

GVII™-G500™

AIRCRAFT MAINTENANCE MANUAL

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Gulfstream™
A GENERAL DYNAMICS COMPANY

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12-13-01 Defueling Procedure - Defuel

General

Record the hardware type, quantity and location during removal. Attach a removal tag to the component and keep the hardware for installation, unless told to discard. The installation hardware must be the equivalent of Gulfstream Engineering approved hardware. Refer to the appropriate Illustrated Parts Catalog figure for details. Use Gulfstream Engineering approved procedures to install the hardware. Refer to the Wiring Diagram Manual for procedures to address any wiring discrepancies..

Support Equipment

Nomenclature	Part Number	Quantity
200 - 1000 inch-pounds, 3/8 inch drive, torque wrench	GSE5100722 or equivalent	1
Circuit breaker safety clips	GSE2400984 or equivalent	As necessary
Drain hoses	Standard	As necessary
Ground refueling carrier	Standard	1

Material Required

Nomenclature	Part Number	Quantity
Form-A-Funnel	18714 (NOTE: The Form-A-Funnel flexible draining tool is available from New Pig Corporation, Tipton, PA.) or equivalent	As necessary
Rubber gloves, chemical resistant	Standard	As necessary

Reference Materials

[Tip-back Protection - Handling Procedure, 07-20-02](#)
[Safe Ground Maintenance - General Maintenance, 20-00-00](#)
[Open / Close Checks - Visual Examination, 20-00-02](#)
[Electrical Power Application - General Maintenance, 20-20-01](#)
[SSPC - General Maintenance, 20-20-02](#)
[APU Fuel System - Bleed, 28-00-03](#)
[Aft WTBF Panels - Removal / Installation, 53-93-01](#)

Preliminary Requirements

Do [Safe Ground Maintenance - General Maintenance, 20-00-00](#).

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Safety Conditions

WARNING

MAKE SURE THAT THERE IS SUFFICIENT FIRE EQUIPMENT AVAILABLE TO EXTINGUISH A FIRE. USE A FIRE EXTINGUISHER FOR SMALL FIRES THAT ARE NO THREAT TO SAFETY. FOR LARGE FIRES, START AN EVACUATE / EMERGENCY RESPONSE AND IMMEDIATELY CALL THE CORRECT AGENCIES.

SOME OF THE NECESSARY MATERIALS HAVE SAFETY, HEALTH AND ENVIRONMENTAL REQUIREMENTS. READ THE MATERIAL SAFETY DATA SHEETS FOR ALL MATERIALS. THE USER HAS THE RESPONSIBILITY FOR PROTECTION FROM INJURY AND EXPOSURE TO MATERIALS. THE USER HAS THE RESPONSIBILITY FOR COMPLIANCE WITH NATIONAL, FEDERAL, STATE AND LOCAL REQUIREMENTS FOR THE MATERIALS THAT ARE SPECIFIED.

JET FUEL IS POISONOUS AND FLAMMABLE. WEAR THE CORRECT PROTECTIVE EQUIPMENT, INCLUDING RUBBER GLOVES, WHILE YOU MOVE FUEL CONTAINERS OR IF YOU ARE IN AN AREA WHERE FUEL CAN GET IN YOUR EYES OR ON YOUR SKIN. KEEP FUEL CONTAINERS CLOSED AND MAKE SURE THAT THE FUEL AREA HAS GOOD AIRFLOW. DO NOT BREATHE THE FUEL FUMES. IF FUEL TOUCHES YOUR SKIN, CLEAN THE AREAS IMMEDIATELY. REMOVE AND CLEAN CONTAMINATION FROM YOUR CLOTHES.

KEEP SPARKS, FLAME AND HEAT AT A DISTANCE. MAKE SURE THAT THERE ARE NO OPEN FLAMES AND SPARKS IN LESS THAN 50 FT. OF DEFUEL OPERATION. DO NOT SMOKE DURING A DEFUEL OPERATION.

DO NOT OPERATE THE RADAR WHILE THE AIRCRAFT IS DEFUELED OR IN LESS THAN 300 FEET (91.44 METERS) OF OTHER REFUEL / DEFUEL OPERATIONS.

DO NOT OPERATE THE AIRCRAFT ENGINES WHILE THE AIRCRAFT IS DEFUELED.

BEFORE THE AIRCRAFT IS DEFUELED, MAKE SURE THAT THERE IS A GROUND FROM THE AIRCRAFT TO THE FUEL SOURCE.

THE USE OF BOOST PUMPS TO DEFUEL OR BALANCE FUEL IS ONLY PERMITTED UNTIL 5000 LBS REMAINS IN EACH WING. BELOW 5000 POUNDS, THE INTERTANK VALVE MUST BE USED TO BALANCE FUEL.

CAUTION

THE DEFUEL MUST BE DONE WITH THE WINGS LEVEL Laterally and NOSE IN THE NORMAL GROUND ATTITUDE. IF THE DEFUEL IS DONE WITH ONE WING LOWER THAN THE OTHER, IT CAN RESULT IN TRAPPED FUEL IN THE WINGS.

BEFORE THE AIRCRAFT IS DEFUELED, MAKE SURE THAT THERE IS A GROUND FROM THE AIRCRAFT TO THE FUEL SOURCE.

MAKE SURE THAT THE VISIBLE PASSAGES OF THE LOWER WING OVERBOARD VENTS ARE NOT BLOCKED BEFORE THE AIRCRAFT IS REFUELED / DEFUELED OR DAMAGE TO THE AIRCRAFT CAN OCCUR.

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NOTE

For information on the operation of the SSPCs, refer to [SSPC - General Maintenance, 20-20-02](#).

Procedure

WARNING

IN SOME AIRCRAFT WEIGHT CONFIGURATIONS, MAKE SURE TO ATTACH THE NOSE GEAR COUNTERWEIGHTS OR THE AIRCRAFT MAY TIP BACK. THIS CAN RESULT IN AIRCRAFT DAMAGE OR INJURY TO PERSONNEL.

- 1 If it is necessary, do [Tip-back Protection - Handling Procedure, 07-20-02](#).

WARNING

MAKE SURE THAT ALL LANDING GEAR AND LANDING GEAR DOOR SAFETY DEVICES ARE INSTALLED BEFORE WORK IS DONE IN A WHEEL WELL OR IT CAN RESULT IN SERIOUS INJURY OR DEATH.

- 2 In the right main wheel well, make sure that the intertank shut-off valve is in the closed (CL) position. See Figure 1. Intertank Shut-off Valve.

NOTE

Aircraft power is not necessary to defuel the aircraft by suction through the pressure fueling / defueling adapter. If aircraft power is available, typical fuel quantity and fault indications are available.

Aircraft power is necessary to do a pump assisted defuel through the manual defuel valve, located in the WTBF.

- 3 Open the Ground Service Control Panel (GSCP) access door as follows (see Figure 2. Ground Service Control Panel):
164AR-1
- 4 Bond the fuel carrier bond wire to the aircraft ground receptacle on the GSCP. See Figure 2. Ground Service Control Panel and Figure 3. Satisfactory / Not Satisfactory Bonding Procedures.
- 5 If power is available, do a test of the fuel indicator panel as follows (see Figure 2. Ground Service Control Panel):
 - 5.1 Make sure that the PANEL POWER switch on the GSCP is in the OFF position (red switch guard closed).
 - 5.2 Press and hold the GND SVS BUS SW switch for a minimum of 3 seconds but not more than 5 seconds, then release it.

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NOTE

The GND SVS BUS SW switch is installed below the GSCP.

- 5.3 Make sure that the light in the GND SVC BUS SW switch comes on.
- 5.4 Wait for the fuel quantity signal conditioner to power up, approximately 30 seconds.

NOTE

If the GSCP PANEL POWER switch is on before the fuel quantity signal conditioner is powered up, a display error will occur. The correct number values will not be shown in the LEFT / RIGHT – QTY and PRESELECT TOTAL QTY display windows.

- 5.5 Lift the red switch guard on the GSCP and select the GSCP PANEL POWER switch to the ON position.
- 5.6 On the GSCP, make sure that number values are shown in the LEFT / RIGHT – QTY and PRESELECT TOTAL QTY display windows.
- 5.7 Select and hold the HIGH LEVEL TEST / DISPLAY BIT DATA switch to the HIGH LEVEL TEST position. Make sure that the results are as follows:
- The amber HIGH LEVEL WARN lights come on
 - Fuel system fault messages are not shown on the GSCP display

NOTE

The HIGH LEVEL TEST / DISPLAY BIT DATA toggle switch is spring-loaded to the center position. The switch must be manually held in the HIGH LEVEL TEST or DISPLAY BIT DATA position for necessary results.

- 5.8 Release the HIGH LEVEL TEST / DISPLAY BIT DATA switch from the HIGH LEVEL TEST position. Make sure that the results are as follows:
- The amber HIGH LEVEL WARN lights go off
 - Fuel system fault messages are not shown on the GSCP display
- 5.9 Select and hold the HIGH LEVEL TEST / DISPLAY BIT DATA switch to the DISPLAY BIT DATA position and make sure that:
- The PRESELECT TOTAL QTY displays NO FAULT
- 5.10 Release the HIGH LEVEL TEST / DISPLAY BIT DATA switch from the DISPLAY BIT DATA position. Make sure that the results are as follows:
- The PRESELECT TOTAL QTY shows the correct PRESELECT TOTAL QTY
 - Fuel system fault messages are not shown on the GSCP display
- 6 The defueling procedures are provided as follows:

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- Step 7 - Suction Defuel Through The Pressure Fueling / Defueling Adapter
- Step 8 - Pump Assisted Defuel Through The Defuel Valve Located in WTBF
- Step 9 - Draining Fuel From The Manual Water / Fuel Drain Valves

7 Suction Defuel Through The Pressure Fueling / Defueling Adapter

- 7.1 Open the single point refuel door as follows (see Figure 4. Right Wing Lower Surface Access Doors and Panels):

621RB

CAUTION

BEFORE THE AIRCRAFT IS DEFUELED, MAKE SURE THAT THERE IS A GROUND FROM THE AIRCRAFT TO THE FUEL SOURCE.

NOTE

Monitor the fuel quantity indicator to prevent a fuel unbalance condition more than 1000 pounds (454 kg).

When the wing tanks have been fully drained for an extended time, it can be necessary to bleed the APU fuel system before an APU start. Refer to [APU Fuel System - Bleed, 28-00-03](#).

- 7.2 Make sure that the bond wire is connected from the fuel carrier to the aircraft ground receptacle on the GSCP. See Figure 2. Ground Service Control Panel and Figure 3. Satisfactory / Not Satisfactory Bonding Procedures.
- 7.3 Remove the cap from the pressure fuel / defuel adapter. See Figure 5. Single Point Fuel / Defuel Adapter.
- 7.4 Connect the single point fuel nozzle to the pressure fuel / defuel adapter.
- 7.5 Open the single point fuel nozzle to defuel the aircraft.

WARNING

THE USE OF BOOST PUMPS TO BALANCE FUEL IS ONLY PERMITTED WHEN FUEL LEVELS ARE ABOVE 5000 LBS PER WING. BELOW 5000 POUNDS, THE INTERTANK VALVE MUST BE OPENED TO ALLOW FUEL TO BALANCE.

FUEL PUMPS MUST BE SUBMERGED IN FUEL. NEVER OPERATE DRY. THIS CAN RESULT IN AIRCRAFT DAMAGE OR INJURY TO PERSONNEL.

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CAUTION

FUEL IMBALANCE IS NOT TO BE MORE THAN 1000 POUNDS (454 KG).

- 7.6 Start defueling at a fuel flow rate not more than 50 gpm.

NOTE

If the rate of flow is more than 50 gpm, there will be no suction and defueling will stop.

Monitor the fuel quantity indicator to prevent a fuel unbalance condition more than 1000 pounds (454 kg).

If power is available, the fuel quantity can be monitored at the GSCP to prevent an unbalanced fuel condition.

- 7.7 When the fuel flow stops, close the single point fuel nozzle.
- 7.8 Disconnect the single point fuel nozzle from the pressure fuel / defuel adapter.
- 7.9 Install the cap on the pressure fuel / defuel adapter and make sure that the cap is locked.
- 7.10 If power is available, select the GSCP PANEL POWER switch to the OFF position and close the red switch guard on the GSCP.
- 7.11 Press and release the GND SVC BUS SW switch. See Figure 2. Ground Service Control Panel.

NOTE

The GND SVS BUS SW switch is below the GSCP.

- 7.12 Make sure that the light in the GND SVC BUS SW switch goes off.
- 7.13 Do [Open / Close Checks - Visual Examination, 20-00-02](#).
- 7.14 Close the single point refuel door as follows (see Figure 4. Right Wing Lower Surface Access Doors and Panels):
- 621RB
- 7.15 If additional fuel removal from the wings is necessary, go to Step 9.
- 7.16 If defuel is complete, go to Step 10.
- 8 Pump Assisted Defuel Through The Manual Defuel Valve Located in WTBF**

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WARNING

PUMP ASSISTED DEFUELING IS ONLY PERMITTED ABOVE 5000 POUNDS PER WING. BELOW 5000 POUNDS, DEFUELING MUST BE ACCOMPLISHED THROUGH OTHER METHODS SUCH AS SUCTION DEFUELING OR DRAINING.

- 8.1 Remove the WTBF panel as follows (refer to [Aft WTBF Panels - Removal / Installation, 53-93-01](#)):
193AL

NOTE

Use the numbers in parentheses () in connection with Figure 6. Manual Defuel Valve.

- 8.2 Remove the defuel drain valve end cap (2) from the defuel drain valve (1).

CAUTION

BEFORE THE AIRCRAFT IS DEFUELED, MAKE SURE THAT THERE IS A GROUND FROM THE AIRCRAFT TO THE FUEL SOURCE.

NOTE

Monitor the fuel quantity indicator to prevent a fuel unbalance condition more than 1000 pounds (454 kg).

When the wing tanks have been fully drained for an extended time, it can be necessary to bleed the APU fuel system before an APU start. Refer to [APU Fuel System - Bleed, 28-00-03](#).

- 8.3 Make sure that the bond wire is connected from the ground refueling carrier to the aircraft ground receptacle on the GSCP. See Figure 2. Ground Service Control Panel and Figure 3. Satisfactory / Not Satisfactory Bonding Procedures.
- 8.4 Attach the hose to the defuel drain valve (1) and connect the hose to the fuel carrier.

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WARNING

MAKE SURE THAT ALL PERSONNEL AND EQUIPMENT ARE CLEAR OF THE FLIGHT CONTROL SURFACES BEFORE ELECTRICAL POWER IS APPLIED OR IT CAN RESULT IN SERIOUS INJURY / DEATH TO PERSONNEL OR DAMAGE TO THE AIRCRAFT. WHEN ELECTRICAL POWER IS APPLIED TO THE AIRCRAFT, IT CAN CAUSE THE FLIGHT CONTROL SURFACES TO MOVE.

8.5 Apply electrical power to the aircraft. Refer to [Electrical Power Application - General Maintenance, 20-20-01](#).

8.6 Remove the tags, safety clips and close the circuit breakers:

NOMENCLATURE	PANEL	LOCATION
L MAIN FUEL PUMP	Left PDB	LEFT ESS DC
R MAIN FUEL PUMP	Right PDB	RIGHT ESS DC

8.7 Remove the collars and close the SSPCs:

For information on the operation of the SSPCs, refer to [SSPC - General Maintenance, 20-20-02](#).

NOMENCLATURE	PANEL	LOCATION
ALT FUEL PUMP L	TSC	2808
ALT FUEL PUMP R	TSC	2809
FUEL XFLO VLV CLS	TSC	2813
FUEL XFLO VLV OPN	TSC	2814

8.8 On the OHPTS Fuel page, make sure that the following switches are in the OFF position:

- L MAIN PUMP and R MAIN PUMP
- L ALT PUMP and R ALT PUMP

CAUTION

THE DEFUEL MUST BE DONE WITH THE WINGS LEVEL Laterally and NOSE in the normal ground attitude. Defuel with one wing lower than the other can result in trapped fuel in the wings.

8.9 Open the defuel drain valve (1).

8.10 On the OHPTS Fuel page, make the selections as follows:

8.10.1 Select the L Main Pump and R Main Pump switches to on.

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NOTE

The L Main Pump and R Main Pump switches will change from white to green.

The L Main Pump and R Main Pump switches may turn to amber if back pressure in the defuel line is not sufficient. This is satisfactory.

- 8.10.2 Select L Alt Pump and R Alt Pump switches to on.

NOTE

The L Alt Pump and R Alt Pump switches will change from white to green.

The L Alt Pump and R Alt Pump switches may turn amber if back pressure in the defuel line is not sufficient. This is satisfactory.

- 8.10.3 Select Crossflow to Open.

- 8.10.4 Select Accept.

NOTE

Switch will change to green.

WARNING

FUEL PUMPS MUST BE SUBMERGED IN FUEL. NEVER OPERATE DRY. THIS CAN RESULT IN AIRCRAFT DAMAGE OR INJURY TO PERSONNEL.

PUMP ASSISTED DEFUELING IS ONLY PERMITTED ABOVE 5000 POUNDS PER WING. BELOW 5000 POUNDS, DEFUELING MUST BE ACCOMPLISHED THROUGH OTHER METHODS SUCH AS SUCTION DEFUELING OR DRAINING.

CAUTION

FUEL IMBALANCE IS NOT TO BE MORE THAN 1000 POUNDS (453.6 KG).

- 8.11 Monitor the fuel quantities during the defuel.
- 8.11.1 Ensure fuel level does not fall below 5000 pounds per wing.
- 8.12 When the aircraft defuel is complete, on the OHPTS Fuel page, make the selections as follows:

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- 8.12.1 Select the L Main Pump and R Main Pump switches to off.

NOTE

Switch will change from amber to white.

- 8.12.2 Select L Alt Pump and R Alt Pump switches to off.

NOTE

Switch will change from amber to white.

- 8.12.3 Select Crossflow to Closed.

- 8.12.4 Select Accept.

NOTE

Switch will change to white.

- 8.13 Close the defuel drain valve (1).

- 8.14 Select the GSCP PANEL POWER switch to the OFF and close the red switch guard on the GSCP.

- 8.15 Press and release the GND SVC BUS SW switch. See Figure 2. Ground Service Control Panel.

NOTE

The GND SVS BUS SW switch is below the GSCP.

- 8.15.1 Make sure that the light in the GND SVC BUS SW switch goes off.

- 8.16 Pull and install the collars on the SSPCs:

For information on the operation of the SSPCs, refer to [SSPC - General Maintenance, 20-20-02](#).

NOMENCLATURE	PANEL	LOCATION
ALT FUEL PUMP L	TSC	2808
ALT FUEL PUMP R	TSC	2809
FUEL XFLO VLV CLS	TSC	2813
FUEL XFLO VLV OPN	TSC	2814

- 8.17 Pull, tag and install the safety clips on the circuit breakers:

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NOMENCLATURE	PANEL	LOCATION
L MAIN FUEL PUMP	Left PDB	LEFT ESS DC
R MAIN FUEL PUMP	Right PDB	RIGHT ESS DC

- 8.18 Remove electrical power from the aircraft. Refer to [Electrical Power Application - General Maintenance, 20-20-01](#).
- 8.19 Disconnect the hose from the defuel drain valve (1) and the fuel carrier.
- 8.20 Install the defuel drain valve end cap (2).
- 8.21 Torque the defuel drain valve end cap (2) to 695 - 775 inch-pounds (78.5 - 87.5 Nm).
____ TECH ____ INSP ____
- 8.22 Inspect the work area for foreign objects and damage.
- 8.23 Install the WTBF panel as follows (refer to [Aft WTBF Panels - Removal / Installation, 53-93-01](#)):
193AL
- 8.24 If additional fuel removal from the wings is necessary, go to Step 9.
- 8.25 If defuel is complete, go to Step 10.
- 9 Draining Fuel From The Manual Water / Fuel Drain Valves**
If necessary, drain the remaining fuel from the wings as follows:
- 9.1 Open the necessary access doors as follows (see Figure 7. WTBFs, Access Doors and Panels):
191AL-1 191AL-2 191AR-1 191AR-2
- 9.2 If necessary, position the Form-A-Funnel flexible draining tool below the water / fuel drain valves.

NOTE

The Form-A-Funnel flexible drain tool is used to stop the wind from splashing the fuel as it drains. It is also used to prevent fuel from draining into the WTBF.

There are six (three per wing) water / fuel drain valves on the underside of each wing. See Figure 8. Water / Fuel Drain Valves.

CAUTION

MAKE SURE THAT THE STEM OF THE VALVE IS FULLY PUSHED UP BEFORE IT IS TURNED. IF IT IS NOT FULLY UP, IT CAN CAUSE DAMAGE TO THE INTERNAL PINS THAT LOCK THE VALVE.

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NOTE

Use a correct fuel container to catch the fuel from the manual water / fuel valves.

- 9.3 Open the necessary manual water / fuel drain valves as follows (see Figure 8. Water / Fuel Drain Valves):
 - 9.3.1 To open the valve, use a cross-slot (Phillips type) screwdriver, positioned in the center of the valve and push the valve up.
 - 9.3.2 To keep the valve in the open position, with the valve pushed in the up position, turn the stem of the valve approximately 90° (1/4 turn) counterclockwise.
- 9.4 When the necessary fuel draining is complete, close the necessary manual water / fuel drain valves as follows (see Figure 8. Water / Fuel Drain Valves):
 - 9.4.1 Use a cross-slot (Phillips type) screwdriver positioned in the center of the stem of the valve and turn it approximately 90° (1/4 turn) clockwise.
 - 9.4.2 The valve stem should return to the down position.
 - 9.4.3 Make sure that the valve is closed (down) and is flush with the wing surface.
- 9.5 If necessary, remove the Form-A-Funnel flexible draining tool from below the water / fuel drain valves.
- 9.6 Inspect the work area for foreign objects and damage.
- 9.7 Do [Open / Close Checks - Visual Examination, 20-00-02](#).
- 9.8 Close the necessary access doors as follows (see Figure 7. WTBFs, Access Doors and Panels):

191AL-1	191AL-2	191AR-1	191AR-2
---------	---------	---------	---------
- 10 Remove the bond wire from the receptacle in the GSCP. See Figure 2. Ground Service Control Panel.
- 11 Inspect the work area for foreign objects and damage.
- 12 Do [Open / Close Checks - Visual Examination, 20-00-02](#).
- 13 Close the GSCP access door as follows (see Figure 2. Ground Service Control Panel):

164AR-1

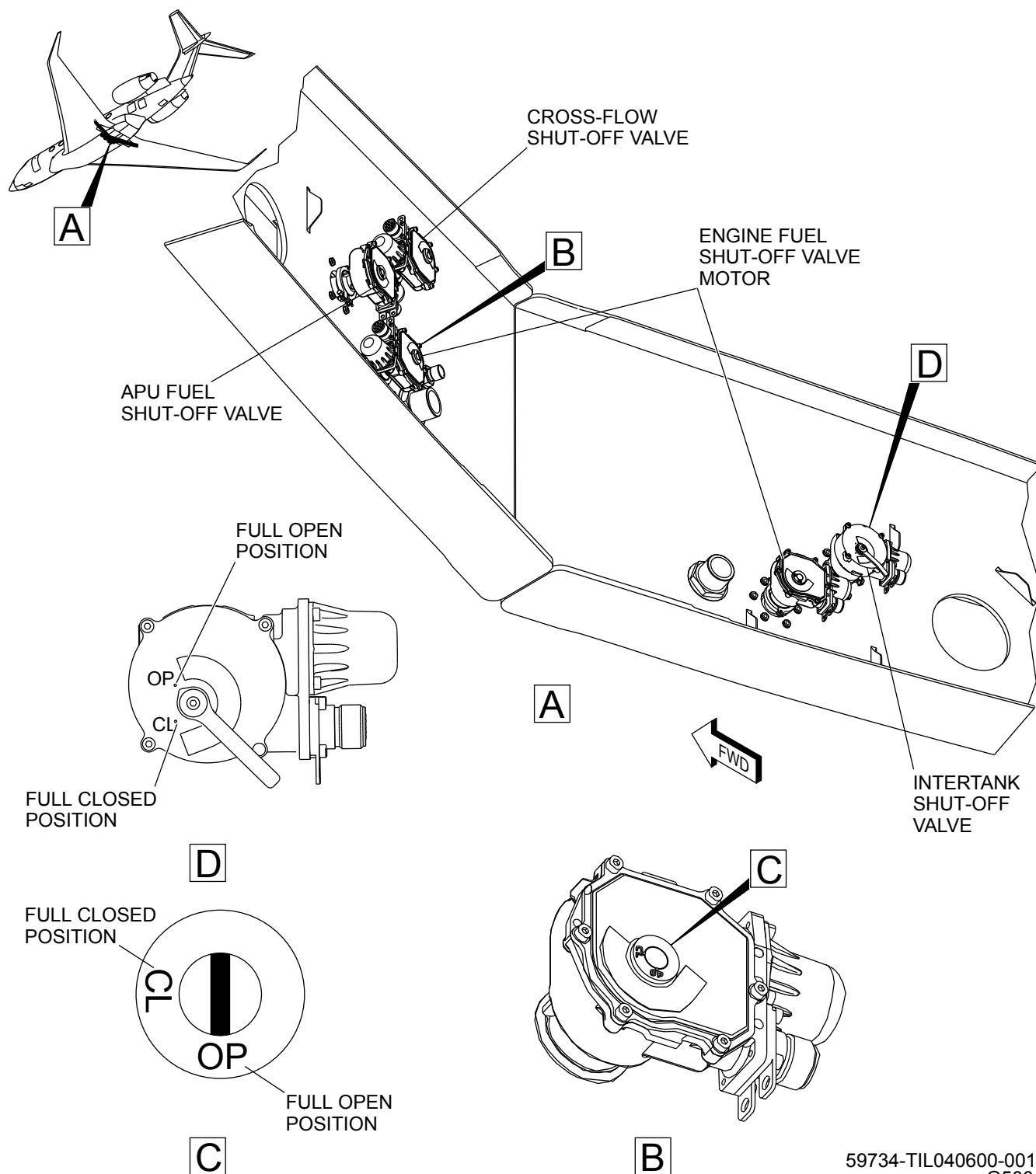
Requirements After Job Completion

Inspect the work area for foreign objects and damage.

Record all maintenance in compliance with the National Aviation Authority Regulations.

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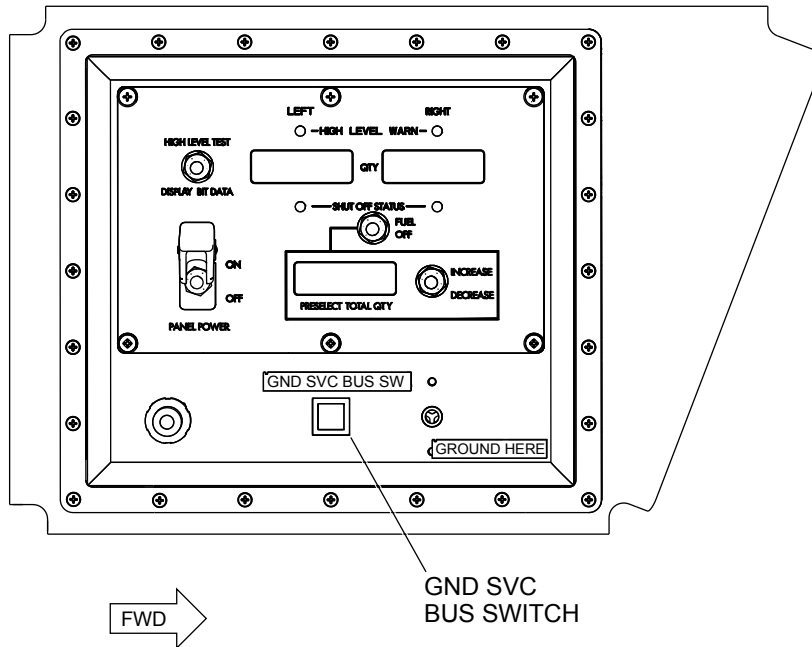
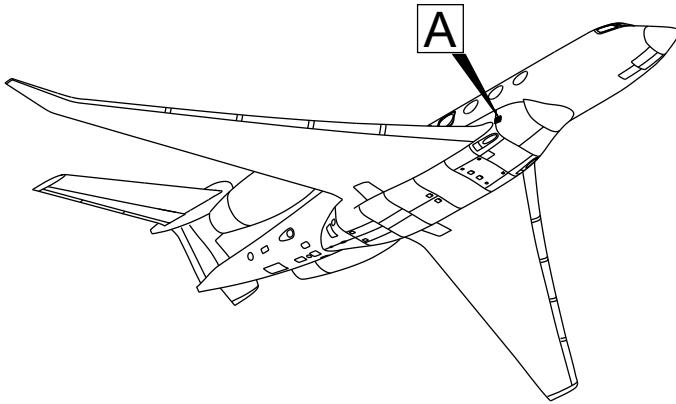


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G500

Intertank Shut-off Valve
Figure 1

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MAINTENANCE MANUAL



A

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G500

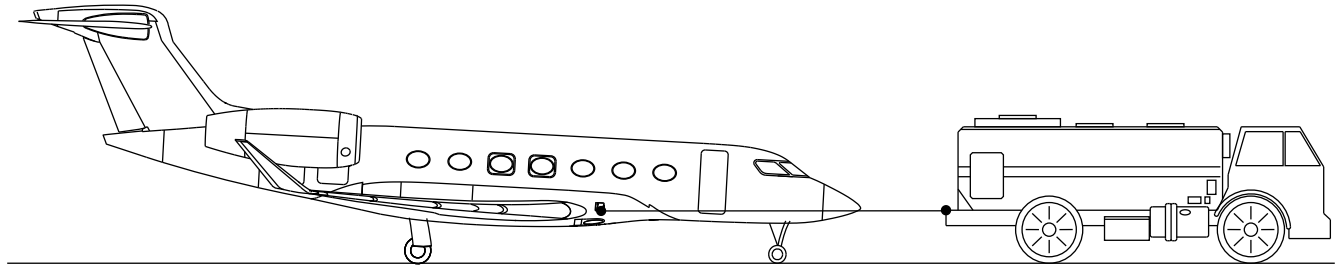
Ground Service Control Panel
Figure 2

12-13-01 Defueling Procedure - Defuel

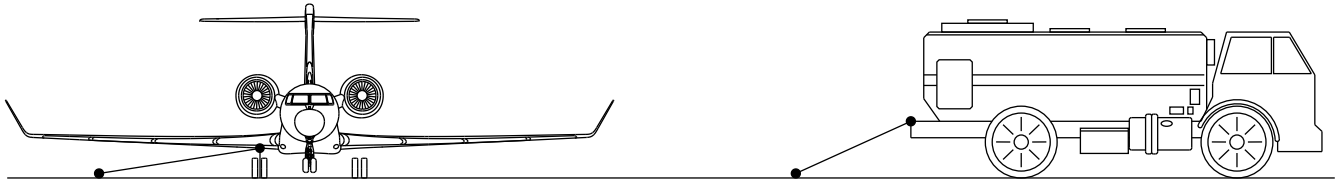
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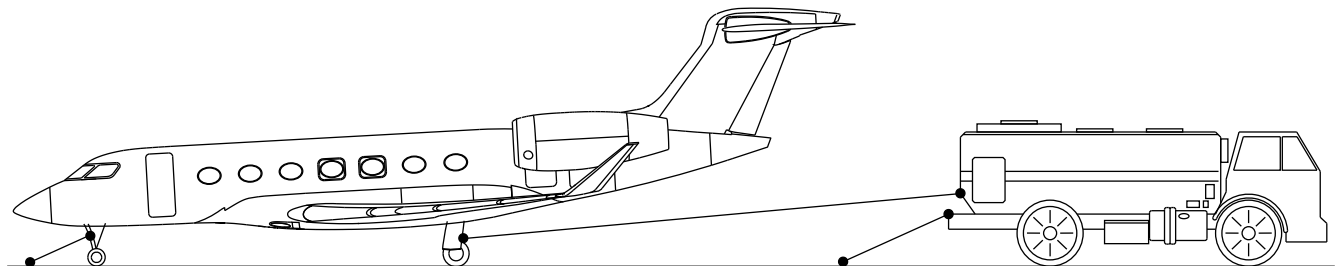
MAINTENANCE MANUAL



BONDING (SATISFACTORY)



GROUNDING (NOT SATISFACTORY)



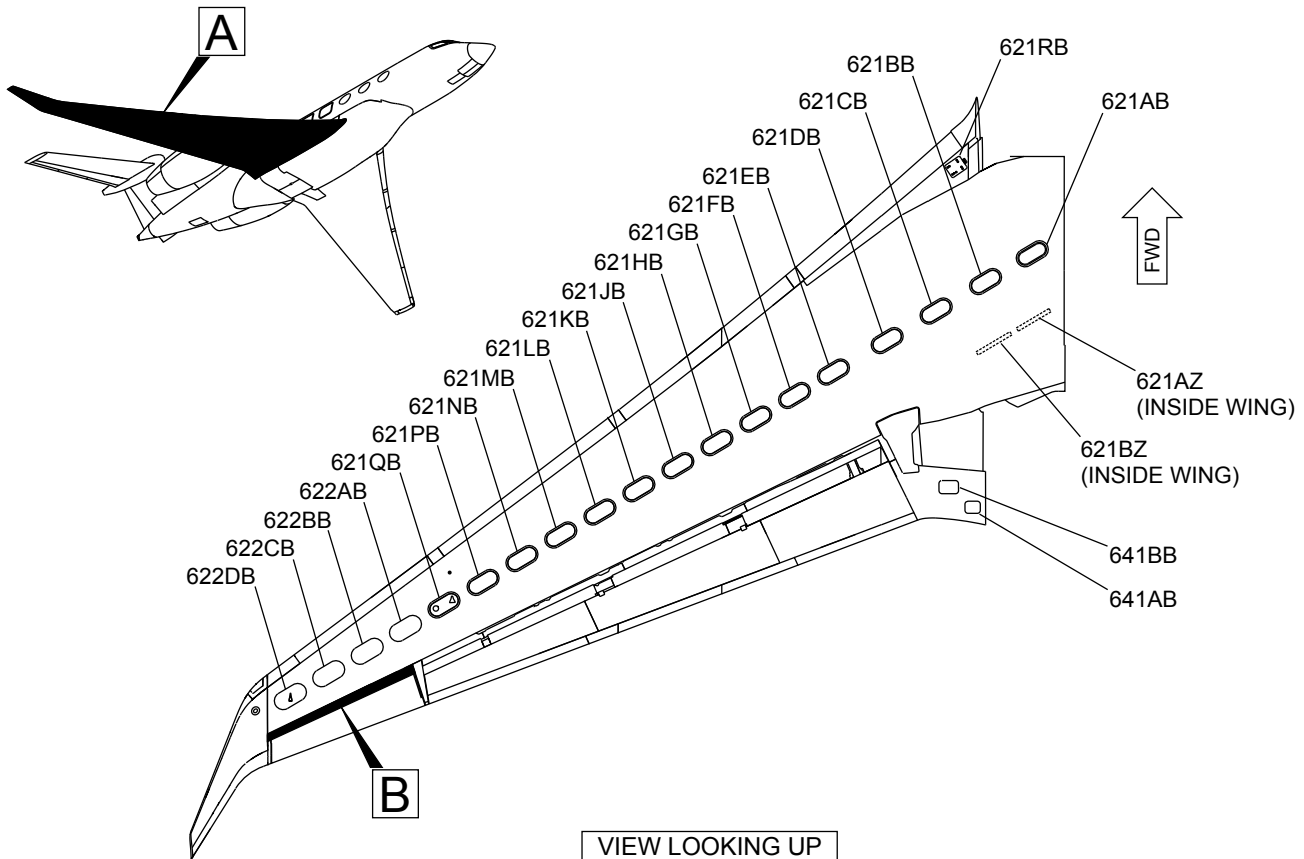
BONDING AND GROUNDING (NOT SATISFACTORY)

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Satisfactory / Not Satisfactory Bonding Procedures
Figure 3

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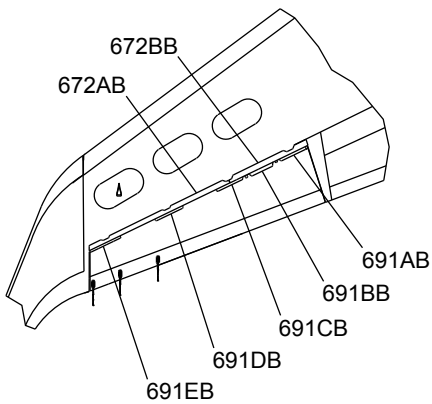
MAINTENANCE MANUAL



VIEW LOOKING UP

A

RIGHT WING



VIEW LOOKING UP

B

RIGHT WING

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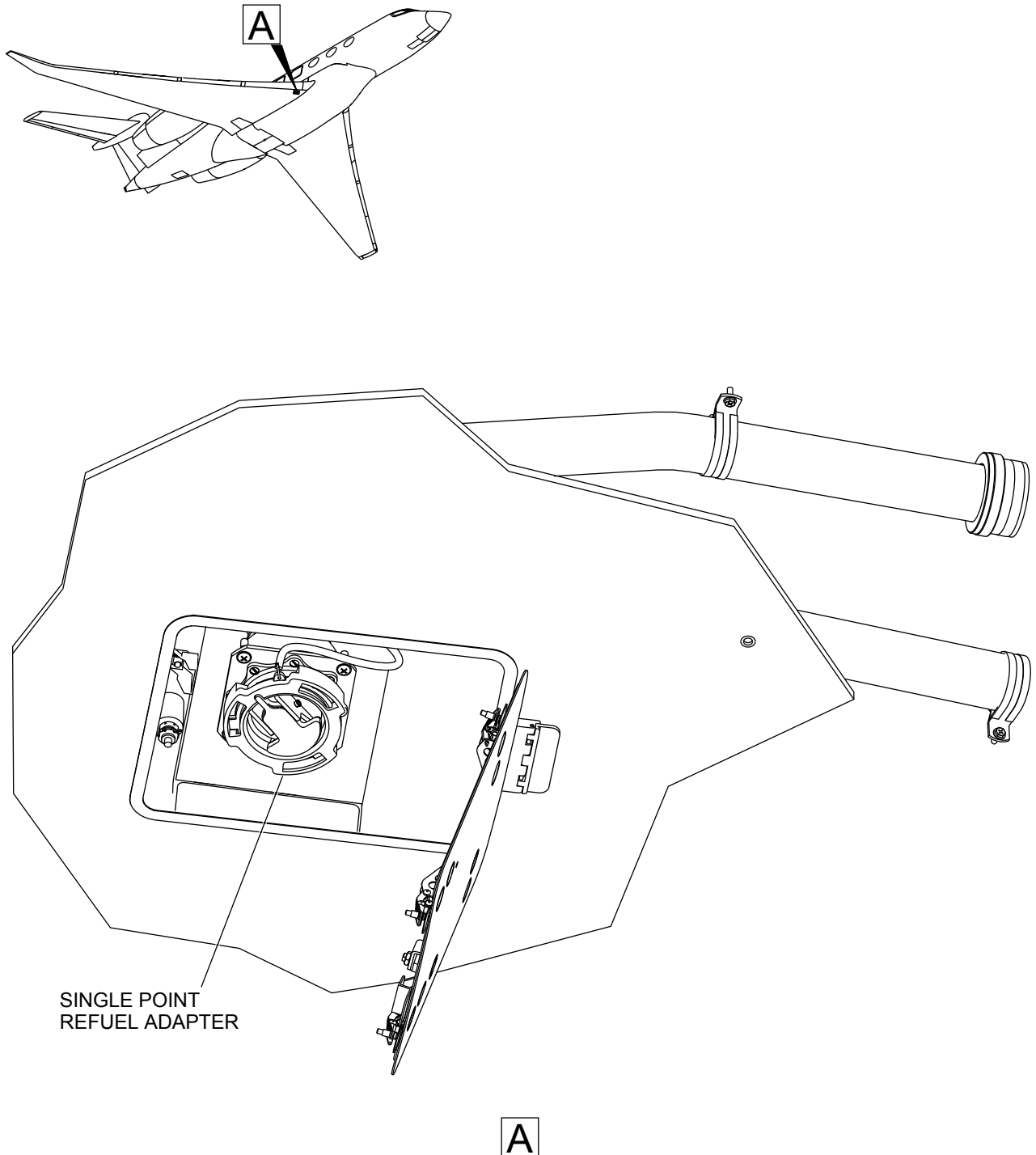
Right Wing Lower Surface Access Doors and Panels
Figure 4

12-13-01 Defueling Procedure - Defuel

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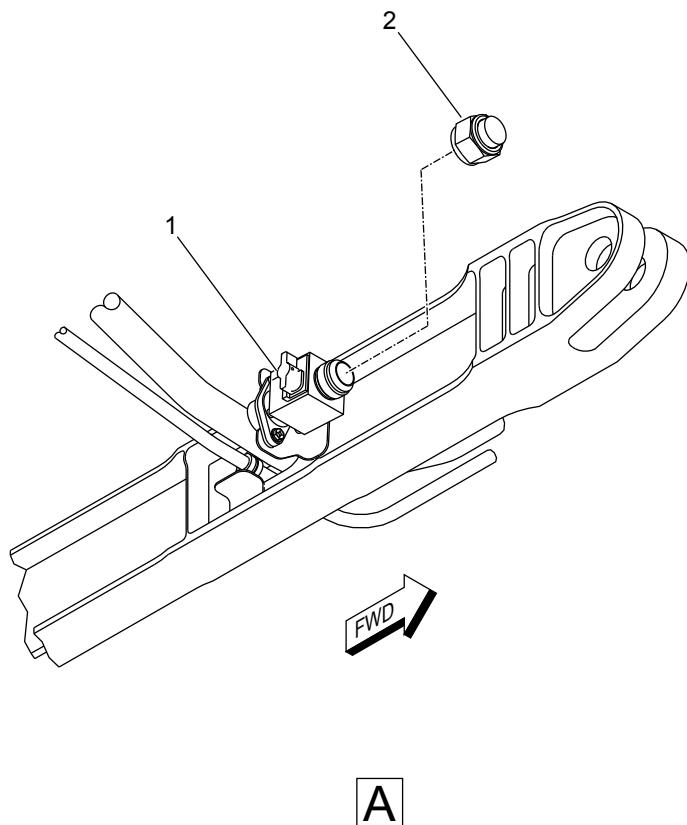
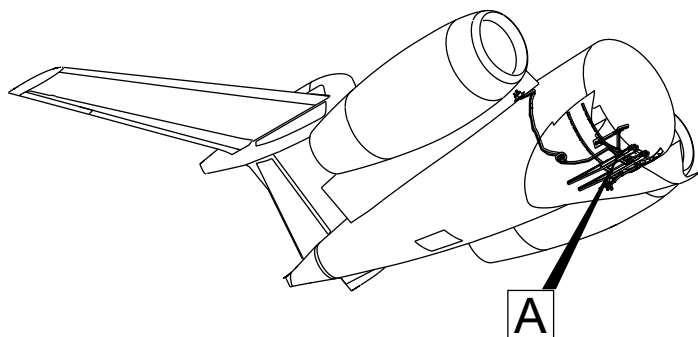


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Single Point Fuel / Defuel Adapter
Figure 5

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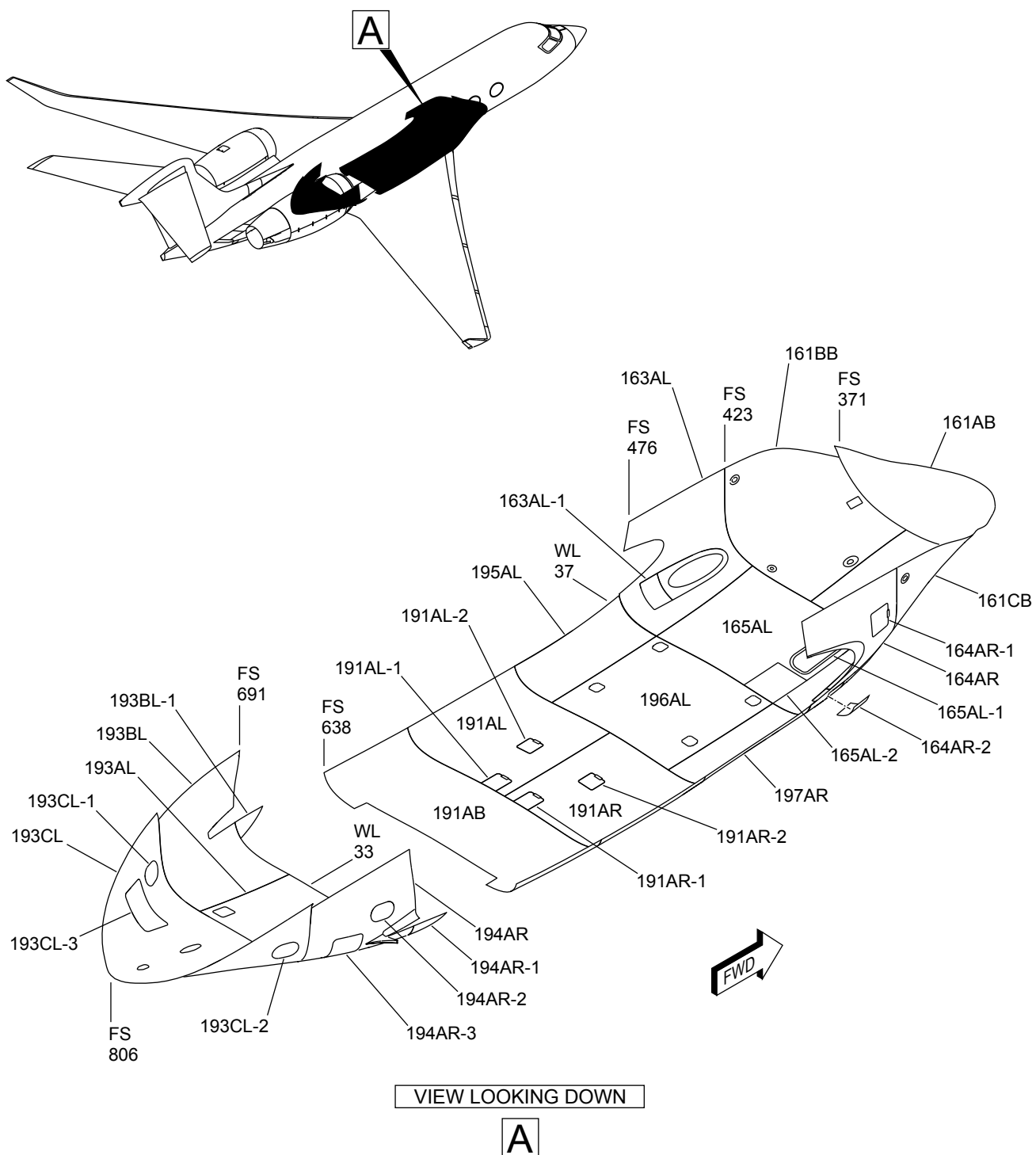
Manual Defuel Valve
Figure 6

12-13-01 Defueling Procedure - Defuel

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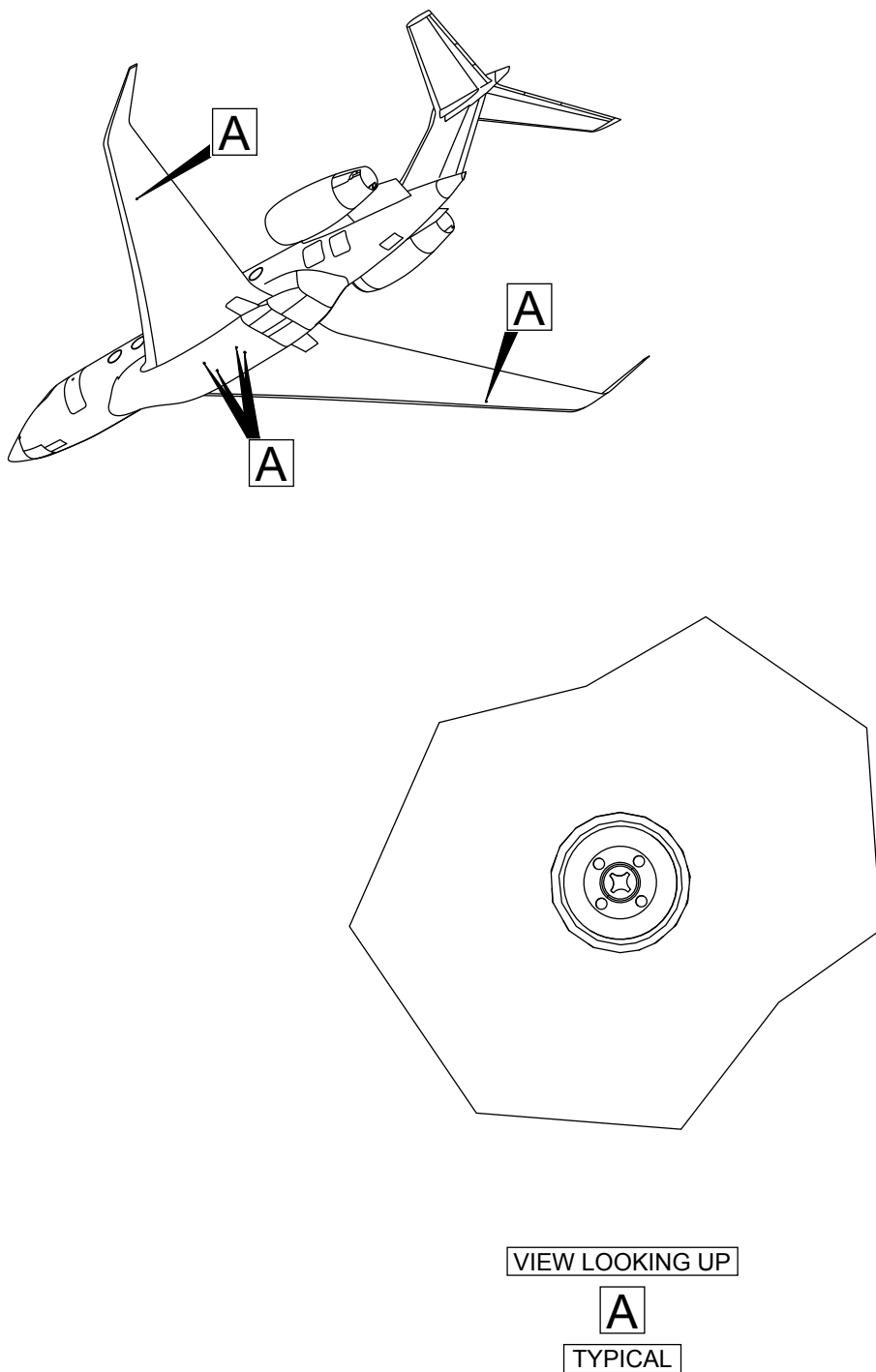


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WTBFs, Access Doors and Panels
Figure 7

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Water / Fuel Drain Valves
Figure 8

12-13-01 Defueling Procedure - Defuel

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