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200 Quattro – 016 Trans.

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Synchronizer

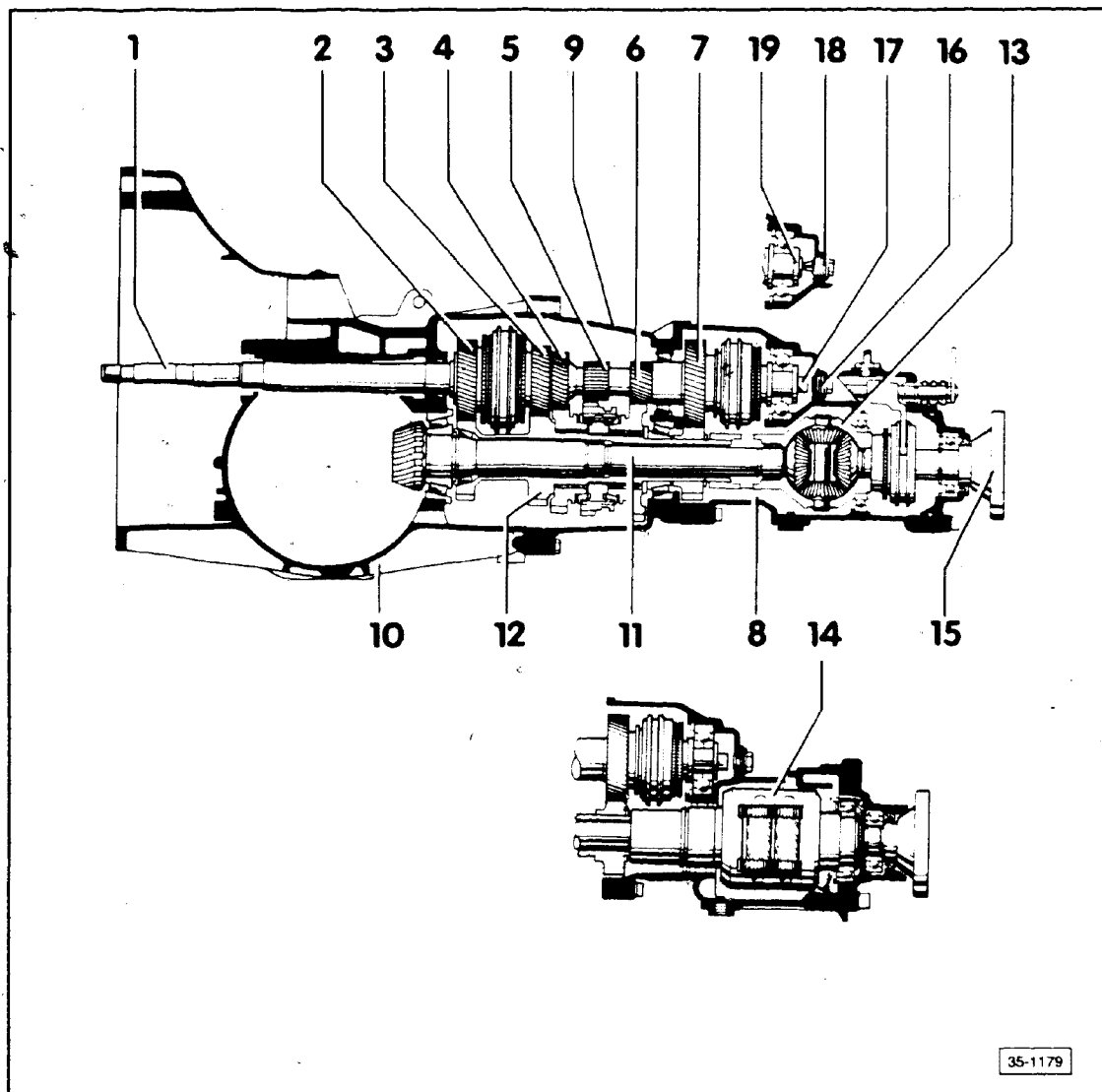
- assembling 35-140

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- assembling 35-50

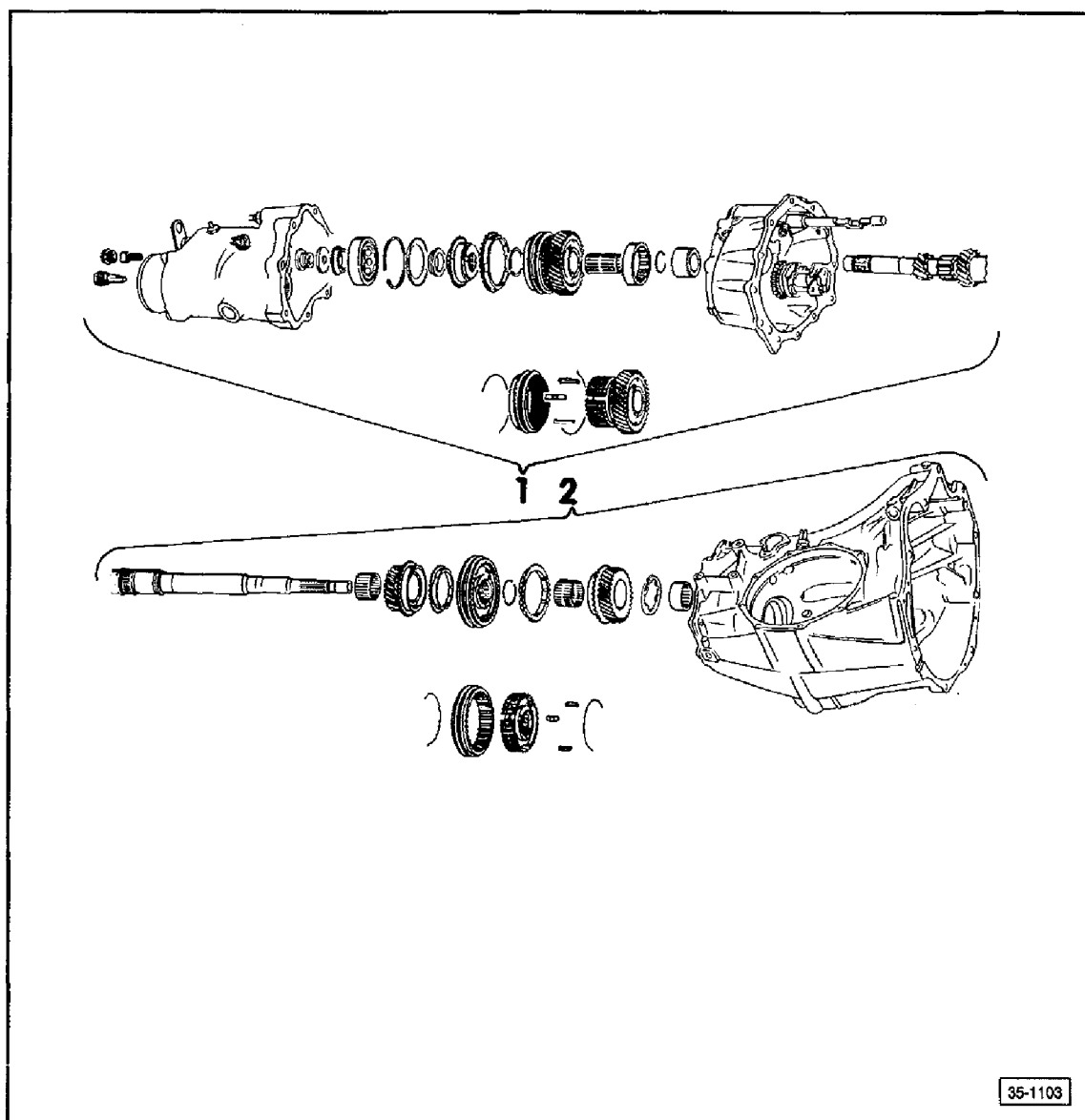
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- general layout 35-10



- | | |
|---|--|
| <p>1 — Input shaft
disassembling/assembling, section 35-20</p> <p>2 — 4th gear</p> <p>3 — 3rd gear</p> <p>4 — 2nd gear</p> <p>5 — Reverse gear</p> <p>6 — 1st gear</p> <p>7 — 5th gear</p> <p>8 — End cover</p> <p>9 — Bearing carrier</p> <p>10 — Transmission housing</p> | <p>11 — Pinion shaft
disassembling/assembling, section 35-80</p> <p>12 — Hollow shaft
disassembling/assembling, section 35-80</p> <p>13 — Differential with differential lock
• vehicles through 12/87
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• vehicles after 12/87
• do not disassemble
• removing/installing, Repair Group 34</p> <p>15 — Driveshaft flange</p> |
|---|--|

- 16 — **Plug 30 Nm (22 ft lb)**
 - up to build date 15 07 5 and from build date 12 01 9
- 17 — **Self locking bolt**
 - up to build date 15 07 5 and from build date 12 01 9
 - tighten to **50 Nm (37 ft lb)** and turn additional 90°
- 18 — **Plug with oil distribution funnel**
 - from build date 16 07 5 up to build date 11 01 9
 - threads are specially coated, always replace plug
 - **30 Nm (22 ft lb)**
- 19 — **Hollow bolt**
 - from build date 16 07 5 up to build date 11 01 9
 - **150 Nm (111 ft lb)**

**Note**

See General Repair Information, Repair Group 00.

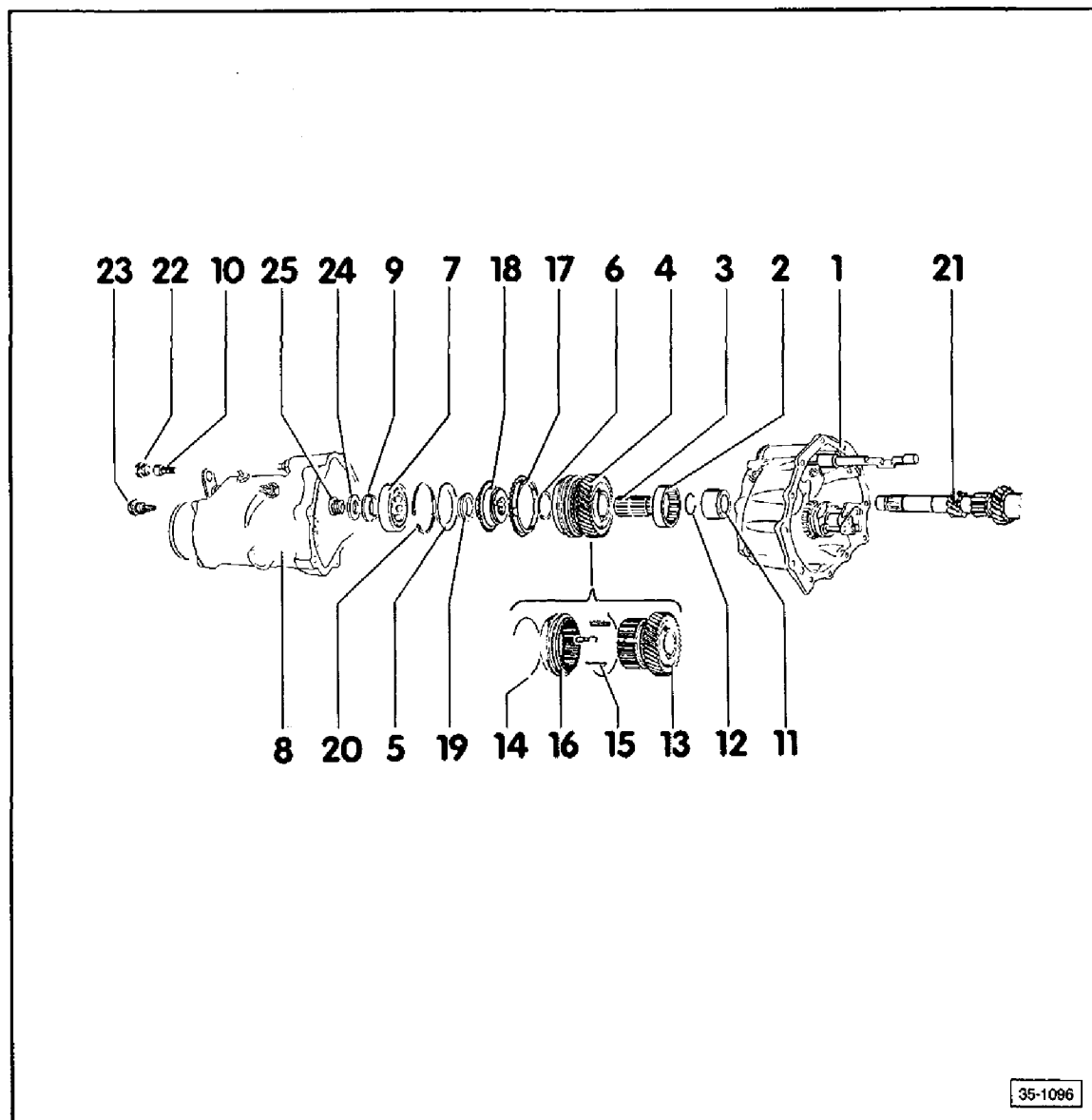
1 — Disassembling/assembling, section 35-30

2 — Disassembling/assembling, section 35-40

CAUTION

From build date 12 01 9, the hole in the input shaft that provides oil supply to the bearing is omitted (see section 35-60). The oil supply is now provided by increasing the oil fill quantity. Therefore, the oil filler hole in the transmission was placed in a higher position (see section 35-70).

The correct input shaft part number can be found in the replacement parts catalog.



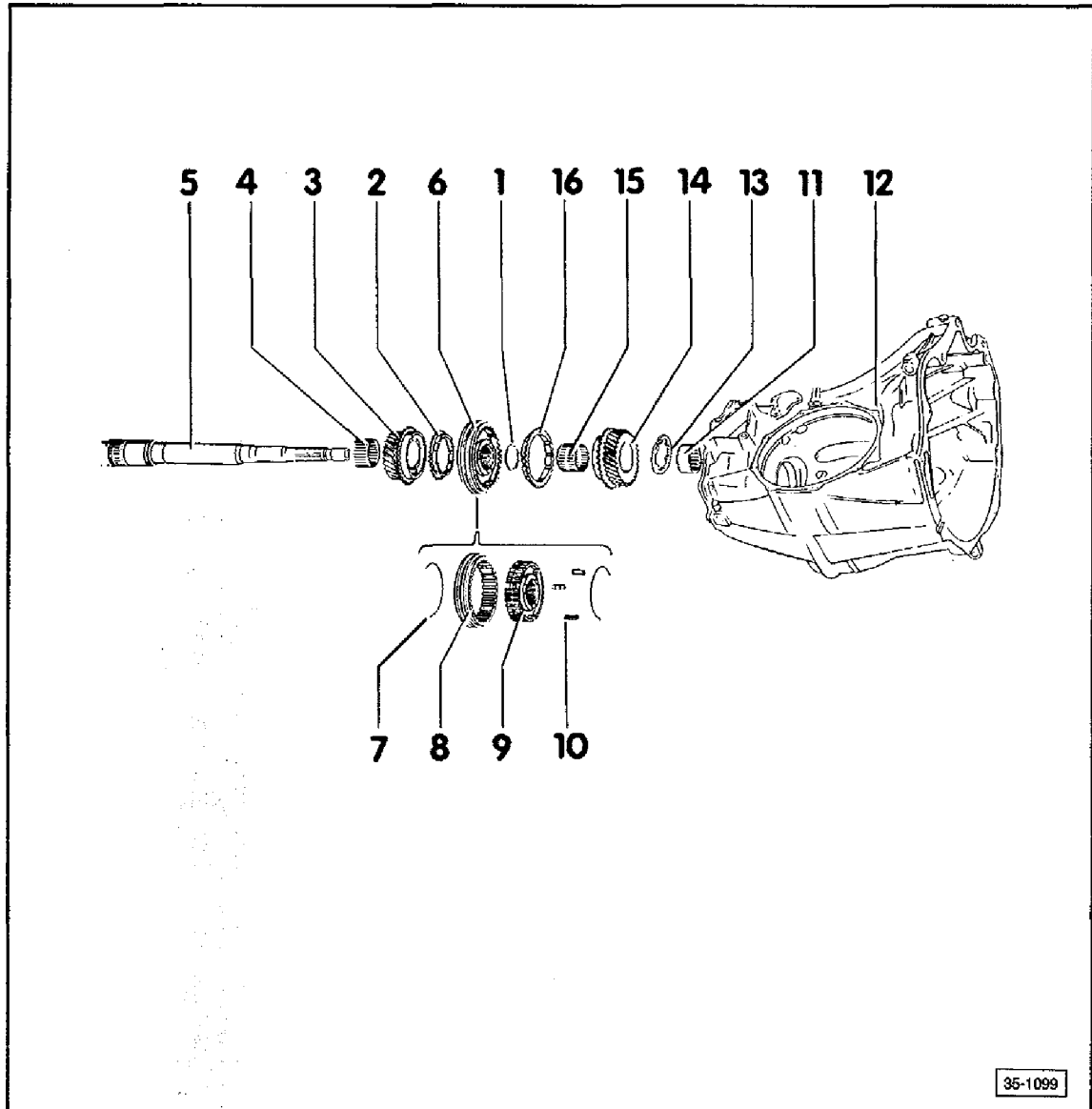
- | | |
|--|--|
| 1 — Gear carrier housing | 9 — 1st inner race ball bearing |
| 2 — Input shaft roller bearing | 10 — Self-locking bolt |
| 3 — 5th gear needle bearing | <ul style="list-style-type: none"> • up to build date 15 07 5 and from build date 12 01 9 • tighten 50 Nm (37 ft lb) and turn additional 90° |
| 4 — 5th gear with sleeve and synchronizer hub
Installing, section 35-50 | 11 — Cylindrical roller bearing inner race |
| 5 — Baffle plate | 12 — Circlip |
| <ul style="list-style-type: none"> • crimped in place • always replace | 13 — 5th gear with synchronizer hub |
| 6 — Circlip | 14 — Spring |
| 7 — Input shaft ball bearing | 15 — Keys |
| 8 — End cover
disassembling/assembling, Repair Group 34 | 16 — Synchronizer sleeve
install with short collar toward 5th gear |

All Wheel Drive 016

Gear carrier housing, disassembling/assembling

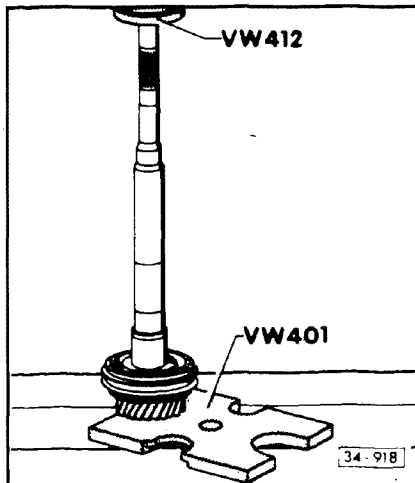
35-30-1

- 17 — **5th gear synchronizer ring**
 - checking for wear, section 35-50
- 18 — **5th gear hub**
- 19 — **2nd inner race ball bearing**
 - drive onto input shaft before mounting end cover plate
- 20 — **Circlip**
- 21 — **Input shaft**
 - ♥ from build date 16 07 5 to build date 11 01 9, includes oil hole
 - starting build date 12 01 9, oil hole omitted, section 35-50
 - input shaft without oil hole can be installed in all transmissions no matter what the oil capacity of the transmission is
 - input shaft does not have to be coordinated with transmission
 - in vehicles with 2.2L-162 kW engine crankshaft with small diameter in area of needle bearing in all vehicles starting 27 06 9, section 35-60
 - if input shaft or entire transmission is replaced, check the diameter of needle bearing in crankshaft engine, if necessary replace needle bearing (see Repair Group 13)
- 22 — **Plug 30 Nm (22 ft lb)**
 - to build date 15 07 5 and from build date 12 01 9
- 23 — **Plug with oil distribution funnel**
 - from build date 16 07 5 up to build date 11 01 9
 - threads are specially coated, always replace plug
 - 30 Nm (22 ft lb)
- 24 — **Washer**
- 25 — **Hollow bolt**
 - from build date 16 07 5 up to build date 11 01 9
 - 150 Nm (111 ft lb)



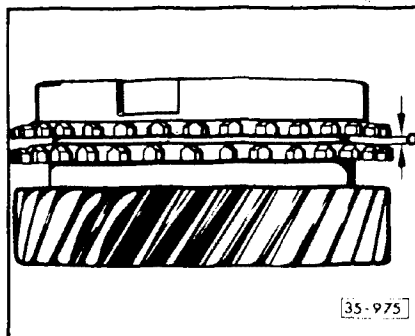
- | | |
|--|---|
| 1 — Circlip
determining thickness, section 35-50 | 8 — Synchronizer sleeve |
| 2 — 3rd gear synchronizer ring
• top angle 115°
• coat friction surfaces with MoS ₂
• checking for wear, section 35-50 | 9 — Synchronizer hub |
| 3 — 3rd gear | 10 — Keys |
| 4 — 3rd gear needle bearing | 11 — Input shaft needle bearing
removing/installing, section 35-60 |
| 5 — Input shaft | 12 — Transmission housing |
| 6 — 3rd/4th gear synchronizer assembly
• removing/installing, section 35-50
• note installation position when removing | 13 — Circlip |
| 7 — Spring | 14 — 4th gear |
| | 15 — 4th gear needle bearing |
| | 16 — 4th gear synchronizer ring
• top angle 115°
• coat friction surfaces with MoS ₂
• checking for wear, section 35-50 |

Synchronizer and gears, disassembling/assembling



3rd gear and synchronizer, disassembling

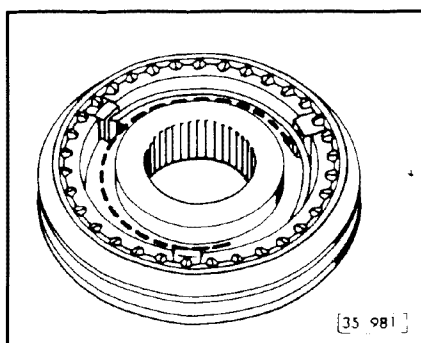
- press off synchronizer sleeve/hub with 3rd gear using **VW 412** and **VW 401**



Synchronizer rings, checking

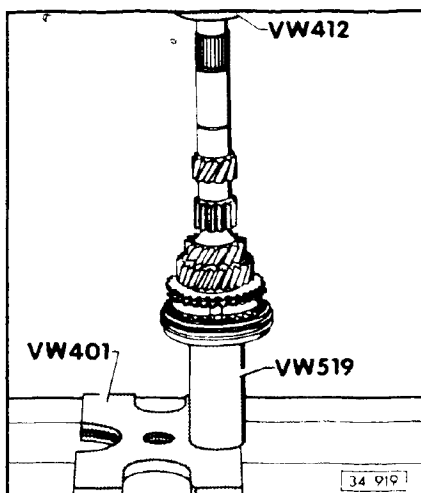
- press synchronizer rings onto gear cones
- measure gap dimension **a** with a feeler gauge

Gap a	Dimension (new)	Wear limit
3rd/4th gear	1.0-1.7 mm (0.039-0.067 in.)	0.5 mm (0.020 in.)
5th gear	1.0-1.9 mm (0.039-0.075 in.)	0.5 mm (0.020 in.)



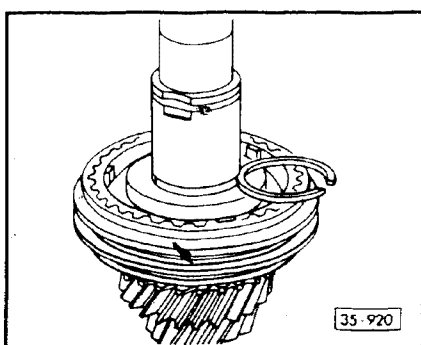
Synchronizer sleeve/hub, assembling

- slide sleeve over synchronizer body
- insert keys and mount springs with ends 120° apart
 - bent end of spring must engage in hollow key



Synchronizer sleeve/hub, installing

- turn synchronizer ring until grooves are aligned with keys
- install with wider collar of hub facing 4th gear

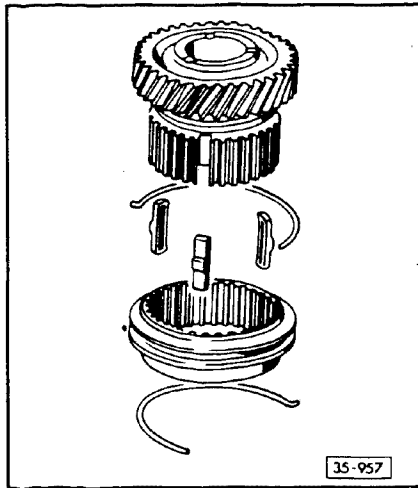


Synchronizer end play, adjusting

- determine the thickest circlip that will fit and install it

The following circlips are available:

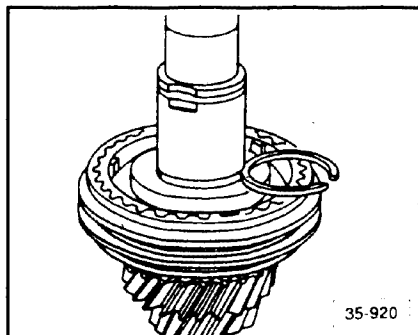
Thickness (mm)	Part number
1.50	088 311 317
1.56	088 311 317 B
1.62	088 311 317 C



5th gear with synchronizer sleeve and hub, assembling

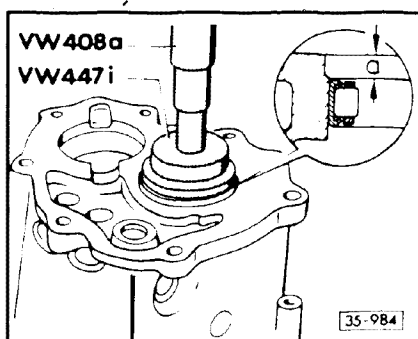
- slide sleeve over hub with short collar toward gear
- insert keys
- hook spring into the first key on the gear side
- pull 2nd and 3rd key back slightly
- press in spring with screwdriver and push keys over spring
- insert 2nd spring with ends offset 120°

Bearings, removing/installing



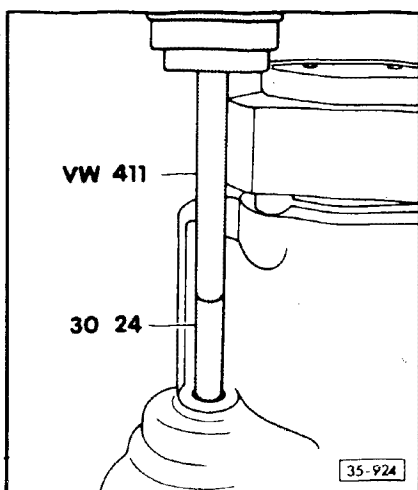
Cylindrical bearing, removing

- press bearing out of gear carrier housing using tools **VW 408a** and **VW 447i**



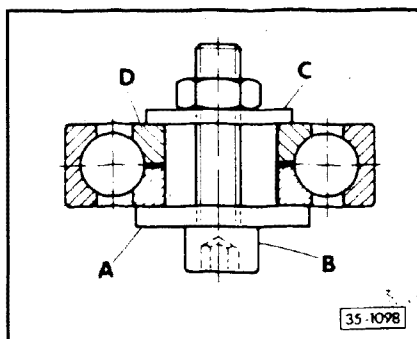
Cylindrical bearing, installing

- press bearing into gear carrier housing using tools **VW 408a** and **VW 447i**
 - push-in depth **a** = 8.5-9.0 mm (0.335-0.354 in.)



Ball bearing end cover, removing

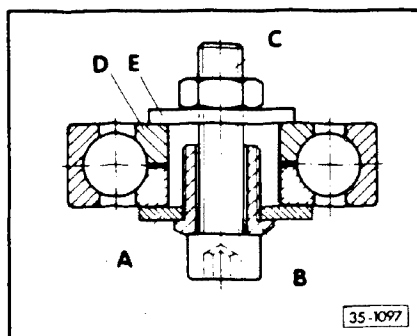
- remove baffle plate and circlips
- remove end plate
- rework bearing seat near crimp marks with a three-sided file



Ball bearing/input shaft, installing

up to build date 15 07 5 and from build date 12 01 9

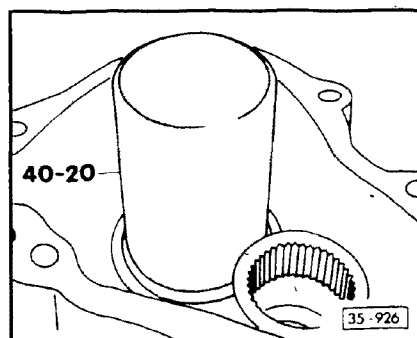
- A - original washer
- B - socket head bolt
- C - washer
- D - 2nd inner race



Ball bearing/input shaft, installing

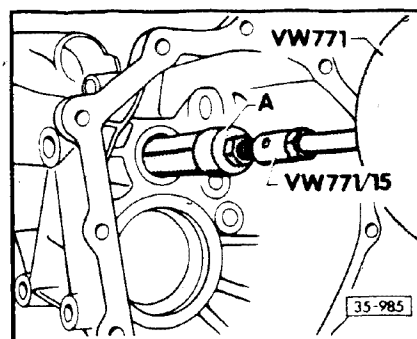
from build date 16 07 5 and up to build date 11 01 9

- A - original washer
- B - hollow bolt
- C - socket head bolt
- D - 2nd inner race
- E - washer



Ball bearing, installing

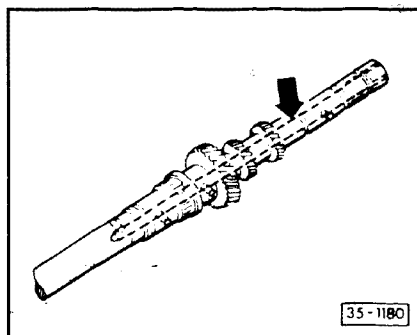
- support sides of end cover
- install bearing
- remove 2nd inner race (D in previous two figures) and drive onto input shaft, see Repair Group 34
- insert circlip into groove
- press in baffle plate and crimp
- remove bolt, nut and washer



Needle bearing, removing

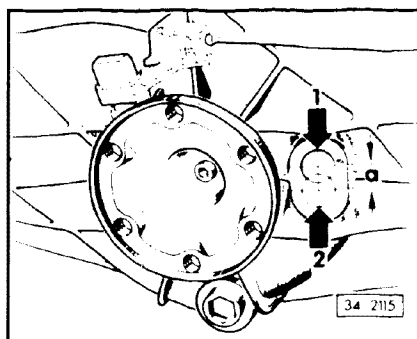
- pull needle bearing out of transmission housing
- A = Puller 30-37 mm, i.e. Kukko 21/5

Input shaft, adjustment



Oil hole, omitted

The oil hole (**arrow**) in the input shaft has been omitted.

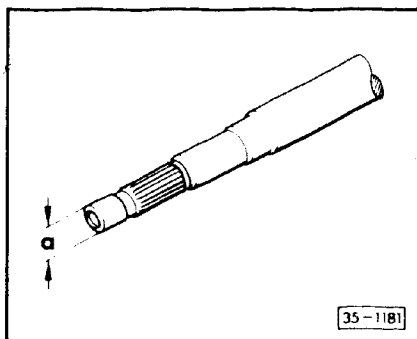


Transmission housing input shaft, adjusting

1 - transmission housing with oil filler hole raised 7 mm higher (dimension **a**) (beginning build date 13 08 9)

2 - transmission housing with previous oil filler opening (up to build date 12 08 9)

- input shaft with or without oil can be installed in either case



Input shaft diameter

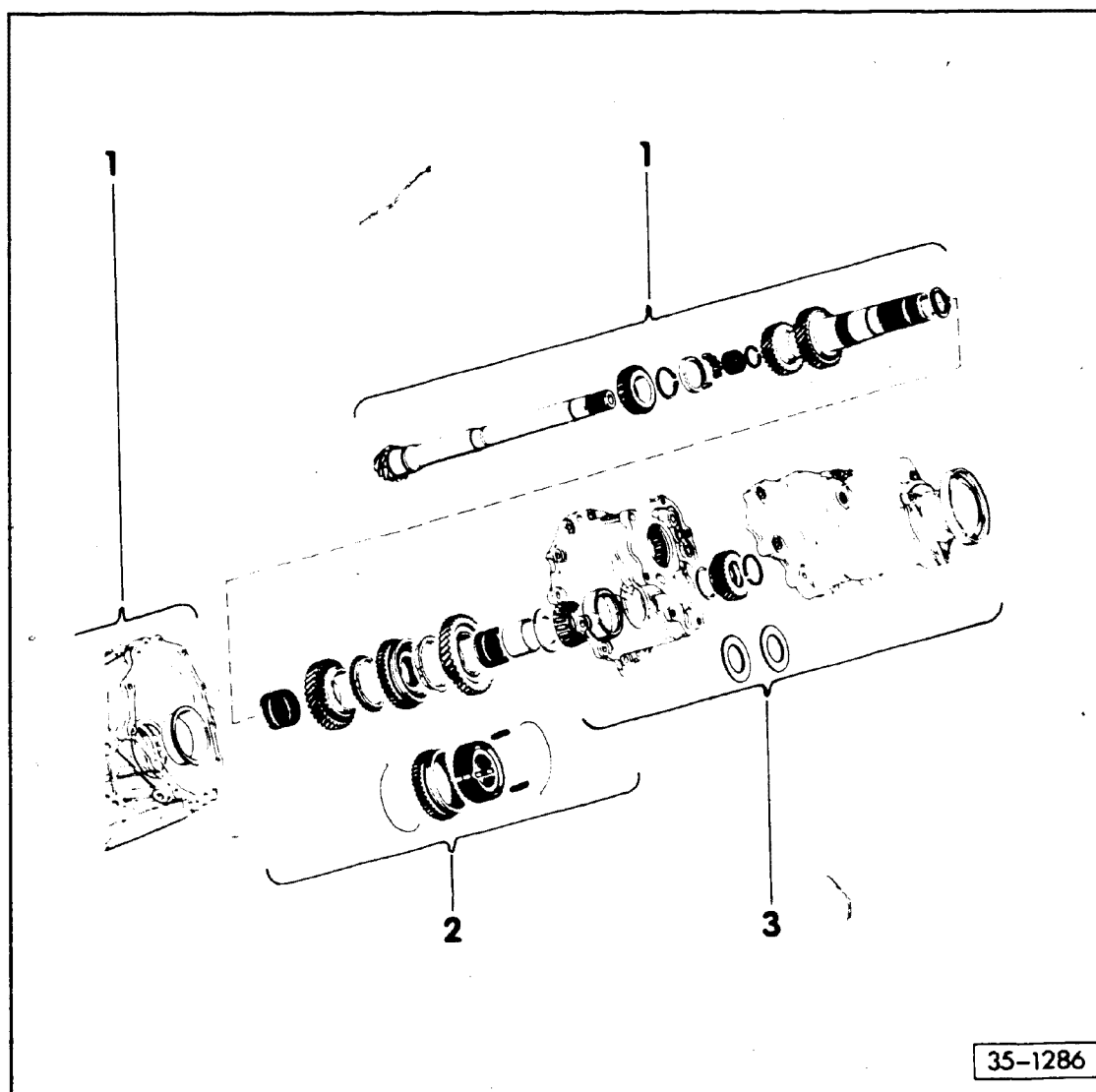
up to build date 26 06 9: **a** 18 mm

from build date 27 06 9: **a** 15 mm

Note

Starting 3/89, the 2.2L 162 kW engine will be installed in the Audi 200. In transmissions that are combined with this engine, only the input shaft with the reduced diameter is installed.

Starting 8/89, exclusively transmissions with the new input shaft are installed in all vehicles, see Technical Data.



35-1286

Note

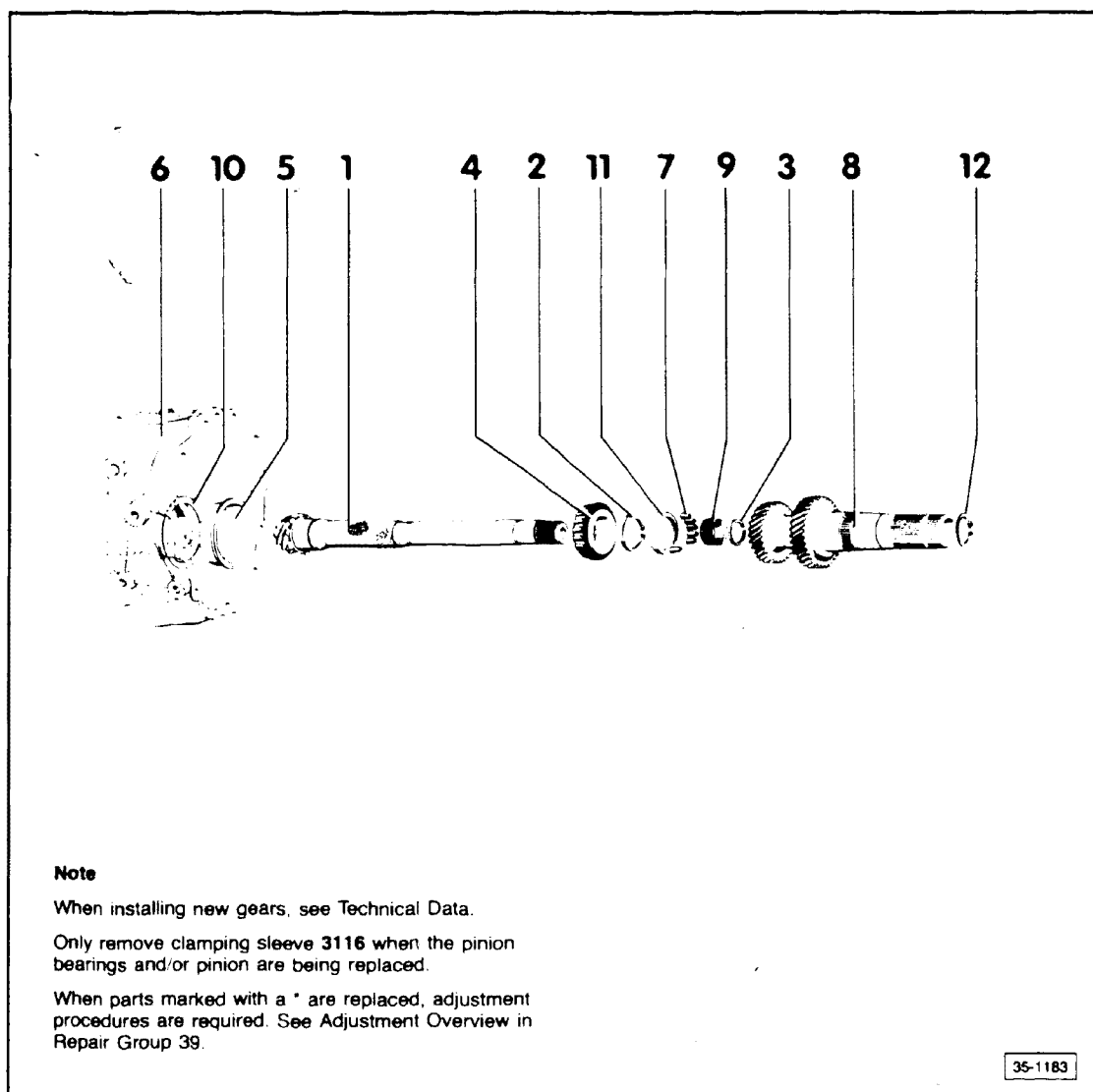
See Repair Group 00 for General Repair Information.

- 1 — Disassembling/assembly, section 35-90
- 2 — Disassembling/assembly, section 35-100
- 3 — Disassembling/assembly, section 35-110

CAUTION

When replacing pinion bearings, determine installation position of pinion through actual measurement before removing bearings. See Repair Group 39.

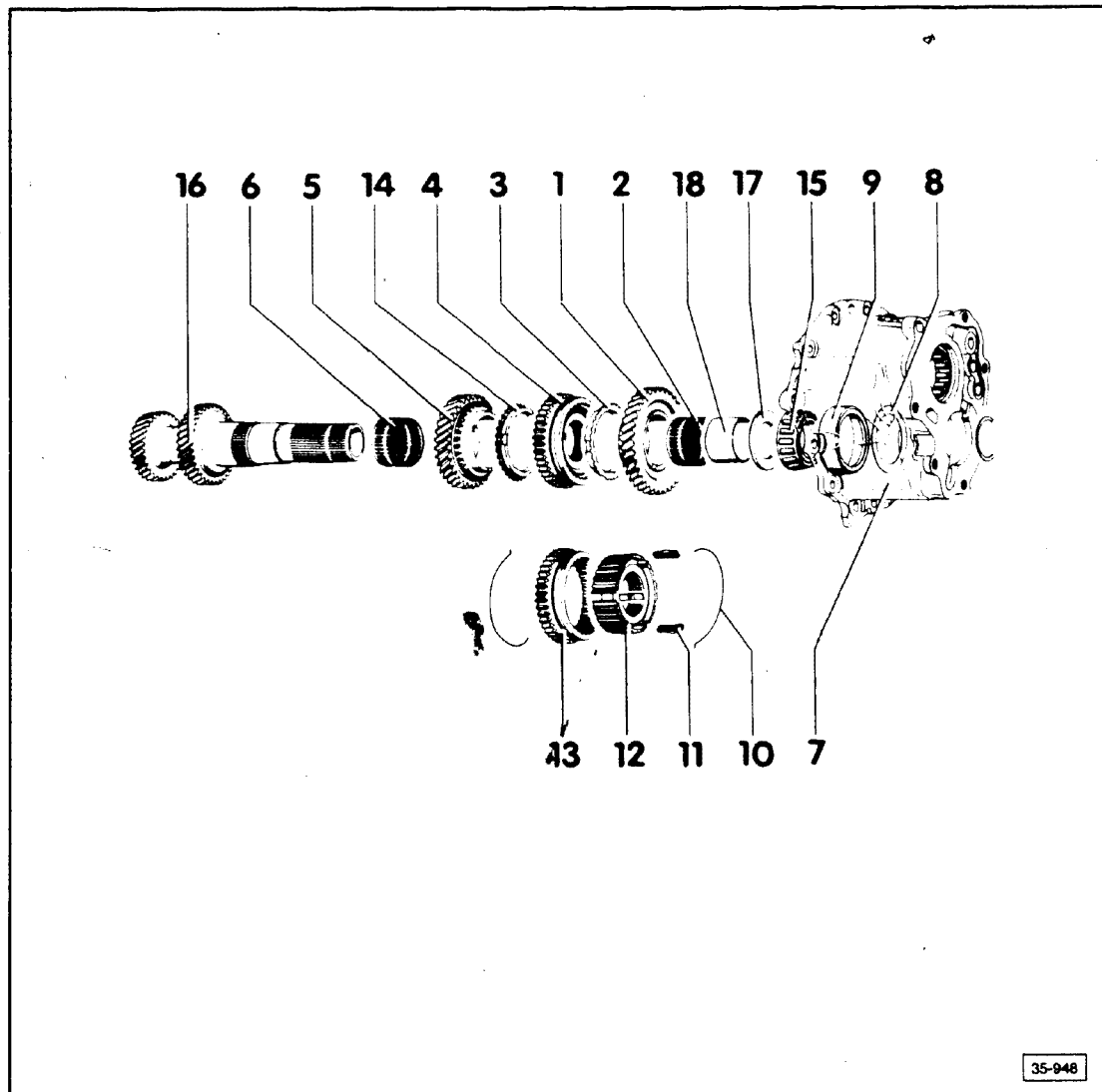
Replace both pinion bearings together. Use products from the same manufacturer if possible.



- | | |
|---|--|
| <p>1 — Pinion*
ring gear and pinion come as a matched set</p> <p>2 — Circlip</p> <p>3 — Circlip</p> <p>4 — Large bearing inner race*
• removing, section 35-130
• installing, section 35-150</p> <p>5 — Large bearing outer race*
removing/installing, section 35-160</p> <p>6 — Transmission housing*</p> <p>7 — Taper rollers
(30 small and 22 large)
installing, section 35-160</p> | <p>8 — Hollow shaft*
with 3rd and 4th gears</p> <p>9 — Needle bearing</p> <p>10 — Shim
see Adjustment Overview, Repair Group 39</p> <p>11 — Spacer</p> <p>12 — Circlip
• prevents pinion from falling out of hollow shaft when removing gear carrier housing
• installed in all transmissions starting 11/84
• only remove when removing pinion</p> |
|---|--|

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When parts marked with a * are replaced, adjustment procedures are required. See Adjustment Overview in Repair Group 39.

- 1 — 1st gear
- 2 — 1st gear needle bearing*
- 3 — 1st gear synchronizer ring
 - top angle = 110°
 - identification: one tooth missing in three places
 - as replacement parts for 1st-4th gears
 - only synchronizer rings with 115° top angle and MoS₂ coated friction surface (with oil groove) are supplied as replacement parts
 - checking for wear, section 35-140

- 4 — 1st/2nd gear synchronizer sleeve/hub*
 - removing, section 35-130
 - assembling, section 35-140
 - installing, section 35-150

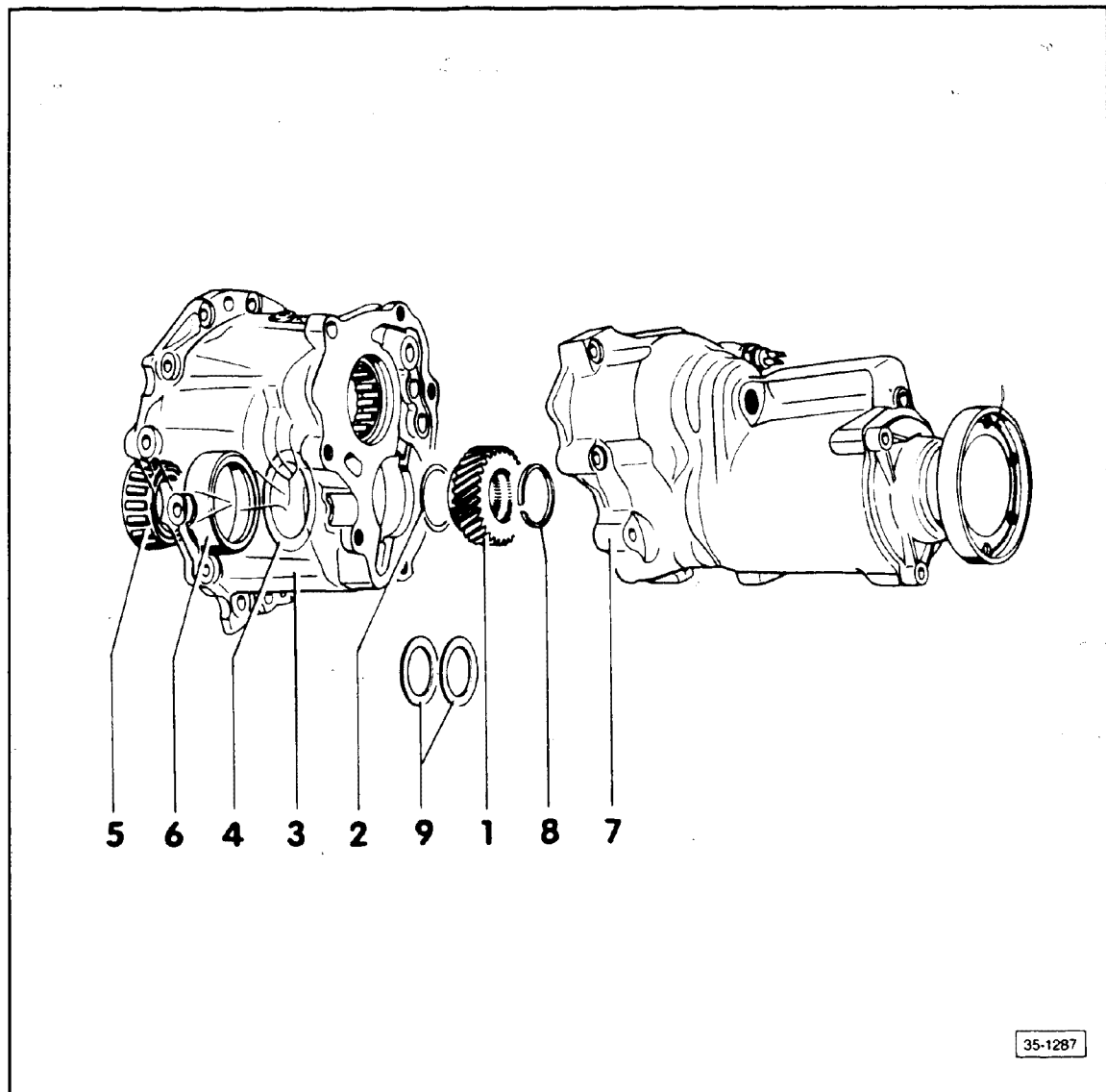
- 5 — 2nd gear
- 6 — 2nd gear needle bearing
- 7 — Gear carrier housing*

- 8 — Shim S4
 - Adjustment Overview, Repair Group 39

- 9 — Small bearing outer race*
 - removing/installing, section 35-160

- 10 — Spring

- 11 — Locking piece
- 12 — Synchronizer hub
- 13 — Synchronizer sleeve
- 14 — 2nd gear synchronizer ring
 - top angle 115°
 - friction surface (with oil groove) coated with MoS₂
 - checking for wear, section 35-140
- 15 — Small bearing inner race*
 - removing, section 35-130
 - installing, section 35-150
- 16 — Hollow shaft*
 - with 3rd and 4th gears
- 17 — Washer
- 18 — 1st gear needle bearing inner race*

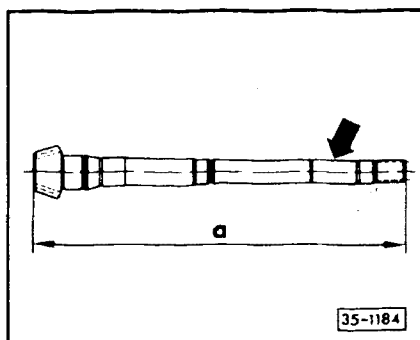


When parts marked with a * are replaced, adjustment procedures are required. See Adjustment Overview in Repair Group 39.

- 1 — **5th gear**
 - for mounting in vehicles with 162 kW, Repair Group 34
 - removing, Repair Group 34
- 2 — **5th gear shim**
 - determining thickness, Repair Group 34
- 3 — **Gear carrier housing***

- 4 — **Shim S4***
 - Adjustment Overview, Repair Group 39
- 5 — **Small bearing inner race***
 - removing, section 35-130
 - installing, section 35-160
- 6 — **Small bearing outer race***
 - removing/installing, section 35-160
- 7 — **End cover**
- 8 — **Circlip**
- 9 — **Dished washers**

Pinion dimensions



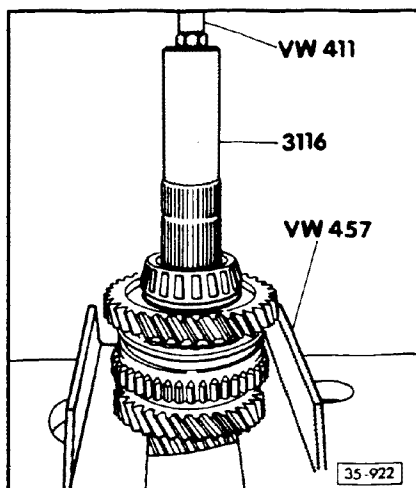
Through 12/87 (vehicles with manually locking differential):

- dimension **a** = 400 mm (15.7 in.)

Starting 1/88 (vehicles with self-locking Torsen differential):

- dimension **a** = 436 mm (17.2 in.)

Bearing inner races, removing

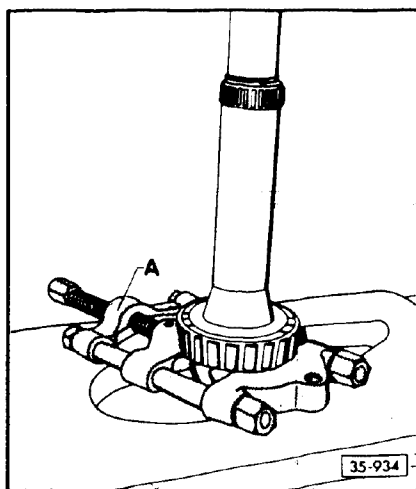


Small bearing inner race, removing

- press off together with 1st and 2nd gears, and synchronizer assembly

Note

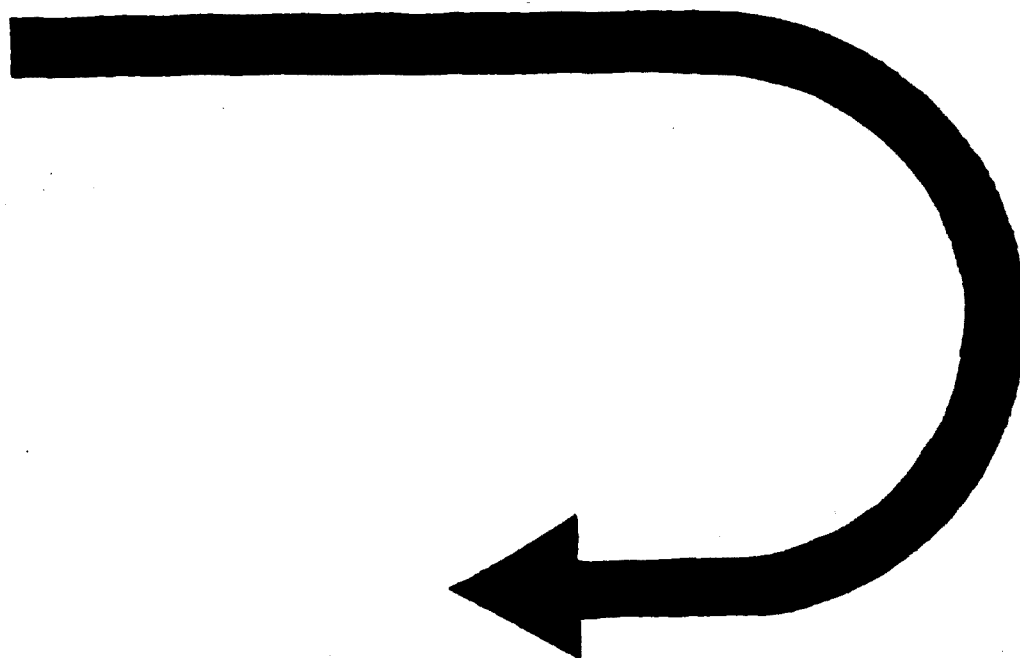
In vehicles with lengthened pinion (with Torsen differential), pipe sleeve **VW 516** is used in addition to clamping sleeve **3116**.



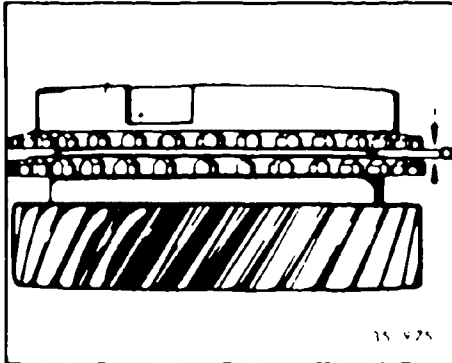
Large bearing inner race, removing

- press off using separating device **A**: 12-75 mm e.g. **Kukko 17/1**

CONTINUED IN THE
BEGINNING OF NEXT ROW



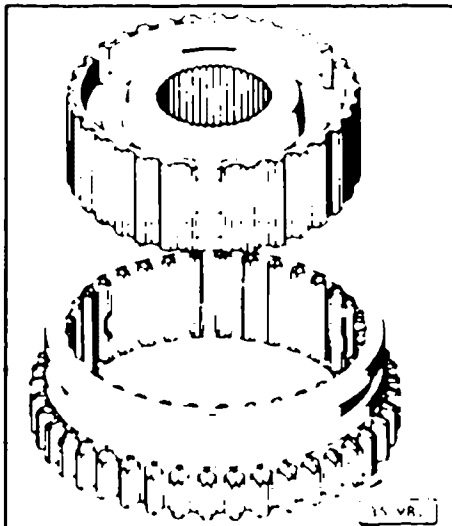
Synchronizer, assembling



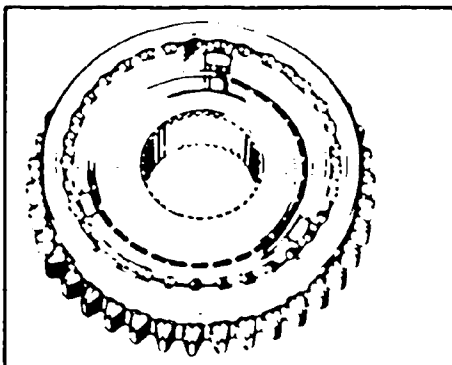
Synchronizer rings, checking

- place rings on gear cones and measure gap *a* with feeler gage

Gap <i>a</i>	Dimension (new)	Wear limit
1st 2nd gear	1.0-1.7 mm (0.039-0.067 in.)	0.5 mm (0.020 in.)



1st 2nd gear synchronizer sleeve hub, assembling

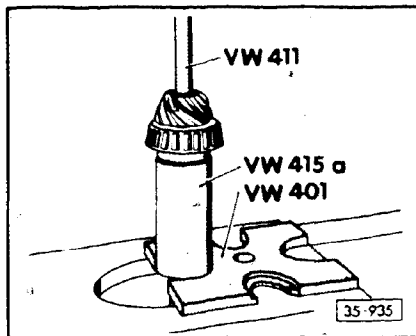


Synchronizer sleeve hub, assembling

- push sleeve over synchronizer hub
 - recesses for locking units on synchronizer hub and operating sleeve must be aligned
- install locking keys and mount springs at 120° intervals
 - the angled end of the spring must engage in the hollow locking unit

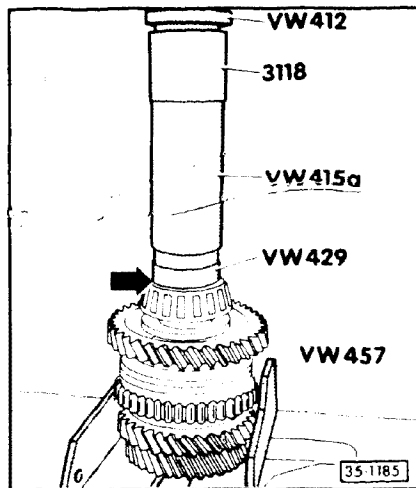
Bearing inner races, installing

Inner race/bearing, installing

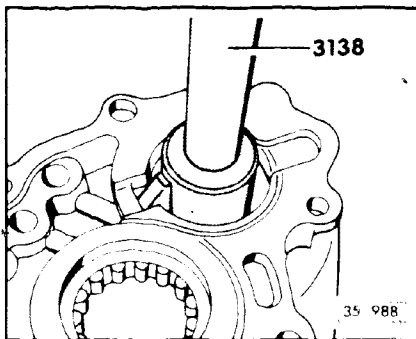


Small bearing inner race, installing

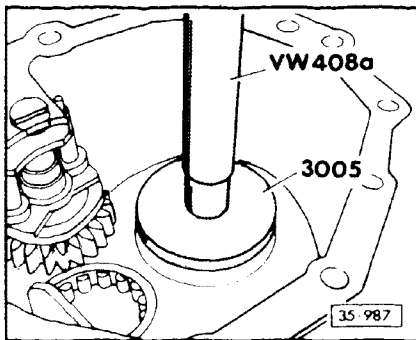
- install 5th gear shim in bearing inner race (arrow)
 - always replace shim
- position 1st and 2nd gears and 1st/2nd synchronizer assembly
- press on bearing
 - pinion remains in hollow shaft when installing



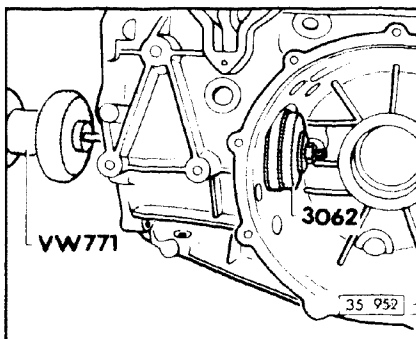
Bearing outer races, removing/installing



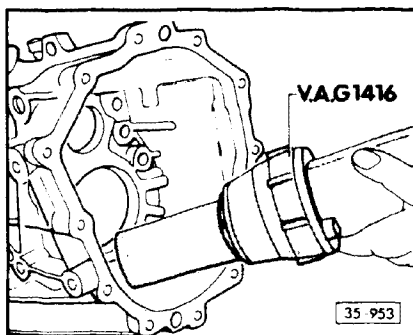
Bearing outer race, removing from gear carrier housing



Bearing outer race, installing in gear carrier housing

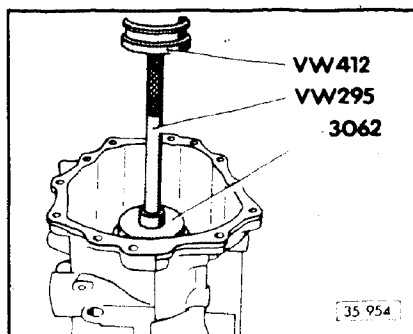


Bearing outer race, removing from transmission housing

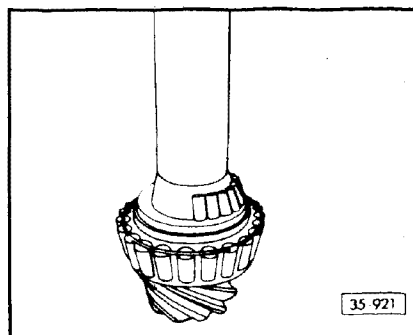


Bearing outer race, installing in transmission housing

- heat transmission housing in area of bearing seat to 100°C (212°F) by using hot air blower VAG 1416 for approximately 15 minutes

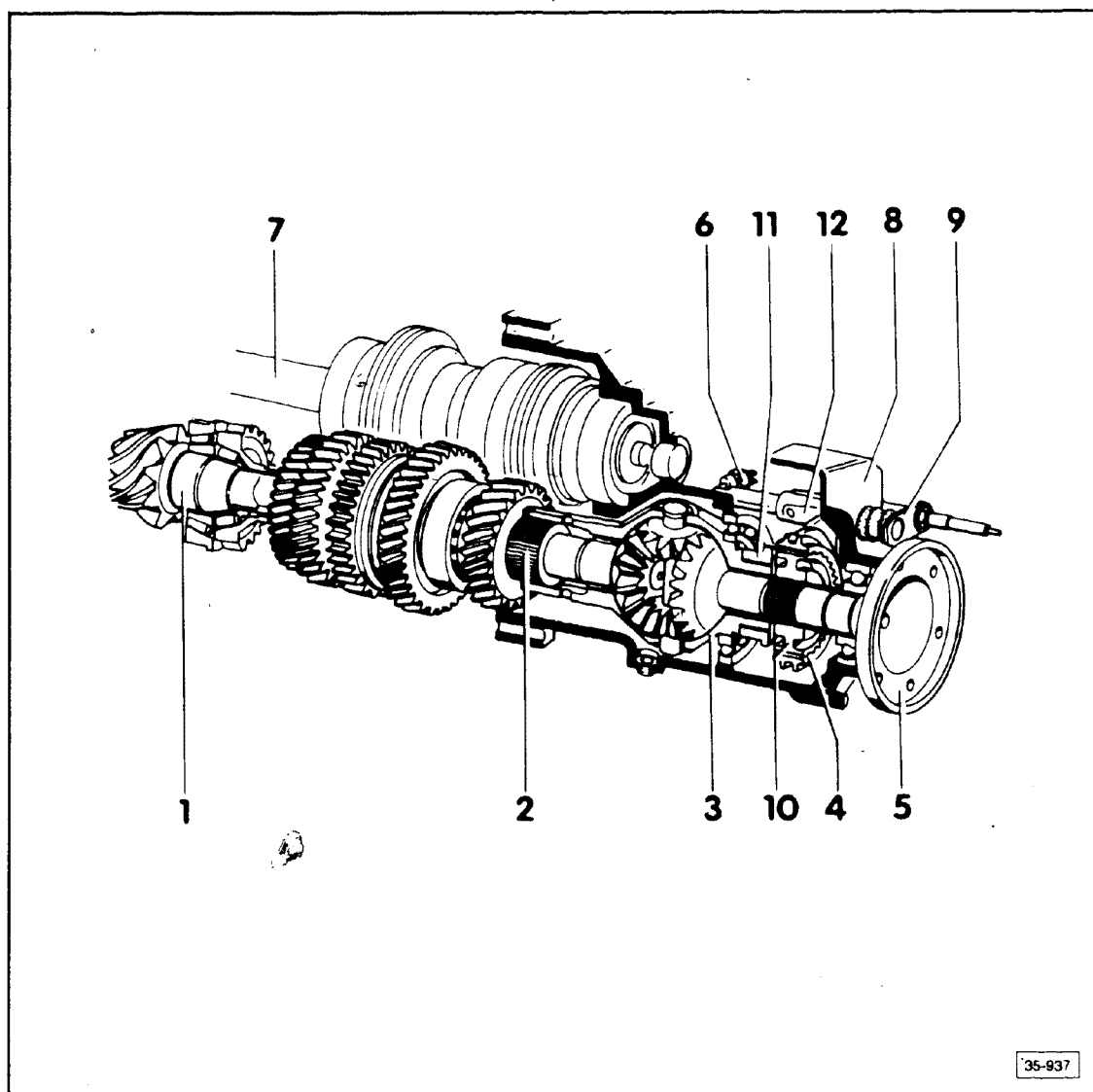


- install outer race into heated transmission housing
- press outer race home and hold in press for 1 to 2 minutes to allow heat transfer to take place



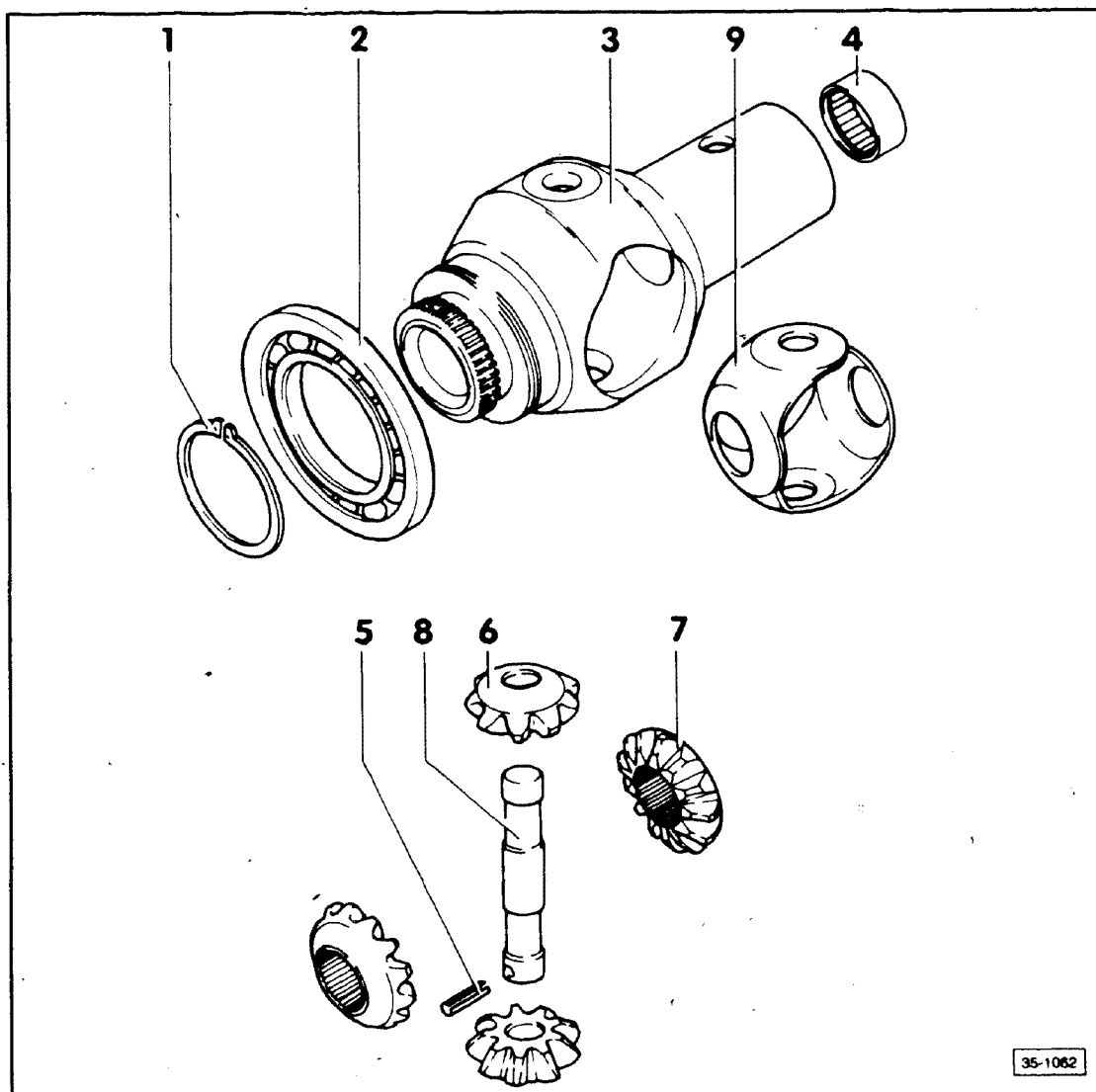
Taper roller bearings, installing

- grease rollers and install with groove facing pinion head



- 1 — **Pinion**
disassembly/assembly, section 35-90
- 2 — **Hollow shaft**
disassembly/assembly, section 35-90
- 3 — **Differential**
disassembly/assembly, section 35-180
- 4 — **Synchronizer sleeve**
- 5 — **Driveshaft flange**
replace O-ring and grooved ball bearing, Repair Group 39

- 6 — **Differential lock indicator light switch**
- 7 — **Input shaft**
disassembly/assembly, section 35-20
- 8 — **End Cover**
disassembly/assembly, Repair Group 34
- 9 — **Differential lock control**
- 10 — **Synchronizer hub**
- 11 — **Clutch hub**
- 12 — **Shift fork**



Differential, removing/installing, Repair Group 34
See General Repair Information, Repair Group 00

- 1 — Circlip
- 2 — Ball bearing
removing/installing, section 35-200
- 3 — Differential housing
- 4 — Needle bearing
removing/installing, section 35-200

- 5 — Spring pin
- 6 — Differential pinion gear
- 7 — Differential side gear
- 8 — Differential pinion shaft
- 9 — Thrust washer

Differential gears, installing

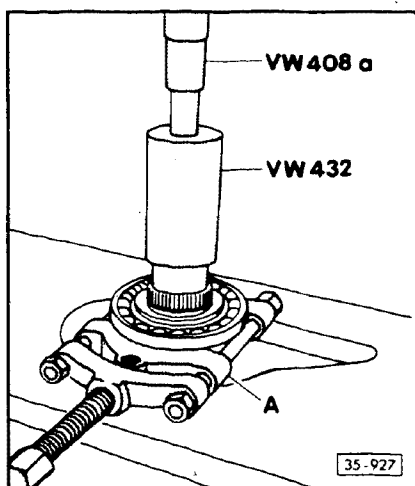
- insert thrust washer set
- insert differential side gears
- insert differential pinion gears staggered 180° and pivot into place
- align thrust washer and gears
- push in pinion shaft and secure

Differential bearings, removing/installing

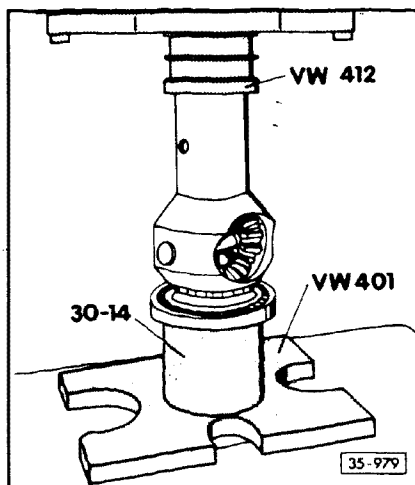
Ball bearing, removing

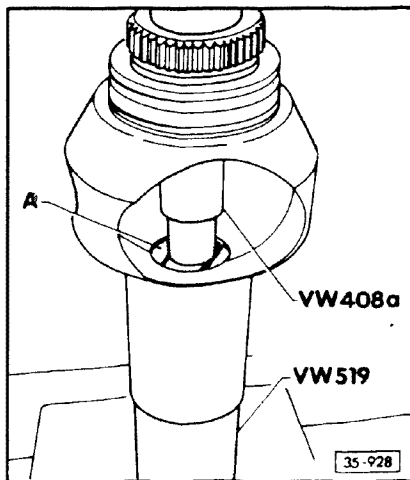
- remove circlip first

A – separating fixture 12-75 mm, e.g. **Kukko 17/1**



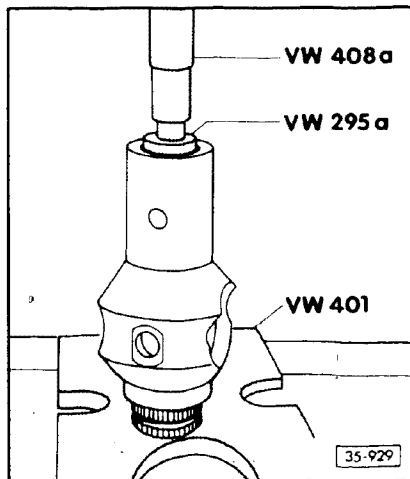
Ball bearing, installing





Needle bearing, removing

A : Puller 23.5-30 mm, e.g. Kukko 21/4



Needle bearing, installing