CHAPTER

36

PNEUMATIC

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CHAPTER 36 - PNEUMATIC
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PNEUMATIC - DESCRIPTION AND OPERATION

1. General

A. The pneumatic system comprises the bleed air system and the door seal inflation system.

B. For information about the bleed air system refer to 36-10-00.

C. For information about the door seal inflation system refer to 36-11-00.

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BLEED AIR SYSTEM - DESCRIPTION AND OPERATION

1. Description

A. The bleed air system comprises a system of ducts and tubes which take pressurized air from the compressor section of the engine to a manifold in the airplane center section. Connectors on the manifold connect to the various systems which use bleed air. The ducts are connected together with threaded connectors.

2. Operation (Ref. Fig. 1)

A. The air from each engine passes through an engine bleed fitting, which is branched to supply air to the air conditioning system. The bleed fitting also has a connection for the fuel purge system. From the bleed fitting the air passes through a spring-loaded check valve which prevents back pressure entering the engine compressor. From the check valve the air passes through a venturi. After the venturi the duct branches to supply air to the anti-ice system. The air is then ducted to the manifold located in Zone 271. From the manifold, air is delivered through a system of tubes, to the various systems which use pneumatic pressure.

B. The systems which use pneumatic pressure are:

- Air conditioning system (Refer to 21-00-00).
- Fuel purge system (Refer to 73-10-00).
- Anti-ice system (Refer to 30-00-00).
- Emergency pressurization (Refer to 21-30-00).
- Pressurization control system (Refer to 21-30-00).
- Hydraulic pressurization (Refer to 29-00-00).
- Door seal inflation system (Refer to 36-11-00).

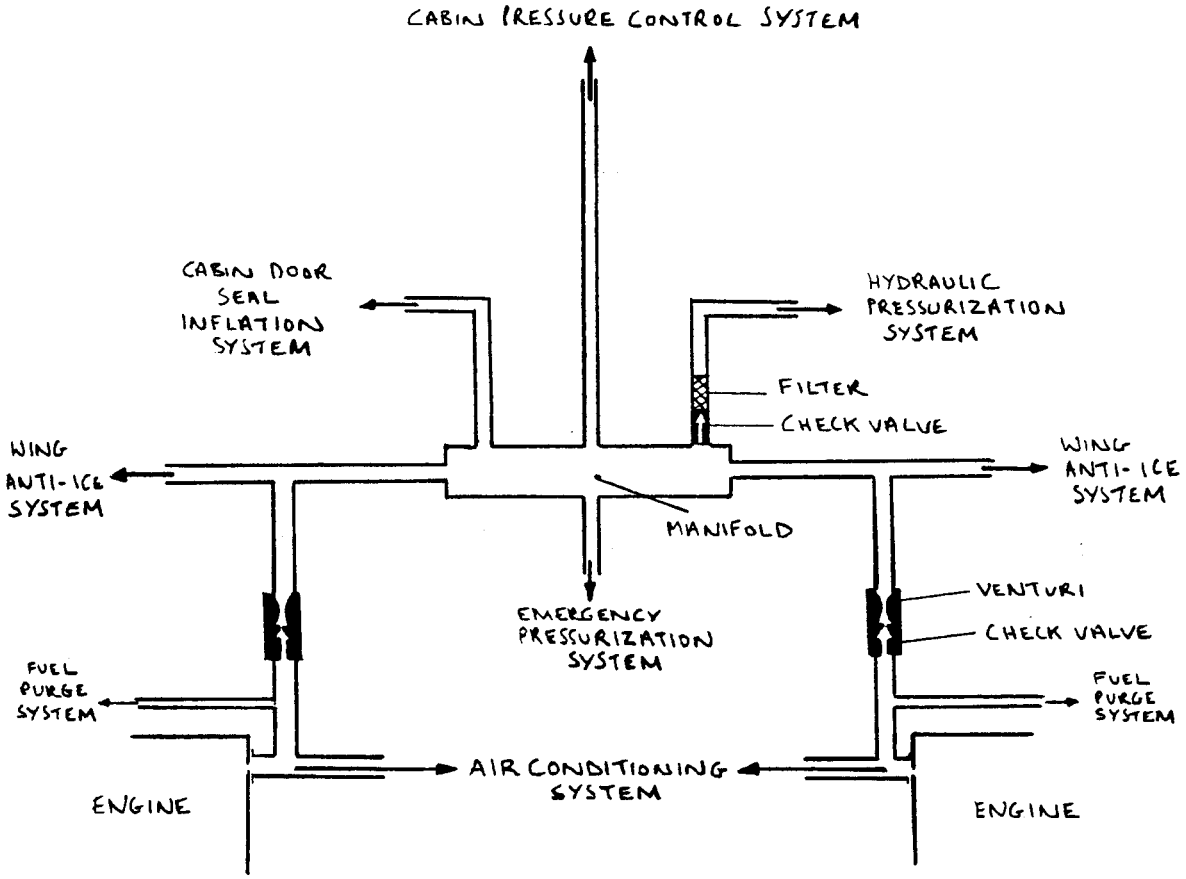

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Fig. 1 - Bleed Air System - Schematic

BLEED AIR SYSTEM - MAINTENANCE PRACTICES

1. General

A. The engine bleed air ducts take air from each engine compressor to a manifold in the airplane center section. From the manifold, the air is distributed to the various systems which use pneumatic pressure.

B. The systems include:

- Door seal inflation system (Refer to 36-11-00)
- Hydraulic power unit pressurization (Refer to 29-00-00)
- Pressurization control system (Refer to 21-30-00)
- Emergency pressurization (Refer to 21-30-00).

2. Bleed Fitting - Removal (Ref. Fig. 201)

NOTE: This procedure is applicable to the LH installation. Data for the RH installation is given between parentheses.

A. Fixtures, Test and Support Equipment

Blanking caps	Not Specified

B. Referenced Information

Maintenance Manual Chapter 54-00-00

C. Procedure

(1) Open, tag and safety these circuit breakers:

Pilot CB Panel:
L ENG START
R ENG START.

(2) Remove the nacelle panels: 410AT (420AT), 410AB (420AB), 430AR (440AR), 430AL (440AL) (Refer to 54-00-00).
(3) Remove the clamp (19) connecting the bleed fitting (24) to the precooler (18).
(4) Disconnect the tube (17) from the bleed fitting (24).
(5) Remove the four nuts (11), bolt (16) and washers (12) attaching the bleed fitting (24) to the duct (10).
(6) Remove the four bolts (23) and washers (22) attaching the bleed fitting (24) to the engine.
(7) Remove the bleed fitting (24). Remove and discard the gasket (21) and seal (20).
(8) Remove the packer (15) from the bleed fitting (24). Make sure the check valve (14) remains correctly installed in the duct (10).
(9) Put caps on all line ends.

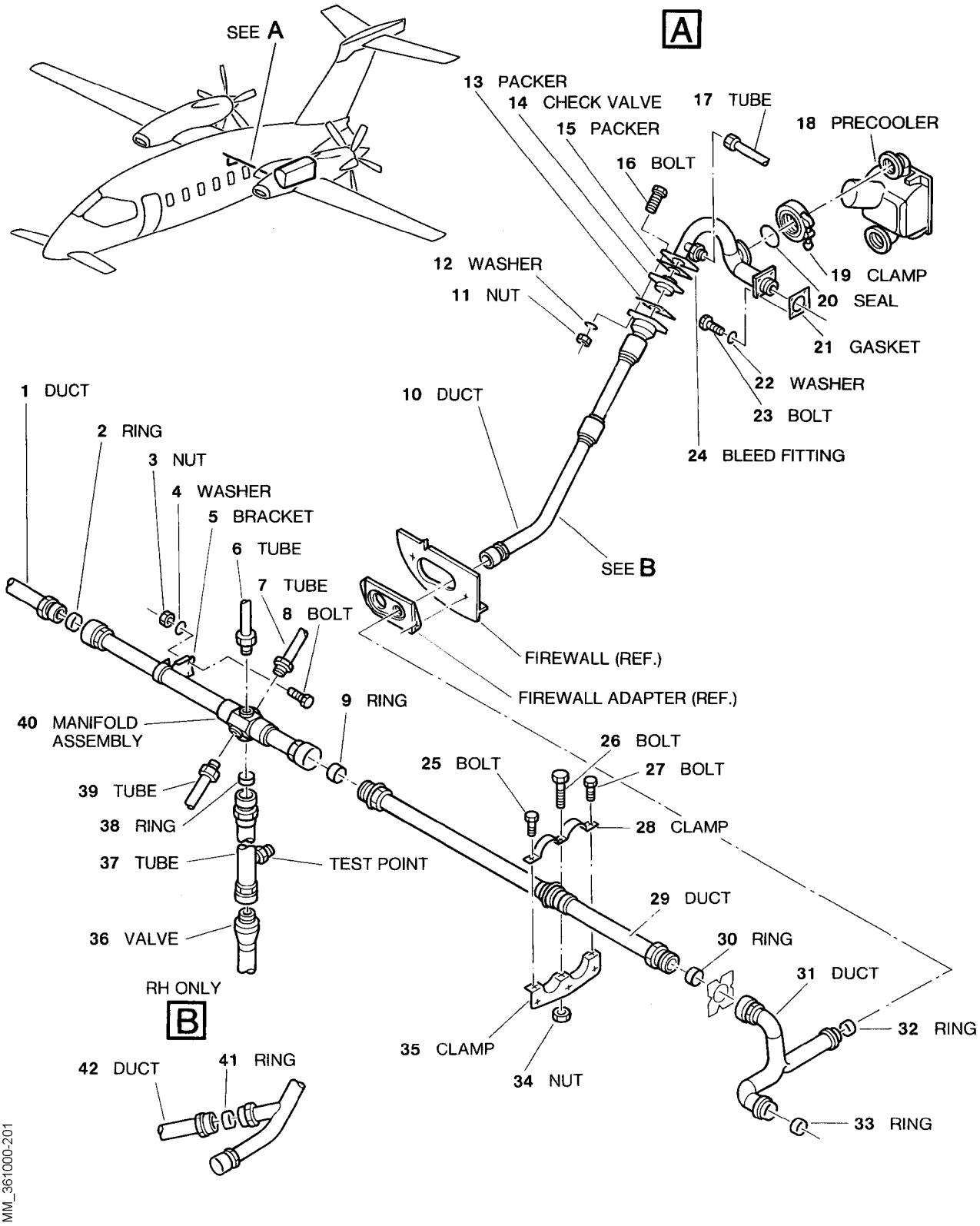

Fig. 201 - Bleed Air Ducts - Removal/Installation

3. Bleed Fitting - Installation (Ref. Fig. 201)

NOTE: This procedure is applicable to the LH installation. Data for the RH installation is given between parentheses.

A. Expendable Parts

ITEM	NOMENCLATURE	IPC-CSN
20	Seal	211000 01-140
21	Gasket	P&WC 723631 01-140

B. Referenced Information

Maintenance Manual Chapter 54-00-00
Maintenance Manual Chapter 71-00-00

C. Procedure

(1) Make sure, as necessary that:
- The applicable circuit breakers are open, tagged and safetied
- The system is safe
- Access is available (Refer to the Removal Procedure).

(2) Remove the caps from all line ends.
(3) Examine the packer (15) for damage and deterioration, if necessary install a new packer.
(4) Put the bleed fitting (24) in the correct position for installation. Install a new gasket (21), new seal (20) and packer (15).
(5) Install the four bolts (23) and washers (22) to attach the bleed fitting (24) to the engine.
(6) Install the clamp (19) to connect the bleed fitting (24) to the precooler (18).
(7) Install the four bolts (16), washers (12) and nuts (11) to connect the bleed fitting (24) to the duct (10).
(8) Connect the tube (17) to the bleed fitting (24).
(9) Install the nacelle panel 410AT (420AT), 410AB (420AB) (Refer to 54-00-00).
(10) Remove the safety tags and close these circuit breakers:

Pilot CB Panel:
L ENG START
R ENG START.

(11) Do a leak check of the bleed fitting (24) during an engine ground run (Refer to 71-00-00).
(12) Install the nacelle panels: 430AR (440AR), 430AL (440AL) (Refer to 54-00-00).

4. Check Valve - Removal (Ref. Fig. 201)

NOTE: This procedure is applicable to the LH installation. Data for the RH installation is given between parentheses.

A. Fixtures, Test and Support Equipment

Blanking caps	Not Specified

B. Referenced Information

Maintenance Manual Chapter 54-00-00

C. Procedure

(1) Open, tag and safety these circuit breakers:

Pilot CB Panel:
L ENG START
R ENG START.

(2) Remove the nacelle panels: 410AT (420AT), 410AB (420AB), 430AR (440AR), 430AL (440AL) (Refer to 54-00-00).
(3) Remove the four nuts (11), bolts (16) and washers (12) attaching the duct (10) to the bleed fitting (24).
(4) Cut and remove the lockwire from the connector between the duct (10) and the duct (31).
(5) Unscrew the connector and remove the duct (10) complete with check valve (14). Collect the ring (32).
(6) Remove the packer (13) and check valve (14) from the duct (10).
(7) Remove the packer (15) from the bleed fitting (24).
(8) Put caps on all line ends.

5. Check Valve - Installation (Ref. Fig. 201)

NOTE: This procedure is applicable to the LH installation. Data for the RH installation is given between parentheses.

A. Materials

Lockwire	04-008

B. Referenced Information

Maintenance Manual Chapter 54-00-00

C. Procedure

(1) Make sure, as necessary that:
- The applicable circuit breakers are open, tagged and safetied
- The system is safe
- Access is available (Refer to the Removal Procedure).

(2) Remove the caps from all line ends.

(3) Examine the packers (13, 15) for damage and deterioration, if necessary, install new packers.

(4) Install the packer (13), check valve (14) and packer (15) into the check valve housing in duct (10). Make sure the check valve (14) is installed to allow airflow from the engine.

(5) Examine the ring (32) for damage, deterioration and corrosion. If necessary, install a new ring.

(6) Install the ring (32) in the duct (31) and put the duct (10) in the correct position for installation.

(7) Install the four bolts (16), washers (12) and nuts (11) to attach the duct (10) to the bleed fitting (24).

(8) Connect the duct (10) to the duct (31) and tighten the connector nut.

(9) Safety the connector nut with lockwire.

(10) Remove the safety tags and close these circuit breakers:

Pilot CB Panel:
L ENG START
R ENG START.

(11) Do a leak check of the disturbed connections (Refer to Para. 11.).

(12) Install the nacelle panels: 410AT (420AT), 410AB (420AB), 430AR (440AR), 430AL (440AL) (Refer to 54-00-00).

6. Bleed Air Ducts - Removal (Ref. Fig. 201)

NOTE: This procedure is applicable to the LH installation. Data for the RH installation is given between parentheses.

A. Fixtures, Test and Support Equipment

Blanking caps	Not Specified

B. Referenced Information

Maintenance Manual Chapter 54-00-00

C. Procedure

(1) Open, tag and safety these circuit breakers:

Pilot CB Panel:
L ENG START
R ENG START.

(2) Remove the nacelle panel: 410AT (420AT) (Refer to 54-00-00).
(3) Remove wing access panels: 522AT (622AT), 522BT (622BT), 522CT (622CT).
(4) Cut and remove the lockwire from the connectors on duct (29) and duct (31).
(5) Unscrew the duct connector nuts on the ducts (29, 31).
(6) Remove the three bolts (25, 26, 27) and one nut (34) and remove the clamp (28).
(7) Remove the duct (29) and collect the rings (9, 30).
(8) Remove the duct (31) and collect the rings (32, 33).

NOTE: The RH installation of duct (31) has one ring (32) only.

(9) Put caps on all line ends.

7. Bleed Air Ducts - Installation (Ref. Fig. 201)

NOTE: This procedure is applicable to the LH installation. Data for the RH installation is given between parentheses.

A. Materials

Lockwire	04-008

B. Referenced Information

Maintenance Manual Chapter 54-00-00

C. Procedure

(1) Make sure, as necessary that:
- The applicable circuit breakers are open, tagged and safetied
- The system is safe
- Access is available

(2) Examine the rings (9, 30, 32, 33) for damage, deterioration and corrosion. If necessary, install new rings.
(3) Remove the caps from all line ends.
(4) Install the ring (9) and connect the duct (29) to the manifold (40).
(5) Install the ring (30) and connect the duct (31) to the duct (29).
(6) Install the ring (32) and connect the duct (31) to the duct (10).
(7) On the LH installation only, install the ring (33) and connect duct (31).
(8) Tighten all duct connector nuts.
(9) Install the clamp (28) to the clamp (35) with the bolts (25, 26, 27) and the nut (34).
(10) Safety the connector nuts with lockwire.
(11) Do a leak check of the disturbed connections (Refer to Para. 11.).
(12) Install the flexible sheath as described in this section.
(13) Install the wing access panels: 522AT (622AT), 522BT (622BT), 522CT (622CT).
(14) Install the nacelle panel: 410AT (420AT) (Refer to 54-00-00).

(15) Remove the safety tags and close these circuit breakers:

Pilot CB Panel:
L ENG START
R ENG START.

8. Manifold Assembly - Removal (Ref. Fig. 201)

A. Fixtures, Test and Support Equipment

Blanking caps	Not Specified

B. Referenced Information

Maintenance Manual Chapter 52-82-00

C. Procedure

(1) Open, tag and safety these circuit breakers:

Pilot CB Panel:
L ENG START
R ENG START.

(2) Disconnect the main landing gear rear doors (Refer to 52-82-00).
(3) Support the main landing gear rear doors in the open position.
(4) Open, tag and safety these circuit breakers:

Pilot CB panel:
HYDR PRESS WRN
LDG GEAR CONT

(5) Disconnect the tubes (6, 7, 39) from the manifold assembly (40).
(6) Cut and remove the lockwire and unscrew the connector nuts between the two ducts (1, 29) and the manifold assembly (40).
(7) Cut and remove the lockwire and unscrew the connector nut between the tube (37) and the valve (36).
(8) Remove the two nuts (3), bolts (8) and washers (4) attaching the manifold assembly (40) to the bracket (5).
(9) Remove the manifold assembly (40) and collect the two rings (2, 9).
(10) Remove the tube (37) from the manifold assembly (40) and collect the ring (38).
(11) Put caps on all line ends.

9. Manifold Assembly - Installation (Ref. Fig. 201)

A. Materials

Lockwire	04-008

B. Referenced Information

Maintenance Manual Chapter 52-80-00

C. Procedure

(1) Make sure, as necessary that:
- The applicable circuit breakers are open, tagged and safetied
- The system is safe
- Access is available

(2) Examine the rings (2, 9, 38) for damage, deterioration and corrosion. If necessary, install new rings.

(3) Remove the caps from all line ends.

(4) Install the ring (38) and install the tube (37) to the manifold assembly (40).

(5) Install the rings (2, 9) and put the manifold assembly (40) in the correct position for installation.

(6) Connect the manifold assembly (40) to the ducts (1, 29) and the valve (36).

(7) Connect the tubes (6, 7, 39) to the manifold assembly (40).

(8) Install the two bolts (8), washers (4) and nuts (3) to attach the manifold assembly (40) to the bracket (5).

(9) Safety the connector nuts with lockwire.

(10) Do a leak check of the disturbed connections (Refer to Para. 11.).

(11) Remove the safety tags and close these circuit breakers:

Pilot CB panel:
HYDR PRESS WRN
LDG GEAR CONT

(12) Remove the supports and connect the main landing gear rear doors (Refer to 52-82-00).

(13) Remove the safety tags and close these circuit breakers:

Pilot CB Panel:
L ENG START
R ENG START.

10. Bleed Air Ducts - Inspection

A. Fixtures, Test and Support Equipment

Strong light source	Not Specified
Mirror	Not Specified

B. Reference Information

Maintenance Manual Chapter 52-82-00
Maintenance Manual Chapter 54-00-00

C. Preparation

(1) Open, tag and safety these circuit breakers:

Pilot CB Panel:
L ENG START
R ENG START.

(2) Remove the left and right engine nacelle panels: 410AT, 410AB, 430AR, 420AT, 420AB, 440AL (Refer to 54-00-00).
(3) Remove the left and right wing access panels: 522AT, 522BT, 522CT, 622AT, 622BT, 622CT.
(4) Disconnect the left and right main landing gear rear doors (Refer to 52-82-00).
(5) Support the main landing gear rear doors in the open position.
(6) Open, tag and safety these circuit breakers:

Pilot CB panel:
HYDR PRESS WRN
LDG GEAR CONT

D. Procedure

(1) Examine the engine bleed fittings for:
- Damage and deformation
- Cracks and corrosion
- Signs of air leaks
- Security of attachment to the engine and the check valve housing
- Security of attachment of the precooler clamp
- Security of attachment of the fuel purge system tube.

(2) Examine the check valve housing and venturi for:
- Damage and deformation
- Cracks and corrosion. Make sure you examine the welded joints carefully
- Signs of air leaks.

(3) Examine the ducts between the venturi and the manifold assembly for:
- Damage and deformation
- Cracks and corrosion
- Signs of air leaks
- Correct safety locking of the connector nuts
- Security of attachment of the clamps.

(4) Examine the manifold assembly for:
- Damage and deformation
- Cracks and corrosion. Make sure you examine the welded joints carefully
- Signs of air leaks
- Security of attachment of the tube connectors
- Correct safety locking
- Security of attachment of the support bracket and clamp.

E. Completion

(1) Remove the safety tags and close these circuit breakers:

Pilot CB panel:
HYDR PRESS WRN
LDG GEAR CONT

(2) Remove the supports and connect the left and right main landing gear rear doors (Refer to 52-82-00).
(3) Install the left and right wing access panels: 522AT, 522BT, 522CT, 622AT, 622BT, 622CT.
(4) Install the left and right engine nacelle panels: 410AT, 410AB, 430AR, 420AT, 420AB, 440AL (Refer to 54-00-00).
(5) Remove the safety tags and close these circuit breakers:

Pilot CB Panel:
L ENG START
R ENG START.

11. Bleed Air Ducts - Leak Check (Ref. Fig. 201)

A. Fixtures, Test and Support Equipment

Clean, oil-free air supply (0-200 PSI)	Not Specified
Adapter (9/16in-18UNJF-3A)	Not Specified

B. Materials

Leak Detector Fluid	04-007

C. Referenced Information

Maintenance Manual Chapter 52-82-00
Maintenance Manual Chapter 54-00-00

D. Preparation

(1) Open, tag and safety these circuit breakers:

Pilot CB Panel:
L ENG START
R ENG START.

(2) Remove the left and right engine nacelle panels: 430AR, 440AL (Refer to 54-00-00).
(3) Remove the left and right wing access panels: 522CT, 622CT.
(4) Disconnect the left and right main landing gear rear doors (Refer to 52-82-00).
(5) Support the main landing gear rear doors in the open position.

(6) Open, tag and safety these circuit breakers:

Pilot CB panel:
HYDR PRESS WRN
LDG GEAR CONT

E. Procedure

(1) Remove the blank from the test point on the tube (37).
(2) Connect the air supply to the test point using the adapter.
(3) Pressurize the bleed air ducts to a maximum of 100 psi (7.0 bar). Maintain the flow of air to keep pressure in the ducts.
(4) Use leak detector fluid at the connectors and welded joints to check for leaks. If you find a leak at the connector:
  (a) Release the air pressure.
  (b) Disconnect the appropriate duct.
  (c) Replace the sealing rings, as necessary.
  (d) Connect the duct.
  (e) Leak check the connector.
  (f) Safety the connector with lockwire.
(5) If you find a leak at a welded joint, repair or replace the duct as necessary.
(6) Release the air pressure from the bleed air ducts.
(7) Disconnect the air supply from the test point.
(8) Remove the adapter.
(9) Install the blank to the test point.

F. Completion

(1) Remove the safety tags and close these circuit breakers:

Pilot CB panel:
HYDR PRESS WRN
LDG GEAR CONT

(2) Remove the supports and connect the main landing gear rear doors (Refer to 52-82-00).
(3) Install the wing access panels: 522CT, 622CT.
(4) Install the nacelle panels: 430AR, 440AL (Refer to 54-00-00).
(5) Remove the safety tags and close these circuit breakers:

Pilot CB Panel:
L ENG START
R ENG START.

12. Emergency Pressuriz. Duct Flexible Sheath (between WS 1665 - 1195) - Removal (Ref. Fig. 202, 203)

WARNING: DO NOT TOUCH THE EMERGENCY PRESSURIZATION DUCT UNTIL IT IS COOL. THE TEMPERATURE STAYS HIGH AFTER THE ENGINE STOPS. HIGH TEMPERATURES CAN CAUSE INJURY TO PERSONS.

NOTE: This removal procedure applies to the left flexible sheath; the procedure for the right flexible sheath is the same.

A. Fixtures, Test and Support Equipment

Flameproof Light Source	Not Specified

B. Referenced Information

Maintenance Manual Chapter 54-10-00
Maintenance Manual Chapter 57-10-00

C. Procedure

(1) Open, tag and safety these circuit breakers:

Pilot CB Panel:
L ENG START
R ENG START.

(2) Remove the LH upper nacelle panel 410AT (420AT) (Refer to 57-10-00).
(3) Remove the LH wing inspection panels 522AT, 522BT and 522CT (622AT, 622BT and 622CT) (Refer to 57-10-00).
(4) Remove the clamps (5, 8) that secure the flexible sheath from the terminals (2, 7) located in the B and E position.
(5) Remove the clamp (4) that secures the terminal (7) to the emergency pressurization duct (6) in B position.
(6) Remove the terminal (7).
(7) Unscrew the nut (10) of the rigid tube connector close to the B position on the emergency pressurization duct (11).
(8) Move the emergency pressurization duct (11) until it is possible to slide out the flexible sheath (3) toward the engine.
(9) Remove the flexible sheath (3).

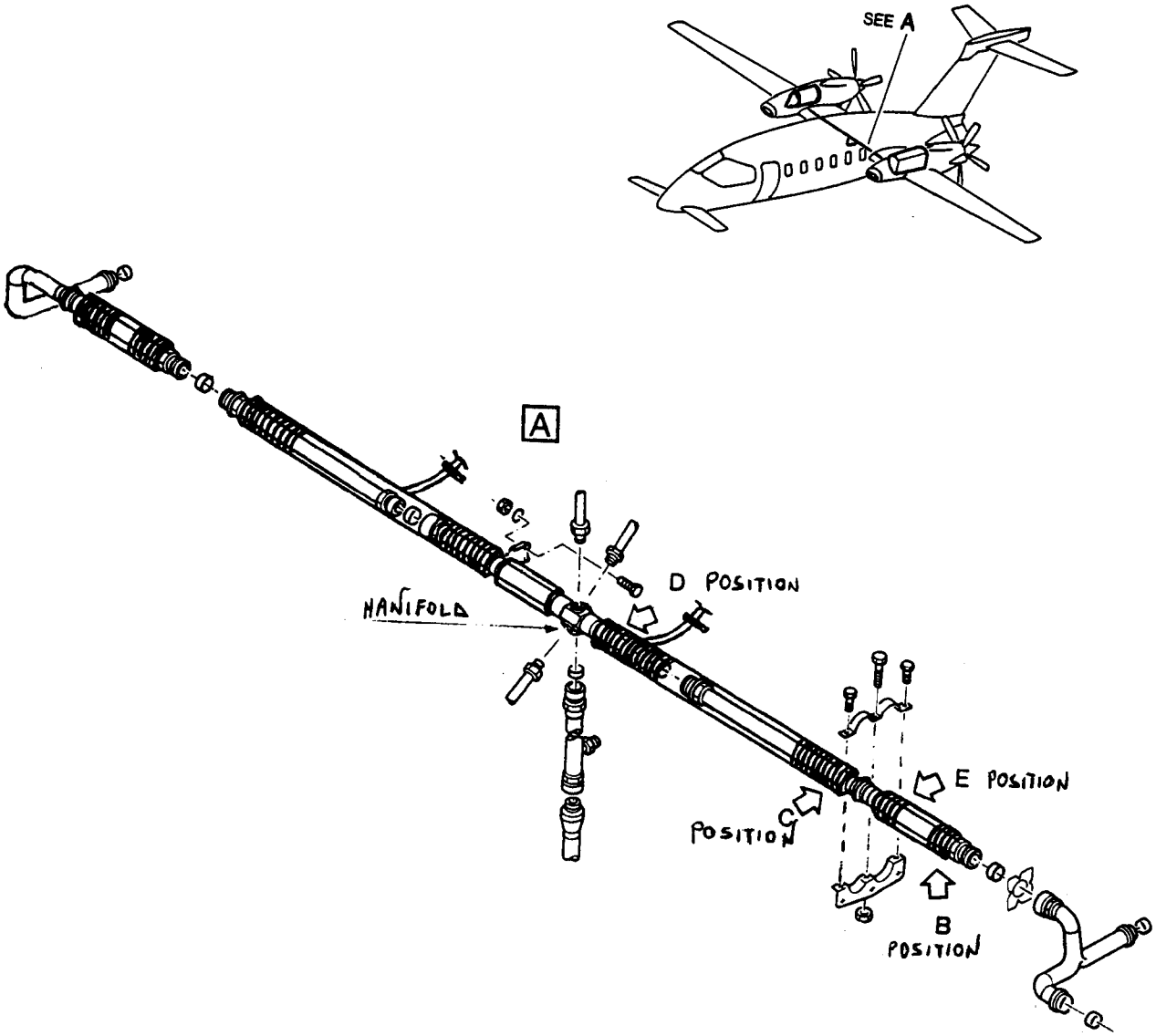

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Fig. 202 - Flexible Sheath - Location

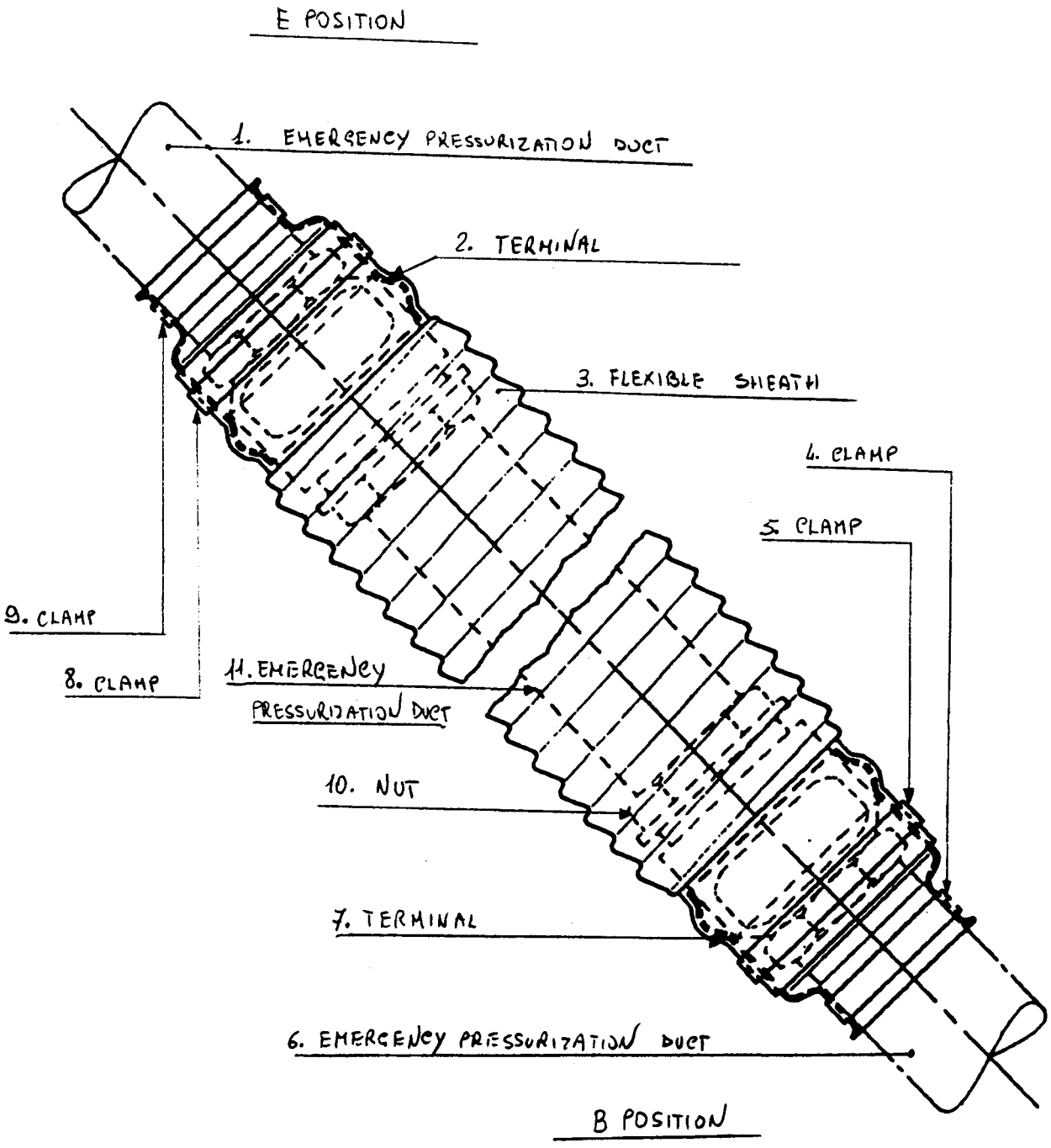

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Fig. 203 - Flexible Sheath - Removal/Installation

13. Emergency Pressuriz. Duct Flexible Sheath (between WS 1665 - 1195) - Installation (Ref. Fig. 202, 203)

NOTE: This procedure applies to the left flexible sheath; the procedure for the right flexible sheath is the same.

A. Fixtures, Test and Support Equipment

Flameproof Light Source	Not Specified

B. Referenced Information

Maintenance Manual Chapter 54-10-00
Maintenance Manual Chapter 57-10-00

C. Procedure

(1) Make sure as necessary that:
- The applicable circuit breakers are open, tagged and safetied
- The system is safe
- Access is available

(2) Install the flexible sheath, in accordance with the arrow, around the duct , keeping the nut (10) in position.

(3) Secure one end of the flexible sheath to the terminal (2) located in the E position by the clamp (8).

(4) Connect the emergency pressurization duct (11) with the nut (10).

(5) Install the terminal (7) located in the B position by the clamp (5).

(6) Secure the other end of the flexible sheath to the terminal (7) located in the B position by the clamp (5).

(7) Install the LH upper nacelle panel 410AT (420AT) (Refer to 54-10-00).

(8) Install the LH wing inspection panels 522AT, 522BT and 522CT (622AT, 622BT and 622CT) (Refer to 57-10-00).

(9) Remove the safety tags and close these circuit breakers:

Pilot CB Panel:

L ENG START

R ENG START.

14. Emergency Pressuriz. Duct Flexible Sheath (between WS 1195 - 0) - Removal (Ref. Fig. 202, 204)

WARNING: DO NOT TOUCH THE EMERGENCY PRESSURIZATION DUCT UNTIL IT IS COOL. THE TEMPERATURE STAYS HIGH AFTER THE ENGINE STOPS. HIGH TEMPERATURES CAN CAUSE INJURY TO PERSONS.

NOTE: This removal procedure applies to the left flexible sheath; the procedure for the right flexible sheath is the same.

A. Fixtures, Test and Support Equipment

Flameproof Light Source	Not Specified

B. Referenced Information

Maintenance Manual Chapter 07-00-00
Maintenance Manual Chapter 52-82-00
Maintenance Manual Chapter 54-10-00

C. Procedure

(1) Open, tag and safety these circuit breakers:

Pilot CB Panel:
L ENG START
R ENG START
HYDR PRESS WRN
LDG GEAR CONT

(2) Lift the airplane on jacks (Refer to 07-00-00).
(3) Disconnect the LH main landing gear rear door and support it in the open position (Refer to 52-82-00).
(4) Remove the LH wing inspection panels 522AT, 522BT and 522CT (622AT, 622BT and 622CT) (Refer to 54-10-00).
(5) Remove the clamps (1, 7) that secure the flexible sheath (4) from the terminals (2, 6) located in the C and D position.
(6) Remove the clamp (9) that secures the vent (8) to the structure.
(7) Compress the flexible sheath (4) to allow unscrewing the nut (3) of the rigid tube connector close to the D position on the emergency pressurization duct.
(8) Unscrew the duct.
(9) Move the emergency pressurization ducts (5, 10) until it is possible to slide out the flexible sheath (4) toward the manifold.
(10) Remove the flexible sheath (4).

15. Emergency Pressuriz. Duct Flexible Sheath (between WS 1195 - 0) - Installation
(Ref. Fig. 202, 204)

NOTE: This removal procedure applies to the left flexible sheath; the procedure for the right flexible sheath is the same.

A. Fixtures, Test and Support Equipment

Flameproof Light Source	Not Specified

B. Referenced Information

Maintenance Manual Chapter 07-00-00
Maintenance Manual Chapter 52-82-00
Maintenance Manual Chapter 57-10-00

C. Procedure

(1) Make sure as necessary that:
– The applicable circuit breakers are open, tagged and safetied
– The system is safe
– Access is available

(2) Install the flexible sheath, in accordance with the arrow, around the ducts (5, 10) keeping the nut (3) in position.

(3) Secure the vent (8) with the clamp (9) to the structure.

(4) Secure one end of the flexible sheath to the terminal (6) located in the C position by the clamp (7).

(5) Compress the flexible sheath (4) to allow the connection of the emergency pressurization ducts (5, 10) with the nut (3).

(6) Connect the ducts (5, 10) with the nut (3).

(7) Secure the other end of the flexible sheath (4) to the terminal (2) located in the D position by the clamp (1).

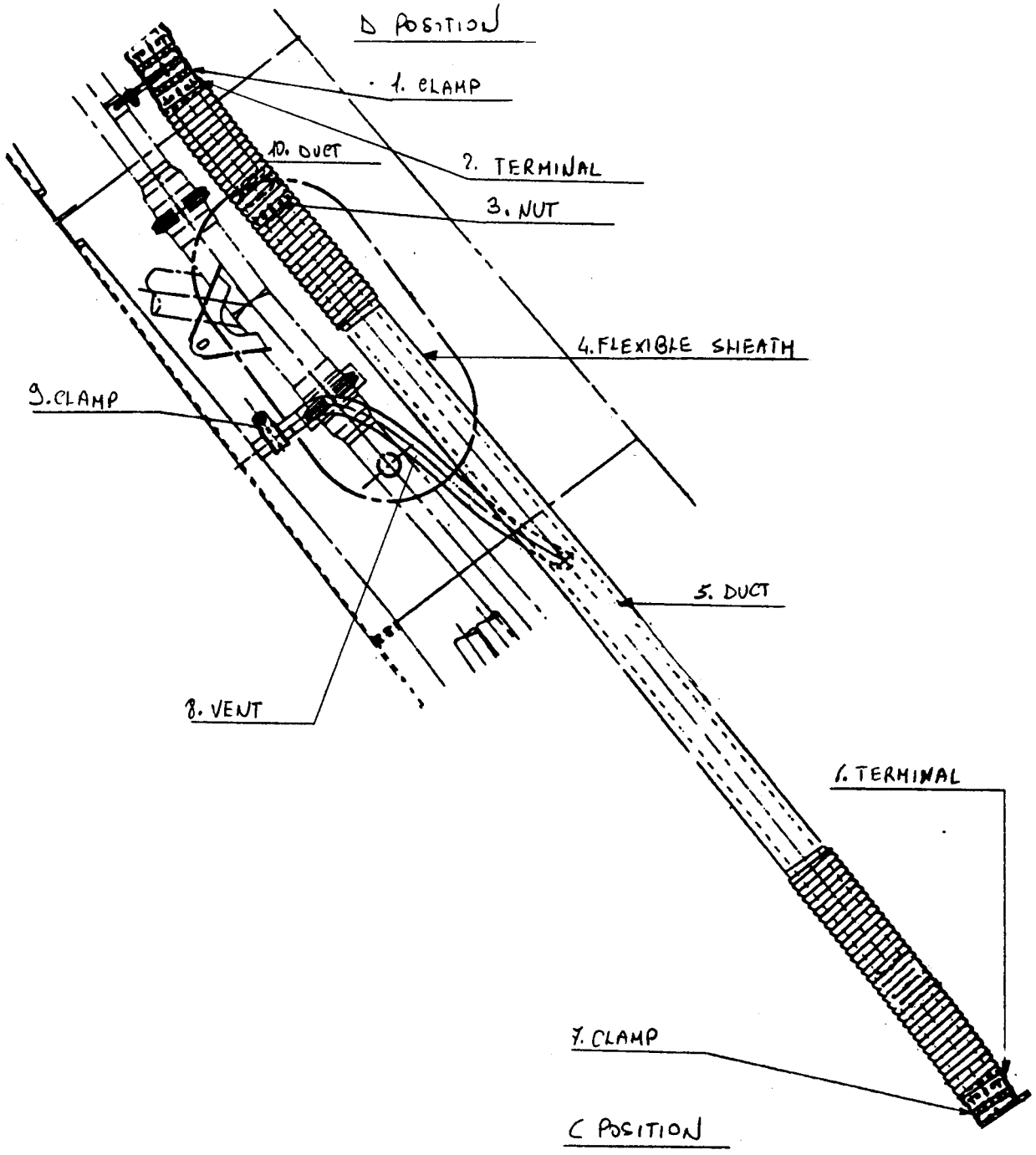
(8) Install the LH wing inspection panels 522AT, 522BT and 522CT (622AT, 622BT and 622CT) (Refer to 57-10-00).

(9) Connect the LH main landing gear rear door (Refer to 52-82-00).

(10) Lower the airplane to the ground and remove the panels (Refer to 07-00-00).

(11) Remove safety tags and close these circuit breakers:

Pilot CB Panel:
L ENG START
R ENG START
HYDR PRESS WRN
LDG GEAR CONT



MM_361000-204

Fig. 204 - Flexible Sheath - Removal/Installation

DOOR SEAL INFLATION SYSTEM - DESCRIPTION AND OPERATION

1. Description

   A. The door seal inflation system consists of two subsystems each one including a check valve, a three-way valve and a pressure switch. Both subsystems are supplied with air from the bleed air system manifold through a check valve, an accumulator and a pressure regulating valve.

   B. Two pressure switches are electrically connected to one amber cautionary caption light on the annunciator panel to give an indication of door seal failure.

2. Operation (Ref. Fig. 1)

   A. When the door is closed and locked two of the door lockpins depress the plungers of the pressure regulating valve or of the three-way valve. The valves open and allow air to flow into the two chambers of the door seal. The door seal inflates and seals the door. At the same time, the pressure opens the pressure switches and the DOOR SEAL caption on the annunciator panel goes off. If either subsystem loses pressure due to a leak or fault, the DOOR SEAL caption comes on.

   B. When the door is unlocked and opened, the two lockpins release the plungers of the pressure regulating valve or of the three-way valve. The valves close and the pressure in the door seal decreases to zero. The decrease in pressure allows the pressure switches to close and the DOOR SEAL caption on the annunciator panel comes on.

   C. The accumulator allows the correct operation of the door seal either during flight at slow engines running, and consequently with low air pressure, or on ground during parking in order to prevent water infiltrations. It also eliminates water accumulation in the pressure regulator inlet filter or in the three-way valve. A drain valve, located on the side of the cabin door lower steps, allows the water discharge from the outside of the accumulator.

3. Location

   A. All the components of the door seal inflation system are located immediately to the rear of the cabin door at FS 2290 in Zone 132.

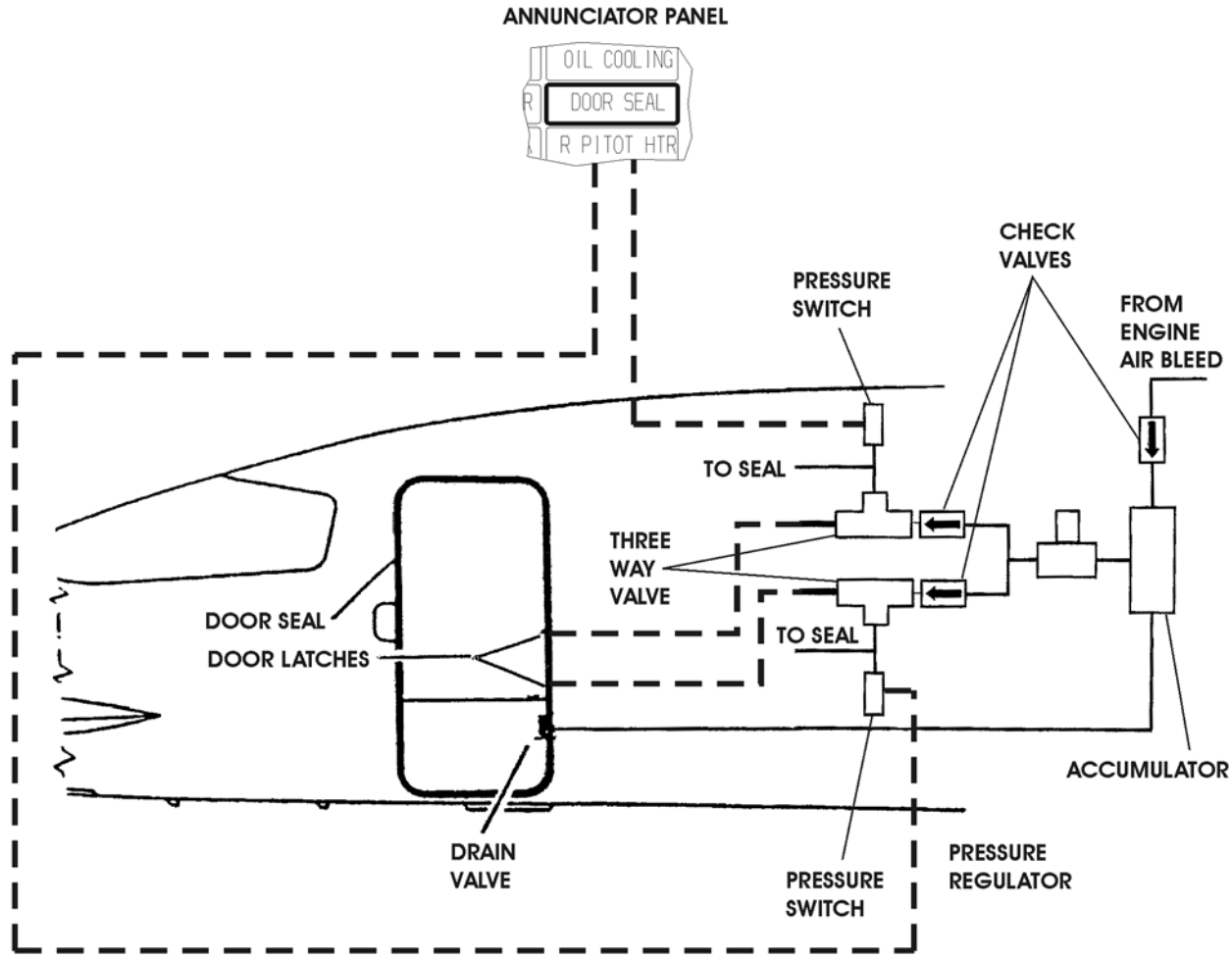


Fig. 1 - Door Seal Inflation System - Schematic

DOOR SEAL INFLATION SYSTEM - MAINTENANCE PRACTICES

1. General

   A. The system comprises a check valve, accumulator, pressure regulating valve, check/Three way valve and pressure switch connected by tubes and hoses.

2. Accumulator - Removal (Ref. Fig. 201)

   A. Referenced Information

      Maintenance Manual Chapter 25-20-00

   B. Procedure

      (1) Open, tag and safety these circuit breakers:

      Pilot CB panel:
      L ENG START
      R ENG START

      (2) Remove either the One Place Divan (Options 1, 20 and 21) or the seat (Options 2 and 19) to gain access to the armest, then remove it.(Refer to 25-00-00).
      (3) Disconnect the unions from the accumulator.
      (4) Remove the clamps.
      (5) Remove the accumulator.

3. Accumulator - Installation (Ref. Fig. 201)

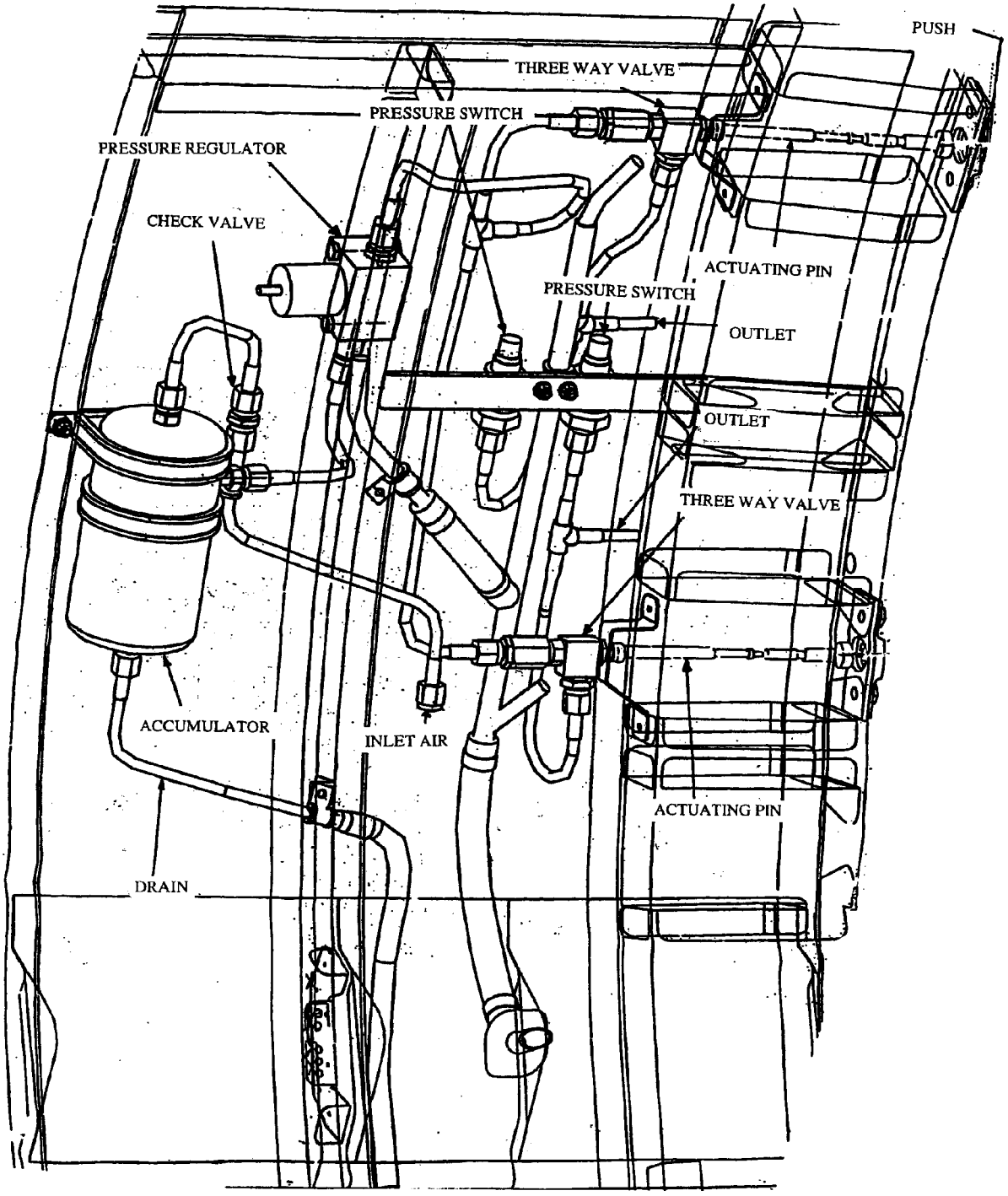
   A. Referenced Information

      Maintenance Manual Chapter 25-20-00

   B. Procedure

      (1) Fasten the accumulator (1) to the structure by the clamps.
      (2) Connect the unions to the accumulator.
      (3) Install either the One Place Divan (Options 1, 20 and 21) or the seat (Options 2 and 19) to gain access to the armest, then install it. (Refer to 25-20-00).
      (4) Remove the safety tag and close these circuit breakers:

      Pilot CB panel:
      L ENG START
      R ENG START



MM_361100-203

Fig. 201 - Accumulator - Removal/Installation

4. Door Seal Pressurization System - Draining (Ref. Fig. 202)

A. Referenced Information

Maintenance Manual Chapter 20-10-02
Maintenance Manual Chapter 36-11-00
Maintenance Manual Chapter 71-00-00

B. Procedure

(1) Refer to Chapter 36-11-00 Page Block 2 and remove the drain valve cap.
(2) Refer to Chapter 71-00-00 and perform a one-engine ground run at F.I. for approximately 3 minutes to allow the condensed water to exit from the draining line.
(3) Shut down the engine.
(4) Refer to Chapter 36-11-00 Page Block 2 and Chapter 20-10-02 Page Block 201 and install the draining valve cap and secure it to lockwire (Refer to Chapter 20-10-02).

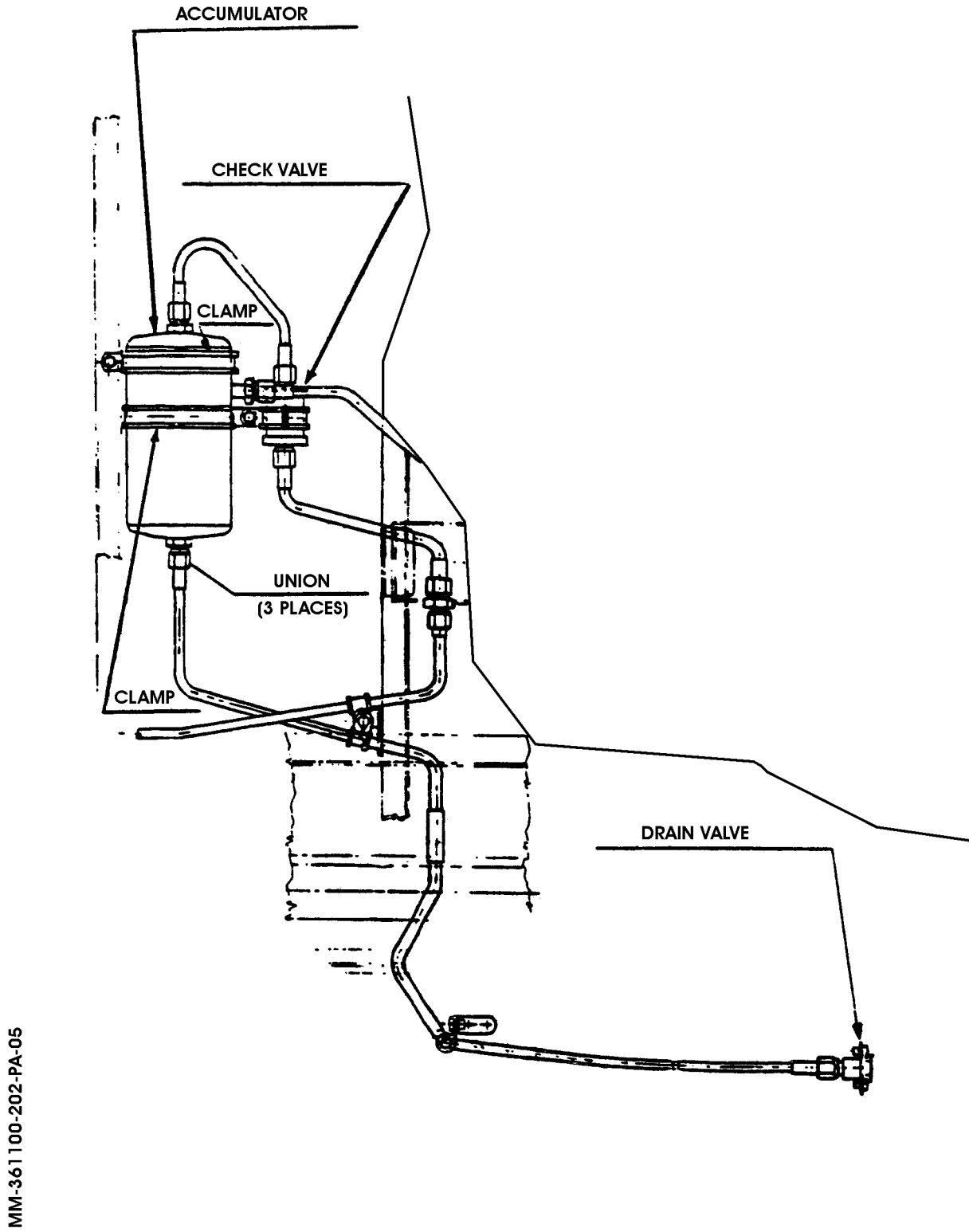


Fig. 202 - Accumulator - Draining

5. Check Valve - Removal(Ref. Fig. 203)

A. Referenced Information

Maintenance Manual Chapter 25-20-00

B. Procedure

(1) Open, tag and safety these circuit breakers:

Pilot CB panel:
L ENG START
R ENG START

(2) Remove either the One Place Divan (Options 1, 20 and 21) or the seat (Options 2 and 19) to gain access to the armest, then remove it.(Refer to 25-00-00).
(3) Hold the Check Valve (1) with a suitable wrench and unscrew the nuts (2, 3).
(4) Remove the Check Valve (2).
(5) Cap the tube ends.

6. Check Valve - Installation (Ref. Fig. 203)

A. Referenced Information

Maintenance Manual Chapter 25-20-00

B. Procedure

(1) Remove the caps from the tube ends.
(2) Place the Check Valve (1) in position between the tube ends.
(3) Hold the Check Valve (1) with a suitable wrench and screw the nuts (2, 3).
(4) Install either the One Place Divan (Options 1, 20 and 21) or the seat (Options 2 and 19) to gain access to the armest, then install it. (Refer to 25-20-00).
(5) Remove the safety tag and close these circuit breakers:

Pilot CB panel:
L ENG START
R ENG START

(6) Perform a Door Seal Leakage Check as described in this section.

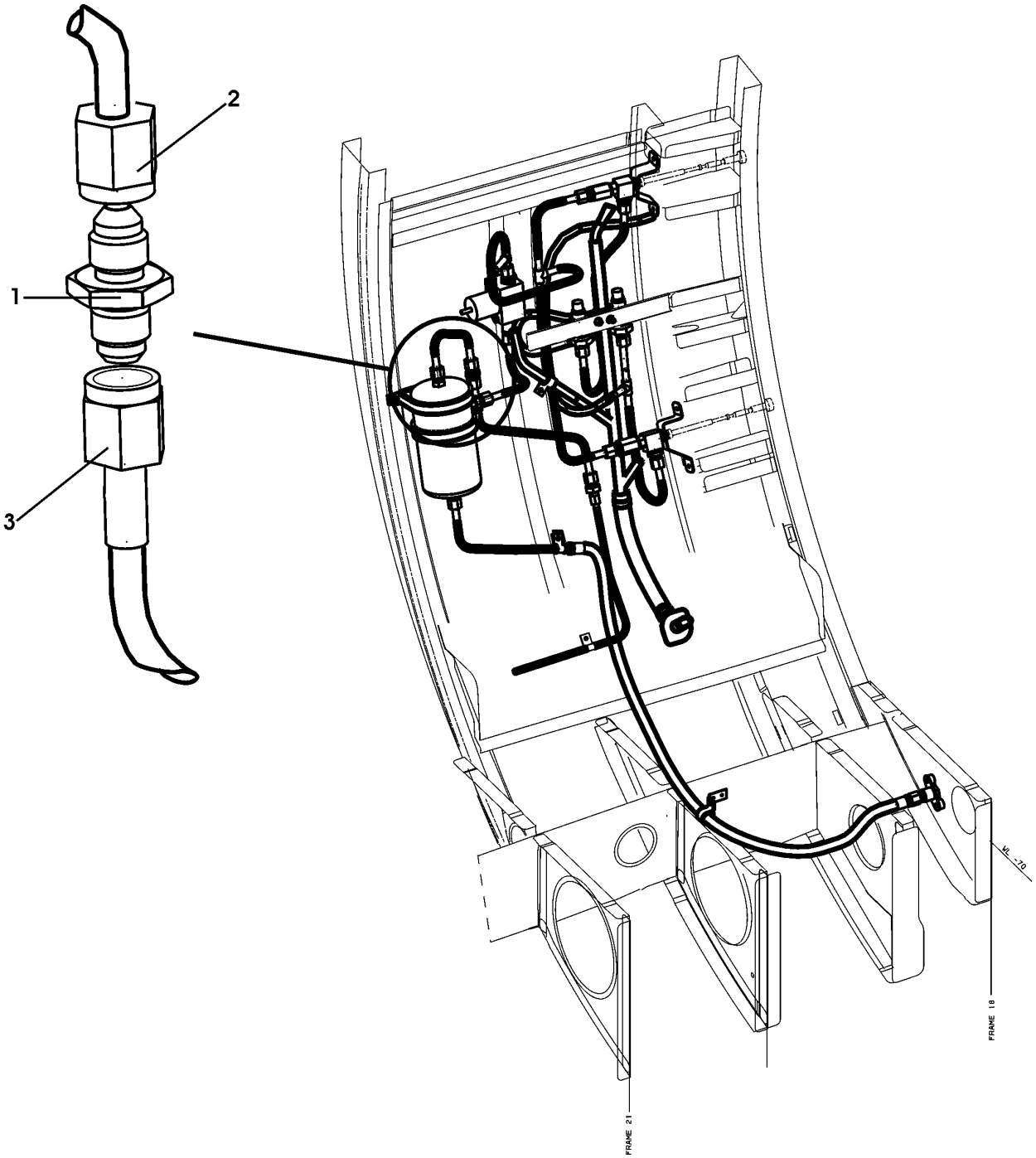


Fig. 203 - Check Valve - Removal / Installation

7. Three Way Valve - Removal(Ref. Fig. 204)

A. Referenced Information

Maintenance Manual Chapter 25-20-00

B. Procedure

(1) Open, tag and safety these circuit breakers:

Pilot CB panel:
L ENG START
R ENG START

(2) Remove either the One Place Divan (Options 1, 20 and 21) or the seat (Options 2 and 19) to gain access to the armest, then remove it.(Refer to 25-00-00).
(3) Loose the nuts (2, 3).
(4) Hold the Valve (1) in such a way it is possible unscrew the Adapter /Check Valve assembly (4).
(5) Unscrew the lock nut (5).
(6) Remove the Three Way Valve (1) pay attention not to let the glover (6) fall.
(7) Cap the tube ends.

8. Three Way Valve - Installation (Ref. Fig. 204)

A. Referenced Information

Maintenance Manual Chapter 25-20-00

B. Procedure

(1) Remove the caps from the tube ends.
(2) Place the Valve (1) and the glover (6) on the support.
(3) Fasten the Valve (1) to the support with the lock nut (5).
(4) Screw the nuts (2, 3).
(5) Install either the One Place Divan (Options 1, 20 and 21) or the seat (Options 2 and 19) to gain access to the armest, then install it. (Refer to 25-20-00).
(6) Remove the safety tag and close these circuit breakers:

Pilot CB panel:
L ENG START
R ENG START

(7) Perform a Door Seal Leakage Check as described in this section.

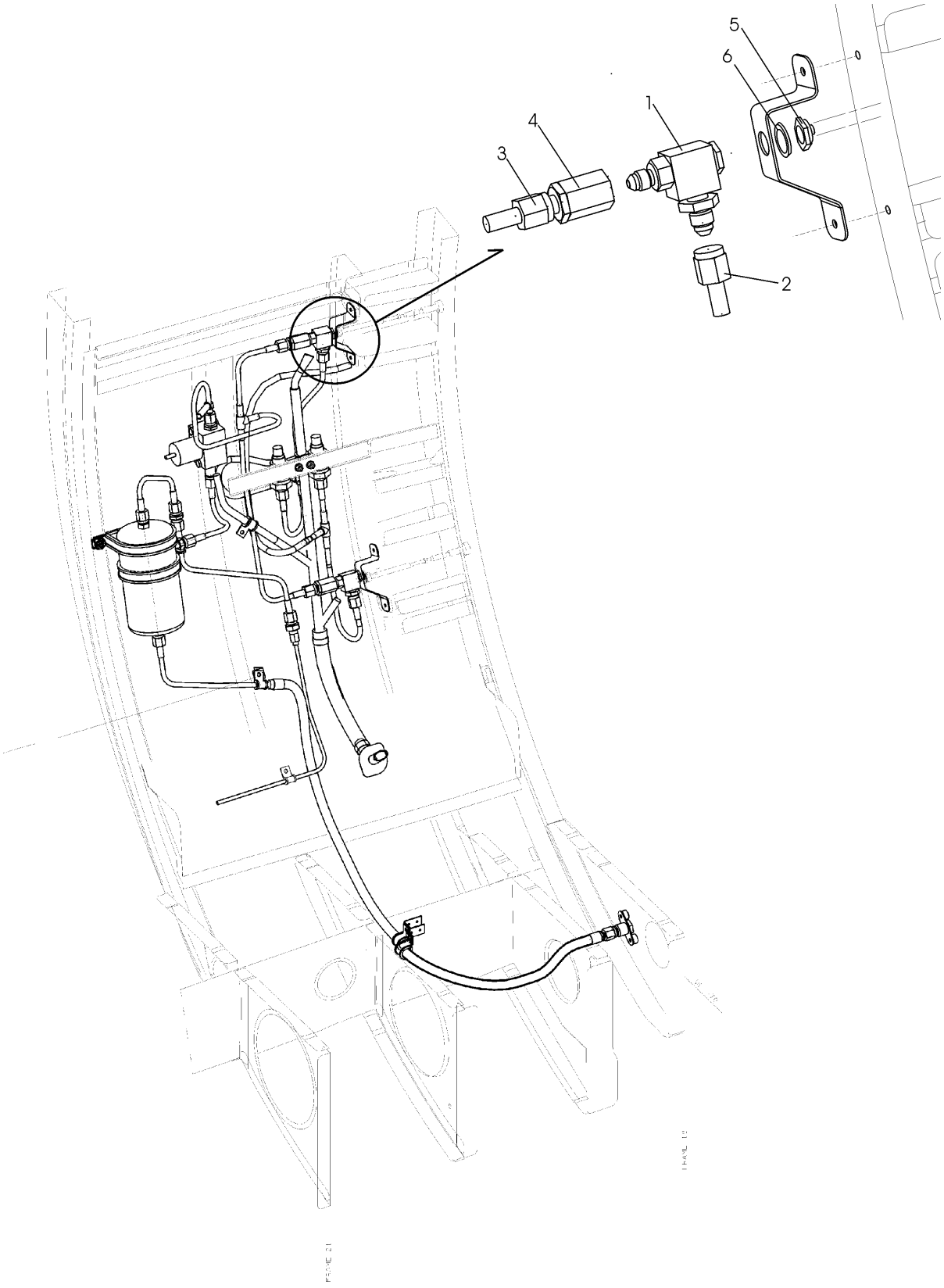


Fig. 204 - Three Way Valve - Removal / Installation

9. Pressure Regulator - Removal (Ref. Fig. 205)

A. Referenced Information

Maintenance Manual Chapter 25-20-00

B. Procedure

(1) Open, tag and safety these circuit breakers:

Pilot CB panel:
L ENG START
R ENG START

(2) Remove either the One Place Divan (Options 1, 20 and 21) or the seat (Options 2 and 19) to gain access to the armest, then remove it.(Refer to 25-00-00).
(3) Loose and unscew the nuts (2, 3).
(4) Remove the bolts (4) that secure the Pressure Regulator (1) to the frame.
(5) Remove the Pressure Regulator (1).
(6) Cap the tube ends.

10. Pressure Regulator - Installation (Ref. Fig. 205)

A. Referenced Information

Maintenance Manual Chapter 25-20-00

B. Procedure

(1) Remove the caps from the tube ends.
(2) Secure the pressure regulator (1) to the frame with the bolts (4).
(3) Screw the nuts (2, 3) to the Pressure Regulator (1).
(4) Install either the One Place Divan (Options 1, 20 and 21) or the seat (Options 2 and 19) to gain access to the armest, then install it. (Refer to 25-20-00).
(5) Remove the safety tag and close these circuit breakers:

Pilot CB panel:
L ENG START
R ENG START

(6) Perform a Door Seal Leakage Check as described in this section.

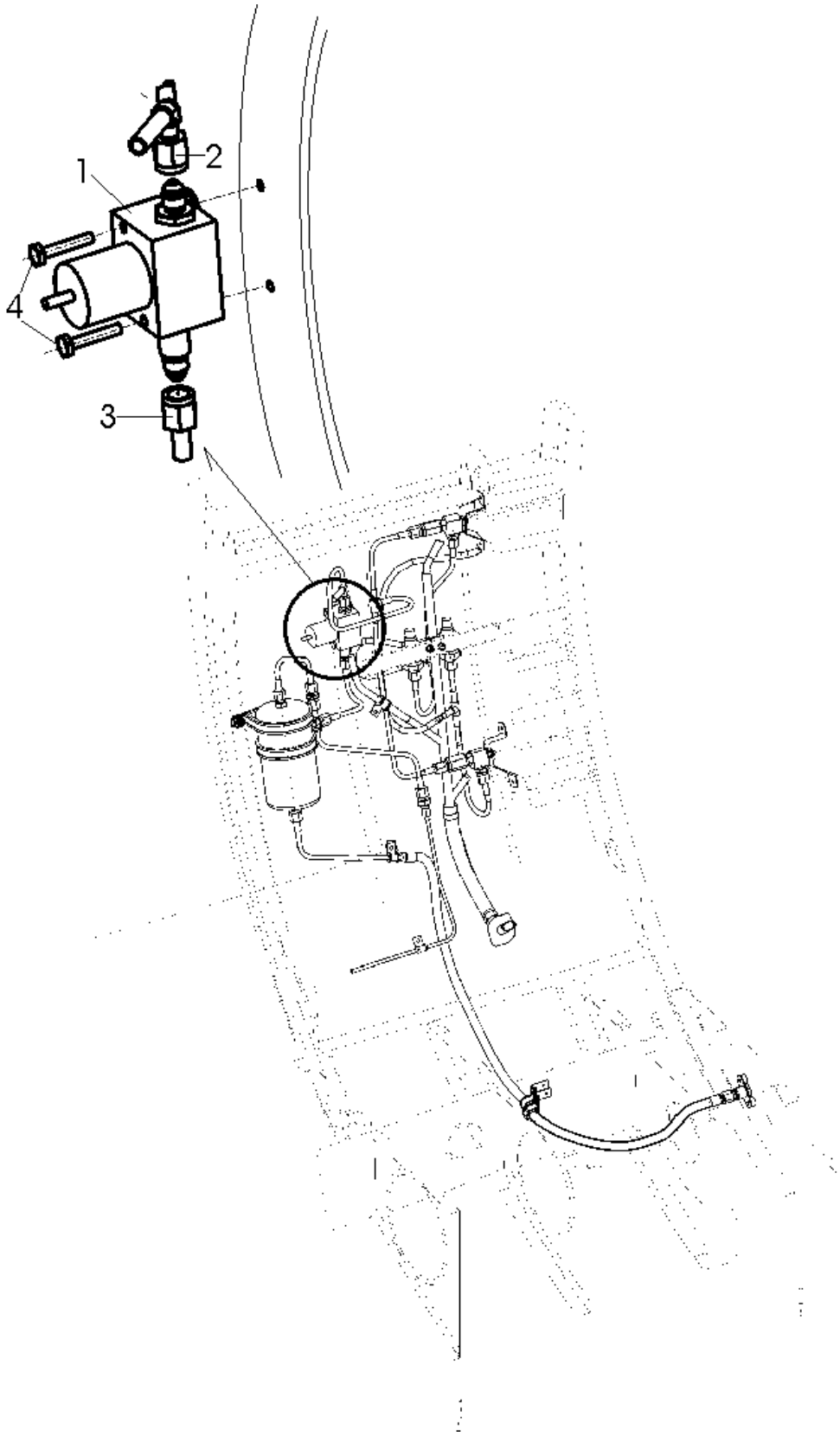


Fig. 205 - Pressure Regulator - Removal / Installation

11. Pressure Transducer - Removal (Ref. Fig. 206)

A. Referenced Information

Maintenance Manual Chapter 25-20-00

B. Procedure

(1) Open, tag and safety these circuit breakers:

Pilot CB panel:
L ENG START
R ENG START

(2) Remove either the One Place Divan (Options 1, 20 and 21) or the seat (Options 2 and 19) to gain access to the armest, then remove it.(Refer to 25-00-00).
(3) Disconnect the electrical connector (1).
(4) Hold the Pressure Transducer (5) with a suitable wrench, then unscrew the nut (2).
(5) Loose the nut (3).
(6) Loose the clamp (4).
(7) Remove the pressure transducer (5) sliding it out from the clamp (4).
(8) Cap the tube ends.

12. Pressure Transducer - Installation (Ref. Fig. 206)

A. Referenced Information

Maintenance Manual Chapter 25-20-00

B. Procedure

(1) Insert the Pressure Transducer (5) in the clamp (4).
(2) Tight the nut (3).
(3) Hold the Pressure Transducer (5) with a suitable wrench, then screw the nut (2).
(4) Connect the electrical connector (1).
(5) Install either the One Place Divan (Options 1, 20 and 21) or the seat (Options 2 and 19) to gain access to the armest, then install it. (Refer to 25-20-00).
(6) Remove the safety tag and close these circuit breakers:

Pilot CB panel:
L ENG START
R ENG START

Perform a Door Seal Leakage Check as described in this section, paying attention not to exceed the Pressure Transducer maximum pressure value.

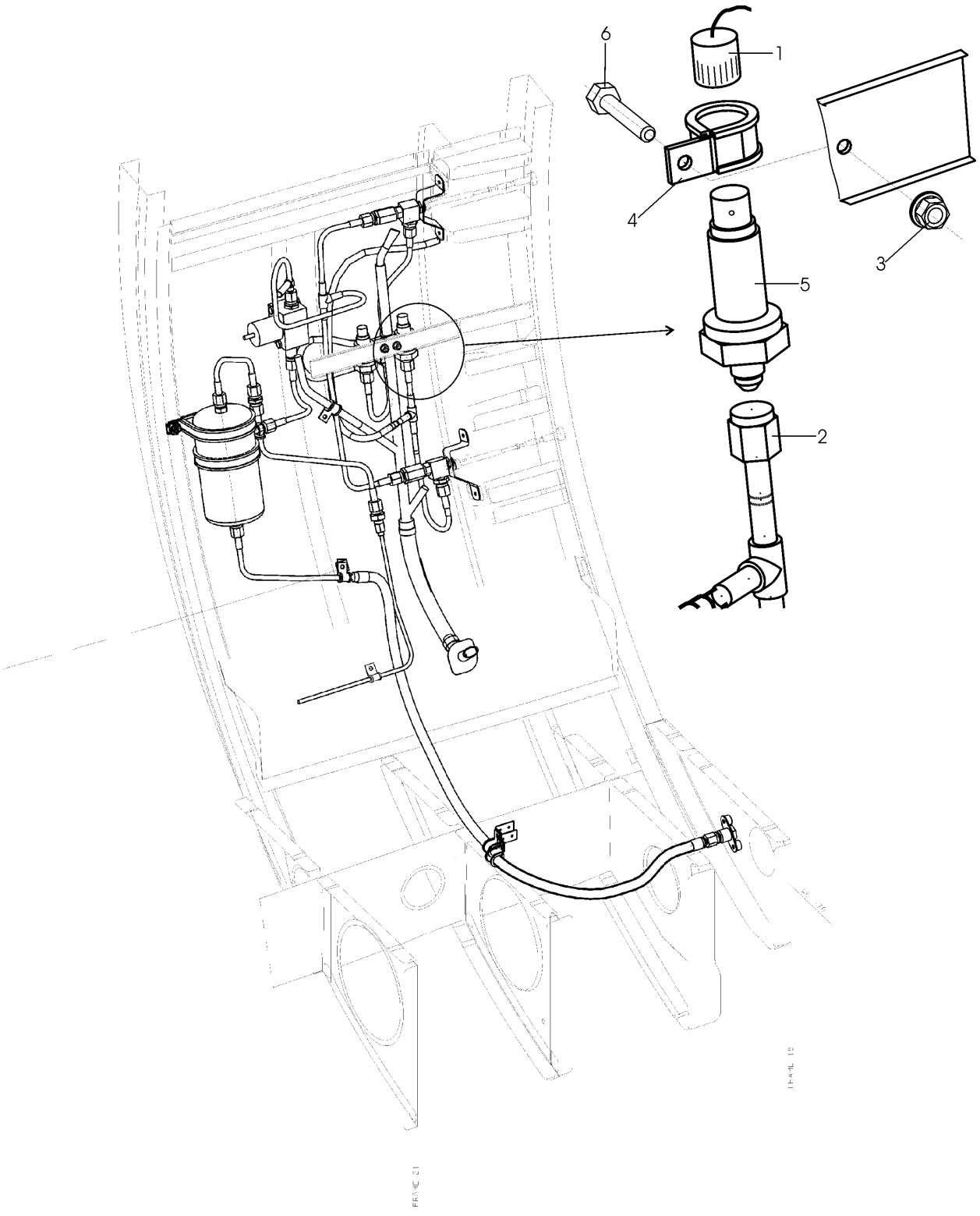


Fig. 206 - Pressure Transducer - Removal / Installation

13. Door Seal Pressurization System - Draining and Drying (Ref. Fig. 201)

A. Referenced Information

Maintenance Manual Chapter 25-00-00
Maintenance Manual Chapter 36-11-00

B. Procedure

(1) Refer to Chapter 25-00-00 and remove the interiors installed on the left side of the cabin as required.
(2) Refer to Chapter 25-00-00 and remove the fuselage LH panel as required (including the armrest if required).
(3) Disconnect both pressure switches from the pipes.
(4) Dry the pressure regulating/shut off valves (5, 6), the pressure switches (10, 11) and the check valves (7, 8, 9) for approximately 10 minutes.
(5) Connect the external air supply pipe to the accumulator Drain Valve.
(6) Set the regulator of the external air source to give a pressure of 28 - 30 PSI.
(7) Push the upper three way valve actuating pin and inflate air for approximately 3 minutes to allow the condensed water to exit from the lines.
(8) Push the lower three way valve actuating pin and inflate air for approximately 3 minutes to allow the condensed water to exit from the lines.
(9) Connect both pressure switches to the pipes.
(10) Disconnect the external air supply pipe from the accumulator Drain Valve.
(11) Refer to Chapter 25-00-00 and install the fuselage LH panels previously removed (and the LH armrest if required).
(12) Refer to Chapter 25-00-00 and install the interiors previously removed.\

14. Door Seal Inflation System - Operational Test

A. Referenced Information

Maintenance Manual Chapter 52-70-00
Maintenance Manual Chapter 71-00-00

B. Procedure

(1) Start one engine (Refer to 71-00-00).
(2) Set the propeller control lever to flight idle (FI).
(3) Do the test:

	Action	Result
(a)	Open the cabin door	The DOOR SEAL caption on the annunciator panel (Zone 25) comes on.

Action	Result
(b) Push the actuating pin of the inflation door seal system by hand and at the same time depress the door warning microswitch plunger at switch S131 position (Refer to 52-70-00).	The inflatable door seal inflates. The DOOR SEAL caption stays on.
(c) Release the microswitch plunger.	The inflatable door seal deflates. The DOOR SEAL caption stays on.
(d) Push the actuating pin of the inflation door seal systemby hand and at the same time depress the door warning microswitch plunger at the switch S130 position (Refer to 52-70-00).	The inflatable door seal inflates. The DOOR SEAL caption stays on.
(e) Release the microswitch plunger.	The inflatable door seal deflates. The DOOR SEAL caption stays on.
(f) Close and lock the cabin door.	The inflatable door seal inflates The DOOR SEAL caption goes off.

(4) Shut down the engine (Refer to 71-00-00).

15. Door Seal Inflation System - Inspection (Ref. Fig. 201)

A. Fixtures, Test and Support Equipment

Strong light source	Not specified
Mirror	Not specified

B. Referenced Information

Maintenance Manual Chapter 25-20-00

C. Procedure

(1) Remove the trim panel to the rear of the cabin door (Refer to 25-20-00).
(2) Use a strong light source and mirror to examine the system as follows:
(a) Examine the tubes for:
– Damage and distortion
– Cracks and corrosion. Make sure you examine the welded joints

thoroughly.
- Security of attachment at the clip positions
- Make sure the connectors are tight.

(b) Examine the hoses for:
- Damage and chafing
- Contamination and perishing
- Security of attachment at the clip positions
- Make sure the hoses are correctly attached to the tubes.

(c) Examine the pressure regulator/shut-off valves for:
- Damage, dents and distortion
- Cracks and corrosion
- Security of attachment to the structure
- Make sure the vent outlets are clear.

(d) Examine the check valves for:
- Damage and corrosion.

(e) Examine the pressure switches for:
- Damage, dents and distortion
- Security of attachment to the structure
- Make sure the electrical connectors are securely connected.

(3) If necessary, repair or replace any defective parts.
(4) Install the trim panel (Refer to 25-20-00).

16. Door Seal - Leakage Check (Ref. Fig. 201)

A. Fixtures, Test and Support Equipment

External air supply	Not specified
Door Leak Test Rods	Not specified

(1) Set the Battery Switch to OFF.
(2) Insert the Door Leak Test Rods in the door pin holes to open the Three Way Valve.
(3) Connect the exetrnal air supply pipe to the accumulator Drain Valve.
(4) Set the battery switch to ON.
(5) Check that the DOOR SEAL annunciator light comes ON.
(6) Set the regulator of the external air source to give a pressure of 28 - 30 PSI and inflate air until the DOOR SEAL annunciator light comes OFF.
(7) Wait 7 (seven) minutes and check that the DOOR SEAL Light still OFF.
(8) If within 7 (seven) minutes the DOOR SEAL comes ON the door seal leakeage occur.

17. Door Seal - Repair Procedure (cuts not exceedin 7mm in lenght)

NOTE: This procedure may be applied in case of damages to the outer tube of the seal.

NOTE: This procedure is effective for cuts not exceeding 7mm in lenght or punctures not exceeding 1,5mm in diameter.
no more than three repairs on a single seal are allowed, and the mutal distance shall not be less than 50mm.

NOTE: For cuts exceeding 7mm and up to 15mm, perform a "Door Seal - Repair Procedure (cuts not exceeding 15mm in length)" (Refer to 36-11-00)

A. Fixtures, Test and Support Equipment

Dow Corning 1200 primer	Not specified
Dow Corning silicone sealant 732 RTV (transparent)	Not specified
MEK	Not specified
Warning Notice	Not specified

B. Referenced Information

Maintenance Manual Chapter 20-00-00
Maintenance Manual Chapter 36-11-00

WARNING: BE CAREFUL WHEN USING MEK. OBEY THE HEALTH AND SAFETY INSTRUCTIONS GIVEN IN AMM CH. 20-00-00.

(1) Put the warning notice to tell persons not to close the door until the end of procedure

NOTE: If necessary, extract the part of the damaged seal from its channel to have an easy access to the affected area; pay attention not to damage the seal during the removal

(2) Clean the damaged zone(s) with Methyl-Ethyl-Ketone (MEK) solvent and dry with a lint-free cloth before the solvent evaporates
(3) Lightly abrade the damaged zone(s) with very fine abrasive pads
(4) Clean again the abraded zone(s) with MEK and dry with a lint-free cloth
(5) Apply a coat of Dow Corning 1200 primer (or similar) to the damaged surface(s) and allow to dry for 30-45 minutes (or as required)
(6) Accurately apply a first layer of silicone sealant 732 RTV to the prepared damaged zone(s) (tool or smooth the sealant if necessary) and allow to dry as required (minimum 6 – 7 hours)
(7) Apply a second layer of silicone sealant 732 RTV to the prepared damaged zone(s) (tool or smooth the sealant if necessary) and allow to dry as required (minimum 6 – 7 hours)
(8) Remove the warning notice
(9) Perform a Door Seal – Leakage Check as per AMM Ch. 36-11-00

18. Door Seal - Repair Procedure (cuts not exceeding 15mm in length) (Ref. Fig. 207)

NOTE: This procedure may be applied in case of damages to the outer tube of the seal

NOTE: This procedure is effective for cuts not exceeding 15mm in length or punctures not exceeding 1,5mm in diameter.
No more than three repairs on a single seal are allowed, and the mutual distance shall not be less than 50mm

A. Fixtures, Test and Support Equipment

Dow Corning 1200 primer	Not specified
RTV 732 clear adhesive	Not specified
MEK (Methyl-Ethyl-Ketone)	Not specified
Warning Notice	Not specified
D117 or D118 fabric (Dacron “snake skin”)	Not specified
Lint-free cloth	Not specified
Fine abrasive paper (180-grit or finer)	Not specified
Syringe with plastic needle for infiltration	Not specified

B. Referenced Information

Maintenance Manual Chapter 20-00-00
Maintenance Manual Chapter 36-11-00

WARNING: BE CAREFUL WHEN USING MEK. OBEY THE HEALTH AND SAFETY INSTRUCTIONS GIVEN IN AMM CH. 20-00-00.

(1) Put the warning notice to tell people not to close the door until the end of procedure
(2) Extract the part of the damaged seal from its channel to have an easy access to the affected area; pay attention not to damage the seal during the removal
(3) Clean the damaged zone(s) with Methyl-Ethyl-Ketone (MEK) solvent and dry with a lint-free cloth before the solvent evaporates
(4) Lightly rub (abrade) the damaged zone(s) with the fine abrasive paper
(5) Clean again the abraded zone(s) with MEK and dry with a lint-free cloth

NOTE: It is very important that the surface is clean in order to have a good bonding

(6) Cut the Dacron D117 or D118 fabric patch that fits the damaged area, following the correct direction of the fibers (Re.f Fig.207)

NOTE: The patch has to be long enough to cover a minimum of 15 mm on each side of the cut, up to 50 mm max

NOTE: The patch has to be wide enough to wrap fully around the seal

(7) Inject with the syringe the primer “Dow Corning 1200” in the cut and apply a layer of it to all the repair area;
(8) Allow to the primer dry for 30-45 minutes

(9) Inject the adhesive type RTV 732 (clear) as much as needed inside of the cut
(10) Apply a first layer of adhesive RTV 732 (clear) to the prepared area on the seal
(11) Apply the Dacron D117 or D118 patch over the wet adhesive; pay attention to the correct direction of the fiber
(12) Apply additional adhesive RTV 732 (clear) on top of the patch
(13) Remove from the surface and edges the unwanted adhesive

NOTE: Do not apply too much adhesive or there will be a rigid area on the seal

(14) Press the patch in order to assure fully contact with the adhesive than allow to dry as required (minimum 6 – 7 hours)
(15) Put the part of the seal previously extracted into the channel and make sure the seal is securely bonded
(16) Remove the warning notice
(17) Perform a "Door Seal – Leakage Check" (Refer to 36-11-00)

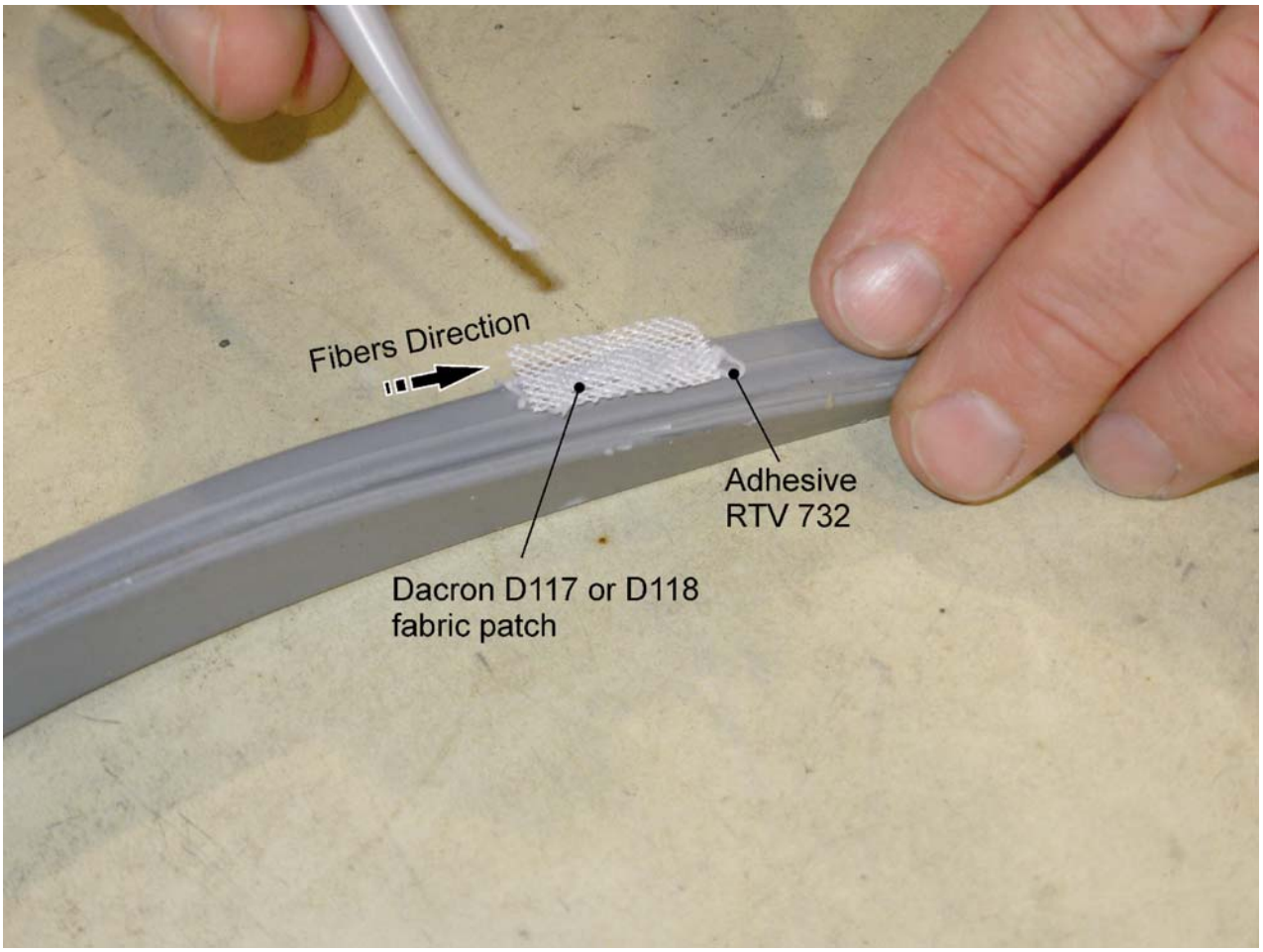


Fig. 207 - Door Seal - Repair (with fiber patch)