

CHAPTER

79

Engine Oil

(LEAP-1B ENGINES)

CHAPTER 79
ENGINE OIL

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79-EFFECTIVE PAGES

CHAPTER 79
ENGINE OIL

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**ENGINE OIL - INTRODUCTION****Purpose**

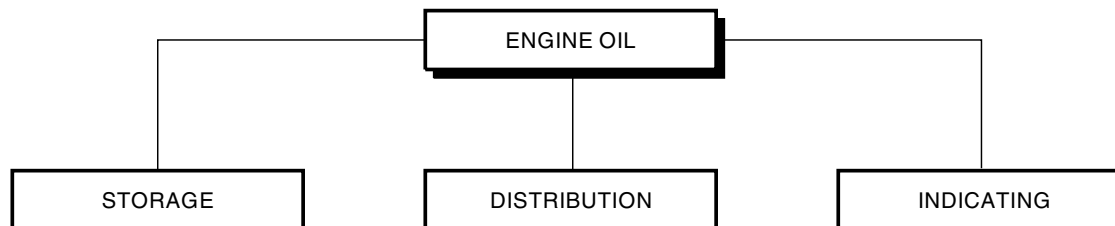
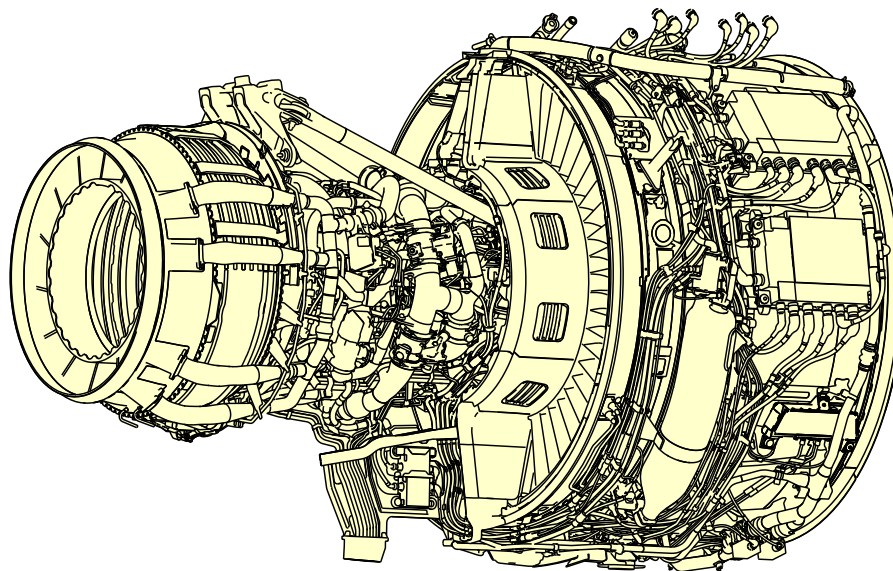
The engine oil system supplies oil to lubricate, cool, and clean the engine bearings and gears. The engine oil system has these subsystems:

- Storage
- Distribution
- Indicating.

Abbreviations and Acronyms

- ACOC - air cooled oil cooler
- AGB - accessory gear box
- AMM - airplane maintenance manual
- DPC - display processing computer
- DU - display unit
- MDS - MAX display system
- MHX - main fuel/oil heat exchanger
- EEC - electronic engine control
- EI - engine indicator
- psid - pound-per-square-inch differential
- TGB - transfer gear box
- TPV - tank pressurizing valver
- ODMS - oil debris monitoring system
- OFDPS - oil filter differential pressure sensor
- OLS - oil level sensor
- OPTS - oil pressure/temperature sensor
- SACOC - surface air cooling oil cooler

ENGINE OIL - INTRODUCTION



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ENGINE OIL - INTRODUCTION

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**ENGINE OIL - GENERAL DESCRIPTION****General**

The engine oil system has these subsystems:

- Storage
- Distribution
- Indicating.

Storage

The oil tank keeps sufficient oil for a continuous supply to the oil distribution circuit. The oil tank has a gravity fill port and an oil level sight gage for servicing.

Distribution

The oil distribution system has these circuits:

- Supply
- Scavenge
- Vent.

The supply circuit sends oil to lubricate the engine bearings and gears. Oil from the tank goes to the lubrication unit through an internal anti-leak check valve. The lubrication unit pressurizes and filters the oil. The oil then goes to the servo fuel heater, the engine air cooled oil coolers, and the main fuel/oil heat exchanger before it goes to the engine.

The scavenge circuit returns oil from the engine to the oil tank. Oil first flows through the lubrication unit. Then it goes through the air/oil/debris separator (lubriclone). From the air/oil/debris separator, the oil returns to the oil tank.

The vent circuit balances the internal air pressures in the oil system. A vent line connects the engine A sump to the lubriclone. Unwanted air pressure goes out of the oil tank through the vent line. The engine sumps are vented through the engine center shaft. An oil sump eductor increases vent airflow at low engine speeds to improve oil control.

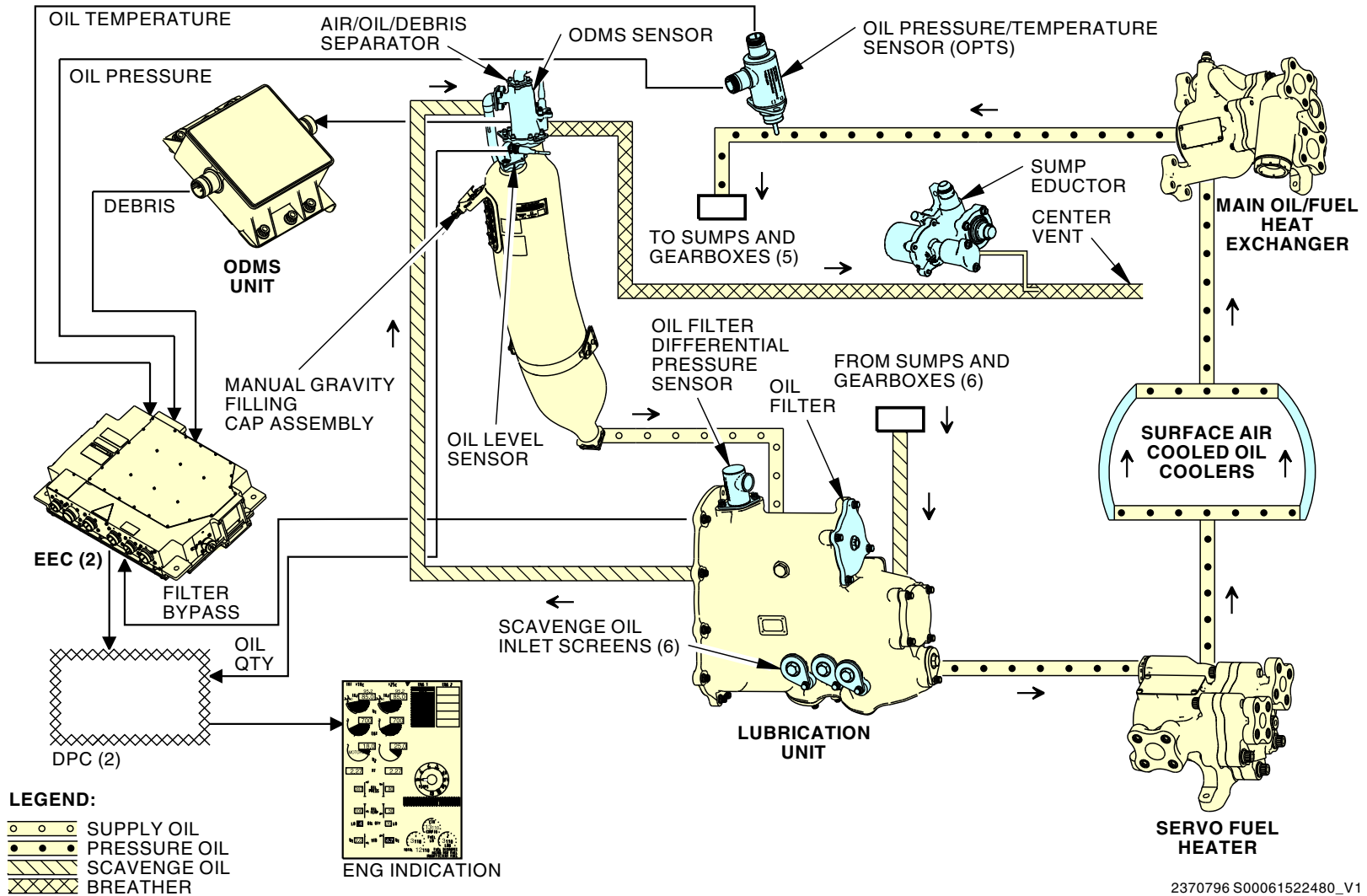
Indication

The oil quantity indicating system sends this data to the electronic engine controls (EECs) and the display processing computers (DPCs):

- Oil filter differential pressure
- Oil debris monitoring system (ODMS) sensor
- Oil pressure
- Oil temperature
- Oil quantity.

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ENGINE OIL - GENERAL DESCRIPTION



ENGINE OIL - GENERAL DESCRIPTION

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**ENGINE OIL - STORAGE - OIL TANK****General**

The oil tank is the engine lubrication oil reservoir. The tank stores and delivers engine oil under pressure to the main engine lube supply pump. The oil level sensor is mounted inside of the tank, and the Oil Debris Monitoring System (ODMS) sensor and the air-oil separator are mounted at the top of the tank.

Component location

The engine oil tank is on the fan case, at the 3:00 position. Oil tank level is checked and serviced through the oil tank access door. The oil tank access door is on the side of the right fan cowl.

Physical Description

The oil tank has an oil level sight gage and a gravity fill port.

The oil level sight gage on the oil tank can be used to make a visual check of the engine oil quantity. The oil level sight gage is on the front of the oil tank.

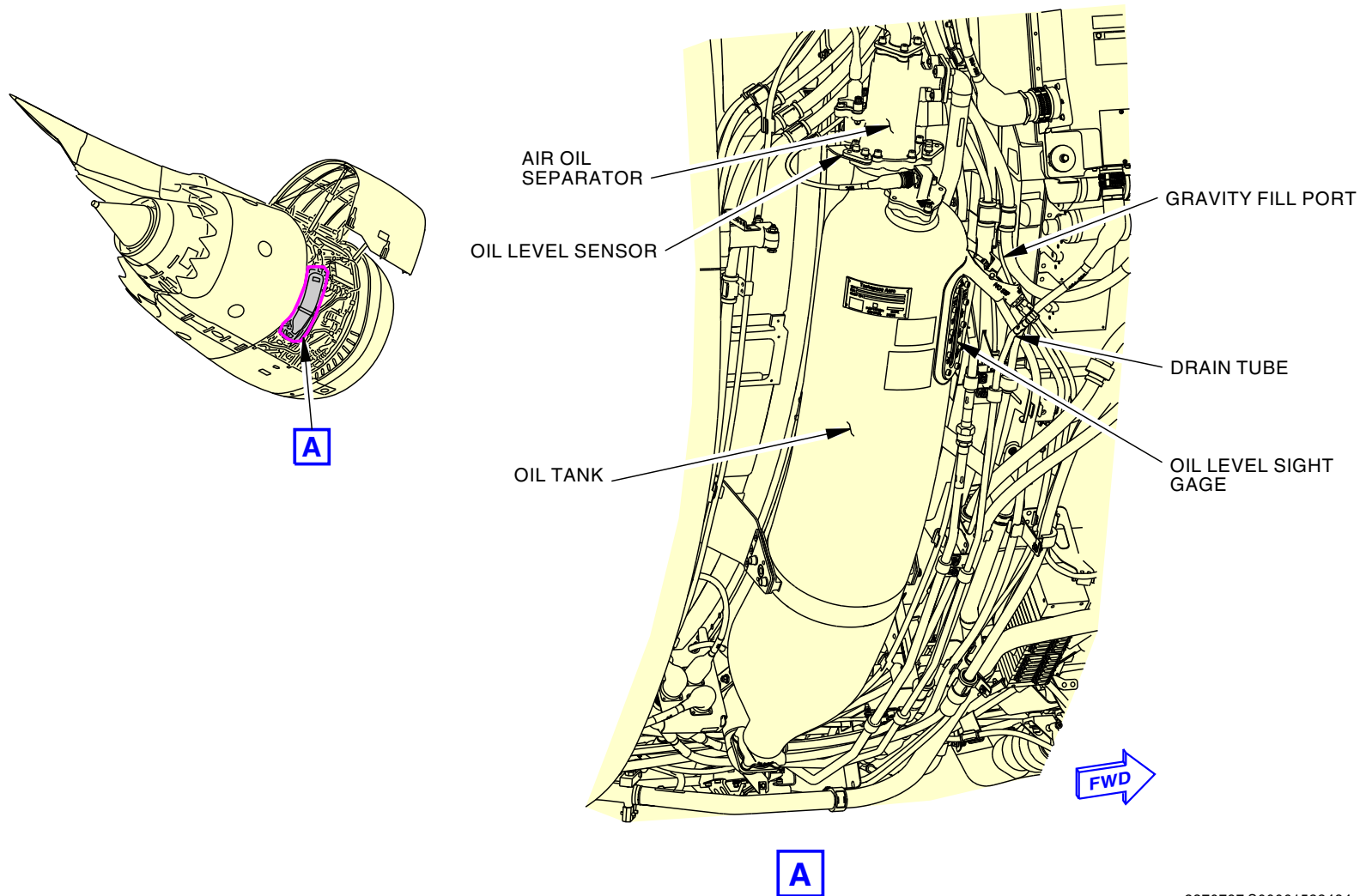
The oil tank is filled through the gravity fill port. The gravity fill port is on the right of the oil tank. The oil filler cap has a locking handle. The oil that falls during servicing collects into the oil scupper. The oil scupper connects to a drain line.

A drain plug at the bottom of the oil tank allows the tank to be drained.

The engine total oil tank capacity is approximately 27.8 qt (26.3 l).

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ENGINE OIL - STORAGE - OIL TANK



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ENGINE OIL - STORAGE - OIL TANK

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**ENGINE OIL - DISTRIBUTION - GENERAL DESCRIPTION****General**

The engine oil distribution system supplies oil to cool, clean, and lubricate the engine bearings and gears. The engine oil distribution system also removes oil from sumps and gearboxes. It sends the oil to the storage system. Engine oil distribution has these systems:

- Supply system
- Scavenge system
- Vent system.

Supply System

From the oil tank, the oil flows to the lubrication unit through the anti-leakage valve. In the lubrication unit, the supply pump pressurizes the oil. The oil goes from the supply pump to the oil filter. The oil filter is inside the lubrication unit. The oil flows out of the lubrication unit and through the servo fuel heater. The oil flows out of the servo fuel heater and through the engine surface air cooled oil coolers. The oil flows out of the air cooled oil coolers and through the main oil/fuel heat exchanger before it goes into the engine to these areas:

- Forward (A) sump and Transfer Gearbox (TGB)
- Rear (B and C) sumps
- Accessory Gearbox (AGB).

Scavenge System

The scavenge system removes the oil that collects at the lowest point of these three areas:

- Forward (A) sump
- Rear (B and C) sump
- AGB and TGB (2 places).

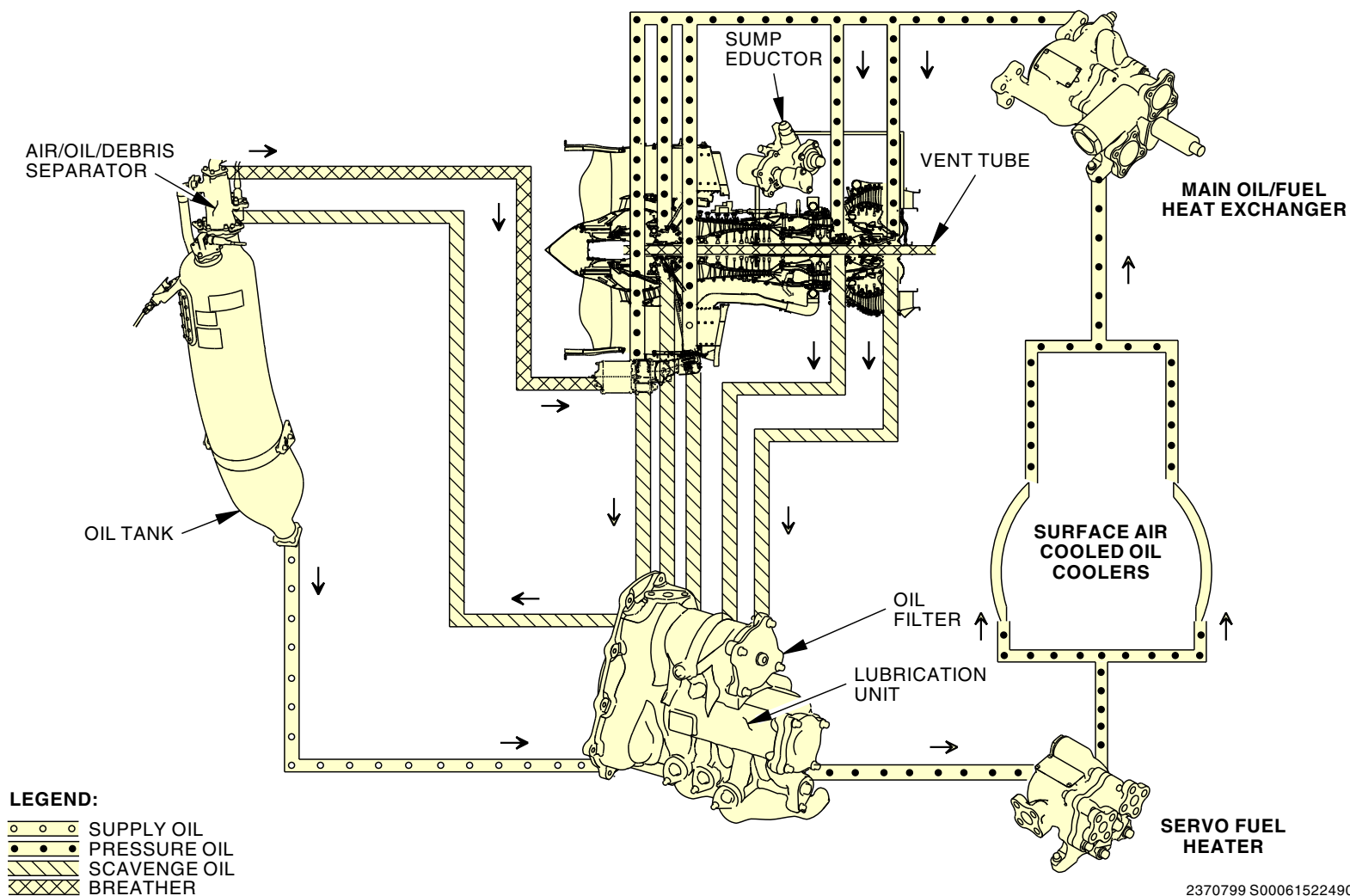
From these areas, the oil flows through six lines to four scavenge screen plugs with magnetic bars. The oil from each scavenge line goes to a dedicated scavenge pump before it goes to the air/oil/debris separator on the top of the oil tank. Air goes to the vent system, and oil returns to the oil tank.

Vent System

A vent line connects the oil tank mounted air/oil/debris separator with the AGB. There are also internal connections between the engine sumps and gearboxes. The vent system bleeds air out of the vent tube which goes through the exhaust plug at the rear of the engine. The sump eductor sends 7th stage High Pressure Compressor (HPC) air through the vent at low engine speeds to improve airflow through the A sump.

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ENGINE OIL - DISTRIBUTION - GENERAL DESCRIPTION



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ENGINE OIL - DISTRIBUTION - GENERAL DESCRIPTION



ENGINE OIL - DISTRIBUTION - COMPONENT LOCATIONS

General

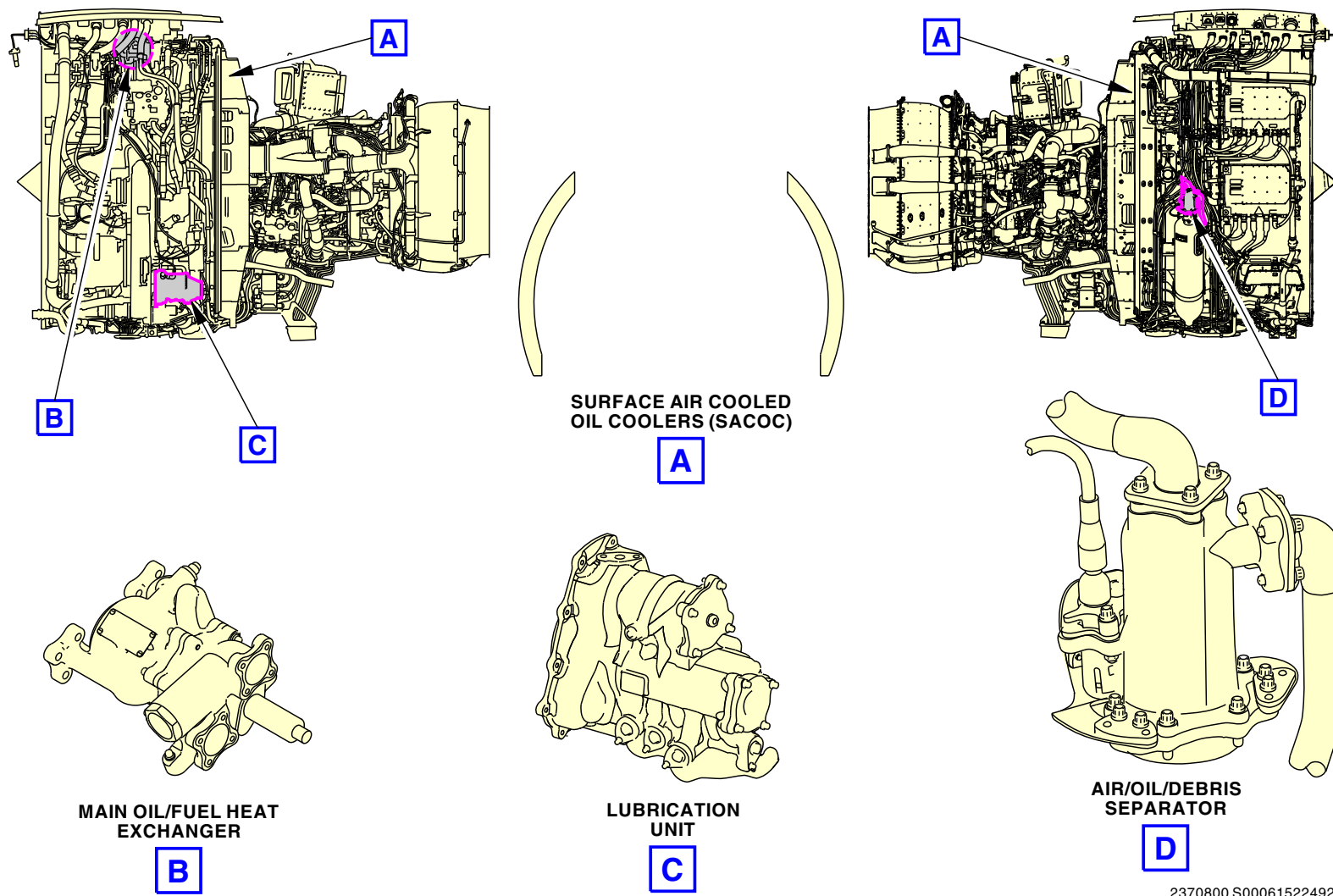
These components of the engine oil distribution system are on the left side, and at the bottom of the fan case:

- Lubrication unit (7:00 o'clock position)
- Main oil/fuel heat exchanger (MHX) (10:00 o'clock position)
- Left Surface Air Cooled Oil Cooler (SACOC) (8:00 to 11:00 o'clock position)
- Right SACOC (1:00 to 4:00 o'clock position)
- Air/oil/debris separator (on top of the oil tank) (3:00 o'clock position).

The oil supply filter and the two single and two double scavenge inlet screen plugs with magnetic bars are located in the lubrication unit.

Open the left and right fan cowls to get access to the components of the engine oil distribution system.

ENGINE OIL - DISTRIBUTION - COMPONENT LOCATIONS



ENGINE OIL - DISTRIBUTION - COMPONENT LOCATIONS

**ENGINE OIL - DISTRIBUTION - LUBRICATION UNIT****General**

The lubrication unit supplies pressurized oil to lubricate the engine bearings and gears. It also takes the oil that collects in the sumps and the gearboxes and sends it back to the oil tank.

Location

The lubrication unit is on the rear face of the accessory gearbox at the 7:00 o'clock position. Open the left fan cowl to get access to the lubrication unit.

Physical Description

The lubrication unit contains these parts:

- Oil supply pump
- Supply oil filter
- Supply oil filter bypass valve
- Supply oil filter differential pressure sensor
- Pressure relief valve
- Oil scavenge pumps (6)
- Two single stage strainers with magnetic bars
- Two double stage strainers with magnetic bars
- Anti-leak valve
- Non return valve.

The lubrication unit is attached to the Accessory Gear Box (AGB) by nine screws.

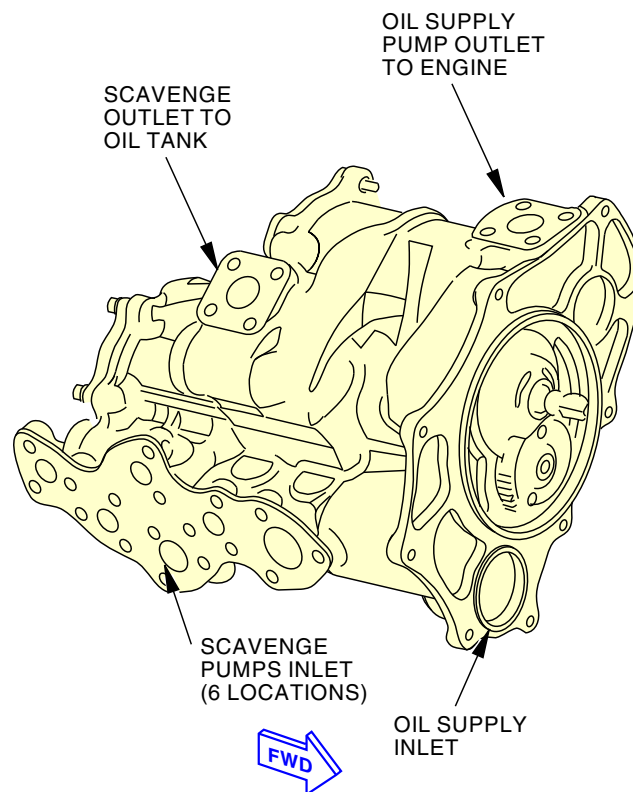
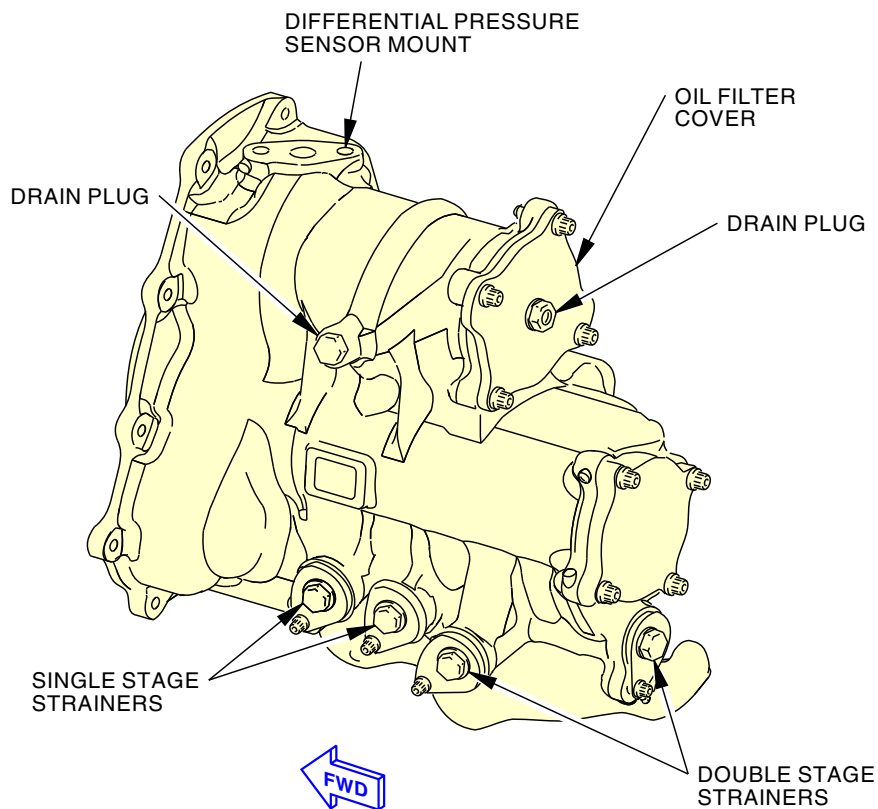
Functional Description

The AGB turns the oil supply pump and the six scavenge pumps in the lubrication unit. The pumps are on a common shaft.

The oil supply pump does not control the output pressure. When the engine speed changes, the oil pressure changes.

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ENGINE OIL - DISTRIBUTION - LUBRICATION UNIT



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ENGINE OIL - DISTRIBUTION - LUBRICATION UNIT

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**ENGINE OIL - DISTRIBUTION - AIR COOLED OIL COOLERS****General**

The engine surface Air Cooled Oil Coolers (ACOCs) in addition to the Main Fuel/Oil Heat Exchanger (MHX) cools the oil before it is sent to bearings and gears.

Location

There are two surface ACOCs. One is on the left side inner wall of the fan frame, at the 08:00 to 11:00 o'clock position, and the other is on the right side at the 01:00 to 04:00 o'clock position. Each Surface ACOC has these features:

- Oil inlet/outlet manifold
- Plain fin core (Matrix)
- Pressure relief valve
- Thermal valve.

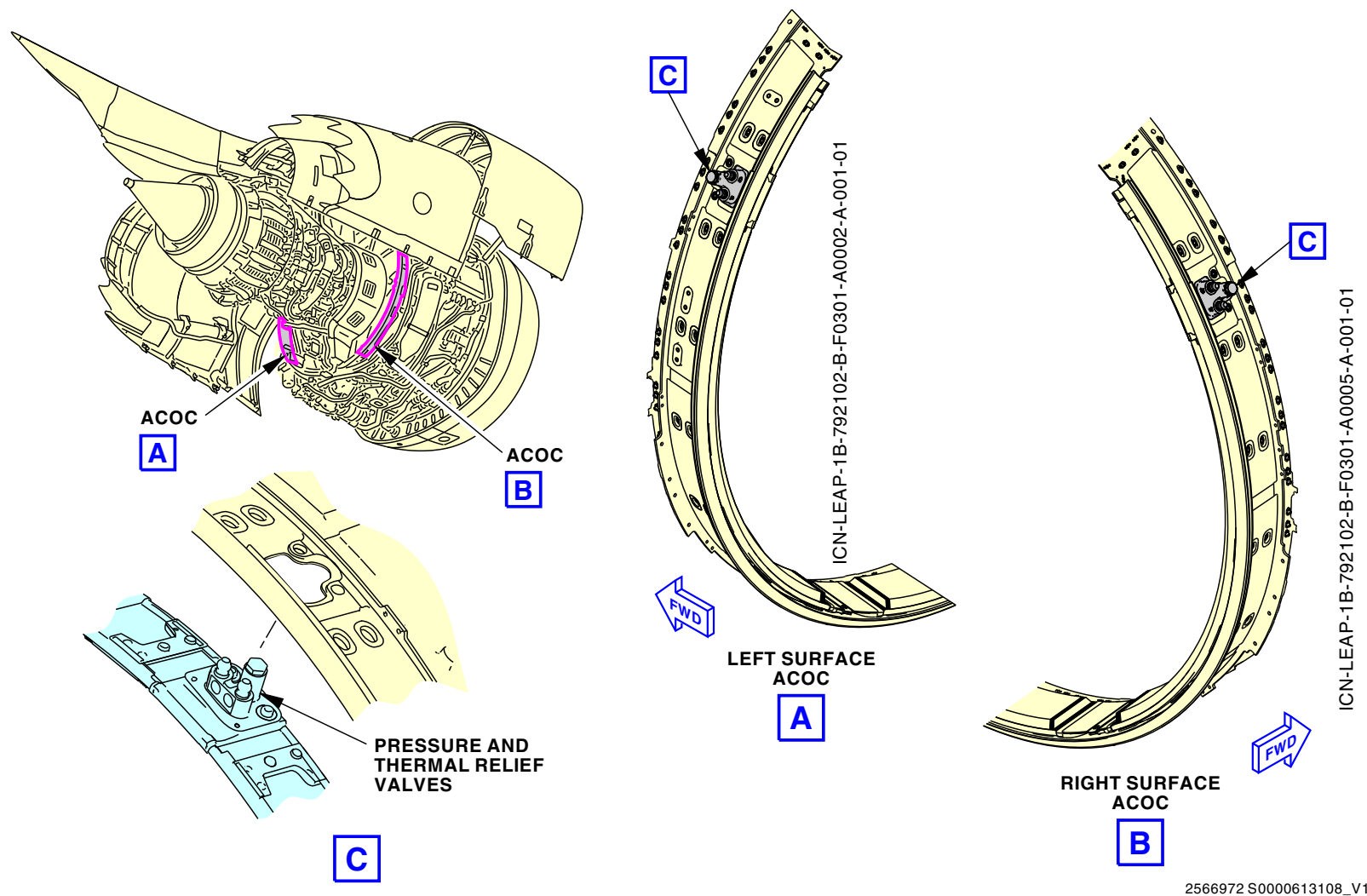
Functional Description

The surface ACOCs are installed in the inner surface of the fan frame. The installation uses hard mounts and a sliding feature to relieve thermal strain. The inlet/ outlet manifold has a pressure relief valve to allow the oil to bypass if there is a blockage in the ACOC.

The inlet/outlet manifold also has a thermal valve, which regulates the amount of oil cooled by the surface ACOC. When the oil is cold, the thermal valve is open. This lets the oil bypass the surface ACOC. When the oil is warm, the thermal valve is close. Warm oil then passes through the surface ACOC plain fin core.

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ENGINE OIL - DISTRIBUTION - AIR COOLED OIL COOLERS



ENGINE OIL - DISTRIBUTION - AIR COOLED OIL COOLERS

**ENGINE OIL - DISTRIBUTION - OIL SUPPLY FILTER****General**

The oil supply filter removes and holds unwanted material from the supply oil. The oil supply filter prevents the contamination of the downstream oil circuit.

Location

The oil supply filter is in the lubrication unit. The lubrication unit is on the rear face of the accessory gearbox at the 7:00 o'clock position. Open the left fan cowl to access the oil supply filter.

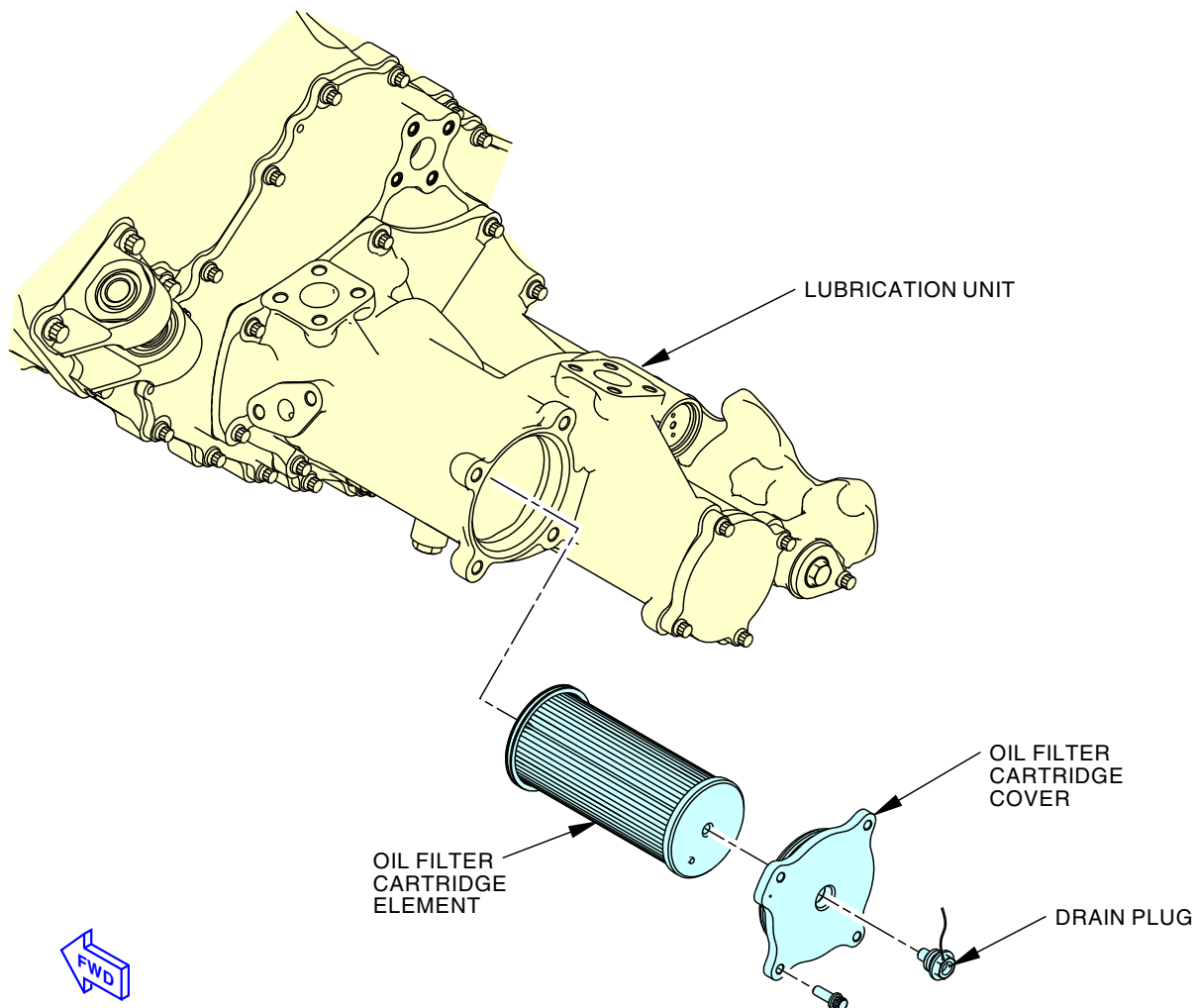
Physical Description

The oil supply filter is a disposable paper filter cartridge.

The lubrication unit housing holds the supply oil filter. The cover keeps the supply oil filter in the housing. The oil filter housing cover has a drain plug.

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ENGINE OIL - DISTRIBUTION - OIL SUPPLY FILTER



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ENGINE OIL - DISTRIBUTION - OIL SUPPLY FILTER

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ENGINE OIL - DISTRIBUTION - MAGNETIC BARS

General

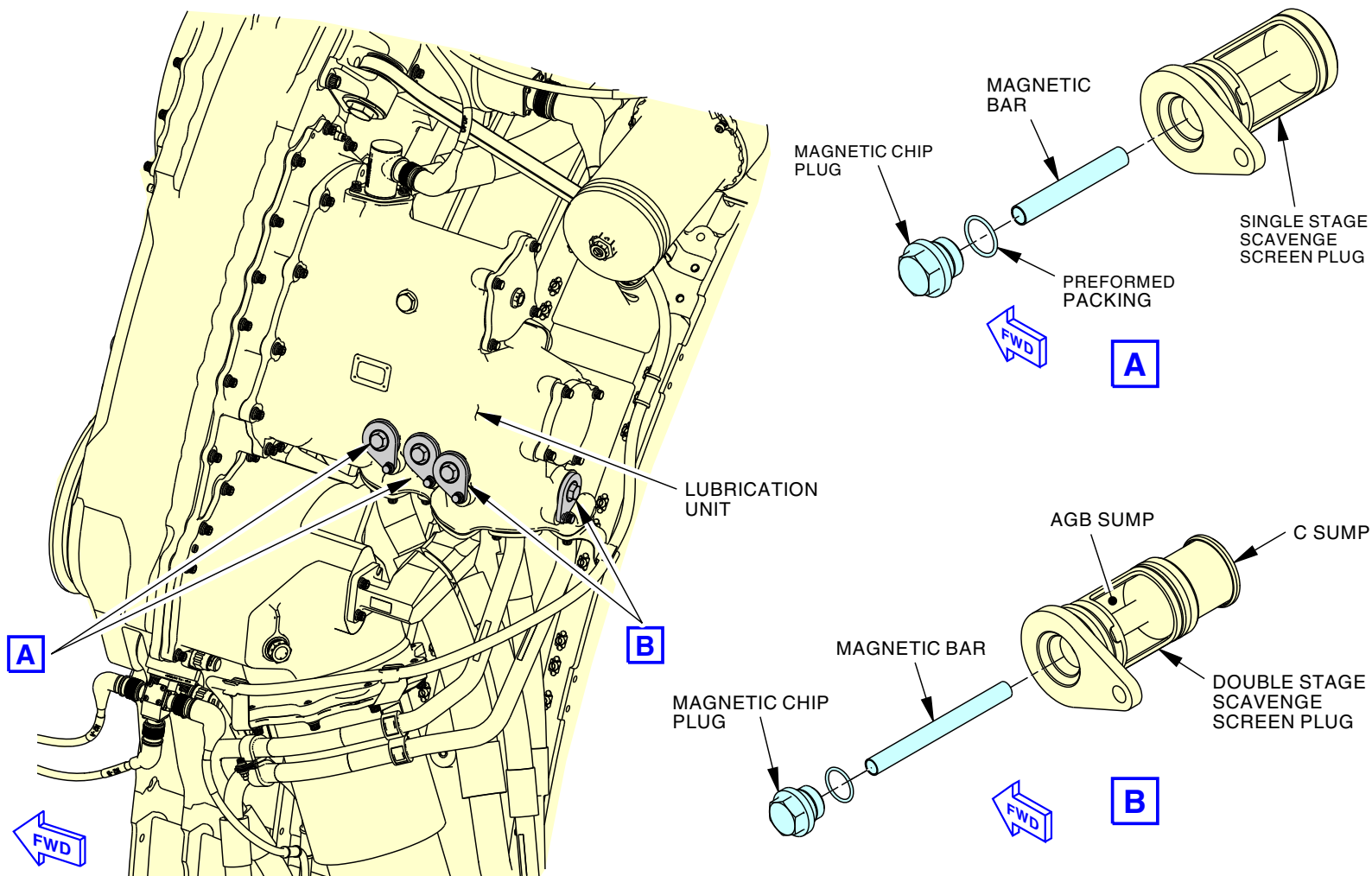
Magnetic bars are chip collectors that attract magnetic particles from the oil system. The magnetic particles can be analyzed for possible mechanical failure of an engine bearing or gear.

Physical Description

The magnetic bars are included in the single and double stage strainers in the lubrication unit.

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ENGINE OIL - DISTRIBUTION - MAGNETIC BARS



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ENGINE OIL - DISTRIBUTION - MAGNETIC BARS

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**ENGINE OIL - DISTRIBUTION - MAIN OIL/FUEL HEAT EXCHANGER****General**

The main oil/fuel heat exchanger uses fuel from the fuel pump to decrease the temperature of the supply oil.

See the fuel distribution system section for more information on the fuel system flow (SECTION 73-11).

Location

The main oil/fuel heat exchanger (MHX) is on the fan case at the 10:00 o'clock position. You open the left fan cowl to get access to the main oil/fuel heat exchanger.

Physical Description

The main oil/fuel heat exchanger has these parts:

- Housing
- Fuel and oil connections
- Exchanger core (inside the housing)
- Oil bypass valve
- Oil pressurizing valve (OPV)
- Fuel delta P sensor.

The exchanger core is where the oil temperature decreases as the oil heats the fuel.

The main oil/fuel heat exchanger has an oil bypass valve. The oil bypass valve opens when the exchanger core gets clogged. This lets the oil to flow around the exchanger core. The oil temperature will increase when the oil bypass valve opens, but the oil will continue to flow.

The MHX has an OPV. The OPV makes sure that there is a constant supply of pressurised oil to feed the engine oil dampened bearings.

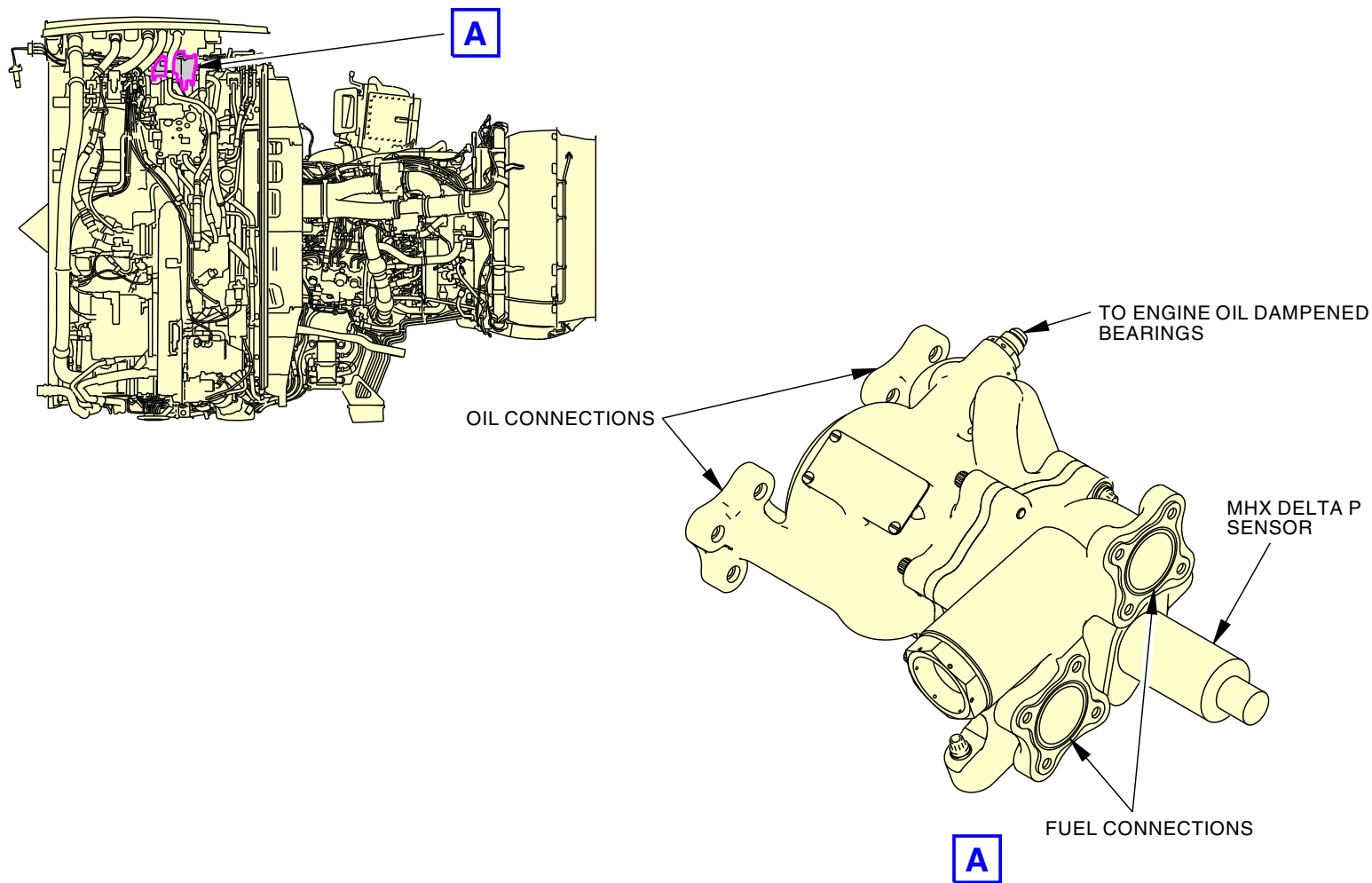
The fuel delta P sensor indicates a blockage in the fuel flow through the heat exchanger.

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ENGINE OIL - DISTRIBUTION - MAIN OIL/FUEL HEAT EXCHANGER



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ENGINE OIL - DISTRIBUTION - MAIN OIL/FUEL HEAT EXCHANGER

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**ENGINE OIL - DISTRIBUTION - SCAVENGE SCREEN PLUGS****General**

The scavenge screen plugs collect and keep unwanted materials from the scavenge oil. Collected material can indicate if there is mechanical failure of an engine bearing or gear. The scavenge screen plugs have magnetic bars that keep a sample of any ferrous material and a screen for non-ferrous material pieces larger than 0.03 in. (0.71 mm).

There are four scavenge screen plugs with magnetic bars. The plugs for the A and B sump are single stage strainers. The plug for the transfer gear box is a double stage strainer. The plug for the combined accessory gear box and C sump is also double stage strainer.

Location

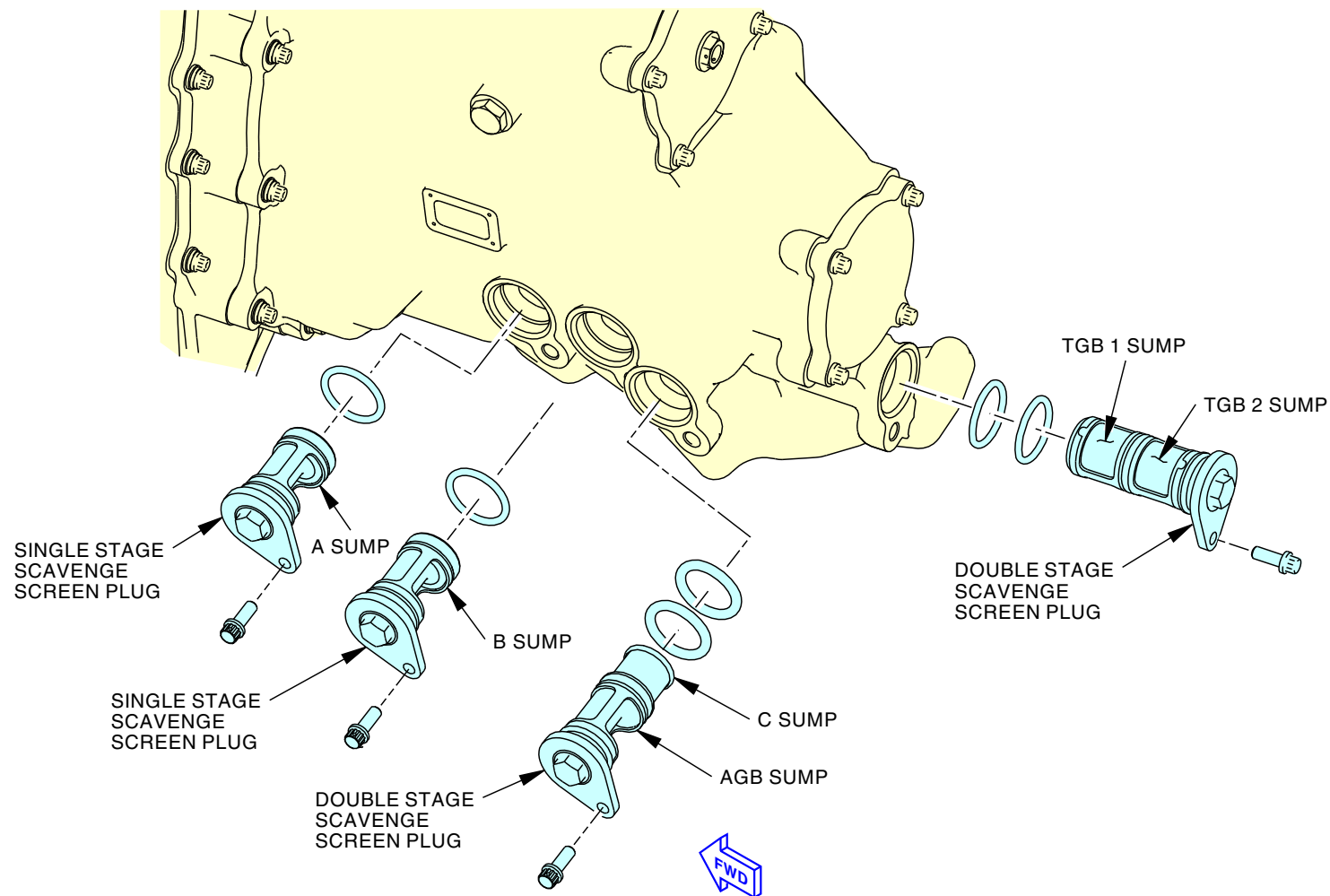
The lubrication unit housing holds the scavenge screen plugs. They are at the inlet of the scavenge pumps. The lubrication unit is on the rear of the accessory gearbox at the 7:00 o'clock position.

Physical Description

A scavenge screen plug has a magnetic bar and a metallic mesh screen. Each scavenge screen plug is attached to the lubrication unit housing with a single attach bolt. There are two types of scavenge screen plugs; scavenge screen plugs with single stage strainers, and scavenge screen plugs with double stage strainers.

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ENGINE OIL - DISTRIBUTION - SCAVENGE SCREEN PLUGS



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ENGINE OIL - DISTRIBUTION - SCAVENGE SCREEN PLUGS

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**ENGINE OIL - DISTRIBUTION - OIL EDUCTOR VALVE****General**

The oil eductor valve increases engine forward sump pressurization by providing primary air to an eductor tube in the center vent tube. This increases the delta pressure across the engine forward (A) sump seals at low engine speeds, which improves oil control.

Location

The oil eductor valve is at the 8:00 o'clock position (aft looking forward) on a bracket fixed to the combustion case and the high pressure turbine case.

Physical Description

The eductor valve is an inlet pressure controlled, altitude compensated poppet style shutoff valve. It is composed of these:

- Housing with 3 mounting lugs and inlet and outlet fittings
- Control piston with evacuated bellows and poppet valve
- Visual position indication.

Functional Description

The eductor valve increases the delta pressure across the A sump number 1 and number 3 carbon seals (the pressure outside the A sump minus the pressure inside the A sump). This is necessary to maintain high enough delta pressure across the seals to avoid oil leakage from the A sump into the center vent tube. When the delta pressure across the A sump carbon seals is too low, the seals in the bearing sump may leak. To prevent this, the eductor valve opens to force ventilation of the sump. This decreases pressure inside the sump, which increases the delta pressure and efficiency across the carbon seals in the A sump.

To ventilate the sump, the eductor valve inlet is connected to 7th stage high pressure compressor (HPC) air, and the outlet is connected to the center vent tube. At low 7th stage HPC inlet pressure, the valve is open. This lets 7th stage HPC air go to the center vent tube, creating a venturi effect in the A sump. At high 7th stage HPC inlet pressure, the control piston bellows closes the valve and shuts off air flow to the center vent tube.

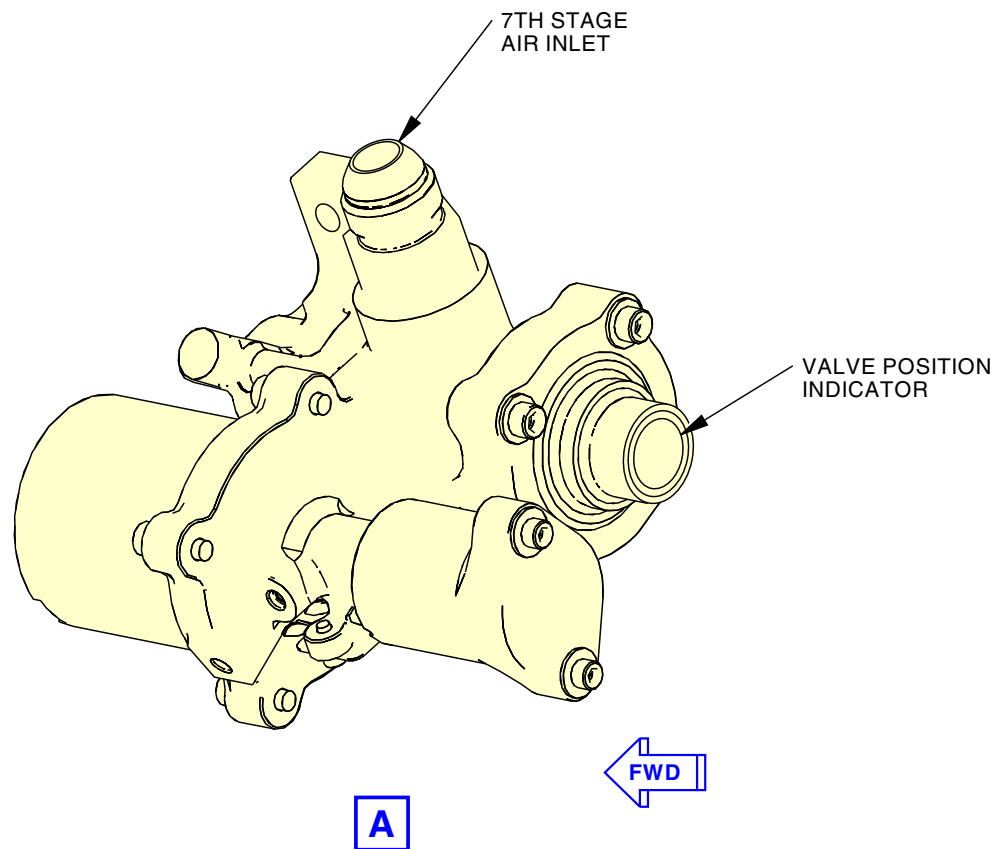
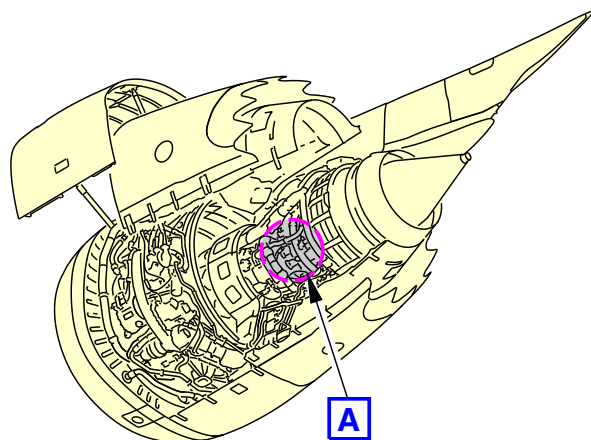
The oil eductor valve has a valve position indication on the housing. A pin extends to show the open position of the valve. The valve should be in the open position when the engine is shutdown on the ground.

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ENGINE OIL - DISTRIBUTION - OIL EDUCTOR VALVE



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ENGINE OIL - DISTRIBUTION - OIL EDUCTOR VALVE

79-20-00

**ENGINE OIL - DISTRIBUTION - AIR/OIL/DEBRIS SEPARATOR****General**

The engine air/oil/debris separator, separates air and debris from the scavenge oil before it goes to the oil tank. The engine air/oil/debris separator is a Lubriclone type separator that uses centrifugal force. The air/oil/debris separator performs these functions:

- Separates particles from the oil and directs them to the Oil Debris Monitoring System (ODMS) sensor
- Provides head pressure on the oil tank with the Tank Pressurizing Valve (TPV)
- Removes air from the lubrication scavenge system oil.

Location

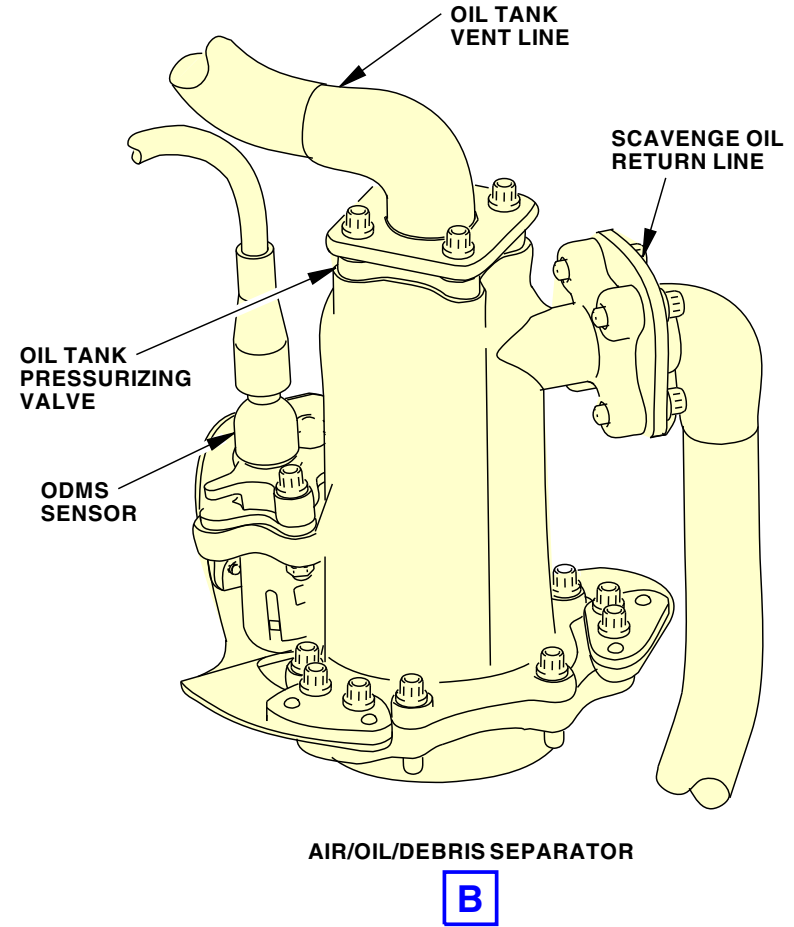
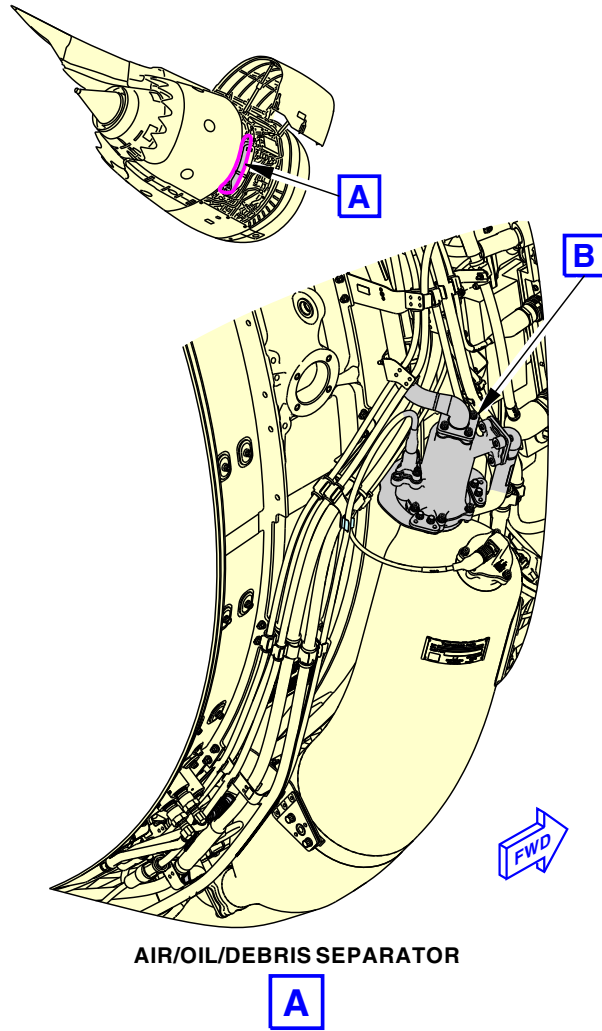
The air/oil/debris separator is on the top of the oil tank. Open the right fan cowl to get access to the air/oil/debris separator.

Functional Description

Air is separated from the oil in the scavenge oil line in the air/oil/debris separator. The air vents through the TPV to the Accessory Gearbox (AGB). The oil goes to the oil tank through the oil outlet on the bottom of the air/oil/debris separator.

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ENGINE OIL - DISTRIBUTION - AIR/OIL/DEBRIS SEPARATOR



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ENGINE OIL -- DISTRIBUTION - AIR/OIL/DEBRIS SEPARATOR

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**ENGINE OIL - DISTRIBUTION - FUNCTIONAL DESCRIPTION****Supply Circuit**

Oil from the oil tank goes to the lubrication unit through the anti-leakage valve that is internal to the unit. The anti-leakage valve keeps the oil in the oil tank when the engine is shutdown. The oil supply pump pressurizes the oil. The oil pressure is not regulated. Oil pressure increases and decreases with engine speed.

A pressure relief valve in the lubrication unit sends the oil to the inlet of the AGB/TGB scavenge pump when the supply pressure is too high.

The oil goes through the oil supply filter. The supply oil filter bypass valve monitors the pressure difference across the supply oil filter. If the filter clogs, the valve opens. A differential pressure sensor gives indication of impending bypass of the oil filter.

The filtered oil flows through the servo fuel heater, the Surface Air Cooled Oil Coolers (SACOCs), and then the main fuel/oil heat exchanger (MHX) . If the SACOCs or the MHX clogs, a bypass valve opens to allow the continued flow of oil.

The oil flows through these supply lines:

- Rear (B and C) sump
- Accessory Gearbox (AGB)
- Transfer gearbox (TGB) and forward (A) sump.

An oil line from the main fuel/oil heat exchanger sends pressure to the oil dampened bearings 1R and 5R.

Scavenge Circuit

Scavenge pumps move oil from engine sumps and gearboxes through scavenge screens with magnetic bars. There is one scavenge pump and one scavenge inlet screen element for each of these six scavenge lines:

- Rear (C) sump
- Rear (B) sump
- AGB
- Forward (A) sump

- TGB (Forward scavenge line)
- TGB (Aft scavenge line).

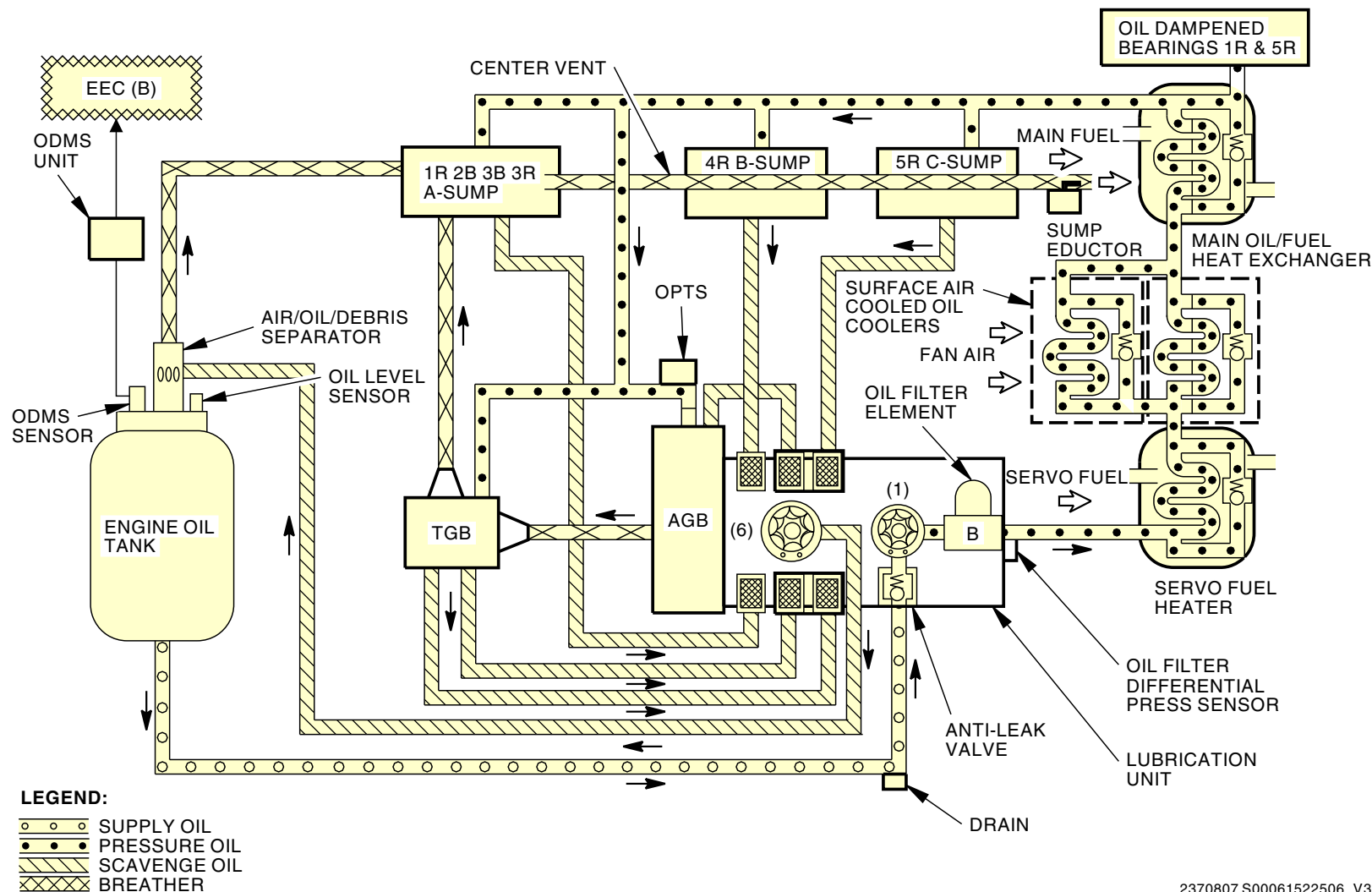
Check valves prevent leakage if a scavenge screen is removed.

The oil from the scavenge pumps goes to the air/oil/debris separator (Lubriclone). Oil from the separator goes back to the oil tank. Air from the separator passes through the pressurizing valve into the vent system. Ferrous debris is captured and indicated by the oil debris monitoring system (ODMS).

Vent Circuit

A vent line connects the oil tank with the AGB. There are also internal connections between the engine sumps and gearboxes. The vent system bleeds air out of the vent tube in the exhaust plug at the rear of the engine. An eductor in the vent tube operates at low engine power settings to increase the efficiency of the oil seals in the engine sumps.

ENGINE OIL - DISTRIBUTION - FUNCTIONAL DESCRIPTION



2370807 S00061522506_V3

ENGINE OIL - DISTRIBUTION - FUNCTIONAL DESCRIPTION

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LEAP-1B ENGINES

737-7/8/8200/9/10 SYSTEM DESCRIPTION SECTION

ENGINE OIL - DISTRIBUTION - FUNCTIONAL DESCRIPTION

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Sep 15/2021



ENGINE OIL - INDICATING - GENERAL DESCRIPTION

General

This engine oil indicating system supplies oil system data to the Display Processing Computers (DPCs) and on the MDS. The engine indication display on the MDS shows this data:

- Oil quantity
- Oil pressure
- Oil temperature
- Oil filter condition.

These components monitor the oil system:

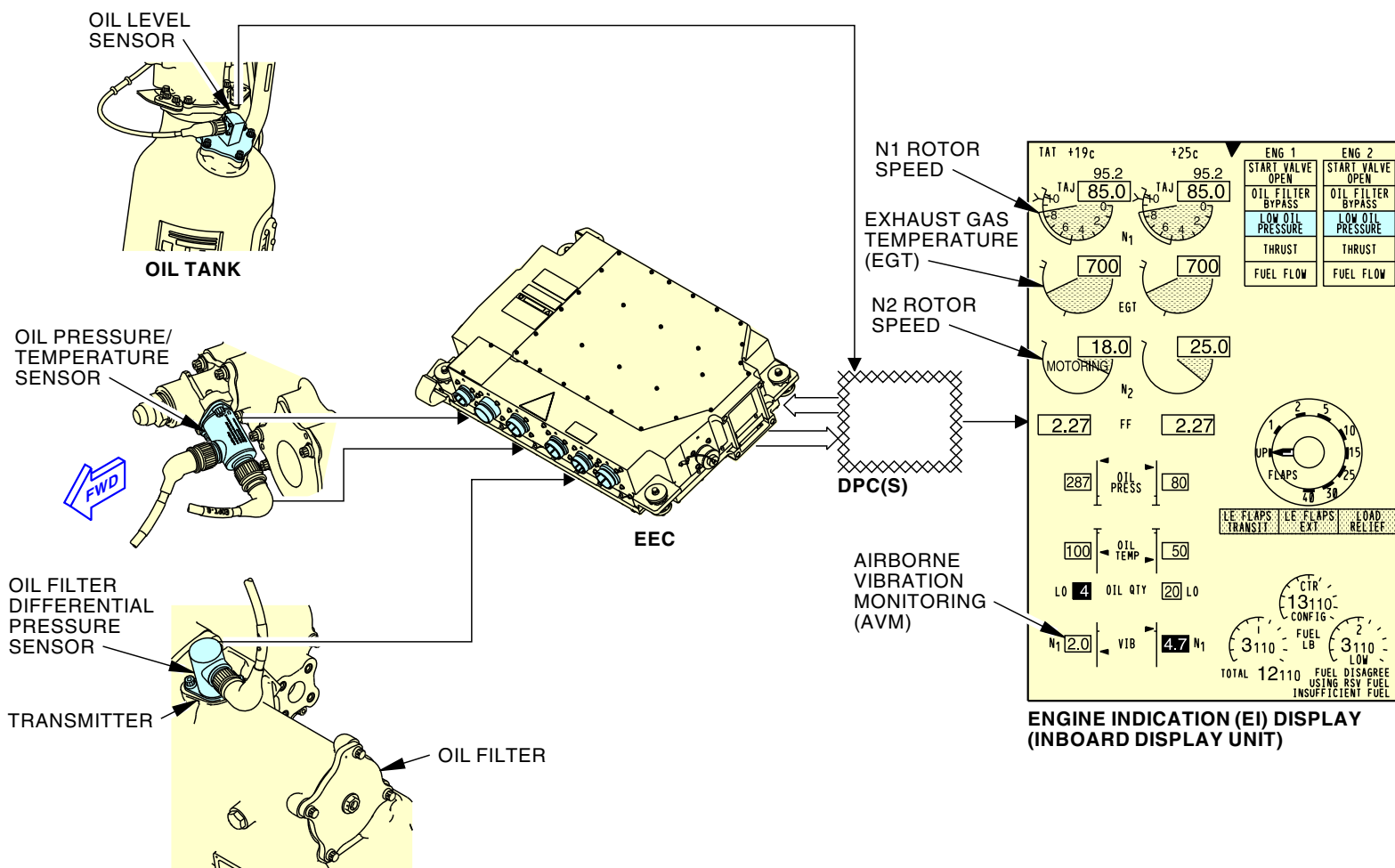
- Oil level sensor
- Oil Pressure Temperature Sensor (OPTS)
- Oil Filter Differential Pressure Sensor (OFDPS)

The oil level sensor sends the oil quantity data to the DPC which converts the data to digital format. The DPC then sends the data to the MDS.

The oil pressure, oil temperature, oil filter differential pressure sensor send data to the EECs which then send it to the DPCs.

The oil temperature and oil pressure sensors are installed as one unit.

ENGINE OIL - INDICATING - GENERAL DESCRIPTION



ENGINE OIL - INDICATING - GENERAL DESCRIPTION

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ENGINE OIL - INDICATING - COMPONENT LOCATIONS

Component Locations

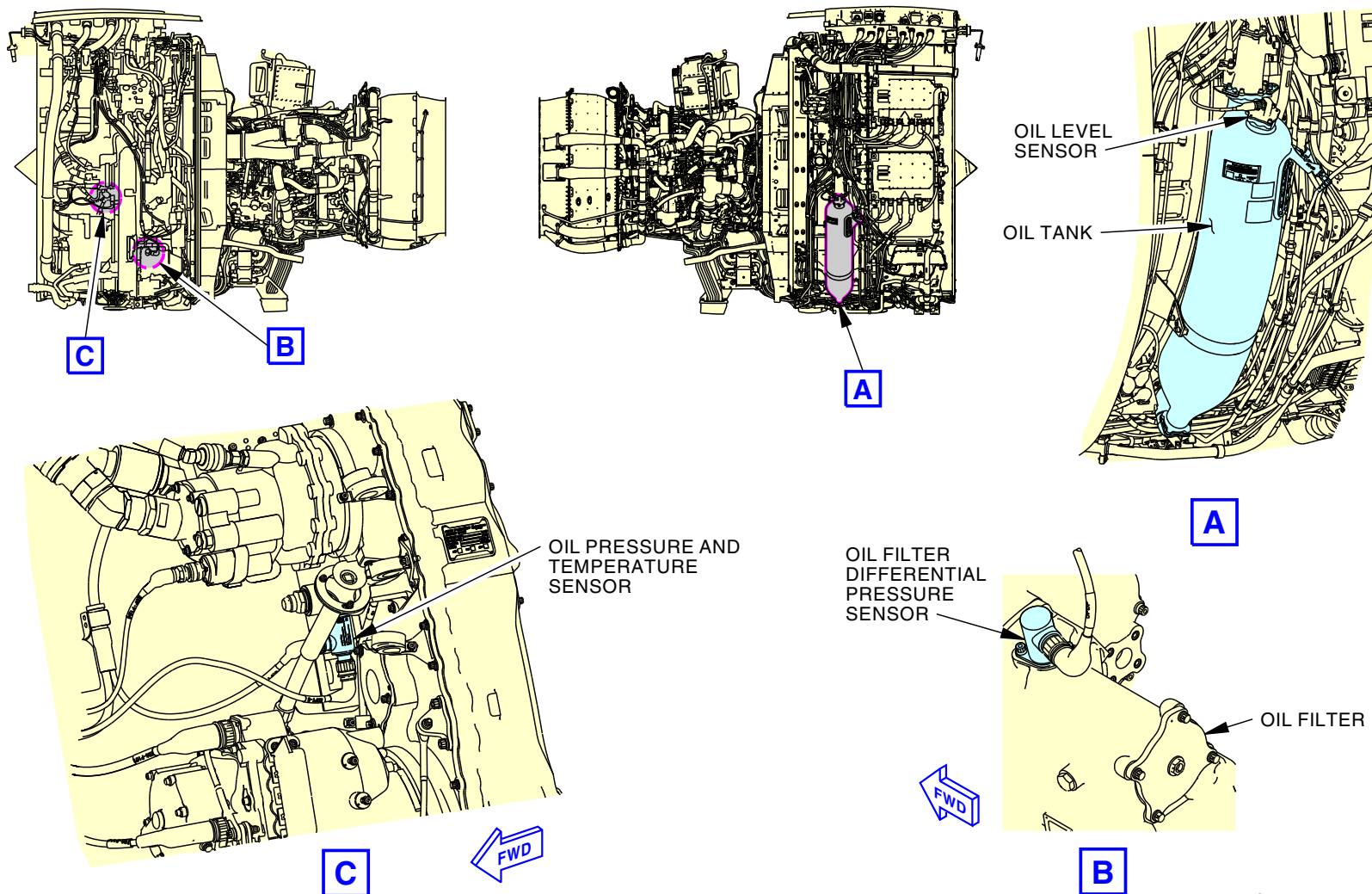
These components of the engine oil indicating system are on the left side of the fan case:

- Oil Pressure and Temperature Sensor (OPTS) (8:00 o'clock position)
- Oil Filter Differential Pressure Sensor (OFDPS) (7:00 o'clock position)

The oil level sensor is on the oil tank (4:00 o'clock position), on the right side of the fan case.

Open the fan cowls to get access to these components.

ENGINE OIL - INDICATING - COMPONENT LOCATIONS



2370809 S00061522512_V1

ENGINE OIL - INDICATING - COMPONENT LOCATIONS

79-30-00

**ENGINE OIL - INDICATING - OIL QUANTITY INDICATING SYSTEM****General**

The oil quantity indicating system shows the engine oil quantity data on the engine display. The oil quantity indicating system uses an oil quantity transmitter to measure the oil quantity in the oil tank. The oil quantity transmitter sends the oil quantity data directly to the Display Processing Computers (DPCs).

Physical Description

The oil quantity transmitter is an electrical resistance sensor. It uses a floating magnet and reed switches to determine the oil level. The oil quantity transmitter has one connector to transmit data to the DPCs.

Functional Description

The DPCs supply an excitation signal to the sensing circuit of the oil quantity transmitter. As the floating magnet moves up or down with the oil level, the reed switches open or close different resistor circuits. A sensor output signal in proportion to the oil level goes to the DPCs. The DPCs show the oil quantity on the engine indicating display.

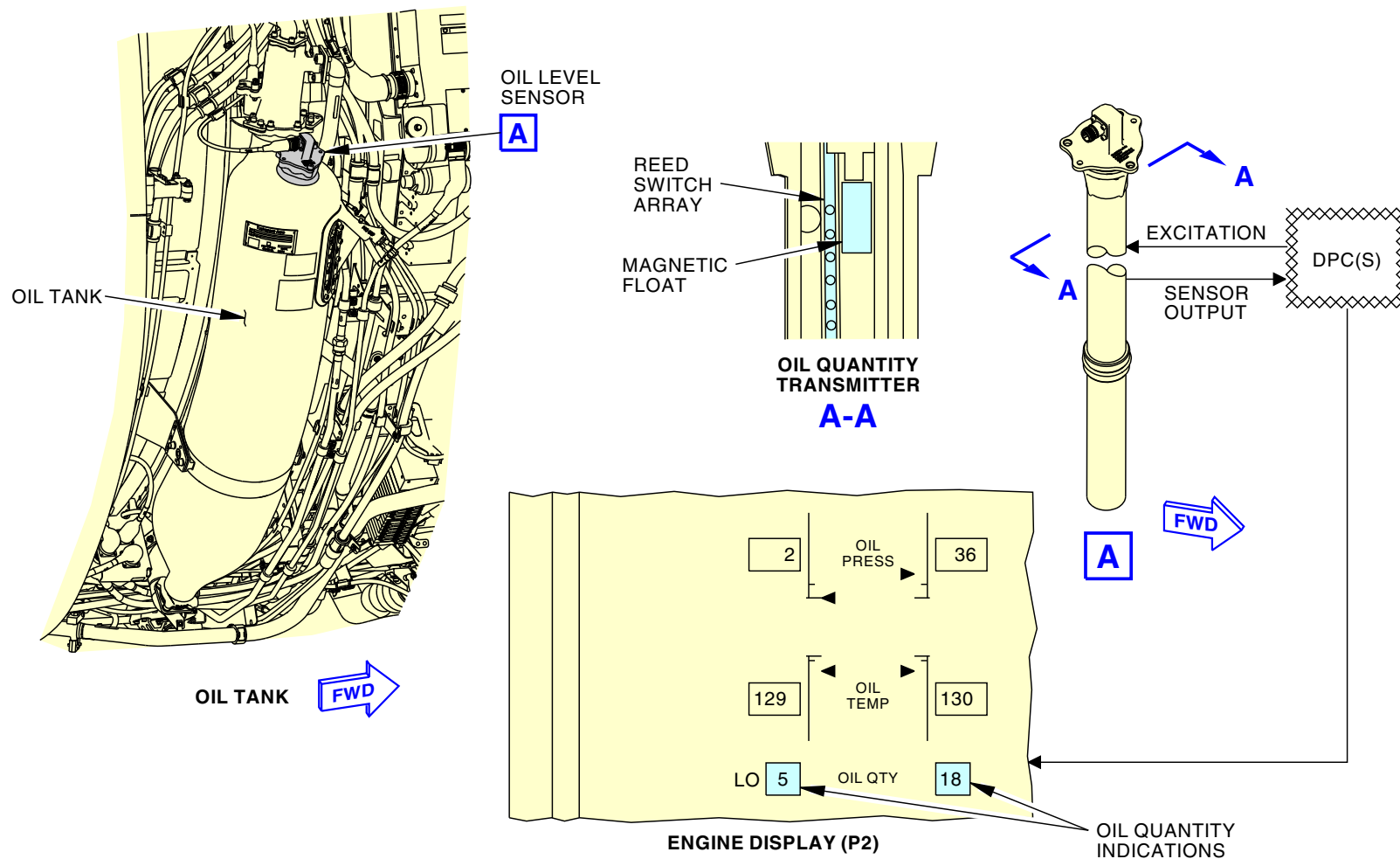
Indication

The engine indication display shows usable oil quantities in quarts. The display range is 0 to approximately 23 quarts. A quantity more than 19 quarts can show thru 21 quarts. The wing dihedral causes the oil tank for engine 2 to hold more oil than engine 1.

A LO message shows when the oil quantity is less than 6.6 quarts for 35 seconds. The oil quantity shows in reverse video when the low quantity exceedance is active.

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ENGINE OIL - INDICATING - OIL QUANTITY INDICATING SYSTEM



2536150 S0000601656_V3

ENGINE OIL - INDICATING - OIL QUANTITY INDICATING SYSTEM

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**ENGINE OIL - INDICATING - OIL PRESSURE INDICATING SYSTEM****General**

The oil pressure indicating system shows the engine oil pressure data on the MDS engine indication display. A combined Oil Pressure Temperature Sensor (OPTS) measures the oil pressure at the inlet to the Accessory Gear Box (AGB).

Physical Description

The OPTS has two sensor elements for oil pressure. Each element connects with one EEC channel through a separate connector. The OPTS is installed on an adapter that is on the front face of the AGB. The OPTS also has the oil temperature sensor.

Functional Description

The oil pressure sensor section of the OPTS is a dual, strain gauge type pressure sensor. Each element in the sensor receives an excitation input, and sends an output to the related EEC channel. The EECs change this signal into an ARINC 429 signal and send it to the DPCs. The DPCs show the oil pressure on the engine indication display.

Indication

Oil pressure shows on two vertical indicators and two digital displays. A pointer shows the oil pressure in psi differential (psid) on each vertical indicator. The indicator has two index markers. The amber index marker shows the oil pressure amber limit. The red index marker shows the oil pressure redline limit.

Low Oil Pressure

The oil pressure (low) amber limit defines the cautionary operating pressure range of the engine lubrication system. The oil pressure (low) amber limit is displayed as an amber (yellow) tick mark on the column scale.

The MDS changes the color of the oil pressure digital readout and outline box to amber if the oil pressure is less than the oil pressure (low) amber limit but greater than the oil pressure (low) redline limit. The MDS reverts back to the normal color indications for the oil pressure digital readout and outline box when the exceedance no longer exists.

The oil pressure (low) redline defines the below-normal operating pressure range of the engine lubrication system. The oil pressure (low) redline limit is displayed as a red tick mark on the column scale.

If the engine oil pressure falls below the oil pressure (low) redline limit, the MDS changes the color of the oil pressure digital readout and outline box to red. The MDS reverts back to the normal color indications for the Oil Pressure digital readout and outline box when the exceedance no longer exists.

The amber LOW OIL PRESSURE message flashes for 10 seconds then shows continuously when the oil pressure is less than the red line limit. The DPCs will not allow the flash mode for takeoffs and landings.

During start, the EEC prevents the indicator and pointer from a change to amber or red.

Oil Pressure Trim

The engine oil pressure trim modifies both the oil pressure (low) amber line and the oil pressure (low) redline limits as a function of engine core speed.

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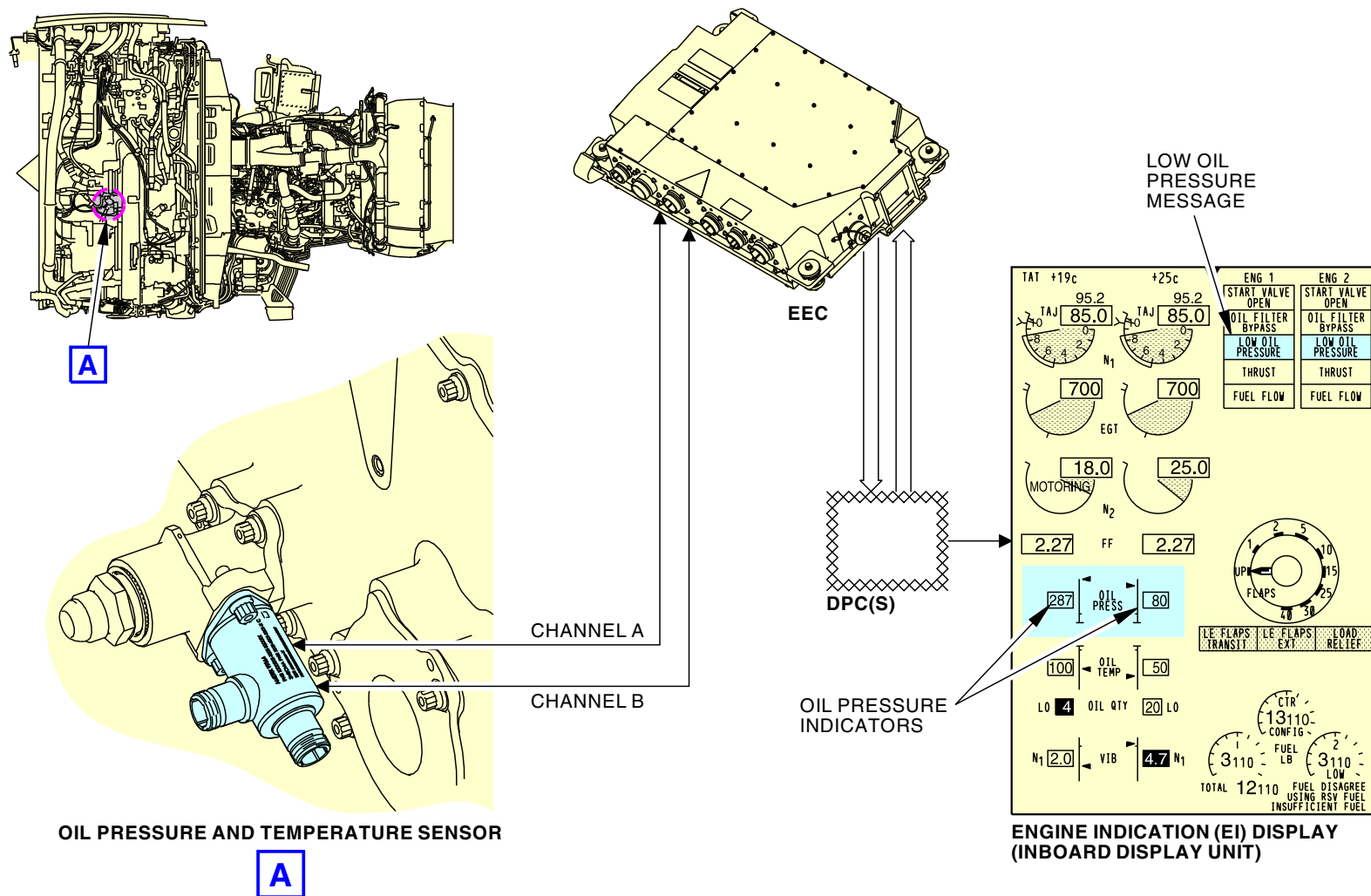
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ENGINE OIL - INDICATING - OIL PRESSURE INDICATING SYSTEM



2370811 S00061522516_V1

ENGINE OIL - INDICATING - OIL PRESSURE INDICATING SYSTEM

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**ENGINE OIL - INDICATING - OIL TEMPERATURE INDICATING SYSTEM****General**

The oil temperature indicating system shows the engine oil temperature data on the MDS engine indication display. A combination Oil Pressure/Temperature Sensor (OPTS) measures the oil temperature at the inlet to the Accessory Gearbox (AGB).

Physical Description

The OPTS sensor has two temperature sensor elements. One sensor element connects to EEC channel A and the second element connects to EEC Channel B.

Functional Description

The oil temperature sensors measure oil temperature at the inlet to the AGB. There are two oil temperature sensor elements in the OPTS. Each element in the sensor sends an output to the related EEC channel. The EECs change this signal to an ARINC 429 signal and sends it to the DPCs. The DPCs show the oil temperature on the engine indication display.

Indication

The oil temperature (high) amber limit defines the cautionary high operating temperature range of the engine lubrication system. The oil temperature (high) amber limit is displayed as an amber (yellow) tick mark on the top of the column scale.

The MDS changes the color of the oil temperature digital readout and outline box to amber in the following conditions:

- The oil temperature is greater than the oil temperature (high) amber limit but less than the oil temperature (high) redline limit

The MDS reverts back to the normal color indications for the oil temperature digital readout and outline box when the high exceedance no longer exists.

If an oil temperature (high) amber exceedance persists for 15 minutes, the EEC changes the fault condition to indicate a (high) redline exceedance.

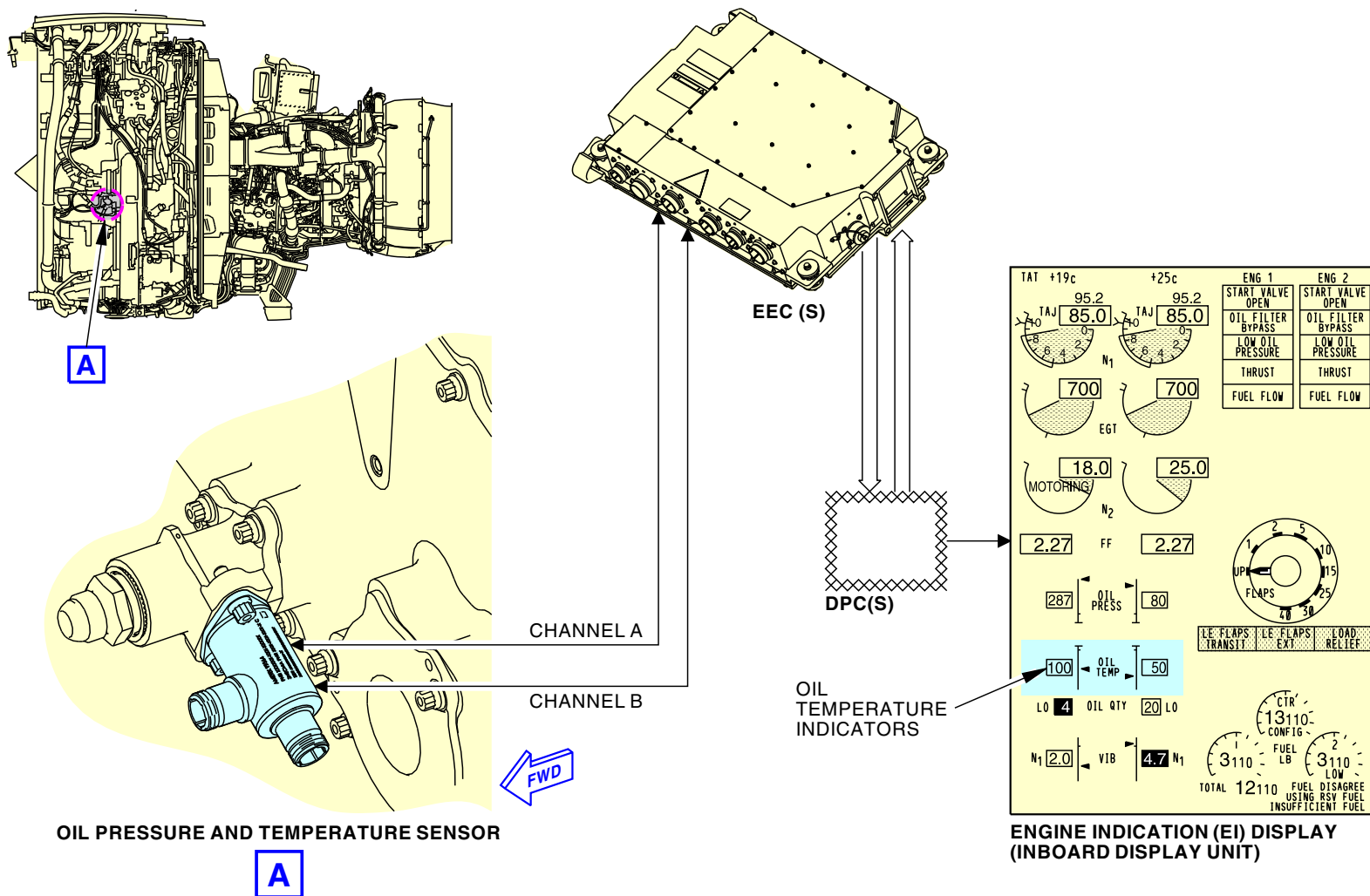
If the engine oil temperature goes above the (high) redline, the MDS changes the color of the oil temperature digital readout and outline box to red. The MDS reverts back to the normal color indications for the oil temperature digital readout and outline box when the exceedance no longer exists.

Oil Temperature Trim

The engine oil temperature trim is an adder that is applied to the selected engine oil temperature value in order to modify the flight deck oil temperature indication. Both the oil temperature (high) amber line and the oil temperature (high) redline limits are variable limits that decrease as a function of the engine core speed.

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ENGINE OIL - INDICATING - OIL TEMPERATURE INDICATING SYSTEM



2370812 S00061522518_V1

ENGINE OIL - INDICATING - OIL TEMPERATURE INDICATING SYSTEM

**ENGINE OIL - INDICATING - OIL FILTER BYPASS WARNING SYSTEM****General**

The oil filter bypass warning system shows a message when the oil filter is near a bypass condition. The message shows on the engine indication display. The oil filter bypass indicating system uses a single, dual element differential pressure sensor. The signal from the sensor is sent to the EECs which in turn sends the signal to the Display Processing Computers (DPCs) just before the oil filter bypass valve opens.

Physical Description

The oil filter differential sensor connects with the EEC through a single connector. The sensor is installed on the lubrication unit.

Functional Description

The oil filter differential pressure sensor monitors the oil pressure difference between the inlet and the outlet of the oil filter. The oil filter differential pressure sensor is a dual, strain gauge type pressure sensor. Each element in the sensor sends an output to the related EEC channel. The EECs change this signal to an ARINC 429 signal and send it to the DPCs.

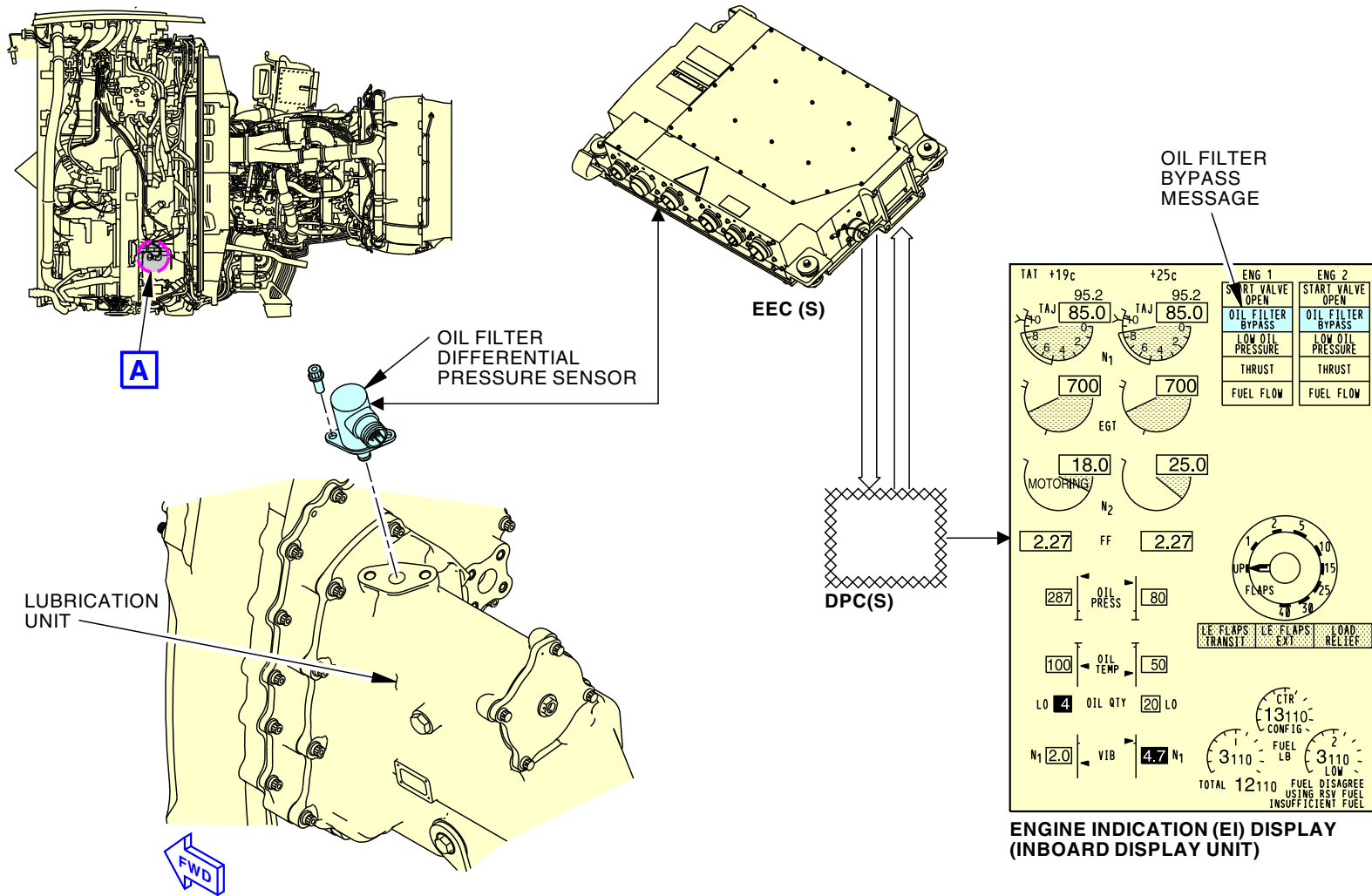
Oil Filter Bypass Message

Just before the oil filter bypass valve opens, the EEC sends a signal to the DPCs. This causes the engine indication display to show the amber OIL FILTER BYPASS message. There is one OIL FILTER BYPASS message for each engine.

The amber OIL FILTER BYPASS message flashes initially for 10 seconds, and then shows continuously. The DPCs do not allow the flash mode during takeoffs and landings.

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ENGINE OIL - INDICATING - OIL FILTER BYPASS WARNING SYSTEM



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ENGINE OIL - INDICATING - OIL FILTER BYPASS WARNING SYSTEM

