

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION TYPE CERTIFICATE DATA SHEET E28NE	TCDS NUMBER E28NE REVISION: 7* DATE: May 17, 2013 CFM INTERNATIONAL, S.A. MODELS: CFM56-5 CFM56-5-A1/F CFM56-5A3 CFM56-5A4 CFM56-5A4/F CFM56-5A5 CFM56-5A5/F
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Engines of models described herein conforming with this data sheet (which is part of Type Certificate Number E28NE) and other approved data on file with the Federal Aviation Administration, meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Federal Aviation Regulations, provided they are installed, operated, and maintained as prescribed by the approved manufacturer's manuals and other approved instructions.

TYPE CERTIFICATE (TC) HOLDER: CFM INTERNATIONAL, S.A.
 2 BOULEVARD DU GENERAL MARTIAL VALIN
 75015 PARIS, FRANCE

I. MODELS	CFM56-5	CFM56-5-A1/F	CFM56-5A3
TYPE	High bypass turbofan; coaxial front fan/booster driven by multi-stage low pressure turbine, multi-stage compressor with one-stage high pressure turbine and annular combustor.		
RATINGS (See NOTE 4)			
Takeoff (5 min., see NOTE 17), sea level, static thrust, lb.	25,000/ (11,120 daN)	--	26,500/ (11,787 daN)
Maximum continuous, sea level static thrust, lb.	23,700/ (10,540 daN)	--	--
Flat rating	AMBIENT TEMPERATURE		
Takeoff	86øF / 30øC	--	--
Maximum continuous	77øF / 25øC	--	--

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LEGEND: "--" INDICATES "SAME AS PRECEDING MODEL"
 "---" NOT APPLICABLE

NOTICE: ALL SIGNIFICANT CHANGES, IF ANY, ARE BLACK-LINED IN THE LEFT MARGIN.

I. MODELS (Continued)	CFM56-5	CFM56-5-A1/F	CFM56-5A3
FUEL SYSTEMS	See NOTE 8 for approved fuels		
Fuel pump / SNECMA P/N (Combined boost and single element gear-type pump)	301-785-501-0 301-785-502-0	-- --	-- --
Hydromechanical unit GE Part Numbers	1348M79	--	--
ELECTRONIC ENGINE CONTROL			
Electronic control unit GE Part Numbers	1459M55 1519M83	-- --	-- --
Identification plugs SNECMA Part Numbers	1820M27 320-586-001-0 320-586-201-0 320-586-301-0	-- 320-586-021-0 320-586-221-0	320-586-031-0 320-586-231-0
OIL	Synthetic type conforming to GE Specification D50TF1, Type 1 and Type 2. CFM Service Bulletin / CFM56-5 79- 001 lists approved oil brands.		
IGNITION SYSTEM	GE PART NUMBER		
Two ignition units Unison and Simmons	1538M69 9238M66	--- --	--- --
Two igniter plugs Unison and Champion	1374M12 1374M13	-- --	-- --
PRINCIPAL DIMENSIONS	INCHES / MILLIMETERS		
Length, (fan case forward flange to LPT rear frame aft flange)	95.3/2422	--	--
Width, (fan casing forward flange diameter)	75.12/1908	--	--
Height, (bottom of accessory gearbox to top of fan casing forward flange)	82.73/2101	--	--
WEIGHT (Dry)	Includes basic engine accessories and optional equipment as listed in manufacturers engine specification, including engine mounted portions of the condition monitoring instrumentation)		
Pounds / Kilograms	5139/2331	--	--
CENTER OF GRAVITY LOCATIONS	STATION, ENGINE ONLY (REFER TO INSTALLATION DRAWING)		
Inches	206.9±1	--	--
Millimeters	5255±25	--	--

II. MODELS	CFM56-5A4	CFM56-5A4/F	CFM56-5A5	CFM56-5A5/F
TYPE	High bypass turbofan; coaxial front fan/booster driven by multi-stage low pressure turbine, multi-stage compressor with one-stage high pressure turbine and annular combustor.			
RATINGS (See NOTE 4)				
Takeoff (5 min., see NOTE 17), sea level, static thrust, lb.	22,000/ (9786 daN)	--	23,500/ (10,453 daN)	--
Maximum continuous, sea level static thrust, lb.	20,670/ (9195 daN)	--	--	--
Flat rating	AMBIENT TEMPERATURE			
Takeoff	113øF / 45øC	--	98.6øF / 37øC	--
Maximum continuous	77øF / 25øC	--	--	--
FUEL SYSTEMS	See NOTE 8 for approved fuels			
Fuel pump / SNECMA P/N (Combined boost and single element gear-type pump)	301-785-501-0 301-785-502-0	-- --	-- --	-- --
Hydromechanical unit GE Part Numbers	1348M79	--	--	--
ELECTRONIC ENGINE CONTROL				
Electronic control unit GE Part Numbers	1519M83 1820M27	-- --	-- --	-- --
Identification plugs SNECMA Part Numbers	336-414-201-0 336-414-205-0	336-414-210-0 336-414-215-0	336-414-220-0 336-414-225-0	336-414-230-0 336-414-235-0
OIL	Synthetic type conforming to GE Specification D50TF1, Type 1 and Type 2. CFM Service Bulletin / CFM56-5 79-001 lists approved oil brands.			
IGNITION SYSTEM	GE PART NUMBER			
Two ignition units Unison and Simmons	1538M69 9238M66	---- --	--- --	--- --
Two igniter plugs Unison and Champion	1374M12 1374M13	-- --	-- --	-- --
PRINCIPAL DIMENSIONS	INCHES / MILLIMETERS			
Length, (fan case forward flange to LPT rear frame aft flange)	95.3/2422	--	--	--
Width, (fan casing forward flange diameter)	75.12/1908	--	--	--
Height, (bottom of accessory gearbox to top of fan casing forward flange)	82.73/2101	--	--	--
WEIGHT (Dry)	Includes basic engine accessories and optional equipment as listed in manufacturers engine specification, including engine mounted portions of the condition monitoring instrumentation)			
Pounds / Kilograms	5139/2331	--	--	--
CENTER OF GRAVITY LOCATIONS	STATION, ENGINE ONLY (REFER TO INSTALLATION DRAWING)			
Inches	206.9±1	--	--	--
Millimeters	5255±25	--	--	--

CERTIFICATION BASIS Federal Aviation Regulations Part 33 effective February 1, 1965, with Amendments 33-1 through 33-10 thereto. In addition, the engines are in compliance with the emissions requirements of Special Federal Aviation Regulation No. 27-5.

MODEL	APPLICATION DATE	TYPE CERTIFICATE ISSUED/AMENDED	TYPE CERTIFICATE WITHDRAWN
CFM56-509/06/84	08/27/87		
CFM56-5A2	12/15/88	02/05/90	10/15/92 (*)
CFM56-5A3	12/15/88	02/05/90	
CFM56-5-A1/F	12/15/88	10/15/92	
CFM56-5A4	02/03/94	02/27/96	
CFM56-5A4/F	02/03/94	02/27/96	
CFM56-5A5	02/03/94	02/27/96	
CFM56-5A5/F	02/03/94	02/27/96	

(*) Effective October 15, 1992, the model designation (CFM56-5A2" was changed to "CFM56-5-A1/F", at the request of the manufacturer. No CFM56-5A2 models were released to revenue service.

PRODUCTION BASIS Production Certification No. 108 for engines produced in the United States by General Electric under license from CFM International, S. A. (See NOTE 11).

NOTES

NOTE 1.	MAXIMUM PERMISSIBLE TEMPERATURES (All Models)
	For engine configurations designated by a suffix for specific installations (see NOTE 12), refer to the appropriate S.O.I. for maximum operating temperatures
TURBINE EXHAUST GAS (T495) (INDICATED / SEE NOTE 5)	As measured by a harness of nine thermocouples located at the second stage low pressure turbine vane:
Takeoff (5 min.)	890øC
Maximum continuous	855øC
Starting	725øC
Time temperature envelope	TP.01.11
Refer to model's S.O.I.	
FUEL PUMP INLET	REFER TO THE APPROPRIATE INSTALLATION MANUAL
OIL SUPPLY	
Continuous operation	140øC/284øF
Transient (15 minutes)	155øC/311øF

NOTE 2.
Fuel limits

FUEL AND OIL PRESSURE LIMITS
Operation and air/ground starting pressure limits extend from a minimum fuel pressure of not less than 5.5 psia (37.9 kPa absolute) above the true fuel vapor pressure to a maximum of 60 psig (413.7 kPa gauge), relative to atmosphere, with vapor/liquid ratio of zero at all conditions. For limits, see Installation Manual, Part A, Section 5, Figures A2 through A5.

Oil limits

The minimum pressure limit at idle is 13 psid (89.6 kPa differential) and varies up to 45 psid (310.2 kPa differential) at cruise thrust. The maximum pressure limit during cold starts is 300 psid (2069 kPa differential), limited by a pressure-relief valve. See NOTE 14.

NOTE 3.

ELECTRICAL

Rotation (1)
 Speed ratio to core
 Maximum torque (inch-pounds)
 Continuous
 Static
 Maximum overhung moment
 (inch-pounds)

HYDRAULIC PUMP

Rotation (1)
 Speed ratio to core
 Maximum torque (inch-pounds)
 Continuous
 Static
 Maximum overhung moment
 (inch-pounds)

ACCESSORY DRIVE PROVISIONS (All Models)	
Rotation (1)	CCW
Speed ratio to core	.5947:1
Maximum torque (inch-pounds)	
Continuous	135 KW
Static	9,492
Maximum overhung moment (inch-pounds)	1,000
HYDRAULIC PUMP	
Rotation (1)	CCW
Speed ratio to core	.256:1
Maximum torque (inch-pounds)	
Continuous	1,500
Static	4,400
Maximum overhung moment (inch-pounds)	160
1. FACING DRIVE PAD: CW = CLOCKWISE / CCW = COUNTERCLOCKWISE	

NOTE 4.

Engine ratings are based on calibrated stand performance under the following conditions:

Takeoff thrust is nominally independent of ambient temperature (flat rated) up to ambient temperature:

- Std + 15°C (30°C, 86°F) for -5, -5A3, & -5-A1/F
- Std + 30°C (45°C, 113°F) for -5A4 & -5A4/F
- Std + 22°C (37°C, 98.6°F) for -5A5 & -5A5/F

Maximum continuous is nominally independent of ambient temperature (flat rated) to Std +10°C (25°C, 77°F);

Zero customer bleed and horsepower extraction;

No scrubbing drags;

100% inlet recovery; and

Based on CFM International referee separate flow exhaust system with primary exhaust nozzle (core) P/N 15-25200-2014 and fan nozzle P/N 4013356-302.

NOTE 5.

CFM56-5, -5A4, -5A5	Indicated 890°C EGT redline corresponds to actual of 890°.
CFM56-5A3, -5-A1/F, -5A4/F, -5A5/F	Indicated 890°C EGT redline corresponds to actual of 915°C, and indicated 855°C EGT redline corresponds to actual of 880°C.

NOTE 6.

Low pressure rotor (N1), rpm
 High pressure rotor (N2), rpm

MAXIMUM PERMISSIBLE ENGINE ROTOR SPEEDS (All Models)	
Low pressure rotor (N1), rpm	5,100 (102%)
High pressure rotor (N2), rpm	15,183 (105%)

NOTE 7. LOCATION	MAXIMUM PERMISSIBLE AIR BLEED EXTRACTION (All Models)	
	FAN CORRECTED SPEED	FLOW LIMIT
Fan discharge	20% - 100% N1K	2% fan airflow
HPC Stage 5 only	20% - 100% N1K	10% core airflow
Compressor discharge only	20% - 61.0% N1K 61% - 82.5% N1K 82.5% - 100% N1K	14% core airflow Linear variation from 14%-7% core airflow 7% core airflow
HPC Stage 5 and compressor discharge combined	20% - 61.0% N1K 61% - 82.5% N1K 82.5% - 100% N1K	14% core airflow Linear variation from 14%-10% core airflow 10% core airflow

NOTE 8. Approved fuel conforming to GE Specification D50TF2. MIL-T-5624, Grades JP-4 or JP-5, ASTM D 1655, Jet A, A1 and B are consistent with this GE Specification. Primary fuel is Jet A, with other fuels listed being acceptable alternates. No fuel control adjustment is required when changing from primary to alternate fuels. Use of aviation gasoline is not authorized. Consult Specific Operating Instructions for additive usage.

NOTE 9. Life limits established for critical rotating components are published in the CFM56-5 Shop Manual, Chapter 5.

NOTE 10. Power setting, power checks and control of engine thrust output in all operations is to be based on CFMI engine charts referring to fan speed. Fan speed sensors are included in the engine assembly for this purpose.

NOTE 11. The type certificate holder, CFM International, S.A., is a company established and jointly owned by Societe Nationale l'Etude et de Construction de Moteurs d'Aviation (SNECMA) of France and the General Electric Company for the certification, sale, and support of CFM56 series engines. With respect to the benefits of type certification for production, General Electric and SNECMA function as licensees of CFM International, S.A.

This type certification applies only to engines produced in the United States under Type Certification No. E28NE. Engines of the same model designation produced in France under import Type Certificate No. E29NE are identical to and fully interchangeable with engines produced under this type certificate. Similarly, modules, assemblies, or parts produced in France are eligible for use in engines produced under this type certificate provided an airworthiness approval tag, EASA Form 1, issued by SNECMA on behalf of EASA under Production Certificate FR.21G.0007 is attached to each item or invoice covering a shipment of similar items (Ref. FAR 21.502).

These engines, when produced by General Electric, are identified by the serial number prefix "730 and 732"; when produced by SNECMA, they are identified by the prefix "731 and 733".

NOTE 12. A suffix may be added to the basic engine model number on the engine nameplate to identify minor variations in engine configuration, installation components or reduced ratings peculiar to aircraft installation requirements. For example: CFM56-5xx.

Engines that have a suffix to the basic model number are identified in CFM International Service Bulletin No. CFM56-5 72-001, and are summarized below:

- (1) CFM56-5-A1, basic model for Airbus A320

- NOTE 13. The minimum permissible idle inflight corresponds to N2=58.8% (8,500 rpm), which is a non-adjustable limit, preset into the ECU control schedule.
- NOTE 14. During negative-g operation only, it is permissible to operate below minimum oil pressure (13 psid) for a maximum of 10 seconds. See Specific Operating Instructions , Section 6.
- NOTE 15. The models shown on this TCDS have the following general characteristics:
- | MODEL | CHARACTERISTICS |
|-------------|---|
| CFM56-5 | Basic model. |
| CFM56-5A1/F | Same as CFM56-5 except EGT limits increased through introduction of hot section modifications. This model was originally certified as CFM56-5A2, but that designation was changed at the request of the manufacturer. |
| CFM56-5A3 | Same as CFM56-5A1/F except for increased takeoff thrust rating. |
| CFM56-5A4 | Same as CFM56-5A3 except for reduced thrust takeoff rating and lower EGT limits. |
| CFM56-5A4/F | Same as CFM56-5A3 except for reduced thrust takeoff rating |
| CFM56-5A5 | Same as CFM56-5A3 except for reduced thrust takeoff rating and lower EGT limits. |
| CFM56-5A5/F | Same as CFM56-5A3 except for reduced thrust takeoff rating. |
- NOTE 16. The CFM56-5, -5-A1/F, -5A3, -5A4, -5A4/F, -5A5, -5A5/F FADEC series engines have been approved to operate with certain faults present in the control system, based on satisfaction of 14 CFR Part 33 requirements and appropriate engine control system reliability requirements. FAA approved criteria pertaining to dispatch and maintenance requirements for the engine control system are specified in GE Document No. GEK 98455, which defines the dispatchable configurations and maximum operating intervals.
- A control system reliability monitoring program has been established with CFMI, as a contingency of the dispatch criteria approval, to ensure that overall engine control system and specific component failure rates do not exceed the maximum values permitted by the reliability analysis.
- NOTE 17. The normal 5 minute takeoff rating may be extended to 10 minutes for engine out contingency.

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