

Index

Differential

- removing/installing 34-260

Differential lock controls

- assembly 34-120
- hose installation (through 12/87) 23-140
- hose installation (after 12/87) 34-170
- hose connection diagram (through 12/87) 34-150
- hose connection diagram (after 12/87) 34-180
- switch, removing/installing (through 12/87) 34-160

Differential lock pneumatic control unit

- removing/installing 34-200

End cover

- components, removing/installing 34-390
- disassembling/ assembling 34-400

End cover/drive flange

- components, removing/installing 34-410
- disassembling/ assembling 34-400

Fifth/reverse gear

- assembly 34-220

Gear carrier

- disassembling/ assembling 34-270, 34-280
- removing/installing 34-250

Gear carrier housing

- disassembling/ assembling 34-350

Gear carrier/final drive housing

- assembly 34-230

Main shaft selector rods

- disassembling/ assembling 34-290

Pinion shaft

- removing/installing 34-240

Rear final drive

- assembly 34-130

Shift controls

- assembly 34-20
- checking adjustment 34-100
- repairing 34-30

Shift lever

- assembly 34-60
- general information 34-70

Shift linkage

- adjusting 34-110

Shift rods

- general information 34-50
- push rods, removing/installing 34-90
- removing/installing 34-80
- repairing 34-40

Shim S4

- determining thickness 34-370
- overview 34-360

Technical data

- chart 34-10

Transmission

- assembling 34-210
- disassembling 34-300
- removing/installing 34-210

Transmission housing

- components, installing 34-330
- disassembling/ assembling 34-320

Technical data

Transmission	Code letters	AGD
Date of manufacture	from:	7 85
	to:	1 88
Type		016 All wheel drive
Application	model	Audi 200 Quattro Wagon
	engine	2.21 – 100 kW
		2.21 – 88 kW
Gear ratios	final drive	37:9 = 4.111
	1st gear	36:10 = 3.600
	2nd gear	34:16 = 2.125
	3rd gear	35:24 = 1.458
	4th gear	30:28 = 1.071
	5th gear	39:35 = 0.829
	reverse	42:12 = 3.500
	speedometer	13:25 = 0.520
Lubrication	capacity	2.2 L (2.3 quarts)
	specification	Gear oil GL4 SAE 80 or G 50 SAE 75 W-90 (synthetic)
Clutch	actuation	hydraulic
	disc diameter	228 mm
Drive flange	diameter	108 mm
Tires	dynamic roll circumference	approximately 1.9 m
Overall ratio	in top gear	3.41
Speed in 5th gear	per 1000 RPM	25 mph (40 Km/h)
Final drive application	code letters	AAT

Manual Transmission – Controls, Assembly 34

Transmission		Code letters	AOA*	APZ	AUL	AUM*
Date of manufacture			from: 1/88 to: 8/89		6/89	
Type			016 All wheel drive			
Application			model Audi 200 Quattro and 200 Quattro Wagon			
			engine 2.21 ~ 121 kW			
Gear ratios			final drive 35:9 = 3.889			
			1st gear 36:10 = 3.600			
			2nd gear 34:16 = 2.125			
			3rd gear 34:25 = 1.360			
			4th gear 29:30 = 0.967			
			5th gear 27:37 = 0.730			
			reverse 42:12 = 3.500			
			speedometer electronic			
Lubrication			capacity 3.2L (3.4 quarts)			
			specification Gear oil GL4 SAE 80 or G 50 SAE 75 W-90 (synthetic)			
Clutch			actuation hydraulic			
			disc diameter 240 mm			
Drive flange			diameter 108 mm			
Tires			dynamic roll circumference approximately 1.9 m			
Overall ratio			in top gear 2.84			
Speed in 5th gear			per 1000 RPM 25 mph (40 km/h)			
Final drive application			code letters AET			
Remarks			with Torsen differential			

* For vehicles with automatic seat belt tensioning system

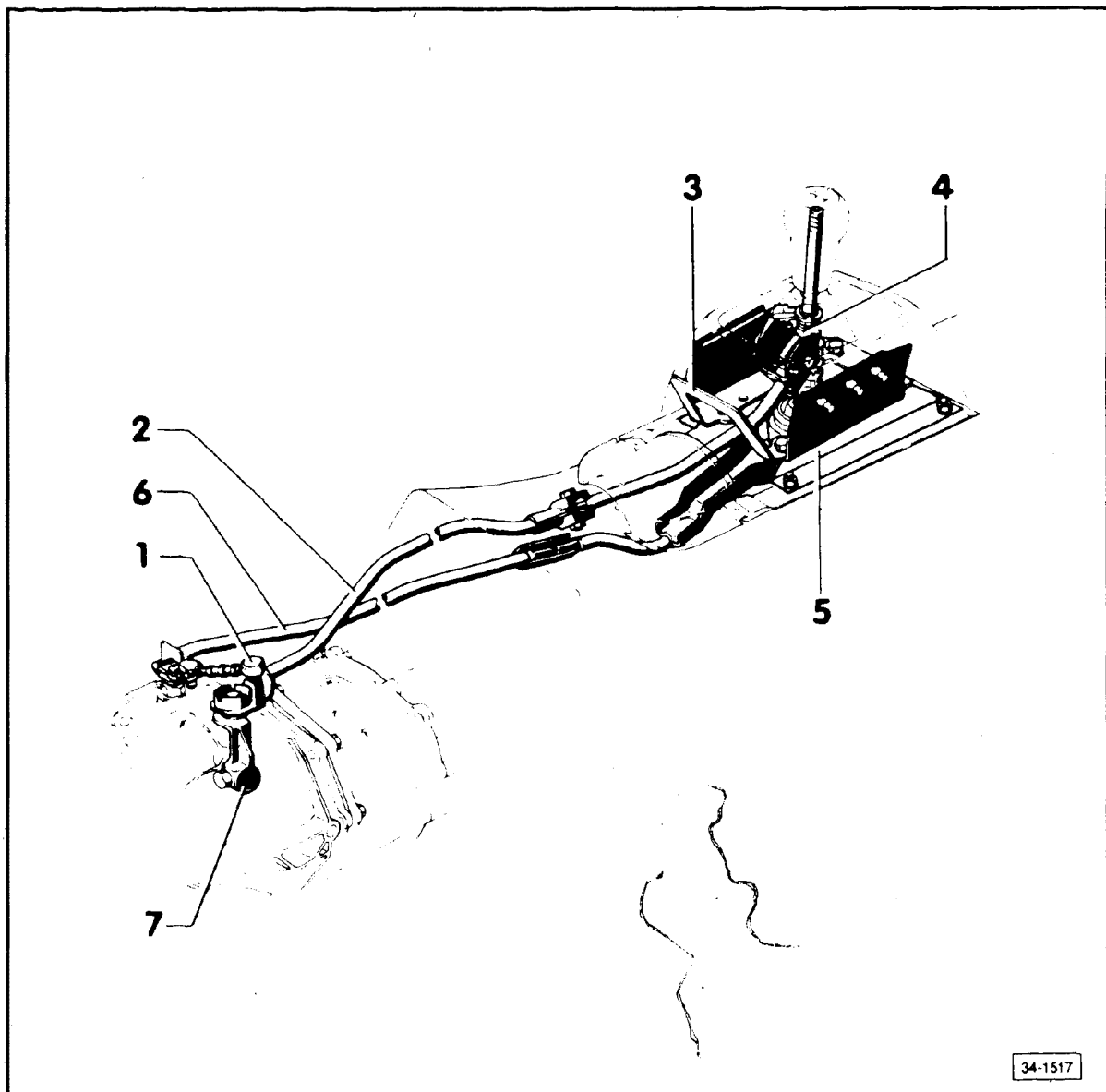
Note

Beginning with build date 13 09 8 the **016** All Wheel Drive transmission has a revised oil capacity.

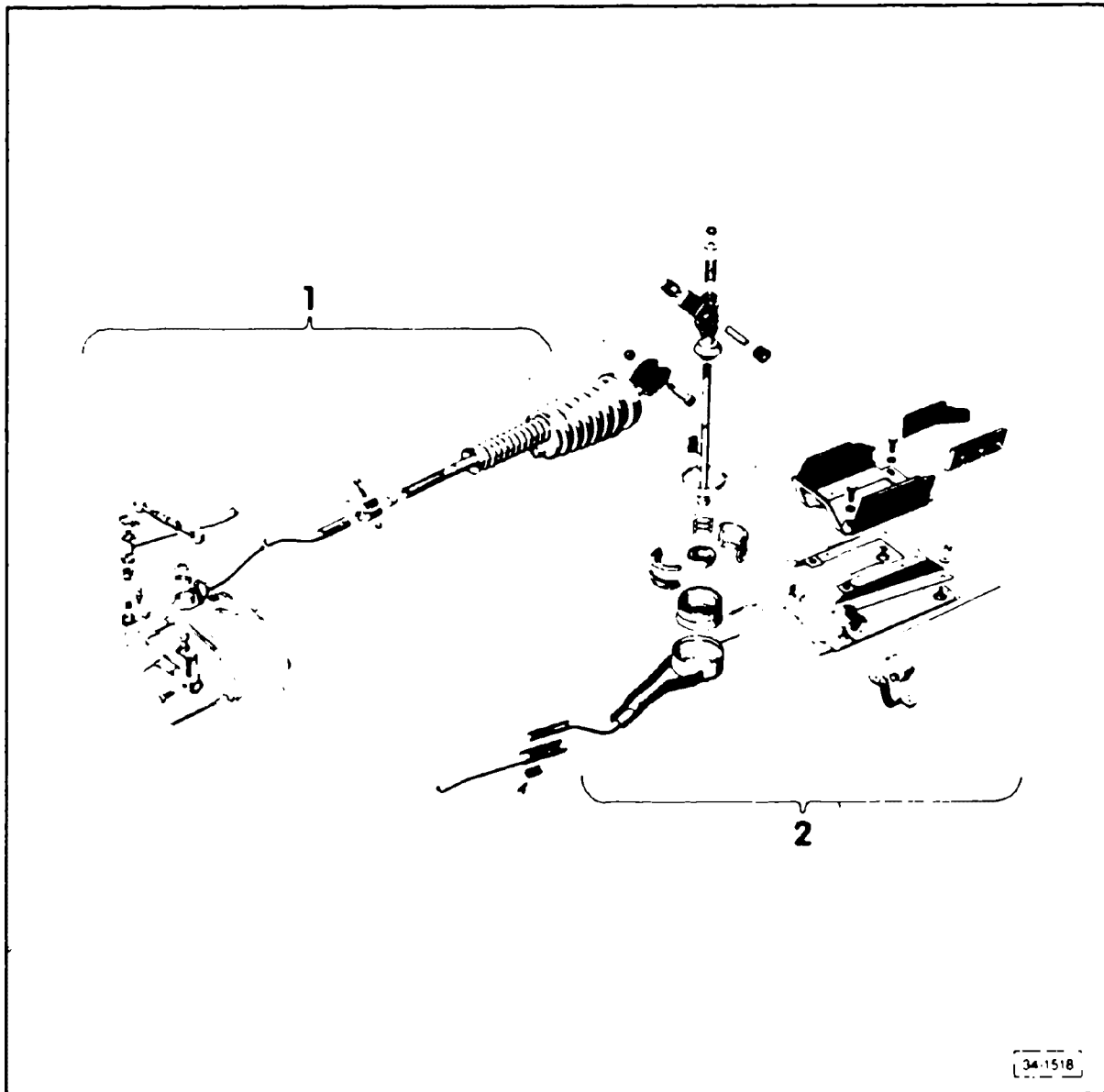
The oil filler hole in transmissions from 13 09 8 is located 15 mm higher than previously. See section 34-330.

- previous capacity = 2.2 liters (2.33 qt.)
- new capacity = 2.6 liters (2.75 qt.)

The transmission is full when the oil level is 7 mm below the lower edge of the filler hole. However, during repairs the transmission can be filled to the lower edge of the filler hole. This corresponds to a capacity of 3.2 liters (3.4 qt.).



- 1 — Adjusting rod
- 2 — Selector rod
- 3 — Stop plate mounting
- 4 — Shift lever
- 5 — Shift lever bracket
- 6 — Push rod
- 7 — Selector shaft lever



Shift rods: removing/installing, section 34-70

Push rods: removing/installing, section 34-80

Shift controls: checking/adjusting, section 34-90

1 — Shift rods and front push rods
repairing, section 34-30

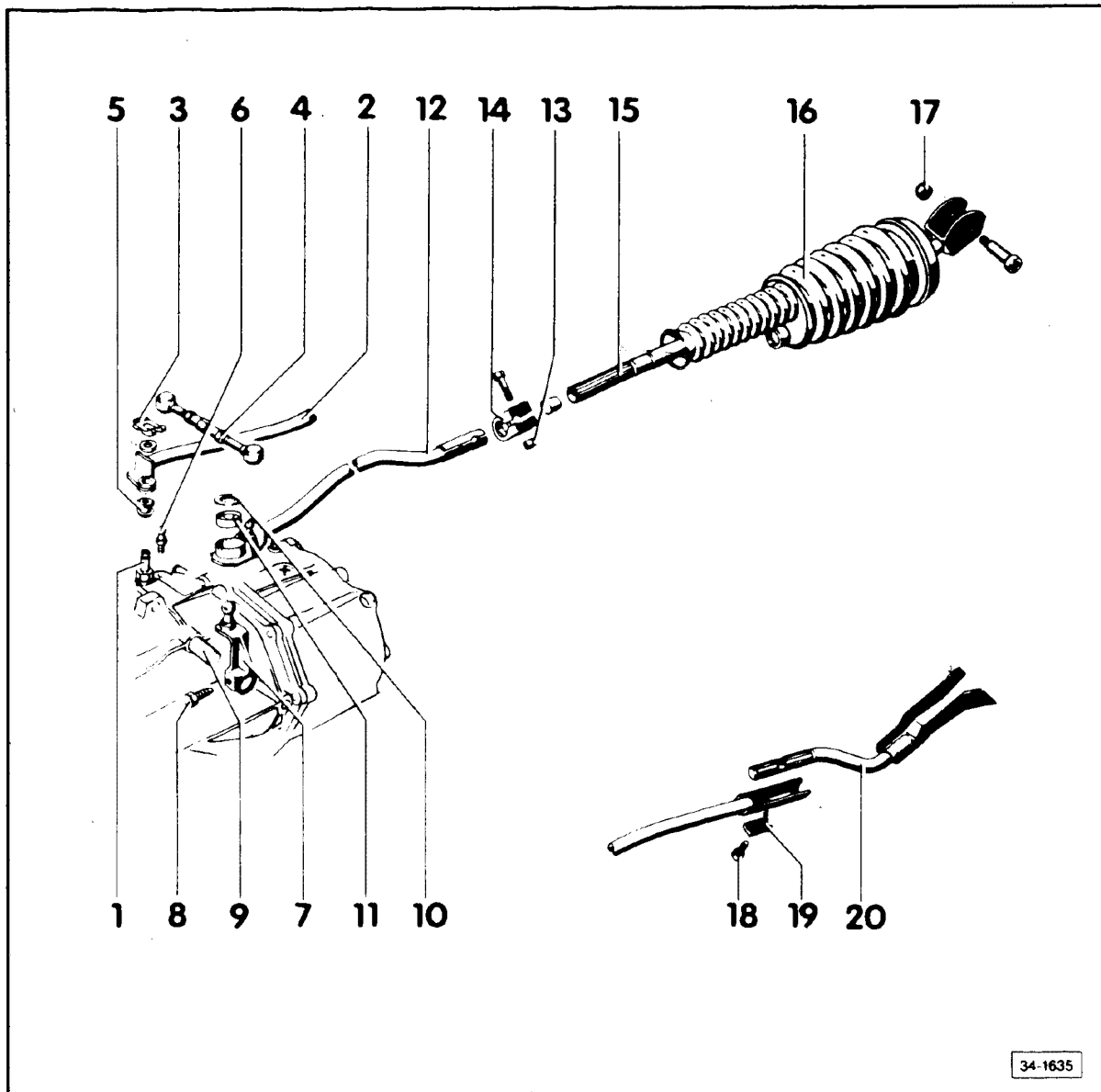
2 — Shift lever and rear push rods
repairing, section 34-50

CAUTION

Lubricate all joints and mating surfaces with white lubricating compound, Part No. **AOS 126 000 05**

THIS FRAME INTENTIONALLY LEFT

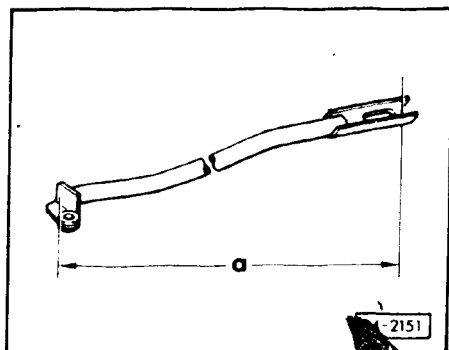
BLANK



- | | |
|--|--|
| <p>1 — 5th and reverse gear lock</p> <ul style="list-style-type: none"> • with push rod pin • installation position, section 34-50 <p>2 — Front push rod</p> <ul style="list-style-type: none"> • shortened starting 188, section 34-50 • shortened push rod is mounted on pivot pin on reverse gear, section 34-50 • always install with lengthened rear push rod, section 34-70 <p>3 — Clip</p> <p>4 — Adjusting rod</p> <p>adjusting, section 34-110</p> <p>5 — Bushing</p> | <p>6 — Ball joints</p> <p>installation position, section 34-330</p> <p>7 — Selector shaft lever</p> <p>8 — Self-locking bolt — 20 Nm (15 ft lb)</p> <p>9 — Transmission selector rod</p> <p>10 — Washer</p> <p>11 — Ball socket</p> <ul style="list-style-type: none"> • install into shift rod with washer • secure by bending collar onto washer |
|--|--|

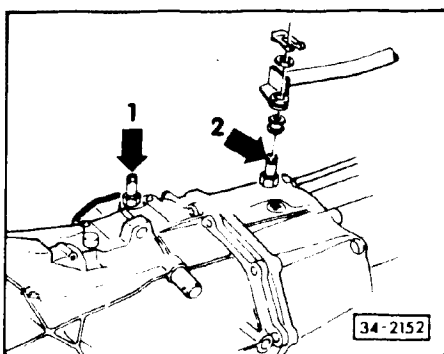
- 12 — **Front shift rod**
 - contour change starting 1/88, section 34-50
 - install modified shift only in vehicles with automatic seat belt tensioning system, section 34-50
- 13 — 15 Nm (11 ft lb)
- 14 — **Clamp**
- 15 — **Rear shift rod**
- 16 — **Boot**
- 17 — 10 Nm (7 ft lb)
- 18 — 20 Nm (15 ft lb)
- 19 — **Lock sleeve**
- 20 — **Rear push rod**
 - adjusting, section 34-90
 - lengthened starting 1/88, section 34-70

Front push rod and shift rod, general information



Shortened front push rod

Dimension **a**: through 12/87 = 570 mm (22.4 in.)
from 1/88 = 270 mm (10.6 in.)



Front push rod, installing

- through 12/87, install on pivot pin on transmission housing
- from 1/88, install on pivot pin on reverse gear

Front shift rod shape modified

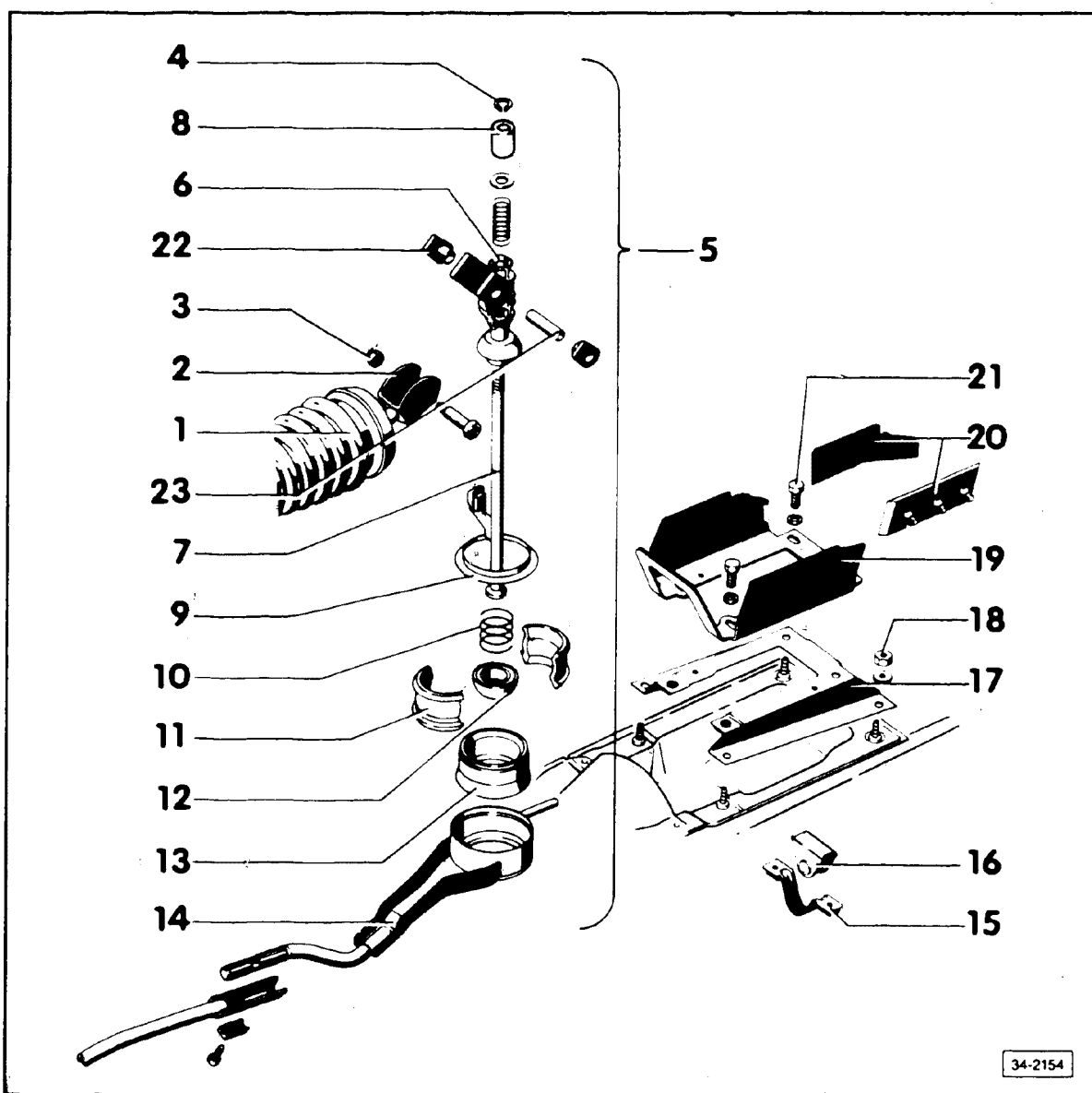
- A** – through 12/87
 - cannot be installed in vehicle with automatic seat belt tensioning system, comes in contact with cable reel (arrow)
- B** – from 1/87
 - can be installed in all vehicles

Note

For vehicles without the automatic seat belt tensioning system, both types of front shift rod can be installed optionally.

THIS FRAME INTENTIONALLY LEFT

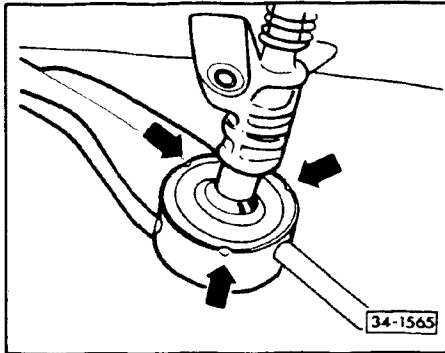
BLANK



- | | |
|---|---|
| 1 — Boot | 6 — Shift lever guide with upper ball half |
| 2 — Rear shift rod | 7 — Shift lever
lengthened starting 1/88, section 34-70 |
| 3 — 10 Nm (7 ft lb) | 8 — Bushing
only install in vehicles with lengthened shift lever |
| 4 — Circlip | 9 — Cover plate |
| 5 — Complete shift lever
disassemble only to lubricate assembling: | 10 — Spring |
| • preassemble rubber guide, gearing shells, and ball halves | 11 — Bearing shells |
| • install shift lever with spring, cover plate, and upper ball half into bearing shells | 12 — Lower ball half |
| • press rubber guide into shift lever bracket | 13 — Rubber guide
install with collar pointing up |
| • mount cover plate and crimp shift lever bracket together at three points, section 34-70 | |

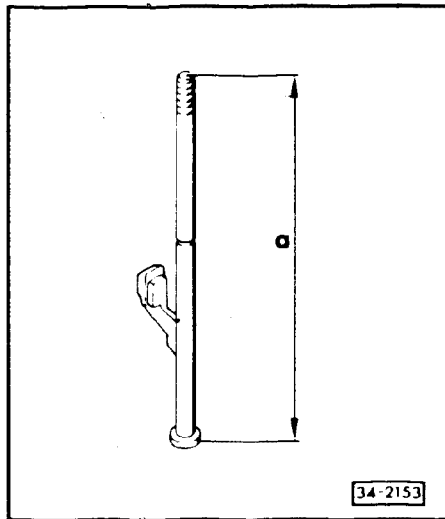
- 14 — **Rear push rod with shift lever bracket and bearing pin**
 - adjusting, section 34-90
 - lengthened starting 1/88, section 34-70
 - install lengthened rear push rod only with shortened front push rod, section 34-50
- 15 — **Bearing bracket**
- 16 — **Rubber bushing**
- 17 — **Cover plate**
- 18 — **10 Nm (7 ft lb)**
- 19 — **Stop plate**
- 20 — **Stop pads**
- 21 — **10 Nm (7 ft lb)**
- 22 — **Bushing**
- 23 — **Tube**

Shift lever and rear push rod, general information



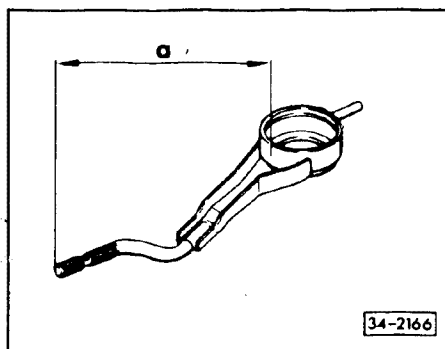
Shift lever bracket, crimping

- crimp in three places (arrow)



Shift lever, lengthened

Dimension a: through 12/87 = 252 mm (9.9 in.)
from 1/88 = 276 mm (10.9 in.)



Rear push rod, lengthened

Dimension a: through 12/87 = 320 mm (12.6 in.)
from 1/88 = 400 mm (15.7 in.)

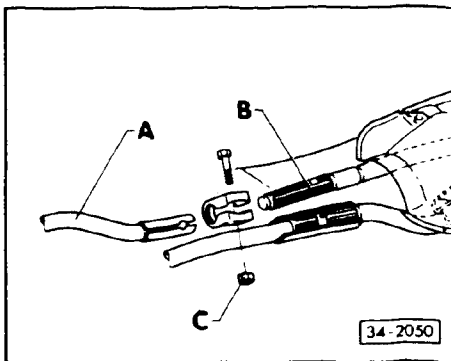
Shift rods, removing/installing

Removing

- loosen clamp
- disconnect rear shift rod from shift lever
- pull shift rod up and out
- press front shift rod off selector shaft and remove adjusting rod
- pull shift rod down and out

Note

In vehicles with automatic seat belt tensioning system, the shift rod is pulled out toward the front.



Installing

- press shift rod **A** onto shift rod coupling
- connect shift rod **B**
- tighten bolt and nut **C** to 20 Nm (15 ft lb)
- adjust shift linkage, section 34-100

Note

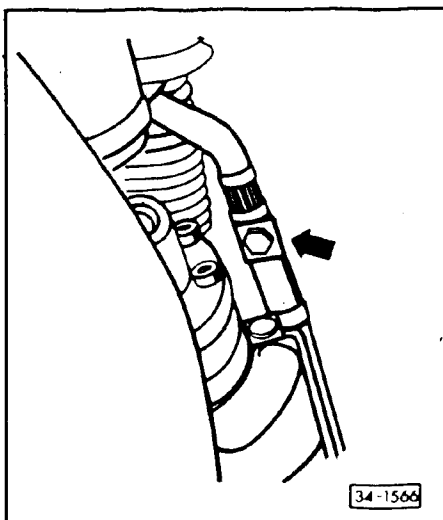
Make sure boot is seated properly when installing.

Push rods, removing/installing

Removing

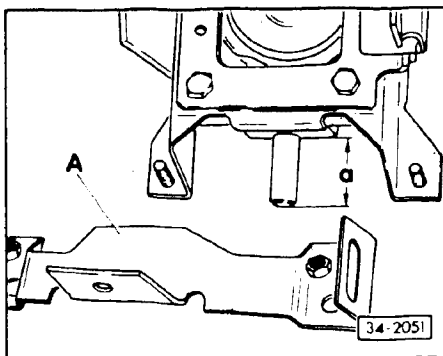
The rear push rod should be removed completely with the shift lever and rear shift rod.

- loosen shift rod clamp
- remove clamp (**arrow**)
- remove center console shift lever cover (see Repair Group 70)
- remove stop plate mounting
- remove rear push rod, shift lever, rear shift rod, and boot by pulling upward
- remove front push rod by taking out clip on pivot pin



Installing

- install in reverse order of removal
 - make sure that boot is seated correctly
 - make sure clamp is seated correctly
- after installing push rods, adjust bearing pin
 - dimension **a** = 17 mm
 - remove angle bracket **A** and push carpet to side if necessary
- adjust shift linkage, section 34-110



Shift controls, checking adjustment

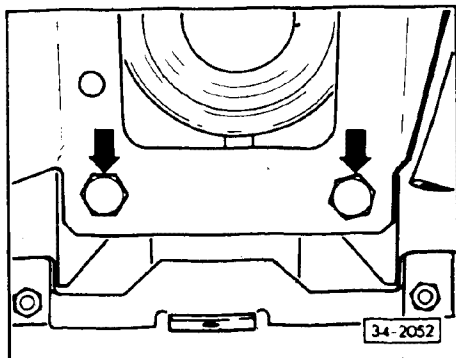
- engage 1st gear
- push shift lever to left stop
- hold shift lever with one finger and slowly allow it to spring back to the right
 - lever must spring back at least 5 mm (1/4 in.)
 - do not include elasticity into measurement
- engage 5th gear
- push shift lever to right stop
- hold shift lever with one finger and slowly allow it to spring back to the left
 - lever must spring back at least 5 mm (1/4 in.)
 - do not include elasticity into measurement

Note

If this spring path is maintained, the shift quality cannot be improved further by resetting the linkage.

cardiagn.com

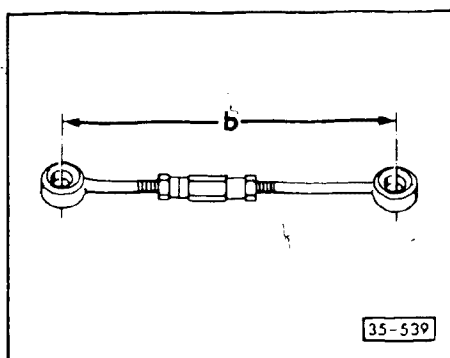
Linkage, adjusting



Fine adjustment

If spring path is incorrect, adjust using following procedure:

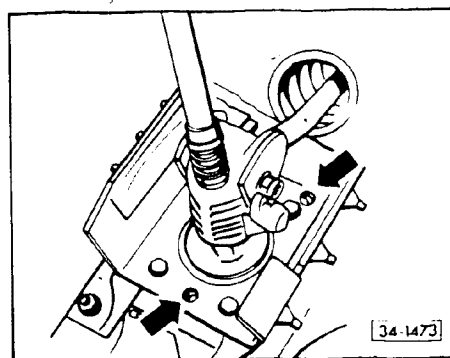
- place transmission in neutral
- loosen stop bolts (**arrows**)
- push stop towards side
 - to right — more spring path in 5th gear
 - to left — more spring path in 1st gear



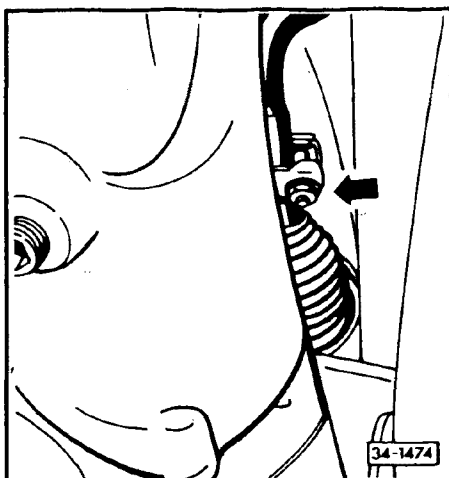
Basic adjustment

Perform basic adjustment if the fine adjustment was not sufficient or if repairs have been done in which the locking clamp was loosened.

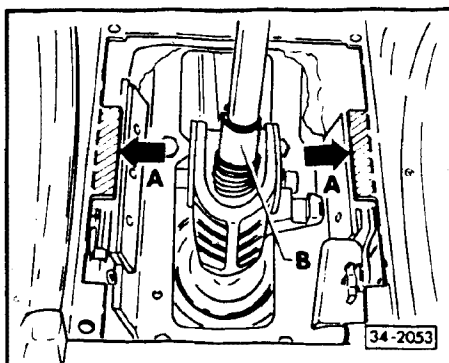
- place transmission in neutral
- set adjusting rod length
 - $b = 134 \text{ mm (5.275 in.)}$
- press shift rod onto ball pin
- install adjusting rod



- align centering holes (**arrows**) in stop and shift lever bracket
- tighten bolts



- loosen clamp between front and rear rods (arrow)
- rear shift rod must move freely



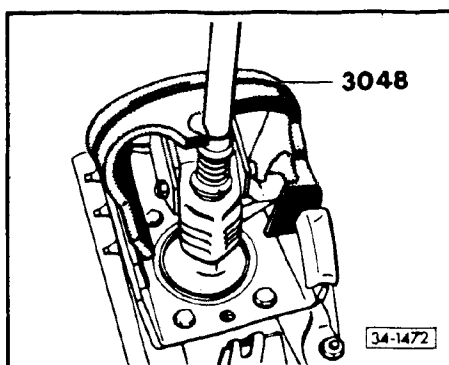
Note

In vehicles starting 1/88, the following should be noted before installing the gauge:

- if projections (arrows A) are on shifter console, saw off along dashed lines

CAUTION

Cover shift mechanism with a cloth to catch shavings that might fall into the shift lever bracket.



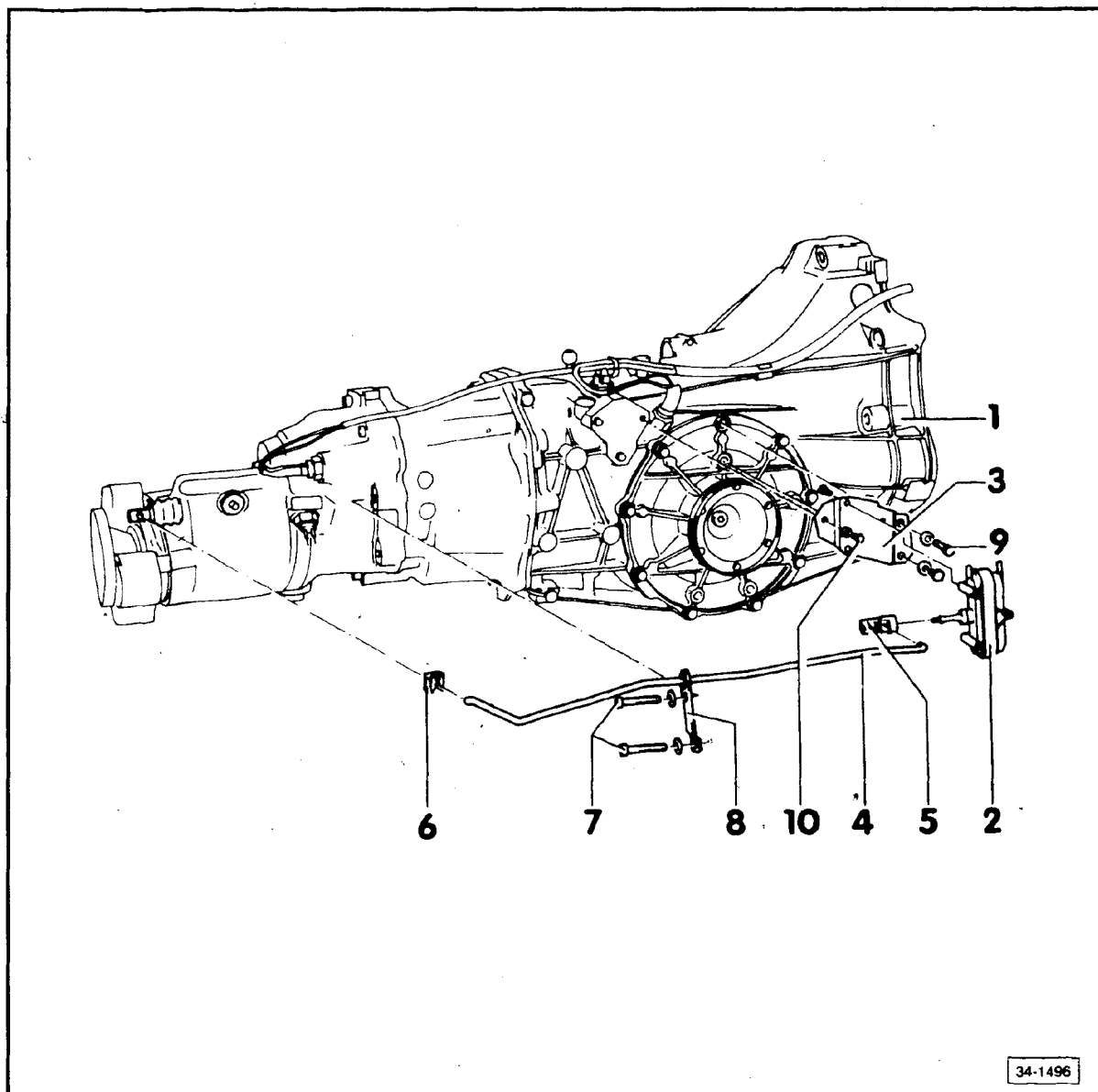
- remove spacer B and spring
 - use new circlip when installing
- tighten shift lever to stop
- install gauge 3048 by first placing tool's pins in open holes on stop plate pad
- make sure transmission is in neutral
- tighten clamp
- remove gauge
- check linkage adjustment and, if necessary, perform fine adjustment procedure
- shift through all gears
 - gears should engage easily without catching
 - pay special attention to the performance of the reverse gear lock

- assemble boot
- install shift lever knob

CAUTION

The boot must contact the shift lever knob.

cardiagn.com



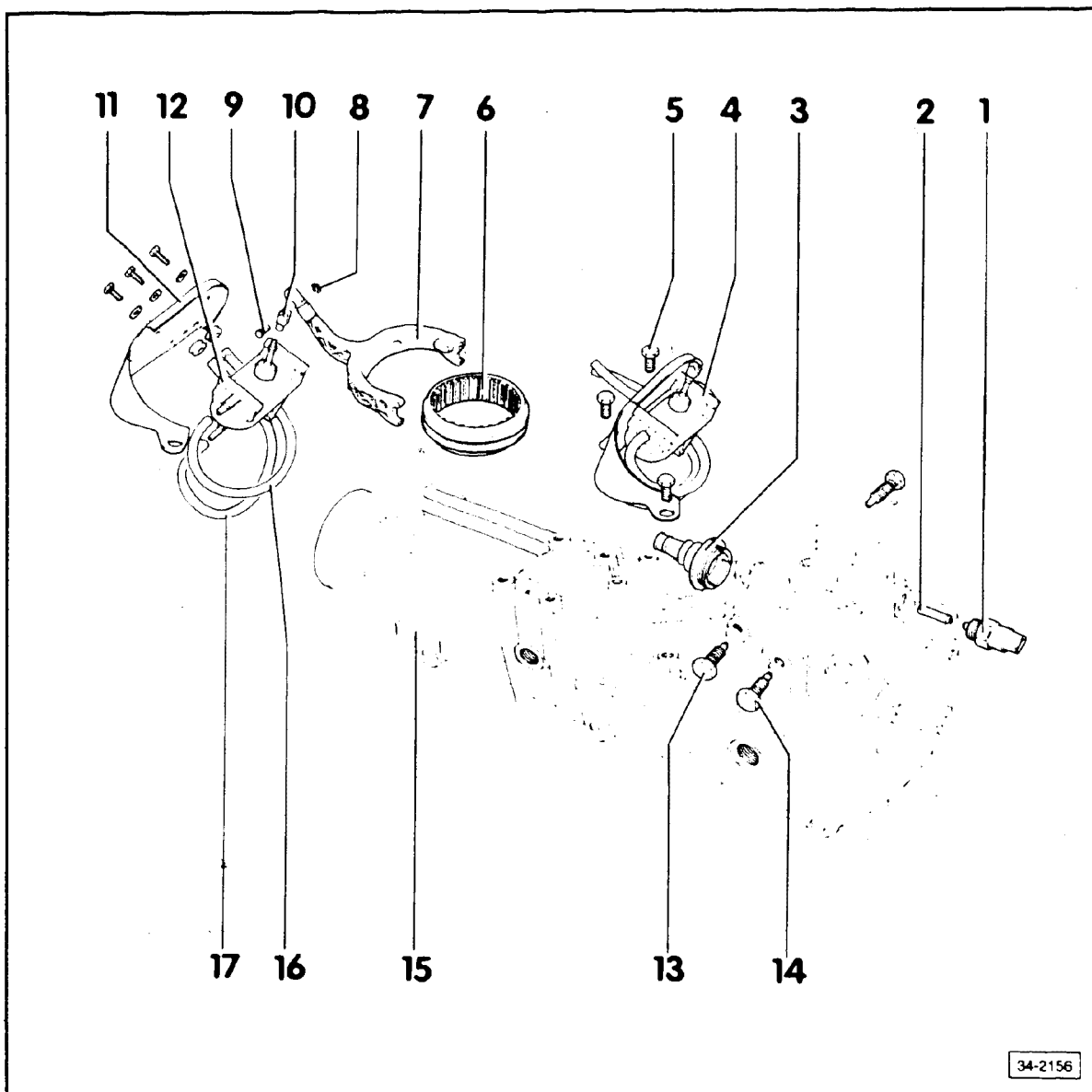
Note

Through 12/87, central differential only. From 1/88, the self-locking Torsen differential replaces the previously installed manually locking differential.

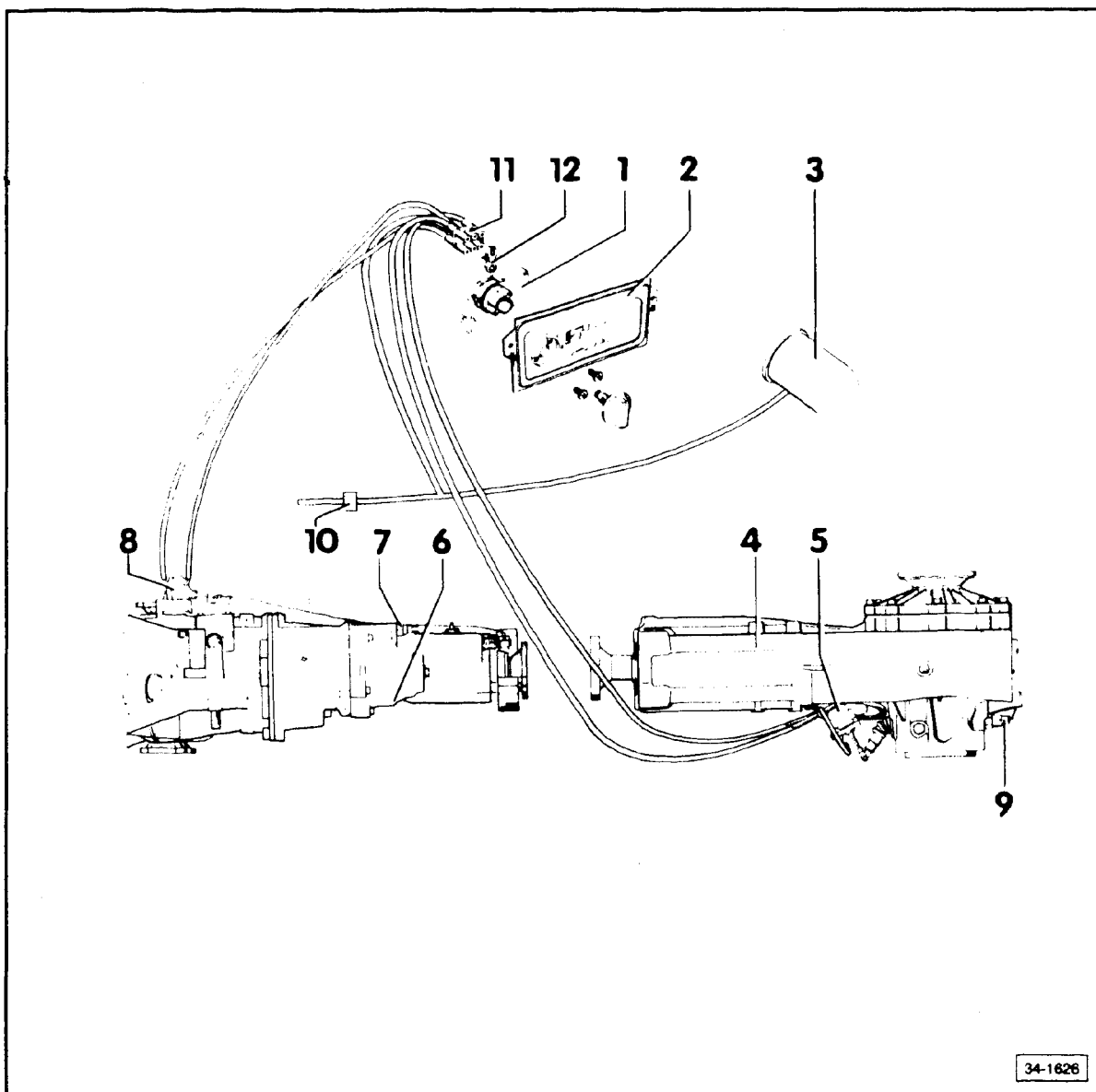
Only the rear final drive differential can be locked manually, up to 25 km/h (15.5 mph), by means of a control cell.

At speeds of more than 25 km/h (15.5 mph) the catch is disconnected automatically.

- 1 — Manual transmission
- 2 — Vacuum servo
- 3 — Vacuum servo bracket
- 4 — Selector rod
- 5 — Lock sleeve
- 6 — Clip
- 7 — 25 Nm (18 ft lb)
- 8 — Selector rod guide
- 9 — 25 Nm (18 ft lb)
- 10 — 10 Nm (7 ft lb)



- | | |
|--|------------------------------------|
| 1 — Indicator lamp switch — 45 Nm (33 ft lb) | 10 — Clevis |
| 2 — Extension pin | 11 — Vacuum servo bracket |
| 3 — Boot | 12 — Vacuum servo |
| • removing: pry out, do not damage sealing surface | 13 — 35 Nm (26 ft lb) |
| • installing: press in to stop, seal with hose clamp at small diameter of shift fork | guides shift fork (2 pieces) |
| 4 — Vacuum system | 14 — 35 Nm (26 ft lb) |
| 5 — 25 Nm (18 ft lb) | stop for shift fork |
| 6 — Operating sleeve | 15 — Rear final drive |
| 7 — Shift fork | 16 — Vacuum hose, yellow |
| 8 — Clip | outer connection of vacuum element |
| 9 — Bolt | 17 — Vacuum hose, blue |
| | inner connection of vacuum element |



CAUTION

To route the lines, see Routing Diagram, section 34-150.

Note

For vehicles starting 1/88, see section 34-170.

Electrical System, see Wiring Diagrams, Electrical Troubleshooting, and Installations Locations Binders.

- 1 — **Switch**
removing/installing, section 34-160
- 2 — **Indicator lamp assembly**
- 3 — **Vacuum reservoir**
installed in trunk

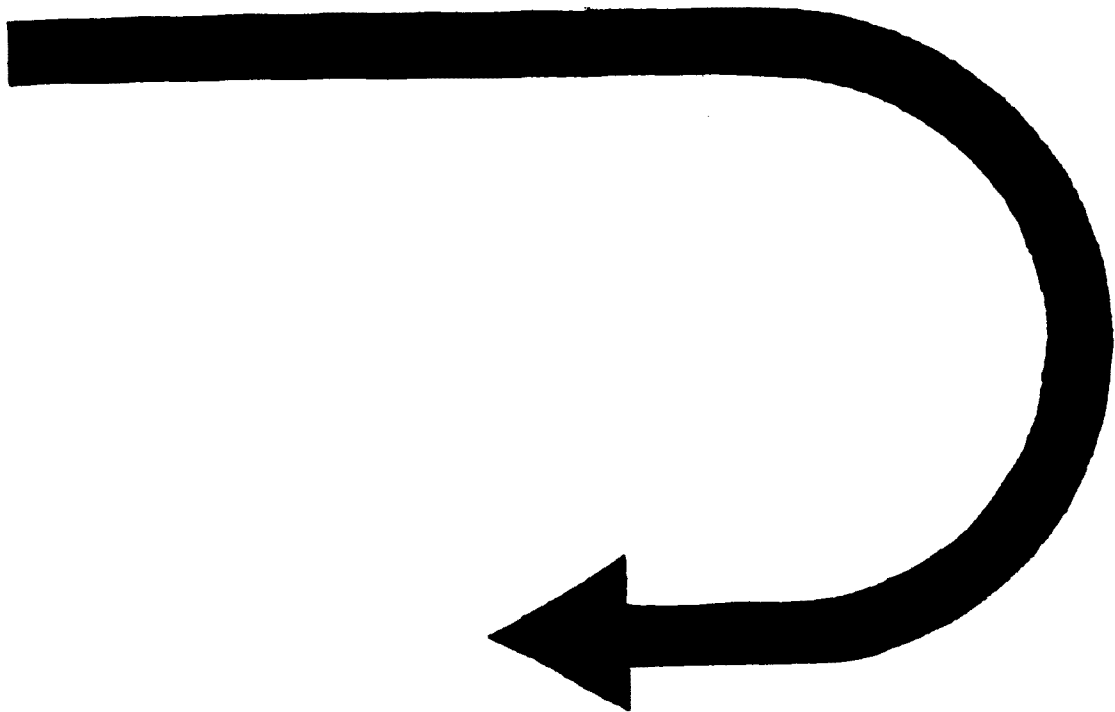
- 4 — **Rear final drive**
- 5 — **Rear final drive differential lock controls**
disassembling/assembling, section 34-130
- 6 — **Manual transmission**
- 7 — **Indicator lamp switch**
- 8 — **Differential lock controls**
- 9 — **Indicator lamp switch**
- 10 — **Check valve**
- 11 — **Distributor piece**
- 12 — **Fuse**
 - insert into two left outlets
 - prevents incorrect connection of distributor piece

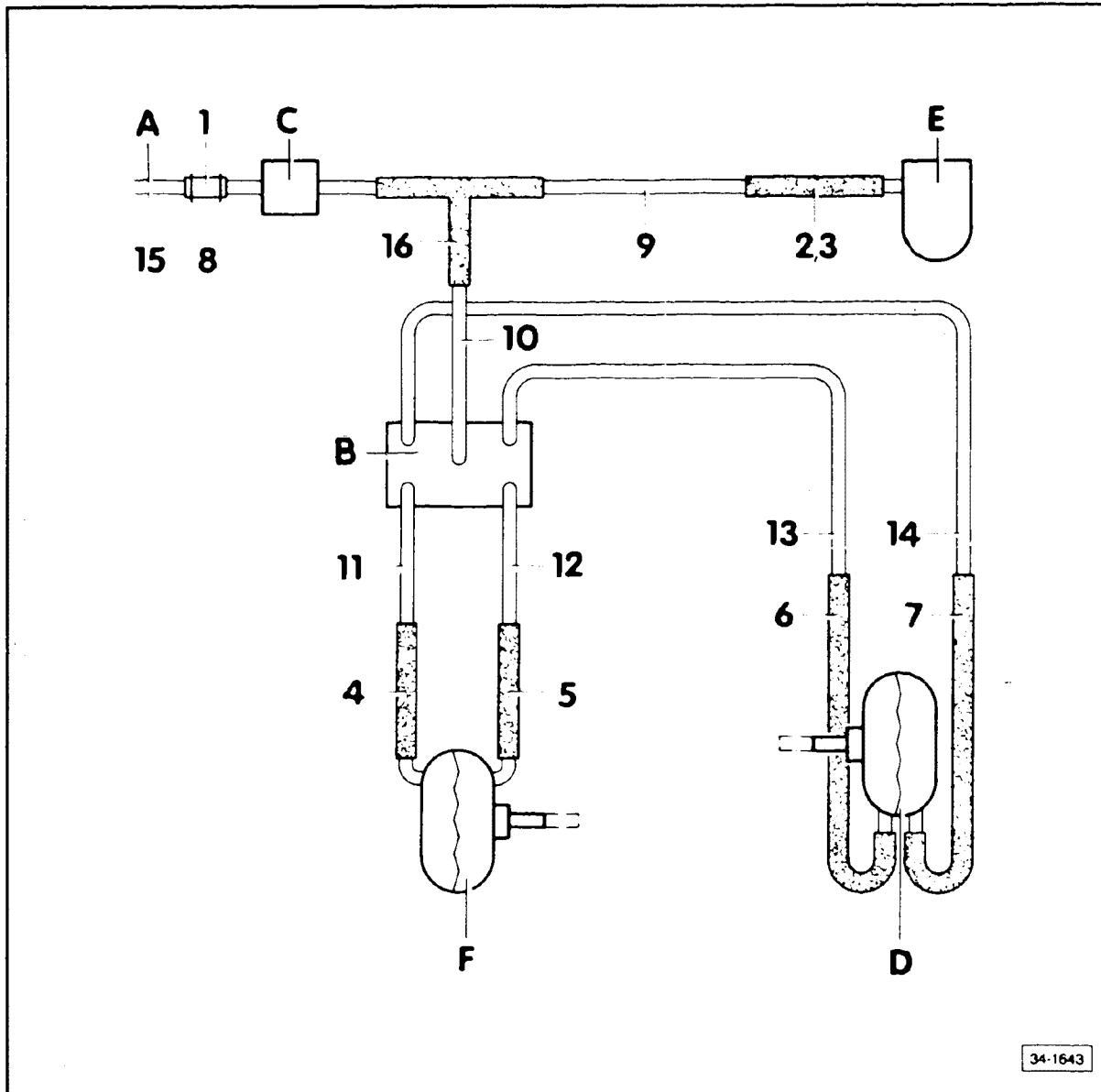
Vehicles
through 12/87

Hose installation

34-140-1

CONTINUED IN THE
BEGINNING OF NEXT ROW





- A — Vacuum line from intake manifold
- B — Switch
- C — Check valve
- D — Vacuum servo for rear differential lock
- E — Vacuum reservoir
- F — Vacuum servo for differential lock

Note

Only black hose and white tubing are supplied as replacement parts. During installation, cut hose or tubing to length and identify with proper color using a strip of adhesive tape

Hoses 3, 5 x 2				
No.	Length (mm)	Colour	Qty.	Part number
1	45	black	1	N 20 353.5
2	320	black (sedan)	1	
3	720	black (wagon)	1	
4	310	red	1	
5	350	green	1	N018068.2
6	600	yellow	1	
7	570	blue	1	
8	Hose clips		2 343A	311 133

through 12/87

Tube and hose connection diagram

34-150-1

Manual Transmission – Controls, Assembly 34

Pipes 4 x 1				
No.	Length (mm)	Colour	Qty.	Part number
9	2400	white	1	N 20 139.1
10	200	white	1	
11	620	red	1	
12	620	green	1	
13	1900	yellow	1	
14	1900	blue	1	
15	1450	purple	1	447 711 758
16	T piece		1	

cardiagn.com

through 12/87

Tube and hose connection diagram

34-150-2

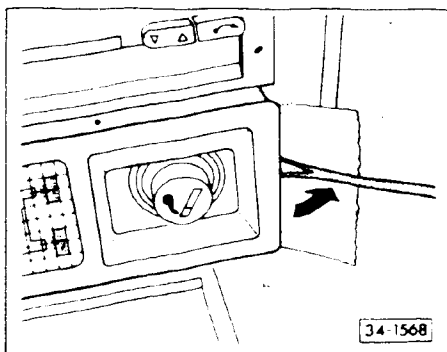
Differential lock switch, removing/installing

Through 12/87

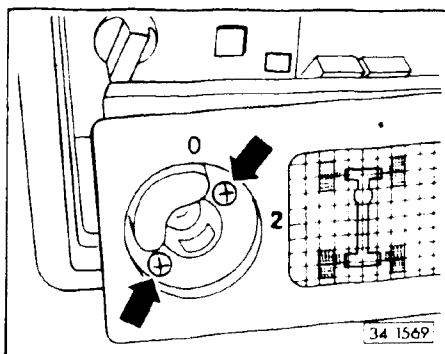
For vehicles starting 1/88 see section 34-190.

Removing

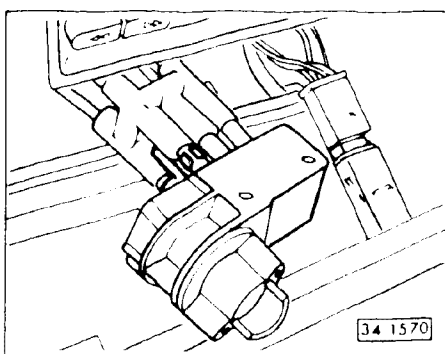
- pull off differential lock operating knob
- press out trim cover by inserting screw driver in right side (arrow)



- disconnect switch from trim cover (arrows) and remove



- pull distributor piece off switch



Installing

- install in reverse order
 - see Routing Diagram, section 34-150

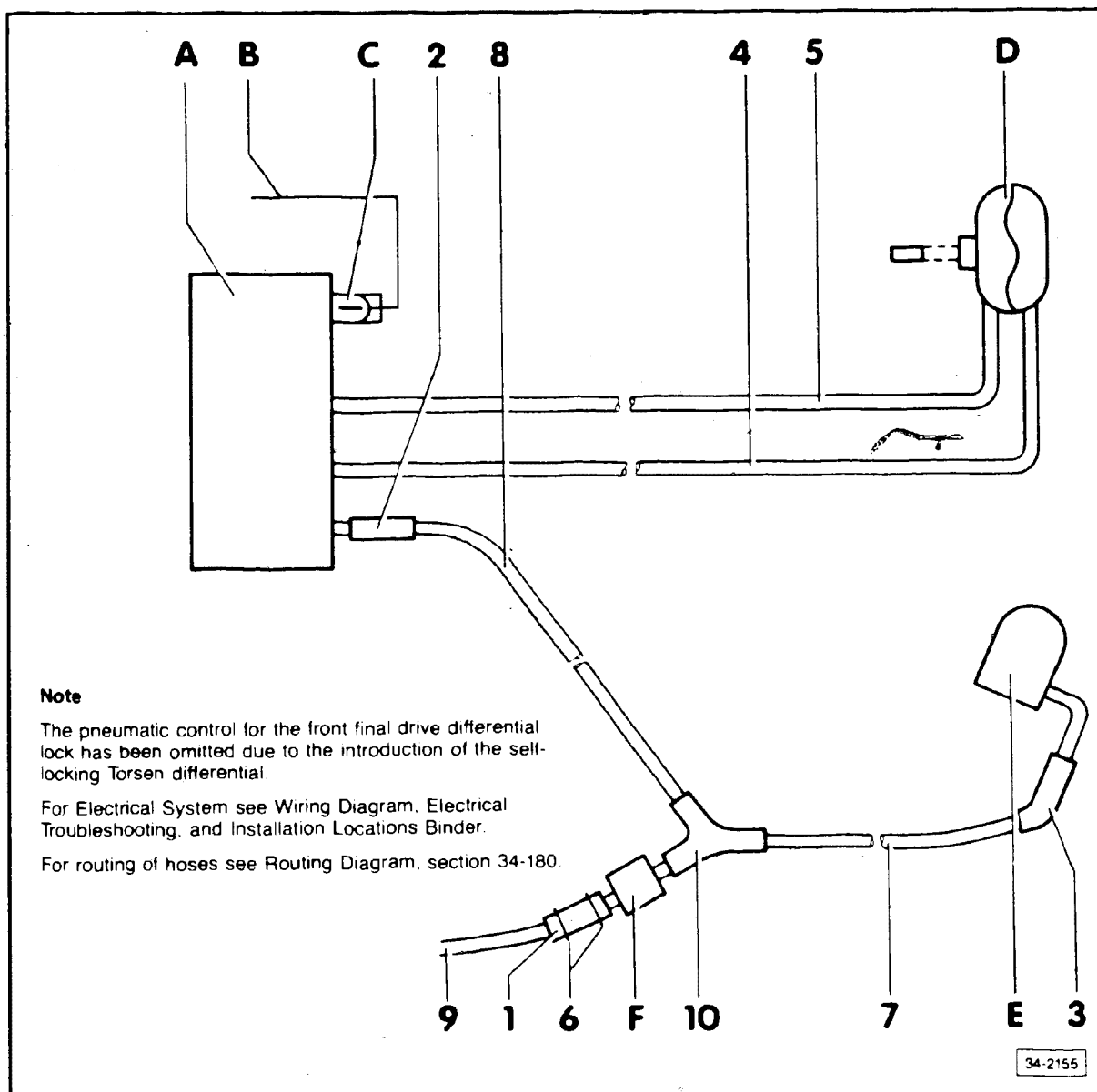
Note

For Electrical System, see Wiring Diagram, Electrical Troubleshooting, and Installation Locations Binder.

Through 1987

Differential lock switch, removing/installing

34-160-1



- 1 — Control gear**
- installed under rear seat
 - removing/installing, section 34-200
 - engages differential lock after operating pressure switch in center console
 - automatically shuts off lock at speeds over 25 km/h (15.5 mph)

- 2 — Electrical line**
to differential lock control and speedometer

- 3 — Rear final drive**

- 4 — Vacuum servo**
- controls rear final drive differential lock
 - disassembling/assembling, section 34-120

- 5 — Switch**
for indicator light

- 6 — Vacuum reservoir**
- located in upper left luggage compartment in area of back seat frame
 - Audi Wagon: accessible through cover trim on left rear wheel house

- 7 — Check valve**
installed under rear seat

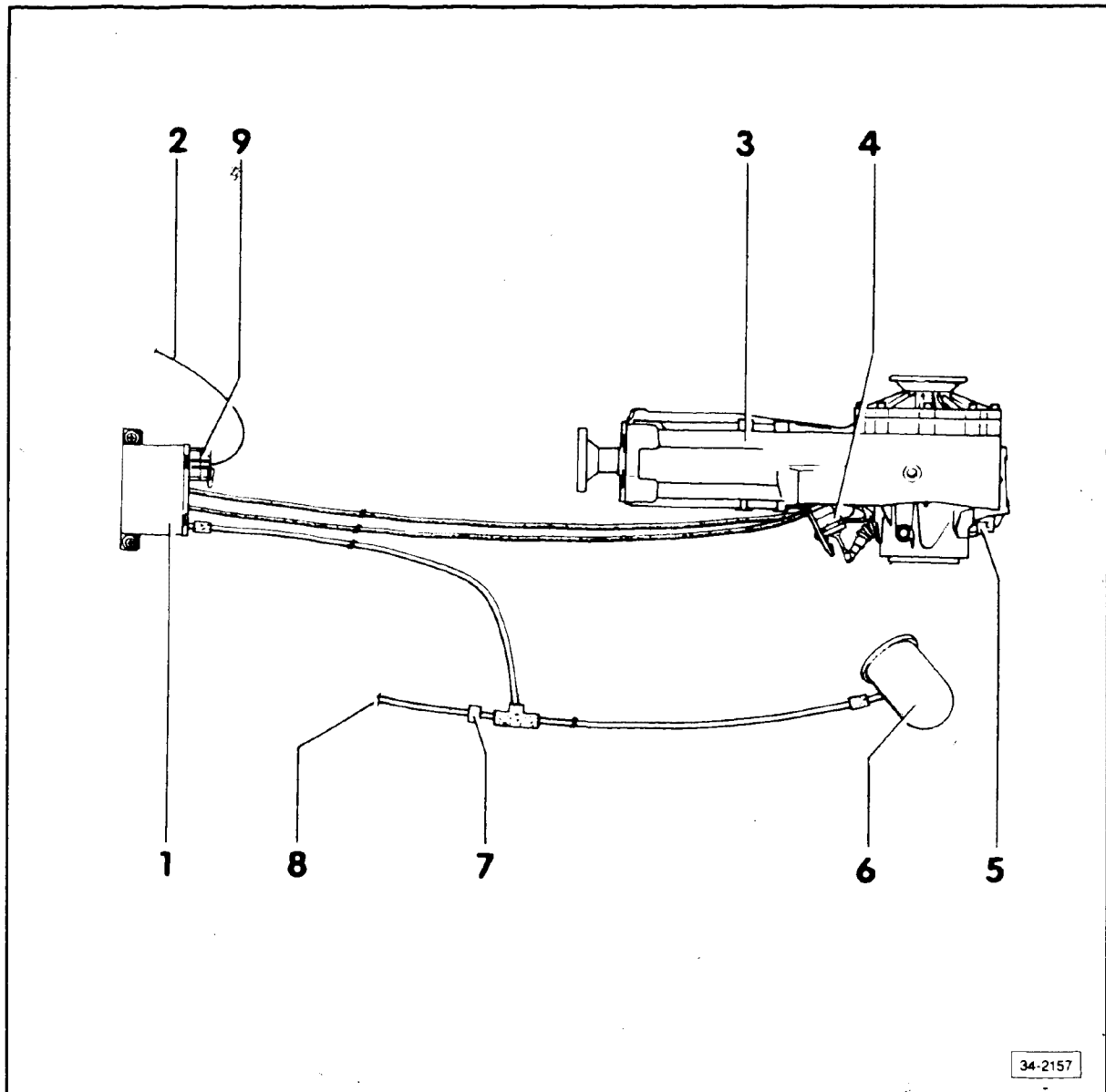
- 8 — Vacuum line to manifold**

- 9 — Connector**

After 1987

Hose Installation

34-170-1



- A — Control gear
- B — Electrical line
to differential lock control switch and speedometer
- C — Connector
on control unit
- D — Vacuum servo
on rear final drive
- E — Vacuum reservoir
- F — Check valve

Note

Only black hose and white tubing are supplied as replacement parts. During installation, cut hose or tubing to length and identify with proper color using a strip of adhesive tape.

After 1987

Tube and hose routing diagram

34-180-1

Hoses 3, 5 x 2				
No.	Length (mm)	Colour	Qty.	Part Number
1	45	black	1	N018062.2
2	170	black	1	
3	130 720*	black	1	
4	850	yellow	1	
5	820	blue	1	
6	Hose clips		2	311 133 343A

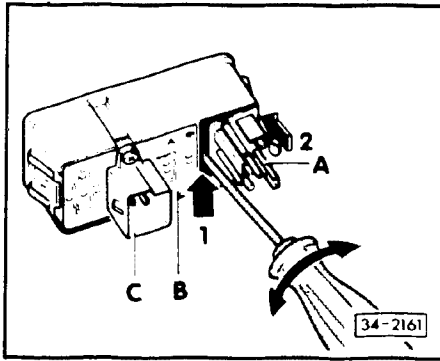
*Wagon

Pipes 4 x 1				
No.	Length (mm)	Colour	Qty.	Part Number
7	815	white	1	N 20 139.1
8	540	purple	1	
9	2900	purple	1	
10	T piece		1	443 711 758

Differential lock control switch, removing/installing

Note

The differential lock control switch is installed with a trim plate in the front center console cover.



Removing

- carefully pry switch and trim plate out of cover
- loosen cable connections
- insert a small screwdriver between switch **A** and circuit board **B** (**arrow 1**)
- detach switch from front attachment by turning screwdriver
- detach switch from rear attachment by inserting and turning a small screwdriver (**arrow 2**)
- remove switch from trim plate
- remove circuit board **B** and connector housing **C** from trim plate

Installing

- press switch into rear attachment (**arrow 2**)
- press switch into front attachment (**arrow 1**)

Note

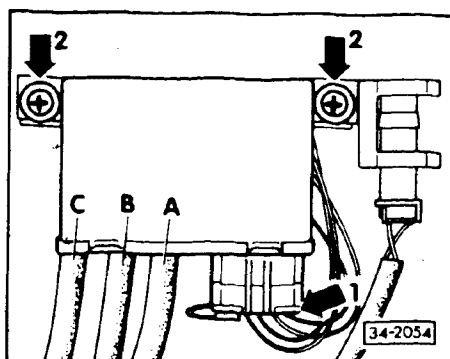
To repair electrical components, see Electrical System – Wiring Diagrams, Electrical Troubleshooting, and Installation Locations Binder.

cardiagn.com

Pneumatic differential lock control unit, removing/installing

Note

To repair electrical components, see Electrical System – Wiring Diagrams, Electrical Troubleshooting, and Installation Locations Binder.



Removing

- remove control line connections
 - A – blue - to vacuum servo
 - B – yellow - to vacuum servo
 - C – purple - to engine manifold

Note

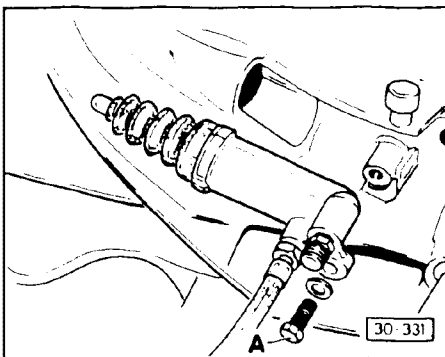
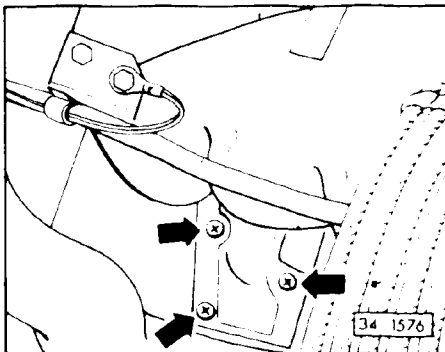
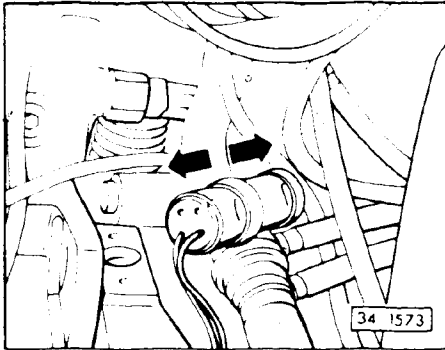
For installation of control line on rear final drive, see section 34-130.

- disconnect differential lock control cable connector (**arrow 1**)
- remove control unit by loosening two screws (**arrow 2**)

Installing

- install in reverse order of removal procedure

Transmission, removing/installing



Removing

- remove ground strap from battery (under rear seat)
- unscrew three upper engine-transmission connecting bolts
- disconnect cable connector and Oxygen sensor connector, if present
- remove speedometer sensor connector by pressing in clips

- vehicles with turbocharger — unscrew bolts (**arrows**) for underbody cover plate (cannot be removed yet)
- remove clutch slave cylinder as follows:

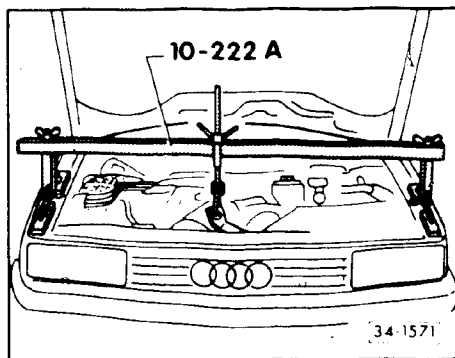
- remove bolt **A**
- remove clutch slave cylinder

CAUTION

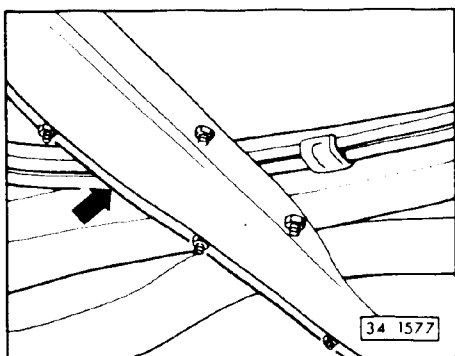
The hydraulic system should remain closed during removal of the clutch slave cylinder.

- tie up coolant hoses and cable

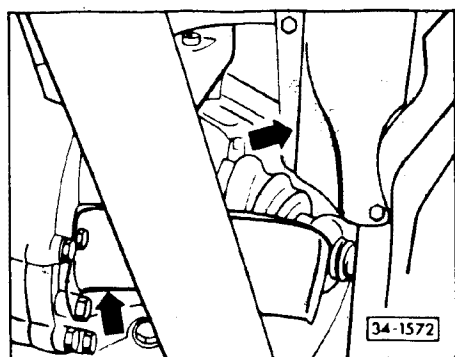
cardiagn.com



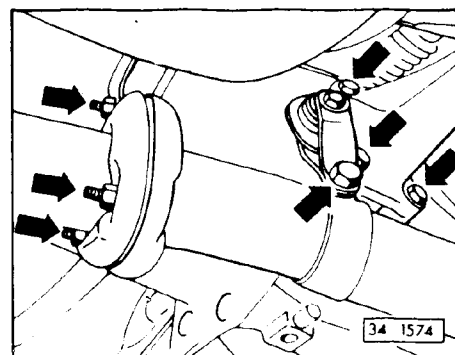
- install engine support and place tension on device and engine with spindle



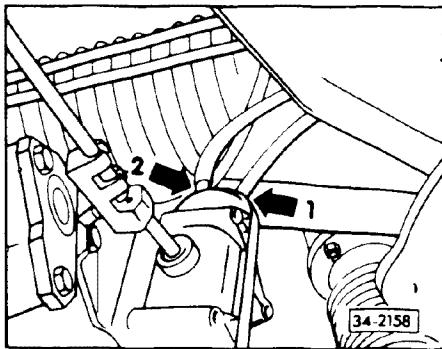
- remove bracket (**arrow**), if present
- remove clutch cover plate



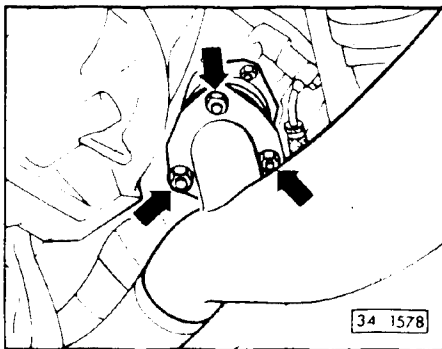
- unscrew axle shaft and right transmission bracket cover plates (**arrow**)



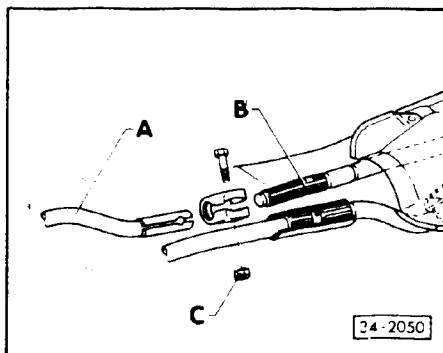
- remove right transmission mount and exhaust pipe
- remove drive shaft, see Repair Group 39
 - adjust after installation, Repair Group 39



- unscrew right axle shaft
- remove starter



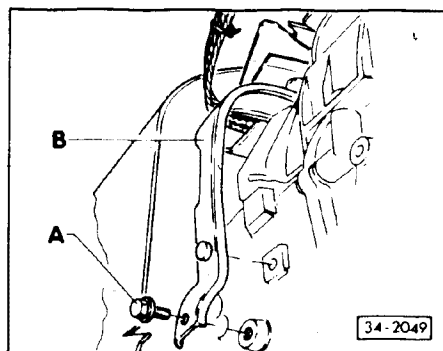
- on vehicles with turbocharger, remove cover plate
- remove front exhaust pipe (figure shows vehicle with turbocharger)



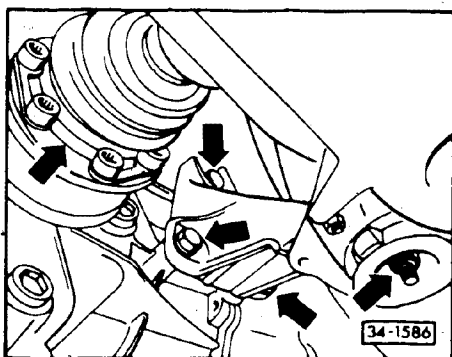
Note

On vehicles with automatic seat belt tensioning system, the cable reel is mounted on the transmission by the front shift rod. Therefore, remove the transmission in combination with front shift rod **A**.

- separate front shift rod **A** and rear shift rod **B** by loosening nut **C**
- separate front and rear push rod
- remove front push rod from transmission



- on vehicles with automatic seat belt tensioning system, remove mounting screw **A** for cable bracket **B** and press cable bracket with over cable reel
- support transmission with support **VAG 1383**



- unscrew left transmission mounting and left axle shaft
- remove all engine/transmission connecting bolts from below
- push transmission back

CAUTION

Check that axle shafts, driveshaft, push rod, exhaust pipe, tie bar and shift rod all move freely. All cable ties to transmission must be loosened.

- carefully lower transmission

Installing

- install transmission in reverse order of removal procedure
- install engine/transmission mount and exhaust system without tension
- when installing push rod, check that engine/transmission centering guide sleeves are inserted in engine block
- clean main shaft splines, remove corrosion and lightly lubricate splines with **G 000 100** grease
- grease crankshaft bearing with MoS₂ grease
- pre-stress clutch slave cylinder after transmission installation so that mounting bolt can be installed easily
 - to make installation easier, the mounting bolt with turned tip listed in the replacement parts catalog can be used
- When installing push rod, make sure that bearing pin **A** is inserted in rubber bushing **B** on shift lever bracket

Note

The threads in the transmission drive flange and the rear final drive must be cleaned of locking compound residue after removal. Otherwise there is a danger that the bolts will seize when being installed and will strip when removed again. Clean with a thread cleaner.

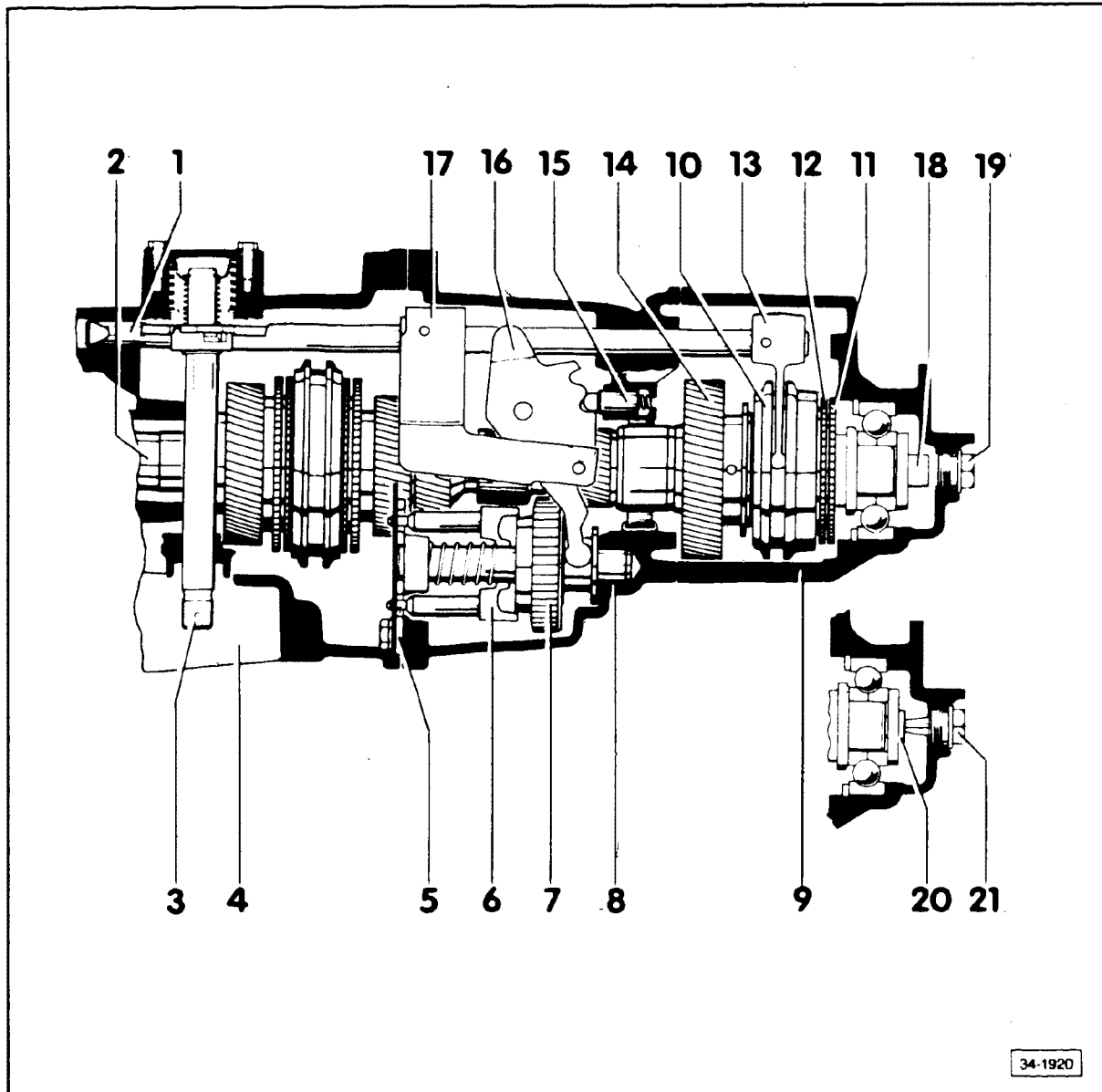
Tightening torques

Transmission to engine (M8)	20 Nm (15 ft lb)
(M10)	45 Nm (32 ft lb)
(M12)	65 Nm (48 ft lb)
Axle shaft to transmission	80 Nm (59 ft lb)
Bracket to transmission	40 Nm (30 ft lb)
Transmission support to subframe mount	45 Nm (32 ft lb)
Exhaust pipe to transmission bracket	25 Nm (18 ft lb)
Cable bracket to transmission	40 Nm (30 ft lb)
Clutch slave cylinder to transmission	25 Nm (18 ft lb)

cardiagn.com

THIS FRAME INTENTIONALLY LEFT

BLANK



Note

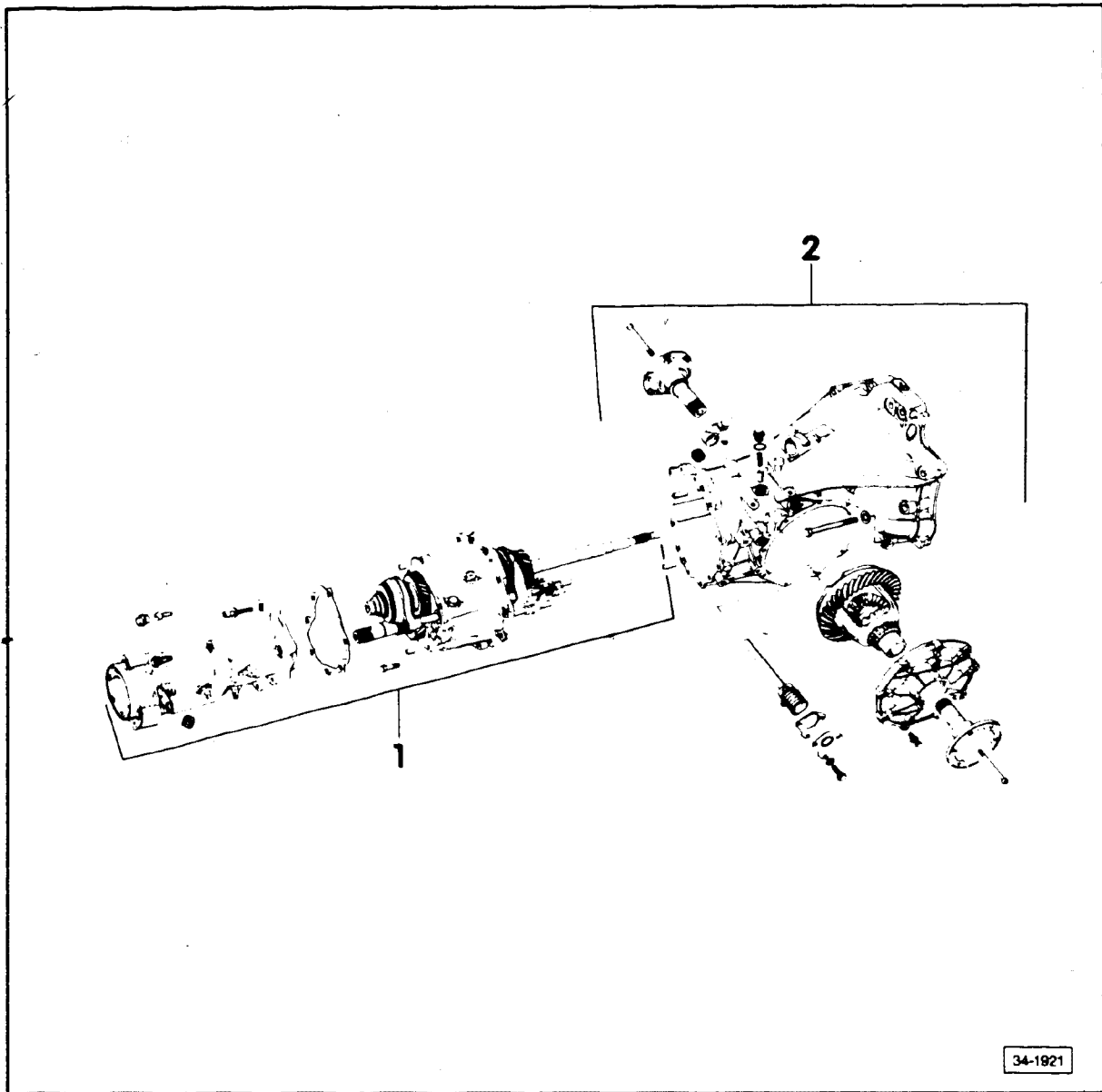
Functions of gearshift mechanism:

- move shift lever into and out of the 3rd and 4th gear plane
- move shift lever into and out of the 5th and reverse gear plane
- prevent shifting directly from 5th gear to reverse. (Shifting must always be done back to neutral, 3rd and 4th gear plane first.)

- 1 — 5th/reverse gear selector rod
- 2 — Main shaft
- 3 — Gearshift lever shaft
- 4 — Transmission housing

- 5 — Mounting plate
- 6 — Reverse gear synchronizer
- 7 — Reverse gear
- 8 — Gear carrier housing
- 9 — End cover
- 10 — 5th gear synchronizer sleeve
- 11 — 5th gear synchronizer hub
- 12 — 5th gear synchronizer ring
- 13 — 5th gear shift fork
- 14 — 5th gear

- 15 — Reverse gear lock
- 16 — Reverse gear relay lever
- 17 — Reverse gear shift fork
- 18 — Self-locking bolt
 - tighten to **50 Nm (37 ft lb)** then turn additional 90°
 - for transmissions up to build date 15 7 5 and from build date 12 1 9
- 19 — **30 Nm (22 ft lb)**
 - for transmissions up to build date 15 7 5 and from build date 12 1 9
- 20 — Hollow bolt — **150 Nm (110 ft lb)**
 - for transmissions from build date 16 7 5 up to build date 11 1 9
- 21 — Plug with oil passage — **30 Nm (22 ft lb)**
 - for transmissions from build date 16 7 5 up to build date 11 1 9
 - always replace bolt



CAUTION

If transmission housing or pinion tapered roller bearing are to be replaced, and the dimension r is not marked on the bevel gear, the pinion position must be measured before removing the gear carrier housing. See Repair Group 39.

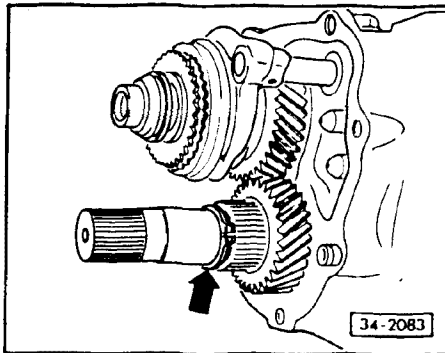
1 — Gear carrier

- removing/installing, section 34-250
- disassembling/assembling, section 34-270
- repairing, section 34-340
- determining shim **S4**, section 34-370
- end cover: repairing, section 34-380

2 — Final drive housing

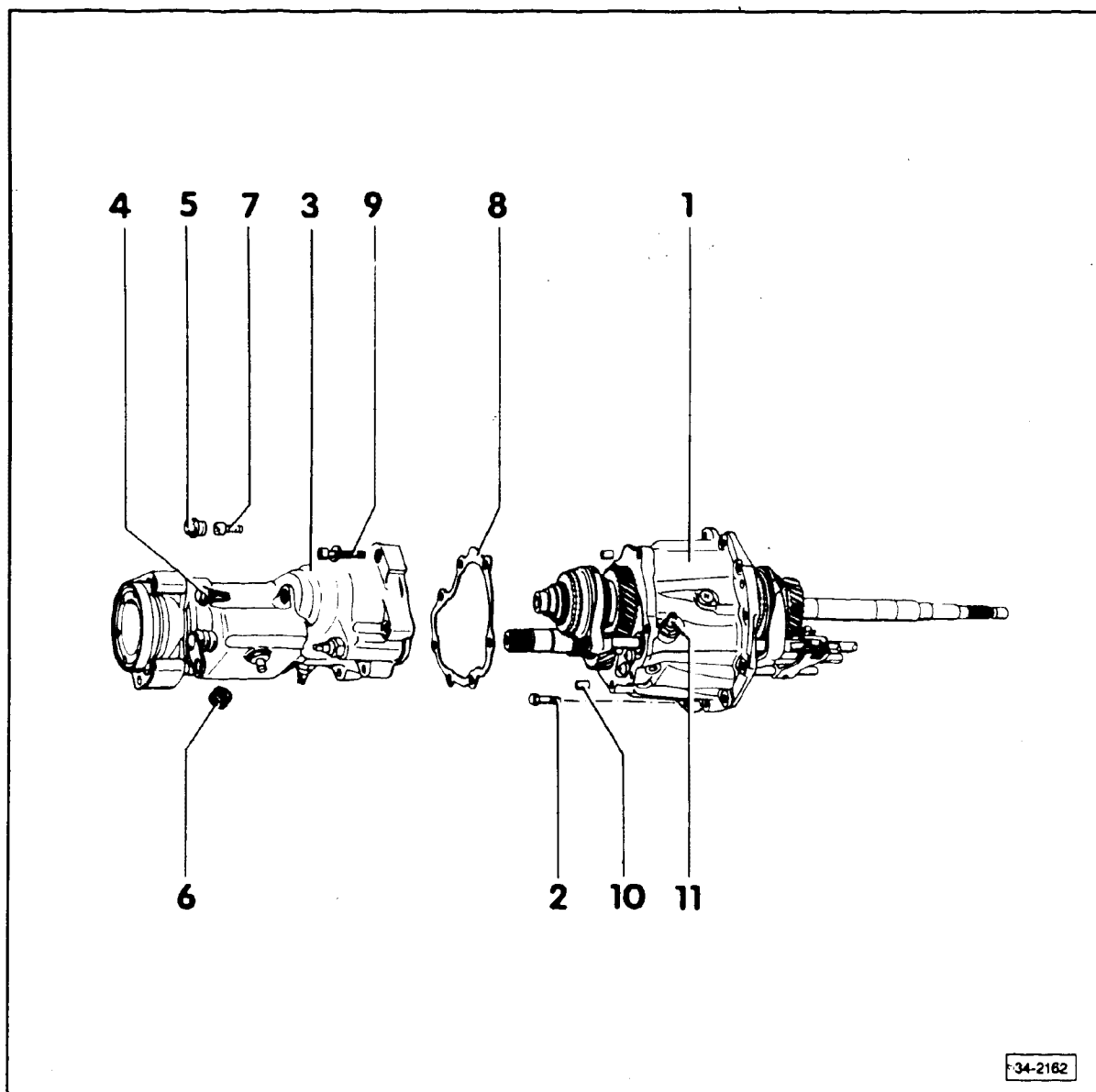
- repairing, section 34-320
- differential gear: removing/installing section 34-260

Pinion shaft, removing/assembling



Note

A circlip (**arrow**) prevents pinion from falling out of hollow shaft.



1 — Gear carrier

- before removing/installing: protect main shaft sealing ring from damage by the main shaft teeth. If necessary, pull insulating tube from a wiring harness over the teeth
- disassembling/assembling, section 34-64

2 — 25 Nm (18 ft lb)
without washer (12 pieces)

3 — End cover

- repairing: through 12/87, section 34-380; after 12/87 section 34-400

4 — Plug with oil passage

- for transmissions from build date 16 7 5 up to build date 11 1 9
- always replace bolt

5 — 30 Nm (22 ft lb)

- for transmissions up to build date 15 7 5 and from build date 12 1 9

6 — Oil drain plug — 25 Nm (18 ft lb)

34-2162

7 — Self-locking bolt

- for transmissions up to build date 15 7 5 and from build date 12 1 9
- installing, section 34-310
- always replace
- tighten to **50 Nm (37 ft lb)**
- for transmissions from build date 16 7 5 up to build date 11 1 9 banjo bolt is used
- tighten to **150 Nm (111 ft lb)**

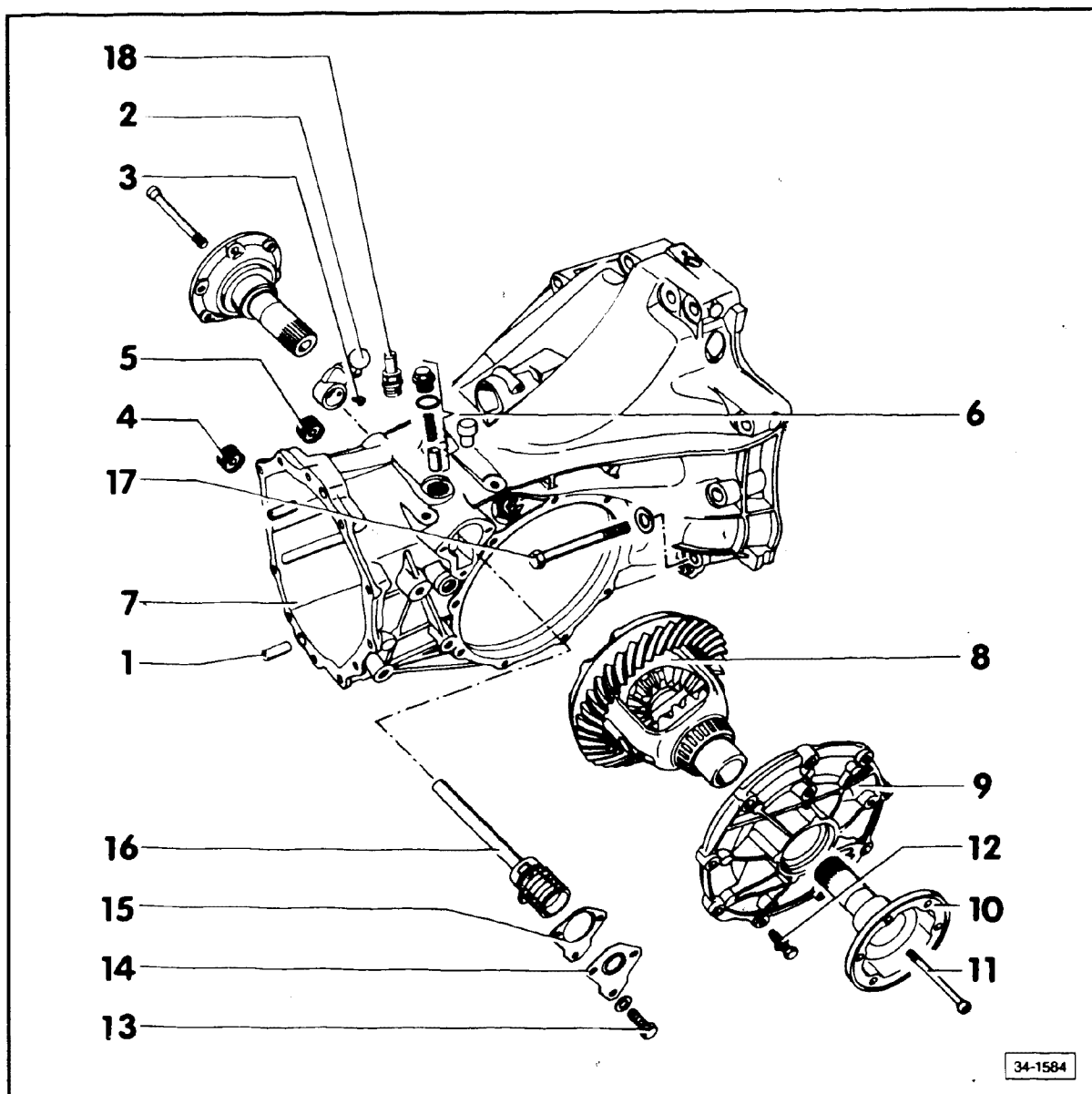
8 — Gasket

- 9 — 25 Nm (18 ft lb)**
with washer (7 pieces)

10 — Dowel pins

11 — Screw with push rod pivot pin

- after 12/87
- through 12/87: mounting push rod on transmission housing, section 34-50

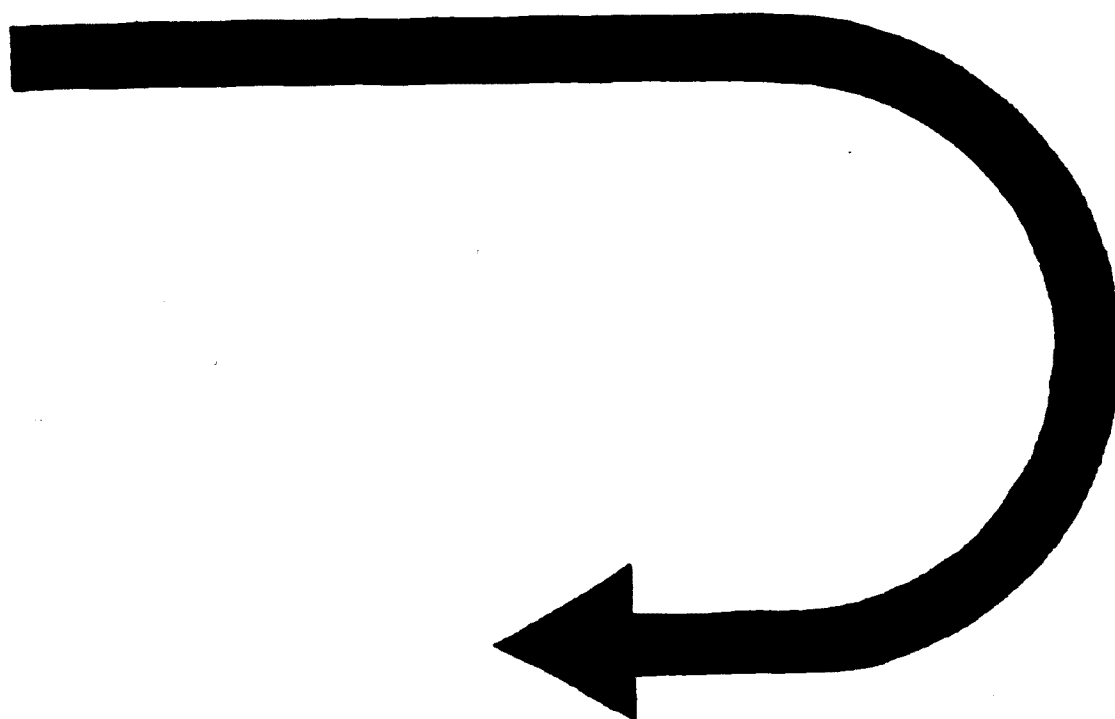


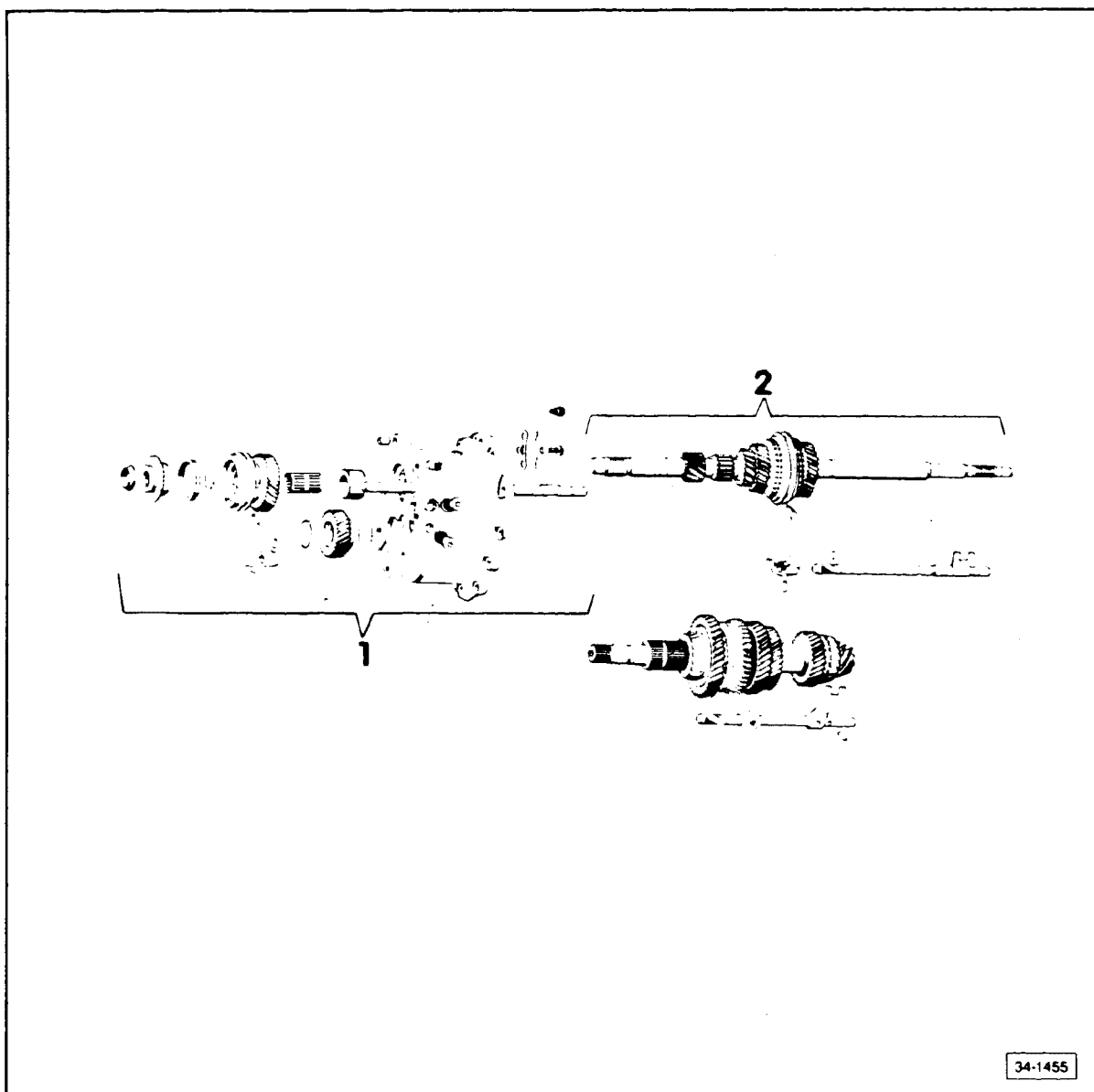
- 1 — Dowel pins
- 2 — Selector shaft lever
- 3 — Self-locking bolt
- 4 — Oil drain plug — 25 Nm (18 ft lb)
- 5 — Oil filler plug — 25 Nm (18 ft lb)
- 6 — 5th/reverse gears lock
 - prevents direct shifting from 5th into reverse gear
 - lever must always be moved into neutral of 3rd and 4th gear plane
- 7 — Transmission housing
 - repairing, section 34-320
 - oil filler hole locations, section 34-330

- 8 — Differential
 - remove reverse gear before removing differential
 - disassembling/assembling, Repair Group 39
- 9 — Final drive cover
 - repairing, section 34-320
 - install with magnet at bottom
- 10 — Axle flange
- 11 — 10 Nm (7 ft lb)
 - turn additional 90°
- 12 — 25 Nm (18 ft lb)
 - with washer (9 pieces)
- 13 — 10 Nm (7 ft lb)

- 14 — Cover
- 15 — Gasket
- 16 — Selector shaft assembly
- 17 — Engine/transmission mounting bolt
install before installing axle flange
- 18 — 5th/reverse lock with push rod pin
after 12/87, push rod mounted on gear carrier,
section 34-40

CONTINUED IN THE
BEGINNING OF NEXT ROW





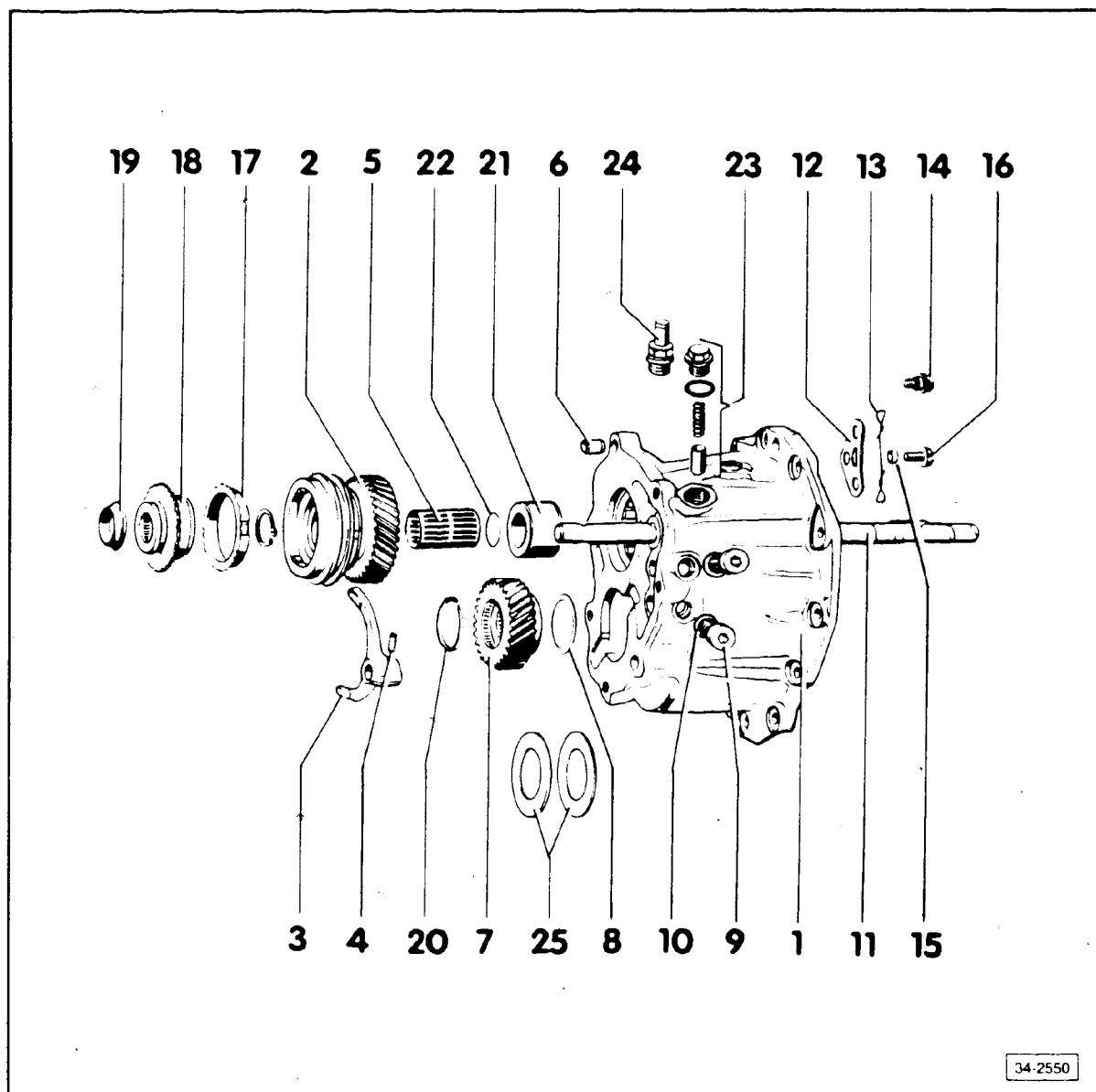
Note

A circlip (**arrow**) prevents pinion from falling out of hollow shaft.

- 1 — Gear carrier housing with 5th gear
disassembling assembling, section 34-280
- 2 — 1st — 4th gear internal shift controls
disassembling assembling, section 34-290

THIS FRAME INTENTIONALLY LEFT

BLANK

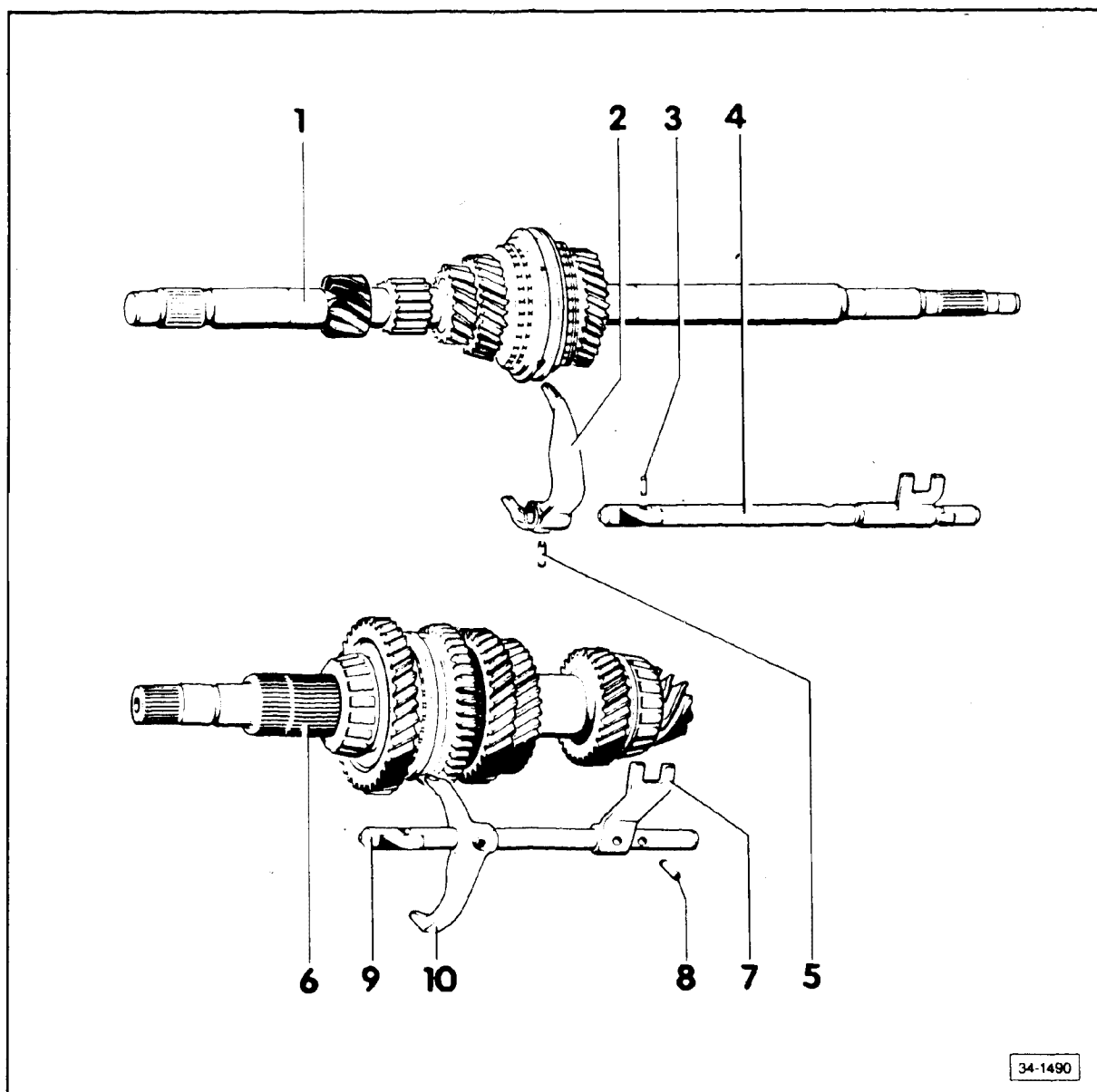

Note

In vehicles with 162 kW, two dished washers are located between 5th gear and the 5th gear shim. The thickness of the circlip (item 20) does not need to be adjusted. Installation position of dished washers: the outer diameters contact each other.

- 1 — Gear carrier housing
repairing, section 34-340
- 2 — 5th gear with synchronizer hub and sleeve
assembling, Repair Group 35
- 3 — 5th gear shift fork
supplied only with 5th gear shift rod
- 4 — Spring pin

- 5 — 5th gear needle bearing
- 6 — Dowel pin
- 7 — 5th gear
- 8 — 5th gear shim
determining thickness, section 34-310
- 9 — Stop screw
- 10 — Gasket
0.2 mm (0.008 in.) thick
- 11 — 5th/reverse gears selector rod

- 12 — **Mounting plate**
install with chamfers of locking pin hole toward gear carrier housing
- 13 — **Spring clip**
- 14 — **Shoulder bolt— 20 Nm (15 ft lb)**
used instead of bolt and sleeve
- 15 — **Sleeve**
- 16 — **20 Nm (15 ft lb)**
- 17 — **5th gear synchronizer ring**
- 18 — **5th Clutch hub**
- 19 — **Main shaft bearing 2nd inner race**
drive inner race onto main shaft before installing end cover, section 34-310
- 20 — **Circlip**
determining thickness, section 34-310
- 21 — **Inner race roller bearing**
- 22 — **Circlip**
- 23 — **5th/reverse gear stop**
- 24 — **Bolt with push rod pivot pin**
starting 1 88
- 25 — **Dished washers**
 - installing, outer diameter contact each other
 - in vehicles with 162 kW engine



1 — Main shaft
disassembling assembling, Repair Group 35

2 — 3rd and 4th gear shift fork

3 — Locking pin

- install with grease into 3rd 4th gear selector rod
- installation position, section 34-340

4 — 3rd/4th gear selector rod

5 — Spring pin

6 — Pinion and hollow shaft

7 — 1st/2nd gear selector rod fork

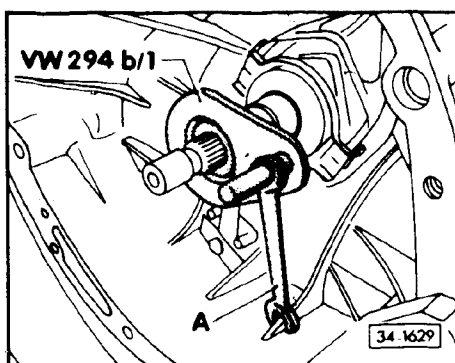
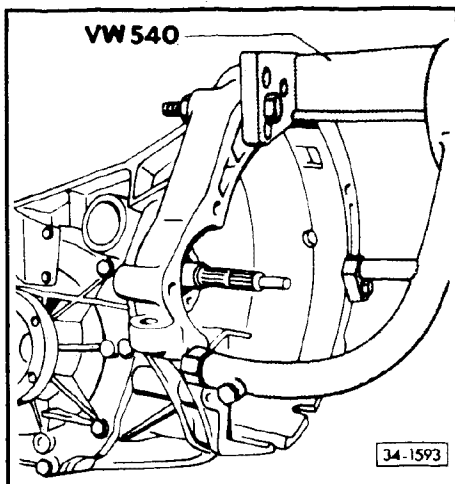
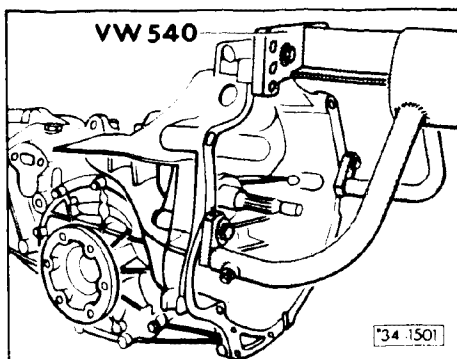
8 — Spring pin

9 — 1st/2nd gear selector rod

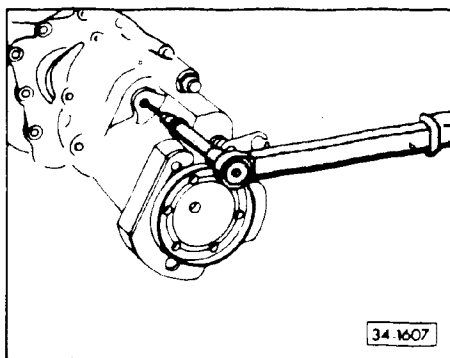
10 — 1st/2nd gear shift fork

Transmission, disassembling

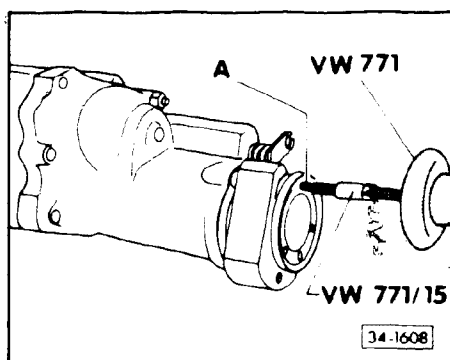
- secure transmission in repair stand
- transmission for vehicles with a 5-cylinder engine



- drain transmission oil
 - remove shift lever from transmission
 - remove complete vacuum system (transmission through 12/87)
 - remove 5th and reverse gear lock, section 34-260
 - remove complete selector shaft (do not disassemble), section 34-260
 - remove plug for end cover
-
- block main shaft with **VW 294b/1**
 - **A** – combination wrench 12 mm



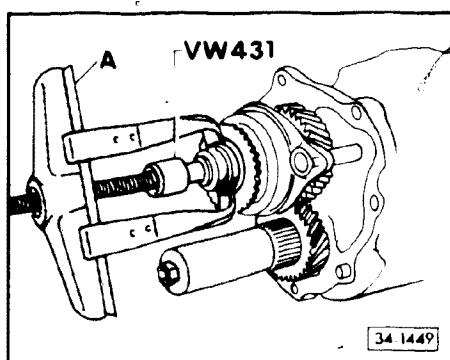
- remove main shaft bolt
- remove end cover bolts
 - bolts are self-locking, always replace



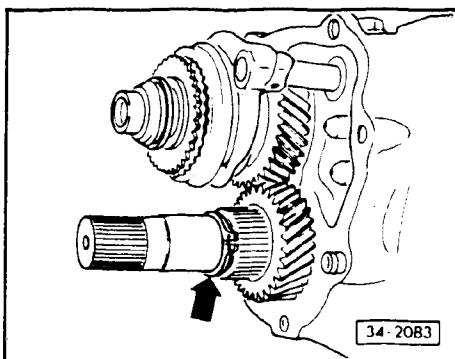
- pull off end cover
 - A – threaded pin M8/M10

Note

A circlip prevents the pinion from falling out the hollow shaft.

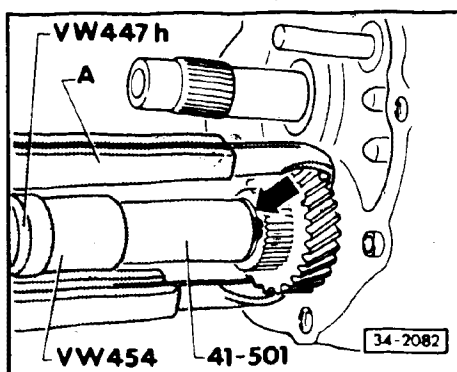


- pull off clutch hub and 2nd inner race/ball bearing
 - to build date 15 7 5, use **VW 431**
 - after build date 15 7 5, use **VW 295a**
 - A – two arm puller (commercial), i.e., **Kukko 20/10**
- remove 5th gear synchronizer ring
- drive out 5th gear shift fork spring pin
- remove synchronizer hub circlip
- remove 5th gear with sleeve hub, hub, needle bearing, and 5th gear shift fork
 - selector rod should stay in gear carrier housing
- remove 5th gear circlip
- pull off 5th gear



Note

The pinion is secured into the hollow shaft with a circlip (**arrow**). Do **not** remove the circlip, otherwise the pinion will fall out of the hollow shaft.



Note

During the pulling process, the pinion will move back into the hollow shaft to circlip stop (**arrow**). The sleeve 41-501 is supported by the circlip on the hollow shaft. The circlip will not be damaged.

A — two arm puller (commercial type), i.e.,
Kukko 20/10

Before installing the two-arm puller, the hooks should be ground down slightly, or the gear should be pushed free slightly with two tire irons. This will prevent damage to the sealing surface.

- remove 5th gear shim
- clamp gear carrier housing in vise with shafts to the front and shift forks to the top
 - use jaw covers
- drive out 1st and 2nd gear selector fork spring pins and support selector rod
- turn selector fork upwards
- remove selector rod stop screws, section 34-280
- drive out 3rd/4th gear shift fork spring pins, section 34-290
- pull out 3rd/4th gear selector rod
 - shift fork stays in operating sleeve
 - do not lose small locking pins
- remove circlip for ball bearing inner race
- remove inner race
- remove main shaft with 3rd/4th gear shift fork
- remove reverse gear shaft
- remove reverse gear, synchronizer ring and spring
- remove pinion with selector rod and 1st/2nd gear shift fork

Differential, removing

Note

If only the differential is to be removed, the end cover must first be removed, then the complete gear carrier housing must be removed.

- remove mounting bolts for the axle flange, holding steady with a drift
- remove bolts from final drive cover
- remove cover
- remove differential, see Repair Group 39

cardiagn.com

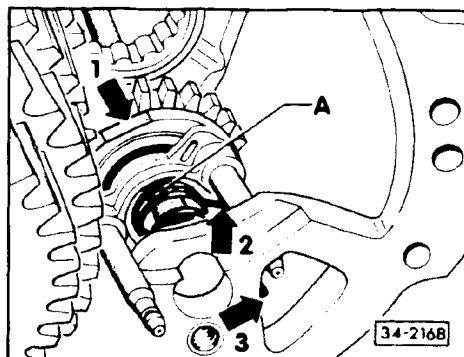
Transmission, assembling

- install differential, see Repair Group 39

Note

If necessary, the hex bolt for mounting the engine/transmission must be fitted before installing the drive flange.

- install pinion with shift fork and selector rod into gear carrier housing, section 34-290

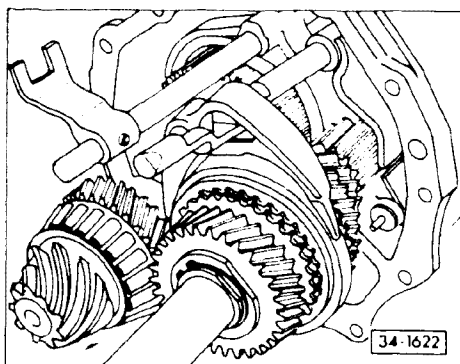


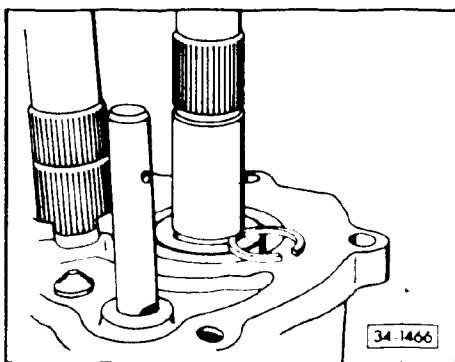
- insert screwdriver **A** from 5th gear side through hole for reverse gear shaft
- install reverse gear and synchronizer ring
 - synchronizer ring installation position: flattened surfaces on ring point towards pinion and input shaft
- install compression spring
 - installation position: attach single angled end in recess on synchronizer ring, turn double angled end to left and hook in opening in gear carrier housing

Note

When installing the compression spring on the synchronizer ring, lift gear and synchronizer ring slightly with a screwdriver. Push the screwdriver through the spring slowly and hook the spring end on the gear carrier housing opening.

- push in gear shaft by pulling screwdriver out slowly
 - note position of compression spring
- engage reverse gear and attach spring clip, section 34-340
- disengage reverse gear
- install main shaft with 3rd/4th gear shift fork, section 34-290
- install inner race roller bearing





Inner race roller bearing circlip, determining thickness

- select the thickest circlip which will fit the gap and install it
 - end play maximum = 0.005 mm (0.002 in.)

The following circlips are available:

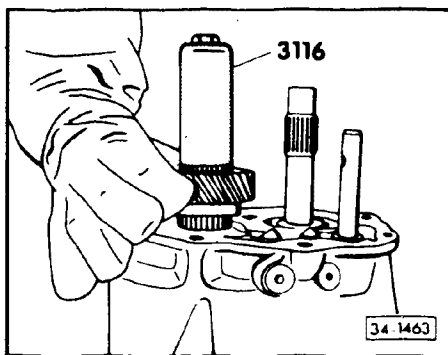
Thickness (mm)	Part number
1.35	N 900 606.01
1.40	N 900 606.02
1.45	N 900 606.03

- place selector rods in neutral position and check that locking pins are in the correct position. section 34-340
- install 3rd/4th gear selector rod with small locking pins
 - install with grease
- pin 3rd/4th gear shift fork to selector rod
- pin 1st/2nd gear shift fork to selector rod
- install stop screw with new paper gaskets and tighten

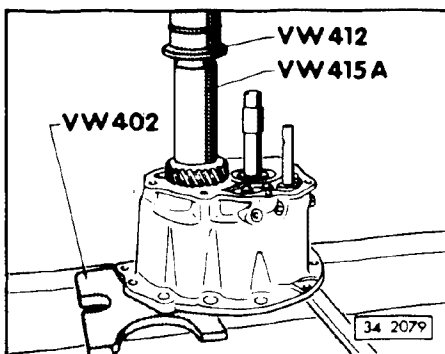
5th gear shim, determining thickness

- determine measurement between inner race of taper roller bearing and circlip mounted on it (push upward) with a depth gauge and determine shim thickness from the following table

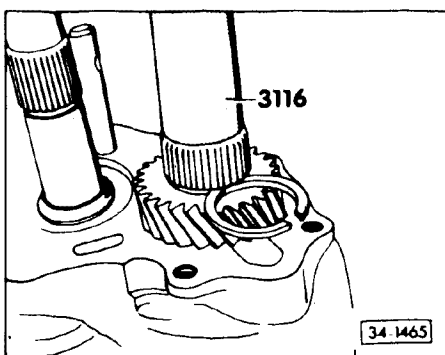
Measuring range (mm)	Shim thickness (mm)	Part number
34.75-34.82	0.95	016 311 391 N
34.83-34.92	1.05	016 311 391 P
34.93-35.02	1.15	016 311 391 Q
35.03-35.12	1.25	016 311 391 R
35.13-35.22	1.35	016 311 391 S



- heat 5th gear to approximately 120°C (250°F) and slide on
 - installation position: collar faces gear carrier housing



- press 5th gear on until seated
- support 3rd gear of hollow shaft on VW 402

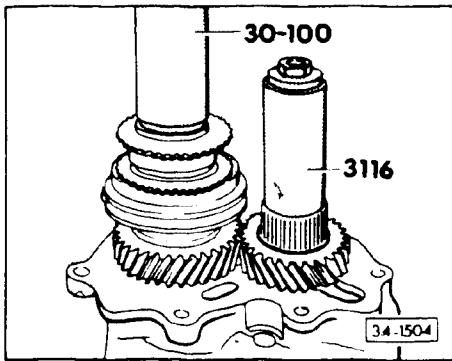


- select the thickest circlip which will fit the 5th gear gap and install it

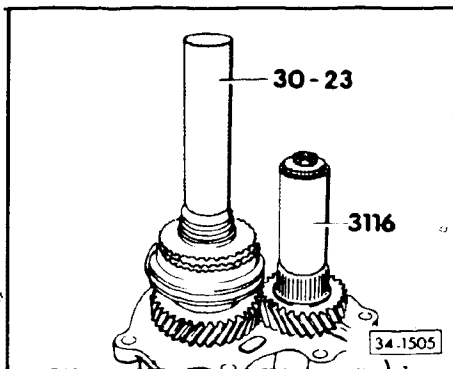
The following circlips are available:

Thickness.(mm)	Part number
2.34	N 901 080.01
2.36	N 901 081.01
2.38	N 901 082.01
2.40	N 901 083.01
2.42	N 901 084.01
2.44	N 901 085.01
2.46	N 901 086.01
2.48	N 901 087.01
2.50	N 901 088.01

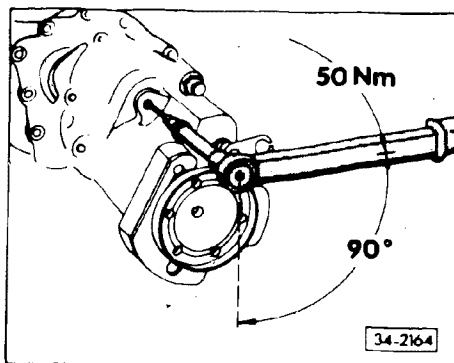
- install 5th gear with synchronizer hub and sleeve, needle bearing and shift fork
- pin shift fork to selector rod, section 34-280
- install synchronizer hub circlip
- install 5th gear synchronizer ring



- heat clutch hub to approximately 120 °C (250 °F) and install
- if necessary, drive on until seated with driving sleeve 30-100



- drive in 2nd inner race ball bearing
- lightly coat gear carrier housing/transmission housing mating surfaces with sealer Part No. D 000 300 and install gear carrier (housing, main shaft, pinion) in the transmission housing
- drive in dowel pins and tighten bolts to 25 Nm (18 ft lb)
- install complete selector shaft
- install 5th/reverse gear lock
- install shift lever
- remove clamping sleeve 3116 if mounted
- mount end cover gasket and install dowel pin
- mount end cover and install mounting bolts and self-locking socket head bolts for main shaft
- tighten end cover using main shaft socket head bolts
 - block main shaft with VW 294/1 and wrench
- after installing end cover, loosen socket head bolt 1/2 turn
- tighten end cover mounting bolts to 25 Nm (18 ft lb)



- on transmissions up to build date 15 7 5 and starting 12 1 9: tighten main shaft hex bolt to 50 Nm (37 ft lb) and then turn an additional 90°
- on transmissions from build date 16 7 5 to build date 11 1 9: tighten main shaft banjo bolt to 150 Nm (110 ft lb)
- tighten plug to 30 Nm (22 ft lb)

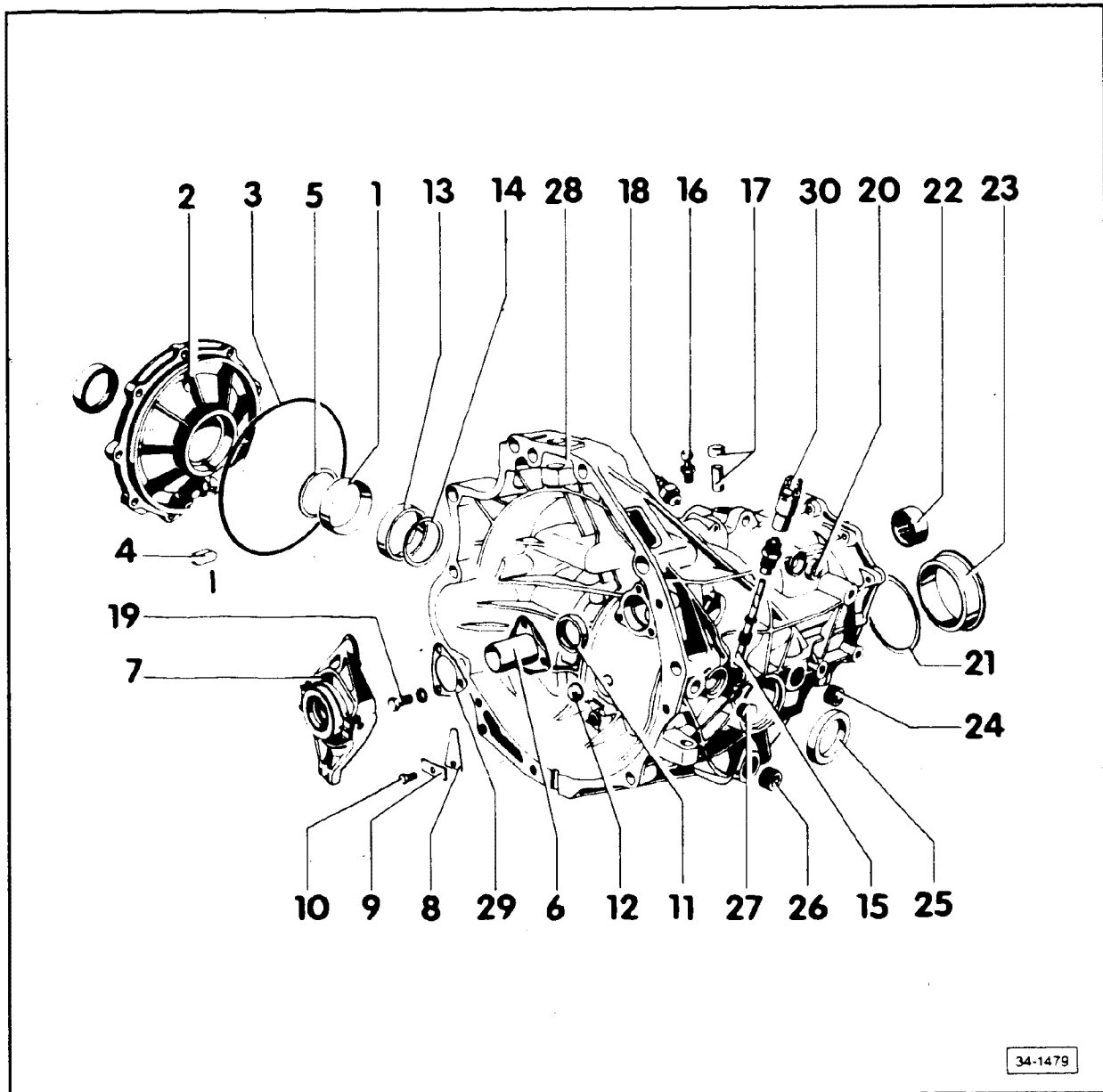
CAUTION

Always replace plug and/or socket head bolt.

- on transmissions up to 12 8 7: install vacuum system

THIS FRAME INTENTIONALLY LEFT

BLANK



Note

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

1 — **Differential small bearing outer race***
removing/installing. Repair Group 39

2 — **Final drive cover***
starting build date 16 07 5, coat sealing surface with a sealing compound

3 — **Sealing ring**
omitted starting build date 16 07 5

4 — **Magnet**

5 — **Shim S2**

- note thickness
- see Adjustment Overview, Repair Group 39

6 — **Plastic guide sleeve**

- do not grease
- starting 3/86, guide sleeve is steel
- always replace release bearing if replacing plastic guide sleeve

7 — **Clutch release lever**

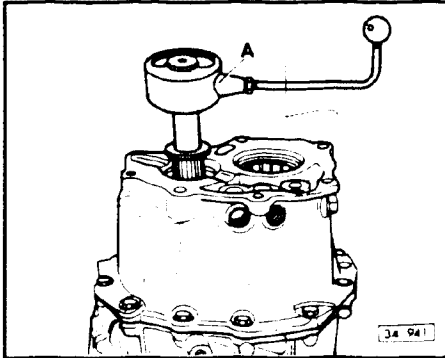
- grease all contact surfaces with MoS₂ grease

8 — **Spring**

9 — **Holding plate**

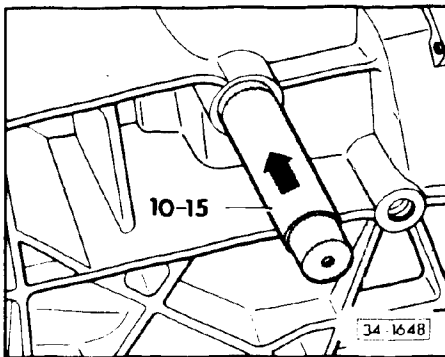
- 10 — 15 Nm (11 ft lb)
in some transmissions, release lever is secured by a holding spring, see Repair Group 30
- 11 — Main shaft seal
 - pull out with VW 681
 - installing, section 34-330
 - can be replaced with transmission removed (not disassembled)
- 12 — Ball stud
 - lightly grease steel stud with MoS₂
 - do not grease plastic cap
- 13 — Differential large bearing outer race*
removing/installing, Repair Group 39
- 14 — Shim S1
 - note thickness
 - see Adjustment Overview, Repair Group 39
- 15 — Speedometer drive pinion
 - electronic speedometer starting 1/88
 - assembling, section 34-330
- 16 — Adjusting rod ball stud
installing, section 34-330
- 17 — Vent
note insertion depth, section 34-330
- 18 — Back-up light switch — 45 Nm (33 ft lb)
- 19 — 15 Nm (11 ft lb)
- 20 — Selector shaft sealing ring
 - pull out with VW 681
 - installing, section 34-330
- 21 — Shim S3
 - note thickness
 - see Adjustment Overview, Repair Group 39
- 22 — Main shaft needle bearing
removing/installing, Repair Group 35
- 23 — Outer race bearing
 - removing/installing, Repair Group 35
 - before removing, determine installation position of pinion (actual measurement), Repair Group 39
- 24 — Oil filler plug — 25 Nm (18 ft lb)
- 25 — Axle flange sealing ring
 - pull out with VW 681
 - installing, section 34-330
 - replace with transmission installed, Repair Group 39
- 26 — Oil drain plug — 25 Nm (18 ft lb)
- 27 — Plug
- 28 — Transmission housing
 - before removing, determine installation position of pinion (actual measurement), Repair Group 39
 - starting build date 13 09 8, oil filler hole is placed higher, section 34-330
 - oil fill quantity, see Technical Data
- 29 — Spacer
only with plastic guide sleeve
- 30 — Speedometer sender
 - starting 1 88, electronic speedometer sender can be removed with transmission installed
 - removing: push down holding clip and swing sender out carefully — do not damage

Transmission housing components, installing



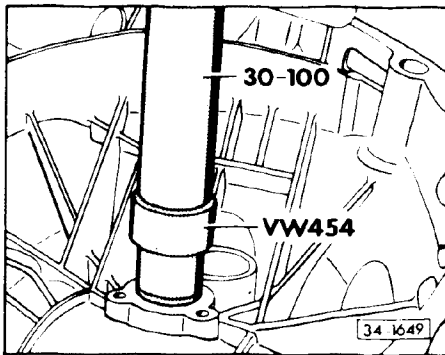
Axle flange seal, installing

- drive in until seated



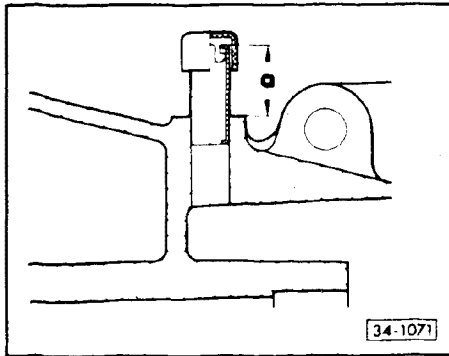
Selector shaft seal, installing

- drive in until seated



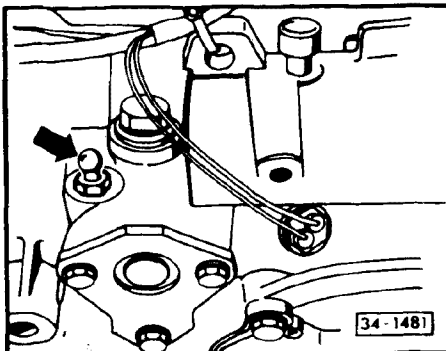
Main shaft seal, installing

- drive in until seated

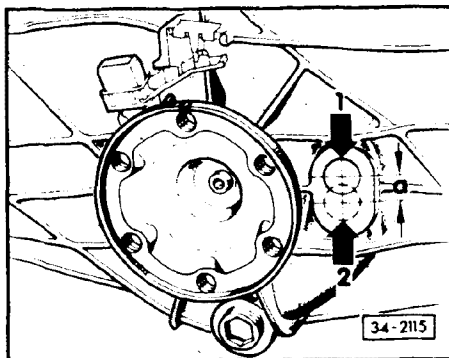


Vent sleeve, insertion depth

a = 21 mm (0.827 in.)



Adjusting rod ball stud, installing



Oil filler hole position

Note

Starting build date 13 09 8, in the **016** all wheel drive manual transmission, the transmission housing of the **016** manual transmission will be installed. However, the oil filler hole on transmission housing **016** lies 15 mm (0.59 in.) higher than on the housing of the all wheel transmission **016** (dimension **a**).

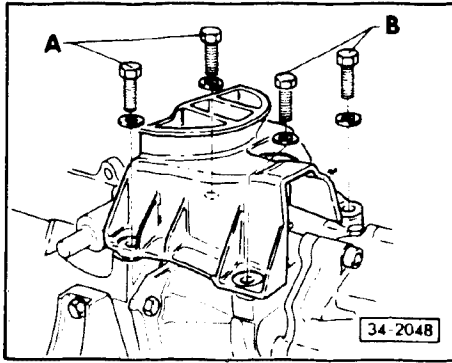
Arrow 1 – Oil filler hole, transmission housing **016**

Arrow 2 – Oil filler hole, all wheel drive transmission housing **016**

During repairs, the **016** manual transmission housing can also be installed with previous transmissions.

Note

The oil fill level for either housing remains the same: bottom edge of filler hole.

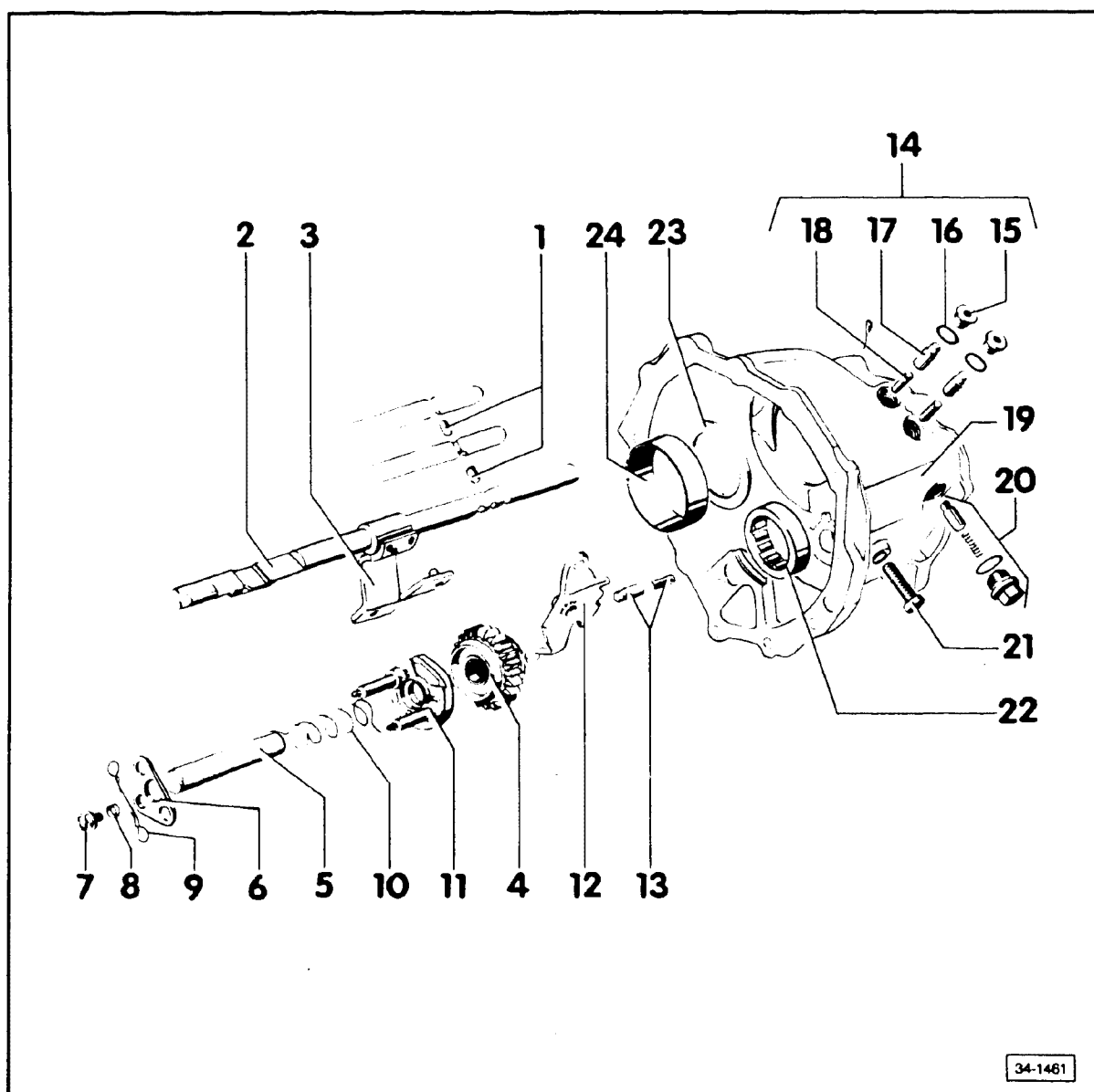


Cable interceptor, installing

- install while transmission is removed
 - **A** = 40 Nm (30 ft lb)
 - **B** = 65 Nm (48 ft lb)

THIS FRAME INTENTIONALLY LEFT

BLANK



1 — **Locking pieces**
installation position, section 34-350

2 — **5th/reverse gear shift rod**
supplied only with reverse gear and 5th gear shift forks

3 — **Reverse gear shift fork**

4 — **Reverse gear**
removing/installing, section 34-350

5 — **Reverse gear shaft**

6 — **Mounting plate**
installation position: locking pin hole chamfers face toward gear carrier housing

7 — **20 Nm (15 ft lb)**

8 — **Sleeve**
bolt and sleeve can be one part or two parts

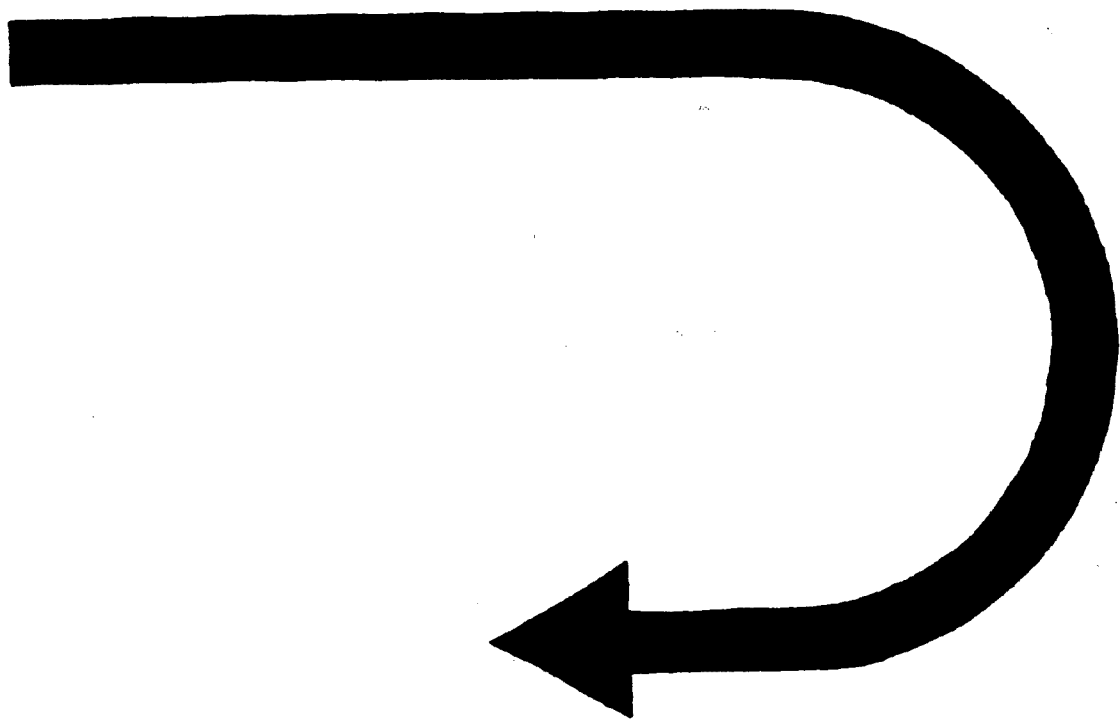
9 — **Spring clip**

10 — **Pressure spring**
Installation position: hook single angled end in recess in synchronizer ring, turn double angled end to left and hook in opening on gear carrier housing

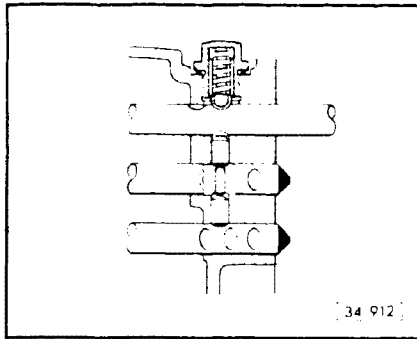
11 — **Reverse gear synchronizer**
• with locking pins
• checking for wear, section 34-350
• Installation position: flat surfaces on circumference point toward pinion and main shaft

- 12 — Reverse gear relay lever**
adjusting, section 34-350
- 13 — Reverse gear lock**
installing, section 34-350
- 14 — Gear lock mechanism**
installing, section 34-350
- 15 — Stop bolt — 30 Nm (22 ft lb)**
- 16 — Gasket**
0.2 mm thick
- 17 — Bushing**
- 18 — Spring**
- 19 — Gear carrier housing**
when replacing, determine shim **S4**, section 34-370
- 20 — 5th gear lock mechanism**
installing, section 34-350
- 21 — 35 Nm (26 ft lb)**
- 22 — Cylinder roller bearing**
removing/installing main shaft, Repair Group 35
- 23 — Shim S4**
Adjustment Overview, Repair Group 39
- 24 — Outer race bearing**
removing/installing pinion, Repair Group 35

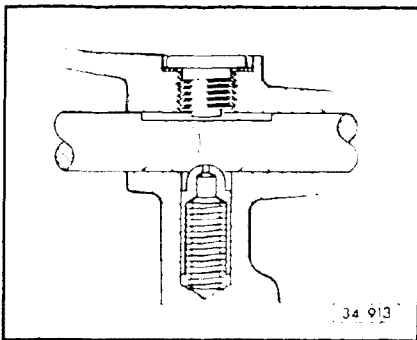
CONTINUED IN THE
BEGINNING OF NEXT ROW



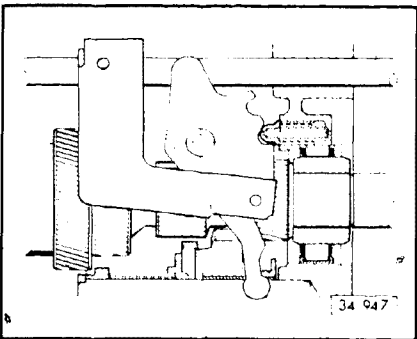
Gear carrier housing components, removing/installing



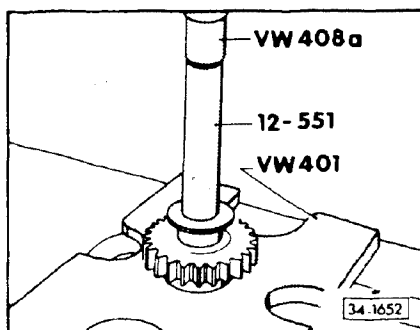
5th gear lock mechanism, installing



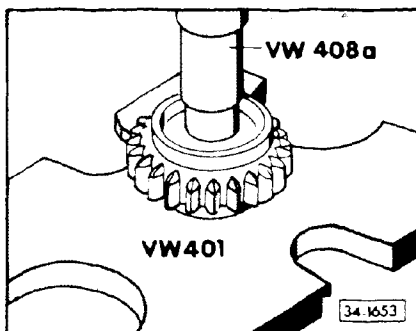
1st-4th gear lock mechanism, installation position



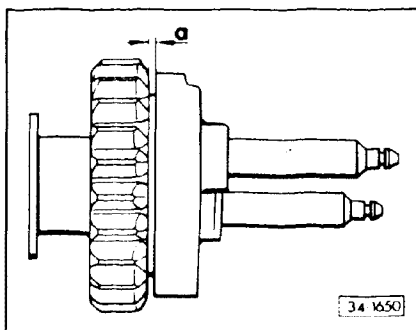
Reverse gear lock, installation position



Reverse gear bushing, removing

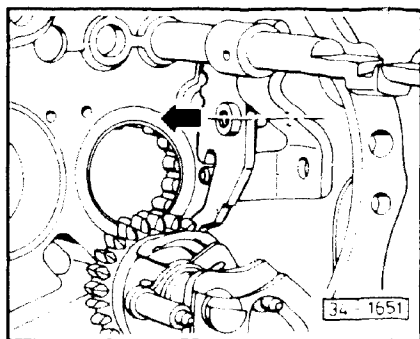


Reverse gear bushing, installing



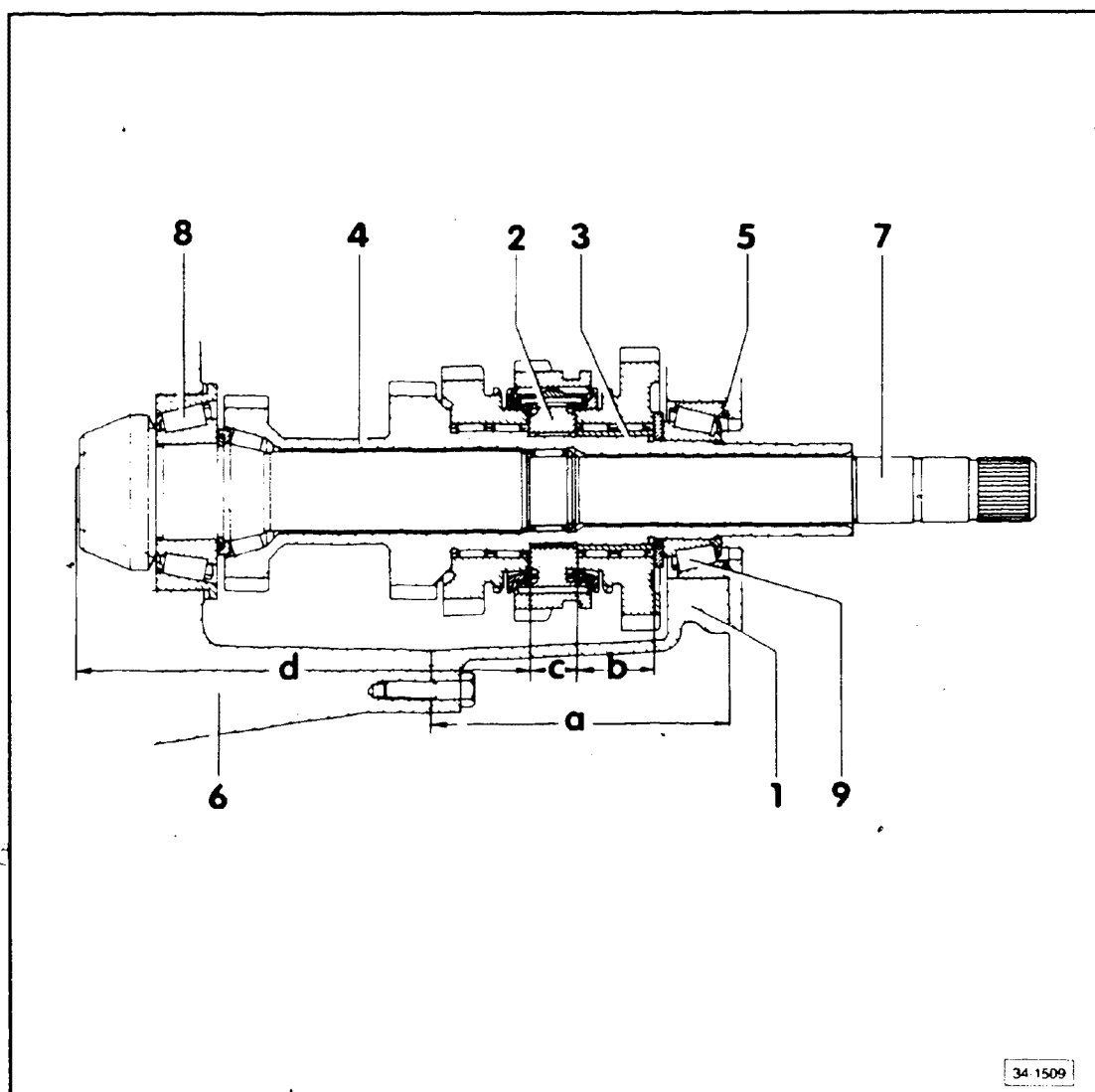
Synchronizer ring, checking

- press ring onto gear and measure gap **a** with a feeler gauge
 - **a** = new part 0.75-3.3 mm (0.029-0.090 in.)
 - wear limit = 0.2 mm (0.008 in.)



Relay lever, adjusting

- install reverse gear and relay lever
- install bolt in gear carrier housing
- push relay lever in direction of **arrow** and screw bolt into relay lever until seated
 - bolt and threaded lever bushing must be in line
- press lever against bolt and loosen bolt until bolt threads just touch bushing threads
 - bolt must have been turned at least 1/4 turn
- tighten bolt to 35 Nm (26 ft lb)
- engage reverse gear several times and check that relay lever moves easily in all positions



Note

The size of shim **S4** must be determined if the gear carrier housing, 1st/2nd gear synchronizer hub, or the hollow shaft are replaced. The adjustment recreates the preload on the pinion bearing.

- 1 — Gear carrier housing
- 2 — 1st/2nd gear synchronizer hub
- 3 — 1st gear needle bearing
- 4 — Hollow shaft
- 5 — Shim S4
- 6 — Transmission housing

7 — Pinion

8 — Large bearing

9 — Small bearing

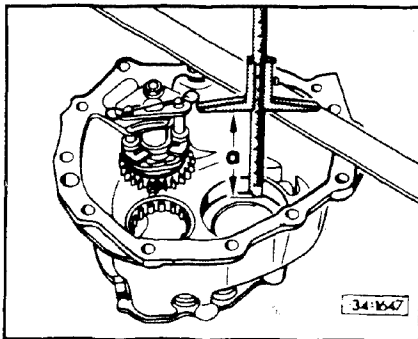
a — transmission depth of gear carrier

b — length of inner race/needle bearing

c — length of 1st/2nd gear synchronizer hub

d — from pinion head to synchronizer hub shoulder on hollow shaft

Shim S4, determining thickness



Gear carrier housing, replacing

- measure depth of old and new gear carrier housing and determine the difference

Example

Old gear carrier housing depth:

a = 121.60 mm (4.787 in.)

New gear carrier housing depth:

a = 121.85 mm (4.797 in.)

0.25 mm (0.10 in.)

- if the **new** gear carrier housing is deeper, install **thicker S4**
- if the **old** gear carrier housing is deeper, install **thinner S4**

Example

Previous shim 0.95 mm (0.37 in.)

— difference 0.25 mm (0.10 in.)

New S4 shim 1.20 mm (0.47 in.)

Shims available as replacement parts.

Thickness (mm)	Part number
0.24	016 311 393
0.27	016 311 393 A
0.30	016 311 393 B
0.33	016 311 393 C
0.36	016 311 393 D
0.39	016 311 393 E
0.42	016 311 393 F
0.45	016 311 393 G
0.69	016 311 393 H
0.93	016 311 393 J
1.17	016 311 393 K
1.41	016 311 393 L

1st gear needle bearing, replacing

- measure length **b** on the inner race of the old and new needle bearing and determine the difference

Example

Old inner race:

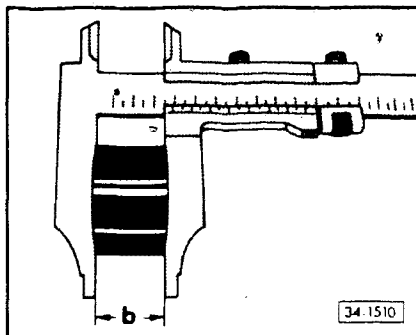
$$b = 31.95 \text{ mm (1.258 in.)}$$

New inner race:

$$b = \frac{32.00 \text{ mm (1.260 in.)}}{0.05 \text{ mm (0.002 in.)}}$$

- if the **new** inner race is longer, install a correspondingly **thinner S4**
- if the **old** inner race is longer, install a correspondingly **thicker S4**

For shims available as replacement parts, see page 34-370-1.



1st/2nd gear synchronizer hub, replacing

- measure length **c** on the old and new synchronizer hub and determine the difference
- measure the slots for the hollow keys

Example

Old synchronizer hub:

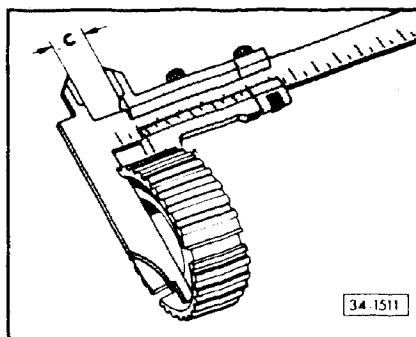
$$c = 19.65 \text{ mm (0.774 in.)}$$

New synchronizer hub:

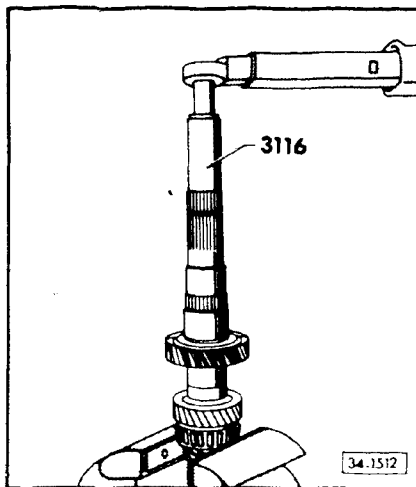
$$a = \frac{19.60 \text{ mm (0.772 in.)}}{0.05 \text{ mm (0.002 in.)}}$$

- if the **new** synchronizer hub is longer, install a correspondingly **thinner S4**
- if the **old** synchronizer hub is longer, install a correspondingly **thicker S4**

For shims available as replacement parts, see page 34-370-1.



Manual Transmission — Controls, Assembly **34**

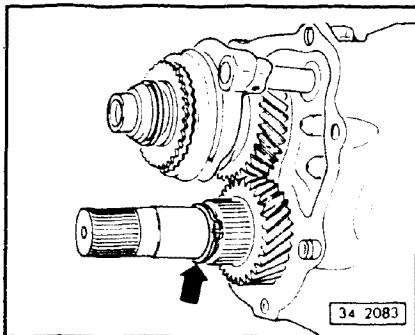


Hollow shaft, replacing

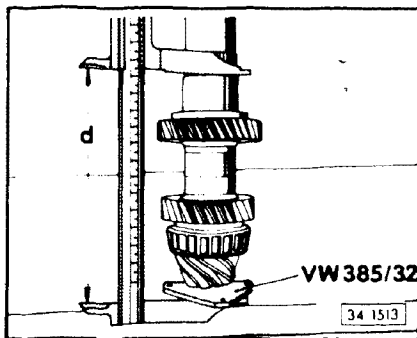
- disassemble pinion up to hollow shaft
- tighten spring pin to exactly 10 Nm (7 ft lb)

Note

For vehicles after 12/87 (with Torsen differential), pipe sleeve **VW 516** is used in addition to wrench **3116**.



- before tightening, remove pinion circlip (arrow)



- set end measuring plate of **VW 385/32** on pinion head and measure dimension **d**
 - upper measuring point is the mating collar for the synchronizer hub

Example

d = 198.40 mm (7.811 in.)

- install new hollow shaft and measure dimension **d** again

Example

d = 198.55 mm (7.817 in.)

- determine the difference

Manual Transmission – Controls, Assembly **34**

Example

Old hollow shaft:

$$d = 198.40 \text{ mm (7.811 in.)}$$

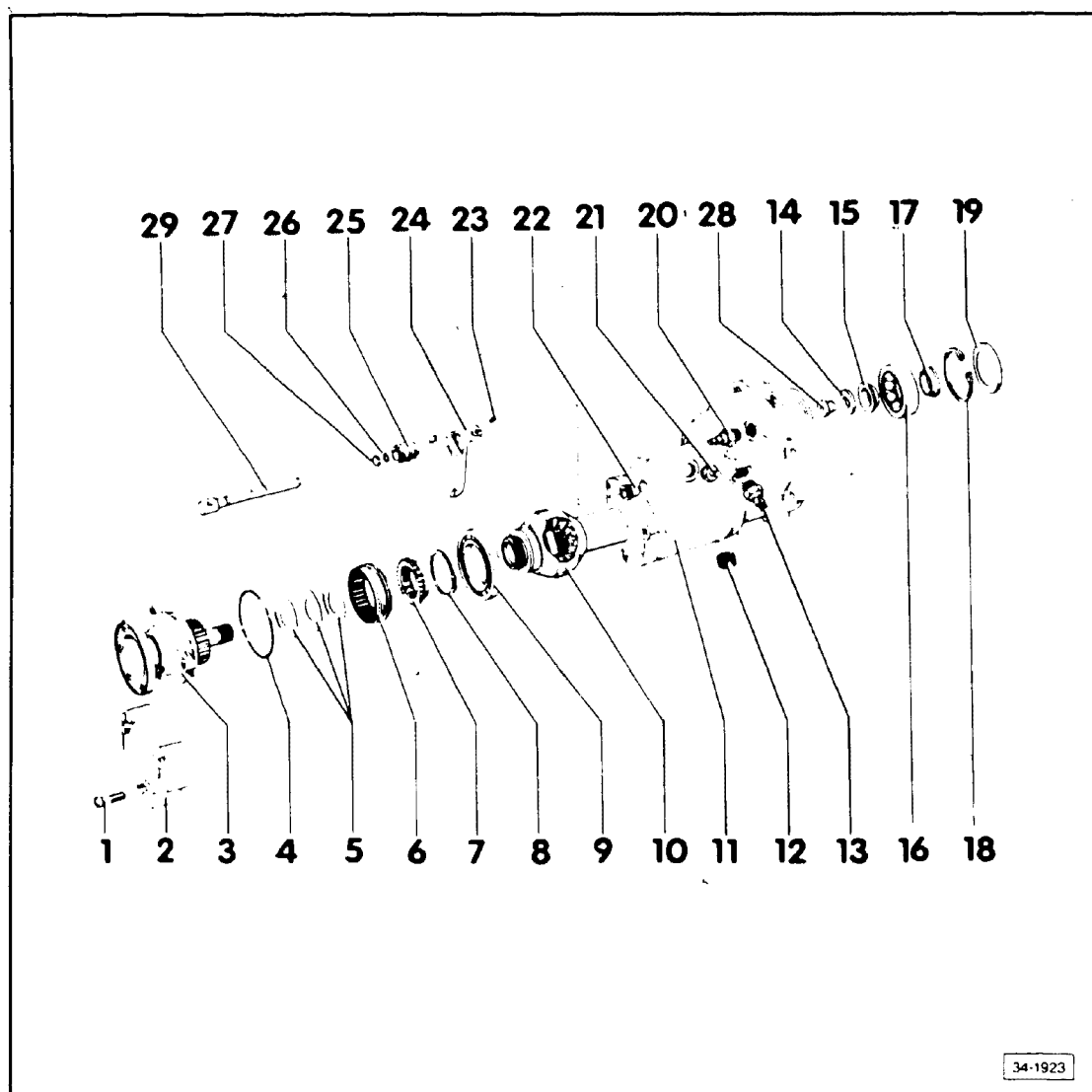
New hollow shaft:

$$d = 198.55 \text{ mm (7.817 in.)}$$

$$0.15 \text{ mm (0.006 in.)}$$

- if the dimension **d** of the **new** hollow shaft is larger, install a correspondingly **thinner S4**
- if the dimension **d** of the **old** hollow shaft is larger, install a correspondingly **thicker S4**

For shims available as replacement parts, see page 34-370-1.



Note

The following information covers transmissions, in vehicles through 12 87, with manually locking differentials. Vehicles after 12 87 are covered in section 34-400.

1 — 15 Nm (11 ft lb)

- then turn additional 90
- clean thread
- coat with D 000 600 and tighten in diagonal sequence
- self-locking screws starting 16 12 3

2 — Damper

3 — Flange shaft

- disassembling assembling, Repair Group 39
- replace sealing ring (item 4)

4 — Sealing ring

5 — Plate springs

- installing, section 34-390

6 — Sliding sleeve

7 — Hub

8 — Circlip

9 — Differential ball bearing

- remove complete with differential, section 34-380
- removing installing, Repair Group 35

10 — Differential

- disassembling assembling, Repair Group 35
- removing installing, section 34-390

Through 1987

End cover, disassembling/assembling

34-380-1

Manual Transmission — Controls, Assembly **34**

- 11 — End cover
- 12 — Oil drain plug
with magnet
- 13 — Switch — 45 Nm (33 ft lb)
- 14 — Washer
installing, section 34-390
- 15 — Main shaft 1st inner race
installing, section 34-390
- 16 — Main shaft bearing
removing installing, section 34-390
- 17 — Main shaft 2nd inner race
drive inner race onto main shaft before installing end
cover, section 34-320
- 18 — Circlip
- 19 — Baffle plate
- 20 — Switch
for shift and consumption display
- 21 — Plug — 30 Nm (22 ft lb)
- 22 — Bushing
 - remove, section 34-390
 - drive in with 12-551
- 23 — Spring pin
removing, section 34-390
- 24 — Shift fork
for differential lock
- 25 — Boot
- 26 — O-ring
- 27 — Circlip
secures protective sleeve
- 28 — Hollow boot — 150 Nm (111 ft lb)
- 29 — Shift shaft
for differential lock

cardiagn.com

Through 1987

End cover, disassembling/assembling

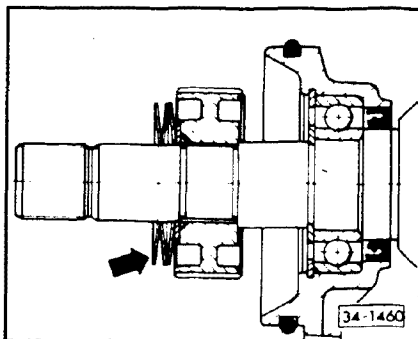
34-380-2

End cover components, removing/installing

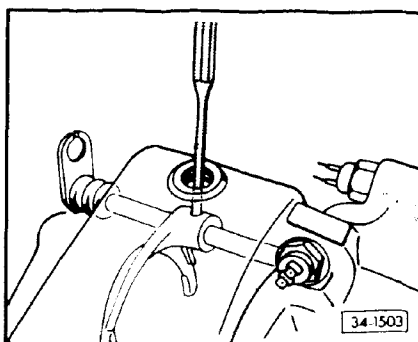
Note

The following information covers transmissions, in vehicles through 12/87, with manually locking differentials. Vehicles after 12/87 are covered in section 34-400.

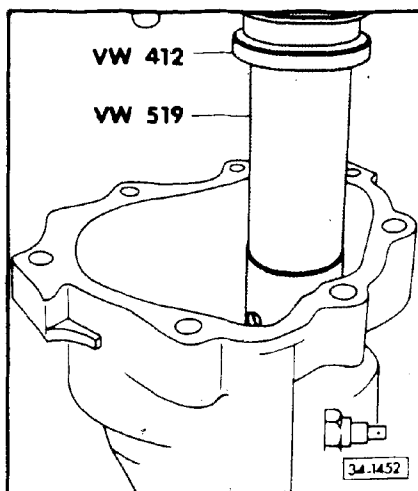
Plate springs, installation position



Shift fork spring pin, removing/installing

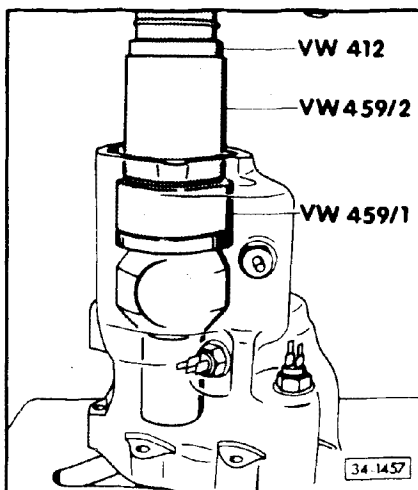


Manual Transmission – Controls, Assembly **34**



Differential with bearing, removing from end cover

- align shaft for differential gears with recesses in end cover
- press differential and bearing out of end cover



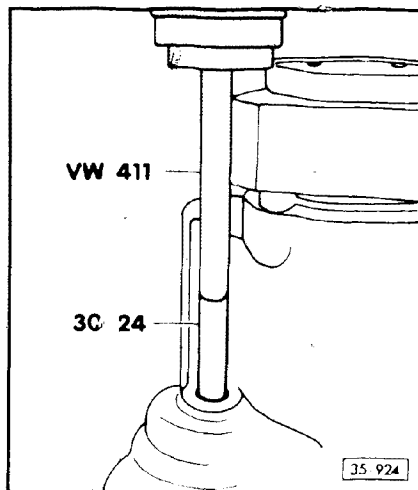
Differential with bearing, installing in end cover

cardiagn.com

Through 1987

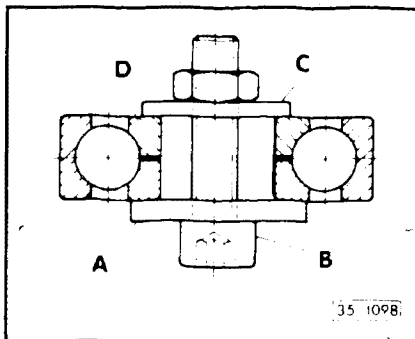
End cover components, removing/installing

34-390-2



Main shaft bearing, removing from end cover

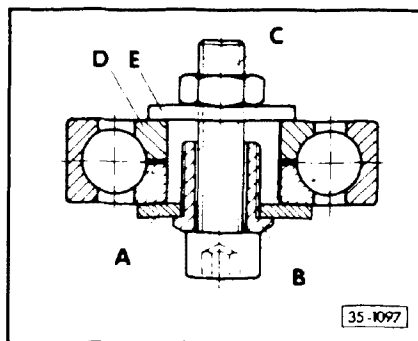
- remove deflector plate
- remove circlip
- remove peening marks
- press bearing out of end cover



Main shaft and bearing assembly

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



Main shaft and bearing assembly

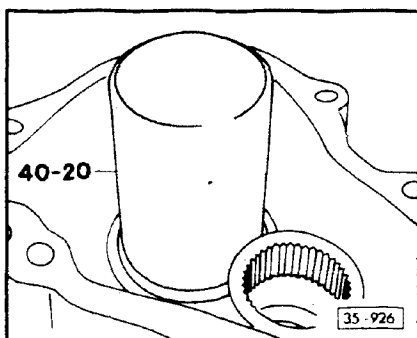
From build date 16 07 5 up to build date 11 01 9

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

Through 1987

End cover components, removing/installing

34-390-3



Main shaft bearing, installing into end cover

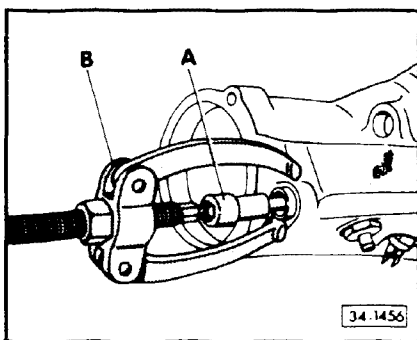
CAUTION

Support sides of end cover. Do not support laterally.

Do not tilt bearing otherwise it will catch in the circlip groove.

Note

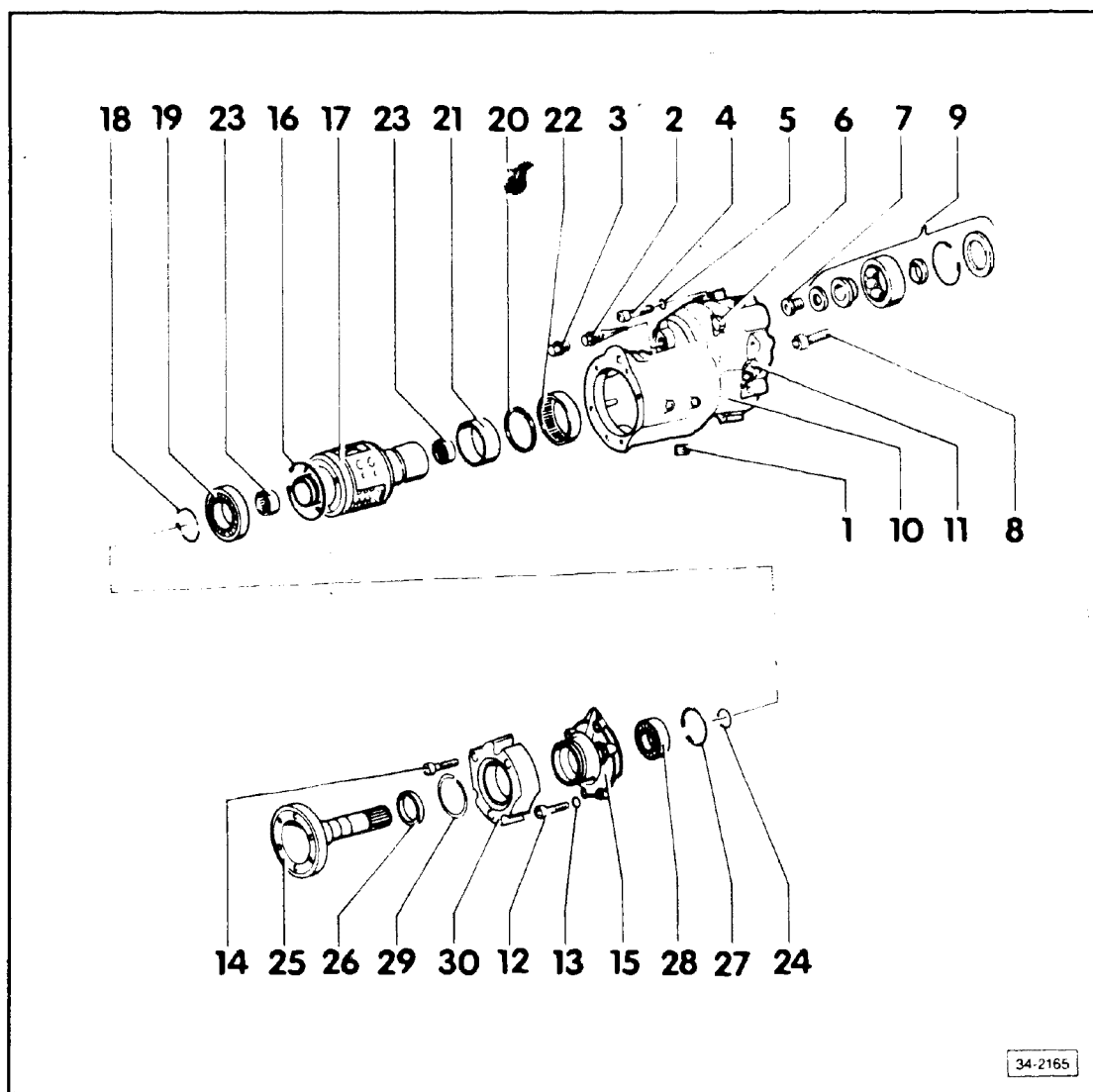
After pressing in the bearing, remove 2nd inner race **D** (see previous two figures) and drive onto main shaft, section 34-310.



Bushing, removing

A – puller 12-14.5 mm, i.e., **Kukko 21/1**

B – support, i.e., **Kukko 22/1**



Note

The following information covers transmissions, in vehicles after 12/87, with Torsen differentials. Vehicles through 12/87 are covered in section 34-370.

- 1 — Oil drain plug — 25 Nm (18 ft lb)
with magnet
- 2 — Oil filter plug — 30 Nm (22 ft lb)
 - for transmissions up to build date 11 01 9
 - self-locking, always replace
- 3 — Plug — 30 Nm (22 ft lb)
 - for transmissions from build date 12 01 9
 - self-locking, always replace
- 4 — 25 Nm (18 ft lb)

5 — Washer

- 6 — Plug 30 Nm (22 ft lb)
 - not on all transmissions
 - does not have to be removed
 - install with D6
- 7 — Hollow bolt — 150 Nm (111 ft lb)
 - for transmissions up to build date 11 01 9
 - installing, section 34-380
- 8 — 50 Nm (37 ft lb)
 - then turn additional 90°
 - for transmissions from build date 12 01 9
 - installing, section 34-380
- 9 — Main shaft support
removing/installing, section 34-380

- 10 — **End cover**
from 22 08 9, seal to gear carrier housing with O-ring
- 11 — **Switch — 45 Nm (33 ft lb)**
to switch off air conditioning system when engaging 1st gear
- 13 — **25 Nm (18 ft lb)**
• self-locking, always replace
• clean thread in end cover
- 13 — **Washer**
- 14 — **25 Nm (18 ft lb)**
• self-locking, always replace
• clean thread in end cover
- 15 — **Gear carrier housing**
• can be removed with transmission installed
• removing, section 34-410
• remove from end cover together with drive flange and Torsen differential
• install with sealant D2/D3
• from 22 08 9, sealed with O-ring
- 16 — **Circlip**
• installing, section 34-410
• install on Torsen differential before install bearing (item 19)
- 17 — **Torsen differential**
• DO NOT disassemble
• always replace if damaged
• To separate from gear carrier housing, remove circlip (item 16)
• installing, section 34-410
- 18 — **Circlip**
- 19 — **Ball bearing**
removing installing, section 34-410
- 20 — **Circlip**
- 21 — **Bushing**
removing installing, section 34-410
- 22 — **Bushing**
removing installing, section 34-410
- 26 — **Sealing ring**
• before removing ONLY separate gear carrier housing from Torsen differential, then press out drive flange
• removing installing, section 34-410
- 27 — **Circlip**
- 28 — **Ball bearing**
• before removing ONLY separate gear carrier housing from Torsen differential, then press out drive flange
• removing installing, section 34-410
- 29 — **Circlip**
- 30 — **Balance weight**
• before removing ONLY separate gear carrier housing from Torsen differential, then press out drive flange
• removing installing, section 34-410
- 23 — **Needle bearing**
removing installing, section 34-410
- 24 — **Circlip**
- 25 — **Flange shaft**
• press off Torsen differential together with gear carrier housing
• removing installing, section 34-410

Note

Replace bearings 21 and 22 together.

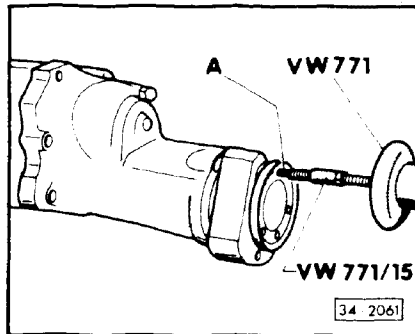
Note

Clean the threads of the flange shaft of any locking compound residue before installing the drive shaft. Otherwise there is a danger that the bolts will seize when being installed and strip when being removed. A thread cutter can be used to clean the threads.

End cover/drive flange components, removing/installing

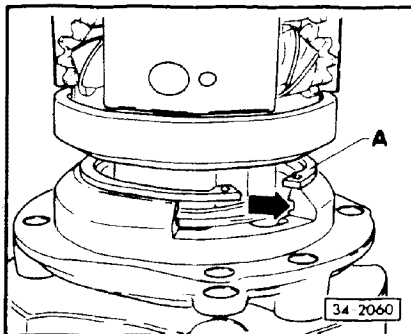
Gear carrier housing, removing

A – threaded pin M8/M10

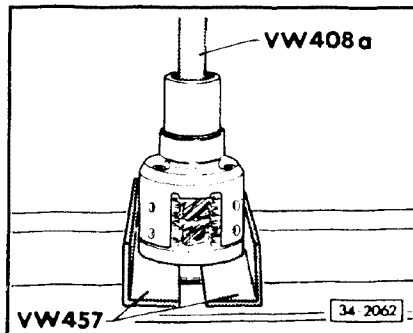


Circlip, installing

- circlip A must fit into entire circumference of groove (arrow)



Torsen differential, separating from gear carrier housing

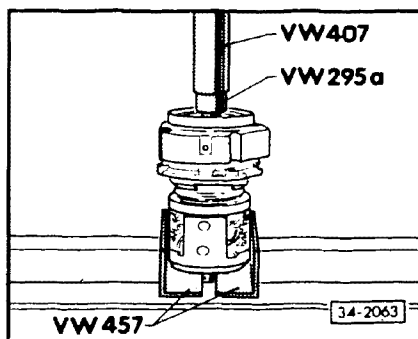


After 1987

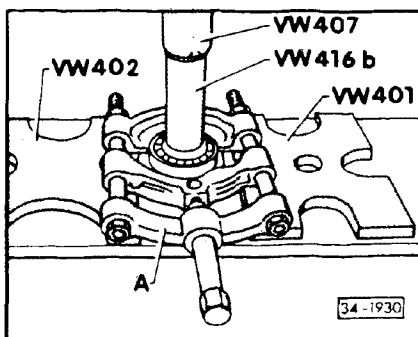
End cover/drive flange components, removing/installing

34-410-1

Manual Transmission – Controls, Assembly 34

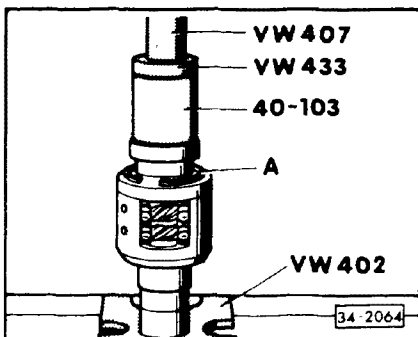


Torsen differential, installing in gear carrier housing



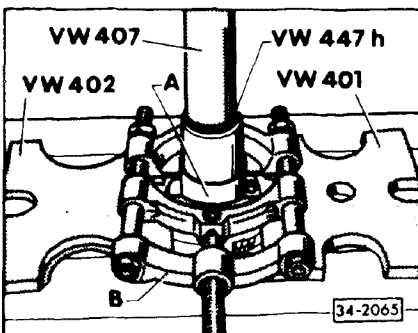
Ball bearing, removing

A – separating device 22-115 mm i.e.,
Kukko 17/2



Ball bearing, installing

- install circlip A before installing bearing



- bushing, removing

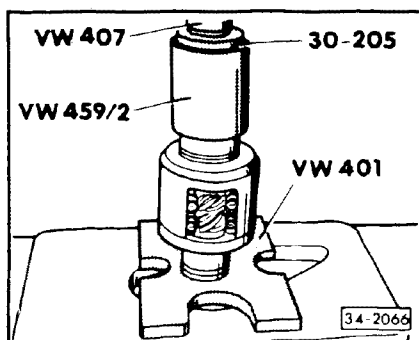
- press off carefully

B – separating device 22-115 mm i.e.,
Kukko 17/2

After 1987

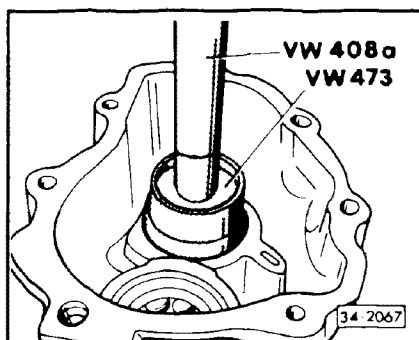
End cover/drive flange components, removing/installing

34-410-2

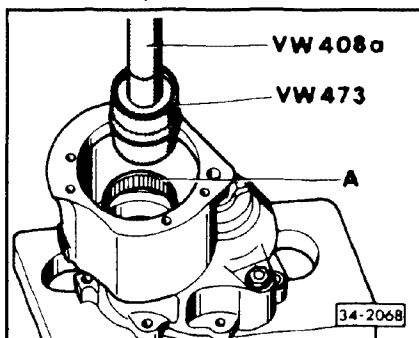


Bushing, installing

- press on with angled side of VW 459/2

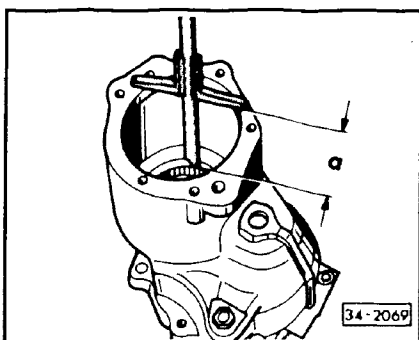


Bushing, removing from end cover



Bushing, installing in end cover

A— bushing



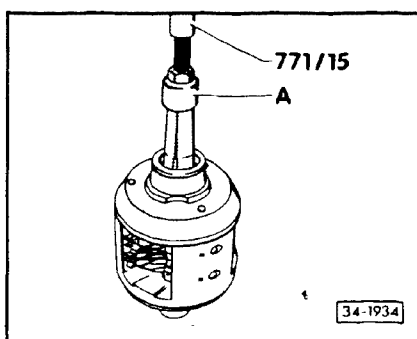
Bushing, installation depth

a = 130 mm (5.12 in.)

After 1987

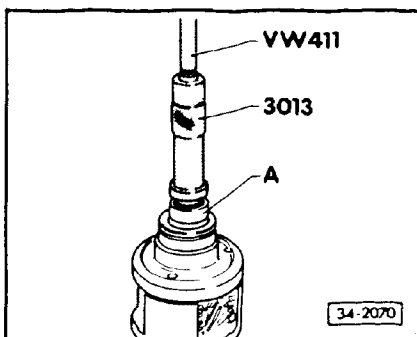
End cover/drive flange components, removing/installing

34-410-3



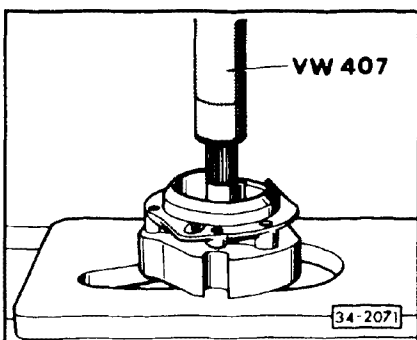
Needle bearing, removing

- always replace needle bearing if damaged
- A – puller 23.5 - 30 mm, i.e., Kukko 21.4

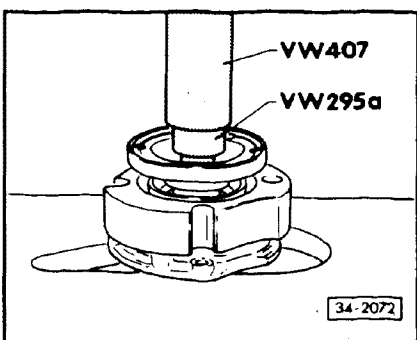


Needle bearing, installing

- press in until seated
- A – needle bearing



Flange shaft, removing

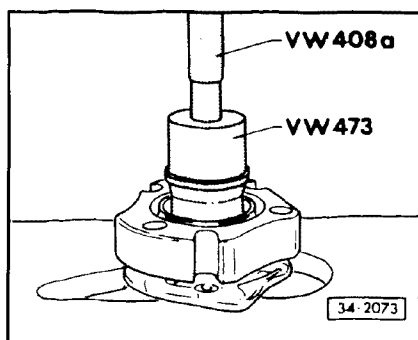


Flange shaft, installing

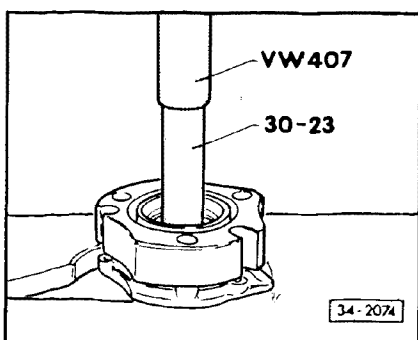
After 1987

End cover/drive flange components, removing/installing

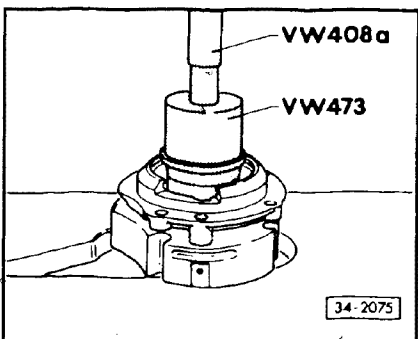
34-410-4



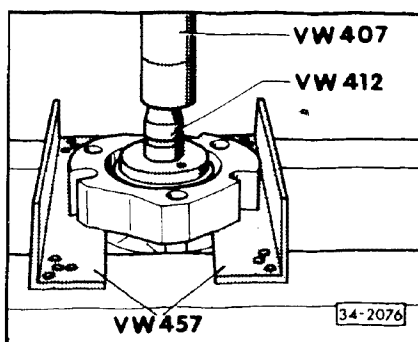
Flange shaft seal, installing



Ball bearing for flange shaft, removing



Ball bearing for flange shaft, installing

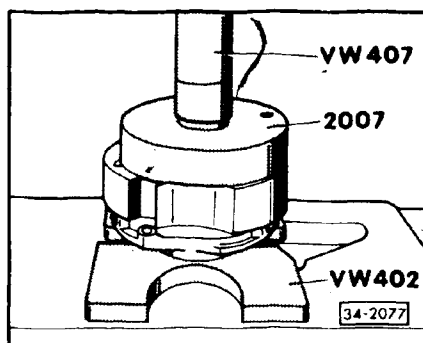


Balance weight, removing

After 1987

End cover/drive flange components, removing/installing

34-410-5



Balance weight, installing

cardiagn.com

After 1987

End cover/drive flange components, removing/installing

34-410-6