

Technical Manual

Boxster

Technical Information

Repair

Contents:

Group 3

Transmission, automatic transmission

Foreword

The workshop documentation for the Boxster model has the designation "**Boxster**" **Technical Manual** and contains **Technical Information** as well as instructions on **Repairs**.

The integration of the technical information published in the "Boxster" Technical Manual with the descriptive matter on repairs provides the user with a complex reference work that combines into one book associated or cross-referenced material of relevance to workshops and originating from various information media.

The "Boxster" Technical Manual consists of 15 folders, subdivided into the following Groups

0	Entire vehicle – General
0	Diagnosis, part 1 (up to Repair Group 45) * ¹
0	Diagnosis, part 2 (as of Repair Group 69) * ²
1	Engine, part 1 (up to Repair Group 13) * ³
1	Engine, part 2 (as of Repair Group 15) * ⁴
2	Fuel, exhaust, engine electronics
3	Transmission, manual transmission
3	Transmission, automatic transmission
4	Running gear
5	Body
6	Body equipment, exterior
7	Body equipment, interior
8 / 9	Air conditioning / Electrics
9	Circuit diagrams, part 1 (up to and including the '99 model) * ⁵
9	Circuit diagrams, part 2 (as of the '00 model) * ⁶

| *¹ The two folders with Group 0 are to be regarded as one folder; i.e. file the "Technical Information" notices only in front of the repair descriptions in the folder "Group 0 – Diagnosis, part 1" (**up to Repair Group 45**).

| *² The **second folder** "Group 0 – Diagnosis, part 2" (**as of Repair Group 69**) includes the further Repair Groups belonging to Group 0.

| *³ The two folders with Group 1 are to be regarded as one folder; i.e. file the "Technical Information" notices only in front of the repair descriptions in the folder "Group 1 – Engine, part 1" (**up to Repair Group 13**).

| *⁴ The **second folder** "Group 1 – Engine, part 2" (**as of Repair Group 15**) includes the further Repair Groups belonging to Group 1.

- *5 The two folders with Group 9 are to be regarded as one folder; i.e. file the "Technical Information" notices only in front of the repair descriptions in the folder "Group 9 – Circuit diagrams, part 1" (**up to the '99 model**).
- *6 The **second folder** "Group 9 – Circuit diagrams, part 2" (**as of the '00 model**) includes the further circuit diagrams belonging to Group 9.

The "Boxster" Technical Manual has the same structure in each folder, with the following breakdown for all Groups:

Title page, "Boxster" Technical Manual

> Foreword

Title page: "Technical Information"

> Table of Contents, Technical information

> Technical information

Title page: "Repair"

> Repair Groups: overview

> Table of Contents, repairs

> General / technical data

> Instructions on repairs

As can be seen from the breakdown, the published Technical Information is in the front part of each folder – numbered according to the Groups. The Table of Contents assigned to each Group will be periodically updated.

Following the Technical Information, separated by a title page, the instructions on repairs – assigned according to the Groups or broken down into Repair Groups – are included in the folder.

The instructions on repairs will be extended and updated by means of supplements.

Note

Sheets that already exist in the "Boxster" Technical Manual and are updated or revised and thereby exchanged by a supplement are designated "Replacement sheet". Revisions or technical modifications on pages of these replacement sheets are identified for the user with a vertical bar at the margin.

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3 Transmission – Automatic transmission**3 Transmission**

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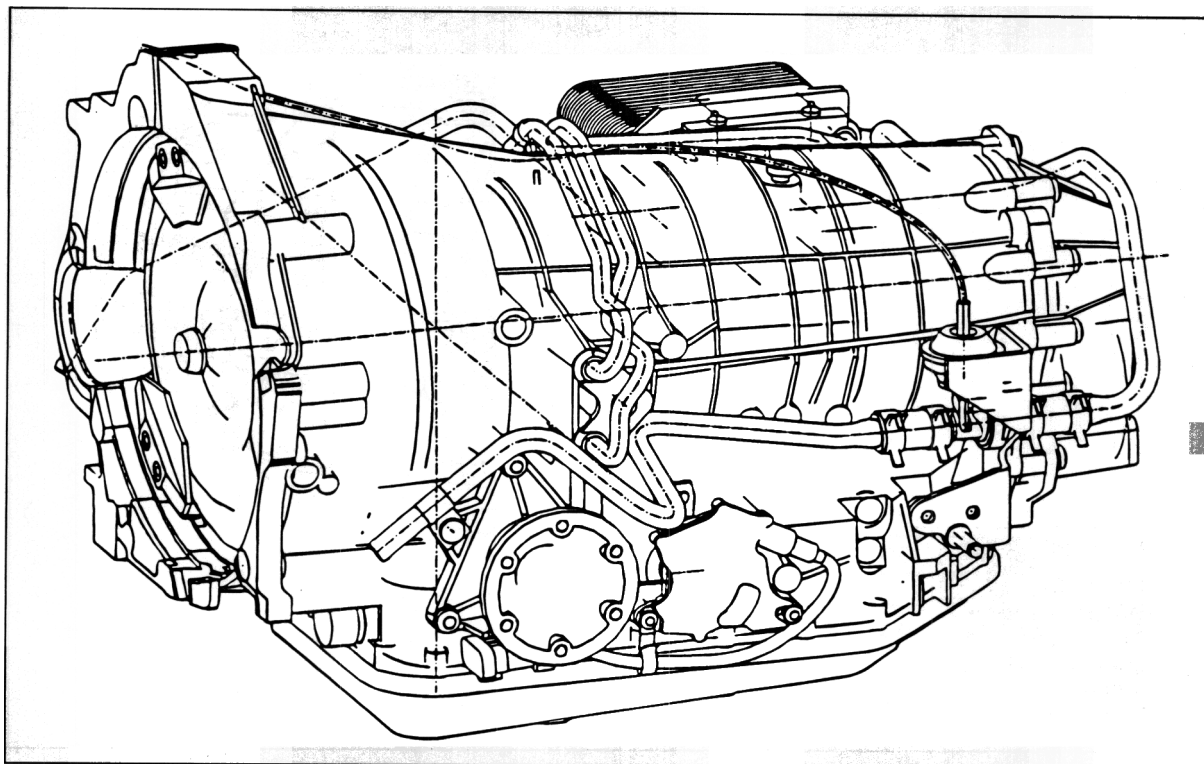
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3 Technical data (Tiptronic transmission A86)

5-speed Tiptronic transmission A86

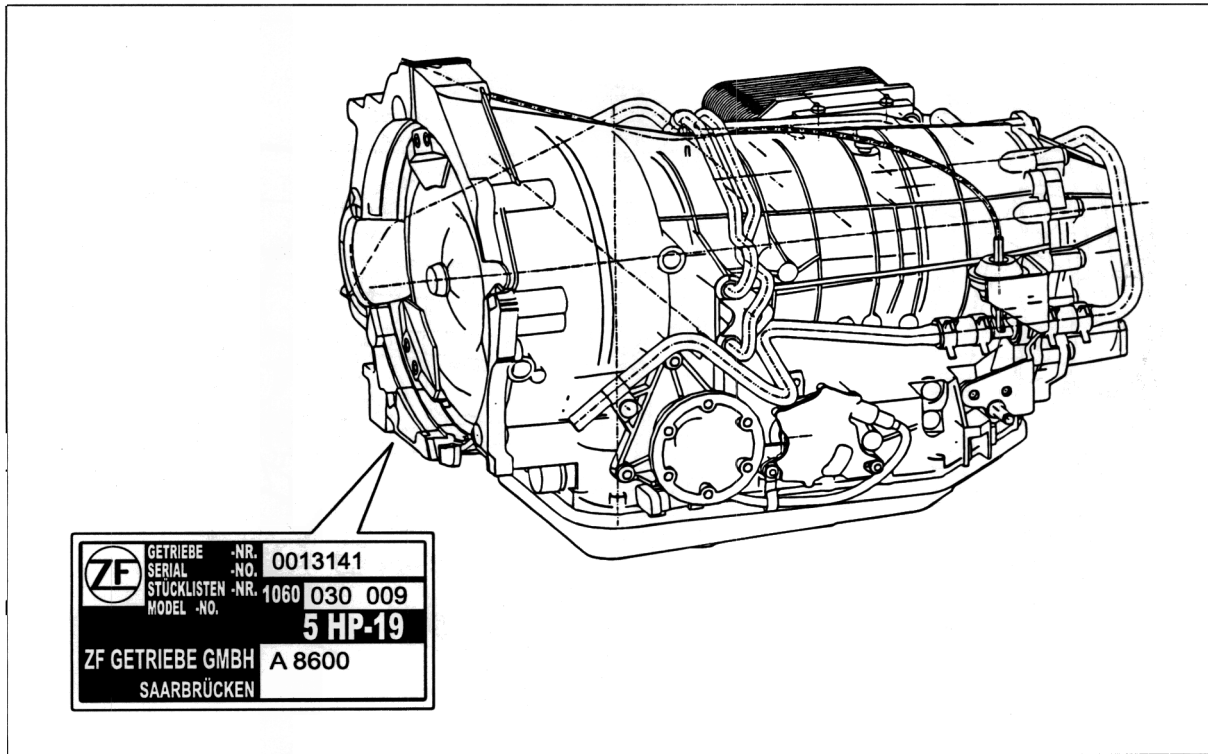


37350001

Type	Code letter	Equipment	Installed in	Model year
A86/00		5-speed	Boxster	97/98/99
A86/05		5-speed	Boxster	00

Technical data

Identification of Tiptronic transmission



37350002

There are two identification plates on the transmission. One plate is located near the ATF cooler and the other, which can be read from underneath, is on the converter bell housing.

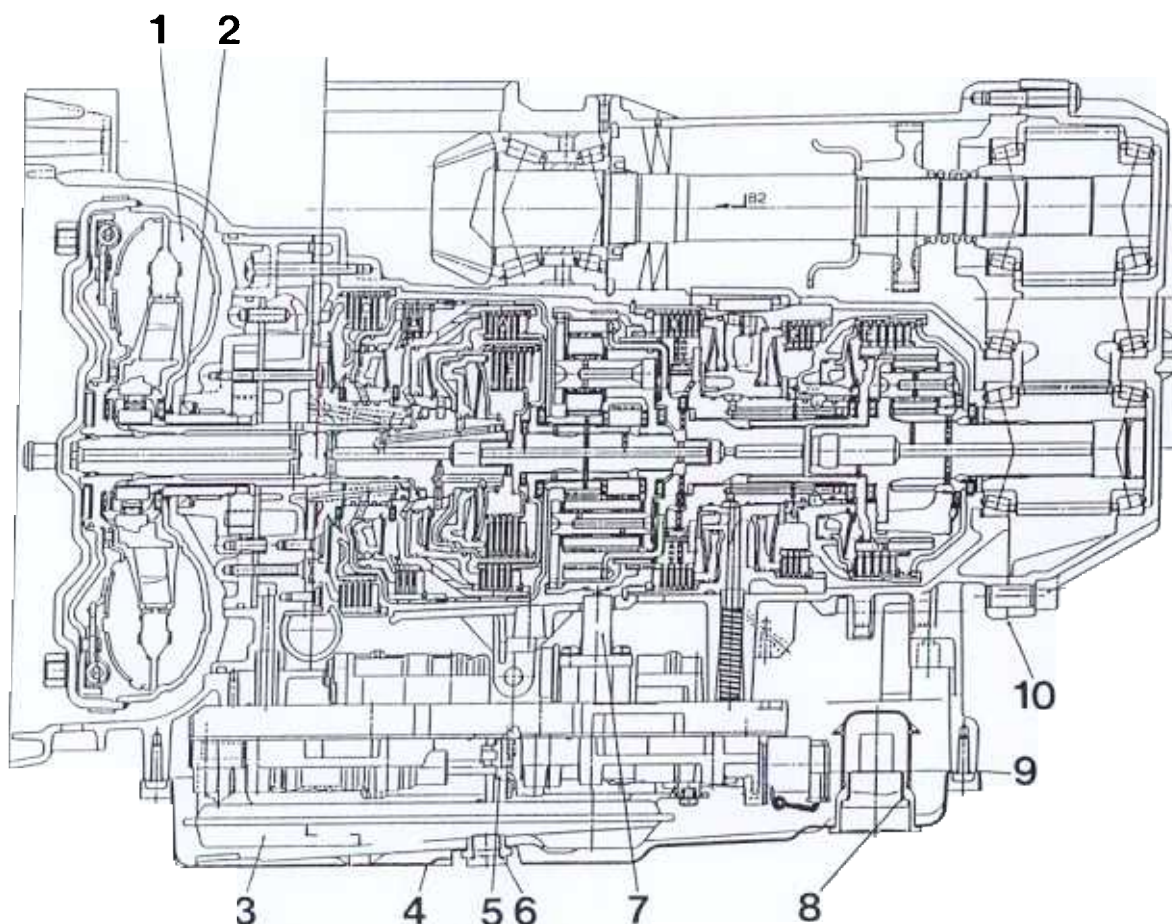
Technical data

General data	Transmission A86/00/05
Type	Fully automatic 5-speed planetary gear set (Tiptronic)
Transmission ratio	
Spur gear	1.25 (*1.21)
1st gear	3.67
2nd gear	2.00
3rd gear	1.41
4th gear	1.00
5th gear	0.74
Reverse gear	4.10
Final drive	hypoid bevel gear drive with 10 mm offset
Final drive ratio	11:37 i=3.364. As of 23.9.97– 9:30 i=3.333
Stall speed	2300...2700 (*2200...2600)
Filling capacity rear wheel gear	0.8 l transmission oil
Automatic section:	
New filling (with converter)	Approx. 9 l
Change quantity	Approx. 3.5 l
Lubricant	See Parts Catalogue

Note

The parts marked with (*) refer only to the transmission **A86/05**.

Technical data



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- 1 - Torque converter
- 2 - Sealing ring for torque converter
- 3 - ATF filter
- 4 - ATF pan
- 5 - Hydraulic control unit

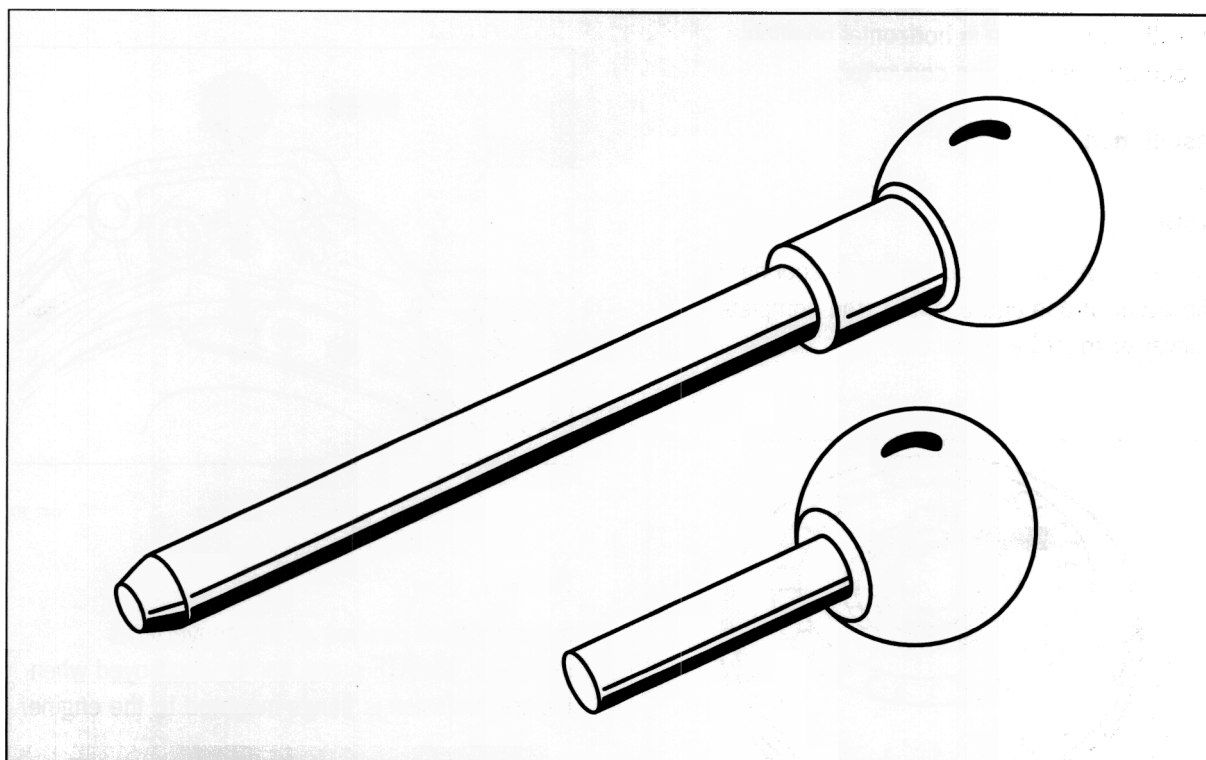
- 6 - ATF drain plug
- 7 - Transmission input speed sensor
- 8 - ATF filler screw
- 9 - Gasket for ATF pan
- 10 - Gasket for spur gear

Technical data**Tightening torques for Tiptronic transmission**

Location	Thread	Tightening torque Nm (ftlb.)
ATF filler screw to ATF pan	M30	80 (59)
ATF drain plug to ATF pan	M16	40 (29)
ATF pan to transmission housing	M6	10 (7)
ATF strainer to hydraulic control unit	M5	6 (4)
Hydraulic control unit to transmission housing	M6	8 (6)
Sensor for transmission input speed to hydraulic control unit	M6	6 (4)
Solenoid valves to hydraulic control unit	M5	6 (4)
Sensor for transmission speed to transmission housing	M6	6 (4)
Multi-function switch to transmission housing	M6	8 (6)
Short flanged shaft to differential	M8	25 (18)
Cover for final drive to transmission housing	M8	23 (17)
Plug to cover for final drive	M18	30 (22)
Mounting saddle for long flanged shaft to transmission housing	M8	23 (17)
Housing for spur gear to transmission housing	M8	23 (17)

32 50 19 Removing and installing torque converter

Tools



32500002

Item	Designation	Special tool	Explanation
	Dowel pin (long)	9595/1	

Notes on removal and installation

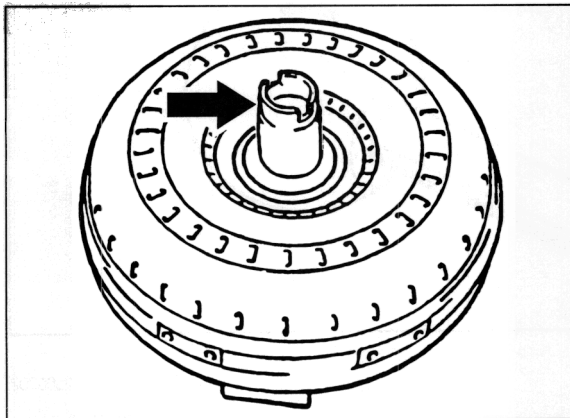
Removal

1. Remove transmission.
2. With transmission in horizontal position, carefully remove the converter.

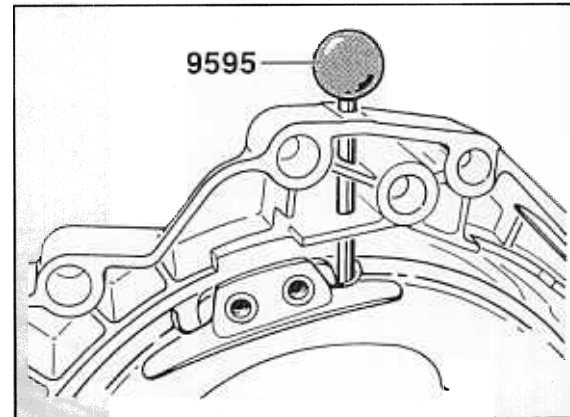
Installation

Note

Check converter hub for traces of scoring. In the event of damage or faults, the complete converter must be replaced.



32500001

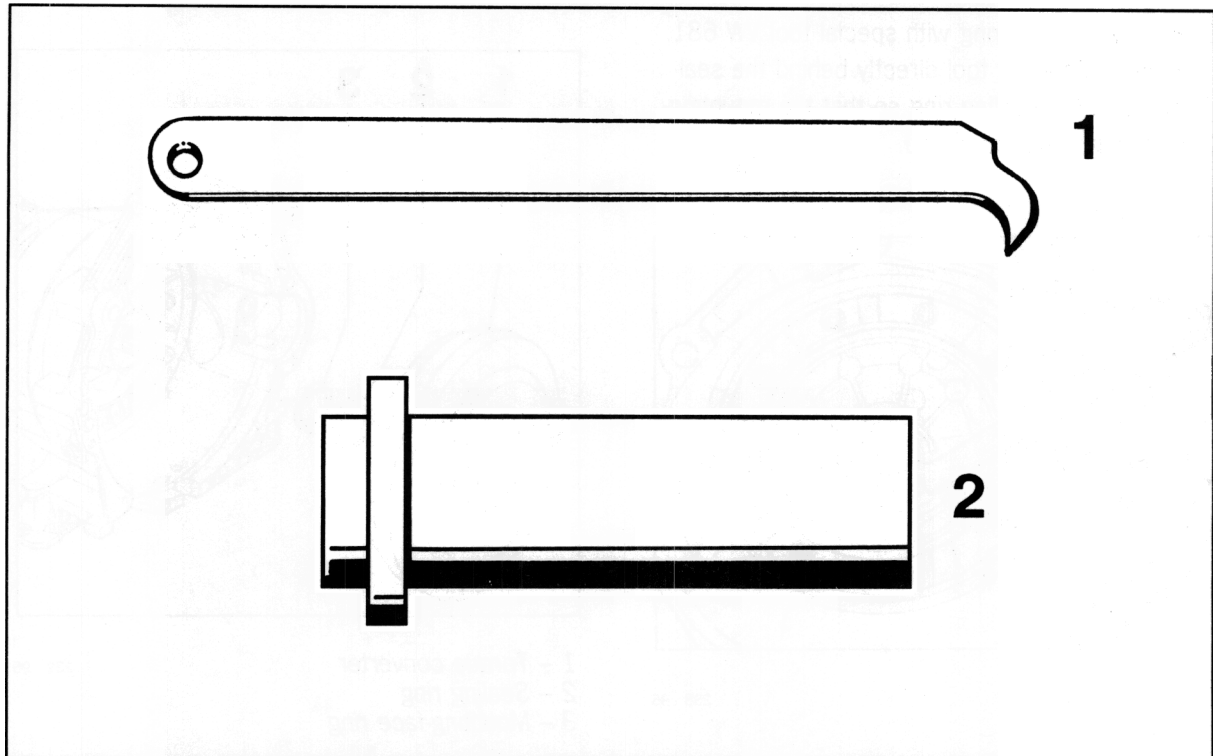


042_97

Note

If the installed position of the converter is incorrect, the ATF pump can be destroyed when the transmission is flange-mounted to the engine.

1. Grease the bearing pin of the converter with Longtime 3EP (Part No. 000.043.024.00).
2. Carefully push converter onto transmission shaft as far as the first stop. Then press converter by hand into the converter bell housing and turn it until the recess in the converter hub engages in the driver of the impeller and the converter perceptibly slides inward.

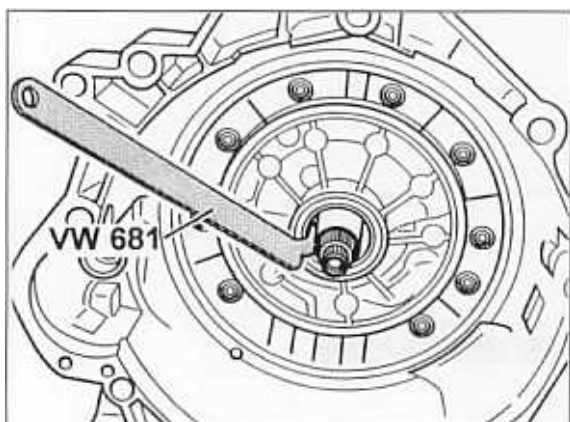
32 47 19 Removing and installing torque-converter sealing ring**Tools**

No.	Designation	Special tool	Explanation
1	Hook	VW 681	
2	Assembly sleeve	3295	

Notes on removal and Installation

Removal

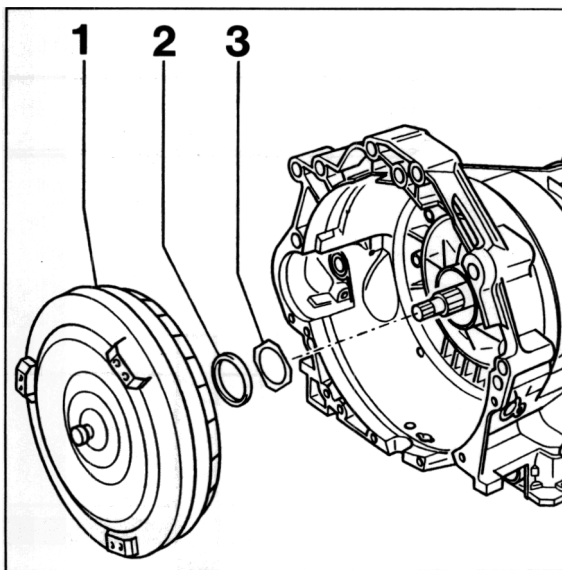
1. Remove transmission and converter.
2. Remove sealing ring with special tool VW 681.
Place the special tool directly behind the sealing lip of the sealing ring so that the mounting-face ring is not damaged.



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Installation

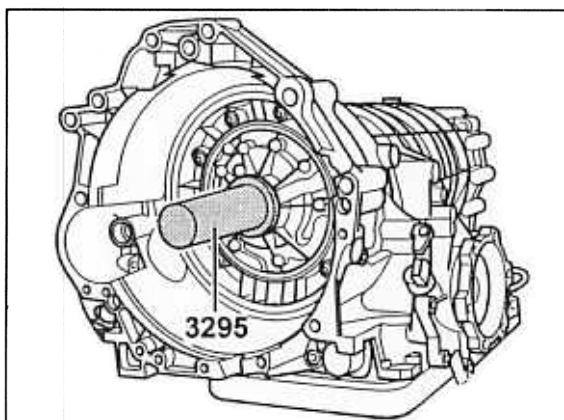
1. Replace mounting-face ring if damaged.



- 1 - Torque converter
- 2 - Sealing ring
- 3 - Mounting-face ring

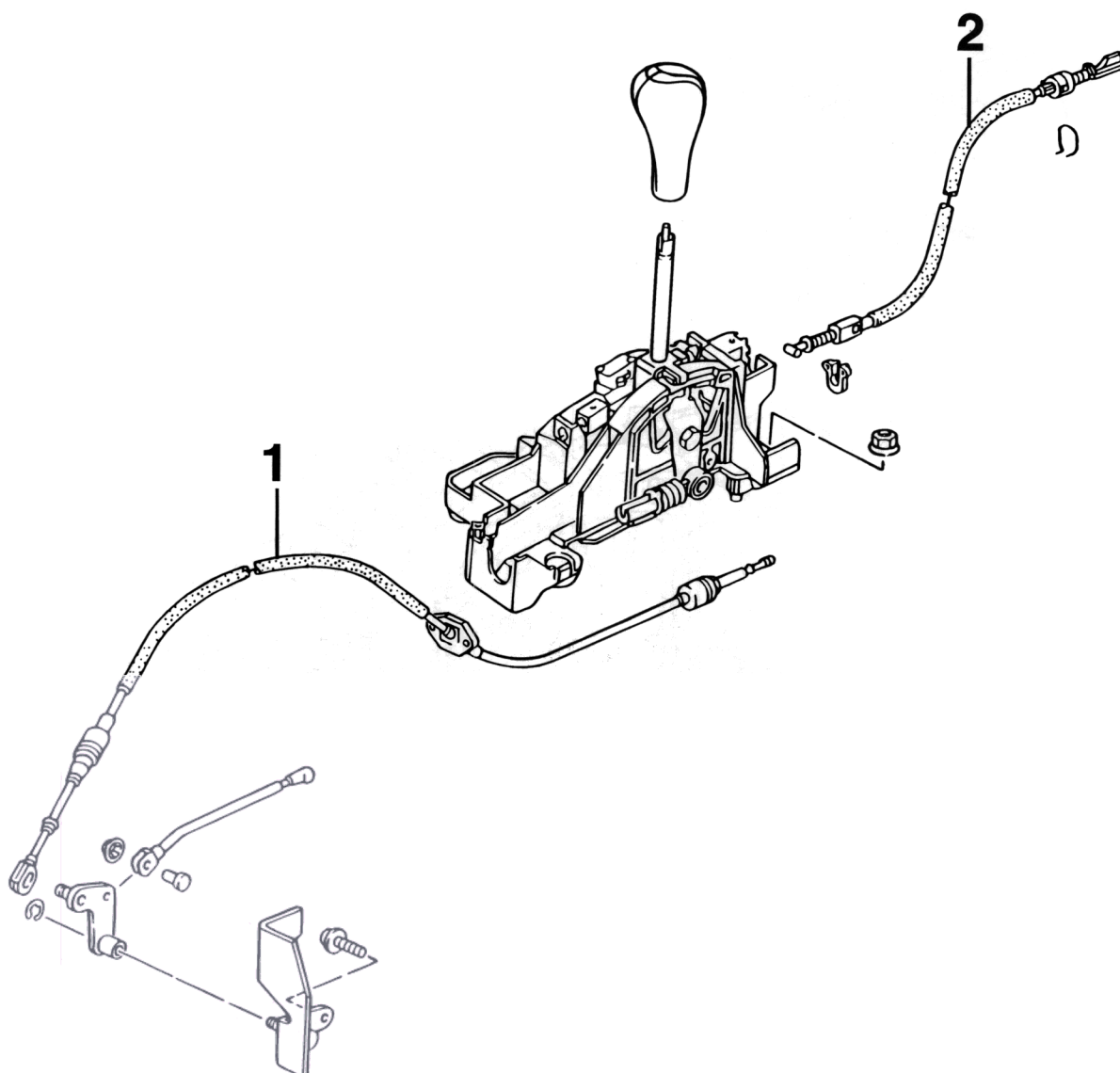
239 - 96

2. Thinly coat circumference and sealing lip of sealing ring with Vaseline and drive sealing ring home as far as the mounting face with special tool 3295.



240 - 96

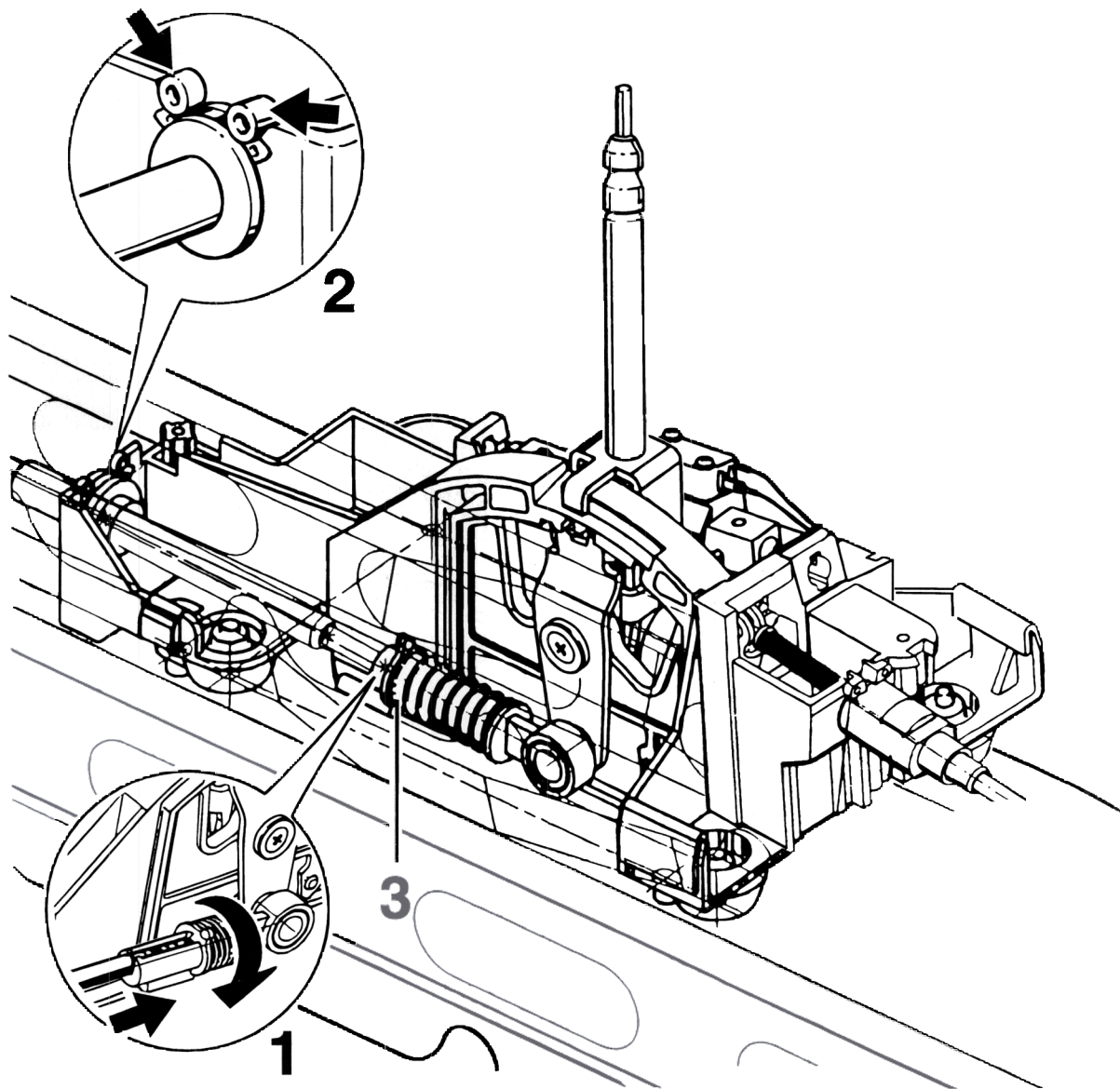
37 15 19 Removing and installing selector lever cable



- 1 – Selector lever cable
- 2 – Keylock cable

401-97

Removing and installing selector lever cable



407-97

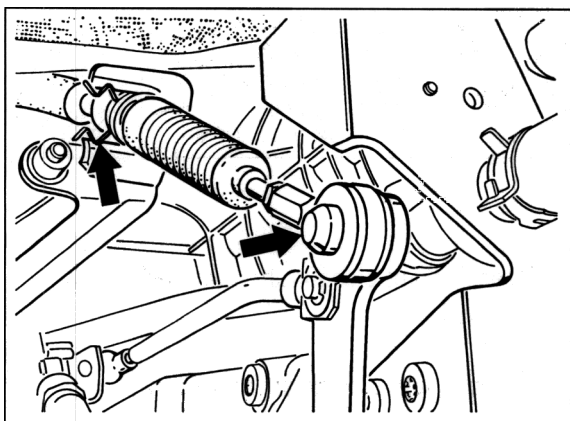
Removing and installing selector lever cable

Removal

Note

The selector cable must not be excessively bent or kinked.

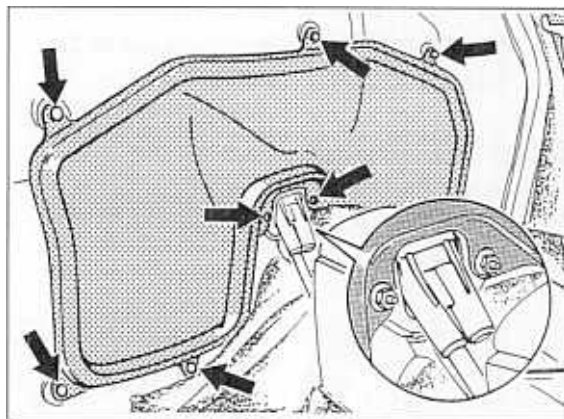
1. Move selector lever to "P" position.
2. Detach selector lever cable at deflection lever and at transmission support.



418-97

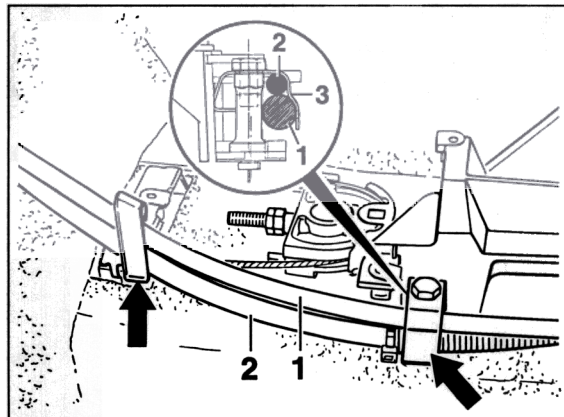
3. Remove selector knob (see Page 37 - A9).
4. Remove centre console (see Page 68 - 9).

5. Remove rear wall cover.



414-97

6. Remove cable holder.



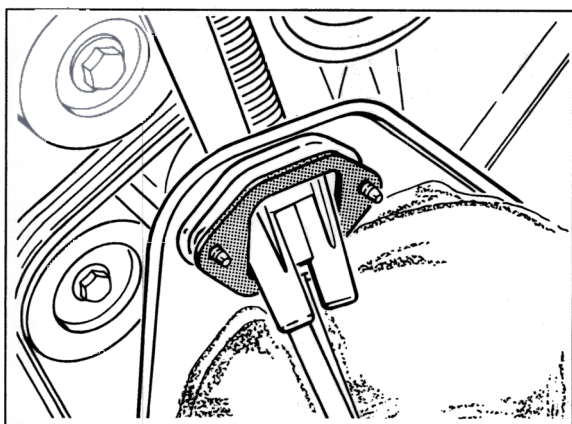
- 1 - Selector lever cable
2 - B+ cable

408-97

7. Disengaging selector lever cable:

- Slide the locking sleeve of the adjuster (1) forward and turn it clockwise to removal position.
- Press the retaining clip (2) together and carefully pull the cable upward out of the support bracket.

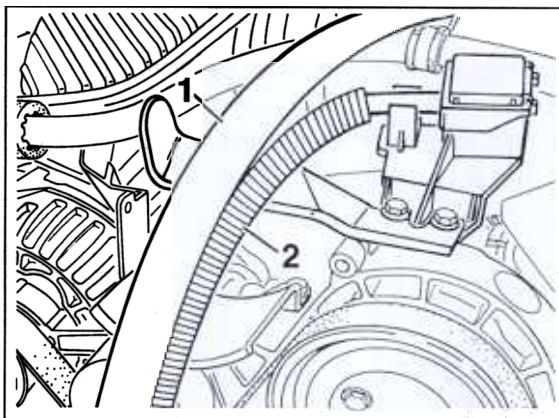
8. Press out locking piece and remove selector lever cable. Take care not to soil the passenger compartment.



404-97

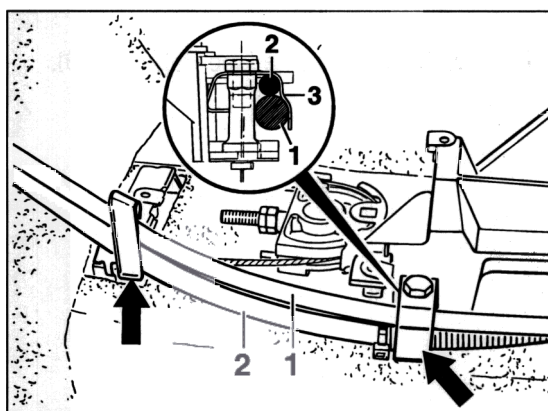
Installation

1. Route the selector lever cable (1) through the rear wall to the correct position on the transmission and fasten on the transmission.



415-97

2. Insert locking piece in the rear wall and fit rear wall cover.
3. Fasten cable on support bracket (2).
4. Fit cable holder.



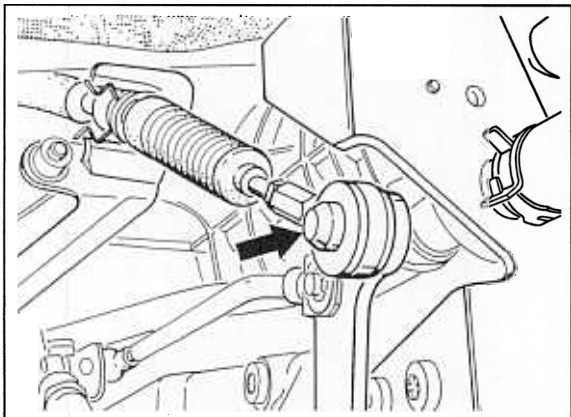
- 1 – Selector lever cable
2 – B+ cable

408-97

5. Move selector lever and transmission to position "P".
6. Press cable into the open adjuster (1) and close the adjuster (3).
The locking sleeve must move to the end position automatically.
7. Check adjustment of the selector lever cable (see Page 37 - A7).

37 15 15 Adjusting selector lever cable

1. Move selector lever and transmission selector shaft to position "P".
2. Adjust cable length at mounting head so that the cable can be fitted free of tension.



417-97

3. Check adjustment. To do this, select all gears and check that the gear is indicated in the right-hand instrument cluster. Also change gate from "D" to "M". A straight movement must be possible without catching.

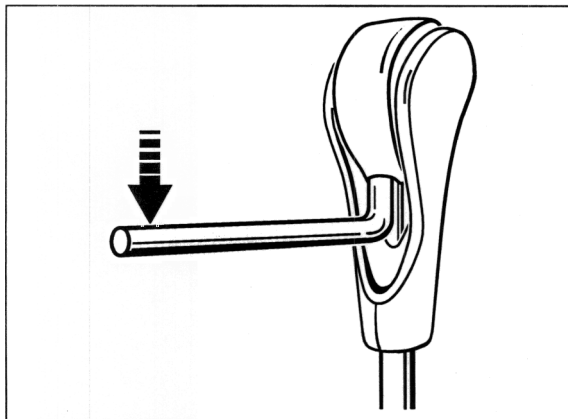
37 04 19 Removing and installing selector knob**Note**

In vehicles manufactured **before 21.1.1997**, the selector knob is only pushed on and can be pulled off by hand (important: observe Technical Information notice 3d/96).

As from 22.1.1997, Porsche has been installing a new gear selection actuator as standard, in which the selector knob is fixed in installation position with a spring clip.

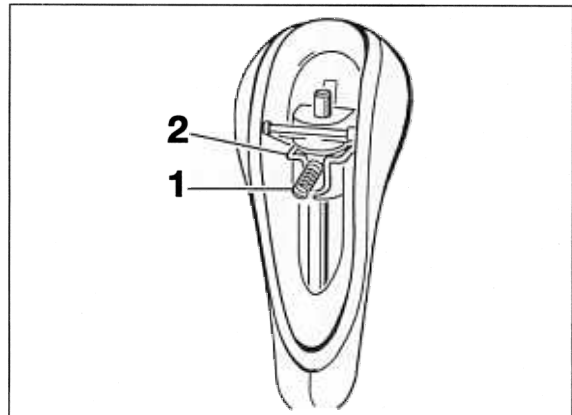
Removal

1. Lever off locking button with an angled pipe.
The locking button must be pressed so that the pipe section can be inserted between the shift lever and the locking button. To do this, turn the ignition key to "1" position.



085_97

2. Remove the compression spring and spring clip and pull off the selector knob.



- 1 – Compression spring
(conical as of 12.10.98)
- 2 – Spring clip

086_97

Installation

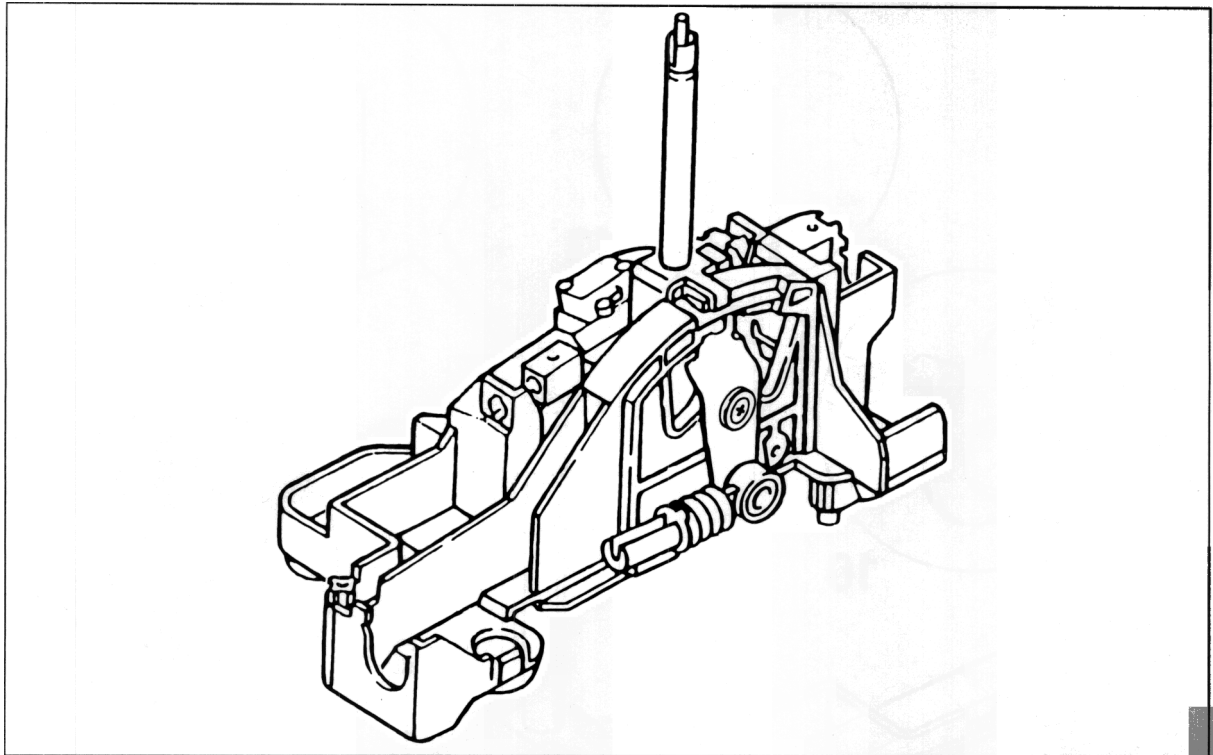
1. Assemble the selector knob with spring clip, compression spring and locking button.

Note

Fit conical compression spring with the small diameter facing the guide peg.

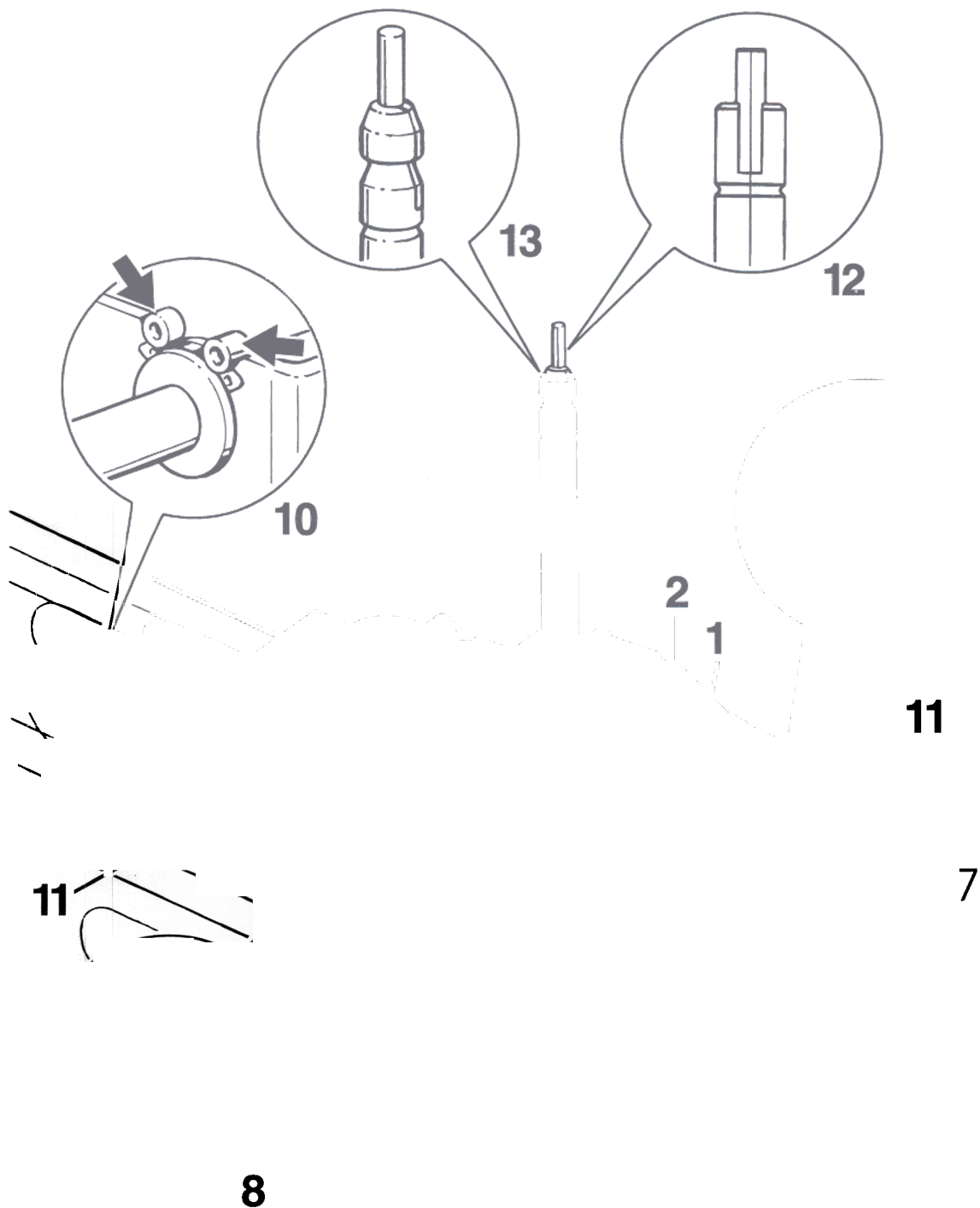
2. Press the complete selector knob onto the shift lever until it bottoms and check function of the locking button.

37 08 19 Removing and installing selector support



089-97

Removing and installing selector support



431-97

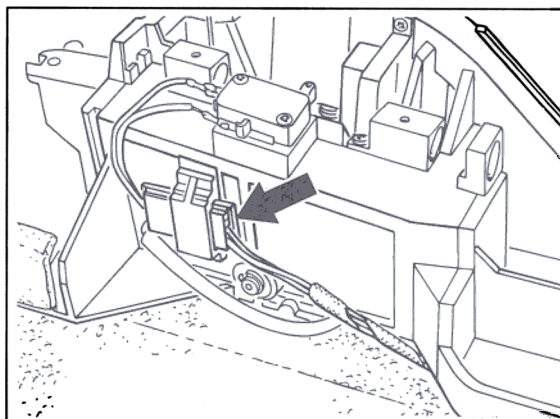
- 1 – Cable nipple
- 2 – Keylock lever
- 3 – Adjuster
- 4 – Retaining clip
- 5 – Cable sleeve
- 6 – Selector support
- 7 – Locking button
 - A = Close adjuster
 - B = Open adjuster
- 8 – Adjuster (open)
- 9 – Adjuster (closed)
- 10 – Retaining clip
- 11 – Hexagon nut
- 12 – Selector lever until 21.1.1997
- 13 – Selector lever after 22.1.1997
(with spring clip)

Removing and installing selector support

Removal

1. Remove selector knob (see Page 37 - A9).
2. Remove centre console (see Page 68 - 9).
3. Move selector lever to position "D".
4. Disengaging keylock cable:
 - Open adjuster (3) by pressing the unlocking button (7).
 - Press the retaining clip (4) together and carefully pull the adjuster (3) upward out of the support bracket.
 - Disengage cable nipple (1) on the keylock lever (2).
5. Disengaging selector lever cable:
 - Slide the locking sleeve of the adjuster forward and turn it clockwise to removal position (8).
 - Press the retaining clip (10) together and carefully pull the cable upward out of the support bracket.

6. Disconnect plug connection.



406-97

7. Unscrew fastening nuts (11).

Installation

Install in reverse order, observing the following points:

1. Tighten fastening nuts (11) to **10 Nm (7.5 ftlb.)**.
2. Fastening selector lever cable:
 - Press the cable into the support bracket until the retaining clip engages in the housing (10).
 - Press cable into the open adjuster (8) and close the adjuster (9). The locking sleeve must move to the end position automatically (9).

3. Fastening keylock cable:

Note

The keylock cable should only be adjusted when the selector lever **is fitted**.

- Install selector knob (refer to Service No. 37 04 19).

Turn ignition key to position "1" (ignition on) and move selector lever to position "D".

- Open adjuster (3).

Engage cable nipple (1) on the keylock lever (2).

Press housing for adjuster (3) into the support bracket until the retaining clip (4) engages.

Move selector lever to position "P" and turn ignition key to position "0" (removal position).

- Press cable sleeve (5) toward the selector support.

Release cable and press locking button (7) until it engages.

4. Check keylock function:

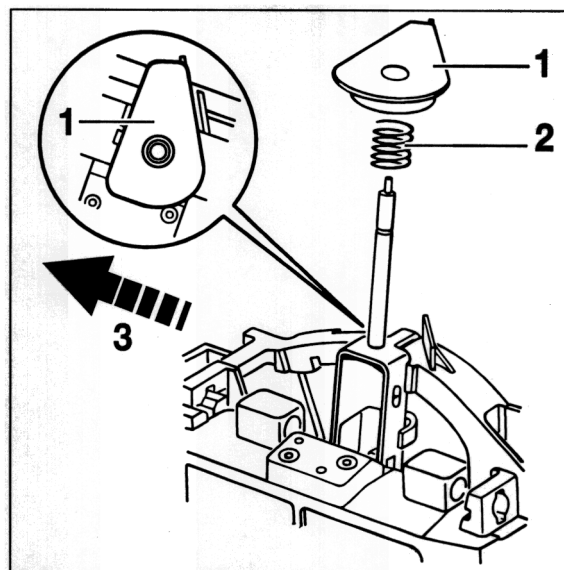
Turn ignition key to position "1" (ignition on).

Move selector lever from position "P" to "D" and turn ignition key counter-clockwise. The removal position must not be reached.

Release ignition key again and engage selector lever position "P". In this position, it must be possible to remove the ignition key and the locking button must be locked.

5. Remove selector lever again.

6. Fit rotary valve in correct position and install centre console.



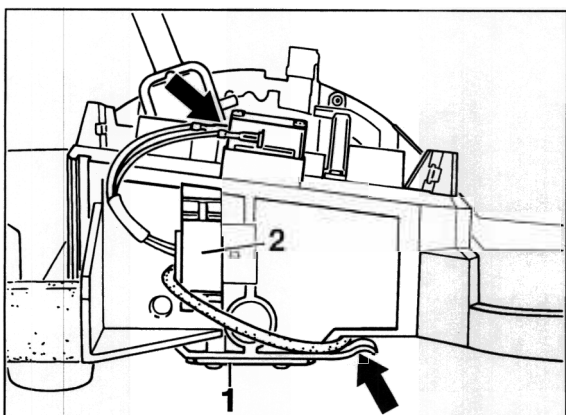
1 – Rotary valve
2 – Spring
3 – Direction of travel

541_97

37 87 19 Removing and installing shiftlock solenoid

Removal

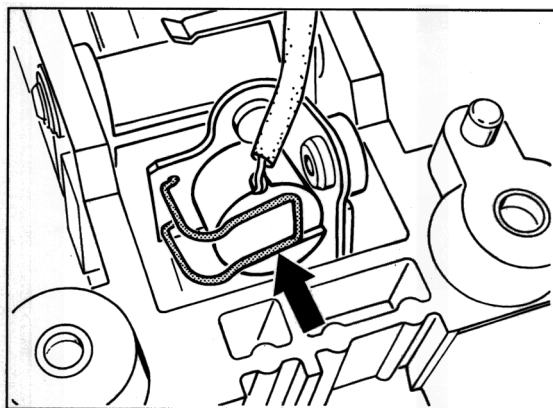
1. Remove centre console (see Page 68 - 9).
2. Removing and installing selector support (see Page 37 - A11).
3. Remove cover plate on selector lever support.
4. Pull off cable on manual switch, unclip holder for plug connection and remove cable from the cable guides.



420-97

- 1 – Cover plate
2 – Holder for plug connection

5. Pull solenoid holding clip only far enough away to permit the solenoid can be removed. Do not overstretch the holding clip.

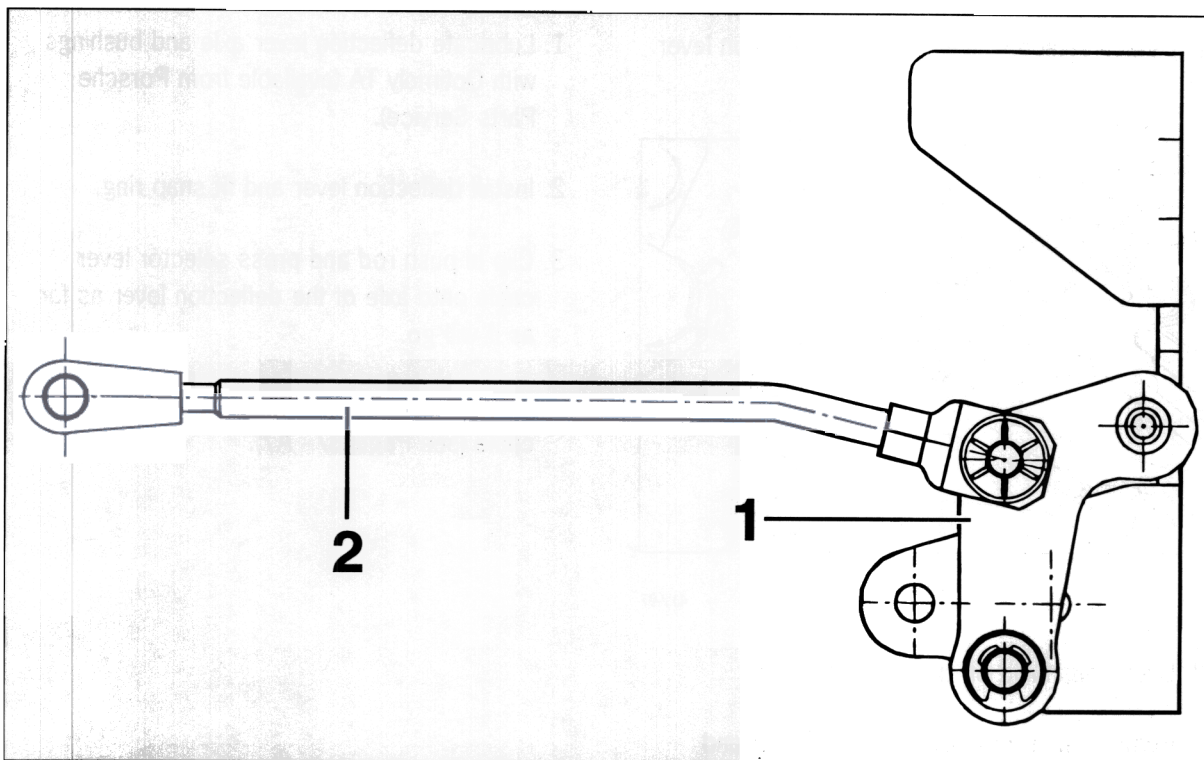


421-97

Installation

1. Fit solenoid in correct position and properly route cable underneath the cable guides (see figure at left).
2. Plug cable onto manual switch according to the wiring diagram and fasten plug connection with holder on the selector support.

37 60 19 Removing and installing deflection lever



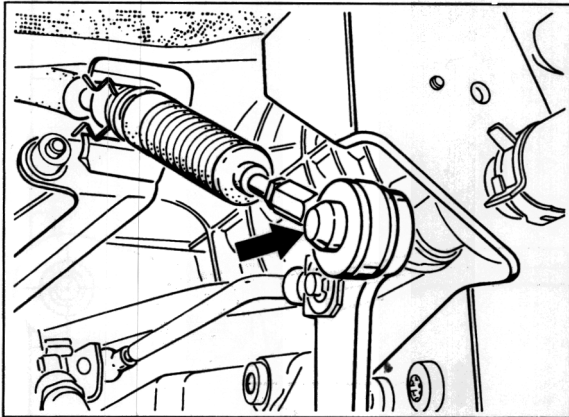
- 1 – Deflection lever
2 – Push rod

41697

Removing and installing deflection lever

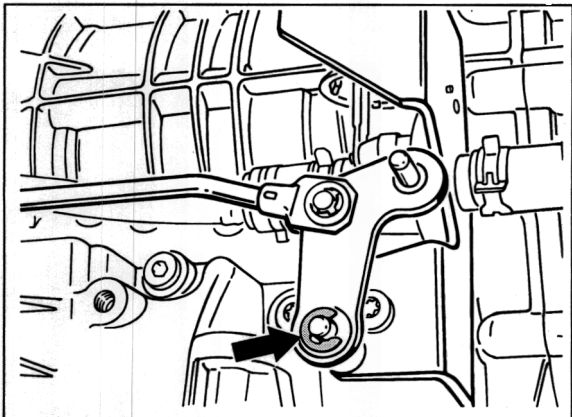
Removal

1. Detach selector lever cable at deflection lever.



417-97

2. Unclip push rod on transmission lever.
3. Remove snap ring for deflection lever and remove lever with push rod.



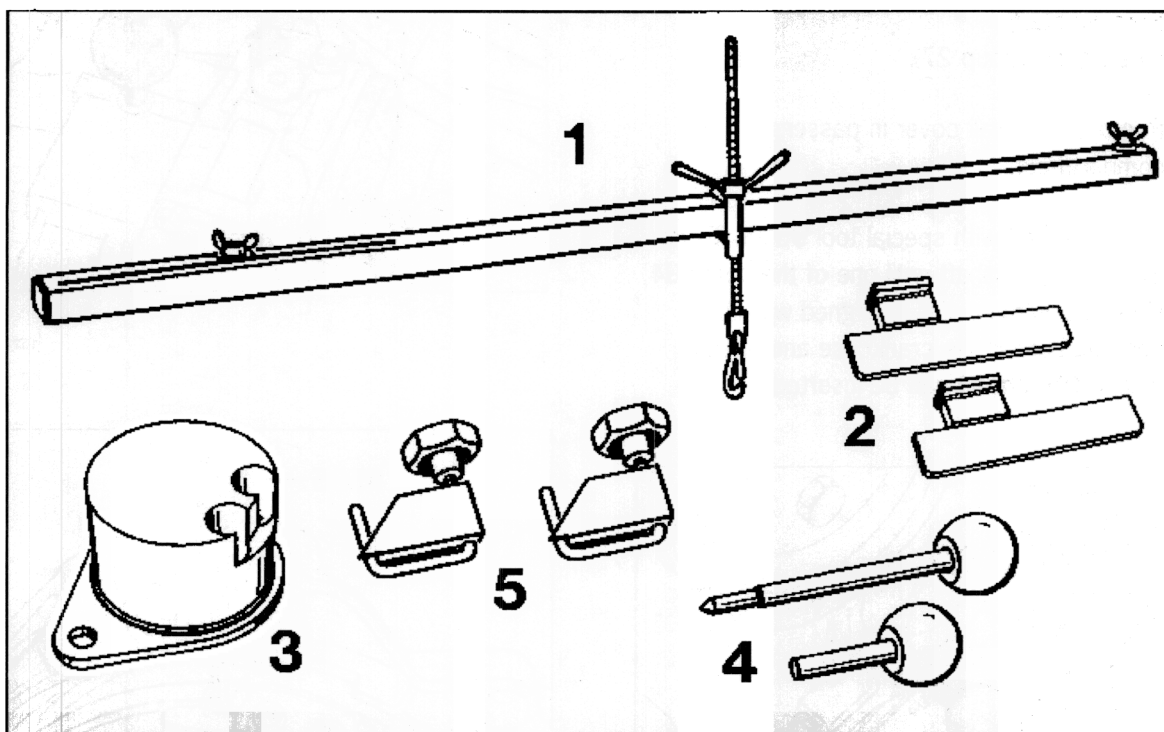
419-97

Installation

1. Lubricate deflection lever axle and bushings with Optimoly TA (available from Porsche Parts Service).
2. Install deflection lever and fit snap ring.
3. Clip in push rod and press selector lever cable onto axle of the deflection lever as far as it will go.
4. Check adjustment of the selector lever cable (see Page 37 - A7).

37 01 19 Removing and installing Tiptronic transmission

Tools



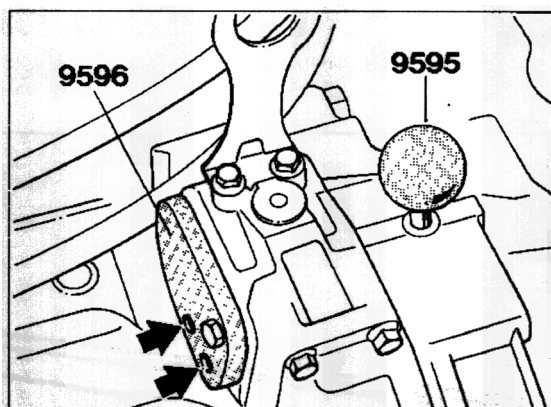
33696g

No.	Designation	Special tool	Explanation
	Support	10 - 222A	
2	Support feet	9591/1	
3	Assembly aid	9596	
4	Dowel pin	9595	
5	Hose clamp	3094	

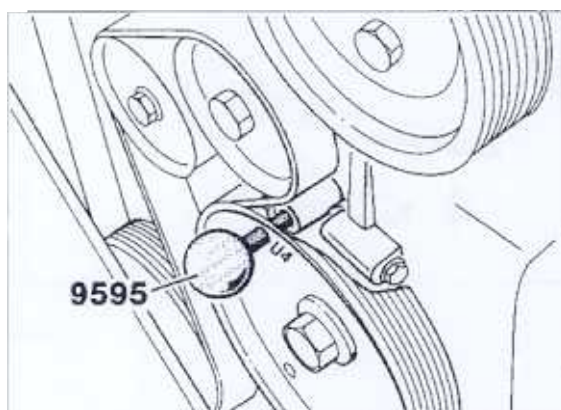
Removing and installing Tiptronic transmission

Removal

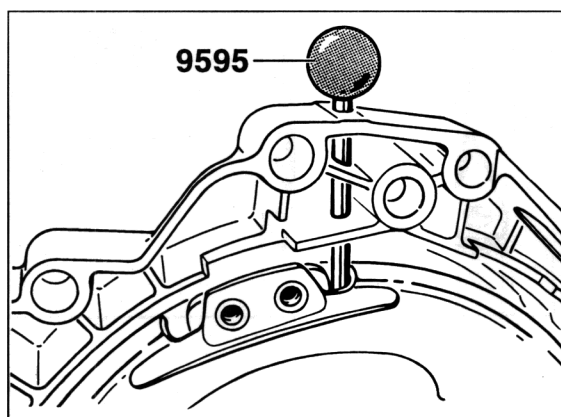
1. Disconnect battery.
2. Remove starter
(see Repair Group 27).
3. Remove rear wall cover in passenger compartment.
4. Fix crankshaft with special tool **9595**. To do this, turn crankshaft until one of the bores U4, U5 or U6 in the pulley is aligned with the centring bore in the crankcase and special tool **9595 (short)** can be inserted.



152-96



151-96



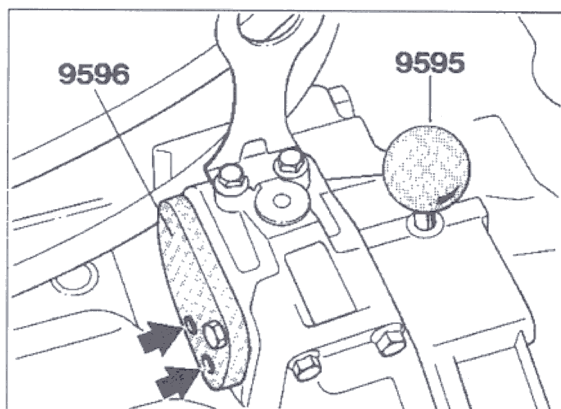
042-97

5. With special tool 9595 (**long**), hold converter in installation position.

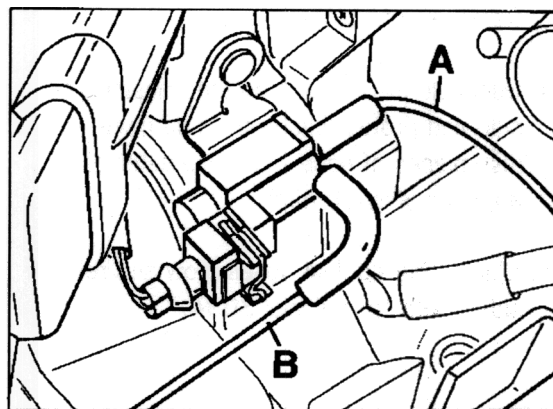
Note

If the special tool cannot be inserted, the crankshaft was not fixed properly. Check Step 4.

6. Install special tool 9596 and unscrew two of the six converter fastening screws with a 6-mm Allen socket insert (long).



152-96



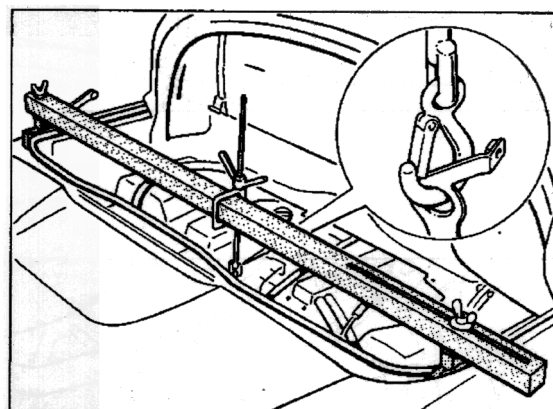
352-96

8. Hold engine in installed position with special tools 10 - 222A and 9591/1 at transport shackle.

Note

For the remaining four fastening screws, remove special tool 9595, rotate crankshaft through a further 120° in each case (to pulley marking U4, U5 or U6) and fix again.

7. Pull off vacuum pipe (B) at switch-over valve.



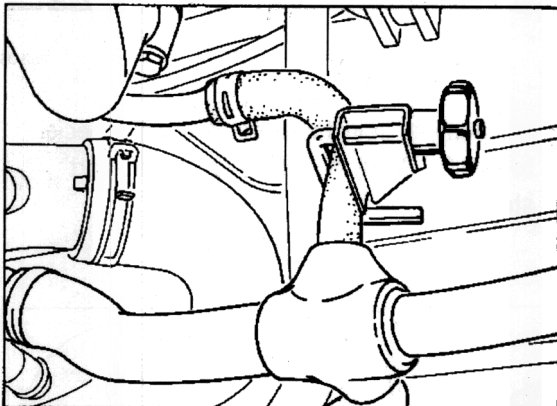
194-96

9. Remove diagonal braces and cross-member panel.
10. Remove stabilizer.
11. Remove silencers with catalytic converters.
12. Remove rear cross member (V-brace).

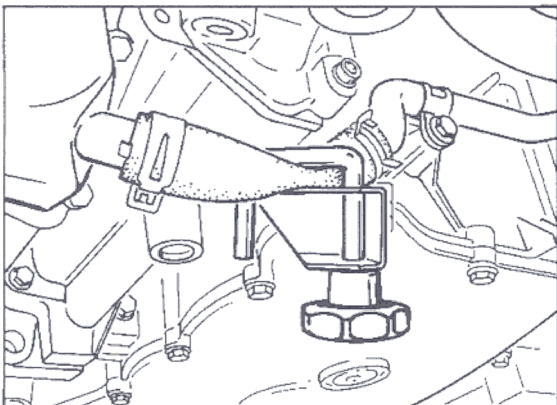
13. Remove front cross member.

14. Uncouple drive shafts on the transmission side and protect shafts from damage (use pieces of hose with a diameter of approximately 30 mm).

15. Clamp shut coolant hoses (flow and return sides) with special tool **3094**.



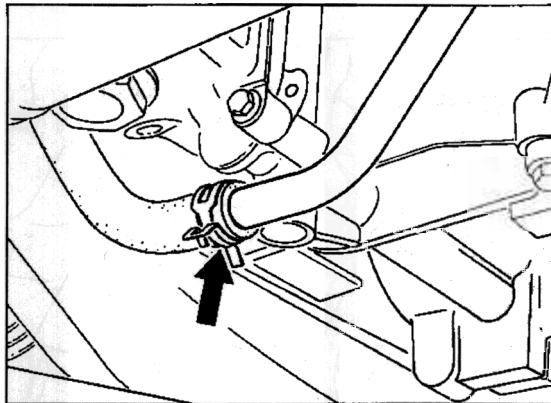
319-96



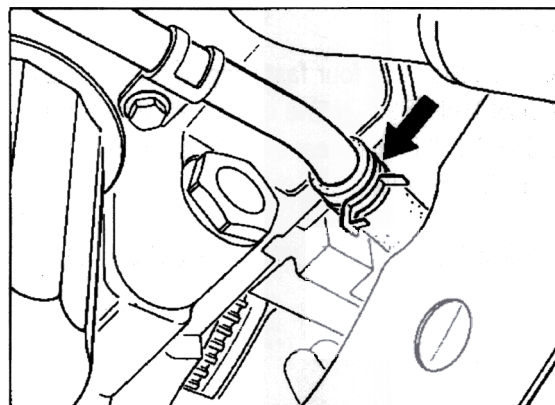
325-96

16. Place oil collection tray under the transmission.

17. Relieve spring-band clamps and pull off coolant hoses on flow and return sides.



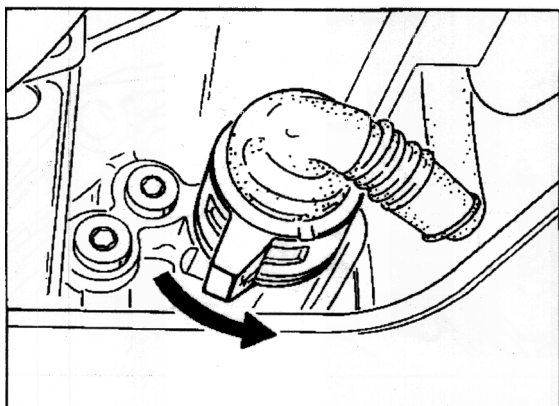
348-96



349-96

18. Disconnect plug connection for multi-function switch.

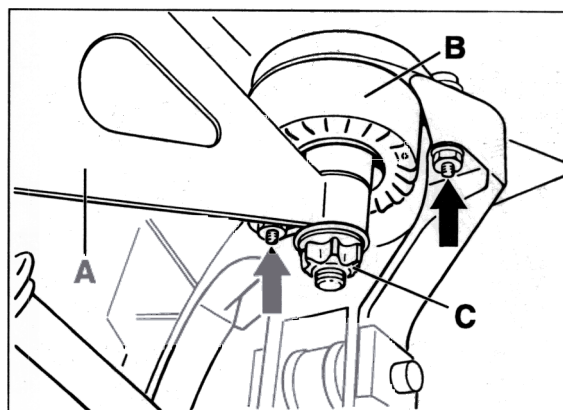
19. Disconnect plug from transmission socket.
To do this, turn plug anticlockwise and pull off.



350-96

Note

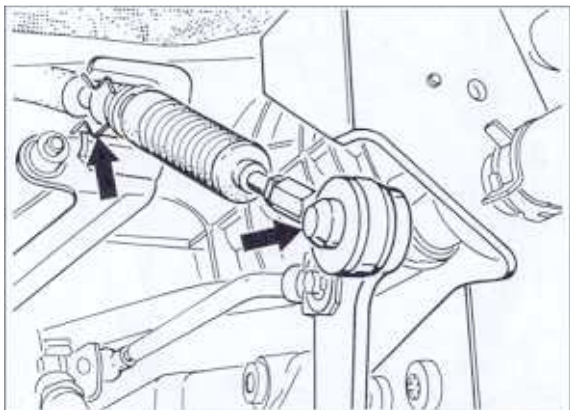
Fastening nut "C" (M12) must not be loosened. Otherwise, the transmission prop will be damaged.



435-97

20. Detach selector lever cable at deflection lever and at transmission support.

A – Transmission support
B – Hydraulic mount
C – Fastening nut M12

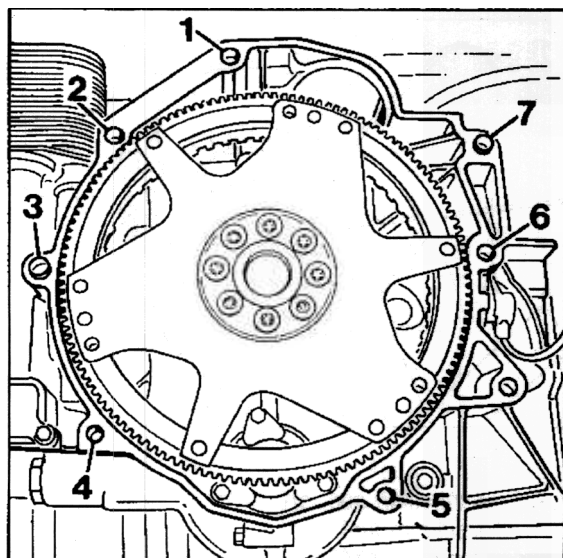


418-97

21. Place transmission jack under the transmission and fasten fixing strap.
22. Remove transmission support **with** left and right hydraulic mounts.

23. Unscrew transmission/engine fastening screws.

For screw No. 5, use polygon wrench (10 mm, part no. 999.571.052.02).



351-96

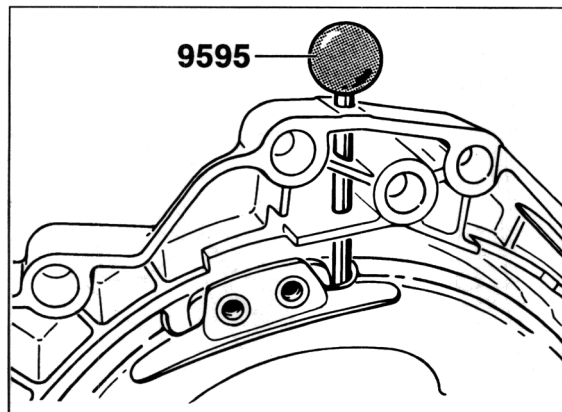
24. Pull transmission to the rear and lower it carefully.

Installation

Install in the reverse order.

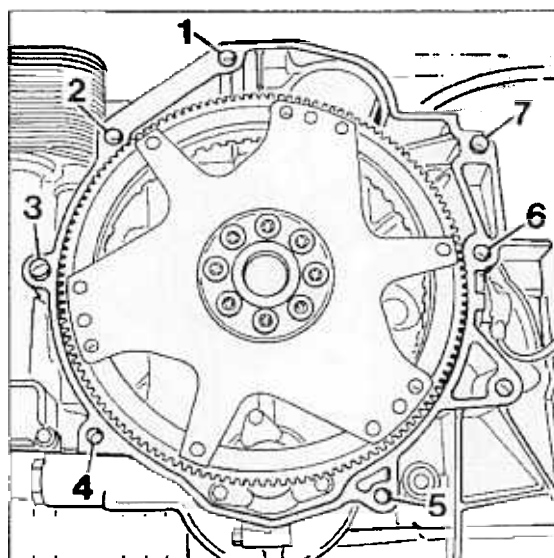
1. Ensure perfect seating of dowel sleeves in crankcase.

2. Fix installed position of converter with special tool 9595 (long).



042-97

3. Carefully insert transmission and fasten to engine.



351-96

No.	Screw/Nut	Nm (ftbl.)
1	M12 x 70	85 (63)
2	M12 x 90	85 (63)
3	M12 x 70	85 (63)
4 *	M10	45 (33)
5 **	M10 x 35	45 (33)
6 ***	M12 x 90	85 (63)
7	M12 x 100	85 (63)

Hexagon nut
10 mm multiple-tooth nut
With washer

4. Install transmission supports with right und left hydraulic mounts.

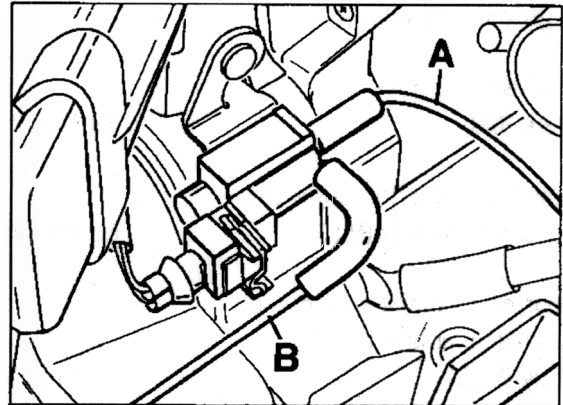
Note

For reasons of space, install the right transmission support first. To do so, move transmission to the left.

5. Remove dowel pins (special tool **9595**).
6. Push vacuum pipe onto switch-over valve.

Note

The two vacuum pipes must not be confused. Transmission cooling will otherwise be inadequate.



352-96

A – from vacuum reservoir
B – to the flat-base valve on the transmission

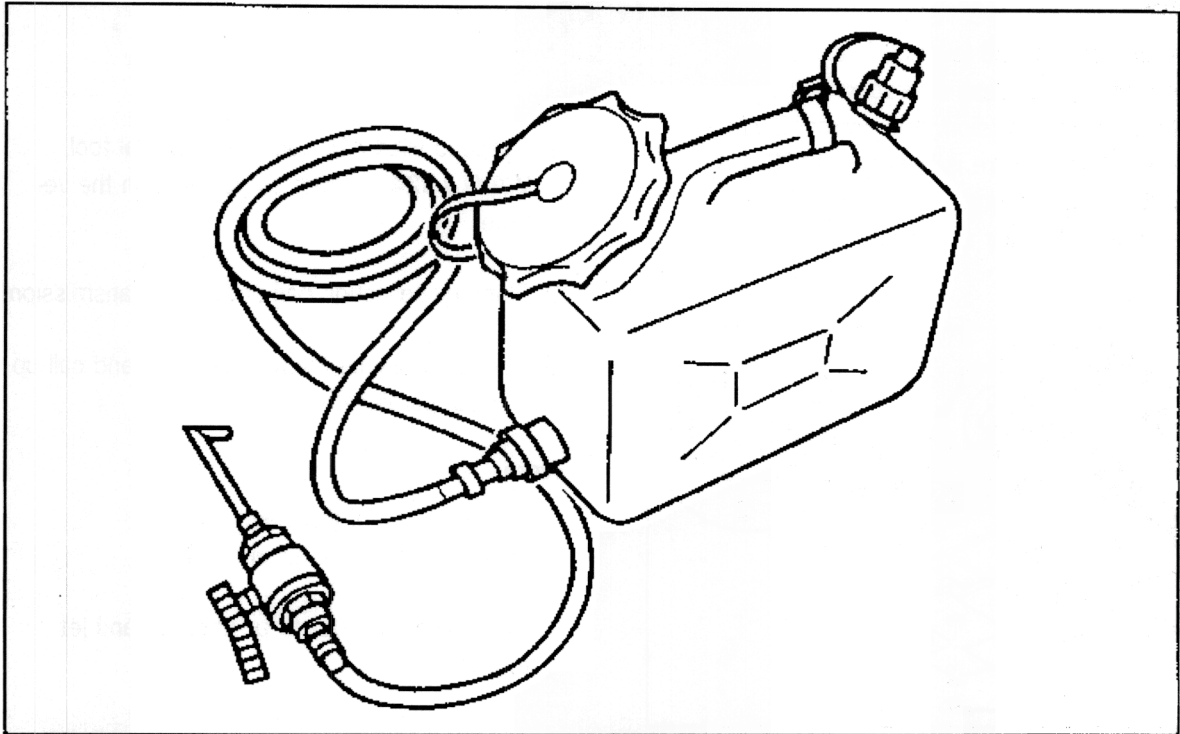
7. Check selector lever cable adjustment
(see Page 37 - A7).
8. Check coolant level (see Repair Group 19).

Tightening torques:

Converter to drive plate (M8)	=	39 Nm (29 ftlb.)
Diagonal brace to carrier side section and body (M10)	=	65 Nm (48 ftlb.)
Rear cross member (V-brace) to cross-member panel and body (M10)	=	65 Nm (48 ftlb.)
Stabilizer to carrier side section (M8)	=	23 Nm (17 ftlb.)
Stabilizer mount to stabilizer (M10)	=	46 Nm (34 ftlb.)
Drive shaft to transmission flange (M8)	=	39 Nm (29 ftlb.)
Transmission support to transmission (M10)	=	65 Nm (48 ftlb.)
Hydraulic mount to carrier side section (M8)	=	23 Nm (17 ftlb.)

37 02 35 Checking and topping up ATF fluid

Tools



235-96g

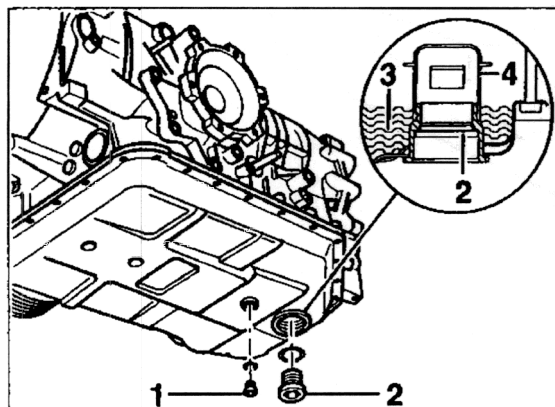
Item	Designation	Special tool	Explanation
	ATF filling system	V.A.G 1924	

Checking and topping up ATF fluid

Use only ATF approved by Porsche.
Refer to Parts Catalogue.

Note

The prescribed fluid level (3) is extremely important for faultless operation of the automatic transmission. It is correct if when the ATF temperature is between 30 °C and **40 °C** there is a slight emission of ATF at the bore in the filler screw (2).



236-96

Air conditioning and heater must be switched off.

The vehicle must be horizontal.

1. Suspend filled ATF container (special tool **V.A.G 1924**) as high as possible on the vehicle.
2. Place oil collection pan under the transmission.
3. Connect Porsche System Tester 2 and call up ATF temperature.

Note

At the beginning of the check, the ATF temperature must not exceed **40 °C**.

4. Move selector lever to position "P" and let engine idle.

Test conditions:

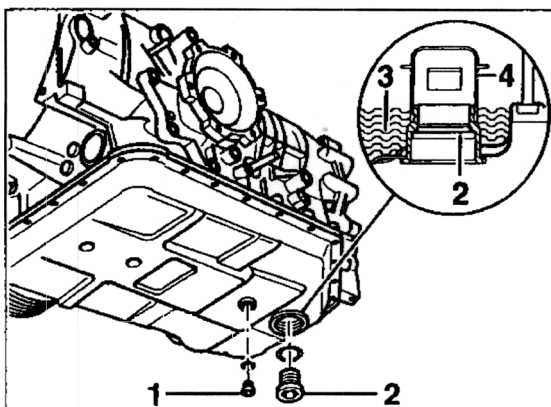
- The transmission must not be in the reduced driving program.

The ATF temperature must lie between 30 °C and 45 °C.

Checking ATF at an insufficient ATF temperature causes overfilling, while checking at an excessive ATF temperature causes underfilling.

Selector lever in position "P" and engine idling.

5. **Put on safety goggles** and unscrew ATF filler screw (2). If ATF emerges from the bore of the filler screw (2) and the ATF temperature is 30 °C...40 °C, the ATF level is correct.



236-96

Note

The filler hook must be carefully inserted into one of the openings in the ATF guard cap (4), which is set on the filler bore. Do not push filler hook upwards, otherwise the oil guard cap (4) can jump up and off.

6. Screw in ATF filler screw with new sealing ring and tighten to 80 Nm (59 ftlb.).

Note

The filler screw must be closed by the time the ATF temperature reaches **45 °C**.

7. If no ATF emerges from the filler screw (2) although approximately 40 °C has been reached, ATF must be topped up.
8. Top up ATF with special tool **V.A.G 1924** until excess ATF emerges at the bore (2).

37 02 55 Changing ATF fluid

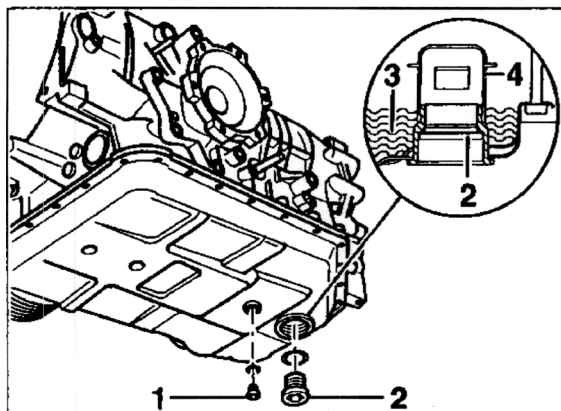
Filling capacity: **approximately 9 l**

Change quantity: **approximately 3.5**

Note

Use only ATF approved by Porsche.
Refer to Parts Catalogue!

1. Remove transverse strut member.
2. Place oil collection pan under the transmission.
3. Unscrew drain plug (1) and drain ATF.



236-96

6. Move selector lever to position "P" and allow engine to idle.

7. With engine running, top up ATF again until excess ATF emerges from the bore of the ATF filler screw (2).

8. With the brake pedal depressed, select all selector lever positions, holding each position for approximately 10 s.

9. Check ATF level again and top up.

Note

All instructions and test conditions for "Checking and topping up ATF fluid" must be observed.

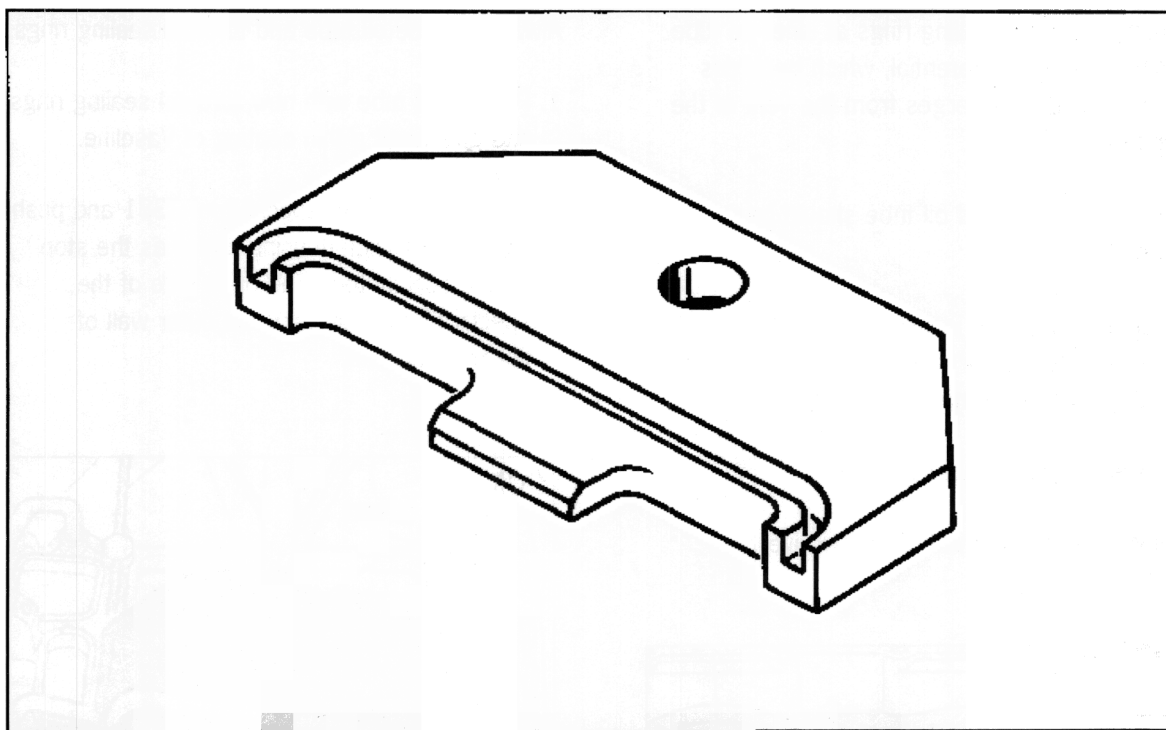
Note

The engine must not be started and the vehicle must not be towed without ATF.

4. Replace sealing ring for ATF drain plug (1) and tighten plug to 40 Nm (29 ftlb.).
5. Unscrew ATF filler screw (2) and top up ATF until excess ATF emerges from the bore of the ATF filler screw.

37 64 19 Removing and installing inner oil tube

Tools



261-96g

Item	Designation	Special tool	Explanation
	Insertion aid	3381	

Notes on removal and installation

Removal

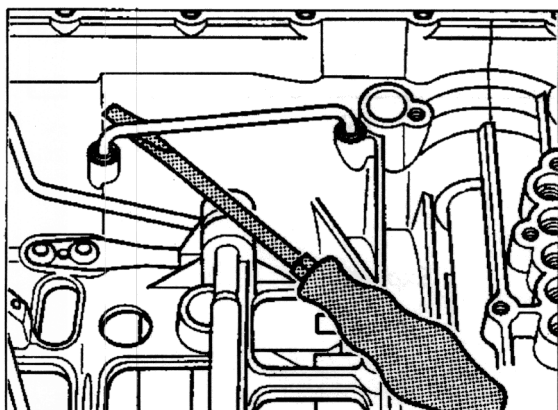
Notes

Defective toroidal sealing rings at inner oil tube let ATF enter the differential, which becomes overfilled, and oil emerges from the vent of the differential.

In general, a removed oil tube should be replaced.

The oil tube must be inserted only with special tool 3381. Otherwise there is a danger of leakage due to bending of the oil tube.

1. Remove hydraulic control unit.
2. Lever out oil tube with a screwdriver.



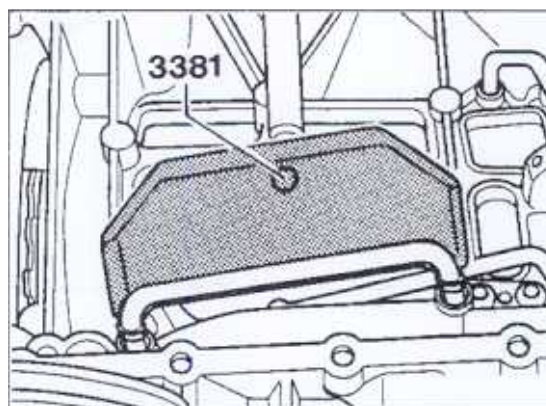
258-96

Installation

Note

Always replace oil tube and toroidal sealing rings.

1. Provide oil tube with new toroidal sealing rings and give rings a thin coating of Vaseline.
2. Insert oil tube into special tool 3381 and push into transmission housing as far as the stop on the special tool. The open side of the special tool should face the outer wall of the transmission.



259-96

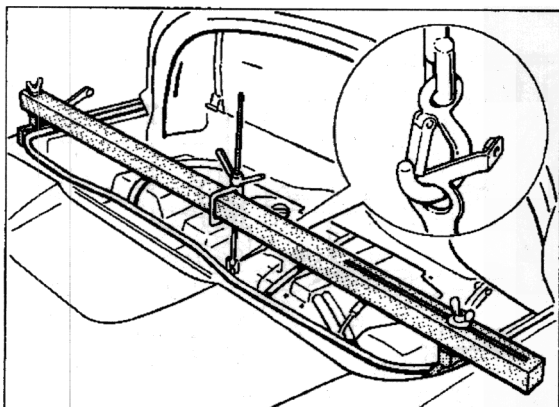
Note

Do not tilt oil tube. Drive in both tube ends equally.

37 31 19 Removing and installing multi-function switch

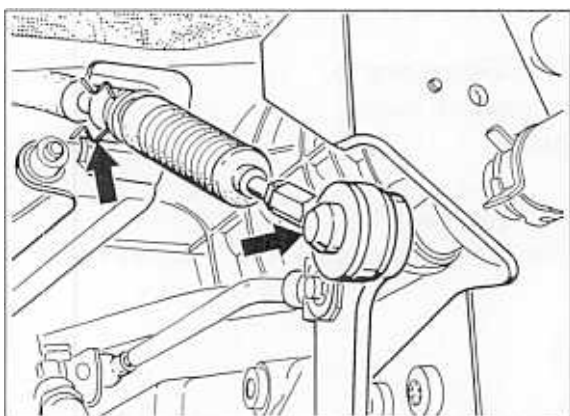
Removal

1. Hold engine by transport shackle in installed position with special tools 10 - 222A and 9591/1.



194-96

2. Remove the left catalytic converter.
3. Detach selector lever cable from deflection lever and transmission support.

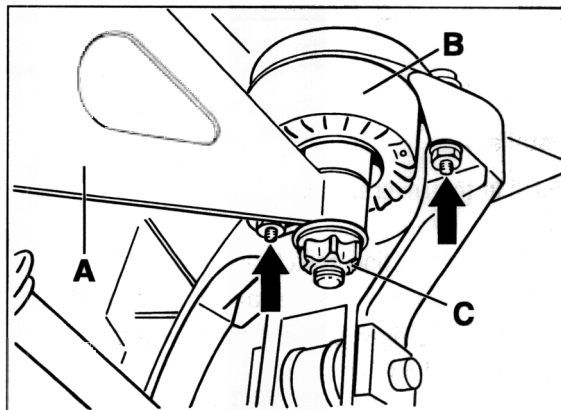


418-97

4. Place transmission jack under the transmission.
5. Remove the left transmission support with hydraulic mount.

Note

The fastening nut M12 (C) must not be loosened. The transmission support will otherwise be damaged.

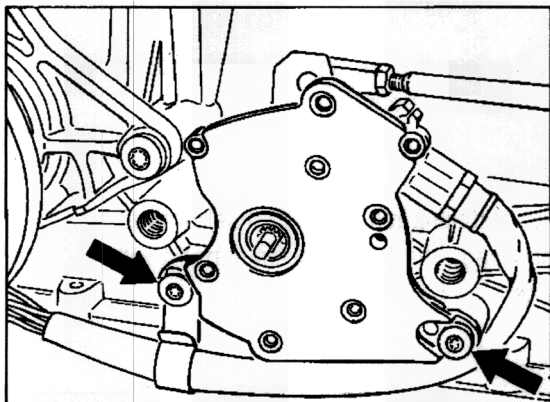


435-97

A – Transmission support
B – Hydraulic mount
C – fastening nut M12

6. Release and disconnect cable connection to multi-function switch.

7. Unscrew fastening screws and pull switch off the selector shaft.

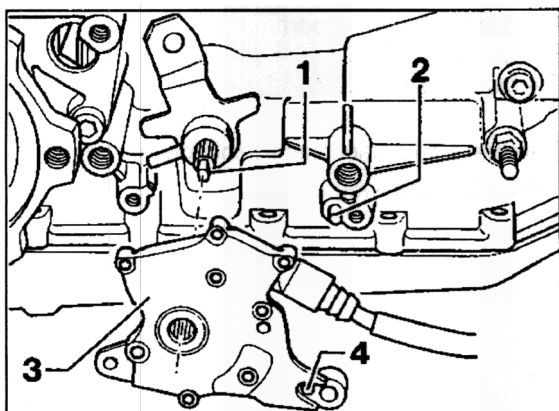


285-96

Installation

Install in the reverse order.

Put multi-function switch on the selector shaft. The flat point on the serrations in the switch (3) must lie against the flat point on the selector shaft (1).

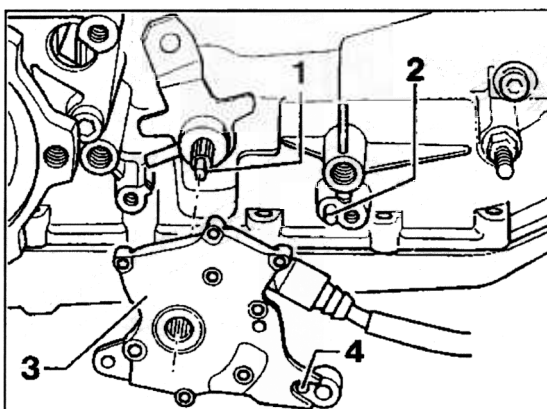


286-96

Note

Place multi-function switch on the selector shaft. Do not tilt or use force: you may damage the switch contacts.

2. Turn switch until the fitting bore (4) can be put on the dowel pin (2) on the transmission housing.



286-96

Tightening torques

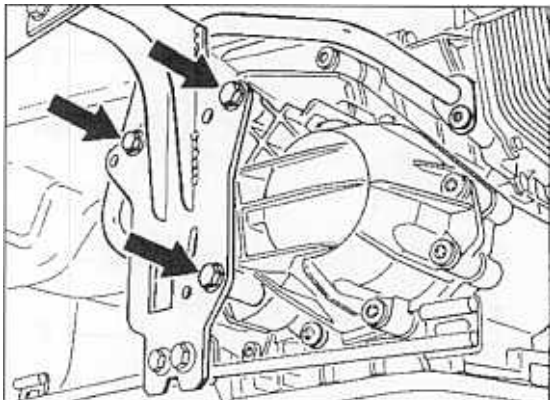
Multi-function switch to transmission housing (M6)	=	8 Nm (6 ftlb.)
Transmission prop to transmission housing (M10)	=	65 Nm (48 ftlb.)
Hydraulic mount to carrier side section (M8)	=	23 Nm (17 ftlb.)

37 50 19 Removing and installing gasket for spur-gear cover

Removal

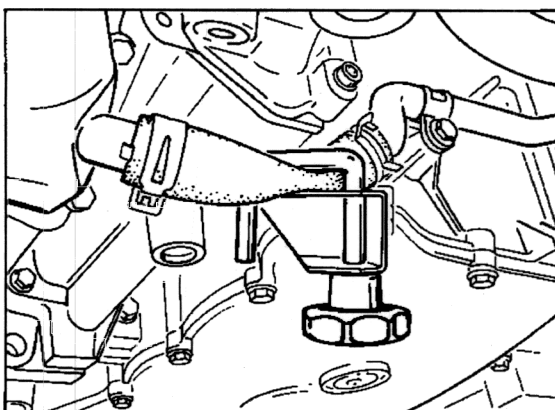
Remove silencers.

2. Unscrew silencer holder from transmission.



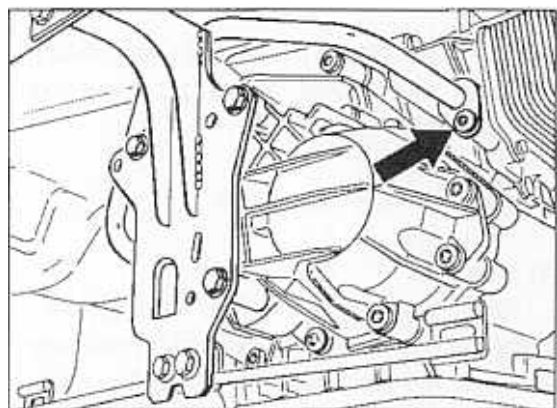
324-96

3. Clamp shut flow-side coolant hose with special tool 3094.



325-96

4. Unscrew flow-side coolant hose at port plate.



324-96-1

5. Place oil collection pan under the transmission.

6. Unscrew screws of spur-gear cover.

Note

Slowly and carefully remove cover from transmission housing. Otherwise the spur gears may fall out of the transmission housing. Spur gears that have fallen onto the floor must not be reinstalled. The gears must be exchanged in this event.

7. Remove cover and secure spur gears against falling out.

Note

If the spur gears have nonetheless been removed, when they are being replaced the markings must face outwards (away from transmission).

Installing

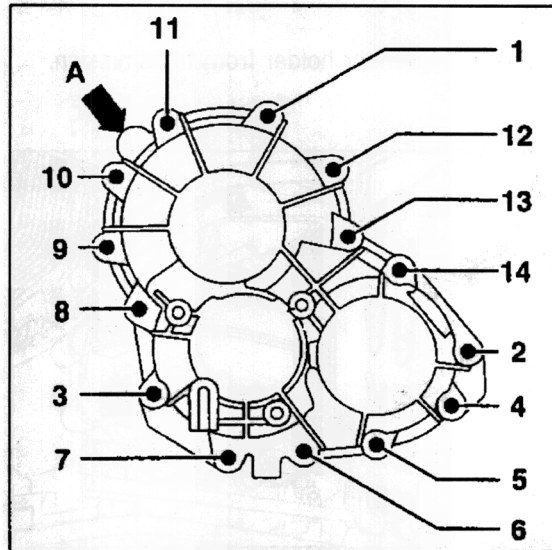
1. Ensure faultless seating of the dowel sleeve.
2. Screw two centring pins (special tool **9321**) into the transmission housing, put new gasket on and fit cover.
3. Tighten screws in two steps.

1st step:

Tighten screws 1, 2 and 3 by hand. Ensure that the gap between cover and transmission housing is equally reduced all round.

2nd step:

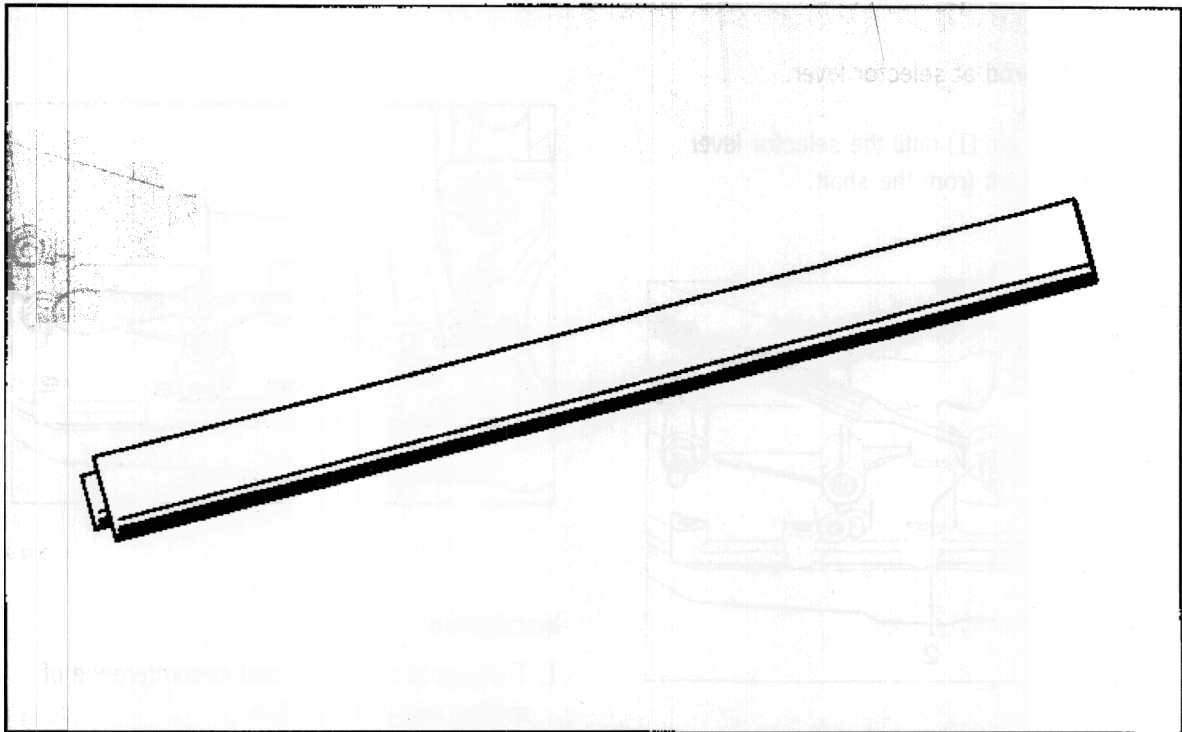
Tighten screws 1...14 in the stated sequence to 23 Nm (17 ftlb.).



323-96

A – Dowel sleeve

4. Check and top up ATF level (see Page 37 - A29).

37 33 19 Removing and installing sealing ring for selector shaft**Tools**

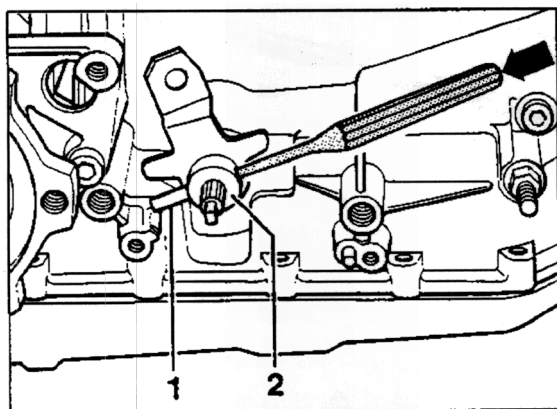
33096g

Item	Designation	Special tool	Explanation
	Mandrel	3385	

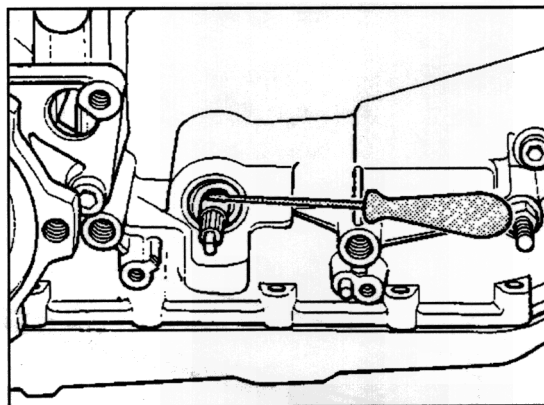
Removing and installing sealing ring for selector shaft

Removal

1. Remove multi-function switch (see Page 37 - A37).
2. Detach push rod at selector lever.
3. Drive out roll pin (1) until the selector lever can be pulled off from the shaft.
4. Pierce sealing ring with small screwdriver and pull out.



301-96



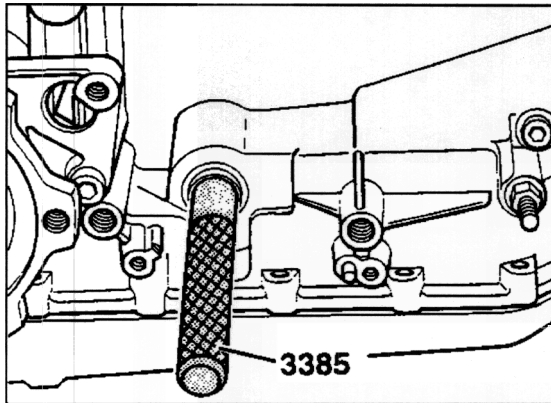
302-96

Installation

1. Thinly coat sealing lip and circumference of sealing ring with Vaseline.
2. Drive in sealing ring with special tool **3385** as far as the mounting face.

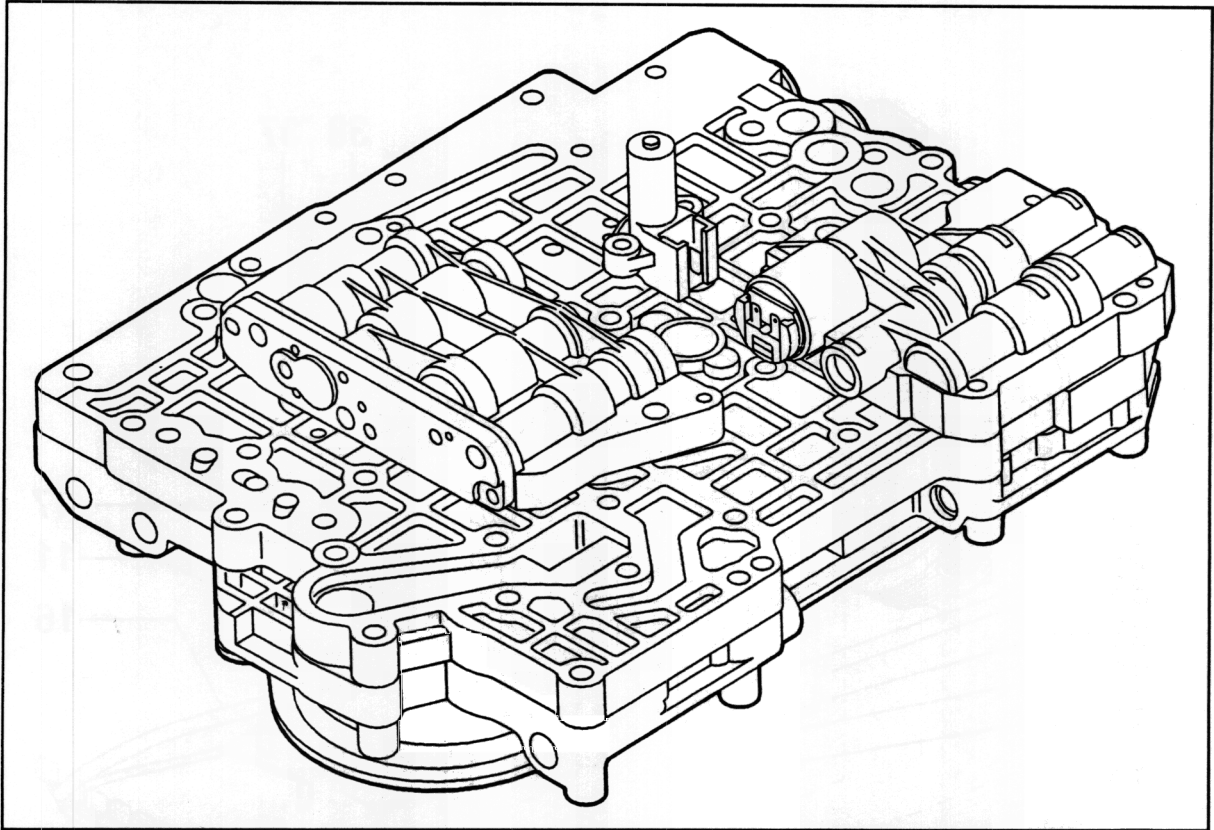
Note

The open side faces the transmission.

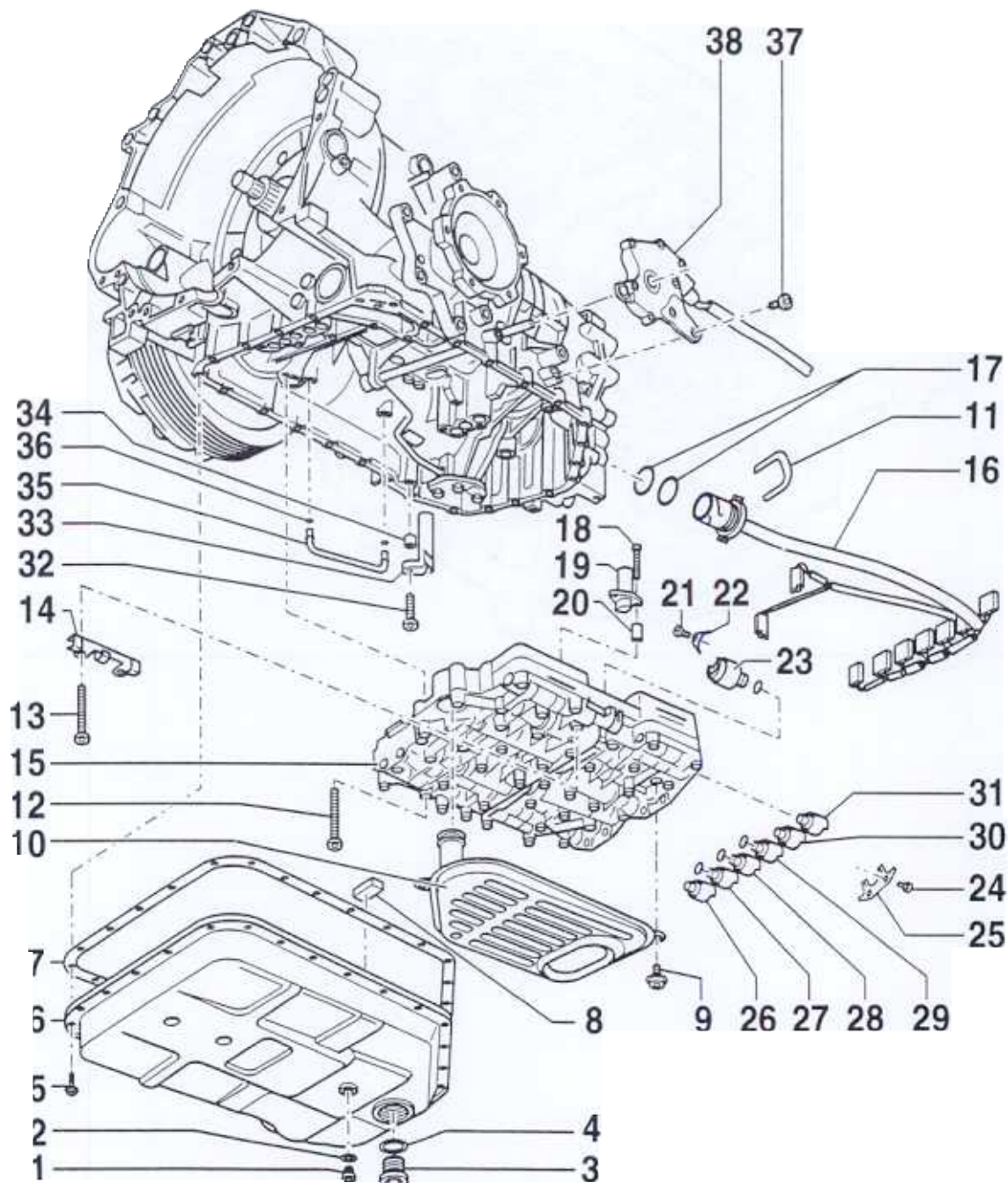


303-96

38 77 19 Removing and installing hydraulic control unit



Removing and installing hydraulic control unit



No.	Designation	Qty.	Removal	Note:	Installation
1	ATF drain plug	1			Tightening torque 40 Nm (29 ftlb.)
2	Sealing ring	1			Always replace
3	ATF filler screw (hexagon socket 17 mm)	1			Tightening torque 80 Nm (59 ftlb.)
4	Toroidal sealing ring	1			Always replace
5	Screw	27	Loosen crosswise		Tighten crosswise in several stages. Tightening torque 10 Nm (7 ftlb.)
6	ATF pan				
7	Gasket	1			Always replace
8	Magnet	4			Clean and lay in the beads of the ATF pan. Ensure contact over full area
9	Screw	2			Tightening torque 6 Nm (4 ftlb.)
10	ATF filter	1			Thinly coat gasket at suction collar with Vaseline
11	Securing clasp	1			Holding tongue must engage
12	Screw	16	1 screw M6 x 30 and 15 screws M6 x 60		See Removing and installing hydraulic control unit. Tightening torque 8 Nm (6 ftlb.)
13	Screw M6 x 60	1			
14	Holder for wiring harness				
15	Hydraulic control unit	1	See Page 38 - A7		
16	Wiring harness	1	See Page 38 - A15		
17	Toroidal sealing ring	2			Always replace and coat with Vaseline
18	Screw	1			Tightening torque 6 Nm (4 ftlb.)

No.	Designation	Qty.	Removal	Note:	
				Installation	
19	Sensor for transmission input speed	1	See Page 38 - A11		
20	Spacer sleeve (height 20 mm)	1			
21	Screw	1			Tightening torque 6 Nm (4 ftlb.)
22	Holder	1			
23	Pressure regulator 1 (with toroidal sealing ring)	1	Remove hydraulic control unit.		Thinly coat toroidal sealing ring with Vaseline
24	Screw	4			
25	Holder	2			
26	Solenoid valve 1 (without toroidal sealing ring)	1	Unscrew guide plate for parking-lock mechanism		Do not tighten screws for guide plate in selector lever position "P". Tightening torque 23 Nm (17 ftlb.)
27	Pressure regulator 2 (with toroidal sealing ring)	1			Thinly coat toroidal sealing ring with Vaseline
28	Pressure regulator 4 (with toroidal sealing ring)	1			Thinly coat toroidal sealing ring with Vaseline
29	Pressure regulator 3 (with toroidal sealing ring)	1			Thinly coat toroidal sealing ring with Vaseline
30	Solenoid valve 2 (without toroidal sealing ring)	1			
31	Solenoid valve 3 (without toroidal sealing ring)	1			
32	Screw	1			Tightening torque 6 Nm (4 ftlb.)
33	Sensor for transmission speed	1	See Page 38 - A13		
34	Spacer sleeve (height 8 mm)	1			
35	Oil tube	1	See Page 37 - A17		Always replace
36	Toroidal sealing ring	2			Always replace and thinly coat with Vaseline

No.	Designation	Qty.	Removal	Note:	
					Installation
37	Screw	2			Tightening torque 8 Nm (6 ftlb.)
38	Multi-function switch	1	See Page 37 - A19		

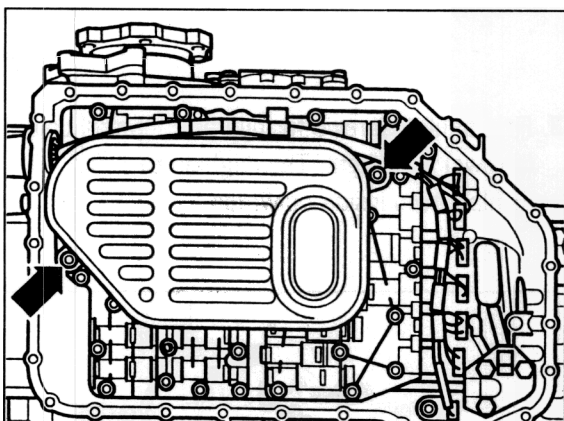
Notes on removal and installation

Note

Do not let engine run with the ATF pan removed or without ATF filling.

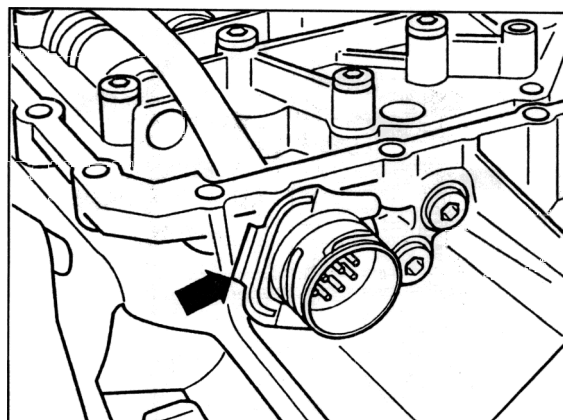
Removal

1. Remove transverse member panel.
2. Unscrew ATF drain screw and drain ATF fluid.
3. Remove ATF pan (loosen screws crosswise).
4. Remove ATF filter.



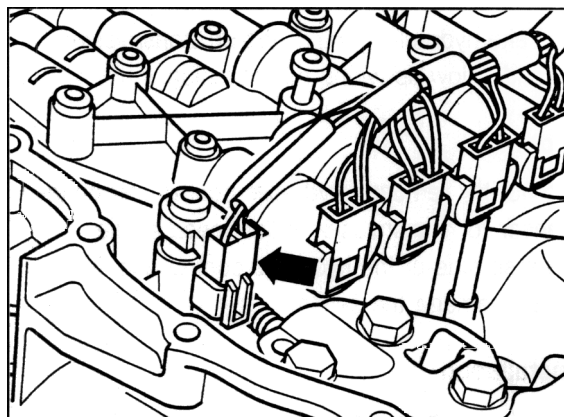
241 - 96

5. Pull off securing clasp for wiring harness plug.



242 - 96

6. Pull off plugs for transmission speed sensors.

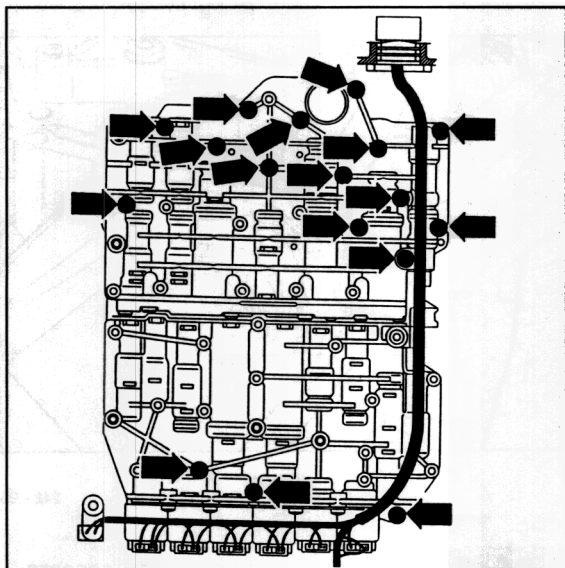


243 - 96

7. Unscrew fastening screws for hydraulic control unit.

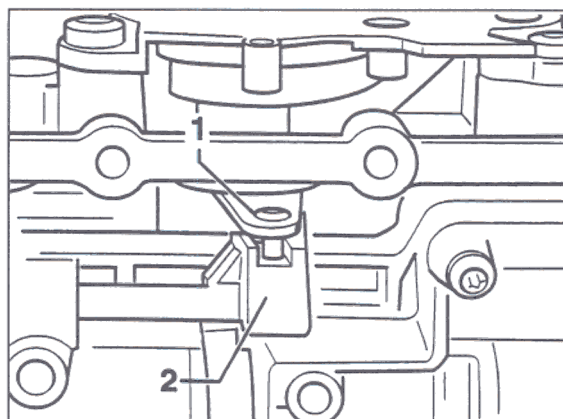
Note

Only the marked screws may be unscrewed.



244 - 96

2. Carefully put on hydraulic control unit and insert the pin of the detent disc (1) into the groove of the selector valve (2).



282 - 96

8. Take hydraulic control unit off transmission and follow up wiring harness plug.

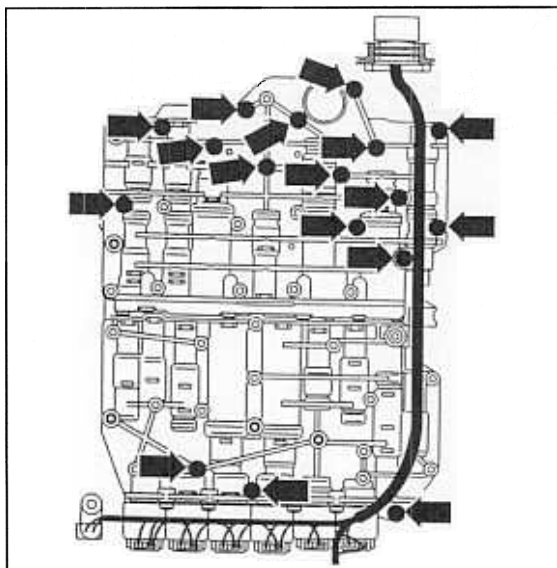
Note

Do not lay removed hydraulic control unit on the sensor for transmission input speed at the reverse side of the hydraulic control unit. This could damage the sensor.

Installation

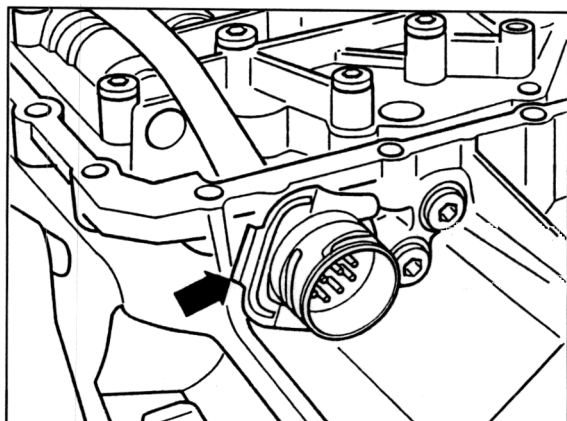
Install in reverse order, observing the following points:

1. Thinly coat toroidal sealing rings for wiring harness plugs with Vaseline and insert plug into transmission housing.



244 - 96

4. Push on securing clasp for wiring harness plug and let holding tongue engage.



242 - 96

Tightening torques:

Drain plug to ATF pan	40 Nm (29 ftlb.)
ATF pan to transmission housing	10 Nm (7 ftlb.)
ATF sieve to hydraulic control unit	6 Nm (4 ftlb.)
Hydraulic control unit to transmission housing	8 Nm (6 ftlb.)

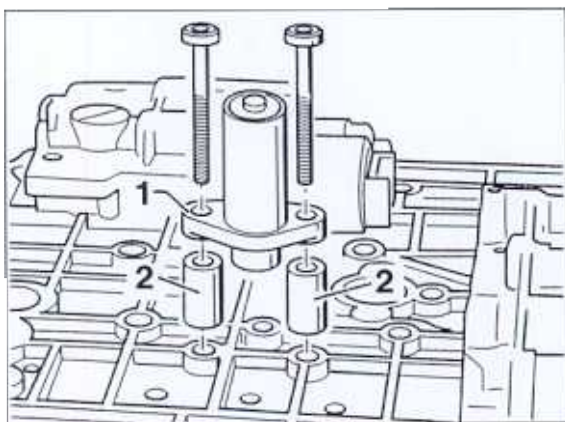
5. Thinly coat gasket on the suction collar of the ATF strainer with Vaseline and install strainer.
6. Replace gasket for ATF pan.
7. Clean all four magnets in the beads of the ATF pan and ensure there is contact over the full area of the ATF pan.
8. Tighten screws of the ATF pan crosswise in several stages.
9. Top up ATF fluid
(see Page 37 - A11).

38 17 19 Removing and installing sensor for transmission input speed**Note**

Do not reuse speed sensors that have fallen down (permanent magnet breaks).

Removal

1. Remove hydraulic control unit.
2. Remove sensor.



1 = Sensor

255 - 96

2 = Spacer sleeves (height 20 mm)

Installation

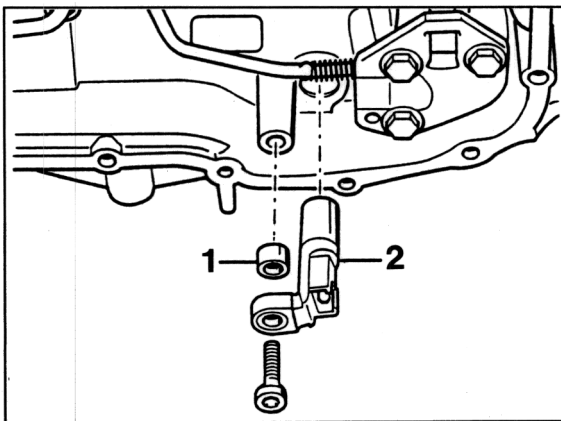
1. Using the two spacer sleeves, install sensor and tighten fastening screws to 6 Nm (4 ftlb.).

38 17 19 Removing and installing sensor for transmission speed**Note**

Do not reuse speed sensors that have fallen down (permanent magnet breaks).

Removal

1. Remove ATF pan.
2. Remove sensor.



1 = Spacer sleeve (height 8 mm)

256 - 96

2 = Sensor

Installation

1. Using the spacer sleeve, install sensor and tighten fastening screw to 6 Nm (4 ftlb.).

38 18 19 Removing and installing wiring harness**Note**

The ATF temperature sensor is integrated in the transmission wiring harness. If damaged, the complete transmission wiring harness must be replaced.

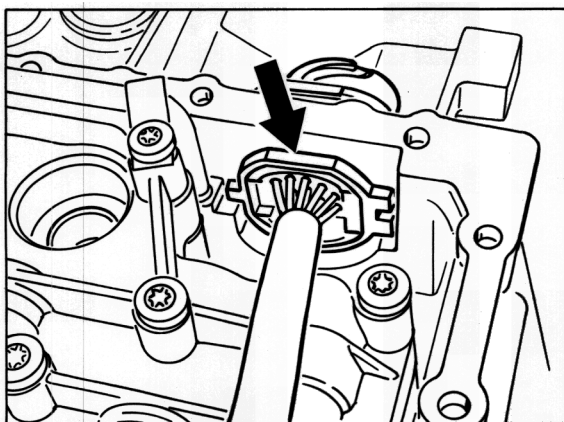
Removal

1. Remove hydraulic control unit.
2. Disconnect plug connections from the solenoid valves and from sensor for transmission input speed.
3. Detach wiring harness from the retainers.

Installation

Install in reverse order.

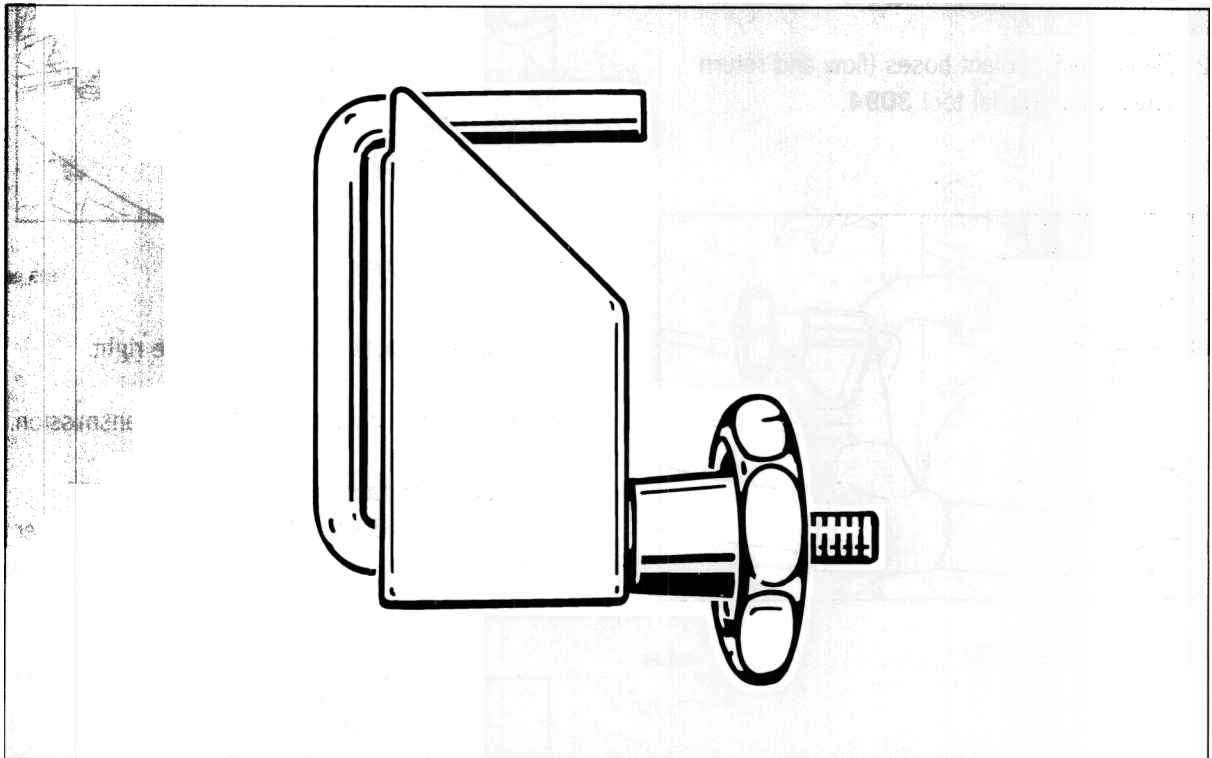
1. Insert wiring harness plug with the flat point (arrow) to the ATF pan.



260 - 96

38 60 19 Removing and installing ATF cooler

Tools



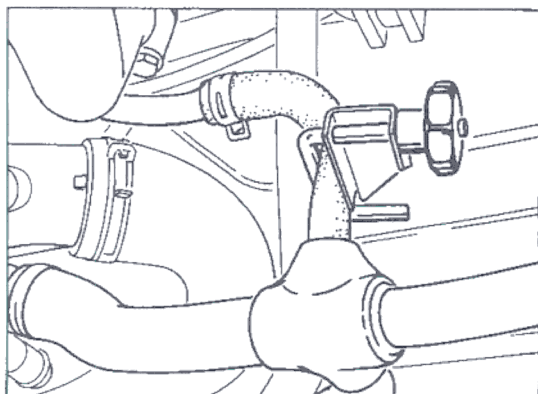
38600001

Item	Designation	Special tool	Explanation
	Hose clamp	3094	

Removing and installing ATF cooler

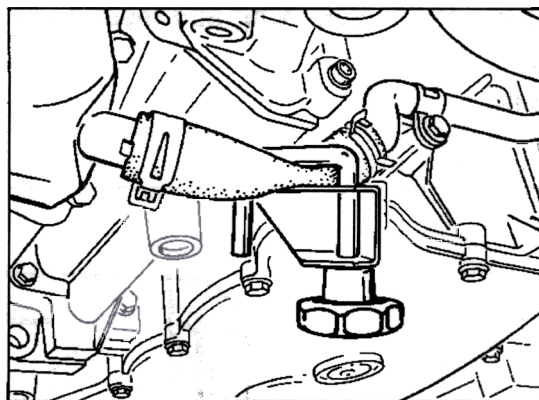
Removal

1. Remove rear underside panel (only for transmission type A86/05).
2. Clamp shut coolant hoses (flow and return sides) with special tool **3094**.



Transmission A86/00

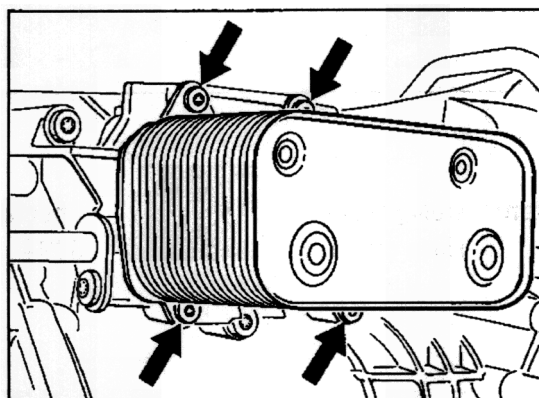
319_96



Transmission A86/00

325_96

3. Remove catalytic converter on the right.
4. Place oil collection pan under the transmission.
5. Unscrew the fastening screws for the ATF cooler with a **Torx T30** (3/8 inch) screwdriver insert.



356_96

Note

If necessary, use a mirror when unscrewing the top two screws.

Installation

1. Replace toroidal sealing rings and coat with ATF.
2. Check and top up ATF
(refer to **Serv. No. 37 02 35**).
3. Top up engine coolant level and bleed system
(refer to **Serv. No. 19 38 17**).

Tightening torques

ATF cooler to port plate (M6) = 10 Nm (7.5 ftlb.)

39 90 55 Changing and checking transmission oil in final drive

Filling capacity: approximately 0,8 l

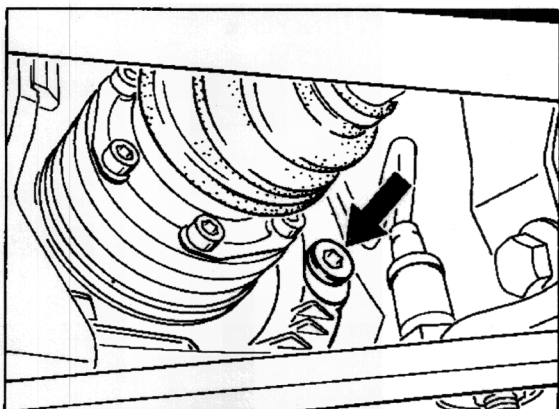
Use only transmission oil approved by
Porsche.

Refer to Parts Catalogue!

Note

There is no oil drain plug on the final drive.
For oil changes, the cover of the final drive must
be removed (see Page 39 - A7).

1. Unscrew screw plug (arrow) and drain oil with
the vehicle parked on a horizontal surface.



234-96

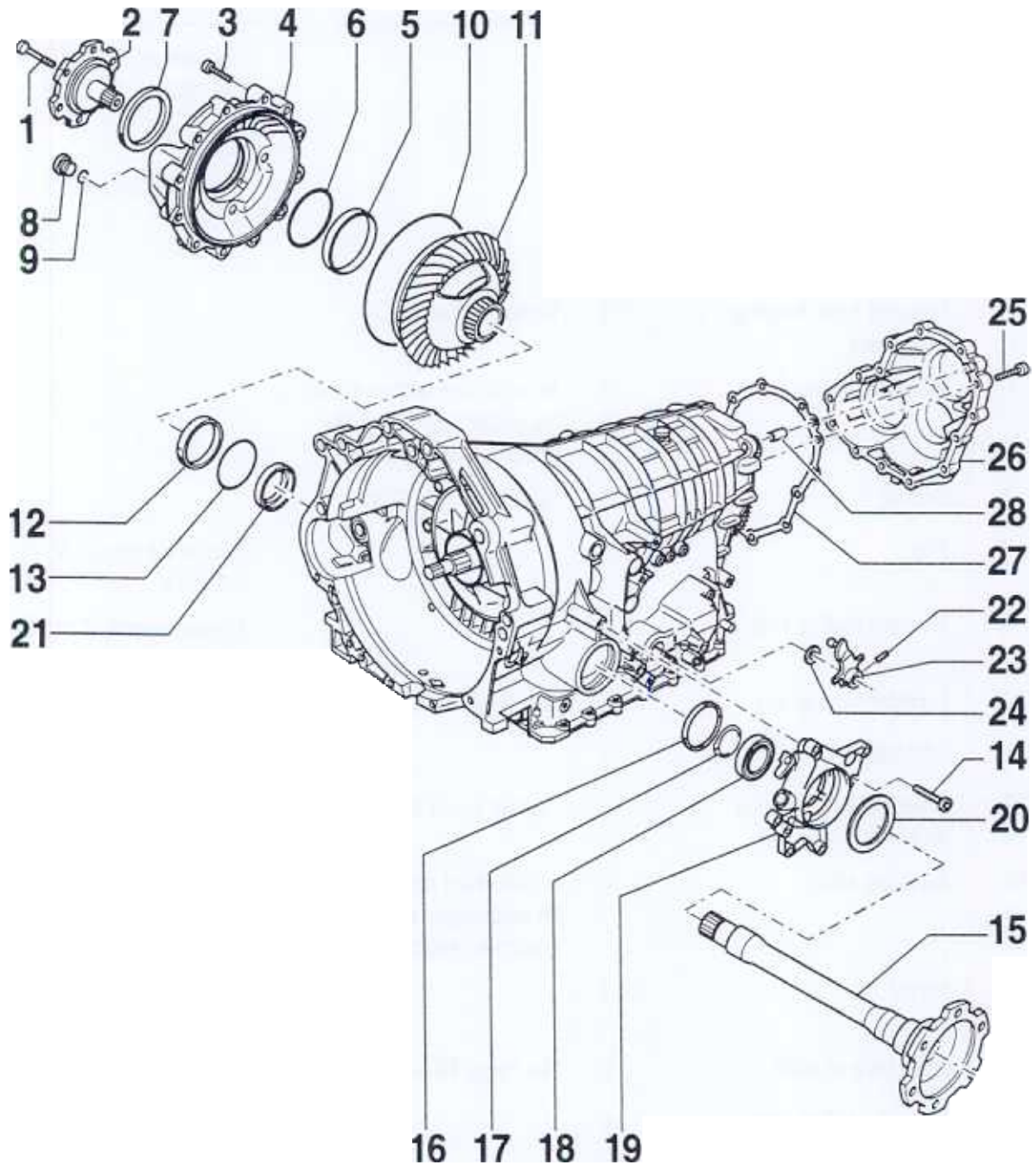
2. Fill in 0.8 litres of transmission oil with special
tool (**VAG 1924**).

Note

As there is a baffle plate in the cover for the
final drive, fill in the oil **very slowly**.

3. Replace toroidal sealing ring for plug and
tighten to **30 Nm** (22 ftlb.).

39 01 37 Disassembling and assembling final drive



Note

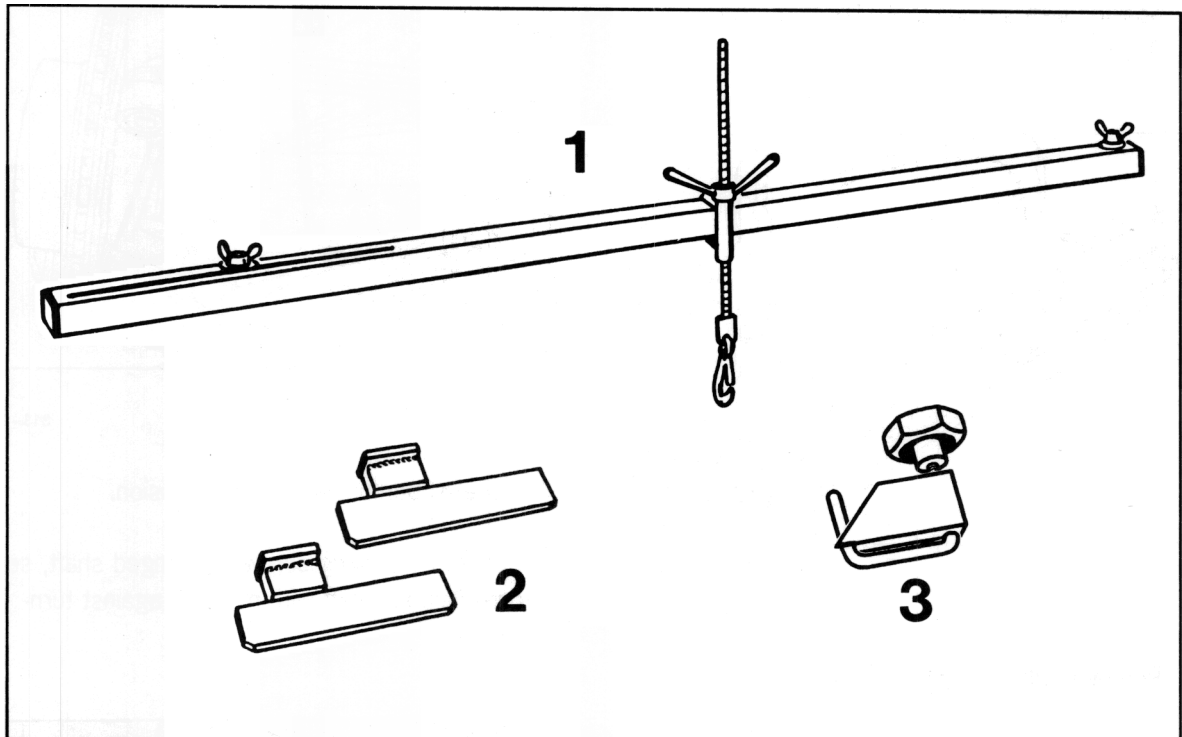
The parts shown in the figure can also be removed with the transmission installed.

No.	Designation	Qty.	Removal	Note:	Installation
	Screw	1			Tightening torque 25 Nm (18 ftlb.)
2	Short flanged shaft	1			
3	Screw	12			Tightening torque 23 Nm (17 ftlb.)
4	Cover for final drive	1			
5	Tapered roller bearing outer race	1	Without press fit		
6	Adjusting shim	X	Is calibrated and must not be exchanged for an ap- proximate substitute		
	Sealing ring	1	See Page 39 - A13		
8	Plug	1			Tightening torque 30 Nm (22 ftlb.)
9	Toroidal sealing ring	1			Always replace. Coat with transmission oil
10	Toroidal sealing ring	1	See Page 39 - A10		Always replace
11	Differential	1			
12	Tapered roller bearing outer race	1	Without press fit		
13	Adjusting shim	X	Is calibrated and must not be exchanged for an ap- proximate substitute		
14	Screw	3			Tightening torque 23 Nm (17 ftlb.)
15	Long flanged shaft	1	See Page 39 - A17		
16	Toroidal sealing ring (square)	1			Always replace. Coat with transmission oil
17	Snap ring	1			
18	Ball bearing	1			

No.	Designation	Qty.	Removal	Note:	
				Installation	
19	Mounting saddle				
20	Sealing ring	1	See Page 39 - A19	Always replace	
21	Double sealing ring	1	See Page. 39 - A23	Always replace	
22	Roll pin	1			
23	Selector lever	1			
24	Sealing ring	1	See Page 37 - A23	Always replace	
25	Screw	14		Tightening torque 23 Nm (17 ftlb.)	
26	Housing cover	1			
27	Gasket	1	See Page 37 - A21	Always replace	
28	Dowel sleeve	2			

39 09 19 Removing and installing differential

Tools



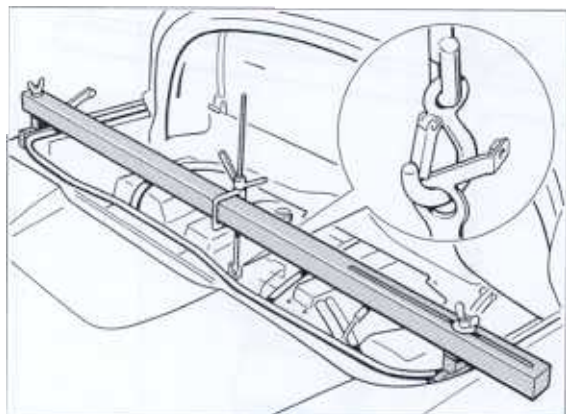
321 - 96

No.	Designation	Special tool	Explanation
1	Supporting bridge	10 - 222A	
2	Support feet	9591/1	
3	Hose clamp	3094	

Removing and installing differential

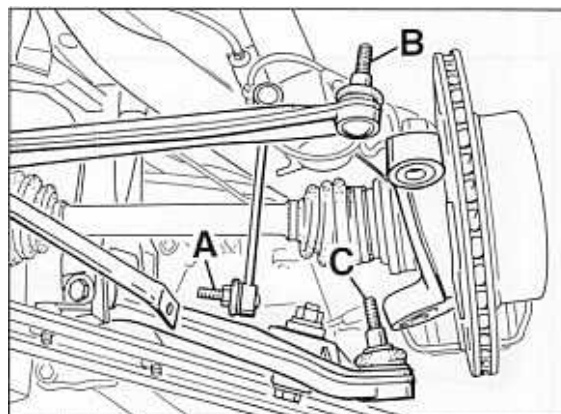
Removal

1. Hold engine by transport shackle in installed position with special tools 10-222A and 9591/1.



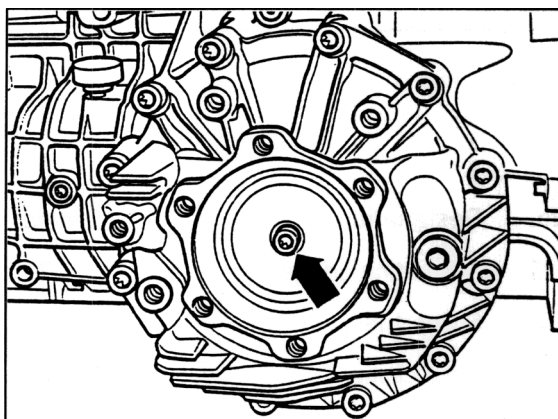
194 - 96

2. Remove right rear wheel.
3. Remove diagonal braces and cross-member panel.
4. Remove right catalytic converter.
5. Uncouple drive shaft on the transmission side and protect shaft from damage (use piece of hose with diameter of approximately 30 mm).
6. Detach stabilizer/stabilizer mount ball joint (A), toe control arm (B) and control arm (C) from wheel carrier (see Group 42, Disassembling and assembling wheel suspension).



313 - 96

7. Place oil pan under the transmission.
8. Unscrew fastening screw for flanged shaft, secure flanged shaft with mandrel against turning.

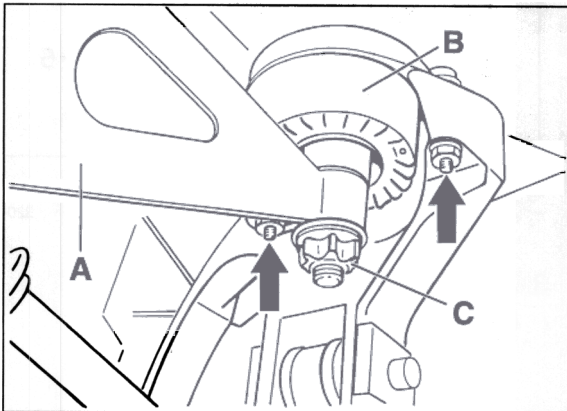


314 - 96

9. Unscrew transmission support with hydraulic mount at transmission and at carrier side member.

Note

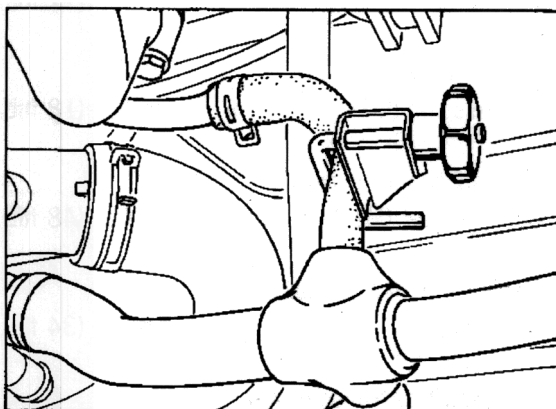
Fastening nut "C" (M12) must not be loosened. Otherwise the transmission prop will be damaged.



435-97

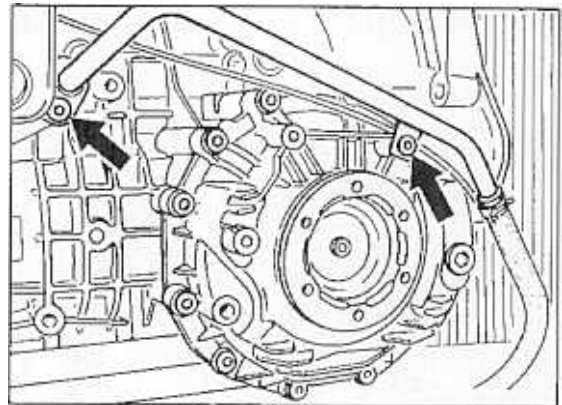
A – Transmission support
B – Hydraulic mount
C – fastening nut M12

10. Clamp shut coolant return-side hose with special tool **3094**.



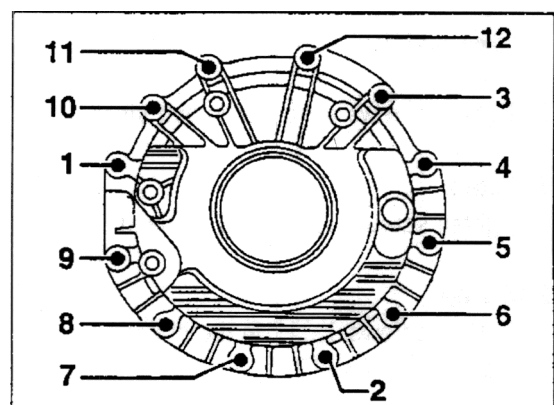
319-96

11. Unscrew coolant return-side hose at ATF cooler and at cover for final drive.



318-96

12. Unscrew cover screws, reversing the indicated order for tightening 12...1, and remove cover.

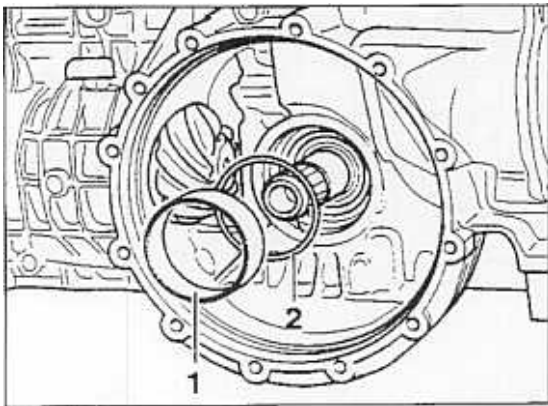


320-96

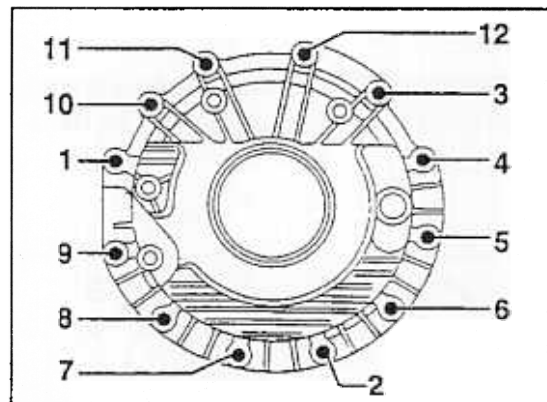
13. Take differential, bearing outer race (1) and adjusting shim (2) out of the transmission housing by hand.

Note

The adjusting shim (2) is calibrated and must not be exchanged for an approximate substitute.



306-96



320-96

3. Add transmission oil for final drive (see Page 39 - A1).

Tightening torques:

Cover for final drive to transmission (M8) = 23 Nm (17 ftlb.)

Coolant line to cover for final drive and port plate (M8) = 23 Nm (17 ftlb.)

Short flanged shaft to transmission (M8) = 25 Nm (18 ftlb.)

Diagonal brace to carrier side member (M10) = 65 Nm (48 ftlb.)

Stabilizer mount to stabilizer (M10) = 46 Nm (34 ftlb.)

Drive shaft to transmission flange (M8) = 39 Nm (29 ftlb.)

Transmission support to transmission (M10) = 65 Nm (48 ftlb.)

Installation

1. Replace toroidal sealing ring for final drive cover and coat with transmission oil.
2. Tighten screws for cover in two steps.

1st step:

Tighten screws 1, 2 and 3 by hand.

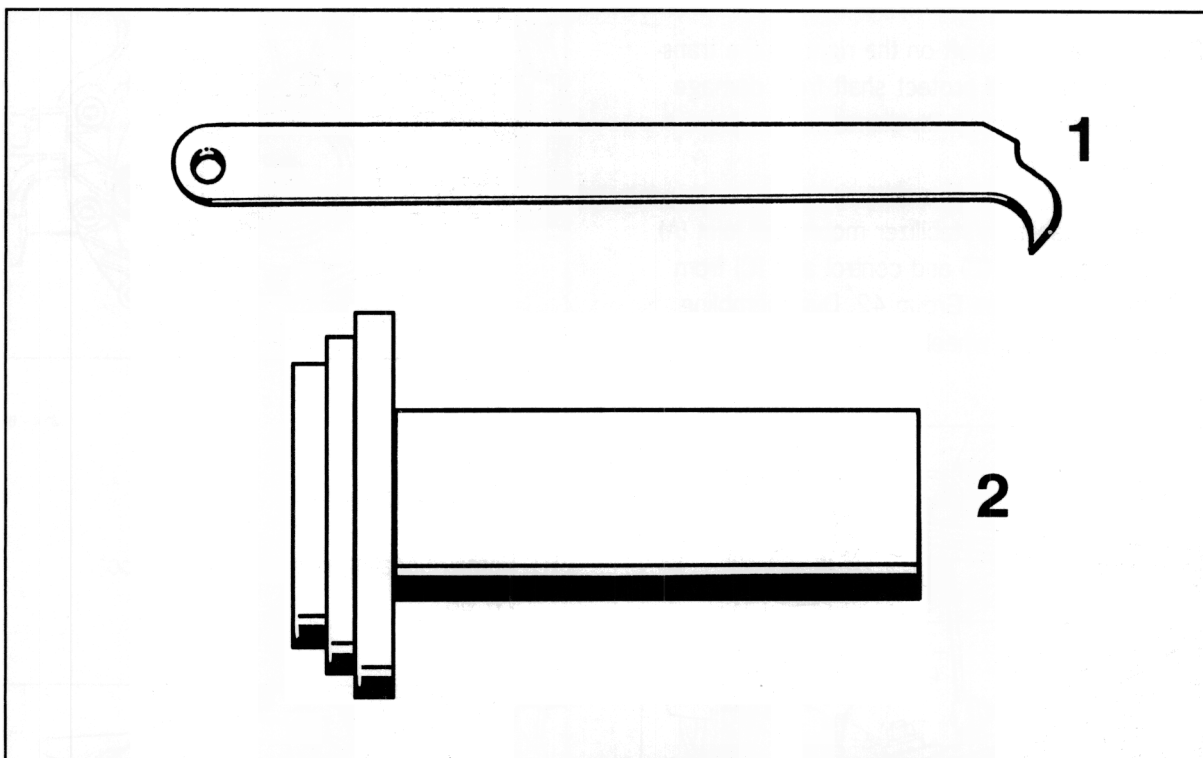
2nd step:

Tighten screws 1...12 in the stated order to 23 Nm (17 ftlb.).

Hydraulic mount to carrier
side member (M8) = 23 Nm (17 ftlb.)

Control arm to wheel
carrier (M12) = 75 Nm (55 ftlb.)

Toe control arm to wheel
carrier (M12) = 75 Nm (55 ftlb.)

39 22 19 Removing and installing sealing ring for short flanged shaft**Tools**

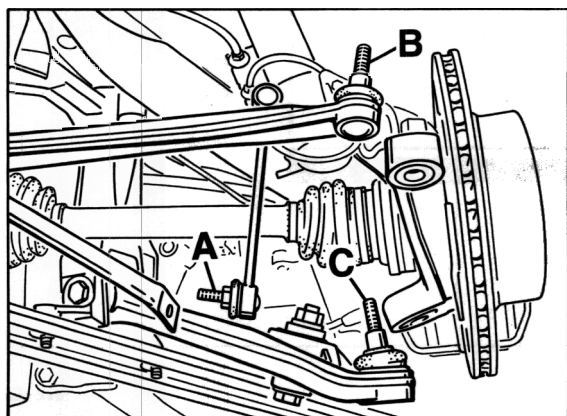
312 - 96

No.	Designation	Special tool	Explanation
1	Hook	VW 681	
2	Pressure piece	3382	

Removing and installing sealing ring for short flanged shaft

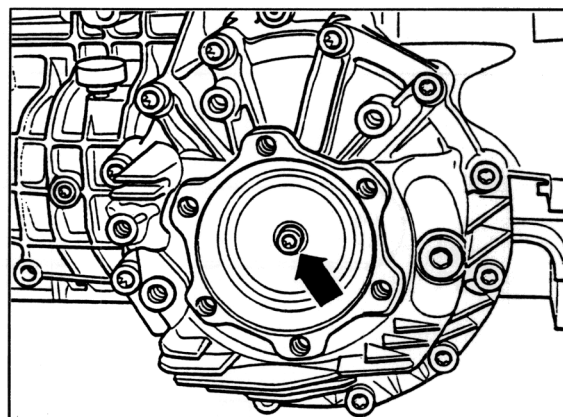
Removal

1. Remove right rear wheel.
2. Uncouple drive shaft on the right on the transmission side and protect shaft from damage (use piece of hose with diameter of approximately 30 mm).
3. Detach stabilizer/stabilizer mount ball joint (A), toe control arm (B) and control arm (C) from wheel carrier (see Group 42, Disassembling and assembling wheel suspension).



313 - 96

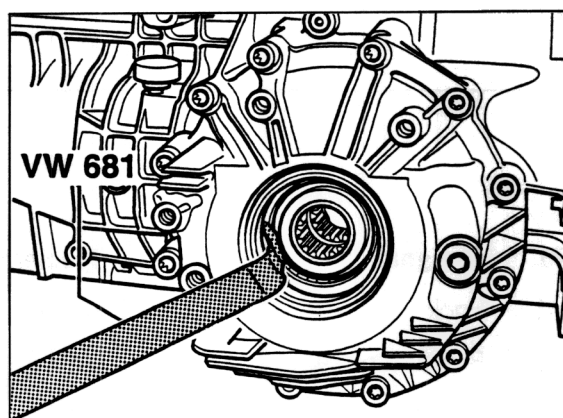
4. Place oil collection pan under the transmission.
5. Unscrew fastening screw for flanged shaft, secure flanged shaft with mandrel against turning.



314 - 96

9. Pull out flanged shaft.

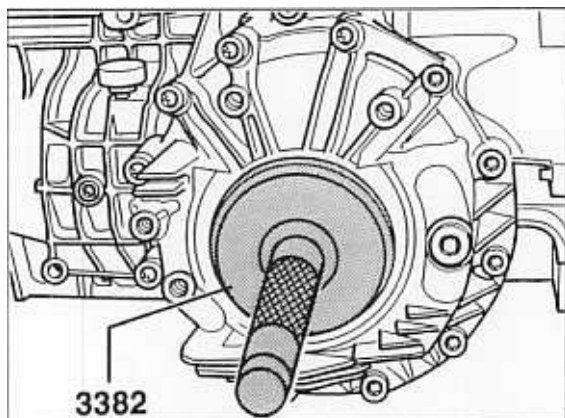
10. Remove sealing ring with special tool VW 681.



315 - 96

Installation

1. Thinly coat sealing lip and circumference of sealing ring with Vaseline and insert sealing ring with special tool 3382 up to the stop.



316 - 96

Note

The sealing ring must fit in the housing at the same depth all round.

2. Check transmission oil in final drive and top up if necessary.

39 25 19 Removing and installing long flanged shaft**Removal**

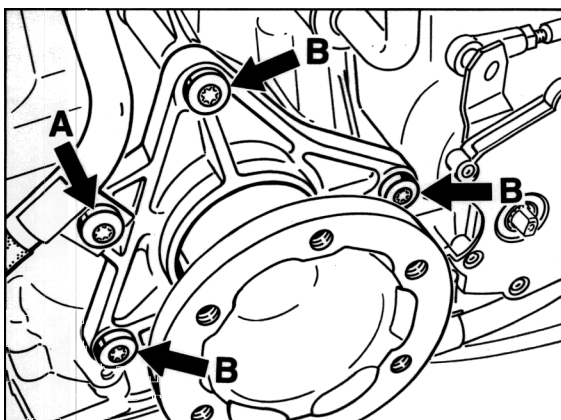
1. Remove left rear wheel.
2. Drain rear-axle oil (see Page 39 - A1).

Note

Draining the oil prevents rear-axle oil entering the ATF.

This would cause malfunctions of the hydraulic transmission control system.

5. Uncouple left drive shaft on the transmission side and protect shaft from damage (use piece of hose with diameter of approximately 30 mm).
4. Unscrew fastening screw (A) for coolant pipe and (B) for the mounting saddle.

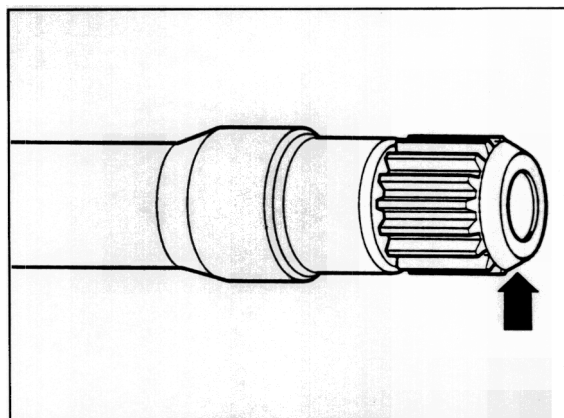


298 - 96

5. Carefully pull out flanged shaft.

Installing

1. Replace square sealing ring in mounting saddle.
2. Check flanged shaft for burrs and sharp edges on the transmission end of the shaft (arrow) and deburr if necessary.



300 - 96

3. Carefully insert flanged shaft into the transmission.

Note

While being inserted, the flanged shaft must be carefully guided with the hand in order to prevent damage to the double sealing ring in the transmission.

4. Refill rear-axle oil.

Tightening torques:

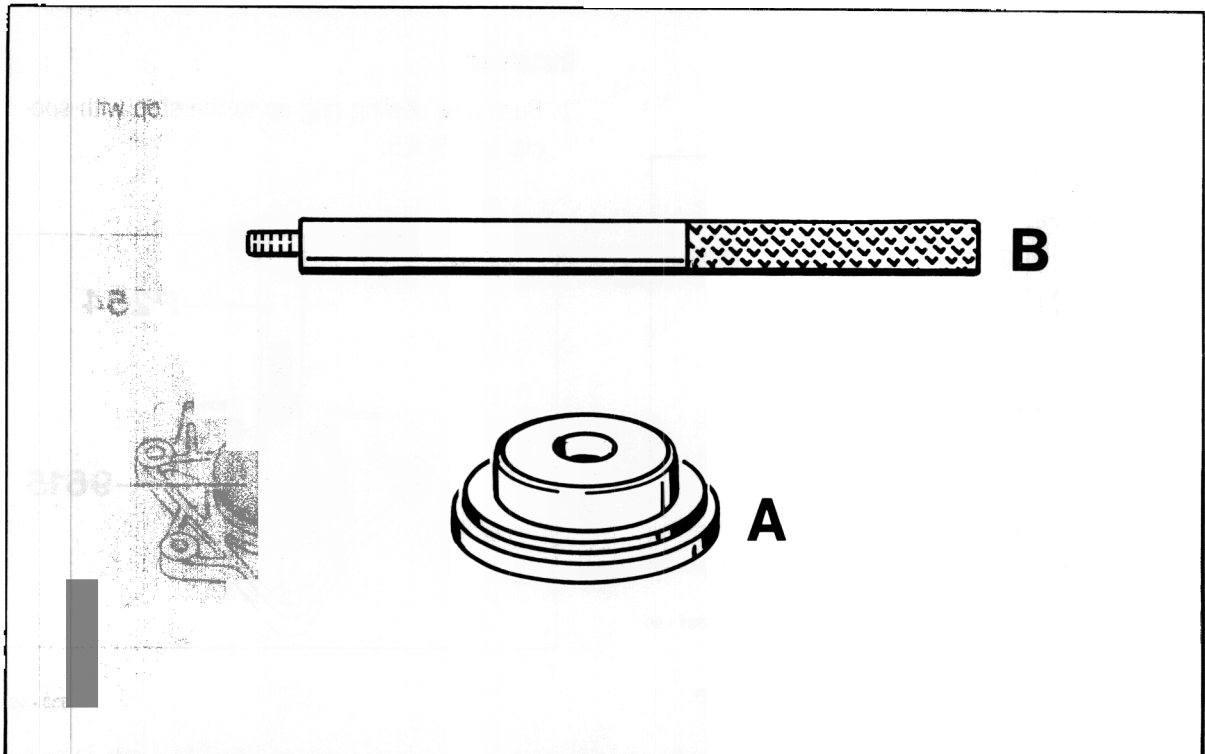
Mounting saddle for flanged
shaft to transmission = 23 Nm (17 ftlb.)

Coolant pipe to
mounting saddle = 23 Nm (17 ftlb.)

Drive shaft to
flanged shaft = 39 Nm (29 ftlb.)

39 22 19 Removing and installing sealing ring for long flanged shaft

Tools

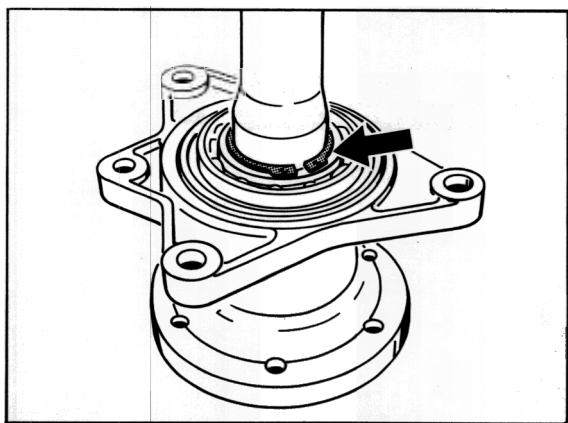


No.	Designation	Special tool	Explanation
A	Pressure piece	9615	
B	Inserter and puller	P254	

Removing and installing sealing ring for long flanged shaft

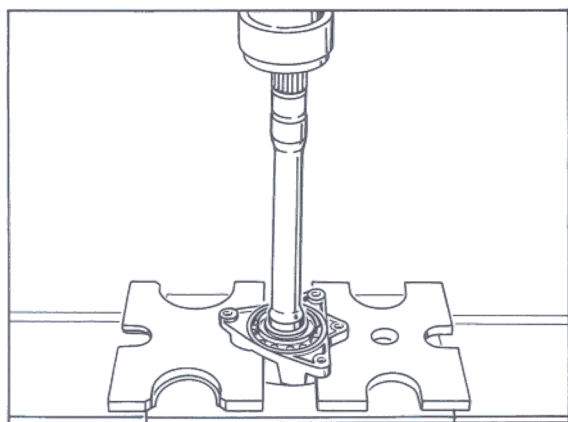
Removal

1. Remove long flanged shaft (see Page 39 - A17).
2. Remove snap ring for ball bearing.



331 - 96

3. Press flanged shaft out of mounting saddle.

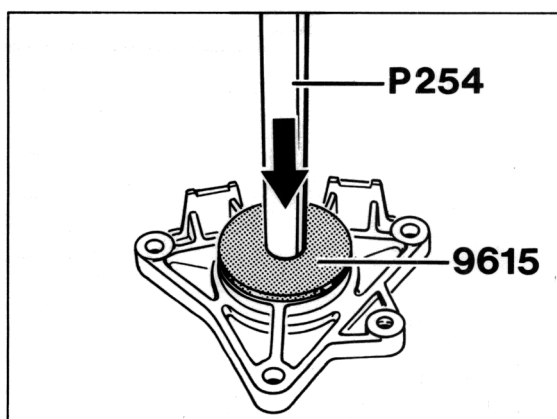


332 - 96

4. Lever sealing ring out of mounting saddle with large screwdriver.

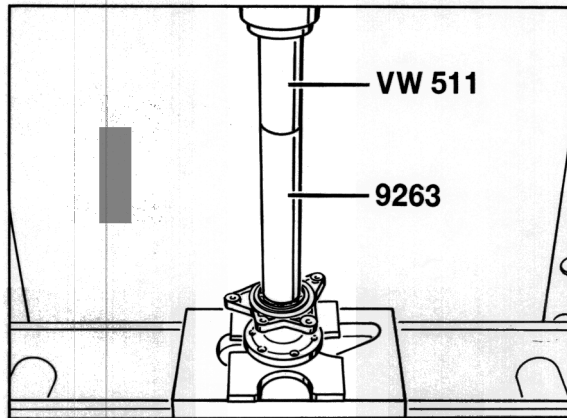
Installing

1. Push new sealing ring up to the stop with special tool 9615.



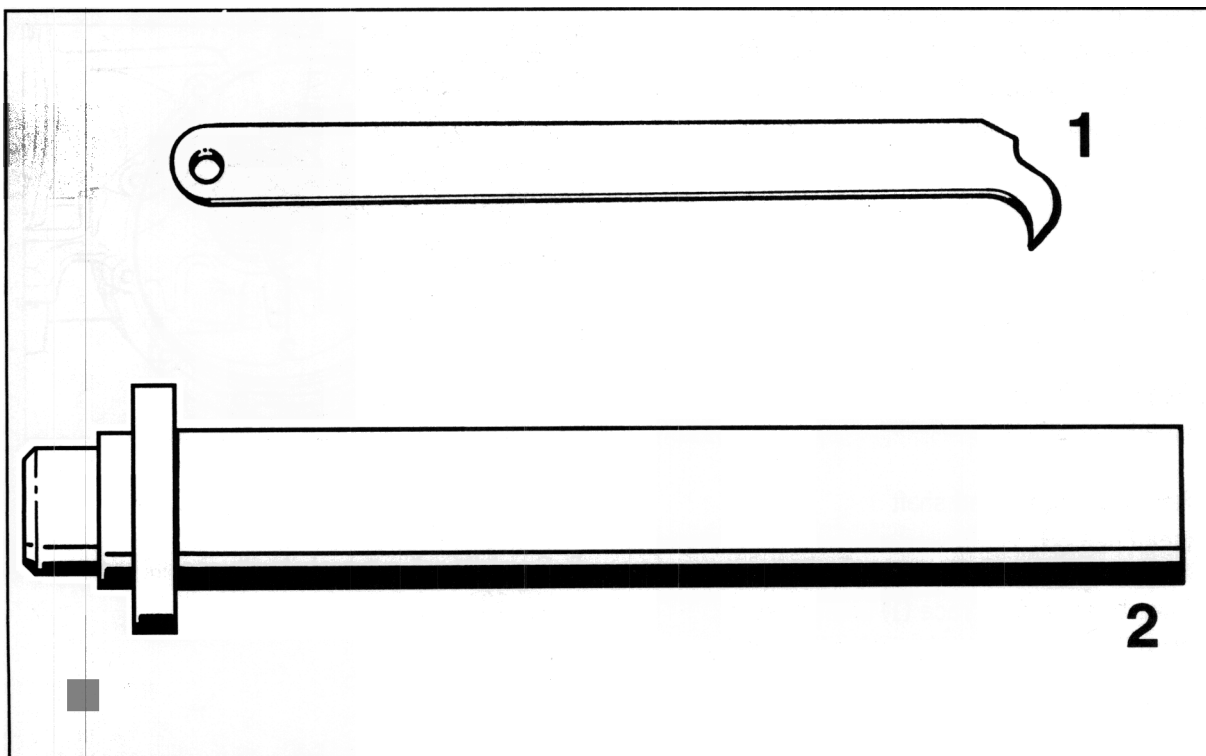
333 - 96

2. Press mounting saddle with ball bearing onto flanged shaft.



334 - 96

3. Insert snap ring.
4. Install flanged shaft; check and top up transmission oil in final drive.

39 15 19 Removing and installing final drive/transmission housing double sealing ring**Tools**

No.	Designation	Special tool	Explanation
1	Hook	VW 681	
2	Pressure piece	3383	

Removing and installing final drive/transmission housing double sealing ring

Note

A defective double sealing ring allows ATF or transmission oil to escape via the middle vent opening of the shaft seal (between the two sealing lips) into the converter bell housing.

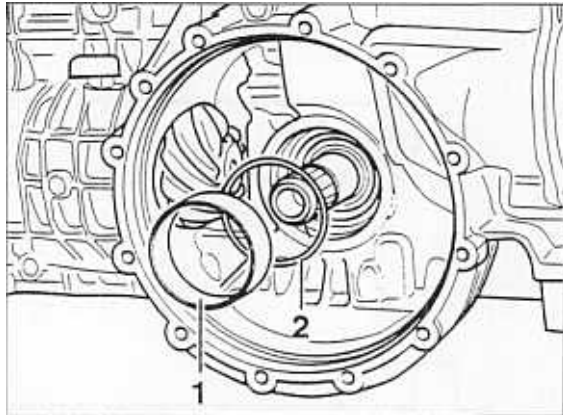
A defective double sealing ring can also let ATF enter the differential. The latter is overfilled, and oil emerges at the differential vent opening.

Removal

1. Unbolt rear wheels.
2. Remove differential (see Page 39 - A7).
3. Remove long flanged shaft (see Page 39 - A17).
4. Take bearing outer race (1) and adjusting shim (2) out of the transmission housing by hand.

Note

The adjusting shim is calibrated and cannot be exchanged for an approximate substitute.

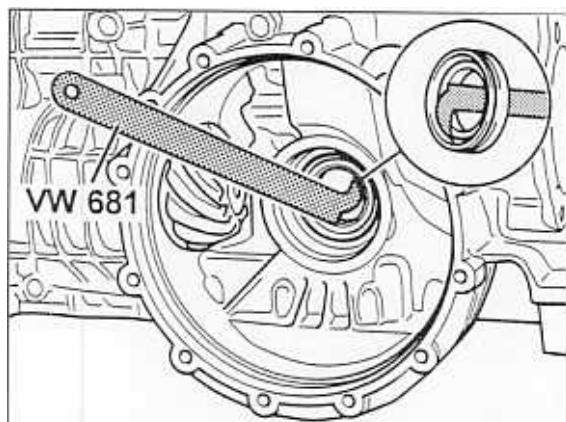


306 - 96

5. Carefully pull out gasket with special tool VW 681.

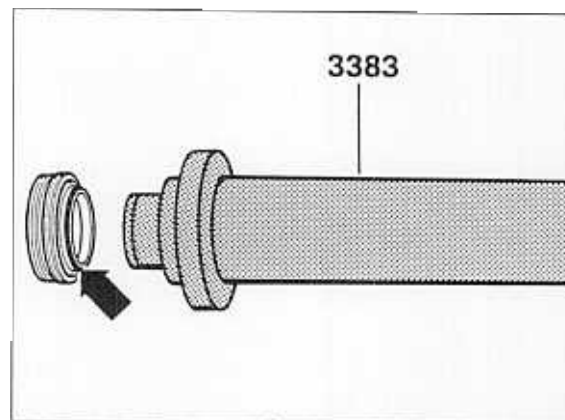
Note

Special tool VW 681 must be applied behind the two sealing lips of the sealing ring. Do not apply to the circumference of the sealing ring, since otherwise the contact area in the transmission housing will be damaged. While levering it out, guide lever carefully.



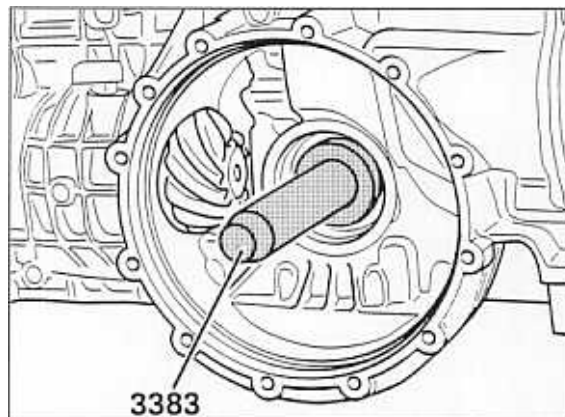
307 - 96

3. Push sealing ring up on the special tool so that the projecting sealing lip (arrow) faces the special tool.



308 - 96

4. Drive sealing ring in to the stop with special tool 3383.



309 - 96

Installation

1. Check seat of sealing ring in transmission housing for damage.
2. Thinly coat circumference and sealing lip of sealing ring with Vaseline.