DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

E22NE
Revision - 2
ALFA ROMEO
AR318-02

March 26, 2007

TYPE CERTIFICATE DATA SHEET NO. E22NE

Engines of models described herein conforming with this data sheet (which is part of Type Certificate No. E22NE) 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 Civil Air Regulations provided they are installed, operated and maintained as prescribed by the approved manufacturer's manuals and other approved instructions.

Type Certificate Holder: Alfa Romeo Avio S.p.A.
Pomigliano d'Arco (Napoli)
Italia

Model: AR318-02

Type: The AR318-02 is a single-shaft turboprop engine comprising a single stage centrifugal compressor, a reverse flow annular combustion chamber, and a two stage axial turbine. An integral main reduction and accessory gearbox is driven by a forward extension of the compressor shaft and has provisions for a starter-generator unit, fuel pump and control system, propeller governor, oil pump and aircraft accessories. One aircraft bleed air port is provided.

Ratings: (see Note 1)	SHP	(KW)
Maximum Continuous, sea level static	563	(420)
Takeoff (5 minutes), sea level static	607	(453)

Limitations: (see Note 2) Gas Generating operating speed	RPM	
Takeoff (5 minutes) rating (maximum)	38,095	(100%)
Maximum continuous rating (maximum)	37,523	(98.5%)
Flight idle (minimum)	36,190	(95%)

Temperature Limitations: (see Note 3) Max. permissible interstage turbine temp.	ITT	
Takeoff (5 minutes) rating	1313°F	(712°C)
Maximum continuous rating	1284°F	(696°C)
Maximum transient starts	1382°F	(750°C)

Fuel Temperature: Measured at engine pump inlet		
Minimum at start	- 31°F	(- 35°C)
Maximum	104°F	(40°C)

Oil Temperature: Measured at supply oil pump inlet		
Minimum at start	- 4°F	(- 20°C)
Maximum	131°F	(55°C)

Output Shaft Torque Limitations:		
Takeoff (5 minutes)	1589	(lb.-ft.)
Maximum continuous	1496	(lb.-ft.)

Fuel and Oil Pressure Limitations:

Fuel (measured at engine FCU pump inlet)	
Minimum	7 psig
Maximum	50 psig

The engine will operate satisfactorily with fuel pressure at the fuel control inlet 5 psi above the vapor pressure of the fuel inlet temperature.

Oil (measured at oil filter outlet)

Minimum	60 psig
Maximum	70 psig

Ambient Temperature Limitation: Permissible ambient temperature range for engine start:

Sea Level	- 4°F to 104°F (- 20°C to 40°C)
10,000 ft.	- 4°F to 86°F (- 20°C to 30°C)

NOTE: Additional data on engine start are specified in Alfa Romeo Avio AR318-02 Operating and Installation Instructions Manual.

Fuel Control System: (a) Fuel control unit (FCU), Lucas Ltd. type PGC 302
(b) Speed and temperature amplifier (ECU), Lucas Ltd. type STA-550

Accessory Provisions:

Drive	Type	Rotation	*Speed	Maximum Torque		Maximum Overhang Moment	
				(N.m)	(lb.-in.)	(N.m)	(lb.-in.)
Starter/Generator	Lear Siegler	CW	0.256	9.10	80.52	13.78	122
Fuel Pump	Lucas PGC 302	CW	0.162	1.96	17.36	6.21	55
Propeller Governor	Woodward 82010-080	CW	0.102	1.63	14.44	1.29	11.45
Oil Pump		CW	0.262	1.64	14.52	1.80	15.9

*Speed = ratio to engine

Torque Measurement System: (a) Torque signal conditioning unit (SCU), Simmonds Precision, type 473265-001.
(b) Torque and speed sensor, Simmonds Precision, type 473216.

Propeller Governor: Woodward, type 8210-080

Interstage Temperature Sensor: Smiths Industries, type 3101-RTH-1

Low Oil Pressure Switch: Smiths Industries, type 4502/KPS/6/35

Ignition System: Three torch ignitors, Lucas, type 08107
Two ignitor plugs, Auburn, type YB63-1
Ignition box, Simmons Precision, type 49930

Starter Generator: Lear Siegler, type 23046-028

Fuel: (See NOTE 4) Type: JP-1 (Aviation Kerosene), JP-4

Oil: (See NOTE 5) Type (synthetic, conforming to MIL-L-23699C): Shell ASTO 500

Principal Dimensions: Length 41.3 in. (1049 mm)
Width 21.57 in. (548 mm)

Center of Gravity Locations: Complete engine with accessories except spinner and propeller.

Forward of engine gearbox/front mount pad:	7.32 in. (186 mm)
On the left side of propeller shaft center line, rear view:	0.27 in. (6.8 mm)

Weight:

Basic engine weight:	356 lbs. (161.5 kg.)
Dry (includes FCU, oil pump, levers, oil/fuel pipes; excludes propeller, spinner, propeller governor, starter generator, unfeathering pump):	388 lbs. (176 kg.)
Propeller, spinner, propeller governor, starter generator, unfeathering pump:	150 lbs. (68 kg.)

Certification Basis: Federal Aviation Regulations (FAR's) 21.29 and 33 through Amendment 9, inclusive.
Pursuant to FAR 21.29 (a) (1) (ii) the type certificate was issued in validation of Registro Aeronautico Italiano (RAI) certification to RAI requirements, Part 233 (Amendment 9).
Date of type certification application: April 21, 1982.

The aviation authority for Italy, Ente Nazioonale per l'Aviazione Civile (ENAC) (formerly Registro Aeronautico Italiano), originally type certificated this engine. The FAA validated this product under U.S. Type Certificate Number E22NE. Effective September 28, 2003, the European Aviation Safety Agency (EASA) began oversight of this product on behalf of Italy.

Import Requirements: To be considered eligible for installation on U.S. registered aircraft, each new engine to be exported to the United States with ENAC or EASA airworthiness approval shall have a Joint Aviation Authorities (JAA) or EASA Form 1, Authorized Release Certificate. The JAA or EASA Form 1 should state that the engine conforms to the type design approved under the U.S. Type Certificate E22NE ***is*** in a condition for safe operation and has undergone a final operational check.

NOTE 1. Engine ratings are based on calibrated test stand performance under the following conditions:
- Nominal output shaft speed of 2,006 rpm.
- Static sea level standard conditions of 59°F (15°C) and 29.92 in. Hg (1 atm).
- Air intake: air intake box and mounting shroud, P/N 180.30.72.100 E02, intake flare, P/N L22091 (DLF 10311).
- Exhaust configuration, P/N LF 133203.
- No external air bleed or accessory drive power for aircraft accessories.
- Additional performance parameters are contained in Alfa Romeo Avio AR318-02 Operating and Installation Instructions Manual.

NOTE 2. 100% output shaft speed equals 2,006 rpm, corresponding to 38,095 turbine rpm.

NOTE 3. The interstage inlet gas temperature (ITT) is measured by eight (8) thermocouples mounted in a radial plane at the second stage turbine nozzle.

NOTE 4. Approved fuels and additives are listed in Alfa Romeo Avio AR318-02 Operating and Installation Instructions Manual.

NOTE 5. Any derogation from oil type specified herein must be declared in approved Alfa Romeo Service Instructions.

NOTE 6. The installation of engine must be such that ingestion of birds is prevented.

NOTE 7. Life limited parts and accountability methods are identified in Alfa Romeo Avio AR318-02 Continued Airworthiness Instructions, RAI approved. The time of first overhaul is equal to 750 hours.

NOTE 8. AR318-02 manual approved under RAI requirements as equivalent to FAR 33.4 and 33.5 (Amendment 9) requirements are as follows:

- Installation Instructions	AR318-02 Installation Instruction Manual
- Operation Instructions	AR318-02 Operating Instructions Manual
- Maintenance	AR318-02 Maintenance Manual
- Overhaul	AR318-02 Overhaul Manual
- Performance	AR318-02 Technical specification document

NOTE 9. Overhaul of engine must comply with the AR318-02 Overhaul Manual.

NOTE 10. The air inlet pressure distortion limits are defined in AR318-02 Operating and Installation Manual.

NOTE 11. Each of the documents listed below must state that it is approved by the European Aviation Safety Agency (EASA) or, for approvals made before September 28, 2003 by Ente Nazionale per l'Aviazione Civile (ENAC) or Registro Aeronautico Italiano (RAI). Any such documents including those approved under a delegated authority, are accepted by the FAA and are considered FAA approved.
- Service bulletins,
- Structural repair manuals,
- Vendor manuals,
- Aircraft flight manuals, and
- Overhaul and maintenance manuals.

These approvals pertain to the type design only.

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