CHAPTER

38

CHAPTER 38

WATER AND WASTE

TABLE OF CONTENTS

WATER AND WASTE - MAINTENANCE PRACTICES

1. Lavatory Sink Cabinet Drain Lines

A General

(1) Water system drain lines are made of nylon tubing. Care should be exercised in handling them to avoid nicks, scrapes and abrasions.

(2) On airplanes incorporating SB 3146. When installing sink cabinet drain line (and drain vent line on all lavatories except E), ensure that line has protective sleeving.

CAUTION: IF PROTECTIVE SLEEVING IS NOT INSTALLED, CIGARETTES, WHICH ARE OCCASIONALLY EXTINGUISHED IN LAVATORY WASTE CONTAINERS, MAY CAUSE PLASTIC DRAIN LINE TO BURN.

TOILET SYSTEMS - DESCRIPTION AND OPERATION

1. General

A. Two independent toilet systems are provided in the passenger cabin, one forward and one aft The forward system consists of two toilet units, one in each of lavatory compartments "A" and "B" The aft system consists of three toilet units, one in each of lavatory compartments "E", "C" and "D" Each toilet unit is provided with a drain tube, drain valve control cable and ground flush line (See figure 1.)

B. The toilet systems are serviced from separate exterior service panels The forward system panel is located on the lower right side of the fuselage, aft of the nose wheel area The rear system panel is located on the underside of the fuselage below the vertical fin area. In both the forward and aft systems, the toilet drain tubes join below floor level to terminate in a common drain tube at the service panel (See figure 2.)

C. Each toilet unit, installed entirely above lavatory compartment floor level, consists of a seat, cover and decorative shroud, toilet bowl, tank top and flushing system, toilet waste tank and outlet valve (See figure 3)

D. The toilet is an electrically powered flushing unit. It collects waste material in the toilet waste tank, disinfects, deodorizes, dyes, and separates the liquids in the waste and utilizes these liquids for flushing purposes Toilet flushing is initiated by pushing the toilet flush button This action energizes an electrical timer which begins a 15-second cycle The timer completes a circuit to energize a motor which simultaneously drives a pump and a mechanical, self-cleansing filter The pump draws liquid through the rotating filter and pumps it through a toilet bowl flush ring into the bowl with a swirling action. This action carries the deposits into the waste tank and thoroughly cleanses the bowl At the end of 15-seconds the timer opens the circuit to the electric motor, stops the cycle, and rearms itself for the next cycle. The units must be initially charged with a minimum of 5 gallons of a concentrated solution of disinfectant, deodorant and dye. The charge is good for approximately 100 usages, after which the toilet should be emptied, cleansed and recharged. (See figures 4 and 5.)

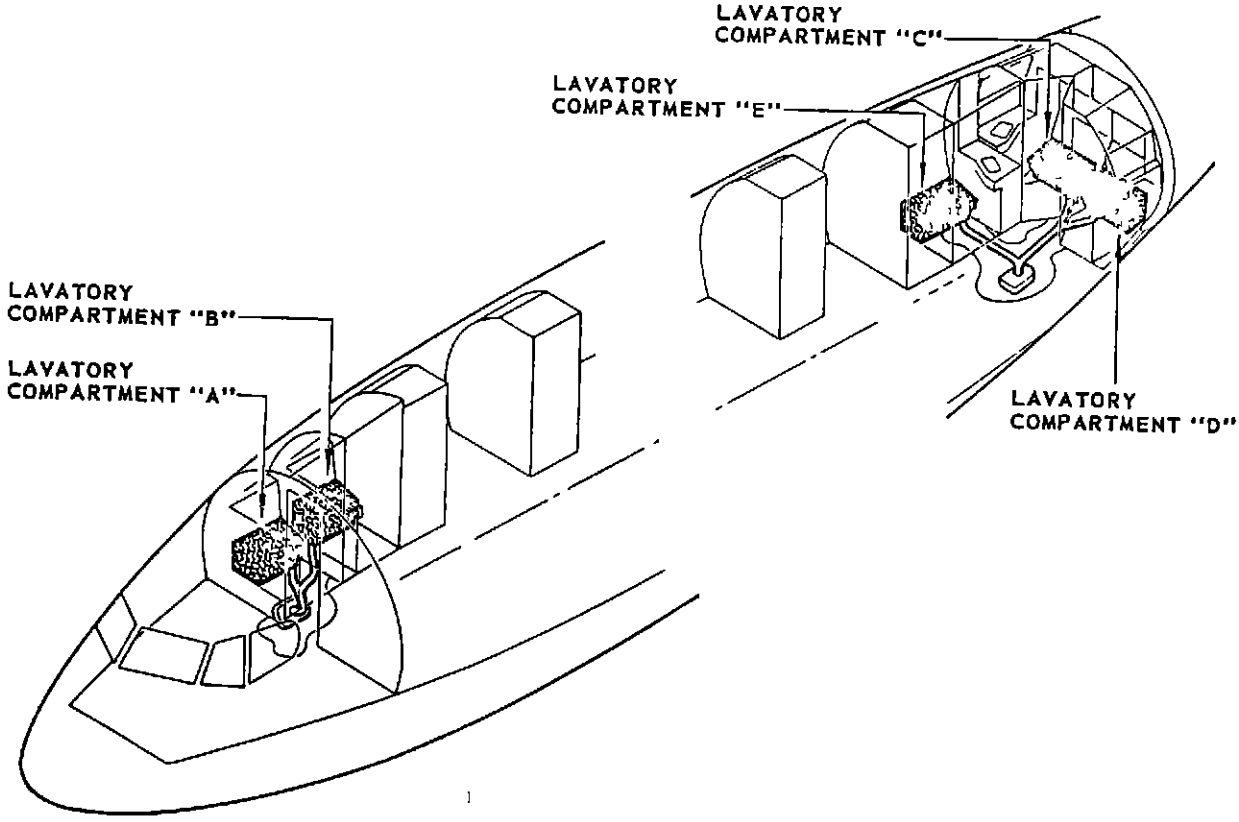
2. Toilet Shroud Assembly

A. The toilet decorative shroud covers the toilet waste tank top and provides attachemnt for the seat and toilet bowl cover assembly. The shroud is formed from a single piece of stain proof, flame resistant Royalite. It is attached to the waste tank top with countersunk screws. (See figure 3.)

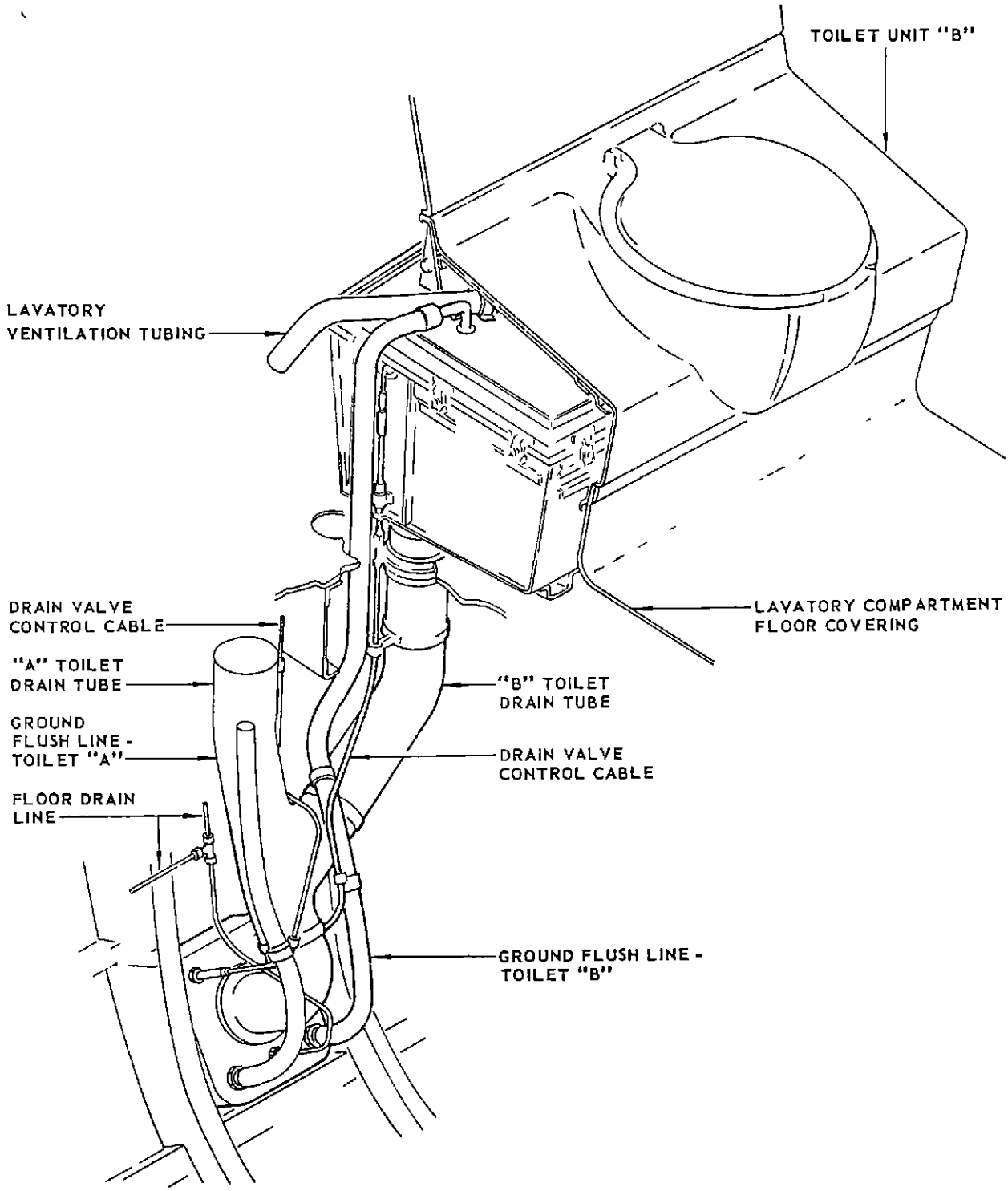
3. Toilet Assembly Flushing Components

A. The toilet bowl, which is mounted on the waste tank top, is manufactured of stainless steel. The lower part of the bowl is closed off by a removable neoprene restrictor which serves as a sight trap and prevents splash-back. The bowl interior is polished for ease of cleaning and contains large nozzles to direct the flow of flushing fluid for proper cleansing action. (See figure 3.)

B. The tank top, in each of toilets "A", "B", "C" and "D", is manufactured from marine plywood with a stainless steel facing on both sides. The tank top of toilet "E" is manufactured of fiberglas. A ground flush line is attached to the underside of the tank top. This line is perforated to rinse the walls of the waste tank and the underside of the top during the ground flush operation. (See figures 3 and 4.)



Toilet Systems
Figure 1 (Sheet 1 of 2)


TOILET UNIT "B"
LAVATORY VENTILATION TUBING
DRAIN VALVE CONTROL CABLE
"A" TOILET DRAIN TUBE
GROUND FLUSH LINE - TOILET "A"
FLOOR DRAIN LINE
LAVATORY COMPARTMENT FLOOR COVERING
"B" TOILET DRAIN TUBE
DRAIN VALVE CONTROL CABLE
GROUND FLUSH LINE - TOILET "B"

C. A filter assembly is suspended from the tank top into the waste tank. The assembly consists of a stack of flat wheel-shaped discs, each separated by a spacer. The thickness of the spacer determines the degree of filtration. A rod, holding knife-like stationary cleaning blades, is mounted beside the stack of filter discs. The blades extend into the slots between the discs to the inside edge of each disc rim. When the filter is turned through a complete revolution, all foreign particles are combed out of the slots by the cleaner blades. The filter is driven at 4 rpm by the pump motor and will filter particles down to 300 microns. (See figure 4.)

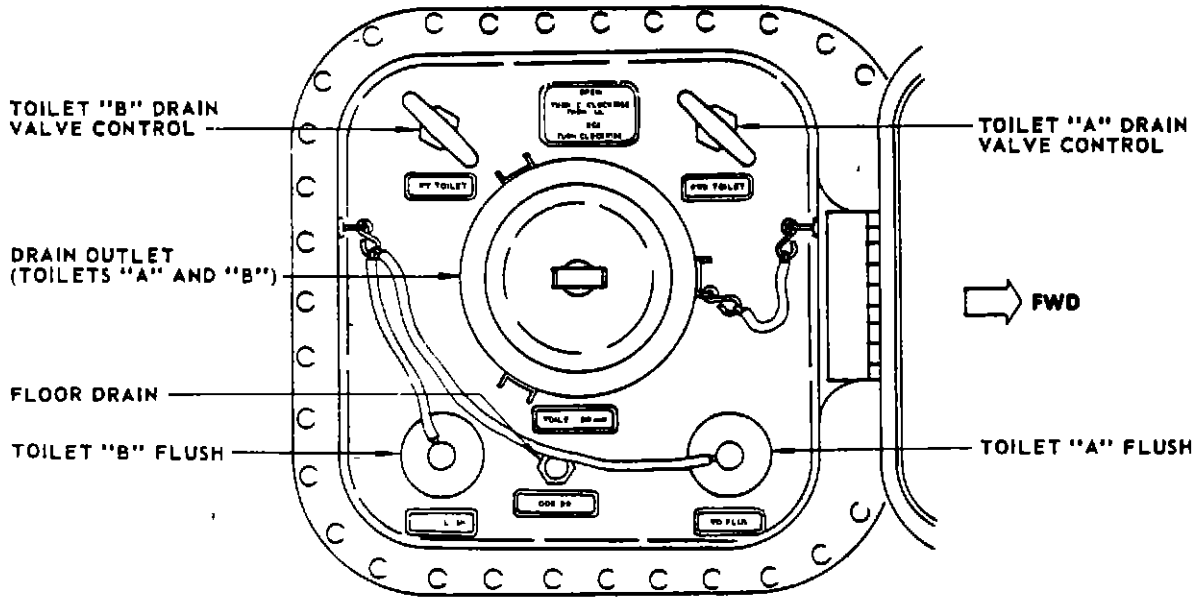
D. A motor-pump assembly is located on the upper side of the tank top, just behind the bowl. The assembly drives the filter and pumps the flushing fluid to the toilet bowl during the timer-controlled flushing cycle. The impeller type pump is self-priming, of light weight and is fitted with a neoprene impeller. The motor operates on 100-volt d c power, is reversible and does not require lubrication. The motor and pump are mounted on a plate to ensure proper alignment. The plate is shock-mounted to the tank top.

E. A timer assembly, located on the upper surface of the tank top behind the rear shroud support, operates on 115-volt, 400 cycle current. The timer rectifies the 115-volt alternating current to 100-volt direct current to operate the various electrical components of the flushing system. (See figure 5.)

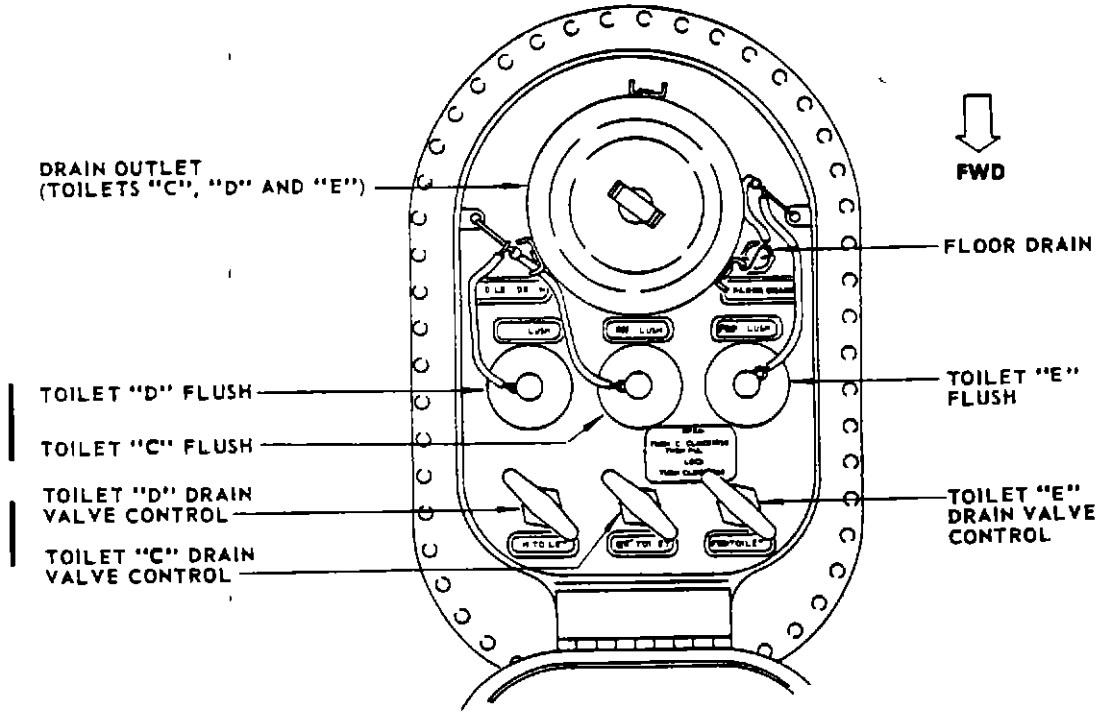
F. A flush switch, located on the cabinet adjacent to the toilet unit, furnishes the momentary pulse to start the timer. (See figure 5.)

G. A safety switch, located behind the toilet bowl, opens the flushing circuit when the shroud assembly is removed. (See figure 5.)

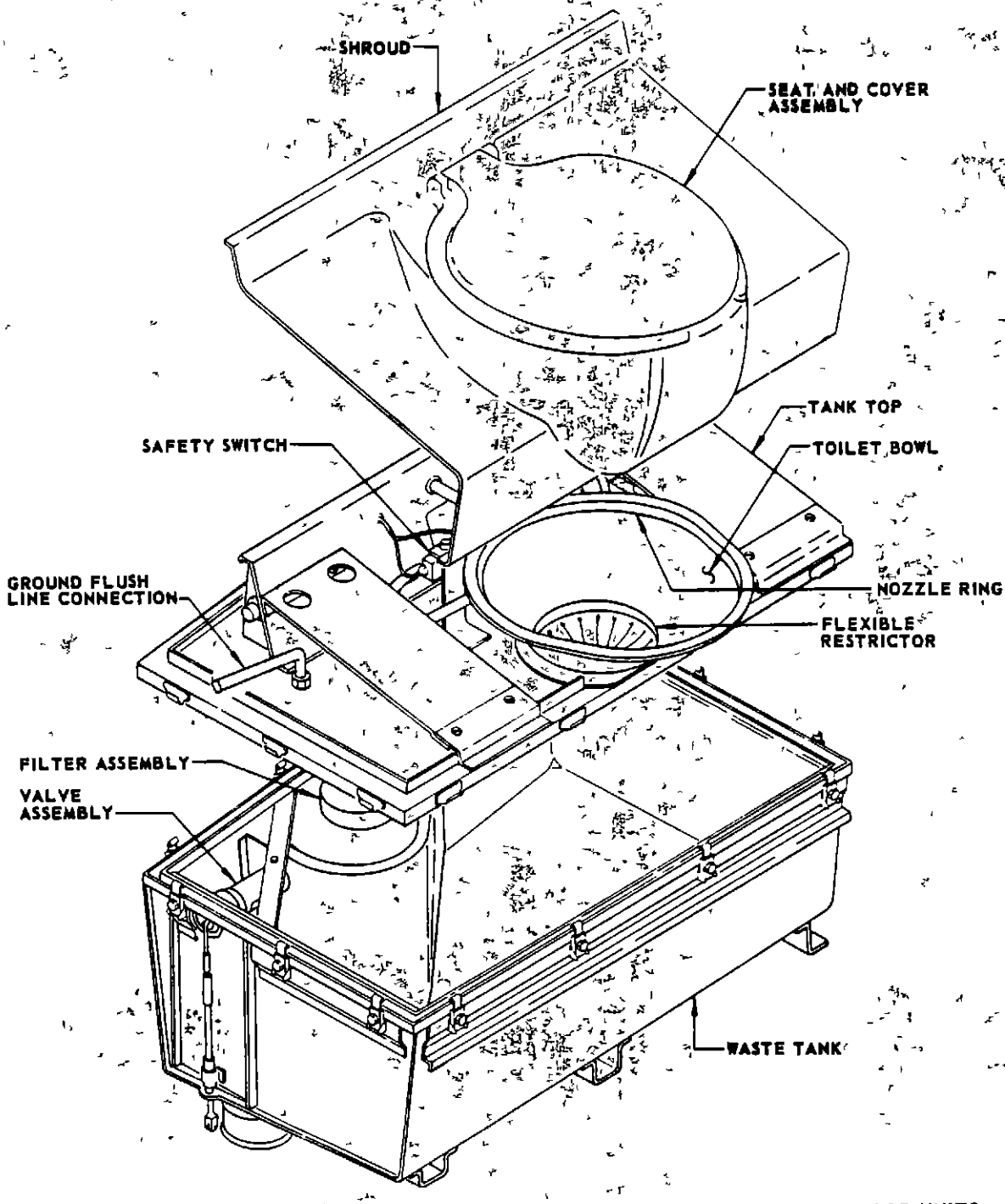
H. A pump safety switch is installed in the "E" toilet circuit to prevent damage to the pump. This pressure-operated switch is located in the toilet flush line downstream of the pump outlet. If the waste tank is dry, at the start of a flushing cycle, the switch will remain open to stop the pump motor after 2 seconds. The pump motor cannot be operated again until the timer has run out, thus limiting pump operation to 2 seconds in any 15 second cycle. Normally, with the waste tank properly charged, fluid pressure will cause the safety switch to close and maintain current flow to the pump motor after the 2-second timer switch opens. (See figure 5.)



FWD SERVICE PANEL
(VIEW FROM GROUND)

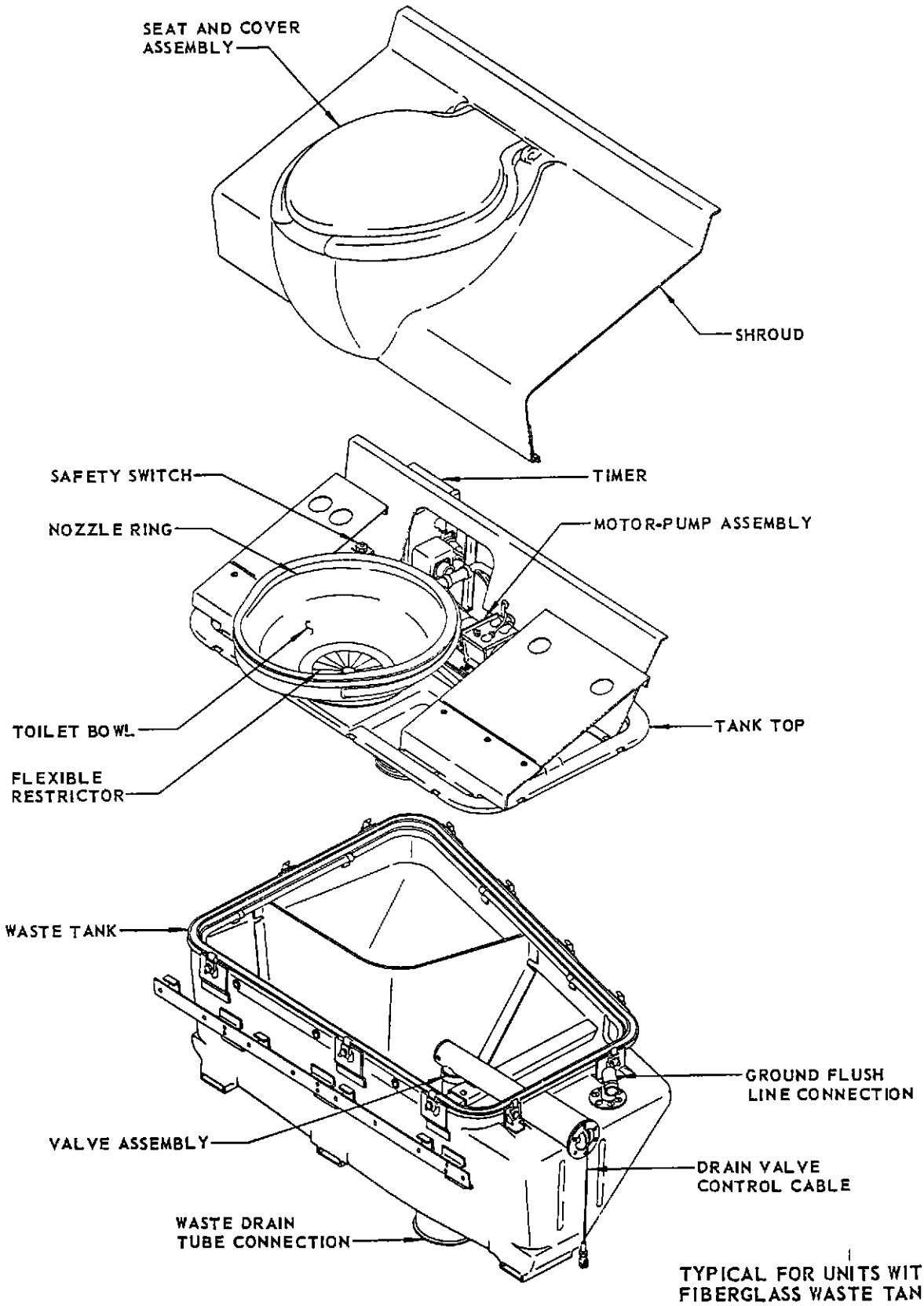


AFT SERVICE PANEL
(VIEW FROM GROUND)

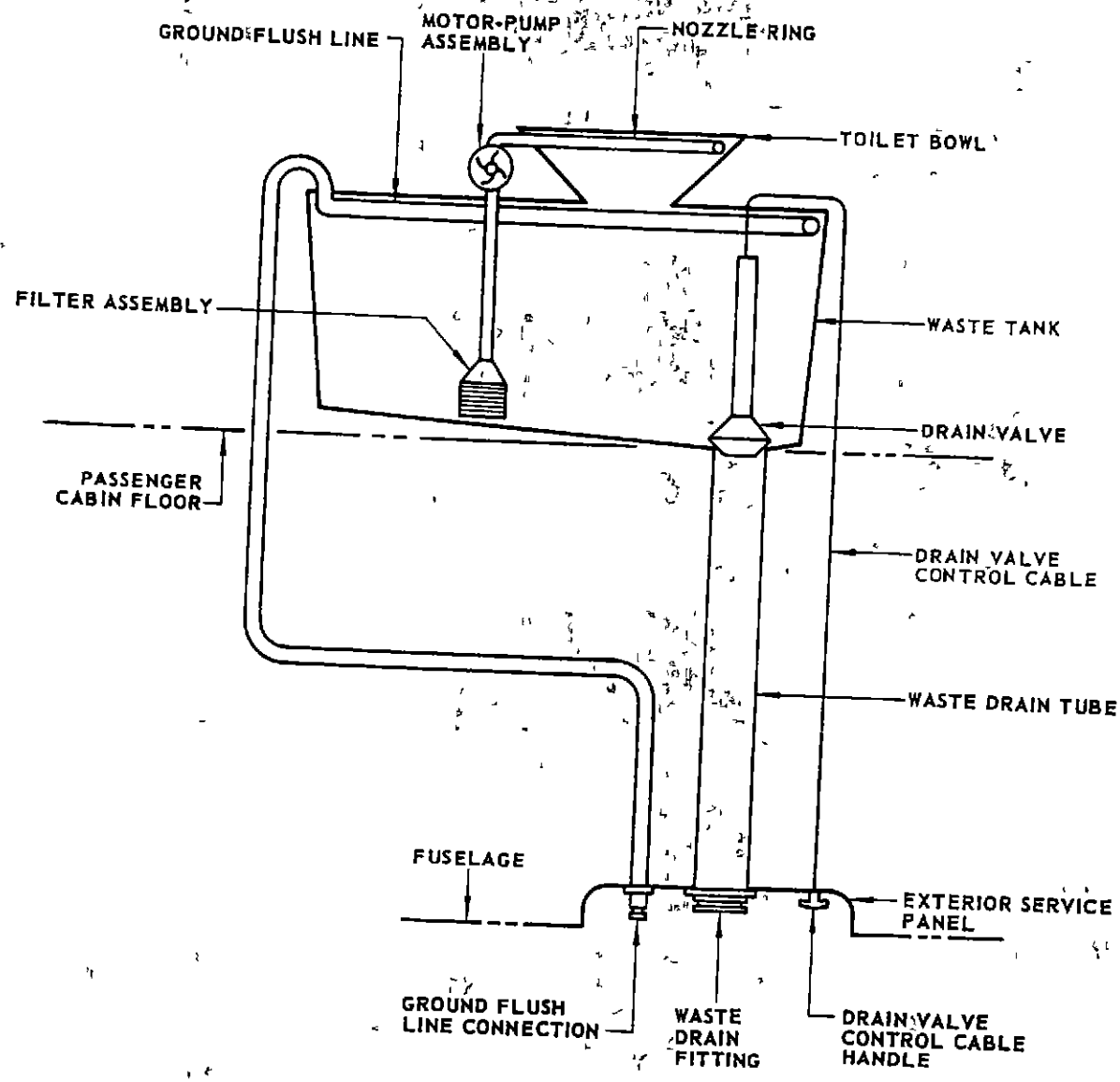


TYPICAL FOR UNITS WITH STAINLESS STEEL WASTE TANKS

Toilet Unit
Figure 3 (Sheet 1)



TYPICAL FOR UNITS WITH FIBERGLASS WASTE TANKS



Toilet System Schematic
Figure 4

4. Toilet Waste Tank Assembly

A. The toilet waste tank in each of toilets "A", "B", "C" and "D" is manufactured of stainless steel. The toilet waste tank of toilet "E" is manufactured of fiberglas. The tank has a capacity of 17 gallons and is fitted with a bulb-shaped, spring-loaded drain valve. The top edges of the waste tank are formed into a retaining channel to receive a specially designed gasket. This gasket forms a seal between the tank and the tank top. (See figure 3.)

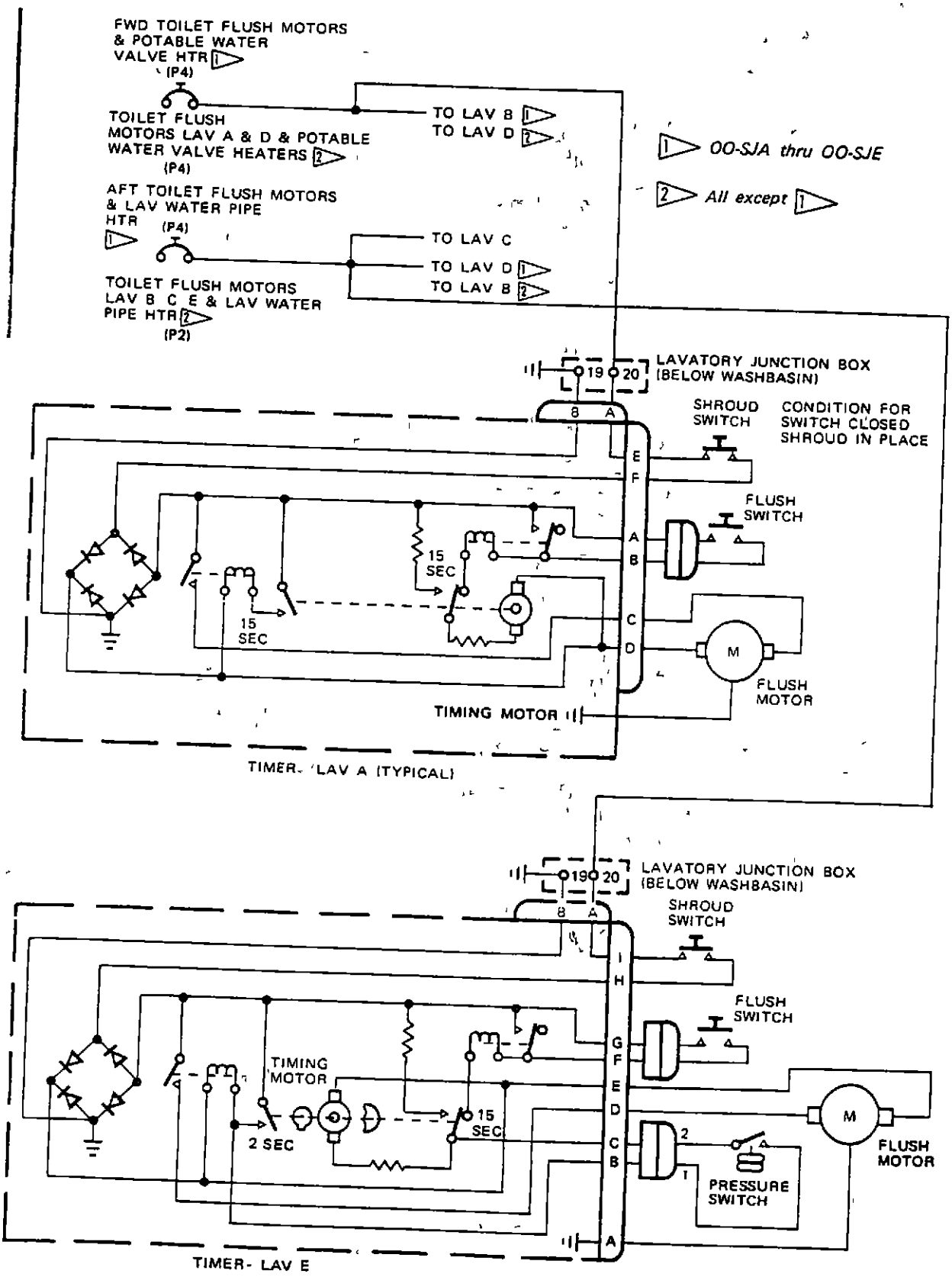
B. The drain valve, when fully open, permits unrestricted passage of large masses of sewage. In the closed position, it forms a positive seal at all altitudes normally encountered. The valve is made up of stainless steel, chemical resistant neoprene and plastics. It is self-closing and does not require lubrication. The valve is opened by pulling a handle on its related exterior service panel. (See figure 4)

5. Exterior Service Panels

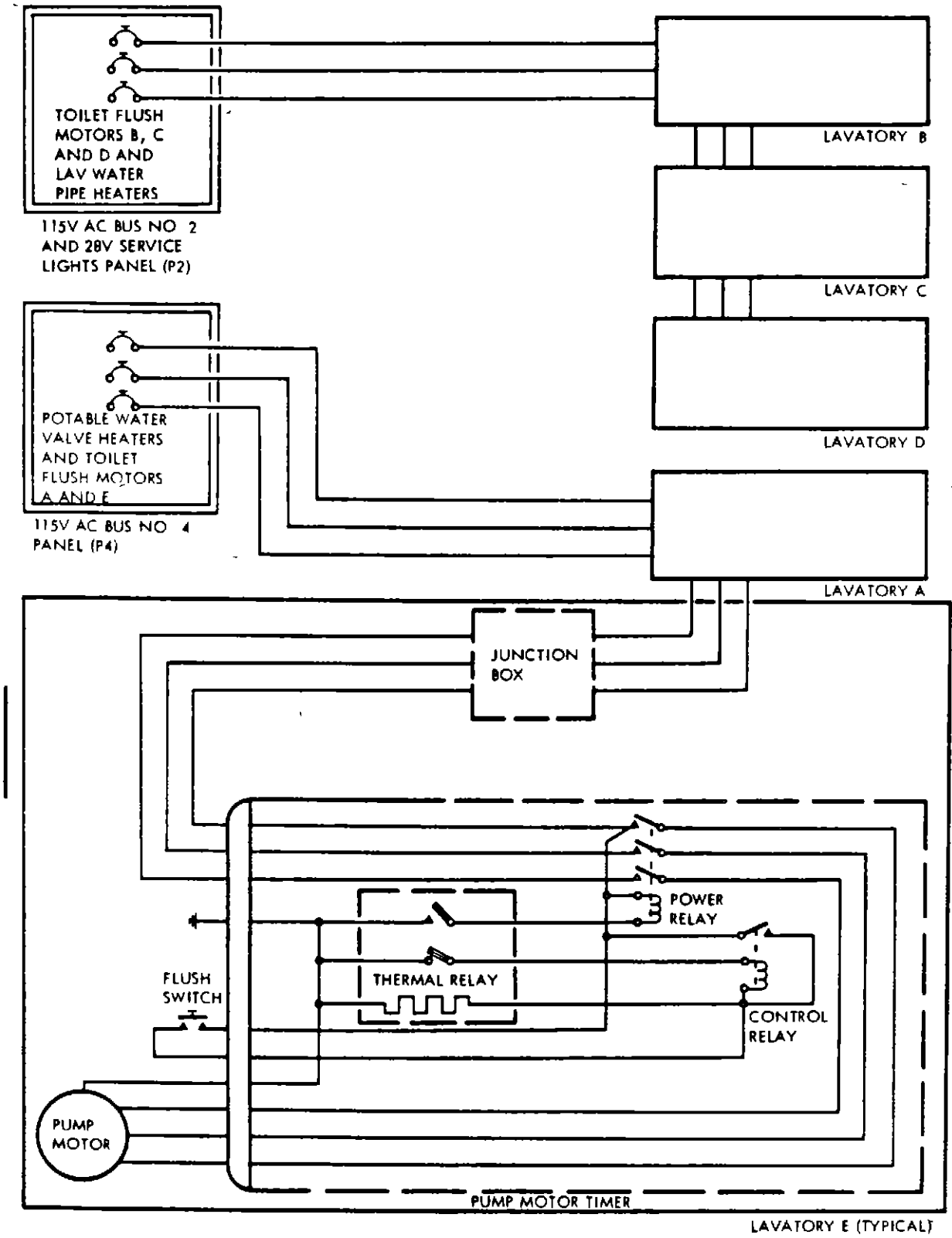
A. The forward exterior service panel contains a 4-inch waste drain tube, two drain valve control cable handles, two ground flush line connections and a floor drain outlet. The waste drain tube is common to both of toilets "A" and "B", but each has its separate drain valve control handle and ground flush connection The floor drain outlet allows drainage of any water which may be spilled on the floor of lavatory compartments "A" and "B". This drain acts as a safeguard against water spillage flowing through the floor onto the electronic equipment which is located in the lower fuselage in this area. (See figure 2.)

B The aft exterior service panel contains a 4-inch waste drain tube, three drain valve control handles, three ground flush line connections, and a floor drain outlet The waste drain tube is common to toilets "C", "D", and "E". Each toilet has its separate drain valve control handle and ground flush connection. The floor drain outlet allows drainage of any water which may be spilled on the floor of lavatory compartments "C", "D", and "E".

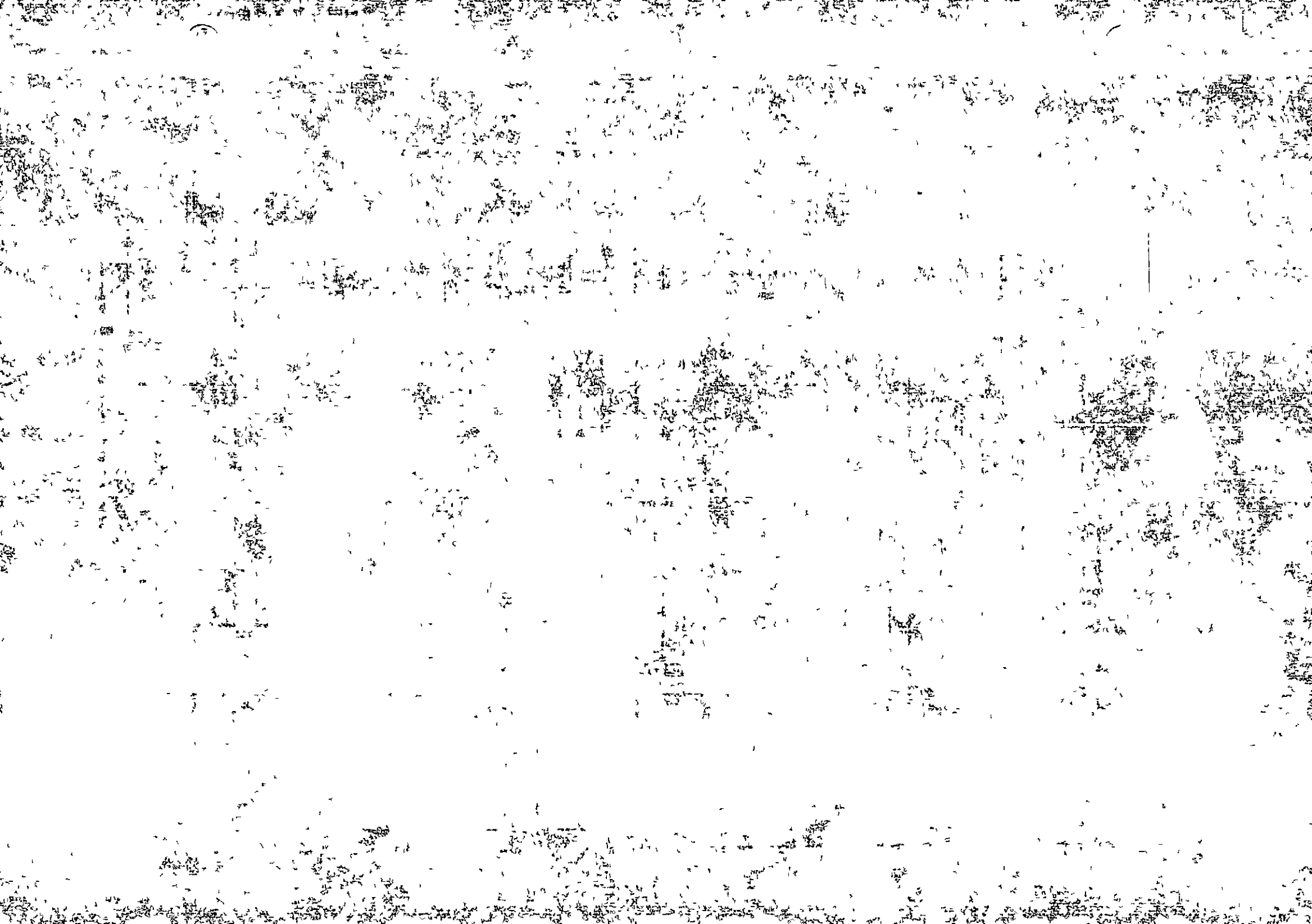
C The waste drain tube in each panel is covered with a self-locking cap. A small petcock is located in the center of each cap to check for, and bleed off, any liquid which may be present in the drain tube prior to removing the cap. Individual self-locking caps are also provided for the ground flush line connections. Each exterior service panel is provided with a cover secured by two quick-release latches.



Toilet Flushing System Circuit
Figure 5 (Sheet 1)



Toilet Flushing System Circuit
Figure 5 (Sheet 2)



TOILET SYSTEMS - TROUBLE SHOOTING

1. General

   A. These procedures apply to the forward or aft toilet system. Trouble shooting of the toilet flushing system is outlined in the trouble shooting chart, paragraph 3. Procedures for correction of problems not directly related to the flushing system are described in paragraph 2.

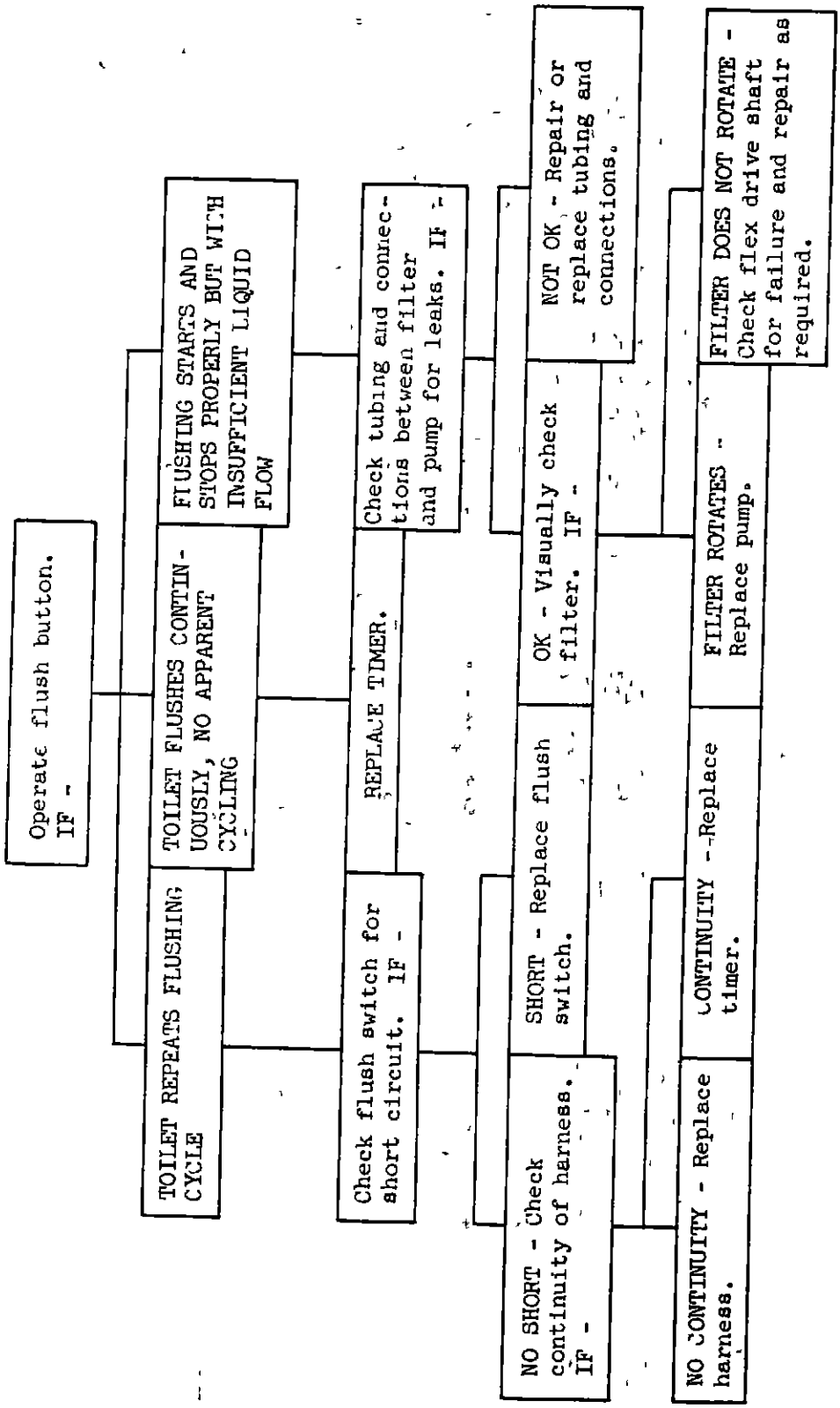
   B. CAUTION. WHEN TROUBLE SHOOTING THE TOILET FLUSHING SYSTEM, DO NOT OPERATE THE FLUSH PUMP WHEN THE TANK IS DRY.

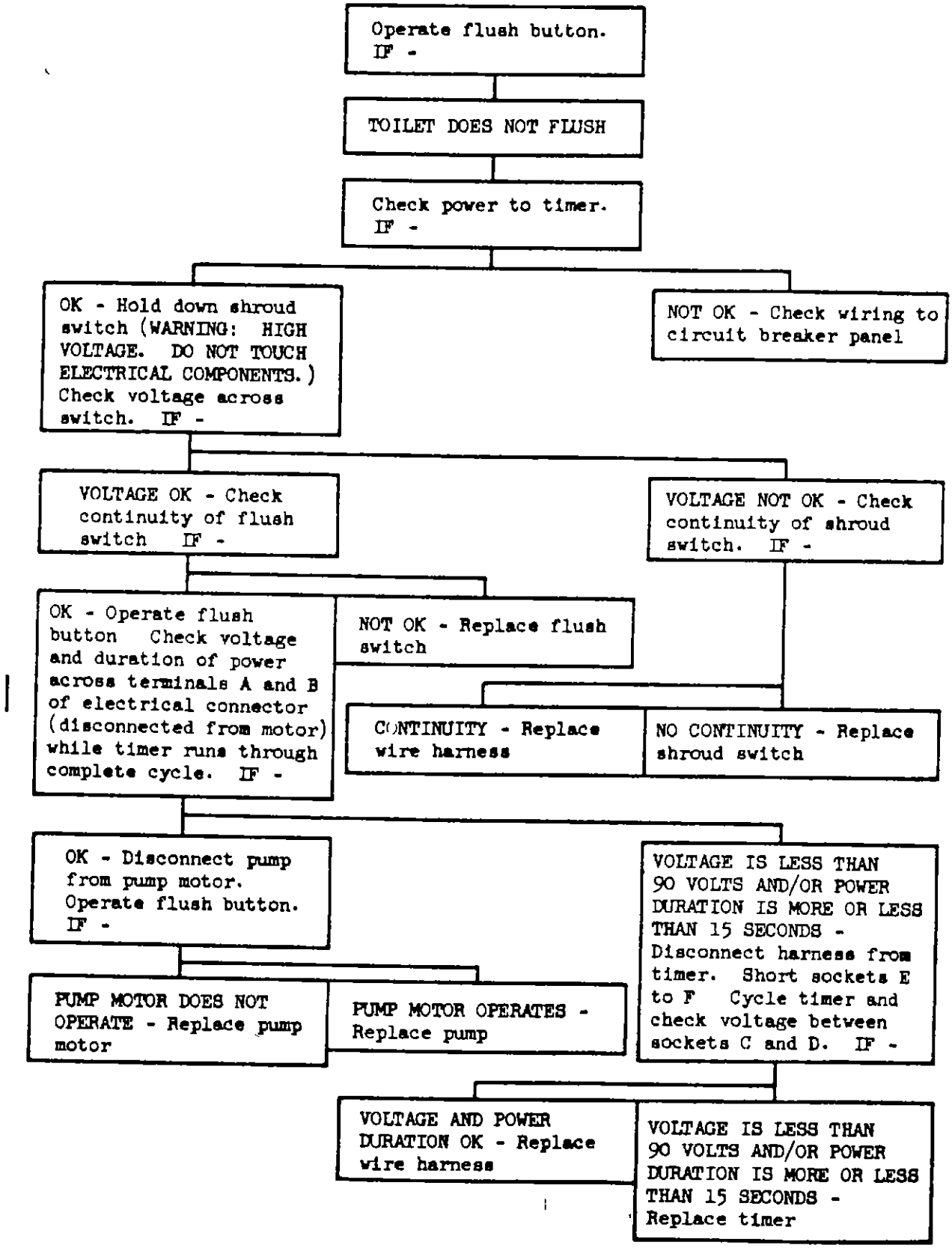
2. Toilet System - Trouble Shooting

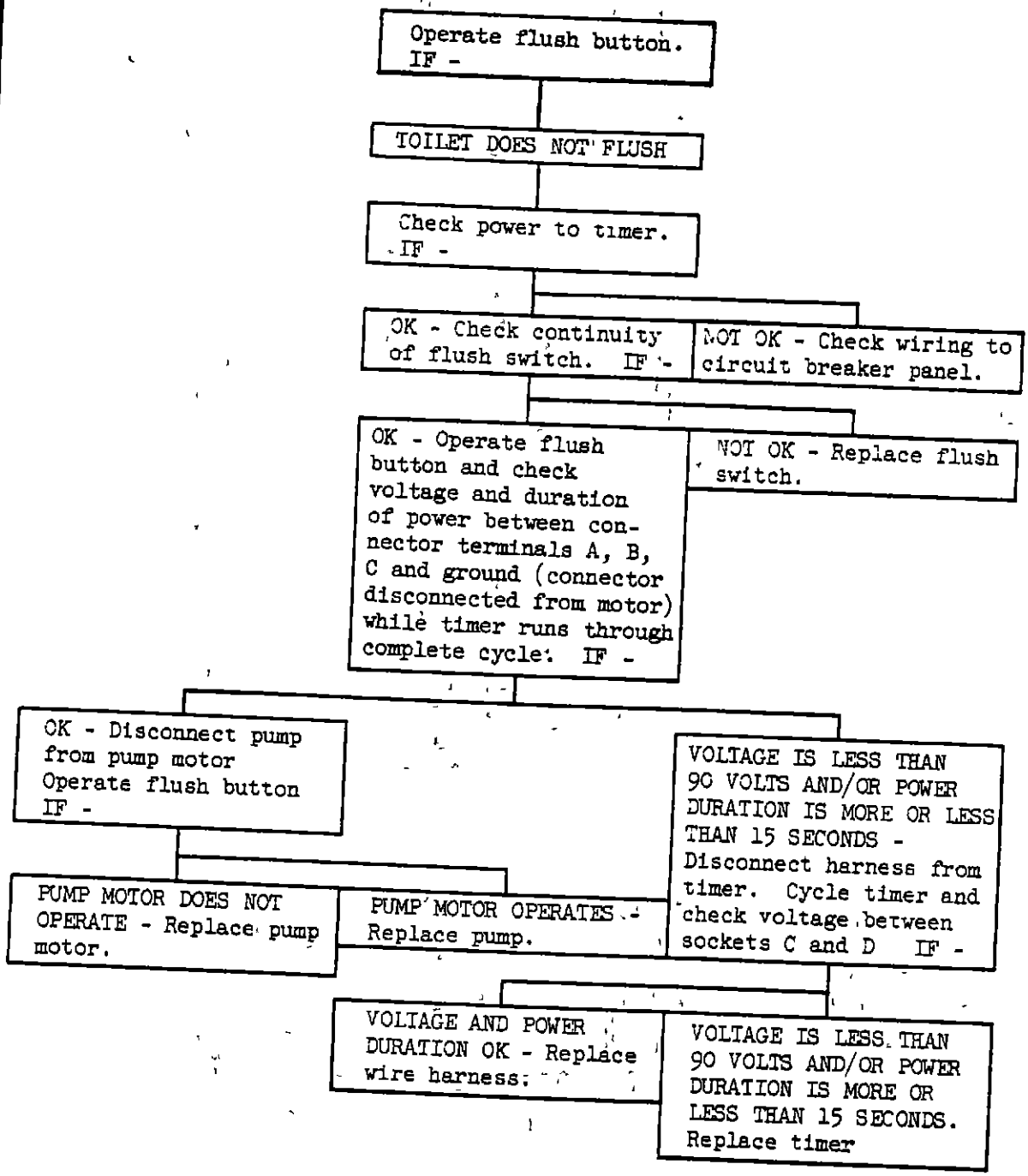
   A An unpleasent odor from the toilet unit indicates improper servicing of the toilet system To correct, drain and flush the toilet system and insure that recommended service procedure is being followed, including use of proper chemical solution.

   B. If liquids are present in the drain line prior to opening the drain valve a damaged or obstructed drain valve is indicated. Remove waste tank cover and check the drain valve. If valve is obstructed, remove obstruction: if valve is damaged, replace valve.

3 Toilet Flushing System Trouble Shooting Chart


Operate flush button. IF -
TOILET REPEATS FLUSHING CYCLE
TOILET FLUSHES CONTINUOUSLY, NO APPARENT CYCLING
FLUSHING STARTS AND STOPS PROPERLY BUT WITH INSUFFICIENT LIQUID FLOW
Check flush switch for short circuit. IF -
REPLACE TIMER.
Check tubing and connections between filter and pump for leaks. IF -
NO SHORT - Check continuity of harness. IF -
SHORT - Replace flush switch.
OK - Visually check filter. IF -
NOT OK - Repair or replace tubing and connections.
NO CONTINUITY - Replace harness.
CONTINUITY - Replace timer.
FILTER ROTATES - Replace pump.
FILTER DOES NOT ROTATE - Check flex drive shaft for failure and repair as required.


Operate flush button. IF -
TOILET DOES NOT FLUSH
Check power to timer. IF -
OK - Hold down shroud switch (WARNING: HIGH VOLTAGE. DO NOT TOUCH ELECTRICAL COMPONENTS.) Check voltage across switch. IF -
NOT OK - Check wiring to circuit breaker panel
VOLTAGE OK - Check continuity of flush switch IF -
VOLTAGE NOT OK - Check continuity of shroud switch. IF -
OK - Operate flush button Check voltage and duration of power across terminals A and B of electrical connector (disconnected from motor) while timer runs through complete cycle. IF -
NOT OK - Replace flush switch
CONTINUITY - Replace wire harness
NO CONTINUITY - Replace shroud switch
OK - Disconnect pump from pump motor. Operate flush button. IF -
VOLTAGE IS LESS THAN 90 VOLTS AND/OR POWER DURATION IS MORE OR LESS THAN 15 SECONDS - Disconnect harness from timer. Short sockets E to F Cycle timer and check voltage between sockets C and D. IF -
PUMP MOTOR DOES NOT OPERATE - Replace pump motor
PUMP MOTOR OPERATES - Replace pump
VOLTAGE AND POWER DURATION OK - Replace wire harness
VOLTAGE IS LESS THAN 90 VOLTS AND/OR POWER DURATION IS MORE OR LESS THAN 15 SECONDS - Replace timer


Operate flush button. IF -
TOILET DOES NOT FLUSH
Check power to timer. IF -
OK - Check continuity of flush switch. IF -
NOT OK - Check wiring to circuit breaker panel.
OK - Operate flush button and check voltage and duration of power between connector terminals A, B, C and ground (connector disconnected from motor) while timer runs through complete cycle. IF -
NOT OK - Replace flush switch.
OK - Disconnect pump from pump motor Operate flush button IF -
VOLTAGE IS LESS THAN 90 VOLTS AND/OR POWER DURATION IS MORE OR LESS THAN 15 SECONDS - Disconnect harness from timer. Cycle timer and check voltage between sockets C and D IF -
PUMP MOTOR DOES NOT OPERATE - Replace pump motor.
PUMP MOTOR OPERATES - Replace pump.
VOLTAGE AND POWER DURATION OK - Replace wire harness.
VOLTAGE IS LESS THAN 90 VOLTS AND/OR POWER DURATION IS MORE OR LESS THAN 15 SECONDS. Replace timer

TOILET ASSEMBLY FLUSHING COMPONENTS - MAINTENANCE PRACTICES

1. General

   A. Toilet flushing components, with the exception of the filter and timer, are accessible by removing the shroud assembly. See 38-2-1.

   B. For access to the filter or to improve the accessibility of any of the flushing components, the tank top may be removed with the components in place. See "Waste Tank Assembly - Maintenance Practices," 38-2-41. For access to the timer remove the bottom shelf of the cabinet in back of the toilet unit.

2. Removal/Installation Motor and Pump Assembly

   A. Remove Motor and Pump Assembly

      (1) Open flush motors circuit breakers.

         (a) Open circuit breaker at a-c bus No.2 circuit breaker panel (P2) for toilets "B,""C" and "D" and open circuit breaker panel at a-c bus No.4 circuit breaker panel (P4) for toilet "A" and "E".

      (2) Disconnect electrical terminals at motor. (See figure 201.)

      (3) Remove shroud supports.

      (4) Disconnect pump inlet tubing.

      (5) Disconnect pump outlet tubing.

      (6) Disconnect filter drive shaft.

      (7) Remove spring tie-downs.

(8) Remove motor and pump assembly with mounting plate intact.

NOTE: To remove either motor or pump from mounting plate, disconnect shaft at coupling and remove mounting fasteners.

B. Install Motor and Pump Assembly (See figure 201.)

(1) Position mounting plate on tank top.

(2) Install spring tie-downs.

(3) Connect flexible shaft.

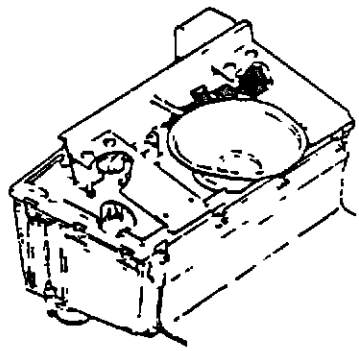
(4) Connect pump discharge tubing.

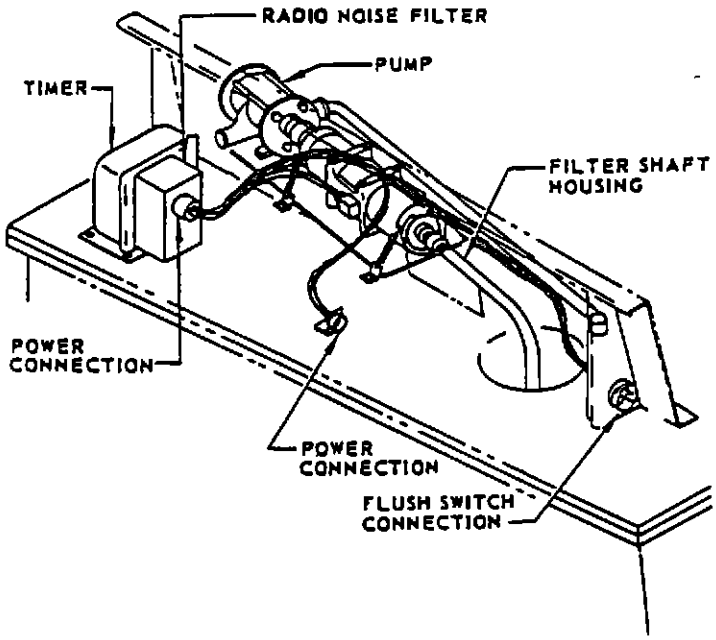
(5) Connect pump inlet tubing.

(6) Install shroud supports.

(7) Install electrical connector to motor.

(8) Close toilet flush motors circuit breaker.





Motor and Pump Installation
Figure 201

3. Removal/Installation Timer

A. Remove Timer

(1) Remove bottom shelf of cabinet behind toilet unit.

(2) Open flush motors circuit breakers

(a) Open circuit breaker at a-c bus No.2 circuit breaker panel (P2) for toilets "B,""C" and "D" and open circuit breaker panel at a-c bus No.4 circuit breaker panel (P4) for toilet "A" and "E".

(3) Disconnect 115 volt electrical connector at timer. (See figure 202.)

(4) Disconnect harness at timer.

(5) Remove screws that attach timer at base and remove timer.

B. Install Timer (See figure 202.)

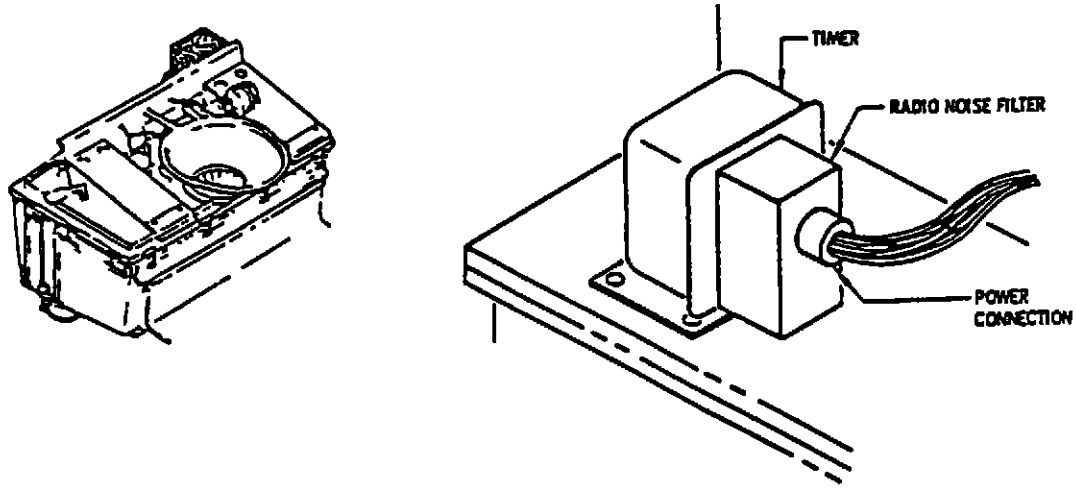
(1) Position timer on tank top and install screws.

(2) Connect harness.

(3) Connect 115 volt ac at timer.

(4) Close toilet flush motors circuit breaker.

(5) Replace bottom shelf of cabinet behind toilet unit.



Timer Installation
Figure 202

4. Removal/Installation Filter (Units with Flexible Shaft)

A. Remove Filter

(1) Remove tank top for access to filter.

(2) Disconnect flexible shaft at filter. (See figure 203.)

(3) Disconnect tubing to pump at filter.

(4) Remove filter.

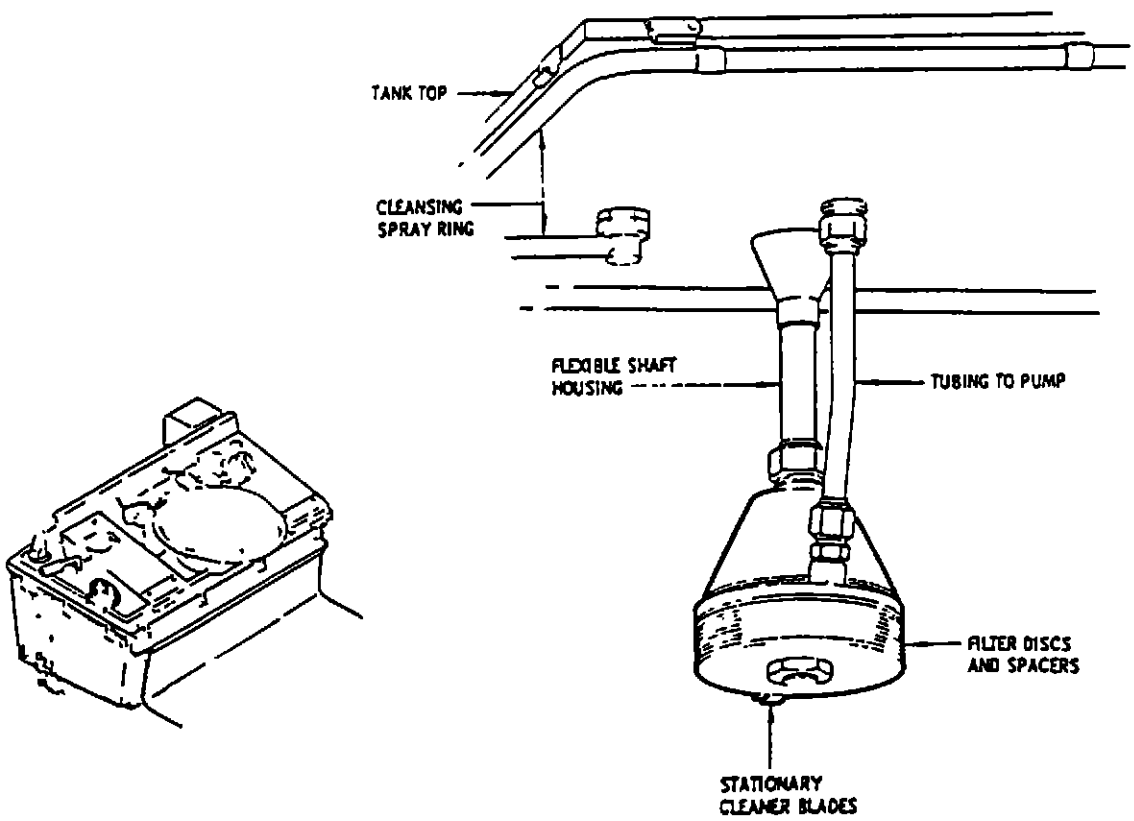
B. Install Filter

(1) Position filter on underside of tank top. (See figure 203.)

(2) Connect tubing.

(3) Connect flexible shaft.

(4) Install tank top on waste tank.



Filter Installation (Flexible Shaft)
Figure 203

5. Removal/Installation Filter (Units with Direct Shaft)

A. Remove Filter

(1) Remove shroud.

(2) Disconnect tube leading to pump. (See figure 204.)

(3) Disconnect filter drive coupling

(4) Remove nuts from attachment studs.

(5) Withdraw filter through aperture in tank top, tilting as necessary to clear any items which may overhang the aperture.

B. Install Filter

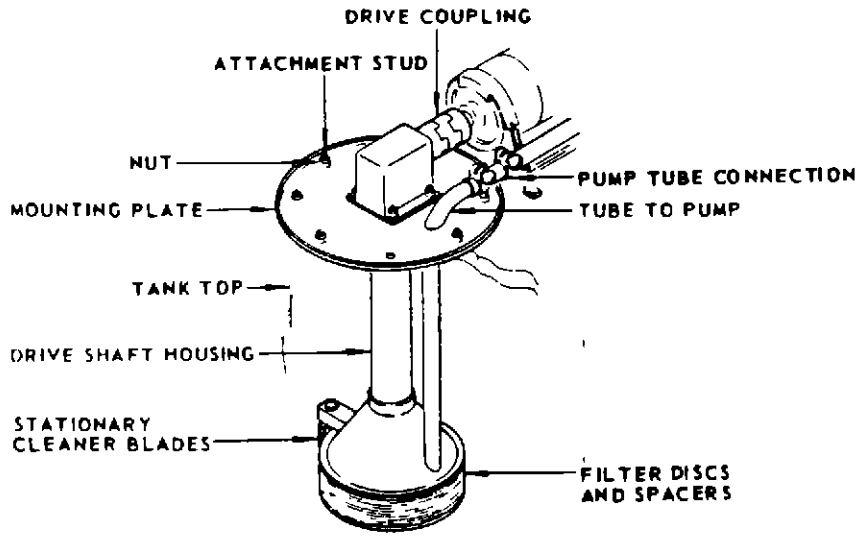
(1) Lower filter through aperture in tank top and position mounting plate on attachment studs (See figure 204.)

(2) Install nuts on attachment studs.

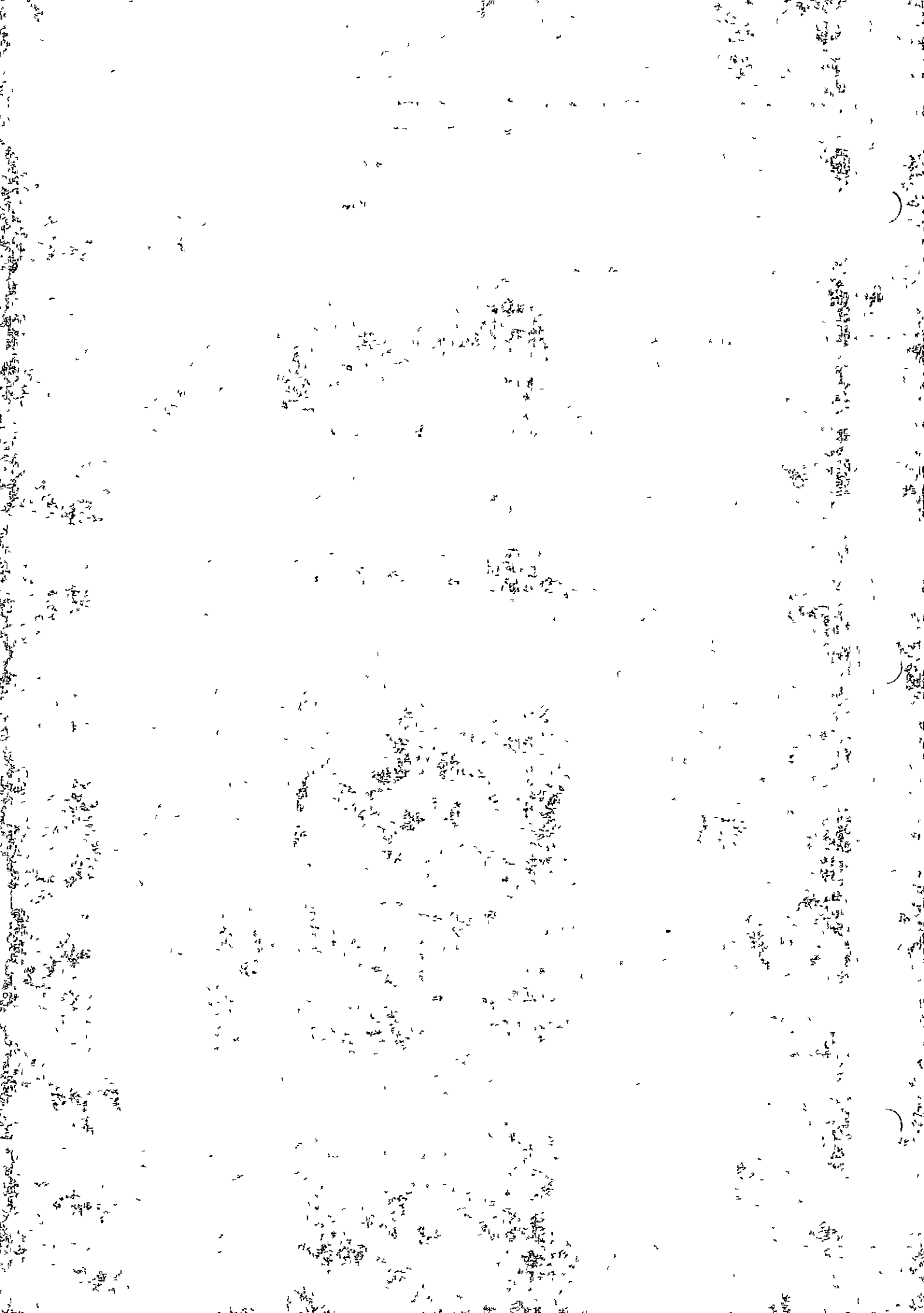
(3) Connect filter drive coupling

(4) Connect tube leading to pump

(5) Replace shroud.



Filter Installation (Direct Shaft)
Figure 204



TOILET WASTE TANK ASSEMBLY - MAINTENANCE PRACTICES

1. Removal/Installation Toilet Waste Tank Top

A. Remove Tank Top (See figure 201.)

(1) Drain and flush waste tank from exterior service panel.

(2) Remove shroud assembly.

(3) Open toilet flush motor circuit breaker.

(a) Open circuit breaker at ac bus No.2 circuit breaker panel (P2) for toilets B,C and D and open circuit breaker panel at ac bus No.4 circuit breaker panel (P4) for toilet A and E.

(4) Remove bottom shelf of cabinet behind toilet unit.

(5) Disconnect 115 volt ac power receptacle at timer.

(6) Disconnect flush switch connection at rear shroud support.

(7) Disconnect exterior flush line.

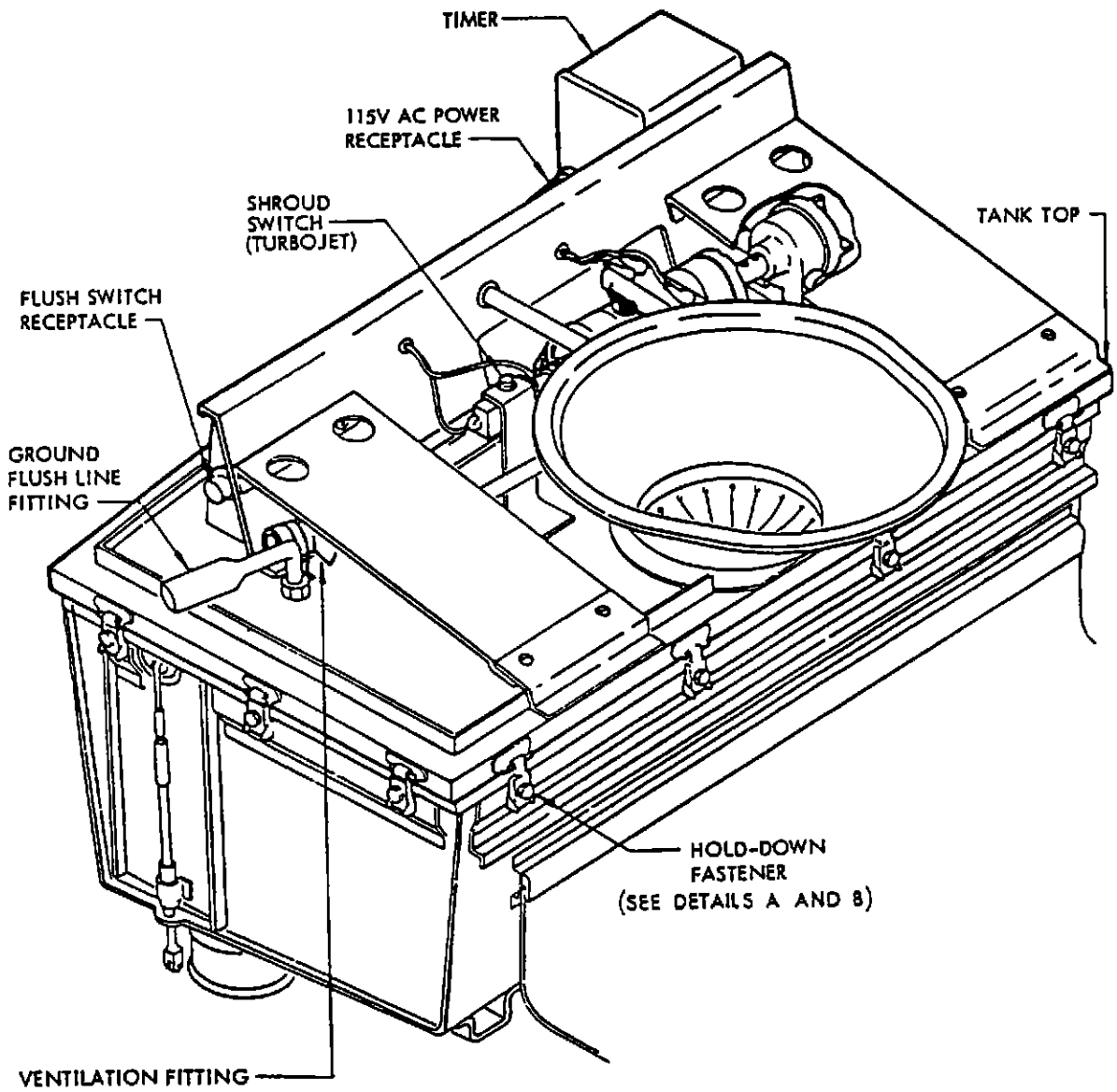
(8) Disconnect vent line.

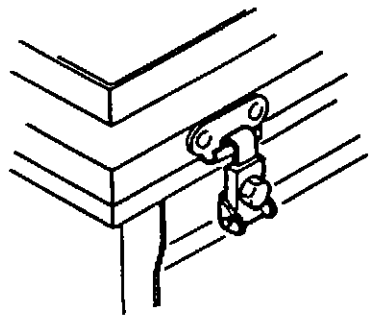
(9) Remove bolt to disconnect bonding jumper from sidewall. Reinstall bolt.

(10) Loosen hold-down fasteners.

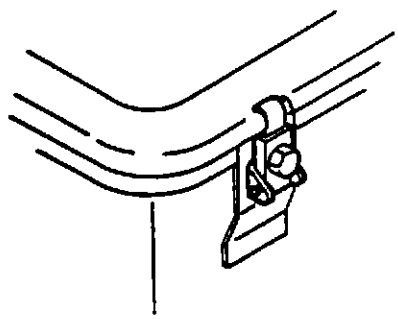
(11) Lift up and out to remove tank top.

NOTE: Due to space limitations some difficulty may be encountered in removing tank tops in lavatory compartments A and B. To remove tank top in lavatory compartment A, lift aft end of top up until the filter clears the upper edge of the tank then lift out top. In lavatory compartment B it may be necessary to dismantle the wall panels on the cabinet in order to remove tank top. The filter can be removed from fiberglass waste tanks without removing the tank top.





DETAIL A
TYPICAL FOR UNITS WITH STAINLESS STEEL WASTE TANKS (AS ILLUSTRATED)



DETAIL B
TYPICAL FOR UNITS WITH FIBERGLAS WASTE TANKS

Toilet Waste Tank Top Installation
Figure 201

B. Install Tank Top

(1) Position tank top on waste tank making sure gasket is seated correctly.

(2) Tighten hold-down fasteners and connect bonding jumper to sidewall.

(3) Connect vent line.

(4) Connect exterior flush line.

(5) Connect flush switch at rear shroud support.

(6) Connect 115 volt ac power receptacle at timer.

(7) Replace bottom shelf of cabinet behind toilet unit.

(8) Close toilet flush motors circuit breaker on ac bus No. 4 circuit breaker panel (P4).

(9) Install shroud assembly.

(10) Add flushing mixture in proper quantity at exterior service panel.

2 Removal/Installation Waste Tank - Forward Toilets (except toilet L on cargo airplanes)

A Remove Waste Tank - Forward Toilets (See figure 202.)

(1) Remove shroud assembly and toilet waste tank top.

(2) Unscrew retaining strips and remove lavatory floor covering.

(3) Disconnect cable to waste drain valve, and remove clamp to disconnect drain tube at bottom of waste tank.

NOTE The cable and the drain tube are accessible in the lower portion of section 41 forward of electronic equipment racks.

(4) Remove bolts that attach tank to floor. (See details A and B, figure 202.)

(5) Remove waste tank.

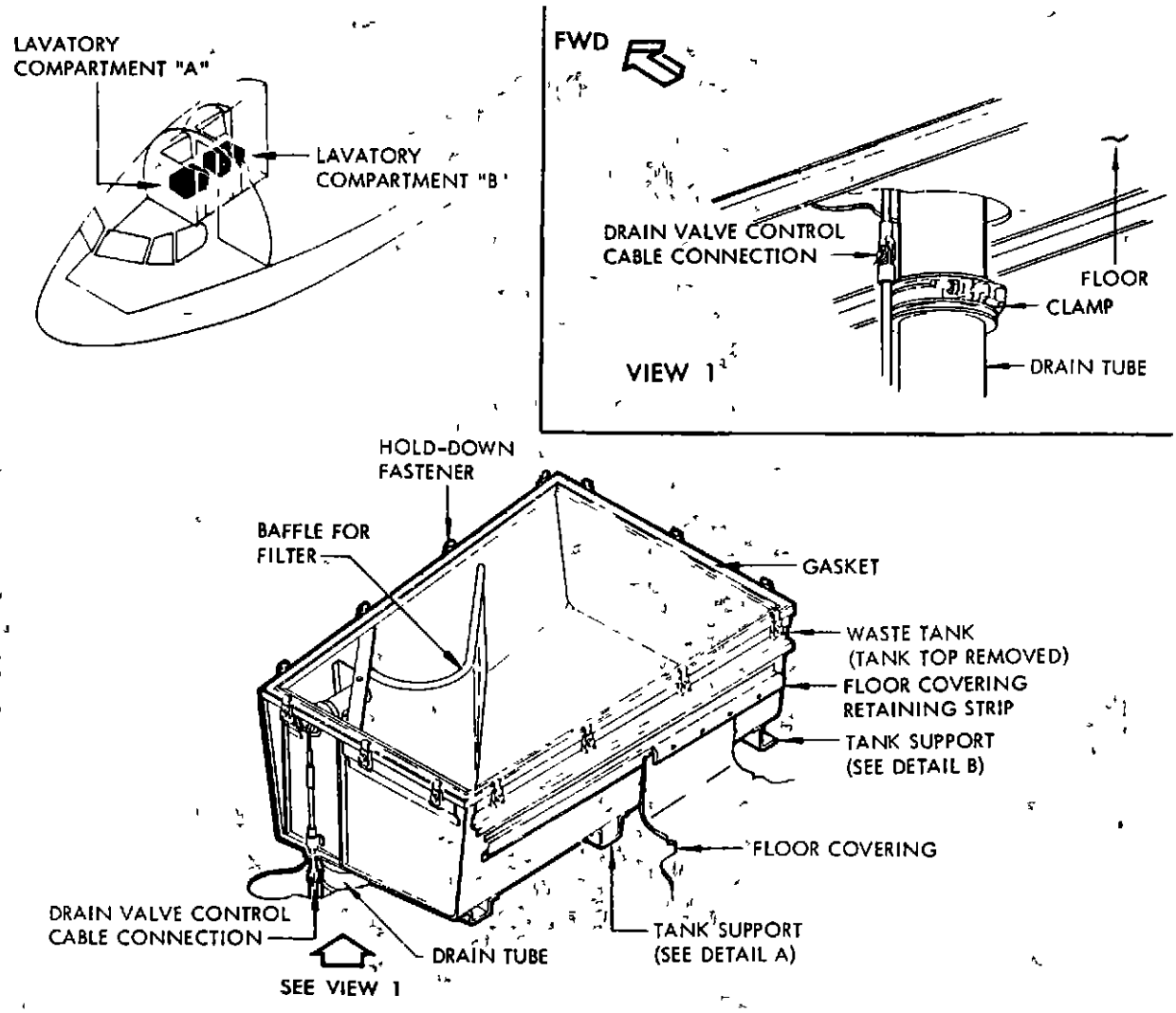
B. Install Waste Tank - Forward Toilets (See figure 202.)

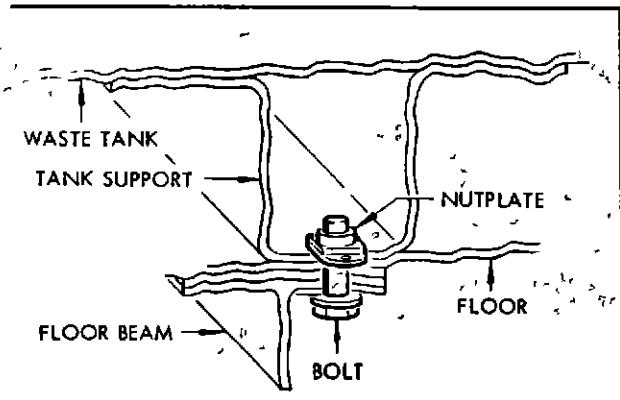
(1) Position waste tank on floor structure.

(2) Install bolts that attach tank to floor.

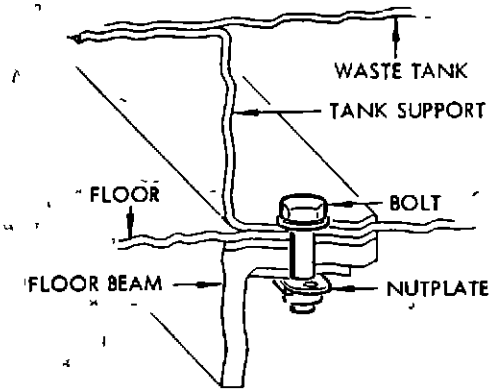
(3) Connect drain tube and waste drain valve cable.

NOTE. The drain tube and drain valve cable are accessible in the lower portion of section 41 forward of the electronic equipment racks.



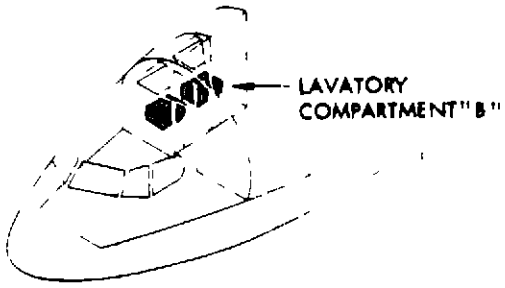


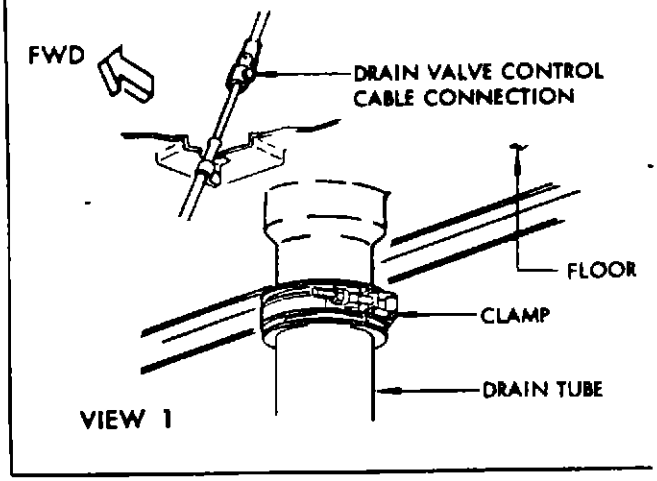
DETAIL A
(TYPICAL TOILETS A AND B)

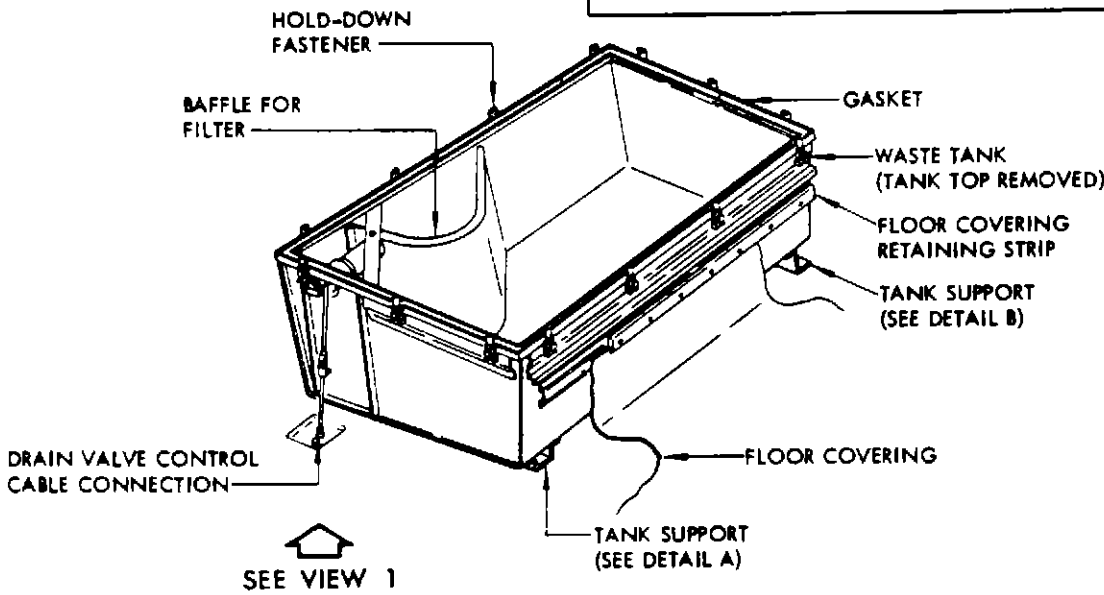


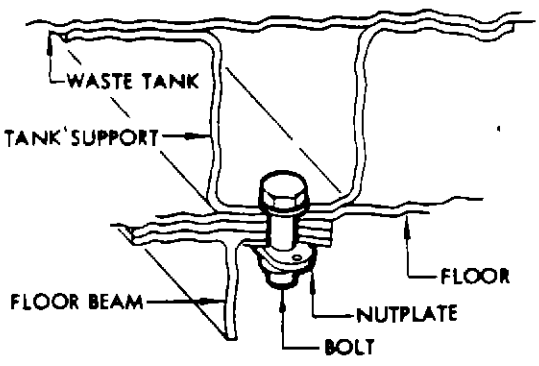
DETAIL B
(TOILET A ONLY)

Forward Waste Tank Installation - Typical
Figure 202 (Sheet 1)

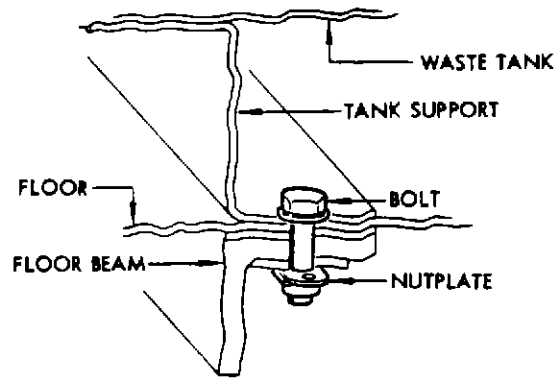








DETAIL A



DETAIL B

(4) Replace floor covering and install screws in retaining strips.

(5) Install toilet waste tank top and shroud assembly.

3 Removal/Installation Waste Tank - Aft Toilets (except toilet E on cargo airplanes)

A Remove Waste Tank - Aft Toilets (See figure 203)

(1) Remove shroud assembly and toilet waste tank top.

(2) Unscrew retaining strips and remove floor covering.

(3) Unscrew and remove floor panel

(4) Disconnect cable to waste drain valve and remove clamp to disconnect drain tube at bottom of waste tank

NOTE. The cable and the drain tube are accessible in the lower portion of section 46 aft of cargo compartment

(5) Remove bolts that attach tank to floor (See detail B, figure 203)

(6) On toilets C and D, slide waste tank forward 2 or 3 inches to disengage rear attachments (See detail A, figure 203.)

(7) Remove waste tank.

B Install Waste Tank - Aft Toilets (See figure 203)

(1) Position waste tank on floor structure

(2) On toilets C and D, slide waste tank aft to engage rear attachments (See detail A, figure 203)

(3) Install bolts that attach tank to floor.

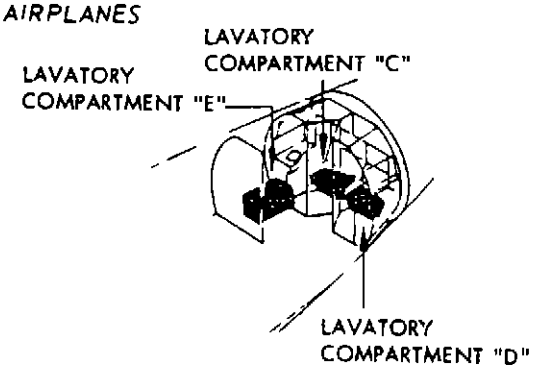
(4) Connect drain valve control cable and waste tank drain tube

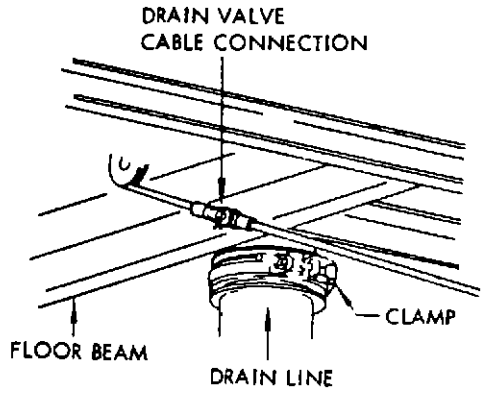
NOTE The cable and the drain tube are accessible in the lower portion of section 46 aft of cargo compartment

(5) Position floor panel and install screws

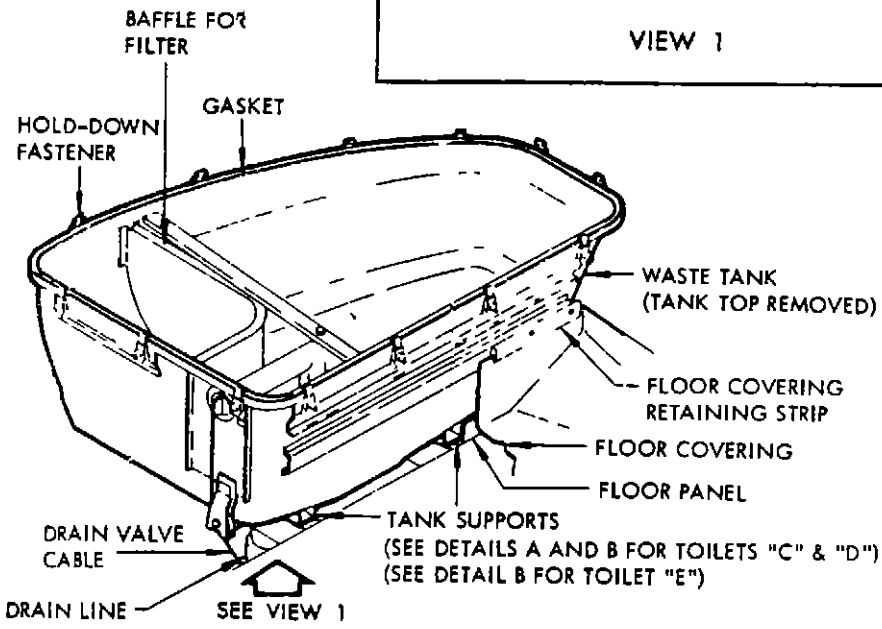
(6) Replace floor covering and install screws in retaining strips

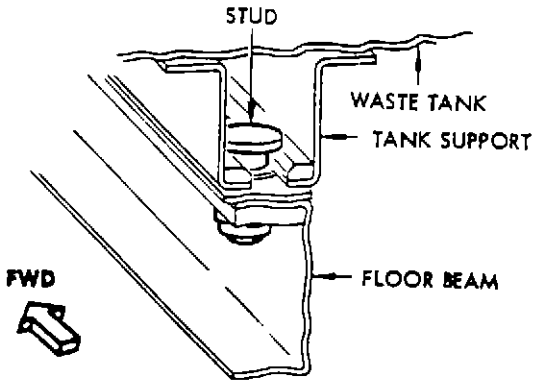
(7) Install toilet waste tank top and shroud assembly





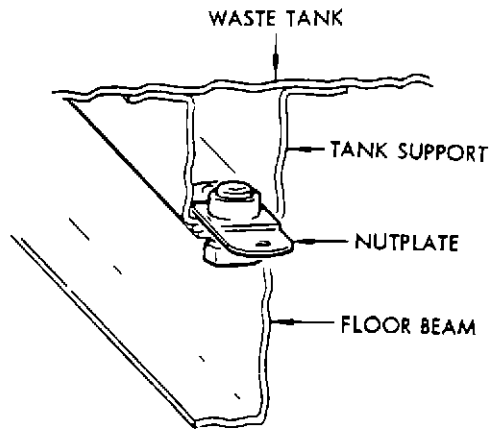
VIEW 1





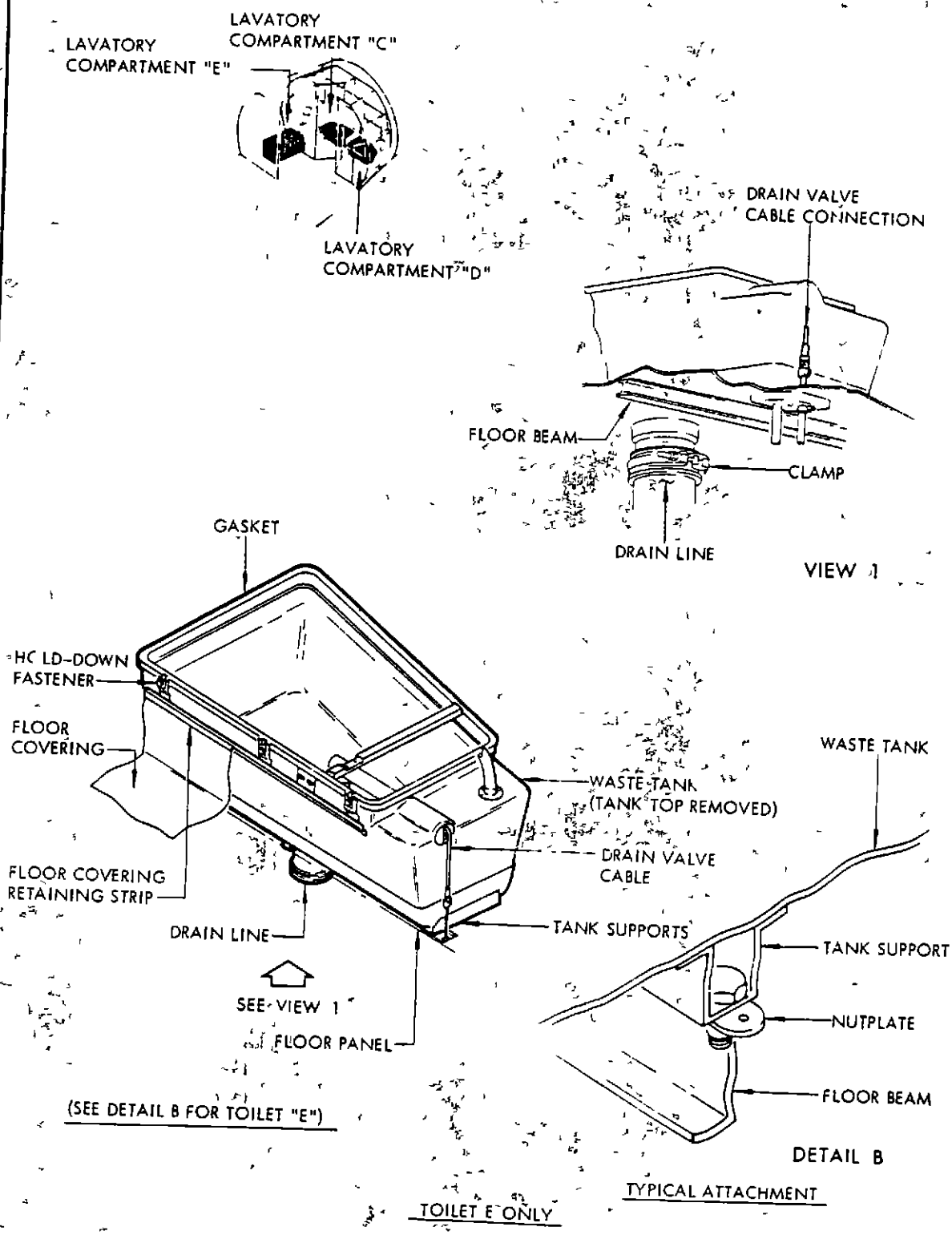
DETAIL A

TYPICAL REAR ATTACHMENT FOR TOILETS "C & "D"



DETAIL B

TYPICAL ATTACHMENT



Aft Vacuum Tank Installation-Typical
Figure 20, Sheet 2

4. Removal/Installation Waste Tank - Toilet B (cargo airplanes)

A Remove Waste Tank (See figure 202.)

(1) Drain and flush waste tank from exterior service panel.

(2) Disconnect bonding jumper connecting toilet tank unit to sidewall by removing bolt attaching it to sidewall. Replace bolt in sidewall after disconnection, and stow jumper on tank top.

(3) Disconnect teleflex control cable from tank unit, replacing fasteners in tank end of cable after disconnection. Coil cable protruding above floor so that it lies in stowage recess. Unscrew stowage cover plate from its adjacent position on floor and screw it in position on top of cable stowage recess. (See figure 204.)

(4) Disconnect vent and flush lines from connection box on sidewall. Fit protective caps to disconnect fittings in sidewall and stow toilet lines between top of toilet tank and its shroud.

(5) Remove four bolts attaching toilet tank unit to floor.

(6) Lift tank vertically until drain pipe coupling is disengaged, and carry tank out of airplane

(7) Replace four tank attachment bolts in their holes in floor, and fit blanking plug over drain pipe orifice through floor, using screws securing plug in its stowed position.

B Install Waste Tank (See figure 202.)

(1) Remove four toilet tank attachment bolts from floor, remove blanking plug from drain pipe orifice and screw it down to its stowed position nearby

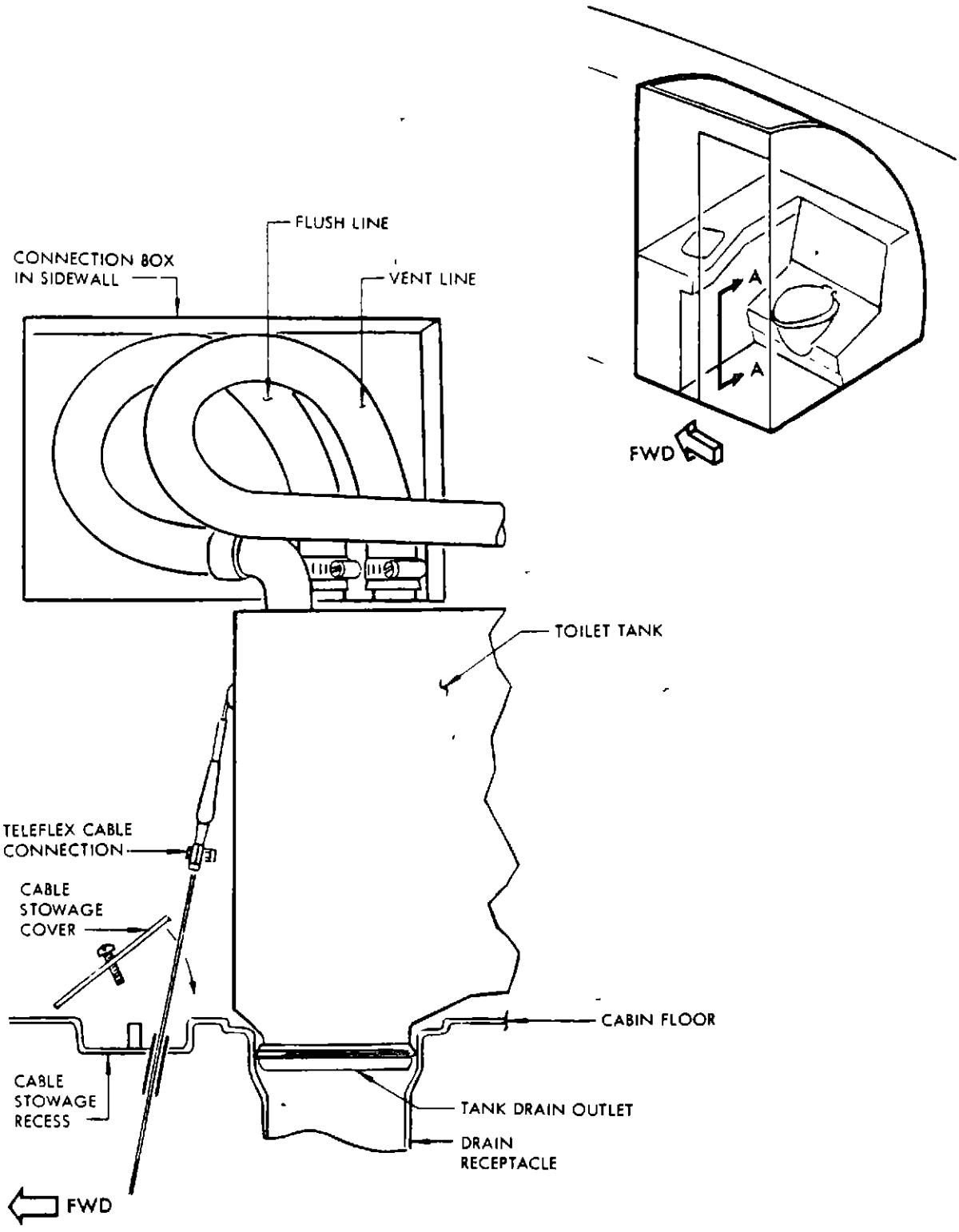
(2) Carry toilet tank into airplane, engage drain outlet on bottom of tank with drain pipe orifice in floor, lower tank into position install four attachment bolts and tighten down. (See figure 204.)

NOTE Before attempting to install toilet tank, check that O-ring on its drain outlet is in good condition and properly seated.

(3) Remove protective caps from vent and flush connections in sidewall and connect both lines from toilet tank, taking care to observe labels to avoid cross-connecting.

(4) Unscrew and remove cover plate over teleflex cable stowage recess, screw it down to its stowed position nearby and connect teleflex cable to equivalent cable on toilet tank.

(5) Remove bonding jumper attachment bolt from sidewall, install bonding jumper and bolt to sidewall and tighten bolt.



Lavatory B Waste Tank Installation
Figure 204

5 Removal/Installation Waste Tank - Toilet E (cargo airplanes)

A. Remove Waste Tank (See figure 203)

(1) Drain and flush waste tank from exterior service panel.

(2) Disconnect bonding jumper connecting toilet tank unit to sidewall by removing bolt attaching it to sidewall. Replace bolt in sidewall after disconnection, and stow jumper on tank top.

(3) Disconnect teleflex control cable from tank unit, replacing fasteners in tank end of cable after disconnection. Coil cable protruding above floor so that it lies in stowage recess. Unscrew stowage cover plate from its adjacent position on floor and screw it in position on top of cable stowage recess. (See figure 205.)

(4) Disconnect vent and flush lines from connection box on sidewall. Fit protective caps to disconnect fittings in sidewall and stow toilet lines between top of toilet tank and its shroud.

(5) Remove four bolts attaching toilet tank unit to floor.

(6) Lift tank vertically until drain pipe coupling is disengaged, and carry tank out of airplane.

(7) Replace four tank attachment bolts in their holes in floor, and fit blanking plug over drain pipe orifice through floor, using screws securing plug in its stowed position.

B. Install Waste Tank (See figure 203.)

(1) Remove four toilet tank attachment bolts from floor, remove blanking plug from drain pipe orifice and screw it down to its stowed position nearby.

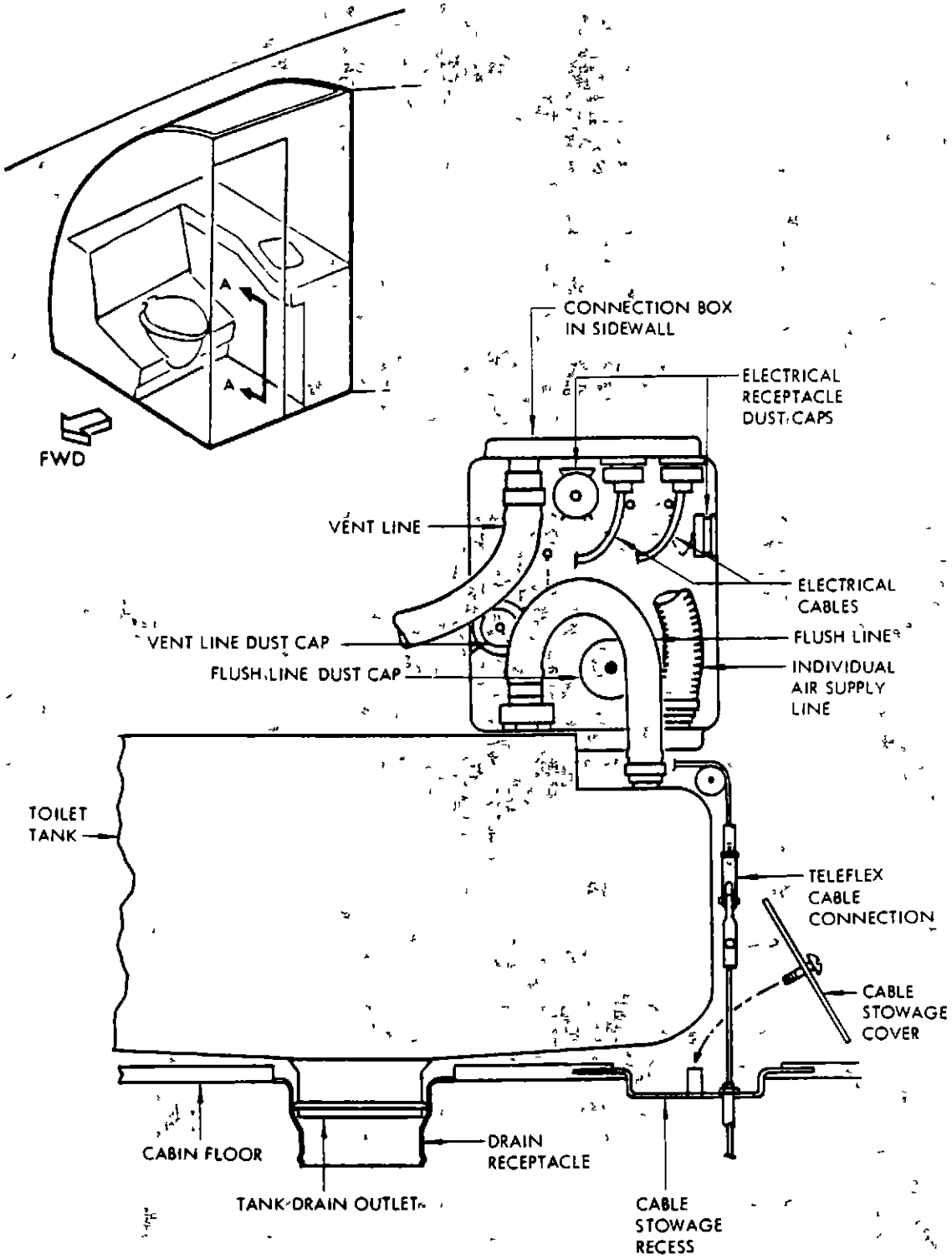
(2) Carry toilet tank into airplane, engage drain outlet on bottom of tank with drain pipe orifice in floor, lower tank into position install four attachment bolts and tighten down (See figure 205.)

NOTE: Before attempting to install toilet tank, check that O-ring on its drain outlet is in good condition and properly seated

(3) Remove protective caps from vent and flush connections in sidewall and connect both lines from toilet tank, taking care to observe labels to avoid cross-connecting.

(4) Unscrew and remove cover plate over teleflex cable and connect cable to equivalent cable on toilet tank. Screw cover plate down to its stowed position nearby.

(5) Remove bonding jumper attachment bolt from sidewall, install bonding jumper and bolt to sidewall and tighten bolt.



SECTION A-A

Lavatory E Waste Tank Installation
Figure 205

TOILET DRAIN VALVE - REMOVAL/INSTALLATION

1. General

A. Removal/installation of forward and aft toilet drain valve is typical and is accessible by removing the toilet shroud assembly

2 Equipment and Materials

A Sealing Compound, No. EC 801, Minnesota Mining and Manufacturing Co

3 Remove Toilet Drain Valve

A Drain and flush toilet waste tank. Refer to Chapter 12, Toilet Servicing

B Remove toilet shroud assembly Refer to 38-2-71, Toilet Shroud Assembly - Removal/Installation

C Remove waste tank top Refer to 38-2-41, Toilet Waste Tank Assembly - Removal/Installation

D Disconnect toilet drain valve cable at clevis pin and unscrew clevis from cable (See figure 401)

E Remove screws and washers which attach valve to valve support channel

F. Loosen loop clamp which is around valve housing holder

G Compress valve with C-clamp or with hand and rotate valve and pulley housing to break bond between holder and pulley housing

h. Remove valve and attached cable

CAUTION WEAR GLOVES AND PROTECTIVE SLEEVES WHEN WORKING WITH PARTS INSIDE THE TANK.

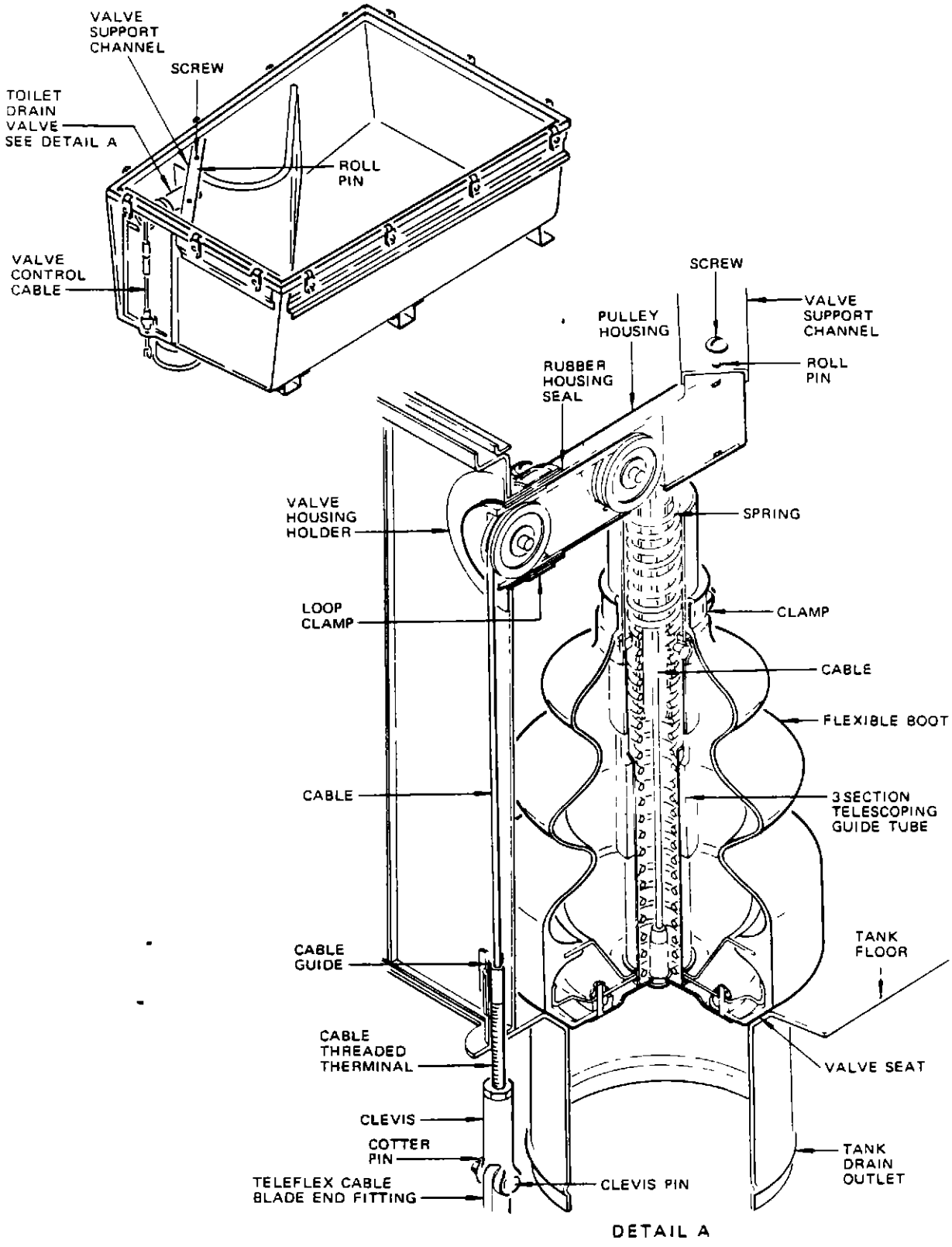
4 Install Toilet Drain Valve

A. Clean drain valve seat

NOTE Ensure valve seat is smooth, free of debris and no scratches, dents, abrasions or other evidence of damage.

B. Slip loop clamp on holder

C. Apply coating of sealant on both inner and outer surfaces of new seal and slide seal over area of pulley housing which fits in holder.



Typical Toilet Drain Valve Installation
Figure 401

D. With valve compressed, insert pulley housing in holder, rotating slightly to spread sealant throughout holder (See figure 401)

E. Attach valve support channel to tank and attach valve to support channel

NOTE Do not tighten screws Ensure flexible boat is free of breaks or holes and drain valve is installed spring-loaded toward the close position

F Pour enough water around valve seat to check for leakage, and tighten attaching screws on support channel loop clamp on holder when valve is properly seated

G. Check valve for proper seating

(1) Pour several gallons of water into tank

(2) Operate valve several times and drain water from tank in 1-gallon amounts

(3) As valve closes each time, check that no water leaks from around valve

H. When valve is thoroughly checked for proper seating install roll pins through support channel

I. Spread a coating of sealant around rim of pulley housing on tank exterior

J. Pass toilet drain valve cable through guide Install clevis, connect clevis to teleflex cable and install clevis pin and cotter pin.

NOTE Check that drain valve control cable handle is in closed position and the force required to bring the drain valve to full open does not exceed 35 pounds

K Install waste tank top Refer to 38-2-41, Toilet Waste Tank - Removal/Installation

L Connect flexible vent and flush tubing

M Connect electrical wiring

N Install toilet shroud assembly

O. Service toilet waste tank Refer to Chapter 12, Toilet Servicing

TOILET DRAIN VALVE CONTROL CABLE - MAINTENANCE PRACTICES

1 Removal/Installation Toilet Drain Valve Control Cable

A Equipment and Materials

(1) Lubricating Oil Teleflex, P/N 12603, Dow Corning No 33 or equivalent

B Remove Toilet Drain Valve Control Cable (See figure 201)

(1) Disconnect drain valve cable at toilet by removing cotter pin, washer and clevis pin

NOTE Toilet "A" connector is accessible from the lower nose compartment Toilet "B" and "E" connections are above floor level and reached by opening the outboard stowage compartment door in the sink cabinet, unscrewing and removing the bottom of the compartment Toilet "C" and "D" connections are below the floor but access must be gained from above by removing the floor panel

(2) Loosen nut on cable locking plug in order to free teleflex cable from blade end fitting

(3) From exterior service panel, pull out entire length of teleflex cable

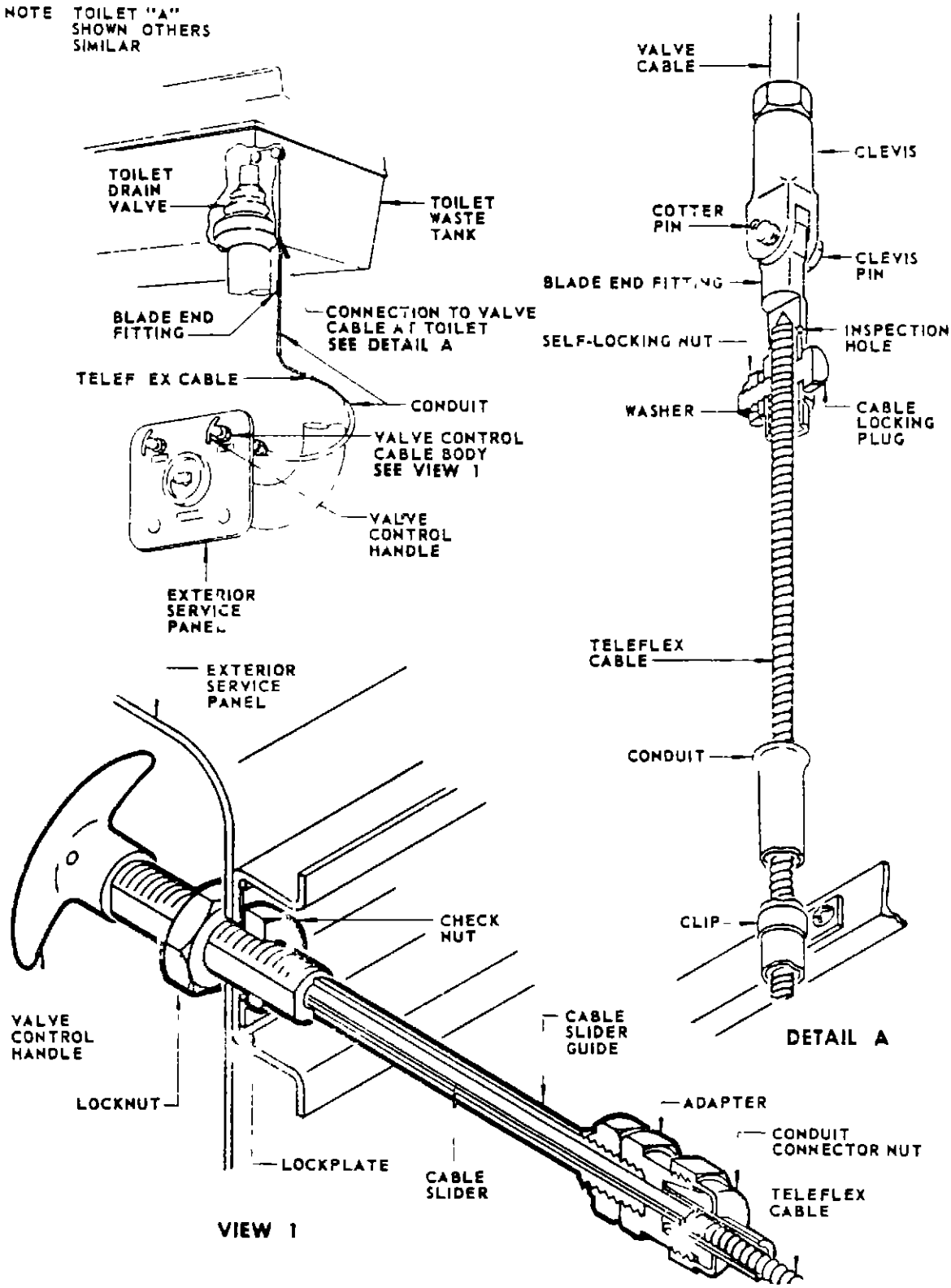
C Install Toilet Drain Valve Control Cable

(1) Lubricate cable with oil and wipe off excess

(2) Insert handle and cable assembly into cable slider guide at exterior service panel and push cable into conduit until valve control handle is in "CLOSED" position See figure 202 for orientation of handle

(3) Insert teleflex cable into blade end fitting and check through inspection hole for cable end

(4) Tighten nut on cable locking plug



Toilet Drain Valve Control Cable Installation
Figure 201

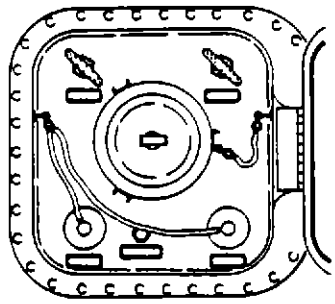
(5) Check adjustment of cable

(a) Pull handle at the service panel Before extended 0.25 inch a distinct increase in load should be felt, indicating that the valve is beginning to open. If adjustment is necessary, remove clevis pin, loosen locknut at clevis, screw clevis up or down as required, and install clevis pin

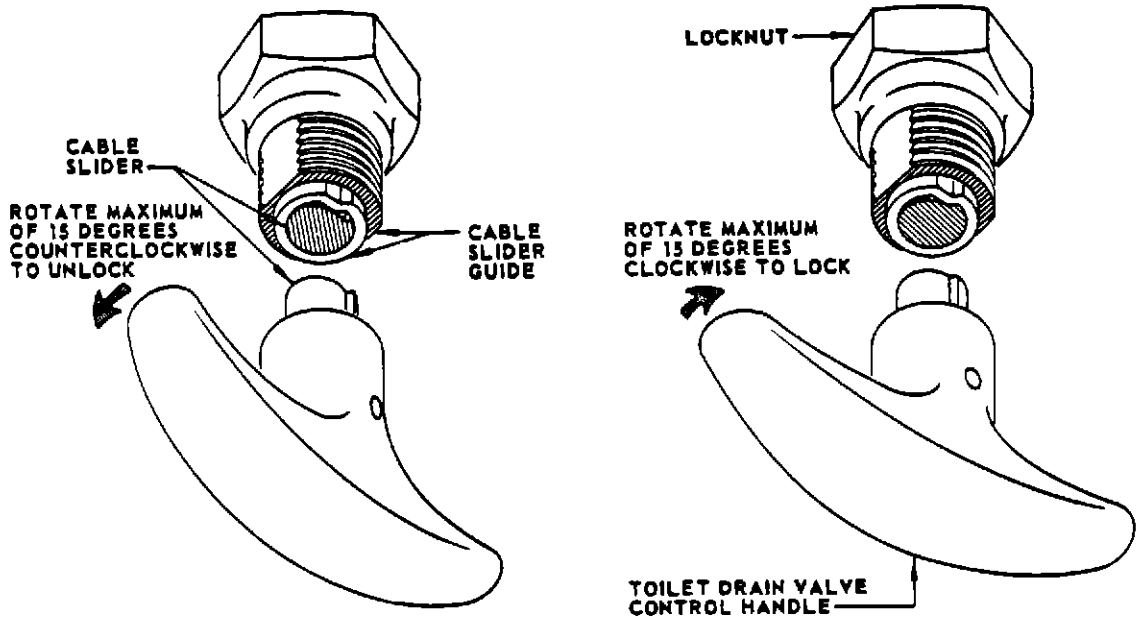
(b) Tighten locknut on clevis, and install washer and cotter pin on clevis pin at connection to blade end fitting

(c) Pull handle out until fully extended, and turn clockwise until locked in open position

CAUTION: DO NOT ROTATE HANDLE MORE THAN APPROXIMATELY FIFTEEN DEGREES BETWEEN LOCKED AND UNLOCKED POSITIONS AS THIS MAY DAMAGE THE CABLE.



EXTERIOR SERVICE PANEL



LOCKED POSITION

UNLOCKED POSITION

Toilet Drain Valve Control Cable Locking Details
Figure 202

(d) Charge toilet waste tank with about 3 gallons of water and check that valve does not leak. Operate valve control several times from closed to open, checking correct functioning

(6) Recharge toilet with flushing liquid See Chapter 12, "Toilet Servicing "

2 Removal/Installation Toilet Drain Valve Control Cable Conduit

A Remove Toilet Drain Valve Control Cable Conduit

(1) Remove toilet drain valve control cable.

(2) Release nut attaching end of conduit to cable slider guide at service panel (See figure 202)

NOTE Access to the forward toilet conduit attachments is gained from the lower nose compartment Access to the aft toilet conduit attachments is gained from above floor level with floor panels removed.

(3) Remove conduit by releasing clips attaching it to structure

B Install Toilet Drain Valve Control Cable Conduit

(1) Loosely connect nut at lower (flared) end of conduit to cable slider guide at service panel

(2) Temporarily insert cable to insure correct alignment and location of cable

NOTE If any bending is necessary it must be done with the cable inserted to prevent flattening o bend may have a smaller radius than 3 0 inches and, after bending, the cable should be pushed in and pulled out 6 times with at least a 12 inch stroke The cable should then be withdrawn and any loose particles blown from the conduit with an air hose, using care not to introduce moisture

(3) Tighten nut attaching conduit to cable slider guide at service panel

(4) Secure clips to structure

(5) Install toilet drain valve control cable

(6) Operate valve several times to check adjustment and function

END

TOILET SHROUD ASSEMBLY - REMOVAL/INSTALLATION

1 Remove Shroud Assembly (See figure 401.)

A. Remove cabinet door in sidewall back of toilet unit by disconnecting the quick-release hinges.

B. Remove screws along upper edge of shroud.

C Remove screws along lower edge of shroud.

D. Remove shroud by pulling horizontally for approximately an inch, and lifting from the lower edge.

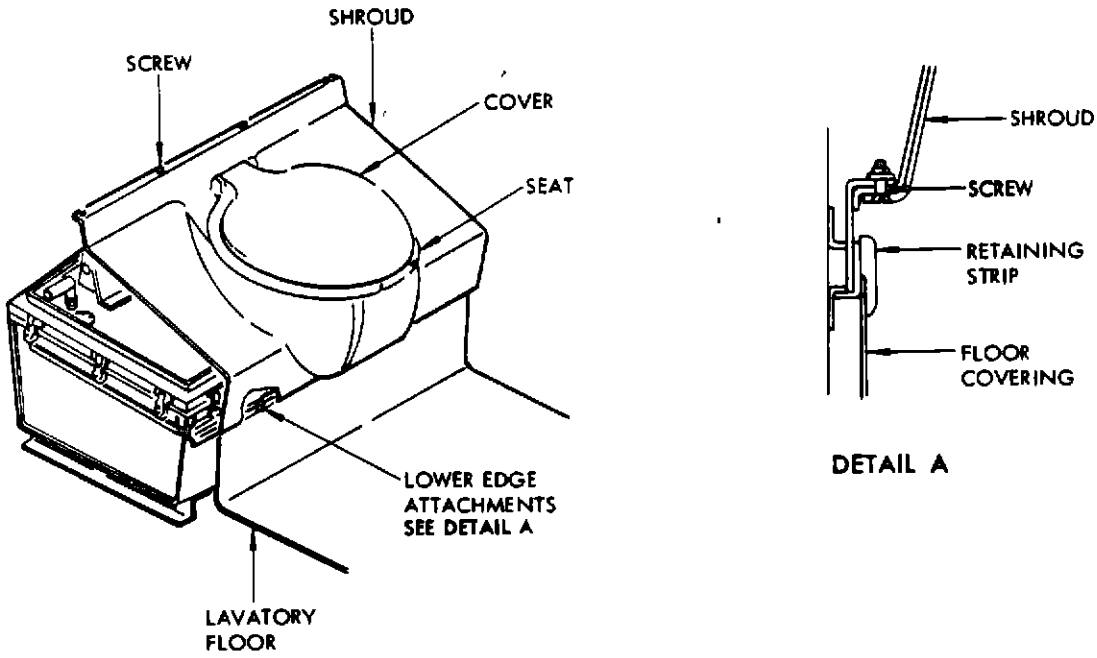
2. Install Shroud Assembly (See figure 401.)

A. Position shroud on top of toilet unit.

B. Install screws along upper edge of shroud.

C. Replace cabinet door.

D. Install screws along lower edge of shroud.



Toilet Shroud Installation
Figure 401

GALLEY AND LAVATORY VENTILATION SYSTEMS - DESCRIPTION AND OPERATION

1. General

A. Two independent galley and lavatory ventilation systems, one forward and one aft, provide ventilation for the galley units and lavatory compartments in their respective areas. On cargo airplanes when the airplane is in various passenger/cargo configurations, the B and E lavatories and the galley units may be removed and their vent attach points plugged. For conversion procedure, refer to Chapter 25, Cabin Accommodation Conversions. Each system consists of a venturi tube, swing check valve, muffler, two galley vent inlets and associated tubing containing balance restrictors. (See figure 1.)

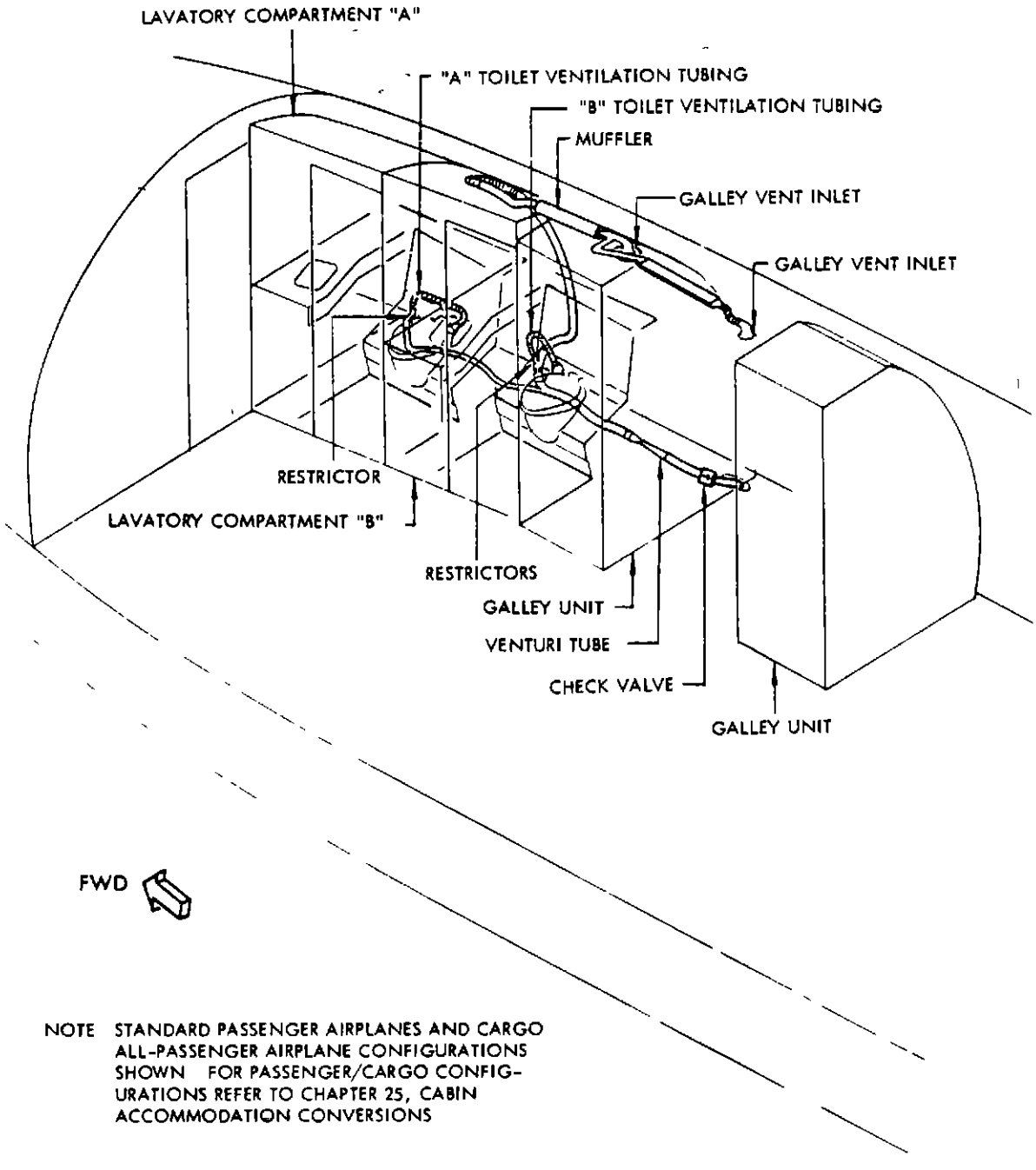
B. Ventilation is accomplished by permitting pressurized cabin air to escape to atmosphere in each case. The galleys are vented through vent inlets located in the lowered-ceiling panels, one at each galley unit. Each lavatory compartment is vented by air flowing under the toilet seat, through a gap between the toilet shroud and the toilet bowl flange, and into the vent duct located beneath the toilet shroud.

C. The forward system tubing is routed from the galley vent inlets forward along the right sidewall, down to floor level where the lavatory tubing connects, then below the floor and aft to the outlet on the lower right side of the airplane. (See figure 1.)

D. The aft system tubing is routed from the galley vent inlets aft along the right sidewall to the E lavatory vent pipe connection, across the ceiling and down the rear pressure bulkhead where the C and D lavatory tubing connects, then through the pressure bulkhead to the outlet on the right side of the fuselage above cabin floor level. (See figure 1.)

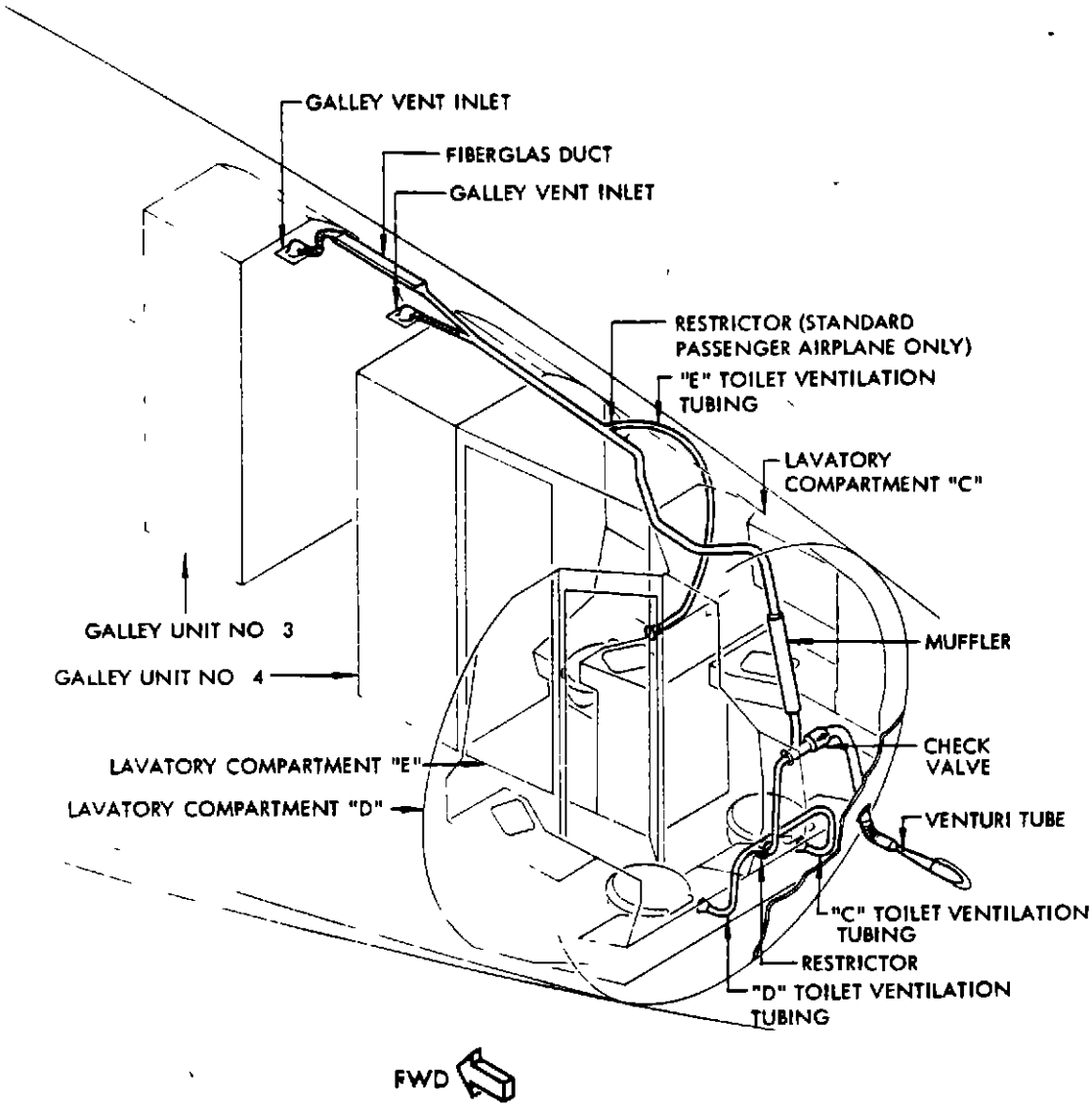
2. Venturi

A. The venturi acts as a choke tube to limit the outflow of cabin air when the airplane is pressurized. The venturi is made up of spun aluminum alloy tubing and is beaded at each end to retain clamped flexible connectors.



NOTE STANDARD PASSENGER AIRPLANES AND CARGO ALL-PASSENGER AIRPLANE CONFIGURATIONS SHOWN FOR PASSENGER/CARGO CONFIGURATIONS REFER TO CHAPTER 25, CABIN ACCOMMODATION CONVERSIONS

Galley and Lavatory Ventilation Systems
Figure 1 (Sheet 1)



NOTE STANDARD PASSENGER AIRPLANES AND CARGO ALL-PASSENGER AIRPLANE CONFIGURATIONS SHOWN FOR PASSENGER/CARGO CONFIGURATIONS REFER TO CHAPTER 25, CABIN ACCOMMODATION CONVERSIONS

3. Check Valves

A The swing check valve prevents back-flow through the ventilation system. The valve consists of an aluminum alloy body and cap with a swing sub-assembly attached to the inner portion of the cap. The cap and body have beaded ends to retain clamped flexible connectors.

4 Muffler

A. The muffler deadens duct noise in the galley ventilation tubing. The muffler consists of a perforated aluminum core surrounded with fiberglas insulation and enclosed in an aluminum alloy cover. The cover ends are beaded to retain clamped flexible connectors.

5. Galley Vent Inlet

A. The galley vent inlet provides the means of picking up galley odors. The horn-shaped inlet is manufactured of laminated fiberglas and facilitates installation of a vent grating. The upper section is beaded to retain a clamped flexible connector.

6 Tubing

A. The ventilation system tubing consists of light gage aluminum alloy tubing, flexible tubing and formed fiberglas ducts at the lowered-ceiling panels.

7. Restrictors

A. The restrictors serve to balance the airflow between the galley units and lavatory compartments. The cup-shaped restrictors are made from clad aluminum alloy sheet and are cemented in place in the tubing (See figure 1, sheets 1 and 2.)

PASSENGER WATER SYSTEM - DESCRIPTION AND OPERATION

EFFECTIVITY

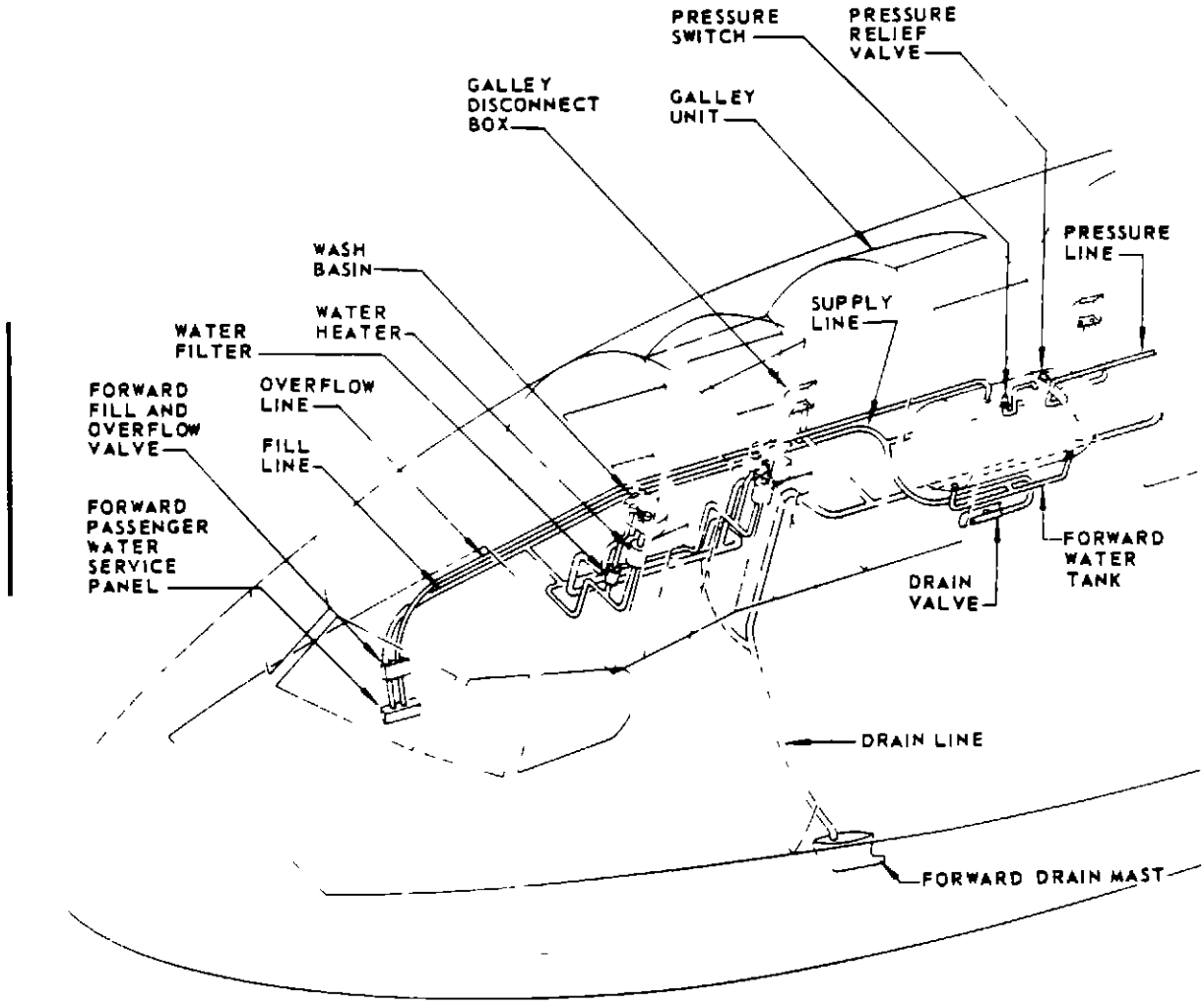
Passenger/Cargo Convertible Airplanes

1 General

A Two independent water systems, one forward and one aft, are provided for the purpose of drinking and washing On early airplanes the systems have a total capacity of 86 gallons of water and on later airplanes the total capacity is 103 gallons of water (See figure 1 for water tank location and figure 2 for water tank capacity and effectivity.) Each system consists of a water tank, quantity indicating system, fill and overflow valve, drain valve, overboard drain mast, passenger water service panel and associated tubing Each system supplies water to, and permits waste water drainage from, the lavatory compartments and the main galley units in the area which it serves (See figures 1 and 2.)

B Since the water tanks are below the floor, air pressure is used to force water to the several outlets. Two air sources are available for pressurizing the passenger water systems. Pressurized air from the hydraulic system engine bleed pressurization line is the primary source An electric motor-driven air compressor is used as an alternate source when primary source air pressure is insufficient. Check valves are in each line to prevent reverse pressurization. The two sources are connected in parallel The common line passes through an air filter to prevent contaminating the water, and then to a pressure regulator to control pressure in the systems. The line then branches into two, one for the forward system and one for the aft system. These lines run to a solenoid-operated shutoff valve and then to the water tanks. The solenoid shutoff valves isolate either system. The solenoid shutoff valves control switch is located above the forward dropped ceiling in the emergency equipment area. A pressure relief valve to prevent overpressurization of the tanks is mounted on the top of both tanks. A pressure switch above each water tank controls the air compressor operation to assure adequate pressure in the system at all times

C The water tanks are filled from separate passenger water service panels on the lower right side of the fuselage. The forward panel is located in the nose wheel area and the aft panel below the rear galley service door When the tanks are full, the systems are ready for operation Separate hot and cold water outlets are provided at the wash basins in each lavatory and a cold water outlet is provided at each galley unit Waste water outlets are provided for the wash basins and galley units. Waste water drainage is accomplished by gravity flow which is augmented in flight by cabin pressure. The systems may be completely drained by gravity flow to prevent freezing on the ground Warm air from the air conditioning system is exhausted into the water tank areas during flight to prevent freezing



FORWARD PASSENGER CABIN

Passenger Water System Component Location
Figure 1 (Sheet 1 of 2)

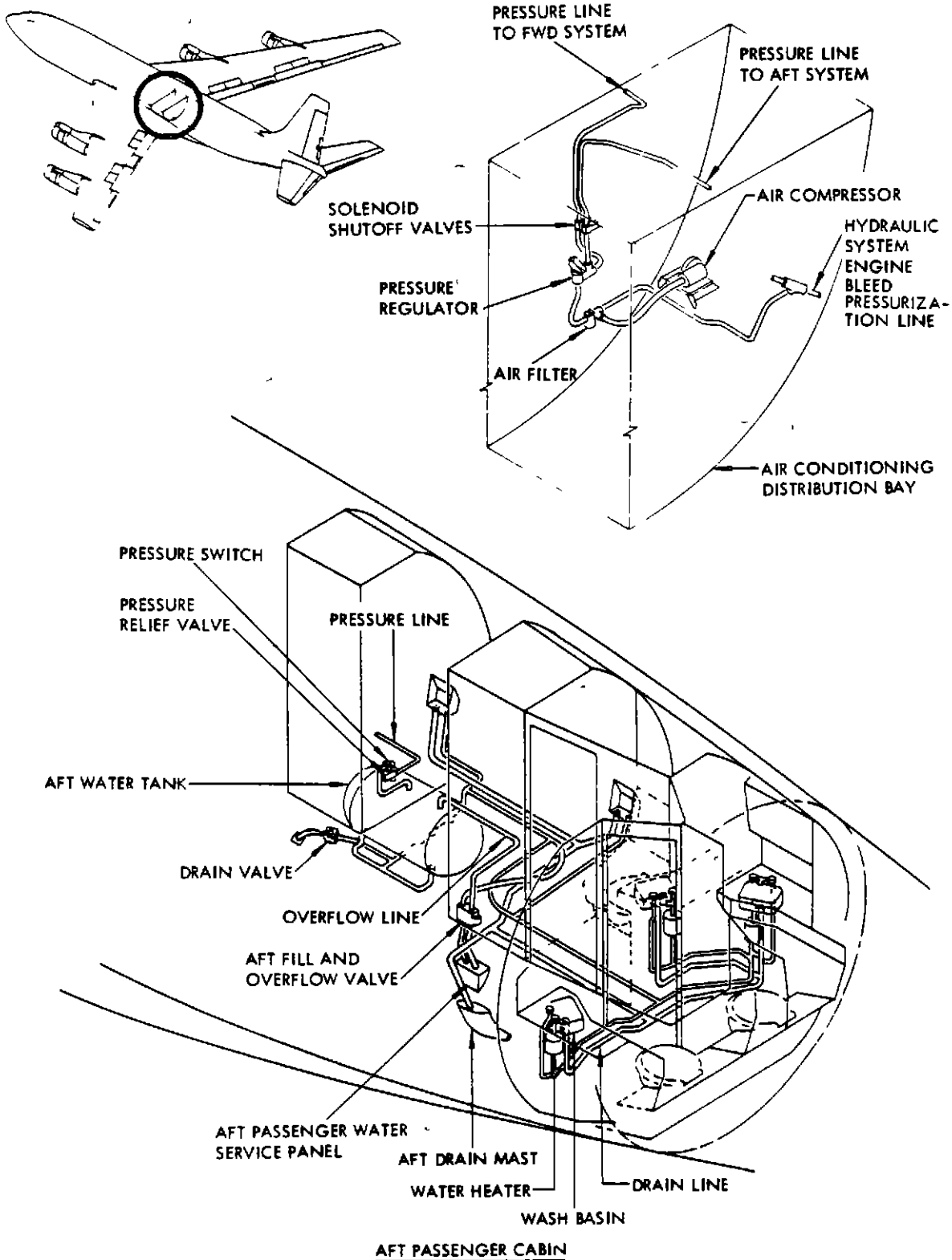


Figure 1 (Sheet 2) Passenger Water System Components Location Diagram

2 Passenger Water Tank

A. The welded stainless steel passenger water tanks are mounted on the right side of the airplane. The forward system tank is in the forward cargo compartment forward of the compartment door and enclosed by the water tank shroud. The aft system tank is in the aft cargo compartment aft of the compartment door and enclosed by the water tank shroud.

B. The tanks have fittings attached to the top for system overflow and pressurization, and a pressure switch. Two fittings on the bottom of the tanks are used for system filling, draining and supply. A float-type quantity transmitter is attached to the forward end of each tank. The volume of the tank is approximately 2 gallons larger than the usable volume because of a pipe on the overflow line that allows for air space and limits water capacity to usable volume. (See figure 2 for correct volume.)

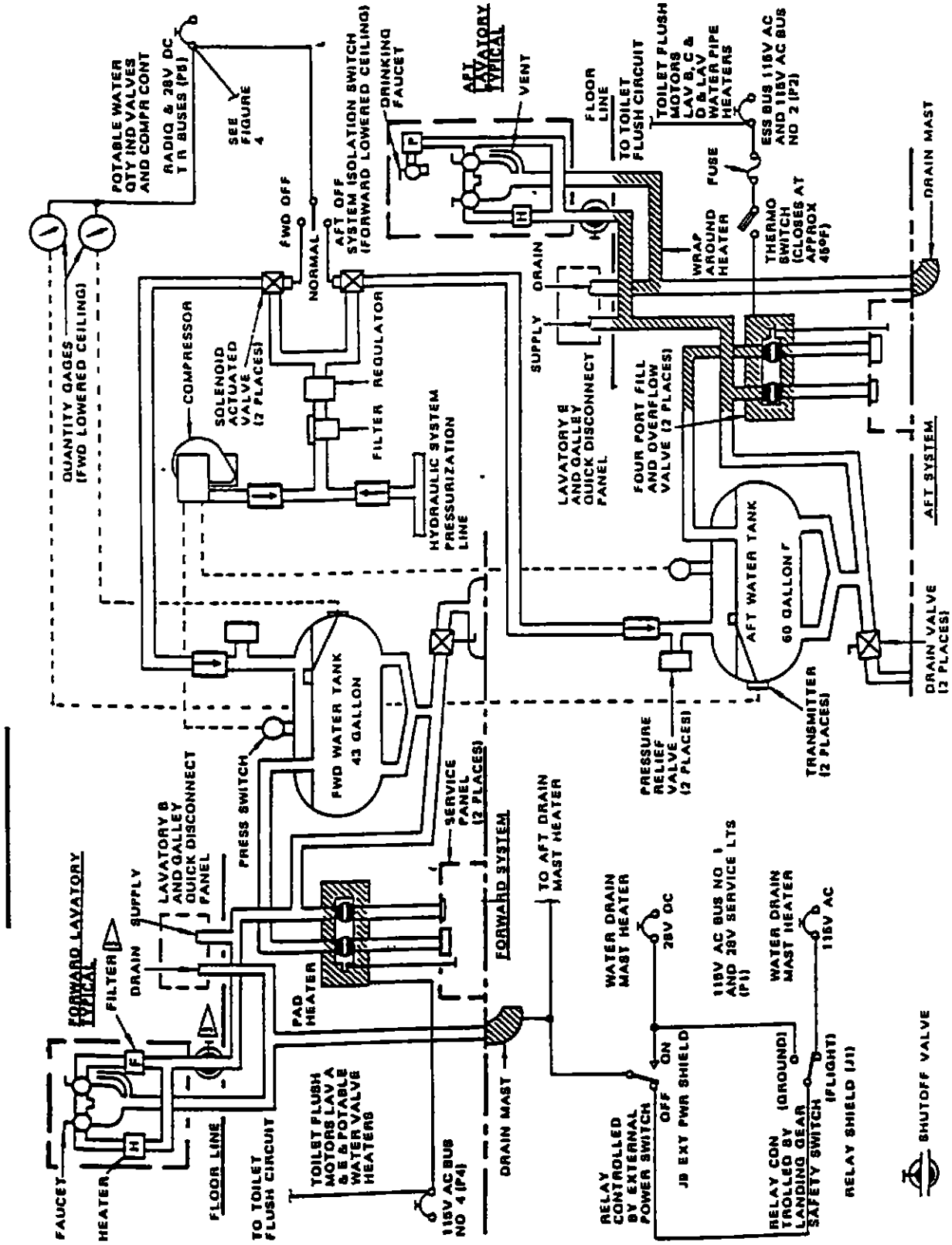
3. Quantity Indicating Systems

A. The passenger water quantity indicating system are provided to indicate water quantity in the passenger water tanks. The systems consist of a float-actuated potentiometer transmitter on the forward end of each water tank and an individual indicator for each system in the forward dropped ceiling area. For circuit diagram see figure 4.

4. Water System Valves

A. Fill and Overflow Valve

(1) The fill and overflow valves control filling of the water systems. Each valve consists of a 4-port, machined stainless steel body with a two-segment, gear-driven, rotary valve core. The two valve segments are spring-loaded to ensure positive seating and prevent leakage. The rotating core includes a spring-loaded ball and detent lock The ball seats in the detent when the valve is in the closed position, to prevent the valve from opening while the airplane is in flight. The valve is located above the passenger water service panel and is remotely operated by means of a handle on the passenger water service panel. A shaft connects the handle to the valve.



Passenger Water System Schematic Diagram
Figure 2

B Drain Valve

(1) The passenger water tank drain valves are two-port valves located below the passenger water tanks. The valves control draining of the passenger water tanks. The valve core is spring loaded to prevent leakage. Access to the forward drain valve control handle is through the passenger water drain service door located below the forward galley service door. The aft drain valve handle is just below the forward end of the aft water tank and accessible through a door in the water tank shroud. A flush mounted plug is provided to close the drain hole when not in use. The drain hole and plug are located in the right lower rear fuselage area.

F Overboard Drain Mast

The overboard drain masts deflect waste water away from the body of the airplane. The masts are mounted fore and aft on the underside of the fuselage. Each masts consists of two cast-aluminum halves bolted together to form a shell around the inner drain mast tube. The masts are anti-iced by an electrical heating element installed around the inner drain mast tube.

G. Passenger Water Service Panel

- The passenger water service panels provide a convenient means of servicing the water system from outside the airplane. It contains a control handle for the fill and overflow valve, an overflow outlet and a fill connector.

B The forward service panel cover is hinged at the top and is secured by two quick release latches. The control handle is so positioned that it will prevent the cover being closed unless the valve is placed in the "CLOSED" position.

C The aft service panel cover is hinged at the bottom and is secured by a single quick release latch. An angle is attached to the cover so that it will prevent the cover being closed unless the valve is in the "CLOSED" position.

H. Tubing

-. Tank fill and drain lines, tank overflow lines, and lavatory and galley supply lines are plastic braid reinforced plastic hose. The waste water drain lines are nylon tubing.

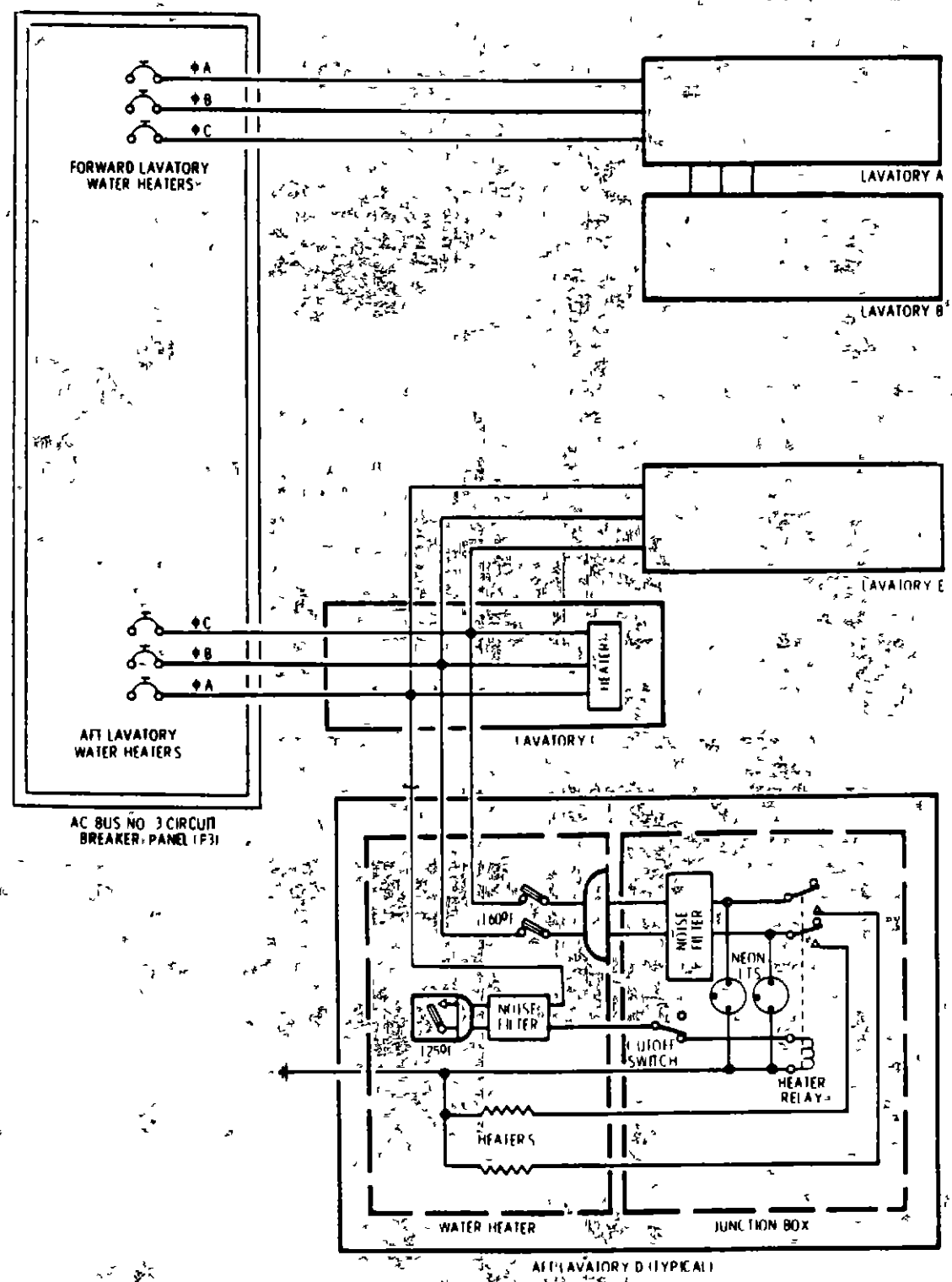
8. Tubing Heaters

A. All passenger water system tubing aft of station 1300 and below the passenger cabin floor is heated by electrical ribbon heaters to prevent freezing of the tubing. The heater ribbon is wrapped around and taped to the tubing. A thermal switch attached to structure aft of the aft cargo compartment, actuates at about 45°F to maintain the temperature of the tubing above freezing. The power wiring is connected through the electrical junction box in the wash basin cabinet in lavatory C A fuse is installed in the heater circuit adjacent to the junction box. This fuse protects the aft water system tubing and fill and drain valve heater circuit. Spare fuses are located in the control cabin spare bulb stowage box.

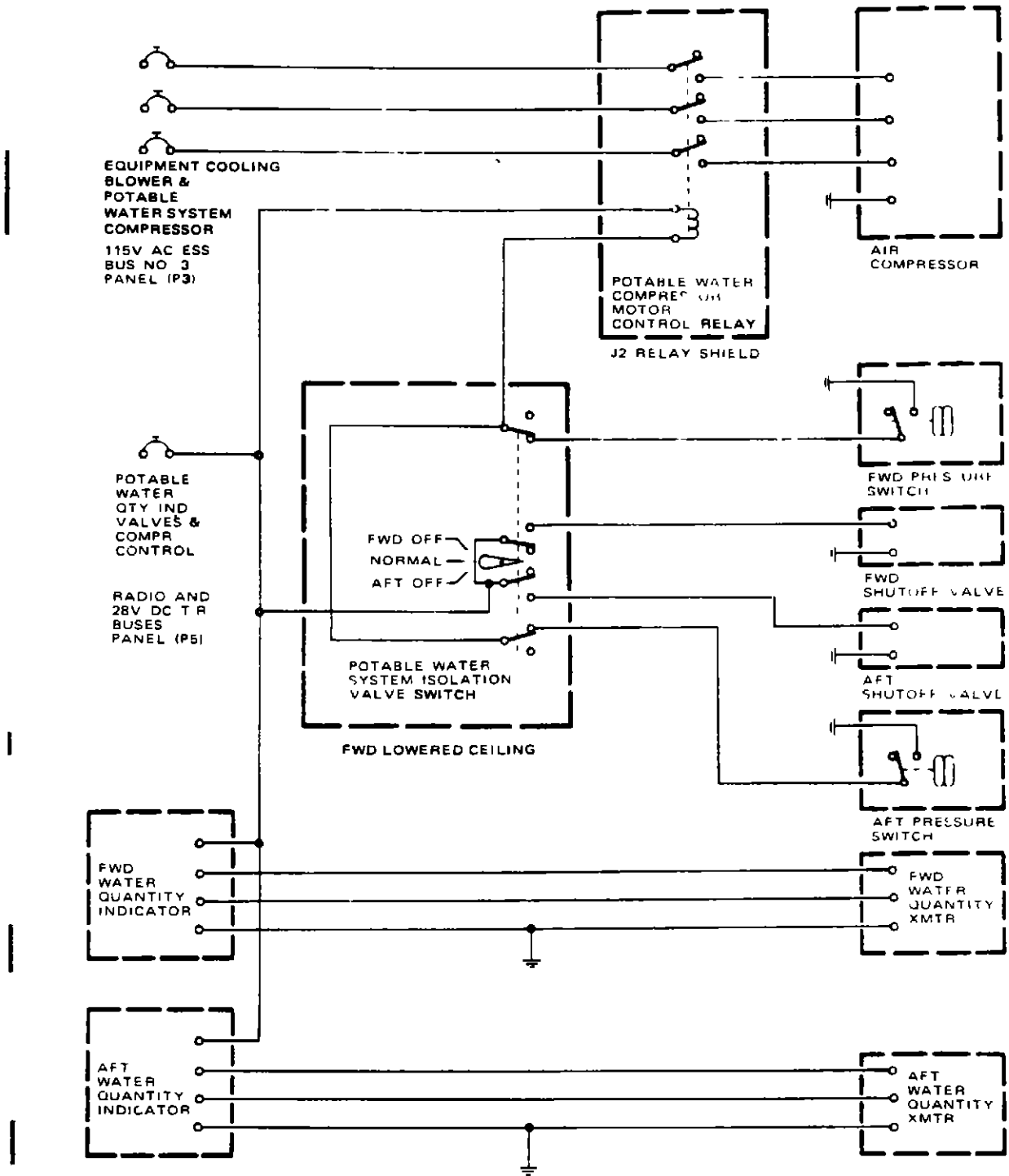
9. Lavatory Components

A. The components in each lavatory compartment consist of a wash basin, sink counter top and storage areas under the counter which furnish space for a water heater, electrical junction box, and a water filter (purifier) in lavatory A. The wash basin fixtures include spring-loaded hot and cold water faucets, a single spigot, and a lever-operated stopper. The stopper is spring-loaded to the closed position to prevent unnecessary loss of cabin pressure through the overboard vent outlet. Hot water is provided by a water heater In lavatory A, dechlorinated water is supplied to the cold water faucet through an activated charcoal filter (purifier) which is mounted below the sink counter top. The filter cartridge may be removed without draining the water system by shutting off a valve which is installed in the supply tubing to the filter. The valve also shuts off the water supply to the hot water faucet.

B A two-quart water heater is installed under each lavatory wash basin in the supply line to the hot water faucet. Water is heated by two probes inserted in the bottom of the heater. One bimetal thermal switch in the bottom of the heater turns off the two heater probes by means of a heater relay at approximately 125°F Two overheat switches are on the sides of the heater. These switches open to interrupt power to the probes at a case temperature of approximately 160°F. Each overheat switch must be manually reset, by pushing in on the center of the rubber cap on the switch. Power to the heaters is supplied from a junction box mounted adjacent to the heaters. Mounted on the junction box are two neon lights which are on during normal operation, and a switch to manually turn off the heater in the event of water supply failure. (See figure 3.)



Water Heater Circuit
Figure 3



Passenger Water System Pressurization Circuit Diagram
Figure 4

10. Passenger Water System Pressurization Components

A Air Compressor

(1) The air compressor unit is shock mounted to the airplane frame on the right side of the air conditioning distribution bay The air compressor is rated one cubic foot per minute against a back pressure of 45 psi It is operated by a one-half horse power motor The air compressor is controlled by the water pressure switches and powered by 115 volts ac from essential bus No 3 circuit breaker panel (P3). (See figure 4)

B. Air Filter

(1) The air filter is located on the lower aft side of the forward wall of the air conditioning distribution bay just to the right of the entry panel. The filter contains a replaceable filter cartridge It filters all air entering the passenger water tank

C Pressure Regulator

(1) The pressure regulator is located above the air filter on the right aft side of the forward wall of the air conditioning distribution bay The pressure regulator reduces the air pressure to 12 (+2, -1) psi for all the air pressurizing the passenger water system

D Solenoid Shutoff Valves

(1) Two solenoid shutoff valves are located above the pressure regulator on the right aft side of the forward wall of the air conditioning distribution bay The shutoff valves are normally open They are controlled by the "POTABLE WATER SYSTEM ISOLATION VALVES SWITCH" installed in the forward dropped ceiling area Access to the switch is through the emergency equipment door When the switch is in the OFF position for either system the respective shutoff valve is closed and pressure switch deactivated.

E. Pressure Relief Valve

(1) The pressure relief valves are installed on the top of both water tanks The relief valve is opened by a pressure of 50 (± 2 5) psi. The excess pressure is relieved into the cargo compartment

F Pressure Switch

(1) The pressure switches are installed on the floor beam just over the forward end of the water tank. A short pressure line from each tank actuates the respective switch They are actuated to the closed position and start the air compressor when the pressure in either water tank drops to 5 psi The pressure switches open and shut off the air compressor when the pressure in both water tanks has increased to 10 psi When the potable water system isolation valves switch is in the OFF position for one system the respective pressure switch is deactivated

PASSENGER WATER SYSTEMS - TROUBLE SHOOTING

EFFECTIVITY

TURBOFAN

1. General

A. These procedures apply to either the forward or the aft system.

B. If the tank does not fill when using a properly charged and functioning ground supply vehicle, check that the fill-and-overflow valve is correctly set. If it is correctly set, check the valve control shaft, and check the fill-and-overflow tubing for breaks and blockage.

NOTE: When filling the tank, a full condition is indicated by water starting to flow from the overflow outlet at the service panel.

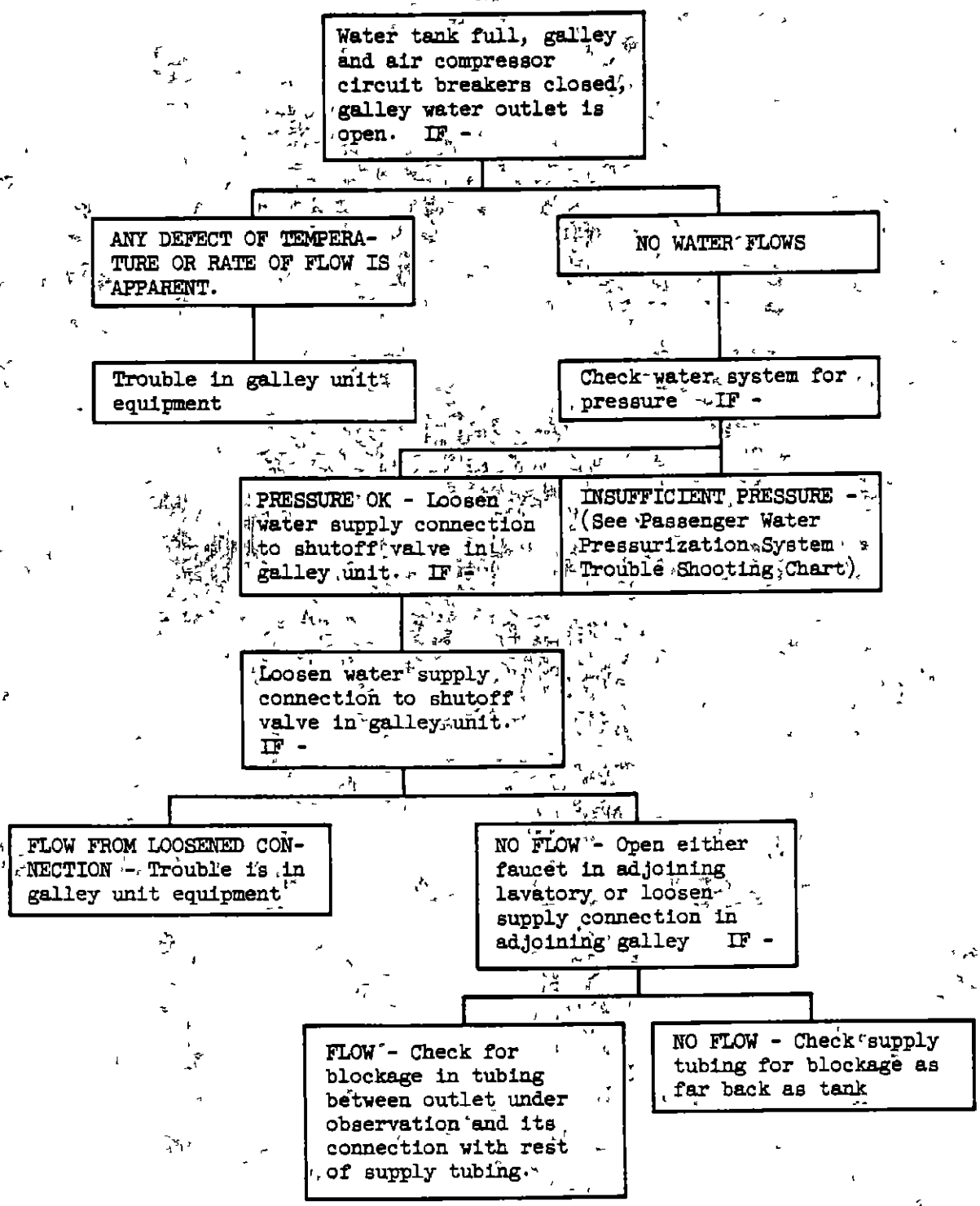
C. Procedures for trouble shooting supply and drainage are given in accompanying charts.

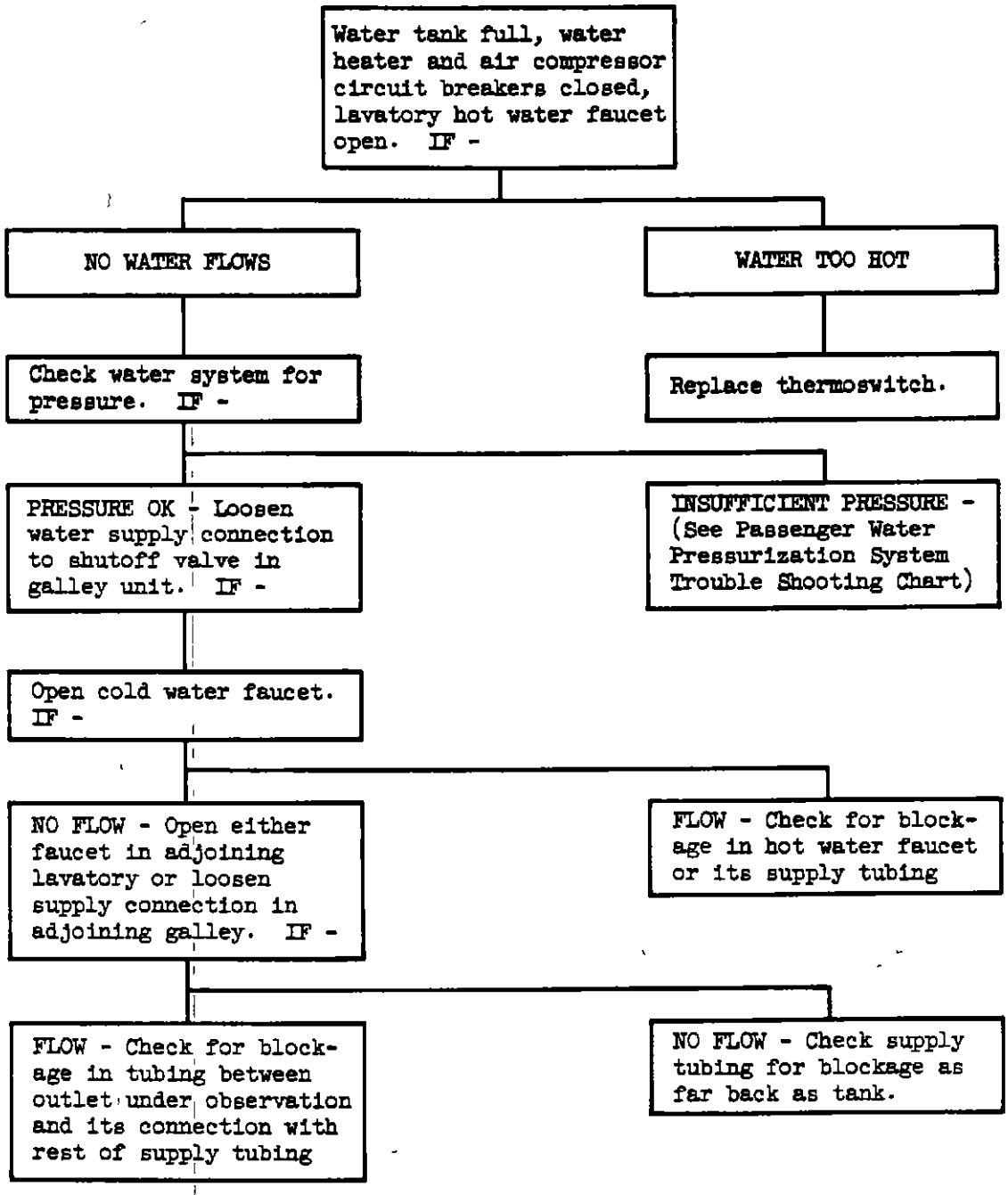
D. If the system does not drain from the service panel, check that the drain valve and fill and overflow valve are set correctly. If the valves are set correctly, and water is still in the system, check the valve control shafts and check the drain tubing for blockage.

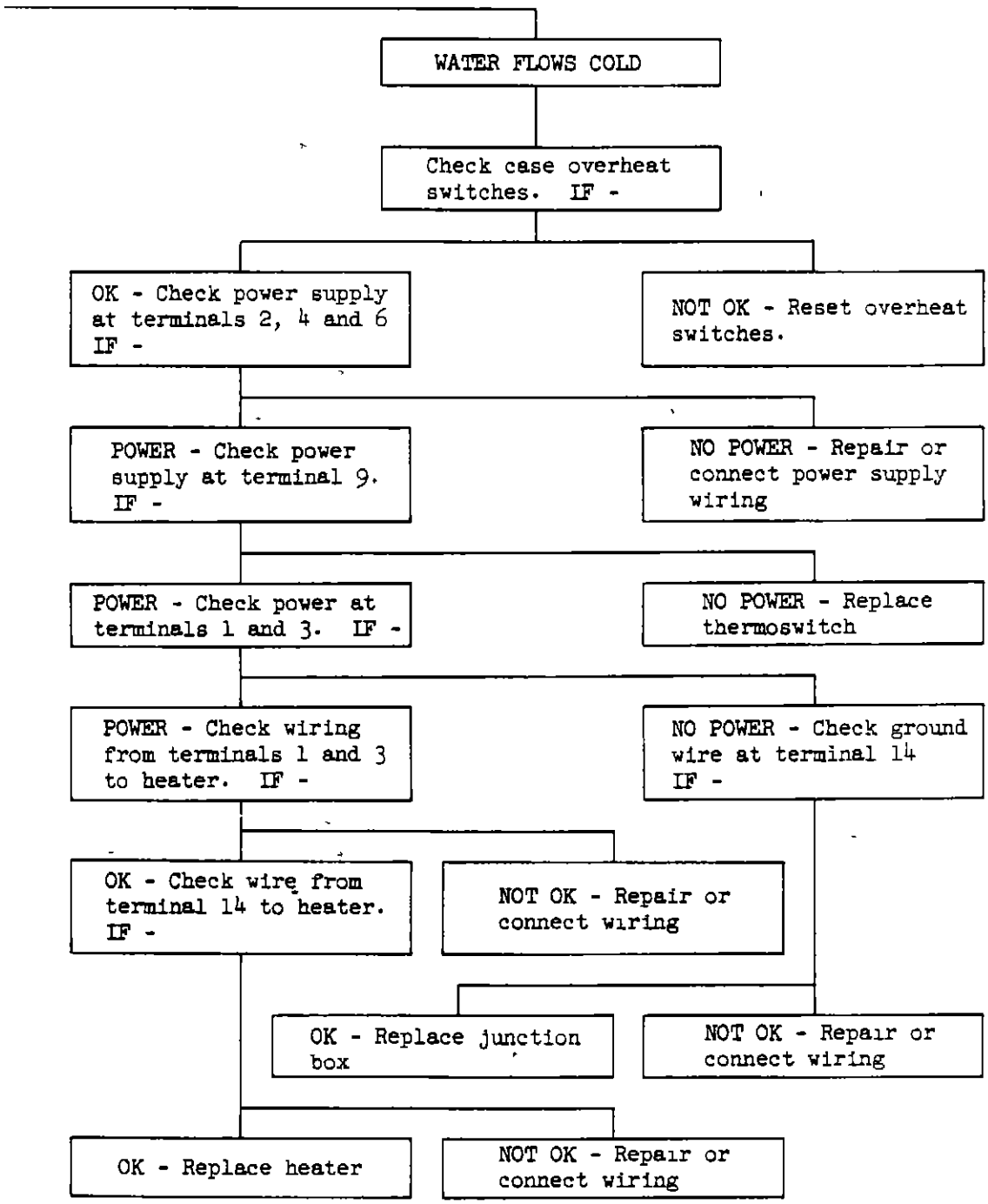
E. If the quantity gauge fails to indicate correctly, check gauge and transmitter and replace necessary part.

F. If the compressor operates continuously, check and replace defective pressure switch.

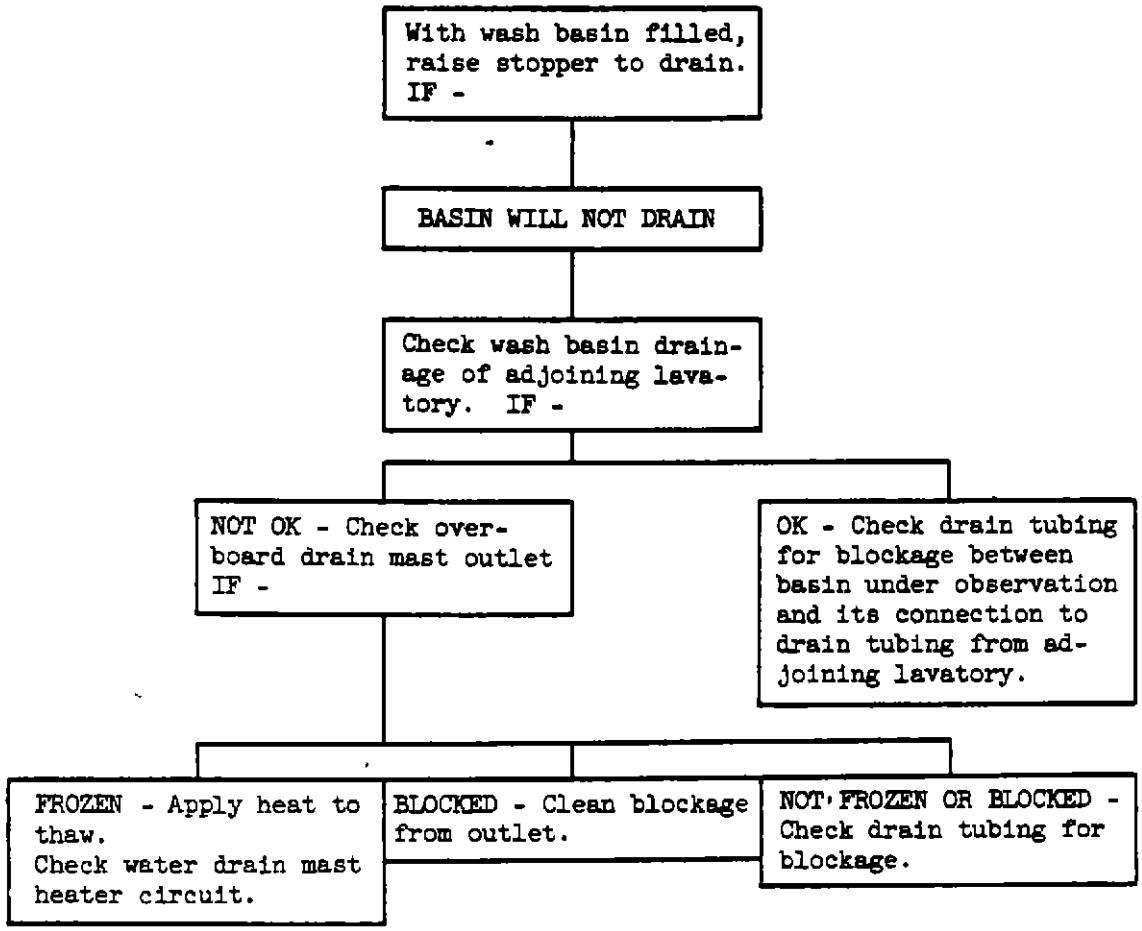
2. Passenger Water Supply Trouble Shooting Chart



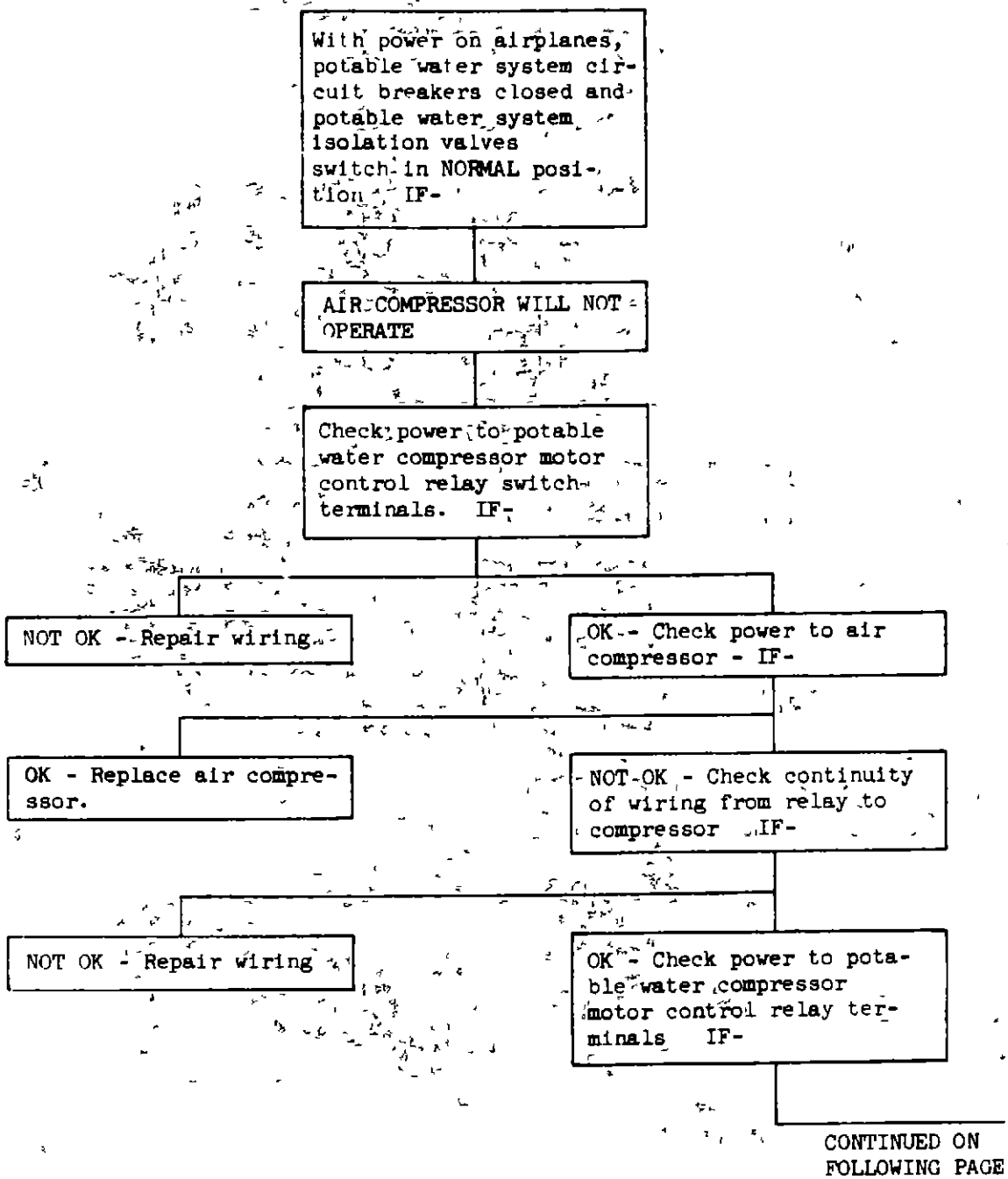

Water tank full, water heater and air compressor circuit breakers closed, lavatory hot water faucet open. IF -
NO WATER FLOWS
WATER TOO HOT
Check water system for pressure. IF -
Replace thermoswitch.
PRESSURE OK - Loosen water supply connection to shutoff valve in galley unit. IF -
INSUFFICIENT PRESSURE - (See Passenger Water Pressurization System Trouble Shooting Chart)
Open cold water faucet. IF -
NO FLOW - Open either faucet in adjoining lavatory or loosen supply connection in adjoining galley. IF -
FLOW - Check for blockage in hot water faucet or its supply tubing
FLOW - Check for blockage in tubing between outlet under observation and its connection with rest of supply tubing
NO FLOW - Check supply tubing for blockage as far back as tank.


WATER FLOWS COLD
Check case overheat switches. IF -
OK - Check power supply at terminals 2, 4 and 6 IF -
NOT OK - Reset overheat switches.
POWER - Check power supply at terminal 9. IF -
NO POWER - Repair or connect power supply wiring
POWER - Check power at terminals 1 and 3. IF -
NO POWER - Replace thermoswitch
POWER - Check wiring from terminals 1 and 3 to heater. IF -
NO POWER - Check ground wire at terminal 14 IF -
OK - Check wire from terminal 14 to heater. IF -
NOT OK - Repair or connect wiring
OK - Replace junction box
NOT OK - Repair or connect wiring
OK - Replace heater
NOT OK - Repair or connect wiring

3. Passenger Water System Overboard Drain Trouble Shooting Chart



Passenger Water System Pressurization-Trouble Shooting Chart



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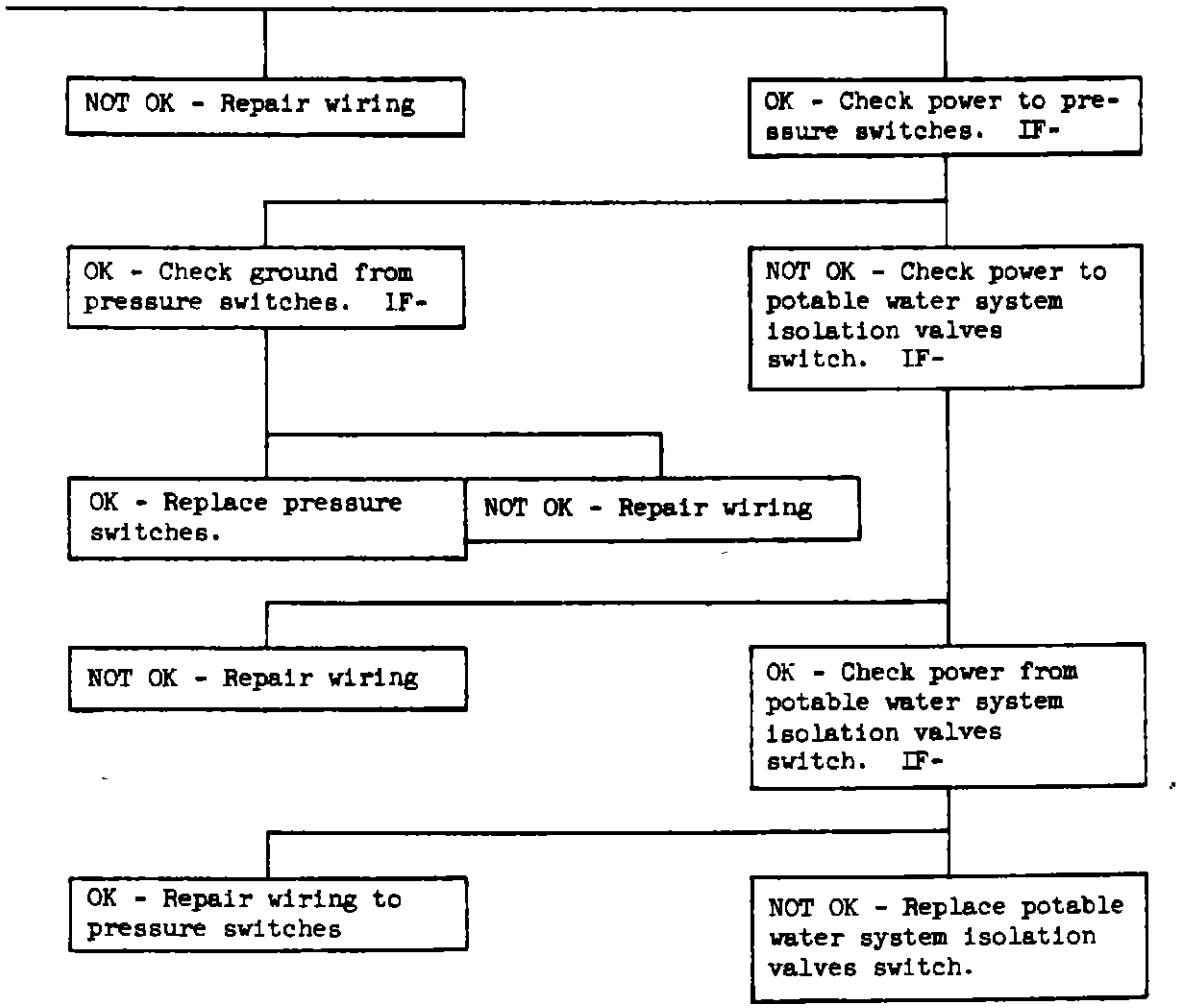


PASSENGER WATER SYSTEMS - MAINTENANCE PRACTICES

EFFECTIVITY

Passenger/Cargo Convertible Airplanes

1. Unit Servicing Passenger Water Systems

A. General

(1) To completely drain the water systems it is necessary that the faucets in the lavatory washbasins be opened for approximately 1 minute after the water tanks have been emptied.

(2) The forward and aft water systems should be disinfected upon finding contamination in the water, and regularly at some set interval of time.

B. Disinfect Passenger Water System

(1) General

(a) The passenger water system may be disinfected with an application of 50 or 100 parts per million of chlorine. An application of 100 parts per million of chlorine will reduce the water system disinfectant time from 4 hours to 1 hour.

(2) Flush both fore and aft systems separately with drinkable (potable) water.

(3) Fill the system with chlorinated water which contains 50 or 100 parts per million of chlorine.

(a) The water may be chlorinated three different ways.

1) - concentrated chlorine solution may be introduced first and then the system filled with drinkable water.

2) The concentrated chlorine solution may be mixed with the drinkable water first then pumped into the system.

3) The concentrated solution may be added while the system is being filled.

(4) After the system is filled with chlorinated water, open all water faucets and let water run until chlorinated water appears at faucets.

(5) Refill system with chlorinated water until chlorinated water flows from overflow outlet.

(6) Close fill and overflow valve and remove filling equipment.

(7) Cap fill and overflow outlet and drain outlet and open fill and overflow valve and drain valves.

(8) Let chlorinated water stand in system for four hours if filled with 50 parts per million of chlorine or one hour if filled with 100 parts per million of chlorine.

(9) Open fill and overflow valve and drain valve and drain all chlorinated water from system.

(10) Flush system with drinkable water until chlorine content is not objectionable

(11) Check water in system and see that chlorine content is a minimum and not objectionable for passenger use

PASSENGER WATER TANK - MAINTENANCE PRACTICES

EFFECTIVITY

Turbofan

1. Removal/Installation Passenger Water Tank

A. General

(1) The forward water tank is in the forward cargo compartment on the right side forward of the cargo door. The aft water tank is in the aft right corner of the aft cargo compartment. Both tanks are enclosed by a shroud. The removal and installation of the tanks are identical except as noted.

B Remove Passenger Water Tank

(1) Open POTABLE WATER QTY IND COMPR AND VALVE CONTROL circuit breaker on T-R bus No. 2 of radio and 28 volt dc T-R busses on circuit breaker panel (P5).

(2) Remove water tank protective shroud. The forward shroud has 58 fasteners. The aft shroud has 79 fasteners.

(3) Drain water tank.

NOTE To drain the tank turn both fill and overflow valve and drain valve to the OPEN position. After draining the tank turn the drain valve to the CLOSED position.

(4) Remove air pressure supply line, pressure relief valve, pressure switch line and tank overflow line from the top of the tank. (See figure 201.)

(5) Remove the two fill and drain lines from bottom of the tank.

NOTE: On forward tank remove fill and drain support bracket attachment bolts (2 places) on bottom of tank center rib

(6) Remove connector plug from water quantity transmitter.

(7) Remove lockwire and transmitter mounting bolts (6 places)

(8) Slowly remove transmitter away from tank and carefully pull arm and float through tank opening.

(9) On aft water tank remove forward stop fitting bolts (4 places) from below water tank aft rib and remove stop fitting

(10) Loosen clevis bolts from water tank attachment forks (4 places)

(11) Remove cotter pins from pins attaching water tank to water tank attachment forks

(12) Remove pins from water tank attachment forks.

(13) Remove water tank

NOTE The forward water tank is removed by moving the tank inboard and down The aft water tank is removed by moving the tank forward

C Install Passenger Water Tank

(1) Place tank in mounting position (See figure 201)

(2) Insert pins through tank ribs and attachment forks in four places and secure with washers and cotter pins

(3) Tighten clevis bolts until tank contacts cradle and then tighten an additional 1/4 to 1/2 turn

(4) Install stop fitting with four mounting bolts

NOTE Stop fitting should butt against tank rib

(5) Install water quantity transmitter in proper position with six mounting screws Lockwire all mounting screws

(6) Connect electrical plug to quantity transmitter

(7) Connect fill and lines at bottom of tank

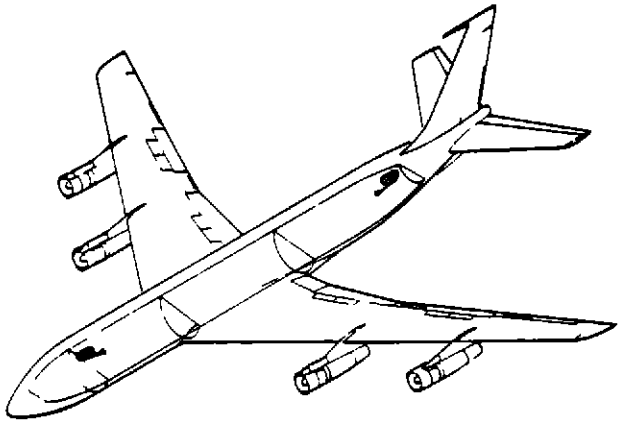
NOTE On forward tank install fill and drain line support bracket

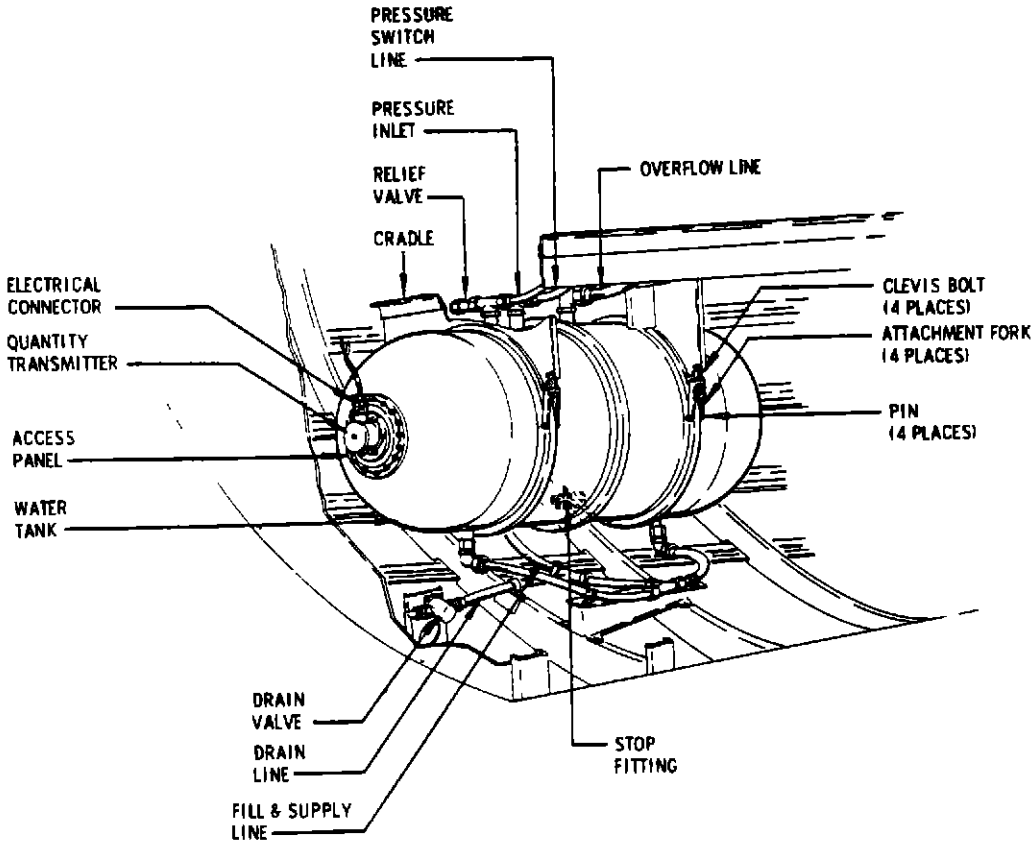
(8) Connect three lines and pressure relief valve to top of tank

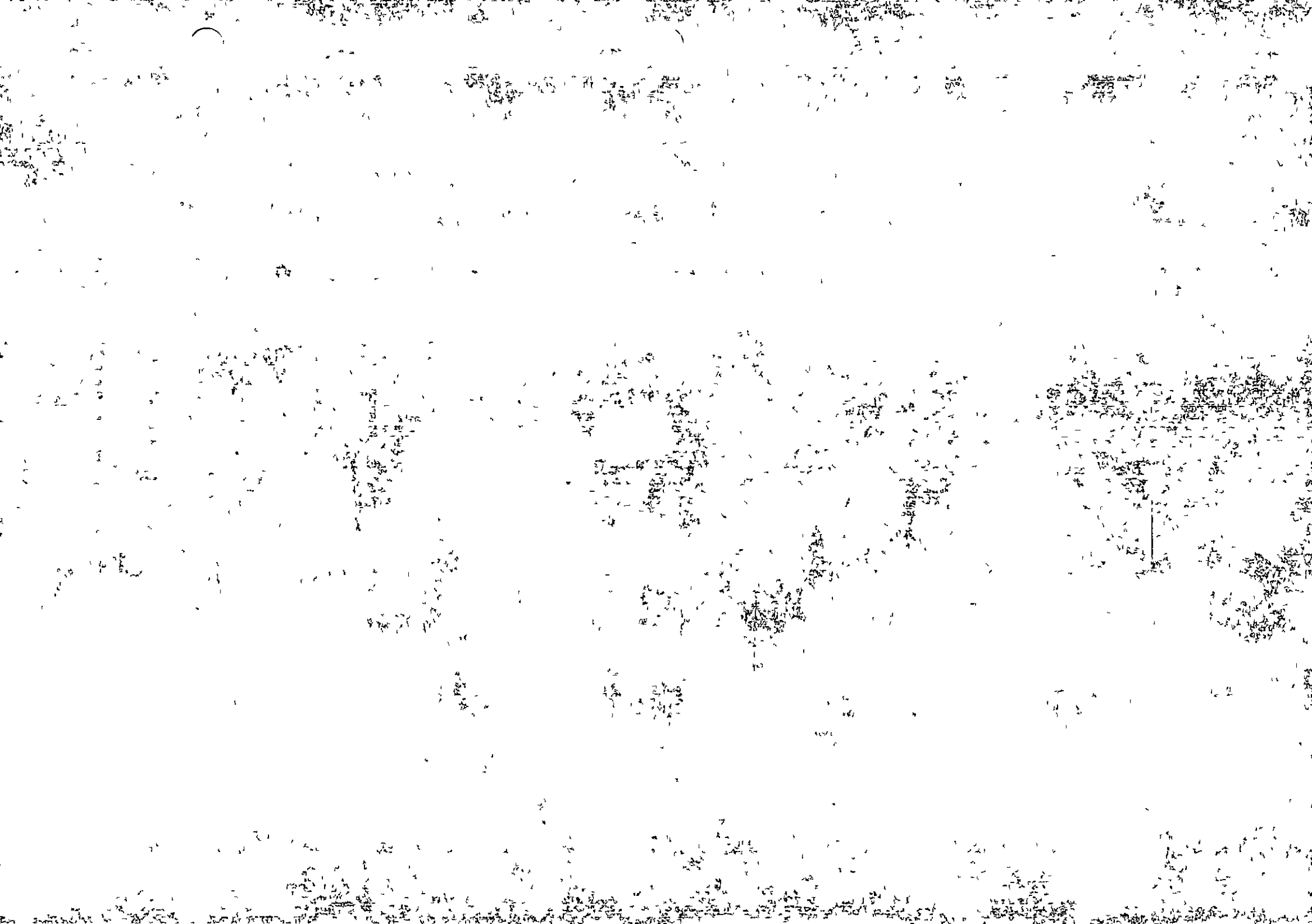
(9) Fill water tank See Chapter 12, "Servicing "

(10) Install protective shroud

(11) Close proper circuit breaker




PRESSURE SWITCH LINE
PRESSURE INLET
RELIEF VALVE
CRADLE
OVERFLOW LINE
ELECTRICAL CONNECTOR
QUANTITY TRANSMITTER
ACCESS PANEL
WATER TANK
CLEVIS BOLT (4 PLACES)
ATTACHMENT FORK (4 PLACES)
PIN (4 PLACES)
DRAIN VALVE
DRAIN LINE
FILL & SUPPLY LINE
STOP FITTING
FWD
NOTE AFT TANK SHOWN FORWARD SIMILAR

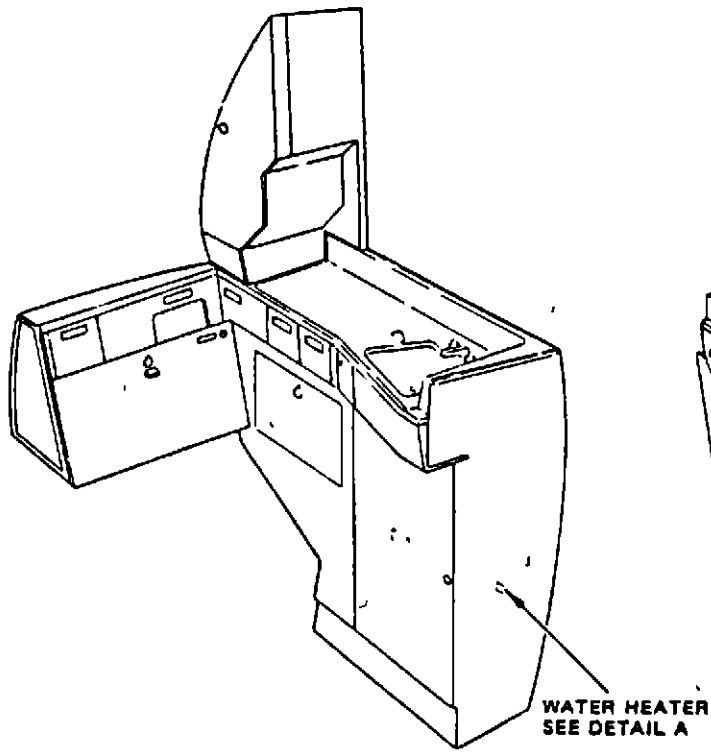


WATER HEATERS - MAINTENANCE PRACTICES

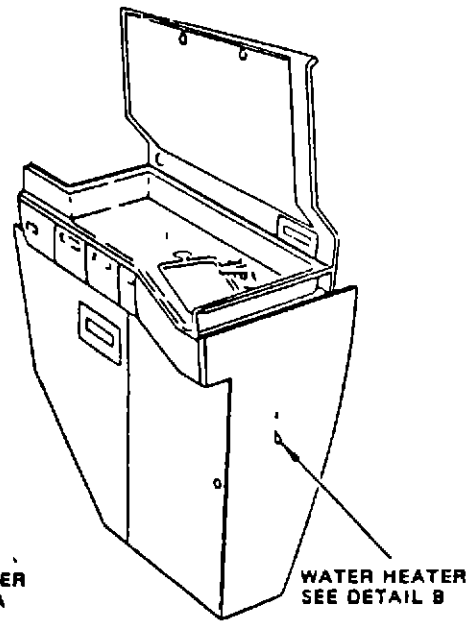
EFFECTIVITY

Turbofan

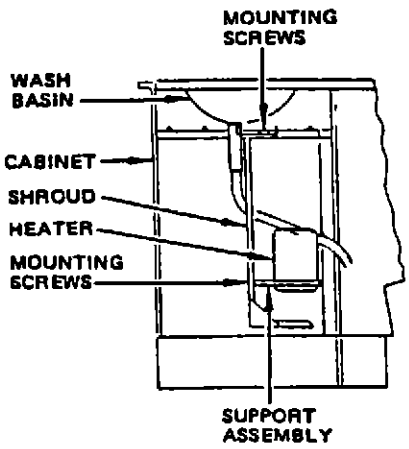
1. Removal/Installation Water Heaters (Fig. 201)
   A. Remove Water Heater
      (1) Open FORWARD LAVATORY WATER HEATER or AFT LAVATORY WATER HEATER circuit breaker on panel P3 and POTABLE WATER QTY IND COMPR AND VALVES CONTROL circuit breaker on panel P5.
      (2) Drain passenger water tank (Ref 12-1-91).
      (3) Remove shroud.
         (a) Remove two upper and two lower shroud mounting screws.
         (b) Remove shroud.
         (c) Remove lower shroud support assembly and, on lavatories C and D, upper shroud support assembly from hot water heater.
      (4) Disconnect inlet and outlet tubing
      (5) Disconnect electrical connectors from heater.
      (6) Unfasten six mounting screws and remove heater.
   B. Install Water Heater
      (1) Position heater and install mounting screws.
      (2) Connect electrical connectors to heater.
      (3) Connect inlet and outlet tubing.
      (4) Install lower shroud support assembly and, on lavatories C and D, upper shroud assembly onto water heater.
      (5) Position shroud.
         (a) For lavatory C and D, see Fig. 201.
         (b) For lavatory E, align shroud lower mounting holes with screws on water heater safety switch.
      (6) Install two upper and two lower shroud mounting screws.
      (7) Fill passenger water tank (Ref 12-1-91).
      (8) Close circuit breakers opened in step A.



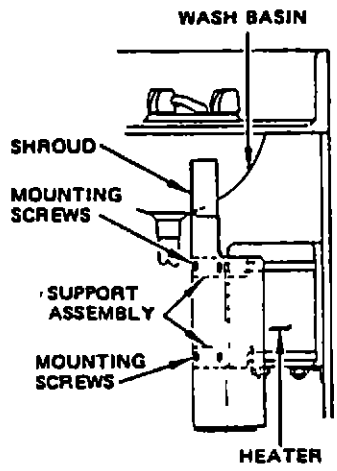
WATER HEATER LOCATION FORWARD LAVATORIES



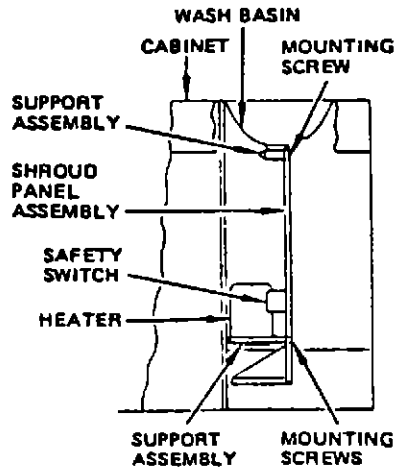
WATER HEATER LOCATION AFT LAVATORIES



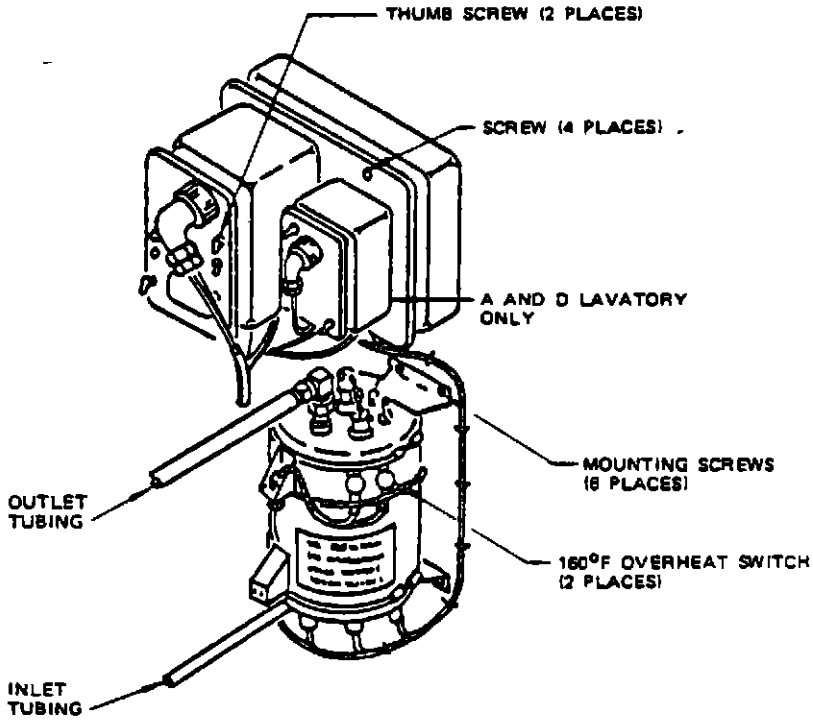
(LAVATORIES A AND B)
DETAIL A

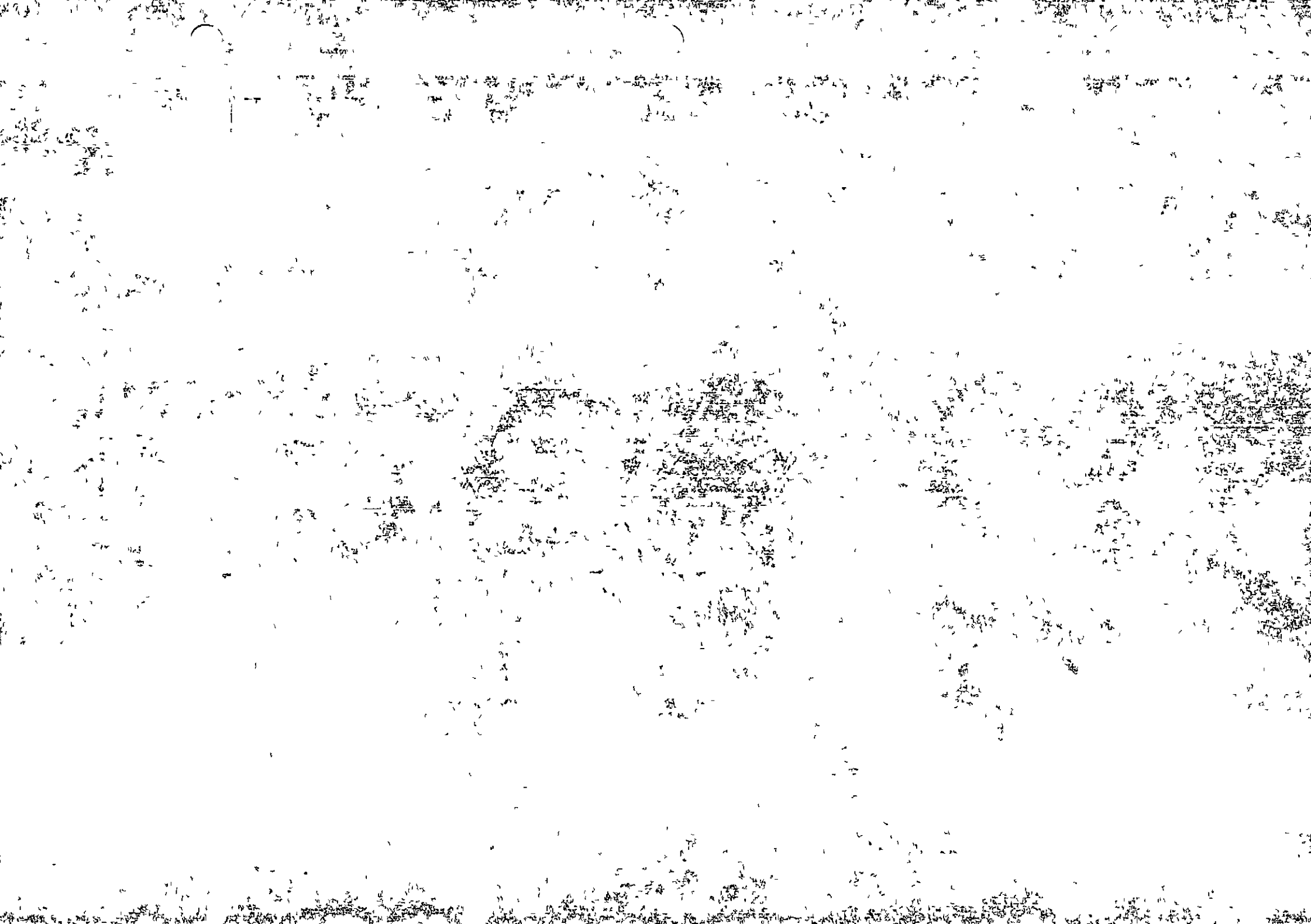


(LAVATORIES C AND D)
DETAIL B



(LAVATORY E)
DETAIL B


THUMB SCREW (2 PLACES)
SCREW (4 PLACES)
A AND D LAVATORY ONLY
MOUNTING SCREWS (6 PLACES)
OUTLET TUBING
160°F OVERHEAT SWITCH (2 PLACES)
INLET TUBING



QUANTITY INDICATING SYSTEM - MAINTENANCE PRACTICES

1 General

A The quantity indicating system consists of a quantity transmitter and a quantity indicator Forward and aft systems are identical except for tank capacity

2. Adjustment/Test Quantity Indicating System

A Equipment and Materials

(1) Container suitable for measuring 10 gallons

B Test Quantity Indicating System

(1) Connect external power.

(2) Close POTABLE WATER QTY IND, VALVES AND COMPR CONTROL circuit breaker on T-R bus No 2 of radio and 28 volts dc T-R busses on circuit breaker panel (P5)

(3) Ensure that water tank is full and that quantity indicator on forward lower ceiling shows approximately 43 or 60 gallons as applicable Add water if necessary Refer to Chapter 12, Servicing

(4) Drain tank of 10 gallons.

NOTE: To drain tank turn both the fill and overflow valve and the drain valve to OPEN position After draining desired amount, turn drain valve back to CLOSED position.

(5) Ensure that quantity indicator shows approximately 33 or 50 gallons as applicable

(6) Fill water tank. Refer to Chapter 12, Servicing.

(7) Determine whether there is any further need for electrical power on the airplane, if not remove electrical power.

3 Removal/Installation Water Quantity Transmitter

A. Remove Water Quantity Transmitter

(1) Open POTABLE WATER QTY. IND. COMPR. AND VALVE CONTROL circuit breaker on T-R bus No. 2 of radio and 28 volt dc T-R busses or circuit breaker panel (P5).

(2) Drain water tank.

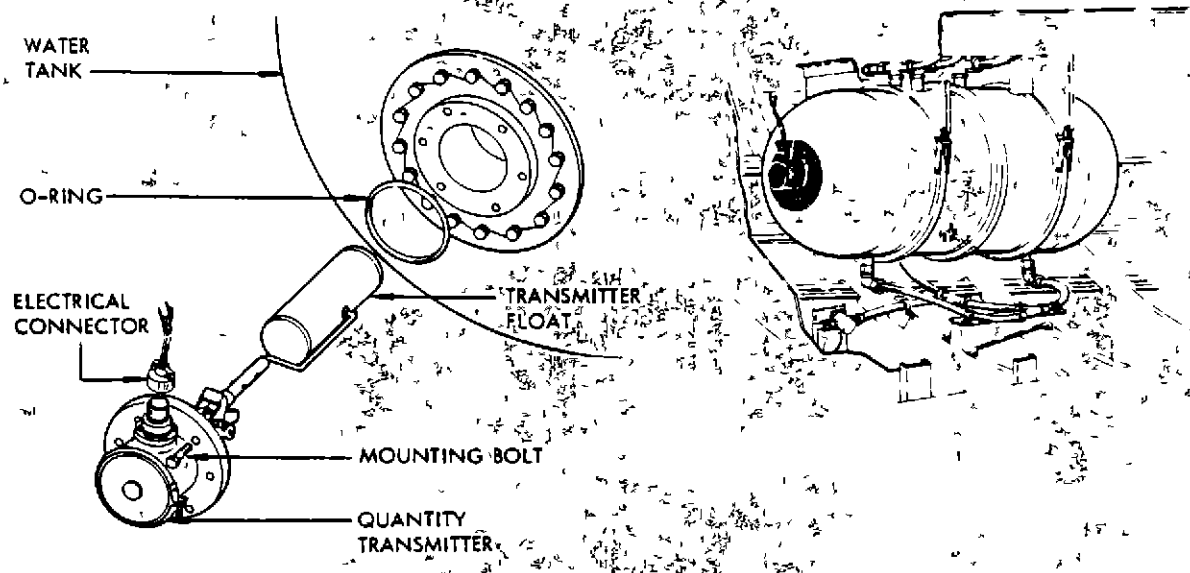
NOTE To drain tank turn both the fill and overflow valve and the drain valve to OPEN position. After draining tank turn drain valve to CLOSED position.

(3) On forward system remove access panel on forward end of shroud. On aft system remove forward shroud section for access

(4) Remove connector plug from transmitter (See figure 201.)

(5) Remove lockwire and transmitter mounting bolts (6 places).

(6) Slowly remove transmitter away from tank and carefully pull arm and float through tank opening.



Quantity Transmitter Installation
Figure 201

B. Install Water Quantity Transmitter

(1) Check that mounting surfaces on tank and transmitter are clear.

(2) Install new O-ring on flange. (See figure 201.)

(3) Carefully insert transmitter float and arm into the tank opening. Position transmitter correctly and secure it with mounting bolts Lockwire all mounting bolts.

(4) Install transmitter connector plug.

(5) Close circuit breaker.

(6) Check the water quantity gage shows zero.

(7) Test water quantity indicating system.

(8) Install access panel on forward shroud section.

PASSENGER WATER PRESSURIZATION SYSTEM - MAINTENANCE PRACTICES

EFFECTIVITY

Turbofan

1. General

   A. Open POTABLE WATER QTY. IND., COMPR. AND VALVE CONTROL circuit breaker on T-R bus No. 2 of radio and 28 volt dc T-R busses, circuit breaker panel (P5), before performing any maintenance practices on the pressurization system.

2. Unit Servicing Passenger Water Pressurization System Filter

   A. Remove Passenger Water Pressurization System Filter Element

      (1) Remove center air conditioning equipment access panel.

      (2) Disconnect lockwire and unscrew filter case and element from filter head. (See figure 201.)

      (3) Remove filter element and clean filter case.

   B. Install Passenger Water Pressurization System Filter Element

      (1) Insert O-ring in filter element and place new element in filter case. (See figure 201.)

      (2) Place O-ring on filter case and screw filter case into filter head. Torque filter case to 75 pound-inches.

      (3) Lockwire filter case to filter head.

      (4) Replace access panels.

      (5) Close circuit breaker.

3. Removal/Installation Passenger Water Pressurization System Filter

   A. Remove Passenger Water Pressurization System Filter

      (1) Remove center air conditioning equipment access panel.

      (2) Disconnect lines from filter and install line protective caps. (See figure 201.)

      (3) Remove filter mounting bolts and remove filter.

B Install Passenger Water Pressurization System Filter

(1) Position assembled filter on mounting bracket and install filter mounting bolts (See figure 201.)

NOTE: Check that outlet side of filter is inboard

(2) Remove protective caps from air lines and connect lines to filter

(3) Replace access panels

(4) Close circuit breaker

4 Removal/Installation Passenger Water Pressurization System Air Compressor

A Remove Passenger Water Pressurization System Air Compressor

(1) Remove center air conditioning equipment access panel

(2) Disconnect electrical connector from air compressor (See figure 201)

(3) Disconnect check valve from compressor at air compressor outlet

(4) Remove four mounting bolts and remove air compressor

B Install Passenger Water Pressurization System Air Compressor

(1) Position air compressor and install mounting bolts (See figure 201)

NOTE Check that bonding jumper is attached to compressor with mounting bolt

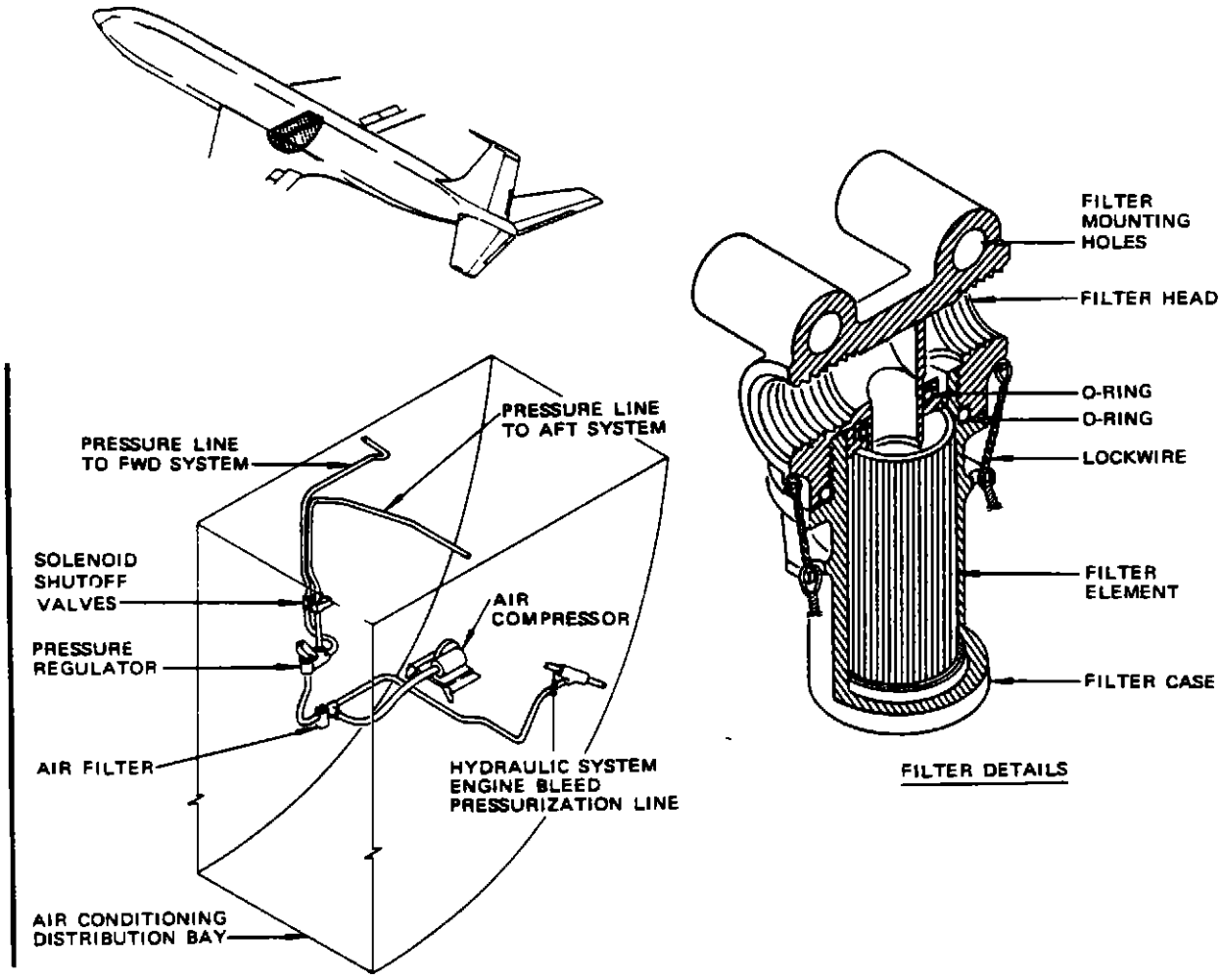
(2) Connect check valve to compressor at air pressure outlet

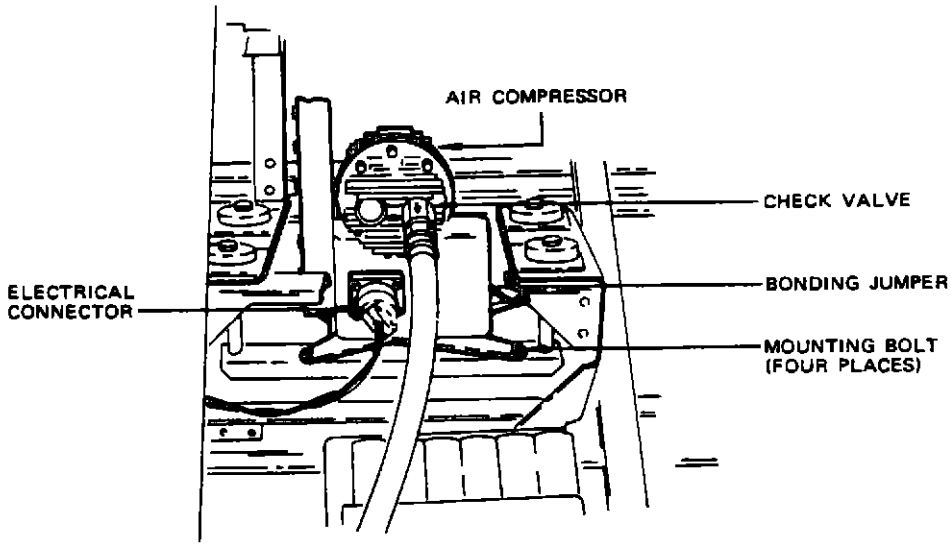
NOTE Check that arrow on check valve points away from the air compressor.

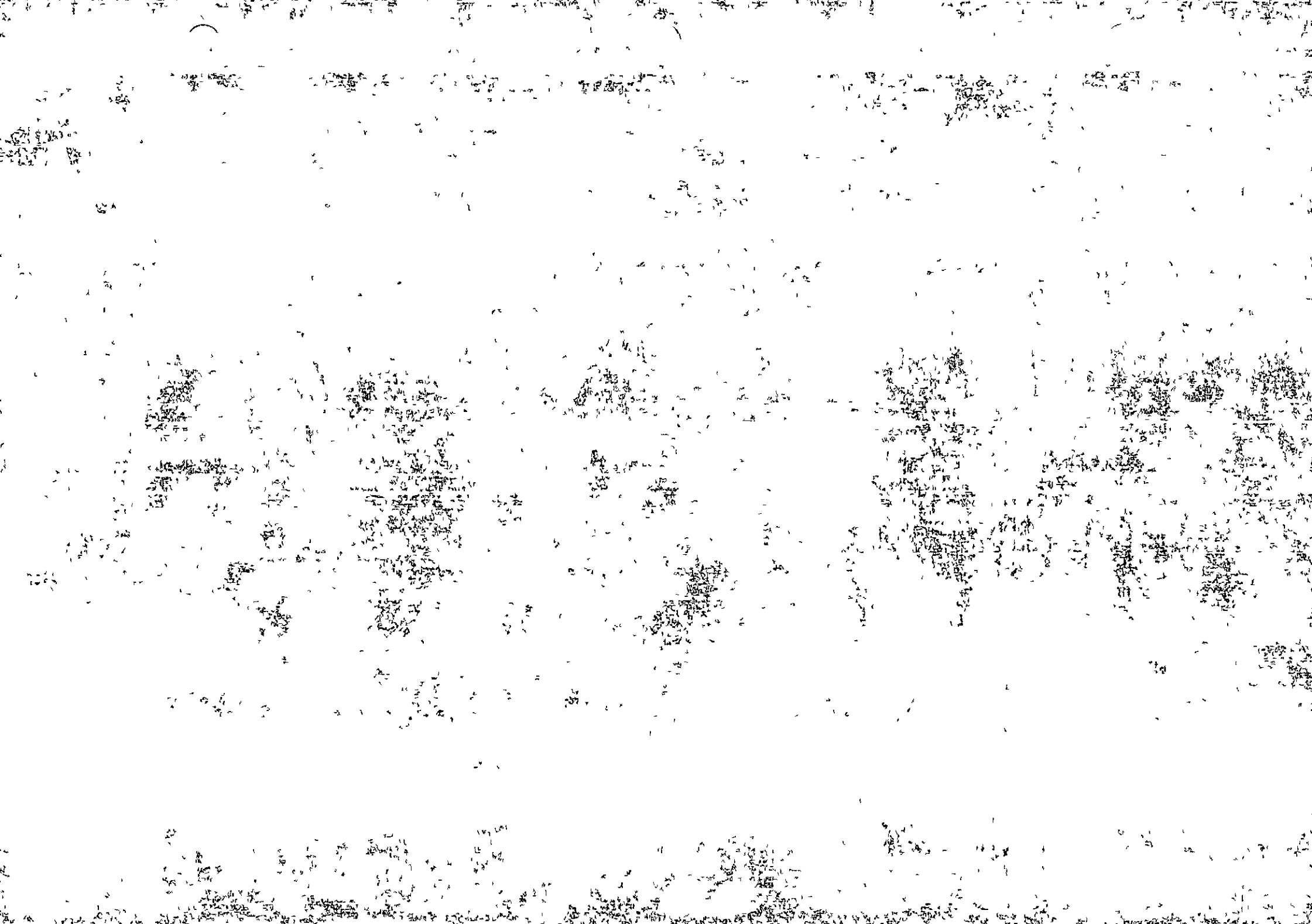
(3) Connect electrical connector to air compressor

(4) Close circuit breaker.

(5) Replace access panel.


PRESSURE LINE TO FWD SYSTEM
PRESSURE LINE TO AFT SYSTEM
SOLENOID SHUTOFF VALVES
PRESSURE REGULATOR
AIR COMPRESSOR
AIR FILTER
HYDRAULIC SYSTEM ENGINE BLEED PRESSURIZATION LINE
AIR CONDITIONING DISTRIBUTION BAY
FILTER MOUNTING HOLES
FILTER HEAD
O-RING
O-RING
LOCKWIRE
FILTER ELEMENT
FILTER CASE
FILTER DETAILS


AIR COMPRESSOR
CHECK VALVE
BONDING JUMPER
ELECTRICAL CONNECTOR
MOUNTING BOLT (FOUR PLACES)
AIR COMPRESSOR INSTALLATION



WATER PURIFIERS - MAINTENANCE PRACTICES

EFFECTIVITY
TURBOFAN

1. Unit Servicing Water Purifier

A. General

(1) The water purifier in the lavatory wash basin cabinet contains a replaceable charcoal cartridge. This cartridge should be replaced whenever the chlorine content in the water at the drinking water faucet is beyond desirable limits.

B. Remove Purifer Cartridge

(1) Turn shutoff valve to "OFF" position.

(2) Unfasten V-clamp at top of purifier body.

(3) Remove cap.

(4) Unscrew cartridge until threaded connector at its base is free and withdraw cartridge.

(5) Reinstall cap, open shutoff valve and cold water faucet, and allow a gallon of water to flow through the purifier body.

C. Install Purifier Cartridge

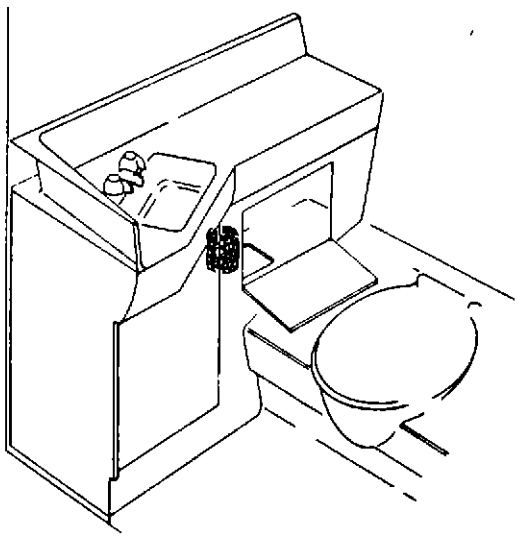
(1) Place cartridge into purifier body and screw into position.

CAUTION. BEFORE TURNING CARTRIDGE INSURE THAT THREADED CONNECTOR AT ITS BASE IS CORRECTLY ENGAGED INTO PURIFIER BODY. FAILURE TO INSURE THIS MAY RESULT IN DAMAGE TO THREADS OF CARTRIDGE CONNECTOR.

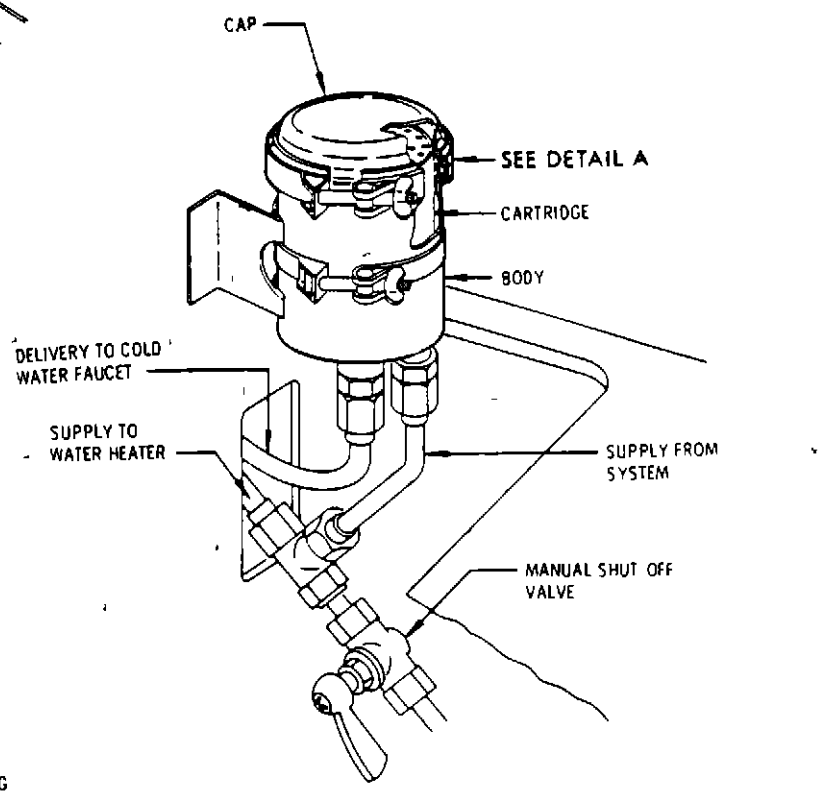
(2) With sealing ring correctly located around top of body place cap in position.

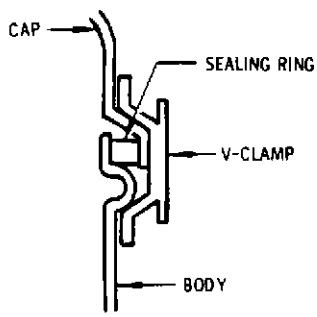
(3) Install V-clamp.

(4) Turn shutoff valve to "ON" position.



LAVATORY "A"





DETAIL A

FILL AND OVERFLOW VALVE - MAINTENANCE PRACTICES

EFFECTIVITY

Turbofan

1. Removal/Installation Fill and Overflow Valve

A. General

(1) The forward fill and overflow valve is in the lower nose section on the right side of the fuselage mounted on a bracket against the inner surface of the airplane skin. The aft valve is in the crawlway aft of the aft cargo compartment.

(2) Both the fore and aft installations include a valve heating element. Power to the heating elements must be cut off before the valve is removed.

B. Remove Fill and Overflow Valve

(1) Open valve heater circuit breaker.

(a) For forward valve, open POTABLE WATER VALVE HEATERS AND TOILET FLUSH MOTOR LAV A AND E circuit breaker on ac bus No. 4 circuit breaker panel (P4).

(b) For aft valve, open TOILET FLUSH MOTOR LAV B, C, D AND LAV WATER PIPE HEATERS circuit breaker on ac bus No. 2 circuit breaker panel (P2).

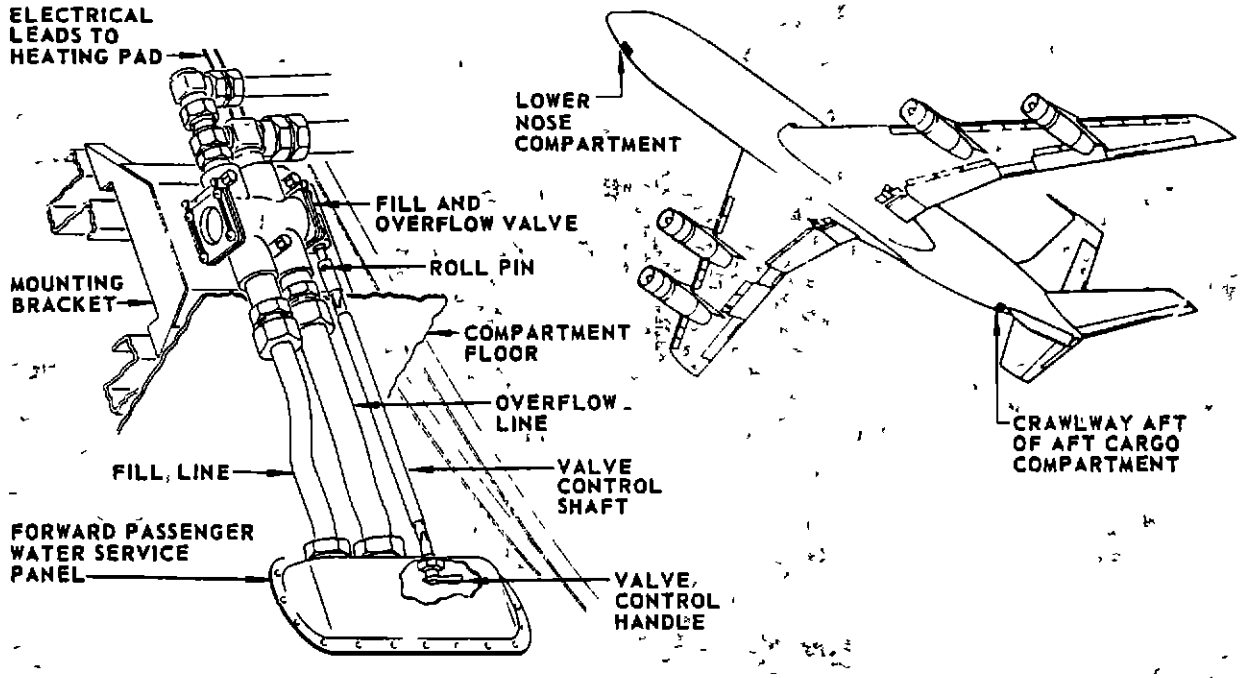
(2) Open the POTABLE WATER QTY. IND. COMPR AND VALVE CONTROL circuit breaker on T-R bus No. 2 of radio and 28 volt dc T-R busses on circuit breaker panel (P5).

(3) Drain water system at service panel.

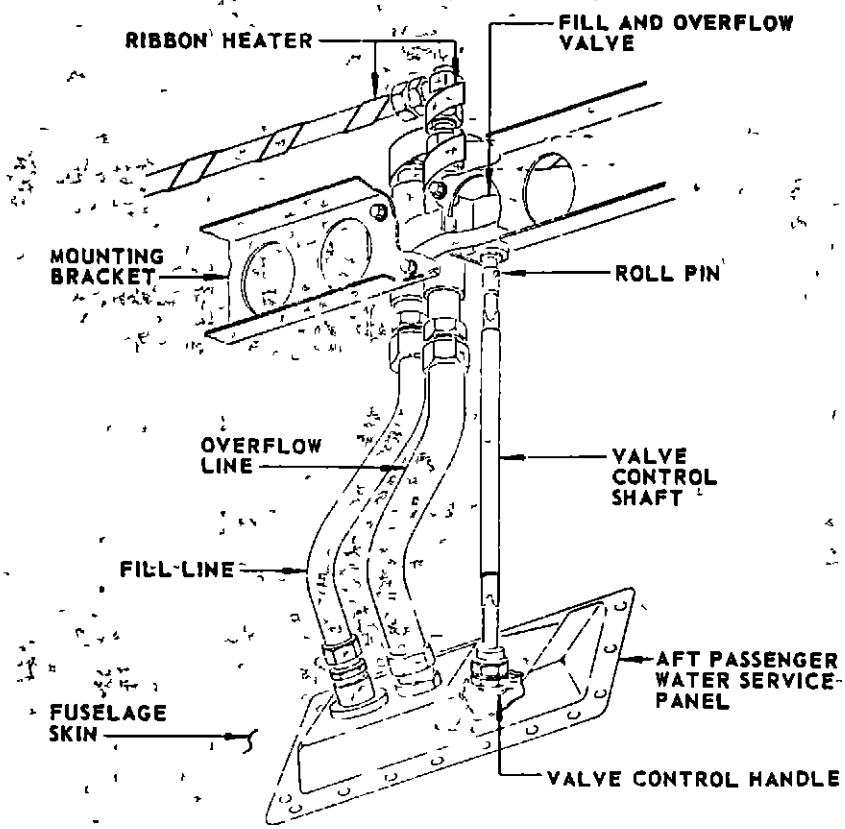
(4) Disconnect fill and overflow tubing at fill and overflow valve. (See figure 201.)

(5) Remove roll pin at upper end of shaft assembly.

(6) Remove bolts that attach valve to support bracket and lift valve up to disengage valve from shaft assembly.



FORWARD INSTALLATION



AFT INSTALLATION

Fill and Overflow Valve Installation
Figure 201

(7) Detach heater from valve.

(a) Remove forward valve from heating pad.

CAUTION: DO NOT ALLOW HEATING PAD TO HANG FROM LEADS AS THIS WILL DAMAGE THE SPLICE CONNECTION.

(b) Unwrap ribbon heater from aft valve without electrically disconnecting the ribbon heater.

C. Install Fill and Overflow Valve

(1) Position heater on valve, insert valve shaft into shaft assembly and position valve on support bracket. (See figure 201.)

(a) Position heating pad against curved side of forward valve.

(b) Wrap ribbon heater around aft valve two complete wraps.

(2) Bolt valve to support bracket.

(3) Install roll pin in shaft assembly.

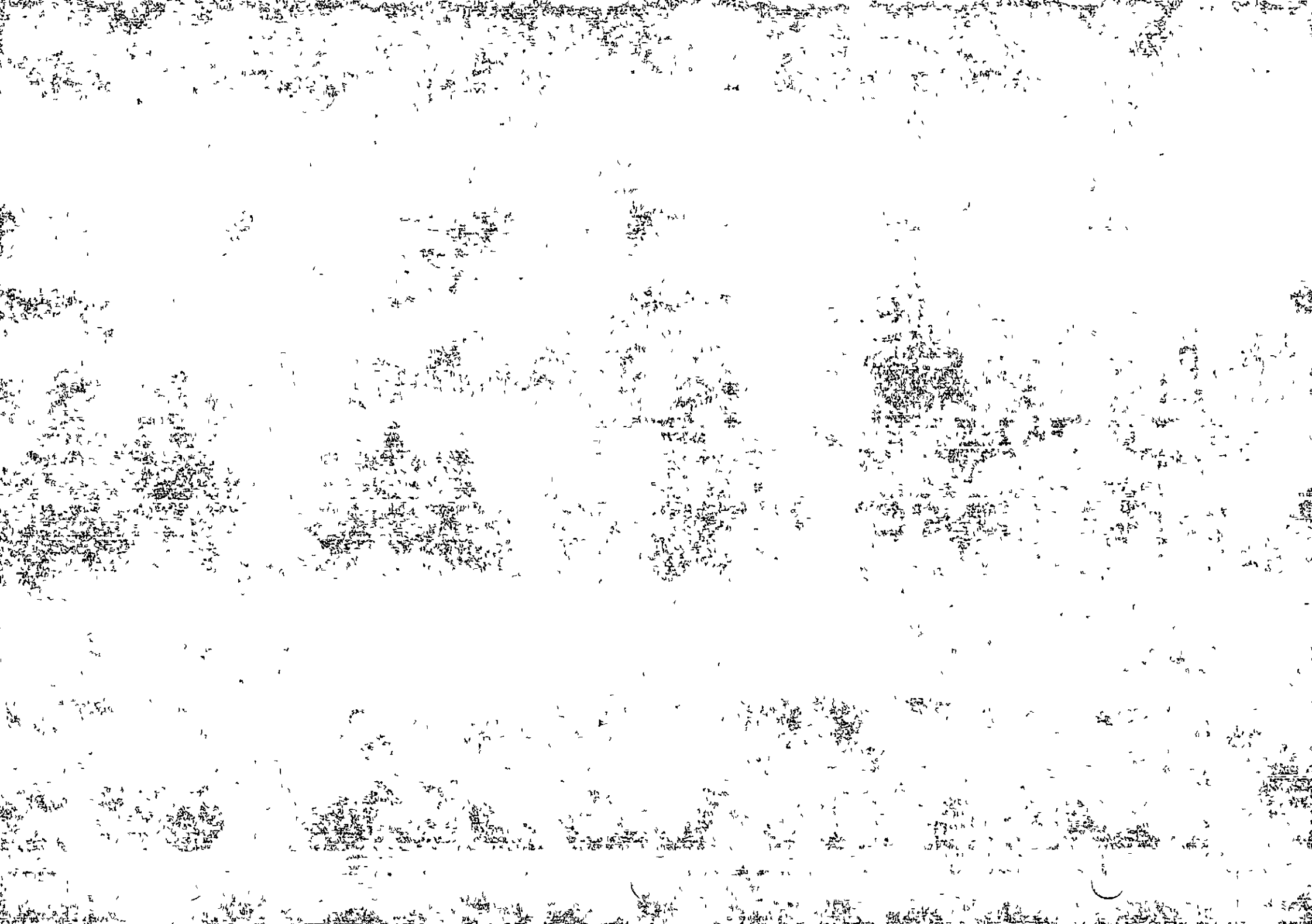
CAUTION. VALVE AND VALVE HANDLE MUST BOTH BE IN OPEN POSITION DURING INSTALLATION.

(4) Connect tubing to valve.

(5) Fill water system at service panel.

(6) Check installation for leaks.

(7) Close circuit breaker.



PASSENGER WATER DRAIN VALVES - MAINTENANCE PRACTICES

EFFECTIVITY

Turbofan

1. General

A. Open POTABLE WATER QTY. IND. COMPR. AND VALVE CONTROL circuit breaker on T-R bus No. 2 of radio and 28 volt dc T-R busses on circuit breaker panel (P5), before performing any maintenance practices on passenger water drain valves.

2. Removal/Installation Passenger Water Drain Valve

A. Remove Forward Drain Valve

(1) Drain water tank.

NOTE: To drain the tank turn the fill and overflow valve and drain valve to the OPEN position. After draining the tank turn the drain valve to the CLOSED position.

(2) Remove water tank protective shroud.

(3) Remove bolt holding valve adapter to valve shaft. (See figure 201.)

(4) Disconnect drain lines from valve.

(5) Remove lockwire from mounting bolts on underside of mounting bracket.

(6) Remove mounting bolts (4 places).

(7) Remove drain valve.

B Remove Aft Drain Valve

(1) Drain water tank.

NOTE To drain the tank turn the fill and overflow valve and drain valve to the OPEN position. After draining the tank turn the drain valve to the CLOSED position.

(2) Remove forward end of water tank protective shroud.

(3) Remove valve handle attachment screw and valve handle. (See figure 201.)

(4) Disconnect drain lines from valve.

(5) Remove lockwire from mounting bolts on outboard side of mounting bracket.

(6) Remove mounting bolts (4 places).

(7) Remove drain valve.

C. Install Forward Drain Valve

(1) Position the drain valve on the mounting bracket. (See figure 201)

NOTE. Check to see that the valve handle and the valve are both in the "CLOSED" position.

(2) Install and lockwire mounting bolts (4 places).

(3) Connect drain lines to valve.

(4) Install bolt through valve adapter and shaft.

(5) Install water tank protective shroud.

(6) Close circuit breaker.

(7) Fill water tank See Chapter 12, "Servicing "

D Install Aft Drain Valve

(1) Position the drain valve on the mounting bracket (See figure 201)

NOTE. Check to see that the valve handle and the valve are both in the "CLOSED" position.

(2) Install and lockwire mounting bolts (4 places)

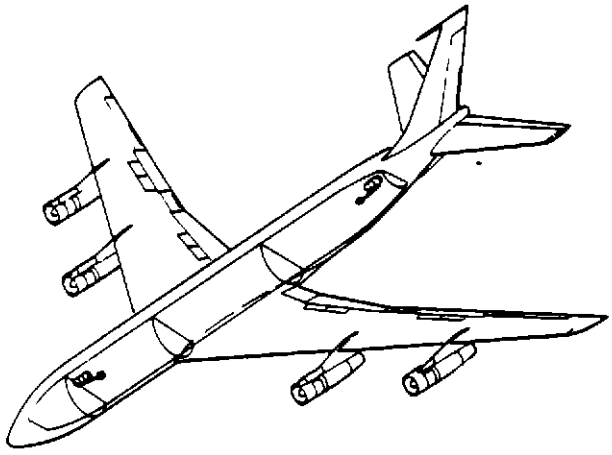
(3) Connect drain lines to valve.

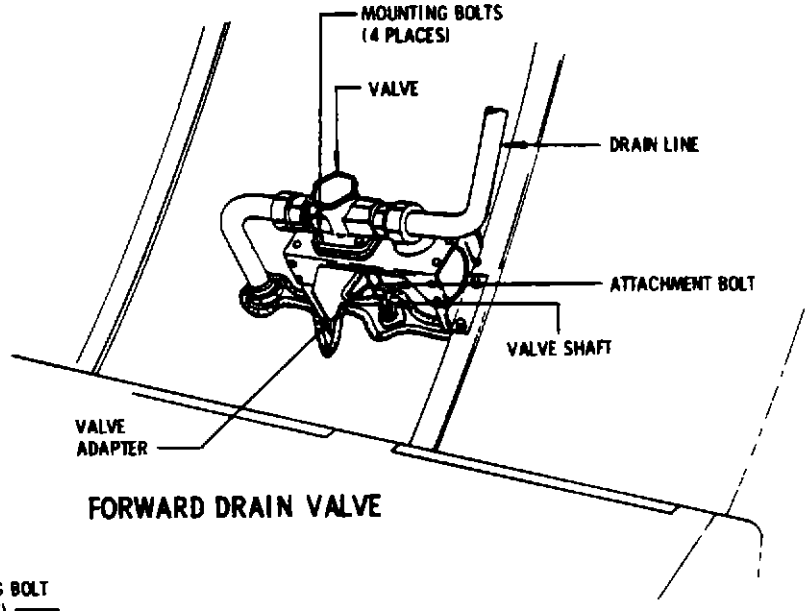
(4) Install valve handle and valve handle attachment screw

(5) Install water tank protective shroud

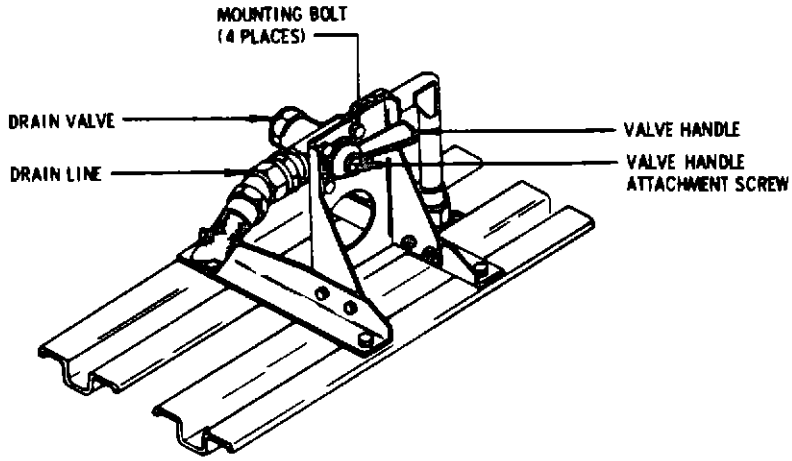
(6) Close circuit breaker.

(7) Fill water tank. See Chapter 12, "Servicing "





FORWARD DRAIN VALVE



AFT DRAIN VALVE

WASH BASINS - MAINTENANCE PRACTICES

1 Removal/Installation Lavatory Wash Basin Faucets

A Remove Faucets (See figure 201)

(1) Drain water system

(2) Disconnect hot and cold water supply and waste water drain tubing

NOTE Tubing is accessible under wash basin cabinet

(3) Remove spring and disconnect stopper valve.

(4) Remove drain fixture by loosening fitting

(5) Remove water supply faucets by loosening lock nuts on underside of wash basin

B Install Faucets (See figure 201)

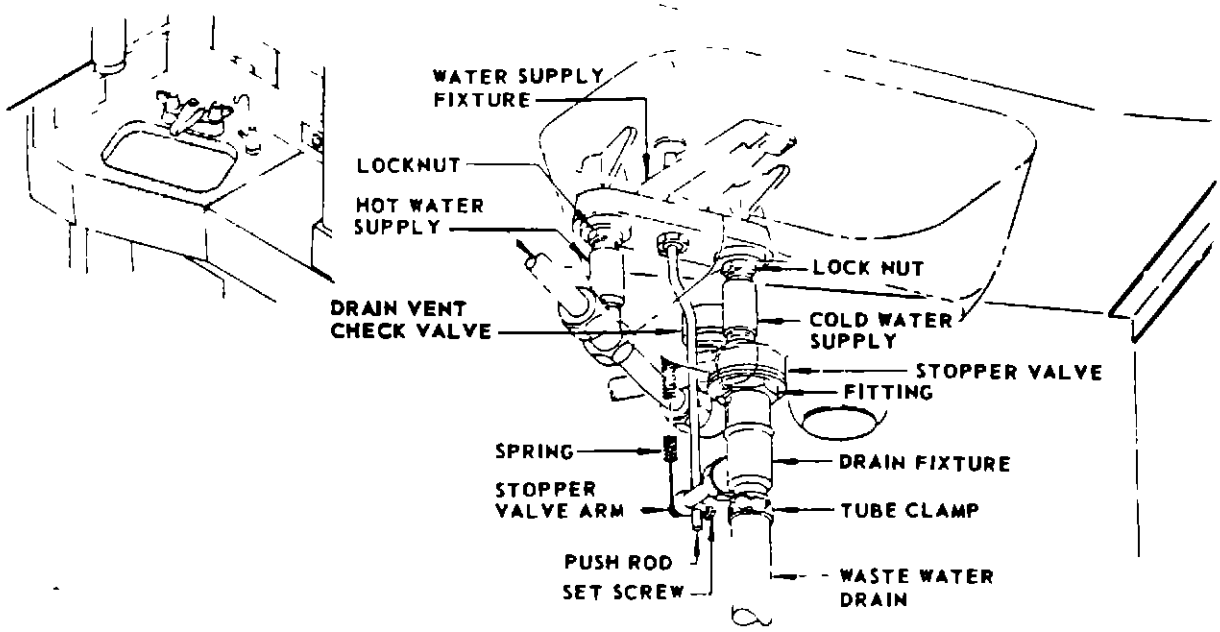
(1) Position water supply faucets and install lock nuts

(2) Install drain fixture and tighten fitting.

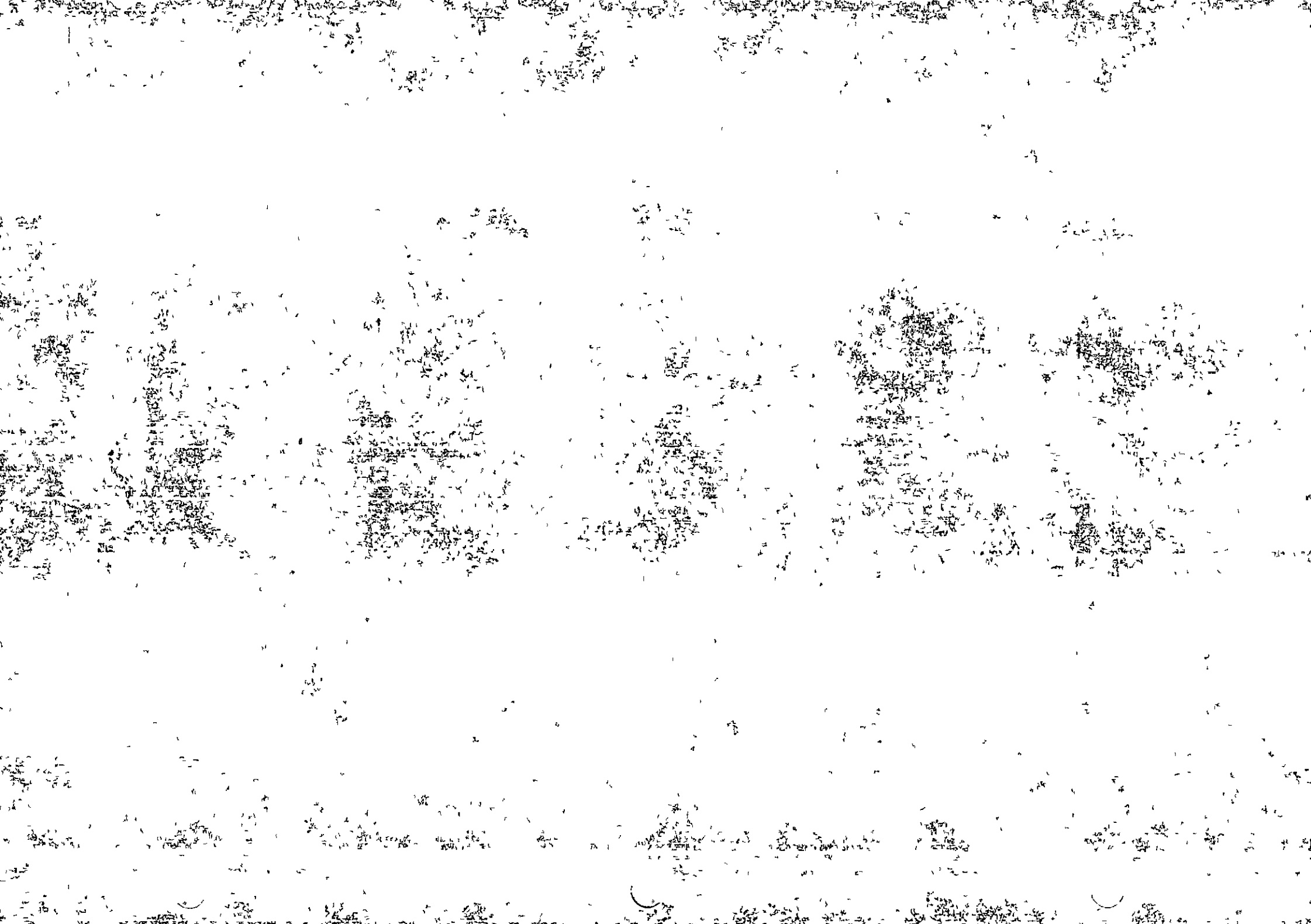
(3) Connect and adjust push rod and spring

(4) Connect hot and cold water supply and waste water drain tubing.

(5) Fill water system



Typical Lavatory Wash Basin Faucets Installation
Figure 201



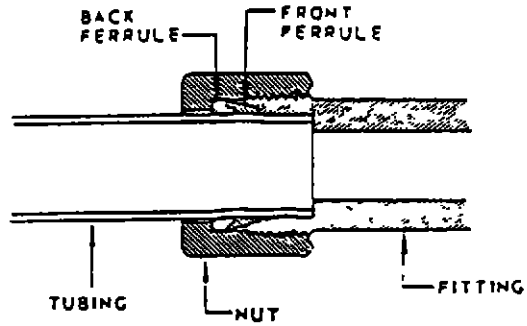
NYLON TUBING AND FITTINGS - MAINTENANCE PRACTICES

1 Removal/Installation Nylon Tubing and Fittings

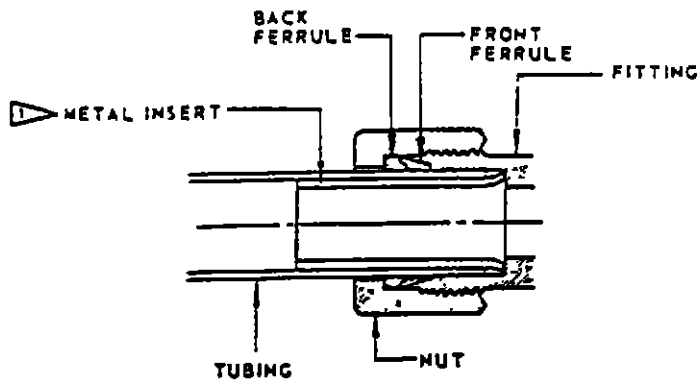
A. General

(1) When connecting nylon fittings to nylon tubing, the tubing shall be butted square against the shoulder of the fitting. The nuts on the fitting shall then be tightened one and one-half turns beyond the hand tight position (See figure 201.) Metal inserts may be used in any nylon tubing and fitting connection. (See figure 202.)

(2) Do not use any lubrication or cement when installing tubing and fittings Elbow or tee fittings shall not be backed off for alignment. They shall either be further tightened or replaced by another fitting



Typical Assembly of Nylon Tube Fittings
Figure 201



1 METAL INSERTS IN INITIAL INSTALLATION ON FOLLOWING AIRPLANES:

TCA	LX-N20198
	LX-N20199
RTCA	LX-N19997
	LX-N20000

Typical Assembly of Nylon Tube Fittings with Metal Insert
Figure 202

WASTE WATER DRAIN MAST AND HEATER - REMOVAL/INSTALLATION

1. General

   A. The removal and installation of both the forward and aft drain masts and heaters are the same, except as noted in the following procedure.

2. Equipment and Materials

   A. Permacel 2650 Silicone Rubber tape, Permacel 421 Teflon tape, or equivalent

3. Remove Drain Mast and Heater

   A. Remove Drain Mast

      (1) Open both WATER DRAIN MAST HEATER circuit breakers on P1.

      (2) Gain access to drain mast.

         (a) For forward drain mast gain access into electronic equipment compartment and remove right floor plate. (See figure 401.)

         (b) For aft drain mast remove aft cargo compartment rear bulkhead access panel.

      (3) Loosen fitting and disconnect drain mast tube.

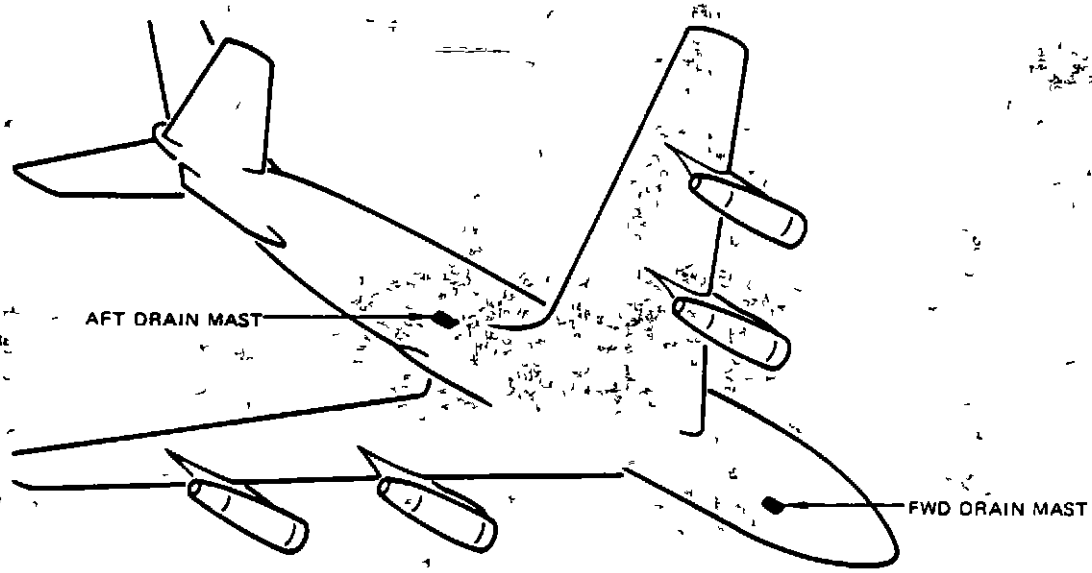
      (4) Disconnect electrical wires at splices.

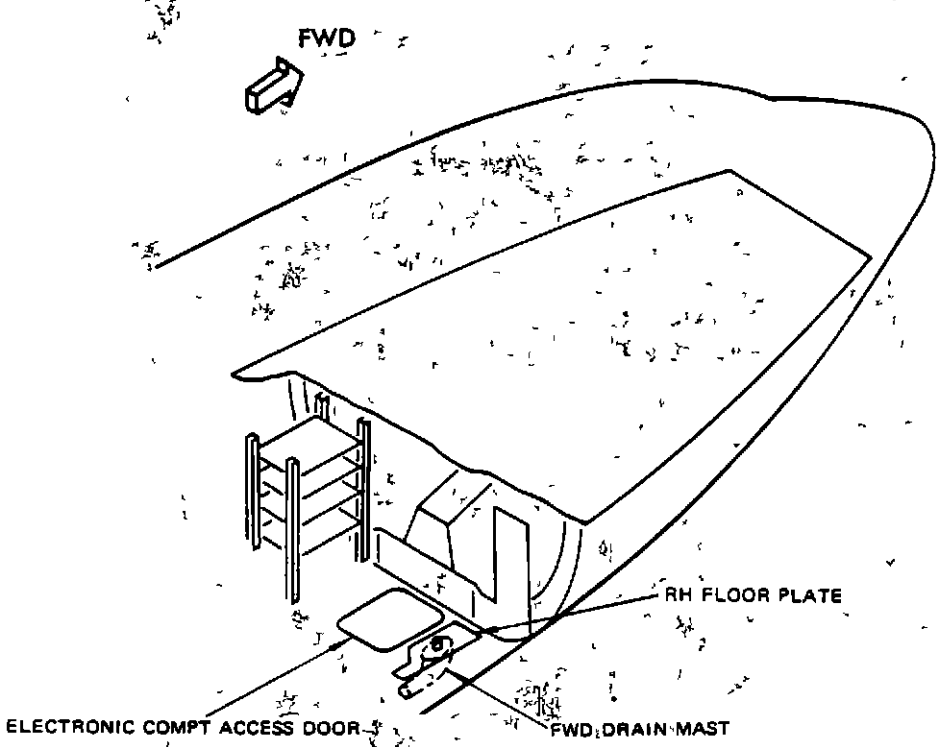
      (5) Remove attachment bolts and washers.

         CAUTION: WHEN REMOVING ATTACHMENT BOLTS HOLD DRAIN MAST TO PREVENT IT FROM FALLING.

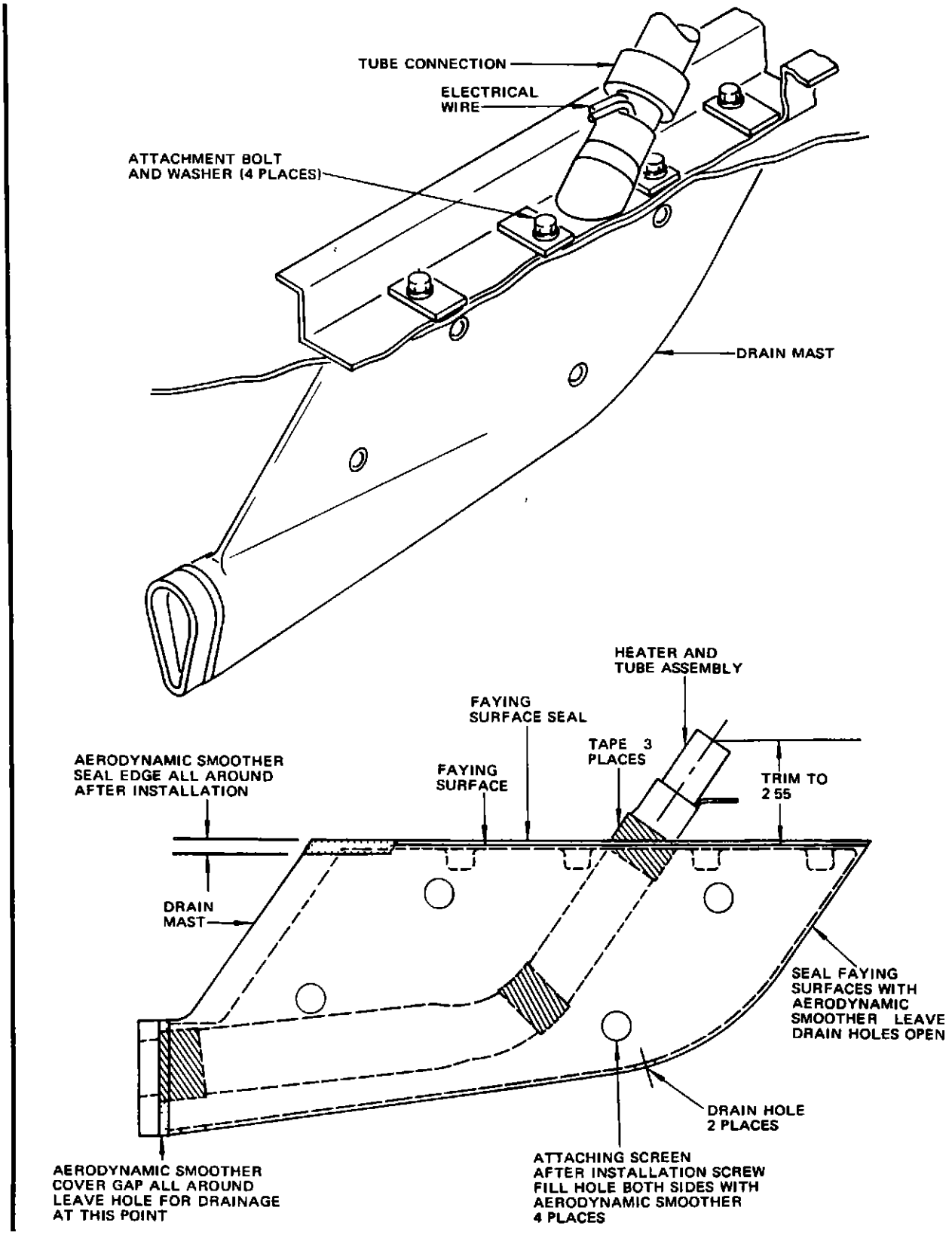
      (6) Remove drain mast.

      (7) Remove and clean aerodynamic smoother and faying surface seal. Refer to Sealing, Chapter 51.





Drain Mast and Heater Installation
Figure 401 (Sheet 1)



Drain Mast and Heater Installation
Figure 401 (Sheet 2)

B Remove Drain Mast Heater

(1) Remove aerodynamic smoother.

(2) Remove drain mast connecting screws

(3) Separate drain mast halves.

(4) Remove heater and tube assembly.

(5) Clean remaining aerodynamic smoother from mast halves.

4 Install Heater and Drain Mast

A Install Heater on Drain Mast

NOTE: Heater and tube are assembled together

(1) Prepare heater and tube assembly per figure 401

(a) Wrap tape around heater, at approximate locations shown on figure 401, so that heater and tube assembly are clamped firmly in place when drain mast halves are joined

CAUTION: USE ONLY THAT AMOUNT OF TAPE NECESSARY TO HOLD TUBE AND HEATER ASSEMBLY IN PLACE. IF TOO MUCH TAPE IS USED TAPE MAY BE DAMAGED. IF TOO LITTLE TAPE IS USED AND AN ATTEMPT IS MADE TO TIGHTEN SCREWS TO HOLD TUBE AND HEATER FIRMLY MAST HALVES MAY BE DAMAGED

(b) Position drain mast halves and seal faying surfaces with aerodynamic smoother as shown on figure 401. Refer to Sealing, Chapter 51.

(c) Install and tighten connecting screws

(d) Fill connecting screw holes, and cover gap between heater and drain mast, with aerodynamic smoother (See figure 401.)

B. Install Drain Mast

(1) Position drain mast on outside of airplane.

(2) Seal faying surfaces. Refer to Sealing, Chapter 51

(3) Install attachment bolts and washers. Tighten bolts.

(4) Fair sealed surfaces. Apply aerodynamic smoother per figure 401.

(5) Connect fitting to drain tube.

(6) Connect electrical wire.

(7) Close circuit breakers.

(8) Check for leaks.

(a) Plug drain mast.

(b) Let an appropriate amount of water run from the sink of an adjacent lavatory.

(c) Check for leaks at drain mast tube connection.

(d) Unplug drain mast.

(9) Check for heating of drain mast. Refer to Waste Water Drain Mast Heater - Adjustment/Test, Chapter 30