

NOM : PRENOM :

GRILLE D'EVALUATION

1.3. EPREUVE PRATIQUE EN ATELIER OU SUR AVION

Durée : 3 heures
Coef. : 5

OPERATION A EFFECTUER : AIA 29 CIRCUIT HYDRAULIQUE SECOURS

UTILISATION DE LA DOCUMENTATION	/10 pts
PREPARATION DU POSTE DE TRAVAIL /SECURITE	/20 pts
ETABLISSEMENT GAMME DE TRAVAIL	/ 20 pts
DEPOSE DE L'ORGANE	/ 30 pts
VERIFICATION DE L'ORGANE	/ 30 pts
POSE DE L'ORGANE	/ 30 pts
AUTO CONTROLE ESSAIS	/ 30 pts
REMETTRE EN SITUATION DE VOL	/ 20 pts
RENDRE COMPTE/A.P.R.S.	/ 10 pts
TOTAL	/200 pts

Ramener la note sur 20 : /

Nom et Prénom du notateur :

Signature :

ACADEMIE DE GRENOBLE				SESSION 2002	
EXAMEN : CAP Mécanicien Entretien Avions option T2				DUREE: 3 h	
Epreuve : Epreuve Pratique en Atelier ou sur Avion				COEFFICIENT: 5	
ECHELLE :	Nb. Tirages :	SUJET	3	FEUILLE:	_____



MAINTENANCE MANUAL

STANDBY SYSTEM ELECTRIC MOTOR DRIVEN PUMP ASSEMBLY - REMOVAL/INSTALLATION

1. General

- A. Should replacement of the standby hydraulic pump be required due to mechanical malfunction, check the pressure filter, and the case drain filter for particles of foreign material. If an excessive amount is present, remove and clean the appropriate filter element and filter bowl thoroughly and install cleaned filter element and bowl.
- B. A container will be necessary to catch fluid from the reservoir and from disconnected lines. Take necessary precaution to prevent spillage of fluid. Should any fluid spill on the airplane, decontaminate (Ref Chapter 12, Cleaning and Washing).
- C. Removal and installation of the hydraulic pump, if required, may be performed after the removal of the entire electric motor driven pump assembly.

2. Equipment and Materials

- A. Hydraulic Fluid, BMS 3-11
- B. Suitable container for BMS 3-11, about 2 gallons capacity

3. Remove Standby System Electric Motor-Driven Pump Assembly (Fig. 401)

- A. Open aft stair well left side panel.
- B. Depressurize standby hydraulic system.
 - (1) Disconnect standby pump electrical connector (11).
 - (2) Depressurize standby reservoir and hydraulic system (Ref 29-11-0, Maintenance Practices).

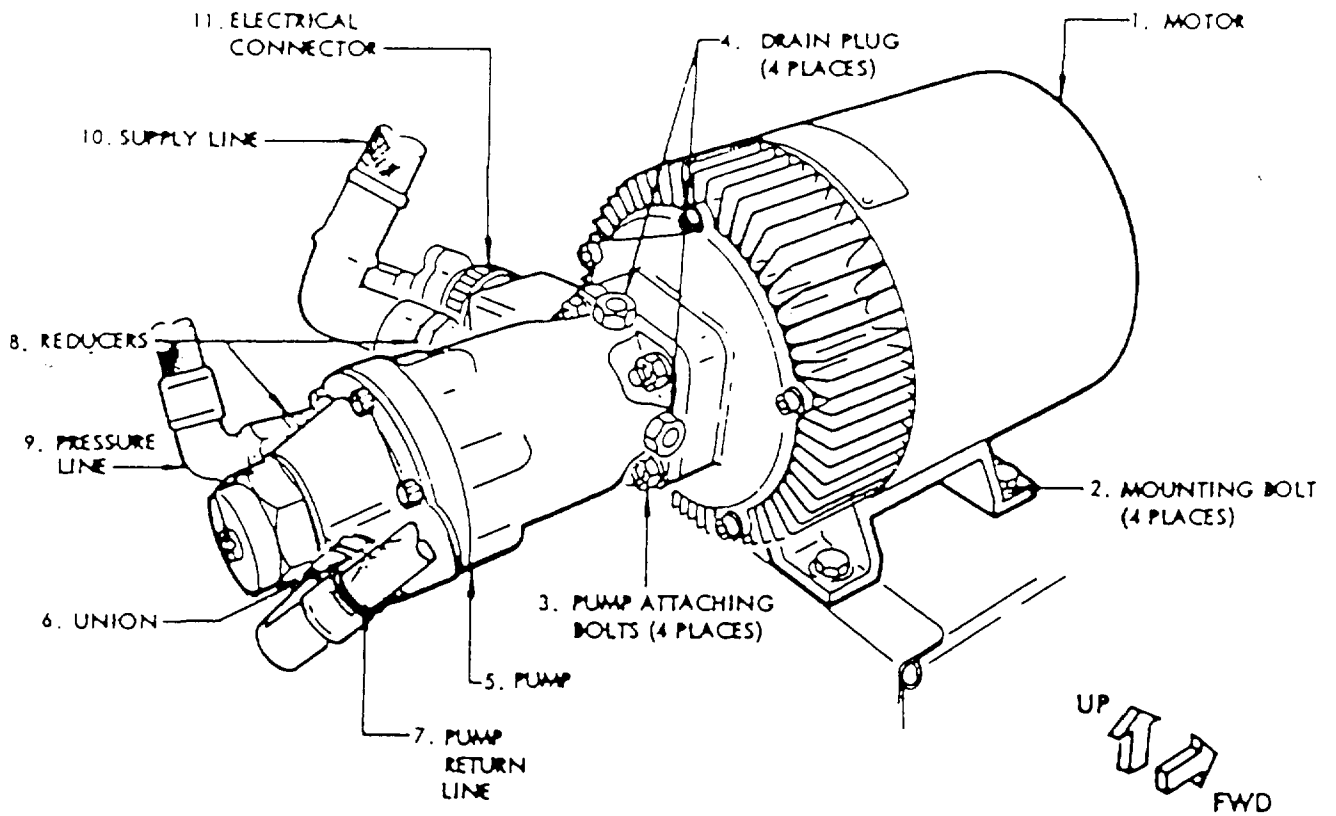
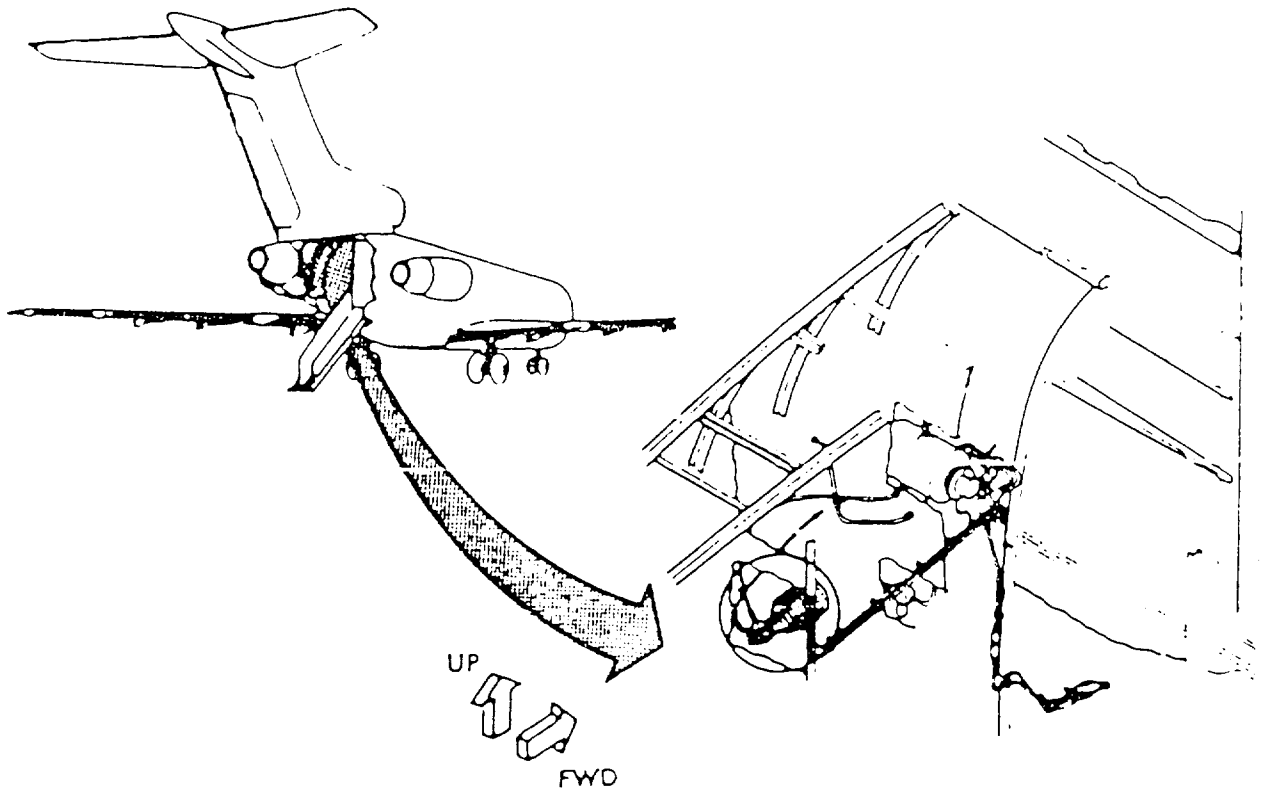
NOTE: To depressurize standby system, the hydraulic system A must be depressurized to open the rudder hydraulic system selector valve, allowing hydraulic flow to the lower rudder actuator.

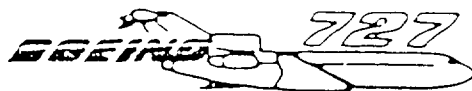


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- C. Open standby reservoir drain valve and drain reservoir. After draining is performed, close drain valve and secure with lockwire.
 - D. Disconnect return (7), pressure (9) and supply lines (10) from hydraulic pump (5). Install protective caps on hydraulic lines.
 - E. Remove pump mounting bolts (2).
 - F. Remove electric motor-driven pump assembly.
4. Prepare Electric Motor-Driven Pump Assembly for Installation
- A. Remove lowest drain plug (4, Fig. 401) from hydraulic pump mounting flange and install an O-ring and drain fitting in opening.
 - B. If hydraulic pump (5) was removed from electric motor-driven pump, check for clean mounting surfaces and install pump. Lockwire mounting bolts (3).
 - C. Install O-ring and reducer (8) in supply (10) and pressure lines (9).
 - D. Install O-ring and union (6) in return line (7).
 - E. Fill pump approximately half full with hydraulic fluid through supply port (10).
5. Install Standby System Electric Motor-Driven Pump Assembly
- A. Place electric motor driven pump assembly in mounting position and install pump mounting bolts (2, Fig. 401).

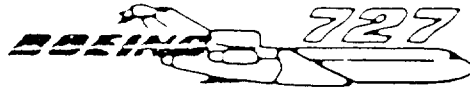
NOTE: Pump mounting bolts, washers, nuts and faying surfaces must be clean to provide an adequate electrical ground.
 - B. Connect supply (10), pressure (9) and return lines (7) to hydraulic pump (5).





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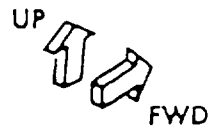
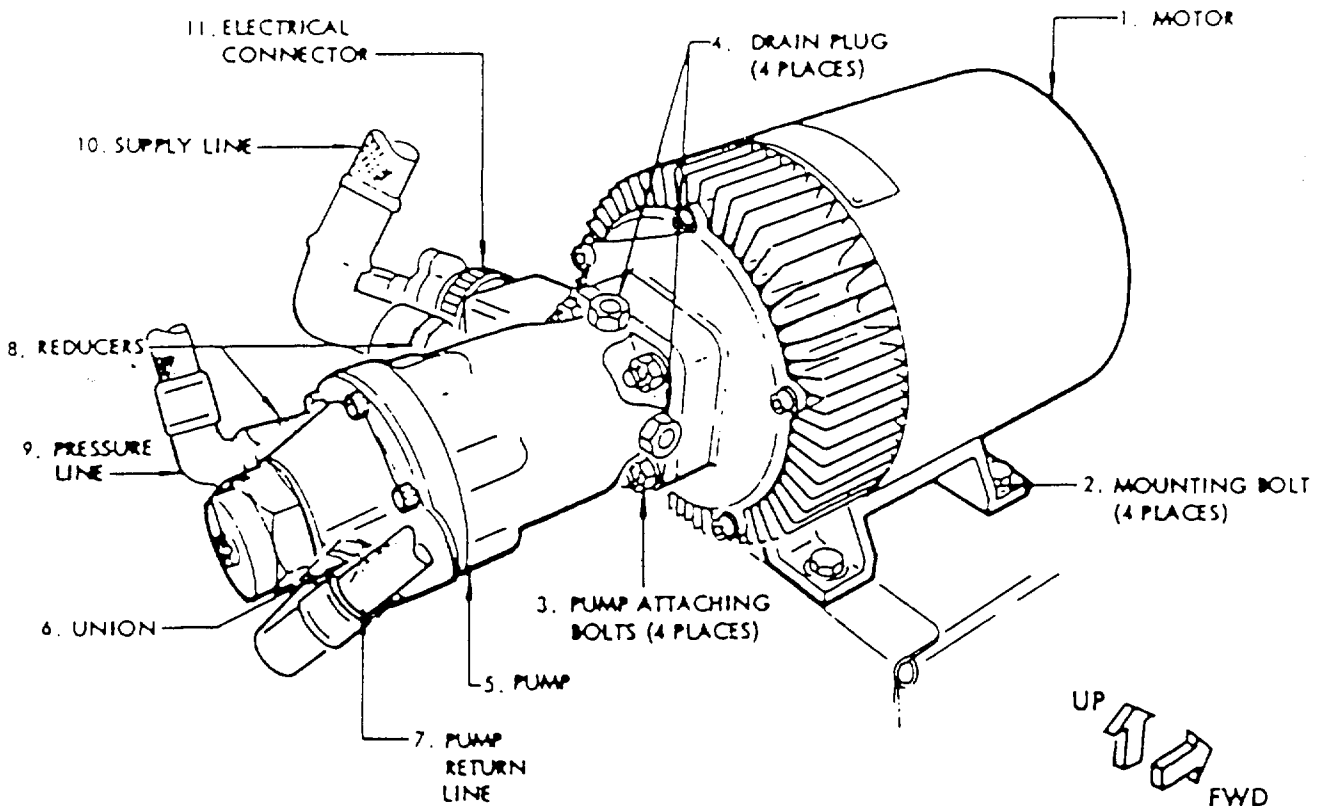
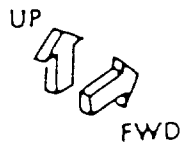
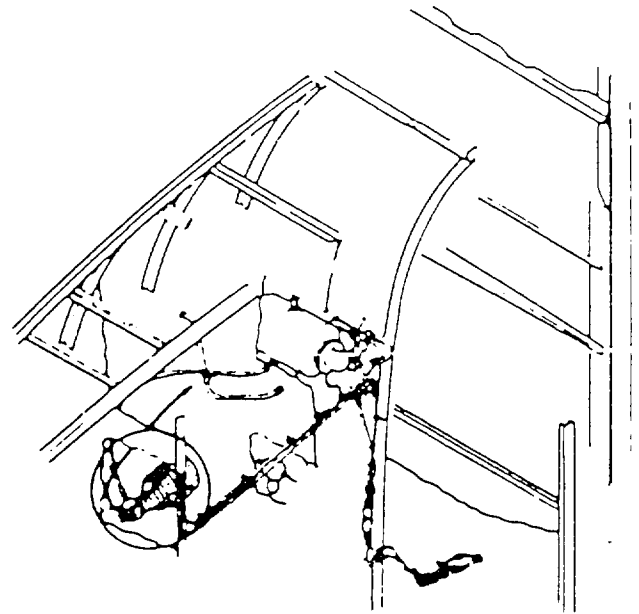
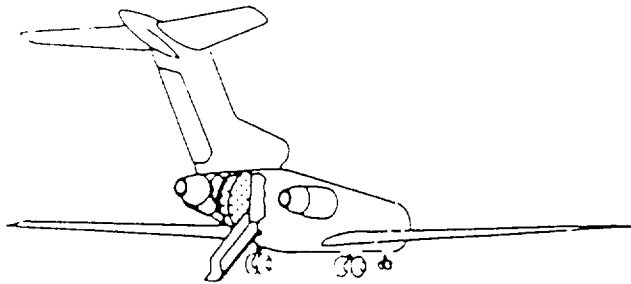
- C. On the captain's overhead panel check that RUDDER - STANDBY switch and the ALTERNATE FLAPS switch are in OFF position.
- D. Connect electrical connector (11) to electric motor (1).
- E. Service standby hydraulic reservoir. Refer to Chapter 12, Hydraulic Fluid Servicing.
- F. Pressurize hydraulic reservoir. Refer to 29-11-0, Hydraulic System A, Maintenance Practices.
- G. Pressurize standby system to bleed standby system and check line connections for leaks.
 - (1) Connect electrical power to airplane.
 - (2) Check that VALVE-LEADING EDGE circuit breaker on panel P6-4 is closed.
 - (3) Depressurize hydraulic system A. Refer to 29-11-0, Hydraulic System A, Maintenance Practices.
 - (4) On the overhead panel position ALTERNATE FLAPS switch to ON and INBD or OUTBD switch to DN to energize standby hydraulic pump and to lower leading edge flaps and slats. Operate rudder pedals several times to cycle rudder.
- WARNING: PERSONNEL STAND CLEAR OF RUDDER AND LEADING EDGE FLAPS AND SLATS.
- H. Check electric motor-driven pump connections for leaks.
- I. Determine whether there is any further need for hydraulic pressure on airplane. If not, restore system to normal configuration.
- J. Determine whether there is any further need for electrical power on airplane. If not, remove electrical power.
- K. Close access panel.



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STANDBY SYSTEM ELECTRIC MOTOR-DRIVEN PUMP - ADJUSTMENT TEST

1. Equipment and Materials
 - A. Test pressure gage, 0 to 3500 psi
 - B. Connect tubing
2. Test Standby System Electric Motor-Driven Pump
 - A. Open aft stair well left side panel.
 - B. Disconnect pressure hose (9, figure 501) from hydraulic pump (5) and connect tubing with a pressure gage between pump and disconnected hose.
 - C. Pressurize standby system.
 - (1) Provide electrical power to airplane.
 - (2) Depressurize hydraulic system A. Refer to 29-11-0, Hydraulic System A - Maintenance Practices.
 - (3) On the captain's overhead panel position RUDDER-STANDBY switch to ON.
 - D. Check that the test pressure gage indicates between 2875 and 3175 psi and that the STANDBY SYSTEM-ON indicating light illuminates.
 - E. Operate rudder pedals several times to cycle rudder.
 - F. Check on test gage that pressure returns to normal after each rudder cycle
 - G. Position RUDDER-STANDBY switch to OFF.
 - H. Depressurize standby system by operating rudder pedals until rudder no longer responds hydraulically.
 - I. Disconnect tubing with pressure gage from pressure line and reinstall pressure hose (9) on the hydraulic pump (5).
 - J. Position RUDDER-STANDBY switch to ON and check hydraulic pump connections for leaks.
 - K. Determine whether there is any further need for hydraulic pressure on airplane. If not, restore system to normal configuration.
 - L. Determine whether there is any further need for electrical power on airplane. If not, remove electrical power.
 - M. Close access panel.



Standby System Electric Motor-Driven Pump Installation
 Figure 501



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STANDBY SYSTEM CASE DRAIN FILTER - MAINTENANCE PRACTICES

1. General

A. A container will be necessary to catch any fluid when disconnecting hydraulic lines. Should any fluid spill, decontaminate. Refer to Chapter 12, Cleaning and Washing.

2. Unit Servicing Standby System Case Drain Filter

A. General

(1) The hydraulic pump case drain filter element and filter bowl should be removed and checked at regular intervals. Between these intervals the pump case drain filter should be checked for metal contamination from the magnetic plug. If excessive metal contamination is found the hydraulic pump should be removed and the filter element cleaned or replaced and filter bowl cleaned.

B. Check Pump Case Drain Magnetic Plug

- (1) Open aft stairwell left side panel.
- (2) Unscrew magnetic plug (figure 201) and check for metal contamination on the magnetic plug, and in the hydraulic fluid lost during removal of the plug.
- (3) Place new O-ring (10) on magnetic plug (9). Install magnetic plug in filter bowl (5). Apply a torque of 50 to 75 pound-inches to magnetic plug (9) while holding drain plug (8).
- (4) Lockwire plug.

C. Remove Standby System Case Drain Filter Element

- (1) Open aft stairwell left side panel.
- (2) Disconnect standby electric motor-driven pump electrical connector.



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- (3) Unscrew filter bowl (5, figure 201) from filter head (1). Remove bowl with filter element.
- (4) Remove filter element (4) and check element and bowl for metal contamination.
- (5) Remove spring (6) from filter bowl (5).
- (6) Clean filter bowl (5), magnetic plug (9) and spring (6). Clean metallic element or replace paper element (4).

NOTE: The most effective means of cleaning metallic filter elements is the ultrasonic method.

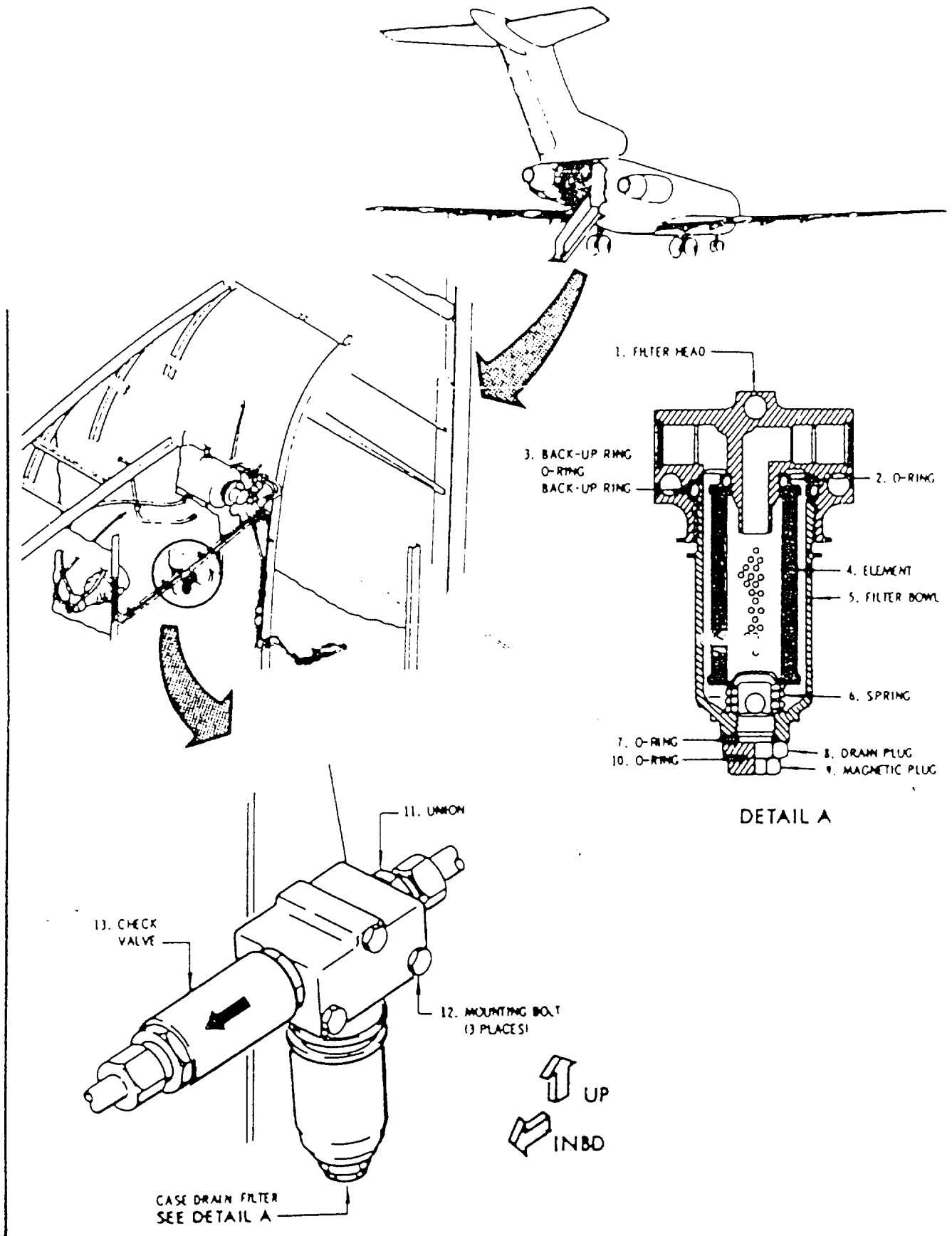
D. Install Standby System Case Drain Filter Element

- (1) Insert back-up-ring, O-ring, and back-up-ring (3) in groove in filter head (1).
- (2) Insert O-ring (2) in groove in filter element (4).
- (3) Install spring (6) and filter element (4) in filter bowl (5).
- (4) Screw filter bowl (5) into filter head (1). Apply a torque of 75 pound-inches to filter bowl and safety lockwire.
- (5) Service standby hydraulic reservoir. Refer to Chapter 12, Hydraulic Fluid Servicing.
- (6) Connect standby electric motor electrical connector.
- (7) Pressurize hydraulic reservoir. Refer to 29-11-0, Hydraulic System A - Maintenance Practices.
- (8) Operate standby electric motor-driven pump and check filter for leaks.
- (9) Close access panels.

3. Removal/Installation Standby System Case Drain Filter

A. Remove Standby System Case Drain Filter

- (1) Open aft stair well left side panel.
- (2) Depressurize hydraulic reservoir and standby system.
 - (a) Disconnect standby electric motor driven pump electrical connector.





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- (b) Depressurize hydraulic system A. Refer to 29-11-0, Hydraulic System A - Maintenance Practices.

NOTE: To depressurize standby system, the hydraulic system A has to be depressurized to open the rudder hydraulic system selector valve, allowing hydraulic flow to the lower rudder actuator.

- (3) Drain standby hydraulic reservoir. After draining is performed, close drain valve and secure with lockwire.
- (4) Disconnect hydraulic lines from case drain filter and cap lines. (See figure 201.)

NOTE: Do not remove check valve (13) when disconnecting lines.

- (5) Remove case drain filter mounting bolts (12) and remove case drain filter assembly.

B. Install Standby System Case Drain Filter

- (1) Install O-ring and union (11, figure 201) in case drain filter outboard port.
- (2) Install O-ring and check valve (13) in case drain filter inboard port.
- (3) Position filter assembly on mounting bracket and install filter mounting bolts (12).

CAUTION: INSTALL CASE DRAIN FILTER SUCH THAT DIRECTION ARROW ON CASE DRAIN FILTER AGREES WITH CASE DRAIN FILTER METAL-CAL.

- (4) Remove caps from hydraulic lines and connect lines to case drain filter.
- (5) Service standby hydraulic reservoir. Refer to Chapter 12, Hydraulic Fluid Servicing.
- (6) Connect standby electric motor driven pump electrical connector.
- (7) Pressurize hydraulic reservoir. Refer to 29-11-0, Hydraulic System A - Maintenance Practices.
- (8) Operate standby system electric motor driven pump and check filter and connections for leaks.
- (9) Close access panels.



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3. Deleted

9. System A Hydraulic Valves

A. System A Relief Valve

- (1) The cartridge type system a relief valve installed in the modular unit (figures 2 and 5) protects the system against damage by abnormally high pressures. The valve is set to relieve at 3500 (± 50) psi and reset at 3100 psi minimum. The valve is set by the manufacturer and no maintenance other than removal and installation is recommended.

B. Hydraulic Supply (Fire) Shutoff Valve

- (1) The hydraulic supply (fire) shutoff valves are provided to stop the flow of hydraulic fluid to the engine area. The supply shutoff valve is a sliding gate type valve which is motor-driven by 28-volt dc power from main load control center, panel (P6-4). The valves, one in each of the engine-driven pump supply lines, are mounted just below the system A reservoir in the aft stairwell on the left sidewall. (See figure 1.) The valves are controlled either by engines No. 1 or No. 2 fire switches on the pilot's fire switch panel, or by separate hydraulic shutoff switches on the third crewman's panel. (See figure 8.) The hydraulic shutoff switches allow closing of the valves without operating the engine fire switch. A position indicator on the valve provides a valve CLOSED or OPEN position indication.

C. Ground Interconnect Valve

- (1) The ground interconnect valve is provided to pressurize system A using system B hydraulic power source. A check valve installed on the system A side of the interconnect valve prevents the valve from being used to pressurize system B using system A power source, and also prevents loss of system A fluid through a failure of system B. The valve is a motor operated valve, consisting of a motor, cam operated slide valve and three port housing (one port plugged).



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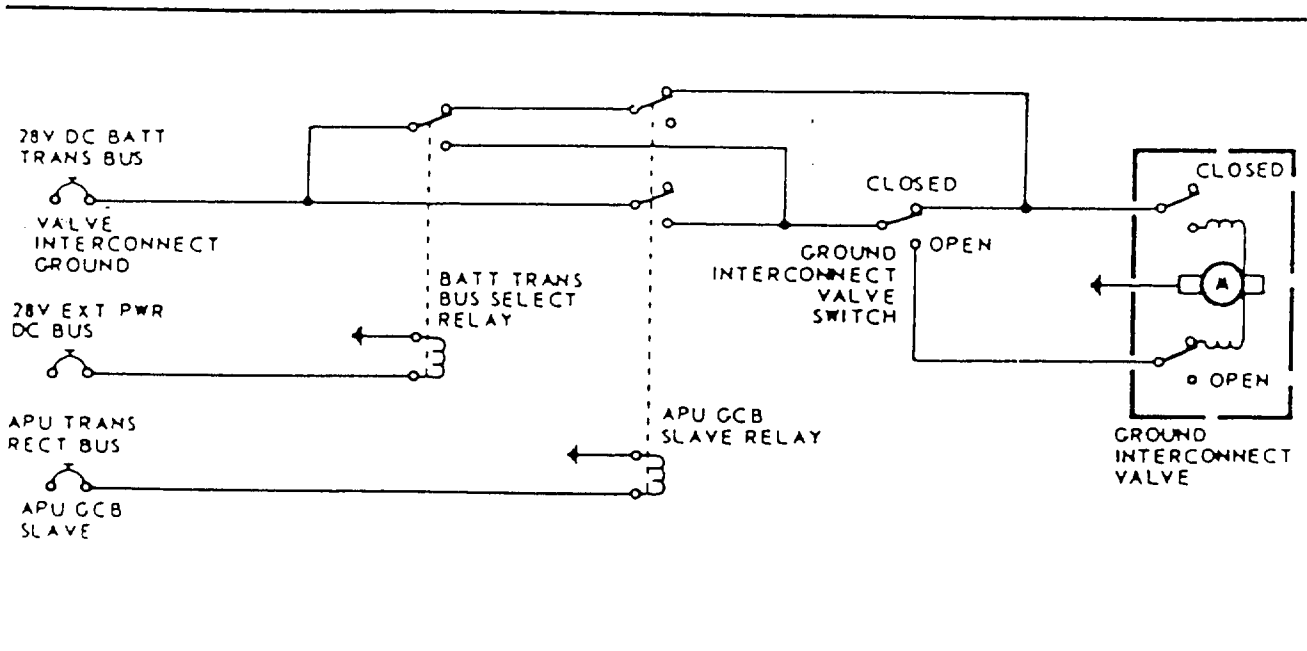
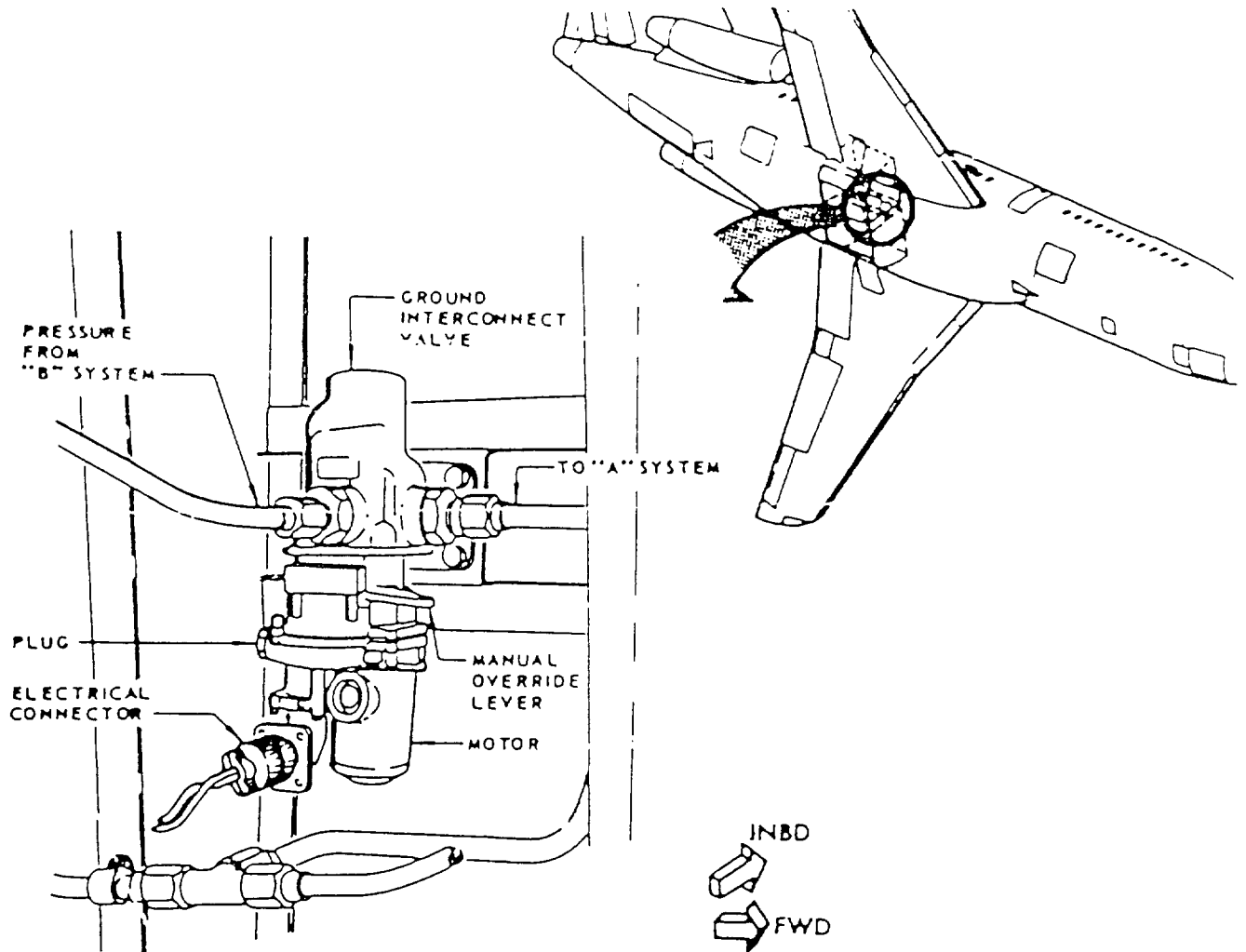
(Fig. 8). The valve can be operated on the ground only. For normal ground operation the valve is wired through the battery transfer bus selector relay normally open contact, and receives 28 volts dc from the main load control center panel (P6). The valve is also wired to close automatically in case the interconnect valve control switch is not moved to the CLOSED position prior to the removal of external power. For this condition the valve is wired through the battery transfer bus selector relay normally closed contact and receives 28 volts dc from the main load control center panel (P6). The valve is controlled by the ground interconnect valve switch on the third crewman's panel, and installed in the right wheel well on the inboard wall. A manual override lever is provided on the valve for operating the valve on the ground without electrical power.

D. Brake Interconnect Valve (Fig. 10)

- (1) The brake interconnect valve is used for connecting system A pressure line to the brake system whenever system B is inoperative and the brake system is intact. This allows brake operation and brake accumulator charging using system A pressure (Ref Chapter 32, Hydraulic Brake System). The valve is a motor operated valve, consisting of a motor, cam operated slide valve and three port housing (one port plugged). The valve is powered by 28 volts dc and controlled by the brake interconnect valve switch on the third crewman's panel. A brake interconnect light on the third crewman's panel illuminates when the brake interconnect valve is open, and extinguishes when the valve is closed. A manual override lever is provided on the valve for ground operation without electrical power. The valve is in the left wheel well.

E. Brake Flow Limiting Valve

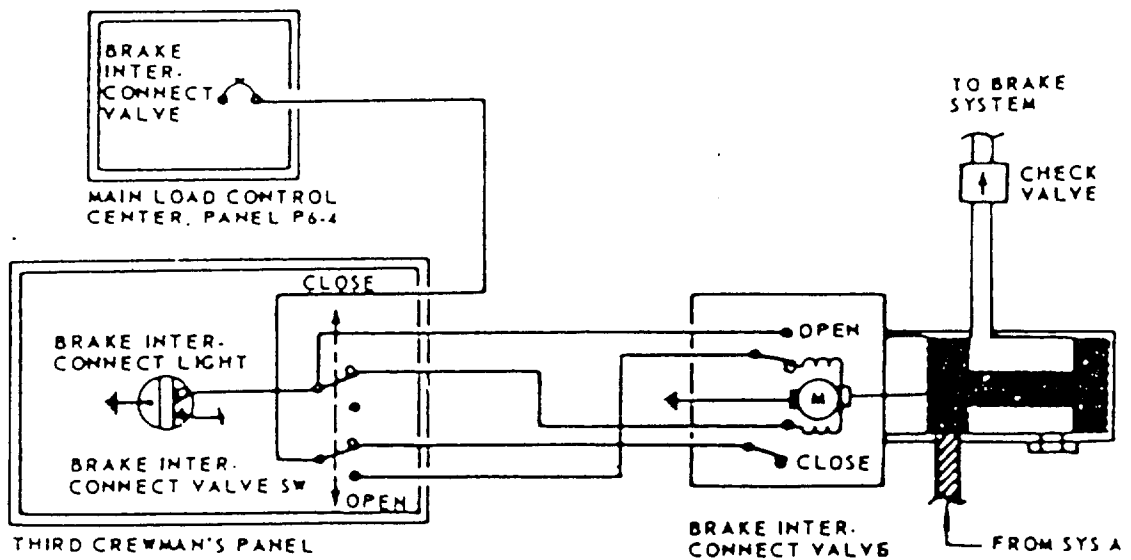
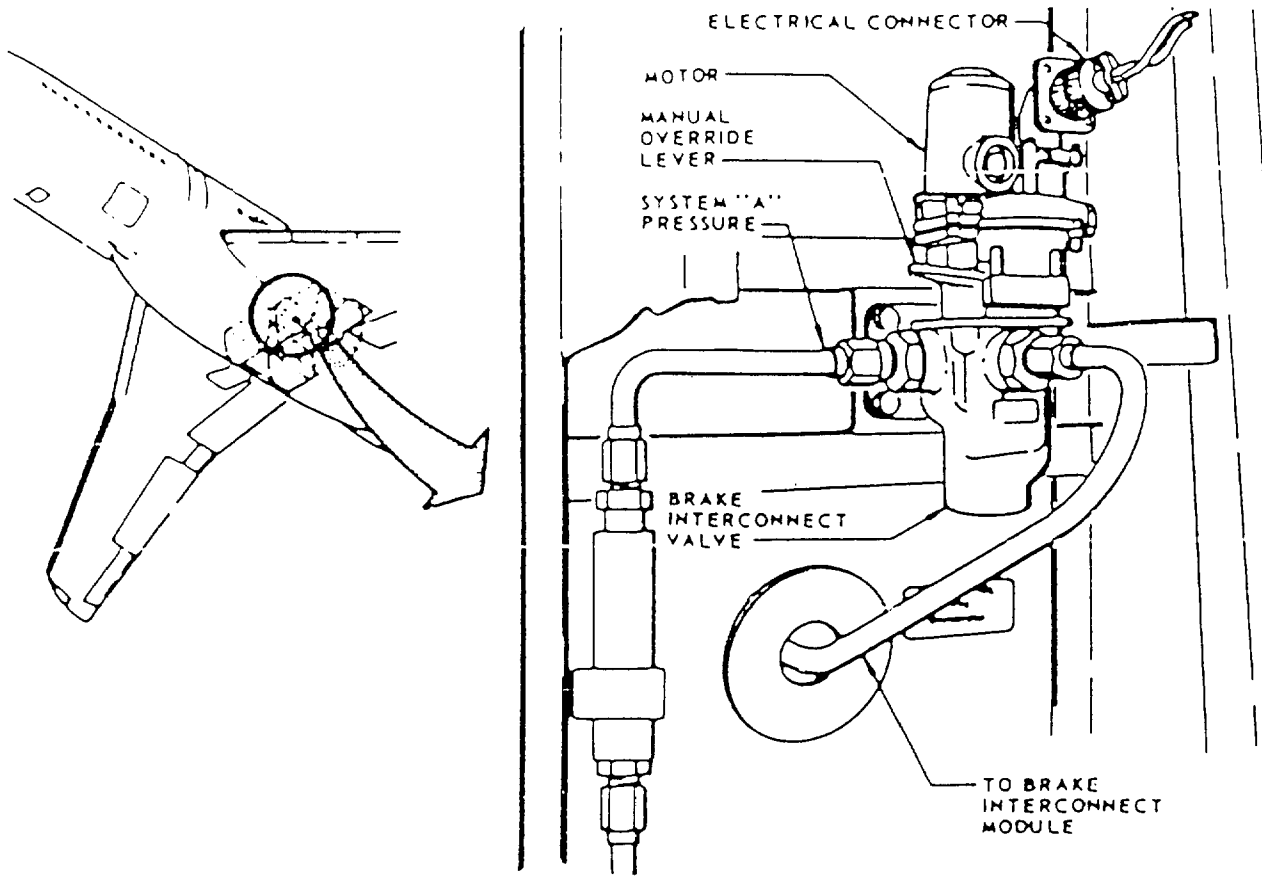
- (1) A flow limiting valve is installed in system A pressure line upstream of the brake interconnect valve (Fig. 2). When the brake interconnect valve is open, the valve regulates flow between 1.35 and 1.55 gpm at 80°F and between 1.20 and 1.88 gpm at 65°F.



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Ground Interconnect Valve and Control Circuit
Figure 9

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Brake Interconnect Valve and Control Circuit
Figure 10



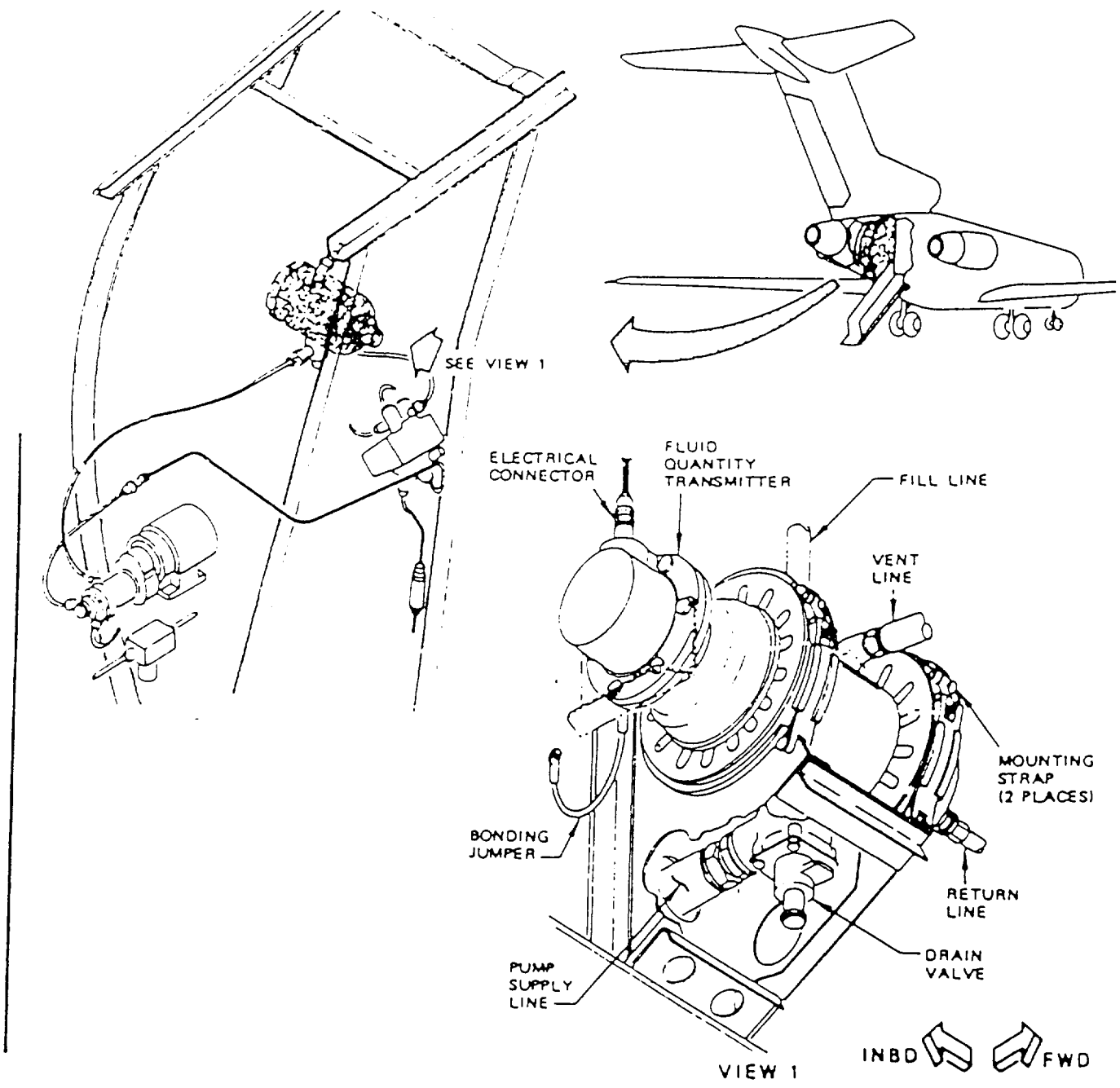
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STANDBY SYSTEM HYDRAULIC RESERVOIR - REMOVAL/INSTALLATION

1. General
 - A. Take precaution to prevent spilling of hydraulic fluid. Should any fluid spill on the airplane, decontaminate. Refer to Chapter 12, Cleaning and Washing.
2. Remove Standby System Hydraulic Reservoir (See figure 401.)
 - A. Open aft stairwell left side panel.
 - B. Depressurize reservoir and hydraulic systems A, B, and standby. Refer to 29-11-0, Hydraulic System - Maintenance Practices.
 - C. Disconnect standby electric motor pump electrical connector.
 - D. Drain hydraulic fluid from reservoir.
 - E. Remove fluid quantity transmitter. Refer to 29-33-1, Fluid Quantity Transmitter - Removal/Installation.
 - F. Disconnect hoses from standby reservoir. Cap hoses.
 - G. Disconnect mounting straps and bonding jumper.
 - H. Remove reservoir.
 - I. Remove unions from all reservoir ports.
3. Prepare Standby System Hydraulic Reservoir for Installation (See figure 401.)
 - A. Check that reservoir is clean and mounting surfaces free from foreign material. Make sure that no foreign matter enters reservoir openings during installation.
 - B. Install O-ring and drain valve at bottom of reservoir. Lockwire drain valve.
 - C. Install O-rings, check valve and unions as required in new reservoir.
4. Install Standby Hydraulic Reservoir (See figure 401.)
 - A. Place reservoir in mounting position and secure mounting straps.
 - B. Install fluid quantity transmitter. Refer to 29-33-1, Fluid Quantity Transmitter - Removal/Installation.

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- C. Install bonding jumper.
- D. Connect hydraulic and air lines.
- E. Service reservoir. Refer to Chapter 12, Hydraulic Fluid Servicing.
- F. Pressurize hydraulic reservoir. Refer to 29-11-0, Hydraulic System A - Maintenance Practices.
- G. Check reservoir for fluid leaks.
- H. Close access panel.



Standby Hydraulic Reservoir Installation
Figure 401