DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
TYPE CERTIFICATE DATA SHEET NO. E00011CH

E00011CH
Revision NC
Williams International Co., L.L.C.
FJ33-4A-15
September 10, 2004

Engines of models described here that conform with this data sheet (which is part of Type Certificate No. E00011CH) and other approved data on file with the FAA, 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 FAA approved manufacturer's manuals and other FAA approved instructions.

TYPE CERTIFICATE HOLDER: Williams International Co., L.L.C.,
Walled Lake, Michigan 48390-0200 USA

MODEL	**FJ33-4A-15**
ENGINE TYPE	Twin spool turbofan with a single-stage fan and three-stage axial compressor direct driven by a two-stage turbine, a single-stage centrifugal compressor driven by a single-stage turbine, an annular combustor, a full length bypass duct and an exhaust mixer.
RATINGS Note 1.	
Maximum Continuous, lb.	1,568
Takeoff (5 minutes), lb.	1,568
CONTROL SYSTEM	
Fuel Control	Dual Channel Full Authority Digital Electronic Control (FADEC) coupled with Fuel Delivery Unit (FDU). See Parts List identified in Note 18.
FUEL	
Fuel Specifications	See Operating Instructions or Maintenance Manual identified in Note 18 for approved fuel specifications.
Fuel Additives	See Note 12.
Fuel Pump	Integral with Fuel Control
Motive Flow	See Note 9.
OIL	
Oil Specification	Synthetic conforming to MIL-L-23699. See Operating Instructions or Maintenance Manual identified in Note 18 for approved oil brands.
Oil Reservoir	Integral. See Installation Instructions identified in Note 18 for capacity and installed usable quantity.
IGNITION	
Exciter	One required. See Parts List identified in Note 18.
Igniter Plug	Two, Required. See Parts List identified in Note 18.
PRINCIPAL DIMENSIONS	
Length Overall, inches (cm)	47.8 (121.4)
Between flanges, inches (cm)	37.8 (96.0)
Height (Overall) , inches (cm)	23.7 (60.2)
Forward flange outer diameter, inches (cm)	15.6 (39.6)
Aft flange outer diameter, inches (cm)	17.3 (43.9)

Page No.	1	2	3	4	5	6	7	LEGEND	- - indicates same as previous model
Revision	0	0	0	0	0	0	0		- indicates does not apply

MODEL	FJ33-4A-15
	See Installation Instructions identified in Note 18 for complete dimensional details.
DRY WEIGHT Total Engine (Includes gearbox and airframe mounted equipment identified in Note 8) Basic engine (Includes gearbox mounted equipment identified in Note 8)	300 lb. maximum. 293 lb. maximum.
C.G. LOCATION	See Installation Instructions identified in Note 18 for center of gravity location.
CERTIFICATION BASIS Regulations and Amendments Application Date Type Certificate Date	 14 CFR Part 33, effective February 1, 1965 including Amendments 33-1 through 33-20. 14 CFR Part 34, effective September 10, 1990 including Amendments 34-1 through 34-3. Equivalent level of safety with respect to 14 CFR Part 33.28(b) and 33.68 (See Note 13) 28 March 2000, Extended to 28 November 2001 10 September 2004.
PRODUCTION BASIS	Production Certificate 334CE.

NOTE 1. ENGINE RATINGS.

Engine ratings are based on static un-installed thrust stand performance at the following conditions:

- 0% humidity
- sea level ambient pressure (29.92 inches Hg)
- no aircraft gearbox accessory loads
- no aircraft air bleed
- 0% inlet total pressure loss
- using an exhaust nozzle as specified in the Installation Instructions identified in Note 18.
- the flat rate temperature as shown below

FLAT RATE TEMPERATURES

MODEL	FJ33-4A-15
Maximum Continuous	59° F and below
Takeoff	72° F and below

NOTE 2. TEMPERATURE LIMITS.

MAXIMUM INTERTURBINE TEMPERATURE (ITT)

MODEL	FJ33-4A-15
Takeoff, °F (°C)	1,508 (820) for 5 minutes 1,535 (835) for 10 seconds
Maximum Continuous, °F (°C)	1,481 (805)
Starting, °F (°C)	See Operating Instructions identified in Note 18.

OIL TEMPERATURE. Measured at oil cooler exit.

MODEL	FJ33-4A-15
Maximum, °F (°C)	275 (135)
	300 (149) for 5 minutes
Minimum, °F (°C)	-40 (-40) Start and Idle
	50 (10) Takeoff

ENGINE EXTERNAL AMBIENT TEMPERATURE. Certain external and/or airframe mounted engine components have temperature limitations other than those listed here. See Installation Instructions identified in Note 18.

MODEL	FJ33-4A-15
Maximum, °F (°C)	300 (149)
Minimum, °F (°C)	-65 (-54)
Minimum Starting, °F (°C)	-40 (-40)

NOTE 3. MAXIMUM SPEEDS.

SPEED LIMITATIONS

MODEL	FJ33-4A-15
Low Pressure Rotor (N1), rpm (%)	22,875 (100.0)
	23,125 (101.1) for 20 seconds
High Pressure Rotor (N2), rpm (%)	51,125 (100.0)
	No transient permitted

REFERENCE (100%) SHAFT SPEEDS

MODEL	FJ33-4A-15
100 % Low Pressure Rotor (N1), rpm	22,875
100% High Pressure Rotor (N2), rpm	51,125

NOTE 4. THRUST SETTING.

Setting of engine thrust is to be based on power setting charts referencing low pressure rotor speed (N1). See Operating Instructions identified in Note 18.

NOTE 5. PRESSURE LIMITS.

FUEL PRESSURE. Measured at fuel pump or fuel control inlet. See Installation Instructions identified in Note 18 for pressure limitations.

OIL PRESSURE. Measured at oil cooler exit.

MODEL	FJ33-4A-15
Maximum, psig	115
	120 for 5 minutes
Minimum, psig	45 above high pressure rotor speed (N2) of 40,900 rpm (80%)
	32 from idle to high pressure rotor speed (N2) of 40,900 rpm (80%)
	23 for 5 minutes from idle to high pressure rotor (N2) speed of 40,900 (80%)

NOTE 6. ACCESSORY DRIVES.

The following information applies to the FJ33-4A-15 engine model accessory drives. See Installation Instructions identified in Note 18 for mounting pad dimensions and power extraction limits.

Drive	Pad Spec.	Rotation Direction, Facing Pad	Speed Ratio Driven/N2*	Max. Torque (in-lb.)			Max. Wt (lb.)	Max. Overhung Moment (in-lb.)
				Continuous	Overload **	Static +		
Starter Generator	MS3326-2(AS)	Clockwise	0.2288	175 at 48.9% N2 decreasing linearly to 152 at 68.4% and then to 105 at 100% N2	187 from idle to 68.4% N2, decreasing linearly to 128 at 100% N2	-660	38	210
High Speed Accessory ++	MS3325-1	Clockwise	0.1526	58	85	100	5	15
Low Speed Accessory ++	AN20001 Type XI-1B	Clockwise	0.0874	101	150	175	10	30

* 100% High Pressure Rotor Speed (N2) is identified in Note 3.
** 5 minutes per 4-hour operating period
\+ Start or breakaway torque is negative for torque into drive pad
++ Engine comes equipped with either a low speed or a high speed accessory drive pad. See Parts List identified in Note 18 to determine the pad configuration for the specific engine part number

NOTE 7. ENGINE MODEL CONFIGURATION.

Model FJ33-4A-15 is the engine basic model.

For each engine model number, there may be minor differences in the engine configuration based upon specific airframe installation requirements. See Parts List identified in Note 18 for specific engine configuration.

NOTE 8. STANDARD EQUIPMENT.

Engine dry weight includes the following standard equipment. Engine dry weight does not include starter/generator.

ENGINE GEARBOX MOUNTED EQUIPMENT.

MODEL	FJ33-4A-15				
Lubrication Pump	Standard equipment				
Fuel Control	Standard equipment (FDU)				
Fuel Pump	Integral with FDU				
Permanent Magnet Alternator (PMA)	Integral with FDU				

AIRFRAME MOUNTED EQUIPMENT.

MODEL	FJ33-4A-15				
TT2/PT2 Sensor	Standard Equipment				
FADEC	Standard Equipment				

NOTE 9. MOTIVE FLOW.

Fuel from the motive flow port on the fuel control unit may be extracted to drive jet or turbine pumps in the airplane fuel system. See Installation Instructions identified in Note 18.

NOTE 10. BLEED EXTRACTION.

HIGH PRESSURE BLEED. Flow rates expressed as percent are based on engine core airflow rate. See Installation Instructions identified in Note 18 for bleed extraction limits during operation with One Engine Inoperative (OEI).

MODEL	FJ33-4A-15				
Maximum, Both Ports	50 lb./min. or 12.0% whichever is less				
Maximum, One Port	50 lb./min. or 6.0% whichever is less				
Minimum	0%				
Maximum, Starting	Engine is capable of starting with bleed extraction. See Installation Instructions identified in Note 18.				

IP COMPRESSOR BLEED. Percent of core airflow. This port is optional. See Parts List identified in Note 18 for specific engine configuration.

MODEL	FJ33-4A-15				
Maximum	0.1 %				
Minimum	0 %				
Maximum, Starting	0.1 %				

FAN BLEED. Percent of bypass duct airflow. This port is optional. See Parts List identified in Note 18 for specific engine configuration. See Operating Instructions identified in Note 18 to determine effect of bleed on engine performance.

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MODEL	**FJ33-4A-15**				
Maximum, Both Ports	2.8% total				
Maximum, One Port	2.8%				
Minimum	0%				
Maximum, Starting	2.8%				

NOTE 11. LIMITED USE FUEL OPERATION.

ASTM D910, Grade 100LL is approved for use on certain engine models. Refer to the Operating Instructions identified in Note 18 for limits on duration, fuel temperature and fuel pressure.

NOTE 12. FUEL ADDITIVES.

Icing Inhibitor. The use of icing inhibitors is optional for the FJ33-4A-15 engine. See Operating Instructions identified in Note 18 for the approved icing inhibitors and allowable concentration levels.

Anti-static. See Operating Instructions identified in Note 18 for the approved anti-static additives and allowable concentration levels.

Biocide. See Operating Instructions identified in Note 18 for the approved biocide additives and allowable concentration levels.

NOTE 13. ANTI-ICING AND DE-ICING REQUIREMENTS.

The FAA has approved a finding of equivalent level of safety (ELOS) for the FJ33-4A-15 engine related to compliance of the engine with the requirements of 14 CFR Sections 33.28(b) and 33.68 as related to the TT2/PT2 sensor power supplied by the aircraft. The ELOS identifies specific requirements for aircraft supplied power to the TT2/PT2 heater and/or air data requirements that must be met by the airframe manufacturer. The specific aircraft requirements related to this ELOS are identified in the Engine Installation Instructions listed in Note 18.

The calibration curves for conditions of TT2/PT2 anti-ice and de-ice active are unique for each installation and must be approved by Williams International.

NOTE 14. POWER RATINGS FOR HIGH CUSTOMER BLEED AIR USAGE.

Use of significant amounts of high pressure bleed air, such as for aircraft anti-icing, requires reduced thrust settings. See Operating Instructions identified in Note 18.

NOTE 15. ROTOR DISK INTEGRITY AND BLADE CONTAINMENT.

This engine meets 14 CFR Part 33 requirements for rotor disk integrity and blade containment. Certain rotor parts are life limited. These limits and the associated flight profile are listed in the Maintenance Manual identified in Note 18.

NOTE 16. TIME LIMTED DISPATCH.

Dispatch of an aircraft employing the FJ33-4A-15 engine is allowed with certain engine control system faults present subject to the limitations identified in the Airworthiness Limitations Section (ALS) of the Maintenance Manual listed in Note 18.

NOTE 17. ENGINE MOUNT SYSTEM.

See Installation Instructions identified in Note 18 for engine mount dimensions and load limits.

NOTE 18. APPLICABLE DOCUMENTS.

APPLICABLE DOCUMENTS.

MODEL	**FJ33-4A-15**				
Parts List	61000-200				
Installation Instructions	65528				
Operating Instructions	65529				
Maintenance Manual	65530				
Engine Manual	65531				

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