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012 5-speed

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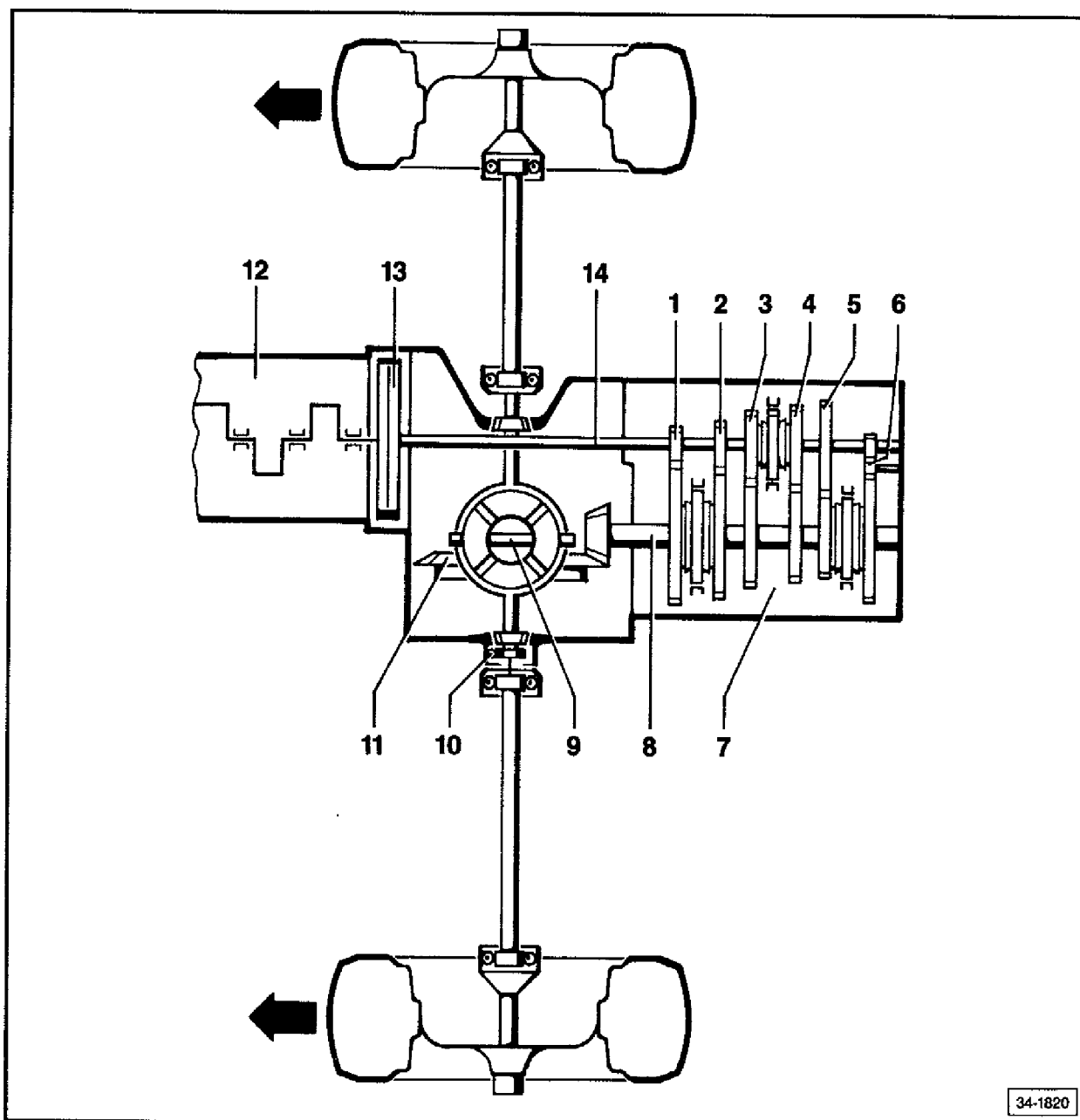
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Manual Transmission – Controls, Assembly



Note

Arrows point in driving direction.

- 1 — 1st gear
- 2 — 2nd gear
- 3 — 3rd gear
- 4 — 4th gear
- 5 — 5th gear
- 6 — Reverse gear
- 7 — Gear train

- 8 — Pinion shaft
- 9 — Differential
- 10 — Speedometer drive electric
- 11 — Final drive
- 12 — Engine
- 13 — Clutch
- 14 — Main shaft

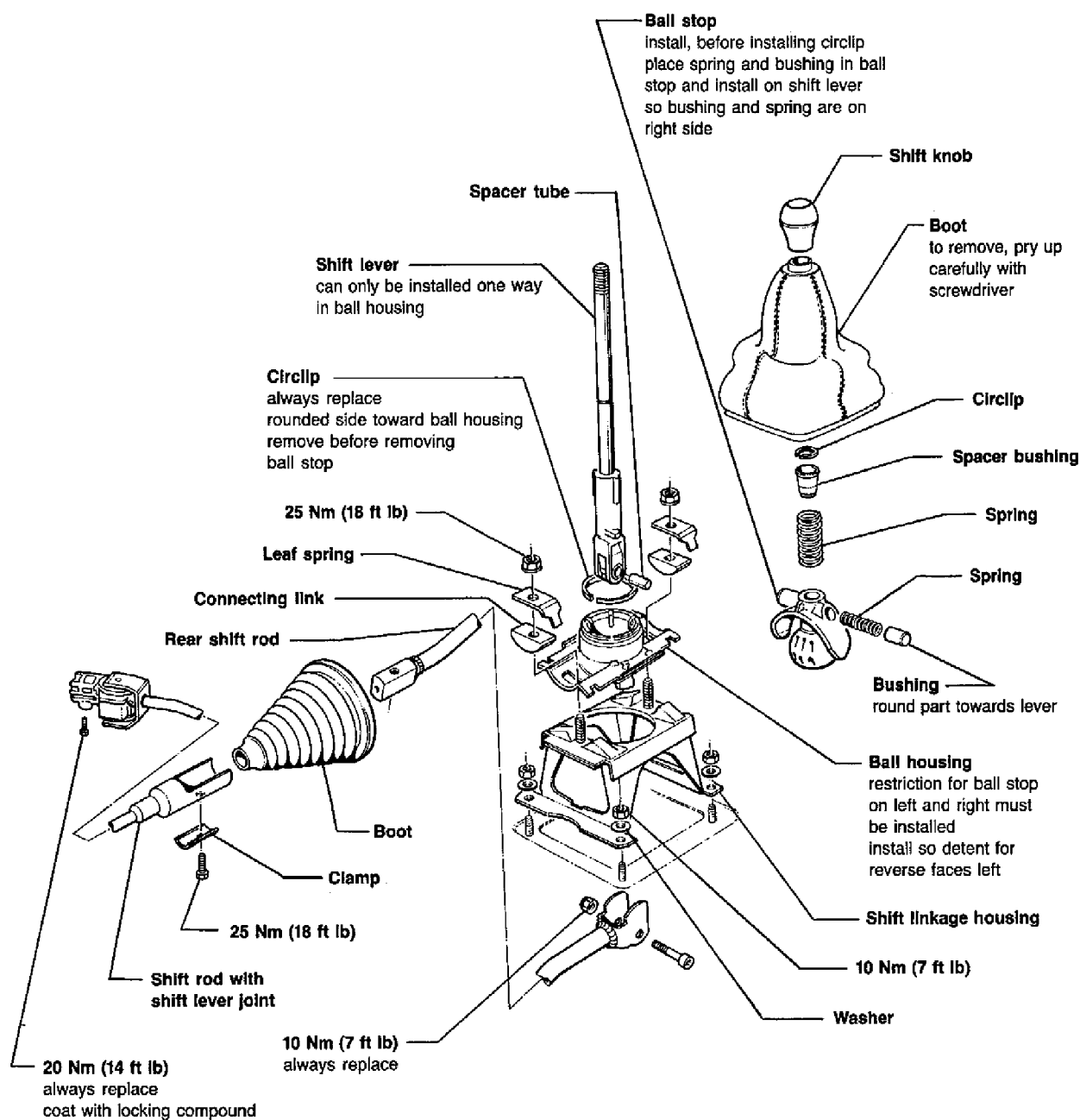
Technical data, 5-speed transmission 012

Note

For location of transmission codes, see
Group 00.

Code		AMK
Production	from	07/87
	to	
Application	type	Audi 100
	engine	5 cylinder 2.3 liter - 100 kW
Ratio	final drive	35:9 = 3.889
	1st gear	39:11 = 3.545
	2nd gear	40:19 = 2.105
	3rd gear	40:28 = 1.429
	4th gear	35:34 = 1.029
	5th gear	31:37 = 0.838
	reverse gear	35:10 = 3.500
	speedometer	electric
Lubricant capacity		2.35 liter (2.5 qt)
Specification		Transmission oil G 50 (synthetic oil) SAE 75 W 90
Clutch actuation		hydraulic
Clutch disc diameter		228 mm
Drive shaft-flange diameter		108 mm
Speed in highest gear at 1000 RPM		35 km/h (54.7 mph)

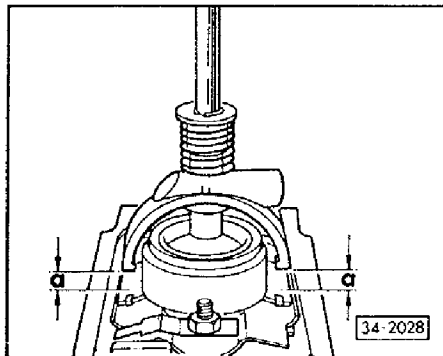
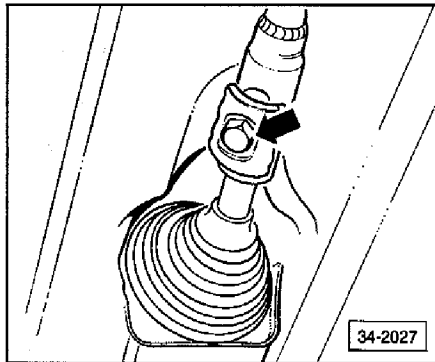
Manual Transmission – Controls, Assembly



34-2030

Shift linkage, adjusting/checking**Adjusting**

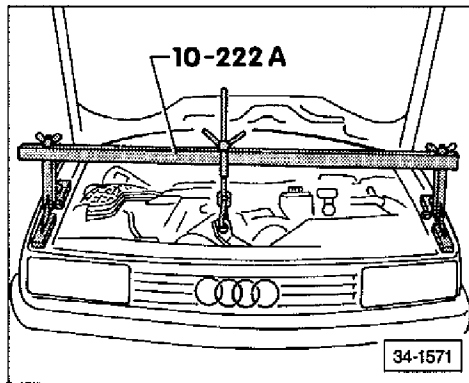
- place gearshift lever in neutral
- remove shift knob and boot
- loosen bolt (**arrow**)
- position gearshift lever as close to vertical as possible



- align lever so both lugs on ball stop are same distance **a** (**arrows**) from ball housing
- tighten bolt (be sure that lever does not move)

Checking

- check function of shifter; shift through all gears
 - lever must be in 3rd/4th gear plane in neutral
 - ensure that reverse safety catch is effective. If not, loosen and turn ball housing slightly
- install boot and shift knob



Transmission, removing/installing

Removing

- disconnect battery ground strap
- remove upper engine/transmission bolts
- remove speedometer sensor connector by pressing in clips
- support engine with **10-222A**
- remove splash shield if installed
- loosen **oxygen** sensor wiring from transmission and remove **oxygen** sensor
- remove bolts at exhaust manifold
- separate exhaust pipe at catalytic converter and remove from transmission
- remove automatic seatbelt tensioning system cable from transmission (see Repair Group 68)
- remove bolt for shift rod at transmission and separate
- remove heat shield for inner right CV joint
- remove axle shafts from transmission flanges and tie up
- remove heat shield for bonded rubber bushing on right side
- support transmission with **VW 1383** or equivalent
- remove strut at rear of transmission
- remove clutch slave cylinder (do not open hydraulic line)
- remove lower engine/transmission bolts
- pry transmission back and then lower carefully

Installing

Proceed in reverse order of removal and note the following:

- ensure that centering (dowel) sleeves are installed in engine
- press clutch slave cylinder in with lever until bolt can be installed

Note

A replacement bolt for mounting the clutch slave cylinder is available with a pointed tip for easier installation.

Tightening torques

axle shafts to flange

M8 bolts 45 Nm (33 ft lb)

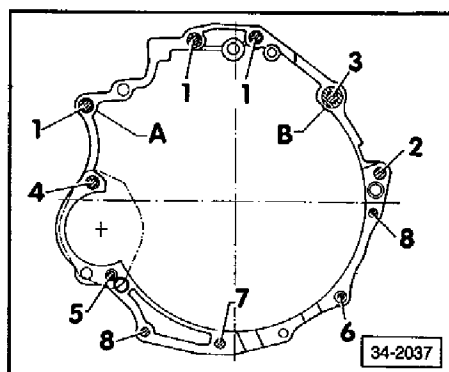
M10 bolts 80 Nm (59 ft lb)

engine to transmission

M8 bolts 25 Nm (18 ft lb)

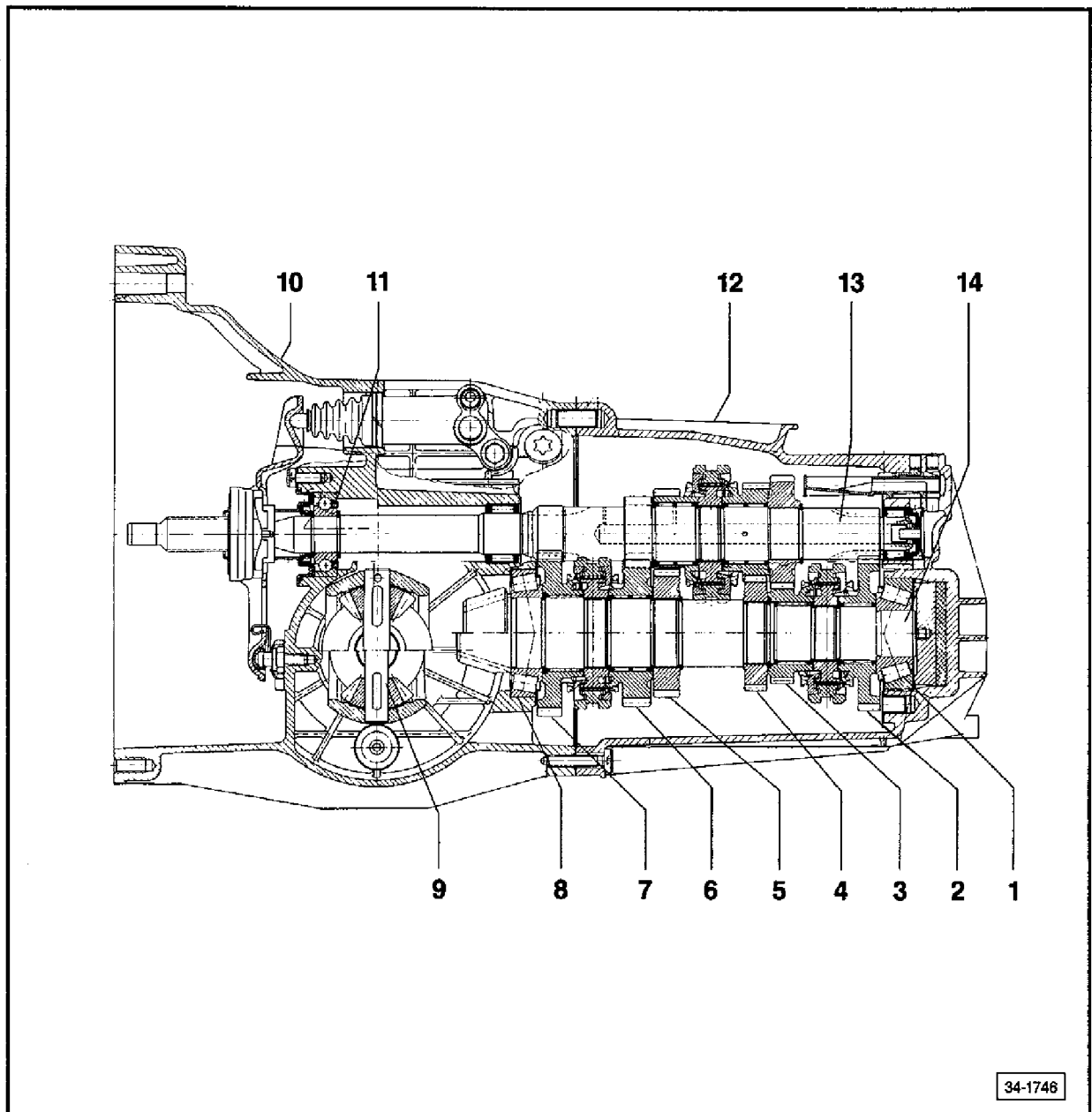
M10 bolts 45 Nm (33 ft lb)

M12 bolts 65 Nm (48 ft lb)

**Engine to transmission, mounting**

- 1 = Bolt M 12 x 70 (3)
- 2 = Bolt M 12 x 80
- 3 = Bolt M 12 x 90
- 4 = Bolt M 12 x 100
- 5 = Bolt M 10 x 120
- 6 = Bolt M 10 x 50
- 7 = Bolt M 10 x 40
- 8 = Bolt M 8 x 40 (2)

Centering (dowel) sleeves:
positions A and B



1 — Tapered roller bearing
adjusting, see Repair Group 39

2 — Reverse gear

3 — 5th gear

4 — 4th gear

5 — 3rd gear

6 — 2nd gear

7 — 1st gear

8 — Tapered roller bearing
adjusting, see Repair Group 39

9 — Differential
• disassembling/assembling, see Repair Group 39
• adjusting, see Repair Group 39, Adjustment Overview

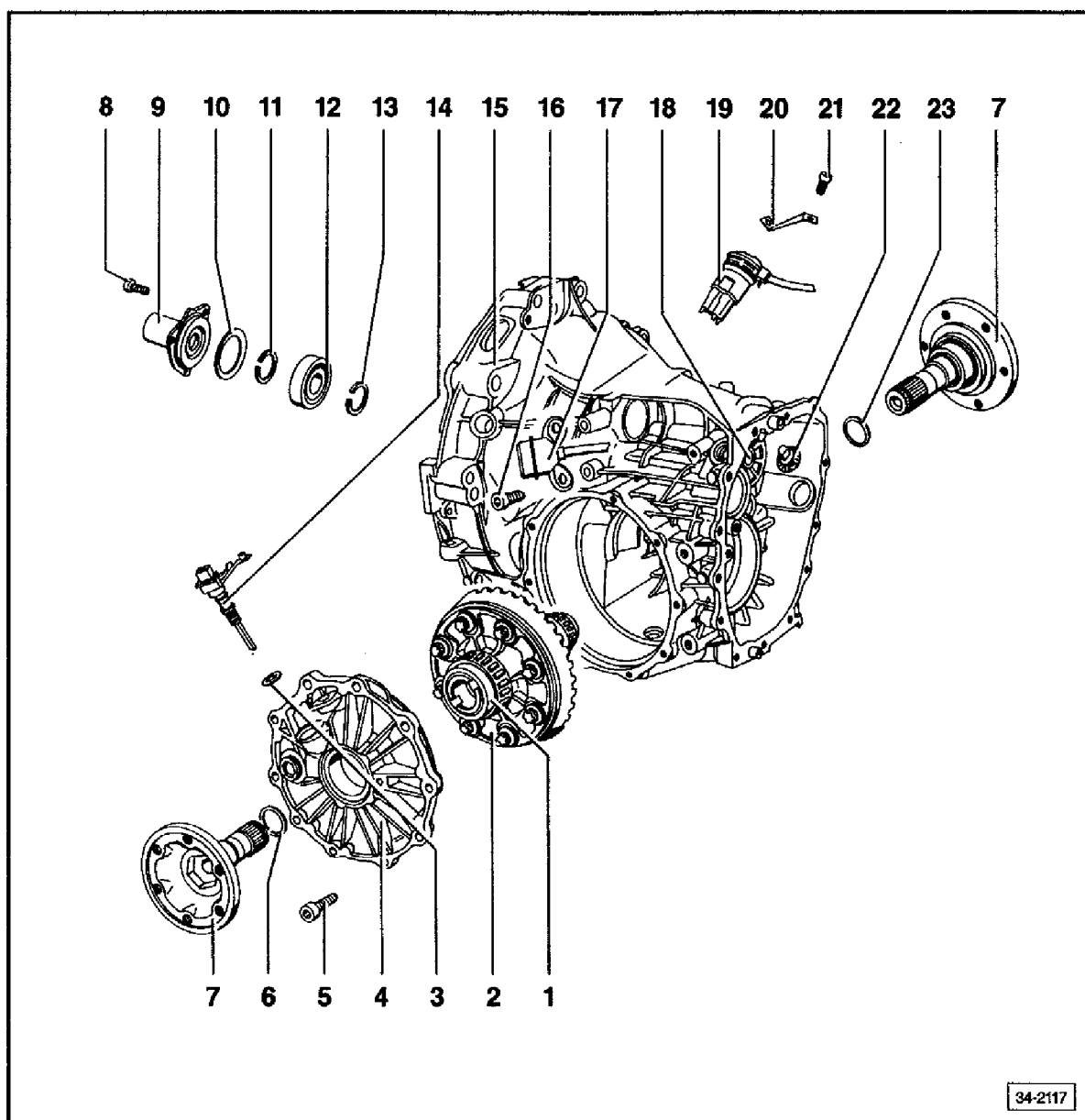
10 — Transmission housing
disassembling/assembling, page 34.31

11 — Ball bearing
adjusting, see Repair Group 35

12 — Gear carrier housing
disassembling/assembling, page 34.39

13 — Main shaft
• disassembling/assembling, see Repair Group 35
• adjusting, see Repair Group 35

14 — Pinion shaft
• disassembling/assembling, see Repair Group 35
• adjusting, see Repair Group 39

**CAUTION**

If transmission housing or tapered roller bearing for pinion or hollow shaft is to be replaced and the deviation r is not specified on the bevel gear, the position of the pinion must be determined before removal of the gear carrier housing (actual measurement), see Repair Group 39.

Note

Before installing gear carrier housing, make sure that the guide sleeves are mounted in transmission housing.

Handle speedometer sender carefully. Do not let it fall, otherwise speedometer data may not be exact.

- 1 — **Speedometer drive**
can be replaced with transmission installed
- 2 — **Differential**
 - can be removed with gear carrier housing installed
 - disassembling/assembling, see Repair Group 39
- 3 — **Sealing ring**
- 4 — **Final drive cover**
 - tapered roller bearing outer race, removing/installing Figs. 11 and 12
 - pull sealing ring out with **VW 681**
 - installing Fig. 9
 - seal with **AMV 188 200 03**
- 5 — **Torx bolt**
25 Nm (18 ft lb)

- 6 — Circlip
 - always replace
 - removing/installing, Fig. 8
- 7 — Drive flange
 - removing, Fig. 7
 - drive in with **VW 295**
- 8 — Torx bolt — 35 Nm (26 ft lb)
- 9 — Guide sleeve with sealing ring
 - sealing ring removing/installing, see Repair Group 30
- 10 — Concave washer
 - small diameter faces guide sleeve (convex side)
- 11 — Circlip
 - mark after removal
 - measuring, see Repair Group 35
- 12 — Main shaft ball bearing
 - pull out of transmission housing, Fig. 2
 - installing, Fig. 3
- 13 — Circlip
 - mark after removal
 - measuring, see Repair Group 35
- 14 — Speedometer sender
- 15 — Transmission housing
 - transmission — clamping in assembly stand, Fig. 1
 - sealing ring for drive flange — remove with **VW 681**
drive in (5 mm under transmission housing surface) with **VW 195**
 - note breather insertion depth, Fig. 5
 - tapered roller bearing outer race — removing, Fig. 13
drive in with **VW 511** and **VW 295**
 - 3rd/4th gear shift rod bushing — removing, Fig. 6
drive in with **VW 295** and **VW 295a**
 - pinion shaft needle bearing, removing/installing,
see Repair Group 35
 - seal with **AMV 188 200 03**
- 16 — Torx bolt — 10 Nm (7 ft lb)
- 17 — Multi-function sender connector
- 18 — Gear shift lever shaft cover
- 19 — Multi-function sender
 - installing, Fig. 4
- 20 — Locking plate
 - for multi-function sender
- 21 — 25 Nm (18 ft lb)
- 22 — 5th/reverse gear lock
 - can be replaced with transmission installed
 - tightening torque for mounting bolts:
10 Nm (7 ft lb)
 - install beveled side of plastic bushing toward relay
shaft bore
 - disassembling/assembling, Fig. 14
 - installation position, Fig. 15
- 23 — Circlip
 - always replace
 - removing/installing, Fig. 8

Transmission, disassembling/ assembling

Disassembling

- clamp transmission in assembly stand, page 34.34
- drain transmission oil
- remove clutch return lever and clutch release bearing
- remove guide sleeve
- remove and measure thickness of circlip in front of ball bearing
- pull ball bearing out of transmission housing using puller, page 34.34
- remove and measure thickness of circlip behind ball bearing
- remove transmission housing/gear carrier housing bolts. Take off gear carrier housing
- remove multi-function sender
- remove relay shaft bolts, page 34.41
- remove locking segment bolt and take locking segment out
 - installed position, Fig. 34.41
- remove main shaft, pinion, relay shaft, selector rods and shift forks together

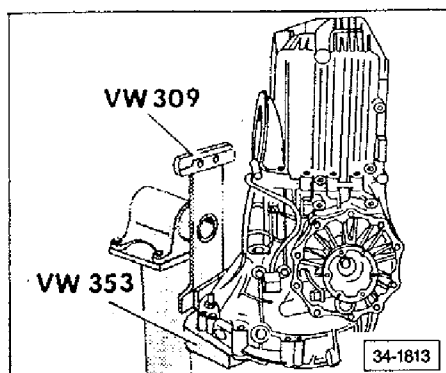
Assembling

Assemble in reverse order of removal.

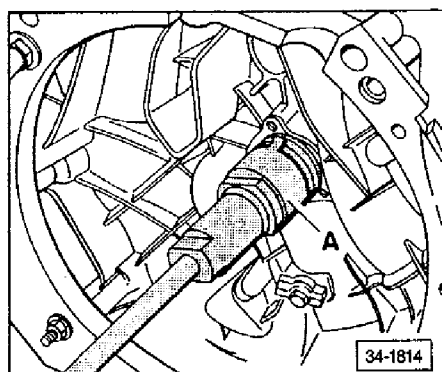
Note

Main shaft, pinion with hollow shaft, relay shaft, selector rods and shift forks must be installed together, page 34.41.

Circlips for main shaft at ball bearing must be replaced in the same position and be of the same thickness.



► Fig. 1 Transmission, mounting in assembly stand

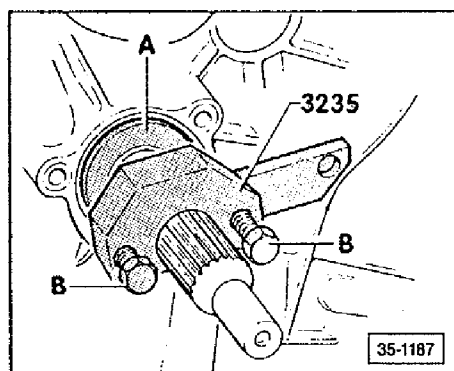


► Fig. 2 Ball bearing, removing from housing

- A — puller VAG 1582 and gripper VAG 1582/2

Note

When installing puller do not damage the ball bearing cage.



► Fig. 3 Ball bearing, installing in housing

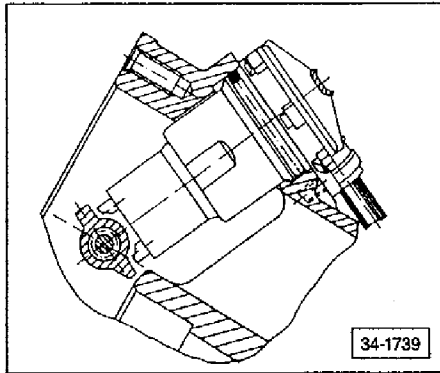
- install circlip on main shaft
- install ball bearing on main shaft, up to stop
- position thrust washer (A) of press 3235, on ball bearing
- brace flange of press 3235 as shown, and tighten both bolts (B)

CAUTION

Bolts (B) must be tightened alternately and evenly (i.e. 1/2 turn at a time), or ball bearing could tilt and become damaged.

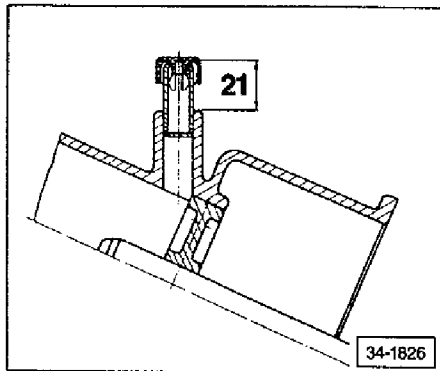
Note

Installation position of ball bearing: open side of plastic cage points towards guide sleeve.



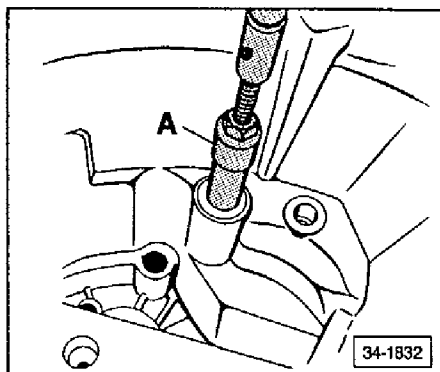
► Fig. 4 Multi-function sender, installing

- install lock ring to seal multi-function sender



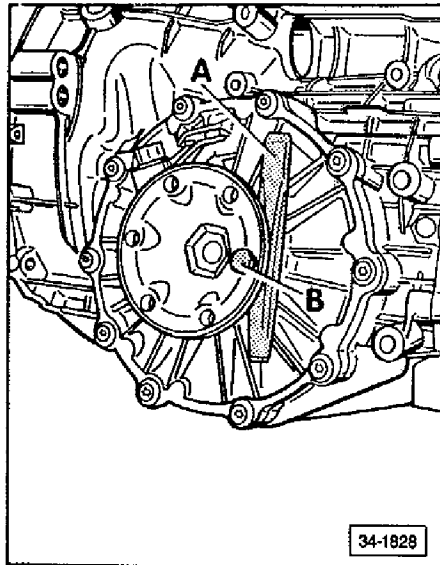
► Fig. 5 Transmission breather sleeve, installing

- install, so that sleeve extends 21 mm above vent lip



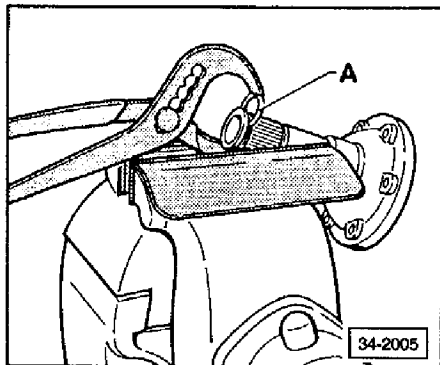
► Fig. 6 Shift rod bushing, removing

- remove with slide hammer VW 771 and an 18.5 mm-23.5 mm puller, A (i.e. US 1088 or Kukko 21/3)



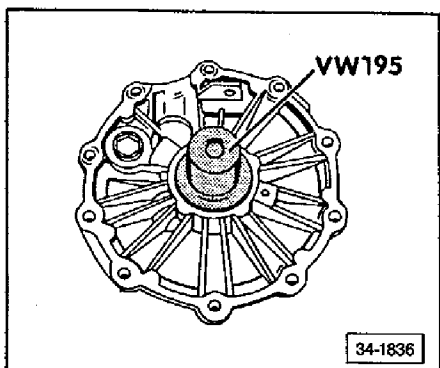
► Fig. 7 Drive flange, removing

- put chisel or spacer **A** under drive flange and pull drive flange out of differential gear by turning bolt **B**



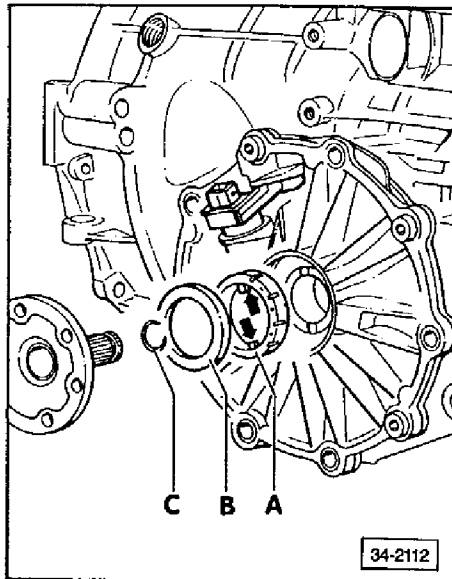
► Fig. 8 Drive flange circlip, removing/installing

- clamp drive flange in vise with protective jaw covers. Press circlip out of drive flange groove with new circlip **A**



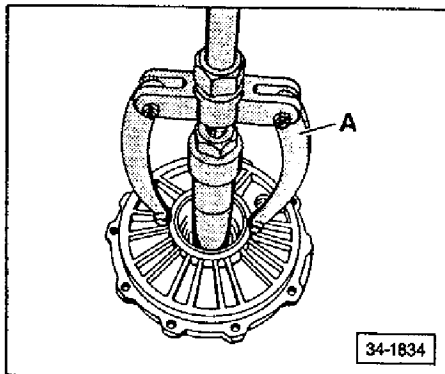
► Fig. 9 Drive flange sealing ring, installing

- drive sealing ring in 5 mm under upper edge of cover with **VW 195**



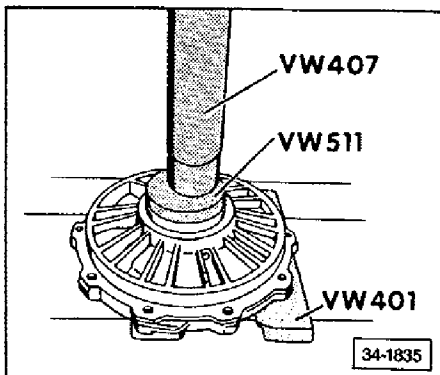
► Fig. 10 Speedometer drive, replacing

- remove axle shaft from left drive flange
- remove drive flange
- remove sealing ring (B)
- remove speedometer drive (A)
 - pry on alternate sides of drive pins (arrows) with screwdriver
- position replacement speedometer drive
 - always replace sealing ring (B) and circlip (C)
 - drive pins (arrows) point toward sealing ring (B), and engage in grooves of differential gear housing
- add transmission oil, to specifications

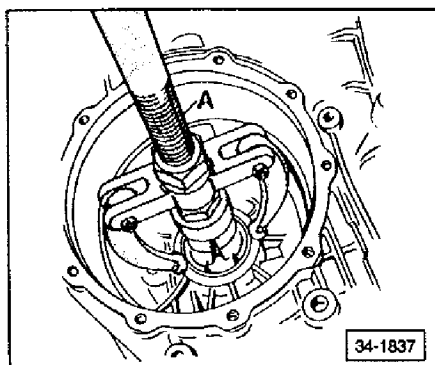


► Fig. 11 Tapered roller bearing outer race, removing from final drive cover

- remove using A, 46 mm-56 mm puller (e.g. US 1037 or Kukko 21/7) with holder (e.g. US 1039 or Kukko 22/2)



► Fig. 12 Tapered roller bearing outer race, installing in final drive cover

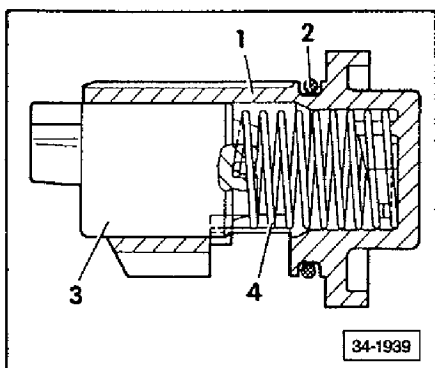


► Fig. 13 Tapered roller bearing outer race (in transmission housing), removing/installing

- remove using A, 46 mm-56 mm puller (e.g. US 1037 or Kukko 21/7) with holder (e.g. US 1039 or Kukko 22/2)

Note

Install using VW 295 and VW 295a.

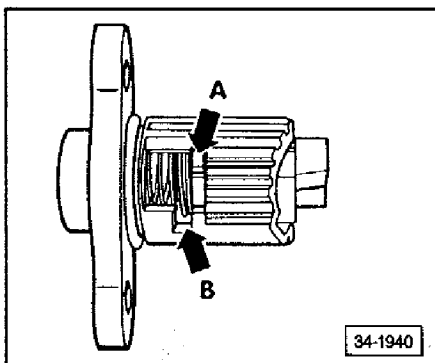


► Fig. 14 5th and reverse gear lock, assembling

- 1 - plastic bushing
- 2 - lock ring
- 3 - bushing with lock for 5th and R gear
- 4 - spring

Assembly instructions

- place spring 4 in plastic bushing 1
- turn spring counterclockwise under light pressure until spring snaps in place in base of plastic part
- place bushing 3 on spring so that bent end of spring lies in groove
- press spring together using bushing 3
 - approximately one turn counterclockwise (turn to left), until bushing 3 tab lies over the groove in plastic bushing
- press bushing 3 tab into groove in plastic bushing 1 to stop surface
- turn bushing 3 in clockwise direction (to the right) and release
 - bushing 3 springs into assembly end position

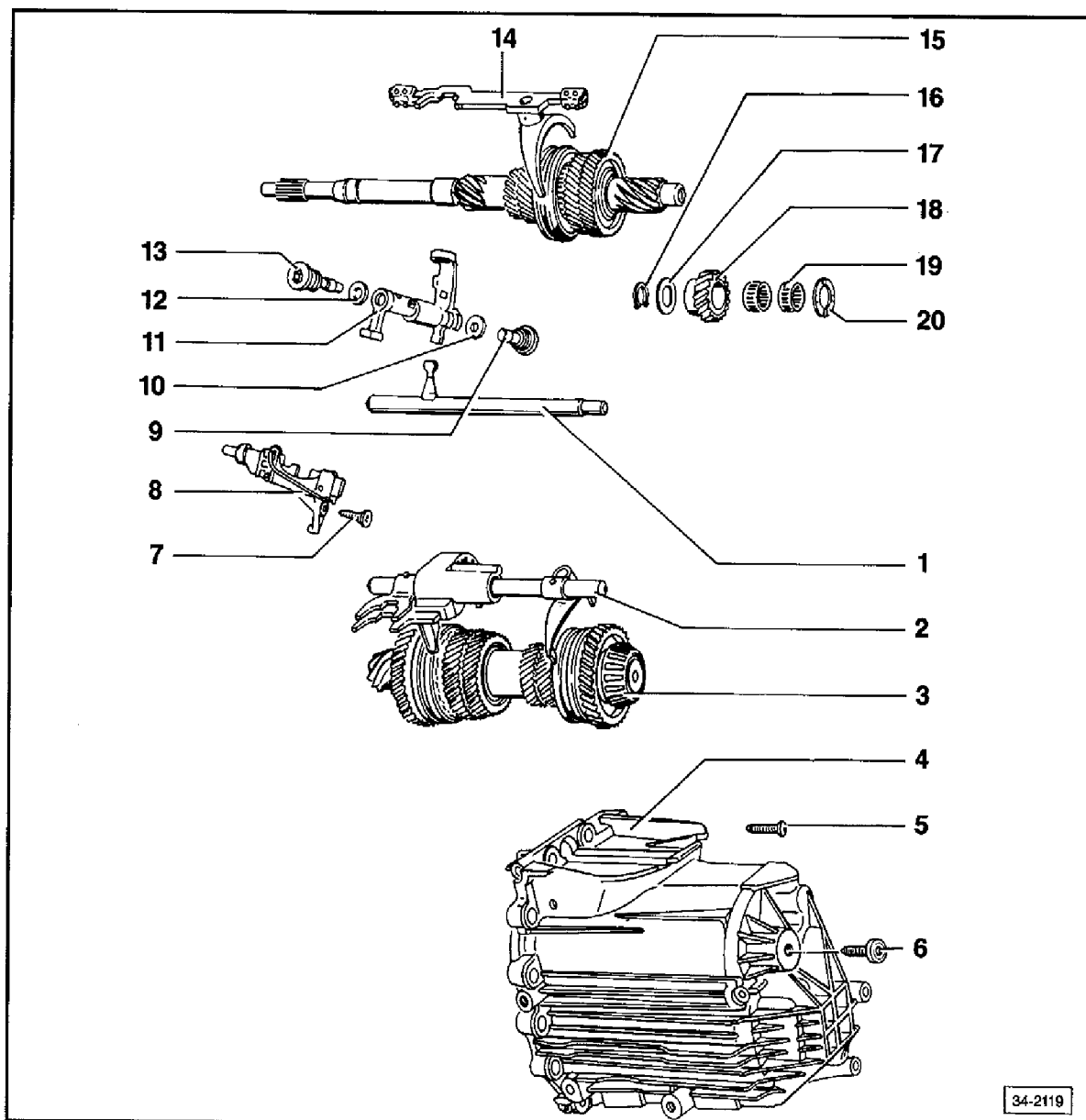


► Fig. 15 5th/reverse gear lock, installation position

- 5th/reverse gear bushing tab (arrow A) must always come to stop opposite groove (arrow B) on plastic bushing

Note

If there is any catching or hanging up in 5th or reverse gear after adjusting the shifting control, the 5th and reverse gear lock must first be removed, checked, and if necessary replaced, before removal and disassembly of the transmission.

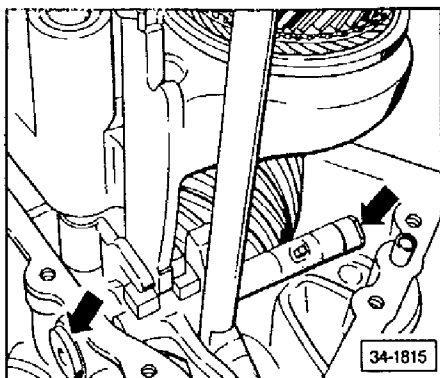
**CAUTION**

If transmission housing or tapered roller bearing for pinion or hollow shaft is to be replaced and the deviation r is not specified on the bevel gear, the position of the pinion must be determined before removal of the gear carrier housing (actual measurement). See Repair Group 39.

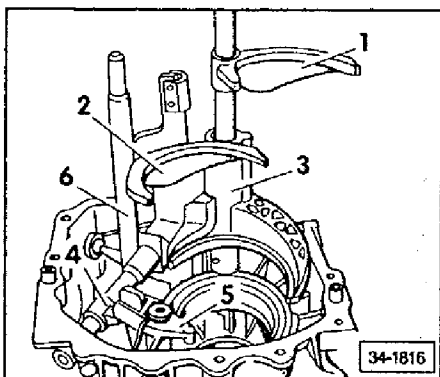
1 — Inner shift rod

- installed position, Fig. 2
- installing, Figs. 3 and 4
- pull out inner shift rod sealing ring with **VW 681**, and drive in flush with **VW 460/2** on installed transmission, carefully pry out sealing ring with screwdriver and drive in with **VW 423** remove exhaust system and trans shift rod first, for clearance installed position of sealing ring, Fig. 8

- 2 — **1st, 2nd, 5th and reverse gear selector shaft with shift fork**
 - installed position, Fig. 2
 - installing, Fig. 3
 - to disassemble/assemble, remove/install spring pins
 - 1st/2nd gear shift fork bearing, removing/installing, Fig. 6
 - 1st/2nd gear shift fork can be replaced individually
 - replace 5th/reverse gear shift fork only together with selector ring and selector shaft
- 3 — **Pinion with hollow shaft**
disassembling/assembling, see Group 35
- 4 — **Gear carrier housing**
oil collector, removing/installing, Fig. 7
- 5 — **Torx bolt — 25 Nm (18 ft lb)**
- 6 — **Torx bolt for reverse gear axle — 35 Nm (26 ft lb)**
reverse gear axle does not need to be removed for removal of reverse gear
- 7 — **Torx bolt — 25 Nm (18 ft lb)**
with flange facing spring/locking segment safety mechanism
- 8 — **Locking segment**
 - installed position, Fig. 2
 - install after installation of relay shaft (item 11) and inner shift rod (item 1)
- 9 — **Torx bolt — 40 Nm (30 ft lb)**
removing, Fig. 1
- 10 — **Spacer**
- 11 — **Relay shaft**
 - installed position, Fig. 2
 - installing, Figs. 3 and 4
- 12 — **Spacer**
- 13 — **Torx bolt — 40 Nm (30 ft lb)**
removing, Fig. 1
- 14 — **3rd/4th gear selector shaft and shift fork**
 - position of selector shaft, Fig. 2
 - installing, Fig. 3
 - selector shaft or shift fork can be replaced individually
 - selector shaft bushing, removing, Fig. 5
 - drive in with VW 295 and VW 295a
 - replace selector shaft bearing, if worn
- 15 — **Main shaft**
 - disassembling/assembling, see Group 35
 - adjusting, see Group 35
 - installing, Fig. 3
- 16 — **Circlip**
- 17 — **Washer**
- 18 — **Reverse gear**
- 19 — **Reverse gear needle bearing**
- 20 — **Thrust washer**

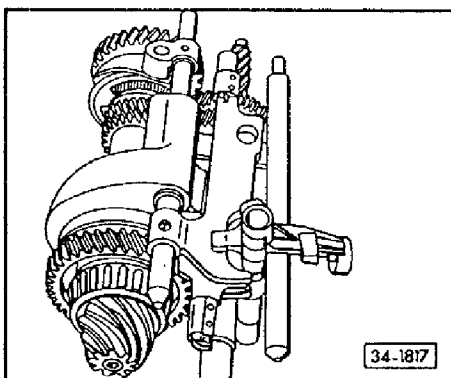


► Fig. 1 Relay shaft bolts (arrows), removing



► Fig. 2 Shift mechanism, installation position

- 1 — 5th/reverse gear selector shaft with swinging fork
- 2 — 3rd/4th gear selector shaft
- 3 — 1st/2nd gear shift fork
- 4 — relay shaft
- 5 — locking segment
- 6 — inner shift rod

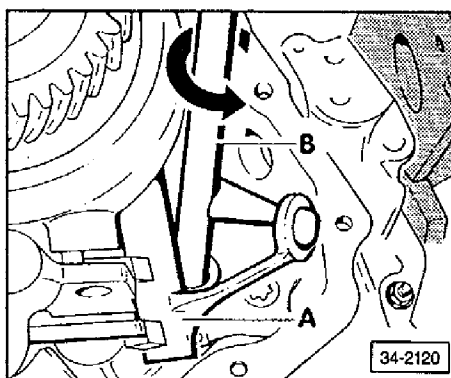


► Fig. 3 Main shaft, pinion with hollow shaft, selector shafts and shift forks, installation position

- these parts must be installed together

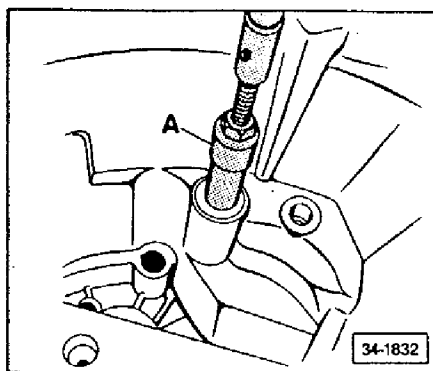
Note

The relay shaft and inner shift rod can also be installed afterward. See Figure 4.



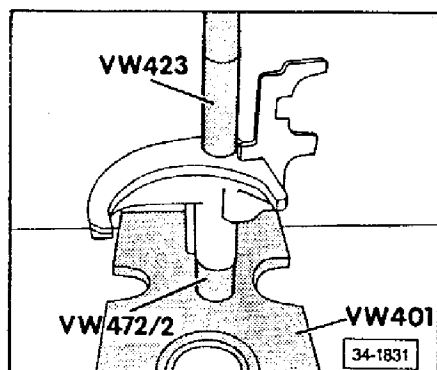
► Fig. 4 Relay shaft with inner shift rod, installing

- engage 3rd gear
- install relay shaft (A)
- place inner shift rod (B) sideways on bracket opening in transmission housing and align with bracket eye in relay shaft

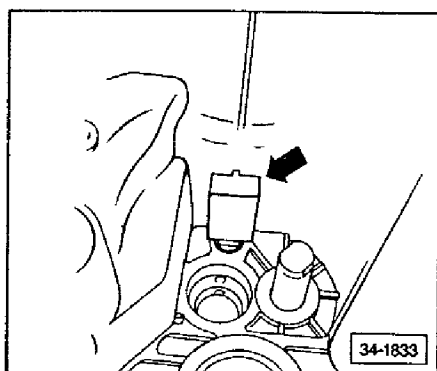


► Fig. 5 Selector shaft bushing, removing

- with 18.5 mm-23.5 mm puller A, e.g. US 1088 or Kukko 21/3

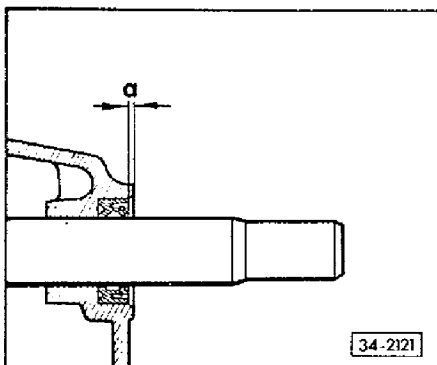


► Fig. 6 Shift fork bearing, removing/installing



► Fig. 7 Oil collector, removing/installing

- pry out oil collector (arrow) with screwdriver
- push oil collector far enough into gear carrier housing that oil collector locking tab snaps into gear carrier housing
 - collector cup points upwards in gear carrier housing



► Fig. 8 Inner shift rod sealing ring, installing

- dimension a = 1 mm