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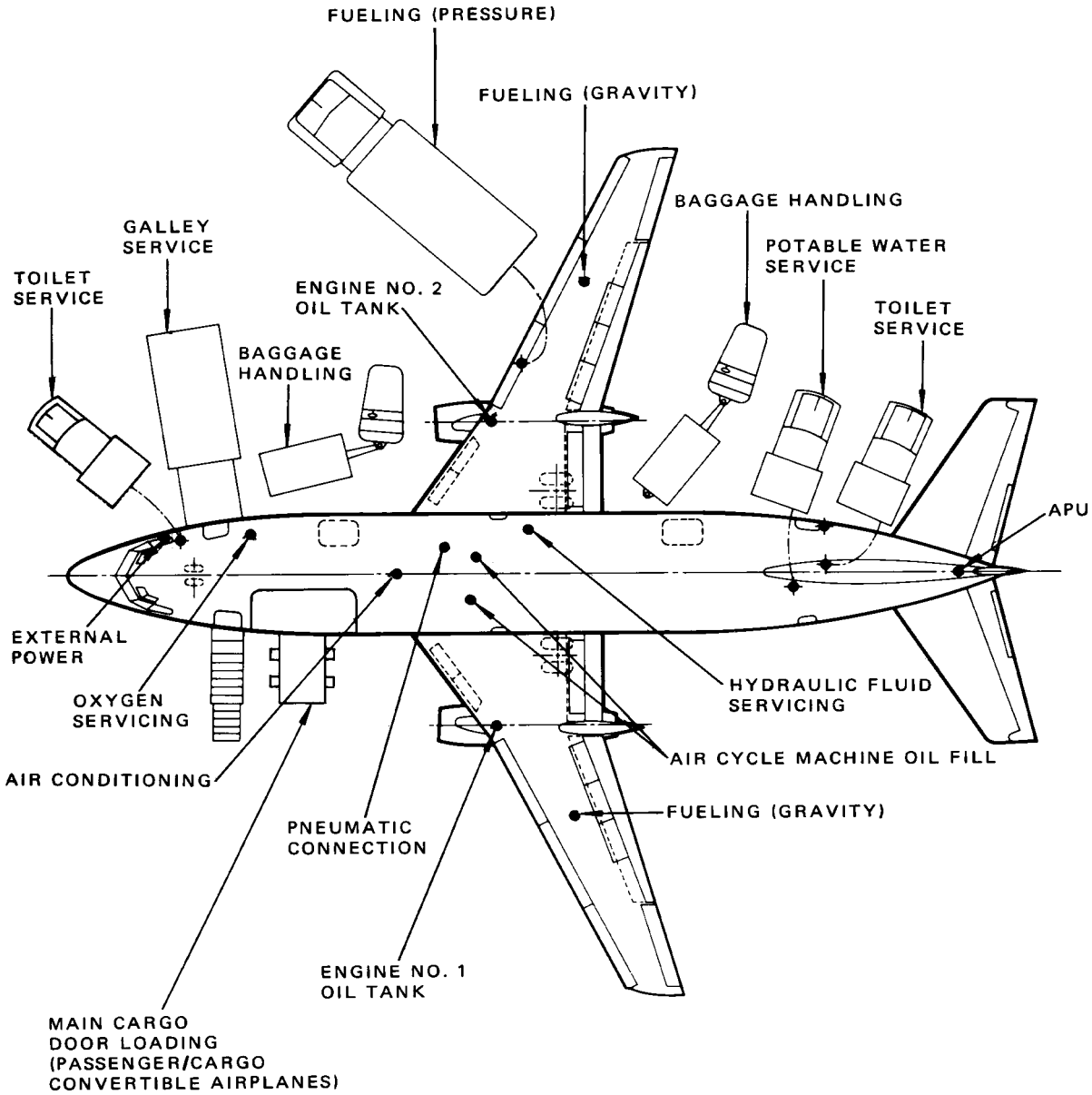
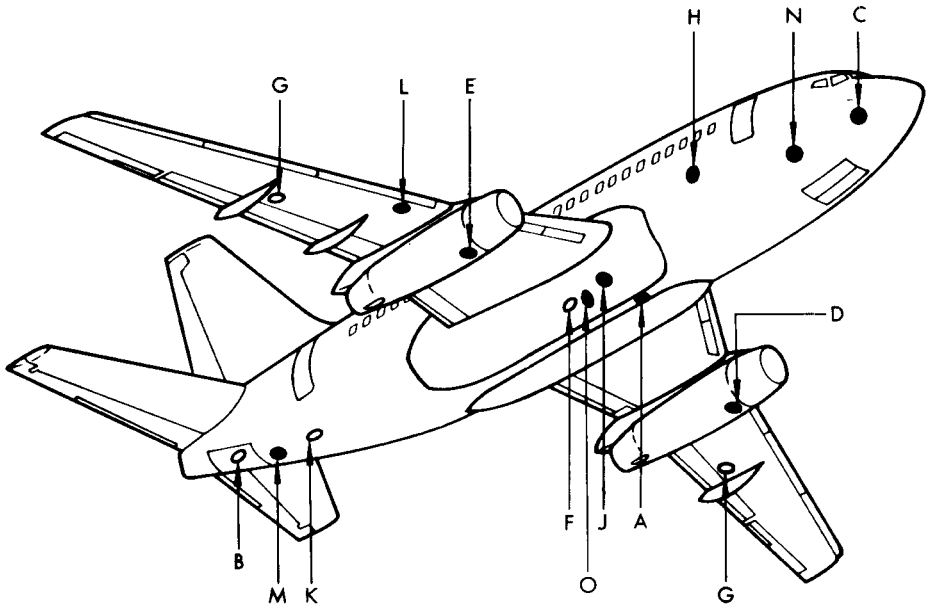
SERVICING - MAINTENANCE PRACTICES

1. General
   A. The design of this airplane provides for most of the servicing to be accomplished from the right side of the fuselage. To avoid interference during ground servicing activities, passenger loading doors are located forward and aft on the left side of the fuselage.
   B. This chapter contains instructions and precautions for replenishment of items involved in servicing the airplane. Charts are provided to show tank and reservoir capacities. See Fig. 201 and 202 for general service layout.
   C. Diagrams are provided to show location and identification of access panels.
   D. Airplane cleaning instructions and periodic lubrication requirements for the airplane are included.
   E. Figures 203 and 204 locate the wing and stabilizer walkway areas approved by Boeing. If walkway areas are marked on the airplane, they will be marked per BAC drawing 65-45211.



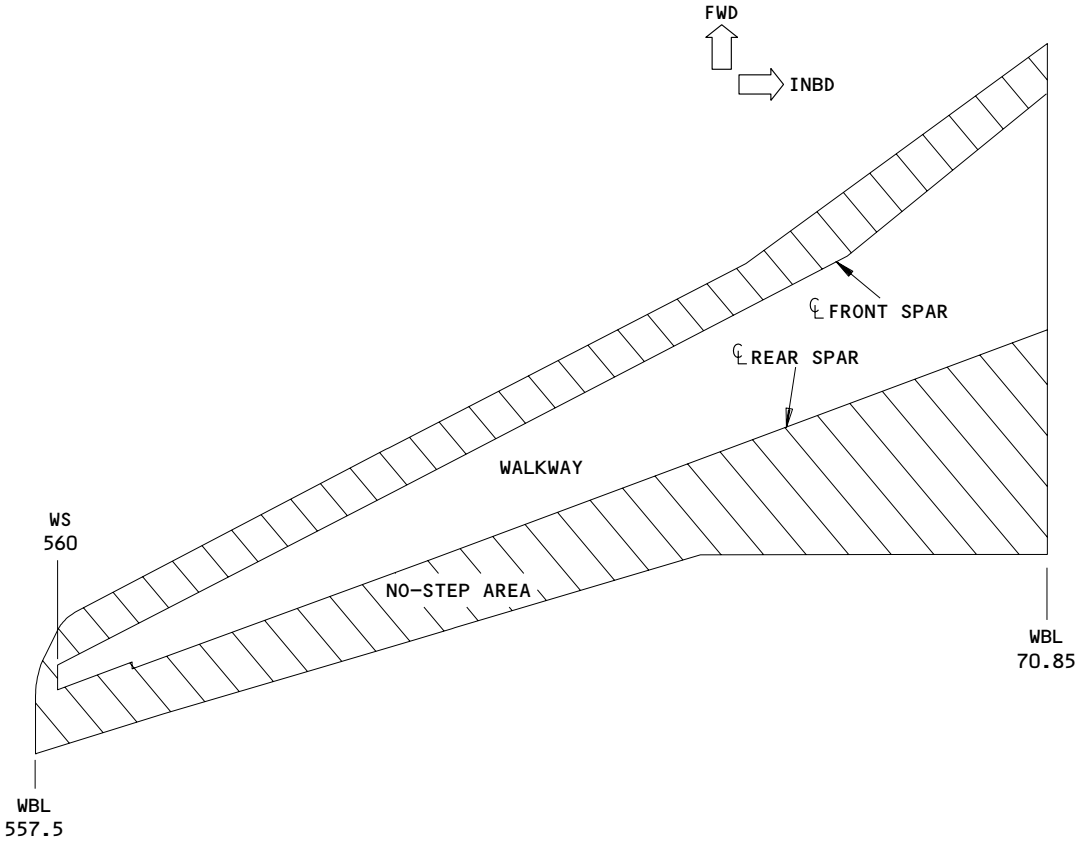
Typical Terminal Service Arrangement
Figure 201



● NEAR SIDE
O FAR SIDE

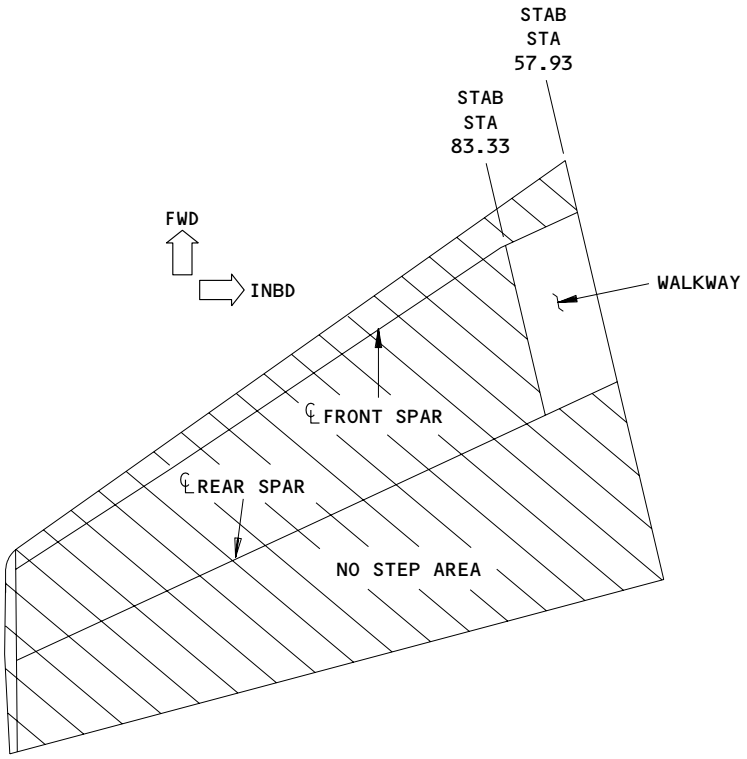
		BODY STATION	BODY BUTTOCK LINE	APPROXIMATE HEIGHT FROM GROUND
A	AIR CONDITIONING	528	0	3'-4"
B	AUX POWER UNIT OIL TANK	1121	L13	12'-0"
C	ELEC RECEPTACLE - AC	232	R35	5'-4"
D	ENGINE NO. 1 OIL TANK	616	L213	3'-5"
E	ENGINE NO. 2 OIL TANK	616	R178	3'-1"
F	HYDRAULIC OIL RESERVOIR	664	R53	4'-5"
G	OVERWING FUEL FILLER	755	R & L 362	9'-4"
H	OXYGEN PANEL	390	R64	6'-3"
J	PNEUMATIC CONNECTION	540	R36	3'-8"
K	POTABLE WATER	957	L18	6'-4"
L	PRESSURE FUELING AND DEFUELING	659	R265	8'-0"
M	TOILET PANEL	996	R10	7'-0"
N	TOILET PANEL, FWD	270	R44	5'-10"
O	AIR CYCLE MACHINE OIL FILL	575	R & L 21	4'-2"

Ground Service Receptacle Locations
Figure 202



PLAN VIEW - WING

Wing Walkway Area
Figure 203



Stabilizer Walkway Areas
Figure 204

FUEL SERVICING

1. General
   A. This procedure has moved to the subsequent procedures:
      (1) Precautions and Limits for Fuel Servicing (AMM 12-11-01/301)
      (2) Prepare the Airplane for the Refuel Operation (AMM 12-11-01/301)
      (3) Pressure Refueling (AMM 12-11-02/301)
      (4) Overwing Refueling (AMM 12-11-03/301)
      (5) Alternative Refueling Procedures (AMM 12-11-04/301)
      (6) Fuel System Drainage (AMM 12-11-05/301).
   B. Fuel Servicing Regulations
      (1) Each operator is responsible for complying with the local, state and national regulations regarding aircraft fuel servicing. It is possible that fire codes and standards make it necessary to use different or more restrictive procedures than those given in the above procedures. Make sure the procedures used during the refuel operation give sufficient protection to persons and equipment.
      (2) If you make a decision not to do these recommended procedures, you must have an approved alternative procedure.

FUEL - SERVICING

1. General
   A. This procedure has these tasks:
      (1) Precautions and Limits for Fuel Servicing
      (2) Prepare the Airplane for the Refuel Operation
   B. Fuel Servicing Regulations
      (1) Each operator is responsible for complying with the local, state and national regulations regarding aircraft fuel servicing. It is possible that fire codes and standards make it necessary to use different or more restrictive procedures than those given below. Make sure the procedures used during the refuel operation give sufficient protection to persons and equipment.
      (2) If you make a decision not to do this recommended procedure, you must have an approved alternative procedure.
      (3) Refuel procedures can be found in these procedures:
         (a) Pressure Refueling (AMM 12-11-02/301)
         (b) Overwing Refueling (AMM 12-11-03/301)
         (c) Alternative Refueling Procedures (AMM 12-11-04/301)
         (d) Fuel System Drainage (AMM 12-11-05/301).
2. Precautions and Limits for Fuel Servicing
   A. General
      (1) Obey all of the precautions in this task when you refuel the airplane.
   B. Emergency Procedures
      (1) Obey all airport and operator provided fire protection, rescue and fuel spill emergency procedures. Emergency procedures include these subjects:
         (a) Location of emergency fuel shutoff
         (b) Airport fire department phone numbers
         (c) Evacuation of airplane passengers
         (d) Fuel spill containment and ignition source reduction
         (e) Location and use of fire extinguishers
         (f) Responsibilities of fuel servicing and airplane servicing personnel.
      (2) Refuel the airplanes in areas which allow the free movement of air, fire fighting equipment and other emergency equipment.
      (3) Stop the refuel operation if any conditions change which could cause an unsafe condition for persons or equipment.
   C. Fuel Spills
      (1) Each fuel spill event is different. Variables such as the size of the spill, weather conditions, equipment location, aircraft occupancy, emergency equipment and personnel available will determine the correct response to control the fire hazard.
      (2) During a refuel operation, continuously monitor the airplane for fuel leaks and spills.

(3) If a fuel spill occurs, do these steps:
(a) Stop the fuel flow.
(b) Unload and shut down the APU. Do the usual APU shutdown procedure (AMM Chapter 49).
(c) Follow the fire department and operator provided fuel spill and fire protection emergency procedures.
(d) Find and correct the cause of the fuel spill.
(e) Inspect enclosed areas to make sure they are free of fuel vapor.
(f) Do not begin the refuel operation or start the APU again until the fire department or the person(s) in charge have given approval.

D. Passenger Precautions
(1) Obey all airport and operator procedures if you refuel the airplane with passengers onboard.

WARNING: OBEY THE SUBSEQUENT PASSENGER PRECAUTIONS DURING A REFUEL OPERATION. IF YOU DO NOT OBEY THESE REQUIREMENTS, INJURY TO PERSONS CAN OCCUR.

(2) For each airplane type, a hazardous area must be identified for boarding or unloading passengers during a refuel operation. Barriers must be in position to stop passengers from entering this hazardous area.

E. Airplane System Precautions
(1) Do not operate these systems during a refuel operation:
(a) Weather mapping radar
(b) HF communications system
(2) Do not do these maintenance tasks during a refuel operation:
(a) Re-start an APU if that APU experienced an automatic shutdown or a failed start attempt during its previous operation unless refueling is suspended.
(b) Connect or disconnect the battery chargers, aircraft ground-power generators or other electrical ground-power.
(c) Fill or change oxygen bottles.
(d) Remove electrical power.

NOTE: Damage to the refuel system components can occur.

(e) Begin a refuel operation if a fire or engine overheat condition exists.
(f) Begin a refuel operation if any part of the landing gear is unusually hot.

(3) Make sure these components are in the closed position before you begin the refuel operation:

NOTE: Fuel spills, damage to the airplane or inability to close doors can occur if these components are not closed.

(a) Wing pressure relief valves (if installed)
(b) Landing gear doors
(c) Overwing entry doors (if installed)

(4) Damage or wear at the fueling receptacle adapter can cause fuel leaks. Do these maintenance actions to prevent fuel leaks:
(a) Make sure the mating surface of the fuel hose and fueling receptacle adapter are clean and free from unwanted material.
(b) Make sure the slots and lugs on the adapter are not damaged.
(c) Use a wear gauge to make sure the adapter is within operational limits.

(5) Make sure the landing gear wheel chocks do not touch the tires. The wheel chocks can wedge against the tire after you add fuel. The wheel chocks should be placed about 3 inches away from the tires.

(6) A refuel operation with a main engine operating is an emergency procedure. Obey all airport and operator provided emergency procedures.

F. APU Operations During Refueling and Defueling - Limits and Precautions

(1) Obey the limits for APU operation (AMM 49-11-0/201).

WARNING: OBEY THE LIMITS AND PRECAUTIONS FOR APU OPERATION DURING REFUELING. IF YOU DO NOT OBEY THESE LIMITS AND PRECAUTIONS, INJURY TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) You can start the APU during a refueling operation if the start is an initial start or a restart after normal shutdown.

(3) You can shut down the APU (manual or automatic) during a refueling operation.

(4) If there is a protective automatic shutdown or failure to start condition on the APU, stop the refueling operation and disconnect the fuel hose from the airplane fueling receptacle adapter before you start the APU again.

(5) If an APU fire occurs, do these steps in this sequence:
(a) Stop the refueling operation.
(b) Make sure the APU shutdowns automatically.
1) If the APU does not shut down automatically, do the APU Emergency Shutdown Procedure (AMM 49-11-0/201).
(c) Discharge the APU fire bottles (AMM 49-11-0/201).
(d) Obey all airport and operator supplied fire protection and emergency procedures.

(6) If a fuel spill occurs, do these steps:
  (a) Unload and shut down the APU (AMM 49-11-0/201).
  (b) Do not start the APU again until the fire department or the person(s) in charge have given approval.
(7) Obey these APU exhaust precautions during refueling operations:
  (a) Make sure the fuel vehicles are in a position that avoids any risk of being in the path of the APU exhaust stream.

G. Airplane Separation Distance Limits
(1) Maintain the separation distance given in Table 301.

WARNING: OBEY THE SUBSEQUENT FUELING SEPARATION DISTANCES DURING A REFUEL OPERATION. IF YOU DO NOT OBEY THESE REQUIREMENTS, A FIRE OR EXPLOSION CAN OCCUR.

TABLE 301	
EQUIPMENT OR IGNITION SOURCES	REFUEL/DEFUEL SEPARATION DISTANCE *[1]
Adjacent aircraft engine or APU	50 feet (15 meters)
Fuel service equipment - measured from engine or exhaust system	10 feet (3 meters) from fuel vents
Ground Power Units	20 feet (6 meters)
Aircraft servicing equipment - measured from the engine or exhaust system	10 feet (3 meters)
Aircraft servicing equipment during an overwing refuel operation	Not under the trailing edge of the wing
Electrical equipment that is likely to cause arcs or sparks	50 feet (15 meters)
Photographic equipment	10 feet (3 meters)
Battery powered equipment	10 feet (3 meters) from fuel servicing equipment or fuel spills *[2]
Open flames, heat sources, lighted smoking material, and any other potential ignition sources	50 feet (15 meters)
Electrical transmitting equipment	Reference Table 302

*[1] The distance is measured from a point on the ground directly below the fuel vents or from fueling equipment.
*[2] Does not apply to battery powered equipment approved (by an independent testing laboratory) for use in Class I Division 1 hazardous locations.

(2) Maintain the separation distance given in Table 302.

WARNING: OBEY THE SUBSEQUENT ELECTRICAL SYSTEM SEPARATION DISTANCES DURING A REFUEL OPERATION. IF YOU DO NOT OBEY THESE REQUIREMENTS, A FIRE OR AN EXPLOSION CAN OCCUR.

TABLE 302

POWER (EIRP *[1]) OF EQUIPMENT TRANSMITTING RADAR OR RADIO	REFUEL/DEFUEL SEPARATION DISTANCE *[2]
More than 100 watts (radio or radar)	200 feet (60 meters)
25 to 100 watts (radio or radar)	50 feet (15 meters)
Less than 25 watts *[3]	10 feet (3 meters)

*[1] EIRP is Effective Isotropic Radiated Power in watts.
*[2] The distance is measured from a point on the ground directly below the fuel vents or from fueling equipment.
*[3] This category includes mobile phones, pagers, two-way radios, etc. There are low power intrinsically safe communication systems that are approved for use in hazardous locations. These devices can be used safely in areas that contain fuel vapor (UL 913 or equivalent standards).

H. Fuel Requirements

(1) Make sure the fuel source contains the correct fuel grade as specified by the AFM (Airplane Flight Manual).

WARNING: OBEY THE FUEL GRADE LIMITATION. IF YOU DO NOT USE THE CORRECT GRADE OF FUEL, ENGINE FLAMEOUT, PERFORMANCE DEGRADATION, OR DAMAGE CAN OCCUR.

(2) The use of wide cut fuels may be restricted. Read the capacity placard on the refuel panel to find if there is information on the use of Jet B and JP-4.

I. Fuel Servicing Equipment Precautions

(1) Obey all separation distance requirements (Table 301).

WARNING: OBEY THE SUBSEQUENT FUEL SERVICING EQUIPMENT PRECAUTIONS DURING A REFUEL OPERATION. IF YOU DO NOT OBEY THESE REQUIREMENTS, A FIRE OR AN EXPLOSION CAN OCCUR.

(2) Use only approved fuel servicing equipment in a serviceable condition.

(3) Do not disable the fueling shutoff (deadman) controls.

NOTE: Wire, rope or tools used to disable the deadman control can prevent the immediate shutoff of pressurized fuel. A disabled deadman control can cause a fuel spill hazard.

(4) When you position fuel servicing vehicles, make sure the equipment:
(a) Has a clear exit path at all times
(b) Does not interfere with access to the aircraft for rescue or fire protection
(c) Does not obstruct the passenger evacuation routes
(d) Does not obstruct the chute deployment areas.

J. Ground Equipment and Airplane Servicing Equipment Precautions
(1) Obey all separation distance requirements (Table 301).

WARNING: OBEY THE FUEL SERVICING EQUIPMENT PRECAUTIONS DURING A REFUEL OPERATION. IF YOU DO NOT OBEY THESE REQUIREMENTS, A FIRE OR EXPLOSION CAN OCCUR.

(2) Do not put ground equipment below the fuel system vents at the wingtips. The fuel tanks are vented through the wingtip vents. An explosive mixture of fuel vapor can exist at these locations.
(3) Added fuel weight will compress the landing gear shock struts and lower the airplane. Make sure all stands, ladders, vehicles and equipment that can come in contact with the airplane are removed before the refuel operation begins.

K. Personnel Precautions
(1) Personnel that refuel the airplane must be trained in the safe operation of these systems and procedures:

WARNING: OBEY THE PERSONNEL PRECAUTIONS. IF YOU DO NOT OBEY THESE REQUIREMENTS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(a) 737 fuel servicing operations
(b) Fuel servicing equipment
(c) Fuel spill prevention
(d) Emergency controls
(e) Emergency equipment
(f) Emergency fuel spill and fire protection procedures
(g) Fuel vapor hazard locations (wing tips, engine locations, etc.)

(2) Wear eye protection (chemical splash goggles or safety glasses and face shield) during the connection of the fuel hose and during the initial pressurization of the hose after hookup.
(3) At some airport locations, a fuel safety person may be needed to oversee aircraft refueling operations.

L. Fueling Zone

(1) Refuel operations must only be done in airport approved areas. Fire protection, emergency rescue equipment and correct separation distances will be available in these areas.

WARNING: OBEY THE FUELING ZONE PRECAUTIONS. IF YOU DO NOT OBEY THESE REQUIREMENTS, A FIRE OR EXPLOSION CAN OCCUR.

(2) A fueling zone exists around the airplane anytime an airplane is preparing for or during a refuel operation.

(3) Fire and rescue equipment, including approved fire extinguishers, must be available.

(4) Within the fueling zone, obey these requirements:

(a) Obey the equipment separation requirements (Tables 301 and 302).

(b) Only authorized persons and vehicles are permitted.

(c) Passengers are not permitted.

(d) All personnel must assume that a refuel operation is in progress any time a fuel servicing vehicle is in the fueling zone.

(e) Limit maintenance activity on the airplane to work that does not increase the risk of igniting fuel vapor.

(f) All electrical equipment must be rated for the hazardous location zone where it will operate.

(g) Do not keep vehicle engines running unless necessary for aircraft maintenance or servicing.

(h) Metal wheels or studded tires are not permitted.

(i) Do not approach within 50 feet (15 meters) of the airplane with these items:

1) Open flames
2) Heat sources
3) Lighted smoking material
4) Shoes with metal clips
5) Other potential ignition sources

M. Adverse Weather Conditions Precautions

(1) When thunderstorms or lightning are in the area, approximately a 10-mile (16-kilometer) radius, do these steps:

WARNING: STOP THE REFUEL OPERATION DURING ATMOSPHERIC ELECTRICAL ACTIVITY. DO NOT CONNECT A HEADSET AND DO NOT TOUCH ELECTRICAL CONNECTIONS TO THE AIRPLANE. LIGHTNING STRIKES CAN CAUSE INJURIES TO PERSONS, AND A FIRE OR EXPLOSION DURING A REFUEL OPERATION.

(a) Contact the airport authority, air traffic control, or flight deck crew for guidance on the decision to continue or suspend fueling operations.

(b) Stop the refuel operation when fueling operations are suspended.
(c) Disconnect and remove any external headsets.
(d) Do not touch any electrical connections.

(2) Refuel operations must stop if strong wind conditions are present. Strong wind conditions can cause a build-up of static electricity. Large charges of static electricity can develop on support equipment while parked as a result of the movement of dust particles and air currents during strong wind conditions. Strong wind conditions can also cause the unwanted movement of items or equipment which can cause injury to persons or strike the airplane.

3. Prepare the Airplane for a Refuel Operation (Fig. 301)

A. General

(1) This task prepares the airplane for a pressure refuel operation.
(2) Refer to AMM 12-11-03/301 for overwing refuel procedures.

B. Prepare the Airplane for a Refuel Operation

(1) Read and obey the precautions in this task: Precautions and Limits for Fuel Servicing.

WARNING: OBEY ALL THE REFUEL OPERATIONS PRECAUTIONS. IF YOU DO NOT OBEY THE REFUEL PRECAUTIONS, INJURIES TO PERSONS AND DAMAGE TO EQUIPMENT CAN OCCUR.

(2) Make sure the airplane is in a 1 ±0.25-degree nosedown and a 0 ±0.25-degree roll attitude.
(3) Sump the water from the fuel tanks before you refuel the airplane (AMM 12-11-05/301).
(4) Make sure the wingtip pressure relief valves (if installed) are in the closed position:
(5) Do this task for extended leading edge flaps and slats: Leading Edge Flaps and Slat Locks Application (AMM 27-81-0/201).

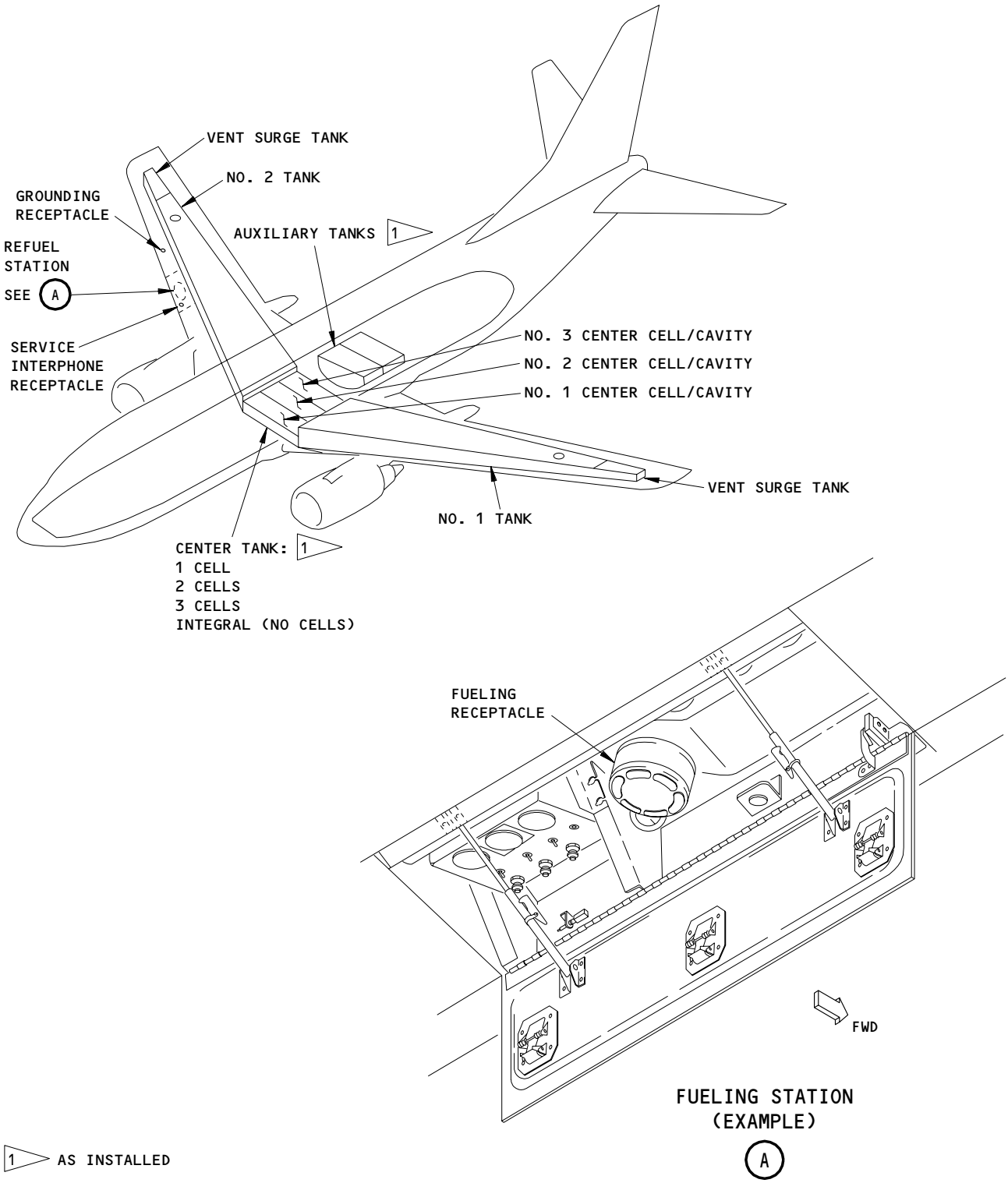
WARNING: INSTALL THE LOCKS ON ALL EXTENDED LEADING EDGE FLAPS AND SLATS. THIS WILL PREVENT INJURY FROM AN ACCIDENTAL OPERATION OF THE FLAPS OR SLATS.

(6) Supply electrical power (AMM 24-22-0/201).
  (a) If you do not have 115-volt ac power (external power), you can do the pressure refuel operation with electrical power from the airplane battery.

    NOTE: This procedure operates static inverter which supplies the necessary AC voltage to operate the full refuel system with its usual functions. This includes fuel gages and the fuel shutoff system. The only limit during this type of operation is the battery life. Complete the refuel operation as soon as possible. A fully charged battery can operate the refuel system for 15-20 minutes.

    1) Make sure these circuit breakers on the circuit breaker panel, P6, are closed:
      a) INVERTER PWR
      b) INVERTER CONT
    2) Set the battery switch to ON.
    3) Set the standby power switch to BATT.
  (b) If the APU is to supply power, refer to AMM Chapter 49 and the limits and precautions for APU operations during refueling.
(7) AIRPLANES WITH AN AUXILIARY TANK;
  Do these steps:
  (a) Put the engine No. 2 start lever in the CUTOFF position.
  (b) Put the crossfeed valve switch in the closed position.
(8) Make sure the onboard fuel load is in a valid fuel distribution configuration (equivalent to after a flight operation).
  (a) Transfer fuel if it is necessary (AMM 28-23-0/201).

C. Pressure Refuel Operation Procedures
(1) Do one of these pressure refuel operations:
  (a) Pressure Refueling (AMM 12-11-02/301).
  (b) Alternative Refueling Procedures (AMM 12-11-04/301).



Fuel Tank Usable Fuel Quantities
Figure 301 (Sheet 1)

TOTAL USABLE FUEL (APPROXIMATE QUANTITIES:) 2			
FUEL TANK	U. S. GALLONS	IMPERIAL GALLONS	LITERS
CENTER TANK:			
INTERGAL 1	2290–2314	1907–1927	8668–8758
1 CELL 1	687–704	572–586	2600–2665
2 CELL 1	1351–1374	1125–1144	5114–5201
3 CELL 1	1902–1937	1584–1613	7199–7332
TANK NO. 1 OR 2	1412–1430	1176–1191	5344–5413
AUXILIARY TANK:			
(ONE) 1	391–400	326–333	1480–1514
(TWO) 1	811	675	3070

1 AS INSTALLED
2 REFER TO PLACARD ON FUELING STATION DOOR FOR EXACT QUANTITIES – FUEL SYSTEM CONFIGUATION WILL CHANGE QUANTITIES

Fuel Tank Usable Fuel Quantities
Figure 301 (Sheet 2)

PRESSURE REFUELING – SERVICING

1. Pressure Refuel
   A. General
      (1) This task uses the pressure refuel system to refuel the airplane.
   B. Prepare the Airplane for the Refuel Operation
      (1) Read and obey the precautions in this task: Precautions and Limits for Fuel Servicing (AMM 12-11-01/301).

          WARNING: OBEY ALL REFUEL OPERATION PRECAUTIONS IN AMM 12-11-01/301. FAILURE TO OBEY THE REFUEL PRECAUTIONS CAN CAUSE SERIOUS INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

      (2) Do this task: Prepare the Airplane for a Refuel Operation (AMM 12-11-01/301).
   C. Connect the Fueling Equipment
      (1) Do the operator supplied procedures to position the fuel vehicle.
      (2) Connect a bonding cable from the fueling source to an approved electrical grounding or bonding connection on the airplane (AMM 20-40-11/201).

          CAUTION: OBEY THE PRECAUTIONS IN AMM 20-40-11/201 FOR ATTACHMENT OF BONDING CABLES. AN ADEQUATE ELECTRICAL BOND MAY NOT EXIST IF THE BONDING CABLES ARE NOT INSTALLED AT APPROVED AIRPLANE GROUND CONNECTIONS. IF THE FUEL SERVICE EQUIPMENT AND AIRPLANE ARE NOT CORRECTLY BONDED, A FIRE OR EXPLOSION CAN OCCUR.

      (3) Open the fueling station access door to get access to the fueling station.
      (4) Connect the bonding cable attached to the refuel nozzle to an approved airplane electrical ground (AMM 20-40-11/201).

          NOTE: The bonding cable is not necessary if there is electrical continuity between the fueling source and the fueling nozzle.

      (5) Connect the fuel hose to the fueling receptacle adapter:
          (a) Remove the fueling receptacle cap (if installed).
          (b) Make sure there are no fuel leaks.
          (c) Make sure the fueling receptacle adapter is clean and not damaged.
          (d) Connect the refuel nozzle to the fueling receptacle.
      (6) AIRPLANES WITH AN AUXILIARY TANK;
          Open the defueling valve access door and put the defueling valve handle to the OPEN position.

D. Prepare the Fueling Panel, P15
   (1) Fully open the fueling station access door.
   (2) Make sure the panel floodlights come on.
   (3) If the floodlights do not come on (no ground power), then do this step:
      (a) Hold the test gage switch in the AUX FUELING POWER CONTROL position.
   (4) Test the indicator lights:
      (a) Push the PRESS TO TEST indicator lights.
      (b) Make sure each light comes on when pushed.
   (5) If the test gage switch is not in the AUX FUELING POWER CONTROL position, test the fueling quantity indicators:
      (a) Put and hold the test gage switch to TEST GAGES & FUELING PRECHECK or to TEST GAGES position.
      (b) Make sure the fueling quantity indicators show downscale pointer mover (dial indicator) or show countdown or all 8's (digital indicators).
      (c) Release the test gage switch.
      (d) Make sure all the fueling quantity displays go back to the usual indication.

E. Prepare the Fuel Sheet
   (1) Use the operator supplied fuel sheet to record the pre-uplift fuel quantity for each tank.
   (2) Calculate the fuel to be uplifted converted to volume (if necessary).
   (3) Record the uplift quantity on the fuel sheet (if necessary).

F. Begin the Refuel Operation
   (1) Put all the fueling shutoff (refuel) valve switches to the OPEN position.
   (2) Activate the fuel shutoff control switch (deadman switch) to start the fuel flow.
   (3) Make sure the refuel pressure is between 35 and 55 psi.
      (a) This pressure corresponds to a maximum fueling rate of 500 gallons per minute if you fuel all the tanks simultaneously.
      (b) Aircraft with bladder cells will be restricted to 450 gallons per minute at 55 PSIG
   (4) Make sure the refuel valve indication lights come on (valves open).
   (5) Make sure the left and right wing fuel tanks refuel at approximately the same rate.
   (6) Monitor the fueling quantity indicators and the refuel valve indication lights.

G. Stop the Refuel Operation

(1) Release the deadman switch to stop the fuel flow when all of the fueling shutoff (refuel) valve position lights are off or when the fueling quantity indicators show the predetermined quantities of fuel.

NOTE: The volumetric top-off unit or the fuel tank float switch (whichever is installed) will close the tank refuel valve(s) when the fuel tank quantity is at the full level. If a volumetric top-off (VTO) unit and a backup float switch are installed, if the VTO unit fails to close a tank refuel valve, the backup float switch will close the refuel valve. However the fueling quantity indicator will not show the correct quantity of fuel in the tank (approximately +200-300 pounds/+91-136 kilograms). Use the fuel quantity indicator in the flight compartment to determine the correct fuel quantity.

(2) Put all the refuel valve switches to the CLOSED position.

(3) Make sure the onboard fuel load is in a valid pre-flight fuel distribution.

(a) Tanks No. 1 and 2 must have equal quantities of fuel.

(b) In general, do not put fuel in the center tank if the tanks No. 1 and 2 are not full.

(c) AIRPLANES WITH AN AUXILIARY TANK;
Make sure all other tanks are full before you put fuel in the auxiliary fuel tank.

(4) Transfer fuel to balance the fuel load if necessary (AMM 28-23-0/201).

(5) Wait one minute to let the fuel quantities stabilize.

(6) Record the actual fuel quantities from the fueling quantity indicators.

(7) Record the actual fuel quantity from the fuel vehicle flow meter.

(8) Do the discrepancy check and make sure it is within limits.

NOTE: Per the operator's requirement.

(9) Complete the Fuel Sheet.

(10) Complete the Delivery Receipt if necessary.

(11) Give a copy of the forms to the airline representative or flight crew.

H. Put the Airplane Back to Its Usual Condition

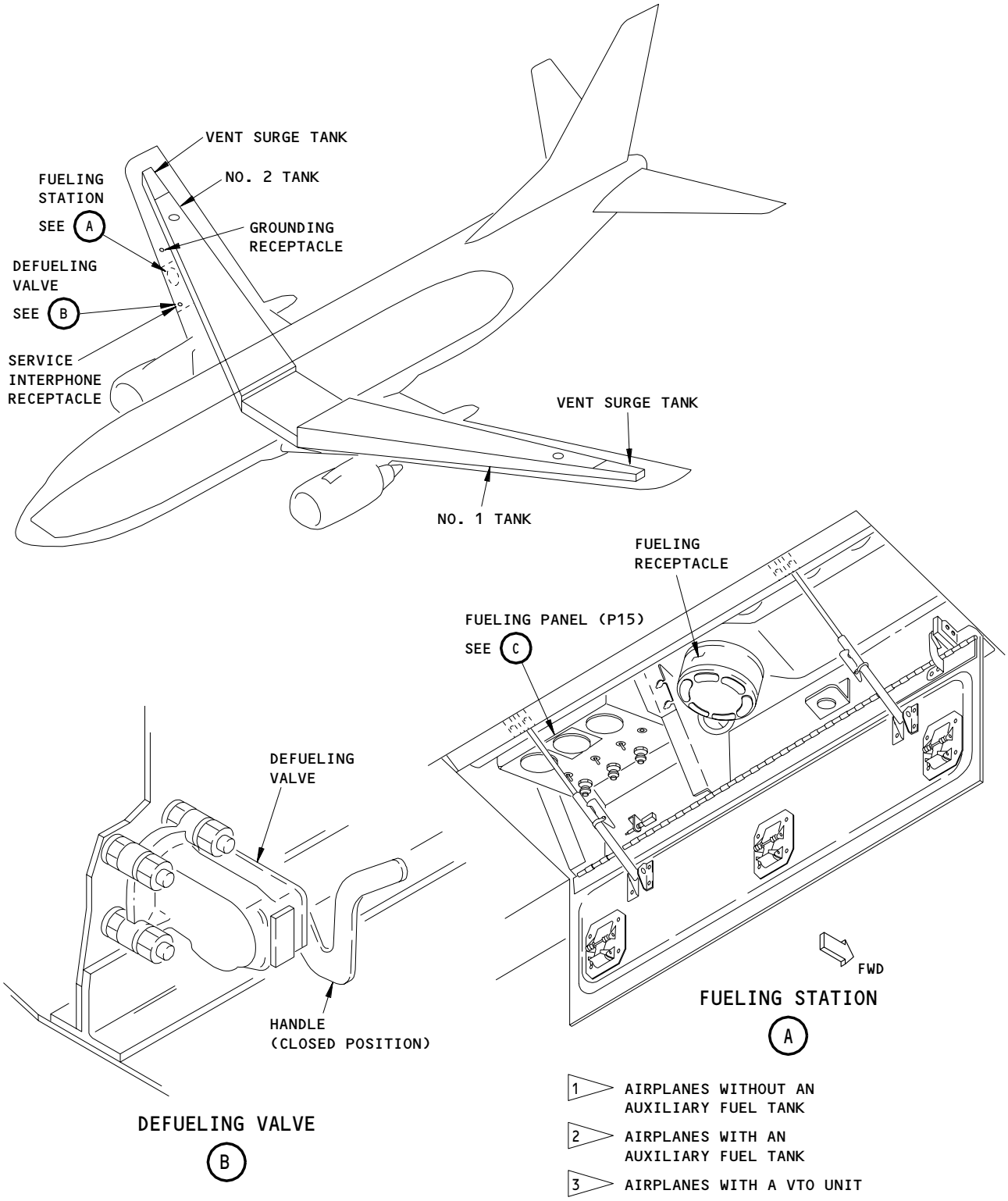
(1) Make sure all the P15 panel valve switches are in the CLOSED position.

(2) Put the test gages switch to the OFF position (if necessary).

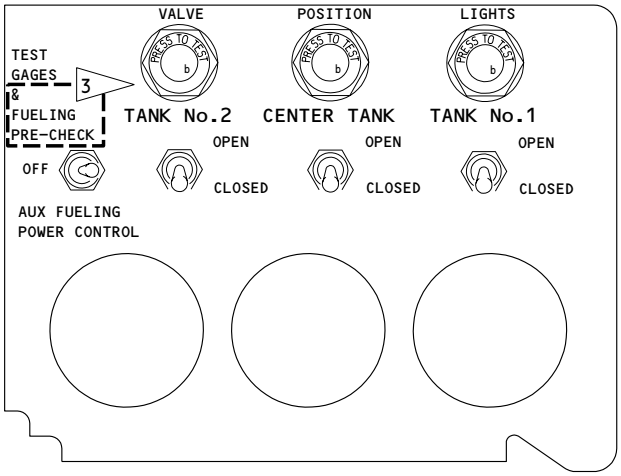
(3) Disconnect the refuel nozzle from the airplane.

(4) Remove the refuel nozzle bonding cable (if installed).
(5) Make sure the fueling receptacle adapter is not damaged.
(6) Install the fueling receptacle cap.
(7) Close and security latch the fueling station access door.
(8) AIRPLANES WITH AN AUXILIARY TANK;
Put the defueling valve handle in the CLOSED position and close the defueling valve access door.
(9) Disconnect the bonding/grounding cables (AMM 20-41-11/201).
(10) Do the operator supplied procedures to remove the fuel vehicle.
(11) Do this task to remove the lock from the extended leading edge flaps and slats: Leading Edge Flap and Slat Lock Application (AMM 27-81-0/201).

WARNING: DO THE PROCEDURE IN AMM 27-81-0/201 TO REMOVE THE LOCKS ON ALL EXTENDED LEADING EDGE FLAPS AND SLATS. THE FLAPS AND SLATS MOVE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

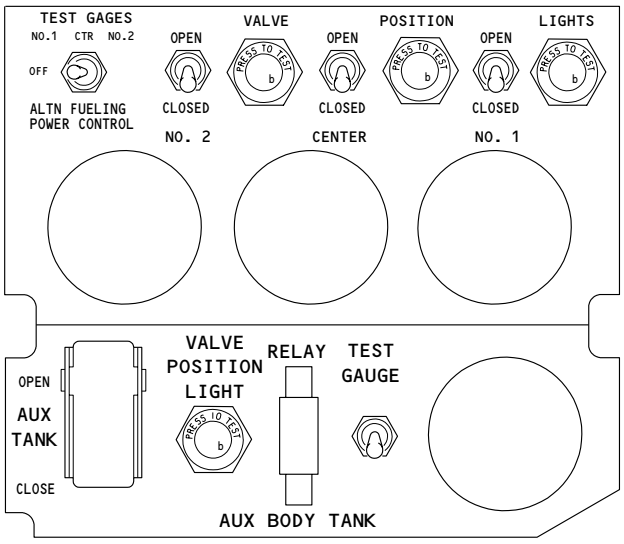


Pressure Refueling
Figure 301 (Sheet 1)



FUELING PANEL (P15)

C 1



FUELING PANEL (P15)

C 2

Pressure Refueling
Figure 301 (Sheet 2)

OVERWING REFUELING – SERVICING

1. General
   A. This procedure contains instructions, precautions and limits for overwing refueling.
   B. Overwing refueling lets the operator add fuel to the main fuel tanks. Fuel is added through the fill ports found on top of the wings. Fuel is transferred to the center tank or auxiliary tank (if installed) as necessary.
   C. Overwing refueling of the No. 1 and 2 tanks can be done if the pressure refuel equipment, or electrical power is not available. With electrical power available, the fuel quantity can be monitored from the flight compartment or the fueling panel (P15). With no electrical power available, the fuel quantity can be monitored with fuel measuring sticks.
   D. If operation of boost pumps or fueling quantity indicators is necessary during overwing refueling, external power can be used for pump or indicator operation.
2. Overwing Refueling (Fig. 301)
   A. Prepare the Airplane for an Overwing Refuel Operation
      (1) Read and obey the precautions in this task: Precautions and Limits for Fuel Servicing (AMM 12-11-01/301).

      WARNING: OBEY ALL THE FUEL SERVICING PRECAUTIONS IN AMM 12-11-01/301. FAILURE TO OBEY THE PRECAUTIONS CAN CAUSE SERIOUS INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

      (2) Supply electrical power (AMM 24-22-0/201).
      (3) Do not operate the APU during a overwing refuel operation.
      (4) Make sure the airplane is in a 1 ±0.25° nose down and a 0 ±0.25° roll attitude.
      (5) Sump the water from the fuel tanks before you refuel the airplane (AMM 12-11-05/301).
      (6) Make sure these components are in the closed position:
         (a) Wing pressure relief valves (if installed)
         (b) Landing gear doors
         (c) Overwing entry doors (if installed)
      (7) Do this task for extended leading edge flaps and slats: Leading Edge Flaps and Slat Locks Application (AMM 27-81-0/201).

      WARNING: INSTALL THE LOCKS ON ALL EXTENDED LEADING EDGE FLAPS AND SLATS. THIS WILL PREVENT INJURY FROM AN ACCIDENTAL OPERATION OF THE FLAPS OR SLATS.

B. Connect the Fueling Equipment

(1) Use the operator supplied procedures to position the fuel vehicle.

WARNING: DO NOT POSITION FUEL SERVICING EQUIPMENT OR AIRPLANE SERVICING EQUIPMENT UNDER THE WING DURING AN OVERWING REFUEL OPERATION. AN OVERWING FUEL SPILL CAN CAUSE FUEL TO FLOW FROM THE WING SURFACE ONTO EQUIPMENT UNDER THE WING. A FUEL SPILL CAN CAUSE A FIRE OR EXPLOSION.

(2) Connect a grounding cable from an approved earth ground to an approved electrical ground point on the airplane (static ground) (AMM 20-40-11/201).

WARNING: YOU MUST GROUND THE AIRPLANE TO AN APPROVED EARTH GROUND AND BOND THE REFUEL SOURCE BEFORE THE OVERWING REFUEL OPERATION. IF YOU DO NOT FOLLOW THIS PROCEDURE, A STATIC SPARK CAN CAUSE FUEL VAPOR TO IGNITE.

(3) Connect a grounding cable from the fueling source to an approved earth ground (AMM 20-40-11/201).

(4) Connect a bonding cable from the fueling source to an approved airplane electrical ground point (AMM 20-40-11/201).

(5) Put on a safety harness and connect the harness to the supplied harness receptacle.

WARNING: YOU MUST WEAR A SAFETY HARNESS WHEN YOU DO AN OVERWING REFUEL OPERATION. A SERIOUS INJURY CAN OCCUR IF YOU FALL FROM THE WING SURFACE.

(6) Position pads on the wing surface to prevent damage from the fuel nozzle and fuel hose.

(7) Connect the fuel hose to the overwing fill port:

CAUTION: DO NOT DRAG THE FUEL NOZZLE AND HOSE ACROSS THE WING SURFACE. DAMAGE TO THE WING SURFACE CAN OCCUR.

(a) Connect the overwing nozzle bonding cable to an approved airplane bonding point (AMM 20-40-11/201).

WARNING: BOND THE OVERWING NOZZLE TO THE AIRCRAFT BEFORE THE TANK FILL CAP IS REMOVED. THIS CONNECTION MUST REMAIN IN PLACE UNTIL AFTER THE TANK FILL CAP IS REPLACED. THE NOZZLE MUST REMAIN IN CONTACT WITH THE FILL OPENING DURING REFUELING. IF YOU DO NOT FOLLOW THIS PROCEDURE, A STATIC SPARK CAN CAUSE FUEL VAPOR TO IGNITE.

(b) Open the overwing fill port.

WARNING: MAKE SURE THE FUEL LEVEL FOR THE APPLICABLE TANK IS BELOW THE LEVEL OF THE FILL PORT BEFORE YOU OPEN THE FILL CAP. A FUEL SPILL CAN OCCUR. A FUEL SPILL CAN CAUSE A FIRE OR AN EXPLOSION.

CAUTION: KEEP ALL LOOSE OBJECTS AWAY FROM THE FILL PORT. REMOVE ANY OBJECTS FROM YOUR SHIRT POCKET (PENS, CIGARETTES, LIGHTERS, ETC.) BEFORE YOU OPEN THE FILL CAP. IF AN OBJECT DOES FALL INTO THE FUEL TANK, CONTACT AN AIRLINE REPRESENTATIVE. FIND AND REMOVE THE OBJECT IMMEDIATELY. UNWANTED OBJECTS IN THE FUEL TANK CAN CAUSE DAMAGE TO IN-TANK EQUIPMENT AND ELECTRICAL WIRING.

(c) Connect the overwing nozzle to the fill port.
(d) Use a nozzle extension or spout to make sure the fuel does not splash into the fuel tank.
(e) Make sure the nozzle extension is below the level of the fuel.
(f) Make sure the overwing nozzle remains in contact with the fill port during the refuel operation.

C. Overwing Refuel Operation

(1) Record these values on the fuel sheet:
(a) Pre-uplift fuel quantity for each tank.

NOTE: If there is not electrical power, use the fuel measuring sticks to calculate the pre-uplift fuel quantity in each tank.

(b) Final fuel quantity necessary in each tank.
(c) Fuel to be uplifted converted to volume.

(2) Use the fueling quantity indicators (P15 panel), fuel quantity indicators in the flight compartment, or fuel measuring sticks to monitor the fuel quantity.
(3) Activate the fuel shutoff control switch (deadman switch) to start the fuel flow.
(4) Make sure the refuel rate for each tank is a maximum of 155 U.S. gallons (580 liters) per minute.

WARNING: DO NOT REFUEL MORE THAN THE MAXIMUM PERMITTED RATE OF 155 U.S. GALLONS (580 LITERS) PER MINUTE FOR EACH TANK. THIS WILL REDUCE STATIC CHARGE IN THE FUEL TANK.

(5) Monitor the fuel quantity.

WARNING: DO NOT OVERFILL THE TANK. THERE IS NO AUTOMATIC SHUTOFF CONTROL FOR OVERWING REFUELING.

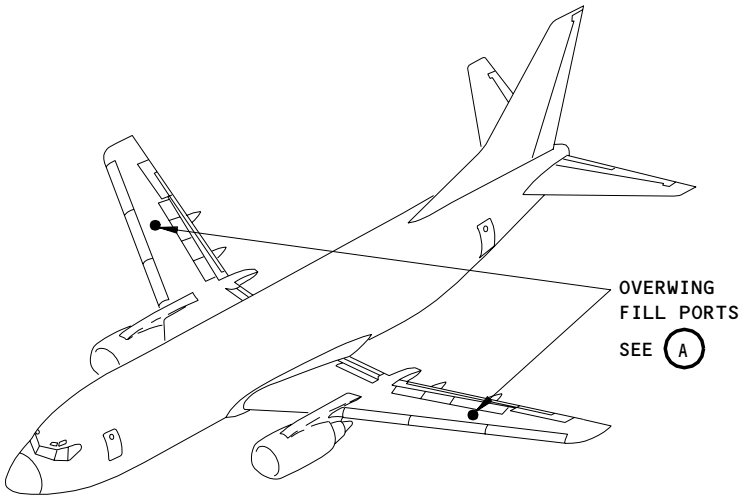
D. Stop the Refuel Operation
(1) When you have the necessary fuel quantity, stop the refuel operation.
(2) Release the deadman switch to stop the fuel flow.
(3) Disconnect the refuel nozzle from the airplane.
(4) Install the overwing fill cap.
(5) Remove the overwing refuel nozzle bonding cable.
(6) Remove all equipment used for the overwing refuel operation.
(7) Transfer fuel to the center tank or auxiliary tank (if installed) as necessary (AMM 28-23-0/201).
(8) Make sure the onboard fuel load is in a valid pre-flight fuel distribution.
(9) Record the actual fuel quantities from the fuel quantity indicators.
(10) If the fuel quantity indicators are not available, record the actual fuel quantities from the fuel measuring sticks.
(11) Do the discrepancy check and make sure it is within limits.
(12) Complete the Fuel Sheet.
(13) Complete the Delivery Receipt.
(14) Give a copy of the forms to the airline representative or flight crew.
(15) Make sure all the P15 switches are in the CLOSED position (if necessary).

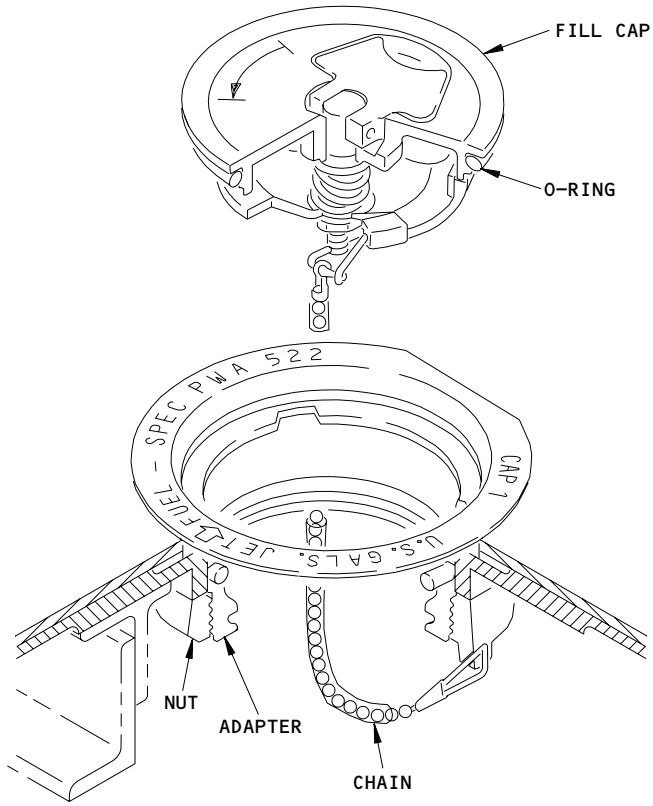
E. Put the Airplane Back to Its Usual Condition
(1) Close and latch the fueling station access door (if opened).
(2) Do these steps in this sequence to remove the bonding/grounding cables (AMM 20-40-11/201).
(a) Disconnect the bonding cable from the airplane to the fuel source.

(b) Disconnect the grounding cable from the earth ground to the fuel source.
(c) Disconnect the grounding cable from the airplane to the earth ground.

(3) Do the operator supplied procedure to remove the fuel vehicle.
(4) Do this task to remove the lock from the extended leading edge flaps and slats: Leading Edge Flap and Slat Lock Application (AMM 27-81-0/201).

WARNING: DO THE PROCEDURE IN AMM 27-81-0/201 TO REMOVE THE LOCKS ON ALL EXTENDED LEADING EDGE FLAPS AND SLATS. THE FLAPS AND SLATS MOVE QUICKLY AND CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.





OVERWING FILL PORT
A

Overwing Fill Ports
Figure 301

ALTERNATE REFUELING PROCEDURES - SERVICING

1. General
   A. This procedure contains these tasks:
      (1) Refuel Operation - Inoperative Fueling Quantity Indicator
      (2) Refuel Operation - Early Shutoff (Airplanes with a VTO unit)
      (3) Refuel Operation - Inoperative Fueling Shutoff Valve
2. Refuel Operation - Inoperative Fueling Quantity Indicator
   A. Prepare the Airplane
      (1) Read and obey the precautions in this task: Precautions and Limits for Fuel Servicing (AMM 12-11-01/301).

          WARNING: OBEY ALL THE FUEL SERVICING AND MANUAL PRESSURE REFUEL PRECAUTIONS IN AMM 12-11-01/301. FAILURE TO OBEY THE PRECAUTIONS CAN CAUSE SERIOUS INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

      (2) Do this task: Prepare the Airplane for a Refuel Operation (AMM 12-11-01/301).
      (3) Do one of these procedures to refuel the airplane with an inoperative fueling quantity indicator:
          (a) Fuel Transfer Method
          (b) Fuel Truck Flow Meter Method
          (c) Fuel Measuring Sticks Method
   B. Fuel Transfer Method
      (1) Transfer fuel from the tank with an inoperative fueling quantity indicator:
          (a) Make sure the fueling shutoff (refuel) valve(s) in the tank with an inoperative indicator are closed.
          (b) Make sure the receiving tank(s) have enough fuel capacity to accept all of the fuel from the tank with an inoperative indicator.
          (c) Transfer all of the fuel from the tank with an inoperative fueling quantity indicator (AMM 28-23-0/201).
              1) Continue the fuel transfer until the fuel pump low pressure lights come on.
                 a) Immediately put the applicable fuel boost pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.

                    NOTE: When defueling or transferring fuel with minimum backpressure to the pumps, it is possible for the low pressure light(s) to be on. In this case, monitor the tank quantity and put the pump switch(es) to OFF if the tank quantity is not changing.

(2) Calculate the supply tank fuel to remain (Table 301):

TABLE 301		
SUPPLY TANK TRANSFER (FUEL TO REMAIN)		(LBS/KGS)
Initial Supply Tank Fuel Quantity	INITIAL	A:
- Transfer Fuel Quantity *[1]	- TRANSFER	B:
= Final Supply Tank Fuel Quantity *[2]	= FINAL	C:

*[1] Fuel quantity necessary for the tank with an inoperative gage (per the fuel sheet).
*[2] Fuel quantity to remain in the supply tank after fuel transfer.

(a) Make a decision about which fuel tank will supply transfer fuel.
(b) Record the INITIAL supply tank fuel quantity, BLOCK A.
(c) Use the fuel sheet to find the fuel necessary for the tank with an inoperative indicator.

NOTE: This is the fuel quantity that will be transferred from the supply tank.

(d) Record the TRANSFER fuel quantity, BLOCK B.
(e) Calculate the fuel quantity that will remain in the supply tank after the fuel transfer operation.

NOTE: Subtract the transfer fuel quantity (B) from the initial supply tank fuel quantity (A) to get the final supply tank fuel quantity (C). BLOCK C: is the fuel quantity that will remain in the supply tank after the fuel transfer is complete. When the supply tank fuel quantity decreases to this value, stop the fuel transfer operation.

(f) Record the FINAL fuel quantity for the supply tank, BLOCK C.

(3) Transfer a known quantity of fuel into the tank with an inoperative indicator:

(a) Transfer fuel from the supply tank into the tank with an inoperative indicator (AMM 28-23-0/201).

(b) Monitor the fuel quantity decrease from the supply tank.

(c) Stop the transfer at the final fuel quantity, BLOCK C.

NOTE: For tanks No. 1 and 2, as an option, you can use the fuel measuring sticks to do a check of the actual fuel quantity in the tank with the inoperative indicator.

(d) Record the fuel quantity on the fuel sheet.

C. Fuel Truck Flow Meter Method

(1) Transfer fuel from the tank with an inoperative indicator:

(a) Make sure the fueling shutoff (refuel) valve(s) in the tank with an inoperative indicator are closed.

(b) Make sure the receiving tank(s) have enough capacity to accept all of the fuel from the tank with an inoperative indicator.

(c) Transfer all of the fuel from the tank with an inoperative indicator (AMM 28-23-0/201).

1) Continue the fuel transfer until the fuel pump low pressure lights come on.

a) Immediately put the applicable fuel boost pump switch(es) to OFF if the LOW PRESSURE light comes on and stays on.

NOTE: When defueling or transferring fuel with minimum backpressure to the pumps, it is possible for the low pressure light(s) to be on. In this case, monitor the tank quantity and put the pump switch(es) to OFF if the tank quantity is not changing.

(2) Calculate the upload fuel quantity for the tank with an inoperative indicator (Table 302):

TABLE 302 UPLOAD FUEL QUANTITY		
Upload Fuel Quantity pounds (kilograms) *[1]	LBS (KGS)	A:
/ Current Station Density	/ DENSITY	B:
= Target Quantity, gallons (liters)	= GALLONS (LITERS)	C:

*[1] Fuel quantity necessary for the tank with an inoperative indicator (per the fuel sheet).

(a) Record the fuel sheet upload fuel quantity in pounds (kilograms), BLOCK A.
(b) Record the current station DENSITY, BLOCK B.
(c) Convert the fuel sheet upload fuel quantity in pounds (kilograms) into gallons (liters) by dividing pounds (kilograms) by the current station density.
(d) Record the target upload fuel quantity in GALLONS (LITERS), BLOCK C.

(3) Upload a known quantity of fuel into the tank with an inoperative indicator:
(a) Do a pressure refuel operation (AMM 12-11-02/301).
(b) Monitor the fuel flow meter.
(c) Stop the upload at the BLOCK C fuel quantity.
(d) Put the fueling shutoff (refuel) valve switch in the CLOSED position.

NOTE: For tanks No. 1 and 2, as an option, you can use the fuel measuring sticks to do a check of the actual fuel quantity in the tank with the inoperative indicator.

(e) Record the upload fuel quantity on the fuel sheet.

D. Fuel Measuring Sticks Method (Fig. 301)
(1) For the tank with the inoperative indicator, set the fuel measuring sticks to the necessary fuel quantity.
(a) Use the applicable document for the fuel measuring sticks.

NOTE: The subsequent is a list of the Boeing Company documents necessary for conversion of readings taken from the fuel tank measuring sticks, which may be calibrated in inches, pounds or kilograms.

DOCUMENT NUMBER	TITLE
D6-32037	Fuel Quantity Data - U.S. Gallons for Ground Attitudes - Drip Sticks (Measuring sticks) in Inches
D6-32037-1	Fuel Quantity Data - Pounds for Ground Attitudes - Drip Sticks (Measuring sticks) in Inches
D6-32038	Fuel Quantity Data - U.S. Gallons for Ground Attitudes - Drip Sticks (Measuring sticks) in Pounds
D6-32039	Fuel Quantity Data - U.S. Gallons for Ground Attitudes - Drip Sticks (Measuring sticks) in Kilograms
D6-32616	Fuel Quantity Data - Kilograms for Ground Attitudes - Drip Sticks (Measuring sticks) in Inches
D6-32146	Fuel Quantity Data - Kilograms for Ground Attitudes - Drip Sticks (Measuring sticks) in Kilograms
D6-32628	Fuel Quantity Data - Imperial Gallons for Ground Attitudes - Drip Sticks (Measuring sticks) in Inches

(b) Make sure you know the attitude of the airplane.

(2) Set a container that can catch fuel below each of the extended fuel measuring sticks.

NOTE: This is not necessary if you use the tool (F72949) for the fuel measuring sticks.

(3) Put fuel into the tank until fuel starts to fall in drops from the fuel measuring sticks.

NOTE: During the refuel operation, fuel can fall from the fuel measuring stick, No. 2, before the fuel quantity in the tank goes to the level shown on the stick.

(4) Stop the refuel operation.

(5) Let the fuel level in the tanks become stable for five minutes.
(6) Examine the fuel measuring sticks again.
(7) If fuel does not continue to fall from the fuel measuring sticks, continue to put fuel into the tanks.
(8) When fuel falls from the fuel measuring sticks in drops, stop the refuel operation.
(9) Continue to refuel the tank and let the fuel level become stable until the fuel continues to fall from the fuel measuring sticks after the five minute time.
(10) Lock the fuel measuring sticks in the retracted position.

E. Put the Airplane Back to Its Usual Position
(1) Do the necessary procedure to refuel the remaining tanks (AMM 12-11-02/301).
(2) At the first maintenance opportunity, do the task to troubleshoot and repair the pressure fueling system (AMM 28-21-00/101).

3. AIRPLANES WITH A VOLUMETRIC TOP-OFF (VTO) SYSTEM;
Refuel Operation - Early Fuel Quantity Shutoff

A. General
(1) This procedure refuels a fuel tank when the desired fuel quantity is less than expected (early shutoff). This early shutoff will occur only when a tank is filled to a level between 88 and 100% fuel and the ac power to the volumetric top-off (VTO) is interrupted. Generally ac power interruption is caused by one of these conditions:
(a) Fueling power control switch (a proximity switch activated by the fueling station door) is accidentally deactivated.
(b) External or APU ac power is interrupted.
(c) Fueling quantity indicator TEST GAGES & FUELING PRECHECK switch is actuated.
(d) Fuel quantity indicator TEST switch is actuated.

B. Airplane Precautions
(1) Read and obey the precautions in this task: Precautions and Limits for Fuel Servicing (AMM 12-11-01/301).

WARNING: OBEY ALL THE FUEL SERVICING AND PRESSURE REFUEL PRECAUTIONS IN AMM 12-11-01/301. FAILURE TO OBEY THE PRECAUTIONS CAN CAUSE SERIOUS INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

C. Refuel Operation When an Early Fuel Shutoff Occurs

(1) To reset the fueling shutoff valve with the early shutoff, do one of the subsequent steps:

(a) With electrical power on, disconnect and immediately reconnect the J-1 connector on the face of the applicable tank volumetric top-off unit (AMM 28-09-100/001).

CAUTION: DO NOT LEAVE THE CONNECTOR DISCONNECTED WITH ELECTRICAL POWER ON. DAMAGE TO THE INDICATORS CAN OCCUR WITH A CIRCUIT THAT IS KEPT OPEN.

(b) With electrical power on, disconnect and immediately reconnect the connector on the back of the fuel quantity indicator for the applicable tank on the center instrument panel, P2, in the flight compartment.

(c) Defuel the applicable tank to a fuel level below 88% fuel (AMM 28-23-0/201).

(2) Continue the refuel operation (AMM 12-11-02/301).

(3) At the first maintenance opportunity, do the task to troubleshoot and repair the pressure fueling system (AMM 28-21-00/101).

4. Refuel Operation - Inoperative Fueling Shutoff Valve

A. General

(1) You can refuel a fuel tank with a fueling shutoff valve (refuel valve) that does not open electrically, but can be opened manually.

(2) There is no automatic fueling shutoff valve shutdown or overfill protection when a fueling shutoff (refuel) valve is opened manually. If you put too much fuel into the tank, fuel will overfill the tank and go into the surge tank(s). If the fuel flow is not stopped, the surge tank will overfill and an overboard fuel spill will occur.

B. Procedure

(1) Read and obey the precautions in this task: Precautions and Limits for Fuel Servicing (AMM 12-11-01/301).

WARNING: OBEY ALL THE FUEL SERVICING AND PRESSURE REFUEL PRECAUTIONS IN AMM 12-11-01/301. FAILURE TO OBEY THE PRECAUTIONS CAN CAUSE SERIOUS INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(2) Electrically ground the airplane and the fuel truck (AMM 20-40-11/201).

(3) Connect the bonding cable on the refueling hose to the ground jack on the wing.

NOTE: The bonding cable is not necessary if there is electrical continuity between the nozzle and the receptacle.

(4) Make sure the access door for the fueling station is open.
(5) Make sure the fueling quantity indicator for the tank you will refuel is operative.
(6) Do an inspection of the fueling receptacle adapter before you connect the refuel nozzle on the fuel hose:
    (a) Make sure there are no fuel leaks.
    (b) Make sure there is not contamination at the fueling receptacle adapter.
    (c) Make sure the fueling receptacle adapter is clean and does not have any damage.

        CAUTION: MAKE SURE THE FUELING RECEPTACLE ADAPTER IS CLEAN AND DOES NOT HAVE DAMAGE. IF THE FUELING RECEPTACLE ADAPTER HAS DAMAGE, IT CAN CAUSE A FUEL LEAK.

(7) Do these steps to put fuel into the tank with the fueling shutoff valve that does not open:
    (a) Connect the refuel nozzle to the fueling receptacle.
    (b) Activate the fueling shutoff control switch (deadman switch) to start the fuel flow.
    (c) For the tank with the fueling shutoff valve that does not open, push the red manual override button on the fueling shutoff valve to open the fueling shutoff valve for that tank.

        CAUTION: DO NOT LET THE FUEL QUANTITY BE MORE THAN THE MAXIMUM FUEL QUANTITY FOR THE APPLICABLE TANK. THERE IS NO AUTOMATIC SHUTOFF. A FUEL SPILL CAN OCCUR.

    (d) Continue to hold down the manual override button.
    (e) Monitor the fueling quantity indicator for the tank with the fueling shutoff valve that does not open.
    (f) When the fueling quantity indicator shows a full tank or the fuel quantity scheduled for that tank, release the red manual override button.
    (g) Release the deadman switch to stop the fuel flow.
    (h) Remove the refuel nozzle from the airplane fueling receptacle.
(8) Use the fuel measuring sticks to make sure the correct fuel quantity is in the tank with the fueling shutoff valve that does not open (Fig. 301).
    (a) Make sure you know the attitude of the airplane.
    (b) Use the fuel measuring stick procedure in the applicable fuel measuring stick document to calculate the fuel quantity in the applicable tank.
(9) Disconnect the bonding cable that you connected between the fueling source and the airplane (AMM 20-40-11/201).
(10) Disconnect the ground cables for the fuel source (AMM 20-40-11/201).

(11) Disconnect the ground cables for the airplane (AMM 20-40-11/201).
(12) Close the access door for the fueling station.
(13) At the first maintenance opportunity, do the task to troubleshoot and repair the pressure fueling system (AMM 28-21-00/101).

FUEL TANK SUMPING - SERVICING

1. General
   A. This procedure has this task:
      (1) Drain the tank sump for each tank.
   B. You must not let the fuel tanks collect too much water. Do the procedure to drain the sump drain valves for each tank regularly.
   C. Obey all of the safety precautions in the task: Precautions and Limits for the Refuel Operation (AMM 12-11-01/301).
2. Fuel Tank Sumping (Fig. 301)
   A. General
      (1) The fuel tank sumps must be drained regularly for the removal of water from the fuel tanks. Each fuel tank sump has a drain valve that drains the water from the fuel tank. Water in the fuel tank comes from condensation or from fuel that is uploaded during a refuel operation. Removal of water will help minimize microbial growth that exists at the fuel/water interface. Microbial growth can cause fuel system degradation including clogged engine filters, fuel quantity indication problems, and eventually structural corrosion. You can also use the fuel tank sump to do the subsequent:
         (a) Do a check for fuel contamination
         (b) Do a check for ice accumulation
         (c) Collect a fuel sample for microbial contamination (AMM 28-11-0/201)
         (d) Drain fuel to defuel the tank (AMM 28-23-0/201).
      (2) During refueling or airplane operations, water mixes in the fuel. Schedule the task to drain the fuel tank after sufficient time has elapsed to let the water settle to the bottom of the tanks. Water sinks in fuel at a rate of approximately one foot (30 cm) per hour.
      (3) Look at each fuel sample for water, for ice, or for contamination. Water in a fuel sample usually shows as a layer below the fuel, or as small bubbles in the fuel. Ice crystals usually appear as cloudiness or haziness and makes the fuel less transparent. To help you see the water in the fuel, you can add one or two drops of food coloring (water soluble) into the container of fuel. Any water in the fuel will be shown by a color. You can put the food coloring into the container before you drain the fuel sump.

(4) Fuel with no water, ice or contamination is clear and bright and very transparent. The words "clear and bright" mean than you cannot see undissolved water, sediment, or suspended material when you examine fuel in a clear glass container. If the fuel is free of these types of contamination, it is clear and bright.

NOTE: Jet-A fuel can have a range of colors from yellow (straw) color to no color. The words "clear and bright" is not a reference to the color of the fuel. Yellow fuel or fuel that has no color can be "clear and bright" as specified above.

(5) If the water in the fuel has a foul odor or a brown color, then it is possible there is microbial contamination. Refer to the check for microbial contamination (AMM 28-11-0/201).

(6) If the fuel has a pink or a red color, do an inspection for red dye contamination (AMM 28-10-0/701).

(7) In cold weather, the water can freeze on the inside and outside of the fuel tanks. The frozen water can prevent the sump drain valve from opening. If the ambient temperature is less than 0° Celsius (32° Fahrenheit), then you may have to supply heat before you can drain the sumps.
   (a) Drain the sumps within one hour after remove the airplane from the hanger if the ambient temperature is less than 0° Celsius (32° Fahrenheit).

(8) Cold weather can also cause the drain valve to stay open or damage the O-ring when you push the poppet open. Cold weather can also prevent the correct re-seating of the primary or secondary poppet valve after you drain the fuel.

(9) You can also use an approved anti-ice additive if the fuel specification permits it. For example, you can add Phillips PFA 56MB in a maximum concentration of 0.1% by volume.

(10) For cold weather maintenance, refer to AMM 12-50-0/201.

(11) AIRPLANES WITHOUT AN INTEGRAL CENTER FUEL TANK;
The wing center cavity drain system is installed with a drain valve to let water be drained from the low point of the system. If fuel is present in the drained fluid, it shows there is a leak in the fuel tanks, bladder cells or APU fuel line or fittings within the APU fuel line shroud.

(12) AIRPLANES WITH AN INTEGRAL CENTER FUEL TANK;
A center cavity drain system is not used, but drain lines and a drain valve are installed to drain condensation or fuel leakage from the APU fuel line shroud and, if installed, the auxiliary tank shroud and cavity drain system. If there is fuel in the drained fluid, it shows there is leak:
   (a) In the APU fuel line or fittings into the shroud

(b) In the auxiliary tank (if installed) fuel line or fittings into the shroud
(c) In the auxiliary tank (if installed) removable cell(s) into the tank cavity drain system
(d) In the auxiliary tank (if installed) sump drain valve into the sump drain bellows and into the tank cavity drain.

B. Equipment (Fig. 302)
(1) Main Tank Sump Drain Tool - C12002-7 (recommended), F80201-1 (alternate)
(2) Center Tank Sump Drain Tool - F80201-1
(3) AIRPLANES WITH AN AUXILIARY TANK;
Auxiliary Tank Sump Drain Tool - F72995 (recommended), F72868 (alternate)
(4) Clear plastic or glass container - 1 gallon capacity

C. Prepare for the Procedure
(1) If the ambient temperature is less than 0° Celsius (32° Fahrenheit), do the cold weather maintenance procedure (AMM 12-50-0/201).

NOTE: Supply heat before you drain the sumps to make sure the fuel drains freely.

(2) Let water go to the bottom of the tank before you open the sump drain valve.

D. Drain the Sumps for the Tank No. 1 and 2
(1) Put the top end of the tool against the bottom side of the poppet on the sump drain valve.
(2) Put the container below the tool.
(3) Push up on the poppet until fuel flows into the container.
(4) Drain each sump until the container is full.
(5) Remove the sample container from the sump and let the valve close.
(6) Look at the fuel in the container.
(7) If the fuel in the container has visible water (free water), do these steps:
(a) Empty the fuel from the container.
(b) Use the correct procedures to dispose of the fuel.
(c) Continue to drain fuel from the sump drain until all the free water is removed.
(8) If the water in the fuel sample container has a foul odor or a brown color, do a detection test for microbial contamination (AMM 28-11-0/201).
(9) If you see red dye in the fuel, do the procedure for red dye contamination (AMM 28-10-0/701).
(10) Make sure the final sample of fuel the sump drain is clear and bright.

E. AIRPLANES WITH AN INTEGRAL CENTER TANK;
Drain the sump for the center tank.

NOTE: Put the airplane in 0.25° nose high, 0° roll attitude to drain the maximum quantity of fuel from the center tank sump drain.

(1) Open the access door for the sump drain.
(2) Electrically ground the sump drain tool to the airplane structure.
(3) Turn the sump drain valve clockwise and push it up to open it.

NOTE: You must hold the drain valve in this position.

(4) Drain each sump until the container is full.
(5) Release the sump drain valve and turn it counterclockwise to close it.
(6) Look at the fuel in the container.
(7) If the fuel in the container has visible water (free water), do these steps:
(a) Empty the fuel from the container.
(b) Use the correct procedures to dispose of the fuel.
(c) Continue to drain fuel from the sump drain until all the free water is removed.
(8) If the water in the fuel sample container has a foul odor or a brown color, do a detection test for microbial contamination (AMM 28-11-0/201).
(9) If you see red dye in the fuel, do the procedure for red dye contamination (AMM 28-10-0/701).
(10) Make sure the final sample of fuel the sump drain is clear and bright.
(11) Close the access door for the sump drain.

F. AIRPLANES WITH AN AUXILIARY FUEL TANK;
Drain the sump for the auxiliary fuel tank.
(1) Open the cap for the auxiliary tank sump in the bottom fuselage skin.
(2) Put the sump drain tool for the auxiliary tank into the sump drain valve.
(a) Obey the instructions on the tool label.
(b) Drain the fuel into a container.
(3) Drain the sump until the container is full.
(4) Remove the tool from the sump and close the drain valve.
(5) Look at the fuel in the container.
(6) If the fuel in the container has visible water (free water), do these steps:
(a) Empty the fuel from the container.
(b) Use the correct procedures to dispose of the fuel.

(c) Continue to drain fuel from the sump drain until all the free water is removed.

(7) If the water in the fuel sample container has a foul odor or a brown color, do a detection test for microbial contamination (AMM 28-11-0/201).

(8) If you see red dye in the fuel, do the procedure for red dye contamination (AMM 28-10-0/701).

(9) Make sure the final sample of fuel the sump drain is clear and bright.

(10) Install the cap for the auxiliary tank sump.

G. Drain the Wing Center Cavity Drain System (Airplanes Without an Integral Center Tank) or APU Fuel Line Shroud Drain System

(1) Put a container below the drain valve.

(2) Open the drain valve and let the collected fluid drain into the container.

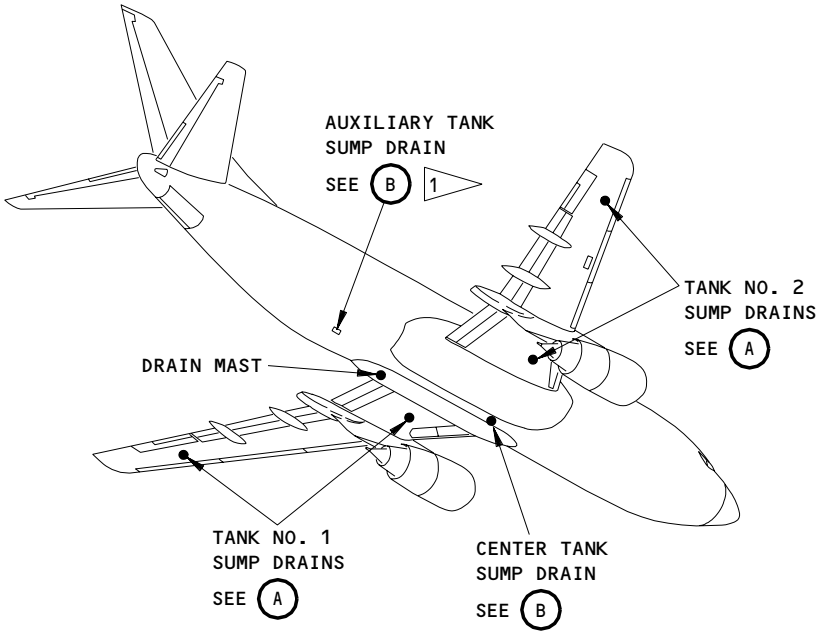
(3) Close the drain valve.

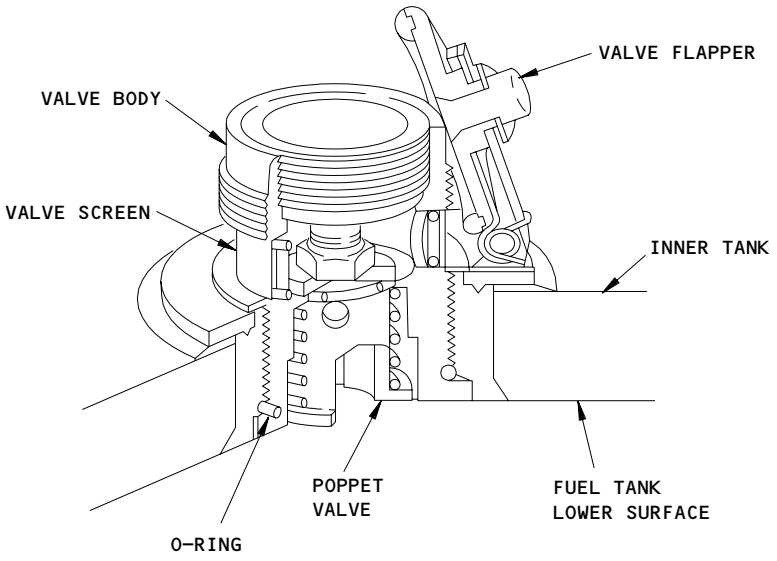
(4) Examine the fluid that you drained to see if there is fuel in it. If you find some fuel:

(a) Tighten the couplings on the APU fuel line or replace the APU fuel line, if it is necessary (AMM 28-22-81/401).

(b) AIRPLANES WITH AN AUXILIARY FUEL TANK; Refer to AMM 28-14-0/101 to find a leak in the fuel lines for the auxiliary tank if it is necessary.

(c) AIRPLANES WITHOUT AN INTEGRAL FUEL TANK; Refer to AMM 28-12-0/101 to find a leak in the bladder cells, if it is necessary.



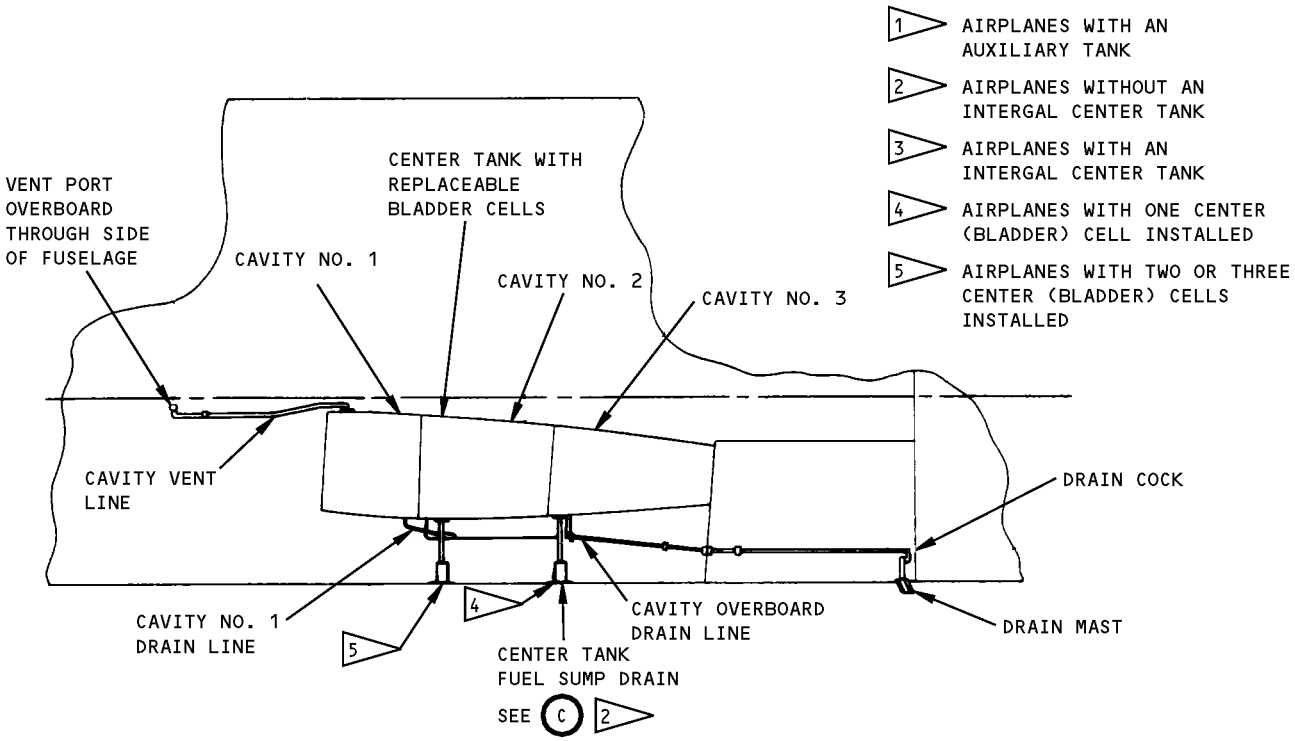


FUEL SUMP DRAIN VALVE FOR TANKS NO. 1 AND 2
(MAIN AND SURGE)

A

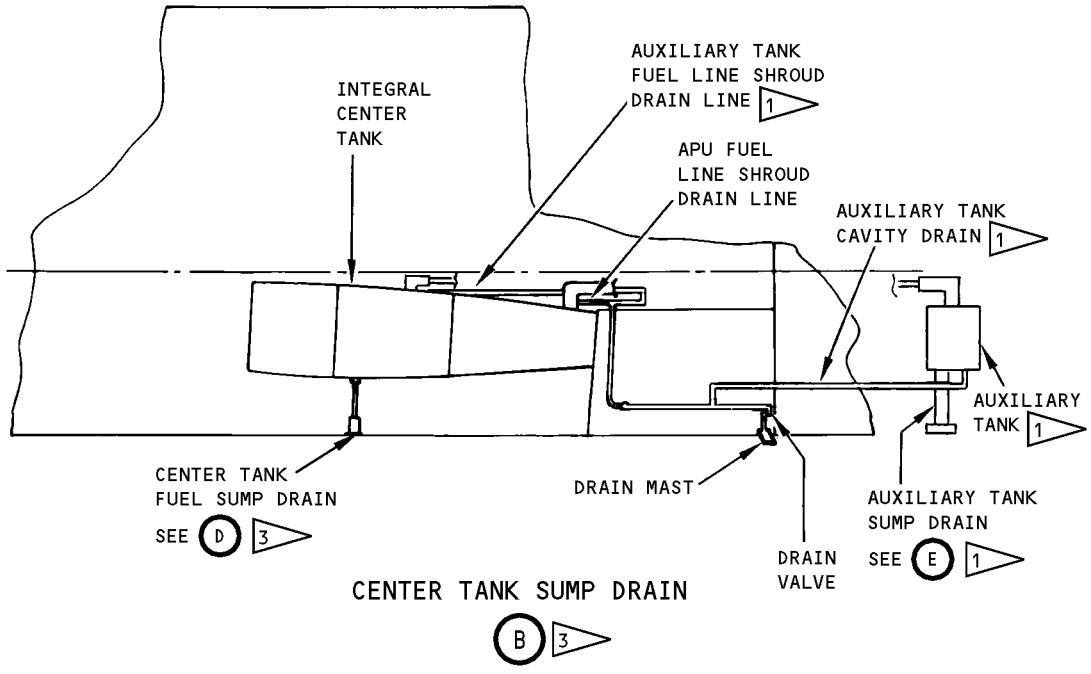
1 AIRPLANES WITH AN AUXILIARY FUEL TANK

Fuel System Drains
Figure 301 (Sheet 1)



WING CENTER CAVITY DRAIN AND CENTER TANK SUMP DRAIN

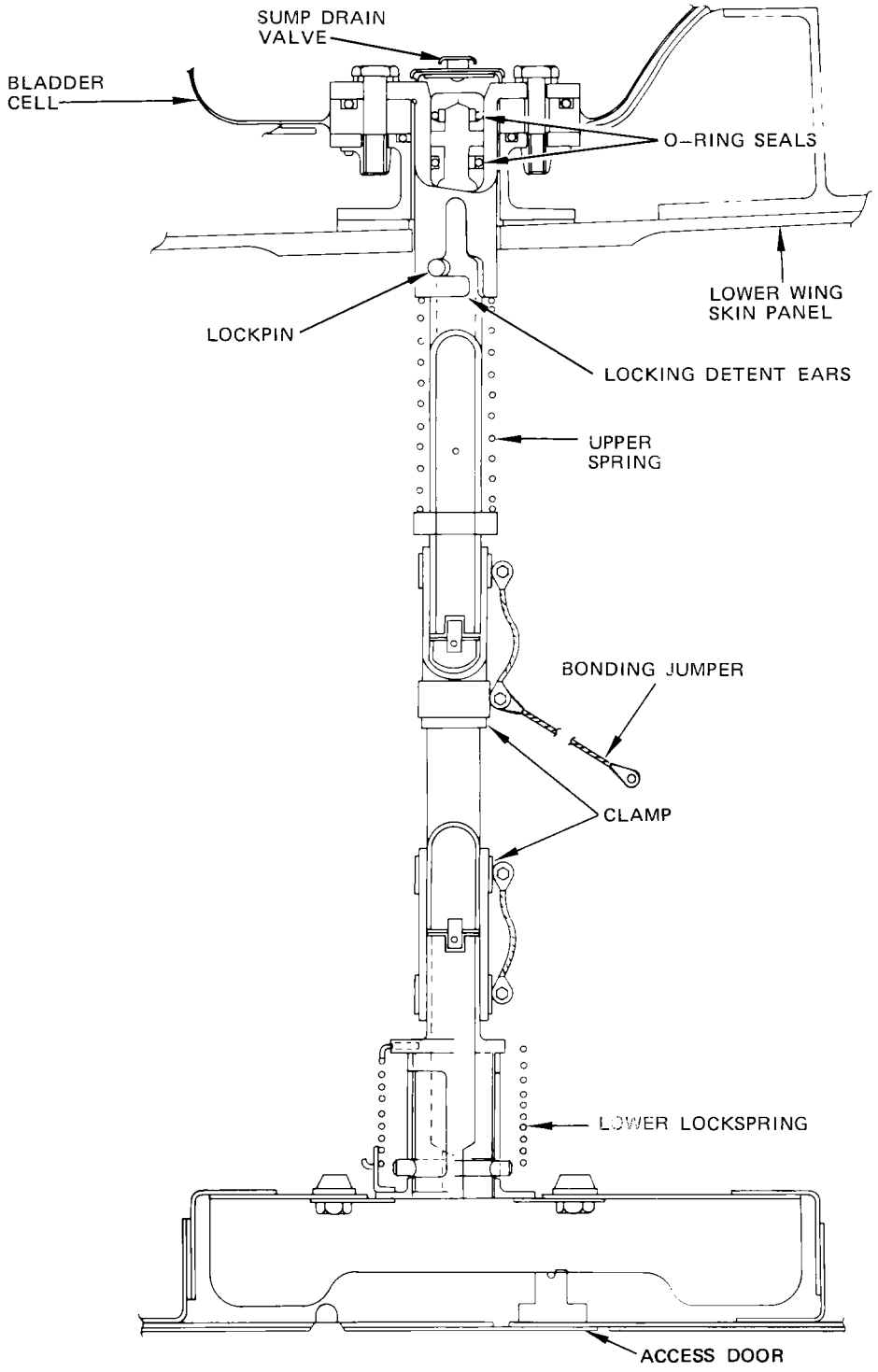
B 2



CENTER TANK SUMP DRAIN

B 3

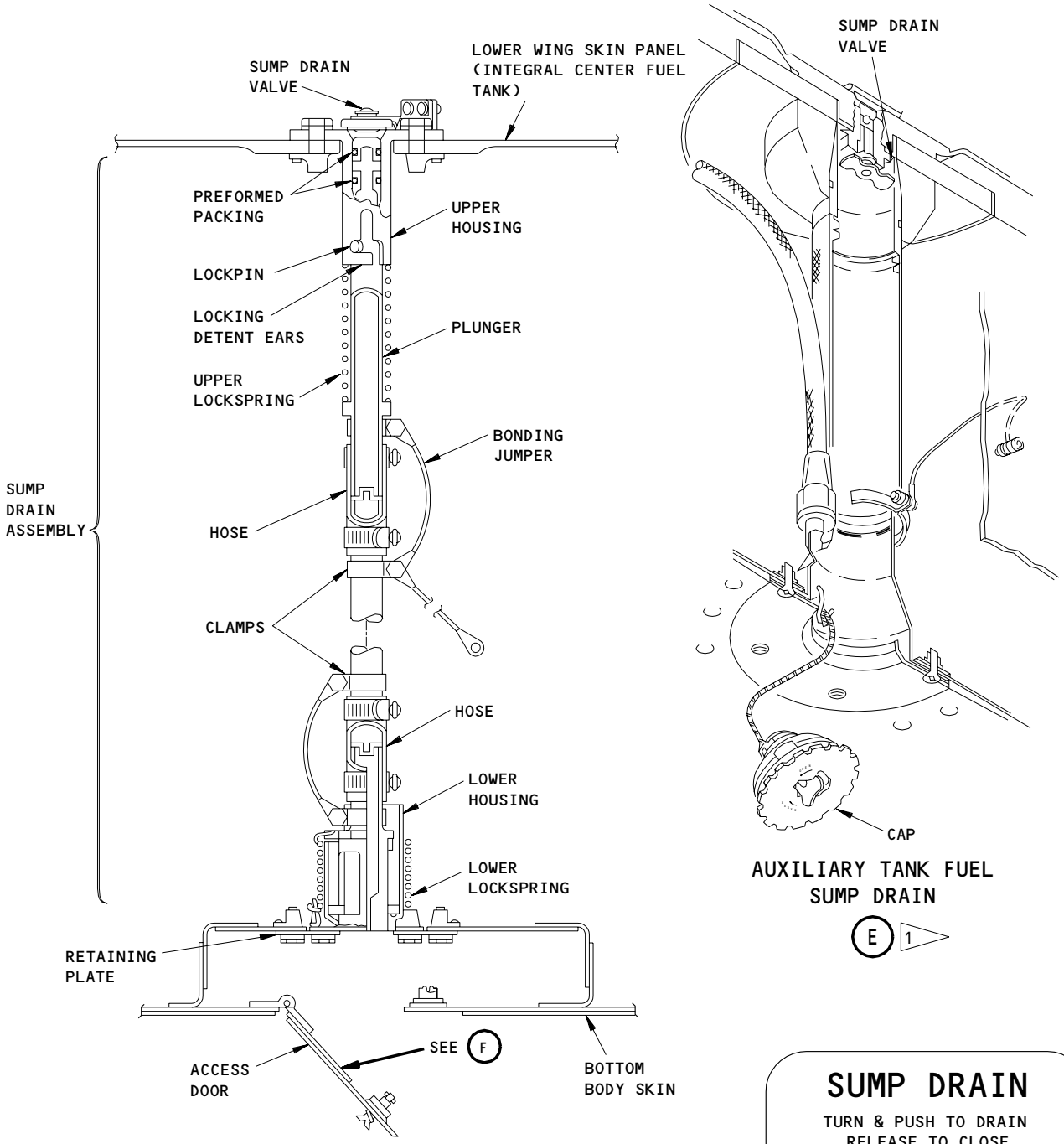
Fuel System Drains
Figure 301 (Sheet 2)



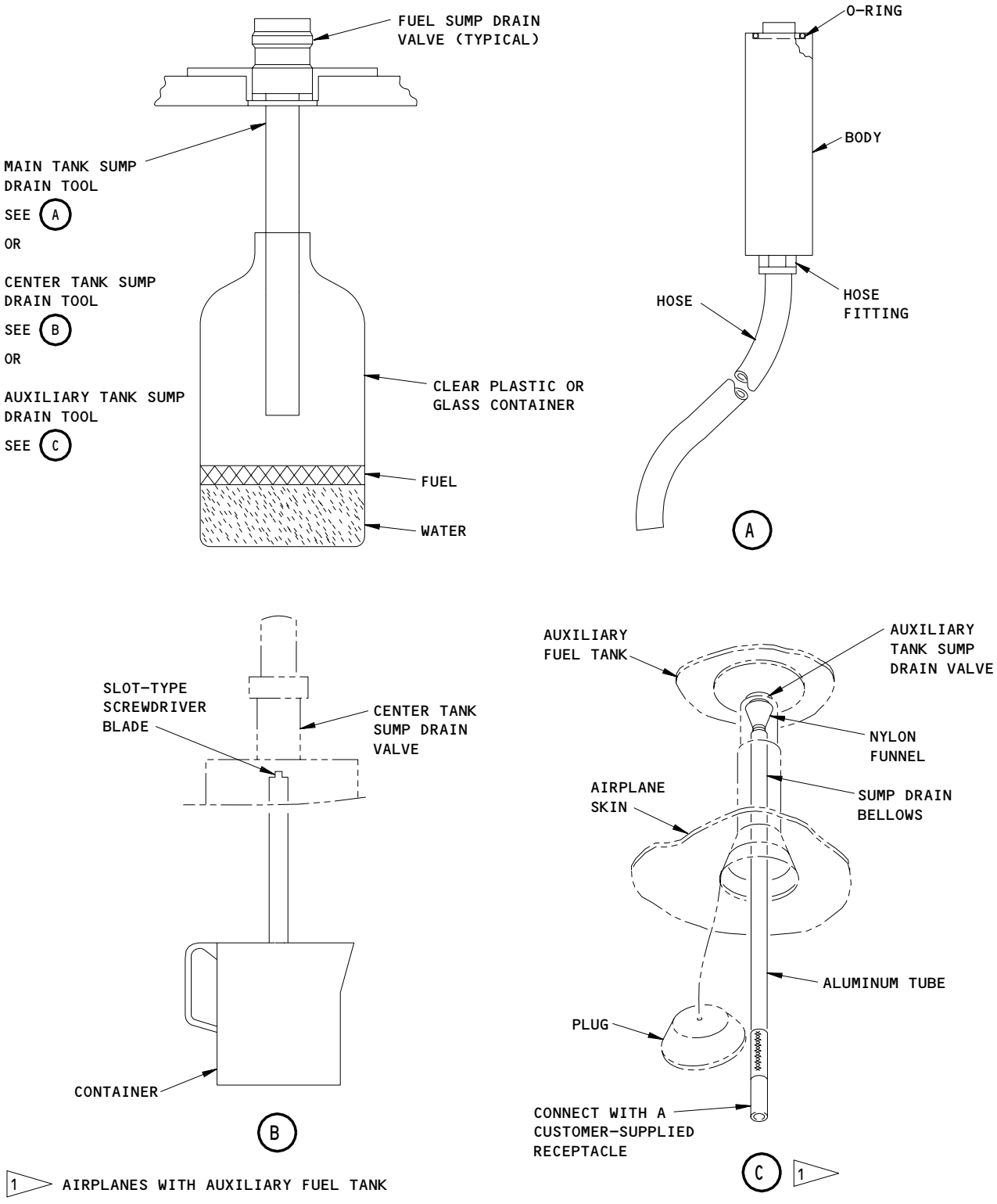
CENTER TANK FUEL SUMP DRAIN

C 2

Fuel System Drains
Figure 301 (Sheet 3)



Fuel System Drains
Figure 301 (Sheet 4)



Fuel Sump Drain Tools
Figure 302

1. Service Hydraulic Reservoirs

A. General

(1) The hydraulic fluid filling station (Fig. 201) is provided to fill all hydraulic reservoirs from one location. The servicing station is located on the forward bulkhead of the right wheel well. The filling equipment consists of a manually operated hand pump, a connection for pressure filling and a ground servicing filter. A fluid quantity indicator mounted on the system A reservoir is visible from the fluid filling station. The system B and standby system reservoir are filled automatically when the system A and system A series reservoirs are being filled, so that when the system A quantity indicator shows full the other two systems are also full. Reservoir servicing procedures are accomplished with the systems depressurized and all flaps and slats retracted.

B. Equipment and Materials

(1) Hydraulic Fluid, Fire Resistant - BMS 3-11 (Ref 20-30-21)

NOTE: All currently qualified BMS 3-11 Type IV hydraulic fluids are interchangeable and intermixable in any proportion.

C. Service Hydraulic Reservoirs

WARNING: TO PREVENT THE POSSIBILITY OF UNDESIRABLE FLIGHT CONDITIONS, DO NOT SERVICE HYDRAULIC SYSTEM WITH STAUFFER ER FLUID UNLESS GROUND SPOILER LOCKING ACTUATORS WITH PART NUMBERS 65-44851-7 OR HIGHER AND 65-44961-6 OR HIGHER ARE INSTALLED.

NOTE: Stauffer ER fluid is no longer a qualified BMS 3-11 fluid.

(1) If handpump is to be used, place end of suction hose in hydraulic fluid container.

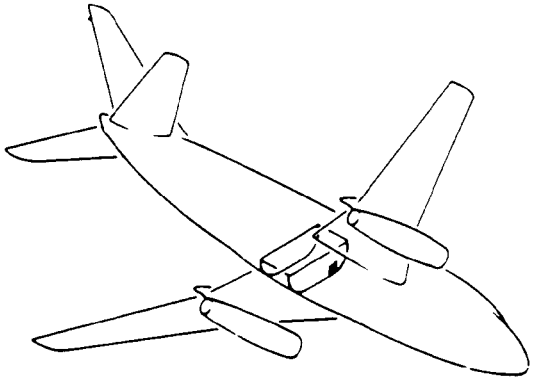
(2) If a pressure cart is to be used, connect service cart hose to ground filling port.

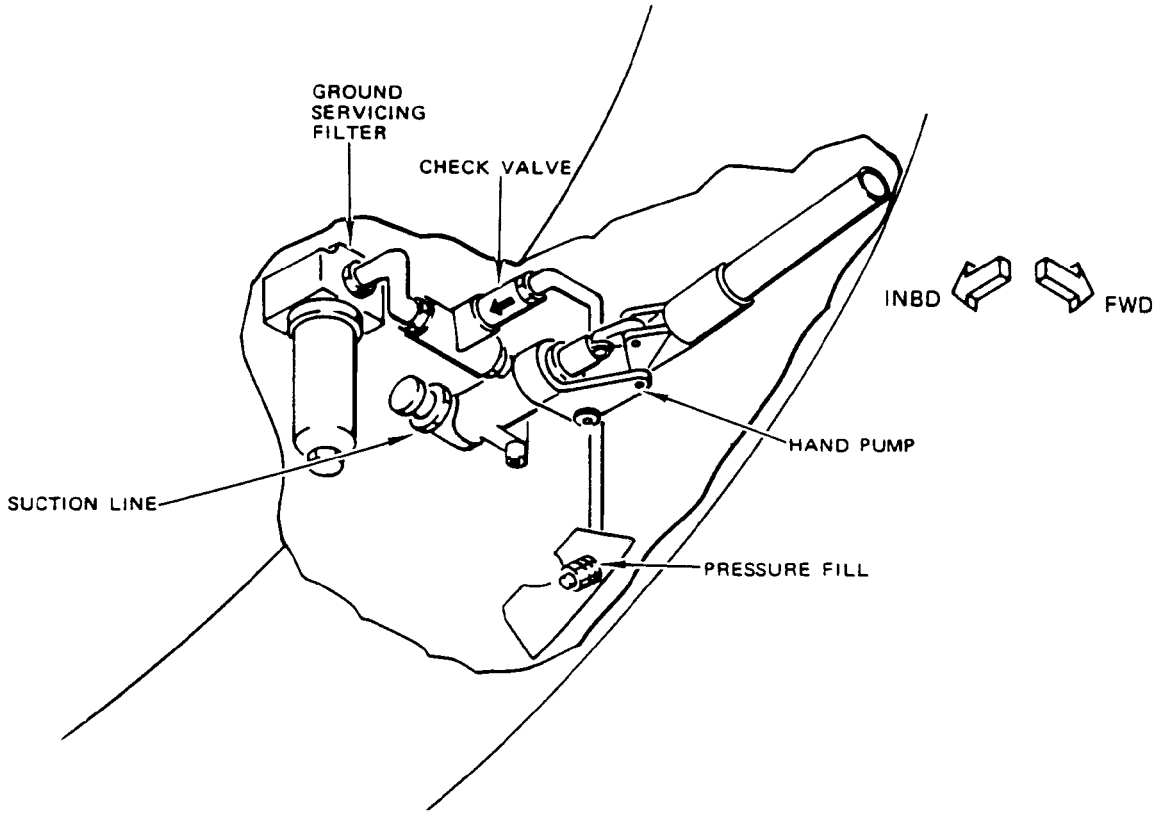
WARNING: FIRE-RESISTANT HYDRAULIC FLUIDS CONFORMING TO BMS 3-11 MAY CAUSE SKIN IRRITATION. AVOID PROLONGED OR REPEATED CONTACT WITH THE SKIN. IN CASE OF EYE CONTACT, FLUSH THE EYES WITH WATER AND OBTAIN MEDICAL AID. IN CASE OF INGESTION, OBTAIN MEDICAL AID.

CAUTION: WHEN SERVICING HYDRAULIC RESERVOIRS MAKE SURE THAT SERVICE EQUIPMENT IS CLEAN, AND THAT CLEAN HYDRAULIC FLUID, FIRE RESISTANT, BMS 3-11, IS USED.
OVER-FILLING RESERVOIR MAY FORCE FLUID THROUGH RESERVOIR PRESSURIZATION SYSTEM TO PNEUMATIC DUCT, CAUSING SMOKE AND ODORS IN CABIN.

(3) Add fluid to reservoir.
(4) Restore airplane to normal.

NOTE: After a substantial fluid loss or draining, exercise all systems affected by the hydraulic systems being serviced. Then check the hydraulic reservoir for proper fluid level.





NOTE: 0.55 US GALLONS (EACH RESERVOIR) IS UNUSED FLUID

1 AIRPLANES WITHOUT SYSTEM A SERIES RESERVOIR

2 AIRPLANES WITH SYSTEM A SERIES RESERVOIR

	U.S. GAL	IMP GAL	LITRES
SYSTEM A RESERVOIR	1 4.1	1 3.34	1 15.52
	2 5.0	2 4.16	2 18.93
SYSTEM B RESERVOIR	1.3	1.08	4.92
STANDBY SYSTEM RESERVOIR	1.9	1.58	7.19

Hydraulic Servicing Details
Figure 201

ENGINE OIL TANK - SERVICING

1. General
   A. The engine oil tank is serviced with oil per P&WA Specification No. 521 (refer to P&WA Service Bulletin No. 238) through the filler port on the tank. Access to the oil tank is obtained by opening an access panel on the forward left side of the engine cowling.
2. Equipment and Materials
   A. Oil per P&WA Specification No. 521 (Ref P&WA SB No. 238)

      CAUTION: SOME OILS ARE NOT COMPATIBLE WHEN MIXED. UNLESS COMPATIBILITY IS ASSURED, DO NOT MIX BRAND NAME OILS.

3. Service Engine Oil Tank

   CAUTION: THE ENGINE IS SUBJECT TO STATIC INTERNAL OIL LEAKAGE AND UP TO 2 GALLONS OF OIL MAY DRAIN BACK INTO THE ENGINE SUMPS. IN ORDER TO ELIMINATE OVERSERVICING, WHICH COULD RESULT IN A BUILDUP OF SUFFICIENT INTERNAL PRESSURE TO RUPTURE THE OIL TANK DURING ENGINE OPERATION, THE OIL TANK SHOULD BE SERVICED WITHIN 30 MINUTES AFTER ENGINE SHUTDOWN.

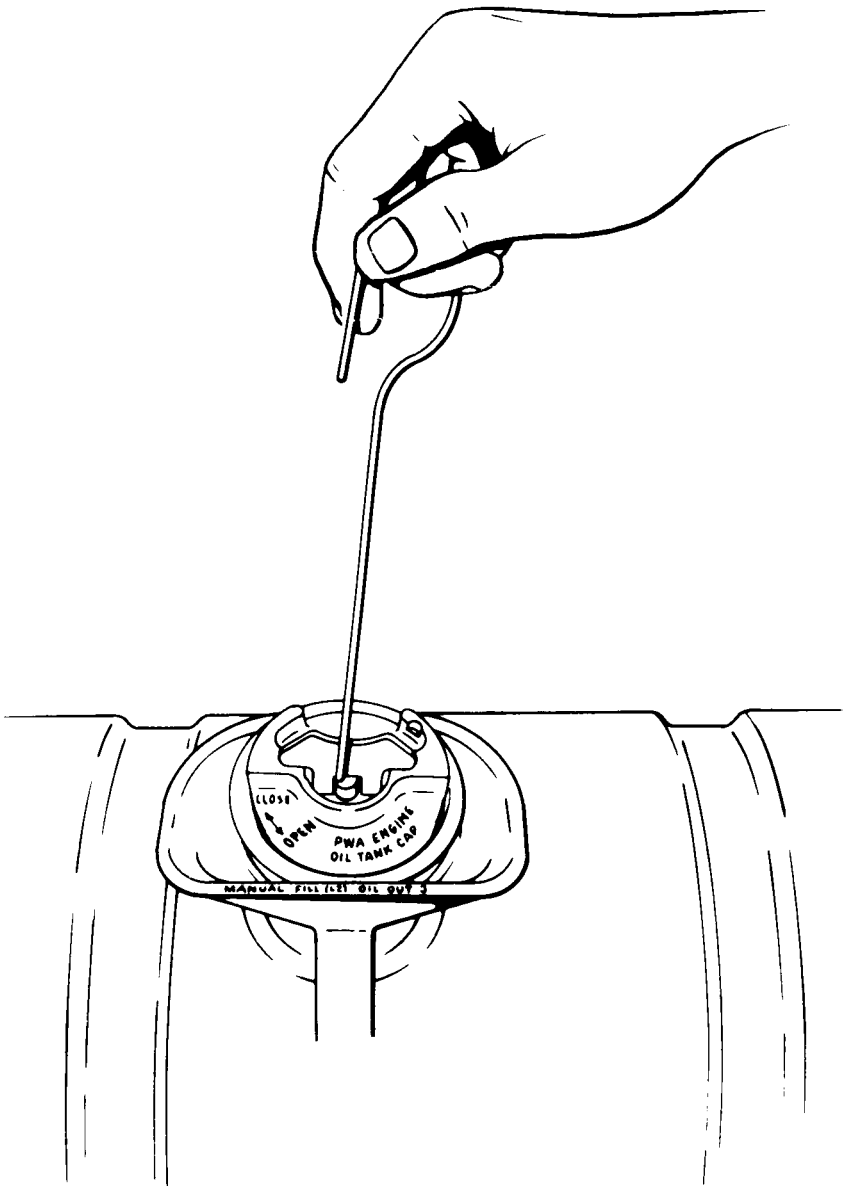
   NOTE: If engine oil tank is not serviced within 30 minutes after engine shutdown; the engine shall be motored until oil pressure is steady prior to checking oil level.

   A. Remove self-locking filler cap from port in sump cavity.
   B. Add approved lubricating oil to fill engine oil tank until oil level is at the lip of the filler port (Fig./202).

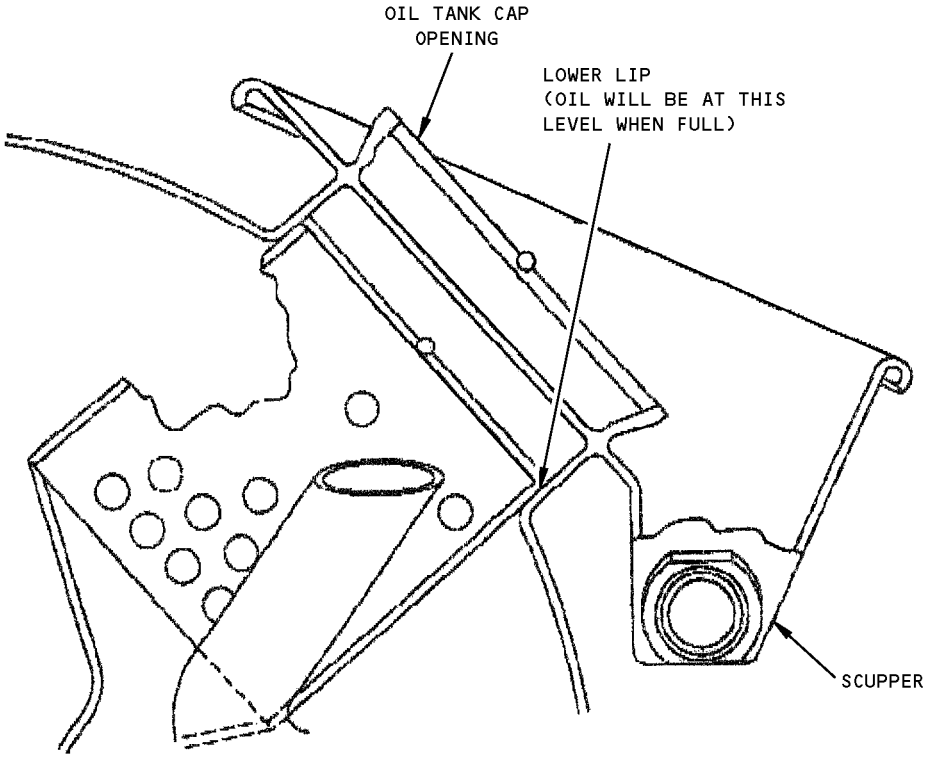
      NOTE: Any oil spilled in the sump cavity or overserviced will drain to a drain hole on the underside of the engine.

   C. Replace filler cap.

      CAUTION: INSECURE INSTALLATION OF THE OIL TANK FILLER CAP MAY OCCUR IF INTERNAL STOPS ARE WORN PERMITTING INCORRECT LOCK ROTATION. CHECK FOR PROPER LUG ENGAGEMENT AFTER CAP IS INSTALLED AND LOCK HANDLE IS TURNED TO "CLOSE" BY ATTEMPTING TO REMOVE CAP (PULL STRAIGHT OUT ON HANDLE BY HAND OR WITH A WIRE HOOK AS SHOWN IN FIG. 201). WHEN STOWING LOCK HANDLE, CHECK THAT MACHINED SURFACE OF HANDLE IS TURNED UP AND AS-CAST SURFACE IS DOWN TOWARD CAP. PROPERLY LOCKED AND STOWED, THE LOCK HANDLE PRESENTS A SMOOTH FLAT SURFACE THAT IS FLUSH WITH THE CAP.



Checking Oil Tank Filler Cap Installation
Figure 201



CROSS SECTION THROUGH
TANK FILLER NECK

Oil Tank Cap Filler Neck Oil Level Visual Check
Figure 202

CONSTANT SPEED DRIVE - SERVICING

1. General
   A. The need and time for oil changes depends on operating conditions and manufacturer's recommendations. Use only clean, recommended oil.
   B. A sight gage on CSD indicates oil level in system. A standpipe attached to the engine accessory gearbox indicates oil level in input spline cavity.
2. Equipment and Materials
   A. Service Cart - Malabar 53361-2, Malabar Hydraulics Co., 220 West Los Angeles Avenue, Simi Valley, CA 93065
   B. Coupling - OMP2506-3, Ozone Metal Products 101-32, 101st St., Ozone Park, Long Island, NY 11416
   C. Oil - MIL-L-7808, or any oil conforming to Pratt and Whitney Specification PW-521B Type I or Type II
3. Service Constant Speed Drive Case and Reservoir (Fig. 201)
   A. Check oil level at reservoir sight gage. The operating range is within the applicable crosshatched band.

      NOTE: Oil level reading on sight gage of a disconnected drive may indicate more oil than there actually is due to expanded air that may have forced oil from oil cooler into transmission. To obtain a true oil level reading on sight gage, pressure fill transmission, then recheck sight gage.

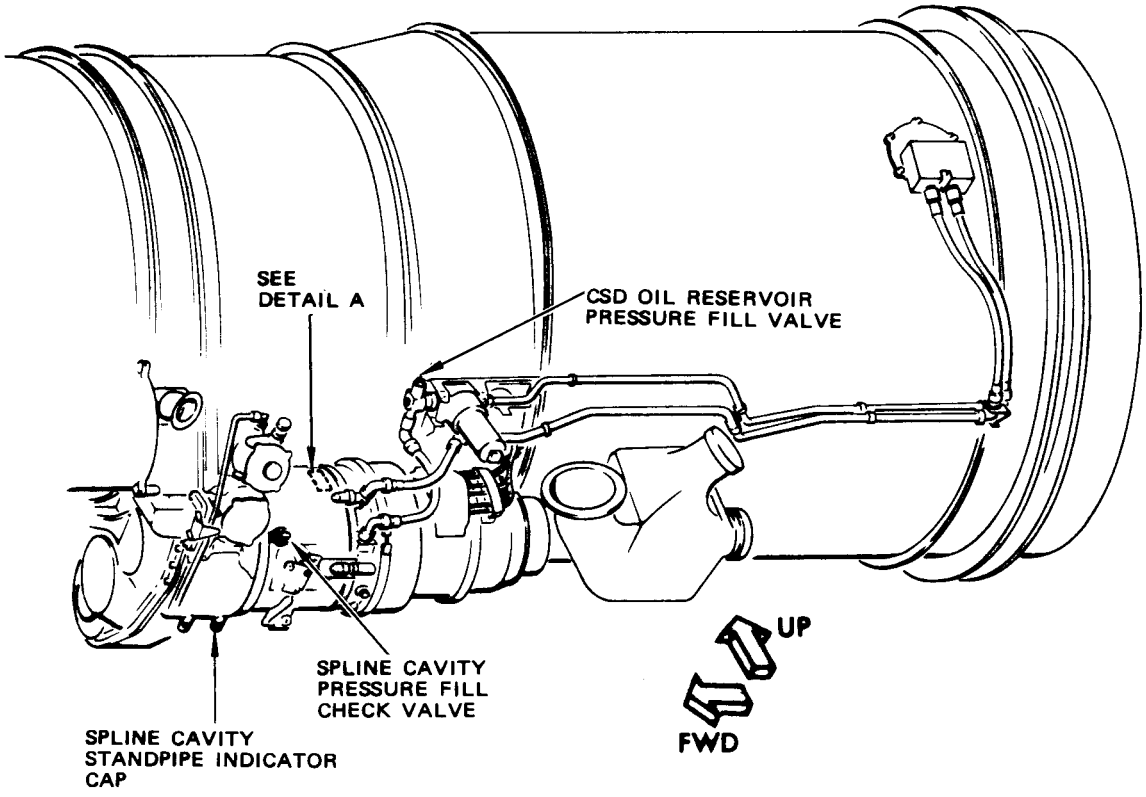
      NOTE: Persistently high CSD oil level readings may be caused by a plugged spline cavity vent or CSD vent valve and leaking oil seals at the CSD and engine gearbox ends of the CSD drive shaft. Left and right bands are provided to allow for difference in water line of drive on No. 1 or 2 engine.

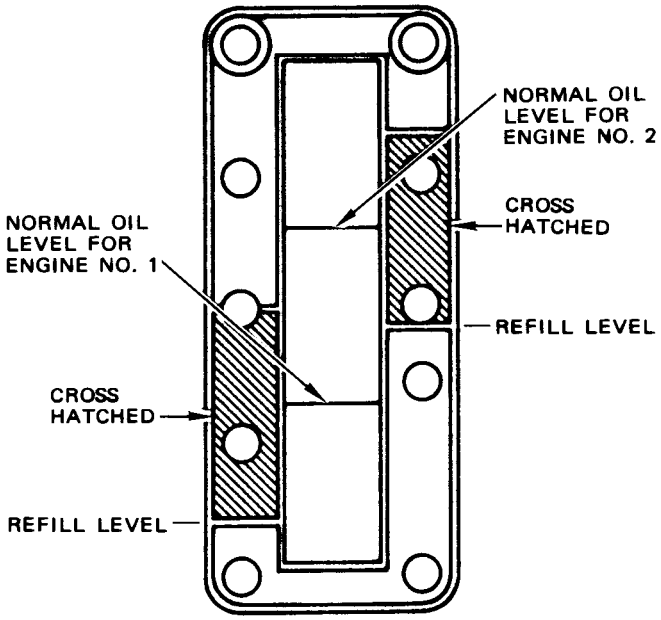
   B. If oil level is below bottom edge of band, service to bottom edge of crosshatched band.
      (1) Pump oil (with 5 to 30 psi pressure) from service cart through CSD oil reservoir pressure fill valve.

      WARNING: USE EXTREME CARE WHEN DRAINING CSD OIL OR REMOVING CSD COMPONENTS. HOT OIL CAN CAUSE INJURY.

      PROLONGED CONTACT WITH CSD OIL CAN CAUSE DERMATITIS. OIL WILL STAIN CLOTHING AND CAN SOFTEN PAINT.

      CAUTION: DO NOT OVERFILL CONSTANT SPEED DRIVE. EXCESS OIL CAUSES OVERHEATING.





CSD OIL RESERVOIR SIGHT GAGE

DETAIL A

Constant Speed Drive Pressure Fill Valve Locations
Figure 201

(2) Stop pumping when oil appears in the bottom of sight gage and wait approximately five minutes for oil level to stabilize. Oil level will rise when drive is warm.

CAUTION: DO NOT TOP OFF OIL LEVEL AFTER MOTORING. MOTORING DOES NOT CONSTITUTE A COMPLETE OPERATIONAL RUN OF THE DRIVE. OIL MAY BE HELD IN OPERATIONAL RESERVOIR, RESULTING IN A LOW READING ON SIGHT GAGE. ADDITION OF OIL CAN CAUSE OVERFILLING WITH CONSEQUENT OVERHEAT AND SLUDGING CONDITIONS. DO NOT OVERFILL.

(3) Check oil level and add or drain as required to obtain correct level.

NOTE: Low oil level in drive case reservoir may be caused by leaks at CSD input shaft seal. Check input spline cavity oil level. If excessive oil is found in spline cavity, this would indicate a defective seal.

4. Service Constant Speed Drive Wet Pad Input Spline Cavity

A. Service Wet Pad Input Spline Cavity On CSD (Fig. 201)

(1) Check oil level in the input spline cavity by removing pressure seal fitting cap on engine gearbox and allow oil to flow from standpipe indicator inside the cavity. When oil stops flowing spline cavity is filled to proper level. If excessive oil flows at this check either CSD or engine seals are leaking and oil is entering input spline cavity.

WARNING: USE EXTREME CARE WHEN DRAINING CSD OIL OR REMOVING CSD COMPONENTS. HOT OIL CAN CAUSE INJURY.

PROLONGED CONTACT WITH CSD OIL CAN CAUSE DERMATITIS. OIL WILL STAIN CLOTHING AND CAN SOFTEN PAINT.

(2) To bring oil to overflow level, pump oil from service cart through spline cavity fill check valve on CSD until it begins to flow from the standpipe indicator.

NOTE: Approximately 35 psi is required to force oil thru the CSD fill check valve into the spline cavity.

(3) Allow excess oil to flow from standpipe, then replace pressure seal fitting cap on engine gear case and tighten to 40-50 pound-inches.

NOTE: The wet pad spline cavity may be drained by removing the entire fill check valve assembly from the CSD.

(4) Disconnect oil pump connection from spline cavity fill check valve on CSD and replace cap.

APU OIL TANK - SERVICING

1. General
   A. This section covers topping-off of the APU oil tank. A separate procedure, 49-91-31, Oil Tank - Unit Servicing, covers draining and filling of oil tank with same brand of oil and draining and filling of oil tank with different brands of oil.
   B. Topping-off is an approved method of changing to a different approved oil, by replenishing oil in the reservoir through routine oil servicing without any draining or flushing. This method should only be used for changing approved oil brands conforming to the same oil specification.
2. Equipment and Materials
   A. Cleaning Solvent - Federal Specification P-D-680 (Ref 20-30-31)
   B. Turbine Engine Lubricating Oil - (Ref 20-30-21)
      (1) Lubricant Specification MIL-PRF-7808
         (a) Aeroshell Turbine Oil 390
         (b) Brayco 880 Conojet
         (c) Brayco 880H
         (d) BP Aero Turbine Oil 15
         (e) Castrol 3C
         (f) Castrol 325
      (2) Lubricant Specification MIL-PRF-23699
         (a) Aeroshell Turbine Oil 500
         (b) Aeroshell Turbine Oil 555
         (c) Antar Turbojet II
         (d) BP Turbo Oil 2380
         (e) Brayco 899S
         (f) Castrol 205
         (g) Chevron Jet Oil No. 5
         (h) Hatcol 3211
         (i) Mobil Jet II
         (j) Monsanto Skylube 450
         (k) Stauffer Jet II
         (l) Texaco or Caltex Starjet 5
3. Replenish APU Lubrication System
   A. Open APU compartment access door latches and open door. Install door support rods.
   B. Support lower shroud, open shroud latches, and remove shroud.

      CAUTION: EXERCISE EXTREME CARE NOT TO DAMAGE SHROUD DRAIN LINES WHEN HANDLING SHROUD.

C. Open oil access panel (left side of fuselage above APU door opening).

WARNING: PROLONGED CONTACT OF LUBRICATING OIL WITH SKIN CAN CAUSE DERMATITIS, STAIN CLOTHING AND SOFTEN PAINT. REMOVE SATURATED CLOTHING IMMEDIATELY AND THOROUGHLY WASH SKIN AFTER CONTACT. PAINTED SURFACES SHOULD BE CLEANED IMMEDIATELY AFTER CONTACT WITH OIL.

NOTE: Oil access panel allows better visibility when pouring oil from can into filler neck.

D. Remove filler cap from APU oil tank and check dipstick.
E. Add oil until oil level is at FULL mark on dipstick.

CAUTION: SOME OILS ARE NOT COMPATIBLE WHEN MIXED. UNLESS COMPATIBILITY IS ASSURED, DO NOT MIX DIFFERENT TYPES OF OILS. ONLY OILS CONFORMING TO THE SAME SPECIFICATIONS CAN BE MIXED.

F. Install filler cap on APU oil tank.
G. Close oil access panel.
H. Position lower shroud against upper shroud and close shroud latches.

CAUTION: MAINTAIN A MINIMUM CLEARANCE OF 0.18 INCH BETWEEN ENGINE PLUMBING, FIRE DETECTOR, CLAMPS, AND INSIDE SURFACE OF LOWER SHROUD. EXERCISE EXTREME CARE NOT TO DAMAGE SHROUD DRAIN LINES WHEN HANDLING SHROUD.

I. Disengage APU compartment access door support rods and stow rods. Close and latch access door.

STARTER - SERVICING

1. General
   A. Lubricating the starter is limited to the periodic draining, filling, and/or adding oil to the starter oil sump.

      WARNING: PROLONGED CONTACT OF LUBRICATING OIL WITH THE SKIN CAN CAUSE DERMATITIS, THE OIL WILL STAIN CLOTHING AND CAN SOFTEN PAINT. SKIN MUST BE THOROUGHLY WASHED AFTER CONTACT AND SATURATED CLOTHING MUST BE REMOVED IMMEDIATELY. PAINTED SURFACES ON WHICH OIL HAS BEEN SPILLED SHOULD BE CLEANED IMMEDIATELY.

2. Equipment and Materials
   A. Lubricating Oil - MIL-L-7808, MIL-L-23699 or P&WA Specification No. 521 (Refer to P&WA Service Bulletin No. 238)

      CAUTION: SOME OILS ARE NOT COMPATIBLE WHEN MIXED, UNLESS COMPATIBILITY IS ASSURED, DO NOT MIX NAME BRAND OILS.

   B. Starter drain plug and fill plug gaskets
   C. Clean 1-gallon drain oil container

      CAUTION: TO ASSIST DRAIN OIL EXAMINATION ENSURE SERVICING ACCESSORIES ARE CLEAN. DISPOSE OF USED OIL.

3. Drain Starter Oil Sump
   A. Remove fill cap assembly from retainer or remove fill plug (Fig. 201).
   B. Remove complete drain plug and gasket and allow lubricating oil to drain into container. Check magnetic drain plug (if installed) (Ref 80-11-11, I/C).
   C. Examine drained lubricating oil for metal particles. Metal particles indicate external damage and starter should be removed from service.
   D. Install a new gasket on drain plug. Install plug and gasket in starter. Install lockwire on starters with lockwire provisions.
   E. Reinstall fill cap assembly in retainer or reinstall fill plug. Install lockwire on starters with lockwire provisions.
4. Fill Starter Oil Sump
   A. Service starter with lubricating oil in accordance with preferred method when ports are level as follows:

      NOTE: The starter is designed to be serviced when the two fill ports are level with each other. If engine installation causes them not to be level, the highest of the two ports shall be used as the fill port.

      (1) Remove fill cap assembly and plug or remove fill plug.

(2) Fill starter with a pre-measured quantity of 350 cc of lubricating oil.
(3) Reinstall plug and fill cap assembly or reinstall fill plug. Install lockwire on starter with lockwire provisions.

B. Service starter with lubricating oil in accordance with preferred method when ports are not level as follows:

NOTE: The optimum lubricating oil quantity for the starter is 350 cc, a variation of ±100 cc can be tolerated without detrimental effects under normal operating conditions. This variation can be caused by the particular aircraft installation. Example: If fill port is five degrees above normal (level) position, capacity is approximately 430 cc when filled to overflow; if fill port is five degrees below normal (level) position, capacity is approximately 280 cc. The effect of higher lubricating oil volume is more rapid heating of lubricating oil due to churning and is most evident during free run. The effect of lower lubricating oil volume is marginal lubrication during starting and overrun conditions. If lower lubricating oil volume is required, more frequent lubricating oil level checks are required.

(1) Remove only fill cap assembly or remove fill plug.

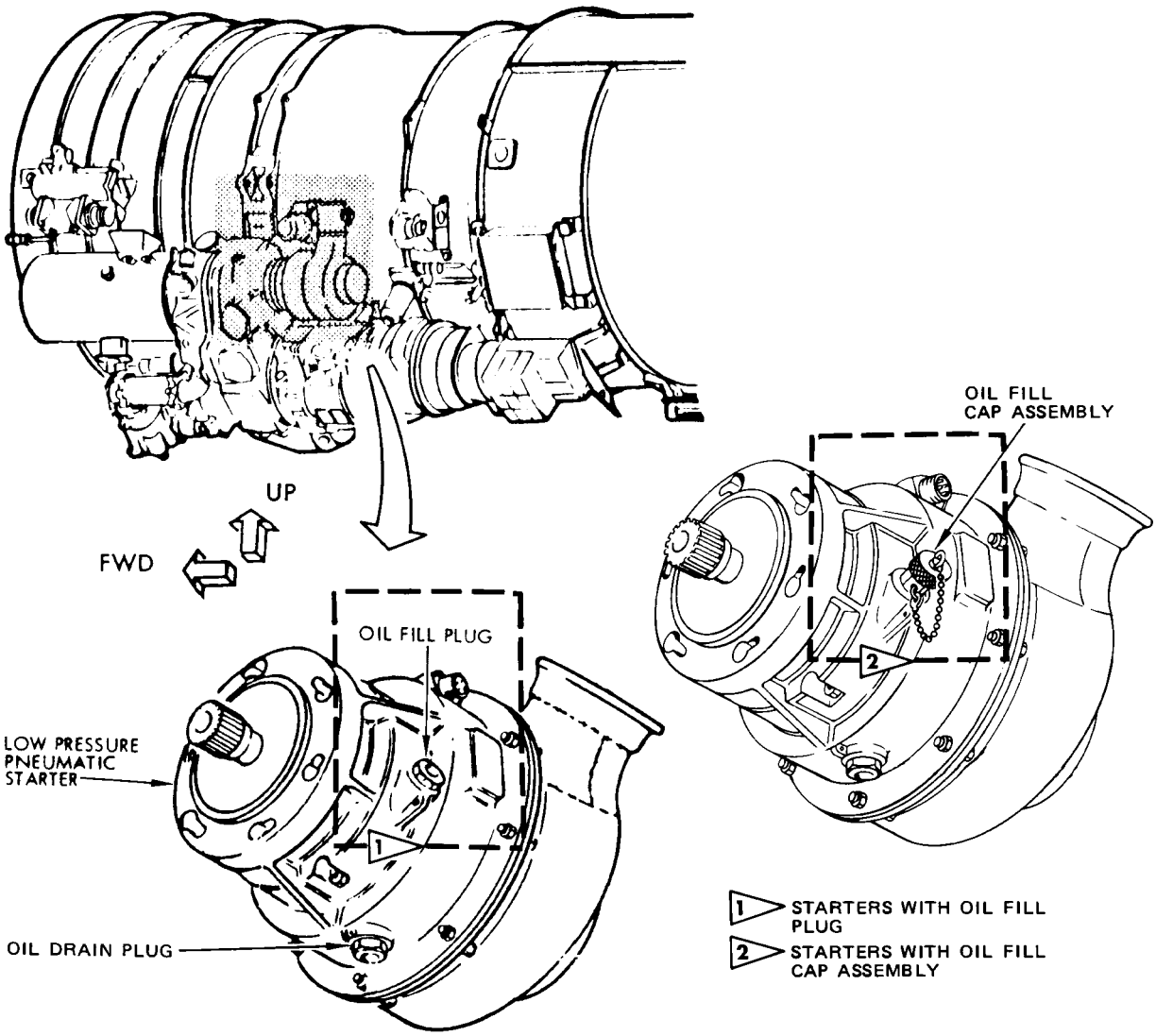
NOTE: Fill cap assembly may be installed on either side of starter and should always be installed in the highest port.

(2) Fill starter with a pre-measured quantity of 350 cc of lubricating oil.
(3) Reinstall fill cap assembly or fill plug. Install lockwire on starters with lockwire provisions.

C. Service starter with lubricating oil in accordance with alternate method of servicing as follows.
(1) Remove fill cap assembly or fill plug.

NOTE: Fill cap assembly may be installed on either side of starter and should always be installed in the highest port.

(2) Slowly fill starter with lubricating oil until lubricating oil level is at the bottom thread of the port used for filling. This will approximate 350 cc lubricating oil in starter.
(3) Reinstall fill cap assembly or fill plug. Install lockwire on starters with lockwire provisions.
(4) Motor starter, then recheck lubricating oil level. Lubricating oil level shall be at bottom thread of the port used for filling.



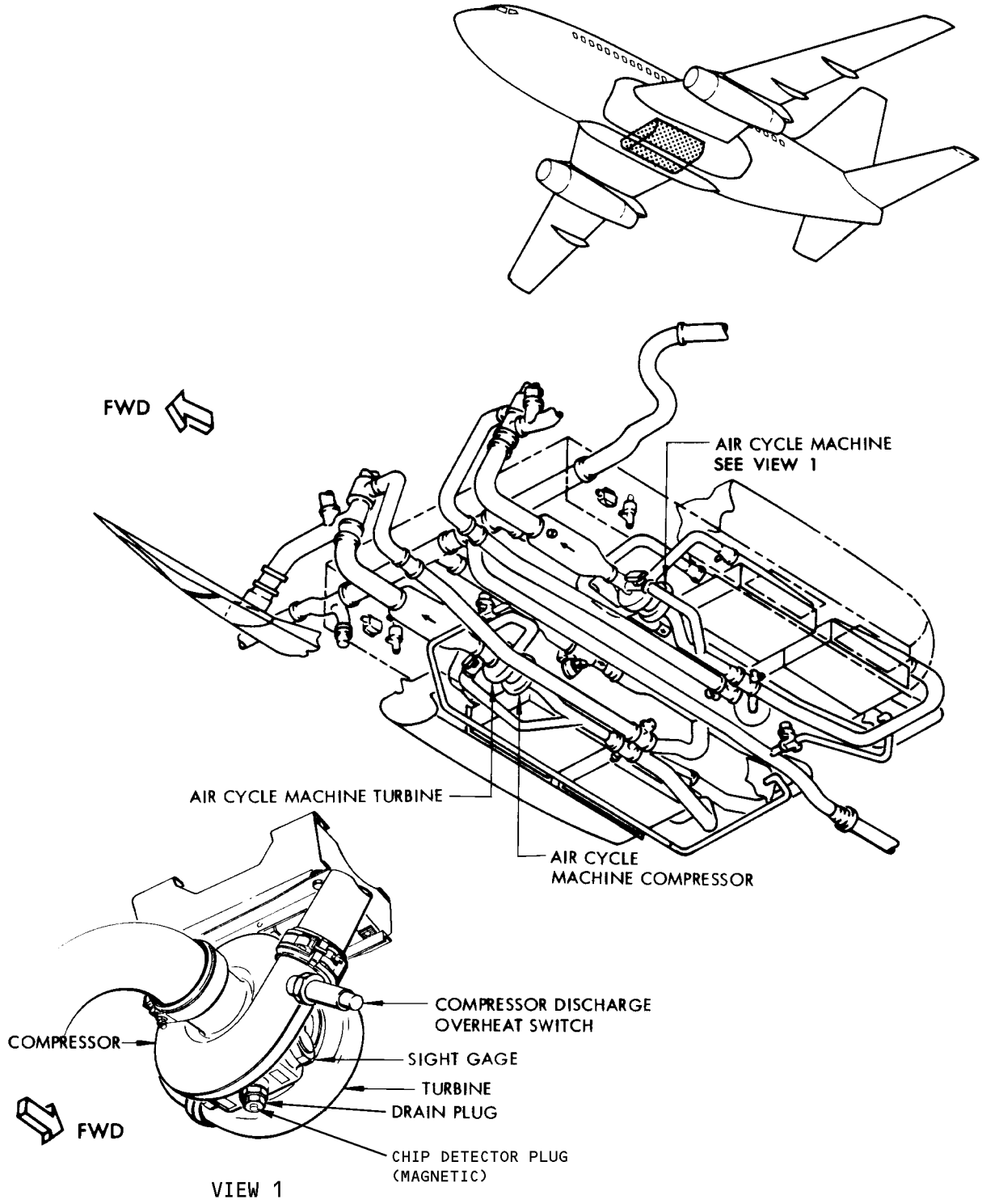
Pneumatic Starter Servicing
Figure 201

AIR CYCLE MACHINE - SERVICING

1. General
   A. The procedure outlined in this section is for checking and refilling the oil level in the air cycle machine. For replacing oil refer to Chapter 21, Air Cycle Machine - Unit Servicing.
2. Equipment and Materials
   A. Lubricant - Oil as approved by AiResearch Manufacturing Company. Refer to Chapter 20, Oil, Lubricant (Air Cycle Machine)
3. Service Air Cycle Machine
   A. Open air conditioning equipment bay doors.
   B. Check air cycle machine oil level.
      (1) Observe oil level through sight glass. If oil does not extend three-fourths up the glass, refill. (See figure 201.)

      NOTE: Operators may wish to check the chip detector plug for metal particles. The presence of metal particles is a sign of wear in the air cycle machine and of possible ACM failure.

   C. Refill air cycle machine oil sump.
      (1) Remove filler plug.
      (2) Add oil until it starts to flow from filler port.
      (3) Check sight glass for condition of oil.
      (4) Install filler plug.
      (5) If sight glass check shows presence of water in oil sump, replace oil. Refer to Chapter 21, Air Cycle Machine - Unit Servicing.
   D. Close Air Conditioning Equipment Bay Doors.



Air Cycle Machine Lubrication
Figure 201

RAM AIR SYSTEM TURBOFAN - SERVICING

1. General
   A. The procedure outlined in this section is for replenishing the turbofan oil sump. For draining and refilling of sump, refer to Chapter 21, Turbofan - Unit Servicing.
2. Equipment and Materials
   A. Turbofan lubricant - Mobil Jet Oil II, MIL-L-23699
3. Service Ram Air System Turbofan
   A. Open air conditioning equipment bay doors.
   B. Replenish turbofan oil sump.
      (1) Check that oil level in turbofan has not dropped below ADD line on dipstick.
      (2) Remove dipstick and add oil to overflow holes in dipstick fitting.
      (3) Visually check for oil discoloration on dipstick.
      (4) If oil is discolored, drain sump (Ref Chapter 21).
      (5) Install dipstick.
      (6) Close air conditioning equipment bay doors.

WATER SYSTEM - SERVICING

1. General

   WARNING: IF THE POTABLE WATER SYSTEM IS NOT DRAINED OR IN NORMAL SERVICE A MINIMUM OF ONE TIME EACH THREE DAYS, THE GROWTH OF BACTERIA CAN OCCUR. IF BACTERIA GROWTH CONTINUES AND YOU DRINK THE WATER, ILLNESS CAN OCCUR.

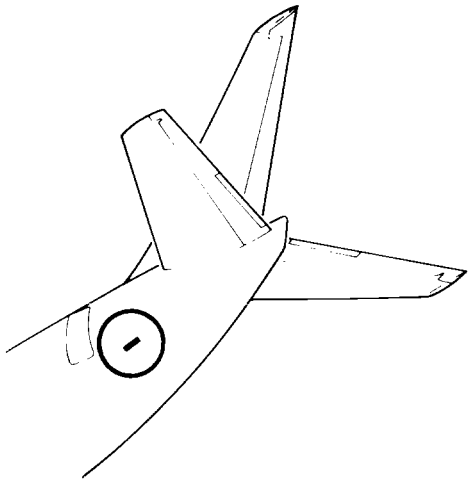
   A. Opening the fill and overflow valve will prevent pneumatic system pressure from building up in the tank during the filling operation, but will not prevent pneumatic system pressure from causing excessive overflow once the tank is full.

2. Fill Water Tank
   A. Connect water hose to fill connection and turn fill and overflow valve control handle to open (Fig. 201).

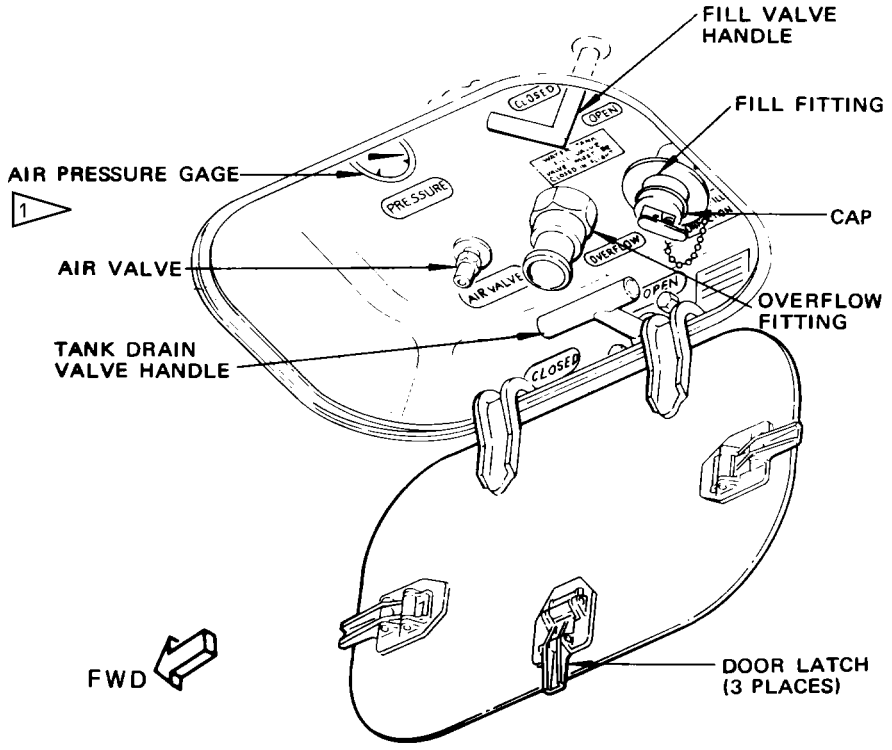
      CAUTION: WATER PRESSURE GREATER THAN 35 PSI CAN CAUSE DAMAGE TO THE WATER TANK.

   B. Pump drinkable water into tank. The recommended servicing water pressure is 25-30 psi.
   C. As soon as water begins to flow from overflow port, turn off water at source.
   D. Turn fill and overflow valve to CLOSED.
   E. If use of water system is desired before normal pressurization is available, pressurize tank at air valve on service panel. Pressurize to 25 psi.
   F. Close access doors.

      NOTE: Fill valve handle must be in the closed position before the access door can be closed. A retainer prevents the fill valve handle from opening when the door is closed.



1 BU LN–SUP; LN–SUS
NH JA8401 thru JA8403; JA8405 thru JA8410
TM CR–BAA; CR–BAB
AR LV–JMW thru LV–JMZ; LV–JND; LV–JNE



WATER SERVICE PANEL

Passenger Water Service Panel
Figure 201

HYDRAULIC ACCUMULATOR - SERVICING

1. Brake Hydraulic Accumulator Servicing
   A. Equipment and Materials
      (1) Nitrogen charging truck
   B. Service Brake Hydraulic Accumulator
      (1) Chock wheels and release parking brake.
      (2) Depressurize brake system by operating captain's or first officer's brake pedals approximately eight times.
      (3) Do these steps to precharge the brake accumulator:

          WARNING: DO NOT LOOSEN THE BODY OF THE HYDRAULIC BRAKE ACCUMULATOR CHARGING VALVE. THE PRESSURE IN THE BRAKE ACCUMULATOR CAN BLOW THE VALVE OUT CAUSING INJURY TO PERSONNEL.

          (a) Remove the cap from the brake accumulator charging valve.
          (b) Attach nitrogen source to the brake accumulator charging valve.
          (c) Turn the outer swivel nut of the brake accumulator charging valve one turn counterclockwise.
          (d) Pressurize the brake accumulator to the correct pressure according to the instructions shown on the aluminum foil marker near the pressure gage in the right main wheel well (Fig. 201).
          (e) Tighten the outer swivel nut of the brake accumulator charging valve clockwise unitl it is tight.
          (f) Wait ten minutes or until accumulator temperature becomes stable.
          (g) Operate the brake pedals until the pressure gage at the brake accumulator (104) shows no change in pressure.

              NOTE: You will have to operate the brake pedals approximately 8 times to fully release the oil pressure from the accumulator.

          (h) Wait ten minutes or until the accumulator temperature becomes stable.

(i) Make sure the pressure that shows on the brake accumulator pressure gage is within +/- 50 psig (+/- 300 kPa) of the pressure you obtained from the graph on the aluminum foil marker. If not, repeat steps (c) through (j) until the precharge pressure stabilizes within the aluminum foil marker requirements.

(4) Pressurize applicable hydraulic system (Ref 29-11-0 and 29-12-0) system gage should read approximately 3000 psi.

(5) Wait 5 minutes and depressurize hydraulic system (Ref 29-11-0 and 29-12-0). Brake pressure gage should read approximately 3000 psi.

(6) Operate the brake pedals approximately eight times, or until the brake accumulator pressure gage shows no change in pressure.

(7) Wait ten minutes or until the accumulator temperature becomes stable.

(8) Make sure the pressure that shows on the brake accumulator pressure gage is within +/- 50 psig (+/- 300 kPa) of the pressure you obtained from the graph on the aluminum foil marker.

(9) Disconnect the source of nitrogen from the brake accumulator charging valve and install the cap.

2. Charge Thrust Reverser Hydraulic Accumulators

A. On airplanes equipped with thrust reverser accumulators, SA ZS-SBL thru ZS-SBO, AR LV-JMW thru LV-JMY, AQ ALL EXCEPT N21SW, N22SW, N25SW, TM CR-BAA, CR-BAB, SQ 9M-AOU, 9M-AOV, 9M-AOW, 9V-BBC, 9V-BBE, ND CF-NAB, CF-NAH, charge accumulators with dry nitrogen as follows (Fig. 202):

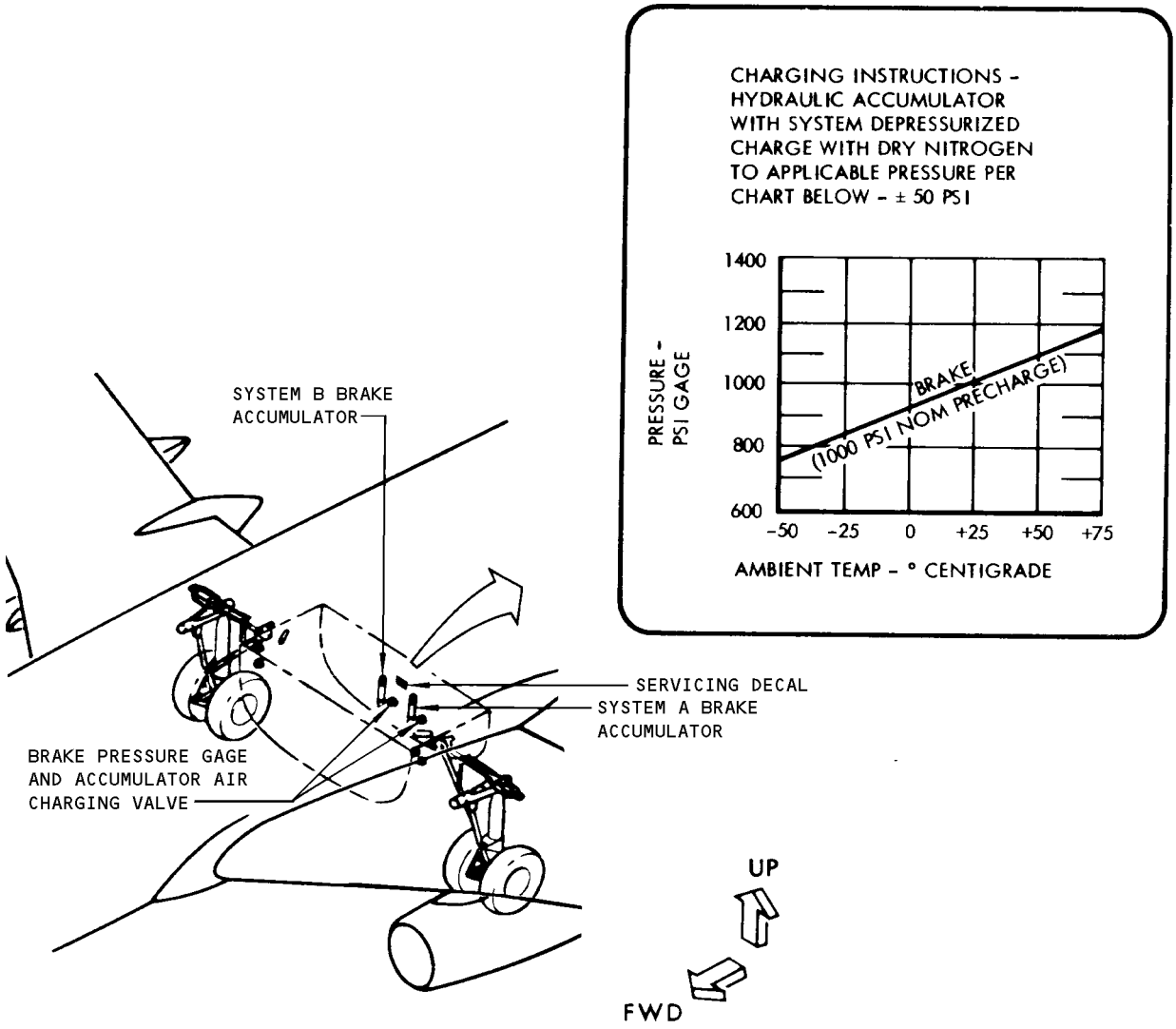
(1) Turn on B hydraulic system to supply pressure to the A system through the interconnect valve.

(2) Open isolation valves by means of the override switch, and operate the thrust reversers several times.

(3) Shut off the B system pump and operate the thrust reversers until system pressure is below that required to function.

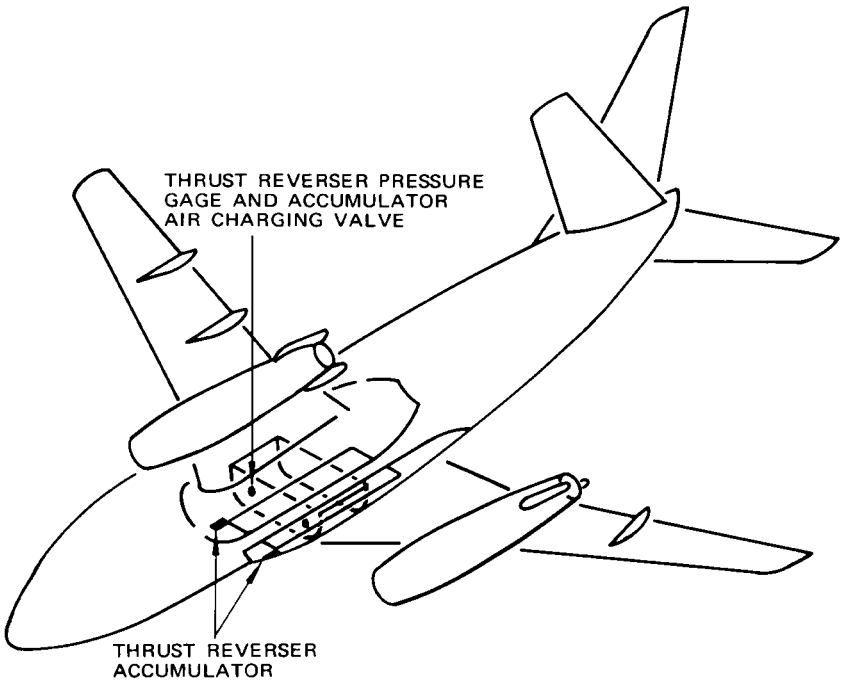
(4) Precharge accumulators to 2000 psi, then operate the thrust reversers until they no longer move. Exercise the controls several more times to ensure complete bleed-off of hydraulic pressure.

WARNING: WHEN CHARGING ACCUMULATORS DO NOT LOOSEN CHARGING VALVE BODY. INTERNAL PRESSURE CAN BLOW VALVE OUT, CAUSING INJURY TO PERSONNEL. REMOVE VALVE CAP AND ATTACH PRESSURE SOURCE. LOOSEN VALVE OUTER HEX-SWIVEL NUT ONE TURN AND SERVICE TO SPECIFIED PRESSURE. TIGHTEN VALVE OUTER HEX-SWIVEL NUT. DISCONNECT SERVICE PRESSURE AND REPLACE VALVE CAP.



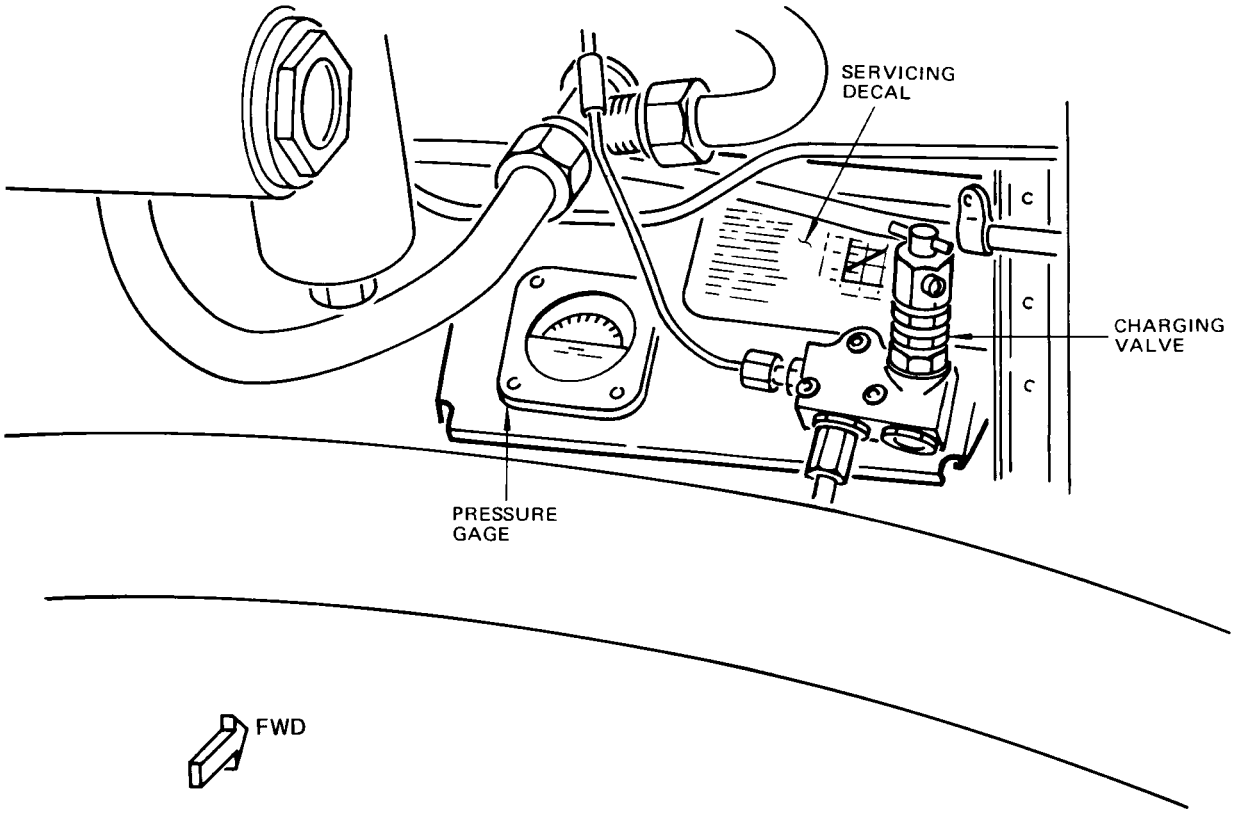
Brake Hydraulic Accumulator
Figure 201

(5) Bleed the accumulator air charge to the value specified on the servicing decal located adjacent to the charging valve.
(6) Turn on the B system pump and pressurize the system. Accumulator pressure gage shall reflect system pressure.
(7) Shut off the B system pump and close the thrust reverser isolation valves.



EFFECTIVITY

AQ	ALL EXCEPT N21SW, N22SW, N25SW
AR	LV–JMW THRU LV–JMY
ML	9M–AOU, 9M–AOV, 9M–AOW, 9V–BBC, 9V–BBE
ND	CF–NAB, CF–NAH
SA	ZS–SBL THRU ZS–SBO
PS	N378PS THRU N382PS, N983PS THRU N987PS
WE	N2711R, N4906, N4907



Thrust Reverser Accumulator Servicing
Figure 202

OXYGEN SERVICING - MAINTENANCE PRACTICES

1. General
   A. Passenger and crew oxygen system servicing is accomplished by the cylinder replacement method or if desired, on airplanes with an external servicing provision, by the external servicing method.
   B. Portable oxygen servicing is accomplished by replacing the cylinders with fully serviced cylinders. Refer to Chapter 35, Portable Oxygen Equipment for location of portable oxygen cylinders.
   C. Oxygen Requirements
      (1) Gaseous oxygen for aviation purposes shall contain not less than 99.5% oxygen by volume and be free from all contaminants of known toxicity to the maximum practicable extent. Moisture content shall not exceed 0.005 milligram of water vapor per liter of gas at temperature of 70°F and pressure of 760 millimeters of Hg. Oxygen per Specification MIL-O-27210, Type I, meets these requirements and is preferred. Deviation per SAE (AS 1065) for moisture content is allowed.
   D. Precautionary Measures
      (1) Ensure that hands, clothing, tools, servicing area, and servicing equipment are clean and free of petroleum products, other oils and greases, hydraulic fluid, or dirt before servicing the oxygen system.
      (2) Keep oxygen away from all sources of ignition (hot exhausts, sparks, flame, smoking, etc.).
      (3) Do not allow oxygen to mix with other gases, fumes, or flammable materials.
      (4) Use only aviation grade breathing oxygen. Welding and hospital oxygen are not acceptable for use in the airplane system due to lack of purity and moisture controls.
      (5) Open all oxygen valves slowly to prevent sudden pressure rise. This will minimize the possibility of fire due to resultant temperature rise. Ensure that valves are also open fully.

         WARNING: VALVES MUST BE OPENED SLOWLY OR EXCESSIVE TEMPERATURES MAY RESULT.

         (a) Opening Oxygen Cylinder Valves
            1) Provide electrical power (Ref 24-22-0 MP).
            2) Ensure that OXYGEN IND & VALVE circuit breaker on P18 panel is closed.

3) Slowly open oxygen cylinder shutoff valve to full open. Do not exceed 25 pound-inches (finger-tight). Then close valve one-fourth turn. Lockwire valve in this position when restoring the system to normal.

CAUTION: IF GIVEN TORQUE IS EXCEEDED, VALVE MAY BE DAMAGED.

NOTE: Use the 0.020-inch diameter copper lockwire.

4) Immediately check that applicable pressure indicator on aft overhead panel agrees with average of applicable oxygen cylinder gages ± 100 psi.

2. Service Oxygen System (Cylinder Replacement Method)
   A. Prior to performing maintenance, review oxygen system safety precautions and general maintenance instructions outlined in 35-00, MP.
   B. Ensure that airplane is properly grounded (Ref 20-40-11).
   C. Gain access to oxygen cylinder.
   D. Close all oxygen cylinder valves finger-tight. This is equivalent to a maximum torque of 25 pound-inches.

      CAUTION: IF GIVEN TORQUE IS EXCEEDED, VALVE MAY BE DAMAGED.

   E. Ensure that hands, clothing, tools, oxygen cylinders, and associated connections are clean and free of petroleum products, other oils and greases, hydraulic fluid, or dirt.
   F. Loosen fittings at cylinder carefully to bleed system pressure.

      WARNING: RESIDUAL PRESSURE MAY EXIST IN LINES AND ESCAPE WITH SOME FORCE.

      CAUTION: DISCONNECT HIGH PRESSURE OXYGEN LINE AT VALVE COUPLING, NOT AT FLARELESS TUBE CONNECTION. DO NOT DISASSEMBLE THERMAL COMPENSATOR.

G. Release the clamps and remove cylinder assembly. Install a cap on the cylinder assembly connection. If the replacement cylinder is not immediately installed, install a tube cap, STD-1130 or tube plug, STD-1131, on the open line (AMM 35-00/201, Oxygen System Installation Practices)

WARNING: USE ONLY OXYGEN-CLEAN COMPONENTS IN THE OXYGEN SYSTEM. IF YOU DO NOT USE OXYGEN-CLEAN COMPONENTS, A FIRE OR AN EXPLOSION CAN OCCUR. THIS CAN CAUSE DAMAGE TO EQUIPMENT OR INJURIES TO PERSONS. CONNECTIONS MUST BE CAPPED TO AVOID CONTAMINATION.

NOTE: Oxygen clean fittings come from a sealed package labeled for oxygen system installation. Make sure that you use only oxygen clean fittings. Some fittings used in the oxygen system are the same as fittings in other systems and are not oxygen clean. If it is necessary to clean parts, use the applicable oxygen procedures to clean the parts. This also applies to tube caps or plugs which must be as clean as the installation connections.

H. When removing cylinders having metal seats in the shutoff valve, a cap will be found attached by a chain to the valve. Install this cap on the inlet/outlet line and tighten to a torque of 350 to 400 pound-inches.

CAUTION: FAILURE TO TIGHTEN CAP TO THE GIVEN TORQUE MAY RESULT IN CYLINDER LEAKING WHILE STORED.

I. Make sure that the oxygen cylinder hydrostatic test date complies with current regulations.

NOTE: The hydrostatic test date must be within the prescribed service life limit. The service life limit is established by national regulatory authorities, the cylinder manufacturer, and/or the airline.

NOTE: The hydrostatic test date is on the neck of the oxygen cylinder.

J. Remove cap, if installed, from airplane connection and examine to ensure fittings are clean and free of contaminants, thread chips, etc.
K. Remove any lockwire or cotter pin which may be used to secure cap on fully charged oxygen cylinder. Slowly unscrew cap from cylinder and allow any trapped gas to bleed off before final disengagement of threads.

WARNING: FULL CYLINDER PRESSURE MAY EXIST INSIDE PRESSURE-TYPE CAP. CAP MAY BE BLOWN OFF WITH SOME FORCE IF UNSCREWED TOO RAPIDLY TO ALLOW FOR VENTING OF TRAPPED GAS.

NOTE: Pressure-type caps are used on oxygen cylinders having metal seats in the shutoff valves and are usually retained to cylinder with a short length of chain. Do not cut or detach chain after removal of cap.

L. Place fully charged cylinder assembly in mounting position.

NOTE: Ensure that high pressure outlet aligns with high pressure line connection.

M. Connect high pressure oxygen line. Tighten nut to a torque of 650 to 700 pound-inches. Connect overboard discharge line. Ensure connection is tight.

WARNING: NO OIL, LUBRICANT OR GASKETS SHALL BE USED IN MAKING THESE CONNECTIONS.

N. Clamp cylinder assembly in position.
O. Open all oxygen cylinder shutoff valves slowly to prevent sudden pressure rise. This will minimize the possibility of fire due to resultant temperature rise. Ensure that valves are also open fully. Do not exceed 25 pound-inches (finger-tight). Then close valves one-fourth turn. Lockwire valve in this position when you restore the system to normal.

WARNING: VALVES MUST BE OPENED SLOWLY OR EXCESSIVE TEMPERATURES MAY RESULT.

CAUTION: IF GIVEN TORQUE IS EXCEEDED, VALVE MAY BE DAMAGED.

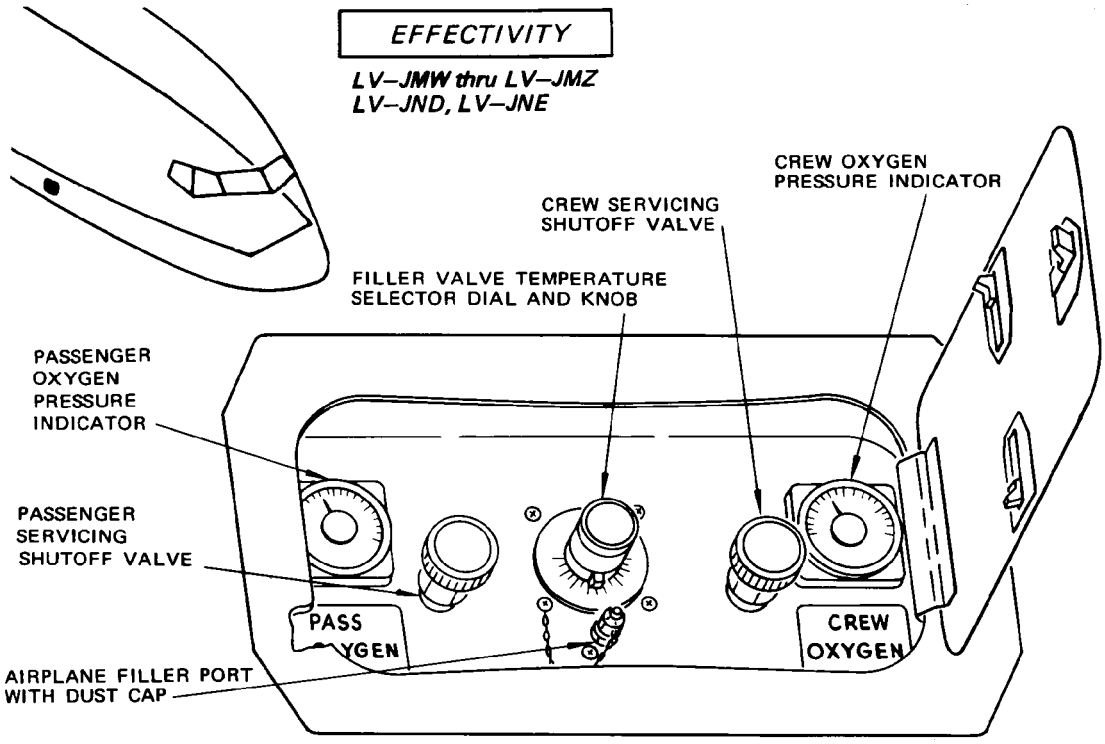
NOTE: Use the 0.020-inch diameter copper lockwire.

P. Check that no leakage exists at cylinder connections using leak test solution specified in Chapter 20. Test solution shall be wiped off with a clean cloth immediately after testing.
Q. Check that system pressure is within required range.
R. If oxygen cylinders have pressure caps retained to cylinders by chains, snap cap in stowed position.
S. Restore system to normal by closing oxygen cylinder access.

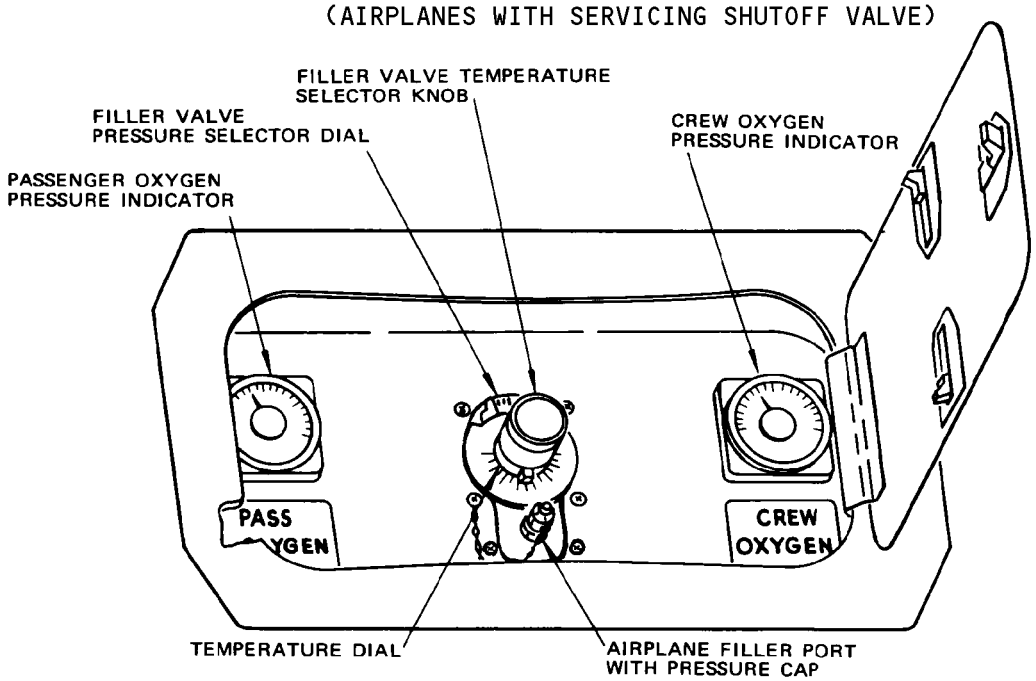
3. Servicing Oxygen System (External Servicing Method) (Airplanes with external servicing panel)
   A. General
      (1) Servicing the crew and passenger oxygen systems may be accomplished by replenishing the oxygen from externally located oxygen ground servicing equipment. The oxygen servicing is accomplished at a servicing panel located on the right side of the airplane (Fig. 201). The servicing panel filler port is approximately 6 feet above the ground and servicing is accomplished by standing on the ground. The crew and passenger oxygen systems are serviced at the same time except it is possible on some airplanes, which have a servicing shutoff valve for each oxygen system to service the passenger or crew system separately (see Fig. 201 for configuration and refer to Chapter 35 for airplane effectivity). The servicing procedure in paragraph D is for airplanes with servicing shutoff valves and the servicing procedure in paragraph E is for airplanes without servicing shutoff valves. In either configuration, the oxygen enters through a common filler valve that controls the rate of filling and the final pressure. The following information and requirements should be reviewed and carefully considered prior to the servicing operation.
      (2) For airplanes having the servicing shutoff valves, both the crew and passenger oxygen systems should be serviced at the same time when required. If systems are serviced separately or reservicing is required, a minimum of 30 minutes must elapse between the end of one charging cycle and the beginning of the next in order to achieve a controlled rate of charging and proper final pressure.

         WARNING: TO PREVENT THE POSSIBILITY OF OVERPRESSURE OR FIRE, DO NOT START SERVICING A SECOND SYSTEM WITHOUT DISCONNECTING THE SUPPLY HOSE AT THE AIRPLANE FILLER PORT AND WAITING A MINIMUM OF 30 MINUTES.

      (3) Servicing Personnel
         (a) The oxygen servicing operation shall be performed by qualified personnel. The qualified person must understand the operation of the airplane oxygen servicing panel, the operation of the oxygen ground servicing equipment, and connection of ground servicing equipment to the airplane servicing panel filler port. Servicing personnel should also be alert to emergency situations during oxygen system servicing.
      (4) Precautionary Measures
         (a) Ensure that hands, clothing, tools, servicing area, and servicing equipment are clean and free of petroleum products, other oils and greases, hydraulic fluid, or dirt before servicing the oxygen system.
         (b) Keep oxygen away from all sources of ignition (hot exhausts, sparks, flame, smoking, etc.).
         (c) Do not allow oxygen to mix with other gases, fumes, or flammable materials.



OXYGEN SERVICING PANEL
(AIRPLANES WITH SERVICING SHUTOFF VALVE)



OXYGEN SERVICING PANEL
(AIRPLANES WITHOUT SERVICING SHUTOFF VALVE)

Oxygen System Servicing Panel
Figure 201

(d) Use only aviation grade breathing oxygen. Welding oxygen and hospital oxygen may be pure enough for breathing but could contain excess water which could freeze and plug the lines, regulators, and valves of the airplane oxygen system.

(e) When beginning the oxygen servicing operation open valves slowly to prevent sudden pressure rises and resultant temperature rise. Use pressure reducing valve on oxygen ground servicing equipment to control supply pressure.

B. Equipment and Materials

(1) Oxygen Requirements

(a) Gaseous oxygen for aviation purposes shall contain not less than 99.5% oxygen by volume and be free from all contaminants of known toxicity to the maximum practicable extent. Moisture content shall not exceed 0.005 milligram of water vapor per liter of gas at temperature of 70°F and pressure of 760 millimeters of Hg. Oxygen per Specification MIL-O-27210, Type I, meets these requirements and is preferred. Deviation per SAE (AS 1065) for moisture content is allowed.

(2) Oxygen Ground Servicing Equipment Requirements

WARNING: TO MINIMIZE POSSIBILITY OF FIRE, ENSURE THAT OXYGEN SERVICING EQUIPMENT IS PROPERLY MAINTAINED IN A CLEAN CONDITION PER AIRPLANE STANDARDS. SEE CHAPTER 35.

(a) The following components must be included to cover the minimum requirements for a satisfactory oxygen ground servicing system.

1) High pressure oxygen storage cylinders with shutoff valves to supply oxygen at a pressure and volume sufficient to fill the airplane oxygen cylinders to capacity.
2) Manifold and other high pressure connecting tubing fabricated from brass or corrosion resistant steel.
3) Check valves having brass body and metal seats.
4) Filter with sintered bronze filter element.
5) Pressure reducing valve with following features: Heavy duty type with brass body; manual pressure adjustment from 0 to 3000 psi; pressure gages to show the supply cylinder pressure at the inlet port and the reduced pressure at the outlet port; outlet port relief valve set at 2400 psi; and outlet port vented to ambient pressure when valve is closed.
6) Supply shutoff valve - slow opening, heavy duty type with metal-to-metal valve seats and clockwise shutoff.
7) High pressure flexible teflon lined supply hose for oxygen service, approximately 25 feet long (MS22028 hose assembly procured under Military Specification MIL-H-26633).

NOTE: Refer to QPL-26633-8 for list of approved vendors.

8) Supply hose adapter made of brass or corrosion resistant steel to attach to airplane filler port. The airplane filler port end fitting is a cone-type connection with a 0.375-24 UNF-3A thread per AND10089-3.
9) Protective cover (metal cap and polyethylene bag) to prevent contamination of supply hose adapter.
10) Stowage provisions for supply hose and protective provisions for stowing adapter end of hose.
11) Static ground cable permanently attached to equipment.

C. Prepare for Oxygen Servicing
(1) Review the precautionary measures before beginning the servicing operation.
(2) Ground airplane and oxygen servicing equipment (Ref Chapter 20, Static Grounding).

WARNING: AIRPLANE MUST BE ELECTROSTATICALLY GROUNDED AND BONDED TO OXYGEN SERVICING EQUIPMENT TO PREVENT THE POSSIBILITY OF SPARKS.

(3) Before servicing equipment supply hose is carried to airplane, remove protective cover from supply hose adapter, examine for cleanliness and with ground servicing equipment pressure reducing valve set at a nominal outlet pressure of 100 to 150 psi, slowly open servicing equipment supply shutoff valve to purge supply hose and adapter of any possible contaminants. Close supply shutoff valve and replace protective cover on supply hose adapter.

CAUTION: NEVER ALLOW THE HOSE END FITTING TO CONTACT THE GROUND OR ANY OTHER UNCLEAN SURFACE.

(4) Unlatch and open oxygen servicing panel door.
(5) Check oxygen pressure indicators on servicing panel prior to filling.
(a) Remove cylinders when a pressure reading of 50 psi or less is indicated and verify pressure with a supplemental gage, reading in 2-pound increments.
1) If pressure reading is less than 5 psi replace cylinders with fully serviced cylinders. System is then considered serviced.

NOTE: Replaced oxygen cylinder should be sent to an authorized oxygen cylinder repair and overhaul facility to ensure that moisture has not entered oxygen cylinder.

2) If pressure reading is above 5 psi, reinstall cylinders for servicing.

D. Service Oxygen Cylinders (Airplanes with servicing shutoff valves)

(1) Check that crew oxygen system shutoff valve, located in control cabin is closed.

(2) Check that airplane oxygen cylinder shutoff valves are open.

(3) Ensure that crew and passenger external fill shutoff valves are closed (Fig. 201).

(4) Ensure that airplane oxygen servicing panel area is clean, then remove dust cap from airplane filler port and examine fitting to be sure that it is clean and free of oil, grease, etc.

(5) Remove protective cover from ground servicing equipment supply hose adapter and connect adapter to airplane filler port.

WARNING: NO OIL, LUBRICANT OR GASKETS SHALL BE USED IN MAKING THESE CONNECTIONS.

(6) Determine temperature of airplane oxygen cylinder area and set filler valve temperature selector to this temperature.

(7) Ensure that ground servicing equipment pressure reducing valve has been adjusted not to exceed 150-psi outlet pressure.

(8) Slowly open ground servicing equipment supply shutoff valve to full open. Ensure that there are no leaks.

(9) Adjust ground servicing equipment pressure reducing valve to increase outlet pressure to a value equal to airplane indicator pressure.

NOTE: If both crew and passenger systems are being serviced the pressure reducing valve must be adjusted to the pressure of the system indicator reading the lower pressure.

(10) Slowly open crew and/or passenger external fill shutoff valve to full open for system(s) being serviced. If both systems are not being serviced ensure that valve for other system is fully closed.

(11) Gradually increase setting on ground servicing equipment pressure reducing valve in such a manner that outlet pressure gage does not exceed 250 psi over airplane system pressure indicator for system being serviced.

(12) After automatic shutoff occurs at desired pressure, and flow has ceased, close airplane shutoff valve(s).

CAUTION: NEVER ALLOW AIRPLANE CYLINDER PRESSURE TO EXCEED 2300 PSI.

(13) Close ground servicing equipment supply shutoff valve and reset ground servicing equipment pressure reducing valve to zero.
(14) Gradually loosen supply hose adapter to bleed off residual pressure, then disconnect adapter from filler port on servicing panel. Install protective cover on adapter and stow hose.

WARNING: RESIDUAL PRESSURE MAY EXIST IN SUPPLY LINE AND ESCAPE WITH SOME FORCE.

CAUTION: NEVER ALLOW THE HOSE END ADAPTER FITTING TO CONTACT THE GROUND OR ANY OTHER UNCLEAN SURFACE.

(15) Reinstall dust cap on airplane servicing panel filler port.
(16) Close and latch servicing panel door.
(17) Slowly open crew oxygen system shutoff valve.

E. Service Oxygen Cylinders (Airplanes without servicing shutoff valves)
(1) Close crew oxygen system shutoff valve.
(2) Check that airplane crew and passenger oxygen cylinder shutoff valves are open.
(3) Ensure that airplane oxygen servicing panel area is clean, then slowly unscrew pressure cap from airplane filler port (Fig. 201) and allow any trapped gas to bleed off before final disengagement of threads.

WARNING: FULL CYLINDER PRESSURE MAY EXIST INSIDE PRESSURE CAP. CAP MAY BE BLOWN OFF WITH SOME FORCE IF UNSCREWED TOO RAPIDLY TO ALLOW FOR VENTING OF TRAPPED GAS.

(4) Examine filler port fitting to ensure that it is clean and free of oil, grease, etc.

(5) Remove protective cover from ground servicing equipment supply hose adapter and connect adapter to airplane filler port.

WARNING: NO OIL, LUBRICANT, OR GASKETS SHALL BE USED IN MAKING THESE CONNECTIONS.

(6) Determine pressure of lowest airplane oxygen system (crew or passenger) and set filler valve pressure dial to this pressure.
(7) Determine temperature of airplane oxygen cylinder area and set filler valve temperature knob to this temperature.
(8) Ensure that ground servicing equipment pressure reducing valve has been adjusted not to exceed 150-psi outlet pressure.
(9) Slowly open ground servicing equipment supply shutoff valve to full open. Ensure that there are no leaks.
(10) Adjust ground servicing equipment pressure reducing valve to increase outlet pressure to a value equal to lowest airplane system pressure reading (crew or passenger).
(11) Gradually increase setting on ground servicing equipment pressure reducing valve in such a manner that outlet pressure gage never exceeds the airplane system pressure by more than 250 psi throughout filling.
(12) After automatic shutoff occurs at desired pressure, and flow has ceased, close ground servicing equipment supply shutoff valve and reset ground servicing equipment pressure reducing valve to zero.

CAUTION: NEVER ALLOW AIRPLANE CYLINDER PRESSURE TO EXCEED 2300 PSI.

(13) Gradually loosen supply hose adapter to bleed off residual pressure, then disconnect adapter from filler port. Install protective cover on adapter and stow hose.

WARNING: RESIDUAL PRESSURE MAY EXIST IN SUPPLY LINE AND ESCAPE WITH SOME FORCE.

CAUTION: NEVER ALLOW THE HOSE AND ADAPTER FITTING TO CONTACT THE GROUND OR ANY OTHER UNCLEAN SURFACE.

(14) Replace pressure cap on airplane servicing panel filler port and tighten to 100 (±5) pound-inches torque.

NOTE: A loose pressure cap on filler port could allow slow leakage to reduce amount of oxygen in crew and passenger cylinders.

(15) Close and latch servicing panel door.
(16) Slowly open crew oxygen system shutoff valve.

MAIN LANDING GEAR SHOCK STRUT - SERVICING

1. General
   A. Procedures are provided for bottom servicing with or without jacking of airplane to cover different positions and conditions of the main landing gear shock strut at time of servicing. The appropriate procedure must be used for each given set of circumstances. Servicing of a shock strut after repair will always require jacking of airplane.
   B. There is no simple method for checking the fluid level within a depressurized strut after any pressurization such as raising the airplane by pressurizing the strut with air or nitrogen. Gas entering into solution with the fluid changes the effective volume of the fluid. The complete servicing procedure must be performed to properly fill the shock strut.
   C. A lubricant is added to the shock strut when servicing. As an alternate, fully formulated fluid with a lubricant premixed is available. For routine servicing where relatively small amounts of fluid are required, it is acceptable to use hydraulic oil without added lubricant to top off shock struts.

      CAUTION: DO NOT ADD SMALL QUANTITIES OF HYDRAULIC FLUID WITHOUT LUBRIZOL MANY TIMES. IF THERE IS NOT A SUFFICIENT QUANTITY OF LUBRIZOL IN THE FLUID, DAMAGE TO THE SHOCK STRUT CAN OCCUR.

      NOTE: Unless the shock strut is completely drained and refilled, the new yellow colored fluid may be used to top off a strut which contains the red colored fluid with the resulting mixture being brown in color.

2. Service Main Landing Gear Shock Strut - Procedure I (Strut in normal service - Airplane not jacked)
   A. General
      (1) This procedure must be used to add fluid to a shock strut that has been in normal operation and inflated up to the time that servicing is required. This procedure is performed without jacking the airplane. Once this procedure is started, the airplane must not be jacked or moved in any way that will allow the shock strut to partially extend until the entire procedure has been completed.
   B. Equipment and Materials
      (1) Low pressure servicing cart for MIL-H-5606, MIL-H-6083 hydraulic fluid or fully formulated shock strut fluid (Ref 20-30-21). Servicing of shock struts not equipped with a check valve will require a temporary check valve to fit shock strut drain hole.
      (2) Hose to suit air charging valve

(3) Suitable container to collect hydraulic fluid (approximately 5-gallon capacity)
(4) Dry air or nitrogen bottle charged to 2500 psi minimum
(5) Strut Inflation Tool - F70200-1
(6) (Preferred) Fully formulated BMS3-32 Type I (with corrosion inhibitor) or Type II (without corrosion inhibitor). BMS3-32, Type I is used to fill a strut for the first time after being overhauled. Subsequent refills may be done with BMS3-32 Type I or Type II.
(7) (Optional) As a substitute for BMS3-32, Type I, operators may mix the MIL-H-6083 with 2.4% by volume of Lubrizol 1395. As a substitute for BMS3-32, Type II, operators may mix MIL-H-5606 with 2.4% by volume of Lubrizol 1395.

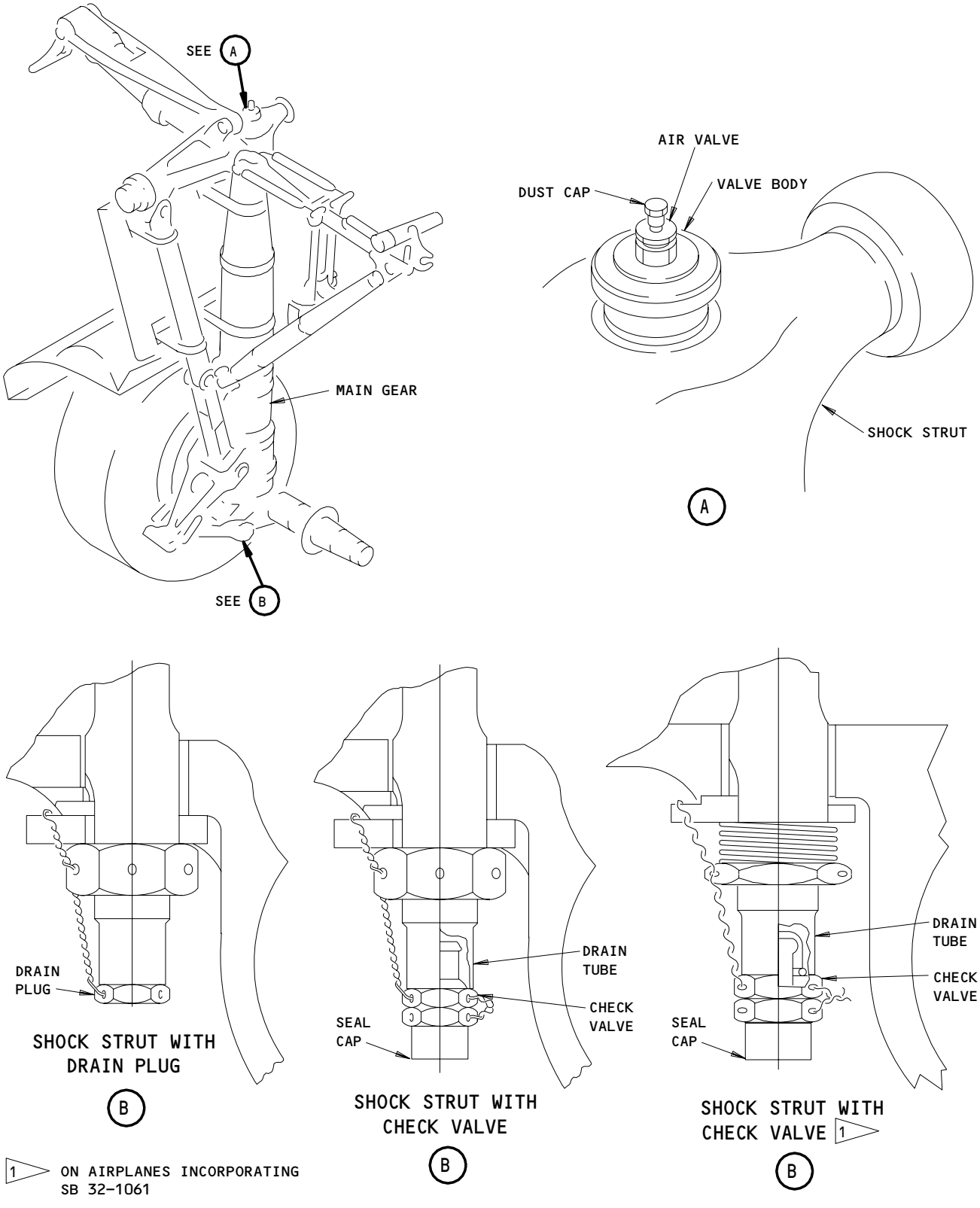
NOTE: Avoid adding the Lubrizol directly. We recommend thoroughly pre-mixing the Lubrizol with 10 parts shock strut fluid before pouring the additive into the strut.

C. Service Main Landing Gear Shock Strut
(1) Completely deflate shock strut by removing dust cap from charging valve on top of shock strut and slowly opening air valve nut two turns maximum (Fig. 201).

WARNING: DO NOT REMOVE VALVE BODY. INTERNAL PRESSURE CAN BLOW BODY OUT CAUSING POSSIBLE INJURY TO PERSONNEL.

NOTE: Fluid in the shock strut will start foaming immediately as pressure is reduced to ambient. Deflate shock strut slowly to prevent loss of fluid through air valve.

(2) Remove foamed fluid and fill with fluid by either of the following methods:
(a) Flushing Method
1) On shock struts equipped with check valve, remove check valve sealing cap.
2) On shock struts without check valve, remove drain plug and install temporary check valve.
3) Connect servicing cart to drain tube check valve.
4) Connect an overflow hose to air valve on top of shock strut and check that air valve is fully opened. Place other end of hose to drain into container.
5) Pump fluid from service cart into shock strut until approximately 3 gallons of fluid overflows into container to ensure all foamed fluid has been displaced.
6) On airplanes not using fully formulated shock strut fluid, add shock strut fluid extreme pressure additive and seal lubricant (optional).
a) Remove air valve from top of shock strut and remove approximately one pint of fluid.



Main Landing Gear Shock Strut Charging Valve
Figure 201

b) Pour in 11 ounces of Lubrizol and top off with clean fluid.

NOTE: Avoid adding the Lubrizol directly. We recommend thoroughly pre-mixing the Lubrizol with 10 parts shock strut fluid before pouring the additive into the strut.

NOTE: Unless the shock strut is completely drained and refilled, the new yellow colored fluid may be used to top off a strut containing the red colored fluid, resulting in a mixture being brown in color.

c) Replace air valve.

(b) Draining Method

1) On shock struts equipped with check valve, remove check valve and completely drain shock strut.
2) On shock struts with drain plug, remove drain plug and completely drain shock strut.
3) On shock strut equipped with check valve, remove seal cap from check valve. Apply shock strut fluid to valve threads. Install check valve snug with bottom of drain tube. Tighten 8-10 foot-pounds torque and lockwire. Ensure arrow on check valve is pointing up.
4) On shock strut with drain plug, install temporary check valve in drain tube.
5) Connect servicing cart to check valve.
6) On airplanes not using fully formulated shock strut fluid, add shock strut fluid extreme pressure additive and seal lubricant (optional).
   a) Remove air valve from top of shock strut. Pour in 11 ounces of Lubrizol.

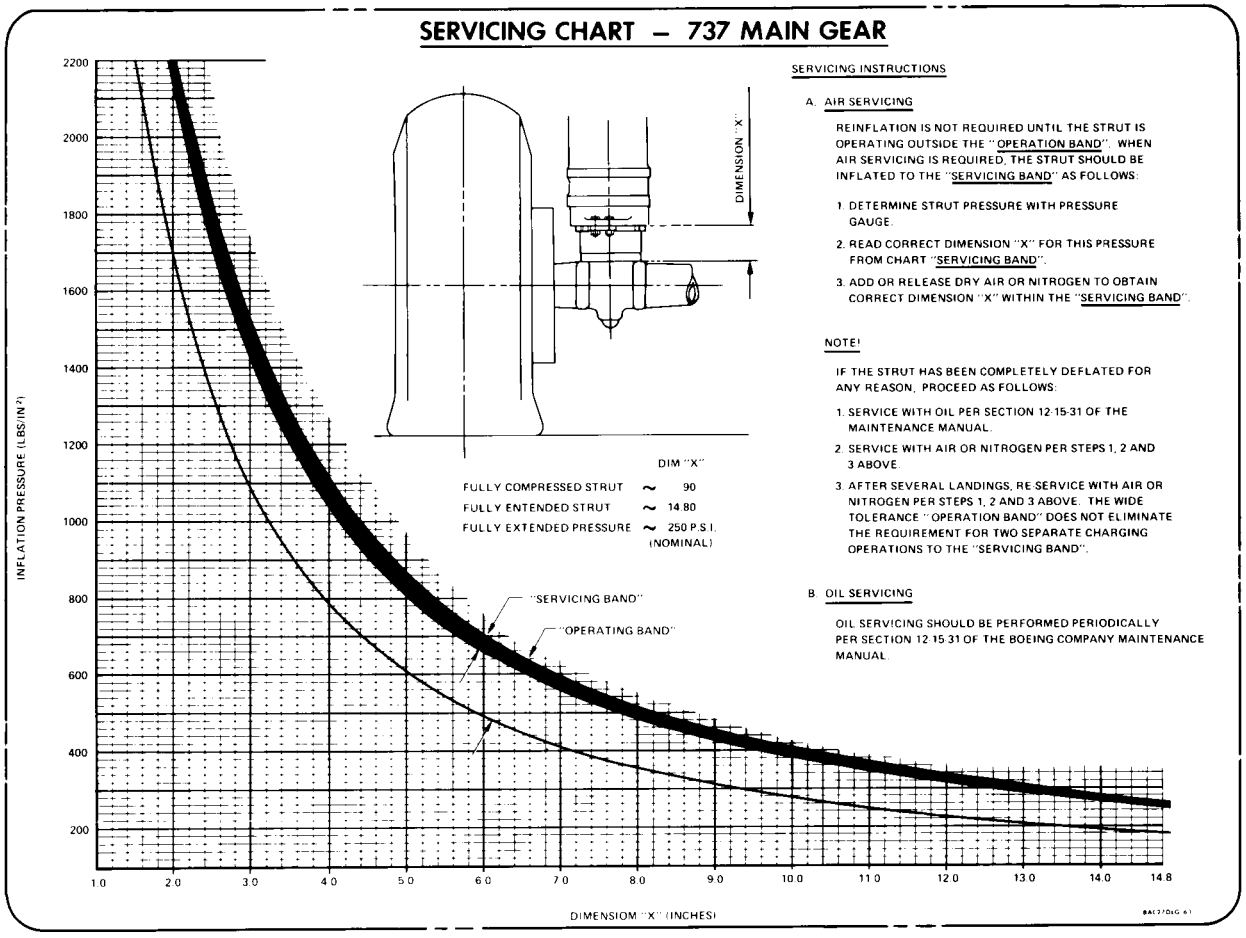
   NOTE: Avoid adding the Lubrizol directly. We recommend thoroughly pre-mixing the Lubrizol with 10 parts shock strut fluid before pouring the additive into the strut.

   b) Replace air valve.
7) Connect an overflow hose to air valve on top of shock strut and check that air valve is fully opened. Place other end of hose to drain into container.
8) Pump fluid into shock strut from servicing cart until fluid overflows into container.

(3) Disconnect service cart and remove hose from top of shock strut.
(4) For shock struts being serviced with a temporary check valve:
    (a) Close air valve at top of shock strut.
    (b) Remove check valve and immediately install drain plug snug with bottom of drain tube. Torque to 40 to 60 pound-inches and lockwire. Keep fluid loss to a minimum.
    (c) Remove charging valve from top of shock strut and fill strut to replace any fluid lost in previous step.
    (d) Install charging valve.
(5) Inflate shock strut with dry air or nitrogen to conform to servicing chart (Fig. 201).
(6) For shock struts equipped with check valve:
    (a) Close air valve at top of shock strut.
    (b) Install dust cap and lockwire air valve.
(7) Return airplane to service and, after 5 to 10 service landings do the following steps:
    (a) Check shock strut pressure and X dimension. If necessary, reinflate shock strut.
    (b) Reservice the shock strut with air or nitrogen (Fig. 201).

        NOTE: The wide tolerance "Operation Band" does not eliminate the requirement for two separate charging operations to the "Servicing Band".

3. Service Main Landing Gear Shock Strut - Procedure II (Strut dry after repair, or airplane on jacks)
   A. General
      (1) This procedure is used to service the shock strut after the shock strut has been drained and disassembled for repairs or for adding fluid while the airplane is supported on jacks.
   B. Equipment and Materials
      (1) Low pressure servicing cart for MIL-H-5606, MIL-H-6083 hydraulic fluid or fully formulated shock strut fluid (Ref 20-30-21). Servicing of shock struts not equipped with a check valve will require a temporary check valve to fit drain hole
      (2) Hose to suit air charging valve



INFLATION INSTRUCTIONS

NOTE: THIS CHART (BAC27DLG-63) REPLACES CHARTS BAC27DLG-54.

Main Gear Shock Strut Servicing Chart
Figure 202

(3) Suitable container to collect hydraulic fluid (approximately 5-gallon capacity)
(4) Airplane jacks
(5) Axle jack
(6) Dry air or nitrogen bottle charged to 2500 psi minimum
(7) Strut Inflation Tool - F70200-1
(8) (Preferred) Fully formulated BMS3-32 Type I (with corrosion inhibitor) or Type II (without corrosion inhibitor). BMS3-32, Type I is used to fill a strut for the first time after being overhauled. Subsequent refills may be done with BMS3-32 Type I or Type II.
(9) (Optional) As a substitute for BMS3-32, Type I, operators may mix the MIL-H-6083 with 2.4% by volume of Lubrizol 1395. As a substitute for BMS3-32, Type II, operators may mix MIL-H-5606 with 2.4% by volume of Lubrizol 1395.

NOTE: Avoid adding the Lubrizol directly. We recommend thoroughly pre-mixing the Lubrizol with 10 parts shock strut fluid before pouring the additive into the strut.

C. Service Main Landing Gear Shock Strut
(1) Jack airplane until shock strut is fully extended (Ref Chapter 7, Jacking Airplane).
(2) Completely deflate shock strut by removing dust cap from charging valve on top of shock strut and slowly opening air valve nut two turns maximum (Fig. 201).

WARNING: DO NOT REMOVE VALVE BODY. BODY CAN BLOW OUT CAUSING POSSIBLE INJURY TO PERSONNEL.

NOTE: Fluid under pressure in shock strut will start foaming immediately after pressure is reduced to ambient. Deflate shock strut slowly to prevent loss of fluid through air valve.

(3) Place axle jack under shock strut and slowly raise inner cylinder until shock strut is fully compressed.
(4) Remove foamed fluid and fill with fluid by either of the following methods:
(a) Flushing Method
1) On shock strut equipped with check valve, remove check valve sealing cap.
2) On shock strut without check valve, remove drain plug and install temporary check valve.
3) Connect servicing cart to drain tube check valve.
4) Connect an overflow hose to air valve on top of shock strut and check that air valve is fully opened. Place other end of hose to drain into container.
5) Pump fluid from service cart into shock strut until approximately 3 gallons of fluid overflows into container to ensure all foamed fluid has been displaced.

6) On airplanes not using fully formulated shock strut fluid, add shock strut fluid extreme pressure additive and seal lubricant (optional).
   a) Remove air valve from top of shock strut and remove approximately 1 pint of fluid.
   b) Pour in 11 ounces of Lubrizol and top off with clean fluid.
   c) Replace air valve.
7) Replace air valve.

(b) Draining Method
1) On shock struts equipped with check valve, remove check valve and completely drain shock strut.
2) On shock struts with drain plug, remove drain plug and completely drain shock strut.
3) On shock strut equipped with check valve, remove seal cap from check valve and install check valve snug with bottom of drain tube. Tighten check valve 40 to 60 pound-inches and lockwire. Ensure arrow on check valve is pointing up.
4) On shock strut with drain plug, install temporary check valve in drain tube.
5) Connect servicing cart to check valve.
6) On airplanes not using fully formulated shock strut fluid, add shock strut fluid extreme pressure additive and seal lubricant (optional).
   a) Remove air valve from top of shock strut. Pour in 11 ounces of Lubrizol. Replace air valve.
7) Connect an overflow hose to air valve on top of shock strut and check that air valve is fully opened. Place other end of hose to drain into container.
8) Pump fluid into shock strut from servicing cart until fluid overflows into container.

(5) Slowly lower axle jack until shock strut is fully extended. Remove axle jack.

CAUTION: TO PREVENT THE OVERFLOW FLUID BEING DRAWN BACK INTO SHOCK STRUT, DO NOT ALLOW HOSE TO BECOME SUBMERGED BELOW SURFACE OF FLUID IN CONTAINER WHEN SHOCK STRUT IS EXTENDING.

(6) Lower airplane to fully compress shock strut.
(7) Remove all jacks.
(8) Disconnect service cart and remove hose from top of shock strut.
(9) For shock struts being serviced with a temporary check valve,
   (a) Close air valve at top of shock strut.
   (b) Remove check valve and immediately install drain plug snug with drain tube. Torque to 40 to 60 pound-inches and lockwire. Keep fluid loss to a minimum.
   (c) Remove charging valve from top of shock strut and fill strut to replace any fluid lost in previous step.
   (d) Install charging valve.
(10) Inflate shock strut with dry air or nitrogen to conform to the servicing chart (Fig. 201).

(11) For shock struts equipped with check valve,
  (a) Close air valve at top of shock strut.
  (b) Install dust cap and lockwire air valve.
(12) Return airplane to service and, after 5 to 10 service landings do the following steps:
  (a) Check shock strut pressure and X dimension. If necessary, reinflate shock strut.
  (b) Reservice the shock strut with air or nitrogen (Fig. 201).

NOTE: The wide tolerance "Operation Band" does not eliminate the requirement for two separate charging operations to the "Servicing Band".

4. Check Fluid Level by Pressure/Extension Method

NOTE: Shock strut fluid level may be checked by measuring shock strut pressure and extension at two different airplane weights and comparing measurements with shock strut servicing band (curve).

A. With airplane unloaded (at typical landing weight) measure strut pressure and extension and compare with strut servicing chart band. Inflate or deflate strut as required to shift point into chart band.
B. With airplane loaded and fueled (typical dispatch weight) measure strut pressure and extension. For best accuracy airplane weight should differ from that in previous step by a minimum of 30,000 pounds and ambient temperatures at time of measurements are taken should be within 20°F.
C. Compare point measured in previous step with servicing chart.
  (1) If point falls within servicing band, fluid level is in proper operating range.
  (2) If point falls to left of band, fluid level is low. Add fluid per Service Main Landing Gear Shock Strut - Procedure I or II. If strut requires 1 quart or more fluid to fill, find leakage source and repair.
  (3) If point falls to right of band, fluid level is high. Remove fluid per Service Main Landing Gear Shock Strut - Procedure I or II. Excess (high) fluid level is caused by a prior incorrect servicing procedure.

NOSE LANDING GEAR SHOCK STRUT - SERVICING

1. General
   A. This procedure is used to add fluid to a shock strut that has either been in normal operation or requires initial filling after disassembly and repair. Following procedure applies to shock struts with or without a check valve existing at bottom of shock strut.
   B. There is no simple method for checking the fluid level within a depressurized strut after any pressurization such as raising the airplane by pressurizing the strut with air or nitrogen. Gas entering into solution with the fluid changes the effective volume of the fluid. The complete servicing procedure must be performed to properly fill the shock strut.
   C. A lubricant is added to the shock strut when servicing. As an alternate, fully formulated fluid with a lubricant premixed is available. For routine servicing where relatively small amounts of fluid are required, it is acceptable to use hydraulic oil without added lubricant to top off shock struts.
2. Equipment and Materials
   A. Low pressure servicing cart for MIL-H-5606, MIL-H-6083 hydraulic fluid or fully formulated shock strut fluid (AMM 20-30-21). Servicing of shock struts not equipped with a check valve will require an external check valve to fit shock strut drain plug hole
   B. Hose to suit air valve
   C. Suitable container to collect hydraulic fluid (approximately 3-gallon capacity)
   D. Dry air or nitrogen bottle charged to 2500 psi
   E. Airplane jacks
   F. Strut Inflation Tool - F70200-1
   G. (Preferred) Fully formulated BMS 3-32 Type I (with corrosion inhibitor) or Type II (without corrosion inhibitor). BMS 3-32, Type I is used to fill a strut for the first time after being overhauled. Subsequent refills may be done with BMS 3-32 Type I or II.
   H. (Optional) As a substitute for BMS 3-32, Type I, operators may mix the MIL-H-6083 with 2.4% by volume of Lubrizol 1395. As a substitute for BMS 3-32, Type II, operators may mix the MIL-H-5606 with 2.4% by volume of Lubrizol 1395.

      NOTE: Avoid adding the Lubrizol directly. We recommend thoroughly premixing the Lubrizol with 10 parts shock strut fluid before pouring the additive into the strut.

3. Service Nose Landing Gear Shock Strut
   A. Jack nose of airplane with fuselage nose jack until nose shock strut is fully extended. Lower tail support jack as nose is raised (Chapter 7, Jacking Airplane).

B. Deflate shock strut.
   (1) Remove valve cap from air valve at top of shock strut (Fig. 201).
   (2) Remove lockwire and loosen air valve nut two turns maximum.

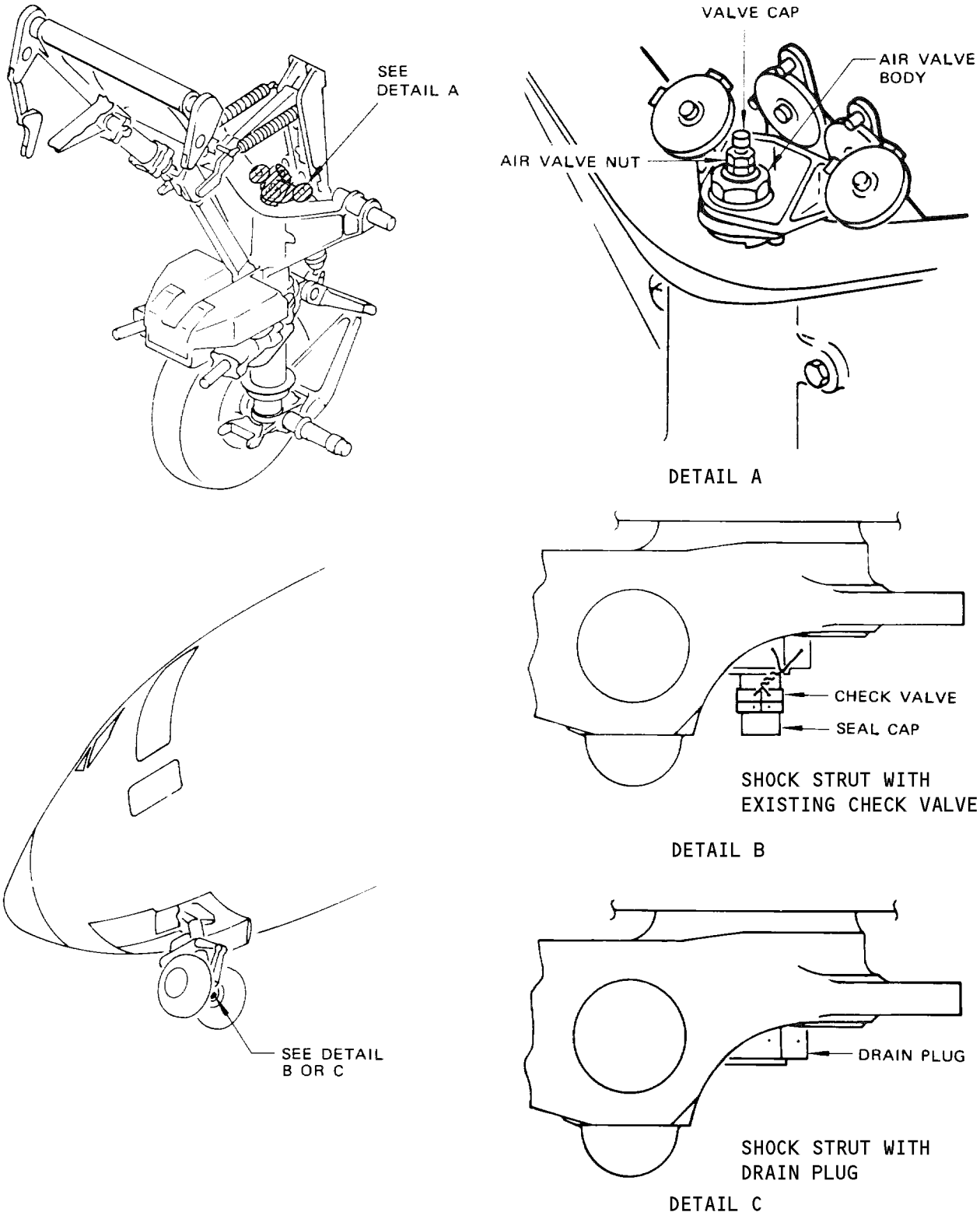
WARNING: DO NOT REMOVE VALVE BODY. INTERNAL PRESSURE CAN BLOW BODY OUT, CAUSING POSSIBLE INJURY TO PERSONNEL.

NOTE: Fluid in shock strut will start foaming immediately as pressure is reduced to ambient. Deflate shock strut slowly to prevent loss of fluid through air valve.

C. Remove check valve sealing cap from bottom of shock strut and connect servicing cart output hose to check valve. Shock struts not equipped with a check valve will require use of an external check valve to be used in place of drain plug at bottom of shock strut. Installation of check valve should be performed as quickly as possible to minimize fluid loss from shock strut (Fig. 201).
D. Connect hose to air valve on top of shock strut and check that air valve is open as far as possible. Place other end of hose to drain into container.
E. Pump fluid into shock strut from servicing cart until fluid overflows into container.
F. Steps (1) thru (4) are only required when completely filling the shock strut.
   (1) Slowly stroke shock strut with an axle jack through one complete compression and extension cycle. Do not allow end of waste fluid hose to become submerged below surface of waste fluid while strut is being stroked. This will prevent sucking contaminated fluid back into shock strut.
   (2) Remove axle jack.
   (3) Pump fluid into strut with servicing cart until fluid flows from top of strut through waste fluid hose.
G. Disconnect servicing cart and install check valve sealing cap. If an external check valve was used, check valve must be removed and shock strut drain plug immediately installed to avoid excessive loss of fluid.

CAUTION: IF EXTERNAL CHECK VALVE WAS USED, CHECK VALVE MUST BE REPLACED BY DRAIN PLUG AS STRUCTURAL INTERFERENCE COULD CAUSE BREAKAGE OF CHECK VALVE LATER WITH LOSS OF ALL FLUID.

NOTE: Be prepared to install drain plug, if an external check valve was used, as servicing cart is being disconnected in step G. A quantity of fluid will be lost from the shock strut and it is important that the amount be kept to a minimum. Maximum allowable fluid loss is 1 pint.



Nose Gear Shock Strut Air Valve
Figure 201

H. Lower nose of airplane with fuselage nose jack until shock strut is fully compressed and overflow fluid ceases to flow into container.

NOTE: If no fluid is expelled from shock strut during step H, an excessive amount of fluid was lost during step G. Shock Strut must be reserviced by repeating steps A and C thru H.

I. Remove fuselage nose jack.
J. Remove hose from top of shock strut and remove service cart.
K. On airplanes not using fully formulated shock strut fluid, add shock strut fluid extreme pressure additive and seal lubricant (optional).
   (1) Remove air valve from top or shock strut and remove approximately four ounces of fluid.
   (2) Pour in two ounces of Lubrizol. Top off with clean fluid.

NOTE: Avoid adding the Lubrizol directly. We recommend thoroughly premixing the Lubrizol with 10 parts shock strut fluid before pouring the additive into the strut.

   (3) Replace air valve.
L. Reinstall air valve in top of shock strut.
M. Inflate shock strut with dry air or nitrogen to the servicing placard (Fig. 202).
N. Return airplane to service, and after 5 to 10 service landings do the following steps:
   (1) Check shock strut pressure and X dimension. If necessary, reinflate shock strut.
   (2) Reservice the shock strut with air or nitrogen (Fig. 202).

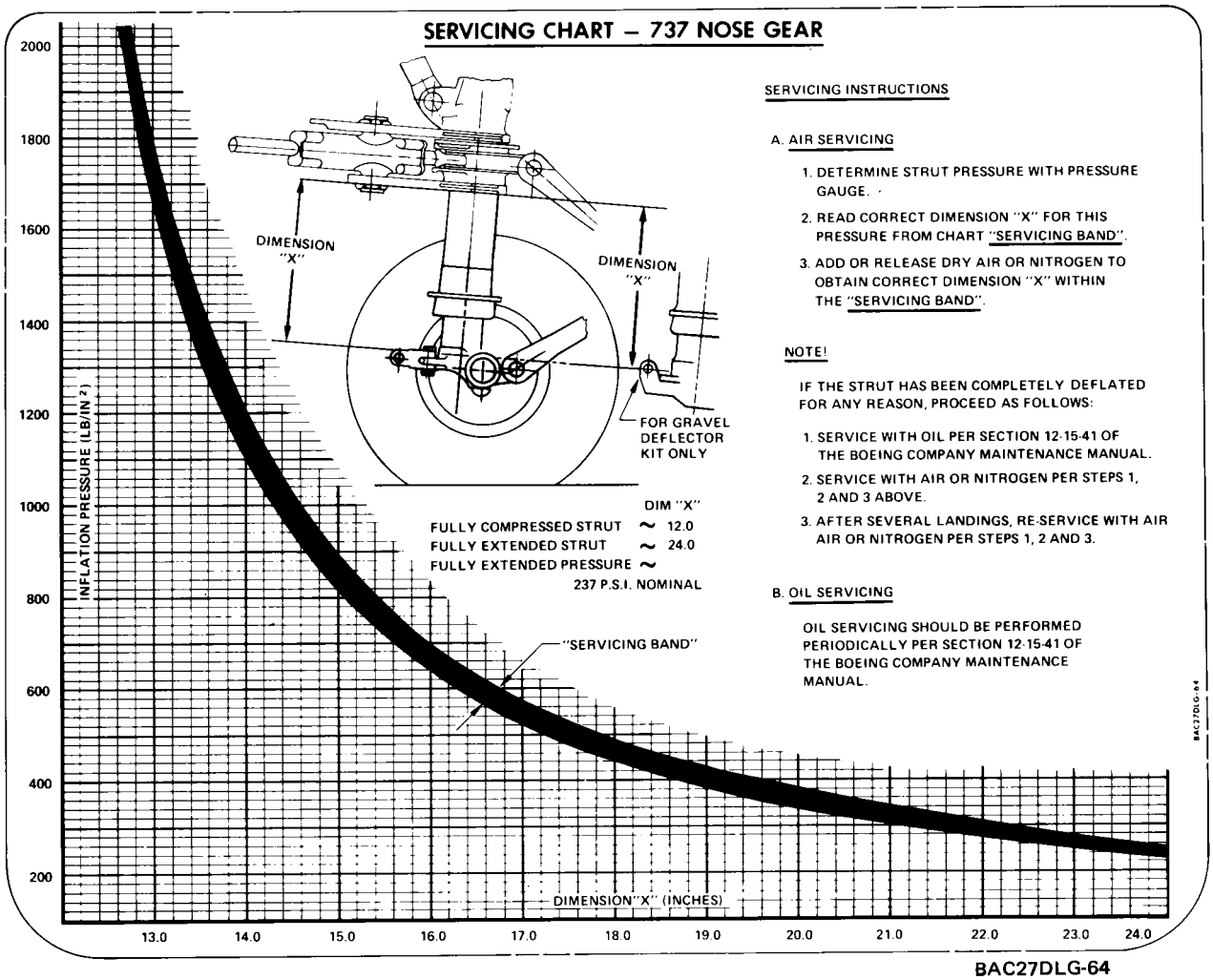
4. Check Fluid Level by Pressure/Extension Method

NOTE: Shock strut fluid level may be checked by measuring shock strut pressure and extension at two different airplane weights and comparing measurements with shock strut servicing band (curve).

A. With airplane unloaded (at typical landing weight) measure strut pressure and extension and compare with strut servicing chart band. Inflate or deflate strut as required to shift point into chart band.

B. With airplane loaded and fueled (typical dispatch weight) measure strut pressure and extension. For best accuracy airplane weight should differ from that in previous step by a minimum of 30,000 pounds and ambient temperatures at time of measurements are taken should be within 20°F.

C. Compare point measured in previous step with servicing chart.
   (1) If point falls within servicing band, fluid level is in proper operating range.
   (2) If point falls to left of band, fluid level is low. Add fluid per Service Nose Landing Gear Shock Strut - Procedure II. If strut requires 6 fluid ounces or more to fill, find leakage source and repair.
   (3) If point falls to right of band, fluid level is high. Remove fluid Service Nose Landing Gear Shock Strut - Procedure II. Excess (high) fluid level is caused by a prior incorrect servicing procedure.



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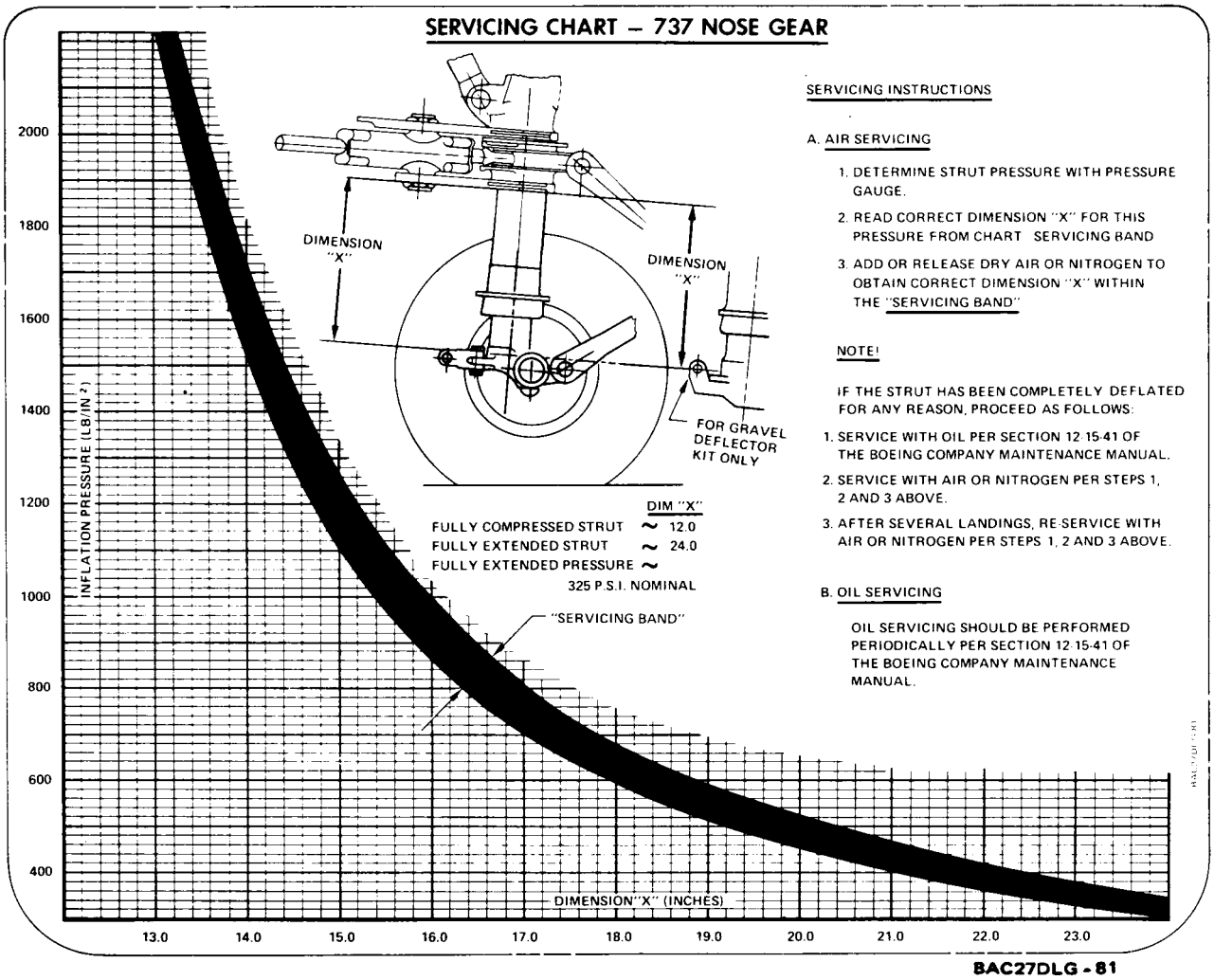
EFFECTIVITY

AIRPLANES NOT INCORPORATING SB 32-1077

Nose Landing Gear Shock Strut Servicing
Figure 202 (Sheet 1)



EFFECTIVITY

AIRPLANES INCORPORATING SB 32-1077

Nose Landing Gear Shock Strut Servicing
Figure 202 (Sheet 2)

LANDING GEAR TIRE - SERVICING

1. General
   A. A calibrated gauge with a standard size dial should be used for tire inflation or when a pressure reading of high accuracy is desired.

      CAUTION: USE A CALIBRATED GUAGE WITH A STANDARD SIZE DIAL TO CHECK TIRE PRESSURE. INCORRECT INFLATION FROM INACCURATE PRESSURE READINGS CAN CAUSE DAMAGE TO THE TIRE.

   B. All tires must initially be inflated with nitrogen.
   C. Refilling (topping-off) with air is acceptable when nitrogen is not available provided the oxygen content does not exceed 5 percent of the total tire volume. Two refill procedures are given in Service Main and Nose Gear Tires paragraph.
      (1) The first procedure permits one value of 6 psi for the sum of all air refill pressures. Use this procedure for simplicity.
      (2) The second procedure permits different refill pressure values across the range of desired loaded tire inflation pressures. Use this procedure for flexibility.
   D. Tire pressure maintenance requirements are covered in Service Main and Nose Gear Tires paragraph. These requirements are applicable for all normal airline service including operation at maximum taxi gross weight.
   E. When the airplane is operated consistently at less than maximum weight, such as pilot training, main gear tire pressures may be reduced.

      CAUTION: IF THE AIRPLANE IS TO BE OPERATED AT A HIGHER GROSS WEIGHT, READJUST TIRE PRESSURES. DAMAGE WILL RESULT IF THE TIRES ARE OPERATED AT PRESSURES BELOW THOSE GIVEN FOR THE AIRPLANE GROSS WEIGHT BEING USED.

   F. Tire pressures should be checked daily with an accurate gauge. Checks are to be made when tires are cool. Wait a minimum of 2 hours after a flight to check tire pressure. Never bleed gas from a hot tire to bring pressures within limits.
2. Equipment and Materials
   A. Tire Inflation Tool - F70199-1
   B. Dry Nitrogen - Commercial grade (99.5 percent pure nitrogen), from a regulated pressure source
   C. Air Source - Clean dry with a maximum moisture content that corresponds to an atmospheric dewpoint of -20°F (-29°C), from a regulated pressure source
3. Service Main and Nose Gear Tires
   A. Tire inflation pressure check.
      (1) Let the tires cool for a minimum of 2 hours after a flight.

(2) Do a check of the tire inflation pressure with an accurate gage.
(3) Compare the measured pressure to the pressure found in the main and nose gear tire pressure limit charts.
(4) Do these steps for tires which have tire pressures below the necessary pressure:
    (a) If the measured tire pressure is below the necessary pressure by no more than 5%, inflate the tire to the necessary pressure.
    (b) If the measured tire pressure is between 5%-10% below the necessary tire pressure, do these steps:
        1) Inflate the tire to the necessary pressure.
        2) Do a check of the tire pressure again after 24 hours.

        CAUTION: TIRES THAT REQUIRE FREQUENT REFILLS TO MAINTAIN THE NOMINAL SERVICE PRESSURE ARE LIKELY TO HAVE A TREAD LOSS OR CARCASS RUPTURE IF THEY ARE LEFT IN SERVICE TOO LONG. THESE TIRES SHOULD BE REMOVED FROM SERVICE AS SOON AS POSSIBLE.

        3) If the tire pressure is more than 5% below the necessary pressure again, replace the tire.
            a) Send the wheel and tire assembly for an inspection to find the cause for the low pressure.
            b) Mark the reason for the tire removal on the tire to aid the inspectors when they examine the tire.
    (c) If the measured tire pressure is between 10%-20% below the necessary tire pressure, do these steps:
        1) Replace the wheel and tire assembly.
            a) Send the wheel and tire assembly for an inspection to find the cause for the low pressure.
            b) Mark the reason for the tire removal on the tire to aid the inspectors when they examine the tire.
    (d) If the measured tire pressure is more than 20% below the necessary tire pressure, do these steps:
        1) Replace the wheel and tire assembly.
        2) Send the wheel and tire assembly for an inspection to find the cause for the low pressure.

3) Mark the reason for the tire removal on the tire to aid the inspectors when they examine the tire.
4) If the wheel and tire assembly has turned with the airplane weight on it after the pressure had decreased, replace the wheel and tire assembly installed on the opposite side of that axle.
   a) Mark on the tire that it was on the same axle with a wheel and tire assembly that was replaced because of low tire pressure.
   b) Send the tire for inspection for damage.

B. Inflate tire (initial inflation).

WARNING: TIRE MUST INITIALLY BE INFLATED WITH NITROGEN. IF TIRE WERE INFLATED WITH AIR, VOLATILE GASES GENERATED BY AN OVERHEATED TIRE COULD COMBINE EXPLOSIVELY WITH OXYGEN IN THE AIR INSIDE THE TIRE. A TIRE EXPLOSION CAN RESULT IN DAMAGE TO AIRPLANE AND/OR INJURY TO PERSONNEL.

(1) Install tire inflation tool per instructions on tool.

WARNING: USE A REGULATED PRESSURE SOURCE TO SERVICE THE TIRES. AN UNREGULATED PRESSURE SOURCE CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO THE EQUIPMENT

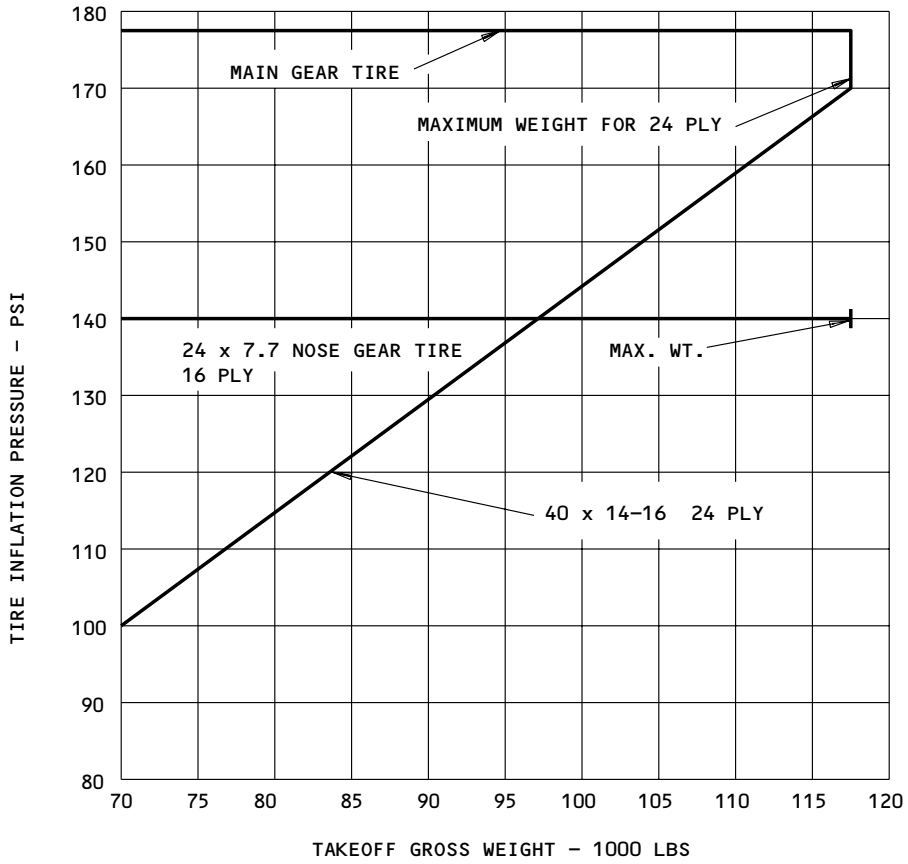
(2) Inflate tire with nitrogen to pressure shown in Fig. 202.
(3) Remove tire inflation tool.

C. Refill tire.

NOTE: If refilling with air would result in an oxygen content in excess of 5 percent by volume as determined as follows, deflate tire to one atmosphere and inflate per initial inflation procedure.

(1) Install tire inflation tool per instructions on tool.

WARNING: USE A REGULATED PRESSURE SOURCE TO SERVICE THE TIRES. AN UNREGULATED PRESSURE SOURCE CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO THE EQUIPMENT



VARIABLE TIRE PRESSURE

TIRE PRESSURE MAY BE VARIED WITHIN THE ABOVE LIMITS

NOTE:
IN THIS EXAMPLE, MAIN GEAR TIRES ON A 95,000-POUND GROSS WEIGHT AIRPLANE MAY BE INFLATED FROM 138 PSI (MINIMUM) TO 177 PSI (MAXIMUM) FOR 24-PLY RATING TIRES.

Main Landing Gear Inflation
Figure 201

(2) Refill (top-off) with nitrogen. Air may be used when nitrogen is not available provided oxygen content in tire does not exceed 5 percent by volume. To assure that oxygen content does not exceed 5 percent, use one of the following procedures:
(a) Make a record of each air refill. Sum of all air refill pressures added to tire must not be more than 6 psi.

EXAMPLE: One 6 psi refill with air can be done before tire must be deflated and reinflated with nitrogen.

(b) Make a record of each air refill. Sum of all air refill pressures added to tire must not be more than maximum given in Fig. 203.

EXAMPLE: Assume tire is initially inflated to 165 psi with nitrogen. Per Fig. 203, sum of all air refill pressures that can be added to tire is 30 psi. One 6 psi, one 14 psi, and two 5 psi refills with air can be done before tire must be deflated and reinflated with nitrogen.

(3) Remove tire inflation tool.

D. Hot tire pressure check.

NOTE: The hot tire pressure check procedure is intended for occasional use only. It is not intended to be used as a permanent alternative method to performing the more accurate cold tire checks. The more accurate cold tire pressure check method should be used as frequently as possible to avoid possible tire service life problems such as tread losses and carcass ruptures.

(1) If the pressure of one tire is 5%-10% below the average pressure of the other tires, do these steps:
(a) Inflate the tire to the average pressure of the other tires.
(2) If the tire pressure of one tire is more than 10% below the average pressure of the other tires, do these steps:
(a) Replace the wheel and tire assembly.
1) Send the wheel and tire assembly for an inspection to find the cause for the low tire.

2) Mark the reason for the tire removal on the tire to aid the inspectors when they examine the tire.

(3) If the tire pressure of one tire is more than 20% below the average pressure of the other tires, do these steps:

(a) Replace the wheel and tire assembly.

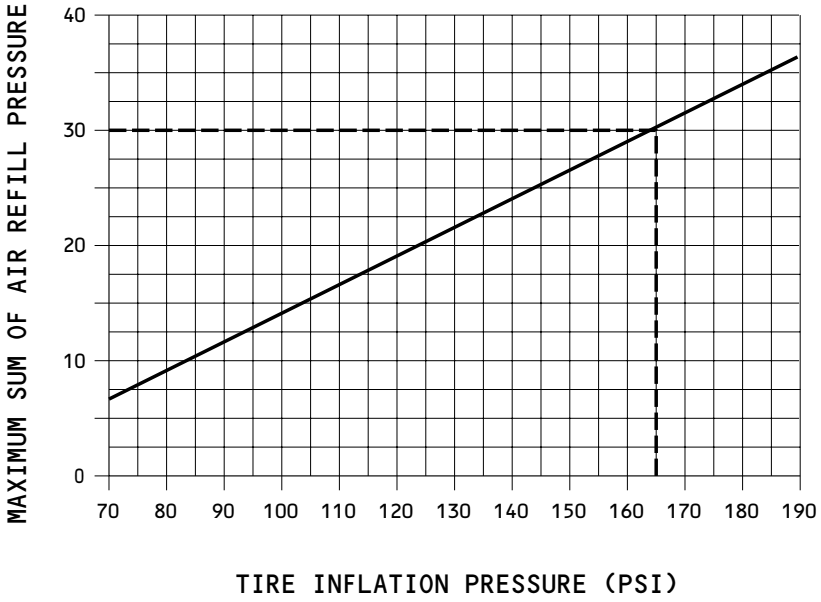
1) Send the wheel and tire assembly for an inspection to find the cause for the low tire.

2) Mark the reason for the tire removal on the tire to aid the inspectors when they examine the tire.

(b) Replace the wheel and tire assembly installed on the opposite side of that axle.

1) Mark on the tire that it was on the same axle with a wheel and tire assembly that was replaced because of low tire pressure and send it for inspection for damage.

2) Send the wheel and tire assembly for an inspection to find the cause for the low tire.



Air Refill Pressure
Figure 202

RAIN REPELLENT CONTAINER - SERVICING

1. General (Fig. 301)
   A. The rain repellent container is located in the flight compartment as shown in Fig. 301. The container is to be replaced when the sight level indicator in the reservoir indicates container replacement is necessary.
2. Service Rain Repellent Container (Fig. 301)
   A. Close manual shutoff valve by turning handle to horizontal position.

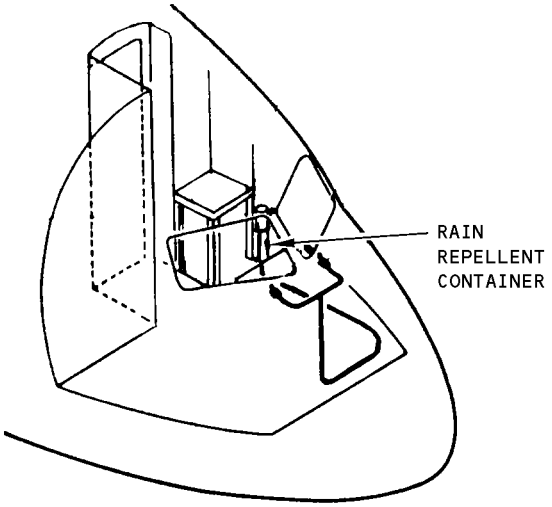
      WARNING: IF REPELLENT CONTACTS EYES OR SKIN, IMMEDIATELY AND THOROUGHLY FLUSH AFFECTED AREA WITH WATER. IRRITATION MAY RESULT.

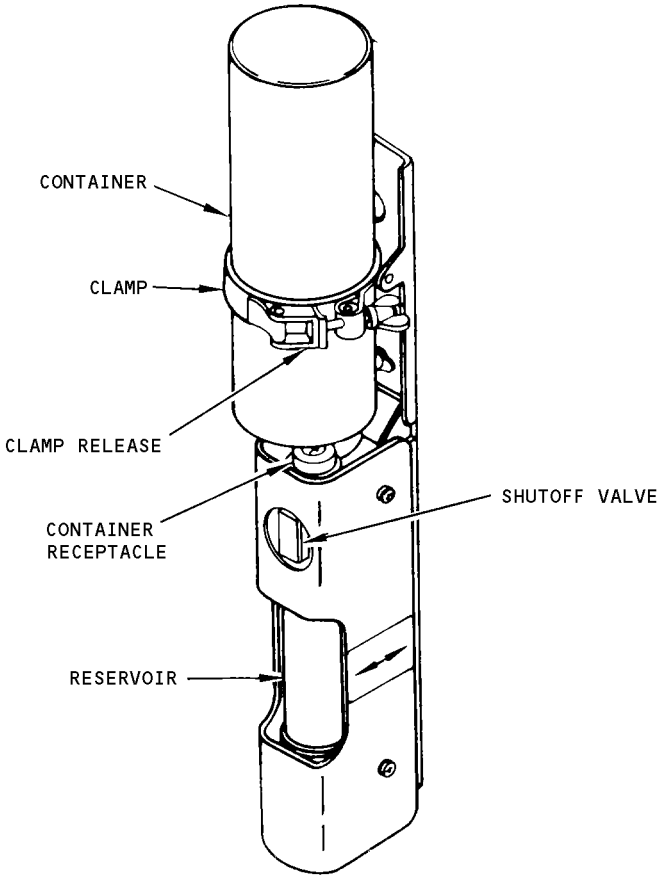
   B. Release container clamp and unscrew container from receptacle.
   C. Examine container seat and O-ring to ensure that tight seal will be obtained with new container.
   D. Screw new container into receptacle.

      CAUTION: TIGHTEN CONTAINER FINGER-TIGHT ONLY. EXCESSIVE TORQUE MAY CAUSE LEAKAGE.

   E. Tighten clamp.
   F. Turn manual shutoff valve to vertical position.
   G. Check that repellent level float in the visual reservoir is at the full position (top).

      NOTE: If a new rain repellent container is installed and the fluid level remains at the low level. Then removal and reinstallation of the rain repellent container is required to relieve the gas pressure. This allows the fluid level to show a new level.





Rain Repellent Container Installation
Figure 301

TOILET - SERVICING

1. General
   A. These servicing procedures apply to each toilet system. The drain fitting, flush port and drain valve handle are accessible by opening the servicing door (Fig. 201). Each time the toilet tank is serviced, always recharge the system with recommended amount of chemical precharge.

      WARNING: DO NOT OVERSERVICE THE TOILET SYSTEM. A LEAKAGE OF TOILET FLUID CAN POSSIBLY ENTER ELECTRICAL AND/OR ELECTRONIC SYSTEMS AND CAUSE A DANGEROUS MALFUNCTION. THIS COULD CAUSE AN UNWANTED EFFECT TO THE FLIGHT SAFETY OF THE AIRPLANE AND RESULT AS INJURY OR LOSS OF LIFE TO THE PERSONS ABOARD.

   B. AIRPLANES WITH FWD LAVATORY OVERFILL SENSOR AND SHUTOFF VALVE, POST SB 38-1045;
      To get protection from FWD lavatory outflows, electrical power must be supplied to the overfill and shutoff valve installation. External or APU Generator Power must be used. Electrical power is not available for the overfill sensor at the external ground service bus.
   C. Addition of antifreeze to toilet tanks is needed only when airplane is allowed to cold soak during cold weather operation. Refer to 12-50-0 MP for recommended antifreeze addition procedure.
   D. In adding antifreeze, ensure the total charge of chemical precharge and antifreeze mixture does not exceed 3 gallons to avoid overfilling of the toilet tank if toilet usage is considerable.

      CAUTION: TOILET FLUIDS ARE CORROSIVE TO THE AIRPLANE STRUCTURE. STAINS ON BODY SKIN INDICATE INFLIGHT LEAKAGE OR UNSATISFACTORY SERVICING PROCEDURES. INFLIGHT RELEASE OF ICE BUILDUP FROM THE FORWARD TOILET SERVICE PANEL MAY CAUSE NO. 2 ENGINE DAMAGE OR DAMAGE TO AIRPLANE STRUCTURE.

2. Equipment and Materials
   A. Toilet service cart
   B. Y-fitting - Roylyn Part No. 2651-133; Roylyn, Inc., Glendale, California or equivalent; or drain plug wrench - Roylyn, Part No. 7899, Roylyn, Inc., Glendale, California
   C. Recommended Chemical Precharge (see Table 201 - Chemical Precharge)

Boeing-Recommended Chemical Precharge - Table 201		
Elkee Formula 1	Cyclo Manufacturing Co.	Denver, Colorado
Head-O-Matic	Alex Milne Assoc.	Ontario, Canada
NFC A/C Toilet Deod	George Industries	Los Angeles, CA
#101 Timsen Air Toilet Deodorant (Liquid or Powder)	Timsen Chemical Corp.	Los Angeles, CA
Aerofresh	Century Chemical Products	Elkhart, IN
Sani-Pak 41-100	Celeste Industries,	Easton, MD
Sanitex QC	Selig Chemical Industries	Atlanta, GA
Sani-Pak 41-008 *[1]	Celeste Industries	Easton, MD
*[1] (use for procedure II only)		

3. Service Toilet
   A. Open FLUSH MOTORS circuit breakers on panel P18.
   B. AIRPLANES WITH FWD LAVATORY OVERFILL SENSOR AND SHUTOFF VALVE, POST SB 38-1045;
      Make sure these circuit breakers, on the P18 panel are closed:
      (1) C1105, TOILET TANK FILL CONT
      (2) C1104, TOILET TANK SHUTOFF VALVE
   C. AIRPLANES WITH FWD LAVATORY OVERFILL SENSOR AND SHUTOFF VALVE, POST SB 38-1045;
      Supply External Power or APU Generator power to the buses before you service the FWD Lavatory (AMM 24-22-0/201).

      NOTE: It is possible to service the FWD Lavatory with no External Power or APU Generator power to prevent dispatch delays. The toilet shutoff valve must be open. Use the procedure, Manual Operation of the Toilet Tank Rinse/Fill Shutoff Valve if it is necessary to manually open the valve.
   D. Open service panel and toilet drain cap (Fig. 201).

      NOTE: Fluid in drain line indicates drain valve is leaking.

   E. Connect toilet service cart.
      (1) On airplanes with drain plug in drain line and Y-fitting on waste drain hose:
         (a) Connect flush line and waste drain hose.

(b) Remove drain plug with T-handle on Y-fitting.
1) Push T-handle in to engage end of rod with mating part in drain line plug.
2) Rotate T-handle counterclockwise until drain line plug releases.
3) Pull T-handle outward until it stops.

(2) On airplanes with drain plug in drain line and waste drain hose with no Y-fitting:
(a) Remove drain plug with drain plug wrench.
(b) Connect flush line and waste drain hose.

(3) On airplanes without drain plug connect flush line and waste drain hose.

F. Pull out waste drain valve handle and turn handle to lock in extended (open) position, allowing waste to drain into toilet service cart.

NOTE: The toilet service line pressure should not exceed 10.0 PSID.

NOTE: For best flushing action, drain toilet tanks one at a time.

G. Close drain valve by releasing the valve handle and pump a minimum of 6 gallons of water through flush line to flush the toilet system.

H. As water continues to enter through the flush line, pull and release the drain valve handle several times to clear the valve face and the valve seat.

I. Discontinue flushing and lock drain valve handle in the extended (pulled) position to open the waste drain valve and completely drain the tank.

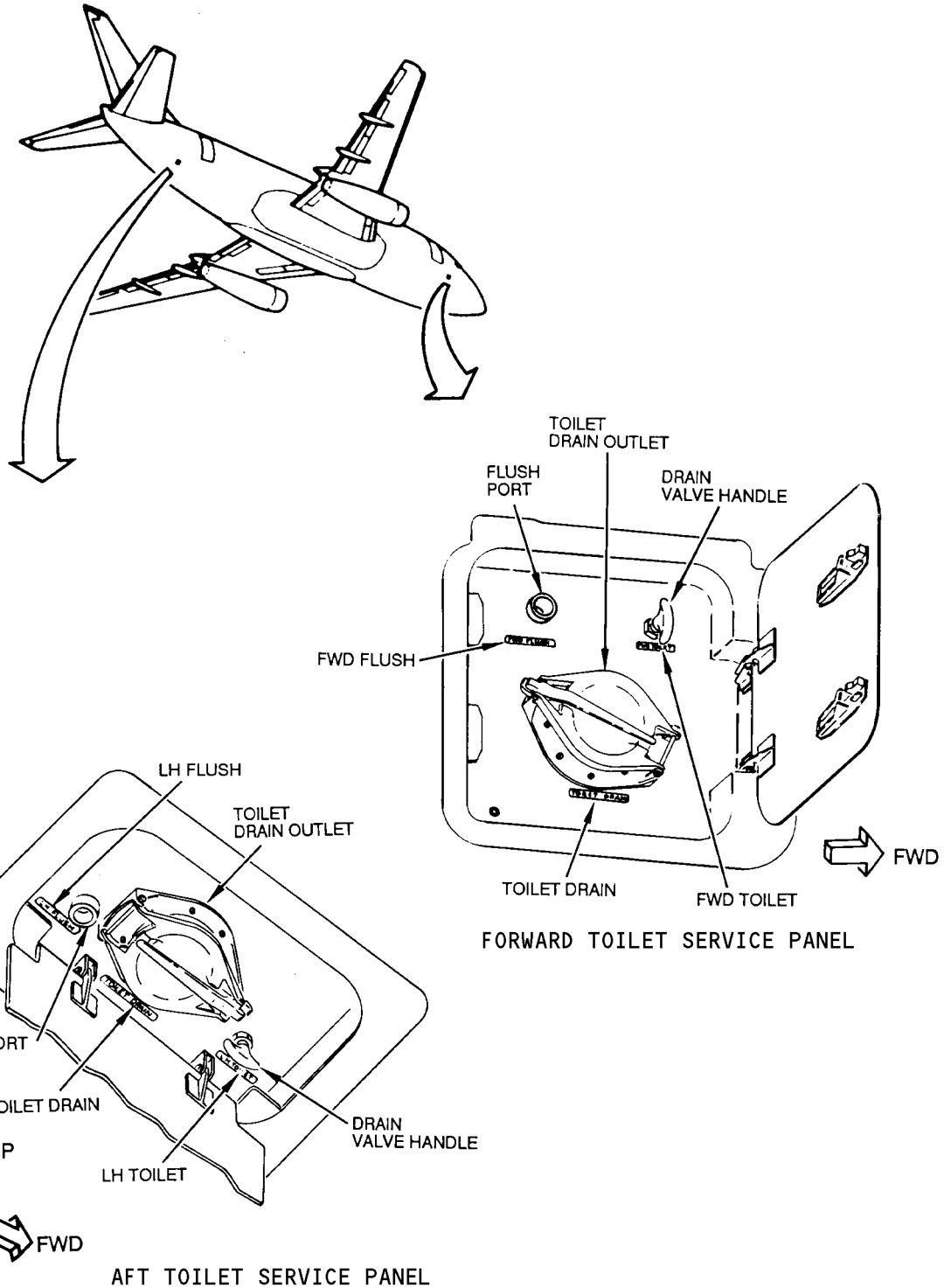
J. Release the toilet drain handle to close the waste drain valve.

NOTE: Allow the toilet drain handle to snap into the closed position to assure a watertight seal at the tank drain valve. Maintenance personnel may choose at this point to charge toilets and check for possible leakage of drain valve.

K. Disconnect toilet service cart.

(1) On airplanes with drain plug and with Y-fitting on waste drain hose:
(a) Push in T-handle as far as possible while rotating handle slightly counterclockwise to reduce friction between drain plug and drain tube wall.
(b) While holding T-handle in the innermost position, rotate the handle clockwise to lock the drain plug in position.
(c) Continue to rotate the T-handle clockwise. Use additional force to expand the drain plug against the drain tube wall until the force yields as the locking device goes overcenter.

CAUTION: UNLESS YIELD IS FELT, PLUG IS NOT PROPERLY LOCKED.



Toilet Service Panels
Figure 201

(d) Pull T-handle out to disengage from drain plug.

CAUTION: IF COUPLING HANDLE DOES NOT DISENGAGE EASILY, THE DRAIN PLUG IS NOT PROPERLY LOCKED IN POSITION. REPEAT DRAIN PLUG REMOVAL AND REINSERTION STEPS UNTIL PLUG IS PROPERLY LOCKED.

(e) Disconnect flush line and waste drain hose.

(2) On airplanes with drain plug and with no Y-fitting on drain hose:

(a) Disconnect flush line and waste drain hose.

NOTE: Maintenance personnel may choose at this point to charge toilets and check for possible leakage of drain valve.

(b) Install drain plug with drain plug wrench.

1) Mount waste drain plug on drain plug wrench.
2) Insert waste drain plug into drain tube until plug is firmly seated against shoulder; rotate plug slightly counterclockwise to aid in properly seating plug.
3) While holding plug firmly against shoulder rotate the wrench clockwise to lock the drain plug in position.
4) Continue to rotate the drain plug wrench clockwise; use additional force to expand the drain plug against the drain tube wall until the force yields as the locking device goes overcenter.

CAUTION: UNLESS YIELD IS FELT, PLUG IS NOT PROPERLY LOCKED.

5) Remove drain plug wrench.

CAUTION: IF DRAIN PLUG WRENCH DOES NOT DISENGAGE EASILY, THE DRAIN PLUG IS NOT PROPERLY LOCKED IN POSITION. REPEAT DRAIN PLUG REMOVAL AND REINSERTION STEPS UNTIL PLUG IS PROPERLY LOCKED.

(3) On airplanes without drain plug, disconnect flush line and waste drain holes.

L. Connect chemical hose from toilet service cart to flushing connection and replenish the system with a minimum of 3 gallons of a recommended chemical precharge.

WARNING: DO NOT USE TOO MUCH TOILET FLUID DURING SERVICING. A LEAKAGE OF TOILET FLUID CAN POSSIBLY ENTER ELECTRICAL AND/OR ELECTRONIC SYSTEMS AND CAUSE A DANGEROUS MALFUNCTION. THIS COULD CAUSE AN UNWANTED EFFECT TO THE FLIGHT SAFETY OF THE AIRPLANE AND RESULT AS INJURY OR LOSS OF LIFE TO THE PERSONS ABOARD.

NOTE: A charge in excess of 4 gallons may result in overfilling if toilet usage is considerable.

M. Disconnect chemical hose and reinstall cap on flush line.
N. Clean and dry all service panel components and doors.
O. Check seal in drain line cap for aging, cuts, wear, or other signs of deterioration. Deteriorated seals should be replaced. Check end of drain tube for nicks, dents, scratches or cracks. Any irregularity in the end of the tube should be smoothed to prevent leakage.

CAUTION: DETERIORATED SEALS CAN RESULT IN TOILET FLUID LEAKAGE IF TOILET DRAIN VALVE HAS LEAKED.

P. Close drain tube cap.

NOTE: On airplanes with interlock cap, drain cap will not close if drain plug is not properly installed.

Q. Close and secure service panel door.
R. Restore airplane to normal configuration.

4. Servicing Panel Cleaning
   A. Equipment and Materials
      (1) Manual alkaline emulsion cleaner (Ref 12-40-0, Cleaning and Washing)
      (2) Soft-bristle brush or sponge
   B. Clean Panel
      (1) Periodically wash panel with water and cleaner. Use soft-bristle brush or sponge as necessary to remove contamination.
      (2) Dry with clean cloth.

5. AIRPLANES WITH FWD LAVATORY OVERFILL SENSOR AND SHUTOFF VALVE, POST-SB 38-1045;
   Manual Operation of Toilet Tank Rinse/Fill Shutoff Valve (Fig. 202)
   A. General
      (1) The toilet tank rinse/fill shutoff valve is opened and closed electrically.
      (2) If the electrical components do not operate, you can open or close the valve manually to flush and service the toilet tank.

NOTE: You can use this procedure if the dispatch schedule of the airplane does not allow time for the corrective action.

B. Access

(1) Location Zones

103 Forward Lavatory

(2) Access Panels

1104 Forward Toilet Panel

C. Procedure

(1) Open these circuit breakers, on the P18 panel and attach DO NOT CLOSE tags:

(a) C1105, TOILET TANK FILL CONT

(b) C1104, TOILET TANK FILL SHUTOFF VALVE

(2) Remove the toilet tank shroud to get access to the valve.

(3) Disconnect the electrical connector at the valve.

(4) Move the valve to the open position.

(5) Do the task to service the toilets.

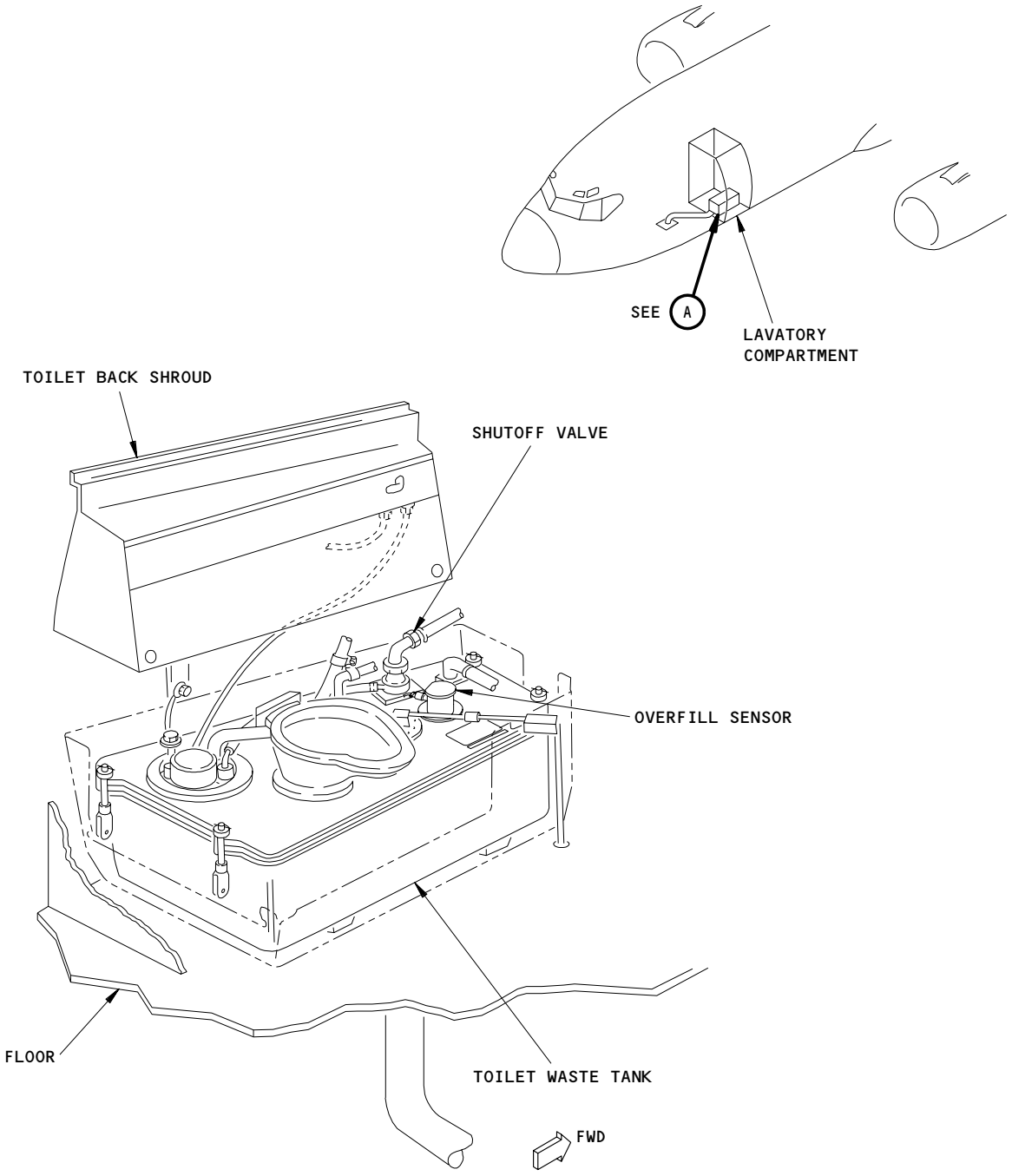
(6) Move the valve to the closed position.

NOTE: Do not connect the electrical connector until the necessary maintenance is done on the components that did not operate.

D. Put the Airplane to Its Usual Condition

CAUTION: MAKE SURE THE VALVE IS CLOSED CORRECTLY. IF THE VALVE IS NOT CLOSED CORRECTLY, LOSS OF THE CABIN PRESSURE CAN OCCUR.

(1) Install the toilet tank shroud.



MOTOR OPERATED SHUTOFF VALVE INSTALLATION
(TYPICAL)

A

Forward Lavatory – Component Location
Figure 202

PERIODIC LUBRICATION - GENERAL

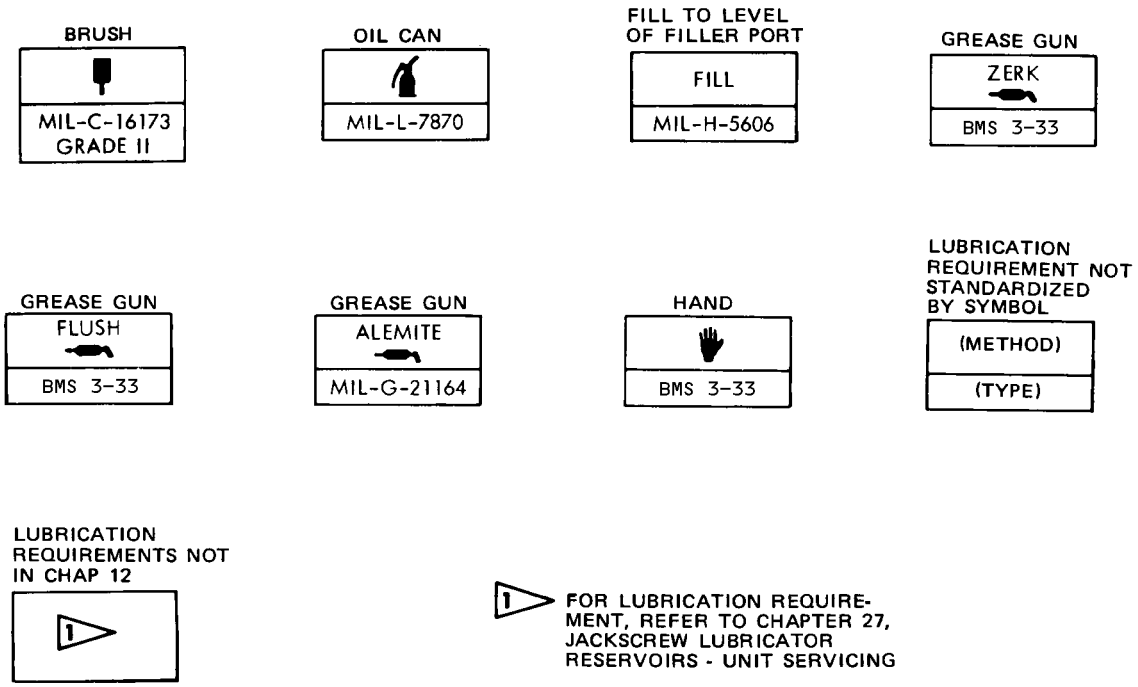
1. General (Ref 20-30-2)
   A. Certain bearings and bushings used throughout the airplane have Teflon bearing surfaces and do not require additional lubrication.

      CAUTION: ONLY BEARINGS AND BUSHINGS PROVIDED WITH LUBRICATION FITTINGS SHOULD BE LUBRICATED, SINCE LUBRICATION OF BEARINGS AND BUSHINGS CONTAINING TEFLON WILL CAUSE DETERIORATION OF THE TEFLON AND REDUCE BEARING LIFE.

   B. Information regarding airplane lubrication, such as item to be lubricated, lubricant to be used and method of application are provided in the following lubrication subjects of this section.
   C. Lubrication equipment, such as grease guns, brushes and oil cans must be clean and free of everything but the lubricant involved during use.
   D. Lubrication blocks are used to locate the component or unit to be lubricated. Each block is divided into two sections, one section calls out the method of application, the other section calls out the type of lubricant.
   E. Where access to lubrication points is not obvious, the access panel number is called out directly above or below the lubrication callout. Refer to the appropriate section on access doors and panels in this chapter.
   F. Figure 201 shows examples of lubrication blocks that may be used in the following lubrication subjects. If more detailed lubrication instructions are required, detailed lubrication instructions will be provided.
   G. Lubrication of sealed ball and roller bearings having lubrication provisions requires care to prevent seal blowout during lubrication. A restrictor type nozzle used on the grease gun will aid in preventing seal blowout by limiting the rate of grease flow. The flow of grease should be discontinued at the first evidence of seal deformation or grease seeping from the bearing.

      CAUTION: ON SEALED BEARINGS, DO NOT APPLY GREASE WITH A PRESSURE GREATER THAN 1000 PSI (6.9 MPA) AND AT A RATE GREATER THAN 8.5 FL OZ (0.25 LITER) PER MINUTE. WHEN USING A HAND-OPERATED GREASE GUN, DO NOT USE EXTENSION HANDLE TO GAIN MORE FORCE. SEALED BEARINGS MAY BE DAMAGED BY EXCESSIVE PRESSURE.

   H. A Alemite Midget Flush adapter No 314150, or equivalent, is recommended for flush type grease fittings. Lincoln/St. Louis Medium Pressure Control Valve, which limits pressure to less than 2500 psi, is recommended with an Alemite Type 1728B lubrication fitting.



Lubrication Block Examples
Figure 201

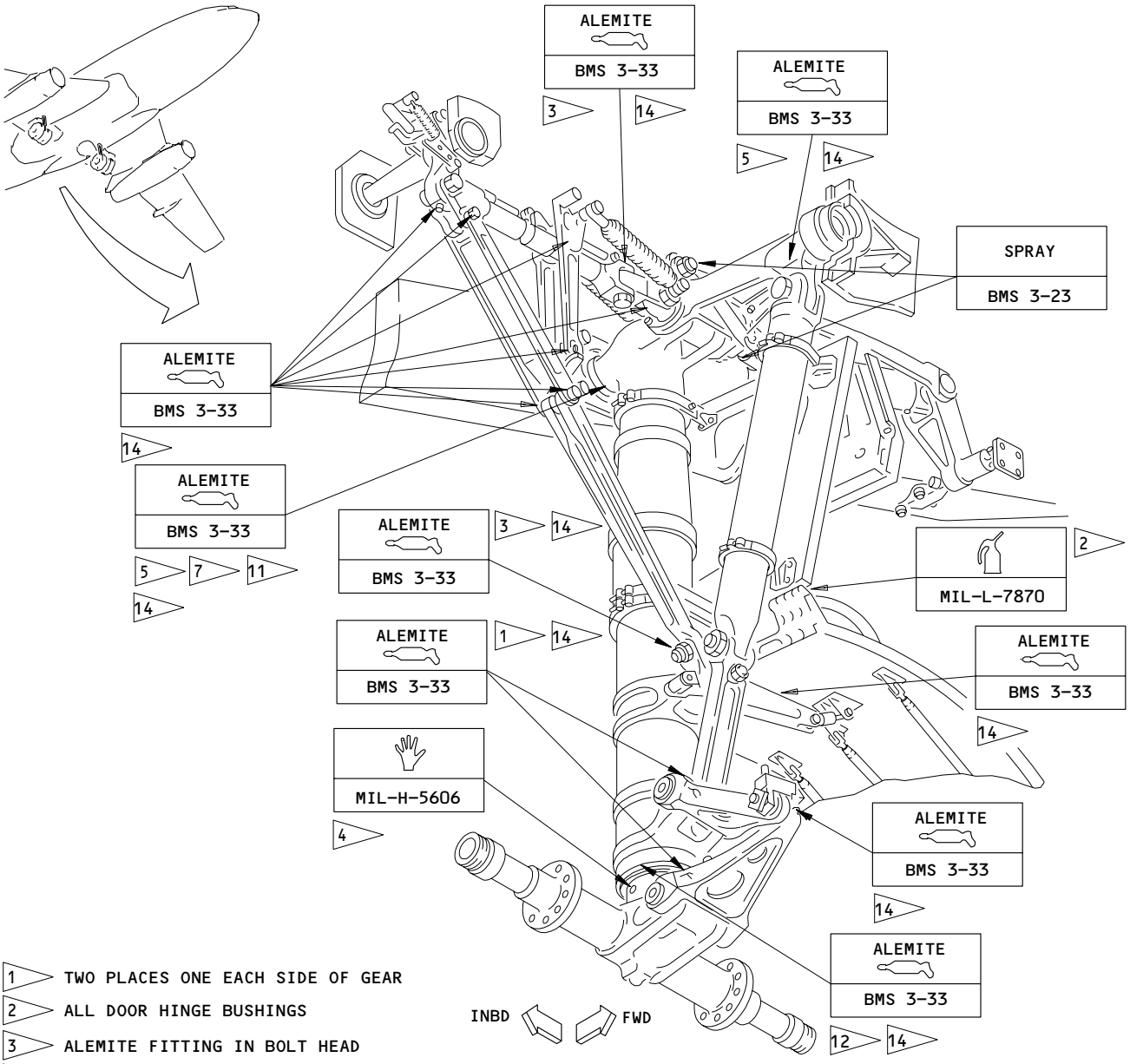
I. Lubrication pressures from 100-200 psi should normally be sufficient for joint to accept grease. However, higher pressures may be required in some cases. Lubrication pressures in excess of 2500 psi may cause lubrication fitting to come loose (blow out) from joint.
   (1) If fitting "blow out" occurs
      (a) Check lubrication path of joint for obstruction or foreign material.
      (b) Install new fitting. (Ref 20-10-151 R/I)

J. General Purpose Lubricants
   (1) The preferred general-purpose grease is BMS 3-33. MIL-PRF-23827 and BMS 3-24 are alternate general purpose grease.

      NOTE: Some incompatibility may exist between MIL-PRF-23827 and MIL-G-21164 greases that are thickened with clay and those thickened with lithium soap. Therefore, intermixing of brand name greases that employ different thickening systems should be avoided. Whenever changing brand name grease, flush out old grease to minimize intermixing.

   (2) It will be noted that both MIL-G-21164 and MIL-PRF-23827 are called out as general-purpose airplane lubricants. MIL-G-21164 is essentially MIL-PRFG-23827 with 5 percent molybdenum disulfide added. This makes MIL-G-21164 a black or very dark grease with a coloring which, when in contact with fabric, causes soiling that is very difficult to remove. MIL-G-21164 may be used in preference to MIL-PRF-23827 as a single lubricant with the following restraints:
      (a) MIL-PRF-23827 is preferred for:
         1) Instrument bearings
         2) Areas where a stain is not permitted and the area must look satisfactory.
         3) When the friction of braking components could be decreased from the molybdenum disulfide.
         4) If the relation of torque-to-tension of threaded fasteners could be changed from the molybdenum disulfide.
      (b) MIL-G-21164 is usually better for:
         1) For heavy loads, especially for steel surfaces sliding on steel surfaces.
         2) Bearings where remaining lubrication is necessary to prevent or delay bearing failure if most of the grease is gone.
      (c) BMS 3-33 is better than MIL-PRF-23827 and MIL-G-21164 for general routine lubrication.
         1) In some cases where MIL-PRF-23827 or MIL-G-21164 is specified, BMS 3-33 can be substituted.

2) While BMS 3-33 is the preferred grease, because it demonstrates improved wear, corrosion protection and low temperature torque properties, it is acceptable to use MIL-PRF-23827 grease where BMS 3-33 is specified. Although MIL-PRF-23827 and BMS 3-33 can be intermixed, repeated intermixing is not recommended. When switching between greases, the new grease shall be applied until it is seen at the grease exit points.



1 > TWO PLACES ONE EACH SIDE OF GEAR

2 > ALL DOOR HINGE BUSHINGS

3 > ALEMITE FITTING IN BOLT HEAD

4 > HAND WIPE EXPOSED SHOCK STRUT SURFACE

5 > CAUTION: DO NOT EXCEED 400 PSI WHEN USING GREASE GUN AT MAIN GEAR TRUNNION BEARING. HIGHER PRESSURE MAY CAUSE STRUCTURAL DAMAGE.

6 > AIRPLANES INCORPORATING SB 32-1084

7 > AIRPLANES WITH GREASE RESERVOIR

8 > ON AIRPLANES WITHOUT ANTIROTATION BOLT, ONE PLACE LOWER DRAG STRUT AND TOP OF TORSION LINK PIVOT

9 > NOT ON ALL AIRPLANES

10 > ONE PLACE ON OUTBOARD SIDE OF DRAG STRUT BOLT

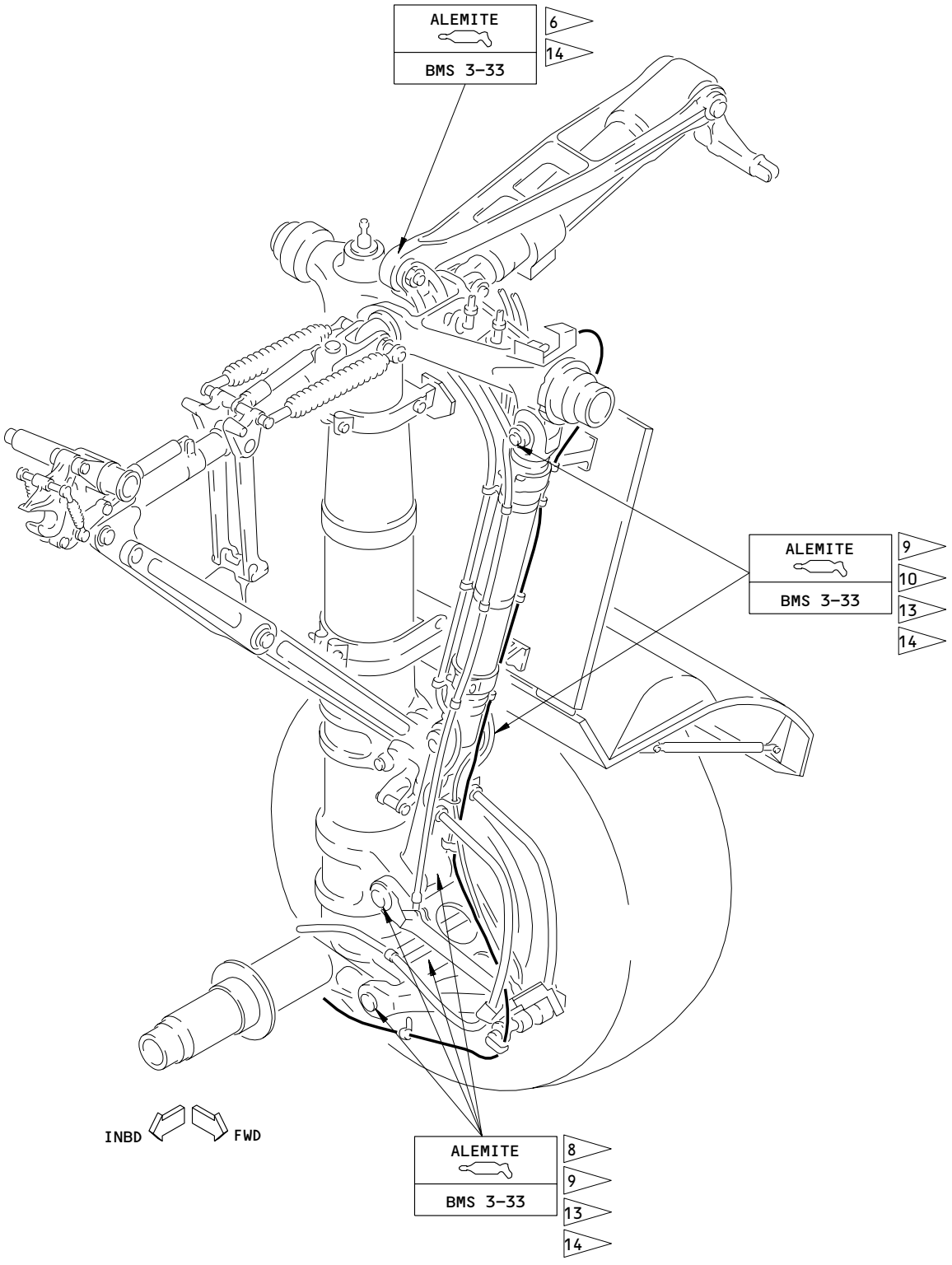
11 > ALEMITE FITTING IN AFT SIDE TRUNNION BEARING

12 > NOT ON ALL AIRPLANES, FOUR PLACES ON GLAND NUT

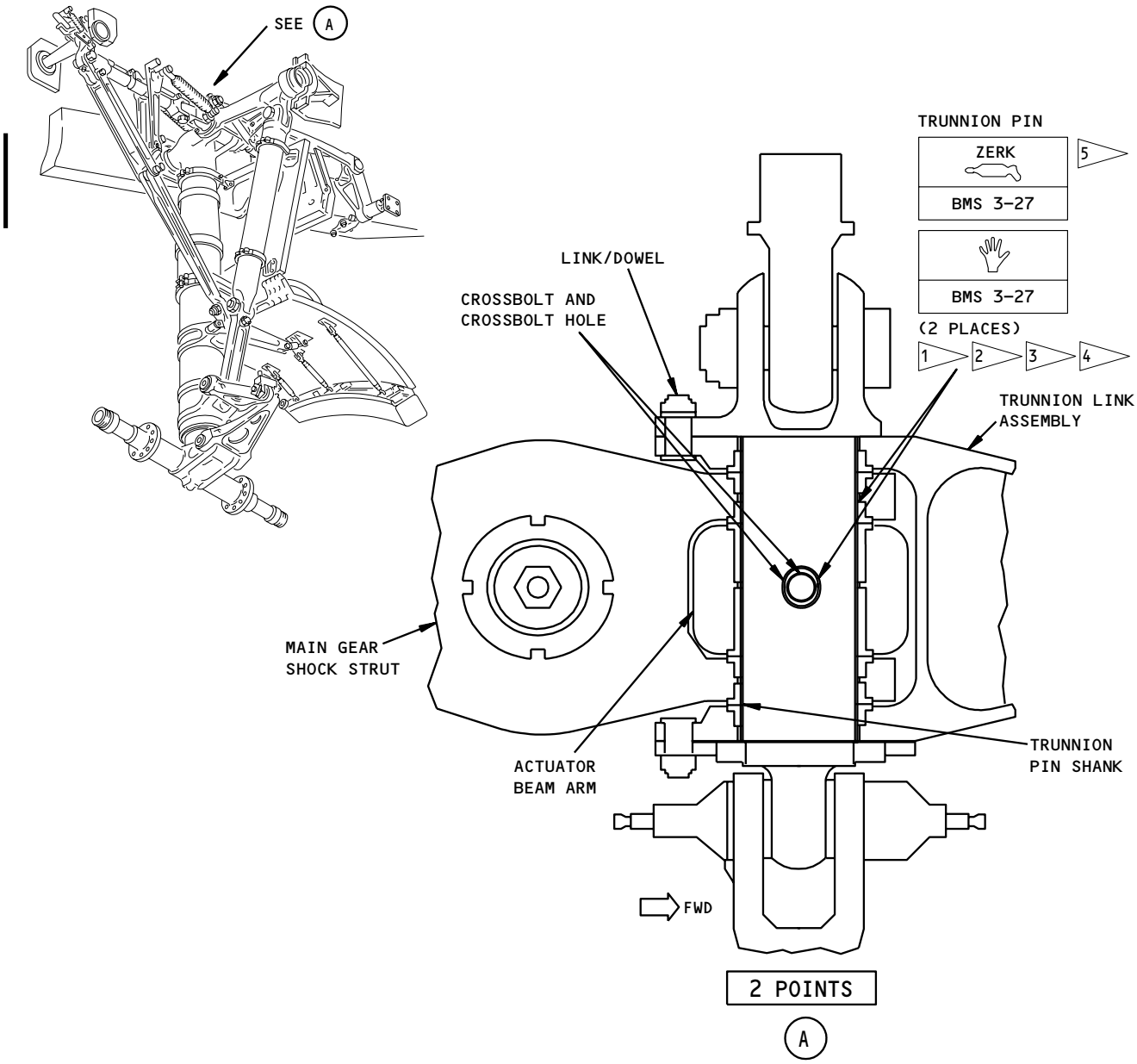
13 > ON AIRPLANES INCORPORATING SB 32-1123

14 > MIL-G-21164 OR MIL-G-23827 OPTIONAL TO BMS 3-33

Main Landing Gear Lubrication
Figure 201 (Sheet 1)



Main Landing Gear Lubrication
Figure 201 (Sheet 2)



1 WARNING: NITRILE GLOVES ARE RECOMMENDED FOR SKIN PROTECTION AGAINST AROMATIC SOLVENT BASE CHROMATE COMPOUNDS FOUND IN MASTINOX.

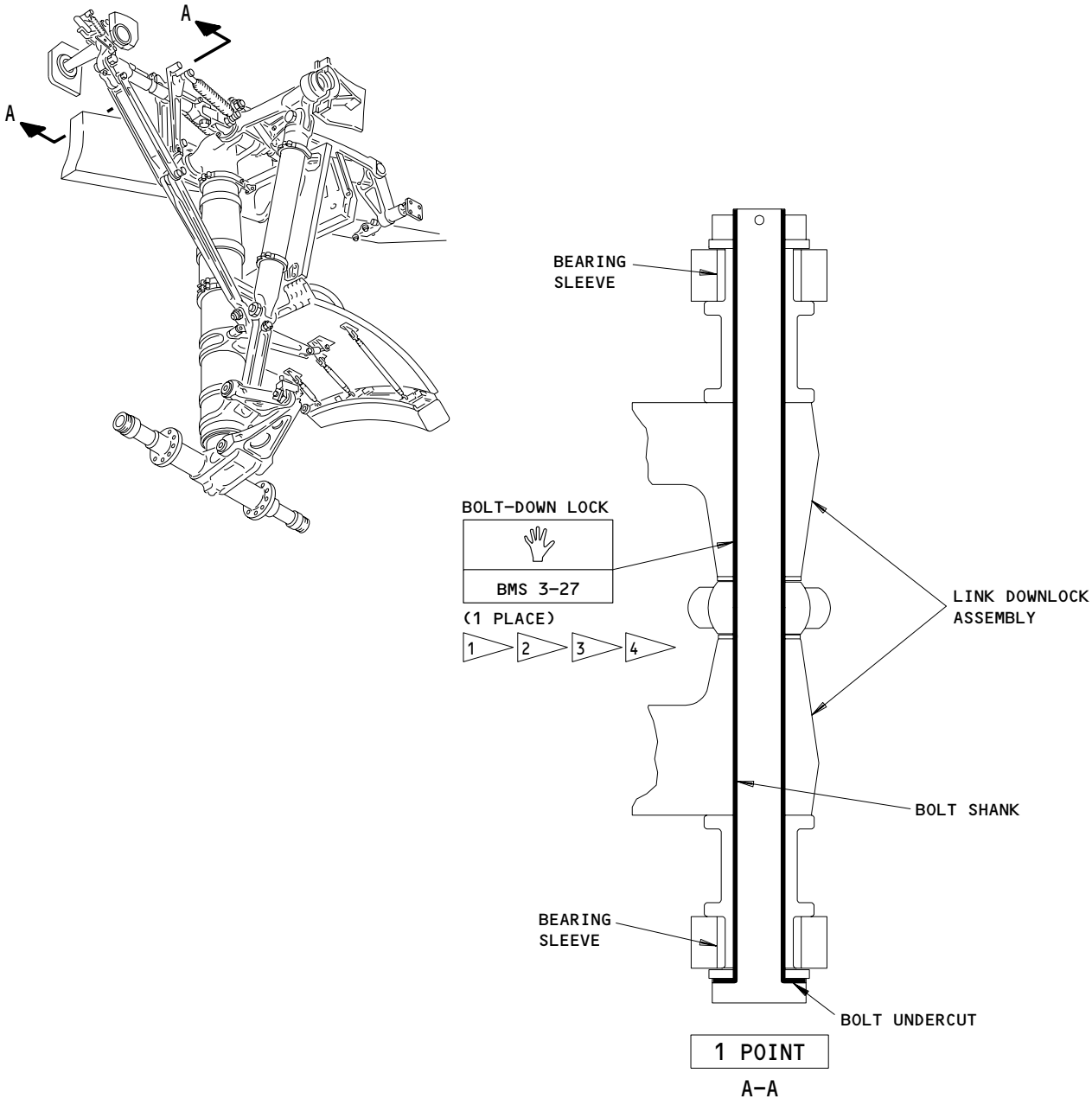
2 CAUTION: EXCESS MASTINOX MUST BE REMOVED FROM SURFACES WHICH WILL BE GREASED. APPLICATION OF MASTINOX TO JOINTS WHICH ROTATE COULD RESULT IN FAILURE OF LANDING GEAR TO EXTEND OR RETRACT.

3 APPLY BMS 3-27 (MASTINOX 6856K) TO TRUNNION PIN SHANK, THREAD RELIEF AND THREADS, FILLING ANY INTERNAL VOIDS IN THE IMMEDIATE AREA AND OUTER SURFACES OF TRUNNION LINK.

4 APPLY BMS 3-27 (MASTINOX 6856K) TO CROSSBOLT AND CROSSBOLT HOLE IN BEAM ARM AND TRUNNION PIN.

5 ZERK FITTING OPTIONAL.

Trunnion Pin and Link
Figure 202



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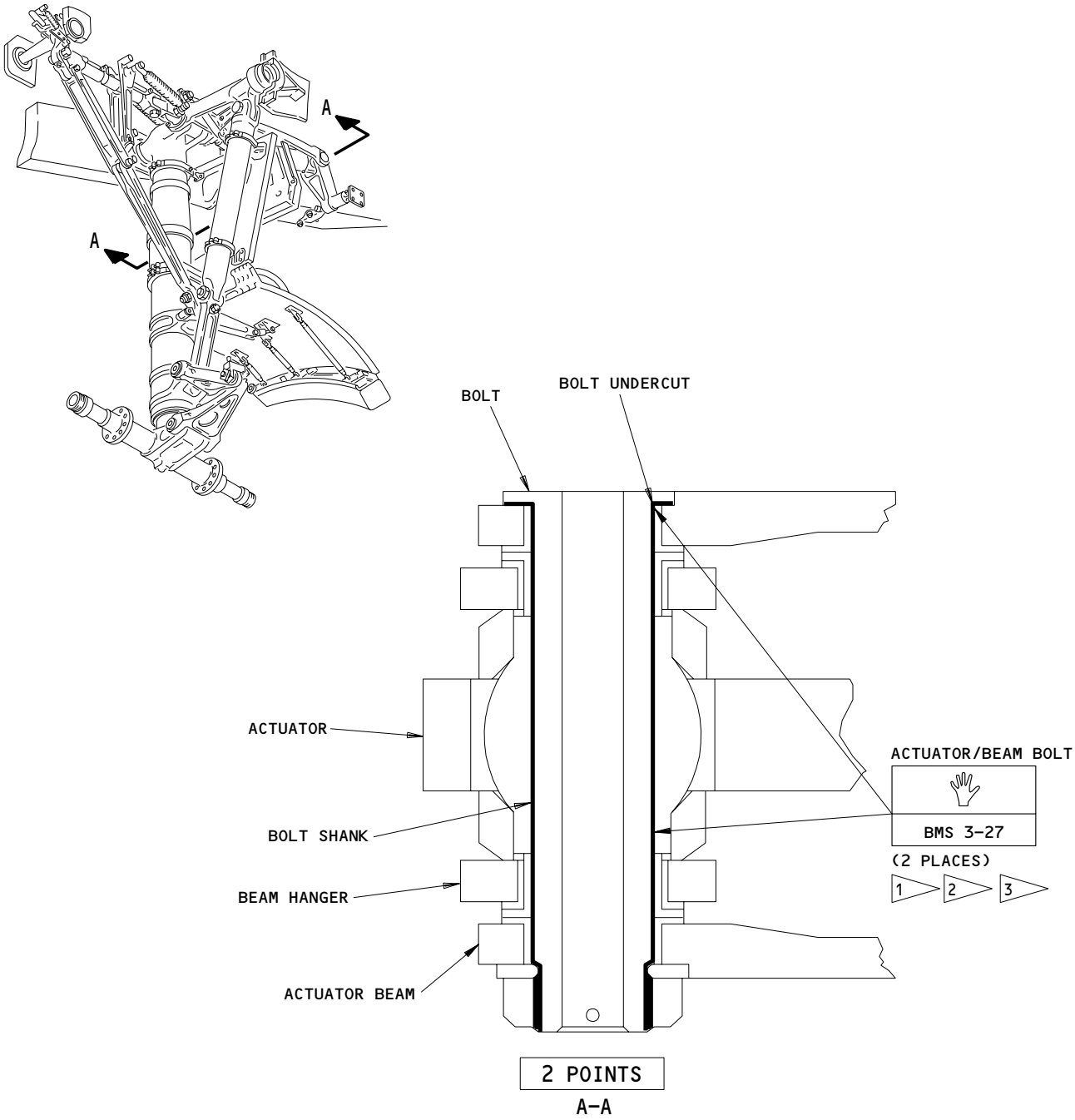
2 CAUTION: EXCESS MASTINOX MUST BE REMOVED FROM SURFACES WHICH WILL BE GREASED. APPLICATION OF MASTINOX TO JOINTS WHICH ROTATE COULD RESULT IN FAILURE OF LANDING GEAR TO EXTEND OR RETRACT.

3 APPLY BMS 3–27 (MASTINOX 6856K) TO BOLT UNDERCUT, SHANK, THREAD RELIEF AND THREADS, FILLING ANY INTERNAL VOIDS IN THE IMMEDIATE AREA.

4 DO NOT APPLY BMS 3–27 (MASTINOX 6856K) TO THE OUTER DIAMETER OF THE SPACERS. SPRINGS MUST BE GREASED AND FREE TO ROTATE.

Downlock Bolt
Figure 203



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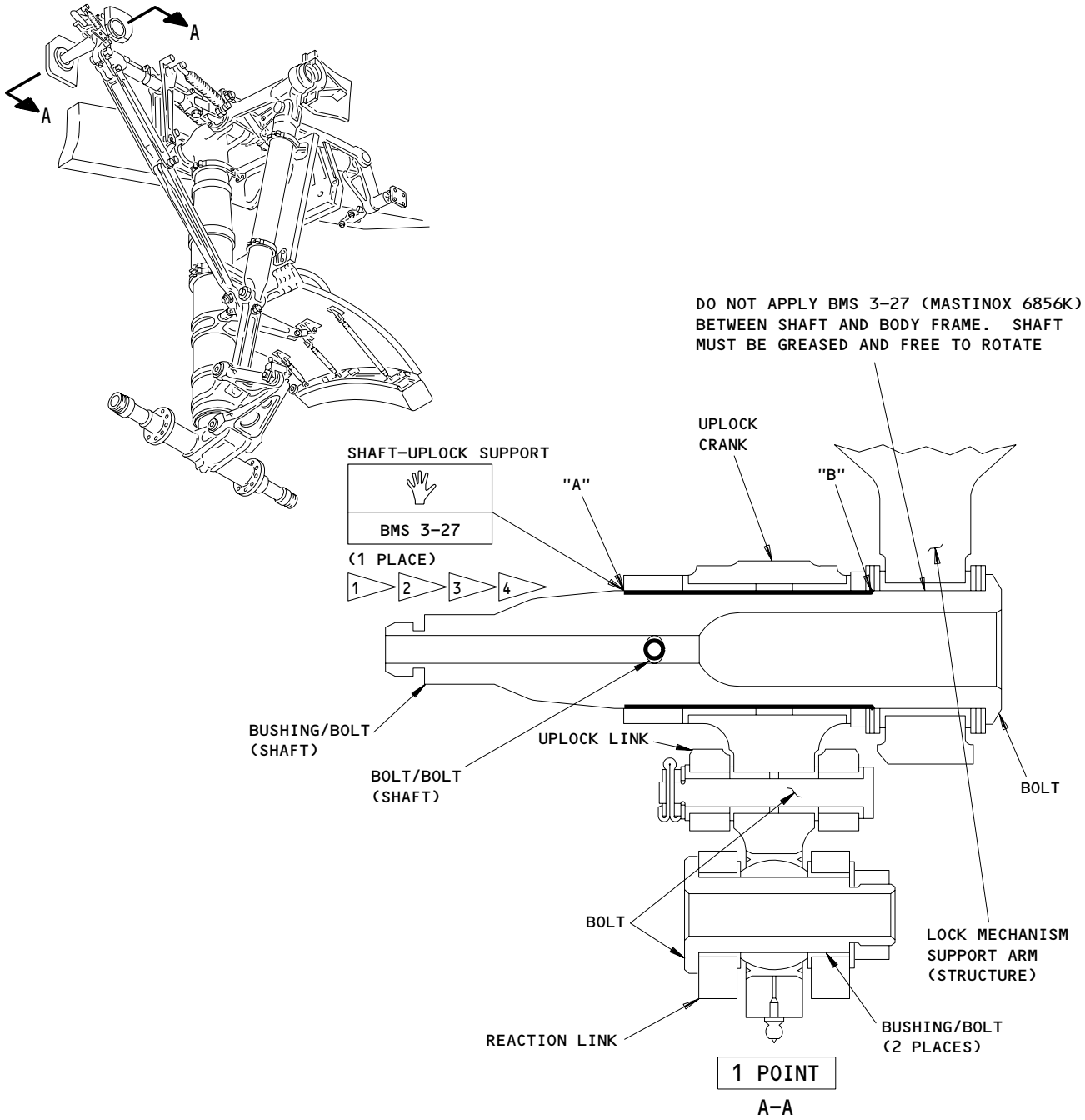
2 CAUTION: EXCESS MASTINOX MUST BE REMOVED FROM SURFACES WHICH WILL BE GREASED. APPLICATION OF MASTINOX TO JOINTS WHICH ROTATE COULD RESULT IN FAILURE OF LANDING GEAR TO EXTEND OR RETRACT.

3 APPLY BMS 3-27 (MASTINOX 6856K) TO PIN UNDERCUT, SHANK, THREAD RELIEF AND THREADS, FILLING ANY INTERNAL VOIDS IN THE IMMEDIATE AREA.

Actuator/Beam Bolt
Figure 204



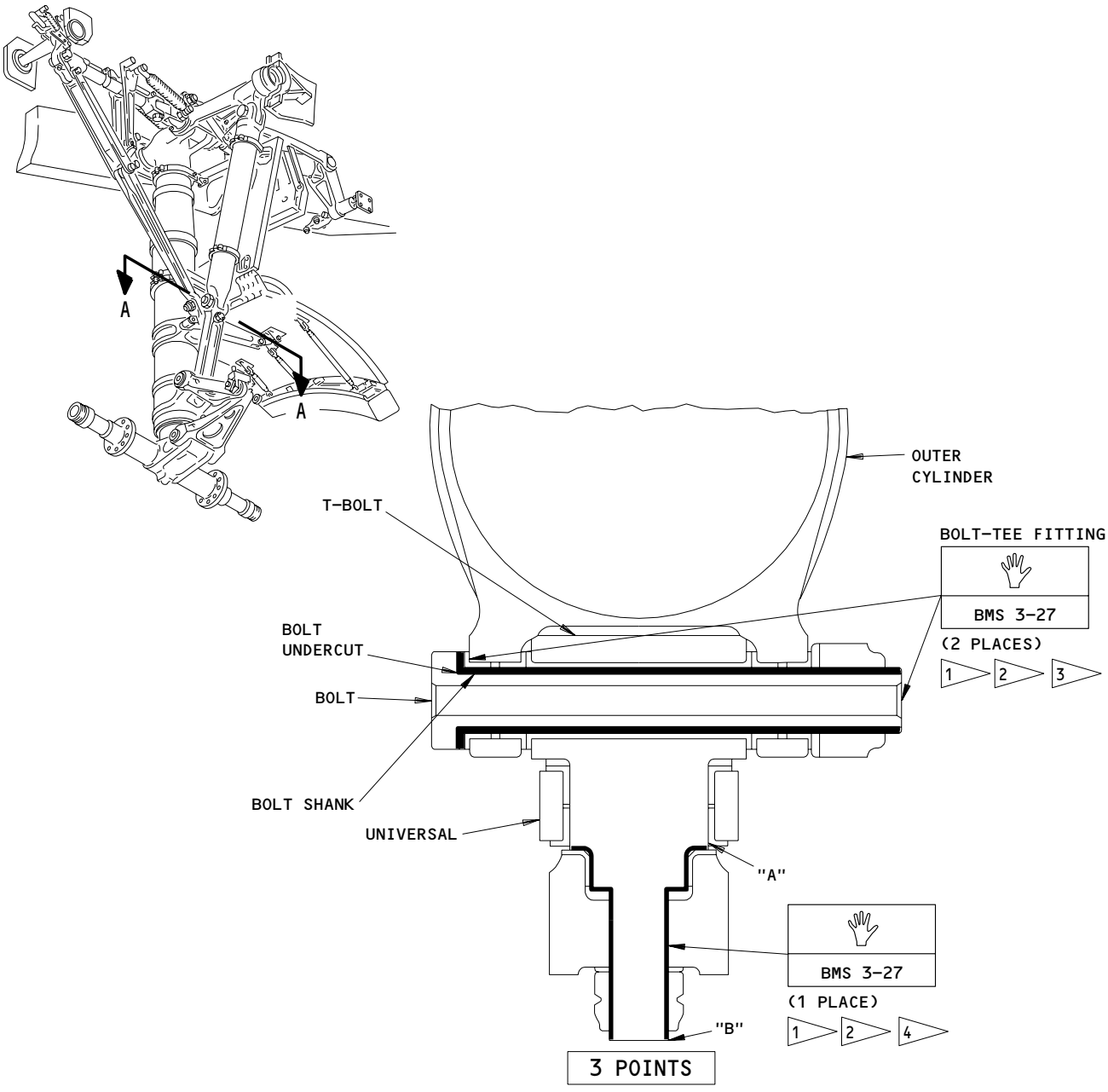
1 WARNING: NITRILE GLOVES ARE RECOMMENDED FOR SKIN PROTECTION AGAINST AROMATIC SOLVENT BASE CHROMATE COMPOUNDS FOUND IN MASTINOX.

2 CAUTION: EXCESS MASTINOX MUST BE REMOVED FROM SURFACES WHICH WILL BE GREASED. APPLICATION OF MASTINOX TO JOINTS WHICH ROTATE COULD RESULT IN FAILURE OF LANDING GEAR TO EXTEND OR RETRACT.

3 APPLY BMS 3-27 (MASTINOX 6856K) TO UPLOCK SHAFT FROM POINT 'A' TO POINT 'B' (OUTER DIAMETER ONLY) FILLING ANY VOIDS IN THE IMMEDIATE AREA.

4 DO NOT GET MASTINOX ON ANY SURFACES OUTSIDE OF DESCRIBED AREA.

Shaft - Uplock Support
Figure 205



1 WARNING: NITRILE GLOVES ARE RECOMMENDED FOR SKIN PROTECTION AGAINST AROMATIC SOLVENT BASE CHROMATE COMPOUNDS FOUND IN MASTINOX.

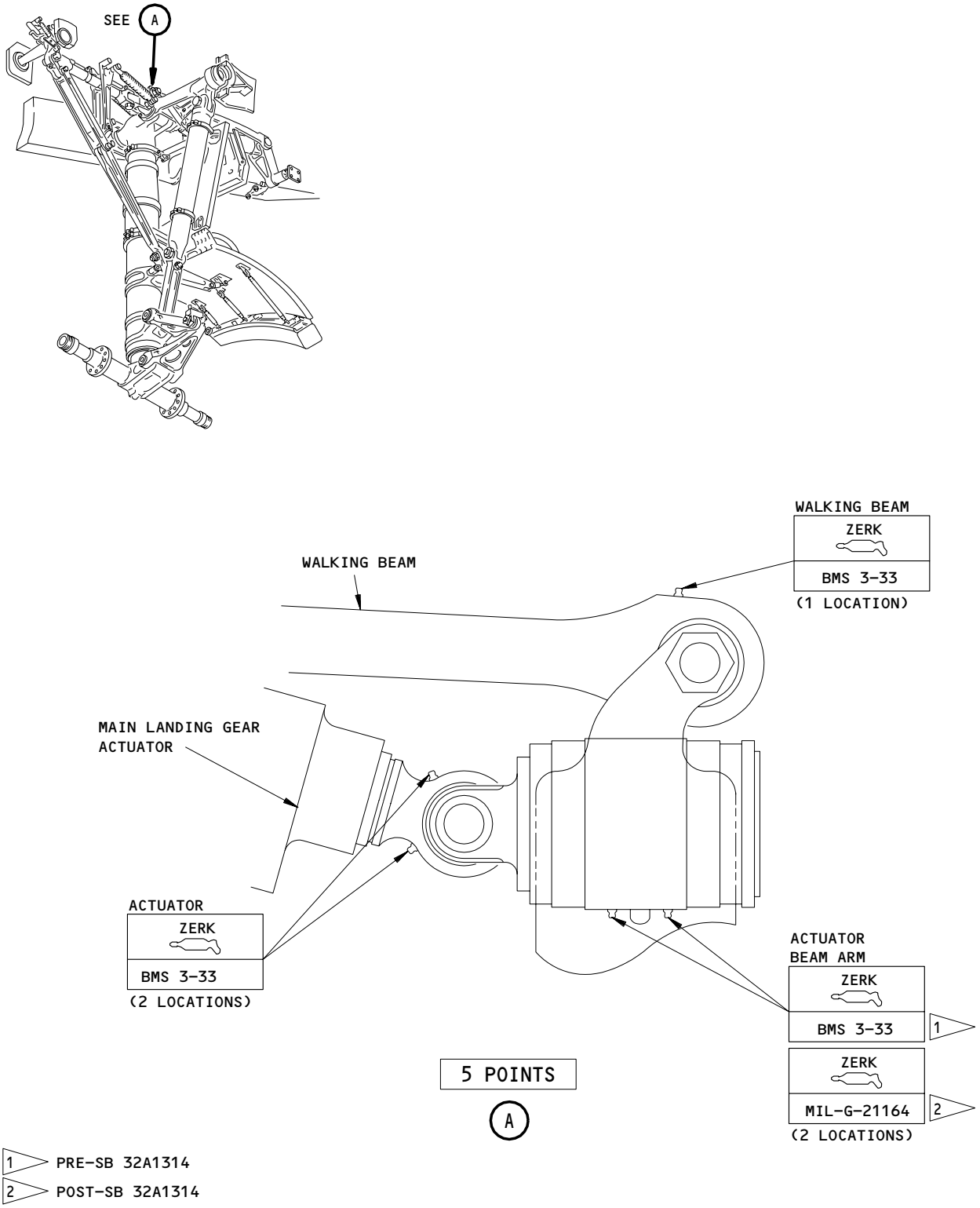
2 CAUTION: EXCESS MASTINOX MUST BE REMOVED FROM SURFACES WHICH WILL BE GREASED. APPLICATION OF MASTINOX TO JOINTS WHICH ROTATE COULD RESULT IN FAILURE OF LANDING GEAR TO EXTEND OR RETRACT.

3 APPLY BMS 3–27 (MASTINOX 6856K) TO BOLT UNDERCUT, SHANK, THREAD RELIEF AND THREADS, FILLING ANY INTERNAL VOIDS IN THE IMMEDIATE AREA.

4 APPLY BMS 3–27 (MASTINOX 6856K) TO T–BOLT FROM POINT "A" TO POINT "B"

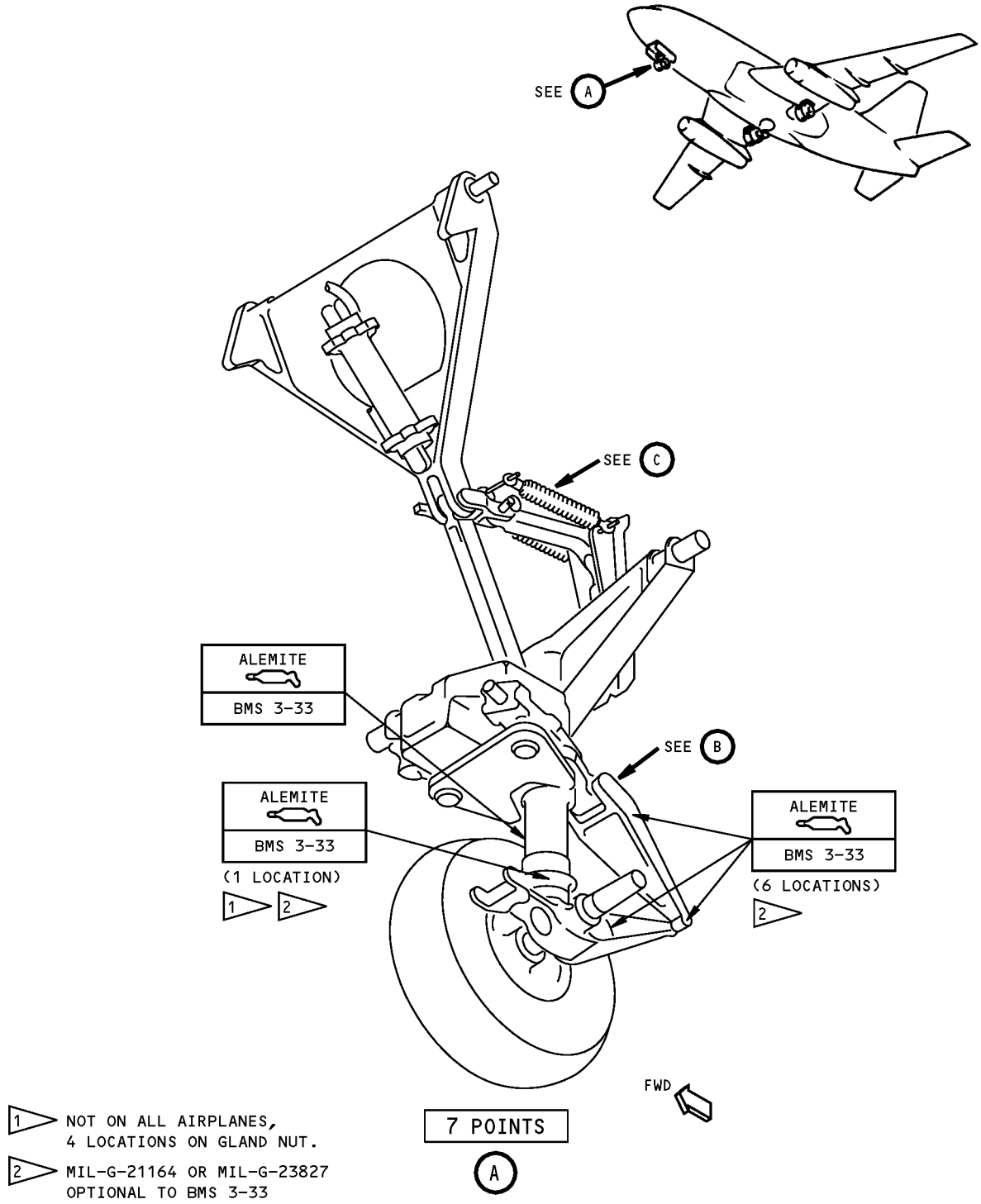
5 DO NOT APPLY BMS 3–27 (MASTINOX 6856K) UNDER THE UNIVERSAL. THE UNIVERSAL MUST BE GREASED AND FREE TO ROTATE.

Bolt – T-Fitting
Figure 206

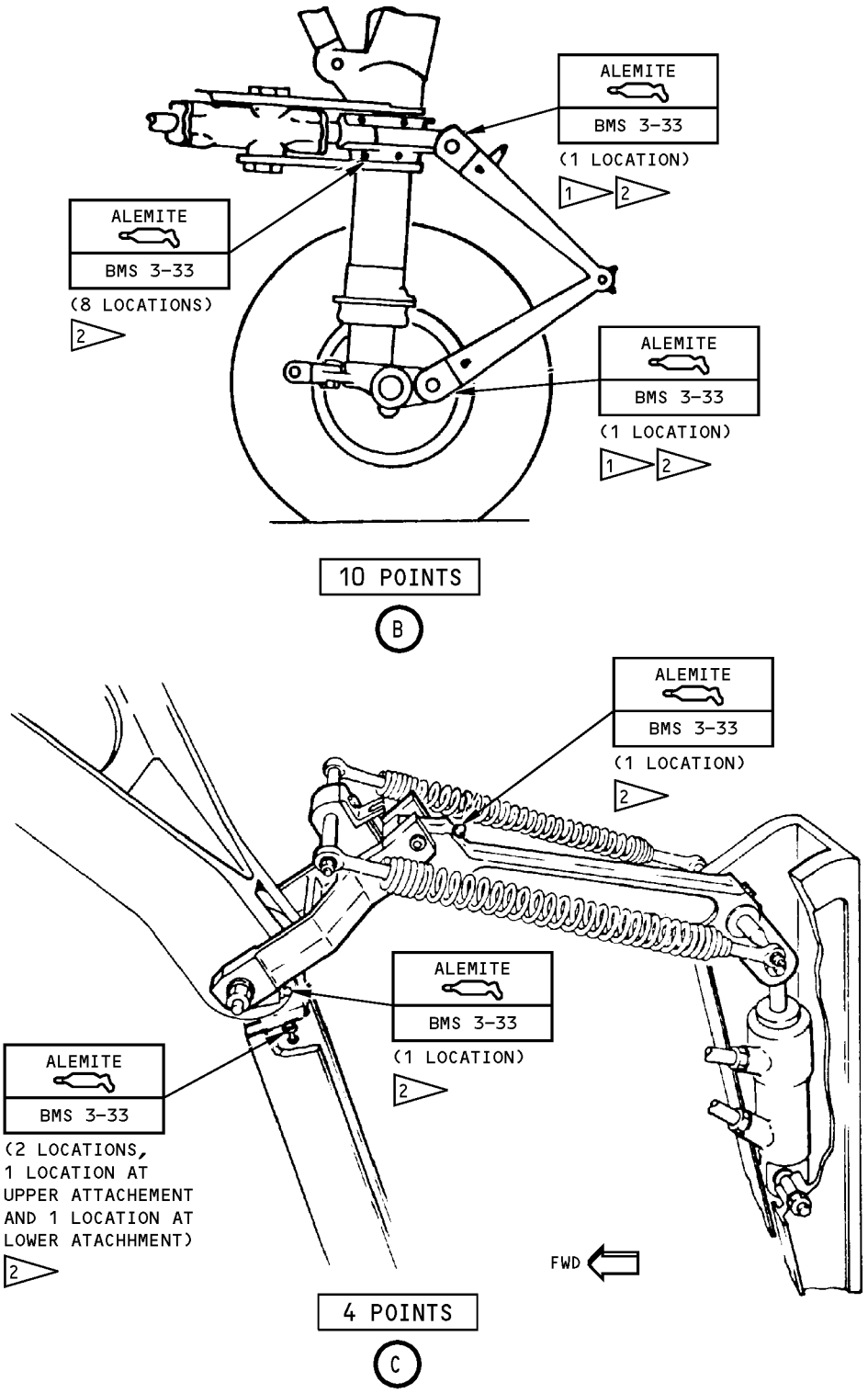


Actuator and Beam Arm
Figure 207

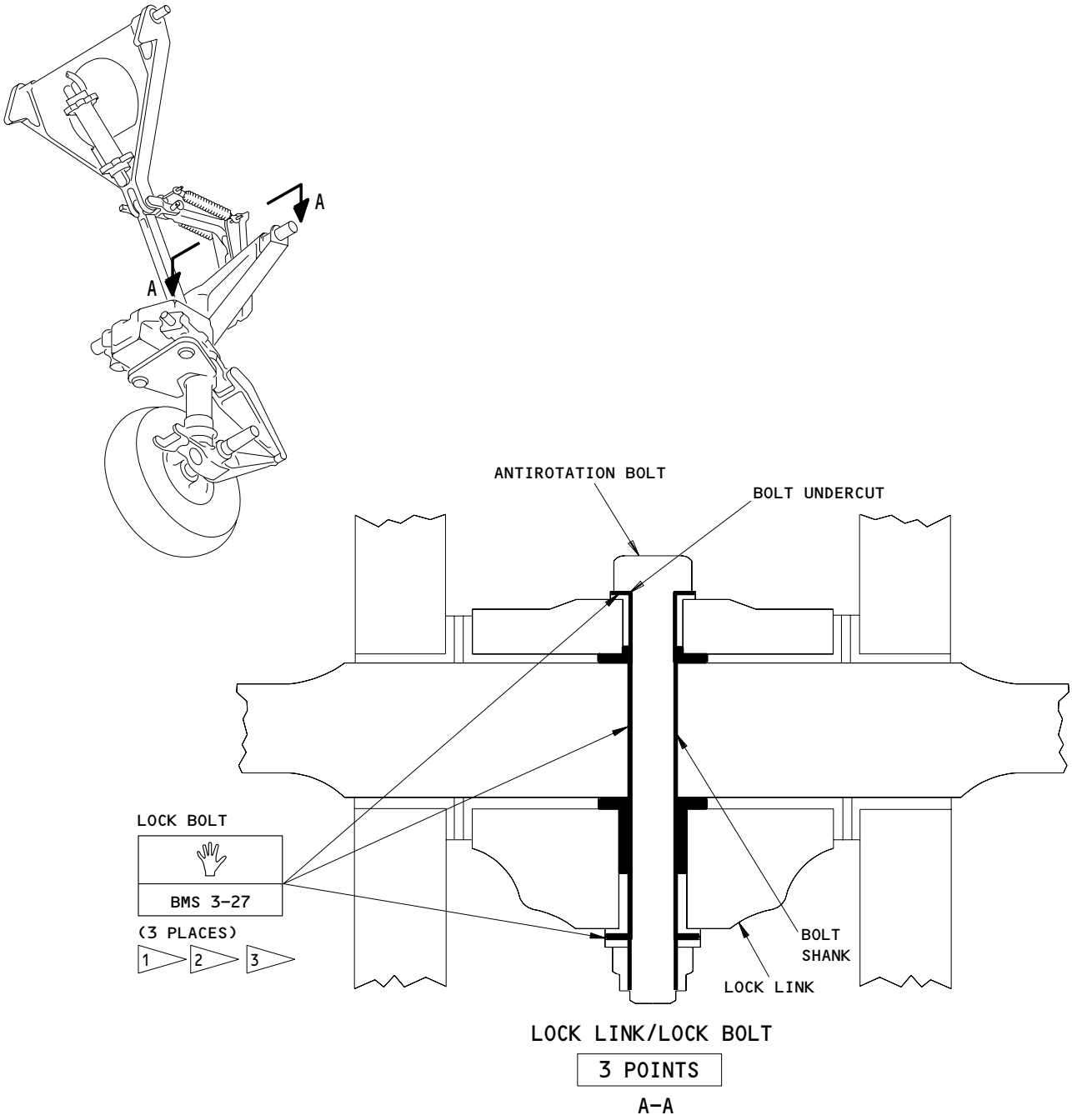
NOSE LANDING GEAR LUBRICATION - MAINTENANCE PRACTICES



Nose Landing Gear Lubrication
Figure 201 (Sheet 1)



Nose Landing Gear Lubrication
Figure 201 (Sheet 2)



LOCK LINK/LOCK BOLT

3 POINTS

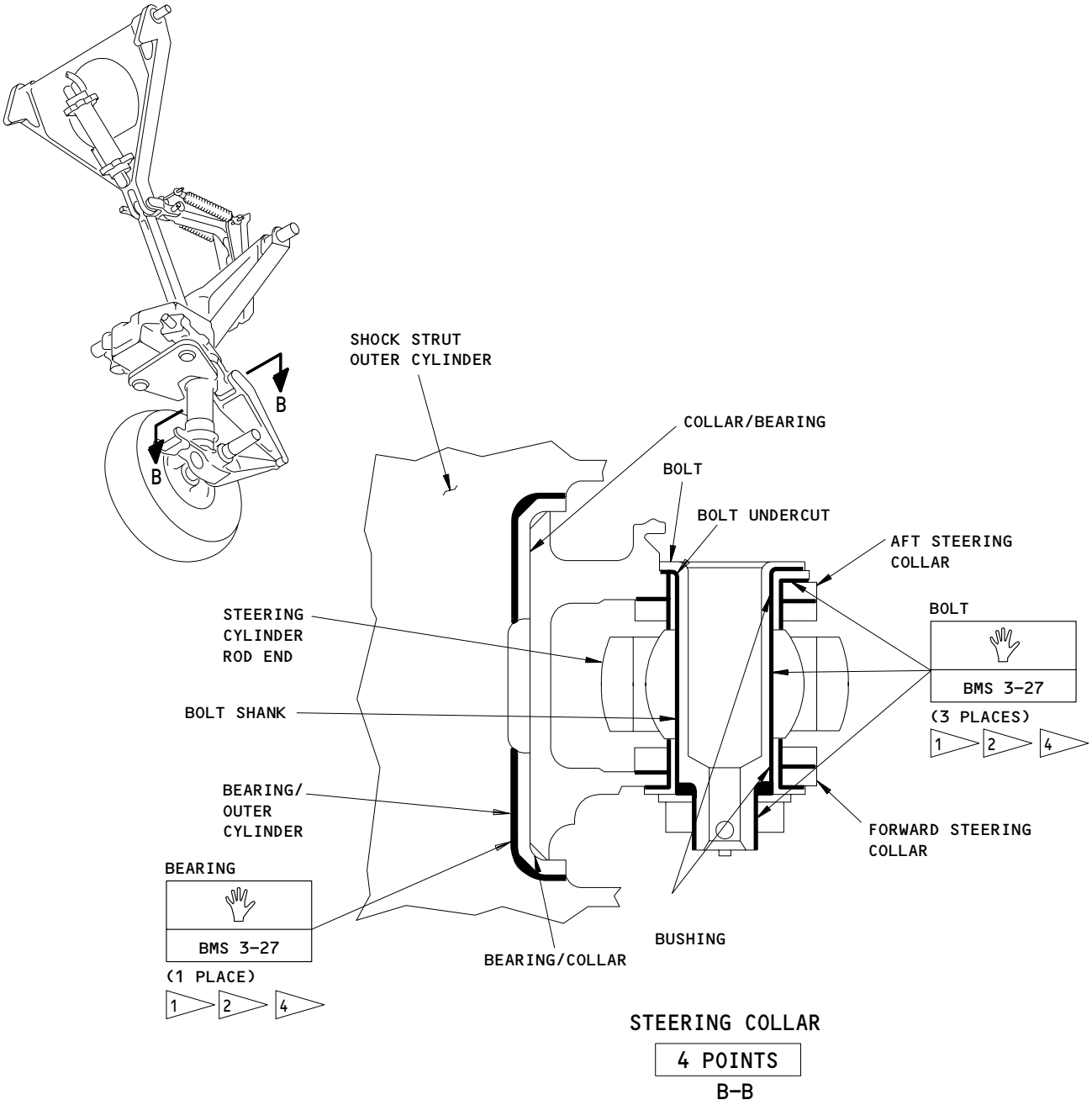
A-A

1 WARNING: NITRILE GLOVES ARE RECOMMENDED FOR SKIN PROTECTION AGAINST AROMATIC SOLVENT BASE CHROMATE COMPOUNDS FOUND IN MASTINOX.

2 CAUTION: EXCESS MASTINOX MUST BE REMOVED FROM SURFACES WHICH WILL BE GREASED. APPLICATION OF MASTINOX TO JOINTS WHICH ROTATE COULD RESULT IN FAILURE OF LANDING GEAR TO EXTEND OR RETRACT.

3 APPLY BMS 3-27 (MASTINOX 6856K) TO BOLT UNDERCUT, SHANK, THREAD RELIEF AND THREADS, FILLING ANY INTERNAL VOIDS IN THE IMMEDIATE AREA.

Nose Landing Gear Mastinox Application
Figure 202 (Sheet 1)



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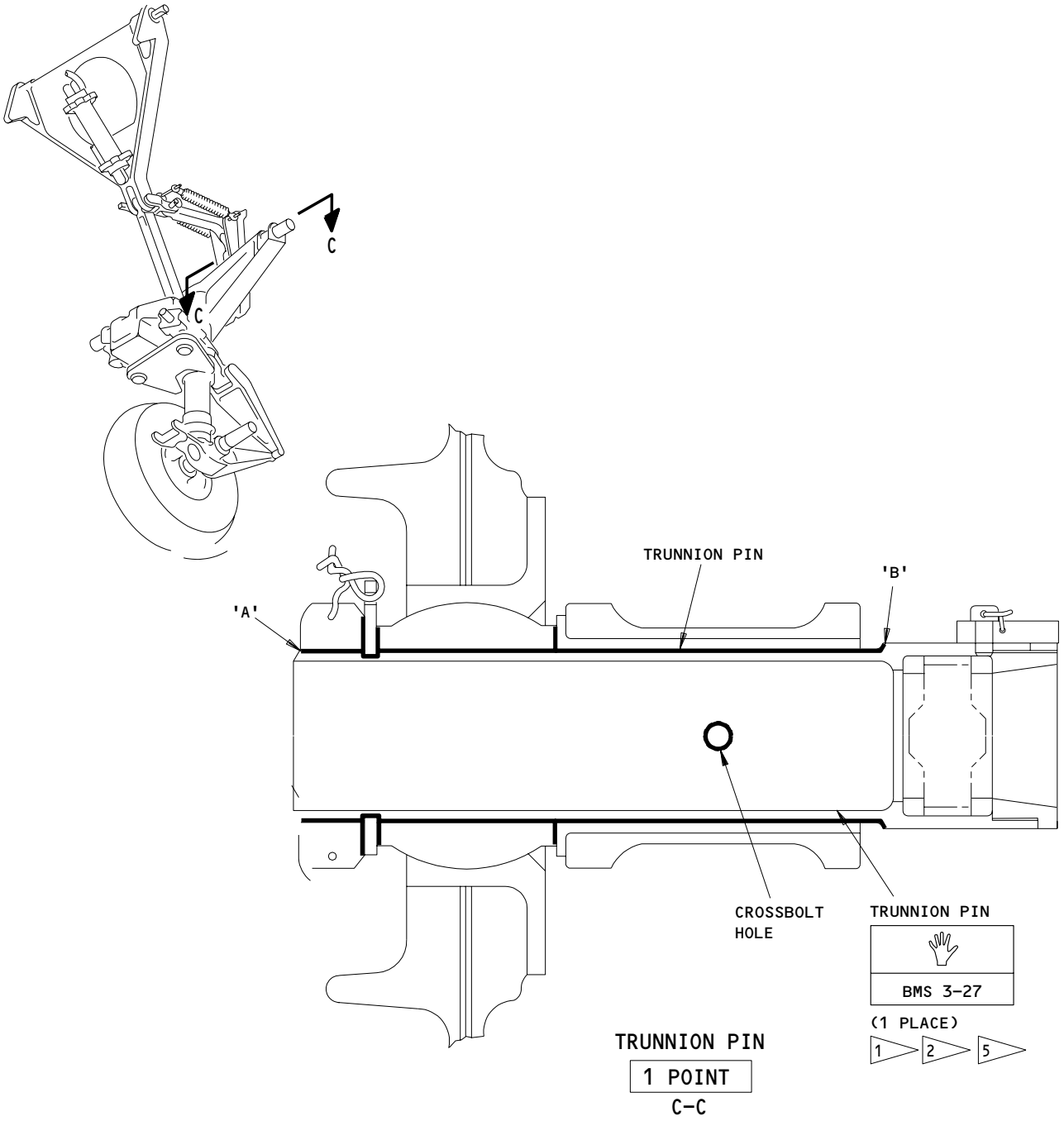
2 CAUTION: EXCESS MASTINOX MUST BE REMOVED FROM SURFACES WHICH WILL BE GREASED. APPLICATION OF MASTINOX TO JOINTS WHICH ROTATE COULD RESULT IN FAILURE OF LANDING GEAR TO EXTEND OR RETRACT.

4 APPLY BMS 3-27 (MASTINOX 6856K) TO ALL MATING SURFACES OF FWD AND AFT COLLAR HALVES INCLUDING ABUTMENT FACES AND BUSHING OUTER DIAMETER, BETWEEN BEARING AND OUTER CYLINDER, TO ROD ATTACH BOLT INSIDE FLANGE FACE, UNDERCUT, SHANK, THREAD RELIEF AND THREADS. FILL ANY INTERNAL VOIDS IN THE AREAS DISCRIBED ABOVE.

Nose Landing Gear Mastinox Application
Figure 202 (Sheet 2)



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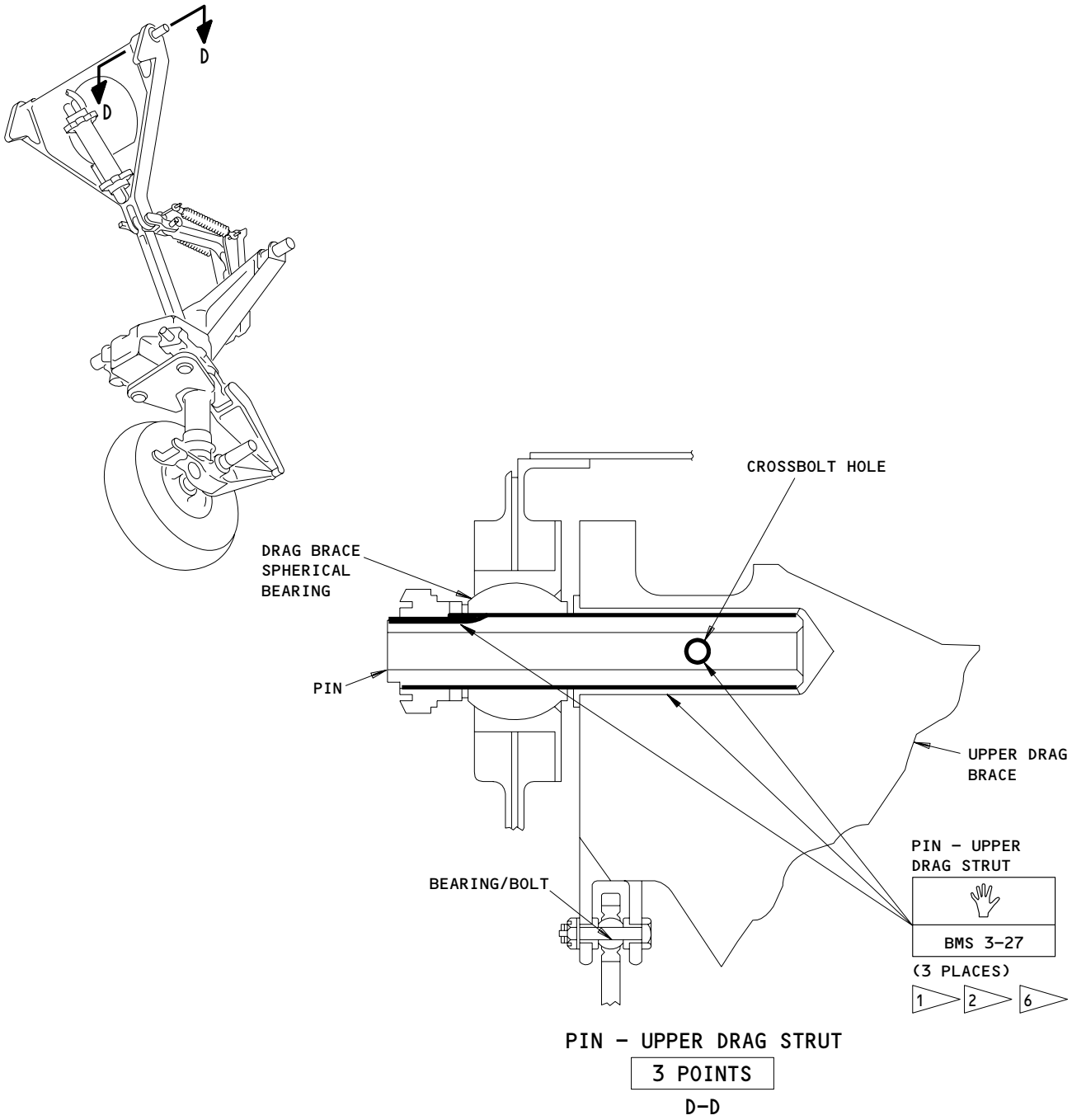
2 CAUTION: EXCESS MASTINOX MUST BE REMOVED FROM SURFACES WHICH WILL BE GREASED. APPLICATION OF MASTINOX TO JOINTS WHICH ROTATE COULD RESULT IN FAILURE OF LANDING GEAR TO EXTEND OR RETRACT.

5 APPLY BMS 3-27 (MASTINOX 6856K) FROM POINT 'A' TO POINT 'B' AROUND ENTIRE CIRCUMFERENCE OF TRUNNION PIN, FILLING ANY INTERNAL VOIDS IN THE IMMEDIATE AREA.

Nose Landing Gear Mastinox Application
Figure 202 (Sheet 3)



PIN – UPPER DRAG STRUT

3 POINTS

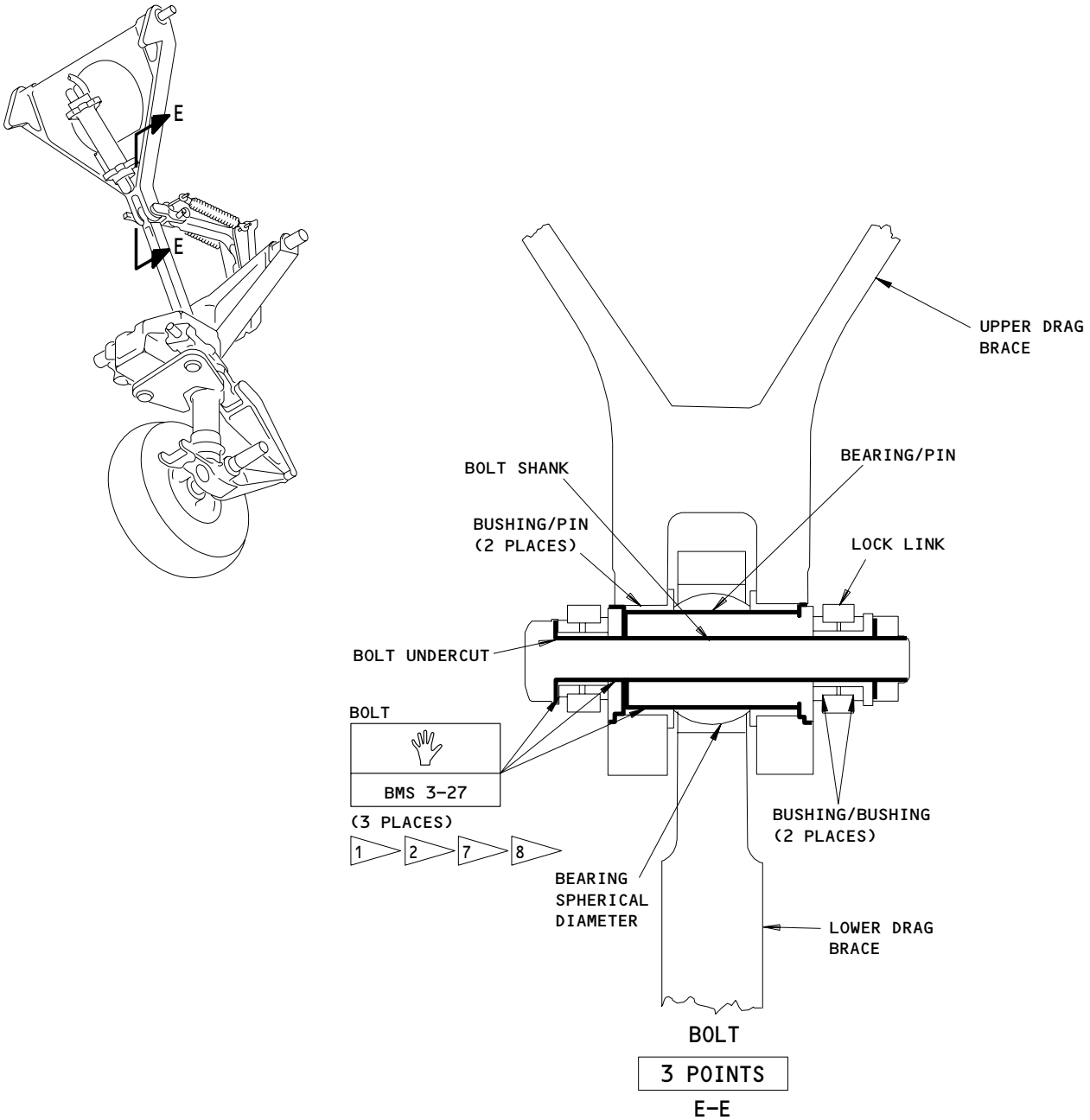
D–D

1 WARNING: NITRILE GLOVES ARE RECOMMENDED FOR SKIN PROTECTION AGAINST AROMATIC SOLVENT BASE CHROMATE COMPOUNDS FOUND IN MASTINOX.

2 CAUTION: EXCESS MASTINOX MUST BE REMOVED FROM SURFACES WHICH WILL BE GREASED. APPLICATION OF MASTINOX TO JOINTS WHICH ROTATE COULD RESULT IN FAILURE OF LANDING GEAR TO EXTEND OR RETRACT.

6 APPLY BMS 3–27 (MASTINOX 6856K) TO PIN OUTSIDE DIAMETER, CROSSBOLT HOLE, KEYWAY, UNDERCUT AND THREADS.

Nose Landing Gear Mastinox Application
Figure 202 (Sheet 4)



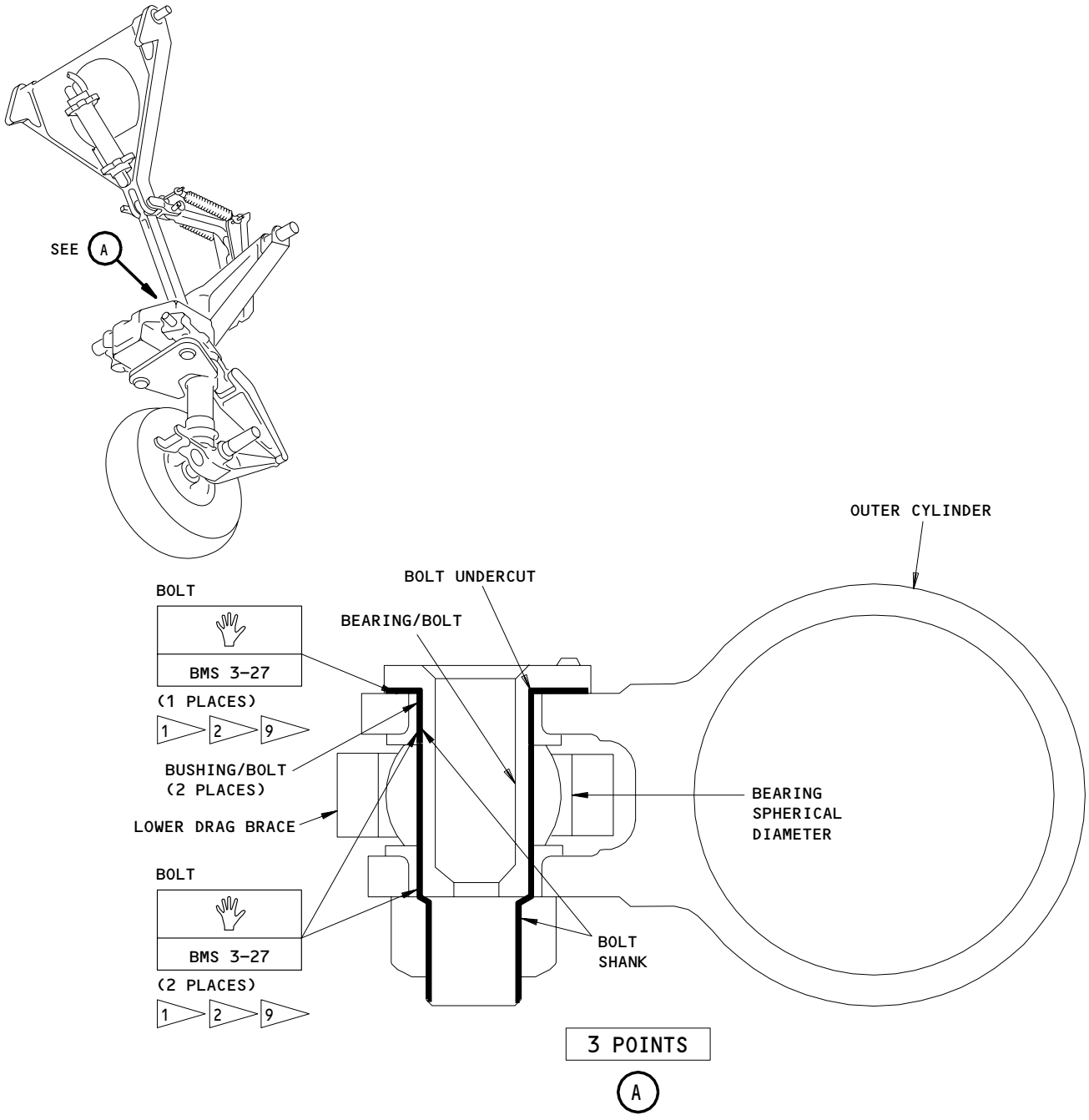
1 WARNING: NITRILE GLOVES ARE RECOMMENDED FOR SKIN PROTECTION AGAINST AROMATIC SOLVENT BASE CHROMATE COMPOUNDS FOUND IN MASTINOX.

2 CAUTION: EXCESS MASTINOX MUST BE REMOVED FROM SURFACES WHICH WILL BE GREASED. APPLICATION OF MASTINOX TO JOINTS WHICH ROTATE COULD RESULT IN FAILURE OF LANDING GEAR TO EXTEND OR RETRACT.

7 APPLY BMS 3-27 (MASTINOX 6856K) TO BOLT UNDERCUT, SHANK, THREAD RELIEF AND THREADS, FILLING ANY INTERNAL VOIDS IN THE IMMEDIATE AREA.

8 DO NOT APPLY BMS 3-27 (MASTINOX 6856K) TO OUTSIDE DIAMETER OF BUSHING. LOCK LINK MUST BE FREE TO ROTATE.

Nose Landing Gear Mastinox Application
Figure 202 (Sheet 5)

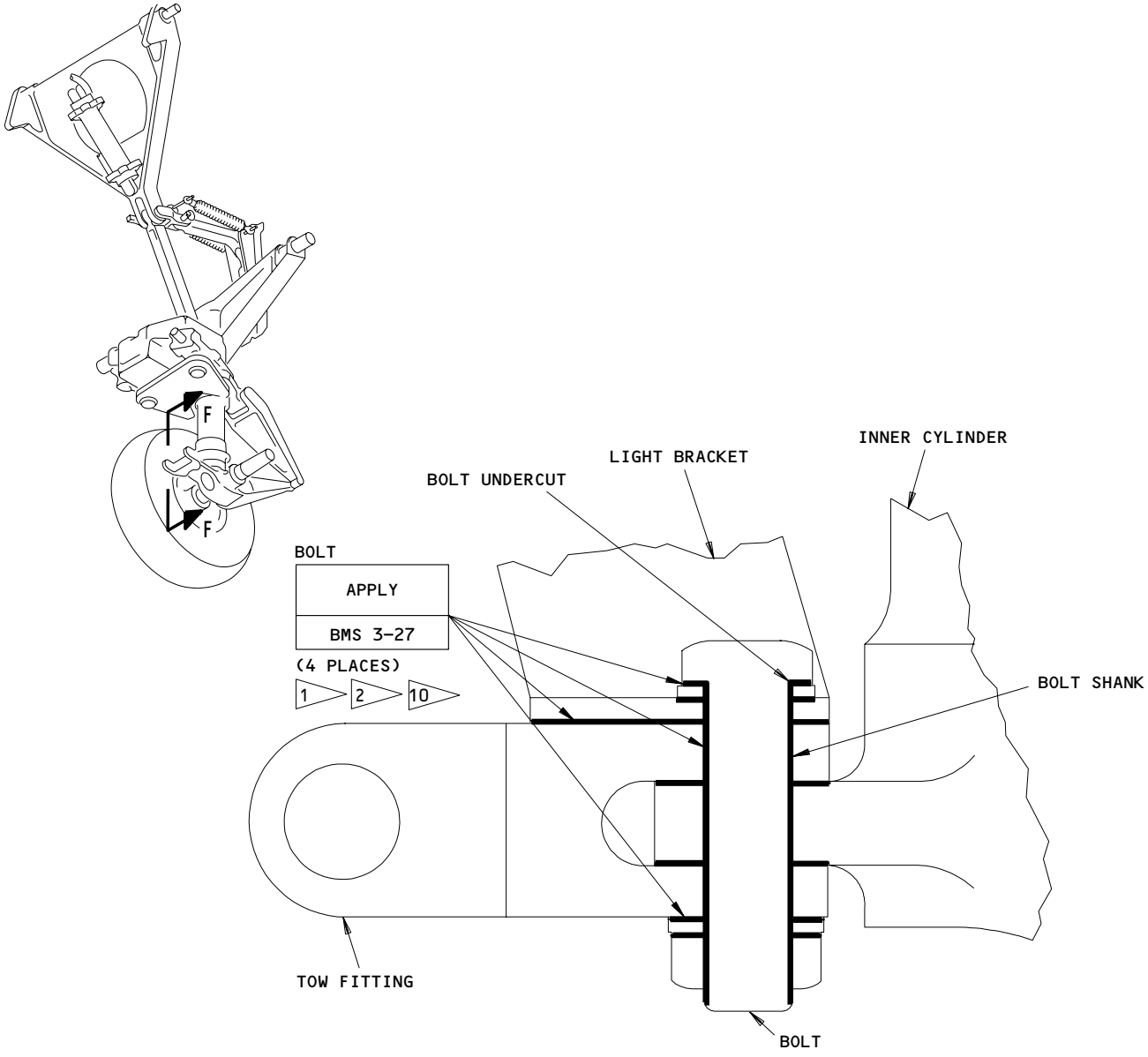


1 WARNING: NITRILE GLOVES ARE RECOMMENDED FOR SKIN PROTECTION AGAINST AROMATIC SOLVENT BASE CHROMATE COMPOUNDS FOUND IN MASTINOX.

2 CAUTION: EXCESS MASTINOX MUST BE REMOVED FROM SURFACES WHICH WILL BE GREASED. APPLICATION OF MASTINOX TO JOINTS WHICH ROTATE COULD RESULT IN FAILURE OF LANDING GEAR TO EXTEND OR RETRACT.

9 APPLY BMS 3-27 (MASTINOX 6856K) TO BOLT INSIDE FLANGE FACE, UNDERCUT, SHANK, THREAD RELIEF AND THREADS, FILLING ANY INTERNAL VOIDS IN THE IMMEDIATE AREA.

Nose Landing Gear Mastinox Application
Figure 202 (Sheet 6)



BOLT - TOW FITTING

4 POINTS

F-F

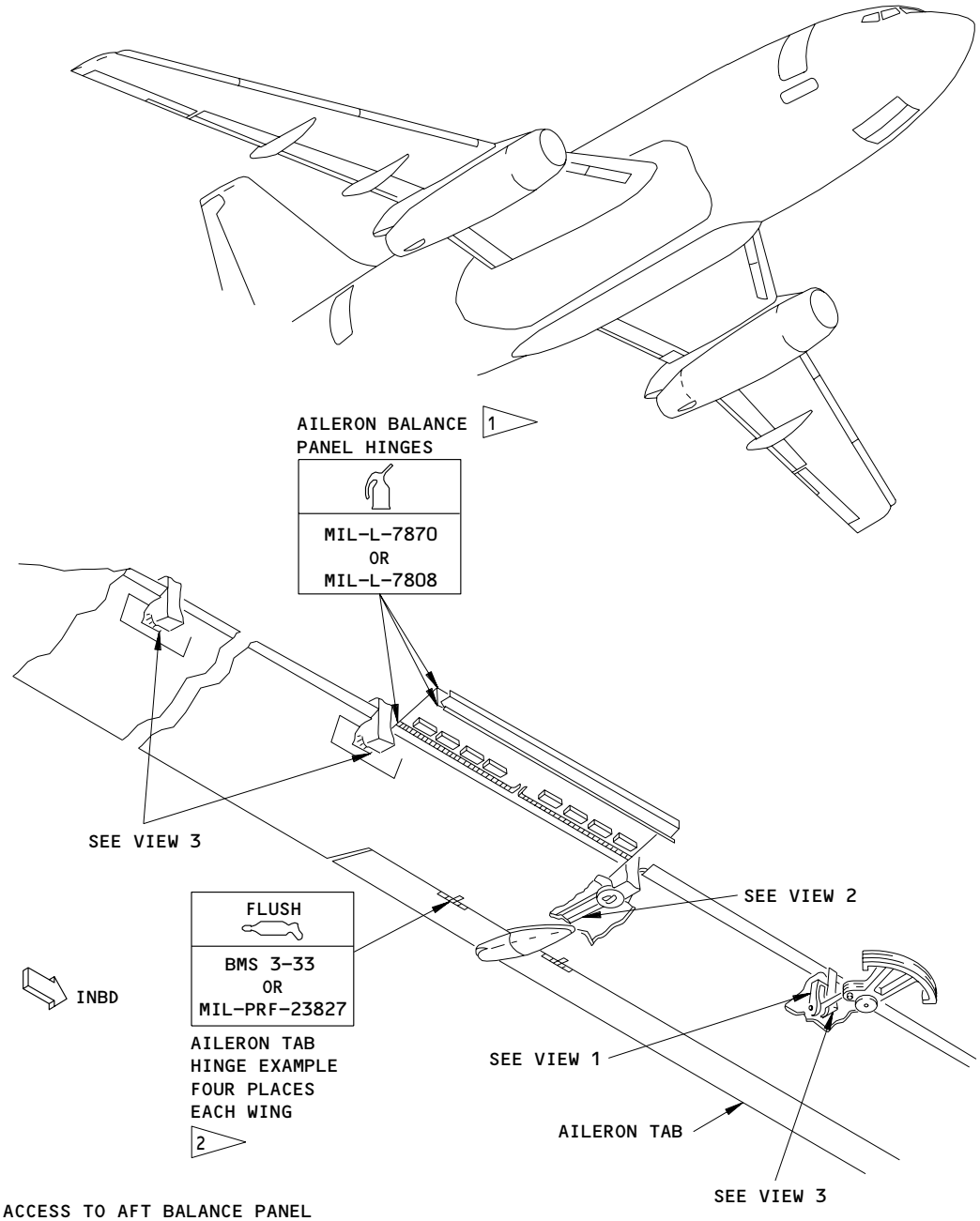
1 WARNING: NITRILE GLOVES ARE RECOMMENDED FOR SKIN PROTECTION AGAINST AROMATIC SOLVENT BASE CHROMATE COMPOUNDS FOUND IN MASTINOX.

2 CAUTION: EXCESS MASTINOX MUST BE REMOVED FROM SURFACES WHICH WILL BE GREASED. APPLICATION OF MASTINOX TO JOINTS WHICH ROTATE COULD RESULT IN FAILURE OF LANDING GEAR TO EXTEND OR RETRACT.

10 APPLY BMS 3-27 (MASTINOX 6856K) TO BOLT UNDERCUT, SHANK, THREAD RELIEF, THREADS, AND MATING SURFACES OF LUGS, FILLING ANY INTERNAL VOIDS IN THE IMMEDIATE AREA.

Nose Landing Gear Mastinox Application
Figure 202 (Sheet 7)

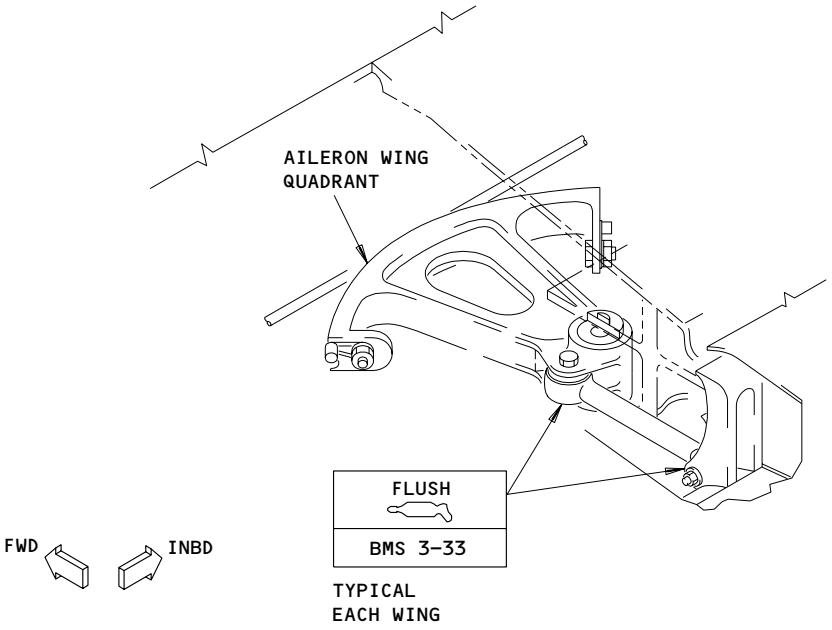
AILERON CONTROL SYSTEM LUBRICATION



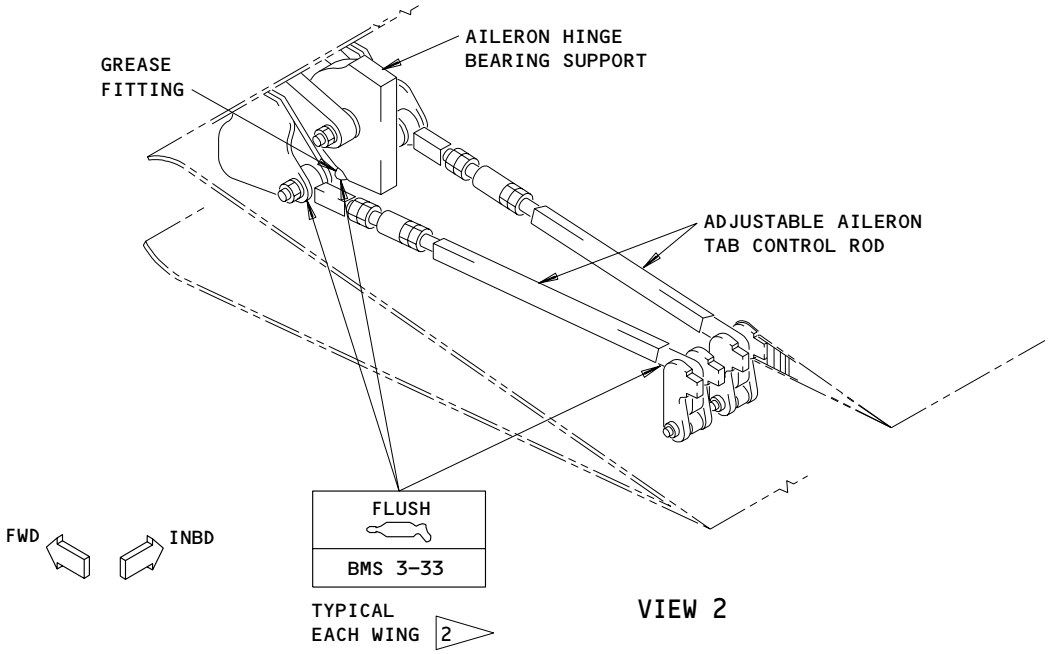
1 GAIN ACCESS TO AFT BALANCE PANEL HINGE BY MOVING AILERON TO UPPER LIMIT. GAIN ACCESS TO FWD BALANCE PANEL HINGE BY REMOVING SEALS AND ATTACHMENTS.

2 RED NYLON GREASE FITTINGS

Aileron Lubrication
Figure 201 (Sheet 1)

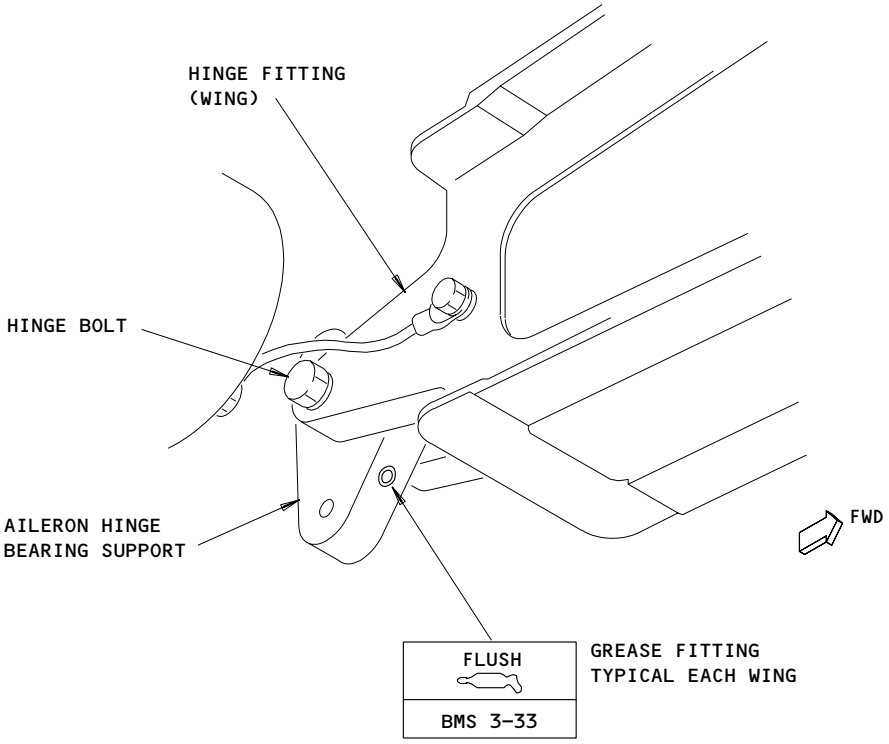


VIEW 1



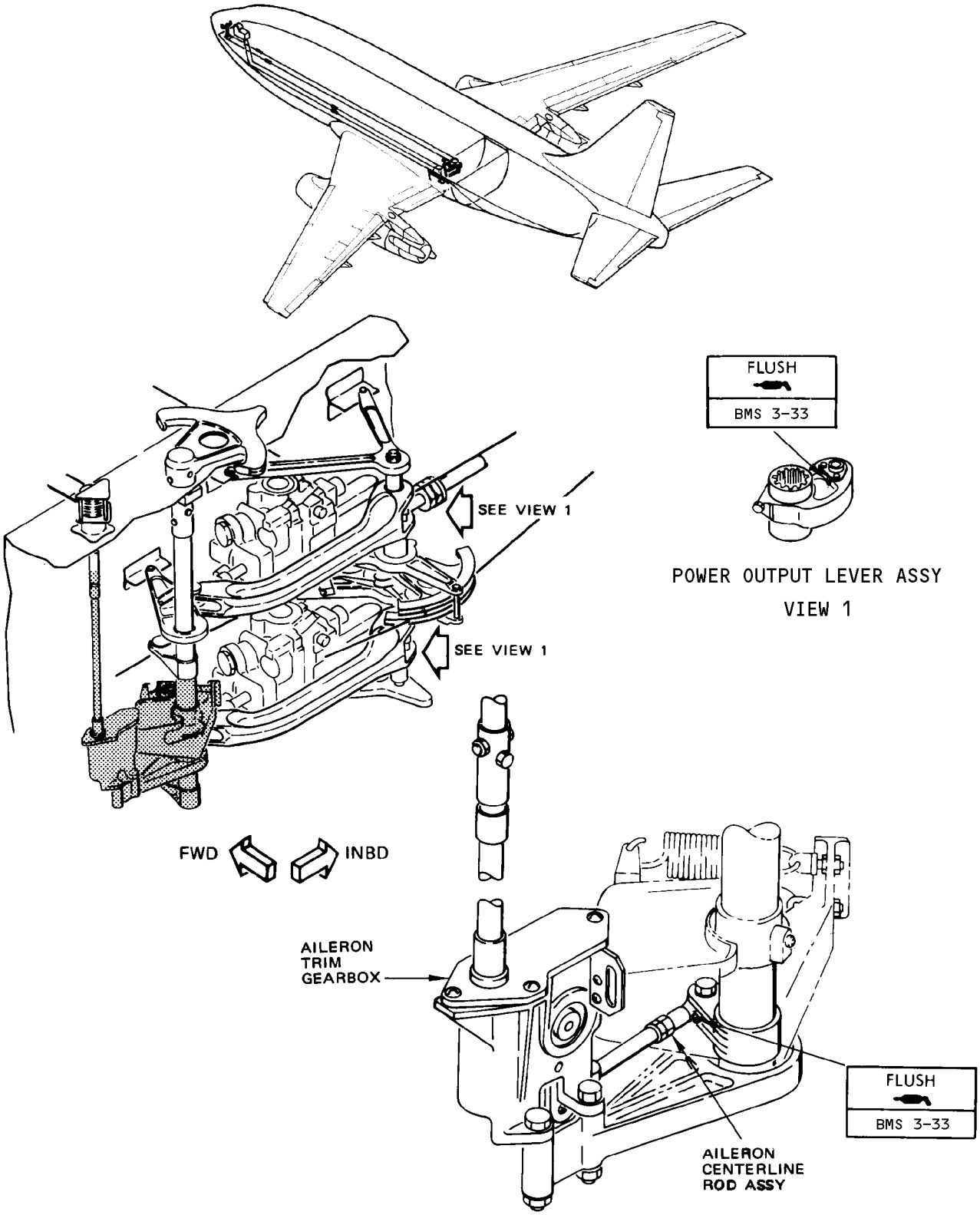
VIEW 2

Aileron Lubrication
Figure 201 (Sheet 2)



VIEW 3
(4 PLACES)

Aileron Lubrication
Figure 201 (Sheet 3)

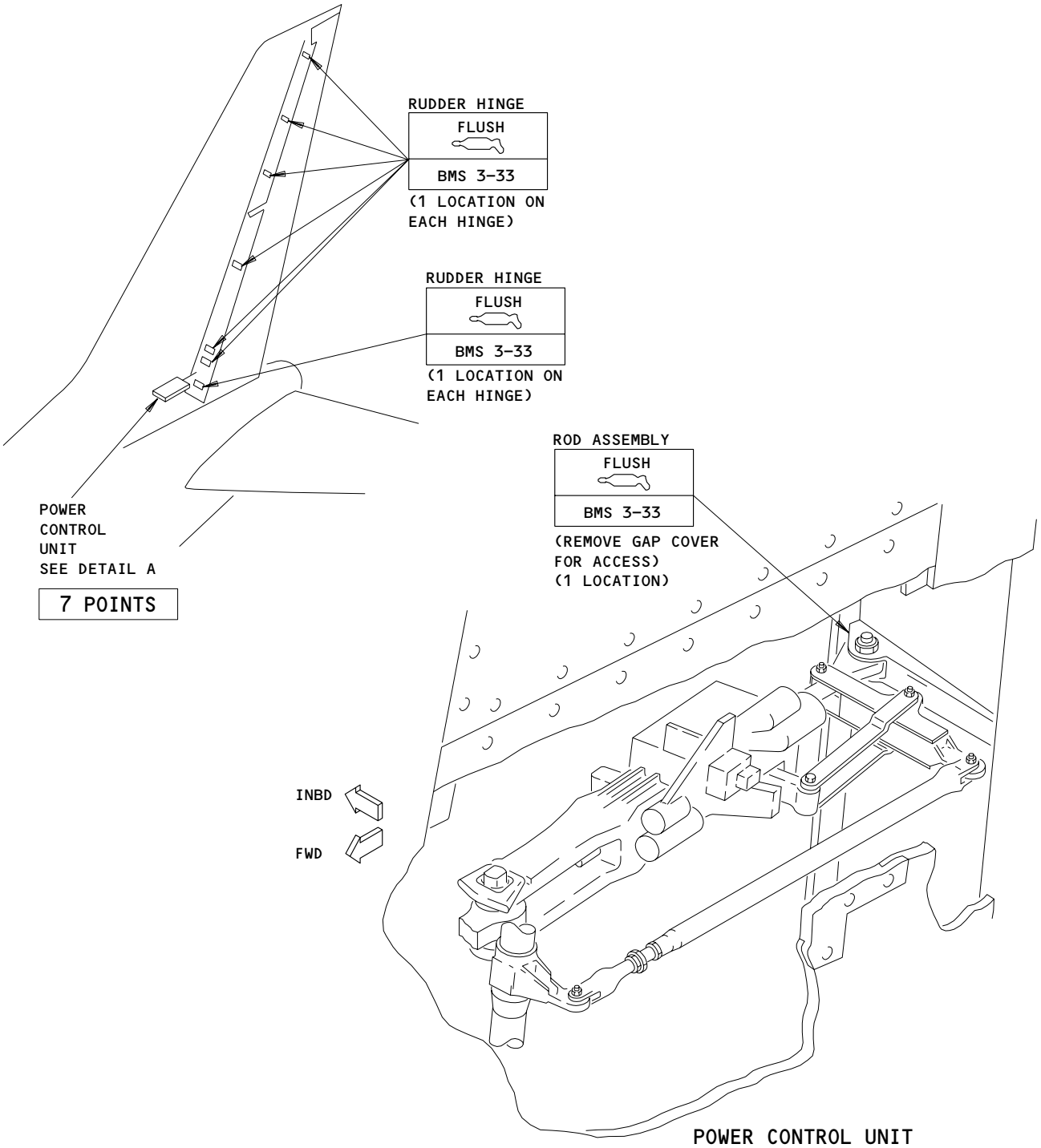


Aileron Lubrication
Figure 201 (Sheet 4)

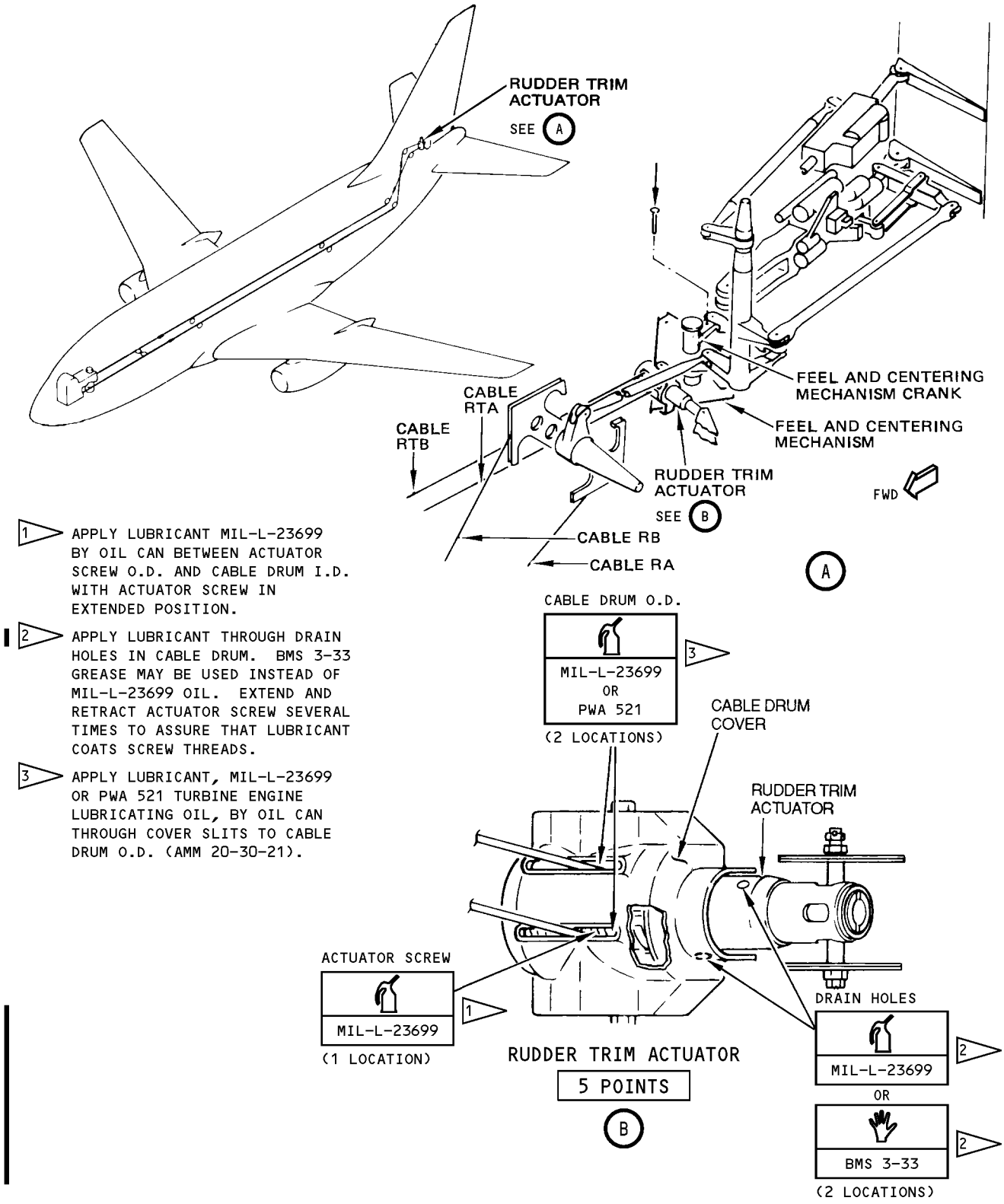
RUDDER CONTROL SYSTEM LUBRICATION

1. General
   A. This procedure provides instructions for lubricating the rudder control system.
2. Equipment and Materials
   A. Flush gun (grease gun)
   B. Grease - BMS 3-33, preferred (AMM 20-30-21/201)
   C. Grease - MIL-L-23699, alternate (AMM 20-30-21/201)
   D. Grease - BMS 3-24, alternate (AMM 20-30-21/201)
   E. See specific instructions for other grease types.

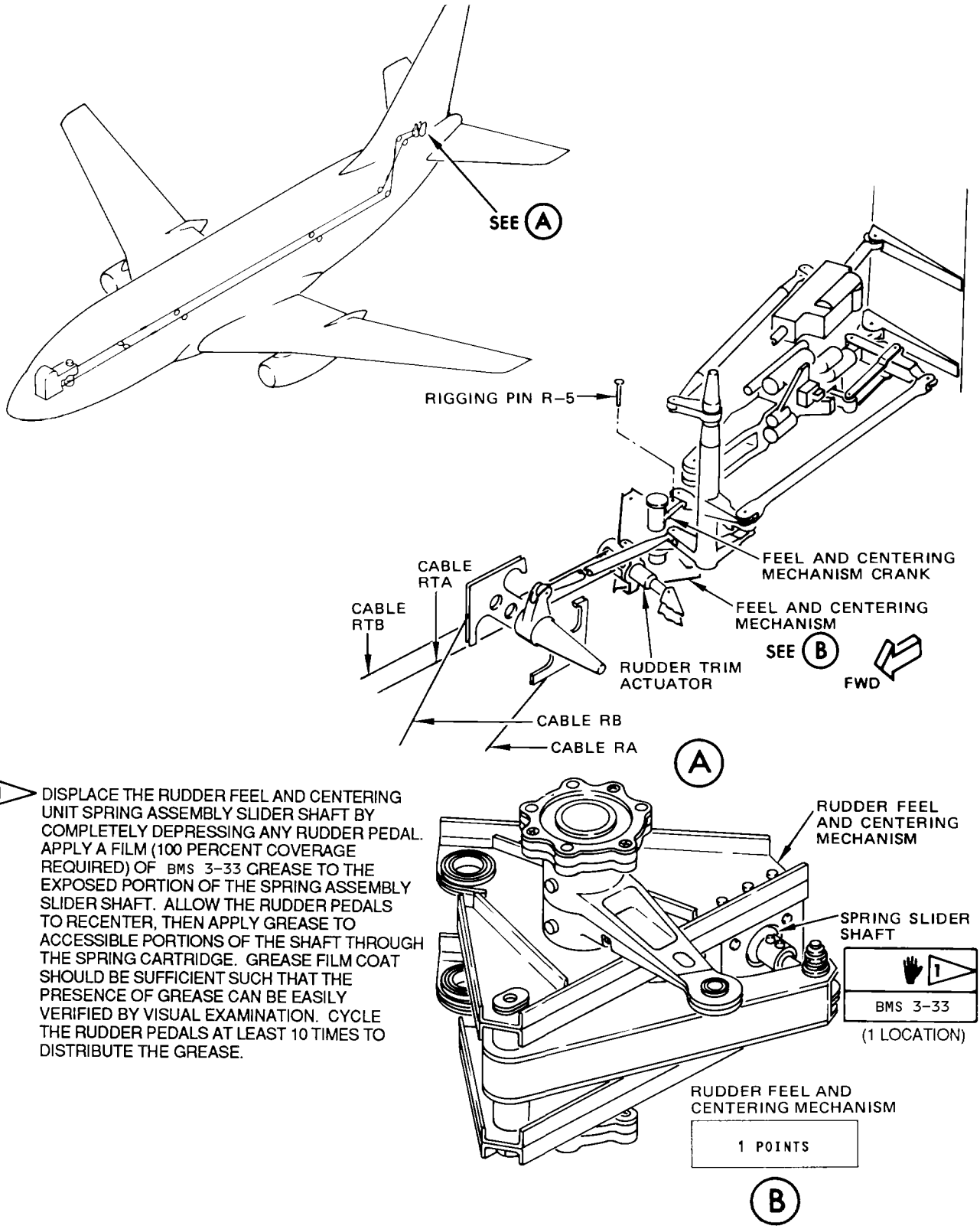
RUDDER CONTROL SYSTEM LUBRICATION



Rudder Lubrication
Figure 201

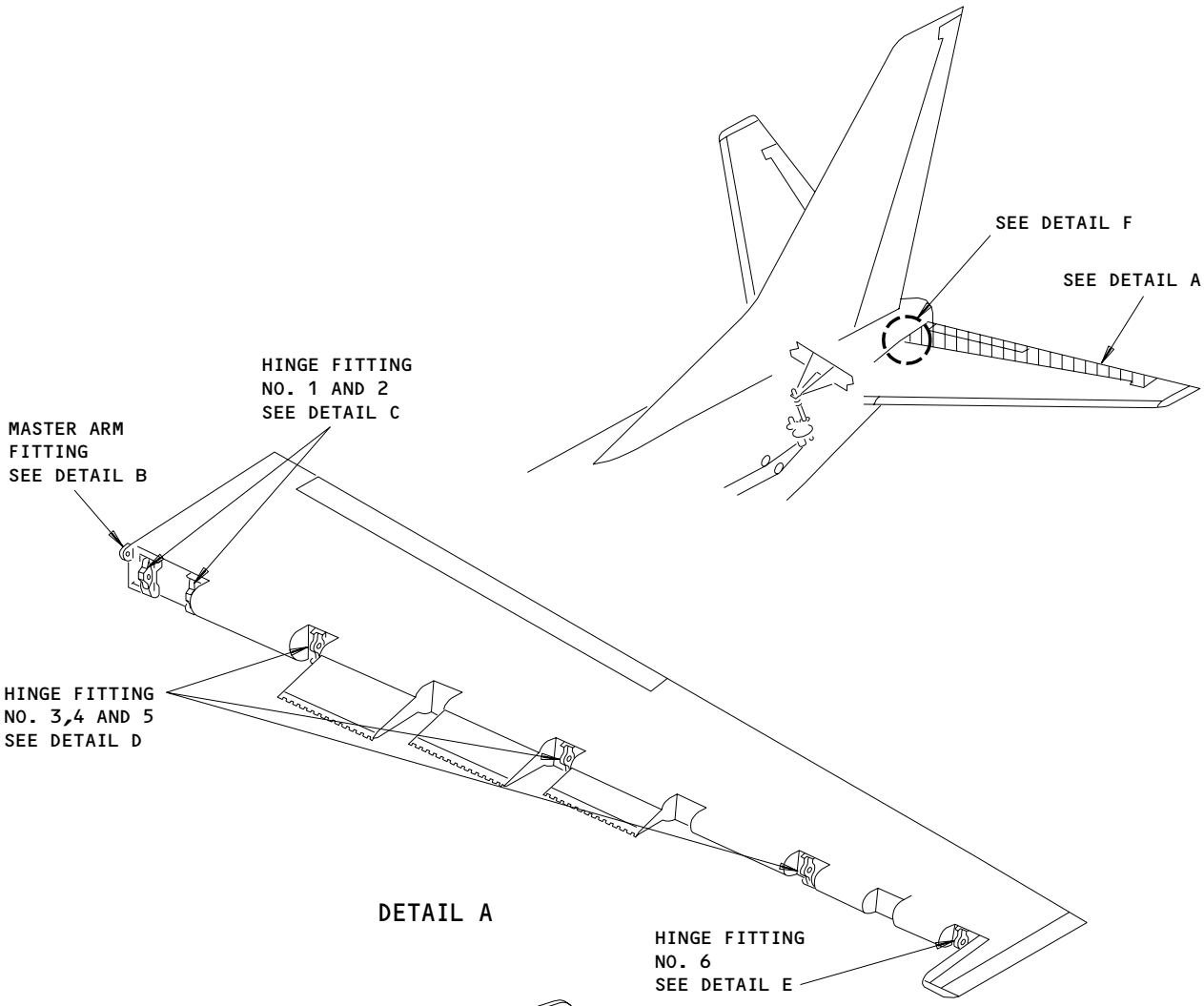


Rudder Trim Actuator Lubrication
Figure 202

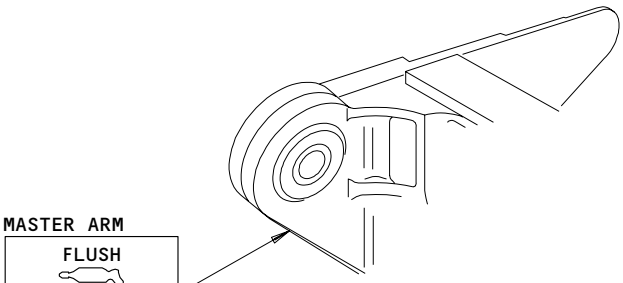


Rudder Feel and Centering Mechanism Lubrication
Figure 203

ELEVATOR CONTROL SYSTEM LUBRICATION



DETAIL A



(1 LOCATION PER HINGE, 1 HINGE) 3

MASTER ARM FITTING

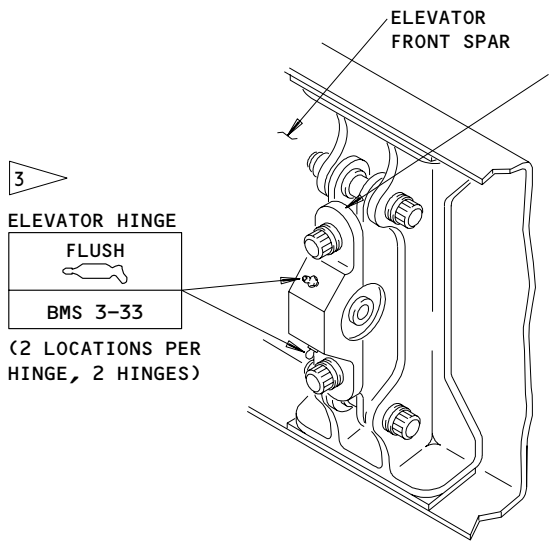
1 POINT

DETAIL B

NOTE: THE GRAPHITE ELEVATOR IS SHOWN. THE ALUMINUM ELEVATORS ARE THE SAME EXCEPT THAT THE GREASE FITTINGS ARE NOT ON ALL AIRPLANES AND THE GREASE FITTING CAN BE ON THE TOP OR BOTTOM OF THE ELEVATOR.

3 CAUTION: ONLY BEARINGS AND BUSHINGS PROVIDED WITH LUBRICATION FITTINGS SHOULD BE LUBRICATED, SINCE LUBRICATION OF BEARINGS AND BUSHINGS CONTAINING TEFLON WILL CAUSE DETERIORATION OF THE TEFLON AND REDUCE BEARING LIFE.

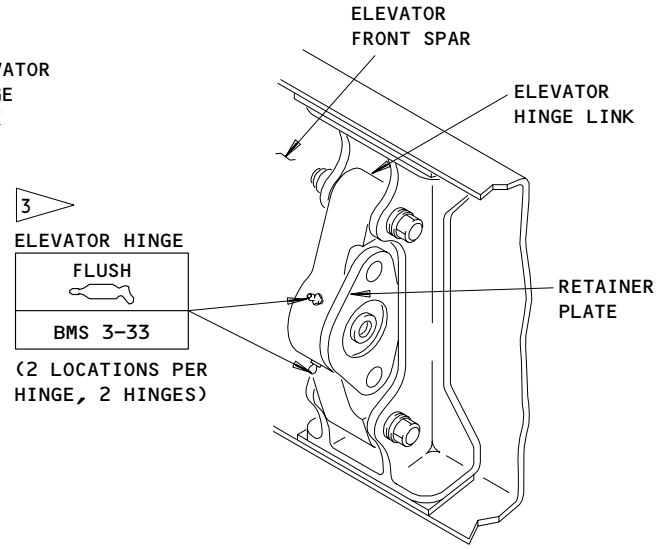
Elevator Control System Lubrication
Figure 201 (Sheet 1)



AIRPLANES WITH PILLOW BLOCK
NO. 1 AND 2 ELEVATOR HINGE FITTINGS

2 POINTS

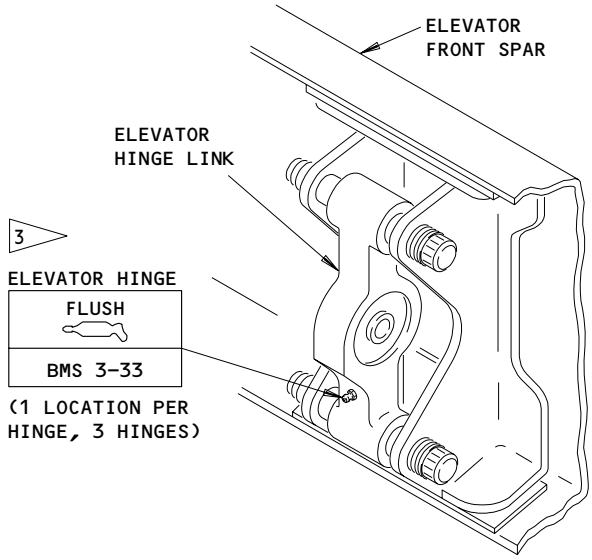
DETAIL C



AIRPLANES WITH RETAINER PLATE
NO. 1 AND 2 ELEVATOR HINGE FITTINGS

2 POINTS

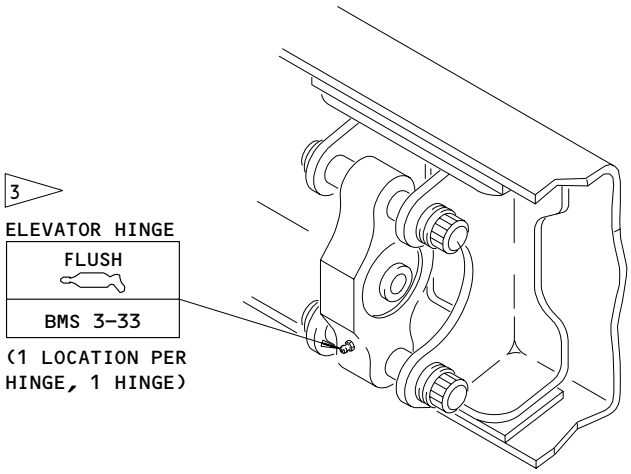
DETAIL C



NO. 3 THRU NO. 5 ELEVATOR HINGE FITTINGS

1 POINT

DETAIL D



NO. 6 ELEVATOR HINGE FITTING

1 POINT

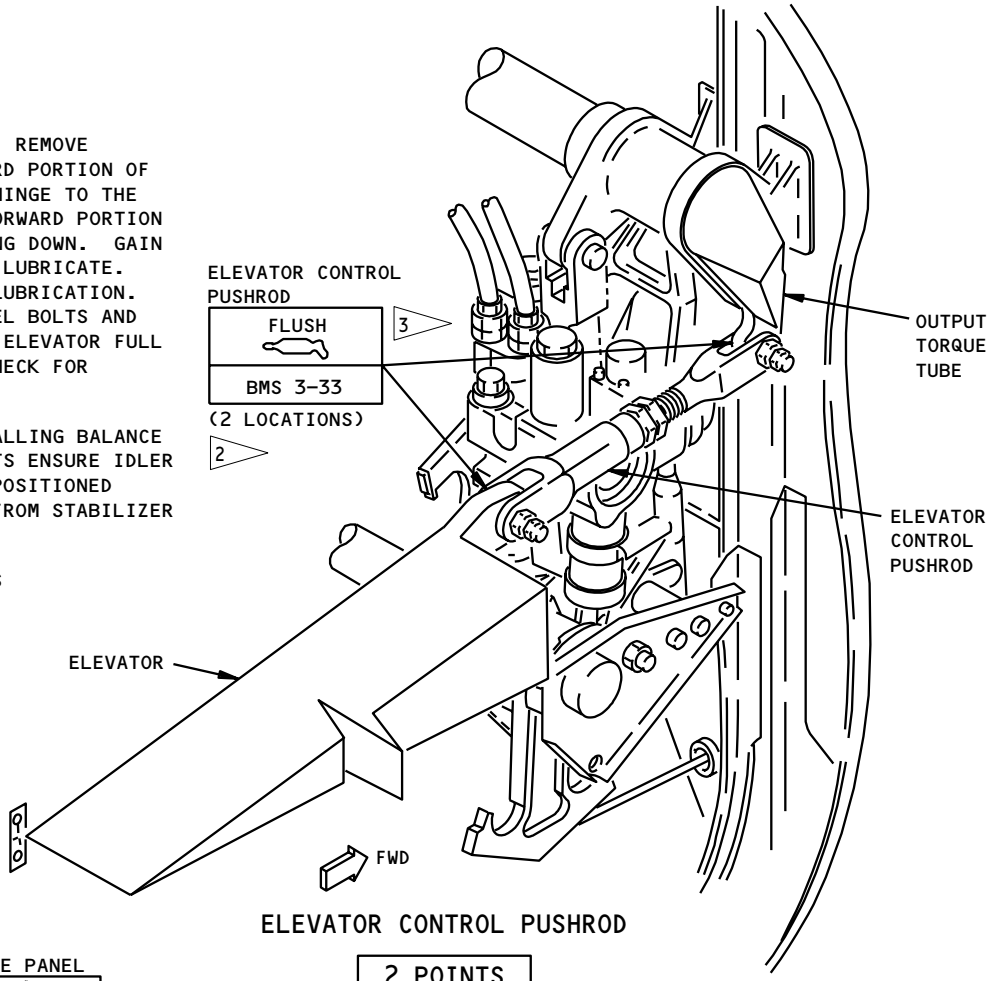
DETAIL E

Elevator Control System Lubrication
Figure 201 (Sheet 2)

1 REMOVE ACCESS PANEL. REMOVE BOLTS HOLDING FORWARD PORTION OF EACH BALANCE PANEL HINGE TO THE IDLER HINGE. LET FORWARD PORTION OF BALANCE PANEL HANG DOWN. GAIN ACCESS TO HINGE AND LUBRICATE. CYCLE HINGE DURING LUBRICATION. INSTALL BALANCE PANEL BOLTS AND ACCESS PANEL. CYCLE ELEVATOR FULL TRAVEL BY HAND TO CHECK FOR BINDING.

CAUTION: WHEN INSTALLING BALANCE PANEL BOLTS ENSURE IDLER HINGE IS POSITIONED DOWNWARD FROM STABILIZER REAR SPAR.

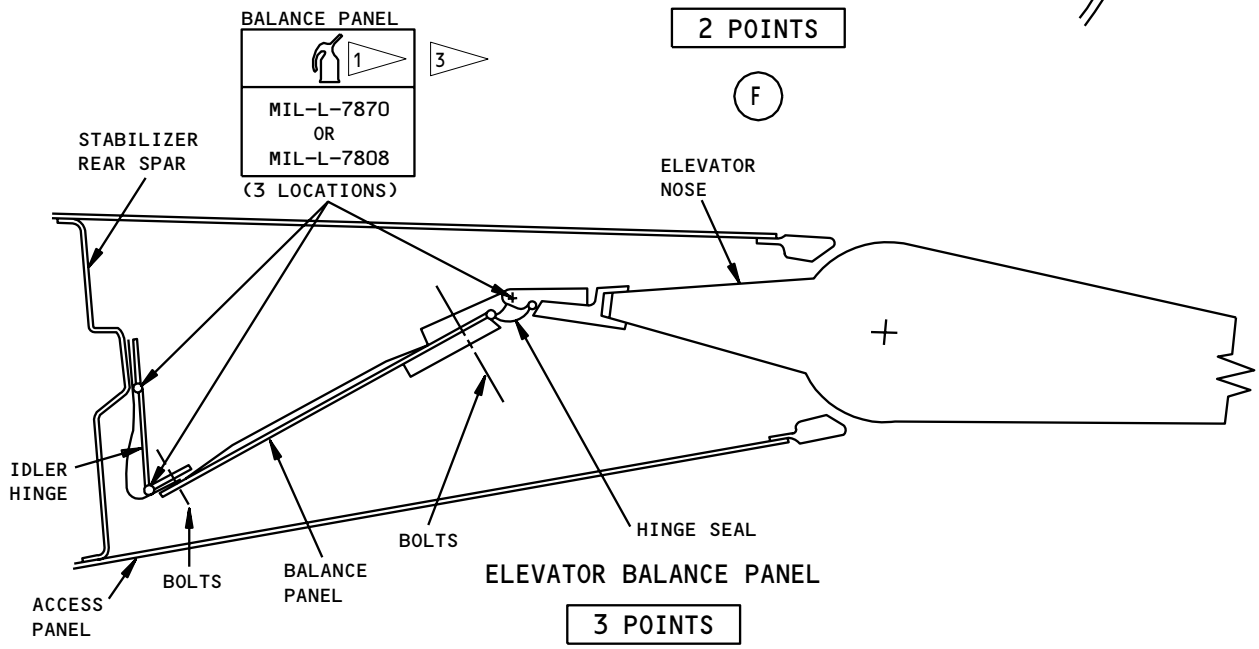
2 NOT ON ALL AIRPLANES



ELEVATOR CONTROL PUSHROD

2 POINTS

F



ELEVATOR BALANCE PANEL

3 POINTS

Elevator Control System Lubrication
Figure 201 (Sheet 3)

1. General
   A. There are three tasks in this procedure. There is one task each for the lubrication of the stabilizer trim jackscrew and the gimbal fittings, the stabilizer trim indicator flexible shaft and the stabilizer trim control system chain. The procedure has these parts:
      (1) The lubrication of the upper and lower gimbal.
      (2) The lubrication of the jackscrew between the ball nut and the stops.
      (3) The lubrication of the chain.
      (4) The lubrication of the jackshaft.
2. Stabilizer Trim Jackscrew, Upper and Lower Gimbal Lubrication
   A. Consumable Materials
      (1) Grease - BMS 3-33 (Preferred)
      (2) Grease - MIL-PRF-23827 (Supercedes MIL-G-23827) (Alternate)
   B. Access
      (1) Access Panels
          1103 Forward Access Door
   C. Procedure
      (1) Supply electrical power (AMM 24-22-0 /201).
      (2) Open the access door 3701.
      (3) Lubricate the upper and lower gimbals with grease (Fig. 201).
      (4) Lubricate the stabilizer trim jackscrew (Fig. 201):

          NOTE: If you replace a damaged Horizontal Stabilizer Trim Actuator with a serviceable Horizontal Stabilizer Trim Actuator that is not new or not overhauled, then you must do the Detailed Inspection for the replacement Horizontal Stabilizer Trim Actuator, and the Horizontal Stabilizer Gearbox Backlash Inspection as given in AMM 27-41-81/606.

          (a) Move the stabilizer to the APL NOSE DN position (stabilizer leading edge up).
              1) Make sure the stabilizer jackscrew touches the endstop.
          (b) Set the stabilizer trim cutout switches to CUTOUT.
          (c) Lubricate the bottom part of the stabilizer trim jackscrew between the ballnut and the endstop with grease.
          (d) Set the stabilizer trim cutout switches to NORMAL.
          (e) Move the stabilizer to the APL NOSE UP position (stabilizer leading edge down).
              1) Make sure the stabilizer jackscrew touches the endstop.
          (f) Set the stabilizer trim cutout switches to CUTOUT.
          (g) Lubricate the top part of the stabilizer trim jackscrew between the ballnut and the endstop with grease.
          (h) Set the stabilizer trim cutout switches to NORMAL.

(i) Put grease into the ballnut zerk fitting and do a visual check to make sure that one of the following two conditions is met:
1) That new grease continuously comes out of the vent hole at the upper portion of the ballnut while you operate the actuator for one complete cycle of the ballnut (endstop to endstop).
a) Examine the grease exiting the ballnut for signs of metallic debris, discolored water, rust, or other harmful particles. If you find any of these items in the grease, replace the stabilizer trim actuator (AMM 27-41-81/401).

NOTE: Clean unwanted grease from the vent hole, as necessary. Do not remove the grease from the ballscrew.

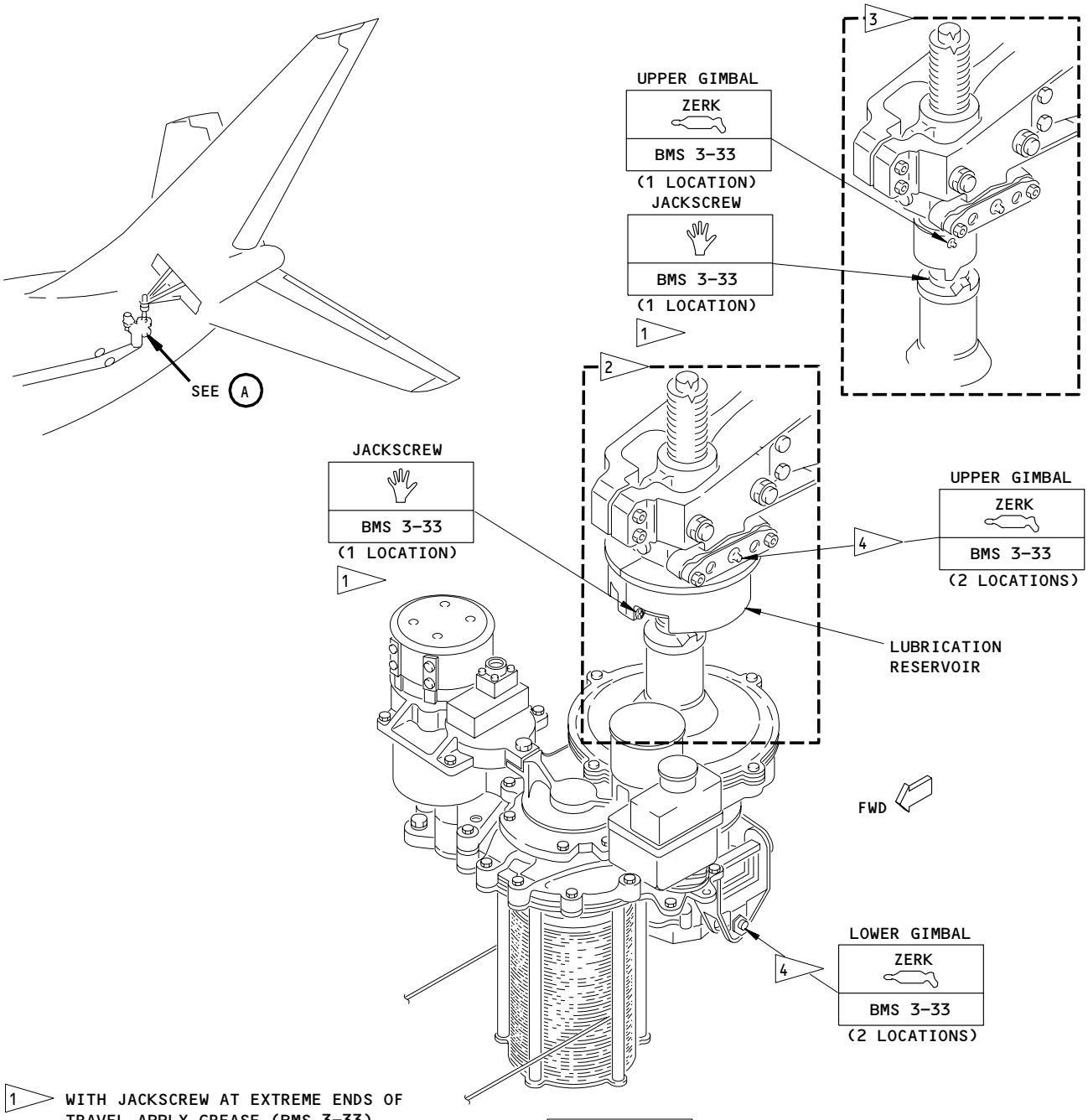
2) If any grease exits the ballnut from any location other than the upper or lower seal or through the grease vent, replace the stabilizer trim actuator (AMM 27-41-81/401).
3) If the majority of grease exits the ballnut from any location other than the upper seal at the end of the ballnut opposite of the zerk fitting, or through the grease vent, replace the stabilizer trim actuator (AMM 27-41-81/401).

NOTE: Large quantity of grease exiting from the upper and lower seal may be due to a faulty seal which may leak water and cause corrosion inside the ballnut.

4) Inspect the area under, on, and around the Ballscrew actuator to see if grease is escaping from Ball Nut. Large amounts of grease present around the Stabilizer Trim Actuator indicate that a faulty seal or raised return tube may be present on the Ball Nut. If a large amount of grease is present due to a faulty seal or raised/leaking return tube, Replace the Horizontal Stabilizer Trim Actuator (AMM 27-41-81/401).

(j) Close the access door 3701.
(k) If the electrical power is not necessary, remove the electrical power (AMM 24-22-0/201).

3. Stabilizer trim Control System Chain Lubrication
A. Consumable Materials
(1) D00014 Grease - MIL-G-21164
B. Access
(1) Access Panels
1103 Forward Access Door
C. Procedure
(1) Open these circuit breakers and attach DO-NOT-CLOSE tags:
(a) P6-2 Circuit Breaker Panel
1) STABILIZER TRIM ACTUATOR



1 WITH JACKSCREW AT EXTREME ENDS OF TRAVEL APPLY GREASE (BMS 3-33) TO UNUSED PORTION OF JACKSCREW BETWEEN BALLNUT AND STOP

2 AIRPLANES WITH LUBRICATION RESERVOIR

3 AIRPLANES WITHOUT LUBRICATION RESERVOIR

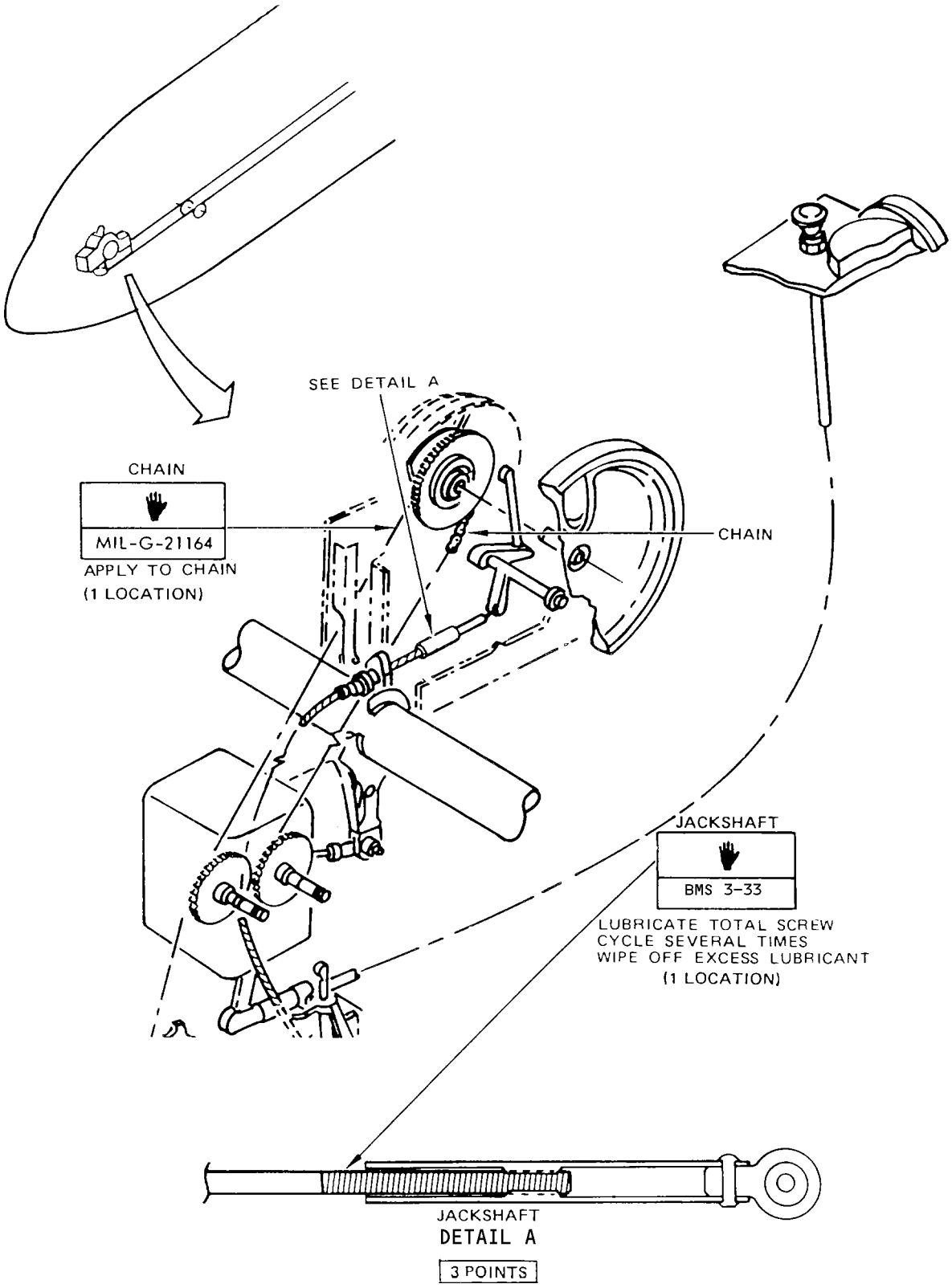
4 ONE MORE LUBE POINT IS ON THE OPPOSITE SIDE (NOT SHOWN)

Stabilizer Trim Jackscrew Lubrication
Figure 201

(b) P6-2 Circuit Breaker Panel
1) AUTOPILOT STABILIZER TRIM SERVO
(2) Open the access door 1103.
(3) Lubricate the chain (Fig. 202).
(4) Close the access door 1103.
(5) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) P6-2 Circuit Breaker Panel
1) STABILIZER TRIM ACTUATOR
(b) P6-2 Circuit Breaker Panel
1) AUTOPILOT STABILIZER TRIM SERVO

4. Stabilizer Trim Indicator Jackshaft Lubrication

A. Consumable Materials
(1) D00014 Grease - MIL-G-21164
B. Access
(1) Location Zone
101 Control Cabin, LH 102 Control Cabin, RH
(2) Access Panels
1103 Forward Access Door
C. Procedure
(1) Supply electrical power (AMM 24-22-0 /201).
(2) Move the stabilizer to the APL NOSE UP position.
(3) Open these circuit breakers and attach DO-NOT-CLOSE tags:
(a) P6-2 Circuit Breaker Panel
1) STABILIZER TRIM ACTUATOR
(b) P6-2 Circuit Breaker Panel
1) AUTOPOLOT STABILIZER TRIM SERVO
(4) Open the access door 1103.
(5) Lubricate the jackshaft (Fig. 202):
(a) Lubricate the screw.
(b) Move the screw in and out three times.
(c) Remove the unwanted lubricant.
(6) Close the access door 1103.
(7) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
(a) P6-2 Circuit Breaker Panel
1) STABILIZER TRIM ACTUATOR
(b) P6-2 Circuit Breaker Panel
1) AUTOPILOT STABILIZER TRIM SERVO
(8) If the electrical power is not necessary, remove the electrical power (AMM 24-22-0/201).



Control Stand Stabilizer Trim Jack Assembly
Figure 202

TRAILING EDGE FLAP SYSTEM LUBRICATION - MAINTENANCE PRACTICES

1. Equipment and Materials
   A. Lubrication Tool Set (Inboard Flap Carriages) - F80167-13
   B. Grease Nozzle - Alemite Number 6783
   C. Lubrication Tool - C12004

*[1] REMOVE INBOARD FLAP TRACK FAIRING PER MM 27-51-141, REMOVAL/INSTALLATION. LUBRICATE ROLLER ASSEMBLY THROUGH FITTING IN BOLT END.

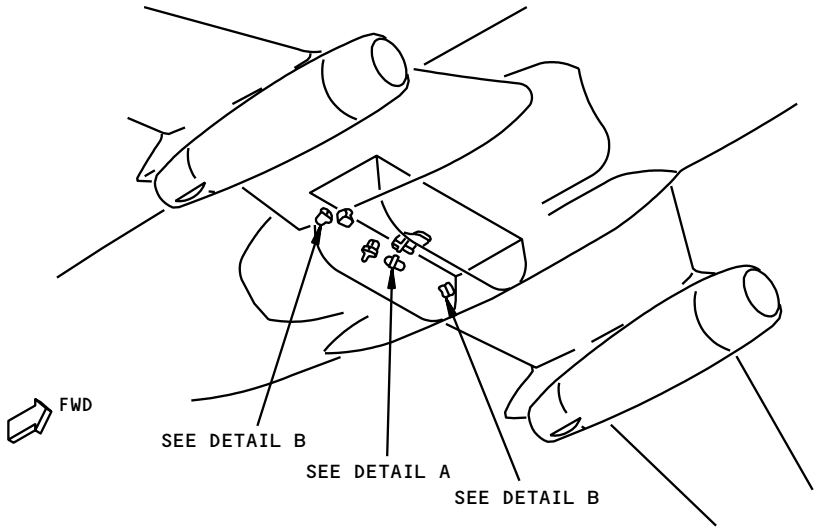
CAUTION: ON SEALED BEARINGS, DO NOT APPLY GREASE WITH A PRESSURE GREATER THAN 1000 PSI AND AT A RATE GVREATER THAN 0.25 LITER PER MINUTE. WHEN USING A HAND-OPERATED GREASE GUN, DO NOT USE EXTENSION HANDLE TO GAIN MORE FORCE. SEALED BEARINGS MAY BE DAMAGED BY EXCESSIVE PRESSURE.

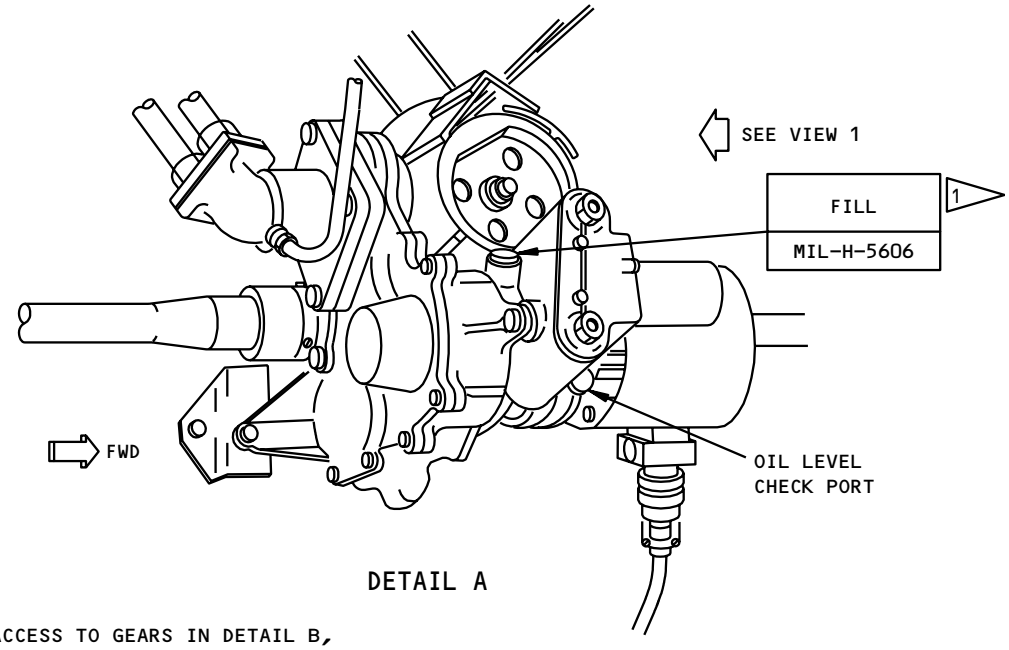
NOTE: EXTEND AND RETRACT FLAPS UNTIL BEARINGS TURN FREELY AND RELUBRICATE.

ON SEALED BEARING LUBRICATE BEARING UNTIL TINY AMOUNT OF GREASE CAN BE SEEN FORMING AROUND PERIPHERY OF END PLATE. GREASE WILL NOT FLOW OUT OF THIS BEARING IN LARGE AMOUNTS, SUCH AS OBSERVED ON UNSEALED BEARING. BEARING MAY BE DIFFICULT TO MOVE BY HAND BECAUSE OF INTERNAL PRESSURE, WHICH WILL DISSIPATE IN APPROXIMATELY 30 MINUTES. TO BLEED OFF PRESSURE IMMEDIATELY INSERT A SHORT INSTRUMENT INTO LUBE FITTING TO UNSEAT SPRING-LOADED BALL CHECK.

CAUTION: DO NOT LOOSEN OR REMOVE CASTELLATED NUT IMMEDIATELY AFTER LUBRICATION. TO DO SO WILL DISPLACE SEAL PLATES IN AN OUTWARD DIRECTION.

ON UNSEALED BEARINGS, LUBRICATE BEARING UNTIL LUBRICANT FLOWS EXACTLY AROUND PERIPHERY OF END PLATE.



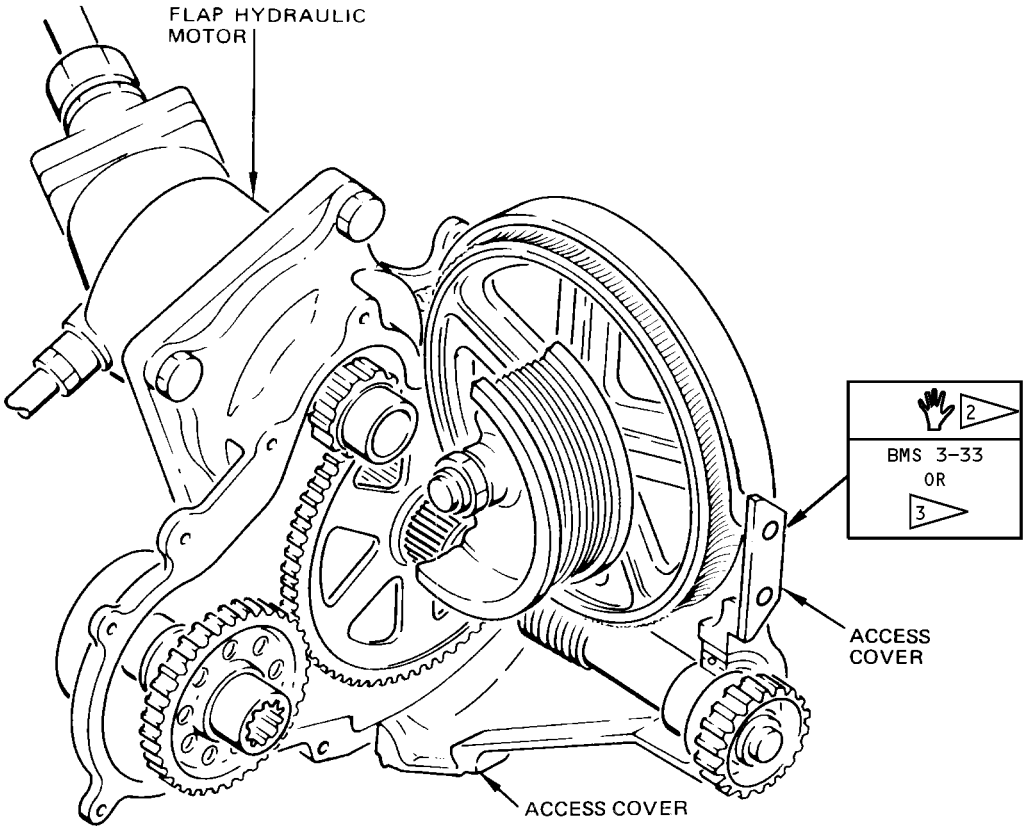


DETAIL A

NOTE: TO GAIN ACCESS TO GEARS IN DETAIL B, REMOVE FLAP TRACK FAIRINGS 3501 AND 3601. SEE 12-31-31

1 REMOVE FILL AND OIL LEVEL CHECK PORTS, SERVICE THROUGH FILL PORT UNTIL FLUID DRAINS FROM LOWER LEVEL CHECK PORT.

Trailing Edge Flap Drive System Lubrication
Figure 201 (Sheet 1)

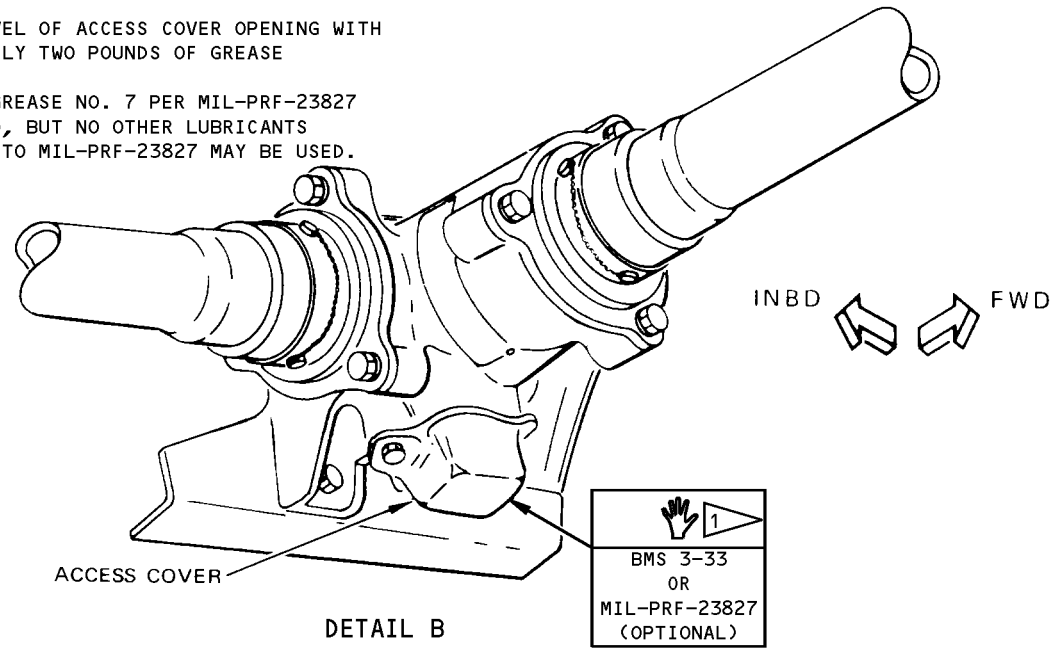


VIEW 1

1. REMOVE ACCESS COVER AND BUTTER LUBRICATE BEVEL GEARS. ROTATE SHAFT TO SPREAD GREASE EVENLY OVER GEAR TEETH

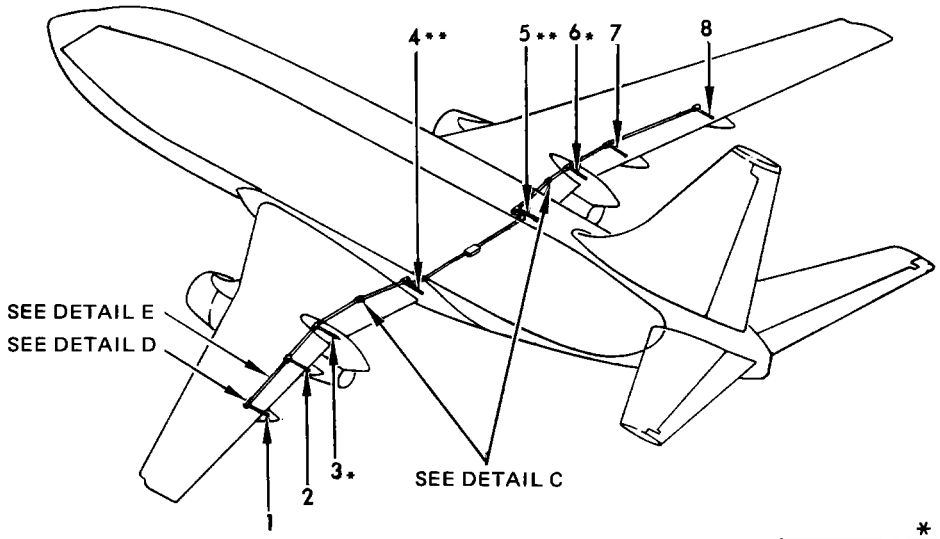
2. FILL TO LEVEL OF ACCESS COVER OPENING WITH APPROXIMATELY TWO POUNDS OF GREASE

3. AEROSHELL GREASE NO. 7 PER MIL-PRF-23827 MAY BE USED, BUT NO OTHER LUBRICANTS CONFORMING TO MIL-PRF-23827 MAY BE USED.



DETAIL B

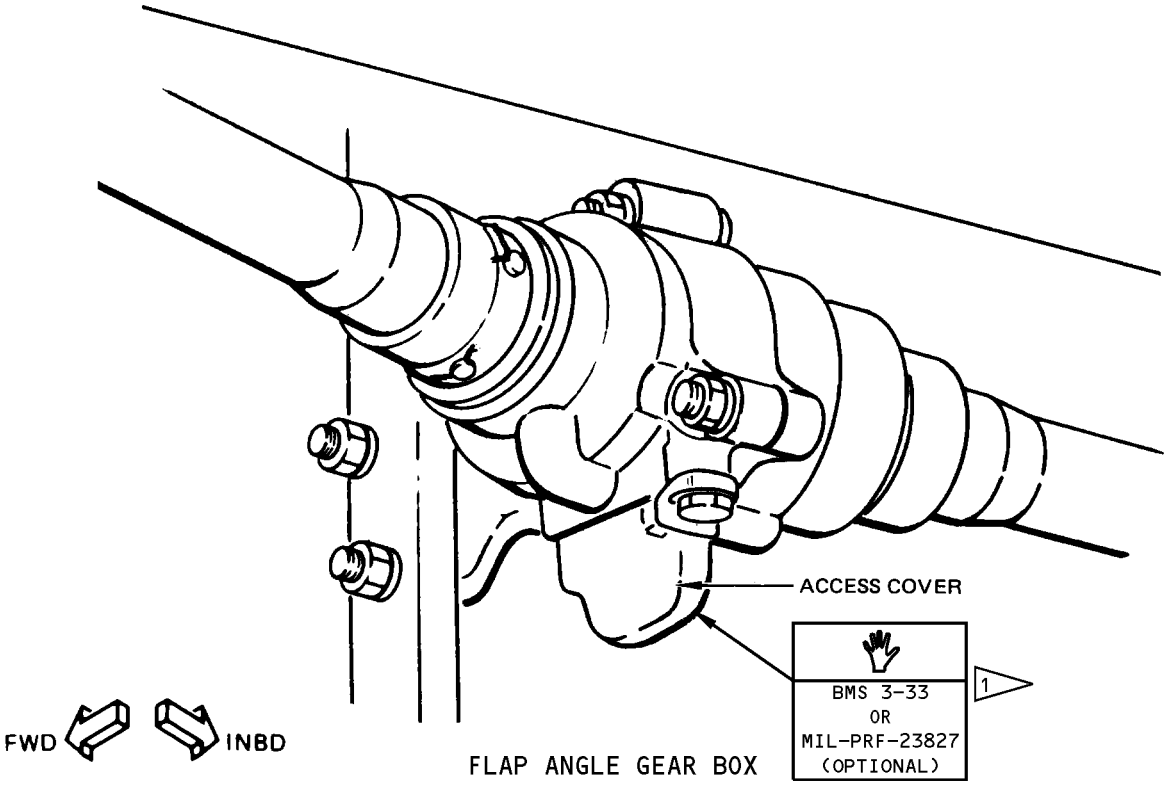
Trailing Edge Flap Drive System Lubrication
Figure 201 (Sheet 2)



NOTE: ALL LUBRICATION POINTS ARE ACCESSIBLE WHEN FLAPS ARE DOWN, UNLESS OTHERWISE NOTED.

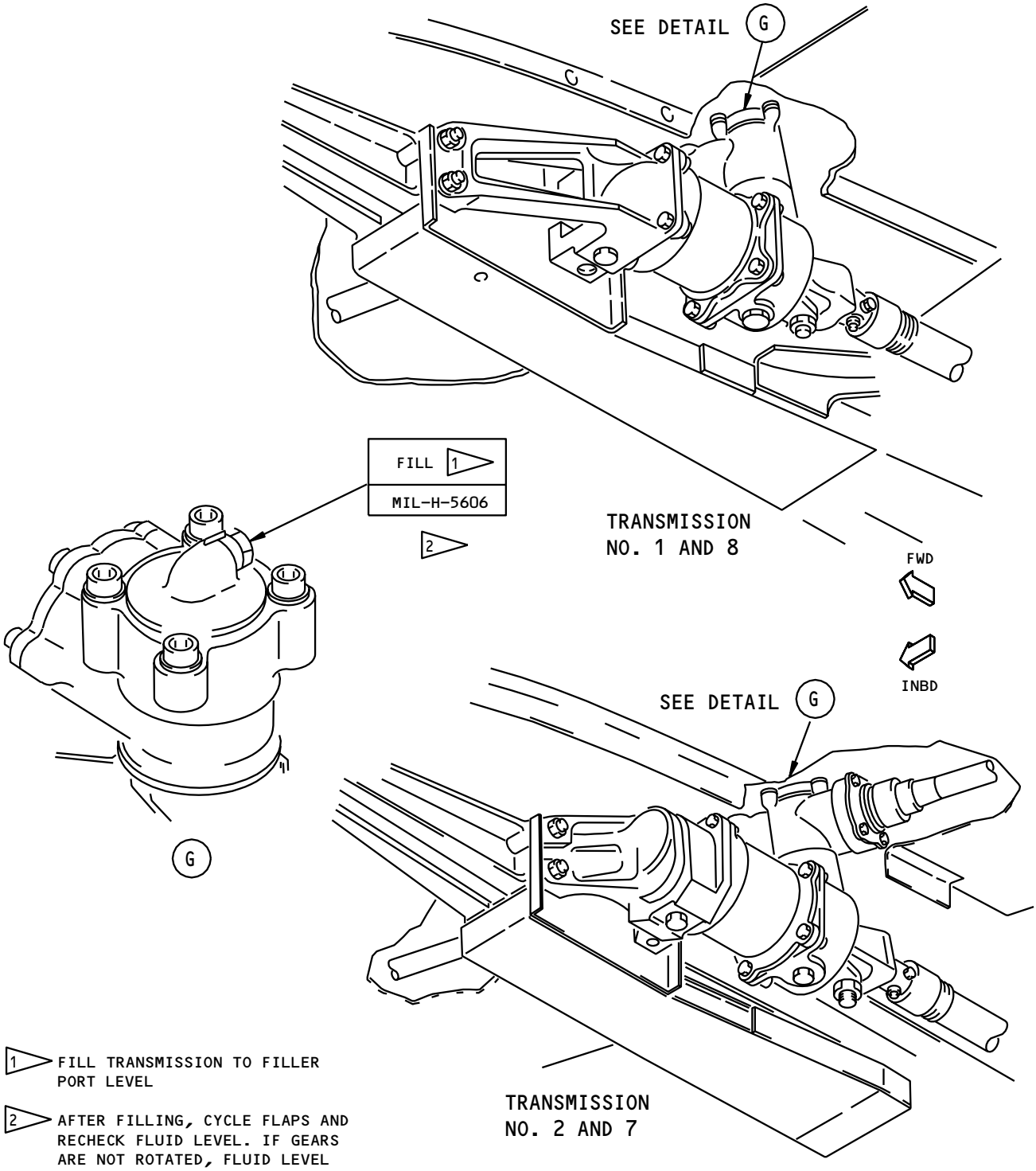
** NOTE: FOR LUBRICATION POINTS 4 AND 5, REMOVE SERVICE PANEL 65–48692 ON SHROUD INSIDE WHEEL WELL.

LUBE POINT	ACCESS PANEL *
6	5139
3	5239

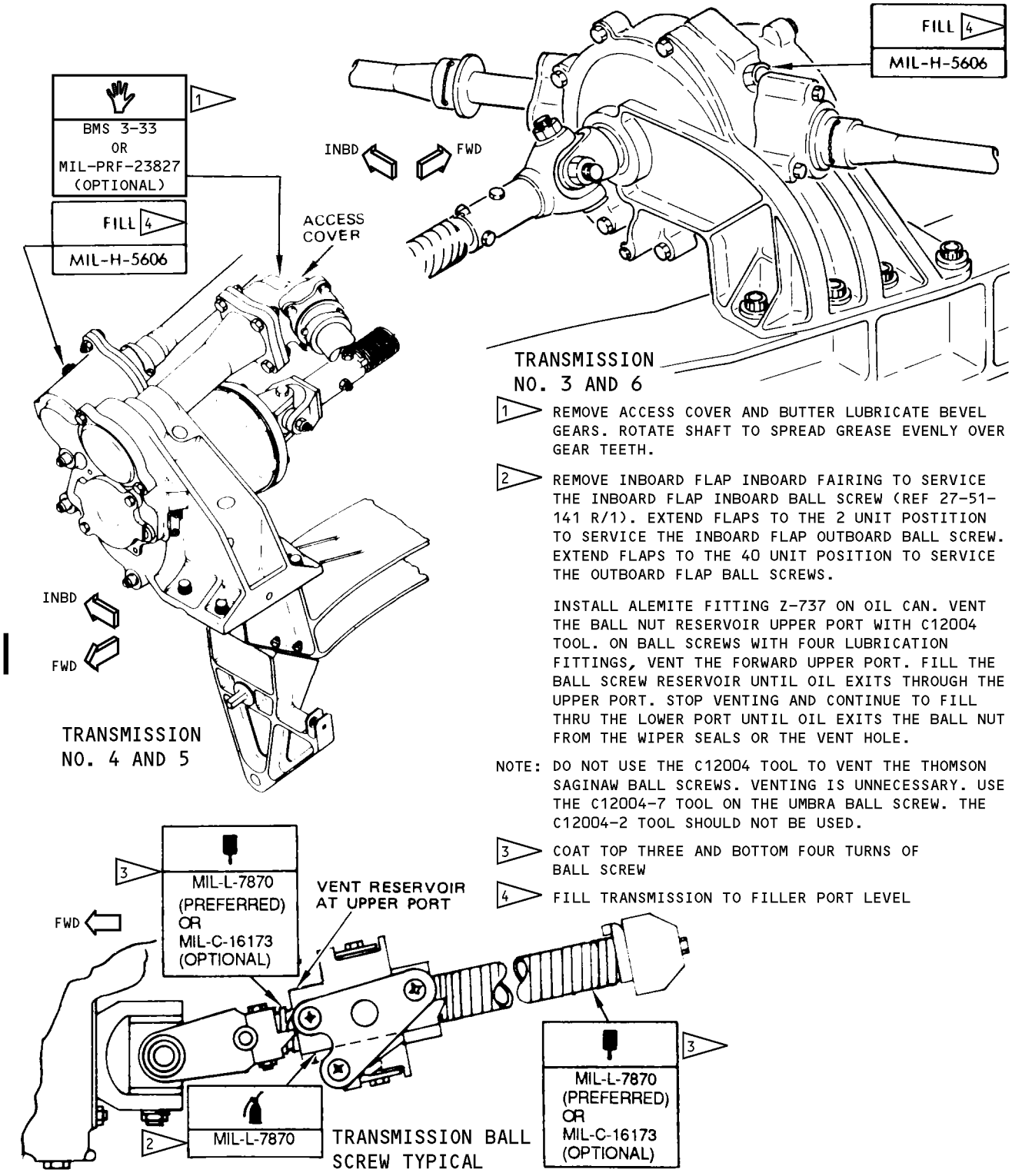


FLAP ANGLE GEAR BOX
DETAIL C

Trailing Edge Flap Drive System Lubrication
Figure 201 (Sheet 3)



Trailing Edge Flap Drive System Lubrication
Figure 201 (Sheet 4)



1 REMOVE ACCESS COVER AND BUTTER LUBRICATE BEVEL GEARS. ROTATE SHAFT TO SPREAD GREASE EVENLY OVER GEAR TEETH.

2 REMOVE INBOARD FLAP INBOARD FAIRING TO SERVICE THE INBOARD FLAP INBOARD BALL SCREW (REF 27-51-141 R/1). EXTEND FLAPS TO THE 2 UNIT POSTITION TO SERVICE THE INBOARD FLAP OUTBOARD BALL SCREW. EXTEND FLAPS TO THE 40 UNIT POSITION TO SERVICE THE OUTBOARD FLAP BALL SCREWS.

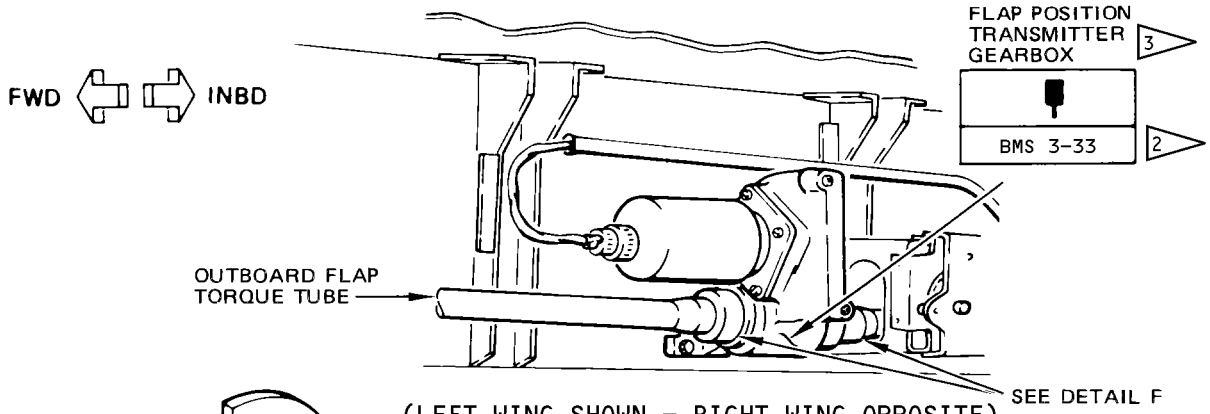
INSTALL ALEMITE FITTING Z-737 ON OIL CAN. VENT THE BALL NUT RESERVOIR UPPER PORT WITH C12004 TOOL. ON BALL SCREWS WITH FOUR LUBRICATION FITTINGS, VENT THE FORWARD UPPER PORT. FILL THE BALL SCREW RESERVOIR UNTIL OIL EXITS THROUGH THE UPPER PORT. STOP VENTING AND CONTINUE TO FILL THRU THE LOWER PORT UNTIL OIL EXITS THE BALL NUT FROM THE WIPER SEALS OR THE VENT HOLE.

NOTE: DO NOT USE THE C12004 TOOL TO VENT THE THOMSON SAGINAW BALL SCREWS. VENTING IS UNNECESSARY. USE THE C12004-7 TOOL ON THE UMBRA BALL SCREW. THE C12004-2 TOOL SHOULD NOT BE USED.

3 COAT TOP THREE AND BOTTOM FOUR TURNS OF BALL SCREW

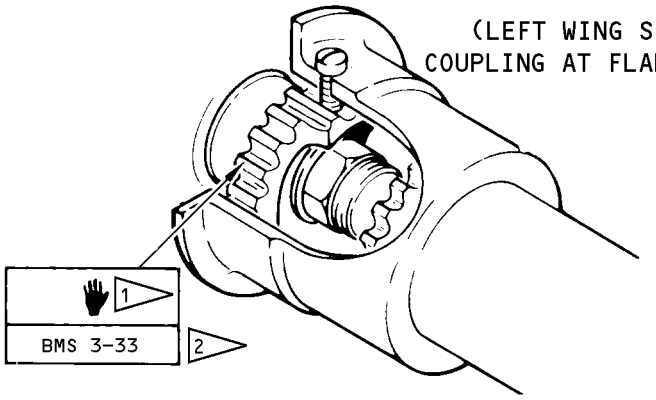
4 FILL TRANSMISSION TO FILLER PORT LEVEL

Trailing Edge Flap Drive System Lubrication
Figure 201 (Sheet 5)

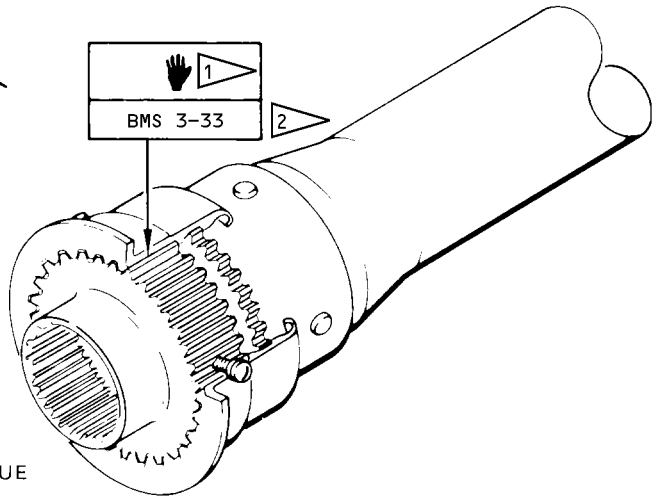


(LEFT WING SHOWN - RIGHT WING OPPOSITE)
COUPLING AT FLAP POSITION TRANSMITTER GEARBOX

DETAIL E



DETAIL F



COUPLING AT TRANSMISSIONS AND GEARBOXES

DETAIL D

1> ON AIRPLANES WITH LUBRICATION HOLES IN TORQUE TUBE COUPLING, MOVE TORQUE TUBE AXIALLY FULL TRAVEL TOWARD END BEING LUBRICATED. FILL COUPLING CAVITY WITH GREASE USING ALL THREE LUBRICATION HOLES.

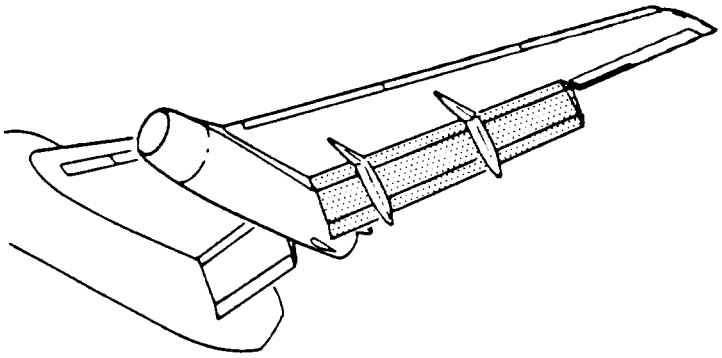
ON AIRPLANES WITHOUT LUBRICATION HOLES IN TORQUE TUBE COUPLING, DISCONNECT COUPLING AND APPLY LIGHT FILM OF GREASE TO FULL LENGTH OF INTERNAL SPLINES AND RECONNECT TORQUE TUBE COUPLING.

CAUTION: ON AIRPLANES WITHOUT LUBRICATION HOLES IN TORQUE TUBE COUPLING, COUPLING MUST BE DISCONNECTED TO LUBRICATE SPLINES. ENSURE THAT FLAP SYSTEM DRIVE SHAFTS AND TRANSMISSIONS ARE NOT MOVED WHILE COUPLINGS ARE DISCONNECTED SINCE FLAP SYSTEM RIGGING WILL BE DISTURBED. RERIG FLAP SYSTEM IF MOVEMENT OCCURS WHILE COUPLINGS ARE DISCONNECTED (REF 27-51-01, AT).

3> REMOVE THE COVER ON THE AFT SIDE OF THE TRANSMITTER GEARBOX TO GET ACCESS TO THE GEARS. APPLY A FULL COAT OF GREASE TO THE GEARS. DO NOT COMPLETELY FILL THE GEARBOX WITH GREASE.

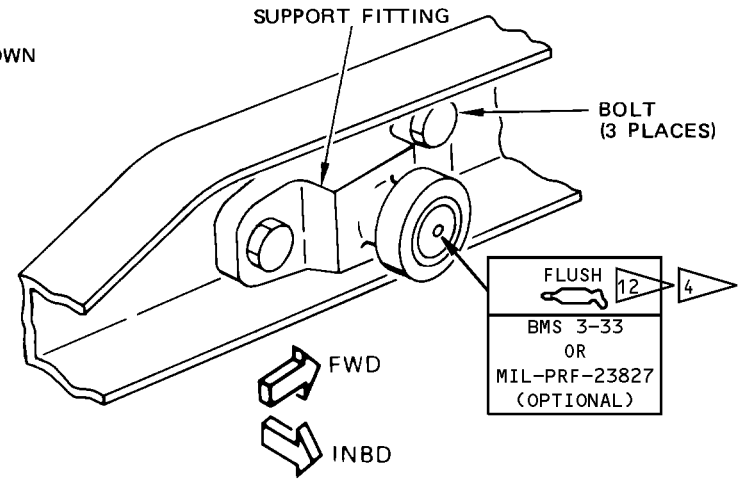
2> MIL-PRF-23827 OPTIONAL TO BMS 3-33

Trailing Edge Flap Drive System Lubrication
Figure 201 (Sheet 6)

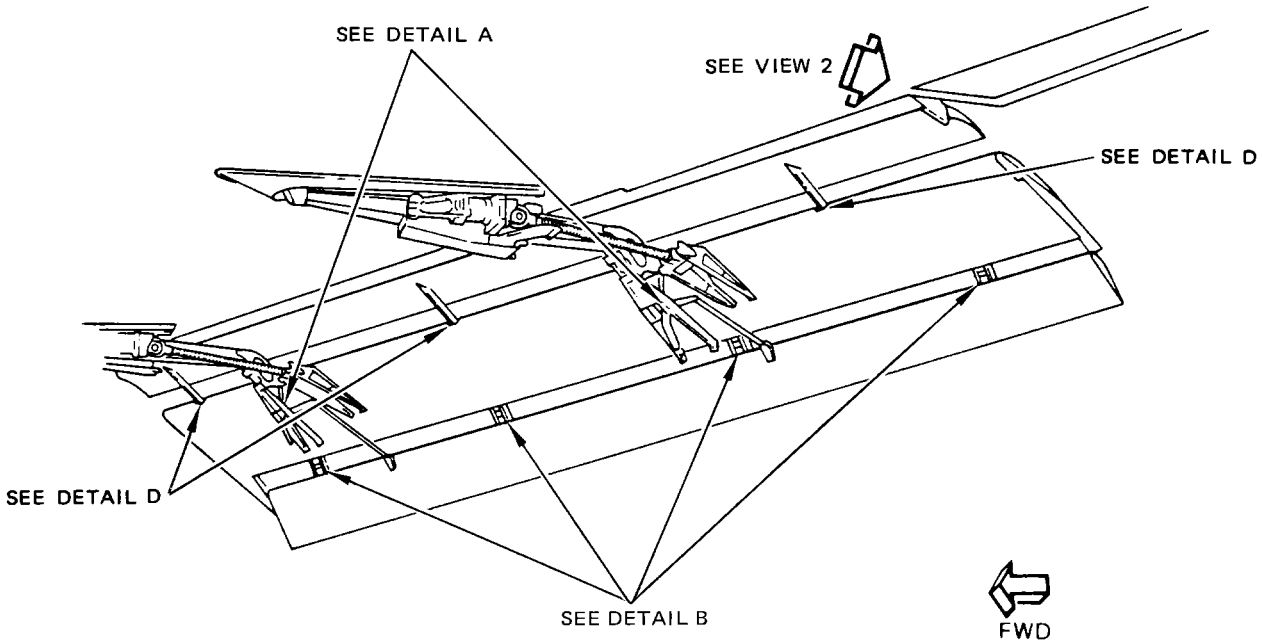


NOTE: ALL LUBRICATION POINTS SHOWN HERE ARE ACCESSIBLE WHEN THE FLAPS ARE DOWN.

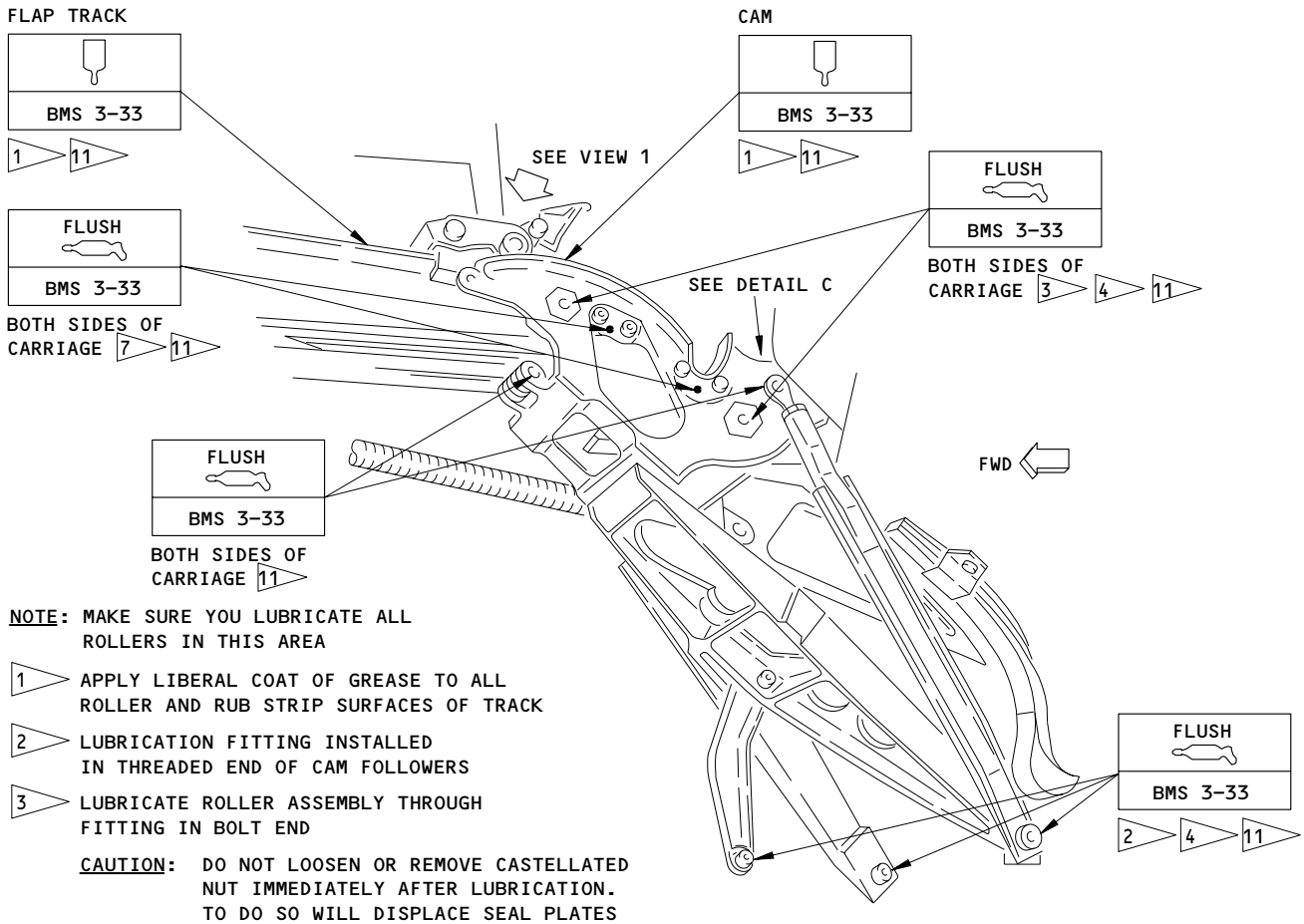
12 ON AIRPLANES WITHOUT LUBRICATION FITTING IN ROLLER END, REMOVE THREE BOLTS AND SUPPORT FITTING AND LUBRICATE ROLLER FROM NUT END.



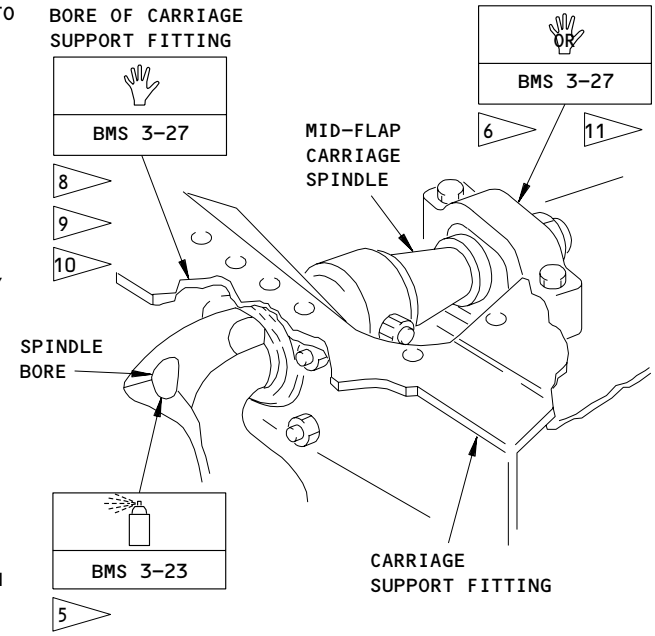
VIEW 2



Outboard Trailing Edge Flap Lubrication
Figure 202 (Sheet 1)



DETAIL A



NOTE: MAKE SURE YOU LUBRICATE ALL ROLLERS IN THIS AREA

1 APPLY LIBERAL COAT OF GREASE TO ALL ROLLER AND RUB STRIP SURFACES OF TRACK

2 LUBRICATION FITTING INSTALLED IN THREADED END OF CAM FOLLOWERS

3 LUBRICATE ROLLER ASSEMBLY THROUGH FITTING IN BOLT END

CAUTION: DO NOT LOOSEN OR REMOVE CASTELLATED NUT IMMEDIATELY AFTER LUBRICATION. TO DO SO WILL DISPLACE SEAL PLATES IN AN OUTWARD DIRECTION

4 CAUTION: LUBRICATE SEALED BEARINGS CAREFULLY TO PREVENT DAMAGE TO THE BEARING FROM EXCESSIVE PRESSURE (REF 12-20-00 MP)

NOTE: ROTATE ROLLER SLOWLY DURING LUBRICATION

ON SEALED BEARING LUBRICATE BEARING UNTIL TINY AMOUNT OF GREASE CAN BE SEEN FORMING AROUND PERIPHERY OF END PLATE. GREASE WILL NOT FLOW OUT OF THE BEARING IN LARGE AMOUNTS, SUCH AS OBSERVED ON UNSEALED BEARING. BEARING MAY BE DIFFICULT TO MOVE BY HAND BECAUSE OF INTERNAL PRESSURE, WHICH WILL DISSIPATE IN APPROXIMATELY 30 MINUTES. TO BLEED OFF PRESSURE IMMEDIATELY INSERT A SHORT INSTRUMENT INTO LUBE FITTING TO UNSEAT A SPRING-LOADED BALL CHECK

ON UNSEALED BEARINGS, LUBRICATE BEARING UNTIL LUBRICANT FLOWS FREELY AROUND PERIPHERY OF END PLATE

5 SPRAY INTO BORE OF SPINDLE. APPLY PER 51-21-91

6 APPLY GREASE LIBERALLY AROUND SLOTTED HOLE AND ON BEARING OR ROLLER PERIPHERY

7 LUBE FITTING MAY BE LOCATED ON UPPER SIDE OR ON LOWER SIDE OF ROLLER ASSEMBLY

Outboard Trailing Edge Flap Lubrication
Figure 202 (Sheet 2)

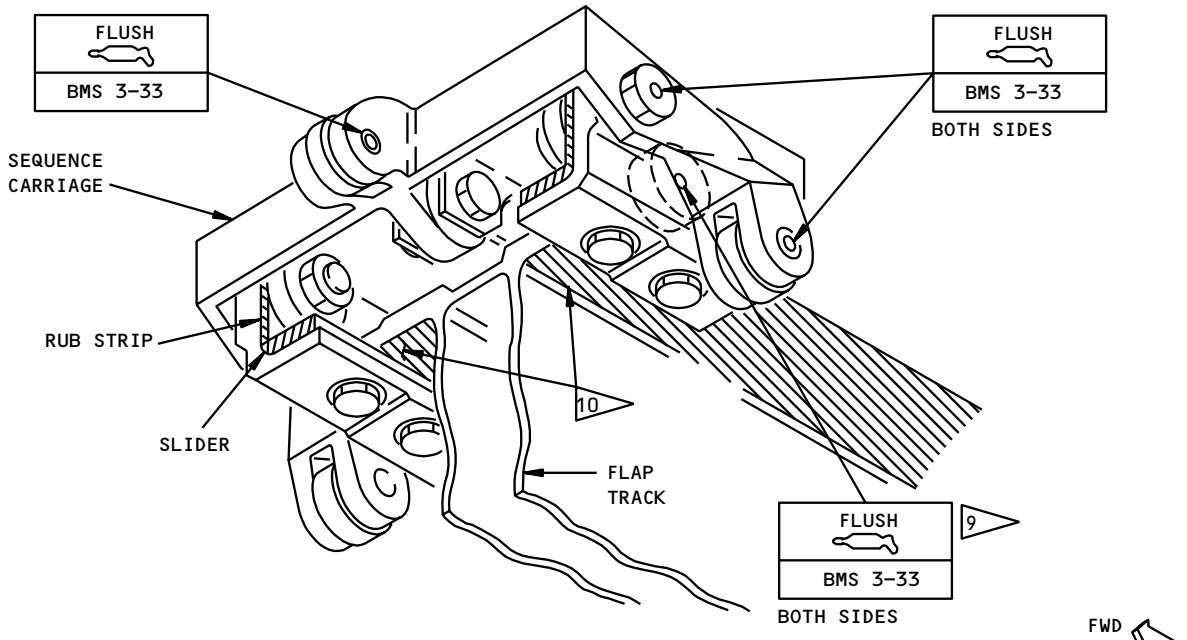
8 APPLY BMS 3-27 (MASTINOX 6856K) CORROSION PREVENTIVE COMPOUND BETWEEN THE CARRIAGE SUPPORT FITTING AND THE OUTER RACE OF THE SPHERICAL BEARING WHEN YOU INSTALL THE SPHERICAL BEARING. APPLY MASTINOX AT WBL 254 AND WBL 355 ON THE OUTBOARD FLAP (REF 27-51-44).

9 WARNING: USE NITRILE GLOVES FOR SKIN PROTECTION AGAINST BMS 3-27 (MASTINOX 6856K). IF MASTINOX GETS ON YOUR SKIN, IMMEDIATELY REMOVE IT WITH WATER. IF THIS MATERIAL GETS IN YOUR EYES, IMMEDIATELY FLUSH YOUR EYES WITH WATER AND GET MEDICAL AID. THIS MATERIAL CONTAINS VERY POISONOUS AND FLAMMABLE AGENTS WHICH CAN CAUSE INJURIES TO PERSONS.

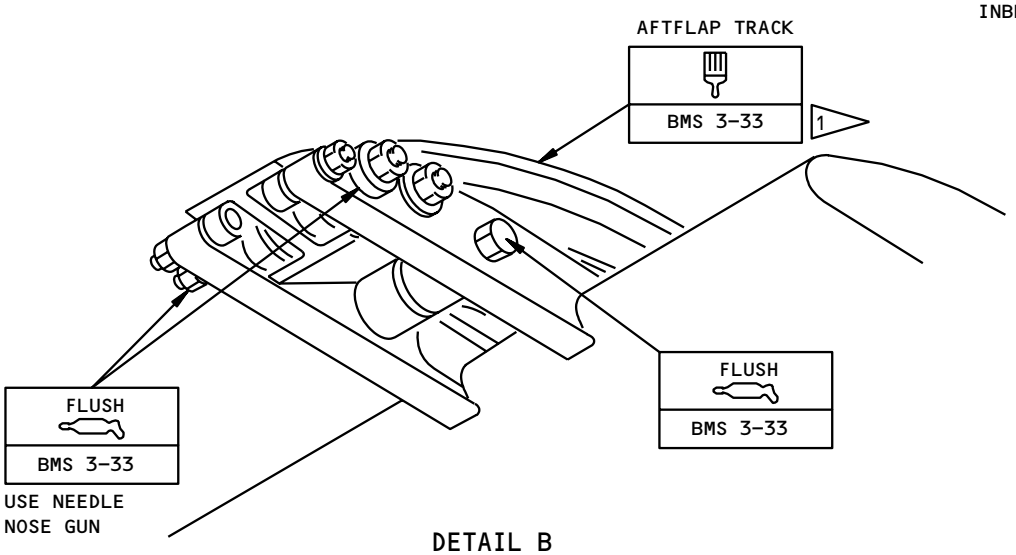
10 CAUTION: REMOVE UNWANTED MASTINOX FROM SURFACES WHICH WILL BE LUBRICATED AND FROM SURFACES THAT MOVE. YOU CAN CAUSE FAILURE OF MOVING PARTS IF YOU APPLY MASTINOX TO SURFACES THAT MOVE.

11 MIL-PRF-23827 OPTIONAL TO BMS 3-33

Outboard Trailing Flap Lubrication
Figure 202 (Sheet 3)



VIEW 1



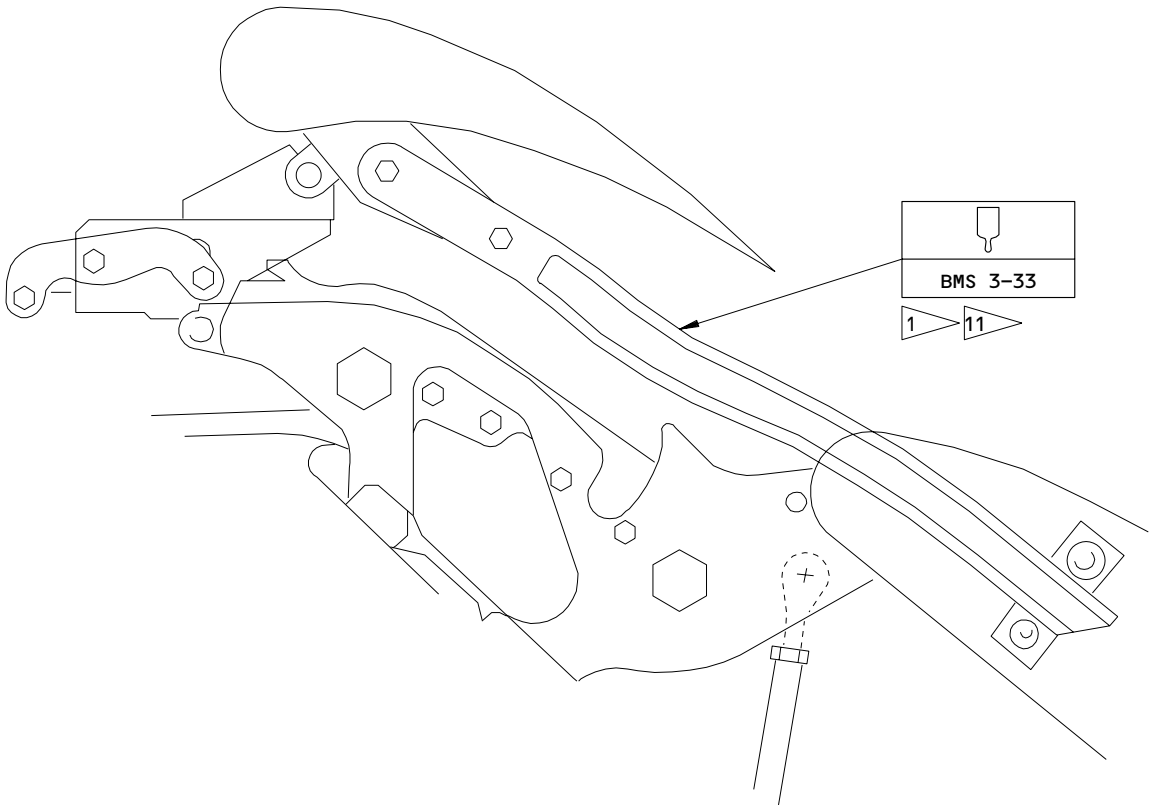
DETAIL B

1 APPLY LIBERAL COAT OF GREASE TO ALL ROLLER AND RUB STRIP SURFACES OF TRACK

9 EXTEND FLAPS UNTIL MAIN CARRIAGE MOVES 0.10 INCH PAST SEQUENCE CARRIAGE (JUST PRIOR TO 15-UNIT POSITION), USE ALEMITE NUMBER 6783 GREASE NOZZLE ON GREASE GUN

10 APPLY GREASE BMS 3-33 TO FLAP TRACK FOR COMPLETE LENGTH OF SEQUENCE CARRIAGE TRAVEL. CLEAN TRACK SURFACE PRIOR TO APPLYING GREASE, MAKING SURE THAT ANY METAL THAT MAY HAVE TRANSFERRED FROM THE CARRIAGE SLIDER TO THE TRACK IS REMOVED

Outboard Trailing Edge Flap Lubrication
Figure 202 (Sheet 4)

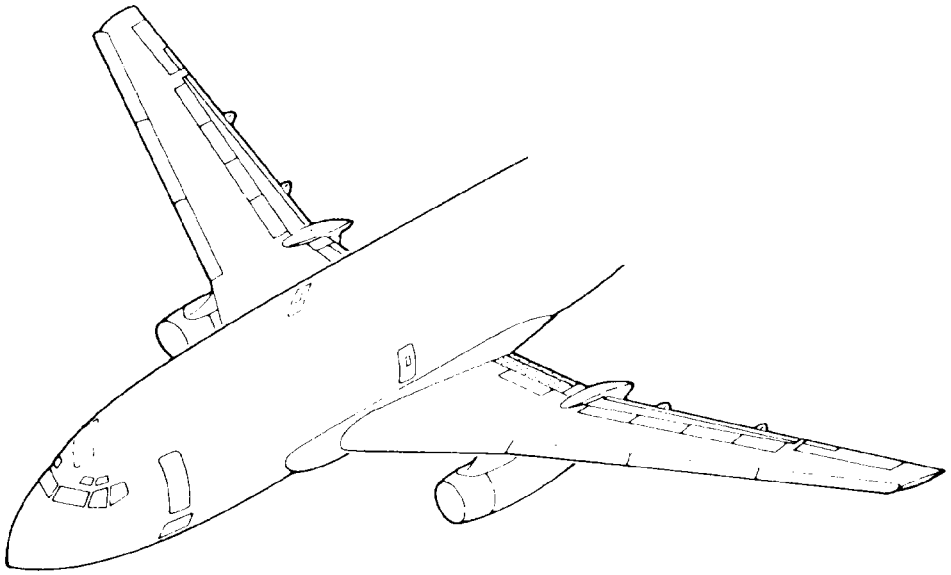


DETAIL D

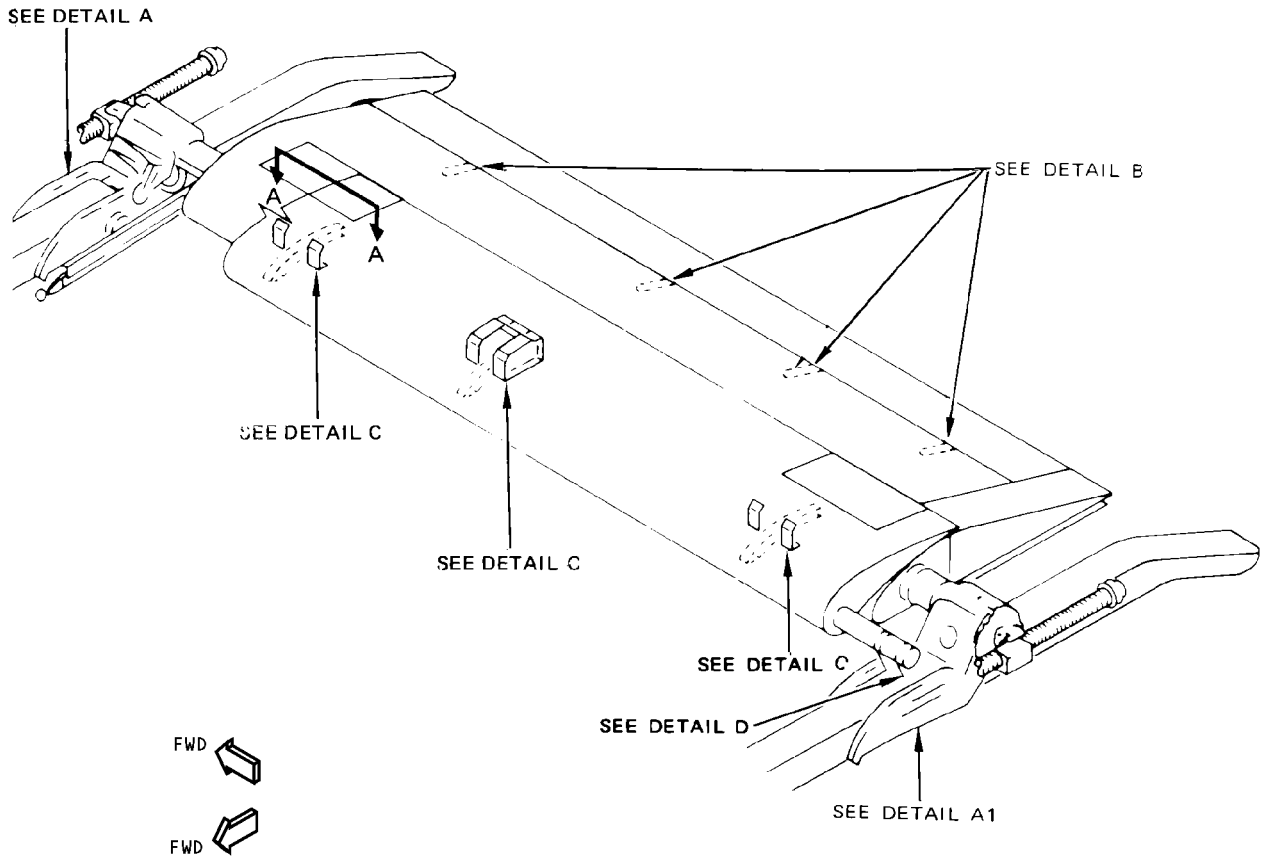
1 APPLY LIBERAL COAT OF GREASE TO ALL ROLLER AND RUB STRIP SURFACES OF TRACK

11 MIL-PRF-23827 OPTIONAL TO BMS 3-33

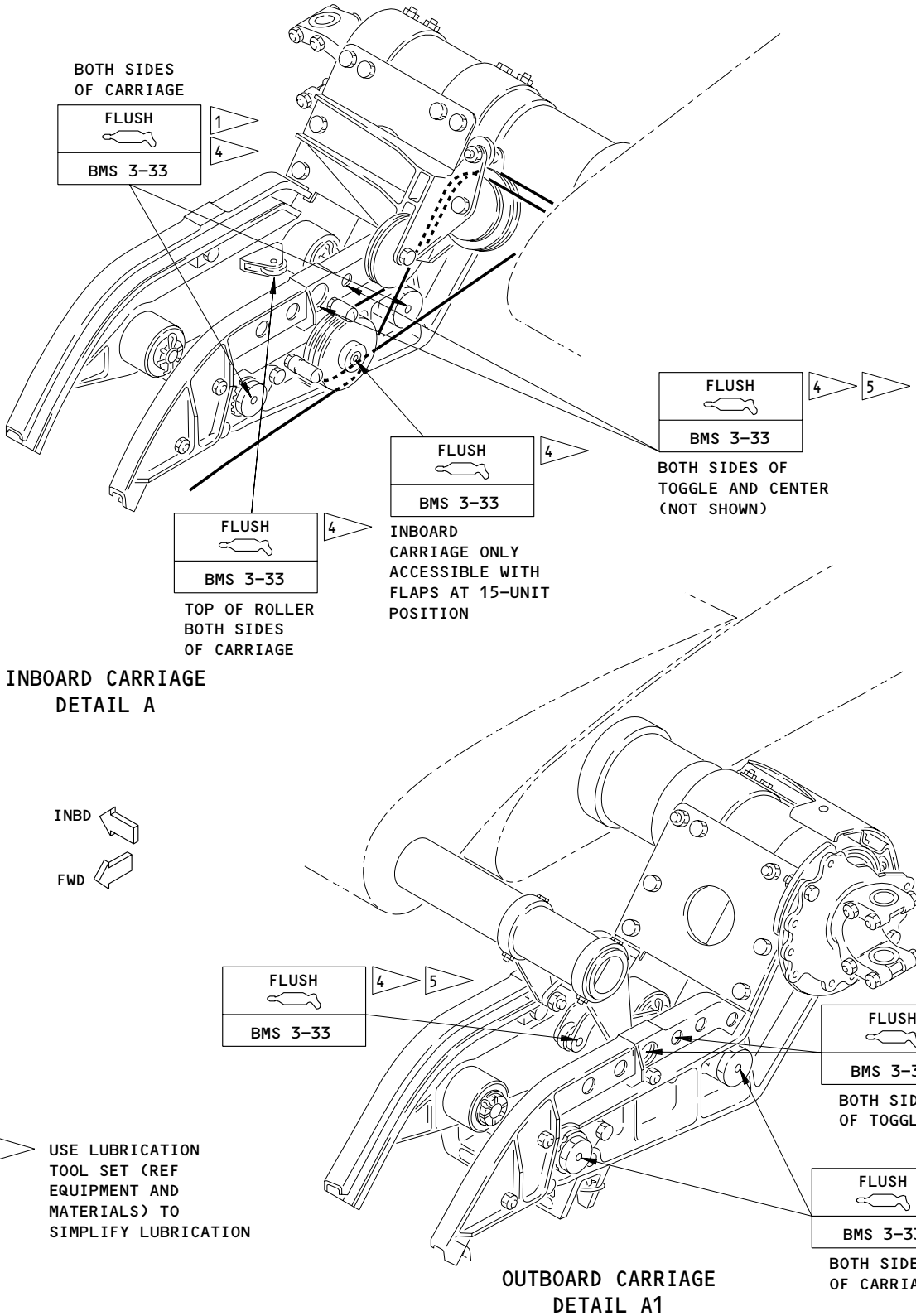
Outboard Trailing Edge Flap Lubrication
Figure 202 (Sheet 5)



NOTE: ALL LUBRICATION POINTS ARE ACCESSIBLE WHEN FLAPS ARE DOWN UNLESS OTHERWISE NOTED.



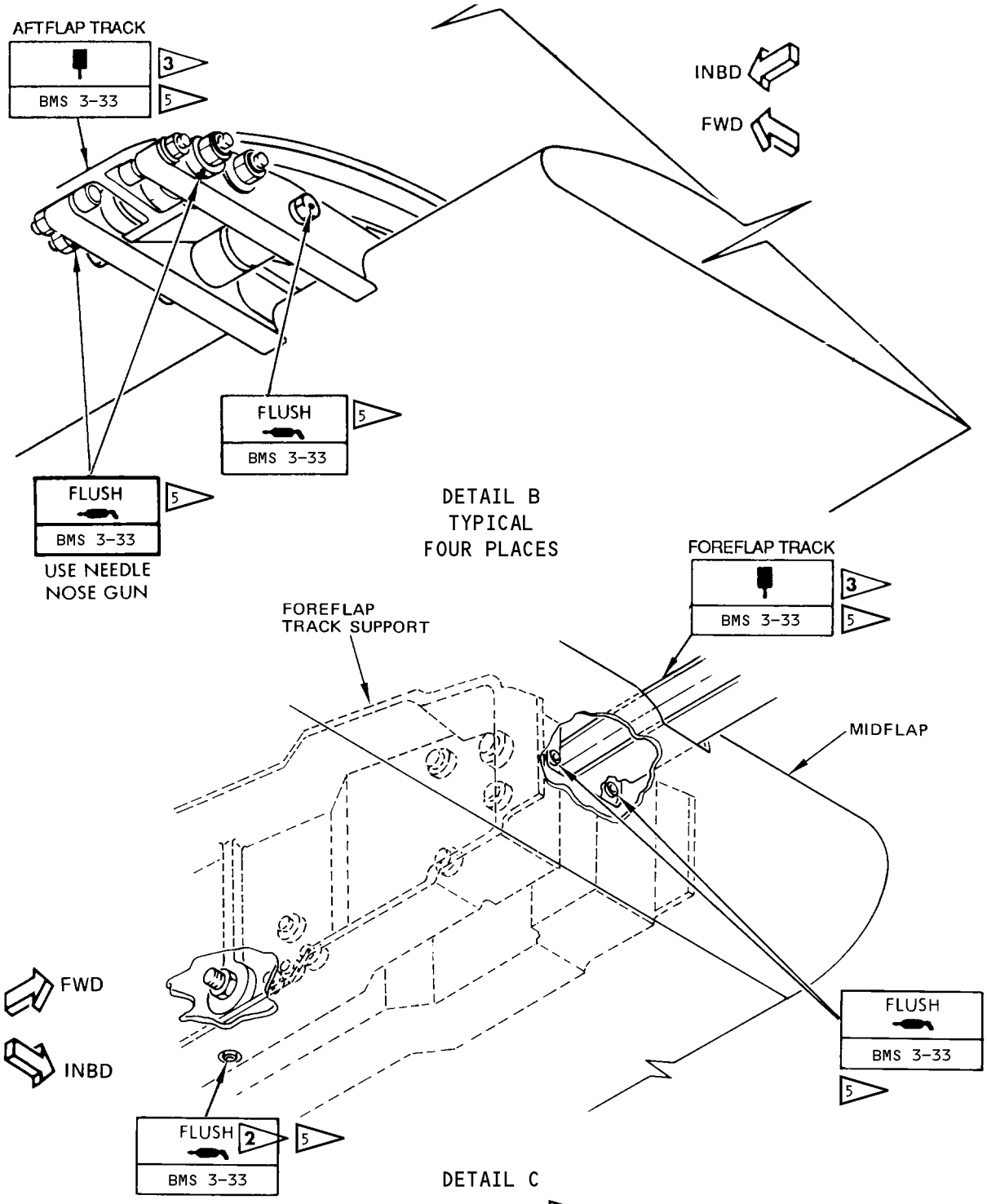
Inboard Trailing Edge Flap Lubrication
Figure 203 (Sheet 1)



Inboard Trailing Edge Flap Lubrication
Figure 203 (Sheet 2)

NOT USED

Inboard Trailing Edge Flap Lubrication
Figure 203 (Sheet 3)

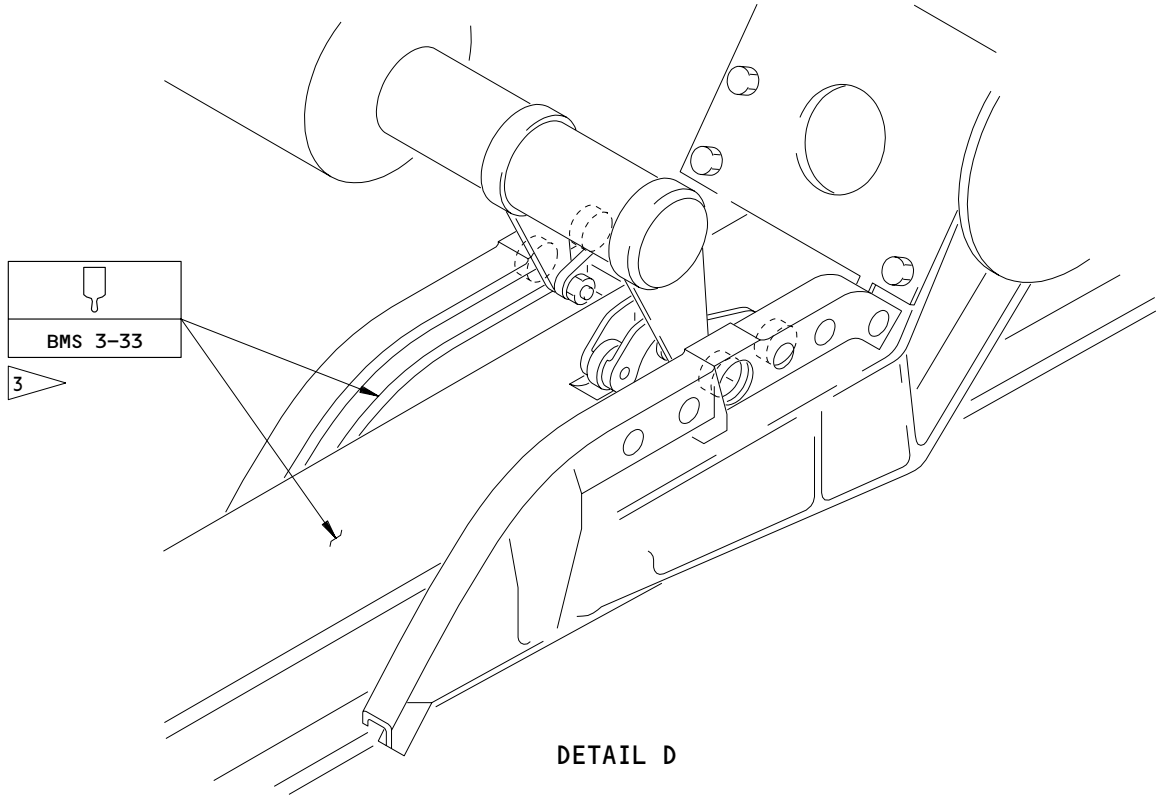


2 FITTING ACCESSIBLE THROUGH SMALL HOLE IN LOWER SURFACE OF FLAP PANEL

LUBRICATION FITTING AT THIS LOCATION APPLIES TO CENTER FOREFLAP TRACK ONLY.

3 APPLY LIBERAL COAT OF GREASE TO ALL ROLLER AND RUB STRIP SURFACES OF TRACK.

Inboard Trailing Edge Flap Lubrication
Figure 203 (Sheet 4)

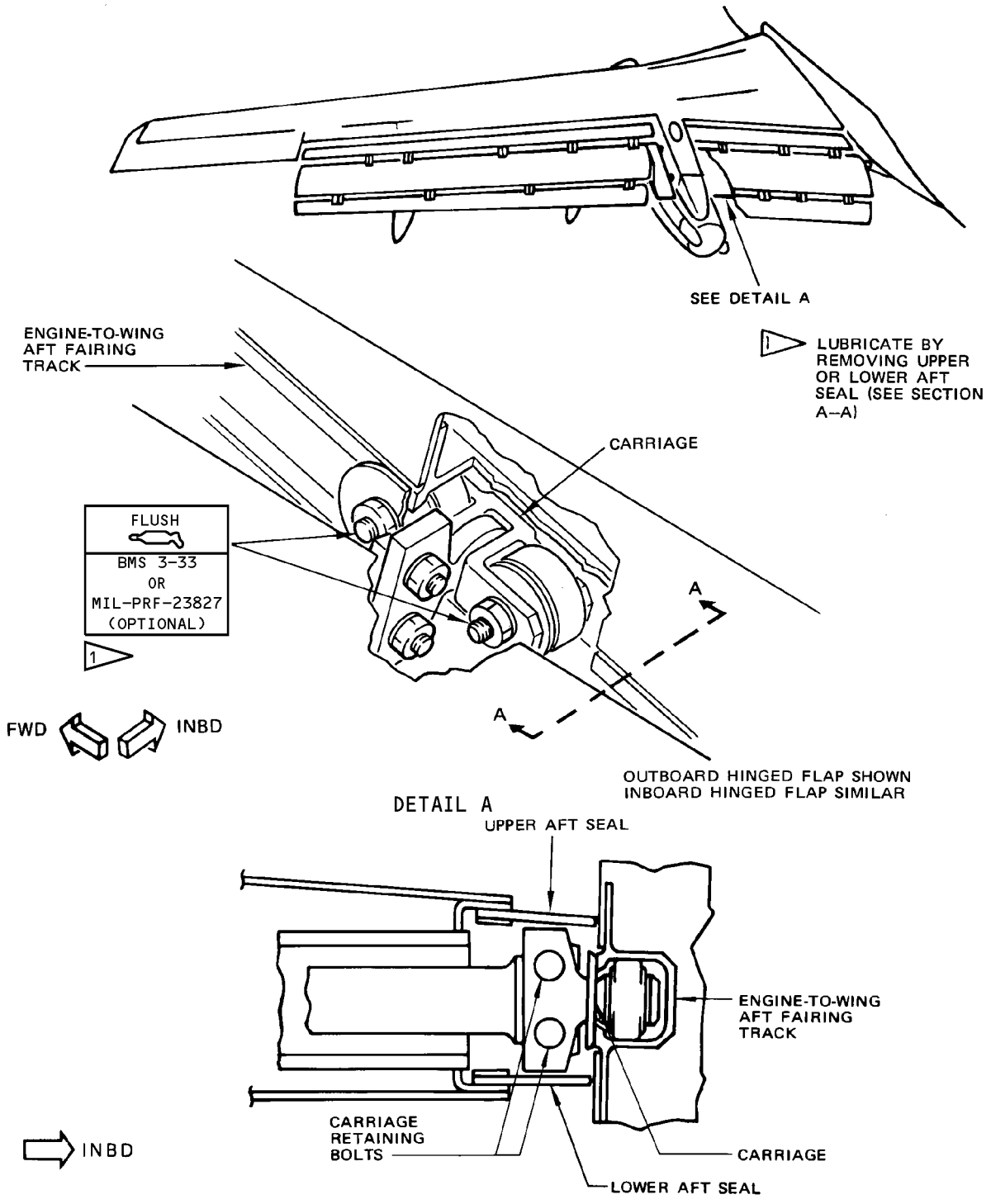


DETAIL D

NOTE: OUTBOARD TRACK SHOWN.
INBOARD TRACK SIMILAR.

3 APPLY LIBERAL COAT OF GREASE TO ALL ROLLER AND RUB STRIP SURFACES OF TRACK

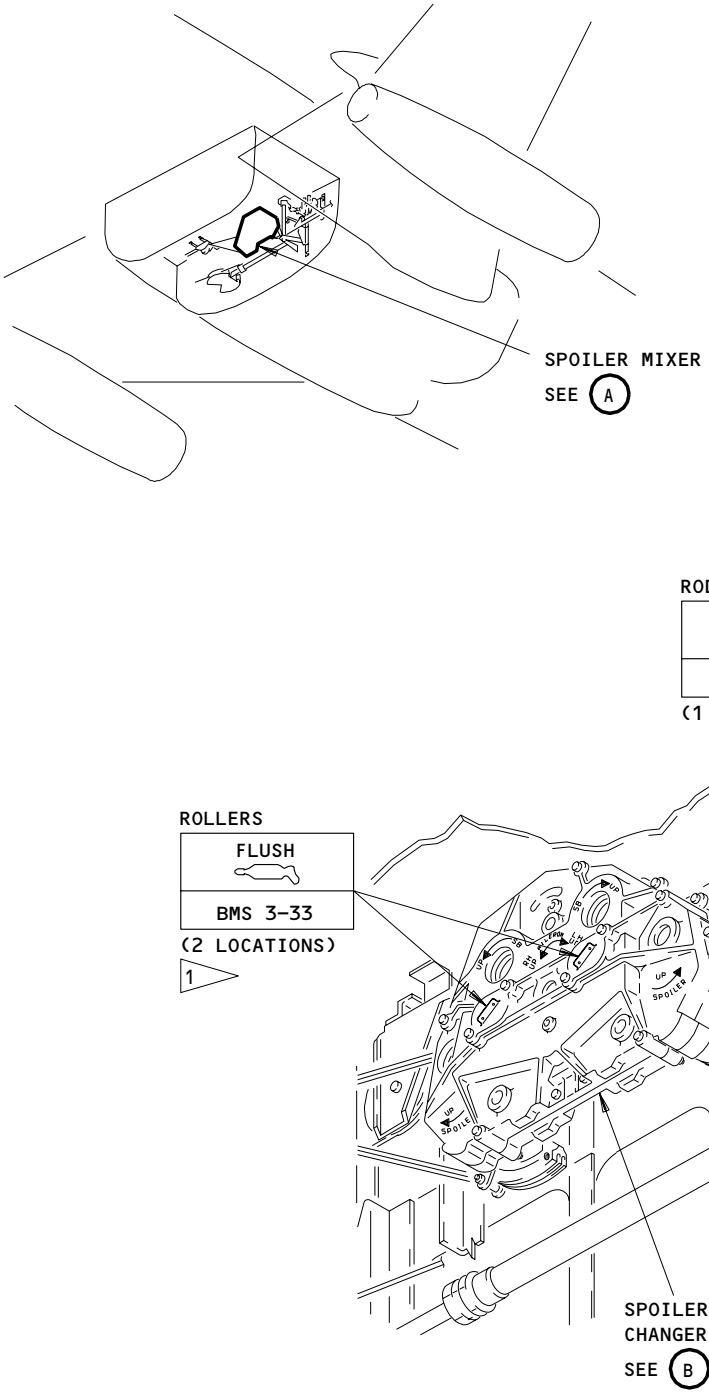
Inboard Trailing Edge Flap Lubrication
Figure 203 (Sheet 5)



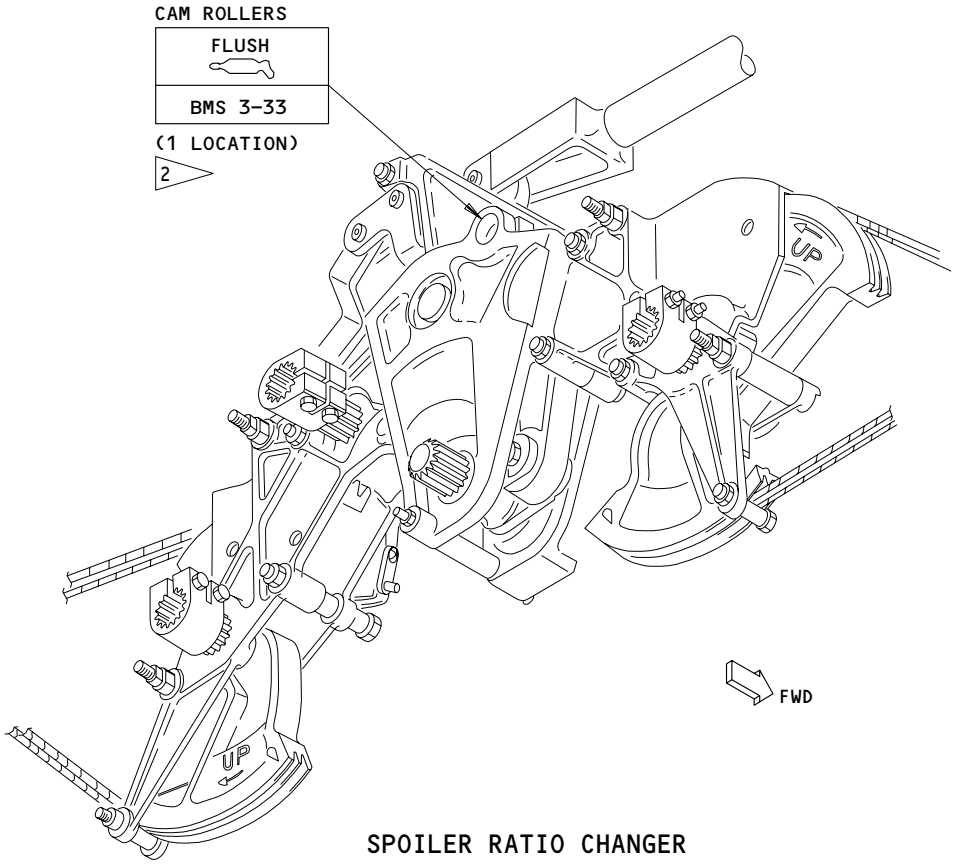
SECTION A–A

Hinged Flap Lubrication
Figure 204

SPOILER CONTROL SYSTEM LUBRICATION



Spoiler Lubrication
Figure 201 (Sheet 1)



SPOILER RATIO CHANGER
(MIXER REMOVED)

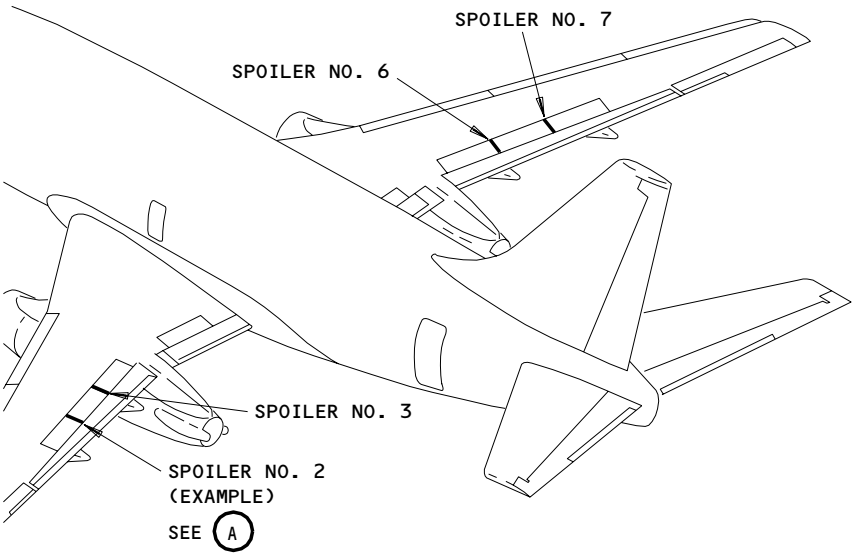
1 POINT

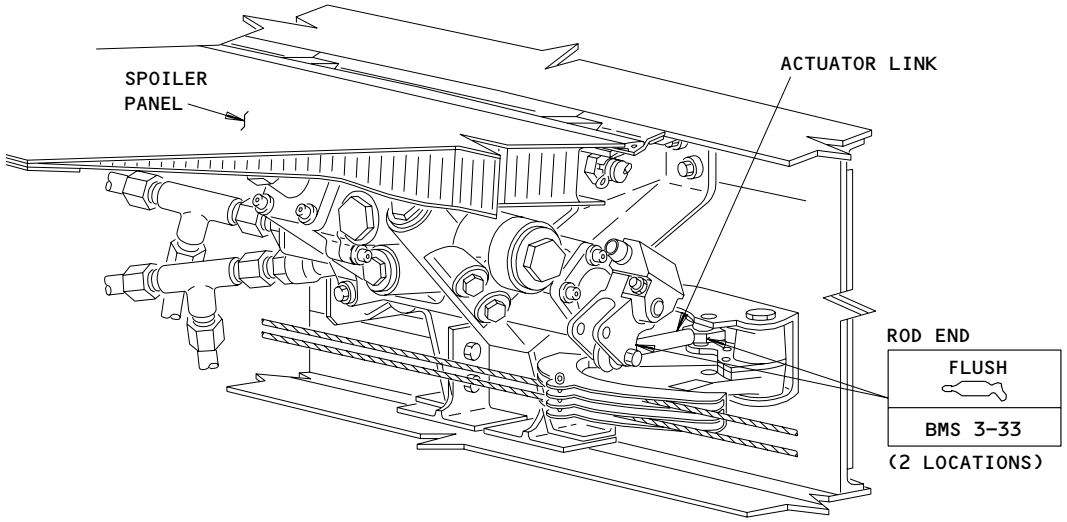
B

2 IT IS NECESSARY TO USE A CURVED NOZZLE TO LUBRICATE THE ROLLER.

NOTE: IT IS ONLY NECESSARY TO LUBRICATE THE ROLLER IF THE RATIO CHANGER HAS A LUBRICATION FITTING.

Spoiler Lubrication
Figure 201 (Sheet 2)



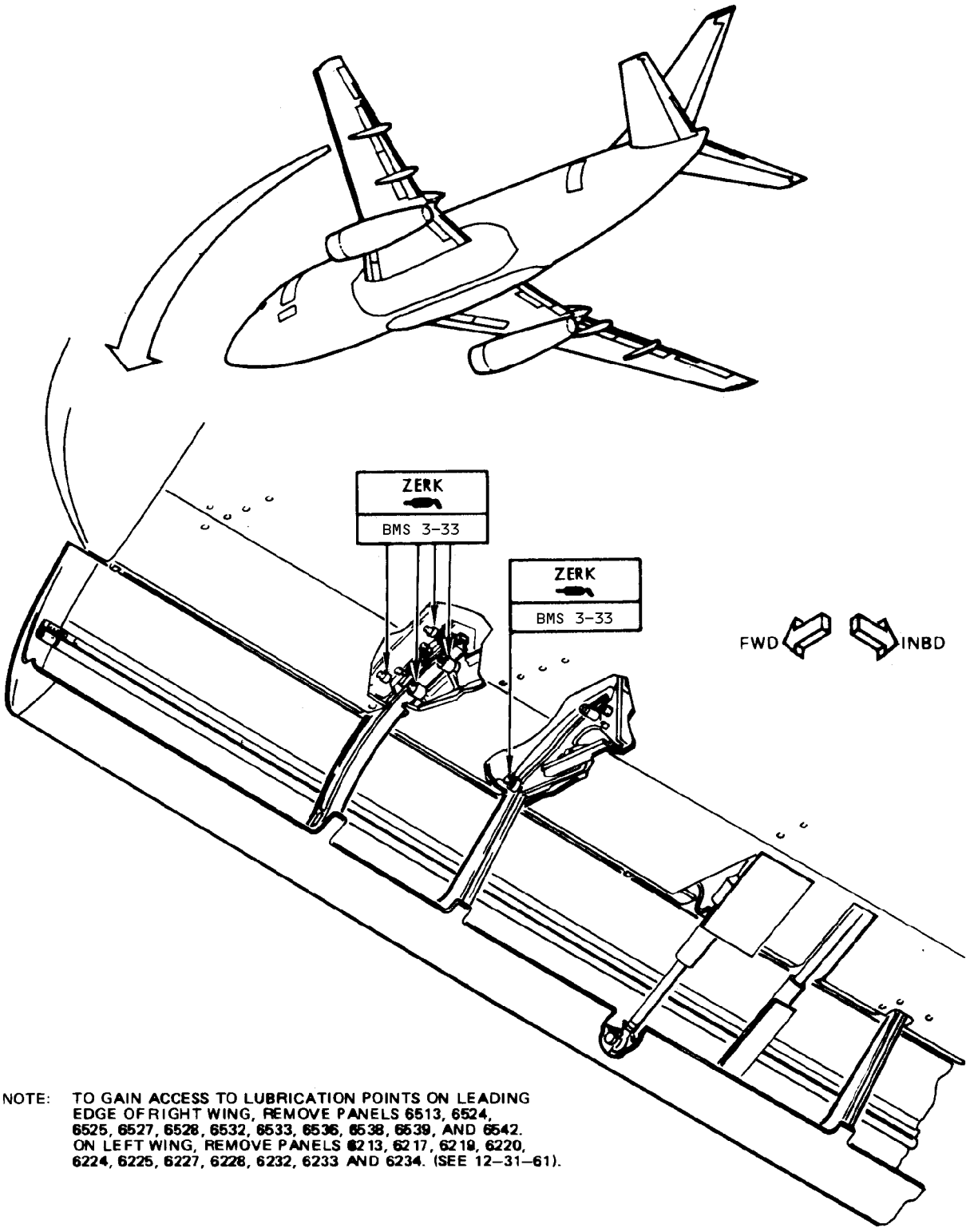


2 POINTS

A

Spoiler Actuator Quadrant Lubrication
Figure 202

LEADING EDGE SLAT SYSTEM LUBRICATION - MAINTENANCE PRACTICES



NOTE: TO GAIN ACCESS TO LUBRICATION POINTS ON LEADING EDGE OF RIGHT WING, REMOVE PANELS 6513, 6524, 6525, 6527, 6528, 6532, 6533, 6536, 6538, 6539, AND 6542. ON LEFT WING, REMOVE PANELS 6213, 6217, 6219, 6220, 6224, 6225, 6227, 6228, 6232, 6233 AND 6234. (SEE 12-31-61).

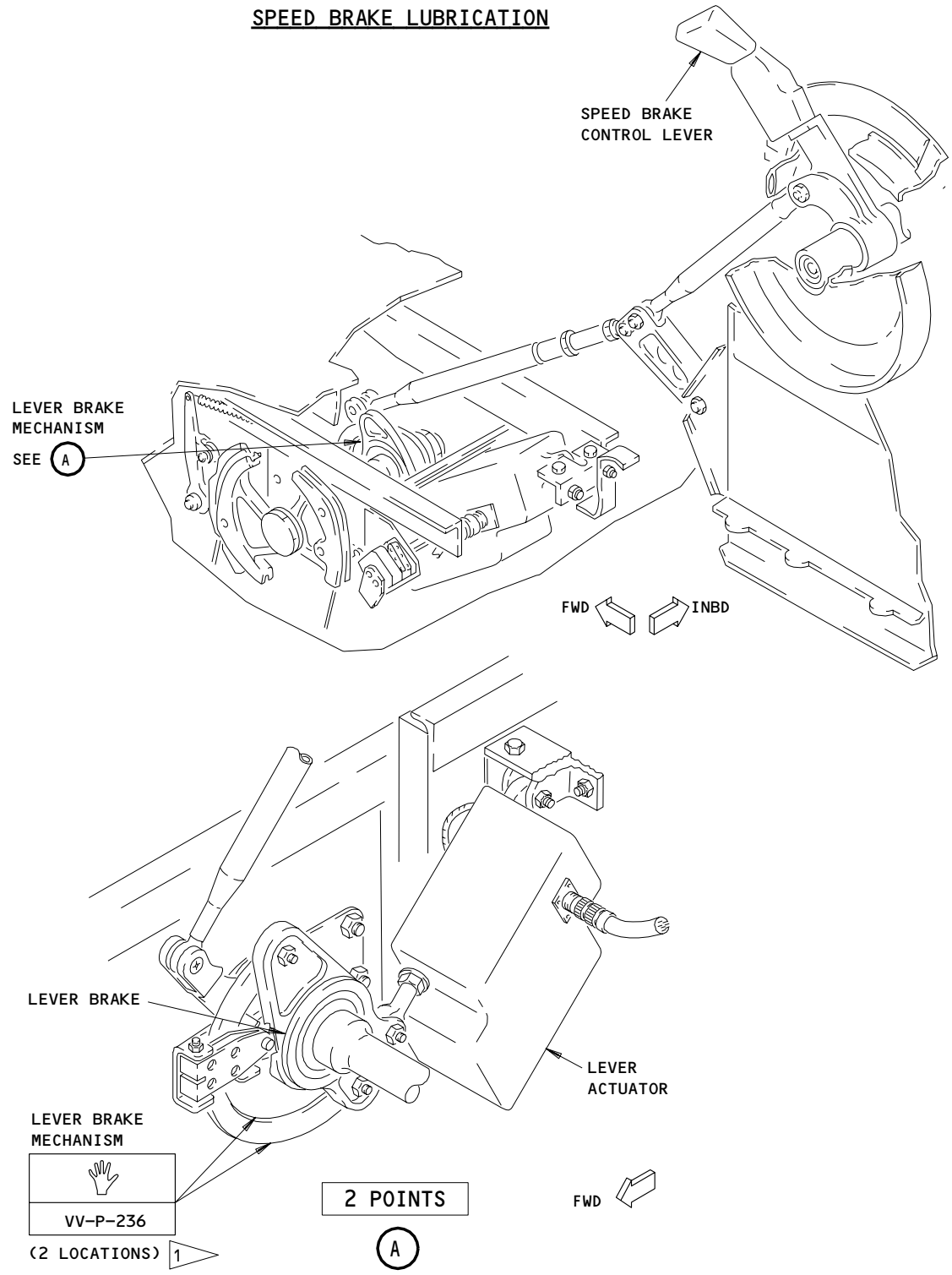
Leading Edge Slat Lubrication
Figure 201

SPEEDBRAKE/GROUND SPOILER INTERLOCK VALVE CABLE LUBRICATION - MAINTENANCE PRACTICES

1. Completely Lubricate the Ground Spoiler Interlock Valve Cable
   A. Remove flexible cable.
      (1) If there is corrosion, or worn replace cables (AMM 27-62-51/401).
   B. Apply a liberal coating of grease to entire length of cable and to faying surfaces of swivel tube and guide tube at each end of cable.
   C. Install the flexible cable (AMM 27-62-51/401).
   D. With bolt removed that attaches lower rod end to landing gear torsion link, cycle cable through full travel a minimum of 6 times. Force required to push cable should be less than 18.0 pounds at fully extended position. Force required to extend the cable should be less than 15.0 pounds at fully compressed position. Replace cable if force is excessive.
   E. Wipe off excess grease on upper end. Leave a generous grease coating on all components within boot.
   F. Reposition and reclamp protective boot on lower end. Install lower rod end bolt.
   G. Adjust and test cable (AMM 27-62-51/501).
2. Partially Lubricate the Ground Spoiler Interlock Valve Cable at Each End
   A. Remove bolt attaching lower rod end to landing gear torsion link.
   B. Remove protective boot on lower end.
   C. Apply grease to fitting, if installed, at each end of cable.

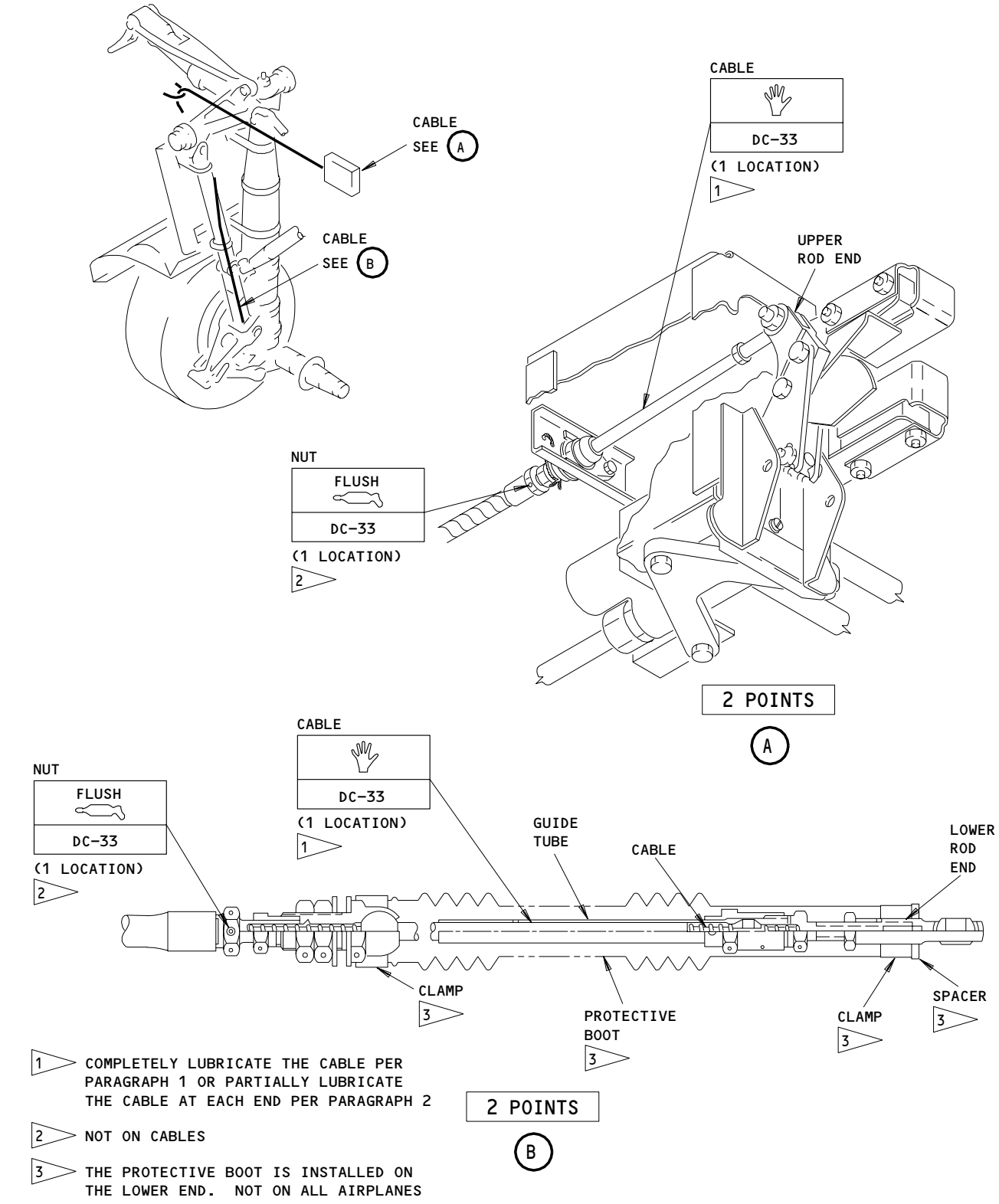
      NOTE: Some grease may extrude out on cable outer surface.

   D. Apply a liberal coating of grease to faying surfaces of swivel tube and guide tube at each end of cable.
   E. Cycle cable through full travel a minimum of 6 times. The force required to push cable should be less than 18.0 pounds at the fully extended position. Force required to extend the cable should be less than 15.0 pounds at fully compressed position. If force is excessive, remove flexible cable and completely lubricate cable.
   F. Wipe off excess grease on upper end. Leave a generous grease coating on all components within boot.
   G. Reposition and reclamp protective boot on lower end. Install lower rod end bolt.
   H. Adjust and test cable (AMM 27-62-51/501).



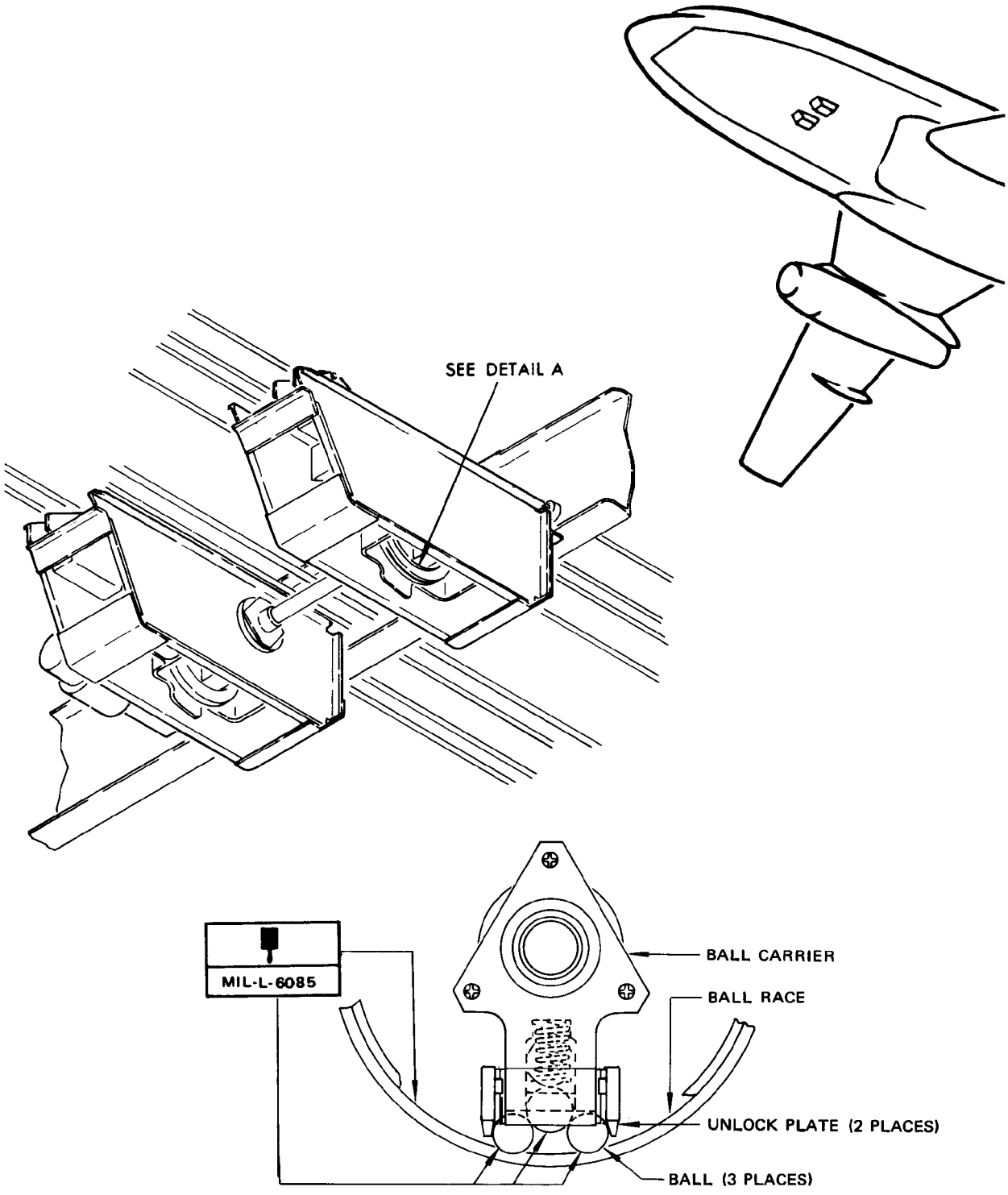
1 APPLY A THIN LAYER OF LUBRICANT

Speed Brake Forward Drum and Level Brake Lubrication
Figure 201



Ground Spoiler Interlock Valve Cable Installation
Figure 202

AUTOTHROTTLE CLUTCH LUBRICATION



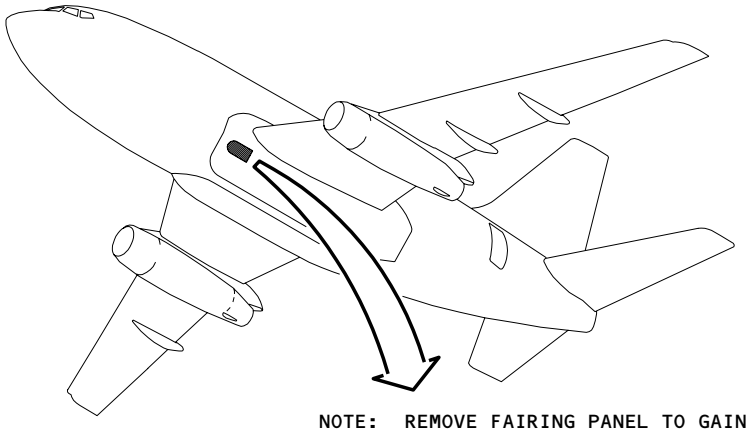
DETAIL A

Autothrottle Clutch Lubrication
Figure 201

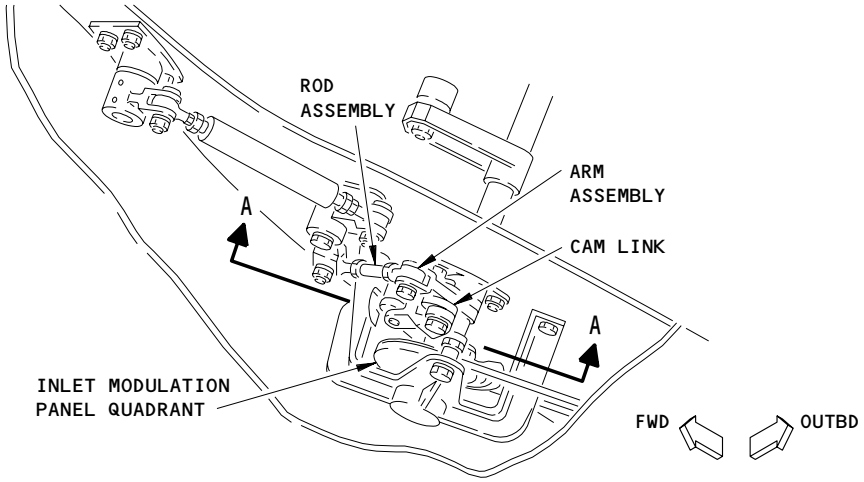
AFT AIRSTAIR HYDRAULIC DAMPER - SERVICING

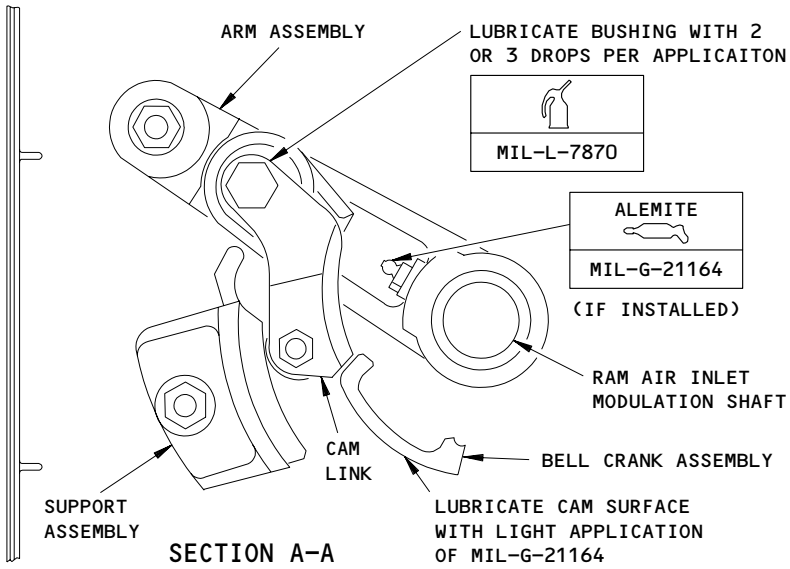
1. Equipment and Material
   A. Hydraulic Fluid - MIL-H-5606
2. Refill Damper
   A. Remove damper from airstair (Ref. 52-14-111).
   B. Mount damper so that piston stem is pointed up.
   C. Remove lockwiring and plug from end of piston stem and attach MIL-H-5606 fluid source.
   D. Bleed air from cart line before filling by leaving fitting B-nut loose and applying low pressure.
   E. When fluid runs clear, tighten B-nut.
   F. Apply sufficient pressure, not to exceed 100 psi, to extend piston rod.
   G. When piston rod stops, depressurize and remove line.
   H. Insert a rod into fill port and depress plunger.
   I. Release plunger when rod retracts to approximately the center of the alodine band. If air bubbles are observed when plunger is depressed, repeat filling procedure.
   J. Insert plug in piston stem and lockwire.
   K. Install damper in airstair (Ref. 52-14-111).

AIR CONDITIONING RAM AIR INLET MODULATION SHAFT ASSEMBLY LUBRICATION



NOTE: REMOVE FAIRING PANEL TO GAIN ACCESS TO LUBRICATION POINTS.

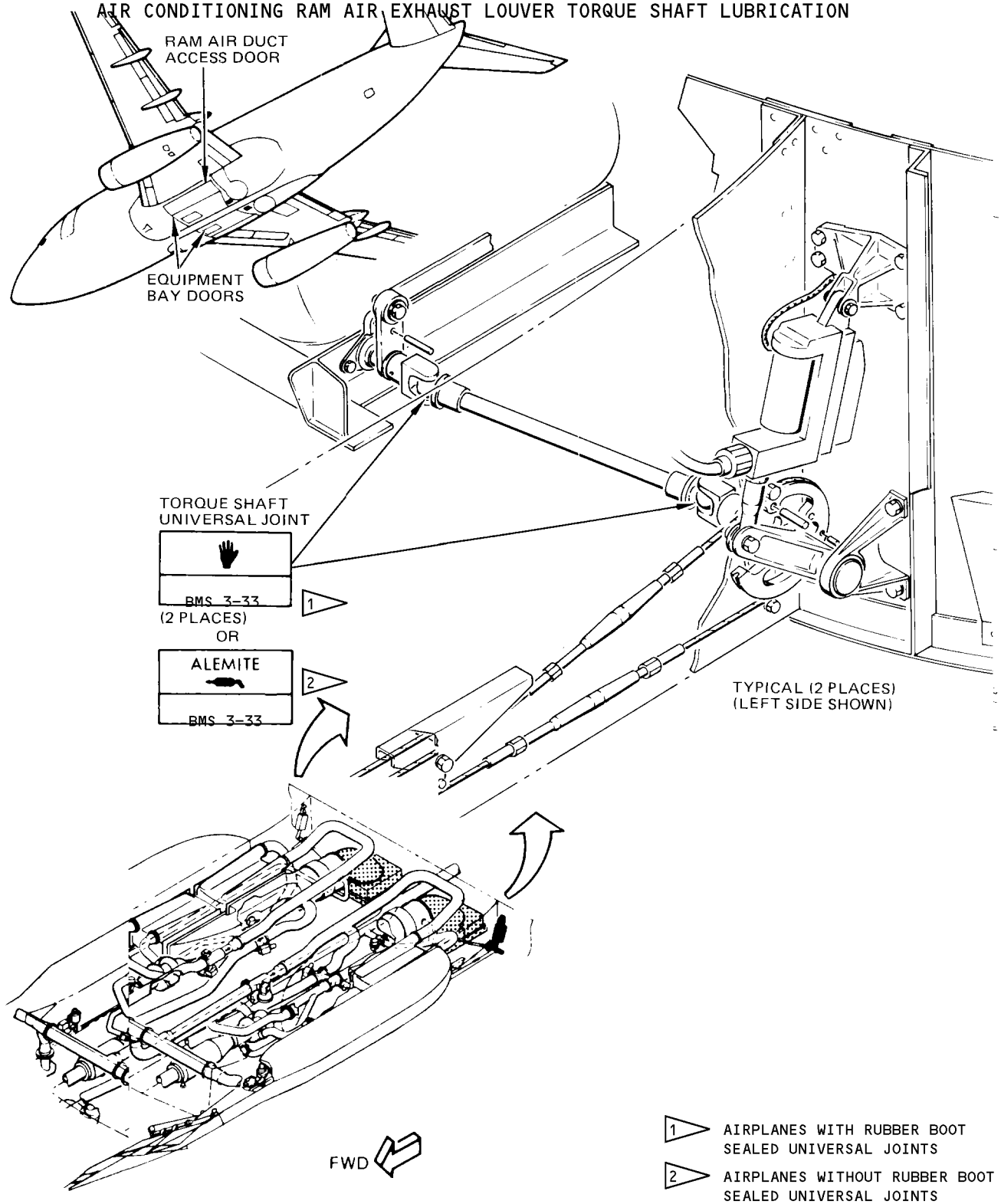




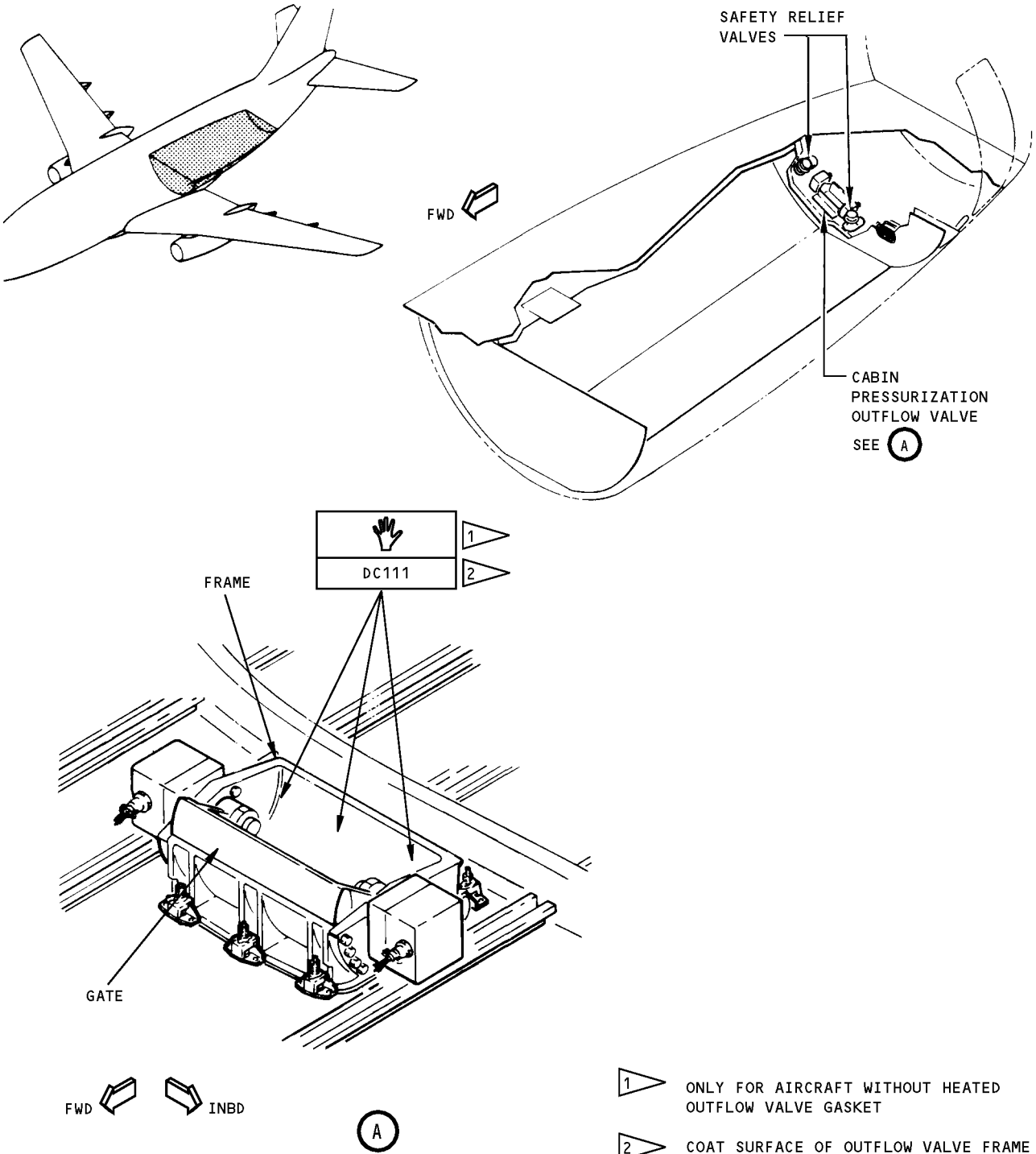
SECTION A-A

Air Conditioning Ram Air Inlet Modulation Shaft Assembly Lubrication
Figure 201

AIR CONDITIONING RAM AIR EXHAUST LOUVER TORQUE SHAFT LUBRICATION



Torque Shaft Universal Joint Lubrication
Figure 201



1 ONLY FOR AIRCRAFT WITHOUT HEATED OUTFLOW VALVE GASKET

2 COAT SURFACE OF OUTFLOW VALVE FRAME WITH DC111 IN AREAS INDICATED. (AREAS TO BE COATED ON FRAME SHOULD COINCIDE WITH CONTACT AREA BETWEEN GATE AND FRAME).

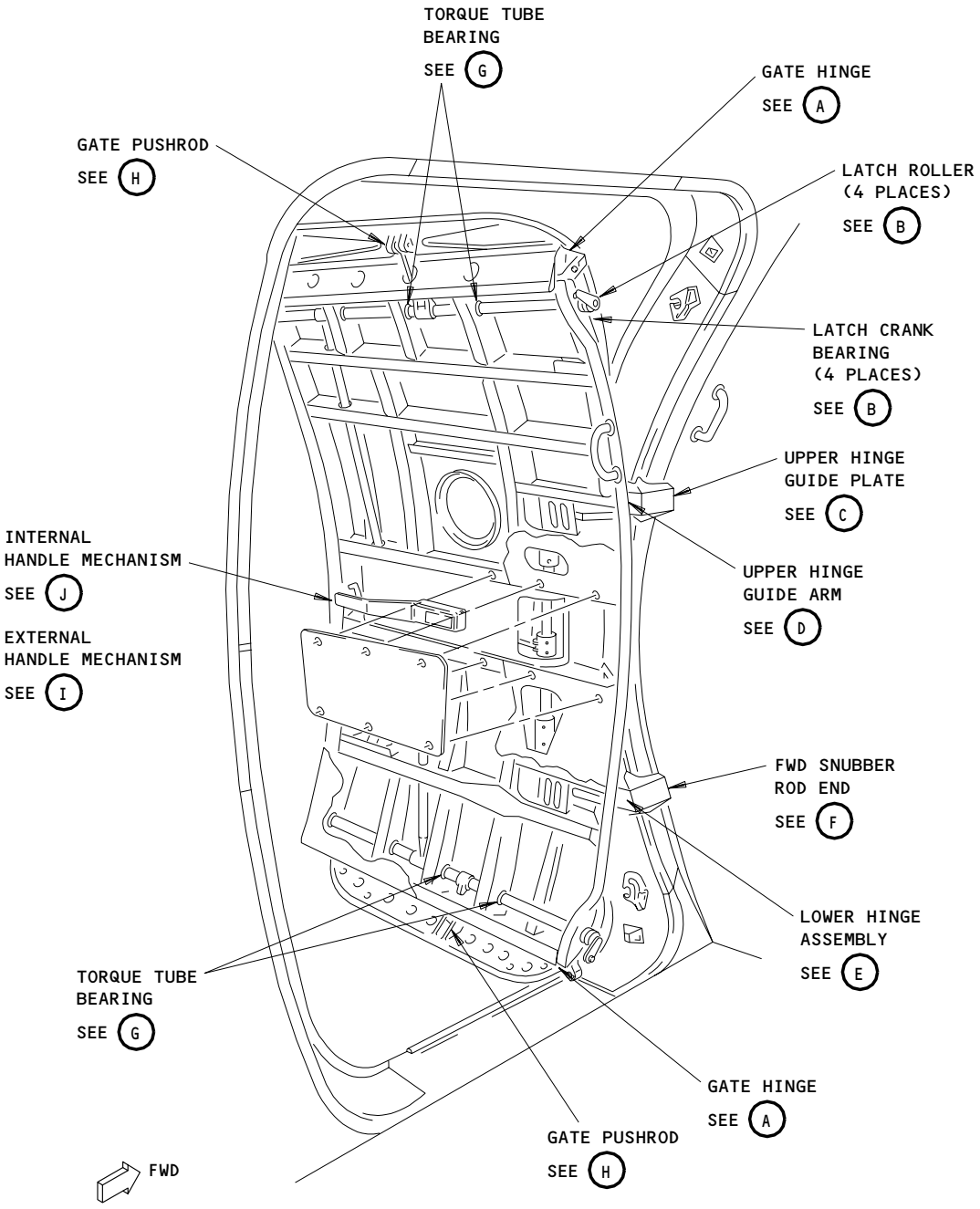
Cabin Pressurization Outflow Valve Lubrication
Figure 201

AFT ENTRY DOOR LUBRICATION

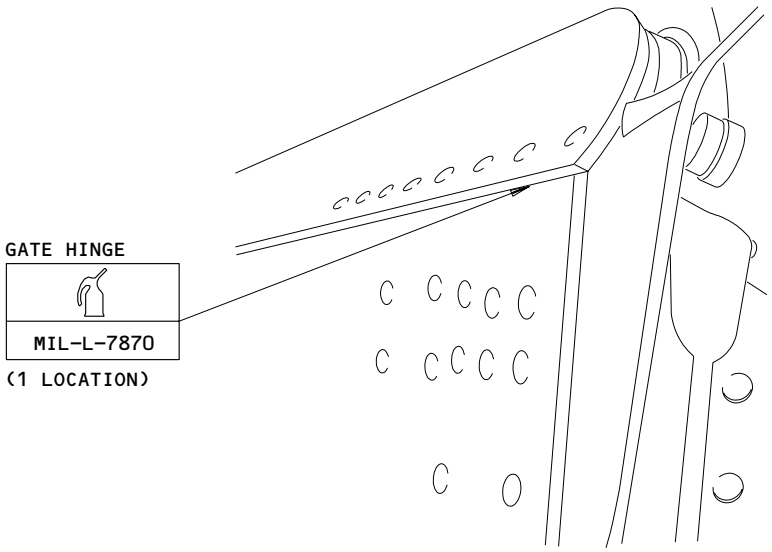
1. General
   A. This procedure provides instructions for lubricating the aft entry door.
2. Equipment and Materials
   A. Lubrication Set - Entry, Cargo, Service, and Galley Door Camshaft Bearings - F72942-1

      NOTE: Lubrication set may be used to reach lubrication fittings where access is difficult.

   B. Flush gun (grease gun)
   C. Oil squirt can
   D. Grease - BMS 3-33 (Preferred)
   E. Grease - MIL-PRF-23827 (Supercedes MIL-G-23827) (Alternate)
   F. Oil - MIL-L-7870
3. Service Aft Entry Door
   A. Remove aft entry door lining and gate lining (Ref. 52-13-21/401).
   B. Remove handle lining retainer and handle mechanism cover plate.
   C. Lubricate aft entry door as shown (Fig. 201).
   D. Install handle mechanism cover plate and handle lining retainer.
   E. Install aft entry door lining and gate lining (Ref. 52-13-21/401).



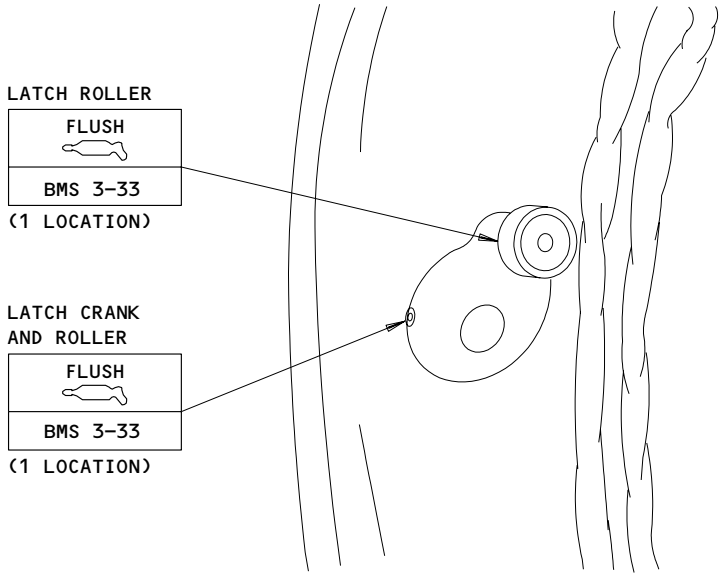
Aft Entry Door Lubrication
Figure 201 (Sheet 1)



GATE HINGE

1 POINT

A 1



1 THE UPPER GATE HINGE IS SHOWN. THE LOWER GATE HINGE IS THE SAME

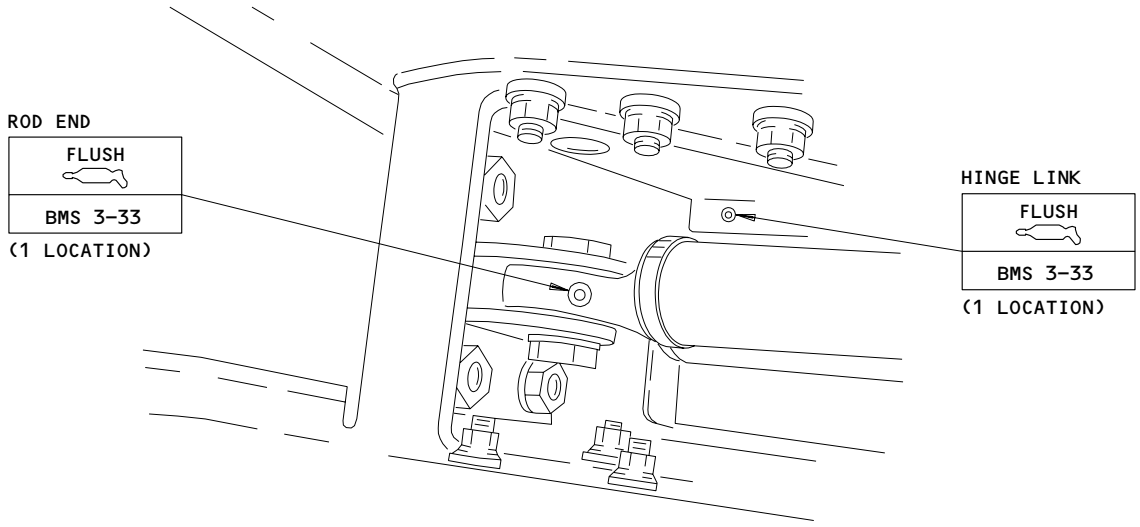
2 THERE ARE FOUR LATCH CRANKS ON THE DOOR

LATCH CRANK AND ROLLER

2 POINTS

B 2

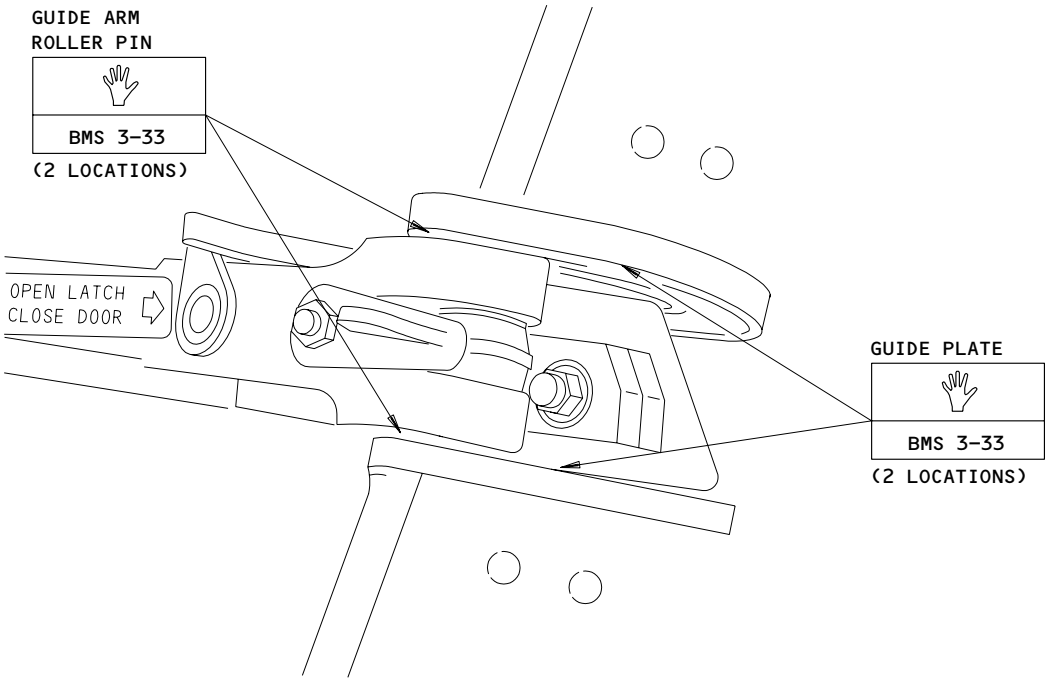
Aft Entry Door Lubrication
Figure 201 (Sheet 2)



UPPER HINGE GUIDE ARM

2 POINTS

D

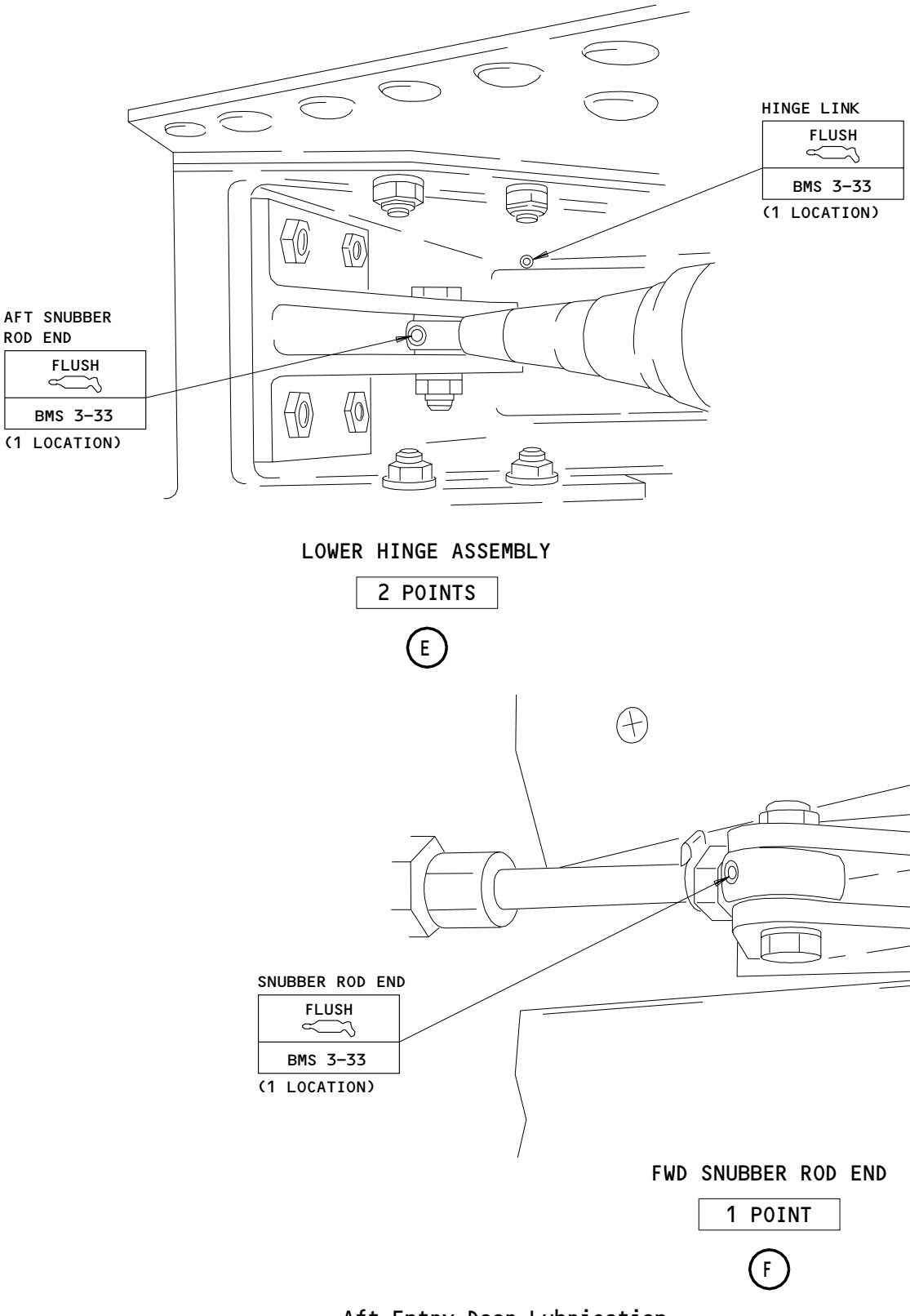


UPPER HINGE GUIDE PLATE

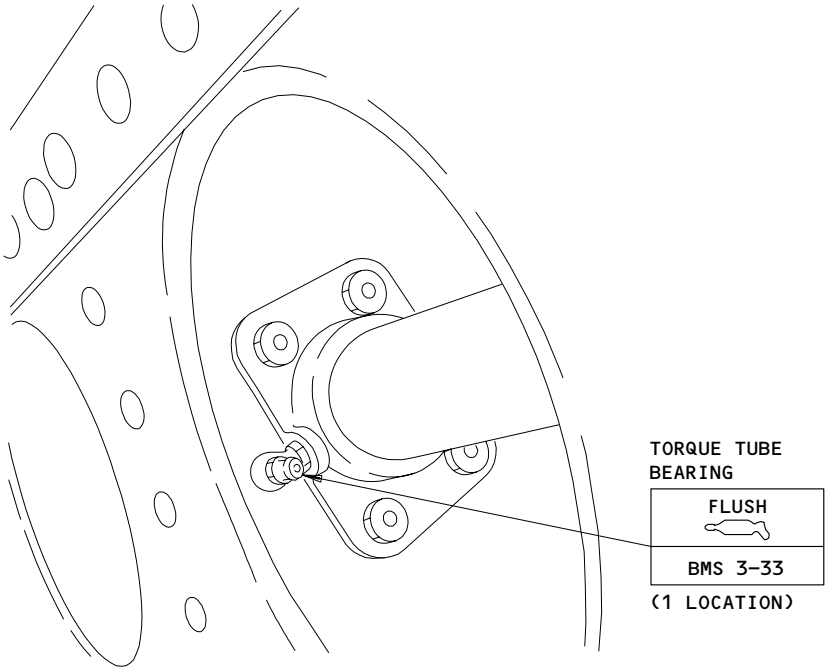
4 POINTS

C

Aft Entry Door Lubrication
Figure 201 (Sheet 3)



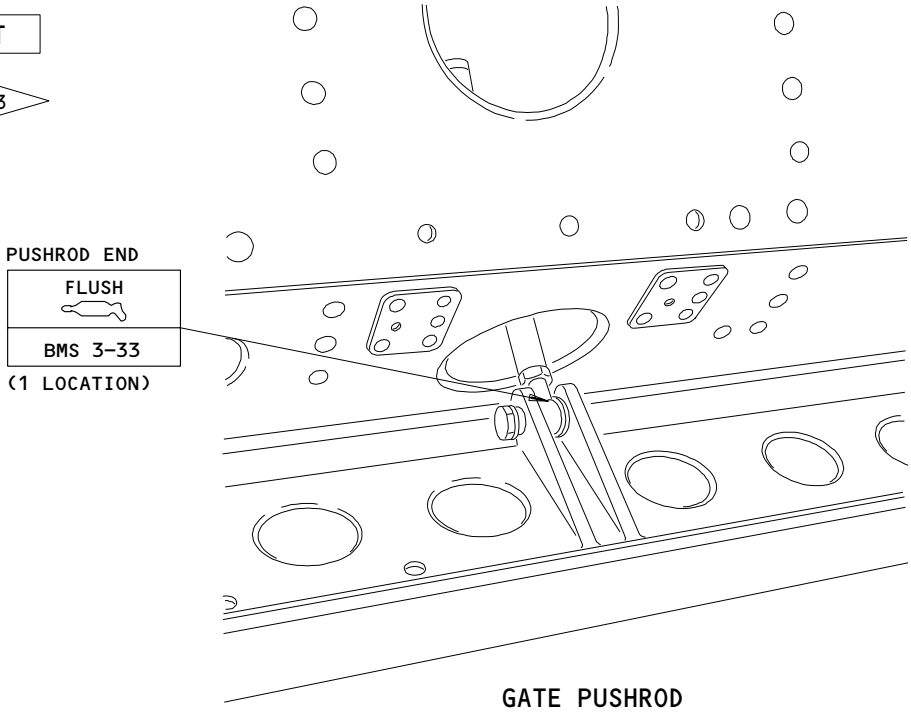
Aft Entry Door Lubrication
Figure 201 (Sheet 4)



TORQUE TUBE BEARING

1 POINT

G 3



GATE PUSHROD

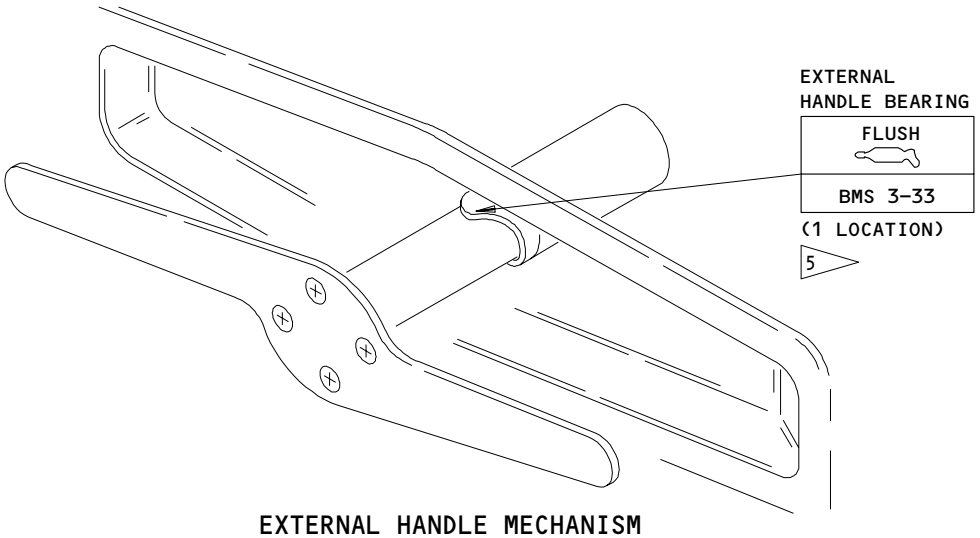
1 POINT

H 4

3 THERE ARE FOUR TORQUE TUBE BEARINGS ON THE DOOR

4 THE LOWER PUSHROD IS SHOWN. THE UPPER PUSHROD IS THE SAME

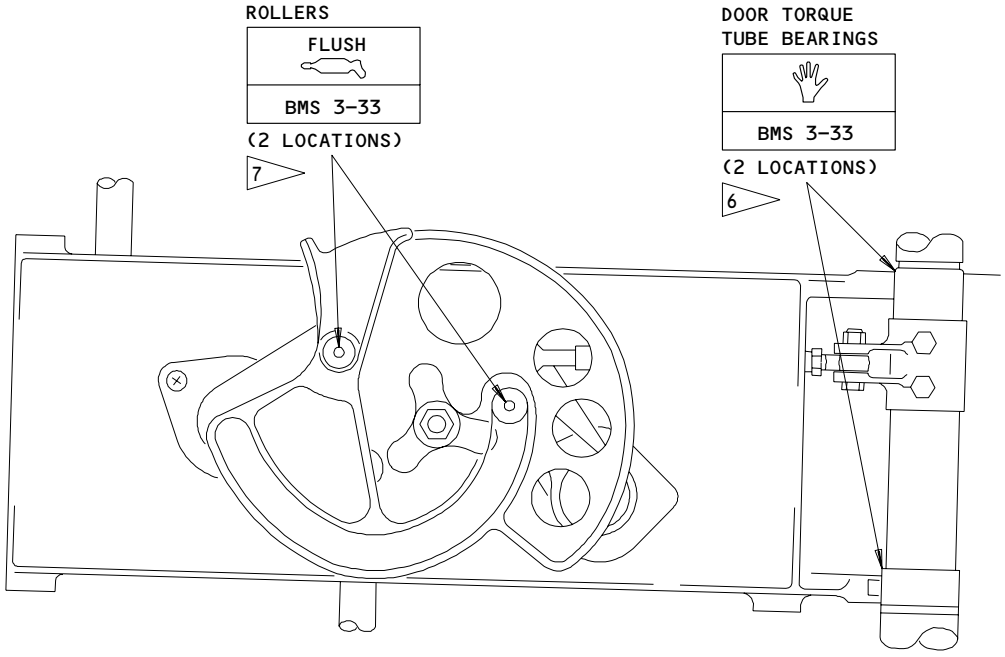
Aft Entry Door Lubrication
Figure 201 (Sheet 5)



EXTERNAL HANDLE MECHANISM

1 POINT

I



INTERNAL HANDLE MECHANISM

4 POINTS

J

5 PULL THE EXTERNAL HANDLE TO GET ACCESS TO THE FLUSH FITTING

6 FILL THE EMPTY SPACES ABOVE THE DOOR TORQUE TUBE BEARINGS

7 PUT THE CAM PLATE IN THE LATCHED CLOSED POSITION FOR ACCESS TO THE ROLLERS

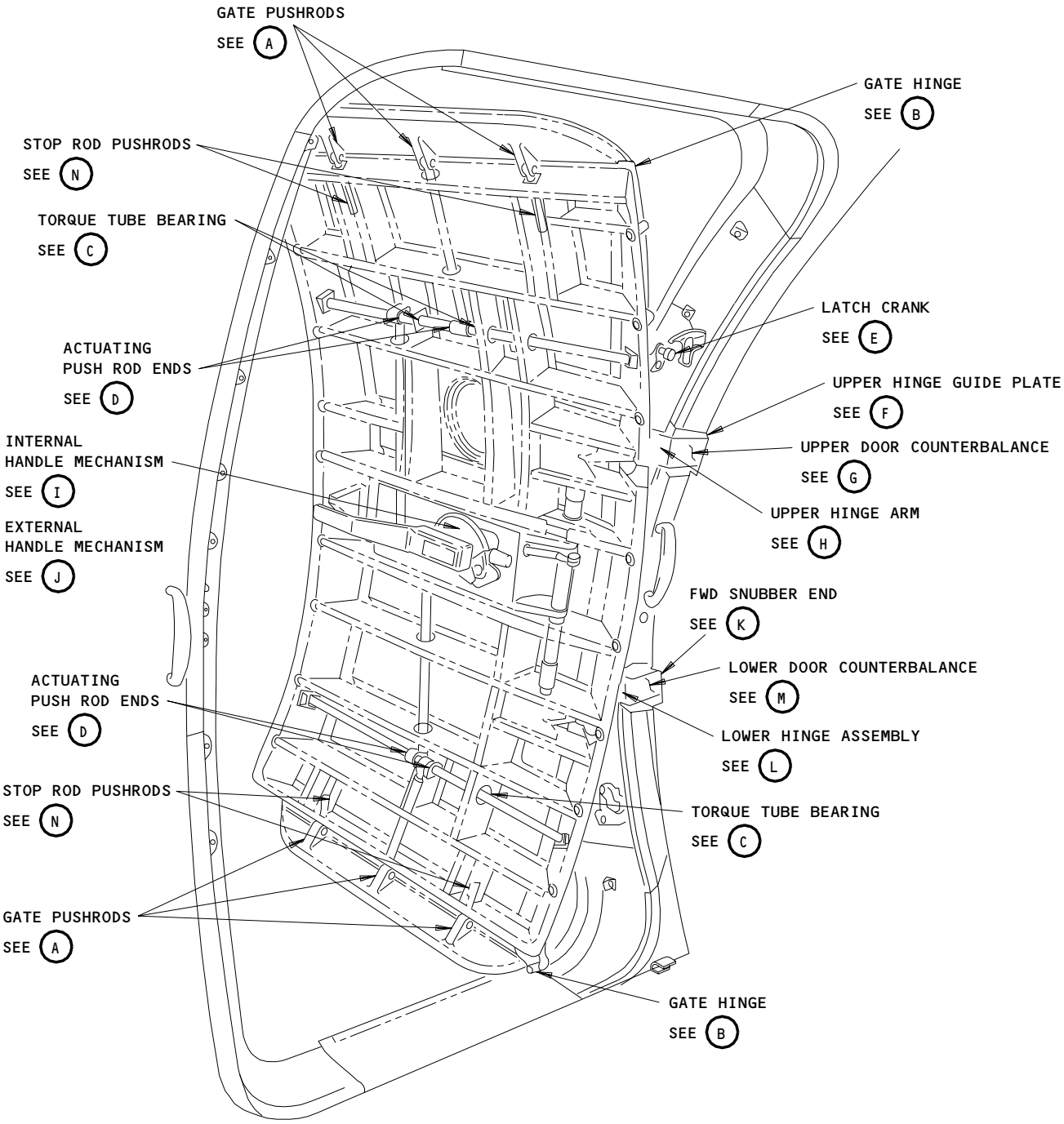
Aft Entry Door Lubrication
Figure 201 (Sheet 6)

FORWARD ENTRY DOOR LUBRICATION

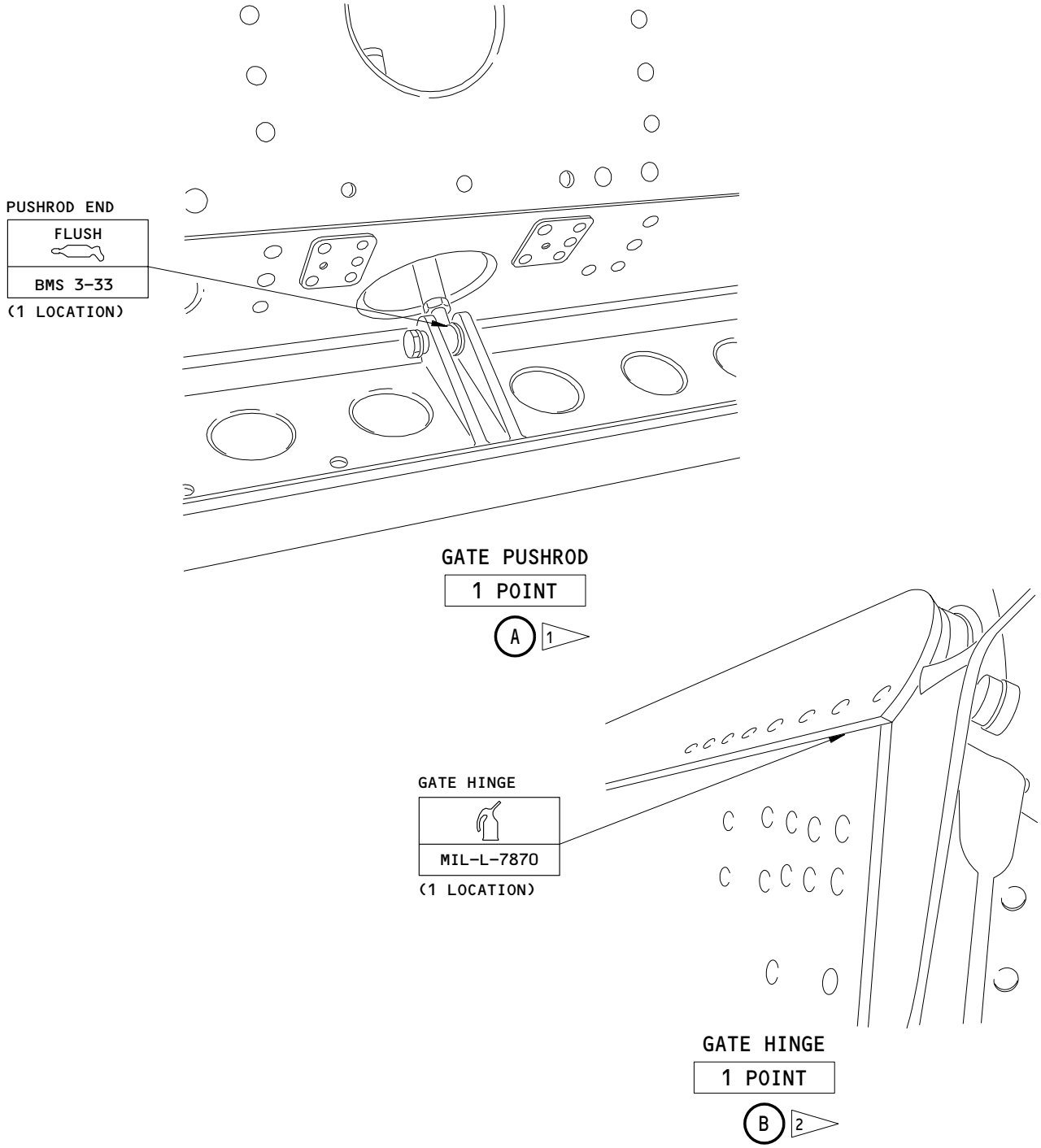
1. General
   A. This procedure provides instructions for lubricating the forward entry door.
2. Equipment and Materials
   A. Lubrication Set - Entry, Cargo, Service, and Galley Door Camshaft Bearings - F72942-1

      NOTE: Lubrication set may be used to reach lubrication fittings where access is difficult.

   B. Flush gun (grease gun)
   C. Oil squirt can
   D. Grease - BMS 3-33 (Preferred)
   E. Grease - MIL-PRF-23827 (Supercedes MIL-G-23827) (Alternate)
   F. Oil - MIL-L-7870
3. Service Forward Entry Door
   A. Remove forward entry door and gate lining (Ref 52-11-31).
   B. Remove handle lining retainer and handle mechanism cover plate.
   C. Lubricate forward entry door as shown (Fig. 201).
   D. Install handle mechanism cover plate and handle lining retainer.
   E. Install forward entry door and gate lining (Ref 52-11-31/404).



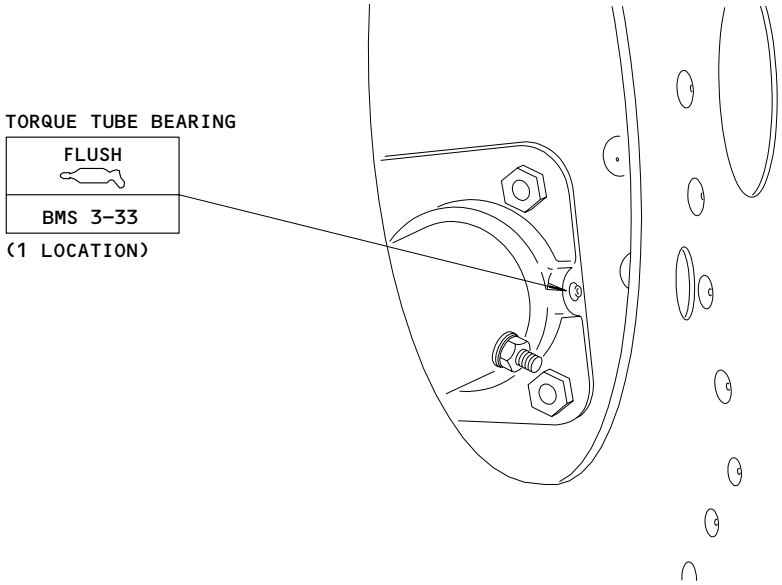
Forward Entry Door Lubrication
Figure 201 (Sheet 1)



1 THE LOWER CENTER PUSHROD IS SHOWN. THE OTHER FIVE GATE PUSHRODS ON THE DOOR ARE THE SAME

2 THE UPPER GATE HINGE IS SHOWN. THE LOWER GATE HINGE IS THE SAME

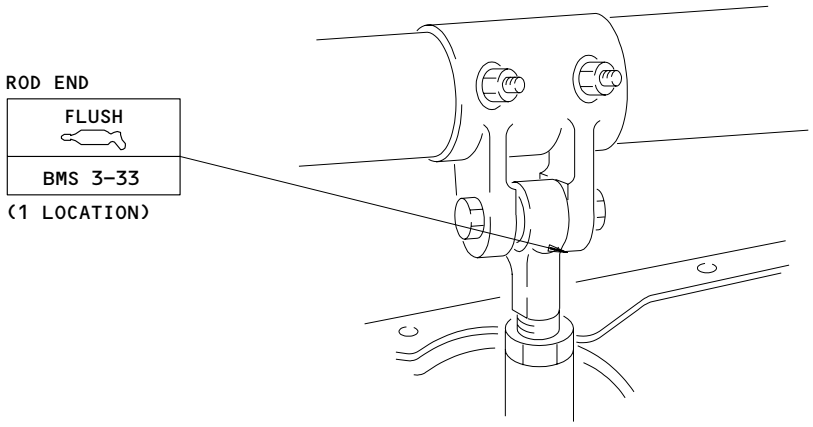
Forward Entry Door Lubrication
Figure 201 (Sheet 2)



TORQUE TUBE BEARING

2 POINTS

C 3



3 THERE ARE FOUR TORQUE TUBE BEARINGS ON THE DOOR

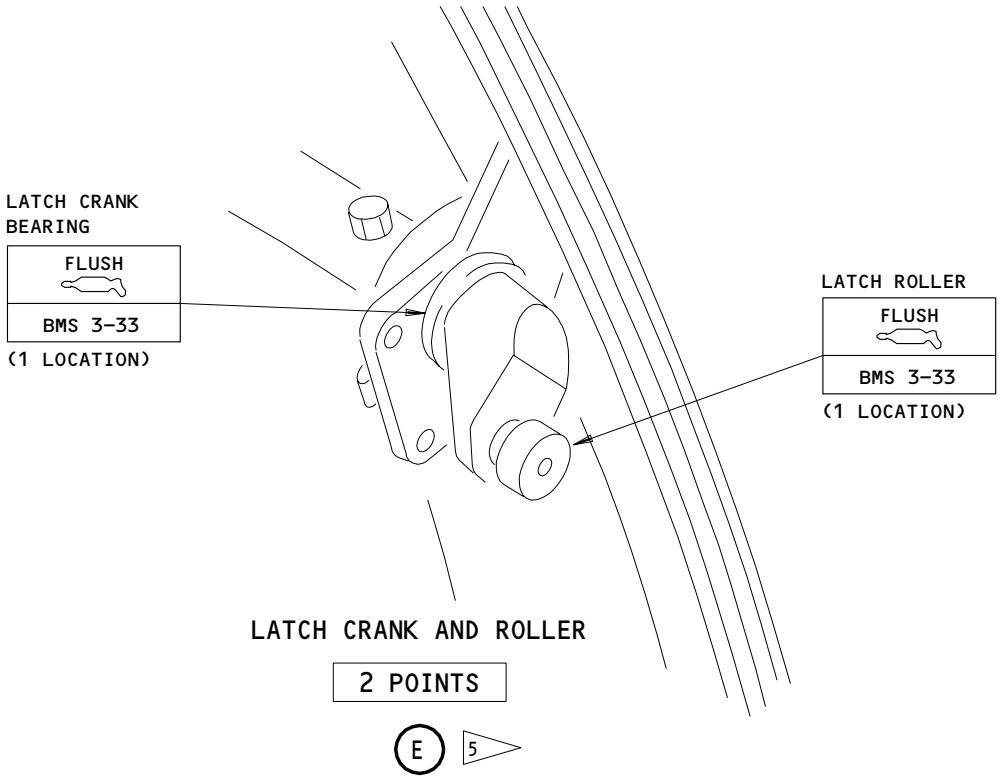
4 THERE ARE FOUR ACTUATING PUSHROD ENDS ON THE DOOR

ACTUATING PUSHROD ENDS

1 POINT

D 4

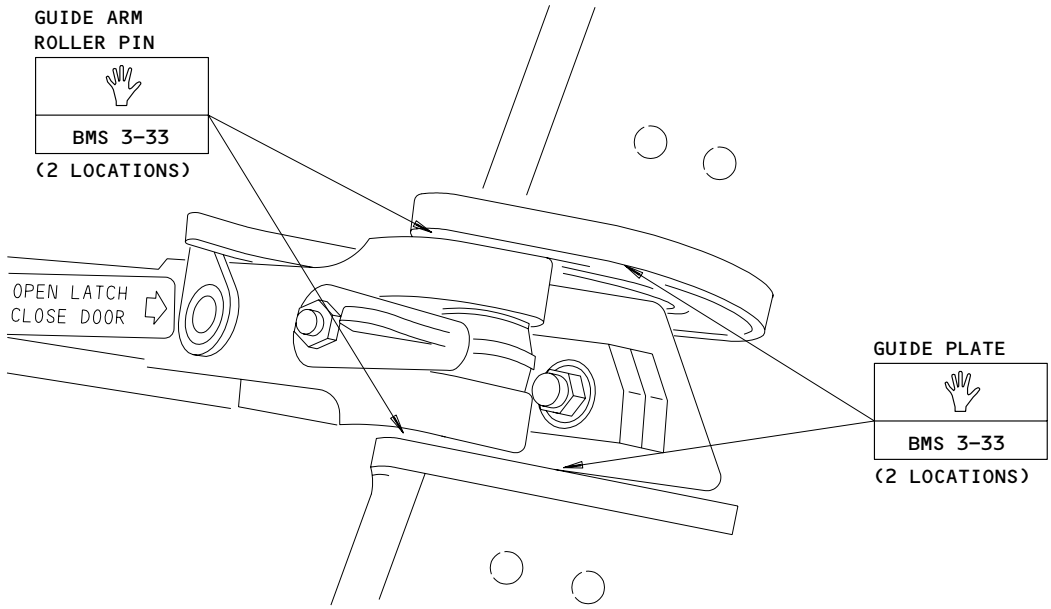
Forward Entry Door Lubrication
Figure 201 (Sheet 3)



LATCH CRANK AND ROLLER

2 POINTS

E 5



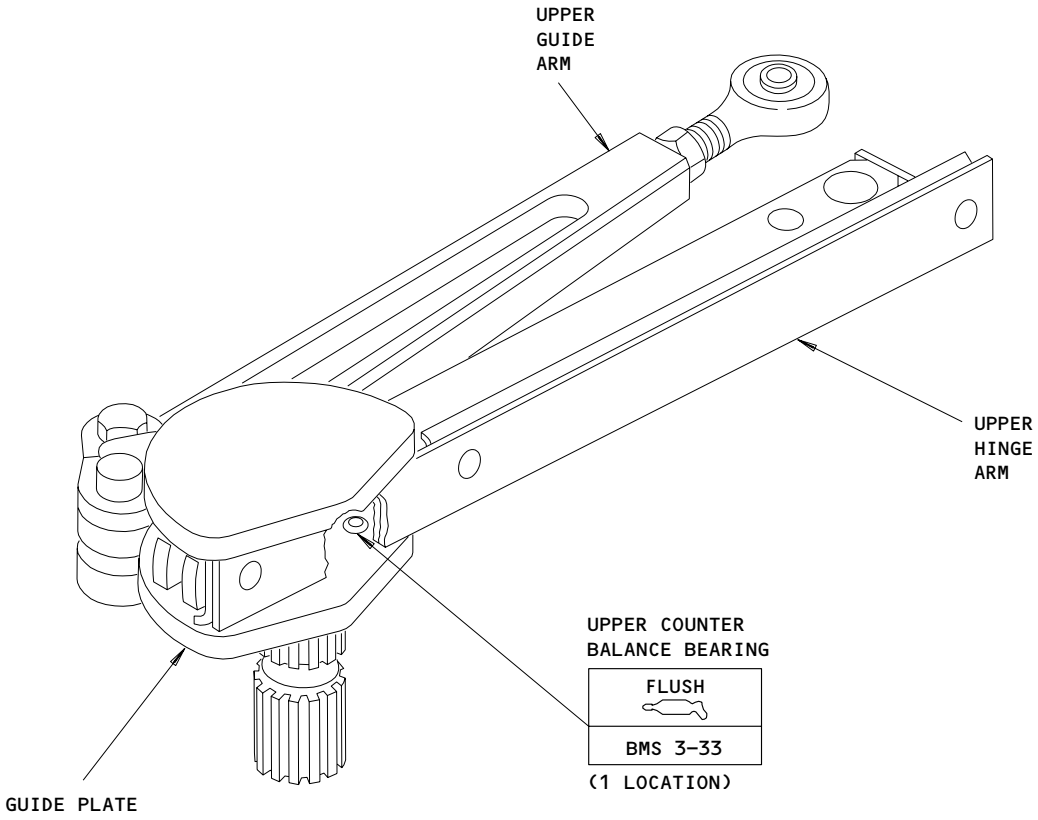
UPPER HINGE GUIDE PLATE

4 POINTS

F

5 THERE ARE FOUR LATCH CRANKS ON DOOR

Forward Entry Door Lubrication
Figure 201 (Sheet 4)

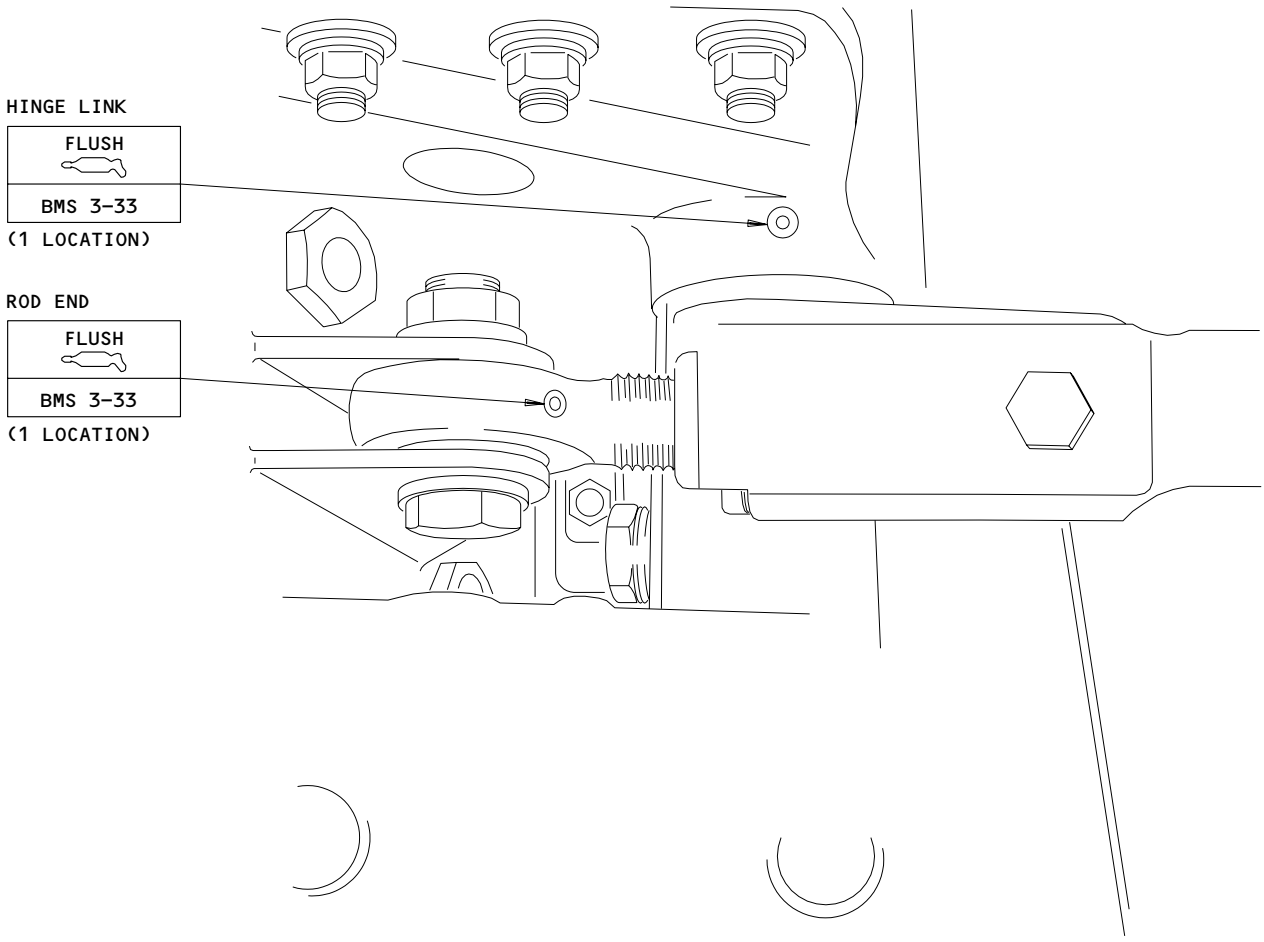


UPPER DOOR COUNTERBALANCE

1 POINT

G

Forward Entry Door Lubrication
Figure 201 (Sheet 5)

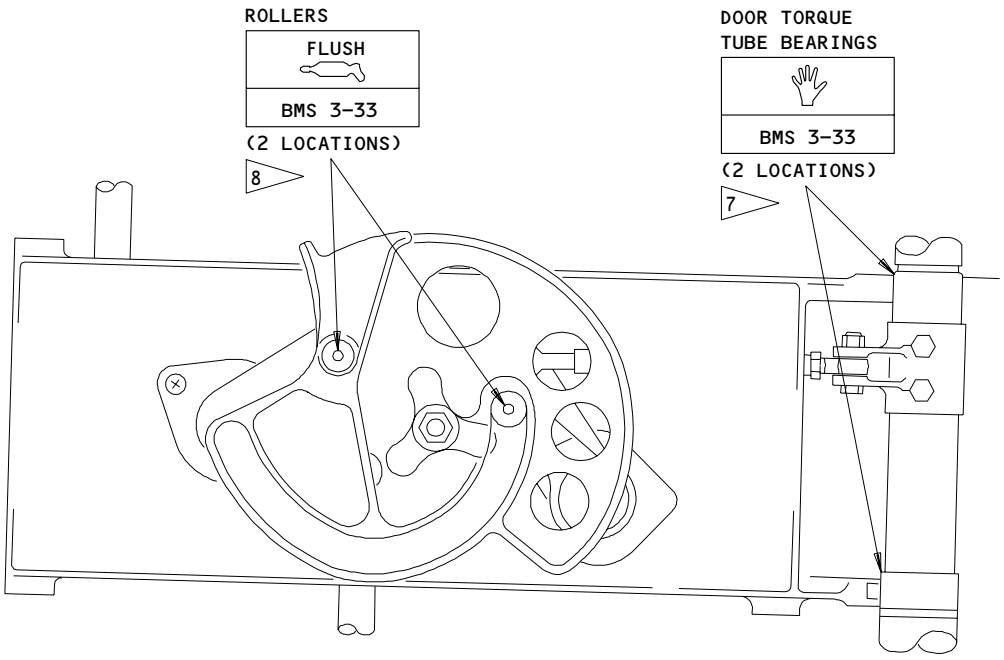


UPPER HINGE ARM

2 POINTS

H

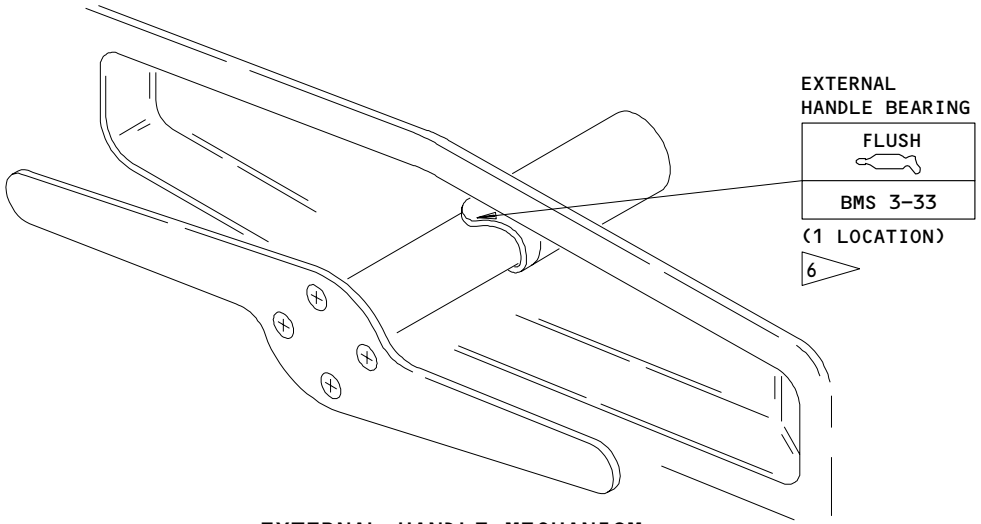
Forward Entry Door Lubrication
Figure 201 (Sheet 6)



INTERNAL HANDLE MECHANISM

4 POINTS

I



EXTERNAL HANDLE MECHANISM

1 POINT

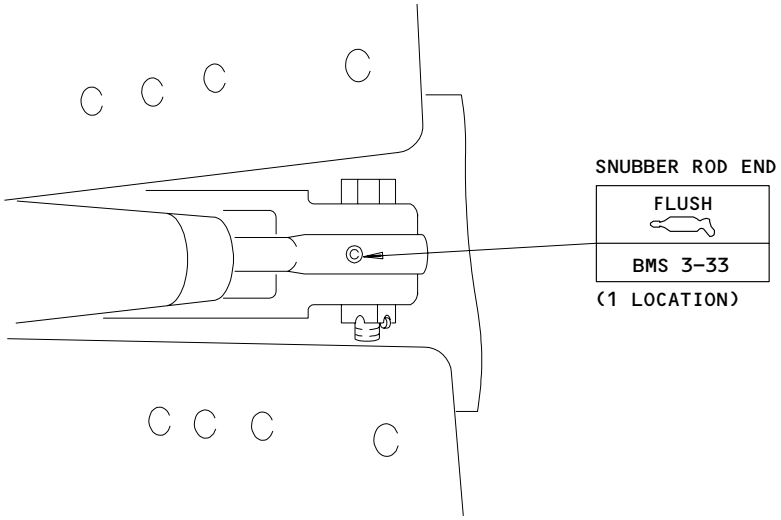
J

6 PULL THE EXTERNAL HANDLE TO GET ACCESS TO THE FLUSH FITTING

7 FILL THE EMPTY SPACES ABOVE THE DOOR TORQUE TUBE BEARINGS

8 PUT THE CAM PLATE IN THE LATCHED CLOSED POSITION FOR ACCESS TO THE ROLLERS

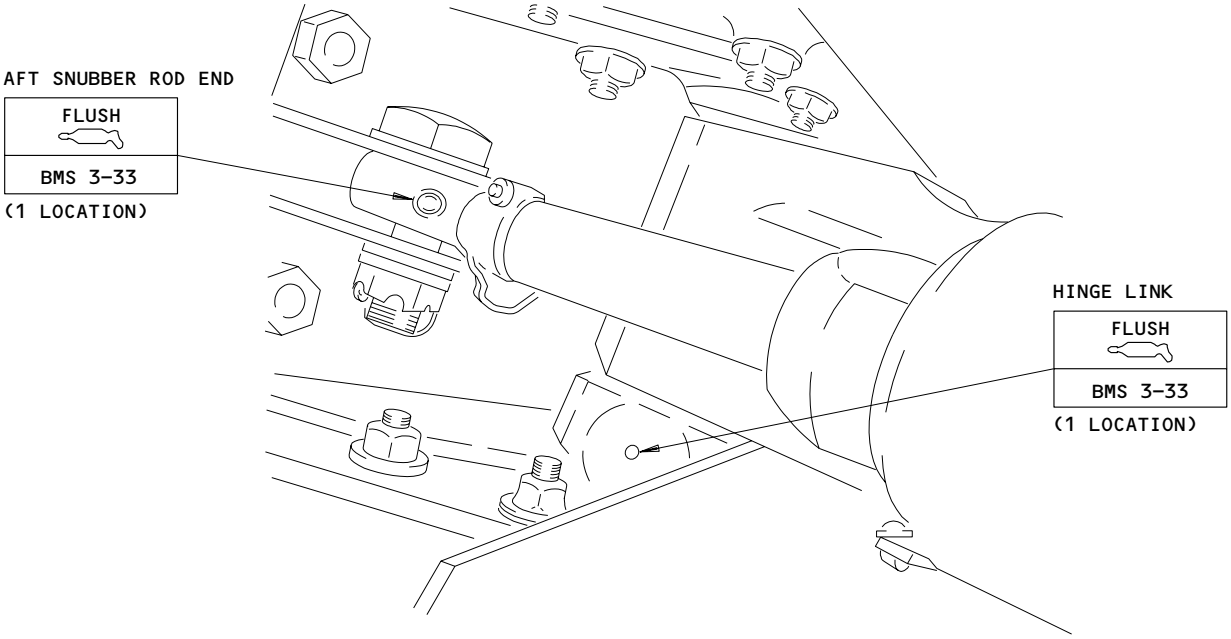
Forward Entry Door Lubrication
Figure 201 (Sheet 7)



FORWARD SNUBBER END

1 POINT

K

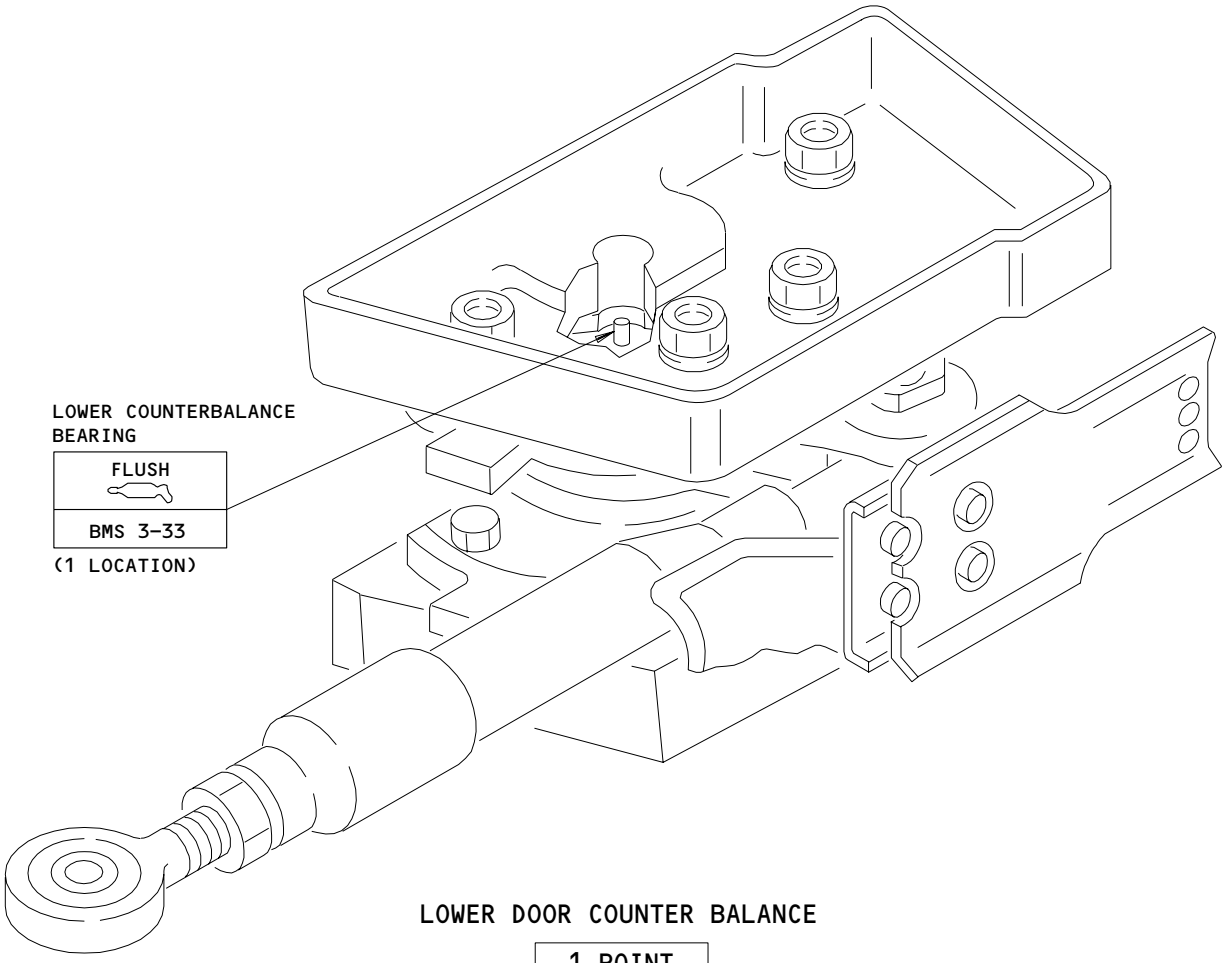


LOWER HINGE

2 POINTS

L

Forward Entry Door Lubrication
Figure 201 (Sheet 8)

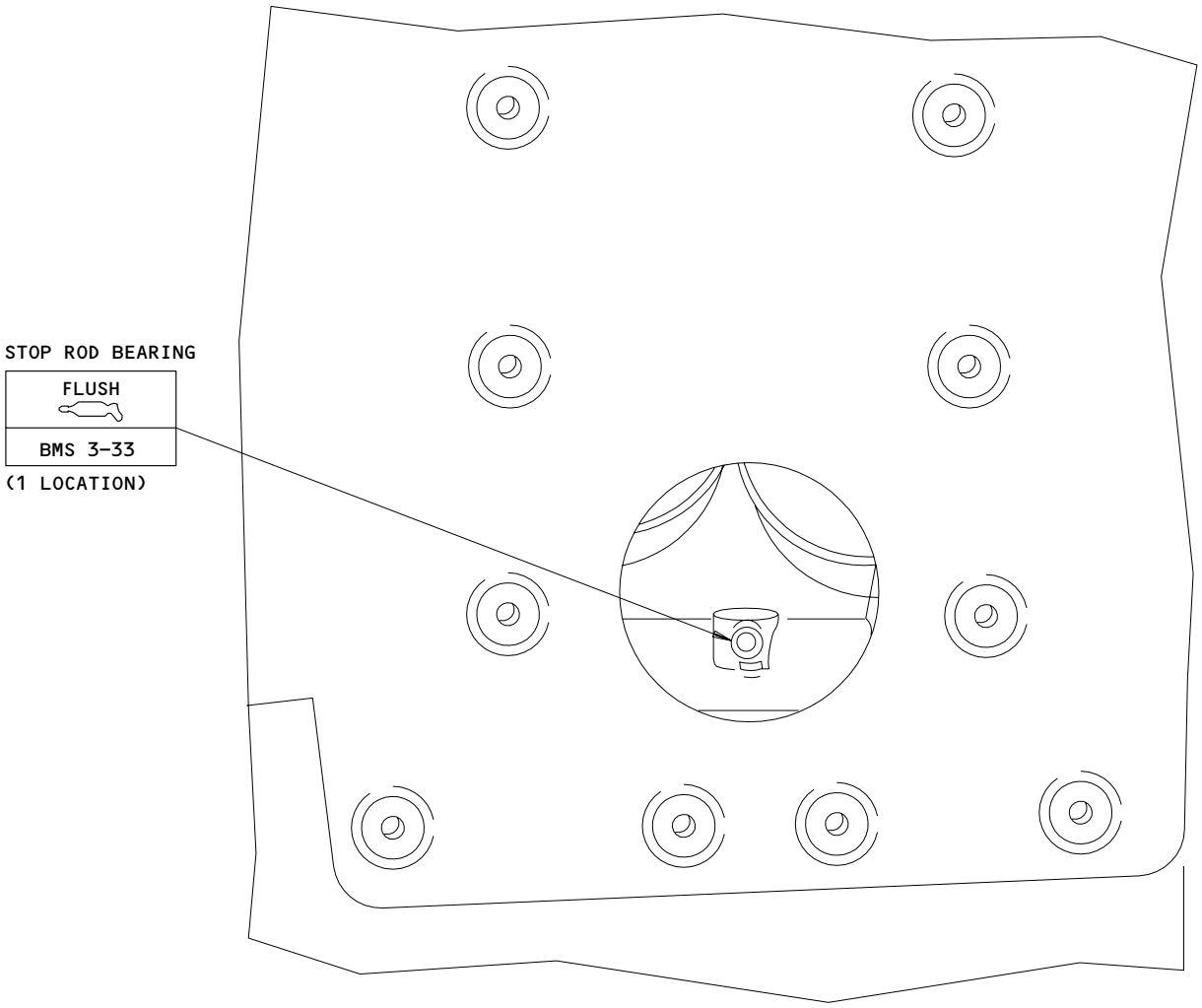


LOWER DOOR COUNTER BALANCE

1 POINT

M

Forward Entry Door Lubrication
Figure 201 (Sheet 9)



9 THERE ARE FOUR STOP ROD PUSHRODS ON THE DOOR

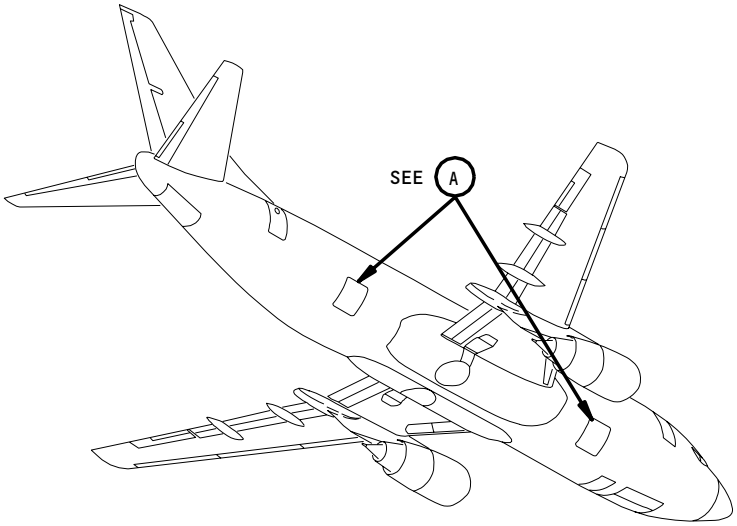
Forward Entry Door Lubrication
Figure 201 (Sheet 10)

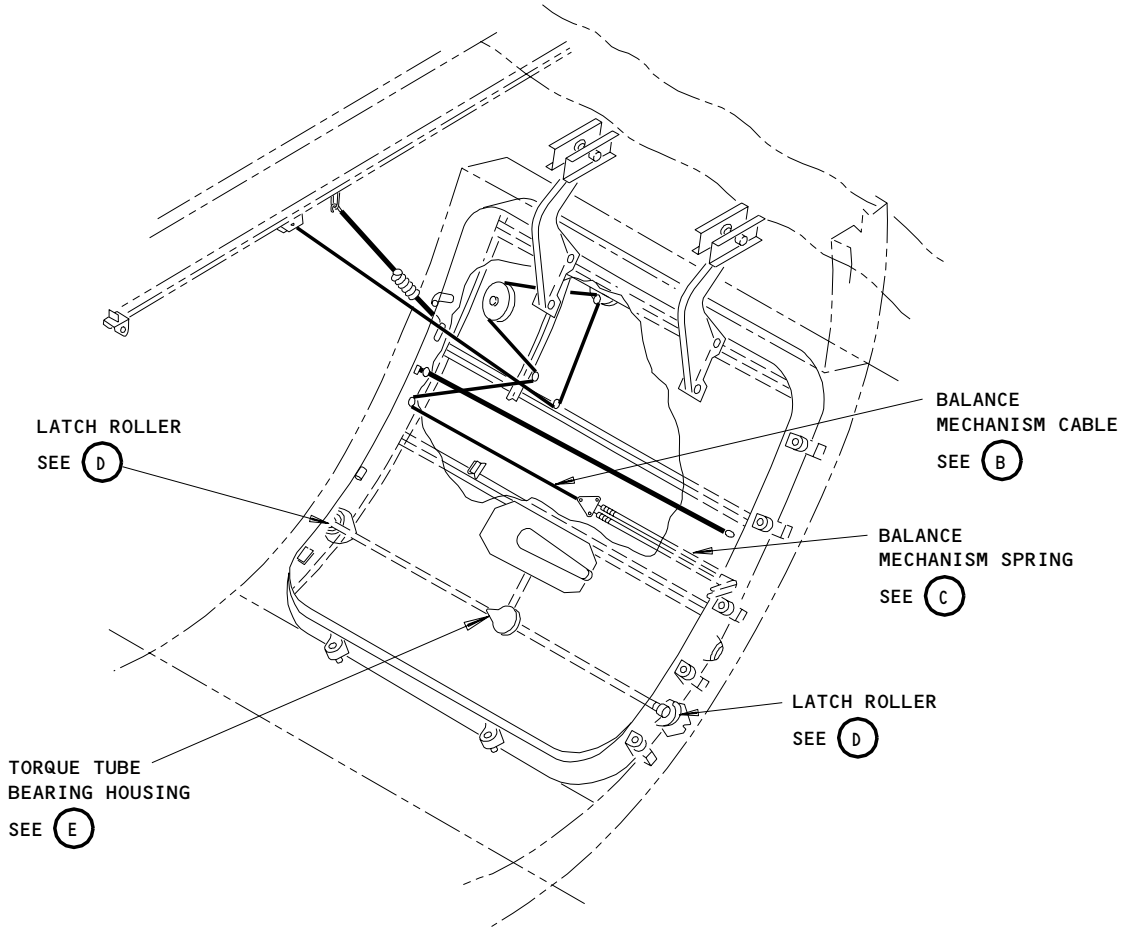
CARGO DOOR LUBRICATION

1. General
   A. This procedure provides instructions for lubricating the forward and aft cargo doors.
2. Equipment and Materials
   A. Lubrication Set - Entry, Cargo, Service, and Galley Door Camshaft Bearings - F72942-1

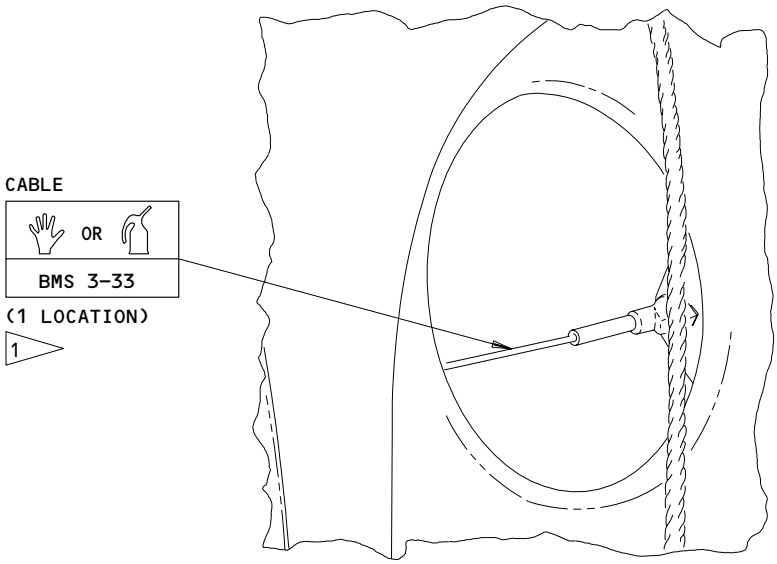
      NOTE: Lubrication set may be used to reach lubrication fittings where access is difficult.

   B. Flush gun (grease gun)
   C. Oil spray can
   D. Grease - BMS 3-33 (Preferred)
   E. Grease - MIL-PRF-23827 (Supercedes MIL-G-23827) (Alternate)
   F. Compound - BMS 3-23
   G. Adapter, Grease Gun, Cargo Door - ST992B
3. Service Cargo Door
   A. Remove the three bolts on the torque tube bearing access panel and remove the panel.
   B. Lubricate the cargo door as shown (Fig. 201).
   C. Replace the torque tube bearing access panel and the three bolts.





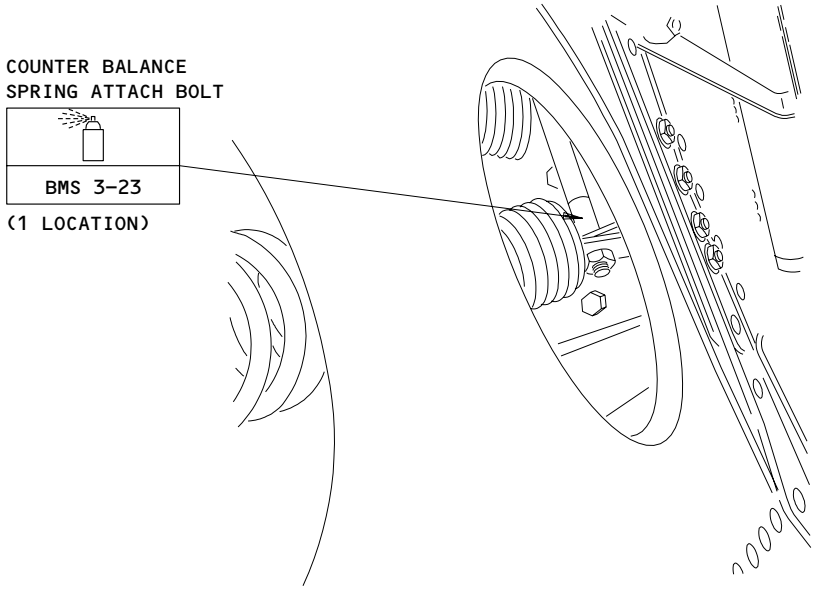
Cargo Door Lubrication
Figure 201 (Sheet 1)



BALANCE MECHANISM CABLE

1 POINT

B

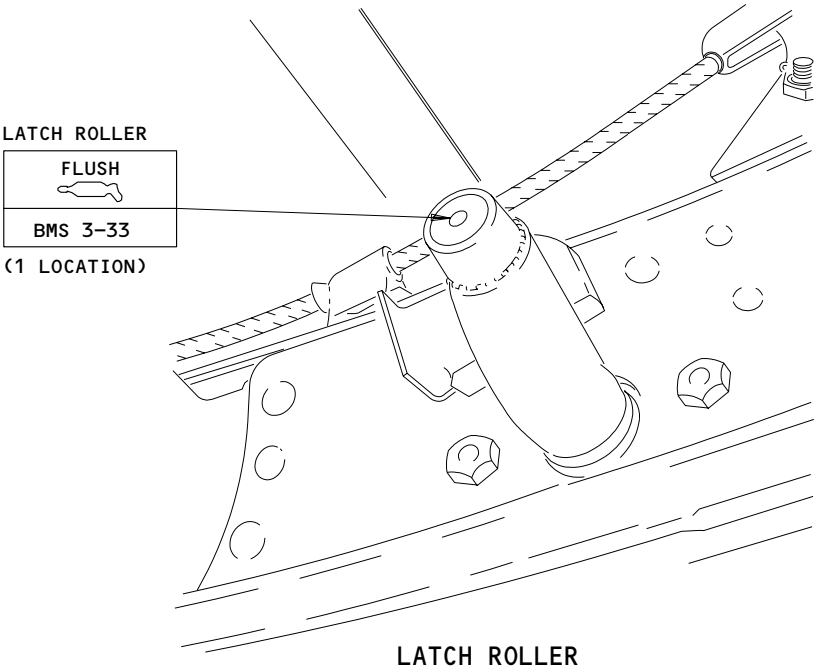


1 POINT

C

1 ACCESSIBLE BY REMOVING INSULATION PADS. REFER TO 12-26-0 FOR CABLE LUBRICATION PROCEDURE

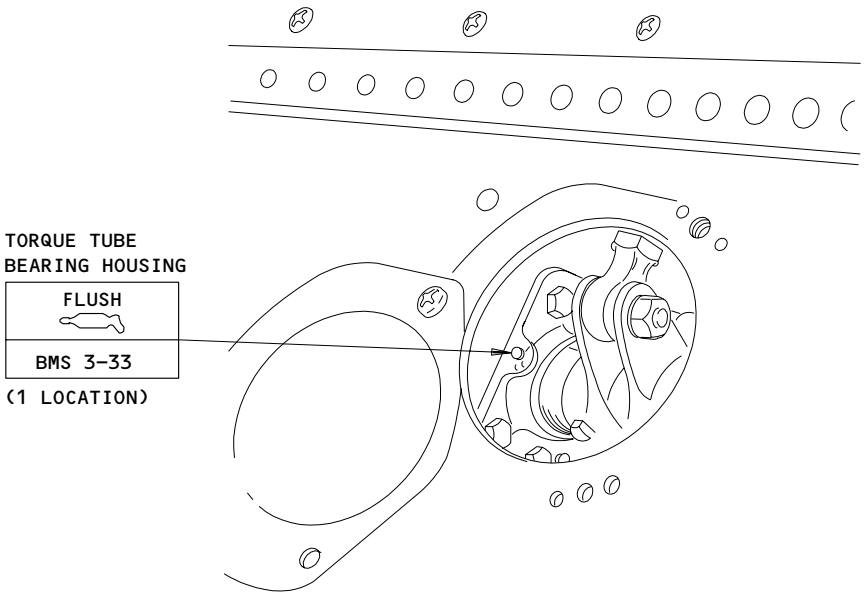
Cargo Door Lubrication
Figure 201 (Sheet 2)



LATCH ROLLER

1 POINT

D 2



TORQUE TUBE BEARING HOUSING

1 POINT

E

2 THERE ARE TWO LATCH ROLLERS ON EACH CARGO DOOR

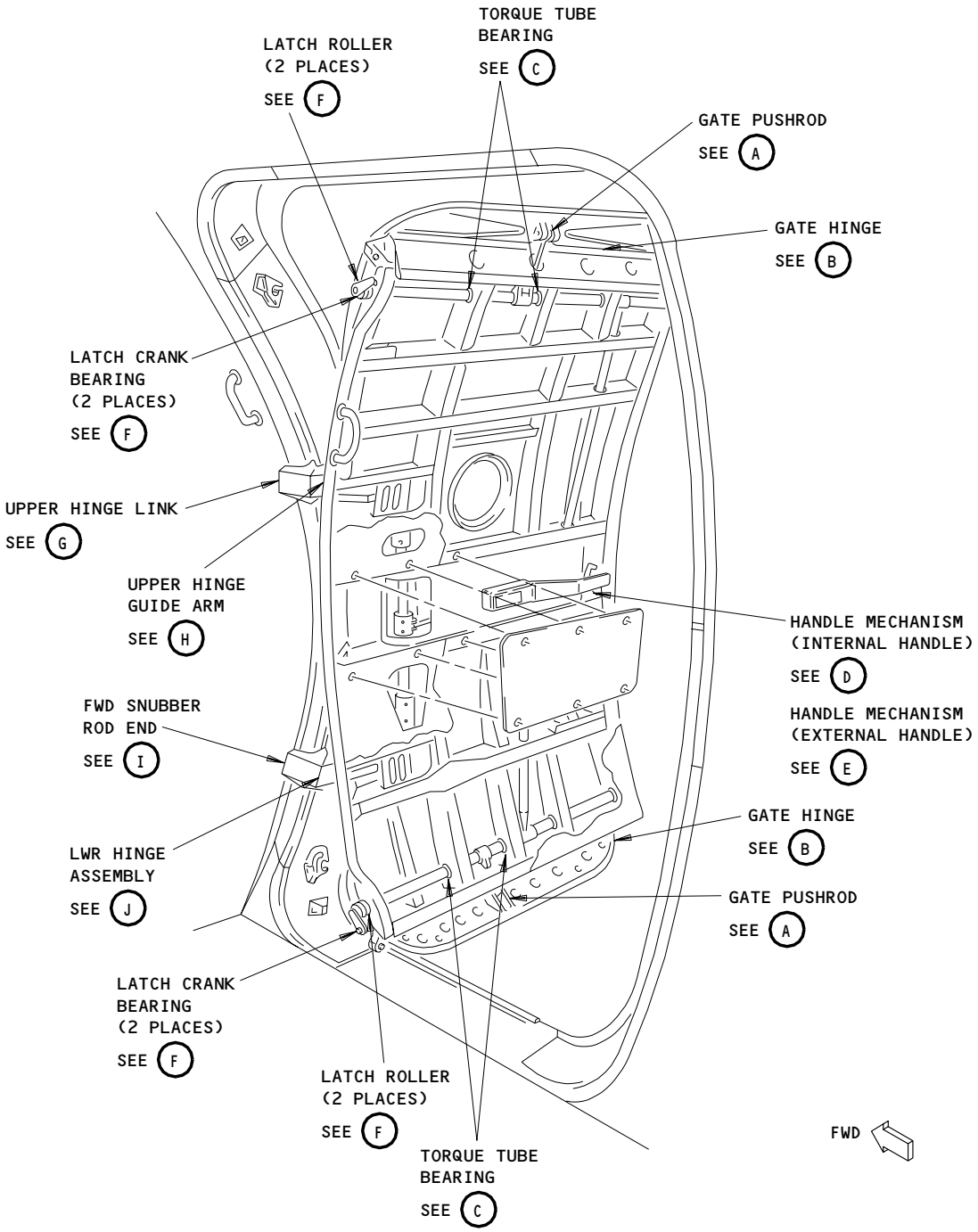
Cargo Door Lubrication
Figure 201 (Sheet 3)

GALLEY DOOR - LUBRICATION

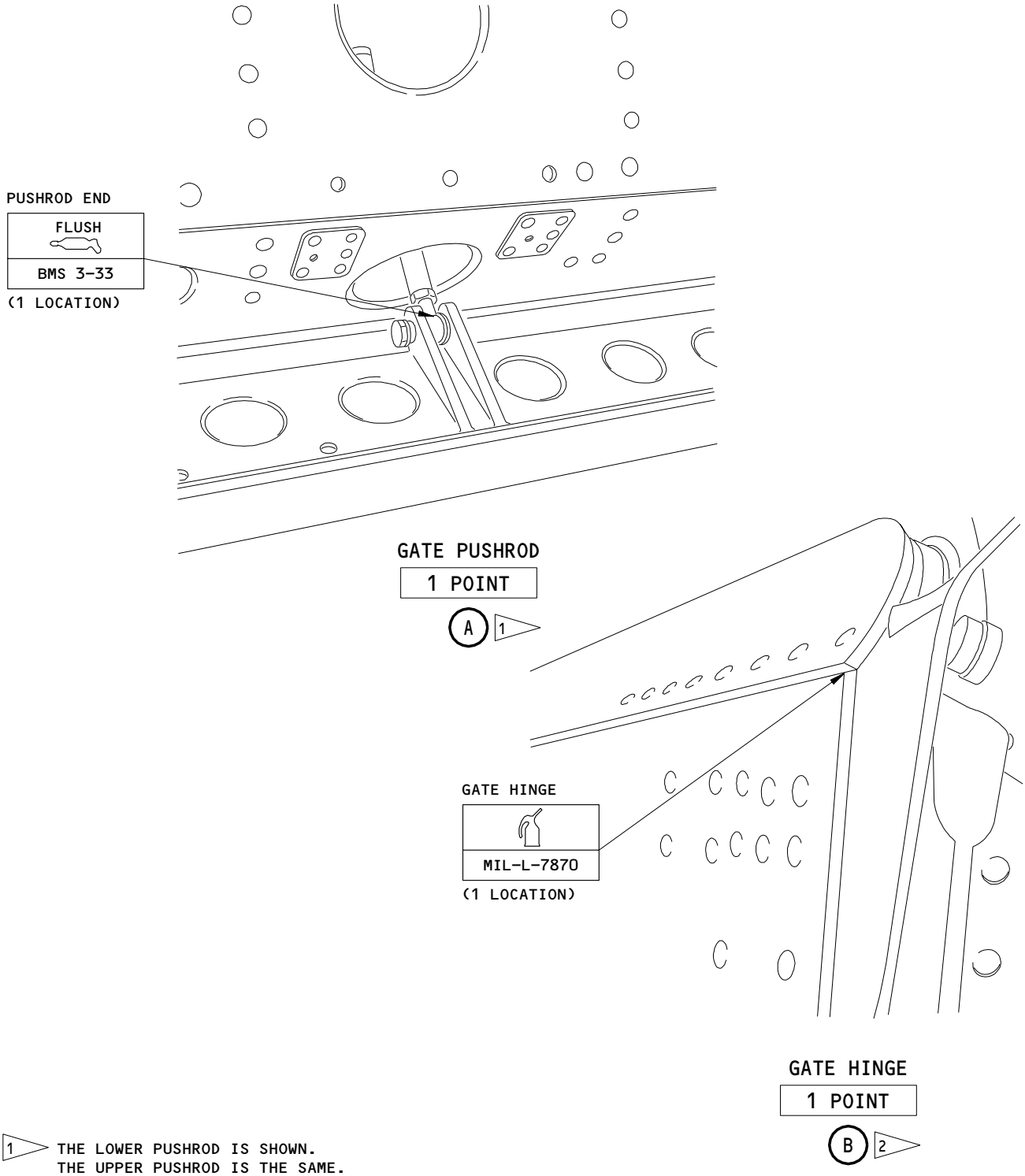
1. General
   A. This procedure provides instructions for lubricating the galley doors.
2. Equipment and Materials
   A. Lubrication Set - Entry, Cargo, Service, and Galley Door Camshaft Bearings - F72942-1

      NOTE: Lubrication set may be used to reach lubrication fittings where access is difficult.

   B. Flush gun (grease gun)
   C. Oil squirt can
   D. Grease - BMS 3-33 (Preferred)
   E. Grease - MIL-PRF-23827 (Supercedes MIL-G-23827) (Alternate)
   F. Oil - MIL-L-7870
3. Service Galley Door
   A. Remove the galley door lining and the gate lining (Ref 52-41-31).
   B. Remove the handle lining retainer and the handle mechanism cover plate.
   C. Lubricate the galley door as shown (Fig. 201).
   D. Install the handle lining retainer and the handle mechanism cover plate.



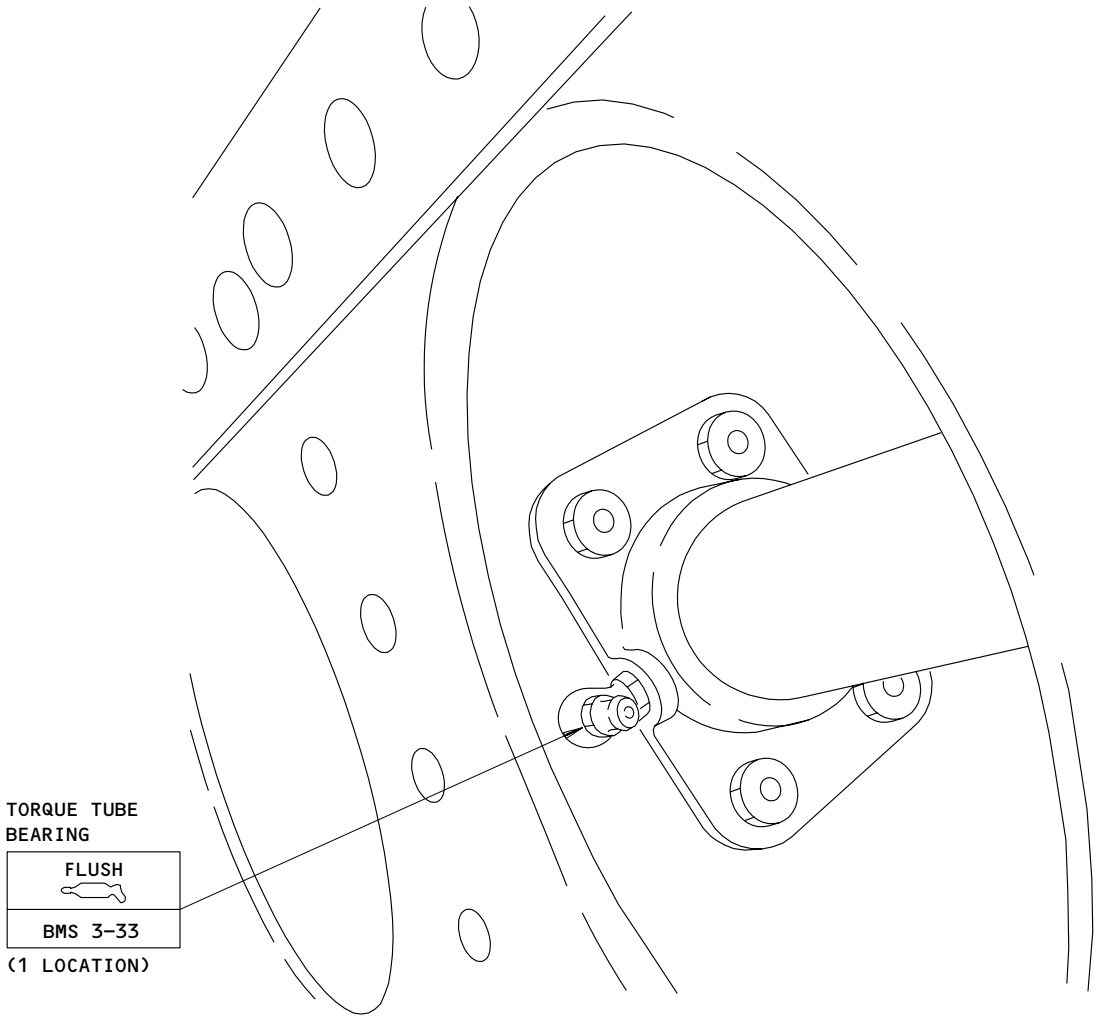
Galley Door Lubrication
Figure 201 (Sheet 1)



1 THE LOWER PUSHROD IS SHOWN.
THE UPPER PUSHROD IS THE SAME.

2 THE UPPER GATE HINGE IS SHOWN.
THE LOWER GATE HINGE IS THE SAME

Galley Door Lubrication
Figure 201 (Sheet 2)



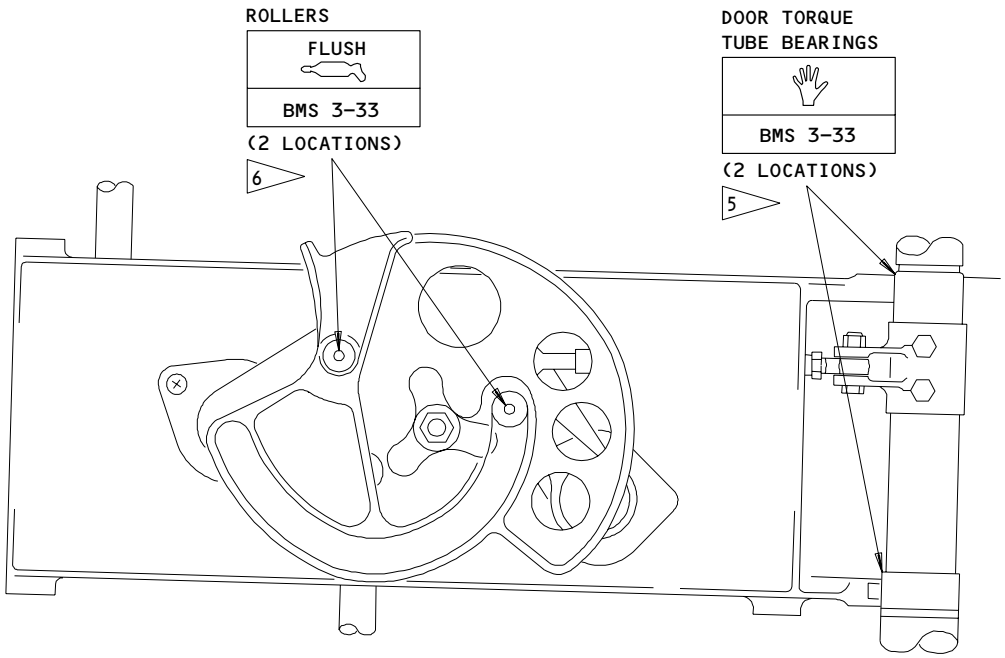
TORQUE TUBE BEARING

1 POINT

C 3

3 THERE ARE FOUR TORQUE TUBE BEARINGS ON THE DOOR

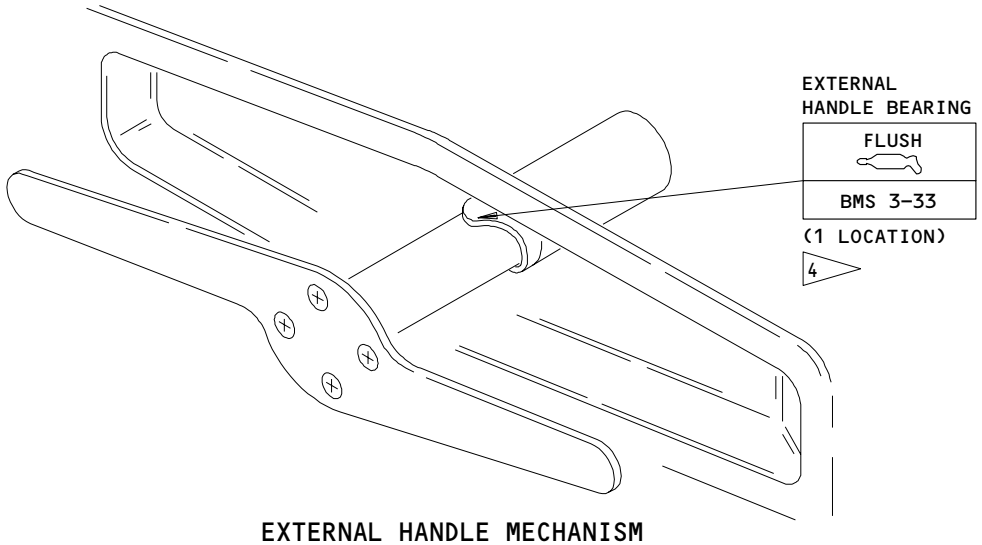
Galley Door Lubrication
Figure 201 (Sheet 3)



INTERNAL HANDLE MECHANISM

4 POINTS

D



EXTERNAL HANDLE MECHANISM

1 POINT

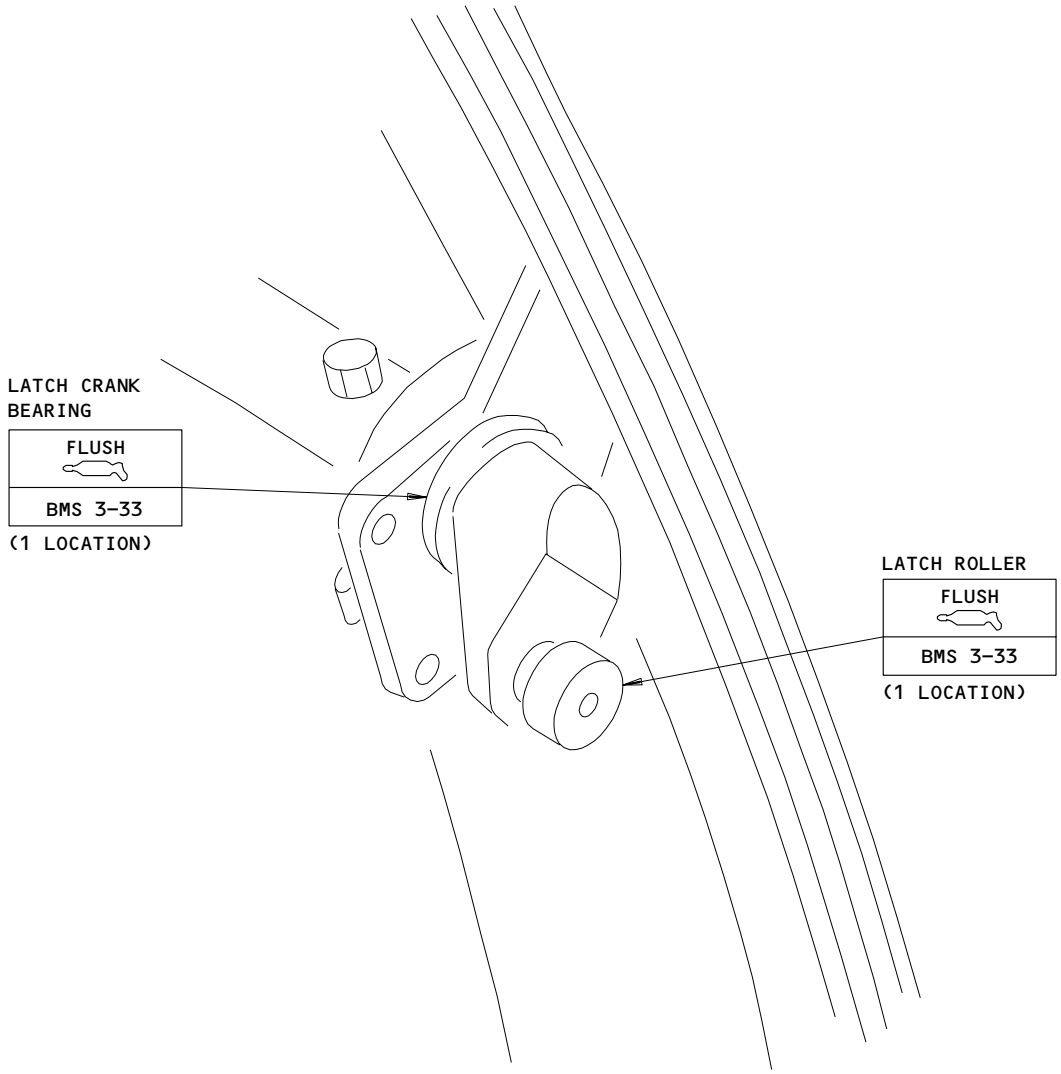
E

4 PULL THE EXTERNAL HANDLE TO GET ACCESS TO THE FLUSH FITTING

5 FILL THE EMPTY SPACES ABOVE THE DOOR TORQUE TUBE BEARINGS

6 PUT THE CAM PLATE IN THE LATCHED CLOSED POSITION FOR ACCESS TO THE ROLLERS

Galley Door Lubrication
Figure 201 (Sheet 4)



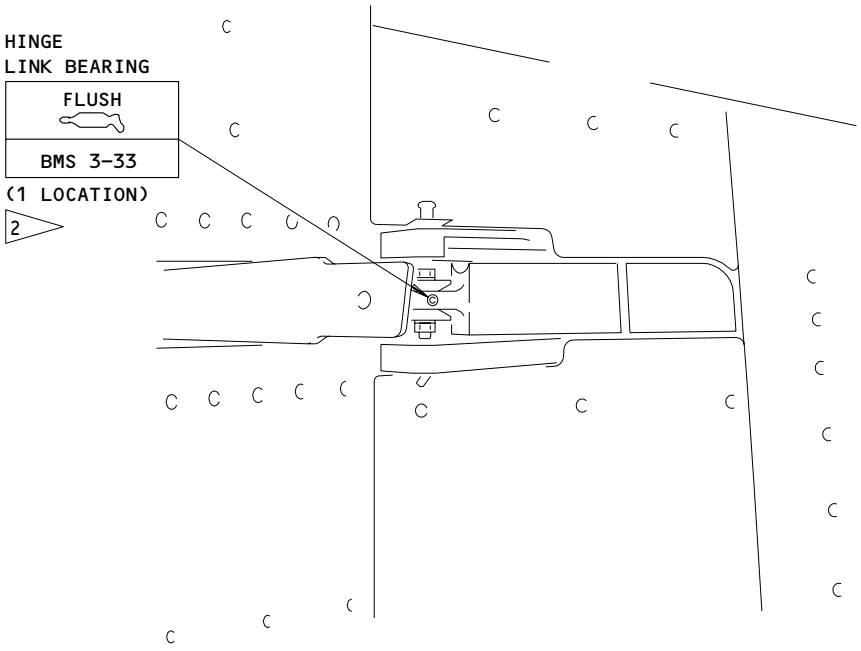
LATCH CRANK AND ROLLER

2 POINTS

F 7

7 THERE ARE FOUR LATCH CRANKS ON DOOR

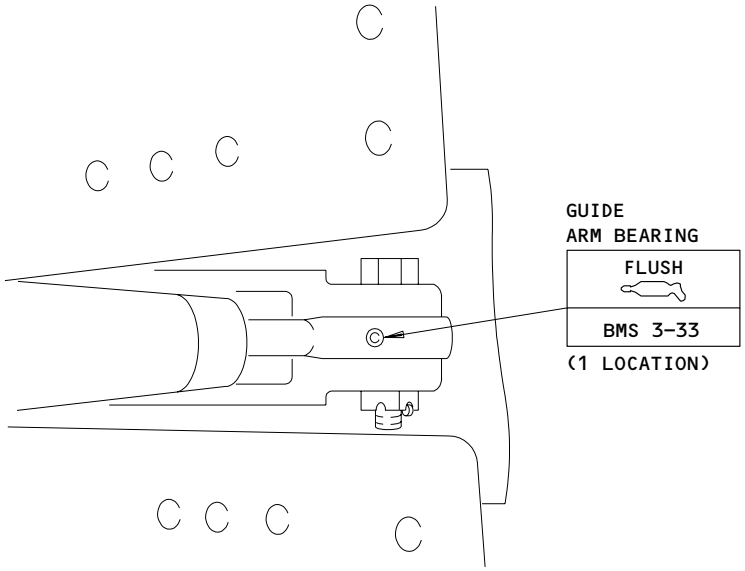
Galley Door Lubrication
Figure 201 (Sheet 5)



UPPER HINGE LINK

1 POINT

G



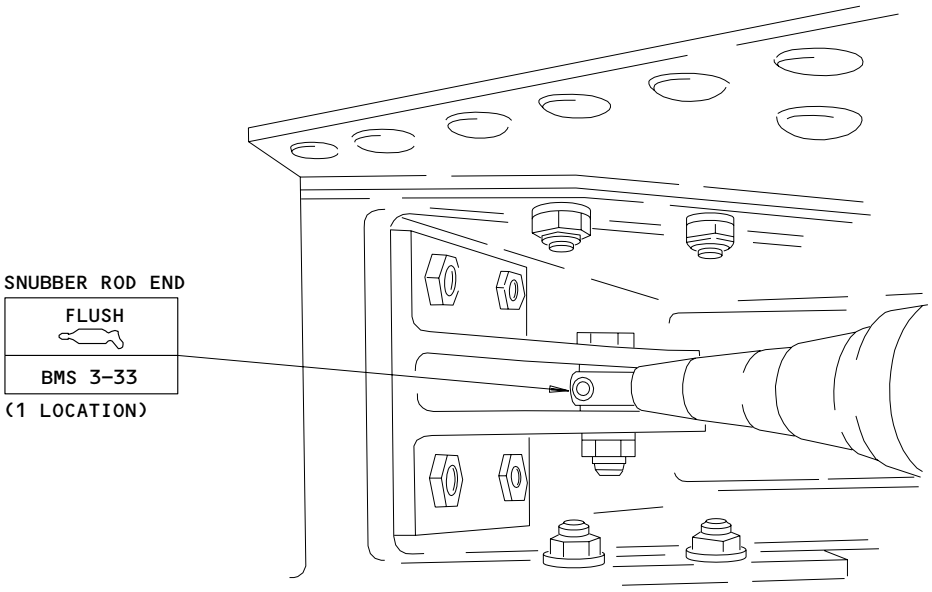
UPPER HINGE GUIDE ARM

1 POINT

H

2 THE DOOR IS NOT OPEN COMPLETELY IN THIS VIEW.

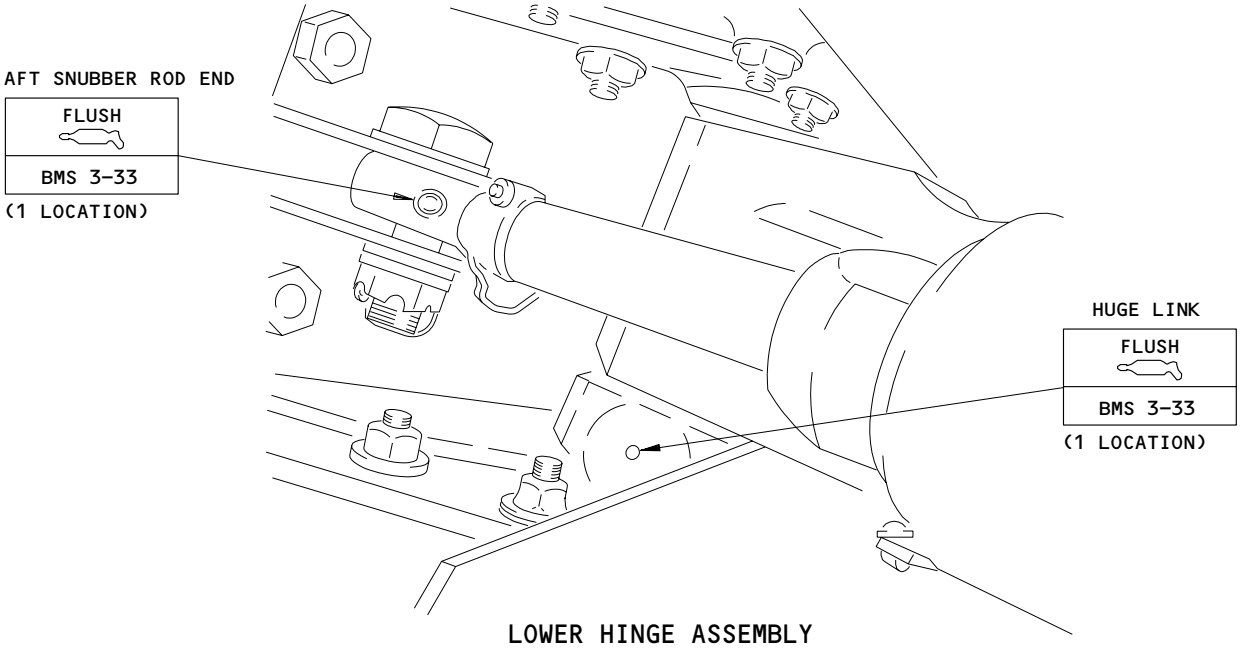
Galley Door Lubrication
Figure 201 (Sheet 6)



FWD SNUBBER ROD END

1 POINT

I



LOWER HINGE ASSEMBLY

2 POINTS

J

Galley Door Lubrication
Figure 201 (Sheet 7)

SERVICE AND ACCESS DOOR LUBRICATION

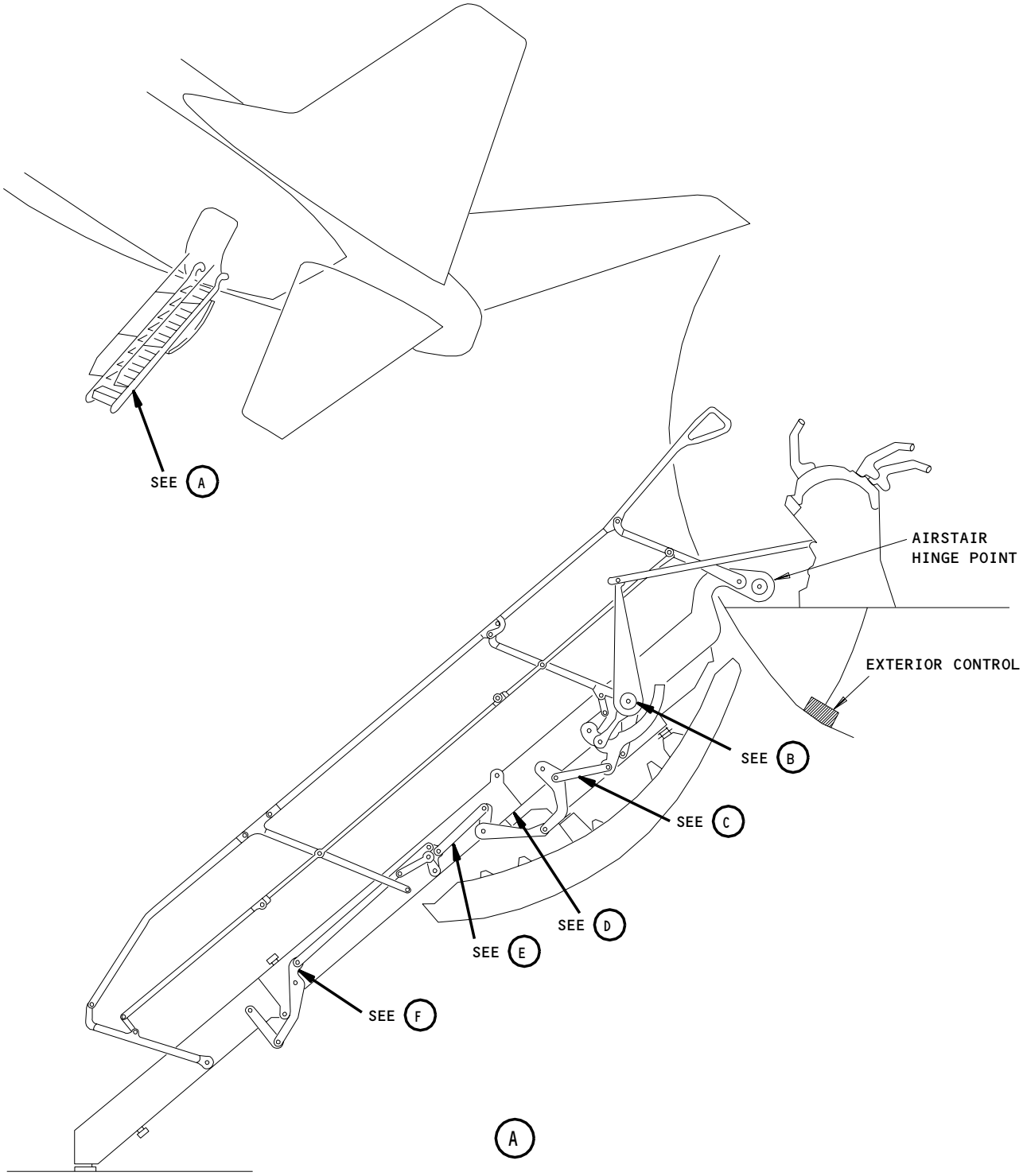
1. General
   A. For location of service and access doors covered in the following paragraphs, refer to appropriate access door and panel location sections in this chapter.
2. Fueling Station Access Door 6540
   A. Remove door and hand lubricate hinge pin with BMS 3-33 grease.
   B. Install door.
3. Manual Defuel Bay Access Door, Slat Access Panel, 6535
   A. Remove door and hand lubricate hinge pin with BMS 3-33 grease.
   B. Install door.

AFT AIRSTAIR AND ENTRY DOOR LUBRICATION

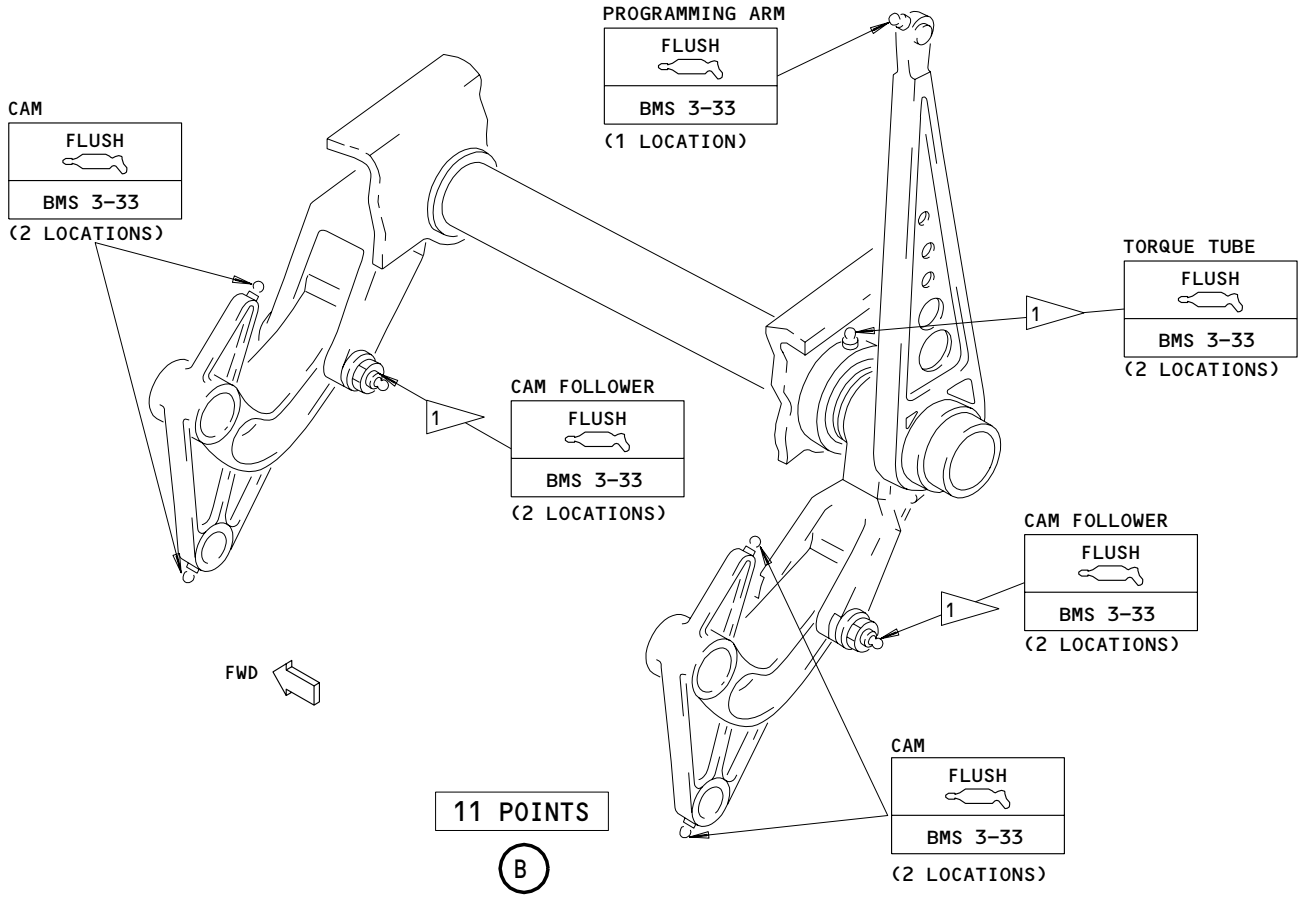
1. General
   A. This procedure provides instructions for lubricating the aft airstair and entry door.
2. Equipment and Materials
   A. Flush gun (grease gun)
   B. Zerk gun (grease gun)
   C. Lubrication Set - Entry, Cargo, Service, and Galley Door Camshaft Bearings - F72942-1

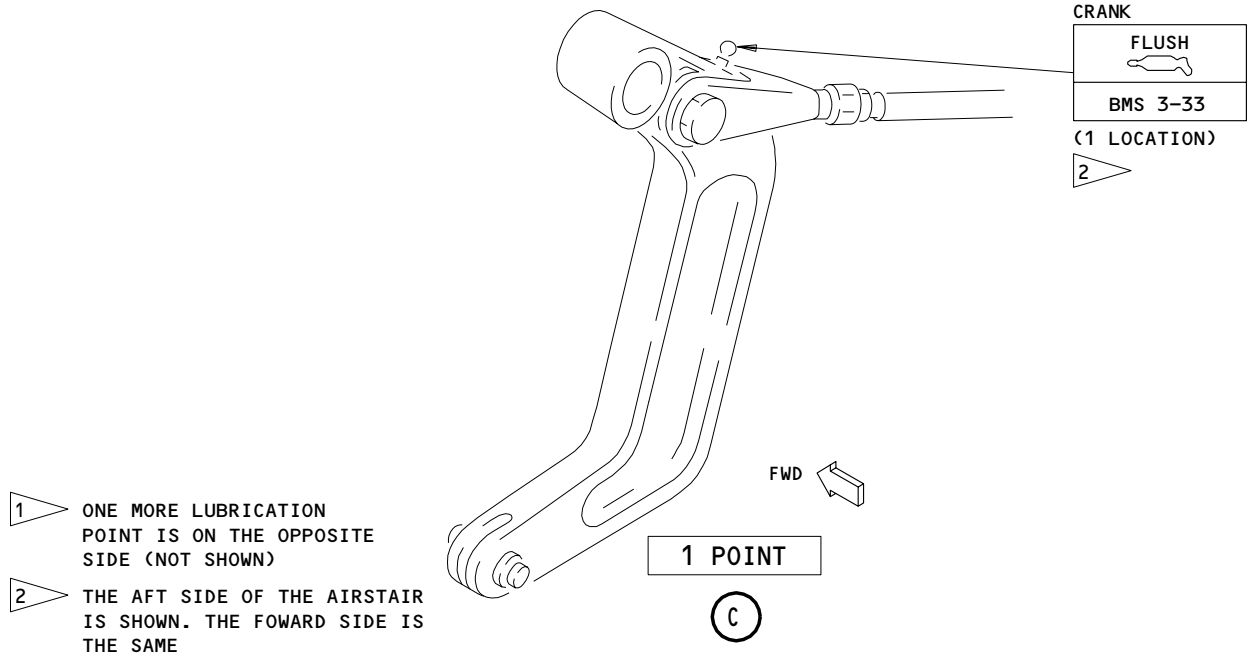
      NOTE: Lubrication set may be used to reach lubrication fittings where access is difficult.

   D. Grease - BMS 3-33 (Preferred)
   E. Grease - MIL-PRF-23827 (Supercedes MIL-G-23827) (Alternate)
3. Service Airstair and Entry Door
   A. Extend aft airstair (Ref 52-14-0 D&0).
   B. Lubricate aft airstair and entry door as shown (Fig. 202).
   C. Retract aft airstair (Ref 52-14-0 D&0).



Aft Airstairs and Entry Door Lubrication
Figure 201 (Sheet 1)

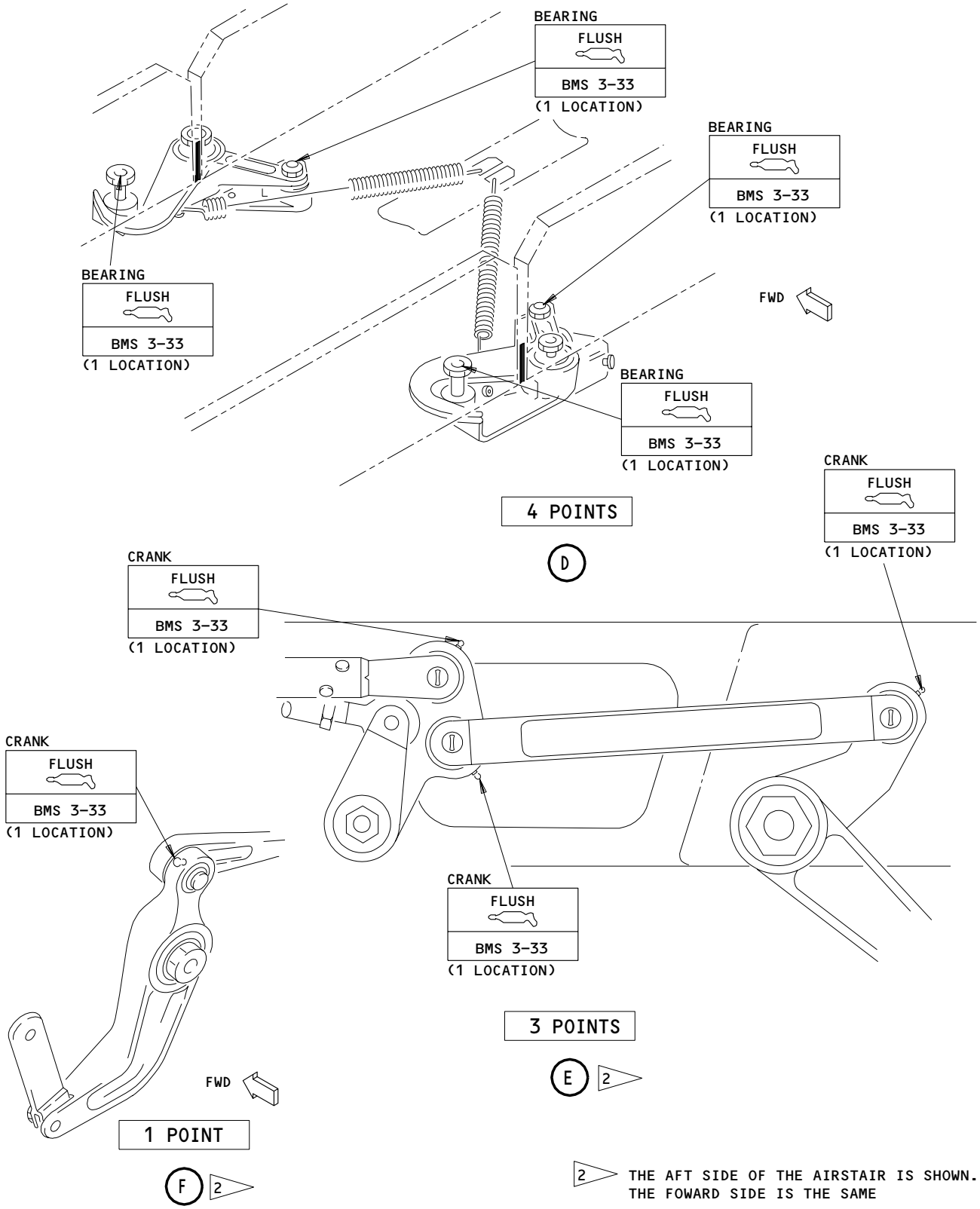




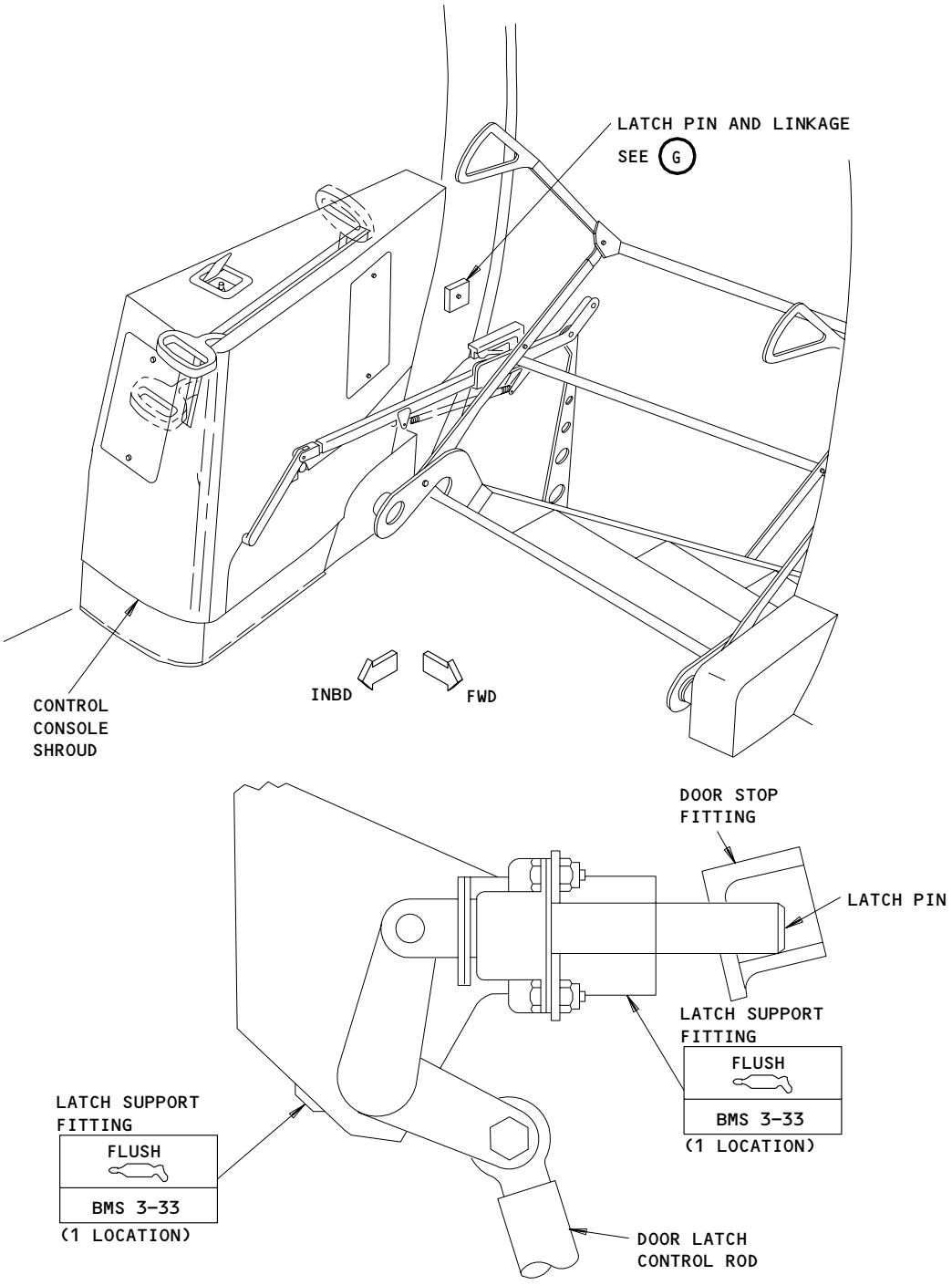
Aft Airstair and Entry Door Lubrication
Figure 201 (Sheet 2)

EFFECTIVITY
Airplanes with Aft Airstair

440744



Aft Airstair and Entry Door Lubrication
Figure 201 (Sheet 3)

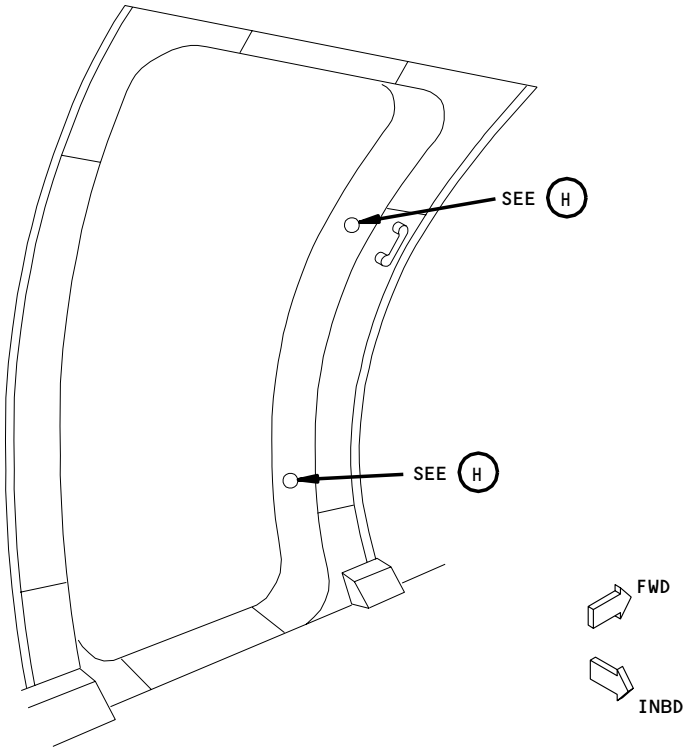


LATCH PIN AND LINKAGE

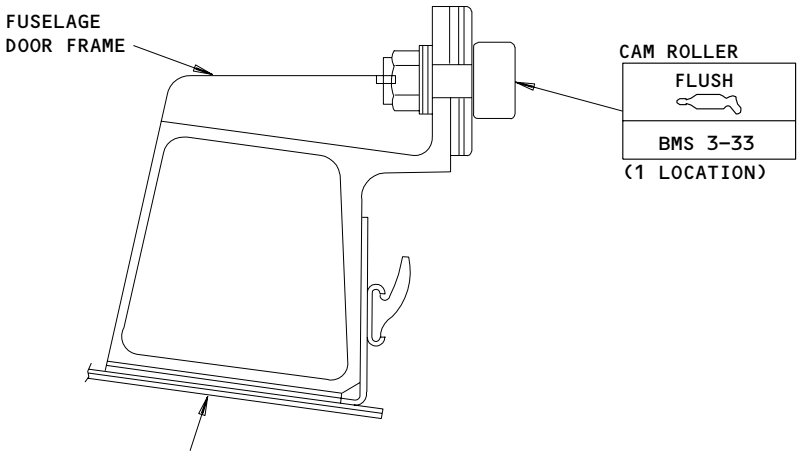
2 POINTS

G

Aft Airstairs and Entry Door Lubrication
Figure 201 (Sheet 4)



DOOR OPENING 3



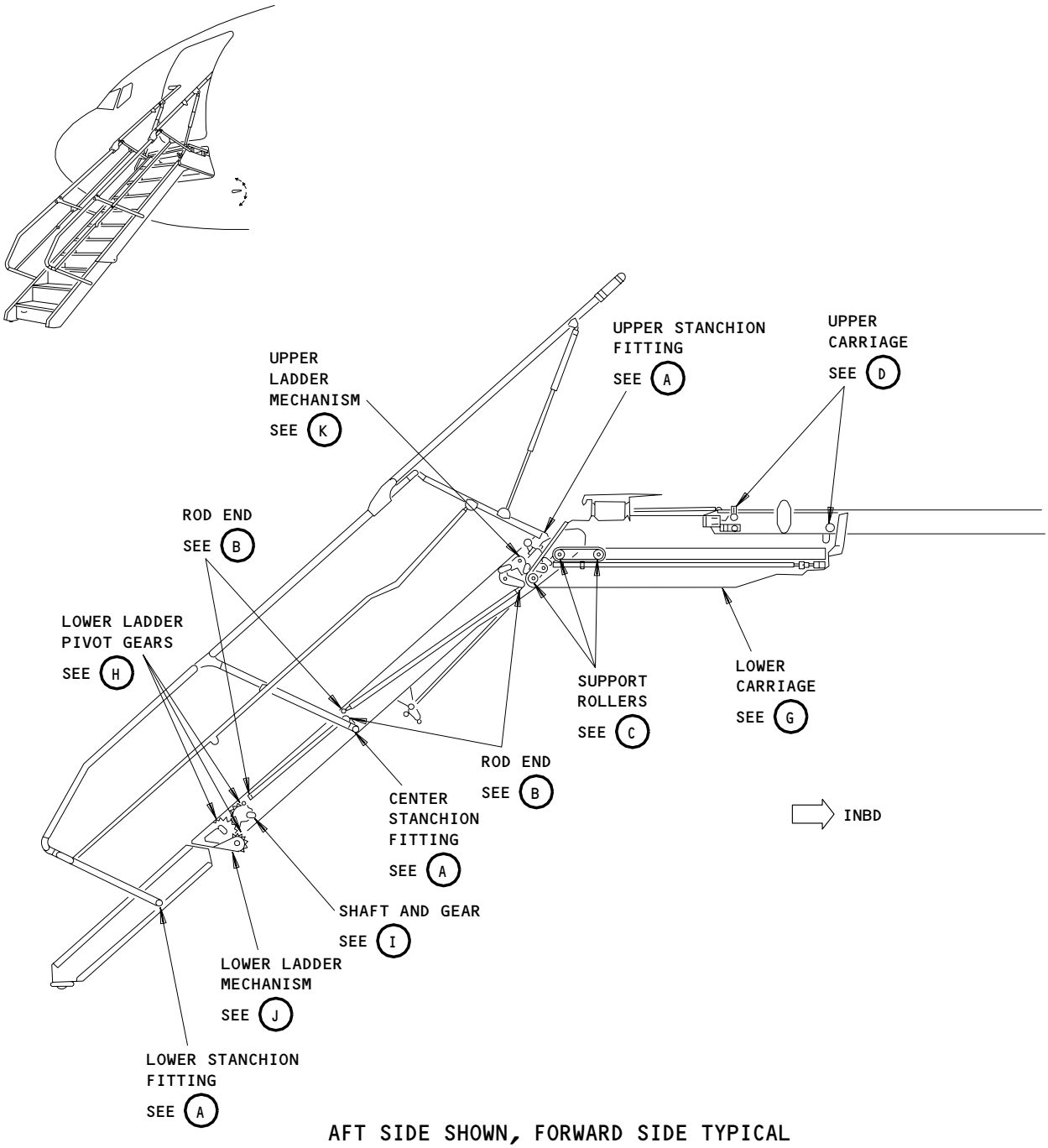
3 THE FOWARD SIDE OF THE DOOR OPENING IS SHOWN. THE AFT SIDE IS THE SAME

4 THERE ARE FOUR CAM ROLLERS ON THE DOOR

Aft Airstair and Door Lubrication
Figure 202

FORWARD AIRSTAIRS LUBRICATION

1. General
   A. This procedure provides instructions for lubricating the forward airstairs.
2. Equipment and Materials
   A. Flush gun (grease gun)
   B. Zerk gun (grease gun)
   C. Grease - BMS 3-33 (Preferred)
   D. Grease - MIL-PRF-23827 (Supercedes MIL-G-23827) (Alternate)
3. Service Forward Airstairs
   A. Extend forward airstairs (Ref. 52-61-0 D&0).
   B. Lubricate forward airstairs as shown (Fig. 201).
   C. Retract forward airstairs (Ref. 52-61-0 D&0).



AFT SIDE SHOWN, FORWARD SIDE TYPICAL

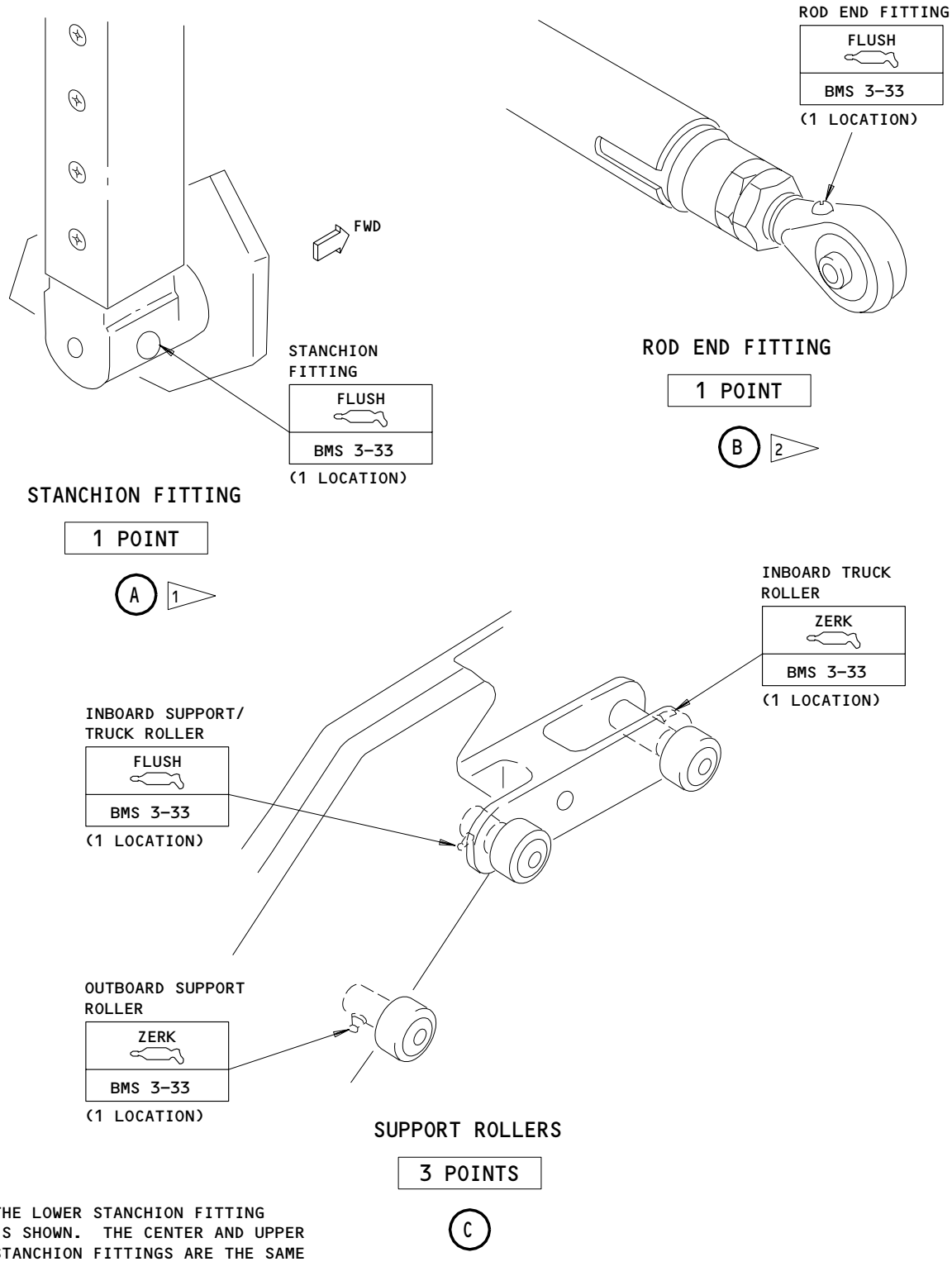
Forward Airstair Lubrication
Figure 201 (Sheet 1)

EFFECTIVITY
Airplanes With Forward Airstair

12-25-71

02 Page 202
Aug 01/06

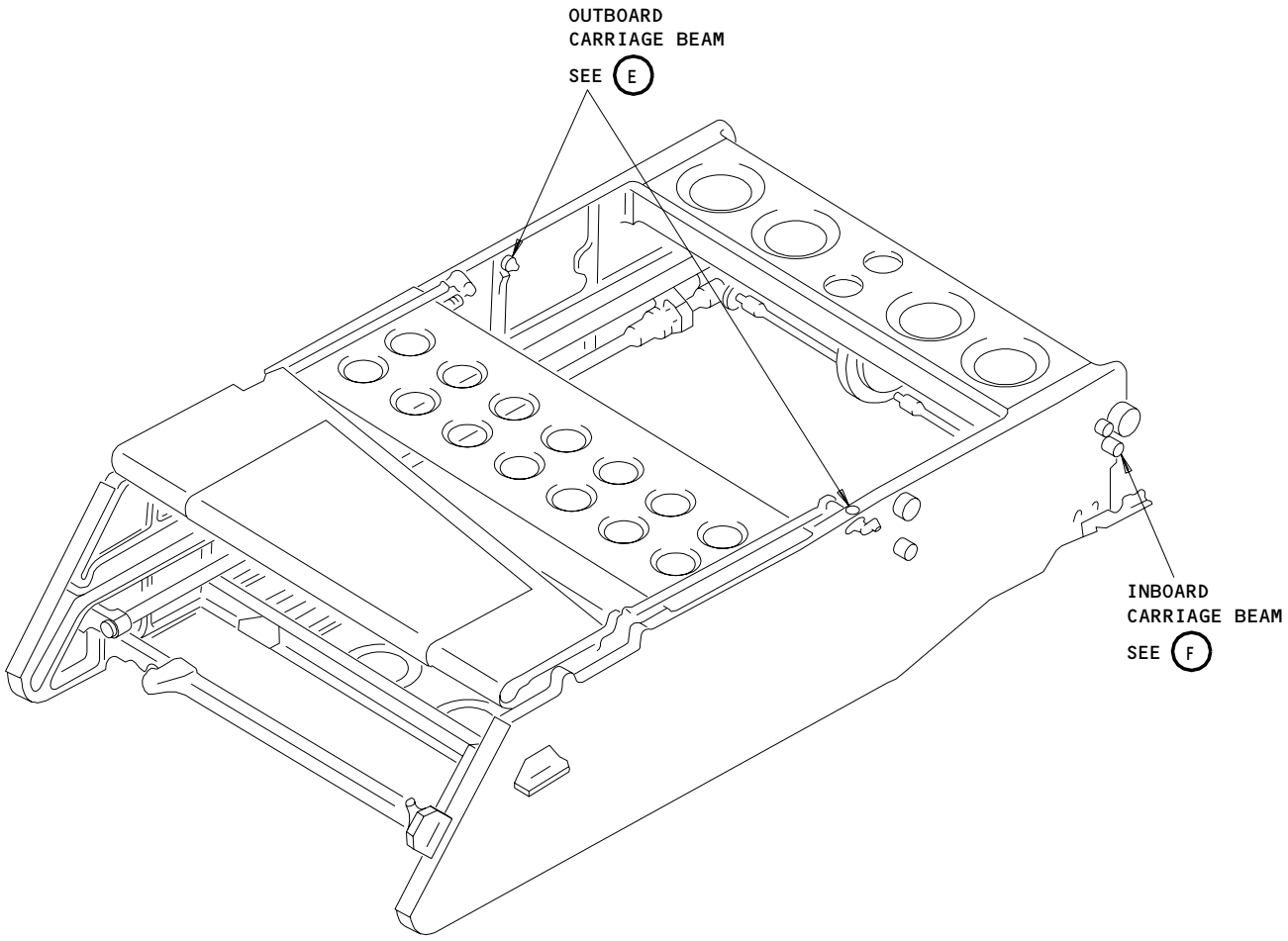
440748



1 THE LOWER STANCHION FITTING IS SHOWN. THE CENTER AND UPPER STANCHION FITTINGS ARE THE SAME

2 THERE ARE FOUR ROD END FITTINGS ON EACH SIDE OF THE AIRSTAIR

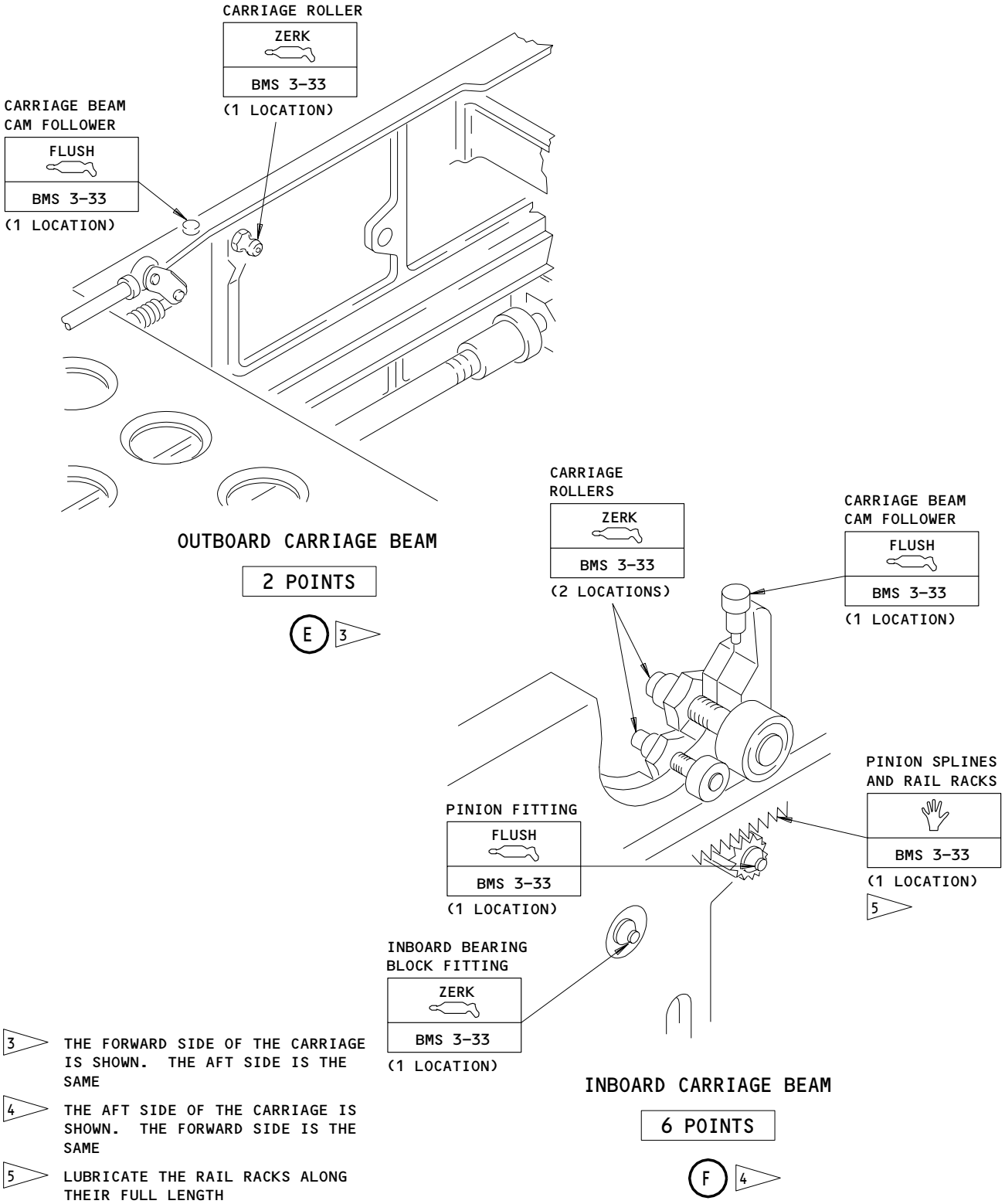
Forward Airstair Lubrication
Figure 201 (Sheet 2)



UPPER AIRSTAIR CARRIAGE

D

Forward Airstair Lubrication
Figure 201 (Sheet 3)



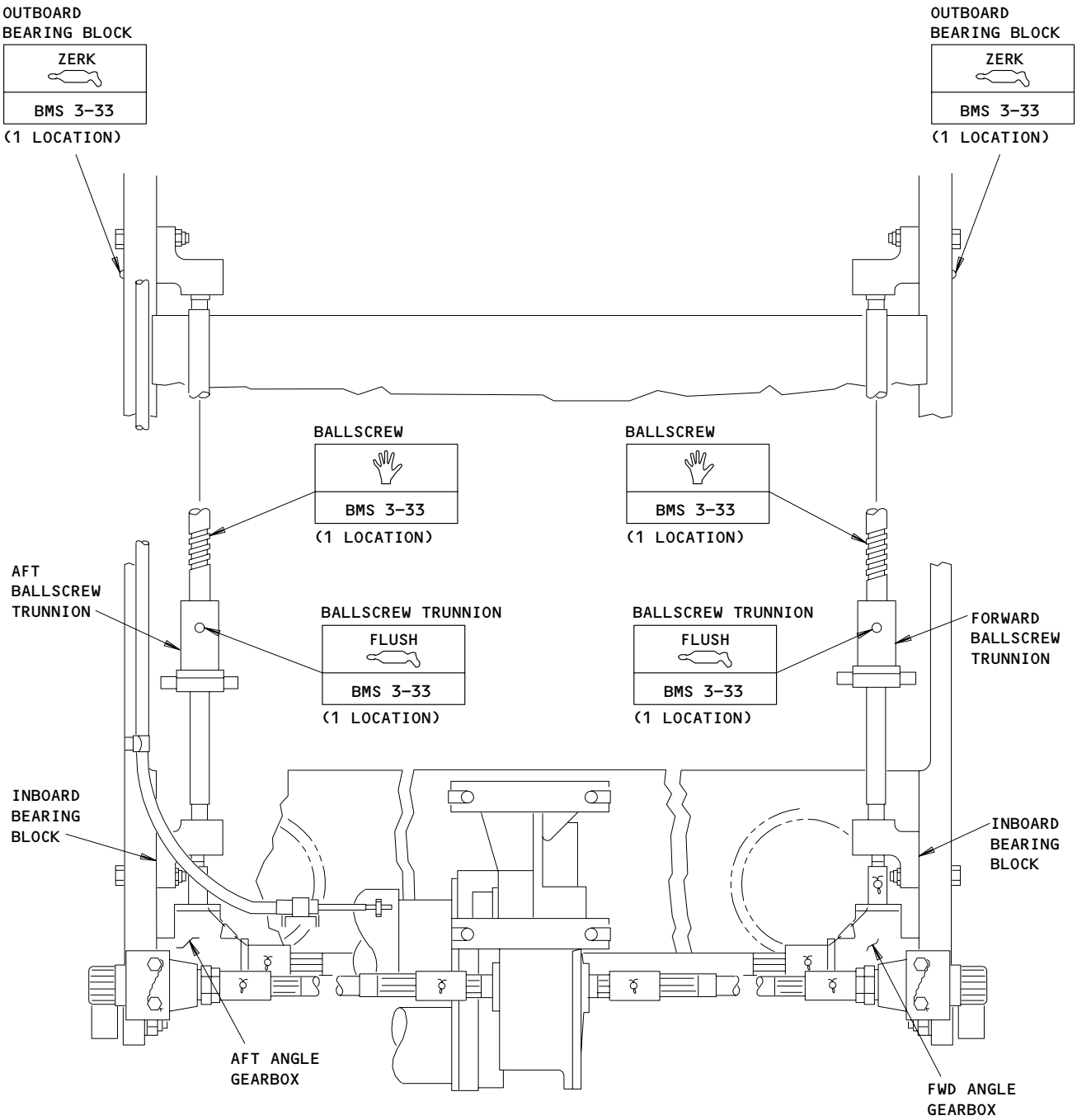
Forward Airstair Lubrication
Figure 201 (Sheet 4)

EFFECTIVITY
Airplanes With Forward Airstair

12-25-71

02 Page 205
Aug 01/06

440751

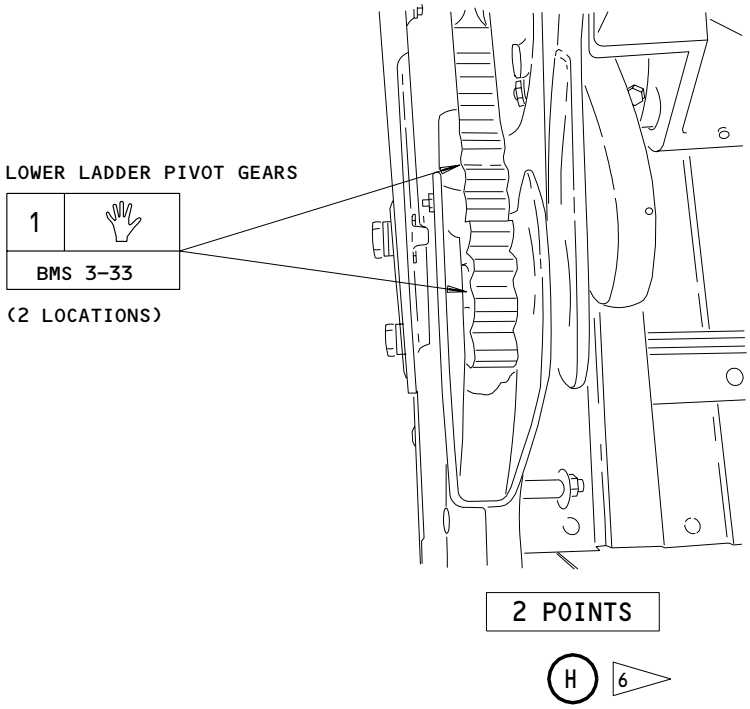


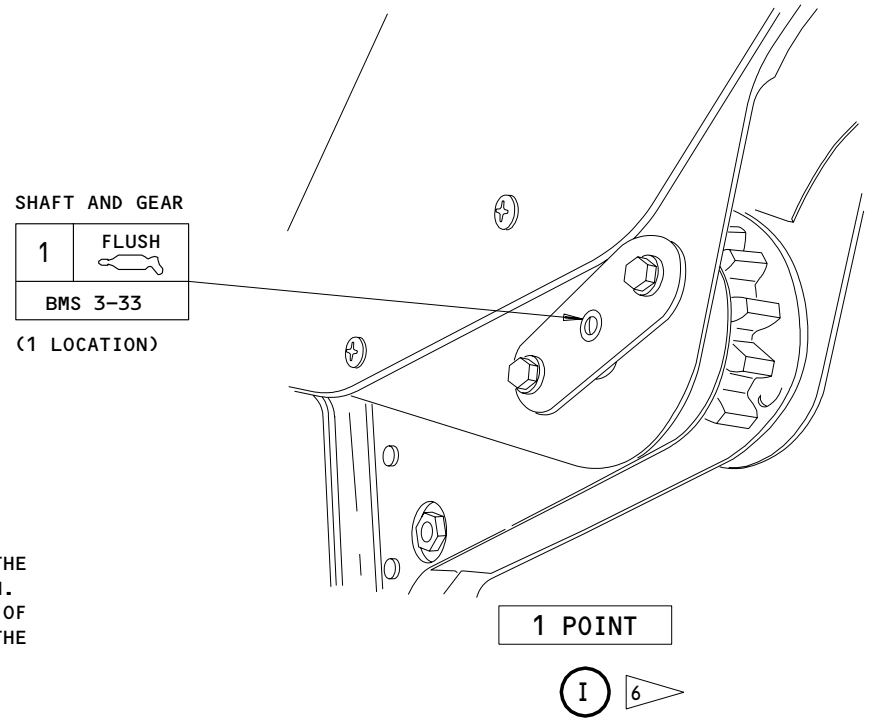
LOWER CARRIAGE

6 POINTS

G

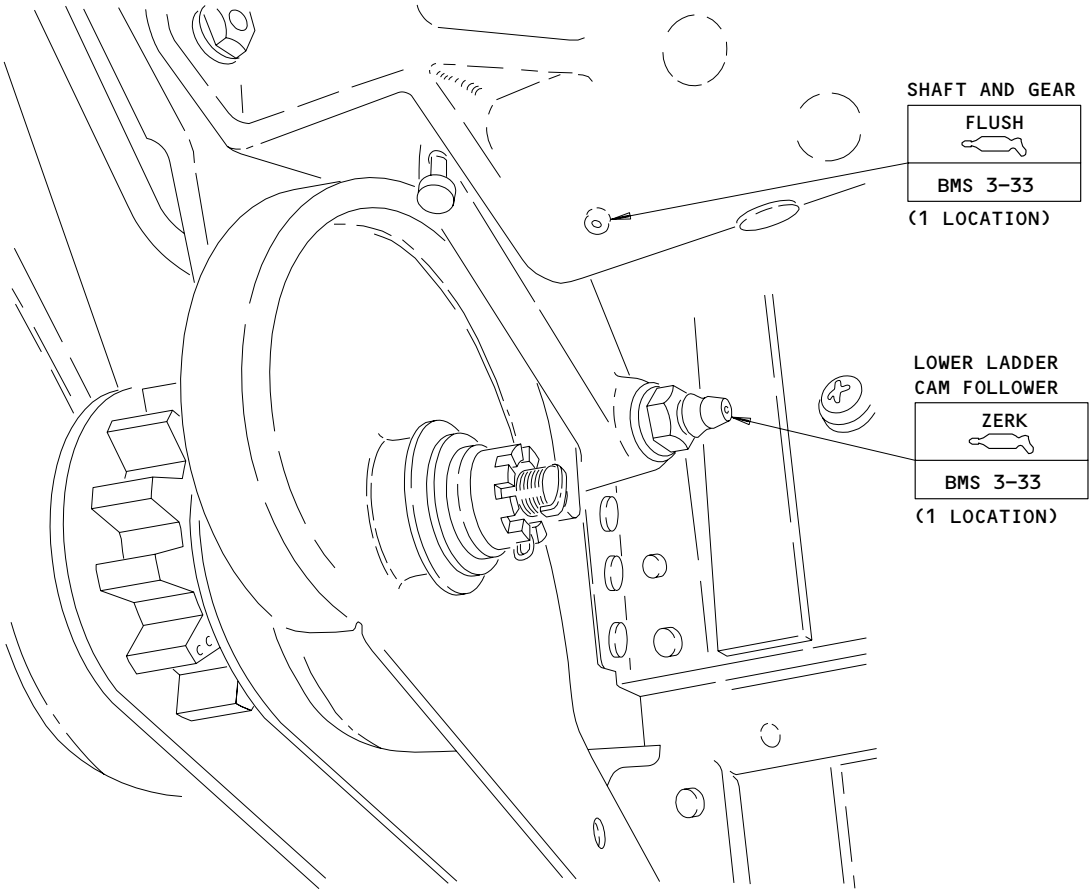
Forward Airstair Lubrication
Figure 201 (Sheet 5)





6 THE AFT SIDE OF THE AIRSTAIR IS SHOWN. THE FORWARD SIDE OF THE AIRSTAIR IS THE SAME.

Forward Airstair Lubrication
Figure 201 (Sheet 6)



LOWER LADDER MECHANISM

2 POINTS

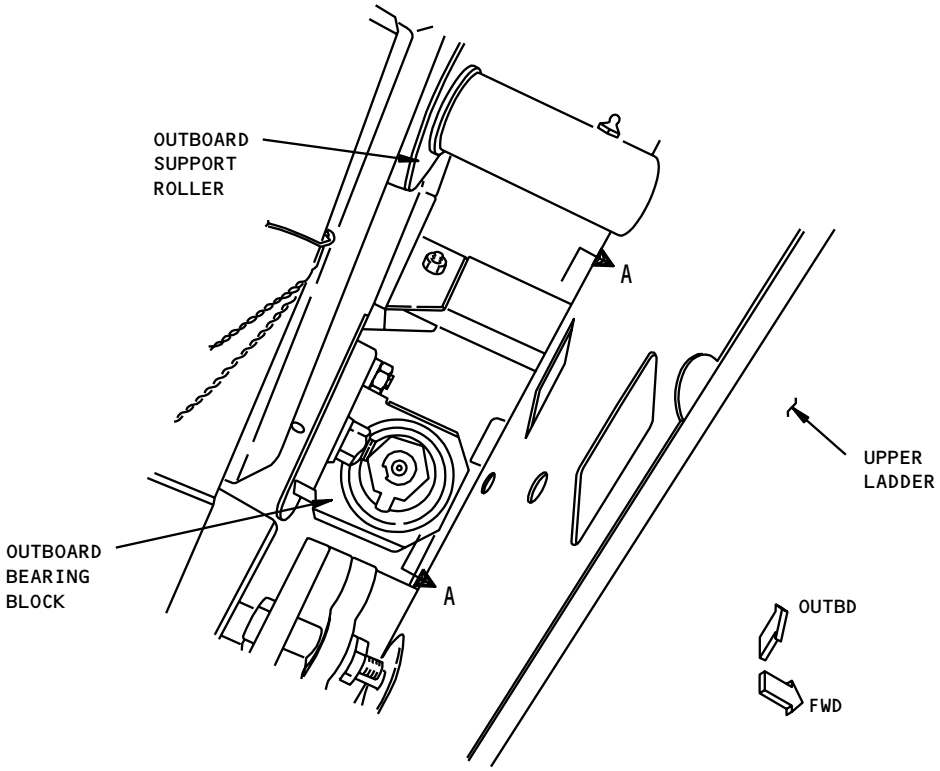
J 6

6 THE AFT SIDE OF THE AIRSTAIR IS SHOWN.
THE FORWARD SIDE OF THE AIRSTAIR IS THE SAME.

Forward Airstair Lubrication
Figure 201 (Sheet 7)

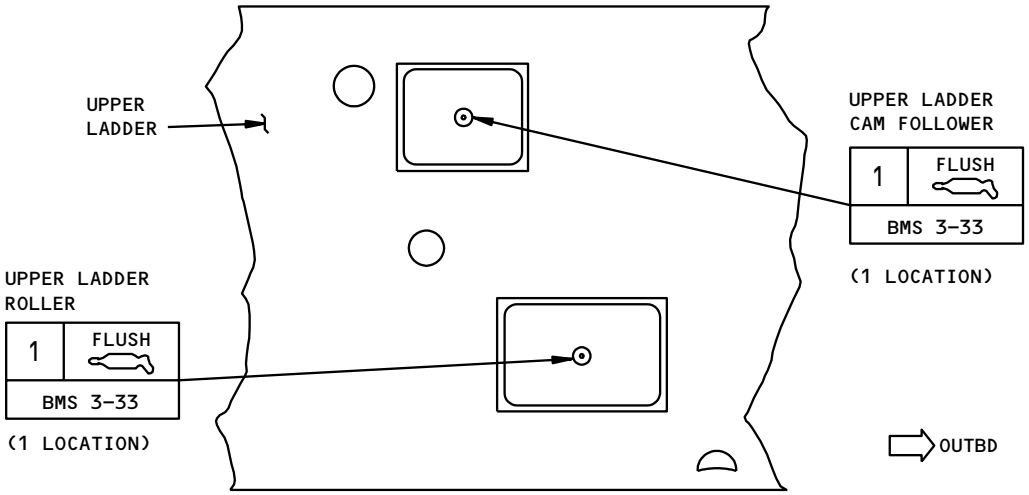
EFFECTIVITY
Airplanes With Forward Airstair

440754



UPPER LADDER MECHANISM

K



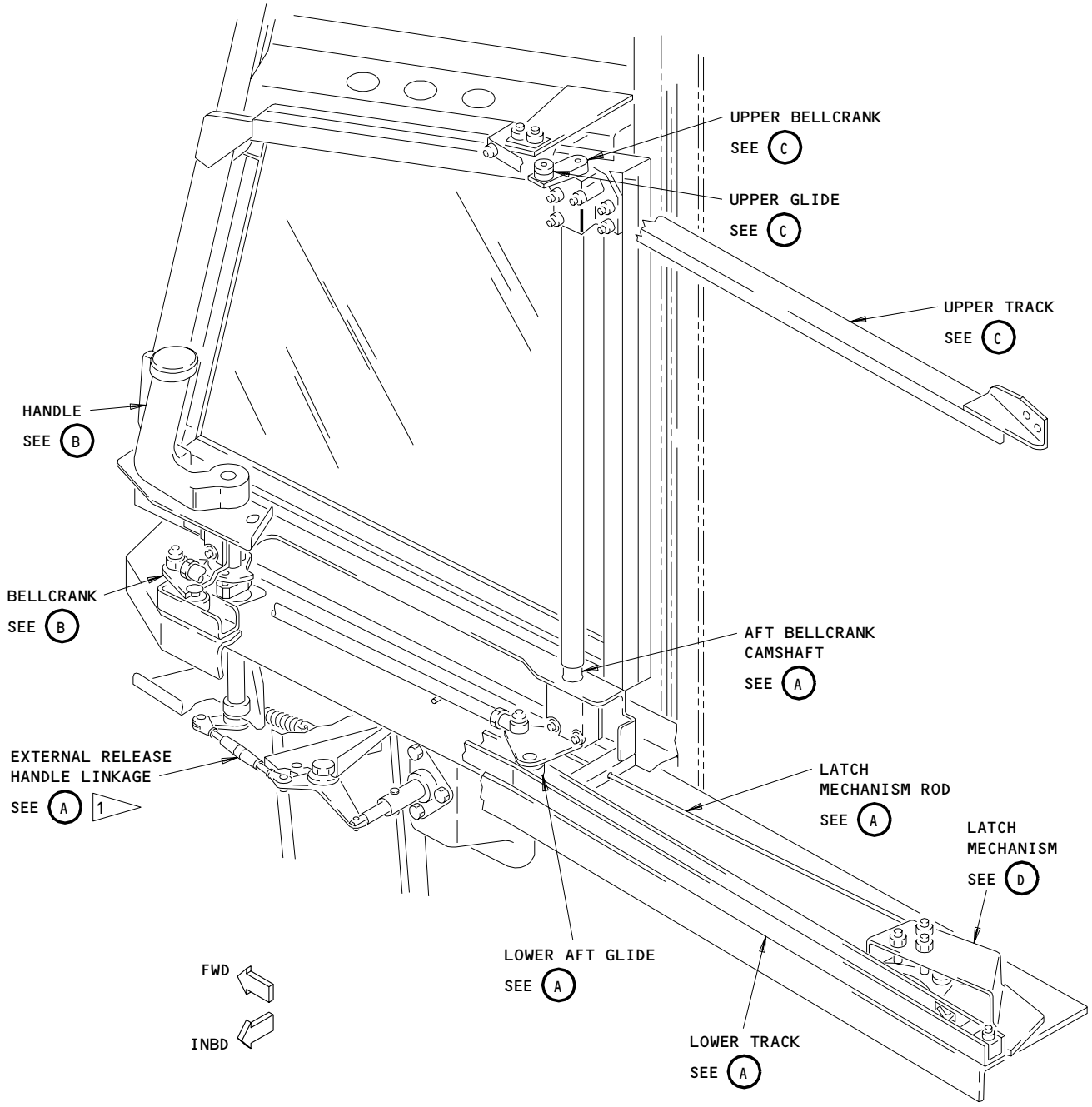
7 THE FORWARD SIDE OF THE AIRSTAIR IS SHOWN. THE AFT SIDE OF THE AIRSTAIR IS THE SAME.

2 POINTS

A-A 7

Forward Airstair Lubrication
Figure 201 (Sheet 8)

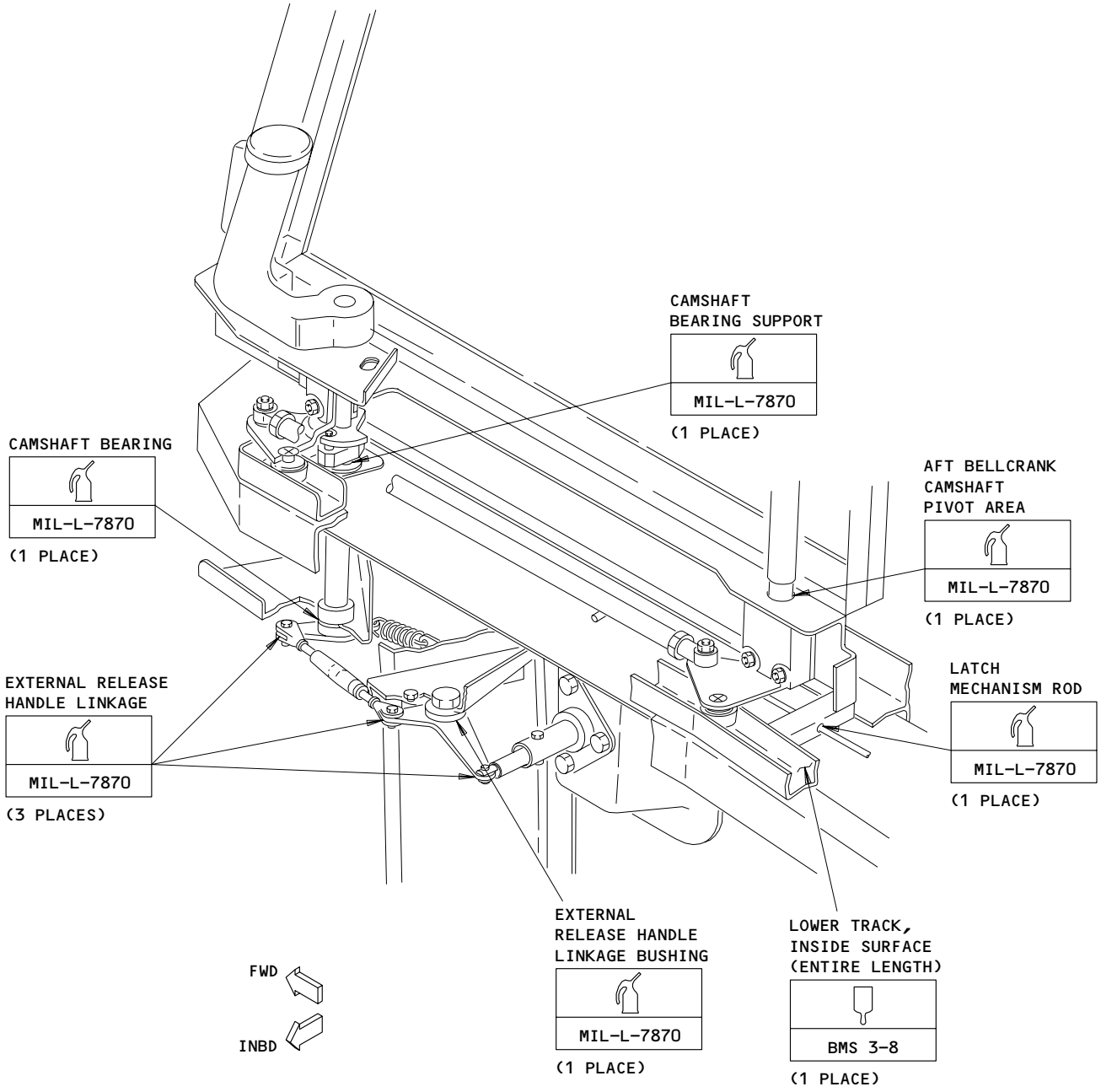
PILOTS' SLIDING WINDOW LUBRICATION



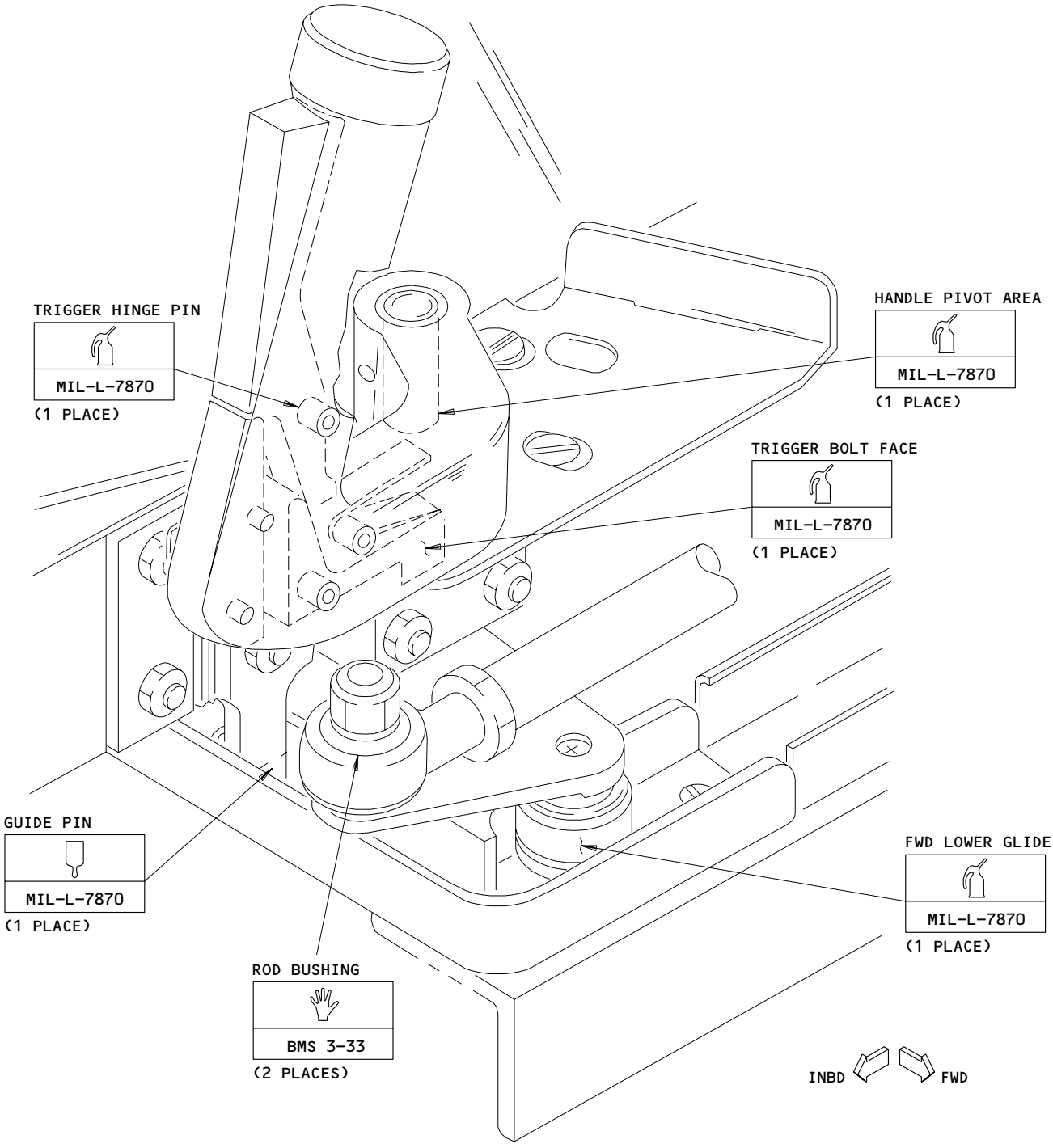
RIGHT WINDOW SHOWN
(LEFT WINDOW SIMILAR)

1 RIGHT SIDE WINDOW ONLY

Pilots' Sliding Window Lubrication
Figure 201 (Sheet 1)



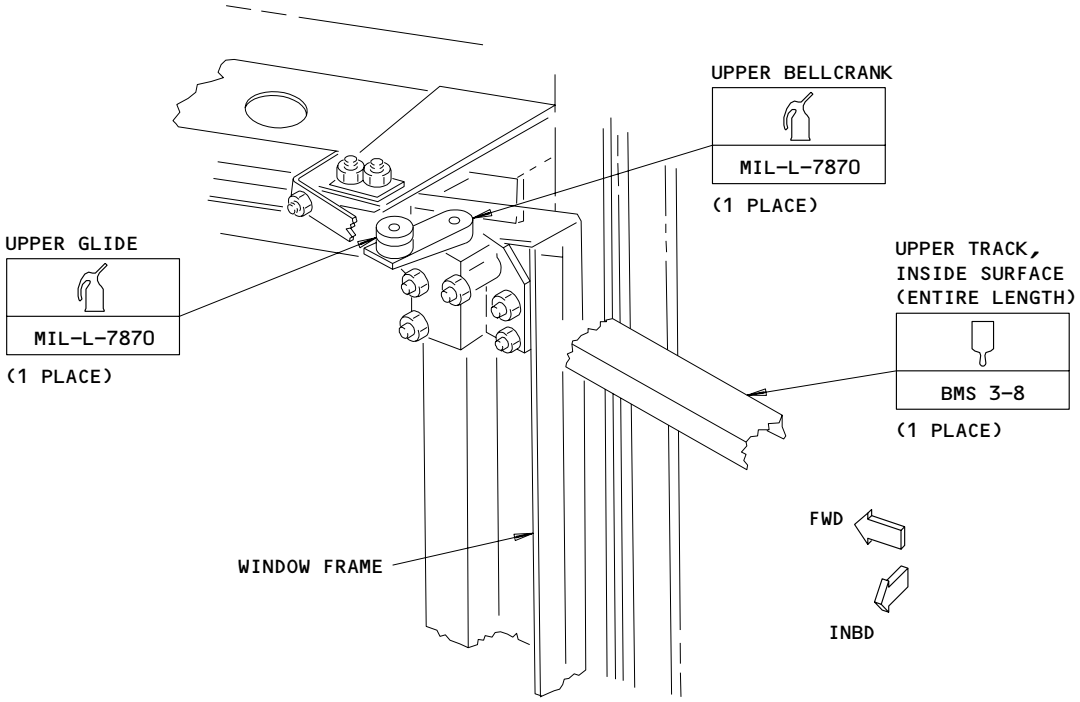
Pilots' Sliding Window Lubrication
Figure 201 (Sheet 2)



7 POINTS

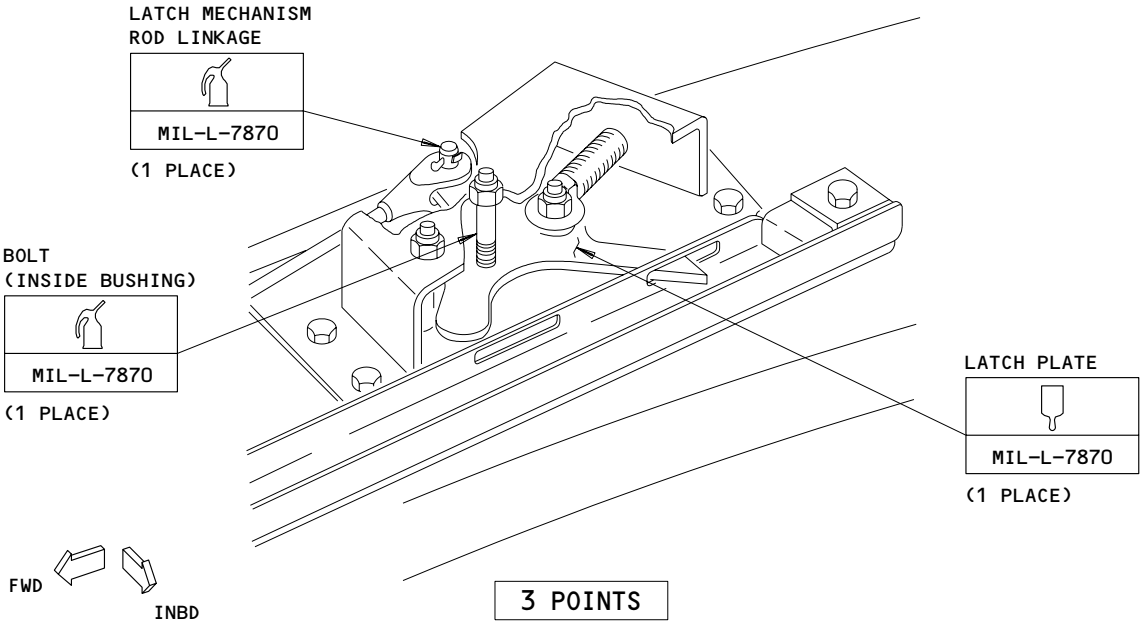
B

Pilots' Sliding Window Lubrication
Figure 201 (Sheet 3)



3 POINTS

C



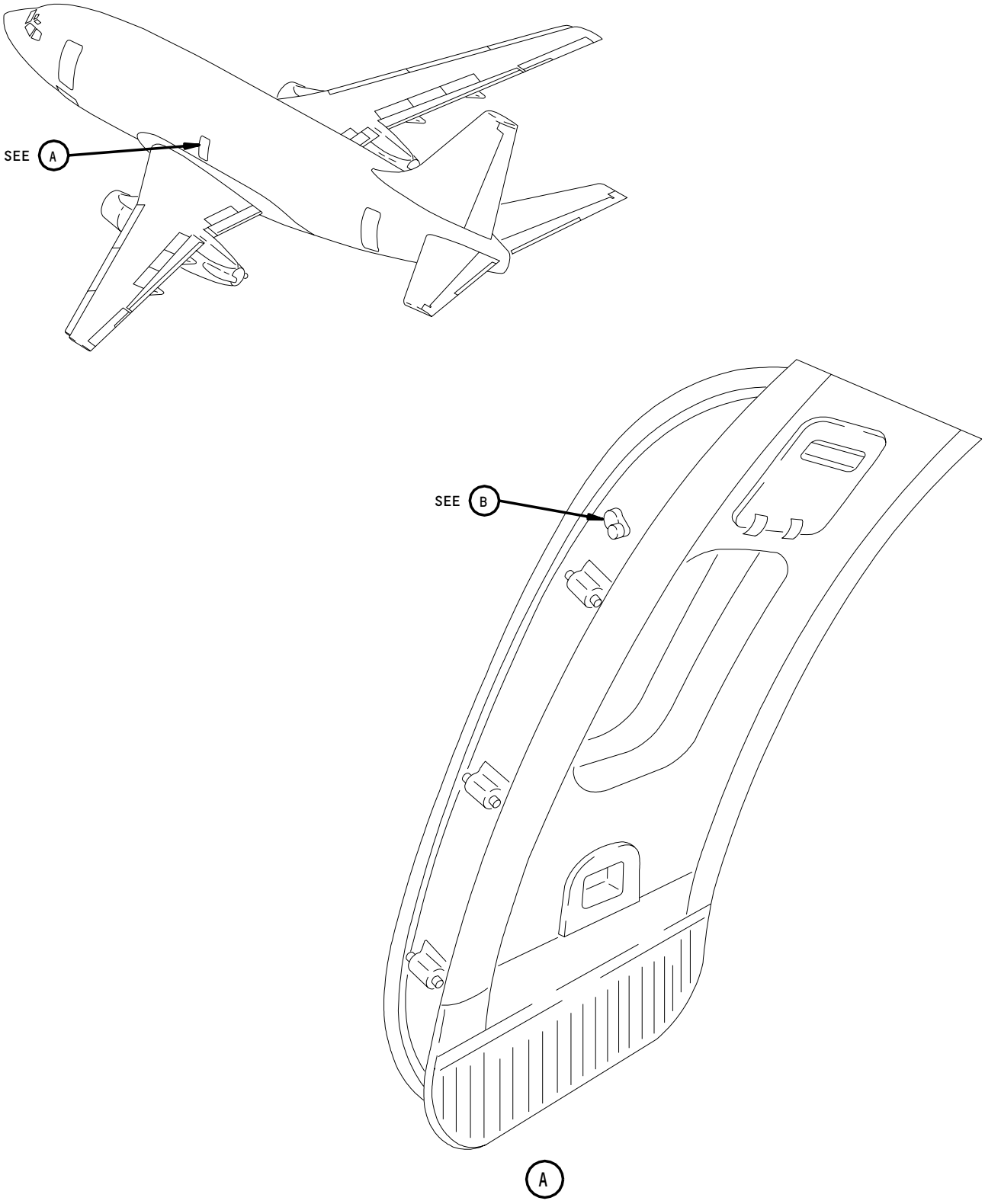
3 POINTS

D

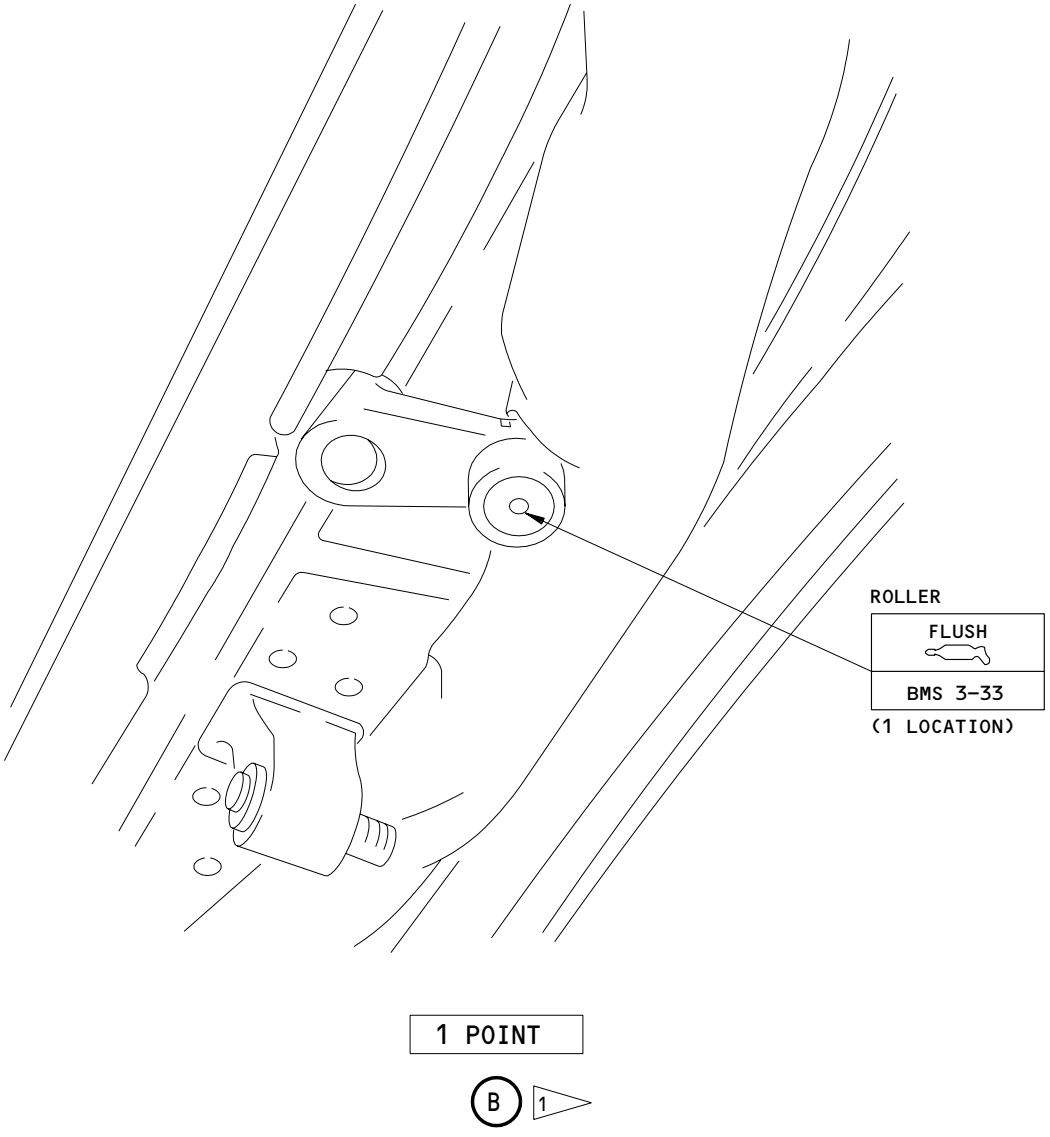
Pilots' Sliding Window Lubrication
Figure 201 (Sheet 4)

EMERGENCY EXIT HATCH LUBRICATION

1. General
   A. This procedure provides instructions for lubricating the emergency exit hatches.
2. Equipment and Materials
   A. Flush gun (grease gun)
   B. Grease - BMS 3-33 (Preferred)
   C. Grease - MIL-PRF-23827 (Supercedes MIL-G-23827) (Alternate)
3. Lubricate Emergency Exit Hatch
   A. Remove emergency exit hatch (Ref 52-21-0).
   B. Lubricate hatch as shown (Fig. 201).
   C. Install emergency exit hatch (52-21-0).



Emergency Exit Hatch Lubrication
Figure 201 (Sheet 1)

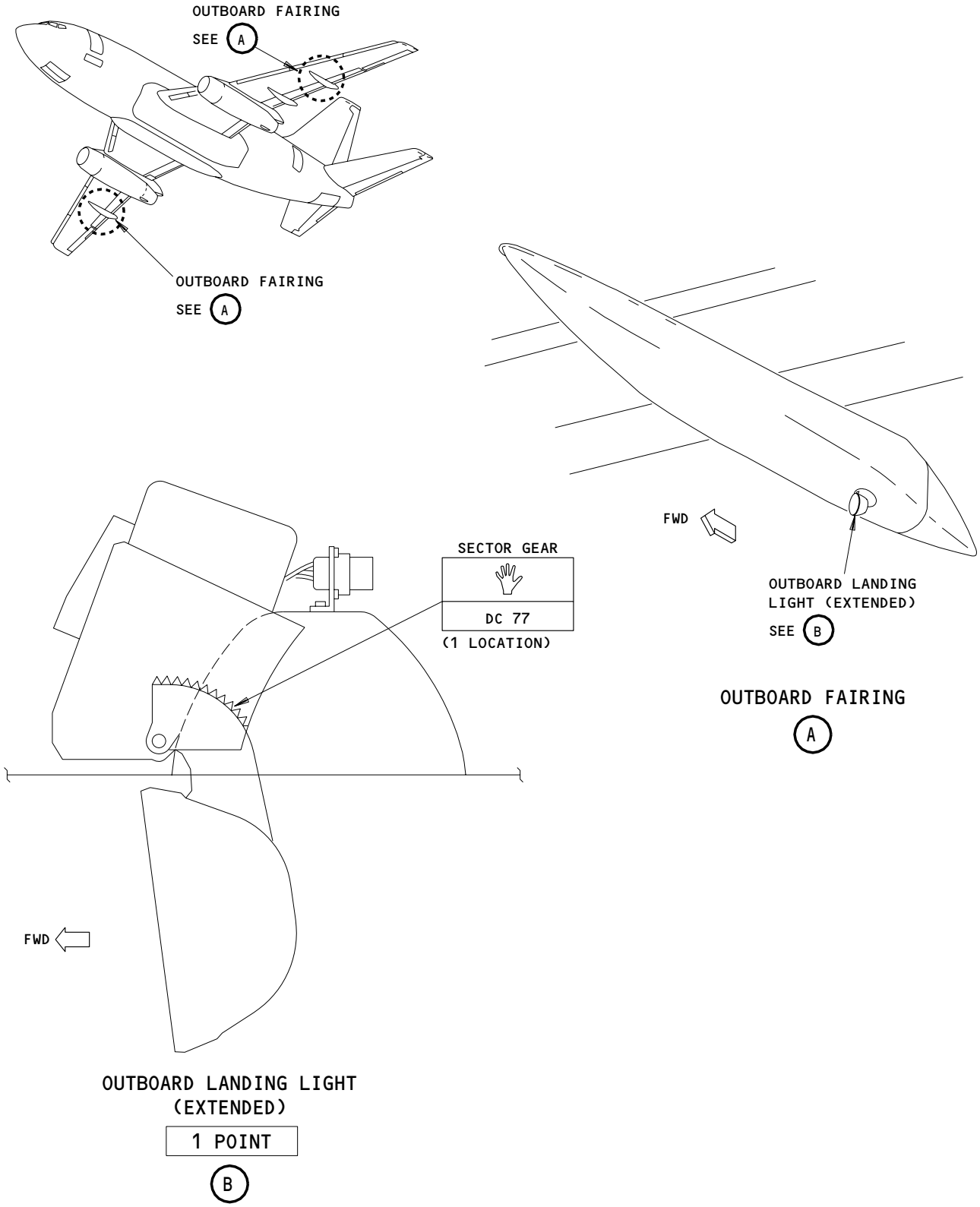


1 THE AFT SIDE OF THEHATCH IS SHOWN.
THE FORWARD SIDE OF HATCH IS THE SAME

Emergency Exit Hatch Lubrication
Figure 201 (Sheet 2)

OUTBOARD LANDING LIGHTS - SERVICING

1. General
   A. This procedure contains a task for the lubrication of the outboard landing lights.
   B. There is an outboard landing light in each outboard fairing.
   C. The outboard landing lights can be extended and retracted.
2. Outboard Landing Light Lubrication (Fig. 301)
   A. Consumable Materials
      (1) Lubricant - Dow Corning 77 (DC77) or Molycote 77 (M77)
   B. Procedure
      (1) Supply electrical power (Ref 24-22-0 MP)
      (2) At the overhead panel, P5, set each switch for the outboard landing lights to the extend position.
          (a) Make sure the outboard landing lights extend fully down.
      (3) Remove electrical power from the outboard landing light:
          (a) Open each applicable circuit breaker and attach the DO-NOT-CLOSE tag:
              1) On the load control center panel, P18.
      (4) Lubricate the sector gear of each outboard landing light (Fig. 301).
   C. Put the Airplane to Its Usual Condition
      (1) Remove the DO-NOT-CLOSE tag and close each circuit breaker that was opened.
      (2) Set each switch to the retract position.
          (a) Make sure the outboard landing lights retract.
      (3) Remove electrical power if it is not necessary (Ref 24-22-0 MP).



Outboard Landing Light Lubrication
Figure 301

MAIN CARGO DOOR LUBRICATION - MAINTENANCE PRACTICES

1. General
   A. This procedure provides instructions for lubricating the main cargo doors.
2. Equipment and Materials
   A. Lubrication Set - Entry, Cargo, Service, and Galley Door Camshaft Bearings - F72942-1

      NOTE: Lubrication set may be used to reach lubrication fittings where access is difficult.

   B. Flush gun (grease gun)
   C. Oil spray can
   D. Grease - BMS 3-33, preferred
   E. Grease - MIL-PRF-23827 (Supercedes MIL-G-23827) (Alternate)
   F. Compound - BMS 3-23
   G. Personnel Safety Barrier - F70258-1
   H. Maintenance Stand
3. Service Cargo Door
   A. Open the main cargo door until you can remove the door ceiling panels (Ref 52-32-0).
   B. Install Personnel Safety Barrier - F70258-1.

      WARNING: BE CAREFUL WHEN YOU ARE NEAR THE DOOR OPENING. IF YOU FALL THROUGH THE DOOR OPENING, INJURY WILL OCCUR.

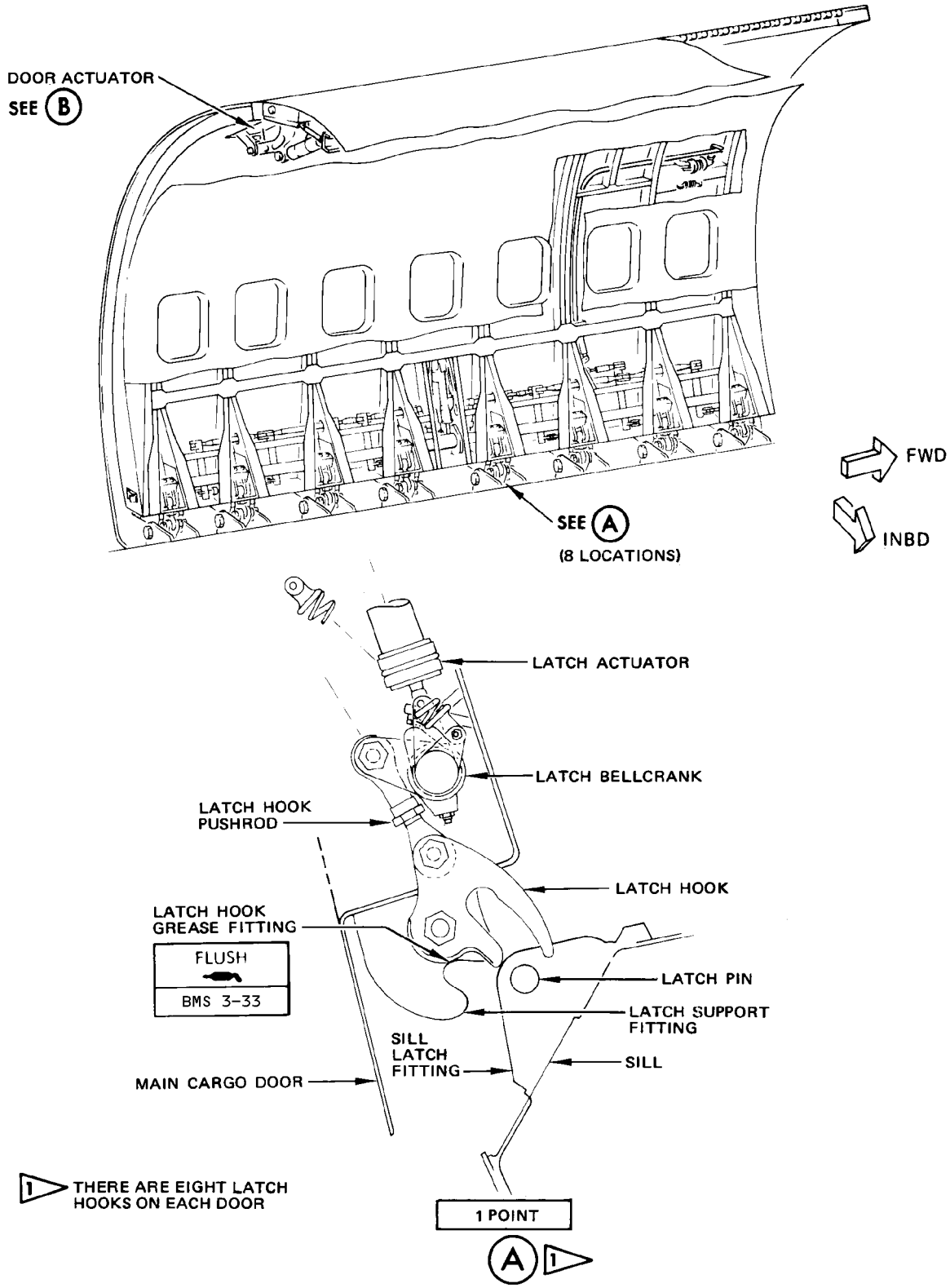
   C. Remove the door ceiling panels (Ref 52-32-81).
   D. Lubricate the door (Fig. 201, Fig. 202, Fig. 203).

      NOTE: A maintenance stand is required to lubricate the main cargo door hinges.

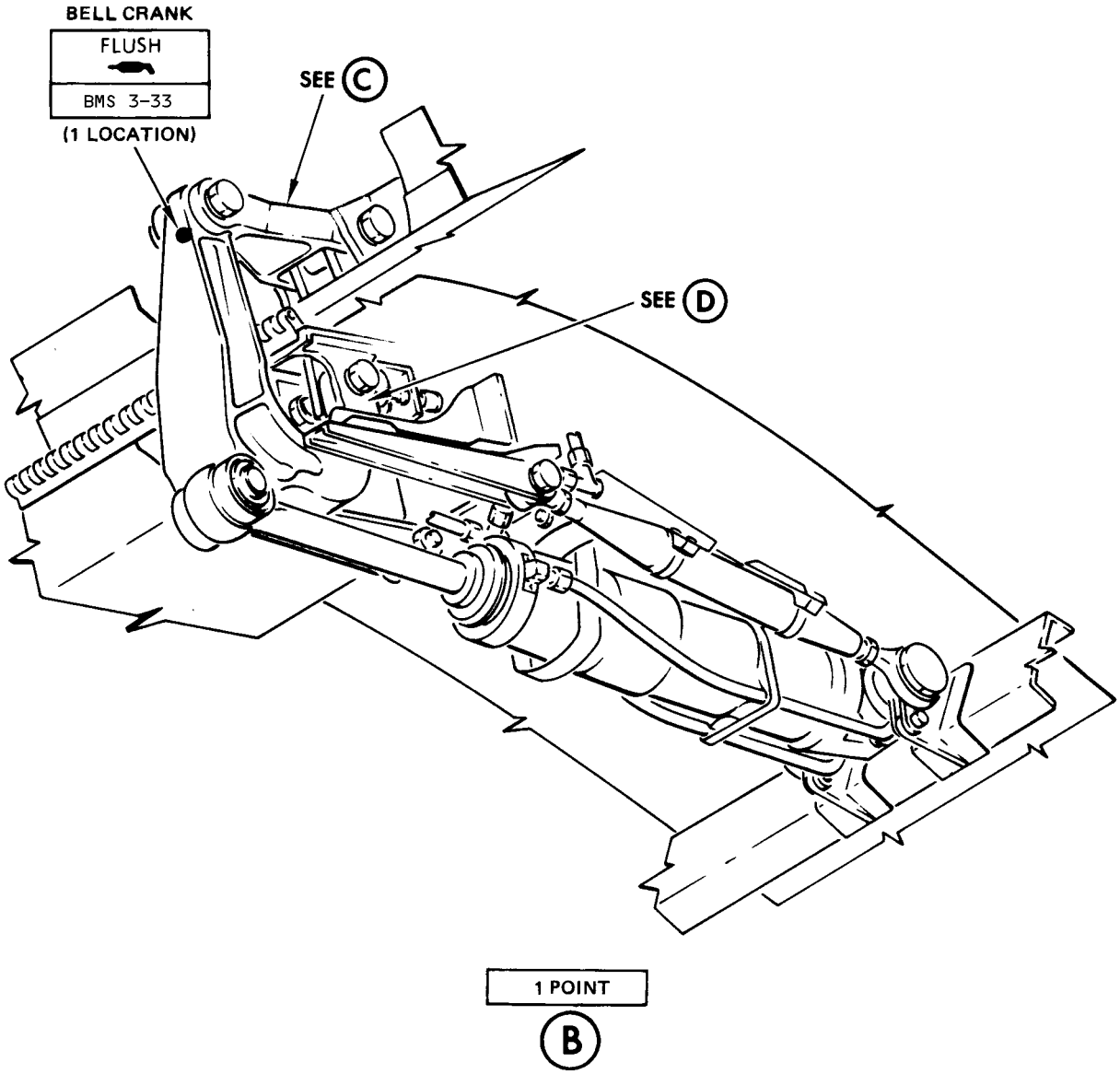
   E. Install the door ceiling panels (Ref 52-32-81).
   F. Remove Personnel Safety Barrier - F70258-1.

      WARNING: BE CAREFUL WHEN YOU ARE NEAR THE DOOR OPENING. IF YOU FALL THROUGH THE DOOR OPENING, INJURY WILL OCCUR.

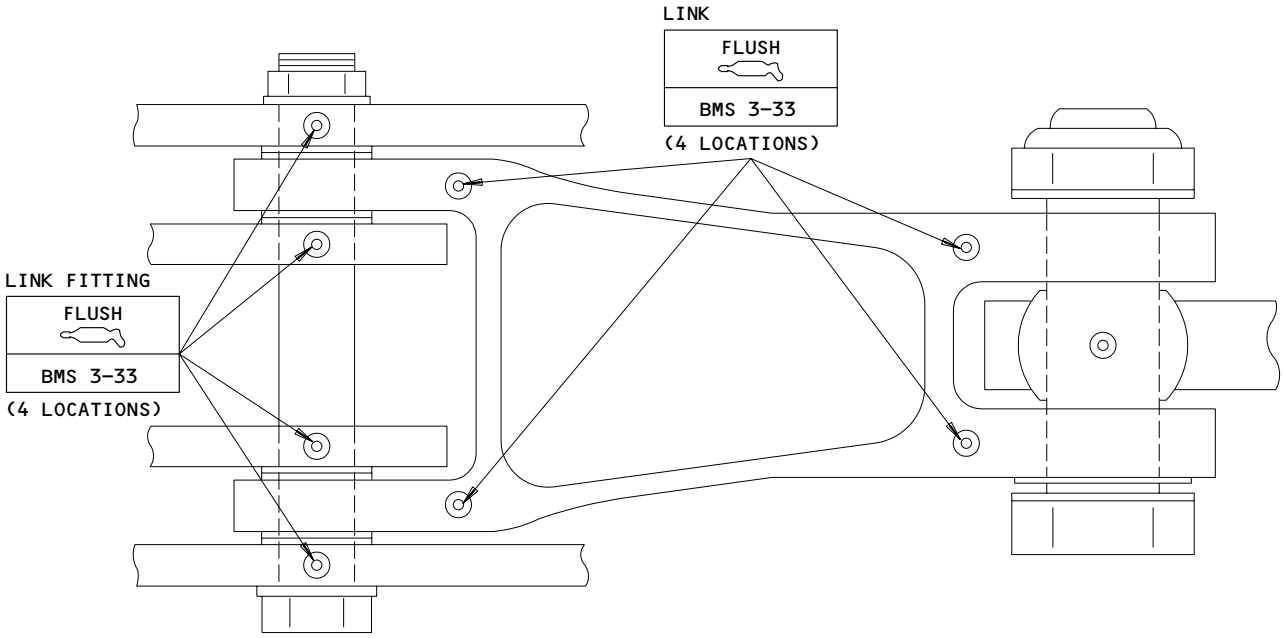
   G. Close and lock the main cargo door (Ref 52-32-0).



Main Cargo Door Lubrication
Figure 201



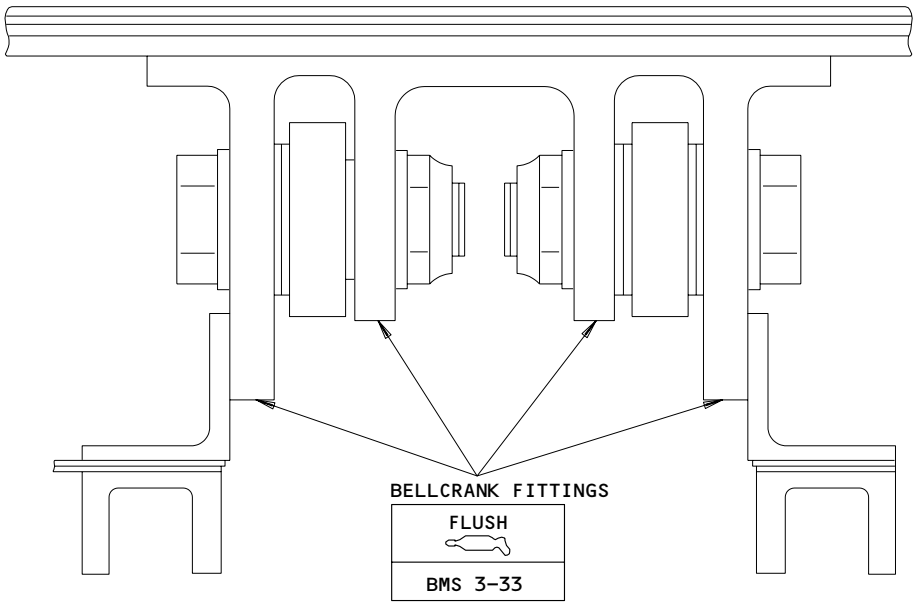
Main Cargo Door Installation
Figure 202



ACTUATOR LINK

8 POINTS

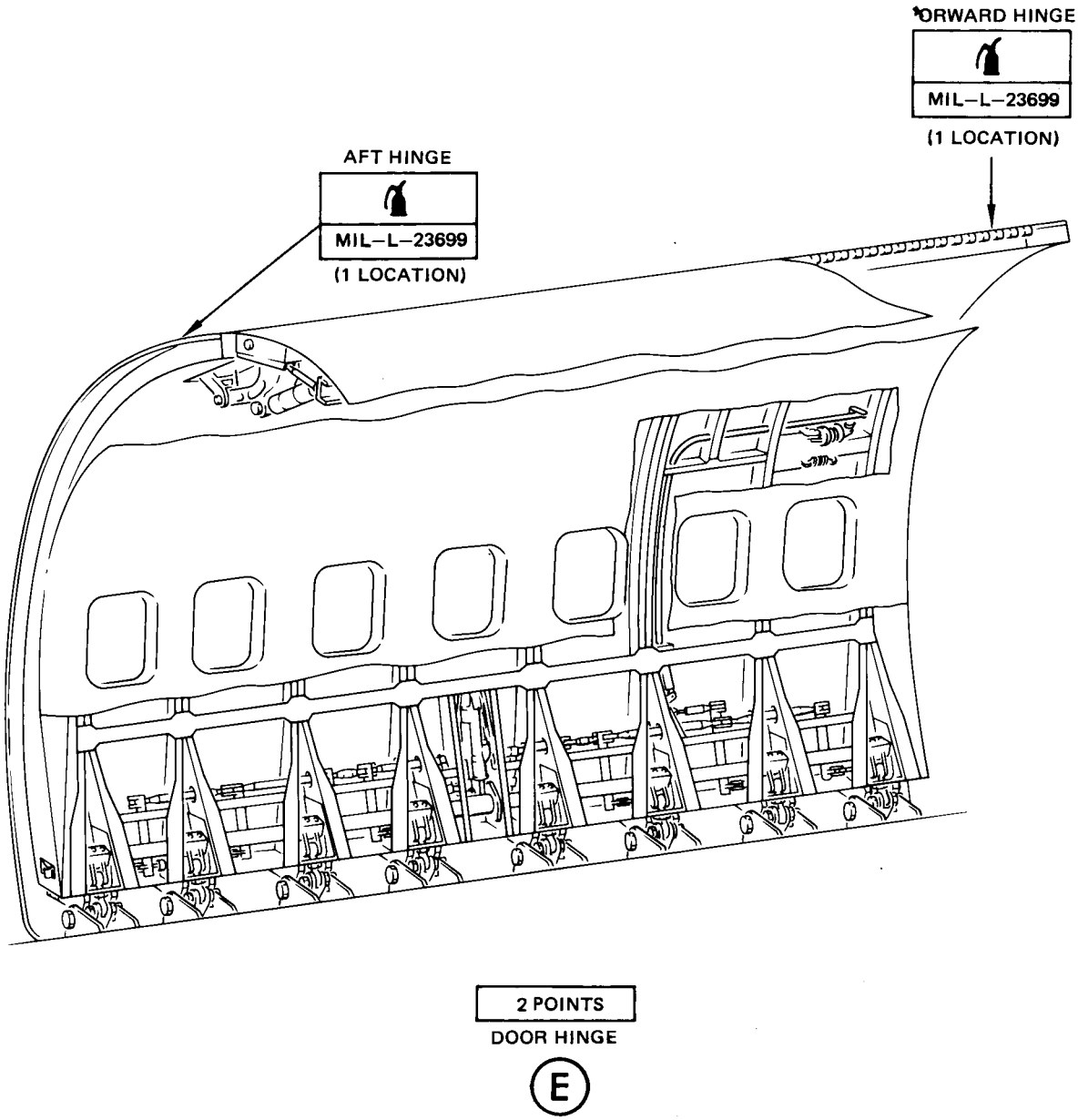
C



4 POINTS

D

Main Cargo Door Lubrication
Figure 203 (Sheet 1)



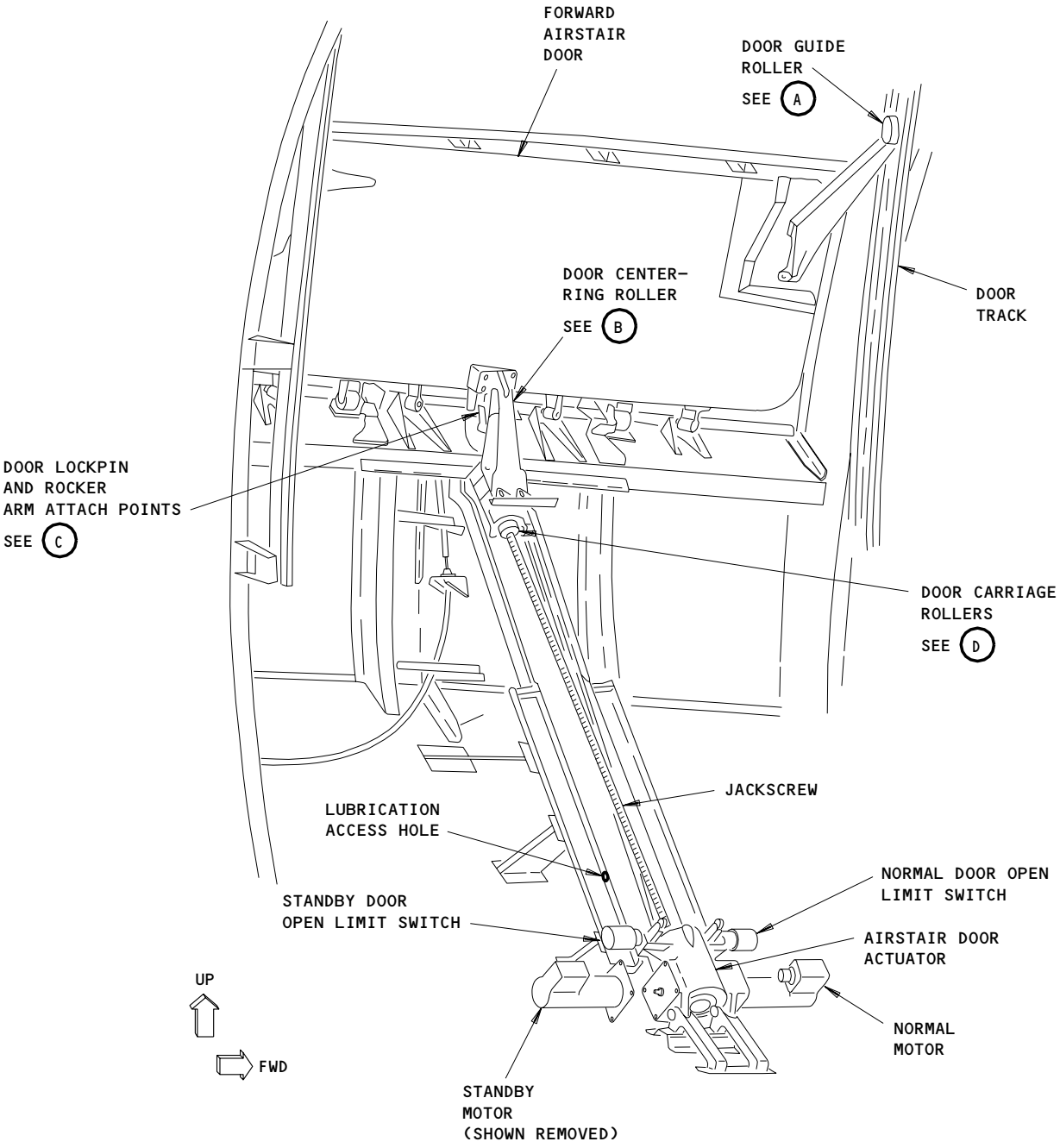
Main Cargo Door Lubrication
Figure 203 (Sheet 2)

FORWARD AIRSTAIR DOOR LUBRICATION

1. General
   A. This procedure provides instructions for lubricating the forward airstair door.
2. Equipment and Materials
   A. Flush gun (grease gun)
   B. Grease - BMS 3-33 (Preferred)
   C. Grease - MIL-PRF-23827 (Supercedes MIL-G-23827) (Alternate)
   D. Grease - BMS 3-24 (Alternate)
   E. Grease - DC-33 (Ref. 20-30-21)
3. Lubricate Forward Airstair Door
   A. Gain access to work area through electronic equipment compartment access door.
   B. Remove forward airstair door standby system meter (Ref. 52-61-591).
   C. Manually position airstair door to locate door carriage rollers opposite 0.5-inch lubrication access hole in guide rail.
   D. Lubricate airstair door as shown (Fig. 201).

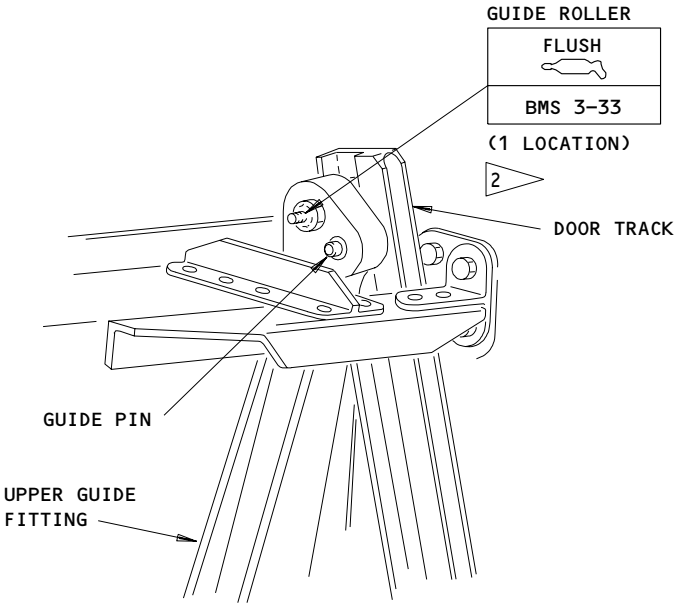
      NOTE: It may be necessary to remove the airstair door during the lubrication of the guide roller in View A (AMM 52-61-500/401). Some installations have the fitting on the bearing side.

   E. Lubricate Forward Airstair Door Lock Mechanism Interior and Exterior Control Cables
      (1) Remove interior and exterior control cables (Fig. 201, Detail C). Replace cables if corroded or worn (Ref. 52-61-531).
      (2) Wipe all old lubricant and foreign material from cables.
      (3) Hand lubricate complete cable assemblies with BMS 3-24 grease.
      (4) Install cable assemblies (Ref. 52-61-531).
   F. Manually close and lock airstair door.
   G. Install forward airstair door standby system motor (Ref. 52-61-591).



VIEW FROM INSIDE THE ELECTRONIC EQUIPMENT COMPARTMENT WITH THE DOOR CLOSED

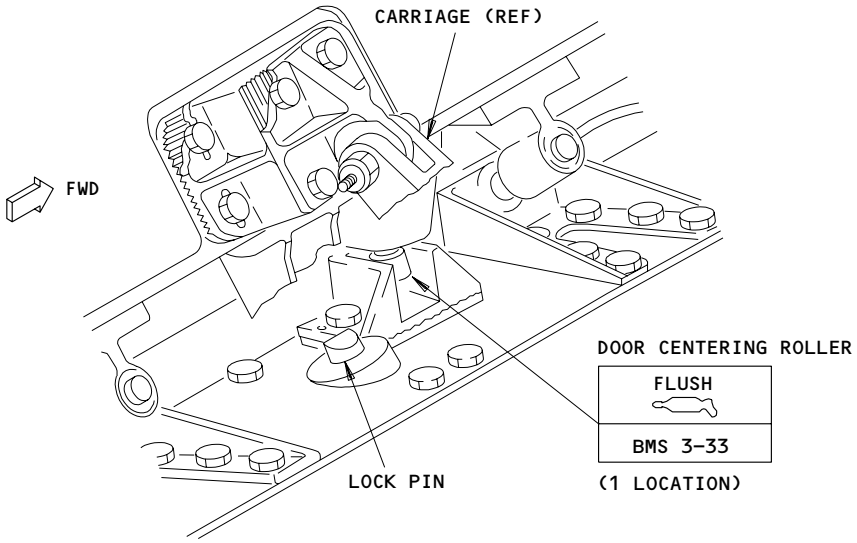
Forward Airstair Door Lubrication
Figure 201 (Sheet 1)



DOOR GUIDE ROLLER

1 POINT

A 1



DOOR CENTERING ROLLER

1 POINT

B

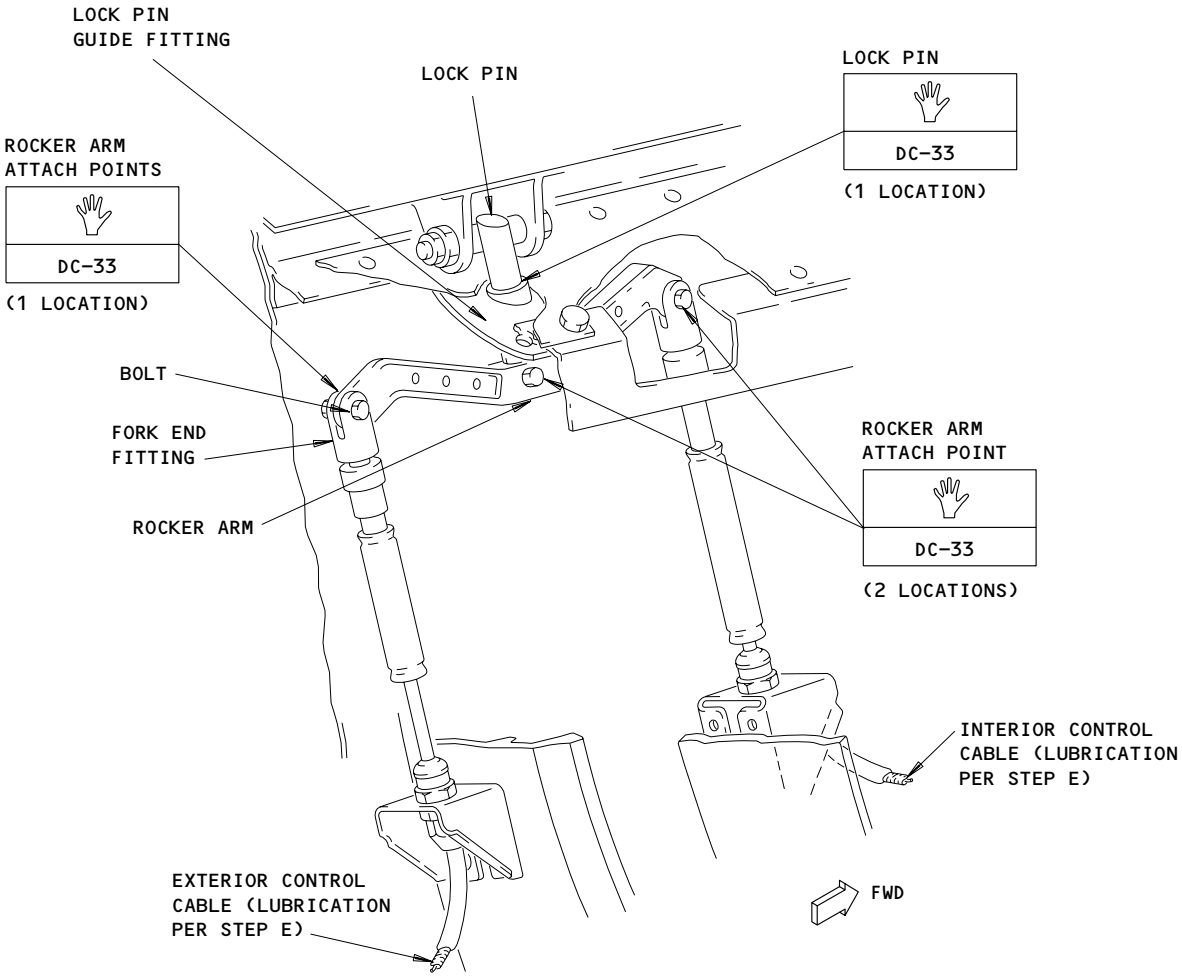
1 THE FORWARD ROLLER IS SHOWN. THE AFT ROLLER IS THE SAME

2 THE LUBRICATION FITTING IS LOCATED IN THE VISIBLE END OF THE GUIDE ROLLER

Forward Airstair Door Lubrication
Figure 201 (Sheet 2)

EFFECTIVITY
Airplanes with Forward Airstair

440769



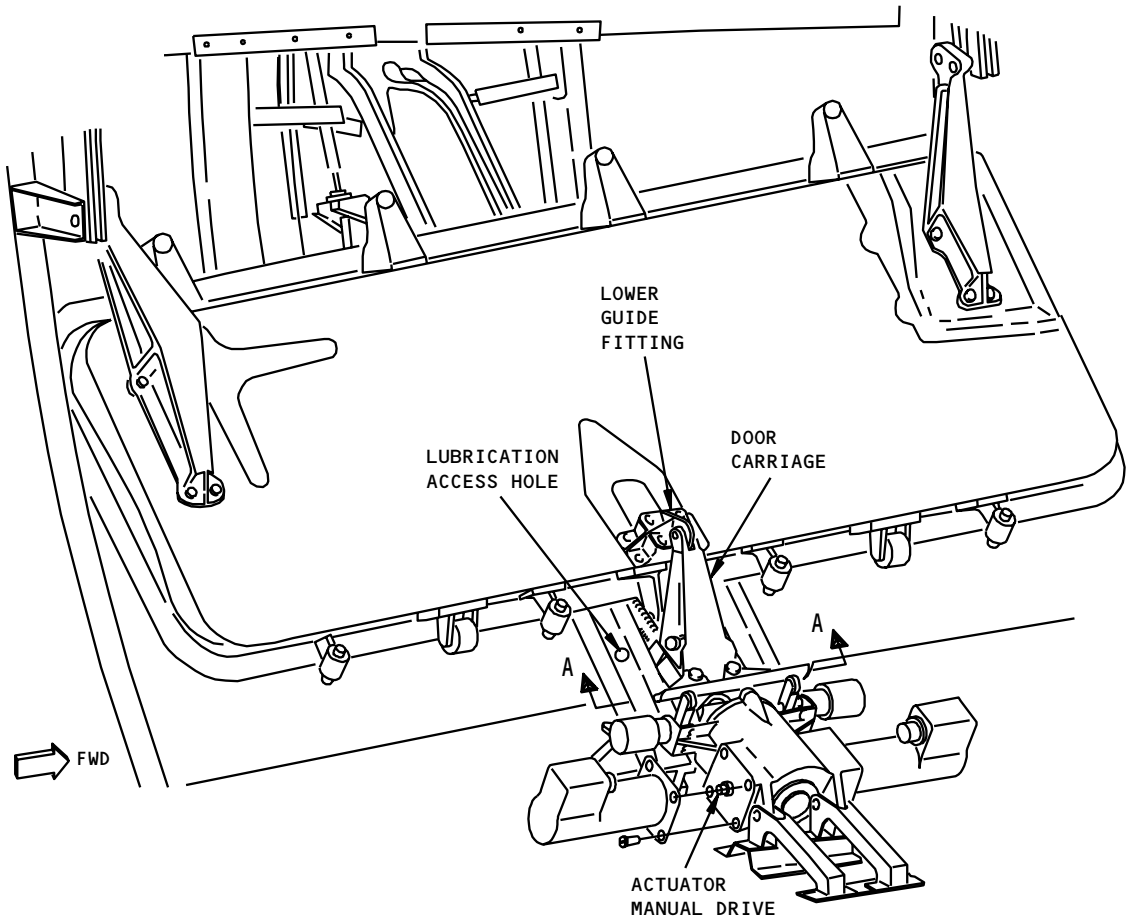
DOOR LOCKPIN AND ROCKER ARM ATTACHMENT POINTS

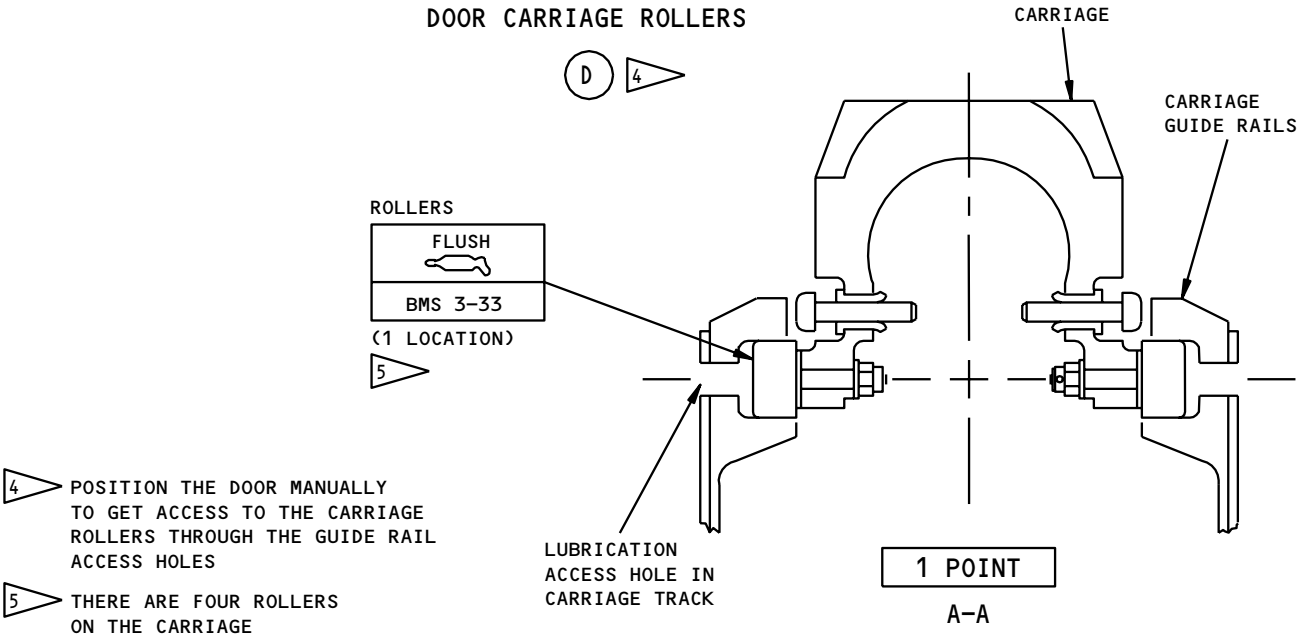
4 POINTS

C 3

3 DOOR AND CARRIAGE NOT SHOWN FOR CLARITY

Forward Airstair Door Lubrication
Figure 201 (Sheet 3)

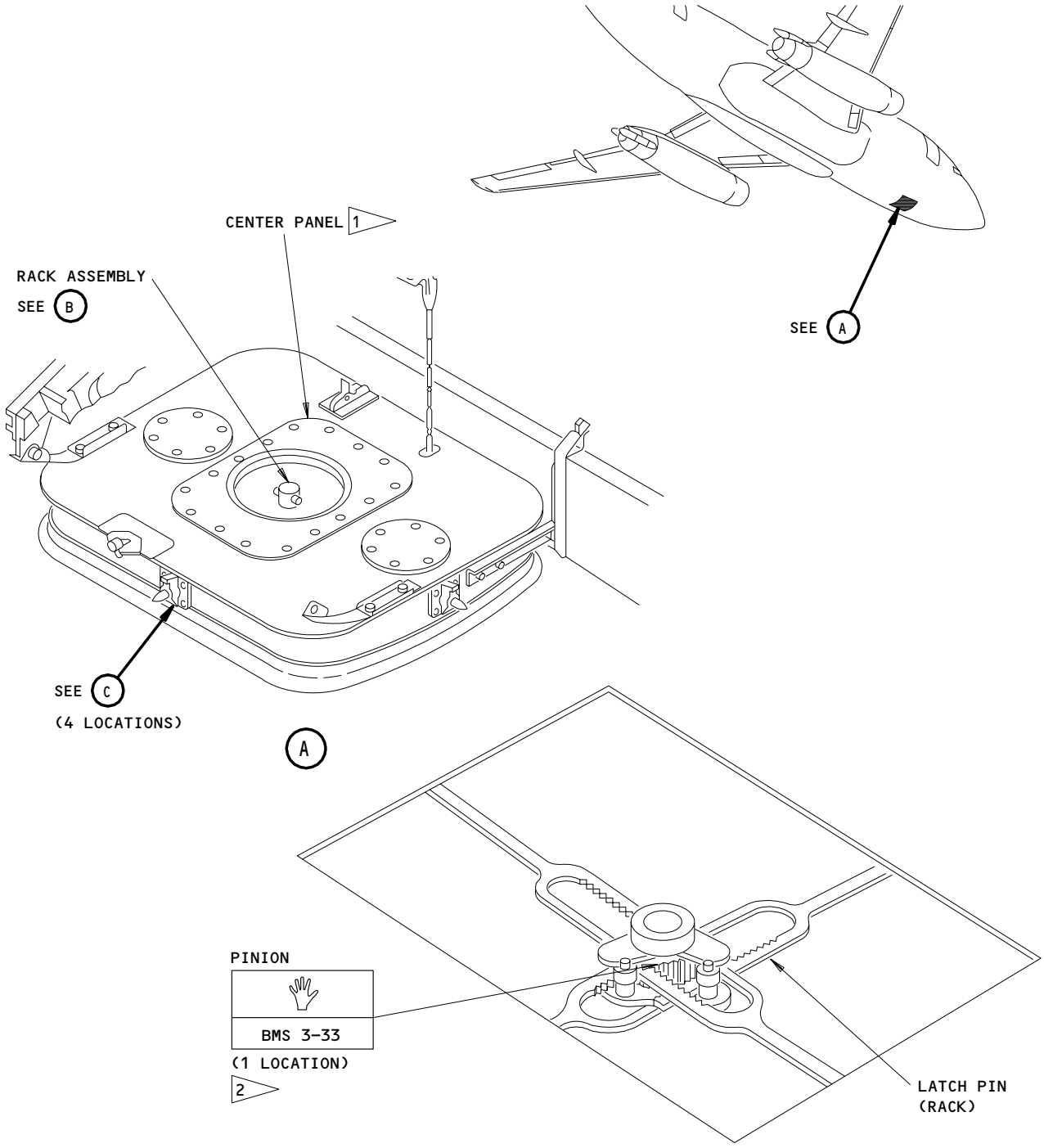




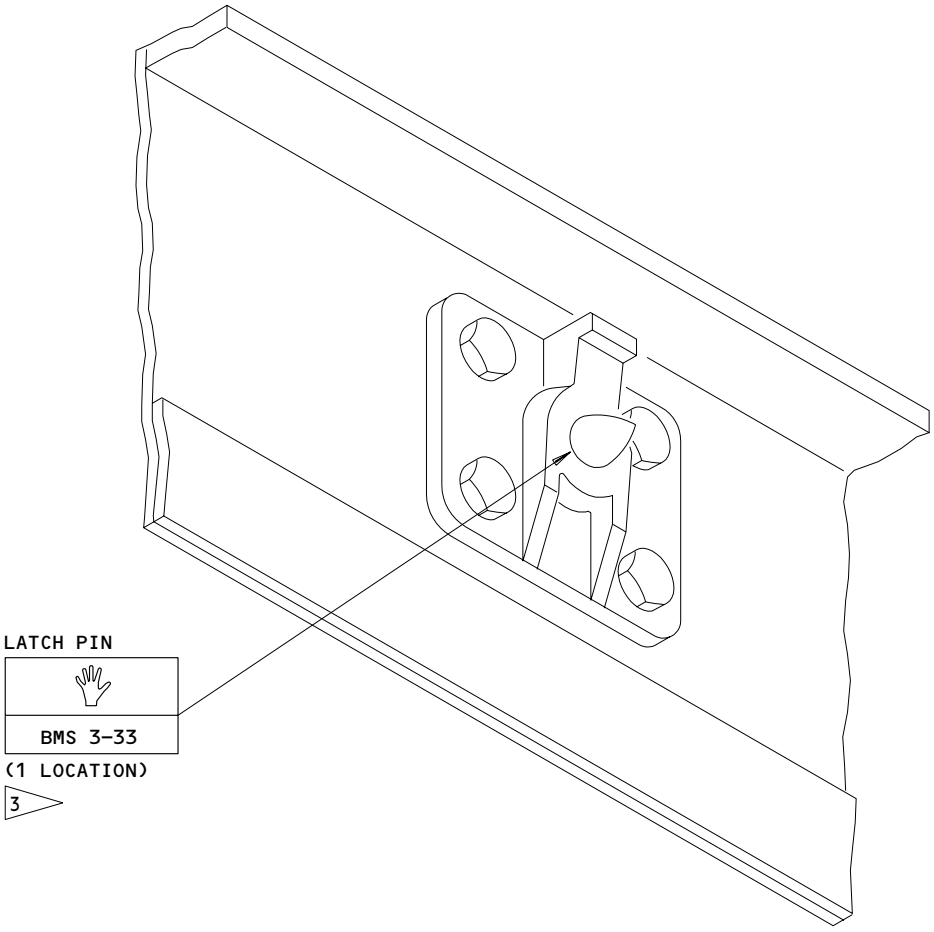
Forward Airstair Door Lubrication
Figure 201 (Sheet 4)

ELECTRONIC EQUIPMENT COMPARTMENT EXTERNAL ACCESS DOOR LUBRICATION

1. General
   A. This procedure provides instructions for lubricating the electronic equipment compartment external access door.
2. Equipment and Materials
   A. Grease - BMS 3-33 (Preferred)
   B. Grease - MIL-PRF-23827 (Supercedes MIL-G-23827) (Alternate)
3. Lubricate Electronic Equipment Compartment External Access Door
   A. Open electronic equipment compartment external access door.
   B. Remove the center panel located on top of door to gain access to the rack assembly.
   C. Lubricate electronic equipment compartment external access door as shown (Fig. 201).
   D. Replace the center panel over rack assembly.
   E. Close electronic equipment compartment external access door.



Electronic Equipment Compartment External Access Door Lubrication
Figure 201 (Sheet 1)



EXTERNAL HANDLE MECHANISM

1 POINT

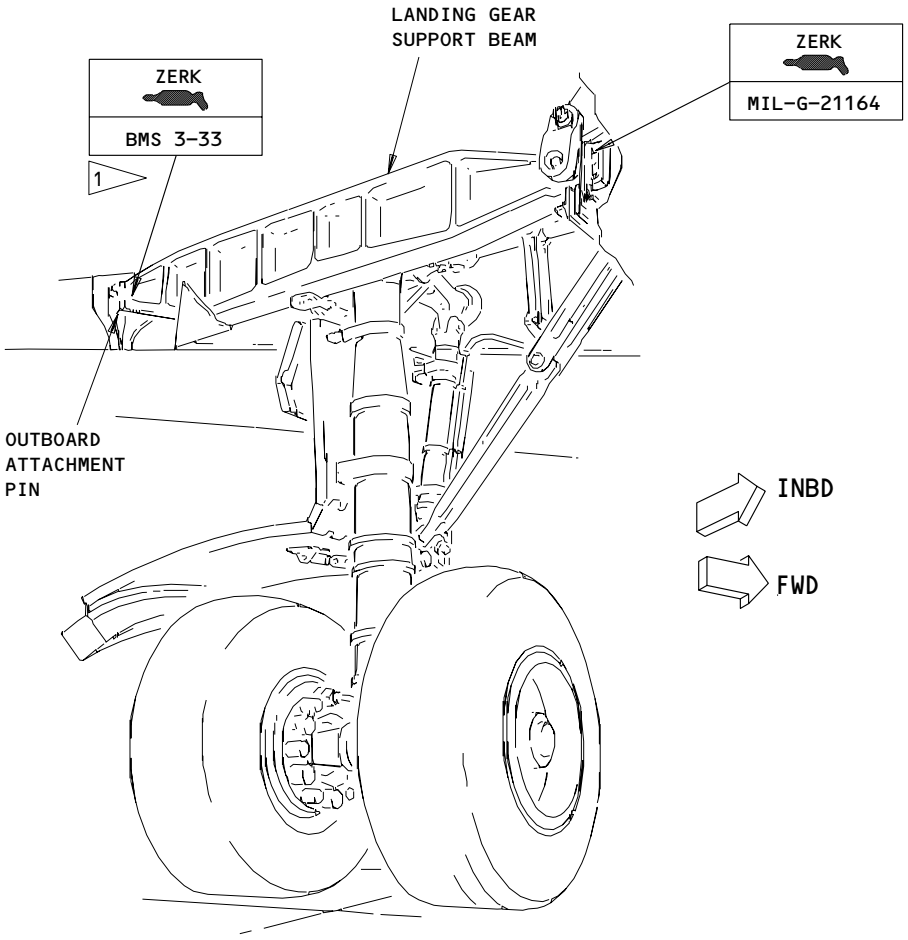
C 4

3 OPERATE THE OUTER HANDLE WITH THE DOOR OPEN TO EXTEND THE LATCH PINS FOR LUBRICATION

4 THERE ARE FOUR LATCH PINS ON THE DOOR

Electronic Equipment Compartment External Access Door Lubrication
Figure 201 (Sheet 2)

LANDING GEAR SUPPORT BEAM LUBRICATION - MAINTENANCE PRACTICES



EFFECTIVITY

AH ALL EXCEPT 7T-VEC
AR ALL EXCEPT LV-JMW THRU LV-JMZ,LV-JND,LV-JNE,LV-JTD,LV-JTO
BU ALL EXCEPT LN-SUA,LN-SUG,LN-SUS,LN-SUP
IC ALL EXCEPT VT-EAG THRU VT-EAM
PW ALL EXCEPT 731 THRU 735,762,772
DL ALL EXCEPT N452W THRU N453W

1 ON AIRPLANES AFTER INCORPORATION OF SB 57-1172

Landing Gear Support Beam Lubrication
Figure 201

EFFECTIVITY
ILLUSTRATION IS APPLICABLE TO THE AIRPLANES SHOWN ABOVE

440789

CABLE LUBRICATION

1. Equipment and Materials
   A. Grease - BMS 3-33, preferred (Ref. 20-30-21)
   B. Grease - BMS 3-24, alternate (Ref 20-30-21)
2. Lubrication Procedure
   A. Remove the previously applied lubricant and any foreign matter from the surface of control cable for the full length of travel through fairleads, air pressure seals, over pulleys, quadrants, and drums with a dry lint-free cloth.

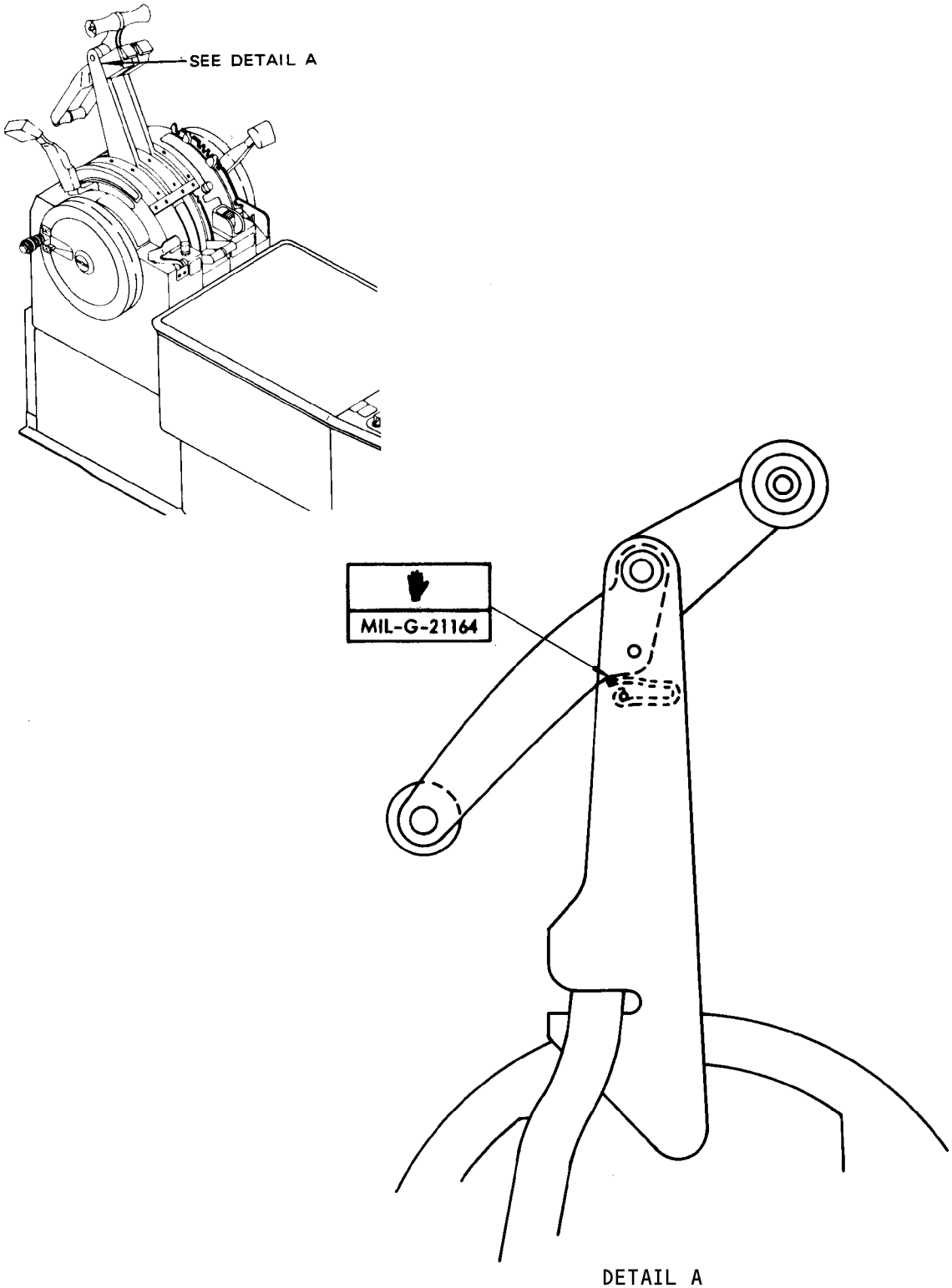
      CAUTION: DO NOT USE SOLVENT OR HEAT TO THIN GREASE. DO NOT USE SOLVENT TO CLEAN CABLES, SINCE SOLVENT DILUTES AND REMOVES GREASE FROM INSIDE CABLE STRANDS. DO NOT APPLY OR SPRAY BMS 3-23 ON CONTROL CABLES.

   B. Lubricate Cables
      (1) Carbon Steel Cables
         (a) Coat full length of cable (except through fair leads air pressure seals, over pulleys, quadrants and drums) with a minimum quantity of BMS 3-33 grease sufficient only to produce a continuous, thin, visible fillet of grease in cable grooves.

            CAUTION: THROTTLE CABLES IN ENGINE AREA ARE IN A HIGH TEMPERATURE ENVIRONMENT, AND LUBRICATION MAY DETERIORATE MORE RAPIDLY THAN ON OTHER CABLE INSTALLATIONS. CHECK CABLE LUBRICATION CONDITION IN ENGINE AREA AT MORE FREQUENT INTERVALS.

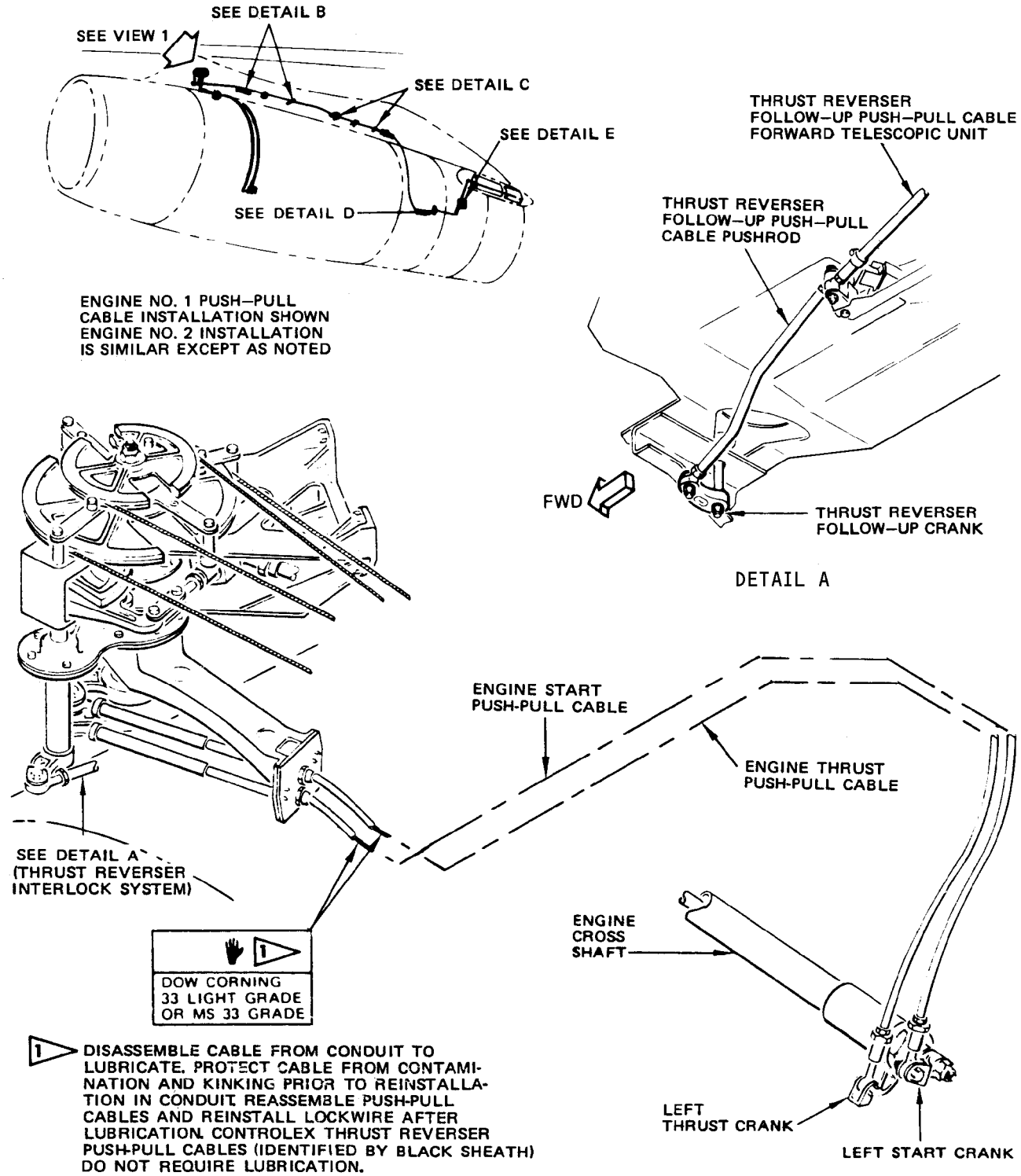
      (2) Stainless Steel Cables (CRES)
         (a) Do not apply cleaning solvents on control cables.
         (b) Do not apply grease or oil on control cables.

REVERSE THRUST LEVER LUBRICATION

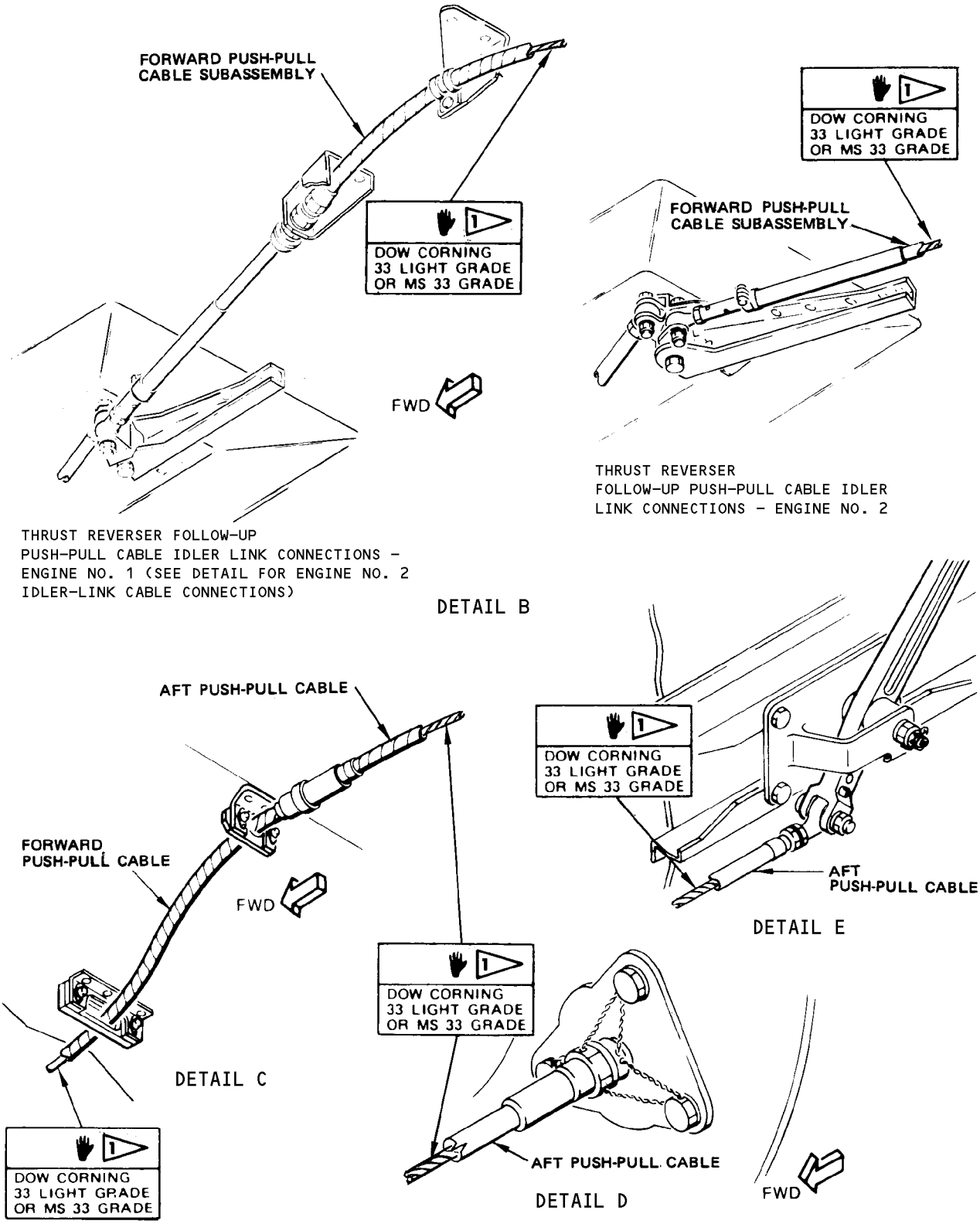


Reverse Thrust Lever Lubrication
Figure 201

ENGINE-PUSH PULL CABLE LUBRICATION - MAINTENANCE PRACTICE



Reverse Thrust Lever Lubrication
Figure 201



Engine Push-Pull Cable Lubrication
Figure 202

THRUST REVERSER LINKAGE LUBRICATION

1. General
   A. This procedure contains the steps to lubricate the thrust reverser linkages that need lubrication. There are two different linkages for the thrust reverser, the driver link (4 locations) and the idler link (4 locations).
2. Equipment and Materials
   A. Flush gun (grease gun)
   B. Grease - MIL-G-81322 (AMM 20-30-21)
3. Lubricate the Thrust Reverser Linkages
   A. Put the deflector doors in the reverse thrust position (AMM 78-32-01/201).

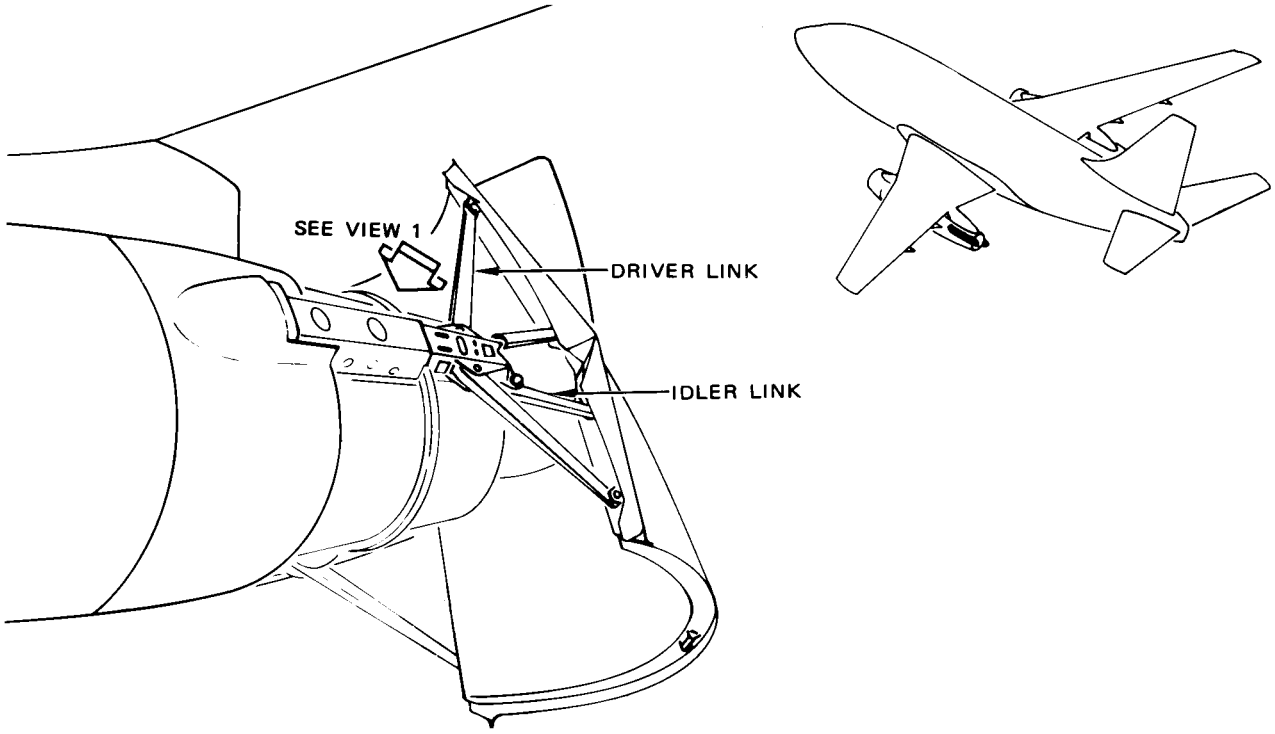
      WARNING: MAKE SURE ALL PERSONS ARE CLEAR OF THE THRUST REVERSER. THE DEFLECTOR DOORS WILL ROTATE AFT WHEN THE THRUST REVERSER IS DEPLOY. THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.

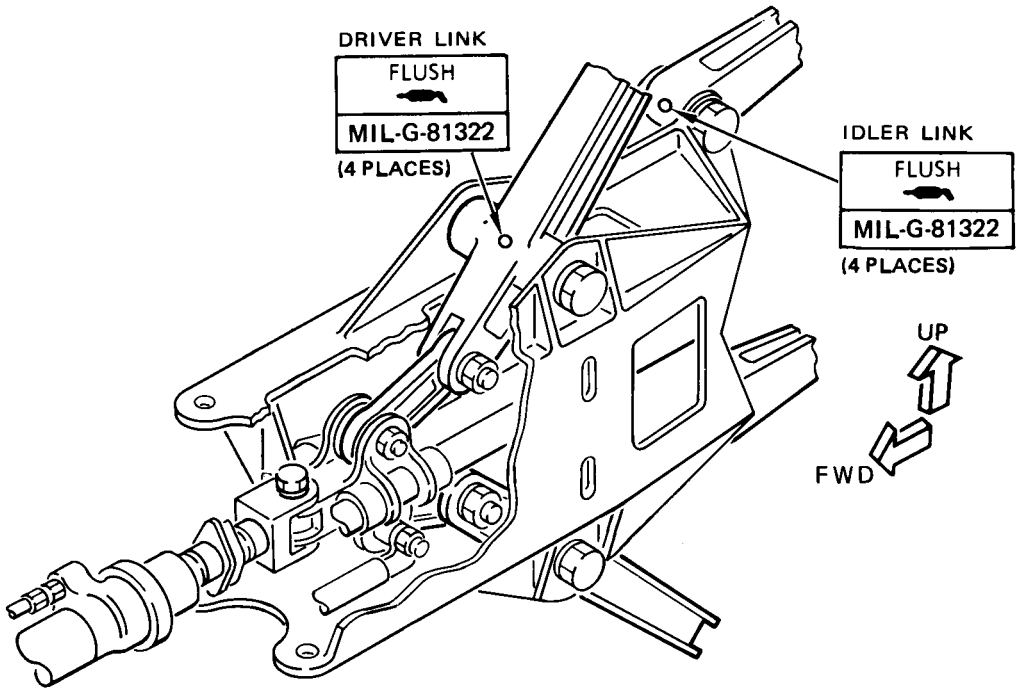
      (1) Deactivate the reverser hydraulic system:
          (a) Install ground locks on both thrust reverser isolation valves.

              WARNING: MAKE SURE THE GROUND LOCKS ARE CORRECTLY INSTALLED. MAKE SURE THE THRUST REVERSERS CANNOT DEPLOY AFTER YOU INSTALL THE GROUND LOCKS. ACCIDENTAL DEPLOYMENT OF THE THRUST REVERSERS CAN CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

      (2) Remove the screws that attach the actuator housing fairing to the thrust reverser.
      (3) Remove the actuator housing fairing.
   B. Lubricate the thrust reverser links as shown (Fig. 201).
   C. Install the actuator housing fairing.
   D. Remove the ground lock from both thrust reverser isolation valves.
   E. Put the deflector doors in the forward thrust position (AMM 78-32-01/201).

      WARNING: MAKE SURE ALL PERSONS ARE CLEAR OF THE THRUST REVERSER. THE DEFLECTOR DOORS WILL ROTATE AFT WHEN THE THRUST REVERSER IS DEPLOY. THE THRUST REVERSER CAN CAUSE INJURIES TO PERSONS OR DAMAGE TO EQUIPMENT.





VIEW 1

Thrust Reverser Linkage Lubrication
Figure 201

ACCESS DOORS AND PANELS - MAINTENANCE PRACTICES

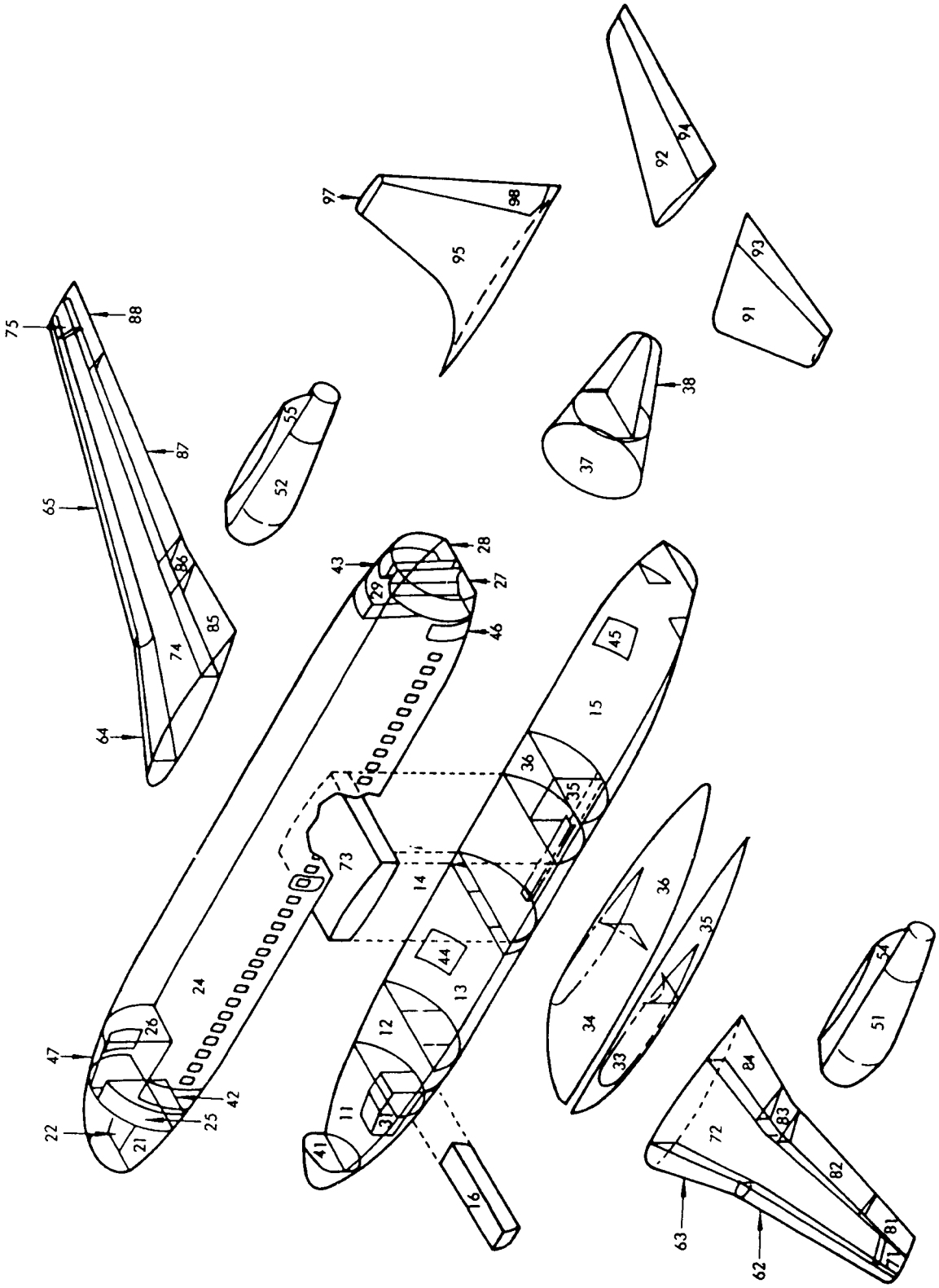
1. General
   A. This section covers procedures that should be followed generally when an access door or panel is removed and installed.
2. Bonding Jumpers
   A. Bonding jumpers disengaged to remove a panel must be engaged again when the panel is installed.
3. Aluminum and Steel Fasteners
   A. Care should be taken to distinguish between aluminum and steel fasteners. Unless special attention is paid by personnel to aluminum fasteners, there is a possibility that they will be installed utilizing a torque value normally associated with the same diameter steel fastener which could either stretch the fastener or damage the drive slot or threads.
4. Faying Surface Seals
   A. If you break a faying surface seal during panel removal, you must apply a new faying surface seal during the panel installation (AMM 51-31-0/201).

      CAUTION: OBEY THE INSTRUCTIONS IN THE PROCEDURE TO APPLY THE FAYING SURFACE SEAL. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

      NOTE: Most access panels do not have a faying surface seal. If a panel has a faying surface seal, apply BMS 5-95 sealant if the panel does not touch fuel, and BMS 5-45 sealant (preferred), BMS 5-26 sealant (alternate) if the panel touches fuel (unless other AMM procedures are specified).

ACCESS DOORS AND PANELS - IDENTIFICATION AND LOCATION

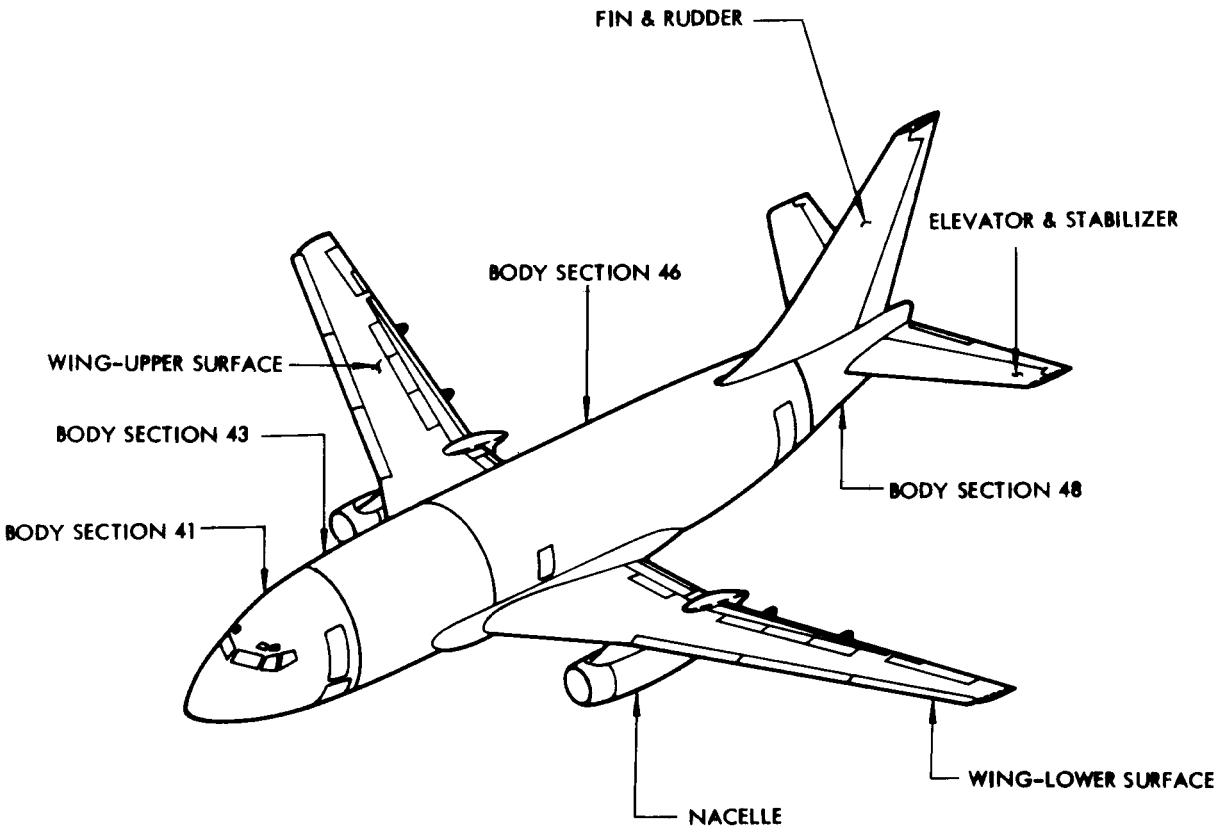
1. General
   A. Access doors and panels are identified by a four-digit number and in general by a descriptive designation. The first two figures of any identification number are related to a particular zone on the airplane (Fig. 201). The last two digits of any identification number is the number of the panel or door within a zone. Refer to AMM 51-31-0/201 for sealing instructions.
   B. Coverage of access doors and panels has been broken down according to the following (Fig. 202).
      (1) Body Section 41 Access Doors and Panels (AMM 12-31-11)
      (2) Body Section 43 Access Doors and Panels (AMM 12-31-21)
      (3) Body Section 46 Access Doors and Panels (AMM 12-31-31)
      (4) Body Section 48 Access Doors and Panels (AMM 12-31-41)
      (5) Pin and Rudder Access Doors and Panels (AMM 12-31-51)
      (6) Wing Lower Surface Access Doors and Panels (AMM 12-31-61)
      (7) Wing Upper Surface Access Doors and Panels (AMM 12-31-71)
      (8) Elevator and Stabilizer Access Doors and Panels (AMM 12-31-81)
      (9) Nacelle and Engine-to-Wing Access Doors and Panels (AMM 12-31-91)
      (10) Interior Access Doors and Panels
         (a) Passenger cabin floor panel locations are shown on the following Boeing drawings:
            1) Body Section 41 Floor Panel Installation 65-51268
            2) Body Section 43 Floor Panel Installation 65-46819
            3) Body Section 46 Floor Panel Installation 65-46820



Zone Diagram
Figure 201

ZONE DESCRIPTION	
ZONE	
09	AIRPLANE EXTERIOR
10	BELOW FLOOR
11	Lower Nose Compartment
12	Electronic Compartment
13	Forward Cargo Compartment
14	Air Conditioning Distribution Bay
15	Aft Cargo Compartment
16	Forward Stairs and Fairing Door
20	ABOVE FLOOR
21	Control Cabin - Left
22	Control Cabin - Right
24	Passenger Cabin
25	Forward Lavatory - Left
26	Forward Galley and Windscreen
27	Aft Lavatory - Left
28	Aft Lavatory - Right
29	Aft Galley
30	UNPRESSURIZED BODY AREAS
31	Nose Wheel Well
33	Air Conditioning Compartment - Left
34	Air Conditioning Compartment - Right
35	Left Main Wheel Well
36	Right Main Wheel Well
37	Tail Cone
38	APU Compartment
40	NOSE AND DOORS
41	Radome
42	Forward Entry Door
43	Aft Galley Service Door
44	Forward Cargo Door
45	Aft Cargo Door
46	Aft Entry Door
47	Forward Galley Service Door
50	POWER PLANT
51	Engine No. 1
52	Engine No. 2
54	Engine No. 1 Fairing
55	Engine No. 2 Fairing

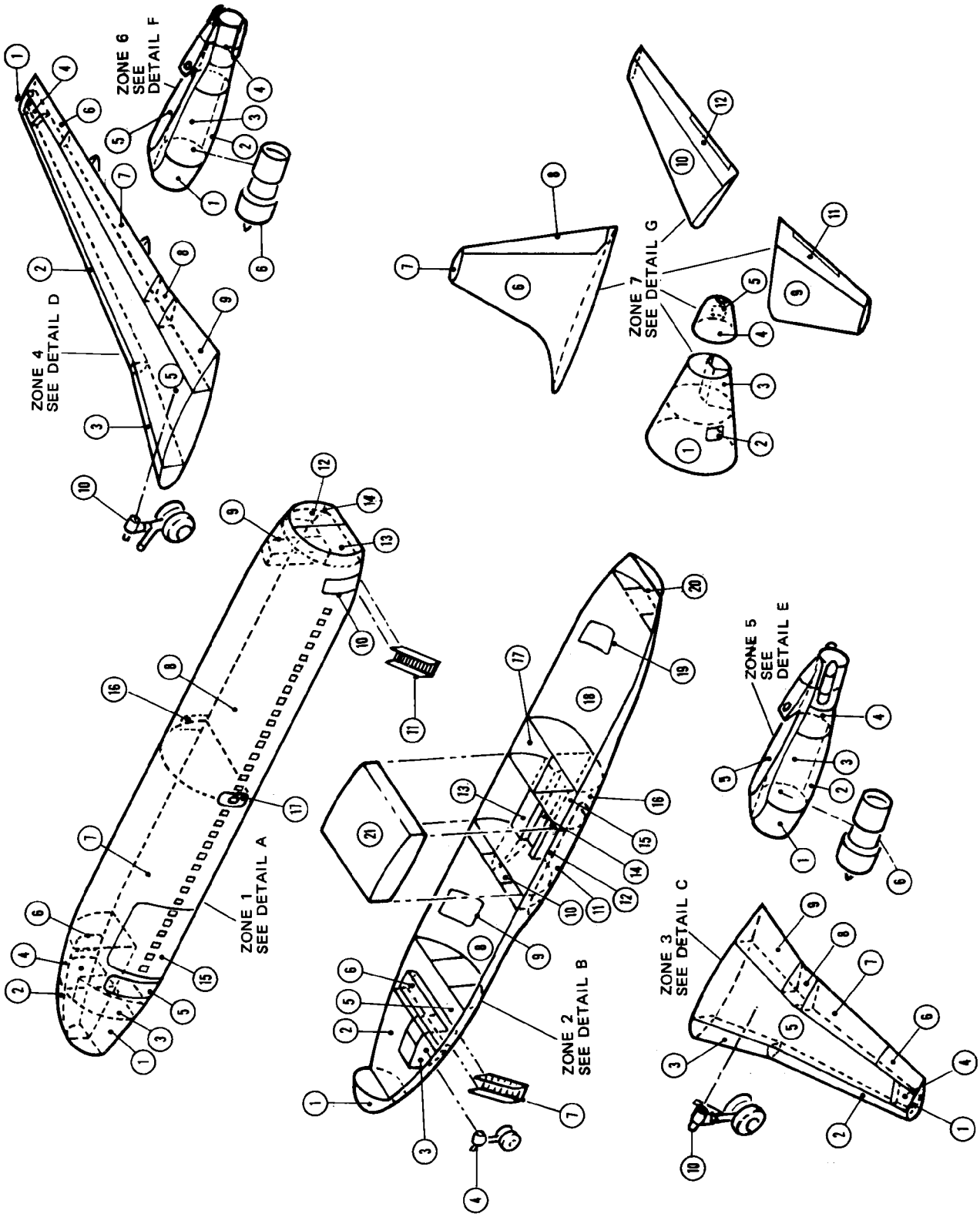
ZONE DESCRIPTION	
ZONE	
60	WING LEADING EDGE
62	Left Outboard Wing Leading Edge - Including Slats
63	Left Inboard Wing Leading Edge - Including Flaps
64	Right Inboard Wing Leading Edge - Including Flaps
65	Right Outboard Wing Leading Edge - Including Slats
70	FUEL TANKS
71	Left Fuel Vent Surge Tank
72	Left Fuel Tank
73	Center Section Fuel Tank
74	Right Fuel Tank
75	Right Fuel Vent Surge Tank
80	WING FLIGHT CONTROLS AND AFT OR REAR SPAR
81	Left Wing Trailing Edge, Aileron and Control Tab
82	Left Wing Trailing Edge, Outboard Flap and Spoilers
84	Left Wing Trailing Edge, Inboard Flap and Spoilers
85	Right Wing Trailing Edge, Inboard Flap and Spoilers
87	Right Wing Trailing Edge, Outboard Flap and Spoilers
88	Right Wing Trailing Edge, Aileron and Control Tab
90	EMPENNAGE
91	Left Horizontal Stabilizer
92	Right Horizontal Stabilizer
93	Left Elevator and Tab
94	Right Elevator and Tab
95	Vertical Fin
97	Vertical Fin Tip Fairing
98	Rudder



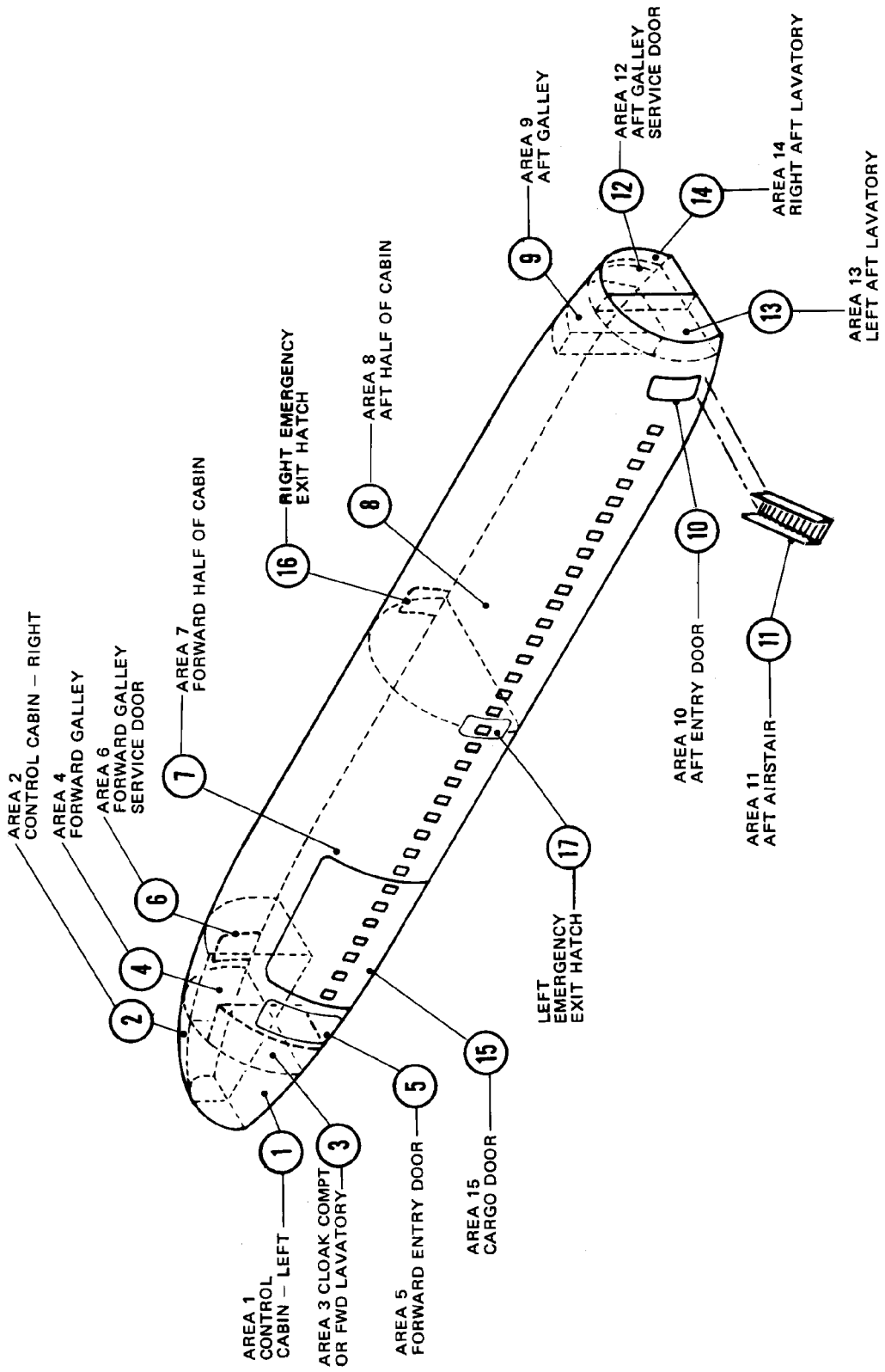
Body Sections
Figure 202

ZONE DIAGRAMS - MAINTENANCE PRACTICES

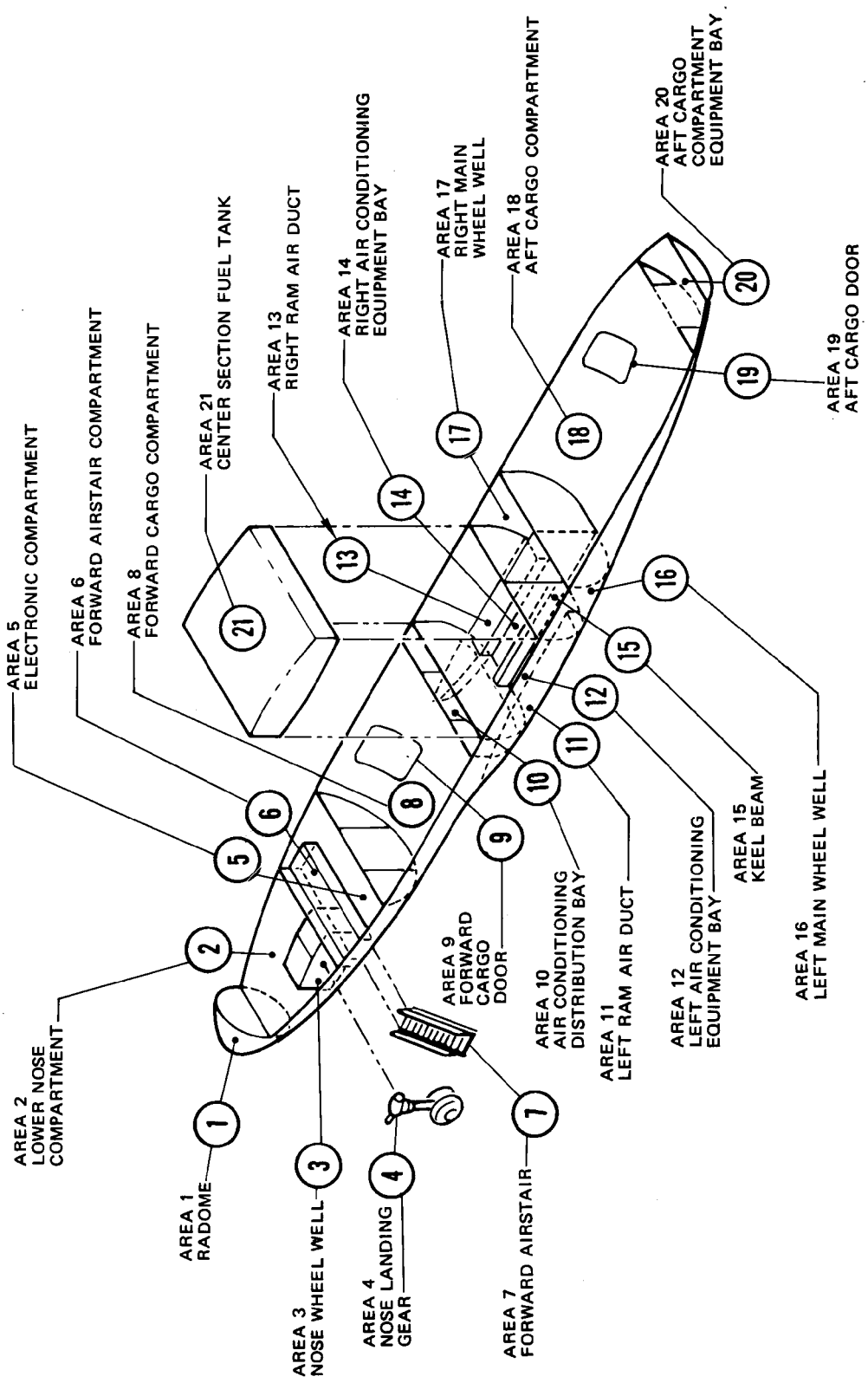
1. General
   A. This section is provided for reference purposes only. The information is derived from, and virtually identical to, the ZONE DIAGRAM section in the Maintenance Planning Document, D6-17594-1.
   B. The 737 Zone Diagram is comprised of seven major zones covering the fuselage, wings, nacelles and empennage. Further identification breakdown is achieved by use of areas in conjunction with major zones which denote specific compartments, equipment bays, doors, engines, etc.
2. Zone and Area Identification
   A. The zone and area is identified by a number consisting of a first digit indicating the zone followed by a dash and a number of one or two digits which indicate area.
   B. Thus 1-2 is read: zone 1, area 2 which identifies the upper half of the fuselage and the right side of the control cabin.
3. Zone Location (Fig. 201)
   A. General Zone Diagram (Covers entire aircraft)
      (1) Zone 1 - Upper Half of the Fuselage
      (2) Zone 2 - Lower Half of the Fuselage
      (3) Zone 3 - Left Wing
      (4) Zone 4 - Right Wing
      (5) Zone 5 - Left Nacelle
      (6) Zone 6 - Right Naceele
      (7) Zone 7 - Empennage



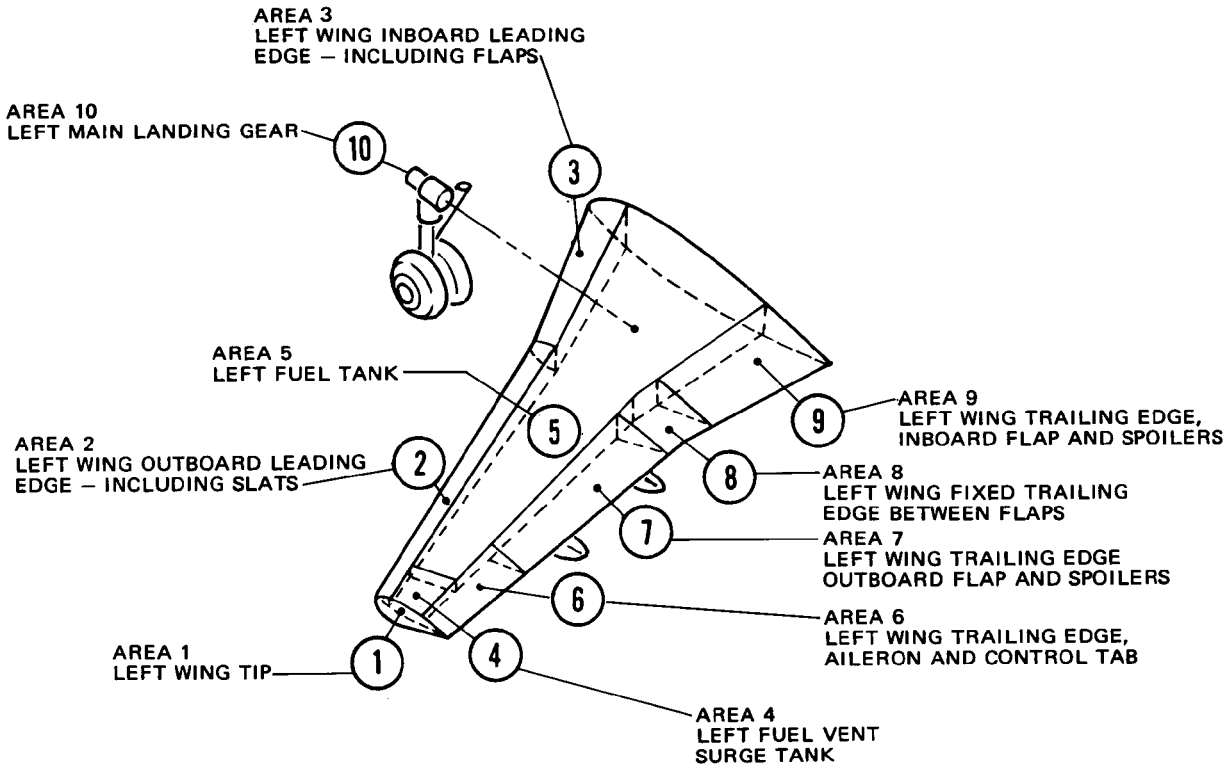
General Zone Diagram
Figure 201 (Sheet 1)



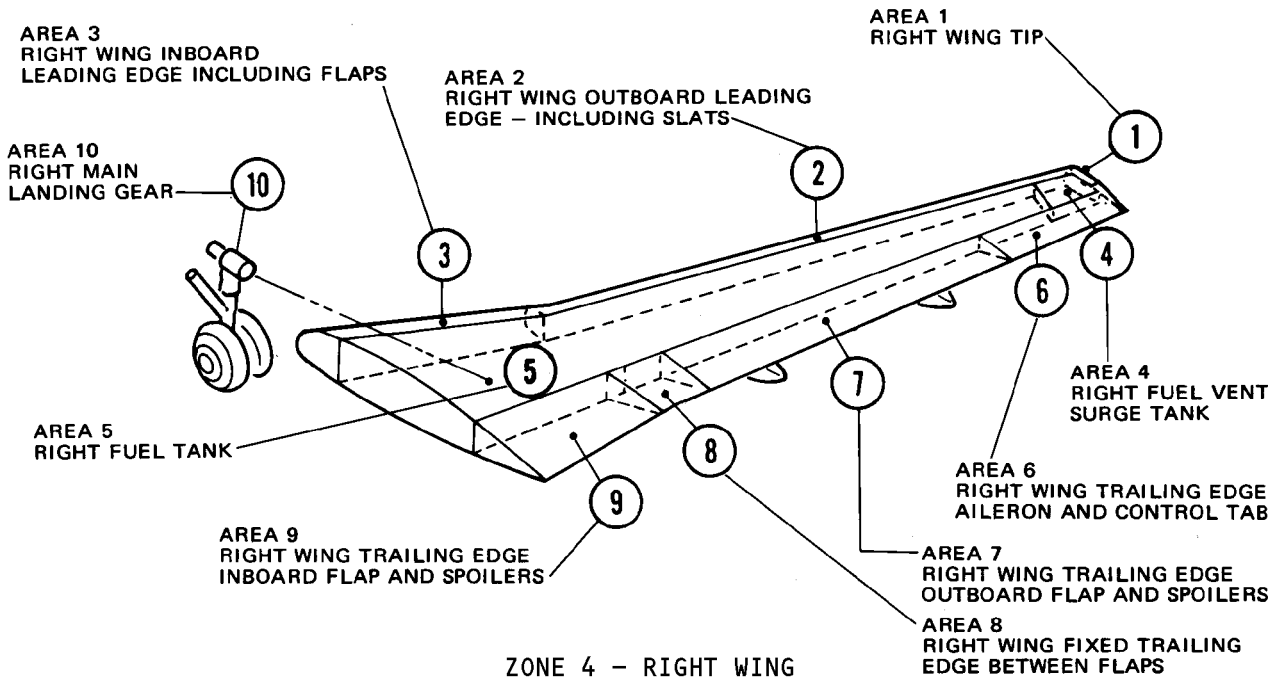
General Zone Diagram
Figure 201 (Sheet 2)



General Zone Diagram
Figure 201 (Sheet 3)

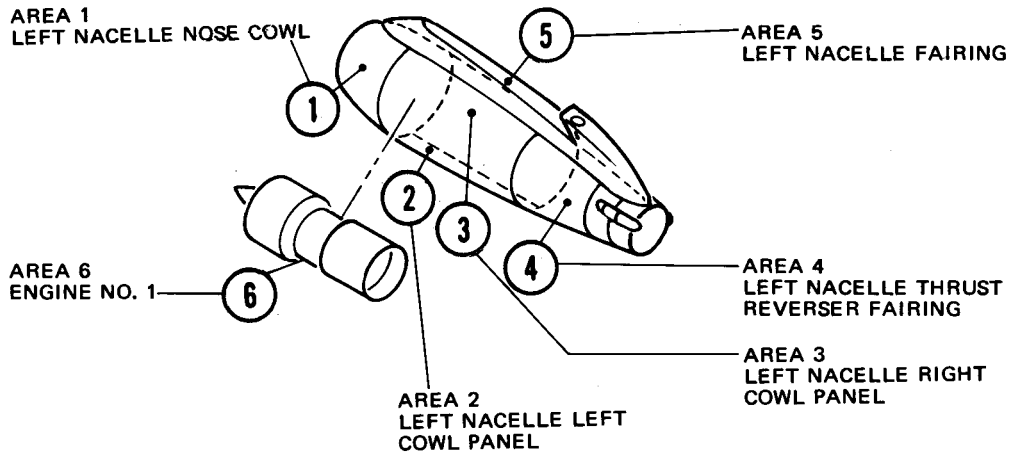


ZONE 3 – LEFT WING
DETAIL C

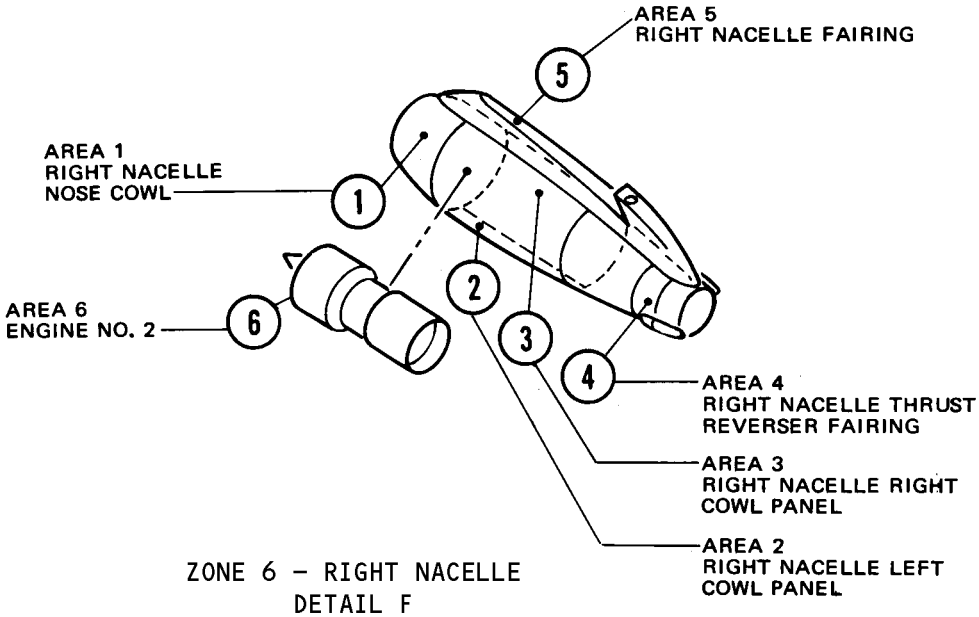


ZONE 4 – RIGHT WING
DETAIL D

General Zone Diagram
Figure 201 (Sheet 4)

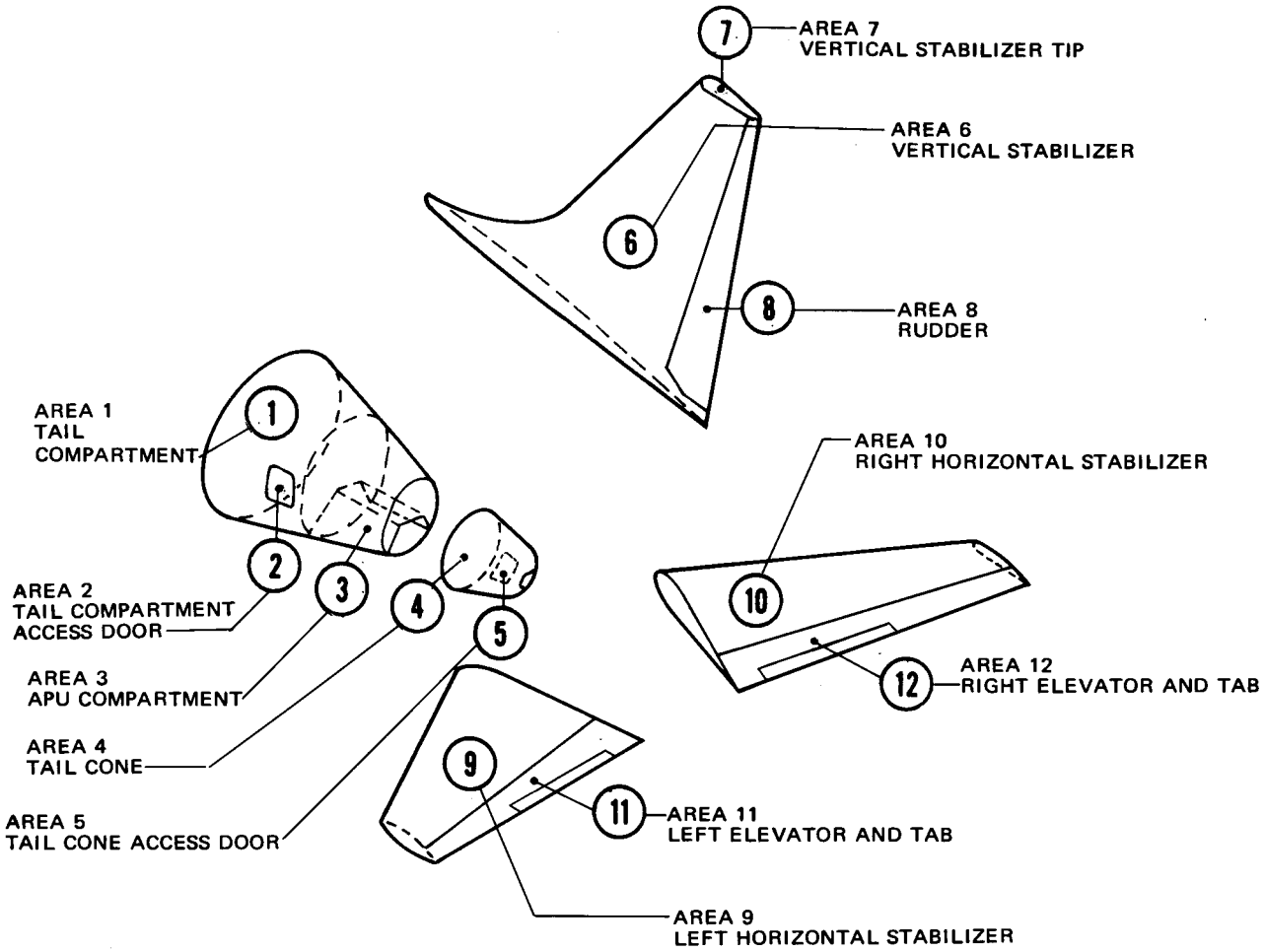


ZONE 5 – LEFT NACELLE
DETAIL E



ZONE 6 – RIGHT NACELLE
DETAIL F

General Zone Diagram
Figure 201 (Sheet 5)

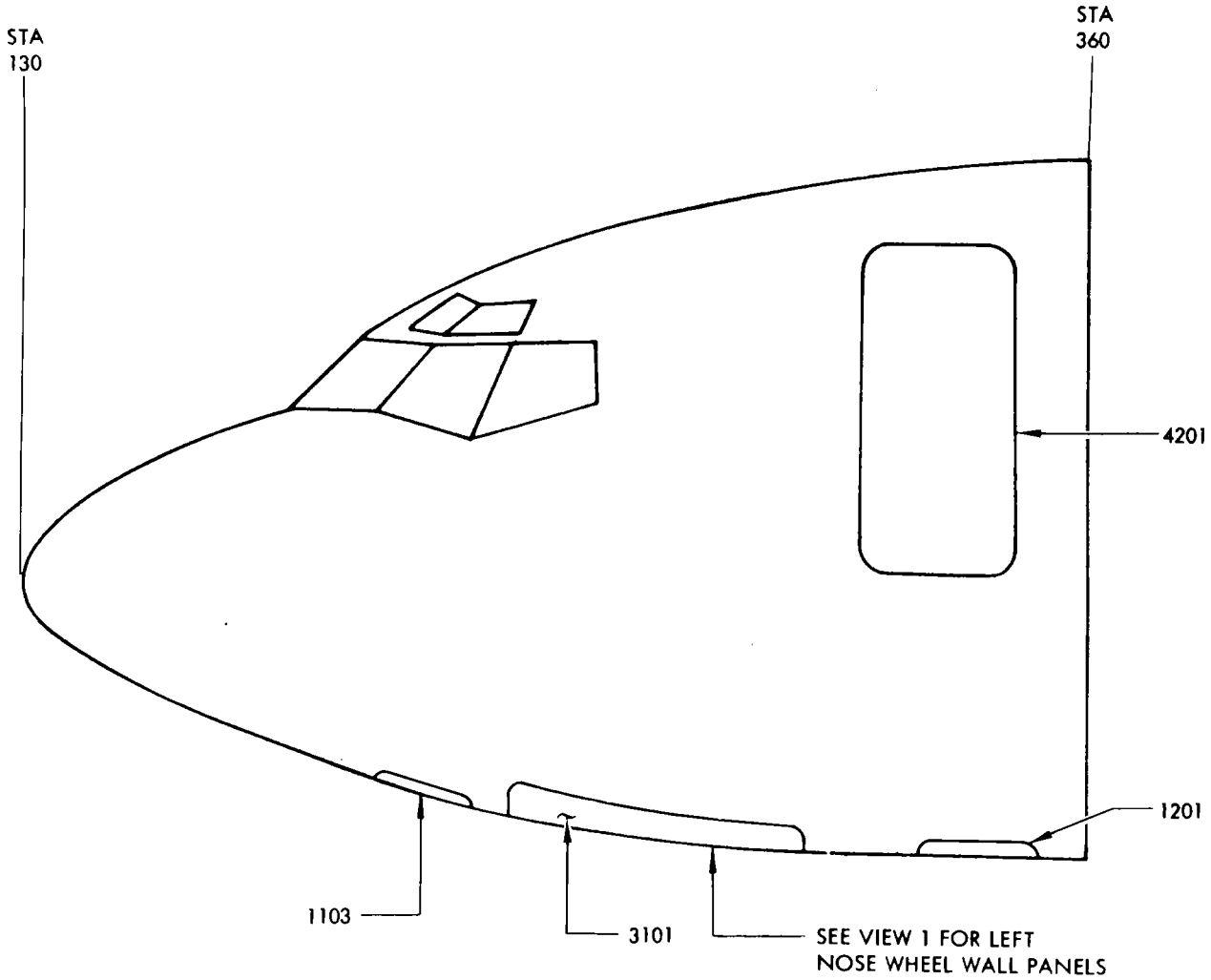


ZONE 7 - EMPENNAGE
DETAIL G

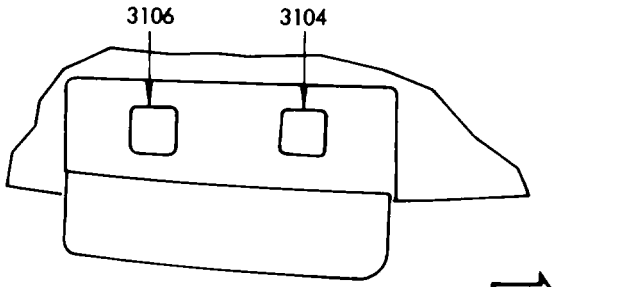
General Zone Diagram
Figure 201 (Sheet 6)

BODY SECTION 41 ACCESS DOORS AND PANELS

REF DRAWING 65-45211 FOR ACCESS DOORS & PANELS

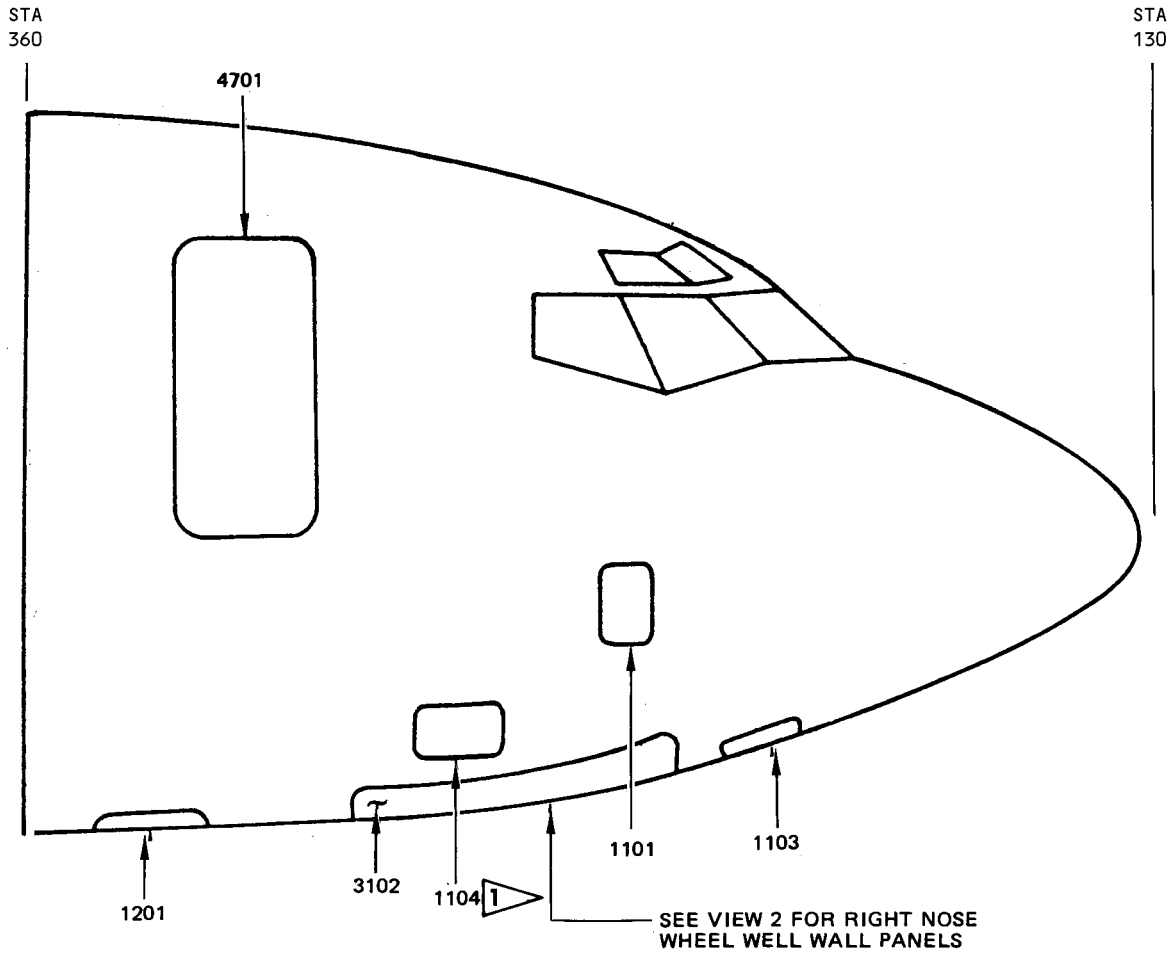


LEFT SIDE VIEW



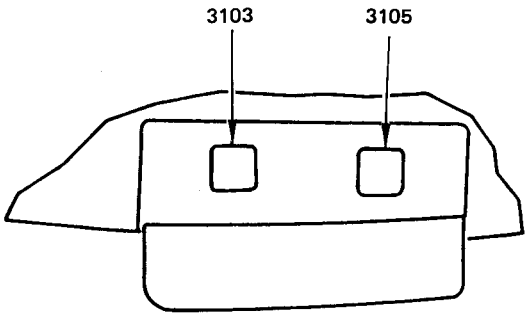
LEFT NOSE WHEEL WELL WALL
VIEW 1

Body Section 41 Access Doors and Panels
Figure 201



RIGHT SIDE VIEW

1 AIRPLANES WITH FORWARD TOILET



RIGHT NOSE WHEEL WELL WALL

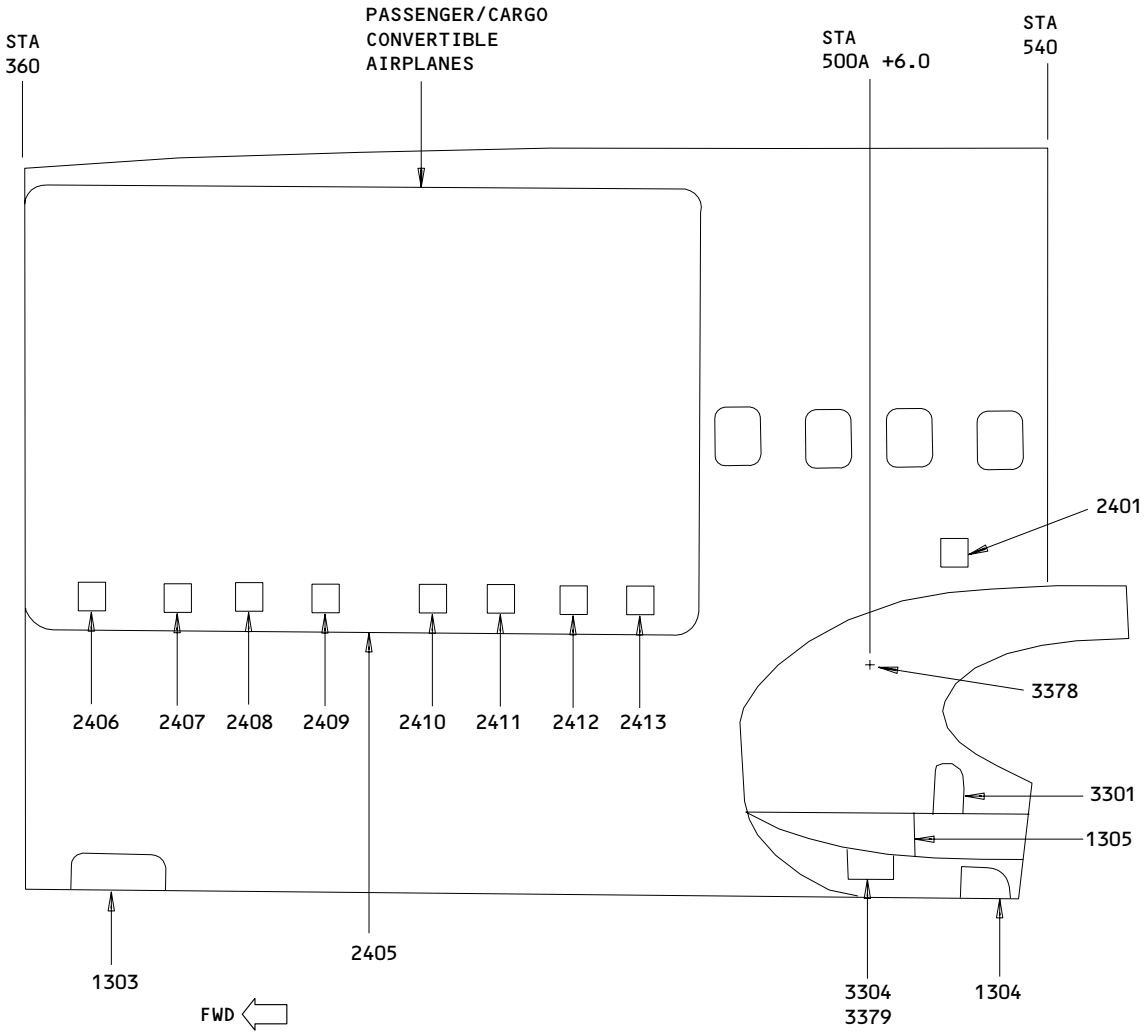
General Zone Diagram
Figure 202

WING UPPER SURFACE ACCESS DOORS AND PANELS		
		BONDING RESISTANCE
PANEL NO.	TITLE	MAX OHMS
1101	EXTERNAL POWER RECEPTACLE DOOR	0.1
1103	FORWARD ACCESS DOOR	0.1
1104	FORWARD TOILET DOOR	0.1
1201*	ELECTRONICS EQUIPMENT ACCESS DOOR	0.1
1601*	FORWARD AIRSTAIR DOOR	0.1
3101*	NOSE WHEEL WELL DOOR	2M
3102*	NOSE WHEEL WELL DOOR	2M
3103	NOSE WHEEL WELL PANEL	
3104	NOSE WHEEL WELL PANEL	
3105	NOSE WHEEL WELL PANEL	
3106	NOSE WHEEL WELL PANEL	
4201*	FORWARD ENTRY DOOR	0.1
4701*	FORWARD GALLEY DOOR	0.1

* THIS NUMBER IS NOT MARKED ON AIRPLANE AND IS GIVEN FOR SERVICE INFORMATION ONLY

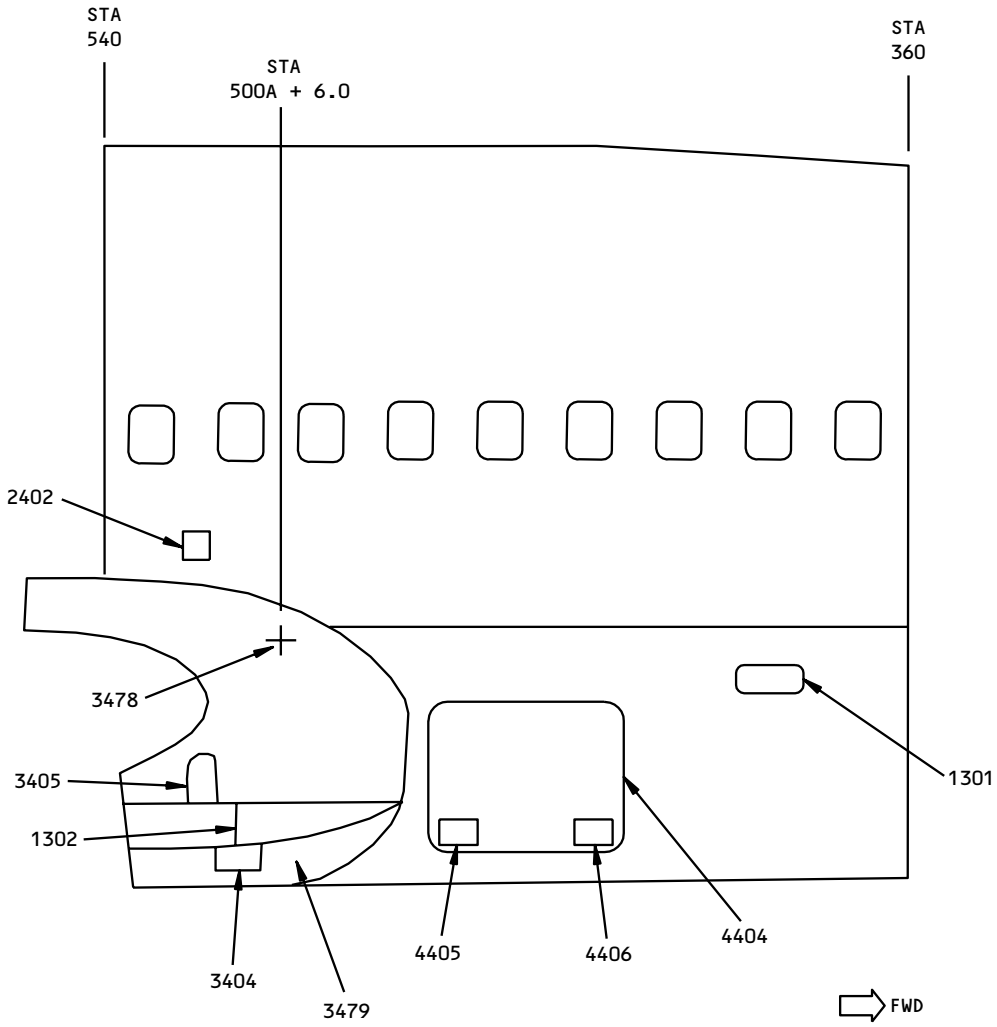
NOTE: Bonding resistance values are maximum values which allow for the possibility of oxidation at the bonding interface. Lower values can be obtained after bonding joint has been cleaned.

BODY SECTION 43 ACCESS DOORS AND PANELS
REF DRAWING 65-45211 FOR ACCESS DOORS AND PANELS



LEFT SIDE VIEW

Body Section 43 Access Doors and Panels
Figure 201 (Sheet 1)



RIGHT SIDE VIEW

Body Section 43 Access Doors and Panels
Figure 201 (Sheet 2)

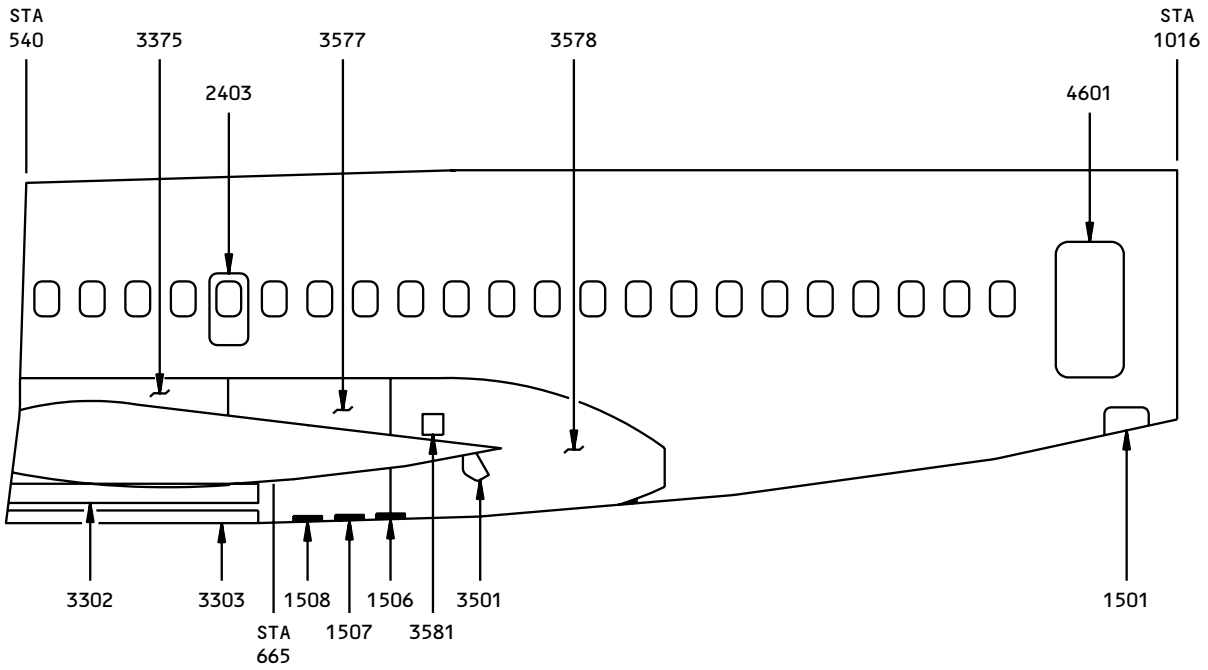
PANEL NO.	TITLE	BONDING RESISTANCE MAX OHMS
1301	OXYGEN SERVICE PANEL	0.1
1302	A/C RAM AIR INLET	0.1
1303	E/E COOLING EXHAUST	
1304	GROUND CONDITIONED AIR DOOR	0.1
1305	A/C RAM AIR INLET	0.1
2401	WING SCANNING LIGHT	
2402	WING SCANNING LIGHT	
2405	MAIN CARGO DOOR	0.1
2406	MAIN CARGO DOOR ACCESS PANEL	0.1
2407	MAIN CARGO DOOR ACCESS PANEL	0.1
2408	MAIN CARGO DOOR ACCESS PANEL	0.1
2409	MAIN CARGO DOOR ACCESS PANEL	0.1
2410	MAIN CARGO DOOR ACCESS PANEL	0.1
2411	MAIN CARGO DOOR ACCESS PANEL	0.1
2412	MAIN CARGO DOOR ACCESS PANEL	0.1
2413	MAIN CARGO DOOR ACCESS PANEL	0.1
3301	A/C ACCESS DOOR	2M
3302*	A/C ACCESS DOOR	
3304	A/C ACCESS DOOR	2M
3378	REMOVABLE PANEL	
3379	REMOVABLE PANEL	
3404	A/C ACCESS DOOR	2M
3405	A/C ACCESS DOOR	2M
3478	REMOVABLE PANEL	
3479	REMOVABLE PANEL	
4404*	FORWARD CARGO DOOR	0.1
4405	FWD CARGO DOOR ACCESS PNL	0.1
4406	FWD CARGO DOOR ACCESS PNL	0.1

*THIS NUMBER IS NOT MARKED ON AIRPLANE AND IS GIVEN FOR SERVICE INFORMATION ONLY

NOTE: Bonding resistance values are maximum values which allow for the possibility of oxidation at the bonding interface. Lower values can be obtained after bonding joint has been cleaned.

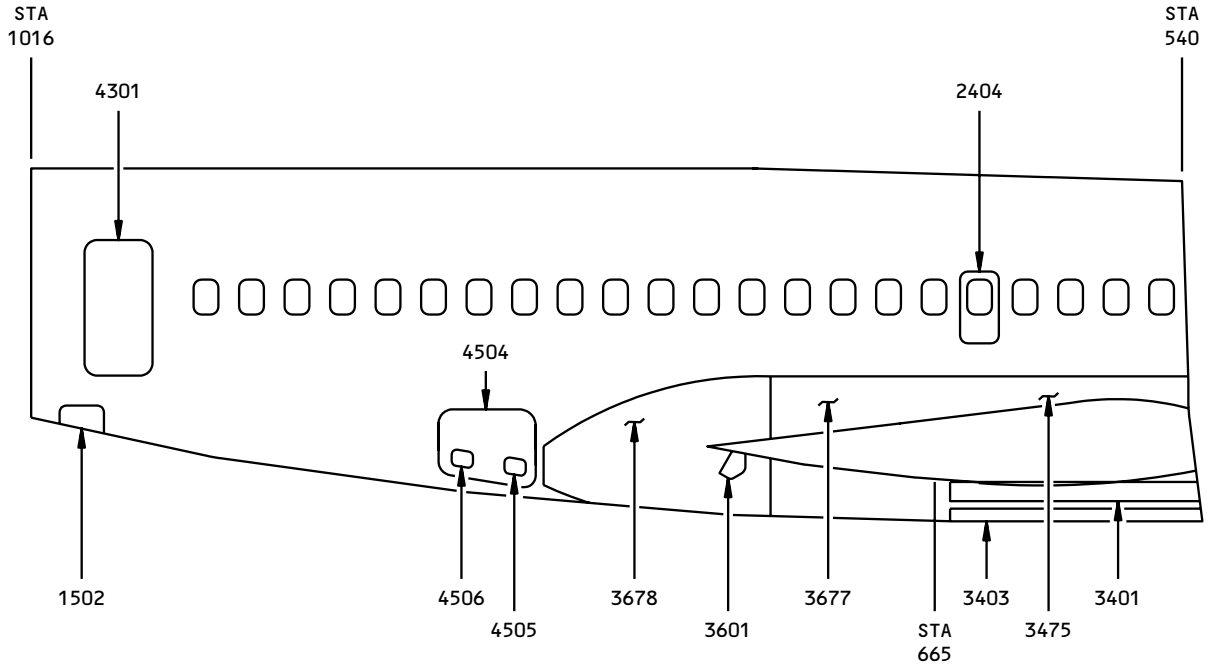
Body Section 43 Access Doors and Panels
Figure 201 (Sheet 3)

REF DRAWING 65-45211 FOR ACCESS DOORS AND PANELS



LEFT SIDE VIEW

Body Section 46 Access Doors and Panels
Figure 201 (Sheet 1)



RIGHT SIDE VIEW

Body Section 46 Access Doors and Panels
Figure 201 (Sheet 2)

PANEL NO.	TITLE	BONDING RESISTANCE MAX OHMS
1501	WATER SERVICE PANEL	0.1
1502	TOILET SERVICE DOOR	0.1
1506	APU DUCT ACCESS PANEL	1.0
1507	HEAT DETECTION WIRE REPLACEMENT ACCESS PANEL	0.1
1508	HEAT DETECTION WIRE REPLACEMENT ACCESS PANEL	0.1
2403*	EMERGENCY HATCH	0.1
2404*	EMERGENCY HATCH	0.1
3302	UNDERWING FAIRING ACCESS PANEL	2M
3303	A/C ACCESS PANEL	1.0
3475	REMOVABLE PANEL	1.0
3401	UNDERWING FAIRING ACCESS PANEL	1.0
3403	A/C ACCESS PANEL	1.0
3501	INBD TE FLAP TRACK FAIRING ACCESS DOOR 1	1.0
3677	REMOVABLE PANEL	1.0
3678	REMOVABLE PANEL	1.0
3581	HYDRAULIC SERVICE DOOR	
3601	INBD TE FLAP TRACK FAIRING ACCESS DOOR 1	1.0
4301*	AFT GALLEY DOOR	0.1
4504*	AFT CARGO DOOR	0.1
4505	AFT CARGO DOOR ACCESS PNL	0.1
4506	AFT CARGO DOOR ACCESS PNL	0.1
4601*	AFT ENTRY DOOR	0.1

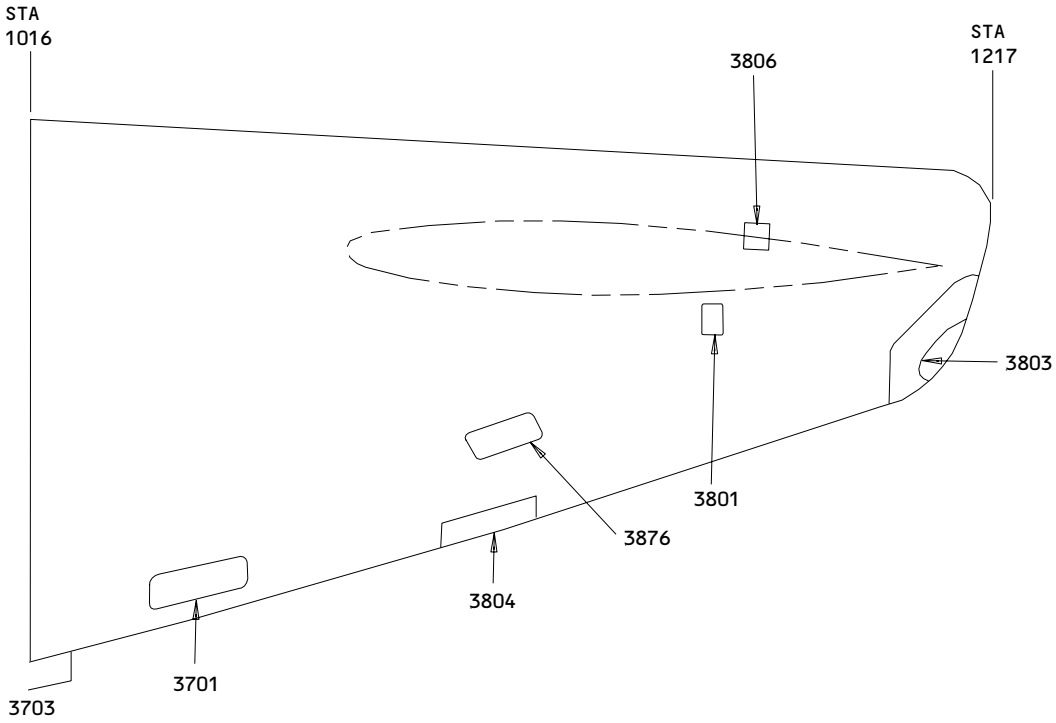
* THIS NUMBER IS NOT MARKED ON AIRPLANE AND IS GIVEN FOR SERVICE INFORMATION ONLY

1 REFER TO CHAPTER 27, INBOARD FLAP TRACK FAIRING, FOR REMOVAL/INSTALLATION OF THIS DOOR

NOTE: Bonding resistance values are maximum values which allow for the possibility of oxidation at the bonding interface. Lower values can be obtained after bonding joint has been cleaned.

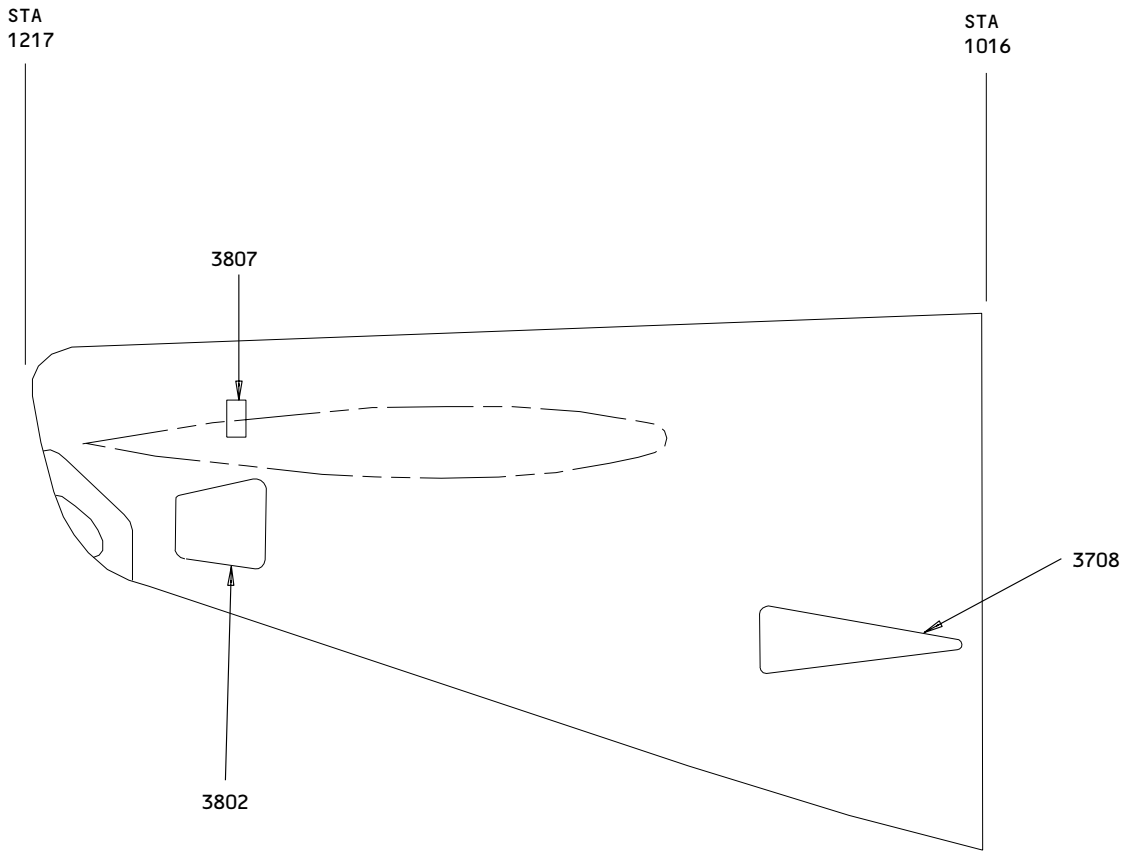
Body Section 46 Access Doors and Panels
Figure 201 (Sheet 3)

BODY SECTION 48 ACCESS DOORS AND PANELS
REF DRAWING 65-45211 FOR ACCESS DOORS AND PANELS



LEFT SIDE VIEW

Body Section 48 Access Doors and Panels
Figure 201 (Sheet 1)



RIGHT SIDE VIEW

Body Section 48 Access Doors and Panels
Figure 201 (Sheet 2)

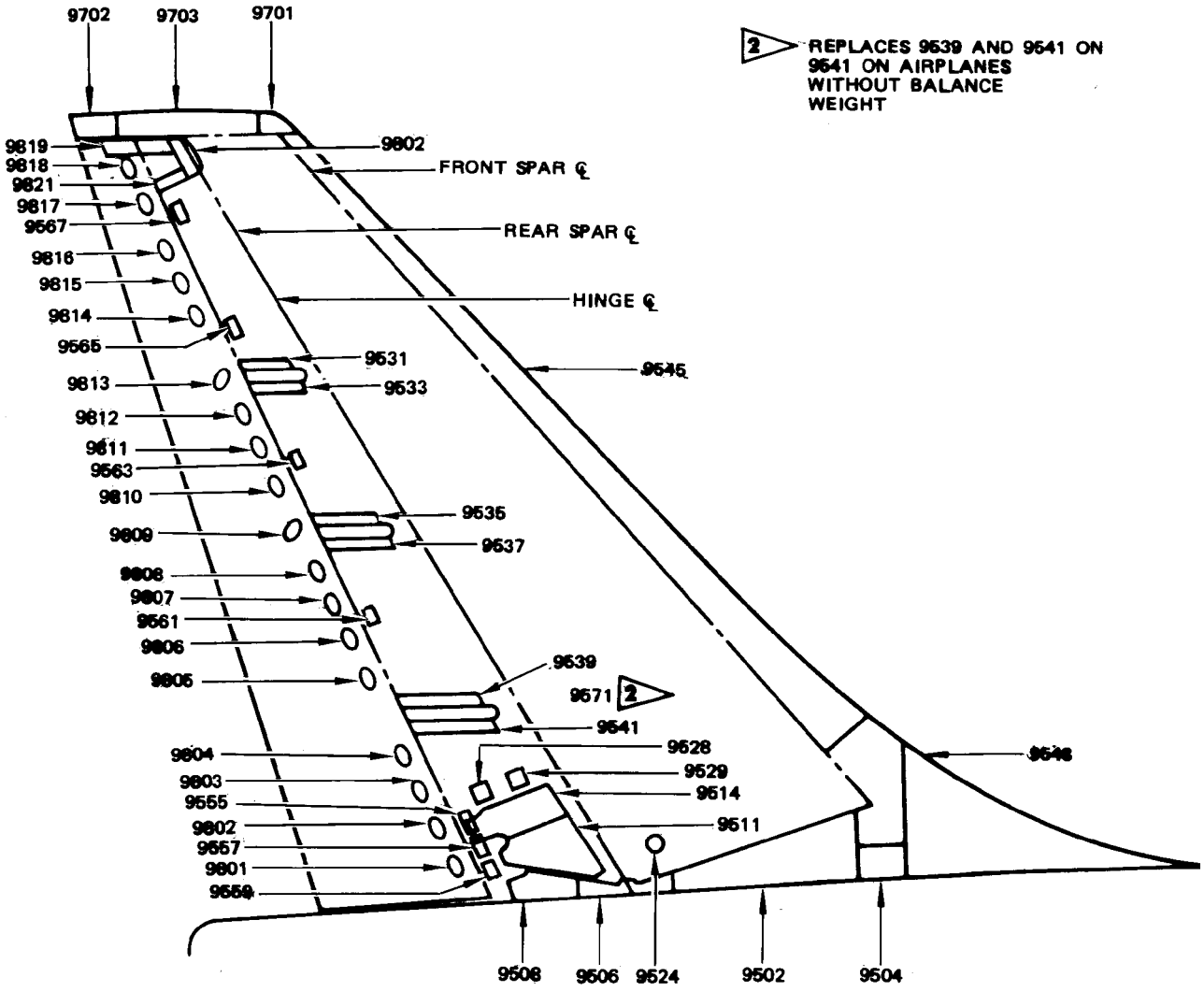
PANEL NO.	TITLE	BONDING RESISTANCE MAX OHMS
3701	STABILIZER TRIM ACCESS DOOR	0.1
3703	FLUID DRAIN	0.1
3708	APU AIR INTAKE	0.1
3801	TAIL CONE ACCESS DOOR	2M
3802	TAIL CONE ACCESS DOOR	2M
3803	APU EXHAUST DUCT	0.1
3804	APU COWL DOOR	0.1
3806	TAILCONE COVERPLATE	0.1
3807	TAILCONE COVERPLATE	0.1
3876	APU OIL FILLER DOOR	

NOTE: Bonding resistance values are maximum values which allow for the possibility of oxidation at the bonding interface. Lower values can be obtained after bonding joint has been cleaned.

Body Section 48 Access Doors and Panels
Figure 201 (Sheet 3)

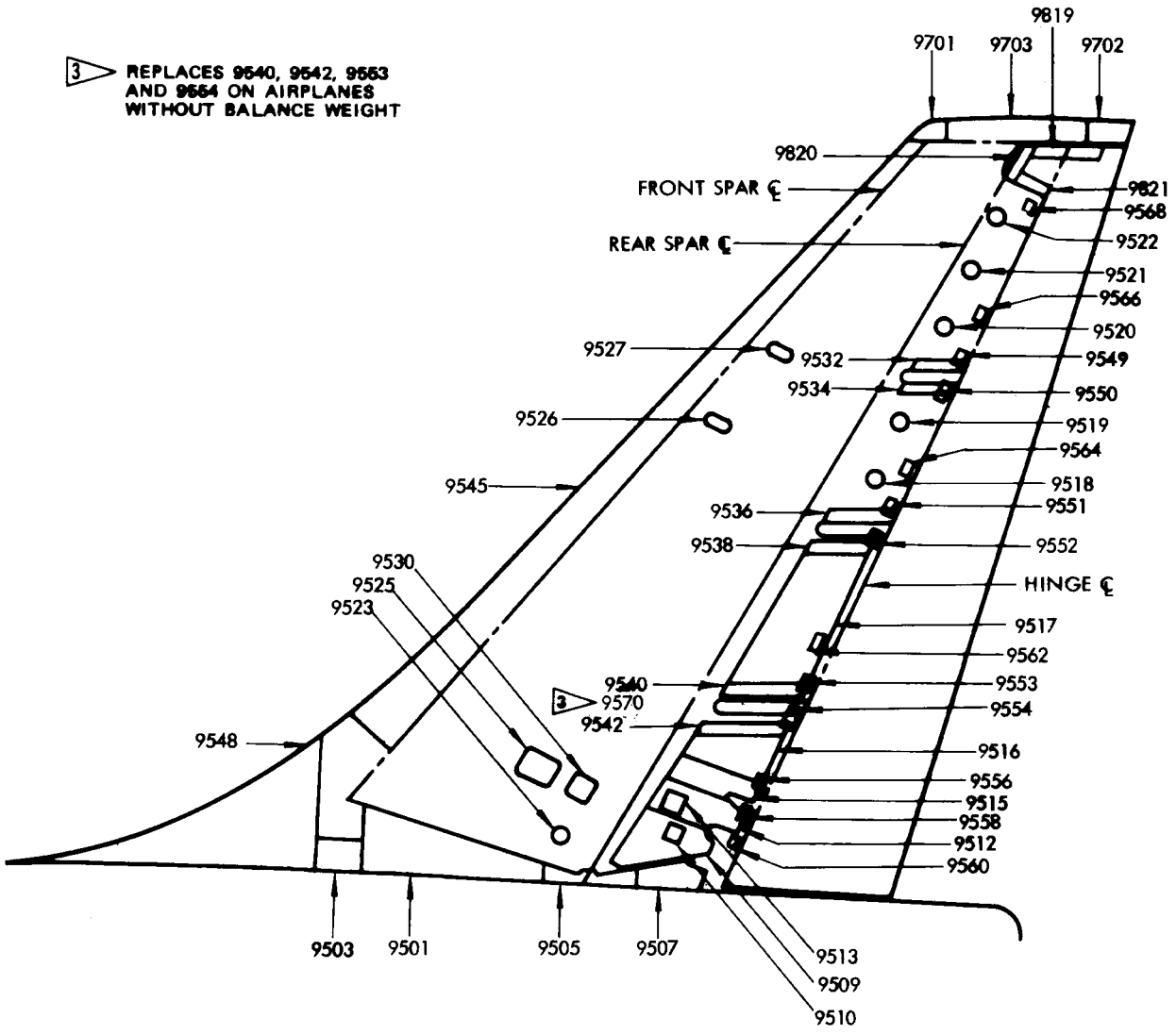
FIN AND RUDDER ACCESS DOORS AND PANELS

REF DRAWING 65-45211 FOR ACCESS DOORS & PANELS



RICHT SIDE VIEW

Fin and Rudder Access Doors and Panels
Figure 201 (Sheet 1)



LEFT SIDE VIEW

Fin and Rudder Access Doors and Panels
Figure 201 (Sheet 2)

PANEL NO.	TITLE	BONDING RESISTANCE MAX OHMS
9501	FORWARD FIN ACCESS PANEL	2M
9502	FORWARD FIN ACCESS PANEL	2M
9503	FRONT SPAR ACCESS DOOR	1.0
9504	FRONT SPAR ACCESS DOOR	1.0
9505	REAR SPAR ACCESS DOOR	1.0
9506	REAR SPAR ACCESS DOOR	1.0
9507	AFT FIN ACCESS PANEL	2M
9508	AFT FIN ACCESS PANEL	2M
9509	RUDDER ACCESS PANEL	2M
9510	RUDDER ACCESS PANEL	2M
9511	RUDDER ACCESS PANEL	2M
9512	RUDDER ACCESS PANEL	2M
9513	RUDDER ACCESS PANEL	2M
9514	RUDDER ACCESS PANEL	2M
9515	RUDDER ACCESS PANEL	2M
9516	RUDDER ACCESS PANEL	2M
9517	RUDDER ACCESS PANEL	2M
9518	RUDDER ACCESS PANEL	2M
9519	RUDDER ACCESS PANEL	2M
9520	RUDDER ACCESS PANEL	2M
9521	RUDDER ACCESS PANEL	2M
9522	RUDDER ACCESS PANEL	2M
9523	ACCESS PANEL	2M
9524	ACCESS PANEL	2M
9525	ACCESS PANEL	2M
9526	FLUX VALVE ACCESS PANEL 2	0.1
9527	FLUX VALVE ACCESS PANEL 2	0.1
9528	RUDDER ACCESS DOOR	0.1
9529	RUDDER ACCESS DOOR	0.1
9530	ACCESS DOOR	0.1
9701	VOR ANTENNA ACCESS PANEL	0.1
9702	STATIC TEST FITTING ACCESS PANEL	0.1
9703	FIN TIP, MID FAIRING 1	OPEN
9531	BALANCE WEIGHT SEAL ACCESS PANEL	2M
9532	BALANCE WEIGHT SEAL ACCESS PANEL	2M
9533	BALANCE WEIGHT SEAL ACCESS PANEL	2M
9534	BALANCE WEIGHT SEAL ACCESS PANEL	2M
9535	BALANCE WEIGHT SEAL ACCESS PANEL	2M
9536	BALANCE WEIGHT SEAL ACCESS PANEL	2M
9537	BALANCE WEIGHT SEAL ACCESS PANEL	2M
9538	BALANCE WEIGHT SEAL ACCESS PANEL	2M
9539	BALANCE WEIGHT SEAL ACCESS PANEL	2M
9540		2M

BALANCE WEIGHT SEAL ACCESS PANEL

1 PANEL 9701 OR 9702 MUST BE REMOVED BEFORE REMOVING FIN TIP MID FAIRING 9703

2 CAUTION: USE ONLY NON-MAGNETIC TOOLS AND FASTENERS ON FLUX VALVE ACCESS PANELS

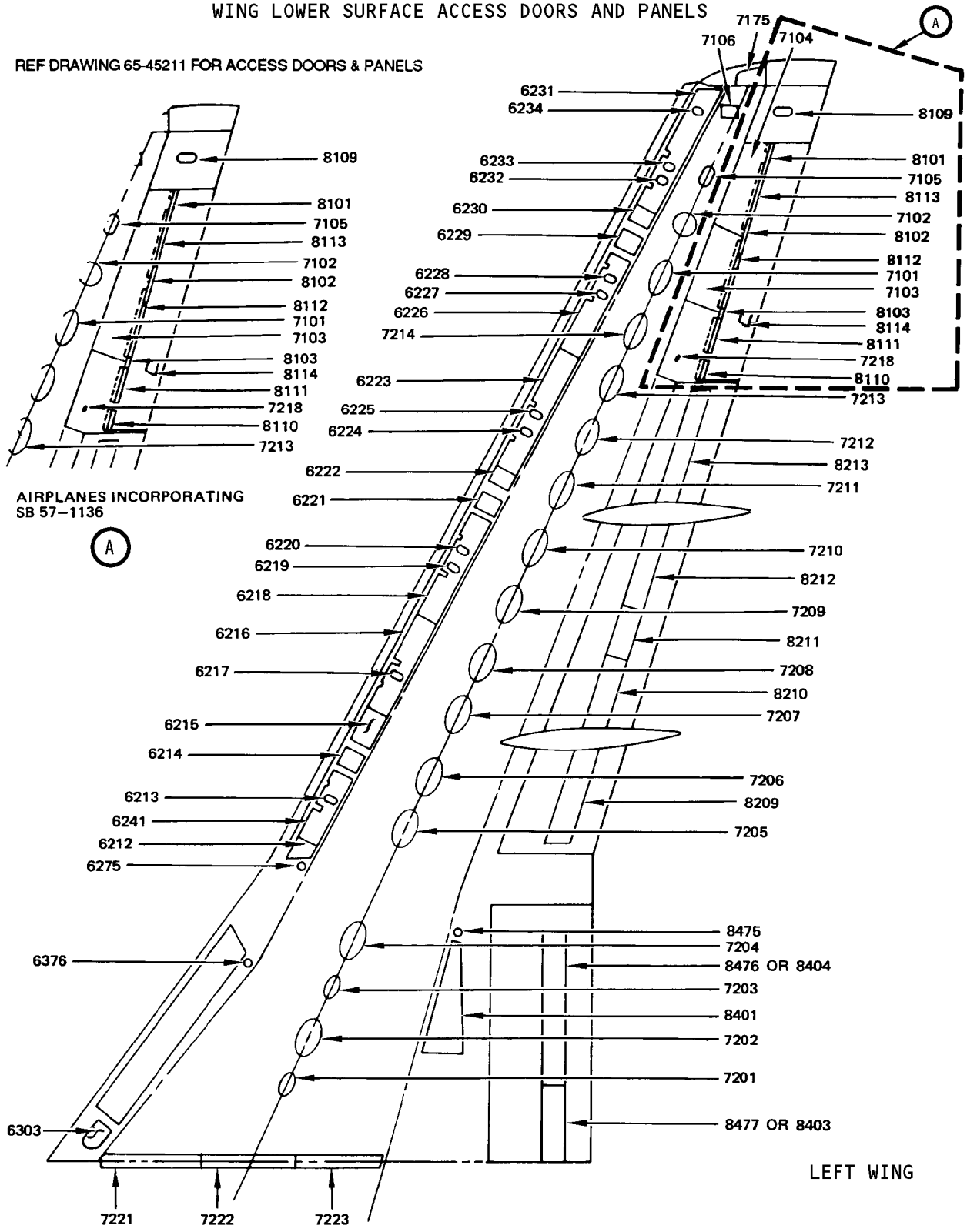
NOTE: Bonding resistance values are maximum values which allow for the possibility of oxidation at the bonding interface. Lower values can be obtained after bonding joint has been cleaned.

Fin and Rudder Access Doors and Panels
Figure 201 (Sheet 3)

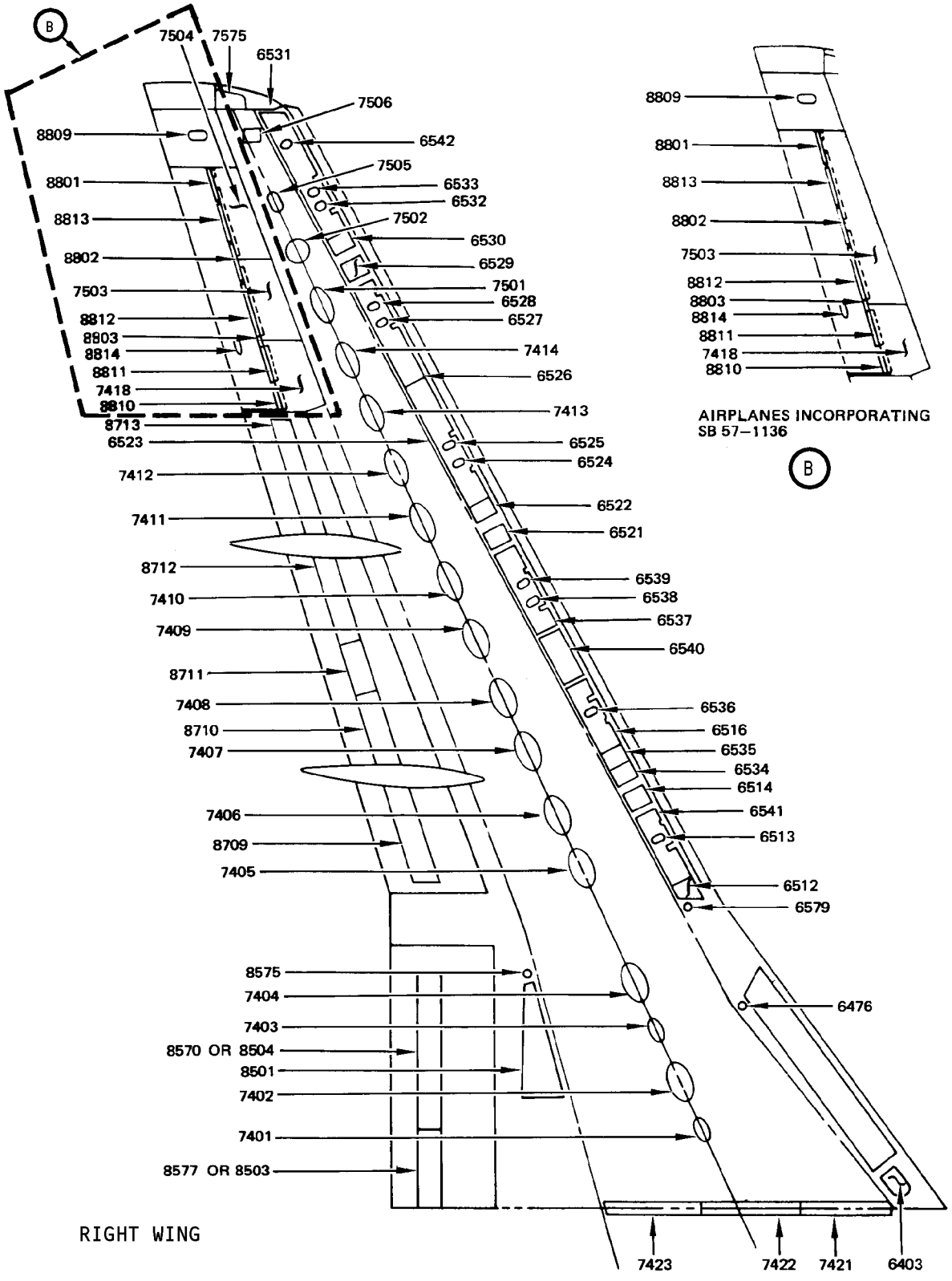
PANEL NO.	TITLE	BONDING RESISTANCE MAX OHMS
9541	BALANCE WEIGHT SEAL ACCESS PANEL	2M
9542	BALANCE WEIGHT SEAL ACCESS PANEL	2M
9545	LEADING EDGE PANEL	0.1
9548	DORSAL FIN	0.1
9549	RUDDER NOSE CLOSURE SKIN	2M
9550	RUDDER NOSE CLOSURE SKIN	2M
9551	RUDDER NOSE CLOSURE SKIN	2M
9552	RUDDER NOSE CLOSURE SKIN	2M
9553	RUDDER NOSE CLOSURE SKIN	2M
9554	RUDDER NOSE CLOSURE SKIN	2M
9555	RUDDER NOSE FAIRING	0.1
9556	RUDDER NOSE FAIRING	0.1
9557	RUDDER NOSE FAIRING	0.1
9558	RUDDER NOSE FAIRING	0.1
9559	RUDDER NOSE FAIRING	0.1
9560	RUDDER NOSE FAIRING	0.1
9561	RUDDER NOSE COVER	1.0
9562	RUDDER NOSE COVER	1.0
9563	RUDDER NOSE COVER	1.0
9564	RUDDER NOSE COVER	1.0
9565	RUDDER NOSE COVER	1.0
9566	RUDDER NOSE COVER	1.0
9567	RUDDER NOSE COVER	1.0
9568	RUDDER NOSE COVER	1.0
9570	LOWER HINGE ACCESS PANEL	2M
9571	LOWER HINGE ACCESS PANEL	2M
9801	RUDDER ACCESS PANEL	2M
9802	RUDDER ACCESS PANEL	2M
9803	RUDDER ACCESS PANEL	2M
9804	RUDDER ACCESS PANEL	2M
9805	RUDDER ACCESS PANEL	2M
9806	RUDDER ACCESS PANEL	2M
9807	RUDDER ACCESS PANEL	2M
9808	RUDDER ACCESS PANEL	2M
9809	RUDDER ACCESS PANEL	2M
9810	RUDDER ACCESS PANEL	2M
9811	RUDDER ACCESS PANEL	2M
9812	RUDDER ACCESS PANEL	2M
9813	RUDDER ACCESS PANEL	2M
9814	RUDDER ACCESS PANEL	2M
9815	RUDDER ACCESS PANEL	2M
9816	RUDDER ACCESS PANEL	2M
9817	RUDDER ACCESS PANEL	2M
9818	RUDDER ACCESS PANEL	2M
9819	RUDDER TIP PANEL	2M
9820	RUDDER TIP PANEL	2M
9821	RUDDER TIP PANEL	2M

Fin and Rudder Access Doors and Panels
Figure 201 (Sheet 4)

WING LOWER SURFACE ACCESS DOORS AND PANELS



Wing Lower Surface Access Doors and Panels
Figure 201 (Sheet 1)



Wing Lower Surface Access Doors and Panels
Figure 201 (Sheet 2)

PANEL NO.	TITLE	BONDING RESISTANCE MAX OHMS
6212	SLAT ACCESS PANEL	1.0
6213	SLAT ACCESS PANEL	1.0
6214	SLAT ACCESS PANEL	1.0
6215	SLAT ACCESS PANEL	1.0
6216	SLAT ACCESS PANEL	1.0
6217	SLAT ACCESS PANEL	1.0
6218	SLAT ACCESS PANEL	1.0
6219	SLAT ACCESS PANEL	1.0
6220	SLAT ACCESS PANEL	1.0
6221	SLAT ACCESS PANEL	1.0
6222	SLAT ACCESS PANEL	1.0
6223	SLAT ACCESS PANEL	1.0
6224	SLAT ACCESS PANEL	1.0
6225	SLAT ACCESS PANEL	1.0
6226	SLAT ACCESS PANEL	1.0
6227	SLAT ACCESS PANEL	1.0
6228	SLAT ACCESS PANEL	1.0
6229	SLAT ACCESS PANEL	1.0
6230	SLAT ACCESS PANEL	1.0
6231	SLAT ACCESS PANEL	1.0
6232	SLAT ACCESS PANEL	1.0
6233	SLAT ACCESS PANEL	1.0
6234	SLAT ACCESS PANEL	1.0
6241	SLAT ACCESS PANEL	0.1
6275	ENGINE HOIST FITTING	
6303	ACCESS PANEL	1.0
6376	ENGINE HOIST FITTING	
6403	ACCESS PANEL	
6476	ENGINE HOIST FITTING	
6512	SLAT ACCESS PANEL	1.0
6513	SLAT ACCESS PANEL	1.0
6514	SLAT ACCESS PANEL	1.0
6516	SLAT ACCESS PANEL	1.0
6521	SLAT ACCESS PANEL	1.0
6522	SLAT ACCESS PANEL	1.0
6523	SLAT ACCESS PANEL	1.0
6524	SLAT ACCESS PANEL	1.0
6525	SLAT ACCESS PANEL	1.0
6526	SLAT ACCESS PANEL	1.0
6527	SLAT ACCESS PANEL	1.0
6528	SLAT ACCESS PANEL	1.0
6529	SLAT ACCESS PANEL	1.0
6530	SLAT ACCESS PANEL	1.0
6531	SLAT ACCESS PANEL	1.0
6532	SLAT ACCESS PANEL	1.0
6533	SLAT ACCESS PANEL	1.0

NOTE: Bonding resistance values are maximum values which allow for the possibility of oxidation at the bonding interface. Lower values can be obtained after bonding joint has been cleaned.

Wing Lower Surface Access Doors and Panels
Figure 201 (Sheet 3)

PANEL NO.	TITLE	BONDING RESISTANCE MAX OHMS
6534	SLAT ACCESS PANEL	1.0
6535	MANUAL DEFUEL BAY ACCESS DOOR	1.0
6536	SLAT ACCESS PANEL	1.0
6537	SLAT ACCESS PANEL	1.0
6538	SLAT ACCESS PANEL	1.0
6539	SLAT ACCESS PANEL	1.0
6540	FUELING STATION ACCESS DOOR	0.1
6541	SLAT ACCESS PANEL	1.0
6542	SLAT ACCESS PANEL	1.0
6579	ENGINE HOIST FITTING	
7101*	SURGE TANK ACCESS DOOR	0.1
7102*	SURGE TANK ACCESS DOOR	0.1
7103	ACCESS PANEL	0.1
7104	ACCESS PANEL	2M
7105	ACCESS PANEL	2M
7106	TAI EXHAUST DOOR	1.0
7175	WING TIP LIGHT WINDOW	
7201*	BOOST PUMP ACCESS DOOR	0.1
7202*	FUEL TANK ACCESS DOOR	0.1
7203*	FUEL TANK ACCESS DOOR	0.1
7204*	FUEL TANK ACCESS DOOR	0.1
7205*	FUEL TANK ACCESS DOOR	0.1
7206*	FUEL TANK ACCESS DOOR	0.1
7207*	FUEL TANK ACCESS DOOR	0.1
7208*	FUEL TANK ACCESS DOOR	0.1
7209*	FUEL TANK ACCESS DOOR	0.1
7210*	FUEL TANK ACCESS DOOR	0.1
7211*	FUEL TANK ACCESS DOOR	0.1
7212*	FUEL TANK ACCESS DOOR	0.1
7213*	FUEL TANK ACCESS DOOR	0.1
7214*	FUEL TANK ACCESS DOOR	0.1
7218	ACCESS PANEL	
7221	REMOVABLE L. WING TO BODY FAIRING PANEL	1.0
7222	REMOVABLE L. WING TO BODY FAIRING PANEL	1.0
7223	REMOVABLE L. WING TO BODY FAIRING PANEL	1.0
7401*	BOOST PUMP ACCESS DOOR	
7402*	FUEL TANK ACCESS DOOR	0.1
7403*	FUEL TANK ACCESS DOOR	0.1
7404*	FUEL TANK ACCESS DOOR	0.1
7405*	FUEL TANK ACCESS DOOR	0.1
7406*	FUEL TANK ACCESS DOOR	0.1
7407*	FUEL TANK ACCESS DOOR	0.1

* THIS NUMBER IS NOT MARKED ON AIRPLANE AND IS GIVEN FOR SERVICE INFORMATION ONLY

Wing Lower Surface Access Doors and Panels
Figure 201 (Sheet 4)

PANEL NO.	TITLE	BONDING RESISTANCE MAX OHMS
7408*	FUEL TANK ACCESS DOOR	0.1
7409*	FUEL TANK ACCESS DOOR	0.1
7410*	FUEL TANK ACCESS DOOR	0.1
7411*	FUEL TANK ACCESS DOOR	0.1
7412*	FUEL TANK ACCESS DOOR	0.1
7413*	FUEL TANK ACCESS DOOR	0.1
7414*	FUEL TANK ACCESS DOOR	0.1
7418	ACCESS PANEL	1.0
7421	REMOVABLE R. WING TO BODY FAIRING PANEL	
7422	REMOVABLE R. WING TO BODY FAIRING PANEL	1.0
7423	REMOVABLE R. WING TO BODY FAIRING PANEL	1.0
7501*	SURGE TANK ACCESS DOOR	0.1
7502*	SURGE TANK ACCESS DOOR	0.1
7503	ACCESS PANEL	0.1
7504	ACCESS PANEL	0.1
7505	ACCESS PANEL	
7506	TAI EXHAUST DOOR	0.1
7575	WING TIP LIGHT WINDOW	
8101	AILERON ACCESS PANEL	0.1
8102	AILERON ACCESS PANEL	0.1
8103	AILERON ACCESS PANEL	0.1
8109	WING TIP ACCESS PANEL	0.1
8110	REMOVABLE SKIN PANEL–AILERON LWR SURFACE	0.1
8111	REMOVABLE SKIN PANEL–AILERON LWR SURFACE	0.1
8112	REMOVABLE SKIN PANEL–AILERON LWR SURFACE	0.1
8113	REMOVABLE SKIN PANEL–AILERON LWR SURFACE	0.1
8114	AILERON TAB MAST ACCESS PANEL	0.1
8209	OUTBOARD MID FLAP ACCESS PANEL	0.1
8210	OUTBOARD MID FLAP ACCESS PANEL	0.1
8211	OUTBOARD MID FLAP ACCESS PANEL	0.1
8212	OUTBOARD MID FLAP ACCESS PANEL	0.1
8213	OUTBOARD MID FLAP ACCESS PANEL	0.1
8401	HYDRAULIC ACCESS PANEL	1.0
8403	AFT FLAP CLUTCH & DRIVE MECH ACCESS PANEL	2M
8404	AFT FLAP DRIVE (SLAVE) ACCESS PANEL	2M
8475	ENGINE HOIST FITTING	
8476*	AFT FLAP DRIVE (SLAVE) ACCESS PANEL	
8477*	AFT FLAP CLUTCH & DRIVE MECH ACCESS PANEL	
8501	HYDRAULIC ACCESS PANEL	1.0
8503	AFT FLAP CLUTCH & DRIVE MECH ACCESS PANEL	2M
8504	AFT FLAP DRIVE (SLAVE) ACCESS PANEL	2M
8575	ENGINE HOIST FITTING	
8576*	AFT FLAP DRIVE (SLAVE) ACCESS PANEL	
8577*	AFT FLAP CLUTCH & DRIVE MECH ACCESS PANEL	

* THIS NUMBER IS NOT MARKED ON AIRPLANE AND IS GIVEN FOR SERVICE INFORMATION ONLY

Wing Lower Surface Access Doors and Panels
Figure 201 (Sheet 5)

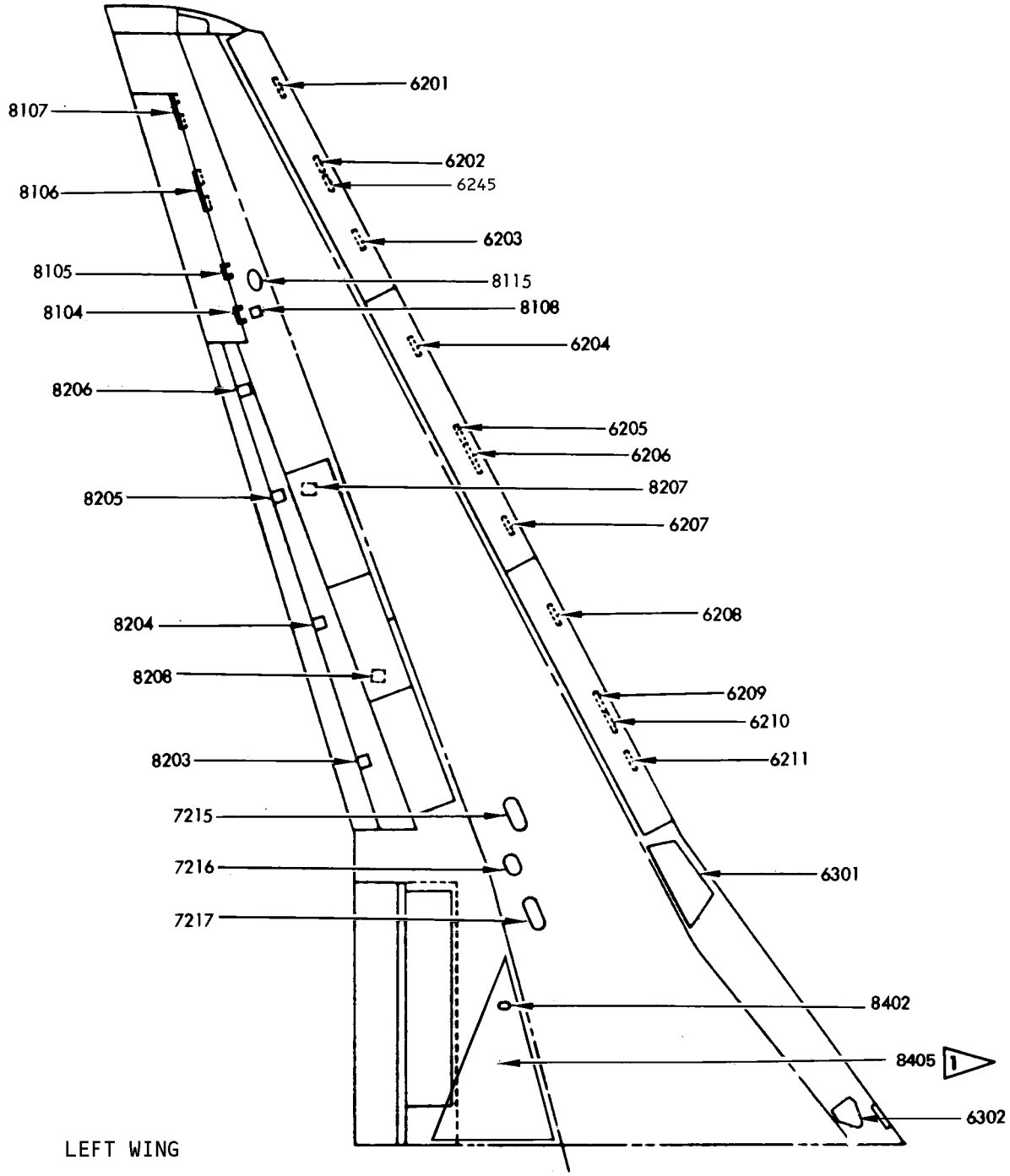
PANEL NO.	TITLE	BONDING RESISTANCE MAX OHMS
8709	OUTBOARD MID FLAP ACCESS PANEL	0.1
8710	OUTBOARD MID FLAP ACCESS PANEL	0.1
8711	OUTBOARD MID FLAP ACCESS PANEL	0.1
8712	OUTBOARD MID FLAP ACCESS PANEL	0.1
8713	OUTBOARD MID FLAP ACCESS PANEL	0.1
8801	AILERON ACCESS PANEL	
8802	AILERON ACCESS PANEL	0.1
8803	AILERON ACCESS PANEL	0.1
8809	WING TIP ACCESS PANEL	1.0
8810	REMOVABLE SKIN PANEL-AILERON LWR SURFACE	0.1
8811	REMOVABLE SKIN PANEL-AILERON LWR SURFACE	0.1
8812	REMOVABLE SKIN PANEL-AILERON LWR SURFACE	0.1
8813	REMOVABLE SKIN PANEL-AILERON LWR SURFACE	0.1
8814	REMOVABLE SKIN PANEL-AILERON LWR SURFACE	0.1

* THIS NUMBER IS NOT MARKED ON AIRPLANE AND IS GIVEN FOR SERVICE INFORMATION ONLY

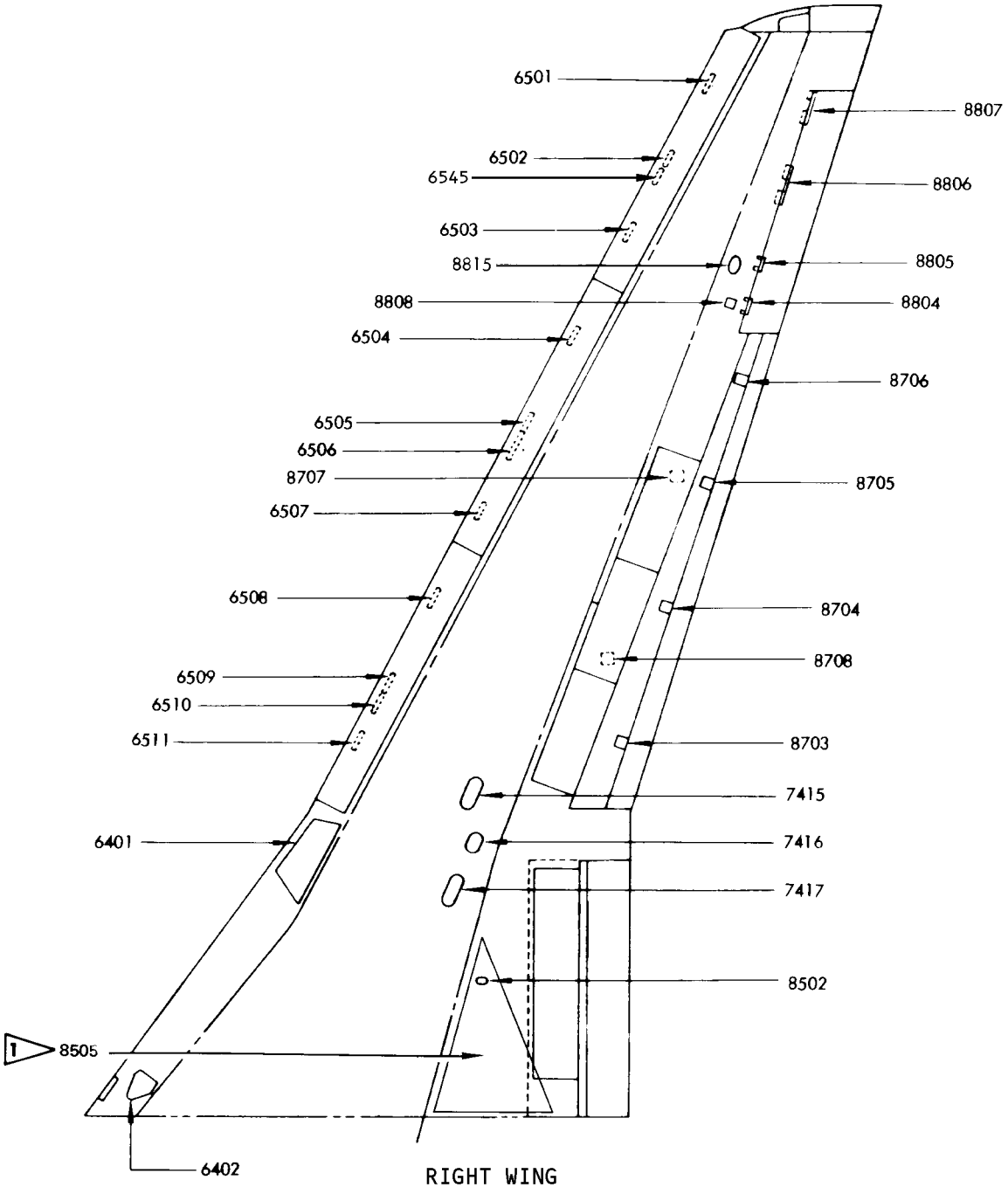
Wing Lower Surface Access Doors and Panels
Figure 201 (Sheet 6)

WING UPPER SURFACE ACCESS DOORS AND PANELS

REF DRAWING 65-45211 FOR ACCESS DOORS & PANELS



Wing Upper Surface Access Doors and Panels
Figure 201 (Sheet 1)



Wing Upper Surface Access Doors and Panels
Figure 201 (Sheet 2)

Wing Upper Surface Access Doors and Panels		
		BONDING RESISTANCE
PANEL NO.	TITLE	MAX OHMS
6201	SLAT ACCESS PANEL	
6202	SLAT ACCESS PANEL	
6203	SLAT ACCESS PANEL	
6204	SLAT ACCESS PANEL	
6205	SLAT ACCESS PANEL	
6206	SLAT ACCESS PANEL	
6207	SLAT ACCESS PANEL	
6208	SLAT ACCESS PANEL	
6209	SLAT ACCESS PANEL	
6210	SLAT ACCESS PANEL	
6211	SLAT ACCESS PANEL	
6245	SLAT ACCESS PANEL	
6301	ACCESS DOOR	0.1
6302	ACCESS DOOR	0.1
6401	ACCESS DOOR	0.1
6402	ACCESS DOOR	0.1
6501	SLAT ACCESS PANEL	
6502	SLAT ACCESS PANEL	
6503	SLAT ACCESS PANEL	
6504	SLAT ACCESS PANEL	
6505	SLAT ACCESS PANEL	

Wing Upper Surface Access Doors and Panels		
		BONDING RESISTANCE
PANEL NO.	TITLE	MAX OHMS
6506	SLAT ACCESS PANEL	
6507	SLAT ACCESS PANEL	
6508	SLAT ACCESS PANEL	
6509	SLAT ACCESS PANEL	
6510	SLAT ACCESS PANEL	
6511	SLAT ACCESS PANEL	
6545	SLAT ACCESS PANEL	
7215	DRY BAY ACCESS PANEL	2M
7216	DRY BAY ACCESS PANEL	2M
7217	DRY BAY ACCESS PANEL	2M
7415	DRY BAY ACCESS PANEL	2M
7416	DRY BAY ACCESS PANEL	2M
7417	DRY BAY ACCESS PANEL	2M
8104	AILERON ACCESS PANEL	0.1
8105	AILERON ACCESS PANEL	0.1
8106	AILERON ACCESS PANEL	0.1
8107	AILERON ACCESS PANEL	0.1
8108	ACCESS PANEL	0.1
8115	ACCESS PANEL	2M
8203	OUTBOARD MIDFLAP PANEL	2M
8204	OUTBOARD MIDFLAP PANEL	2M

Wing Upper Surface Access Doors and Panels		
		BONDING RESISTANCE
PANEL NO.	TITLE	MAX OHMS
8205	OUTBOARD MIDFLAP PANEL	2M

NOTE: Bonding resistance values are maximum values which allow for the possibility of oxidation at the bonding interface. Lower values can be obtained after bonding joint has been cleaned.

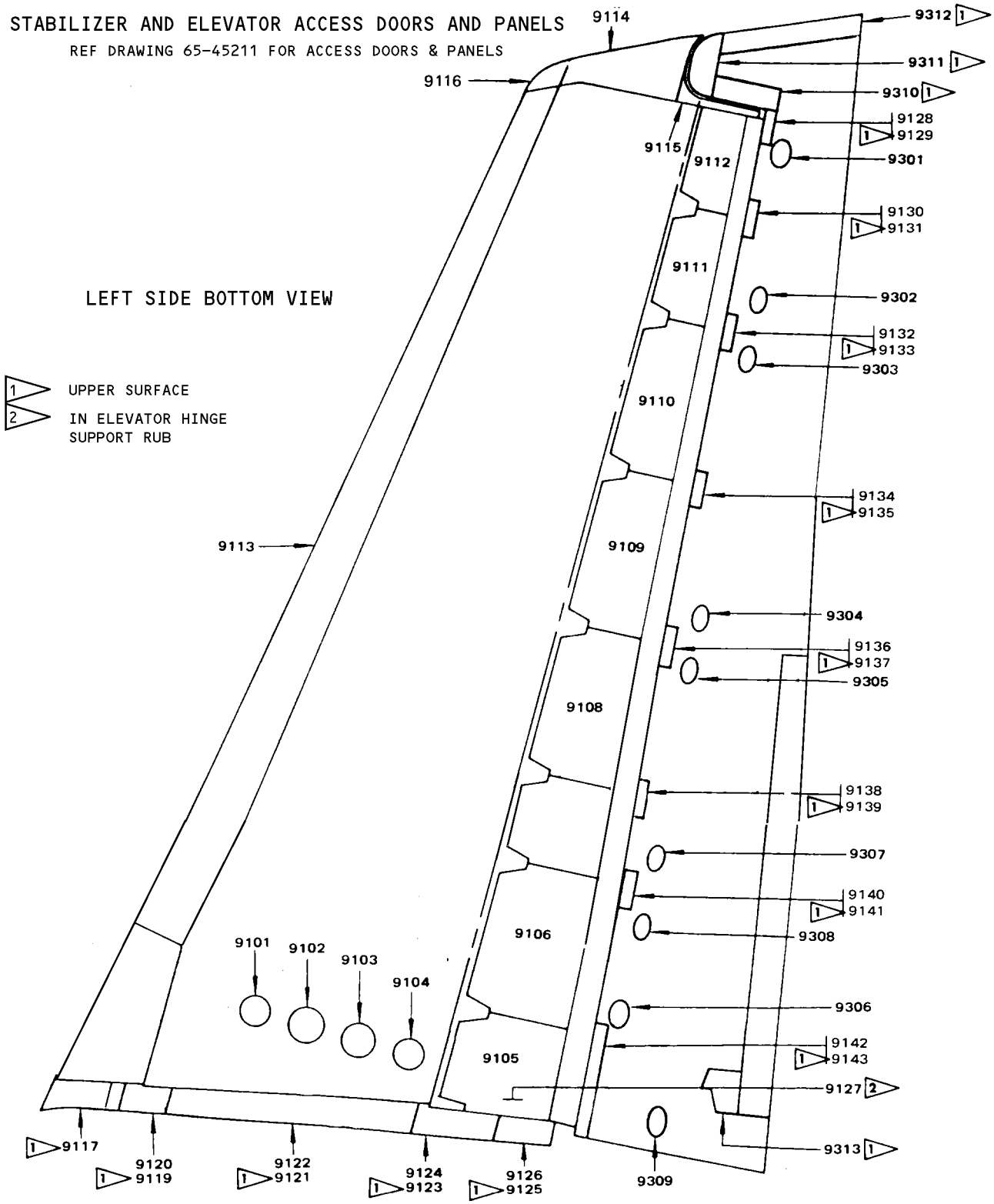
PANEL NO.	TITLE	BONDING RESISTANCE MAX OHMS
8206	OUTBOARD MIDFLAP PANEL	2M
8207	ACCESS DOOR - OUTBOARD TE FLAP	
8208	ACCESS DOOR - OUTBOARD TE FLAP	
8402	HYDRAULIC ACCESS PANEL	0.1
8405	UPPER INBOARD TE PANEL	0.1
8502	HYDRAULIC ACCESS PANEL	0.1
8505	UPPER INBOARD TE PANEL	0.1
8703	OUTBOARD MIDFLAP PANEL	2M
8704	OUTBOARD MIDFLAP PANEL	2M
8705	OUTBOARD MIDFLAP PANEL	2M
8706	OUTBOARD MIDFLAP PANEL	2M
8707	ACCESS DOOR - OUTBOARD TE FLAP	
8708	ACCESS DOOR - OUTBOARD TE FLAP	
8804	AILERON ACCESS PANEL	0.1
8805	AILERON ACCESS PANEL	0.1
8806	AILERON ACCESS PANEL	0.1
8807	AILERON ACCESS PANEL	0.1
8808	ACCESS PANEL	
8815	ACCESS PANEL	0.1

1> NOT ON ALL AIRPLANES

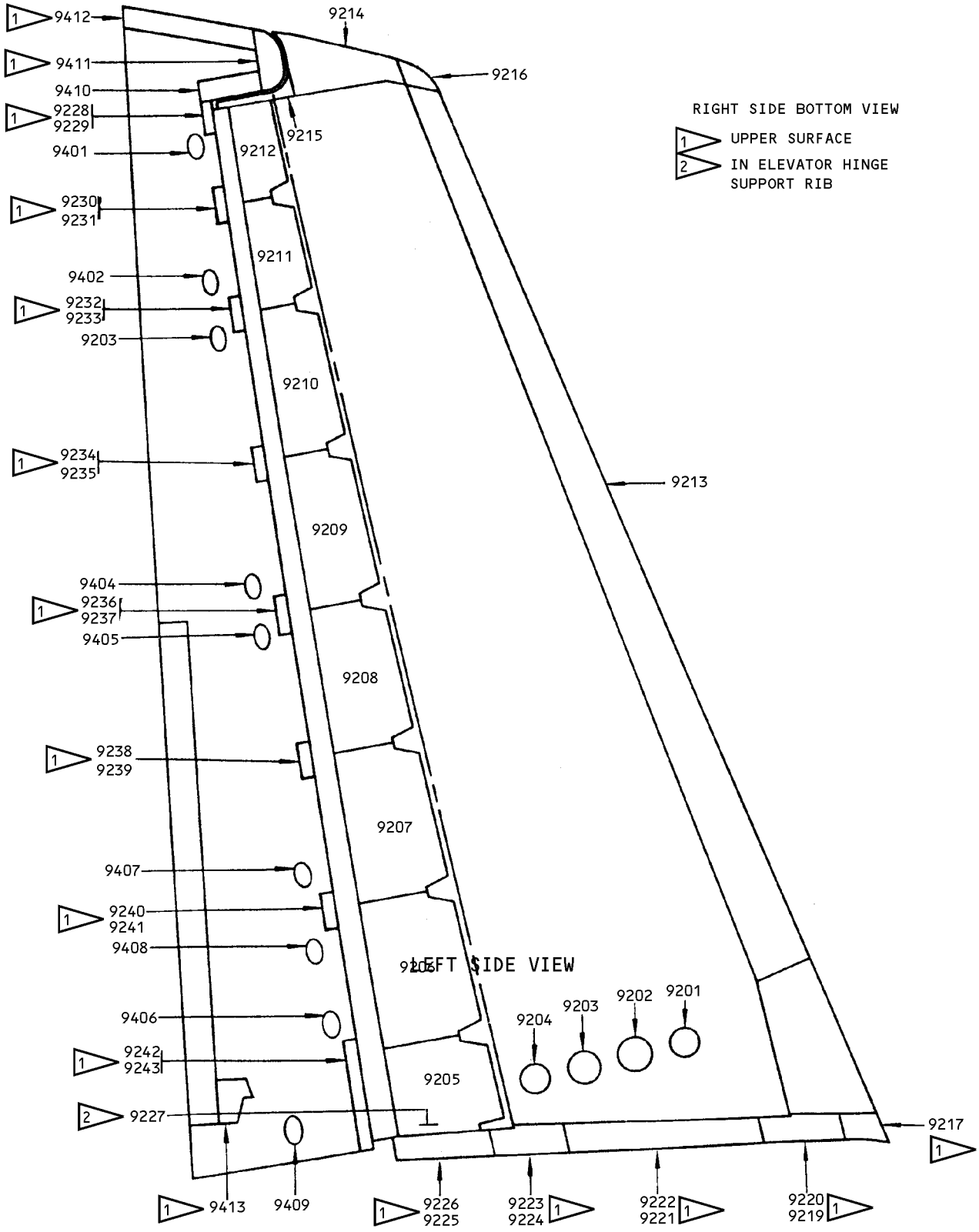
Wing Upper Surface Access Doors and Panels
Figure 201 (Sheet 3)

STABILIZER AND ELEVATOR ACCESS DOORS AND PANELS

REF DRAWING 65-45211 FOR ACCESS DOORS & PANELS



Stabilizer and Elevator Access Doors and Panels
Figure 201 (Sheet 1)



Stabilizer and Elevator Access Doors and Panels
Figure 201 (Sheet 2)

PANEL NO.	TITLE	BONDING RESISTANCE MAX OHMS
9101	ACCESS PANEL	0.1
9102	ACCESS PANEL	0.1
9103	ACCESS PANEL	0.1
9104	ACCESS PANEL	0.1
9105	ACCESS PANEL	2M
9106	ACCESS PANEL	
9107	ACCESS PANEL	2M
9108	ACCESS PANEL	2M
9109	ACCESS PANEL	2M
9110	ACCESS PANEL [2]	2M
9111	ACCESS PANEL [2]	2M
9112	ACCESS PANEL [2]	2M
9113	LEADING EDGE [2]	2M
9114	FAIRING TIP, FWD SECTION	
9114	FAIRING TIP, MID SECTION	
9114	FAIRING TIP, AFT SECTION	
9115	REMOVABLE STABILIZER TIP	2M
9116	REMOVABLE STABILIZER TIP	2M
9117	GAP COVER	0.1
9119	GAP COVER	0.1
9120	GAP COVER	0.1
9121	GAP COVER	0.1
9122	GAP COVER	0.1
9123	GAP COVER	0.1
9124	GAP COVER	0.1
9125	GAP COVER	0.1
9126	GAP COVER	0.1
9127	ELEVATOR HINGE SUPPORT RIB ACCESS PANEL	0.1
9128	ELEVATOR NOSE COVER	
9129	ELEVATOR NOSE COVER	
9130	ELEVATOR NOSE COVER	
9131	ELEVATOR NOSE COVER	
9132	ELEVATOR NOSE COVER	
9133	ELEVATOR NOSE COVER	0.1
9134	ELEVATOR NOSE COVER	0.1
9135	ELEVATOR NOSE COVER	0.1
9136	ELEVATOR NOSE COVER	0.1
9137	ELEVATOR NOSE COVER	0.1
9138	ELEVATOR NOSE COVER	0.1
9139	ELEVATOR NOSE COVER	0.1
9140	ELEVATOR NOSE COVER	0.1
9141	ELEVATOR NOSE COVER	0.1
9142	ELEVATOR LE FAIRING	0.1
9143	ELEVATOR LE FAIRING	0.1
[2]	RIVETED ON SOME AIRPLANES	

NOTE: Bonding resistance values are maximum values which allow fopossibility of oxidation at the bonding interface. Lower values can be obtained after bonding joint has been cleaned.

Stabilizer and Elevator Access Doors and Panels
Figure 201 (Sheet 3)

PANEL NO.	TITLE	BONDING RESISTANCE MAX OHMS
9201	ACCESS PANEL	0.1
9202	ACCESS PANEL	0.1
9203	ACCESS PANEL	0.1
9204	ACCESS PANEL	0.1
9205	ACCESS PANEL 1	2M
9206	ACCESS PANEL 1	2M
9207	ACCESS PANEL 1	2M
9208	ACCESS PANEL 1	2M
9209	ACCESS PANEL 1	
9210	ACCESS PANEL 1	2M
9211	ACCESS PANEL 1	2M
9212	ACCESS PANEL 1	2M
9213	LEADING EDGE	0.1
9214	FAIRING TIP, FWD SECTION	2M
9214	FAIRING TIP, MID SECTION	2M
9214	FAIRING TIP, AFT SECTION	2M
9215	REMOVABLE STABILIZER TIP	2M
9216	REMOVABLE STABILIZER TIP	2M
9217	GAP COVER	0.1
9219	GAP COVER	
9220	GAP COVER	0.1
9221	GAP COVER	0.1
9222	GAP COVER	0.1
9223	GAP COVER	0.1
9224	GAP COVER	0.1
9225	GAP COVER	0.1
9226	GAP COVER	0.1
9227	ELEVATOR HINGE SUPPORT RIB ACCESS PANEL	0.1
9228	ELEVATOR NOSE COVER	
9229	ELEVATOR NOSE COVER	
9230	ELEVATOR NOSE COVER	
9231	ELEVATOR NOSE COVER	
9232	ELEVATOR NOSE COVER	0.1
9233	ELEVATOR NOSE COVER	0.1
9234	ELEVATOR NOSE COVER	0.1
9235	ELEVATOR NOSE COVER	0.1
9236	ELEVATOR NOSE COVER	0.1
9237	ELEVATOR NOSE COVER	0.1
9238	ELEVATOR NOSE COVER	0.1
9239	ELEVATOR NOSE COVER	0.1
9240	ELEVATOR NOSE COVER	0.1
9241	ELEVATOR NOSE COVER	0.1
9242	ELEVATOR LE FAIRING	0.1
9243	ELEVATOR LE FAIRING	0.1
	1 RIVETED	

NOTE: Bonding resistance values are maximum values which allow for the possibility of oxidation at the bonding interface. Lower values canbe obtained after bonding joint has been cleaned.

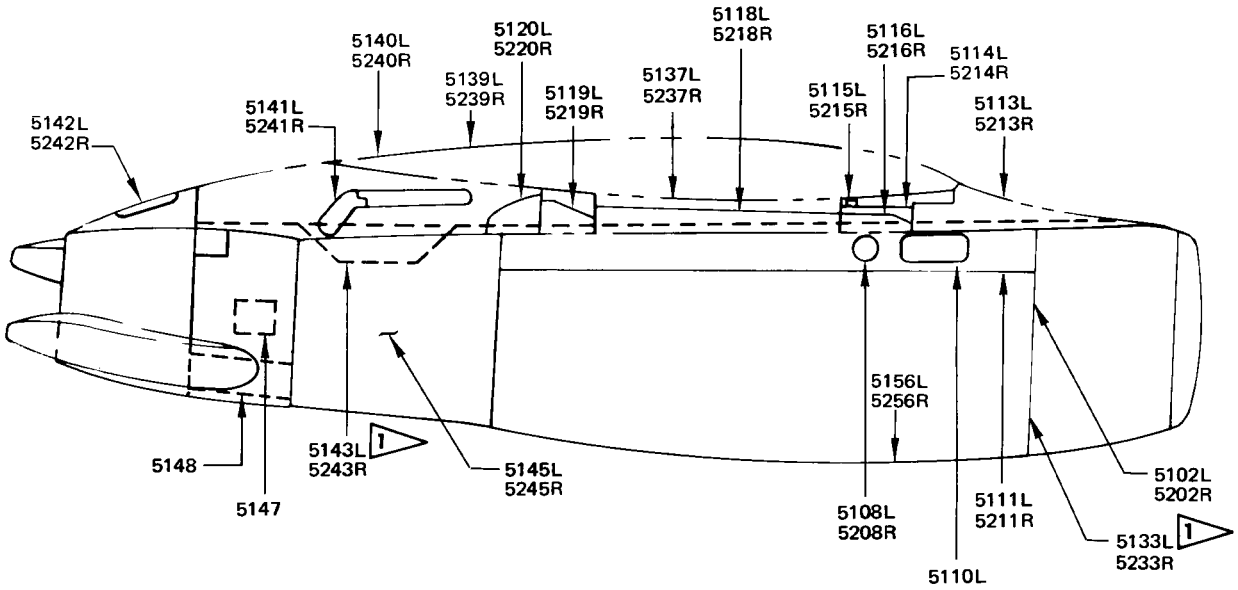
Stabilizer and Elevator Access Doors and Panels
Figure 201 (Sheet 4)

PANEL NO.	TITLE	BONDING RESISTANCE MAX OHMS
9301	ELEVATOR ACCESS DOOR	2M
9302	ELEVATOR ACCESS DOOR	2M
9303	ELEVATOR ACCESS DOOR	2M
9304	ELEVATOR ACCESS DOOR	2M
9305	ELEVATOR ACCESS DOOR	
9306	ELEVATOR ACCESS DOOR	2M
9307	ELEVATOR ACCESS DOOR	2M
9308	ELEVATOR ACCESS DOOR	2M
9309	ELEVATOR ACCESS DOOR	2M
9310	ELEVATOR TIP ACCESS PANEL	0.1
9311	ELEVATOR TIP ACCESS PANEL	0.1
9312	ELEVATOR TIP ACCESS PANEL	2M
9313	ELEVATOR MAST FITTING FAIRING	
9401	ELEVATOR ACCESS DOOR	2M
9402	ELEVATOR ACCESS DOOR	2M
9403	ELEVATOR ACCESS DOOR	2M
9404	ELEVATOR ACCESS DOOR	2M
9405	ELEVATOR ACCESS DOOR	
9406	ELEVATOR ACCESS DOOR	2M
9407	ELEVATOR ACCESS DOOR	2M
9408	ELEVATOR ACCESS DOOR	2M
9409	ELEVATOR ACCESS DOOR	2M
9410	ELEVATOR TIP ACCESS PANEL	0.1
9411	ELEVATOR TIP ACCESS PANEL	0.1
9412	ELEVATOR TIP ACCESS PANEL	2M
9413	ELEVATOR MAST FITTING FAIRING	

Stabilizer and Elevator Access Doors and Panels
Figure 201 (Sheet 5)

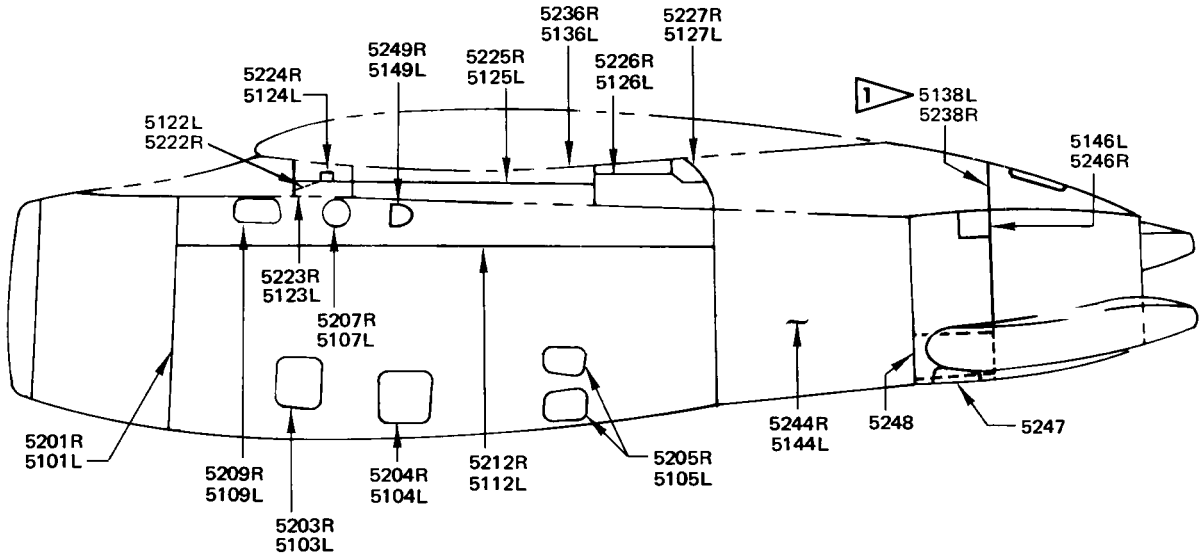
NACELLE AND ENGINE-TO-WING FAIRING ACCESS DOORS AND PANELS

REF DRAWING 65-45211 FOR ACCESS DOORS & PANELS



RIGHT SIDE VIEW NO. 1 AND NO. 2 ENGINE AND INBOARD SIDE OF THE WING-TO-NACELLE FAIRING

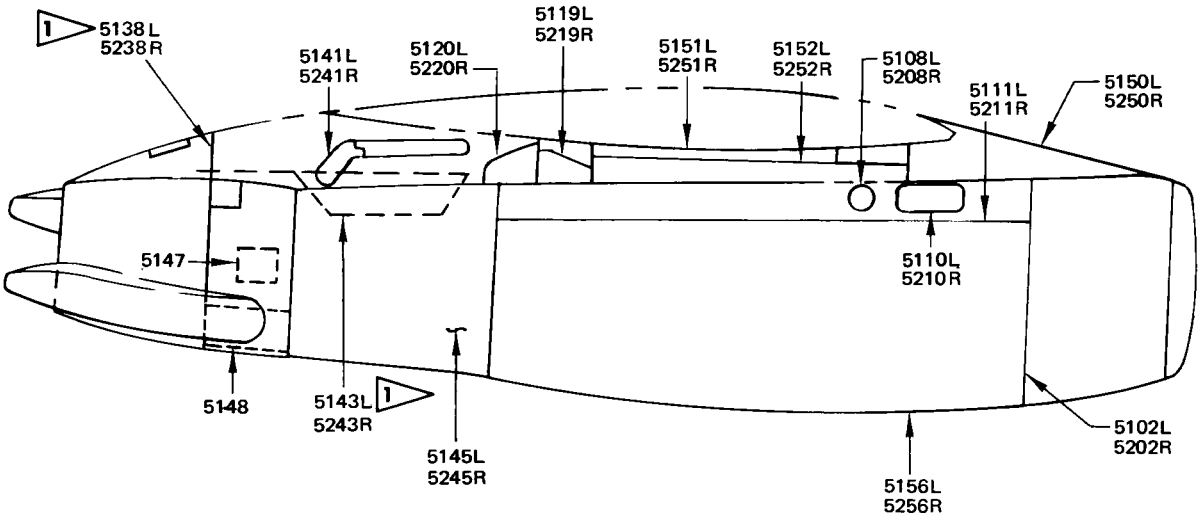
1 INTERIOR PANEL



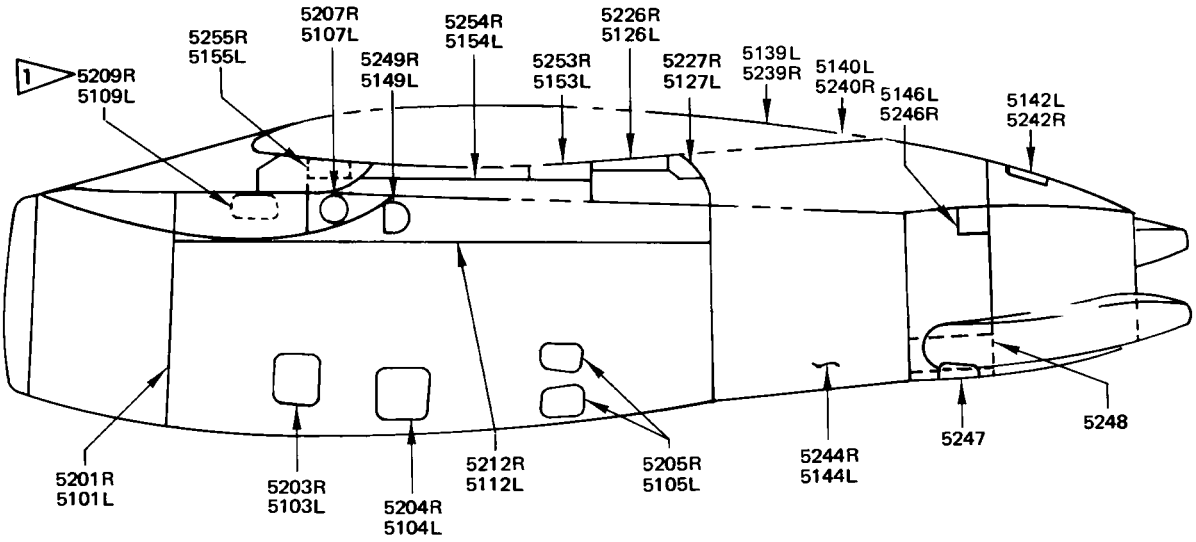
LEFT SIDE VIEW NO. 1 AND NO. 2 ENGINE AND OUTBOARD SIDE OF THE WING-TO-NACELLE FAIRING

Nacelle and Engine-to-Wing Fairing Access Doors and Panels
Figure 201 (Sheet 1)

NACELLE AND ENGINE-TO-WING FAIRING ACCESS DOORS AND PANELS



RIGHT SIDE VIEW NO. 1 AND NO. 2 ENGINE AND INBOARD SIDE OF THE WING-TO-NACELLE FAIRING



LEFT SIDE VIEW NO. 1 AND NO. 2 ENGINE AND INBOARD SIDE OF THE WING-TO-NACELLE FAIRING

1 INTERIOR PANEL

EFFECTIVITY

ALL EXCEPT
TM CR-BAA AND CB-BAB
NH JA8403, JA8406 THRU JA8411
AR LV-JMW THRU LV-JMZ, LV-JND AND LV-JNE

Nacelle and Engine-to-Wing Fairing Access Doors and Panels
Figure 201 (Sheet 2)

Nacelle and Engine-to-Wing Fairing Access Doors and Panels		
		BONDING RESISTANCE
PANEL NO.	TITLE	MAX OHMS
5101	COWL PANEL	0.1
5102	COWL PANEL	0.1
5103	OIL TANK ACCESS DOOR	0.1
5104	ACCESS DOOR	0.1
5105	PRESSURE RELIEF PANELS	0.1
5107	ACCESS DOOR	0.1
5108	ACCESS DOOR	0.1
5109	ACCESS DOOR	0.1
5110	ACCESS DOOR	0.1
5111	FIXED FAIRING	0.1
5112	FIXED FAIRING	0.1
5113	FORWARD FAIRING	0.1
5114	MID FAIRING DOOR ASSY	0.1
5115	MID FAIRING PANEL	0.1
5116	MID FAIRING PANEL	0.1
5118	MID FAIRING PANEL	0.1
5119	MID FAIRING PANEL	0.1
5120	MID FAIRING PANEL	0.1
5122	MID FAIRING PANEL	0.1
5123	MID FAIRING PANEL	0.1
5124	MID FAIRING PANEL	0.1

Nacelle and Engine-to-Wing Fairing Access Doors and Panels		
		BONDING RESISTANCE
PANEL NO.	TITLE	MAX OHMS
5125	MID FAIRING PANEL	0.1
5126	MID FAIRING PANEL	0.1
5127	MID FAIRING PANEL	0.1
5133	NOSE COWL ANTI-ICE ACCESS	0.1
5136	MID FAIRING PANEL	0.1
5137	MID FAIRING PANEL	0.1
5138	AFT FAIRING PANEL	0.1
5139	AFT FAIRING PANEL, TOP SURFACE	0.1
5140	AFT FAIRING PANEL, TOP SURFACE	0.1
5141	AFT FAIRING PANEL, INBOARD SIDE	0.1
5142	THRUST REVERSER FAIRING PANEL, TOP SURFACE	0.1
5143	FLAP CARRIAGE ACCESS	0.1
5144	TAILPIPE FAIRING PANEL	0.1
5145	TAILPIPE FAIRING PANEL	0.1
5146	THRUST REVERSER PANEL, UPPER SURFACE	0.1
5147	THRUST REVERSER PANEL, INBOARD SIDE	0.1
5148	THRUST REVERSER PANEL, LOWER SURFACE	0.1
5149	FILTER ACCESS	0.1
5150	FORWARD FAIRING NO. 1 ENGINE	0.1
5151	MID FAIRING DOOR ASSY RH NO. 1 ENGINE	0.1
5152	MID FAIRING DOOR ASSY	0.1

Nacelle and Engine-to-Wing Fairing Access Doors and Panels		
		BONDING RESISTANCE
PANEL NO.	TITLE	MAX OHMS
5153	MID FAIRING	0.1
5154	MID FAIRING	0.1
5155	LATCH ACCESS PANEL	0.1
5156	FIRE EXTINGUISHER ACCESS HOLE	
5226	MID FAIRING PANEL	0.1
5201	COWL PANEL	0.1
5202	COWL PANEL	0.1
5203	OIL TANK ACCESS DOOR	0.1
5204	ACCESS DOOR	0.1
5205	PRESSURE RELIEF PANELS	0.1
5207	ACCESS DOOR	0.1
5208	ACCESS DOOR	0.1
5209	ACCESS DOOR	0.1
5210	ACCESS DOOR	0.1
5211	FIXED FAIRING	0.1

Nacelle and Engine-to-Wing Fairing Access Doors and Panels		
		BONDING RESISTANCE
PANEL NO.	TITLE	MAX OHMS
5212	FIXED FAIRING	0.1
5213	FORWARD FAIRING	0.1
5214	MID FAIRING DOOR ASSY	0.1
5215	MID FAIRING PANEL	0.1
5216	MID FAIRING PANEL	0.1
5218	MID FAIRING PANEL	0.1
5219	MID FAIRING PANEL	0.1
5220	MID FAIRING PANEL	0.1
5222	MID FAIRING PANEL	0.1
5223	MID FAIRING PANEL	0.1
5224	MID FAIRING PANEL	0.1
5225	MID FAIRING PANEL	0.1
5226	MID FAIRING PANEL	0.1
5227	MID FAIRING PANEL	0.1
5233	NOSE COWL ANTI-ICE ACCESS	0.1

Nacelle and Engine-to-Wing Fairing Access Doors and Panels		
		BONDING RESISTANCE
PANEL NO.	TITLE	MAX OHMS
5236	MID FAIRING PANEL	0.1
5237	MID FAIRING PANEL	0.1
5238	AFT FAIRING PANEL	0.1
5239	AFT FAIRING PANEL, TOP SURFACE	0.1
5240	AFT FAIRING PANEL, TOP SURFACE	0.1
5241	AFT FAIRING PANEL, INBOARD SIDE	0.1
5242	THRUST REVERSER FAIRING PANEL, TOP SURFACE	0.1
5243	FLAP CARRIAGE ACCESS	0.1
5244	TAILPIPE FAIRING PANEL	0.1
5245	TAILPIPE FAIRING PANEL	0.1
5246	THRUST REVERSER PANEL, UPPER SURFACE	0.1
5247	THRUST REVERSER PANEL, OUTBOARD SIDE	0.1
5248	THRUST REVERSER PANEL, LOWER SURFACE	0.1
5249	FILTER ACCESS	0.1
5250	FORWARD FAIRING	0.1
5251 THRU 5254	MID FAIRING PANEL	0.1
5255	LATCH ACCESS PANEL	0.1

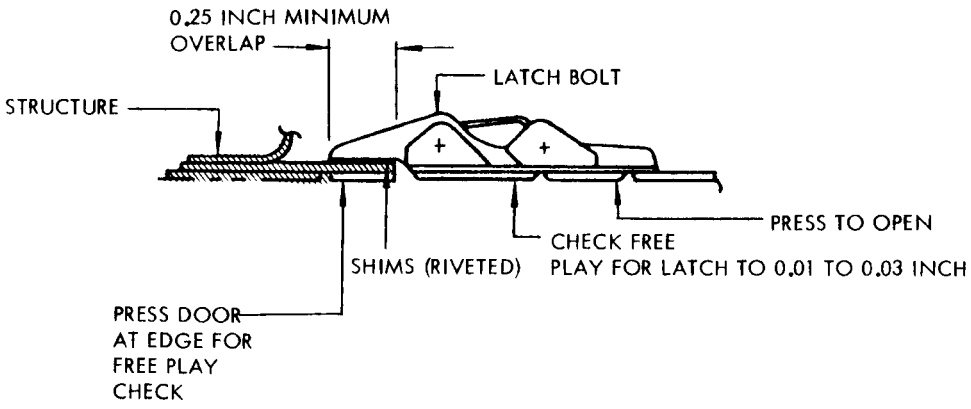
Nacelle and Engine-to-Wing Fairing Access Doors and Panels		
		BONDING RESISTANCE
PANEL NO.	TITLE	MAX OHMS
5256	FIRE EXTINGUISHER ACCESS HOLE	
NOTE: Bonding resistance values are maximum values which allow for the possibility of oxidation at the bonding interface. Lower values can be obtained after bonding joint has been cleaned.		

HARTWELL TYPE LATCHES - ADJUSTMENT/TEST

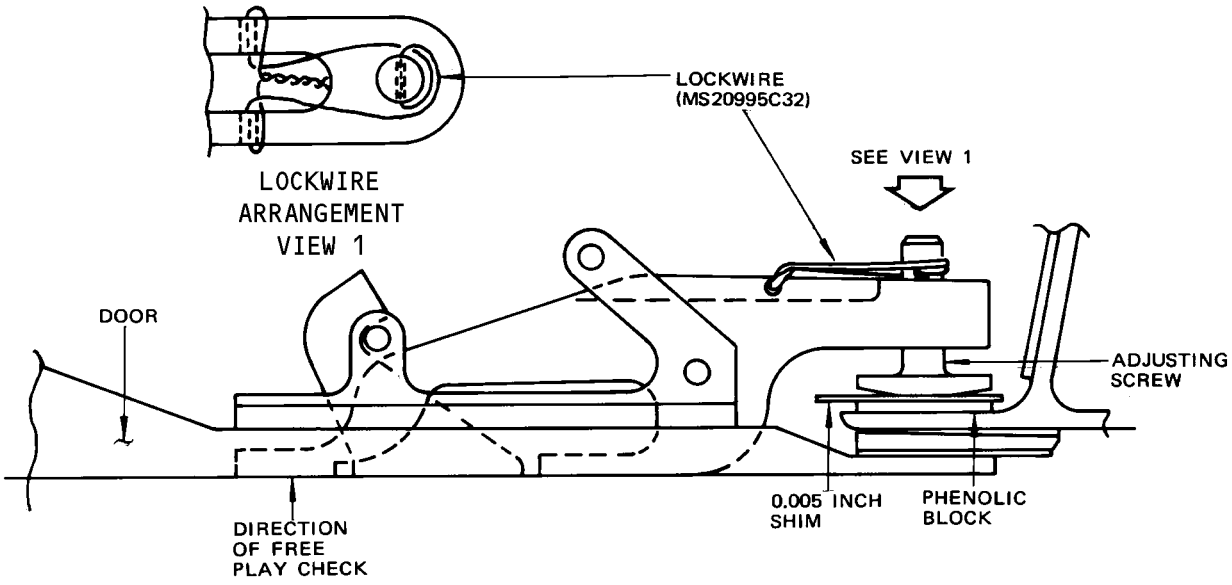
1. Hartwell Series 5100, 5101, H502-1 and H503-1 Latches
   A. Test Hartwell Series 5100, 5101, H502-1 and H503-1 Latches
      (1) Check that door rotates freely to within +0.100 or -0.030 inch of contour at latch position.
      (2) At latch being checked, press door to its fit and fair position at door edge as shown in figure 501. Lock latch and check that preload exists by depressing latch bolt at location indicated in figure 501. There must be 0.010 to 0.030 inch depression free play at this point. Adjust per paragraph B. if this free play is not obtained.
      (3) Check that door latch bolt overlap on structure to be 0.25 inch as shown in figure 501.
   B. Adjust Hartwell Series 5100, 5101, H502-1 and H503-1 Latches
      (1) If the 0.010 to 0.030 inch depression free play required (figure 501) is not obtained, add or subtract phenolic shims.

          NOTE: Nominal 0.030 and 0.040 inch shims are installed to obtain the dimensional condition shown in figure 501. Shim thickness may be varied.

2. Hartwell Series H856 and H2040 Latch
   A. General
      (1) The adjustment/test of this paragraph applies to H856 and H2040 latches with adjusting screw. H856 latches without adjusting screw may be tested and adjusted per paragraph 1.
   B. Test Hartwell Series H856 and H2040 Latch (See figure 502.)
      (1) Check that door operates freely on its hinges to within +0.10 or -0.04 inch of contour at each latch location.
      (2) With the latch closed, check that there is no free play at the end of the latch lever and that thumb pressure only is required to latch and unlatch. Adjust per paragraph C.
   C. Adjust Hartwell Series H856 and H2040 Latch
      (1) With a piece of 0.005-inch shim between the adjusting screw and the phenolic block on the airframe, turn the adjusting screw until, with the latch closed, there is no free play at the end of the latch lever.
      (2) Remove the 0.005-inch shim and check that thumb pressure only is required to latch and unlatch.
      (3) Wire lock the adjusting screw per figure 502.



Hartwell Series 5100, 5101, H502-1 and H503-1 Latches
Figure 501



Hartwell Series H856 and H2040 Latch
Figure 502

CLEANING AND WASHING - MAINTENANCE PRACTICES

1. General
   A. Use this procedure to clean and polish the external surfaces of the airplane. Clean the external surfaces frequently to help prevent corrosion and to extend the life of the airplane structure. Clean the surfaces that do not have paint more frequently than the painted surfaces.
   B. The liquids used in this procedure can cause injury to the skin and eyes, or damage to the airplane. Always wear clothing that will prevent injury when you clean the airplane. The cleaners can cause corrosion if they are not removed completely from the airplane surfaces. The solvent that is mixed with the cleaners is flammable. Keep the solvent away from sources of heat.
   C. Failure to remove covers from pitot static probes or coverings from static ports before flight may cause large errors in airspeed-sensing and altitude-sensing signals, which may lead to loss of safe flight.
2. Clean the External Surfaces of the Airplane
   A. General

      NOTE: Boeing considers water pressure above 80 psi to be "high pressure".

      (1) This section includes these procedures:
         (a) Remove Light Material (dust and dirt) from Smooth Surfaces
         (b) Remove Moderately Heavy Material (oil and mud) from Smooth Surfaces
         (c) Remove Heavy Material (grease and exhaust particles) from Smooth Surfaces
         (d) Remove Material Around Sensitive Components
         (e) Remove Unwanted Hydraulic Fluid
         (f) Clean With Foam
      (2) Use the Remove Material Around Sensitive Components procedure to clean the areas that contain mechanical, electrical, or hydraulic components. These areas include the wheel wells, flight control surfaces, and landing gear.
      (3) When moderately heavy or heavy material removal is necessary, remove the heavier material first. Then clean the airplane with the procedure for light material removal.
      (4) To clean large areas, use non-atomizing spray equipment, swabs, and brushes. To clean small areas, use rags, brushes, and sponges. Do not clean an area so large that the cleaner dries on the surface before you can flush it with water.
   B. References
      (1) 20-41-11/201, Static Grounding
      (2) 32-00-01/201, Landing Gear Door Locks
   C. Equipment and Materials
      (1) Pitot Static Probe Cover - KPC3-775-625 (Fwd Fuselage)
      (2) Pitot Probe Cover - KPC3-640-35 (Vert Stabilizer)
      (3) Main Landing Gear Door Locks (AMM 32-00-01)

(4) Nose Landing Gear Door Locks (AMM 32-00-01)
(5) Spray Equipment - Ted Trump Co., Highway 98 East, Elberta, Alabama
(6) Source of compressed air - commercially available
(7) Mops - commercially available
(8) Boots - commercially available
(9) Gloves - commercially available
(10) Face mask or goggles - commercially available
(11) Apron - commercially available
(12) Rain Repellent-Residue Removal Pad - Leader 275G (AMM 20-30-51)
(13) Degreasing Fluid - MIL-T-81533A (AMM 20-30-31)
(14) Solvent (Common) - TT-N-261 (AMM 20-30-31)
(15) Cleaner - Oakite 74L (foam cleaning) (AMM 20-30-31)
(16) Soft-bristle fiber brush (AMM 20-30-31)
(17) Cleaning Solvent - BMS 3-2, Type I (AMM 20-30-31)
(18) B00316 Solvent - Aliphatic Naphtha, TT-N-95 Type I
(19) G02443 Orange Barricade tape, 3 inches wide, 4 mils thick, non-adhesive, with REMOVE BEFORE FLIGHT printed on it in black letters
(20) G02219 - 3M Scotch brand No. 471 vinyl adhesive tape (1.5 inches wide), bright yellow color
(21) G02444 - Red paper tag (3 inches wide, 6 inches long) with attaching wire that has STATIC PORTS COVERED printed on it in black letters
(22) G02447 - Red paper tag (3 inches wide, 6 inches long) with attaching wire that has PITOT PROBES COVERED printed on it in black letters
(23) G00252 - Black polyethylene sheet, 6 mils thick
(24) Table I: Water-Based Alkaline Cleaners (AMM 20-30-31)

Table I
Water-Based Alkaline Cleaners

	DILUTION RATIO: NUMBER VOLUMES OF WATER PER ONE VOLUME OF CLEANER		
CLEANER	LIGHTLY DIRTY	MODERATELY DIRTY	VERY DIRTY
PACIFIC CHEMICAL B-82	7	3	2
KELITE 28	10	4	2
CEEBEE 280	10	4	2
OAKITE 204	10	4	2
TEC NO. 1	10	4	2
METACLEAN AC	10	4	2
DUBOIS C-1102	10	4	3
CALLA 301	10	4	3
PENNSALT 2271R	10	3	2
TURCO JET CLEAN C	20	5	3

(25) Table II: Solvent Emulsion Cleaners (AMM 20-30-31)

Table II Solvent Emulsion Cleaners		
	DILUTION RATIO: NUMBER VOLUMES OF WATER PER ONE VOLUME OF CLEANER	
CLEANER	WATER	CLEANING SOLVENT
ANY CLEANER IN TABLE I	2	5 TO 6

(26) Table III: Heavy Duty Cleaners (AMM 20-30-31)

Table III Heavy Duty Cleaners		
	DILUTION RATIO: NUMBER VOLUMES OF WATER PER ONE VOLUME OF CLEANER	
CLEANER	WATER	CLEANING SOLVENT
AIRSHOW W NAVEE 427 GREASE SOLVE	5 TO 15 3 TO 5	6 TO 12

D. Prepare to Clean the Airplane

NOTE: Be careful when you clean the airplane in very hot weather. The heated surface of the airplane can dry the cleaners before you can flush them with water. The dried cleaners can stain the surface.

(1) Move all of the equipment that you will use with flammable solvents away from sources of heat.

WARNING: KEEP ALL OF THE EQUIPMENT THAT YOU USE WITH FLAMMABLE SOLVENTS AWAY FROM SOURCES OF HEAT. IF THERE IS WIND, MAKE SURE THE SOLVENTS DO NOT FALL ON ELECTRICAL EQUIPMENT OR WARM COMPONENTS.

(2) Statically ground the airplane (AMM 20-40-11/201).
(3) Close all passenger doors, cargo doors, emergency exits, and access doors and panels.

WARNING: WHEN THE STATIC PORTS ARE COVERED, MAKE SURE THAT CONDITION IS VISIBLE FROM THE GROUND. IN ADDITION, ATTACH A TAG TO THE LEFT CONTROL WHEEL IN THE FLIGHT DECK AS A REMINDER THAT STATIC PORTS ARE COVERED. FAILURE TO OBSERVE AND REMOVE COVERINGS OVER STATIC PORTS BEFORE FLIGHT MAY CAUSE LARGE ERRORS IN AIRSPEED-SENSING AND ALTITUDE-SENSING SIGNALS, WHICH MAY LEAD TO LOSS OF SAFE FLIGHT.

CAUTION: WHENEVER AN OPENING IS COVERED, MAKE SURE THAT CONDITION IS VISIBLE FROM THE GROUND. ENGINES SHOULD NOT BE OPERATED WITH COVERS IN PLACE BECAUSE THE COVERS CAN COME OFF AND DAMAGE THE ENGINES.

CAUTION: USE COVERS, BLACK POLYETYLENE SHEET AND YELLOW VINYL ADHESIVE TAPE TO KEEP LIQUIDS OUT OF AREAS THAT CONTAIN MECHANICAL, ELECTRICAL, OR HYDRAULIC COMPONENTS. LIQUIDS THAT GET INTO THESE AREAS CAN CAUSE CORROSION, FREEZE DURING AIRPLANE FLIGHT, OR REMOVE NECESSARY LUBRICANTS.

(4) Put the covers on these components:
  (a) Pitot-static probes (Fig. 201)
  (b) Engine inlet and turbine exhaust
  (c) Brakes
  (d) Tires
(5) Attach a removed paper tag that has PITOT PROBES COVERED printed on it in black letters, to the left control wheel in the flight deck with wire.

CAUTION: WHENEVER AN OPENING IS COVERED, MAKE SURE THAT CONDITION IS VISIBLE FROM THE GROUND. ENGINES SHOULD NOT BE OPERATED WITH COVERS IN PLACE BECAUSE THE COVERS CAN COME OFF AND DAMAGE THE ENGINES.

CAUTION: DO NOT UNDER ANY CIRCUMSTANCES SPRAY DETERGENT OR WATER DIRECTLY INTO OR AT THE STATIC PORTS, OR DAMAGE TO THE AIRPLANE COULD RESULT.

(6) Use yellow vinyl adhesive tape and black polyethylene sheet to cover and seal the following openings, but do not seal them airtight:
(a) Surge tank and fuel tank vents
(b) APU exhaust duct outlet port
(c) APU oil cooling air exhaust port
(d) Equipment cooling ground supply valve port
(e) Overboard exhaust valve port (AMM 21-58-0/001)
(f) Forward outflow valve port (AMM 21-43-0/001)
(g) Ram air inlet and outlet doors
(h) Outflow valve

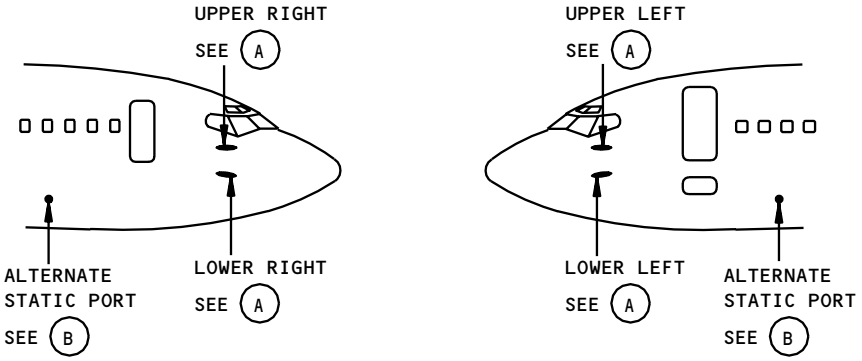
WARNING: WHEN THE STATIC PORTS ARE COVERED, MAKE SURE THAT CONDITION IS VISIBLE FROM THE GROUND. IN ADDITION, ATTACH A TAG TO THE LEFT CONTROL WHEEL IN THE FLIGHT DECK AS A REMINDER THAT STATIC PORTS ARE COVERED. FAILURE TO OBSERVE AND REMOVE COVERINGS OVER STATIC PORTS BEFORE FLIGHT MAY CAUSE LARGE ERRORS IN AIRSPEED-SENSING AND ALTITUDE-SENSING SIGNALS, WHICH MAY LEAD TO LOSS OF SAFE FLIGHT.

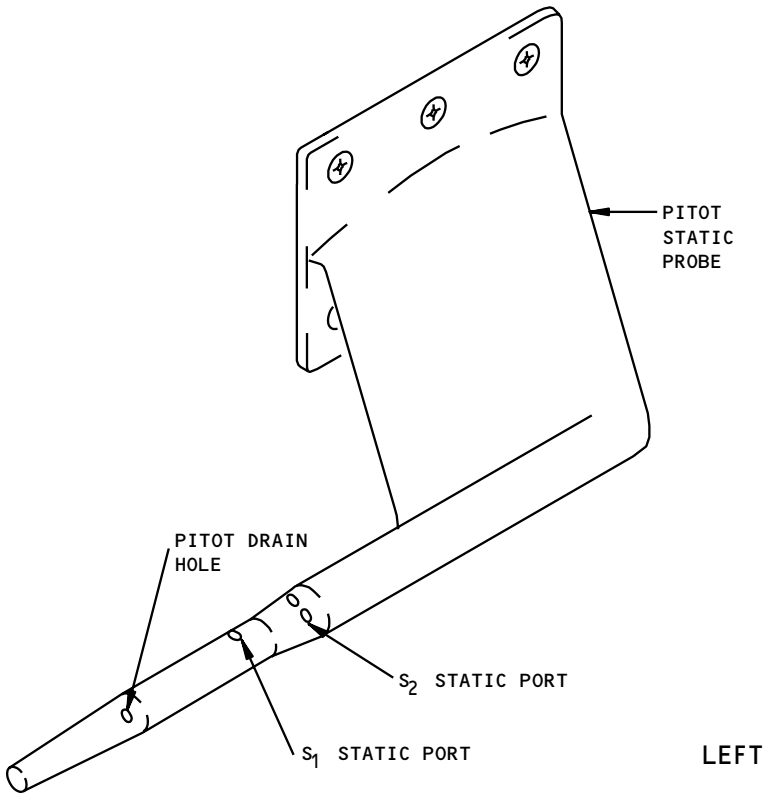
CAUTION: WHENEVER AN OPENING IS COVERED, MAKE SURE THAT CONDITION IS VISIBLE FROM THE GROUND. ENGINES SHOULD NOT BE OPERATED WITH COVERS IN PLACE BECAUSE THE COVERS CAN COME OFF AND DAMAGE THE ENGINES.

CAUTION: DO NOT UNDER ANY CIRCUMSTANCES SPRAY DETERGENT OR WATER DIRECTLY INTO OR AT THE STATIC PORTS OR DAMAGE TO THE AIRPLANE COULD RESULT.

(7) Use yellow vinyl adhesive tape and orange barricade tape that has REMOVE BEFORE FLIGHT printed on it in black letters to cover the static ports in the following manner (see Fig. 201 for locations of the static ports and Fig. 202 for illustrations of the static port cover procedure):

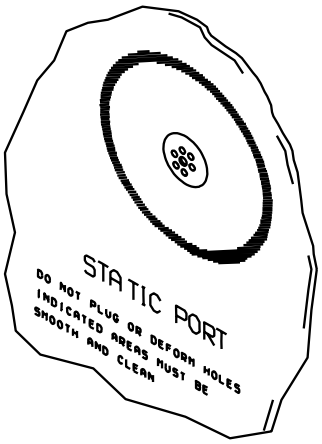
WARNING: DO NOT PLACE 3M NO. 471 YELLOW VINYL ADHESIVE TAPE OVER THE HOLES OF THE STATIC PORTS.





PITOT STATIC PROBE
TYPICAL (2 RIGHT AND 2 LEFT)

A



STATIC PRESSURE PORT
LEFT SIDE (RIGHT SIDE SIMILAR)

B

Pitot Static System Component Location
Figure 201

(a) Clean the area around each static port with aliphatic naphtha or equivalent, and a clean dry rag where you will put the yellow vinyl adhesive tape (Fig. 202).
(b) Put one end of an approximately 4-foot long piece of the orange barricade tape over the holes of the static ports and secure the upper edge with a 5 inch piece of 3M No. 471 yellow vinyl adhesive tape (Fig. 202, steps 1 and 2).

NOTE: Smooth the No. 471 yellow vinyl adhesive tape to make sure the bond is satisfactory to the airplane surface.

(c) Put a 5-inch piece of vinyl adhesive tape on each vertical edge of the barricade tape overlapping the first strip of adhesive tape (Fig. 202, Step 3).
(d) Put an 8-inch piece of vinyl adhesive tape horizontally over the barricade tape below the static portholes, overlapping the two vertical strips of adhesive tape (Fig. 202, Step 4).
(e) The barricade tape should be allowed to stream down so it is visible from the ground.

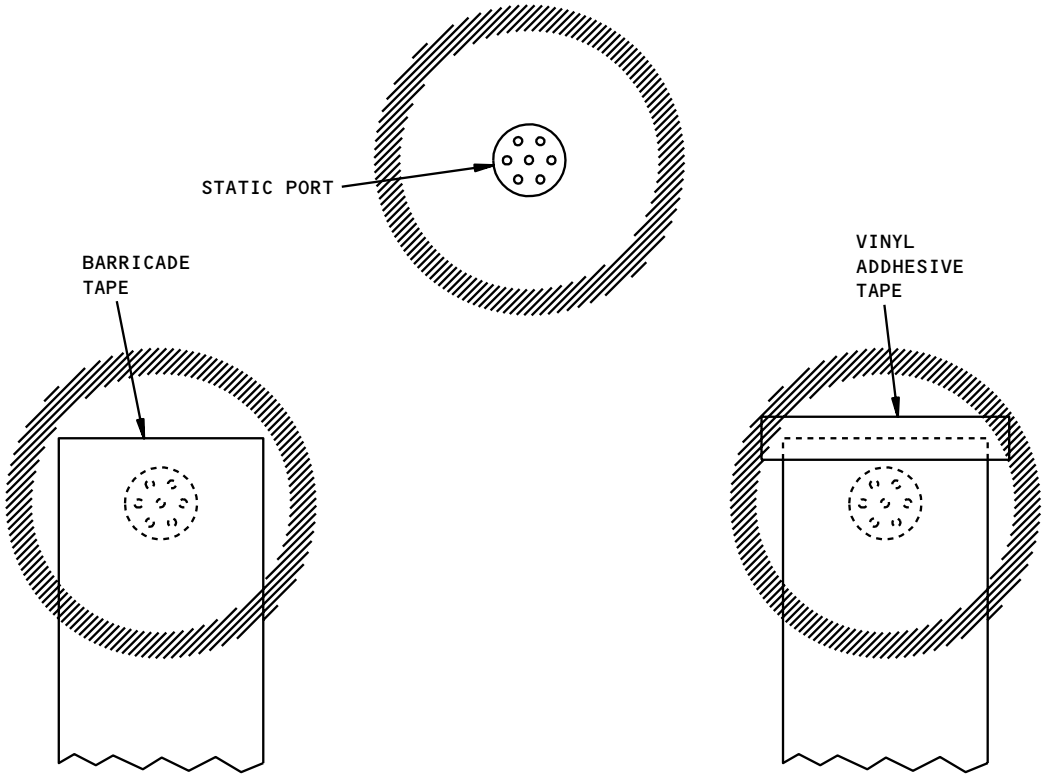
(8) Attach a red paper tag that has STATIC PORTS COVERED printed on it in black letters, to the top of the left control wheel in the flight deck with wire.
(9) Put plastic membranes on the components shown on Fig. 203.

CAUTION: YOU MUST COVER THE NOSE LANDING GEAR WHEEL BEARINGS PRIOR TO WASHING. IF THE WHEEL BEARINGS ARE NOT COVERED, THIS CAN CAUSE THE WHEEL BEARINGS TO FAIL.

(10) Wear gloves and goggles to prevent injury to your skin and eyes. Wear a safety harness when you walk on wet surfaces above the ground.

WARNING: WEAR CLOTHING AND EQUIPMENT THAT WILL PREVENT INJURY WHEN YOU CLEAN THE AIRPLANE. THE LIQUIDS USED IN THIS PROCEDURE CAN CAUSE INJURY TO SKIN AND EYES. WET AIRPLANE SURFACES ARE DANGEROUS WHEN YOU WALK ON THEM.

(11) Do not let the tires stay in the liquid that was used to clean the airplane.



STEP 1

PUT ONE END OF THE BARRICADE TAPE OVER THE STATIC PORT TO COVER THE HOLES

STEP 2

SECURE THE TOP EDGE OF THE BARRICADE TAPE WITH 5 INCHES OF VINYL ADHESIVE TAPE

STEP 3

PUT TWO 5–INCH STRIPS OF VINYL ADHESIVE TAPE OVER THE SIDES OF THE BARRICADE TAPE OVERLAPPING THE TOP STRIP OF ADHESIVE TAPE

STEP 4

PUT AN 8–INCH HORIZONTAL STRIP OF VINYL ADHESIVE TAPE OVER THE BARRICADE TAPE BELOW THE STATIC PORT HOLES OVERLAPPING THE TWO VERTICAL STRIPS

Static Port Cover Procedure
Figure 202

DESCRIPTION	LOCATION	FIGURE NUMBER
AILERON CENTERING MECHANISM ASSEMBLY		
AILERON UPPER REACTION SUPPORT ASSEMBLY		
BEARING	1	204
BEARING	2	204
BEARING	3	204
LEVER ASSEMBLY		
BEARING	4	204
AILERON LOWER REACTION SUPPORT ASSEMBLY		
BEARING	5	204
AILERON TRIM MECHANISM		
AILERON TRIM ACTUATOR	6	204
AILERON POSITION SENSOR		
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NOTE: AIRPLANES WITH SP077 AUTOPILOT DO NOT HAVE THESE COMPONENTS. ONLY AIRPLANES WITH SP177 OR SP300 AUTOPILOTS HAVE THESE COMPONENTS.		
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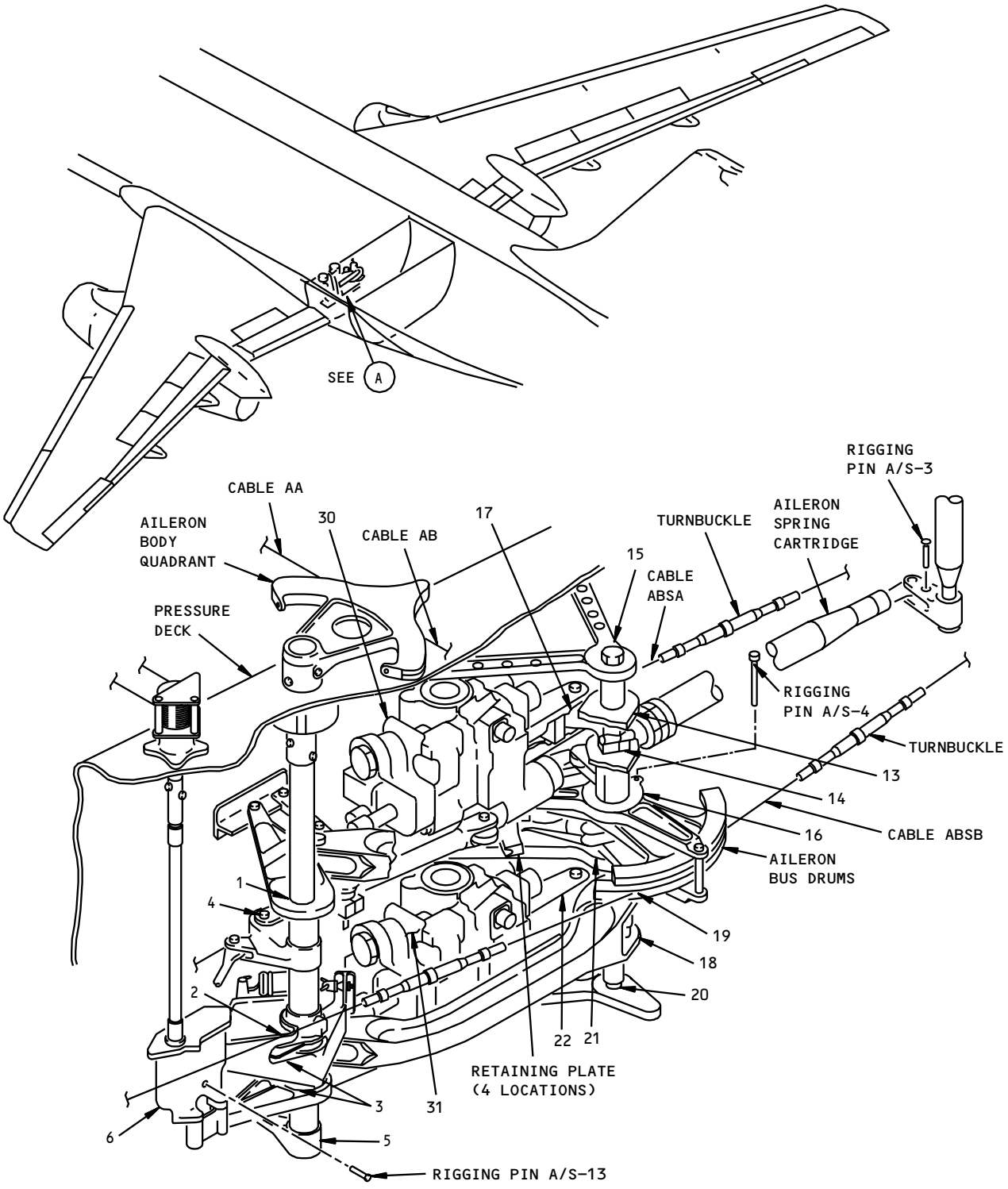
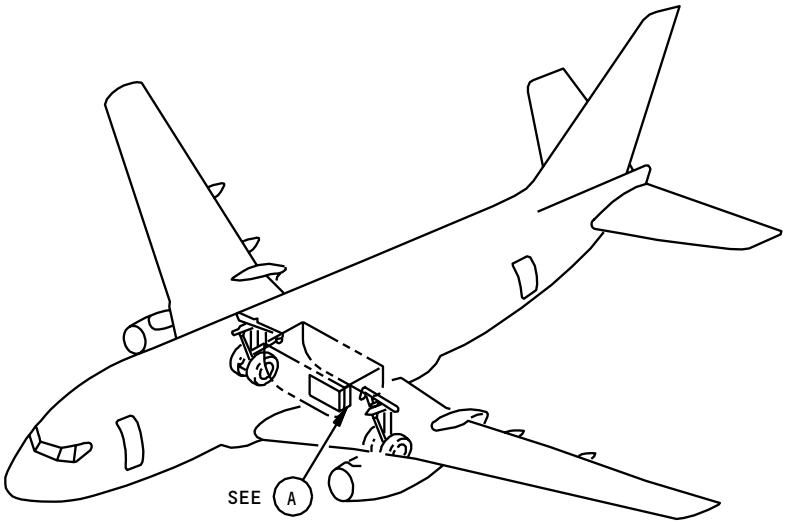
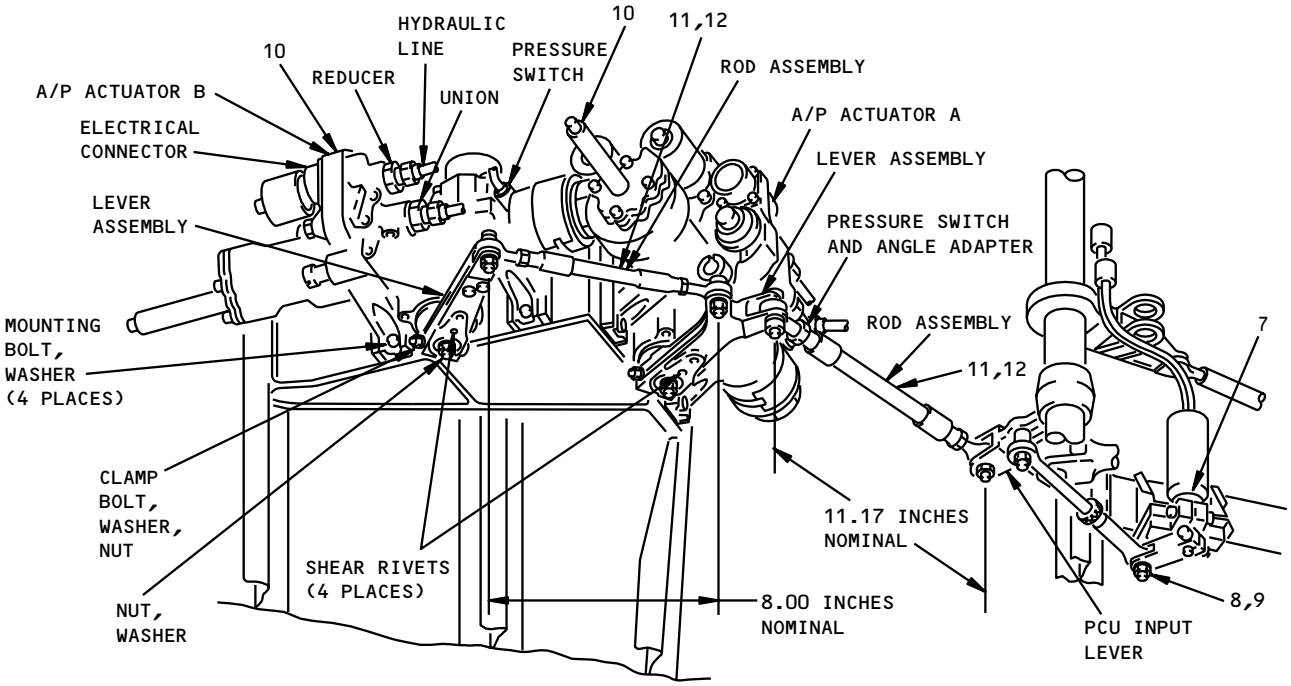
Airplane Components to Cover
Figure 203



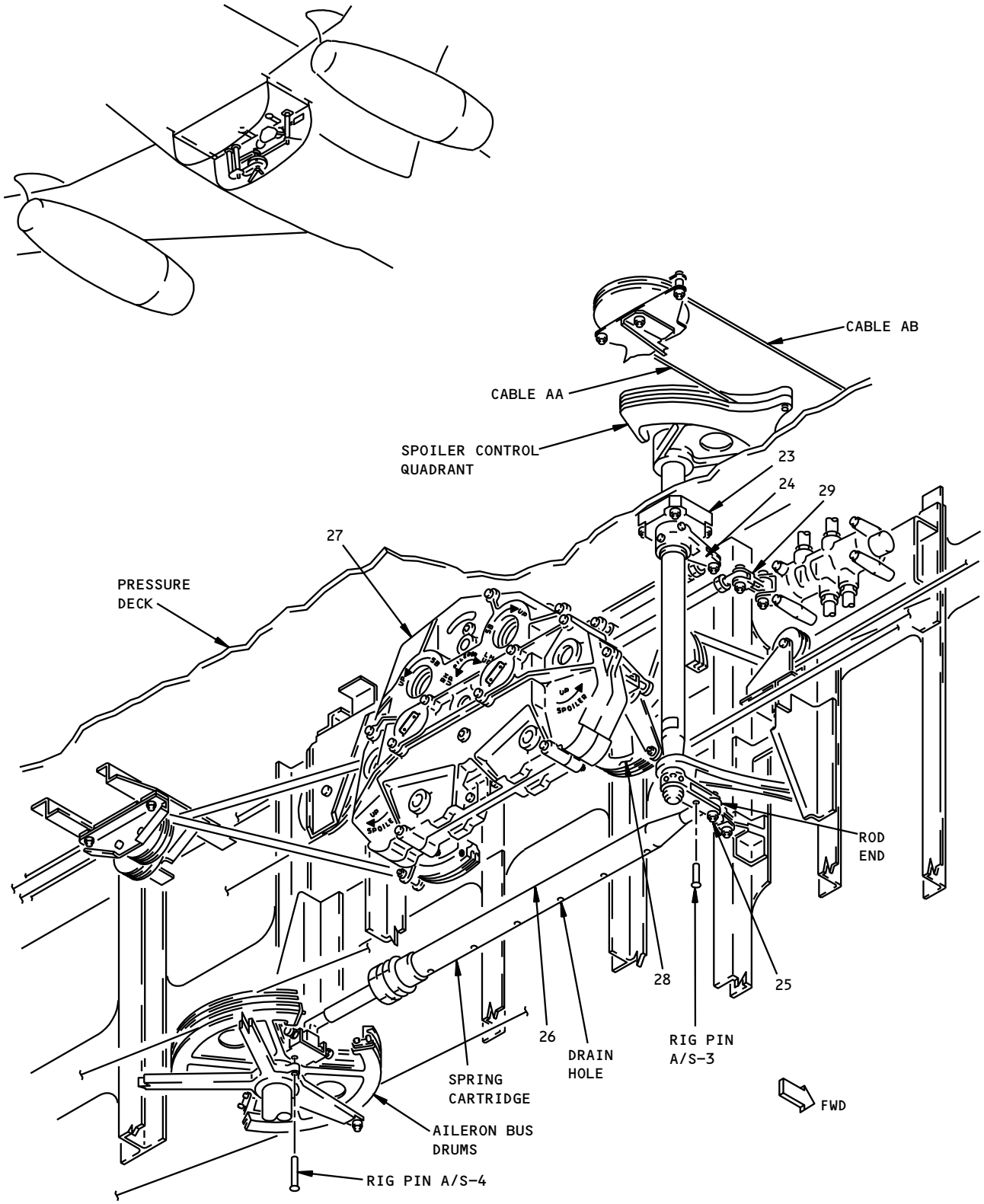
A

Aileron Power Control Unit
Figure 204

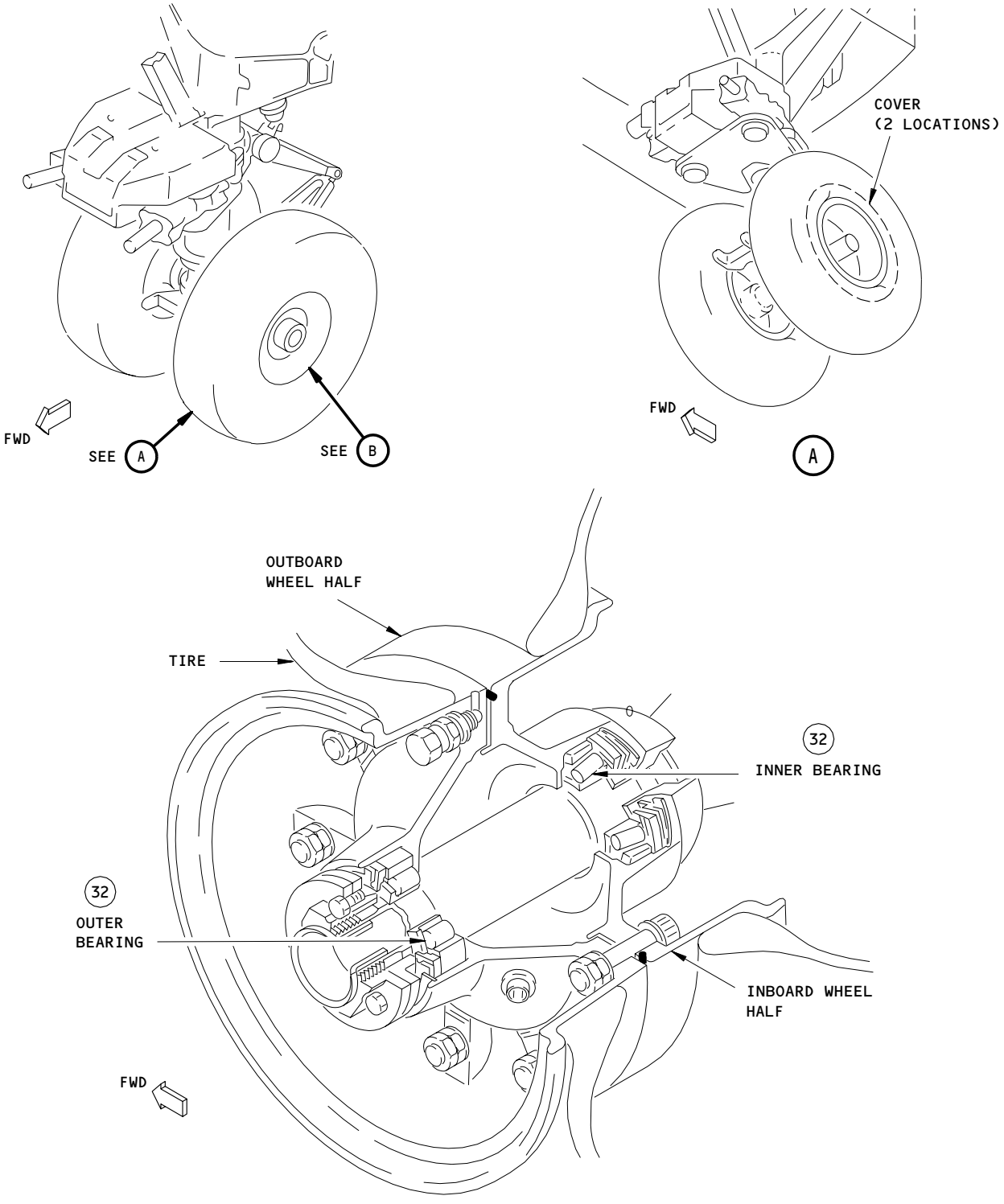




A/P Aileron Actuator
Figure 205



Spring Cartridge
Figure 206



Nose Gear Wheel Bearings
Figure 207

(12) Make sure the brakes are properly covered.

CAUTION: MAKE SURE MIXTURE OR WATER DO NOT GET IN THE STEEL OR CARBON BRAKE HEAT SINKS. CONTAMINATION CAN CAUSE DAMAGE TO CARBON BRAKES AND REDUCE BRAKE PERFORMANCE FOR CARBON AND STEEL BRAKES.

(13) Examine the cleaner before you use it. If the cleaner does not look mixed, then mix it again. Examine the cleaner again after one hour. Discard the cleaner if it does not stay in a mixed condition.

CAUTION: DO NOT USE A CLEANER IF IT IS IN A STRATIFIED (NOT MIXED) CONDITION. A CLEANER THAT IS STRATIFIED CAN STAIN OR CAUSE CORROSION TO AIRPLANE SURFACES.

E. Clean the Airplane

(1) Remove Light Material (dust and dirt) from Smooth Surfaces

(a) Move the flaps to the fully retracted position.

NOTE: To clean the flaps in the extended position, refer to the Remove Material Around Sensitive Components procedure.

(b) Mix the water-base alkaline cleaner from Table I for the condition of the surface that you will clean.

CAUTION: DO NOT USE THE CLEANERS IN HIGHER CONCENTRATIONS THAN SHOWN IN TABLE I. HIGHER CONCENTRATIONS CAN CAUSE DAMAGE TO ACRYLIC WINDOWS, STAINS ON PAINTED SURFACES, AND CORROSION ON METALS.

(c) Apply water to the area you will clean.

CAUTION: DO NOT USE HIGH-PRESSURE SPRAY EQUIPMENT TO CLEAN MECHANICAL, ELECTRICAL, OR HYDRAULIC COMPONENTS. LIQUIDS THAT GET INTO THESE AREAS CAN CAUSE CORROSION, FREEZE DURING AIRPLANE FLIGHT, OR REMOVE NECESSARY LUBRICANTS.

CAUTION: KEEP THE NOZZLE OF THE SPRAY EQUIPMENT MORE THAN 12 INCHES AWAY FROM THE SURFACE OF THE AIRPLANE. THE SPRAY CAN CAUSE DAMAGE TO THE SURFACE.

(d) Apply the cleaner to the applicable area with non-atomizing spray equipment, swabs, or brushes.

NOTE: To prevent scratches on the surface, soak the brushes in the cleaner before you use them.

(e) Let the cleaner soak for approximately 5 minutes. Apply the cleaner again if necessary to keep the surface wet.
(f) Rub the surface with a brush to help remove unwanted material.
(g) Flush the surface with clean, warm water (160°F maximum).

CAUTION: MAKE SURE YOU FLUSH THE SURFACE SUFFICIENTLY TO REMOVE ALL OF THE CLEANER. THE CLEANER CAN CAUSE CORROSION IF IT IS NOT REMOVED COMPLETELY FROM THE AIRPLANE SURFACE.

(h) Dry the wet surface with air or towels.

(2) Remove Moderately Heavy Material (oil and mud) from Smooth Surfaces

(a) Move the flaps to the fully retracted position.

NOTE: To clean the flaps in the extended position, refer to the Remove Material Around Sensitive Components procedure.

(b) Mix the solvent emulsion cleaner from Table II.

WARNING: KEEP THE CLEANING SOLVENT THAT IS USED IN THE SOLVENT EMULSION CLEANERS AWAY FROM SOURCES OF HEAT. THE CLEANING SOLVENT IS FLAMMABLE.

(c) Mix the cleaner until it is thick and creamy.
(d) Apply a heavy layer of cleaner to the applicable area with not-atomizing spray equipment, mop, and brushes.

CAUTION: DO NOT USE HIGH-PRESSURE SPRAY EQUIPMENT TO CLEAN MECHANICAL, ELECTRICAL, OR HYDRAULIC COMPONENTS. LIQUIDS THAT GET INTO THESE AREAS CAN CAUSE CORROSION, FREEZE DURING AIRPLANE FLIGHT, OR REMOVE NECESSARY LUBRICANTS.

CAUTION: KEEP THE NOZZLE OF THE SPRAY EQUIPMENT MORE THAN 12 INCHES AWAY FROM THE SURFACE OF THE AIRPLANE. THE SPRAY CAN CAUSE DAMAGE TO THE SURFACE.

(e) Let the cleaner soak for 5 - 10 minutes. Do not let the cleaner dry on the surface.
(f) Rub the surface with a brush to help remove unwanted material.
(g) Flush the surface with clean, warm water (160°F maximum).

CAUTION: MAKE SURE YOU FLUSH THE SURFACE SUFFICIENTLY TO REMOVE ALL OF THE CLEANER. THE CLEANER CAN CAUSE CORROSION IF IT IS NOT REMOVED COMPLETELY FROM THE AIRPLANE SURFACE.

(h) Dry the wet surface with air or towels.

(3) Remove Moderately Heavy Material (oil and mud) from Smooth Surfaces
   (a) Use the procedure to Remove Moderately Heavy Material (oil and mud) from Smooth Surfaces with these changes:
      1) Use a heavy duty cleaner from Table III.
      2) Let the cleaner soak for 15 minutes maximum.
      3) For stains that are not removed by the cleaners in Table III, use Ceebee Majorclean.

         CAUTION: USE CEEBEE MAJORCLEAN WITH CARE. THE ABRASIVES IN THIS CLEANER CAN REMOVE THE LUSTER ON CLAD ALLUMINUM. THE CLEANER CAN ALSO DECREASE THE CORROSION RESISTANCE OF ANODIXED ALLUMINUM.

(4) Remove Material Around Sensitive Components
   (a) Open the landing gear doors, and install the door locks (AMM 32-00-01).

      WARNING: REFER TO AMM 32-00-01 TO INSTALL THE DOOR LOCKS FOR THE LANDING GEAR. THE DOORS CAN FALL AND CAUSE INJURY OR DAMAGE IF THE LOCKS ARE NOT INSTALLED CORRECTLY.

   (b) If you will clean the flaps, extend them to the fully down position.
   (c) Mix the water-base alkaline cleaner from Table I for the condition of the surface that you will clean. For heavy material (grease and exhaust particles), mix the heavy duty cleaner from Table III.
   (d) Apply the cleaner to the applicable area with swabs or brushes.

      CAUTION: DO NOT USE HIGH-PRESSURE SPRAY EQUIPMENT. HIGH-PRESSURE SPRAY EQUIPMENT CAN PUT LIQUIDS INTO BEARINGS, JOINTS, BRAKES, ELECTRICAL CONNECTORS, AND OTHER SEALED COMPONENTS. LIQUIDS THAT GET INTO THESE AREAS CAN CAUSE CORROSION, FREEZE DURING AIRPLANE FLIGHT, OR REMOVE NECESSARY LUBRICANTS.

      NOTE: To prevent scratches on the surface, soak the brushes in the cleaner before you use them.

   (e) Let the cleaner soak for approximately 5 minutes. Apply the cleaner again if necessary to keep the surface wet.
   (f) Carefully rub the surface with a clean brush to help remove unwanted material.

      CAUTION: DO NOT REMOVE THE LAYER OF GREASE FROM MECHANICAL JOINTS. THIS GREASE LUBRICATES THE JOINT AND PREVENTS CORROSION.

(g) Flush the surface with clean, warm water (160°F maximum).

CAUTION: FLUSH THE SURFACE SUFFICIENTLY TO REMOVE ALL OF THE CLEANER. THE CLEANER CAN CAUSE CORROSION IF YOU DO NOT FULLY REMOVE FROM THE AIRPLANE SURFACE.

(h) Dry the wet surface with air or towels.
(i) Lubricate all bearings and joints in the cleaned area (AMM Chapter 12).

CAUTION: YOU MUST LUBRICATE ALL THE BEARINGS AND JOINTS IN THE AREA YOU CLEANED. THE LUBRICANT WILL REMOVE THE UNWANTED FLUIDS WHICH COULD FREEZE, OR CAUSE CORROSION TO THE BEARING OR THE JOINT. IF YOU DO NOT LUBRICATE THE BEARINGS AND JOINTS, DAMAGE TO THE COMPONENTS CAN OCCUR.

(j) Remove the door locks for the landing gear, and close the landing gear doors (AMM 32-00-01).

WARNING: REFER TO AMM 32-00-01 TO REMOVE THE DOOR LOCKS FOR THE LANDING GEAR. THE DOORS CAN FALL AND CAUSE INJURY OR DAMAGE IF THE LOCKS ARE NOT REMOVED CORRECTLY.

(5) Remove Unwanted Hydraulic Fluid
(a) Clean the unwanted hydraulic fluid with a mop or rags.
(b) Use the MIL-T-81533A degreasing fluid to clean the hydraulic fluid from warm components.

CAUTION: DO NOT USE WATER OR CLEANERS THAT CONTAIN FLAMMABLE SOLVENTS TO CLEAN WARM COMPONENTS.

(6) Clean with Foam

NOTE: Use foam when it is possible that the cleaner will stay on the surface for up to 15 minutes.

(a) Fill the tank of the foam generator. Use a liquid that contains one part of cleaner (from Table I or Oakite 74L) and 10 to 20 parts of water.

NOTE: If you do not have a foam generator, mix the liquid quickly to make foam.

(b) Apply water to the area you will clean.

CAUTION: DO NOT USE HIGH-PRESSURE SPRAY EQUIPMENT TO CLEAN MECHANICAL, ELECTRICAL, OR HYDRAULIC COMPONENTS. LIQUIDS THAT GET INTO THESE AREAS CAN CAUSE CORROSION, FREEZE DURING AIRPLANE FLIGHT, OR REMOVE NECESSARY LUBRICANTS.

CAUTION: KEEP THE NOZZLE OF THE SPRAY EQUIPMENT MORE THAN 12 INCHES AWAY FROM THE SURFACE OF THE AIRPLANE. THE SPRAY CAN CAUSE DAMAGE TO THE SURFACE.

(c) Apply a heavy layer of foam cleaner.
(d) Let the cleaner soak for 5 to 15 minutes. Apply the cleaner.
(e) Rub the surface with a brush to help remove unwanted material.
(f) Flush the surface with clean, warm water (160°F maximum).

CAUTION: MAKE SURE YOU FLUSH THE SURFACE SUFFICIENTLY TO REMOVE ALL OF THE CLEANER. THE CLEANER CAN CAUSE CORROSION IF IT IS NOT REMOVED COMPLETELY FROM THE AIRPLANE SURFACE.

(g) Dry the wet surface with air or towels.

(7) Clean acrylic windows (passenger cabin and cockpit side window)(if applicable).
(a) Remove loosely adhering dirt and grit from the window by flushing with water free of dirt and abrasive materials.
(b) Wash with non-abrasive soap and water. A soft, thoroughly clean cloth, sponge, or chamois may be used in washing, but only as a means of carrying the soapy water to the plastic. Go over the surface only with the bare hand so that any abrasive can be quickly detected and removed before it scratches the plastic surface.

NOTE: All rubbing operations on acrylic plastics shall be done with as light a pressure as possible.

(c) Dry the window with a clean damp chamois. A clean, soft cloth or tissue may be used if care is taken not to rub the plastic after the surface is dry.

CAUTION: RUBBING THE PLASTIC SURFACE WITH A DRY CLOTH WILL CAUSE SCRATCHES AND BUILD UP AN ELECTROSTATIC CHARGE WHICH ATTRACTS DUST PARTICLES.

(d) Remove oil and grease by rubbing lightly with a clean cloth wetted with any of the cleaners listed in Table I.

CAUTION: DO NOT USE THE FOLLOWING MATERIALS ON ACRYLIC PLASTICS: GASOLINE, ALCOHOL, BENZINE, HEXANE, XYLENE, ACETONE, CARBON TETRACHLORIDE, FIRE EXTINGUISHER OR DEICING FLUIDS, LACQUER THINNERS, OR WINDOW CLEANING SPRAYS. THEY SOFTEN THE PLASTIC, AND CAUSE CRAZING.

(8) Glass Window Cleaning (Control Cabin)

(a) Check that power is off in window heating circuit.

WARNING: OUTPUT VOLTAGE OF AUTOTRANSFORMER RANGES FROM 250 TO 350 VOLTS. BE CAREFUL WHEN WORKING ON CONTROL CABIN WINDOWS.

(b) Wash with a mild, nonabrasive detergent soap solution. Apply detergent solution with a clean, soft cloth or sponge. Rub with as light pressure as possible. Rinse and wipe dry. Avoid excessive rubbing when dry.

NOTE: In subfreezing temperatures, prewarm windows using electrical heating circuits.

(c) As an alternative to step (b) in subfreezing temperatures, clean windows with isopropyl alcohol.

WARNING: THIS CLEANER IS FLAMMABLE AND ITS USE REQUIRES SUBSEQUENT REAPPLICATION OF RAIN REPELLENT.

NOTE: If hardened rain repellent stains remain on the windshield or windows after normal washing, these may be removed with a repellent remover pad or by hand-scouring with a mild detergent solution and a plastic abrasive pad such as nylon knit over a foam core. Hand polishing with an optical grade polishing compound allied with a wet outing flannel cloth may be used as an alternative method. Rinse the window with clean tap water after using either method.

NOTE: Do not use the optical polishing compound with the plastic abrasive pad. Do not use household grade abrasive cleaners because of uncontrolled grit size.

(d) Close all window electrical heating circuits.

F. Put the Airplane Back in Its Usual Condition

WARNING: FAILURE TO REMOVE COVERS FROM PITOT PROBES BEFORE FLIGHT MAY CAUSE LARGE ERRORS IN AIRSPEED-SENSING AND ALTITUDE-SENSING SIGNALS WHICH MAY LEAD TO LOSS OF SAFE FLIGHT.

CAUTION: REMOVE ALL COVERS. ENGINES SHOULD NOT BE OPERATED WITH COVERS IN PLACE, BECAUSE THE COVERS CAN COME OFF AND DAMAGE THE ENGINES.

(1) Remove covers from the following components:
  (a) Pitot probes
  (b) Engine inlet and turbine exhaust
  (c) Brakes
  (d) Tires
(2) Remove the PITOT PROBES COVERED tag from the left control wheel in the flight deck.

WARNING: FAILURE TO REMOVE BARRICADE TAPE AND VINYL ADHESIVE TAPE FROM STATIC PORTS BEFORE FLIGHT MAY CAUSE LARGE ERRORS IN AIRSPEED-SENSING AND ALTITUDE-SENSING SIGNALS, WHICH MAY LEAD TO LOSS OF SAFE FLIGHT.

CAUTION: REMOVE ALL BARRICADE TAPE, COVERS, PLYETHYLENE SHEET AND VINYL ADHESIVE TAPE. ENGINES SHOULD NOT BE OPERATED WITH COVERS IN PLACE BECAUSE THE COVERS CAN COME OFF AND DAMAGE THE ENGINES.

(3) Remove all barricade tape, covers, polyethylene sheet and vinyl adhesive tape from the following openings:
  (a) Static Ports
    1) Inspect each static port and if necessary use naphtha or equivalent, and a clean dry rag to remove all tape residue, dirt and other contaminants around the static port.
  (b) Surge tank and fuel tank vents
  (c) APU exhaust duct outlet port
  (d) APU oil cooling air exhaust port
  (e) Equipment cooling ground supply valve port
  (f) Overboard exhaust valve port
  (g) Forward outflow valve port
  (h) Ram air inlet and outlet doors
  (i) Outflow valve
(4) Remove the STATIC PORTS COVERED tag from the left control wheel in the flight deck.

3. Polish the External Surfaces of the Airplane

A. Equipment and Materials
(1) Bonnet, Wool Pile - commercially available

(2) Buffer Wheel - cotton cloth, 80/92 thread count, spiral sewn, 4- or 6-inch diameter, 5/8- or 7/8-inch thick, 1/4-inch diameter arbor hole - commercially available
(3) Buffer Wheel - hard cloth, machine sewn, bias-type, 7 x 3 x 5/8-inch, 16 ply, commercial available
(4) Burnishing Tool - commercially available
(5) Sander/Polisher - Orbital, Air-driven, commercially available
(6) Alodine 1000 - MIL-C-5541
(7) Cheesecloth - Woven, Rymplecloth No. 301 (AMM 20-30-51)
(8) Compound - Cutting and Coloring, Schaffner No. 521, White Bar
(9) Compound - Coloring, Schaffner No. 4094, Green Bar
(10) Lubricant - Petroleum jelly
(11) Pad - Scotch-Brite, fine or Ultrafine (AMM 20-30-51/201)
(12) Paste - Fine Polishing, Schaffner No. AS-0410 (AMM 20-30-41)
(13) Polish - Turco 1495-X (AMM 20-30-41)
(14) Wiper - BMS 15-5D, Class A (AMM 20-30-51)

B. Reference Procedures
(1) Alodizing (AMM 51-21-41/701)

C. Prepare to Polish the Surface
(1) Use the "Clean The External Surfaces Of The Airplane" procedure to clean the surfaces you will polish.

D. Polish the Surface

WARNING: DO NOT POLISH THE STATIC PORTS. IF POLISHING MATERIAL ENTERS THE STATIC PORTS, IT MAY CAUSE LARGE ERRORS IN AIRSPEED-SENSING AND ALTITUDE-SENSING SIGNALS, WHICH MAY LEAD TO LOSS OF SAFE FLIGHT.

(1) PROCEDURE I - Polish the surface to repair light stains or to make the surface bright.

NOTE: Any polish listed in D6-9002 is acceptable for polishing.

(a) Use the wiper to remove the outer layer of protection as necessary.
(b) Manually or mechanically polish the surface as follows:
1) ALTERNATIVE I - Manually polish the surface.
a) Apply AS-0410 fine polishing paste or Turco 1495-X polish to the BMS 15-5D Class A wiper.
b) Rub the damaged area of the surface with the wiper.

NOTE: Rub in the direction of the grain of the metal until you get the necessary finish.

2) ALTERNATIVE II - Mechanically polish the surface.
a) Apply AS-0410 fine polishing paste or Turco 1495-X polish to the BMS 15-5D Class A wiper.
b) Polish the damaged area of the surface with the orbital air-driven sander/polisher.

(c) Remove the remaining polish material with solvent wipers.

NOTE: Always wipe in the direction of the grain of the metal.

(d) If necessary, use ALTERNATIVE I or II to polish the surface again.

NOTE: If the polished area is too bright, rub the area with an ultra fine Scotch-Brite pad. Remove the dried polish with solvent and wipers.

(e) Rub the area around the polished area to get a constant finish.
(f) Do the "Clean the External Surfaces of the Airplane" procedure in the polished area.
(g) Put some water on the surface, and make sure the water becomes drops.
(h) If the surface was conversion coated before it was polished, apply Alodine 1000 with a swab, or sponge (AMM 51-21-41).

(2) PROCEDURE II - Polish the surface to remove heavy stains or scratches that do not penetrate the clad aluminum.
(a) Use these steps to find if the scratch penetrated the clad aluminum:
1) Apply BMS 3-2 cleaning solvent to a wiper.
2) Use the wiper to clean the area around the scratch.
3) Dry the surface.
4) Apply masking tape around the scratch.

NOTE: Make sure there is no more than 1/32 inch of bare metal around the scratch.

5) Prepare the clad penetrating solution as follows:
a) Mix 200 grams of Potassium Nitrate (KNO3) and 100 grams of Sodium Hydroxide (NaOH) with sufficient water to make one liter of clad penetrating solution.
6) Apply one drop of clad penetrating solution with the point of a toothpick to the deepest part of the scratch.

CAUTION: MAKE SURE YOU PUT THE CLAD PENETRATING SOLUTION ONLY ON THE SCRATCH. THE SOLUTION WILL CAUSE DAMAGE TO THE SURFACE WHERE IT IS APPLIED.

NOTE: Use the minimum quantity of the clad penetrating solution necessary to flow to the bottom of the scratch.

7) If there is a positive reaction, immediately flush the scratch with water. Do not let the clad penetrating solution stay on the scratch for more than 3 minutes.

NOTE: If the bottom of the scratch becomes black, then the scratch penetrated the clad to the base metal.

8) Prepare the nitric acid solution as follows:
   a) Mix one volume of nitric acid (40 or 42° Be) with two to three volumes of water.
9) Apply one drop of the nitric acid solution to the scratch.
10) Let the nitric acid solution stay on the scratch for 1/2 to 1 minute.
11) Flush the scratch with clean water.
12) Apply Alodine 1000 to the scratch with a swab, cloth, or sponge (AMM 51-21-41).

(b) If the scratch penetrated the clad aluminum, do PROCEDURE III.
(c) Use the "Clean and External Surfaces of the Airplane" procedure to clean around the scratch.
(d) If the surface is badly scratched, rub it with fine or ultrafine Scotch-Brite pads to make it smoother.
(e) Polish with the air-driven sander/polisher as follows:

NOTE: Polish the airplane surface first with Schaffner No. 521 white bar compound. Polish with the Schaffner No. 521 white bar compound until all of the gray undercast is removed. Then apply the No. 4094 green coloring bar compound.

Always clean the surface with solvent before you change to a different bar compound.

1) Remove the dried polish material from the buffer wheel with a wheel rasp or a coarse file.
2) Apply the applicable polishing compound to the buffer wheel.
3) Hold the buffer wheel parallel to the direction that you polish.
4) Polish in the forward-to-aft direction.
5) Use sufficient pressure to remove the stains and scratches.
6) Move the buffer wheel in the correct direction to keep the finish in a good condition.
7) Apply the applicable polishing compound to the buffer wheel frequently.
8) Remove the dried polish material from buffer wheel frequently.

9) Remove the dried polish material from the airplane surface with the wipers and solvents.

NOTE: Put the solvent on the heavy polish material to make it soft before you wipe it off.

10) Do the "Clean the External Surfaces of the Airplane" procedure in the polished area.
11) Put some water on the surface, and make sure the water becomes drops.
12) If the surface was conversion coated before it was polished, apply Alodine 1000 with a swab, cloth, or sponge (AMM 51-21-41).

(3) PROCEDURE III - Polish the surface to repair damage that penetrates the clad aluminum.

NOTE: There is a test in PROCEDURE II to find if a scratch penetrates the clad aluminum.

(a) Use the soft wipers to clean the damaged area.

NOTE: Wipe the damaged area carefully to prevent scratches.

(b) Remove the burr edge as follows:
1) Apply the lubricant to the burnishing tool.
2) Move the burnishing tool in the direction of the scratch so that the clad aluminum material is moved into the defective area.

NOTE: Keep the area that you burnish to a minimum.

3) Move the burnishing tool on the repaired area so the area has a smooth surface, and so the stress is applied on a large area.
4) If the burnished area blends in with the adjacent surface, no further work is necessary.
5) If the burnished area does not blend in with the adjacent surface, continue as shown in PROCEDURE II.

E. Put the Airplane Back In Its usual Condition

WARNING: FAILURE TO REMOVE COVERS FROM PITOT PROBES BEFORE FLIGHT MAY CAUSE LARGE ERRORS IN AIRSPEED-SENSING AND ALTITUDE-SENSING SIGNALS, WHICH MAY LEAD TO LOSS OF SAFE FLIGHT.

CAUTION: REMOVE ALL COVERS. ENGINES SHOULD NOT BE OPERATED WITH COVERS IN PLACE BECAUSE THE COVERS CAN COME OFF AND DAMAGE THE ENGINES.

(1) Remove covers from the following components:
(a) Pitot probes

(b) Engine inlet and turbine exhaust
(c) Brakes
(d) Tires

(2) Remove the PITOT PROBES COVERED tag from the left control wheel in the flight deck.

WARNING: FAILURE TO REMOVE BARRICADE TAPE AND VINYL ADHESIVE TAPE FROM STATIC PORTS BEFORE FLIGHT MAY CAUSE LARGE ERRORS IN AIRSPEED-SENSING AND ALTITUDE-SENSING SIGNALS, WHICH MAY LEAD TO LOSS OF SAFE FLIGHT.

CAUTION: REMOVE ALL BARRICADE TAPE, COVERS, POLYETHYLENE SHEET AND VINYL ADHESIVE TAPE. ENGINES SHOULD NOT BE OPERATED WITH COVERS IN PLACE BECAUSE THE COVERS CAN COME OFF AND DAMAGE THE ENGINES.

(3) Remove all barricade tape, covers, polyethylene sheet and vinyl adhesive tape from the following openings:
(a) Static Ports
1) Inspect each static port and if necessary, use naphtha or equivalent, and a clean dry rag to remove all tape residue, dirt and other contaminates around the static port.
(b) Surge tank and fuel tank vents
(c) APU exhaust duct outlet port
(d) APU oil cooling air exhaust port
(e) Equipment cooling ground supply valve port
(f) Overboard exhaust valve port
(g) Forward outflow valve port
(h) Ram air inlet and outlet doors
(i) Outflow valve

(4) Remove the STATIC PORTS COVERED tag from the left control wheel in the flight deck.

BIRD STRIKE CLEANING - MAINTENANCE PRACTICES

1. General
   A. The procedure has the steps for the safe removal of pieces of a bird from an aircraft exterior.
2. Bird Strike Cleaning
   A. Consumable Materials
      (1) Alcohol, Isopropyl - TT-I-735
      (2) Cloth, Lint-Free
      (3) Gloves, Protective
      (4) Disinfectant
   B. References
      (1) AMM 05-51-201-/201, Bird/Hail Strike Conditional Inspection
   C. Procedure
      (1) Gain access to the suspected bird strike area.
      (2) Clean the bird pieces from the airplane.

      WARNING: PUT ON EQUIPMENT FOR PROTECTION BEFORE YOU TOUCH THE BIRD CARCASS, BLOOD, GUTS, AND ANY RESIDUE. THIS CAN CONTAIN BACTERIA AND VIRUSES THAT CAN CAUSE ILLNESSES, AND INJURIES TO PERSONNEL.

      WARNING: DO NOT LET THE BIRD CARCASS OR OTHER PIECES OF THE BIRD TOUCH YOUR SKIN. DISCARD THE BIRD PIECES IN A PLASTIC DISPOSAL BAG. THE BIRD PIECES CAN CONTAIN INFECTIOUS MATERIALS (BACTERIA AND VIRUSES). THEY CAN CAUSE ILLNESSES, AND INJURIES TO PERSONNEL.

      WARNING: PUT THE BIRD PIECES INTO PLASTIC DISPOSAL BAGS WHEN YOU REMOVE THEM FROM THE AIRPLANE. OBEY THE AIRLINE POLICY, LOCAL HEALTH DEPARTMENT, AND LAW ENFORCEMENT REGULATIONS WHEN YOU DISCARD THIS MATERIAL. OBEY THESE INSTRUCTIONS TO PREVENT INJURIES TO PERSONNEL.

         (a) Discard the bird pieces in a plastic bag.
         (b) Clean the area with isopropyl alcohol and disinfectant.
         (c) Make sure that you remove all signs of bird material from the airplane.
      (3) After you remove the bird pieces from the airplane, do this task: Bird/Hail Strike Conditional Inspection (AMM 05-51-201/201).

COLD WEATHER MAINTENANCE - MAINTENANCE PRACTICES

1. General
   A. Operating airplanes safely in cold weather conditions presents unique problems due to the effects of ice, snow, slush, frost, and low temperatures. Maintenance personnel must recognize the impact of cold weather on operations to minimize costs and lost time. This procedure provides information on protection against or removal of ice, snow, slush and frost from the airplane and various other airplane related aspects of cold weather operation. The operator is responsible for selection and implementation of procedures suitable for existing climatic conditions.
   B. The procedures for operation of equipment to be used during ice, snow and/or frost conditions must be developed by the operator to meet his unique requirements based on his cold weather experiences, equipment and materials availability, and the climatic conditions existing at his bases.
   C. For airplanes originating in a warm environment and terminating in a cold environment, the Main and Nose Gear shock struts should be over-inflated by approximately 1 inch before departure. A single point pressure/extension check should be performed after arriving at the colder location. If the strut is under-inflated and no leaks are present, then service with nitrogen to bring the strut back onto the low end of the AMM shock strut servicing band found in AMM 12-15-31/201 Main Landing Gear Shock Strut - Servicing and 12-15-41/201 Nose Landing Gear Shock Strut - Servicing.
   D. For airplanes originating in a cold environment and terminating in a warm environment, a single point pressure/extension check should be performed before departure while the airplane is still in the cold environment. If the strut is under-inflated and no leaks are present, service with nitrogen to bring the strut back onto the low end of the shock strut servicing band. When the airplane arrives in the warmer location, the strut will appear slightly over-inflated. Do not re-service the struts if the airplane will soon return to the colder climate. However, if the airplane will remain in service at the warmer location, then re-service the struts.

E. This procedure contains the following topics:

TOPIC
Equipment and Materials
Guidelines
General
Specific Requirements
Control Surfaces
Wing and Horizontal Tail
Fuselage and Vertical Tail
Engines and APU
Brakes
Landing Gear and Door
Wing Fuel Tanks
Fuel Tank Sumping
Miscellaneous
Hot Water Deicing
One-Step Deicing/Anti-Icing
Two-Step Deicing/Anti-Icing
Operation Checks
Parking
Engine Operation
Fuel Icing
Toilets and Potable Water

F. Definitions

(1) Deicing is a procedure by which frost, ice, or snow is removed from the airplane by applying hot water or a hot mixture of water and deicing/anti-icing fluid.

(2) Anti-icing consists of the application of an anti-icing fluid or a mixture of anti-icing fluid and water to the airplane to protect against the accumulation and adherence of ice, snow and/or frost to airplane surfaces.

(3) One step deicing/anti-icing consists of the application of deicing/anti-icing fluid or a mixture of fluid and water heated as necessary considering the ambient temperature and weather conditions.

(4) Two step deicing/anti-icing consists of deicing with hot water or a hot mixture of deicing/anti-icing fluid and water, followed immediately by anti-icing with an overspray of deicing/anti-icing fluid or a mixture of deicing/anti-icing fluid and water. The second step must be performed within 3 minutes of the beginning of the first step and completed area by area if necessary.

(5) Holdover time is the estimated time anti-icing fluid will prevent frost, ice, or snow from forming or accumulating on the protected surfaces of an airplane.

NOTE: The degree of protection, or holdover, is dependent upon the weather conditions and fluid/fluid mixture selected and cannot be precisely determined. Refer to FAA Notice 8000.XXX for the current winter season. This document includes tables for Holdover Times for all commercially available deicing fluids that have been certified for the current winter season.

(6) The application of Type II, III, and IV fluid, especially when used in a one-step process or in the first step of a two-step process, may cause residues to collect in aerodynamically quiet areas, cavities and gaps. The application of hot water or heated Type I fluid in the first step of a two-step process will minimize the formation of residues. Residues may rehydrate and freeze under certain temperature, high humidity and/or rain conditions and may block or impede critical flight control systems. If a Type II, III, or IV fluid is used in a one-step process or in the first step of a two-step process, then an appropriate inspection and cleaning program should be established. Whenever suitable, deice and anti-ice with only Type I.

(7) Deicing fluid residues can slowly migrate out of crevice areas after being removed from open areas by cleaning. Repeated cleaning of the aircraft may be necessary. The deicing fluid residue inspection and cleaning steps in this procedure should be used to remove these residues.

(8) Type II, Type III, and Type IV (thickened) deicing/anti-icing fluids have a minimum Glycol content of 50% with 45% to 50% water plus thickeners and inhibitors. Their viscosity is a function of the applied shear stress as well as temperature. They are usually highly viscous at low shear stress levels, and their viscosity decreases dramatically as shear stress increases. They provide longer holdover time than Type I deicing/anti-icing fluids.

(9) In cold weather, it is necessary to drain fuel tank sumps prior to fueling to remove water from fuel tanks if the airplane has been idle for more than 45 minutes prior to fueling. Drain fuel tank sumps again after refueling if the airplane has been idle for 2 hours or more after refueling. In cold weather, water can freeze and not let the drain valves open.

GUIDELINE SUMMARY FOR APPLICATION OF TYPE I FLUID MIXTURES (MINIMUM CONCENTRATIONS) AS A FUNCTION OF OAT			
OUTSIDE AIR TEMPERATURE OAT	ONE-STEP PROCEDURE	TWO-STEP PROCEDURE	
	DEICING/ANTI-ICING	1ST STEP: DEICING	2ND STEP: ANTI-ICING 1
27°F (-3°C) AND ABOVE	MIX OF FLUID AND WATER HEATED TO 140°F (60°C) MINIMUM AT THE NOZZLE, WITH A FREEZING POINT OF AT LEAST 18°F (10°C) BELOW OAT	WATER OR A MIX OF FLUID AND WATER HEATED 140°F (60°C) MINIMUM AT THE NOZZLE	MIX OF FLUID AND WATER HEATED TO 140°F (60°C) MINIMUM AT THE NOZZLE, WITH FREEZING POINT OF AT LEAST 18°F (10°C) BELOW OAT
27°F (-3°C) BELOW		FP OF HEATED FLUID MIXTURE SHALL BE NOT MORE THAN 5°F (3°C) ABOVE ACTUAL OAT	

TYPE I FLUID

°C DEGREES CELSIUS
°F DEGREES FAHRENHEIT
OAT OUTSIDE AIR TEMPERATURE
FP FREEZING POINT

CAUTION: WING SKIN TEMPERATURES MAY DIFFER AND IN SOME CASES MAY BE LOWER THAN OAT. A STRONGER MIX (MORE GLYCOL) CAN BE USED UNDER THESE CONDITIONS.

NOTE: THIS TABLE IS APPLICABLE FOR THE USE OF TYPE I HOLDOVER TIME GUIDELINES. IF HOLDOVER TIMES ARE NOT REQUIRED, A TEMPERATURE OF 140°F (60°C) AT THE NOZZLE IS DESIRABLE.

UPPER TEMPERATURE LIMIT SHALL NOT EXCEED FLUID MANUFACTURER'S RECOMMENDATION.

1 TO BE APPLIED BEFORE FIRST STEP FLUID FREEZES, TYPICALLY WITHIN 3 MINUTES

Fluid Mixture Guidelines for Deicing
Figure 201 (Sheet 1)

GUIDELINE FOR APPLICATION OF TYPE II, III, AND IV FLUID MIXTURES			
OUTSIDE AIR TEMPERATURE OAT	ONE-STEP PROCEDURE 2	TWO-STEP PROCEDURE	
	DEICING/ANTI-ICING	1ST STEP: DEICING	2ND STEP: ANTI-ICING 1
27°F (-3°C) AND ABOVE	50/50 HEATED TYPE II, III OR IV	HEATED WATER OR A HEATED MIX OF TYPE I, II, III, OR IV AND WATER	50/50 TYPE II, III OR IV
BELOW 27°F (-3°C) TO 7°F (-14°C)	75/25 HEATED TYPE II, III OR IV	HEATED SUITABLE MIX OF TYPE I, II, III, OR IV, AND WATER WITH FP NOT MORE THAN 5°F (3°C) ABOVE ACTUAL OAT	75/25 TYPE II, III OR IV
BELOW 7°F (-14°C) TO -13°F (-25°C)	100/0 HEATED TYPE II, III OR IV		100/0 TYPE II, III OR IV
BELOW -13°F (-25°C)	TYPE II/IV FLUID MAY BE USED BELOW -13°F (-25°C) PROVIDED THAT THE FREEZING POINT OF THE FLUID IS AT LEAST 13°F (7°C) BELOW OAT AND THAT AERODYNAMIC ACCEPTANCE CRITERIA ARE MET. TYPE III FLUID MAY BE USED BELOW 14°F (-10°C) PROVIDED THAT THE FREEZING POINT OF THE FLUID IS AT LEAST 13°F (7°C) BELOW OAT AND THAT AERODYNAMIC ACCEPTANCE CRITERIA ARE MET. CONSIDER THE USE OF TYPE I WHEN TYPE II, III, OR IV FLUID CANNOT BE USED.		

TYPE II, III, AND IV FLUIDS

CAUTION: WING SKIN TEMPERATURES MAY DIFFER AND, IN SOME CASES MAY BE LOWER THAN OAT. A STRONGER MIX (MORE GLYCOL) CAN BE USED UNDER THESE CONDITIONS.

AS FLUID FREEZING MAY OCCUR, 50/50 TYPE II, III OR IV FLUID SHALL NOT BE USED FOR THE ANTI-ICING STEP OF A COLD-SOAKED WING AS INDICATED BY FROST OR ICE ON THE LOWER SURFACE OF THE WING IN THE AREA OF THE FUEL TANK.

AN INSUFFICIENT AMOUNT OF ANTI-ICING FLUID, ESPECIALLY IN THE SECOND STEP OF A TWO-STEP PROCEDURE, MAY CAUSE A SUBSTANTIAL LOSS OF HOLDOVER TIME, PARTICULARLY WHEN USING A TYPE I FLUID MIXTURE FOR THE FIRST STEP (DEICING).

NOTE: FOR HEATED FLUIDS, A FLUID TEMPERATURE NOT LESS THAN 140°F (60°C) AT THE NOZZLE IS DESIRABLE. UPPER TEMPERATURE LIMIT SHALL NOT EXCEED FLUID MANUFACTURER'S RECOMMENDATIONS.

1 TO BE APPLIED BEFORE FIRST STEP FLUID FREEZES, TYPICALLY WITHIN 3 MINUTES

2 CLEAN AIRCRAFT MAY BE ANTI-ICED WITH UNHEATED FLUID.

Fluid Mixture Guidelines for Deicing
Figure 201 (Sheet 2)

2. Equipment and Materials
   A. Ground equipment compatible with and suitable for application of Type I, II, III, or IV deicing/anti-icing fluids and water

      WARNING: BE SURE TO USE EQUIPMENT DESIGNATED FOR THE FLUIDS BEING APPLIED. MECHANICAL OR EQUIPMENT SHEARING OF MANY TYPE II, III, AND IV DEICING/ANTI-ICING FLUIDS REDUCES THEIR VISCOSITY AND ALSO REDUCES THEIR ESTIMATED HOLDOVER TIME. BE SURE TO REFER TO MANUFACTURER'S GUIDELINES FOR THE SPECIFIC FLUID BEING USED.

      (1) Deicing/Anti-icing Truck
      (2) Boomtruck or Cherry-picker
      (3) Water
      (4) Hot Air Source
      (5) Type I, II, III, or IV Deicing Fluid
      (6) Type I, II, III, or IV Anti-Icing Fluid

   B. Materials

      NOTE: The applicable fluids which obey the Boeing document D6-17487, "Evaluation of Airplane Maintenance Materials" and conform to any of the following specifications, are acceptable fluids.

      (1) Type I (newtonian) fluids (Ref Chapter 20):
          (a) G02301 fluid SAE AMS 1424 latest revision
      (2) Type II, III, and IV (non-newtonian) fluids (Ref Chapter 20):
          (a) G02301 fluid SAE AMS 1428 latest revision

3. Guidelines
   A. General
      (1) There are many conditions influencing a decision concerning the method of ice, snow, or frost removal and the method of protection from ice, snow, and frost accumulation. The best methods must be determined by the individual operator based on his experience and the prevailing local conditions. However, as a general guideline, Type II, Type III, and Type IV fluids provide a longer holdover time than Type I fluids. Use of Type II, Type III, and Type IV fluids reduces the risk of ice, snow, or frost accumulation on the aircraft during a long taxi.
      (2) One-step deicing/anti-icing is performed using a heated mixture of water and either Type I, II, III, or IV deicing/anti-icing fluids. The fluid dilution and temperature used depends on the weather, the desired hold over protection and condition of the airplane. Ice and snow removal requires sufficient fluid temperature and flow rate to flush the accumulation from aircraft surfaces. The residual fluid on the aircraft surfaces provides protection against further accumulation of ice, snow, or frost, with the holdover time dependent on the mixture and type of fluid used.

(3) The application of Type II, III, and IV fluid, especially when used in a one-step process or in the first step of a two-step process, may cause residues to collect in aerodynamically quiet areas, cavities and gaps. The application of hot water or heated Type I fluid in the first step of a two-step process will minimize the formation of residues. Residues may rehydrate and freeze under certain temperature, high humidity and/or rain conditions and may block

(4) Deicing fluid and hot water should be heated to 140-180°F (60-82°C), at the nozzle, for best results in ice or snow removal. A fine to medium spray is recommended for best dispersion of the fluid across a large area of ice or snow for maximum melting effect. A solid stream is recommended for flushing ice or snow from airplane surfaces. However, the maximum force on the surfaces, to prevent damage, must not exceed 10 psi on an area of 25 square inches.

CAUTION: DO NOT DIRECT SOLID FLUID STREAM NORMAL TO SURFACE. APPLY AT LOW ANGLE TO PREVENT DAMAGE TO AIRPLANE SURFACES. DO NOT USE HIGH PRESSURE SPRAY TO "BATTER" ICE AND SNOW OFF AIRPLANE SURFACES.

(5) A coating of anti-icing fluid or a mixture of anti-icing fluid and water, depending on the atmospheric temperature, will offer protection from ice, snow, and frost if the fluid is applied to a dry wing on a cold-soaked airplane before such conditions begin. Consideration should also be given to anti-icing an airplane in precipitation conditions where the air temperature is above freezing. Since the airplane external surfaces may be below the freezing point, ice may form and adhere to the surface. Clear ice may be present below the layer of snow or slush, which is difficult to detect. Check to ensure removal of all ice after deicing or deicing/anti-icing. Some cases may require inspection by touch.

(6) For continuing precipitation conditions, the two-step deicing/anti-icing procedure is normally the preferred method. The percentage of fluid used in the mixture should be determined based on airline experience or the fluid manufacturer's recommendations and the atmospheric temperature.

(7) Maintenance personnel must recognize that the requirement for an ice, snow, and frost free wing at takeoff can only be met by close inspection of the aircraft at the time of departure.

(8) Snow should be removed from parked airplanes at regular intervals to prevent a large build-up and possible freezing to the airplane surface.

(9) Removal of snow may be facilitated by brushing snow from wings and horizontal stabilizers with long handled brooms. Fuselage can be cleared by use of ropes or fabric fire hose laid over fuselage and see-sawed aft over fuselage.

CAUTION: PROTRUDING EQUIPMENT MAY BE DAMAGED BY MOVEMENT OF ROPES OR FABRIC HOSE.

(10) Prior to moving an airplane from heated hangar to an outside location during icing conditions, the airplane should be anti-iced. This reduces the possibility of ice or snow melting upon contact with the warm airplane and then refreezing.

(11) Unheated water deicing should be accomplished in a heated hangar, and the airplane should remain in the hangar until the surfaces are dry. It will be necessary to check those areas where water could be trapped and freeze. Application of anti-icing fluid will minimize the drying requirements.

(12) General Precautions

WARNING: DEICING/ANTI-ICING FLUID MAY BE TOXIC. CONTACT WITH SKIN OR EYES SHOULD BE AVOIDED, AND ADEQUATE PROTECTIVE CLOTHING SHOULD BE WORN BY PERSONNEL.

(a) Do not spray deicing/anti-icing fluid directly at or into pitot inlets, TAT probes or static ports.

(b) Do not spray heated deicing/anti-icing fluid or hot water directly on cold windows.

(c) Do not spray deicing/anti-icing fluid directly into engine, APU, scoops, vents, drains, etc.

(d) Do not exceed 10 psi on an area of 25 square inches, and do not direct a solid stream of fluid perpendicular to airplane surfaces.

(e) Check that ice and/or snow is not forced into areas around flight controls during ice and snow removal.

(f) Remove all ice or snow from the door and girt bar areas before closing any door.

(g) Cargo doors should be opened only when necessary. Cargo containers should be cleared of ice or snow prior to loading. Apply deicing/anti-icing fluid on pressure relief doors, lower door sills, and bottom edge of door prior to closing doors for flight.

(h) Do not use hard or sharp tools to scrape or chip ice from airplane surface.

(i) Both the right and left sides of the wing and the right and left sides of the horizontal stabilizer must receive the same deicing/anti-icing treatment.

1) If contamination exists only in a limited area (such as a spoiler panel) and there is no active precipitation, it is permitted to deice only that area, but the same area should also be treated on the other wing.

(j) If SAE Type II, III, or IV fluids are used, then any traces of deicing/anti-icing fluid on cockpit windows must be removed prior to departure, particular attention being paid to windows fitted with wipers. In addition, any forward area from which fluid may flow back onto windshields during taxi and takeoff must be clean prior to departure.

NOTE: Deicing/anti-icing fluid can be removed by rinsing with approved cleaner and soft cloth or flushing with type I fluid.

(k) After prolonged periods of deicing/anti-icing, it is advisable to check aerodynamic quiet areas and cavities like balance bays and wing and stabilizer rear spars for residue of deicing/anti-icing fluids.

(13) When slush is present on runways, inspect the aircraft when it arrives at the ramp for slush accumulation on the airplane or damage to airplane surfaces.
(a) Check leading edges, flaps, flap wells, vertical stabilizer, rudder, underside and upper surface horizontal stabilizers and elevators for ice accumulation and skin panel damage. Deice as required.
(b) Check landing gear wheel well areas for accumulation of ice, slush, and snow. Deice as required.
(c) Check skin panels aft of wheel wells for edge deformation.
(14) Check deicing/anti-icing fluid concentration before application to airplane.
(15) Use a boomtruck, a cherry-picker, or deicing/anti-icing truck to do deicing/anti-icing.

WARNING: DO NOT WALK ON THE WINGS OR THE HORIZONTAL STABILIZER. ICE OR SNOW ON THESE SURFACES IS NOT SAFE. MAINTENANCE PERSONS CAN FALL WHICH MAY CAUSE PERSONAL INJURY OR AIRPLANE DAMAGE.

B. Specific Requirements
(1) Control Surfaces
(a) Wing flaps, slats, and spoilers should be retracted during periods of snowfall and icing conditions. If it is necessary to operate these controls, ensure they are clear of accumulation before retraction.

NOTE: If an airplane arrives at the gate with flaps in a position other than fully retracted during a period of ice or snow conditions, those flaps which are extended must be inspected for ice or snow accumulation before retracting.

(b) All control surfaces must be free of ice, snow, or frost. Following deicing operation check associated hinges, tracks, and actuators for trapped moisture which could freeze. Apply deicing/anti-icing fluid for protection.

(c) Balance panel bays (Fig. 202) must be free of ice and snow to permit free movement of the surfaces through their full travel. Following any deicing operation, these bays must be checked for ice, snow, or pockets of water which could later freeze. Drains from balance panel bays should be checked to verify they are open. Prior to airplane operation, move control surfaces slowly through full travel to determine freedom of movement.

CAUTION: DO NOT OPERATE CONTROLS IF THE BALANCE PANEL SEALS ARE FROZEN. THE BALANCE PANEL SEALS SHOULD BE DEICED BEFORE OPERATING THE CONTROLS. THE BALANCE PANEL SEALS MAY BE DAMAGED IF THE CONTROLS ARE OPERATED WHILE THEY ARE FROZEN.

(d) Position stabilizer (Fig. 202) from 0 to 2 units so that water or fluid will not run into balance panel bays.

(e) Open leading edge devices and check for ice or snow.

(2) Wing and Horizontal Tail Surfaces

(a) Wing and horizontal tail surfaces must be free from ice, snow, and frost.

CAUTION: BE CAREFUL WHEN REMOVING ICE AND SNOW FROM WING AND TAIL SURFACES WHERE VORTEX GENERATORS ARE INSTALLED. FAILURE TO COMPLY COULD RESULT IN DAMAGE.

NOTE: Coatings of frost up to 1/8 inch in thickness on the lower wing surfaces, caused by very cold fuel in the area of the wing tanks between the front and rear spar, is permissible; however, all leading edge devices, control surfaces (including both upper and lower surfaces of the horizontal stabilizer), tab surfaces, upper wing surfaces and balance panel cavities must be free of ice, snow, or frost.

(b) Leading edge surfaces must be free of ice, snow or frost. Check areas between stationary and movable surfaces for ice formation.

(c) Both the right and left sides of the horizontal stabilizer must receive the same deicing/anti-icing treatment.

1) If contamination exists only in a limited area (such as a spoiler panel) and there is no active precipitation, it is permitted to deice only that area, but the same area should also be treated on the other wing.

(3) Fuselage and Vertical Tail Surfaces

(a) Fuselage and vertical tail surfaces, including the left and right sides of the vertical stabilizer, should be free of ice and snow to reduce aerodynamic drag and weight.

CAUTION: BE CAREFUL WHEN REMOVING ICE AND SNOW FROM FUSELAGE WHERE LIGHTS AND ANTENNA ARE LOCATED. FAILURE TO COMPLY MAY RESULT IN DAMAGE TO EQUIPMENT.

NOTE: Thin hoar frost is acceptable on the upper surface of the fuselage provided all vents and ports are clear. Thin hoar frost is a uniform white deposit of fine crystalline texture, which usually occurs on exposed surfaces on a cold and cloudless night. It is thin enough to distinguish surface features underneath, such as paint lines, markings, or lettering.

(b) All snow must be removed from the nose radome area to prevent snow blowing back and obscuring pilots vision on takeoff.

(c) Do not apply hot deicing fluid or hot water directly on pilots windshield or passenger window. Fluid may be allowed to run over windows after application to top of cabin as fluid will be cooled before reaching windows.

(d) If SAE Type II, III, or IV fluids are used, then any traces of deicing/anti-icing fluid on cockpit windows must be removed prior to departure, particular attention being paid to windows fitted with wipers. In addition, any forward area from which fluid may flow back onto windshields during taxi and takeoff must be clean prior to departure.

NOTE: Deicing/anti-icing fluid can be removed by rinsing with approved cleaner and soft cloth or flushing with type I fluid.

(4) Engines and APU

(a) For personnel safety, engines and APU should not be operating during the deicing/anti-icing operations. However, if necessary, deicing/anti-icing may be accomplished with the engines and/or APU operating at idle speed if care is exercised to avoid spraying anti-icing/deicing fluids directly into the engine and/or APU inlet.

WARNING: PERSONS MUST STAY CLEAR OF THE DANGEROUS AREAS IN FRONT OF AND IN BACK OF AN OPERATING ENGINE (CHAPTER 71). INJURY OR DEATH OF PERSONS CAN OCCUR IN THESE AREAS.

WARNING: MAKE SURE THE APU INLET AREA IS CLEAR BEFORE YOU START THE APU. THE APU CAN BE DAMAGED BY ICE OR SNOW THAT HAS COLLECTED IF IT GOES INTO THE INLET. PERSONS MUST ALSO STAY CLEAR OF THE APU EXHAUST AREA (CHAPTER 49) WHEN THE UNIT IS OPERATING. INJURY OR DEATH OF PERSONS CAN OCCUR IN THESE AREAS.

(b) If engines/APU are operating, close cabin air conditioning pack valves and bleed valves to prevent fumes from entering cabin when applying deicing or anti-icing fluid in the area of the engines/APU inlets.

CAUTION: DO NOT START THE ENGINES IN AREAS WHERE THERE ARE PUDDLES OF DEICING OR ANTI-ICING FLUID. MOVE THE AIRPLANE TO A DIFFERENT LOCATION. THE FLUID CAN GO INTO THE ENGINE COMPRESSOR. THESE FLUIDS CAN CAUSE THE COMPRESSOR TO STALL AND THE ENGINE TO SURGE.

(c) Do not spray deicing/anti-icing fluid directly into the engine or APU inlet ducts, exhausts, engine thrust reverser, engine inlet, strut mounted probes or engine bleed air ducts.
(d) Remove ice from APU inlet door vortex generator while APU is not running.

(5) Brakes
(a) Brakes must be cool before applying deicing/anti-icing fluid to the wheel area.
(b) When deicing or anti-icing the airplane, protect the wheels and brakes from fluid contamination with the methods below:
1) Do not direct a spray of deicing or anti-icing fluid at the wheels or brakes.
2) Use suitable covers on the wheels and brakes when operationally feasible.

CAUTION: MAKE SURE DEICING/ANTI-ICING FLUIDS DO NOT GET IN THE STEEL OR CARBON BRAKE HEAT SINKS. CONTAMINATION CAN CAUSE DAMAGE TO CARBON BRAKES AND REDUCE BRAKING PERFORMANCE FOR CARBON AND STEEL BRAKES.

3) Apply the parking brake to reduce incidental contamination of brake friction surfaces when operationally feasible.

NOTE: The brakes do not need to be applied again if the wheels have not rotated since the last brake application.

(c) Manually remove snow or ice accumulation from the wheel, brake, or tire. A hot air blower may be used for this purpose.

(6) Landing Gear and Doors

(a) Landing gear moving parts and position indicating switches may become coated with ice and/or snow which will prevent normal operation. Care must be exercised when applying deicing/anti-icing fluids not to dilute or remove lubricants. Unlubricated parts may seize or fail prematurely if not properly serviced.

(b) Remove ice and snow from landing gear doors (inside and out), door latches, uplock mechanism, uplock hook, downlock mechanism, bungee springs, lock actuators and position indicating switches. Anti-icing fluid can be applied as a protective coating after deicing at operator option.

(c) Check nose gear steering cables for ice accumulation and clear as necessary. Check landing gear alternate extension system control cables and mechanism and gear extension mechanism for ice formation in exposed and unheated areas.

(d) Clear ground landing gear areas of ice and snow in order to minimize the possibility of tires freezing to the ground or of aircraft sliding due to wind or engine operation.

CAUTION: DO NOT ATTEMPT TO MOVE AIRPLANE IF TIRES ARE FROZEN TO GROUND, AND ENSURE WHEELS ROTATE WHEN AIRPLANE IS MOVED.

1) Use warm air and/or deicing fluid to free tires from the ground or to remove frozen deposits.
2) The use of salt is not recommended as it may be deposited on metal parts and result in corrosion.

(7) Wing Fuel Tanks

(a) Frost may form under the wings in the fuel tank areas in temperatures above freezing. This is caused by atmospheric moisture condensing on the cold surfaces where fuel temperatures are below freezing. The frost will generally melt when warmer fuel is added. If the frost persists and is greater than 1/8 inch thick, it must be removed before takeoff.

(b) Clear ice may form on the wing upper surface when the fuel temperature in the tank is below freezing, the ambient temperature is above freezing, and rain or fog is present. Carefully check the wing upper surface to determine if clear ice is present. Use suitable equipment to ensure adequate access to the wing upper surface for this check. In some cases, clear ice can only be detected by touch. Clear ice must be removed and the wing anti-iced, if appropriate, before takeoff.

CAUTION: IF YOU CAN DRAIN FUEL FROM DRAIN VALVE AFTER YOU APPLIED HOT AIR TO THE EXTERIOR FOR 3 TO 5 MINUTES, DO NOT THINK THAT ALL THE ICE IS MELTED. ICE ADJACENT TO THE DRAIN VALVE UNIT CAN MELT AND LET SOME WATER AND FUEL FLOW FROM THE DRAIN, BUT A PIECE OF ICE CAN STAY BEHIND. IF FUEL DOES NOT FLOW FROM THE DRAIN, CONTINUE TO APPLY HOT AIR FOR A SHORT TIME, AND FREQUENTLY DO A CHECK OF FLOW FROM THE DRAIN. CATCH FUEL IN A CONTAINER AND MAKE SURE ALL WATER IS REMOVED.

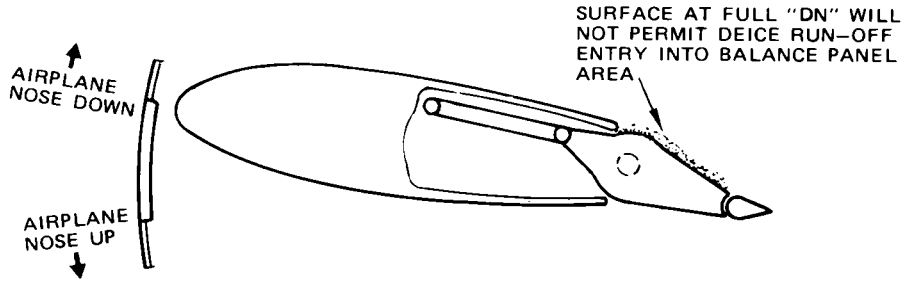
HEAT APPLIED TO THE SUMP DRAIN VALVES FOR OUTBOARD MAIN AND RESERVE TANKS WILL NOT REMOVE ICE WHICH HAS COLLECTED IN THE TANK SUMP OR IN DRAIN LINE BETWEEN TANK SUMP AND VALVE. TO REMOVE THIS ICE, YOU MUST PUT THE AIRPLANE IN A WARM HANGAR FOR SUFFICIENT TIME TO MELT ICE. THEN DRAIN SUMPS UNTIL THE WATER IS REMOVED.

(8) In very cold weather, drain fuel tank sumps prior to refueling to remove water from fuel tanks if the airplane has been idle for more than 45 minutes prior to refueling. Drain fuel tank sumps again after refueling if the airplane has been idle for 2 hours or more after refueling, prior to departure.

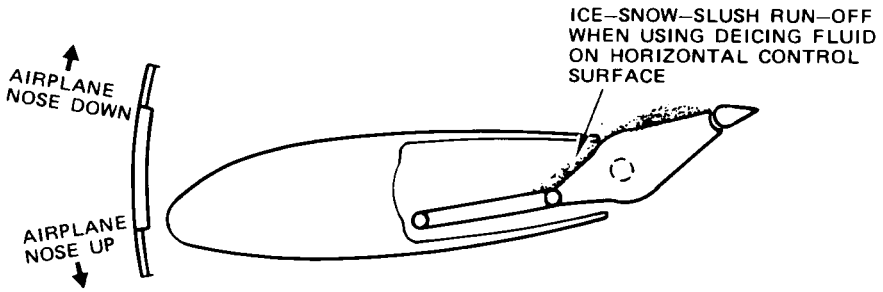
(9) Miscellaneous

(a) Pitot Probe, Static Ports, and Total Air Temperature (TAT) Probes (Fig. 203).

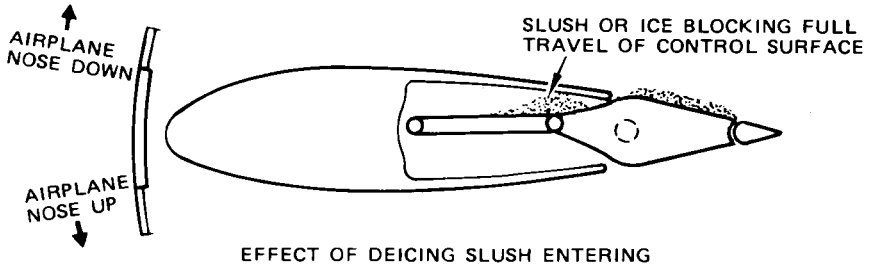
1) Check and remove any ice adhering to the surface within four feet of pitot probe, static port, and TAT probe inlets.
2) Do not spray deicing/anti-icing fluid directly at or into pitot inlets, static ports, or TAT probes.
3) If static openings become clogged with ice, gently apply warm air until the ice melts.



RECOMMENDED POSITION OF HORIZONTAL STABILIZER DURING DEICING OPERATIONS

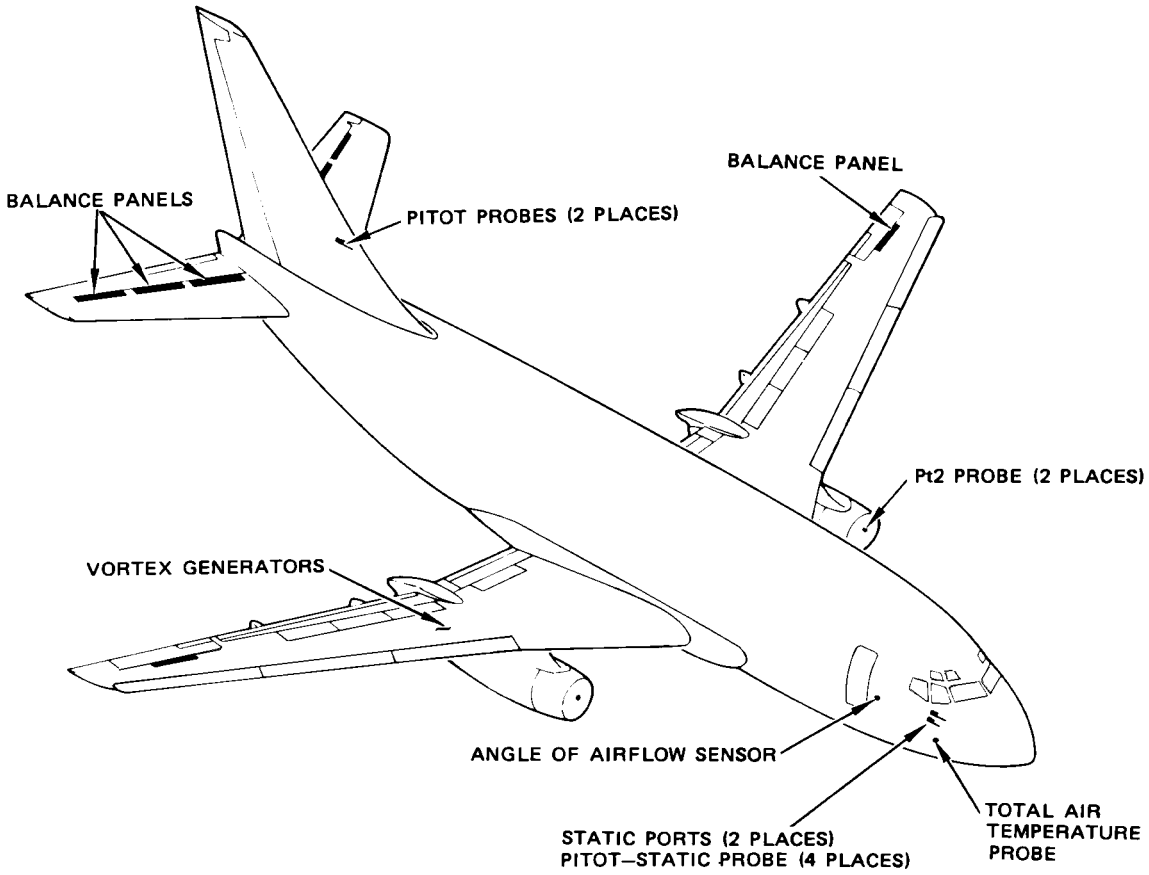


DEICING SLUSH RUN-OFF INTO BALANCE PANEL CAVITY



EFFECT OF DEICING SLUSH ENTERING BALANCE PANEL CAVITY

Horizontal Stabilizer Position
Figure 202



Balance Panel and Probe Location
Figure 203

4) If excessive fluid was applied to fuselage in vicinity of static ports, check the nearest in-line drain to clear water which may have accumulated.

(b) Drains

1) Check that all waste water and condensate drains on the airplane are free of ice or obstructions. Plugging of drains is not necessary during deicing or anti-icing operation; however, fluid spray must not be directed at these drain areas.

(c) Airstairs

1) Retract stairs as soon as possible to prevent excessive ice or snow accumulations. Snow accumulations may be removed by sweeping or brushing. Should ice accumulation occur on the stairs, remove the ice with deicing fluid. Be careful not to spray deicing fluid into door opening.
2) Ice and snow accumulation may prevent extension of the stairs from outside the airplane. Deice the external controls and apply anti-icing fluid.

(d) Angle of Airflow Sensor (Fig. 203).

1) Check that sensors are free of ice and/or snow and sensors move freely. Apply deicing fluid as required.

(e) Windshield Wiper Blades

1) Remove accumulated ice from windshield wiper blades.

4. Hot Water Deicing

A. Hot water at 140-180°F (60-82°C) maximum nozzle temperature can be used effectively to remove ice and snow from airplane surfaces when the ambient temperature is 27°F (-2.8°C) and stable or rising.

B. To prevent water from freezing again, anti-icing fluid should be applied to the surface immediately following hot water deicing.

5. One Step Deicing/Anti-Icing

A. One step deicing/anti-icing, using deicing/anti-icing fluid heated to 140-180°F (60-82°C), is effective for ice and snow removal from airplanes when the temperature is below 28°F (-2.2°C). After the mixture has been used to clear the aircraft surfaces, the residual fluid will provide some anti-ice protection.

B. The application of Type II, III, and IV fluid, especially when used in a one-stepprocess or in the first step of a two-step process, may cause residues to collect in aerodynamically quiet areas, cavities and gaps. The application of hot water or heated Type I fluid in the first step of a two-step process will minimize the formation of residues. Residues may rehydrate and freeze under certain temperature, high humidity and/or rain conditions and may block or impede critical flight control systems. If a Type II, III, or IV fluid is used in a one-step process or in the first step of a two-step process, then an appropriate inspection and cleaning program should be established. Whenever suitable, deice and anti-ice with only Type I.

C. The fluid mixed with the water can be either Type I deicing/anti-icing fluid, Type II, Type III, or Type IV deicing/anti-icing fluid. The holdover time will be longer with the Type II, Type III, and Type IV deicing/anti-icing fluid. In either case, the percentage of fluid in the mixture should be based on airline experience, fluid specifications, or manufacturer's recommendations and weather conditions.

D. If an additional treatment is needed before the next flight, perform a complete deicing/anti-icing. Ensure that any residues from previous treatments are flushed off.

6. Two-Step Deicing/Anti-icing

A. Two-step deicing/anti-icing is normally the preferred method for continuing precipitation conditions. The second step must be performed within 3 minutes at the beginning of the first step and completed area by area if necessary.

B. The application of Type II, III, and IV fluid, especially when used in a one-stepprocess or in the first step of a two-step process, may cause residues to collect in aerodynamically quiet areas, cavities and gaps. The application of hot water or heated Type I fluid in the first step of a two-step process will minimize the formation of residues. Residues may rehydrate and freeze under certain temperature, high humidity and/or rain conditions and may block or impede critical flight control systems. If a Type II, III, or IV fluid is used in a one-step process or in the first step of a two-step process, then an appropriate inspection and cleaning program should be established. Whenever suitable, deice and anti-ice with only Type I.

C. The holdover time realized from anti-icing is dependent on the fluid used and weather conditions. Therefore, frequent inspections must be made to determine when additional applications are needed.

D. Do not apply an additional coating of anti-icing fluid on top of contaminated fluid (fluid that has been absorbing precipitation). If an additional treatment is needed before the next flight, perform a complete deicing/anti-icing. Ensure that any residues from previous treatments are flushed off.

7. Operation Checks

A. Prior to engine start, checks must be made to ensure the systems will function properly.

(1) Operate all control surfaces. An observer on the ground should verify movement to full travel. If there is reason to suspect frozen seals or obstructions (ice, snow) in the balance panel bays, move the control surfaces manually prior to moving with power.

(2) Check pitot probe, engine inlet or strut mounted probe and static port openings for obstructions of ice or snow.
(3) Check landing gear and wheel wells for packed ice or snow.
(4) Check that all inlets are free from ice and snow.
(5) Check that all drains are clear and free from obstructions.
(6) Check engine compressor rotation. Also check the backside of the fan blades for ice.

CAUTION: EXTENSIVE DAMAGE MAY RESULT DURING AN ENGINE START IF FAN (N1) ROTATION IS PREVENTED BY ICE. N1 ROTATION MUST BE CHECKED PRIOR TO ANY ENGINE START WHENEVER WATER MAY HAVE ACCUMULATED IN THE ENGINE AT FREEZING TEMPERATURES. ROTATION OF THE LOW PRESSURE (LP) ROTOR FAN BLADES CAN BE SEEN FROM THE GROUND. IF WIND DOES NOT ROTATE THE FAN, IT MAY BE TURNED BY HAND. IF ROTATION IS TO BE CHECKED BY MOTORING THE ENGINE, FOLLOW THE PROCEDURE FOR MOTORING GIVEN IN CHAPTER 71, MAINTENANCE PRACTICES.

(7) Make sure all of the doors, including the doors to the off-wing escape compartments, are clear of ice.

8. Parking

A. The area in which an airplane is to be parked must be cleared of ice and snow. Chapter 10 provides detailed parking procedures if weather conditions and length of parking duration warrant additional steps.

WARNING: IF SEVERE WINDS ARE EXPECTED, REFER TO CHAPTER 10 - MOORING, FOR STABILIZER POSITIONING.

B. When possible, face the airplane into the prevailing wind. Set the airplane control surfaces so that melting snow and rain will not run into balance bay areas where subsequent freezing can lock the control (Fig. 202).
(1) Position wing flaps to full up.
(2) Position stabilizer to 0 to 2 units of trim.

C. Install all plugs and covers, where available, for intake or exhaust ducts and various appendages such as pitot tubes. Covers can be prevented from freezing to airplane by a light brush application of anti-icing fluid to the airplane surface before installing the cover.

CAUTION: EXAMINE ENGINE INTAKE AREAS IMMEDIATELY AFTER SHUTDOWN FOR PRESENCE OF ICE FORMATION WHICH SHOULD BE REMOVED WHILE ENGINE IS COOLING AND BEFORE ENGINE PROTECTIVE PLUGS AND COVERS ARE INSTALLED. IF PLUGS ARE INSTALLED BEFORE THE ENGINE HAS COOLED, RESIDUAL HEAT WITHIN THE ENGINE WILL MELT THE ICE TO WATER WHICH RUNS TO THE BOTTOM OF THE FAN SECTION. THIS REFREEZES AS THE ENGINE COOLS AND LOCKS THE FAN LOWER BLADE TIPS IN ICE.

9. Engine Operation

A. Detailed operation of the engines in cold weather conditions is given in Chapter 71 of the Maintenance Manual.

B. Chunks of ice and/or snow entering the engine inlet may damage internal engine parts. Remove all ice or snow from engine inlet ducts prior to starting engines.

C. Engine icing conditions may be anticipated when visible moisture such as clouds, fog, rain, snow, sleet, or ice crystals are present during ground operations with static air temperature below 50°F. The engine/nacelle thermal anti-icing system should be used when these conditions exist.

D. Check that no ignitable accumulation of fluids exists around exhaust areas prior to starting engines.

10. Fuel Icing

A. Percentage of water in aviation fuels depends largely on fuel storage and handling conditions. Fuels exposed to dampness or ordinary atmospheric conditions contain a larger percentage of water than those kept in tightly sealed containers. This water content, under high humidity and fluctuating temperature conditions, may be several gallons in every thousand gallons of fuel. As temperatures are reduced, solubility of water in fuel is also reduced resulting in water separating from fuel. This water will collect at the lowest point in the tank and freeze if temperature is low enough. If water has collected and frozen in sumps (indicated by a lack of flow from drain valves), heat (explosion proof hot air) should be applied to underside of wing in area of tank sumps until fuel drained is free of water.

CAUTION: IF YOU CAN DRAIN FUEL FROM DRAIN VALVE AFTER YOU APPLIED HOT AIR TO THE EXTERIOR FOR 3 TO 5 MINUTES, DO NOT THINK THAT ALL THE ICE IS MELTED. ICE ADJACENT TO THE DRAIN VALVE UNIT CAN MELT AND LET SOME WATER AND FUEL FLOW FROM THE DRAIN. BUT A PIECE OF ICE CAN STAY BEHIND. IF FUEL DOES NOT FLOW FROM THE DRAIN, CONTINUE TO APPLY HOT AIR FOR A SHORT TIME, AND FREQUENTLY DO A CHECK OF FLOW FROM THE DRAIN. CATCH FUEL IN A CONTAINER AND MAKE SURE ALL WATER IS REMOVED.

HEAT APPLIED TO THE SUMP DRAIN VALVES FOR OUTBOARD MAIN AND RESERVE TANKS WILL NOT REMOVE ICE WHICH HAS COLLECTED IN THE TANK SUMP OR IN DRAIN LINE BETWEEN TANK SUMP AND VALVE. TO REMOVE THIS ICE, YOU MUST PUT THE AIRPLANE IN A WARM HANGAR FOR SUFFICIENT TIME TO MELT ICE. THEN DRAIN SUMPS UNTIL THE WATER IS REMOVED.

B. In very cold weather, drain fuel tank sumps prior to refueling to remove water from fuel tanks if the airplane has been idle for more than 45 minutes prior to refueling. Drain fuel tank sumps again after refueling if the airplane has been idle for 2 hours or more after refueling, prior to departure.

11. Toilets and Potable Water

A. In an operating airplane, there is sufficient heat present to prevent water from freezing. When the airplane is shutdown and left in an unheated area, additional servicing will be required as follows if the cabin temperature is expected to fall below the freezing point.

(1) Potable Water

(a) The potable water system must be drained of all water (Ref Chapter 38, Passenger Water Systems - Servicing).

(2) Toilets

(a) Antifreeze fluids may be added to the toilet flushing water to prevent freezing. Care must be exercised in the selection of materials used. Foaming may occur as a reaction between the antifreeze and the flushing deodorizer detergent. Antifoam agents may also deteriorate in the presence of the deodorizing detergent and allow foaming to occur. Check fluid manufacturers' recommendations for compatibility.

(b) The toilet flushing system may be completely drained to prevent freezing (Ref Chapter 12, Waste Water System - Servicing).