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INTRODUCTION

The Falcon 2000EX EASy is powered by two Pratt & Whitney PWC308C engines, automatically controlled by dedicated computers.

Each engine is rated at approximately 6,998 lb (3,114 daN) of thrust at sea level with an outside ambient temperature up to ISA + 15.0°C, and up to ISA + 17.0°C with Automatic Power Reserve (APR).

The Maximum Cruise Thrust is 1,581 lb (703 daN) at FL 400 and Mach 0.8 in ISA conditions.

Engine weight without options is 1,336 lb (606 kg).

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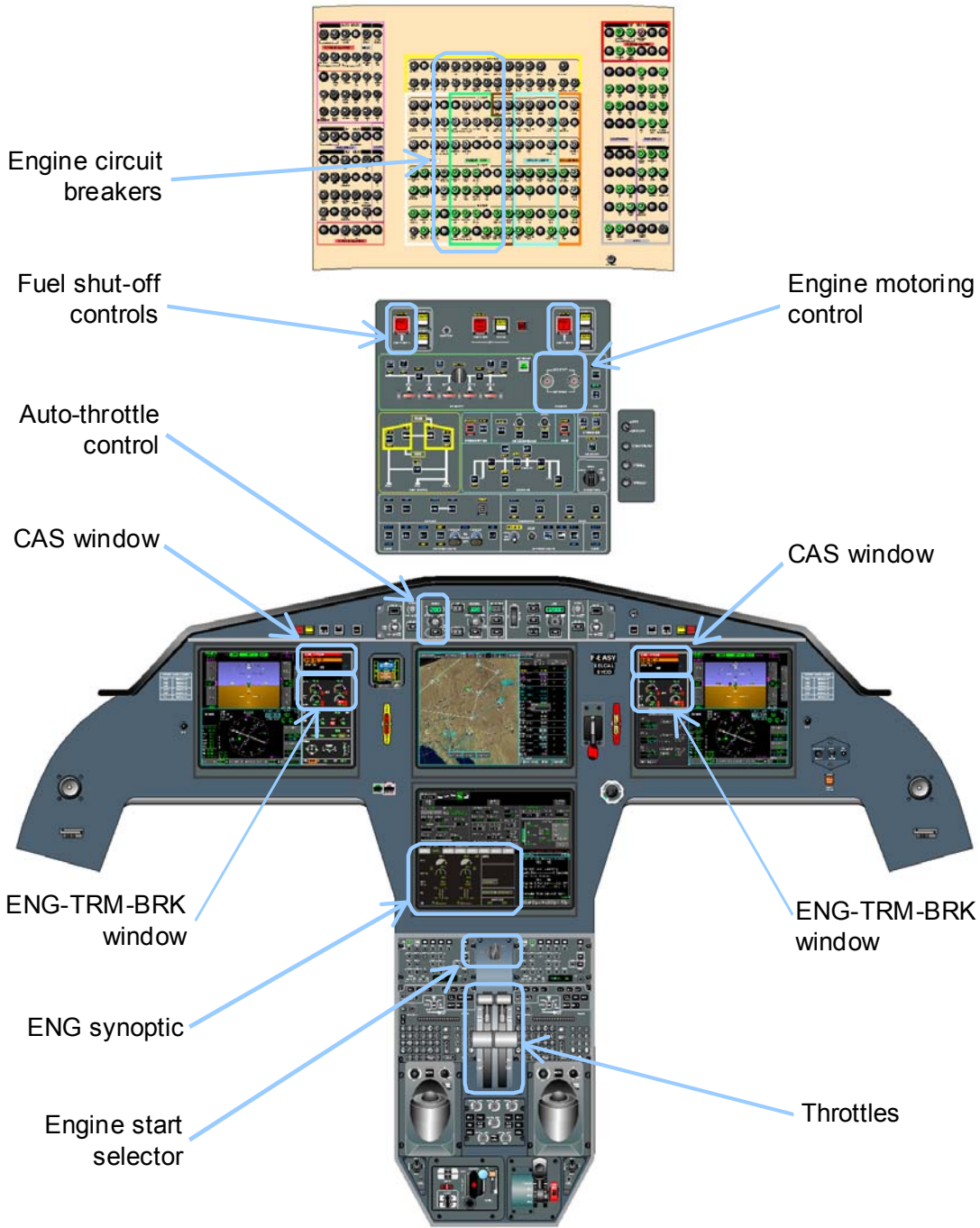


FIGURE 02-70-05-00 FLIGHT DECK OVERVIEW

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SOURCES

ELECTRICAL POWER	PNEUMATIC POWER	FUEL	HYDRAULIC POWER
Engine start or in-flight ignition requires electrical power: - batteries, assisted if needed by Auxiliary Power Unit, or - Ground Power Unit	Engine start requires pneumatic power, provided by: - the APU, or - a ground compressor, or - bleed air from the other engine running	➤ Refer to CODDE 1 / Chapter 02 / ATA 28	Thrust reverser operation requires HYD 1 and HYD 2 systems

ENGINE LOCATION

The engines are pylon-mounted on the left and right sides of the rear fuselage.

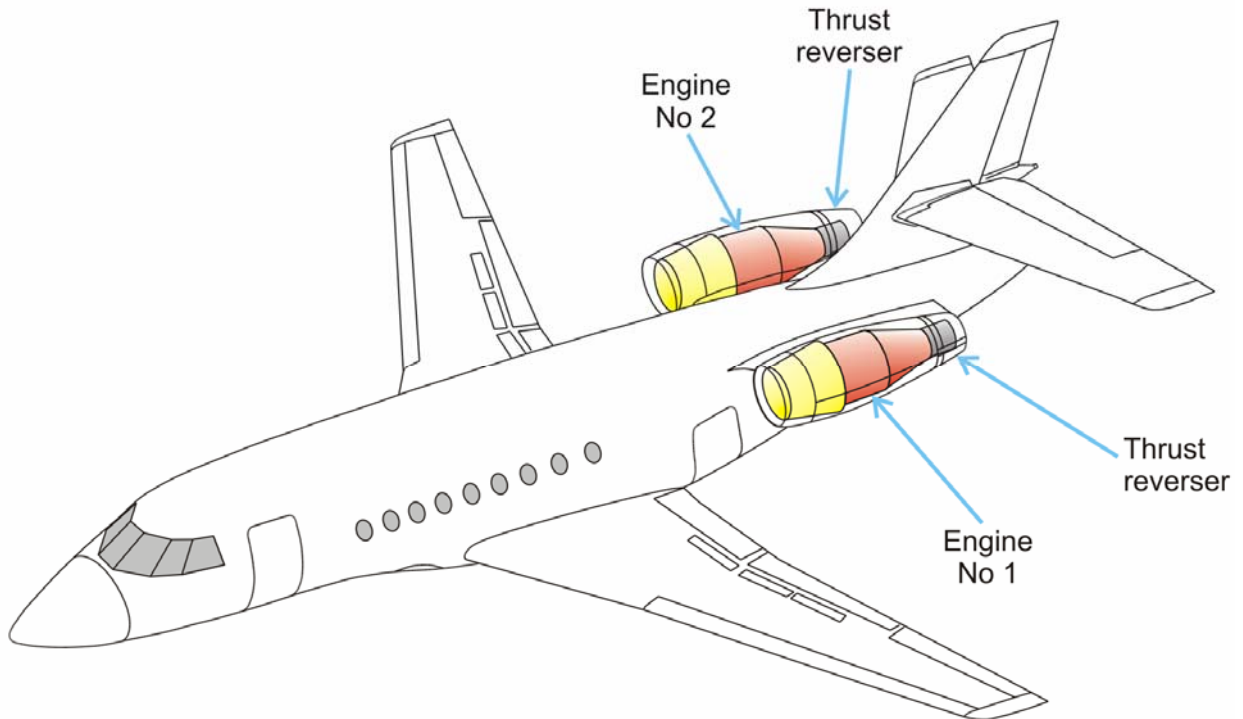


FIGURE 02-70-05-01 ENGINE LOCATION

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INTRODUCTION

The PWC308C is an axial flow turbofan engine.

Both engine incorporate lubrication, fuel, and ignition systems.

Both engines are equipped with a thrust reverser.

The engines are automatically controlled by dedicated Full Authority Digital Engine Control computers (FADEC).

Both engines are equipped with a fire detection system and they share a common fire extinguishing system.

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MAJOR COMPONENTS

INTRODUCTION

The PWC308C is a dual flow engine with two spool type LP and HP compressor-turbine assemblies and one mixer nozzle. The LP compressor is the front single stage fan.

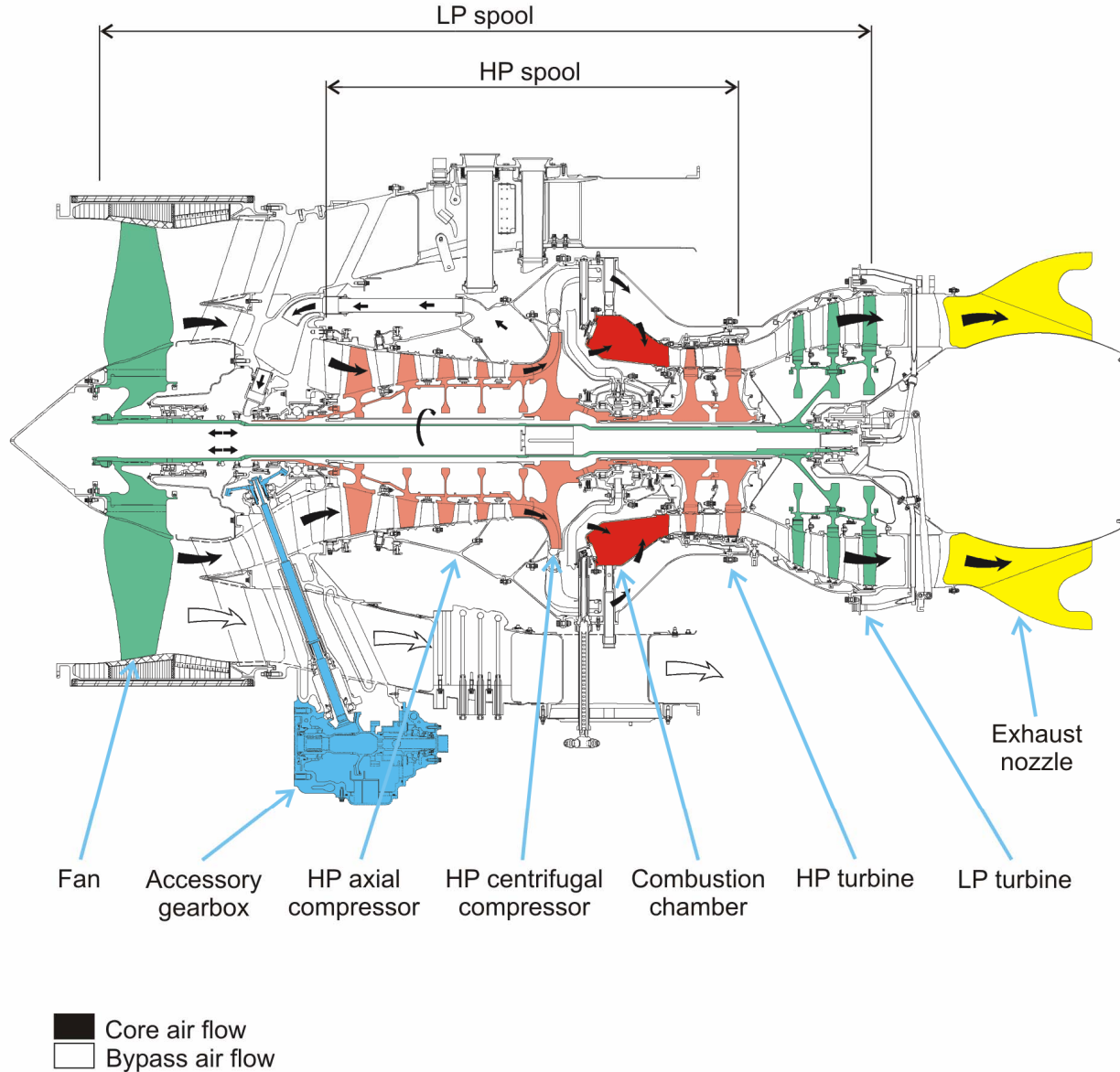


FIGURE 02-70-10-00 PWC308C MAJOR COMPONENTS

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LP SPOOL

The LP spool is composed of a single stage fan compressor, the LP shaft and a three-stage turbine.

The fan performs acceleration of a large air mass up to a relatively low velocity.

The engine main frame bears an airflow divider that separates the airflow going through the fan into a primary flow sent to the HP compressor, and a secondary flow sent to the exhaust mixing nozzle.

The three-stage LP turbine, located downstream from the HP turbine, extracts energy from the exhaust gases to drive the fan.

The LP spool speed is designated N1. 100% N1 corresponds to 10,400 rpm.

HP SPOOL

The HP spool is composed of a four-stage axial compressor, a single stage centrifugal compressor, the HP shaft and a two-stage turbine. Bleed Off Valves (BOV) are located between the axial and centrifugal compressors in order to prevent compressor stall.

The HP compressor provides high pressure airflow for the combustion chamber.

It also supplies airflow to the pneumatic systems.

For more information, refer to CODDE1 / Chapter 02 / ATA 36.

The two-stage HP turbine, located downstream from the combustion chamber, extracts energy from the exhaust gases to drive the HP compressor and the accessory gearbox.

The HP spool speed is designated N2. 100% N2 corresponds to 26,780 rpm.

COMBUSTION CHAMBER

The combustion chamber is of the annular type. It has multi-holed patterns for air mixing and dilution with the combustion gases.

The fuel is injected into the combustion chamber through 22 air assist nozzles. Two of the nozzles have an additional fuel supply line to provide a separate primary fuel flow for a better start.

The combustion chamber includes two spark igniters.

EXHAUST NOZZLE

Exhaust gases, exiting the LP turbine, are directed through the engine primary nozzle equipped with a mixer. The mixer forces high speed exhaust gases to mix with the fan peripheral secondary airflow. The gas mixture provides higher thrust and lower external noise level.

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ACCESSORY GEARBOX

The accessory gearbox is driven by the HP spool through a transfer gearbox.

All engine-driven accessories, except N1 LP rotor speed sensor, are on the accessory gearbox which transmits the mechanical power necessary for:

- the oil pump,
- the hydraulic pump (two pumps on RH engine),
- the DC generator,
- the Hydromechanical Fuel Control Unit (HMU) which controls fuel flow and the angle of HP compressor inlet guide vanes,
- the Permanent Magnetic Alternator (PMA) which provides the Electronic Engine Control (EEC) with alternating current and N2 input signal.

The air starter is connected to the accessory gearbox.

OPERATING PRINCIPLE

The single stage fan draws air in through the engine nacelle duct. The fan accelerates a large air mass up to a relatively low velocity.

A part of this mass flows direct to the exhaust nozzle. This is the secondary flow.

The pressure of the other airflow is increased through the HP compressor before entering the combustion chamber.

The air enters the combustion chamber liner and mixes with the fuel. When necessary, during engine start, stall or flameout detection, the mixture is ignited by one or the two high-energy igniter plugs. Then, the mixture expands through the turbine section. The HP turbine extracts energy to drive the HP compressor through the main rotor shaft on one hand and the accessory gearbox through bevel gears on the other hand.

The LP turbine extracts energy to drive the fan through the LP rotor shaft.

The LP turbine exhaust gas flow continues to accelerate through the exhaust mixer and mixes with the bypass airflow in the exhaust duct, which directs it into the atmosphere to provide the thrust.

During engine start, the pneumatic starter drives the HP spool through the accessory gearbox.

It stops operating and declutches when the engine reaches 50% N2 and is able to accelerate by itself. Ignition stops at the first of these two events:

- air starter declutches,
- ITT increases by 200°C from beginning of start-up.

If engine starter fails to stop when N2 reaches 50%, the amber **STARTER ENG ..** is displayed in the CAS window.

If the valve operating mechanism fails, the Starter Control Valve (SCV) can be manually opened and closed through an access port in the lower engine cowl.

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ENGINE SYSTEMS

The engine systems include the oil, fuel, and ignition systems described hereafter.

OIL SYSTEM

The oil system provides the HP and LP spools and the accessory gearbox with lubrication and cooling. It mainly features:

- a pressurized oil tank with a sight glass and electric gauge,
- a pressure pump flow-regulating to feed the system from the oil tank,
- a clogging filter located downstream from oil pressure pump,
- a Fuel-Oil Heat Exchanger (F.O.H.E.) which cools oil,
- a combination of scavenge pumps to feed back the oil tank directly or via the accessory gearbox and separate the air from the oil, both mixed in the engine,
- a chip detector located upstream of oil tank,
- temperature and pressure probes and a low pressure switch.

The electrical gauge supplies oil quantity data to the avionics.

NOTE

Oil quantity should be checked within 10 min after engine shutdown, and serviced with the type and brand specified in the AFM (DGT88898) or Ground Servicing Manual (DGT681).

The clogging filter is equipped with by-pass line and a switch which transmits the filter clogging information. When the filter is clogged, prior to the bypass opening, the **ENG .. : OIL FILTER** message appears in the CAS window.

The chip detector plug attracts ferrous metal and detects important accumulation of particles. When ferrous metal particles accumulate on the chip detector, the related **ENG .. : OIL CHIP** message appears in the CAS window.

The chip detector circuit is self-monitored and in case of failure, the **ENG .. : OIL CHIP FAIL** message appears in CAS window.

Engine oil temperature is measured just upstream from the engine.

Indicated engine oil pressure is the pressure differential between pressure just upstream from engine and downstream from engine in one of the scavenge lines.

The data are displayed within the appropriate ENG synoptic and ENG-TRM-BRK window.

Another oil pressure differential sensor is dedicated to a pressure switch to provide warning of abnormally low pressure during operation. When the oil system pressure is below 20 psi, the **ENG .. : OIL PRESS** message appears within the CAS window.

FUEL SYSTEM

Fuel supply of the engine is provided from the airplane fuel system through the fuel shut-off valve, then through the HydroMechanical Unit (HMU) assembly consisting of the pressurizing system and Fuel Control Unit (FCU), to the distribution system.

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Fuel shut-off valve

The fuel shut-off valve, located upstream from the pressurizing system, controls fuel supply to the HMU. The valve automatically opens when the power lever position is set to IDLE position. In case of engine fire, the valve can also be controlled and shut off using the SHUT-OFF pushbutton, located on the fire warning panel.

➤ For more information, refer to CODDE 1 / Chapter 02 / ATA 26.

Pressurizing system

The pressurizing system consists of a two-stage pump (low and high pressure stages), feeding the FCU (Fuel Control Unit) with fuel at the required pressure and flow rate. The first stage is a centrifugal booster pump, and the second one is a gear pump. There is a fuel filter between the two pump stages. A part of the fuel is by-passed after the second stage through the Fuel-Oil Heat Exchanger (FOHE) to increase the temperature and then directed to the filter again to prevent it from being clogged by ice.

The filter is fitted with a by-pass valve. When the filter is clogged, the by-pass valve opens and activates the white **ENG .. : FUEL FILTER** message in the CAS message window.

Fuel Control Unit

The Fuel Control Unit (FCU) includes a metering valve and a minimum pressure valve that supplies the secondary injection nozzles in normal operation or duplex primary nozzles for start-up.

As part of the HMU, the FCU also includes an inlet guide vanes servo valve, an overspeed protection solenoid and an emergency stand-by shutdown solenoid which is controlled through the fire protection system.

The whole HMU is protected from overpressure by a high-pressure relief valve. This valve opens if pump second stage pressure increase is higher than 1,450 psi. Fuel is then by-passed to pump second stage inlet.

As all the FCU systems are actuated by fuel pressure, a Minimum Pressure Valve (MPV) provides a minimum fuel pressure whatever the fuel flow.

Distribution system

The distribution system includes 22 fuel nozzles (20 secondary simplex nozzles and 2 primary duplex nozzles).

During normal operation, the fuel flows from the HMU to the 20 secondary nozzles through the flowmeter. The 2 primary nozzles are supplied through a fuel manifold upstream from the secondary nozzles.

During start-up, the MPV enables fuel to be distributed only to the 2 primary nozzles.

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IGNITION SYSTEM

Each engine is equipped with an ignition system including one ignition exciter and two ignitor plugs.

The two plugs can be operated separately by the exciter. Only one is operated during normal ground start-up, and both during in-flight start-up or in-flight relight.

The exciter is current supplied by the airplane electrical system and controlled by the EEC.

THRUST REVERSER

A thrust reverser system is installed on both engines. It is designed, for ground operation only, to slow down the airplane after landing.

The thrust reverser system consists of two thrust reverser doors tilting in the vertical plane under the action of two hydraulic actuators. LH thrust reverser is powered by No 1 hydraulic system and RH thrust reverser by No 2 hydraulic system. It also incorporates an accumulator that supplies sufficient pressure to perform one thrust reverser cycle if the airplane hydraulic system pressure fails.

Safety latch position (two per door), hydraulic pressure and time of operation are monitored to detect any malfunction.

CAUTION

Use of thrust reverser to move the airplane back is forbidden.

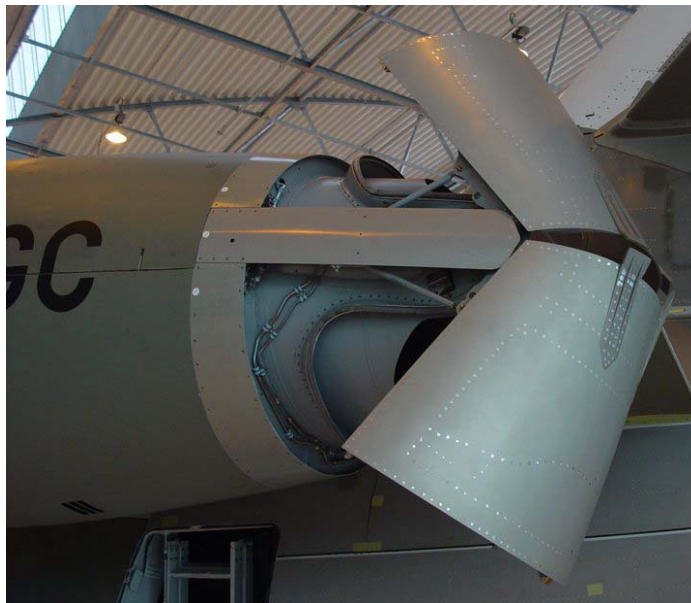


FIGURE 02-70-10-01 THRUST REVERSER IN DEPLOYED POSITION

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AUTOMATIC ENGINE CONTROL

The engines are electro-mechanically controlled by Full Authority Digital Engine Control (FADEC). The computer of the FADEC is the EEC. The FADEC is powered by the Permanent Magnetic Alternator (PMA), so that it is independent of airplane electrical system. During start-up and in case of PMA failure, it is powered by airplane electrical system.

There is one FADEC per engine and each FADEC has two channels. Both channels run, but only one controls at a time. During start-up, the channels are inverted for a short while for the stand-by one to be tested. The role of each channel, i.e. controlling versus backup, alternates for each engine start.

The FADEC continuously performs self-check and cross-check of both channels. In case of discrepancy between the two channels, the faulty one is automatically inhibited. Loss of both channels of a FADEC leads to corresponding engine shutdown.

The FADEC performs:

- complete engine start control,
- opening of the bleed-off valve when necessary,
- engine N1 and N2 control through acceleration, deceleration and steady state operation,
- synchronization of RH engine speed on LH one (operates on N1 or N2 on request by crew),
- computation of N1 to achieve a flat-rated thrust of 6,998 lb,
- ignition control,
- inlet guide vanes control,
- supply engine parameters to avionics (N1, N2, ITT, oil temperature,...).

It also protects the engine against damage by ensuring:

- start protection (hot start protection, with auto-start termination if ITT exceeds 980°C and hung-start protection with start termination if N1 = 0 when N2 is 2% below scheduled N2 ground idle),
- temperature monitoring,
- overspeed protection,
- monitoring of N2 to avoid spool-down,
- automatic engine relight (on stall or flameout detection).

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AUTOMATIC POWER RESERVE (APR)

The FADEC manages the Automatic Power Reserve (APR). In case of failure of one engine when required thrust is above maximum cruise thrust, the APR is triggered which increases the thrust limits:

REQUIRED THRUST	APR THRUST
Climb rating	Maximum continuous rating
Take off rating	APR rating: ITT max = 875°C instead of 860°C for 5 min

The APR mode can be manually forced or inhibited.

APR USAGE CONDITIONS

The APR usage conditions are as follows:

- a power lever beyond MAX CLB position,
- N1% are separated by more than 10%,
- pressure altitude below 17,700 ft.

Two cases appear (APR light on):

- temperature above ISA +15°C (59°F) power increase on valid engine,
- temperature below ISA +15°C (59°F) power do not increase on valid engine.

NOTE

When APR is operative, the airflow of the conditioning and pressurization is cut off. It will be available after APR shut down.

FIRE PROTECTION

On each engine, a temperature sensitive detector provides fire detection and monitors system integrity. Engine fire protection is provided by a total of two fire extinguisher cylinders shared by the two engines.

➤ *For more information, refer to CODDE1 / Chapter 02 / ATA 26.*

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CONTROL



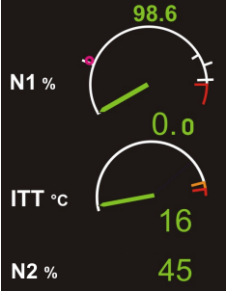

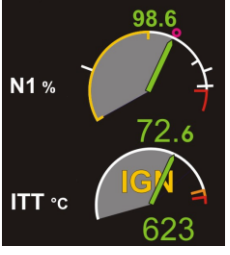

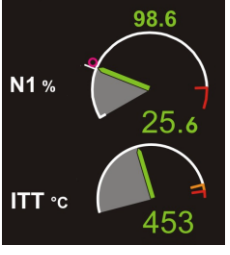

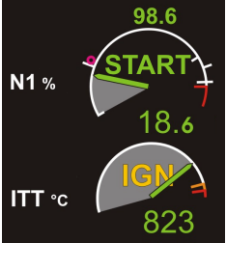


Engine start selector

FIGURE 02-70-15-00 PEDESTAL ENGINE START SELECTOR AND THROTTLE CONTROLS



FIGURE 02-70-15-01 PEDESTAL ENGINE START SELECTOR

CONTROL	FUNCTION	TO ACTIVATE	SYNOPTIC
 <p>Engine start selector</p>	<p>MOTOR: enables MOTORING pushbuttons for motoring without ignition, or manually stops the starting sequence</p>		
	<p>IGN: activates all engine igniters simultaneously and re-lights any engine that has flamed out after a non-mechanical failure</p>		
	<p>NORMAL: normal position in normal flight conditions, also selected for in-flight relight and ground motoring stop</p>		
	<p>START: initiates the starting sequence of the selected engine. This is an unsteady position of the selector</p>		

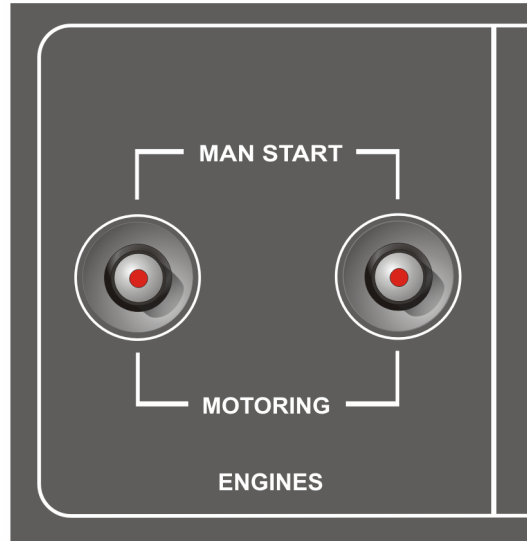


FIGURE 02-70-15-02 OVERHEAD PANEL ENGINE MOTORING CONTROL

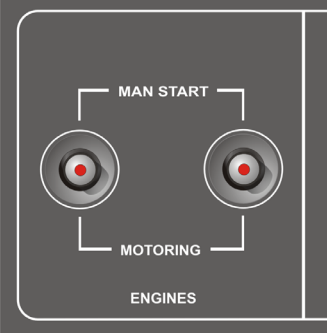

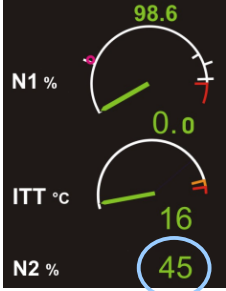













CONTROL	FUNCTION	TO ACTIVATE	SYNOPTIC
	<p>MOTORING:</p> <p>allows motoring of corresponding engine when start selector is on MOTOR, or in-flight relight, or on ground in case of failure of pedestal engine start selector</p>		 <p>HP spool running</p>



FIGURE 02-70-15-03 APR CONTROL PUSHBUTTONS

CONTROL	FUNCTION	TO ACTIVATE	SYNOPTIC
		TO DEACTIVATE	
	Disarms APR function	Normal position:  day APR armed  night	APR not triggered no synoptic APR triggered 
		Push to disarm  day  night	no synoptic
	Forces APR function	Normal position:  day APR armed  night	APR not triggered no synoptic APR triggered 
		Push to enforce function  day  night	

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THROTTLE CONTROL UNIT

The pilot has control over each engine through a throttle that sets the engine power from cut-off to full power. Each throttle is equipped with three mechanical stops corresponding to stop (STOP), idle (IDLE) and take-off.(TO) One intermediate detent locates max climb thrust (MAX CLB). White marks indicate these stops and detent.

A catch and a thrust reverser control lever are fitted on each throttle. The catch must be risen to shift the throttle from cut-off to idle position and vice versa.

Throttle and thrust reverser control levers are designed with an artificial feel system.

An engine fire repeater warning light is installed on each throttle.

The mechanical devices of Auto-Throttle system (A/T), installed in the pedestal of the power levers, are used for airplane automatic speed control or engine power control.

For more information, refer to CODDE 1 / Chapter 02 / ATA 22.

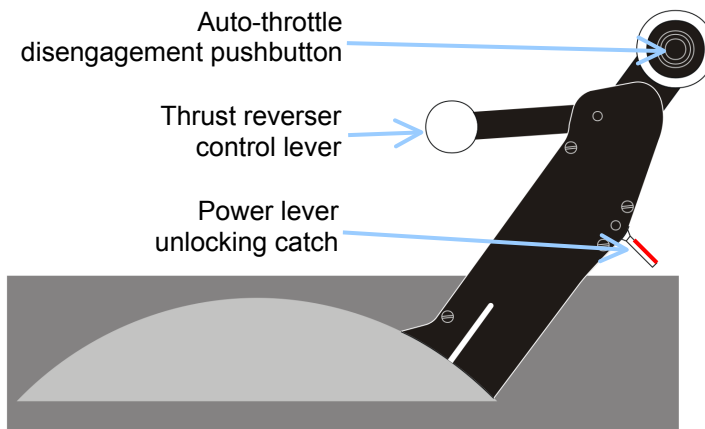


FIGURE 02-70-15-04 ENGINE POWER LEVER

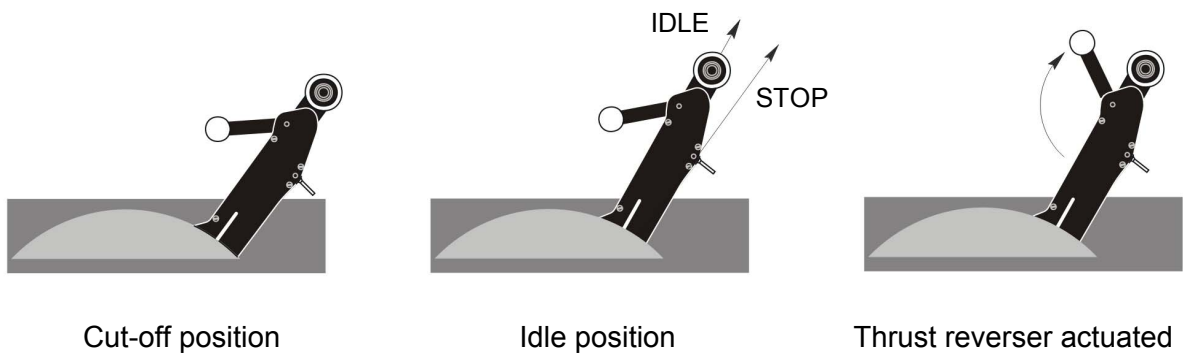


FIGURE 02-70-15-05 POWER LEVER POSITIONS

AUTO-THROTTLE ENGAGEMENT

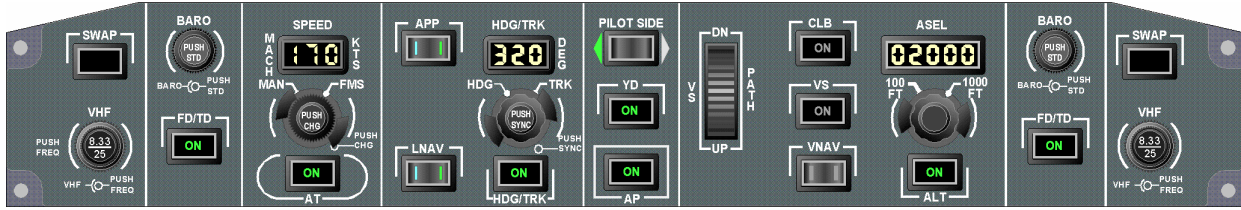


FIGURE 02-70-15-06 GUIDANCE PANEL

Push on A/T pushbutton to engage auto-throttle.
For more information, refer to CODDE 1 / Chapter 02 / ATA 22.

THRUST REVERSER

Switch over to thrust reverser mode is only possible when the throttle is in the IDLE position on ground.

As soon as the reverser lever is engaged in reverse-idle position, the engine throttle is locked into idle position. In reverser mode, the engine power increases by pulling the reverser lever to reverse-full power position (lever rear stop).

Return to normal operation is performed by pushing back the reverser lever beyond the reverse-idle notch. Then the engine throttle lever becomes free to be moved normally.

SOFT KEY CONTROLS

Selection of auto-throttle mode and synchronization is made through soft key controls located on the right side of the ENG synoptic in the MDU.

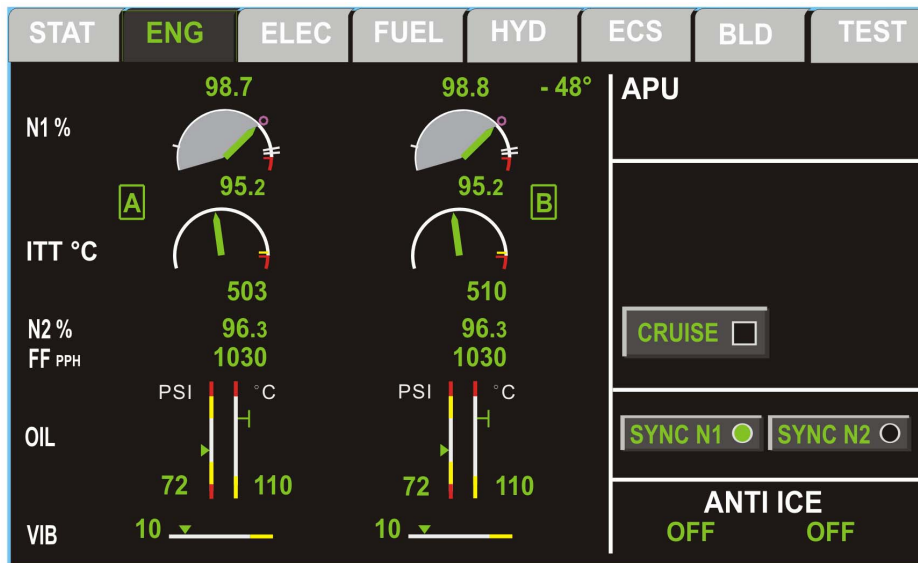


FIGURE 02-70-15-07 MDU ENG AND APU SYNOPTIC

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A/T mode selection

Depressing CRUISE soft key checks the corresponding box and limits the engine thrust to max cruise.

A/T status (A/T if Auto-Throttle is engaged or blank if not engaged) and mode annunciation (CRUISE) are displayed.

The A/T status, with CRUISE annunciation, is also displayed in the upper left corner of the PDU.

N1 or N2 synchronization

Depressing one of the two soft keys SYNC N1 or SYNC N2 selects either the N1 or N2 synchronization mode. The autothrottle synchronizes the N1 or N2 value of the two engines. No 1 engine is the master.

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INDICATION

Engine parameters are displayed:

- in the ENG CAS window (primary parameters: N1, ITT and N2),
- in the ENG-TRM-BRK window (secondary parameters: fuel flow, oil pressure and temperature, LP spool vibration level),
- in the ENG synoptic (primary and secondary parameters, FADEC channel in control).

ENGINE AND APU SYNOPTIC

The ENG synoptic on the Multifunction Display Unit (MDU) allows the crew to display engine primary and secondary parameters, A/T status and soft key controls.

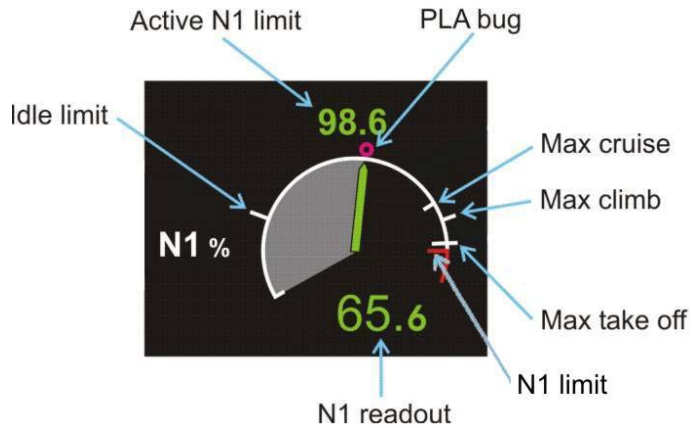


FIGURE 02-70-15-08 MDU ENGINE SYNOPTIC

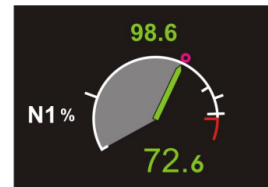
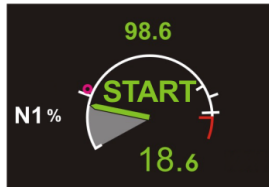
The following information are displayed:

- N1 %;
- ITT,
- N2 %,
- Fuel Flow,
- oil pressure and temperature,
- N1 vibration level,
- APU N1 and EGT,
- A/T status and cruise selection soft key,
- N1 and N2 SYNC modes and soft keys,
- FADEC channel in control for each engine,
- APR annunciation if triggered.

N1 INDICATION



The PLA magenta bug indicates Power Lever Angle (throttle position). It shows the power required by the pilot. During acceleration or deceleration, the PLA bug and the needle indicating engine actual N1 may not be at the same location.



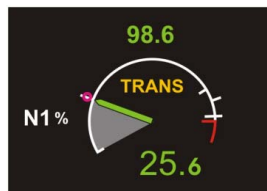
N1 indication during start sequence:

- PLA bug is at idle position
- engine is accelerating up to idle

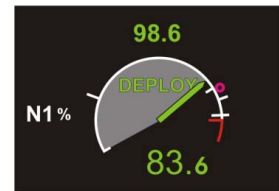
In-flight N1 normal indication



N1 overspeed indication



Thrust reverser in transit



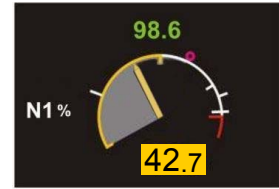
Thrust reverser deployed



Invalid data

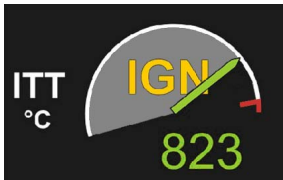
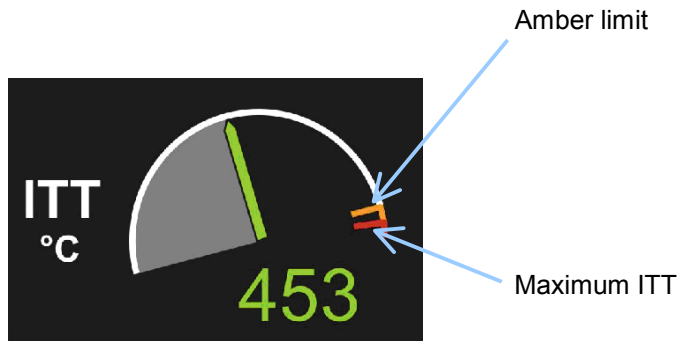


Anti-ice minimum N1
out of amber zone



N1 below anti-ice minimum

ITT INDICATION



Ignition activated during start-up



Normal indication



Data mismatch between MAU 1 and 2 channels



Invalid data

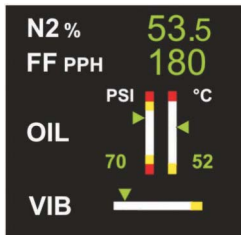
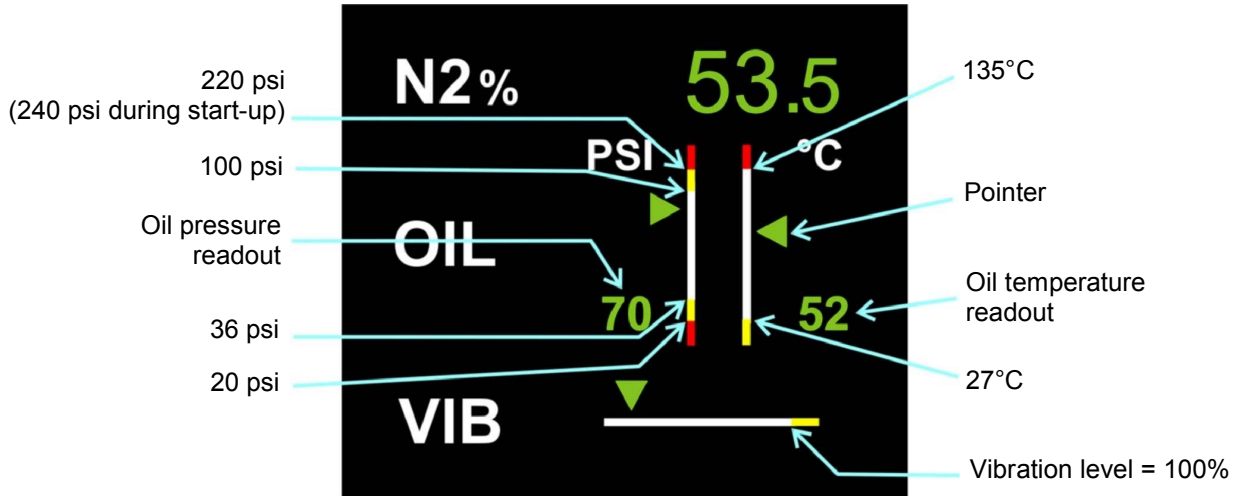


High temperature indication

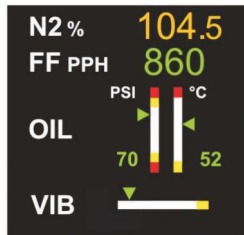


Over temperature indication

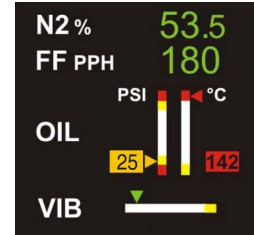
N2 OIL AND VIBRATION INDICATION



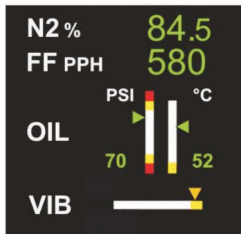
Normal indication



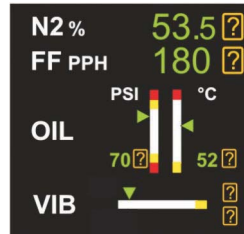
N2 overspeed



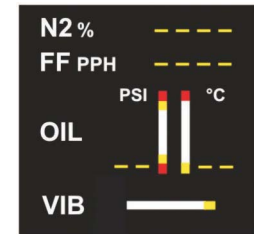
Low oil pressure and high oil temperature



N1 excessive vibration level



Data mismatch between MAU 1 and 2 channels



Invalid data

NOTE

Parameters displayed in ENG-CAS and ENG-TRM-BRK windows use the same color code philosophy.

OIL LEVEL ON TEST SYNOPTIC

Each engine oil level can be checked on the TEST synoptic by selecting the **ENG OIL** tab, on ground only.

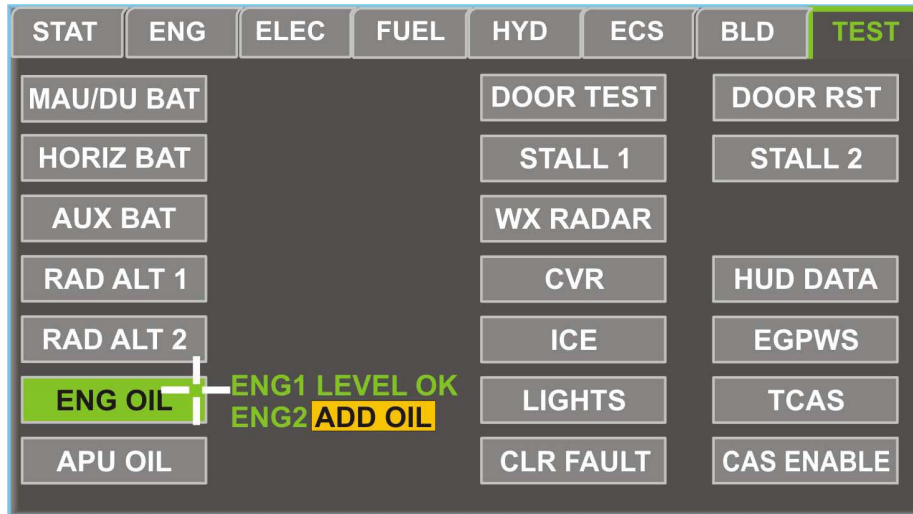


FIGURE 02-70-15-09 ENGINE OIL LEVEL ON TEST SYNOPTIC

The Primary Engine Instruments are displayed below the CAS Message Field. The Primary Engine Instruments consist of:

- fan rotation speed (N1) analog gauge and digital readout,
- Inter Turbine Temperature (ITT) analog gauge and digital readout,
- High Pressure compressor rotation speed (N2) digital readout for each engine,
- APR annunciation,
- N1 active limit (take-off).

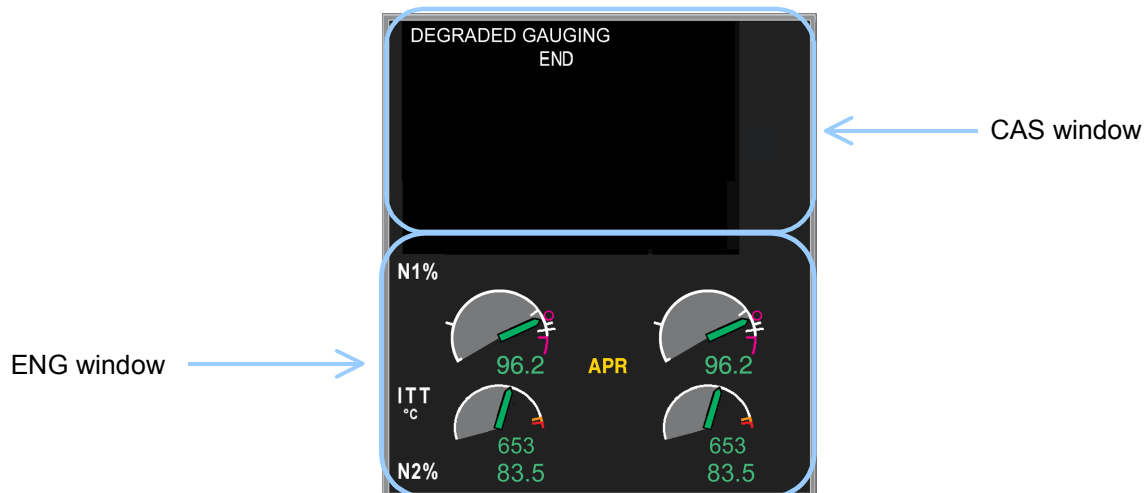


FIGURE 02-70-15-10 ENG-CAS PERMANENT WINDOW

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ENG-TRM-BRK WINDOW

The engine-trim-brake window displays secondary engine parameters.

The ENG-TRM-BRK window can be displayed to the pilot in the lower 1/6 window of each PDU. No graphic interface is available in this window. The AFM and checklist require this window to be displayed on the Pilot Flying PDU for take-off and landing.

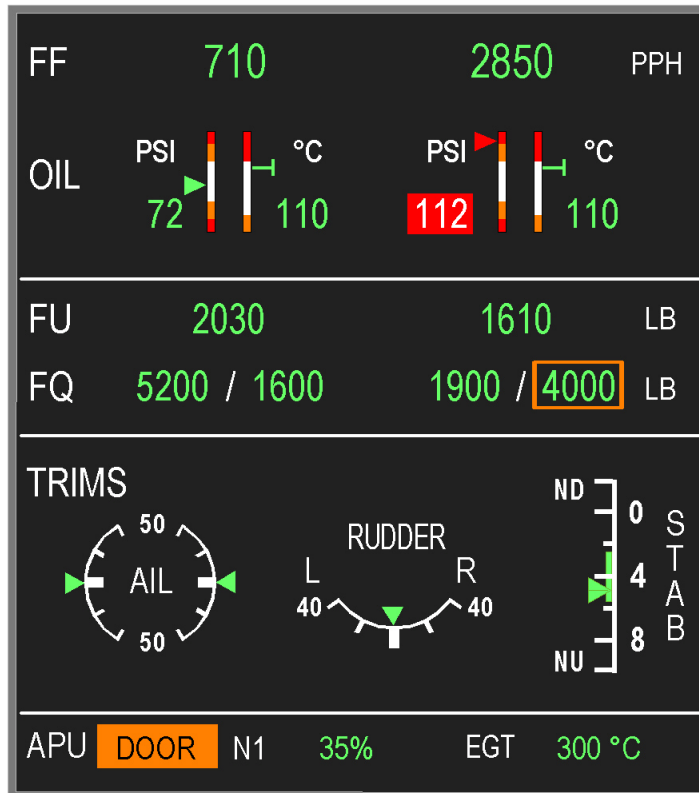


FIGURE 02-70-15-11 ENG-TRM-BRK WINDOW

The ENG-TRM-BRK window provides the following engine information:

- fuel flow digital readout,
- oil pressure and temperature digital readouts.

The ENG-TRM-BRK window automatically pops-up in case an engine parameter exceeds limitations.

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CIRCUIT BREAKERS

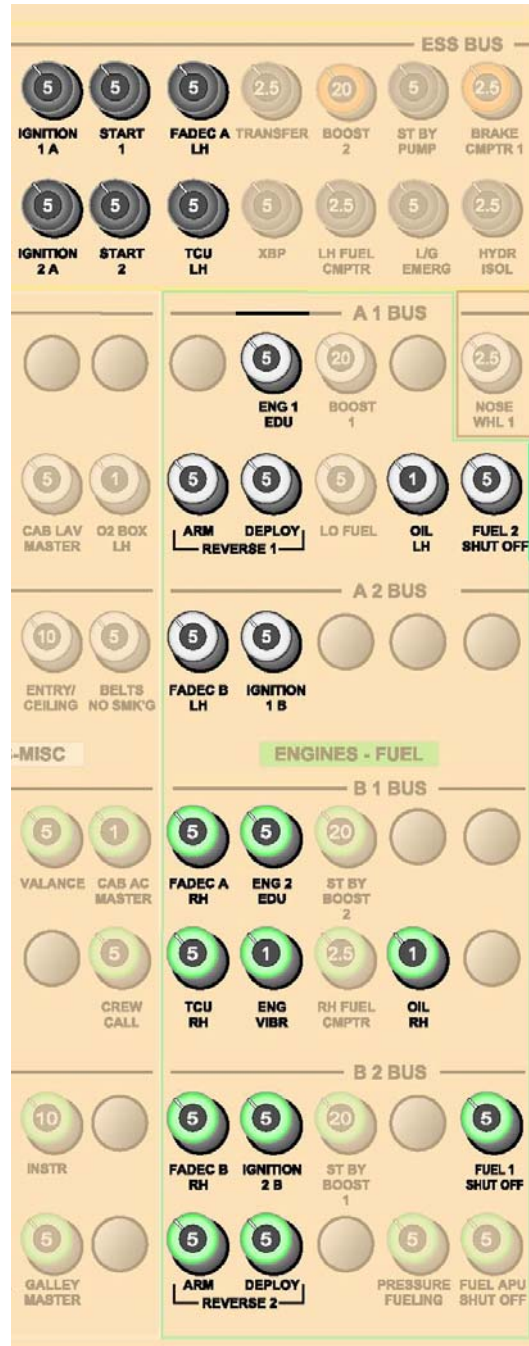


FIGURE 02-70-20-00 ENGINE CIRCUIT BREAKER PANEL

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ENGINE START

Engine start is always automatically controlled by the FADEC. It is achieved through the pedestal engine start selector located in front of the throttles. The engine power lever must be moved from the STOP to the IDLE position before the engine start selector is turned to the START (spring loaded) position.

The system automatically turns on the corresponding fuel booster pump and manages the power sources. The FADEC monitors the correct starting sequence.

In case of an anomaly, the crew can stop the starting sequence at any time by pulling back throttle to STOP position then selecting the MOTOR position.

In-flight relight of any engine can be achieved by selecting the IGN position on the engine start selector, which activates all engine igniters simultaneously. Ignition can also be automatically commanded by the FADEC upon detection of rapid engine deceleration or stall.

➤ *For more information, refer to CODDE 2.*

In case of flameout or failed start, the power lever must be pulled back to the STOP position before restart.

ENGINE SHUTDOWN

Engine shut down is achieved with the engine power lever moved from the IDLE to the STOP position by raising the catch and pulling the lever back.

The FADEC monitors the stopping sequence. The corresponding fuel booster is not automatically turned off.

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ENGINE MOTORING

Dry and wet motoring are possible. The throttle must be positioned to STOP (dry motoring) or IDLE (wet motoring), engine start selector to MOTOR and corresponding START pushbutton on overhead panel pushed on. The rotation of HP spool starts, N2 display increases. Rotation continues until engine start selector is turned to NORMAL position.

➤ For abnormal and emergency procedures: refer to CODDE 2 / Chapter 03.

CAS MESSAGES

CAS MESSAGE	DEFINITION
ENGINES: ALL OUT	Both engines below 50% N2 and airplane flying
ENGINES: DUAL START	Both engines starting up at the same time
ENG .. : OIL PRESS	Oil pressure below 20 psi and engine running at N2 above 50%
FIRE ENG ..	Fire detected on engine No 1 and/or No 2
ENG .. : APR FAULT	FADEC detects a failure in APR mode
ENG .. : CHECK OIL	Oil pressure or temperature is out of normal range
ENG .. FIRE DETECT FAIL	Failure of engine No 1 and/or No 2 fire detector
ENG .. : MONITOR ITT	FADEC detects an ITT exceedance
ENG .. : NO DISPATCH	Parking only, maintenance required
ENG .. OUT	Engine is under 50% N2 and airplane is flying
ENG .. : SURGE PROT FAIL	Surge bleed valve inoperative
ENG .. : THROTTLE INOP	Double T/R Not Stowed Switch failure (both channels operational) or during deployment if engine power is limited to ground or flight idle by T/R logic for more than 10 sec
ENG .. : VIBRATION	Detected vibration is above 100%
FADEC .X FAIL	One or more FADEC channel(s) (1A, 2A, 1B or 2B) is inoperative
STARTER .. FAIL	FADEC detects discrepancy in starter valve position

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CAS MESSAGE	DEFINITION
T/R .. : FAIL	T/R Control Unit (TRCU) detects a single failure on ground or a dual failure in flight
T/R .. : LIMITED TO IDLE	Failure on FADEC limits T/R power to flight idle rating due to Weight On Wheel wrong information
ENG .. : EXCEEDANCE EVENT	Parking only, exceedance of N1, N2 or ITT detected
ENG .. : FUEL FILTER	Fuel filter clogged
ENG .. : OIL CHIP	On ground, oil chip detected
ENG .. : OIL CHIP FAIL	Parking only, oil chip detector failed
ENG .. : OIL FILTER	Oil filter clogged
ENG .. : OIL PRESS FAIL	On ground, failure of oil pressure switch
ENG .. : NO DISPATCH	Cruise only, maintenance required
ENG .. : LONG DISPATCH	Parking only, maintenance required
ENG .. : SHORT DISPATCH	Parking only, maintenance required
ENG .. : SHUTDOWN BY FADEC	FADEC has commanded engine shutdown
FADEC .. : DISCRETE INOP	Loss of FADEC discrete inputs