

**COMANDO DA AERONÁUTICA
DEPARTAMENTO DE PESQUISAS E DESENVOLVIMENTO
CENTRO TÉCNICO AEROESPACIAL**

TYPE CERTIFICATE DATA SHEET Nº EM-2000T02

Type Certificate Holder:

BOMBARDIER- ROTAX GmbH
Welser Straße 32
A-4623 Gunskirchen
ÁUSTRIA

EM-2000T02

Sheet 01

ROTAX

912F2; 912S2

912F3; 912S3

912F4; 912S4

February 2000

Engines of models described herein conforming with this data sheet, which is part of Type Certificate No. 2000T02, meet the minimum standards for use in certificated aircraft in accordance with pertinent aircraft data sheets and applicable portions of the Brazilian Aeronautical Regulations provided they are installed, operated, and maintained as prescribed by the approved manufacturer's manuals and other instructions.

MODEL 912F2, 912F3, 912F4, 912S2, 912S3, 912S4

TYPE Four stroke, four cylinder horizontally opposed, spark ignition engine, propeller drive via integrated reduction gear, liquid cooled cylinder heads, ram air cooled cylinders, dry sump pressure lubrication, dual magneto high-voltage condenser ignition, contactless, 2 x constant-pressure carburetors, electric starter, generator, fuel pump, vacuum pump.

RATINGS	912F2	912F3	912F4	912S2	912S3	912S4
Max. Continuous, hp - rpm: (Sea level pressure altitude)	78 - 5 500	--	--	93 - 5 500	--	--

		912F2	912F3	912F4	912S2	912S3	912S4
	Takeoff (5 min.), hp - rpm: (Sea level pressure altitude)	80 - 5 800	--	--	99 - 5 800	--	--
FUEL TYPE		See Note 6	--	--	--	--	--
CARBURETION / INJECTION		See Note 3	--	--	--	--	--
OIL, LUBRICATION	Oil capacity, lt / US gal:	3 / 0.8	--	--	--	--	--
	Oil specification: see Operator's Manual:	P/N 899.370	--	--	--	--	--
TEMPERATURE LIMITS	Maximum permissible						
	Cylinder head, °C:	150	--	--	135	--	--
	Oil inlet, °C:	140	--	--	130	--	--
PRESSURE LIMITS		See Note 1	--	--	--	--	--
IGNITION	Dual magneto ignition:	See Note 3	--	--	--	--	--
	Ignition Timing :	26° BTDC	--	--	--	--	--
	Spark plugs:	NGK DCPR 7E	--	--	NGK DCPR 8E	--	--
COMPRESSION	Bore, mm:	79.5	--	--	84	--	--
	Stroke, mm:	61	--	--	61	--	--
	Displacement, cm ³ :	1 211	--	--	1 352	--	--
	Compression rate:	9.0:1	--	--	10.5:1	--	--
WEIGHT (See Note 4)	kg :	57.1	59.8	57.1	58.3	61	58.3
CENTER OF GRAVITY	See Installation Manual:	P/N 897.796	--	--	P/N 899.376	--	--
COOLANT	See Operator's Manual:	P/N 899.370	--	--	--	--	--

REDUCTION GEAR RATIO

2.2727:1	--	--	2.4286:1	--	--
2.4286:1 Opt.	--	--			

“--” Indicates same as preceding

IMPORT REQUIREMENTS

Each engine imported separately and/or spare parts must be accompanied by an export airworthiness approval issued by ACG, attesting that the particular engine and/or parts were submitted to the governmental quality control before delivery and are in conformity with the CTA approved type design.

CERTIFICATION BASIS

RBHA 33 (Brazilian Requirements for Aeronautical Certification), which corresponds to FAR 33 Amendt. 15

Option: FAA NPRM Doc. 24922, Notice 92-14.

Special Condition:

- 1) SC1 HIRF requirements as per RTCA DO 160C.
- 2) SC2 approval for external alternator.

	Application	Issued TC
912F2	16 Sept. 1996	23 Feb. 2000
912F3	16 Sept. 1996	23 Feb. 2000
912F4	16 Sept. 1996	23 Feb. 2000
912S2	04 Sept. 1998	23 Feb. 2000
912S3	04 Sept. 1998	23 Feb. 2000
912S4	04 Sept. 1998	23 Feb. 2000

NOTES

NOTE 1 Pressure Limits:

Fuel pressure at inlet to carburetor:

- Maximum + 0.4 bar (5.8 psi)
- Minimum + 0.15 bar (2.2 psi)

Oil pressure:

- Normal operation range ⁽¹⁾: 2.0 bar – 5.0 bar (29 – 73 psi)
- At idle speed, minimum ⁽²⁾: 0.8 bar (12 psi)
- At cold start and warming up period, maximum: 7 bar (103 psi)

(1) Normal operation range : 1.5 bar – 5.0 bar (22 – 73 psi) for 912F up to engine n°. 4,412.764

(2) At idle speed, minimum : 1.5 bar (22 psi) for 912F up to engine n°. 4,412.764

NOTE 2 Accessory drive or mounting provisions

Accessory	912F2	912F3	912F4	Rotation facing Drive Pad	Speed Ratio to Crankshaft	Max. Torque (N.m)	Max. Overhang Moment (N.m)
Starter	*	*	*	C	25.25:1	0.5	#
Alternator	**	**	**	CC	1.32:1	2.0	#
Vacuum Pump	**	#	**	CC	0.58:1	0.1	0.40
Governor	#	*	#	CC	0.58:1	2.0	1.04
Fuel pump	*	*	*	C	0.44:1	#	0.14
Rev-counter	**	**	**	C	0.25:1	#	#
Water Pump	*	*	*	CC	0.87:1	0.5	#
Oil Pump	*	*	*	CC	0.50:1	0.7	#
“#” Does not apply	* Standard		** Optional		“C” Clockwise	“CC” Counter Clockwise	

Accessory	912S2	912S3	912S4	Rotation facing Drive Pad	Speed Ratio to Crankshaft	Max. Torque (N.m)	Max. Overhang Moment (N.m)
Starter	*	*	*	C	25.25:1	0.5	#
Alternator	**	**	**	CC	1.32:1	2.0	#
Vacuum Pump	**	#	**	CC	0.54:1	0.1	0.40
Governor	#	*	#	CC	0.54:1	2.0	1.04
Fuel pump	*	*	*	C	0.44:1	#	0.14
Rev-counter	**	**	**	C	0.25:1	#	#
Water Pump	*	*	*	CC	0.87:1	0.5	#
Oil Pump	*	*	*	CC	0.50:1	0.7	#
"#" Does not apply	* Standard		** Optional		"C" Clockwise	"CC" Counter Clockwise	

NOTE 3 Equipment:

Carburetor 2 x BING constant depression carburetors Type 64/32, main nozzle 158 or 155 for F series and 155 for S series.
 Fuel pump: Mechanical pump, Pierburg 720.971.55.
 Ignition unit: ROTAX, dual, breakerless capacitor discharge ignition, SMD design.
 Integrated generator: DUCATI, permanent magnet generator with external rectifier regulator.
 External alternator: NIPPODENSO F3A with integrated regulator (optional).
 Electric Starter: NIPPODENSO, permanent magneto, 12V / 0.6 kW, engagement via reduction gear and freewheel.
 Vacuum pump: AIRBORN 211C, including drive (optional) See Note 9.
 Rev counter: Connection fro electronic rev-counter, drive for mechanical rev-counter (optional).

Propeller control: For 912F series:
 WOODWARD.... hydraulic governor, 210.786 (for F3 only), See Note 10.
 WOODWARD..... 210.790 for i=2.27 and i=2.43 with feathering arrangement.
 WOODWARD..... 210.786 for i=2.43
 McCAULEY..... DCFU 290D17B/T1 for i=2.27, execution with or without feathering arrangement.
 McCAULEY..... DCFU 290D17B/T2 for i=2.43, execution with or without feathering arrangement.

NOTE 3
(cont.)

For 912S series:

WOODWARD.... hydraulic governor, 210.786 (for S3 only), See Note 10.

WOODWARD..... 210.786 for i=2.43

WOODWARD..... 210.790 for i=2.43 with feathering arrangement.

McCAULEY..... DCFU290D17B/T2 for i=2.43, execution with or without feathering arrangement.

NOTE 4 Engine weight is defined as the following configurations:

Version 912 F2 / 912 F4: 57.1 kg (125.9 lb) with ignition unit and generator, carburetor, oil tank and electric starter, but without the muffler and radiator.

Version 912 F3: 59.8 kg (131.8 lb) with propeller flange P.C.D. 75/80 mm / 4", drive gear, adapter and hydraulic governor for constant speed propeller.

Version 912 S2 / 912 S4: 58.3 kg (128.5 lb) with ignition unit and generator, carburetor, oil tank and electric starter, but without the muffler and radiator.

Version 912 S3: 61 kg (134.5 lb) with propeller flange P.C.D. 75/80 mm / 4", drive and adapter for hydraulic governor for constant speed propeller.

Alternator (external): 3.0 kg (6.6 lb)

NOTE 5 Model description

F2 Basic Model: four stroke, spark ignition, four 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, 2 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 DC generator, vacuum pump drive (optional), external alternator (optional).

NOTE 5 (cont.)	F3	Similar to F2, except additional drive and adapter for hydraulic governor, hydraulic governor and propeller shaft for constant speed propeller.
	F4	Similar to F3, except fixed pitch propeller, prepared for hydraulic governor for constant speed propeller (without drive, adapter and governor)
	S2	Similar to F2, except the increased power
	S3	Similar to F3, except the increased power
	S4	Similar to F4, except the increased power

NOTE 6 Fuel Specifications (see Operator's Manual as defined in Note 7):

912 F series:

- 100LL AVGAS in accordance with American Society for Testing & Materials (ASTM) D91 0.
- Automotive gasoline, unleaded, minimum RON 90, in accordance with ASTM D4814

912 S series:

- 100LL AVGAS in accordance with American Society for Testing & Materials (ASTM) D91 0.
- Premium gasoline, unleaded, minimum RON 95, in accordance with ASTM D4814

NOTE 7 Operating and Service Instructions:

Operator's Manual for Rotax 912 F/S series Aircraft Engine – P/N 899.370
Maintenance Manual for Rotax 912 F/S series Aircraft Engine – P/N 899.372
Installation Manual for Rotax 912 F series Aircraft Engine – P/N 897.796
Installation Manual for Rotax 912 S series Aircraft Engine – P/N 899.376
Overhaul Manual for Rotax 912 F series Aircraft Engine – P/N 897 794

NOTE 8 Generator and Alternator Operation:

The optional external alternator was certified with the engine under 14-CFR, part 33, using some of the standards specified in Aerospace Standard AS 8020. Compliance to the AS 8020 standard for parallel operation of the external alternator and internal generator has not been demonstrated.

- NOTE 9** Vacuum Pump:
The vacuum pump is optional for the 912 F2/S2 and 912 F4/S4 engine models, and not applicable, nor available, for the 912 F3/S3 model. Compliance has only been shown to the attachment requirements specified in FAR 33.25
- NOTE 10** 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 proved.
- NOTE 11** Parts identification and coding are subject in the Rotax Operator's Manual of latest approved revision, Section C VA-no. LG11-011
- NOTE 12** For 912 S series only: engine overhaul exclusively by Rotax until Overhaul Manual has been published.

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