

Controls. Fuel controls and power management are controlled by a Digital Electronic Engine Control (DEEC) with a backup hydromechanical control. The hardware and software configurations of this system and the associated engine fuel pump and hydromechanical unit are controlled by an approved engine equipment list for each specific engine model and aircraft application.

Principal Dimensions

Refer to the installation drawing for each specific engine model configuration for dimensions and center of gravity location.

Weight, Dry, Pounds (maximum):

TFE731 Models	Lbs.
-20	895
-20AR	895
-20BR	895
-20R	895
-40	885
-40R	885
-40AR	885
-40BR	895
-50R	978
-60	993

The engine weights shown herein are that of the power section and all components coded "E" in the Engine Equipment List. The total engine weight, including the weight of items coded "A" in the Engine Equipment list, is included on the engine installation drawing for each specific aircraft configuration.

Fuel

Fuels conforming to Honeywell International Inc. Specifications EMS 53111 (Jet A Type), EMS 53112 (Jet A-1 and JP-8 Types), EMS 53113 (Jet B and JP-4 Types), and EMS 53116 (JP-5 Type). Refer to engine installation manual for approved fuel types (see NOTE 12).

Refer to engine installation manual for approved fuel additives (see NOTE 12).

Aviation Gasoline, ASTM D 910 Grades 80 or 100LL, not in excess of 500 gallons per 100 hours of operation, may be used in emergencies.

Oil

Oil conforming to Honeywell International Inc. Specification EMS53110.

Certification Basis

*14 CFR part 33, effective February 1, 1965, as amended by 33-1 through 33-15, effective August 16, 1993.

**14 CFR part 34 effective September 10, 1990, as amended by 34-1 through 34-3, effective February 3, 1999.

Model	Part 33 Certification Basis	Part 34 Certification Basis	Date of Application	Date of Issuance/Amended
-60	* as stated above	Original effective 9/10/90	02/08/94	05/01/95
-40, -40R	* as stated above	Original effective 9/10/90	02/08/94	07/13/95
-20, -20R	* as stated above	Original effective 9/10/90	01/19/93	04/04/97
-20AR	* as stated above	**	03/24/99	05/14/99
-20BR	* as stated above	**	01/22/01	08/25/03
-40AR	* as stated above	**	02/07/05	10/31/05
-50R	* as stated above	**	09/24/04	10/13/06

-40BR	* as stated above	**	02/16/12	01/15/13
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Production Basis

Production Certificate No. 413, issued March 4, 1965. Reissued Production Certificate No. 413NM to Honeywell International Inc. on January 25, 2000.

NOTE 1. Maximum permissible operating speeds for the low and high pressure rotors for all engine models excluding TFE731-50R and TFE731-40BR are as follows:

	<u>Low Pressure Rotor (N1) RPM</u>	<u>High Pressure Rotor (N2) RPM</u>
Takeoff/Maximum Continuous	21,000	31,485
Maximum Transient (control overshoot)	21,105	31,957

NOTE 1A. Maximum permissible operating speeds for the low and high pressure rotors for the TFE731-50R and TFE731-40BR engine models are as follows:

	<u>Low Pressure Rotor (N1) RPM</u>	<u>High Pressure Rotor (N2) RPM</u>
Takeoff	21,000	31,800
Maximum Continuous	21,000	31,485
Maximum Transient (control overshoot)	21,105	32,277

NOTE 2. Temperature Limits:

Maximum Interstage Turbine Temperature (ITT) Limits: °F (°C)

<u>TFE731 Models</u>	<u>Max. Continuous</u>	<u>Takeoff (see NOTE 15)</u>	<u>Starting (Ground/Air)</u>
-20	1,726 (941)	1,766 (963)	1,726 (941)
-20AR	1,726 (941)	1,766 (963)	1,726 (941)
-20BR	1,816 (991)	1,871 (1022)	1,822 (994)
-20R	1,726 (941)	1,766 (963)	1,726 (941)
-40	1,816 (991)	1,871 (1022)	1,822 (994)
-40R	1,816 (991)	1,871 (1022)	1,822 (994)
-40AR	1,816 (991)	1,871 (1022)	1,822 (994)
-40BR	1,816 (991)	1,871 (1022)	1,822 (994)
-50R	1,816 (991)	1,871 (1022)	1,822 (994)
-60	1,816 (991)	1,871 (1022)	1,822 (994)

Maximum Oil Inlet Temperature Range, °F (°C) for all engine models:

	<u>Sea Level to 30,000 Feet</u>	<u>Above 30,000 Feet</u>
Fan Gearbox Inlet Maximum	260 (127)	284 (140)
Accessory Gearbox Inlet Maximum	300 (149)	315 (157)

Fan gearbox oil inlet temperature transient of 300°F (149°C) for a maximum of 2 minutes is permitted for all operational altitudes.

External engine components, maximum temperature (limiting temperature of specific components) are as specified in the applicable engine installation manual, see NOTE 12.

Operation at an engine fuel inlet temperature as high as 135°F (57°C) with a vapor volume to liquid volume ratio (V/L) equal to 0.45, and as low as -65°F (-54°C) with fuel at a viscosity of 12 centistokes or less during starting is approved.

NOTE 3. Fuel and Oil Pressure Limits:

Fuel pump inlet pressure	minimum	5 psi above true vapor pressure
	maximum	50 psig
Oil pressure	minimum	50 psig
	normal operating range	65 to 80 psig

NOTE 4. The ratings are based on static test stand operation and under the following conditions:

- No loading of aircraft accessory drives.
- No compressor bleed airflow.
- Bellmouth inlet conforming to Honeywell International Inc. Drawing 5837113 for the TFE731-60 and SKP17308 for the TFE731-20, -20AR, -20BR, -20R, -40, -40R, -40AR, -40BR, and SKP23600 for the TFE731-50R.
- Fan exhaust and turbine exhaust nozzles conforming to Honeywell International Inc. Drawing SKP23202 for the TFE731-60 and SKP23199 for the TFE731-40, -40R, -40AR and SKP23196 for the TFE731-20, -20AR, -20BR, -20R, -40BR, and SKP24973 for the TFE731-50R.
- No anti-icing airflow.
- Interstage Turbine Gas Temperature (ITT) and rotor speed limits not exceeded.
- Dry inlet air.

NOTE 5. Accessory Drive Provisions:

Accessory Drive	Drive Type (one each)	Internal Spline Config.	RPM and Rotation Facing Drive End	Note: (e) Accessory Max. Torque (lb-in)			Weight (pounds, maximum) Note (b)	Overhung Moment (lb-in)
				Tc	To	Ts		
Starter or Starter Generator D2* Note (c)	AND20002 Type XII-D modified as follows: RPM, torques, accessory weight, and moment as shown	AND20002	12,602 Note (a) CW 12,728 Note (f) CW	200	300	1600	45	400
Aircraft Accessory D3*	AND20002 Type XII-D modified as follows: RPM, torques, accessory weight, and moment as shown	AND20002	12,602 Note (a) CW 12,728 Note (f) CW	200	300	1000	40	400
Aircraft Accessory D1* (for engines without motive flow fuel pump)	AND20001 Type XI-B modified as follows: RPM, torques, accessory weight, and moment as shown	AND20001	6,300 Note (a) CW 6,364 Note (f) CW	240	360	1650	15	100
Aircraft Accessory D1* (for engines with motive flow fuel pump) Note (d)	AND20001 Type XI-B modified as follows: RPM, torques, accessory weight, and moment as shown	AND20001	6,300 Note (a) CW 6,364 Note (f) CW	100	165	1000	7	18

CW= clockwise (looking aft)
Tc = continuous torque

To = torque overload (5 min. per 4 hr. period)
Ts = static torque

*Accessory pads are identified by these symbols on the applicable installation drawings.

- Notes: (a) Drive speeds are based on a maximum steady state HP rotor speed of 31,485 rpm for all models excluding TFE731-50R and TFE731-40BR.
- (b) Total weight of the aircraft accessories shall not exceed 95 pounds for engines without motive flow fuel pump: 87 pounds with motive flow fuel pump.
- (c) The estimated torsional spring constant for the starter generator drive is 7,000 pound inches per radian.
- (d) Drive is located on engine auxiliary motive flow fuel pump.
- (e) Total combined accessory power extraction limits are specified in the applicable engine installation manual (see NOTE 12).
- (f) Drive speeds are based on a maximum steady state HP rotor speed of 31,800 rpm for models TFE731-50R and TFE731-40BR.

NOTE 6. For compressor bleed airflow limits, refer to the applicable engine installation manual (see NOTE 12).

NOTE 7. These engines meet FAA requirements for turbine disk integrity and rotor blade containment.

NOTE 8. These engines meet FAA requirements for operation in icing conditions within the envelope defined in 14 CFR part 25, Appendix C.

NOTE 9. Certain engine parts are life-limited. These limits are published in the FAA Approved Airworthiness Limitations Section of the Instructions for Continued Airworthiness contained in the Light Maintenance Manuals, Chapter 5.

NOTE 10. Variations in engine configuration and installation components are identified by a suffix to the basic model number on the engine nameplate; i.e. TFE731-60-XY (“X” denotes Honeywell installed configuration rating code number(s) and “Y” denotes Honeywell equipment code letter(s) of aircraft manufacturer), and an Engine Equipment List number. Certain features of these components are influenced by aircraft design considerations. In the Engine Equipment List, those items coded “E” are basic engine items and are controlled by Part 33. Items coded “A” have been demonstrated as compatible with the basic engine during engine certification testing. However, operation, functioning, and performance of these in a specific aircraft installation must be demonstrated during aircraft certification. Subsequent design control associated with these factors is the responsibility of the aircraft manufacturer.

NOTE 11 Power setting, power checks and control of engine thrust output in all operations is to be based on Honeywell International Inc. engine charts referring to low pressure rotor speed (N_1). Speed sensors are included in the engine assembly for this purpose.

NOTE 12. For additional authorized operation and installation detailed information, refer to FAA approved engine installation manuals as follows:

IM-8300: TFE731-20, -20AR, -20BR, -20R
IM-8010: TFE731-40, -40R, -40AR
IM-8009: TFE731-60
IM-8024: TFE731-50R
IM-8033: TFE731-40BR

NOTE 13. Model description – similarities, differences and special characteristics:

TFE731-60 Basic Model	One stage geared fan (damperless low-aspect-ratio rotor blade), four-stage axial flow low pressure compressor, one-stage centrifugal high pressure compressor, annular combustor, one-stage high pressure turbine, and three-stage low pressure turbine.
TFE731-40	Same as TFE731-60 basic model except one-stage geared fan (midspan dampered rotor blade), different external assembly (plumbing, electrical, etc.).
TFE731-40R	Same as TFE731-40 except different external assembly (plumbing, electrical, etc.). The -40R incorporates the Automatic Performance Reserve (APR) system and/or the Manual Performance Reserve (MPR) system.
TFE731-20	Same as TFE731-60 basic model except one-stage geared fan (midspan dampered rotor blade), modification to the tangential onboard inducer (TOBI), DS material for first-stage LP turbine blade, different HP turbine nozzle area, different combustor and fuel atomizer shroud cooling scheme, different external assembly (plumbing, electrical, etc.).
TFE731-20R	Same as TFE731-20 except the -20R incorporates the APR and/or MPR system.
TFE731-20AR	Same as TFE731-40R except different external assembly (plumbing, electrical, etc.).
TFE731-20BR	Same as TFE731-20AR except operates at the higher ITT ratings of the -40R engine.
TFE731-40AR	Same as TFE731-40R except operates at lower takeoff thrust rating.
TFE731-50R	Same as TFE731-60 basic model except a reduced-diameter fan rotor assembly and associated surrounding outer structure, incorporates the APR system, increased N2 speed at takeoff.
TFE731-40BR	Same as TFE731-20BR with increased takeoff flat-rated thrust and increased N2 limit. Incorporates improved durability hot-section hardware already used on TFE731-60.

NOTE 14. The engine type design does not include a thrust reverser. Considerations for the installation of a thrust reverser are contained in the engine installation manuals (see [NOTE 12](#)). The engines have demonstrated compatibility with the following thrust reversers:

Engine Model	T/R Manufacturer	Right Hand	Left Hand	Center
-20/-20R/-20AR/ -20BR/-40BR	Nordam	TR5045	TR5045	N/A
-40R/-40AR	Nordam	TR5040AS	TR5040AS	N/A
-40	Dassault (Alenia)	N/A	N/A	F50B-583-D3
-60	Dassault (Alenia)	N/A	N/A	FGFB-583-D1
-50R	Nordam	TR5050	TR5050	N/A

NOTE 15. The normal 5-minute takeoff time limit may be extended to 10 minutes for engine out contingency.

NOTE 16. DELETED

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