

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION TYPE CERTIFICATE DATA SHEET E36NE	TCDS NUMBER E36NE REVISION: 5*
	DATE: November 25, 2008 PRATT & WHITNEY PW4164 PW4170 PW4168 PW4168A-1D PW4168A PW4168-1D PW4164C PW4164-1D PW4164C/B PW4164C-1D PW4164C/B-1D

Engines of models described herein conforming with this data sheet (which is part of Type Certificate Number E36NE) and other approved data on file with the Federal Aviation Administration, meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Federal Aviation Regulations, provided they are installed, operated, and maintained as prescribed by the approved manufacturer's manuals and other approved instructions.

TYPE CERTIFICATE (TC) HOLDER: Pratt & Whitney Division
 United Technologies Corporation
 East Hartford, Connecticut 06108

I. MODELS	PW4164	PW4168	PW4168A	PW4164C	PW4164C/B
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)					
Static thrust at sea level, lbs.					
Takeoff, Dry 5 Minutes (see NOTE 19)	64,500	68,600	--	64,500	68,600
Maximum Continuous	55,800	59,357	--	55,800	--
COMPONENTS					
Fuel Metering unit	Hamilton Standard Model Number JFC-131				
Fuel pump and filter	Argo-Tech Model 723300				
Electronic engine control (EEC)	Hamilton Standard EEC Model Number 170				
Ignition	Unison Industries Model Number TFN – 29				
Exciter	PW P/N IC709520				
Ignitors					

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LEGEND: "--" INDICATES "SAME AS PRECEDING MODEL"
 "---" NOT APPLICABLE
 NOTE: ALL PAGES ARE REFORMATTED. SIGNIFICANT CHANGES IF ANY,
 ARE BLACK-LINED IN THE LEFT MARGIN.

II. MODELS	PW4170	PW4168A-1D	PW4168-1D	PW4164-1D	PW4164C-1D	PW4164C/B-1D
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)						
Static thrust at sea level, lbs	70,000	68,600	--	64,500	--	68,600
Takeoff, Dry 5 Minutes (see NOTE 19)	59,357	--	--	55,800	--	--
Maximum Continuous						
COMPONENTS	Hamilton Standard Model Number JFC-131 Argo-Tech Model 723300 Hamilton Standard EEC Model Number 170 Unison Industries Model Number TFN – 29 PW P/N IC709520					

I. MODELS (CONT.), II. MODELS (CONT.)	PW4164	PW4168	PW4168A	PW4164C	PW4164C/B	
	PW4170	PW4168A-1D	PW4168-1D	PW4164-1D	PW4164C-1D	PW4164C/B-1D
COMPONENTS						
EEC alternator						
Stator	Unison P/N 430073					
Rotor	Unison P/N 430074					
Fuel distribution valve	Hamilton Standard Model Number GTA40					
Station 2.5 bleed actuator	Hamilton Standard Model Number GTA42					
Hamilton Standard Model Number GTA42	Hamilton Standard Model Number GTA41					
PT2/TT2 probe	Rosemont Model Number 154 GT					
PRINCIPAL DIMENSIONS (IN)						
Length	167.220					
Nominal diameter	123.246					
Maximum radial projection	61.623					
WEIGHT (DRY)	12,900 lbs.					
	Weight of basic engine includes all essential accessories, but excludes exhaust nozzle and power source for the ignition system.					

CENTER OF GRAVITY (IN)

Axial: Engine station

114.5 ± 1.0 (Titanium Fan Case Containment)
 117.1 ± 1.0 (Kevlar Fan Case Containment)
 117.4 ± 1.0 (Kevlar Fan Case Containment and Ring Case Compressor)

Vertical: Below engine centerline

-0.9 ± 0.5

Lateral: Left of centerline

-0.4 ± 0.5

FUEL
OIL

See NOTE 9

See NOTE 10

CERTIFICATION BASIS

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

Type Certificate Number E36NE

MODEL	APPLICATION	ISSUED
PW4164	NOV 17, 1989	AUG 24, 1993
PW4168	NOV 17, 1989	AUG 24, 1993
PW4168A	JULY 8, 1997	DEC 18, 1997
PW4164C	MARCH 5, 2008	NOV 25, 2008
PW4164C/B	MARCH 5, 2008	NOV 25, 2008

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)

Equivalent Level of Safety Finding:

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

PW4170	DEC 12, 2006	NOV 25, 2008
PW4168-1D	DEC 12, 2006	NOV 25, 2008
PW4168A-1D	DEC 12, 2006	NOV 25, 2008
PW4164-1D	DEC 12, 2006	NOV 25, 2008
PW4164C-1D	DEC 12, 2006	NOV 25, 2008
PW4164C/B-1D	DEC 12, 2006	NOV 25, 2008

PRODUCTION BASIS (All Models)

Production Certificate Number 2

NOTES

NOTE 1. Maximum Permissible Operating Speeds for Engine Rotors

PW4164/PW4168/PW4168A/PW4164C/PW4164C/B/PW4168A-1D./PW4168-1D/PW4164-1D/PW4164C-1D/PW4164C/B-1D only
Low pressure rotor (N₁), RPM 3,600

For PW4170 only
Low Pressure Rotor (N₁), RPM 3,680

For PW4170/PW4168A-1D/PW4168-1D/PW4164-1D/PW4164C-1D/PW4164C/B-1D and
PW4164/PW4168/PW4168A/PW4164C/PW4164C/B
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, PW4168A, PW4164C, PW4164C/B, PW4170, PW4168A-1D, PW4168-1D, PW4164-1D, PW4164C-1D, and PW4164C/B-1D Maintenance Manual.

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

Turbine Exhaust gas temperature (See NOTE 18)

At takeoff (5 minutes, see NOTE 19) 645°C/1193°F actual; 620°C/1148°F indicated

Maximum continuous 615°C/1139°F actual; 600°C/1112°F indicated

At start-up

Ground 535°C/995°F

In-flight 645°C/1193°F actual; 620°C/1148°F indicated

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	0.0	0.0
Above 40% Maximum Continuous Thrust	4.0	6.0
15TH STAGE BLEED		
Idle to 40% Maximum Continuous	8.0	12.0
Above 40% Maximum Continuous Thrust	6.0	7.6

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 1.0.

NOTE 6. The following accessory drive provisions are incorporated:

DRIVE	ROTATION	SPEED RATIO TO TURBINE SHAFT	TORQUE (lb-in)		OVERLOAD	OVERHANG (in-lb)												
			CONTINUOUS	STATIC														
High pressure rotor																		
Starter	CCW	0.841:1	---	*	---	500												
IDGS	CCW	0.841:1	**	12,620	**	2,000												
Fluid power pump (R)	CCW	0.389:1	1,300	6,500	1,950***	400												
Auxiliary fluid power pump	CCW	0.412:1	1,300	6,500	1,950***	400												
<p>LEGEND: CCW = counterclockwise</p> <p>* 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.</p> <p>** 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:</p> <table border="1"> <thead> <tr> <th>HORSEPOWER</th> <th>DURATION TIME</th> <th>RECURRING TIME</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>*** Maximum allowable for 5-minute duration recurring at four-hour intervals minimum.</p>							HORSEPOWER	DURATION TIME	RECURRING TIME	225	5 minutes	1,000 hours	225	5 seconds	1 hour	450	5 seconds	1,000 hours
HORSEPOWER	DURATION TIME	RECURRING TIME																
225	5 minutes	1,000 hours																
225	5 seconds	1 hour																
450	5 seconds	1,000 hours																

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, PW4164C, PW4164C/B, PW4170, PW4168A-1D, PW4168-1D, PW4164-1D, PW4164C-1D, PW4164C/B-1D Turbofan Engine Manual, Part No. 51A342, Time Limit Section.

NOTE 12. The engines meet the smoke and gaseous emission requirements of Part 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, 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:

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 Engine and Propeller Directorate Policy, letter dated October 18, 1993, for Time Limited Dispatch of Engine fitted with FADEC Systems.

NOTE 18. 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.

NOTE 19. The normal 5 minute takeoff time limit may be extended to 10 minutes for engine out contingency.

NOTE 20. 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.

NOTE 21. The PW4164C engine model provides the same takeoff thrust as the PW4164, and increased maximum climb thrust of the PW4168A.

NOTE 22. The PW4164C/B engine model provides the same takeoff thrust as the PW4168A, and increased maximum climb thrust of the PW4168A.

NOTE 23. The PW4170 engine model conversion requires the incorporation of the following MECs:
MEC 06KA009, Ring Case HPC
MEC 06KA104, HPT first vane
MEC 06KA063, LPT third vane, and MEC 06KY002 LPT third blade
MEC 06KA058, HPT first blade outer airseals
MEC 07KA011G, LPT sixth disk
MEC 06KY001, thicker nickel LPT shaft or MEC 05KM003, steel LPT shaft
MEC 06KZ021, SCN 10 EEC software

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