ROTAX
AIRCRAFT ENGINES

SERVICE INSTRUCTION

INSTALLATION INSTRUCTION OF UL REDUCTION GEARBOX TYPE „B“
SI-12-1994 R2

MANDATORY

Repeating symbols:

Please, pay attention to the following symbols throughout this document emphasizing particular information.

▲WARNING: Identifies an instruction, which if not followed, may cause serious injury or even death.

■ CAUTION: Denotes an instruction which if not followed, may severely damage the engine or could lead to suspension of warranty.

◆ NOTE: Information useful for better handling.

1) Planning information

1.1) Engines affected

All versions of the engine type:

- 447 UL SCDI (Series)
- 503 UL DCDI (Series)
- 582 UL DCDI mod. 90/99 (Series)
- 618 UL DCDI (Series)

1.2) Concurrent ASB/SB/SI and SL

Further to this Service Instruction the following additional Service Instructions must be observed and complied with:

- SI-2ST-004 Running modifications on ROTAX® 2-stroke UL Aircraft engines
- SI-07-1998 Rotax® 503 UL DCDI (all versions), ‘’B’’ type gearbox installation

1.3) Subject

Installation instruction of UL reduction gearbox type „B“

1.4) Approval

The technical content of this document is approved under the authority of MOT, DOA Nr. MOT. JA. 03.

1.5) Manpower

Estimated man-hours:
Engine removed from the aircraft 1 h per unit.

1.6) Mass data

Change of weight see relevant Installation Manual (IM)
Moment of inertia see relevant Installation Manual (IM)

1.7) References

In addition to this technical information refer to current issue of

- Installation Manual (IM)
- Maintenance Manual (MM)
- Repair Manual (RM)
- all relevant Service Instructions (SI)

2) Material Information

2.1) Material - cost and availability

Price and availability will be supplied on request by ROTAX® Authorized Distributors or their Service Center.

2.2) Special tooling/lubricant-/adhesives-/sealing compound - Price and availability

Fig.no.	p/n	Qty/engine	Description	Old p/n	Application
(1; 4)	n.a.	NB	DEGREASING AGENT		U
(3; 5)	899785	NB	LOCTITE 221 VIOLET		A
(7; 9)	n.a.	NB	MULTI PURPOSE GREASE LZ		N
(7)	899788	NB	LOCTITE 648 GREEN		C

3) Accomplishment / Instructions

Accomplishment

- ROTAX® -Distributors or their Service Centers
- *Persons with type-specific training (applicable only for non-certified engines)*

▲WARNING: Proceed with this work only in a non-smoking area and not close to sparks or open flames. Switch off ignition and secure engine against unintentional operation. Secure aircraft against unauthorized operation. Disconnect negative terminal of aircraft battery.

▲WARNING: Risk of scalds and burns! Allow engine to cool sufficiently and use appropriate safety gear while performing work.

▲WARNING: Should removal of a locking device (namely lock tabs, self-locking fasteners) be required when undergoing disassembly/assembly, always replace with a new one.

◆ NOTE: All work has to be performed in accordance with the relevant Maintenance Manual.

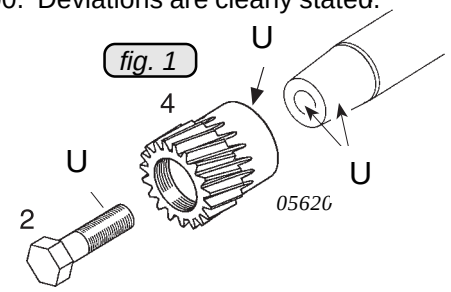
◆ NOTE: Installation of the gear box by qualified, trained and authorized (by ROTAX) persons only. Careful installation and attention to stated instructions warrant trouble-free operation.

◆ NOTE: In the following instructions distinguish in same points between gearboxes with reduction ratio of 2,00 / 2,224 /, 2,58 and gear box with reduction ratio 3,00. Deviations are clearly stated.

3.1) Instructions

➤ Remove the enclosed drive gear ((4) or (5)) that is shipped with the preassembled gearbox (see fig. 1).

fig. 1



3.1.1) Procedure of fitting the reduction unit with reduction ratio i = 2,00 / 2,24 / 2,58.

➤ Clean thread of hex. hd. screw 1/2-20 UNFx50 (2), cone in drive gear (4),and taper and thread of crankshaft (1) with suitable degreasing agent (U) (see fig. 1).

➤ Lock crankshaft using fixation pin p/n 876640 (8) (see fig. 2)

➤ Place drive gear (4) on crankshaft taper and attach with hex. hd. screw 1/2-20 UNFx50, (2) Lock washer (7) and washer (6) with face of washer towards crankshaft and tighten screw to **80 Nm** (708 in. lb.) (see fig. 3)

▲WARNING: Secure hex. screw (2) with Loctite 221 (A) (see fig. 3).

fig. 2

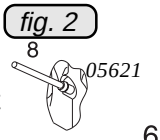


fig. 3

3.1.2) Procedure of fitting the reduction unit with reduction ratio i = 3,00

➤ Clean thread of hex. hd. screw 1/2-20 UNFx75 (3), cone in drive gear (5), taper and thread of crankshaft (1) with suitable degreasing agent (U) (see fig 4).

➤ Lock crankshaft using fixation pin p/n 876640 (8) (see fig. 4).

➤ Place drive gear (5) on crankshaft taper (1) and attach with hex.hd. screw 1/2- 20UNFx75 (3) and lock washer (4) and tighten screw to **80 Nm** (708 in.lb.) (see fig. 5)

▲WARNING: Secure hex. hd. screw (3) with Loctite 221 (A) (see fig. 5).

fig. 4

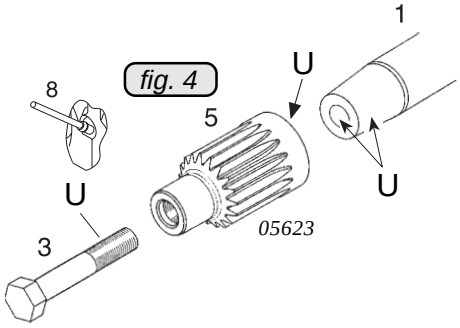
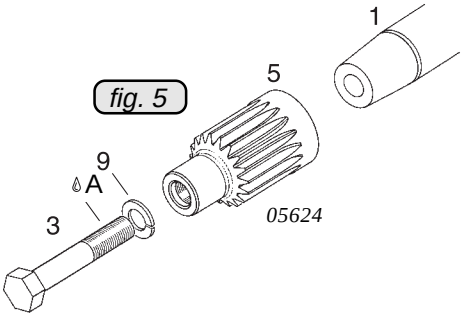


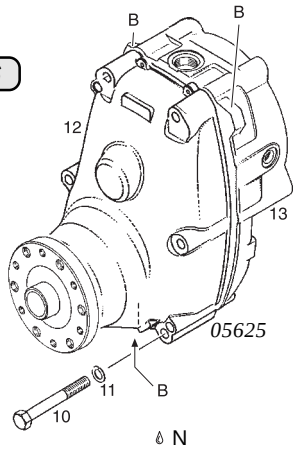
fig. 5



3.1.3) Subsequent fitting procedure of reduction gear box, regardless whether reduction ratio i=2,00 / 2,24 / 2,58 or 3,00

➤ After removal of the two hex. hd. screws M8x65 (10) and washer A8 (11) carefully separate gear cover (12), from gear housing (13) by light tapping with a mallet on the lug (B) (see fig. 6).

fig. 6

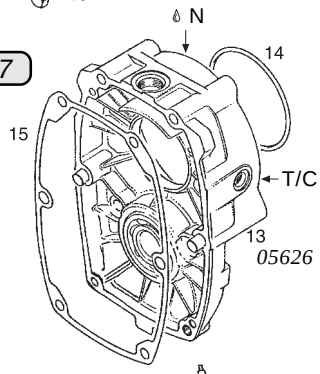


➤ Carefully remove existing gasket and store on a clean, dry surface.

➤ Apply grease on a few spots of O-Ring groove in gear housing (13) and place O-ring (14) in position (see fig. 7).

➤ Clean sealing face of gear housing (13) and crankcase (U), apply Loctite 648 (C) and fit gear housing (13) in the correct position (see fig. 7).

fig. 7

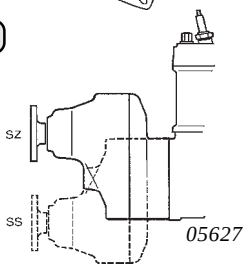


➤ Basically, there are two possible positions how to install the reduction gear box:

Version SZ = with prop shaft offset towards cylinderhead.

Version SS = with prop shaft offset towards engine base. (see fig. 8)

fig. 8



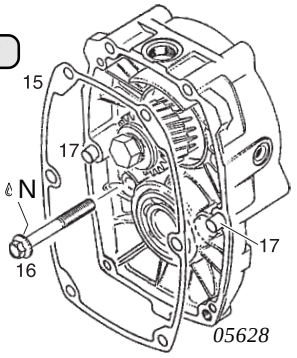
➤ For fitting the gear housing to the engine apply bearing grease (N) on support face of hex. collar screws M8 x 65 (16) and tighten to 24 Nm (210 in.lb.) (see fig. 9)

◆ NOTE: Grease on the support face of the screw head prevents seizing.

➤ Check dowel sleeves (17) for proper fit and place gasket (15) into position (see fig. 9).

■ CAUTION: Gasket has to be fitted in dry condition to warrant optimum sealing. Do not use any gasket ce ment, sealant or grease on the gasket.

fig. 9



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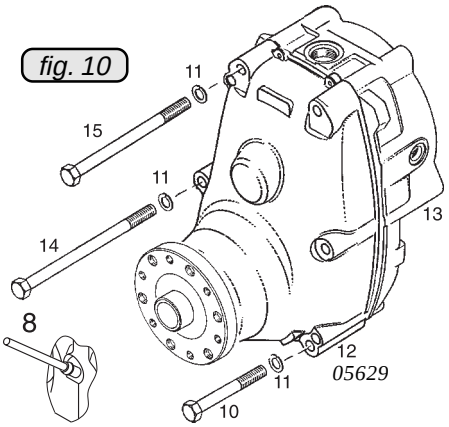
➤ Carefully fit gear cover (12) on gear housing (13) (see fig. 10).

■ CAUTION: When fitting the gear cover pay attention for easy engagement of the mating gears, and on a gearbox with reduction ratio 3,00 mind the extra bearing of the drive gear (5) in the gear cover.

fig. 10

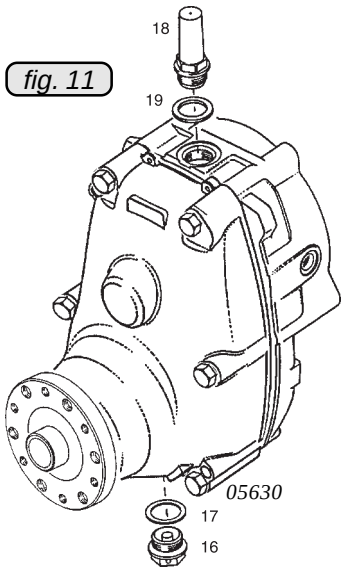


➤ Fasten gear cover to gear housing with the 2 hex. hd. screws M8x65 (10) and the 2 hex. hd. screws M8x125(14) along with lockwashers and tighten screws in crosswise sequence to 24Nm (212 in.lb.). Afterwards add the screws M8x110 (11) with lockwasher A8 (11) and tighten screws to 24Nm (212 in.lb.) as well (see fig. 10).

➤ Remove crankshaft locking pin (8) (see fig. 10).

➤ Depending on position of gearbox fit magnetic plug(16) and sealing ring (17) (tightening torgue 24 Nm (212 in.lb.) and vent screw (18) with sealing ring(19) (tightening torque 6 Nm (53 in.lb.)) (see fig. 11).

fig. 11

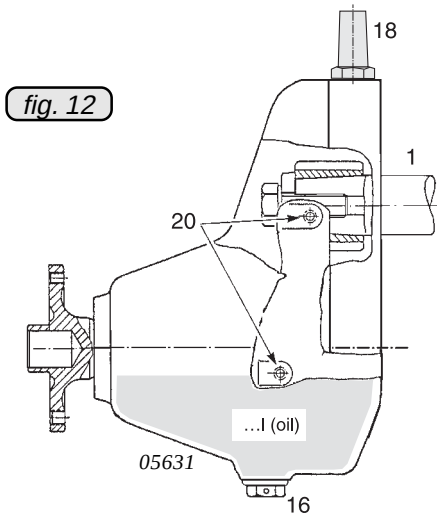


➤ Initial quantity of oil:
fitting position „SZ“.....ca 330 cm³ (.70 lq.pt.)
fitting position „SS“.....ca 300 cm³ (.63 lq.pt.)

➤ Basically fill gearbox with oil until oil emerges on the lower oil level plug (20). Fit oil level plug (20) along with sealing ring (see fig. 12).

■ CAUTION: Use suitable oils only!
Recommended: SAE 140 EP or SAE 85; W - 140 EP
(API-classification GL 5 or 6)

fig. 12

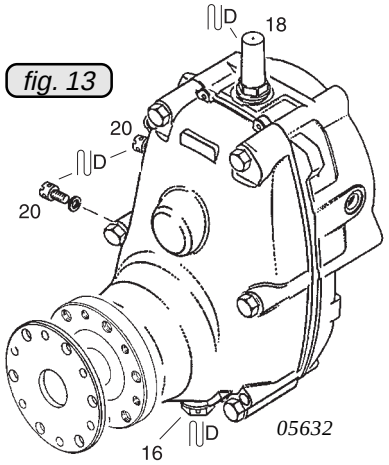


➤ Safty -wire the filling plug (18), level plugs (20) and drain plug (16) (see fig. 13).

■ CAUTION: Check gearbox for tightness without fail at trial run.

➤ The prop flange is furnished with 6 tapped holes M8 and 6 holes of 6,5 mm dia. Prop attachment bolts are not supplied by ROTAX.

fig. 13



➤ For ROTAX part numbers consult spare parts list of the respective engine.

- Restore aircraft to original operating configuration.
- Connect negative terminal of aircraft battery.

3.2) Test run

Conduct test run including ignition check and leakage test.

◆ NOTE: The illustrations in this document show the typical construction. They may not represent full detail or the exact shape of the parts which have the same or similar function.
Exploded views are **not technical** drawings and are for reference only. For specific detail, refer to the current documents of the respective engine type.