

型号认可证数据单 THE VALIDATION DATA SHEET

编号/No. : VTC0024E
 版次/Revision: 1
 型号/Type:
 PW4060
 PW4158 (1994-2-24)
 PW4460 (1994-2-24)
 批准人/Approved by:
 周凯旋
 日期/Date: 2006-12-29

本数据单是型号认可证（编号 VTC0024E）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 a part of Validation Type Certificate (No: VTC0024E), prescribes conditions and limitations under which the product for which the Type Certificate was issued meets the airworthiness requirements of the Chinese Civil Aviation Regulation.

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

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

型式/Type:

轴流，双转子，涡轮风扇，单级风扇，4 级低压压气机，11 级高压压气机，环形燃烧室，2 级高压涡轮，4 级低压涡轮。

Axial airflow, dual-spool, turbofan, single-stage fan, 4-stage low-pressure compressor, 11-stage high-pressure compressor, annular combustor, 2-stage high-pressure turbine, 4-stage low-pressure turbine.

额定值（见注5）/RATINGS (See NOTE 5)

海平面静态推力，磅/STATIC THRUST AT SEA LEVEL, LBS		
型号/MODEL	最大连续/ MAXIMUM CONTINUOUS	起飞，5分钟（见注13、21）/ TAKEOFF, DRY, 5 MINUTES (SEE NOTE 13 & 21)
PW4060	50,250*	60,000***
PW4158	49,580**	58,000**
PW4460	51,050**	60,000**
* Flat-rated to 77°F/25°C ** Flat-rated to 86°F/30°C *** Flat-rated to 92°F/33°C		

部件/COMPONENTS:

参考经核准的零件清单。

For information regarding components, refer to the approved parts list.

主要尺寸（英寸）/PRINCIPAL DIMENSIONS (inches):

长/Length 153.6;

标称直径/Nominal diameter 97.5;

最大径向投影/Maximum radial projection 52.8

重量（净重）/WEIGHT (DRY):

9420 磅，基本发动机的重量，包括所有必需的附件，但不包括起动机，尾喷管及点火系统的电源。

9420POUND, Weight of basic engine includes all essential accessories, but excludes starter, exhaust nozzle, and power source for the ignition system.

重心（英寸）/CENTER OF GRAVITY (IN):

轴向/Axial: 发动机站位/Engine station 9.4 ± 1.0 ;

纵向/ Vertical: 相对于发动机/Relative to engine 0.7 ± 0.5 ;

横向/Lateral: 相对于中心线/Relative to centerline 0.1 ± 0.5 。

燃油/FUEL:

见注 10/See NOTE 10

滑油/OIL:

见注 11/See NOTE 11

审定基础/CERTIFICATION BASIS:

1965 年 2 月 1 日生效的 FAR33, 第 1 修正案到第 9 修正案全部和第 10 修正案的 33.7/.14/.23/.27/.77/.88/.90/.92/.94。

FAR 33 effective February 1, 1965, as amended by 33-1 through 33-9, and Amendment 33-10 for FARs 33.7/.14/.23/.27/.77/.88/.90/.92/.94.

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转速:

MAXIMUM PERMISSIBLE OPERATING SPEEDS FOR ENGINE ROTORS
(ALSO SEE NOTE 16)

型号/ MODELS	PW4060/PW4158/PW4460
低压转子转速/ Low Pressure rotor N1 (RPM)	4,012
高压转子转速/ Low Pressure rotor N1 (RPM)	10,450

注 2/NOTE 2

最大允许温度/MAXIMUM PERMISSIBLE TEMPERATURES:

对于空中启动造成超过地面启动限制, 最高温度和持续时间必须按 PW4000 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 PW4000 Maintenance Manual.

发动机外部部件最高限制温度见安装和操作手册的 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/ Turbine exhaust gas:

型号/ MODELS	PW4060/PW4158/PW4460
起飞(5分钟, 见注21)/ At takeoff (5 min. see NOTE 21)	654°C/1209°F
最大连续/ Max. continuous	629°C/1164°F
启动 (地面) / Start-up(Ground)	535°C/995°F
启动 (空中) / Start-up(In-flight)	650°C/1202°F
滑油出口温度(连续)/ Oil outlet temperature(Continuous)	163°C/325°F
滑油出口温度(瞬态)/ Oil outlet temperature(Transient operation*)	177°C/350°F

注 3/NOTE 3

燃油压力限制/FUEL PRESSURE LIMITS:

燃油泵进口压力至少比燃油蒸汽压力高 5 psig，但不超过 70 psig。

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，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。

Minimum 70psig. 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:

8级引气/8TH STAGE BLEED

	正常/NORMAL	最大/MAXIMUM
慢车到40%最大连续/ Idle to 40% Maximum Continuous	0.0	0.0
40%最大连续到起飞/ 40% Maximum Continuous to Takeoff:	6.0	6.0

15级引气/15TH STAGE BLEED

	正常/NORMAL	最大/MAXIMUM
慢车到40%最大连续/ Idle to 40% Maximum Continuous	12.0	12.0
40%最大连续到起飞/ 40% Maximum Continuous to Takeoff:	1.6	1.6

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			扭矩/TORQUE (lb-in)															
	转 向 / Rotation	与 涡 轮 轴 的 速 比 / Speed ratio to turbine shaft	连续/ Continuous	静态/ Static	过载/ Overload	悬臂力矩/ Overhang (in-lb)												
起动机/ Starter	CCW	0.841:1	---	*	---	500												
整体驱动电 机/IDGS	CCW	0.841:1	**	12,620	**	2,000												
液动泵/Fluid power pump (R)	CCW	0.389:1	1,300	6,500	1,950***	400												
辅助液动泵/ Auxiliary fluid power pump	CCW	0.379:1	1,300	6,500	1,950***	400												
CCW=逆时针/counterclockwise																		
*起动机最大扭矩：零转速时910 lb-ft；最大冲击扭矩为1,250 lb-ft；最大允许扭矩1,498 lb-ft。 Maximum starter torque = 910 lb-ft at zero rpm and 1,250 lb-ft maximum impact torque. Maximum allowable starter torque value is 1,498 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:																		
<table><tr><td>马 力 / HORSEPOWER</td><td>持 续 时 间 / DURATION TIME</td><td>再 次 出 现 时 间 / RECURRING TIME</td></tr><tr><td>225</td><td>5 minutes</td><td>1,000 hours</td></tr><tr><td>225</td><td>5 seconds</td><td>1 hour</td></tr><tr><td>450</td><td>5 seconds</td><td>1,000 hours</td></tr></table>							马 力 / HORSEPOWER	持 续 时 间 / DURATION TIME	再 次 出 现 时 间 / RECURRING TIME	225	5 minutes	1,000 hours	225	5 seconds	1 hour	450	5 seconds	1,000 hours
马 力 / HORSEPOWER	持 续 时 间 / DURATION TIME	再 次 出 现 时 间 / RECURRING TIME																
225	5 minutes	1,000 hours																
225	5 seconds	1 hour																
450	5 seconds	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

飞行中遇到结冰条件时，风扇最小允许转速（N1）为 20%（720rpm）。

For inflight operation during icing conditions, the minimum allowable fan speed (N1) is 20% (720rpm).

注 9/NOTE 9

雷电保护和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 omitted by the electronic engine control system, including cables, are specified in the Installation and Operating Manual, Section 4.12.

注 10/NOTE 10

燃油和燃油添加剂符合 FAA 核准的 Pratt & Whitney 涡轮喷气发动机服务通告 No.2016 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，而不会对发动机的允许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 11/NOTE 11

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 12/NOTE 12

某些发动机部件是寿命限制件，其寿命限制列于 PW4000 涡扇发动机手册 Part Nos. 50A443, 50A605 和 50A822 中时间限制章节。

Certain engine parts are life-limited. Limits are listed in Pratt & Whitney PW4000 Turbofan Engine Manuals, Part Nos. 50A443, 50A605 and 50A822, Time Limit Section.

注 13/NOTE 13

发动机满足 1984 年 1 月 1 日生效的 SFAR27 中烟雾和气体排放的要求，同样的要求现在并入 1990 年 9 月 10 日生效的 FAR34。

The engines meet the January 1, 1984, smoke and gaseous emission requirements of SFAR 27. The same requirements are now incorporated into Federal Aviation Regulation Part 34, effective September 10, 1990.

注 14/NOTE 14

发动机满足 1975 年 1 月 1 日生效的 SFAR27 中燃油排泄的要求，同样的要求现在并入 1990 年 9 月 10 日生效的 FAR34。

The engines meet the January 1, 1975, fuel venting emission requirements of SFAR 27. The same requirements are now incorporated into Federal Aviation Regulation Part 34, effective September 10, 1990.

注 15/NOTE 15

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-6049 中详细说明。

The maximum permissible engine inlet distortion limit is specified in the Installation and Operating Manual, Section 4.4, Report PWA-6049.

注 16/NOTE 16

关于发动机转子瞬间超转的转速和瞬时排气超温以及超温发生的次数的限制在维修文档 Part Nos. 50A444, 50A606 和 50A823 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 Documents, Part Nos. 50A444, 50A606, and 50A823.

注 17/NOTE 17

关于经批准的燃油滤和滑油滤更换件的信息在 PW4000 系列的零件图解目录中给出，Part Nos. 50A445, 50A607 和 50A824。

Information regarding approved fuel filter and oil filter replacement parts is in the PW4000 Series Illustrated Parts Catalogs, Part Nos. 50A445, 50A607, and 50A824.

注 18/NOTE 18

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-6049 中详细说明。

Requirements and limitations associated with automatic fuel system anti-icing are specified in the Installation and Operating Manual, section 4.5, Report PWA-6049.

注 19/NOTE 19

PW4000 系列发动机在满足 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 报告 PWA-6139 和 PWA-6139 的附录中有详细说明。

The PW4000 series 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-6139 and PWA-6139 Addendum, which defines the various configurations and maximum operating intervals as follows:

A类故障/ Fault Level A:	不允许放行/ No dispatch allowed
B类故障/ Fault Level B:	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 fault(s) is 20 days.
C类故障/ Fault Level C:	可以放行, C类故障的最大运行间隔为1000工作小时/ Dispatchable; maximum operating interval for Fault level C is 1000 operating hours 仅从最近的飞行记录得到的EEC故障数据来看, 1000工作小时的间隔足够了, 除了下列件号的EEC: P&W P/N 50D791, 50D824, 51D037, 50D823, 51D319, 51D586。/ Review of EEC fault data from only the most recent flight leg is sufficient at the 1000 hour interval except for the following EEC part numbers: P&W P/N 50D791, 50D824, 51D037, 50D823, 51D319, 51D586.

A、B、C三类故障等级是按Pratt & Whitney的标准命名的, 也许飞机厂家在维修和显示系统中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要严格执行。

Fault Levels A, B, and C 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.

按照发动机和螺旋桨理事会1993年10月28日的信中关于装有FADEC系统的发动机放行时间限制的要求, 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 Engines fitted with FADEC Systems.

注 20/NOTE 20

Pratt & Whitney服务通告PW4ENG 79-43规定了FAR 33.71(c)(1)条符合性的可选的方法。

Incorporation of Pratt & Whitney Service Bulletin PW4ENG 79-43 provides an alternative means of compliance with the requirements of FAR 33.71(c)(1).

注 21/NOTE 21

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 22/NOTE 22

在制造厂执行了编号为EC92KK322G, H, I, J,和K的工程更改的发动机, 在其数据铭牌上标明了(-3)。

Engines in which Engineering Change Number EC92KK322G, H, I, J, and K were incorporated during manufacturer are designated by a (-3) on the Engine Data Plate.