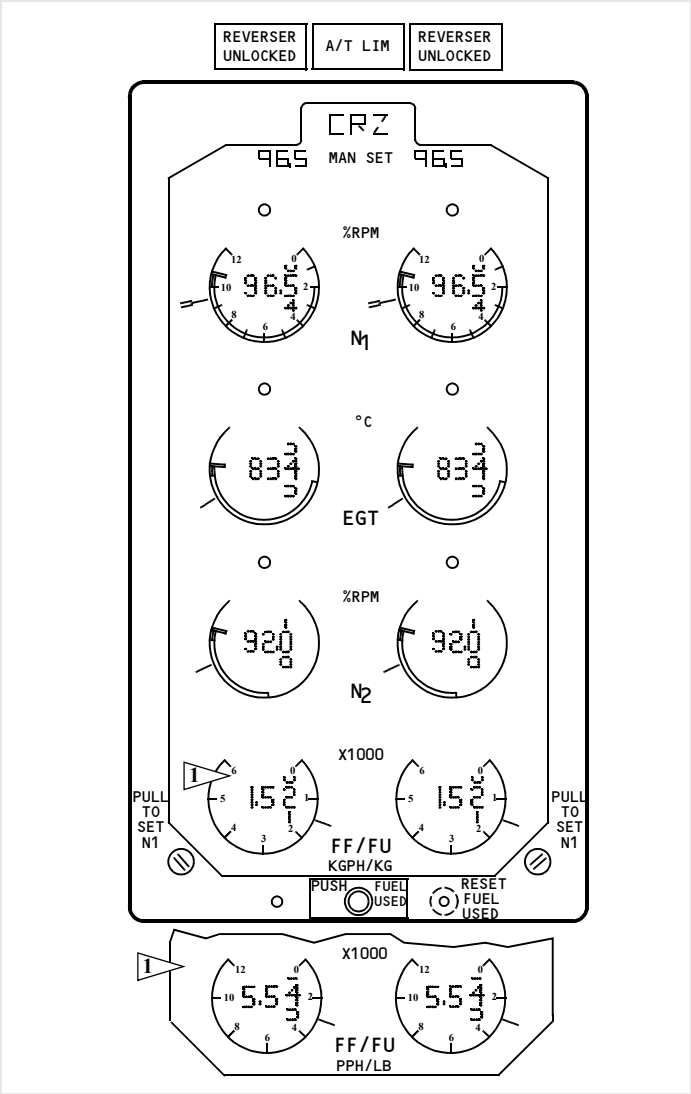
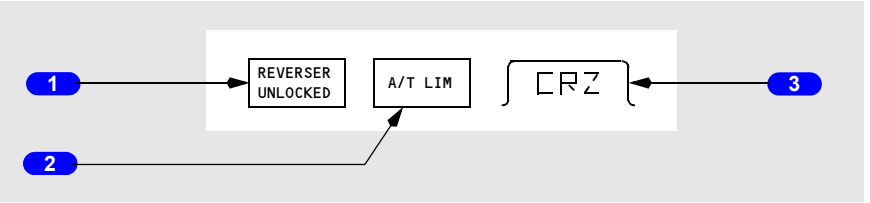
Engine Instrument System (EIS) Primary Panel



CENTER INSTRUMENT PANEL

Reverser Unlocked, Autothrottle Limit, and Thrust Mode Display



1 Reverser Unlocked Light

Illuminated (amber) – Indicates the thrust reverser is unlocked.

2 Autothrottle Limit (A/T LIM) Indication

Illuminated (white) – A/T computer is calculating a single fixed N1 thrust limit for affected engine(s) when FMC calculations become invalid or if either engine N1 is less than 18%.

3 Thrust Mode Display

Displays the active N1 limit reference mode.

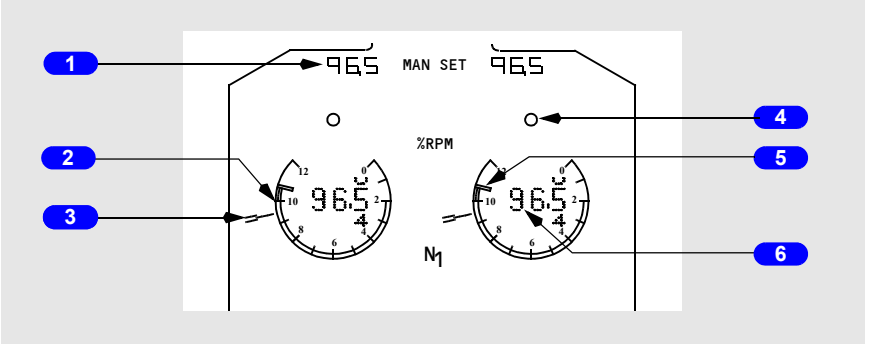
With N1 manual set knob pushed in, active N1 limit is displayed by reference N1 bugs. If knob is pulled out, FMC computed N1 is disabled.

Active N1 limit is normally calculated by FMC.

Thrust mode display annunciations are:

- R – reduced (can appear with TO or CLB)
- TO – takeoff
- CLB – climb
- CRZ – cruise
- G/A – go–around
- CON – continuous
- – – – – FMC not computing thrust limit.

N1 Indications



1 N1 Manual Set Indication

Set by N1 manual set knob.

Blank when manual set knob is pushed in.

2 N1 RPM Indication (green)

Displays N1 % RPM.

3 Reference N1 Bug (yellow)

With N1 manual set knob pushed in:

- positioned by FMC
- based on N1 limit page and takeoff reference page
- displays active N1 limit for A/T operation.

With N1 manual set knob pulled out:

- displays crew selected N1 limit
- has no effect on A/T operation.

4 Warning Light

Illuminated (red) –

- indicates the N1 limit has been reached or exceeded
- remains illuminated until N1 is reduced below the limit.

Note: Failure of an N1 input signal to the primary EIS panel will cause the affected display pointer and digital counter to slew to their lower stops and hold for two seconds. The pointer will then disappear and the counter will display dashes. An internal failure will cause the display(s) to simply blank.

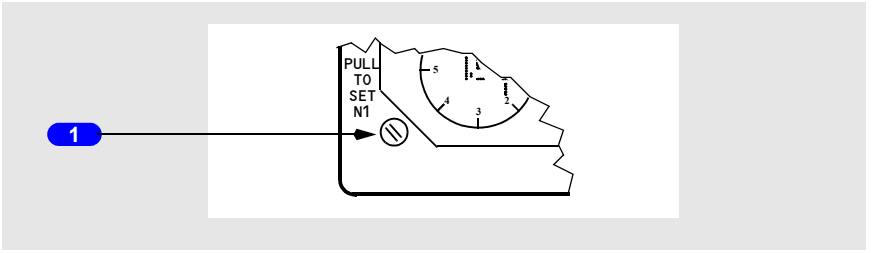
5 **N1 Red Radial**

Shows N1 % RPM operating limit.

6 **N1 RPM Readout (digital)**

Displays N1 % RPM.

N1 Manual Set Knob



1 **N1 Manual Set Knob**

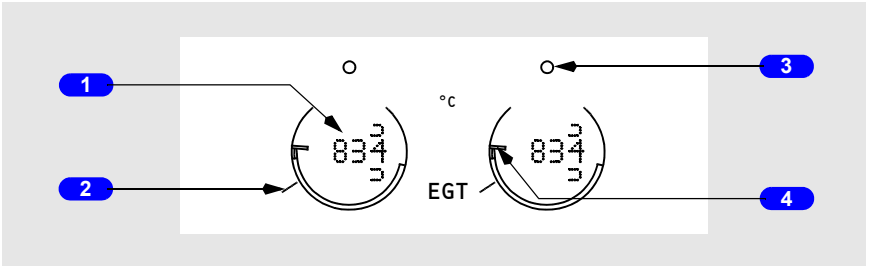
Push in –

- reference N1 bug set by FMC based on N1 limit page and takeoff reference page
- blanks N1 manual set indication.

Pull out –

- disables FMC input signal
- rotation sets desired N1 RPM in the N1 manual set indication and moves the reference N1 bug to the corresponding location.

EGT Indications



1 **Exhaust Gas Temperature (EGT) Readout (digital)**

Displays engine EGT in degrees C.

If flashing, indicates the abnormal start advisory system has sensed conditions which may lead to an abnormal engine start.

2 Exhaust Gas Temperature (EGT) Indication (green)

Displays engine EGT in degrees C.

3 Warning Light

Illuminated (red) –

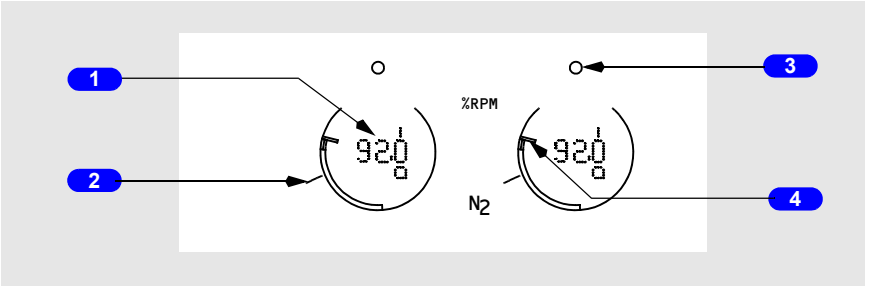
- indicates the EGT limit has been reached or exceeded
- remains illuminated until EGT is reduced below the limit.

4 Exhaust Gas Temperature (EGT) Red Radial

Displays maximum takeoff EGT limit.

Note: Failure of an EGT input signal to the primary EIS panel will cause the affected display pointer and digital counter to slew to their lower stops and hold for two seconds. The pointer will then disappear and the counter will display dashes. An internal failure will cause the display(s) to simply blank.

N2 Indications



1 N2 Readout (digital)

Displays N2 % RPM.

2 N2 RPM Indication (green)

Displays N2 % RPM.

3 Warning Light

Illuminated (red) –

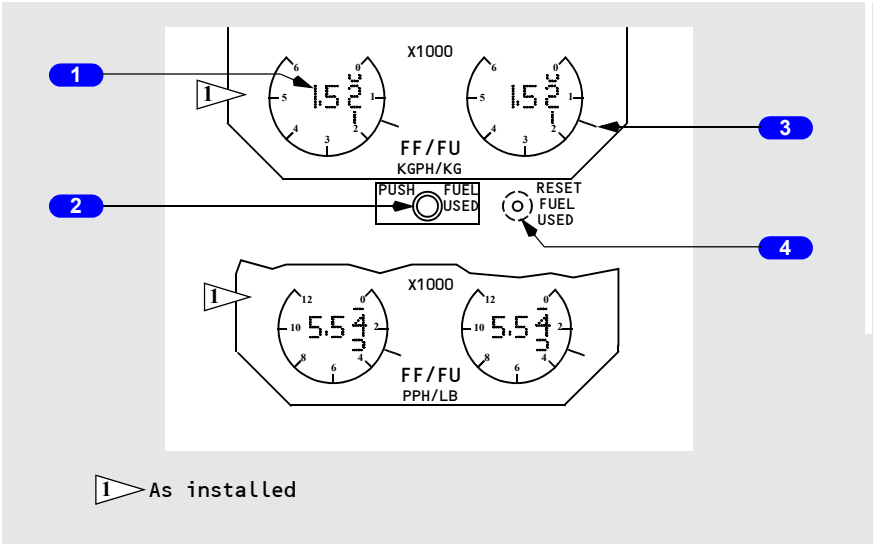
- indicates the N2 limit has been reached or exceeded
- remains illuminated until N2 is reduced below the limit.

4 N2 Red Radial

Displays N2 % RPM operating limit.

Note: Failure of an N2 input signal to the primary EIS panel will cause the affected display pointer and digital counter to slew to their lower stops and hold for two seconds. The pointer will then disappear and the counter will display dashes. An internal failure will cause the display(s) to simply blank.

Fuel Flow/Fuel Used Indications



1 Fuel Flow/Fuel Used (FF/FU) Readout (digital)

Normally displays the present rate of fuel flow in pounds or kilograms per hour X 1000.

After the fuel used reset switch has been pushed, this readout displays current fuel used for one second, decreases to zero, then displays fuel flow.

After the fuel flow/used switch is pushed, this readout shows fuel used since the last reset. After 10 seconds, display automatically reverts to fuel flow.

2 Fuel Flow/Used Switch

Push – digital readout shows fuel used since last reset. After 10 seconds, display automatically reverts to fuel flow.

3 Fuel Flow Indicator

Indicates rate of fuel flow in pounds or kilograms per hour at all times.

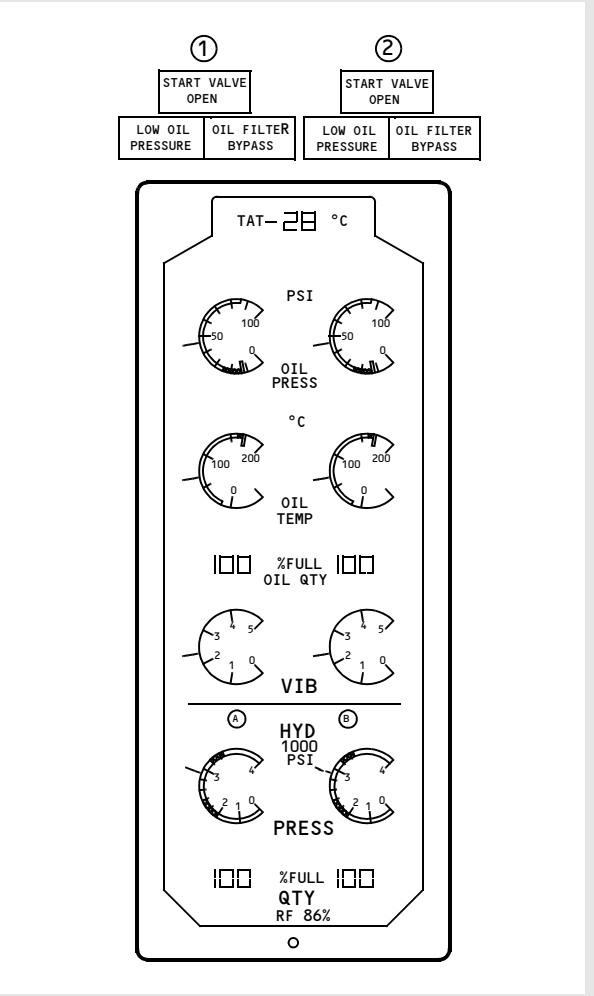
4 FUEL USED RESET Switch (recessed)

Push –

- resets computed fuel used to zero
- digital readout displays current fuel used for one second, decreases to zero, then fuel flow
- resets abnormal start advisory system.

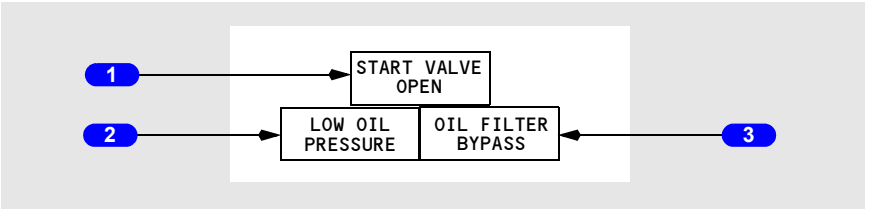
Note: Failure of a fuel flow input signal to the primary EIS panel will cause the affected display pointer and digital counter to slew to their lower stops and hold for two seconds. The pointer will then disappear and the counter will display dashes. An internal failure will cause the display(s) to simply blank.

Engine Instrument System (EIS) Secondary Panel



CENTER INSTRUMENT PANEL

Caution Lights



1 START VALVE OPEN Light

Illuminated (amber) – related engine start valve is open and air is being supplied to the starter.

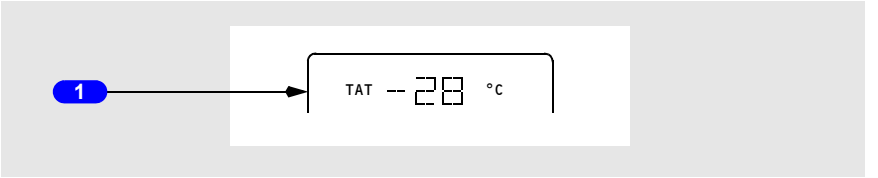
2 LOW OIL PRESSURE Light

Illuminated (amber) – related engine oil pressure is at or below the red radial.

3 OIL FILTER BYPASS Light

Illuminated (amber) – indicates an impending bypass of scavenge oil filter.

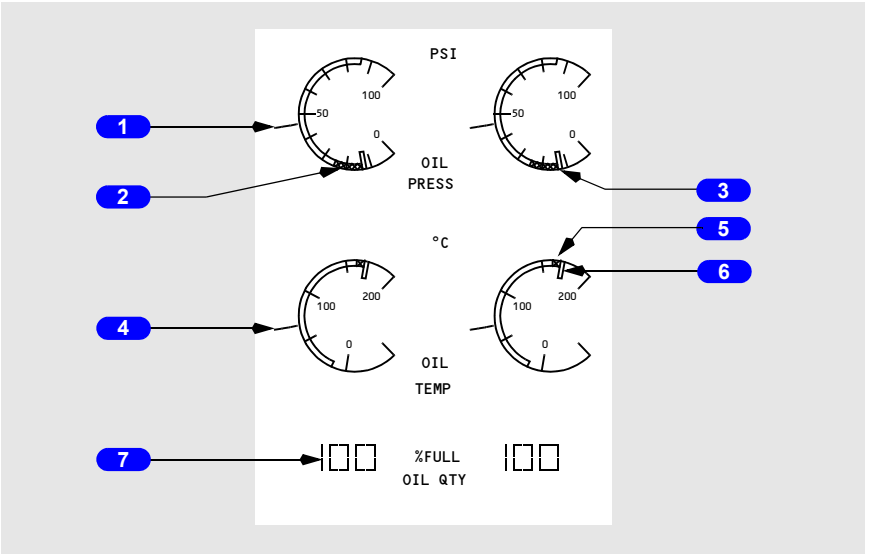
Total Air Temperature Indication



1 Total Air Temperature (TAT) Indicator

Displays total air temperature in degrees C.

Engine Oil Indications



1 Oil Pressure (OIL PRESS) Indication (green)

Displays engine oil pressure in psi.

Note: Oil pressure is unregulated and is primarily a function of engine speed (N2).

2 Low Oil Pressure Yellow Band

With takeoff thrust set, indicates minimum oil pressure limit.

Note: Yellow band is valid only at takeoff thrust.

3 Low Oil Pressure Red Radial

Indicates minimum oil pressure limit.

4 Oil Temperature (OIL TEMP) Indication (green)

Displays engine oil temperature in degrees C.

5 High Oil Temperature Yellow Band

Indicates oil temperature caution range.

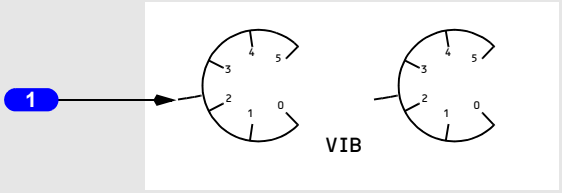
6 High Oil Temperature Red Radial

Indicates maximum oil temperature limit.

7 Oil Quantity (OIL QTY) Indication

Displays engine oil quantity in percentage of full quantity.

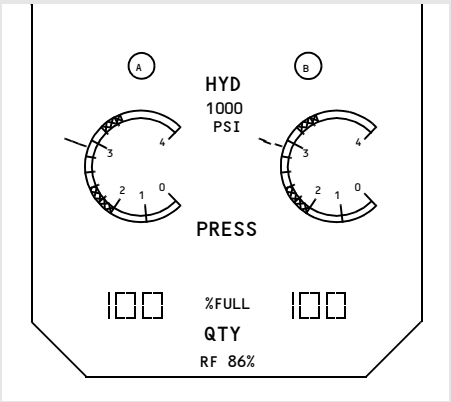
Engine Vibration Indications



1 Airborne Vibration (VIB) Monitor (green)

Indicates engine vibration level.

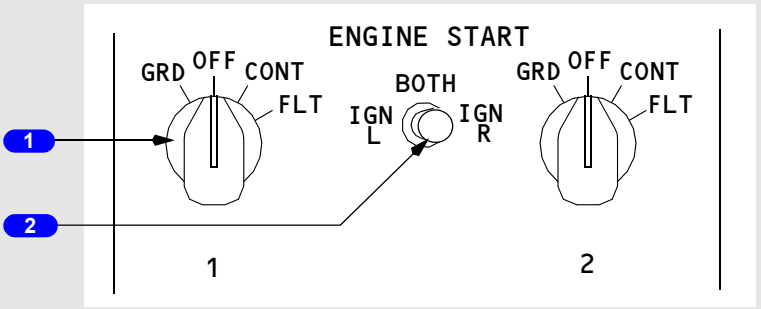
Hydraulic System Pressure and Quantity Indications



Described in Chapter 13 – Hydraulics.

Note: Failure of an input signal to the secondary EIS panel will cause an affected pointer to blank or an affected digital counter to display dashes. An internal failure will cause either type of display to blank.

Engine Start Switches



FORWARD OVERHEAD PANEL

1 ENGINE START Switches

GRD –

- opens start valve
- closes engine bleed air valve
- provides ignition to selected igniter(s) when engine start lever is moved to IDLE
- releases to OFF at starter cutout.

OFF – ignition off

CONT – provides ignition to selected igniter(s) when engine start lever is in IDLE.

FLT –

- provides ignition to both igniters when engine start lever is in IDLE
- ignition select switch is bypassed when the Engine Start switch is in FLT.

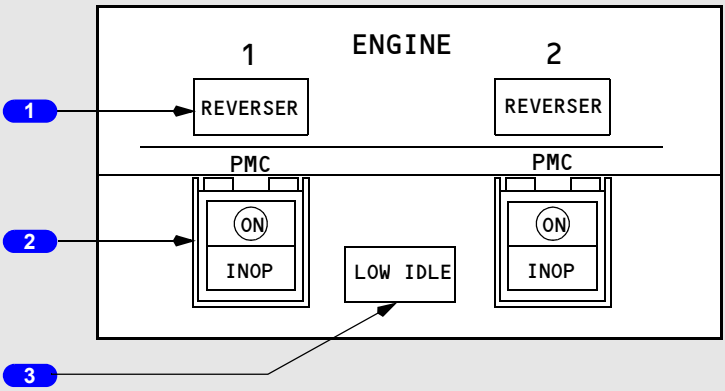
2 Ignition Select Switch

IGN L – selects the left igniter for use on both engines.

BOTH – selects both igniters for use on both engines.

IGN R – selects the right igniter for use on both engines.

Engine Panel



AFT OVERHEAD PANEL

1 REVERSER Light

Illuminated (amber) – one or more of following has occurred:

- isolation valve or thrust reverser control valve is not in commanded position
- thrust reverser sleeve position sensors are in disagreement
- auto–restow circuit has been activated

2 Power Management Control (PMC) Switch

ON (ON in view – white) – PMC is selected ON.

INOP (INOP in view – amber) – PMC is inoperative when engine speed is above 46% N2, or the PMC is selected OFF.

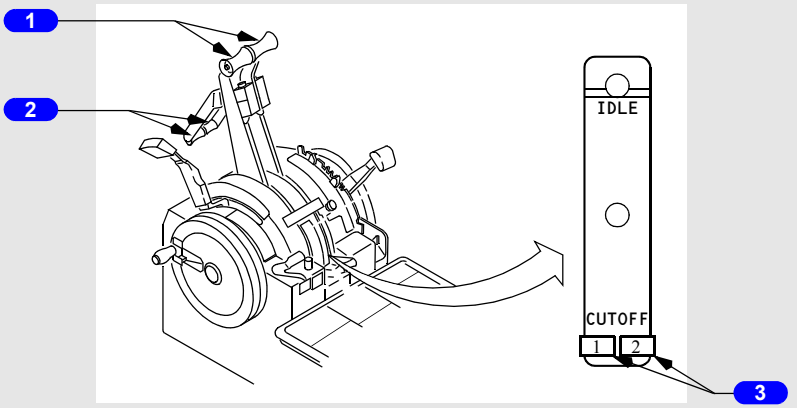
3 LOW IDLE Light

Illuminated (amber) –

- the thrust lever for either engine is near idle and the MEC on either engine is not commanded to maintain high idle RPM in flight
- the speed of either engine is below 25% N1 in flight

If an engine start lever is in CUTOFF, the light is deactivated.

Engine Controls



CONTROL STAND

1 Forward Thrust Levers –

- control engine thrust
- cannot be advanced if the related reverse thrust lever is in the deployed position.

2 Reverse Thrust Levers –

- control engine reverse thrust
- cannot select reverse thrust unless related forward thrust lever is at IDLE.

Note: Reverse thrust lever is blocked at reverse idle position until related thrust reverser is more than 60% deployed.

Note: Movement of reverse thrust lever into reverse thrust engages locking pawl preventing forward thrust lever from moving. Terminating reverse thrust removes locking pawl and restores forward thrust lever movement ability.

3 Engine Start Levers

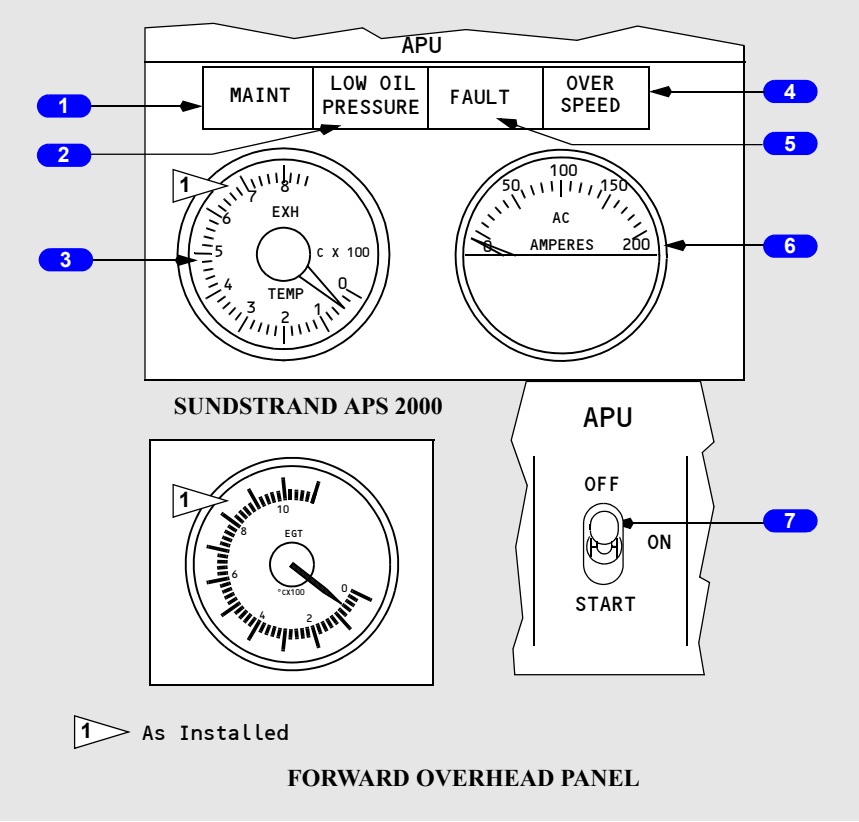
IDLE –

- energizes ignition system
- electrically opens engine fuel shutoff valve in the wing leading edge outboard of the pylon
- mechanically opens MEC shutoff valve.

CUTOFF –

- closes both engine fuel shutoff valve and MEC shutoff valve
- de-energizes ignition system.

APU



1 APU Maintenance (MAINT) Light

Illuminated (blue) – APU maintenance problem exists:

- APU may be operated.
- light is disarmed when APU switch is OFF.

2 APU LOW OIL PRESSURE Light

Illuminated (amber) –

- during start until the APU oil pressure is normal
- oil pressure is low causing an automatic shutdown (after start cycle is complete)
- if light is illuminated when APU switch is placed to OFF, light extinguishes after 5 minutes.
- light is disarmed when APU switch is OFF.

3 APU Exhaust Gas Temperature (EGT) Indicator

Displays APU EGT

EGT indicator remains powered for 5 minutes after APU shutdown.

4 APU OVERSPEED Light

Illuminated (amber) –

- APU RPM limit has been exceeded resulting in an automatic shutdown.
- overspeed shutdown protection feature has failed a self–test during an abnormal APU start or shutdown
- if light is illuminated when APU switch is placed to OFF, light extinguishes after 5 minutes.
- light is disarmed when APU switch is OFF.

5 APU FAULT Light

Illuminated (amber) –

- a malfunction exists causing APU to initiate an automatic shutdown
- if light is illuminated when APU switch is placed to OFF, light extinguishes within 5 minutes.
- Additional restarts may be attempted.
- light is disarmed when APU switch is OFF.

6 APU Generator AC Ammeter

Displays APU generator load current

7 APU Switch

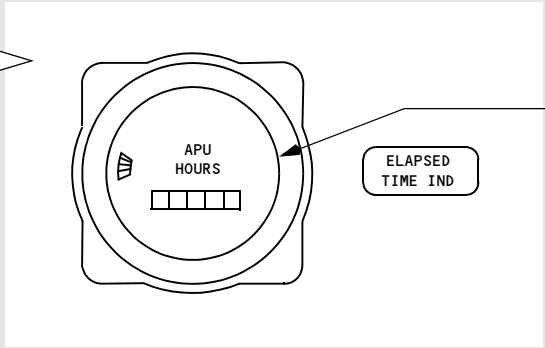
OFF – normal position when APU is not running.

- positioning switch to OFF with APU running initiates APU shutdown, trips APU generator off the bus(es), if connected, and closes APU bleed air valve. On some airplanes, the APU continues to run for a 30 second cool down period before it automatically shuts down. An immediate shutdown can be accomplished by pulling the APU fire switch or the APU fire control handle in the main wheel well.

ON – normal position when APU is running.

START (momentary) – positioning APU switch from OFF to START and releasing it to ON initiates an automatic start sequence.

APU Hours Indicator



1 As Installed

AFT OVERHEAD PANEL

1 APU Hours Indicator

Indicates elapsed hours of APU operation since last reset.

Introduction to Engines

The airplane is powered by two CFM56–3 engines. The engine is a dual rotor axial flow turbofan. The N1 rotor consists of a fan, a three stage booster section connected by a through shaft to a four stage low pressure turbine. The N2 rotor consists of a high pressure compressor and a high pressure turbine. The N1 and N2 rotors are mechanically independent. The N2 rotor drives the engine gearboxes. A bleed air powered starter motor is connected to the N2 rotor.

The main engine control (MEC) schedules fuel to provide the thrust called for by the forward thrust lever setting. The fuel flow is further refined electronically by the power management control (PMC) without moving the thrust levers.

Each engine has individual flight deck controls. Thrust is set by positioning the thrust levers. The thrust levers are positioned automatically by the autothrottle system or manually by the flight crew. The forward thrust levers control forward thrust from idle to maximum. With the PMCs ON or OFF, advancing the thrust levers full forward provides some overboost and should be considered only during emergency situations when all other available actions have been taken and terrain contact is imminent. The reverse thrust levers control thrust from reverse idle to maximum reverse.

Certain engine malfunctions can result in airframe vibrations from the windmilling engine. As the airplane transitions from cruise to landing, there can be multiple, narrow regions of altitudes and airspeeds where the vibration level can become severe. In general, airframe vibrations can best be reduced by descending and reducing airspeed. However, if after descending and reducing airspeed, the existing vibration level is unacceptable, and if it is impractical to further reduce airspeed, the vibration level may be reduced to a previous, lower level by a slight increase in airspeed.

Engine Indications

Engine indications are displayed on the center instrument panel by the Engine Instrument System (EIS). N1, EGT, N2, and FF/FU are the primary indications and are displayed as both digital readouts and round dial/moving pointer indications. N1, EGT, and N2 have operating and caution ranges and limits indicated by green and yellow bands and red radials. When the round red warning light above the indicator is illuminated it indicates the limit for the engine parameter displayed below it has been reached or exceeded. The red warning light remains illuminated until the engine parameter is reduced below the limit.

Oil pressure and oil temperature indications are displayed with a round dial/moving pointer. Operating and caution ranges and limits are displayed with green and yellow bands and red radials. The oil quantity indicator displays a digital readout of quantity as a percentage of full.

The airborne vibration monitor indications are displayed with a round dial/moving pointer.

N1, N2, oil quantity, and engine vibration are displayed directly from the engine sensors.

Power Management Control (PMC)

The thrust control system consists of a hydromechanical MEC unit and a PMC unit mounted on each engine. The PMC is an electronic system with limited authority over the MEC.

The PMC uses MEC power lever angle, N1 speed, and inlet temperature and pressure to adjust, or trim, the MEC to obtain the desired N1 speed. The PMC adjusts fuel flow as a function of thrust lever angle.

The PMC provides a constant thrust climb feature once the thrust lever is set at the beginning of climb. Thus, when thrust is set for the climb, the PMC automatically maintains that thrust throughout the climb profile with no further thrust lever adjustments. If the thrust lever is repositioned, the PMC maintains the setting corresponding to the new thrust lever angle.

The PMC includes failure detection and annunciation modules which detect PMC failures and provide a signal to the crew. For detectable failure conditions, the PMC schedules a slow N1 drift over approximately 30 seconds and then illuminates the PMC INOP light, the ENG system annunciator, and the MASTER CAUTION lights. For a PMC failure, the PMC can be selected OFF by a switch on the aft overhead panel. The engine speed is then controlled by the hydromechanical MEC only. The PMC INOP Light is suppressed below starter cutout engine speed.

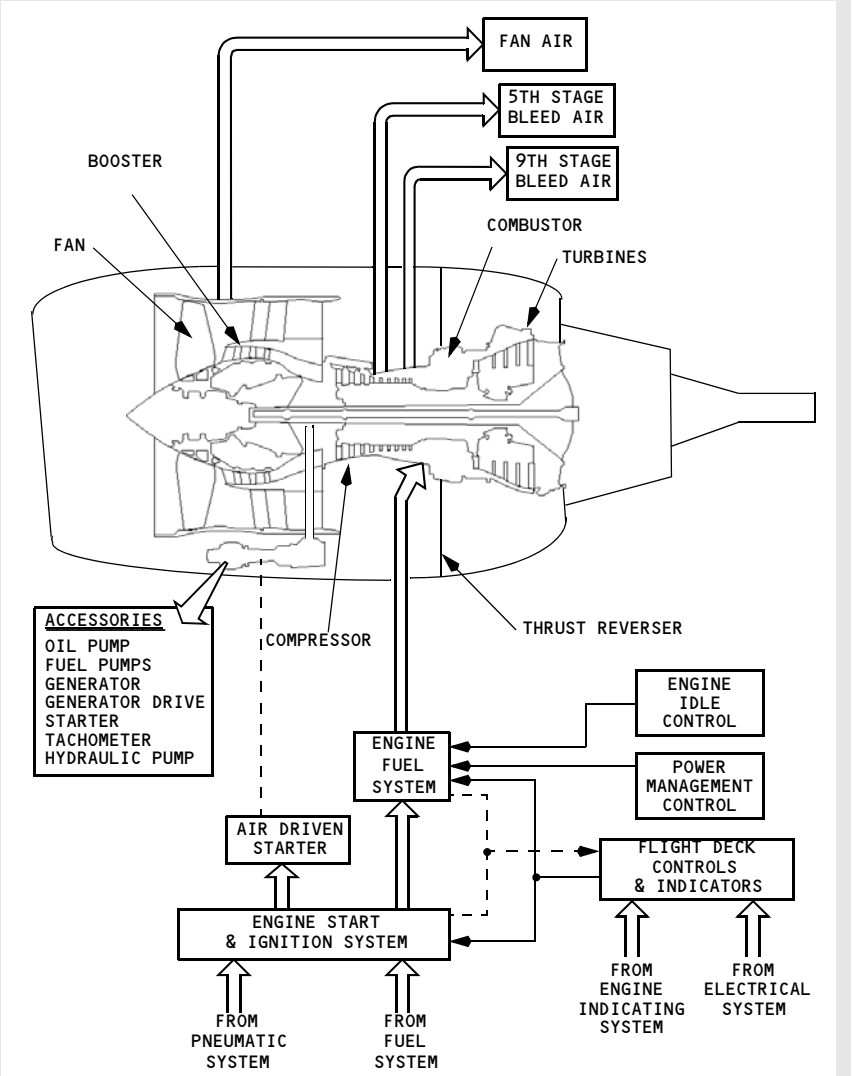
Idle RPM

There are two engine idle speeds, low idle and high idle.

The minimum engine speed for all flight phases is high idle, which varies with flight conditions. As temperature and airspeed decrease, high idle speed also decreases. The average high idle setting is approximately 32% N1.

To reduce braking activity, engine idle speed is reduced to low idle, approximately 22% N1, four seconds after touchdown. The four second delay is provided to enhance engine speed acceleration for reverse thrust.

Power Plant Schematic



Engine Fuel System

Fuel is delivered under pressure from fuel pumps located in the fuel tanks. The fuel enters the engine through the fuel shutoff valve. The fuel passes through the first stage engine fuel pump where pressure is increased. It then passes through two fuel/oil heat exchangers where engine oil heats the fuel. A fuel filter then removes contaminants. Fuel automatically bypasses the filter if the filter becomes saturated. Before the fuel bypass occurs, the fuel FILTER BYPASS alert illuminates on the fuel control panel. The second stage engine fuel pump provides high pressure fuel to the main engine control (MEC). As the fuel leaves the second stage pump, a portion of the fuel is diverted to run the hydromechanical portion of the MEC. This fuel is filtered again and then routed through the fuel heater a second time. The MEC meters the correct amount of fuel to the combustor.

The engine fuel shutoff valve and MEC fuel shutoff valve allow fuel flow to the engine when both valves are open. The valves are open when the engine fire warning switch is in and the start lever is in IDLE. The engine fuel shutoff valve closes when either the start lever is in CUTOFF or the engine fire warning switch is out. The MEC fuel shutoff valve closes only when the start lever is in CUTOFF. The FUEL VALVE CLOSED light on the fuel control panel indicates engine fuel shutoff valve position.

Fuel flow is measured after the MEC fuel shutoff valve and is displayed on the center instrument panel. Fuel flow information is also provided to the FMS.

Engine Oil System

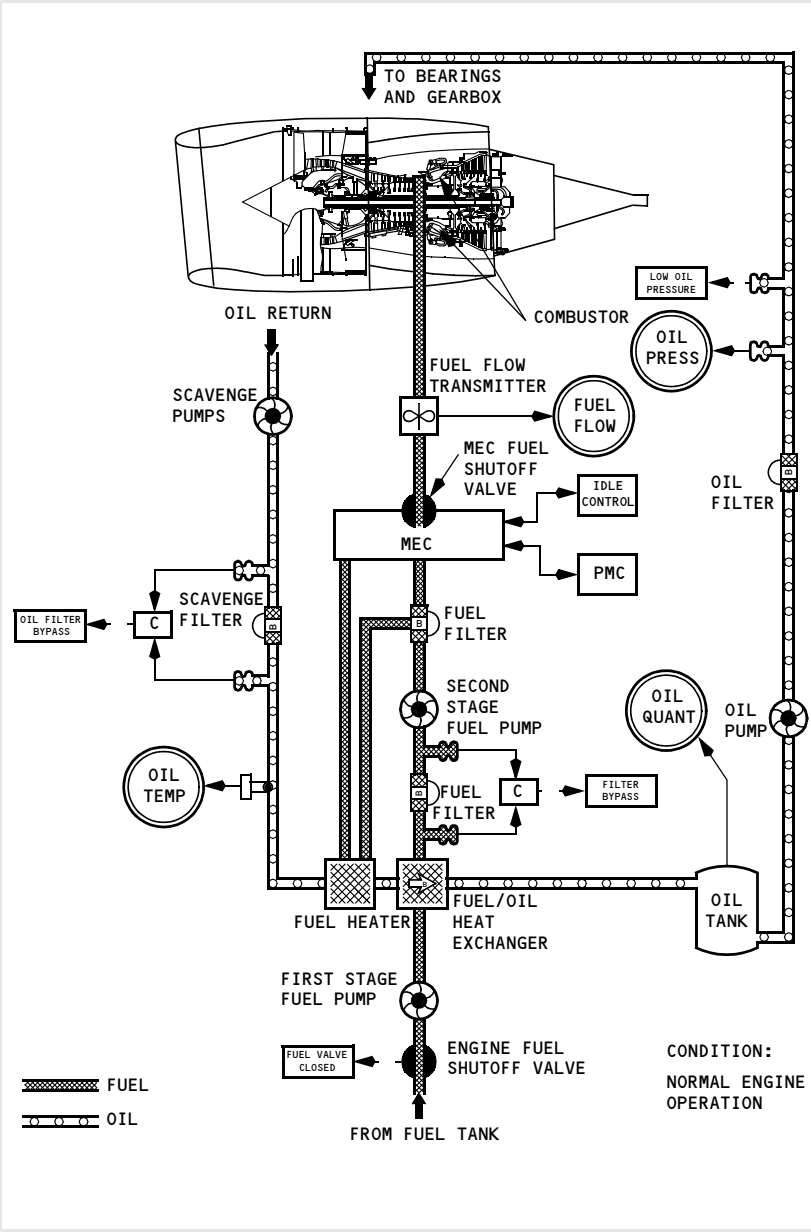
Oil from the individual engine tank is circulated under pressure through the engine to lubricate the engine bearings and accessory gearbox. Oil quantity is displayed on the oil quantity indicator, located on the center instrument panel.

The oil system is pressurized by the engine driven oil pump. Oil from the pump is filtered and then passes to the engine bearings and gearbox. Sensors for the oil pressure indicator and LOW OIL PRESSURE light are located downstream of the oil filter prior to engine lubrication.

Oil is returned to the oil tank by engine driven scavenge pumps. From the scavenge pumps the oil passes through a scavenge filter. If the filter becomes saturated with contaminants, oil automatically bypasses the filter. Prior to the oil bypassing the scavenge filter, the OIL FILTER BYPASS illuminates on the center instrument panel.

Scavenge oil temperature is sensed as the oil returns to the oil tank and is displayed on the oil temperature indicator, located on the center instrument panel. The oil then passes through the fuel/oil heat exchanger, where it is cooled by engine fuel prior to returning to the oil tank.

Engine Fuel and Oil System Schematic



Engine Start System

Starter operation requires pressurized air and electrical power. Air from the bleed air system powers the starter motor. The APU, an external ground cart, or the other operating engine provides the bleed air source.

In the GRD position, the engine start switch uses DC power from the battery bus to close the engine bleed air valve and open the start valve to allow pressure to rotate the starter. When the start valve opens, an amber START VALVE OPEN light on the center instrument panel illuminates. The starter rotates the N2 compressor through the accessory drive gear system. When the engine accelerates to the recommended value (25% or max motoring), moving the engine start lever to the IDLE position opens the fuel valves and causes the MEC to supply fuel to the combustor where the fuel ignites. At starter cutout speed (approximately 46% N2), power is removed from the engine start switch holding solenoid. The engine start switch returns to OFF, the engine bleed air valve returns to the selected position, and the start valve closes.

Abnormal Start Advisory System

The abnormal start advisory system monitors N2, fuel flow, EGT, and outside air temperature during ground engine starts to detect conditions which may lead to an abnormal engine start. The crew is alerted to such a situation by the flashing EGT digital display.

During an engine start, the alert indication will occur if:

- the EGT exceeds a calculated EGT limit based on inputs of N2 and outside air temperature
- the EGT reaches 725°C
- the engine fails to accelerate properly after N2 reaches 32%.

If a normal start occurs, the alert indication can be reset by pressing the fuel used reset switch on the EIS panel. The alert indication is automatically reset when zero fuel flow is sensed

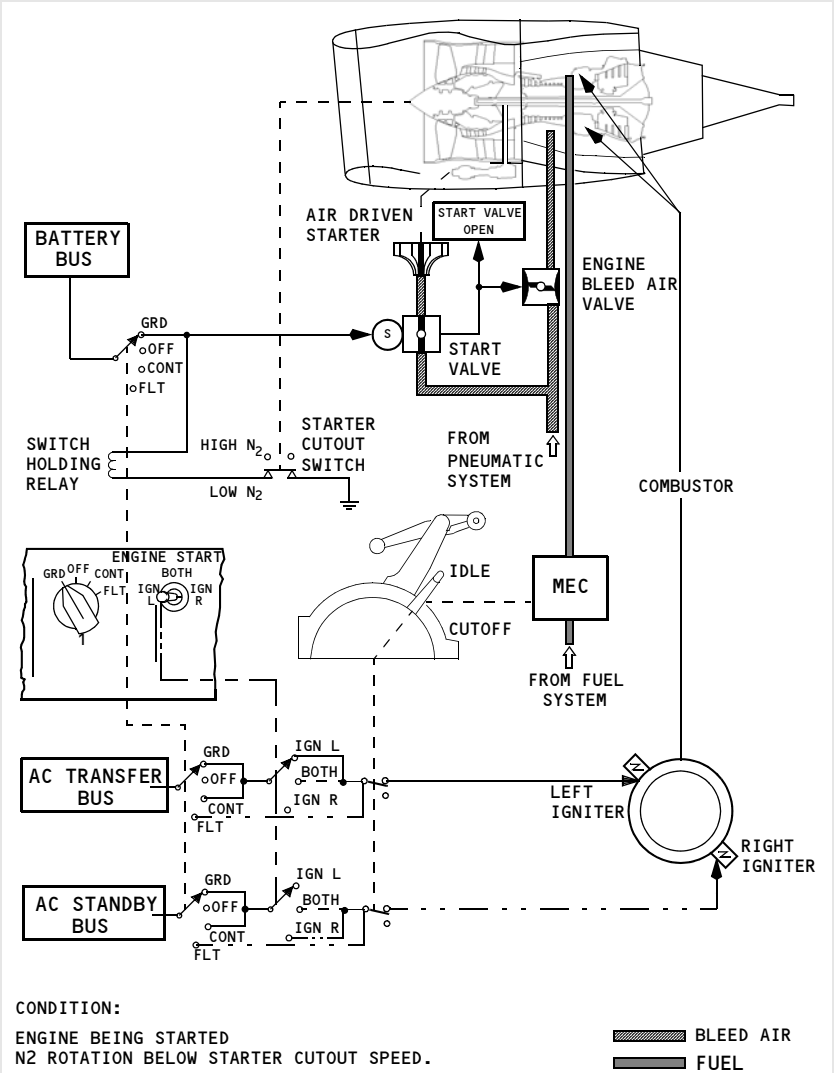
Engine Ignition System

Each engine has two igniters. The ignition select switch selects either the left, right, or both igniters for both engines. The ignition select switch is bypassed when the engine start switch is in FLT.

IGN L, powered by the AC transfer bus, provides high energy ignition to the left igniter. IGN R, powered by the AC standby bus, provides high energy ignition to the right igniter.

With the engine start switch in the GRD position, the selected igniter(s) are energized when the engine start lever is positioned to IDLE. The CONT position energizes the selected igniter(s) continuously. The FLT position energizes both igniters when the engine start lever is positioned to IDLE.

Engine Start and Ignition System Schematic



Thrust Reverser

Each engine is equipped with a hydraulically operated thrust reverser, consisting of left and right translating sleeves. Aft movement of the reverser sleeves causes blocker doors to deflect fan discharge air forward, through fixed cascade vanes, producing reverse thrust. The thrust reverser is for ground operations only and is used after touchdown to slow the airplane, reducing stopping distance and brake wear.

Hydraulic pressure for the operation of engine No. 1 and engine No. 2 thrust reversers comes from hydraulic systems A and B, respectively. If hydraulic system A or B fails, alternate operation for the affected thrust reverser is available through the standby hydraulic system. When the standby system is used, the affected thrust reverser deploys and retracts at a slower rate, and some thrust asymmetry can be anticipated.

The thrust reverser can be deployed when either radio altimeter senses less than 10 feet altitude, or when the air/ground safety sensor is in the ground mode. Movement of the reverse thrust levers is mechanically restricted until the forward thrust levers are in the idle position.

When reverse thrust is selected, the isolation valve opens, and the thrust reverser control valve moves to the deploy position, allowing hydraulic pressure to unlock and deploy the reverser system. An interlock mechanism restricts movement of the reverse thrust lever until the reverser sleeves have approached the deployed position. When either reverser sleeve moves from the stowed position, the amber REVERSER UNLOCKED light on the center instrument panel illuminates. As the thrust reverser reaches the deployed position, the reverse thrust lever can be raised to detent No. 2. This position provides adequate reverse thrust for normal operations. When necessary, the reverse thrust lever can be pulled beyond detent No. 2, providing maximum reverse thrust.

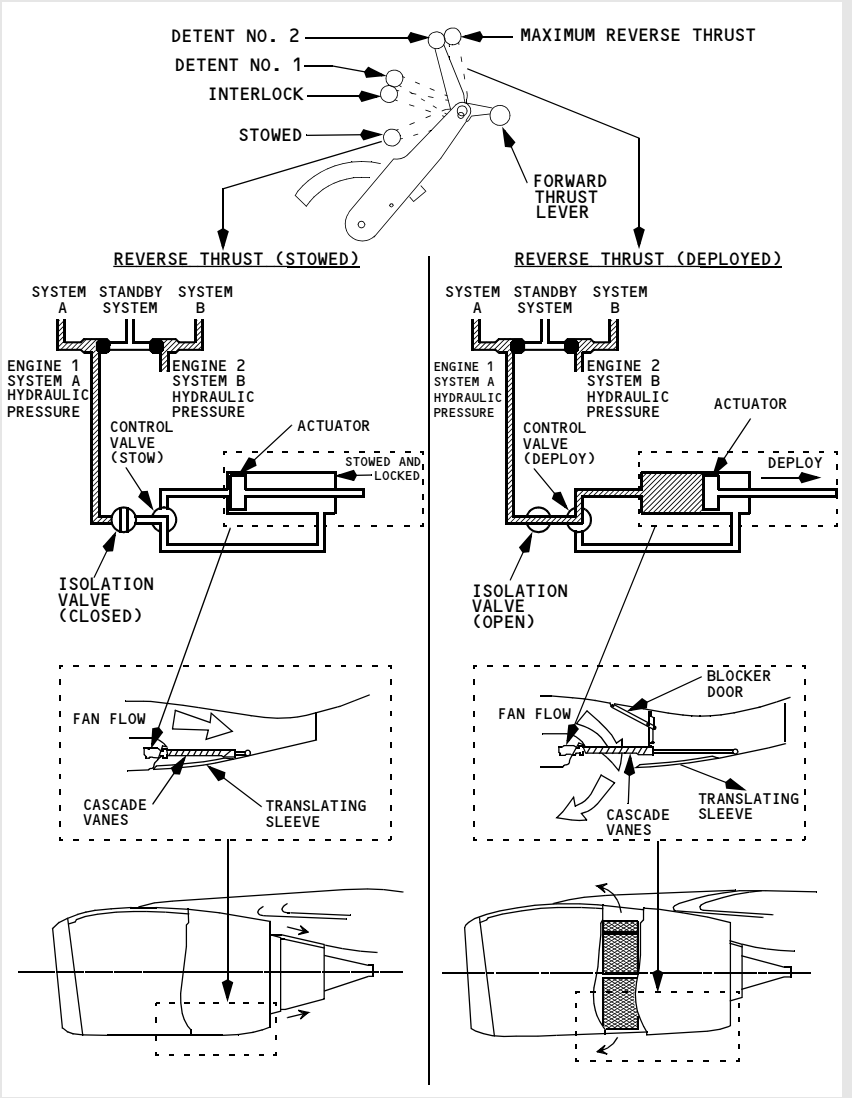
Downward motion of the reverse thrust lever past detent No. 1 commands the reverser to stow. Once the thrust reverser is commanded to stow, the control valve moves to the stow position allowing hydraulic pressure to stow and lock the reverser sleeves. After the thrust reverser is stowed, the isolation valve closes.

The REVERSER light, located on the aft overhead panel, illuminates when the thrust reverser is commanded to stow and extinguishes 10 seconds later when the isolation valve closes. Any time the REVERSER light illuminates for more than approximately 12 seconds, a malfunction has occurred, and the MASTER CAUTION and ENG system annunciator lights illuminate.

When the reverser sleeves are in the stowed position, a hydraulically operated locking actuator inhibits motion to each reverser sleeve until reverser extension is selected. Additionally, an auto–restow circuit compares the actual reverser sleeve position and the commanded reverser position. In the event of incomplete stowage or uncommanded movement of the reverser sleeves toward the deployed position, the auto–restow circuit opens the isolation valve and commands the control valve to the stow position, directing hydraulic pressure to stow the reverser sleeves. Once the auto–restow circuit is activated, the isolation valve remains open and the control valve is held in the stowed position until the thrust reverser is commanded to deploy or until corrective maintenance action is taken.

WARNING: Actuation of the thrust reversers on the ground without suitable precautions is dangerous to ground personnel.

Thrust Reverser Schematic

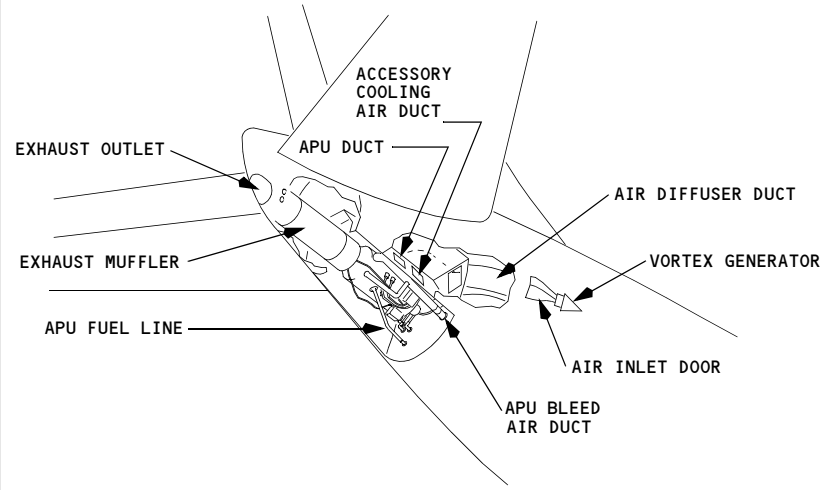


Introduction to APU

The auxiliary power unit (APU) is a self–contained gas turbine engine installed within a fireproof compartment located in the tail of the airplane.

The APU supplies bleed air for engine starting or air conditioning. An AC electrical generator on the APU provides an auxiliary AC power source.

APU Location



APU Operation

The APU operates up to the airplane maximum certified altitude.

The APU supplies bleed air for one air conditioning pack either on the ground or in flight. Both generator busses can be powered on the ground. In flight only one generator bus can be powered.

APU Fuel Supply

Fuel to start and operate the APU comes from the left side of the fuel manifold when the AC fuel pumps are operating. If the AC fuel pumps are not operating, fuel is suction fed from the No. 1 tank. During APU operation, fuel is automatically heated to prevent icing.

With the APU operating and AC electrical power on the airplane busses, operate at least one fuel boost pump to supply fuel under pressure to the APU.

APU Engine and Cooling Air

APU engine and cooling air is routed to the APU through an automatically operated air inlet door located on the right side of the fuselage. APU exhaust gases are discharged overboard through an exhaust muffler.

The APU oil cooler and electrical generator are provided positive cooling airflow by a gear-driven fan.

Electrical Requirements for APU Operation

APU operation requires the following:

- APU fire switch on the overheat/fire panel must be IN
- APU fire control handle on the APU ground control panel must be IN
- Battery switch must be ON.

Electrical power to start the APU comes from the airplane battery.

Moving the battery switch to OFF on the ground shuts down the APU.

APU Start

The automatic start sequence begins by moving the APU switch momentarily to START. This initiates opening of the air inlet door. When the APU inlet door reaches the full open position the start sequence begins. After the APU reaches the proper speed, ignition and fuel are provided. When the APU is ready to accept a bleed air or electrical load the APU GEN OFF BUS light illuminates.

If the APU does not reach the proper speed with the proper acceleration rate within the time limit of the starter, the start cycle automatically terminates. The start cycle may take as long as 135 seconds.

Operate the APU for one full minute before using it as a bleed air source. This one minute stabilization is recommended to extend the service life of the APU.

APU Shutdown

Moving the APU switch to OFF shuts down the APU, trips the APU generator, and closes the APU bleed air valve. On some airplanes, the APU continues to run for a 30 second cooling period before it automatically shuts down. Shutdown can also be accomplished by pulling the APU fire switch.

Fuel Control Unit (FCU)

A Fuel Control Unit (FCU) controls APU engine speed and exhaust gas temperature. Automatic shutdown protection is provided for overspeed conditions, low oil pressure, high oil temperature, APU fire, and fuel control unit failure. Control air input is provided to the fuel control unit through a solenoid operated three-way control valve.

The control air pressure is modulated in response to EGT changes. When electrical load and bleed air extraction combine to raise the EGT above acceptable levels, the bleed air valve will modulate toward the closed position. In the event of an overtemperature, the APU will shut down, and the FAULT light will illuminate.

APU Automatic Galley Load Shedding

Galley electrical loads will automatically be shed should the total airplane electrical power requirements exceed design limits with the APU generator providing electrical power.