Drive pinion and hollow shaft, disassembling and assembling

Special tools, testers and auxiliary items required:

- Multi-purpose tool 771/1 with attachment 771/15
- Installing sleeve 2003/3
- Punch 3013
- Thrust pad 3062
- Thrust piece 3118
- Drift 3138
- Drift VW 295
- Thrust plate VW 401
- Thrust plate VW 402
- Press tool VW 407
- Press tool VW 411
- Press tool VW 412
- Tube VW 415a
- Support rails VW 457
- Separating device 22-115 mm (e.g. Kukko 17/2)
- Internal puller 12-14.5 mm (e.g. Kukko 22/1)
- Hot air blower V.A.G 1416
Note:

- When installing new gears or final drive set ⇒ Page 00-3, Technical data

- Adjustments are required when replacing components marked 1) ⇒ Page 39-37, Adjustment overview

1 - Gearbox housing

- Servicing ⇒ Page 34-127

2 - Shim "S3"

- Adjustment overview ⇒ Page 39-37
3 - Outer race for large tapered roller bearing 1)
- Pulling out ⇒ Fig. 1
- Pressing in ⇒ Fig. 2 and ⇒ Fig. 3

4 - Drive pinion 1)
- Paired with ring gear (final drive set)

5 - Needle bearing for flange shaft/drive pinion
- Pulling out ⇒ Fig. 4
- Driving in ⇒ Fig. 5

6 - Inner race for large tapered roller bearing 1)
- Pressing off ⇒ Fig. 6
- Pressing on ⇒ Fig. 7
- Low-friction bearing; do not oil when measuring friction torque
7 - Circlip
   ✦ Re-determining ⇒ Fig. 8

8 - Flange ring
   ✦ Installation position ⇒ Page 34-68

9 - Tapered rollers
   ✦ Qty. 23
   ✦ Installation position ⇒ Page 34-68

10 - Support ring
    ✦ Installation position ⇒ Page 34-68

11 - Corrugated spring

12 - Needle bearing for drive pinion/hollow shaft
    ✦ Oil before installing

13 - Hollow shaft with 3rd and 4th speed gears
    1)
14 - Needle bearing for 2nd speed sliding gear
- Split
- Oil with gear oil before installing

15 - 2nd speed sliding gear
- Pressing off ⇒ Fig. 12
- Before installing, fit spring and slide needle bearing onto hollow shaft
- After installing, check axial clearance with a feeler gauge (0.15-0.35 mm)

16 - Synchro-ring for 2nd gear
- Coated with Molybdenum
- Checking for wear ⇒ Fig. 2, ⇒ Page 35-9
17 - Synchro-hub for 1st and 2nd gear
- Pressing off ⇒ Fig. 12
- Pressing on ⇒ Fig. 13
- Installation position: flush hub towards 2nd speed sliding gear

18 - Circlip
- Removing and installing ⇒ Fig. 11
- Re-determining ⇒ Fig. 8

19 - Washer
- Removing and installing ⇒ Fig. 11

20 - Locking collar for 1st and 2nd gear
- Installation position: splines for reverse gear towards synchro-ring for 2nd gear

21 - Synchro-ring for 1st gear
- Checking for wear ⇒ Fig. 2, ⇒ Page 35-9
22 - Needle bearing for 1st speed sliding gear
   ♦ Oil with gear oil before installing

23 - 1st speed sliding gear
   ♦ Before installing, insert spring ⇒ Fig. 1 , ⇒ Page 35-9
   ♦ After pressing on -item 24 -, check axial clearance

24 - Inner race for small tapered roller bearing
   1)
   ♦ Pressing off ⇒ Fig. 9
   ♦ Pressing on ⇒ Fig. 10
   ♦ Low friction bearing; do not oil when measuring friction torque

25 - Outer race for small tapered roller bearing
   1)
   ♦ Driving out ⇒ Fig. 15
   ♦ Pressing in ⇒ Fig. 16

26 - Shim "S4"
   ♦ Adjustment overview ⇒ Page 39-37
27 - Bearing plate 1)
   - Servicing ⇒ Page 34-112

28 - 6th gear wheel
   - Pressing off ⇒ Page 34-68
   - Pressing on ⇒ Page 34-69
   - Installation position: shoulder towards inner race for small tapered roller bearing

29 - Spacer sleeve

30 - Shim
   - Re-determining ⇒ Page 34-78

31 - 5th gear wheel
   - Pulling off ⇒ Page 34-62
   - Driving on ⇒ Page 34-79

32 - Circlip for 5th gear wheel
   - Re-determining ⇒ Page 34-80

33 - End cover
   - Servicing ⇒ Page 34-103
Fig. 1 Pulling out outer race for large tapered roller bearing
◆ Stepped side of thrust pad 3062 rests against the outer race

Fig. 2 Heating gearbox housing to insert the outer race for large tapered roller bearing
- Heat gearbox housing in area of bearing seat for approx. 15 minutes, to approx. 100 °C, with a hot air blower.
Fig. 3  Inserting outer race for large tapered roller bearing in gearbox housing and pressing home

- Insert outer race only after heating gearbox housing and press home for 1-2 minutes under a repair press until a heat exchange has taken place.

Fig. 4  Pulling out needle bearing for flange shaft/drive pinion

A - Internal puller 12-14.5 mm, e.g. Kukko 21/1
Fig. 5  Driving needle bearing for flange shaft/ drive pinion in flush

Fig. 6  Pressing off inner race for large tapered roller bearing

A - Separating device 22-115 mm, e.g. Kukko 17/2

- Bearing is destroyed when pressing off
**Fig. 7** Pressing on inner race for large tapered roller bearing

- Heat inner race to approx. 100°C and fit.
- Press home ensuring there is no axial play.
Fig. 8 Determining circlip for large tapered roller bearing for drive pinion

- Determine thickest circlip that can still just be fitted.
- Determine circlip from table.

⇒ Parts catalog

The following circlips are available:

<table>
<thead>
<tr>
<th>Circlip thickness (mm)</th>
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<tr>
<td>2.34</td>
</tr>
<tr>
<td>2.36</td>
</tr>
<tr>
<td>2.38</td>
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</tbody>
</table>

- Fit circlip.
Fig. 9  Pressing off inner race of small tapered roller bearing for drive pinion together with 1st speed sliding gear

Note:

Do not press off together with 1st and 2nd gear synchro-hub and 2nd speed sliding gear.
Fig. 10  Pressing on inner race for small tapered roller bearing for drive pinion together with 1st speed sliding gear

- Install circlip, shim for 1st speed sliding gear, synchro-ring for 1st speed, and 1st speed sliding gear with spring and needle bearing.
- Heat inner race to approx. 100 °C and fit.
- Press home ensuring there is no axial play.

Note:

- With shoulder of thrust piece 3118 facing downwards, press only onto bearing inner race.
- Position stepped shoulder of tube VW 415 A facing up towards press tool VW 412.
- After pressing on, check axial clearance of 1st speed sliding gear.
Fig. 11 Removing and installing circlip for synchro-hub and shim for 1st speed sliding gear

- Removing: take off shim -A- then circlip -B-.
- Installing: fit circlip -B- then shim -A-.

Note:

Do not press off together with 1st speed sliding gear and inner race for small tapered roller bearing.

Fig. 12 Pressing off 2nd speed sliding gear with synchro-hub for 1st and 2nd gear

- Take off locking collar for 1st and 2nd gear and synchro-ring for 1st gear.
- Remove shim and circlip for synchro-hub.
- Press off 2nd speed sliding gear together with synchro-hub for 1st and 2nd gear.
Fig. 13  Fitting 2nd speed sliding gear, pressing on synchro-hub for 1st and 2nd gear
- Install needle bearing (split), sliding gear with spring and synchro-ring for 2nd gear.
- Oil needle bearing.
- Heat synchro-hub to approx. 100 °C and fit.
- Press home ensuring there is no axial play.

Note:
◆ *Position tube VW 415 a with shoulder towards synchro-hub.*
◆ *Position thrust pad 3118 with stepped shoulder towards press tool VW 412.*
**Fig. 14  Determining thickness of circlip for synchro-hub for 1st and 2nd gear**

- Determine thickest circlip that can still just be fitted.
- Determine circlip from table.

⇒ *Parts catalog*

The following circlips are available:

<table>
<thead>
<tr>
<th>Circlip thickness (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.90  1.96  2.02</td>
</tr>
<tr>
<td>1.93  1.99</td>
</tr>
</tbody>
</table>

- Fit circlip in direction of arrow onto synchro-hub.
Fig. 15  Driving out outer race for small tapered roller bearing

Fig. 16  Pressing in outer race for small tapered roller bearing
- Insert shim "S4" into bearing flange behind bearing seat.
- Press outer race for small tapered roller bearing onto stop.