Civil Aviation Authority
United Kingdom

TYPE-CERTIFICATE DATA SHEET

UK.TC.E.00089

for

PW800 Series engines

Type Certificate Holder

Pratt & Whitney Canada Corp.

1000 Marie -Victorin

Longueuil, Quebec J4G1A1

Canada

Model(s):	PW814GA PW815GA PW812D
Issue:	03
Date of issue:	22 January 2024

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Section 1 General (All Models)

I. General

This Type-Certificate Data Sheet (TCDS) is the concise definition of the type-certificated product accepted and or approved by the CAA in the UK for the affected types and models.

This TCDS includes:

1. Details of the type design that affect the TCDS that have been approved or accepted by the CAA in the UK from 01 January 2021.

2. Details of the type design that affected the TCDS and were approved or accepted by EASA before 01 January 2021, and were incorporated into EASA TCDS IM.E.096 at Issue 03 dated 11 December 2019 and are therefore accepted by the UK under Article 15 of Annex 30 of the UK-EU Trade and Cooperation Agreement.

Section 2 PW800

I. General

1. Type / Variant or Model

Type: PW800

Models: PW814GA, PW815GA, PW812D.

These models are approved for use on multi-engine civil aircraft at the ratings and within the operating limitations specified below, subject to compliance with the aircraft powerplant installation requirements.

2. Type Certificate Holder

Pratt & Whitney Canada Corp.

1000 Marie-Victorin Longueuil,

Quebec J4G1A1 Canada.

3. Manufacturer

Pratt & Whitney Canada Corp.

1000 Marie-Victorin Longueuil,

Quebec J4G1A1 Canada.

4. Date of Application

Model	Application Date
PW814GA	08 March 2013
PW815GA	08 March 2013
PW812D	27 March 2023

5. CAA Type Certification date

Model	Certification Date
PW814GA	31 August 2017
PW815GA	31 August 2017
PW812D	15 September 2023

II. Certification Basis

1. Reference Date for determining the applicable airworthiness requirements.

Model	Application date at TCCA (Certificating Authority)
PW814GA	31 March 2012
PW815GA	31 March 2012
PW812D	30 November 2018

2. State of Design Airworthiness Authority Type Certification Data Sheet Number

Canadian TC E-39

3. State of Design Airworthiness Authority Certification Basis

Model	State of Design Authority Certification basis (see Canadian TC E-39)
PW814GA	AWM Chapter 533 at Change 533-13; and Subchapter B of AWM Chapter 516 – Aircraft Engine Emissions, which refers to ICAO Annex 16, Volume II
PW815GA	
PW812D	AWM Chapter 533 at Change 533-16; and Subchapter B of AWM Chapter 516 – Aircraft Engine Emissions at Change 516-15; including ICAO annex 16 Volume II – Aircraft Engine Emissions, as amended up to and including Amendment 10 (CAEP/11).

4. UK CAA Certification Basis

4.1 Airworthiness Standards

Model	UK CAA Airworthiness Standards
PW814GA	CS-E Amendment 3, dated 23 December 2010 (Decision No. 2010/015/R of the Executive Director of the European Aviation Safety Agency)
PW815GA	
PW812D	CS-E Amendment 4, dated 12 March 2015.

4.2 Special Conditions (SC)

Model	UK CAA Airworthiness Standards
PW814GA	None
PW815GA	
PW812D	

4.3 Equivalent Safety Findings (ESF)

Model	UK CAA Airworthiness Standards
PW814GA	CS-E 810 ESF – Compressor and Turbine Blade Failure / Fan Integrally-Bladed Rotor (IBR) Airfoil release
PW815GA	
PW812D	

4.4 Deviations

Model	UK CAA Airworthiness Standards
PW814GA	None
PW815GA	
PW812D	

4.5 Environmental Protection

Model	UK CAA Airworthiness Standards
PW814GA	CS-34 Amendment 4 as adopted by CAA ORS9 Decision No.36 (applicable from 20 December 2023), meeting the requirement of ICAO Annex 16 Volume II, Amendment 10 applicable 1 January 2021. NOx standard in accordance with ICAO Annex 16 Volume II, Part III, Chapter 2, § 2.3.2 e) (CAEP/8). Maximum nvPM mass concentration levels in compliance with Part III, Chapter 4, paragraph 4.2.2.1. nvPM mass and number emissions in compliance with Part III, Chapter 4, paragraph 4.2.2.2 a) 1) and 4.2.2.2 b) 1) (CAEP/11 In-Production standard).
PW815GA	
PW812D	

III. Technical Characteristics

1. Type Design Definition

The build standards are defined in the following Drawing Introduction Sheet (DIS) or later approved issues:

Model	UK CAA Airworthiness Standards
PW814GA	Configuration of the PW814GA and PW815GA engine is defined by Engine Assembly Drawing 33B1170*
PW815GA	
PW812D	Configuration of the PW812D engine is defined by Engine Assembly Drawing 33B9100*
* and subsequent approved revisions	

2. Description

PW814GA and PW8145GA

The PW814GA and PW815GA engine models are high bypass ratio two spool turbofan engines, straddle mounted across two bearings and consisting of an eight-stage axial High-Pressure Compressor (HPC), a straight flow annular low emission combustor and a two-stage High Pressure Turbine (HPT). The low-pressure rotor consists of a fan, two boost stages and an axial five-stage Low Pressure Turbine (LPT) connected by a one-piece shaft. The engine is controlled by an engine mounted dual channel engine control (FADEC). The only difference between the PW814GA and the PW815GA is thrust de-rate by means of software selection.

PW812D

The PW812D engine model is a scaled down version of the PW814GA and PW815 GA engine. It's a high bypass ratio two spool turbofan engines, straddle mounted across two bearings and consisting of an eight-stage axial High-Pressure Compressor (HPC), a straight flow annular low emission combustor and a two-stage High Pressure Turbine (HPT). The low-pressure rotor consists of a fan, two boost stages and an axial four-stage Low Pressure Turbine (LPT) connected by a one-piece shaft. The engine is controlled by an engine mounted dual channel engine control (FADEC).

3. Equipment

See III. 1. Type Design Definition. See also Note 1.

4. Dimensions

	Dimensions (m)			
Models	**Overall Length** (flange to flange)	**Overall Length** (fan spinner face to aft tail cone)	**Nominal Diameter** (fan case)	**Maximum Radial Projection.** (at drain mast)
PW814GA	2.685	3.313	1.255	0.990
PW815GA				
PW812D	2.608	2.874	1.109	0.930

5. Dry Weight

Model	**Dry Weight kg (lbs)**
PW814GA	1408* kg (3105 lbs)
PW815GA	
PW812D	1237* (2727 lbs)

(*) This is the weight at the time of certification, subject to change +/- 2% Max.

The above dry weight value applies to the basic engine and includes standard equipment.

6. Ratings

	Sea Level Static Thrust			
	Take-Off (5 minutes)		**Maximum Continuous**	
Models	**Thrust** -see Note 3 – daN (lbf)	**Ambient Limit Temperature** °C (°*F*)	**Thrust** daN (lbf)	**Ambient Limit Temperature** °C (°*F*)
PW814GA	6863 (15,429)	33 (91.4)	6296 (14,155)	28 (82.4)
PW815GA	7122 (16,011)	33 (91.4)	6925 (15,568)	28 (82.4)
PW812D	6161 (13,850)	35 (95)	5778 (12,989)	25 (77)

Refer to Notes 2 and 3.

7. Control System

The engine is equipped with a Full Authority Digital Engine Control (FADEC) system.

Model	**FADEC Hardware P/N**
PW814GA	33B3787*
PW815GA	
PW812D	33B7751*

(*) or later approved standard

8. Fluids (Fuel, Oil Coolant, Additives)

List of approved Fuel and Additives : Refer to the Engine Maintenance Manual.

Lis of approved Oil: Refer to the Engine Maintenance Manual.

9. Aircraft Accessory Drives

Refer to the Installation and Operating Manual Section 11 for additional information on provisions and connections for airframe provided components.

10. Maximum Permissible Air Bleed Extraction

Customer ECS/WAI + Nacelle Anti Ice: 24% and 23.5% of core flow P2.8/P3.1 combined for PW814GA/PW815GA and PW812D, respectively.

For detailed information see Installation and Operating Manual, Section 11.2.

IV. Operating Limitations

1. Temperature Limits

	Maximum Permissible Indicated Turbine Temperature (ITT)		
Models	**Take-off (5 minutes)** - see Note 3 - °C (°F)	**Maximum Continuous** °C (°F)	**Maximum Starting** °C (°F)
PW814GA	965 (1769)	956 (1753)	975 (1787)
PW815GA			
PW812D	985 (1805)	920 (1688)	

1.1. Fuel Temperature

Refer to the Installation and Operating Manual Section 6 for fuel temperature limits.

Note: For PW814GA and PW815GA Minimum fuel temperature (less than 0 °C ambient temperature) for ground operation is 8°C (46 °F).

1.2. Oil Temperature

Refer to the Installation and Operating Manual Section 2 for oil temperature limits.

2. Pressure Limits

2.1. Fuel Pressure

Refer to the Installation and Operating Manual Section 6 for fuel temperature limits.

For PW814GA and PW815GA:

- Fuel pressure at the engine fuel pump inlet during operation shall be maintained at not less than 34.5 kPa (5.0 psi) above the true vapor pressure of the fuel or ambient pressure plus 6.9kPa (1 psi), whichever limit is reached first with a vapor/liquid ratio of zero, but not greater than 972.1 kPa (141 psi) above the ambient pressure.
- The maximum inlet pressure shall not exceed 379.2 kPa (55 psig) for normal operation, the maximum allowable pressure at the fuel pump inlet after shutdown is 1275.5 kPa (185 psig).

2.2. Oil Pressure

Refer to the Installation and Operating Manual Section 2 for oil temperature limits.

Oil pressure is measured relative to #4 bearing compartment pressure. Temporary interruption associated with negative “g” operation is limited to 7 seconds maximum. Normal oil pressure will be restored rapidly once the negative “g” effect has been eliminated.

For PW814GA and PW815GA:

- Minimum oil pressure at idle is 241.3 kPa (35 psig), variable by N2 speed off idle.
- Maximum oil pressure for continuous operation is 1275.5 kPa (185 psig). Oil pressure between 1275.5 kPa (185 psig) and 1896.1 kPa (275 psig) is limited to 300 seconds.

3. Rotational Speed Limits (rpm)

	Maximum Permissible Speeds			
	Low Pressure Spool (N1)		**High Pressure Spool (N2)**	
Models	**Take-off (5 minutes)** - see Note 3 - rpm	**Maximum Continuous** rpm	**Take-off (5 minutes)** - see Note 3 - rpm	**Maximum Continuous** rpm
PW814GA	6315		24043	
PW815GA				
PW812D	7572		24919	

Note:

Power setting, power checks, and control of engine thrust output in all operations are based on Low Rotor Speed (N1).

For PW814GA and PW815GA: The minimum N1 certified for in-flight operation in icing conditions is 2018 rpm. The Electronic Engine Control will prevent rotor speeds below this value while in flight.

4. Torque Limits

Not appliable.

5. Time Limited Dispatch

The PW814GA engines and PW815GA engines, equipped with EEC Part number 33B3787-08 and subsequent part numbers, are approved for Time Limited Dispatch (TLD) capability in accordance with CS-1030. The dispatch status is referred in the Airworthiness Limitations Manual (ALM) 33B1391 Engine Systems Faults Time Limited Dispatch.

The PW812D engines, equipped with EEC Part number 33B7751-04 and subsequent part numbers, are approved for Time Limited Dispatch (TLD) capability in accordance with CS-E 1030. The dispatch status is referred in the Airworthiness Limitations Manual (ALM) 33B7516 Engine Systems Faults Time Limited Dispatch.

6. ETOPS

The PW800 series engines are not approved for Extended Twin Engine Operations (ETOPS) capability in accordance with CS-E 1040.

V. Operating and Service Instructions

Manuals	**PW814GA/PW815GA**	**PW812D**
Engine Installation and Operating manual	P/N 33B1410*	P/N 33B9460*
Control System Interface Control Document (CSICD)	P/N 33B1286*	P/N 33B7438*

(*) And subsequently approved amendments or issues.

Instructions for Continued Airworthiness (ICA)	**PW814GA/PW815GA**	**PW812D**
Airworthiness Limitations Manual (AWL)**	P/N 33B1391	P/N 33B7516
Engine Maintenance Manual	P/N 33B1390	P/N 33B7515
Engine Shop Manual	P/N 33B1393	P/N 33B7518
Clean, Inspect and Repair Manual	P/N 33B1401	P/N 33B1401
Component Maintenance Manuals	As published by P&W Canada Corp.	
Service Bulletins	As published by P&W Canada Corp.	

(**) The CAA accepted/approved Airworthiness Limitations Section of the Instructions for Continued Airworthiness is the Airworthiness Limitation Manual.

VI. Notes

1. The following are standard equipment as itemized in the engine type design definition:
   - Full authority digital engine control system comprising electronic engine control with dedicated power source from a permanent magnetic alternator/generator; integrated fuel pump and associated fuel flow metering, filtering with bypass indication, and flow transmission; bleed valve and variable compressor vane actuation; engine harnesses; and speed, temperature and pressure sensors.
   - Dual igniters and dual channel ignition exciter using airframe supplied power.
   - Oil and fuel temperature management comprising fuel-oil heat exchanger, air-oil cooler. PW814GA/PW815GA engines also include an integrated drive generator air-oil cooler.
   - Lubrication system comprising oil supply and scavenge pump, variable oil pressure valve; temperature, pressure and level sensors; oil filtering with bypass indication; and chip detection.
   - Air Turbine and Starter
   - Vibration sensors

   Refer to the Installation and Operating Manual Section 11 for accessory power extraction provisions and additional information on provisions and connections for airframe provided components.

2. The engine ratings declared in the TCDS and Installation Manual are based on:
   - ICAO standard atmospheric conditions
   - Sea level static conditions, ISA ambient temperature
   - No customer bleed power extraction.
   - Ideal inlet (100% recovery)
   - Exhaust nozzle with no leakage and with velocity coefficient equal to 1.0.

3. The take-off ratings that are nominally limited to 5 minutes duration may be used for up to 10 minutes for one engine inoperative operations without adverse effects upon engine airworthiness. Such operations are anticipated on an infrequent basis (as engine failure events during take-off are uncommon) and no limits or special inspections have been imposed.

4. Oil Capacity:

PW814GA/PW815GA			
	Litres	Imp. Gallons	U.S.Gallons
Total	9.5	2.09	2.51
Useable	3.6	0.79	0.95

PW812D			
	Litres	Imp. Gallons	U.S.Gallons
Total	10.6	2.33	2.80
Useable	4.6	1.01	1.22

5. Refer to Installation and Operating Manual Section 7 for High Intensity Radiated Fields (HIRF) and Lightning qualification and conformance. Refer to Electrical drawing referred to in the Installation and Operating Manual and Control System Interface Control Document (CSICD) for functional and electrical descriptions.

6. Engine mount system provisions are specified in Installation Drawing (PW812GA/PW815GA: P/N 33B1172 and PW812D: P/N 33B7509) and Installation and Operating Manual Section 5.

7. Requirements and limitations for ground operation in icing conditions are specified in the Installation and Operating Manual.

8. The engine bill of material does not include a thrust reverser. Considerations for installation of a thrust reverser are contained in the Installation and Operating Manual.

9. The EEC software has been developed and verified in accordance with RTCA/DO-178C respectively ED- 12B, Level A, with system Development assurance carried out in accordance with ED79A/ARP4754A.

   For PW812D, compliance with ED-202A/DO-326A and ED-204/DO-355 was demonstrated (airworthiness information security).

Section 3 Administration

I. Acronyms and Abbreviations

Acronym / Abbreviation	Definition
ARINC	Aeronautical Radio, Incorporated
CNA	Common Nozzle Assembly
DIS	Drawing Introduction Sheet
EASA	European Union Aviation Safety Agency
EBU	Engine Build Unit
EEC	Engine Electronic Controller
EMI	Electro Magnetic Interference
FADEC	Full Authority Digital Engine Control
HP	High Pressure
ICAO	International Civil Aviation Organisation
IP	Intermediate Pressure
LP	Low Pressure
rpm	Revolutions per Minute
SC	Special Conditions
TCDS	Type Certificate Data Sheet
CAA	Civil Aviation Authority
AEO	All Engine Operative
CS-E	Certification Specifications for Engines
CW	Clockwise
W25	Core Engine Air Mass Flow
WAI	Wing Anti-Ice
psi	Pound per square inch
psia	Pound per square inch gauge
psig	Pounds per Square inch gauge
WAI	Wing Anti-Ice
TCCA	Transport Canada Civil Aviation

II. Type Certificate Holder Record

Not applicable

III. Amendment Record

TCDS Issue No.	TCDS Issue Date	Changes	Type Certificate Issue and Date
01	15 Sep 2023	- Section 1 is added to provide explanatory notes about the details of the type design that affect the TCDS, that have been approved or accepted by the CAA in the UK from 01 January 2021 and that the design changes accepted by EASA before 01 January 2021 were incorporated into EASA TCDS IM.E.096 at Issue 03 dated 11 December 2019 and are therefore accepted by the UK under Article 15 of Annex 30 of the UK-EU Trade and Cooperation Agreement - Adding PW812D model to TC- UK.MAJ.00305 Rev 0.	Issue 01 15 Sep 2023
02	26 Sep 2023	- Administrative update to the Type Certificate	Issue 02 26 Sep 2023
03	22 Jan 2024	- Introduction of CAEP/11 for nvPM compliance. - Introduction of EEC software 6.3.0.3 - Some typographical corrections. (UK CAA Major Change approval UK.MAJ.000347)	Issue 02 26 Sep 2023

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