

7.4.3 Engine Control System

7.4.3.1 FADEC

The engines are controlled by the FADEC (Full-Authority-Digital-Engine-Control) system. It provides all functions which are necessary for economical, comfortable and safe engine operation. These functions are:

- Fuel supply, in dependency of the N_1 RPM, during starting procedure and ground idle operation.
- Automatic engine control in all speed and power ranges of the engines.
- Automatic torque match with possibility to set constant torque split.
- Monitoring of engine and power parameters.
- Overspeed protection of the power turbines.
- In normal "Power On" operation the rotor speed is governed automatically as a function of density altitude (Fig. 7-14 shows the rotor RPM vs DA under AEO conditions including HIGH NR mode and OEI/ OEI Training).

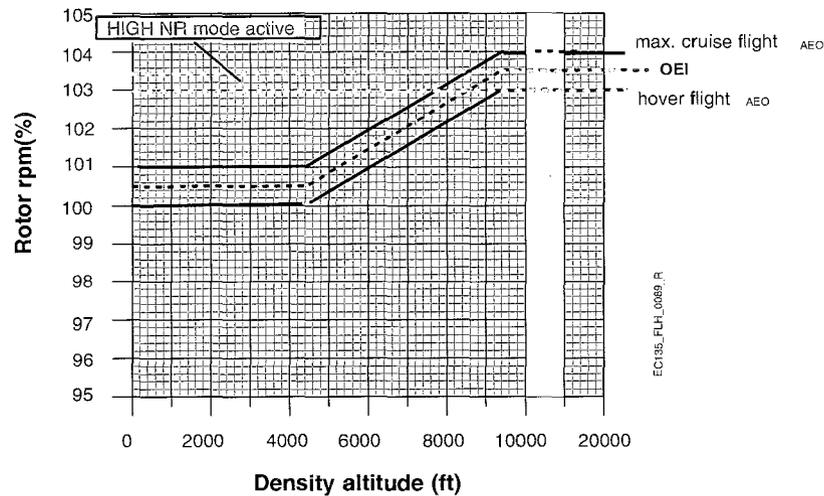


Fig. 7-14 Rotor RPM vs Density Altitude

- 1 Engine main switch
- 2 FADEC control switch
- 3 Training selector switch (inactive)

Note: With optional Training Mode (FMS 9.1-4) the switch is labeled "TRAIN SEL"

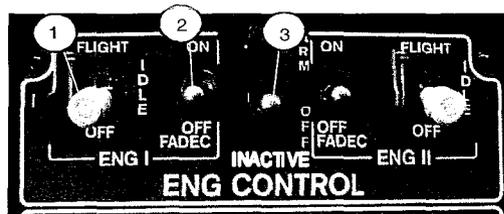


Fig. 7-15 Engine control panel (typical)

7.4.3.2 Manual engine control

Slight mismatches between both engines torque indication can be corrected by using the ENG TRIM switch, located on the collective pitch panel (Fig. 7-9). The 2-way switch allows either increasing the power of engine 1 (L+) and simultaneously decreasing the power of engine 2 (R-) or vice versa.

For training purposes or in case of a FADEC failure a direct manual engine control is provided via two twist grips (see Fig. 7-10 and Fig. 7-11) at the collective pitch. The front grip controls engine 1, the aft one controls engine 2. To change from normal to manual mode the ENG MODE SEL switch has to be set from NORM to MAN position. ENG MANUAL caution appears on the CAD.

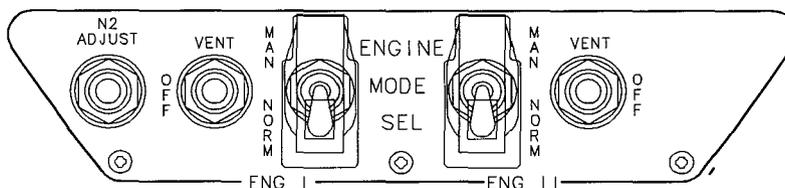


Fig. 7-16 ENG MODE SEL switches

Now the pilot is able to control the engine by twisting the respective grip from the neutral position N towards MIN or MAX direction as required (see para. 7.3.3.1). As soon as the twist grip is turned out of the N position the TWIST GRIP caution comes on at the CAD.

To change from manual mode back to normal mode the ENG MODE SEL switch has to be set from MAN to NORM position. The ENG MANUAL caution disappears. To regain the default constellation, set twist grip(s) to neutral (N) position. TWIST GRIP caution disappears.

7.4.3.3 Engine shutdown

Normal engine shutdown

In accordance with the Normal Procedures (see Sect. 4) the engines are shut down by placing the ENG I/II main switches to OFF position. The respective shut off valves are closed and the engines will shut down.

Manual engine shutdown

Overriding the twist grip MIN position by pushing the red minimum fuel override button and turning the grip further on as far as it is possible causes the manual fuel control valve to close and the engine will shut down.

Emergency shutdown

In case of emergency conditions the engine(s) can be shut down by pressing and releasing the FIRE switch(es) in the warning panel, the respective emergency shut off valve(s) will be closed and the engine(s) will shut down.

7.4.3.4 Engine ventilation

Engine ventilation can be performed by using the VENT switch located at the overhead switchpanel. (see Section 4 Normal Procedures)

7.4.3.5 N2 ADJUST rheostat (see Fig. 7-16)

If a engine or a FADEC was replaced it can be necessary to adjust the N2 in accordance to the maintenance manual.

7.4.3.6 30 sec./ 2min. topping selection switch

For TM Arrius 2B2 engines, the limitations of the OEI MCP rating will be controlled by the pilot, whereas the OEI 30 sec / 2.0 min. ratings are controlled by the engines FADEC. Therefore a topping selection switch, located on the collective pitch panel, has been installed to allow the activation of the respective 30 seconds/ 2 minutes power limitations.

In case of an engine failure, the 30 sec. limitations will be active (default). When the pilot does not need the 30 sec. power anymore, he is able to select the 2 min. limitations by pushing the topping switch. If required, the pilot may select the 30 sec. limitations again, by means of the topping switch.

If all parameters (torque, TOT, N₁) are below their MCP limiting values, the 30 sec. limitations are reset automatically.

7.4.3.7 Engine overspeed protection system

Each engine is monitored by an engine tachometer unit to prevent serious damage to the engine, in case of malfunction, by shut down.

If during engine operation the OVSP FAIL caution indication comes on the overspeed protection system of the affected engine has failed and the engine is no longer protected against power turbine overspeed.

If during engine operation the OVSP caution indication comes on in conjunction with the ENG FAIL caution indication, the affected engine will be shut down automatically due to an engine overspeed event.

In order to prevent both engines being shut down by their overspeed protection system a cross inhibition function deactivates the overspeed protection system of the remaining engine in case of an overspeed event.