



TYPE CERTIFICATE DATA SHEET Nº EM-2016T02

Type Certificate Holder:

INTERNATIONAL AERO ENGINES, LLC (IAE)

400 Main Street

East Hartford, CT 06118

USA

EM-2016T02-00

Sheet 01

IAE

PW1133G-JM, PW1133GA-JM,

PW1130G-JM, PW1127G-JM,

PW1127GA-JM, PW1127G1-JM,

PW1124G-JM, PW1124G1-JM,

PW1122G-JM.

29 March 2016

Engines of models described herein conforming with this data sheet, which is part of Type Certificate No. 2016T02, meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Brazilian Aeronautical Regulations provided they are installed, operated, and maintained as prescribed by the approved manufacturer's manuals and other instructions.

TYPE

High bypass ratio, axial airflow, dual-spool, turbofan engine controlled by a Full Authority Digital Electronic Control (FADEC). The low pressure spool consists of a three-stage low pressure turbine that directly drives a three-stage low pressure compressor, and a single stage high bypass ratio fan through a fan drive gear speed reduction system. The high pressure compressor has eight axial stages driven by a two-stage cooled high pressure turbine.

RATINGS

(See Note 1)

MODELS

PW1133G-JM, PW1133GA-JM, PW1130G-JM, PW1127G-JM.

Engine Thrust, at sea level, kN (lbf.)	PW1133G-JM	PW1133GA-JM	PW1130G-JM	PW1127G-JM
- Maximum Continuous - static	145.8 (32 780)	--	--	117.2 (26 345)
- Takeoff - 5 min	147.3 (33 110)	--	--	120.4 (27 075)
Flat Rating Ambient Temp., °C (°F)				
- Maximum Continuous	25 (77)	--	--	--
- Takeoff - 5 min	30 (86)	--	--	47 (117)

MODELS

PW1127GA-JM, PW1127G1-JM, PW1124G-JM, PW1124G1-JM.

Engine Thrust, at sea level, kN (lbf.)	PW1127GA-JM	PW1127G1-JM	PW1124G-JM	PW1124G1-JM
- Maximum Continuous - static	117.2 (26 345)	--	106.9 (24 035)	--
- Takeoff - 5 min	120.4 (27 075)	--	107.8 (24 240)	--
Flat Rating Ambient Temp., °C (°F)				
- Maximum Continuous	25 (77)	--	--	--
- Takeoff - 5 min	47 (117)	--	51 (123)	--

MODELS

PW1122G-JM.

Engine Thrust, at sea level, kN (lbf.)	PW1122G-JM
- Maximum Continuous - static	106.9 (24 035)
- Takeoff - 5 min	107.8 (24 240)
Flat Rating Ambient Temp., °C (°F)	
- Maximum Continuous	25 (77)
- Takeoff - 5 min	51 (123)

ENGINE CONFIGURATION	PW1133G-JM	PW1133GA-JM	PW1130G-JM	PW1127G-JM
- FADEC Hardware (P/N)	5323745	--	--	--
- FADEC Software (earliest P/N)	5321231	--	--	--
- FADEC Rating Plug (P/N)	5322188	--	--	5322191
	5322195	--	--	5322196
	5322189	--	--	5322190
- Integrated Fuel Pump and Control (IFPC)	5323889	--	--	--
	PW1127GA-JM	PW1127G1-JM	PW1124G-JM	PW1124G1-JM
- FADEC Hardware (P/N)	5323745	--	--	--
- FADEC Software (earliest P/N)	5321231	--	--	--
- FADEC Rating Plug (P/N)	5322191	--	5322193	--
	5322196	--	5322192	--
	5322190		5322194	--
- Integrated Fuel Pump and Control (IFPC)	5323889	--	--	--
	PW1122G-JM			
- FADEC Hardware (P/N)	5323745			
- FADEC Software (earliest P/N)	5321231			
- FADEC Rating Plug (P/N)	5322193			
	5322192			
	5322194			
- Integrated Fuel Pump and Control (IFPC)	5323889	--	--	--

Note: For information regarding components and engine configuration, refer to Installation Drawing 5320001.

IGNITION SYSTEM	The PW1100G-JM Series engine ignition system is composed of the following: <ul style="list-style-type: none"> - One dual channel Ignition Exciter UTAS P/N 5315125; - Two Igniter Plugs UTAS P/N 5306763.
COMPONENTS AND CONFIGURATION	For details of components included in the Type Design Definition, refer to the Installation Drawing 5320001. The UTAS thrust reverser unit, as specified in the Installation and Operating Manual PWA-9851, is not part of the engine type design and is certified as part of the aircraft.
FUEL TYPE	Refer to Service Bulletin PW1000G-1000-73-00-0002-00A-930A-D for approved fuel types and additives for use in the PW1100G-JM Series turbofan engine.
OIL TYPE	Refer to Service Bulletin PW1000G-1000-79-00-0002-00A-930A-D for approved turbine oils for use in the PW1100G-JM Series turbofan engine.
TEMPERATURE LIMITS	For engine indicated turbine gas temperature limits, see Note 2.
PRESSURE LIMITS	For fuel and oil pressure limits, see Note 3.
ROTOR SPEEDS	For engine rotational speed limits, see Note 4.
AIR BLEED	For maximum permissible air bleed extraction, see Note 5.
DIMENSIONS AND WEIGHT	<ul style="list-style-type: none"> - Length (flange to flange): 3 284 mm (129.285 in). - Length (fan spinner face to aft flange): 3 401 mm (133.898 in). - Nominal diameter: 2 224 mm (87.566 in). - Maximum radial projection (at drain mast): 1 274 mm (50.150 in). - Weight (dry, basic engine - see Note 8): 2 858 kg (6 300 lbs).

CENTER OF GRAVITY

- Axial engine station, relative to A-flange: 1 613 mm (63.510 in).
- Vertical, relative to engine centerline: - 36.1 mm (- 1.420 in).
- Lateral, relative to centerline: 20.9 mm (0.820 in).

IMPORT REQUIREMENTS

Each engine imported separately and/or spare parts must be accompanied by an Airworthiness Certificate for Export and/or an Airworthiness Approval Tag, respectively, issued by FAA (or a third country authority, in case of used engine imported from such country), attesting that the particular engine and/or parts were submitted to the governmental quality control before delivery and they are in conformity with the ANAC-approved type design. The ANAC type design corresponds to the FAA-approved type design, as stated in ANAC report number V.33-1077-00 dated 29 March 2016 or further revisions.

CERTIFICATION BASIS

- RBAC 33, corresponding to 14 CFR Part 33, effective 01 February 1965, as amended by 33-1 through 33-32, inclusive;
- RBAC 34, corresponding to 14 CFR Part 34, effective 10 September 1990, as amended by 34-1 through 34-5, inclusive (see Note 16 for further information about certification basis for fuel venting and exhaust emissions);
- Equivalent Level of Safety (ELOS) findings, raised by FAA:
 - No. TC3289EN-E-P-8 Rev. 1 to 14 CFR 33.76(c)(7)(i) – Bird Ingestion,
 - No. TC3289EN-E-P-5 Rev. 1 to 14 CFR 33.77(c) – Foreign Object Ingestion-Ice,
 - No. TC3289EN-E-P-6 Rev. 1 to 14 CFR 33.78(a)(1) – Rain and Hail Ingestion.

<u>Model</u>	<u>Application</u>	<u>Issued TC</u>
PW1133G-JM	04 December 2015	29 March 2016
PW1133GA-JM	04 December 2015	29 March 2016
PW1130G-JM	04 December 2015	29 March 2016
PW1127G-JM	04 December 2015	29 March 2016
PW1127GA-JM	04 December 2015	29 March 2016
PW1127G1-JM	04 December 2015	29 March 2016
PW1124G-JM	04 December 2015	29 March 2016
PW1124G1-JM	04 December 2015	29 March 2016
PW1122G-JM	04 December 2015	29 March 2016

NOTES**NOTE 1**

The engine ratings are based on calibrated test stand performance under the following conditions;

- Sea level static, standard pressure (14,696 psia), up to the flat rating ambient temperature °F;
- No customer bleed or customer horsepower extraction;
- Ideal inlet, 100% ram recovery;
- Production aircraft flight cowling;
- Production instrumentation;
- Fuel lower heating value of 18 400 BTU/lb.

NOTE 2Maximum Permissible Temperatures:

- Indicated Turbine Temperature (ITT), °C (°F):

Takeoff - 5 minutes:	1 083 (1 982)
Maximum continuous:	1 005 (1 841)
At start-up:	1 083 (1 982)

- Oil Temperature Limits, °C (°F):

Continuous operation: Engine main oil temperature maximum limit varies with engine power level. The limit decreases from 152°C (305°F) at idle power; to 146°C (295°F) at cruise power; to 141°C (285°F) at high power. See Installation and Operating Manual P/N PWA-9851 for details.

Minimum oil temperature at idle before takeoff power operation: 51.7 (125)

- Fuel Temperatures See Installation and Operating Manual PWA-9851 for details.
- Component Temperatures See Installation and Operating Manual PWA-9851 for details.

NOTE 3 Fuel and Oil Pressure Limits:- Fuel Pressure Limits (measured at engine pump inlet):

The fuel pressure during operation shall be maintained at not less than 5.0 psi above the true vapor pressure of the fuel but not greater than 100 psi above the absolute ambient pressure with a vapor/liquid ratio of zero. The maximum allowable pressure at the fuel pump inlet after shutdown is 121 psig.

- Oil Pressure Limits:

- Minimum: 63 psig at idle. Variable by N2 Speed off idle. See Installation and Operating Manual PWA-9851 for details.
- Maximum: 270 psig.

Oil supply pressure is measured relative to main lube pressure.

Temporary interruption associated with negative “g” operation is limited to 10 seconds maximum. Normal oil pressure will be restored rapidly once the negative “g” effect has been eliminated.

NOTE 4 Permissible Rotor Speeds (rpm):

- Maximum Low Pressure Rotor (N1): 10 047
- Minimum Low Pressure Rotor
 - Ground Idle: 1 750
 - Flight Idle (see Note 11): 1 801
- Maximum High Pressure Rotor (N2): 22 400
- Minimum High Pressure Rotor (N2)
 - Ground Idle: 12 400
 - Flight Idle: 12 400

Power setting, power checks, and control of engine thrust output in all operations are based on Low Rotor Speed (N1). Fan Speed (NFAN) is directly proportional to Low Rotor Speed (N1) by a gear ratio of 1:3.0625.

NOTE 5 Maximum Permissible Air Bleed Extraction:

- Customer ECS / WAI: 18.2% W25
- Nacelle Anti-Ice: 1.2% W25

NOTE 6Aircraft Accessory Drives:

Drive Pad	Rotation	Speed Ratio to N2	Torque (lb.-in)			Overhung Moment (lb.-in)
			Continuous	Overload	Static	
Hydraulic Pump	CCW	0.1768 : 1	1 300	1 800	4 250	400
Integrated Drive Generator (IDG)	CCW	0.3932 : 1	1 990 *	4 475 *	9 400	900
Air Turbine Starter	CCW	0.4070 : 1	#	10 692	9 084	280

Remarks:

(a) Rotation is defined facing the drive pad. CCW = Counter Clockwise;

(b) * Maximum allowable continuous torque values are at any engine speed unless otherwise specified provided no destructive forces resulting from accessory torsional vibration are present.

NOTE 7Model Description:

The PW1100G-JM engine series consist of the following engine models:

PW1133G-JM	Basic Model, Airbus A321-271n
PW1133GA-JM	Alternate Climb Thrust Model, Airbus A321-271n
PW1130G-JM	Reduced Thrust Model, Airbus A321-272n
PW1127G-JM	Basic Model, Airbus A320-271n
PW1127GA-JM	Alternate Climb Thrust Model, Airbus A320-271n
PW1127G1-JM	Hot and High Thrust Model, Airbus A319-173n
PW1124G-JM	Basic Model, Airbus A319-171n
PW1124G1-JM	Alternate Climb Thrust Model, Airbus A320-272n
PW1122G-JM	Reduced Thrust Model, Airbus A319-172n

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- NOTE 8** The engine weight is defined as the dry weight of the basic engine with IAE, LLC supplied engine build-up component (EBU1) that includes: Low Oil Pressure Switch; Core Nacelle Temperature Sensor; GBX Breather Tube; Engine Air Turbine Starter; starter attachment hardware and seals to gearbox; duct from starter to Starter Air Valve ; Starter Air Valve; electrical harnesses; Mass Fuel Flow Meter; environmental control system Intermediate Pressure Check Valve.
- NOTE 9** Engine mount system provisions are specified in Installation Drawing 530001, and Mount and Maneuver Load Drawing 5320003.
- NOTE 10** Life limits for critical components and mandatory inspection requirements are specified in the FAA-approved PW1100G-JM Airworthiness Limitation Manual P/N 5316993.
- NOTE 11** Icing Conditions – The minimum N1 certified for in-flight operation in icing conditions is 1 801 rpm. The Electronic Engine Control will prevent rotor speeds below this value while in flight. Requirements and limitations for ground operation in icing conditions are specified in the Installation and Operating Manual PWA9851.
- NOTE 12** ETOPS – The PW1100G-JM Engine Series is not eligible for Extended Twin-Engine Operations (ETOPS) operation.
- NOTE 13** TLD – This engine is certified with Time Limit Dispatch. FADEC System faults fall into 4 categories as follows: A) No Dispatch, B) Short Term Dispatch, C) Long Term Dispatch, or D) Fix at a schedule agreed upon between the engine and airframe manufacturer. Details on the short and long terms dispatch intervals are provided in the PW1100G-JM Airworthiness Limitations Manual.
- NOTE 14** Lightning protection requirements and electromagnetic interference emitted by the electronic engine control system, including cables, are specified in the Installation and Operating Manual PWA9851.
- NOTE 15** Applicable Installation, Maintenance and Overhaul Manuals:
- 1) Installation and Operating Manual, PWA9851;
 - 2) The following Engine Instructions for Continued Airworthiness (ICA's) have been accepted by the FAA Engine Certification Office and, consequently, by ANAC:
 - PW1100G-JM Engine Maintenance Manual P/N 5316994;
 - PW1100G-JM Engine Manual P/N 5316992;
 - PW1100G-JM Clean, Inspect and Repair Manual P/N 5315653.

NOTE 16

The following emissions standards promulgated in RBAC 34 which endorses 14 CFR Part 34, Amendment 5, effective 31 December 2012, have been complied with for the PW1100G-JM Engine Series:

- Fuel Venting Emission Standards: § 34.10(a) and § 34.11;
- Smoke Number (SN) Emission Standards: § 34.21(e)(2);
- Carbon Monoxide (CO) Emission Standards: § 34.21(d)(1)(ii);
- Hydrocarbons(HC) Emission Standards: § 34.21(d)(1)(i);
- Oxides of Nitrogen (NOx) Emission Standards: § 34.23(b)(1).

In addition, the engine manufacturer has declared that the ICAO emissions standards identified in Annex 16, Volume II, 3rd Edition, Part III, Chapter 2, Section 2.2.2 for SN, Section 2.3.2 for CO and HC, Section 2.3.2.e.3 for NOx (also known as CAEP/8), and Part II Chapter 2 for fuel venting have been demonstrated.

NOTE 17

Service Bulletins, Structural Repair Manuals, Vendor Manuals, and Engine Maintenance Manuals, with contain a statement that the document is FAA-approved, are acceptable by the ANAC and are considered ANAC-approved unless otherwise noted. These approvals pertain to the type design only.

**MÁRIO IGAWA**

**Gerente Geral de Certificação de Produto Aeronáutico
(Manager, Aeronautical Product Certification Branch)**