

**ROTAX****SERVICE INFORMATION**

6 UL 86/E

Dec. 1986

UL-Reduction gear box, torsional shock absorber  
Execution with prop shaft in one piece

Preload setting of the 12 spring ass'y

for engines 377, 447, 462, 503 and 532

edition: March 1987

1) Preface

- 1.1 Due to wear on components of the torsional shock absorber in the UL-reduction gear box, an occasional check and correction on the pre-load setting of the spring pack, has to be carried out.
- 1.2 At a conversion to the 12 spring execution a new initial pre-load setting is necessary. This conversion requires the use of a propeller shaft execution with marking groove (C) on shaft flange (see ill. 1).

2) Procedure2.1 Disassembly

- 2.11 Drain oil.
- 2.12 Withdraw gearbox from engine after removal of the 4 hex. nuts m8 (item 32).
- 2.13 Remove 2 hex. nuts M8 (item 32a) and push off gear box cover (item 17) using two M6 screws (part no. 241 875) together with the assigned tapped holes in the cover.
- 2.14 Pull off ball bearing (item 8) from prop shaft.
- 2.15 Place gearbox under hand press (see ill. 2) and apply pressure via mounting yoke (part no. 876 880) on the dog gear (item 27) until ring halves (item 30) become free and can be taken off.
- C a u t i o n : Load must not exceed 16000 N (3600 lbs), otherwise dog gear might be damaged.
- 2.16 Withdraw angular ring, thrust washer, dog gear, dog hub, disk springs, distance ring and shims (item 29, 28, 27, 26, 25, 24, 23) from the prop shaft.

2.2 Checking

- 2.21 Clean all parts and check for wear. Examine carefully the groove in the prop shaft for the ring halves (see (D), Ill.3). Renew any burr at edges ensuring that outer shoulder is straight cut. If any doubt exists replace shaft.

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## 2.3 Exchange of the respective parts for conversion from 8 to 12 spring execution

- 2.31 Exchange the 13,7 long distance sleeve (part no. 847 505) for a 4,5 mm thick distance ring, part no. 847 620 (item 24), with one side tapered. To ease recognition of the tapered side, see marking groove (B) Ill. 3.
- 2.32 Exchange the 8 existing springs for 12 new ones (part no. 939 020, item 25). When converting fairly new gear boxes, the existing springs (2 mm thickness) may be continued for use. Use 50 hrs as a guideline.
- 2.33 Use shims as required after determination of preload with sizes from 0,1 - 0,2 - 0,3 - 0,5 up to 1,0 mm (part no. 944 474, 944 470, 944 471, 944 472, 944 473) at location 23 (see para. 2.4 below, also (E) Ill. 4).
- 2.34 Thrust washer, thickness 0,8 mm, has to be placed between dog gear and angular ring (item 28).
- 2.35 Renew prop shaft (837 025) in case of excessive wear.

## 2.4 Determination of the proper preload setting of the springs

- 2.41 Assemble the distance ring with the tapered side (marking groove B) towards springs, 12-spring pack (item 25, also F, Ill. 4), the dog hub (item 26), dog gear (item 27) and the thrust washer 0,8 mm (item 28). Don't yet place any shims (item 23) in position (see Ill. 3).

A t t e n t i o n : Fit disk springs together in pairs, according to illustr. 4 (F).

- 2.42 Place gearbox under handpress (see illustr. 2) with mounting yoke (part no. 876 880) over dog gear (item 27). Do not use motorized press.
- 2.43 Place angular ring (item 29) upside down on the prop shaft (see illustr. 3) to facilitate reading of the distance (A).
- 2.44 Apply 16000 N (3600 lbs) via the yoke, so that springs will be completely compressed.

C a u t i o n : Don't exceed 16000 N (3600 lbs), otherwise dog gear might be damaged.



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2.45 At this completely compressed state, the distance between upper side of angular ring to lower edge of groove has to be measured (see Ill. 3). Add appropriate shims between angular ring and dog gear face until bottom is flush with inside groove (D).

2.46 Release the load and compensate the determined distance (A) with shims (item 23) between distance ring (item 24) and bearing (item 21).

Shims are available in the sizes 0,1 - 0,2 - 0,3 - 0,5 and 1,0 mm (see para. 2.33).

## 2.5 Reassembly of the gear box

2.51 Fit the shims determined according to para 2.45, the distance ring with the marked groove (B) on top and the 12 springs to prop shaft. Apply gear lub to all springs prior to ass'y.

To prevent metal galling apply LOCTITE Antiseize at specified positions (item 43) to prop shaft and to dog gear, dog hub and thrust washer (item 28) prior to ass'y. consult illustr. 1 and 4.

2.52 Place angular ring to prop shaft with open end upside and coat mating side with LOCTITE Antiseize (see illustr. 4)

2.53 Apply load, in the already described manner to dog gear until insertion of the ring halves (item 30) into groove in prop shaft is possible. Pull angular ring over ring halves before releasing load.  
Don't exceed 16000 N (3600 lbs) load.

Attention: Take care for proper position of the ring halves in groove and in angular ring.

2.54 To ease fitting of bearing (item 8) heat up gear housing to approx. 80 degrees Celsius. Insert both aligning dowels (Ill. 1, item 10), renew gasket (item 11), and fit gear cover ass'y to gear housing. Hand tighten hex. nuts M8 (item 32a).

Note: If bearing (item 8) fits too loose in gear housing, degrease and apply LOCTITE 648 on outer ring of bearing.



### 3) Re-fitting of gear box ass'y to engine

- 3.1 Check adaptor (item 2) for tight fit and cracks. If need be, tighten M10 Allen head screws to 38 - 42 Nm (340 - 370 in.lbs) using LOCTITE 221 on threads and LOCTITE 648 under screw head.

Note: When loosening or tightening Allen head screws, always use proper Allen head spanner with guide pin, e.g. Rotax part no. 277 817.

Renew O-ring seal (item 1) in case adaptor has been taken off.

- 3.2 Check drive gear (item 12) and oil slinger for wear and damage. If replacement required install lock pin in impule hole and turn crankshaft slowly until pin engages. Remove 1/2" U.N.F. bolt (standard right hand thread). Clean all mating surfaces well and reassemble with LOCTITE 221 on thread. Ensure that oil slinger (item 14) is in horizontal position and torque to 60 Nm (530 in.lbs).

- 3.3 Apply Loctite 648 to mating surfaces between gear housing and adaptor, place new O-ring seal in position. Turn crankshaft so that oil slinger (item 14) will remain horizontal, fit gear box ass'y to already fitted adaptor and studs and tighten the 4 hex. nuts M8 (item 32).

Torque all M8 nuts to 20 - 24 Nm (180 - 210 in lbs).

- 3.4 Thoroughly clean and refit magnetic plug M18 x 1,5 (if so equipped).

- 3.5 Fill gear box with oil up to lower level plug.  
Use only quality gear box oil. e.g. API-GL5 or GL6.

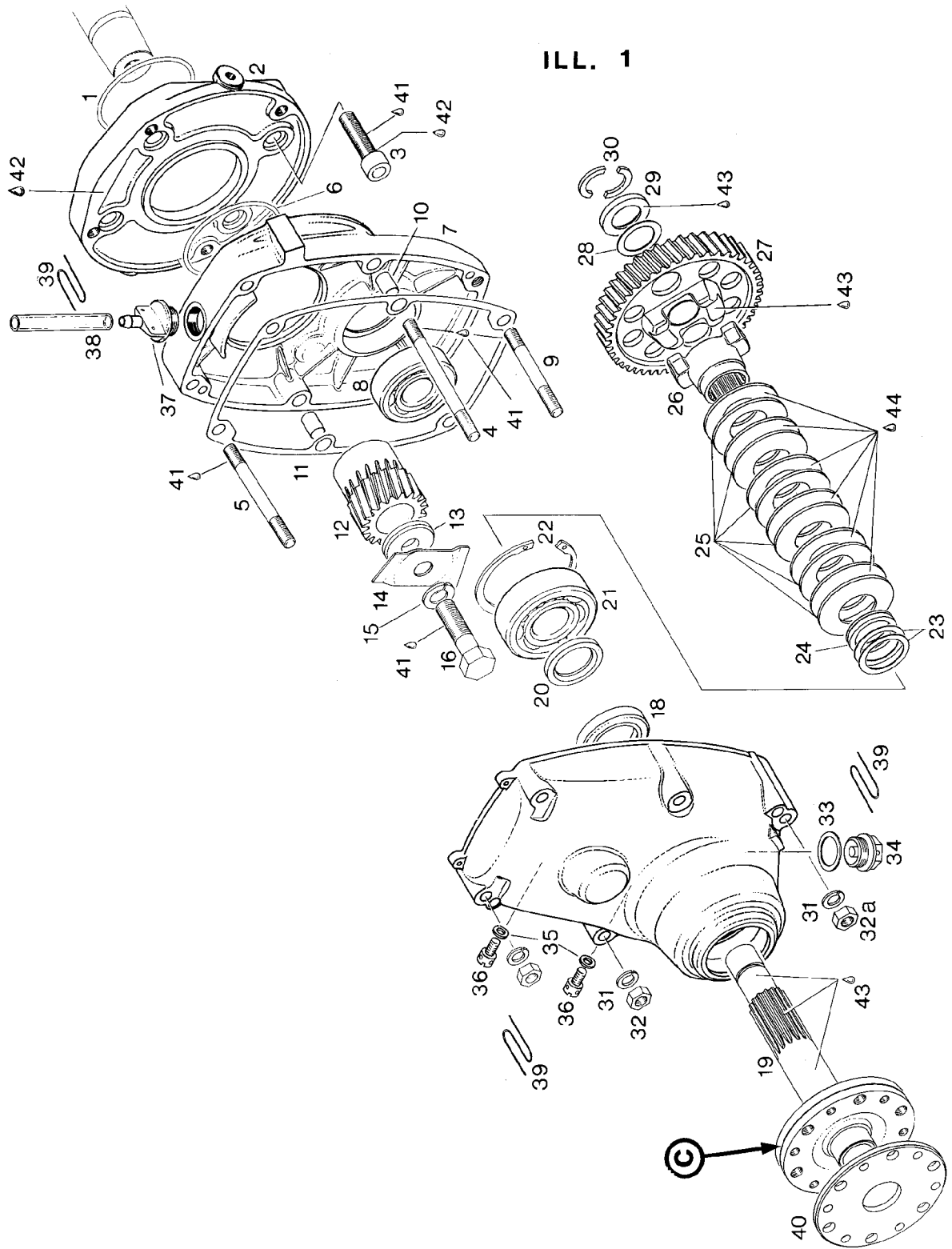
- 3.6 Check breather hole in vent cap and replace.

- 3.7 Lock wire all plugs.

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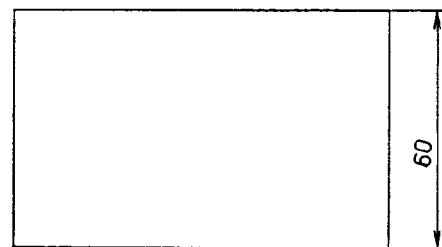
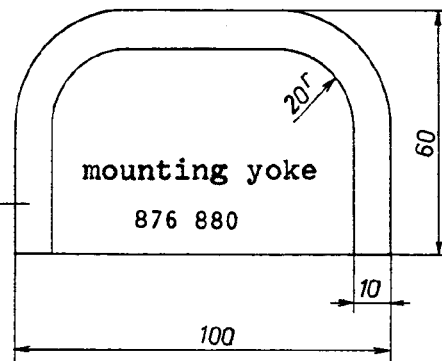
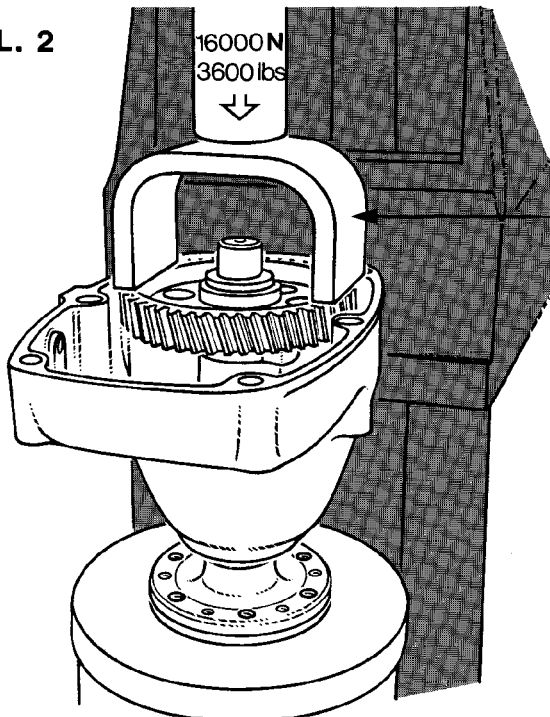


ILL. 1

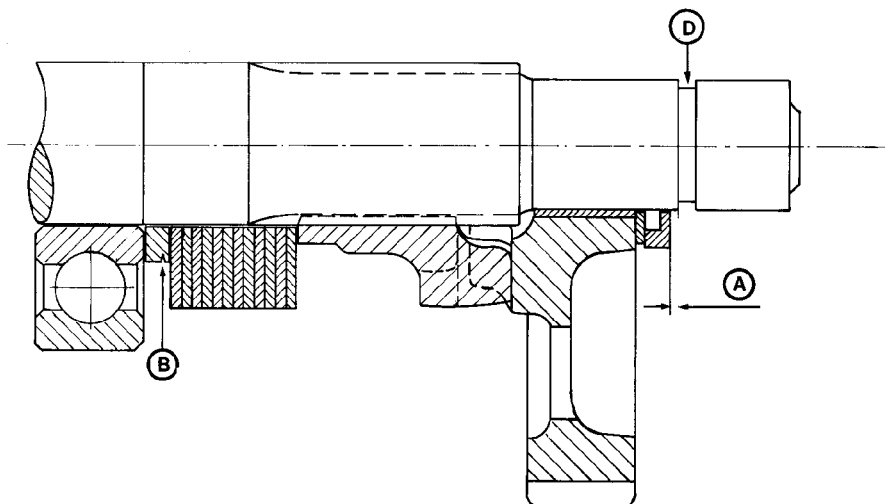




ILL. 2



ILL. 3



ILL. 4

