



TYPE-CERTIFICATE DATA SHEET

No. IM.E.093

for

PW1100G-JM Series Engines

Type Certificate Holder

International Aero Engines (IAE), LLC

400 Main Street
East Hartford, CT 06118
United States of America

For Models:

PW1133G-JM
PW1133GA-JM
PW1130G-JM
PW1127G-JM
PW1127GA-JM
PW1127G1-JM
PW1124G-JM
PW1124G1-JM
PW1122G-JM
PW1431G-JM
PW1129G-JM
PW1431GA-JM
PW1431GH-JM
PW1428G-JM
PW1428GA-JM
PW1428GH-JM



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I. General

1. Type/ Model

Type: PW1100G-JM
Models: PW1133G-JM, PW1133GA-JM, PW1130G-JM, PW1127G-JM, PW1127GA-JM,
PW1127G1-JM, PW1124G-JM, PW1124G1-JM, PW1122G-JM, PW1431G-JM
PW1129G-JM, PW1431GA-JM, PW1431GH-JM, PW1428G-JM, PW1428GA-JM,
PW1428GH-JM

2. Type Certificate Holder

International Aero Engines, LLC
400 Main Street
East Hartford, CT 06118
United States of America

3. Manufacturer

International Aero Engines AG
400 Main Street
East Hartford, CT 06118
United States of America

4. Date of Application

PW1133G-JM, PW1130G-JM, PW1127G-JM, PW1127G1-JM, PW1124G-JM, PW1124G1-JM, PW1122G-JM:	17 January 2013
PW1133GA-JM and PW1127GA-JM:	21 September 2015
PW1431G-JM:	09 December 2016
PW1129G-JM, PW1431GA-JM, PW1431GH-JM, PW1428G-JM PW1428GA-JM, PW1428GH-JM:	26 June 2018

5. EASA Type Certification Date

PW1133G-JM, PW1130G-JM, PW1127G-JM, PW1127G1-JM PW1124G-JM, PW1124G1-JM, PW1122G-JM, PW1133GA-JM and PW1127GA-JM:	30 October 2015
PW1431G-JM:	10 August 2017
PW1129G-JM, PW1431GA-JM, PW1431GH-JM, PW1428G-JM PW1428GA-JM, PW1428GH-JM:	14 September 2018



II. Certification Basis

1. State of Design Authority Certification Basis

Refer to FAA ETCDS E00087EN Revision 6 and later approved issue

2. Reference Date for determining the applicable airworthiness requirements

15 December 2011

3. EASA Certification Basis

3.1. Airworthiness Standards

CS-E Amendment 3, dated 23 December 2010 (Decision No. 2010/015/R of the Executive Director of the European Aviation Safety Agency)

3.2. Special Conditions (SC)

None

3.3. Equivalent Safety Findings

CS-E 790(a)(1)	Ingestion of Rain and Hail – Large hailstone ingestion
CS-E 800(d)	Bird Strike and Ingestion – Medium and small birds ingestion tests

3.4. Deviations

None

3.5. Environmental Protection

All models:

CS-34 Amendment 3 as implemented by ED Decision 2019/014/R (29th July 2019); ICAO Annex 16 Volume II, Amendment 9 (1st January 2018) as implemented into EU legislation 11/09/2018; NO_x levels in compliance with Part III, Chapter 2, paragraph 2.3.2e) (CAEP/8) of the above mentioned Annex. Maximum nvPM mass concentration levels in compliance with Part III, Chapter 4, and paragraph 4.2.2 (CAEP/10) of the above mentioned Annex.



III. Technical Characteristics

1. Type Design Definition

PW1100G-JM: Installation Drawing 5320001
PW1400G-JM: Installation Drawing 5330001

2. Description

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

3. Equipment

See III. 1. Type Design Definition

4. Dimensions

Overall Length (flange to flange): 3.284 m (129.285 inches) +/- 0.001 m (0.051 inches)
Overall Length (fan spinner face to aft flange): 3.401 m (133.898 inches)
Nominal diameter (fan case): 2.224 m (87.566 inches)
Maximum radial projection (at drain mast): 1.274 m (50.150 inches)

5. Dry Weight

2857.6 kg (6300 lbs)

The PW1100G-JM dry weight is defined as the dry weight of the basic engine and include the IAE, LLC supplied engine build-up component (EBU1). EBU1 components include: Low Oil Pressure Switch, Core Nacelle Temperature Sensor, Gearbox 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.

The PW1400G-JM engine weight is defined as the dry weight of the basic engine with standard equipment only.

6. Ratings

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

- Sea level static, standard pressure 1.01 bar (14.696 psia), up to the flat rating ambient temperature.
- No customer bleed or customer horsepower extraction.
- Ideal inlet, 100% ram recovery.
- Production aircraft flight cowling.
- Production instrumentation.
- Fuel lower heating value 42798 kJ/kg (18400 BTU/lb).



<i>Model</i>	<i>Sea Level Static Thrust</i>	
	<i>Take-Off (5 min.)</i>	<i>Maximum Continuous</i>
PW1133G-JM	147.28 kN (33110 lbf)	145.81 kN (32780 lbf)
PW1133GA-JM	147.28 kN (33110 lbf)	145.81 kN (32780 lbf)
PW1130G-JM	147.28 kN (33110 lbf)	145.81 kN (32780 lbf)
PW1127G-JM	120.43 kN (27075 lbf)	117.18 kN (26345 lbf)
PW1127GA-JM	120.43 kN (27075 lbf)	117.18 kN (26345 lbf)
PW1127G1-JM	120.43 kN (27075 lbf)	117.18 kN (26345 lbf)
PW1124G-JM	107.82 kN (24240 lbf)	106.91 kN (24035 lbf)
PW1124G1-JM	107.82 kN (24240 lbf)	106.91 kN (24035 lbf)
PW1122G-JM	107.82 kN (24240 lbf)	106.91 kN (24035 lbf)
PW1431G-JM	140.39 kN (31572 lbf)	138.19 kN (31068 lbf)
PW1129G-JM	130.00 kN (29245 lbf)	117.19 kN (26345 lbf)
PW1431GA-JM	140.44 kN (31572 lbf)	138.20 kN (31068 lbf)
PW1431GH-JM	140.44 kN (31572 lbf)	138.20 kN (31068 lbf)
PW1428G-JM	132.38 kN (29761 lbf)	126.55 kN (28450 lbf)
PW1428GA-JM	132.38 kN (29761 lbf)	126.55 kN (28450 lbf)
PW1428GH-JM	132.38 kN (29761 lbf)	126.55 kN (28450 lbf)
<p>-Flat rating ambient temperature Takeoff: 30°C/86°F for models PW1133G-JM, PW1133GA-JM, PW1130G-JM, PW1431G-JM, PW1428G-JM, PW1428GA-JM, PW1428GH-JM, PW1431GA-JM, PW1431GH-JM 47°C/117°F for models PW1127G-JM, PW1127GA-JM and PW1127G1-JM 51°C/123°C for models PW1124G-JM, PW1124G1-JM and PW1122G-JM 44°C/111°F for PW1129G-JM</p> <p>-Flat rating ambient temperature Maximum Continuous: 25°C/77°F for all models</p>		

7. Control System

<i>Model</i>	<i>Data Storage Unit (Ratings Plug) P/N</i>
PW1133G-JM	5322188 or 5325241
PW1133GA-JM	5322195 or 5325243
PW1130G-JM	5322189 or 5325245
PW1127G-JM	5322191 or 5325246
PW1127GA-JM	5322196 or 5325242
PW1127G1-JM	5322190 or 5325249
PW1124G-JM	5322193 or 5325248
PW1124G1-JM	5322192 or 5325247
PW1122G-JM	5322194 or 5325244
PW1431G-JM	5324037
PW1129G-JM	5325964
PW1431GA-JM	5313531
PW1431GH-JM	5327152
PW1428G-JM	5313532
PW1428GA-JM	5327153
PW1428GH-JM	5327151



8. Fluids (Fuel, Oil, Coolant, Additives)

Fuel: Service Bulletin PW1000G-1000-73-00-0002-00A-930A-D defines the fuel requirements and provides a listing of approved fuels and fuel additives.

Oil: Service Bulletin PW1000G-1000-79-00-0002-00A-930A-D provides a listing of approved turbine oils.

9. Aircraft Accessory Drives

All models except for the PW1100G-JM:

Drive	Rotation	Speed Ratio to N2	Torque Nm (lb.-in.)			Overhung Moment Nm(lb.-in.)
			Continuous	Overload	Static	
Hydraulic Pump	CCW*	0.1768.1	146.9 (1300)	203.3 (1800)	480.1 (4250)	45.1 (400)
Integrated Drive Generator (IDG)	CCW*	0.3932:1	224.8** (1990)	505.6 (4475)	1062 (9400)	101.6 (900)
Air Turbine Starter	CCW*	0.407:1	-	1208 (10692)	1026.3 (9084)	280 (31.6)

*: 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.

PW1400G-JM:

Drive	Rotation	Speed Ratio to N2	Torque Nm (lb.-in.)			Overhung Moment Nm(lb.-in.)
			Continuous	Overload	Static	
Hydraulic Pump	CCW*	0.1763.1	146.9 (1300)	203.3 (1800)	480.1 (4250)	45.1 (400)
Variable Frequency Drive Generator (VFG)	CCW*	0.9611:1	112.9 (1000)**	146.9 (1300)	864.8 (7655)	144.0 (1275)
Air Turbine Starter	CCW*	0.407:1	-	1208 (10692)	1026.3 (9084)	280 (31.6)

*: 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.



10. Maximum Permissible Air Bleed Extraction

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

IV. Operating Limitations

1. Temperature Limits

Maximum permissible Indicated Turbine Temperatures (ITT), °C(°F):

<i>Take-Off (5 minutes)*</i>	<i>Maximum Continuous</i>	<i>At start-up</i>
1083 (1982)	1043 (1909)	1083 (1982)
*: The normal 5 minute takeoff rating may be extended to 10 minutes for engine out contingency.		

Fuel Temperatures:

Refer to Installation and Operating manual, paragraph V refers.

Oil Temperatures:

For 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 and to 141°C (285°F) at high power. See Installation and Operating Manual for details, paragraph V refers.

Minimum oil temperature at idle, before takeoff power operation: 51.7°C (125°F)

2. Speed Limits

<i>Low Pressure Rotor (N1) rpm</i>			<i>High Pressure Rotor (N2) rpm</i>		
<i>Maximum permissible</i>	<i>Minimum at Ground Idle</i>	<i>Minimum at Flight Idle</i>	<i>Maximum permissible</i>	<i>Minimum at Ground Idle</i>	<i>Minimum at Flight Idle</i>
10047	1750	1801	22300	12400	12400

Notes:

- Power setting, power checks, and control of engine thrust output in all operations are based on Low Rotor Speed (N1). The Fan Speed (NFAN) is directly proportional to N1 by a gear ratio of 1:3.0625.
- The minimum N1 certified for in-flight operation in icing conditions is 1801 rpm. The Electronic Engine Control will prevent rotor speeds below this value while in flight.

3. Torque Limits

N/A



4. Pressure Limits

4.1 Fuel Pressure

Fuel pressure at the engine fuel pump inlet during operation shall be maintained at not less than 34.47 kPa (5 psi) above the vapour true pressure of the fuel but not greater than 689.47 kPa (100 psi) above the absolute ambient pressure with a vapour/liquid ratio of zero. The maximum allowable pressure at the fuel pump inlet after shutdown is 834.2 kPa (121 psig).

4.2 Oil Pressure

Oil Inlet Pressure Limits:

Minimum: 434.3 kPa (63 psig) at idle. Variable by N2 Speed of idle. See Installation and Operating Manual for details, paragraph V refers.

Maximum: 1861.5 kPa (270 psig).

Oil 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.

5. Time Limited Dispatch (TLD)

The PW1100G-JM engine models are approved for TLD in accordance with CS-E 1030. 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 Operators Discretion. Details on the short and long term dispatch intervals are provided in the Airworthiness Limitations Manual PN 5316993.

The PW1400G-JM engine models are not approved for TLD.

6. ETOPS

When compliant with Pratt & Whitney Service Bulletin PW1000G-C-72-00-0056-00A-930A-D latest approved revision, all PW1100G-JM models are approved for ETOPS capability in accordance with CS-E 1040 Amendment 3 for a Maximum Approved Diversion Time of 180 minutes at MCT thrust plus 15 minutes at hold power. ETOPS does not require any special engine limitation, marking placard or configuration other than as instructed by Pratt & Whitney Service Bulletin PW1000G-C-72-00-0056-00A-930A-D latest approved revision. This approval does not constitute an approval to conduct ETOPS operations.

The PW1400G-JM engine models are not eligible for Extended Operations (ETOPS).



V. Operating and Service Instructions

Engine Maintenance Manual:	PN 5316994 for all PW1100G-JM models
Engine Manual:	PN 5316992 for all PW1100G-JM models
Airworthiness Limitations Manual:	PN 5316993 for all PW1100G-JM models
Clean, Inspect and Repair Manual:	PN 5315653 for all PW1100G-JM models
Installation and Operating Manual:	PWA-9851 for all PW1100G-JM models PWA-9914 for all PW1400G-JM models

The Instructions for Continued Airworthiness (ICA) for the PW1400G-JM models are not completed yet and any aircraft with that engine installed is not eligible for airworthiness certification.

VI. Notes

- Note 1:** For all PW1100G-JM models, engine mount system provisions are specified in Installation Drawing 5320001 and Mount and Maneuver Load Drawing, 5320003. For all PW1400G-JM models, engine mount system provisions are specified in Installation Drawing 5330001 and Mount and Maneuver Load Drawing, 5330003.
- Note 2:** Engine design and operating limitations are defined in the Installation and Operating Manual, paragraph V refers.
- Note 3:** Electromagnetic compatibility (EMC) protection requirements and electromagnetic interference (EMI) emitted by the electronic engine control system, including cables, are specified in the Installation and Operating Manual, paragraph V refers.
- Note 4:** Requirements and limitations for ground operation in icing conditions are specified in the Installation and Operating Manual, paragraph V refers.
- Note 5:** For all PW1100G-JM models, the EASA approved Airworthiness Limitations Section of the Instructions for Continued Airworthiness is published in the PW1100G-JM Airworthiness Limitation Manual PN 5316993, for all PW1400G-JM models in Report PWA-9913.
- Note 6:** For all PW1100G-JM models, the UT Aerospace System- Aerostructures Thrust Reverser Unit as specified in the Installation and Operating Manual, PWA-9851, is acceptable for use with the engine. The thrust reverser is not part of the engine type design and is certified as part of the aircraft.
For the PW1400G-JM engine models, the Shorts Brother's Thrust Reverser Unit as specified in the Installation and Operating Manual, PWA-9914, is acceptable for use with the engine. The thrust reverser is not part of the engine type design and is certified as part of the aircraft.



SECTION: ADMINISTRATIVE

I. Acronyms and Abbreviations

ETCDS	Engine Type Certificate Data Sheet
CAEP	Committee on Aviation Environmental Protection
CS-E	Certification Specifications Engines
ECS	Environmental Control System
ETOPS	Extended Range Operation with Two-Engine Aeroplanes
FAA	Federal Aviation Administration
FADEC	Full Authority Digital Engine Control
ICAO	International Civil Aviation Organisation
MCT	Maximum Continuous
PN	Part Number
W25	Core Engine Air Mass Flow
WAI	Wing Anti-Ice

II. Type Certificate Holder Record

Not applicable

III. Change Record

Issue	Date	Changes	TC issue
Issue 01	30 October 2015	Initial Issue	30 October 2015
Issue 02	20 November 2015	<ul style="list-style-type: none"> • Include approval statement for Time Limited Dispatch (TLD). • Revise minimum oil temperature limit. • Include reference to the Installation and Operating Manual with respect to the Thrust Reverser the engine is approved to operate with. • Revise FADEC hardware PN. 	As for Issue 1 above
Issue 03	13 June 2017	<ul style="list-style-type: none"> • Include approval statement for ETOPS. • Remove FADEC Hardware and Software PN and add data Storage Unit PN. 	As for Issue 1 above
Issue 04	10 August 2017	<ul style="list-style-type: none"> • Include the PW1431G-JM engine model. • Editorial changes. 	10 August 2017
Issue 05	14 September 2018	<ul style="list-style-type: none"> • Models PW1129G-JM, PW1431GA-JM, PW1431GH-JM, PW1428G-JM, PW1428GA-JM, PW1428GH-JM added 	14 September 2018
Issue 06	27 May 2019	<ul style="list-style-type: none"> • Reflect introduction of FAA ELOS No TC3289EN-E-P-9 	As for Issue 05
Issue 07	09 December 2019	<ul style="list-style-type: none"> • Update of the Environmental Protection requirements (nvPM) (Major Change Approval 10071945) 	

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