

U. S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION TYPE CERTIFICATE DATA SHEET E00087EN	TCDS NUMBER E00087EN Revision 2
	International Aero Engines, LLC MODELS: PW1133G-JM, PW1133GA-JM, PW1130G-JM, PW1127G-JM, PW1127GA-JM, PW1127G1-JM, PW1124G-JM, PW1124G1-JM, PW1122G-JM
	Date: November 20, 2015

Engines of models described herein conforming with this data sheet (which is part of Type Certificate Number E00087EN) 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: International Aero Engines, LLC
 400 Main Street
 East Hartford, CT 06118

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.
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MODELS:	PW1133G-JM PW1133GA-JM PW1130G-JM	PW1127G-JM, PW1127GA-JM, PW1127G1-JM	PW1124G-JM, PW1124G1-JM, PW1122G-JM
RATINGS (See NOTE 1)			
SEA LEVEL STATIC THRUST (lb.)			
Takeoff (5 minutes) (See NOTE 2)	33,110	27,075	24,240
Maximum Continuous	32,780	26,345	24,035
FLAT RATING AMBIENT TEMPERATURE			
Takeoff	30°C / 86°F	47°C / 117°F	51°C / 123°F
Maximum Continuous	25°C / 77°F	25°C / 77°F	25°C / 77°F
FADEC Hardware PN	5323745	--	--
FADEC Software PN	5321231	--	--
Data Storage Unit PN (Ratings Plug)	5322188 5322195 5322189	5322191 5322196 5322190	5322193 5322192 5322194

PAGE	1	2	3	4	5	6	7				
REV.	2	0	1	2	2	2	0				

LEGEND: "-" INDICATES "SAME AS PRECEDING MODEL"
"--" NOT APPLICABLE
NOTE: SIGNIFICANT CHANGES ARE BLACK-LINED IN THE LEFT MARGIN.

COMPONENTS/CONFIGURATION	For information regarding components and engine configuration, refer to: Installation Drawing 5320001
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MODELS: (cont.)	PW1133G-JM PW1133GA-JM PW1130G-JM	PW1127G-JM PW1127GA-JM PW1127G1-JM	PW1124G-JM PW1124G1-JM PW1122G-JM
PRINCIPAL DIMENSIONS (Room temperature)			
Length (flange to flange, in.)	129.285 in +/- 0.051	--	--
Length (fan spinner face to aft flange, in.)	133.898 in	--	--
Nominal diameter (fan case, in.)	87.566 in	--	--
Maximum radial projection (in.) (at drain mast)	50.150 in	--	--
CENTER OF GRAVITY (in.)			
Axial engine station, relative to A-flange:	63.510 in	--	--
Vertical, relative to engine centerline:	- 1.420 in	--	--
Lateral, relative to centerline:	0.820 in	--	--
WEIGHT * (DRY) Basic engine (lbs.) (See Note 6)	6,300	--	--
FUEL	Service Bulletin PW1000G-1000-73-00-0002-00A-930A-D defines the fuels requirements and provides a listing of approved fuels and fuel additives for use in the PW1100G-JM series turbofan engine.		
LUBRICATING OILS	Service Bulletin PW1000G-1000-79-00-0002-00A-930A-D provides a listing of approved turbine oils for use in the PW1100G-JM series turbofan engine.		

CERTIFICATION BASIS	<p>14 CFR, Part 33, effective February 1, 1965, as amended by 33-1 through 33-32 with the following Equivalent level of safety findings:</p> <ul style="list-style-type: none"> • 33.76, Bird Ingestion, par. (c)(7)(i) ELOS No. TC3289EN-E-P-8 Rev 1 • 33.77, Foreign Object Ingestion-Ice, par. (c) ELOS No. TC3289EN-E-P-5 Rev 1 • 33.78, Rain and Hail Ingestion par. (a)(1) ELOS No. TC3289EN-E-P-6 Rev 1 <p>14 CFR, Part 34, effective September 10, 1990, as amended by 34-1 through 34-5. See NOTE 23 for detailed summary of the certification basis for fuel venting and exhaust emissions.</p>
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	TYPE CERTIFICATE NUMBER E00087EN			
	<u>MODEL</u>	<u>APPLICATION</u>	<u>ISSUED/AMENDED</u>	<u>DELETED</u>
	PW1133G-JM	December 15, 2011	December 19, 2014	
	PW1133GA-JM	June 12, 2015	October 23, 2015	
	PW1130G-JM	December 15, 2011	October 23, 2015	
	PW1127G-JM	December 15, 2011	October 23, 2015	
	PW1127GA-JM	June 12, 2015	October 23, 2015	
	PW1127G1-JM	December 15, 2011	October 23, 2015	
	PW1124G-JM	December 15, 2011	October 23, 2015	
	PW1124G1-JM	December 15, 2011	October 23, 2015	
	PW1122G-JM	December 15, 2011	October 23, 2015	
PRODUCTION BASIS (ALL MODELS)	Production Certificate No. 114			

NOTES

NOTE 1.**ENGINE RATINGS**

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

1. Sea level static, standard pressure (14.696 psia), up to the flat rating ambient temperature °F
2. No customer bleed or customer horsepower extraction
3. Ideal inlet, 100% ram recovery
4. Production aircraft flight cowling
5. Production instrumentation
6. Fuel lower heating value of 18,400 BTU/lb.

NOTE 2.**TEMPERATURES**

Maximum permissible Indicated Turbine Temperatures (ITT) are as follows:

Takeoff (5 minutes)*	1,083 degC / 1,982 degF
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Maximum Continuous	1,043 degC / 1,909 degF
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*The normal 5 minute takeoff rating may be extended to 10 minutes for engine out contingency.

Indicated Turbine Temperatures (ITT)

at start-up	1,083 degC / 1,982 degF
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Oil outlet temperature:

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

Minimum oil temperature at idle, before takeoff power operation: 51.7 degC / 125 degF

Fuel Temperatures: See Installation and Operating Manual, PWA-9851
(All Models)

Component Temperatures: See Installation and Operating Manual, PWA-9851
(All Models)

NOTE 3.**PRESSURES**

Fuel pressure limits: Fuel pressure at the engine fuel pump inlet 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.

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. ACCESSORY DRIVE PROVISIONS

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	1300	1800	4250	400
Integrated Drive Generator (IDG)	CCW	0.3932 : 1	1990*	4475*	9400	900
Air Turbine Starter	CCW	0.407 : 1	---	10692	9084	280

CCW = Counterclockwise (facing the drive pad)
 * 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 5.

MODEL 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
PW1124G1-JM	Alternate Climb Thrust Model, Airbus A320-272n
PW1127G1-JM	Hot and High Thrust Model, Airbus A319-173n
PW1124G-JM	Basic Model, Airbus A319-171n
PW1122G-JM	Reduced Thrust Model, Airbus A319-172n

NOTE 6.

The engine weight is defined as the dry weight of the basic engine with IAE, LLC supplied engine build-up component (EBU1). EBU1 components include: 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 7.

Not Applicable

NOTE 8.

Not Applicable

NOTE 9.

Engine mount system provisions are specified in Installation Drawing 5320001 and Mount and Maneuver Load Drawing, 5320003.

NOTE 10.

Not Applicable

NOTE 11.

SPECIAL INSTALLATION REQUIREMENTS:

- 1) Engine design and operating limitations are defined in the Installation and Operating Manual, PWA-9851.
- 2) The PW1100G-JM Engine Series is not eligible for Extended Twin Engine Operations, (ETOPS) Operation.
- 3) 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.
- 4) This engine is certified with Time Limited 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 term dispatch intervals are provided in the PW1100G-JM Airworthiness Limitations Manual.
- 5) Lightning protection requirements and electromagnetic interference emitted by the electronic engine control system, including cables, are specified in the Installation and Operating Manual, PWA-9851.
- 6) The UT Aerospace System- Aerostructures Thrust Reverser Unit as specified in the Installation and Operating Manual, PWA-9851, is acceptable for use on the engine. The thrust reverser is not part of the engine type design and is certified as part of the aircraft.

- NOTE 12.** Not Applicable
- NOTE 13.** SPECIAL OPERATING PROCEDURES:
Requirements and limitations for ground operation in icing conditions are specified in the Installation and Operating Manual, PWA-9851.
- NOTE 14.** Not Applicable
- NOTE 15.** APPLICABLE INSTALLATION, MAINTENANCE & OVERHAUL MANUALS
1) Installation and Operating Manual, PWA-9851
2) The following Engine Instructions for Continued Airworthiness (ICA's) have been accepted by the FAA Engine Certification Office. PW1100G-JM Engine Maintenance Manual PN 5316994, PW1100G-JM Engine Manual PN 5316992, PW1100G-JM Clean, Inspect and Repair Manual PN5315653.
- NOTE 16.** Not Applicable
- NOTE 17.** LIFE LIMITED PART INFORMATION
Life limits for critical components and mandatory inspection requirements are specified in the PW1100G-JM Airworthiness Limitation Manual PN 5316993 .
- NOTE 18.** Not Applicable
- NOTE 19.** ROTOR SPEEDS
Maximum permissible Low Pressure Rotor (N1): 10,047 rpm

Minimum Low Pressure Rotor (N1),
Ground Idle: 1,750 rpm
Flight Idle: 1,801 rpm
(See Note 11)

Maximum permissible High Pressure Rotor (N2): 22,300 rpm

Minimum High Pressure Rotor (N2),
Ground Idle: 12,400 rpm
Flight Idle: 12,400 rpm

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 20.** Not Applicable.
- NOTE 21.** Maximum Permissible Bleed Air Extraction

Customer ECS/WAI: 18.2% W25
Nacelle Anti-Ice: 1.2% W25
- NOTE 22.** Not Applicable.

NOTE 23.**EXHAUST EMISSIONS AND FUEL VENTING**

The following emissions standards promulgated in 14 CFR Part 34, Amendment 5, effective December 31, 2012, and 40 CFR Part 87, effective July 18, 2012, have been complied with for the PW1133G-JM.

Fuel Venting Emission Standards: 14 CFR 34.10(a) and 34.11 ; in addition, 40 CFR 87.10(a) and 87.11.

Smoke Number (SN) Emission Standards: 14 CFR 34.21 (e)(2); in addition, 40 CFR 87.23(c)(1).

Carbon Monoxide (CO) Emission Standards: 14 CFR 34.21(d)(1)(ii); in addition, 40 CFR 87.23(c)(1).

Hydrocarbons (HC) Emission Standards: 14 CFR 34.21(d)(1)(i); in addition, 40 CFR 87.23(c)(1).

Oxides of Nitrogen (NOx) Emission Standards: 14 CFR 34.23(b)(1); in addition, 40 CFR 87.23(c)(3).

In addition to the FAA's finding of compliance based on the certification requirements defined in this TCDS, the engine manufacturer has declared that the ICAO emissions standards identified in Annex 16, Volume II, Third 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 also been demonstrated.

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