

SERVICE LETTER

Standardization of the reduction gearbox for ROTAX® 912/914

SL-912-002

SL-914-002

Repeating symbols:

Please, pay attention to the following symbols throughout the Service Bulletin 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 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:

Group A (increasing of gear width / modified crankshaft / overload clutch with and / or modified dog hub):

- 912 ULS commencing with S/N 4,425.001
- 914 F commencing with S/N 4,420.164
- 914 UL commencing with S/N 4,417.791
- 912 S commencing with S/N 4,922.501

Group B (standardization of back lash):

- 912 UL commencing with S/N 4,403.283
- 912 F commencing with S/N 4,412.792
- 912 A commencing with S/N 4,410.367
- 912 ULS commencing with S/N 4,425.014
- 912 S commencing with S/N 4,922.501
- 914 UL commencing with S/N 4,417.769
- 914 F commencing with S/N 4,420.158

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Group C (specifying the slipping torque):

- 912 UL commencing with S/N 4,403.229
- 912 F commencing with S/N 4,412.790
- 912 A commencing with S/N 4,410.356
- 912 ULS commencing with S/N 4,425.030
- 912 S commencing with S/N 4,922.503
- 914 UL commencing with S/N 4,417.769
- 914 F commencing with S/N 4,420.157
- gearbox commencing with S/N 15.366

Group D (gearbox housing part no. 911.746):

- 912 UL commencing with S/N 4,403.413
- 912 F commencing with S/N 4,412.796
- 912 A commencing with S/N 4,410.380
- 912 ULS commencing with S/N 4,425.290
- 912 S commencing with S/N 4,922.505
- 914 UL commencing with S/N 4,417.806
- 914 F commencing with S/N 4,420.173
- gearbox commencing with S/N 15.913

◆ NOTE: Engines in group B and C of 912 UL, 912 ULS and 914 UL are only affected if equipped with an overload clutch.

1.2) Concurrent ASB/SB/SI and SL

none

1.3) Reason

In the course of standardization various modifications have been carried out on the gearbox for ROTAX® 912 and ROTAX® 914 engine.

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1.4) Subject

With the start of the serial production of the engine type 912 ULS/S, standardization of the gearbox for engine type 914 was carried out too.

- Introduction of a dog hub of increased width.
- Standardization to a modified crankshaft.

Furthermore the following standardization for all the serial engines of type 912 and 914 was carried out:

- Standardizing to back lash from 15° to 30°.
- Standardizing of the slipping torque.
- Standardizing of the gearbox housing.

This information is intended to assist the aircraft builder and operator in achieving the proper operating conditions, correct engine installation and consequently optimum performance and reliability.

1.5) Compliance

NONE - ONLY FOR INFORMATION

1.6) Approval

not required

1.7) Manpower

estimated man-hours:

engine installed in the aircraft - - - manpower time will depend on installation and therefore no estimate is available from the engine manufacturer.

1.8) Mass data

- change of weight - - - none.
- moment of inertia - - - unaffected.

1.9) Electrical load data

no change

1.10) Software accomplishment summary

no change

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1.11) References

In addition to this technical information refer to

- current issue of the Operator's Manual (OM)
- engine data sheet
- power, torque and fuel consumption curves
- current issue of the Illustrated Parts Catalog (IPC)
- Installation Manual (IM) and Check List
- all relevant Service Information
- all relevant Technical Bulletins
- Collective Manual (CM)
- Repair Manual (RM)
- Maintenance Manual (MM)

1.12) Other publications affected

none

1.13) Interchangeability of parts

at exchange take care of the following:

Proceed according to wording and the table in this Service Letter since not all parts are compatible with each other.

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2) Material Information

2.1) Material - cost and availability

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

2.2) Company support information

none

2.3) Material volume per engine

parts volume:

For any part stated in this Service Letter refer to the relevant Illustrated Parts Catalog.

■ **ATTENTION:** Upon retrofitting of a component, proceed according to wording and table in this Service Letter since not all parts are compatible with each other.

2.4) Material volume per spare part

none

2.5) Rework of parts

none

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

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

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3) Accomplishment / Instructions

Accomplishment

- Not applicable

All the measures must be taken and confirmed by the following persons or facilities:

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

▲ **WARNING:** Proceed with this work only in a non-smoking area and away from open flames. Switch off ignition and secure engine against unintentional operation.

- Secure aircraft against unauthorized operation.
- Disconnect negative pole of aircraft battery.

▲ **WARNING:** Proceed with work only on a cold engine.

3.1) Increasing of the dog gear width (affected engines "group A"):

On ROTAX_a 912 ULS, 912 S, 914 UL, 914 F a dog gear of a width increased by 5 mm (0,2 in) was introduced (see fig. 3). This dog gear is part of the gear set 886.518.

◆ **NOTE:** The gear set of increased width is available only for gear reduction ratio 1:2,43.

Increasing of the dog gear width made the following additional modifications necessary:

- Modification of the dog support face (see section 3.1.1)
- Change of the axial design of the crankshaft (see section 3.1.2)
- Additional clearance in the gearbox housing (see section 3.1.3)
- Interim gear set (see section 3.1.4)

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3.1.1) Modification of dog hub and of overload clutch (affected engines "group A"):

The increase in dog gear width made modification of the dog support surface necessary. The dog support surface is now machined 7° tapered (see fig. 4).

A gear set of the increased width must be only paired with the 7° tapered dog hub part no. 958.892 and is allowed to be fitted only together with the overload clutch of new design part no. 996.886.

▲ **WARNING:** This dog hub and overload clutch must never be used in connection with a gear set of narrow width as the contact surfaces do not match correctly.

◆ **NOTE:** The new dog hub and dog gear of the overload clutch and the dog gear of increased width can be identified by a groove (see fig. 4).

3.1.2) Standardizing of the crankshafts (affected engines "group A"):

Because of the wider dog gear, it became necessary to change the axial position of the drive gear. Therefore the crankshaft part no. 888.164 is furnished with a longer ending (see fig. 5).

▲ **WARNING:** If the modified crankshaft part no. 888.164 will be installed instead of the previous one (part no. 996.583) take care of the following:

- If the narrow gear set is going to continue to be used, then it will be necessary to inspect the gear set for traces of wear due to axial staggering between drive gear and dog gear. If traces of wear are obvious, exchange the gear set for one of increased width. In this case the overload clutch or dog hub has to be exchanged for use with a 7° dog support face.
- The crankshaft part no. 888.164 is only allowed to be installed into the gearbox housing part no. 911.746 (see chapter 3.1.3)

◆ **NOTE:** The crankshaft part no. 996.583 installed up to now, will be still available for spare part service .

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3.1.3) Gearbox housing assy. part no. 911.746 (affected engines, "group D")

The changed axial position of the drive gear and the dog gear of increased width require extra space in the gearbox housing (see fig. 2).

- **ATTENTION:** The crankshaft part no. 888.164 is allowed to be installed only in the gearbox housing part no. 911.746 as in any other housing the space between gear set and housing wall is inadequate.

3.1.4) Interim gear set

(see fig. 6)

This gear set is necessary if a gearbox with a narrow gear set has to be converted into a gearbox with an increased gear set width and for a crankshaft part no. 996.583 or older.

- ◆ **NOTE:** This gear set is with a drive gear of increased width which compensates for the axial staggering between crankshaft part no. 996.583 and dog gear of increased width.
- ◆ **NOTE:** The interim gear set is only available with reduction ratio 2,43.
- ▲ **WARNING:** This gear set is allowed to be installed only together with a crankshaft part no. 996.583 or of earlier date and in gearbox housing part no. 911.746.

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3.2) In the course of standardization further modifications of the gearbox were carried out:

3.2.1) Standardization of the back lash on the gear dogs to 30° (affected engines "group B"):

All gearboxes with overload clutch from serial production will be with a back lash of 30°.

◆ NOTE: The back lash of 30° is between dog hub and dog gear.

◆ NOTE: In the future, gearboxes without an overload clutch will have no backlash.

3.2.2) Specifying of the slipping torque (affected engines "group C"):

The slipping torque has been newly specified on all gearboxes with overload clutch.

New slipping torque: **475 Nm ± 25 Nm (350 ft.lb ± 18 ft.lb).**

At a repair of the overload clutch this slipping torque has to be set by an authorized distributor. On an overload supplied for spare part service the slipping torque is already set correctly and needs no readjustment.

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3.3) Overall view:

The table shows the feasible combination of the various gearbox executions:

| 03138 | | Kombinationsmöglichkeit / combination | | | | | | | | | | | |
|---|---|---|---|---|-----------------------------|---|---|---|---|--|--|---|--|
| | | Rutschkupplung, rechtwinkelige Klauennabe overload clutch, rectangular dog hub | Klauennabe rechtwinkelig dog hub rectangular | Rutschkupplung 7° overload clutch 7° | Klauennabe 7° dog hub 7° | Zahnradsatz 1:2,27 (Klauenrad schmal, 22 mm) (5) gear set 1:2,27 (dog gear narrow, 22mm) (5) | Zahnradsatz 1:2,43 (Klauenrad schmal, 22 mm) (5) gear set 1:2,43 (dog gear narrow, 22mm) (5) | Zahnradsatz 1:2,43 (Klauenrad breit, 27mm) (6) gear set 1:2,43 (dog gear wide, 27mm) (6) | Zahnradsatz 1:2,43 (Interim, Klauenrad breit, 27 mm) (5) gear set 1:2,43 (interim, dog gear wide, 27 mm) (5) | Getriebegehäuse bis S/N 15.912 gearbox housing up to S/N 15.912 | Getriebegehäuse ab S/N 15.913 gearbox housing from S/N 15.913 | Kurbelwelle TNr. 996.583 (5) crankshaft part no. 996.583 (5) | Kurbelwelle TNr. 888.164 (6) crankshaft new, part no. 888.164 (6) |
| Gemeinsame Verwendbarkeit der Verschiedenen Zahnradsätze, Klauennaben, Rutschkupplungen, Getriebedeckel und Kurbelwellen: common use of the different gear sets, dog hubs, slipper clutches, gear box housings and crankshafts: | | | | | | | | | | | | | |
| Ausgangsbasis / starting base | Rutschkupplung, rechtwinkelige Klauennabe overload clutch, rectangular dog hub | | | | | yes | yes | no | no | | | | |
| | Klauennabe rechtwinkelig dog hub rectangular | | | | | yes | yes | no | no | | | | |
| | Rutschkupplung 7° overload clutch 7° | | | | | no | no | yes | yes | | | | |
| | Klauennabe 7° dog hub 7° | | | | | no | no | yes | yes | | | | |
| | Zahnradsatz 1:2,27 (Klauenrad schmal, 22 mm) (5) gear set 1:2,27 (dog gear narrow, 22mm) (5) | yes | yes | no | no | | | | | yes(1) | yes | yes | no |
| | Zahnradsatz 1:2,43 (Klauenrad schmal, 22 mm) (5) gear set 1:2,43 (dog gear narrow, 22mm) (5) | yes | yes | no | no | | | | | yes(1) | yes | yes | yes(2) |
| | Zahnradsatz 1:2,43 (Klauenrad breit, 27mm) (6) gear set 1:2,43 (dog gear wide, 27mm) (6) | no | no | yes | yes | | | | | no | yes(3) | no | yes(2) |
| | Zahnradsatz 1:2,43 (Interim, Klauenrad breit, 27 mm) (5) gear set 1:2,43 (interim, dog gear wide, 27 mm) (5) | no | no | yes | yes | | | | | no | yes(1) | yes(2) | no |
| | Getriebegehäuse bis S/N 15.912 gearbox housing up to S/N 15.912 | | | | | yes(1) | yes(1) | no | no | | | yes(4) | no |
| | Getriebegehäuse ab S/N 15.913 gearbox housing from S/N 15.913 | | | | | yes | yes | yes(3) | yes(1) | | | yes | yes |
| | Kurbelwelle TNr. 996.583 (5) crankshaft part no. 996.583 (5) | | | | | yes | yes | no | yes(2) | yes(4) | yes | | |
| | Kurbelwelle TNr. 888.164 (6) crankshaft new, part no. 888.164 (6) | | | | | no | yes(2) | yes(2) | no | no | yes | | |

1) nur mit Kurbelwelle TNr. 996.583 oder älter
1) only with crankshaft part no. 996.583 or older

3) nur mit Kurbelwelle TNr. 888.164
3) only with crankshaft partno. 888.164

5) nicht erlaubt bei Motoren Gruppe A
5) not allowed on engines group A

2) nur mit Getriebegehäuse ab S/N 15.913
2) only with gearbox housing from S/N 15.913

4) nur mit schmalen Zahnradätzen
4) only with narrow gear sets

6) nicht erlaubt bei 912 UL/ A/ F
6) not allowed on engines 912 UL/ A/F

3.4) Summary

▲ **WARNING:** Non-compliance with these recommendations could result in engine damage, personal injury or death!

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4) Appendix

The following drawings should convey additional information:

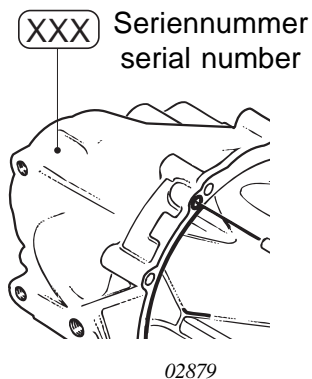


Bild / Fig. 1

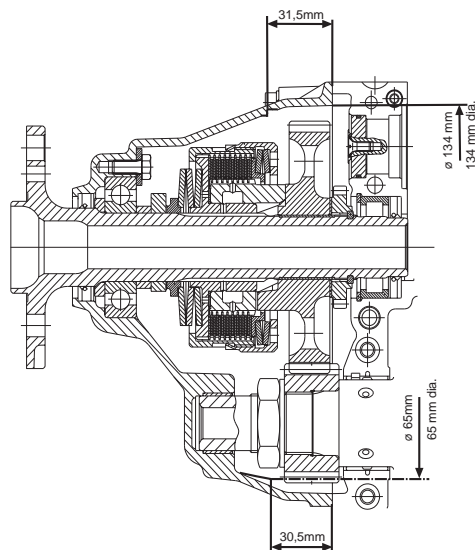


Bild / Fig. 2

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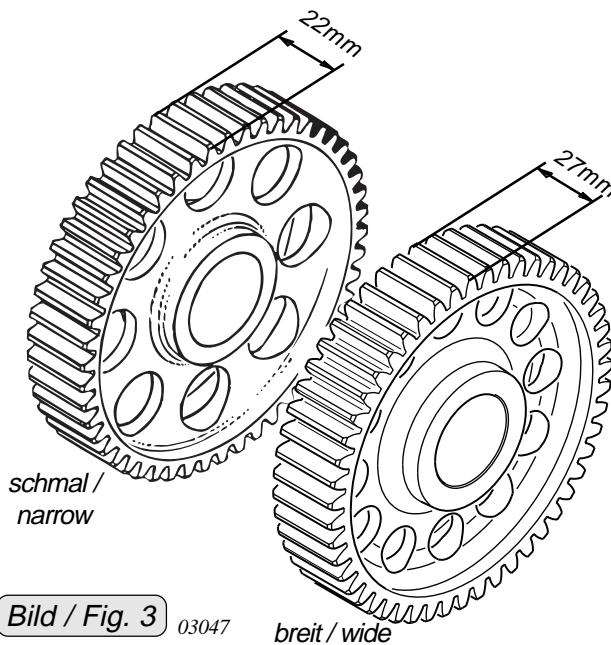


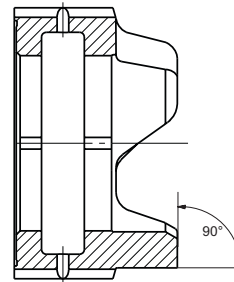
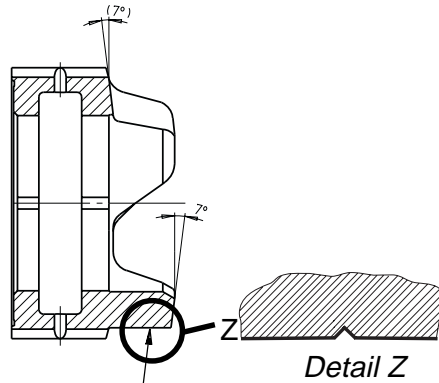
Bild / Fig. 3

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für breiten Zahnrad-
satz
for wide gear set

für schmalen Zahnrad-
satz
for narrow gear set



Erkennungsrille
identification groove

Bild / Fig. 4

03049

Kurbelwelle TNr.996.583 oder älter: <1mm
Kurbelwelle TNr.996.164: 5 - 7 mm
crankshaft, part no.996.583 or before: <1mm
crankshaft, part no.996.164: 5 - 7 mm

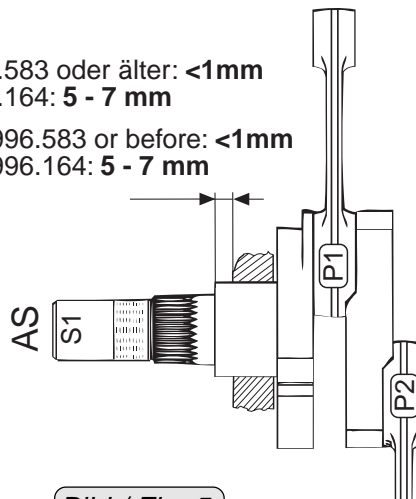


Bild / Fig. 5

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ANTRIEBSRAD FÜR
ZAHNRADSATZ
INTERIM

DRIVE GEAR FOR
INTERIM GEAR SET

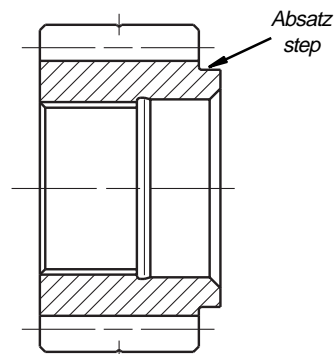


Bild / Fig. 6

03254