

**Special inspection to increase the TBO for engine type 912 UL**

FOR INFORMATION ONLY.
WITHOUT COMMITMENT TO ADVISE MODIFICATIONS.

1) Repeating symbols

Please, pay attention to the following symbols throughout the service info. emphasizing particular information.

- ▲ **WARNING:** Identifies an instruction, which if not followed, may cause serious injury or even death.
- **ATTENTION:** Denotes an instruction which if not followed, may severely damage the engine or other components.
- ◆ **NOTE:** Information useful for better handling.

2) Subject

Increase of TBO from 600^h/10 years to 1200^h/15 years.

3) Engines affected

Generally all engines of Series Type 912 UL up to and including engine No. 4,152.666 From engine N. 4,152.667 onwards the 1200^h TBO is covered by SI 26 UL-94.

4) Reason

In the agreement of the 27, July 1992 with the Type Certificate Authority ACG the program for the 1. extension of the time between overhauls was conducted. Owing to the good findings of the 5 engines examined, the TBO can be increased from the present 600^h/10 years to the period of 1200^h/15 years.

5) Compliance

On all engines up to and including engine N. 4,152.666 the 600^h examination has to be carried out to obtain the TBO of 1200^h/15 years.

6) Remedy

Not required.

7) Accomplishment

These tasks to be performed according to instructions overleaf. Amendment no. 6 of the Operator's manual in April 1994 to be entered without delay or the manual to be exchanged for a new one of Series 912 UL - Rev. 6.

The necessary measures to be taken and confirmed by the producer or by persons entitled from the Aviation Authorities. New Operator's Manual with the amendment N. 6 from April 1994 entered, is readily available at Bombardier-ROTAX, A-4623 Gunskirchen.



8) Instructions:

8.1) Basically:

On the occasion of the 600 h inspection the following tasks according to state of amendment have to be taken care of. As guideline consider, the following list of Service Informations.

8.2) Technical Bulletins

The following Service-Informations have to be taken into account .

SI 10 UL 91 E	SI 3 UL 93 E	SI 20 UL 94 E
SI 1 UL 92 E	SI 8 UL 93 E	SI 21 UL 94 E
SI 2 UL 92 E	SI 1 UL 94 E	SI 26 UL 94 E
SI 2 UL 93 E	SI 5 UL 94 E	SI 27 UL 94 E

State of amendments:

The following modifications as per list of amendments have to be carried out.

Concerning	up to and including engine no.
Introduction of friction washer at drive gear	3,792.880
Length of oil pump rotor increased from 13 mm to 16 mm.	3,792.943
Conversion to modified compression spring in oil pump to improve pressure control.	4,005.185
Change to inside centering of disk springs in the gear box (see spare parts list no. 825, latest edition).	4,005.323
Oil tank of steel with a drain plug	4,005.537
Shim to adjust pressure of relief valve on oil pump.	4,152.274
Rubber plate for protection of expansion tank	May 1993
Change to steel bush in dog gear (see spare parts list no. 825, latest edition).	4,152.553
Three disk springs 3 mm thick instead of two with 3 mm and one with 2,5 mm thickness.	Dec. 1993
Washer in water pump out of stainless steel.	4,152.606
Thrust washer behind retaining ring in gear box out of wear resistant plastic.	4,152.659
Ring halves on the prop shaft out of material poor of sulfur.	4,152.666



8.3) Withdrawal of propeller gear

Withdrawal of the gear box; in most cases with the engine installed in the aircraft. Disconnect minus terminal of battery. Remove engine cowling as required and propeller as per instructions of aircraft producer.

Remove the two Allen screws M8x45 and eight Allen screws M6x45 along with lock washers. The gear cover is positioned by two dowel pins. Fit the puller assembly ① part no. 877 660 on the two tapped lugs M8 ② of gear cover. Tap off gear cover assembly by impact handle ③ without the risk of damaging propeller shaft and bearing. Clean sealing face of crankcase.

Turn crankshaft into T.D.C. position for cylinder 1 and 2 and lock crank-

shaft by fitting screw 240 880 instead of plug screw. To facilitate positioning of crankshaft, turn crankshaft until the forged four-digit number ④ on flywheel ⑤ aligns with the edge ⑥ of the ignition cover.

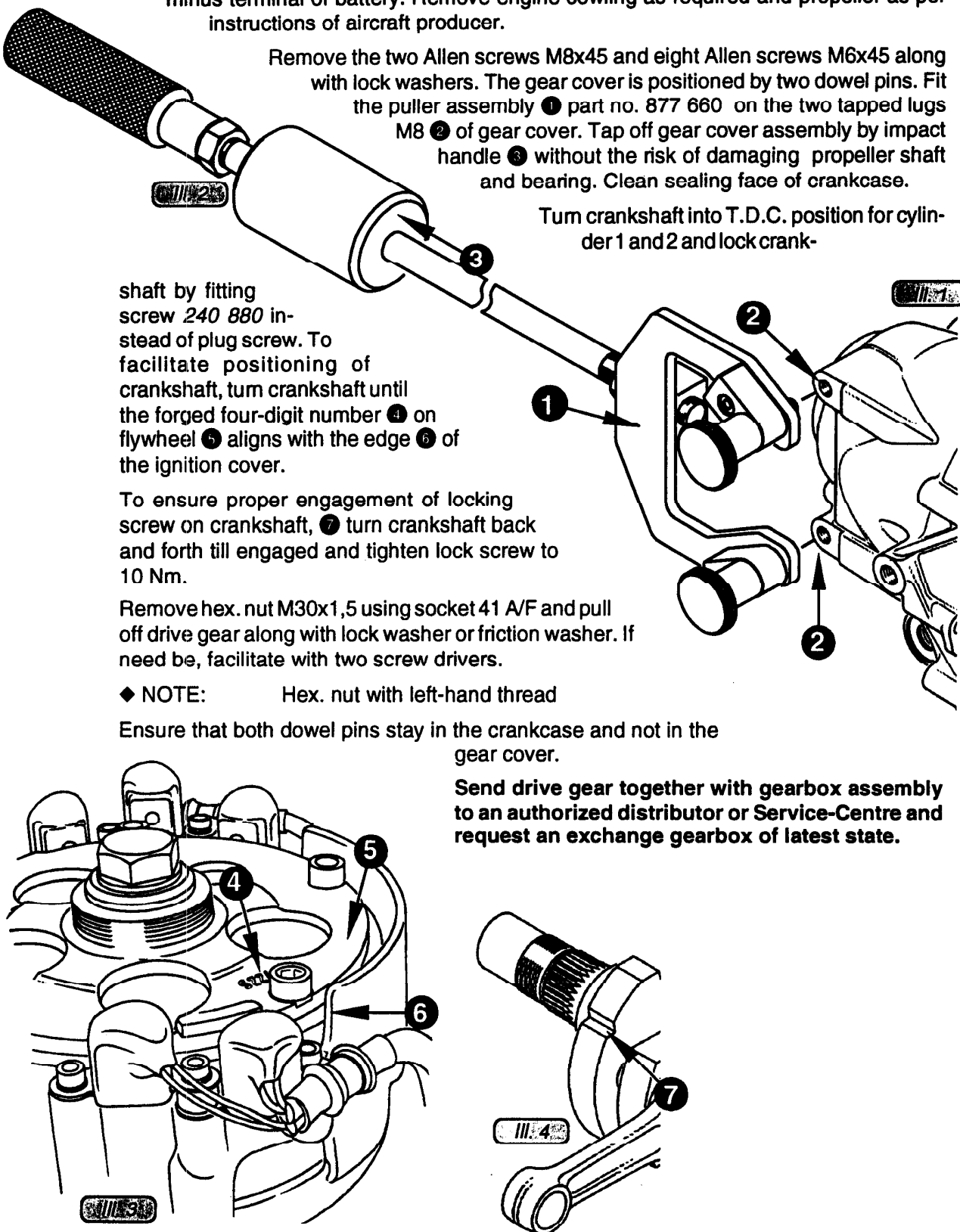
To ensure proper engagement of locking screw on crankshaft, ⑦ turn crankshaft back and forth till engaged and tighten lock screw to 10 Nm.

Remove hex. nut M30x1,5 using socket 41 A/F and pull off drive gear along with lock washer or friction washer. If need be, facilitate with two screw drivers.

◆ NOTE: Hex. nut with left-hand thread

Ensure that both dowel pins stay in the crankcase and not in the gear cover.

Send drive gear together with gearbox assembly to an authorized distributor or Service-Centre and request an exchange gearbox of latest state.

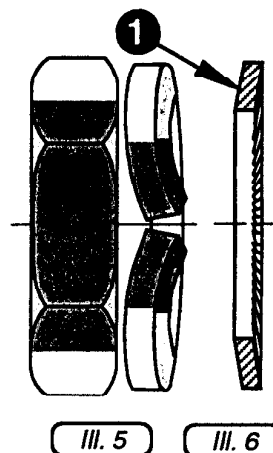




8.4) Friction washer

If hex. nut is still secured by a lock washer, it has to be exchanged for the friction washer ①. Slide drive gear of the exchange gearbox on cleaned serration of crankshaft and fit friction washer and hex. nut M30x1,5.

■ ATTENTION: Secure hex. nut with LOCTITE 221. Hex. nut with L.H. thread.



8.5) Renewal of oil seal and roller bearing

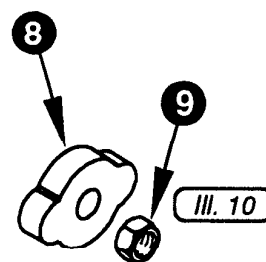
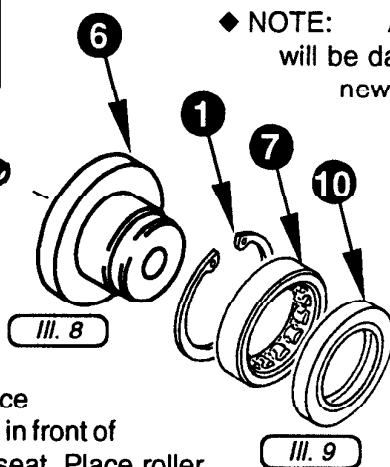
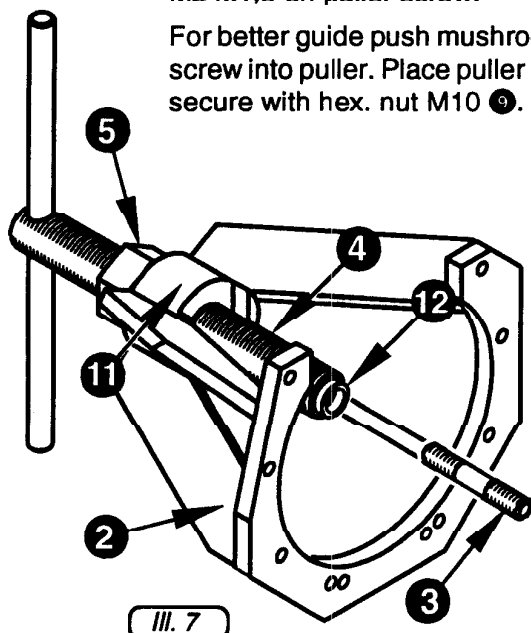
Remove circlip ① using a pair of circlip pliers. Attach puller structure ② 877 615 with 8 Allen screws M6x25 on crankcase. Fit stud ③ M10x45/20 into puller screw ④ 877 580 and hex. nut ⑤ M24x1,5 on puller screw.

For better guide push mushroom insert ⑥ 877 592 into roller bearing ⑦ and place puller screw into puller. Place puller plate ⑧ 877 560 from backside of crankcase onto stud and secure with hex. nut M10 ⑨.

Hold puller screw at handle and turn hex. nut ⑤ clockwise until roller bearing along with oil seal ⑩ is pulled out of the housing. Remove the hex. nut ⑨ again, take off puller plate along with roller bearing and oil seal, withdraw puller screw and remove stud ③ from puller screw.

◆ NOTE: At this operation the oil seal will be damaged and has to be renewed.

For fitting a new oil seal and roller bearing the puller ② is



used again but with the difference that the hex. nut ⑤ is positioned in front of the support ⑪. Clean bearing seat. Place roller bearing and greased oil seal on mushroom insert ⑥ and put on centering ⑫ of puller screw. Press both items into position by turning puller screw clockwise. Fit circlip and grease roller bearing.

Remove puller assy. from crankcase.

As on type 912 with governor no oil seal is used on this location, only renewal of roller bearing at detection of pittings on bearing rollers is necessary.



8.6) Fitting of the exchange propeller gear:

Ensure that both dowel pins are on crankcase. Use grease to keep rollers of roller bearing in position. Apply sealing compound, LOCTITE 574 on clean sealing face of gear cover and put on pre-assembled prop gear.

■ **ATTENTION:** Put on gear cover parallel until engagement of the dowel pins and push on evenly on crankcase, using mallet if necessary.

Attach cover with two Allen screws M8x45 and eight Allen screws M6x45 along with lock washers and tighten screws to 25 Nm / 10 Nm. Check backlash of gears and fit and tighten cleaned magnetic drain plug to 25 Nm (225 in.lb.)

9) Oil pump:

Remove oil filter, using oil filter wrench. Take off oil pump along with 3 O-rings after removal of the 4 Allen screws M6x45 and lock washers.

◆ **NOTE:** Cut open oil filter and inspect filter element for foreign matter. This investigation reveals a lot about the condition of the engine.

Remove oil pump cover and inspect inside for wear. The gap between pump cover and rotor assembly must not be more than 0,2 mm (0,008 in.). A bigger gap reduces pump capacity greatly. Check sealing face of pump housing and pump cover. If need be, true on a ground plate. Remove rotary piston and rotor. Remove needle pin and withdraw pump shaft. At noticeable furrows on mating faces of rotary piston and rotor, renew both items.

Remove plug screw ❶ of pressure relief valve ❷, clean valve and check ball seat in housing. Clear all oil passages by compressed air. From engine serial no. 4,005.186 onwards, to improve oil pressure control the following parameters of the relief valve were changed. Free length of the compression spring ❸ was reduced from 46 mm to 39,5 mm. Spring rate was changed by increase of wire dia. from 0,8 mm to 0,9 mm, and dia. of ball was increased from 8 mm to 8,5 mm.

If existing, remove shim ❹, but if specified oil pressure can't be reached, adjust pressure by adding shim again.

◆ **NOTE:** Starting with engine N. 3,792.944 the oil pump housing and oil pump cover is in pressure die cast. On this occasion capacity of the pump was increased by lengthening of the rotary piston assembly from 13 mm to 16 mm along with the respective changes of oil pump housing, pump shaft and O-rings.

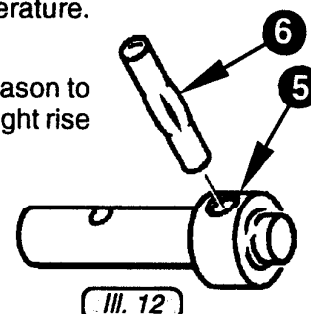
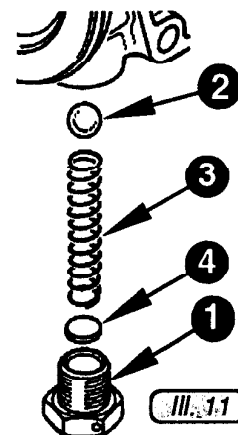
From engine serial no. 4,152.101 onward the follower in the oil pump shaft ❺ was changed to notched pin ❻ instead of the former dowel tube.

At a renewal of components change oil pump to the version with the 16 mm long rotors.

Nominal oil pressure is 3,5 bar (51 p.s.i.) at 5800 r.p.m. and oil temp. of 110°C (230°F). Oil pressure above 5 bar (72,5 p.s.i.) is not permissible with engine at operating temperature.

At idle speed oil pressure drops to 1,5 bar (22 p.s.i.).

Oil pressure has to rise within 10 seconds after engine start; If not find reason to prevent engine damage. At extreme low temperatures the oil pressure might rise up to 7 bar (100 p.s.i.) at engine start.





9.1) Oil tank

Starting with engine N. 4,005.537 on oil tank out of steel instead of aluminium is installed. On this occasion a drain plug was fitted too. Exchange aluminium tank for steel tank to comply with thermic specifications.

After the installation of the oil tank connect oil lines **correctly**, wire secure drain plug, fill up with engine oil according to specification in Manual and vent lubrication system.

9.2) Venting of the lubrication system

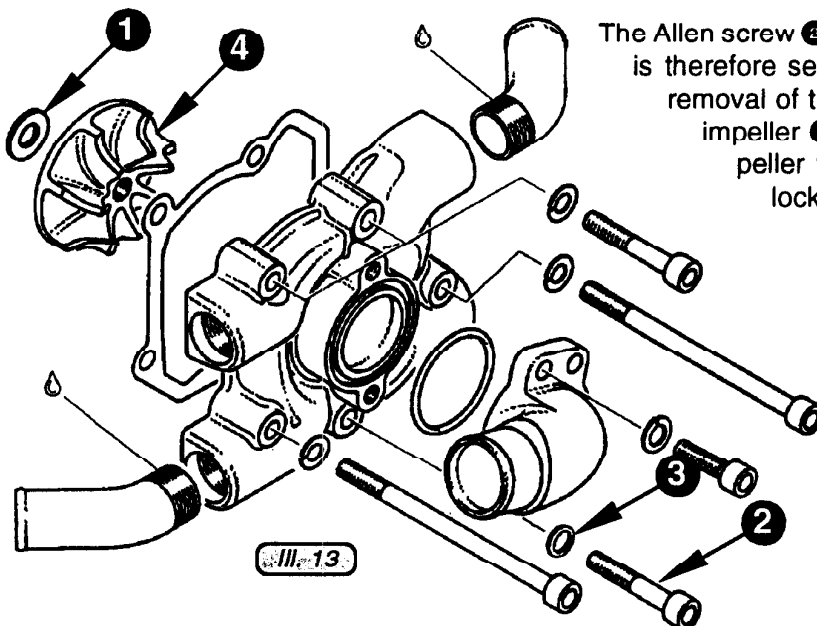
Fill oil supply line with oil. If the oil pressure does not rise within 10 sec. after engine start, then the engine must be stopped and the oil supply line for oil pump has to be vented as follows: First block oil return line by clamp and then connect compressed air (max. 3 bar = 46 p.s.i.) to venting line. Oil will be pushed from the oil tank to the oil pump within 30 sec. Remove clamp from oil return line and reconnect vent line.

10) Rubber plate

To prevent chafing of the expansion tank a protective rubber plate is glued to underside of expansion tank since May 1993. Inspect expansion tank and stick rubber plate to underside of tank.

11) Water pump

At engine operation without antifreeze in the coolant, increased formation of corrosion takes place. Therefore the material of the pump shaft was changed with engine serial no. 4,152.414. Because of galvanic reactions, caused by the use of various materials, the washer Q and the screw W are of stainless steel since engine serial no. 4,152.607.

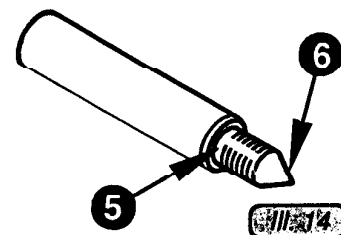


The Allen screw ② extends into the waterspace and is therefore sealed by the ring gasket ③. After removal of the water pump housing, unscrew impeller ④ anticlockwise by use of the impeller wrench 877 295, with crankshaft locked.



Check water pump shaft at thread chamfer ⑤ for possibly existing corrosion. At bad corrosion renew water pump shaft. For this renewal remove ignition housing and fit new water pump shaft as per instructions in the Repair Manual.

◆ Note: The new shaft ends in a cone ⑥.

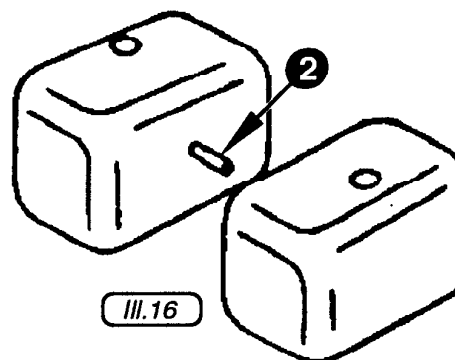
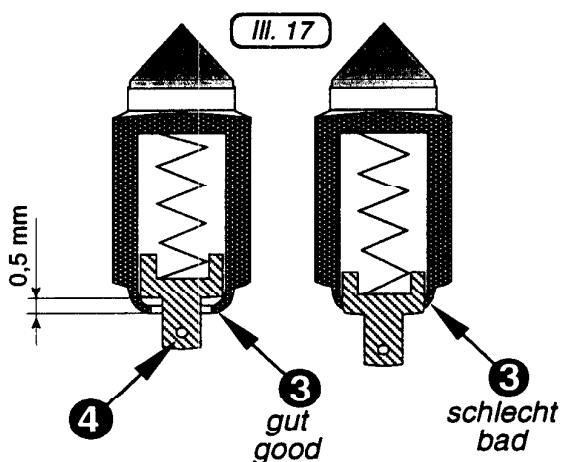
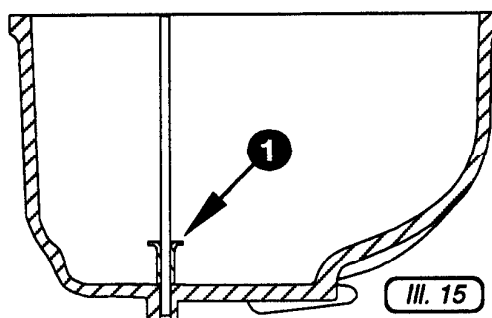


12) Carburetor

Remove float chamber and lift out both floats. If float chamber is still without distance pieces ① part no. 861 920, add them now, thus avoiding possible sticking of the floats in the float chamber.

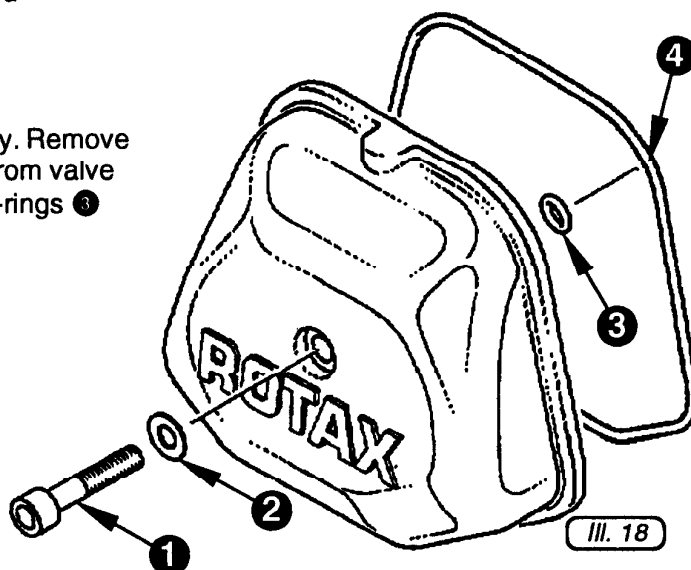
Check support pin ② of floats. At heavy wear of float bracket contact faces, caused by excessive vibration, renew float and float bracket as required.

Examine float valve with float chamber removed. At noticeable wear of beaded edge ③ at the sprung pin ④ the valve has to be renewed. If the distance becomes less than 0,5 mm (see ill. 17) the float level will be effected too.



13) Check of valve spring tension

Disconnect minus terminal of the battery. Remove Allen screw ① M6x30 and washer ② from valve cover and take off cover along with O-rings ③ and ④.





Set cylinder 1 to ignition T.D.C. Fit dial gauge ① to indicate any movement of valve spring retainer ②. Fit test lever ③, part no. 877 690, in hollow rocker arm shaft ④ and determine the spring tension on both valves by utilizing a spring balance ⑤, part no. 877 700. Read value on the balance between 0,2 + 0,3 mm (.008 + .012 in.) indication on dial gauge.

◆ NOTE: Read at first try, with force steadily rising, otherwise action of hydraulic tappet will falsify reading. After a misreading wait until valve is closed again completely. Valve closing can be quickened if necessary, by applying pressure to push rod side of rocker arm with the aid of the test lever.

Check valve springs on all 4 cylinders.

The value shown on the spring balance must not be below 35 N (8 lbf). Valve springs with lower tension must be renewed. Clean sealing face, place both O-rings on valve cover and attach cover with Allen screw M6x30 and washer. Tightening torque 10 Nm (90 in.lb.).

14) Final check

After end of overhaul fit propeller and cowling. Connect battery, start engine and keep an eye on oil pressure. Conduct trial run inclusive ignition check and finally tightness test of lubrication and cooling system.

▲ WARNING: Failure to comply with these recommendations could result in engine damage and personal injury.

