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# TYPE-CERTIFICATE DATA SHEET

E.150

**for**  
RED A03 series engines

**Type Certificate Holder**

Raikhlin aircraft Engine Developments GmbH

Am alten Wehr 23  
D-53518 Adenau  
Germany

For Models: RED A03-003  
RED A03-102



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## TABLE OF CONTENTS

<b>I. General</b> .....	<b>4</b>
1. Type/ Model .....	4
2. Type Certificate Holder .....	4
3. Manufacturer .....	4
4. Date of Application .....	4
5. EASA Type Certification Date .....	4
<b>II. Certification Basis</b> .....	<b>4</b>
1. State of Design Authority Certification Basis .....	4
2. Reference Date for determining the applicable airworthiness requirements .....	4
3. EASA Certification Basis .....	4
3.1. Airworthiness Standards .....	4
3.2. Special Conditions (SC) .....	5
3.3. Equivalent Safety Findings .....	5
3.4. Deviations .....	5
3.5. Environmental Protection .....	5
<b>III. Technical Characteristics</b> .....	<b>5</b>
1. Type Design Definition .....	5
2. Description .....	5
3. Equipment .....	5
4. Dimensions .....	5
5. Dry Mass .....	5
6. Ratings (see Note 2) .....	6
7. Control System .....	6
8. Fluids (Fuel, Oil, Coolant, Additives) .....	6
9. Aircraft Accessory Drives .....	6
10. Maximum Permissible Air Bleed Extraction .....	7
<b>IV. Operating Limitations</b> .....	<b>7</b>
1. Temperature Limits .....	7
2. Speed Limits .....	7
3. Pressure Limits .....	7
3.1 Fuel Pressure .....	7
3.2 Oil Pressure .....	8
4. Operating Altitude .....	8
<b>V. Operating and Service Instructions</b> .....	<b>8</b>
<b>VI. Notes</b> .....	<b>8</b>
<b>SECTION:ADMINISTRATIVE</b> .....	<b>10</b>
I. Acronyms and Abbreviations .....	10
II. Type Certificate Holder Record .....	10
III. Change Record .....	10



## **I. General**

### **1. Type/ Model**

Type RED A03  
Model RED A03-003, RED A03-102

### **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. Date of Application**

RED A03-003	RED A03-102			
31 August 2009	08 December 2015			

### **5. EASA Type Certification Date**

RED A03-003	RED A03-102			
19 December 2014	27 August 2018			

## **II. Certification Basis**

### **1. State of Design Authority Certification Basis**

Not applicable

### **2. Reference Date for determining the applicable airworthiness requirements**

Refer to section 4 (Date of Application) of part I. General

### **3. EASA Certification Basis**

#### **3.1. Airworthiness Standards**

CS-E, Amendment 3, dated 23 December 2010



### 3.2. Special Conditions (SC)

Addition to CS-E 40(d): Engine Flame Out during Flight

### 3.3. Equivalent Safety Findings

CS-E 130(h) Fire Proof Engine Attachment Points

### 3.4. Deviations

None

### 3.5. Environmental Protection

None (not required for piston engines)

## III. Technical Characteristics

### 1. Type Design Definition

RED A03-003: "A03-003-00-003-01 ENGINE CONFIGURATION CH3d" or later approved revisions

RED A03-102: "A03-010-00-002-01 ENGINE CONFIGURATION RED-A03-102" 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<sup>3</sup>, 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 A03-003	RED A03-102		
Overall Length	1114 mm	1114 mm		
Overall Height	750 mm	712 mm		
Width	850 mm	850 mm		

### 5. Dry Mass

Model	RED A03-003	RED A03-102		
Mass	363 kg	357 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 2)

Rating		RED A03-003, RED A03-102			
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, Coolant, Additives)

See Engine Operation Manual for approved fluids (see also Note 4).

## 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 (Not available on RED A03-102)	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.



## 10. Maximum Permissible Air Bleed Extraction

Not applicable

### IV. Operating 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 - 100 °C / 140 °F - 212 °F	
Maximum Engine Oil Temperature (10 min.):	108 °C / 226 °F	
Minimum opening up Cooling Fluid Temperature	60 °C / 140 °F	measured at exit from engine
Cooling Fluid Temperature (normal operation)	60 °C - 91 °C / 140 °F - 195 °F	
Maximum Cooling Fluid Temperature (10 min.)	105 °C / 221 °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 (10 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

##### 3.1 Fuel Pressure

Minimum Fuel Pressure (at inlet of HP engine pump)	5,0 bar absolute (72,5 psia)
Maximum Fuel Pressure (at inlet of HP engine pump)	7,0 bar absolute (101,5 psia)



### 3.2 Oil Pressure

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)
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### V. Operating and Service Instructions

Manuals	RED A03-003	RED A03-102	
Engine Installation Manual	A03-180-01-001-01 or later approved revision	A03-180-01-003-01 or later approved revision	
Engine Operation Manual	A03-180-02-001-01 or later approved revision	A03-180-02-003-01 or later approved revision	

Instructions for Continued Airworthiness (ICA)	RED A03-003	RED A03-102	
Engine Maintenance Manual	A03-180-03-001-01 or later approved revision	A03-180-03-003-01 or later approved revision	
Engine Overhaul Manual	not issued yet	not issued yet	
Service Bulletins and Service Letters	as issued		

### VI. Notes

1. The EASA approved Airworthiness Limitations Section of the Instructions for Continued Airworthiness is published in "Engine Maintenance Manual", chapter 71.2 "Airworthiness Limitations".
2. Suffixes in parentheses may be added to the engine model number 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.
3. The RED A03-003 engine was initially certified under the designation "RED A03" and is approved for the installation in CS/Part 23 normal and utility category airplanes.





The RED A03-102 engine is approved for the installation in CS/Part 23 normal, utility & aerobatic category airplanes.

4. The RED A03 series engines are approved for operation with kerosene type fuels according to ASTM D1655, Def Stan 91-91 and GOST 10227 (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).
5. The RED A03 series engines are 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.
6. The recommended Time Between Overhaul (TBO) is published in Engine Maintenance Manual.
7. 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.
8. The EECU of the FADEC/EECS shall be installed according to the general installation requirements as defined in the Engine Installation Manual.
9. 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.
10. Containment has been demonstrated for maximum turbocharger speed of 140000 rpm.
11. The RED A03-102 engine may be used under sustained negative g or inverted flight conditions for continuous periods not exceeding 20 seconds.



**SECTION:ADMINISTRATIVE**

**I. Acronyms and Abbreviations**

CW	clockwise
CCW	counter-clockwise
CS-E	Certification Specifications for Engines
DO-160	Environmental Conditions and Test Procedures for Airborne Equipment
EASA	European Aviation Safety Agency
rpm	Revolutions per minute
RTCA	Radio Technical Commission for Aeronautics
SB	Service Bulletin
TBO	Time between Overhaul
TCDS	Type Certificate Data Sheet

**II. Type Certificate Holder Record**

N/A

**III. Change Record**

Issue	Date	Changes	TC issue
Issue 01	19 December 2014	Initial Issue	Initial Issue, 19 December 2014
Issue 02	27 August 2018	- TCDS Template updated to the latest version - Note 1 added - Engine Model RED A03-102 added. TCDS updated accordingly - Major Change Approval 10066427 incorporated (Change of engine designation from RED A03 to RED A03-003, change of operating limitations (oil and coolant temp., fuel pressure)	27 August 2018

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