FORM CFM 11

SERVICE BULLETIN

NO. 4

DATE 17.7.87

CFM METAL-FAX LTD CONSIDERS
COMPLIANCE - ~~Mandatory~~/~~Recommended~~/Optional
(delete which is not applicable)

SUBJECT UL - REDUCTION GEAR BOX - TORSIONAL SHOCK ABSORBER
MODELS AFFECTED SHADOW B & B-D
SERIES NOS. AFFECTED ALL SERIES AIRCRAFT FITTED WITH ROTAX 447
COMPLIANCE TIME OPTIONAL
PURPOSE SEE ROTAX SERVICE INFORMATION SHEET ATTACHED - 2 UL 87/E FEB 87.
INSTRUCTIONS "
MATERIAL REQUIRED "
AVAILABILITY OF PARTS FROM CYCLONE HOVERCRAFT LTD.
EFFECTIVITY DATE N/A
SUMMARY
NOTES

CYCLONE HOVERCRAFT LTD.
FOR BOMBARDIER ROTAX ENGINES

Registered Office:
'BURNSIDE'
DEPPERS BRIDGE
LEAMINGTON SPA
CV33 0SU
TEL: (0926) 612188
FACSIMILE: (0926) 613781

14-7-87

RE - SERVICE INFORMATION 2UL 87/E

Rotax have made some amendments to the above Service Information Sheet which was sent to you recently. A copy of the latest issue dated May 1987 is enclosed. Could you please replace the original in your records with this amended version.

Circulation:

Microlight Manufacturers
CAA
PFA
Peter Lovegrove
Paul Owen
Dave Simpson
Mac Smith

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

Preload setting of the 12 spring ass'y

execution with 4-dog hub

for engines 377, 447, 462, 503 and 532

edition: May 1987

1) Preface

1.1 In the course of further development of the gear-box for ultra-light engines, the 2-dog hub has been changed to 4-dog hub. In this context, also the dog gear has been modified.

ATTENTION:

a) The 2-dog-hub can be replaced by the new 4-dog-hub 958 770, but not reverse.

b) The dog gear used up to date has 8 bores of approx. 20 mm dia. These bores are eliminated on the new dog gear.

c) Replacement for the old dog-gear (with 8 bores) is the new dog gear together with 4-dog-hub.

d) The axial distance dimension for spring pre-load has changed for the new version (see ill. 1 and 4).

e) The oil slinger fitted together with the drive gear is eliminated (can be left off also on former models).

1.2 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.

1.3 At a conversion to the 12 spring configuration, a new initial preload setting is necessary. This conversion requires the use of a prop shaft execution with marking groove (C) on shaft flange (see ill. 1).

2) Procedure

2.1 Disassembly

2.11 Drain oil.

2.12 Withdraw gear box from engine after removal of 4 hex. nuts M8 (item 31).

2.13 Remove 2 hex. nuts M8 (item 31a) and push off gearbox cover (item 16) using 2 M6 screws (part no. 241 875) together with the assigned tapped holes in the cover.

BOMBARDIER-ROTAX
GESELLSCHAFT M. B. H. MOTORENFABRIK
A-4623 GUNSKIRCHEN · AUSTRIA
Telefon: (0 72 46) 271-0* Telex: 25 546 bomrot a
Telegrammadresse: BOMBROTAX GUNSKIRCHEN

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 26) until ring halves (item 29) become free and can be taken off.

Caution: Load must not exceed 16000 N (3600 lbs) otherwise dog gear might be damaged.

2.16 Withdraw angular ring, 2 thrust washers 0,8 mm thick, dog gear, 4-dog hub, disk springs, distance ring and shims (item 28, 27, 26, 25, 24, 23, 22) 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). Remove any burr at edges ensuring that outer shoulder is straight cut. If any doubt exists replace shaft.

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

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 23), 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 24). 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 22 (see para. 2.4 below, also (E) Ill. 4).

2.34 2 thrust washers 0,8 mm thick, 944 469, have to be placed between dog gear and angular ring (item 27).

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 (item 23) with the tapered side (marking groove (B)) towards springs, 12-spring pack (item 24, also (F), Ill. 4), the 4-dog hub (item 25), dog gear (item 26) and the 2 thrust washers 0,8 mm (item 27). Don't yet place any shims (item 22) in position (see Ill. 3).

Attention: 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 26). Do not use motorized press.

2.43 Place angular ring (item 28) 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 (to a block).

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

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 22) between distance ring (item 23) and bearing (item 20).

Shims are available in the sizes 0,1 - 0,2 - 0,3 - 0,5 and 1,0 mm (see 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 marking 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 42) to prop shaft and to dog gear, 4-dog hub and the 2 thrust washers, 0,8 mm thick, (item 27) prior to assembly (see ill. 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 29) into groove in prop shaft is possible. Pull angular ring over ring halves before releasing load.

Don't exceed 16000 N (3600 lbs) load.

A t t e n t i o n : Take care for proper position of the ring halves in groove and angular ring.

2.54 To ease fitting of bearing (item 8) heat up gear housing to appr. 80 degrees Celsius. Insert both aligning dowels (item 10) renew gasket (item 11) fit gear cover ass'y to gear housing. Hand tighten hex. nuts M8 (item 31a).

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

Re-fitting of gear box ass'y to engine

3.1 Check adapter (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.

N o t e : 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 adapter has been taken off.

3.2 Check drive gear (item 12) for wear and damage. If replacement required install lock pin in impulse 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 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 (item 6) in position, fit gear-box ass'y to already fitted adaptor and studs and tighten the 4 hex. nuts M8 (item 31).

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

3.4 Thoroughly clean and refit magnetic plug M18x1,5 (if so equipped).

3.5 Fill gear box with oil up to lower level plug.

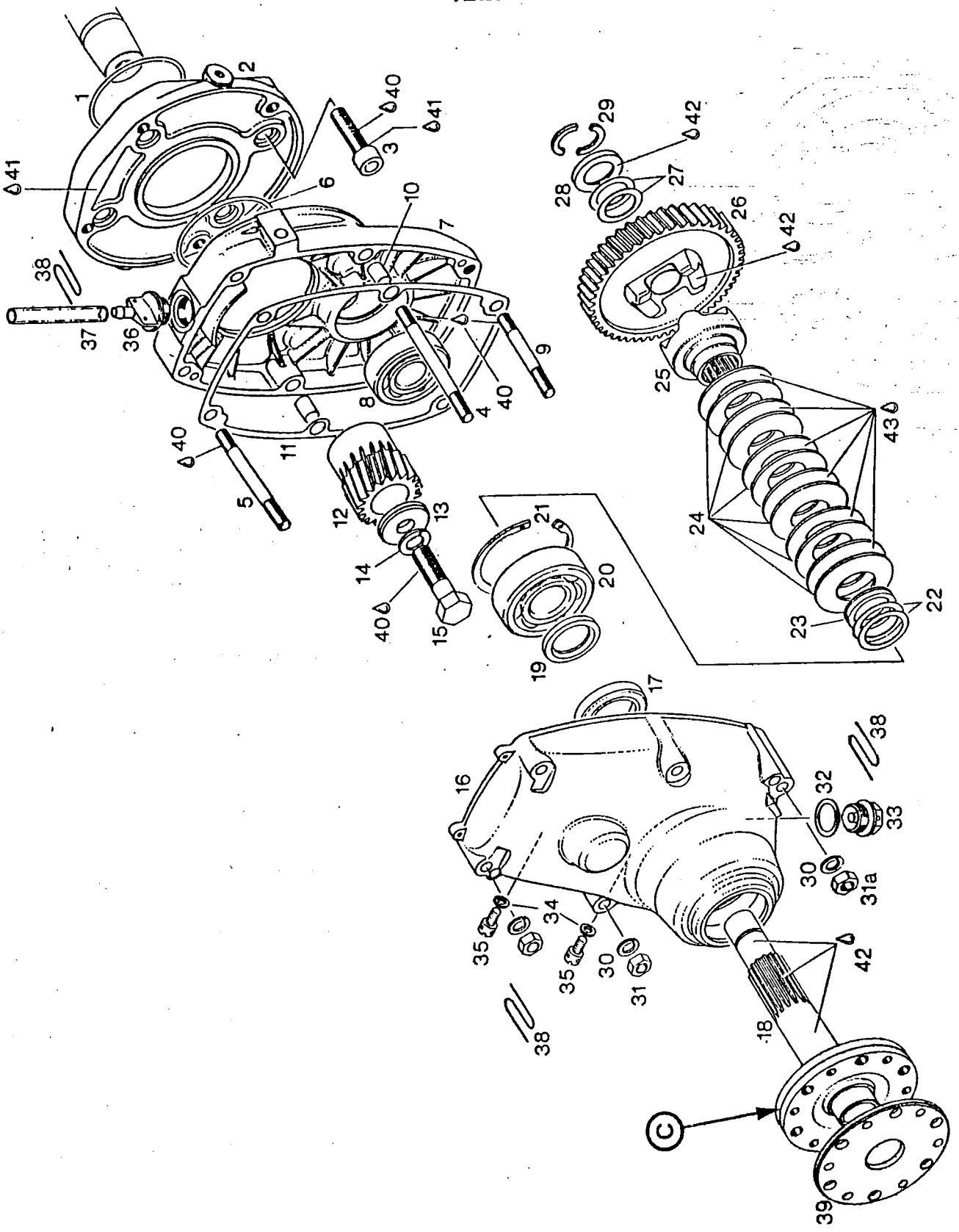
Use only quality gear box oil. e.g. API-GL5 or GL6.

3.6 Check breather hole in vent cap and replace.

3.7 Lock wire all plugs.

MEMBER: SIUL87E
Febr.87

ILL. 1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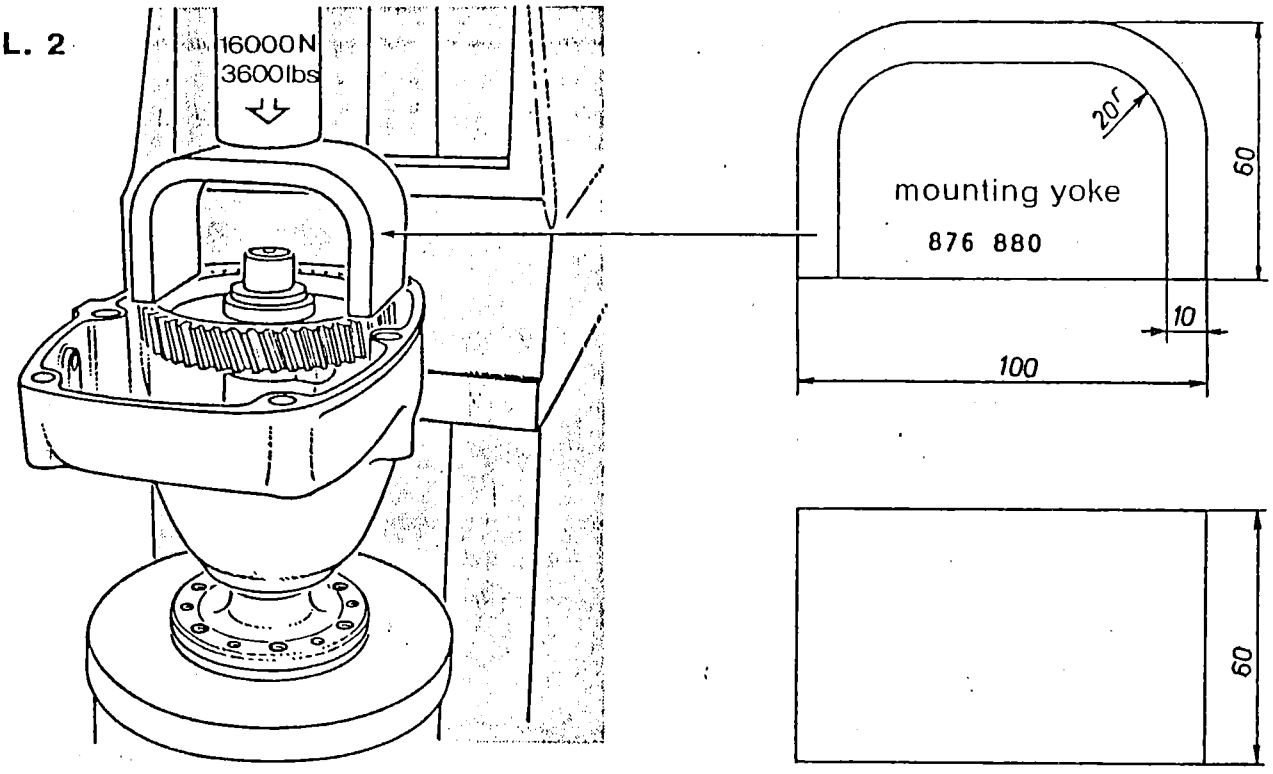
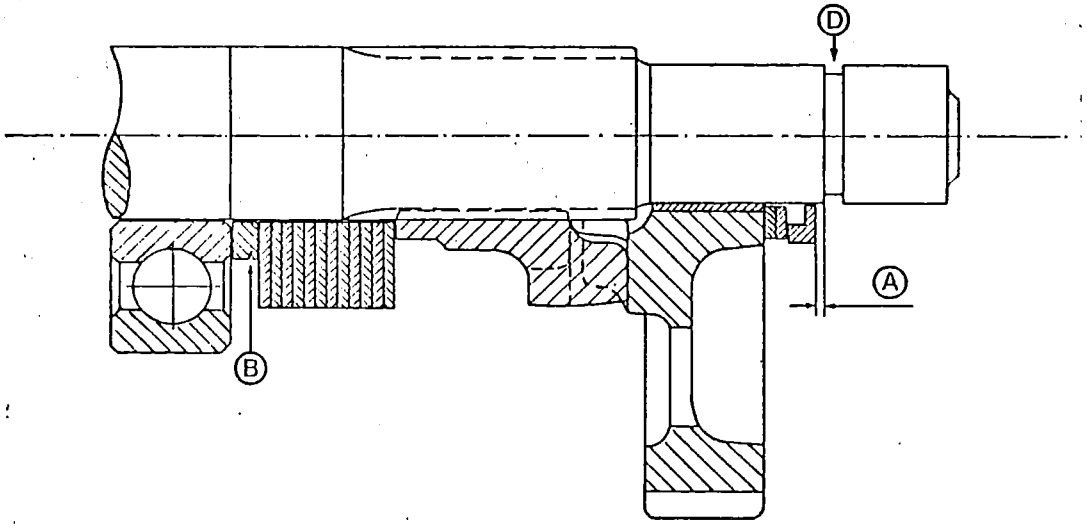
ILL. 2



ILL. 3



ILL. 4