

European Aviation Safety Agency

EASA TYPE-CERTIFICATE DATA SHEET

Number : E.121
Issue : 04
Date : 10 August 2012
Type : Rotax 912 series engines

Models

Rotax 912 A1
Rotax 912 A2
Rotax 912 A3
Rotax 912 A4
Rotax 912 F2
Rotax 912 F3
Rotax 912 F4
Rotax 912 S2
Rotax 912 S3
Rotax 912 S4
Rotax 912 iSc2
Rotax 912 iSc3

List of effective Pages:

Page	1	2	3	4	5	6	7	8	9	10	11	12	13						
Issue	4	4	4	4	4	4	4	4	4	4	4	4	4						

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I - General**1. Type / Models:**

Rotax 912/ Rotax 912 A1, Rotax 912 A2, Rotax 912 A3, Rotax 912 A4, Rotax 912 F2, Rotax 912 F3, Rotax 912 F4, Rotax 912 S2, Rotax 912 S3, Rotax 912 S4, Rotax 912 iSc2, Rotax 912 iSc3

2. Type Certificate Holder:

Since February 3, 2009	BRP-Powertrain GmbH & Co KG Welser Straße 32 A-4623 Gunskirchen, Austria DOA EASA.21J.048
Before February 3, 2009	BRP-Rotax GmbH & Co KG Welser Straße 32 A-4623 Gunskirchen, Austria DOA EASA.21J.048
Before June 16, 2004	Bombardier-Rotax GmbH & Co KG Welser Straße 32 A-4623 Gunskirchen, Austria
Before December 29, 2001	Bombardier-Rotax Gesellschaft mbH Welser Straße 32 A-4623 Gunskirchen, Austria

3. Manufacturer:

As above

4. Date of Application:

Rotax 912 A1	Rotax 912 A2	Rotax 912 A3	Rotax 912 A4	Rotax 912 F2
19 October 1987	19 October 1987	22 July 1992	24 May 1995	21 September 1993
Rotax 912 F3	Rotax 912 F4	Rotax 912 S2	Rotax 912 S3	Rotax 912 S4
21 September 1993	21 September 1993	20 November 1997	20 November 1997	20 November 1997
Rotax 912 iSc2	Rotax 912 iSc3			
07 April 2010	07 April 2010			

5. EASA Certification Date:

Rotax 912 A1	Rotax 912 A2	Rotax 912 A3	Rotax 912 A4	Rotax 912 F2
25 September 1989	25 September 1989	23 April 1993	02 August 1996	22 December 1994
Rotax 912 F3	Rotax 912 F4	Rotax 912 S2	Rotax 912 S3	Rotax 912 S4
22 December 1994	22 December 1994	27 November 1998	27 November 1998	27 November 1998
Rotax 912 iSc2	Rotax 912 iSc3			
10 August 2012	10 August 2012			

Note: EASA type certificate for all these models (except 912 iSc2 and 912 iSc3) is granted in accordance with article 2 paragraph 3(a) of EU Commission Regulation 1702/2003 replacing the BAZ/ACG Austria certification of these products:

Rotax 912 A series: Austrian Type Certification no. TW8/89

Rotax 912 F series and S series: Austrian Type Certification no. TW9-ACG

II - Certification Basis

1. Airworthiness Standards:

Rotax 912 A series: JAR 22 Appendix H, Airworthiness requirements for engines of powered sailplanes, Amdt. 1 of May 18, 1981

Rotax 912 F series and S series: FAR Part 33 Amdt. 15 plus FAA NPRM Doc. # 24922, Notice no. 92-14

Rotax 912 iSc series: CS-E, Amendment 3 (December 23, 2010)

2. Special Conditions (SC):

Rotax 912 F series and S series: SC1 HIRF Requirement according RTCA DO 160 C; SC2 External Alternator

3. Equivalent Safety Findings (ESF):

Rotax 912 F series and S series:

Propeller governor

Instead of FAR 35.42 as stated in FAR 33.19(b), JAR-E180 (B)(1)(ii) has been applied for the operational test of the hydraulic governor. This was fixed as equivalent safety measure.

Conformity with FAR 33.25, attachment of components has been proven.

4. Deviations:

Rotax F series: Temporary exemption to para. 33.15. until 1.7.1995 had been granted.

5. Environmental standards:

none (not required for piston engines)

III - Technical Characteristics

1. Type Design Definition:

Rotax 912 A series: As defined by the type design definition no. 30.912.0022

Rotax 912 F series: As defined by the type design definition no. 30.912.0033

Rotax 912 S series: As defined by the type design definition no. 30.912.0133

Rotax 912 iSc series: As defined by the type design definition no. 31.912.0533

2. Description:

The ROTAX 912 engine is a 4-stroke, 4-cylinder horizontally opposed, spark ignition engine, propeller drive via integrated reduction gear, liquid cooled cylinder heads, ram-air cooled cylinders, dry sump forced lubrication.

For A Series and F Series:

Bore	79,5 mm	3.13 in.
Stroke	61,0 mm	2.40 in.
Displacement	1211 cm ³	73.9 cu.in.
Compression ratio	9:1	
Gear ratio (crankshaft: propeller shaft)	2,2727 : 1 or 2,4286 : 1 (optional)	

For S Series:

Bore	84 mm	3.31 in.
Stroke	61 mm	2.40 in.
Displacement	1352 cm ³	82.5 cu.in.
Compression ratio	11:1	
Gear ratio (crankshaft: propeller shaft)	2,4286 : 1	

For iSc Series:

Bore	84 mm	3.31 in.
Stroke	61 mm	2.40 in.
Displacement	1352 cm ³	82.5 cu.in.
Compression ratio	10,8:1	
Gear ratio (crankshaft: propeller shaft)	2,4286: 1	

Model A2 / F2 / S2

Basic model: 4-stroke, spark ignition, 4 cylinder horizontally opposed, one central camshaft, push-rods, overhead valves, liquid cooled cylinder heads, ram-air cooled cylinders, dry sump forced lubrication, dual breakerless capacitive discharge ignition, two constant depression carburetors, mechanical fuel pump, fixed pitch propeller configuration, drive output via reduction gear with integrated shock absorber and overload protection, electric starter, integrated AC generator, vacuum pump drive (optional), external alternator (optional).

Model A1

Same as A2, except: fixed pitch propeller configuration, pitch circle diameter (P.C.D.) 100 mm (3.937 in.)

Model A3 / F3 / S3

Same as A2 / F2 / S2, except: additional drive and adapter for hydraulic governor, hydraulic governor and propeller shaft for constant speed propeller.

Model A4 / F4 / S4

Same as A3 / F3 / S3, except: fixed pitch propeller, prepared for hydraulic governor for constant speed propeller (without drive, adapter and governor).

Model 912 iSc

Basic model: The engine is a 4 cylinder horizontally opposed, 4-stroke piston engine with liquid cooled cylinder heads, ram-air cooled cylinders, dry sump forced lubrication, 2 electrical fuel pumps and it is controlled by a dual channel Full Authority Digital Engine Control (FADEC) system for ignition and injection.

The engine is equipped with a reduction gear box with integrated shock absorber (dog clutch type) and overload protection to reduce the crankshaft speed to the designed propeller shaft speed. The prop speed could be controlled by a governor mounted on the crankcase (912 iSc3), driven by the propeller shaft. The engine will be operated with automotive gasoline or AVGAS.

Model iSc2

Same as 912 iSc basic model except: Prop shaft with flange for fixed prop.

Model iSc3

Same as 912 iSc basic model except: Prop shaft with flange for constant speed propeller and drive for hydraulic governor for constant speed propeller.

3. Equipment:

description 912 A/F/S series: see Illustrated Parts Catalog ETK-912 (German) and IPC-912 (English)

description 912 iSc series: see Illustrated Parts Catalog ETK-912 i (German) and IPC-912 I (English)

4. Dimensions:**912 A/F/S series:**

Description	mm	in.
Overall length	590	23.23
Overall length with optional 0,9 kW electric starter	630	24.80
Overall length with airbox	717	28.23
Overall height	375	14.76
Overall height with airbox and engine suspension frame	421	16.57
Overall width	576	22.68

912 iSc series:

Description	mm	in.
Overall length	593	23.35
Overall length with suspension frame	593	23.35
Overall height	384	15.12
Overall height with exhaust system	527	20.75
Overall height with engine suspension frame	417	16.42
Overall width	578	22.76

For 912 A series and 912 F series

Description	kg	lbs.
With ignition unit and internal generator, carburetors, overload clutch, oil tank and electric starter but without muffler and radiator	57,1	125.88
With propeller flange P.C.D. 75/80 mm/4 in., drive gear, adapter and hydraulic governor for constant speed propeller	59,8	131.8
External alternator	3,0	6.61
Center of gravity: see Installation Manual EBHB-912 (German) and IM-912 (English)	-	-

For 912 S series:

Description	kg	lbs.
With ignition unit and internal generator, carburetors, oil tank, overload clutch and electric starter but without muffler, airbox and radiator	58,3	128.52
With propeller flange P.C.D. 75/80 mm/4 in., drive gear, adapter and hydraulic governor for constant speed propeller	61,0	134
External alternator	3,0	6.61
Center of gravity: see Installation Manual EBHB-912 (German) and IM-912 (English)	-	-

For 912 iSc series:

Description	kg	lbs.
With electric system: wiring harness ECU, fuse box and start relais. With oil tank. Without engine suspension frame, exhaust system, fuel pumps assy., cooling baffle, radiator and oil cooler.	63,6	140.2
External alternator	3,0	6.61
Center of gravity: see Installation Manual EBHB-912 i (German) and IM-912 i (English)	-	-

6. Ratings:

For 912 A series and 912 F series:

Description	kW	rpm
Max. continuous performance at sea level pressure altitude	58,0	5500
Take-off performance rpm (max. 5 min.) at sea level pressure altitude	59,6	5800

For 912 S series:

Description	kW	rpm
Max. continuous performance at sea level pressure altitude	69	5500
Take-off performance rpm (max. 5 min.) at sea level pressure altitude	73,5	5800

For 912 iSc series:

Description	kW	rpm
Max. continuous performance at sea level pressure altitude	69	5500
Take-off performance rpm (max. 5 min.) at sea level pressure altitude	73,5	5800

7. Fluids:

Fuel / Oil / Coolant:

For 912 A/F/S series:

see Operators Manual HB-912 (German), OM-912 (English)

see Service Instruction: SI-912-016 (German p/n), SI-912-016 (English p/n)

For 912 iSc series:

see Operators Manual HB-912 i (German), OM-912 i (English)

see Service Instruction: SI-912i-001 (German p/n), SI-912i-001 (English p/n)

8. Aircraft Accessory Drives:

for Model 912 A series:

Model 912 A Series									
Accessory	A1	A2	A3	A4	Rotation facing drive pad	speed ratio to crankshaft		Max. torque Nm	Max. overhang moment Nm
						i = 2,2727	i = 2,4286 optional		
Starter	*	*	*	*	CW	25,25:1	25,25:1	0,5	-
Alternator	-	**	**	**	CCW	1,32:1	1,24:1	2,0	-
Vacuum pump	**	**	-	**	CCW	0,585:1	0,548:1	0,1	0,4
Governor	-	-	*	-	CCW	0,585:1	0,548:1	2,0	1,04
Fuel pump	*	*	*	*	CW	0,44:1	0,41:1	-	0,14
Tachometer	**	**	**	**	CW	0,25:1	0,25:1	-	-
Water pump	*	*	*	*	CCW	0,87:1	0,87:1	0,5	-
Oil pump	*	*	*	*	CCW	0,50:1	0,50:1	0,7	-
" - "	Indicates "does not apply"								
" * "	Standard								
" ** "	Optional								
" CW "	Clockwise								
" CCW "	Counter-clockwise								

for Model 912 F series:

Model 912 F Series								
Accessory	F2	F3	F4	Rotation facing drive pad	speed ratio to crankshaft		Max. torque Nm	Max. overhang moment Nm
					i = 2,2727	i = 2,4286 optional		
Starter	*	*	*	CW	25,25:1	25,25:1	0,5	-
Alternator	**	**	**	CCW	1,32:1	1,24:1	2,0	-
Vacuum pump	**	-	**	CCW	0,585:1	0,548:1	0,1	0,4
Governor	-	*	-	CCW	0,585:1	0,548:1	2,0	1,04
Fuel pump	*	*	*	CW	0,44:1	0,41:1	-	0,14
Tachometer	**	**	**	CW	0,25:1	0,25:1	-	-
Water pump	*	*	*	CCW	0,87:1	0,87:1	0,5	-
Oil pump	*	*	*	CCW	0,50:1	0,50:1	0,7	-
" - "	Indicates "does not apply"							
" * "	Standard							
" ** "	Optional							
" CW "	Clockwise							
" CCW "	Counter-clockwise							

for Model 912 S series:

Model 912 S Series							
Accessory	S2	S3	S4	Rotation facing drive pad	speed ratio to crankshaft i = 2,4286	Max. torque Nm	Max. overhang moment Nm
Starter	*	*	*	CW	25,25:1	0,5	-
Alternator	**	**	**	CCW	1,24:1	1,6	-
Vacuum pump	**	-	**	CCW	0,548:1	0,9	0,4
Governor	-	*	-	CCW	0,548:1	1,8	1,04
Fuel pump	*	*	*	CW	0,41:1	-	0,14
Tachometer	**	**	**	CW	0,25:1	-	-
Water pump	*	*	*	CCW	0,87:1	0,5	-
Oil pump	*	*	*	CCW	0,50:1	0,7	-
" - "	Indicates "does not apply"						
" * "	Standard						
" ** "	Optional						
" CW "	Clockwise						
" CCW "	Counter-clockwise						

for Model 912 iSc series:

Model 912 iSc Series						
Accessory	iSc2	iSc3	Rotation facing drive pad	speed ratio to crankshaft $i = 2,4286$	Max. torque Nm	Max. overhang moment Nm
Starter	*	*	CW	25,25:1	0,45	-
Alternator	**	**	CCW	1,24:1	1,6	-
Vacuum pump	**	-	CCW	0,548:1	0,9	0,4
Governor	-	*	CCW	0,548:1	1,8	1,04
Water pump	*	*	CCW	0,87:1	0,5	-
Oil pump	*	*	CCW	0,50:1	0,8	-
" - "	Indicates "does not apply"					
" * "	Standard					
" ** "	Optional					
" CW "	Clockwise					
" CCW "	Counter-clockwise					

IV - Operational Limitations

1. Temperature Limits:

For A 912 series and 912 F series:

Temperature limits (max permissible)	°C	°F
Cylinder head temperature in use of conventional coolant	150	302
Coolant exit temperature in use of conventional coolant (according installation manual EBHB-912 (German), IM-912 (English) and operator's manual HB-912 (German), OM-912 (English))	120	248
Cylinder head temperature in use of waterless coolant	150	302
Oil temperature at inlet	140	284

For 912 S series:

Temperature limits (max permissible)	°C	°F
Cylinder head temperature in use of conventional coolant	135	275
Coolant exit temperature in use of conventional coolant (according installation manual EBHB-912 (German), IM-912 (English) and operator's manual HB-912 (German), OM-912 (English))	120	248
Cylinder head temperature in use of waterless coolant	135	275
Oil temperature at inlet	130	266

For 912 iSc series:

Temperature limits (max permissible)	°C	°F
Cylinder head temperature in use of conventional coolant	120	248
Coolant exit temperature in use of conventional coolant (according installation manual EBHB-912 i (German), IM-912 i (English) and operator's manual HB-912 i (German), OM-912 i (English))	120	248
Oil temperature at inlet	130	266

2. Speed Limits:

Take-off speed, max. 5 min.: 5800 min⁻¹
 Max. continuous speed: 5500 min⁻¹

3. Pressure Limits:

3.1. Fuel Pressure:

For 912 A/F/S series:

- 1.) BING 892.546 (up to s/n 11.000924)
 892.542 (up to s/n 11.01003)
 0,15 – 0,4 bar / 2.18 – 5.8 psi
- 2.) CORONA 893.110 (from s/n 11.0086)
 893.114 (from s/n 11.0166)
 0,15 – 0,5 bar / 2.18 – 7.25 psi

For 912 iSc series:

2,8 – 3,2 bar / 40.61 – 46.41 psi

3.2. Oil Pressure:

912 A/F/S series:

Oil pressure	bar	psi
Normal operating range above 3500 rpm	2,0 ÷ 5,0	29 ÷ 72.5
Minimum below 3500 rpm	0,8	11.6
At cold start and warming up period (maximum)	7,0	101.5

912 iSc series:

Oil pressure	bar	psi
Normal operating range above 3500 rpm	2,0 ÷ 5,0	29 ÷ 72.5
Minimum below 3500 rpm	0,8	11.6
At cold start and warming up period (maximum)	7,0	101.5

4. Oil capacity, consumption limit:

A series and S series:

Engine oil	Lit	liq pt	US gal.
Oil capacity (maximum-mark tank)	3,0	6.34	0.79
Oil capacity (minimum-mark tank)	2,5	5.28	0.66
Oil consumption per hour (maximum)	0,06	0.127	0.016

F series:

Engine oil	Lit	liq pt	US gal.
Oil capacity (maximum-mark tank)	3,0	6.4	0.8
Oil capacity (minimum-mark tank)	2,5	5.3	0.5
Oil consumption per hour (maximum)	0,06	0.13	-

912 iSc series:

Engine oil	Lit	liq pt	US gal.
Oil capacity (maximum-mark tank)	3,0	6.34	0.79
Oil capacity (minimum-mark tank)	2,5	5.28	0.66
Oil consumption per hour (maximum)	0,06	0.127	0.016

V - Operational and Service Instructions

For 912 A/F/S series:

Description	German	English
Operator's Manual	HB-912	OM-912
Installation Manual	EBHB-912	IM-912
Maintenance Manual Line	WHBL-912	MML-912
Maintenance Manual Heavy	WHBH-912	MMH-912
Overhaul Manual	GHB-912	OHM-912
Overhaul Manual, Appendix	GHBA-912	OHMA-912
Illustrated Parts Catalog	ETK-912	IPC-912
Service Bulletins, Service Instructions and Service Letters	as issued	as issued

For 912 iSc series:

Description	German	English
Operator's Manual	HB-912 i	OM-912 i
Installation Manual	EBHB-912 i	IM-912 i
Maintenance Manual Line	WHBL-912 i	MML-912 i
Maintenance Manual Heavy	WHBH-912 i	MMH-912 i
Overhaul Manual	GHB-912 i	OHM-912 i
Overhaul Manual, Appendix	GHBA-912 i	OHMA-912 i
Illustrated Parts Catalog	ETK-912 i	IPC-912 i
Service Bulletins, Service Instructions and Service Letters	as issued	as issued

VI - Notes

Note 1: Generator / Alternator parallel operation (912 A/F/S series)

For the certification of the optional external alternator the aerospace standard AS 8020 has been determined as applicable requirement.

However compliance to the applicable parts for parallel operation of the internal generator (as integrated part of the engine) and the optional external alternator has not been demonstrated.

Note 2: Vacuum pump (912 A/F/S series)

For 912 A series and 912 F series: Compliance has only been shown to the attachment requirements specified in FAR 33.25.

For S series: Conformity with FAR 33.25 attachment of component has been proven.

Note 3: TBO

For recommended TBO see Service Bulletin SB-912-057.

Note 4: 912iSc Equipment Qualification acc. RTCA/DO-160

Equipment is qualified according to RTCA/DO-160G.

For Section 21 "Emission of Radio Frequency Energy" the Equipment has been qualified according to RTCA/DO-160F.