TKS ANTI-ICE SYSTEM - ADJUSTMENT/TEST
(Fairing Installation)

1. General

A. This section includes the test procedures that are necessary to do after a TKS system component replacement.

B. For the purge and test procedures of the leading edge porous panels, refer to TKS Anti-Ice Leading Edge Porous Panel - Adjustment/Test.

C. For the removal and installation and test procedures for the tail bracket assembly (low pressure switches), refer to TKS Anti-Ice Fluid Distribution System - Maintenance Practices.

D. To calibrate the fluid level sender, refer to Fluid Level Sender Calibration in this section.

E. Recommended maintenance to keep the TKS fluid at its correct viscosity is as follows:

- Operate the pumps monthly, or as necessary, in the HIGH 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.

NOTE: If the fluid is too thick, the porous panels can become blocked or clogged.

2. Tools and Equipment

A. For a list of tools and equipment, refer to Ice and Rain Protection - General.

3. TKS Anti-Ice System Test

WARNING: For health and environmental data, review the applicable Safety Data Sheet (SDS).

WARNING: Before you operate the TKS system, put plastic sheets or absorbent cloths below the porous panels. This keeps the TKS fluid off the floor which helps prevent injury to personnel.

WARNING: Slowly loosen the coupling that is connected to the component of the TKS system before you remove components. It is possible that the system continues to have pressure.

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.

NOTE: For the tests that follow, you can disconnect the discharge tube from the filter manifold outlet and connect a drain tube, which will let you contain the fluid more easily, and that is how these procedures are written. Or, you can keep the discharge connected to the filter manifold outlet and use clean, dry cloths to absorb the anti-ice fluid and to clean the airplane surfaces and floor as necessary. Or, 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: Although you can do one or more of the tests that follow, if applicable, it is necessary to do all of the tests after you have installed the fluid tank, timer box, and/or wire bundle.

NOTE: It is easier for two persons to do these tests. One to monitor the cockpit and one to monitor the equipment pack.

A. Prepare To Do the TKS Anti-Ice System Test, (Refer to TKS Anti-Ice System - Maintenance Practices, Figure 201).

(1) Remove external electrical power from the airplane.

(2) Disengage the circuit breakers on the left circuit breaker panel that follow:

- PRIMARY ANTI-ICE
- W/S ANTI-ICE
- BACKUP ANTI-ICE.

(3) Remove the aft fairing. Refer to TKS Anti-Ice Fluid Tank - Maintenance Practices, Remove the Aft Fairing.

(4) Find the drain tube connected to the shut off valve, extending aft of the accessory bracket.
   (a) Put a bucket with a capacity of approximately 3 to 5 gallons below the drain tube outlet.
(5) If you will do tests of the metering pumps, the high pressure switch, or timer box, disconnect the discharge tube from the filter manifold outlet.
(6) Put a cap or plug in the open tube end.
(7) Connect a length of tubing to the filter manifold outlet.
   (a) Put the open tube end in the bucket.
(8) If you are to do the windshield pump test, disconnect the windshield pump outlet tube from the fuselage connector.
   (a) Put the open tube end in the bucket.
(9) Engage the circuit breakers on the left circuit breaker panel that follow:
   - PRIMARY ANTI-ICE
   - W/S ANTI-ICE
   - BACKUP ANTI-ICE.
(10) Do the test procedures if applicable.

B. Do a Test of Metering Pump 1.
(1) Make sure that there is enough fluid in the tank to keep the pump from running dry during the test procedure.
(2) For the correct CAS message that shows for the applicable TKS system switch position refer to, TKS Anti-Ice System - Description and Operation, Table 1.
(3) Supply external electrical power to the airplane.
(4) Put the EXTERNAL POWER switch (SC006) on the pilot's switch panel in the BUS position.
(5) Put the AVIONICS 1 switch to the ON position.
(6) Put the AVIONICS 2 switch to the ON position.
(7) Put the ANTI-ICE-FLUID CONTROL, PRIMARY switch on the left switch panel in the HIGH position to start pump 1.
   (a) Make sure that pump 1 operation starts.
   (b) Make sure that 1000 ml, +100 or - 100 ml fluid discharges in the bucket in one minute.
(8) Disengage the PRIMARY ANTI-ICE circuit breaker on the left circuit breaker panel.
   (a) Make sure that pump 1 operation stops.
(9) Make sure that there is no fluid leakage from the couplings.
(10) Put the ANTI-ICE-FLUID CONTROL, PRIMARY switch in the OFF position.
(11) Engage the PRIMARY ANTI-ICE circuit breaker on the left circuit breaker panel.
(12) Put the EXTERNAL POWER switch on the circuit breaker switch panel in the OFF position.
(13) Do the Return to Service procedures or continue the applicable test(s).

C. Do a Test of Metering Pump 2.
(1) Make sure that there is enough fluid in the tank to keep the pump from running dry during the test procedure.
(2) For the correct CAS message that shows for the applicable TKS system switch position refer to, TKS Anti-Ice System - Description and Operation, Table 1.
(3) Supply external electrical power to the airplane.
(4) Put the EXTERNAL POWER switch (SC006) on the pilot's switch panel in the BUS position.
(5) Put the AVIONICS 1 switch to the ON position.
(6) Put the AVIONICS 2 switch to the ON position.
(7) Put the ANTI-ICE-FLUID CONTROL, BACKUP switch (SI024) on the left switch panel in the ON position to start pump 2.
   (a) Make sure that pump 2 operation starts.
   (b) Make sure that 1000 ml, +100 or - 100 ml discharges in the bucket in one minute.
(8) Disengage the BACKUP ANTI-ICE circuit breaker on the left circuit breaker panel.

(a) Make sure that pump 2 operation stops.

(9) Make sure that there is no fluid leakage from the couplings.

(10) Put the BACKUP switch in the OFF position.

(11) Engage the BACKUP ANTI-ICE circuit breaker.

(12) Put the EXTERNAL POWER switch on the pilot's switch panel in the OFF position.

(13) Do the Return to Service procedures or continue the applicable test(s).

D. Do a Test of the Windshield Pump.

(1) Make sure that there is enough fluid in the tank to keep the pump from running dry during the test procedure.

(2) For the correct CAS message that shows for the applicable TKS system switch position refer to, TKS Anti-Ice System - Description and Operation, Table 1.

(3) Supply external electrical power to the airplane.

(4) Put the EXTERNAL POWER switch (SC006) on the circuit breaker switch panel in the BUS position.

(5) Put the AVIONICS 1 switch to the ON position.

(6) Put the AVIONICS 2 switch to the ON position.

(7) Put the ANTI-ICE-FLUID CONTROL, MAX FLOW switch (SI023) on the left switch panel in the WINDSHIELD position, then release the switch.

NOTE: The windshield pump will start when you put the spring-loaded MAX FLOW switch in the WINDSHIELD position and it will spray fluid on the windshield for four seconds after you release it.

(a) Make sure that the windshield pump starts.

(b) When the pump stops make sure that a minimum of 25 ml was discharged in the collection bucket.

(8) Disengage the W/S ANTI-ICE circuit breaker on the left circuit breaker panel.

(9) Put the ANTI-ICE-FLUID CONTROL, MAX FLOW switch on the left switch panel in the WINDSHIELD position, then release the switch.

(a) Make sure that the windshield pump does not operate.

(10) Make sure that there is no fluid leakage from the couplings.

(11) Engage the W/S ANTI-ICE circuit breaker on the left circuit breaker panel.

(12) Remove external electrical power from the airplane.

(13) Do the Return to Service procedures or continue the applicable test(s).

E. Do a Test of the Fluid Level Sender.

(1) Supply external electrical power to the airplane.

(2) Put the EXTERNAL POWER switch (SC006) on the circuit breaker switch panel in the BUS position.

(3) Put the AVIONICS 1 switch to the ON position.

(4) Put the AVIONICS 2 switch to the ON position.

(5) Drain the tank. Refer to TKS Fluid Tank - Maintenance Practices, TKS Tank Fluid Removal.

(a) Make sure that the fluid quantity indication on the MFD is, A-ICE GAL 0.0.

NOTE: You must calibrate the level sender if it does not read zero when the fluid tank is empty.

(6) Fill the tank.

(a) Make sure that the fluid quantity indication on the MFD is, A-ICE GAL 19.0.

(7) To calibrate the fluid level sender, if necessary, refer to Fluid Level Sender Calibration in this section.

(8) Do the Return to Service in this section, or continue the applicable test(s).

F. Do a Test of the Low Level Switch.

(1) Supply external electrical power to the airplane.

(2) Put the EXTERNAL POWER switch (SC006) on the circuit breaker switch panel in the BUS position.

(3) Put the AVIONICS 1 switch to the ON position.

(4) Put the AVIONICS 2 switch to the ON position.
(5) Drain the tank. Refer to TKS Anti-Ice Fluid Tank - Maintenance Practices, TKS Tank Fluid Removal.
(6) Put the ANTI-ICE-FLUID CONTROL, PRIMARY switch on the left switch panel in the NORM position.
(7) Make sure that the A-ICE NORM (white) CAS message shows on the EICAS display.
(8) Make sure that the A-ICE LOW FLUID (amber) CAS message shows on the EICAS display.
(9) Put the PRIMARY switch in the OFF position
(10) Add 4.0 gallons to the tank.
(11) Put the PRIMARY switch to the NORM position.
(12) Make sure that the A-ICE LOW FLUID (amber) CAS message does not show on the EICAS display.
(13) Put the PRIMARY switch to the OFF position.
(14) Service the TKS system. Refer to Chapter 12, TKS Anti-Ice System - Servicing for the servicing procedures.

NOTE: You must calibrate the fluid level sender if the primary flight display (G1000) does not read zero when the TKS fluid tank is empty. Refer to TKS Anti-Ice System - Adjustment/Test, TKS Level Sender Calibration.

(15) Do the, Return to Service in this section, or continue the applicable test(s).

G. Do a Test of the Pressure Switch (High).
(1) Make sure that the aft fairing is removed. Refer to TKS Anti-Ice System - Maintenance Practices (Fairing Installation), Remove the Aft Fairing.
(2) Supply external electrical power to the airplane.
(3) Put the EXTERNAL POWER switch (SC006) on the circuit breaker switch panel in the BUS position.
(4) Put the AVIONICS 1 switch to the ON position.
(5) Put the AVIONICS 2 switch to the ON position.
(6) Connect a pressure gage and shutoff valve to the filter outlet tube.
(a) Close the shutoff valve.
(7) Put the ANTI-ICE-FLUID CONTROL, PRIMARY switch (SI022) on the left switch panel in the HIGH position for intervals of 10 to 15 seconds.
(8) Monitor the pressure gage for a 150 psi indication after a short time period.
(a) Make sure that the A-ICE HIGH PRESS (amber) CAS message shows on the EICAS display.

NOTE: This makes sure that the high pressure switch is operating correctly.

(9) Put the PRIMARY switch in the OFF position.
(10) Put the EXTERNAL POWER switch on the circuit breaker switch panel in the OFF position.
(11) Slowly open the shutoff valve to release pressure in the system.
(12) Disconnect the pressure gage and shutoff valve from the tube.
(13) Do the, Return to Service in this section, or continue the applicable test(s).

H. Do a Test of the Timer Box.
(1) Make sure that there is enough fluid in the tank to keep the pump from running dry during the test procedure.
(2) For the correct CAS message that shows for the applicable TKS system switch position refer to, TKS Anti-Ice System - Description and Operation, Table 1.
(3) Supply external electrical power to the airplane.
(4) Put the EXTERNAL POWER switch (SC006) on the circuit breaker switch panel in the BUS position.
(5) Put the ANTI-ICE-FLUID CONTROL, PRIMARY switch (SI022) on the left switch panel in the NORM position.
(a) Make sure that each of the two pumps operate for 20 seconds, +3 or - 3 seconds and then do not run for 100 seconds, + 10 or - 10 seconds.
(6) Make sure that there is no fluid leakage from the couplings.
(7) While the pumps are off, Put the ANTI-ICE-FLUID CONTROL, MAX FLOW switch in the AIRFRAME position.

(a) Make sure that each of the two pumps operate for 120 seconds, +10 or - 20 seconds.

(8) Put the PRIMARY switch in the OFF position.

(9) Do a test of the windshield pump. Refer to Do a Test of the Windshield Pump in this section.

(10) Put the EXTERNAL POWER switch on the circuit breaker switch panel in the OFF position.

(11) Do the Return to Service procedures or continue the applicable test(s).

I. Do the Return to Service.

NOTE: After you have completed the applicable test(s), it is necessary to put the airplane back to its initial configuration.

(1) Make sure that there is no fluid leakage from the couplings.

(2) Make sure that all applicable connectors, fasteners, and couplings are installed correctly.

(3) Make sure that the drain valve is closed and safety with wire. Refer to Chapter 20, Safetying - Maintenance Practices.

(4) Install the screws and connect the antenna coaxial cable and covers, if necessary.

(5) Make sure that all the circuit breakers are engaged.

(6) Make sure that all the system switches are in their initial positions.

(7) Make sure that the external electrical power is removed from the airplane.

(8) Make sure that the aft fairing is installed. Refer to TKS Anti-Ice System - Maintenance Practices (Fairing Installation), Install the Aft Fairing.

(9) Make sure that the floor and the airplane surfaces are clean.

4. TKS Level Sender Calibration

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.

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.

NOTE: To make sure that the level sender is calibrated correctly, you can do this calibration procedure. The voltmeter will show 0.0 VDC when the fluid tank is empty and 5.0 VDC, +0.1 or -0.1 VDC when the fluid tank is full.

NOTE: When the fluid tank is empty and the EICAS display shows 0.0 gallons, calibration of the empty adjustment is not necessary. You can then fill the fluid tank and calibrate the level sender full adjustment.

NOTE: Changes in the properties of the anti-ice fluid can occur because of differences between manufacturers, or if the fluid is new (fresh), or if the fluid has gone through the fluid tank and TKS system, or if the fluid has been in the fluid tank too long (the TKS system has not been operated). These fluid changes can cause different results in calibration.

A. Calibrate the Level Sender (Refer to Figure 501).

(1) Make sure that the airplane is level. Refer to Chapter 8, Leveling - Maintenance Practices.

(2) Remove the cockpit floor covering to access floor panel 232BC.

(3) Remove the cockpit floor access panel 232BC. Refer to Floor Covering/Control Column Cover - Maintenance Practices.

WARNING: Do not remove hoses under pressure. This procedure will result in release of refrigerant into the atmosphere. Removing hoses under pressure may also result in personal injury if hose ends are not restrained.

(4) If necessary, disconnect and move the air conditioning lines to get access to the level sender. Refer to Chapter 21, R134A Air Conditioning - Maintenance Practices, Air Conditioning Plumping Removal/Installation.

(5) Move aside the rubber nipples that cover the level sender posts.
(6) Connect one lead of the voltmeter to the SEND post of the level sender.
(7) Connect the other lead of the voltmeter to the NEG post of the level sender.
(8) Supply external electrical power to the airplane.
(9) To calibrate the level sender with an empty fluid tank, do the steps that follow:
    (a) Remove the protective layer from the EMPTY adjustment screw.
        NOTE: This screw is on the right side (airplane's right side) of the level sender.
    (b) Use a screwdriver to turn the EMPTY adjustment screw counter clockwise until the voltage that shows on the voltmeter does not go lower.
    (c) Turn the screw clockwise until 0.0 VDC, +0.1 or -0.1 VDC, shows on the voltmeter.
(10) To calibrate the level sender with a full fluid tank, do the steps that follow:
    (a) Remove the protective layer from the FULL adjustment screw.
        NOTE: This screw is on the right side (airplane's right side) of the level sender.
    (b) Use a screwdriver to turn the FULL adjustment screw until 5.0 VDC, +0.1 or -0.1 VDC, shows on the voltmeter.
(11) Remove external electrical power from the airplane.
(12) Disconnect the leads of the voltmeter from the level sender.
(13) Cover the level sender posts with the rubber nipples.
(14) Put a protective layer on the adjustment screw(s).
(15) Install the cockpit floor access panel 232BC. Refer to Floor Covering/Control Column Cover - Maintenance Practices.
(16) If necessary, connect the air conditioning lines. Refer to Chapter 21, R134A Air Conditioning - Maintenance Practices, Air Conditioning Plumping Removal/Installation.
(17) Install the cockpit floor covering to access floor panel 232BC.
(18) Clean the floor and the airplane surfaces as necessary.

Figure 501 : Sheet 1 : Level Sender Calibration

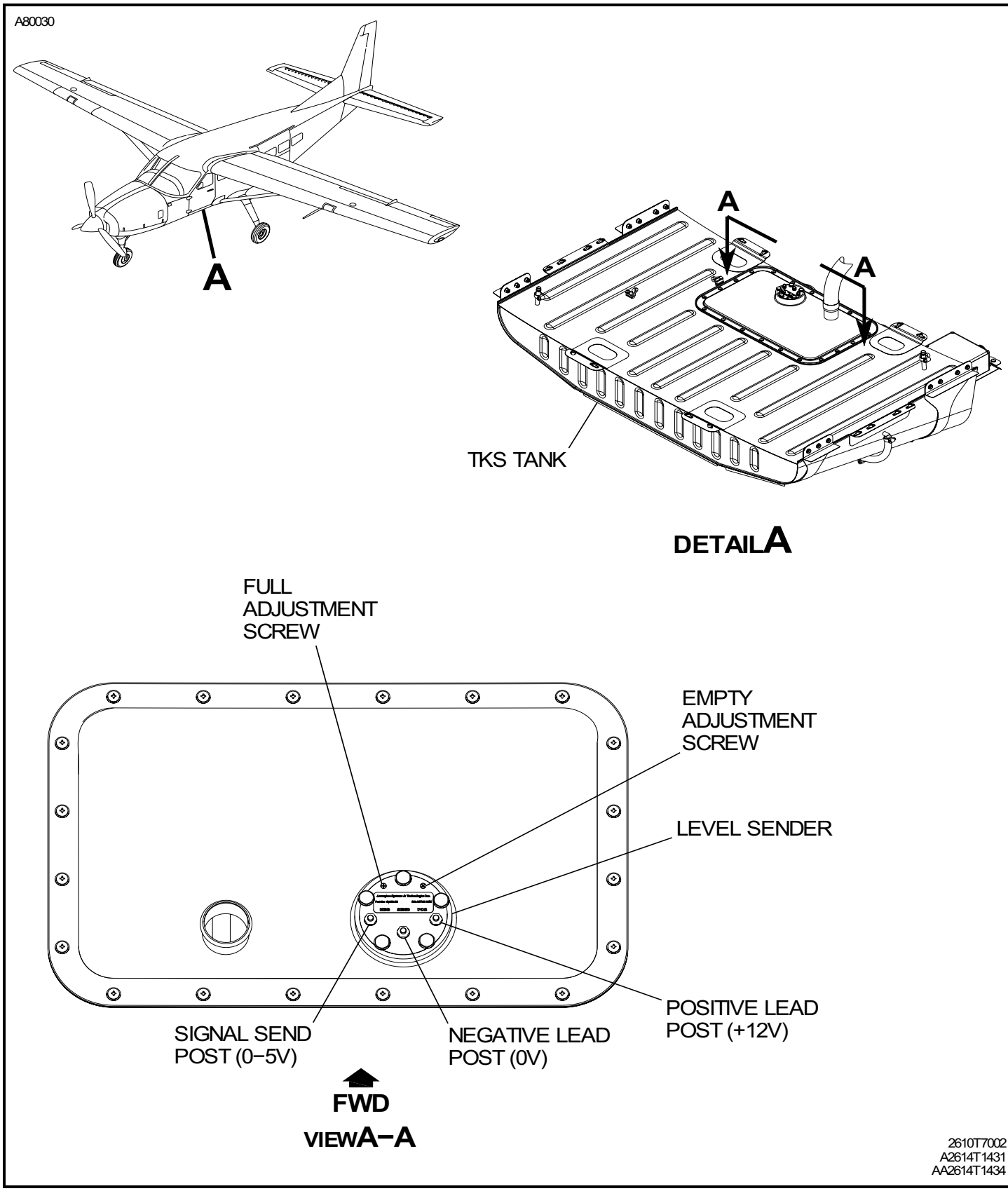

Figure 201 : Sheet 1 : TKS System Installation

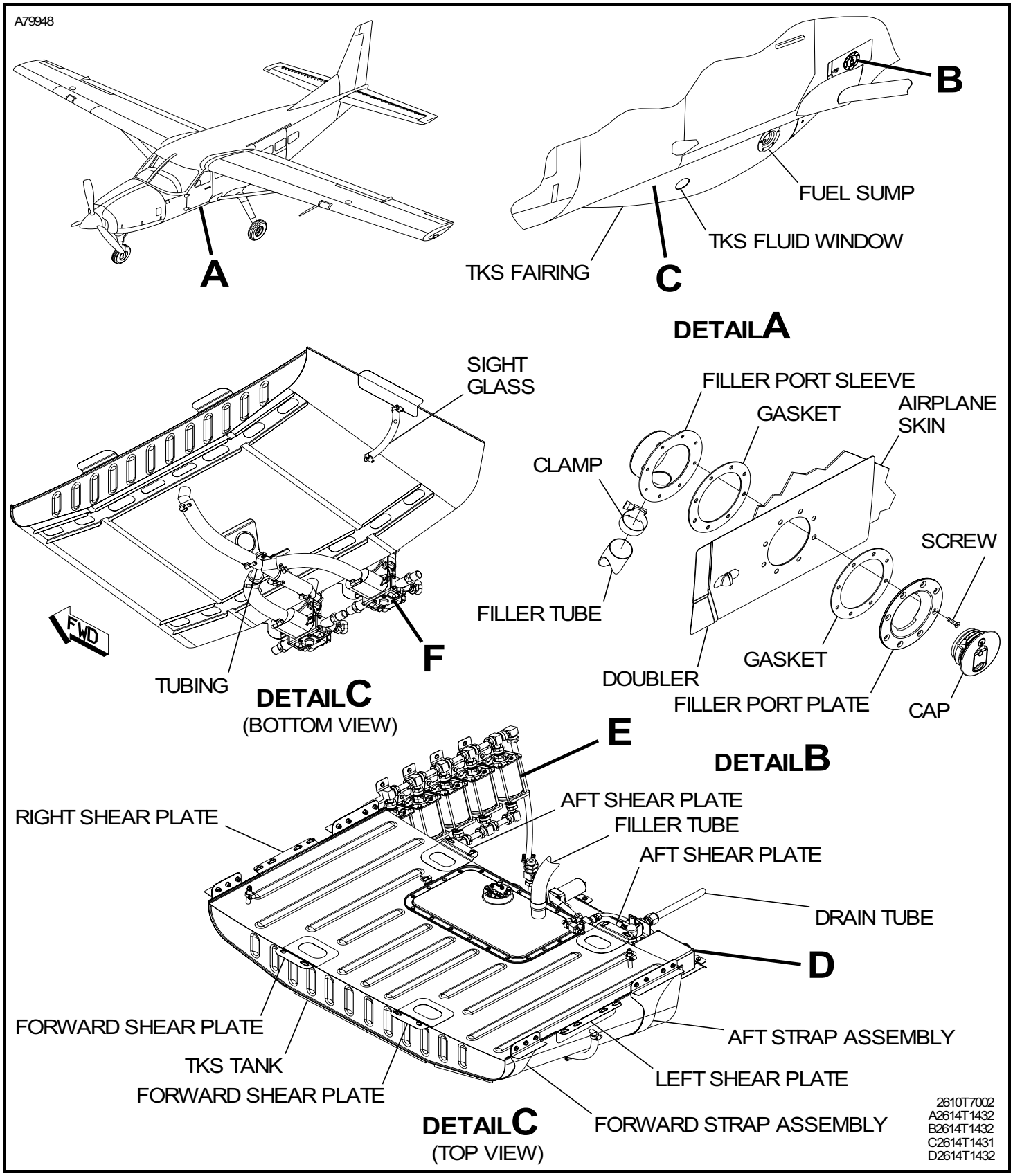

Figure 201 : Sheet 2 : TKS System Installation

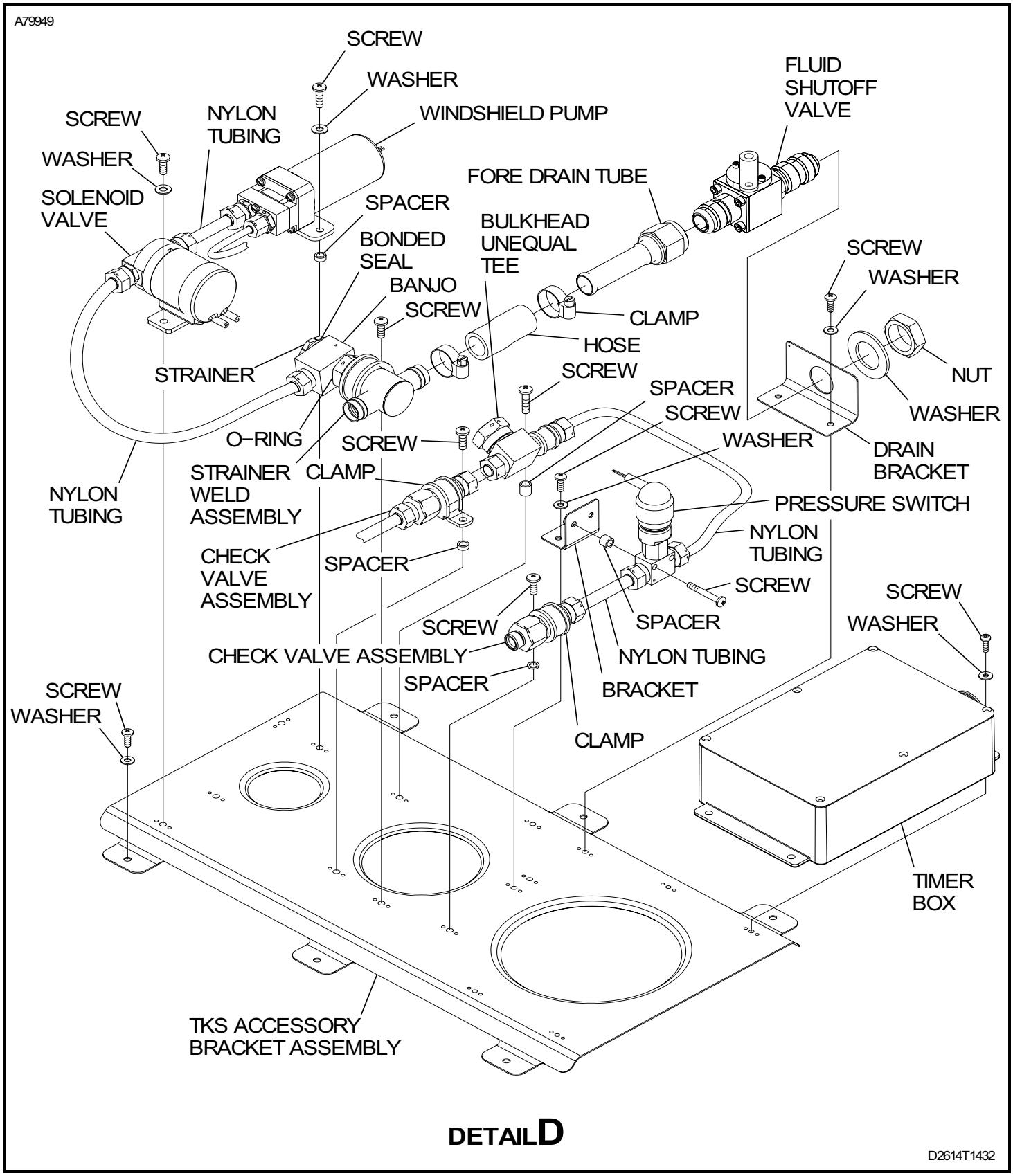

Figure 201 : Sheet 3 : TKS System Installation

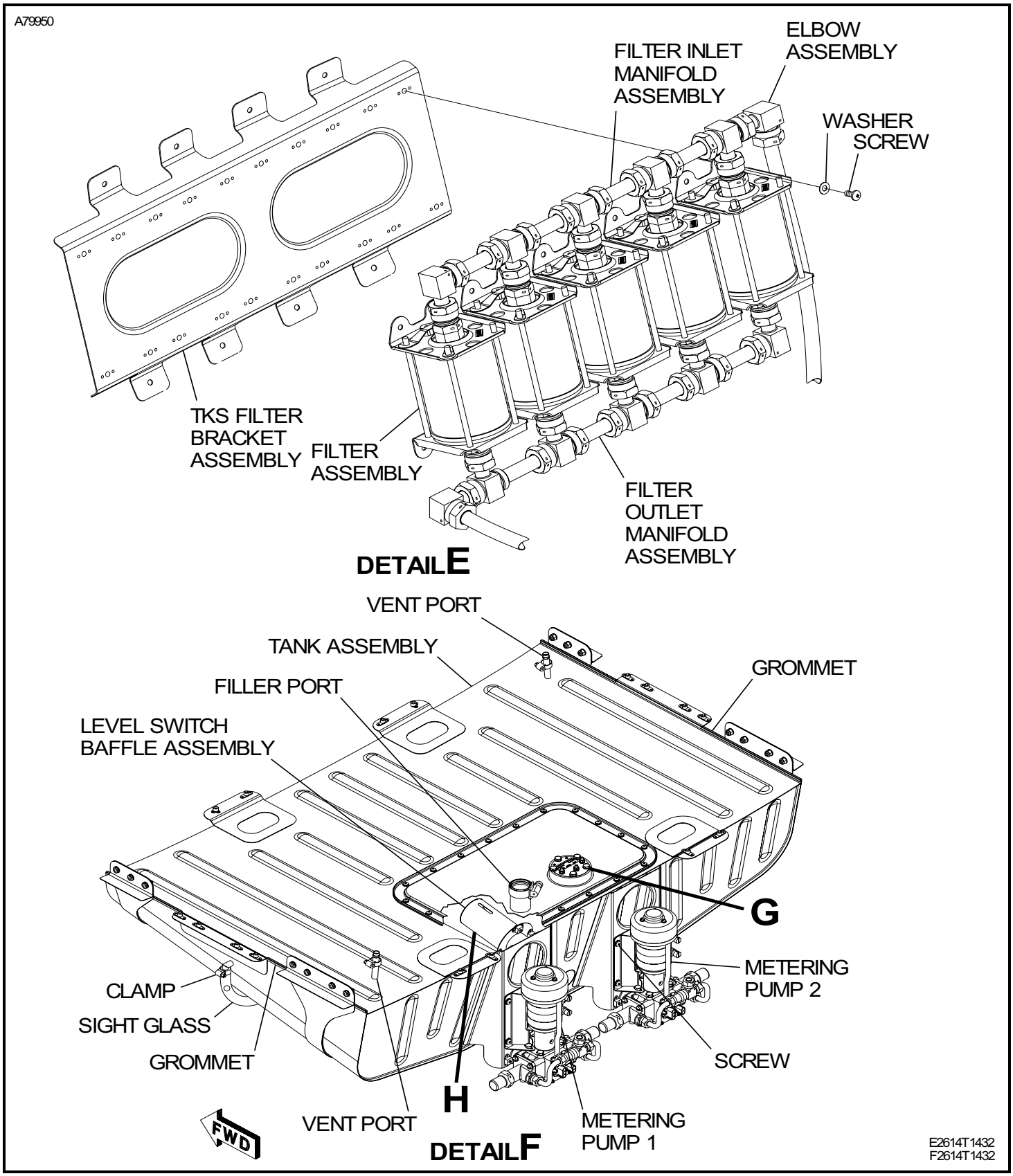

Figure 201 : Sheet 4 : TKS System Installation

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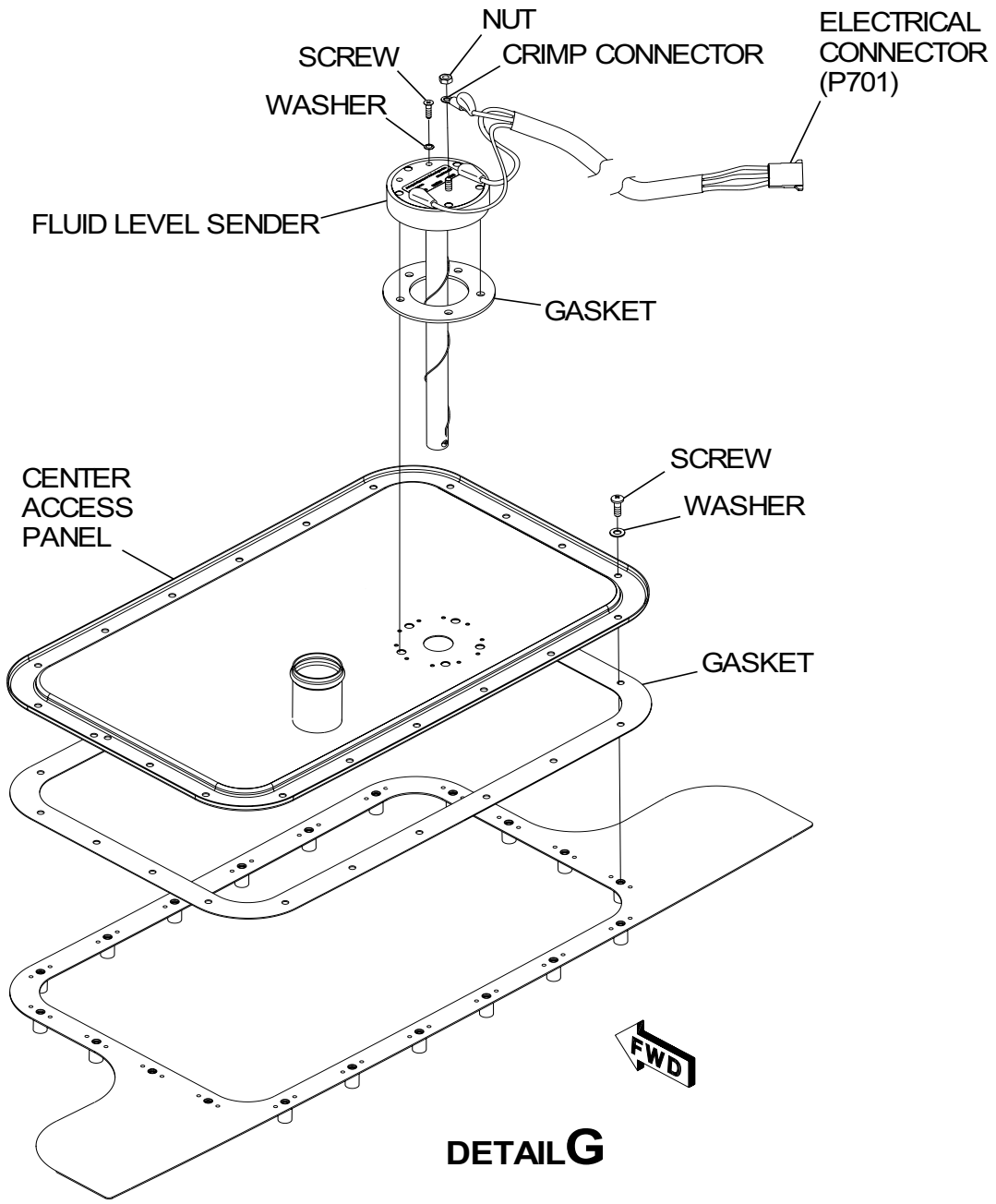

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Figure 201 : Sheet 5 : TKS System Installation

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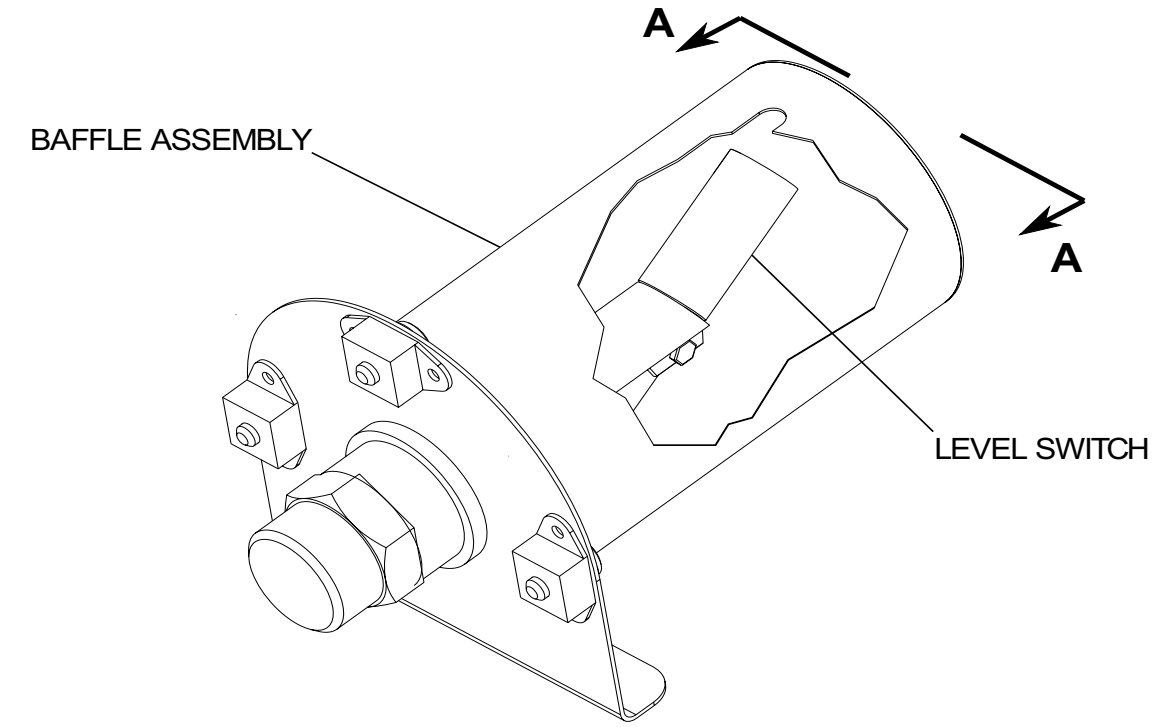
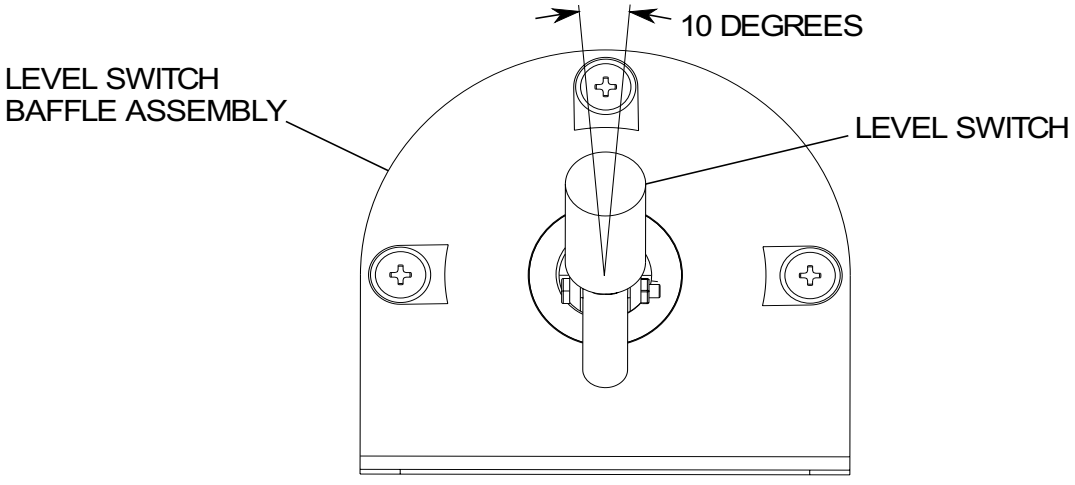


DETAIL H

FWD



VIEW A–A

NOTE: INSTALL THE SWITCH VERTICAL WITHIN THE DIMENSION SHOWN.

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Figure 2 : Sheet 1 : Model 208 Floorboard Access Plates/Panels Identification