



ROTAX

Manual for ROTAX-engine type 535 C

Manufacturer: BOMBARDIER-ROTAX GMBH,
A-4623 Gunskirchen/Austria

Engine serial no.: _____

Aircraft type: _____

Registration no.: _____

Operator: _____

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Approval of translation has been done by best knowledge
and judgement - in any case the original text
in German language is authoritative

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TYPE 535 C

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ROTAX.

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3) Log of revision

revision no.	edition date of revision	authority approval date	revised page no.	date of entry in manual and name



4) General engine description

Twin-cylinder in line- 2-stroke Otto engine

liquid cooling

lubrication by fuel-oil-mixture

1 diaphragm carburetor (vertical)

dual magnetic high-voltage condenser ignition,
contactless

crankshaft layout for belt transmission

electric starter

AC-generator

pneumatic fuel pump

installation only for operation with cylinder head upside

fuel filter to be provided by the aircraft manufacturer

air intake silencer (from aircraft manufacturer)

5) Technical data

Bore:.....	2 x 72 mm (2,83 in.)
Stroke:.....	64 mm (2,52 in.)
Displacement:.....	521,2 cm ³ (31,8 in. ³)
Compression ratio:.....	11,5
Ignition unit:.....	dual magnetic high-voltage condenser ignition, contactless, 12V 100W
ignition box:	a) BOSCH or b) DUCATI (in serial production since engine no. 3.461.582)
Spark plugs:	a) B8ES, BOSCH W3CC, W3CP b) BR8ES, BOSCH WR3CC, WR3CP
Ignition timing:.....	1,36 mm (.05 in.) ± 0,25 = 15° B.T.D.C.
Spark plugs:.....	NGK B8ES, BOSCH W250 T2, W3CC, W3CP
Electrode gap:.....	0,4 - 0,6 mm (.016 - .024 in.)
Carburetor:.....	1 diaphragm carburetor BN 38, Mj 1 1/2, lj 1 1/8
Rotary valve:.....	opening 148° B.T.D.C. closing 54° A.T.D.C.
Rotary sense of crankshaft:.....	counter-clockwise rotation, looking on drive shaft
Starter:.....	Inertia drive electric starter AB
Fuel:.....	2-stroke mixture, Premium fuel not below RON 96, AVGAS 100LL
Lubrication:.....	Oil-fuel-mixture, mixing ratio 1:50, with SUPER 2-stroke-oil
Oil quantity in rotary:.....	2-stroke motor oil in engine 180 cm ³ (10,98 in. ³)
valve drive:.....	minimum total in system 280 cm ³ (17.08 in. ³)



Cooling:	liquid cooling with water pump, radiator and expansion tank
Cooling liquid:.....	water with anti-freeze for -20°C (-4°F) for altitude flights, increase anti-freeze content to -40°C (-40 °F)
Quantity of liquid in engine:.....	1,5 l (.396 gal)
min. liquid quantity in system: .	2,2 l (.581 gal)
Weight:	with exhaust system and electric starter: dry weight 35 kg (77,16 lb.)
	with min. liquid quantity 37,5 kg (82,67 lb.), without radiator

6) Operational data and limitations

Take-off power:	44 kW / 60 HP / 7200 r.p.m.
Max. continous power:.....	44 kW / 60 HP / 7200 r.p.m.
Max. continous r.p.m.:.....	7200 r.p.m.
Idle r.p.m.:	approx. 2500 r.p.m.
Max. temperature of cooling liquid in cylinder head:.....	95°C (203° F)

Fuel consumption:

at 100 % continous power:	approx. 29 l/h (7,66 gal/h)
at 75 % continous power:.....	approx. 22 l/h (5,81 gal/h)

Further data see page 18.

7) Operating instructions

For correct function of the engine it is imperative to observe exactly the following operating and maintenance instructions.

7.1) Before starting the engine

Has daily check been made? (see page 10)

Open throttle lever fully.

Check throttle lever for free movement on full range.

Check choke command to open and close fully.

Ignition: „OFF“

Turn propeller several times by hand to check for abnormal noise or hard motion of engine.

7.2) Starting procedure

Fuel cock open

Choke closed

Throttle lever approx. 1/4 from idle
position

Ignition/main switch „ON“

Starter button press

As soon as engine has started, release starter button, open choke and set throttle lever in a position that engine runs smoothly at approx. 2500 r.p.m.

7.3) Warm-up period, ground test

Allow engine to warm up at approx. 2500 r.p.m. for 2 minutes, then continue warming up during taxiing to achieve sound two-stroke operation.



7.4) Ignition test (function check of both circuits)

to be tested at 3000 r.p.m.

Switch off ignition circuit 1

for a short period - maximum r.p.m. drop 300 r.p.m.

Switch off ignition circuit 2

for a short period - maximum r.p.m. drop 300 r.p.m.

7.5) Take-off

Acceleration up to full throttle, maintain this throttle position during initial climb, then reduce power. Observe temperature of cooling liquid. The limit values must not be exceeded.

7.6) Engine stop (engine shut-down)

Before stopping the engine, run it for approx. 1 minute at idle speed to balance heat stress and to build up a sufficient lubricating film. Then stop engine by switching off the ignition.

7.7) Engine stop and start during flight

To stop, set throttle lever at idle speed, reduce speed to about 100 km/h and switch off ignition. The propeller continues turning after switching off the ignition (wind mill effect).

Actuate propeller brake.

Starting procedure is the same as on ground. As long as the engine is still warm, the choke remains pushed (open).



8) Maintenance instructions

8.1) Daily check before flight

Check fuel quantity.
Check oil level for rotary valve drive.
Check cooling liquid.
Check throttle lever and choke for free movement.
Check outside of engine, engine compartment, belt transmission and mountings for proper condition.
Visual inspection of water- and oilsystem for leaks.

8.2) Inspection after every 25 hours of operation

Replace spark plugs. Check mounting screws for tightness. Check cables bowden and actuating controls.
Check wires and electrical connections. Clean carburetor cover. if necessary, re-adjust idle r.p.m.
Check fixation of charging coil and ignition coil according to technical note no. 535-04.

8.3) Inspection after every 50 hours of operation

Check rotary valve drive for wear (see paragr. 8.12). Check cooling system for leaks. Change gear oil of rotary valve drive.

8.4) Inspection once a year

Replace fuel filter. Check fuel line for its condition and for leaks.
Clean engine. Check and grease starter gear. Visual inspection of water- and oilsystem for leaks.

8.5) Change cooling liquid every 3 years

8.6) Inspection after 300 hours or 6 years of operation

General overhaul by manufacturer or a maintenance workshop authorized by the manufacturer and the Civil Aviation Authorities, after 300 hours of operation or 6 years at the latest after putting into operation (first flight).



8.7) Conservation and storage of engine

If the engine is stored for prolonged time (2 months and more) or is out of use, preserve and store it as follows:

After warm-up, with engine idling, inject approx. 20 cm³ (1.22 in.³) of conservation oil (Shell Ensis, Mobilarma 524, BP Protective Oil or adequate oil) into the carburetor and stop engine. Crank engine through by hand until compression can be felt. Cover intake openings on carburetors and exhaust tube on muffler. Drain fuel and cooling system.

8.8) Hints for re-activation of preserved engine

Open intake- and exhaust openings, refill fuel and cooling system, take off spark plugs and crank engine with electric starter until oil residues are blown out of the combustion chamber.

8.9) Table of screw torques

Spark plugs	28 Nm
Cylinder head	22 Nm
Magneto flywheel	140 Nm
Drive pulley	50 Nm
Crankcase studs M10:	40 Nm
and screws M8:	22 Nm
screws M6:	10 Nm

8.10) Setting idle speed

Adjust idle mixture screw „L“ according to page 6. Let engine warm up and set idle speed at approx. 2500 r.p.m. by turning throttle stop screw. It should be tried to achieve a smooth running of the engine.

8.11) Inspection of ignition timing

The ignition timing mark is stamped on the starter gear. As corresponding mark take the line on a colour dot on the crankcase. For checking the ignition point, use an ignition stroboscope (e.g. Bosch Pocket Sonde ETZ 003-0684100 300).

Check at 3000 r.p.m.

The ignition is set correctly if the spark comes within 2 mm before or after the mark.

For correction, move armature plate.

8.12) Inspection of rotary valve wear

Dismount rotary valve cover with carburetor. The gear backlash of the drive gear can be checked from outside by turning the rotary valve shaft (by hand). The maximum play measured at the teeth of the rotary valve splines of the shaft is 0,9 mm (.35443 in.) (wear limit).

9) Trouble shooting

Engine does not start:

No fuel supply:

Check fuel line to carburetor.

Check function of fuel pump.

When starting cold engine: Choke does not close fully.

No spark:

- on 1 spark plug of one ignition circuit:

Spark plug, ignition cable or electronic box defective.

- on both spark plugs of one ignition circuit:

Too low cranking r.p.m.,

weak battery

shorting cable or stop switch having ground connection,

electronic box defective, if after interchanging

the boxes with the other ignition circuit the

trouble appears on the other ignition circuit:

if not, armature plate or cables may be defective.

- no spark on all plugs

too low cranking r.p.m.

weak battery,

shorting cable or stop switch having ground connection,

defective cable(s)



Exchange electronic boxes: if one circuit is functioning again, the stator plate and one electronic box are defective.

Engine is flooded:

Start at full throttle until engine starts.

Engine gets too hot:

Carburetor jets clogged,
fuel supply insufficient,
fuel filter contaminated,
cooling not in order,
cooling liquid not sufficient,
radiator clogged,
pump impeller loose or defective,
cooling liquid lines clogged,
spark plugs defective,
ignition timing not correct.

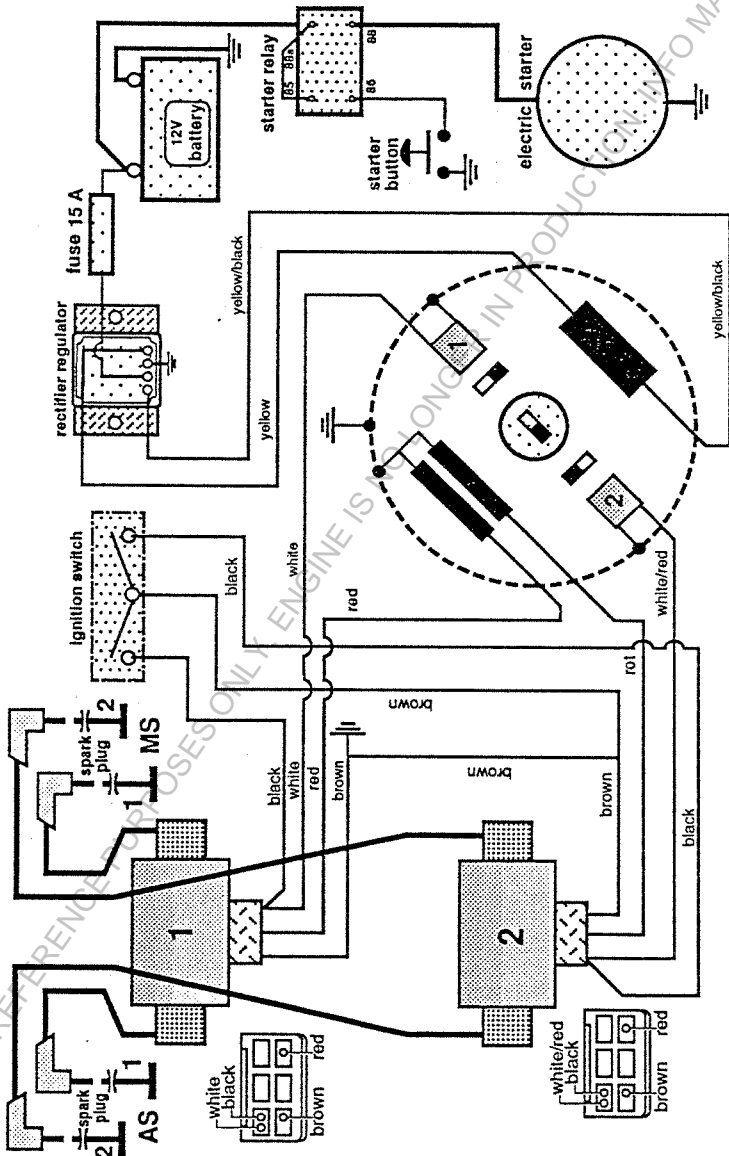
Engine does not reach ground test r.p.m.:

Fuel supply insufficient,
carburetor contaminated,
throttle valve does not open fully,
choke does not open fully,
spark plugs defective,
impulse line for fuel pump clogged or leaking,
rotary valve defective or incorrectly positioned.

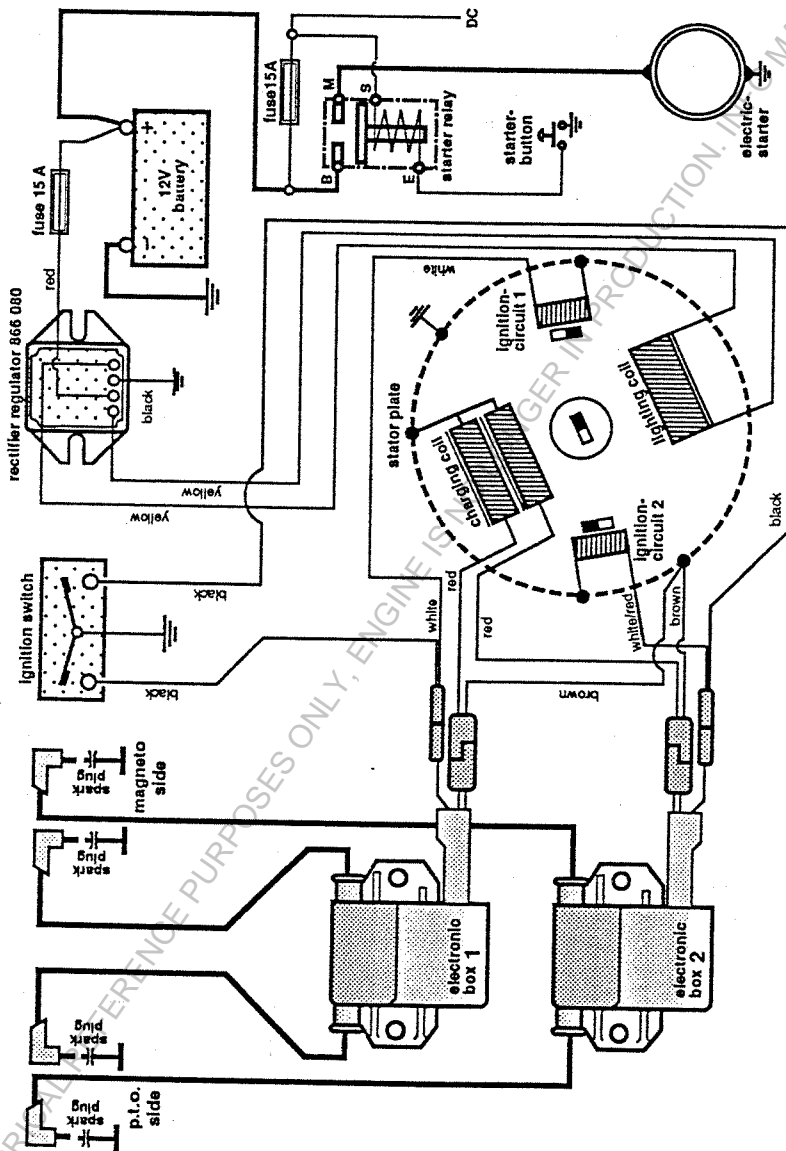
Inspection by manufacturer or in an authorized maintenance workshop (see 8.6.).



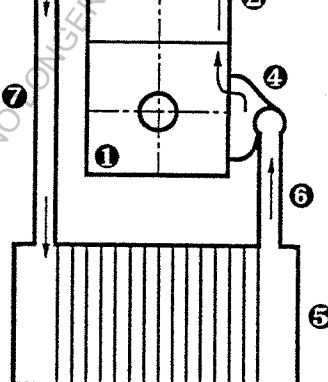
10) Wiring diagram ROTAX 535 C (configuration with BOSCH stator plate and BOSCH ignition boxes up to engine no. 3.461,591)



11) Wiring diagram ROTAX 535 C (configuration with BOSCH stator plate and DUCATI ignition boxes since engine no. 3,461,582)

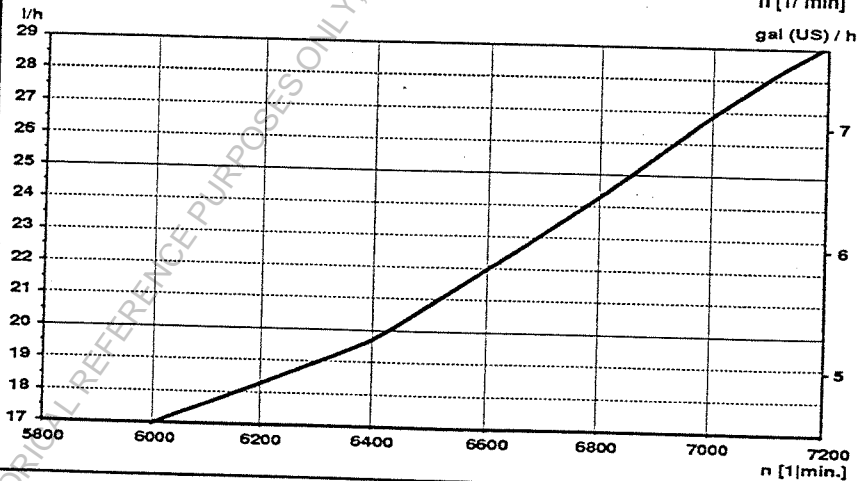
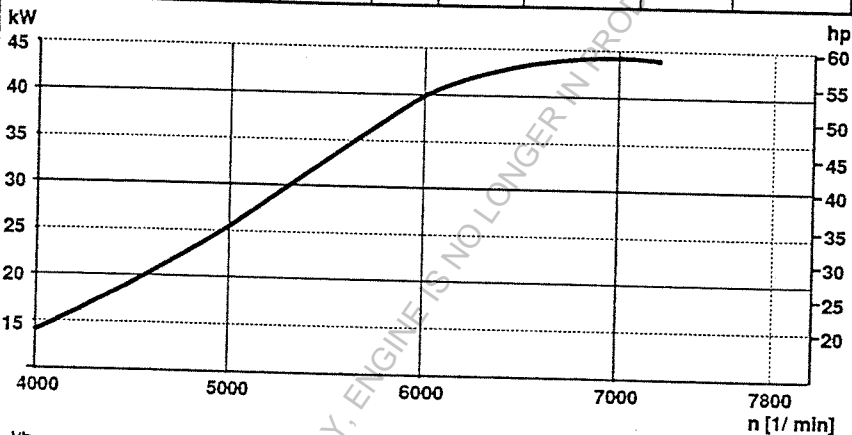


12) Cooling circuit ROTAX 535 C

- 
- ① crankcase
 - ② cylinder
 - ③ cylinder head
 - ④ water pump
 - ⑤ radiator
 - ⑥ line from radiator to engine
 - ⑦ line from cylinder head to radiator
 - ⑧ expansion tank
 - ⑨ temperature gauge for cooling water on cylinder head

13) Power sheet ROTAX 535 C

	n	P		be	B	W-Temp.
	1/min.	kW	PS	g/kWh	l/h	°C
Take-off power	7200	44	60	481	29	75
max. continuous power	7200	44	60	481	29	75
75% continuous power	6600	33	44,8	486	22	72
idle r.p.m.	2500	—	—	—	—	—



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