European Aviation Safety Agency

EASA

TYPE-CERTIFICATE DATA SHEET

Number: E.150
Issue: 01
Date: 19 December 2014
Type: RED A03 series engines

Model
RED A03

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I - General

1. Type / Models: RED A03 / RED A03

2. Type Certificate Holder: Raikhlin aircraft Engine Developments GmbH
Am alten Wehr 23
D-53518 Adenau
Germany

DOA EASA.21J.433

3. Manufacturer: Raikhlin aircraft Engine Developments GmbH

POA DE.21G.0247 (applied)

4. EASA Certification Application Date:

RED A03				
31 August 2009				

5. EASA Certification Date:

RED A03				
19 December 2014				

II - Certification Basis

1. Airworthiness Standards: CS-E, Amendment 3, dated 23 December 2010

2. Special Conditions (SC): Addition to CS-E 40(d): Engine Flame Out during Flight

3. Equivalent Safety Findings (ESF): CS-E 130(h) Fire Proof Engine Attachment Points

4. Deviations: none

5. Environmental Standards: none (not required for piston engines)

III - Technical Characteristics

1. Type Design Definition:

Engine Configuration CH3d A03-003-00-003-01 or later approved revisions

2. Description:

The RED A03 engine is a V12-cylinder, four stroke Diesel piston engine with an displacement of 6134 cm^3, equipped with common rail high pressure direct injection, turbocharger, gearbox with reduction ratio of 1 : 1.88 and a single lever controlled FADEC (Full Authority Digital Engine Control) / EECS (Electronic Engine Control System).

3. Equipment:

See Engine Installation Manual

4. Dimensions:

Model	RED A03			
Overall Length	1100 mm			
Overall Height	750 mm			
Width	850 mm			

5. Dry Mass:

Model	RED A03			
Mass	363 kg			

Note: The engine dry mass is based on the basic engine specification which includes: engine loom with brackets, electrical engine starter, oil-coolant heat exchanger, integrated oil tank, exhaust systems with turbochargers and wastegates, oil pumps and water pumps.
It does not include: propeller, governor, water coolers, coolant piping, charge coolers, oil catch tanks, exhaust gas tailpipes, Electronic Engine Control Unit (EECU) and Glow Plug Power Unit (GPPU), adapter loom, alternators, belt drives and engine fluids.

6. Ratings: (see Note 1)

Rating		RED A03			
Power	Take-off (5 min)	368 kW (500 hp) at 4000 rpm (2127 prop rpm)			
	Max. Continuous	338 kW (460 hp) at 3750 rpm (1995 prop rpm)			
	Max. Best Economy Cruising	294 kW (400 hp) at 3500 rpm (1862 prop rpm)			

Note: The performance values specified above correspond to minimum values defined under the conditions of ICAO or ARDC standard atmosphere.

7. Control System

The engine is equipped with a FADEC/EECS that is controlled by the Electronic Engine Control Unit (EECU) processing unit. Software verified to level B according to RTCA Document DO-178B.

EECU P/N A03-111-06-001-01 or later approved standard
Hardware/Software: TEM_RED_ECU_ECU-1.0.3 or later approved standard

8. Fluids (Fuel/Oil/Additives):

See Engine Operation Manual for approved fluids (see also Note 3).

9. Aircraft Accessory Drives:

	Rotation	Max. Speed	Max. Torque	Max. Power	Type of Drive
Accessory Drive A (in TC configuration used by governor)	CW	2736 rpm	1,7 Nm	0,5 kW	AND 20010
Accessory Drive B	CW	3706 rpm	9,1 Nm	3,5 kW	AND 20000
Accessory Drive C	CW	4000 rpm	30,2 Nm	6,9 kW	for V-Belt
Accessory Drive D	CW	6182 rpm	19,5 Nm	6,9 kW	for V-Belt

CW = Clock-Wise
Speed is indicated for a reference engine speed of 4000 rpm.
Accessory drive direction of rotation is as viewed facing the drive.

IV - Operational Limitations

1. Temperature limits:

	Temperature in °C / °F	Comments
Minimum engine structure and internal engine fluids temperature for starting	-20 °C / -4 °F	
Minimum opening up Engine Oil Temperature	60 °C / 140 °F	measured at entry into engine
Engine Oil Temperature (normal operation)	60 °C - 97 °C / 140 °F - 207 °F	
Maximum Engine Oil Temperature (5 min.):	102 °C / 216 °F	
Minimum opening up Cooling Fluid Temperature	60 °C / 140 °F	measured at exit from engine
Cooling Fluid Temperature (normal operation)	60 °C - 90 °C / 140 °F - 194 °F	
Maximum Cooling Fluid Temperature (5 min.)	95 °C / 203 °F	
Minimum opening up Gearbox Oil Temperature	50 °C / 122 °F	
Gearbox Oil Temperature (normal operation)	50 °C - 95 °C / 122 °F - 203 °F	
Maximum Gearbox Oil Temperature (5 min.)	100 °C / 212 °F	

2. Speed Limits:

Maximum Engine Over-speed (Crankshaft Speed)	4200 rpm (2234 prop rpm)
Take-off speed	4000 rpm (2127 prop rpm)
Max. continuous speed	3750 rpm (1995 prop rpm)

3. Pressure Limits:

Minimum Fuel Pressure (at inlet of HP engine pump)	2,0 bar absolute (29 psia)
Maximum Fuel Pressure (at inlet of HP engine pump)	3,5 bar absolute (50,8 psia)
Minimum Oil Pressure at Idle Conditions	2,4 bar absolute (34,8 psia)
Minimum Oil Pressure at Maximum Continuous Power	4,3 bar absolute (62,4 psia)
Maximum Oil Pressure	7,0 bar absolute (101,5 psia)

4. Operating Altitude:

Maximum altitude	7620 m (25.000 ft)

V - Operational and Service Instructions

	A03		
Engine Installation Manual	A03-180-01-001-01 or later approved revision		
Engine Operation Manual	A03-180-02-001-01 or later approved revision		
Engine Maintenance Manual	A03-180-03-001-01 or later approved revision		
Engine Overhaul Manual	not issued yet		
Service Bulletins and Service Letters	as issued		

VI - Notes

Note 1: Engine model numbers may include suffixes to define minor engine changes related to installation specific configurations. These differences will be specified in Service Bulletins for the configuration specifications.
The software of the electronic engine control for each application has specific software application data. See also respective Service Bulletins for the installation versions.
Also refer to the Engine Installation Manual or appropriate installation.

Note 2: The RED A03 engine is approved for the installation in CS/Part 23 normal and utility category airplanes.

Note 3: The RED A03 engine is approved for operation with kerosene type fuels according to ASTM D1655 and Def Stan 91-91 (see Engine Operation Manual). The engine has been tested for fuels up to a maximum ignition delay time of 8.06 ms / minimum derived cetane number of 27.9 (determined according EN 15195/ASTM D6890).

Note 4: The RED A03 engine is approved for use with propellers and propeller governors as listed in the Engine Installation Manual. This approval does not include the approval of the propellers and their governors.

Note 5: The recommended Time Between Overhaul (TBO) is published in Engine Maintenance Manual.

Note 6: The FADEC/EECS has been tested according to DO-160G for lightning protection and magnetic interference. The demonstrated levels are declared in the Engine Installation Manual.

Note 7: The EECU of the FADEC/EECS shall be installed according to the general installation requirements as defined in the Engine Installation Manual.

Note 8: Dispatch Limitations: Currently no Time Limited Dispatch has been approved. All engine systems and equipment must be functional prior to aircraft take-off. Any detected engine system or equipment failure must be corrected before next flight. For special instructions see the Engine Operation Manual.

Note 9: Containment has been demonstrated for maximum turbocharger speed of 140 000 rpm.

Note 10: Overhaul is not permitted until publication of the Overhaul Manual.