

型号认可证数据单
THE VALIDATION DATA SHEET

编号/No.: VTC0218E

版次/Revision:

型号/Type:

PW4164 PW4168 PW4168A

PW4170 PW4168A-1D

PW4168-1D PW4164C

PW4164-1D PW4164C/B

PW4164C-1D PW4164C/B-1D

批准人/Approved by:

日期/Date:

本数据单是型号认可证（编号 VTC0218）的组成部分，它规定了符合中国民用航空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: VTC0218), 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

有效页清单/List of effective pages :

页数/ Pages	1	2	3	4	5	6	7	8	9	10	11	12	13	14
版次/Revision	1	1	1	1	1	1	1	1	1	1	1	1	1	1

第1部分 概述

SECTION 1 GENERAL

1. 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 1 2010 年 3 月 15 日	FAA TCDS No. E00036EN Revision 6, Jul 30, 2009
历史 History	No. VTC0218E, 版次 0 2009 年 2 月 4 日	FAA TCDS No. E00036EN Revision 4, Jun. 15, 1999

2. 类别/Category: 航空发动机/Aeroengine
3. 认可当局/Validation Authority: 中国民用航空局/CAAC
审定当局/Certifying Authority: 美国联邦航空局/FAA
4. 型号合格证持有人/Type Certificate Holder: Pratt & Whitney Division.
United Technologies Corporation
East Hartford, Connecticut 06108
6. ETOPS: 不适用/NA
7. CAAC 专用要求/Special Requirements: 无/NONE

第2部分

SECTION 2

I. 型号/MODELS	PW4164	PW4168	PW4168A	PW4164C	PW4164C/B
类型/TYPE	轴流式、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) 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)	64,500	68,600	--	64,500	68,600
最大连续/ Maximum Continuous	55,800	59,357	--	55,800	--
组件/COMPONENTS					
燃油计量组件/ Fuel Metering unit	Hamilton Standard Model 件号 JFC-131				
燃油泵和燃油滤/ Fuel pump and filter	Argo-Tech Model 件号 723300				
发动机电子控制器/ Electronic engine control (EEC)	Hamilton Standard EEC Model 件号 170				
点火系统/ Ignition, Unison Industries Model Number					
激励器/Exciter, 点火器/Ignitors,	Unison Industries 件号 TFN-29 PW P/N IC709520				

说明：“--”表示与前面的型号一致，“---”表示不适用
LEGEND: "--" INDICATES "SAME AS PRECEDING MODEL",
"---" NOT APPLICABLE

II. 型号/MODELS	PW4170	PW4168A-1D	PW4168-1D	PW4164-1D	PW4164C-1D	PW4164C/B-1D
类型/TYPE	轴流式、双转子、涡轮风扇，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) 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)	70,000	68,600	--	64,500	--	68,600
最大连续/ Maximum Continuous	59,357	--	--	55,800	--	--
组件/COMPONENTS						
燃油计量组件/ Fuel Metering unit,	Hamilton Standard Model 件号 JFC-131					
燃油泵和油滤/ Fuel pump and filter,	Argo-Tech Model 件号 723300					
电子发动机控制组件/ Electronic engine control (EEC),	Hamilton Standard EEC Model 件号 170					
点火系统/Ignition 激励器/Exciter, Number 点火器/Ignitors,	Unison Industries Model 件号 TFN-29 PW P/N IC709520					

I. 型号 (续) /MODELS(CONT.)	PW4164	PW4168	PW4168A	PW4164C	PW4164C/B	
II. 型号 (续) /MODELS(CONT.)	PW4170	PW4168A-1D	PW4168-1D	PW4164-1D	PW4164C-1D	PW4164C/B-1D
组件/COMPONENTS						
EEC 交流发电机/ EEC alternator						
静子/Stator , 转子/Rotor ,	Unison P/N 430073 Unison P/N 430074					
燃油分配活门/ Fuel distribution valve,	Hamilton Standard Model 件号 GTA40					
2.5 站位引气作动器/ Station 2.5 bleed actuator,	Hamilton Standard Model 件号 GTA42					
静子叶片作动器/ Stator vane actuator ,	Hamilton Standard Model 件号 GTA41					
T2 静温/总温探头/ PT2/TT2 probe,	Rosemont Model 件号 154GT					
主要尺寸 (英寸) / PRINCIPAL DIMENSIONS (IN)						
长度/ Length	167.220					
标称直径/ Nominal diameter	123.246					
最大径向投影/ Maximum radial projection	61.623					
重量 (净重) / WEIGHT (DRY) 磅/ lbs.	12,900 基本发动机的重量包括所有必要的附件, 但尾喷管和点火系统的电源除外 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)

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)
117.4 ± 1.0 (凯夫拉风扇机匣和环形压气机机匣/Kevlar Fan Case Containment and Ring Case Compressor)

纵向: 发动机中心线
以下/
Vertical: Below
engine centerline

-0.9 ± 0.5

纵向: 发动机中心线
以下/
Vertical: Below
engine centerline

横向: 中心线左侧/
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

审定基础/
CERTIFICATION
BASIS

1965 年 2 月生效的 FAR 33 部, 第 1 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 E36NE
Type Certificate Number E36NE

型号/ MODEL	申请日期/ APPLICATION	颁发日期/ ISSUED
PW4164	11. 17, 1989	8. 24, 1993
PW4168	11. 17, 1989	8. 24, 1993
PW4168A	7. 8, 1997	12.18, 1997
PW4164C	2. 5, 2008	11. 25, 2008
PW4164C/B	3. 5, 2008	11. 25, 2008

1965 年 2 月生效的 FAR 33 部, 第 1 到第 14 修正案。
FAR 33.28 第 15 号修正案 (EEC 软件)
FAR 33.78 第 19 号修正案 (防雨和雹)
FAR 33 effective February 1, 1965, as amended by 33-1 through 33-14
FAR 33.28 Amendment 15 (EEC Software)
FAR 33.78 Amendment 19 (Rain/Hail)
等效安全水平要求:

Equivalent Level of Safety Finding:

ELOS No. 8040 ELOS-08-NE08 to 14 CFR §33.87(a) & (b)

型号/ MODEL	申请日期/ APPLICATION	颁发日期/ ISSUED
PW4170	12. 12, 2006	11. 25, 2008

PW4168-1D	12. 12, 2006	11. 25, 2008
PW4168A-1D	12. 12, 2006	11. 25, 2008
PW4164-1D	12. 12, 2006	11. 25, 2008
PW4164C-1D	12. 12, 2006	11. 25, 2008
PW4164C/B-1D	12. 12, 2006	11. 25, 2008

**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 2 号/
Production Certificate Number 2

注 1/NOTE 1

低压转子转速/
Low pressure rotor (N1)

高压转子转速/
High pressure rotor (N2),

低压转子转速/
Low pressure rotor (N₁)

高压转子转速/
High pressure rotor (N₂)

发动机转子最大允许转速/ Maximum Permissible Operating Speeds for Engine Rotors	
PW4164/PW4168/PW4168A/PW4164C/PW4164C/B/PW4168A-1D./PW4168-1D/PW4164-1D/PW4164C-1D/PW4164C/B-1D	PW4170
RPM 3,600 (转/分)	RPM 3,680 (转/分)
PW4170/PW4168A-1D/PW4168-1D/PW4164-1D/PW4164C-1D/PW4164C/B-1D/PW4164/PW4168/PW4168A/PW4164C/PW4164C/B	
RPM 10,450	
发动机转子最小允许运行转速 Minimum Permissible Operating Speeds for Engine Rotors	
RPM 736 (空中)	
RPM 5,860 (空中或地面运行)	

注 2/NOTE 2

最大允许温度/ Maximum Permissible Temperatures
对于空中启动造成的地面启动超限，最高温度和持续时间必须按照 PW4164, PW4168, PW4168A, PW4164C, PW4164C/B, PW4170, PW4168A-1D, PW4168-1D, PW4164-1D, PW4164C-1D, and PW4164C/B-1D 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, PW4168A, PW4164C, PW4164C/B, PW4170, PW4168A-1D, PW4168-1D, PW4164-1D, PW4164C-1D, and PW4164C/B-1D Maintenance Manual.	
发动机外部部件最高限制温度见安装和使用手册 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)	
起飞（5 分钟，见注 19） / At takeoff (5 minutes, see NOTE 19) 最大连续/ Maximum continuous 启动/ 地面/ At start-up Ground 空中/ In-flight 滑油出口温度/ Oil outlet temperature 连续工作/ Continuous operation 瞬态（20 分钟） /Transient operation (20 min.)	实际/actual 显示/indicated
	645°C/1193°F 620°C/1148°F
	615°C/1139°F actual 600°C/1112°F
	535°C/995°F 645°C/1193°F 620°C/1148°F
	163°C/325°F 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 psig
由于失重造成的燃油压力暂时中断的最大限制为30秒，一旦失重影响小时，正常的燃油压力将很快恢复。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

8 级引气/
8TH STAGE BLEED
慢车到40%最大连续/
Idle to 40% Maximum
Continuous
40%最大连续推力以上/
Above 40% Maximum
Continuous Thrust
15级引气/
15TH STAGE BLEED
慢车到40%最大连续/
Idle to 40% Maximum
Continuous
40%最大连续推力以上/
Above 40% Maximum
Continuous Thrust

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	
正常/NORMAL	最大引气（一发不工作）/ MAXIMUM BLEED(one engine out)
0.0	0.0
4.0	6.0
8.0	12.0
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

驱动/DRIVE

高压转子/
High pressure rotor
起动机/ Starter
整体驱动电机/ IDGS
液力泵/

附件驱动规定如下/ The following accessory drive provisions are incorporated:					
转向/ ROTATION	与涡轮轴 的速度比 /SPEED RATIO TO TURBINE SHAFT	扭矩（磅-英寸）/ TORQUE (lb-in)		过载/ OVERLOAD AD	悬臂力 矩（英寸 -磅）/ OVERHANG(in- lb)
		连续/ CONTINUOUS	静态/ STATIC		
CCW	0.841:1	---	*	---	500
CCW	0.841:1	**	12,620	**	2,000
CCW	0.389:1	1,300	6,500	1,950***	400

Fluid power pump (R)
 辅助液力泵/
 Auxiliary fluid power pump

CCW	0.412:1	1,300	6,500	1,950***	400
说明：CCW=逆时针/ LEGEND: CCW = 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 continuous torque = 1050 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.					
**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	1000小时			
225	5秒	1小时			
450	5 秒	1000 小时			
***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（GB6537-2006）已经包含在 2016 号服务通告第 30 次修订版中。

Note: No.3 Jet fuel(GB6537-2006) has already been included in the SB No.2016 revision 30.

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, PW4168A, PW4164C, PW4164C/B, PW4170, PW4168A-1D, PW4168-1D, PW4164-1D, PW4164C-1D, PW4164C/B-1D 涡轮发动机手册 PartNo.51A342，时间限制部分。/

Certain engine parts are life-limited. Limits are listed in Pratt & Whitney PW4164, PW4168, PW4168A, PW4164C, PW4164C/B, PW4170, PW4168A-1D, PW4168-1D, PW4164-1D, PW4164C-1D, PW4164C/B-1D 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 , PW4164C, PW4164C/B, PW4170, PW4168-1D, PW4168A-1D, PW4164-1D, PW4164C-1D, 和 PW4164C/B-1D 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, 允许在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, 在普惠公司的报告 PWA6436 中有详细说明如下: /

The PW4164, PW4168, PW4168A, PW4164C, PW4164C/B, PW4170, PW4168-1D, PW4168A-1D, PW4164-1D, PW4164C-1D, and PW4164C/B-1D 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/	不允许放行/
Fault Level A:	No dispatch allowed
B 类故障/	可以放行, B 类故障的最大运行间隔为 20 天/
Fault Level B:	Dispatchable: maximum operating interval for Fault Level 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现实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 18, 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°C actual and 620°C indicated for takeoff (5 minutes) and 600°C for maximum continuous. To provide an additional 20°C EGT margin, EEC software version SCN6B and later versions can provide maximum permissible EGT of 645°C 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.

注 21/NOTE 21

PW4164C 发动机与 PW4164 具有相同的起飞推力，最大爬升推力比 PW4168A 发动机大/

The PW4164C engine model provides the same takeoff thrust as the PW4164, and increased maximum climb thrust of the PW4168A.

注 22/NOTE 22

PW4164C/B 发动机与 PW4168A 具有相同的起飞推力，最大爬升推力比 PW4168A 大。/

The PW4164C/B engine model provides the same takeoff thrust as the PW4168A, and increased maximum climb thrust of the PW4168A.

注 23/NOTE 23

PW4170 发动机变换需要依据如下的 MEC：/

The PW4170 engine model conversion requires the incorporation of the following MECs:

MEC 06KA009, 高压压气机环形机匣/Ring Case HPC

MEC 07KA171, 高压压气机轴承鼓/HPC Rear Drum

MEC 06KA104, 高压涡轮一级导叶/HPT first vane

MEC 06KA063, 低压涡轮三级导叶/LPT third vane 和 MEC 06KY002 ,低压
涡轮三级转叶/LPT third blade

MEC 06KA058, 高压涡轮一级叶片外部空气封严/
HPT first blade outer airseals

MEC 07KA011G, 低压涡轮六级盘 LPT sixth disk

MEC 06KY001, 加厚的镍合金低压涡轮转子/thicker nickel LPT shaft 或
者 MEC 05KM003, 钢制低压涡轮转子/steel LPT shaft

MEC 06KZ021, SCN 10 EEC 软件/SCN 10 EEC software

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