

CHAPTER

38

Water and Waste

**CHAPTER 38
WATER AND WASTE**

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WATER/WASTE - INTRODUCTION

Purpose

The water and waste system supplies potable water to the lavatories and galleys and removes sink and toilet waste. The water and waste system also removes rain water from the door sill areas.

General Description

The water and waste system has these subsystems:

- Potable water
- Air supply
- Waste disposal.

The potable water system supplies water to the lavatories and galleys.

The air supply system pressurizes the water tank.

The waste disposal system removes waste from the lavatories, galleys, and door sill drains.

Abbreviations and Acronyms

- ac - alternating current
- C - celsius
- CLS - continuous level sensor
- cont - control
- dc - direct current
- E - empty
- F - fahrenheit
- F - filter
- F - full
- fwd - forward
- H - heater
- ind - indication
- lav - lavatory
- LCM - logic control module

- LED - light emitting diode
- PLS - point level sensor
- psig - pounds per square inch, gauge
- qty - quantity
- ref - reference
- S - switch
- T - transmitter
- TYP - typical

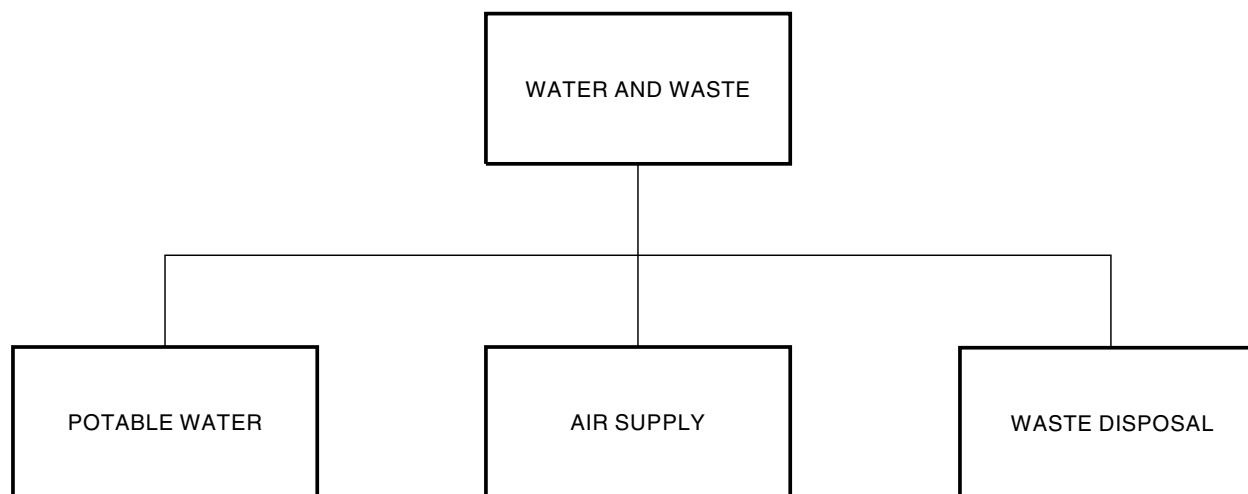
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WATER/WASTE - INTRODUCTION



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WATER/WASTE - INTRODUCTION

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WATER/WASTE - POTABLE WATER - INTRODUCTION

Purpose

The potable water system supplies water to the lavatories and galleys.

- S - switch
- T - transmitter
- TYP - typical

General Description

The potable water system has these subsystems:

- Passenger water
- Water heating
- Water quantity indication.

The passenger water system supplies water to the lavatories and galleys.

The water heating system heats the water supplied to the lavatory hot water faucets.

The water quantity indication system measures and displays the quantity of water in the potable water system.

Abbreviations and Acronyms

- ac - alternating current
- C - celsius
- dc - direct current
- E - empty
- F - Fahrenheit
- F - full
- fwd - forward
- H - heater
- ind - indication
- lav - lavatory
- LED - light emitting diode
- psig - pounds per square inch, gauge
- QTY - quantity
- REF - reference

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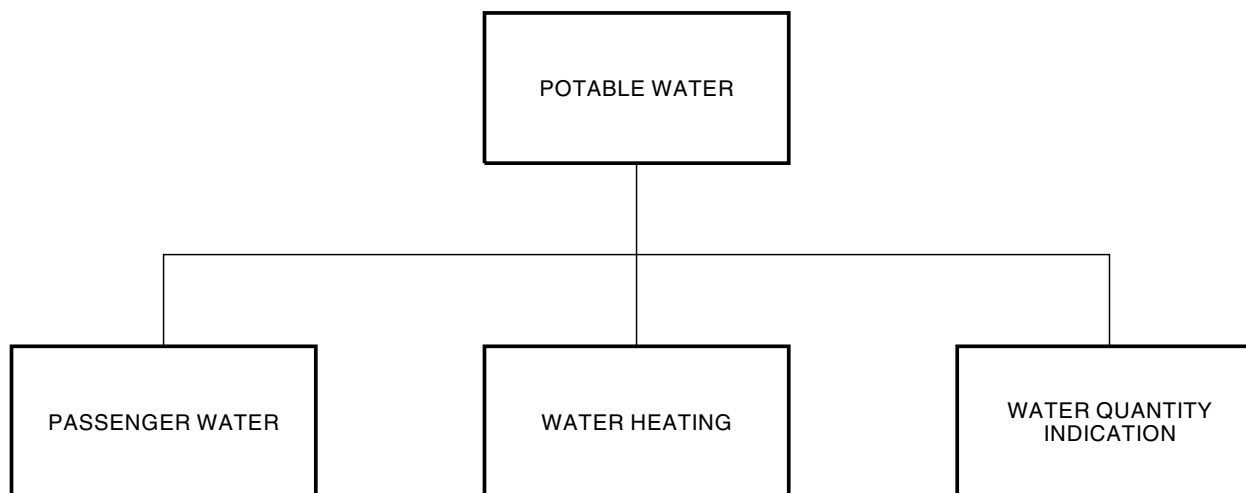
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WATER/WASTE - POTABLE WATER - INTRODUCTION



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WATER/WASTE - POTABLE WATER - INTRODUCTION

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WATER/WASTE - POTABLE WATER - FUNCTIONAL DESCRIPTION

Functional Description

The potable water system has one tank that holds potable water.

You fill and drain the water tank at the water service panel.

To fill the water tank, open the fill/overflow valve and add water through the potable water fill fitting until the water flows from the potable water drain port.

The water tank supplies water to these locations:

- Galley faucets
- Lavatory faucets
- Lavatory toilets.

Each lavatory has a water supply shutoff valve. The water supply shutoff valve lets you isolate the water supply to the sink or to the toilet. The water supply shutoff valve also lets you isolate the sink and the toilet at the same time.

The forward lavatory has a drain valve. The forward lavatory drain valve drains water from the forward water supply lines.

A water heater in each lavatory increases the temperature of the water supplied to the hot water faucet.

The water tank level sensor sends the water quantity data to a water quantity transmitter. The water quantity transmitter sends the data to a water quantity indicator at the attendant panel. The water quantity indicator shows the level of water in the tank.

To drain the potable water system, you open these valves:

- Water tank drain valve
- Forward lavatory drain valve (forward lavatory only)
- Lavatory water supply shutoff valves (one in each lavatory).

When you drain the potable water system, the water drains overboard through the forward and aft potable water drain ports.

Training Information Point

When you drain the potable water system, you must drain water from these two areas:

- Water service panel
- Forward lavatory.

The water service panel lets you drain the water tank and aft supply lines. The forward lavatory has a drain valve that lets you drain the forward water supply lines.

When you drain the potable water system, you must turn the water supply shutoff valves in each lavatory to the SUPPLY ON position. If you do not turn the water supply shutoff valve to the SUPPLY ON position, water will not drain from the toilet or lavatory faucets.



IF THE POTABLE WATER SYSTEM IS NOT DRAINED A MINIMUM OF ONE (1) TIME EACH THREE (3) DAYS, THE GROWTH OF BACTERIA CAN OCCUR. IF BACTERIA GROWTH CONTINUES, AND YOU DRINK THE WATER, ILLNESS CAN OCCUR.



DRAIN THE WATER SYSTEM. IF THE WATERLINES HAVE WATER IN THEM, THEY CAN FREEZE IN COLD WEATHER. THIS CAN CAUSE DAMAGE TO THE WATERLINES.

You must fully drain the potable water system before you add a disinfectant or when you park the airplane in cold weather.

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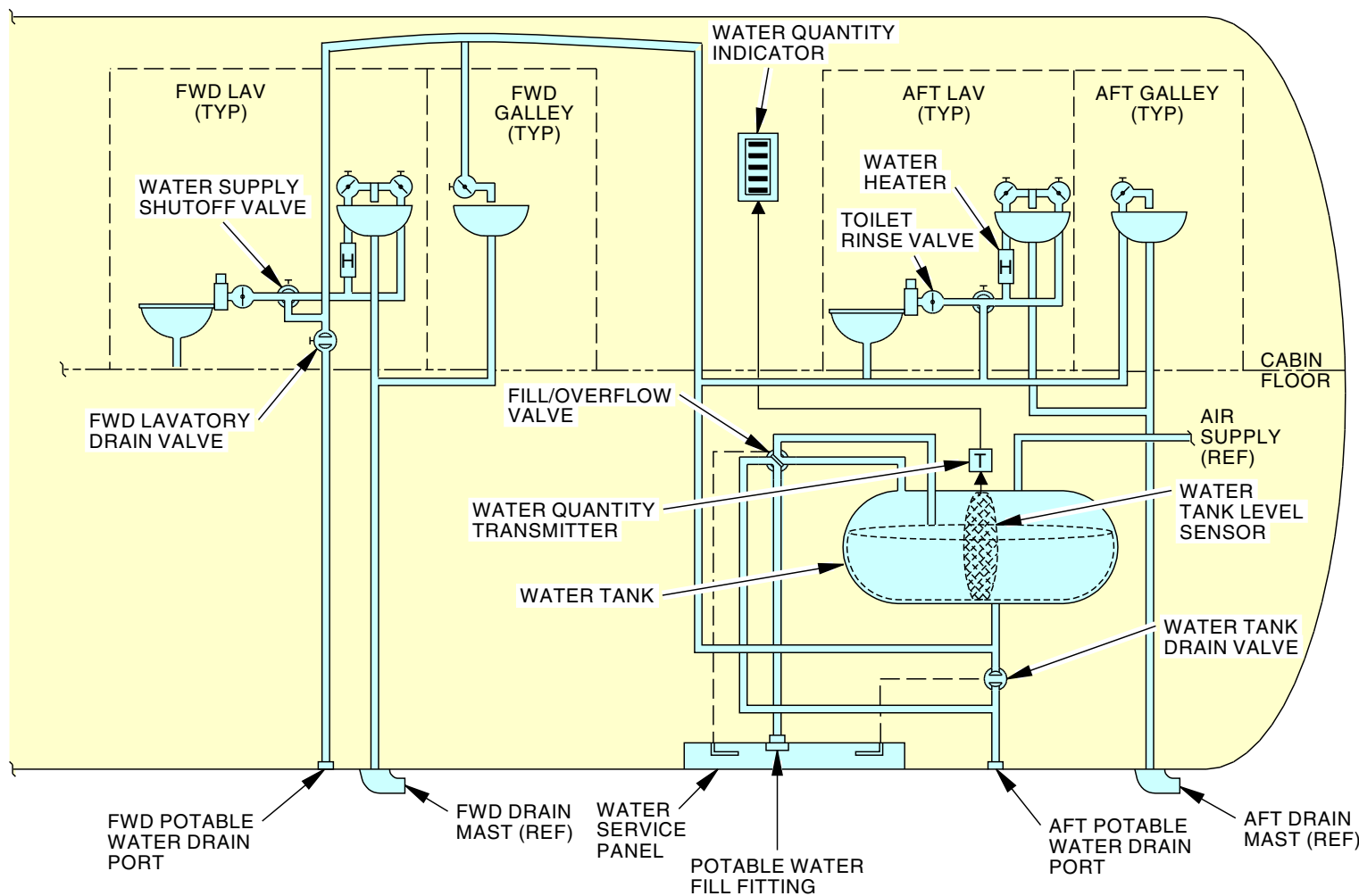
WATER/WASTE - POTABLE WATER - FUNCTIONAL DESCRIPTION

**WARNING**

SEAL THE CARGO COMPARTMENT WITH THE LINING. OBEY THE INSTRUCTIONS IN THE SPECIFIED PROCEDURE WHEN YOU INSTALL THE LINING. IF YOU INSTALL THE LINING INCORRECTLY, THE SMOKE CAN GET INTO THE PASSENGER COMPARTMENT DURING A FIRE.

You must remove the cargo compartment lining to get access to some of the potable water system components. Make sure you correctly replace the lining when you are done.

WATER/WASTE - POTABLE WATER - FUNCTIONAL DESCRIPTION



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WATER/WASTE - POTABLE WATER - FUNCTIONAL DESCRIPTION

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**WATER/WASTE - PASSENGER WATER SYSTEM - WATER SERVICE PANEL****Purpose**

The water service panel lets you fill the potable water system. The water service panel also lets you drain the water tank and part of the potable water system.

Location

The water service panel is at the aft section of the fuselage, bottom right side. There are two snap-latches to open the water service panel door.

Access to the inside of the water service panel is from the aft cargo compartment. The water service panel is under the floor on the aft right side of the cargo compartment.

Physical Description

The water service panel has these components:

- Fill/overflow valve handle
- Water tank drain valve handle
- Potable water fill fitting.

Functional Description

The water service hose connects to the potable water fill fitting. The fill/overflow valve handle lets you open the fill/overflow valve. The fill/overflow valve lets water fill the water tank. The fill/overflow valve also lets air flow overboard from the tank during the fill process. When the tank is at its maximum capacity, water flows overboard through the overflow drain line and potable water drain port.

To drain the tank, open the water tank drain valve. The open water tank drain valve lets water flow out of the water tank and the aft distribution lines.

Interference brackets on the water service panel door prevent the door from closing if a valve handle is in the wrong position for flight.

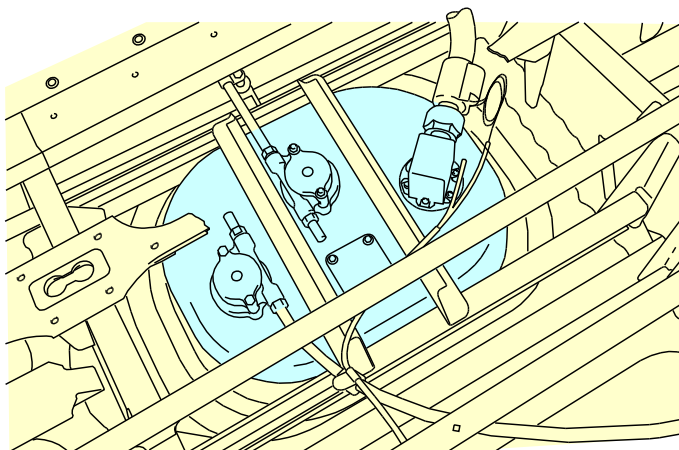
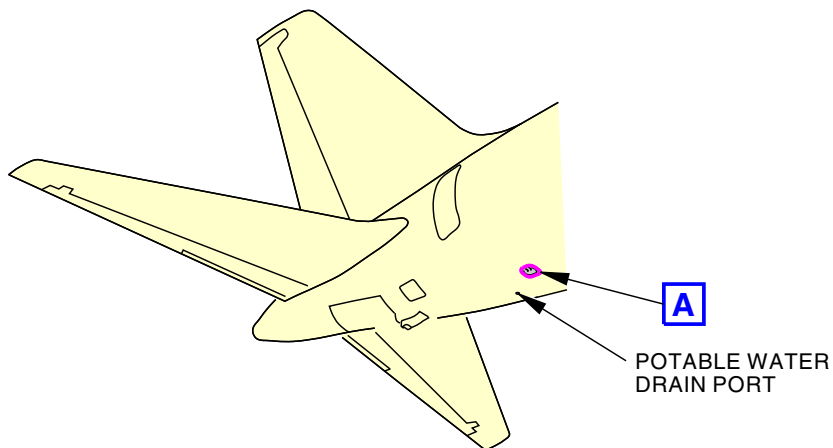
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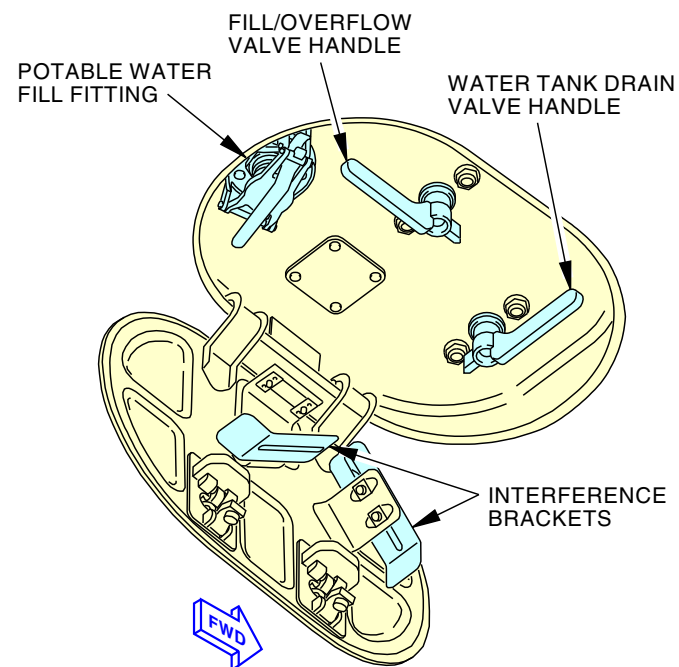
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WATER/WASTE - PASSENGER WATER SYSTEM - WATER SERVICE PANEL



**WATER SERVICE PANEL
(INTERNAL)**

A



**WATER SERVICE PANEL
(EXTERNAL)**

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WATER/WASTE - PASSENGER WATER SYSTEM - WATER SERVICE PANEL



WATER/WASTE - PASSENGER WATER SYSTEM - FILL/OVERFLOW VALVE AND CONTROL CABLE

Purpose

The fill/overflow valve lets you fill the water tank. The control cable lets you open and close the fill/overflow valve from the service panel.

When you put the fill/overflow valve in the closed position, the potable water fill line connects to the potable water drain line and the water tank fill line connects to the water tank overflow line.

Location

The fill/overflow valve is on the right side of the aft cargo compartment. The valve is on the ceiling on the right side of the water tank, aft of the aft cargo compartment bulkhead liner.

The control cable is on the right side of the aft cargo compartment between the water service panel and the fill/overflow valve.

Physical Description

The fill/overflow valve is a four-port rotary valve. The valve operates by manual input and has open and closed positions. The control cable is a rotary-in rotary-out cable.

The control cable attaches the fill/overflow valve handle on the water service panel to the fill/overflow valve.

Functional Description

The fill/overflow valve has these functions:

- Lets water flow into the water tank from the potable water fill fitting
- Lets air out of the water tank to vent overboard as the tank fills with water
- Lets water flow overboard when water volume reaches the standpipe
- Depressurizes the water tank for system service or maintenance.

The control cable has a rotary actuator input at the water service panel. The control cable transmits movement to the fill/overflow valve at a rotary actuator on the valve.

When you put the fill/overflow valve in the open position, the potable water fill line connects to the water tank fill line and the water tank overflow line connects to the potable water drain line.

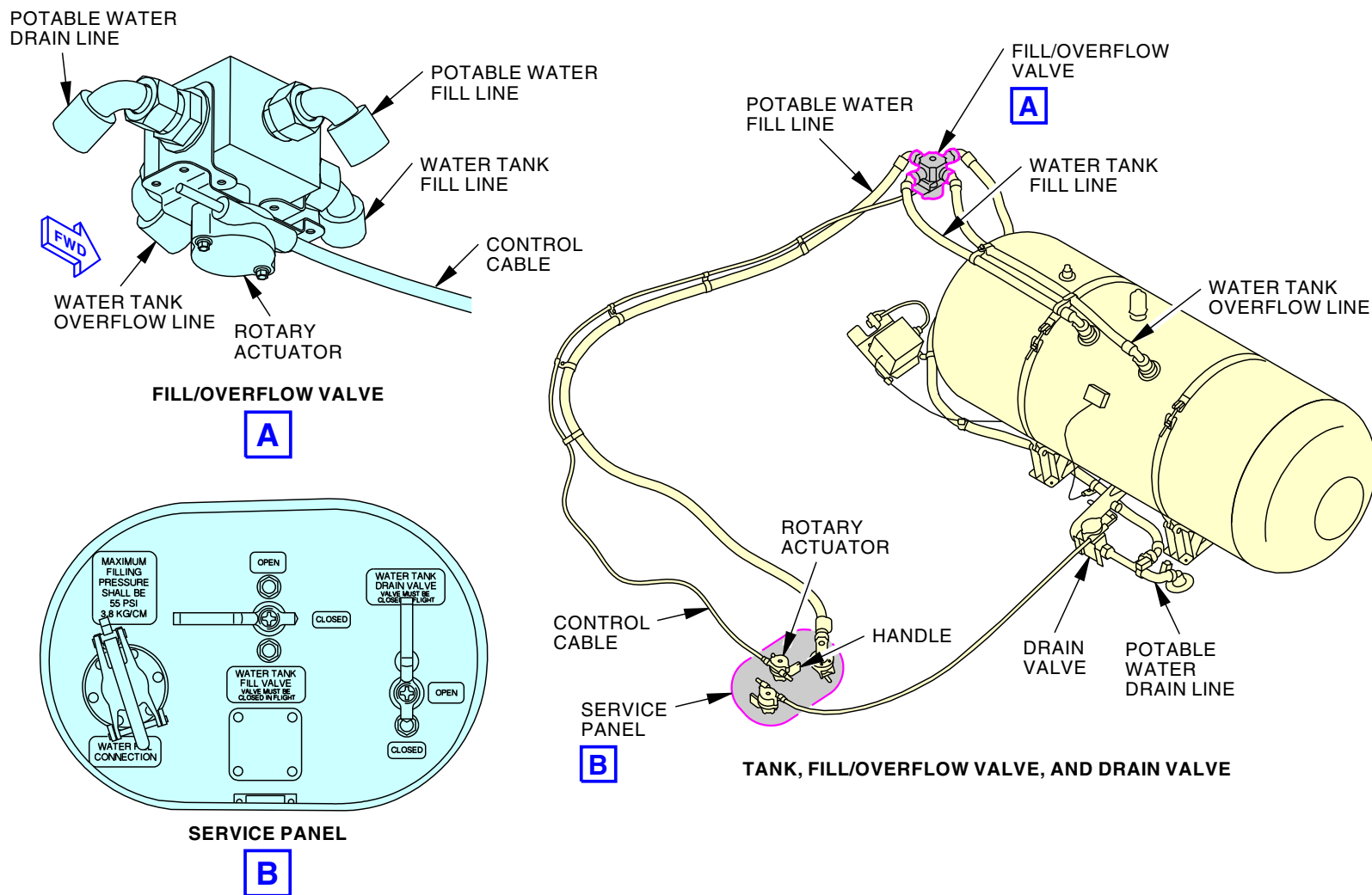
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WATER/WASTE - PASSENGER WATER SYSTEM - FILL/OVERFLOW VALVE AND CONTROL CABLE



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WATER/WASTE - PASSENGER WATER SYSTEM - FILL/OVERFLOW VALVE AND CONTROL CABLE

**WATER/WASTE - PASSENGER WATER SYSTEM - WATER TANK DRAIN VALVE AND CONTROL CABLE****Purpose**

The water tank drain valve lets water drain overboard from the water tank and the aft water distribution lines.

The control cable lets you open and close the water tank drain valve from the water service panel.

Location

The water tank drain valve is behind the aft bulkhead of the aft cargo compartment. The valve is forward and below the water tank.

The control cable is below the cargo floor and is between the water service panel and the water tank drain valve.

Physical Description

The water tank drain valve is a two-port, single-ball, dual-seal valve. The valve operates by manual input and has open and closed positions. The control cable is a rotary-in rotary-out cable.

The control cable attaches the water tank drain valve handle on the water service panel to the water tank drain valve.

Functional Description

The control cable has a rotary actuator input at the water service panel. The control cable transmits movement to the water tank drain valve at a rotary actuator on the valve.

Training Information Point

You must drain the water system at two locations to remove all the water in the passenger water system. To fully drain the water system, use the forward lavatory drain valve and the water tank drain valve.

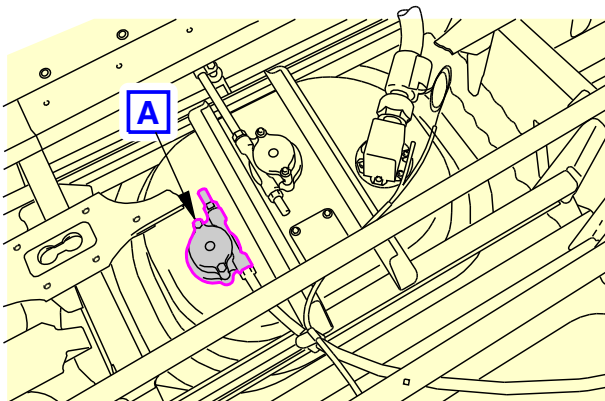
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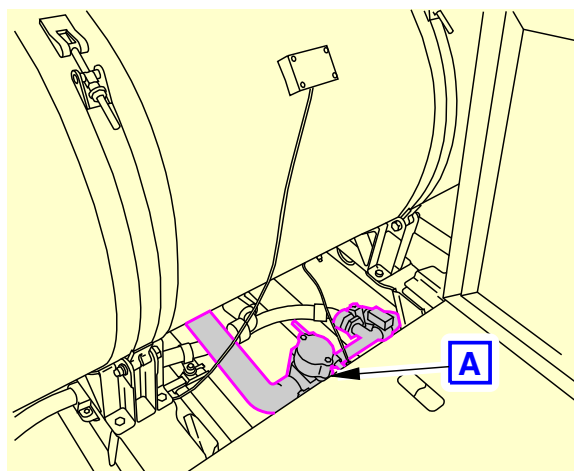
D633AM102-SIA

ECCN 9E991 BOEING PROPRIETARY - See title page for details

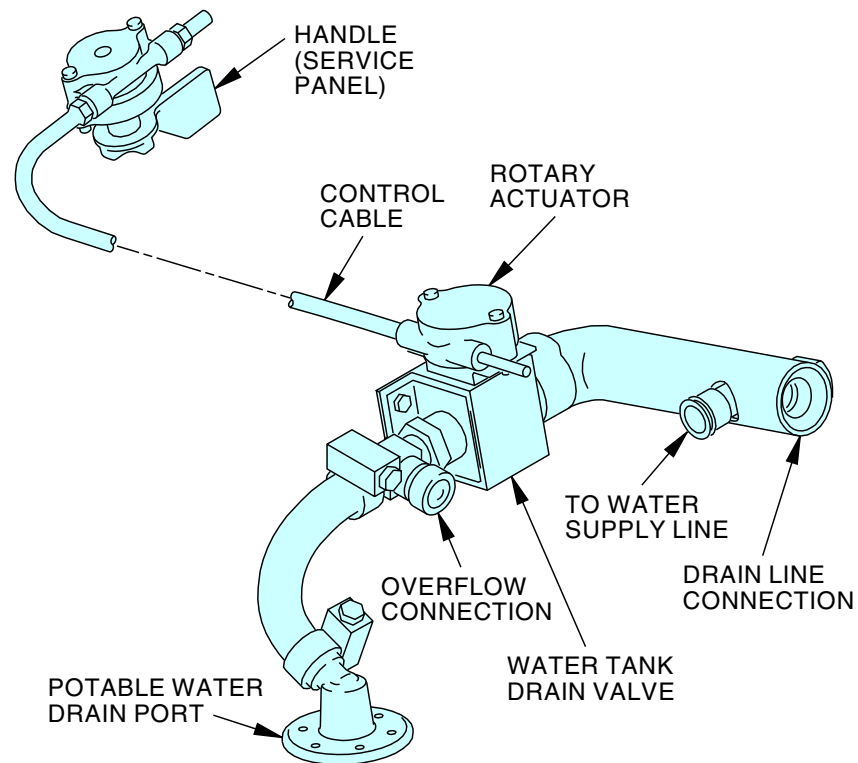
WATER/WASTE - PASSENGER WATER SYSTEM - WATER TANK DRAIN VALVE AND CONTROL CABLE



**WATER SERVICE PANEL
(INTERIOR VIEW)**



WATER TANK AND WATER TANK DRAIN VALVE



**WATER TANK DRAIN VALVE AND CONTROL CABLE
(EXAMPLE)**

A

2370265 S00061521326_V1

WATER/WASTE - PASSENGER WATER SYSTEM - WATER TANK DRAIN VALVE AND CONTROL CABLE

38-11-00

**WATER/WASTE - PASSENGER WATER SYSTEM - WATER TANK****Purpose**

The water tank holds potable water.

Location

The water tank is aft of the aft cargo compartment. You must remove the aft bulkhead cargo lining to get access to the tank.

Physical Description

The water tank is a composite structure. The inner element is a molded thermoplastic lining.

The water tank capacity is 62.1 gallons (235 liters).

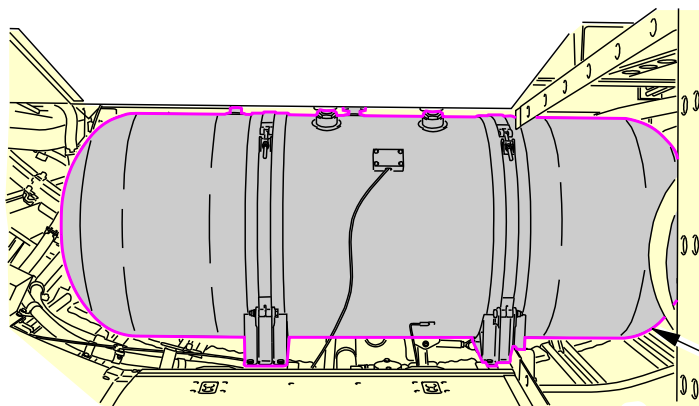
A standpipe decreases the maximum capacity to 60 gallons (227 liters).

The water tank has these parts:

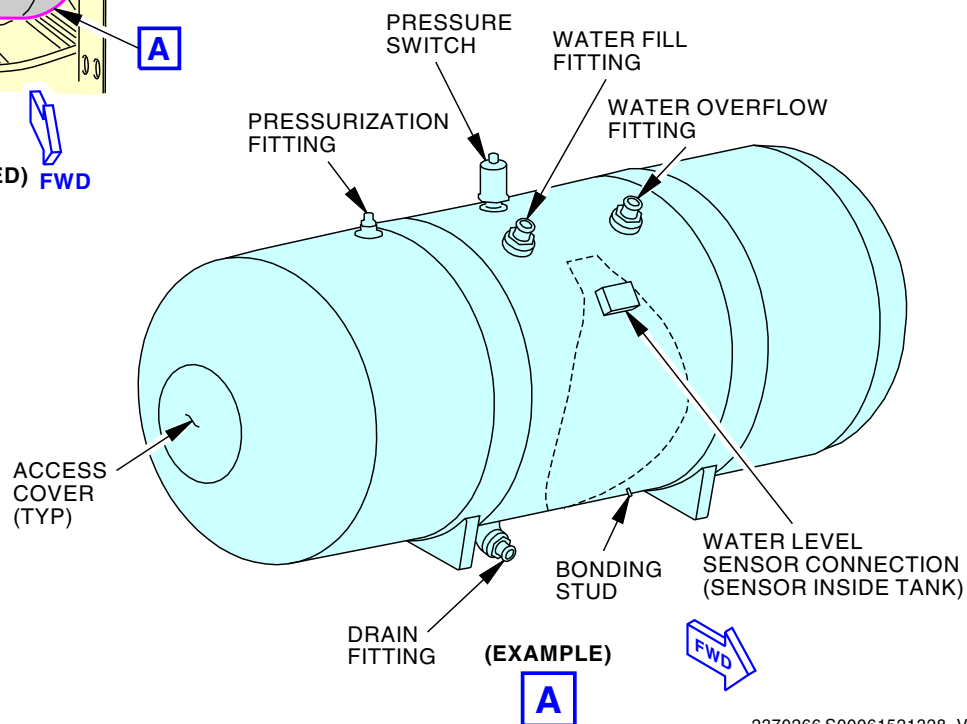
- Access cover (2)
- Water tank pressurization fitting
- Pressure switch
- Water overflow fitting (standpipe)
- Water fill fitting
- Water level sensor
- Drain fitting
- Bonding stud.

The water level sensor is a copper mesh capacitance sensor. The sensor is bonded to the outside of the lining. The sensor is a permanent part of the tank.

WATER/WASTE - PASSENGER WATER SYSTEM - WATER TANK



WATER TANK INSTALLATION
(AFT CARGO COMPARTMENT - LINING REMOVED) FWD



WATER/WASTE - PASSENGER WATER SYSTEM - WATER TANK

2370266 S00061521328_V2

**WATER/WASTE - PASSENGER WATER SYSTEM - LAVATORY WATER SUPPLY SHUTOFF VALVE****Purpose**

The lavatory water supply shutoff valve lets you isolate the flow of water to the lavatory components.

Location

Each lavatory has a lavatory water supply shutoff valve. You open the sink cabinet door to get access to the valve. The valve is in the lower area of the cabinet.

Physical Description

The lavatory water supply shutoff valve is a four-way valve. The valve has a valve body and a control handle (yellow with a red indicator point). These four positions show on the valve body:

- OFF
- TOILET ONLY
- SUPPLY ON
- FAUCET ONLY.

The valve has one line in and two lines out.

Functional Description

The valve handle lets you turn the valve to one of four positions.

When you turn the valve to the OFF position, the valve shuts off water to all of the lavatory components.

In the TOILET ONLY position, water goes to the toilet only.

In the SUPPLY ON position, water goes to the faucet and toilet.

In the FAUCET ONLY position, water goes to the faucet only.

Training Information Point

Before you work on the lavatory components, turn the lavatory water supply shutoff valve to the OFF position. When you turn the valve to the OFF position, water will not flow through any open lines.

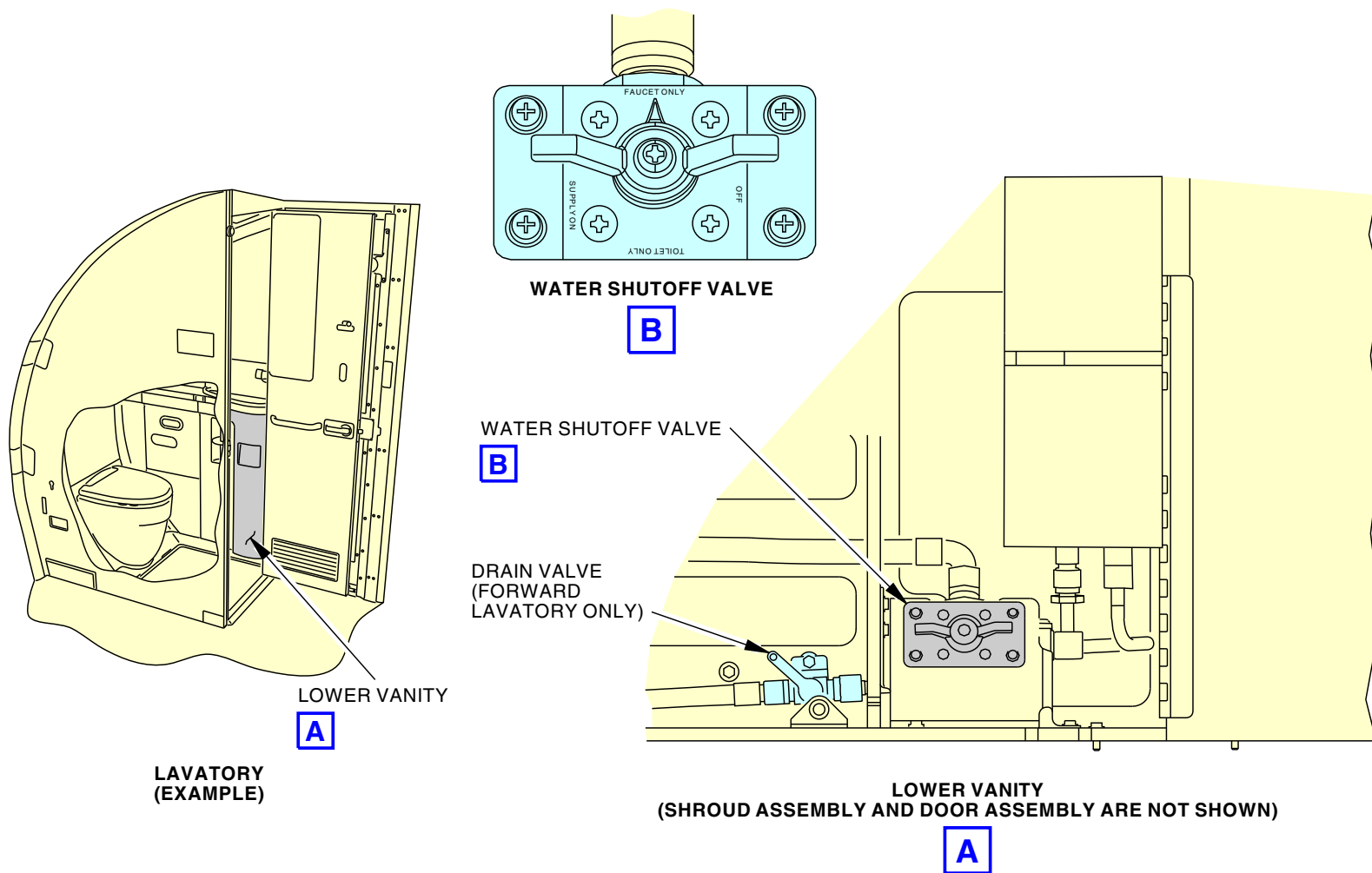
You must turn the lavatory water supply shutoff valve to the SUPPLY ON position when you drain the lavatory supply lines. If you do not turn the valve to the SUPPLY ON position, then the water will not drain from the faucet or toilet supply lines.

38-11-00

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WATER/WASTE - PASSENGER WATER SYSTEM - LAVATORY WATER SUPPLY SHUTOFF VALVE



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WATER/WASTE - PASSENGER WATER SYSTEM - LAVATORY WATER SUPPLY SHUTOFF VALVE

38-11-00

**WATER/WASTE - PASSENGER WATER SYSTEM - FORWARD LAVATORY DRAIN VALVE****Purpose**

The forward lavatory drain valve lets you drain the water from the forward lavatory supply lines.

Location

The forward lavatory drain valve is only in lavatory A (the most forward lavatory). You remove the sink cabinet panel to get access to the valve. The valve is in the lower area of the cabinet.

Physical Description

The forward lavatory drain valve operates manually. The valve has a valve body and a red or gray handle.

Functional Description

The handle lets you put the valve in the OPEN or CLOSE position.

In the OPEN position, the forward lavatory drain valve lets the water drain from all the forward lavatory and galley supply lines. The water drains through the forward potable water drain port.

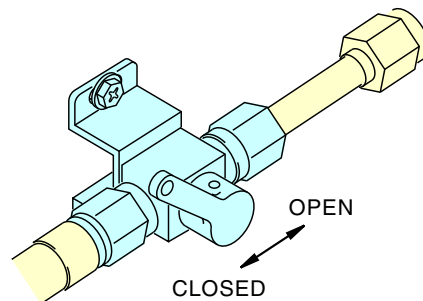
In the CLOSE position, the water from the supply lines flows to the lavatory and galley components. Water does not flow overboard.

A placard shows the valve in the OPEN and CLOSE positions.

Training Information Point

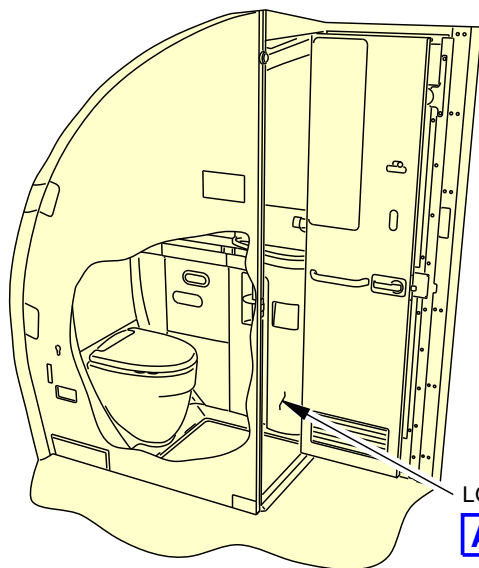
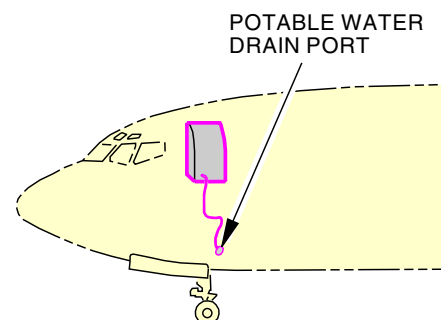
You must put the forward lavatory drain valve in the CLOSE position before you operate the water system. If you do not put the valve in the CLOSE position, water will drain from the forward lavatory during operation.

WATER/WASTE - PASSENGER WATER SYSTEM - FORWARD LAVATORY DRAIN VALVE



LAVATORY DRAIN VALVE

B



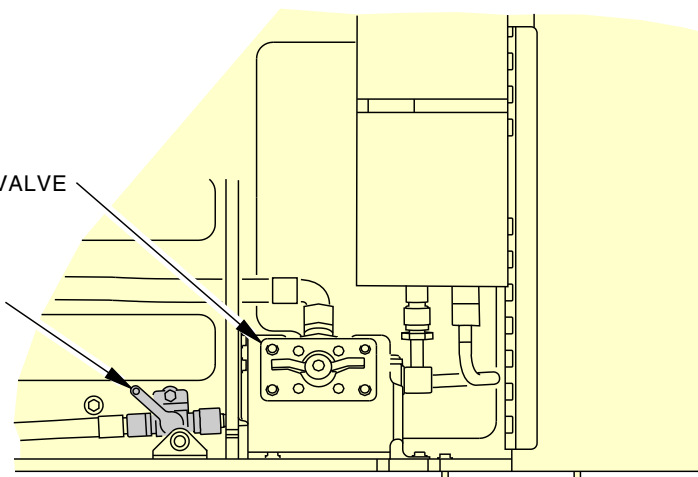
LAVATORY
(EXAMPLE)

A

WATER SHUTOFF VALVE

DRAIN VALVE
(FORWARD
LAVATORY ONLY)

B



LOWER VANITY
(SHROUD ASSEMBLY AND DOOR ASSEMBLY ARE NOT SHOWN)

A

2370268 S00061521332_V1

WATER/WASTE - PASSENGER WATER SYSTEM - FORWARD LAVATORY DRAIN VALVE

38-11-00

**WATER/WASTE - PASSENGER WATER SYSTEM - LAVATORY FAUCET****Purpose**

The lavatory faucet controls the hot and cold water supply to the lavatory sink.

Location

There is a faucet in each lavatory. The faucet is on the sink backsplash.

Physical Description

These are the parts of the faucet:

- Knob
- Mixing Cartridge Assembly
- Faucet Body
- Aerator.

Two setscrews attach the faucet to the backsplash. One setscrew attaches the knob to the mixing cartridge assembly.

The mixing cartridge contains a hydraulic timer that controls water flow timing from 4 seconds to 8 seconds. The hydraulic timer can be adjusted using an Allen-head wrench. Clockwise for slower timing, and counterclockwise for faster timing.

Functional Description

Push the knob operate to start water flow. Turn faucet knob for desired temperature.

The faucets are self-venting. You do not have to open the faucets to drain the potable water system.

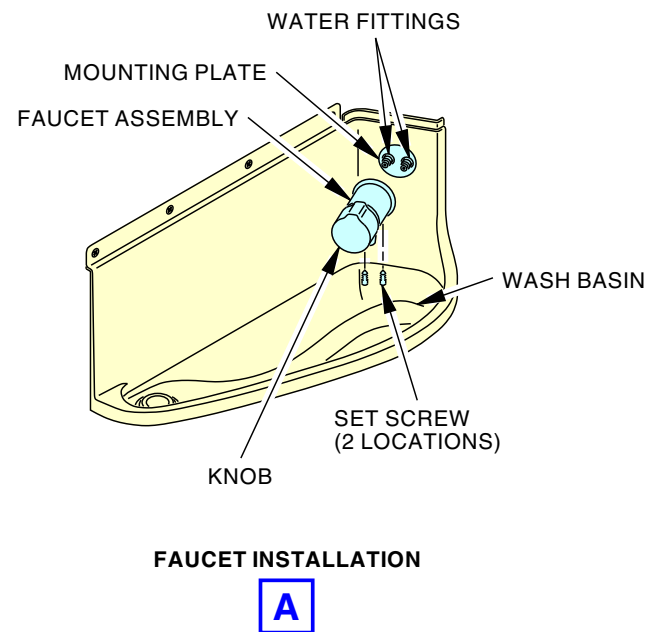
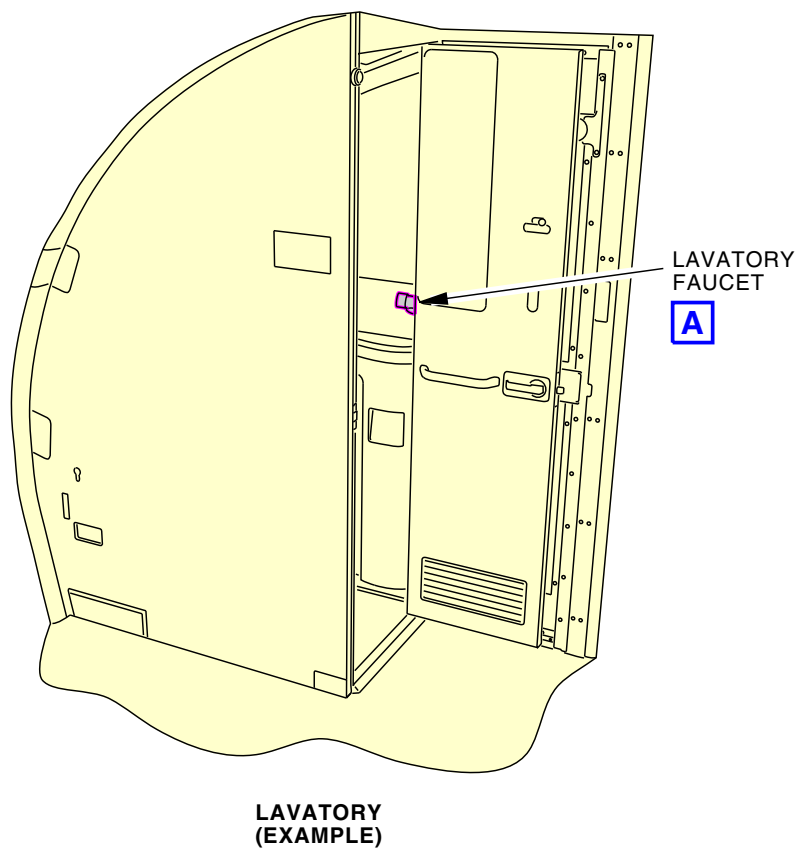
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WATER/WASTE - PASSENGER WATER SYSTEM - LAVATORY FAUCET



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WATER/WASTE - PASSENGER WATER SYSTEM - LAVATORY FAUCET

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WATER/WASTE - WATER HEATING - INTRODUCTION

Purpose

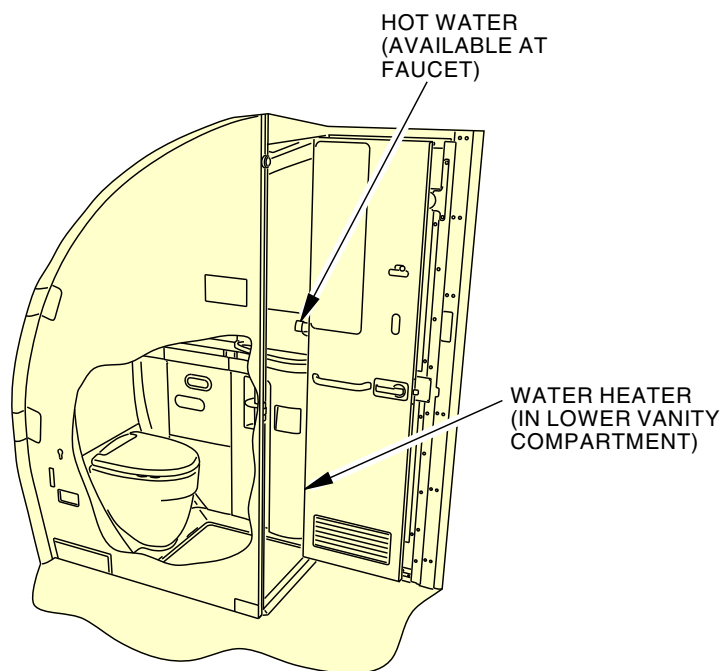
The water heating system supplies hot water to the lavatory hot water faucet.

Abbreviations and Acronyms

- ac - alternating current
- C - celsius
- F - fahrenheit
- psig - pounds per square inch, gauge
- REF - reference
- TYP - typical
- v - volts

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WATER/WASTE - WATER HEATING - INTRODUCTION



**LAVATORY
(EXAMPLE)**

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WATER/WASTE - WATER HEATING - INTRODUCTION

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ECCN 9E991 BOEING PROPRIETARY - See title page for details

**WATER/WASTE - WATER HEATING - WATER HEATER****Purpose**

The water heater increases the temperature of water supplied to the lavatory hot water faucet.

Location

There is a water heater in each lavatory. You open the sink cabinet door to get access to the water heater.

Physical Description

The water heater has these parts:

- Power switch
- Temperature selector switch
- Power indicator light
- Cover
- Overheat switch
- Pressure relief valve.

The temperature selector switch sets the water temperature to one of these three temperatures:

- LOW (105F/40C)
- MEDIUM (115F/46C)
- HIGH (125F/52C).

The power indicator light shows that power is available and that the overheat switch is closed (no overheat).

The overheat switch opens when the water temperature is more than 170F (76C).

The pressure relief valve opens if pressure inside the water heater is more than 140 psig.

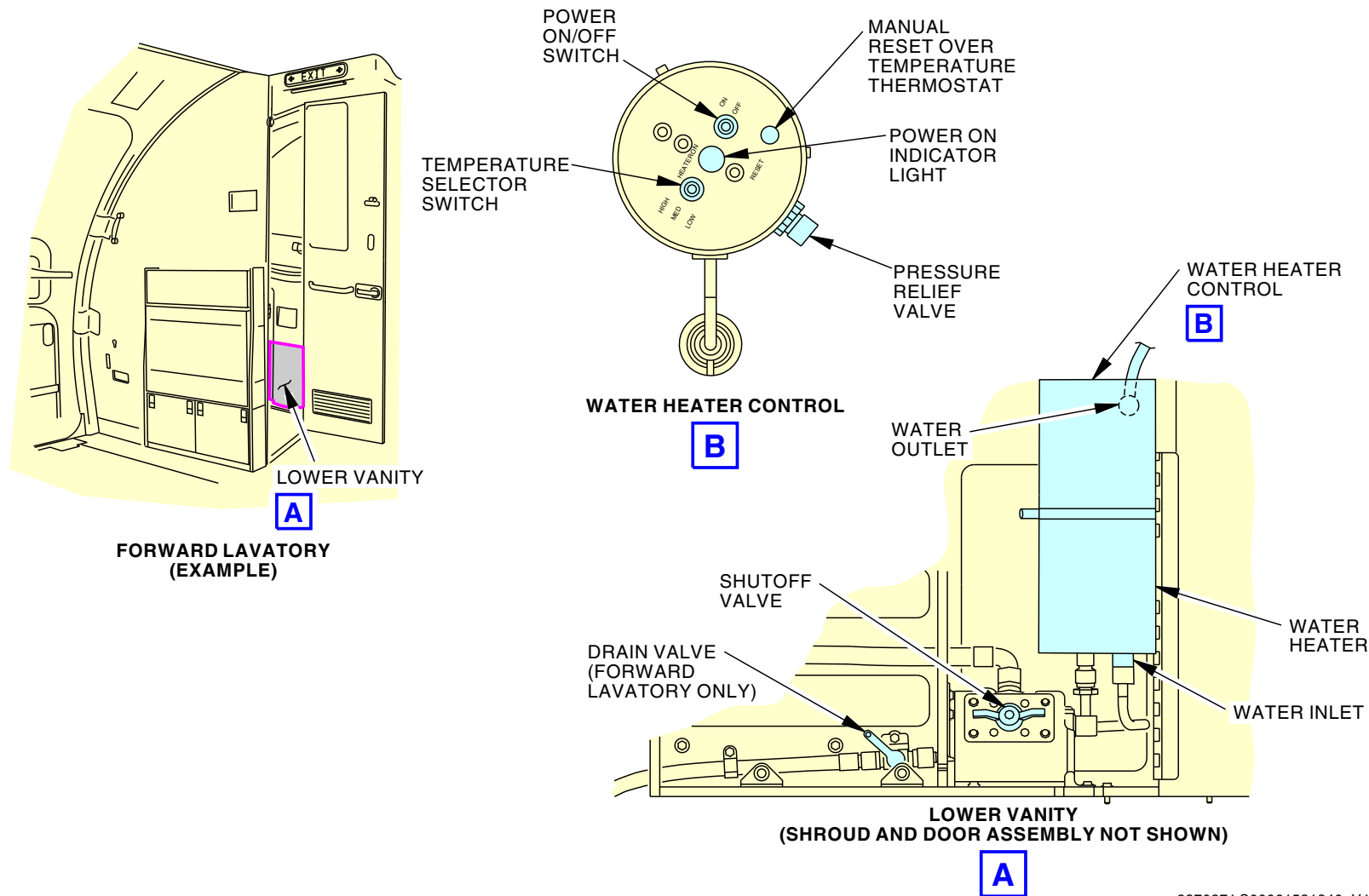
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ECCN 9E991 BOEING PROPRIETARY - See title page for details

WATER/WASTE - WATER HEATING - WATER HEATER



2370271 S00061521340_V1

WATER/WASTE - WATER HEATING - WATER HEATER

**WATER/WASTE - WATER HEATING - FUNCTIONAL DESCRIPTION****Functional Description**

When the power switch is in the ON position, 115v ac power goes to the control electronics.

The temperature selector switch sets the temperature of the water heater. The temperature selector switch has three positions:

- LOW (105F/40C)
- MEDIUM (115F/46C)
- HIGH (125F/52C).

The sense probe (thermistor) gives data on the temperature of the water in the water heater.

If the water is too cold, the control electronics connects power to the heater elements. If the water is at the correct temperature, the control electronics disconnects power from the heater elements.

The overheat switch is a fail-safe device that is a back up to the control electronics. The overheat switch opens the power circuit if the water temperature is more than 170F (76C). If the overheat switch opens, you must manually reset the overheat switch.

Training Information Point

If the power switch is ON and the power indicator light is off, the water heater may have been too hot and opened the overheat switch. You must remove the heater cover to reset the overheat switch.

The rubber cover on the overheat switch isolates electrical power. Do not use a sharp object to reset the overheat switch.

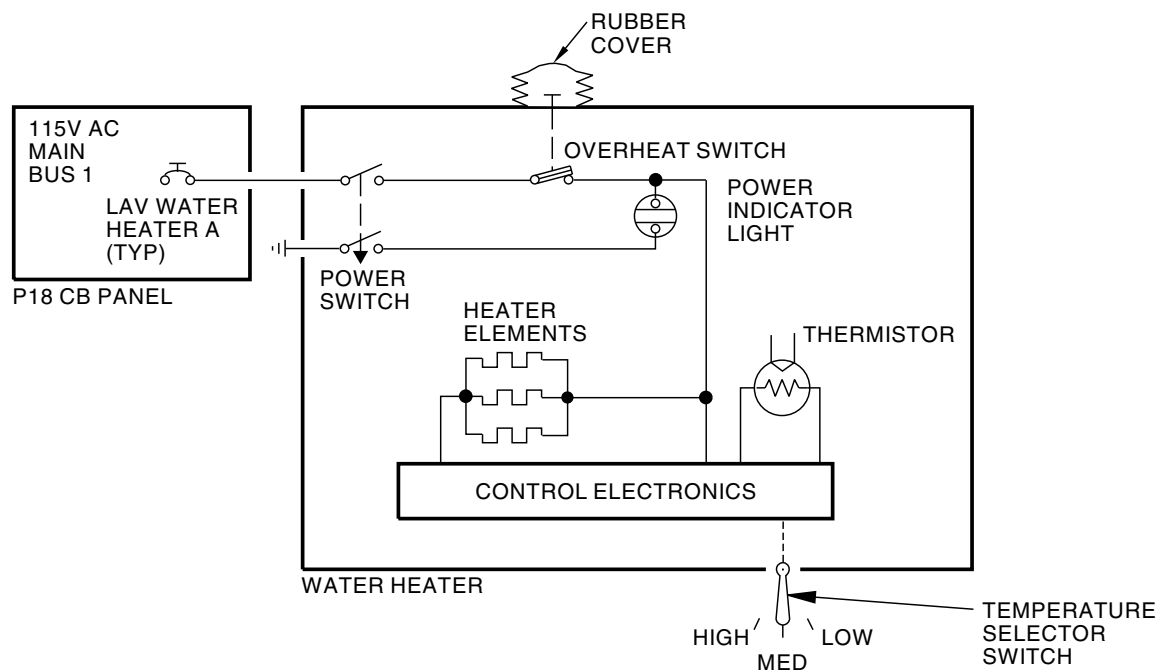
Open the circuit breaker for the water heater when you drain the potable water system.

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WATER/WASTE - WATER HEATING - FUNCTIONAL DESCRIPTION



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WATER/WASTE - WATER HEATING - FUNCTIONAL DESCRIPTION

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WATER/WASTE - WATER QUANTITY INDICATION SYSTEM - INTRODUCTION

Purpose

The water quantity indication system measures and shows the quantity of water in the water tank.

General Description

These are the water quantity indication system components:

- Water level sensor
- Water quantity transmitter
- Water quantity indicator.

The water level sensor is a copper mesh capacitance-type sensor that is a part of the water tank. The water level sensor is permanently bonded between the inner lining and the composite structure of the water tank.

The water quantity transmitter uses the measurement signal from the sensor to calculate the water level.

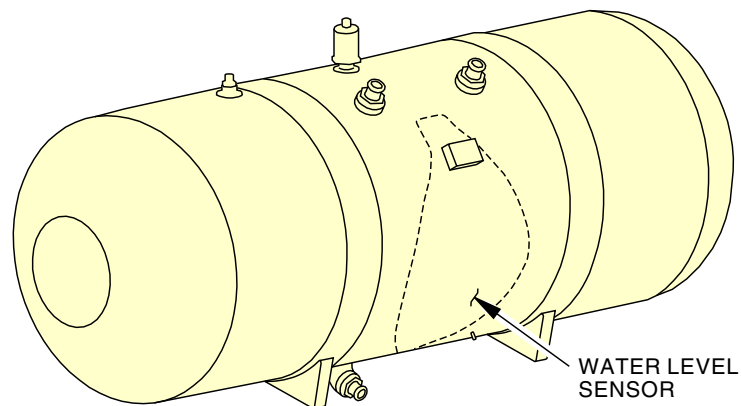
The water level shows at the attendant control panel (ACP) on the water quantity indicator from the ENVIRONMENT menu.

Abbreviations and Acronyms

- ACP - attendant control panel
- dc - direct current
- E - empty
- F - full
- LED - light emitting diode
- REF - reference
- T - transmitter

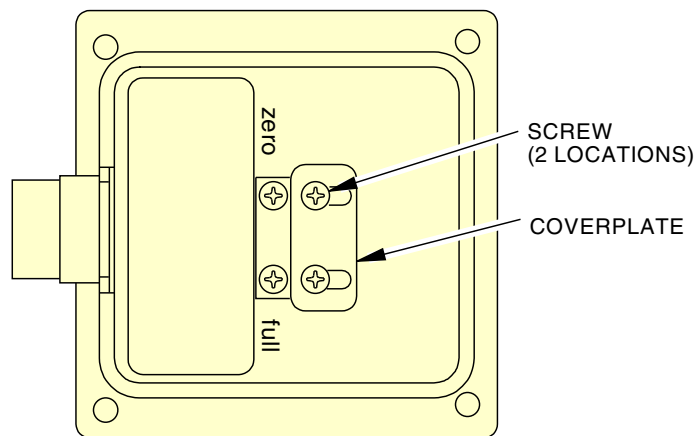
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WATER/WASTE - WATER QUANTITY INDICATION SYSTEM - INTRODUCTION

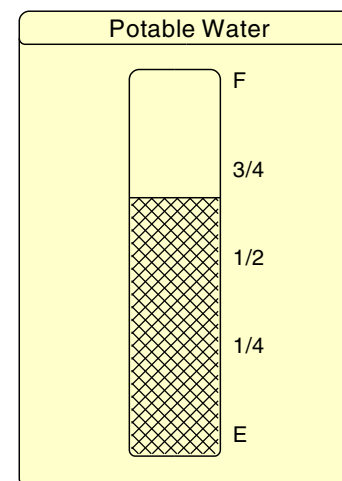


WATER LEVEL
SENSOR

WATER TANK



WATER QUANTITY TRANSMITTER



WATER QUANTITY INDICATOR

2370273 S00061521346_V1

WATER/WASTE - WATER QUANTITY INDICATION SYSTEM - INTRODUCTION

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EFFECTIVITY

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**WATER/WASTE - WATER QUANTITY INDICATION SYSTEM - WATER QUANTITY TRANSMITTER****Purpose**

The water quantity transmitter sends water level data to the water quantity indicator.

Location

The water quantity transmitter is behind the aft cargo lining in the aft cargo compartment. The water quantity transmitter is outboard and below the water tank.

Physical Description

The water quantity transmitter has electrical connections from the water tank level sensor to the water quantity indicator.

An adapter cable connects the transmitter to the wire bundle for the water quantity indicator.

Functional Description

The water quantity transmitter receives 28v dc from bus 1. The water quantity transmitter reads the capacitance of the water level sensor in the tank and supplies a 0 to -10v dc output to the water quantity indicator.

Training Information Point

There are two adjustment screws in the water quantity transmitter. One adjustment screw changes the output voltage when the water tank is empty. The other adjustment screw changes the output voltage when the water tank is full. The adjustment screws are behind a coverplate on the water quantity transmitter.

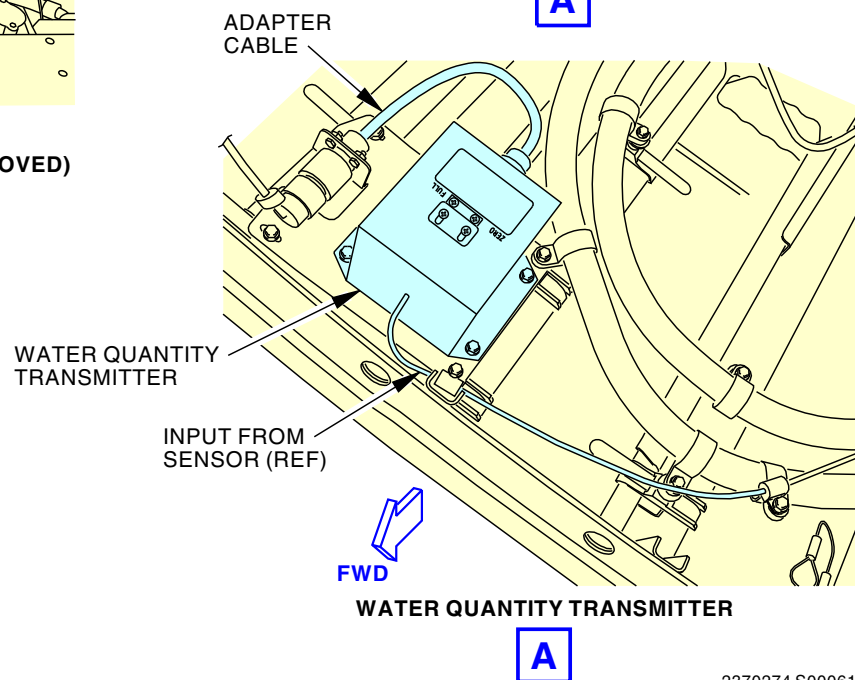
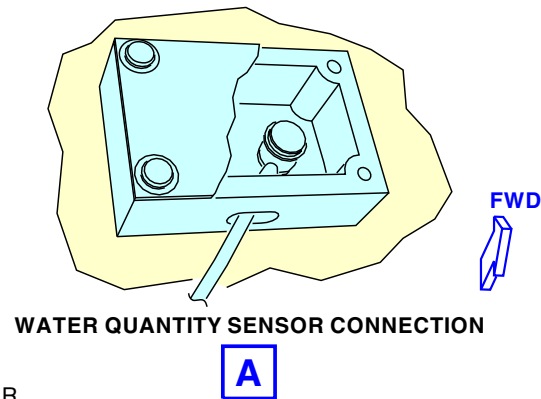
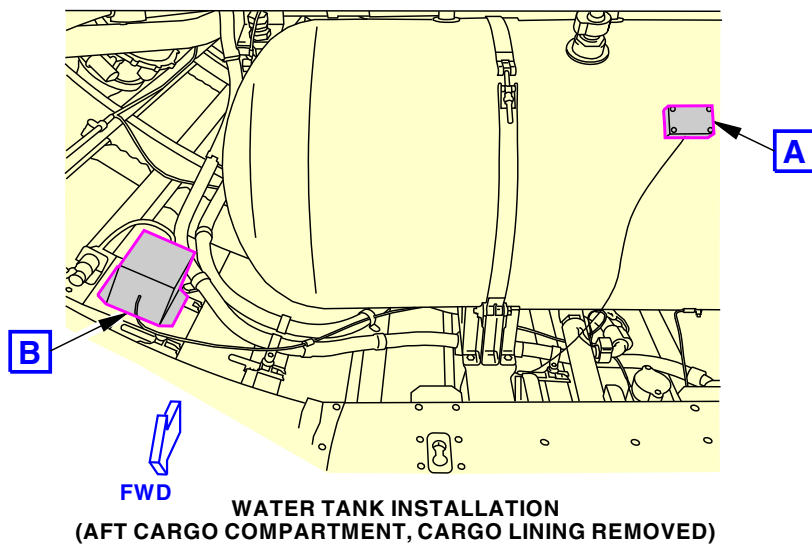
There are different adapter cables for each water tank /standpipe configuration. If you change the water tank or standpipe, you must also change the adapter cable. If you do not change the adapter cable, the water tank quantity will not be correct.

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WATER/WASTE - WATER QUANTITY INDICATION SYSTEM - WATER QUANTITY TRANSMITTER



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WATER/WASTE - WATER QUANTITY INDICATION SYSTEM - WATER QUANTITY TRANSMITTER

**WATER/WASTE - WATER QUANTITY INDICATION SYSTEM - WATER QUANTITY INDICATOR****Purpose**

The water quantity indicator shows the level of water in the water tank.

Location

The potable water quantity indicator is viewed on the ACP from the ENVIRONMENT menu.

NOTE: The ACP is in the forward or aft attendant stations.

Physical Description

The water quantity indicator is a bar style segment display. The segments are from E (empty) to F (full), in increments of 1/16 of a tank.

Functional Description

The water quantity transmitter sends a voltage that is in proportion to the level of water in the water tank. The ACP software logic causes a specified number of indicator segments to come on. The number of segments shows the level of water in the tank.

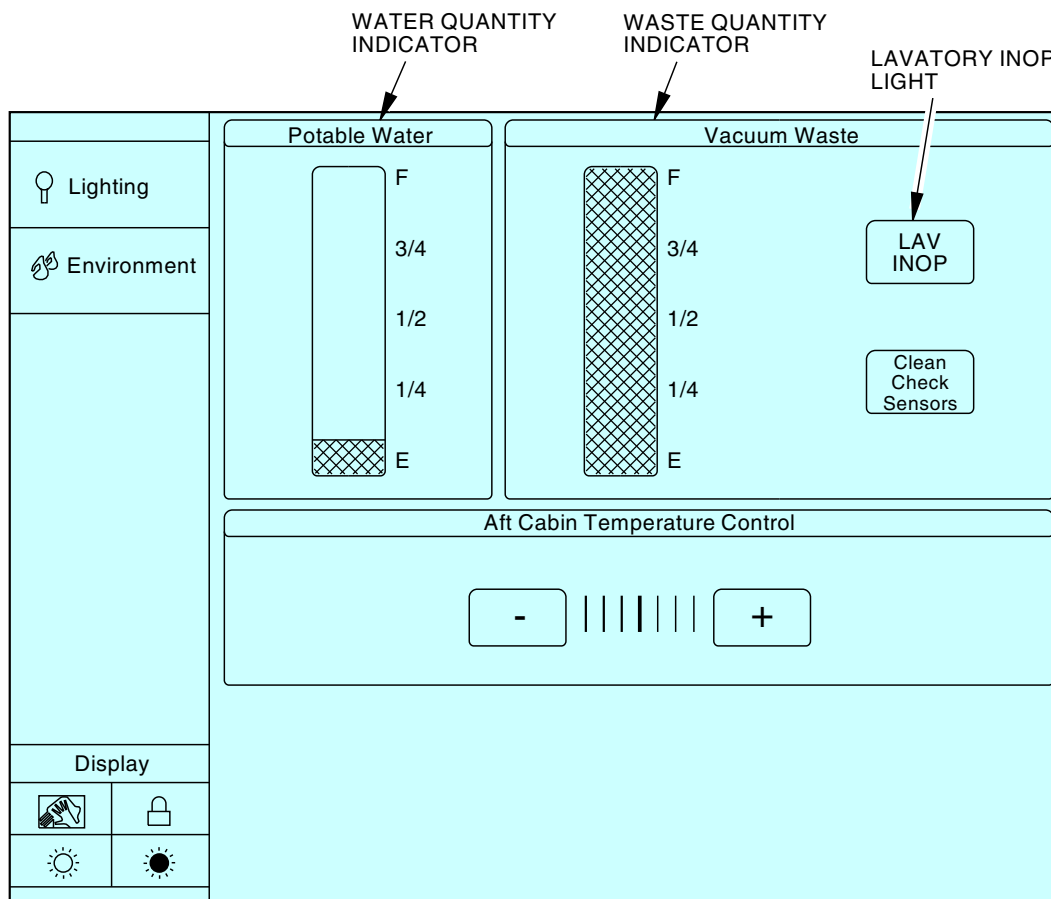
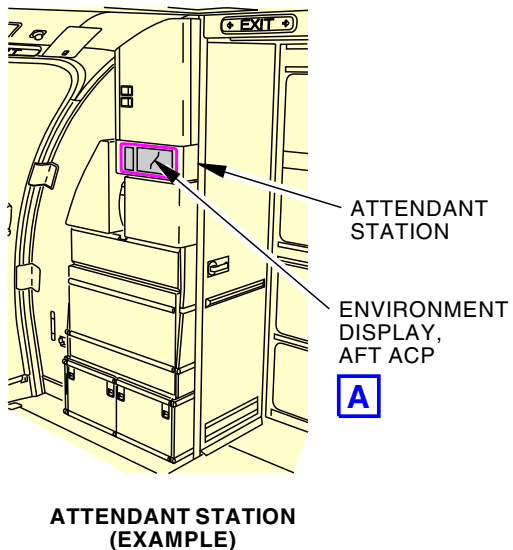
E (empty) to 1/4 full displays in red.

1/4 to 1/2 full displays amber.

1/2 to F (full) displays green.

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WATER/WASTE - WATER QUANTITY INDICATION SYSTEM - WATER QUANTITY INDICATOR



ENVIRONMENT DISPLAY, AFT ACP

A

2370276 S00061521351_V1

WATER/WASTE - WATER QUANTITY INDICATION SYSTEM - WATER QUANTITY INDICATOR

**WATER/WASTE - WATER QUANTITY INDICATION SYSTEM - FUNCTIONAL DESCRIPTION****Functional Description**

The capacitance of the water tank level sensor changes when the water level in the water tank changes.

The water quantity transmitter senses the capacitance of the water tank level sensor and changes the capacitance input to a 0 to -10v dc output voltage. The output voltage of the water quantity transmitter is in proportion to the quantity of water in the water tank.

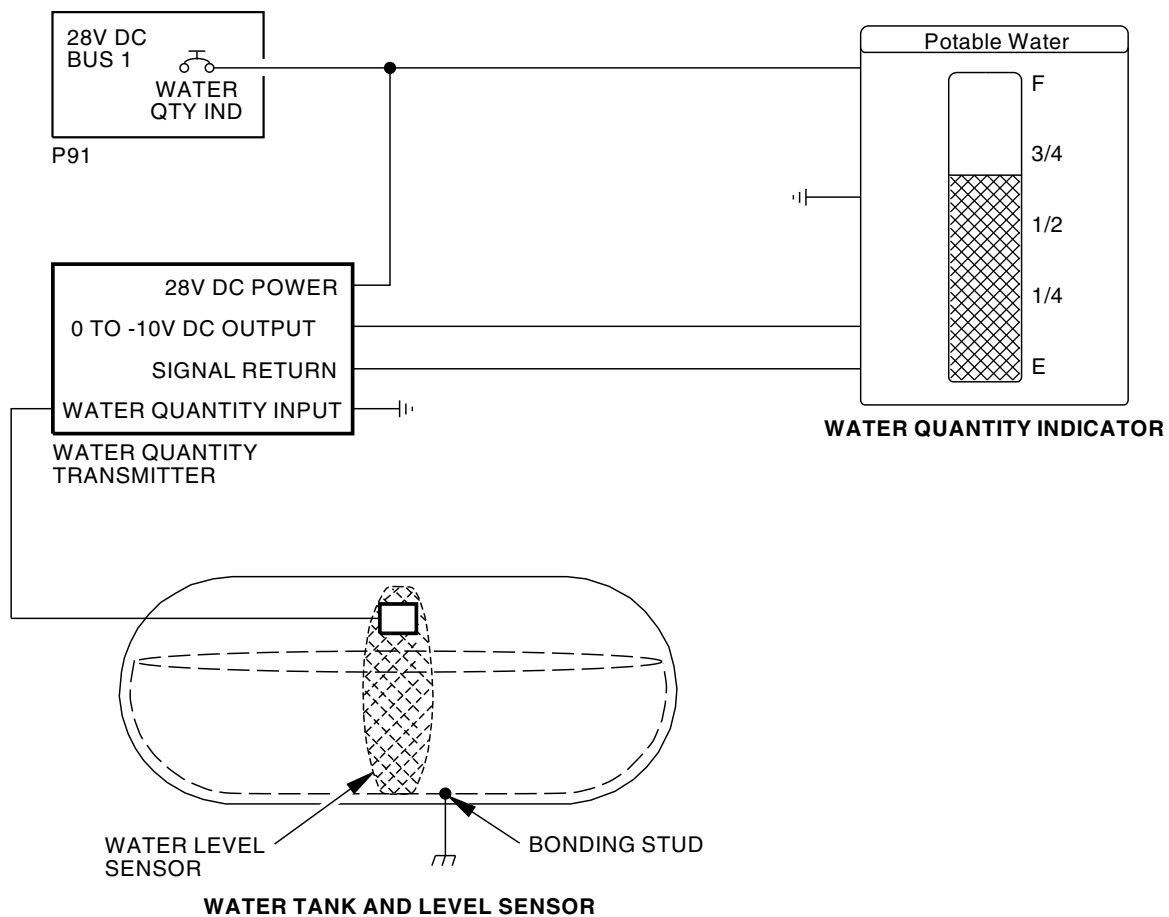
The ACP interprets the output voltage of the water quantity transmitter. The 0 to -10v dc input voltage is changed to a digital signal and used to operate a bar style segment display. The display shows as continuous water quantity indicator when selected from the ENVIRONMENT menu. The water quantity indicator shows water quantity as a percentage of full, with 1/16th tank intervals.

Training Information Point

NOTE: If the water tank is not correctly grounded, intermittent operation of the water quantity indicator can occur.

SIA ALL	EFFECTIVITY

WATER/WASTE - WATER QUANTITY INDICATION SYSTEM - FUNCTIONAL DESCRIPTION



2370277 S00061521353_V1

WATER/WASTE - WATER QUANTITY INDICATION SYSTEM - FUNCTIONAL DESCRIPTION

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**WATER/WASTE - WASTE DISPOSAL - INTRODUCTION****Purpose**

The waste disposal system removes water from the lavatory and galley sinks, human waste from the lavatory toilets, and rain water from the door sills.

General Description

The waste disposal system has these subsystems:

- Gray water
- Vacuum waste
- Waste tank quantity indication.

Gray Water System

The gray water comes from the lavatory and galley sinks, and from door sill drains at each entry and galley service door.

The gray water from the sinks drains overboard through drain masts.

The gray water from the door sills drains overboard through drain fittings.

Vacuum Waste System

The vacuum waste system removes human waste from the toilets. The waste material is held in a waste tank until servicing.

Waste Tank Quantity Indication System

The waste tank quantity indication system measures and shows the level of waste in the waste tank.

Abbreviations and Acronyms

- ac - alternating current
- A/C - air conditioning
- BIT - built in test
- C - Celsius
- dc - direct current

- F - Fahrenheit
- FCU - flush control unit
- FWD - forward
- GND - ground
- LCM - logic control module
- mm - millimeter
- PSID - pounds per square inch differential
- REF - reference
- SEC - section
- SYS - system
- TYP - typical
- v - volts

38-30-00

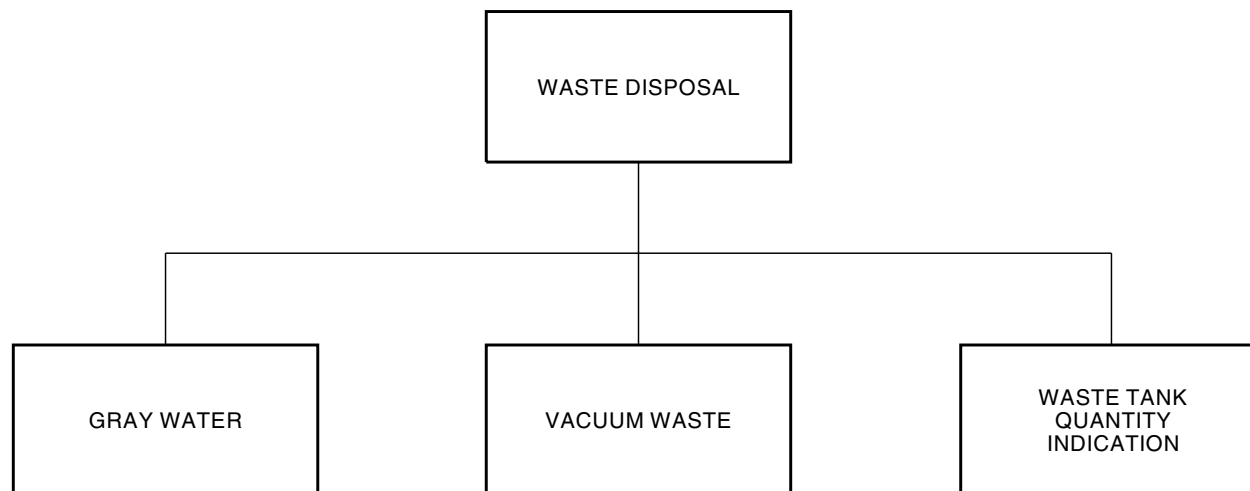
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WATER/WASTE - WASTE DISPOSAL - INTRODUCTION



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WATER/WASTE - WASTE DISPOSAL - INTRODUCTION

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WATER/WASTE - GRAY WATER SYSTEM - INTRODUCTION

Purpose

The gray water system has these functions:

- Drains water and other liquids from the lavatory and galley sinks
- Gives exhaust ventilation from the lavatories and galleys
- Drains rain water from the entry/service door sill areas.

- TYP - typical
- v - volts

General Description

The gray water system has these two subsystems:

- Waste water system
- Door sill drain system.

Waste Drain System

The waste water system collects the waste water from the lavatory and galley sinks and drains the waste water overboard through heated drain masts. The waste water system also gives exhaust ventilation from the lavatories and galleys.

Door Sill Drain System

The door sill drain system collects rain water from the entry/service door sill areas and drains the water overboard through drain fittings.

Abbreviations and Acronyms

- A/C - air conditioning
- dc - direct current
- FWD - forward
- GND - ground
- PSID - pounds per square inch differential
- REF - reference
- SEC - section
- SYS - system

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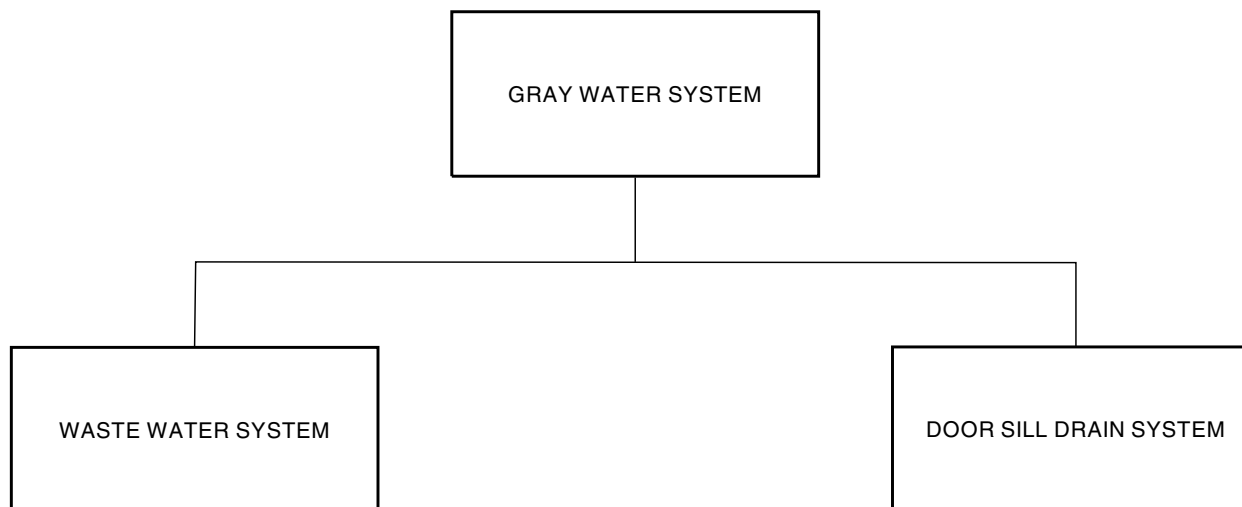
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WATER/WASTE - GRAY WATER SYSTEM - INTRODUCTION



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WATER/WASTE - GRAY WATER SYSTEM - INTRODUCTION

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EFFECTIVITY	
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ECCN 9E991 BOEING PROPRIETARY - See title page for details



WATER/WASTE - GRAY WATER SYSTEM - WASTE WATER SYSTEM

Purpose

The waste water system collects the waste water from the lavatory and galley sinks and drains the waste water overboard through heated drain masts.

The system also gives exhaust ventilation for the lavatories and galleys.

General Description

The waste water system has these components:

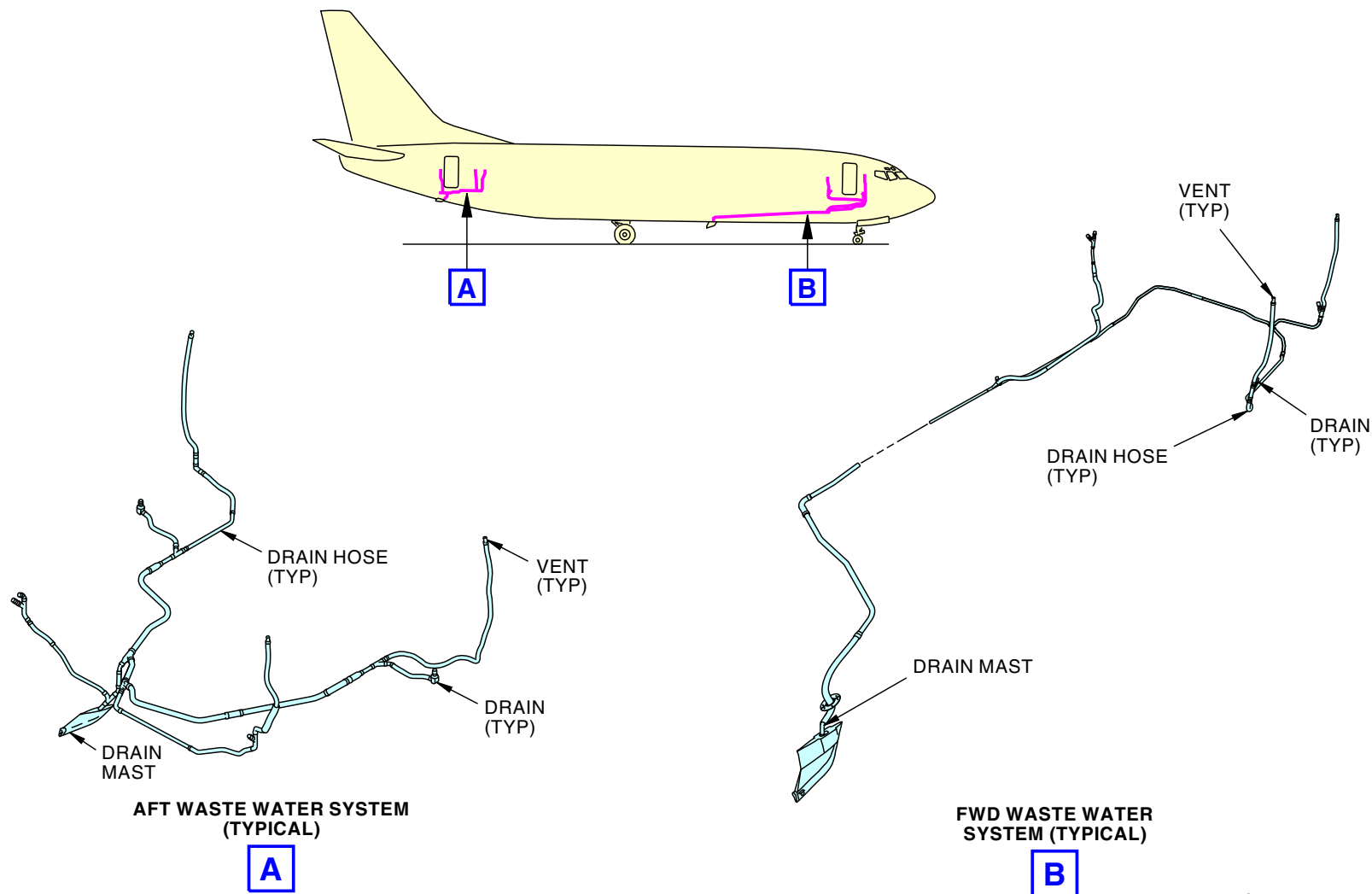
- Lavatory and galley sink drains
- Lavatory and galley sink drain vents
- Drain hoses and lines
- Drain masts.

The waste water drains overboard through the drain masts when the airplane is on the ground and when the airplane is in the air.

Electrical heaters in the drain masts prevent the drain masts from freezing.

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WATER/WASTE - GRAY WATER SYSTEM - WASTE WATER SYSTEM



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WATER/WASTE - GRAY WATER SYSTEM - WASTE WATER SYSTEM

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ECCN 9E991 BOEING PROPRIETARY - See title page for details



WATER/WASTE - GRAY WATER SYSTEM - DRAIN MAST

Purpose

The drain masts let waste water from the lavatory and galley sinks flow overboard.

The drain masts have internal heaters that keep the waste water from freezing.

Location

There are two drain masts on the lower fuselage.

The forward drain mast is on the bottom of the fuselage, forward of the right air conditioning compartment.

The aft drain mast is on the bottom of the fuselage, aft of the aft cargo compartment.

Physical Description

The drain mast is an aerodynamic fairing that attaches to the fuselage.

Each drain mast has an internal 250 watt heater.

See the Water and Toilet Drain Anti-Icing System section for information on the drain mast heaters. (SECTION 30-71).

Training Information Point

The heater on the forward drain mast connects to the airplane wiring through an electrical connector.

The heater on the aft drain mast connects to the airplane wiring through wire splices. When you replace the aft drain mast, you must make a splice in the wires.

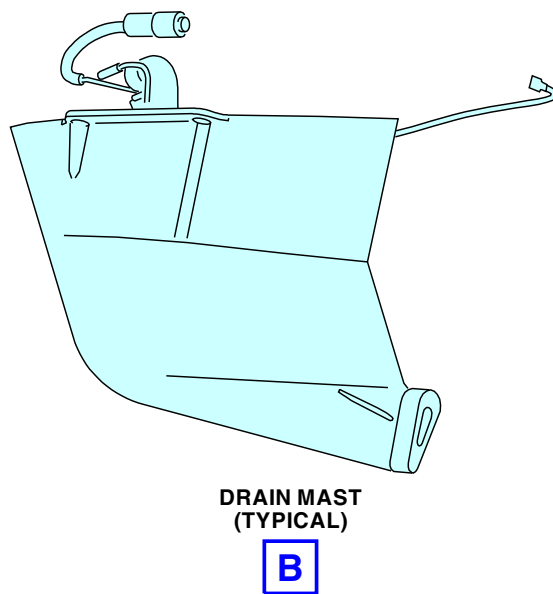
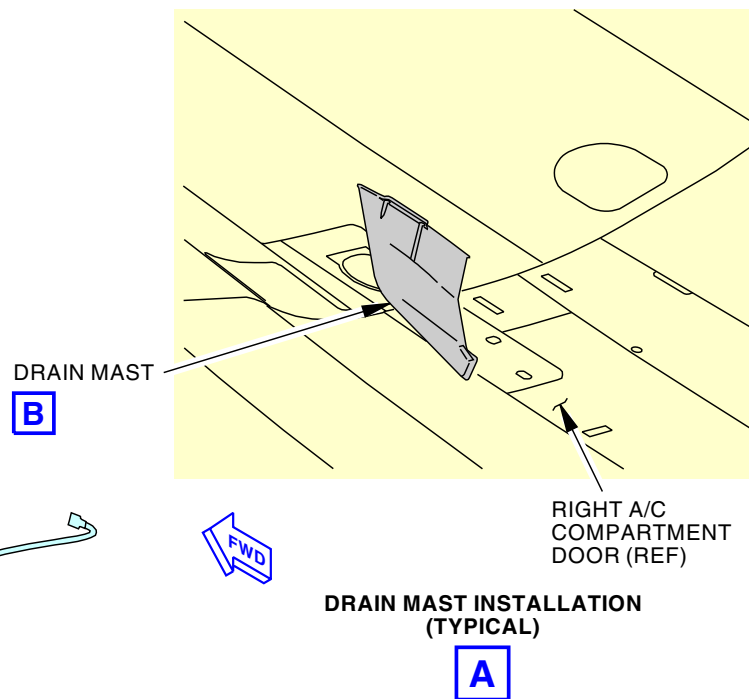
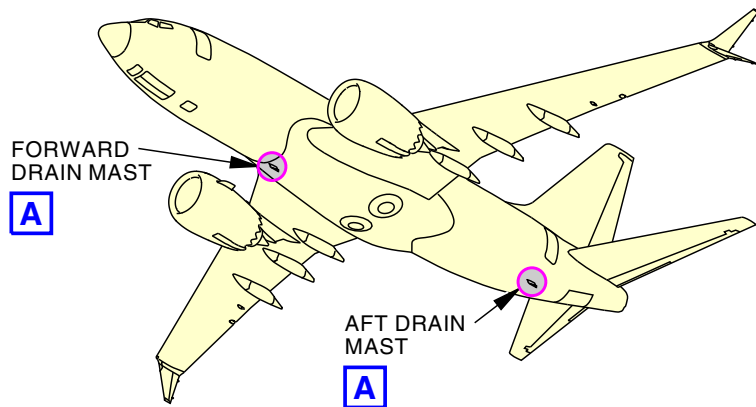


CAUTION

WHEN YOU REMOVE THE FASTENERS, HOLD THE DRAIN MAST. IF THE DRAIN MAST FALLS, DAMAGE CAN OCCUR.

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WATER/WASTE - GRAY WATER SYSTEM - DRAIN MAST



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WATER/WASTE - GRAY WATER SYSTEM - DRAIN MAST

38-31-00

38-31-00-003

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**WATER/WASTE - GRAY WATER SYSTEM - DOOR SILL DRAIN SYSTEM****Purpose**

The door sill drain system removes rain water from the door sill areas.

Physical Description

The door sill drain system has these components:

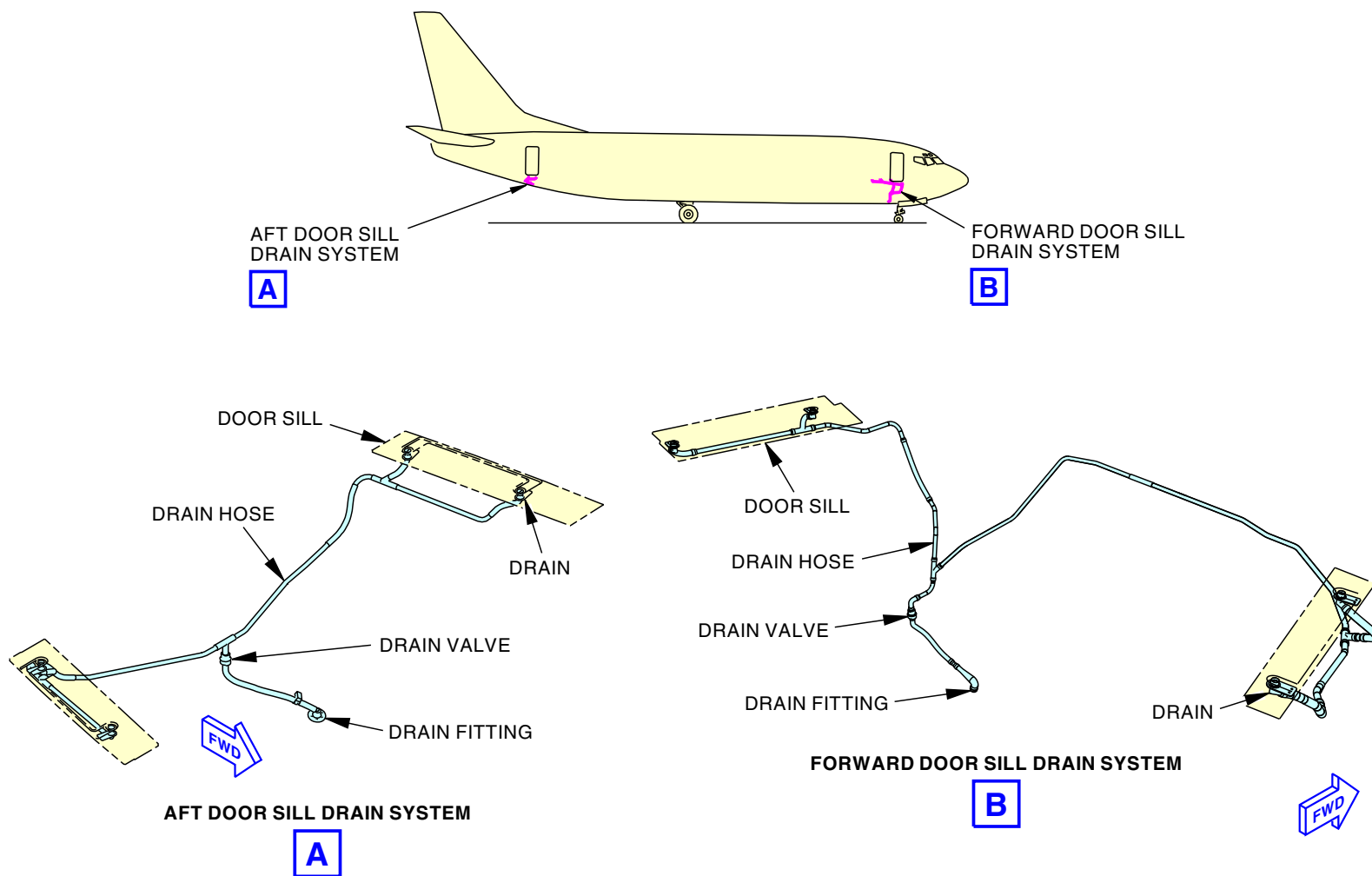
- Door sills
- Door sill drains
- Drain hose
- Drain Valve
- Drain fittings.

When the airplane is on the ground, the sill drain check valves are open and the water drains overboard through a door sill drain fitting on the bottom of the airplane.

When the airplane is in the air, differential pressure closes the sill drain check valves, and any remaining water is held in the system.

EFFECTIVITY	
SIA ALL	

WATER/WASTE - GRAY WATER SYSTEM - DOOR SILL DRAIN SYSTEM



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WATER/WASTE - GRAY WATER SYSTEM - DOOR SILL DRAINS

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WATER/WASTE - GRAY WATER SYSTEM - DOOR SILL DRAINS

Purpose

The door sill drains remove rain water from the door sill areas.

Location

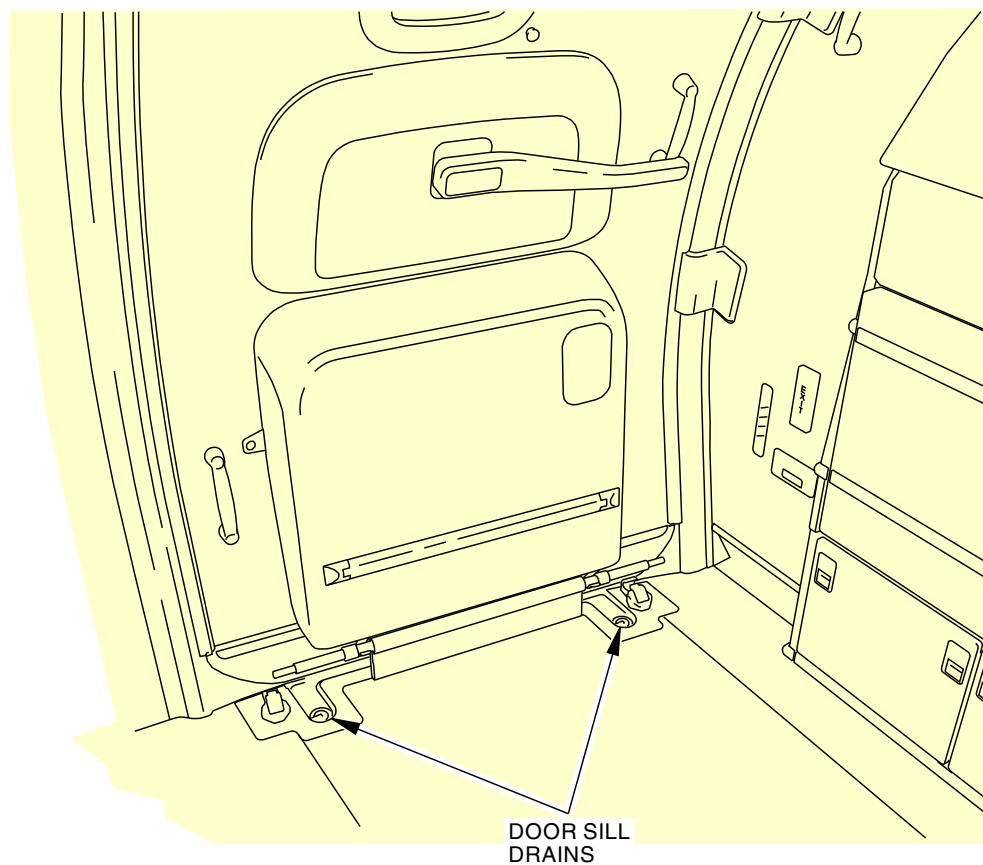
There are two door sill drains at each entry and galley service door.

Physical Description

The door sills send rain water to the door sill overboard drains when the airplane is on the ground. During flight, differential pressure closes a check valve in the system to prevent the overboard drainage of water and the escape of air.

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	D633AM102-SIA

WATER/WASTE - GRAY WATER SYSTEM - DOOR SILL DRAINS



**ENTRY DOOR
(TYPICAL)**

WATER/WASTE - GRAY WATER SYSTEM - DOOR SILL DRAINS

2370283 S00061521369_V1

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EFFECTIVITY

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**WATER/WASTE - VACUUM WASTE SYSTEM - INTRODUCTION****Purpose**

The vacuum waste system removes human waste material from the toilets and holds it in the waste tank.

General Description

The vacuum toilet collects human waste. A flush cycle puts the waste material into the vacuum waste tubing.

Cabin pressure pushes the material to the vacuum waste tank. There are two sources that cause low pressure (vacuum) in the tank:

- The vacuum blower
- Cabin-to-ambient pressure differential.

The waste is kept in the waste tank until servicing. Servicing is done at the waste service panel.

The vacuum waste system has these components:

- Toilet assembly
- Waste tank
- Liquid separator
- Waste tank rinse nozzle
- Waste tank rinse filter
- Waste tank rinse fitting assembly
- Waste drain valve assembly
- Waste drain ball valve
- Drain line blockage removal fitting
- Vacuum check valve
- Vacuum blower
- Vacuum blower barometric switch.

- C - Celsius
- dc - direct current
- F - Fahrenheit
- ISC - integrated system control
- FWD - forward
- LCM - logic control module
- REF - reference
- TYP - typical
- v - volts

Abbreviations and Acronyms

- ac - alternating current

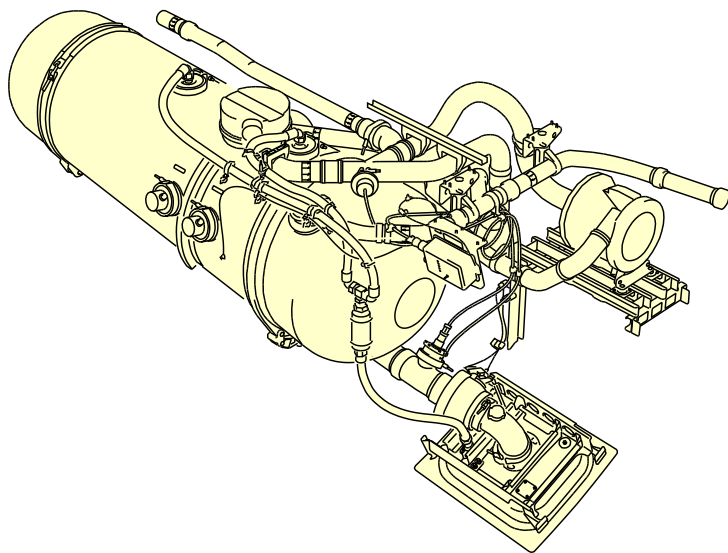
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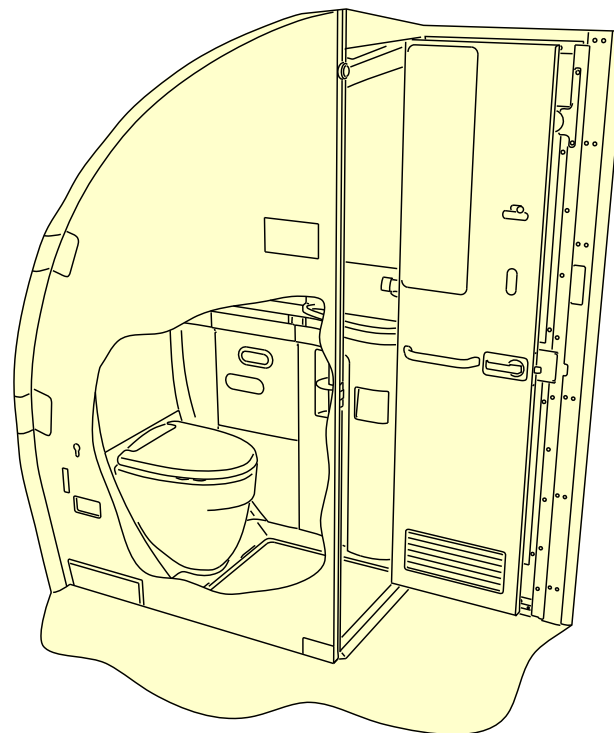
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WATER/WASTE - VACUUM WASTE SYSTEM - INTRODUCTION



VACUUM WASTE SYSTEM



TOILET ASSEMBLY

2370284 S00061521373_V1

WATER/WASTE - VACUUM WASTE SYSTEM - INTRODUCTION

38-32-00-001

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WATER/WASTE - VACUUM WASTE SYSTEM - COMPONENT LOCATIONS - LAVATORY

Component locations

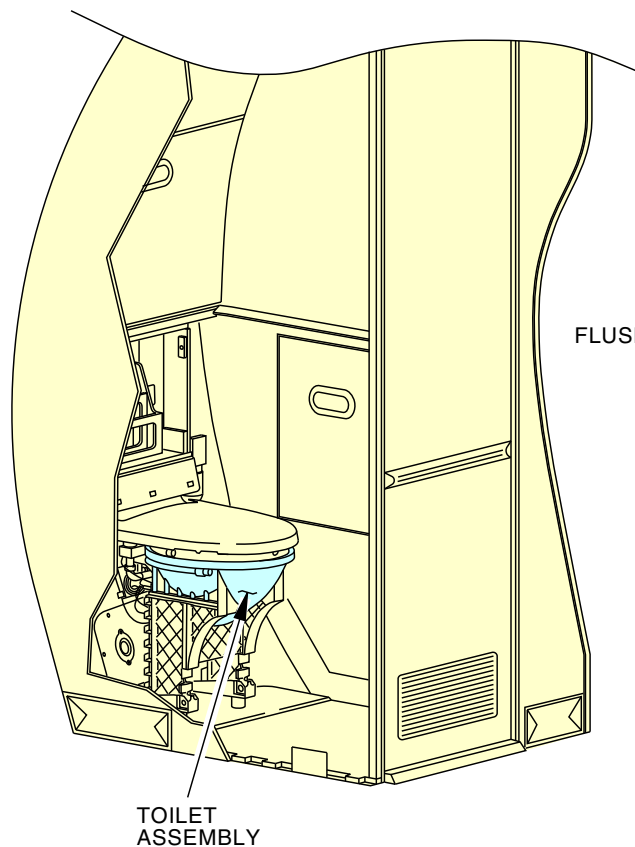
There is a toilet assembly and flush switch in each lavatory.

The toilet assembly is behind the toilet shroud. Removal of the toilet shroud is required to get access to the toilet assembly.

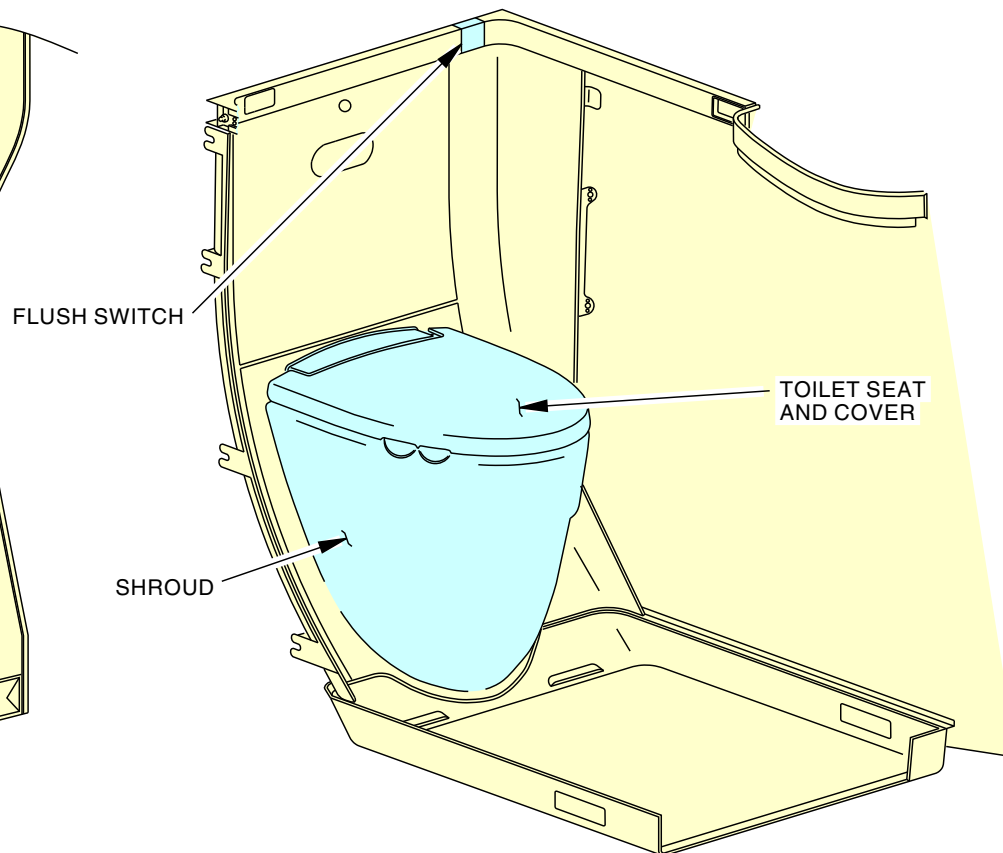
The toilet shroud has a seat and cover. Inoperative toilets can be deactivated to allow the vacuum waste system to remain operative.

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WATER/WASTE - VACUUM WASTE SYSTEM - COMPONENT LOCATIONS - LAVATORY



**LAVATORY MODULE
(EXAMPLE)**



**TOILET SHROUD
(EXAMPLE)**

2370285 S00061521375_V1

WATER/WASTE - VACUUM WASTE SYSTEM - COMPONENT LOCATIONS - LAVATORY

38-32-00-002

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EFFECTIVITY

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ECCN 9E991 BOEING PROPRIETARY - See title page for details



WATER/WASTE - VACUUM WASTE SYSTEM - FLUSH SWITCH

Purpose

The flush switch starts the flush cycle for the vacuum waste system.

Location

Each lavatory has a flush switch adjacent to the toilet assembly.

Physical Description

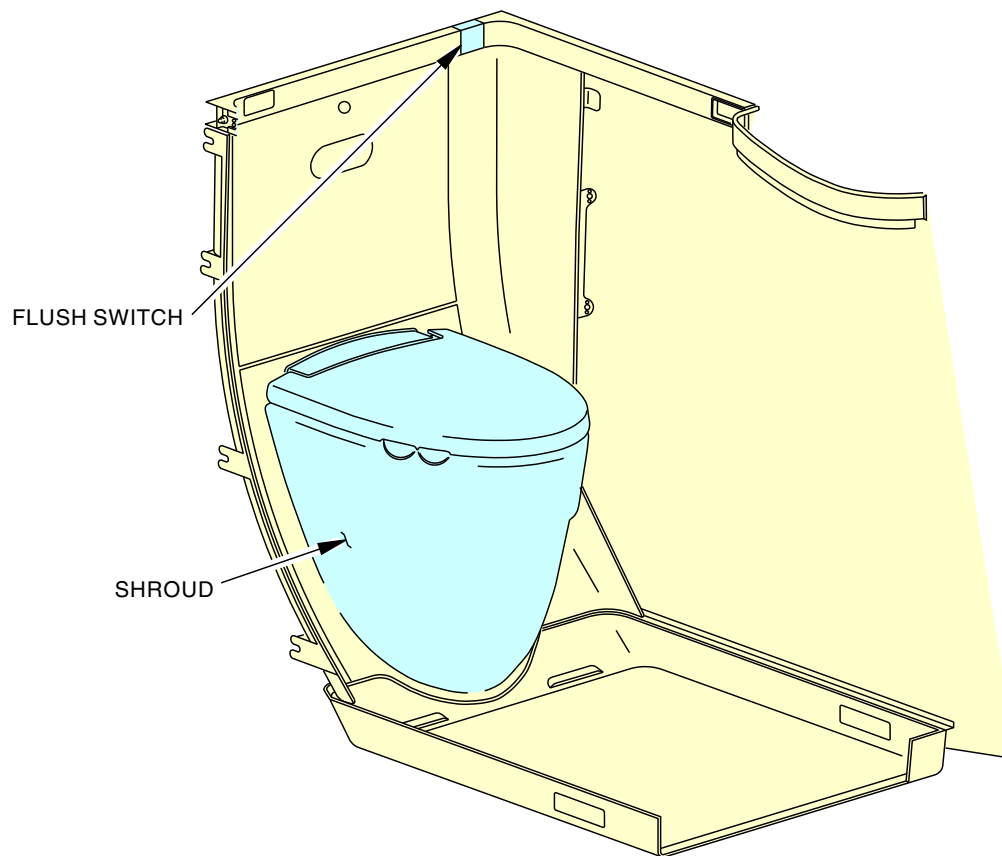
The flush switch is a momentarily closed switch.

Functional Description

The flush switch controls the vacuum waste system flush cycle. The flush switch sends a signal to the integrated system controller on the toilet assembly.

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WATER/WASTE - VACUUM WASTE SYSTEM - FLUSH SWITCH



**TOILET SHROUD
(EXAMPLE)**

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WATER/WASTE - VACUUM WASTE SYSTEM - FLUSH SWITCH

38-32-00-003

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**WATER/WASTE - VACUUM WASTE SYSTEM - TOILET ASSEMBLY****Purpose**

The toilet assembly collects human waste material. The toilet assembly operates the vacuum waste system to send the waste to the waste tank.

Location

There is a toilet assembly in each lavatory.

Physical Description

The Vacuum Toilet Assembly uses a quarter-turn studs or two hitch pins for easy removal and installation of the toilet assembly for maintenance.

The toilet assembly has these parts:

- Toilet bowl
- Toilet Support Structure
- Toilet Base Support
- Rinse Valve Assembly
- Flush Valve Assembly
- Integrated System Controller (ISC)

The toilet bowl has rinse nozzles that are bonded into the toilet bowl and cannot be replaced separately. There are two quarter-turn studs installed in front of the toilet bowl for an easy removal and installation. The toilet bowl may be replaced without removing the entire toilet assembly.

The toilet support structure have four components: two side supports, a front support and a flush valve assembly. These components are connected by an inter-locking dovetail design. When the toilet bowl is attached into its position, it locks the toilet support structure tightly together with the toilet bowl.

The toilet base supports attach the vacuum toilet assembly to the floor of the lavatory structure. There are two quarter-turn studs that attach the vacuum toilet assembly to the toilet base supports for an easy removal and installation.

The rinse valve assembly controls the flow of water to the toilet bowl rinse nozzles to clean the walls of the bowl.

The flush valve assembly is installed at the bowl rear outlet and connects the vacuum toilet assembly to the vacuum waste plumbing. The flush valve assembly is installed together with the rear support of the toilet structure.

The Integrated System Controller (ISC) is set to control flush and rinse cycles and is not adjustable during maintenance. The ISC is attached to the flush valve assembly and also located near the rinse valve assembly for minimum cable lengths. The cables of the ISC is connected to the potentiometer, flush valve assembly, rinse valve assembly and to the lavatory waste/water system.

If there is a blockage that prevents the flush valve to close, the ISC will do a re-flush cycle. The re-flush cycle moves the flush valve back to the open position to try to clear the blockage from the valve. After approximately 4 seconds, the flush valve closes. The re-flush cycle will occur a maximum of three times to try to clear the blockage from the valve. Rinse water will flow during the three re-flush cycles. If the blockage still exists, subsequent flush and re-flush cycles will continue until the blockage is clear. To conserve potable water and prevent the risk of toilet bowl overflows, rinse water will not flow from this point forward.

The toilet bowl has a layer of non-stick material. This material can be damaged if the toilet bowl cleaner fluid is allowed to stay in the toilet bowl for a long period of time.

Functional Description

The flush cycle starts when a flush signal is received from the flush switch. Each flush cycle has the following steps:

- Rinse valve opens to rinse the toilet bowl
- Rinse valve closes
- Flush valve opens to drain the toilet contents.
- Flush valve closes.

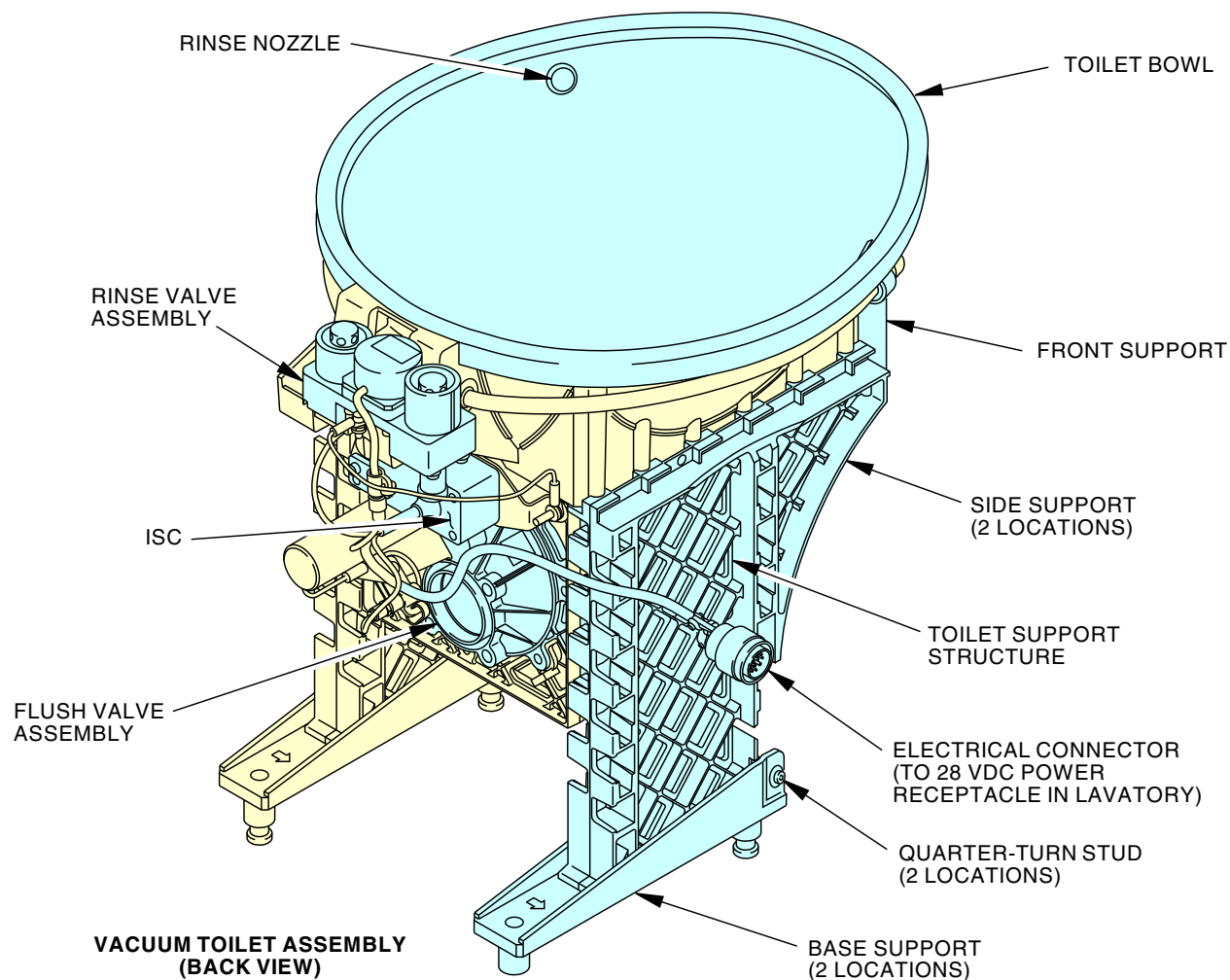
When the rinse valve is open, 5 fl-oz (148 ml) of water flushes the toilet bowl.

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EFFECTIVITY	
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WATER/WASTE - VACUUM WASTE SYSTEM - TOILET ASSEMBLY



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WATER/WASTE - VACUUM WASTE SYSTEM - TOILET ASSEMBLY

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	D633AM102-SIA

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**WATER/WASTE - VACUUM WASTE SYSTEM - FLUSH CYCLE****Lavatory Flush Cycle Operation**

The Vacuum Toilet Assembly operates with the Integrated System Controller (ISC) that controls the flush cycle. The BITE check occurs when the power is turned on.

Lavatory Flush Cycle Operation:

- The Logic Control Module (LCM) monitors the aircraft waste tank to make sure that there is a sufficient capacity in the waste tank. When the waste tank is full, the LCM cuts power to the lavatory to prevent the use of the toilet.
- The user starts a flush cycle with a flush switch in the lavatory module, which sends 28 VDC to the flush circuit of the ISC.
- The ISC starts the flush, sets the flush cycle to 15 seconds and sends 28 VDC to the Vacuum Generator Assembly (VGA) relay.
- The aircraft has an altitude switch in series between the ISC and the VGA relay. If the aircraft is on the ground or below 16,000 ft (4877 m) (18,000 ft (5486 m) on airplanes that have the ultra high altitude landing facility option), the altitude switch closes to send the 28 VDC to the VGA relay.
- The ISC opens and closes the rinse valve and flush valve assemblies in the sequence as shown. The rinse valve assembly sends about 5 fl-oz (148 ml) of rinse water to wash the sides of the toilet bowl and helps the removal of waste material.

Flush Valve Assembly Operation:

- The flush valve assembly is usually closed to keep the pressure boundary between the aircraft cabin and the aircraft waste tank.
- The flush valve assembly contains a disk that turns 90° to the open and closed position. A 28 VDC motor actuator turns the disk to the open position in approximately 0.7 seconds.
- The disk of the flush valve assembly can be manually set to the open or closed position by an override lever. The override lever is on the flush valve at the back of the toilet.

ISC Flush Cycle Operation:

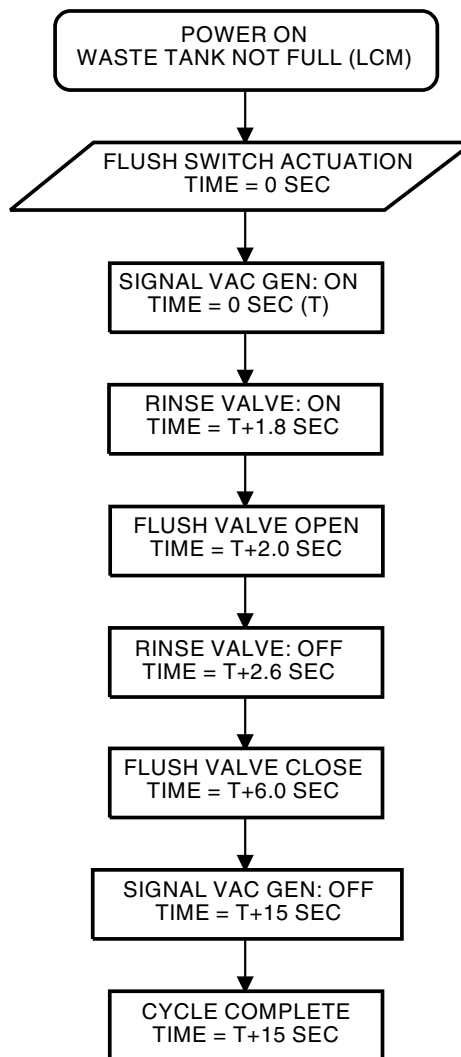
- If there is a blockage that prevents the flush valve to close, the ISC will do a re-flush cycle.
- The re-flush cycle moves the flush valve back to the open position to try to clear the blockage from the valve. After approximately 4 seconds, the flush valve closes.
- The re-flush cycle will occur a maximum of three times to try to clear the blockage from the valve. Rinse water will flow during the three re-flush cycles.
- If the blockage still exists, subsequent flush and re-flush cycles will continue until the blockage is clear.
- To conserve potable water and prevent the risk of toilet bowl overflows, rinse water will not flow from this point forward.

Flush Cycle Completion:

- After 15 seconds, the ISC removes the run signal to the VGA relay and resets the flush cycle.

EFFECTIVITY	
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WATER/WASTE - VACUUM WASTE SYSTEM - FLUSH CYCLE



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WATER/WASTE - VACUUM WASTE SYSTEM - FLUSH CYCLE

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**WATER/WASTE - VACUUM WASTE SYSTEM - COMPONENT LOCATIONS - CARGO COMPARTMENT****Location**

These components are in the aft cargo compartment, left side, behind the cargo lining:

- Waste tank
- Liquid separator
- Vacuum blower
- Vacuum check valve
- Waste drain ball valve and linkage assembly
- Waste drain valve assembly
- Waste tank rinse fitting assembly
- Waste tank rinse nozzles
- Waste tank rinse filter
- Drain line blockage removal fitting

The liquid separator is on top of the waste tank.

The vacuum blower and vacuum check valve are forward of the waste tank.
The vacuum blower and vacuum check valve are behind the sidewall panels in the aft cargo compartment.

The waste drain ball valve is below, outboard, and forward of the waste tank.

The waste drain valve assembly and the waste drain rinse fitting assembly are on the waste service panel. You can access the waste drain valve assembly and the waste drain rinse fitting assembly from below the floor.

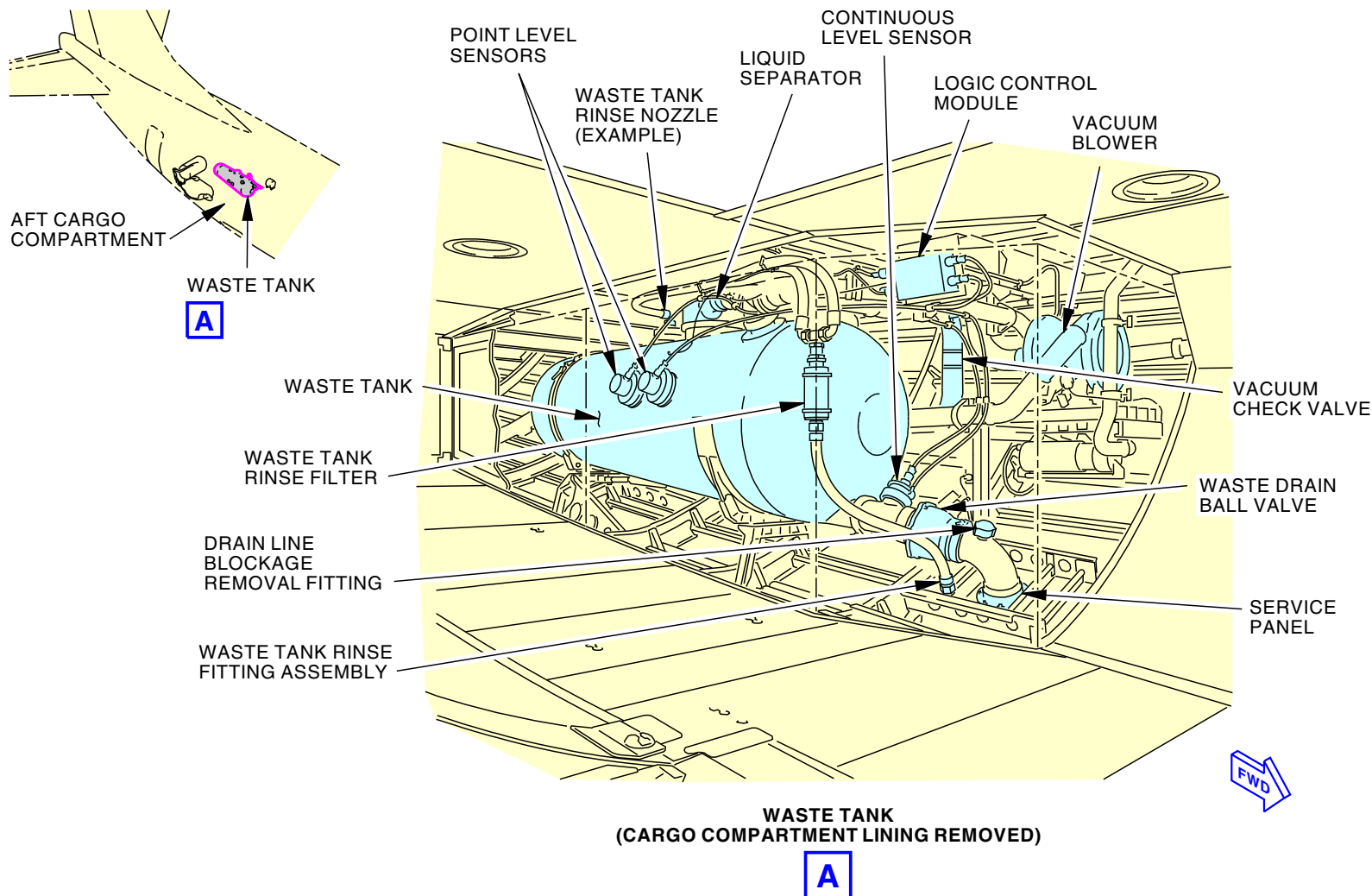
The waste tank rinse nozzles are on the top of the waste tank.

The waste tank rinse filter is along the inboard side of the waste tank.

The drain line blockage removal fitting is on the waste drain tube, forward of the waste tank.

EFFECTIVITY	
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WATER/WASTE - VACUUM WASTE SYSTEM - COMPONENT LOCATIONS - CARGO COMPARTMENT



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WATER/WASTE - VACUUM WASTE SYSTEM - COMPONENT LOCATIONS - CARGO COMPARTMENT

**WATER/WASTE - VACUUM WASTE SYSTEM - WASTE TANK****Purpose**

The waste tank holds waste material from the lavatory toilets.

Location

The waste tank is in the aft cargo compartment on the left side of the airplane. You must remove the cargo lining to get access to the waste tank.

Physical Description

The waste tank is a graphite fiber reinforced plastic container. The tank wall is graphite filaments wound over a stainless steel liner. The center section of the tank wall includes a honeycomb core.

The waste tank usable capacity is 60 gallons (227 liters).

The waste tank has fittings for these components:

- Waste tank rinse nozzle (2)
- Liquid separator
- Waste line inlet (2)
- Drain line
- Point level sensor (2).

An access cover at each end of the tank lets you examine or clean the inside of the tank.

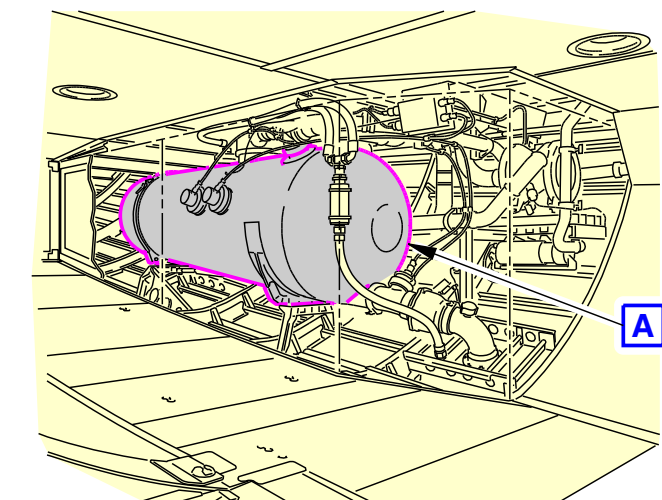
A band strap at the aft end of the tank and a tank mount on the forward end of the tank holds the waste tank to the airplane structure.

38-32-00**SIA ALL EFFECTIVITY**

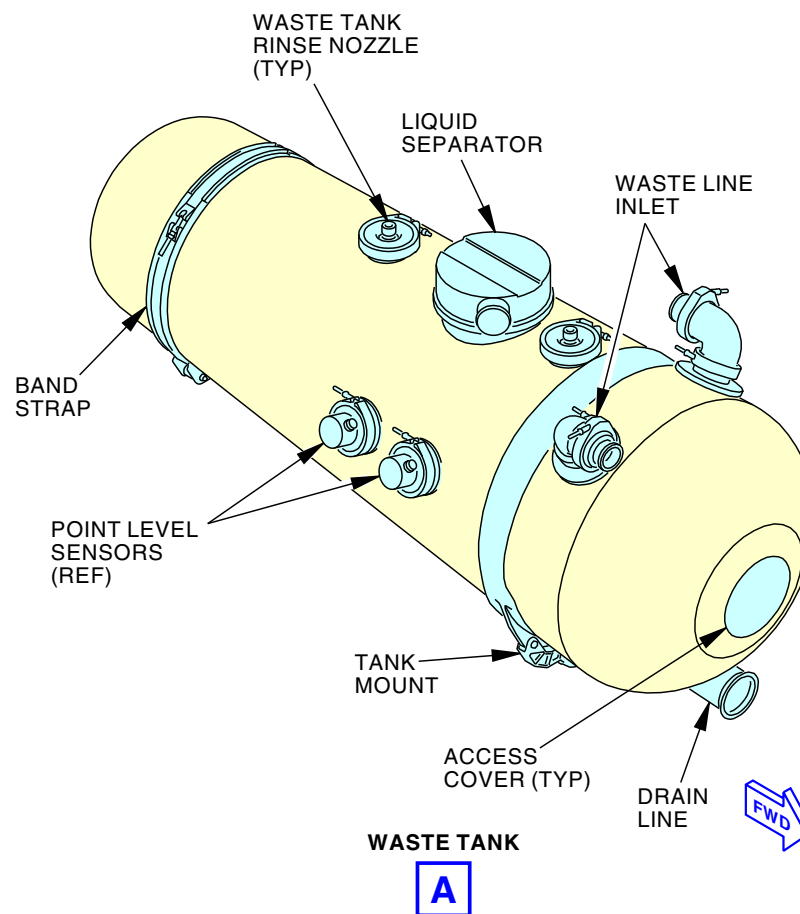
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WATER/WASTE - VACUUM WASTE SYSTEM - WASTE TANK



**LEFT SIDE OF AFT CARGO COMPARTMENT
(LOOKING OUTBOARD AND AFT)**



2370290 S00061521385_V1

WATER/WASTE - VACUUM WASTE SYSTEM - WASTE TANK

38-32-00



WATER/WASTE - VACUUM WASTE SYSTEM - LIQUID SEPARATOR

Purpose

The liquid separator removes moisture and waste particles from the waste tank air.

Location

The liquid separator is at the top of the waste tank.

Physical Description

The liquid separator has these parts:

- Separator cap
- V-band coupling
- Upper separator assembly
- Lower separator assembly
- O-ring.

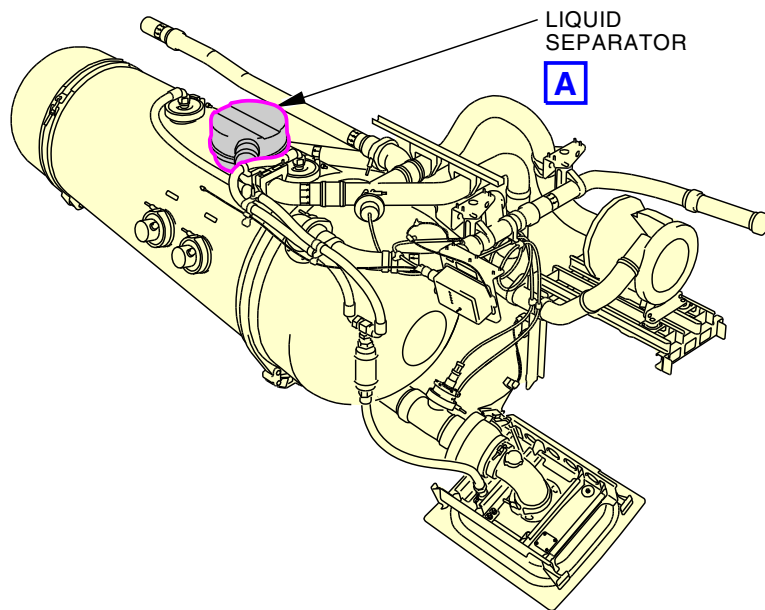
The v-band coupling attaches the liquid separator to the top of the waste tank.

Functional Description

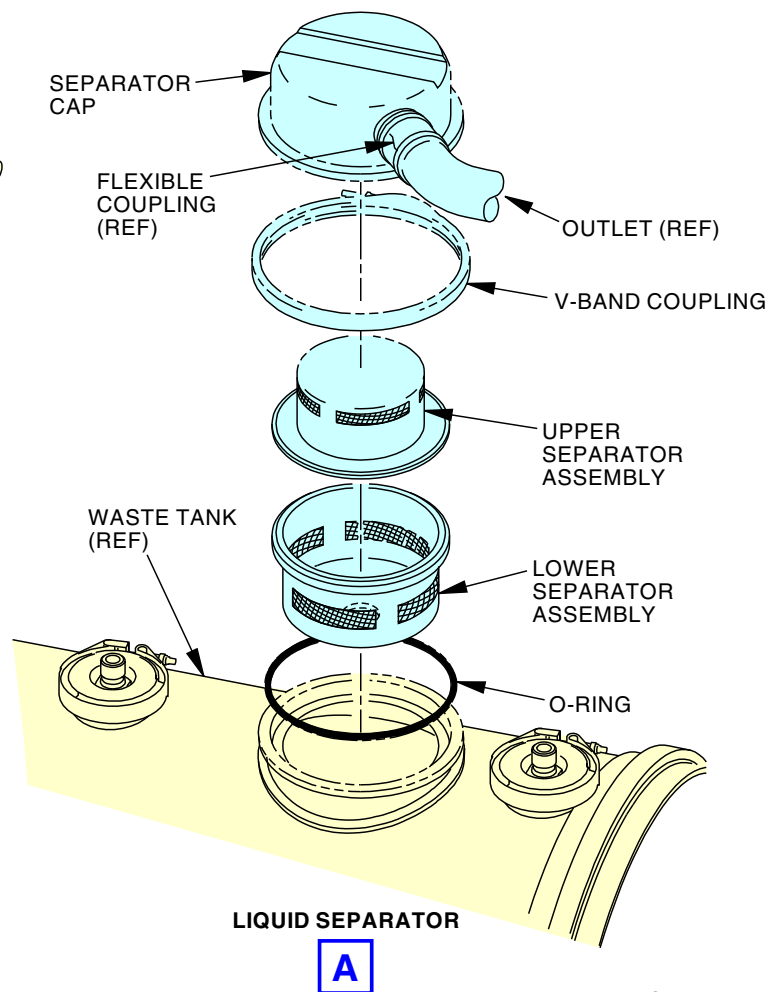
The vacuum blower pulls air out of the waste tank to an overboard port. The air goes through the liquid separator. Filters in the liquid separator remove the moisture and waste particles before the air goes through the port in the separator cap.

SIA ALL	EFFECTIVITY
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WATER/WASTE - VACUUM WASTE SYSTEM - LIQUID SEPARATOR



VACUUM WASTE SYSTEM



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WATER/WASTE - VACUUM WASTE SYSTEM - LIQUID SEPARATOR

38-32-00

**WATER/WASTE - VACUUM WASTE SYSTEM - VACUUM BLOWER****Purpose**

The vacuum blower removes air from the waste tank.

Location

The vacuum blower is in the aft cargo compartment on the left side. The vacuum blower is on a shelf forward of the waste tank.

Physical Description

The vacuum blower is a three phase, high-speed, motor operated fan.

The vacuum blower has two flexible coupling hoses that attach with clamps. Four fasteners on shock mounts and a jumper cable attach the blower to the shelf.

The vacuum blower has these features:

- Intake port
- Exhaust port
- Electrical connection.

Functional Description

The vacuum blower removes the air from the waste tank and blows it out of the airplane. Removal of the air from the waste tank causes the pressure in the waste tank to decrease. When a flush valve opens, higher pressure cabin air pushes lavatory toilet waste to the waste tank.

Three thermal switches give overheat protection. The switches are wired in series and operate at 270F (132C). If a switch operates, it stops motor operation. The switches reset when the temperature decreases to less than their set point.

Operation

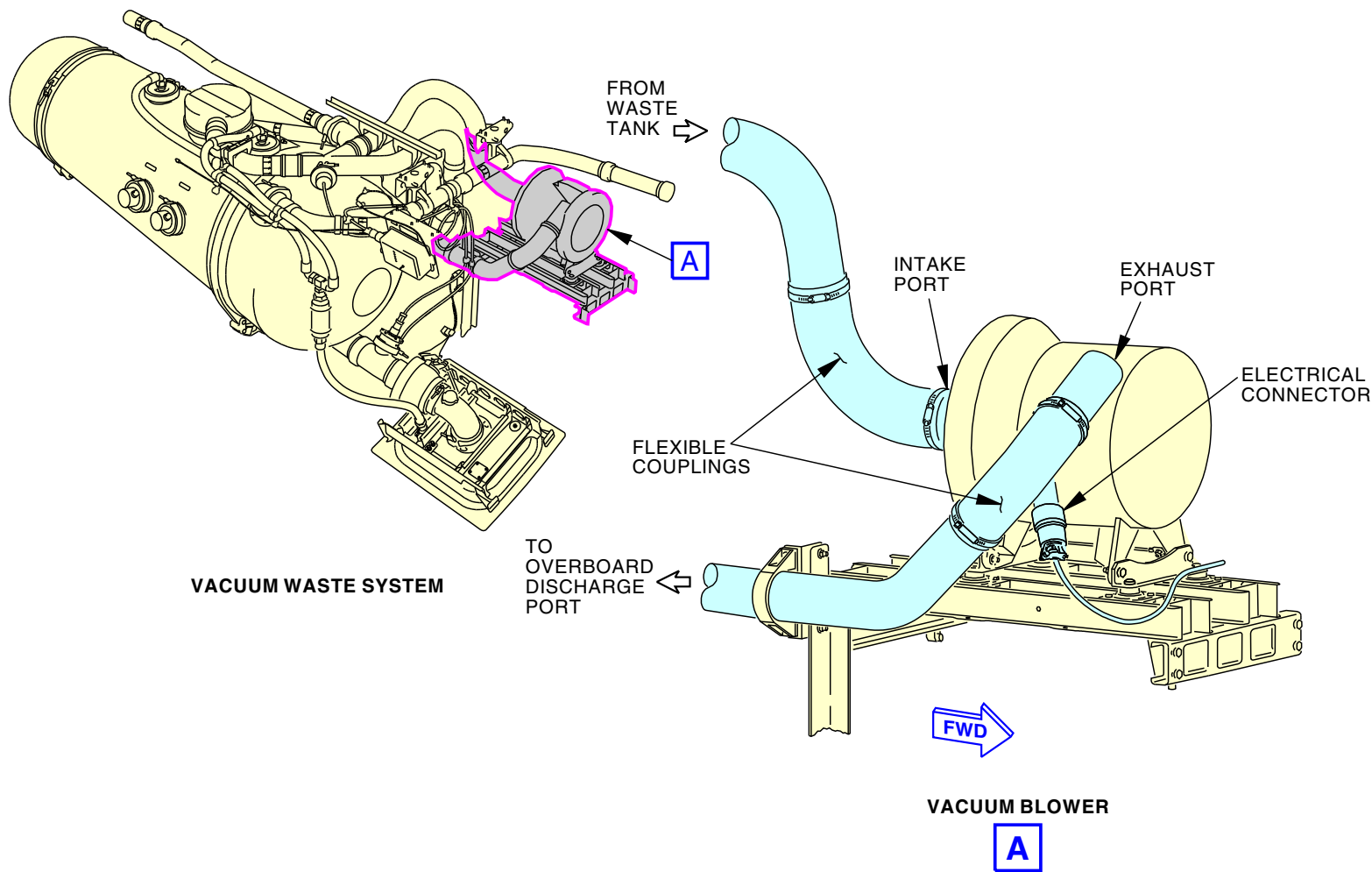
The vacuum blower operates when you push the flush switch and the airplane is below 16,000 ft (4877 m) or 18,000 ft (5486 m) on airplanes that have the ultra high altitude landing facility option.

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EFFECTIVITY	
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WATER/WASTE - VACUUM WASTE SYSTEM - VACUUM BLOWER



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WATER/WASTE - VACUUM WASTE SYSTEM - VACUUM BLOWER

**WATER/WASTE - VACUUM WASTE SYSTEM - VACUUM BLOWER BAROMETRIC SWITCH****Purpose**

The vacuum blower barometric switch opens when the altitude is above 16,000 ft (4877 m) or 18,000 ft (5486 m) on airplanes that have the ultra high altitude landing facility option. The open switch does not let the vacuum blower come on.

Location

The vacuum blower barometric switch is in the jackscrew compartment. You get access to it through the section 48 access and blowout door.

The barometric switch attaches to structure on the left side of the fuselage.

Physical Description

The barometric switch has an aneroid capsule and an electrical connector.

Functional Description

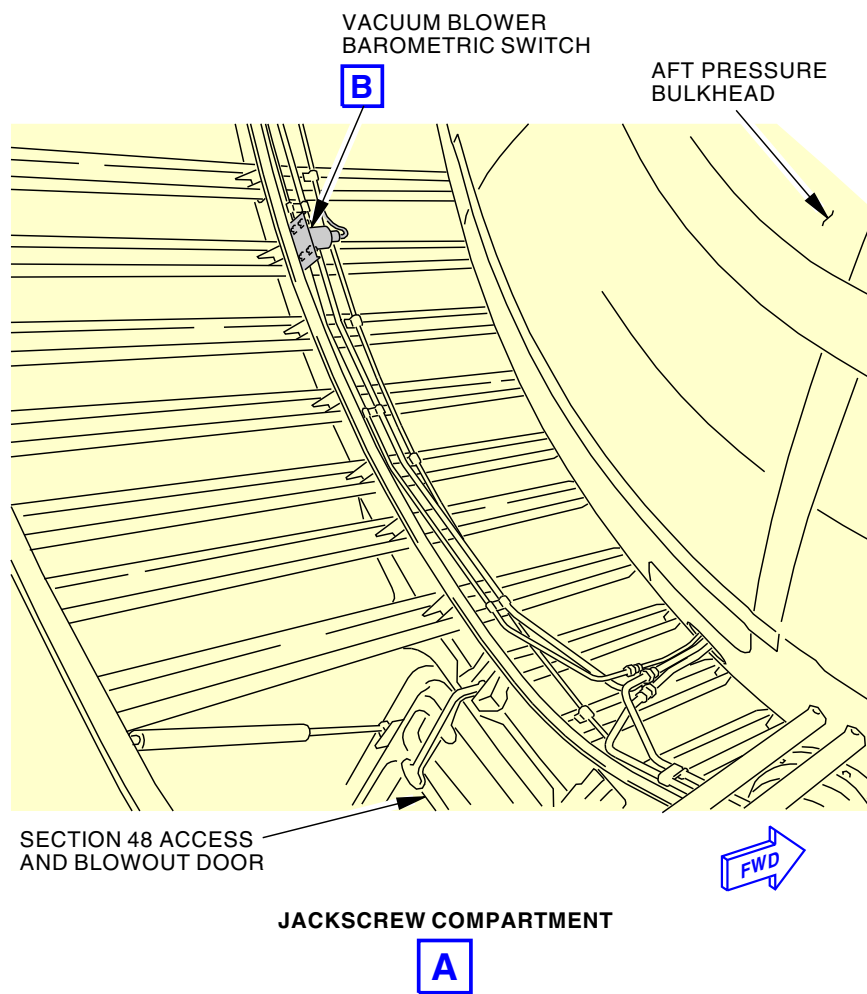
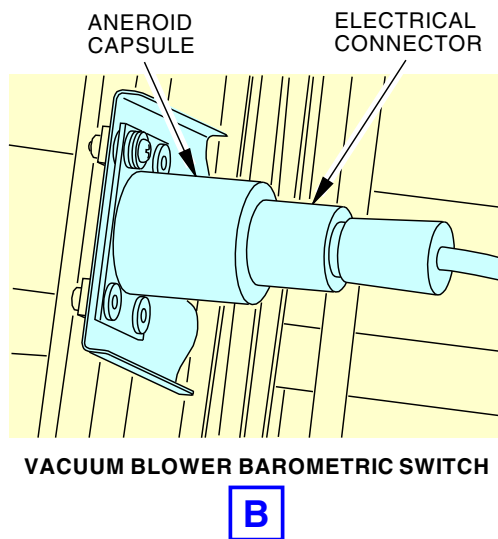
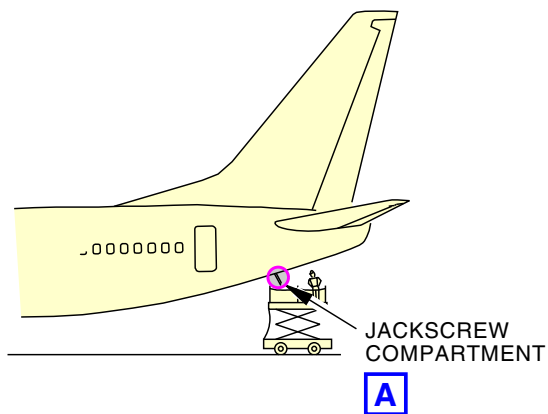
The capsule senses the ambient air pressure. As the pressure outside decreases, the capsule expands. When the capsule expands to a specific size, it opens an internal switch.

Interfaces

The vacuum blower barometric switch is part of the control circuit for vacuum blower operation.

EFFECTIVITY	
SIA ALL	

WATER/WASTE - VACUUM WASTE SYSTEM - VACUUM BLOWER BAROMETRIC SWITCH



2370293 S00061521391_V1

WATER/WASTE - VACUUM WASTE SYSTEM - VACUUM BLOWER BAROMETRIC SWITCH

**WATER/WASTE - VACUUM WASTE SYSTEM - VACUUM BLOWER - FUNCTIONAL DESCRIPTION****Power**

Transfer bus 1 supplies 115v ac three-phase power for vacuum blower operation.

The control power is 28v dc from bus 1.

Functional Description

The vacuum blower operates when the airplane is below 16,000 ft (4877 m) or 18,000 ft (5486 m) on airplanes that have the ultra high altitude landing facility option and these conditions are true:

- Waste drain ball valve is closed
- Waste tank is not full
- Lavatory flush switch operates.

The barometric pressure switch senses ambient pressure. When the airplane is below 16,000 ft (4877 m) or 18,000 ft (5486 m), the barometric pressure switch is closed.

The waste drain ball valve proximity switch is closed when the waste drain ball valve is closed.

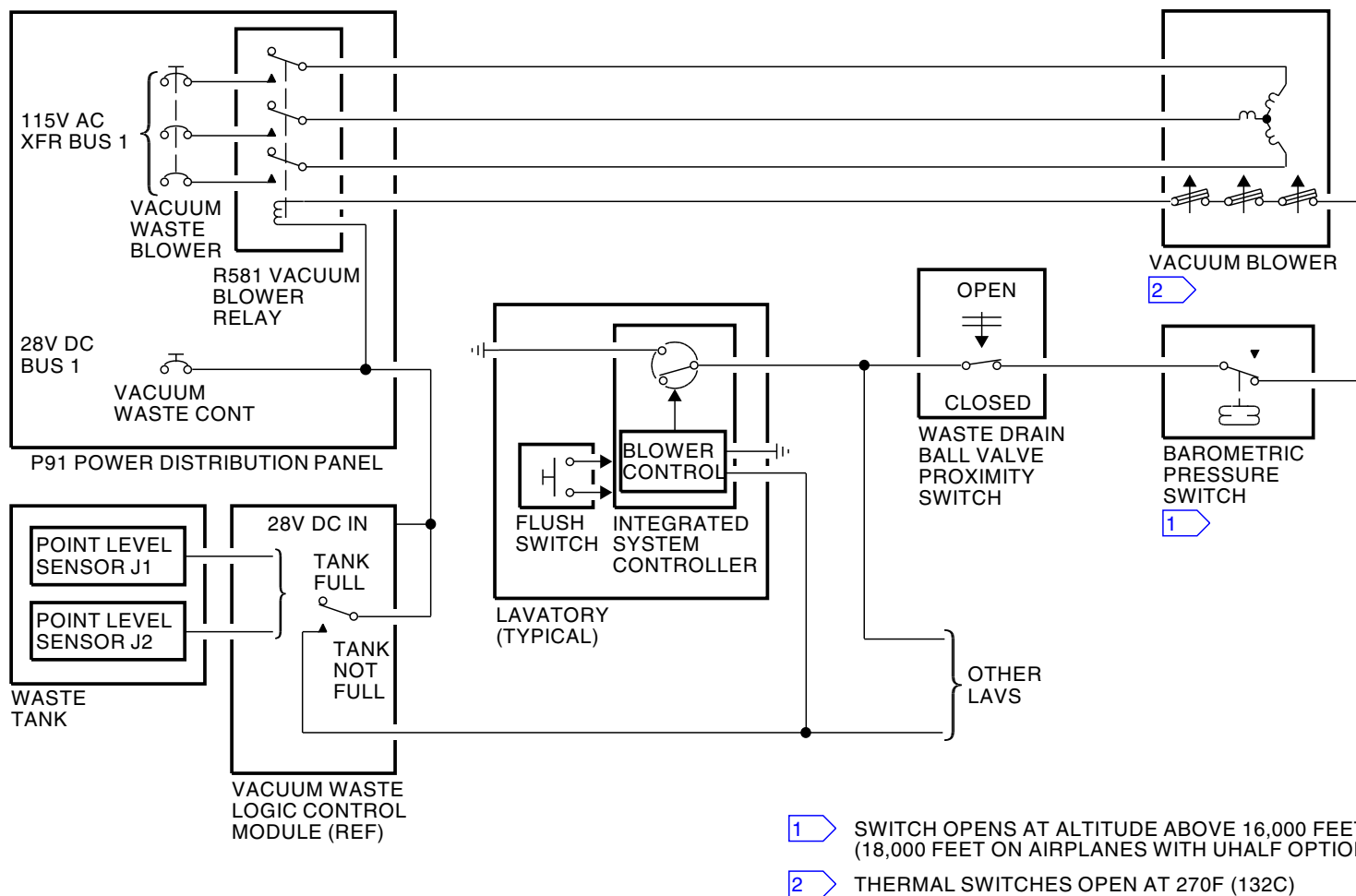
If the tank is not full, the logic control module (LCM) sends an enable signal to each integrated system controller (ISC). Each lavatory flush switch sends a signal to the ISC. The operational logic in each ISC completes the circuit for the vacuum blower to operate.

The barometric pressure switch stops operation of the vacuum blower when the airplane is above 16,000 ft (4877 m) or 18,000 ft (5486 m).

Three thermal switches in the vacuum blower stop the motor operation if the temperature in the vacuum blower is more than 270°F (132°C). The thermal switches reset when the vacuum blower temperature decreases to less than 270°F (132°C).

EFFECTIVITY	
SIA ALL	

WATER/WASTE - VACUUM WASTE SYSTEM - VACUUM BLOWER - FUNCTIONAL DESCRIPTION



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WATER/WASTE - VACUUM WASTE SYSTEM - VACUUM BLOWER - FUNCTIONAL DESCRIPTION

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SIA ALL EFFECTIVITY

D633AM102-SIA

ECCN 9E991 BOEING PROPRIETARY - See title page for details

**WATER/WASTE - VACUUM WASTE SYSTEM - VACUUM CHECK VALVE****Purpose**

The vacuum check valve prevents the pull of air from the waste tank vent port by the vacuum blower.

Location

The vacuum check valve is in the aft cargo compartment on the left side. The vacuum check valve is in the exhaust duct, upstream of the waste tank vent port.

Physical Description

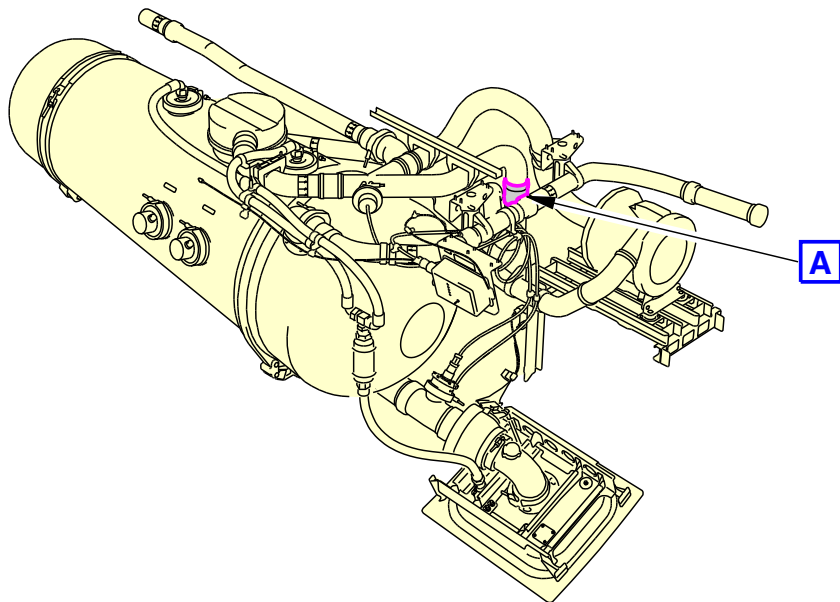
The vacuum check valve is a flapper type valve. A flow direction arrow shows the correct installation orientation.

Functional Description

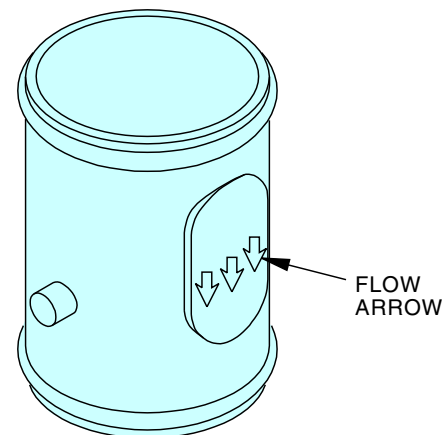
The vacuum check valve is spring-loaded to the closed position. The vacuum check valve opens when there is sufficient differential pressure between the waste tank and the waste tank vent port.

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WATER/WASTE - VACUUM WASTE SYSTEM - VACUUM CHECK VALVE



VACUUM WASTE SYSTEM



VACUUM CHECK VALVE



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WATER/WASTE - VACUUM WASTE SYSTEM - VACUUM CHECK VALVE

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ECCN 9E991 BOEING PROPRIETARY - See title page for details

38-32-00

**WATER/WASTE - VACUUM WASTE SYSTEM - WASTE DRAIN BALL VALVE & LINKAGE ASSEMBLY****Purpose**

The waste drain ball valve and linkage assembly control the flow of waste out of the waste tank.

Location

The waste drain ball valve and linkage assembly are in the aft cargo compartment on the left side. The waste drain ball valve is in the drain line, between the waste tank and the waste service panel. The linkage assembly is adjacent to the waste drain ball valve, between the valve and the waste service panel.

Physical Description

The waste drain ball valve connects to the drain lines with V-band clamps and gask-o-seal gaskets.

The waste drain ball valve is a manually-operated two- position ball valve. It has these parts:

- Ball valve
- Actuator lever
- Proximity switch.

There is an electrical connection at the proximity switch.

The linkage assembly has these parts:

- Control rod
- Uniball assembly
- Handle (not shown).

Functional Description

You pull the handle at the waste service panel to open the waste drain ball valve. The handle transmits the movement through the control rod to the actuator lever. The actuator lever moves the waste drain ball valve.

The proximity switch stops the operation of the vacuum blower when the waste drain ball valve is not closed.

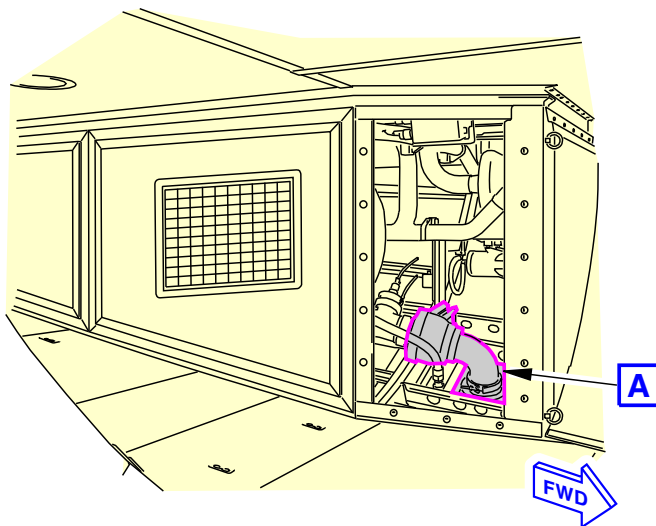
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ECCN 9E991 BOEING PROPRIETARY - See title page for details

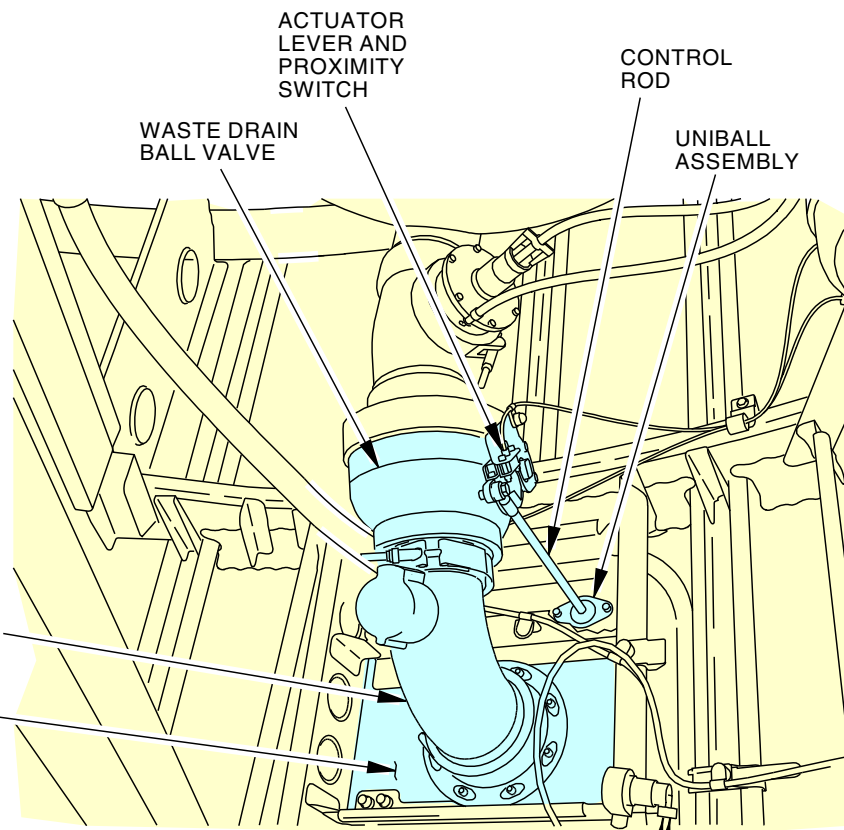
WATER/WASTE - VACUUM WASTE SYSTEM - WASTE DRAIN BALL VALVE & LINKAGE ASSEMBLY



**AFT CARGO COMPARTMENT LEFT SIDE
(VIEW IN THE OUTBOARD DIRECTION)**

A

DRAIN ELBOW
SERVICE PANEL



**WASTE DRAIN BALL VALVE AND LINKAGE ASSEMBLY
(HEATER BLANKET NOT SHOWN)**

A

2370297 S00061521397_V1

WATER/WASTE - VACUUM WASTE SYSTEM - WASTE DRAIN BALL VALVE & LINKAGE ASSEMBLY

38-32-00

38-32-00-013

SIA ALL

EFFECTIVITY

D633AM102-SIA

ECCN 9E991 BOEING PROPRIETARY - See title page for details

**WATER/WASTE - VACUUM WASTE SYSTEM - WASTE SERVICE PANEL****Purpose**

The waste service panel lets you drain the vacuum waste system. The waste service panel also lets you rinse the waste tank.

Location

The waste service panel is in the aft, lower-left area of the fuselage.

Physical Description

These are the components in the waste service panel:

- Waste drain valve assembly
- Waste drain ball valve control handle
- Waste tank rinse fitting assembly.

Two snap-latches hold the waste service panel closed.

You can get access to the waste service panel components from the aft cargo compartment. The service panel components are forward and below the waste tank.

Functional Description

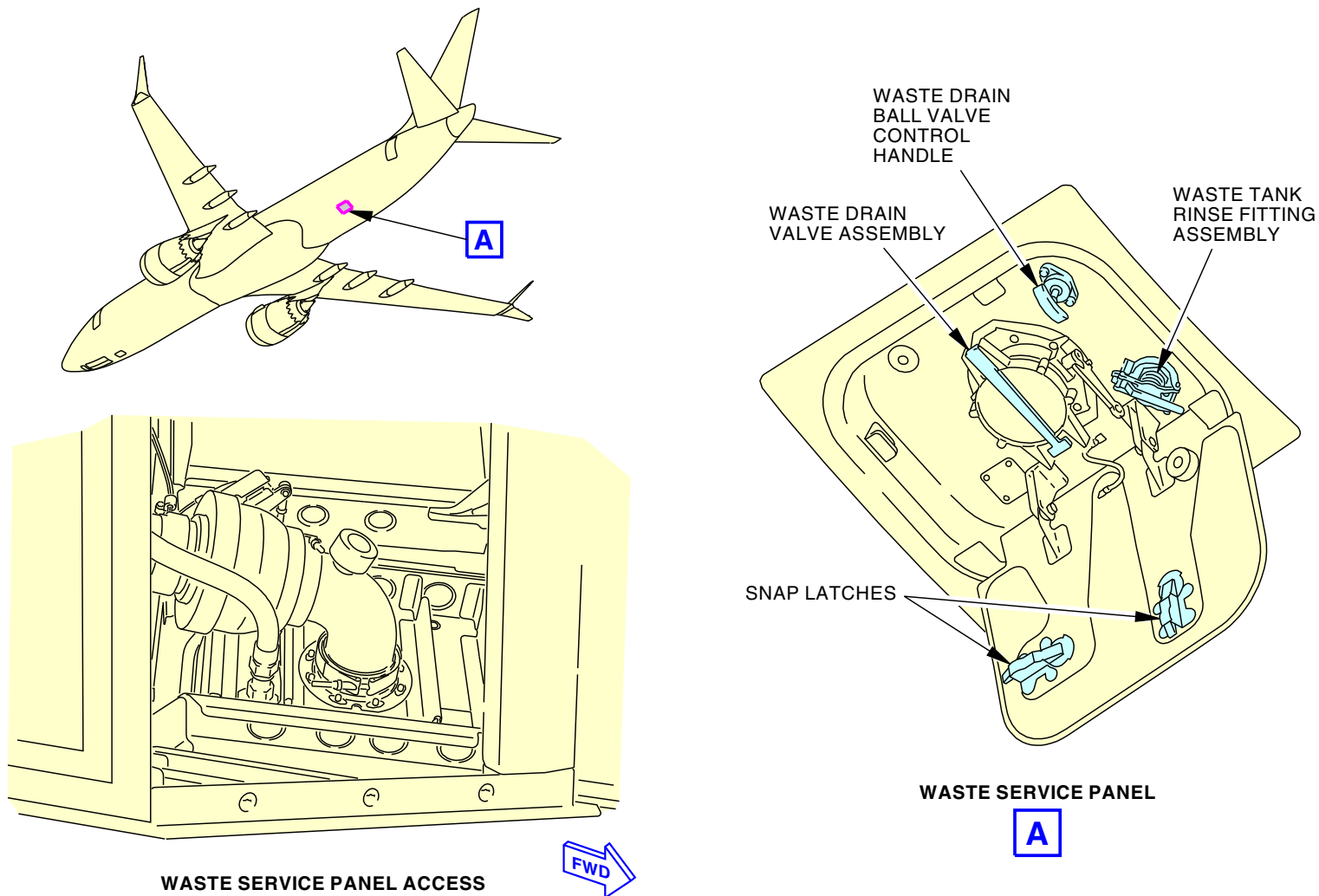
The waste drain valve assembly connects to the waste drain elbow. The waste tank rinse fitting assembly connects to the rinse hose. The control handle lets you open the waste drain ball valve.

To drain the waste tank, you open the waste drain ball valve.

The proximity switch on the waste drain ball valve stops operation of the vacuum blower when the waste drain ball valve is open.

EFFECTIVITY	
SIA ALL	

WATER/WASTE - VACUUM WASTE SYSTEM - WASTE SERVICE PANEL



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WATER/WASTE - VACUUM WASTE SYSTEM - WASTE SERVICE PANEL

38-32-00

**WATER/WASTE - VACUUM WASTE SYSTEM - WASTE DRAIN VALVE ASSEMBLY****Purpose**

The waste drain valve assembly lets you drain the vacuum waste system.

Location

The waste drain valve assembly is part of the waste service panel at the aft left side of the airplane.

Physical Description

The waste drain valve assembly has these parts:

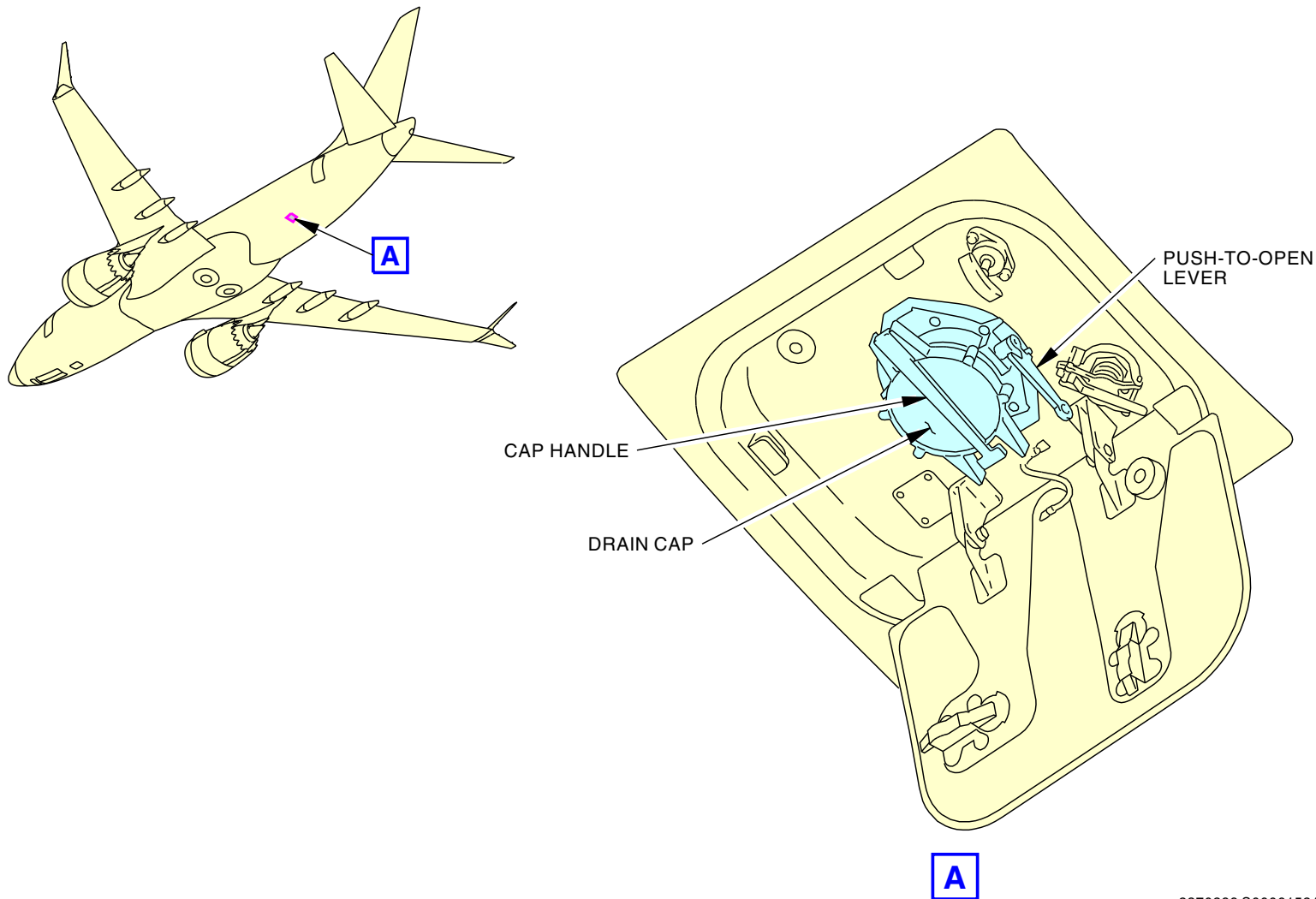
- Quick-disconnect fitting (not shown)
- Push-to-open lever
- Flapper valve (not shown)
- Drain cap
- Cap handle.

Functional Description

You open the drain cap and attach the waste drain hose to the quick-disconnect fitting. The push-to-open lever opens the flapper valve and lets waste drain from the vacuum waste system.

EFFECTIVITY	
SIA ALL	

WATER/WASTE - VACUUM WASTE SYSTEM - WASTE DRAIN VALVE ASSEMBLY



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WATER/WASTE - VACUUM WASTE SYSTEM - WASTE DRAIN VALVE ASSEMBLY

38-32-00

**WATER/WASTE - VACUUM WASTE SYSTEM - WASTE TANK RINSE FITTING ASSEMBLY****Purpose**

The waste tank rinse fitting assembly is the connection for the rinse water hose.

Location

The waste tank rinse fitting assembly is in the waste service panel at the aft fuselage lower left side.

Physical Description

The waste tank rinse fitting assembly has these parts:

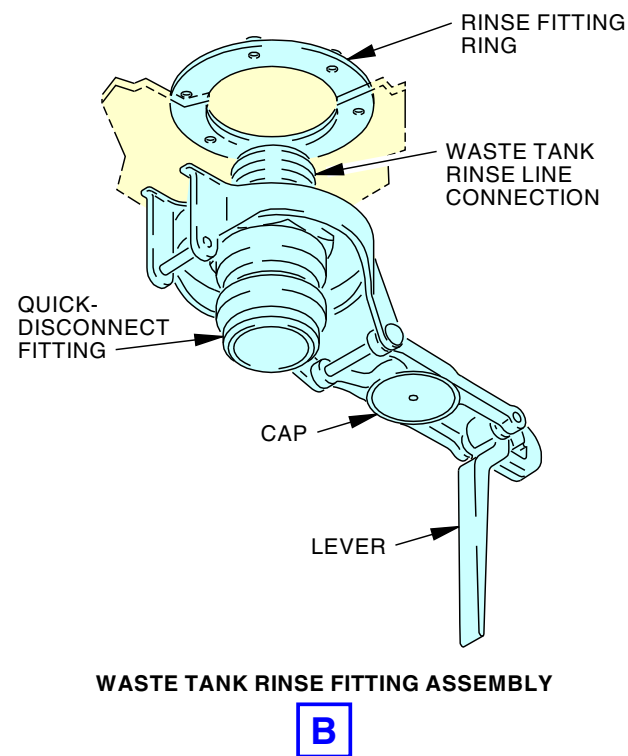
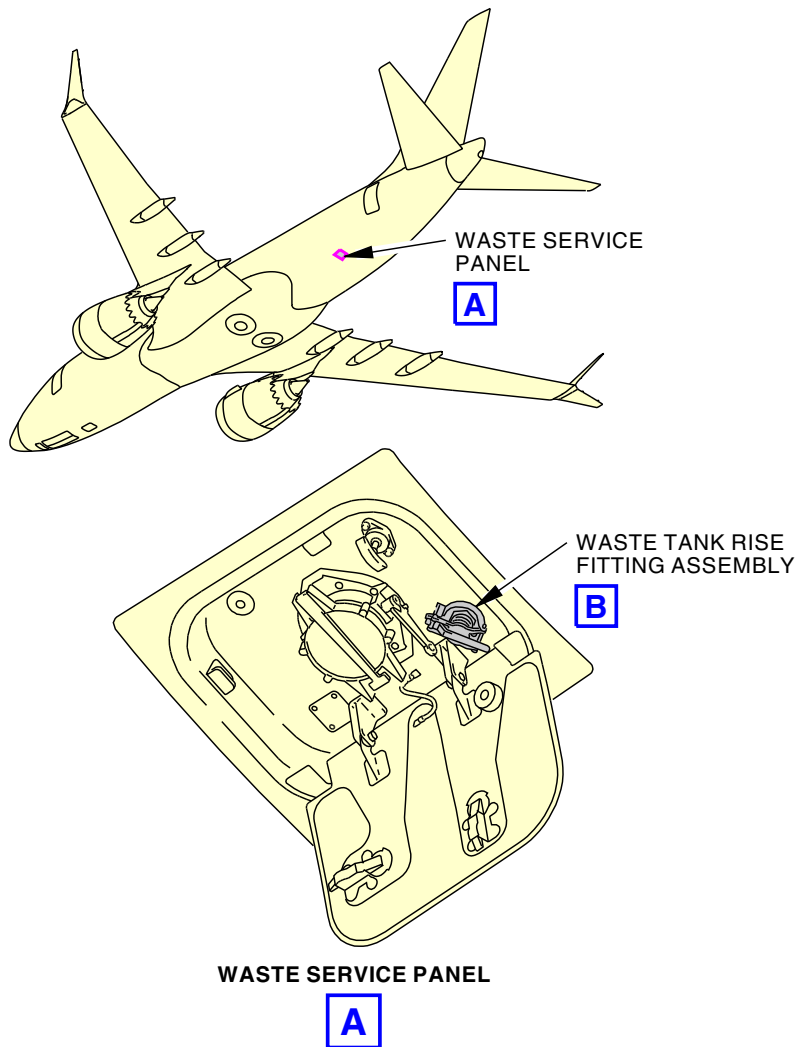
- Waste tank rinse line connection
- Rinse fitting ring
- Quick-disconnect fitting
- Cap
- Lever.

Functional Description

You open the cap and attach the rinse water hose to the quick-disconnect fitting. Rinse water can then be supplied to flush the point level sensors and waste tank.

EFFECTIVITY	
SIA ALL	

WATER/WASTE - VACUUM WASTE SYSTEM - WASTE TANK RINSE FITTING ASSEMBLY



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WATER/WASTE - VACUUM WASTE SYSTEM - WASTE TANK RINSE FITTING ASSEMBLY

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ECCN 9E991 BOEING PROPRIETARY - See title page for details

38-32-00

**WATER/WASTE - VACUUM WASTE SYSTEM - WASTE TANK RINSE FILTER****Purpose**

The waste tank rinse filter removes contamination from the rinse water.

Location

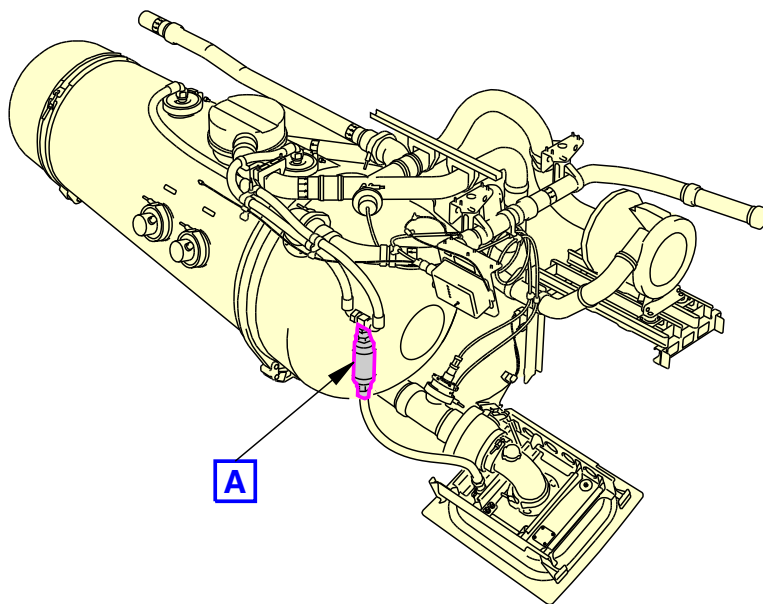
The waste tank rinse filter is in the aft cargo compartment. You remove the waste access panel to get access to the waste tank rinse filter. The waste tank rinse filter is at the forward end of the waste tank.

Physical Description

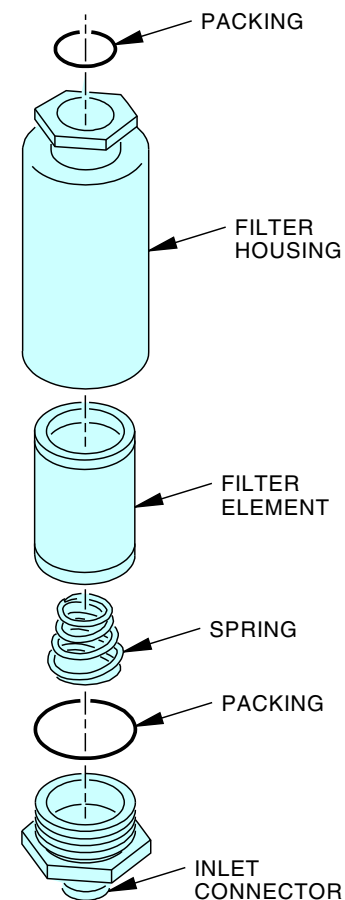
A filter element in the waste tank rinse filter removes contamination from the rinse water. If the contamination is not removed, the contamination could clog the waste tank rinse nozzles.

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WATER/WASTE - VACUUM WASTE SYSTEM - WASTE TANK RINSE FILTER



VACUUM WASTE SYSTEM



WASTE TANK RINSE FILTER

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WATER/WASTE - VACUUM WASTE SYSTEM - WASTE TANK RINSE FILTER

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SIA ALL	EFFECTIVITY
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ECCN 9E991 BOEING PROPRIETARY - See title page for details

38-32-00



WATER/WASTE - VACUUM WASTE SYSTEM - WASTE TANK RINSE NOZZLE

Purpose

The waste tank rinse nozzles spray rinse water at the point level sensors and at the waste tank interior surface.

Location

The waste tank rinse nozzles attach to fittings at the top of the waste tank.

Physical Description

The waste tank rinse nozzle is a rotating sphere with small holes.

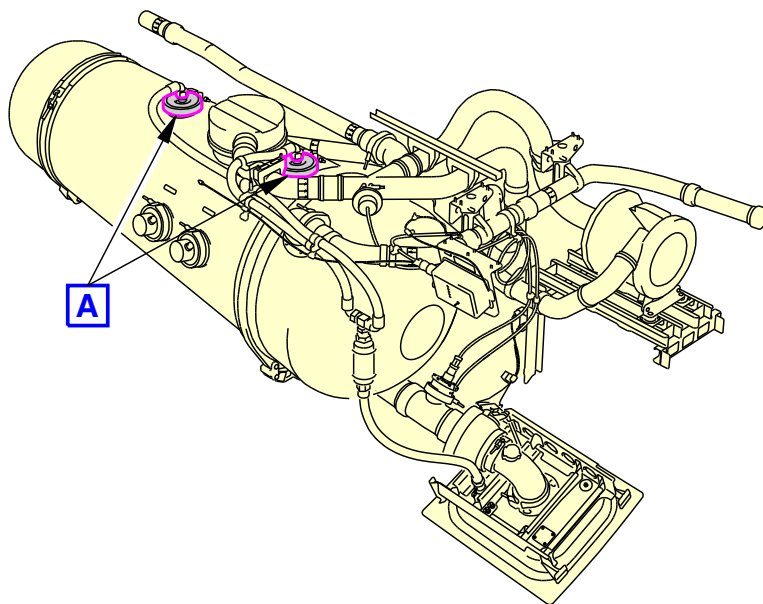
Functional Description

The rinse water supplied to the waste tank rinse nozzles is pressurized by the waste service vehicle.

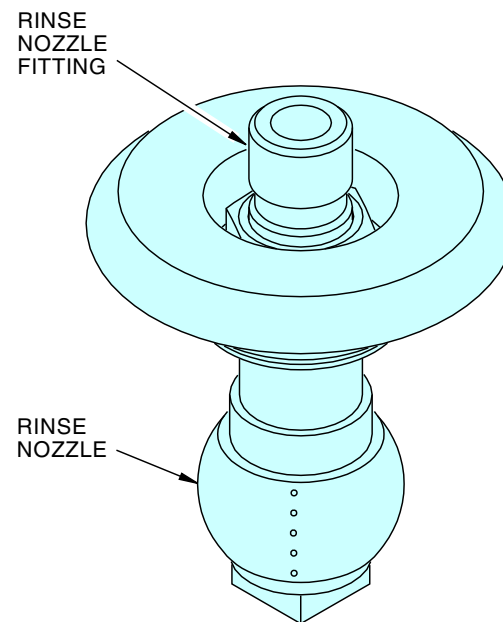
The pressurized rinse water goes through the rinse nozzle fitting and exits through small diameter holes on the rinse nozzle. The force of the rinse water leaving the small diameter holes causes the rinse nozzle to rotate. The rotating rinse nozzle sprays the rinse water around the inside of the waste tank. The rinse water spray flushes the point level sensors and waste tank.

EFFECTIVITY	
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WATER/WASTE - VACUUM WASTE SYSTEM - WASTE TANK RINSE NOZZLE



VACUUM WASTE SYSTEM



WASTE TANK RINSE NOZZLE

A

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WATER/WASTE - VACUUM WASTE SYSTEM - WASTE TANK RINSE NOZZLE

38-32-00

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SIA ALL

EFFECTIVITY

D633AM102-SIA

ECCN 9E991 BOEING PROPRIETARY - See title page for details

**WATER/WASTE - VACUUM WASTE SYSTEM - DRAIN LINE BLOCKAGE REMOVAL FITTING****Purpose**

The drain line blockage removal fitting supplies a tool connection to let air pressure clean a blocked waste tank drain line.

Location

The drain line blockage removal fitting is in the aft cargo compartment. You must remove the waste access panel to get access to the drain line blockage removal fitting. The drain line blockage removal fitting is on the waste drain tube elbow between the waste drain valve and the waste drain ball valve.

Physical Description

The drain line blockage removal fitting is a single, threaded port. The fitting port connects with the blockage removal tool. The fitting port is closed with a threaded cap when not in use.

Operation

Air pressure is put into the waste drain elbow tube through the port with the blockage removal tool. The pressure moves the blockage into the tank where it can be removed manually or by servicing.

Functional Description

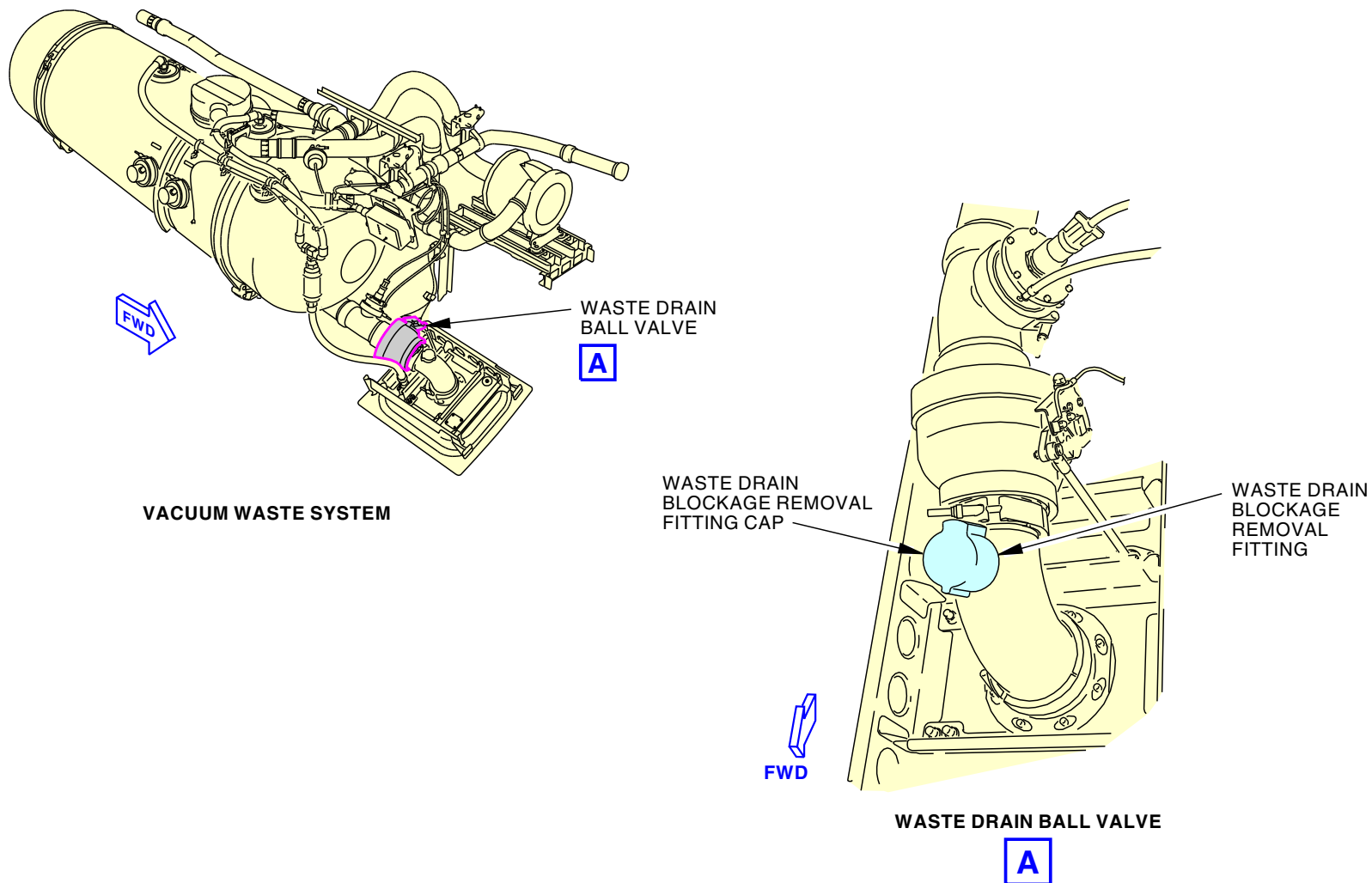
An external air source supplies air to the blockage removal tool which provides the pressure to clear the blockage.

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EFFECTIVITY	
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WATER/WASTE - VACUUM WASTE SYSTEM - DRAIN LINE BLOCKAGE REMOVAL FITTING



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WATER/WASTE - VACUUM WASTE SYSTEM - DRAIN LINE BLOCKAGE REMOVAL FITTING

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SIA ALL

EFFECTIVITY

D633AM102-SIA

ECCN 9E991 BOEING PROPRIETARY - See title page for details



WATER/WASTE - VACUUM WASTE SYSTEM - VACUUM WASTE LINE CLEAN-OUT FITTING

Purpose

The vacuum waste line clean-out fitting lets you clean a blockage between the forward cargo compartment and the waste tank.

Location

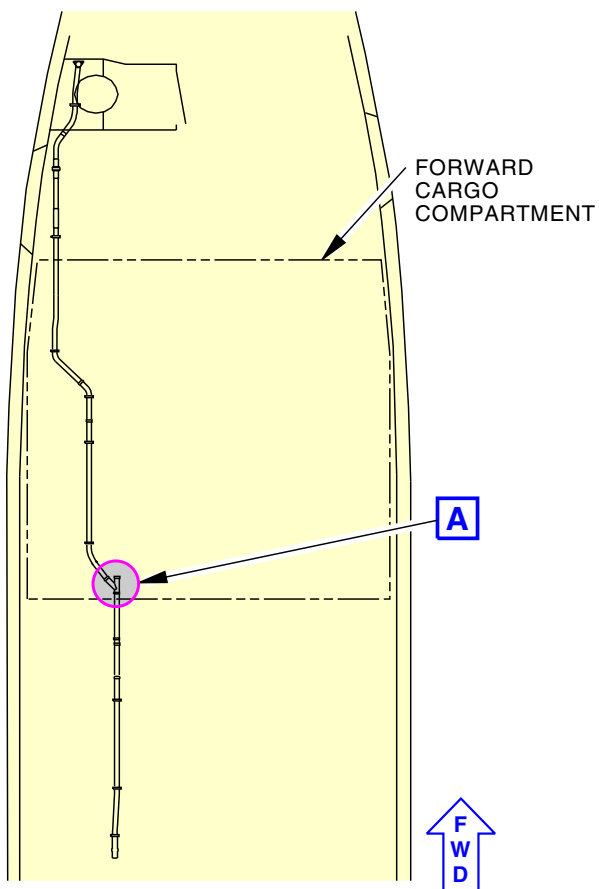
The vacuum waste line clean-out fitting is in the forward cargo compartment. Remove the cargo compartment ceiling lining to get access to the vacuum waste line clean-out fitting.

Functional Description

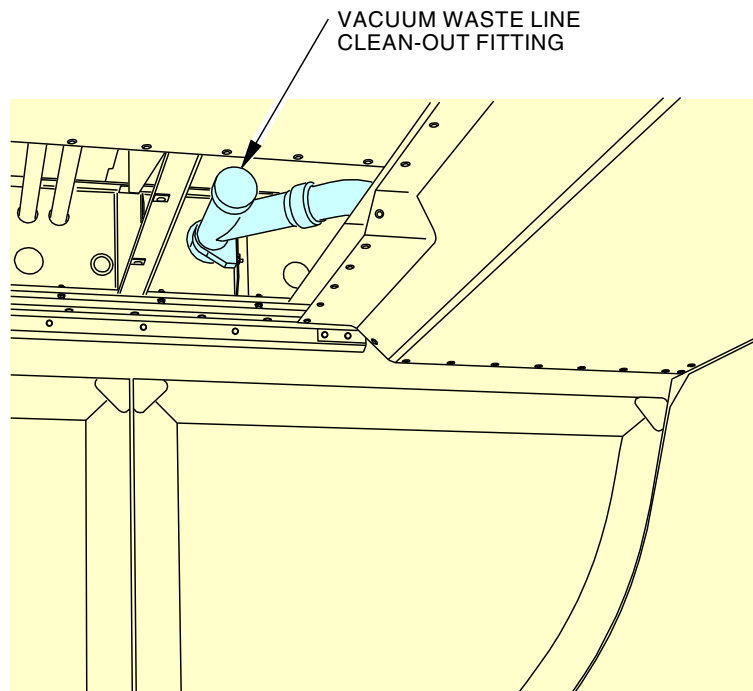
When the vacuum waste line clean-out fitting is removed, you can put a plumbers snake or a kinetic air-ram equipment in the vacuum waste line to remove the blockage.

EFFECTIVITY	
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WATER/WASTE - VACUUM WASTE SYSTEM - VACUUM WASTE LINE CLEAN-OUT FITTING



FORWARD VACUUM WASTE LINE



**FORWARD CARGO COMPARTMENT
(VIEW IN THE AFT DIRECTION)**

A

2370304 S00061521411_V1

WATER/WASTE - VACUUM WASTE SYSTEM - VACUUM WASTE LINE CLEAN-OUT FITTING

38-32-00

**WATER/WASTE - VACUUM WASTE SYSTEM - FUNCTIONAL DESCRIPTION****Vacuum Toilet Assemblies**

The operation of the flush switch sends a signal to the Integrated System Controller (ISC). The ISC controls the toilet flush and rinse cycles and sends a signal to activate the Vacuum Generator Assembly (VGA). The Logic Control Module (LCM) sends 28 VDC to the ISC if the waste tank has sufficient capacity. The ISC starts a 15 second flush cycle and supply a ground circuit of the vacuum generator relay to start the vacuum generator.

Waste Tank Assembly

The waste tank collects the waste from the lavatory toilets.

Differential pressure causes the toilet bowl contents to flow from the toilet to the waste tank. The vacuum blower or cabin differential pressure supplies the differential pressure for the waste tank.

The vacuum check valve prevents the pull of ambient air in from the waste tank vent port by the vacuum blower.

Waste System Servicing

You service the waste tank from the waste service panel.

Attach the waste drain hose to the waste drain valve and open the waste drain ball valve.

When the tank is empty, attach the rinse hose to the waste tank rinse fitting. Then pressurize the rinse water supply. Rinse water flows through the waste tank rinse filter and two rinse nozzles.

The waste tank rinse nozzles spray water on the inside of the tank to clean the point level sensors and waste tank.

Add chemical precharge after the waste tank is fully drained and flushed.

The waste drain ball valve proximity switch stops the operation of the vacuum blower when the waste drain ball valve is open.

You use the drain line blockage removal fitting to remove a blockage in the waste tank drain line. An air pressure tool can be connected to the fitting on the drain line elbow and used to push the blockage out of the drain line.

Interfaces

The ISC receives the signal from the Logic Control Module (LCM) to operate the toilet components. The LCM disables the power to the lavatory to stop flush cycles when the waste tank is full. The LCM monitors the two point level sensors to find if the waste tank is full.

If the ISC is enabled, a flush cycle starts with the operation of the flush switch.

The ISC sets the flush cycle to 15 seconds and sends 28 VDC to the Vacuum Generator Assembly (VGA) relay. The VGA relay is an interface device of the toilet to the vacuum waste system. The VGA is an electric-driven turbine that supplies the vacuum when differential cabin pressure versus atmospheric pressure is not sufficient.

The flush switch sends a signal to the ISC. The ISC then sends a signal to operate the vacuum blower for 15 seconds. The signal goes through the waste drain ball valve proximity switch and the vacuum blower barometric switch. The waste drain ball valve proximity switch and vacuum blower barometric switch must be closed for the vacuum blower to operate.

The waste drain ball valve proximity switch is closed when the waste drain ball valve is closed.

The barometric switch is closed when the airplane is below 16,000 ft (4877 m) or 18,000 ft (5486 m) on airplanes that have the ultra high altitude landing facility option.

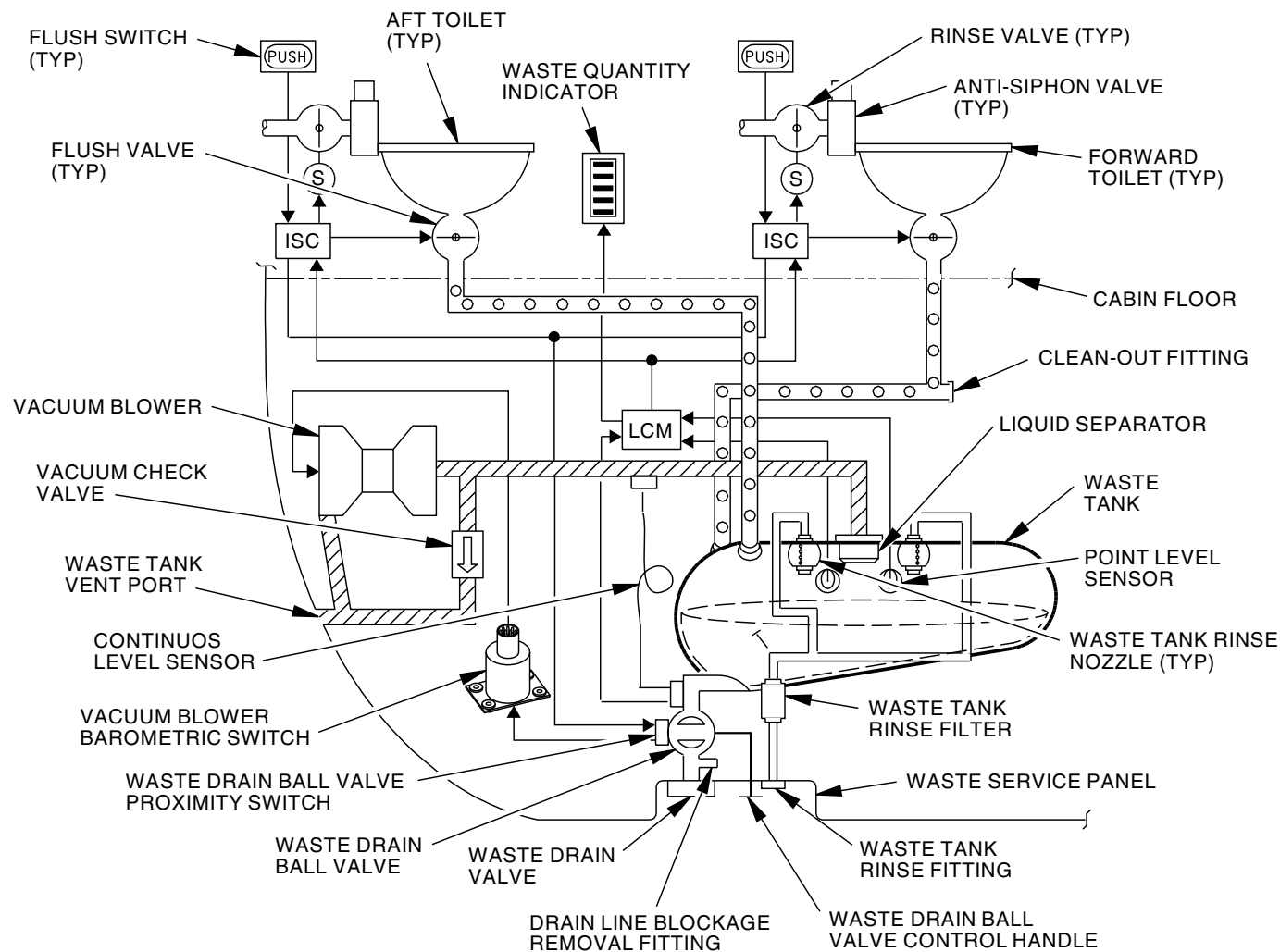
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WATER/WASTE - VACUUM WASTE SYSTEM - FUNCTIONAL DESCRIPTION



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WATER/WASTE - VACUUM WASTE SYSTEM - FUNCTIONAL DESCRIPTION

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WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - INTRODUCTION

Purpose

The waste tank quantity indication system measures and shows the quantity of waste in the waste tank.

- REF - reference
- TYP - typical
- v - volts

General

These components are in the waste tank quantity indication system:

- Waste tank point level sensor (2)
- Waste tank continuous level sensor
- Logic control module (LCM)
- Waste quantity gauge
- Sensor fouled light
- Waste quantity indicator.

The waste tank quantity indication system does these functions:

- Monitors and shows the level of waste in the waste tank
- Stops operation of the toilets when the waste tank is full
- Gives indication when the lavatories stop operation for waste tank full condition
- Gives indication when the sensors are dirty
- Built-In-Test Equipment (BITE).

Abbreviations and Acronyms

- ac - alternating current
- BIT - built in test
- C - Celsius
- dc - direct current
- F - Fahrenheit
- FWD - forward
- LCM - logic control module
- mm - millimeter

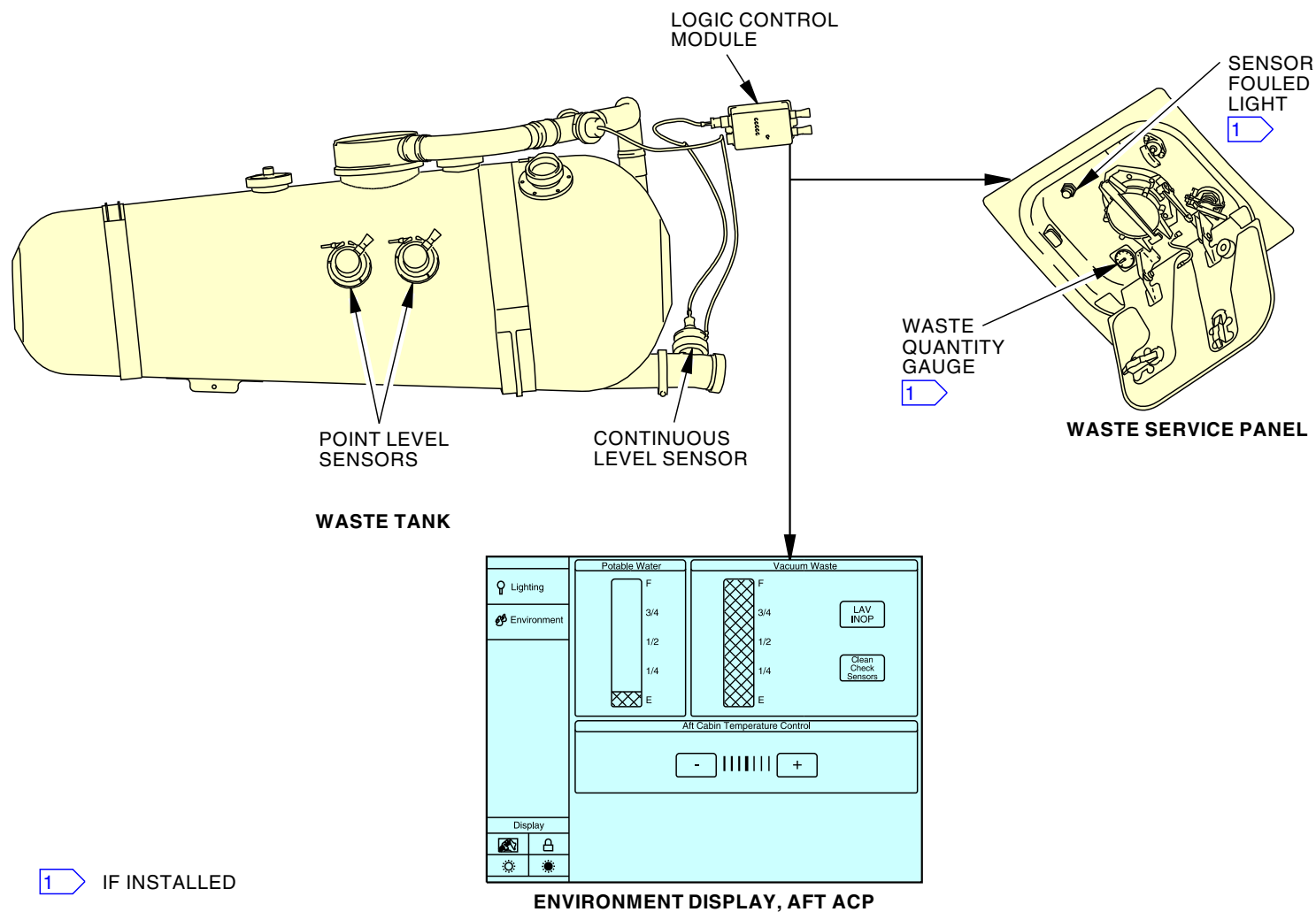
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WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - INTRODUCTION



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WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - INTRODUCTION

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ECCN 9E991 BOEING PROPRIETARY - See title page for details

**WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - POINT LEVEL SENSOR****Purpose**

The point level sensor gives a signal to the Logic Control Module (LCM) when the waste tank is full.

Location

There are two point level sensors in the aft cargo compartment. You remove the waste tank access panel to get access to the point level sensors. The point level sensors are on the center inboard side of the waste tank.

Physical Description

The point level sensor is a capacitance type sensor. It has a sensor face and an electrical connector. A V-band clamp attaches the point level sensors to the waste tank. The gask-o-seal and packing prevent leakage around the sensors.

Functional Description

The LCM supplies 15v dc power to the point level sensors. The point level sensors supply these signals to the LCM:

- Tank not full (0v dc)
- Tank full (15v dc)
- Sensor fouled (1.83 Hz)
- Built-In-Test Equipment (BITE) test results.

When the waste tank level is below a point level sensor, the point level sensor sends a tank not full signal to the LCM.

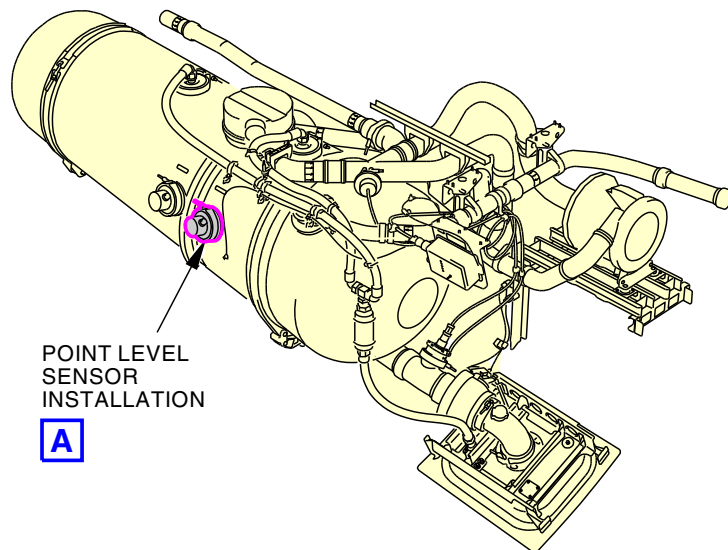
When the waste tank level covers 50 percent of the face of a point level sensor, the point level sensor sends a tank full signal to the LCM.

The point level sensors can tell the difference between the build-up of waste material on a point level sensor and a full tank. A point-level sensor sends a sensor fouled signal to the LCM when the build-up is more than 1/8-inch (3.2 mm). If the build-up becomes more than 3/8-inch (9.5 mm), the point level sensor sends a tank full signal to the LCM.

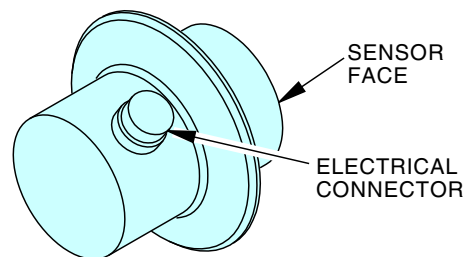
When a system BITE input signal is received from the LCM, the point level sensor starts a BITE test. If the point level sensor passes the BITE test, a 0.0v dc signal goes to the LCM. If the point level sensor fails the BITE test, a 1.83 Hz signal goes to the LCM.

EFFECTIVITY	
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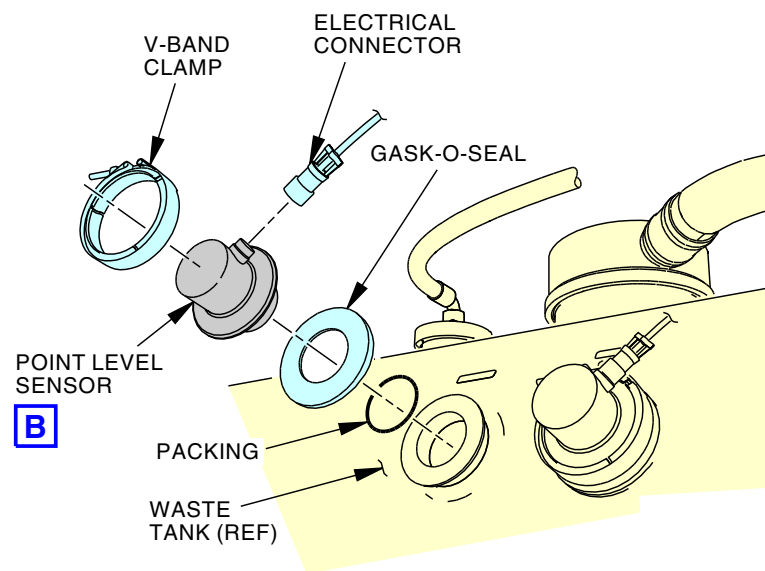
WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - POINT LEVEL SENSOR



VACUUM WASTE SYSTEM



POINT LEVEL SENSOR



POINT LEVEL SENSOR INSTALLATION

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WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - POINT LEVEL SENSOR

**WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - CONTINUOUS LEVEL SENSOR****Purpose**

The continuous level sensor measures the level of waste material in the waste tank.

Location

The continuous level sensor is in the aft cargo compartment. You get access to the continuous level sensor through the waste tank access panel on the left side of the cargo compartment.

The sensor module connects to the drain line at the forward lower end of the waste tank. The remote diaphragm connects to the vacuum line at the forward upper end of the waste tank.

Physical Description

The continuous level sensor is a capacitance-type pressure sensor. The sensor has these parts:

- Remote diaphragm
- Sensor module
- Capillary tube
- Electrical connector.

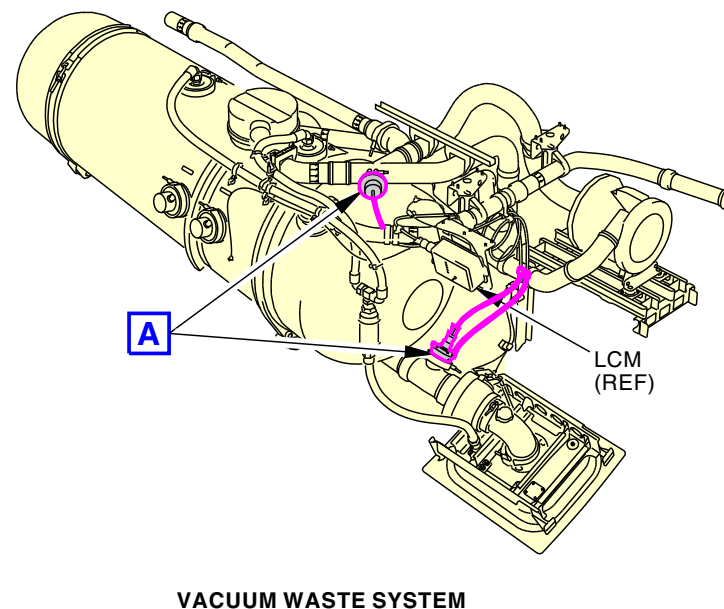
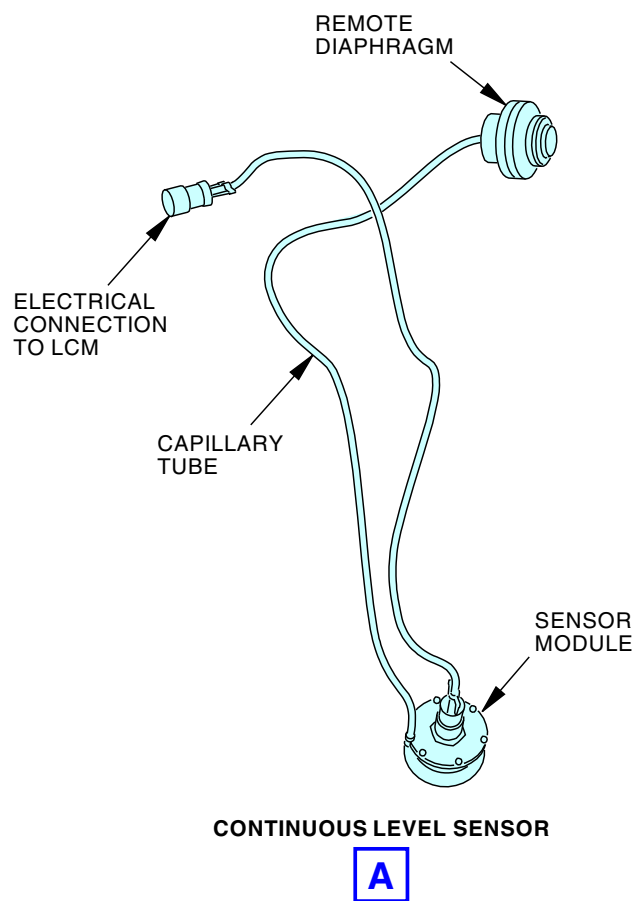
The capillary tube connects the remote diaphragm to the sensor module. The sensor module connects to the Logic Control Module (LCM).

Functional Description

The sensor module measures the liquid (head) pressure at the bottom of the waste tank. The remote diaphragm measures the pressure of the air in the waste tank. The pressure transmits through the oil-filled capillary tube to the sensor module. The sensor module finds the difference between the air pressure in the waste tank and the liquid pressure in the drain line. The sensor uses the difference to calculate the level of waste in the waste tank. The output signal goes to the LCM.

EFFECTIVITY	
SIA ALL	

WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - CONTINUOUS LEVEL SENSOR



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WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - CONTINUOUS LEVEL SENSOR

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**WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - LOGIC CONTROL MODULE****Purpose**

The Logic Control Module (LCM) measures the level of waste in the waste tank. The LCM stops the operation of the vacuum waste system when the waste tank is full.

Location

The LCM is in the aft cargo compartment. You get access to the LCM through the waste tank access panel on the left side of the cargo compartment.

The LCM is above and forward of the waste tank.

Physical Description

The LCM has these features:

- Electrical connectors (4)
- Test switch
- Indicator lights (5).

Two of the electrical connectors are for the point level sensors. One electrical connector is for the continuous level sensor. One electrical connector is for the power and signal connections to the airplane.

The test switch is a three-position (center off) momentary switch. In the UP position (TEST SENSORS), the LCM starts a power-up sequence which includes a full system Built-In-Test Equipment (BITE) test. In the DOWN position (TEST LAMPS), a test of the LEDs occurs. If the test switch is held down for more than 10 seconds and the point level sensors are disconnected, an auto zero adjustment of the continuous level sensor will occur.

The five indicator lights are LEDs. These are the labels for the LEDs:

- SENSOR J1
- SENSOR J2
- SENSOR J3
- TANK FULL

- POWER ON.

The SENSOR J1 and SENSOR J2 LEDs show the status of the two point level sensors. The SENSOR J3 LED shows the status of the continuous level sensor. The TANK FULL LED shows the status of the waste tank and the LCM. The POWER ON LED shows that system power is on.

The POWER ON LED is green. The other LEDs are red.

Functional Description

The LCM gets data from the two point level sensors and the continuous level sensor. The LCM uses the data from the continuous level sensor to calculate the level of the waste in the waste tank.

The LCM sends a waste tank level signal to the waste tank quantity indicator and the service panel waste tank quantity gauge. The waste tank quantity indicator is on the fwd and aft attendant panels and the service panel waste tank quantity gauge is on the waste service panel.

A tank full signal from the continuous level sensor does not affect toilet operation.

The two point level sensors are level switches. When the level of the waste in the waste tank covers 50 percent of the face of a point level sensor, the point level sensor sends a tank full signal to the LCM. When both point level sensors send a tank full signal to the LCM, the LCM stops the operation of the toilets.

The LCM uses a delay of 20 seconds on the point level sensor data before it stops the operation of the toilets. This delay makes sure that there is a stable tank full signal and prevents the effects of momentary tank full signals due to airplane maneuvers or turbulence.

In normal circumstances, both point level sensors must send the tank full signal to the LCM for the LCM to stop toilet operation. However, when one point level sensor has an error, the LCM uses a tank full signal from the other point level sensor to stop toilet operation. If both point level sensors have an error, the LCM will stop toilet operation.

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SIA ALL EFFECTIVITY

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ECCN 9E991 BOEING PROPRIETARY - See title page for details

**WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - LOGIC CONTROL MODULE****Lamp Test**

You do a lamp test when you put the test switch in the TEST LAMPS position.

During the lamp test, the four software-controlled LEDs on the LCM come on. The green POWER ON LED will be on when system power is on.

System BITE

When system power comes on, the LCM does a power-up BITE test. The power-up BITE test makes sure that these components operate correctly:

- Point level sensors
- Continuous level sensor
- LCM.

During the power-up BITE test, the LEDs flash momentarily and then come on for three seconds. If all components pass the test, all LEDs go off. If a component did not pass the test, the related LED flashes at a two Hz rate. The TANK FULL LED shows the results of the BITE test for the LCM.

To do the power-up BITE test, put the LCM test switch in the TEST SENSORS position. You can also do the power-up BITE test with the LAV INOP Test switch on the fwd attendants panel Maintenance screen.

After the LCM completes the power-up BITE test, it then starts a continuous monitor cycle. This monitor cycle occurs every five milliseconds. The monitor cycle makes sure that the point level sensors and LCM are functional. The continuous level sensor does not do a test during the monitoring cycle.

If the continuous level sensor fails after the power-up BITE test is complete, the failure will not be sensed. An erroneous signal from the continuous level sensor will not affect toilet operation. You can detect errors in the continuous level sensor when you do the power-up BITE test.

LED Status

The four red LEDs show system status. System status updates every 250 milliseconds.

These are the conditions necessary for LED status:

LED	STATUS		
	OFF	ON	FLASHING ^{*[1]}
SENSOR J1	Tank not full.	Tank full or sensor disconnected.	Sensor fouled or sensor failed BIT.
SENSOR J2	Tank not full.	Tank full or sensor disconnected.	Sensor fouled or sensor failed BIT.
SENSOR J3	Tank not full.	Tank is above full.	Sensor failed BIT.
TANK FULL	Tank not full, ISC powered.	Tank full, ISC power off.	Two Hz flash: LCM failed BIT. Eight Hz flash: fatal error.

*[1] Flashing rate is two Hz unless otherwise noted.

Auto Zero Adjustment

You must do the auto zero adjustment when one of these conditions occur:

- When you move or replace the continuous level sensor
- When you move or replace the waste tank.

You use the LCM to do the auto zero adjustment. The auto zero adjustment calibrates the LCM for variations between the remote diaphragm and sensor module on the continuous level sensor.

To do the auto zero adjustment, you must make sure that the waste tank is fully drained. You must disconnect the point level sensors. Then you put the test switch in the TEST LAMPS position for more than 10 seconds.

These lights will go off for three seconds to show that the test is complete:

- SENSOR J1
- SENSOR J2
- SENSOR J3
- TANK FULL.

The POWER ON light will stay on.

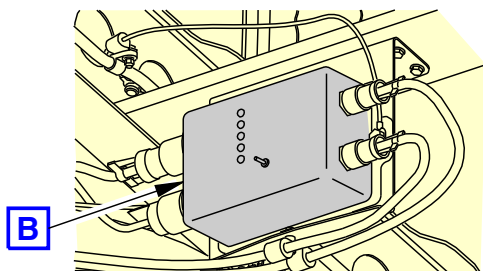
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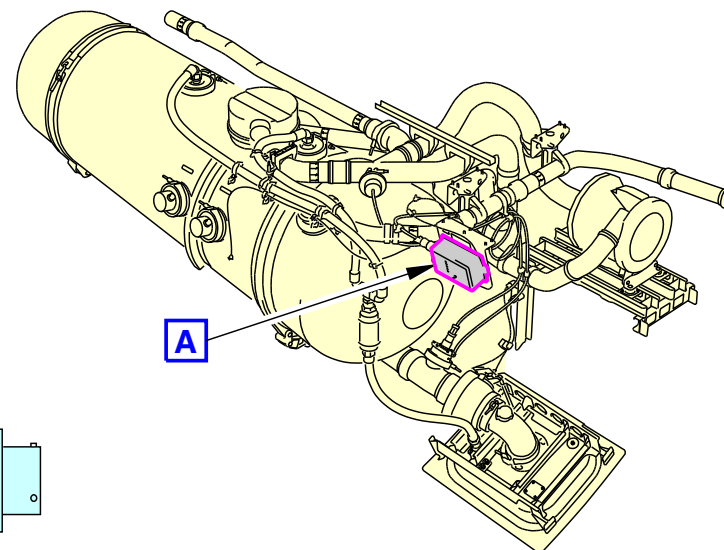
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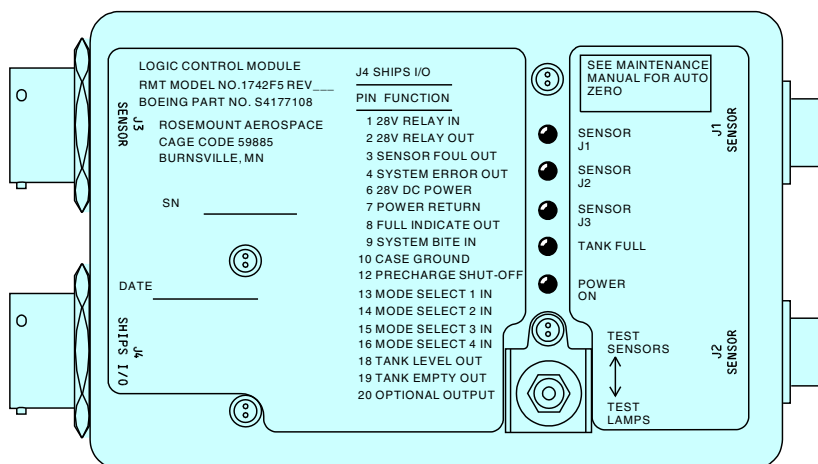
WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - LOGIC CONTROL MODULE



A



VACUUM WASTE SYSTEM



B

WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - LOGIC CONTROL MODULE

2370309 S00061521423_V1

**WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - WASTE QUANTITY INDICATOR****Purpose**

The waste quantity indicator shows the level of waste in the waste tank.

Location

The waste quantity indicator is at the Attendant Control Panel (ACP).

NOTE: The ACP is in the forward or aft attendant stations.

Physical Description

The waste quantity indicator is on the ENVIRONMENT menu of the aft ACP or the MAINTENANCE menu of forward ACP.

The ENVIRONMENT menu has these features:

- Waste quantity indicator
- LAV INOP indicator.

The MAINTENANCE menu has these features:

- LAV INOP indicator
- LAV INOP test switch
- Clean/Check sensor indicator.

Operation

The waste quantity indicator shows the waste quantity with a bar style segment display. The segment display shows the waste quantity from E (empty) to F (full) in 1/8-tank increments.

The CLEAN/CHECK SENSOR light comes on when the waste tank level is three inches (7.6 cm) or more below the tank full level and one of these conditions occur:

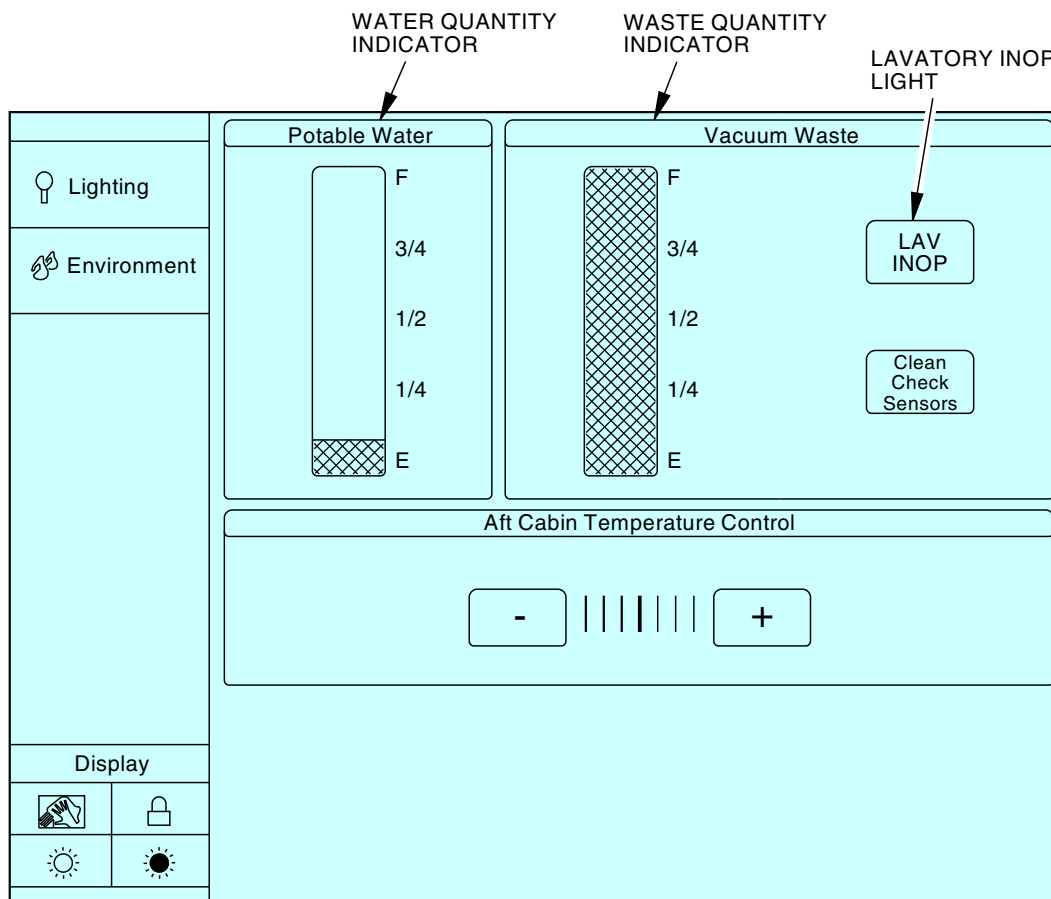
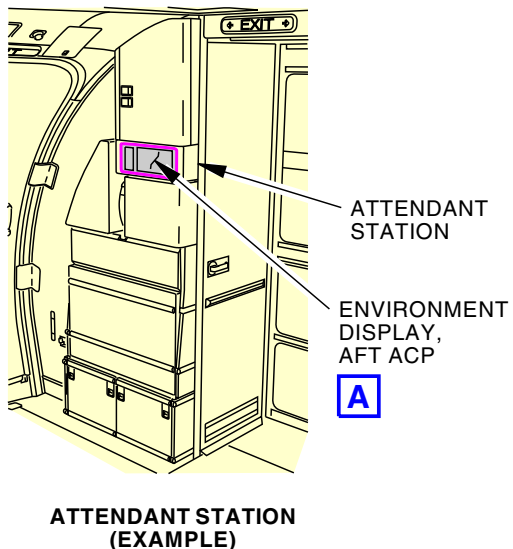
- A point level sensor is fouled (dirty)
- A point level sensor failed the system BIT test
- There is a sensor disagreement.

A sensor disagreement occurs when one point level sensor sends a tank full signal and the other point level sensor sends a tank not full or sensor fouled signal.

The LAVS INOP light comes on when both point level sensors send a tank full signal.

You can do the system BIT test when you push the LAVS INOP test switch. If all components pass the system BIT test, the waste quantity indicator shows a full tank and the CLEAN/CHECK SENSOR light is off.

WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - WASTE QUANTITY INDICATOR



ENVIRONMENT DISPLAY, AFT ACP

A

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WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - WASTE QUANTITY INDICATOR

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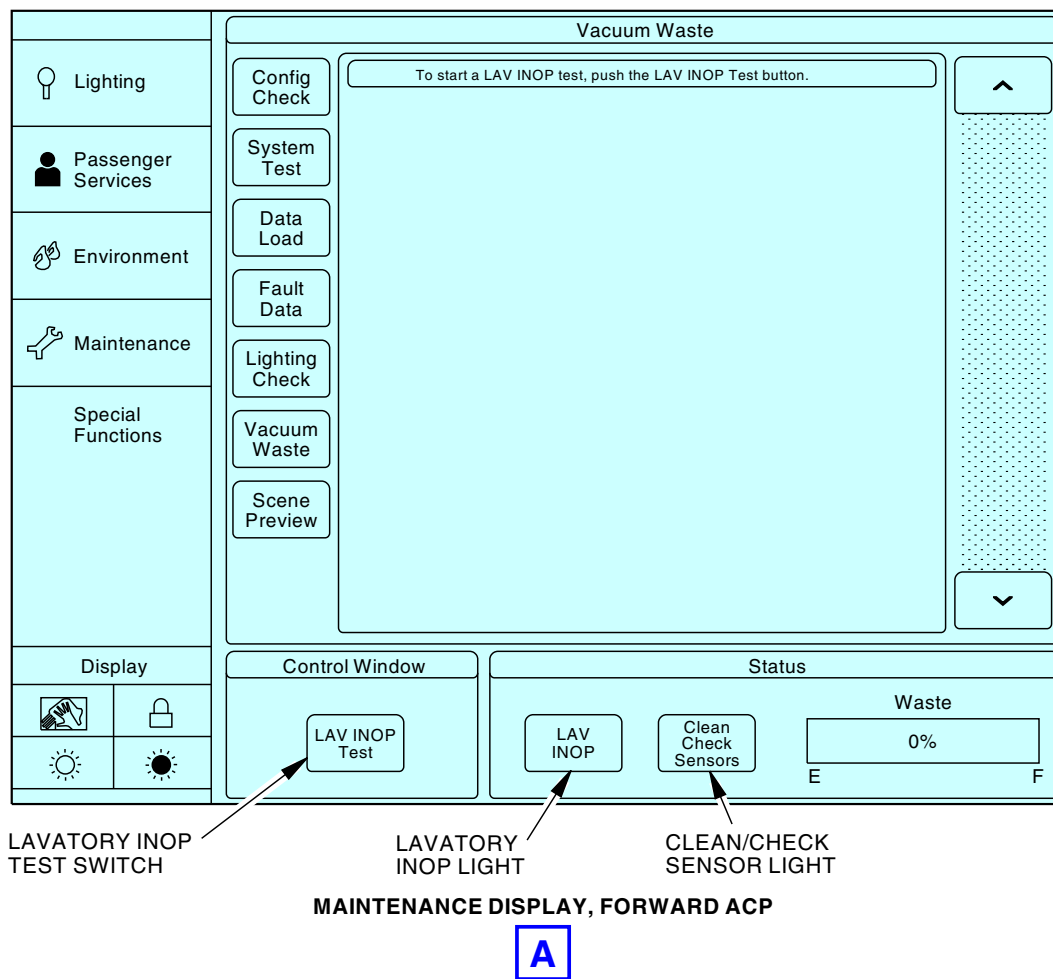
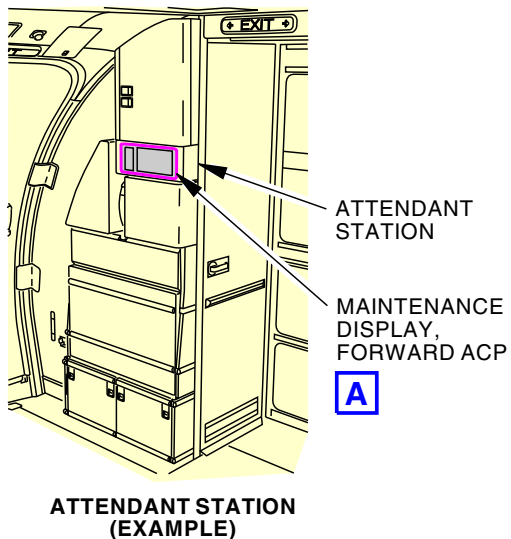
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WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - WASTE QUANTITY INDICATOR



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WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - WASTE QUANTITY INDICATOR

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**WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - SERVICE PANEL WASTE QUANTITY GAUGE****Purpose**

The service panel waste quantity gauge shows the level of waste in the waste tank.

Location

The waste service panel is at the aft section of the fuselage, at the bottom left side.

Physical Description

This gauge is an analog dial indicator. The graduations are equally spaced in increments of 1/8 of a tank from E (empty) to F (full). The graduations are labeled at 1/4 tank increments.

The pointer movement is linear with inputs from 0v DC to 10v DC.

Functional Description

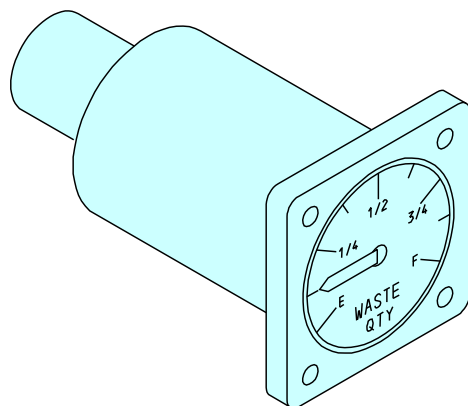
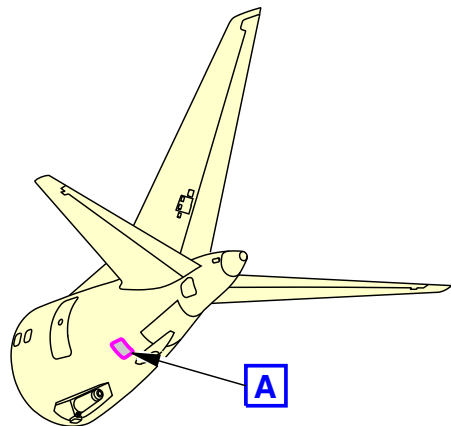
The logic control module sends a voltage that is in proportion to the level of water in the waste tank.

The logic control module voltage output will be 0v DC when the waste tank is empty. For an input voltage of 0v DC, the waste quantity indicator shows E (empty)

The logic control module voltage output will be 10v DC when the tank is full. For an input voltage of 10v DC, the waste quantity indicator shows F (full).

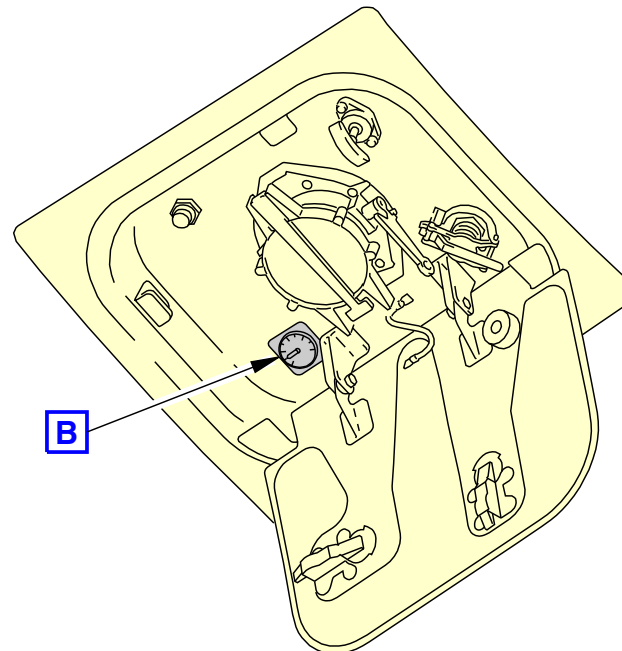
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WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - SERVICE PANEL WASTE QUANTITY GAUGE



SERVICE PANEL WASTE QUANTITY GAUGE

B



WASTE SERVICE PANEL
(EXAMPLE)

A

2584612 S0000623814_V1

WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - SERVICE PANEL WASTE QUANTITY GAUGE



WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - SERVICE PANEL SENSOR FOULED LIGHT

Purpose

The sensor fouled light shows that a point level sensor is fouled (dirty).

Location

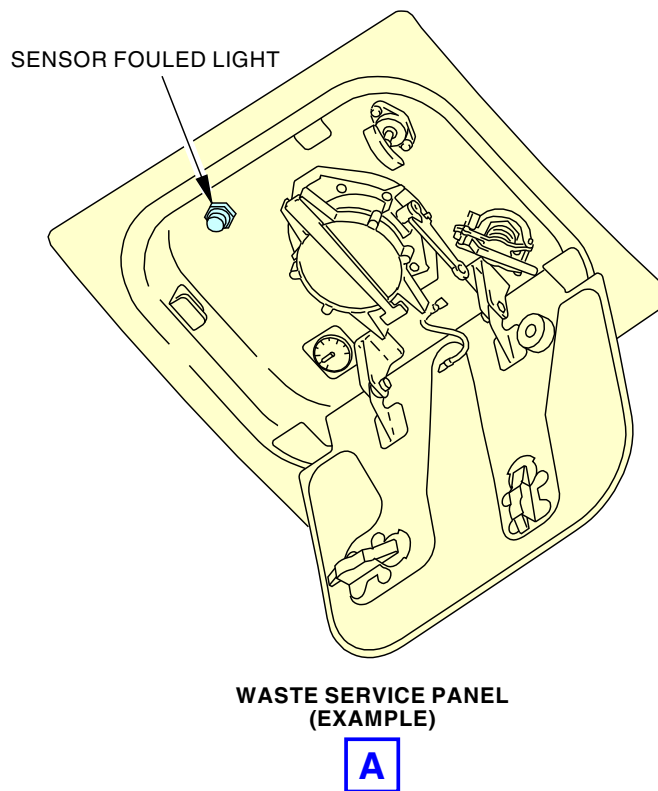
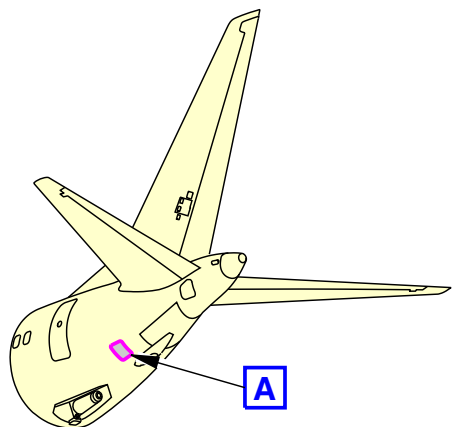
The sensor fouled light is on the waste service panel. The waste service panel is at the aft section of the fuselage, at the bottom left side.

Physical Description

The sensor fouled light is an amber light with press-to-test function.

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WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - SERVICE PANEL SENSOR FOULED LIGHT



2584625 S0000623858_V1

WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - SERVICE PANEL SENSOR FOULED LIGHT

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**WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - FUNCTIONAL DESCRIPTION****Power**

The 28v dc ground service bus supplies power to the waste tank quantity indication system.

Displays

Waste tank quantity indication and status shows on these two displays:

- Environment screen on the aft attendant panel
- Maintenance screen on the fwd attendant panel.

The Environment screen is for indication and status in flight and on ground operations. The Maintenance screen is for status, system Built-In-Test Equipment (BITE) and fault indication on the ground only.

Normal Operation

The continuous level sensor sends waste level data to the Logic Control Module (LCM). The LCM sends a waste level signal to the fwd and aft attendant panels. The aft attendant panel waste quantity indicator shows the waste level with a colored display on the Environment screen. The indicator is green from E (empty) to 1/2. The indicator is amber from 1/2 to 7/8. The indicator is red from 7/8 to F (full). The fwd attendant panel shows waste quantity with a waste level bar graph on the Maintenance screen. The bar graph is shown in percentage from 0 to 100.

The waste level signal also goes to the service panel waste quantity indicator. This indicator shows the tank waste level in 1/8 intervals.

Full Tank and Fault Indication

When both point level sensors send a full tank signal to the LCM, the LCM does these steps:

- Stops operation of the toilets
- Sends a full tank signal to the fwd and aft attendant panels
- The blue LAV INOP info cell on the fwd and aft attendant panel comes on.

The service panel SENSOR FOULED indicator comes on when a point level sensor is fouled.

The fwd attendant panel Clean/Check Sensors info cell comes on when the waste tank level is three inches (7.6 cm) or more below the tank full level and one of these conditions occur:

- A point level sensor is fouled (dirty)
- A point level sensor has failed the power-up BITE test or the continuous monitoring test
- There is a sensor disagreement.

A sensor disagreement occurs when one point level sensor sends a tank full signal and the other point level sensor sends a tank not full or sensor fouled signal.

System BITE

When system power comes on, the LCM does a power-up BITE test. The power-up BITE test makes sure that these components operate correctly:

- Point level sensors
- Continuous level sensor
- LCM.

You do the power-up BITE test when the airplane is on the ground, and when you do one of these steps:

- Push the LAV INOP Test on the fwd attendant panel maintenance screen
- Put the test switch on the LCM in the TEST SENSORS position.

After the LCM completes the power-up BIT test, it starts a continuous monitor cycle. This monitor cycle makes sure that the point level sensors and the LCM are functional. The continuous level sensor does not do a test during the monitor cycle.

You push the Vacuum Waste button on the fwd attendant panel Maintenance screen main menu bar to start the vacuum waste system test. Then push the LAV INOP Test button in the Command Window.

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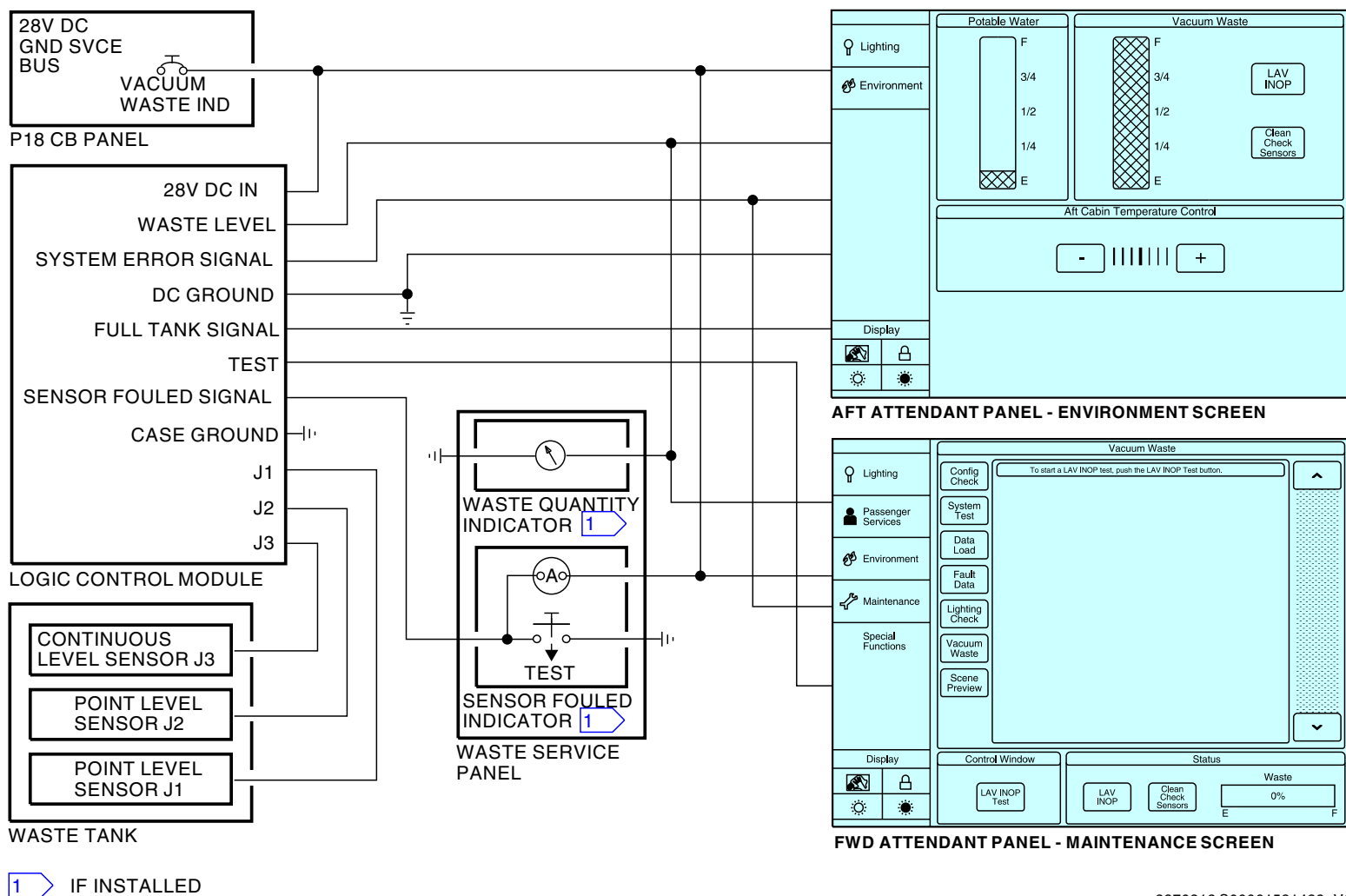


WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - FUNCTIONAL DESCRIPTION

The LAV INOP and Clean Check Sensors info cells in the Status window become blue for three seconds. The lavatory waste indication shows the percentage of waste in the tank. If there are no faults, the buttons become black.

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WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - FUNCTIONAL DESCRIPTION



2370312 S00061521428_V2

WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - FUNCTIONAL DESCRIPTION



WATER/WASTE - WASTE TANK QUANTITY INDICATION SYSTEM - FUNCTIONAL DESCRIPTION

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WATER/WASTE - WATER TANK PRESSURIZATION - INTRODUCTION

Purpose

The water tank pressurization system pressurizes the potable water tank.

General Description

Pressure for the water tank comes from the pneumatic system or the air compressor.

The water tank pressurization system has these functions:

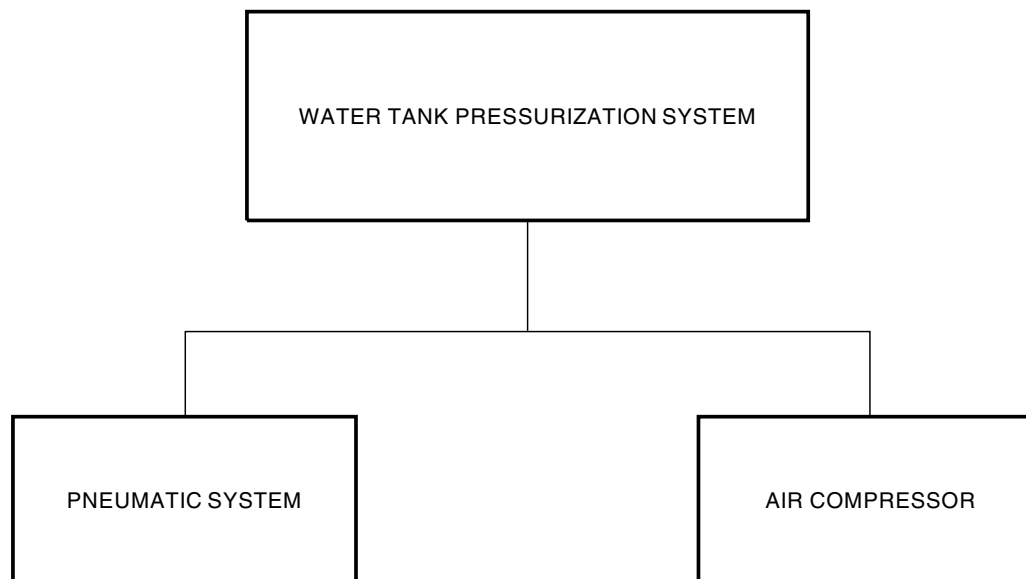
- Controls the air pressure that goes into the water tank
- Selects the source of the pressurized air
- Prevents contamination from unwanted material in the air.

Abbreviations and Acronyms

- AC - alternating current
- fwd - forward
- psig - pounds per square inch gage
- ref - reference
- S - switch
- typ - typical
- V - volts



WATER/WASTE - WATER TANK PRESSURIZATION - INTRODUCTION



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WATER/WASTE - WATER TANK PRESSURIZATION - INTRODUCTION

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WATER/WASTE - WATER TANK PRESSURIZATION - COMPONENT LOCATION

General

The water tank pressurization components are in the aft cargo compartment.

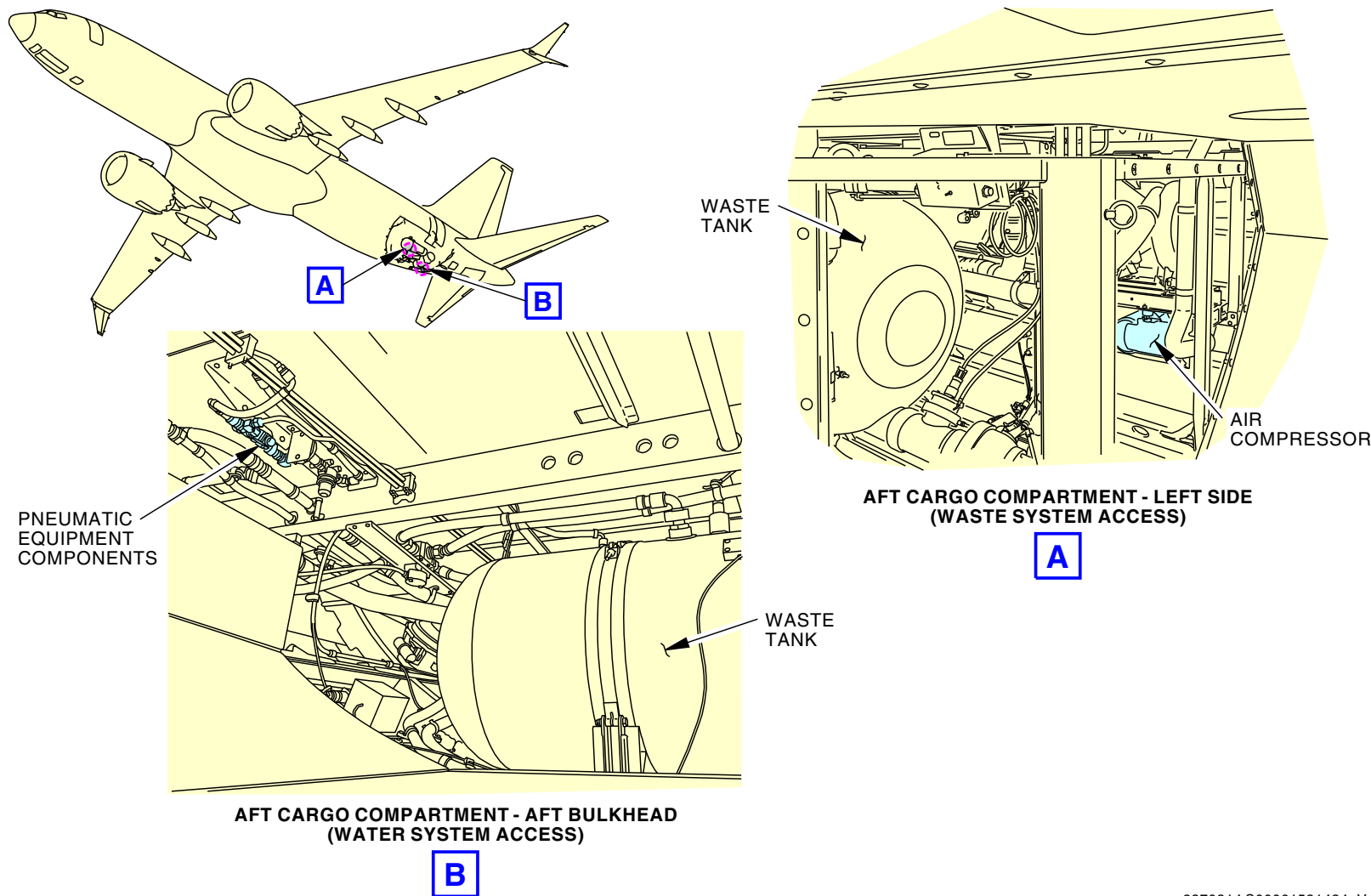
The air compressor is forward of the waste tank on a shelf below the vacuum blower.

The pneumatic equipment components are on the ceiling forward of the aft cargo compartment bulkhead liner.

The water tank components are aft of the aft cargo compartment bulkhead liner.

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WATER/WASTE - WATER TANK PRESSURIZATION - COMPONENT LOCATION



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WATER/WASTE - WATER TANK PRESSURIZATION - COMPONENT LOCATION

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**WATER/WASTE - WATER TANK PRESSURIZATION - PNEUMATIC EQUIPMENT****Location**

The pneumatic equipment is in the aft cargo compartment. You remove the cargo compartment ceiling lining to get access to the pneumatic equipment.

Physical Description

The pneumatic equipment installation has these components:

- In-line air filter
- Pressure regulator
- Check valves (2)
- Pressure relief valve.

In-Line Air Filter

The in-line air filter removes contamination from the pneumatic system supply line.

The in-line air filter has these features:

- Inlet fitting
- Head
- Packing
- Air filter element
- Bowl
- Outlet fitting.

The filter element is a 10-20 micron paper filter element.

Two fasteners attach the in-line filter to the ceiling structure.

Pressure Regulator

The pressure regulator controls the air pressure that goes into the water tank from the pneumatic system.

The pressure regulator has a circular disk-shape body and two threaded fittings. One fitting is for the line from the pneumatic system. The other fitting is for the line that goes to the water tank.

The pressure regulator keeps the air pressure from the pneumatic system to a limit of 35 psig.

Check Valves

The check valves prevent the loss of air pressure in the water tank and do not let water into the water tank pressurization system.

There are two check valves. There is a check valve in the air compressor supply line and a check valve in the pneumatic supply line.

The check valve has these features:

- Tube fittings
- Wrench flats
- Flow direction arrow.

Pressure Relief Valve

The pressure relief valve prevents an over-pressure condition in the water tank pressure lines.

The pressure relief valve has these features:

- Wrench flats
- Tube fitting
- Pressure relief actuator.

The tube fitting connects to the same manifold as the two pressurization sources.

If pressure in the pneumatic supply line increases to 60 psig, the pressure relief valve opens. The valve resets at 55 psig.

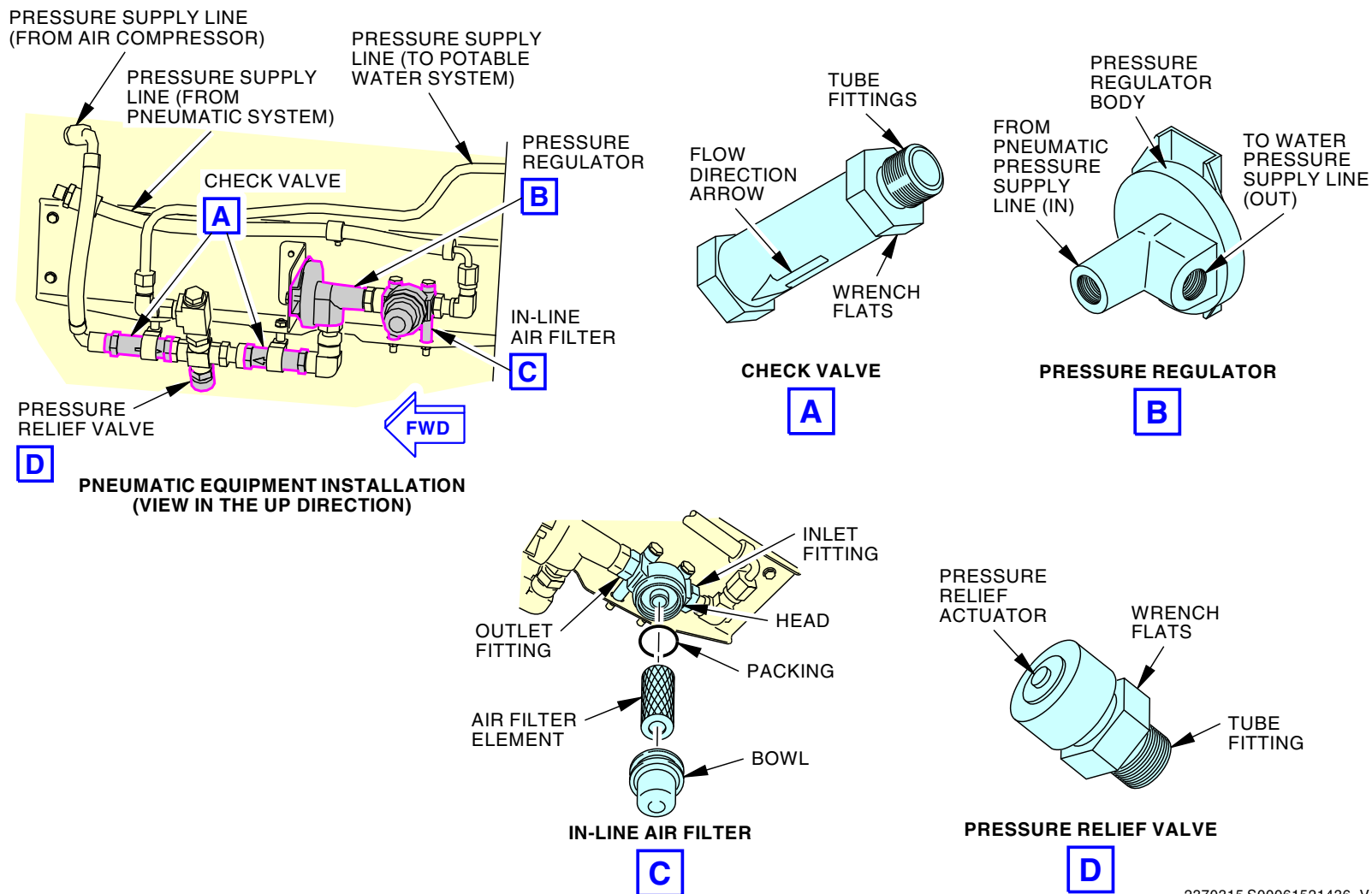
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WATER/WASTE - WATER TANK PRESSURIZATION - PNEUMATIC EQUIPMENT



2370315 S00061521436_V1

WATER/WASTE - WATER TANK PRESSURIZATION - PNEUMATIC EQUIPMENT

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**WATER/WASTE - WATER TANK PRESSURIZATION - AIR COMPRESSOR/INLET AIR FILTER****Purpose**

The air compressor pressurizes the water tank when the pneumatic system is not on.

The inlet air filter removes particles of unwanted material from the air that goes into the water tank.

Location

The air compressor is on the left side of the aft cargo compartment. You remove the forward waste access panel to get access to the air compressor. The air compressor attaches to the lower side the vacuum blower support shelf.

Physical Description

The air compressor has these parts:

- Inlet air filter
- Electrical connector
- Inlet
- Outlet
- Pressure relief valve.

The inlet air filter has these parts:

- Noise baffle
- Filter assembly
- Perforated disk
- Snap ring
- O-ring (2)
- Housing.

Functional Description

The three-phase AC motor operates the air compressor to pressurize the water tank. The motor starts when the water pressure cut-out switch senses that tank pressure is less than 30 psig. The motor stops when tank pressure is 40 psig. The air compressor pulls air through the inlet air filter from the cargo ceiling area.

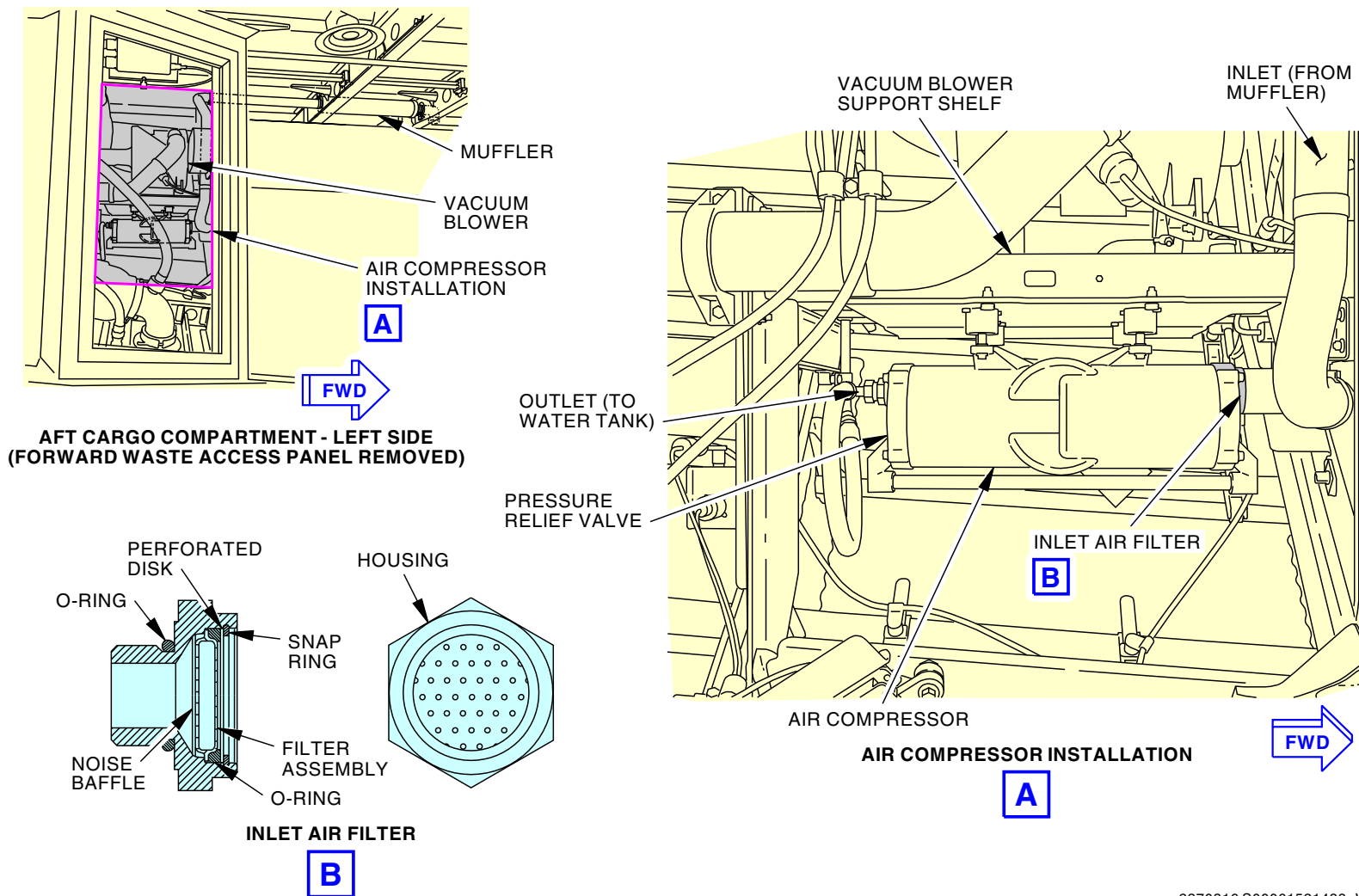
The inlet air filter element is a 40 micron, layered disk filter. The filter housing attaches to the inlet side of the air compressor.

The pressure relief valve prevents the air compressor from over pressurization. The pressure relief valve opens at 90 psig.

Training Information Point

You can replace the inlet air filter element.

WATER/WASTE - WATER TANK PRESSURIZATION - AIR COMPRESSOR/INLET AIR FILTER



2370316 S00061521438_V1

WATER/WASTE - WATER TANK PRESSURIZATION - AIR COMPRESSOR/INLET AIR FILTER

**WATER/WASTE - WATER TANK PRESSURIZATION - WATER PRESSURE CUT-OUT SWITCH****Purpose**

The water pressure cut-out switch controls the operation of the air compressor.

Location

The water pressure cut-out switch is in the aft cargo compartment behind the aft bulkhead. You must remove the water tank access panel to get access to it.

The water pressure cut-out switch attaches to the top of the water tank.

Physical Description

The water pressure cut-out switch has these features:

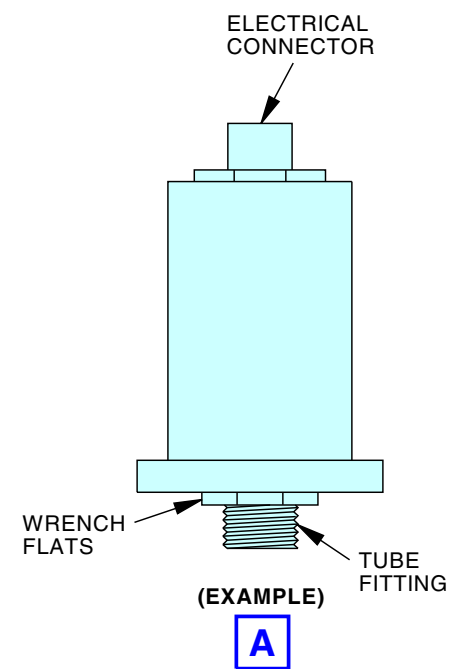
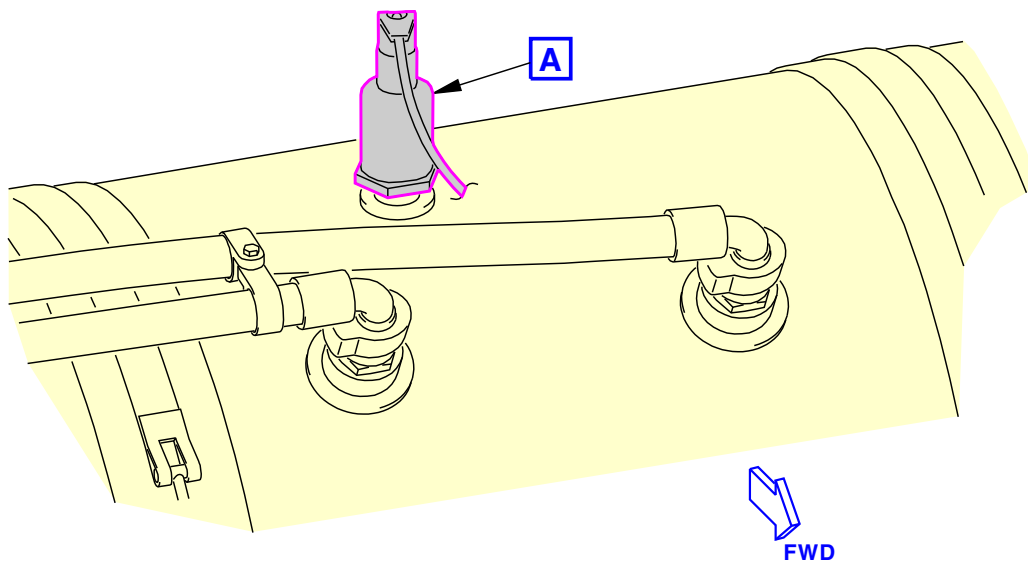
- Electrical connector
- Tube fitting
- Wrench flats.

Functional Description

The switch starts the air compressor when the pressure in the water tank is 30 psig or less. The switch stops the air compressor when the pressure in the water tank is 40 psig.

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WATER/WASTE - WATER TANK PRESSURIZATION - WATER PRESSURE CUT-OUT SWITCH



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WATER/WASTE - WATER TANK PRESSURIZATION - WATER PRESSURE CUT-OUT SWITCH

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WATER/WASTE - WATER TANK PRESSURIZATION - AIR COMPRESSOR - FUNCTIONAL DESCRIPTION

Functional Description

The air compressor operates with 115v ac, three-phase power.

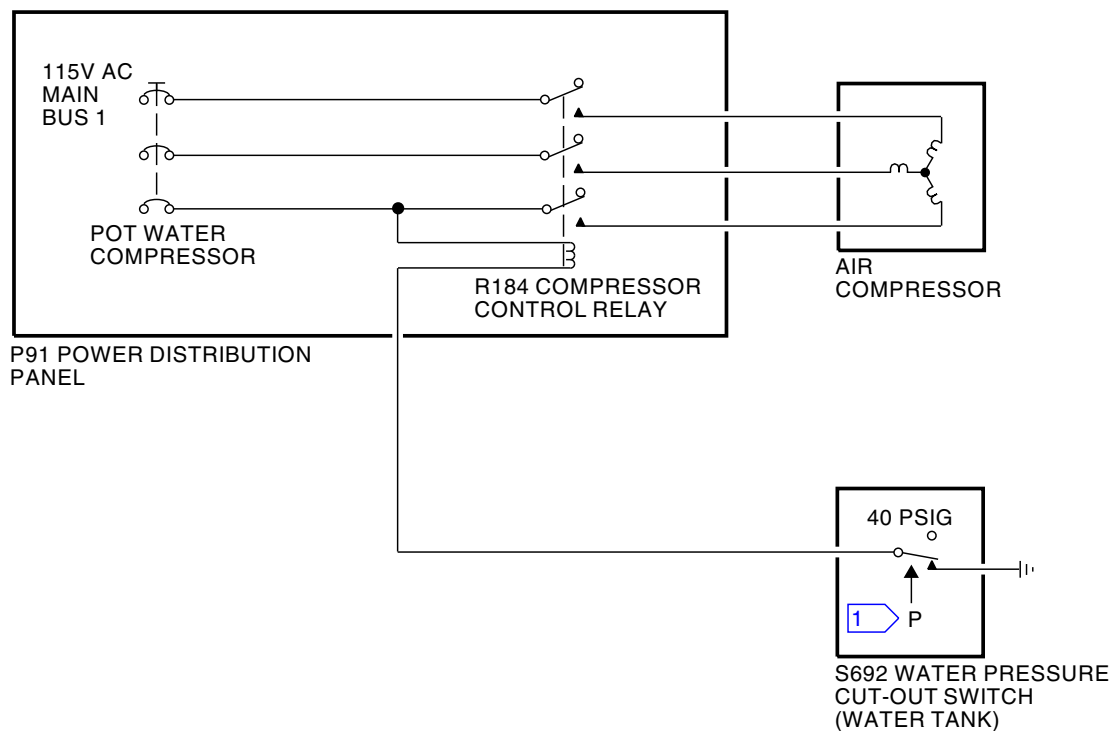
The compressor control relay energizes when these conditions are true:

- Water tank pressure is less than 30 psig (water pressure cut-out switch is closed)
- 115v ac main bus 1 is on.

The air compressor operates when the compressor control relay energizes.

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WATER/WASTE - WATER TANK PRESSURIZATION - AIR COMPRESSOR - FUNCTIONAL DESCRIPTION



1 THE SWITCH CLOSSES WHEN THE PRESSURE IS 30 PSIG OR LESS AND OPENS WHEN THE PRESSURE IS 40 PSIG OR MORE.

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WATER/WASTE - WATER TANK PRESSURIZATION - AIR COMPRESSOR - FUNCTIONAL DESCRIPTION

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EFFECTIVITY

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ECCN 9E991 BOEING PROPRIETARY - See title page for details

**WATER/WASTE - WATER TANK PRESSURIZATION - FUNCTIONAL DESCRIPTION****General**

The water tank pressurization system uses pressurized air from the pneumatic system or the air compressor to pressurize the water tank.

Pneumatic System

The pneumatic system supplies pressurized air to the water tank when the pneumatic system is on.

The pneumatic system supply line gets air from a tap on the pneumatic manifold forward of the Auxiliary Power Unit (APU) check valve.

An in-line air filter cleans the air in the pneumatic system supply line.

A pressure regulator controls the pneumatic system supply line pressure to a maximum of 35 psig (241 kPa).

Air Compressor

The air compressor supplies pressurized air to the water tank when the pneumatic system is off and these conditions are true:

- Pressure in the water tank is less than 30 psig (207 kPa) (water pressure cut-out switch is closed)
- 115v AC main bus 1 is on.

The air compressor gets air from a muffler above the ceiling of the cargo compartment. An air filter at the inlet of the air compressor cleans the air in the air compressor supply line.

The water pressure cut-out switch opens and stops the operation of the air compressor when the air pressure in the water tank increases to 40 psig (276 kPa). When the pressure decreases to 30 psig (207 kPa), the water pressure cut-out switch closes and the air compressor starts.

Training Information Point

 WARNING	SEAL THE CARGO COMPARTMENT WITH THE LINING. OBEY THE INSTRUCTIONS IN THE SPECIFIED PROCEDURE WHEN YOU INSTALL THE LINING. IF YOU INSTALL THE LINING INCORRECTLY, THE SMOKE CAN GO INTO THE PASSENGER COMPARTMENT DURING A FIRE. THIS CAN CAUSE INJURY TO PERSONNEL.
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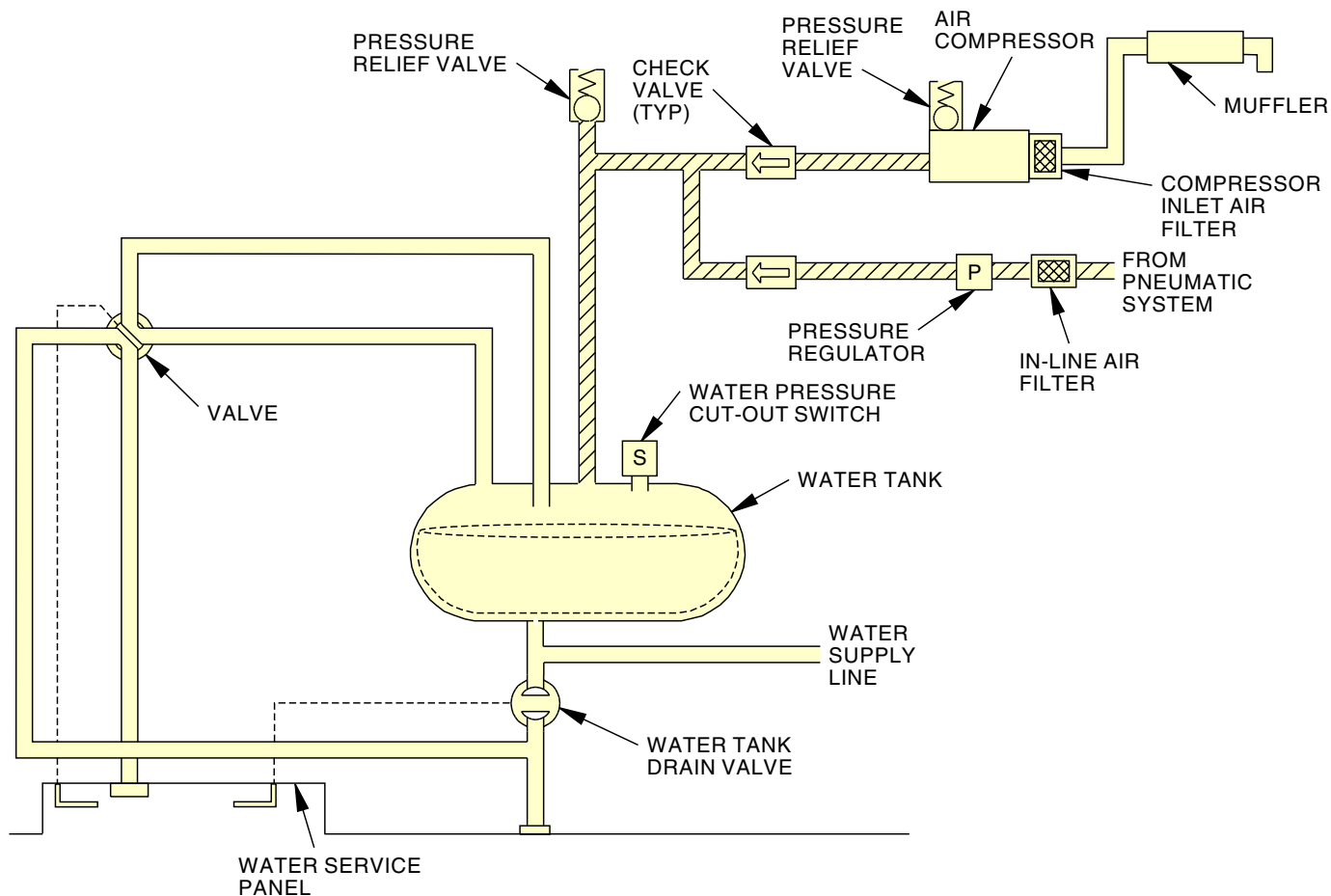
To get access to the water tank pressurization system components, you remove the cargo compartment lining. When you are done, you must replace and seal the cargo compartment lining.

 WARNING	MAKE SURE THAT THERE IS NO PRESSURE IN THE PNEUMATIC PRESSURE LINES BEFORE YOU DISCONNECT THEM. THE STRONG PRESSURE/TEMPERATURE AIR IN THE LINES CAN CAUSE INJURY TO PERSONNEL.
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Before you remove water tank pressurization system components, you must release the pressure from the system. You can open the fill/overflow valve to release the pressure from the pneumatic pressure lines. To open the fill/overflow valve, use the valve handle at the water service panel.

EFFECTIVITY	
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WATER/WASTE - WATER TANK PRESSURIZATION - FUNCTIONAL DESCRIPTION



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WATER/WASTE - WATER TANK PRESSURIZATION - FUNCTIONAL DESCRIPTION

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