attachment screws just loose enough to allow movement of the brush block assembly fore and aft with minimal effort.

(4) Attach the wire terminal ends for the top brushes to the forward insulated terminal screw and for the middle brushes to the middle insulated terminal screw. Refer to Figure 203. Place star washers under the head of the screws and tighten snug. The bottom brush leads are not used and should be coiled and secured using tie straps.

(5) Clean the slip rings using MPK, acetone, or spray degreaser.

(6) View the alignment of the brushes and the slip ring from the side. The brush should ride in the center of the slip ring. Refer to Figure 204. If alignment is necessary, install NAS1149F0316, NAS1149F0332, or NAS1149F0363 washers between the spacer and brush block to achieve correct alignment. Different thickness washers may be stacked together.

(7) Cut and discard the tie straps holding the brushes into the brush block to allow the brushes to contact the slip ring. Press the brush block up to the slip ring and tighten the mounting screws to allow the brush block to be adjusted with moderate force. Adjust the brush block so the left side has approximately 0.06 inch clearance and the right side has approximately 0.09 inch clearance when viewed from the front of the engine looking down. Refer to Figure 205. Tighten the mounting screws snug and secure with 0.032 safety wire per MS33540.

C. Brush Block Maintenance - Inspect the brush block during the 100 hour and/or annual inspections. There are no servicing requirements for the propeller de-ice system outside normal inspection intervals or during routine maintenance.

(1) Inspect for grease, fuel, oil, or carbon deposits on the brushes and brush block. Clean with methyl n-propyl ketone (MPK) or replace components if unable to be cleaned.

(2) Measure brush wear. Replace the brushes if wear exceeds 50 percent or if less than 5/16 inch of brush material remains.

(3) Inspect for uneven wear, chipping, or broken brushes. Replace components as necessary.

(4) Verify brush to slip ring alignment per the Brush Block Installation procedure above.

D. Brush Block Repair - The brushes are non-repairable and should be replaced if found to be defective.

2. Slip Ring

A. Slip Ring Removal

(1) Remove the upper and lower cowlings per Section 71-10-00, Engine Cowling.

(2) Remove the brush block per the Brush Block Removal procedure above.

(3) Remove the spinner, propeller, and left alternator drive pulley per Chapter 61.

(4) Remove the slip ring.

B. Slip Ring Installation

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(1) Place the slip ring on the engine crankshaft flange.

(2) Install the left alternator drive pulley, propeller and spinner per Chapter 61.

C. Slip Ring Maintenance

(1) Clean the slip ring with MPK or other suitable solvent.

(2) Visually inspect the slip ring for excessive wear, grooves, rough surfaces, cracks, burned or discolored areas, and oil or dirt deposits. Inspect for any debonding of the copper rings from the slip ring plate.

(a) If uneven wear or wobble is noted, verify that slip ring run-out is less than 0.005 inches.

(b) Grooves should be less than 0.007 inches deep.

(c) Small defects can be removed with crocus cloth. The rings should have a minimum 32-microinch finish.

D. Slip Ring Repair - The slip ring can be machined to achieve run out and surface finish requirements. The minimum slip ring total thickness is 0.437 in. The maximum allowable slip ring run out is 0.005 inches. Surface finish should be 32 microinches or less.

CAUTION: Excessive heat build-up during machining can cause the copper ring to delaminate from the epoxy. Use appropriate cutting fluid and feed rates to minimize heat build-up during any machining operation on the slip rings.

3. Brush Block Bracket

A. Brush Block Bracket Removal (Refer to Figure 201.)

(1) Remove the top engine cowling per Section 71-10-00, Engine Cowling.

(2) Remove the No. 2 (left) alternator per the instructions in Section 24-30-00, No. 2 Alternator Removal.

(3) Remove the brush block per the Brush Block Removal procedure above.

(4) Remove the two AN5-24 bolts, two MS21042L-5 nuts, four AN960-516 washers, and four Northcoast DI-00030 spacers attaching the No. 2 (left) alternator bracket and brush block bracket to the crankcase. Refer to Figure 201.

(5) Remove the bracket.

B. Brush Block Bracket Installation (Refer to Figure 201.)

(1) Install the brush block bracket and No. 2 (left) alternator bracket using two AN5-24 bolts, two MS21042L-5 nuts, four AN960-516 washers, and four Northcoast DI-00030 spacers

(2) Torque nuts 180 to 220 in.-lbs.

(3) Install the brush block per the Brush Block Installation procedure.

(4) Install the No. 2 (left) alternator per instructions in Section 24-30-00, No. 2 Alternator Installation.

(5) Install the top engine cowling per Section 71-10-00, Engine Cowling.

C. Brush Block Bracket Maintenance - Inspect the brush block bracket for cracks during the 100 hr and/or annual inspections. If cracks are present, replace the bracket. There are no servicing requirements for the propeller de-ice system outside normal inspection intervals or during routine maintenance.

4. Propeller Heater Boot (Hartzell Propeller)

A. Propeller heater boots installed on the aircraft are manufactured by SMR Technologies Inc. or Hartzell Propeller Inc. If you are uncertain of the manufacturer of the propeller heater boots installed, contact Cessna Aircraft Company for guidance.
Remove and install propeller heater boots per instructions in the latest revision of SMR Technologies Report SMR-97-33-013, *Propeller De-Icer Installation and Maintenance Manual*, or Hartzell Propeller Manual 182 (61-12-82), *Propeller Electrical De-ice Boot Removal and Installation Manual*, as applicable.
Repair or service propeller heater boots per instructions in the latest revision of SMR Technologies Report SMR-97-33-013, *Propeller De-Icer Installation and Maintenance Manual*, or Hartzell Propeller Manual 181 (30-60-81), *Propeller Ice Protection System Component Maintenance Manual*, as applicable.
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Administrative Assistant
One Propeller Place
Piqua, OH 45356-2634
Phone: 937.778.4200
Fax: 937.778.4391
Web: www.hartzellprop.com

(1) Heater Boot Removal (Refer to Figure 206 or Figure 207)

(a) Remove the propeller spinner per instructions in Chapter 61.

(b) Remove the cowling per instructions per Section 71-10-00, Engine Cowling.

(c) Remove the propeller heater boots per the latest revision of SMR Technologies Report SMR-97-33-013 or Hartzell Propeller Manual 182 (61-12-82), as applicable. Make a record of lead wire routing and attachment hardware for reinstallation.

(2) Heater Boot Installation (Refer to Figure 206 or Figure 207)

(a) Inspect the heater boot leads for proper resistance. Resistance must measure 1.56 to 1.72 ohms (14 V) or 4.7 to 4.9 ohms (28 V) at 77±5° F.

(b) Inspect the individual components for damage prior to installation.

(c) Install the propeller heater boots per the latest revision of SMR Technologies Report SMR-97-33-013 or Hartzell Propeller Manual 182 (61-12-82), as applicable.

(d) Ensure the SMR boots are positioned so the heat zone is located 1.7±0.06 inches from the edge of the propeller hub; this will place the edge of the boot approximately 1.25 inches from the edge of the propeller hub. Ensure the Hartzell boots are positioned so the edge of the boot is 1.25 inches from the edge of the propeller hub.

(e) Route and attach the heater boot leads.

1 SMR Boots

a Route the heater boot leads between the propeller hub and the inside diameter edge of the spinner bulkhead.

b Loosely install the lead clamps using screws, washers, and nuts over the heater boot leads and onto the forward side of the spinner bulkhead.

c To relieve tension caused by centrifugal force, gently pull the heater boot leads up thought the lead clamps far enough that the lead rests against the inside surface of the spinner dome. Tighten the clamp hardware 20 to 25 in.-lb. to secure the leads.

2 Hartzell Boots

a Route the heater boot leads between the propeller hub and the spinner bulkhead. Do not twist the boot lead wires or allow them to be twisted.

b Loosely install the loop clamps using screws, washers, and self-locking nuts.

c To relieve tension caused by centrifugal force, gently pull the heater boot leads up thought the loop clamps far enough that the lead rests against the inside surface of the spinner dome. Tighten the clamp hardware 22 to 25 in.-lbs. to secure the leads.

d Attach the slip ring wire harness to the spinner bulkhead using bushings, washers, screws, and self-locking nuts. If a self-locking nut configuration is not already present for attaching the boot leads to the spinner bulkhead, replace the top terminal nut with an MS21083C06 self-locking nut; replace the screw with a Hartzell screw (P/N B7035-14) as necessary to provide two thread protrusion through the self-locking nut. Orient wire terminals at the spinner bulkhead at a normal (perpendicular) angle to the spinner dome. Refer to Figure 207. Torque nut 10 to 12 in-lbs.

CAUTION: Do not bend or damage the heater leads.

(f) Connect the terminal ends of the propeller boot leads to the slip ring terminals with 6-32 washers and nuts. Refer to Figure 208. For each heater lead use the two outer terminals only. The inner terminal is not used. Torque the retaining nuts 10 to 12 in.-lb.

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(g) Verify that propeller pitch change over the allowable range will not cause binding or stress on the heater leads.

(h) Install large tie straps over the three heater boot leads and around the propeller hub. Refer to Figure 209. Tighten the straps snug. Forward tie strap should be as far forward as possible. Offset the ends of the tie straps 180 degrees to minimize any imbalance.

(i) Install the cowling per Section 71-10-00, Engine Cowling.

(j) Install the propeller spinner per Chapter 61.

(3) Heater Boot Maintenance - Inspect the heater boots during the 100 hour and/or annual inspections. There are no servicing requirements for the propeller de-ice system outside normal inspection intervals or during routine maintenance.

(a) Visually inspect the heater boots for wrinkles, loose or torn areas, and/or abrasions or cuts along the leading edge and on the thrust face (flat) of the propeller blades.

(b) Inspect the boot leads for signs of abrasion or damage. Inspect the lead clamps for tightness.

(c) Test the resistance of the heater boot elements. Disconnect the boot leads from the slip ring terminals. Place an ohmmeter across the boot leads. The ohmmeter should indicate 1.56 to 1.72 ohms (14 V) or 4.7 to 4.9 ohms (28 V) of resistance at 77±5° F. If the reading is not in this range replace the heater boot.

(4) Heater Boot Repair - The heater boots should be serviced and repaired per SMR Technologies Report No. 97-33-013 or Hartzell Propeller Manual 181 (30-60-81), as applicable.

5. Deice Boot Removal/Installation (McCauley Propeller)

A. Remove the deice boot.

(1) Remove external electrical power from the airplane.

(2) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(3) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(4) Remove the propeller spinner in accordance with the applicable steps in Chapter 61, Spinner and Propeller Removal and Installation.

(5) Remove the cowling in accordance with the applicable steps in Section 71-10-00, Engine Cowling - Maintenance Practices.

(6) Identify and attach tags to the wire harness electrical leads (I) and (G) on the slip ring. Refer to Figure 210.

(a) Disconnect the electrical leads.

(7) Remove the deice boot. Refer to the McCauley Electrothermal De-Ice Systems, Service, Parts, and Installation Manual found in the Supplier Publication List.

B. Install the deice boot. Refer to Figure 210.

CAUTION: The condition of the propeller blades and the deice boot installation must comply with applicable FAA regulations. Inspect each propeller blade prior to deice boot installation for any delamination, cracks, dents, or nicks. If any defects are found, the blade must be repaired by an FAA approved Part 145 Propeller Repair Station or international equivalent by personnel trained to repair McCauley composite propeller components prior to the installation of the deice boot. Check resistance of each heating element before installation of the deice boot. Refer to Table 202 for deice boot resistance values.

(1) Install the deice boot. Refer to the McCauley Electrothermal De-Ice Systems, Service, Parts, and Installation Manual, found in the Supplier Publication List.

(a) All deice boots on a single propeller must be located the same distance from the center line of the propeller for rotational balance. The ("Y") dimension for the location of the deice boot is given in Table 201 and shown in Figure 211.

(b) The integral strap deice boots uses a separate rubber restrainer strap at the inboard end of the boot to prevent loosening of the deice boot bond when centrifugal force acts on the lead strap. The procedure for installing the restrainer strap is given in Figure 211. The ("X") dimension for locating the restrainer strap is given in Table 201. The ("Y") dimension for location of integral strap type deice boots is given in Table 201 and shown in Figure 211.

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Table 201. Aircraft and System Identification and Information

Aircraft Make and Model No.	Normal Total Nominal Power (Watts)*	Dim "Y" See Note 1	Dim "X" See Note 1	McCauley Propeller Model No.	Notes
T240 Corvalis	120	0.562 to 0.688 Inch (14.27 to 17.48 mm)	0.375 Inch (9.53 mm) minimum.	D3A34C447	3 blade prop, integral leads, single engine, single element.
* Based on 24 to 28 VDC at deice boot leads.					
NOTE 1: Deice Boot Restrainer Strap Location Dimension "X" (Inches) and Deice Boot Location "Y" (Inches). See Figure 211.					
NOTE 2: Many McCauley propellers are provided to the aircraft manufacturer without the deice boots installed. In cases where the aircraft manufacturer installs the deice boots, or where non-McCauley deice boots are used, the appropriate aircraft manufacturer's service manual must be consulted for all installation information.					

(2) Check the electrical resistance between the boot electrical leads. Refer to Table 202 for deice boot resistance values.

Table 202. Deice Boot Resistance Values

McCauley Deice Boot Part No.	RESISTANCE VALUES (ohms)	
	Boot Ea. Element (Note 1)	
	Max.	Min.
B-40245-60	1.26	1.14
If the propeller is installed on an aircraft, the propeller deice circuits must be electrically isolated from the rest of the aircraft wiring when making the above resistance check.		
NOTE 1: Remove the deice boot leads from the slip ring terminals.		
Compare with the above table for minimum and maximum values in ohms between the common ground and the other terminal of the deice boot lead. Reinstall the deice boot leads in accordance with the airplane service or maintenance manual instructions.		

(3) Check for intermittent open circuits by tensioning the deice boot leads and/or strap slightly while measuring resistance.

(a) Press lightly on the entire deice boot heating element surface and in the area adjacent to leads.

1 The resistance must not fluctuate.

NOTE: This check is important because an intermittent open circuit may not show up until the propeller is rotating.

(4) Install the wire harness (lead straps) (Integral Lead Type Boot).

(a) Route the lead straps taking care not to twist the strap.

(b) Use the provided clamps to attach the lead straps to the spinner bulkhead.

NOTE: All excess strap length should fall between this clamp and the deice boot. Refer to Figure 210.

(c) Route the lead straps through the spinner bulkhead.

NOTE: A rubber grommet is to be used where the strap is routed through the spinner bulkhead.

CAUTION: Do not bend or damage the heater leads.

(5) Identify and connect the wire harness electrical leads (I) and (G) to the slip ring. Refer to Figure 210.

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NOTE: The leads attach to the outer two slip ring terminals. The inner terminal is not used.

(a) Torque the nuts from 10 to 12 inch pounds.

(6) After the installation of the wire harness is complete, make sure that the length is sufficient so as not to be placed in tension when the propeller is moved through full pitch range.

(7) Install two large tie straps around the propeller hub. Refer to Figure 210.

(a) Offset the ends of the tie straps 180 degrees to minimize any imbalance.

(8) Install the propeller spinner in accordance with the applicable steps in Chapter 61, Spinner and Propeller - Maintenance Practices, Spinner and Propeller Removal and Installation.

(9) Install the cowling in accordance with the applicable steps in Section 71-10-00, Engine Cowling - Maintenance Practices.

6. Control Module

A. The control module is located in one of four places. If Avidyne avionics are installed the control module is attached to the standby battery bracket or to the right side instrument panel brace. If the Garmin G1000 system is installed, the control module is located behind the instrument panel on the right hand side.

(1) Control Module Maintenance - Inspect the control module during the 100 hr and/or annual inspections. There are no servicing requirements for the propeller de-ice system outside normal inspection intervals or during routine maintenance. The propeller de-ice system has a high current draw; use ground power or start the engine.

(a) With aircraft power on, actuate the propeller de-ice system by pressing the de-ice control switch. Verify the power on self test performs correctly.

1 When the Propeller de-ice control switch is powered on, the 'ON' and 'FAIL' annunciators will illuminate for one second and extinguish for one second. The on-off cycle will repeat during the six second self test. After the self test is completed the 'PROP' and 'ON' annunciators will illuminate steady for 30 seconds, indicating the DEICE is in the ON cycle. The 'Prop' annunciator will remain illuminated whenever the Propeller De-Ice Control Switch is powered on.

(b) Inspect attachment of the control module to the support bracket for loose hardware.

(c) Inspect the wiring for damage or abrasion.

(2) Control Module Repair - The control module is non-repairable and should be replaced if found to be defective.

B. For the Model T240 prop timer (control module) maintenance procedures refer to Prop Heater Timer (T240).

C. Control Module (Avidyne Option) (Refer to Figure 212 or Figure 213).

(1) Removal of the Control Module.

(a) Remove the co-pilot's side kidney panel per Chapter 25.

(b) Disconnect the cabling to the control module.

(c) Remove two screws, washers, and nuts attaching the control module to the mounting bracket.

(2) Installation of the Control Module.

(a) Installation is the direct reverse of removal.

D. Removal of the Control Module (Garmin G1000 Option). (Refer to Figure 214).

(1) Remove the glare shield per Chapter 25.

(2) Disconnect the cabling to the control module.

(3) Remove two 8-32 pan head screws attaching the control module to the mounting bracket.

(4) Installation of the Control Module (Garmin G1000 Option).

(a) Installation is the direct reverse of removal.

7. Testing

A. Before testing, assure that all electrical connections are secure and the propeller has been reinstalled.
When the Prop De-Ice Control Switch is powered on, the Prop De-Ice Control Module will perform a self-test. The 'ON' and 'FAIL' annunciators will illuminate for one second and extinguish for one second during a six second cycle. The 'PROP DE-ICE' annunciator will remain illuminated whenever the Prop De-Ice Control Switch is powered on.
Cycle testing should be performed with the cowling and spinner installed and the engine running.

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CAUTION: Do not run the engine with the spinner removed. Damage to the propeller boot leads will occur.

(1) Ground Test - The ground test is best accomplished with two persons. One person actuates the system from the cockpit and the second person verifies heater output at the propeller.

(a) Basic Operation Test - The Basic Operation Test verifies the general electrical connections.

1 Connect a source of external power to the aircraft.

2 Power the right bus

3 Actuate the prop de-ice switch, and wait for the controller set test to complete.

4 Assure the 'ON' annunciator is illuminated.

CAUTION: The propeller boot heaters will become extremely hot during operation. Exercise care when touching the propeller boots or adjacent areas.

5 Verify the three propeller de-icers are generating heat by carefully touching the boots.

6 After the system is verified to be heating, deactivate the prop de-ice switch.

CAUTION: Do not operate the Propeller De-Ice system for longer than 60 seconds without the propeller rotation. It will overheat and cause damage to the de-icing boots.

(b) Cycle Time Test - Perform the Ground Cycle Test with the engine running to allow for proper cooling of the propeller boots. When the pilot presses the propeller de-ice switch, the prop de-ice system will perform a self-test for six seconds. After the self-test is completed the 'PROP' and 'ON' annunciators will illuminate steady for 30 seconds, indicating the propeller deice system is in the ON cycle. After 30 seconds the propeller de-ice 'ON' annunciator well flash, indicating the propeller de-ice is in the OFF cycle. Propeller de-ice 'ON' will continue to cycle 30 seconds steady state, and 30 seconds flashing until the pilot de-selects the propeller de-ice switch.

1 Actuate the propeller de-ice switch and wait for the controller self test to complete.

2 The 'ON' annunciator should remain steady for 30 seconds. Time the ON portion of the cycle with a stopwatch.

CAUTION: The propeller boot heaters will become extremely hot during operation. Exercise care when touching the propeller boots or adjacent areas.

3 When the 'ON' annunciator begins to flash, the system is in the OFF portion of the cycle. Time this portion of the cycle with a stopwatch. The time should be 30 seconds. Verify the three propeller boots are cooling off by carefully touching the boots.

4 Repeat the cycle time test to verify consistent cycle times.

(c) Fault Indications - The Troubleshooting paragraph of this chapter charts the fault indications along with probable causes and remedies.

1 The 'FAIL' light and the 'ON' light illuminate at the same time during the test - This situation indicates the Propeller De-Ice system is drawing less than 18 amps. Check for loose or open circuits, or heater or brush failure.

2 The 'FAIL' light illuminates and the 'ON' light extinguishes during the test - This situation indicates the current draw is too high, above 30 amps. If this condition occurs, check for a short to ground in or around the brushes or power leads. Another cause could be a faulty propeller de-ice system control module, or no or low power at the bus terminal of the control module.

NOTE: The propeller heaters will be hotter at the root than at the outboard section; this is normal due to varying watt density in the heating element and is not cause for concern.

(2) In-Flight Testing - It is recommended that the propeller de-ice system be operated during flight periodically to test the system. It is suggested that the system be turned off when not needed or when clearing the runway after landing. The propeller de-ice system may be activated prior to take off. Assure that the current draw is between 19 and 25 amps.

(a) Actuate the propeller de-ice switch and wait for the controller self test to complete.

(b) The 'ON' annunciator should remain steady for 90 seconds. Time the ON portion of the cycle with a stopwatch.

CAUTION: The propeller boot heaters will become extremely hot during operation. Exercise care when touching the propeller boots or adjacent areas.

(c) When the 'ON' annunciator begins to flash, the system is in the OFF portion of the cycle. Time this portion of the

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cycle with a stopwatch. The time should be 90 seconds. Verify the three propeller boots are cooling off by carefully touching the boots.

(d) Repeat the cycle time test several times to verify consistent cycle times.

8. Propeller Heat/De-Ice - Troubleshooting

Table 203. Propeller Heat/De-Ice - Troubleshooting Chart

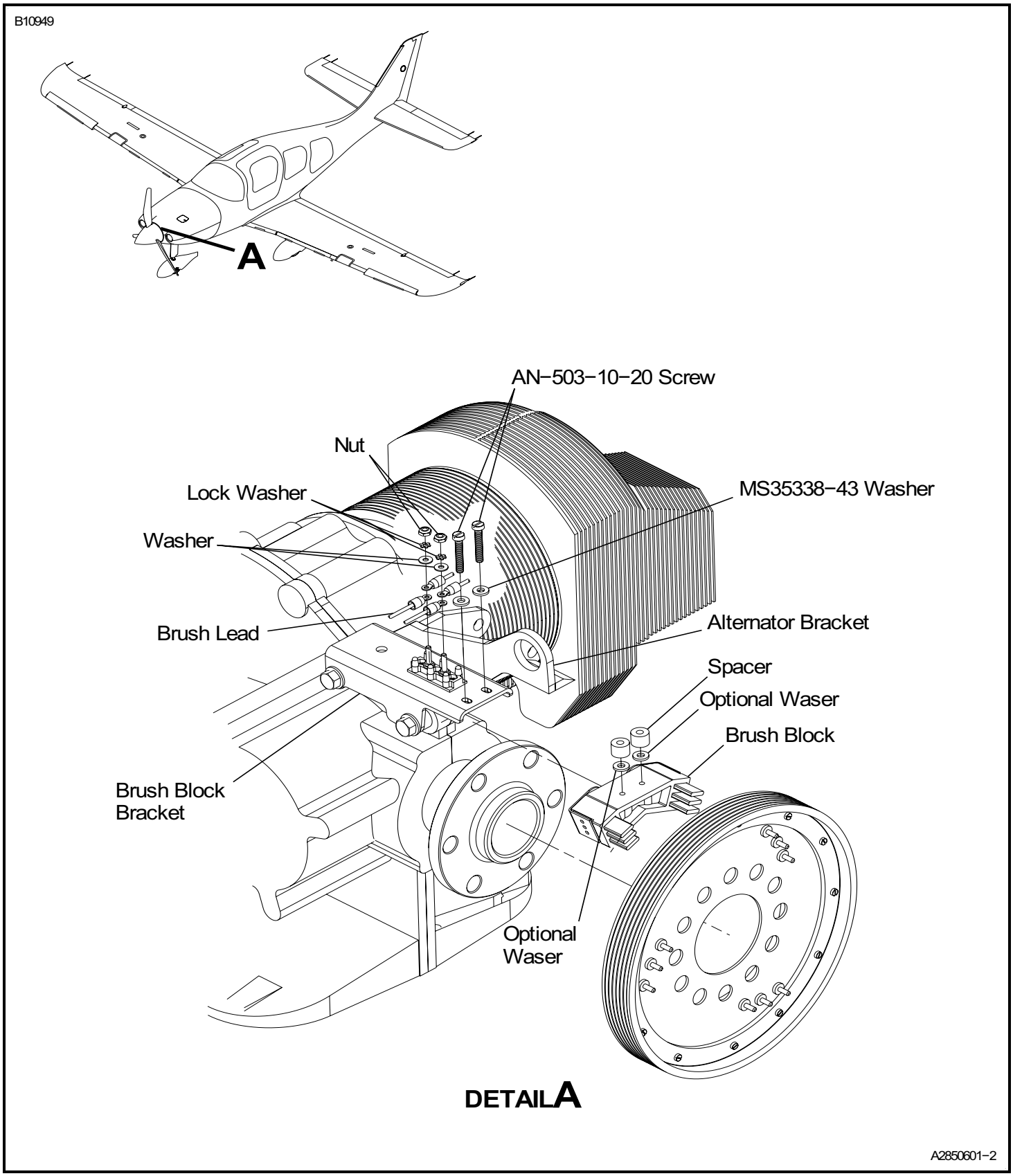
Annunciator Lights	Trouble Indication	Probable Cause	Inspection	Remedy
ON - Steady On FAIL - Steady On	Low Current Draw (Under 18 A)	Heater boot open.	Electrically isolate each boot and check for continuity.	Replace boot if internal open.
				Tighten boot electrical connection at slip ring terminal.
		Brush failure.	Inspect brushes for condition and proper contact with slip ring.	Replace brushes.
				Align brushes.
		Open in power wiring.	Inspect wiring to verify condition. Inspect all connections for tightness.	Repair wiring as necessary. Tighten all connections.
ON - Off FAIL - Steady On	High Current Draw (Over 30 A)	Short to ground in power wiring.	Inspect wiring for shorts. Inspect all connections for tightness.	Repair wiring as necessary. Tighten all connections.
		Short to ground at brush block.	Inspect brushes for condition and short to ground	Replace brushes.
				Align brushes.
		Short between slip ring commutators.	Inspect slip ring assembly to verify electrical isolation	Replace slip ring assembly
	Low Voltage at Control Module	Loose connection at fuse or Control Module	Inspect wiring to verify condition. Inspect all connections for tightness.	Repair wiring as necessary. Tighten all connections.
		Faulty control module.	Test control module.	Replace control module.
ON - Off	Radio Noise or interference when the De-Ice system is ON	Brushes arcing.	Inspect brushes for evidence of burning.	Replace brushes.
				Align brushes.
		Loose connection.	Inspect wiring to verify condition. Inspect all connections for tightness.	Repair wiring as necessary. Tighten all connections.
		Wire too close to radio equipment	Inspect wiring to verify location.	Reroute wiring to at least 8 in. from radio equipment and antenna leads.
		Defective fuse.	Place jumper across fuse.	If radio noise disappears, replace the fuse.
		Defective control switch.	Place jumper across pins 1 and 8 and pins 4 and 10 on the control switch.	If radio noise disappears, replace the control switch.

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FAIL - Steady On (continued)	Rapid or uneven brush wear or brush chipping	Brush assembly out of alignment.	Inspect brushes for condition and proper contact with slip ring.	Align brushes.
		Slip Ring run-out.	Verify slip ring runout is less than 0.005 in.	Replace slip ring.
		Slip Ring surface defects	Visually inspect surface condition.	Resurface slip ring if within limits.
				Replace slip ring.
		Oil leak at propeller hub or engine.	Visually inspect slip ring for oil.	Correct oil leak condition.
	System does not actuate when control switch is selected	Faulty control switch.	Bypass control switch and verify system operation.	Repair wiring as necessary. Tighten all connections.
		Faulty or blown fuse.	Replace fuse. If fuse blows again inspect wiring for shorts.	Replace fuse.

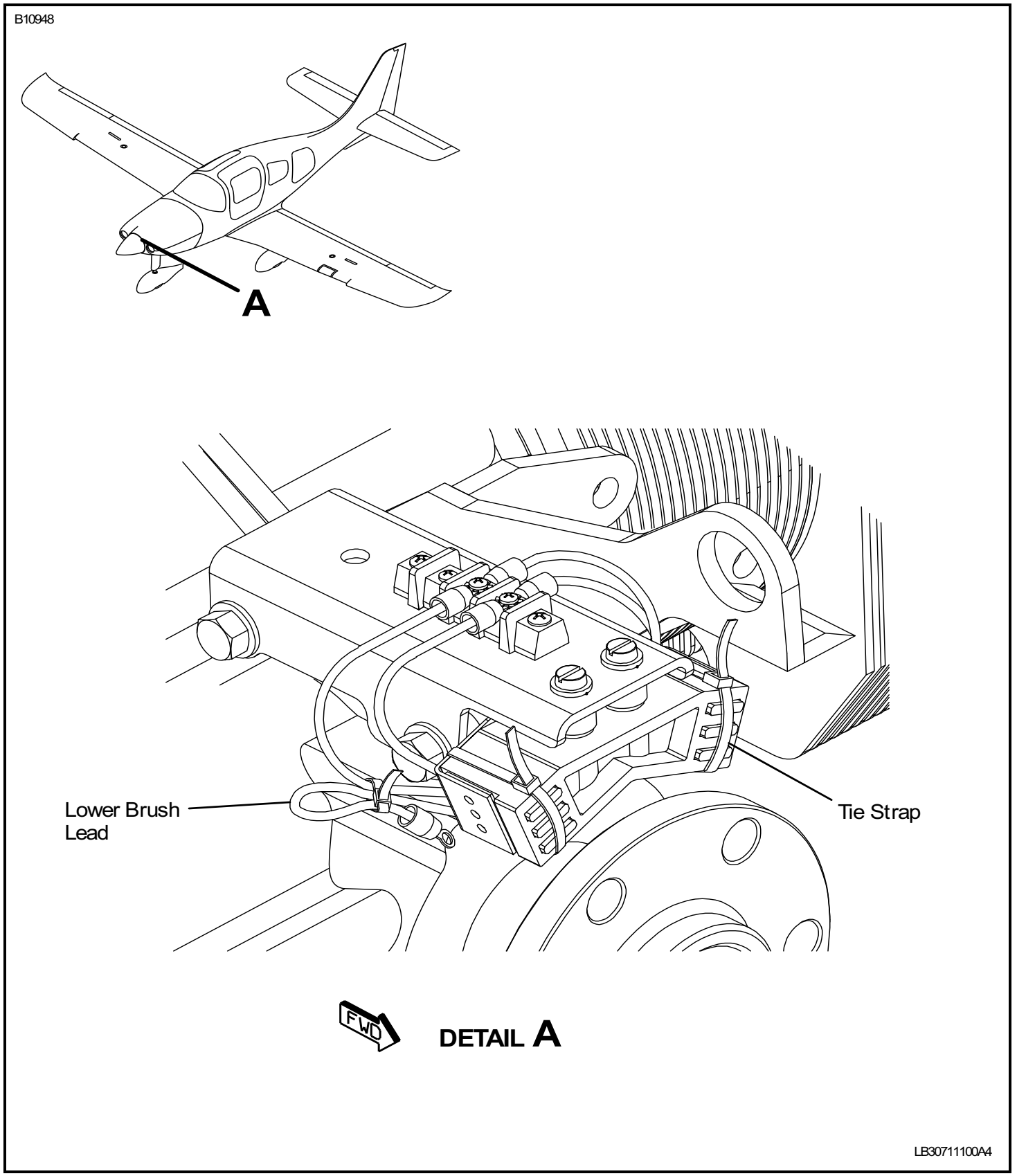
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Figure 201 : Sheet 1 : Brush Block



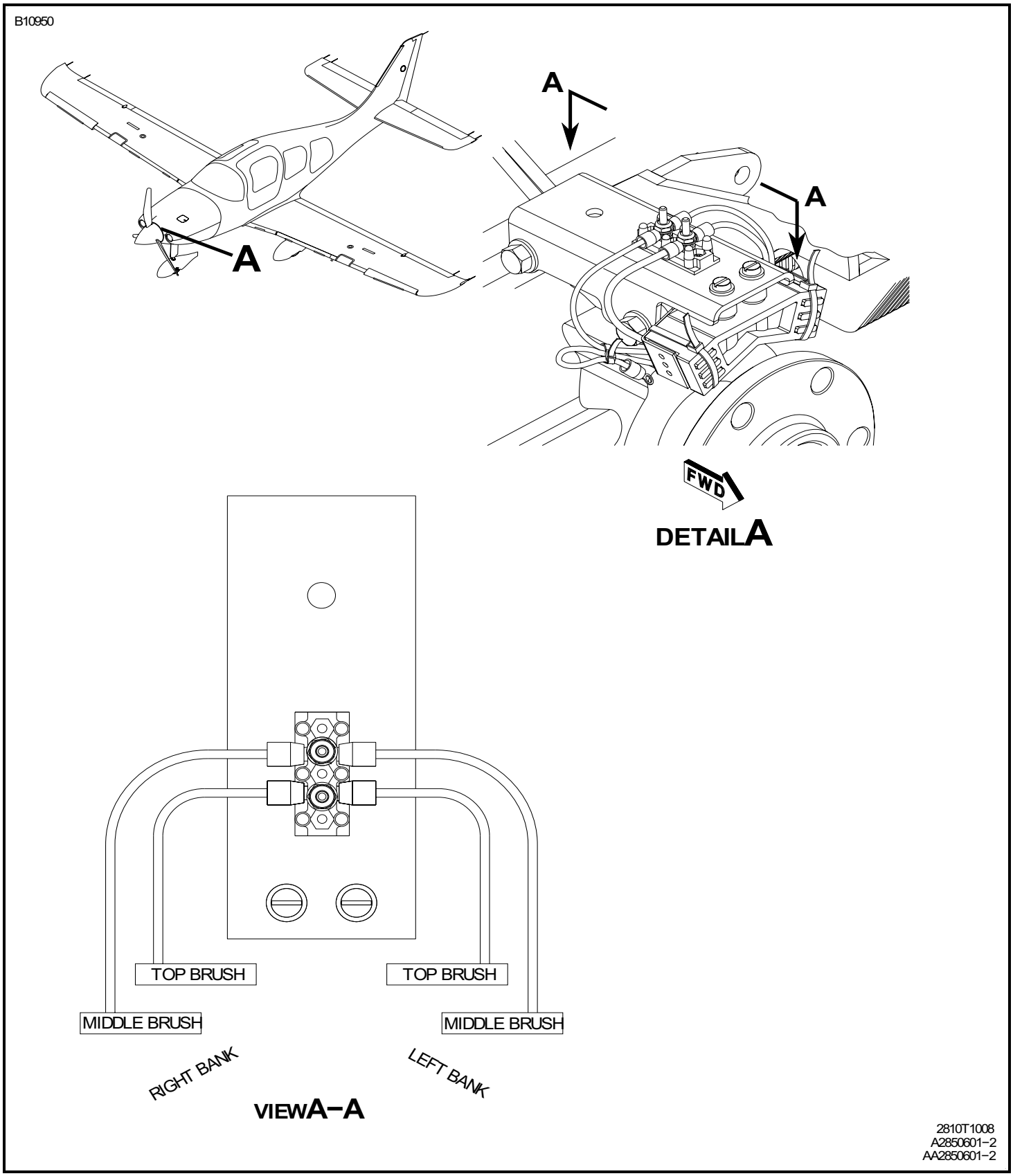
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Figure 202 : Sheet 1 : Brush Block Tie



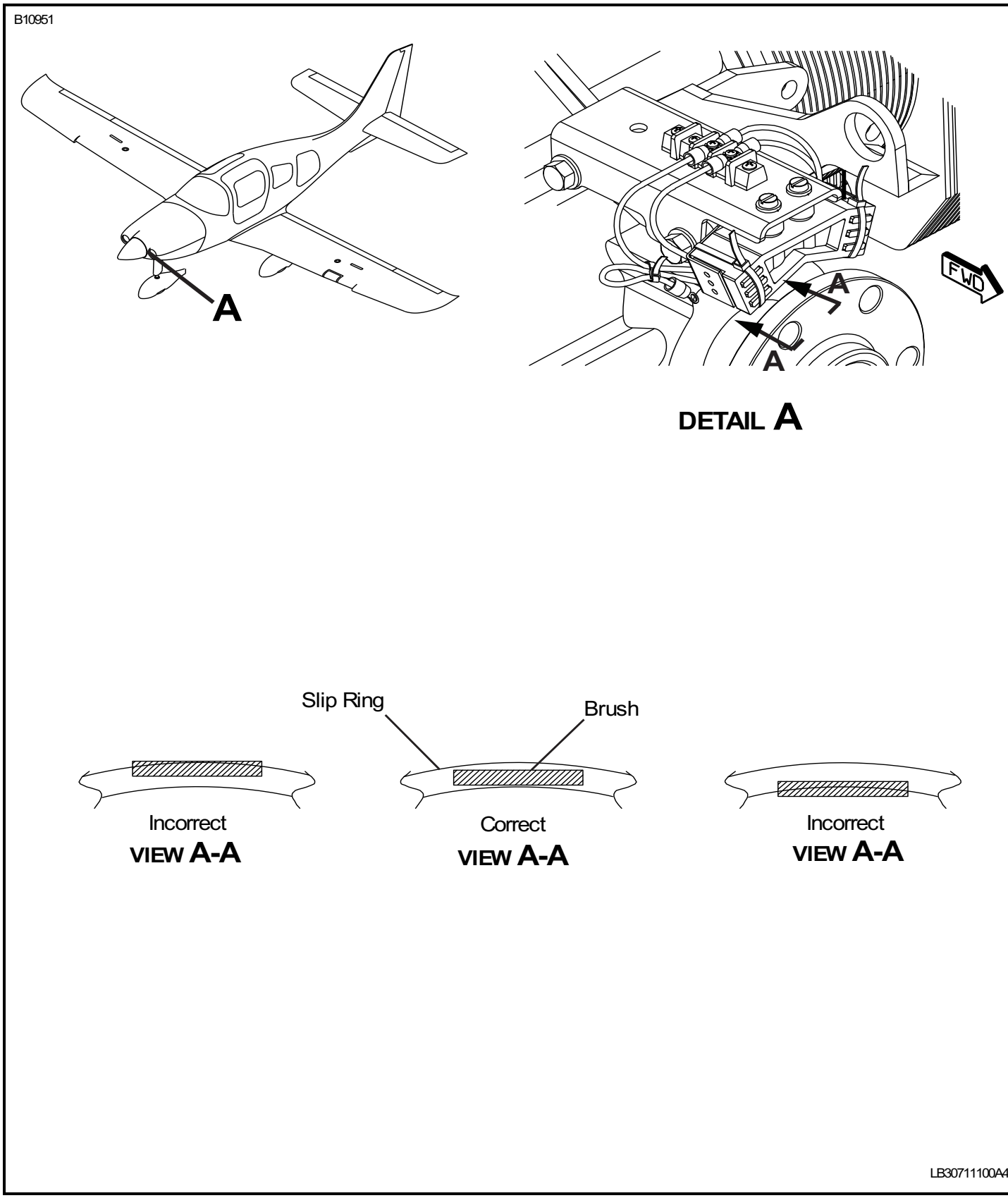
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Figure 203 : Sheet 1 : Brush Wire Routing



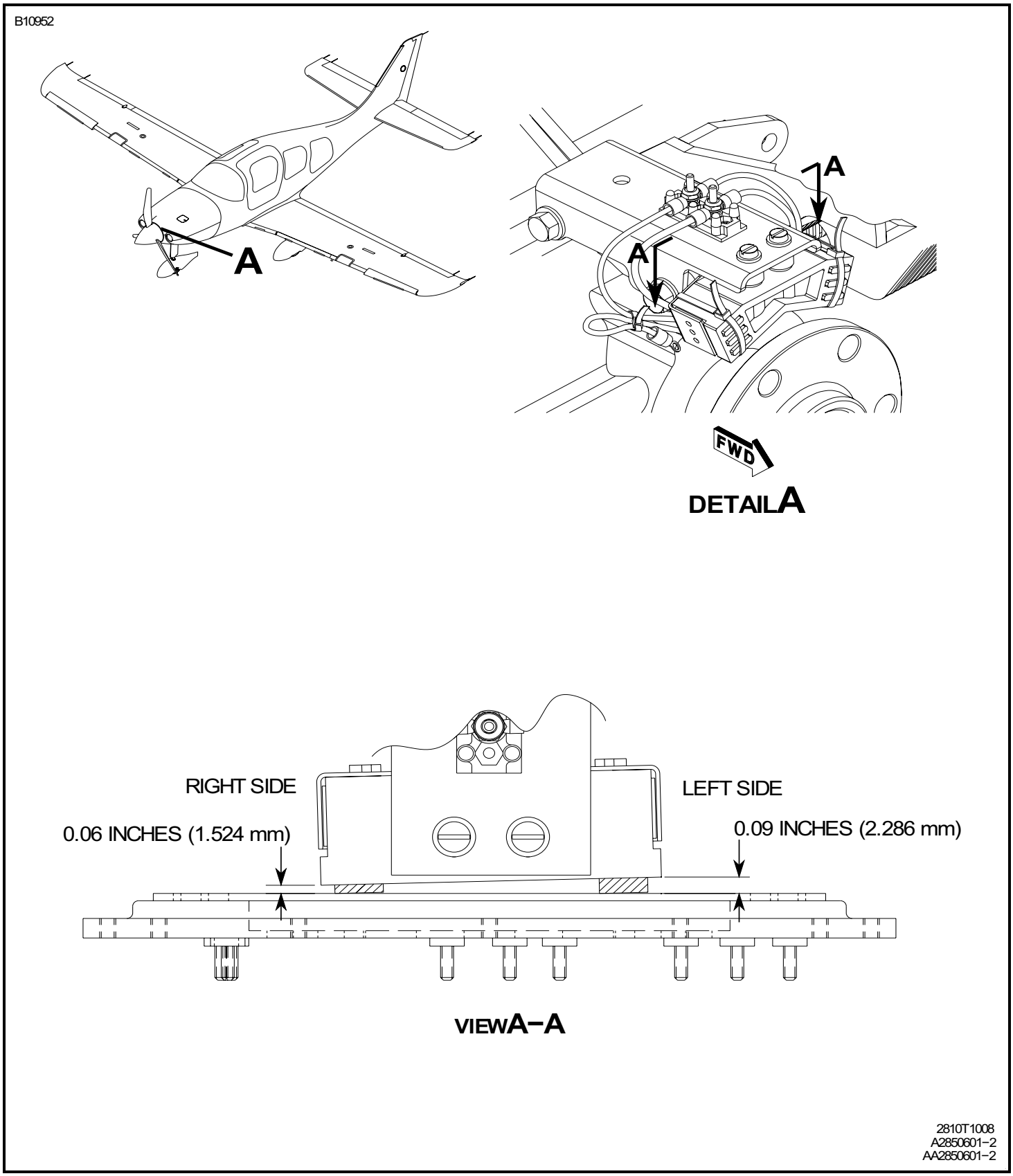
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Figure 204 : Sheet 1 : Brush Alignment on Slip Ring



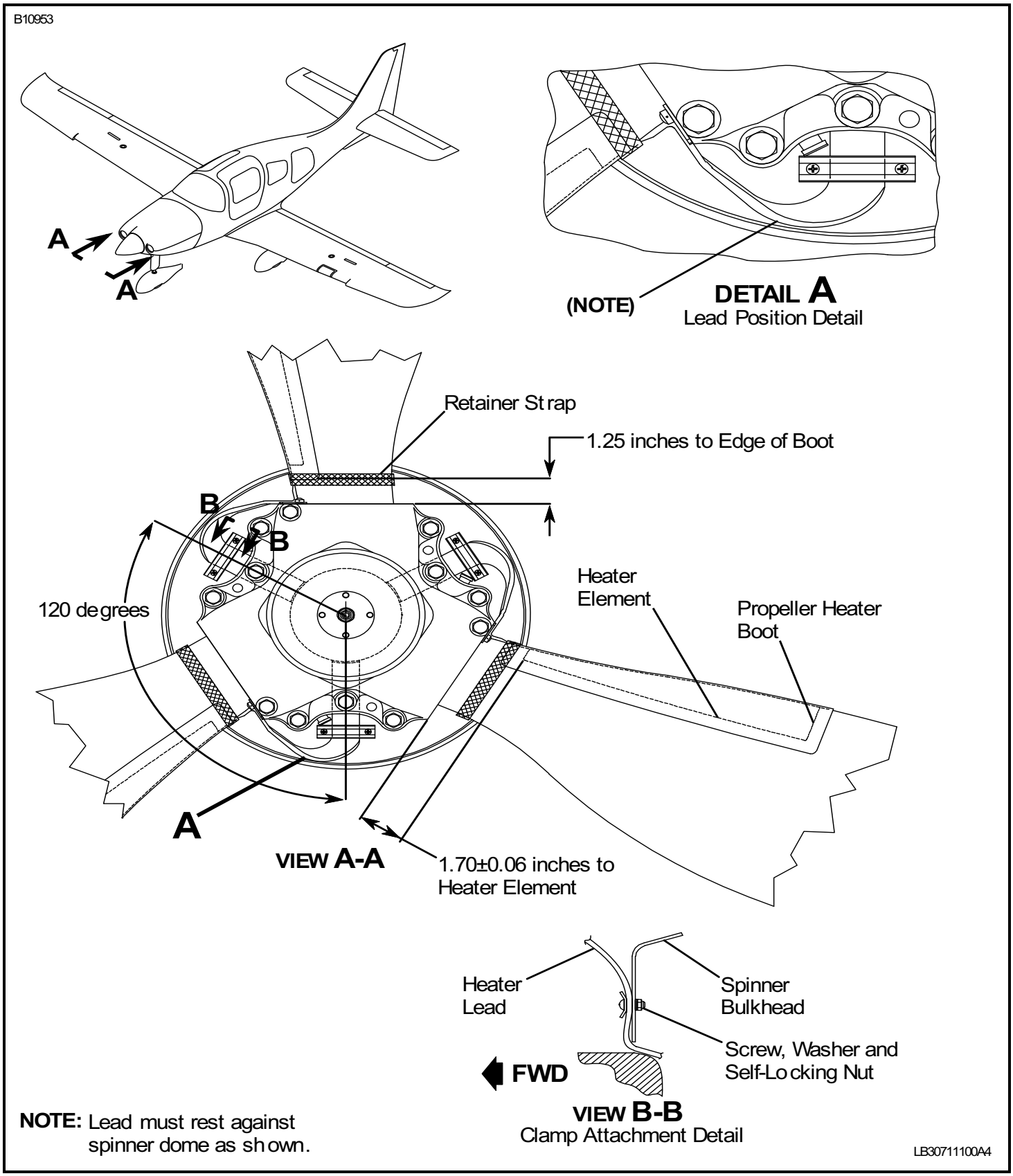
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Figure 205 : Sheet 1 : Brush Block Alignment



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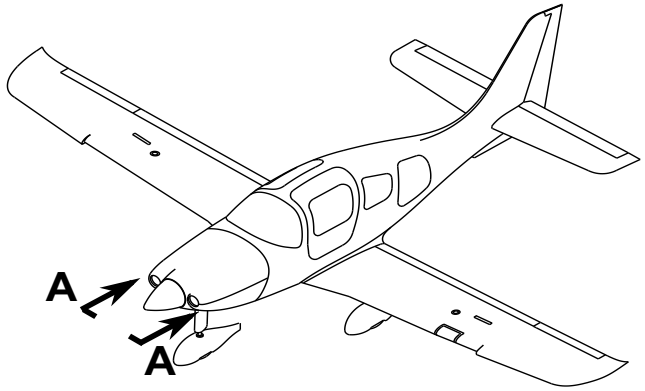
Figure 206 : Sheet 1 : SMR Technologies Inc. Propeller Heater Boot

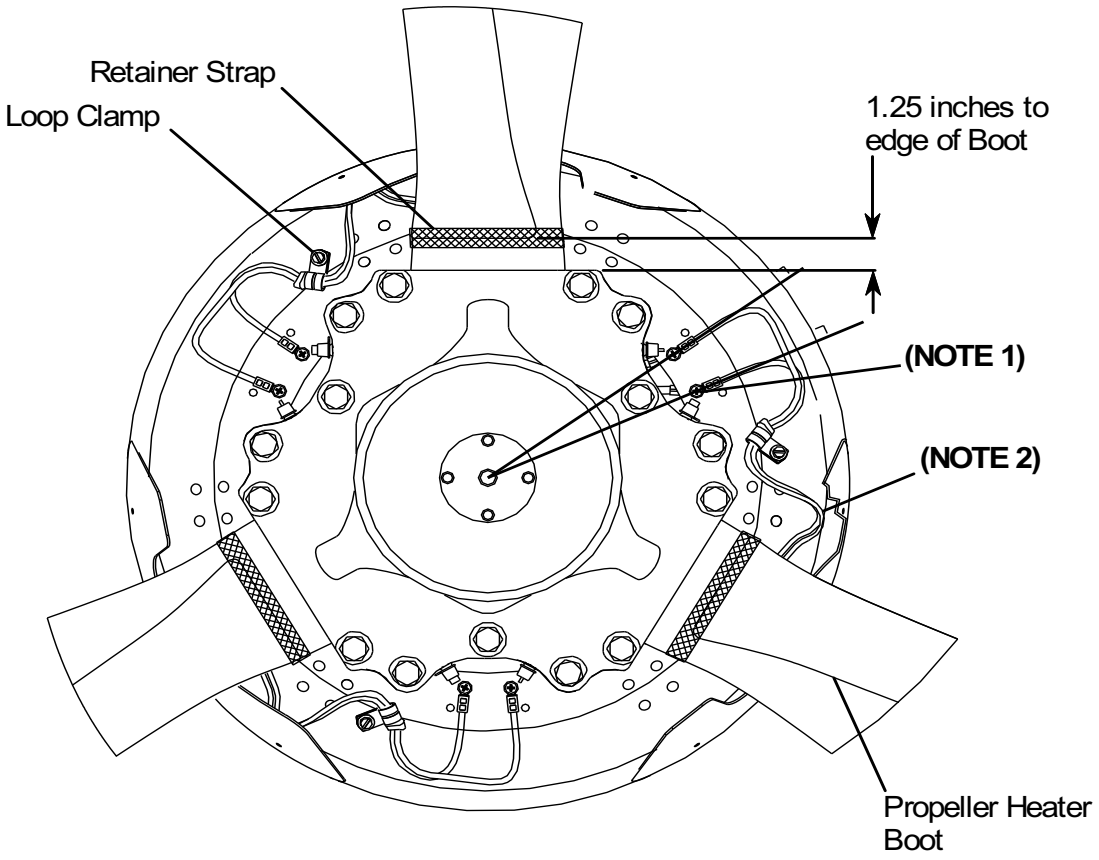


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Figure 207 : Sheet 1 : Hartzell Propeller Inc. Propeller Heater Boot

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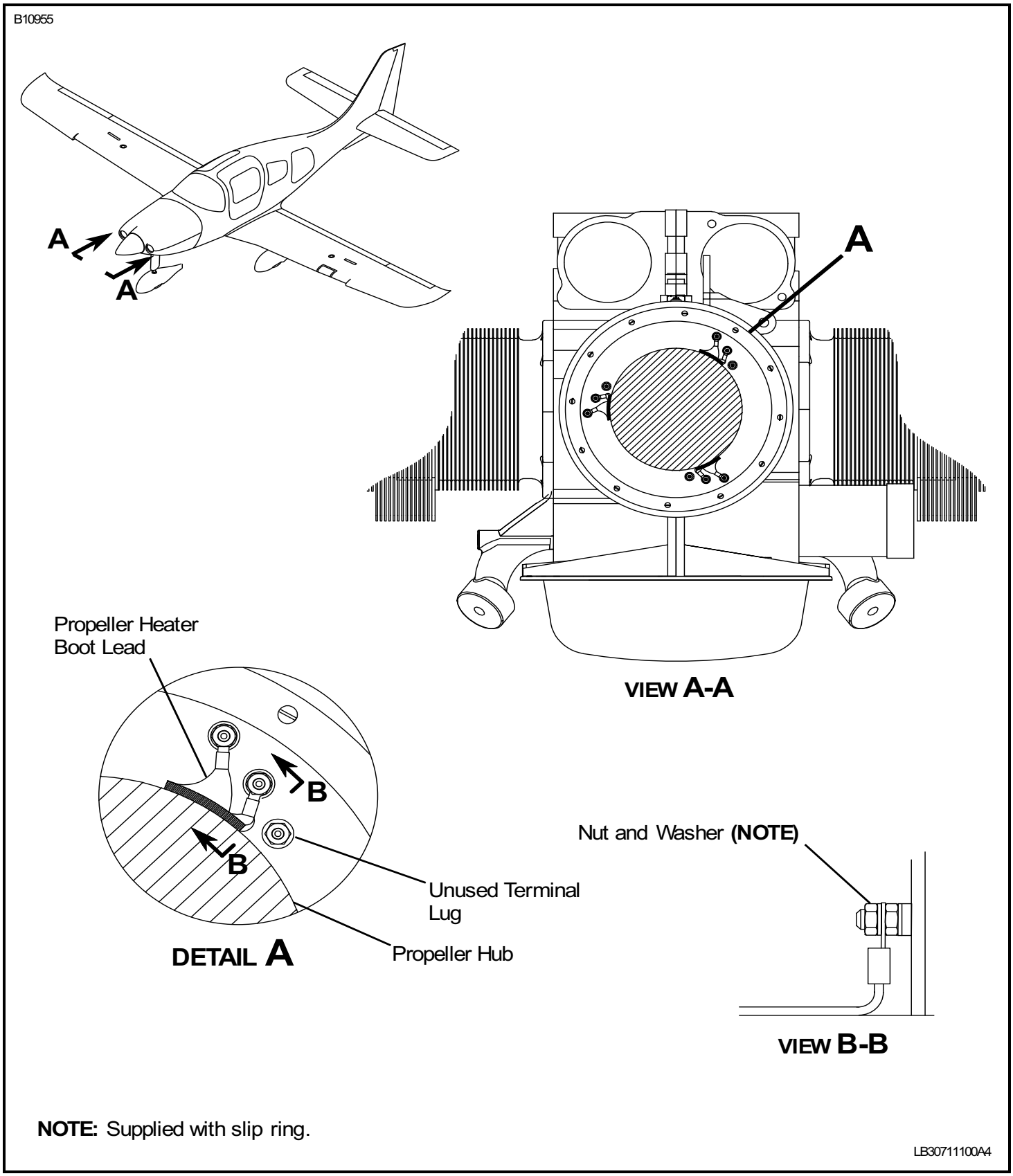
VIEW A-A

NOTE 1: Position wire terminal at a normal (perpendicular) angle to spinner dome as shown.
NOTE 2: Lead must rest against spinner dome as shown.

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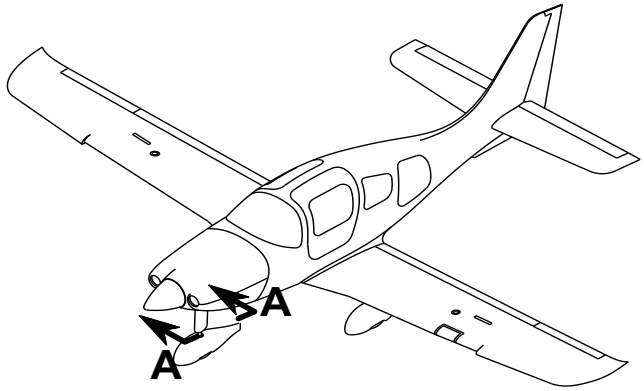
Figure 208 : Sheet 1 : Heater Boot Lead Terminal Attachment

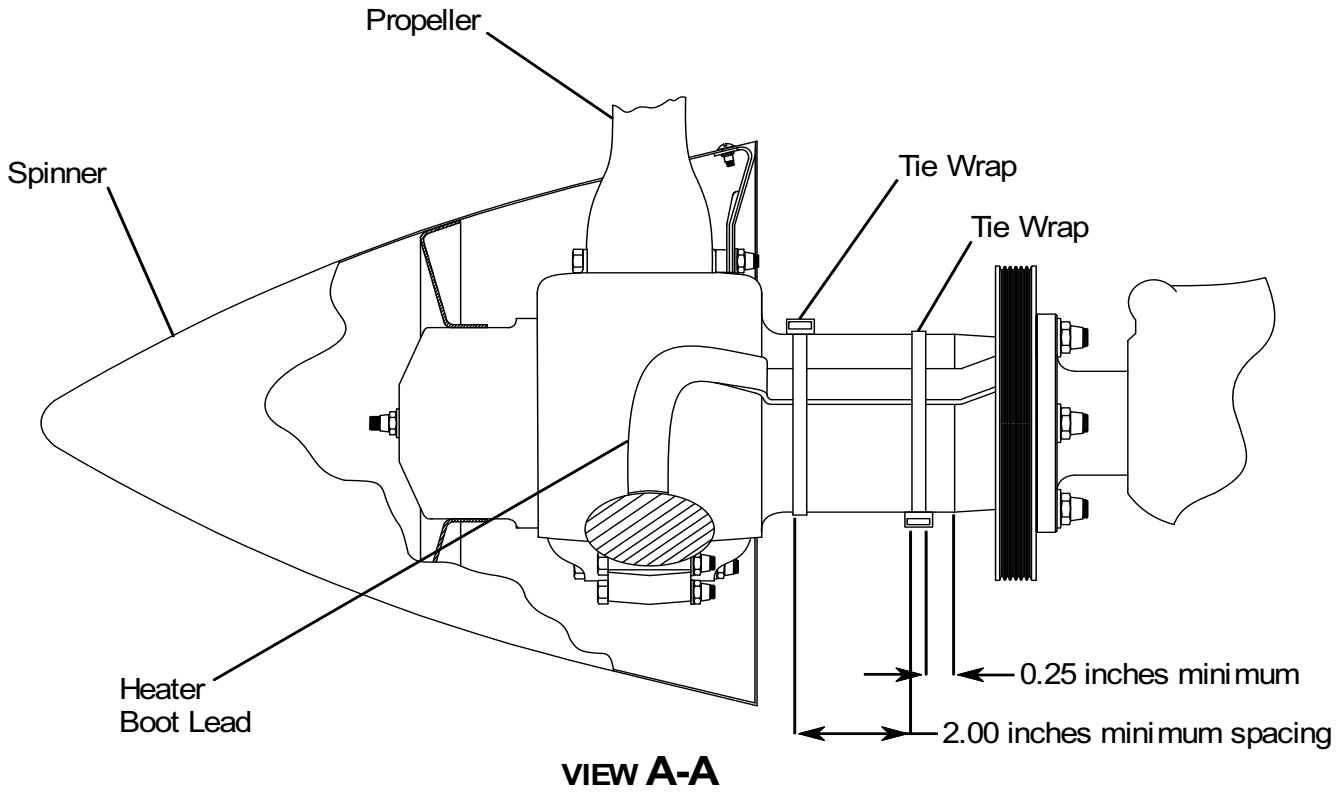


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Figure 209 : Sheet 1 : Heater Boot Lead Attachment

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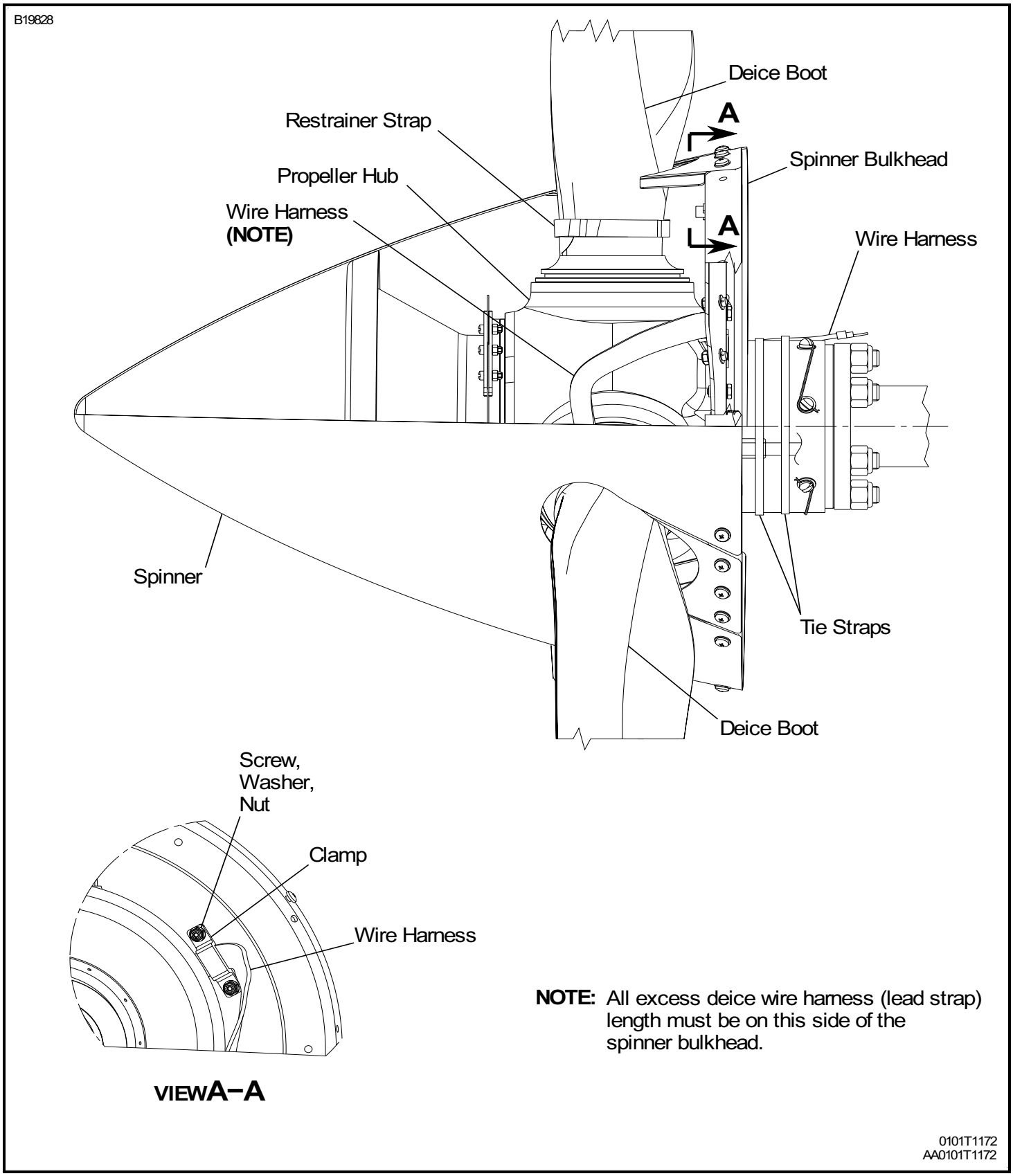


VIEW A-A

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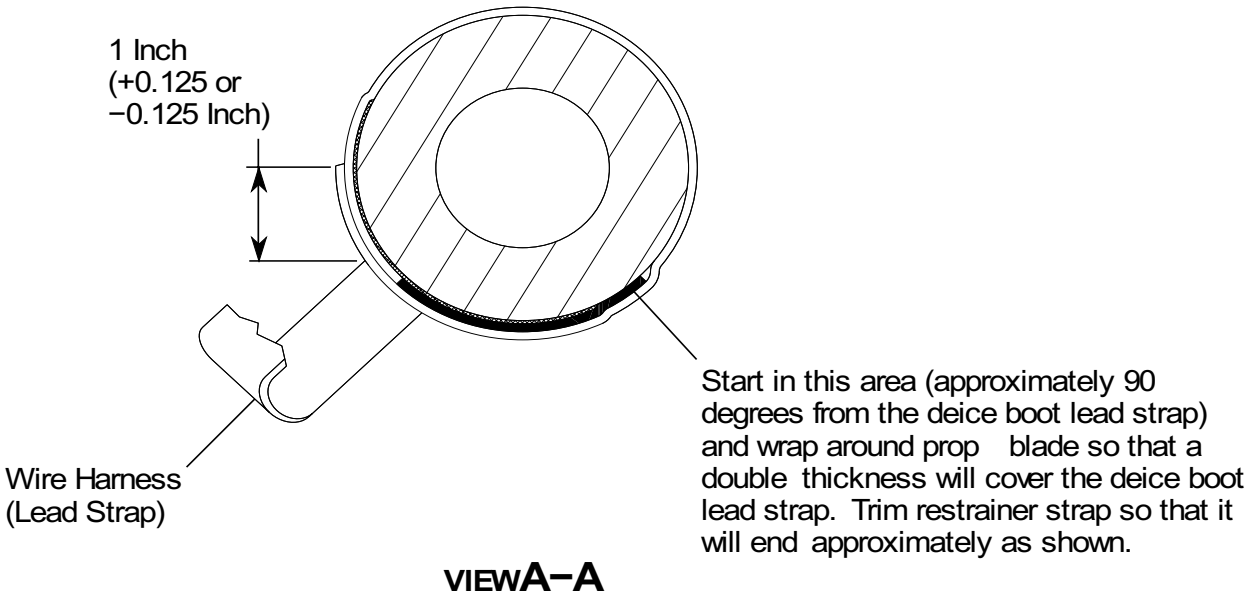
Figure 210 : Sheet 1 : Deice Installation (McCauley)



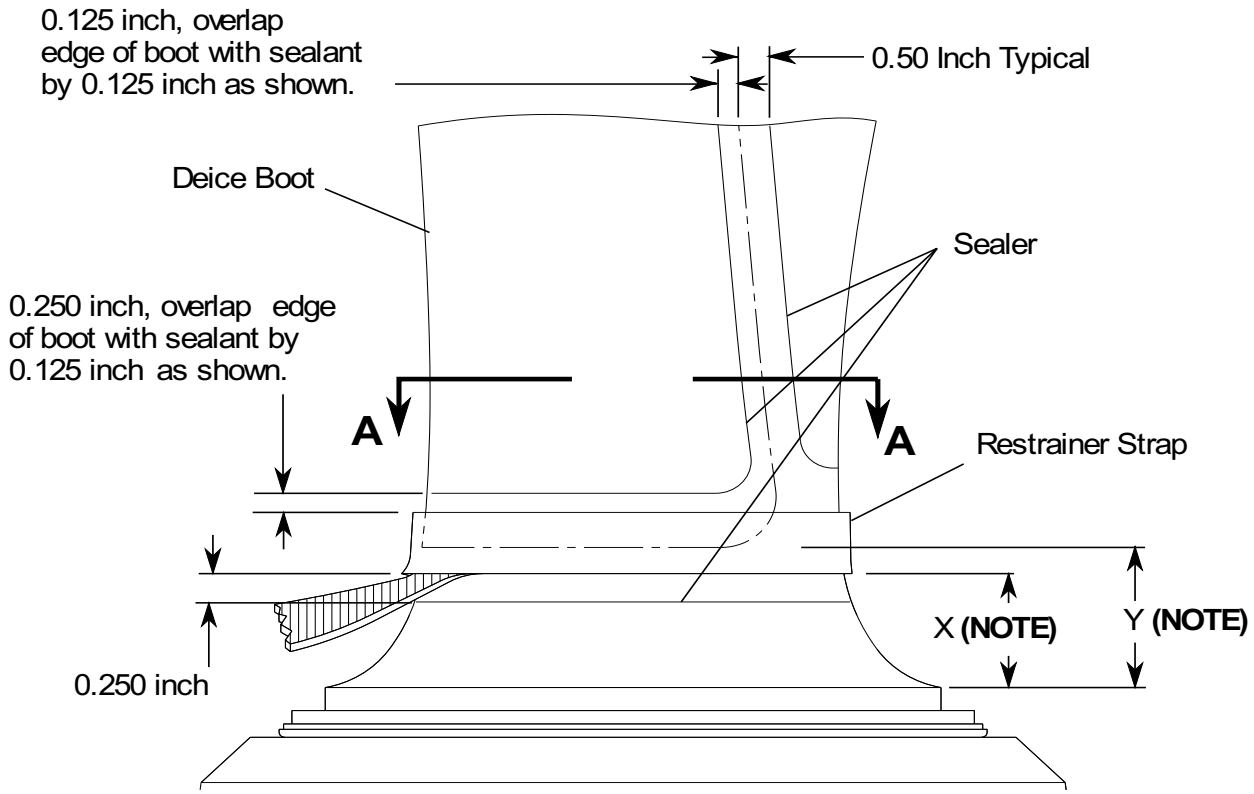
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Figure 211 : Sheet 1 : Restrainer Strap Installation (Used Only On Integral Lead Type Deice Boots)

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VIEW A–A

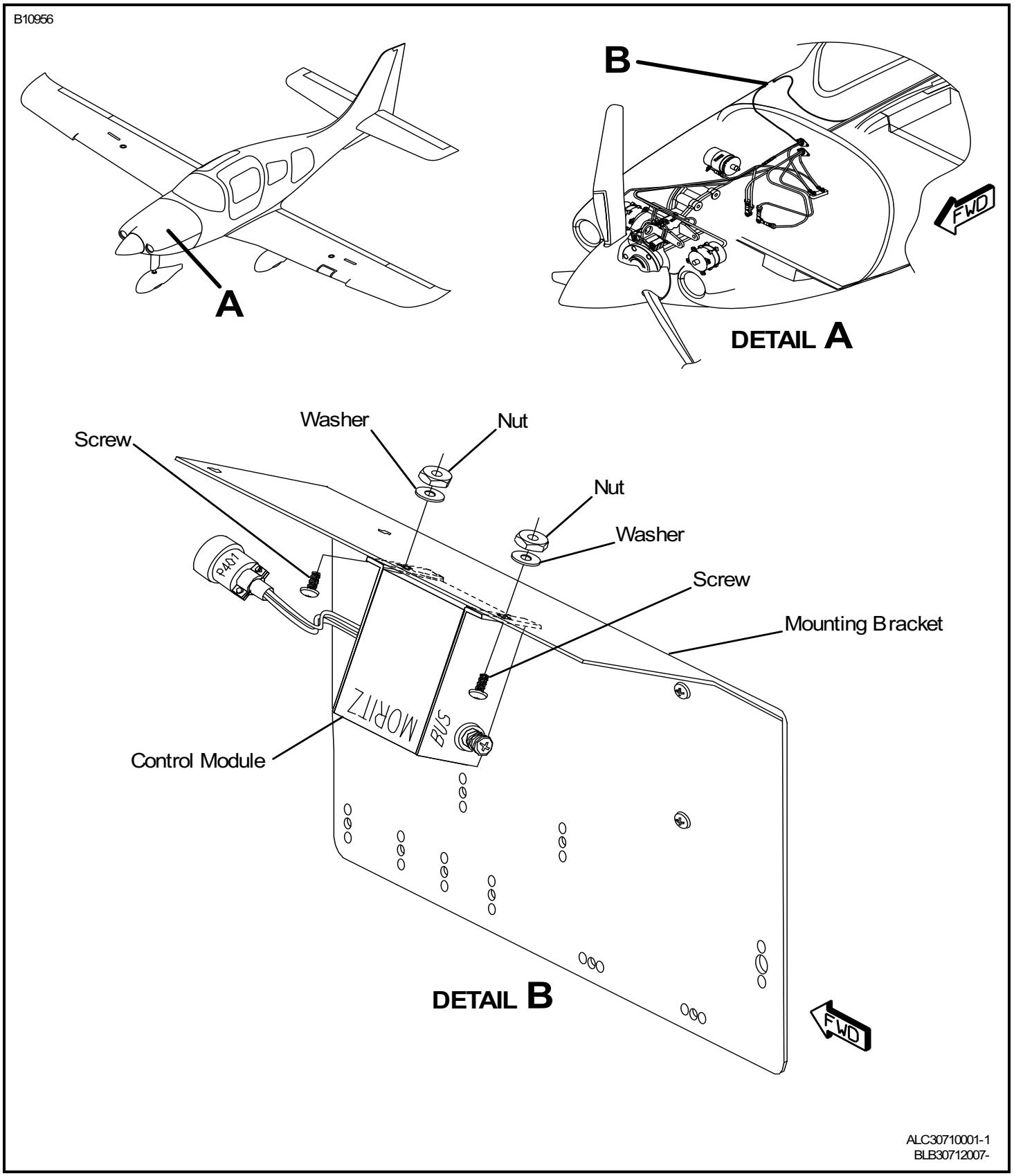


NOTE: Refer to the Aircraft and System Identification and Information table.

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AA0103T1017

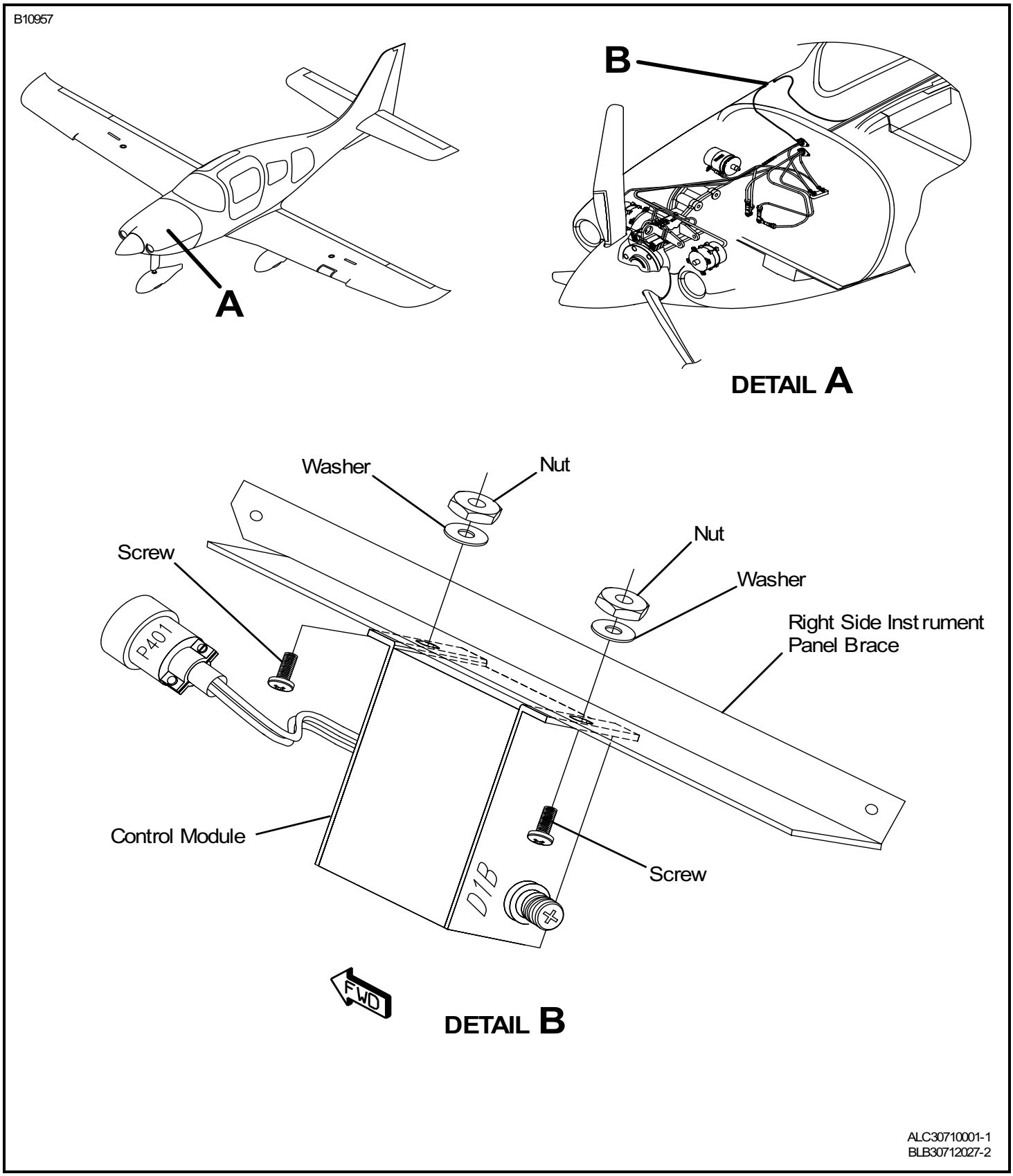
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Figure 212 : Sheet 1 : Control Module (Avidyne Option, Battery Bracket)



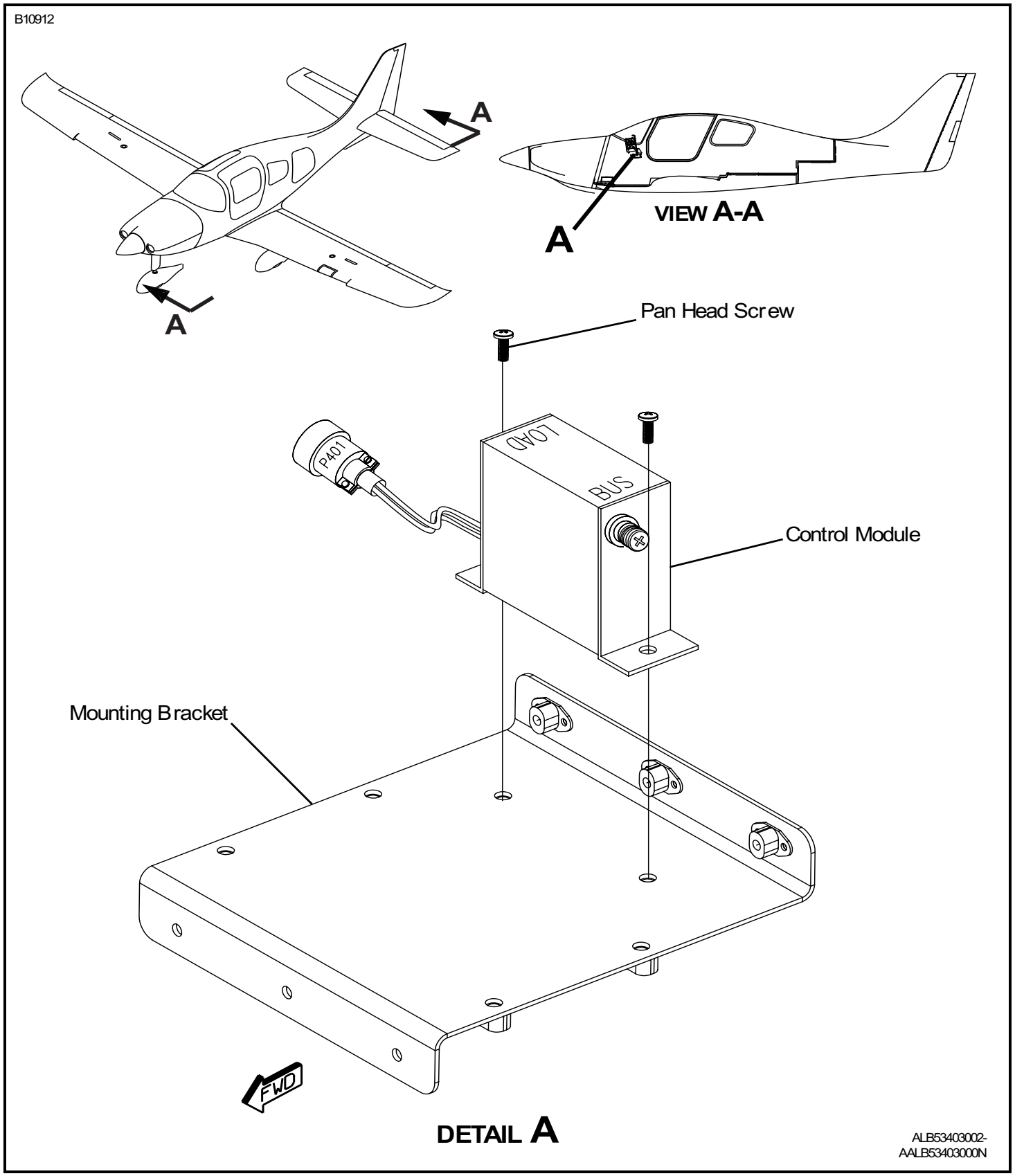
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Figure 213 : Sheet 1 : Control Module (Avidyne Option, Right Side Instrument Panel Brace)



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Figure 214 : Sheet 1 : Control Module (Garmin G1000 Option)



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PROP HEATER TIMER (T240) - REMOVAL/INSTALLATION

1. General

A. This section contains the removal and installation procedures for the Model T240 Prop Heater Timer. The Prop Heat Timer is installed behind of the Multifunctional Display (MFD) on the shelf assembly. For a general description of the Prop Heat Timer, refer to Ice and Rain Protection - General.

B. After you remove and install or replace the Prop Heater Timer, it is necessary to do a test of the timer. Refer to Prop Heat Timer Self-Test.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. Remove and Replace Prop Heat Timer

A. Remove the Prop Heat Timer (UF002) (Refer to Figure 401).

(1) Remove external electrical power from the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(4) Remove the left GDU 1400 Multifunctional Display (MFD) (UI406). Refer to Chapter 34, Garmin GDU 1400 Displays (G2000) - Removal/Installation.

(5) Disconnect the electrical connector (P401) from the rear of the timer.

(6) Remove the screws that attach the timer to the shelf assembly.

(7) Remove the timer from the airplane.

B. Install the Prop Heater Timer (UF002) (Refer to Figure 401).

(1) Put the timer in its correct position on the shelf assembly.

(2) Install the screws that attach the timer to the shelf assembly.

(3) Connect the electrical connector (P401) to the rear of the timer.

(4) Install the MFD (UI406). Refer to Chapter 34, Garmin GDU 1400 Displays (G2000) - Removal/Installation.

(5) Do a test of the timer. Refer to Prop Heat Timer Test.

4. Prop Heat Timer Test

A. General

(1) Before testing make sure that:

- The prop heat electrical connections are tight and correct
- The propeller is installed.

B. Prop Heat Timer Self-Test

CAUTION: The propeller boot heaters will become extremely hot during operation. Be careful when touching the propeller boots or adjacent areas.

(1) Connect external electrical power to the airplane.

(2) Make sure that the master BATT switches (left SW01 and right SW02) are in the ON position.

(3) Make sure that the AVIONICS MASTER switch (SW04) is in the ON position.

(4) Set the PROP HEAT switch to the ON position.

(5) Make sure that the PROP HEAT CAS message comes on for one second on the Primary Flight Display (PFD) and goes out for one second during a six second cycle.

(6) Carefully touch the three propeller de-icers and make sure that they are generating heat.

(7) Set the PROP HEAT switch to the OFF position.

(8) Set the master BATT switches (left SW01 and right SW02) to the OFF position.

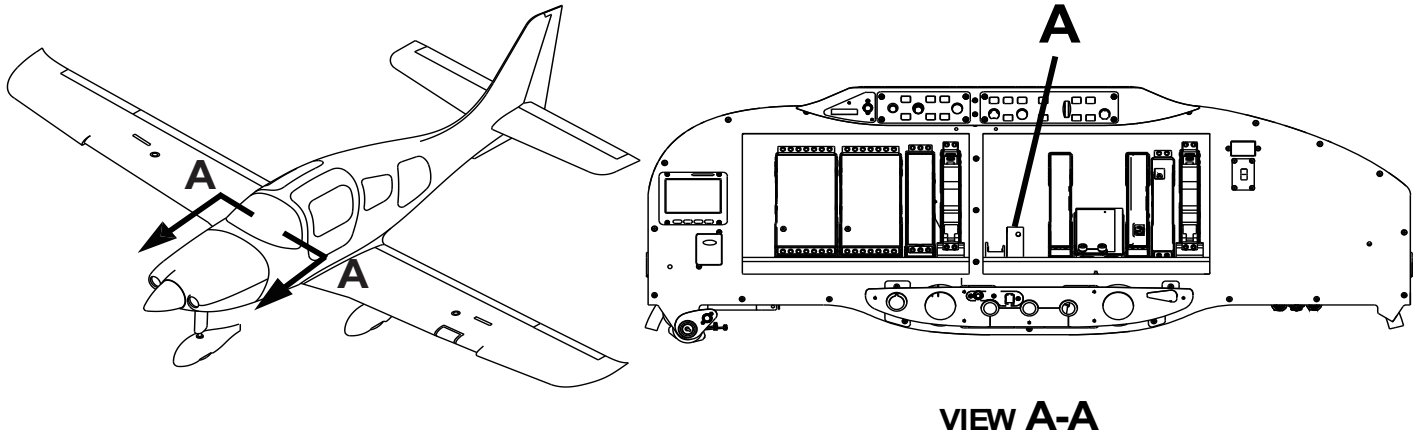
(9) Set the AVIONICS MASTER switch (SW04) to the OFF position.

(10) Remove external electrical power from the airplane.

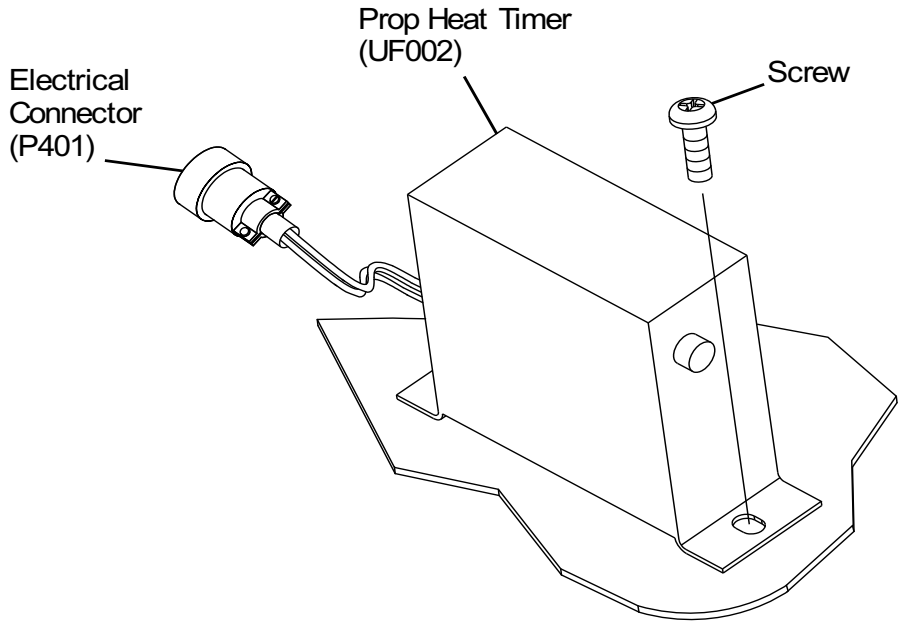
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Figure 401 : Sheet 1 : Prop Heater Timer Installation

B16697



VIEW A-A



DETAIL A

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A2814T1003
AA2818T1001

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PROPELLER (TKS) - MAINTENANCE PRACTICES

1. General

A. The McCauley propeller can be used with TKS anti-ice boots or electric deice boots.

NOTE: For airplanes that have the McCauley deice boots or a Hartzell propeller installed, refer to Propeller Heat - Maintenance Practices.

B. The TKS anti-ice propeller maintenance practices consist of propeller anti-ice feed shoe removal and installation procedures, and the spinner bulkhead anti-ice components removal, installation and adjustments procedures.

2. Propeller TKS Anti-Ice Feed Shoes Removal/Installation

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

WARNING: Before you disconnect components of the TKS anti-ice system, slowly loosen the coupling that is connected to the component to be removed because it is possible that high pressure is still in the system.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

A. Remove the propeller anti-ice feed shoes (Refer to Figure 201).

WARNING: Cement and solvent vapors are toxic and extremely flammable. Use these chemicals only in a well ventilated area away from sparks and vapors. Excess exposure could cause injury or death. If dizziness or nausea occur, get to fresh air immediately. Avoid contact with skin or eyes. Use solvent-resistant gloves to minimize skin exposure. Use safety glasses to protect your eyes from chemicals. If you get chemicals in your eyes, flush your eyes with water for 15 minutes and see a physician immediately. If you get chemicals on your skin, wash thoroughly with soap and water. If you swallow chemicals, do not induce vomiting. See a physician immediately.

CAUTION: The jaws of any tool (vise grips, pliers, etc.) that you use to pull on the feed shoe must be cushioned to prevent damage to the feed shoe, unless the feed shoe is to be scrapped.

(1) Remove external electrical power from the airplane.

(2) Make sure that the AVIONICS MASTER switch (SW04) is in the OFF position.

(3) Make sure that the master BATT switches (left SW01 and right SW02) are in the OFF position.

(4) Remove spinner from the spinner bulkhead. Refer to the applicable steps in Chapter 61, Spinner and Propeller Removal and Installation.

(5) If the feed shoe is to be discarded, remove it from the propeller blade without solvent.

NOTE: The feed shoe can tear or come off in pieces.

CAUTION: When you remove feed shoes from a propeller assembly, be careful not to let solvent leak into the propeller hub and cause damage to the seals. The blade that is being worked on must be pointed down so all excess solvent will run to the outboard tip of the blade. As an extra precautionary measure, the hub and blade area must be masked. Do not use any sharp objects which might scratch the blade when you remove the feed shoe.

(6) Make sure that the blade that is being worked on is pointed down so all excess solvent will run to the outboard tip of the blade.

(7) Use methyl n-propyl ketone or toluene to soften the adhesion line between the anti-ice feed shoe and the propeller blade.

(a) Start at one corner and loosen enough of the feed shoe to grasp it with vise grip pliers, or similar tools.

(8) Apply a steady pull to remove the feed shoe; pull the feed shoe from the blade slowly and carefully while you continue to use methyl n-propyl ketone or toluene to soften the adhesion line.

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(9) Remove all residual cement from the blade.
  (a) Use solvents with caution as mentioned above.
(10) Visually do an inspection of the propeller blade for damage or deterioration.
  (a) Look for corrosion, cracks, dents or nicks.
  (b) If defects are found, the propeller must be repaired by an authorized propeller repair station.

B. Install the propeller anti-ice feed shoes (Refer to Figure 201).

CAUTION: When you install feed shoes on a propeller assembly, be careful not to let solvent leak into the propeller hub and cause damage to the seals. The blade that is being worked on must be pointed down so all excess solvent will run to the outboard tip of the blade. As an extra precautionary measure, the hub and blade area must be masked. Do not use any sharp objects which might scratch the blade when you install the feed shoe.

(1) Make sure that the blade that is being worked on is pointed down so all excess solvent will run to the outboard tip of the blade.
(2) Prepare the propeller blades for the feed shoe installation.
  (a) Trim each propeller blade feed shoe if necessary.
  (b) Mark the inboard center line on the leading edge of the propeller blades.
  (c) Use a template or hand fit the anti-ice feed shoe to the blades so that the feed shoe center line is on the leading edge center line of the propeller blade. Refer to Figure 201.
  (d) Mark an area 1/2 inch outside the feed shoe perimeter on the propeller blade with a red pencil. Refer to Figure 201.
  (e) Use the red pencil line as the perimeter of the area on each propeller blade to be masked.
  (f) Install masking tape around the outline.

CAUTION: It is necessary that the masking steps described be followed so the sealer will be applied to both the cement and 1/8 inch of bare metal. If the cement line and sealer line start at the same point, water will seep under the cement line and cause an unserviceable seal. Refer to Figure 201.

  (g) Remove all paint inside of the masked off area on propeller blades painted with lacquer.
    1 On propeller blades painted with polyurethane, lightly sand inside the masked off area with 400 grit sandpaper.
  (h) Clean all of the masked area on the propeller blades thoroughly with methyl n-propyl ketone or acetone.
    1 Quickly clean the solvent from the propeller blades with a clean, dry, lint-free cloth so that you do not leave a film.
  (i) Apply a second layer of masking tape on the propeller blades to cover an additional 1/8 inch of bare metal area inside of the previously masked area. Refer to Figure 201.

CAUTION: The metal and rubber parts must be clean. Only very clean surfaces will cause a maximum bond of the cement.

(3) Apply cement to the feed shoes and the propeller blades.
  (a) Lightly sand the bond surface of the feed shoe with sandpaper to cause a maximum bond.
  (b) Moisten a clean cloth with methyl n-propyl ketone or acetone.
    1 Clean the bond surface of the anti-ice feed shoe.
    2 Change the cloth frequently to avoid contamination of the clean area.

NOTE: You can use masking tape to prevent any curl of the anti-ice feed shoe edges when you apply cement to the back side of the feed shoe.

  (c) Apply masking tape to the breeze side of the feed shoe edges.
    1 Let approximately 1/4 inch of the tape overhang the edge of the feed shoe.
  (d) Lay the feed shoe on a piece of cardboard with the bond side up.
    1 Tape the feed shoe onto the cardboard with the 1/4 inch overlap of masking tape.

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(e) Make sure to thoroughly mix the cement.

(f) Apply one even brush coat of 1300L or EC1403 cement to the clean, masked surface of the propeller blade and to the fabric impression side of the anti-ice feed shoe.

1 Apply cement at the room temperature of 60°- 75°F.

(g) Allow the cement to air dry for a minimum of one hour at 40°F or above, when the relative humidity is less than 75%.

1 If the humidity is 75% to 90%, additional drying time will be necessary to cure the cement.

2 Do not apply cement if the relative humidity is higher than 90%.

(h) After the cement is dry (not tacky), apply a second even brush coat to the anti-ice feed shoe.

1 Then immediately apply an even brush coat of cement to the clean masked off area of the propeller.

NOTE: Timing is important because the cement on both surfaces must reach the tacky stage at the same time.

(4) Install the feed shoes to the propeller blades.

(a) Remove the anti-ice feed shoe from the cardboard, and the masking tape from the anti-ice feed shoe before you start the installation.

(b) When the cement is tacky on both the propeller blade and feed shoe surfaces, put the anti-ice feed shoe center line to the center line on leading edge of the blade. Start with the inboard end of the blade and work toward the tip.

1 If the cement dries, use methyl n-propyl ketone or toluene as necessary until the cement is tacky.

2 If the feed shoe is off center, pull it up with a quick motion and install it again.

3 Use methyl n-propyl ketone or toluene as necessary when you have to install the feed shoe again.

(c) When the feed shoe is correctly in place, use a rubber or wooden hand roller and press firmly on the full length of the leading edge to form a tight bond.

(d) Gradually push the roller over each side of the leading edge contour to avoid trapping air.

1 Roll from the leading edge of the propeller blade toward the tip.

2 Work all excess feed shoe material out to the perimeter before you move to the next section.

3 If there is excess material at the feed shoe edges that tends to pucker, use your fingers and carefully work puckers smooth.

(e) Remove the masking tape from the propeller blades.

(5) Apply sealer to the feed shoes and propeller blades (Refer to Figure 201.)

(a) Mix two parts of Sunbrite 78-U-1003 brushable black enamel with one part of enamel catalyst U-1001-C.

CAUTION: It is necessary that the masking steps described be followed so the sealer will be applied to both the cement and 1/8 inch of bare metal. If the cement line and sealer line start at the same point, water will seep under the cement line and cause an unserviceable seal. (Refer to Figure 201.)

(b) Apply one, even, brush coat of sealer to the area around the feed shoe and make sure you cover the 1/8 inch of bare metal and adhesive along with the masked off area of 1/8 inch of the anti-ice feed shoe.

1 Remove the masking tape as the sealer is brushed on, otherwise, the sealer will pull up along with the tape.

2 Let the sealer dry.

3. Slinger Ring and Slinger Nozzle Alignment Check

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

WARNING: Before you disconnect components of the TKS anti-ice system, slowly loosen the coupling that is connected to the component to be removed because it is possible that high pressure is still in the

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system.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

A. Examine the TKS slinger nozzle to slinger ring alignment (Refer to Figure 202).

(1) Adjust the slinger nozzle to direct the fluid stream to land in the slinger ring channel as necessary.

(a) Bend and rotate the slinger nozzle at the fitting to align the nozzle with the slinger ring channel.

(b) Extend the slinger nozzle into the slinger ring channel with and edge distance as shown In Figure 202.

(2) Rotate the propeller slowly by hand and make sure the distance between the slinger ring and the feeder tube is in alignment tolerance.

(a) Adjust the slinger nozzle as necessary to get good alignment.

4. Anti-Ice Tube to Propeller Blade Alignment Check

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Immediately remove (clean) or contain all the TKS fluid that is spilled. TKS fluid on the floor will cause a slip hazard.

WARNING: Discard all unwanted TKS fluid and/or dirty cloths correctly. TKS fluid is a hazardous waste and must be discarded in accordance with approved procedures.

WARNING: Before you disconnect components of the TKS anti-ice system, slowly loosen the coupling that is connected to the component to be removed because it is possible that high pressure is still in the system.

CAUTION: Use only approved TKS fluids in accordance with specification DTD 406B. Fluid density is approximately 9.2 lbs/gal.

CAUTION: Use only clean, filtered fluid in the TKS system. Contamination will cause fluid blockage and/or damage to the porous panel.

A. Adjust each propeller anti-ice tube so the center of the tube end is centered approximately over the second groove from the leading edge toward the camber side of the blade when the blade is at low pitch. (Refer to Figure 203).

NOTE: Note that the grooves are identified as Leading Edge Groove, First Groove, Second Groove, and Third Groove. The Leading Edge Groove is a short groove located on the leading edge of the propeller boot.

NOTE: A small punch with a blunt end that will fit into the anti-ice tube can be used to carefully position the tube as necessary.

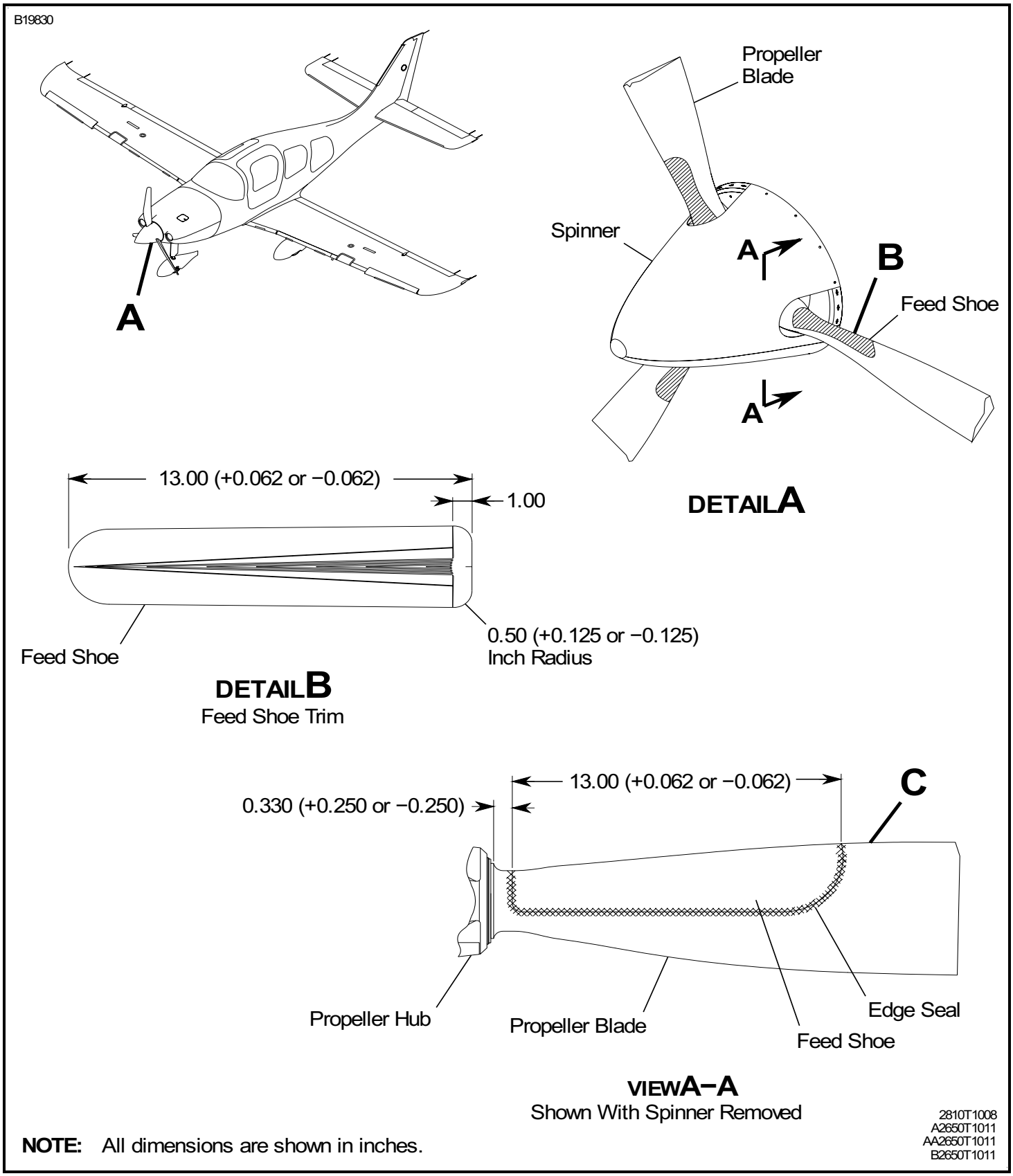
(1) Adjust the anti-ice tube so the clearance between the blade surface and the anti-ice tube is between 0.075 Inch minimum and 0.100 Inch maximum.

(2) Make sure the anti-ice tube does not contact the feed shoe contour.

(3) Make sure the anti-ice tube is contained within the contour of the spinner shell.

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Figure 201 : Sheet 1 : TKS Propeller Anti-Ice Feed Shoe Installation



DETAIL A

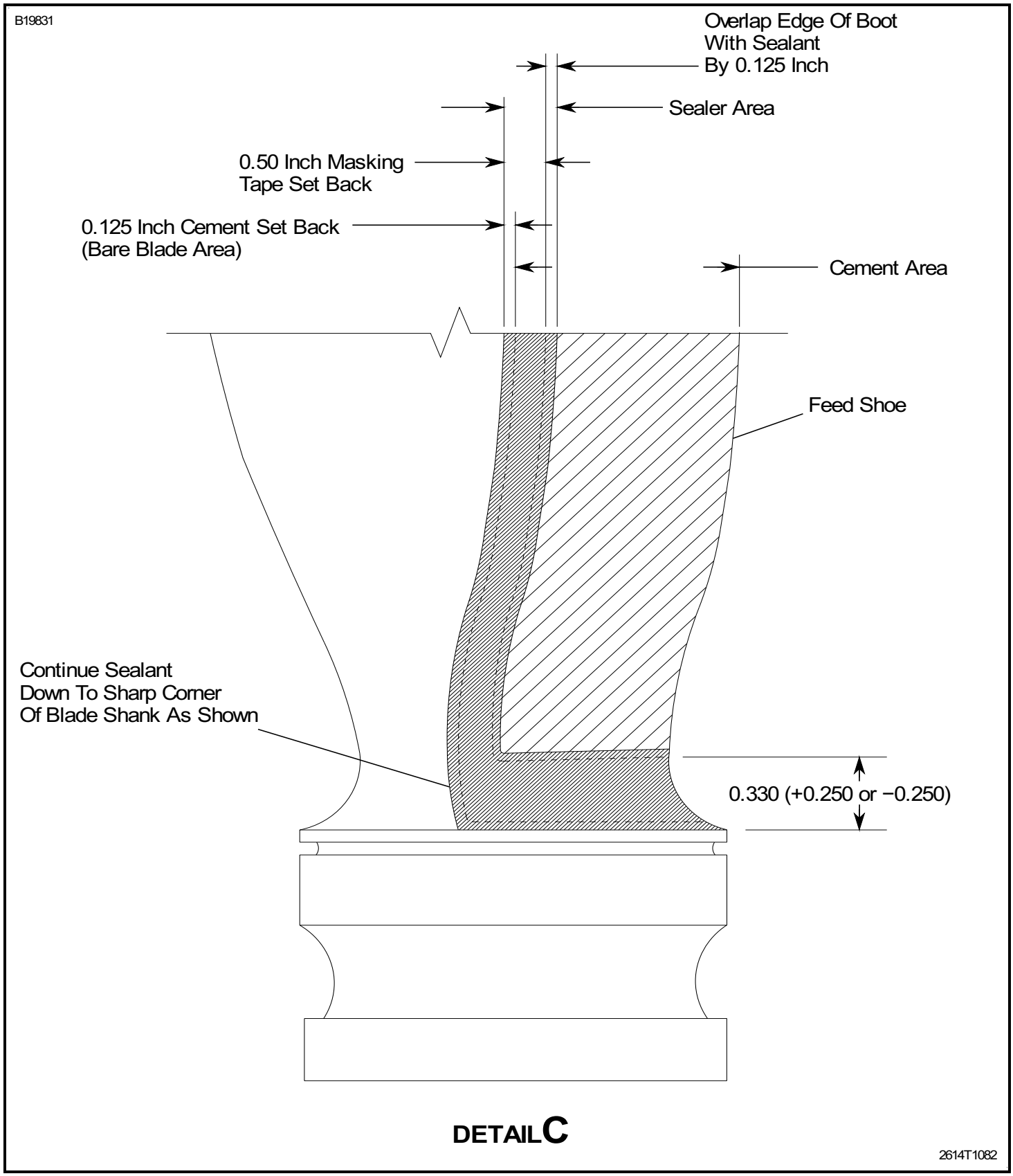
DETAIL B
Feed Shoe Trim

VIEW A−A
Shown With Spinner Removed

NOTE: All dimensions are shown in inches.

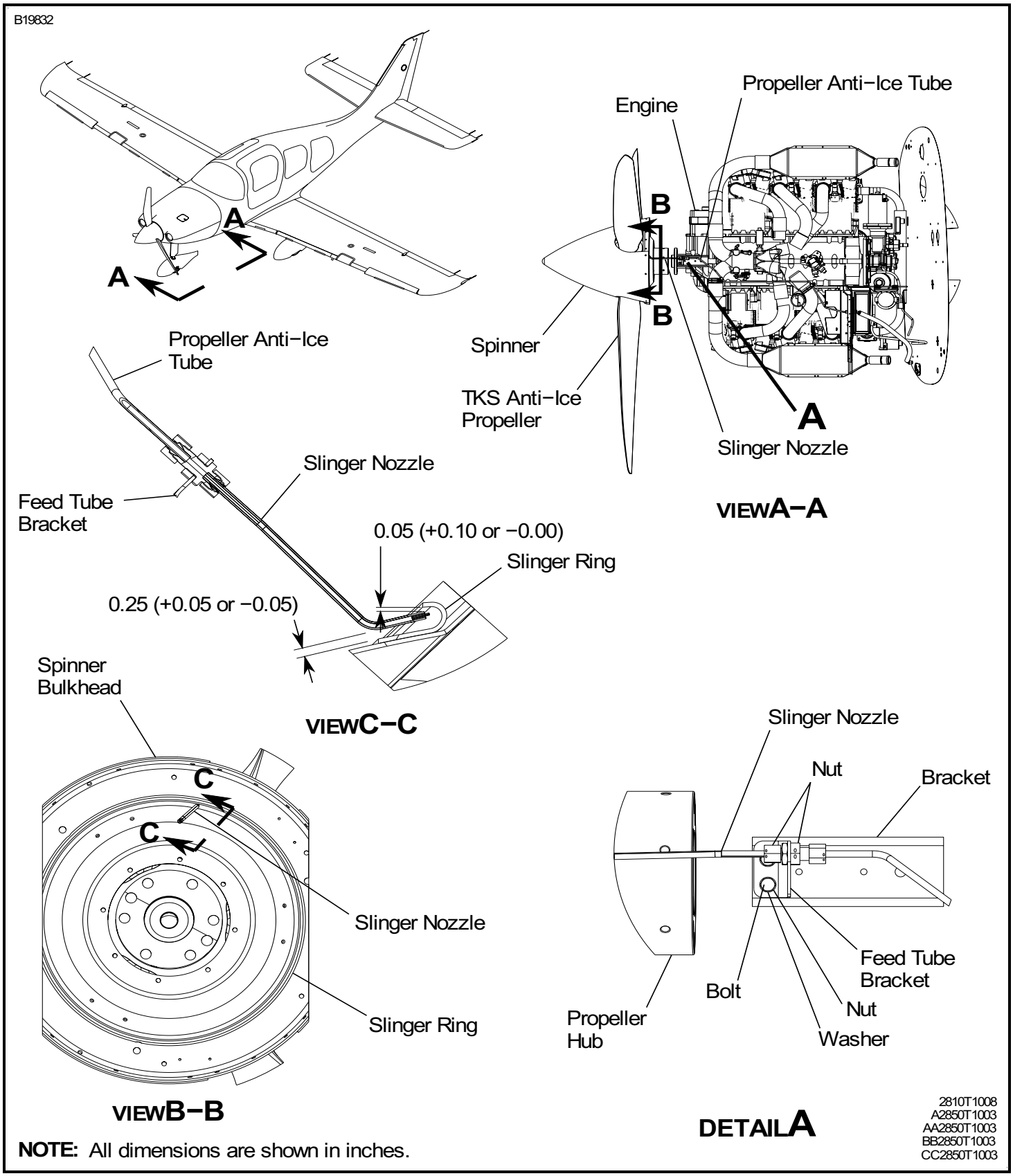
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Figure 201 : Sheet 2 : TKS Propeller Anti-Ice Feed Shoe Installation



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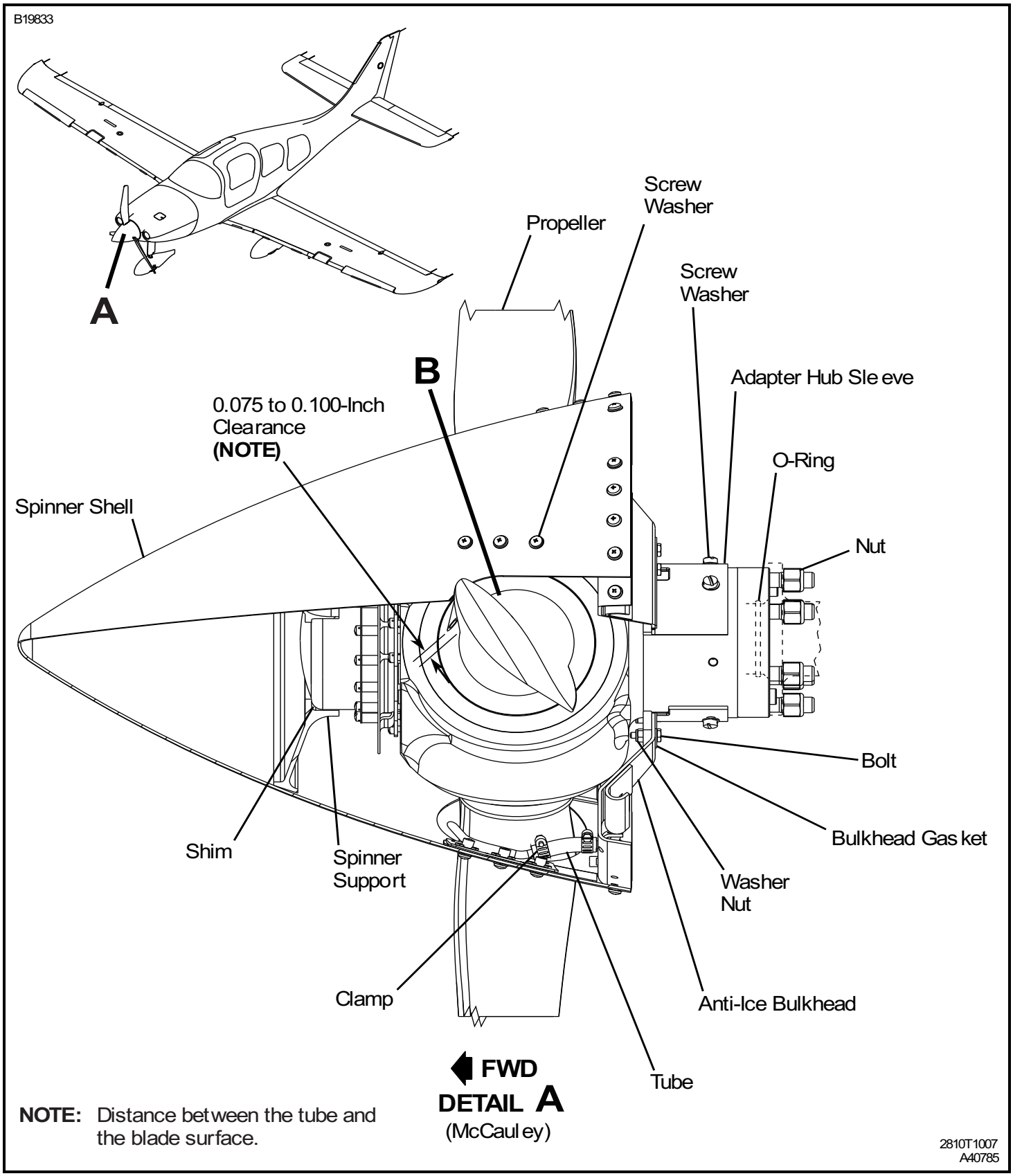
Figure 202 : Sheet 1 : Slinger Ring and Slinger Nozzle Alignment Check



NOTE: All dimensions are shown in inches.

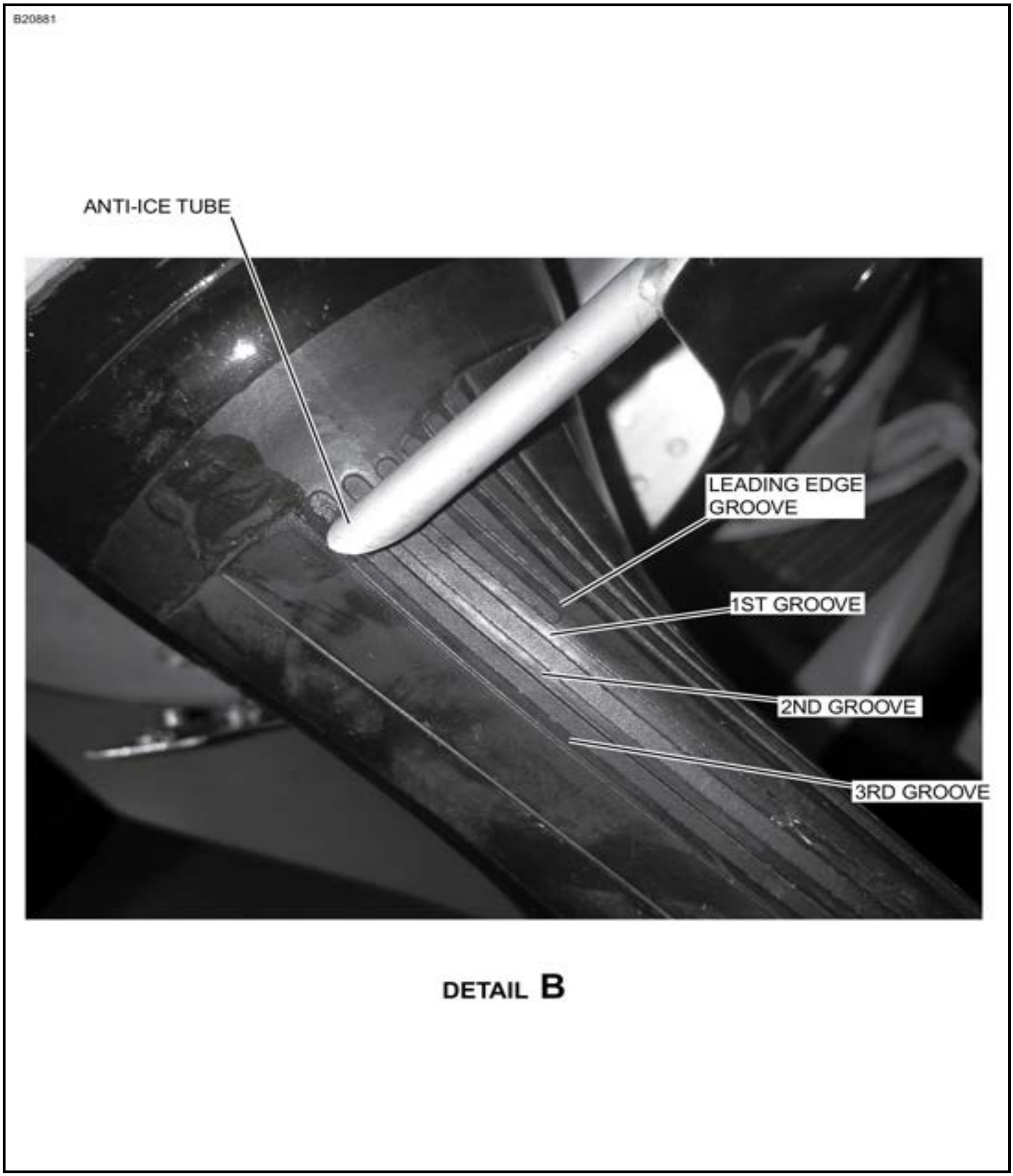
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Figure 203 : Sheet 1 : Anti-Ice Tube to Propeller Blade Alignment Check



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Figure 203 : Sheet 2 : Anti-Ice Tube to Propeller Blade Alignment Check



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INDICATING/RECORDING SYSTEMS - GENERAL

1. Hour Meter - General

A. **Indicating** - Flight time is recorded by an hour meter - most frequently referred to as the *Hobbs*. The Hobbs meter is installed as follows:

(1) For the Avidyne avionics option, the Hobbs is installed in the right knee bolster, next to the ELT remote switch.

(2) For the Garmin G1000 option, the Hobbs is installed on the left side of the center console.

(3) For the Model T240 Hobbs meter installation refer to, Instrument Panel (T240) - Removal/Installation

B. The instrument is DC powered. DC power for the hour meter bypasses the master switch and will operate with the master switch in the off position, provided sufficient battery power is available. The system is protected by a fuse located in a fuse block next to the battery. The meter is activated by an air switch and will record up to 9999.9 hours.

C. **Air Switch** - There is an air switch located behind the co-pilot's side of the instrument panel either on the fuselage or next to the terminal junction rail if Avidyne avionics are installed, or behind the instrument panel on the co-pilot's side if the Garmin G1000 system is installed, that activates at 2 inches of Hg or approximately 60 kts. This switch is plumbed into the pitot line for its activation.

NOTE: To disable the Hobbs during a pitot static check, remove the Hobbs fuse from the power grid. This will stop the accumulation of false time on the Hobbs. Replace the fuse after the test.

2. Documentation Of Hobbs Meter Replacement

A. **Placard** - If a Hobbs meter becomes inoperative, it must be replaced as soon as possible. The time shown on the defective meter plus the best estimate of the additional time in service must be placarded in an area near the Hobbs. For example, if the meter had 627.9 hours when it became inoperative and an additional 2.1 hours of time in service was flown before replacement, then the placarded time would be 630 hours. A statement like *630 hours must be the current Hobbs Meter reading* is an appropriate placard.

B. **Logbooks** - Statements like those in the Placard paragraph, along with the date and time of the discrepancy must be adequately documented in the airframe and engine logbooks.

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INDICATING/RECORDING SYSTEMS - MAINTENANCE PRACTICES

1. Removal, Installation, and Maintenance of the Hour Meter

A. General

(1) This section gives the Hour meter removal and installation procedures for the Avidyne and Garmin G1000 avionics options installations.

(2) For the Model T240 hour meter (Hobbs meter) removal and installation procedures, refer to Instrument Panel (T240) - Removal/Installation.

B. **Removal of the Hour Meter**

(1) If Avidyne avionics are installed in the aircraft, remove the right knee bolster per instructions in Section 25-11-00, Instrument Panels and Electrical Panels. If the Garmin G1000 system is installed, remove the access panel on the right side of the center console.

(2) Remove the connector installed in the back of the hour meter. Be sure to label the location of each wire.

(3) Unscrew the two screws on the back of the knee bolster, and slide the unit out.

C. **Installation of the Hour Meter**

(1) With the hour meter partially inserted through the hole in the knee bolster, install the connectors (per labeling) into the back of the hour meter.

(2) Slide the unit into its slot flush with the bolster, and install the two screws. The screws should be snug tight.

(3) Reinstall the knee bolster. Refer to Chapter 25, Instrument Panels and Electrical Panels - Maintenance Practices or replace the center console access panel, as applicable.

D. **Hour Meter Maintenance** - No special maintenance of the hour meter is required.

2. Removal and Installation of the Hobbs Oil Pressure Switch

A. The Hobbs oil pressure switch is located on the lower left side of the engine just forward of the firewall and below the engine oil filter. The switch serves a dual purpose to arm the aural warning system and to provide low oil pressure warning on the annunciator panel. The switch is closed when oil pressure is introduced to the system. If the battery is adequately charged, a ground is established for the Hobbs (the other side of the Hobbs is powered from the 3 amp fuse on the power grid), and the switch is activated. Refer to Figure 201.

(1) **Oil Pressure Switch Removal** - Use the following steps for removal of the Hobbs oil pressure switch.

(a) Remove the top engine cowling per instructions in Chapter 71.

(b) Remove the Packard electrical plug from the back of the switch.

(c) Use an open-end wrench to screw the 1/8 inch pipe-threaded switch out of the engine case.

(2) **Oil Pressure Switch Installation** - Use the following steps for installation of the oil pressure switch.

(a) Install the 1/8 inch pipe-thread pressure switch into the engine case. Torque switch 60 to 80 in.-lbs.

(b) Connect the Packard connector to the oil pressure switch. Ensure there is a red weather shield around the Packard switch.

(c) At an oil temperature reading of 75° F or higher, run the engine at about 1700 RPM to pressure test the system.

(d) Shut down the engine and check for oil leaks.

(e) Reinstall the engine cowl.

3. Removal and Installation of the Air Switch

A. **Removal of the Air Switch**

(1) If Avidyne avionics are installed in the aircraft, remove the glare shield and right side kidney panel per Section 25-11-00, Instrument Panels and Electrical Panels. If the Garmin G1000 system is installed, remove the glare shield per Chapter 25.

(2) Remove the mounting hardware, wires, and pitot line.

(3) Cap the pitot line, and connect the wires together if the aircraft is going to be operated with the switch removed.

B. **Installation of the Air Switch**

(1) Connect the pitot line, wires (to normally open and common), and mounting hardware.

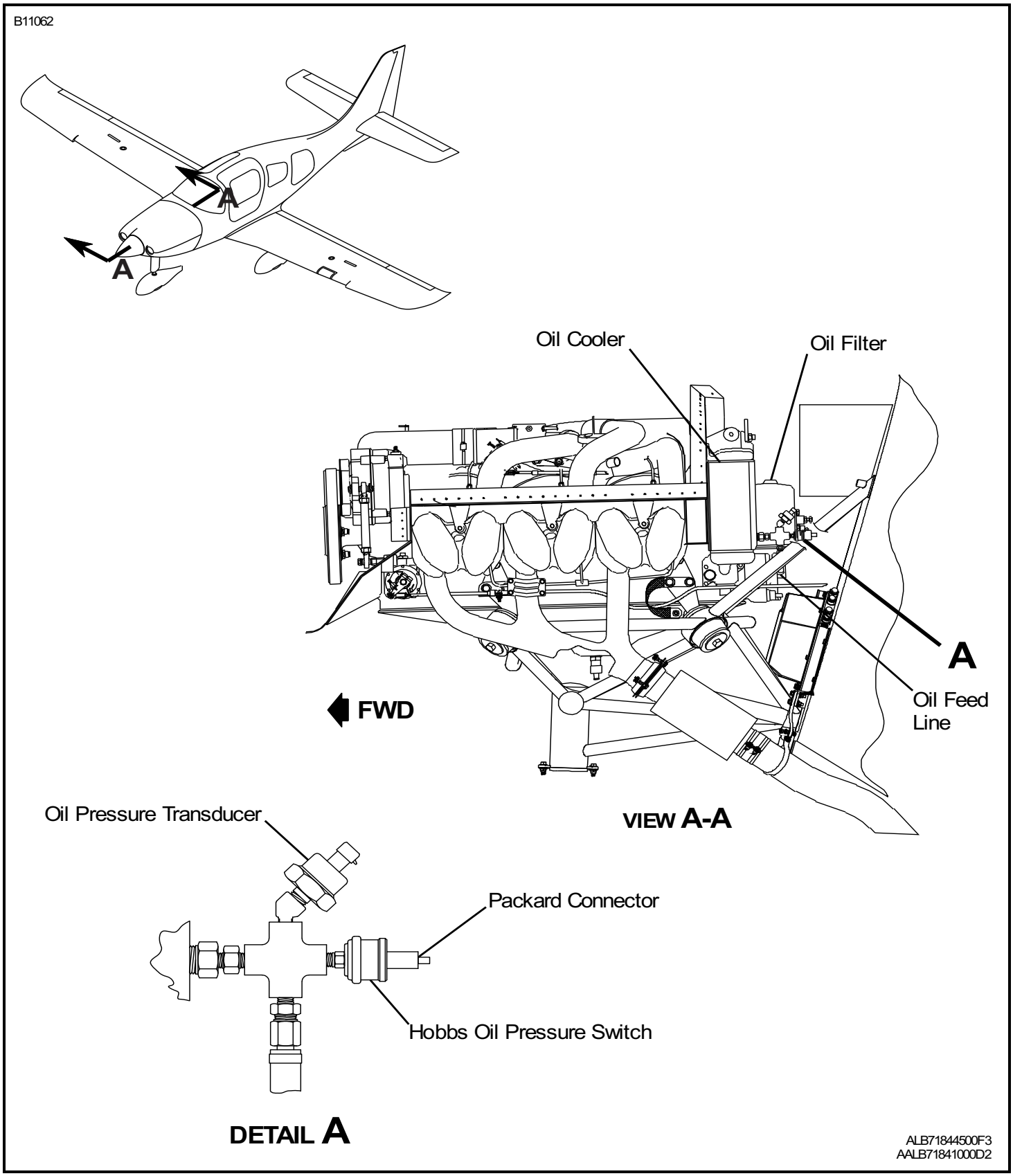
(2) Test the pitot system for leaks. The system cannot exceed 500 fpm at 1000 feet above field elevation.

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(3) Replace the glare shield and kidney panel, as applicable. Refer to Chapter 25, Instrument Panels and Electrical Panels - Maintenance Practices.

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Figure 201 : Sheet 1 : Hobbs Oil Pressure Switch



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INDICATING/RECORDING SYSTEMS - GENERAL

1. Hour Meter - General

A. **Indicating** - Flight time is recorded by an hour meter - most frequently referred to as the *Hobbs*. The Hobbs meter is installed as follows:

(1) For the Avidyne avionics option, the Hobbs is installed in the right knee bolster, next to the ELT remote switch.

(2) For the Garmin G1000 option, the Hobbs is installed on the left side of the center console.

(3) For the Model T240 Hobbs meter installation refer to, Instrument Panel (T240) - Removal/Installation

B. The instrument is DC powered. DC power for the hour meter bypasses the master switch and will operate with the master switch in the off position, provided sufficient battery power is available. The system is protected by a fuse located in a fuse block next to the battery. The meter is activated by an air switch and will record up to 9999.9 hours.

C. **Air Switch** - There is an air switch located behind the co-pilot's side of the instrument panel either on the fuselage or next to the terminal junction rail if Avidyne avionics are installed, or behind the instrument panel on the co-pilot's side if the Garmin G1000 system is installed, that activates at 2 inches of Hg or approximately 60 kts. This switch is plumbed into the pitot line for its activation.

NOTE: To disable the Hobbs during a pitot static check, remove the Hobbs fuse from the power grid. This will stop the accumulation of false time on the Hobbs. Replace the fuse after the test.

2. Documentation Of Hobbs Meter Replacement

A. **Placard** - If a Hobbs meter becomes inoperative, it must be replaced as soon as possible. The time shown on the defective meter plus the best estimate of the additional time in service must be placarded in an area near the Hobbs. For example, if the meter had 627.9 hours when it became inoperative and an additional 2.1 hours of time in service was flown before replacement, then the placarded time would be 630 hours. A statement like *630 hours must be the current Hobbs Meter reading* is an appropriate placard.

B. **Logbooks** - Statements like those in the Placard paragraph, along with the date and time of the discrepancy must be adequately documented in the airframe and engine logbooks.

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INDICATING/RECORDING SYSTEMS - MAINTENANCE PRACTICES

1. Removal, Installation, and Maintenance of the Hour Meter

A. General

(1) This section gives the Hour meter removal and installation procedures for the Avidyne and Garmin G1000 avionics options installations.

(2) For the Model T240 hour meter (Hobbs meter) removal and installation procedures, refer to Instrument Panel (T240) - Removal/Installation.

B. **Removal of the Hour Meter**

(1) If Avidyne avionics are installed in the aircraft, remove the right knee bolster per instructions in Section 25-11-00, Instrument Panels and Electrical Panels. If the Garmin G1000 system is installed, remove the access panel on the right side of the center console.

(2) Remove the connector installed in the back of the hour meter. Be sure to label the location of each wire.

(3) Unscrew the two screws on the back of the knee bolster, and slide the unit out.

C. **Installation of the Hour Meter**

(1) With the hour meter partially inserted through the hole in the knee bolster, install the connectors (per labeling) into the back of the hour meter.

(2) Slide the unit into its slot flush with the bolster, and install the two screws. The screws should be snug tight.

(3) Reinstall the knee bolster. Refer to Chapter 25, Instrument Panels and Electrical Panels - Maintenance Practices or replace the center console access panel, as applicable.

D. **Hour Meter Maintenance** - No special maintenance of the hour meter is required.

2. Removal and Installation of the Hobbs Oil Pressure Switch

A. The Hobbs oil pressure switch is located on the lower left side of the engine just forward of the firewall and below the engine oil filter. The switch serves a dual purpose to arm the aural warning system and to provide low oil pressure warning on the annunciator panel. The switch is closed when oil pressure is introduced to the system. If the battery is adequately charged, a ground is established for the Hobbs (the other side of the Hobbs is powered from the 3 amp fuse on the power grid), and the switch is activated. Refer to Figure 201.

(1) **Oil Pressure Switch Removal** - Use the following steps for removal of the Hobbs oil pressure switch.

(a) Remove the top engine cowling per instructions in Chapter 71.

(b) Remove the Packard electrical plug from the back of the switch.

(c) Use an open-end wrench to screw the 1/8 inch pipe-threaded switch out of the engine case.

(2) **Oil Pressure Switch Installation** - Use the following steps for installation of the oil pressure switch.

(a) Install the 1/8 inch pipe-thread pressure switch into the engine case. Torque switch 60 to 80 in.-lbs.

(b) Connect the Packard connector to the oil pressure switch. Ensure there is a red weather shield around the Packard switch.

(c) At an oil temperature reading of 75° F or higher, run the engine at about 1700 RPM to pressure test the system.

(d) Shut down the engine and check for oil leaks.

(e) Reinstall the engine cowl.

3. Removal and Installation of the Air Switch

A. **Removal of the Air Switch**

(1) If Avidyne avionics are installed in the aircraft, remove the glare shield and right side kidney panel per Section 25-11-00, Instrument Panels and Electrical Panels. If the Garmin G1000 system is installed, remove the glare shield per Chapter 25.

(2) Remove the mounting hardware, wires, and pitot line.

(3) Cap the pitot line, and connect the wires together if the aircraft is going to be operated with the switch removed.

B. **Installation of the Air Switch**

(1) Connect the pitot line, wires (to normally open and common), and mounting hardware.

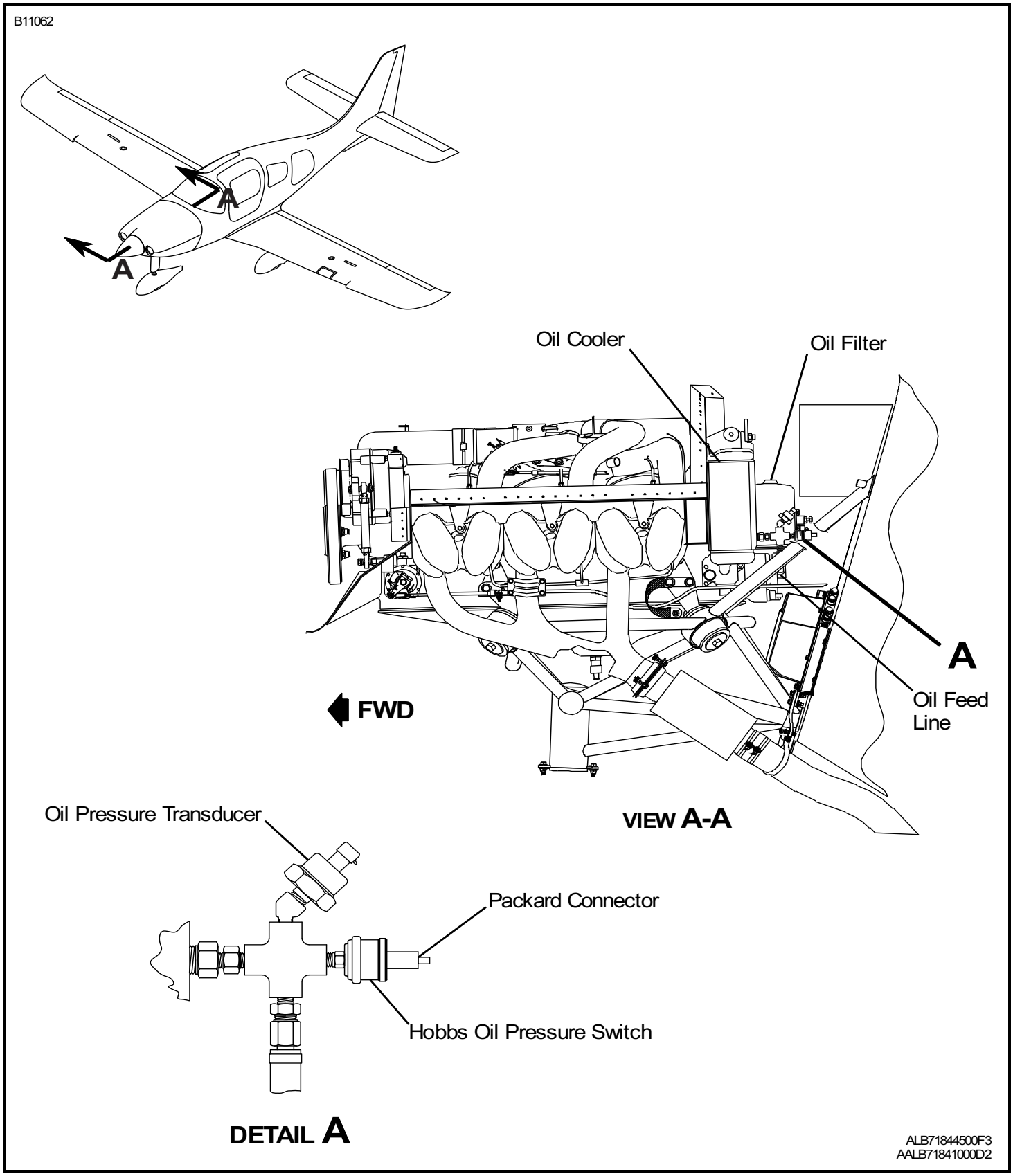
(2) Test the pitot system for leaks. The system cannot exceed 500 fpm at 1000 feet above field elevation.

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(3) Replace the glare shield and kidney panel, as applicable. Refer to Chapter 25, Instrument Panels and Electrical Panels - Maintenance Practices.

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Figure 201 : Sheet 1 : Hobbs Oil Pressure Switch



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VACUUM - GENERAL

1. General

A. The Cessna 400 does not have a vacuum system. All flight instruments are electrically powered.

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ELECTRICAL PANELS - GENERAL

1. General

A. Because there are a limited number of electrical panels in the airplane, and the topic is interrelated with equipment and furnishings the maintenance procedures are found as follows:

(1) Instrument Panels and Electrical Panels - Maintenance Practices.

(2) Instrument Panel (T240) - Removal/Installation.

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STANDARD PRACTICES/ STRUCTURES - GENERAL

1. General

A. This chapter covers non-structural repairs that may be performed in the field. Discussion and procedures include:

(1) Repairable Aircraft Parts - A list of the field repairable parts as well as allowable repairs.

(2) Damage Assessment - Damage area classification and determination of allowable repairs.

(3) Repair Methods - Repair methods to be used after damage assessment.

(4) Definitions - Material and procedure terminology definitions.

B. For structural repairs, refer to the latest revision of the Cessna LC-550FG Structural Repair Manual (LCSRM).

2. Definitions

A. **Controlled Surface** - For parts covered in this chapter, controlled surface is the exterior surface of the part which is painted or upholstered. During its initial cure at fabrication it sits against the mold surface and subsequently after cure will appear more smooth than the other surface.

B. **Uncontrolled Surface** - For parts covered in this chapter, uncontrolled surface is the interior surface of the part which is not painted or upholstered. During its initial cure at fabrication it is not in contact with the mold surface and subsequently after cure will not appear smooth. For the interior parts mounting hardware may exist on this surface.

C. **GTM** - Grain Transfer Mat. This mat allows the repair to have the same texture as leather or ultra-leather. It is to be made at least 24 hours in advance of the repair using Flexproof Compound and Catalyst.

D. **Chill Bar** - A clean, room temperature piece of metal which will allow a heated surface to be compressed and cooled.

3. Repairable Non-Structural Aircraft Parts

Table 1. Repairable Non-Structural Aircraft Parts

Part Name	Applicable Repairs
Air Conditioner Ducting	Interior Laminate, Bonding
Aileron Fences	Paint, Exterior Laminate, Bonding
Cabin Door Windows	Transparency
Elevator Fairings	Paint, Exterior Laminate, Bonding
Exterior Access Panels	Paint, Exterior Laminate
Glare Shield	Interior Laminate, Upholstery,
Horizontal Stabilizer Gap Seals	Paint, Exterior Laminate, Bonding
Interior Access Panels	Upholstery and Interior Laminate
Interior Panels	Upholstery and Interior Laminate
Landing/Taxi Light Cover	Transparency
Leg Fairings	Paint, Exterior Laminate, Bonding
Nose Fairings	Paint, Exterior Laminate, Bonding
Passenger Light Covers	Paint, Transparency
Passenger Windows	Transparency
Position Light Covers	Paint, Transparency
Speed Buns	Paint, Exterior Laminate, Bonding
Stall Strips	Paint, Exterior Laminate, Bonding
Wheel Pants	Paint, Exterior Laminate, Bonding
Windshield	Transparency
Wing Fillets	Paint, Exterior Laminate, Bonding

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CORROSION SEVERITY MAPS - DESCRIPTION AND OPERATION

1. General

A. This section contains maps that show areas of the world where the potential for corrosion on airplane structures is mild, moderate or severe.

B. Corrosion severity zones are affected by atmospheric and other climatic factors. The maps shown in this section are to be used as guidance when types and frequency of required inspections as well as other maintenance are determined.

CAUTION: Airports that use deicing fluids such as potassium formate or those with chemical properties similar to urea or salt must be classified as severe corrosion environments regardless of how they are classified on the following maps. Failure to follow the severe classification for airplanes that operate in these environments can result in corrosion damage to the airplane.

CAUTION: An airplane that flies into any severe corrosion areas during its operational route will be classified as operating in a severe zone.

(1) For the corrosion severity map for North America, refer to Figure 1.

(2) For the corrosion severity map for South America, refer to Figure 2.

(3) For the corrosion severity map for Africa, refer to Figure 3.

(4) For the corrosion severity map for Asia, refer to Figure 4.

(5) For the corrosion severity map for Europe and Asia Minor, refer to Figure 5.

(6) For the corrosion severity map for the South Pacific region, refer to Figure 6.

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Figure 1 : Sheet 1 : North America Corrosion Severity Map



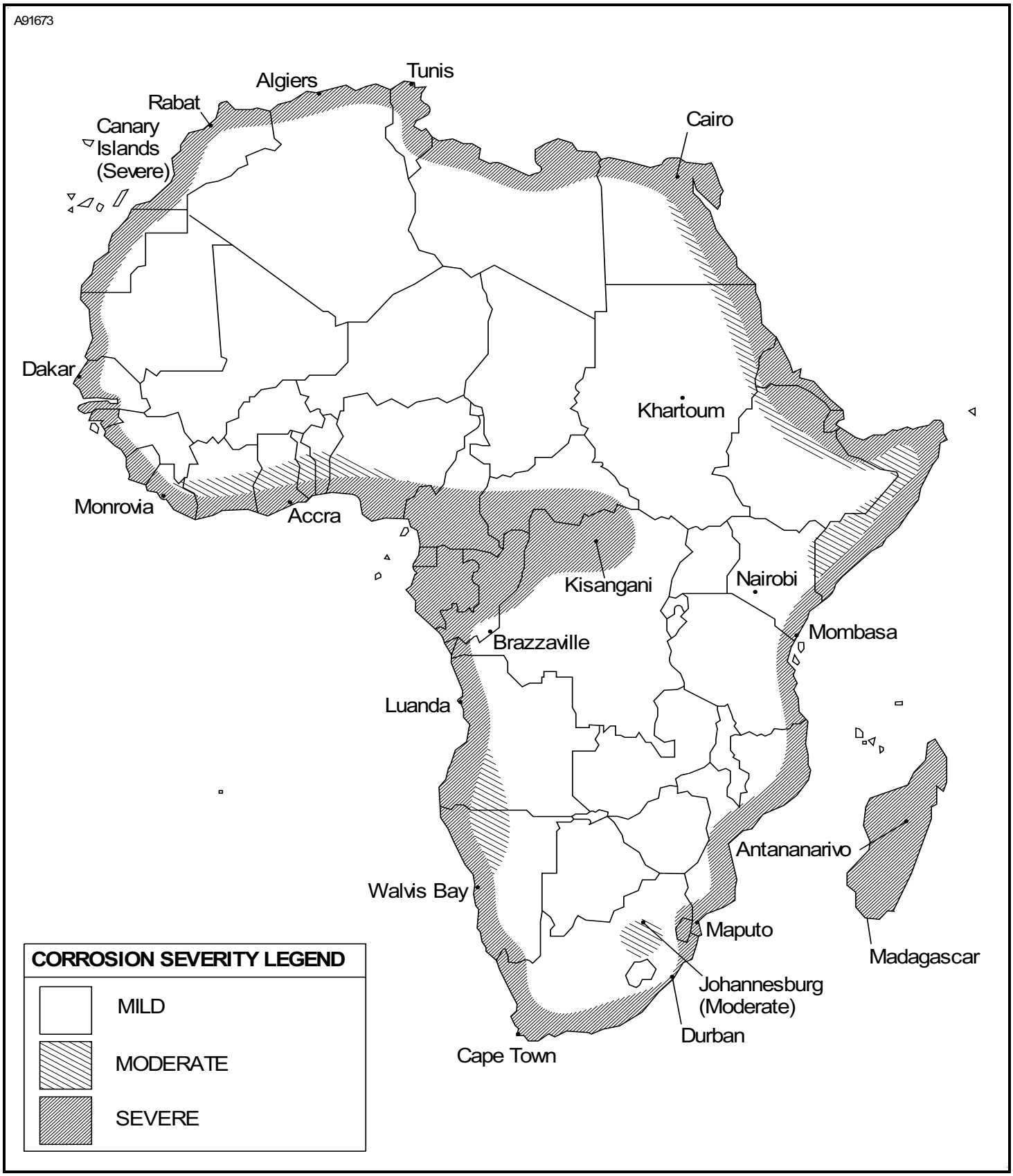
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Figure 2 : Sheet 1 : South America Corrosion Severity Map



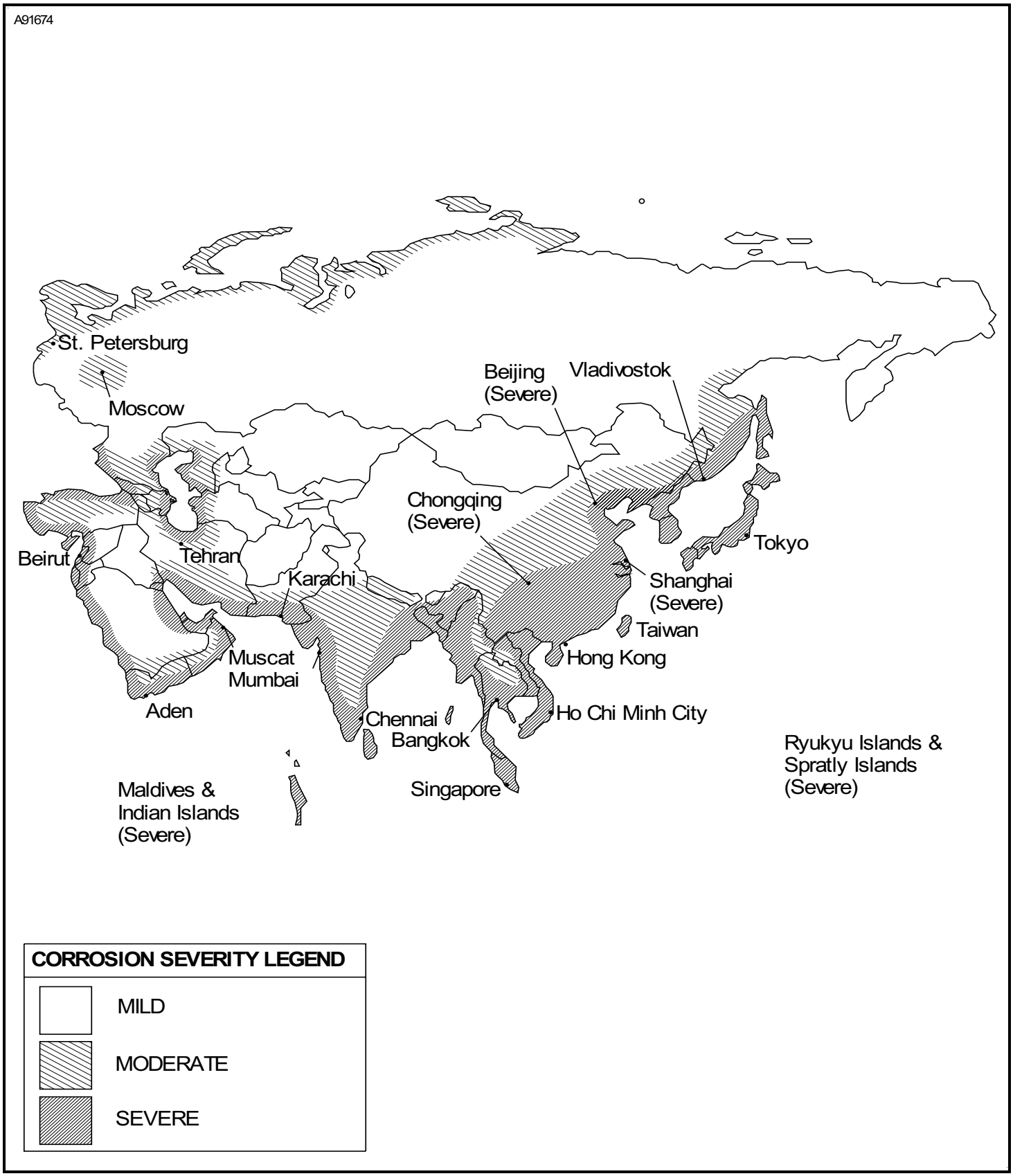
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Figure 3 : Sheet 1 : Africa Corrosion Severity Map



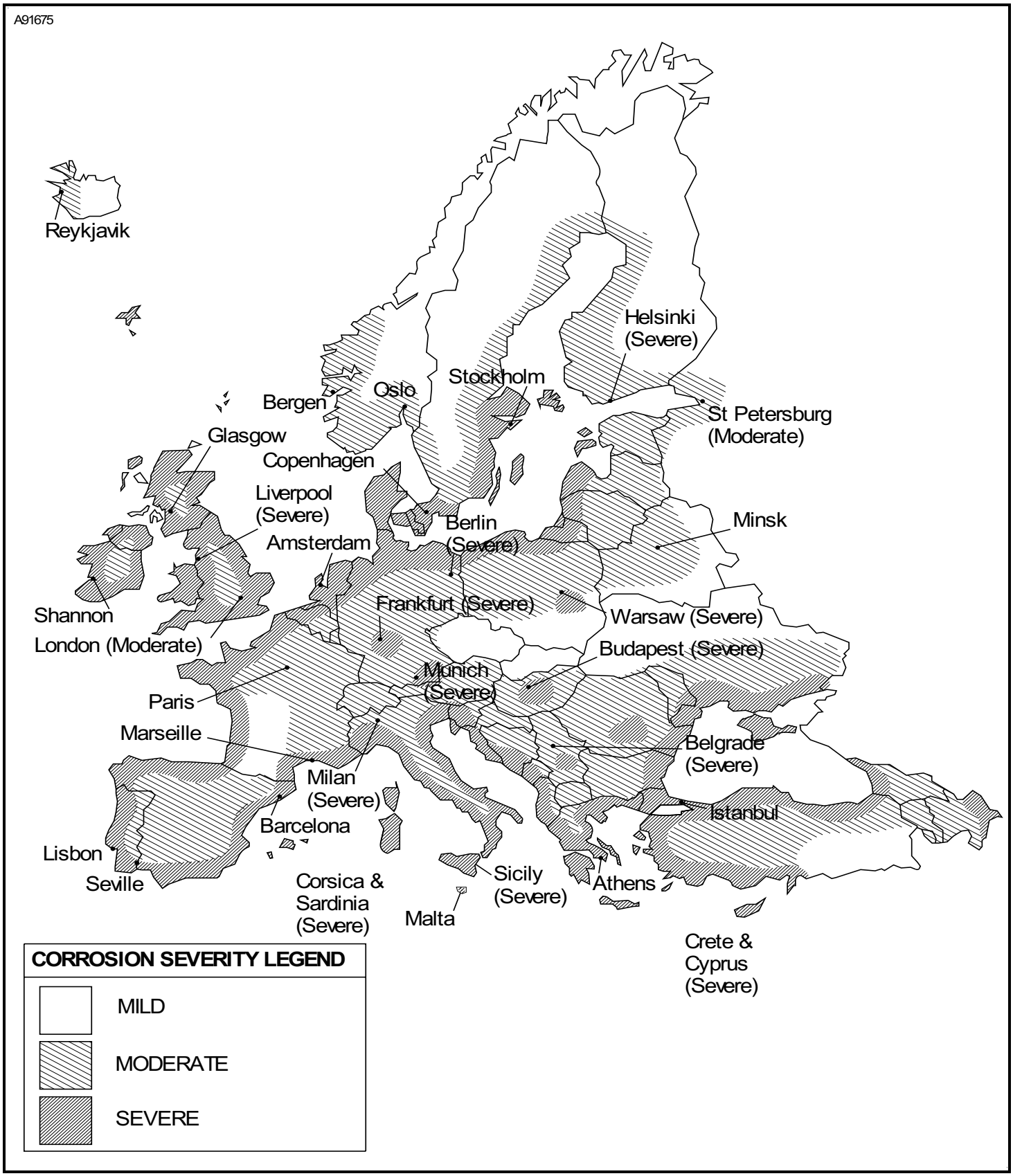
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Figure 4 : Sheet 1 : Asia Corrosion Severity Map



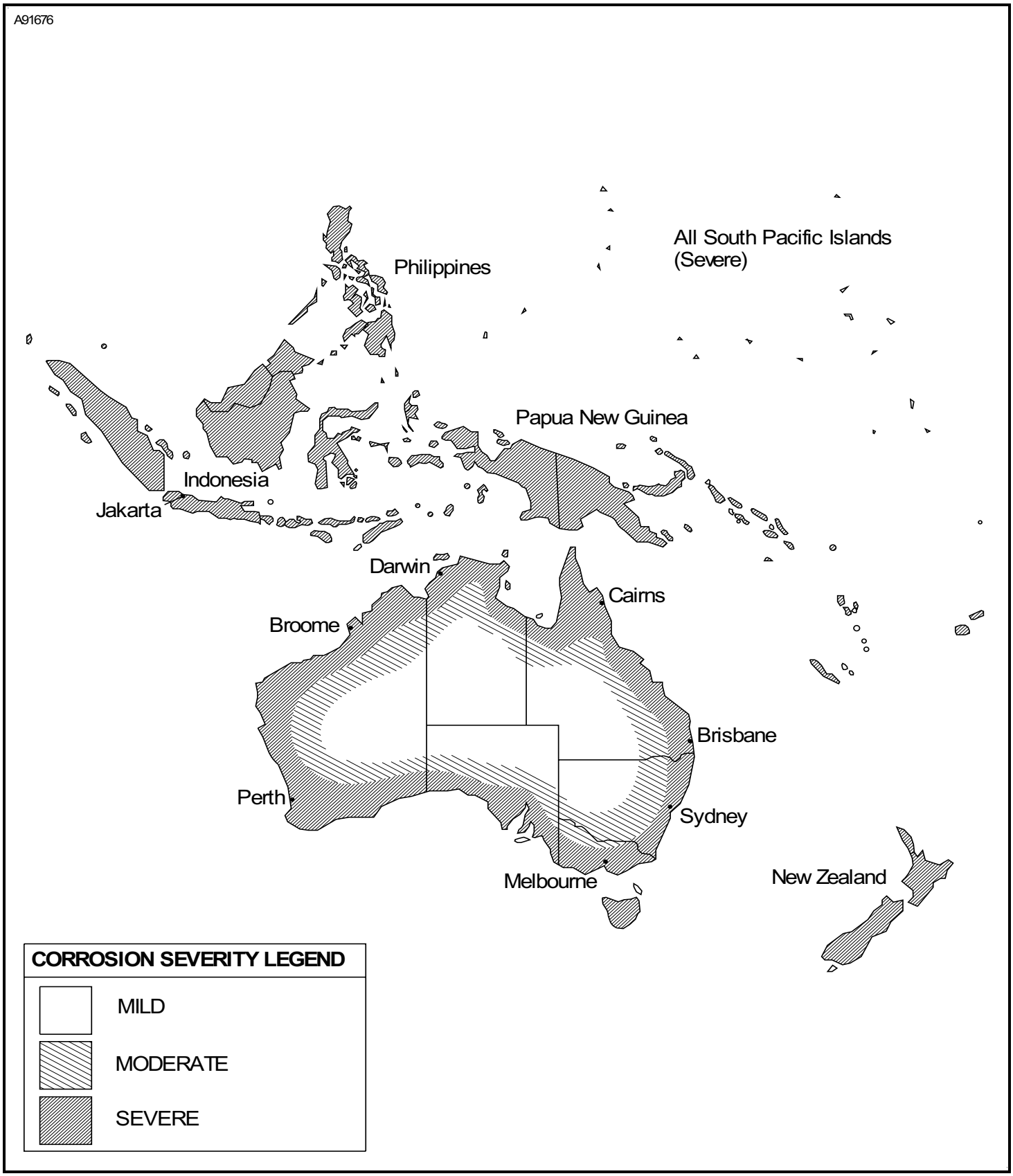
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Figure 5 : Sheet 1 : Europe and Asia Minor Corrosion Severity Map



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Figure 6 : Sheet 1 : South Pacific Corrosion Severity Map



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DAMAGE ASSESSMENT - DESCRIPTION AND OPERATION

1. Damage Assessment

NOTE: During damage assessment it is possible to come across defects unrelated to the suspect damage being investigated. If you have any concerns, please Contact Cessna Customer Service for a history of dispositions on the part.

A. **Paint Damage** - Classified as damage to a painted surface which has removed paint but not damaged the composite part beneath it.

NOTE: Paint damage can be a sign of other types of damage. For example a crack in the paint in an area where two components are bonded together could indicate bond failure. In these cases it is advised to remove paint and primer to investigate.

B. **Mesh Damage** - To determine whether mesh needs to be repaired, first evaluate which "Zone" of the aircraft the damage is in. Refer to Chapter 51, Paint Repair and Painting. Antenna mounting pads and "covered areas" require separate review. A covered area is an area not exposed to direct lightning attachment. Mesh areas inside a cove, under an access panel, and under a static wick mounting pad, for example, are considered covered areas. Major direction is the greater dimension of a fore-to-aft or left-to-right measurement of the assembly's mesh coverage. Minor direction is the lesser dimension of a fore-to-aft or left-to-right measurement of the assembly's mesh coverage.

(1) **Mesh Damage Not Requiring Repair**

(a) Zone 1 - The loss of mesh not greater than two inches average diameter, not to exceed 4 sq. in. per defect on a surface area. Combined losses not to exceed 10 percent of the minor direction or two inches, whichever is greater.

(b) Zone 2 or 3 - The loss of mesh not greater than three inches average diameter, not to exceed six sq. in. per defect on a surface area. Combined losses not to exceed 10 percent of the minor direction or three inches, whichever is greater.

(c) Antenna Mounting Pad - If greater than 50 percent of the antenna mounting pad area has visible mesh, is somewhat flat, and there is electrical connection to both sides of the fuselage then no repair is necessary.

(d) Covered Area - If greater than 50 percent of the covered area has visible mesh, then no repair is necessary.

(2) **Damage Requiring Repair**

(a) Zones 1, 2, and 3 - Any damage greater than that defined above as damage that does not require repair.

(b) Antenna Mounting Pad

1 If greater than 25 percent, but less than 50 percent, of the antenna mounting pad area has visible mesh, and there is an electrical connection to both sides of the fuselage, then the mesh repair will be limited to the antenna mounting area. Refer to the LCSRM, Chapter 51, Mesh Repair.

2 If less than 25 percent of the antenna mounting pad area has visible mesh, or there is no electrical connection to both sides of the fuselage, a mesh repair with 1 inch overlaps to existing mesh (past the mounting pad area) will be required. Refer to the LCSRM, Chapter 51, Mesh Repair.

(c) Covered Area

1 If greater than 25 percent, but less than 50 percent, of the covered area has visible mesh, then the mesh repair can be limited to the covered area. Refer to the LCSRM, Chapter 51, Mesh Repair.

2 If less than 25 percent of the covered area has visible mesh, a full mesh repair with 1 inch overlaps to existing mesh (past the covered area) will be required. Refer to the LCSRM, Chapter 51, Mesh Repair.

C. **Laminate Damage** - Classified as damage to, or penetration of the fibers of the composite part. The two types of damage repairable through methods in this chapter are as follows:

(1) **Surface Cuts and Abrasions** - Cuts, scratches, and abrasions that extend through the surface resin but not into the first layer of fabric shall be acceptable as is and do not need to be repaired.

(2) **Delamination of Plies** - This is defined as the separation of the plies in the composite part. Visually it will appear as a whitened or cloudy area within the composite part though it is important to note that the resin in the composite part may also appear white. Delamination between several different layers of plies is possible and will be denoted by contrasts in the whitened areas.

(a) If you suspect an area may be delaminated but cannot confirm this visually, perform a Tap Test. Refer to the

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LCSRM, Chapter 51, Structural Composite Repair Guidelines, Non-Destructive Inspection.

(3) **Delamination of Plies around Attachment Holes** - This has the same definition of Delamination of plies (above) but occurs specifically around attachment holes. This is limited to the elevator fairings and interior/exterior access panels of the part.

(4) **Fracture of Plies** - This is defined as damage either occurring to or penetrating the fibers of the composite part. It will appear as a break in the plies where the fibers of the composite part have been compromised. It is common to see the reinforcement fibers of the ply during a fracture.

NOTE: With impact damage to the laminate, it is common to see a fractured area surrounded by an area where delamination of the plies has occurred. In these cases, it is recommended to use the tap test method to locate the areas surrounding the fracture which are delaminated. Refer to the LCSRM, Chapter 51, Structural Composite Repair Guidelines, Non-Destructive Inspection.

D. **Upholstery Damage** - Damage to an upholstered surface which has cut or torn the upholstery but with no damage to the underlying composite structure.

E. **Transparency Damage** - Damage to a transparent surface which causes a scratch, a pit or any other visible deformation. Transparent surfaces include the windshield, windows and the landing/taxi light cover.

F. **Bond Failure** - Damage which exists when two components begin to separate at the bonded surface.

2. Field Repairable Damage

A. **Paint Damage** - Any damage to a painted surface which has not damaged the composite part beneath it shall be acceptable as is and does not need to be repaired. The only consideration for repair will be for cosmetic purposes.

B. **Laminate Damage and Repair Defects** - Damage to non-structural aircraft parts may be repaired in accordance with this chapter. Refer to Table 1, Repairable Non-Structural Aircraft Parts.

Table 1. Repairable Non-Structural Aircraft Parts

Part Name	Applicable Repair
Air Conditioner Ducting	Interior Laminate, Bonding
Aileron Fences	Paint, Exterior Laminate, Bonding
Cabin Door Windows	Transparency
Elevator Fairings	Paint, Exterior Laminate, Bonding
Exterior Access Panels	Paint, Exterior Laminate
Glare Shield	Interior Laminate, Upholstery,
Horizontal Stabilizer Gap Seals	Paint, Exterior Laminate, Bonding
Interior Access Panels	Upholstery and Interior Laminate
Interior Panels	Upholstery and Interior Laminate
Landing/Taxi Light Cover	Transparency
Leg Fairings	Paint, Exterior Laminate, Bonding
Nose Fairings	Paint, Exterior Laminate, Bonding
Passenger Light Covers	Paint, Transparency
Passenger Windows	Transparency
Position Light Covers	Paint, Transparency
Speed Buns	Paint, Exterior Laminate, Bonding
Stall Strips	Paint, Exterior Laminate, Bonding
Wheel Pants	Paint, Exterior Laminate, Bonding
Windshield	Transparency
Wing Fillets	Paint, Exterior Laminate, Bonding

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(1) **Exterior Parts** - Parts with defects that are directly exposed to airflow or experience air loads such as wheel pants, wing fillets, wing and vertical stabilizer access panels, flight control surface access panels, vortex generators, etc., may be repaired in accordance with this Maintenance Manual. Refer to Table 2, Maximum Repairable Defects (Exterior Parts).

Table 2. Maximum Repairable Defects (Exterior Parts)

Defect	Repair Limitations
Bond Failure	Complete disbond is repairable if original bond footprint can be identified.
Delamination or fractures in all other locations	Delaminations with a total defect area that do not exceed 4.0 square inches (2581.0 square millimeters) are repairable in accordance with this Maintenance Manual.
Fractures	Fractures that do not exceed 4.0 inches (102.0 mm) in length are repairable in accordance with this Maintenance Manual.

(2) **Interior Parts** - Parts that are not exposed to the airflow, such as interior paneling and support brackets, cabin air vent ducts, access panels, and glare shield, etc., may be repaired in accordance with this Maintenance Manual. Refer to Table 3, Maximum Repairable Defects (Interior Parts).

Table 3. Maximum Repairable Defects (Interior Parts)

Defect	Repair Limitations
Bond Failure	The defect area is repairable provided the area does not exceed 5 percent of the bonding surface.
Delamination	Delamination is repairable provided the total defect areas do not exceed 5 percent of the total area of the parts.
Fracture	Fractures that do not exceed 4.0 inches (102.0 mm) in length is repairable in accordance with this Maintenance Manual.
Transparency Damage	Damage to a transparent surface which causes a scratch, a pit or any other visible deformation is not allowed.
Upholstery Damage	Damage to a cut or torn upholstered surface is repairable. Verify condition of underlying composite structure.

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CORROSION - DESCRIPTION AND OPERATION

1. General

A. This section will describe corrosion so the maintenance personnel can identify the various types of corrosion and apply corrosion-preventive compound to minimize corrosion activity.

B. Corrosion is the deterioration of a metal by reacting with its environment. Corrosion occurs because most metals have a tendency to return to their natural state.

2. Characteristics of Corrosion

A. Metals corrode by direct chemical or electrochemical reaction with their environment. The following listed steps describe electrochemical reaction.

(1) Electrochemical type of corrosion can best be compared to a battery cell. Four conditions must exist before electrochemical corrosion can occur.

(a) There must be a metal that corrodes and acts as the anode.

(b) There must be a less corrodible metal that acts as the cathode.

(c) There must be a continuous liquid path between the two metals which acts as the electrolyte, usually condensation and salt or other contaminations.

(d) There must be a conductor to carry the flow of electrons from the cathode to the anode. This conductor is usually in the form of a metal-to-metal contact (rivets, bolts, welds, etc.).

(2) The elimination of any one of the four conditions described above will stop the corrosion reaction process.

(3) One of the best ways to eliminate one of the four described conditions is to apply an organic film (such as paint, grease, plastic, etc.) to the surface of the metal affected. This will prevent the electrolyte from connecting the cathode to the anode, and current cannot flow, therefore, preventing corrosion reaction.

(4) At normal atmospheric temperatures, metals do not corrode appreciably without moisture, but the moisture in the air is usually enough to start corrosive action.

(5) The initial rate of corrosion is usually much greater than the rate after a short period of time. This slowing down occurs because of the oxide film that forms on the metal's surface. This film tends to protect the metal underneath.

(6) When components and systems constructed of many different types of metals must perform under various climatic conditions, corrosion becomes a complex problem. The pressure of salts on metal surfaces (from sea coast operation) greatly increases the electrical conductivity of any moisture present and accelerates corrosion.

(7) Other environmental conditions which contribute to corrosion are:

(a) Moisture collecting on dirt particles.

(b) Moisture collecting in crevices between lap joints, around rivets, bolts and screws.

3. Types of Corrosion

A. The common types of corrosion that are encountered in airplane maintenance is described below. In actual practice, it may be difficult to determine the exact type. The reason for this is, that, more than one type may be occurring in the same area, at the same time. However, even though you may not be able to identify the exact type or types you shall be able to determine that there is some kind of corrosion taking place. If impractical to replace assembly or component, contact authorized repair station.

B. Uniform Etch Corrosion

(1) The surface effect produced by most direct chemical attacks (as by acid) is uniform etching of the metal. On a polished surface this type of corrosion is first seen as a general dulling of the surface. If such corrosion is allowed to continue unchecked, the surface becomes rough and possibly frosted in appearance.

C. Pitting or Pin Hole Corrosion

(1) The most common effect of corrosion on aluminum and magnesium alloy parts is called pitting. It is first noticeable as a white or gray powdery deposit, similar to dust, which blotches the surface (refer to Figure 1).

(2) When the deposit is cleaned away, tiny pits can be seen in the surface. Pitting may also occur in other types of metal alloys.

D. Intergranular Corrosion

(1) This type of corrosion attacks the grain boundaries of metals. A highly magnified cross-section of any alloy shows the

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granular structure of the metal.

(2) This structure consists of quantities of individual grains, and each of these tiny grains has a clearly defined boundary and differs chemically from the metal grain next to it. The adjacent grains of different elements can react with each other as anode and cathode when in contact with an electrolyte. This conductive arrangement causes rapid selective corrosion at the grain boundary, thus destroying the solidity of the metal (refer to Figure 1).

E. Exfoliation Corrosion

(1) Exfoliation is a form of integranular corrosion. It shows itself by "lifting up" the surface grains of a metal by the force of expanding corrosion. This occurs at the grain boundaries just below the surface of the metal.

(2) Exfoliation gives the appearance of sheets of very thin metal separated by corrosion products. This type of corrosion is most often seen on extruded sections. There the grain thicknesses are usually less than in rolled alloy form. Most exfoliation type corrosion is found on aluminum alloy ducting.

F. Galvanic Corrosion

(1) Galvanic corrosion occurs when dissimilar metals are in contact. The contacting of these unlike metals provide an internal circuit. An external circuit is provided by the presence of a buildup of an electrolytic substance between these metals. An example is when aluminum components are attached with steel fasteners.

G. Concentration Cell Corrosion

(1) Concentration cell corrosion occurs when two or more areas of the same metal surface are in contact with different concentrations of the same solution: moist air, water, chemicals, etc.

(2) The general types of concentration cell corrosion are identified as: metal ion cells and oxygen concentration cell (refer to Figure 1).

H. Filiform Corrosion.

(1) Filiform corrosion is a "concentration cell" corrosion process. When a break in the protective coating over aluminum occurs, the oxygen concentration at the back or bottom of the defect is lower than that at its open surface. The oxygen concentration gradient, thus established, causes an electric current flow, and corrosion results. Filiform corrosion results when this happens along the interface between the metal and the protective coating and appears as small worm-like tracks. Filiform corrosion generally starts around fasteners, holes and countersinks and at the edge of sheet metal on the outer surface of the airplane. Filiform corrosion is more prevalent in areas with a warm and damp environment.

(2) To help prevent filiform corrosion development, the airplane should be:

(a) Spray washed at least every two to three weeks (especially in a warm and damp environment).

(b) Waxed with a good grade of water repellent wax to help keep water from accumulating in the skin joints and around countersinks.

NOTE: Wax only clean surfaces. Wax applied over salt deposits will almost guarantee a trapped salt deposit which is capable of accumulating moisture and developing into corrosion.

(c) Keep the airplane hangared to protect it from the atmosphere.

(d) Fly the airplane to promote aeration of the enclosed parts.

(e) Ensure all vent/drain holes are open to ventilate the interior of the airplane.

I. Stress Corrosion Cracking

(1) This corrosion is caused by the simultaneous effects of tensile stress and corrosion. The stress may be internal or applied. Internal stresses are produced by nonuniform shaping during cold working of the metal. These stresses are also created by press and shrink fitting general hardware.

(2) Stresses induced when pieces such as rivets and bolts are formed, are internal stress. These components can crack because of the internal stresses, and this characteristic is aggravated by corrosion. That is why such cracking is called stress corrosion cracking (refer to Figure 1).

J. Fatigue Corrosion

(1) Fatigue corrosion is a special case of stress corrosion caused by the combined effects of cyclic stress and corrosion. An example of this kind of corrosion is unprotected engine bleed air ducts that are exposed to moisture. They are often held in such a way that thermal expansion causes repeated twisting of the duct. This causes metal fatigue and cracks in which corrosion starts.

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4. Corrosion Typical Areas

A. Aluminum appears high in electrochemical series of elements, and its position indicates that it should corrode very easily. However, the formation of a tightly adhering oxide film offers increased resistance under mild corrosive conditions. Most metals in contact with aluminum form couples which undergo galvanic corrosion attack. The alloys of aluminum are subject to pitting, intergranular corrosion, and intergranular stress corrosion cracking.

B. Battery Electrolyte

(1) The battery, battery cover, battery box and adjacent areas (especially areas below the battery box where battery electrolyte may have seeped) are subject to the corrosive action.

(2) If spilled battery electrolyte is neutralized and cleaned up at the same time of spillage, corrosion can be held to a minimum by using a weak boric acid solution to neutralize the potassium hydroxide (battery electrolyte); if boric acid is unavailable flood the area with cold water.

(3) When corrosion appears, refer to the Structural Repair Manual for corrosion removal and treatment.

C. Relief Tube Area and Toilet Area

(1) The accessible areas shall be cleaned and disinfected after each flight (if used). The key to controlling corrosion is cleanliness. The inaccessible areas are protected by sealant. When corrosion appears, refer to the Structural Repair Manual for corrosion removal and treatment.

D. Steel Control Cable

(1) Checking for corrosion on control cables is normally accomplished during the preventative maintenance check. During preventative maintenance, broken wire and wear of the control cable is also checked.

(2) If the surface of the cable is corroded, carefully force the cable open by reverse twisting and visually inspect the interior. Corrosion on the interior strands of the cable constitutes failure and the cable must be replaced. If no internal corrosion is detected, remove loose external rust and corrosion with a clean dry coarse-weave rag or fiber brush.

NOTE: Do not use metallic wools or solvents to clean installed cables. Use of metallic wool will imbed dissimilar metal particles in the cables and create further corrosion. Solvents will remove internal cable lubricant allowing cable strands to abrade and further corrode.

(3) After thorough cleaning of the exterior cable surface, apply a light coat of lubricant (5565450-28) to the external cable surface.

E. Integral Fuel Tanks

(1) The presence of soil, contamination, a brown slimy substance, and pitting type corrosion has been observed in the lower areas of the intergral fuel tanks of certain airplanes. This condition has caused a general degradation of some topcoating and some depolymerization and loosening of sealant materials in lower areas.

(2) The contaminants resembled normal aluminum corrosion products, including a considerable quantity of iron. The brown, slimy deposits proved to be microbial in nature. Examination of the corrosion pits by metallurgical technician indicated the presence of intergranular attacks.

(3) Procedures for removal of surface contamination and corrosion products from integral fuel tanks is described in the Structural Repair Manual.

F. Requirements Peculiar to Faying Surfaces of Airframes, Airframe Parts and Attaching Surfaces of Equipment, Accessories, and Components

(1) When repairs are made on equipment, or when accessories and components are installed, the attaching surfaces of these items shall be protected. The following requirements are peculiar to faying surfaces in airframes, airframe parts, and attaching surfaces of equipment, accessories, and components.

(2) Surfaces of Similar or Dissimilar Metals.

(a) All faying surfaces, seams and lap joints protected by sealant shall have entire faying surface coated with sealant. Excess material squeezed out shall be removed so that a fillet seal remains. Joint areas which could hold water shall be filled or coated with sealant.

(b) Faying surfaces that are to be adhesive bonded shall be treated and processed as specified in the Structural Repair Manual.

(3) Attaching Parts

(a) Attaching parts such as nuts, bushings, spacers, washers, screws, self-tapping screws, self-locking nuts,

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clamps, etc., do not need to be painted in detail except when dissimilar metals or wood contact are involved in the materials being joined. Such parts shall receive a wet or dry coat of primer.

NOTE: Corrosion inhibiting solid film lubricants, Specification MIL-PRF-46010 and Specification MIL-L-46147, may be used to protect attaching parts from corrosion.

(b) All holes drilled or reworked in aluminum alloys to receive bolts, bushings, screws, rivets and studs shall be treated with Specification MIL-C-81706 material before installation of fastener or bushing.

(c) All holes drilled or reworked in magnesium shall receive a chrome acid pretreatment before installation of bolts, bushings, screws, rivets and studs.

(d) All rivets used to assemble dissimilar metals shall be installed wet with sealant conforming to Specification MIL-PRF-81733.

(4) Close Tolerance Bolts - Close tolerance bolts passing through dissimilar metals shall be coated before installation with a corrosion inhibiting solid film lubricant conforming to Specification MIL-PRF-46010 and/or Specification MIL-L-46147.

(5) Washers - Aluminum alloy washers of suitable design shall be used under machine screws, countersunk fasteners, bolt heads and nuts that would otherwise contact magnesium.

(6) Adjustable Parts - Threads of adjustable parts such as tie rod ends, turnbuckles, etc., shall be protected with solid film lubrication conforming to Specification MIL-PRF-46010 or Specification MIL-L-46147.

(7) Slip Fits - Slip fits shall be assembled using wet primer conforming to Specification MIL-PRF-23377, non-drying zinc chromate paste, or solid film lubricant conforming to Specification MIL-PRF-46010 or Specification MIL-L-46147.

(8) Press Fits - The pressing shall be accomplished with an oil-containing material conforming to Specification MIL-C-11796, Class 3, or Specification MIL-C-16173, Grade 1, or other suitable material that will not induce corrosion.

G. Electrical

(1) Bonding and ground connections shall be as described by the installation procedure.

(2) Potting of Electrical Connectors and Electrical Terminals - Corrosion in electrical systems and resultant failure can often be attributed to moisture and climatic condition. Potting compounds are used to safeguard against moisture.

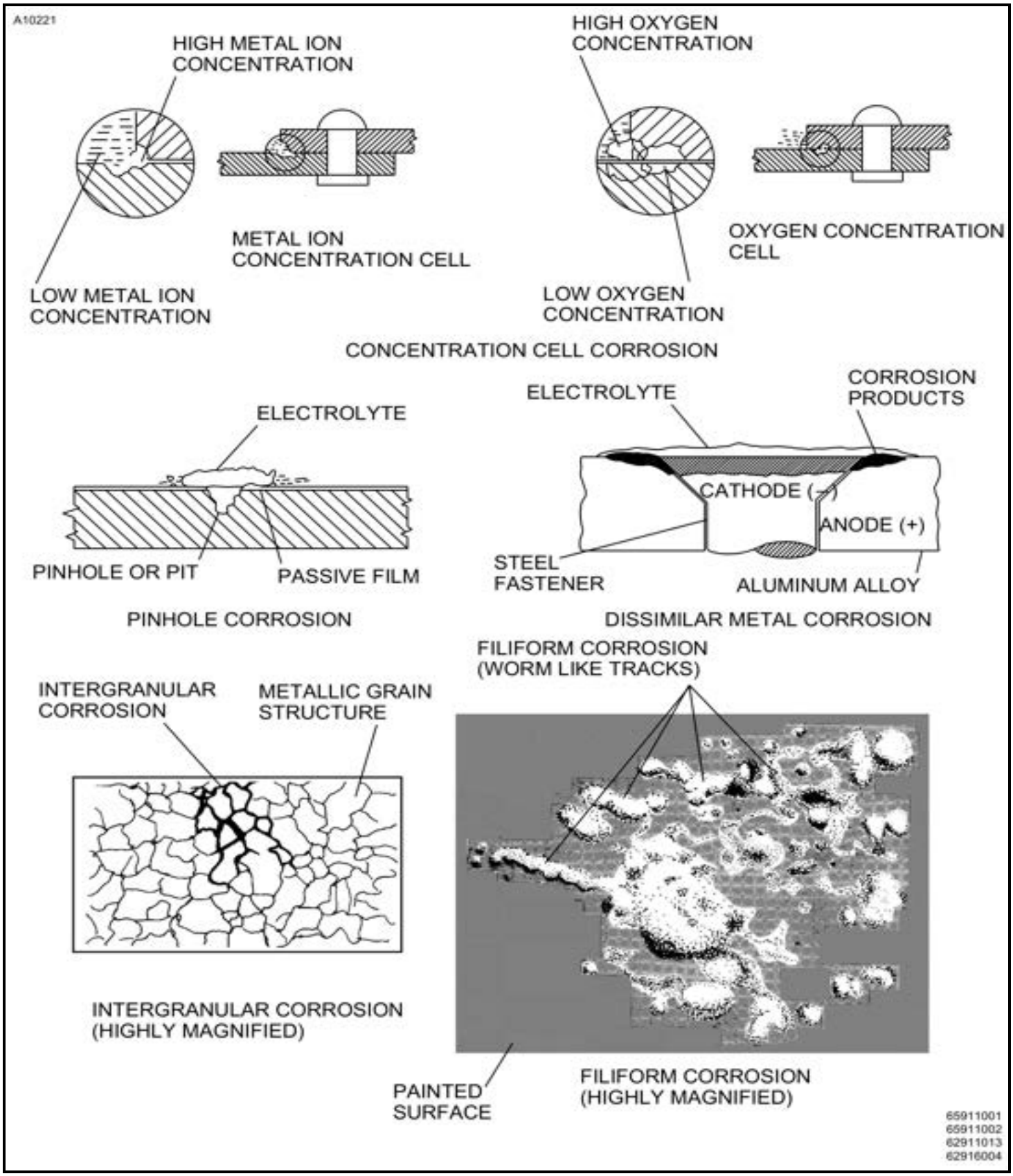
(3) Fungus-Proofing of Electrical and Electronic Equipment - Fungi can create serious problems, as fungi can act as an electrolyte, destroying the resistance of electrical insulating surfaces. Corrosion of metal can be accelerated because of the moisture absorbed by fungi. Moisture and fungus resistant varnish conforms to Specification ASTM D3955 or ASTM D295-58.

H. Corrosion.

(1) Corrosion can be repaired using the same procedures as any other structural repair. Corrosion that does not penetrate the clad material, no greater than 15 percent of skin thickness, can be repaired by blending and polishing. Refer to Model 300, 350 and 400 Structural Repair Manual. Corrosion that is greater than 15 percent of skin thickness can be repaired by patching or replacement of the part. Refer to Structural Repair Manual.

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Figure 1 : Sheet 1 : Corrosion



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PAINT REPAIR AND PAINTING - MAINTENANCE PRACTICES

1. Paint Repair and Painting

A. The paint systems used to paint components of certified aircraft by Cessna are described in this section. All approved paints and step by step instructions for applying the paint are included. Specifically addressed are the primer filler used to fill-in void areas and make the surface smooth, primer sealer used to prevent the filler from penetrating through the paint, and the topcoats, both single-stage and two-stage. Safety and quality considerations are also addressed. Required paint thickness and solar absorptive levels for specific zones on the aircraft are included.

(1) **Materials and Equipment** - PPG and Sherwin Williams produce the standard paint products, and Fire Research Laboratories produces the fire resistant paint products. Recommended equipment and paint gun air pressures are listed for the different types of paint. To achieve optimum results, mixing ratios can vary (up to 1 percent maximum) to suit equipment.

(2) **Additional Information** - Should more data be required than presented in this document, such as equipment, health and safety issues, air pressures, tinting, touch-up procedures, humidity and altitude considerations, etc., refer to the technical manual for the paint being used and instructions on product containers.

WARNING: Read labels on product containers for latest information on safety, emergency first aid, exhaust ventilation requirements, proper protective equipment or clothing, proper first aid equipment and supplies, and fire extinguisher requirements.

WARNING: Avoid inhalation and direct skin contact of products.

WARNING: Keep paint products away from flame and sparks.

WARNING: Use the appropriate respirators when products are sprayed and when cleaners are applied.

WARNING: Do not remove or cover labels on product containers.

WARNING: Refer to Material Safety Data Sheet (MSDS) for safety, health hazards, recommended protection, emergency first aid, fire extinguisher, etc.

(3) **General Quality Procedures** - The following practices should be incorporated for the highest quality product.

(a) Keep the painted article clean.

(b) Keep the atmosphere free from bugs and dust.

(c) For anodized aluminum omit sealing operation of the anodizing process and avoid contamination by painting as soon as possible after drying the anodized article.

(d) Sand completely and evenly.

(e) Keep room temperature above 60° F.

(f) Measure all components of the mixture, do not estimate.

(g) Blend mixture thoroughly.

(h) Do not allow more than five minutes before force drying.

(4) **Approved Body Filler** - Body filler is used to fill in and shape large areas such as bonded joints.

(a) Any polyester or epoxy-based body filler may be used as long as the total paint thickness requirements are not exceeded and the filler is non-conductive.

(b) **Procedure** - Manufacturer's instructions for the application of body filler must be followed.

(5) **PPG Paint System (Exterior)**

(a) **Approved PPG Primer Surfacers**

NOTE: The primer surfacer is used to fill in small divots, holes, and cracks for a smooth surface.

1 PPG D822 Corrosion Resistant Primer

(b) **PPG Primer Surfacer Procedure**

1 Bubbles and voids must be opened up, sanded out, filled, and block sanded smooth to surrounding surface.

2 Clean entire joint and bond area with soap and water if necessary.

3 Orbital sand with 240 grit paper. Hand sand all hard to reach areas using 240 grit dry paper.

4 Use a filtered air blow gun to remove sanding dust from corners and cracks.

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5 Clean with D837 Spirit Wipe.

6 Mask for primer application.

7 Mix 3 part D822 with 1 part D823 by volume. Pot life of mixture is 1-1.5 hours at 68° F. It is acceptable to thin up to half volume with D870, D872, or D873 to improve flow and smoothness.

8 Set spray gun to 1.4-1.6 mm, 3-4 bars (45-55 psi) spray pressure, and spray viscosity of 22 secs ZAHN 2 at 68° F (temperature may be changed based on the hardener and thinner being used).

9 Apply mixture into fill areas up to 6 mils maximum dry coat thickness.

10 Allow 1-2 hours to dry at 68° F or 20 to 30 minutes at 140° F. Use a maximum of three coats.

11 Sand after primer has dried, preferably within 12 hours of drying. If sanding after primer has dried more than 12 hours, clean surfaces with D837 Spirit Wipe prior to sanding. Orbital sand major areas with 320 grit or finer sandpaper and hand sand other areas with 400 grit sandpaper. The smoother the sanded finish, the smoother the top coat application.

(c) **Approved PPG Primer Sealers**

NOTE: The primer sealer is used as a wet-on-wet sealer to prevent fillers from penetrating through the paint.

1 PPG D825 2K Tintable Surfacer Base

2 PPG D822 Corrosion Resistant Primer

(d) **PPG Primer Sealer Procedure**

1 Wash surface with soap and water if necessary.

2 Wipe down with D837 Spirit Wipe.

3 Mix per manufacturer's instructions. The following PPG hardener and thinner combinations should be used for the corresponding temperatures found in Table 201.

Table 201. PPG Hardener And Thinner Combinations

Temperature	Hardener	Thinner
Up to 65° F	D803 Fast	D870 Fast Thinner
65° F - 77° F	D841 Medium	D871 Medium Thinner
77° F - 95° F	D861 Slow	D872 Slow Thinner
Over 95° F	D861 Slow	D873 Very Slow Thinner

4 Set spray gun to 1.4-1.6 mm, 4 bars (55 psi) spray pressure, and spray viscosity of 19-22 secs ZAHN 2 at 68° F.

5 Apply mixture up to 2.4 mils maximum dry coat thickness.

6 Allow 5-10 minutes to dry at 68° F between coats. Use a maximum of 2 coats.

7 If rework is necessary dry sand with 360 grit paper or wet sand with 400 grit paper.

NOTE: Pot life for the mixture is 1.5 hours at 68° F.
D825 may be tinted with DG colors if desired.
Coverage is approximately 396 square feet per gallon at 1 mil thickness.

(e) **Approved PPG Topcoats**

NOTE: The topcoat is the last layer in the painting process that contains the color and protects the part. There are three different types of topcoats: single-stage, two-stage, and three-stage. The advantage of using a single-stage is that it is much faster than the two-stage. The two stage, however, is easier to blend and more durable. The three-stage is used for special pearl coats. The needs of the application should be considered when choosing which method to use.

1 PPG DG single-Stage system

2 PPG BC Two-Stage System

3 PPG BC Three-Stage System

PPG Single-Stage System Procedure

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(f)

1 Sand after primer has dried, preferably within 12 hours of drying. If sanding after primer has dried more than 12 hours, clean surfaces with D837 Spirit Wipe prior to sanding. Wet-sand with 400-500 grit or finer sandpaper or dry-sand with 360-400 grit or finer sandpaper. The smoother the sanded finish, the smoother the top coat application.

2 Use a filtered air blow gun to remove sanding dust from corners and cracks. Wipe with D837 Spirit Wipe and tack cloth.

3 For two-tone paint application, allow 30 minutes at 68° F before applying masking tape.

4 For the first coat, mix per manufacturer's instructions. The following PPG hardener and thinner combinations should be used for the corresponding temperatures found in Table 202.

Table 202. Hardener And Thinner Combinations

Temperature	Hardener	Thinner
Up to 65° F	D841 Medium	D870 Fast Thinner
65° F - 77° F	D841 Medium	D871 Medium Thinner
77° F - 95° F	D861 Slow	D872 Slow Thinner
Over 95° F	D861 Slow	D873 Very Slow Thinner

NOTE: Pot life for the mixture is 1-3 hours at 68° F.

5 Set spray gun to 1.4-1.6 mm and 3-4 bars (45-55 psi) spray pressure and spray viscosity of 17-20 secs ZAHN 2 at 68° F (temperature may be changed based on the hardener and thinner being used).

6 Apply mixture up to 2.5 mils maximum dry coat thickness. The first coat should be medium wet.

7 Allow 10 minutes to dry at 68°F between coats.

8 For the second coat, mix the same as the first coat. The second coat should be full wet.

9 If DG color needs to be flatted, wet sand with 1200 grit paper or finer.

NOTE: For maximum total paint thickness (including all fillers, primers, and topcoats) refer to the Paint Thickness Zones - Paint Repair and Painting section. Colors must be chosen to meet the solar absorptive levels of the Materials and Equipment - Paint Repair and Painting section.
Coverage is approximately 647 Square feet per gallon at 1 mil thickness.

(g) **PPG Two-Stage System Procedure**

1 Sand after primer has dried, preferably within 12 hours of drying. If sanding after primer has dried more than 12 hours, clean surfaces with D837 Spirit Wipe prior to sanding. Wet-sand with 500-600 grit or finer sandpaper or dry-sand with 400-500 grit or finer sandpaper. The smoother the sanded finish, the smoother the top coat application.

2 Use a filtered air blow gun to remove sanding dust from corners and cracks. Wipe with D837 Spirit Wipe and tack cloth.

3 For the base coat (first stage), mix per manufacturer's instructions. The following PPG thinner should be used for the corresponding temperatures found in Table 203.

Table 203. PPG Base Coat Thinners

Temperature	Thinner
Up to 65° F	D870 Fast Thinner
65° F - 77° F	D871 Medium Thinner
Over 77° F	D872 Slow Thinner

NOTE 1:

There is no pot life for the mixture. Stir well before using.

4 Set spray gun to 1.3-1.5 mm and 3-4 bars (45-55 psi) spray pressure and spray viscosity of 14-20 secs ZAHN 2 at 68° F.

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5 Apply mixture up to 1.0 mils maximum dry coat thickness

6 Allow 5 to 10 minutes to dry at 68° F between coats (not to exceed 24 hours). Number of coats is 2 medium wet. Allow 30 minutes at 68° F before applying masking tape

NOTE: Coverage is approximately 243 square feet per gallon at 1 mil thickness.

7 For the PPG clear coat (second stage), mix per manufacturer's instructions. The following PPG hardener and thinner combinations should be used for the corresponding temperatures found in Table 204.

Table 204. PPG Clear Coat Hardener and Thinner Combinations

Temperature	Hardener	Thinner
Up to 65° F	D803 Fast	D870 Fast Thinner
65° F - 77° F	D841 Medium	D871 Medium Thinner
Over 77° F	D861 Slow	D872 Slow Thinner

NOTE 1:

The pot life for the mixture is 6 hours at 68° F.

8 Set spray gun to 1.5-1.7 mm and 4 bars (55 psi) spray pressure and spray viscosity of 16-17 secs ZAHN 2 at 68° F.

9 Apply mixture up to 1.0 mils maximum dry coat thickness. Allow 10-15 minutes to dry at 68° F between coats. Number of coats is 1 light and 1 full wet.

NOTE: Coverage is approximately 321 square feet per gallon at 2 mil thickness.
For maximum total paint thickness (including all fillers, primers, and topcoats) refer to the Paint Thickness Zones - Paint Repair and Painting section. Colors must be chosen to meet the solar absorptive levels of the Materials and Equipment - Paint Repair and Painting section

(6) **Sherwin Williams Paint System (Exterior)**

(a) **Approved Sherwin Williams Primer Surfacers**

NOTE: The primer surfacer is used to fill in small divots, holes, and cracks for a smooth surface.

1 Sherwin Williams CM0482300 Primer

(b) **Sherwin Williams Primer Surfacer Procedure**

1 Bubbles and voids must be opened up, sanded out, filled, and block sanded smooth to surrounding surface.

2 Clean entire joint and bond area with soap and water if necessary.

3 Orbital sand with 240 grit paper. Hand sand all hard to reach areas using 240 grit dry paper.

4 Use a filtered air blow gun to remove sanding dust from corners and cracks.

5 Clean with D837 Spirit Wipe.

6 Mask for primer application.

7 Shake primer component for 15 minutes before admixing.

8 Mix 1 part CM0482300 (Epoxy Primer) with 1 part CM0120900 (Epoxy Adduct) by volume.

9 Add the Epoxy Adduct into the primer component.

10 Stir in slowly and allow a 15 minute induction time.

11 Pot life of mixture is 6 hours at 77 °F.

NOTE: It is recommended to filter strain admixed and reduced primer before placing material in containers for spraying.

12 Set spray gun pressures and settings per manufacturer recommendation.

13 Apply in two or three light coats. Allow each coat to flash of until dull before applying the next coat. Apply mixture into fill areas up to 1 to 1.5 mils dry coat thickness.

NOTE: Application of these product systems requires recommended temperature and humidity conditions and film thickness ranges. The material, hangar and aircraft skin

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temperatures should be no lower than 55F/ 13C before, during and after application.

NOTE: Coverage is approximately 451 ft per gallon at 1 mil thickness.

14 Allow 4 hours minimum to 24 hours maximum to dry at 75° F or 30 minutes at 140° F before light sanding or adding topcoat.

15 Sand after primer has dried, preferably within 24 hours of drying. If sanding after primer has dried more than 24 hours, clean surfaces with D837 Spirit Wipe prior to sanding. Orbital sand major areas with 320 grit or finer sandpaper and hand sand other areas with 400 grit sandpaper. The smoother the sanded finish, the smoother the top coat application.

(c) **Approved Sherwin Williams Topcoats**

NOTE: The topcoat is the last layer in the painting process that contains the color and protects the part. There are three different types of topcoats: single-stage, two-stage, and three-stage. The advantage of using a single-stage is that it is much faster than the two-stage. The two stage, however, is easier to blend and more durable. The three-stage is used for special pearl coats. The needs of the application should be considered when choosing which method to use.

1 Sherwin Williams Jet Glo Express 840 Series (Single-Stage System)

2 Sherwin Williams Acry-Glo Basecoat Metallic Colors (830 Series) (Two-Stage System)

(d) **Sherwin Williams Single-Stage System Procedure**

1 Sand after primer has dried, preferably within 24 hours of drying. If sanding after primer has dried more than 24 hours, clean surfaces with D837 Spirit Wipe prior to sanding. Wet-sand with 400-500 grit or finer sandpaper or dry-sand with 360-400 grit or finer sandpaper. The smoother the sanded finish, the smoother the top coat application.

2 Make sure that the airplane is correctly grounded.

3 Use a filtered air blow gun to remove sanding dust from corners and cracks.

4 Wipe with D837 Spirit Wipe and tack cloth.

5 For two-tone paint application, allow 30 minutes at 68° F before applying masking tape.

6 Shake color component for 15 minutes before admixing.

7 By volume, mix 2 parts color Sherwin Williams CM0840 series (Y and Z color numbers) with 1 part CM0840081 (hardener) and 1 part activator found in Table 205 (choose appropriate activator per manufacturer recommendation).

8 Add the hardener and activator into the base component.

9 Stir in slowly and allow a 30 minute induction time.

10 Pot life of mixture is 4 hours at 77 °F.

NOTE: It is recommended to filter strain admixed and reduced paint before placing material in containers for spraying.

11 Mix per manufacturers instructions. The following Sherwin Williams activator found in Table 205 should be used with the 2 parts Sherwin Williams CM0840 series (Y and Z color numbers) and 1 part CM0840081 (hardener) for the corresponding temperatures and humidity.

a If force curing use CM0840A01.

Table 205. Activator Temperature/Humidity Combinations

Temperature	Humidity 0 – 65%	Humidity 65% +
60 - 75 °F	CM0840A07	CM0840A05
70 - 85°F	CM0840A05	CM0840A03
80 - 95°F	CM0840A03	CM0840A01
Over 95°F	CM0840A01	CM0840A00

12 The following reducers may be used mixed in as 1 part:

- Slow Reducer – CM0110093

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- Medium Reducer – CM0110099
- Fast Reducer – CM0110944

13 Set spray gun pressures and settings per manufacturer recommendation.

14 Apply mixture 2 to 3 mils dry coat thickness.

a Best application results are achieved by applying 2 medium wet coats, allowing 30 to 45 minutes 'tack off' period between coats.

15 At 75 degrees and 50% humidity, tack-free time is 3 – 4 hours and tape time is 6 – 8 hours. Maximum time for re-coat is 24 hours. If the dry time between coats exceeds 24, then the surface should be thoroughly abraded.

NOTE: For maximum total paint thickness (including all fillers, primers, and topcoats) refer to the Paint Thickness Zones - Paint Repair and Painting section. Colors must be chosen to meet the solar absorptive levels of the Materials and Equipment - Paint Repair and Painting section.

NOTE: Coverage is approximately 800 - 960 ft per gallon at 1 mil thickness.

(e) **Sherwin Williams Two-Stage System Procedure**

1 Sand after primer has dried, preferably within 24 hours of drying. If sanding after primer has dried more than 24 hours, clean surfaces with D837 Spirit Wipe prior to sanding. Wet-sand with 400-500 grit or finer sandpaper or dry-sand with 360-400 grit or finer sandpaper. The smoother the sanded finish, the smoother the top coat application.

2 Make sure that the airplane is correctly grounded.

3 Use a filtered air blow gun to remove sanding dust from corners and cracks.

4 Wipe with D837 Spirit Wipe and tack cloth.

5 For two-tone paint application, allow 12 hours at 77° F or 3 hours at 120° F before applying masking tape.

6 Shake base component for 10 minutes before admixing.

7 By volume, mix 4 parts Color component with 1 part Hardener (CM0830081), 2 parts Activator/Stabilizer (CM0830991) and 1 part Compliant Reducer (CM0110944).

8 Add the hardener and activator into the base component.

9 Stir in slowly and allow a 30 minute induction time.

10 Pot life of mixture is 4 hours at 77 °F.

NOTE: It is recommended to filter strain admixed and reduced paint before placing material in containers for spraying.

11 Set spray gun pressures and settings per manufacturer recommendation.

12 Apply mixture 2 to 3 mils dry coat thickness.

13 Best application results are achieved by applying 2 medium wet coats, allowing 30 - 45 minutes 'tack off' period between coats.

14 At 77 degrees and 50% humidity, workable pot life is 1.5 hours, tack time is 20 minutes, and tape time is 12 hours. This time can be reduced to 3 hours at 120 degrees . If the dry time between coats exceeds 24 hours, then the surface should be thoroughly abraded.

15 Acry-Glo high solids clear CM0830080 should be applied a minimum of 2-3 hours after within a maximum of 24 hours after applying the metallic or solid color basecoat. If applying the clearcoat to a solid color basecoat that has been allowed to dry longer than 24 hours then the basecoat should be abraded. Abrading metallic basecoats is not recommended; therefore it is important that clear-coating occurs within the 2-24 hour window.

NOTE: For maximum total paint thickness (including all fillers, primers, and topcoats) refer to the Paint Thickness Zones - Paint Repair and Painting section. Colors must be chosen to meet the solar absorptive levels of the Materials and Equipment - Paint Repair and Painting section

NOTE: Coverage is approximately 550 - 640 ft per gallon at 1 mil thickness.

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(7) **Fire Resistant Paint** - Ocean Fire Retardants number 477 (2 part) Epoxy is used for fire protection of aluminum and composites. When number 477 Epoxy is exposed to flame, it expands up to form a very dense, insulating, spongy foam crust, which retards heat penetration to the under surface. The following items are applicable to fire resistant paints.

(a) Application over epoxy primer is preferred but not required for best adhesion. Prime per the Section Materials and Equipment - Paint Repair and Painting.

(b) Ensure surface is dry and free of oil or grease.

(c) Mix 8 parts number 477A with 1 part number 477B by volume. Allow 45 to 60 minutes to activate 1 gallon and 30 to 40 minutes to activate 5 gallons at room temperature (70° F).

(d) Reduce mixture after activation with Xylene or Solvent Naphtha at a ratio of 1/2 pint per gallon.

(e) Application method can be by brush, roll, or spray. Airless spray application is the application of choice. Airless spray equipment is preferred with recommended pressure of 2650 psi with a 0.015 to 0.017 inch tip size. Clean equipment with Xylene immediately after application.

(f) With air-less spray, avoid wet film build-ups greater than 10 mils per pass. Rolling produces a pattern that should be brushed out.

(g) Dry film recommended build up is 10 to 12 mils and typically requires two coats minimum, which is a coverage rate of 165 square square feet per gallon. Wet film build up is 23 to 27 mils total. Shelf life is 6 months. Store in a well ventilated area at 40° F to 120° F. Do not store or use in areas with open source of ignition. Flash point is 105° F. VOC maximum is 1.5 lbs. per gallon.

(h) Cure times at 70° F are, dry to recoat - 60 minutes, dry to touch - 4 hours, dry to handle - 24 hours, through cure - 7 days, and maximum cure and hardness takes 2 to 3 weeks. Higher temperatures accelerate speed of cure. Clean up with Xylene

(8) **Paints for Special Components**

(a) **Windows and Windshields** - The window and windshield sashes may be painted black for aesthetic purposes. The painted area will be along the perimeter and will cover 0.5±0.125 inch from the exterior paint. The paint on the exterior of the window must cover the black paint so that no more than 0.25 inches extends past the exterior paint when looking from the outside through the window. The paint and paint procedures used must be in accordance with the Topcoats - Paint Repair and Painting section. A specific paint thickness is not required.

(b) **Landing and Taxi Light Cover** - The landing and taxi light cover must be painted black per Figure 201 (shaded areas indicate paint). The paint and paint procedures used must be in accordance with the Topcoats - Paint Repair and Painting section of this specification. A specific paint thickness is not required.

(c) **Interior Panels** - All interior panels that are required to be painted must be painted in accordance with this section.

1 **Approved Paints**

a VQT DuPont Vinyl Color VQT Custom Match Tan

b PPG Exterior White

c PPG DG9300 Black

d PPG Custom Paint Platinum Silver (number 771 Med. Alum: 355.6, No. 772 Coarse Alum: 492.6, No. 743 Yellow: 494.9, No. 753 White: 496.1, and No. 759 Flattener: 503.2.

e PPG BC40101A Starlight Silver

f Sherwin Williams Jetflex WR (Matterhorn White)

2 **DuPont Paint Procedure**

a Bubbles and voids must be opened up, sanded out, filled, and block sanded smooth to surrounding surface.

b Clean entire joint and bond area with soap and water if necessary.

c Orbital sand with 240 grit paper. Hand sand all hard to reach areas using 240 grit dry paper.

d Use a filtered air blow gun to remove sanding dust from corners and cracks.

e Clean with D837 Spirit Wipe.

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f Mask for primer application.

g Shake paint well before using.

h Set spray gun as follows: for a traditional gun, 25-40 psi spray pressure, for a HVLP gun, 6-8 psi spray pressure. Set spray viscosity of 18-22 secs ZAHN 2.

i Spray until covered evenly.

j Allow 5 minutes to dry between coats. Apply 2-3 coats. Allow 30 minutes to dry.

k A specific paint thickness is not required.

3 **PPG Paint Procedure** - Follow the procedures in the Topcoats - Paint Repair and Painting for PPG paint. A specific paint thickness is not required.

4 **Sherwin Williams Paint Procedure**

a Sand after primer has dried, preferably within 24 hours of drying. If sanding after primer has dried more than 24 hours, clean surfaces with D837 Spirit Wipe prior to sanding. Wet-sand with 400-500 grit or finer sandpaper or dry-sand with 360-400 grit or finer sandpaper. The smoother the sanded finish, the smoother the top coat application.

b Use a filtered air blow gun to remove the sanding dust from the corners and cracks. Wipe with D837 Spirit Wipe and tack cloth. Be sure the aircraft is correctly grounded.

c Shake the base component for 10 minutes. Add up to 25 percent by volume deionized water as a thinner. Stir thoroughly. Initial viscosity, measured using a Gardner Signature #2 Zahn Cup, must be 25 to 30 seconds.

d Set the spray gun pressures and settings per manufacturer recommendation.

e Apply mixture 1.2 to 2.5 mils dry coat thickness in one wet coat.

f Flash for 15 minutes. Dry to touch in 30 minutes.

g Cure may be accelerated by heating to 140°F for 10 minutes. A specific paint thickness is not required.

(9) **Paint Thickness Zones** - Paint thickness must be controlled so the aircraft has proper conductivity to prevent damage from lightning strikes. Figure 202 shows the maximum paint thickness for different zones on the aircraft. Maximum total paint thickness includes all fillers, primers, and topcoats.

(10) **Paint Color Zones** - Paint color zones control exterior paint colors based on solar absorptive levels. Solar absorptive values indicated are for the zones shown in Figure 203 and Figure 204. If colors different than originally on the aircraft and are not listed in Table 206, are to be used in Zone A or B, the absorbtivity must be determined using ASTM E903; only paints that meet the absorbtivity levels may be used. Any paint color lighter than black, using an appropriate paint system specified in this chapter, may be used in Zone C without absorbtivity testing. Approved colors and associated zones are listed in Table 206.

- Zone A - solar absorbtivity less than 0.29 White to Zinc Oxide
- Zone B - solar absorbtivity less than 0.65 Gray to Medium Green, Blue, or Tan
- Zone C - solar absorbtivity less than 0.95 Black

Table 206. Approved Paint Colors

Generic Color	Color Number	Color	Zone
Whites	BC91046A / BC5135	White Diamond Pearl coat over Cessna 300 Standard White (3-stage)	Zones A, B, C
	BC5134A/BC5135A	Bright White Diamond (3-stage)	Zones A, B, C
	BC91046A	Standard Cessna White	Zones A, B, C
	BC 3563	Pearle White (Non Metallic)	Zones A, B, C
	CM0840103	Matterhorn White (Sherwin Williams)	Zones A, B, C
	BC84903B/BC84904A	Giallo Orion (3-stage)	Zones B and C

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Yellows	BC4030	Viper Yellow	Zones B and C
	A01582	Wildcat Yellow	Zones B and C
	A01629	Chrome Yellow	Zone B and C
Greens	BC5492	Electric Green	Zone C
	MBC46979/BC5135	Get Green Pearl	Zone C
	BC45817B	Hunter Green or PACUSA Green	Zone C
	5534	2001 Honda Clover Green Pearl	Zone C
	402587	2001 Mercedes-Benz Prismatingrun Met	Zone C
	195027	2001 Volvo Sydney Bay Blue Mica	Zone C
	47395	2001 Subaru Spruce Pearl	Zone C
	402374	2001 Volkswagen Green Collection Pearl	Zone C
	5409	2001 General Motors Forest Green Met	Zone C
	904571		Zone C
	6213		Zone C
	B648695	Racing Green	Zone C
	A05861	Green Apple	Zones B and C
	M06394	Everglades Metallic	Zone C
Blues	BC4372	Solar Blue Met	Zone C only
	BC5588	Island Blue Met	Zone C only
	BC18514***A	Light Poly Teal	Zones B and C
	BC5222C	Bright Purple	Zone C only
	BC5223C	Dark Mulberry	Zone C only
	BC4784	Glacier Blue or PACUSA Blue	Zone C only
	190397	2001 Mercedes-Benz Quartz Blue Met	Zone C only
	193775		Zone C only
	BC19598	Navy	Zone C only
	A00241	Colonial Blue	Zones B and C
	M10642	Sapphire Blue Metallic	Zones B and C
	M00085	Blue Metallic #4	Zone C
	M10586	Steel Blue Metallic	Zone C
	M10592	Ocean Blue Metallic	Zone C
	BC74712	Mojave Red	Zone C only
	BC74492C	Pontiac Red	Zone C only
	BC61930C	Prowler Orange	Zone C only
	BC5359	Cranberry Pearl	Zone C only

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Reds/Oranges	902122		Zone C only
	BC61930	Flame Orange	Zone C only
	BC75250	Ferrari Red	Zone C only
	5222		Zone C only
	N06399	Dark Red Metallic	Zone C
	MP06393	Radiant Red Pearl	Zone C
	A00358	Sunfast Red	Zone C
Golds	BC25622A	Pure Gold Radiance	Zones B and C
	BC4138	Gold	Zones B and C
	5584	Gold (brown)	Zones B and C
	5383	Gold	Zones B and C
	BC 4138	Royal Gold	Zones B and C
	M06401	Gold Metallic	Zones B and C
	ME06397	Convoy Gold Effect	Zone C
	M10494	Las Vegas Gold Metallic	Zones B and C
	M10685	Spanish Gold Metallic	Zone C
	ME06395	Autumn Sunburst Effect	Zone C
Silvers	BC4010A	Silver Poly	Zones B and C
	BC35482	Moon Stone	Zones B and C
	BC33896	Aluminum	Zones B and C
	BC4010	Starlight Silver (metallic)	Zone A, B and C
	Custom color (Refer to Note 1)	Cessna Starlight Silver (nonmetallic)	Zone A, B and C
	Custom color (Refer to Note 2)	Cessna Platinum Silver (metallic)	Zone A, B and C
	M10637	Castle Silver	Zones B and C
	M10679	Titanium Metallic	Zones B and C
Blacks/Dark Greys	5559	River Rock Green Mica	Zone C only
	BC9300	Black	Zone C only
	BC5292	Dark Slate Pearl coat (2-stage)	Zone C only
	BC17038	Black	Zone C only
	905384		Zone C only
	BC36447	Viper Steel Gray	Zone C only
	M10492	Charcoal Metallic	Zone C only
	M10683	Phantom Gray Metallic	Zone C only
	M06400	Medium Taupe Metallic	Zones B and C
Others	BC35915	Shale	Zones B and C
	BC 26634	Cream Beige (Non Metallic)	Zone A, B and C
	ME06398	Purple Effect	Zone C
	M06396	Mocha Frost Metallic	Zone C

NOTE 1:

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92.9 percent D753, 4.68 percent D740, 2.02 percent D778, .42 percent D779

NOTE 2:

15.2 percent D771, 21.0 percent D772, 21.1 percent D743, 21.2 percent D753, 21.5 percent D759

1. **Zone C Paint in a Zone B Area (Wing Tip and Vertical Tail)** - On the wing tip and vertical tail, Zone C paint may be used in a Zone B area provided the surface painted with Zone C paint does not exceed 2 percent of the overall Zone B area. Additionally, Zone C paint can be used as shown in Figure 205.
2. **Zone C Paint in a Zone B Area (Cowl)** - On the Zone B surface of the cowl, Zone C paint can be used to cover the overall area.

2. Non-Structural Laminate Repair

A. **Approved Non-Structural Laminate Repair Materials** - All non-structural laminate repair resin and cloth materials approved for use under this chapter are listed below. Refer to Table 207.

Table 207. Approved Non-Structural Laminate Repair Materials

Approved Non-structural Repair Material	Product Designation	Supplier	Where Used
Adhesive, Dion FR 7704-00 **(NOTE 1)**	P1300010	Cessna Aircraft Company	Interior Laminates (including Panels, Upholstered Panels, and Ventilation Ducts)
Adhesive Kit, Hysol, 3 fluid ounce **(NOTE 2)**	U000700	Cessna Aircraft Company	Bonding only
Adhesive Kit, Jeffco Pack 5, 5 fluid ounce **(NOTE 3)**	U514069S	Cessna Aircraft Company	Exterior Laminates
Glass Fabric **(NOTE 4)**	F441523	Cessna Aircraft Company	Laminate Repair

NOTE 1:

Dion Adhesive is used only for interior repairs.

NOTE 2:

For visual identification purposes, the color of the mixed Hysol resin and adhesive is gray.

NOTE 3:

For visual identification purposes, the color of the mixed Jeffco resin and adhesive is pale yellow.

NOTE 4:

Store away from direct sunlight. No shelf life.

B. The following table lists the repairable non-structural aircraft parts. Refer to Table 208.

Table 208. Repairable Non-Structural Aircraft Parts

Part Name	Applicable Repair
Air Conditioner Ducting	Interior Laminate, Bonding
Aileron Fences	Paint, Exterior Laminate, Bonding
Cabin Door Windows	Transparency
Elevator Fairings	Paint, Exterior Laminate, Bonding
Exterior Access Panels	Paint, Exterior Laminate
Glare Shield	Interior Laminate, Upholstery,
Horizontal Stabilizer Gap Seals	Paint, Exterior Laminate, Bonding
Interior Access Panels	Upholstery, Interior Laminate
Interior Panels	Upholstery, Interior Laminate
Landing/Taxi Light Cover	Transparency
Leg Fairings	Paint, Exterior Laminate, Bonding
Nose Fairings	Paint, Exterior Laminate, Bonding

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Passenger Light Covers	Paint, Transparency
Passenger Windows	Transparency
Position Light Covers	Paint, Transparency
Speed Buns	Paint, Exterior Laminate, Bonding
Stall Strips	Paint, Exterior Laminate, Bonding
Wheel Pants	Paint, Exterior Laminate
Windshield	Transparency
Wing Fillets	Paint, Exterior Laminate, Bonding

C. The following table lists the repair guidelines for non-structural aircraft parts. Refer to Table 209.

Table 209. Repair Guidelines for Non-Structural Aircraft Parts

Defects Repair Guidelines		
Defect Type being Repaired	Number of Repair Cloth Plies	Repair Area
Fracture	Same as the number of plies affected during the removal of the defect.	1 - 2 Repair Plies: Defect and area surrounding by 0.5 inch. (12.7 mm) 3 Repair Plies and more: Defect and area surrounding by 1.0 inch (25.4 mm).
Delamination		

D. **Non-Structural Laminate Repair Method**

(1) Determine if damaged non-structural part is allowed to be repaired. Refer to Table 208.

NOTE: Only the parts listed in Table 208 can be repaired using this Non-Structural Laminate Repair Method.

NOTE: Verify condition of underlying laminate before beginning upholstery repair.

(2) Clean the part to remove oil and dirt prior to repairing damage.

(3) Using 80 grit (P100) or finer aluminum oxide abrasive paper (with an sander or sanding block) remove all paint and primer which surrounds the defect area. Sand in a circular motion to prevent any damage to the underlying laminate.

WARNING: It is not permissible to use any chemical paint strippers as this may damage the composite part.

(4) Use aluminum oxide abrasive paper to remove the entire defect area. If the damage area being repaired is a fracture through all plies it is permissible to leave enough of the damaged area on the part to provide an adequate contour for repair.

(a) If the repair involves 1 to 2 plies, the repair area is the defect and area surrounding by 0.5 inch (12.7 mm).

(b) If the repair involves 3 plies or more, the repair area is the defect and area surrounding by 1.0 inch (25.4 mm).

NOTE: Completely remove all damaged or whitened plies.

(5) If the defect type being repaired is a fracture or delamination, visually determine the number of plies affected.

(a) Lightly apply isopropyl alcohol to the surface of the scarf and allow to dry. As the alcohol dries, rings will appear as translucent lines with no ply orientation being visible. The rings result from how the alcohol dries, one ply at a time.

1 The number of rings will equal the number of plies removed.

(b) To cross check your observation, compare the depth of the area where the defect was removed with an adjacent, undamaged area. Ply thickness on average is 0.010 inch (0.25 mm).

(c) If uncertainty exists, adjust the ply number upwards accordingly.

(6) Surface prepare and scarf the area. Refer to the Model LC-550FG Series Structural Repair Manual, 51-20-01, Process and Handling Requirements - Repair Procedures, General Surface Preparation.

NOTE: Use a minimum 0.5 inch (12.7 mm) scarf per ply for glass.

(7) Cut the appropriate number of repair cloth plies. Refer to corresponding to Table 209, Repair Guidelines.

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NOTE: The size of the first ply must cover the 'Repair Area'. Refer to Table 209, Repair Guidelines.

NOTE: Repair ply orientation is not critical.

(a) For subsequent cloth plies, decrease the dimension from the preceding ply by the following:

1 0.5 inch (12.7 mm) for glass cloth.

(b) Check the fit of the cloth plies by stacking, without resin the cloth plies on top of one another. The largest will be on the bottom, the smallest on top.

1 After checking for fit, remove the cloth plies and lay out individually on a clean, flat surface for resin application.

(8) Repair cloth plies are to be replaced as follows:

(a) The first ply removed during the scarf will be the first ply replaced. (The first ply is the largest.) Refer to the Model LC-550FG Series Structural Repair Manual, 51-70-00, Structural Composite Repair Guidelines.

(9) Select and prepare approved and appropriate resin system. Refer to Table 207.

(10) On a work preparation surface, apply resin to repair cloth plies.

(a) Saturate every repair ply with resin separately.

(b) Center and stack the next smaller saturated repair plies on top of one another. Eventually, when completed the stack will contain the largest ply on the bottom, the smallest on top.

1 To prevent delamination, it is recommended that every individual ply is compacted as it is stacked to remove any trapped air.

a Use a gloved hand, squeegee, roller or other appropriate tool to compact the stack to remove trapped air.

2 Add additional resin to the stack as necessary to prevent any dryness.

(11) Transfer the compressed, centered and resin-saturated stack of repair cloth plies from the work preparation surface to the repair.

(12) Apply the stack of repair cloth plies to the surface prepared area.

(a) Compact the repair cloth plies against the original cloth plies.

(b) Smooth out these areas to remove any trapped air.

(c) Add additional resin to the repair as necessary to prevent any dryness.

(13) Place peel ply over repair cloth plies.

(14) Cure the repair. Refer to LCSRM, Chapter 51, Process and Handling Requirements - Repair Procedures for the appropriate resin and related cure instructions.

(15) Perform the bodywork as required to restore part contour.

(16) Apply primer and paint as necessary using appropriate methods. Refer to the applicable model Maintenance Manual, Chapter 51, Paint Repair and Painting.

3. Bond Repair

A. For non-structural parts requiring bonding, refer to the LCSRM, Chapter 51, Structural Composite Parts Repair, Bond Repair Method.

4. Upholstery Repair

A. Approved Materials

Table 210. Approved Leather Repair Materials

Purpose	Material	Supplier
Filler	LFP Compound P01LFP	Flexproof
Primer	Leather Primer P04GRA08	Flexproof
Texture Mats Compound	R Compound T04RCM	Flexproof
Texture Mats Catalyst	R Catalyst T04CT03	Flexproof
Degreaser	Acryliclean DX-330	PPG

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Leather	Leather - LL-3821	Douglas Interiors
Ultra Leather	Buff Colored Ultra Leather - 3609	Scalise Marine
Ultra Leather	Papyrus Colored Ultra Leather - 1256	Scalise Marine

B. **Grain Transfer Mat Creation**

NOTE: Note: The following repair procedures are not applicable to Oregon Aero High G Seats. For repair procedures applicable to Oregon Aero High G Seats, including upholstery, see the latest revision of EM-01-01 Oregon Aero Engineering Manual, Instructions for Continued Airworthiness.

NOTE: Verify condition of underlying laminate before beginning upholstery repair.

(1) Pour the Texture Mat Compound on a clean surface until the puddle is about 2.5 inches in diameter.

(2) Pour a few drops of an approved interior paint into the middle of the Compound.

(3) Pour a few drops of the Texture Mat Catalyst into the paint in the middle of the Compound.

(4) Mix Catalyst and Paint with the compound. Even distribution of the paint in the mix will signify an even equal distribution of the Catalyst and Compound.

(5) Take a scrap piece of leather or ultra leather (dependent on what type of upholstery repair you will be performing and clean with degreaser.

(6) Using masking tape, tape an area off measuring 2.5 inches x 4.0 inches.

(7) Spread the mixture evenly onto your taped off area until it is between 1/32 and 1/16 of an inch thick.

(8) Peel off the tape from the leather/ultra leather.

(9) Let the compound sit for at least 24 hours prior to removal from the leather/ultra leather.

C. **Repair Method**

(1) Clean damaged and surrounding area by 1.0 inch with degreaser.

(2) Using a q-tip saturate the discrepancy and area 1/8 inch surrounding damage with primer for leather. Primer must be dry (use heat gun as necessary) prior to proceeding to next step.

(3) Clean GTM with alcohol and allow to dry before proceeding.

(4) Fill discrepant area with filler.

(5) Heat GTM to 200 degrees with heat gun (GTM will begin to smoke when this temperature is reached). Apply GTM to discrepant area with pressure for 15 seconds. Gently peel away GTM from area of repair.

(6) Using a chill bar press down on the area of repair to flatten and cool it.

(7) Heat and cool repeatedly as necessary until area of repair is smooth to touch and you can see the outline of the grain in the repair area.

(8) Apply primer with a q-tip to all areas where filler was applied (this area should have a duller color than the leather).

(9) Paint over area where primer was applied. Apply one coat at a time, drying as necessary with heat gun. If paint gets too hot it will boil.

(10) Clean GTM with alcohol and allow it to dry before proceeding.

(11) Heat GTM to allow it to imprint and flatten to paint. Do not heat GTM as excessively as prior. Apply heat gun for no more than 15 seconds at a time. If too much heat is applied to GTM the paint will boil or adhere to the GTM.

(12) Apply GTM to painted area with pressure from the Chill Bar.

(13) If any holes which allow for attachment of the interior panels were repaired and the area of the hole has been compromised it is recommended a soldering iron/gun is used to restore the full area of the hole.

(14) Using an approved interior paint, paint the repair to match the color of the surrounding area.

5. Transparency Repair

A. **Approved Materials**

(1) Novus No. 1 Plastic Clean and Shine (For general cleaning)

(2) Novus No. 2 Fine Scratch Remover (For fine scratches)

(3) Novus No. 3 Heavy Scratch Remover (For heavy scratches)

(4) Summer Laboratories 210® Plastic Cleaner and Polish (For general cleaning)

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(5) 100 percent cotton flannel polishing cloths

(6) 3M™ Adhesive remover Citrus Base 6040-6042 (for general cleaning)

B. **General Cleaning Procedures** - Never do anything that will scratch the surface of the acrylic plastic. The following points for cleaning and caring for the transparencies will ensure no further damage occurs to the transparency during repair.

(1) First, when cleaning any transparency, remove rings and watches as they can cause deep scratches. In this vein, long sleeve shirts must be turned up a few rolls to hide exposed buttons.

(2) If the transparency does not have built-up dirt and bugs on the surfaces, but rather has finger prints and/or dust, Novus No. 1 can be applied directly per product specific application instructions. Summer Laboratories 210® can also be used for this purpose per product specific application instructions.

(3) It is necessary to removing bugs and/or heavy accumulations of dirt, avoid touching the surface. If possible, remove most of the dirt by flushing the windows and windshield with water and a mild dish soap mixture. Allow the accumulation of dirt and/or bugs to soak for a few minutes. If rubbing is required, a bare hand is best. When all the debris on the surface of the window is loosened, apply a second water flush, dry with a 100 percent cotton cloth, and apply Novus No. 1 per product specific application instructions.

(4) The above steps and products may not remove all substances, since they are intended primarily for dirt and smudges. To remove difficult items such as tape residue, oil, and grease, the safest solvents are 100 percent mineral spirits or kerosene. Some alcohols are safe, such as isopropyl alcohol.

(5) The best polishing cloth is the softest cotton available. One hundred percent cotton flannel is ideal and available in yard goods stores. Never use any type of paper product or synthetic material. In particular, never use shop rags or shop towels. Be sure the polishing cloth is clean and dry. Reserve polishing cloths should be stored in a plastic bag or airtight container to limit dirt accumulation. Do not reuse soiled polishing cloths until they are properly laundered.

(6) Small scratches, the type that can be seen but cannot be felt with a fingernail, should be treated with Novus 2. First, clean the transparency per the following instructions (if necessary), and then follow product specific application instructions for using Novus No. 2.

(a) If the transparency does not have built-up dirt and bugs on the surfaces, but rather has finger prints and/or dust, Novus No. 1 can be applied directly per product specific application instructions. Summer Laboratories 210® can also be used for this purpose per product specific application instructions.

(b) It is necessary to removing bugs and/or heavy accumulations of dirt, avoid touching the surface. If possible, remove most of the dirt by flushing the windows and windshield with water and a mild dish soap mixture. Allow the accumulation of dirt and/or bugs to soak for a few minutes. If rubbing is required, a bare hand is best. When all the debris on the surface of the window is loosened, apply a second water flush, dry with a 100 percent cotton cloth, and apply Novus No. 1 per product specific application instructions.

(c) The above steps and products may not remove all substances, since they are intended primarily for dirt and smudges. To remove difficult items such as tape residue, oil, and grease, the safest solvents are 100 percent mineral spirits or kerosene. Some alcohols are safe, such as isopropyl alcohol.

(7) If after using Novus No. 2, scratches are still visible, apply Novus No. 3 per product specific application instructions.

(8) Scratches of greater magnitude (those that can be felt with a fingernail) require the use of high abrasives and removal of some of the window's surface around the greatest depth of the scratch. This procedure requires considerable expertise and the scratch may not be correctable. Repair of transparencies with a scratch depth of approximately .005 of an inch or greater (the depth at which you will be able to feel it with your finger nail) must be referred to your Cessna Service Station.

CAUTION: Do not use anything containing ammonia, aromatic solvents like methyl n-propyl ketone, acetone, lacquer thinner, paint stripper, gasoline, benzene, alcohol, anti-ice fluid, hydraulic fluid, fire extinguisher solutions, or window cleaner on the acrylic transparency surfaces. The use of these substances may cause the surface to craze.

C. **Specific Application Instructions**

(1) **Novus No. 1**

(a) If the surface is extremely dirty, apply Novus No. 1 liberally and wipe using long, sweeping strokes. Do not use pressure at this time or large dirt particles may scratch the plastic. If there are heavy accumulations of bugs and built-up dirt, follow the cleansing instructions of the General Cleaning Procedures.

(b) Shake well before using.

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(c) Re-apply Novus No. 1. Polish using short, circular strokes with a clean portion of the cloth.

(d) When surface is thoroughly clean and uniformly covered, buff to a slippery glaze with a clean portion of the cloth. Surfaces buffed to a high glaze are more resistant to dust and future scratching.

(2) **Novus No. 2**

(a) Observe condition of the surface to be treated. The deeper the scratches, the greater the pressure required to remove them. If the surface is dirty, clean with Novus No.1 before applying Novus No. 2.

(b) Apply Novus No. 2 liberally. Using a clean, soft cloth, polish with a firm back and- forth motion at right angles to the scratches. Keep the cloth saturated with polish at all times.

(c) Shake well before using.

(d) When the worst scratches have been polished out, reapply Novus No.2 uniformly in a circular motion to the entire surface using short, circular strokes and light pressure. Allow to dry to a light haze.

(e) Using a clean portion of the cloth, buff the surface to a slippery glaze using firm, short strokes. This procedure is imperative in achieving the best results.

(f) For heavy scratches, multiple applications of Novus No. 2 or application of Novus No. 3 may be required. Follow with Novus No. 1 for best results.

(3) **Novus No. 3**

(a) Remove surface dirt and dust with Novus No. 1.

(b) Shake well before using.

(c) Apply Novus No. 3 liberally. Using a clean, soft cloth, polish with a firm back and forth motion at right angles to the scratches. Keep the cloth saturated with polish at all times.

(d) Continue polishing until only fine scratches remain. Using cloth, remove all remaining polish, this is very important!

(e) Using a clean cloth, apply Novus No. 2 in a circular motion uniformly to entire surface. Polish using light pressure until Novus No. 2 dries to a light haze.

(f) Using a clean portion of the cloth, buff the surface clean. Follow with Novus No. 1 for best results.

(4) **Summer Laboratories 210 (Plastic Cleaner and Polish)**

(a) This cleaner is dispensed from an aerosol can and ideal for light and quick cleaning jobs.

(b) Shake the can well before using.

(c) Spray a light coat of 210® Cleaner/Polish across the surface of the transparency.

(d) With a soft clean cloth, wipe and buff the surface until it is dry.

(5) **3MTM Adhesive remover Citrus Base 6040-6042**

(a) This cleaner is dispensed from an aerosol can and ideal for light and quick cleaning jobs.

(b) Thoroughly coat adhesive residue/paint over-spray.

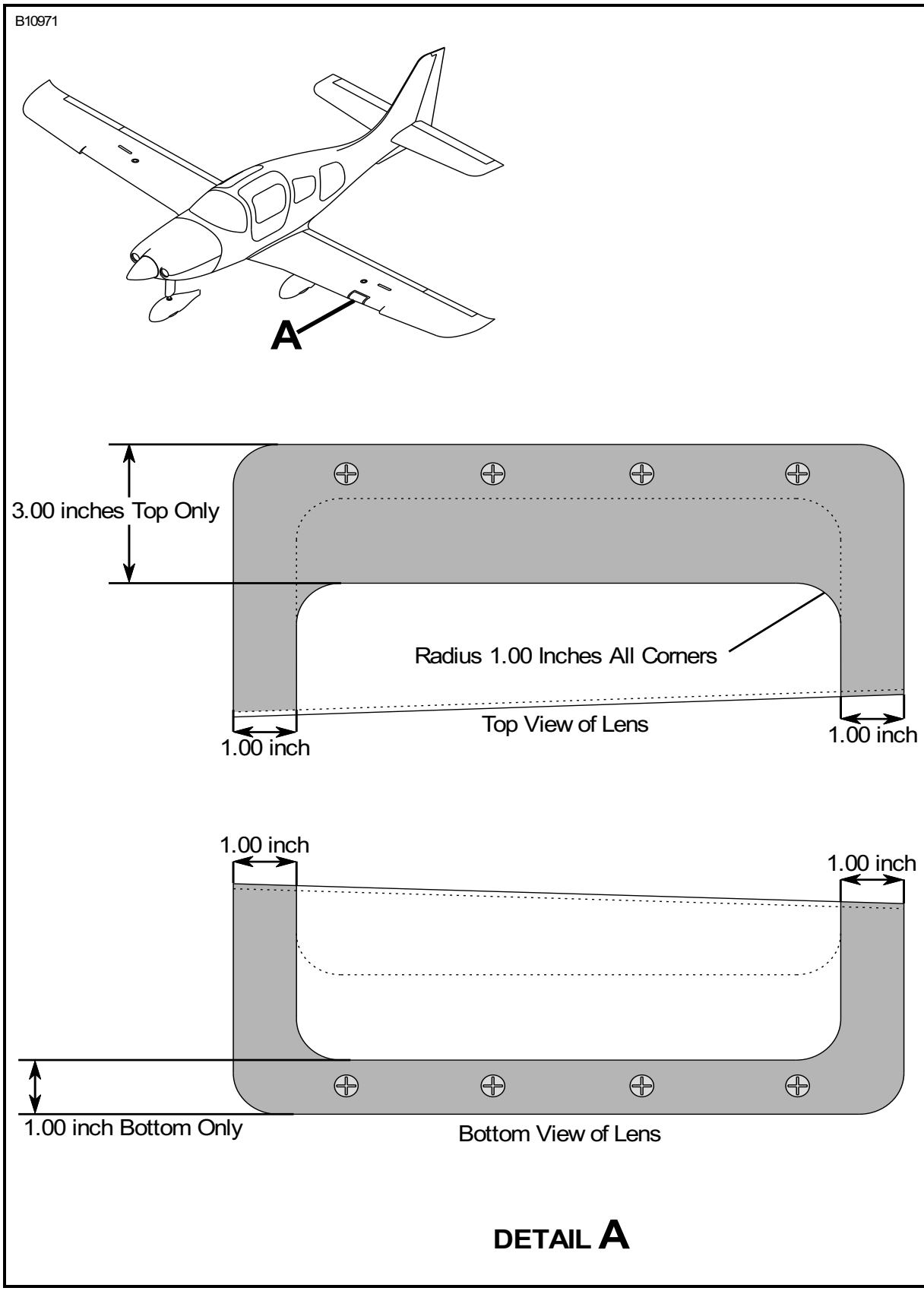
(c) Wait at least 5 minutes for product completely penetrate and loosen adhesive or paint.

(d) Use a soft clean cloth to clean adhesive residue or paint.

(e) Repeat process if necessary.

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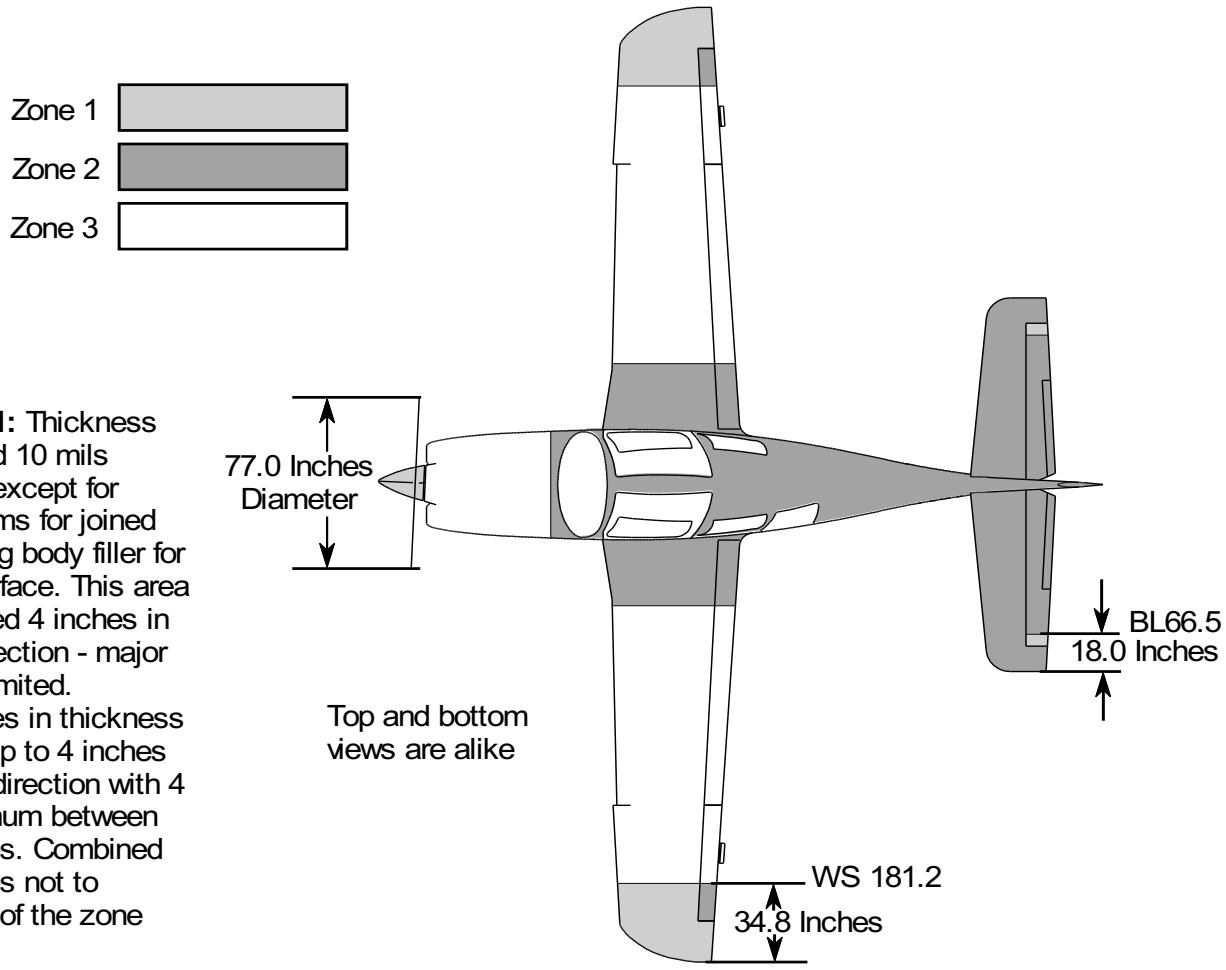
Figure 201 : Sheet 1 : Landing and Taxi Light Paint Areas



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Figure 202 : Sheet 1 : Paint Thickness Zones

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Paint Zone 1: Thickness not to exceed 10 mils (0.010 inch) except for repair or seams for joined parts requiring body filler for a smooth surface. This area cannot exceed 4 inches in the minor direction - major direction unlimited. Discontinuities in thickness are allowed up to 4 inches in the minor direction with 4 inches minimum between discontinuities. Combined discontinuities not to exceed 20% of the zone area.

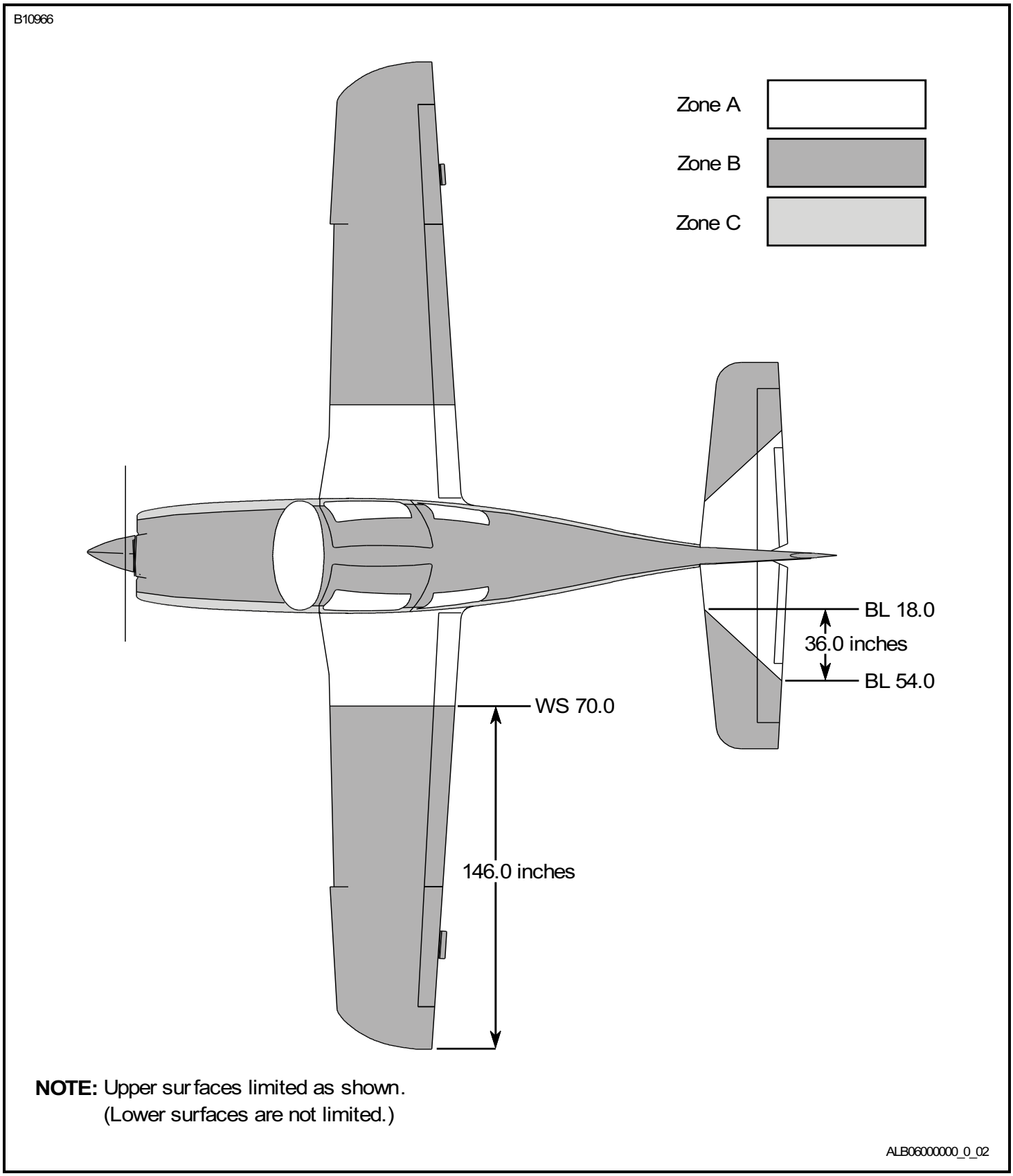
Paint Zone 2: Thickness not to exceed 15 mils (.015 inch) except for repair or seams for joined parts requiring body filler for a smooth surface. This area cannot exceed 5 inches in the minor direction - major direction unlimited. Discontinuities in thickness are allowed up to 5 inches in the minor direction with 5 inches between discontinuities. Combined discontinuities not to excced 20% of the zone area.

Paint Zone 3: Thickness restrictions do not apply.

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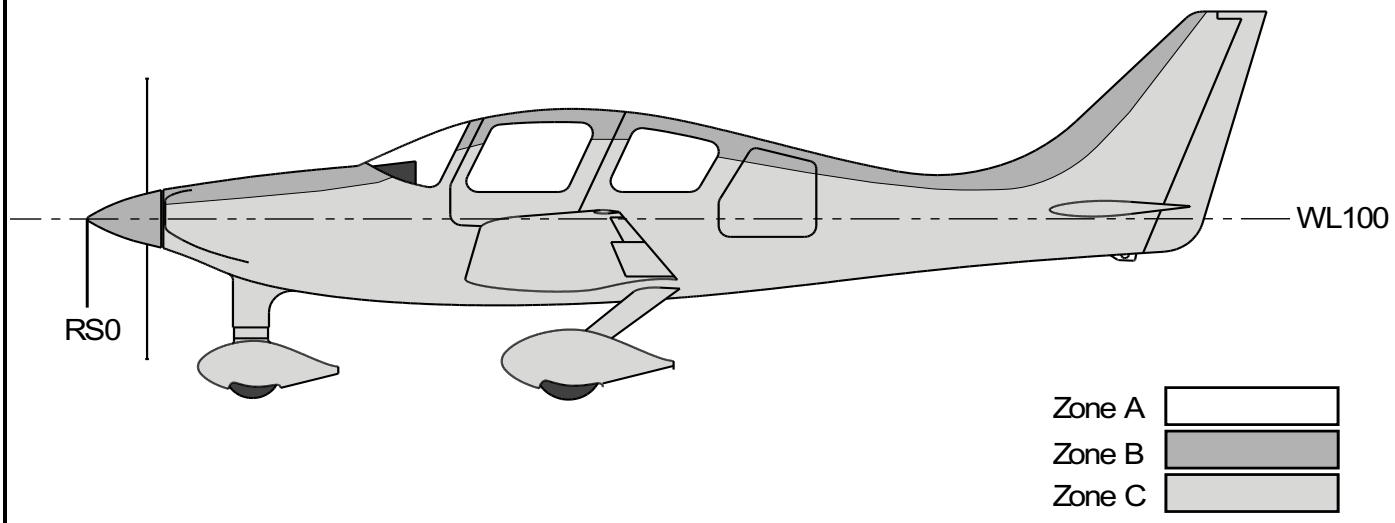
Figure 203 : Sheet 1 : Paint Color Zones for UV and Temperature



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Figure 204 : Sheet 1 : Paint Color Zones for UV and Temperature (Side View)

B10930



Waterline Station	WL103.5	WL104.2	WL105.2	WL106.4	WL107.9	WL109.6	WL117.7	WL119.0	WL122.4
Reference Station	RS20	RS30	RS40	RS50	RS60	RS70	RS95	RS100	RS130

Waterline Station	WL122.1	119.4	WL117.1	WL114.9	WL113.0	WL111.4	WL110.1	WL109.0	WL108.2
Reference Station	RS140	RS160	RS170	RS180	RS190	RS200	RS210	RS220	RS230

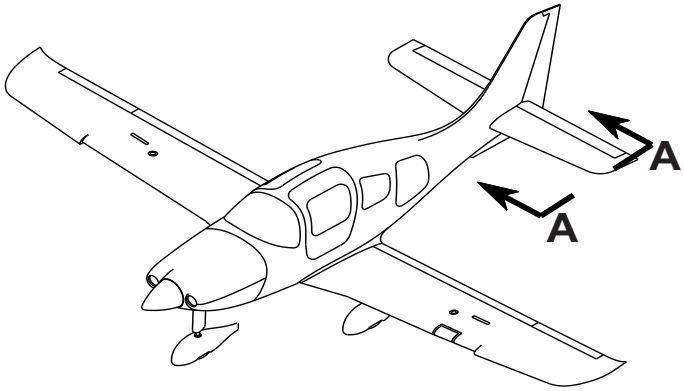
Waterline Station	WL107.7	WL110.0	WL120.6	WL135.2	WL149.7
Reference Station	RS240	RS250	RS260	RS270	RS280

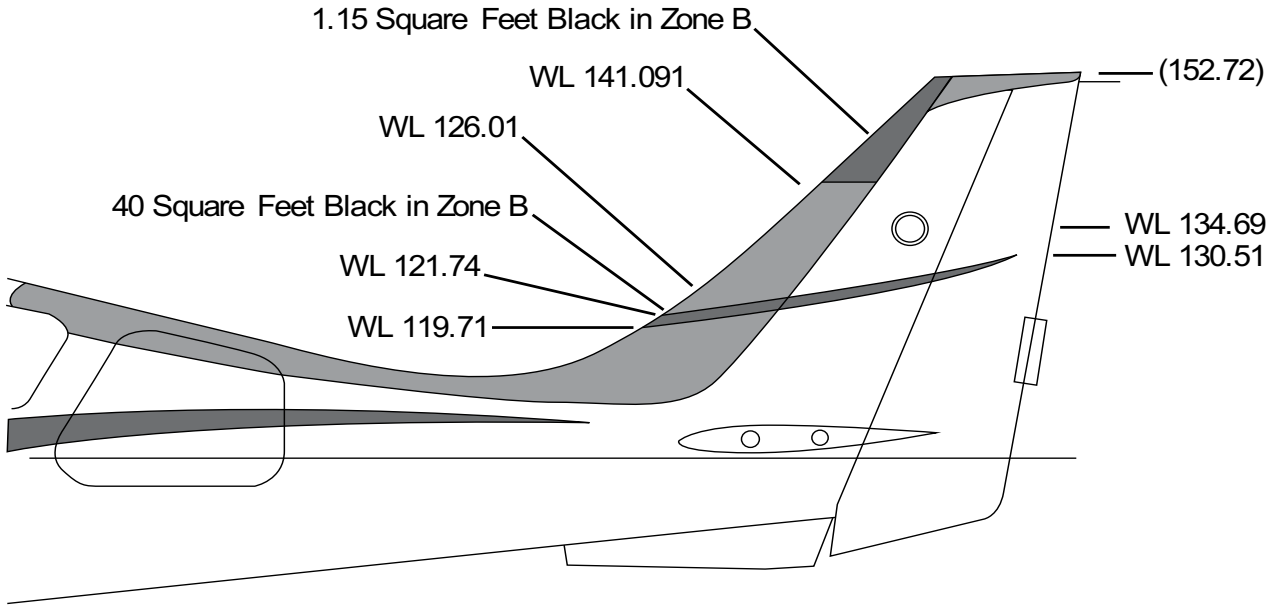
ALA52000000

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Figure 205 : Sheet 1 : Zone C Paint in a Zone B Area

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VIEW A-A

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STABILIZERS - GENERAL

1. General - Scope And Definition

A. The Cessna 400 (LC41-550FG) empennage assembly consists of a horizontal and vertical stabilizer. The vertical stabilizer is an integral part of the fuselage. The horizontal stabilizer is a two-piece unit that is fully removable for service and maintenance.

The horizontal stabilizer is of a carbon fiber composite construction. The internal structure consists of two ribs that run the full length of the stabilizer chord line at their respective stations and two shear webs: one between the two ribs and one that is outboard of the outboard rib. The horizontal stabilizer is attached to the vertical stabilizer via two high-strength steel tubes and two locking pins.

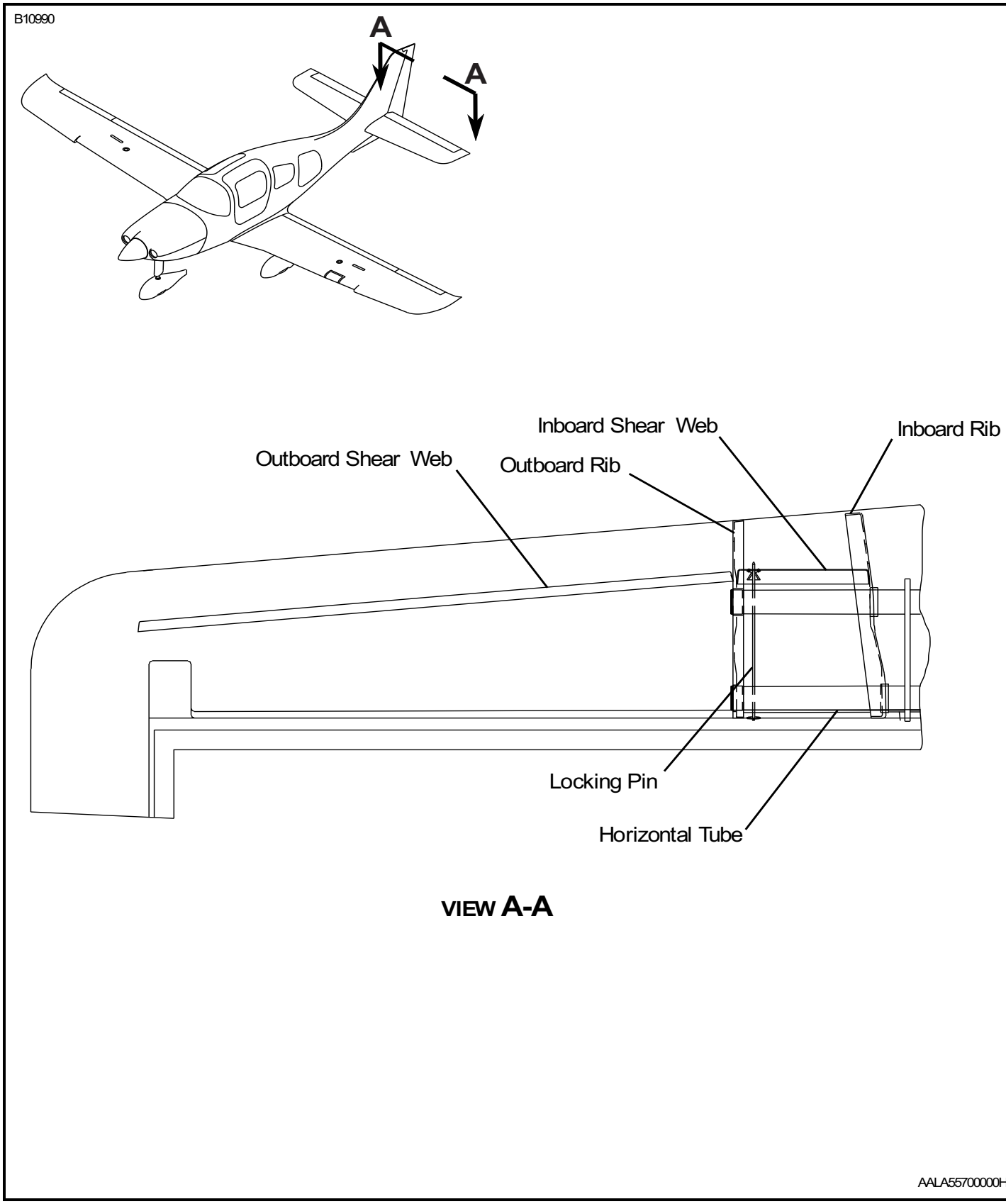
The elevator and rudder are also of a carbon fiber composite construction. The elevator has an electrically actuated trim tab located on the right side. The elevator is attached to the horizontal stabilizer with two piano hinges. The rudder has a fixed trim tab located mid-span along the trailing edge and is attached to the vertical closeout at three locations. Both the elevator and rudder have balance weights installed for stabilization during flight.

2. Horizontal Stabilizer

A. The left and right sides of the horizontal stabilizer structure consist of an inboard rib, an outboard rib, an inboard shear web, and an outboard shear web, as shown in Figure 1. The ribs and shear webs are a pre-molded carbon composite material. The inboard and outboard ribs contain bushings for the horizontal tubes. The bushings are pre-installed in the ribs.

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Figure 1 : Sheet 1 : Horizontal Stabilizer Internal Structure



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HORIZONTAL STABILIZER - MAINTENANCE PRACTICES

1. Horizontal Stabilizer Removal And Installation

CAUTION: Removal of the horizontal stabilizer may require more than one individual due to its size and relatively tight fit.

A. Use the following procedure to remove the horizontal stabilizer:

(1) Remove the rudder and elevator per the instructions in Chapter 27.

(2) Remove the two AN526C1032R8 screws and two NAS1149F0332P (AN960-10L) washers attaching the locking pin to the aft face of the horizontal stabilizer.

(3) Using a pair of vice grips or similar tool, pull the locking pin, part number LA55702003, straight aft out of the horizontal stabilizer.

CAUTION: Take care not to bend the locking pin while removing it. If the pin becomes bent, installation will be difficult, if not impossible.

(4) Remove the horizontal stabilizer by gently rocking it fore and aft while sliding it straight outboard from the fuselage until the horizontal tubes are free of the outboard rib and bushings. Once the tubes are free of the outboard rib, the horizontal stabilizer will slide freely until the end of the tubes contact the inboard rib and bushings. Again, gently rock the stabilizer fore and aft to clear the inboard bushings.

WARNING: Take care not to rock the stabilizer too hard and cause undue stress on the internal ribs and bushings, as this may cause the bushings to break loose. Should the bushings break loose, contact Cessna Aircraft Company for further instructions.

(5) Reinstall the horizontal stabilizer sides in the reverse order. When reinserting the locking pin, take care not to bend it, as installation will become difficult or impossible. Should the locking pin become bent and impossible to install, contact Cessna Aircraft Company for a replacement. Torque the locking pin attachment screws 30 to 36 in.-lbs.

2. Maintenance Practices

A. Regular maintenance of the horizontal stabilizer is not required. The holes in the trailing edge for the elevator hinge attachment screws should be inspected occasionally for wear. The horizontal tubes do not require maintenance.

3. Detection Procedures For Delamination And Latent Damage

A. Due to its composite construction, the horizontal stabilizer should be inspected for delamination and latent damage per the procedures outlined in Chapter 20. The horizontal stabilizer does not have any access panels and needs to be removed in order to inspect the internal structure. Follow the instructions outlined in this chapter for removal of the horizontal stabilizer. Common inspection tools that may be used are mirrors, bore scopes, etc.

4. Inspection Of Horizontal Tubes

A. The horizontal tubes should be inspected per the procedures outlined in Chapter 53.

5. Paint Schemes

A. The horizontal stabilizer is to be painted in accordance with instructions in Chapter 51.

6. Leading Edge Tape and Zig Zag Tape

A. Optional leading edge anti-chafe tape may be added to the aircraft. The anti-chafe tape is 1 inch wide, adhesive-backed, clear, urethane tape that prevents pitting and wear on the leading edges of the horizontal surfaces. For S/N 41563 and On, zig zag tape is added to the underside of the horizontal stabilizer; aligned between the inboard and outboard edges of the elevator and 1.25 inches ± 0.25 inch down from the chord line.

To apply the tape, thoroughly clean the leading edges using isopropyl alcohol. The 1 inch wide tape should be centered along the leading edge of the surface. The tape should end at the beginning of the horizontal stabilizer tip curve. Use a rubber scraper/squeegee as required to smooth the tape and remove air bubbles from underneath the tape. To remove the tape, slowly pull the tape back on itself; then clean the stabilizer surface with isopropyl alcohol. Application and removal procedure for the zig zag tape is identical except its position is per the paragraph above.

The anti-chafe tape and zig zag tape should be inspected at each 100 hour or annual inspection to ensure that it is not peeling up and is properly attached.

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