

U.S. DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION TYPE CERTIFICATE DATA SHEET E00051EN	E00051EN REVISION: ORIGINAL DATE: FEBRUARY 2, 1995 BOMBARDIER-ROTAX GMBH MOTORENFABRIK MODELS: ROTAX 912 F2 912 F3 912 F4
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Engines of models described herein conforming with this data sheet (which is part of Type Certificate Number E00051EN) 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 Federal Aviation Regulations, provided they are installed, operated, and maintained as prescribed by the approved manufacturer's manuals and other approved instructions.

TYPE CERTIFICATE (TC) HOLDER      Bombardier- Rotax GmbH  
 A-4623 Gunskirchen, Austria

I. MODELS	912 F2	912 F3	912 F4
TYPE	For models 912 F2 and 912 F3: four cylinder, horizontally opposed, four stroke engine, reduction gear driven, liquid cooled cylinder head's, 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.  For Model 912 F4: instead of the vacuum pump, a hydraulic constant speed propeller control is mounted.		
RATINGS			
Takeoff power (5 min.) : (sea level pressure altitude)	59.6 kW/81 HP at 5,800 rpm	--	--
Max. continuous power : (sea level pressure altitude)	58 kW/79 HP at 5,500 rpm	--	--
OIL pressure:	Normal operating range 1.5 - 5 bar (22 to 73 psi), with maximum coldstart value of 7 bar (102 psi), and minimum value of 1.5 bar (22 psi) - (see Note 2.).		
Max. oil-temperature (° C):	140	--	--
Max. cylinder-head temperature (° C) :	150	--	--
COOLANT			
temperature:	Monitored via cylinder head temperature		
specification:	see Note 7 for a reference to coolant specifications (ref. Operator's Manual).		
FUEL pressure: (see note 2)	minimum: 0.15 bar (2.2 psi) maximum: 0.4 bar (5.8 psi)		
OIL, Lubrication:	maximum capacity: 3.0 L (2.84 qts) See Note 7 for a reference to oil specifications (reference Operator's Manual).		

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LEGEND: "--" INDICATES "SAME AS PRECEDING MODEL"  
 "---" INDICATES "DOES NOT APPLY"

I. MODELS (Continued)	912 F2	912 F3	912 F4
CARBURETOR	2 x Bing constant pressure carburetor type 64/32 main nozzle 158 or 155		
FUEL PUMP	Mechanical pump, Pierburg 720 971.55 - Rotax P/N 996 590		
IGNITION SYSTEM Ignition timing	Rotax dual magneto high-voltage condenser ignition, contactless SMD type. 26° BTC		
SPARK PLUGS	NGK DCPR 7E		
ALTERNATOR, external	Nippondenso F3A with integrated regulator. (OPTIONAL - see Note 8.)		
GENERATOR	Integrated Ducati, permanent single phase generator with external regulator rectifier.		
STARTER	Nippondenso ferrite type 12V / 0.6 kW, engagement via reduction gear and freewheel.		
VACUUM PUMP	Airborne 211 CCW, including drive. (OPTIONAL) - see Note 9.		
ENGINE SPEED MEASUREMENT (rpm)	electronic tachometer connector and optional mechanical tachometer drive		
WEIGHT (dry) (see Note 4.)	60.1 kg (132.5 lbs)	62.8 kg (138.46 lbs)	60.1 kg (132.5 lbs)
DISPLACEMENT	1211 cm <sup>3</sup> (73.9 in <sup>3</sup> )	--	--
BORE	79.5 mm (3.13 in.)	--	--
STROKE	61 mm (2.40 in.)	--	--
COMPRESSION RATIO	9.0 : 1	--	--
PROPELLER ROTATION	CCW	--	--
PROPELLER FLANGE	P.C.D. 75 mm, 80 mm, and 4 inch diameter for fixed propeller	P.C.D. 75 mm, 80 mm, and 4 inch diameter with drive for hydraulic gov. for constant speed propeller	P.C.D. 75 mm, 80 mm, 4 inch diameter prepared for hydraulic gov. for constant speed propeller
GEAR REDUCTION (crankshaft to prop)	2.2727 : 1	--	--
PROPELLER CONTROL	---	---	adapter and drive for hydraulic constant speed propeller
GOVERNOR (see Note 10.)	---	Woodward, (Rotax part number 210 786)	---
OPERATING INSTRUCTIONS	For models 912 F2, F3 and F4: Operator's Manual for Rotax engine type 912 F, dated December 22, 1994, or latest revision (see Note 7. of this Data Sheet).		

## CERTIFICATION BASIS

14-CFR, part 33, Airworthiness Standards: Aircraft Engines, effective February 1, 1965, as amended by 33-1 through 33-15, inclusive, including Federal Aviation Administration Special Condition, NPRM Doc. 24922, Notice 92-14.

<u>MODEL</u>	<u>DATE OF APPLICATION</u>	<u>DATE TC ISSUED OR REVISED</u>
912 F2	November 18, 1993	February 2, 1995
912 F3	November 18, 1993	February 2, 1995
912 F4	November 18, 1993	February 2, 1995

## IMPORT REQUIREMENTS

To be considered for installation on United States registered aircraft, each engine (or propeller) to be exported to the United States shall be accompanied by a certification of airworthiness for export, or certifying statement endorsed by the exporting cognizant civil airworthiness authority, which contains the following language:

(1) This engine (or propeller) conforms to its United States type design (Type Certification Number E00051EN) and is in a condition for safe operation.

(2) This engine (or propeller) has been subjected by the manufacturer to a final operational check and is in a proper state of airworthiness.

Reference 14-CFR, part 21.500, which provides for the airworthiness acceptance of aircraft engines or propellers manufactured outside of the United States for which a United States type certificate has been issued.

Additional guidance is contained in FAA Advisory Circular 21-23, Airworthiness Certification of Civil Aircraft, Engines, Propellers, and Related Products, Imported into the United States.

Service Bulletins, structural repair manuals, vendor manuals, aircraft flight manuals, and overhaul and maintenance manuals, which contain a statement that the document is Austro Control GmbH approved, are accepted by the FAA and are considered FAA approved. These approvals pertain to the type design only.

<b>NOTES</b>
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NOTE 1: Temperature Limits (maximum permissible):

Cylinder head:	150°C
Oil inlet:	140°C

NOTE 2: Pressure Limits:

Fuel Pressure at inlet to Carburetor: 0.15 bar (2.2 psi) - minimum  
0.40 bar (5.8 psi) - maximum

The delivery pressure of a fuel pump connected in series (backing pump) must not exceed 0.3 bar (4.4 psi) to ensure not to override the float valve in the carburetor

Oil pressure :

normal operation:	1.5 bar - 5.0 bar (22. - 73. psi)
idling:	1.5 bar (22 psi) - minimum
starting & Warm-up:	7 bar (102. psi) - maximum

## NOTE 3: Accessory Drive Mounting Provisions:

Accessory	912 F2	912 F3	912 F4	Rotation, facing drive pad	Speed Ratio, to crankshaft	Maximum Torque	Overhung moment (max.)
Starter	*	*	*	<b>CW</b>	<b>25.25 : 1</b>	<b>0.5 Nm</b>	---
Alternator	**	**	**	<b>CCW</b>	<b>1.32 : 1</b>	<b>2.0 Nm</b>	---
Vacuum pump	**	---	**	<b>CCW</b>	<b>0.58 : 1</b>	<b>0.1 Nm</b>	<b>0.4 Nm</b>
Governor		*	---	<b>CCW</b>	<b>0.58 : 1</b>	<b>2.0 Nm</b>	<b>1.04 Nm</b>
Fuel pump	*	*	*	<b>CW</b>	<b>0.44 : 1</b>	---	<b>0.14 Nm</b>
Tachometer	**	**	**	<b>CW</b>	<b>0.25 : 1</b>	---	---
Water pump	*	*	*	<b>CCW</b>	<b>0.87 : 1</b>	<b>0.5 Nm</b>	
Oil pump	*	*	*	<b>CCW</b>	<b>0.50 : 1</b>	<b>0.7 Nm</b>	---

"---" indicates "does not apply"

"\*\*" standard feature

"\*\*\*" optional feature

"CW" clockwise

"CCW" counter clockwise

## NOTE 4. Engine weight is defined as the following configurations:

912 F2 / 912 F4: 60.1 kg (132.5 lbs), with ignition unit and generator, carburetor, oil tank and electric starter, but without the muffler and radiator.

912 F3: 62.8 kg (138.46 lbs), 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 lbs).

Center of Gravity (CG): Reference the 912F Installation Manual, latest revision (see Note 7.).

## NOTE 5. Fuel Specifications (see Operator's Manual as defined in note 7):

o 100LL AVGAS in accordance with American Society for Testing & Materials (ASTM) D910.

o Automotive gasoline, unleaded, minimum RON 90, in accordance with ASTM D4814.

## NOTE 6. Model Description:

F2	Basic model; 4-stroke, 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 DC generator, vacuum pump drive (optional), external generator (optional).
F3	Same as F2, except; additional drive and adapter for hydraulic governor propeller shaft for constant speed propeller.
F4	Same as F3, except; fixed pitch propeller, prepared for hydraulic governor for constant speed propeller (without drive, adapter and governor).

## NOTE 7. Operating and Service Instructions:

\*Operator's Manual for Rotax 912 F Aircraft Engine - part number 897790

\*Installation Manual for Rotax 912 F Aircraft Engine - part number 897796

\*Maintenance Manual for Rotax 912 F Aircraft Engine - part number 897792

**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 propeller shaft driven Airborn 211 CCW vacuum pump is optional for the 912 F2 and 912 F4 engine models, and not applicable, nor available, for the 912 F3 model. Gear ratio is 1 : 0.758, overall gear ratio is 1.724, with a counter clockwise rotation (forward looking aft).

During 14-CFR, part 33 certification of the 912 F series engine, compliance for the vacuum pump has only been shown to the attachment requirements of 14-CFR, part 33.25.

**NOTE 10. Governor:**

The 912 F3 hydraulic constant speed governor is manufactured by Woodward (part number 210 786). Gear ratio is 1 : 0.758, overall gear ratio is 1.724, with a counter clockwise rotation (forward looking aft). Maximum power consumption of hydraulic governor is 600 W.

During 14-CFR, part 33 certification of the 912 F series engine, compliance for the Woodward hydraulic governor has been shown to the attachment requirements of 14-CFR, part 33.25, and in lieu of 14-CFR, part 35.42 (as required by part 33.19(b)), JAR-E (b)(1)(ii) was used for governor functional testing.

**NOTE 11. Engine Attitude:**

The 912 F2/F3/F4 model engines have been certified up to a maximum 40 degree bank angle, with no loss of lubrication capability of the dry sump system. See Rotax 912 F Operator's Manual, section 7, titled, Operating Instructions.

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