
Workshop Manual

911

Carrera 4

The workshop manual is only for the internal use of the Porsche Dealer Organization.

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* No provisions are currently made for repair of the automatic section.

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Diagnosis

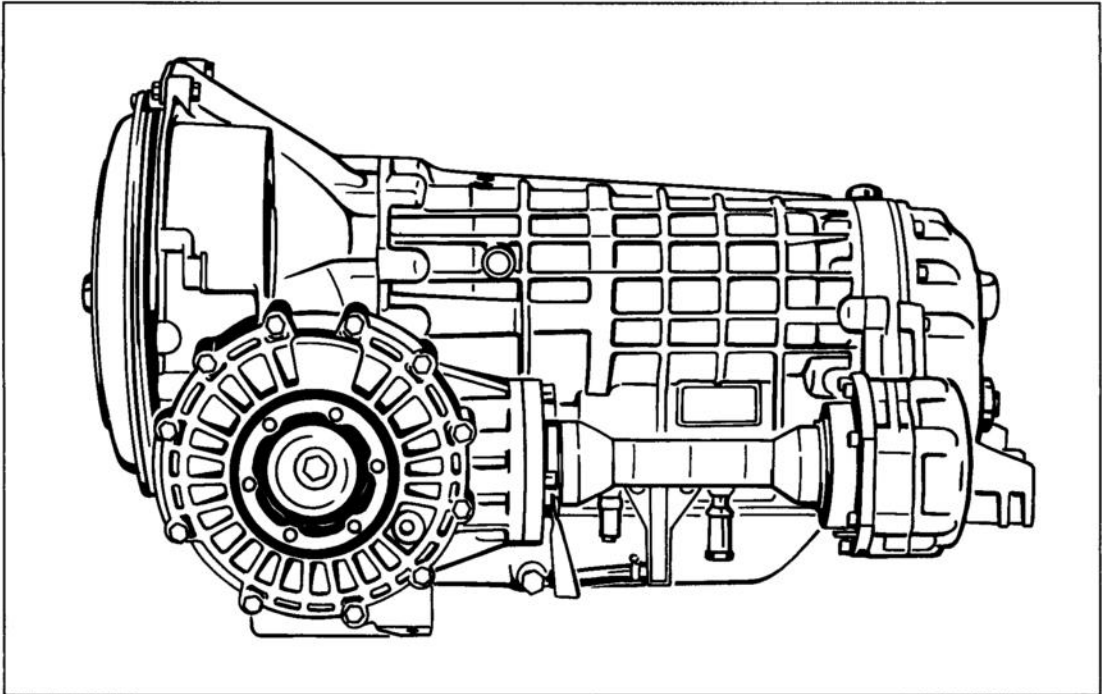
Tiptronic Diagnosis / Troubleshooting

Diagnosis Tiptronic	D37/38 - 101
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* No provisions are currently made for repair of the automatic section.

Technical data

4-speed Tiptronic transmission A50

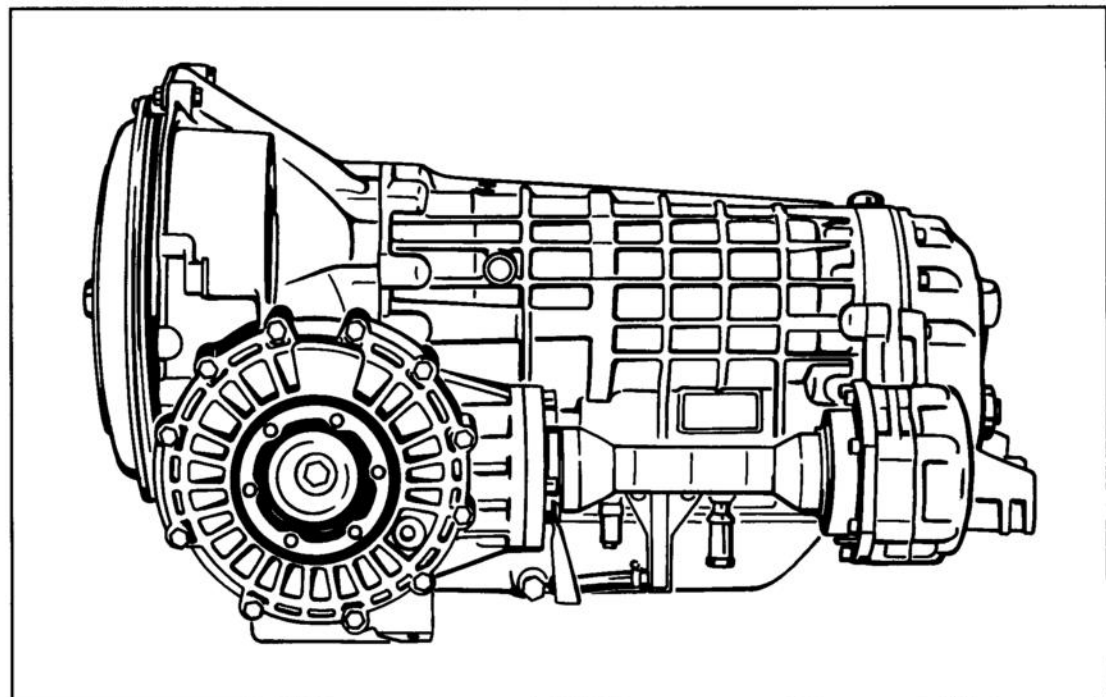


428-37

Type	Identification code	Equipment	Installed in	Model year
A50/01		4-speed	911 Carrera 2 worldwide	90

Technical data

General data	A50/01	
Design	fully-automatic 4-speed planetary transmission (Tiptronic)	
Ratio		
Spur pinion	1.100	
1st gear	2.479	
2nd gear	1.479	
3rd gear	1.000	
4th gear	0.728	
Reverse gear	2.086	
Final drive	Hypoid bevel gear with 15 mm offset	
Final drive ratio	9:33	i = 3.667
Stall speed	2300 $\pm$ 200	
Capacity, rear axle final drive	approx. 0.9 l multi-grade transmission oil 75 W 90 API classification GL5 (MIL-L 2105 B), optionally SAE 90	
Capacity, automatic unit with converter	Total capacity approx. 9.0 l Change quantity approx. 3.0 l ATF-Dexron II D	

Technical data**4-speed Tiptronic transmission A50**

428-37

Type	Identification code	Equipment	Installed in	Model year
A50/01		4-speed	911 Carrera 2 worldwide	90/91
A50/02		4-speed	911 Carrera 2 worldwide (except USA)	92/93/94
A50/03		4-speed	911 Carrera 2 USA	92/93/94

Technical data

General data	A50/01	A50/02	A50/03
Design	fully-automatic 4-speed planetary transmission (Tiptronic)		
Ratio			
Spur pinion	1.100		
1st gear	2.479		
2nd gear	1.479		
3rd gear	1.000		
4th gear	0.728		
Reverse gear	2.086		
Final drive	Hypoid bevel gear with 15 mm offset		
Final drive ratio	9:33	i = 3.667	9 : 32 i = 3,555
Stall speed	2300 – 400		
Capacity, rear axle final drive	approx. 0.9 l multi-grade transmission oil 75 W 90 API classification GL5 (MIL-L 2105 B), optionally SAE 90		
Capacity, automatic unit with converter	Total capacity approx. 9.5 l Change quantity approx. 3.5 l ATF-Dexron II D		

Removing and installing the torque converter

Removing

1. Remove transmission.
2. Remove converter, with transmission in horizontal position.

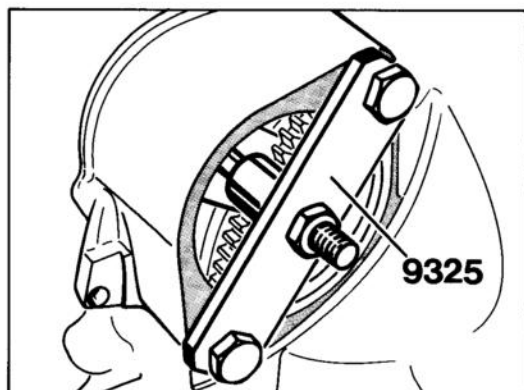
Note

Do not damage converter bearing assembly and rotary shaft seal.

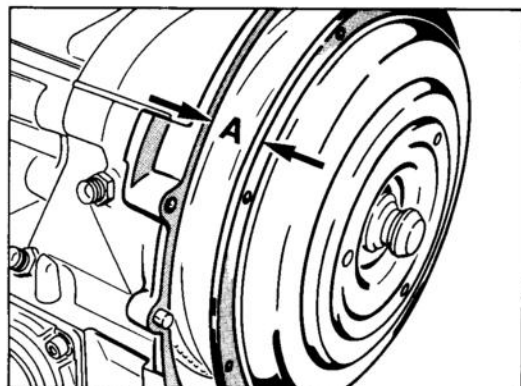
Installing

1. Carefully insert converter, with transmission in horizontal position. Turn the converter to and fro until the gear tooththing engages and the installation position is reached.

2. Secure converter against falling out with special tool 9325



413-32



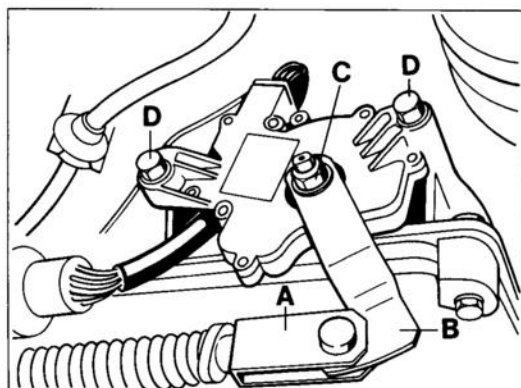
412-32

A = approx. 25 mm

Removing and installing the position switch on transmission

Removing

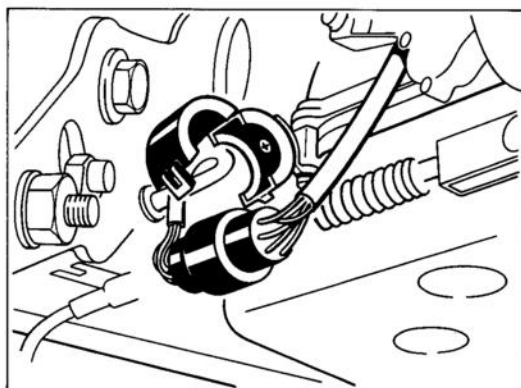
1. Move selector lever to position "N".
2. Remove transmission underbody cladding.
3. Disconnect selector lever cord pull at actuating lever.
4. Remove actuating lever.



381-37a

- A = Selector lever cord pull
 B = Actuating lever
 C = Hexagon nut (M 8 x 1) with washer
 D = Fixing screws

5. Unlock cable holder, remove plug-in connection and disconnect.



397-37

6. Unscrew fixing screws for position switch and remove switch.

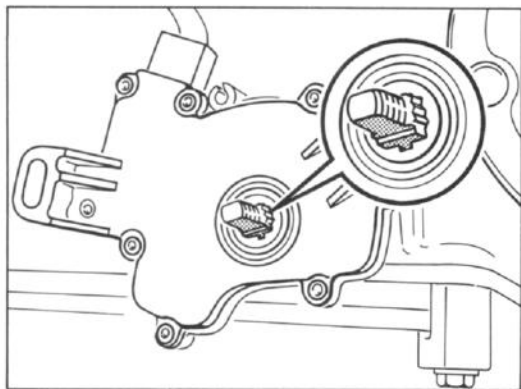
Installing

Installation takes place in reverse order.

Tightening torques:

- Position switch to transmission = 10 Nm
 Actuating lever to switching shaft = 15 Nm

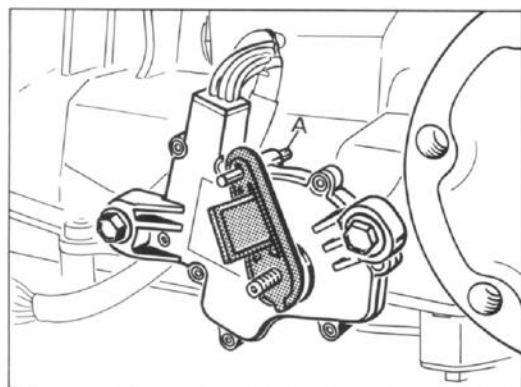
1. Set selector shaft to position "N" (turn shaft anti-clockwise up to the stop and then back two clicks) and place switch in the correct position.
2. Check, and if necessary adjust, setting of selector lever cable.



1884-37

2. Adjusting multifunctional switch.

- Push pointer of special tool **9326** onto the selector shaft and turn the switch until the locating pin can be pushed into the fixing hole of the switch. Tighten the mounting screws to **10 Nm** (7 ftlb.) in this position.



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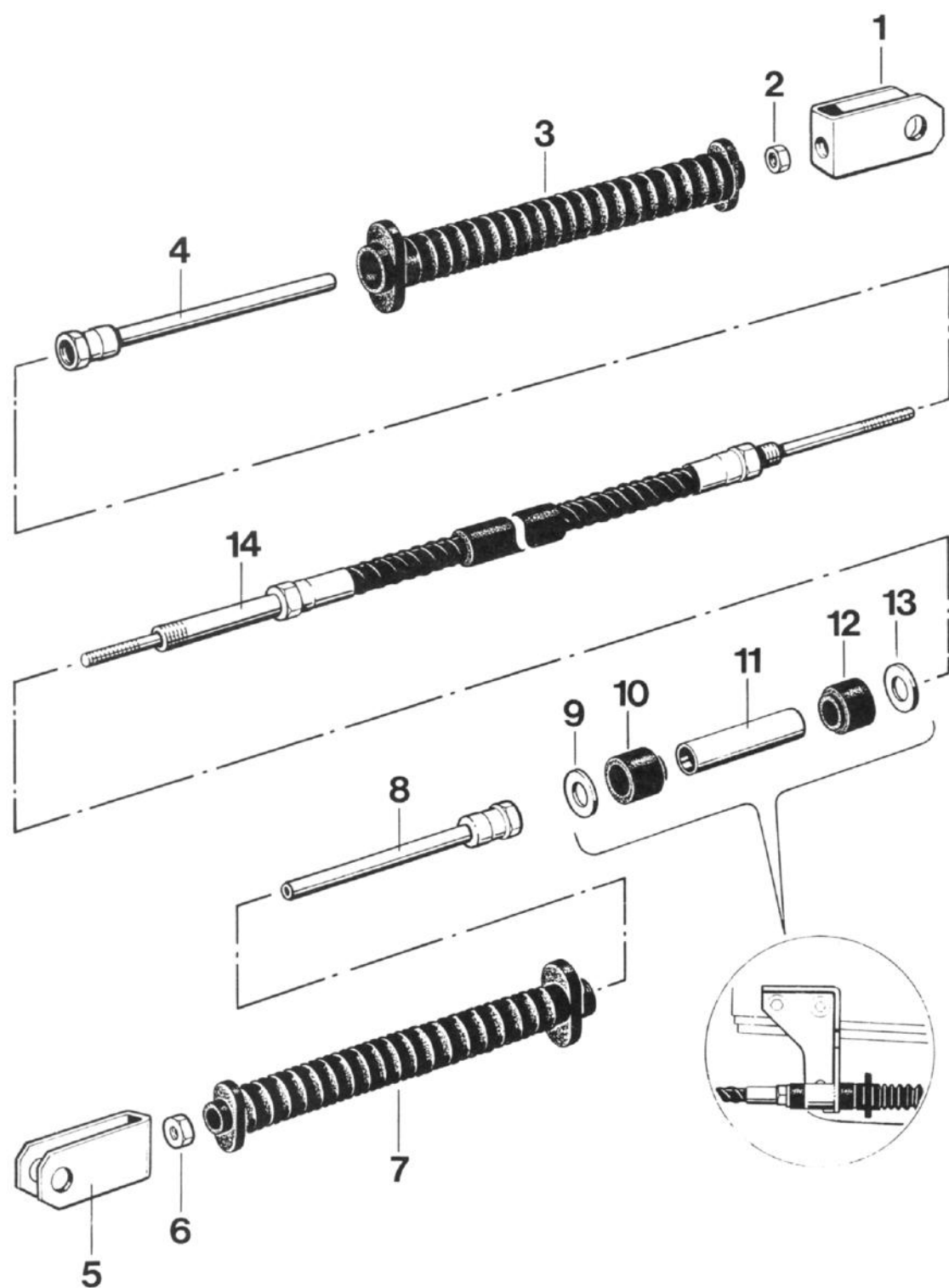
A = locating pin

Adjusting cable for selector device

1. Move selector lever to position "1".
2. Move multi-function switch to position "1" by pushing forward operating lever on switch by maximum amount.
3. Push cable forward and adjust position of fork head until bore holes of fork head and operating lever on gearbox lie exactly one over the other. From this position rotate fork head a further two turns onto thread of cable.
4. Check adjustment by shifting through all the gears and confirming that gear is displayed on speedometer. In addition change gate from "D" to "M". This must be possible with one smooth, straightline movement.

Removing and installing cable for selector mechanism

Removing and installing cable for selector mechanism

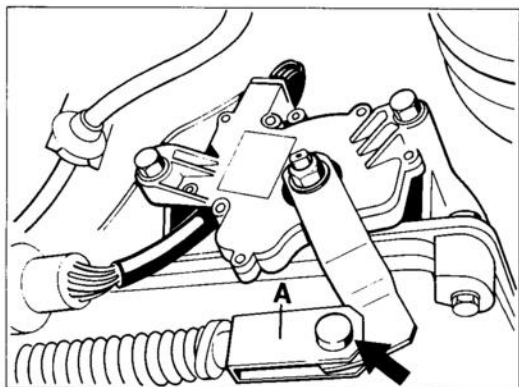


No.	Designation	Qty.	Note:	
			Removal	Installation
1	Fork head	1		Screw on to half length of thread on cable
2	Hexagon nut	1		Tighten to 6 Nm (4.4 ftlb)
3	Gaiter seal	1		
4	Guide tube	1		
5	Fork head	1		
6	Hexagon nut	1		Tighten to 6 Nm (4.4 ftlb)
7	Gaiter seal	1		
8	Guide tube	1		
9	Washer	1		
10	Rubber mount	1		Install in correct position
11	Spacer tube	1		
12	Rubber mount	1		Install in correct position
13	Washer	1		
14	Cable			Readjust

Instructions for removal and installation

Removal

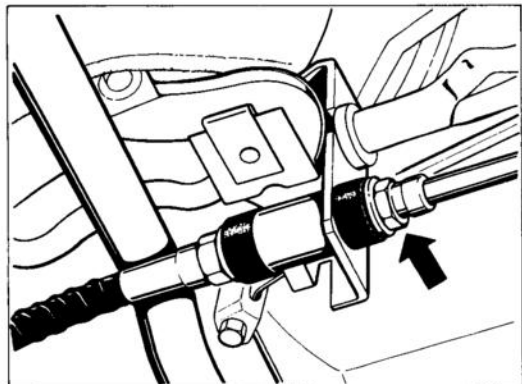
1. Remove underfloor paneling for gearbox and center underfloor paneling.
2. Disconnect cable on operating lever and remove fork head.



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A = Fork head

3. Disconnect guide tube on bracket



494-37

4. Disconnect cable on selector lever casing and disconnect guide tube.

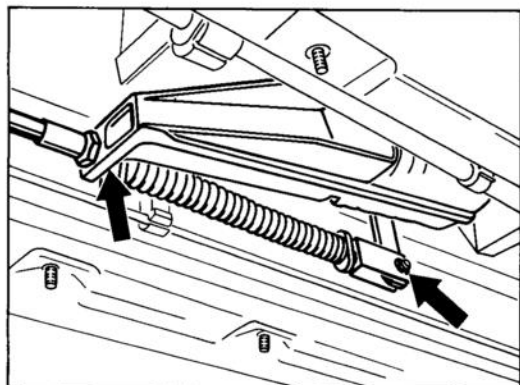
Installation

1. Installation is carried out in reverse order.
2. Adjust cable for selector mechanism (see P. 37 - 102a).

Removing and installing gear selecting system

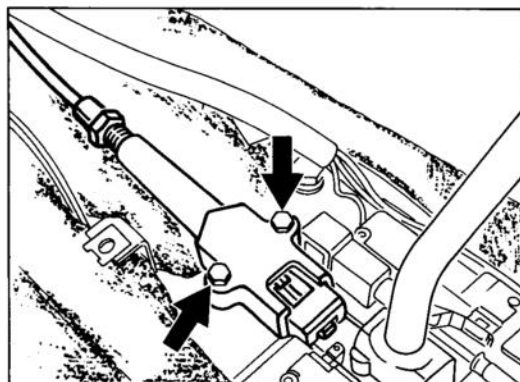
Removal

1. Disconnect battery.
2. Remove center underside panel.
3. Disengage selector lever cable from deflection lever and undo guide tube.



1066-37

4. Unscrew release button and pull off selector knob.
5. Remove center console.
6. Disconnect cable valve body from switch plate (only for keylock models).



1067-37

7. Disconnect connectors for switch plate.
8. Unscrew four mounting screws (M 6) and take out selector lever operator from above.

Installation

Tightening torques:

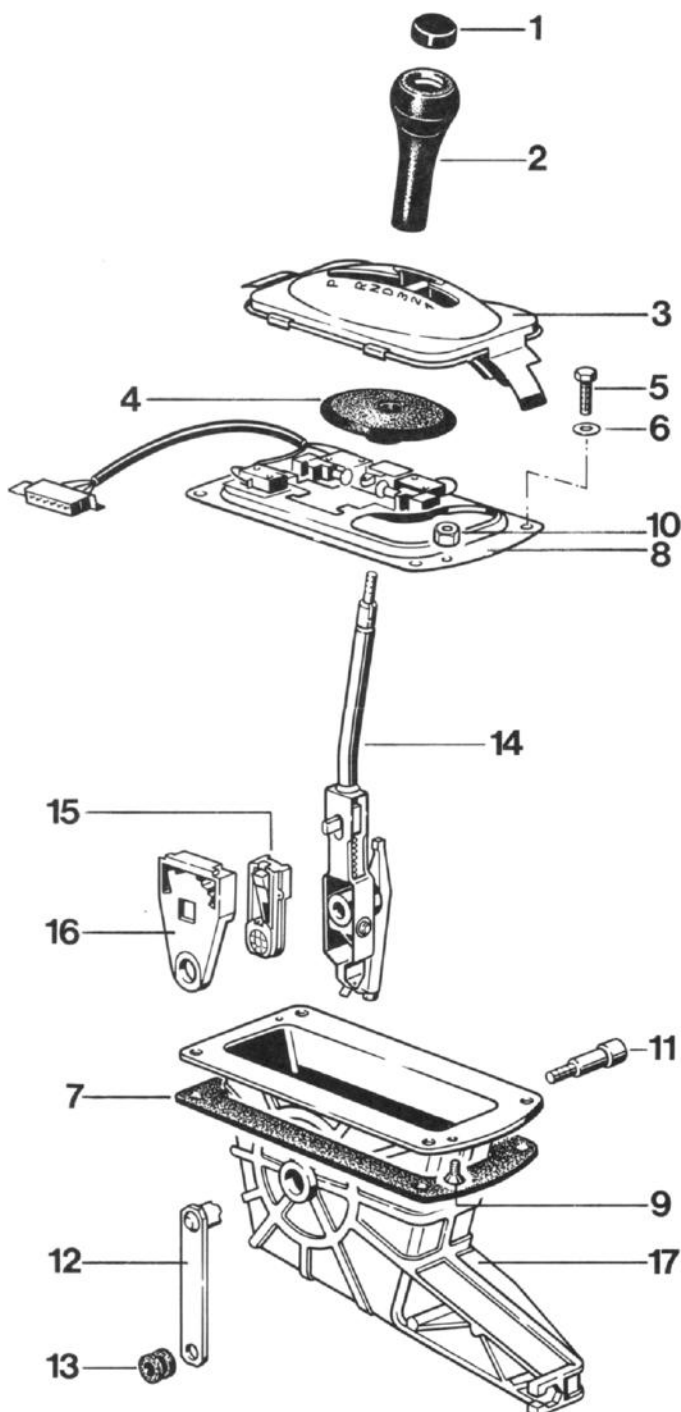
Gear selecting system to body = 10 Nm (7 ftlb)

Cable valve body to switch plate = 2,5 Nm (2 ftlb)

1. Install in reverse order.
2. Press selector knob manually until it is up against the stop, making sure the twist lock engages in the cutout in the selector lever.
3. Check release button for smooth operation. It must return into the home position by itself.
4. Check selector lever cable adjustment and readjust if required.
5. Check operation of keylock and shiftlock (if fitted).

Dismantling and assembling selector mechanism

Dismantling and assembling selector mechanism

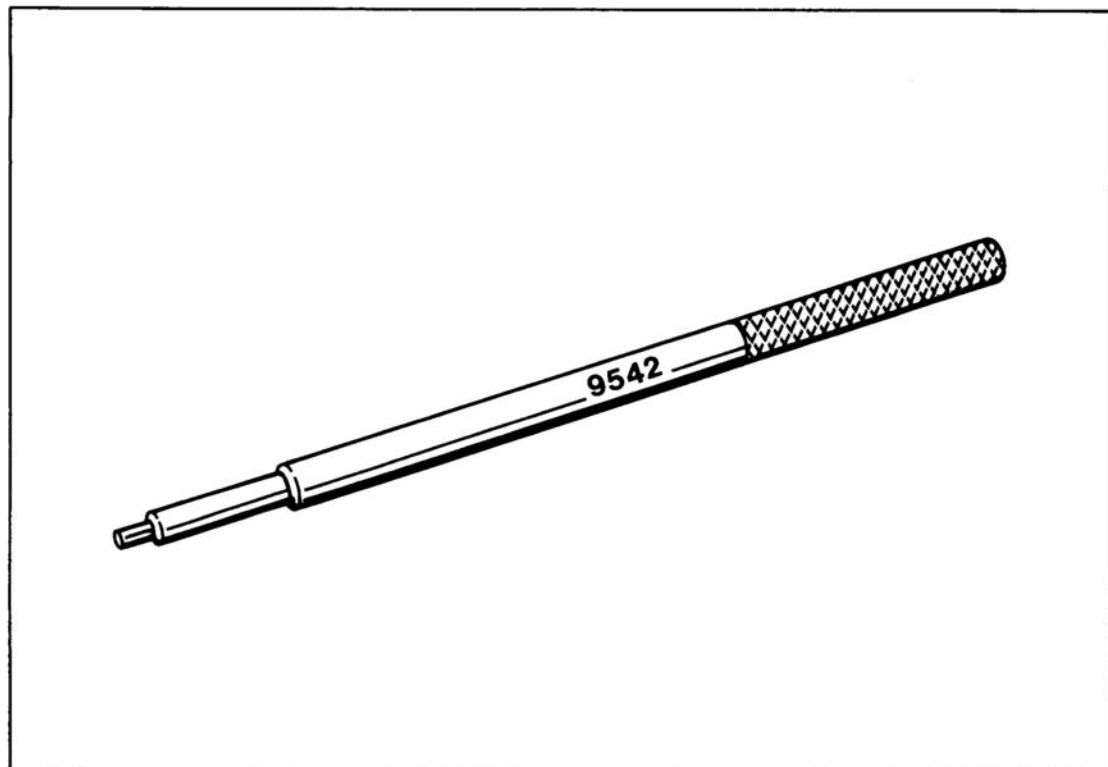


492-37

No.	Designation	Qty.	Note:	
			Removal	Installation
1	Unlocking button	1	Unscrew by hand	Must return automatically to original position after operation
2	Selector lever handle	1	Pull off by hand	Press on in correct position until properly in contact. Twisting lock must engage with lock on shift lever.
3	Cover panel	1	Can only be taken out from below and with center console removed	
4	Cover	1		
5	Hexagon screw	4		Tighten to 10 Nm (7.3 ftlb)
6	Washer	4		
7	Seal	1		
8	Hexagon nut	2		Tighten to 2 Nm (1.4 ftlb)
9	Flat-head screw	2		
10	Control plate	1		
11	Clamping screw	1		Tighten to 23 Nm (16.9 ftlb)
12	Reversing shaft	1		
13	Rubber mount	1		
14	Selector lever (complete)	1		
15	Lock	1		
16	Gate	1		Must engage in recess in control plate
17	Selector lever casing	1		

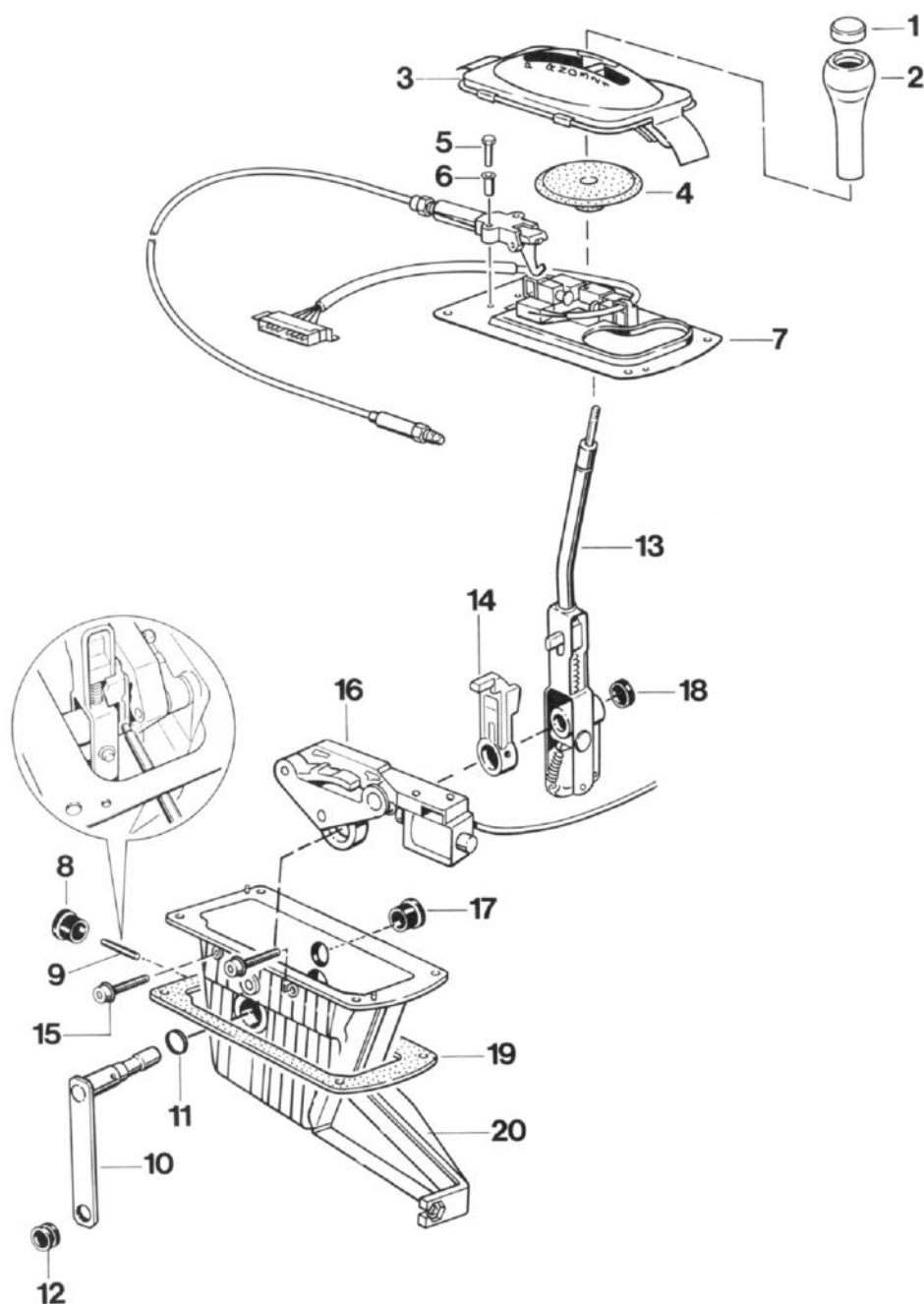
Note

Coat all sliding surfaces in low-temperature grease (e.g. Shell S 6508)

Dismantling and assembling gear selecting system with keylock and shiftlock**Tools**

No.	Designation	Special tool	Order number	Explanation
	Assembly mandrel	9542	000.721.954.20	

Dismantling and assembling gear selecting system with keylock and shiftlock



No.	Designation	Qty.	Note:	
			Removal	Installation
1	Release button	1	Screw off manually	Must return to home position automatically after it has been actuated
2	Selector knob	1	Pull off manually	Push up to stop in correct position. Twist lock must engage in cutout in selector lever
3	Shroud	1	Can only be removed from below with the center console removed	
4	Cover	1		
5	Hexagon head screw	2		Tighten to 2.5 Nm (2 ftlb)
6	Sleeve	2		
7	Switch plate	1		
8	Plug	1		
9	Tensioning sleeve	1	Drive out using Special Tool 9542	Bore of driver and relay shaft must match
10	Deflection lever	1		
11	Seal	1		
12	Rubber mount	1		
13	Selector lever	1	Shift into manual speed selection gate	
14	Driver	1		
15	Hex socket head bolt	2		Tighten to 6.5 Nm
16	Shift-Lock	1		
17	Plug	1		
18	Cover	1		
19	Gasket	1		
20	Housing	1		

Note

Coat all sliding surfaces with low-temperature grease (e.g. Shell S 6508)

Removing and installing lift solenoid for shiftlock

Note

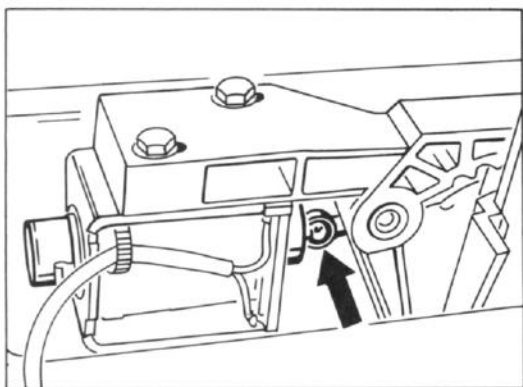
When checking the lift solenoid electrically, be sure to observe correct polarity

Terminal 1 = Positive

Terminal 2 = Negative

Removal

1. Remove center console and gear selecting system.
2. Remove switch plate.
3. Using a suitable tool, press connecting rod carefully off the lift solenoid.



1085-37

4. Screw out mounting screws and take off lift solenoid.

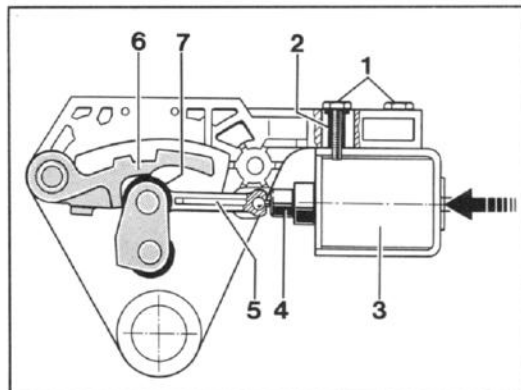
Installation

1. Set selector lever to "1" position.
2. Grease ball and ball socket with low-temperature grease.
3. Clip connecting rod to lift solenoid, retaining the connecting rod in correct position using a suitable wire hook or marking tool and pushing the free lift solenoid carefully into the ball socket.

4. Using sleeves and hexagon head bolts, fit lift solenoid to gate in such a manner that it remains free to slide in an axial direction.

5. Adjusting the lift solenoid:

- Set selector lever to position „P“.
- Slide lift solenoid all the way back in the slots of the gate.
- Push iron core from the lift solenoid towards the pawl until it contacts the stop and locate it in this position.
- Slide the actuated lift solenoid axially until the idler contacts the stop of the pawl.
- Tighten hexagon head bolt to 2.5 Nm (2 ftlb) in this position.



1086-37

- | | |
|-----------------------|---------------|
| 1 - Hexagon head bolt | 2 - Sleeve |
| 3 - Lift solenoid | 4 - Iron core |
| 5 - Connecting rod | 6 - Pawl |
| 7 - Idler | |

6. Check operation of shiftlock.

Removing and installing keylock bowden cable

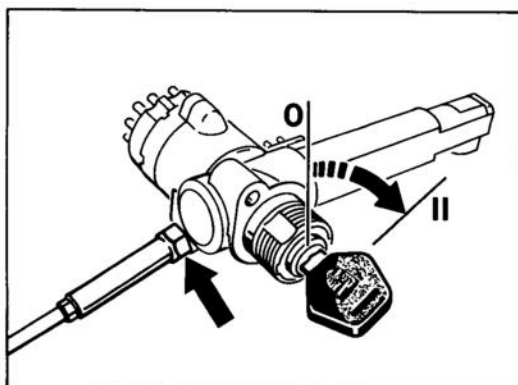
Removal

1. Disconnect battery.
2. Remove complete center console, knee guard and side nozzle.
3. Undo Central Information System and leave it suspended on the wiring.
4. Turn ignition lock to position „2" (Ignition on).

Note

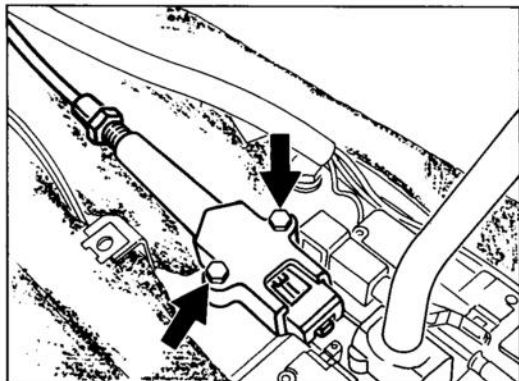
The ignition lock must be in position „2". If it is left in any other position, both the lock and the bowden cable may be damaged.

5. Unbolt bowden cable from ignition lock.



1068-3/

6. Undo mounting screws of valve body.



1067-37

7. Disengage bowden cable from pedal floor-board and from bracket for center console.

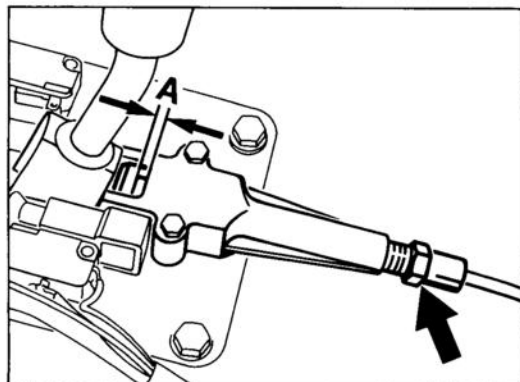
Installation

1. Assemble in reverse order, observing the following points.
2. Turn ignition lock to position „2" (Ignition on) and fit bowden cable to ignition lock. Tightening torque: 2.5 Nm (2 ftlb)
3. Fit bowden cable valve body using sleeves and hexagon head bolts. Tightening torque: 2.5 Nm (2 ftlb)
4. Set selector lever to position „P" and turn ignition lock to position „0".

Note

If the ignition lock cannot be turned to the 0 position, the bowden cable must be re-adjusted.

5. Adjust bowden cable, turning the cable sleeve on the valve body until the lock slide reaches a setting of 2 ± 0.5 mm (refer to Fig.).



1081-37

$$A = 2 \pm 0.5 \text{ mm}$$

6. Check operation of keylock and shiftlock.

Checking keylock and shiftlock

Checking the keylock (ignition key lock)

Selector lever position	Position of release button	Keylock operation	Ignition key
P	not actuated	no	rotary, may be pulled off
P	actuated	yes	cannot be turned to pulloff position
R-N-D-3-2-1	not actuated actuated	yes	cannot be turned to pulloff position

Checking the keylock (selector lever lock)

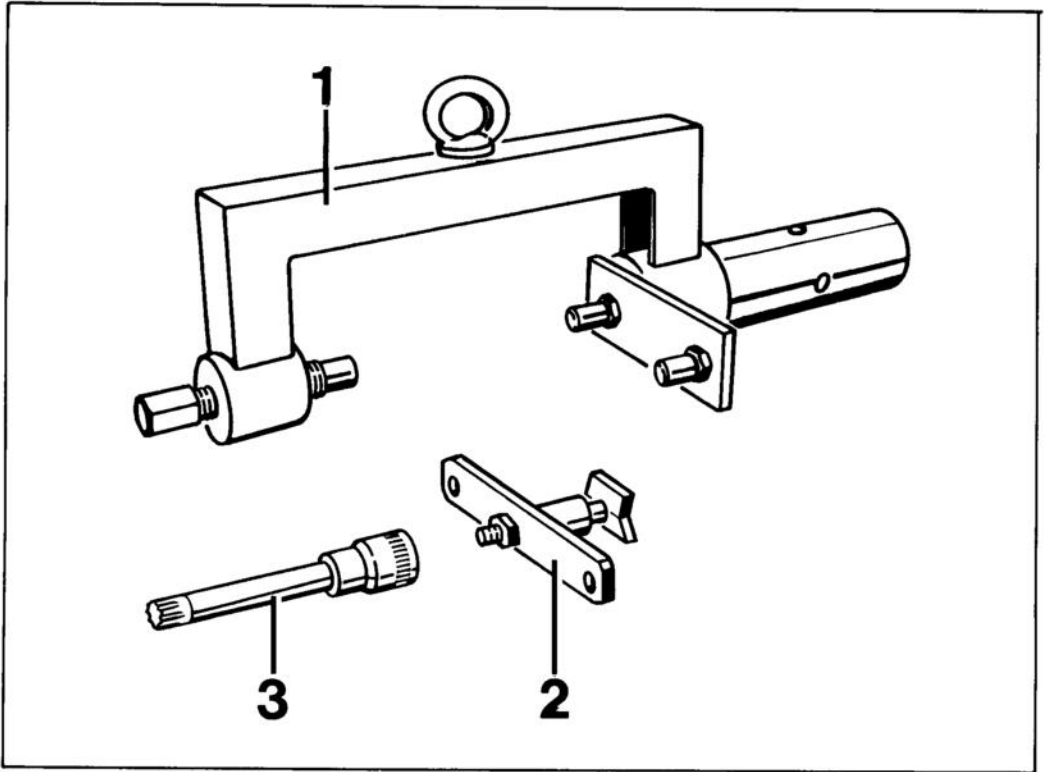
Ignition key position	Release button status	Keylock operation	Selector lever
Pulled off or pulled position	locked	yes	locked
Position 1 or 2	not locked	no	not locked

Checking the shiftlock

Selector lever position	Ignition	Shiftlock operation	Brakes	Selector lever
P-R-N-D-3-2-1	off	no	actuated not actuated	not locked
P and N	on	yes	not actuated	locked
P and N	on	yes	actuated	not locked

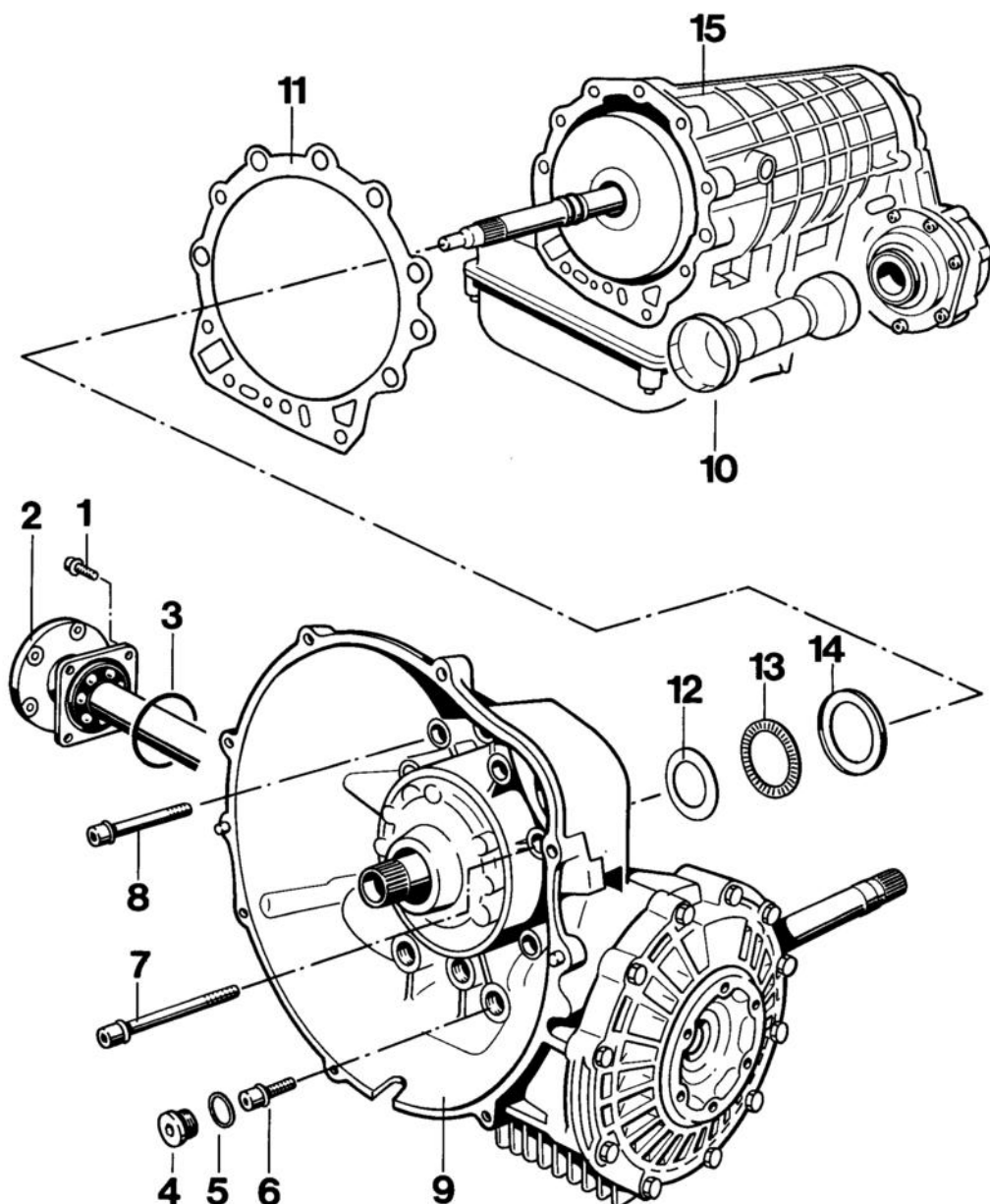
Removing and installing rear transmission case

Tools



No.	Designation	Special tool	Order number	Explanation
1	Transmission holder	9324	000.721.932.40	
2	Holding device	9325	000.721.932.50	
3	socket key insert	9330	000.721.933.00	

Removing and installing rear transmission case



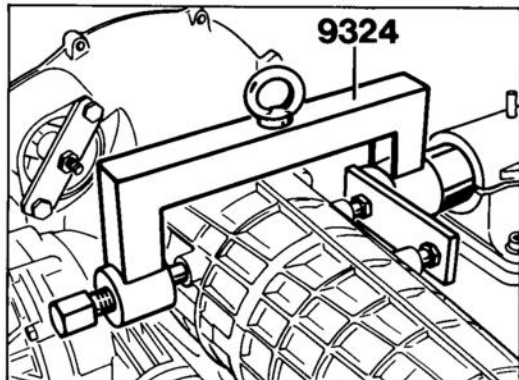
No.	Designation	Qty.	Note:	
			Removal	Installation (= ftlb)
1	Fillister head screw	4	Use Special Tool 9330 to remove	Tighten with 23 Nm (17)
2	Joint flange	1		
3	O-ring	1		Replace, oil slightly
4	Screw plug	3		Tighten with 50 Nm (36)
5	Sealing ring	3		Replace
6	Fillister head screw	3	Remove with Torx insert T50	Tighten with 46 Nm (34)
7	Fillister head screw	3	Remove with Torx insert T50	Tighten with 46 Nm (34)
8	Fillister head screw	6	Remove with Torx insert T50	Tighten with 46 Nm (34)
9	Rear transmission case	1		
10	Protective tube	1		Large diameter to final drive
11	Seal	1		Replace, glue to case with a small quantity of grease (vaseline)
12	Shim	X	Note thickness for re-installation	Redetermine thickness if required (refer to page 38 - 171)
13	Needle cage	1		
14	Angle ring	1		Fit in correct position
15	Automatic transmission	1		Pay attention to installation position of clutch A. Make sure that the square drive shaft rings are correctly fitted. Coat the drive shaft with a small quantity of grease in the area of the square rings.

* Must be checked and, if required, corrected after each transmission installation.

Assembly instructions for removal and installation

Removal

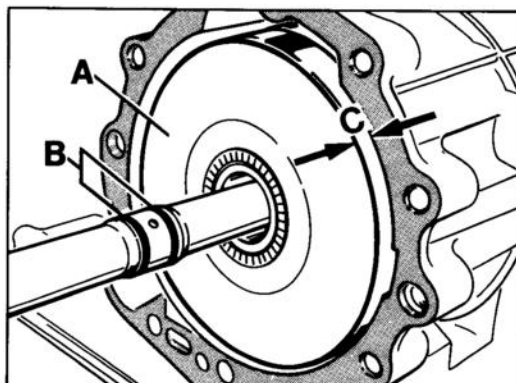
1. Remove the transmission and torque converter.
2. Secure transmission on assembly block with holding device 9324.



415-37

Installation

1. Check the installation position of clutch A.
The installation depth has been reached when the distance "C" is approx. 8.5 mm.

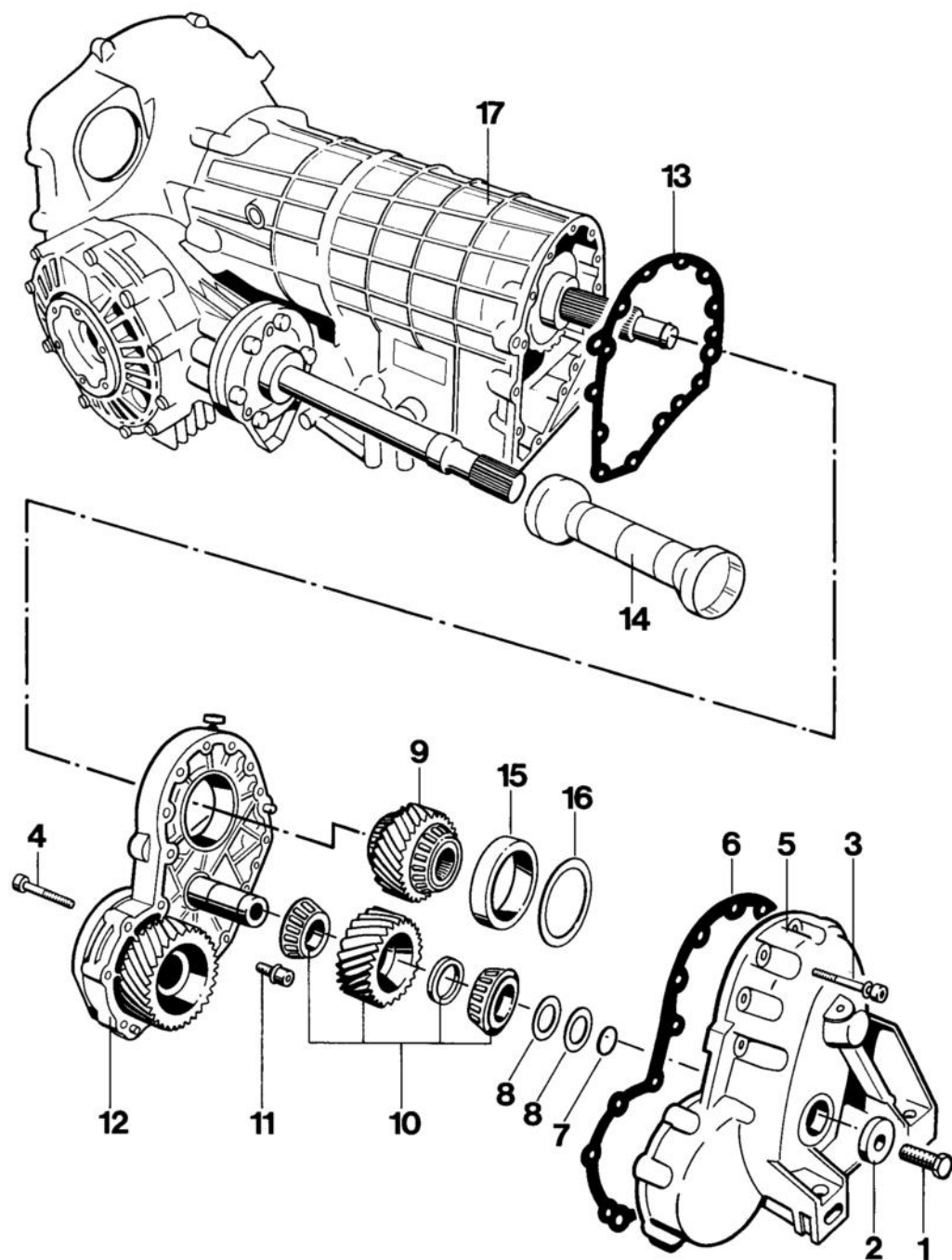


416-37

- A = Clutch A
B = Square rings
C = Installation depths

Removing and installing the intermediate plate

Removing and installing the intermediate plate



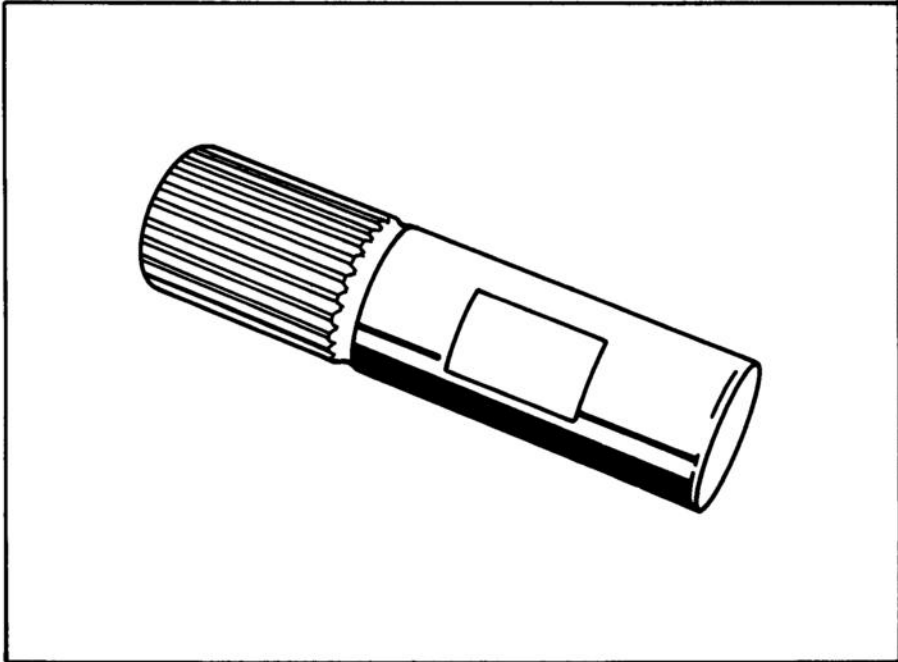
No.	Designation	Qty.	Note:	
			Removal	Installation
1	Hexagon screws	1		Tighten with 46 Nm
2	Washer	1		
3	Fillister head screw	11		Tighten with 23 Nm
4	Fillister head screw	6		Tighten with 23 Nm
5	Front transmission cover*	1		
6	Seal	1		Replace
7	O-Ring	1		Replace, oil with ATF
8	Shim	X	Note thickness for reinstallation	
9	Gear wheel with tapered-roller bearings*	1	Note correct position for reinstallation	Adjust preload if required
10	Gear wheel with bearing assembly*	1	Note correct position for reinstallation	Set by the manufacturer.
11	Fillister head screw	2		Tighten with 23 Nm
12	Intermediate plate*	1		
13	Seal	1		Replace
14	Protective tube	1		Large diameter to final drive
15	Tapper roller bearing outer race	1	Remove with internal pulley (e.g. Schrem 60 - 70)	Heat transmission cover to approx. 120 deg. C and press in to stop
16	Adjusting shim	X	Record thickness for reinstallation	Redetermine thickness if required
17	Automatic transmission with final drive	1		

Note

The spur gear drive is only available as a complete set (intermediate plate, transmission cover and adjusted spur gears). No adjustment of the preload of the taper roller bearings is therefore required.

Dismantling and assembling intermediate plate

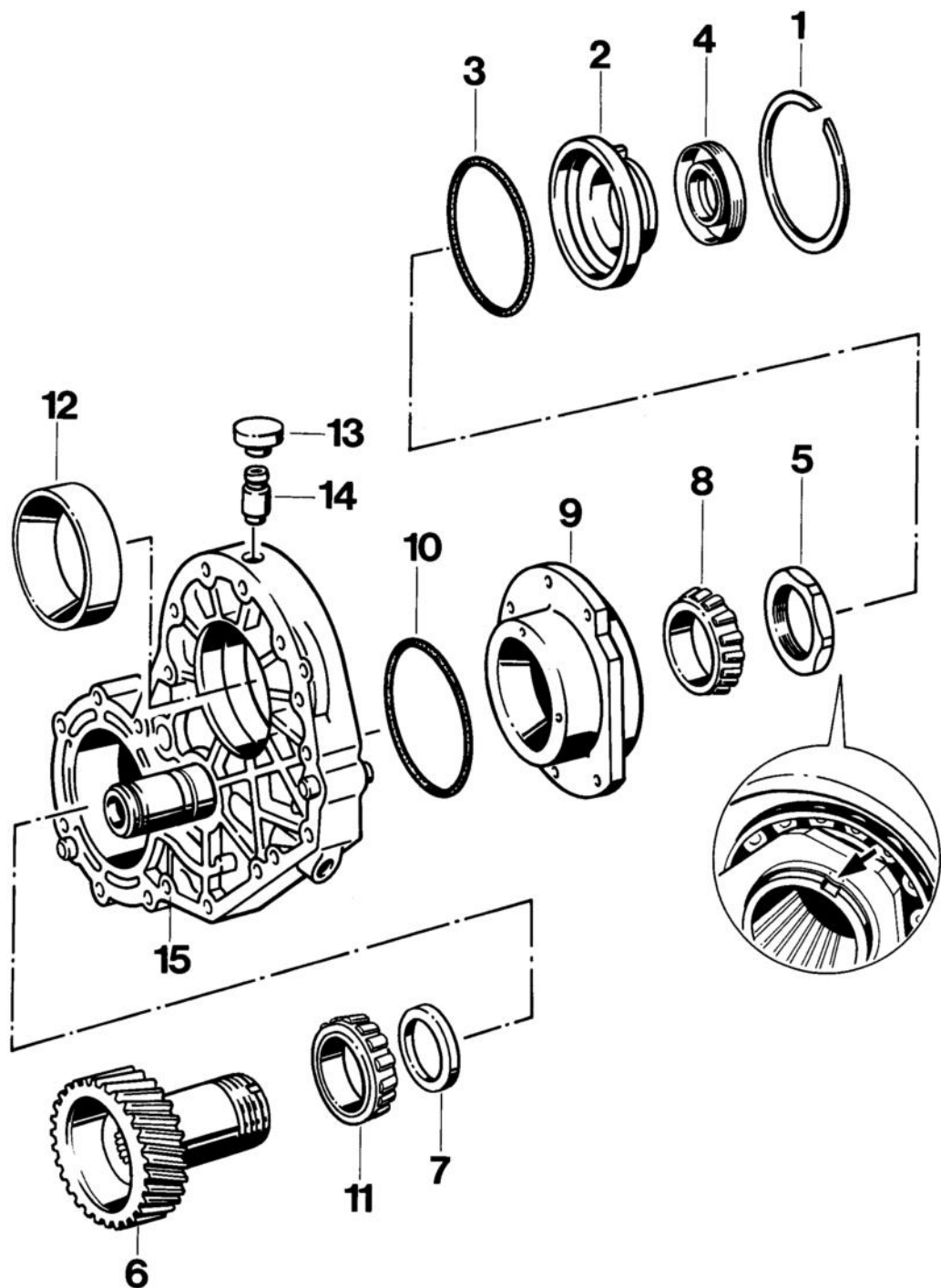
Tools



1027-37

No.	Designation	Special tool	Order number	Explanation
	Retaining device	9340	000.721.934.00	

Dismantling and assembling intermediate plate



No.	Designation	Qty.	Note:	
			Removal	Installation
1	Snap ring	1		
2	Bearing cover	1	Grab at lugs to lift out	
3	Round seal	1		Replace, coat with ATF fluid
4	Shaft seal	1		Fitting depth 2.0 ± 0.5 mm
5	Lock nut	1	Fit Special Tool 9340 into vise. Put intermediate plate into position and undo nut.	Tighten to 250 Nm (184 ftlb). Lock by upsetting the flange (2 x 180°)
6	Helical gear	1	Press out using a hydraulic press.	
7	Adjuster ring*	X	Record thickness for reassembly	Thickness can only be determined by manufacturer
8	Inner race of taper roller bearing*	1	Mark for reassembly	Heat to approx. 120°C and press on
9	Bearing cover *	1		
10	Round seal	1		Replace, coat with ATF fluid
11	Inner race of taper roller bearing*	1	Remove across assembly bore of helical gear. Mark for reassembly.	Heat to approx. 120°C and press into place
12	Outer race of taper roller bearing	1		Heat intermediate plate to approx. 120°C and press into place
13	Breather cover	1	Lever off	
14	Breather tube	1	Pull out	Press in to stop
15	Intermediate plate	1		

Note

The parts identified by an * have been preadjusted by the manufacturer.

Disassembling and assembling the parking lock

Disassembling and assembling the parking lock

