

型号认可证数据单 THE VALIDATION DATA SHEET

编号/No: VTC0218E

版次/Revision: 0

型号/Type:

PW4164

PW4168

PW4168A

批准人/Approved By:

张红鹰

日期/Date: 2009-2-4

本数据单是型号认可证(编号: VTC0218E)的组成部分, 它规定了符合中国民用航空总局的适航要求所颁发此型号认可证的产品状态和限制。

This data sheet, which is part of Validation of Type Certificate (No: VTC0218E), prescribes condition and limitation under which the product for which the type certificate was issued meets the airworthiness requirements of the Chinese Civil Aviation Regulation.

注: 本 VTC 取代 VTC075E 中的 PW4164 和 PW4168 型号。

Note: This VTC supersedes type PW4164 and PW4168 in VTC075E.

CAAC 认可数据单和型号合格证数据单

CAAC Validation Data Sheet and Type Certificate Data Sheet

	中国民用航空总局认可数据单号、版次和颁发日期 CAAC Validation Data Sheet Number, Revision and issuance date	型号合格证数据单号、版次和颁发日期 Type Certificate Data Sheet Number, Revision and issuance date
当前 Current	No. VTC0218E, 版次 0 2009 年 2 月 4 日	FAA TCDS Number E36NE, Revision: 4 June 15, 1999
历史 History		

型号认可证持有人/Validation of Type Certificate Holder:

Pratt & Whitney Division
United Technologies Corporation
East Hartford, Connecticut 06108

类型/TYPE:

轴流、双转子、涡轮风扇发动机, 具有单级风扇、5级低压压气机、11级高压压气机、环形燃烧室、2级高压涡轮、5级低压涡轮。

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.

额定值(见注 5)/RATINGS (See NOTE 5):

型号/ MODELS	海平面静态推力, 磅/Static thrust at sea level, lbs.	
	起飞, 5 分钟 (见注 19) / Takeoff, Dry 5 Minutes (see NOTE 19)	最大连续/ Maximum Continuous
PW4164	64,500	55,800
PW4168	68,600	59,357
PW4168A	68,600	59,357

部件/COMPONENTS:

型号/ MODELS	PW4164/PW4168/PW4168A
燃油计量组件/Fuel Metering unit	Hamilton Standard Model Number JFC-131
燃油泵和燃油滤/Fuel pump and filter	Argo-Tech Model 723300
发动机电子控制器/Electronic engine control (EEC)	Hamilton Standard EEC Model Number 170
点火系统/Ignition	
激励器/Exciter	Unison Industries Model Number TFN – 29
点火器/Ignitors	PW P/N IC709520
EEC交流发电机/EEC alternator	
静子/Stator:	Unison P/N 430073
转子/Rotor	Unison P/N 430074
燃油分配活门/Fuel distribution valve	Hamilton Standard Model Number GTA40
2.5站位引气作动器/Station 2.5 bleed actuator	Hamilton Standard Model Number GTA42
静子叶片作动器/Stator vane actuator	Hamilton Standard Model Number GTA41
PT2/TT2探头/PT2/TT2 probe	Rosemount Model Number 154 GT

主要尺寸(英寸)/PRINCIPAL DIMENSIONS(IN):

型号/ MODELS	PW4164/PW4168/PW4168A
长/Length	167.220
标称直径/Nominal diameter	123.246
最大径向投影/Maximum radial projection	61.623

注: 由于此型号发动机的短舱由PW设计, 因此标称直径即是整个发动机的最大直径。

Note: Since Pratt & Whitney holds the design responsibility for the nacelle, the normal diameter of 123.246 inches represents the largest diameter of the entire propulsion system.

重量(净重)/WEIGHT (DRY):

型号/ MODELS	PW4164/PW4168/PW4168A
	12,900磅/12,900 lbs

基本发动机的重量包括所有基本的附件，但不包括尾喷管和点火系统的电源。
Weight of basic engine includes all essential accessories, but excludes exhaust nozzle and power source for the ignition system.

重心(英寸)/CENTER OF GRAVITY (IN):

型号/ MODELS	PW4164/PW4168/PW4168A
轴向: 发动机站位/ Axial: Engine station	114.5 ± 1.0 钛风扇机匣包容环/(Titanium Fan Case Containment) 117.1 ± 1.0 凯夫拉风扇机匣包容环(Kevlar Fan Case Containment)
纵向: 发动机中心线下/ Vertical: Below engine centerline	-0.9 ± 0.5
横向: 中心线左/ Lateral: Left of centerline	-0.4 ± 0.5

燃油/FUEL:

见注 9/See NOTE 9

滑油/OIL:

见注 10/See NOTE 10

FAA 审定基础/CERTIFICATION BASIS:

1965 年 2 月 1 日生效的 FAR33, 第 1 修正案到第 14 修正案。

FAR 33 effective February 1, 1965, as amended by 33-1 through 33-14.

型号合格证编号/Type Certificate Number E36NE		
型号/MODEL	申请日期/APPLICATION	批准日期/ISSUED
PW4164	1989年11月17日/NOV 17, 1989	1993年8月24日/AUG 24, 1993
PW4168	1989年11月17日/NOV 17, 1989	1993年8月24日/AUG 24, 1993
PW4168A	1997年7月8日/JULY 8, 1997	1997年12月18日/DEC 18, 1997

CAAC 认可审定基础/CAAC VALIDATION BASIS:

接受 FAA 的审定基础作为认可审定基础。

Accept FAA certification basis as validation basis.

生产基础(所有型号)/PRODUCTION BASIS (All Models)

生产合格证 No.2

Production Certificate Number 2

注1/NOTE 1

发动机转子最大允许运行转速:

Maximum Permissible Operating Speeds for Engine Rotors:

型号/MODELS	PW4164/PW4168/PW4168A
低压转子转速/Low pressure rotor (N1)	RPM3,600
高压转子转速/High pressure rotor (N2)	RPM10,450

发动机转子最小允许运行转速:

Maximum Permissible Operating Speeds for Engine Rotors:

型号/MODELS	PW4164/PW4168/PW4168A
低压转子转速/Low pressure rotor (N1)	RPM736 (空中)
高压转子转速/High pressure rotor (N2)	RPM5,860 (空中和地面运行)

注2/NOTE 2

最大允许温度/ Maximum Permissible Temperatures:

对于空中启动造成的超过地面启动限制, 最高温度和持续时间必须按照PW4164, PW4168和PW4168A维修手册进行记录。

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.

发动机外部部件最高限制温度见安装和使用手册的4.3部分。

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

涡轮排气温度(见注18)/Turbine Exhaust gas temperature (See NOTE 18)

型号/MODELS	PW4164/PW4168/PW4168A	
	实际/actual	显示/indicated
起飞(5分钟, 见注19)/ At takeoff (5 minutes, see NOTE 19)	645°C/1193°F	620°C/1148°F
最大连续/Maximum continuous	615°C/1139°F	600°C/1112°F
启动/At start-up	地面/Ground	535°C/995°F
	空中/In-flight	645°C/1193°F 620°C/1148°F
滑油出口温度/ Oil outlet temperature	连续工作/ Continuous operation	163°C/325°F
	瞬态(20分)/Transient operation (20 min.)	177°C/350°F

注3/NOTE 3

燃油压力限制/Fuel Pressure Limits:

发动机系统泵进口燃油压力至少比燃油蒸汽压力高5psig, 但不超过70psig, 汽液比为0。

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.

滑油压力限制/Oil Pressure Limits:

最小70psig/Minimum 70 psid

由于失重造成的滑油压力暂时中断的最大限制为30秒, 一旦失重影响消失, 正常的滑油压力将很快恢复。没有最大滑油压力限制。

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.

注4/NOTE 4

最大允许引气/Maximum Permissible Air Bleed:

	占发动机主气流量的百分比/ PERCENT OF PRIMARY ENGINE AIRFLOW	
8级引气/8TH STAGE BLEED	正常/NORMAL	最大引气(一发不工作)/ MAXIMUM BLEED(one engine out)
慢车到40%最大连续 Idle to 40% Maximum Continuous	0.0	0.0
40%最大连续推力以上/ Above 40% Maximum Continuous Thrust	4.0	6.0
15级引气/15TH STAGE BLEED		
慢车到40%最大连续/ Idle to 40% Maximum Continuous	8.0	12.0
40%最大连续推力以上/ Above 40% Maximum Continuous Thrust	6.0	7.6

注5/NOTE 5

海平面静态额定值是在理想条件下, 基于ICAO标准大气条件, 使用Pratt & Whitney公司钟形进气道, 没有风扇或压气机引气及附件驱动, 排气系统没有内部压力及外部摩擦损失, 并且风扇涵道和主喷口的速度系数等于1.0。

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 1.0.

注6/NOTE 6

附件驱动规定如下/The following accessory drive provisions are incorporated:

高压转子/ High pressure rotor	转向/ Rotation	与涡轮轴 的速比/ Speed ratio to turbine shaft	扭矩/TORQUE (lb-in)		过载/ Overload	悬臂力矩/ Overhang (in-lb)
			连续/ Continuous	静态/ Static		
起动机/ Starter	CCW	0.841:1	---	*	---	500
整体驱动电机 /IDGS	CCW	0.841:1	**	12,620	**	2,000
液力泵/Fluid power pump (R)	CCW	0.389:1	1,300	6,500	1,950***	400

辅助液力泵/ Auxiliary fluid power pump	CCW	0.412:1	1,300	6,500	1,950***	400
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CCW=逆时针/counterclockwise

*起动机最大扭矩：零转速时1,050磅-英尺；最大冲击扭矩为1,250磅-英尺；最大允许扭矩1,498~1,732磅-英尺。

Maximum starter torque = 1050 lb-ft at zero rpm and 1,250 lb-ft maximum impact torque.

Maximum allowable starter torque value is 1,498 lb-ft-1,732 lb-ft.

**最大允许连续扭矩值相当于175马力，在发动机转速等于或高于海平面慢车转速时。以下过载条件可以接受：

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:

马力/ HORSEPOWER	持续时间/ DURATION TIME	再次出现时间/ RECURRING TIME
225	5分钟/5 minutes	1000小时/1,000 hours
225	5秒/5 seconds	1小时/1 hour
450	5秒/5 seconds	1000小时/1,000 hours

***最大允许持续时间5分钟，再次出现最小时间间隔4小时。

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

注7/NOTE 7

功率设定、功率检查及各种运行情况下发动机的输出控制，是基于参照涡轮排气压力和低压转子转速确定的Pratt & Whitney发动机图表，因此发动机组件中包含压力探头和低压转子转速传感器。

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.

注8/NOTE 8

闪电防护的要求和发动机控制系统包括电缆发出的电磁干扰，在安装和使用手册4.12部分详细说明。

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.

注9/NOTE 9

符合FAA批准的Pratt & Whitney涡轮喷气发动机服务通告No.2016最近颁发的适用版本的燃油和燃油添加剂可以单独使用或按任何比例混合使用，而不会对发动机的运行及功率输出产生不利影响。

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.

注：中国的3号航空燃油（GB6537）已经包含在该服务通告中。

Note: #3 Jet fuel (GB6537) has already included in the SB.

注10/NOTE 10

符合Pratt & Whitney涡轮喷气发动机服务通告No.238最新版本的滑油是合格的。

The following oils are eligible: Oils conforming to Pratt & Whitney Turbojet engine Service Bulletin No. 238, latest revision.

注11/NOTE 11

某些发动机部件有寿命限制，其寿命限制列于普惠PW4164，PW4168和PW4168A涡轮发动机手册Part No. 51A342，时间限制部分。

Certain engine parts are life-limited. Limits are listed in Pratt & Whitney PW4164, PW4168 and PW4168A Turbofan Engine Manual, Part No. 51A342, Time Limit Section.

注12/NOTE 12

发动机符合FAR34部中的烟雾和气体排放物的要求。

The engines meet the smoke and gaseous emission requirements of Part 34.

注13/NOTE 13

最大允许的发动机进口变形限制在安装和使用手册4.4部分和报告PWA-6335中有详细说明。

The maximum permissible engine inlet distortion limit is specified in the Installation and Operating Manual, Section 4.4, Report PWA-6335.

注14/NOTE 14

关于发动机转子轴瞬时超转转速和瞬时排气超温以及超温发生的次数限制在维修文档（件号51A341）中详细说明。

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.

注15/NOTE 15

关于经批准的燃油滤和滑油滤的替代件的信息在PW4000系列的零部件图解目录（件号51A343）中给出。

Information regarding approved fuel filter and oil filter replacement parts is in the PW4000 Series Illustrated Parts Catalog, Part No. 51A343.

注16/NOTE 16

与燃油系统自动防冰相关的要求和限制在安装和使用手册4.5部分和报告PWA-6335中有详细说明。

Requirements and limitations associated with automatic fuel system anti-icing are specified in the Installation and Operating Manual, Section 4.5, Report PWA-6335.

注17/NOTE 17

PW4164, PW4168和PW4168A型发动机在满足FAR33的要求和FAR25关于控制系统可靠性要求的基础上,允许控制系统存在某些故障时继续运行。以下标准作为发动机控制系统放行和维修的要求。这些标准定义了不同的构型和最大运行间隔,在Pratt & Whitney的报告PWA 6436中有详细说明。

The PW4164, PW4168 and PW4168A model engines have been approved to operate with certain faults present in the control system, based on satisfaction of FAR 33 requirements and appropriate 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:

A类故障/ Fault Level	不允许放行/ No dispatch allowed
A:	
B类故障/ Fault Level	可以放行, B类故障的最大运行间隔为20天/ Dispatchable; maximum operating interval for Fault level B
B:	fault(s) is 20 days.

故障级别A和B是按照Pratt & Whitney标准制定的。飞机厂家可以在飞机维修和显示系统中使用不同的标准对故障进行分类,但以上给出的最大运行间隔必须严格执行。

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.

根据发动机和螺旋桨理事会在1993年10月28号的信中关于装有FADEC系统的发动机放行时间限制的报告要求, Pratt & Whitney已经制定了控制系统可靠性监测程序。

A control system reliability monitoring program has been established with Pratt & Whitney in compliance with the reporting requirements as outlined in the Engine and Propeller Directorate Policy, letter dated October 28, 1993, for Time Limited Dispatch of Engine fitted with FADEC Systems.

注18/NOTE 18

发动机电子控制(EEC)软件版本为SCN5C的发动机,最大允许排气温度(起飞5分钟)为625℃(实际)和620℃(显示);最大连续工作温度为600℃。而SCN6B和以后版本的EEC软件则为EGT提供了额外20℃的裕度,起飞最大允许的EGT实际为645℃(显示620℃),最大连续工作温度实际为615℃(显示600℃)。发动机的额定值和限制值由EEC的件号和发动机程序插头(EPP)的件号控制,通过专门的服务通告执行。发动机数据牌也能够反映发动机额定值和限制值的构型。与EGT实际值相对应的显示值由EEC软件进行控制。

Electronic Engine Control (EEC) software version SCN5C has maximum permissible exhaust gas temperatures of 625℃ actual and 620℃ indicated for takeoff (5 minutes) and 600℃ for maximum continuous. To provide an additional 20℃ EGT margin, EEC software version SCN6B and later versions can provide maximum permissible EGT of 645℃ actual

(620°C indicated) for takeoff, and 615°C actual (600°C indicated) for maximum continuous. The noted engine ratings and limits are controlled by EEC P/N and Engine Programming Plug (EPP) P/N, and are implemented by specific Service Bulletin instructions only. The engine data plate also reflects the engine ratings and limits configuration. The indicated versus actual EGT values are controlled by EEC software.

注19/NOTE 19

正常的5分钟起飞时间限制在特殊情况下可延长至10分钟。

The normal 5 minute takeoff time limit may be extended to 10 minutes for engine out contingency.

注20/NOTE 20

PW4168A发动机在等于和低于海平面的压力高度下，和PW4168发动机具有相同的起飞推力；而在压力高度高于海平面低于14,100英尺时，标准温度条件下，提高了起飞推力。

The PW4168A engine model provides the same takeoff thrust as the PW4168 model at or below sea level pressure altitude, and increased takeoff thrust at pressure altitudes above sea level and below 14,100 feet and below temperatures of STD & 40°C.