

**MINISTÉRIO DA AERONÁUTICA
DEPARTAMENTO DE PESQUISAS E DESENVOLVIMENTO
CENTRO TÉCNICO AEROESPACIAL**

TYPE CERTIFICATE DATA SHEET Nº EM-9807

Type Certificate Holder:

PRATT & WHITNEY DIVISION
400, Main Street
East Hartford, Connecticut CT 06108
USA

EM-9807
Sheet 01
PRATT & WHITNEY
PW4164
PW4168
PW4168A
October 98

Engines of models described herein conforming with this data sheet, which is part of Type Certificate No. 9807, 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.

MODEL	PW4164, PW4168, PW4168A			
TYPE	Axial airflow, dual-spool, turbofan, single-stage fan, 5-stage low-pressure compressor, 11-stage high pressure compressor, annular combustor, 2-stage high-pressure turbine, 5-stage low-pressure turbine.			
RATINGS	See Note 5	PW4164	PW4168	PW4168A
	Static thrust at sea level, lb			
	Takeoff, dry 5 minutes (See Note 19)	64 500	68 600	68 600
	Maximum continuous	55 800	59 357	59 357

	PW4164	PW4168	PW4168A
COMPONENTS			
Fuel Metering Unit - Hamilton Std., model num.:	JFC-131	JFC-131	JFC-131
Fuel Pump and Filter - Argo Tech., model :	170	170	170
Ignition			
Exciter - Unison Industries, model num.:	TFN-29	TFN-29	TFN-29
Ignitors - PW:	P/N IC709520	P/N IC709520	P/N IC709520
Fuel distribution valve - Hamilton Std., model num. :	GTA40	GTA40	GTA40
Station 2.5 bleed actuator - Hamilton Std, model num :	GTA42	GTA42	GTA42
Stator vane actuator - Hamilton Std., moel nim.:	GTA41	GTA41	GTA41
PT2/TT2 probe - Rosemount, model num. :	154 GT	154 GT	154 GT
ENGINE CONTROL SYSTEM			
EEC - Hamilton Std., model number :	170	170	170
EEC alternator			
Stator - Unison :	P/N 430073	P/N 430073	P/N 430073
Rotor - Unison	P/N 430074	P/N 430074	P/N 430074
FUEL TYPE	See Note 9	See Note 9	See Note 9
OIL, LUBRICATION	See Note 10	See Note 10	See Note 10
TEMPERATURE LIMITS	See Note 2	See Note 2	See Note 2
PRESSURE LIMITS	See Note 3	See Note 3	See Note 3
PRINCIPAL DIMENSIONS			
Length, in.	167.22	167.22	167.22
Nominal diameter, in.	123.246	123.246	123.246
Maximun radial projection, in.	61.623	61.623	61.623
WEIGHT (DRY)			
Weight of basic engines includes all essential accessories, but excludes exhaust nozzle and power source for the ignition system.	12 900 lbs	12 900 lbs	12 900 lbs

		PW4164	PW4168	PW4168A	
CENTER OF GRAVITY	Axial: Forward of "K" flange – in.	114.5 ± 1.0	114.5 ± 1.0	114.5 ± 1.0	
	Vertical: Below engine centerline – in.	0.0± 0.5	0.0± 0.5	0.0± 0.5	
	Lateral: Relative to centerline – in.	0.0 ± 0.5	0.0 ± 0.5	0.0 ± 0.5	
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 are in conformity with the CTA approved type design. The CTA type design corresponds to the FAA approved type design, as stated in CTA Report V33-0620-00 dated 21 October, 1998 or further revisions				
CERTIFICATION BASIS	RBHA 33 which endorses FAR 33 effective February 1, 1965, as amended by 33-1 through 33-14		Application	Issued TC	
			PW4164	25 Feb.1998	21 Oct. 1998
			PW4168	25 Feb.1998	21 Oct. 1998
			PW4168A	25 Feb.1998	21 Oct. 1998
PRODUCTION BASIS	All models: Production Certificate Number 2 (FAA)				

NOTES**NOTE 1** For all models:

Maximum Permissible Operating Speeds for Engine Rotors

Low pressure rotor (N1), rpm 3 600

High pressure rotor (N2), rpm 10 450

Minimum Permissible Operating Speeds for Engine Rotors

Low pressure rotor (N1), rpm 736 (in-flight)

High pressure rotor (N2), rpm 5 860 (in-flight and on ground operation)

NOTE 2 Maximum Permissible Temperatures

For in-flight starts which result in exceedance of the ground start limit, the maximum temperature and duration must be recorded for maintenance action, the PW4164, PW4168 and PW4168A Maintenance Manual.

External engine component maximum limiting temperatures are specified in the Installation and Operating Manual, Section 4.3.

Turbine Exhaust gas temperature

At takeoff (5 minutes, See Note 19) 625°C/1157°F See Note 18

Maximum continuous 600°C/1112°F

At start-up

Ground 535°C/995°F

In-flight 625°C/1157°F

Oil outlet temperature

Continuous operation 163°C/325°F

Transient operation (20 min.) 177°C/350°F

NOTE 3 Fuel Pressure Limits:

At inlet to engine system pump, not less than 5 psig above the true vapor pressure of the fuel and not greater than 70 psig with a vapor/liquid ratio of zero.

Oil Pressure Limits:

Minimum 70 psid

Temporary interruption of oil pressure associated with negative "G" operation is limited to 30 seconds maximum. Normal oil pressure will be restored rapidly once the negative "G" effect has been eliminated. There is no maximum oil pressure limit.

NOTE 4 Maximum Permissible Air Bleed:

8TH STAGE BLEED	PERCENT OF PRIMARY ENGINE AIRFLOW	
	NORMAL	MAXIMUM BLEED (one engine out)
Idle to 40% Maximum Continuous	0.00	0.00
Above 40% Maximum Continuous Thrust	4.00	6.00
15TH STAGE BLEED		
Idle to 40% Maximum Continuous	8.00	12.00
Above 40% Maximum Continuous Thrust	6.00	7.60

NOTE 5 The Sea Level Static Ratings are ideal and are based on ICAO Standard Atmosphere conditions, a Pratt & Whitney hardwall bellmouth inlet, no fan or compressor air bleed or load on accessory drives, an exhaust system having no internal pressure or external scrubbing losses, and fan duct and primary nozzle velocity coefficients equal to 1.00.

NOTE 6 The following accessory drive provisions are incorporated:

Drive	Rotation	Speed Ratio to Turbine Shatf	Torque (lb.in)		Overload	Overhang (in.lb)
			Continuous	Static		
Hight Pressure Rotor						
Starter	CC	0.841:1	#	*	#	500
IDGS	CC	0.841:1	**	12 620	**	2 000
Fluid power pump (R)	CC	0.389:1	1 300	6 500	1 950***	400
Auxiliar fluid power pump	CC	0.412:1	1 300	6 500	1 950***	400

LEGEND:

Does not Apply

CC = counterclockwise

* Maximum starter continuous torque 1 050 lb-ft at zero rpm and 1 250 lb-ft maximum impact torque. Maximum allowable starter torque value is 1 498 – 1 732 lb-ft.

** Maximum allowable continuous torque values are equivalent to 175 horsepower at any engine speed at or above sea level idle. The following overload conditions can be accommodated:

HORSEPOWER	DURATION TIME	RECURRING TIME
225	5 minutes	1 000 hours
225	5 seconds	1 hour
450	5 seconds	1 000 hours

*** Maximum allowable for 5-minute duration recurring at four-hour intervals minimum.

- NOTE 7** Power setting, power checks, and control of engine output in all operations are to be based upon Pratt & Whitney engine charts referring to either turbine discharge section gas pressure or low rotor speed. Pressure probes and a low rotor speed sensor are included in the engine assembly for this reason.
- NOTE 8** Lightning protection requirements and electromagnetic interference emitted by the electronic engine control system, including cables, are specified in the Installation and Operating Manual, Section 4.12.
- NOTE 9** Fuel and fuel additives conforming to the latest applicable issue of FAA-approved Pratt & Whitney Turbojet Engine Service Bulletin No. 2016 may be used separately or mixed in any proportions without adversely affecting the engine operation or power output.
- NOTE 10** The following oils are eligible: Oils conforming to Pratt & Whitney Turbojet engine Service Bulletin No. 238, latest revision.
- NOTE 11** Certain engine parts are life-limited. Limits are listed in Pratt & Whitney PW4164, PW4168 PW4168A Turbofan Engine Manual, Part No. 51A342, Time Limit Section.

- NOTE 12** The engines meet the smoke and gaseous emission requirements of RBHA 34.
- NOTE 13** The maximum permissible engine inlet distortion limit is specified in the Installation and Operating Manual, Section 4.4, Report PWA-6335.
- NOTE 14** Limits regarding transient rotor shaft overspeed rpm and transient gas overtemperature and the number of overtemperature occurrences are specified in the Maintenance Document, Part No. 51A341.
- NOTE 15** Information regarding approved fuel filter and oil filter replacement parts is in the PW4000 Series Illustrated Parts Catalog, Part No. 51A343.
- NOTE 16** Requirements and limitations associated with automatic fuel system anti-icing are specified in the Installation and Operating Manual, Section 4.5, Report PWA-6335.
- NOTE 17** The PW4164, PW4168 and PW4168A model engines have been approved to operate with certain faults present in the control system, based on satisfaction of RBHA 33 (FAR 33) requirements and appropriate RBHA 25 (FAR 25) control system reliability requirements. The following criteria exist as dispatch and maintenance requirements for the engine control system. These criteria are specified in Pratt & Whitney Report PWA 6436 which defines the various configurations and maximum operating intervals as follows:

Fault Level A: No dispatch allowed

Fault Level B: Dispatchable: maximum operating interval for Fault Level B fault(s) is 20 days.

Fault Levels A and B constitute Pratt & Whitney nomenclature. The airframe manufacturers may use different nomenclature in adapting these fault categories to the aircraft maintenance and display systems. However, the maximum operating intervals are restricted as shown above.

A control system reliability monitoring program has been established with Pratt & Whitney in compliance with the reporting requirements as outlined in the FAA Engine and Propeller Directorate Policy, letter dated October 18, 1993, for Time Limited Dispatch of Engine fitted with FADEC Systems.

- NOTE 18** The indicated 620°C EGT Redline for the PW4164/PW4168/PW4168A engines corresponds to an actual measured gas path temperature of 625°C. The 5°C correction to provide the indicated (cockpit) EGT is made in the EEC.
- NOTE 19** The normal 5 minutes takeoff time limit may be extended to 10 minutes for engines out contingency.
- NOTE 20** The PW4168A engine model provides the same takeoff thrust as the PW4168 model at or below sea level pressure altitude, increased takeoff thrust at pressure altitudes above sea level and below 14100 feet and below temperatures of STD & 40° C.
- NOTE 21** The Brazilian Supplemental Type Certificate 9810-12 was issued to validate the FAA Supplemental Type Certificate SE825NE which approves the installation of a fan thrust reverser and exhaust system on the PW4164, PW4168 and PW4168A models.

LUIZ ALBERTO C. MUNARETTO – Ten.-Cel.-Av.

**Chefe da Divisão de Homologação Aeronáutica
(Chief, Divisão de Homologação Aeronáutica)**

Maj.-Brig.-do-Ar REGINALDO DOS SANTOS

**Diretor do Centro Técnico Aeroespacial
(Director, Centro Técnico Aeroespacial)**
