European Aviation Safety Agency

EASA

TYPE-CERTIFICATE DATA SHEET

Number : IM.E.094
Issue : 02
Date : 17 January 2014
Type : Pratt & Whitney Canada
PT6A-100 series engines

Models
PT6A-35
PT6A-110
PT6A-112
PT6A-114
PT6A-114A
PT6A-121
PT6A-135
PT6A-135A
PT6A-140

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I. General

1. Type/Models: PT6A-35, PT6A-110, PT6A-112, PT6A-114, PT6A-114A, PT6A-121, PT6A-135, PT6A-135A, PT6A-140

2. Type Certificate Holder: Pratt and Whitney Canada Corp.
1000 Marie Victorin
Longueuil, Québec, J4G 1A1
Canada

3. Manufacturer: Pratt and Whitney Canada

4. EASA Certification Application Date: 24 January 2013 for PT6A-140

5. Certification Reference Date: 1 March 1974 (except PT6A-140)
30 December 2006 (PT6A-140)

6. EASA Certification Date:

PT6A-35	PT6A-110	PT6A-112	PT6A-114	PT6A-114A
13 Aug. 2002	17 Jan. 1980	21 Nov. 1979	22 Aug. 1986	08 May 1992

PT6A-121	PT6A-135	PT6A-135A	PT6A-140	
23 Dec. 2002	13 Nov. 1980	06 Sept. 1984	15. Jan. 2014	

EASA Type-Certification for the above mentioned engine models, except PT6A-140, is granted, in accordance with Article 3 of Commission Regulation (EC) No. 748/2012, based on the respective CAA UK, DGAC France (TC/TCDS M-IM 65), LBA Germany (TC/TCDS 7020) and ENAC Italy validation letters issued following NAA approvals prior to 28 September 2003.

II. Certification Basis

1. Transport Canada Certification Basis details: see Transport Canada TCDS E-15.

2. EASA Certification Basis:

2.1 Airworthiness Standards:

- FAR Part 33 effective 1 February 1965, and amendments 33-1 to 33-5 (except PT6A-140)

- CS-E Amendment 1 dated 03 December 2007 (PT6A-140)

2.2 Special Conditions:

None

2.3 Equivalent Safety Findings:

None

2.4 Deviations:

None

2.5 Environmental Protection Requirements:

CS-34.1, Fuel Venting

III.Technical Characteristics

1. Type Design Definition:

As defined by the applicable PT6A-35, PT6A-110, PT6A-112, PT6A-114, PT6A-114A, PT6A-121, PT6A-135, and PT6A-135A Engine Parts Lists.
For PT6A-140: Engine Assembly Drawing No. 3076226 Change A and subsequent revisions.

2. Description:

The PT6A-100 series turboprop engines are comprised of a 2 stage reduction gearbox, single stage power turbine, single stage gas generator turbine and 4 stage gas generator compressor (3 axial, 1 centrifugal) and a single annular combustion chamber. The fuel control is purely hydro-mechanical. The accessory gearbox design is common for all PT6A-100 series engines.

3. Equipment:

Approved equipment is defined in the applicable PT6A-35, PT6A-110, PT6A-112, PT6A-114, PT6A-114A, PT6A-121, PT6A-135, and PT6A-135A Engine Parts Lists and in Engine Assembly Drawing No. 3076226 Change A and subsequent revisions for the PT6A-140.

4. Dimensions and Weight:

	Overall Length (mm)	Overall Diameter (mm)	Dry Spec. Weight (kg)
PT6A-35	1572	596	152
PT6A-110	1572	584	156
PT6A-112	1572	584	156
PT6A-114	1572	596	163
PT6A-114A	1341	596	163
PT6A-121	1572	584	156
PT6A-135	1572	584	157
PT6A-135A	1572	584	157
PT6A-140	1629	727	189

5. Ratings:

PT6A-35	Shaft Power (kW)	Output Speed (rpm)	Gas Generator Speed (rpm)
Maximum Continuous	559	2190	38100
Take-off (5 minutes)	559	2190	38100
Maximum Reverse	537	2100	38100

PT6A-110	Shaft Power (kW)	Output Speed (rpm)	Gas Generator Speed (rpm)
Maximum Continuous	354	1900	38100
Take-off (5 minutes)	354	1900	38100
Maximum Reverse	340	1825	-

PT6A-112	Shaft Power (kW)	Output Speed (rpm)	Gas Generator Speed (rpm)
Maximum Continuous	373	1900	38100

Take-off (5 minutes)	373	1900	38100
Maximum Reverse	354	1825	-

PT6A-114	Shaft Power (kW)	Output Speed (rpm)	Gas Generator Speed (rpm)
Maximum Continuous	447	1900	38100
Take-off (5 minutes)	447	1900	38100
Maximum Reverse	447	1825	38100

PT6A-114A	Shaft Power (kW)	Output Speed (rpm)	Gas Generator Speed (rpm)
Maximum Continuous	503	1900	38100
Take-off (5 minutes)	503	1900	38100
Maximum Reverse	503	1825	38100

PT6A-121	Shaft Power (kW)	Output Speed (rpm)	Gas Generator Speed (rpm)
Maximum Continuous	459	1900	38100
Take-off (5 minutes)	459	1900	38100
Maximum Reverse	441	1825	38100

PT6A-135, PT6A-135A	Shaft Power (kW)	Output Speed (rpm)	Gas Generator Speed (rpm)
Maximum Continuous	559	1900	38100
Take-off (5 minutes)	559	1900	38100
Maximum Reverse	537	1825	38100

PT6A-140	Shaft Power (kW)	Output Speed (rpm)	Gas Generator Speed (rpm)
Maximum Continuous	647	1900	38850
Take-off (5 minutes)	647	1900	38850
Maximum Reverse	680	1825	38850

6. Control System:

The PT6A-100 series engines are controlled by purely hydromechanical fuel control system. Refer to model specific Installation Manuals for unit part numbers.

7. Fluids

7.1 Fuel:

The approved fuels and additives must conform to the latest revision of the following P&WC Service Bulletins: SB 1244 (PT6A-35, PT6A-114, PT6A-114A, PT6A-135, PT6A-135A, PT6A-140)
SB 12044 (PT6A-110, PT6A-112, PT6A-121)

7.2 Oil:

The approved oils must conform to the latest revision of the following PWC Service Bulletins:
SB 1001 (PT6A-35, PT6A-114, PT6A-114A, PT6A-135, PT6A-135A, PT6A-140)
SB 12001 (PT6A-110, PT6A-112, PT6A-121)

8. Aircraft Accessory Drives:

For accessory drives specifications, including direction of rotation, drive speed ratio to engine speed, torque continuous pad rating and maximum overhung moment, refer to model specific Installation Manual.

9. Maximum Permissible Air Bleed Extraction: For all engine models, the bleed extraction is as follows:

Maximum External (%):	5.25
Maximum during Start (kg/min):	0.68

IV.Operational Limits:

1. Temperature Limits:

1.1 Maximum Interstage Turbine Temperature (ITT), ^{o}C :

Rating	Maximum Continuous (^{o}C)	Take-off (5 minutes) (^{o}C)	Starting (Ground and Air) (^{o}C)
PT6A-35	805	805	1090
PT6A-110	685	685	1090
PT6A-112	725	725	1090
PT6A-114	805	805	1090
PT6A-114A	805	805	1090
PT6A-121	725	725	1090
PT6A-135	805	805	1090
PT6A-135A	805	805	1090
PT6A-140	825	850	1090

1.2 Maximum Air Inlet Temperature, ^{o}C :

Rating	Maximum Continuous (^{o}C)	Take-off (5 minutes) (^{o}C)
PT6A-35	33.9	33.9
PT6A-110	38	38
PT6A-112	56	56
PT6A-114	57.8	57.8
PT6A-114A	46.1	46.1
PT6A-121	40	40
PT6A-135	29.5	29.5
PT6A-135A	33.9	33.9
PT6A-140	27	39

1.2 Oil Temperature, ^{o}C :

Minimum: -40
Maximum Continuous Operation: 99
Maximum (10 minutes): 104

1.3 Fuel Temperature

Refer to Installation Manual.

2. Maximum Permissible Rotor Speeds:

Engine Model	Gas Generator (N1) (rpm)	Gas Generator (N1) Transient (rpm)	Power Turbine Module Output (N2) (rpm)	Power Turbine Module Output (N2) Transient 20 sec (rpm)
PT6A-35	38100 (101.7%)	38500 (102.8%) for 2 sec	2190 (99.6%)	2410 (110%)
PT6A-110, PT6A-112, PT6A-114, PT6A-114A, PT6A-121, PT6A-135, PT6A-135A	38100 (101.7%)	38500 (102.8%) for 2 sec	1900 (100 %)	2090 (110%)
PT6A-140	38850 (103.7%)	40000 (106.8) for 20 sec	1900 (100 %)	2090 (110%)

100% gas generator speed is defined as 37,468 rpm. Propeller speed of 100% of 1900 rpm corresponds to power turbine speed of 31914 rpm. For the PT6A-35 the 100% propeller speed of 2200 rpm corresponds to power turbine speed of 33159 rpm. For the PT6A-140 propeller speed of 100% of 1900 RPM corresponds to power turbine speed of 32661 RPM.

3. Pressure Limits:

3.1 Fuel Pressure Limit at Engine Pump Inlet:

Refer to Installation Manual.

3.2 Oil Pressure Limits:

PT6A-35, PT6A-114, PT6A-114A, PT6A-135, PT6A-135A, PT6A-140:

Pressure range (gauge): 586-724 kPa (85-105 psi)
Gas Generator speed 27000 rpm or above and oil temperature 60-70 ^{o}C

Minimum Pressure (gauge) : 276 kPa (40 psi)
Gas Generator speed below 27000 rpm

PT6A-110, PT6A-112, PT6A-121:

Pressure range (gauge): 552-690 kPa (80-100 psi)
Gas Generator speed 27000 rpm or above and oil temperature 60-70 ^{o}C

Minimum Pressure (gauge) : 276 kPa (40 psi)
Gas Generator speed below 27000 rpm

4. Installation Assumptions:

The installation assumptions are quoted in the respective model engine Installation Manuals.

5. Time Limited Dispatch:

Not applicable to PT6A-100 series engines as all models have hydro-mechanical fuel control.

V. Operating and Service Instructions

Engine Model	Engine Operating Instructions	Engine Installation Manual	Engine Maintenance Manual	Engine Overhaul Manual	Service Bulletins
PT6A-35	3056646	PT6A-35	3058362	3021243	as issued for each engine model
PT6A-110	3032441	PT6A-100 Series	3030442	3030443	
PT6A-112	3032241	PT6A-100 Series	3030442	3030443	
PT6A-114	3034541	PT6A-100 Series	3043512	3021243	
PT6A-114A	3037338	PT6A-100 Series	3043512	3021243	
PT6A-121	3033641	PT6A-100 Series	3030442	3030443	
PT6A-135	3030341	PT6A-100 Series	3043512	3021243	
PT6A-135A	3033541	PT6A-100 Series	3043512	3021243	
PT6A-140	3075740	3075740	3075742	3075743	

VI. Notes

Note 1: Dry weight includes basic engine accessories and optional equipment as listed in the manufacturer's engine specification.

Note 2: The engine ratings are based on dry sea level static ICAO Standard Atmospheric conditions. Compressor intake screen installed. No external accessory loads and no air bleed. The quoted ratings are obtainable on a test stand with the specified fuel and oil, without intake duct and using exhaust stubs with a total final effective area 447.5 cm².

Note 3: The air inlet temperatures quoted are the highest at which maximum continuous and take-off ratings can be achieved.

Note 4: These engines meet FAA (FAR 33.68) and CS (CS-E 780) requirements for operation in icing conditions when the intake system conforms with the appropriate Installation Manual Instructions for inertial separation of snow and icing particles. The engines also meet FAA (FAR 33.27) and CS (CS-E 840) requirements for adequate disc integrity and rotor blade containment.

Note 5: The PT6A-140 engine, when separated at "C" flange, may be overhauled or maintained as two modules; the Gas Generator Module and the Power Section Module as follows:

Engine Model	G.G. Module Part Number	P.S. Module Part Number
PT6A-140	3076223	3076225

Note 6: The EASA approved Airworthiness Limitations Section of the Instructions for Continued Airworthiness is published in the PT6A-140 maintenance manual P/N 3075742, chapter “Airworthiness Limitations Section”.
For the other models, the EASA approved airworthiness limitations are published in P&WC Engine Service Bulletin Nos. 1002 (PT6A-35, PT6A-114, PT6A-114A, PT6A-135, PT6A-135A) and 12002 (PT6A-110, PT6A-112, PT6A-121) as revised.

Note 7: The recommended Operating Time Between Overhaul (TBO) and Hot Section Inspection (HSI) frequency is defined in the following Service Bulletins:
SB 1703 for the PT6A-114, -114A
SB 1803 for the PT6A-135, -135A
SB 12003 for the PT6A-110, -112, -121
SB 1403 for the PT6A-35
SB 1903 for the PT6A-140
