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5-speed 012

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Manual Transmission – Controls, Assembly

Technical data, 5-speed transmission 012

Note

For location of transmission codes, see Group 00.

Code		AKL	AUF/AXD	ALP
Production	from	09/87	08/89	09/87
	to	7/89		
Application	type	Audi 80		Audi 90
	engine	4-cylinder 2.0 liter - 83kW		5-cylinder 2.3 liter - 100kW
Ratio	final drive	37:9 = 4.111		37:10 = 3.700
	1st gear	39:11 = 3.545		39:11 = 3.545
	2nd gear	40:10 = 2.105		40:19 = 2.105
	3rd gear	39:30 = 1.300		39:30 = 1.300
	4th gear	33:35 = 0.943		35:34 = 1.029
	5th gear	30:38 = 0.789		31:37 = 0.838
	reverse gear	35:10 = 3.500		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		210 mm	228 mm	
Drive shaft-flange diameter		100 mm	108 mm	
Speed in highest gear at 1000 RPM		34 km/h (54.7 mph)	36 km/h (58 mph)	

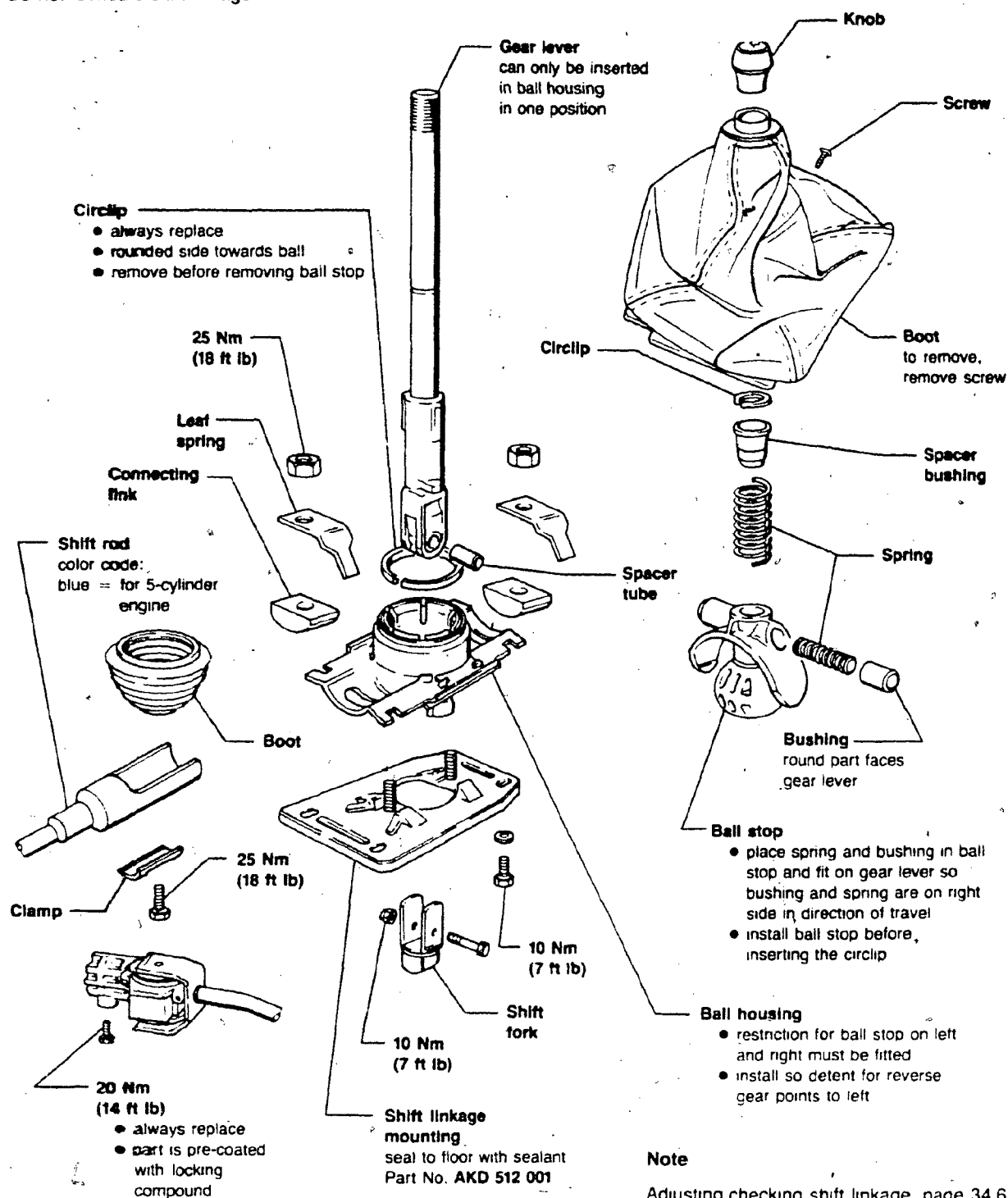
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Manual Transmission – Controls, Assembly

Note

Do not lubricate shift linkage.



Note

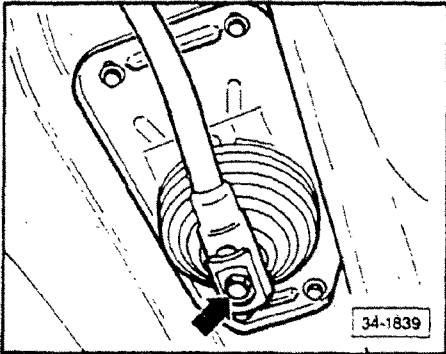
Adjusting checking shift linkage. page 34 6

34-1821

Shift linkage, adjusting/checking

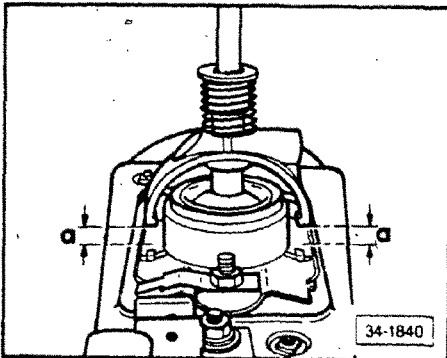
Adjusting

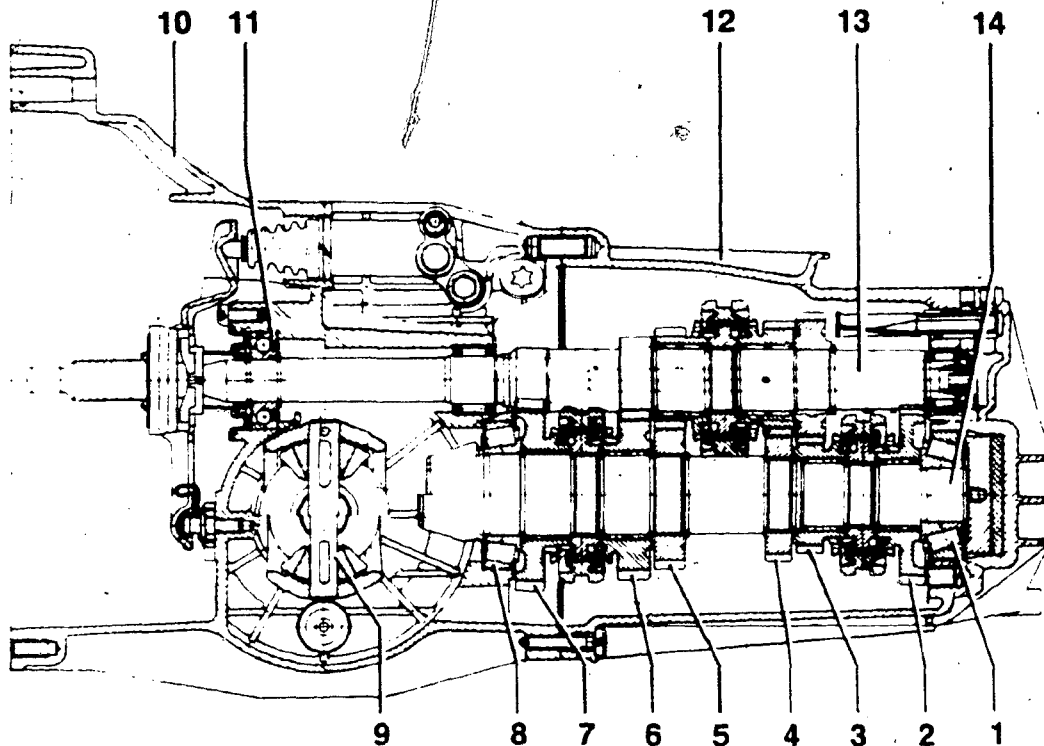
- place gearshift lever in neutral
- remove shift knob, screw for boot, and boot
- loosen bolt (arrow)
- position gearshift lever as close to vertical as possible



Checking

- align lever so that both lugs on ball stop are same distance **a** (arrows) from ball housing
- tighten bolt and ensure that lever does not move
- check function of shifter; shift through all gears
 - lever must be in the 3rd/4th gear plane in neutral
 - ensure that reverse safety catch is effective. If not, loosen screws and turn ball housing slightly
- install boot and shift knob





34-1746

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 — Final drive housing
assembly, page 34.14

11 — Ball bearing
adjusting, see Repair Group 35

12 — Gear carrier housing
assembly, page 34.23

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

Transmission, removing/installing

Removing

- disconnect battery ground strap
- remove 3 upper engine/transmission bolts
- remove transmission ground strap from transmission
- remove connector for speedometer sender and connector for multi-function sender by pressing clips in
- disconnect catalytic converter connector
- remove transmission assembly protection plate
- remove exhaust manifold bolts
- remove front exhaust pipe
- remove following parts:
 - rear cross member
 - automatic seat belt tensioning cables at transmission
 - shift rod
 - bell housing cover plate
 - drive shaft protection plate
- disconnect axle shafts at transmission
- turn steering to right lock and support axle shafts by tying up to body
- remove clutch slave cylinder
- remove steering bracket
- support engine with **10-222A**
- support transmission with **V.A.G. 1383**
- remove transmission strut at left rear
- remove front engine mount
- remove lower engine/transmission bolts
- slowly lower transmission out of vehicle

Installing

Proceed in reverse order of removal and note the following:

- be sure that centering (dowel) sleeves are installed in cylinder block, in positions shown on page 34.10
- press clutch slave cylinder in with lever until bolt can be installed easily

Note

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

Tightening torques

Transmission to engine

M 8 bolts	25 Nm (18 ft lb)
M 10 bolts	45 Nm (33 ft lb)
M 12 bolts	65 Nm (48 ft lb)

Drive shaft to flange

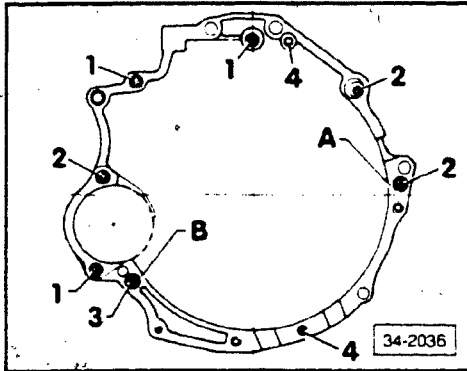
M 8 bolts	45 Nm (33 ft lb)
M 10 bolts	80 Nm (59 ft lb)

Mounting transmission to engine

4-cylinder engine

- 1 = Bolt M 12 x 70
- 2 = Bolt M 12 x 85
- 3 = Bolt M 12 x 100
- 4 = Bolt M 8 x 15

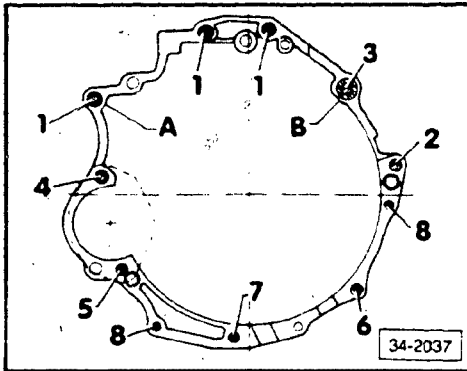
Centering (dowel) sleeves:
positions A and B



5-cylinder engine

- 1 = Bolt M 12 x 70
- 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

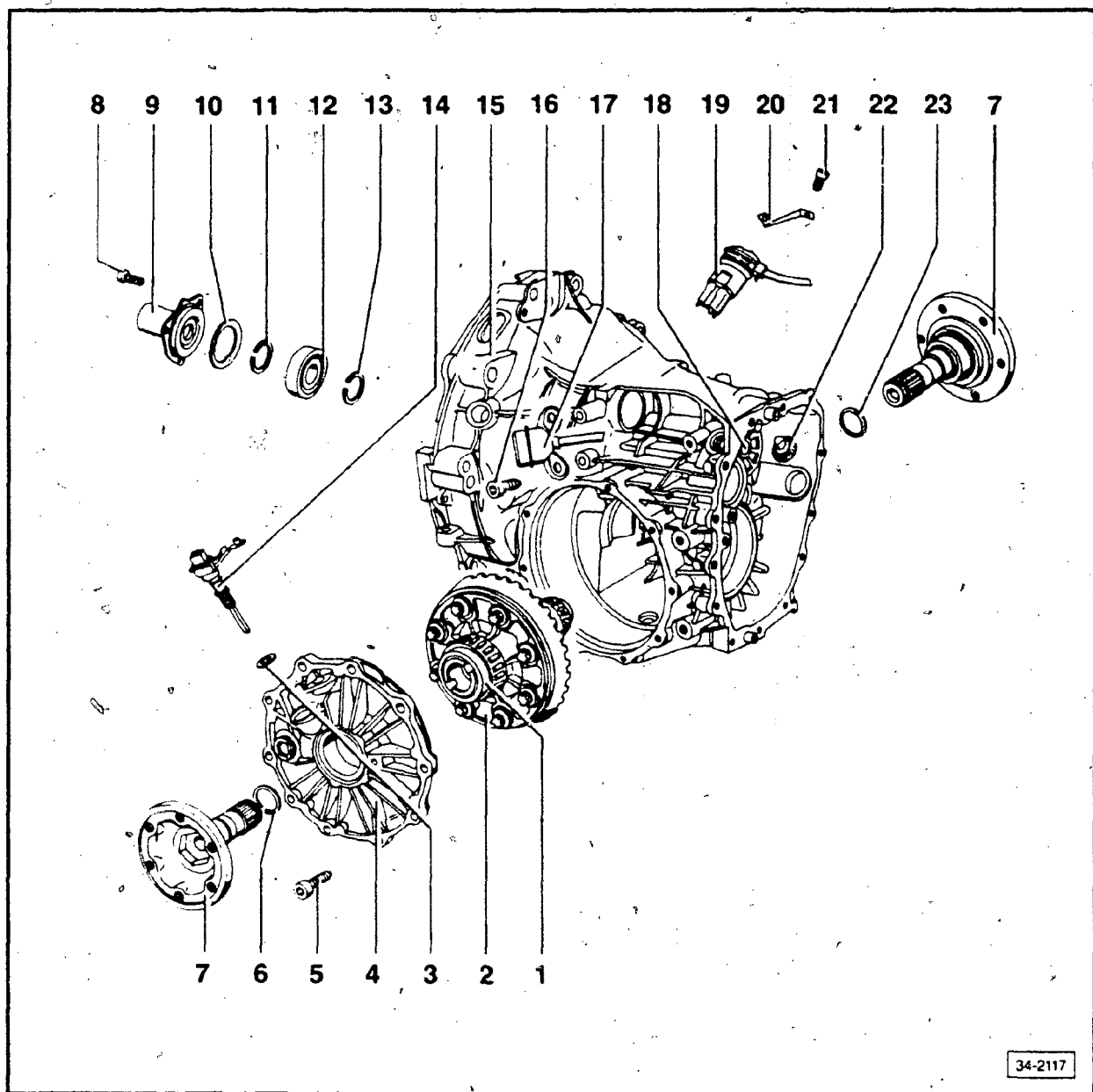
Centering (dowel) sleeves:
positions A and B



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CAUTION

If final drive 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
 - extract sealing ring 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)**
always replace
- 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**
 - removing from final drive housing, Fig. 2
 - installing, Fig. 3
- 13 — **Circlip**
 - mark after removal
 - measuring, see Repair Group 35
- 14 — **Speedometer sender**
- 15 — **Final drive housing**
 - transmission — clamping in assembly stand, Fig. 1
 - sealing ring for drive flange — remove with **VW 681**; drive in (5 mm under final drive housing surface) with **VW 195**
 - 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**
tighten retaining bolts to 20 Nm (15 ft lb)
- 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
 - beveled side of plastic bushing faces relay shaft bore
 - tightening torque for retaining bolts: 10 Nm (7 ft lb)
 - installation position, page 34.22
 - disassembling/assembling, page 34.22
- 23 — **Circlip**
 - always replace
 - removing/installing, Fig. 8

Transmission, disassembling/ assembling

Disassembling

- clamp transmission in assembly stand, Fig. 1
- 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
- extract ball bearing from final drive using puller, Fig. 2
- remove and measure thickness of circlip behind ball bearing
- remove final drive housing/gear carrier housing bolts. Remove gear carrier housing
- remove multi-function sender
- remove relay shaft bolts, page 34.25
- remove locking segment bolt and locking segment
 - installed position, page 34.25
- remove main shaft, pinion, relay shaft, selector rods and shift forks together

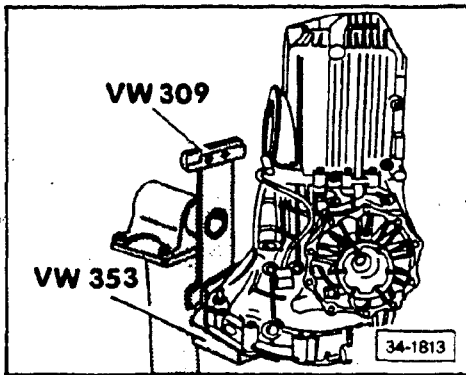
Assembly

Assemble in reverse order of removal.

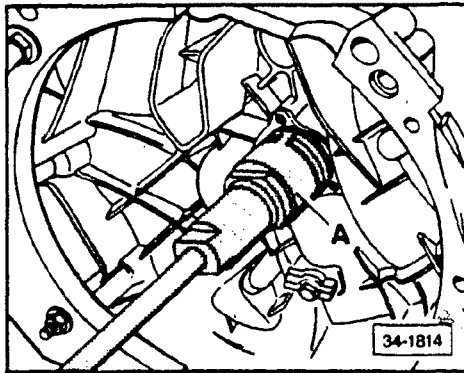
Note

Main shaft, pinion with hollow shaft, relay shaft, selector rods and shift forks must be installed together, page 34.25.

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

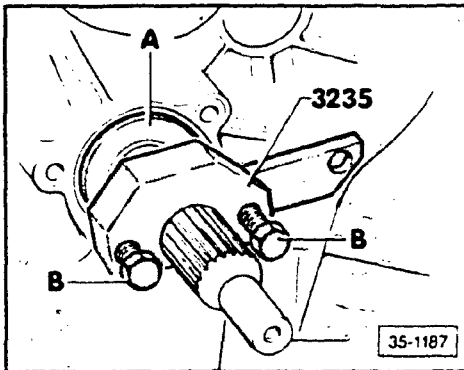


► Fig. 2 Ball bearing, removing from housing

- 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 pad A of press tool 3235, onto ball bearing
- mount press tool 3235 behind clutch plate splines on input shaft
- apply pressure to bearing with two bolts B positioned in the thrust pad A recesses
- press bearing in, onto the stop, by tightening the two bolts alternately and evenly

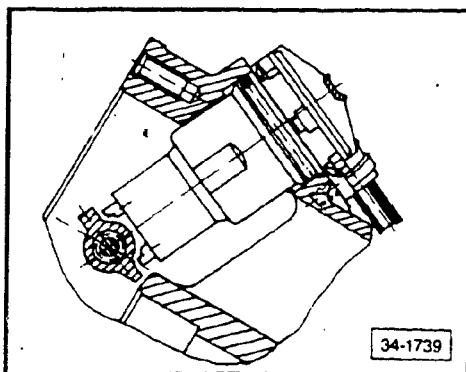
CAUTION

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

Note

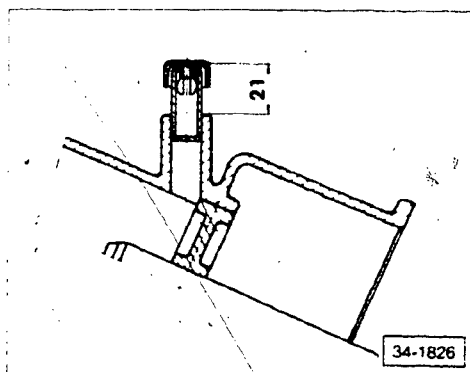
Installation position of ball bearing:

Open side of plastic cage points towards guide sleeve.



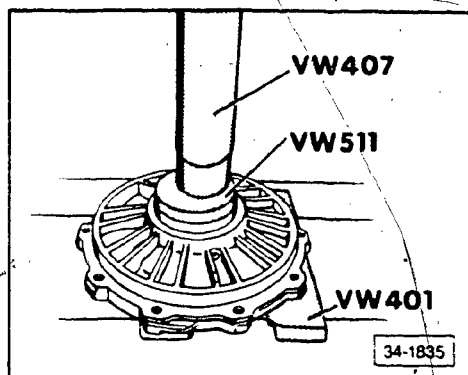
► Fig. 4 Multi-function sender, installing

- install lock ring to seal multi-function sender



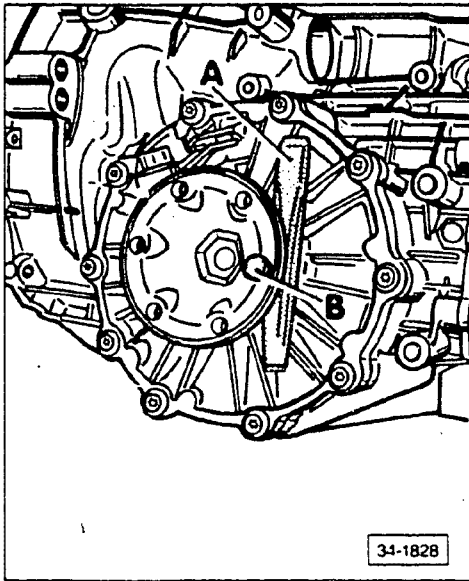
► Fig. 5 Transmission breather sleeve, installing

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



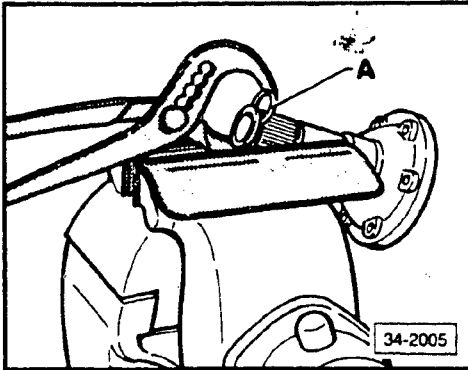
► Fig. 6 Bushing for 3rd/4th gear shift rod, removing/installing

- extract bushing with slide hammer **VW 771** and an 18.5 mm - 23.5 mm puller, **A** (i.e. **US 1088** or **Kukko 21/3**)
- install with drift set **VW 295** and **VW 295A**
 - apply sealant **AMV 188 200**



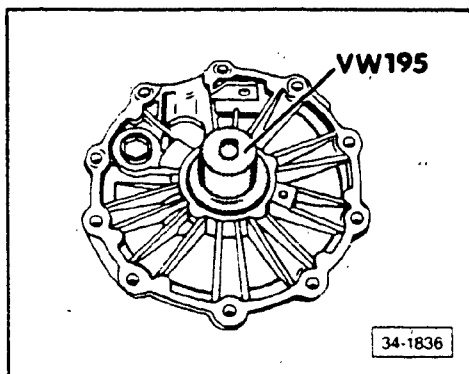
► Fig. 7 Drive flange, removing

- position chisel or spacer **A** under drive flange and extract drive flange from differential gear by turning bolt **B**



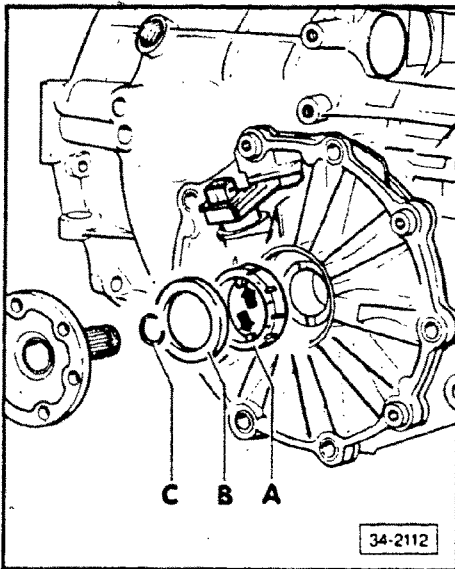
► Fig. 8 Drive flange circlip, replacing

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



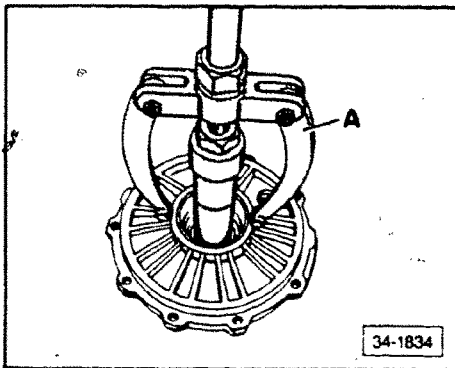
► Fig. 9 Drive flange sealing ring, installing

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



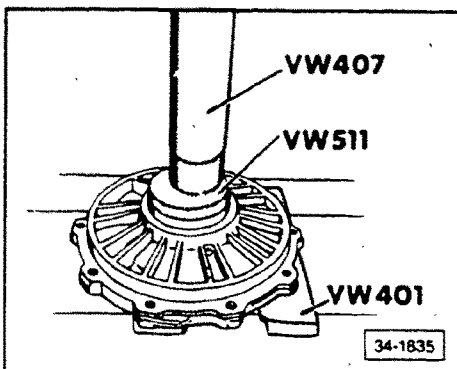
► Fig. 10 Speedometer drive, replacing

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

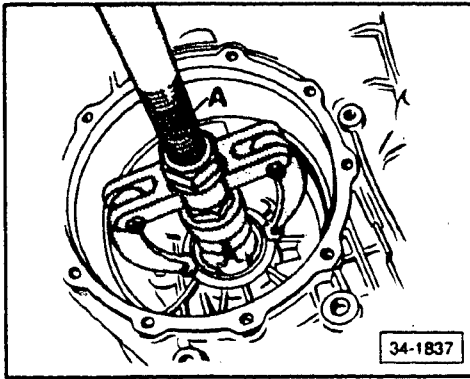


► Fig. 11 Tapered roller bearing outer race, removing from final drive cover

- 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



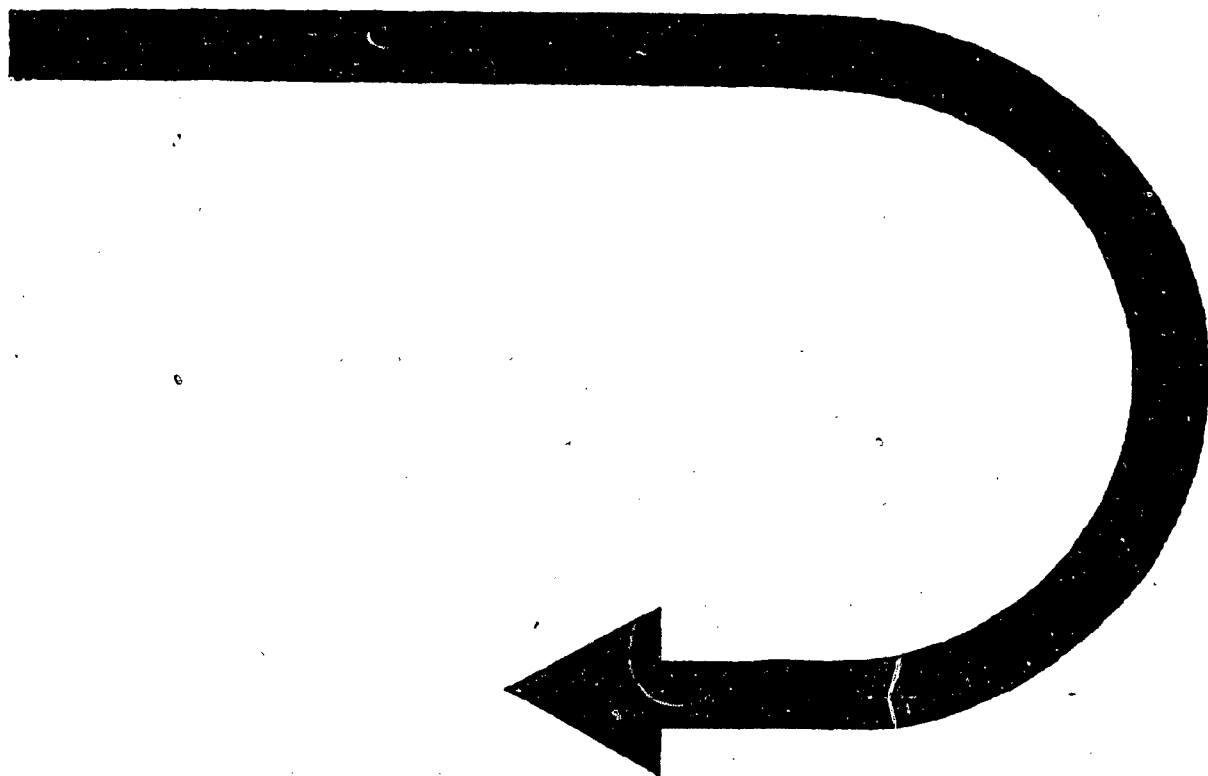
► Fig. 13 Tapered roller bearing outer race (in final drive housing), removing/installing

- 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.

CONTINUED IN THE
BEGINNING OF NEXT ROW



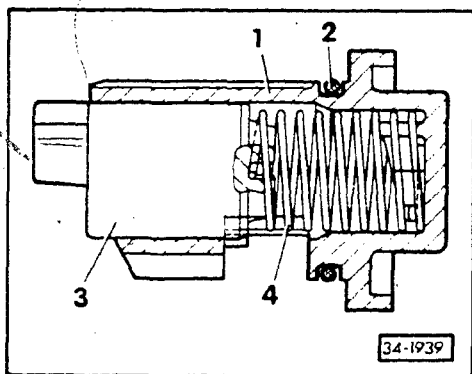
Lock for 5th/reverse gear, assembling/checking

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.

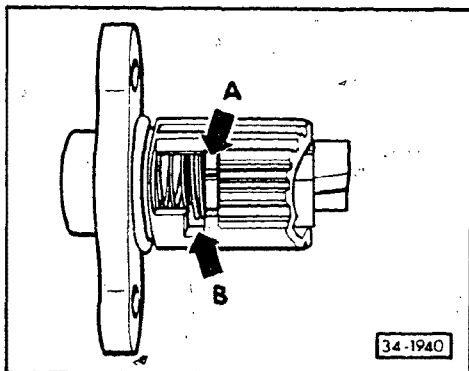
Assembling

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



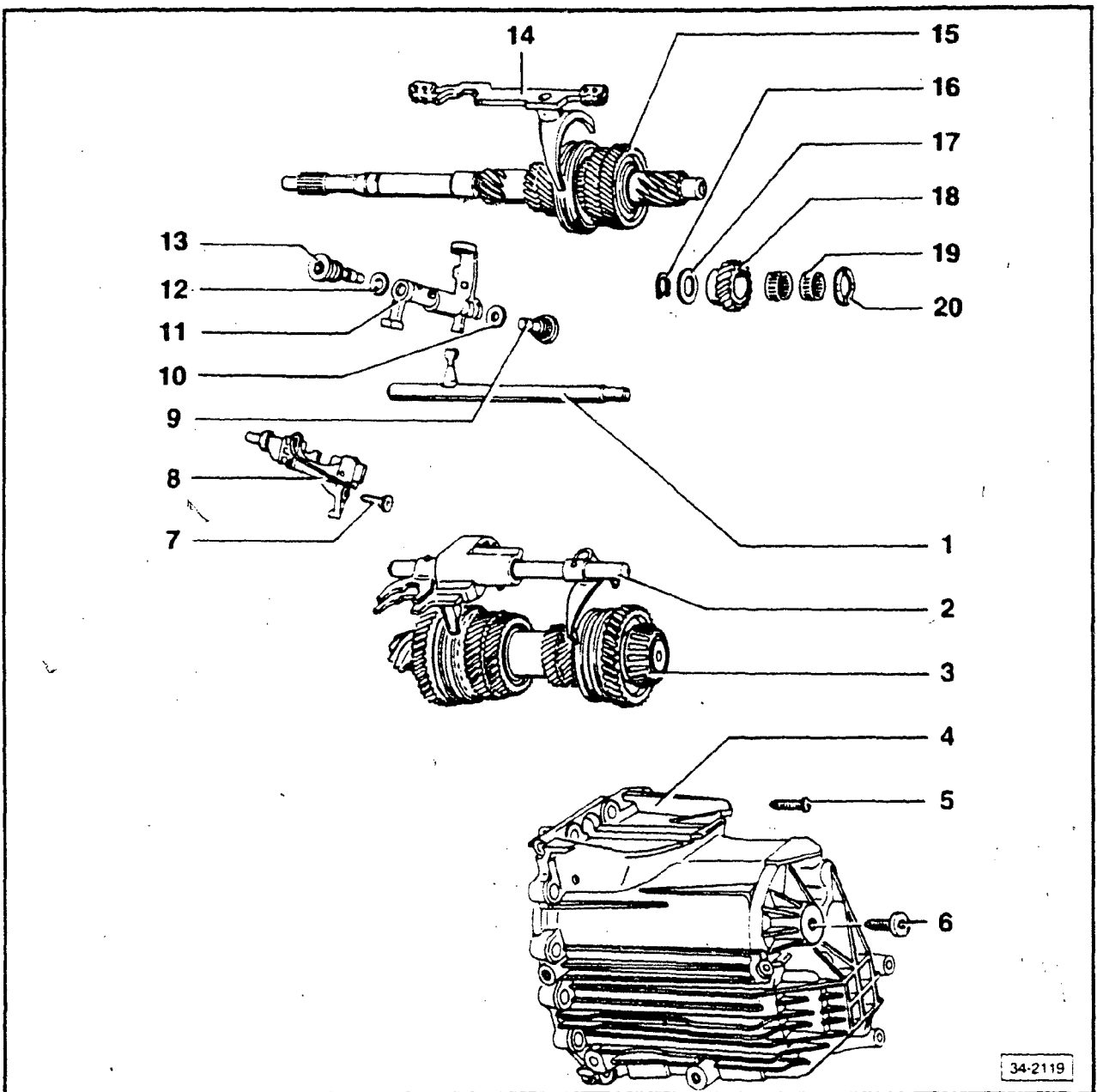
5th/reverse gear lock, checking installation position

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



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CAUTION

If final drive 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 forks can be replaced individually
- replace 5th/reverse gear shift fork only together with selector ring and selector shaft

3 — Pinion with hollow shaft

disassembly/assembly, 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)

shoulder faces safety mechanism for spring locking segment

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

- installed position of selector shaft, Fig. 2
- installing, Fig. 3
- selector shaft or shift fork can be replaced individually
- selector shaft bushing, removing, Fig. 5
- driving in with VW 295 and VW 295A
- replace selector shaft bearing, if worn

15 — Main shaft

- disassembling/assembly, see Group 35
- adjusting, see Group 35
- installing, Fig. 3

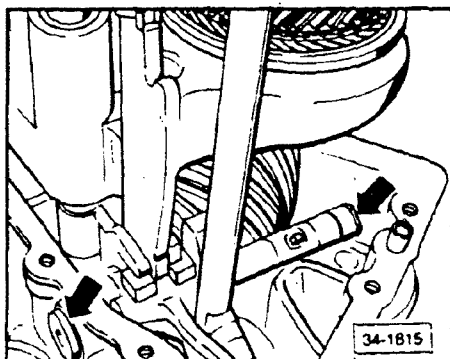
16 — Circlip

17 — Washer

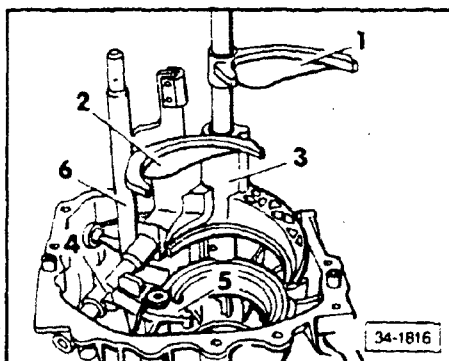
18 — Reverse gear

19 — Reverse gear needle bearing

20 — Thrust washer

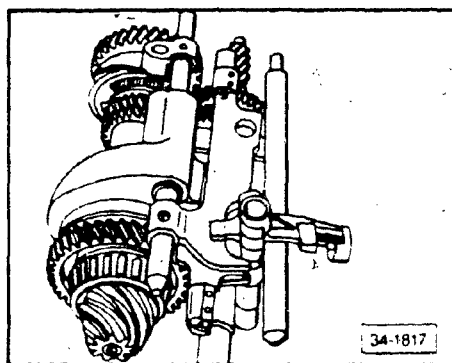


► Fig. 1 Relay shaft bolts (arrows), removing



► 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

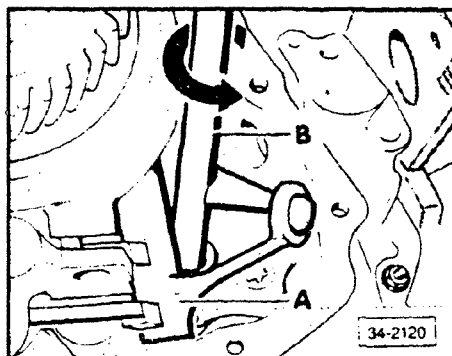


► Fig. 3 Main shaft, pinion with hollow shaft, selector shafts and shift forks, installation position

- these parts must be installed together

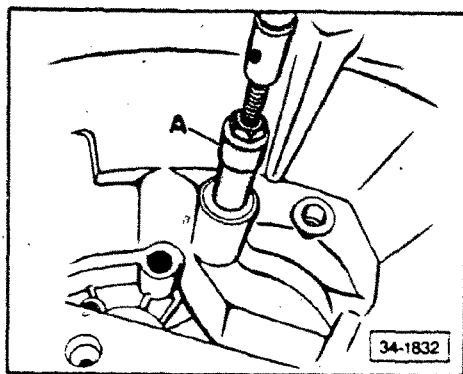
Note

The relay shaft and inner shift rod can also be installed afterward (see Fig. 4).



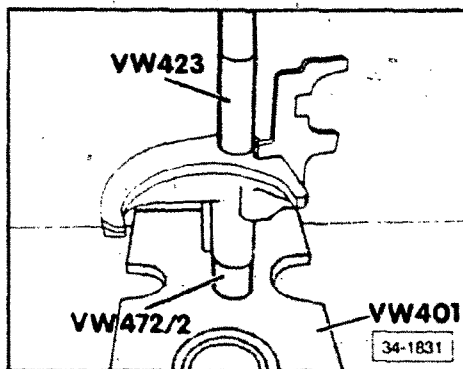
► Fig. 4 Relay shaft with inner shift rod, installing

- engage 3rd gear
- install relay shaft A
- place inner shift rod B sideways on bracket opening in final drive housing and align with bracket eye in relay shaft
- rotate shift rod in (follow direction of arrow)

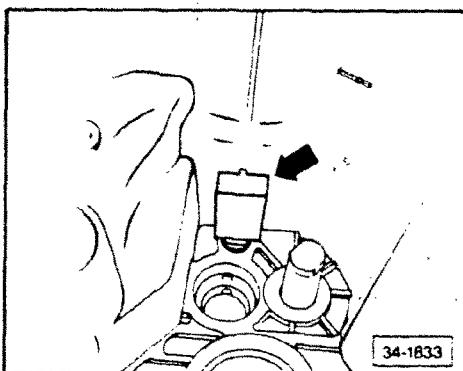


► Fig. 5 Selector shaft bushing, removing

- use slide hammer VW 771, and 18.5 mm - 23.5 mm inner puller A (e.g. US 1088 or Kukko 21/3)

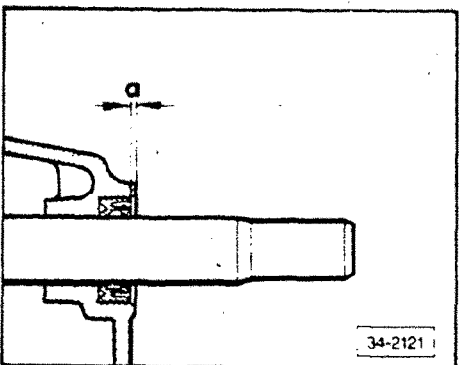


► Fig. 6 Shift fork bearing, removing/installing



► 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