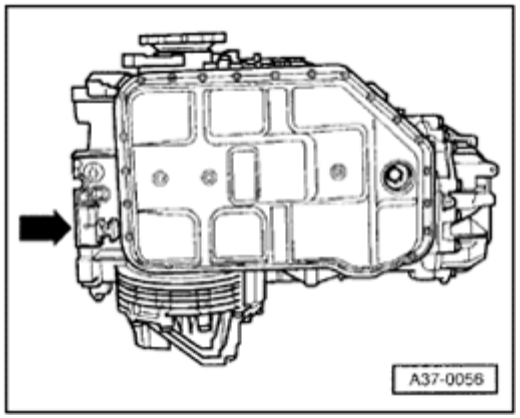
00-1

# Transmission identification

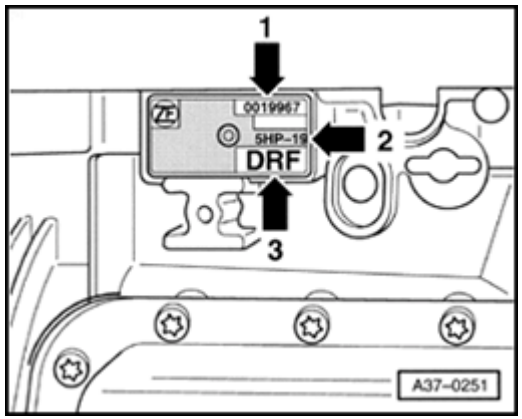
The 5-speed automatic transmission 01V is installed in the Audi A4 1996 ➢ in conjunction with the 4 and 6-cylinder engines. Allocation ⇒ Page 00-4 .

**Code letter allocation at transmission**




➢ Transmission code letters are located on the data plate under the transmission (arrow).

There is another identical data plate on side of transmission which is not accessible with the transmission installed.




➢ Transmission code number and transmission serial number.

Transmission serial number (arrow 1),Transmission identification (arrow 2),Code letter (arrow 3)

The transmission code letters are also listed on the vehicle data plates.

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## 5-speed automatic transmission 01V, notes

Self-study program No.. 180 informs extensively about the function of this transmission.

### Torque converter

The torque converter is equipped with a lock-up clutch. The lock-up clutch is closed load- and speed-dependant with minimum pulsations and mechanically drives the 3., 4. and 5. gear independent of slip.

### Transmission

5-speed automatic transmission 01V is equipped with 5 hydraulically activated forward gears. By passing the torque converter slip, these forward gears become mechanically driven gears if the lock-up clutch is closed.

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**Hydraulic control**

There is a distinction made between two types of transmission. Transmissions with hydraulic control E17, the sensor for transmission RPM (inductive sensor) is secured to bottom of valve body. Transmissions with hydraulic control E18/2, the sensor for transmission RPM (hall effect sensor) is secured to transmission housing behind valve body.

Information regarding which transmission is installed can be found in tables ⇒ page 00-4 onward.

**On Board Diagnostic (OBD)**

On Board Diagnostic (OBD) is described in:

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V On Board Diagnostic (OBD), Repair Group 01*

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## Code letters, allocation, ratios, equipment

### Front Wheel Drive (FWD)

| **Automatic transmission** | | **01V.J** | **01V.F** | **01V.F** |
|---|---|---|---|---|
| **Transmission** | Code letters | **DDT** | **DRD** | **EBX** |
| | Manufactured from | 09.96 | 03.97 | 07.99 |
| | to | 08.99 | 07.99 | |
| **Torque converter** | Code letters | **M28** | **F31** | **F31** |
| **Allocation** | Model | Audi A4 1996➢ USA | Audi A4 1996➢ USA | Audi A4 1996➢ USA |
| | Engine | 1.8 L 5V - 110 kW | 2.8 L 5V - 142 kW | 2.8 L 5V - 142 kW |
| **Ratios** | 1. Gear | 3.665 | 3.665 | 3.665 |
| | 2. Gear | 1.999 | 1.999 | 1.999 |
| | 3. Gear | 1.407 | 1.407 | 1.407 |
| | 4. Gear | 1.000 | 1.000 | 1.000 |
| | 5. Gear | 0.742 | 0.742 | 0.742 |
| | Reverse gear | 4.096 | 4.096 | 4.096 |

*Valve body allocation according to transmission code letters*

⇒ *Parts Catalog*

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| **Transmission** | Code letters | | **DDT** | **DRD** | **EBX** |
|---|---|---|---|---|---|
| **Intermediate drive** | Number of teeth | Drive gear | 29 | 29 | 29 |
| | | Output gear | 35 | 35 | 35 |
| | Ratio | | 1.207 | 1.207 | 1.207 |
| **Final drive** | Number of teeth | Drive pinion | 11 | 11 | 11 |
| | | Ring gear | 34 | 30 | 30 |
| | Ratio | | 3.091 | 2.727 | 2.727 |
| CAN-bus | | | without CAN-bus | with CAN-bus | with CAN-bus |
| E-Gas[1)] | | | without E-Gas | without E-Gas | with E-Gas |
| Hydraulic control | | | Park/Neutral Position (PNP) Switch -E17- | Park/Neutral Position (PNP) Switch -E17- | Rear Fog Light Switch -E18-/2 |

1) "E-Gas" is the general abbreviation for electronic engine power regulation, more information on this can be found in self-study program No.. 210.

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| Automatic transmission | | 01V.J | 01V.J | 01V.J |
|---|---|---|---|---|
| **Transmission** | Code letters | **EFP** | **EFP** | **EKC** |
| | Manufactured from | 09.99 | 05.00 | 08.99 |
| | to | | | |
| **Torque converter** | Code letters | **M28** | **M28** | **F31** |
| **Allocation** | Model | Audi A4 1996➢ USA | Audi A4 1996➢ USA | Audi A4 1996➢ USA |
| | Engine | 1.8 L 5V - 110 kW 210 Nm (LEV) | 1.8 L 5V - 125 kW 240 Nm (ULEV) | 2.8 L 5V - 142 kW |
| **Ratios** | 1. Gear | 3.665 | 3.665 | 3.665 |
| | 2. Gear | 1.999 | 1.999 | 1.999 |
| | 3. Gear | 1.407 | 1.407 | 1.407 |
| | 4. Gear | 1.000 | 1.000 | 1.000 |
| | 5. Gear | 0.742 | 0.742 | 0.742 |
| | Reverse gear | 4.096 | 4.096 | 4.096 |

*Valve body allocation according to transmission code letters*

⇒ *Parts Catalog*

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| **Transmission** | Code letters | | **EFP** | **EFP** | **EKC** |
|---|---|---|---|---|---|
| **Intermediate drive** | Number of teeth | Drive gear | 29 | 29 | 29 |
| | | Output gear | 35 | 35 | 35 |
| | Ratio | | 1.207 | 1.207 | 1.207 |
| **Final drive** | Number of teeth | Drive pinion | 11 | 11 | 11 |
| | | Ring gear | 34 | 34 | 34 |
| | Ratio | | 3.091 | 3.091 | 3.091 |
| CAN-bus | | | with CAN-bus | with CAN-bus | with CAN-bus |
| E-Gas[1)] | | | with E-Gas | with E-Gas | with E-Gas |
| Hydraulic control | | | Rear Fog Light Switch - E18-/2 | Rear Fog Light Switch - E18-/2 | Rear Fog Light Switch - E18-/2 |

1) "E-Gas" is the general abbreviation for electronic engine power regulation, more information on this can be found in self-study program No.. 210.

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| Automatic transmission | | 01V.J | 01V.J |
|---|---|---|---|
| **Transmission** | Code letters | **EZS** | **EZZ** |
| | Manufactured from | 06.00 | 06.00 |
| | to | | |
| **Torque converter** | Code letters | **A33** | **M28** |
| **Allocation** | Model | Audi A4 1996➢ USA | Audi A4 1996➢ USA |
| | Engine | 1.8 L 5V - 125 kW | 2.8 L 5V - 142 kW |
| **Ratios** | 1. Gear | 3.665 | 3.665 |
| | 2. Gear | 1.999 | 1.999 |
| | 3. Gear | 1.407 | 1.407 |
| | 4. Gear | 1.000 | 1.000 |
| | 5. Gear | 0.742 | 0.742 |
| | Reverse gear | 4.096 | 4.096 |

*Valve body allocation according to transmission code letters*

⇒ *Parts Catalog*

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| **Transmission** | Code letters | | **EZS** | **EZZ** |
|---|---|---|---|---|
| **Intermediate drive** | Number of teeth | Drive gear | 29 | 29 |
| | | Output gear | 35 | 35 |
| | Ratio | | 1.207 | 1.207 |
| **Final drive** | Number of teeth | Drive pinion | 11 | 11 |
| | | Ring gear | 34 | 34 |
| | Ratio | | 3.091 | 3.091 |
| CAN-bus | | | with CAN-bus | with CAN-bus |
| E-Gas[1)] | | | with E-Gas | with E-Gas |
| Hydraulic control | | | Rear Fog Light Switch -E18-/2 | Rear Fog Light Switch -E18-/2 |

1) "E-Gas" is the general abbreviation for electronic engine power regulation, more information on this can be found in self-study program No.. 210.

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**All Wheel Drive (AWD)**

| **Automatic transmission** | | **01V.4** | **01V.4** | **01V.4** |
|---|---|---|---|---|
| **Transmission** | Code letters | **DKB** | **DTV** | **EFQ** |
| | Manufactured from | 07.96 | 03.97 | 08.98 |
| | to | 02.97 | 07.99 | |
| **Torque converter** | Code letters | **M28** | **M28** | **M28** |
| **Allocation** | Model | Audi A4 1996➢ USA | Audi A4 1996➢ USA | Audi A4 1996➢ USA |
| | Engine | 1.8 L 5V - 110 kW | 1.8 L 5V - 110 kW | 1.8 L 5V - 110 kW |
| **Ratios** | 1. Gear | 3.665 | 3.665 | 3.665 |
| | 2. Gear | 1.999 | 1.999 | 1.999 |
| | 3. Gear | 1.407 | 1.407 | 1.407 |
| | 4. Gear | 1.000 | 1.000 | 1.000 |
| | 5. Gear | 0.742 | 0.742 | 0.742 |
| | Reverse gear | 4.096 | 4.096 | 4.096 |

*Valve body allocation according to transmission code letters*

⇒ *Parts Catalog*

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| Transmission | Code letters | | DKB | DTV | EFQ |
|---|---|---|---|---|---|
| **Intermediate drive-Va** | Number of teeth | Drive gear | 29 | 29 | 29 |
| | | Output gear | 35 | 35 | 35 |
| | Ratio | | 1.207 | 1.207 | 1.207 |
| **Final drive-Va** | Number of teeth | Drive pinion | 11 | 11 | 11 |
| | | Ring gear | 34 | 34 | 34 |
| | Ratio | | 3.091 | 3.091 | 3.091 |
| **intermediate drive-HA** | Number of teeth | Drive gear | 41 | 41 | 41 |
| | | Output gear | 37 | 37 | 37 |
| | Ratio | | 0.902 | 0.902 | 0.902 |
| **Final drive-HA** | Number of teeth | Drive pinion | 9 | 9 | 9 |
| | | Ring gear | 37 | 37 | 37 |
| | Ratio | | 4.111 | 4.111 | 4.111 |
| CAN-bus | | | without CAN-bus | without CAN-bus | with CAN-bus |
| E-Gas[1)] | | | without E-Gas | without E-Gas | with E-Gas |

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| | | | |
|---|---|---|---|
| Hydraulic control | Park/Neutral Position (PNP) Switch -E17- | Park/Neutral Position (PNP) Switch -E17- | Rear Fog Light Switch -E18-/2 |

1) "E-Gas" is the general abbreviation for electronic engine power regulation, more information on this can be found in self-study program No.. 210.

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| Automatic transmission | | 01V.3 | 01V.3 | 01V.4 |
|---|---|---|---|---|
| **Transmission** | Code letters | **DRN** | **ECG** | **FAL** |
| | Manufactured from | 03.97 | 08.99 | 06.00 |
| | to | 08.99 | | |
| **Torque converter** | Code letters | **F31** | **F31** | **A33** |
| **Allocation** | Model | Audi A4 1996➢ USA | Audi A4 1996➢ USA | Audi A4 1996➢ USA |
| | Engine | 2.8 L 5V - 142 kW | 2.8 L 5V - 142 kW | 1.8 L 5V - 125 kW |
| **Ratios** | 1. Gear | 3.665 | 3.665 | 3.665 |
| | 2. Gear | 1.999 | 1.999 | 1.999 |
| | 3. Gear | 1.407 | 1.407 | 1.407 |
| | 4. Gear | 1.000 | 1.000 | 1.000 |
| | 5. Gear | 0.742 | 0.742 | 0.742 |
| | Reverse gear | 4.096 | 4.096 | 4.096 |

*Valve body allocation according to transmission code letters*

⇒ *Parts Catalog*

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00-13

| Transmission | Code letters | | DRN | ECG | FAL |
|---|---|---|---|---|---|
| **Intermediate drive-Va** | Number of teeth | Drive gear | 29 | 29 | 29 |
| | | Output gear | 35 | 35 | 35 |
| | Ratio | | 1.207 | 1.207 | 1.207 |
| **Final drive-Va** | Number of teeth | Drive pinion | 11 | 11 | 11 |
| | | Ring gear | 30 | 30 | 34 |
| | Ratio | | 2.727 | 2.727 | 3.091 |
| **intermediate drive-HA** | Number of teeth | Drive gear | 41 | 41 | 41 |
| | | Output gear | 33 | 33 | 37 |
| | Ratio | | 0.805 | 0.805 | 0.902 |
| **Final drive-HA** | Number of teeth | Drive pinion | 9 | 9 | 9 |
| | | Ring gear | 37 | 37 | 37 |
| | Ratio | | 4.111 | 4.111 | 4.111 |
| CAN-bus | | | with CAN-bus | with CAN-bus | with CAN-bus |
| E-Gas[1)] | | | without E-Gas | with E-Gas | with E-Gas |
| Hydraulic control | | | E17 | E18/2 | E18/2 |

1) "E-Gas" is the general abbreviation for electronic engine power regulation, more information on this can be found in self-study program No.. 210.

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00-14

| Automatic transmission | | 01V.4 | 01V.2 | 01V.Z |
|---|---|---|---|---|
| **Transmission** | Code letters | **EKD** | **EDF** | **EMP** |
| | Manufactured from | 08.99 | 04.99 | 08.99 |
| | to | | | |
| **Torque converter** | Code letters | **N28** | **D34** | **D34** |
| **Allocation** | Model | Audi A4 1996➢ USA | Audi A4 1996➢ USA | Audi A4 1996➢ USA |
| | Engine | 2.8 L 5V - 142 kW | 2.7 L 5V - 184 kW | 2.7 L 5V - 184 kW |
| **Ratios** | 1. Gear | 3.665 | 3.665 | 3.665 |
| | 2. Gear | 1.999 | 1.999 | 1.999 |
| | 3. Gear | 1.407 | 1.407 | 1.407 |
| | 4. Gear | 1.000 | 1.000 | 1.000 |
| | 5. Gear | 0.742 | 0.742 | 0.742 |
| | Reverse gear | 4.096 | 4.096 | 4.096 |

*Valve body allocation according to transmission code letters*

⇒ *Parts Catalog*

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00-15

| Transmission | Code letters | | EKD | EDF | EMP |
|---|---|---|---|---|---|
| **Intermediate drive-Va** | Number of teeth | Drive gear | 29 | 29 | 29 |
| | | Output gear | 35 | 29 | 35 |
| | Ratio | | 1.207 | 1.000 | 1.207 |
| **Final drive-Va** | Number of teeth | Drive pinion | 11 | 11 | 11 |
| | | Ring gear | 34 | 34 | 32 |
| | Ratio | | 3.091 | 3.091 | 2.909 |
| **Intermediate drive-HA** | Number of teeth | Drive gear | 41 | 43 | 41 |
| | | Output gear | 37 | 34 | 37 |
| | Ratio | | 0.902 | 0.791 | 0.902 |
| **Final drive-HA** | Number of teeth | Drive pinion | 9 | 9 | 9 |
| | | Ring gear | 37 | 35 | 35 |
| | Ratio | | 4.111 | 3.889 | 3.889 |
| CAN-bus | | | with CAN-bus | with CAN-bus | with CAN-bus |
| E-Gas[1)] | | | with E-Gas | with E-Gas | with E-Gas |
| Hydraulic control | | | E18/2 | E18/2 | E18/2 |

1) "E-Gas" is the general abbreviation for electronic engine power regulation, more information on this can be found in self-study program No.. 210.

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00-16

| Automatic transmission | | 01V.Z | 01V.Z | 01V.4 |
|---|---|---|---|---|
| **Transmission** | Code letters | **FAQ** | **FHJ** | **FAS** |
| | Manufactured from | 06.00 | 06.00 | 05.00 |
| | to | | | |
| **Torque converter** | Code letters | **F35** | **F35** | **N28** |
| **Allocation** | Model | Audi A4 1996➢ USA | Audi A4 1996➢ USA | Audi A4 1996➢ USA |
| | Engine | 2.7 L 5V - 184 kW | 2.7 L 5V - 184 kW | 2.8 L 5V - 142 kW |
| **Ratios** | 1. Gear | 3.665 | 3.665 | 3.665 |
| | 2. Gear | 1.999 | 1.999 | 1.999 |
| | 3. Gear | 1.407 | 1.407 | 1.407 |
| | 4. Gear | 1.000 | 1.000 | 1.000 |
| | 5. Gear | 0.742 | 0.742 | 0.742 |
| | Reverse gear | 4.096 | 4.096 | 4.096 |

*Valve body allocation according to transmission code letters*

⇒ *Parts Catalog*

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00-17

| Transmission | Code letters | | FAQ | FHJ | FAS |
|---|---|---|---|---|---|
| **Intermediate drive-Va** | Number of teeth | Drive gear | 29 | 29 | 29 |
| | | Output gear | 35 | 35 | 35 |
| | Ratio | | 1.207 | 1.207 | 1.207 |
| **Final drive-Va** | Number of teeth | Drive pinion | 11 | 11 | 11 |
| | | Ring gear | 32 | 32 | 34 |
| | Ratio | | 2.909 | 2.909 | 3.091 |
| **intermediate drive-HA** | Number of teeth | Drive gear | 41 | 41 | 41 |
| | | Output gear | 37 | 37 | 37 |
| | Ratio | | 0.902 | 0.902 | 0.902 |
| **Final drive-HA** | Number of teeth | Drive pinion | 9 | 9 | 9 |
| | | Ring gear | 35 | 35 | 37 |
| | Ratio | | 3.889 | 3.889 | 4.111 |
| CAN-bus | | | with CAN-bus | with CAN-bus | with CAN-bus |
| E-Gas[1)] | | | with E-Gas | with E-Gas | with E-Gas |
| Hydraulic control | | | E18/2 | E18/2 | E18/2 |

1) "E-Gas" is the general abbreviation for electronic engine power regulation, more information on this can be found in self-study program nr. 210.

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**00-18**

| **Automatic transmission** | | **01V.4** |
|---|---|---|
| **Transmission** | Code letters | **FHH** |
| | Manufactured from<br>to | 06.00 |
| **Torque converter** | Code letters | **N28** |
| **Allocation** | Model | Audi A4 1996➢<br>USA |
| | Engine | 2.8 L 5V - 142 kW |
| **Ratios** | 1. Gear | 3.665 |
| | 2. Gear | 1.999 |
| | 3. Gear | 1.407 |
| | 4. Gear | 1.000 |
| | 5. Gear | 0.742 |
| | Reverse gear | 4.096 |

*Valve body allocation according to transmission code letters*

⇒ *Parts Catalog*

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**00-19**

| **Transmission** | Code letters | | **FHH** |
|---|---|---|---|
| **Intermediate drive-Va** | Number of teeth | Drive gear | 29 |
| | | Output gear | 35 |
| | Ratio | | 1.207 |
| **Final Drive-Va** | Number of teeth | Drive pinion | 11 |
| | | Ring gear | 34 |
| | Ratio | | 3.091 |
| **Intermediate drive-HA** | Number of teeth | Drive gear | 41 |
| | | Output gear | 37 |
| | Ratio | | 0.902 |
| **Final drive-HA** | Number of teeth | Drive pinion | 9 |
| | | Ring gear | 37 |
| | Ratio | | 4.111 |
| CAN-bus | | | with CAN-bus |
| E-Gas[1)] | | | with E-Gas |
| Hydraulic control | | | E18/2 |

1) "E-Gas" is the general abbreviation for electronic engine power regulation, more information on this can be found in self-study program nr. 210.

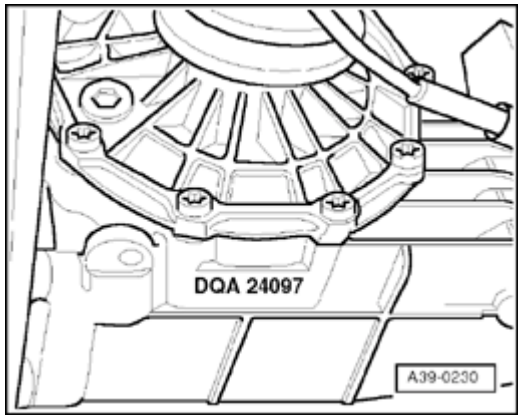
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00-20

# Rear final drive, identification

Final drive 01H is allocated to the all wheel drive automatic transmission 01V.

Allocation ⇒ page 00-21 , technical data.




**Code letters and date of manufacture of rear final drive.**

| **Example:** | DQA | 24 | 09 | 7 |
|---|---|---|---|---|
| | I | I | I | I |
| | I | I | I | I |
| | Code letters | Day | Month | Year (1997) of manufacture |

The code letters of the rear final drive are also listed on the vehicle data plates.

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00-21

## Code letters, allocation, ratios

| Rear final drive | | | 01H.A | 01H.B |
|---|---|---|---|---|
| **Final drive** | Code letters | | DXT | DAK |
| | Application | from | 01.99 | 10.95 |
| | | to | - | - |
| **Ratio** | Final drive | Z2:Z1 = i | 35:9 = 3.889 | 37:9 = 4.111 |
| **Drive axle** | Flange ∅ mm | | 108 | 100 |
| **Allocation:**<br><br>**Automatic transmission 01V all road** | Code letters | | EDF, EMP, FAQ, FHJ | DKB, DTV, EFQ, DRN, ECG, FAL, EKD, FAS, FHH |

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# Capacity

### Planet gear

| Capacity | Planet gear | Automatic transmission |
|---|---|---|
| New filling | 9.0 L | 01V |
| Change | approx. 2.6 L | |
| Lubricant | ATF | |

ATF is available as a replacement part (is also referred to as VW ATF).

Container size 0.5 L -part number G 052 162 A1

Container size 1.0 L -part number G 052 162 A2

*Only ATF available as a replacement part must be used in the planetary gear of the automatic transmission 01V.*

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**Final drive-front**

| Capacity | Final drive | Automatic transmission |
|---|---|---|
| New filling | 0.82 L | 01V |
| Change | Filled for life, no replacement | |
| Lubricant | Gear oil<br>SAE75 W90<br>(synthetic-oil) | |

*Gear oil SAE 75 W90 (synthetic oil) is available as a replacement part.*

*Container size 0.5 L -part number G 052 145 A1*

*Container size 1.0 L -part number G 052 145 S2*

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**Center differential**

| Capacity | Center differential | Automatic transmission |
|---|---|---|
| New filling | 0.8 L | 01V |
| Change | Filled for life, no replacement | |
| Lubricant | Gear oil<br>SAE75 W90<br>(synthetic-oil) | |

*Gear oil SAE 75 W90 (synthetic oil) is available as a replacement part.*

*Container size 0.5 L -part number G 052 145 A1*

*Container size 1.0 L -part number G 052 145 S2*

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**Rear final drive**

| Capacity | Final drive | Rear final drive |
|---|---|---|
| New filling | 1.9 L | 01H |
| Change | Filled for life, no replacement | |
| Lubricant | Gear oil<br>SAE75 W90<br>(synthetic-oil) | |

*Gear oil SAE 75 W90 (synthetic oil) is available as a replacement part.*

*Container size 0.5 L -part number G 052 145 A1*

*Container size 1.0 L -part number G 052 145 S2*

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# Roll starting and towing, notes

***WARNING!***

***When towing the vehicle, selector lever must be in position N and the vehicle must not be towed for more than 50 km and no faster than 50 km/h, otherwise the transmission will be damaged.***

***Note:***

*Roll starting the engine is not possible (e.g. if the battery is too weak or the starter does not work).*

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# Servicing, notes

The maximum possible care, cleanliness and proper tools are essential to ensure satisfactory and successful transmission repairs. The usual basic safety precautions also apply when carrying out vehicle repairs.

A number of generally applicable instructions for individual repair procedures, which are otherwise mentioned at various points in the Repair Manual, are summarized here. They apply to this Repair Manual. They apply to this Repair Manual.

**Special tools and equipment**

*For a complete list of special tools used in this repair manual: see "Special tools and equipment" or "Special tools".*

**Transmission**

- Rules of cleanliness for working on automatic transmissions ⇒ page 37-148 .
- Do not run engine with the oil pan removed or without ATF filling and do not tow vehicle.
- Secure torque converter on removed transmission to keep it from falling out.

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- Thoroughly clean all connections and the surrounding area before disconnecting.

- Check installation dimension of torque converter before installing transmission ⇒ page 32-8

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- When installing transmission, make sure centering sleeves are correctly seated.
- Place parts that have been removed on a clean surface and cover. Use foils and paper. Use lint-free cloths only!
- Carefully cover over opened components or seal, if repairs are not carried out immediately.
- Only install clean components: Only unpack replacement parts immediately prior to installation.
- Check, and if necessary correct amount of the following fluids when replacing the automatic transmission. ATF in planetary gear ⇒ page 37-133 , Gear oil in front final drive ⇒ page 39-1 , Transmission oil in center differential ⇒ page 39-40 . Capacities and specifications ⇒ page 00-22 onward.
- When replacing the rear final drive, check and if necessary, correct oil level in rear final drive ⇒ page 39-94 Capacities and specifications ⇒ page 00-23 .

**O-rings, gaskets, seals**

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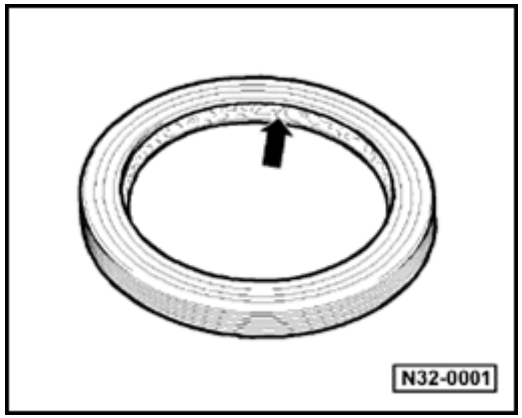
- Always replace O-rings, gaskets and sealing rings.

- After removing gaskets and seals, always inspect the contact surfaces at housing or shaft for burrs resulting from removal or for other signs of damage.

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00-29

- Thoroughly clean housing joint surfaces before assembling and apply sealing compound AMV 188 200 03.




- Before installing, fill gap between sealing lips (arrow) of radial-shaft seals half way with sealing grease 052 128 A1.
- The open side of the seals face toward the fluid to be sealed in.
- For installation, lightly coat outer circumference and sealing lip with ATF or transmission oil, depending on the installation location.
- Lightly lubricate O-rings before installing, this prevents the rings from being pinched when inserting.
- Use only ATF in areas near ATF. Other lubricating substances cause functional problems in the hydraulic transmission control.
- When pressing in new seals, make sure the sealing lip does not run on the same point as the sealing lip of the old seal (use insertion depth tolerances).
- After installing, check and if necessary correct fluid levels in the affected area. ATF in planetary gear ⇒ page 37-133 , Gear oil in front final drive ⇒ page 39-1 , Transmission oil in center differential ⇒ page 39-40 , Transmission oil in rear final drive ⇒ page 39-94 . Capacities and specifications ⇒ page 00-22 onward.

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00-30

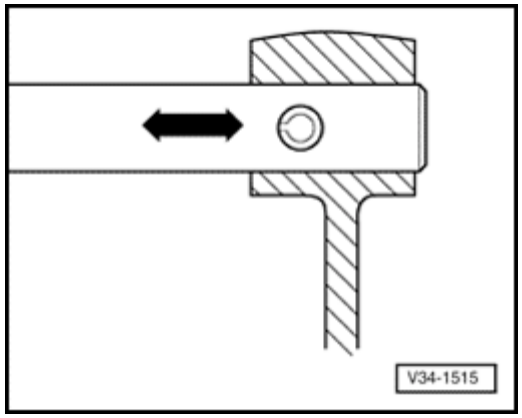
**Nuts, bolts**

- Loosen bolts in reverse order of tightening sequence.
- Tighten and loosen bolts or nuts for securing covers and housings without tightening sequence in diagonal sequence in stages.
- Do not cant, and loosen and tighten especially sensitive parts - e.g. valve body - in diagonal manner in stages.
- The tightening torques stated apply to non-oiled nuts and bolts.
- Always replace self-locking nuts and bolts.
- Using a wire brush, clean threads of bolts which are secured with locking compound. Next, insert bolts using AMV 185 101 A1.
- Threaded holes into which self-locking bolts or bolts with locking compound are threaded in, must be cleaned (e.g. using threaded tap). Otherwise there is danger that the bolts may shear when removed again.

**Circlips**

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- Do not over-stretch circlips.
- Always replace damaged or over-stretched circlips.
- Circlips must be fully seated in grooves.




- Replace roll pins. Installation position: Slot is longitudinal to line of force.

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**Mounts**

- Install needle bearings with the lettering on the bearing (the side with thicker metal) facing the drift.
- Insert bearing with transmission oil or ATF, depending on installation location.
- Tapered roller bearings for output shaft and differential in rear final drive are low-friction bearings. Do not grease new tapered roller bearings additionally for friction torque measurement. The bearings are already greased with a special oil from the factory for this reason.
- Do not interchange inner and outer bearing races with those from other bearings of the same size.
- Tapered roller bearings are allocated to the date of transmission manufacture and code letters in the parts catalog.
- Always replace tapered roller bearings on one shaft together and use new bearings from the same manufacturer.

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- Heat tapered roller bearing inner races to approx. 100 5C before installing. Press in to stop so that there is no axial play.

**Shims**

- Measure shims at several points using a micrometer. Different tolerances make it possible to measure the required shim size exactly.

- Check for burrs and signs of damage. Only install perfect adjustment shims.

- Only install perfect undamaged adjustment shims.

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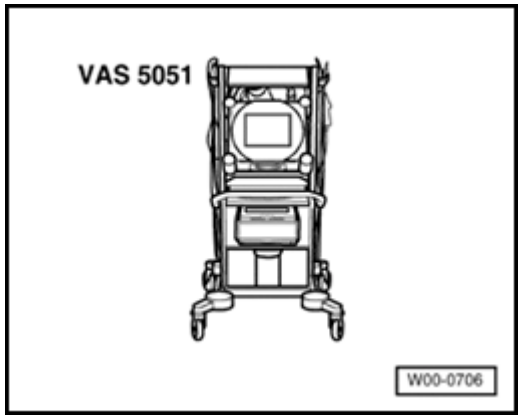
00-32

**Valve body**

- Replace valve body if shift members are burnt.

- The valve body is allocated to the transmission code letters ⇒ parts catalog.

**Guided Troubleshooting, Vehicle On Board Diagnostic (OBD) and Test Instruments**



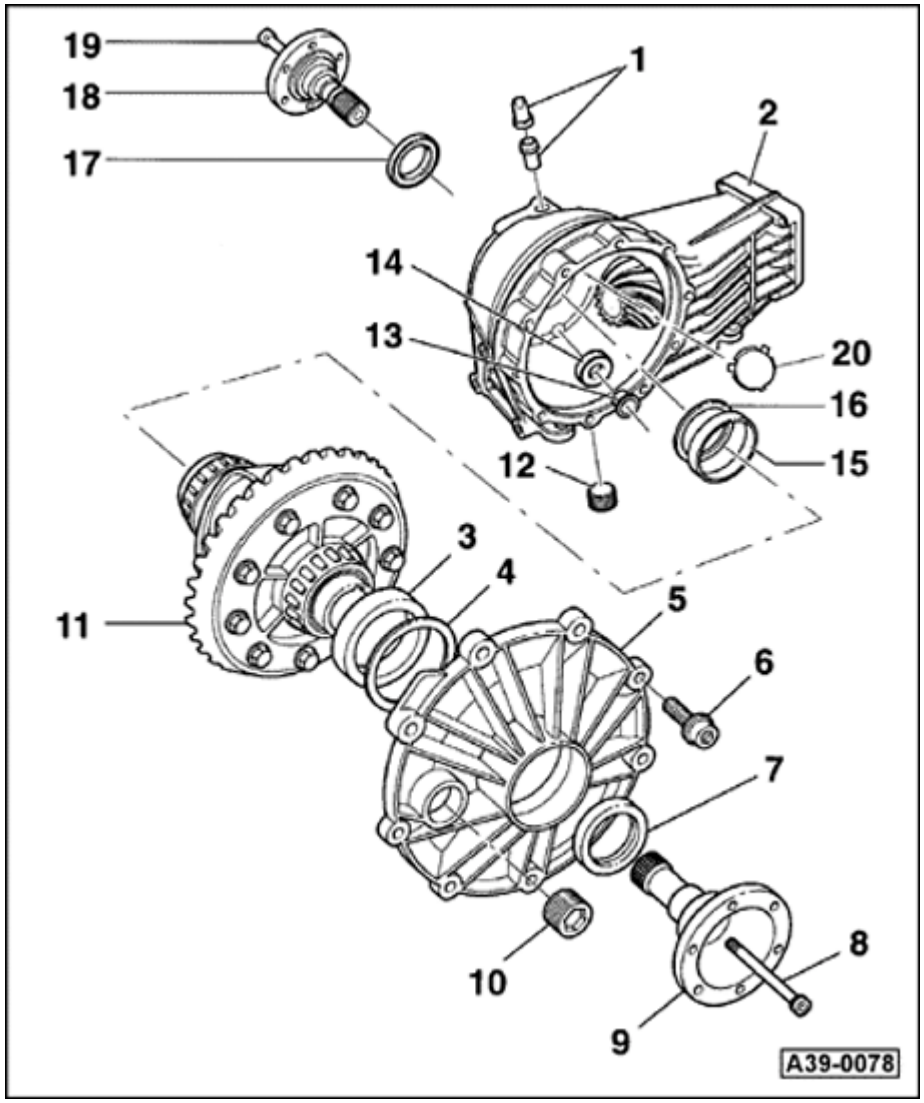

- Before performing repairs on the automatic transmission, the malfunction cause must be determined as precisely as possible via the VAS5051 Tester in operating modes "Guided Troubleshooting", "Vehicle Self-Diagnosis" and "Test Instruments."

On Board Diagnostic (OBD) is described in:

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V On Board Diagnostic (OBD), Repair Group 01, Performing On Board Diagnostic (OBD)*

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39-128




# Differential, removing and installing

***Notes:***

- *General repair notes ⇒ page 00-27 .*
- *Secure final drive to assembly stand ⇒ page 39-123 .*
- *Adjustments are required when replacing components marked with 1) ⇒ Adjustment overview ⇒ page 39-170 .*

**1 - Breather sleeve**

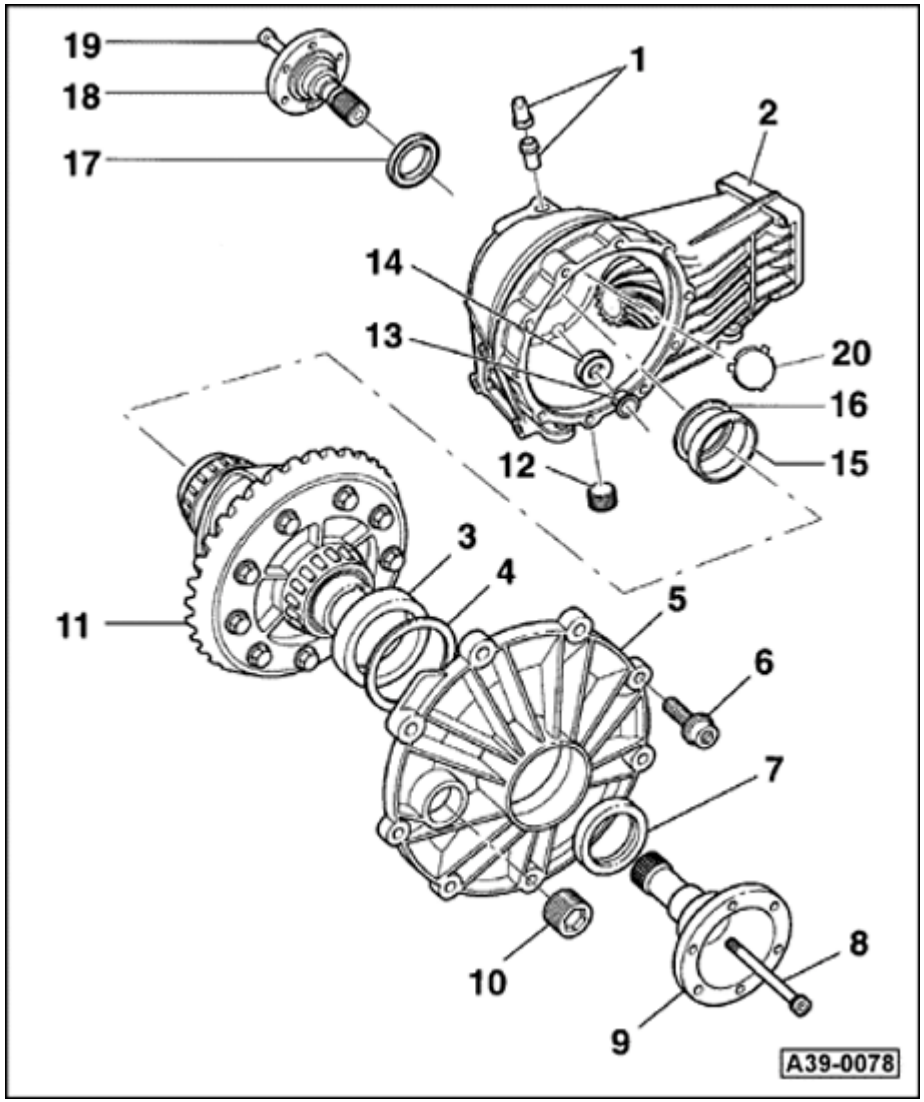
- With rubber valve
- Installed position Item

**2 - Final drive housing 1)**

- With drive pinion
- Drive pinion, removing and installing ⇒ page 39-152

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39-129




**3 - Large tapered roller bearing outer race** [1)]

- Driving out ⇒ Fig. 7 , ⇒ page 39-147
- Pressing in ⇒ Fig. 8 , ⇒ page 39-148

**4 - Adjustment shim "S1"**

- Note thickness
- Adjustment overview ⇒ page 39-170

**5 - Cover for final drive** [1)]

- With O-ring
- Replacing O-ring
- Insert O-ring with oil

**6 - TORX bolt - 25 Nm**

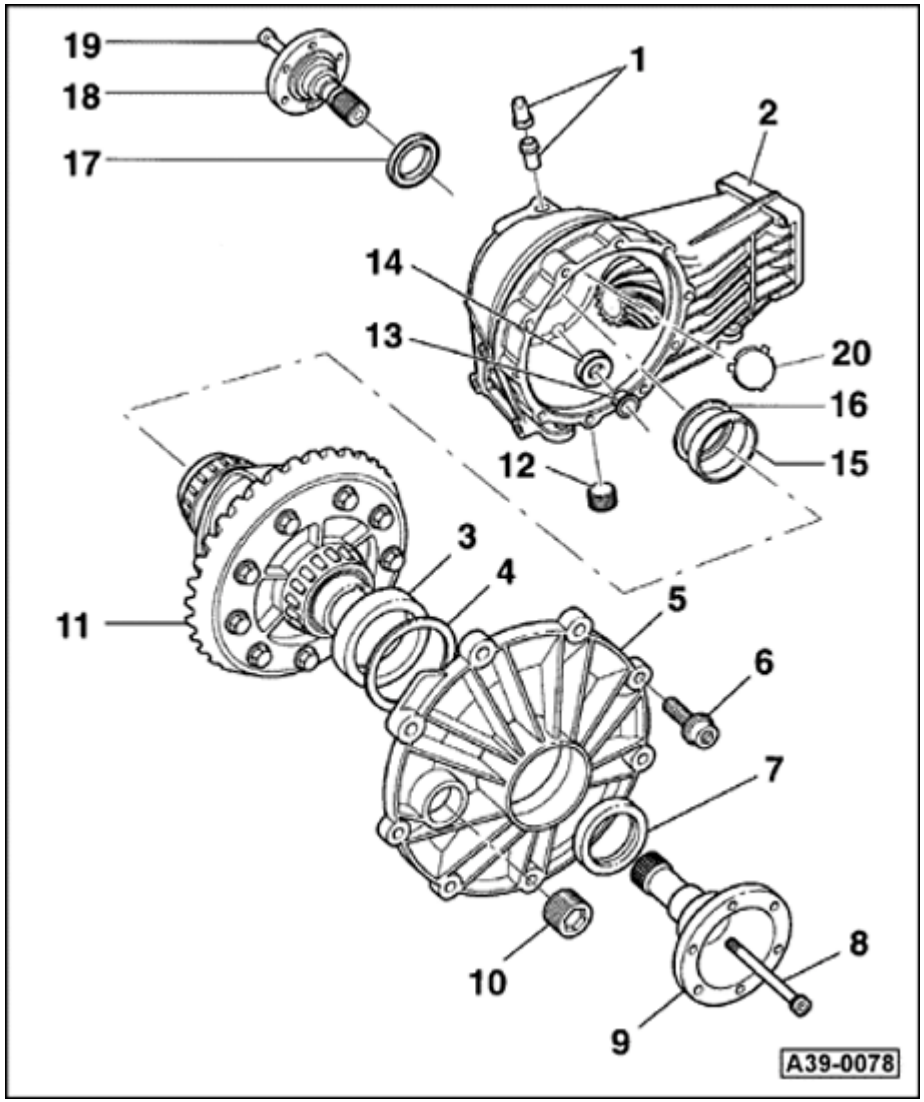
**7 - Right gasket**

- Always replace ⇒ page 39-113

**8 - Socket head bolt - 25 Nm**

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39-130




**9 - Right drive flange**

- Removing and installing ⇒ Fig. 1

**10 - Oil filler plug - 35 Nm**

**11 - Differential with ring gear 1)**

- Disassembling and assembling ⇒ page 39-136

**12 - Oil drain plug - 35 Nm**

**13 - Socket**

- Holds the magnet in position
- Press in until stop

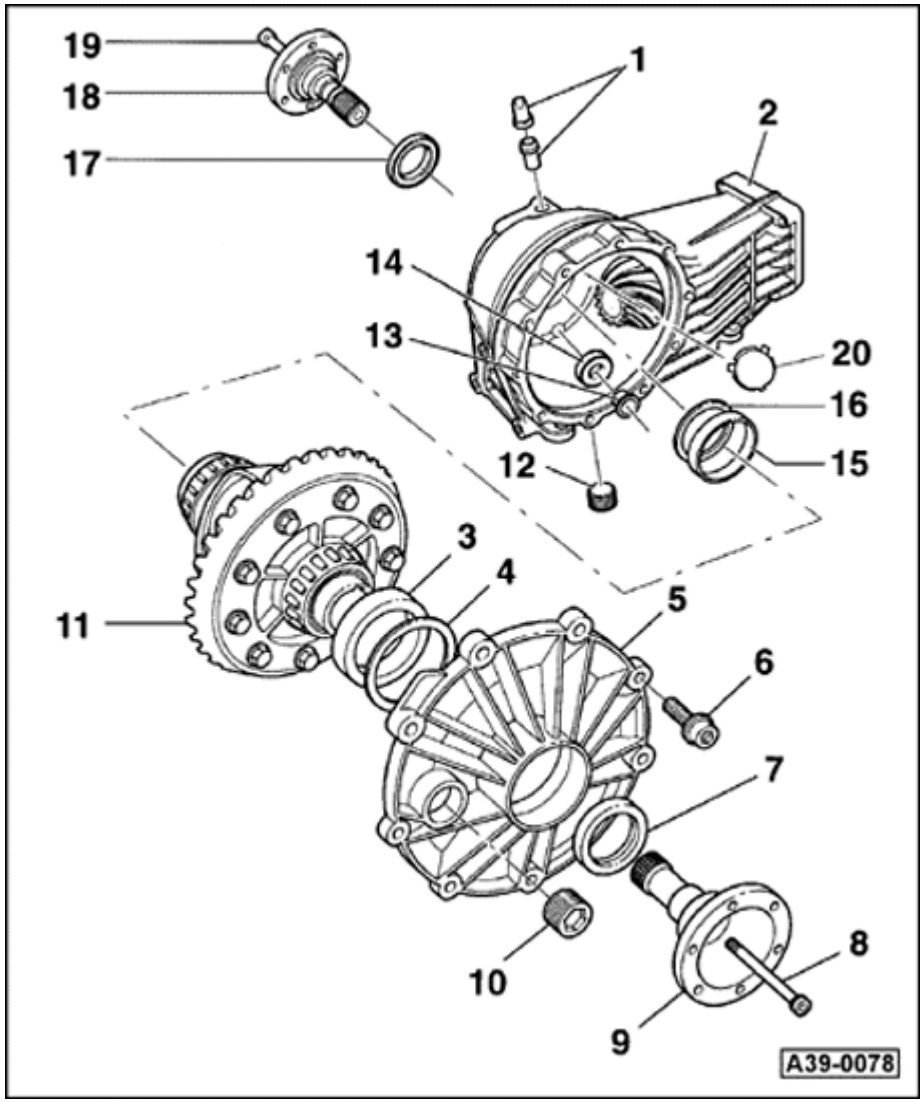
**14 - Magnet**

**15 - Small tapered roller bearing outer race 1)**

- Driving out ⇒ Fig. 1 , ⇒ page 39-144
- Pressing in ⇒ Fig. 2 , ⇒ page 39-144

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39-131




**16 - Shim "S2"**

- Note thickness
- List of adjustments ⇒ page 39-170

**17 - Left gasket**

- Always replace ⇒ page 39-113

**18 - Left drive flange**

- Removing and installing ⇒ Fig. 1

**19 - Socket head bolt - 25 Nm**

**20 - Cover**

- Installing ⇒ Fig. 2

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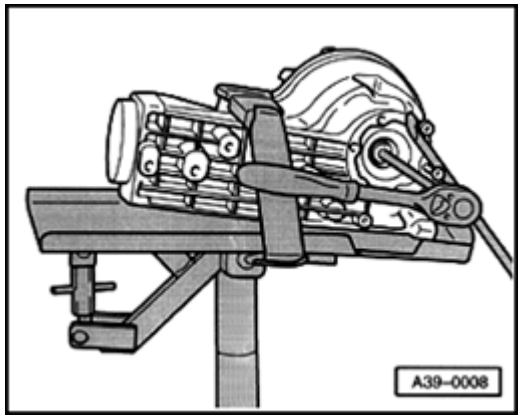



**Fig. 1 Removing and installing drive flange**

- To loosen securing bolt, thread 2 bolts into drive flange and counter hold using tire iron.
- Remove drive flange at installed bolts.

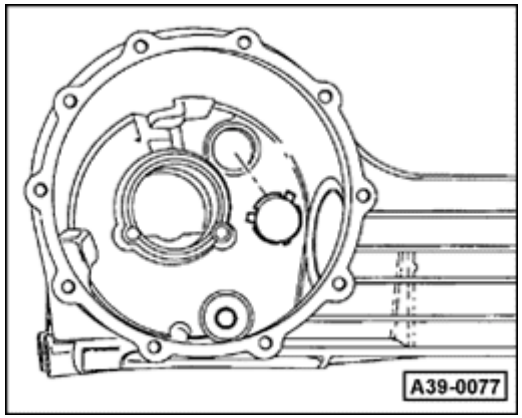



**Fig. 2 Press in cover up to stop**

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39-133

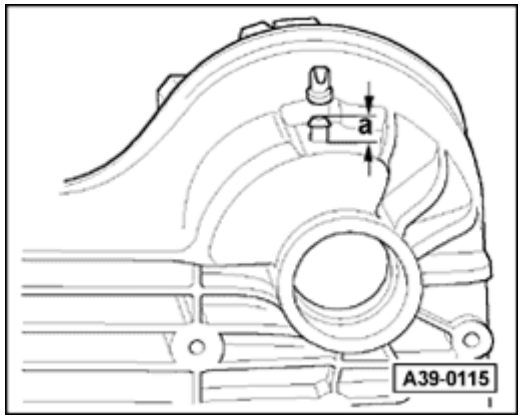



**Fig. 3 Installed position of breather sleeve**

The breather sleeve must protrude 13 mm (measurement -a-) out of housing after pressing in.

The slot in the rubber valve is parallel to direction of travel.

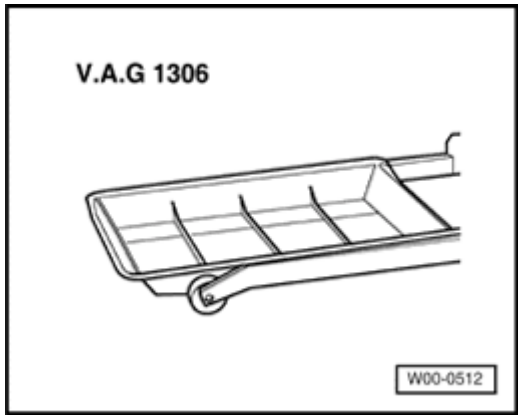
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39-134

## Differential, removing and installing

- Rear final drive removed

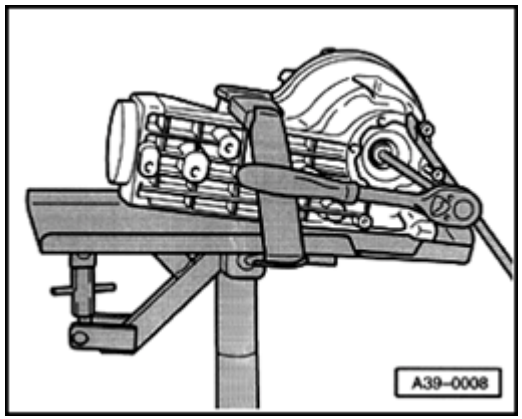
### Special tools and equipment




- VAG1306 drip tray

### Removing

- Secure complete rear final drive to assembly stand ⇒ page 39-123 .
- Place VAG1306 drip tray underneath and drain gear oil.



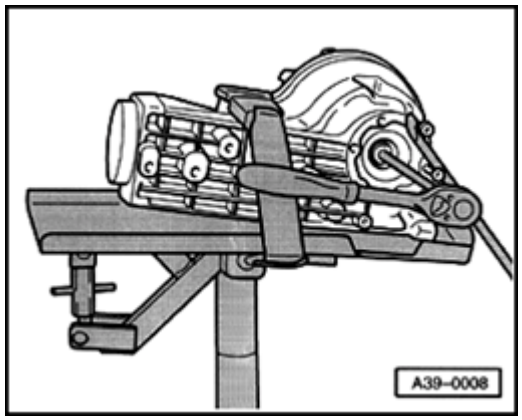

- Remove left and right drive flanges.
- To loosen securing bolt, thread 2 bolts into drive flange and counter hold using tire iron.
- Mark left and right drive flanges.
- Remove drive flange at installed bolts.
- Remove mounting bolts for final drive cover.
- Remove final drive cover from axle housing and remove differential.

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**Installing**

Installation is reverse of removal, noting the following:

- Install differential.
- Replace O-ring for final drive cover and oil for installation.
- Install final drive cover onto final drive housing and tighten in diagonal pattern to 25 Nm.
- Replace drive flange seals ⇒ page 39-113 .
- Fill gap between sealing lip and dust lip with multi-purpose grease.




- Install drive flanges and tighten to 25 Nm.
- Top-up and check gear oil in rear final drive ⇒ page 39-94 .

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32-1

# Torque converter

***WARNING!***

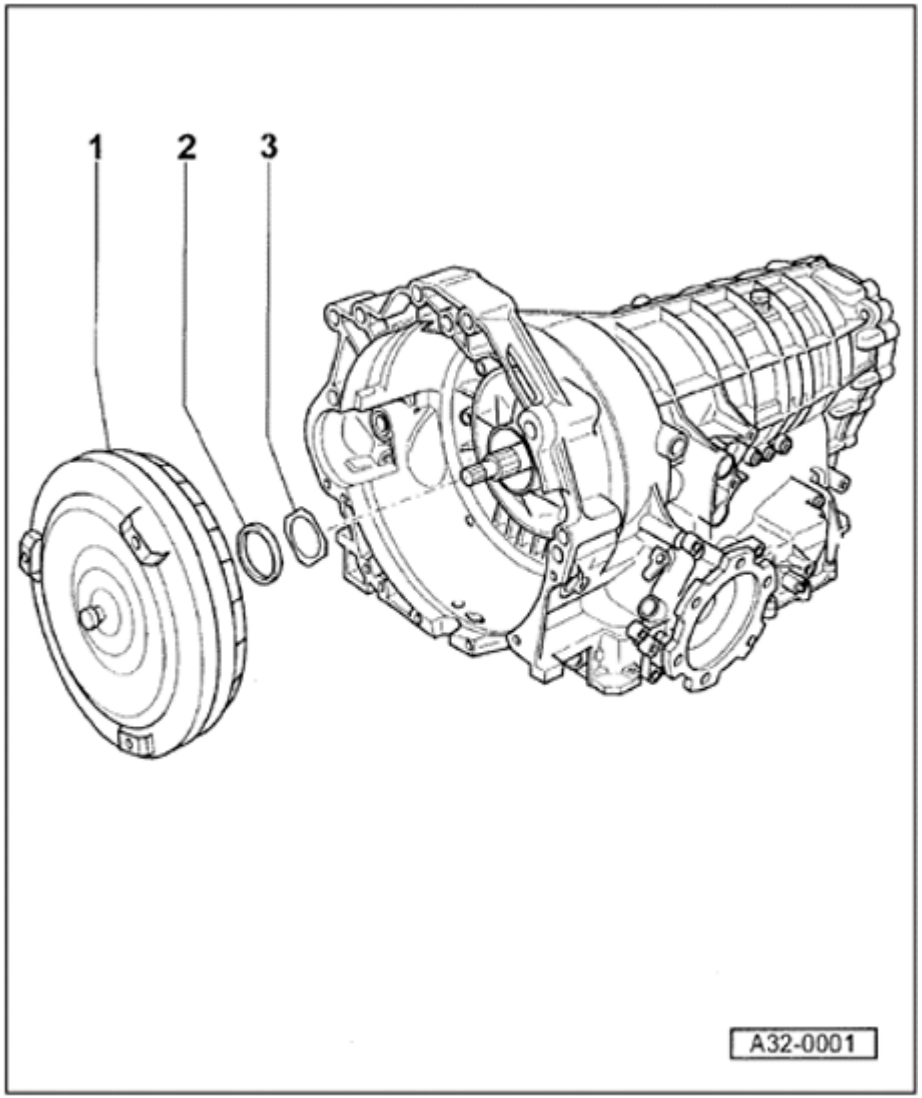
***Check installation dimension of torque converter before installing transmission*** ⇒ ***page 32-8***

***Notes:***

- *Rules of cleanliness for working on automatic transmissions* ⇒ *page 37-148* .
- *General repair notes* ⇒ *page 00-27* .
- *Lightly coat sealing ring with ATF. Other lubricating substances lead to functional problems in the hydraulic transmission control.*

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32-2




**1 - Torque converter**

- Secure on removed transmission to keep it from falling out.
- Identification ⇒ page 32-3
- Installing ⇒ page 32-8

**2 - Seal**

- Always replace ⇒ page 32-6

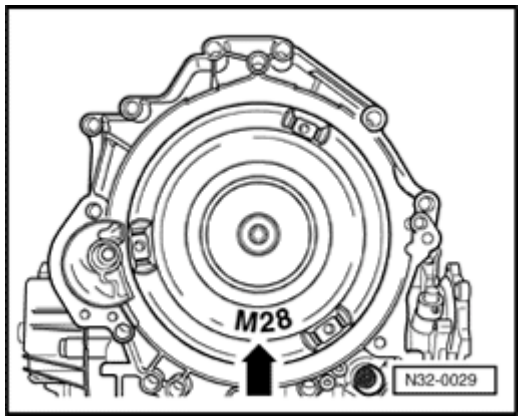
**3 - Contact ring**

- Behind sealing ring
- Replace if damaged

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32-3

## Torque converter, identification



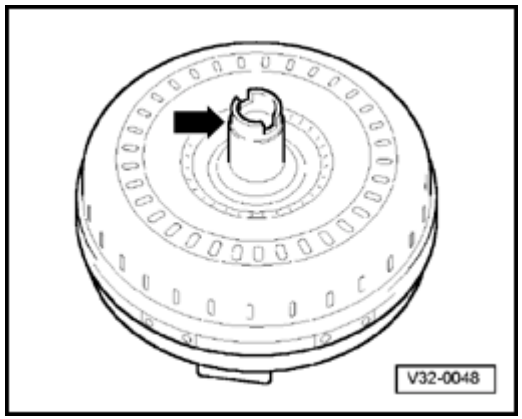

Different types of torque converters exist. Identification is performed via code letters (arrow).

Allocation of torque converter/transmission ⇒ page 00-4 .

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32-4

## Torque converter, checking




- Checking converter hub for wear grooves (arrow).

***Note:***

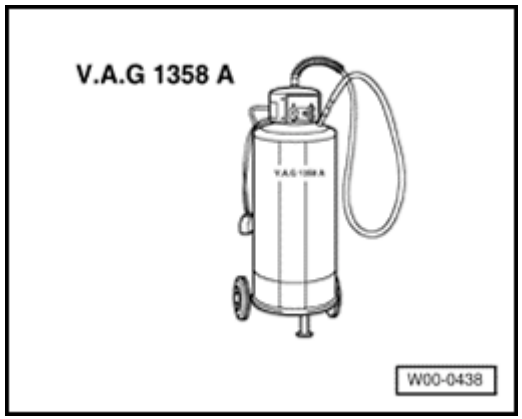
*The torque converter is welded in and must be completely replaced if damaged or in case of malfunctions.*

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32-5

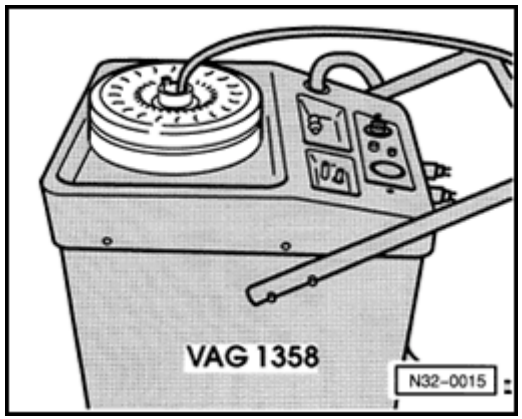
## Torque converter, draining

### Special tools and equipment




- VAG1358A - oil siphoning unit
- V.A.G 1358 A/1 oil syphoning probe

In case of soiling of the ATF via shavings or during a major transmission overhaul, torque converter must be drained.



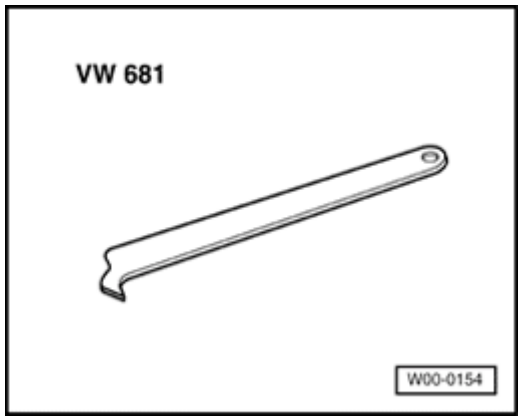

- Drain ATF from torque converter using VAG1358A and oil syphoning probe VAG1358A/1.

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32-6

## Torque converter oil seal, replacing

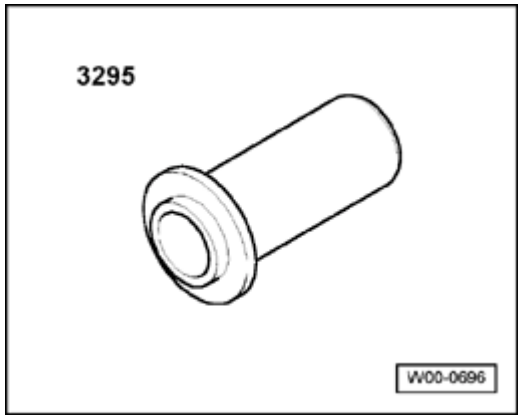
### Special tools and equipment




- VW681 extractor lever
- 3295 thrust piece

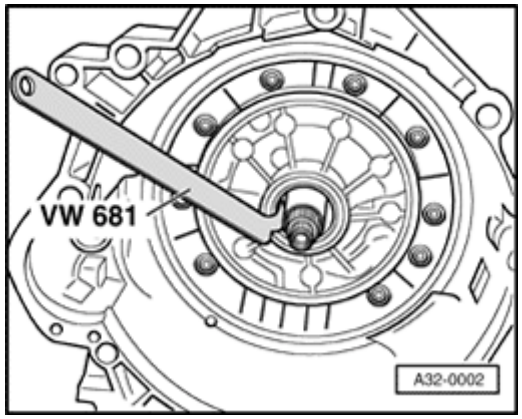
### Removing

- Removing transmission ⇒ page 37-71 .




- Secure transmission to transmission mount ⇒ page 37-131 or place on flat surface.

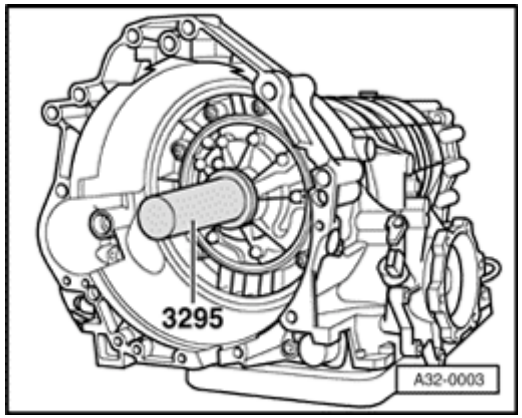
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- Insert VW681 extractor lever directly behind the sealing lip of the sealing ring, so that the contact ring which is behind it is not damaged.

**Installing**

- Insert contact ring.
- Coat outer circumference and sealing lips of sealing ring with ATF.
  - Installation position: The open side of the sealing ring faces the transmission.




- Using 3295 thrust piece, drive in sealing ring for torque converter up to thrust piece stop.

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32-8

## Torque converter, installing

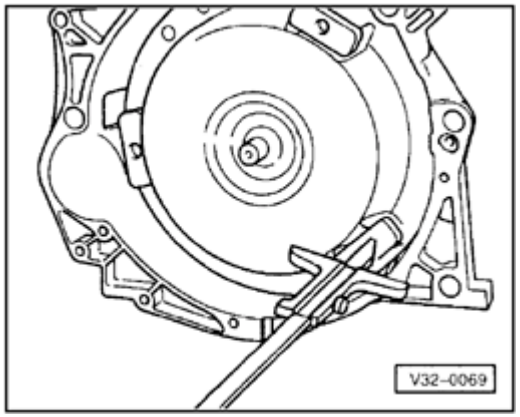
### Special tools and equipment

- Depth gauge

- Slide in converter hub through the sealing ring up to the first stop.

- Rotate torque converter inward with light pressure, until the groove of the torque converter hub engages in the coupling plate of the pump wheel and the torque converter slides inward noticeably.

### Installation dimension




If the Torque converter is inserted properly, the dimension between the surface of the mounting eyes and the surface of the torque converter housing is at least 23 mm.

If the torque converter is not inserted completely, this distance will be approx. 11 mm.

***WARNING!***

***In case of an incorrectly inserted torque converter, the coupling plate of the torque converter or the ATF-pump will be destroyed, if the transmission is flanged to the engine.***

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37-1

# Selector lever mechanism, servicing

***WARNING!***

***Shift selector lever into position "P" and engage parking brake before working with the engine running.***

***Notes:***

- *Lubricate bearing areas and slide surfaces with polycarbamide grease G 052 142 A2.*
- *Center console must be removed for service work:*

## Ignition key removal lock, checking

- Switch ignition key to driving position (ignition on).
- Depress brake pedal and hold.
  - Shifting selector lever out of position "P" must be possible with the button at shift lever depressed without "sticking".
  - It must not be possible to remove ignition

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key with selector lever in any position other than "P".

- Shift selector lever into position "P".

  - It must be possible to move ignition key into removal position without "sticking".

- Remove ignition key.

  - Selector lever cannot be shifted out of position "P" with the button pressed and foot brake operated.

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37-2

## Shift mechanism, checking

**Selector lever in position "P" and ignition switched on:**

- Brake pedal is not being operated:

Selector lever is locked and cannot be shifted out of position "P" with the button at selector lever pressed. Shift lock solenoid is locking the selector lever.

- Brake pedal is being operated:

Shift lock solenoid enables the selector lever. Selecting a driving mode must be possible with the button at shift handle pressed without "sticking".

Slowly shift selector lever through "P" via " R, N, D, 4, 3, 2", while checking if the selector lever position in instrument cluster matches with the selector lever position.

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37-3

**Selector lever in position "N" and ignition switched on:**

- Brake pedal is not being operated:

  Selector lever is locked and cannot be shifted out of position "N" with the button at selector lever handle pressed. Shift lock solenoid is locking the selector lever.

- Brake pedal is being operated:

  Shift lock solenoid enables the selector lever. Selecting a driving mode must be possible with the button at shift handle pressed without "sticking".

**Additional test only for shift mechanisms with Tiptronic: Selector lever in position "D", ignition and lights switched on**

- Start engine and let run at idle

- Engage parking brake and operate brake pedal

  Guide selector lever out of selector lever position "D" into Tiptronic gate. Brightening of

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"D" symbol on the shift mechanism cover must turn off and the "+" and "-" symbols must light up.

The display of the selector lever position in the instrument cluster must change from "PRND432" to "54321" when shifting selector lever into the Tiptronic gate.

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37-4

***Notes:***

- *Starter must not start with selector lever in positions "2", "3", "4", "D" and "R".*
- *For Right Hand Drive (RHD) vehicles, it must only be possible to start the starter with the selector lever positions "P" and "N" with the locking button in selector lever handle not pressed.*
- *For speeds exceeding 5 km/h and shifting into selector lever position "N", the shift lock solenoid must not engage to lock the selector lever. Selector lever can be shifted into a driving mode.*
- *For speeds below 2 km/h (almost standstill) and shifting into selector lever position "N", the shift lock solenoid must only engage after approx. 1 second. Selector lever can only be shifted out of position "N" with the brake pedal operated.*

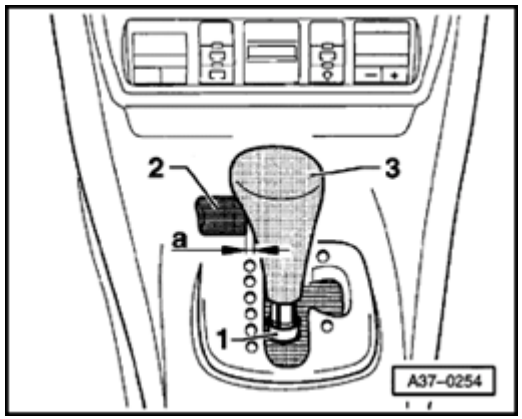
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37-5

## Shift operations, overview

**A distinction is made between shift mechanisms with and without Tiptronic.**

***Notes:***




- *For shift mechanisms with Tiptronic, the selector lever position D can be shifted into the Tiptronic gate by hand. In this gate, the next highest or lowest gear can be selected by pressing the selector lever forward or backward by hand.*
- *This additional Tiptronic gate is not installed in shift mechanisms without Tiptronic.*

**Description of the Tiptronic shift mechanism ⇒ page 37-6 .**

**Description of the shift mechanism (without Tiptronic) ⇒ page 37-52 .**

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37-6

## Tiptronic shift mechanism, removing and installing

### Removing

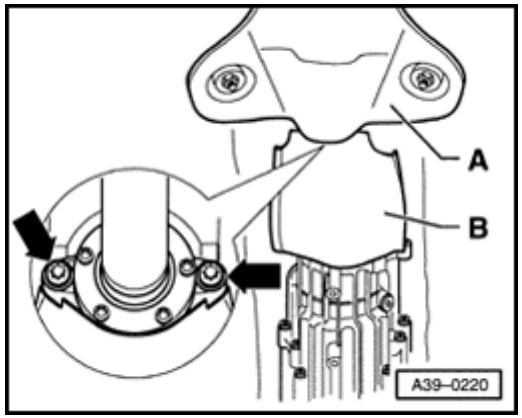
- Shift selector lever into position "P".
- Note radio code (for vehicles equipped with coded anti-theft radio).
- Disconnect Ground (GND) strap from battery.
- Selector lever handle, removing ⇒ page 37-22 .
- Remove shift mechanism cover ⇒ page 37-24 .
- Raise vehicle.
- Disconnect front exhaust pipes with catalytic converter from the rear exhaust system and tie them up on side.

⇒ *Repair Manual, Engine Mechanical, Repair Group 26, removing and installing exhaust system.*

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37-7

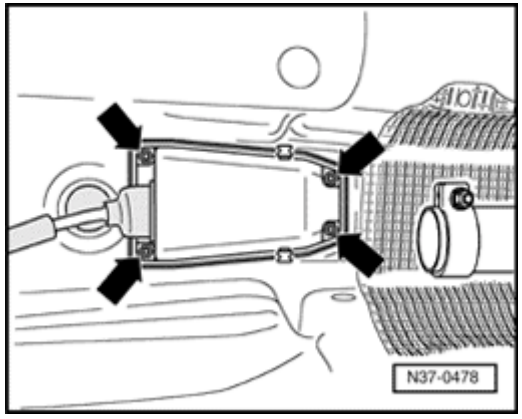
**All-wheel-drive vehicles**




- Remove heat shield -A- above driveshaft.
- Remove heat shield -2- for driveshaft from cover for Torsen differential (arrows).
- Unbolt driveshaft from transmission and hang or support.

**Continuation for all vehicles**

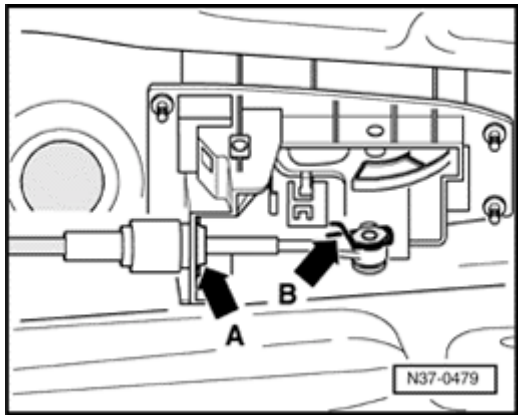
- Loosen boot of selector lever cable from shift mechanism cover and slide back.




- Remove bolts (arrows) and remove shift mechanism cover.

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37-8




- Press ends of locking clip -B- together and remove.
- Remove securing plate -A- for selector lever cable at shift mechanism downward.
- Remove selector lever cable from selector lever.

from top:

- Unclip locking cable from securing spring at shift mechanism housing, slightly lift up securing spring to do so.
- Remove nuts (4 pieces).

from below:

- Remove shift mechanism housing downward.
- Pull selector lever cable out of shift mechanism at the same time, and do not bend.

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37-9

**Installing**

- Installation is the reverse order of removal.

In addition, the following test steps must be performed and observed.

- Selector lever and lever/shift rod in position "P" (park lock must engage).

- Raise vehicle.

- Guide selector lever cable into shift mechanism.

- Do not bend selector lever cable.

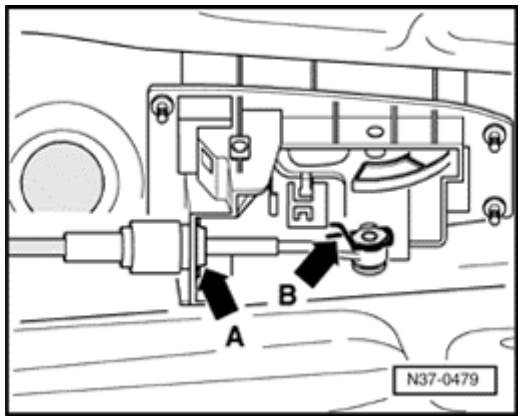
- Mount shift mechanism on chassis.

- Tighten nuts (4 pieces) to 10 Nm from top.

- Secure boot of selector lever cable to shift mechanism cover.

- Installing and adjusting locking cable ⇒ page 37-49 .

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- Connect selector lever cable to selector lever.

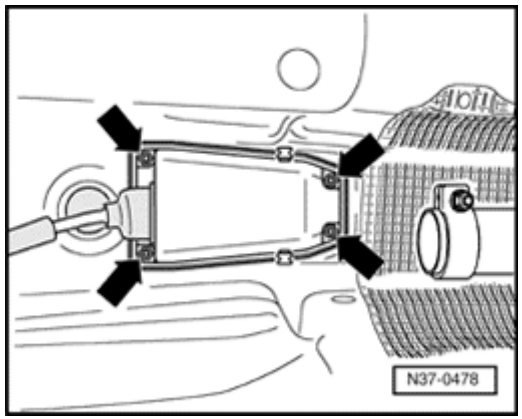
- Install securing plate -A- for selector lever cable to shift mechanism.

Installation position:

Angled end of securing plate points toward the end of the selector lever cable.

- Press ends of locking clip -B- together and slide onto the end of the selector lever cable.

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- Attach cover.

➢

- Tighten nuts (arrows, 4 pieces) to 10 Nm.
- Check adjustment of selector lever cable and adjust if necessary ⇒ page 37-45 .
- Ignition key removal lock, checking ⇒ page 37-1 .

**All-wheel-drive vehicles**

- Bolt driveshaft to transmission flange ⇒ page 39-79 , Driveshaft, removing and installing.
- Install heat shield.

**Continuation for all vehicles**

- Connecting front exhaust pipe to rear exhaust system.

⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system.*

- Installing shift mechanism cover ⇒ page 37-24 .
- Selector lever handle, installing ⇒ page 37-22 .
- Connect battery Ground (GND) strap.
- For vehicles equipped with coded anti-theft radio, activate code.
- Check shift mechanism ⇒ page 37-2 .

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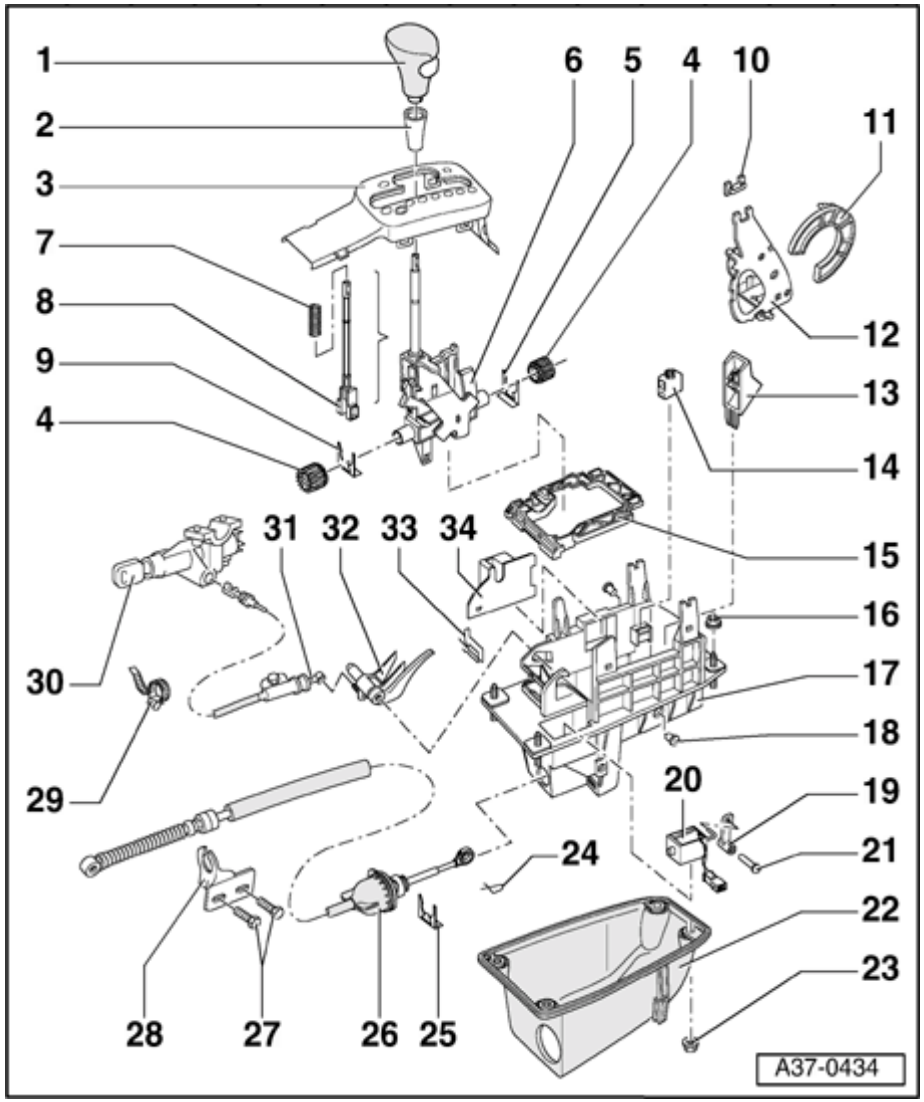
37-11

**Tightening torques:**

| Components | Tightening torques |
|---|---|
| Selector lever cable to mounting bracket | 12 Nm |
| Mounting bracket to transmission (2 x M8) | 23 Nm |
| Heat shield/selector lever cable to transmission, M6 | 9 Nm |
| Heat shield/selector lever cable to transmission, M8 | 23 Nm |
| Selector lever mechanism to chassis M6 | 8 Nm |

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37-12




## Tiptronic shift mechanism, assembly overview

**Assembly sequence ⇒ page 37-32**

*Lubricate bearing areas and slide surfaces with polycarbamide grease Part No. G 052 142 A2.*

**1 - Selector lever handle**

- Removing and installing ⇒ page 37-22

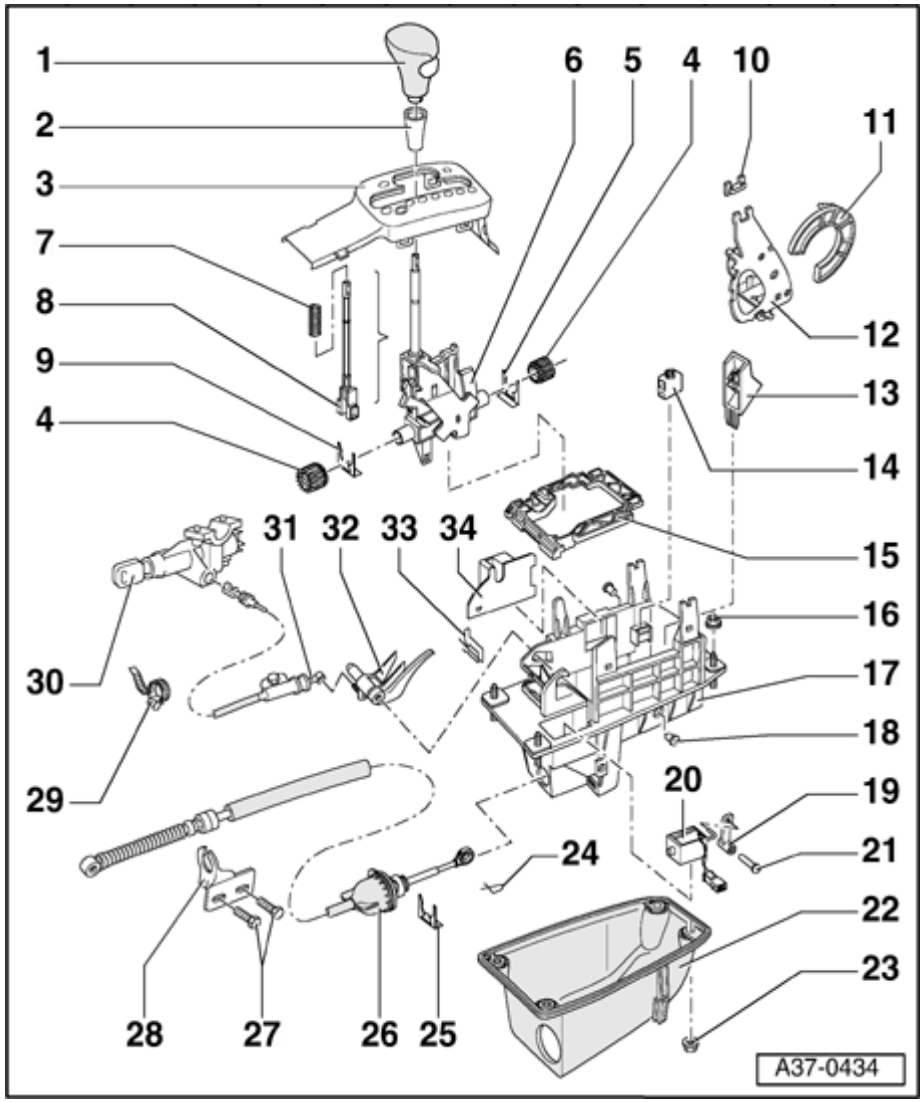
**2 - Sleeve**

- Engages in the selector lever handle

**3 - Cover**

- Removing and installing ⇒ page 37-24
- Disassembling and assembling ⇒ page 37-27

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**4 - Bearing bushing**

- Use securing device - 5 - or secure 9 - in shift mechanism - 17
- Removing and installing ⇒ page 37-32

**5 - Locking clip (thin, with tensioning spring)**

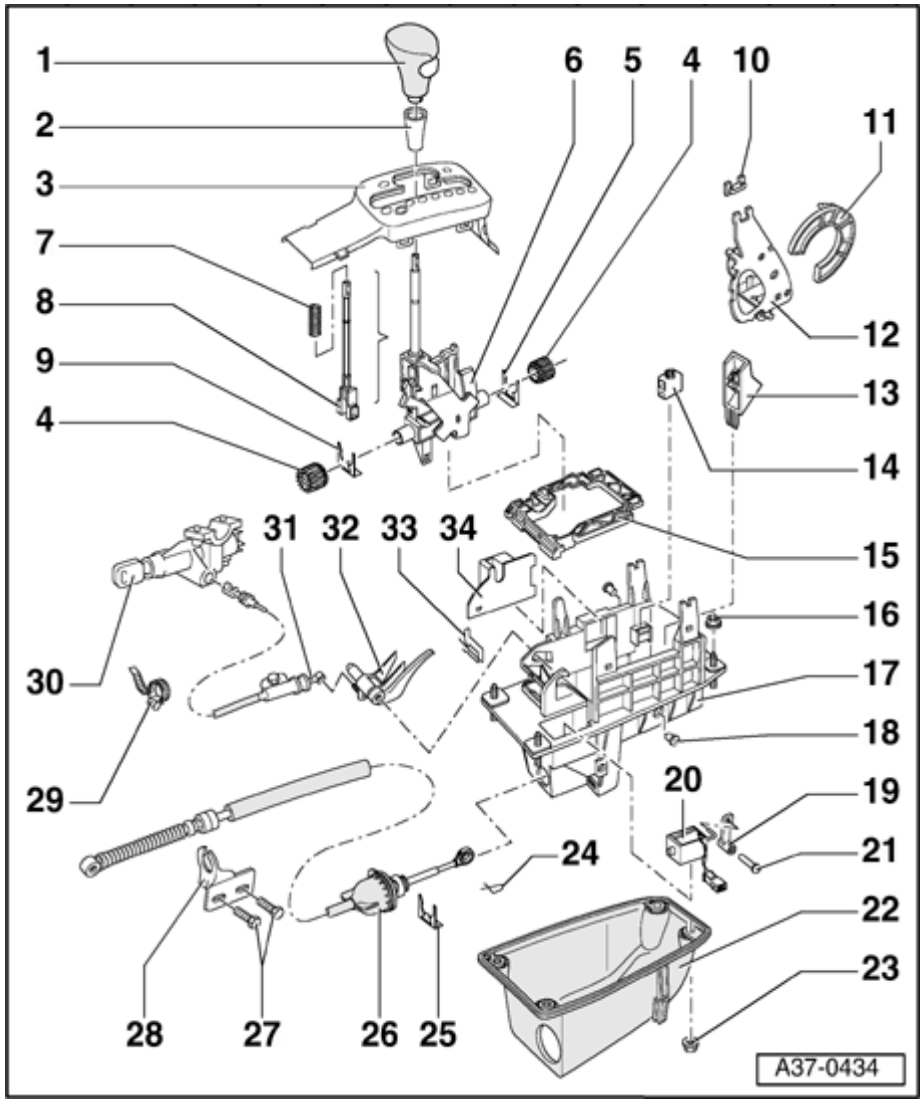
- Secures bushing 17 - in shift mechanism- 4 -
- Installation position:Angled ends point to the inner shift mechanism housing

**6 - Selector lever**

- With pull-lever, compression spring, link and Tiptronic-spring system
- Removing and installing ⇒ Page 37-22 onward
- Disassembling and assembling ⇒ page 37-36

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37-14




**7 - Compression spring**

- Removing and installing ⇒ Page 37-36 onward

**8 - Pull-lever**

- Removing and installing ⇒ Page 37-36 onward

**9 - Locking clip (thick, with compression spring)**

- Secures bushing 17 - in shift mechanism - 4 -
- Installation position:Angled ends point to the inner shift mechanism housing

**10 - Stop buffer**

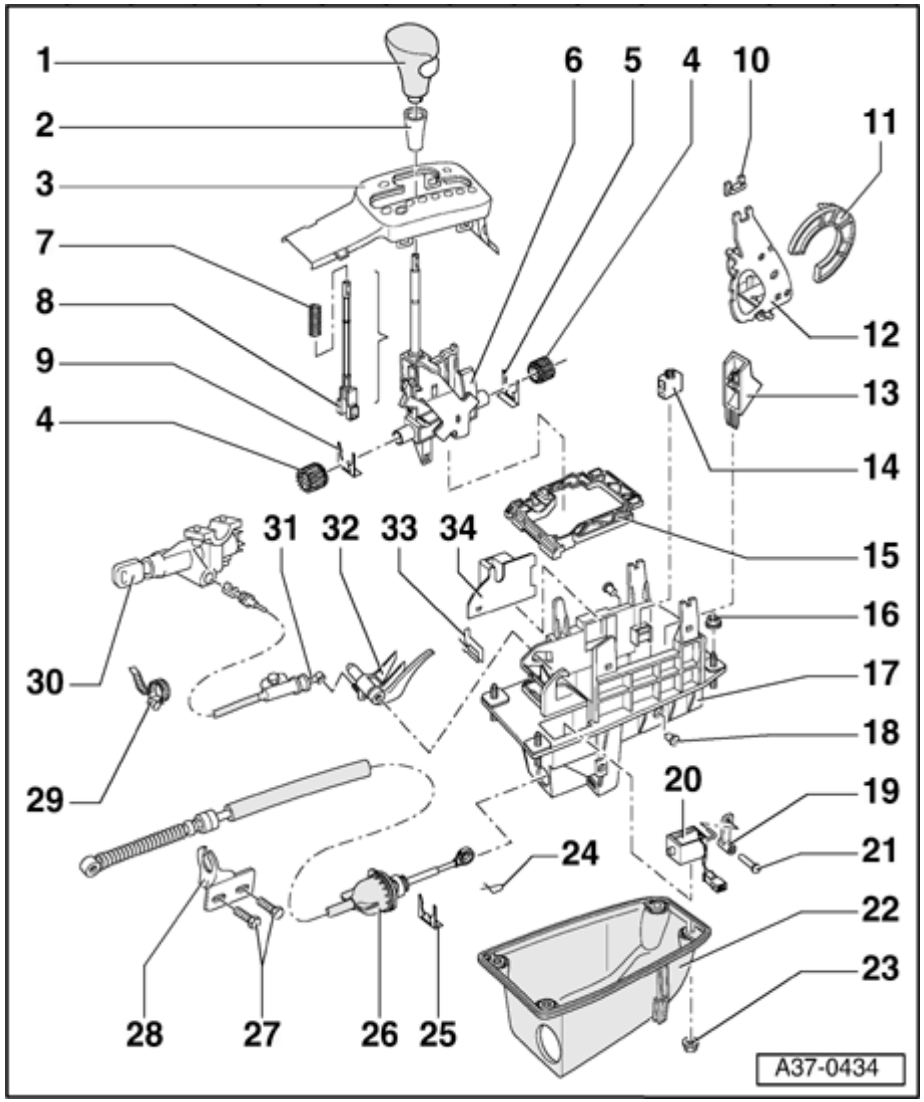
- Clip into cable lever - 12 -
- Installation position: Large contact surface to selector lever

**11 - Catch**

- Clip into cable lever - 12 -
- Removing and installing ⇒ page 37-32

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37-15




**12 - Cable lever**

- With pivot pin - 18 - secured in shift mechanism housing - 17 -

**13 - Catch spring with roller**

- For shift positions
- Removing and installing ⇒ Page 37-32 onward

**14 - Catch spring with roller**

- For Tiptronic position
- Removing and installing ⇒ Page 37-32 onward

**15 - Frame**

- Clip or bolt onto shift mechanism housing
- Installation position: Ribs toward top

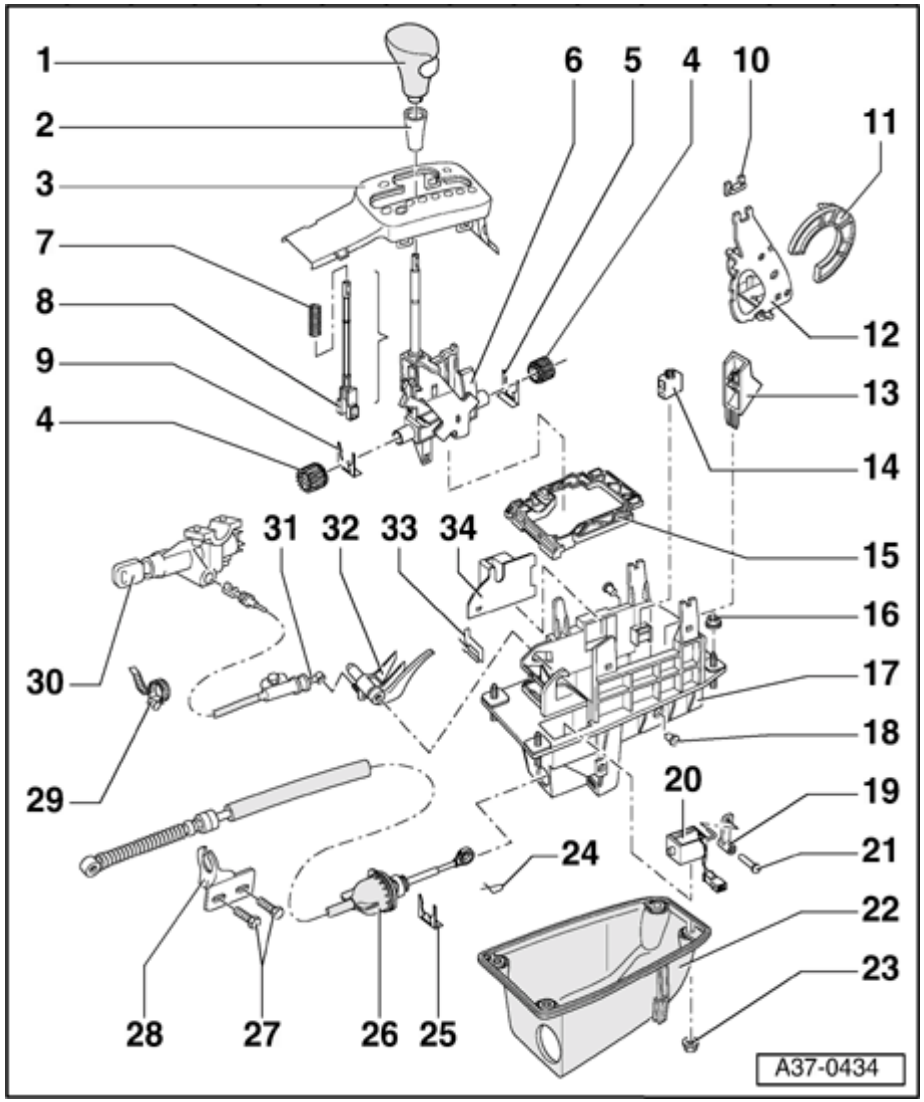
**16 - Nut, 10 Nm**

**17 - Shift mechanism housing**

- Removing and installing ⇒ Page 37-6 onward

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37-16




**18 - Pivot pin**

- Secures cable lever - 12 - in shift mechanism housing - 17 -

**19 - Locking latch**

- For shift lock solenoid
- Removing and installing ⇒ Page 37-32 onward

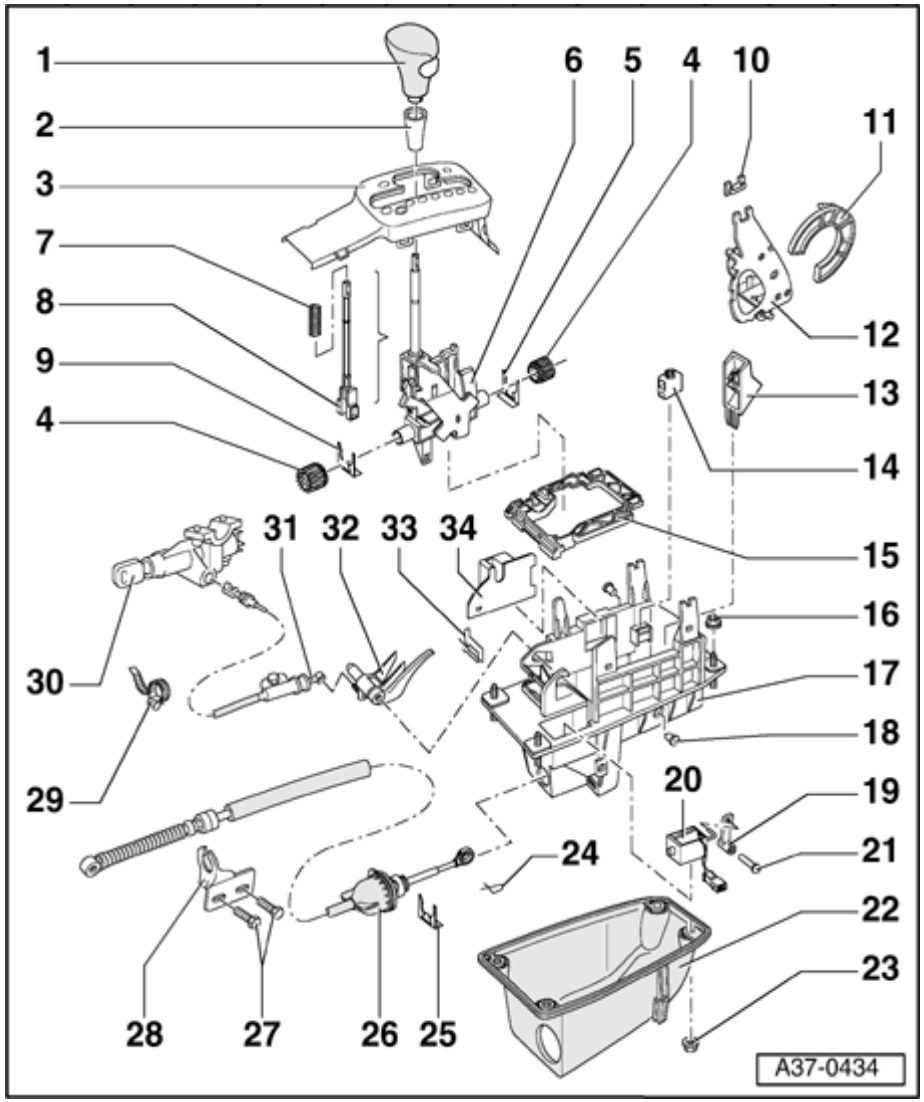
**20 - Shift Lock Solenoid -N110-**

- Removing and installing ⇒ Page 37-32 onward
- Can be checked via electrical test and read measuring value block

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V On Board Diagnostic (OBD), Repair Group 01; Performing On Board Diagnostic (OBD)*

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37-17




**21 - Pivot pin**

- For locking latch
- Removing and installing ⇒ Page 37-32 onward

**22 - Cover**

- With seal for shift mechanism housing
- Removing and installing ⇒ Page 37-6 onward

**23 - Nut, 10 Nm**

**24 - Locking clamp**

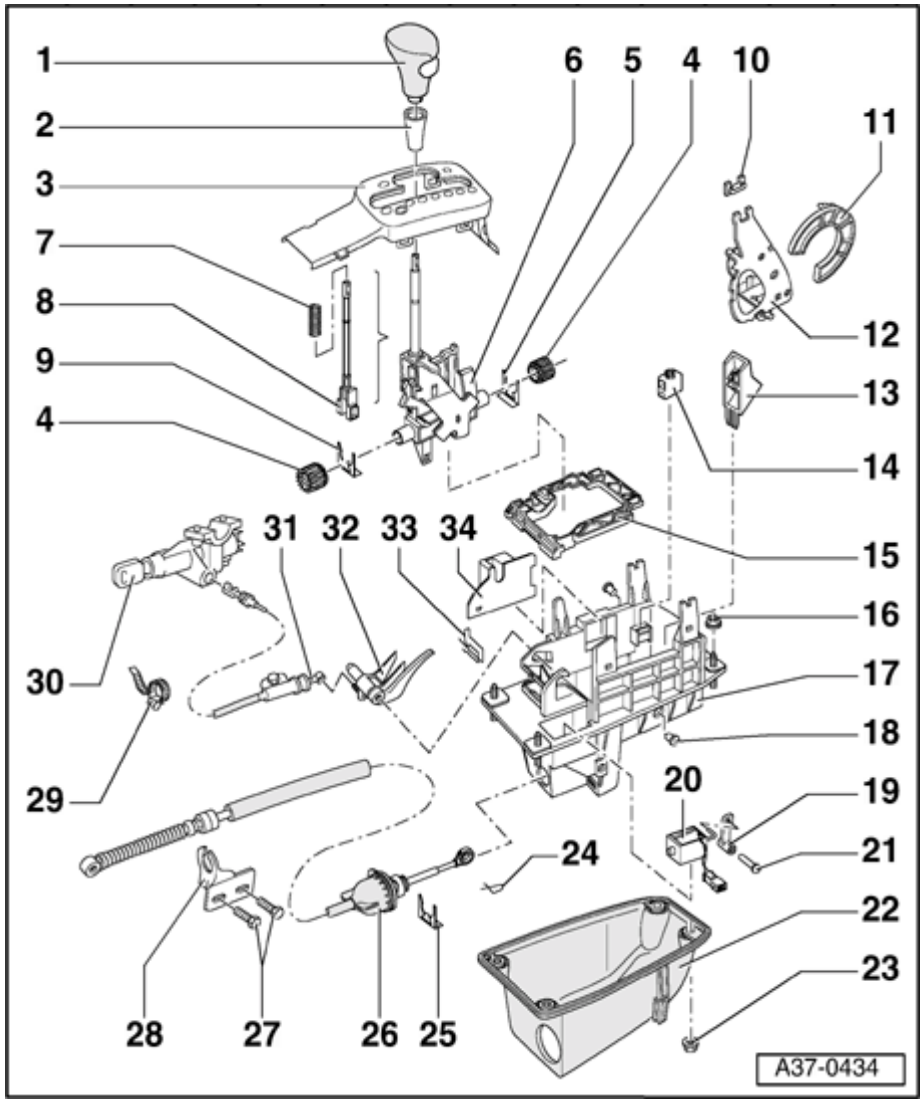
- For selector lever cable to cable lever - 12 -
- Install angled end toward front

**25 - Locking plate**

- For selector lever cable to shift mechanism housing
- Install angled end toward the inner shift mechanism housing

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37-18




**26 - Selector lever cable**

- Do not bend or kink, lightly grease coupling ring and ball socket before installing
- Removing and installing ⇒ page 37-40
- Adjusting ⇒ page 37-45
- In case of damaged rubber boots, the selector lever cable must be replaced
- Do not install rubber boot on transmission side twisted

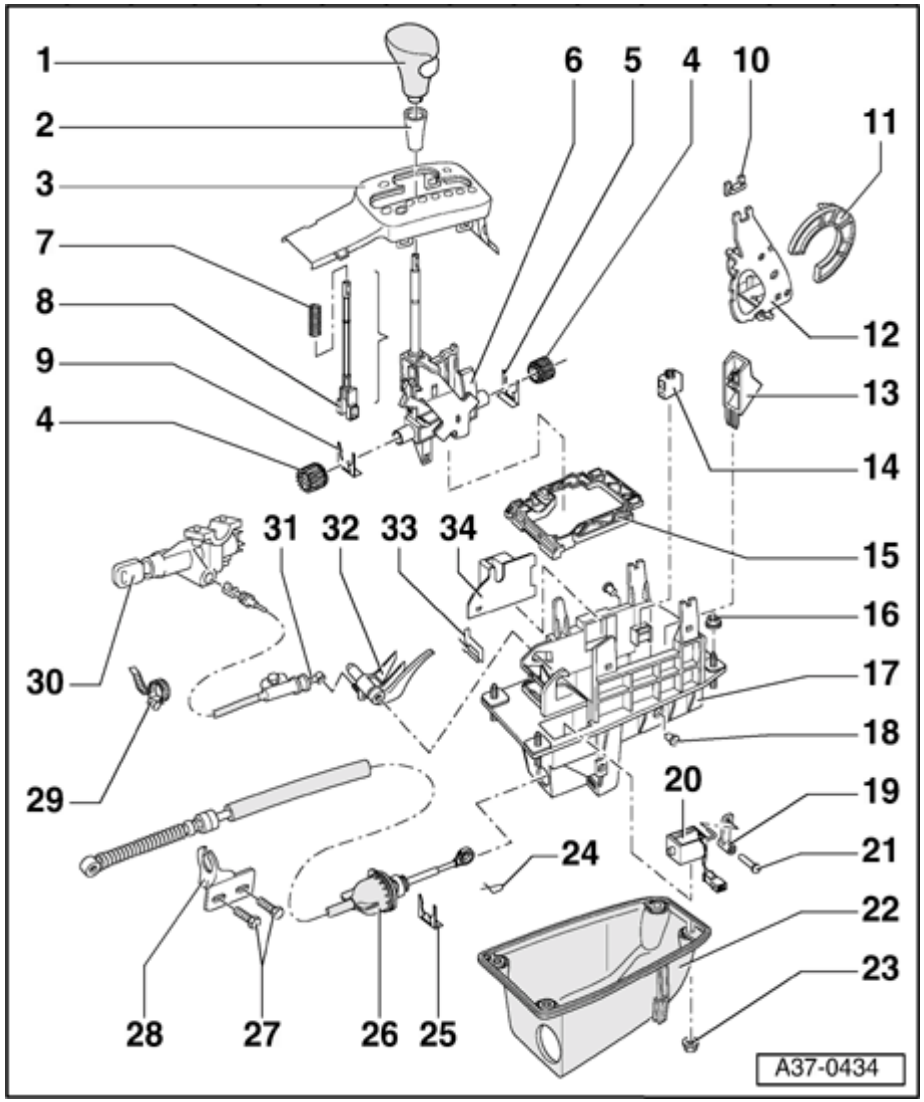
**27 - Hex bolt, 23 Nm**

**28 - Pivot**

- For selector lever cable to transmission
- Removing and installing ⇒ page 37-40

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37-19




**29 - Cable ties**

- For locking cable

**30 - Ignition/Starter Switch**

**31 - Locking cable**

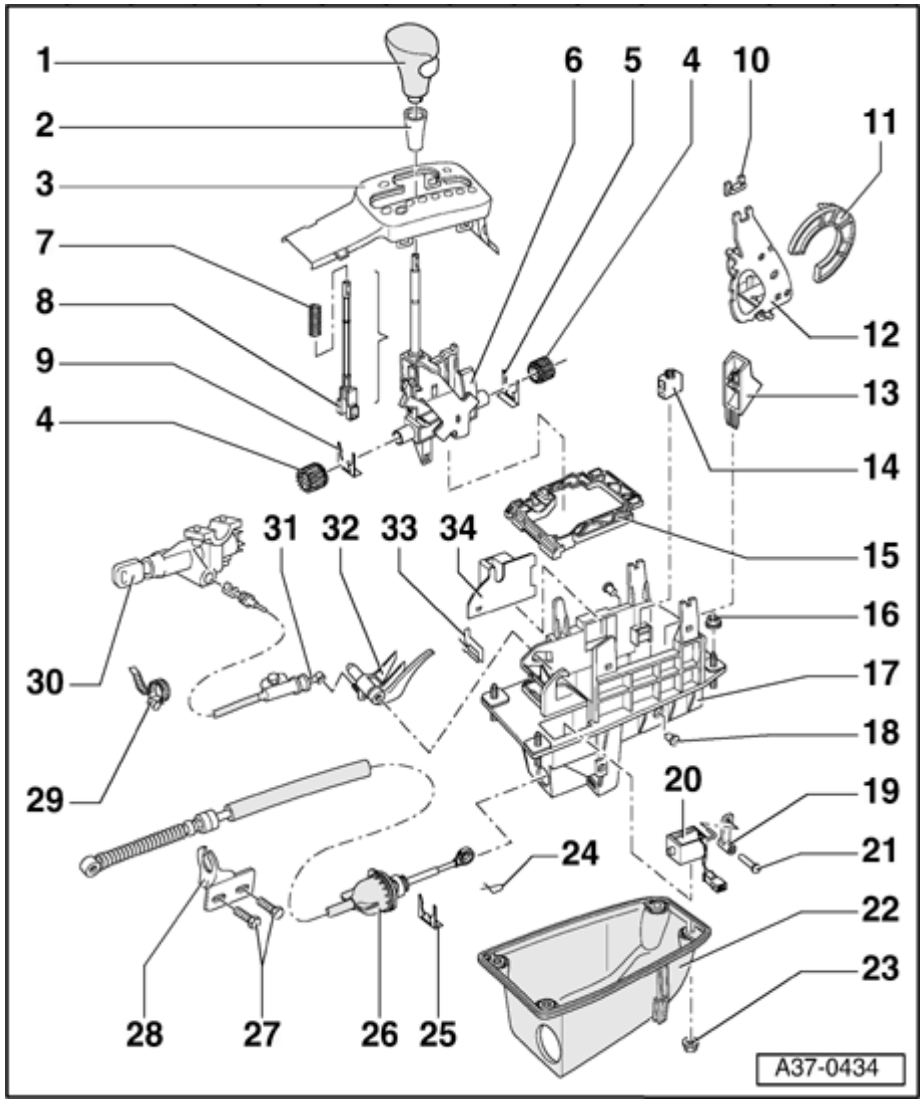
- For ignition key removal lock
- Must not be kinked
- Removing and installing ⇒ page 37-47
- Adjusting ⇒ page 37-50

**32 - Catch lever**

- For ignition key removal lock
- Removing and installing ⇒ Page 37-32 onward

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37-20




**33 - Retaining spring**

- For locking cable
- Removing and installing ⇒ Fig. 1 , ⇒ page 37-21

**34 - Storing**

- For selector lever in Tiptronic position
- Removing and installing ⇒ Page 37-32 onward

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37-21

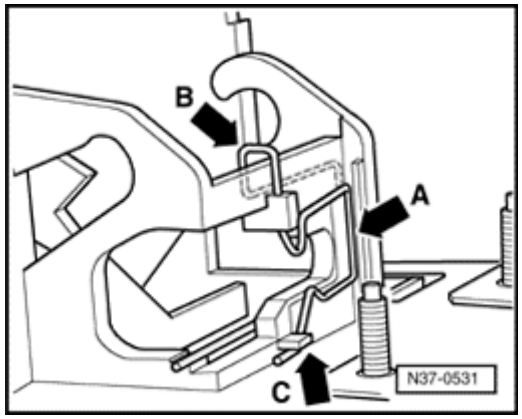



**Fig. 1 Securing spring for locking cable, removing and installing**

### Removing

- To remove locking cable, slightly lift spring at top (arrow B).
- Unhook spring (arrow A) at retaining clip (arrow C) and remove toward top.

### Installing

- Insert spring (arrow B) from top and hook in at retaining clip (arrow C).
- Align spring so that it is seated evenly in groove (arrow A).
- To install locking cable, slightly lift spring at top (arrow B).

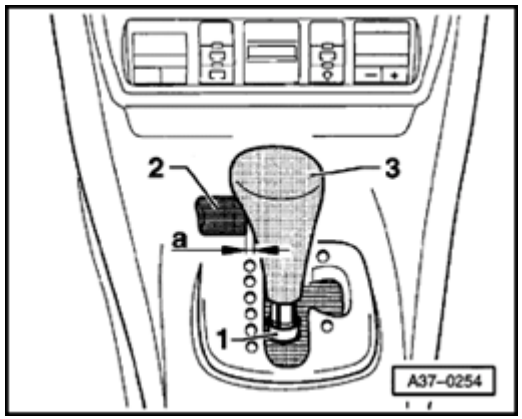
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37-22

## Selector lever handle, removing and installing

### Removing

- Shift selector lever into position "3".




- Slide sleeve -1- downward toward stop.
- Pull button -2- out of selector lever handle -3- up to engagement point (dimension -a-) and pull upward.

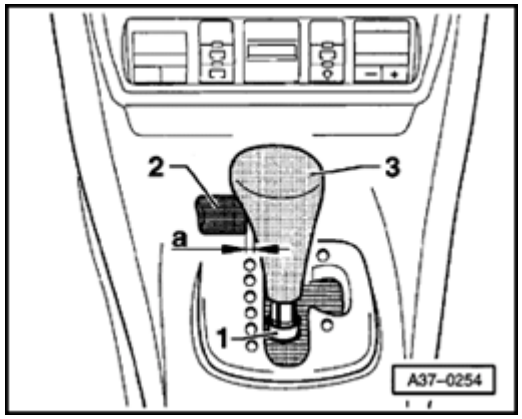
Dimension -a- = 3 mm

### Installing

- Shift selector lever into position "N".
- Carefully pull button -2- out of selector lever handle -3- up to dimension -a-.
- At the same time, place handle -3- with button -2- onto selector lever up to stop in direction of travel.
- Turn handle -3- so that button -2- points toward the driver. During this, the handle engages in a vertical groove of the selector lever.

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37-23




- Completely install handle -3- on the selector lever. During this, it must engage in a ring groove of the selector lever.
- Press button -2- into selector lever handle -3-.
- Pull up sleeve -1- until it engages in selector lever handle -3-.

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## Cover for Tiptronic shift mechanism, removing and installing

**Removing:**

- Remove cover of center console above shift mechanism.

⇒ *Repair Manual, Body Interior, Repair Group 68; Storage compartments, covers and trim; Center console, removing.*

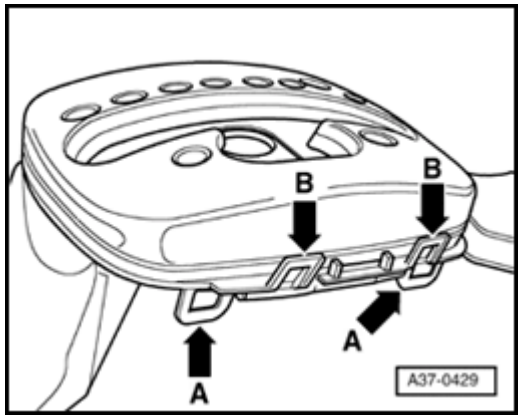
- Selector lever handle, removing ⇒ page 37-22 .

- Shift selector lever into position "P" by pulling pull rod.

- Switch off ignition.

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37-25



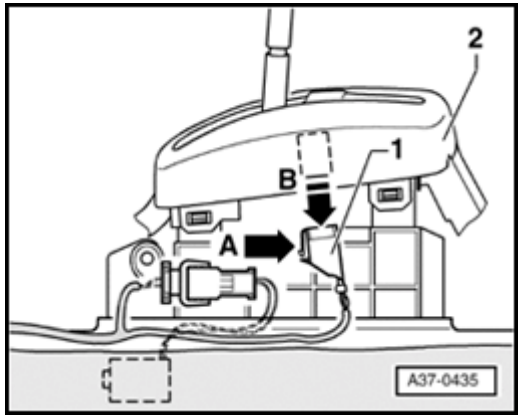

- Carefully pry out the four retaining straps (arrow A) from top using bent wire or hook (retainer strap are difficult to see from top).

**Under no circumstances may the four retaining straps (arrow B) which are visible from top be pried out, otherwise the circuit board will be destroyed. In addition, the chromed upper part is permanently bonded to the upper enclosure cover.**

***Note:***

*If the four retaining straps (arrow A) cannot be pried out with bent wire or a hook, the center console must be removed to gain better access.*

- Remove complete shift mechanism cover upward.




- Press release (arrow A) at connector -1- and pull it out of the cover in direction of arrow -B-.

***Note:***

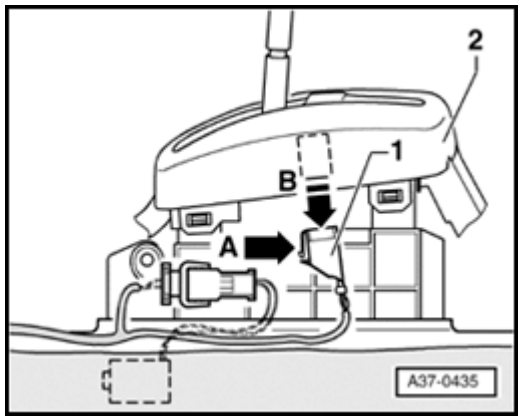
*If the retaining straps are damaged, the upper cover must be replaced Item , ⇒ page 37-27 .*

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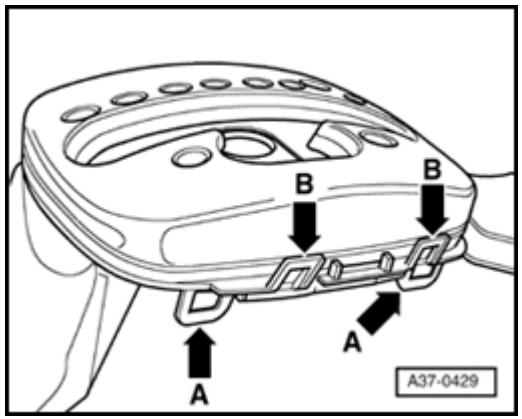
**Installing:**

**Installation is the reverse of removal. The following points must also be observed:**




- Insert connector -1- into cover opposite direction of arrow -B- before they are clipped into the shift mechanism.
- Clip cover onto shift mechanism.

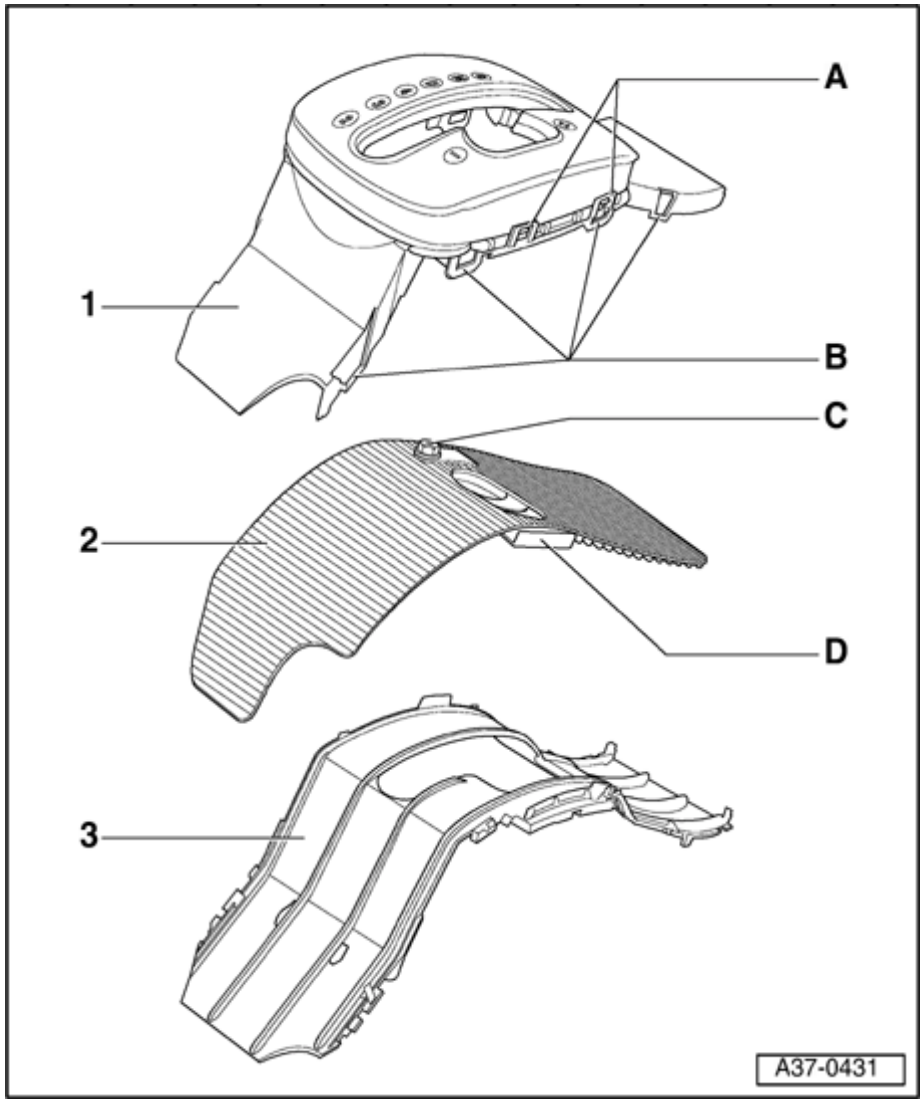
***Note:***




*When clipping on, make sure the retaining straps (arrow A) are not being bent inward. Retaining tabs of shift mechanism must engage on outside without excessive force.*

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37-27




## Cover for Tiptronic shift mechanism, disassembling and assembling

### Overview

**1 - Upper cover**

- With integrated Tiptronic Switch -F189-
- Tiptronic Switch -F189-, removing and installing ⇒ page 37-30

**2 - Masking panel**

- With integrated solenoids -C- and -D-

**3 - Lower cover**

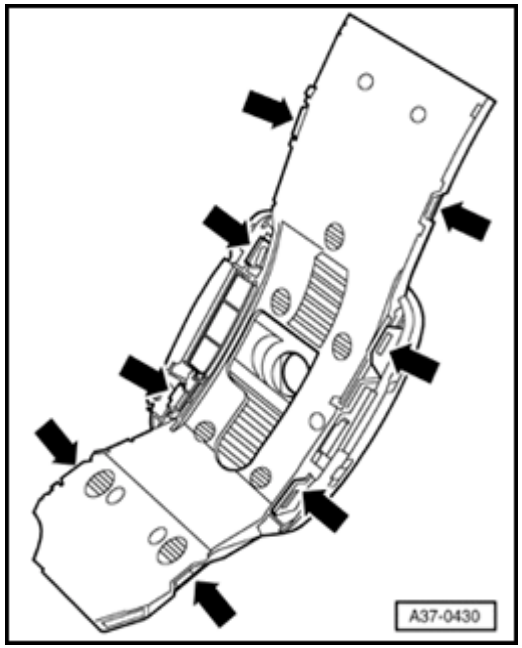
- Guides the masking panel

### Disassembly of suspension strut

- Remove shift mechanism cover ⇒ page 37-24

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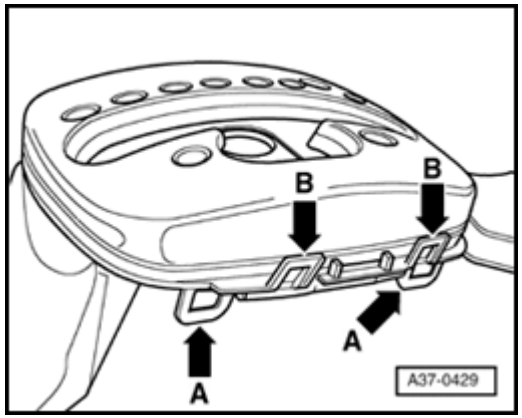
37-28




- Carefully pry out retaining straps (arrows).

***Note:***

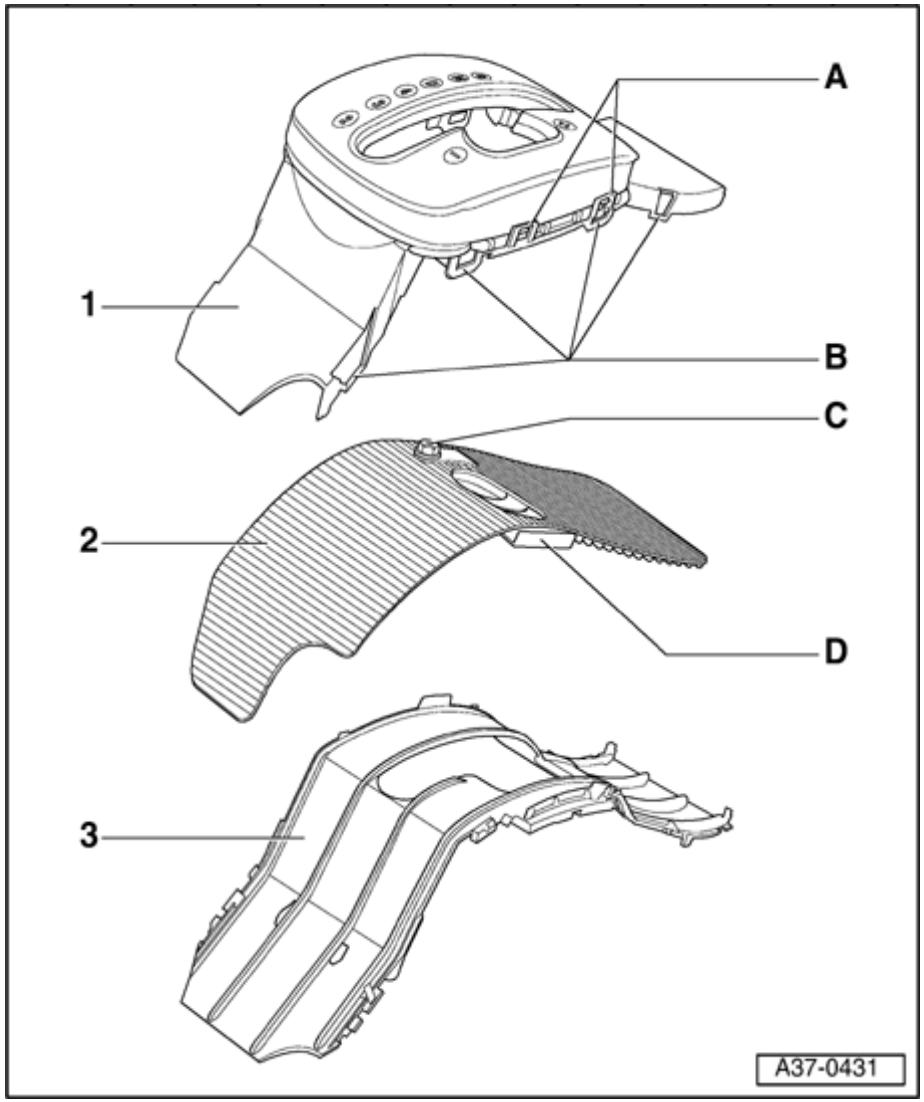
*If the retaining straps are damaged, the upper cover must be replaced Item , ⇒ page 37-27 .*




**Under no circumstances may the four retaining straps (arrow B) which are visible from top be pried out, otherwise the circuit board will be destroyed. In addition, the chromed upper part is permanently bonded to the upper enclosure cover.**

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- Remove lower cover -3- and masking panel -2-.

**Assembly**

- Lay masking panel -2- into upper cover, installation position analog display.

*Solenoids -C- and -D- must be securely fastened on masking panel, if necessary masking panel must be replaced.*

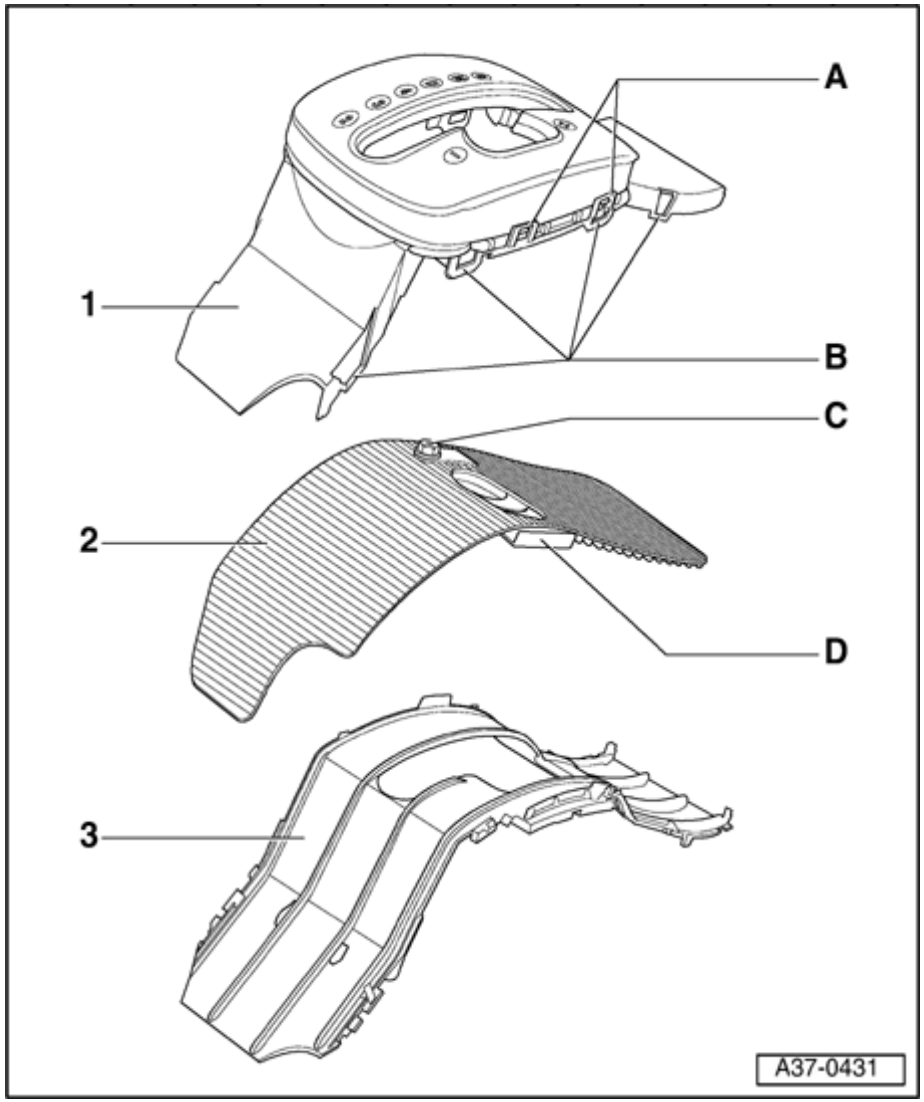
- Carefully clip lower cover -3- into upper cover -1-.

*If retaining straps -A- or -B- are damaged, the upper cover must be replaced.*

- Install shift mechanism cover ⇒ page 37-24

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37-30




## Tiptronic Switch -F189-, removing and installing

**Installation location:**

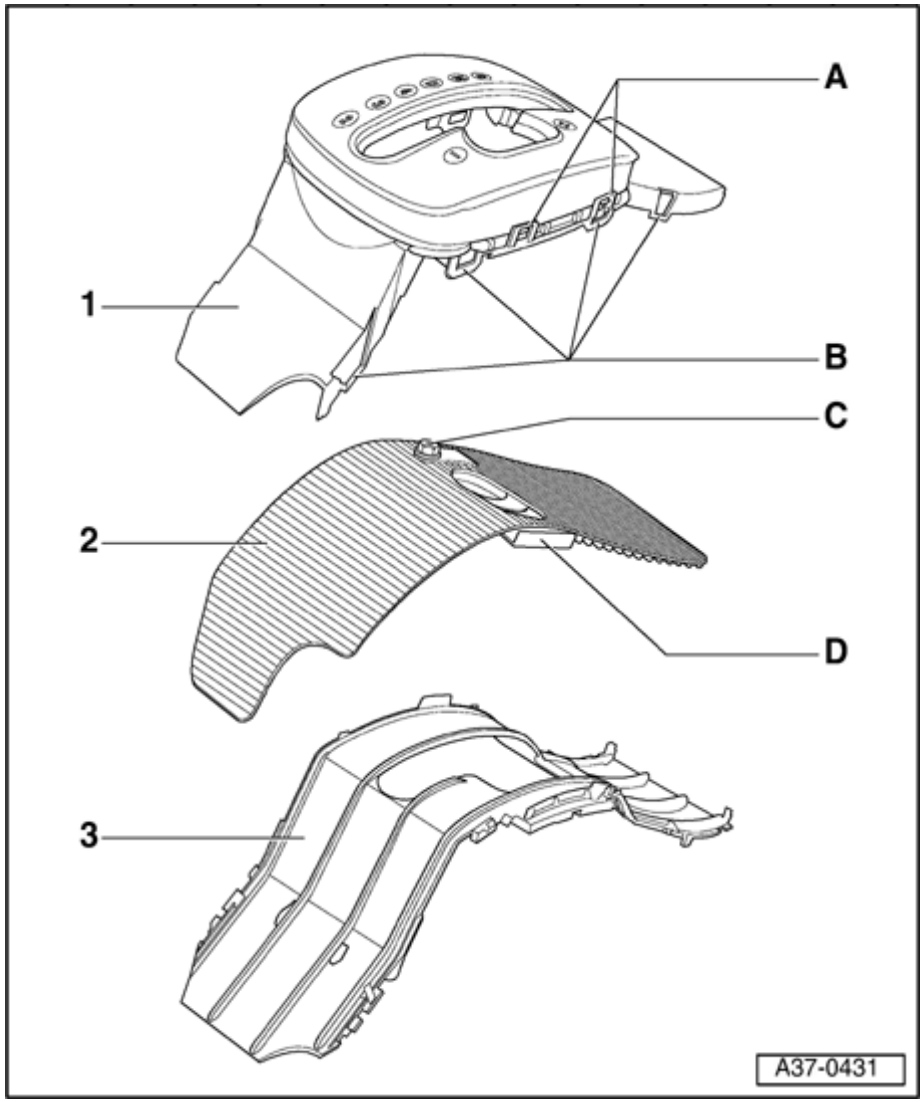
The Tiptronic switch is integrated into the upper cover -1- of shift mechanism.

- For occurring malfunctions, the Tiptronic switch must be checked for interference in Measuring Value Block and in the electrical test. Tiptronic switch must only be replaced after wiring test. For vehicles with Tiptronic sport steering wheel, the buttons at steering wheel and their wire connections must be checked.

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V On Board Diagnostic (OBD), Repair Group 01; Performing On Board Diagnostic (OBD)*

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**Removing:**

- Disassemble shift mechanism cover ⇒ page 37-27

***Notes:***

*Solenoids -C- and -D- must be securely fastened on masking panel, if necessary masking panel must be replaced.*

*If solenoid -D- is missing (or has fallen out), Tiptronic switch will not work, i.e. masking panel must be replaced. In this case the Tiptronic switch must not be replaced.*

- To replace Tiptronic switch, upper cover -1- must be replaced.

**Installing:**

- Install shift mechanism cover ⇒ page 37-27

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## Tiptronic shift mechanism, disassembling and assembling (sequence)

### Disassembly of suspension strut

- Remove shift mechanism ⇒ page 37-6 .
- First remove stop buffers from cable lever
- Shift selector lever into Tiptronic position and then remove frame.
- Shift selector lever into position "2".
- Disengage lever for locking cable by lifting it out of its bearing and remove from shift mechanism housing.
- Shift selector lever into position "D".
- Catch spring for Tiptronic position is carefully pried out of the shift mechanism housing from the outside.
- Pull out retainer for selector lever bushings.

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- Using a screwdriver, press out selector lever bushings outward.

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37-33

- Remove complete selector lever.
- Disassemble selector lever ⇒ page 37-36 .
- To remove bearing for Tiptronic position of selector lever, unlatch retaining tabs at shift mechanism housing and remove bearing inward.
- Press out pin for locking latch using a drift.
- Remove shift lock solenoid together with locking latch upward.
- Catch spring for selector lever positions is carefully pried out of the shift mechanism housing from the outside.
- Pry out both pins of the cable lever/catch.
- Pull cable lever/catch with opening of the catch out of the shift mechanism housing upward.
- Unclip catch from the cable lever.

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**Assembly of suspension strut**

- Clip catch into cable lever.
- Slide cable lever/catch into the shift mechanism housing with opening of the catch forward.
- Drive both pins of the cable lever/catch into the shift mechanism housing from both sides up to stop.
- Press catch spring with roller for selector lever position into its mount in shift mechanism housing up to stop.
- Shift lock solenoid together with locking latch must be slid into the shift mechanism housing from the top.
- Carefully drive in pin for locking latch.
- Using a screwdriver, mechanically check for engagement of the locking latch in position "P" and "N" of selector lever.
- Insert complete selector lever into shift mechanism housing.

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- Hook selector lever into cable lever at bottom and top.

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37-35

- Slide both selector lever bushings into the shift mechanism housing at front or rear.

- Install bearing bushing into shift mechanism housing so that the angled ends point inward.

- Press catch spring for Tiptronic position into its mount in shift mechanism housing up to stop.

- Shift selector lever into position "2".

- Lay cable lever into shift mechanism housing and engage it noticeably in both bearing areas.

- Check locking function of locking lever. In selector lever position "P", it must engage in the catch and lock the shift mechanism.

- Set frame onto shift mechanism housing (ribbing points upward) and insert buffer stop into cable lever.

- Install shift mechanism ⇒ page 37-6 .

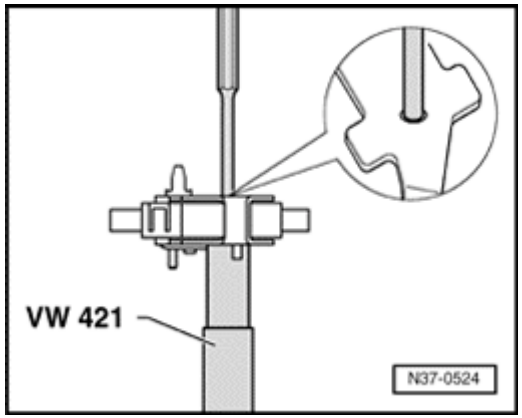
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37-36

## Selector lever, disassembling and assembling

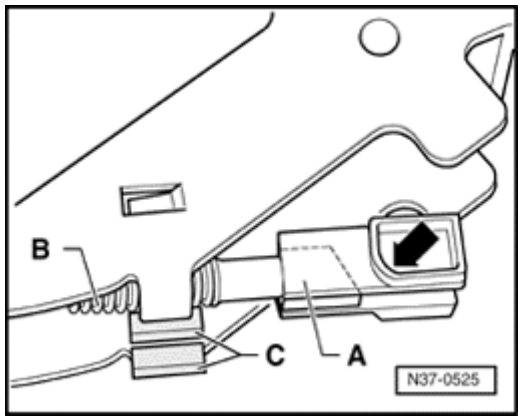
- Remove selector lever ⇒ page 37-32 .

### Disassembly of suspension strut




- Drive out selector lever pivot pin using a drift.
- Slide link with Tiptronic spring with raised pulling rod out of the selector lever.
- Release tension of compression spring and also remove pull-lever and compression spring from the selector lever.

### Assembly of suspension strut




- Set compression spring -B- onto pull-lever -A-.
- Guide pull-rod with compression spring into the selector lever.

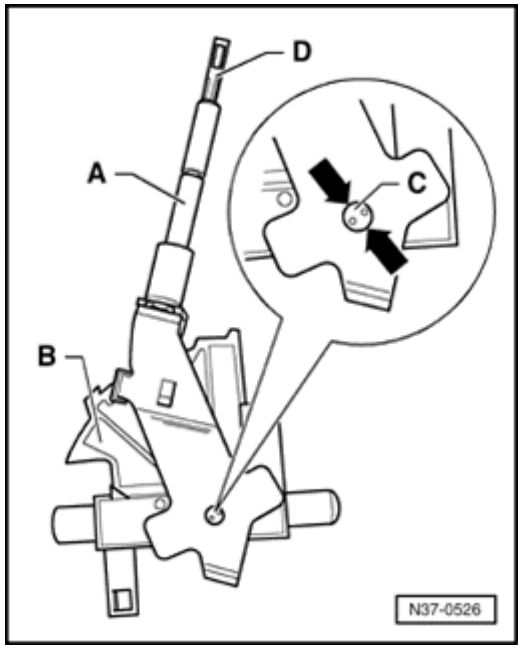
Installation position:

Curvature and edge point in direction of travel.

- Check whether the pull-lever glides on both guides -C- of selector lever.

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37-37




- Slide link -B- with Tiptronic spring mechanism into selector lever -A- with pull-lever -D- raised.
- Drive pivot pin -C- into selector lever using a drift ⇒ page 37-36 , ⇒illustration N37-0524.
- To secure, make two new center punch marks (arrows) offset by 90 ° to the existing ones.

Pivot pin can have a maximum of 4 center punch marks.

- Install selector lever ⇒ page 37-34 .

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## Shift lock solenoid, removing and installing

### Removing

- Remove shift mechanism ⇒ page 37-6 .
- Remove stop buffer from cable lever.
- Shift selector lever into Tiptronic position and then remove frame.
- Shift selector lever into position "2".
- Disengage lever for locking cable by lifting it out of its bearing and remove from shift mechanism housing.
- Press out pin for locking latch using a drift.
- Remove shift lock solenoid together with locking latch upward.

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37-39

**Installing**

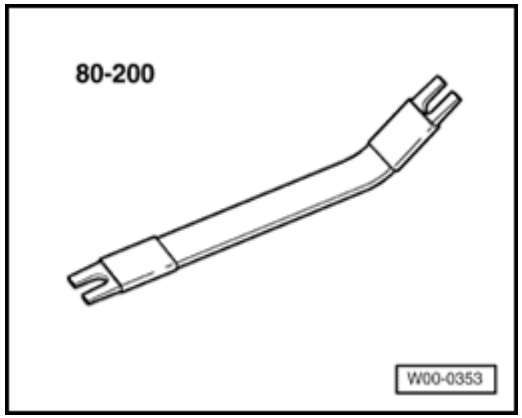
- Shift selector lever into position "2".
- Shift lock solenoid together with locking latch must be slid into the shift mechanism housing from the top.
- Carefully drive in pin for locking latch.
- Using a screwdriver, mechanically check for engagement of the locking latch in position "P" and "N" of selector lever.
- Lay cable lever into shift mechanism housing and engage it noticeably in both bearing areas.
- Check locking function of locking lever. In selector lever position "P", it must engage in the catch and lock the shift mechanism.
- Set frame onto shift mechanism housing (ribbing points upward) and insert buffer stop into cable lever.
- Install shift mechanism ⇒ page 37-6 .

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## Selector lever cable for Tiptronic shift mechanism, removing and installing

### Special tools and equipment




- 80-200 Pry lever

### Removing

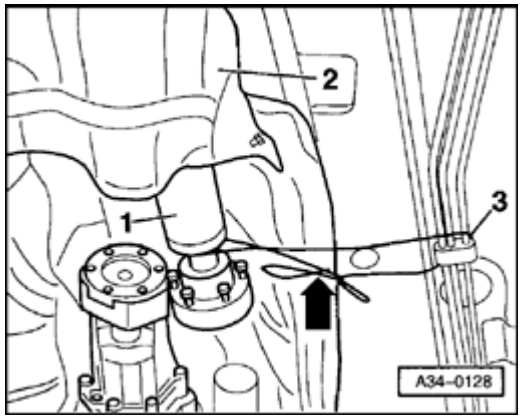
- Shift selector lever into position "P".
- Raise vehicle.
- Remove crossmember below exhaust system if installed.
- Disconnect front exhaust pipes with catalytic converter from the rear exhaust system and tie them up on side;

⇒ *Repair Manual, Engine Mechanical, Repair Group 26, removing and installing exhaust system*

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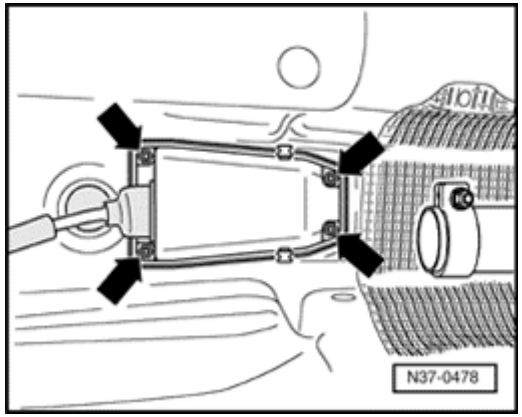
**All-wheel-drive vehicles**




- Unbolt driveshaft -1- from transmission and let rest on heat shield -2- ⇒ page 39-79 , Driveshaft, removing and installing.
- Secure driveshaft using wire (arrow) at bracket -3- of fuel lines.

**Continuation for all vehicles**

- Unbolt heat shield from below shift mechanism housing.

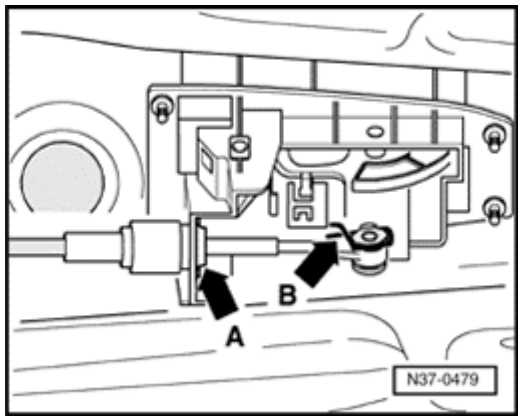



- Remove cover from shift mechanism housing (arrows).

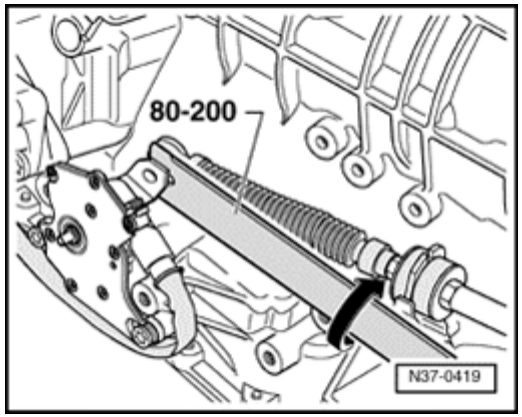
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37-42

Disconnect selector lever cable from shift mechanism housing:




- Press ends of locking clip -B- together and remove.
- Remove securing plate -A- for selector lever cable at shift mechanism downward.
- Remove selector lever cable from selector lever.




- Pry off selector lever cable from lever/shift rod using 80-200 pry lever (arrow).
- Remove bracket from transmission.
- Loosen selector lever cable from bracket.
- Pull selector lever cable out of shift mechanism housing without kinking.

**Installing**

- Selector lever and lever/shift rod in position "P" (park lock must engage).

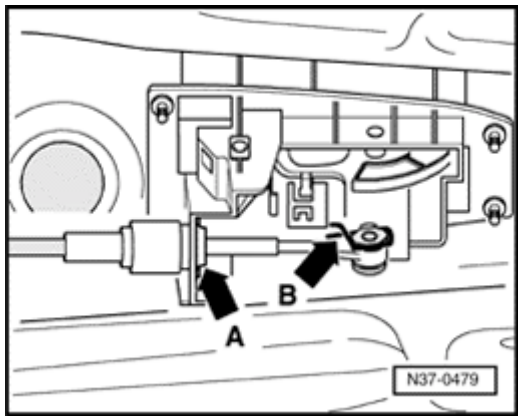
- Do not bend or kink selector lever cable, lightly grease coupling ring and ball socket before installing

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37-43

- Guide selector lever cable into shift mechanism housing.

- Connect selector lever cable to selector lever.

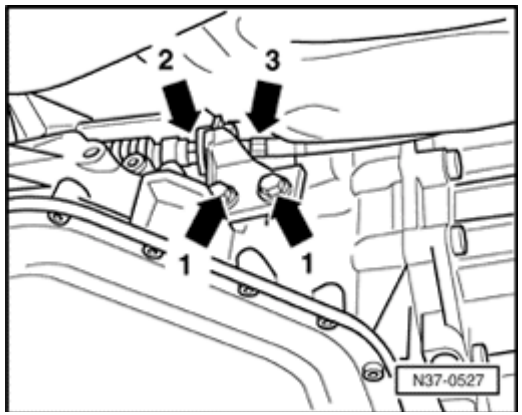



- Press ends of locking clip -B- together and secure selector lever cable.
- Install securing plate -A- for selector lever cable to shift mechanism.

Installation position:

Angled end of securing plate points toward the end of the selector lever cable.

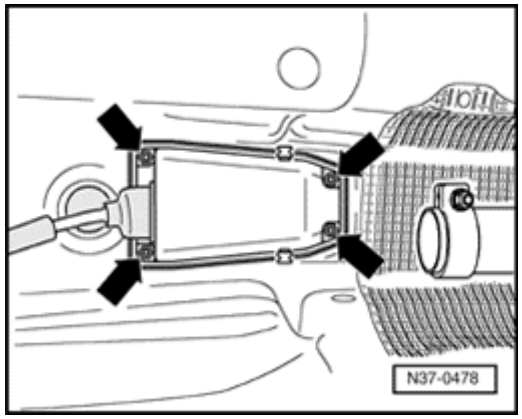
- Connect selector lever cable to bracket by hand.
- Bolt bracket to transmission by hand.
- Press selector lever cable onto lever/shift rod.
- Align selector lever cable in bracket.




- Tighten bracket/transmission (arrows 1) and selector lever cable/bracket (arrow 2) to tightening torque. During this, counterhold at hex socket (arrow 3).

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- Tighten nuts (arrows, 4 pieces) to 10 Nm.
- Check adjustment of selector lever cable and adjust if necessary ⇒ page 37-45 .
- Install heat shield.

**All-wheel-drive vehicles**

- Bolt driveshaft to transmission flange ⇒ page 39-79 , Driveshaft, removing and installing.

**Continuation for all vehicles**

- Connecting front exhaust pipe to rear exhaust system:

⇒ *Repair Manual, Engine Mechanical, Repair Group 26, removing and installing exhaust system.*

- Install front crossmember below exhaust system.

**Tightening torques**

| | |
|---|---|
| Bracket/selector lever cable to transmission | 23 Nm |
| Selector lever cable to mounting bracket | 12 Nm |

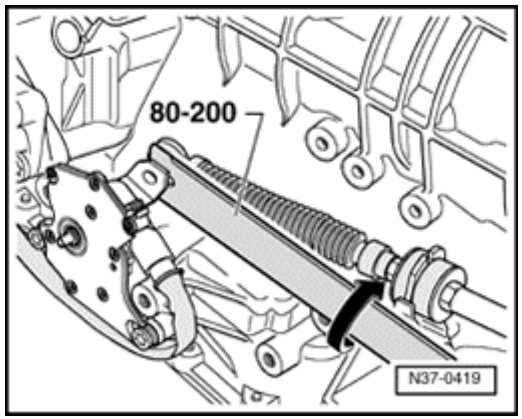
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37-45

## Selector lever cable for Tiptronic shift mechanism, checking and adjusting

### Checking

- Shift selector lever into position "P".
- Raise vehicle.
- Remove shielding plate/selector lever cable.




- Pry off selector lever cable from lever/shift rod (arrow).
- Shift selector lever from "P" to "2".
  - Shift mechanism and selector lever cable must have freedom of movement during this, if necessary, replace selector lever cable or service shift mechanism.
- Shift selector lever into position "P".
- Shift lever/shift rod to "P", parking lock must engage, both front wheels cannot be turned in one direction.
  - It must be possible to push selector lever cable onto lever/shift rod, if necessary adjust selector lever cable.

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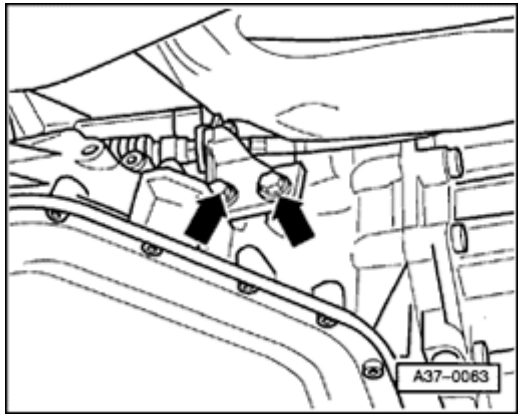
37-46

### Adjusting

- Selector lever cable has been loosened from lever/shift rod.

- Shift selector lever into position "P".

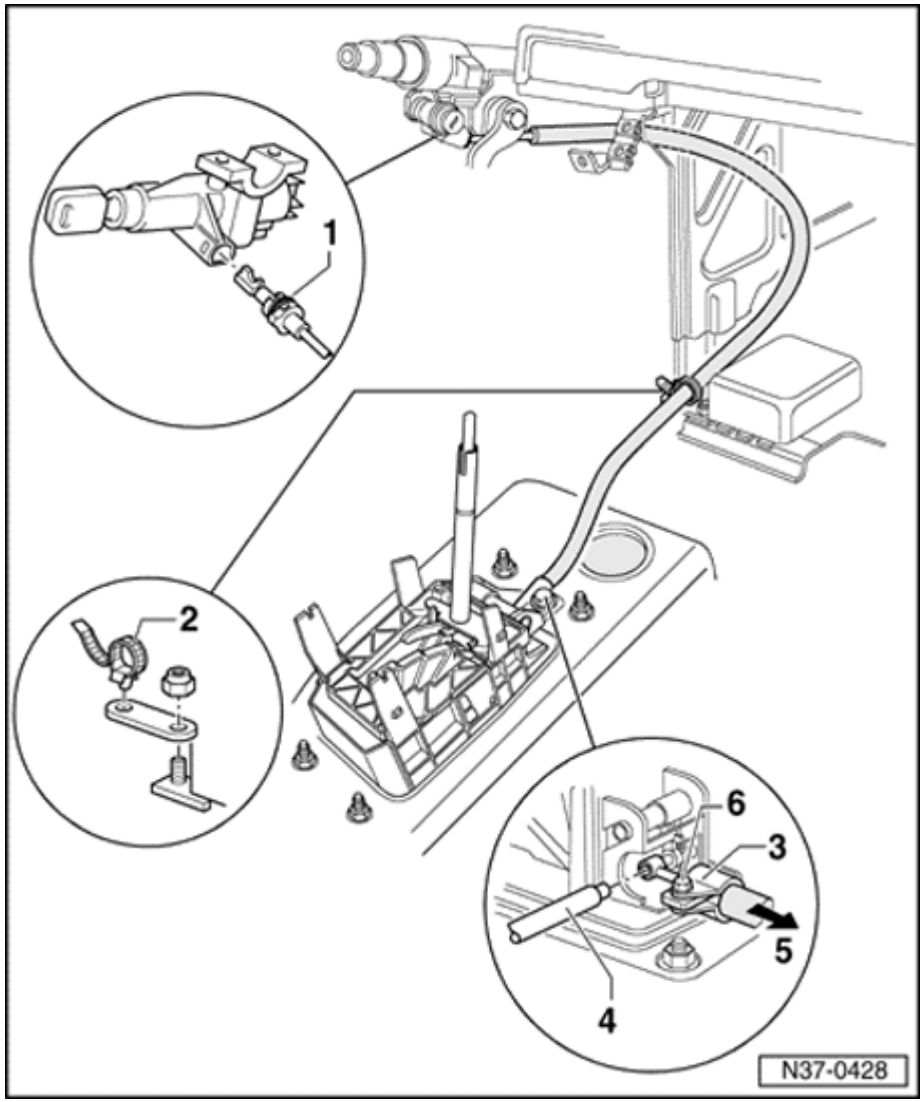
- Shift lever/shift rod to "P", parking lock must engage, both front wheels cannot be turned in one direction.




- Loosen mounting bolts (arrows) of bracket at transmission.
- Press selector lever cable onto lever/shift rod.
- Align selector lever cable in bracket.
- Tighten mounting bolts (arrows) of bracket at transmission to 23 Nm.
- Install shielding plate/selector lever cable
- Check shift mechanism ⇒ page 37-2 .

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37-47




## Locking cable for Tiptronic shift mechanism, removing and installing

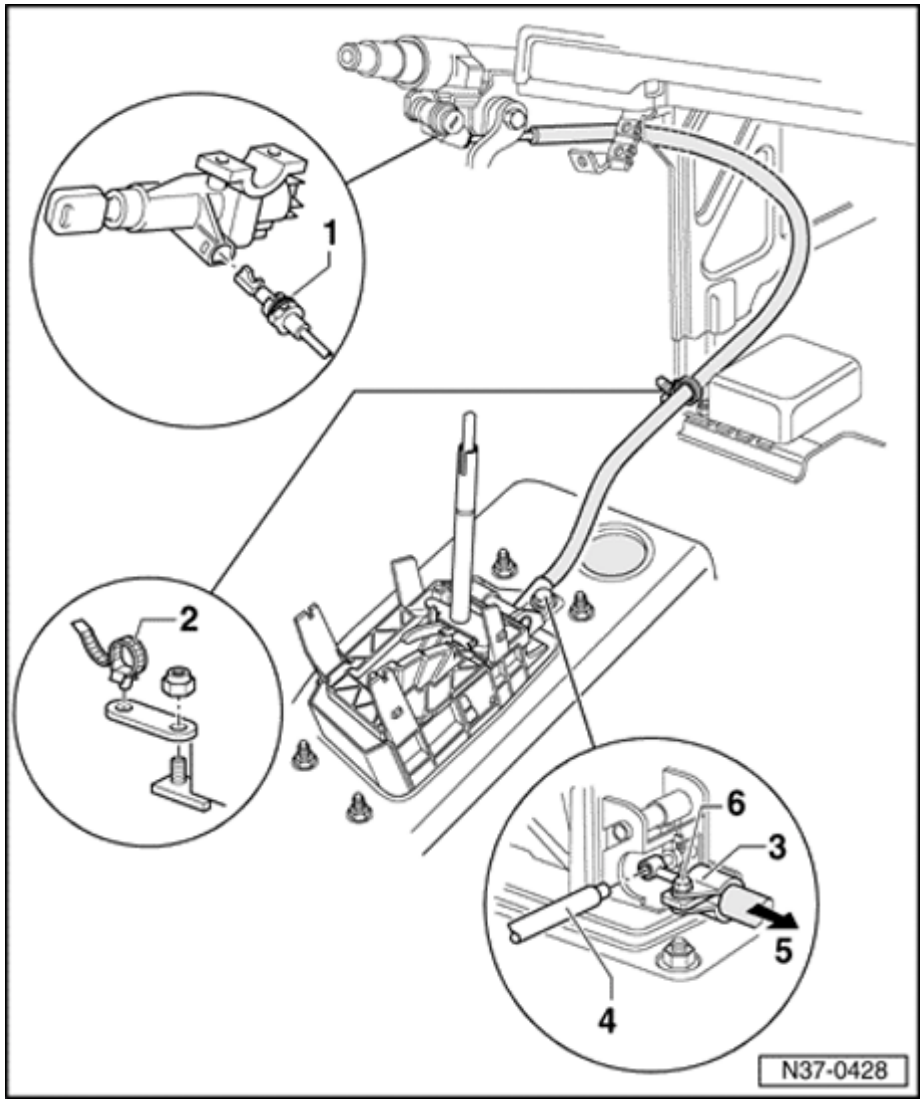
### Removing

- Shift selector lever into position "2".
- Note radio code (for vehicles equipped with coded anti-theft radio).
- Disconnect Ground (GND) strap from battery.
- Selector lever handle, removing ⇒ page 37-22
- Front center console, removing

⇒ *Repair Manual, Body Interior, Repair Group 68; storage compartments/covers; front center console, removing and installing*

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**37-48**



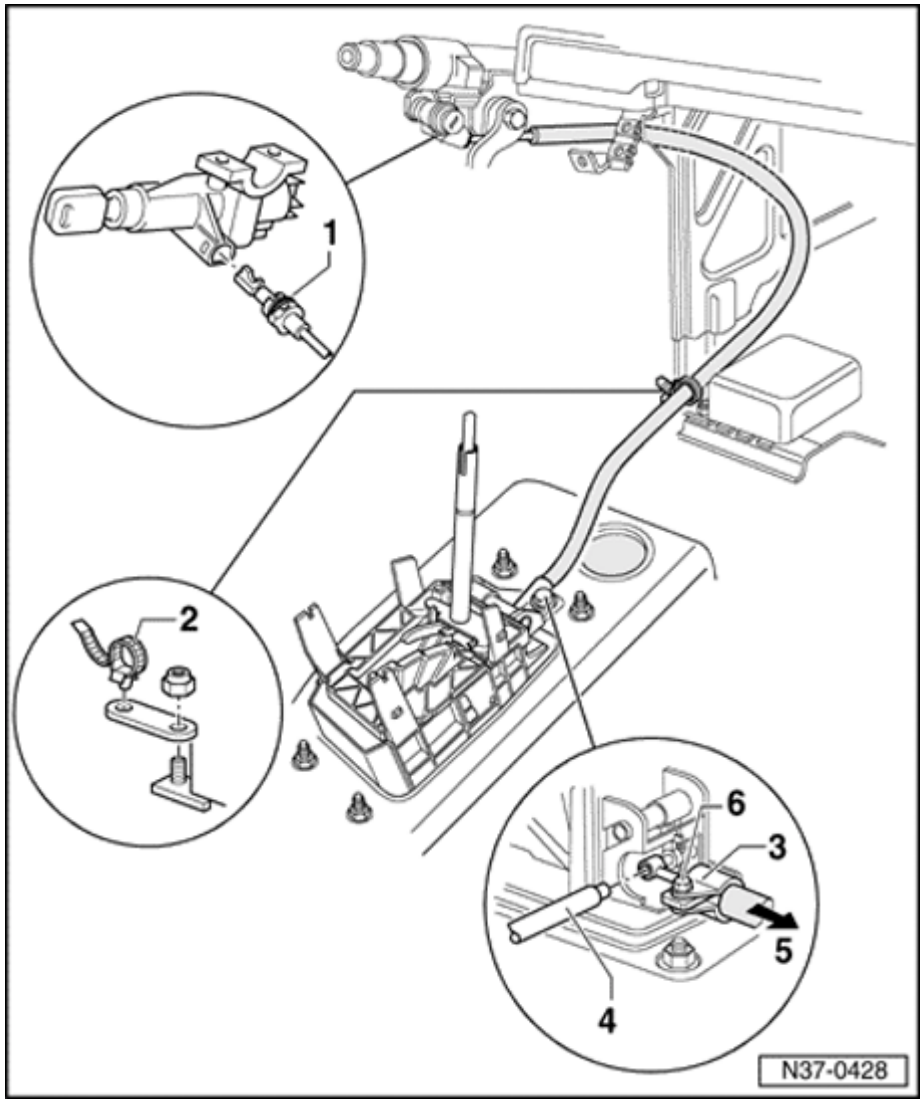

- Remove steering wheel.

⇒ *Repair Manual, Body Interior, Repair Group 69; Airbag; Steering wheel, removing and installing*

- Switch ignition key to driving position (ignition on).
- Shift selector lever into position "P".
- Lift up retaining clip of interlock lever -1- and pull locking cable out of ignition/starter switch.
- Remove cover with guide (selector lever mechanism) ⇒ page 37-5 .
- Unclip locking cable from securing spring at shift mechanism housing, slightly lift up securing spring to do so ⇒ Fig. 1 , ⇒ page 37-21 .
- Loosen and remove locking cable from cable tie -2-.

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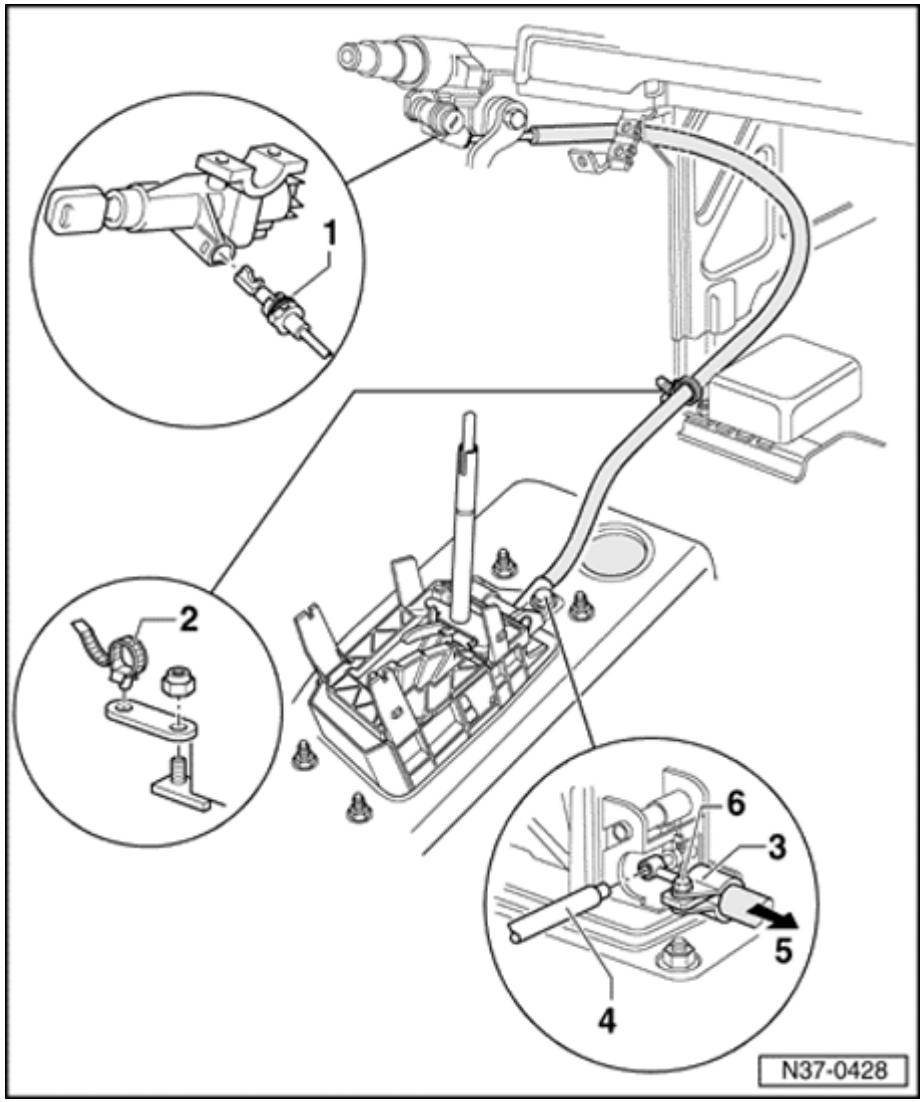



## Installing

- Route locking cable without kinking.
- Switch ignition key to driving position (ignition on).
- Insert locking cable into ignition/starter switch.
- Check locking mechanism of interior lever -1-.
- Secure locking cable to airbag sensor using cable tie -2-.
- Bring ignition/starter switch into locking position (ignition off).
- Shift selector lever into position "P".
- Clip locking cable into securing spring of shift mechanism housing ⇒ Fig. 1 , ⇒ page 37-21 .
- Hook locking cable bracket -3- into shift mechanism and locking coupling ring in lever (for locking cable).

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37-50

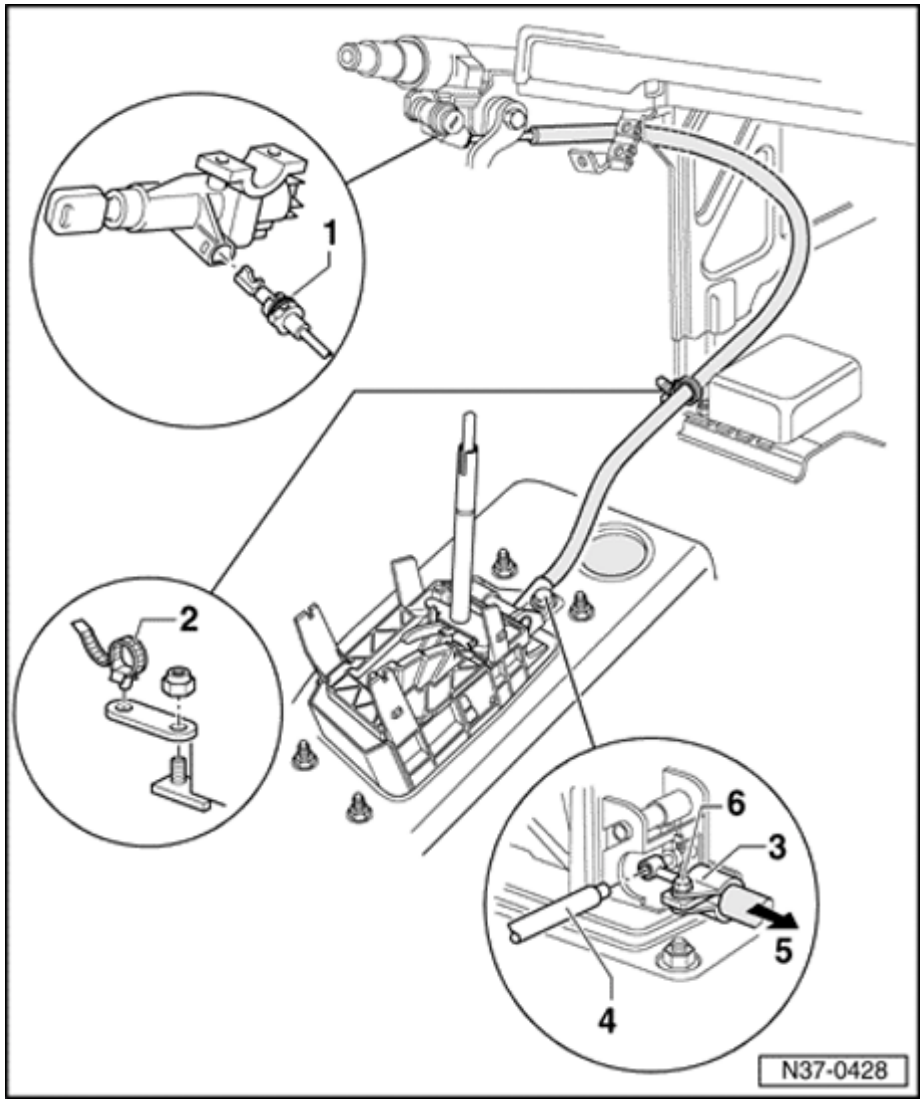



## Adjusting

- Shift selector lever into position "P".
- Loosen bolt -6-.
- It must be possible to slide bracket -3- in direction of arrow -5-.
- Adjust steering column downward.
- Connect 3352 A adjustment pin for shift lock 3 - item 4- between lever (for locking cable) and locking coupling ring.
- Pull locking cable in direction of arrow -5- and tighten bolt -6- to 10 Nm.
- Remove adjusting gauge.
- Check ignition key removal lock after every adjustment of the locking cable ⇒ page 37-1 .

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- Install steering wheel.

⇒ *Repair Manual, Body Interior, Repair Group 69; Airbag; Steering wheel, removing and installing*

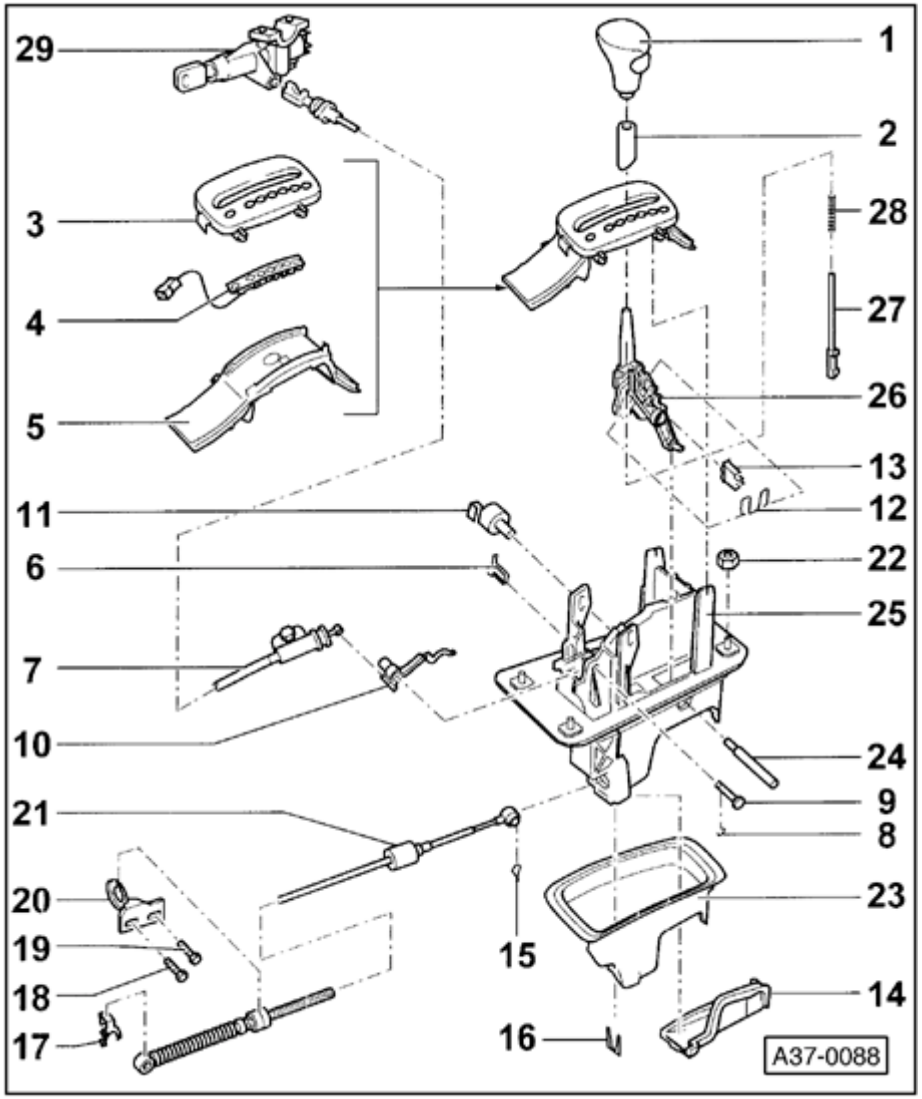
- Front center console, installing

⇒ *Repair Manual, Body Interior, Repair Group 68; storage compartments/covers; front center console, removing and installing*

- Selector lever handle, installing ⇒ page 37-22
- Connect battery Ground (GND) strap.
- For vehicles equipped with coded anti-theft radio, activate code.

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## Shift mechanism (without Tiptronic), disassembling and assembling

The Tiptronic shift mechanism is described on ⇒ page 37-6 .

**1 - Selector lever handle**

- Press casing item 2 downward, pull out button at handle up to stop and pull off handle upward.

**2 - Sleeve**

- Engages in the selector lever handle

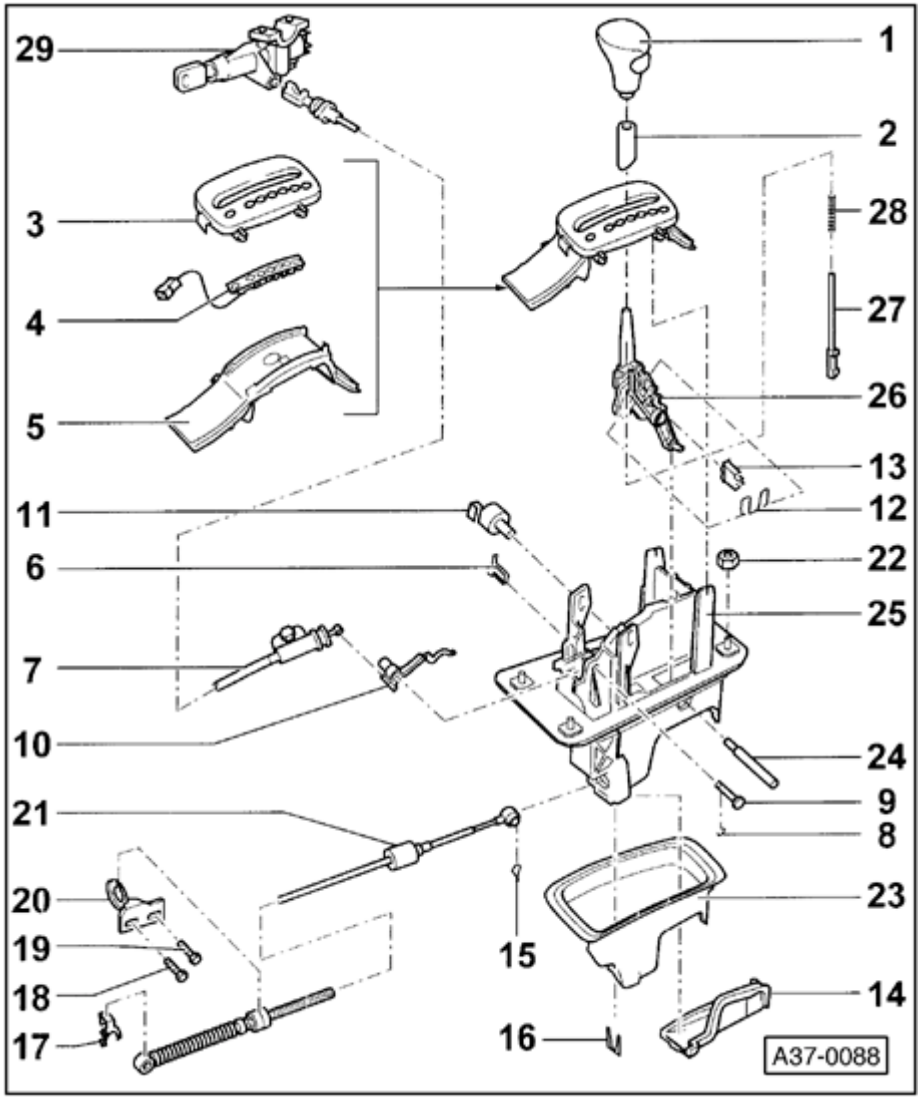
***Note:***

*For all further work on the shift mechanism, the front center console must be removed.*

⇒ *Repair Manual, Body Interior, Repair Group 68; storage compartments/covers; front center console, removing and installing*

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**3 - Cover**

- With gear display and display for shift lock solenoid
- To remove, disengage retaining tabs for shift mechanism housing
- Remove upward together with item 4 and 5 .

**4 - Light track**

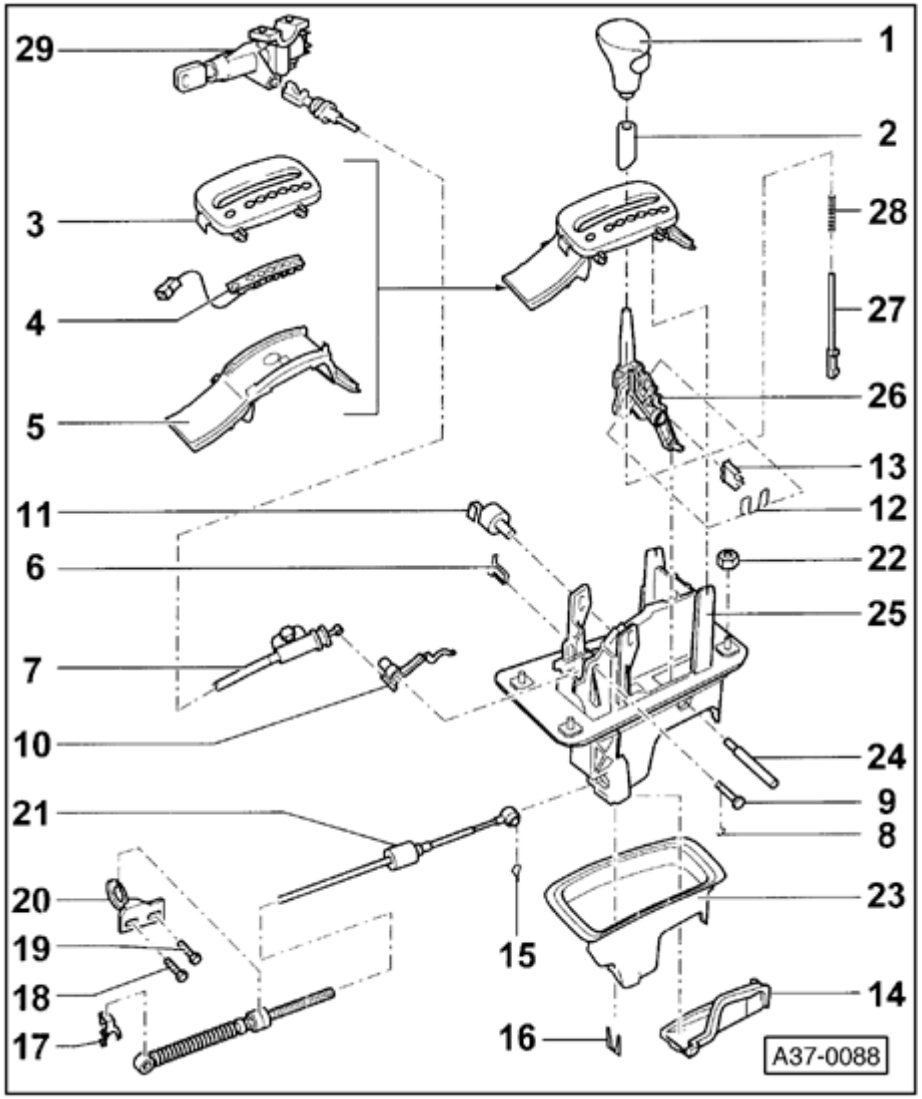
- With wiring harness and LEDs for base illumination
- Wire routing ⇒ Fig. 4 , ⇒ page 37-61

**5 - Guide**

- With masking panel and mirror for individual gear display
- Mechanism can be loosened from the cover by disengaging the four retaining tabs at interior.

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**6 - Retaining spring**

- For locking cable
- Clip into shift mechanism housing ⇒ page 37-47

**7 - Locking cable**

- Must not be kinked
- Removing ⇒ page 37-47
- Installing and adjusting ⇒ page 37-69

**8 - Locking washer**

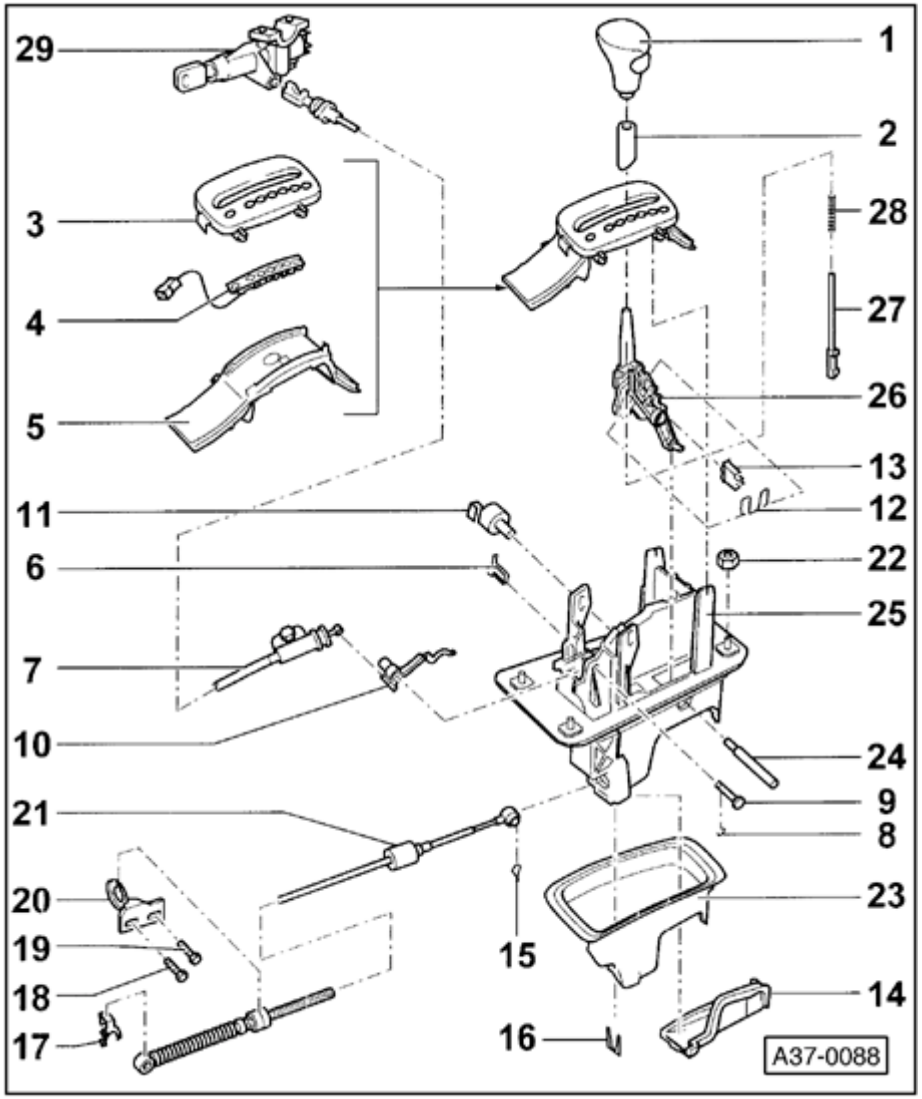
- For pin item 9

**9 - Pin**

- For lever item 10

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**10 - Locking cable lever**

**11 - Shift lock solenoid -N110-**

- Removing and installing ⇒ Fig. 3 , ⇒ page 37-61
- Unclip connector from wiring harness (at center console) item , ⇒ page 37-61
- Can be checked via electrical test and read measuring value block

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V On Board Diagnostic (OBD), Repair Group 01; On Board Diagnostic (OBD); Read measuring value block*

**12 - Spring bracket**

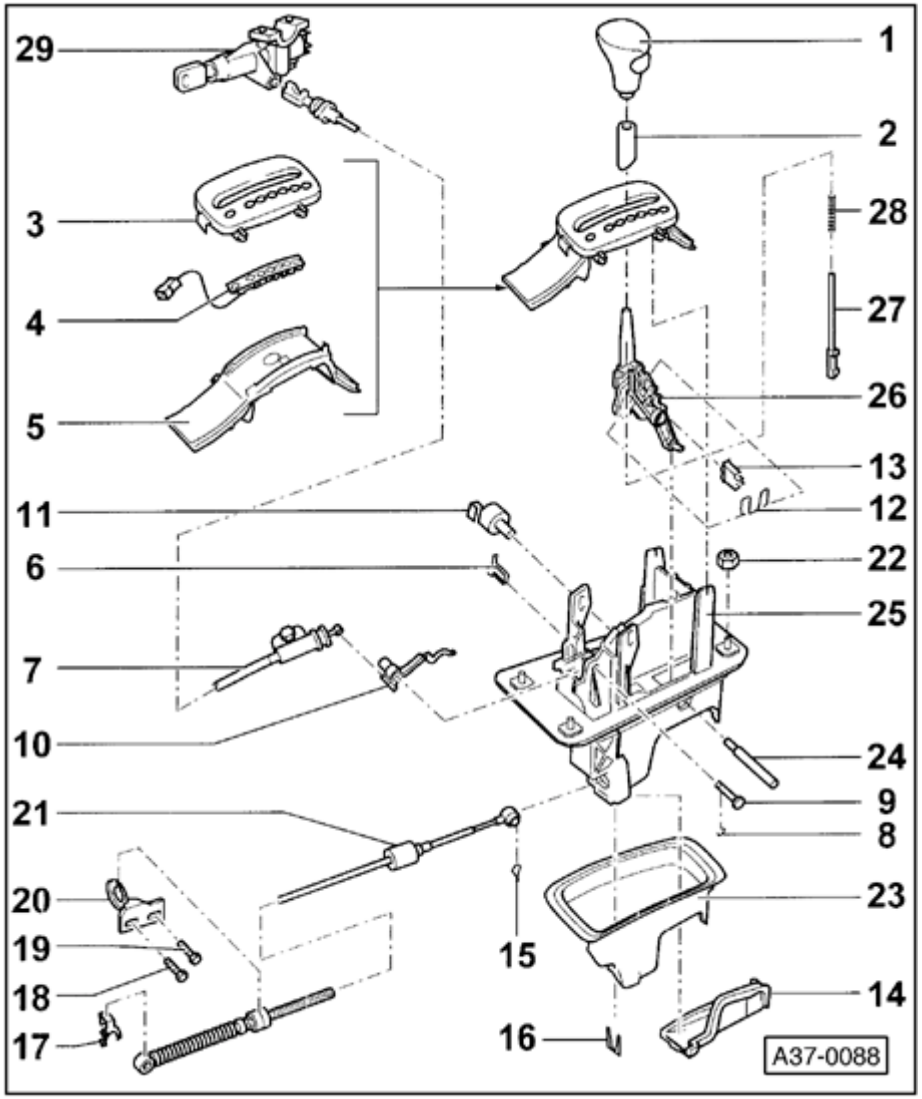
- Insert both ends into selector lever

**13 - Locking segment**

- Insert into selector lever together with spring bracket

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**14 - Cover**

- For shift mechanism housing
- Removing and installing ⇒ Fig. 1 , ⇒ page 37-59

**15 - Locking clamp**

- For selector lever cable to selector lever

**16 - Locking plate**

- For selector lever cable to shift mechanism housing ⇒ Fig. 2 , ⇒ page 37-60 item E

**17 - Clip**

- For selector lever cable to transmission shift lever

**18 - Hex-bolt, 23 Nm**

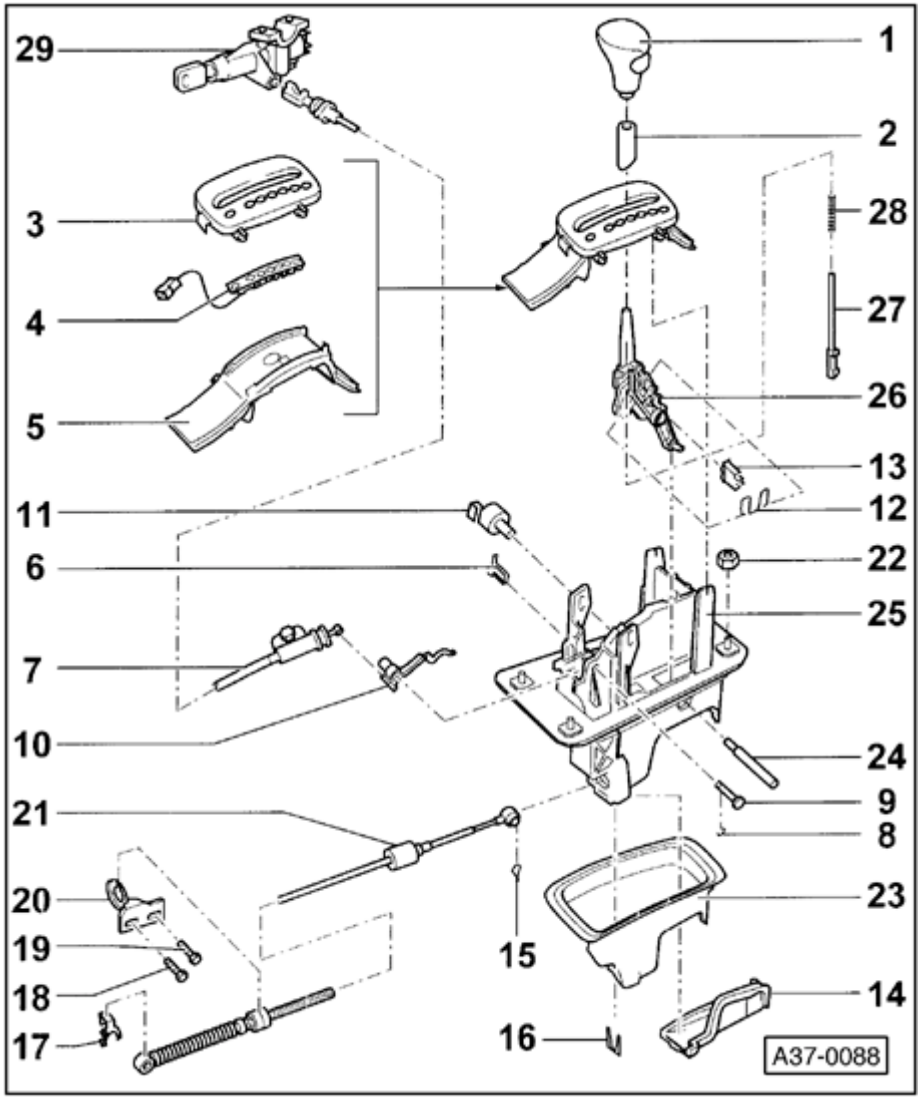
**19 - Hex-bolt, 23 Nm**

**20 - Pivot**

- For selector lever cable at transmission

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**21 - Selector lever cable**

- Removing and installing ⇒ page 37-62
- Adjusting ⇒ page 37-45

***Note:***

*For all further work, shift mechanism must be removed completely from the vehicle.*

**22 - Nut - 9 Nm**

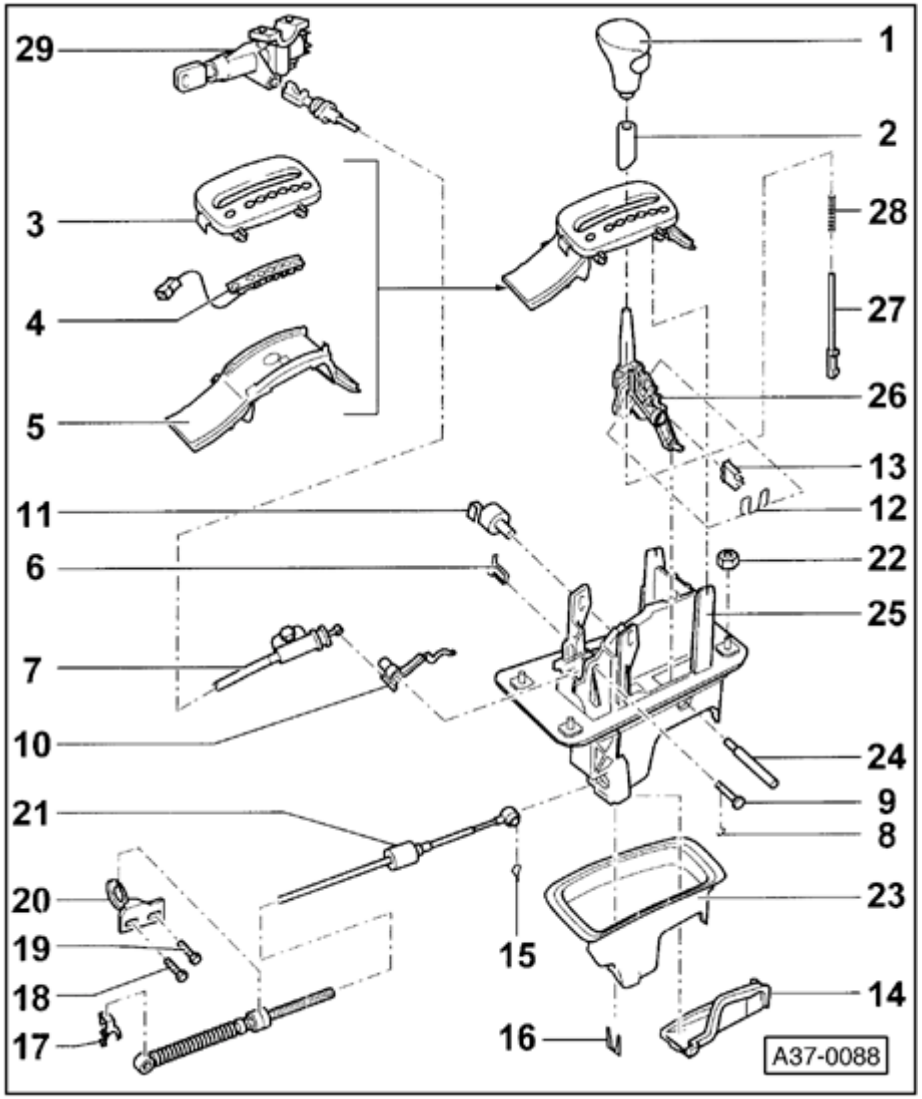
- 4x

**23 - Rubber housing**

- Must only be separated from shift mechanism housing item 25 if damaged or to remove selector lever.
- Installation and installation position ⇒ Fig. 2 , ⇒ page 37-60

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**24 - Pivot pin**

- Removing: carefully press out using screwdriver

**25 - Shift mechanism housing**

- Removing and installing ⇒ Fig. 2 , ⇒ page 37-60

**26 - Selector lever**

**27 - Pull-lever**

- Insert into selector lever together with spring item 28

**28 - Spring**

- For pull-lever

**29 - Ignition/Starter Switch**

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37-59

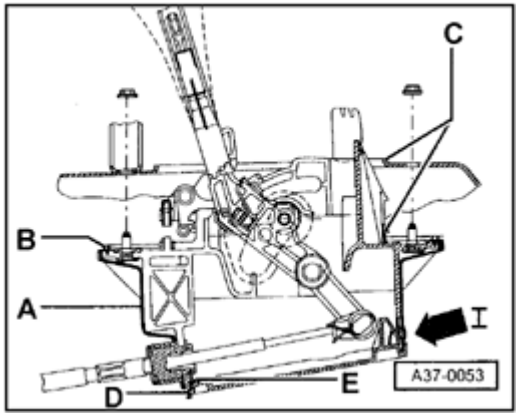



**Fig. 1 Cover, removing and installing**

***Note:***

*Cover can be removed and installed from below with the shift mechanism installed.*

**Removing**

- Press in direction of (arrow I) and disengage snap-lock to shift mechanism housing.

**Installing**

- Guide cover into groove -D- and then engage snap-lock.
- Check cover for proper seating and seal.

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37-60

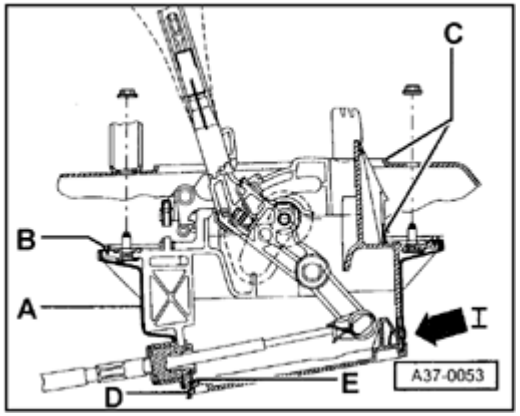



**Fig. 2 Shift mechanism housing, removing and installing**

- Remove bottom shielding plate and catalytic converter.
- Disconnect selector lever cable from shift mechanism housing.
- Before installing, secure rubber housing -A- to shift mechanism housing.
- Tighten nut - 9 Nm

***Note:***

- *Rubber housing -A- must seal shift mechanism housing to chassis (sealing lip -B-).*
- *Do not rout any cables between chassis and mounting bracket.*

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37-61

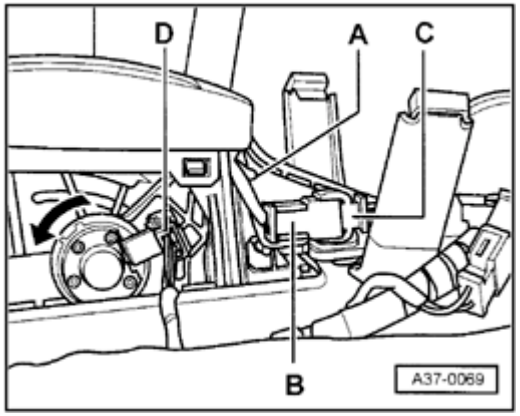



**Fig. 3 Shift Lock Solenoid -N110-, removing and installing**

- Unclip connector -D- (console wiring harness).
- Turn lift solenoid in direction of arrow approx. 90°.
- Check shift mechanism after removing lift solenoid ⇒ page 37-2

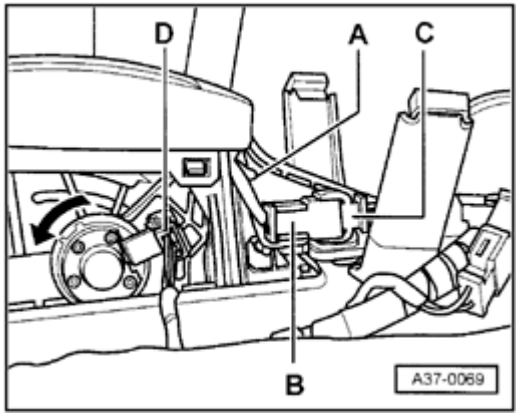



**Fig. 4 Route wire for base illumination**

- Route wire for base illumination below guide and secure in notch -A- (left/right).
- Clip connector -B- in bracket onto guide.
- Clip in wiring harness connector (console).

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37-62

## Selector lever cable for shift mechanism (without Tiptronic), removing and installing

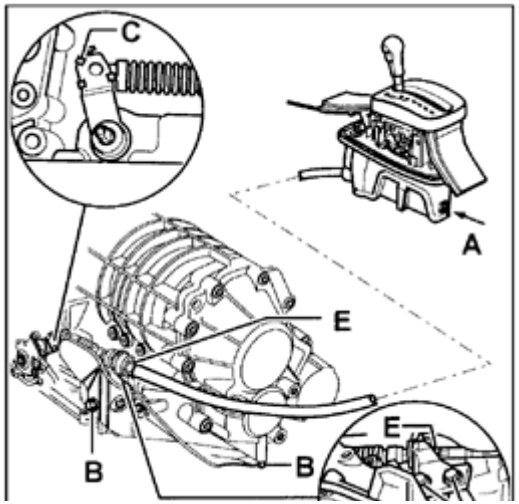
***Note:***

- *Do not bend or kink selector lever cable, lightly grease coupling ring and coupling ends before installing*

- *Selector lever cable can best be removed in selector lever position "P".*

**Removing:**

- Remove shielding plate (below shift mechanism) for exhaust system.




- Remove cover:

  Disengage snap lock of cover by pressing in direction of arrow A ⇒ page 37-59 .

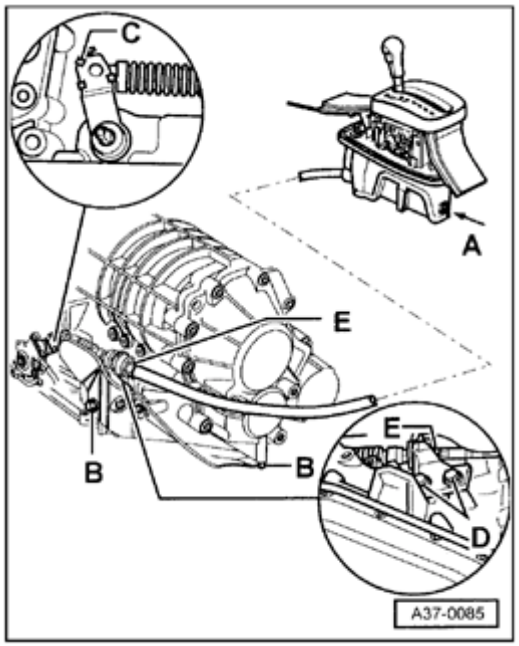
- Disengage locking clip by pressing both ends together and pull selector lever cable off selector lever.

- Pull out securing plate for selector lever cable at shift mechanism housing downward.

- Insert with angled end toward the rear and in groove at selector lever cable ⇒ Fig. 1 , ⇒ page 37-64 .

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- Pull selector lever cable out of shift mechanism housing.

- Remove shielding plate for selector lever cable (item B).

- Press retaining clip off of lever/shift lever (item C).
- Press ball socket of selector lever cable off of lever/shift rod.
- Loosen bracket from transmission (item D).
- If necessary, loosen selector lever cable from bracket (item E).

**Installing**

- Selector lever and lever/shift rod in position "P" (park lock must engage).
- Installation is the reverse order of removal.
- Lightly grease coupling ring and ball socket of selector lever cable.
- Selector lever cable, checking and adjusting ⇒ page 37-45 .

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37-64

**Tightening torques:**

| Components | Tightening torques |
|---|---|
| Selector lever cable to mounting bracket | 12 Nm |
| Bracket to right transmission mount | 23 Nm |
| Shielding plate to transmission, M8 | 23 Nm |

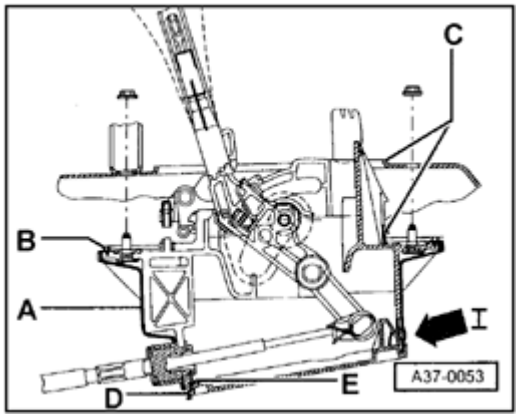



**Fig. 1 Installing securing plate**

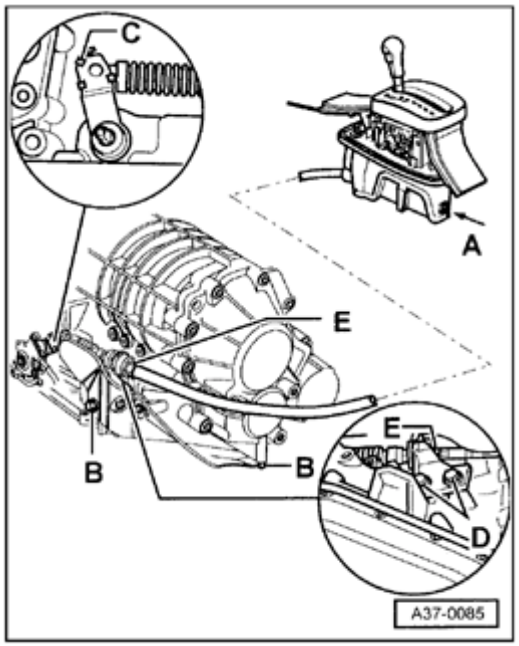
- Installation of the securing plate (item E).

  Insert with angled end toward rear.

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37-65

## Selector lever cable for shift mechanism (without Tiptronic), checking and adjusting




**Checking:**

- Removing retaining clip -C- for selector lever cable at lever/shift lever ⇒ page 37-62 .
- Press selector lever cable off of lever/shift lever.
- Shift selector lever from "P" to "2".
  - Shift mechanism and selector lever cable must have freedom of movement during this, if necessary, replace selector lever cable or service shift mechanism.
- Switch selector lever to "P".
- Shift lever/shift lever to "P" (last position, shift lock solenoid must engage).
  - It must be possible to push selector lever cable onto lever/shift rod, if necessary adjust selector lever cable.

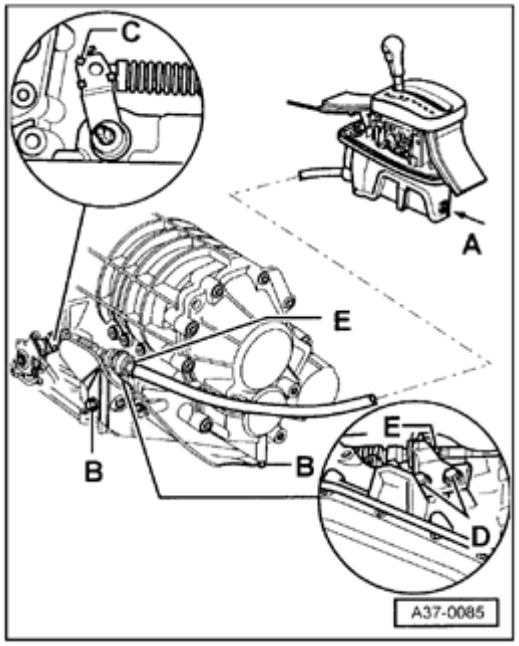
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37-66

### Adjusting

- Place selector lever in position "P".

- Shift lever/shift lever to "P" (last position, shift lock solenoid must engage).




- Slightly loosen mounting bolt at bracket to transmission.

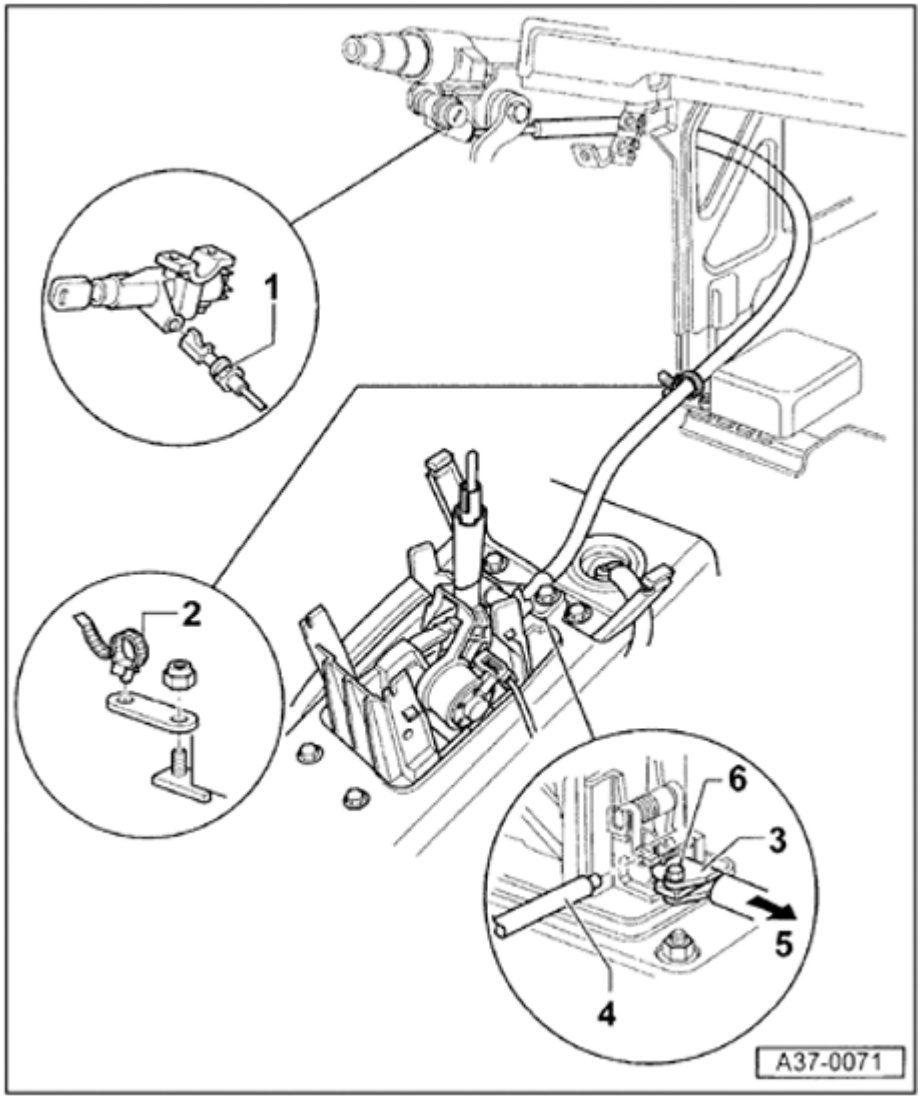
- Check freedom of stress of selector lever cable, if necessary eliminate stress.

- Tighten mounting bolt of bracket to 23 Nm.

- Check shift mechanism ⇒ page 37-2 .

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## Locking cable for shift mechanism (without Tiptronic), removing and installing

***Note:***

- *Locking cable must not be kinked.*

**Removing:**

- Disconnect Ground (GND) strap from battery.
- Remove driver-side storage compartment below steering wheel.

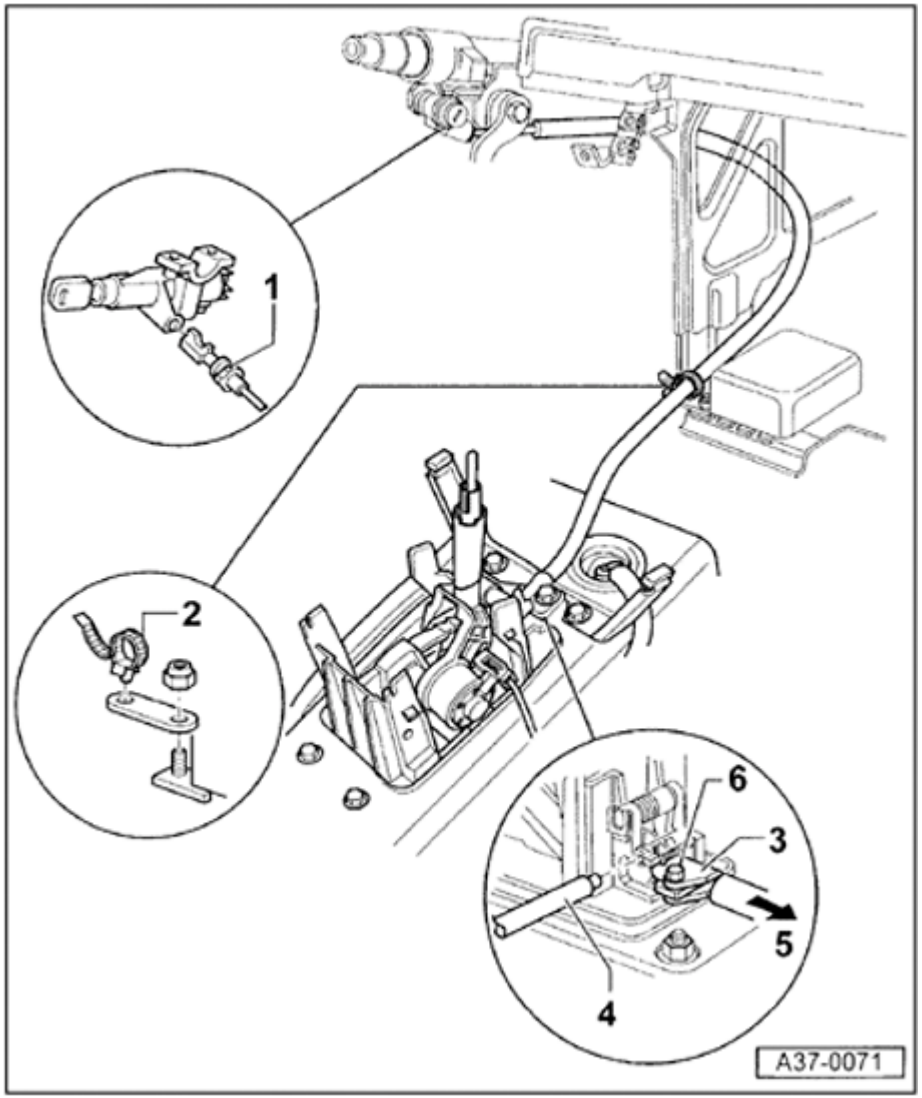
⇒ *Repair Manual, Body Interior, Repair Group 68; storage compartments/paneling; removing storage bin on driver's side*

- Remove steering column switch.

⇒ *Repair Manual, Electrical Equipment, Repair Group 92; Steering column switches, servicing; Steering column switches, removing and installing*

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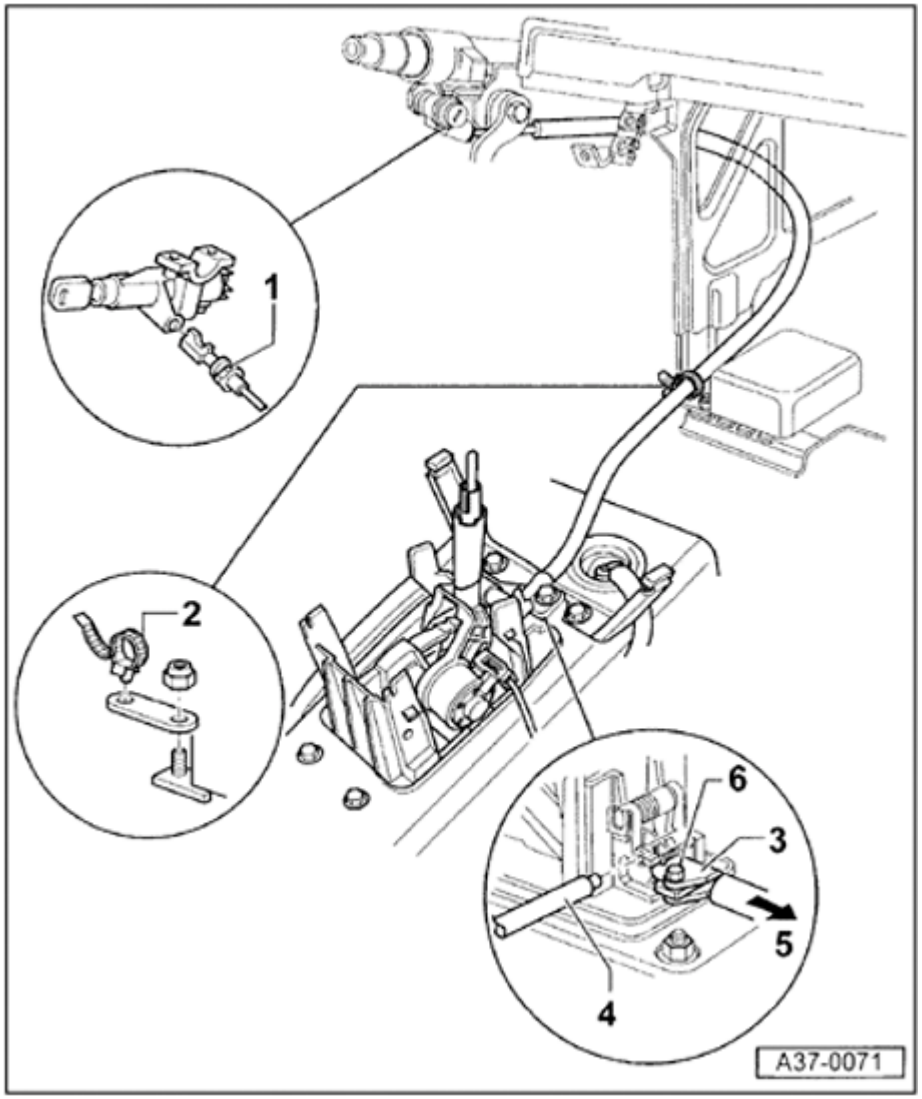
37-68




- Set ignition/starter lock in "Drive" position.
- Shift selector lever into position "P".
- Lift up locking bracket -1- and pull locking cable out of ignition/starter lock.
- Remove cover with guide (selector lever mechanism) ⇒ page 37-5 .
- Unclip locking cable from securing spring at shift mechanism housing, slightly lift up securing spring to do so.
- Loosen cable tie -2- and remove locking cable.

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37-69

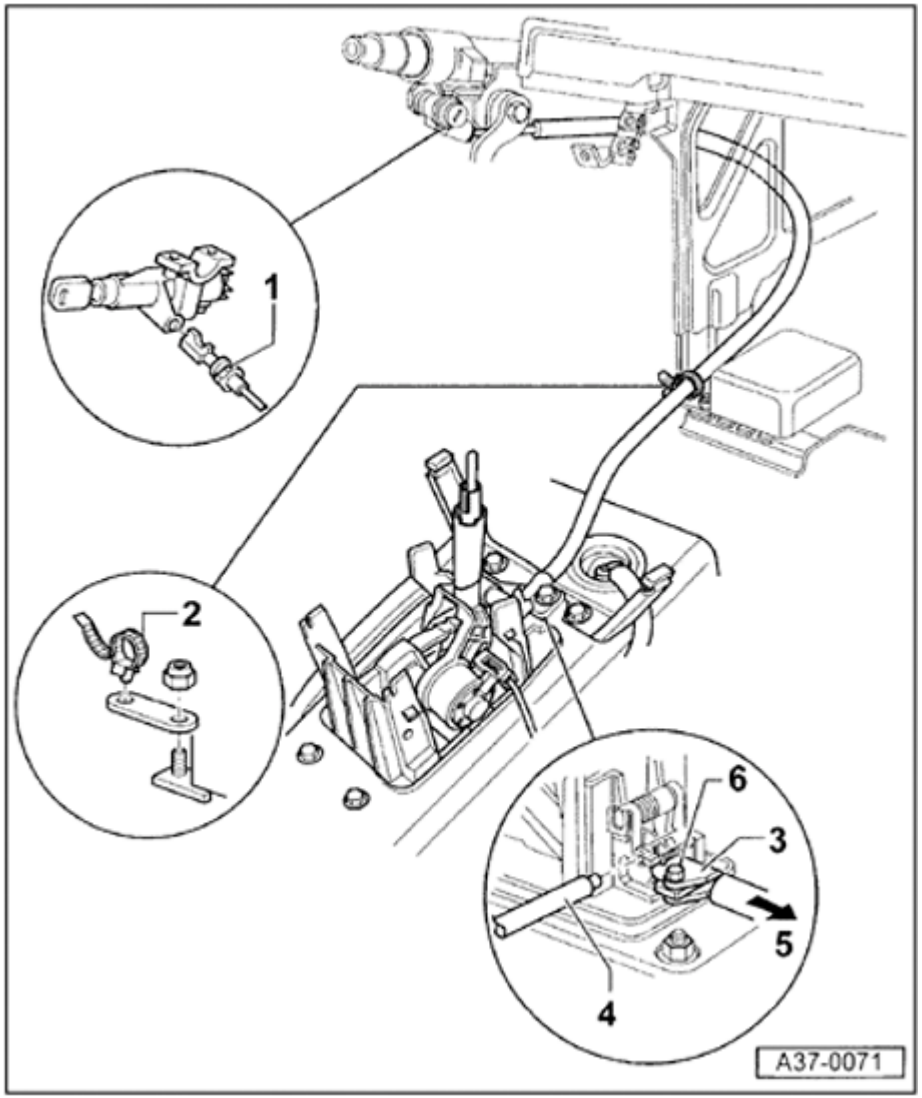



## Installing and Adjusting

- Installation is the reverse of removal.
- Install locking cable without kinking and secure at indicated position using cable tie -2-.
- Adjust steering column rearward/downward.
- Check locking mechanism of interior lever -1-.
- Slightly loosen bolt -6-.
- It must be possible to slide bracket -3- in direction of arrow -5-.
- Make sure securing spring is correctly seated in shift mechanism housing.
- Hook locking cable bracket -3- into shift mechanism and locking coupling ring in lever (for locking cable).

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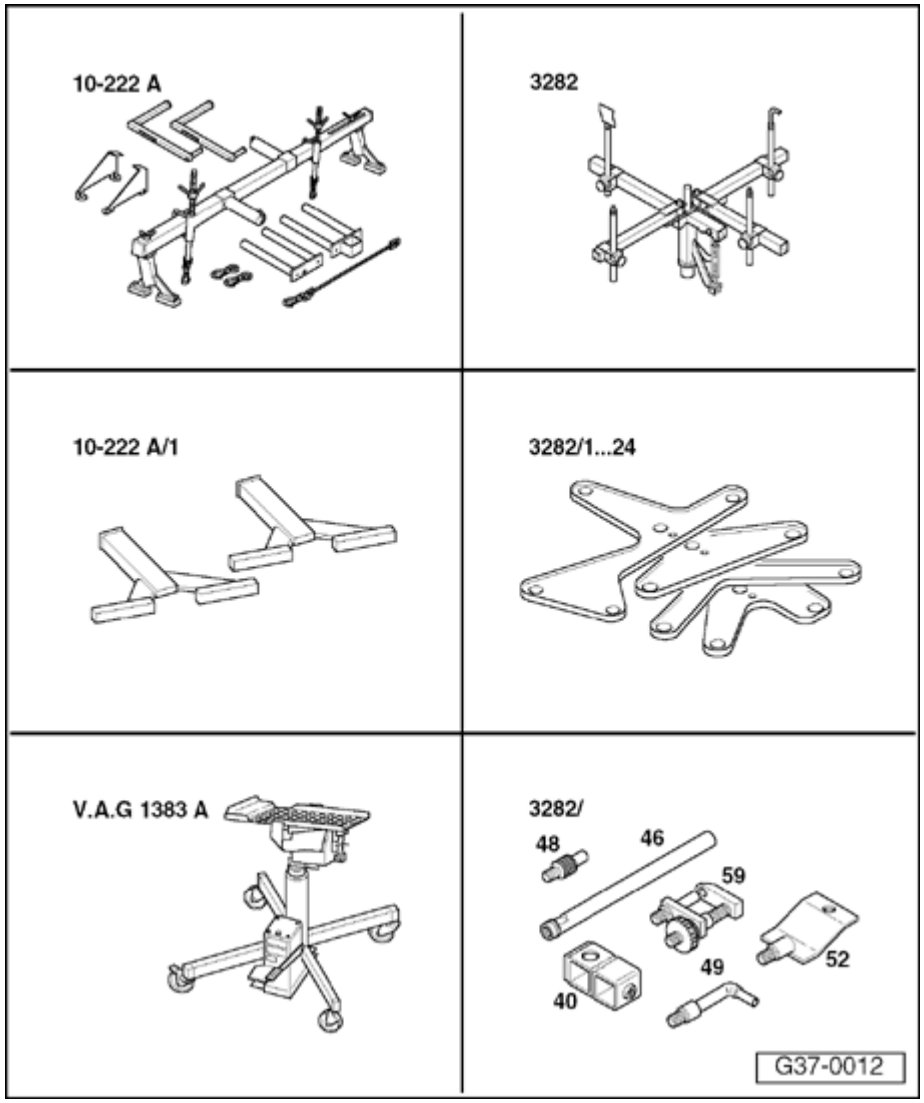
37-70




- Connect 3352A adjustment pin for shift lock 3 - item 4- between lever (for locking cable) and locking coupling ring.
- Pull locking cable in direction of arrow -5- and tighten bolt -6- to 8 Nm.
- Check locking cable after every new adjustment of the locking cable ⇒ page 37-1 .

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# Transmission, removing and installing

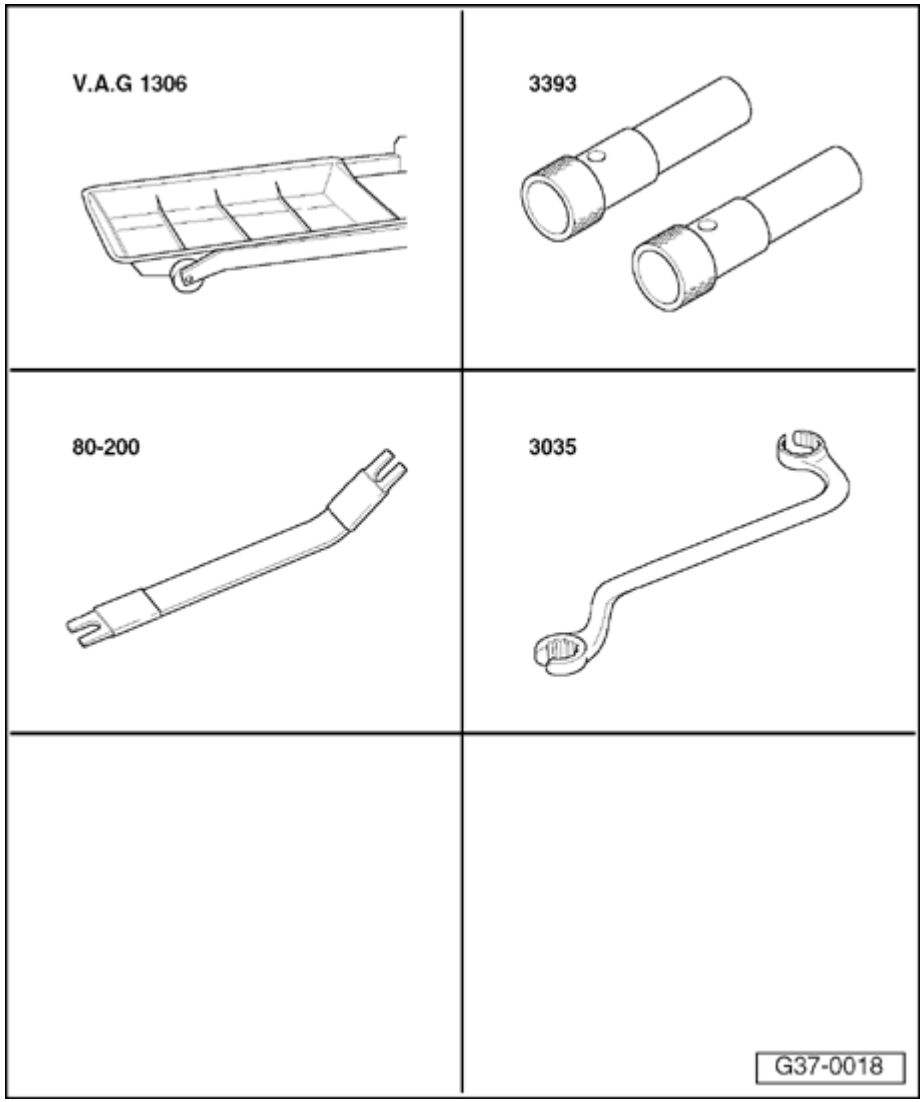
## Removing

**Prepare the following special tools and test equipment for use:**

- 10-222 A engine support bridge
- 10-222 A/1 bracket for engine
- 10-222 A/3 engine support adapter
- V.A.G.1383A lift
- 3282 transmission support
- 3282/19 adjustment plate
- 3282/48 adapter
- 3282/52 - adapter (3 pcs.)

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- VAG1306 drip tray
- 80-200 pry lever
- 3035 injector line wrench
- 3393 Testing Mandrels
- V175 special tool (nut)

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37-73

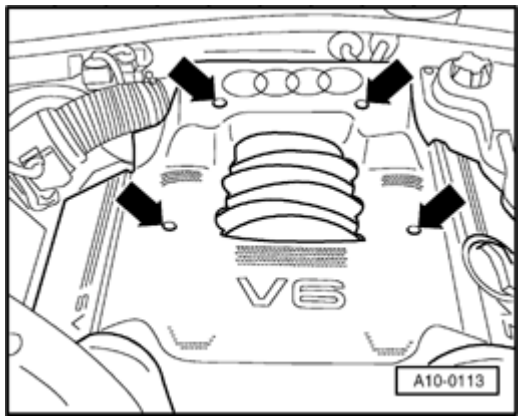
**Additional information**

- Repair Manual, Suspension, Wheels, Steering
- Repair Manual, Electrical Equipment
- Repair Manual, Engine Mechanical

- Note radio code (for vehicles equipped with coded anti-theft radio).

- Disconnect Ground (GND) strap from battery.

**For 6 cylinder gasoline engines except for 2.7 Liter 5V turbo engine:**



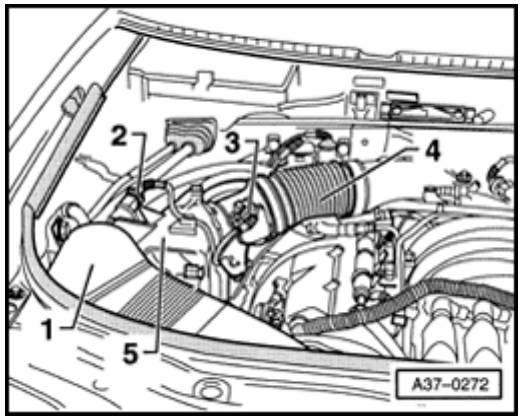

- Remove engine cover (arrows).

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**All except 2.7 Liter 5V turbo engine:**

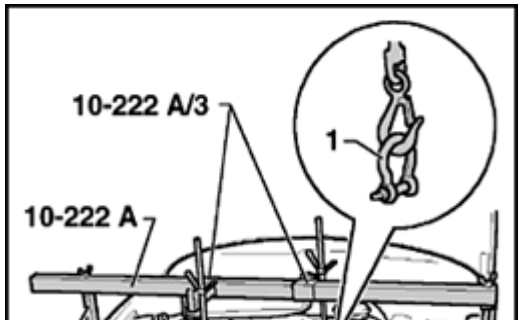
- Remove cover above air filter housing.




- Remove air guide -1- between air filter housing and lock carrier.
- Disconnect connector for Evaporative Emission (EVAP) canister purge regulator valve -2-, and remove valve from bracket. Disconnect connector -3- at Mass Air Flow (MAF) sensor.
- Remove intake air duct -4- from intake manifold.
- Remove upper part of air filter housing -5-.
- Unbolt engine coolant expansion tank and lay aside.
- Remove Heated Oxygen Sensor (HO2S) from front exhaust pipes (left and right).
- Remove upper securing nuts from front exhaust pipes (left and right).

**For all 6 cylinder engines:**

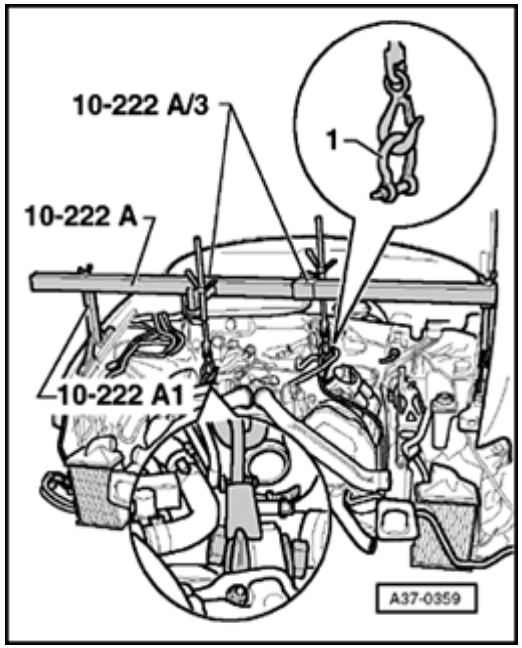
- Assemble both 10-222A/3 engine support adapters for front and rear spindles on support bar.




- Set 10-222A engine support bridge onto the fender mounting flanges using 10-222A/1 brackets.

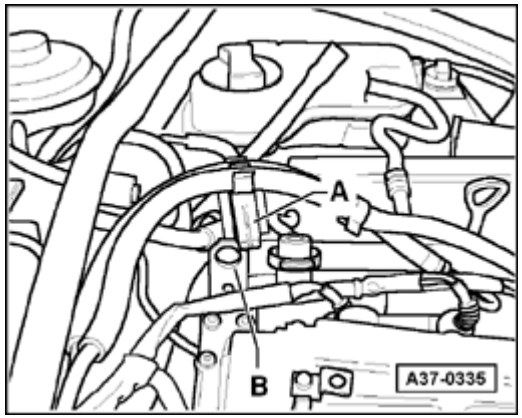
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- Hang both spindles on the adapters.
- Secure engine to spindles. To do so, additionally use a shackle -1- at the rear side of the engine to avoid damage.

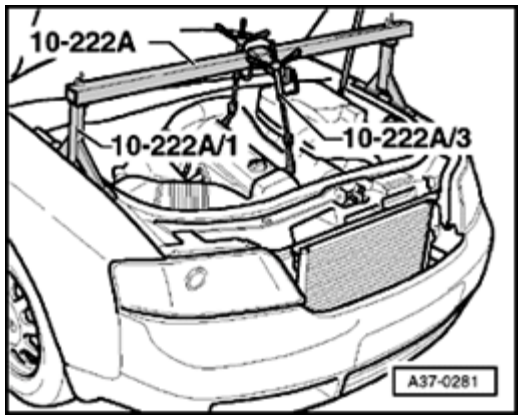
**For 4 cylinder engines:**




- Disconnect connector -A- from bracket -B-.

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- Mount 10-222A/3 adapter for spindle at front of support.

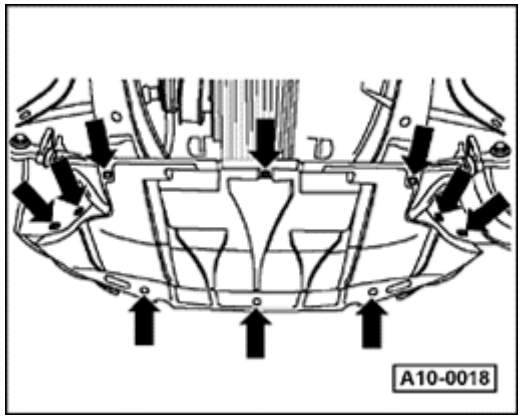
- Install 10-222A engine support bridge with 10-222A/1 brackets and support engine/transmission in this position.

**All:**

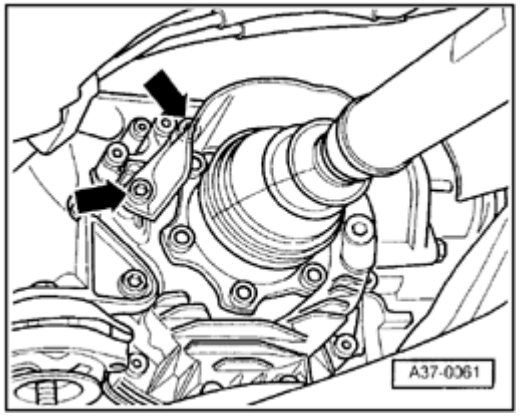
- Take up weight of engine/transmission assembly on spindles.
- Tighten the rear spindle less, to enable later lowering at rear.
- Raise vehicle.
- Remove front wheels.

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- Remove sound-deadening pan.

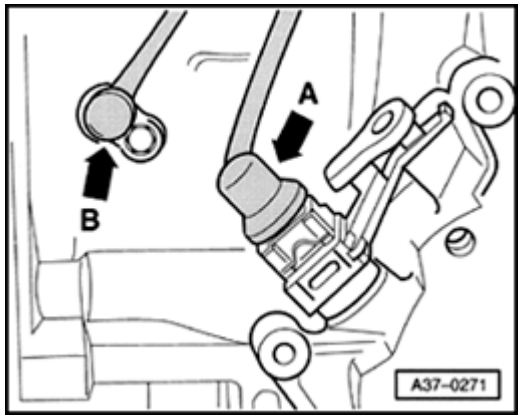



- Remove left and right heat shields for drive axles (arrows).
- Disconnect drive axles from transmission drive flanges.

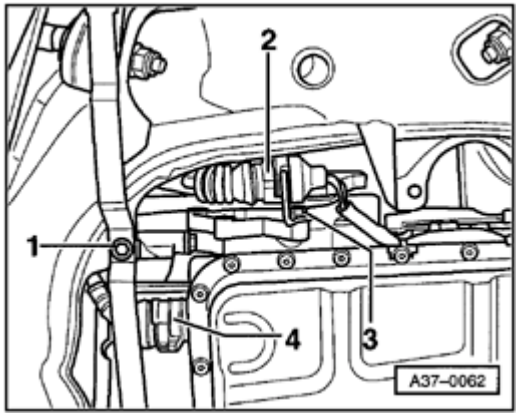
⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 40*

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- Disconnect engine speed (RPM) sensor -G28- (arrow B) from transmission at front left (if installed).
- Remove connector for speedometer (arrow -A-) from transmission.

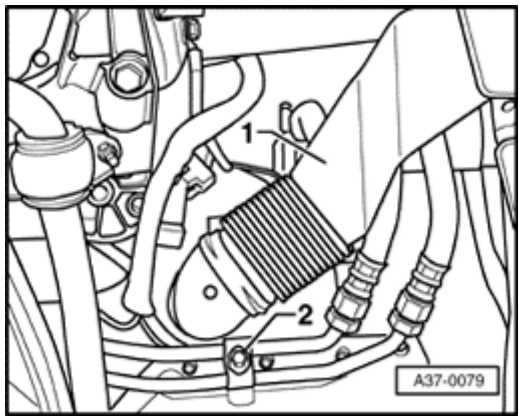



- Remove noise insulation bracket -1-.
- Swing securing lever -4-, disconnect connector for transmission wiring harness.
- Disconnect connector -2- of wire for multi-function switch.
- Unbolt bracket -3- for harness connector.

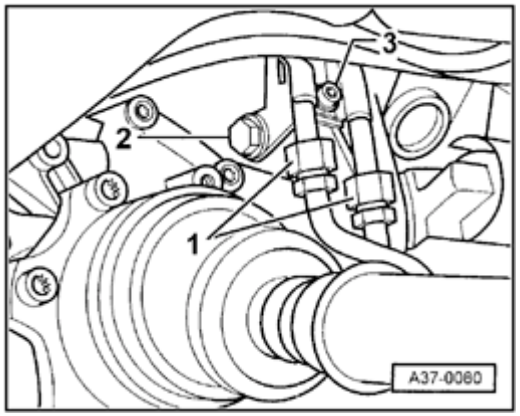
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**For 6 cylinder engines except for 2.7 Liter 5V turbo engine:**



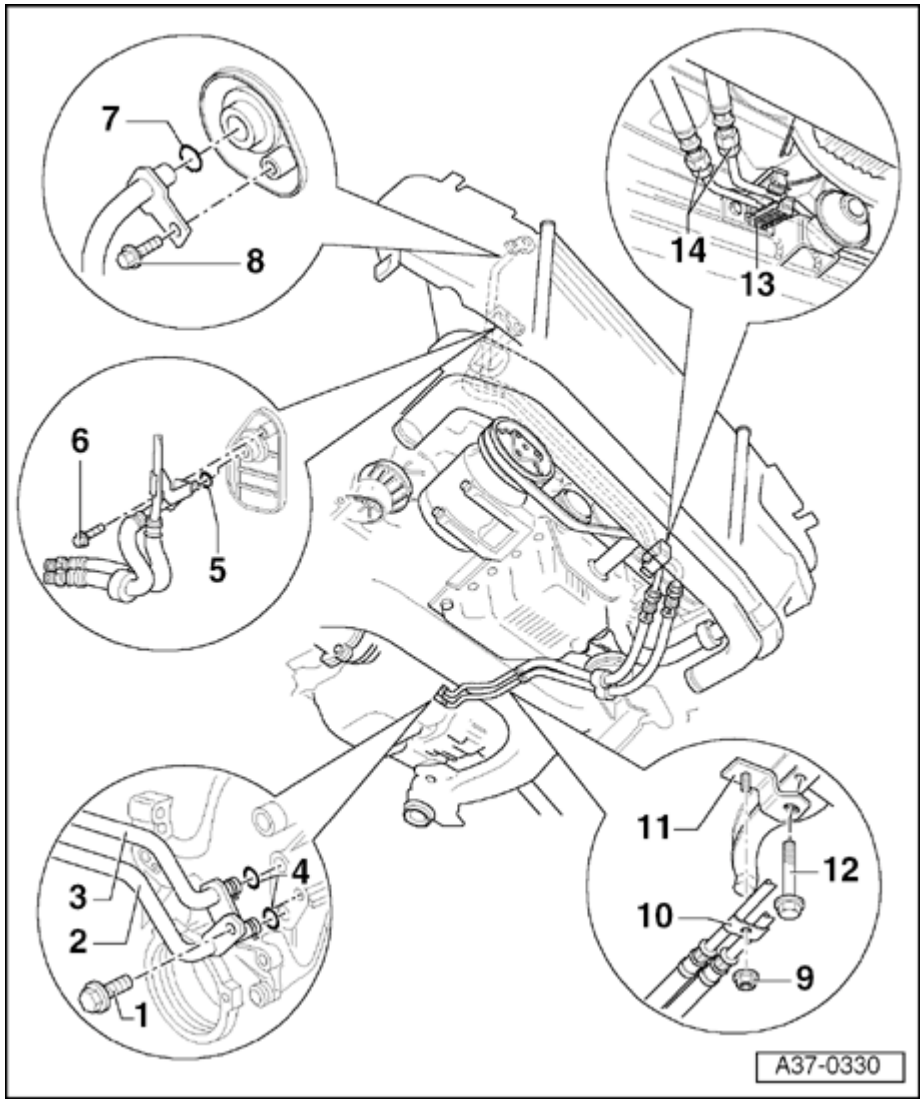

- Unclip vent hose for alternator -1-.
- Unbolt bracket for ATF line -2- at oil pan.




- Separate ATF lines -1- to ATF cooler.
- Plug ATF lines with clean plug.
- Unbolt bracket for ATF line -3-.
- Remove transmission side starter bolt -2-.

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**Vehicles with 4 cylinder engine**

- Remove bolt -12- to separate bracket for ATF line -11- from engine.
- Remove bolt -1-.
- Pull off lines -2- and -3- from transmission.
- Plug lines and openings at transmission with clean plugs.
- Lay lines aside so they are not damaged.

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37-81

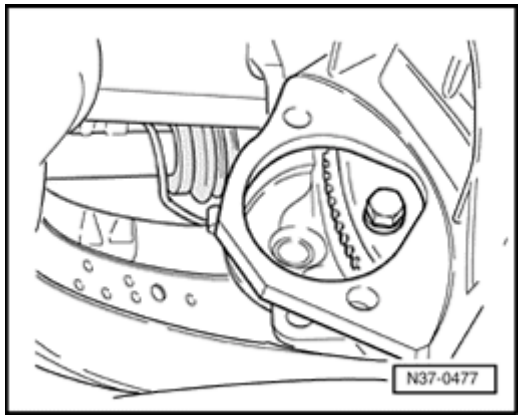
**All except 2.7 Liter 5V turbo engine:**

- Remove starter.

⇒ *Repair Manual, Electrical Equipment, Repair Group 27; Starter, removing and installing*

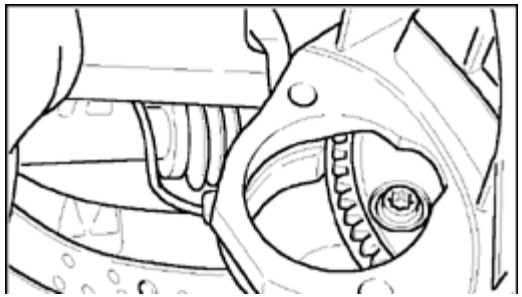
**Disconnect torque converter from drive plate**

For vehicles with hex bolts:




- Remove torque converter from drive plate by removing 3 bolts using special tool V175 (turn crank shaft an additional 1/3 turn every time).

For vehicles with Torx bolts:

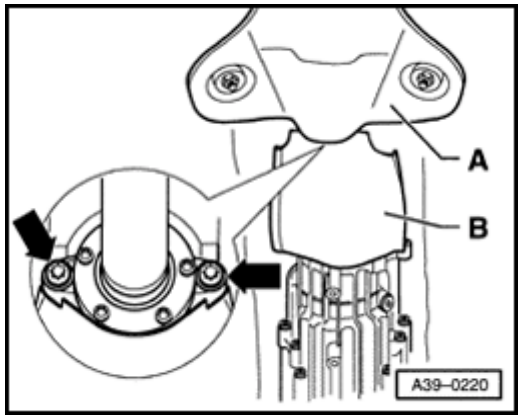


- Unbolt 3 torque converter bolts from drive plate using respective Torx insert (turn crank shaft an additional 1/3 turn every time).

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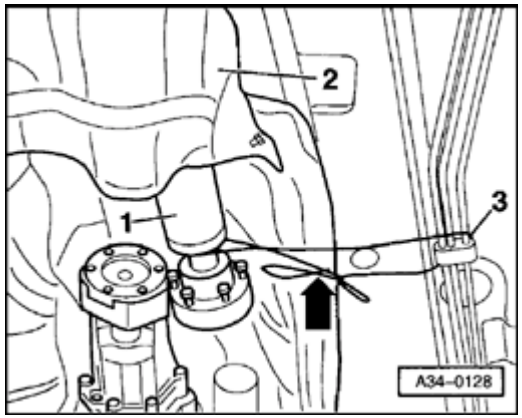
**All-wheel-drive vehicles**




- Remove heat shield -A- above driveshaft.
- Remove rear part of exhaust system if necessary:

⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system.*

- Remove heat shield -2- for driveshaft from cover for Torsen differential (arrows).

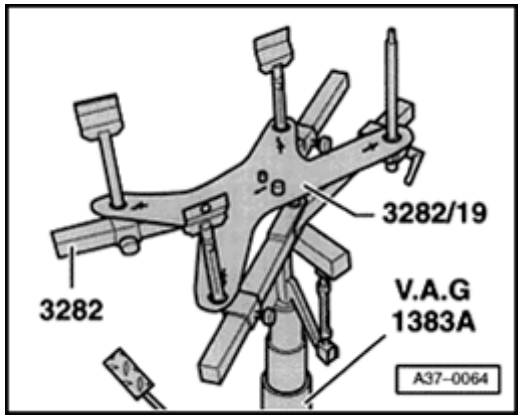



- Unbolt driveshaft from transmission and hang or support.

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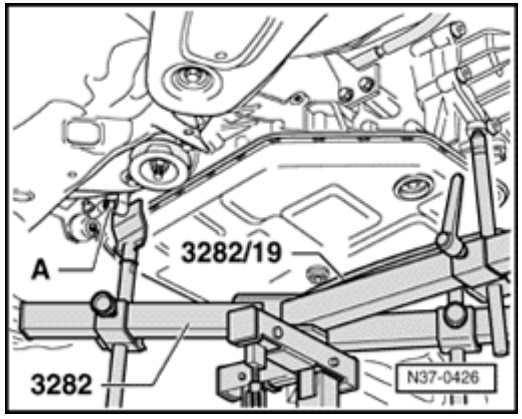
**Continuation for all vehicles**




- Position 3282 transmission support.

Use 3282/19 adjustment plate to position the 3282 transmission support for Automatic Transmission 01V.

The symbols on the adjustment plate indicate the necessary mounts and the arrow points toward front of vehicle.



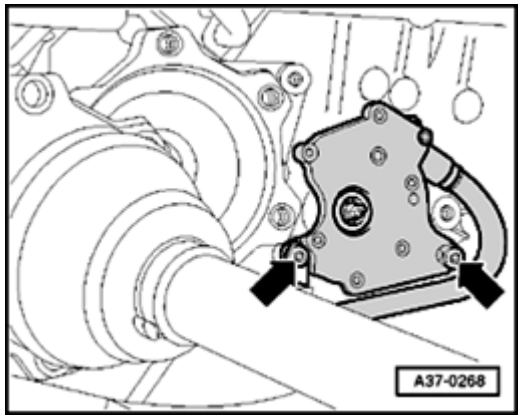

- Roll VAG1383A engine/transmission hoist with 3282 transmission support under transmission and support transmission.
- Align adjustment plate parallel to transmission.
- Secure transmission on 3282 transmission support using bolt -A-.

Automatic Transmission 01V with All Wheel Drive is supported at the same positions as the Front Wheel Drive version.

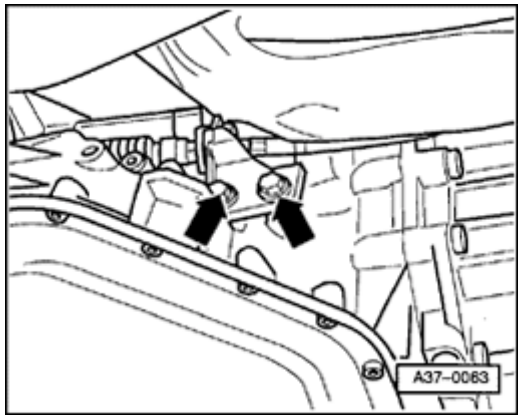
- Remove left and right transmission support with transmission mount ⇒ page 37-125

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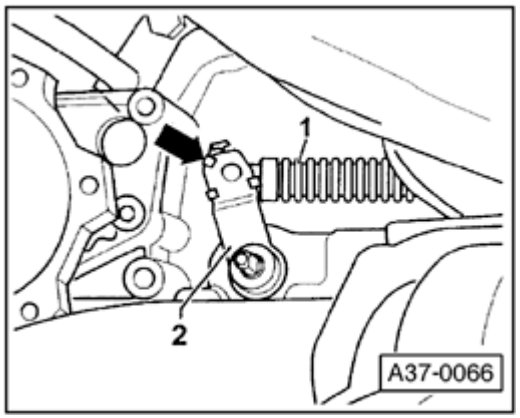

- Unbolt multi-function Transmission Range (TR) switch -F125- for protection against damage (arrows) and expose wiring harness.



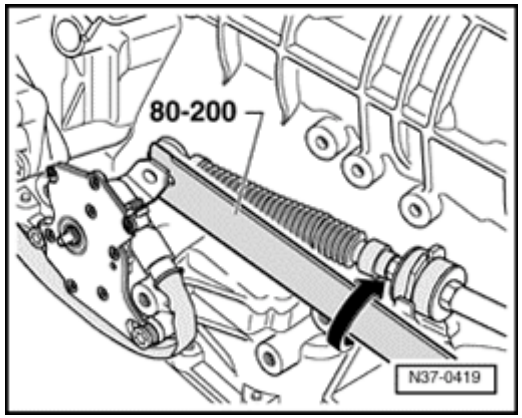

- Mark position of mounting bracket for selector lever cable to transmission housing for re-installation, unbolt mounting bracket (arrows).

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- If installed, press off securing brace (arrow) at end of selector lever cable.

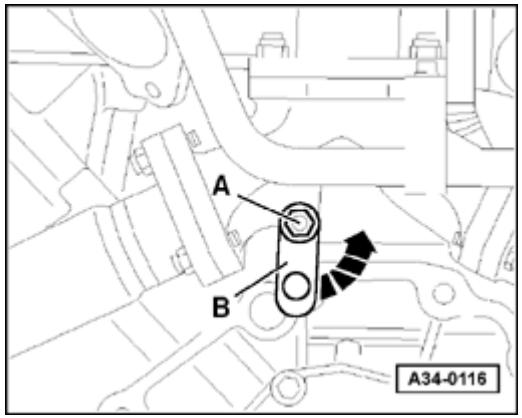



- Pry off selector lever cable from lever/shift rod (arrow).
- Remove upper connecting bolts for engine/transmission.

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**For 6 cylinder TDI engines**

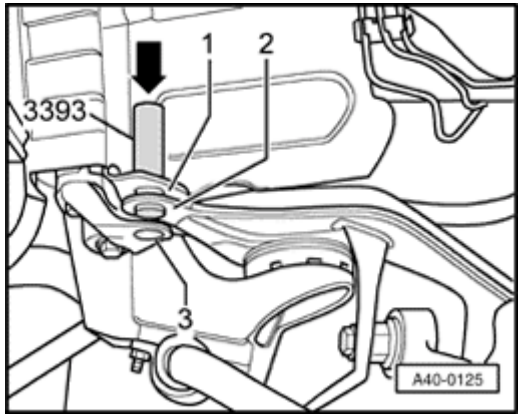



- Loosen bolt -A- (at rear of turbocharger) several turns and rotate brace -B- to side in arrow direction. Then re-tighten bolt -A- lightly.

***Note:***

*Illustration depicts engine from rear with the transmission removed.*

**Continuation for all vehicles**

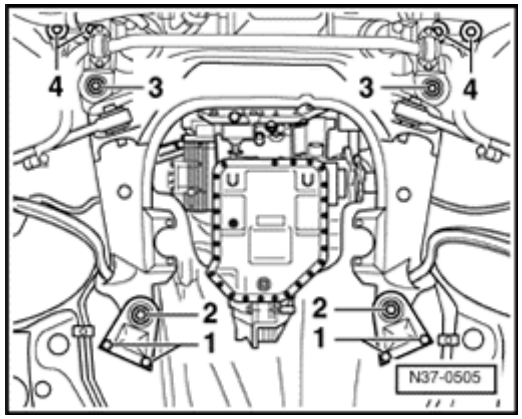



- Before loosening subframe, it must be checked whether holes -1- and -2- (at least) line up using 3393 testing mandrel.

**If this is not the case, an axle alignment must be performed after the carrier is installed.**

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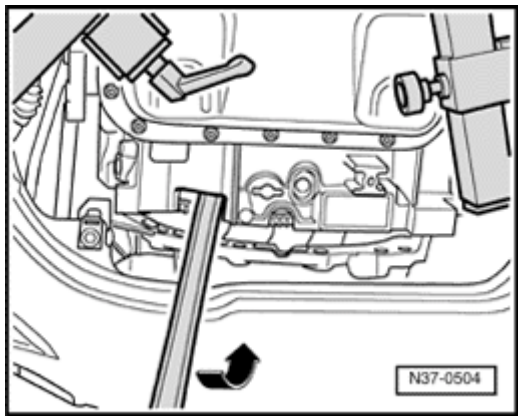

- Remove bolts -1- and -2- at rear of subframe on both sides of vehicle.
- Completely remove bolts -3- at front of subframe on both sides of vehicle.

By removing the bolts, the subframe lowers itself approx. 150 mm at rear edge ⇒ page 37-88 , illustration A37-0067.

- Slightly lower engine/transmission subframe at rear above VAG1383A hoist.
- Remove front exhaust pipes:

⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system.*

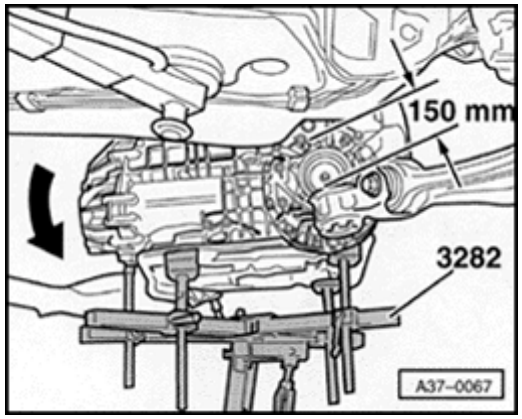
- Remove remaining connection bolts for engine/transmission.
- Press transmission off engine, while pressing torque converter out of drive plate.




- Press torque converter against the ATF pump (arrow).

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- Rotate transmission (arrow) and carefully move into position between subframe and vehicle floor.
- Lower transmission.
- Secure converter so it does not fall out.

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## Installing

Installation is reverse of removal, noting the following:

Before installing:

**All-wheel-drive vehicles**

- Clean threads in driveshaft flange!

**Continuation for all vehicles**

- Clean ATF lines ⇒ page 37-158 .

- Insert torque converter into transmission ⇒ page 32-8 .

***WARNING!***

***Check installation dimension of torque converter before installing transmission ⇒ page 32-8***

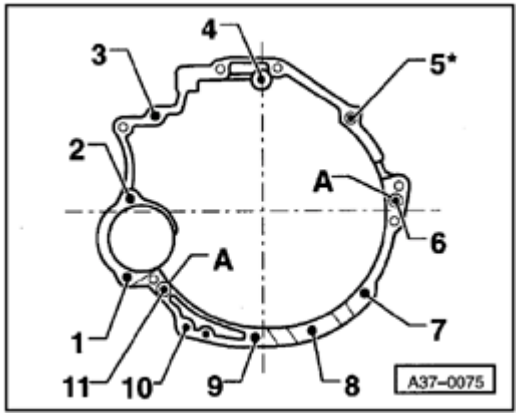
- Make sure bushings are correctly seated.

***Note:***

*If the bushings get stuck in the transmission housing, they must be removed and new bushings must be installed on the engine.*

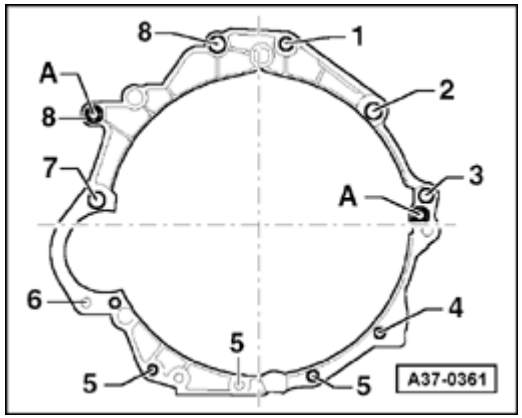
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37-90




➢ **For 4 cylinder engines (5 valve, turbo)**

Item A = bushings

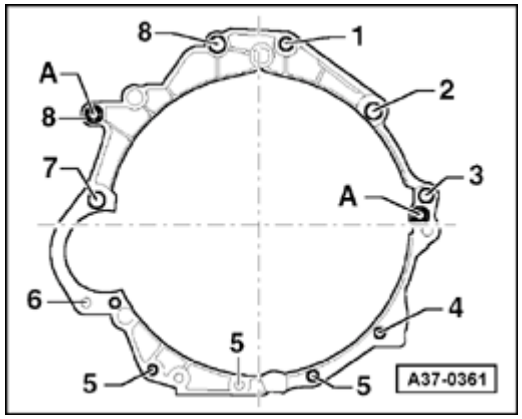



➢ **For 6 cylinder gasoline engines:**

Item A = bushings

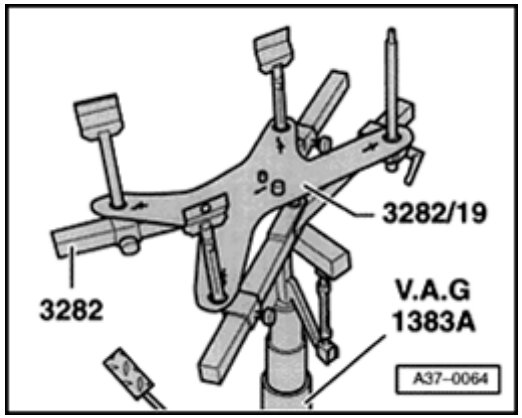
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37-91




**For 6 cylinder TDI engines**

Item A = bushings




- Position 3282 transmission support.

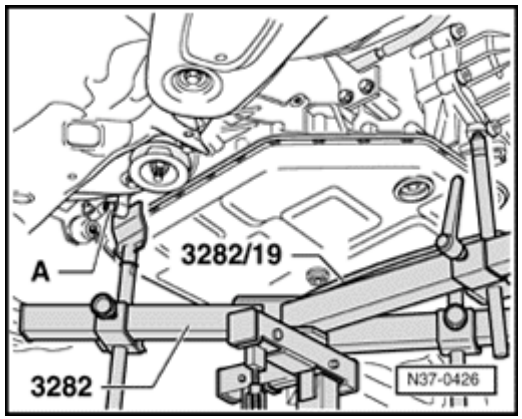
Use 3282/19 adjustment plate to position the 3282 transmission support for Automatic Transmission 01V.

The symbols on the adjustment plate indicate the necessary mounts and the arrow points toward front of vehicle.

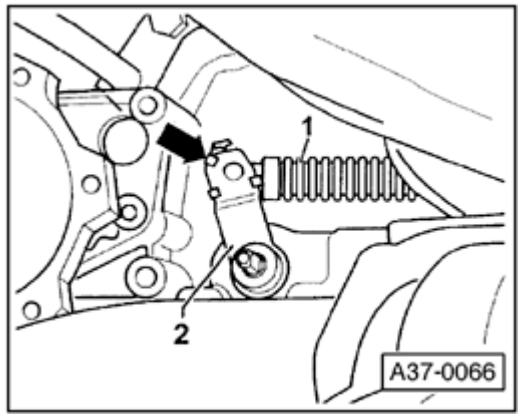
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- Place transmission onto transmission support.




- Secure transmission on 3282 transmission support using bolt -A-.
- Move transmission into position between the lowered subframe and vehicle floor.




- Press the lever/shift rod -2- at transmission completely toward rear (toward right in illustration) until park lock is engaged.
- Shift selector lever into "P" and carefully press up ball head of selector lever cable on lever/shift rod -2- using a pair of pliers.
- If installed, press securing brace (arrow) open at end of selector lever cable.

***Note:***

*Do not deform lever/shift rod when pressing up or else shifting cannot be precisely adjusted any more.*

- Align transmission properly to engine.

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37-93

***Note:***

- *If installed, place intermediate plate onto bushings.*
- *Make sure that wires do not get pinched as transmission is docked at engine.*

Check whether the torque converter is still properly installed and has not slid out of the converter housing toward the font:

- It must be possible to easily turn torque converter by hand without much force.

***WARNING!***

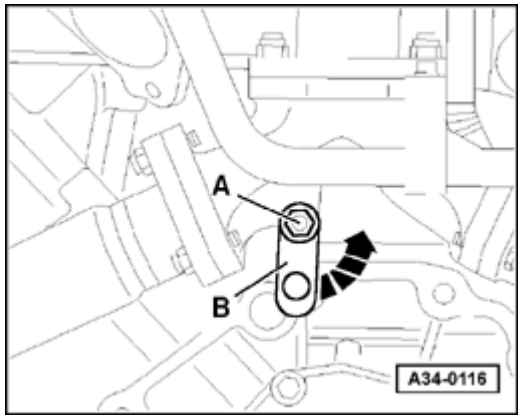
***In case of an incorrectly inserted torque converter, the coupling plate of the torque converter or the ATF-pump will be destroyed, if the transmission is flanged to the engine.***

- If the torque converter is difficult to move, check installation dimension once again ⇒ page 32-8 .

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37-94

**For 6 cylinder TDI engines**



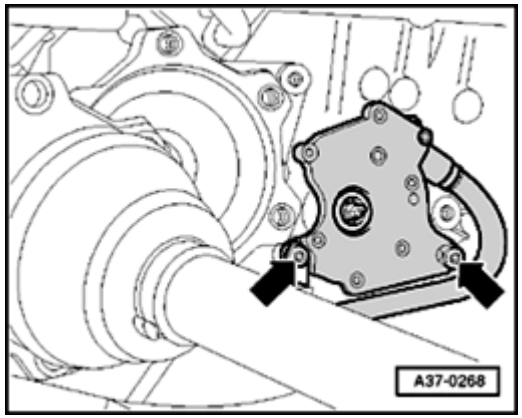

- Check whether brace -B- is still swung to side (arrow direction) before installing the transmission.

**Continuation for all vehicles**

- Install connecting bolts for engine/transmission.

***Note:***

*Some bolts also have a bracket or a Ground (GND) connection attached ⇒ refer to tightening torque tables starting ⇒ page 37-119 onward.*




- Install multi-function Transmission Range (TR) switch -F125-.
- Slightly raise engine/transmission subframe at rear via VAG1383A hoist.
- Install remaining connecting bolts for engine/transmission.
- Install front exhaust pipes:

⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system.*

- Install subframe, observe tightening sequence and alignment with master hole.

⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 40; Subframe, removing and installing*

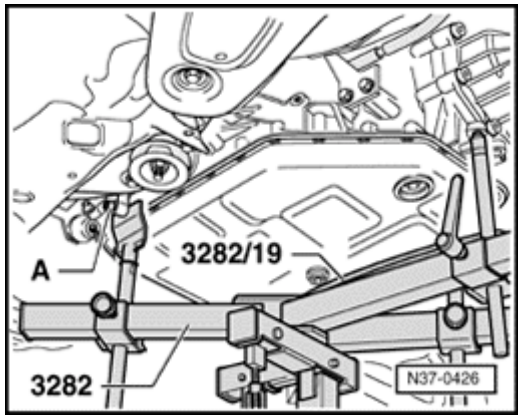
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- Only perform vehicle alignment if necessary.

⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 44; Vehicle alignment*

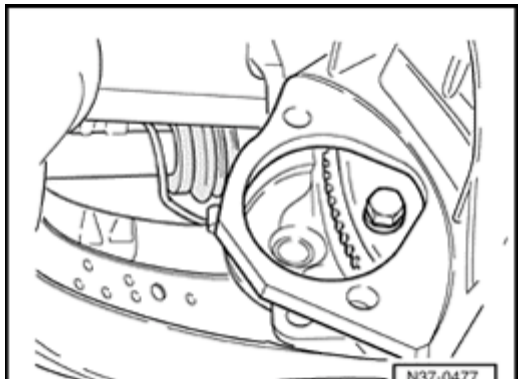
- Install transmission supports at left and right with transmission mount ⇒ page 37-125




- Remove bolt -A- after transmission is bolted to engine.
- Apply corrosion protection to contact surface between bolt -A- and oil pan.

**Bolt torque converter to drive plate**

For vehicles with hex bolts:

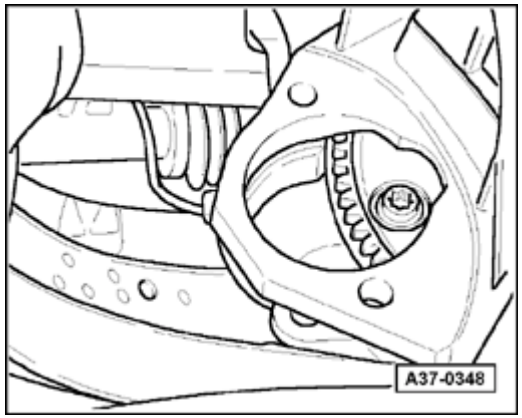


- Bolt torque converter to drive plate via 3 bolts using special tool V175 (turn crank shaft an additional 1/3 turn every time).

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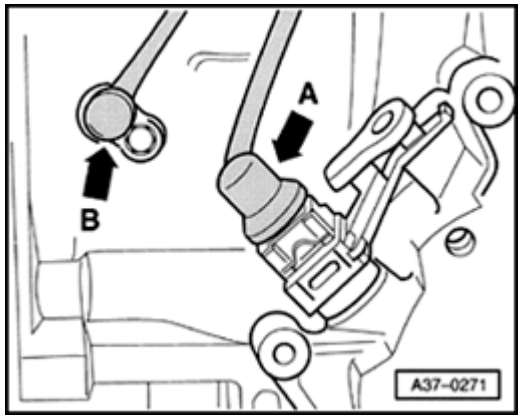
For vehicles with Torx bolts:




- Bolt 3 torque converter bolts to drive plate using respective Torx insert (turn crank shaft an additional 1/3 turn every time).
- Install starter.

⇒ *Repair Manual, Electrical Equipment, Repair Group 27; Starter, removing and installing*

- Install ATF lines to engine/transmission subframe.
- Install bracket for ATF- line.
- Slightly raise engine/transmission subframe at rear via VAG1383A hoist.

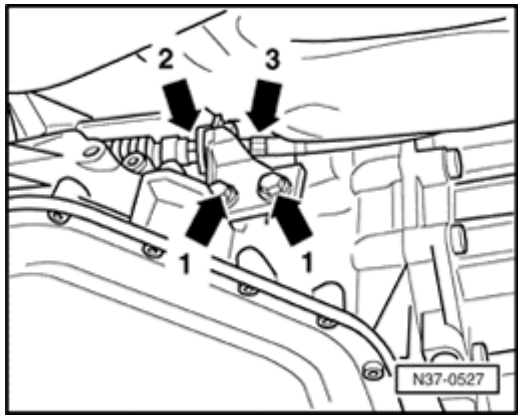



- Bolt in engine speed (RPM) sensor -G28- (arrow -B-) at front left of transmission (if installed).
- Connect connector for speedometer Vehicle Speed Sensor (VSS).
- Bolt drive axles to transmission flanges.

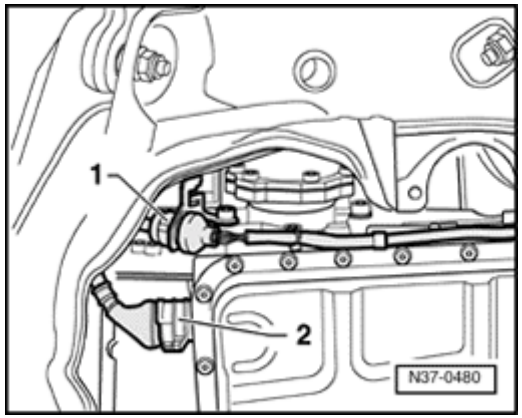
⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 40*

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- Bolt in bolts at mounting bracket of selector lever cable, install selector lever cable and if necessary, adjust.



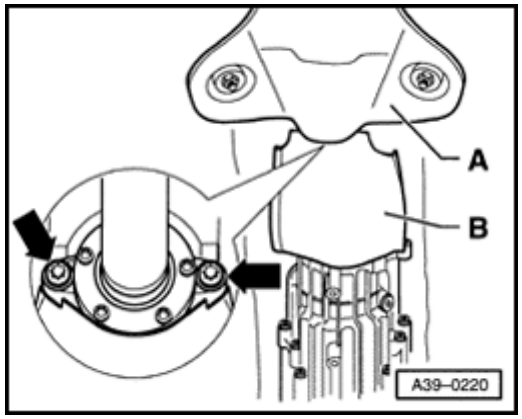

- Connect connector of multi-function Transmission Range (TR) switch -1-.
- Connect connector for transmission wiring harness and secure using securing lever -2-.
- Install shielding plate/selector lever cable

**All-wheel-drive vehicles**

- Bolt driveshaft to transmission flange ⇒ page 39-79 , Driveshaft, removing and installing.

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- Bolt heat shield -B- for driveshaft to Torsen differential cover (arrows) if installed.
- Install heat shield -A- above driveshaft.

**Continuation for all vehicles**

- Install bracket for noise insulation panel.
- Install noise insulation panel.
- Install front wheels.
- Connect battery Ground (GND) strap.
- Check adjustment of selector lever cable ⇒ page 37-45 .
- Check gear oil in final drive with transmission installed ⇒ page 39-1 .
- Then check ATF level and top off ⇒ Page 37-133 onward.
- After connecting battery, enter anti-theft code for radio.

⇒ *Radio operating manual*

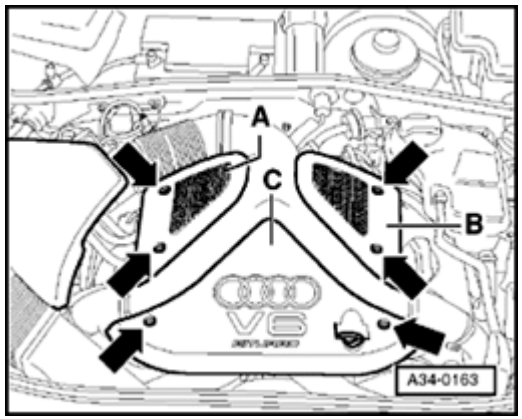
- Fully close power windows to stop.
- Then activate all power window switches ("up") for at least one second to activate automatic window raising/lowering.
- Set clock to correct time.

Tightening torque table ⇒ Page 37-119 onward.

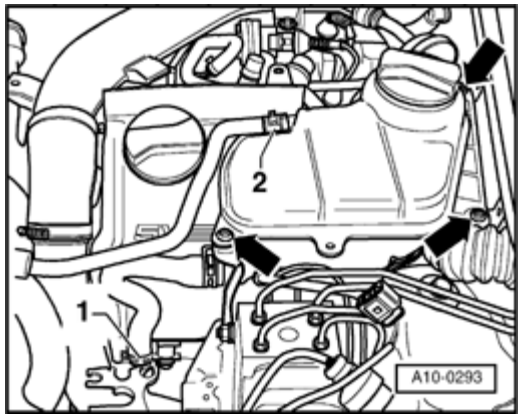
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**Removing and installing for 2.7 Liter 5V turbo engine:**



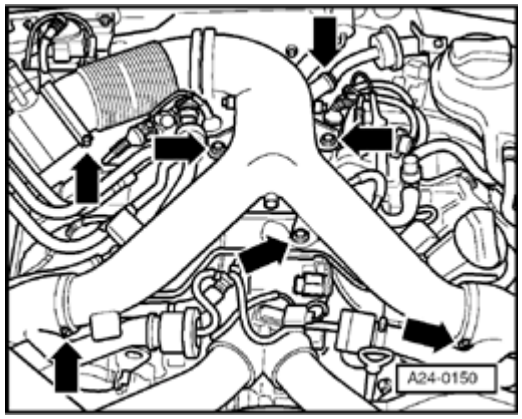

- Remove bolts (arrows) and remove engine covers -A- and -B-.
- Remove cover above air filter.



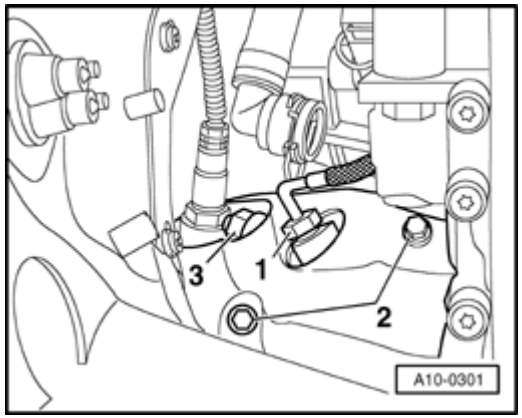

- Remove coolant expansion tank (arrows) and lay to side.
- Disconnect connector for coolant level display.
- Remove cover from valve cover (cylinder bank 4-6).

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37-100



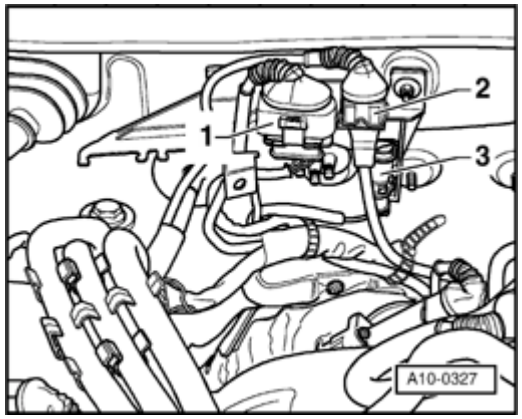

- Remove air distributor (arrows).



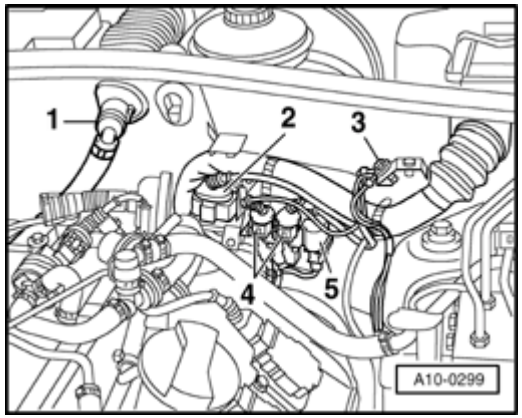

- Remove heat sensor -1- from right turbocharger using 3035.
- Remove heat shields -2- from left and right turbochargers.
- Remove upper bolts -3- to front line to left and right turbochargers.

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- Disconnect connector -1- for oxygen sensor (right side) at bulkhead.
- Expose wire with connector to oxygen sensor.

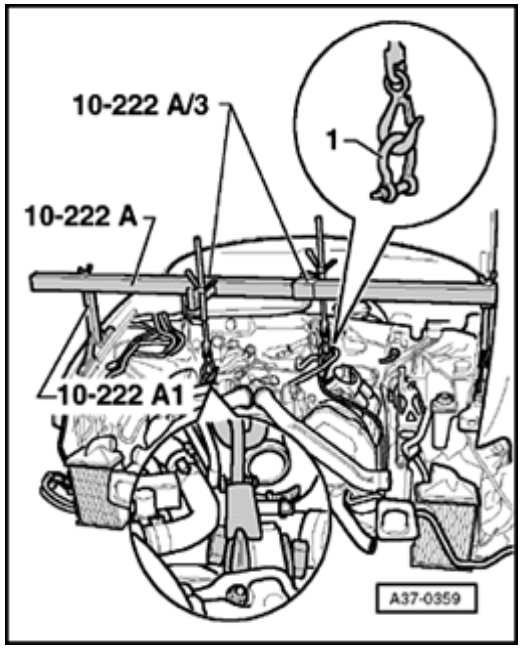



- Disconnect connectors -2- of left oxygen sensor at bulkhead and remove lower part of connectors from bracket.
- Expose wire with connector to oxygen sensor.
- Remove all connecting bolts for engine/transmission which can be reached from the top.

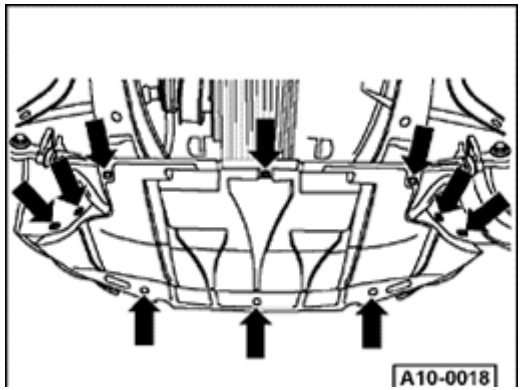
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- Assemble both 10-222A/3 engine support adapters for front and rear spindles on support bar.



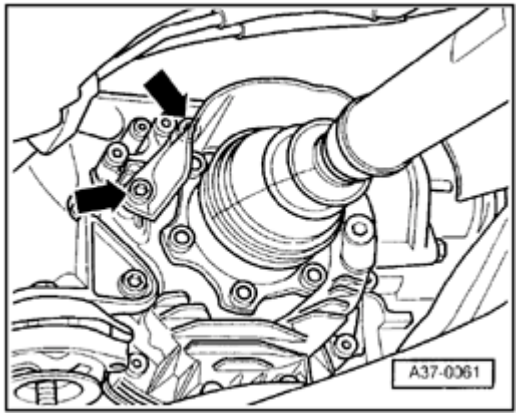

- Set 10-222A engine support bridge onto the fender mounting flanges using 10-222A/1 brackets.
- Hang both spindles on the adapters.
- Secure engine to spindles. To do so, additionally use a shackle -1- at the rear side of the engine to avoid damage.
- Take up weight of engine/transmission assembly on spindles.
- Tighten the rear spindle less, to enable later lowering at rear.
- Raise vehicle.
- Remove front wheels.




- Remove sound-deadening pan.
- Remove bracket for noise insulation panel.

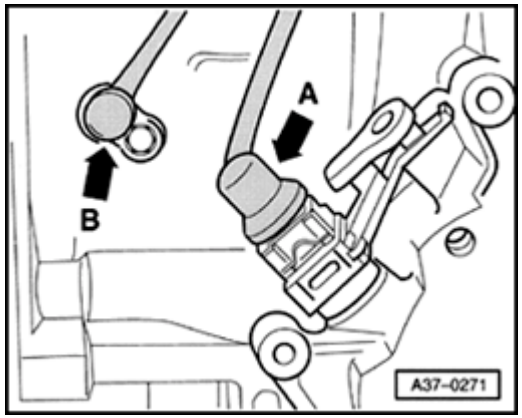
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**37-103**




- Remove left and right heat shields for drive axles (arrows).
- Disconnect drive axles from transmission drive flanges.

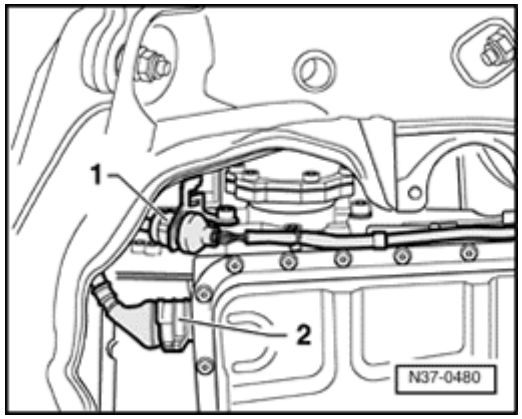
⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 40*



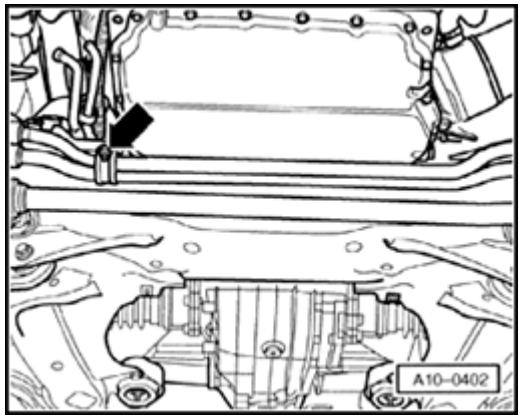

- Unbolt engine speed (RPM) sensor -G28- (arrow B) from transmission at front left.
- Remove connector for speedometer (arrow -A-) from transmission.

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- Disconnect connector -1- from wire for multi-function switch.
- Swing securing lever -2-, disconnect connector for transmission wiring harness.



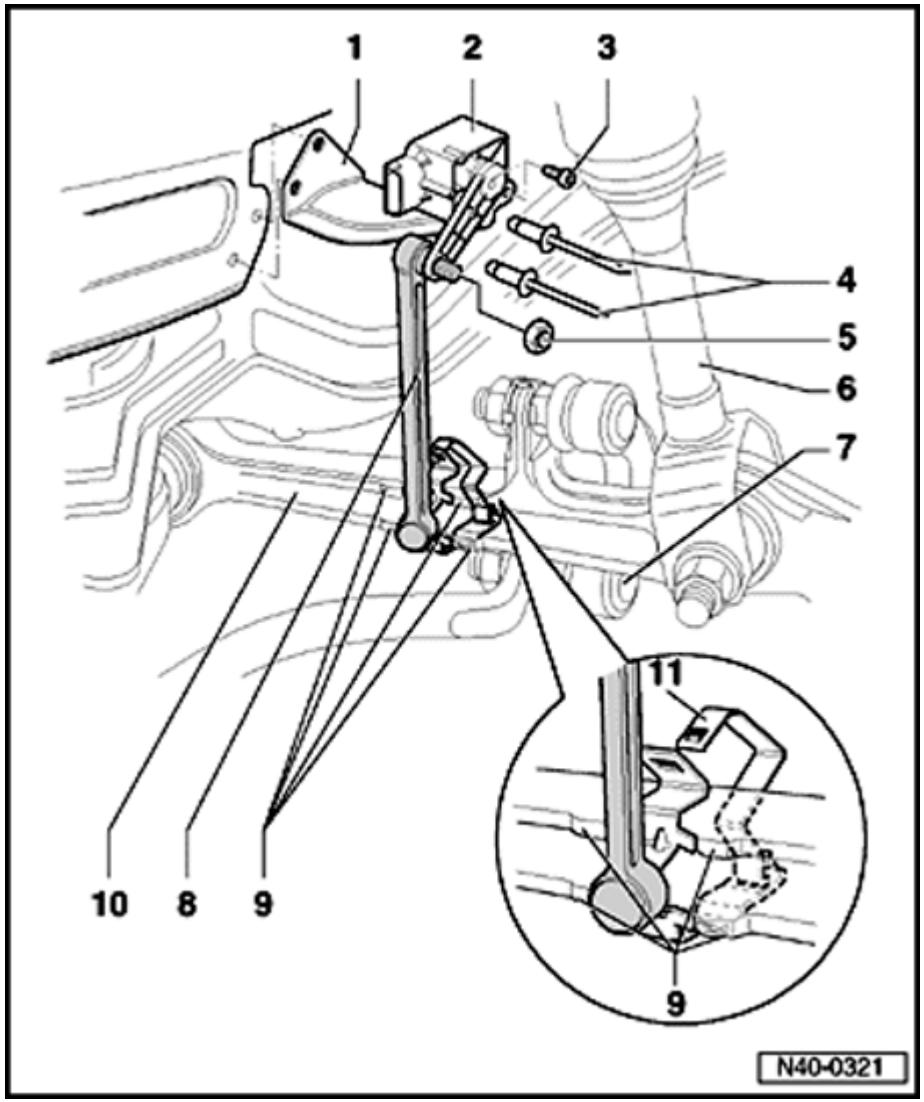

- If necessary, remove A/C line from oil pan (arrow) for better access to the starter.

***WARNING!***

***Do not open refrigerant circuit for A/C system.***

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For vehicles with the illustrated vertical headlight aim control system, notes in the following repair manuals must be observed before lowing subframe;

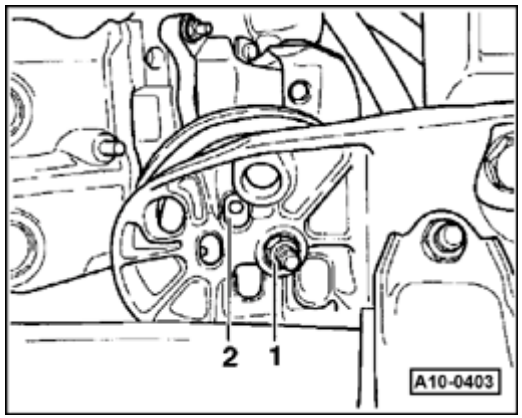
⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 40; control arm removing and installing; sensor for vehicle leveling in vehicles with automatic vertical headlight aim control regulation.*

*Otherwise the sensor may be destroyed.*

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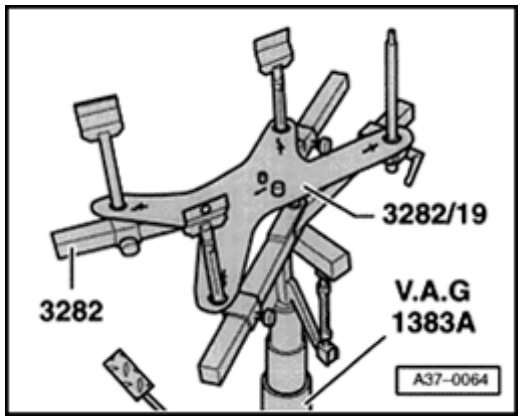
- Loosen left and right transmission mounts from subframe ⇒ page 37-125




- Mark installation positions for threaded assemblies -1- and positioning sleeves -2-.
- Remove nuts -1- on left and right engine mounts.

***Note:***

*When installing, make sure that locating sleeves -2- engage again.*



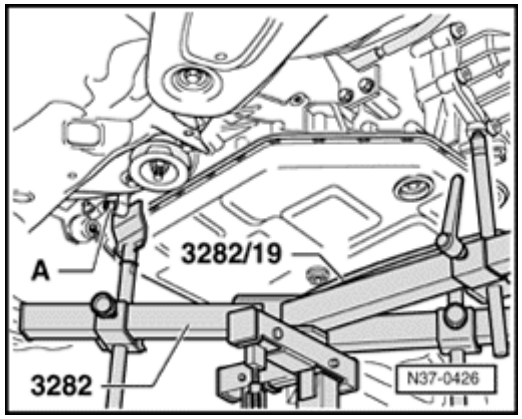

- Position 3282 transmission support.

Use 3282/19 adjustment plate to position the 3282 transmission support for Automatic Transmission 01V.

The symbols on the adjustment plate indicate the necessary mounts and the arrow points toward front of vehicle.

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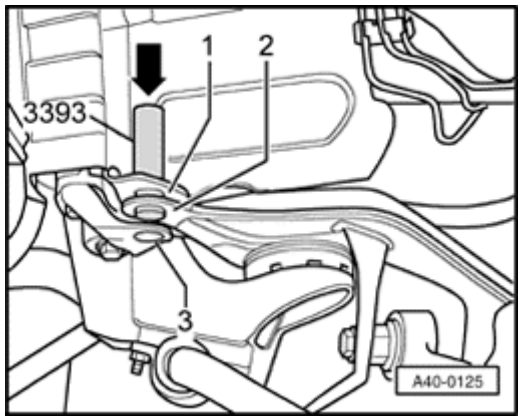



- Roll VAG1383A engine/transmission hoist with 3282 transmission support under transmission and support transmission.
- Align adjustment plate parallel to transmission.
- Secure transmission on 3282 transmission support using bolt -A-.

*Automatic Transmission 01V with All Wheel Drive is supported at the same positions as the Front Wheel Drive version.*

***WARNING!***

***When working on the subframe, all precautions and notes which are listed in ⇒ Repair Manual, Suspension, Wheels, Steering must be must be observed.***

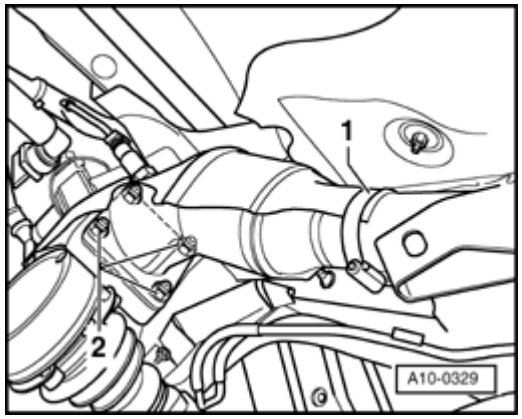



- Before loosening carrier, special tool 3393 must be used to check whether holes -1- and -2- line up.
- Completely lower subframe at rear and front.

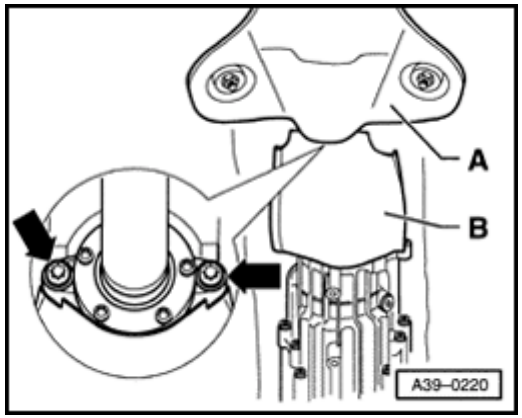
⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 40; Subframe, removing and installing*

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**37-108**




- Mark installation position of protector shield and hose clamp -1- at left and right exhaust pipe using a waterproof marker, to quickly find the correct installation position when re-installing.
- Remove hose clamp -1- from left and right protector shield for turbocharger.
- Unbolt left and right exhaust pipes -2- from turbocharger.



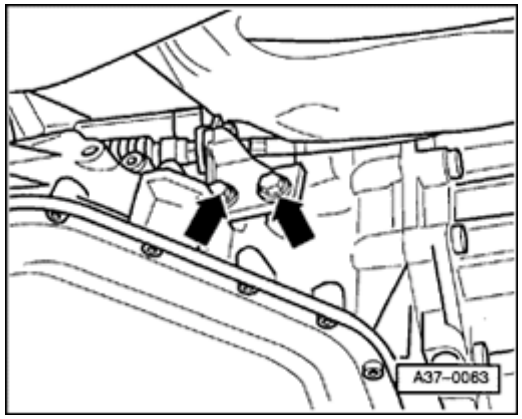

- Remove heat shield -A- above driveshaft.
- Remove rear part of exhaust system if necessary:

⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system.*

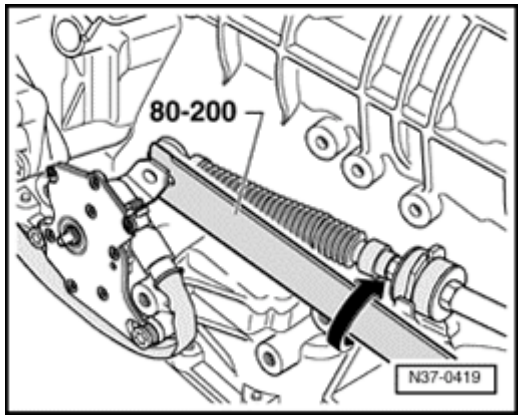
- Remove heat shield -2- for driveshaft from cover for Torsen differential (arrows).
- Unbolt driveshaft from transmission and hang or support.

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**37-109**




- Mark position of mounting bracket for selector lever cable to transmission housing for re-installation, unbolt mounting bracket (arrows).

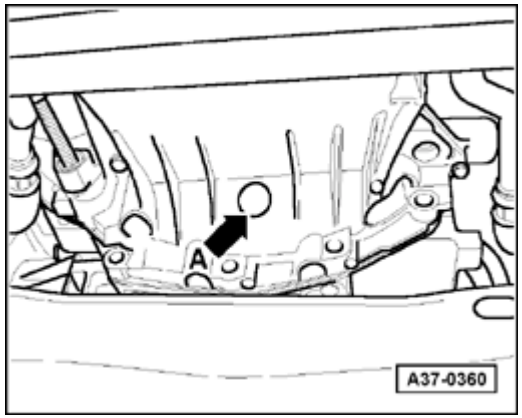



- Pry off selector lever cable from lever/shift rod using 80-200 (arrows).

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### Removing 3 torque converter bolts

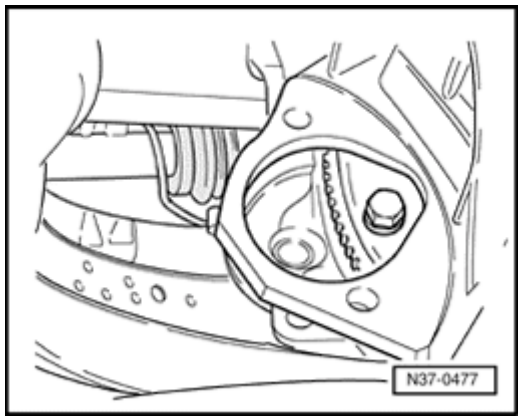



- Remove plug above opening -A- in engine flange.
- Remove torque converter bolts from drive plate via opening -A- in engine flange (turn crankshaft 1/3 rotation each time).

If opening -A- is not present, perform the following two work steps to be able to remove the 3 bolts of the torque converter.

- Remove starter.

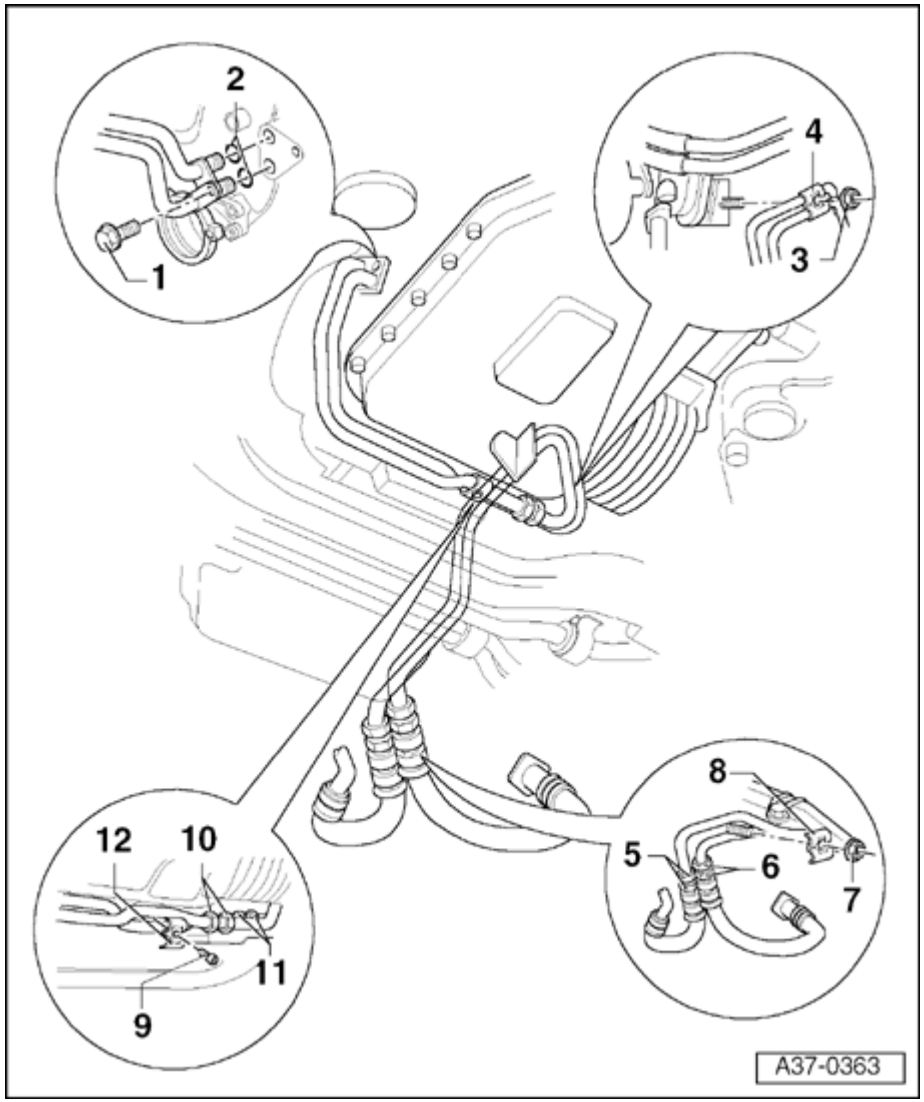
⇒ *Repair Manual, Electrical Equipment, Repair Group 27; Starter, removing and installing*




- Remove torque converter from drive plate by removing 3 bolts using special tool V175 (turn crank shaft an additional 1/3 turn every time).

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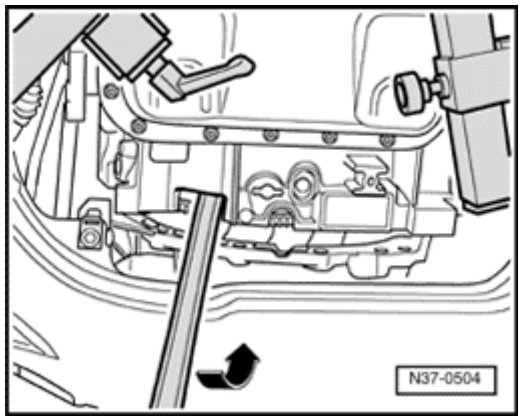

- Remove bolt -9- with bracket -12-.
- Disconnect ATF lines at bolts -10- and -11- and plug the lines with clean plugs.
- Loosen nut -3- with bracket -4- in order to prevent tension when removing and installing.

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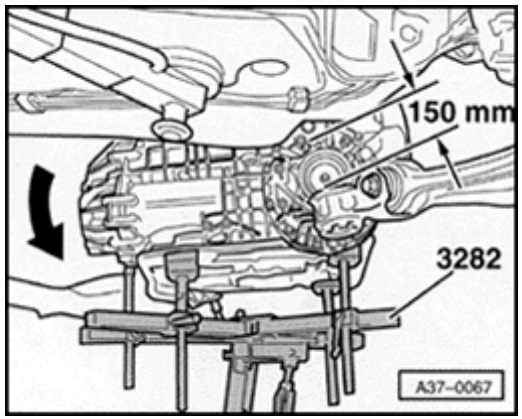
37-112

- Remove remaining connection bolts for engine/transmission.

- Press transmission off engine, while pressing torque converter out of drive plate.




- Press torque converter against the ATF pump (arrow).




- Rotate transmission (arrow) and carefully move into position between subframe and vehicle floor.
- Lower transmission.
- Secure converter so it does not fall out.

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37-113

**Installing**

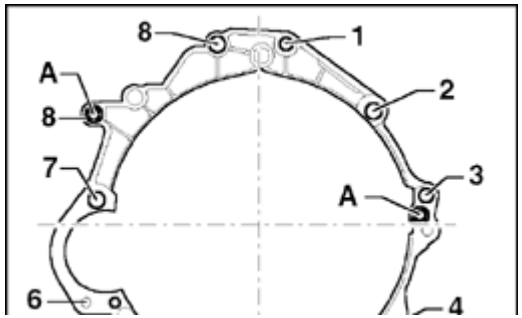
**Installation of transmission is the reverse of removal. The following points must also be observed:**

Before installing:

- Clean threads in driveshaft flange using a tap.
- Clean ATF lines ⇒ page 37-158 .
- Insert torque converter into transmission ⇒ page 32-8 .
- Make sure bushings are correctly seated.

***Note:***

*If the bushings get stuck in the transmission housing, they must be removed and new bushings must be installed on the engine.*

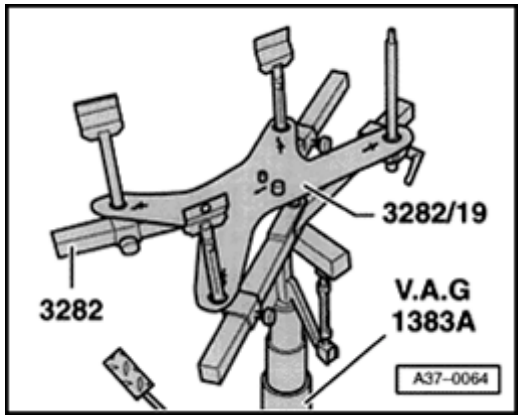



**For 2.7l 5V turbo engines**

Item A = bushings

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37-114

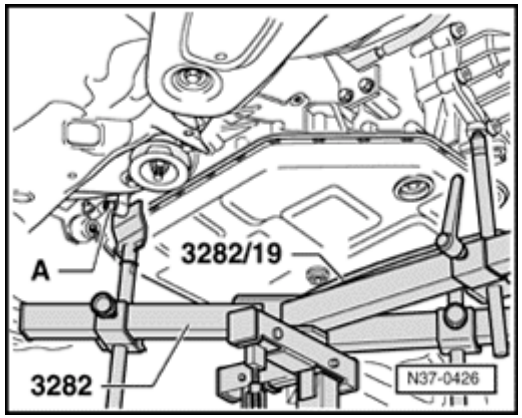



- Position 3282 transmission support.

Use 3282/19 adjustment plate to position the 3282 transmission support for Automatic Transmission 01V.

The symbols on the adjustment plate indicate the necessary mounts and the arrow points toward front of vehicle.

- Place transmission onto transmission support.



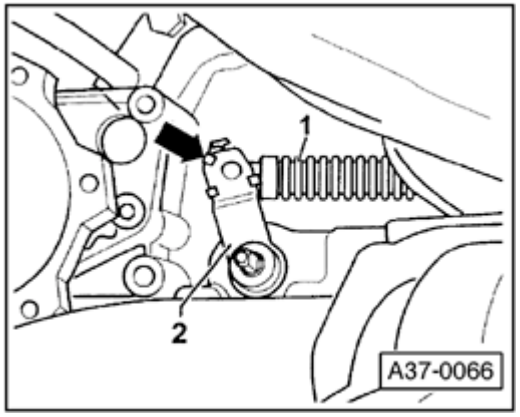

- Secure transmission on 3282 transmission support using bolt -A-.
- Move transmission into position between the lowered subframe and vehicle floor.

During this, the subframe is lowered approx. 150 mm at rear ⇒ page 37-88 , illustration A37-0067.

- Align transmission properly to engine.

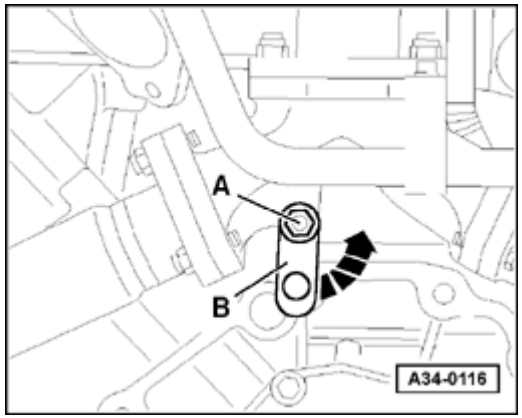
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**37-115**




- Press the lever/shift rod -2- at transmission completely toward rear (toward right in illustration) until park lock is engaged.
- Shift selector lever into "P" and carefully press up ball head of selector lever cable on lever/shift rod -2- using a pair of pliers.

***Note:***




*Do not deform lever/shift rod when pressing up or else shifting cannot be precisely adjusted any more.*

***Note:***

- *Place intermediate plate onto bushings.*
- *Make sure that wires do not get pinched as transmission is docked at engine.*

Check whether the torque converter is still properly installed and has not slid out of the converter housing toward the font:

- It must be possible to easily turn torque converter by hand without much force.

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37-116

***WARNING!***

***In case of an incorrectly inserted torque converter, the coupling plate of the torque converter or the ATF-pump will be destroyed, if the transmission is flanged to the engine.***

- If the torque converter is difficult to move, check installation dimension once again ⇒ page 32-8 .

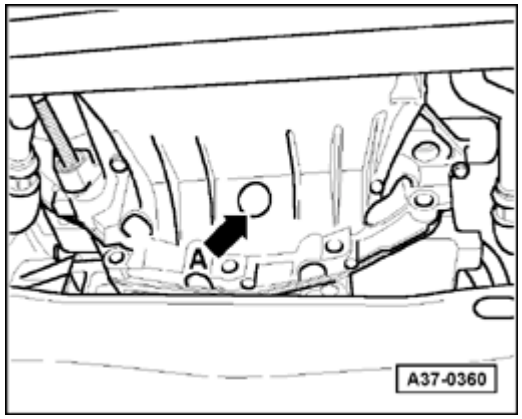
- Install connecting bolts for engine/transmission.

***Note:***

*Some bolts also have a bracket or a Ground (GND) connection attached ⇒ refer to tightening torque tables starting ⇒ page 37-119 onward.*

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37-117



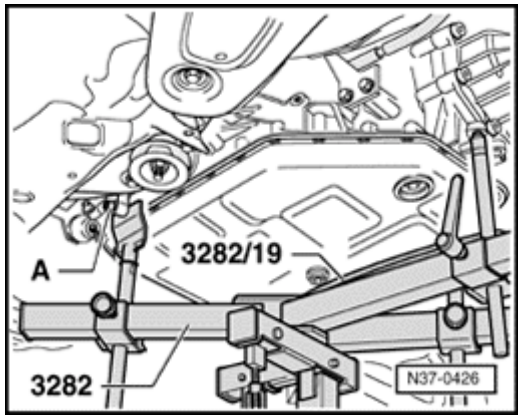

- Install bolts of torque converter through opening -A- in engine flange to the drive plate (turn crankshaft 1/3 rotation each time).
- Insert plug into opening -A- in engine flange.
- Install subframe, observe tightening sequence and alignment with master hole.

⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 40; Subframe, removing and installing*

- Only perform vehicle alignment if necessary.

⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 44, Vehicle alignment*

- Install transmission supports at left and right with transmission mount ⇒ page 37-125




- Remove bolt -A- after transmission is bolted to engine.
- Apply corrosion protection to contact surface between bolt -A- and oil pan.
- Bolt on ATF lines ⇒ page 37-149

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**37-118**

- Bolt drive axles to transmission flanges.

⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 40*

- Bolt driveshaft to transmission flange ⇒ page 39-79 , Driveshaft, removing and installing.

- After connecting battery, enter anti-theft code for radio.

⇒ *Radio operating manual*

- Check adjustment of selector lever cable ⇒ page 37-45 .

- Check gear oil in final drive with transmission installed ⇒ page 39-1 .

- Then check ATF level and top off ⇒ Page 37-133 onward.

- Fully close power windows to stop.

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- Then activate all power window switches ("up") for at least one second to activate automatic window raising/lowering.

- Set clock to correct time.

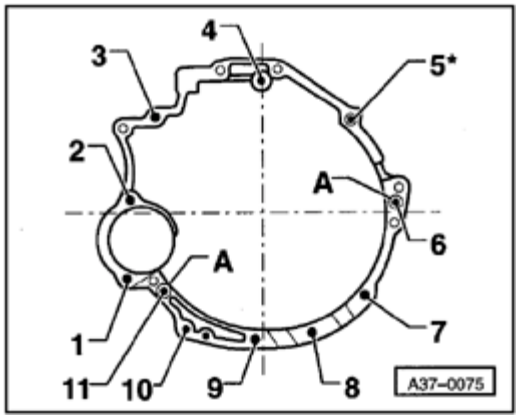
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37-119

## Tightening torques

***Notes:***

- *Tightening torques are valid only for nuts and bolts that are lightly greased, oiled, covered with a thin coat of phosphate or blackened.*
- *Other lubricants are permitted, e.g. engine oil or transmission fluid, however they may not contain graphite.*
- *Do not use any degreased parts.*




Engine/transmission mount for 4 cylinder engines (5 valve, turbo)

| Item no. | Bolt | Nm |
|---|---|---|
| 1, 8, 9, 10 | M10 X 45 | 45 |
| 2, 3, 4, 11 | M12 X 67 | 65 |
| 5 | M12 x 110 | 65 |
| 6 | M12 x 90 | 65 |
| 7 [1)] | M10 x 60 | 45 |

[1)] With nut

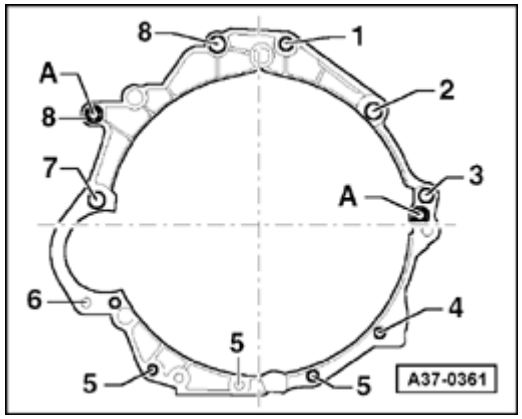
Item A = bushings

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Bolts -3- and -5- also secure a bracket for cables.

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37-120




Engine/transmission mount for 6 cylinder gasoline engines except for 2.7 Liter 5V turbo engine

| Item no. | Bolt | Nm |
|---|---|---|
| 1 | M12 X 67 | 65 |
| 2 | M12 x 90 | 65 |
| 3 | M12 x 75 | 65 |
| 4 [1)] | M10 x 60 | 45 |
| 5 | M10 X 45 | 45 |
| 6 | M10 x 80 | 65 |
| 7 [2)] | M12 x 110 | 65 |
| 8 | M12 X 67 | 65 |

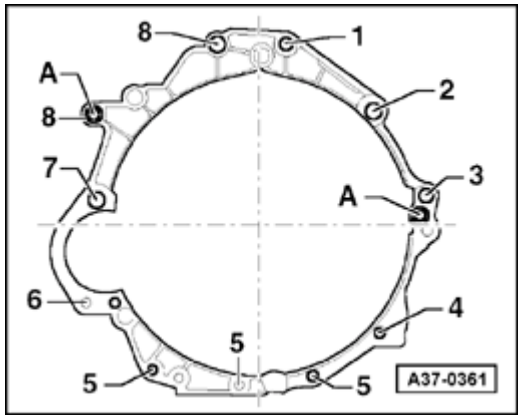
[1)] With nut

[2)] With bracket for ATF- lines

Item A = bushings

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37-121




Engine/transmission mount for 6 cylinder TDI engines

| Item no. | Bolt | Nm |
|---|---|---|
| 1 3) | M12 x 80 | 65 |
| 2 4) | M12 x 90 | 65 |
| 3 | M12 x 75 | 65 |
| 4 1) | M10 x 60 | 45 |
| 5 | M10 X 45 | 45 |
| 6 | M10 x 80 | 65 |
| 7 2) | M12 x 110 | 65 |
| 8 2) | M12 X 67 | 65 |

1) With nut

2) With bracket for ATF- lines

3) With bracket for turbocharger

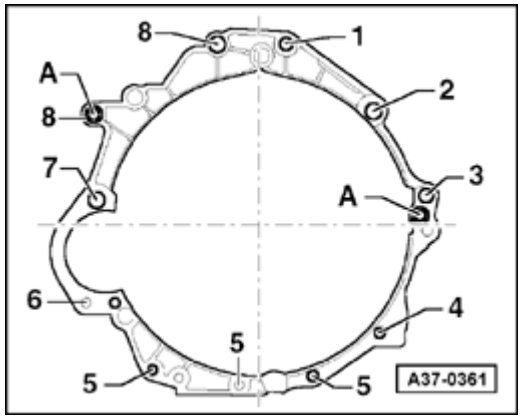
4) With bracket for cables

5) With additional Ground (GND) connection

Item A = bushings

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37-122




Engine/transmission mount for 2.7l 5V turbo engines

With 11 mm intermediate plate

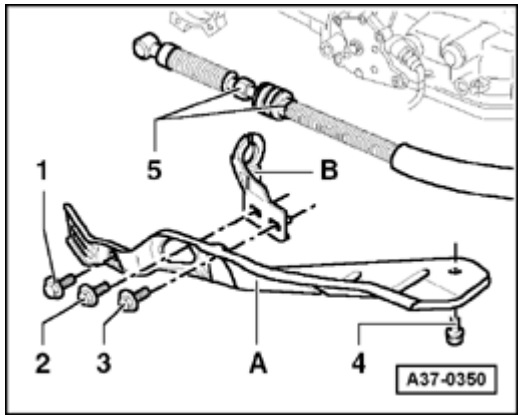
| Item no. | Bolt | Nm |
|---|---|---|
| 1 | M12 x 90 | 65 |
| 2 | M12 x 100 | 65 |
| 3 | M12 x 90 | 65 |
| 4 [1)] | M10 x 70 | 45 |
| 5 | M10 x 60 | 45 |
| 6 | M10 x 100 | 65 |
| 7 | M12 x 110 | 65 |
| 8 | M12 x 80 | 65 |

[1)] With nut

Item A = bushings

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37-123




**Valid for all engine/transmission types:**

| Components | | Tightening torques |
|---|---|---|
| Mounting bracket to transmission (2x M8), item no. 2 and 3 | | 23 Nm |
| Heat shield/selector lever cable to transmission, item no. 1 | | |
| | M6 | 9 Nm |
| | M8 | 23 Nm |
| Heat shield/selector lever cable to transmission, M8, item no. 4 | | 23 Nm |
| Selector lever cable to mounting bracket -B-, item no. 5 | | 12 Nm |

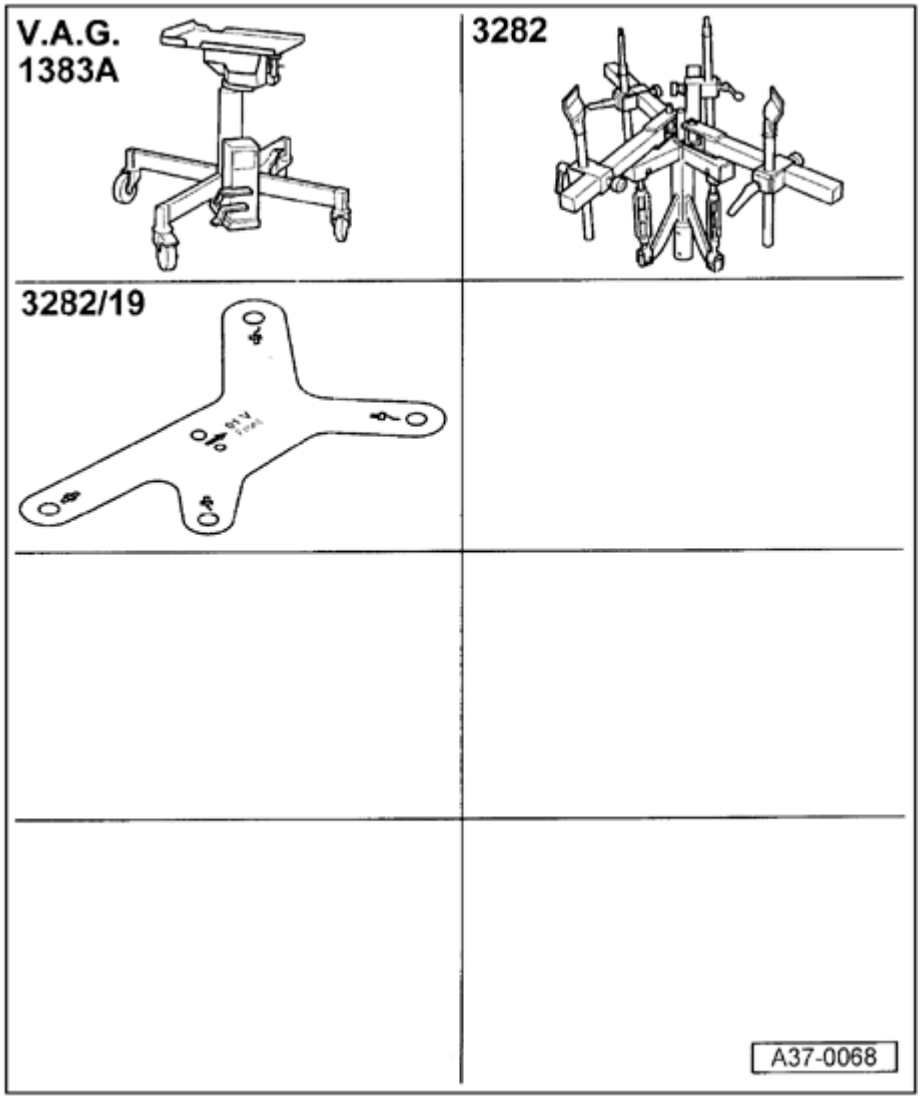
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| Component | | Nm |
|---|---|---|
| Nuts/Bolts | M6 | 10 |
| | M8 | 20 |
| | M10 | 45 |
| | M12 | 65 |
| Except for the following: | | |
| Drive plate to Torque converter | M10 x1 | 85 |
| Installing ATF lines | | Page ⇒ Page 37-149 onward |
| multi-function Transmission Range (TR) switch -F125- to transmission | | 8 |
| Three Way Catalytic Converter (TWC) to mounts | | 25 |
| Bracket for noise insulation to subframe | | 10 |
| Heat shield for drive axle | | 25 |
| Heat shield to turbocharger | | 10 |

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37-125




## Right and left transmission mounts, removing and installing

### Special Tools and equipment

- Engine/transmission support VAG1383A engine/gearbox jack
- 3282 transmission support
- 3282/19 adjustment plate

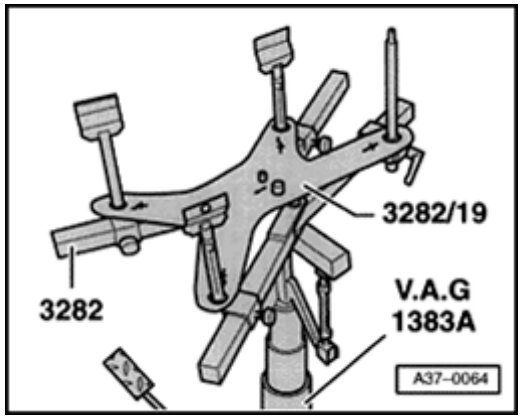
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37-126

**Removing**

***Note:***

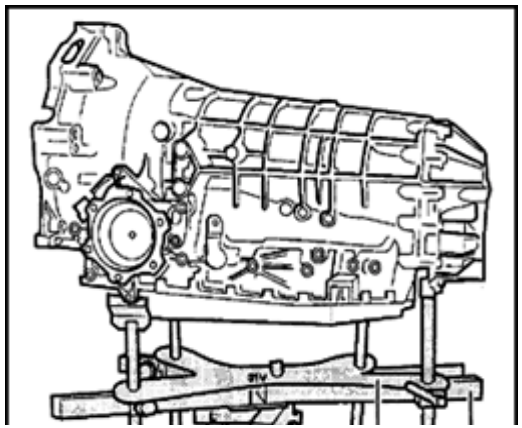
*Transmission must be supported as indicated when both transmission supports are removed. Transmission does not need to be supported this way when only one of the transmission supports is being removed.*




- Prepare 3282 transmission support for Automatic Transmission 01V with3282/10 adjustment plate and place it on the VAG1383A engine/transmission hoist.

***Note:***

*The symbols on the adjustment plate indicate the necessary mounts for Automatic Transmission 01V and the arrow points toward front of vehicle.*



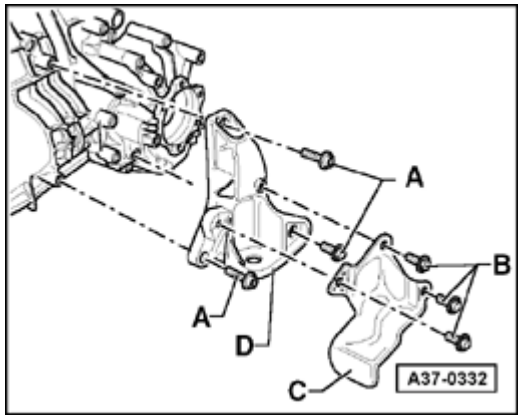
- Roll VAG1383A engine/transmission hoist with 3282 transmission support under transmission and support transmission.

***Note:***

*If 3282 transmission support is not available, transmission can be supported using the VAG1383A transmission lift and the 1359/2 universal mount.*

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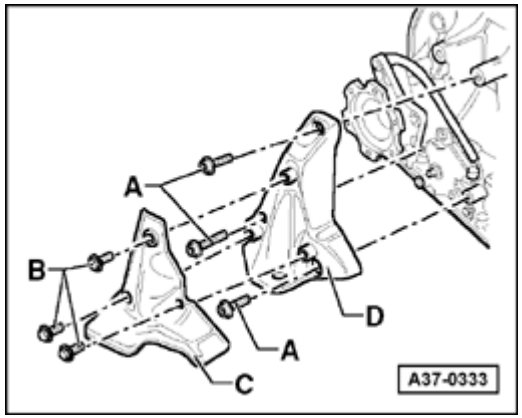

**Right transmission support**

- Remove heat shield -C-.

***Note:***

*The right heat shield is not installed on 6 cylinder TDI engines.*

- Remove right heat shield -D- by removing bolts -A- from transmission.




**Left transmission support**

- Remove heat shield -C-.

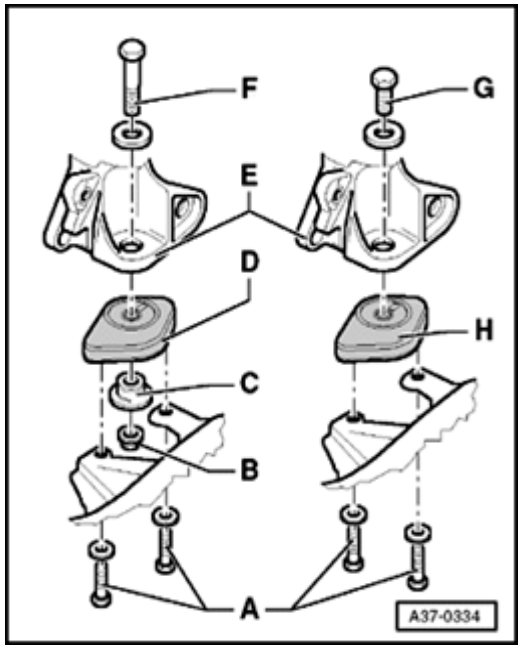
***Note:***

*The left heat shield is not installed on 4 cylinder gasoline engines.*

- Remove left heat shield -D- by removing bolts -A- from transmission.

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**Left and right transmission supports**

- Remove transmission supports -E-.

D - transmission mount (traditional)

H- hydraulic transmission mount

***Note:***

*Items -C- and -B- are not installed on vehicles with hydraulic transmission bearing -H-, because bolt -G- is threaded directly into the transmission bearing.*

**Installing**

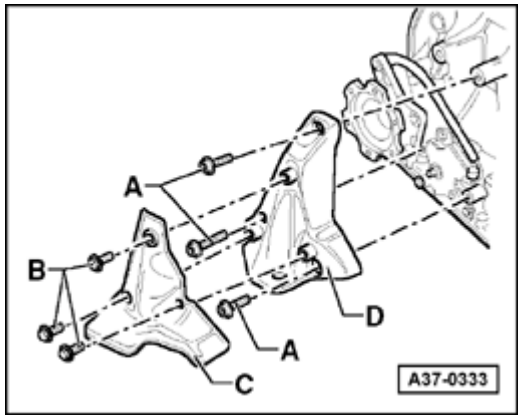
Installation is the reverse of removal.

**Tightening torques for left and right transmission supports**

| Item no. | Bolt | Number | Nm |
|---|---|---|---|
| A | M 8 x 22 | 2 each | 27 |
| B to F | M 10 x 70 | 1 | 50 |
| G | M 10 x 35 | 1 | 50 |

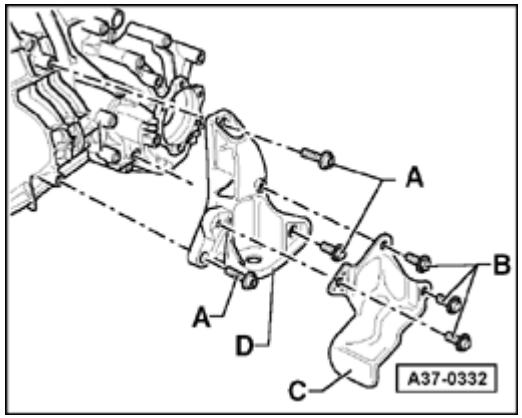
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**Tightening torques for left transmission support**

| Item no. | Bolt | Number | Nm |
|---|---|---|---|
| A | M 10 x 30 | 2 | 40 |
| | M 10 x 50 | 1 | |
| B | M 6 x 22 | 3 | 10 |




**Tightening torques for right transmission support**

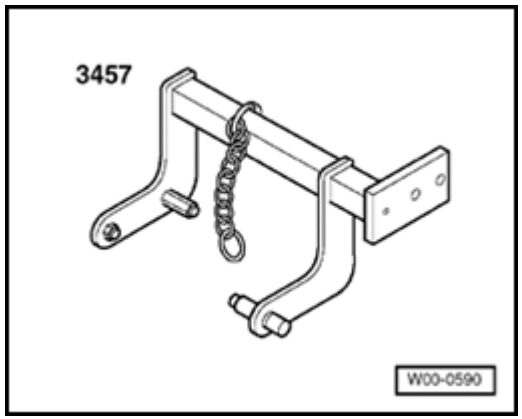
| Item no. | Bolt | Number | Nm |
|---|---|---|---|
| A | M 10 x 30 | 3 | 40 |
| B | M 6 x 22 | 3 | 10 |

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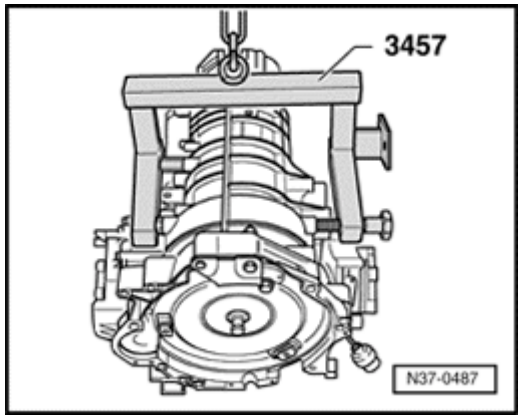
## Automatic transmission, transporting

### Special tools and equipment




- 3457 attachment and holding rig

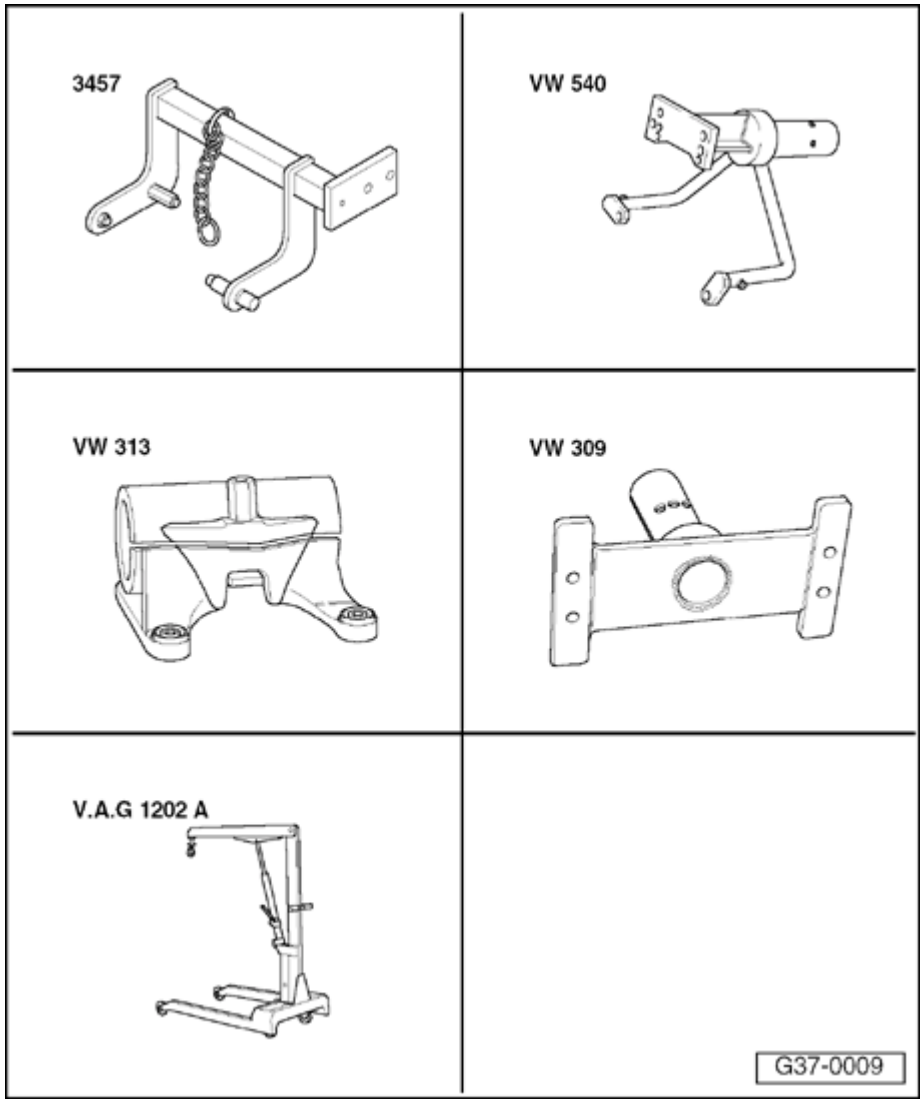
The 3457 attachment and holding rig can be used when transporting the transmission and for setting up the 3282 transmission support.




- Attach the 3457 attachment and holding rig at the transmission housing mounts and secure.

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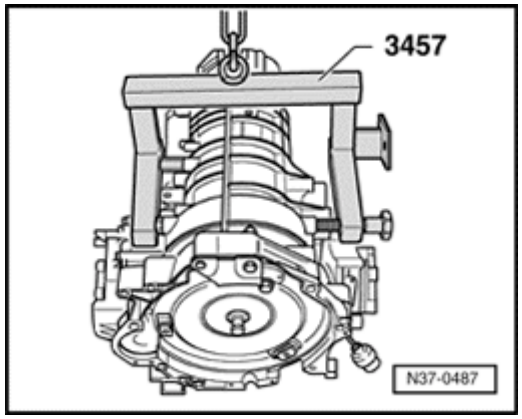

## Transmission, attaching to assembly stand

### Special Tools and equipment

- 3457 attachment and holding rig
- VW540 holding fixture (only for transmission with FWD)
- VW313 holding fixture
- VW309 holding plate
- VAG1202A engine hoist

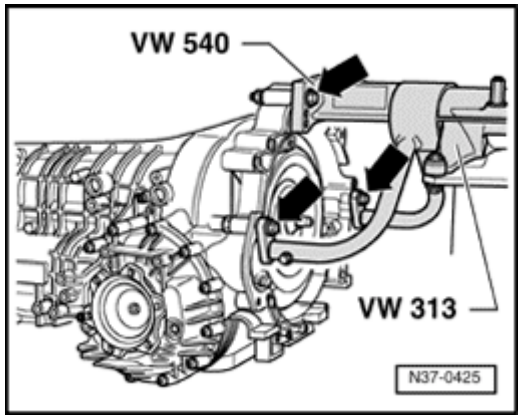
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- Attach the 3457 attachment and holding rig at the transmission housing mounts and secure.
- Bolt the attachment and holding rig to the VW 309 holding plate and place this into the VW313 holding fixture using a workshop crane.

For transmissions with Front Wheel Drive (FWD), the VW540 holding fixture can also be used to secure the transmission to the VW313 holding fixture.




- Secure transmission to VW540 holding fixture (arrows) and insert in VW313 holding fixture.

***WARNING!***

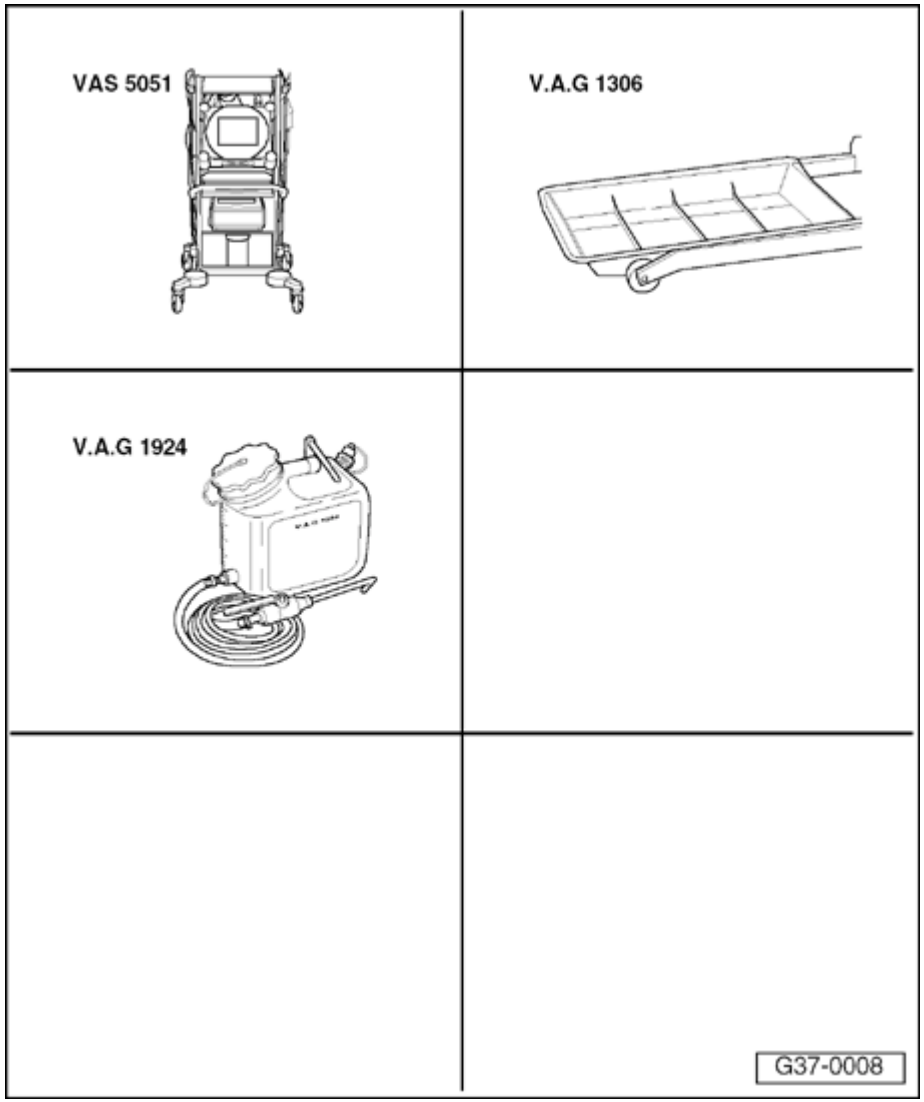
***The center of gravity of the transmission is located outside the turning center at holding fixture. To turn the transmission, a second technician must hold the transmission housing to prevent back-swing.***

***Note:***

*Vents for the transmission housing and final drive must be closed before turning a filled transmission on the assembly stand so that the oil pan faces upward .*

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# Automatic Transmission Fluid (ATF), checking and changing

## ATF level, checking

### Special Tools and Equipment

- VAS5051 tester with VAS5051/1 diagnostic cable (or VAG1551 scan tool with VAG1551/3 cable)
- VAG1306 drip tray
- VAG1924 ATF filler tool
- Protective glasses

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**37-134**

***Test requirements:***

- Transmission must not be in emergency running mode.
- Vehicle on level ground.
- Selector lever in "P", let engine run at idle.
- A/C system and heating switched off.
- ATF temperature must not be higher than 30° C at start of test, allow transmission to cool down if necessary.

***Notes:***

- *ATF level changes with ATF temperature.*
- *Performing ATF level check when ATF temperature is too low causes overfilling.*
- *Performing ATF level check when ATF temperature is too high causes insufficient filling.*
- *Excess filling and insufficient filling both affect*

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*the function of the transmission.*

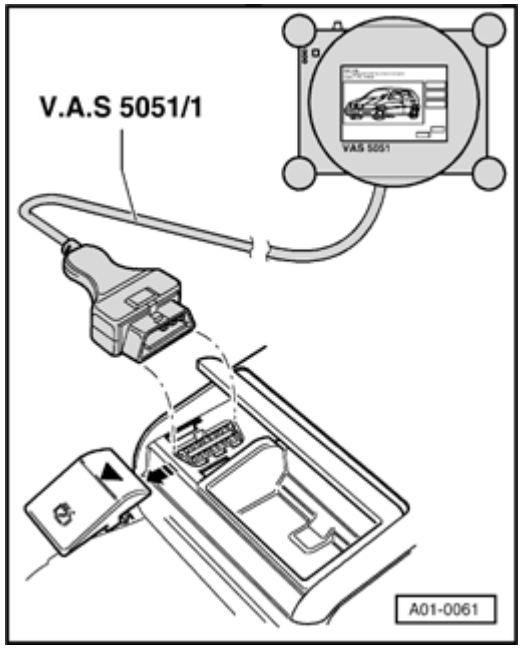
- *An extra ATF check must be performed for vehicles with auxiliary ATF cooler ⇒ page 37-138*

- *The ATF temperature is read out by the VAS5051 tester or VAG1551 Scan Tool (ST).*

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37-135

## Checking ATF temperature




- Connect VAS5051 tester to vehicle with VAS5051/1 diagnostic wire. Alternately, VAG1551 Scan Tool (ST) can also be attached using VAG1551/3 adapter.

⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V On Board Diagnostic (OBD), Repair Group 01, Performing On Board Diagnostic (OBD)*

- Start engine.

| | |
|---|---|
| **Rapid data transfer** | **HELP** |
| **Select function XX** | |

When indicated on display:

- Press buttons -0- and -8- to select "Read measuring value block" and press -Q- button to confirm input.

| | |
|---|---|
| **Read measuring value block** | **Q** |
| **Enter display group number XXX** | |

When indicated on display:

- Press buttons -0-, -0- and -4- to select display group "004" and press -Q- button to confirm input.

| | |
|---|---|
| **Read measuring value block** | **4** → |

When indicated on display:

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- Read ATF temperature in display field 1.

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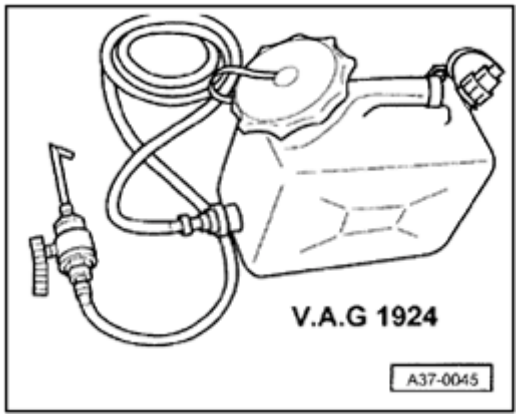
37-136

## Checking and correcting ATF level

***Notes:***

- *ATF level is checked at the ATF check plug.*
- *ATF level is correct if a little bit of fluid still escapes at the ATF check plug between 35 °C and 45 °C [1] (dependant on the fluid level when warming up).*

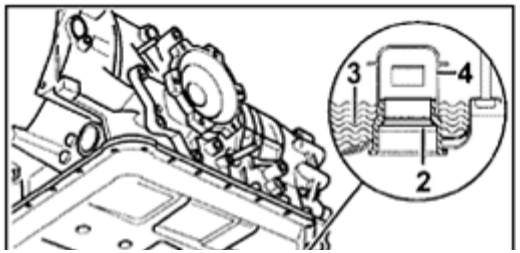
[1] For warm countries 50 °C




- Secure container of VAG1924 ATF filler tool as high up on vehicle as possible.
- Raise vehicle.
- Place VAG1306 drip tray under transmission.

***WARNING!***

***Wear protective glasses.***




- Once an ATF temperature of 35 °C is reached, remove ATF check plug -2- and drain excess ATF if necessary.

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37-137

- If ATF exits from the ATF filler plug hole before the ATF reaches 40 °C, the ATF level is OK.

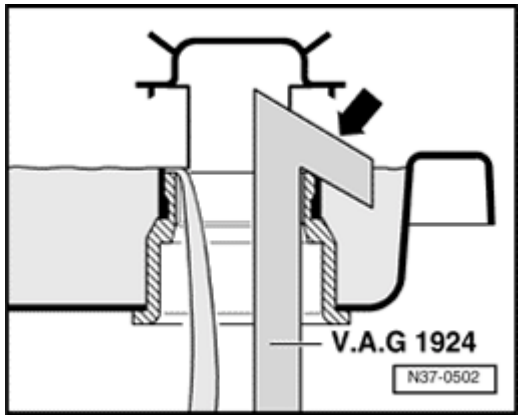
***Note:***

*ATF check plug must be closed again by 45 °C [1] at the latest ⇒ page 37-137 .*

[1] For warm countries 50 °C

- Add ATF if no ATF has escaped from the ATF check plug hole by 40 °C.

- Insert VAG1924 ATF filler tool into an opening -4- in the protective cap, but do not knock cap upward.




- Fill with ATF using VAG1924 ATF filler tool until ATF exits from the check hole.

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- Always replace seal (arrow) for ATF check plug.
- Tighten ATF check plug to 80 Nm.
- → Press button on VAG1551.
- Press buttons -0- and -6- to select "End output" and press -Q- button to confirm input.

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37-138

## ATF level, checking (vehicles with auxiliary ATF cooler)

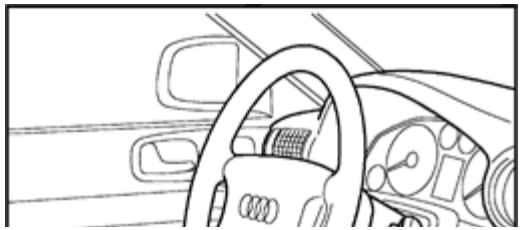
This test must be performed after auxiliary ATF cooler has been emptied or when it has been replaced. Installation position of the auxiliary ATF cooler ⇒ page 37-157 , item A.

***Test requirements:***

- Transmission must not be in emergency running mode.
- ATF is filled up ⇒ 37-140
- Selector lever in "P", let engine run at idle.
- A/C system and heating switched off.

♦ *The ATF temperature is read out by the VAS5051 tester or VAG1551 Scan Tool (ST).*

**Checking ATF temperature**



- Connect VAS5051 tester to vehicle with VAS5051/1 diagnostic wire. Alternately, VAG1551 Scan Tool (ST) can also be attached using VAG1551/3 adapter.

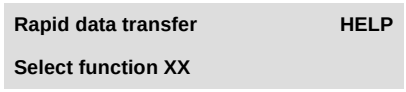
⇒ *Repair Manual, 5 Spd. Automatic Transmission 01V On Board*

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*Diagnostic (OBD), Repair Group 01, Performing On Board Diagnostic (OBD)*

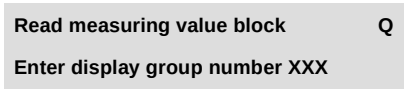
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- Start engine.



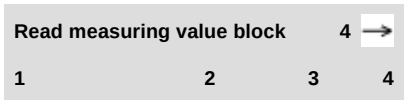

When indicated on display:

- Press buttons -0- and -8- to select "Read measuring value block" and press -Q- button to confirm input.




When indicated on display:

- Press buttons -0-, -0- and -4- to select display group "004" and press -Q- button to confirm input.




When indicated on display:

- Read ATF temperature in display field 1.
- Let engine run until ATF temperature has reached at least 85 ° C, a road test may be necessary to reach this temperature.

***Note:***

*The thermostat at the opening for the auxiliary ATF cooler does not open until 80 ° C so that the cooler can fill up with ATF.*

*The content of the auxiliary ATF cooler is 140 ml. of ATF.*

- Switch off engine and let ATF cool down again until temperature has fallen below 35 ° C.
- Check ATF level ⇒ page 37-133 .

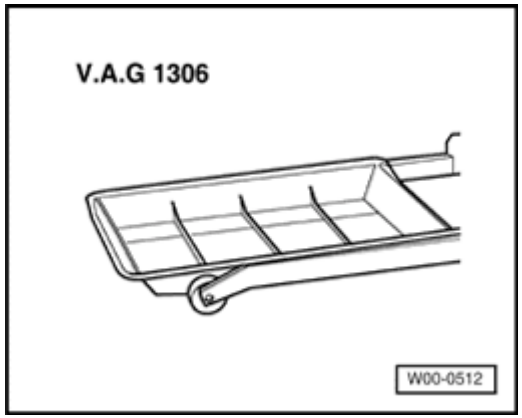
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37-140

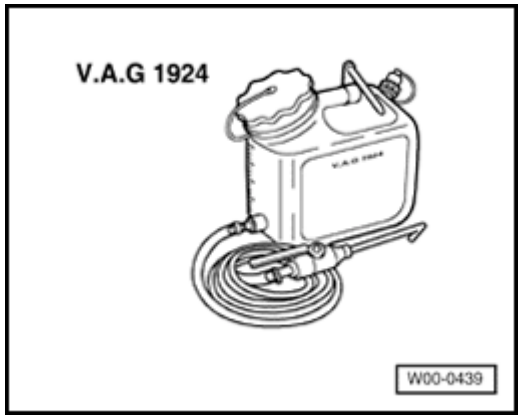
## ATF, changing or topping off after repair work

- Engine switched off.

### Special tools and equipment



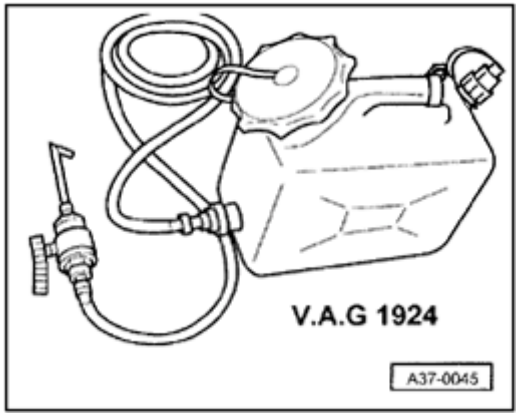

- VAG1306 drip tray




- VAG1924 ATF filler tool

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**37-141**

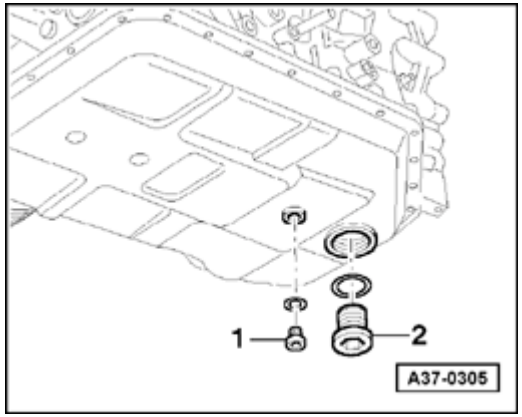



- Secure container of VAG1924 ATF filler tool as high up on vehicle as possible.
- Raise vehicle.

***Notes:***

- *Observe disposal regulations.*
- *Engine must not be started without ATF and vehicle must not be towed!*

- Place VAG1306 drip tray under transmission.




- Remove ATF drain plug -1- and drain ATF.

***Note:***

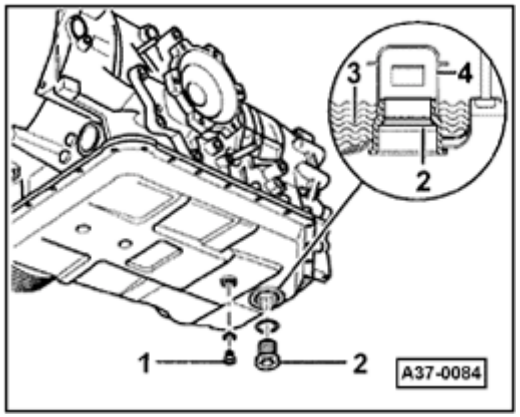
Drain plug and oil seal must both be replaced.

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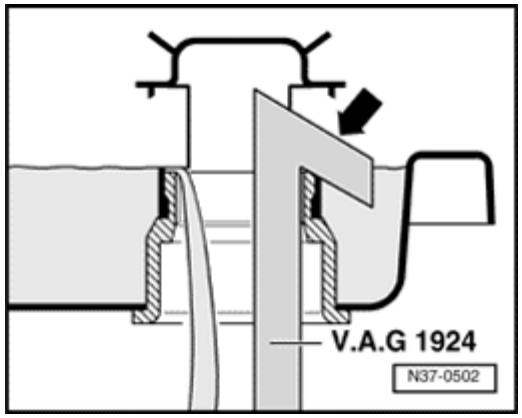
**37-142**

- Tighten ATF drain plug to 40 Nm.

- Remove ATF check plug -2-.




- Insert VAG1924 ATF filler tool into an opening -4- in the protective cap, but do not knock cap upward.




- Fill with ATF using VAG1924 ATF filler tool until ATF exits from the check hole.
- Shift selector lever into position "P".
- Start engine.
- Keeping the brake pedal depressed, shift into all selector lever positions at idle speed. Each position must remain selected for at least 10 seconds.
- Shift selector lever into position "P".
- Check ATF level and top off ⇒ Page 37-133 onward.

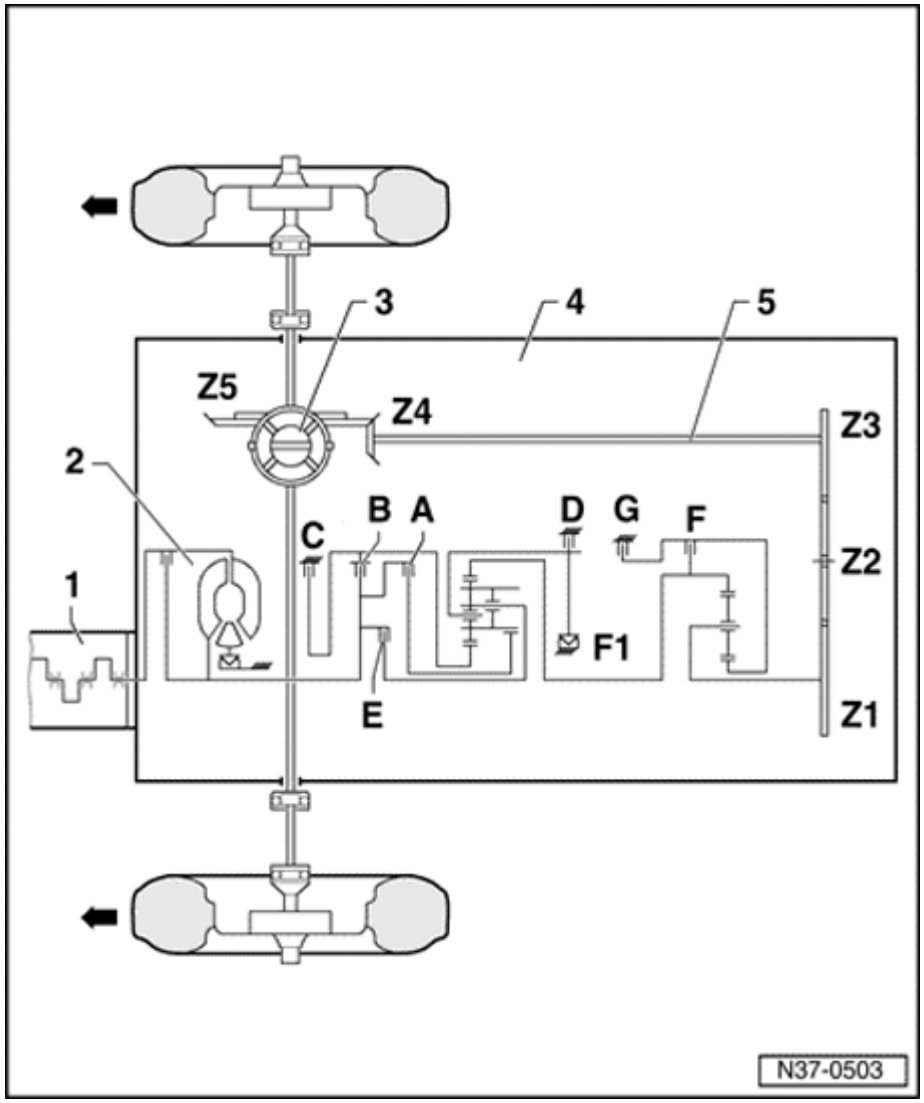
***Note:***

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*Observe all notes and test requirements for "Checking ATF level".*

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37-143




# Power transfer, overview

## Transmission diagram (Front Wheel Drive (FWD) vehicles)

**A - Clutch A**

**B - Clutch B**

**E - Clutch E**

**F - Clutch F**

**C - Brake C**

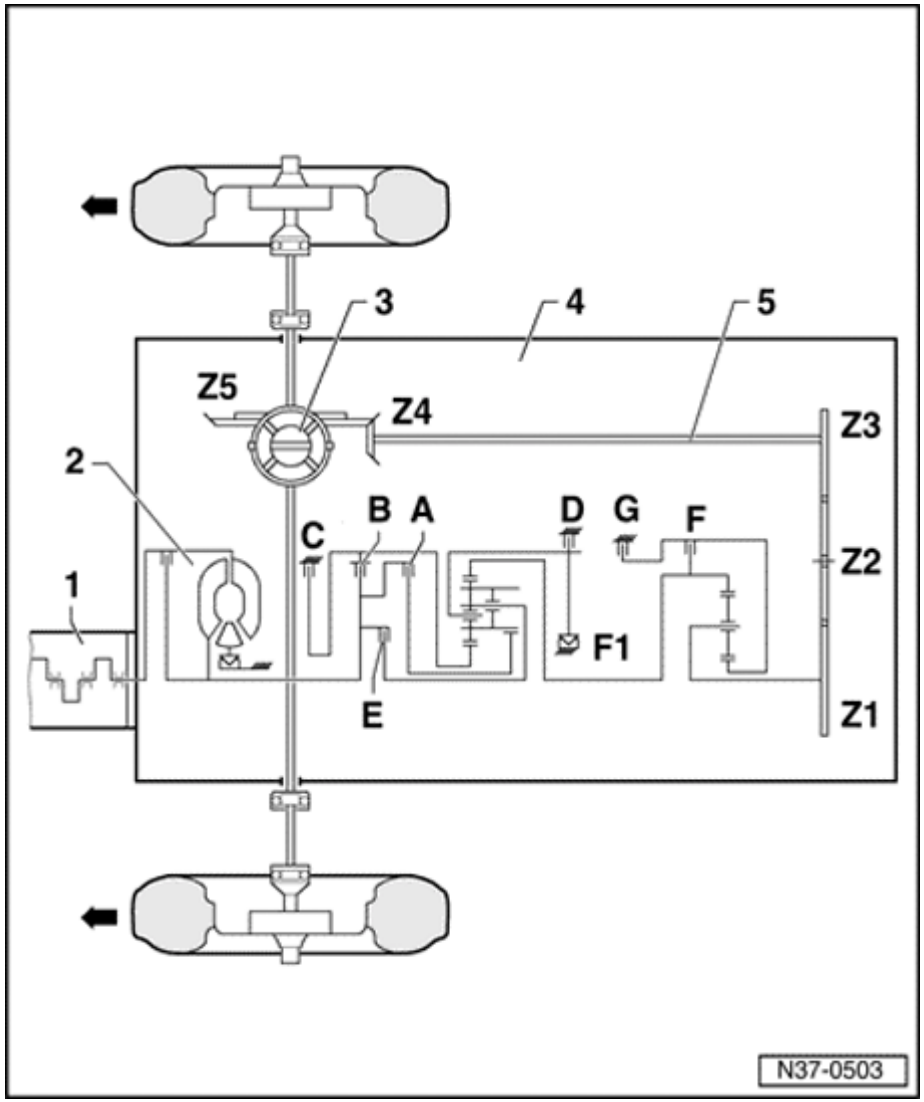
**D - Brake D**

**G - Brake G**

**F1 - Freewheel 1**

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37-144




**1 - Engine**

**2 - Torque converter with lock-up clutch**

**3 - Differential**

**4 - Automatic transmission**

**5 - Drive pinion**

Z1, Z2 and Z3 = spur gears of intermediate drive; ratio ⇒ page 00-4

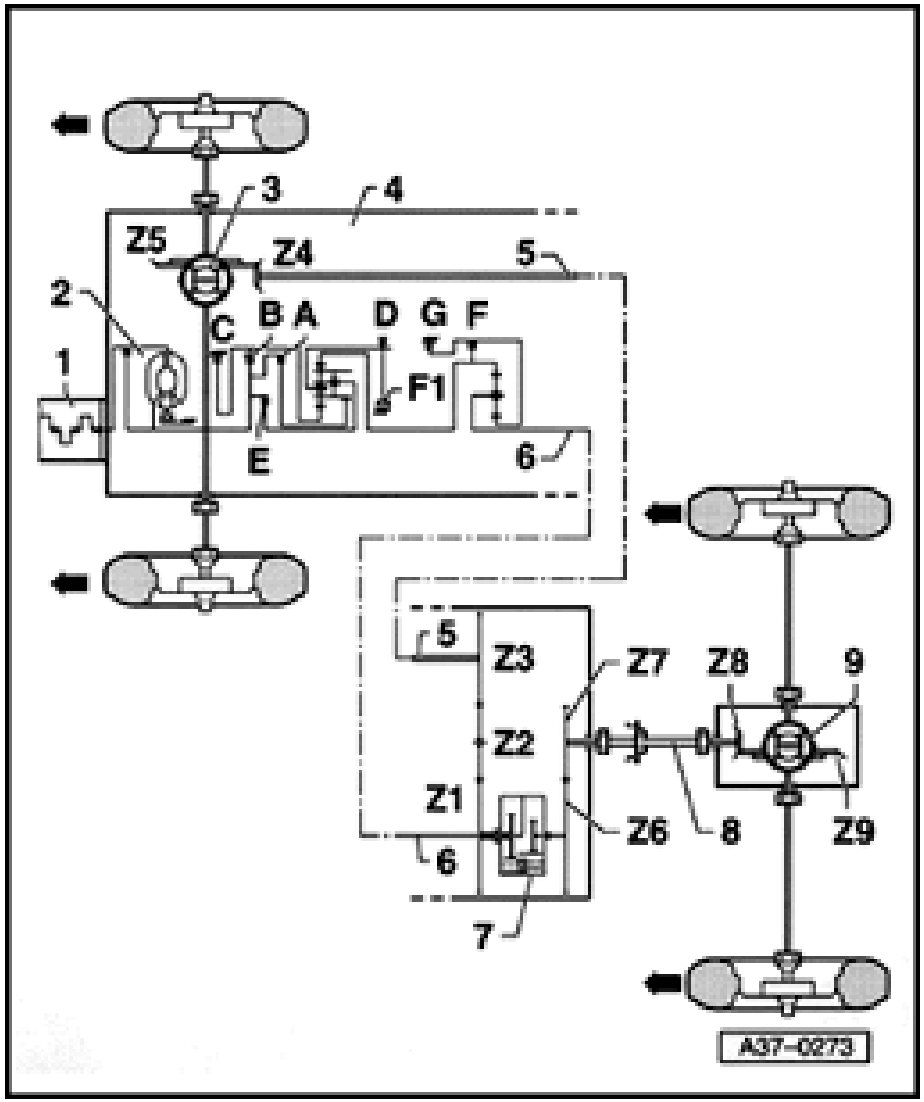
Z4, Z5 = ring gear, ratio ⇒ page 00-4

***Note:***

*Arrows point in direction of travel.*

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## Transmission diagram (All Wheel Drive (AWD) vehicles)

**A - Clutch A**

**B - Clutch B**

**E - Clutch E**

**F - Clutch F**

**C - Brake C**

**D - Brake D**

**G - Brake G**

**F1 - Freewheel 1**

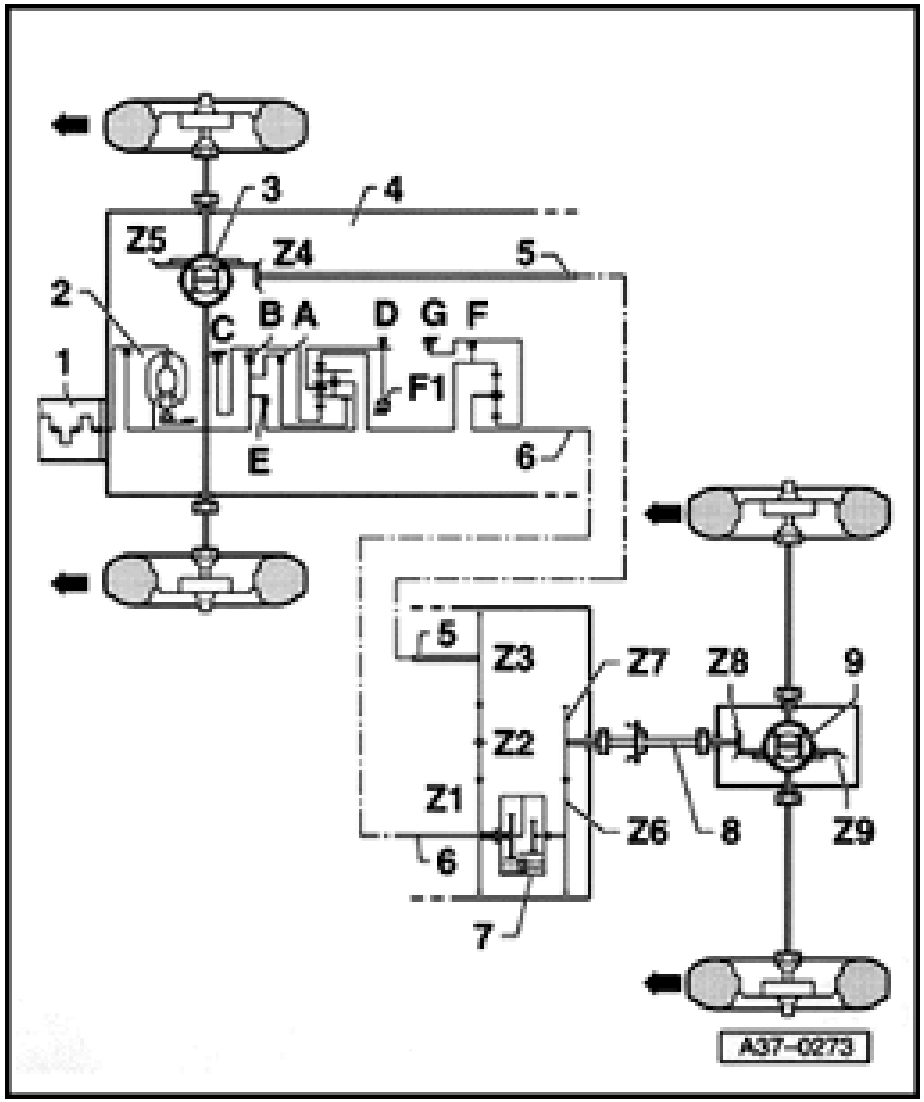
**1 - Engine**

**2 - Torque converter with lock-up clutch**

**3 - Front differential**

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37-146




**4 - Automatic transmission**

**5 - Drive pinion**

**6 - Output shaft**

**7 - Torsen differential**

**8 - Driveshaft**

**9 - Rear differential**

Z1, Z2 and Z3 = spur gears of front intermediate drive; ratio ⇒ page 00-4

Z4, Z5 = front gear set; ratio ⇒ page 00-4

Z6, Z7 = spur gears of rear intermediate drive; ratio ⇒ page 00-10

Z8, Z9 = rear ring gear, ratio ⇒ page 00-10

***Note:***

*Arrows point in direction of travel.*

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## Shift element positions

- *When dealing with problems relating to poor acceleration and performance or general malfunctions, the following chart indicates which selector elements are actuated in the various gears. This should help to identify the selector elements that are not working properly.*

| | Solenoid valves | | | | | | | Clutches | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Solenoid valves | | | Pressure regulation valves | | | | Clutch | | | | Brake | | | Freewheel |
| Position / gear | 1 | 2 | 3 | 1 | 2 | 3 | 4 | A | B | E | F | C | D | G | 1. Gear |
| R = Reverse | x | | | x | | x | | | x | | | | x | x | |
| N = Neutral | x | x | | x | | x | | | | | | | | x | |
| D, 1st gear | x | x | | x | | x | | x | | | | | | x | x |
| D, 2nd gear | x | x | | x | x | x | | x | | | | x | | x | |
| D, 3rd gear | | x | x - x | x | x | | | x | | | x | x | | | |
| D, 4th gear | | | x - x | x | | | | x | | x | x | | | | |
| D, 5th gear | x | | x - x | x | x | | | | | x | x | x | | | |
| 2, 1. Gear | x | | | x | | x | | x | | | | | x | x | x |
| D, 5th to 4th gear | x | | x | x | x | | x | (x) | | x | x | (x) | | | |

- x = Component is actuated

- - = Component is not actuated

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- (x) = Component actuation is dependent on driving condition

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# Transmission, disassembling and assembling

- Observe general repair instructions ⇒ page 00-27 .

## Rules of cleanliness for working on automatic transmissions

- Thoroughly clean all connections and the surrounding area before disconnecting.
- Place parts that have been removed on a clean surface and cover. Use foils and paper. Use lint-free cloths only!
- Carefully cover over opened components or seal, if repairs are not carried out immediately.
- Only install clean components: Only unpack replacement parts immediately prior to installation.
- Always replace O-rings, gaskets and sealing rings.
- Lightly lubricate O-rings before installing, this prevents the rings from being pinched when inserting.

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- Use only ATF in areas near ATF. Other lubricating substances cause functional problems in the hydraulic transmission control.

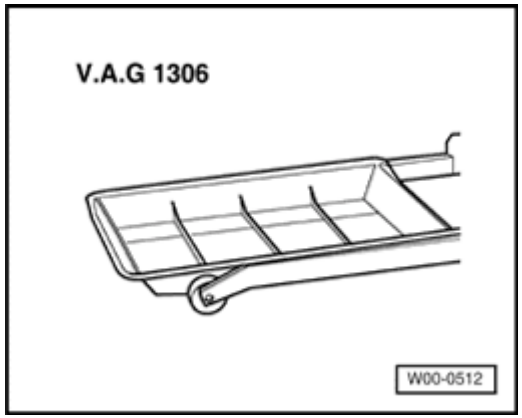
- Check the following fluid levels after installing, top off if necessary. ATF in planetary gear ⇒ page 37-133 , Gear oil in front final drive ⇒ page 39-1 , Transmission oil in center differential ⇒ page 39-40 . Capacities and specifications ⇒ Page 00-22 onward.

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37-149

## ATF lines, removing and installing overview

### Special tools and equipment




- VAG1306 drip tray

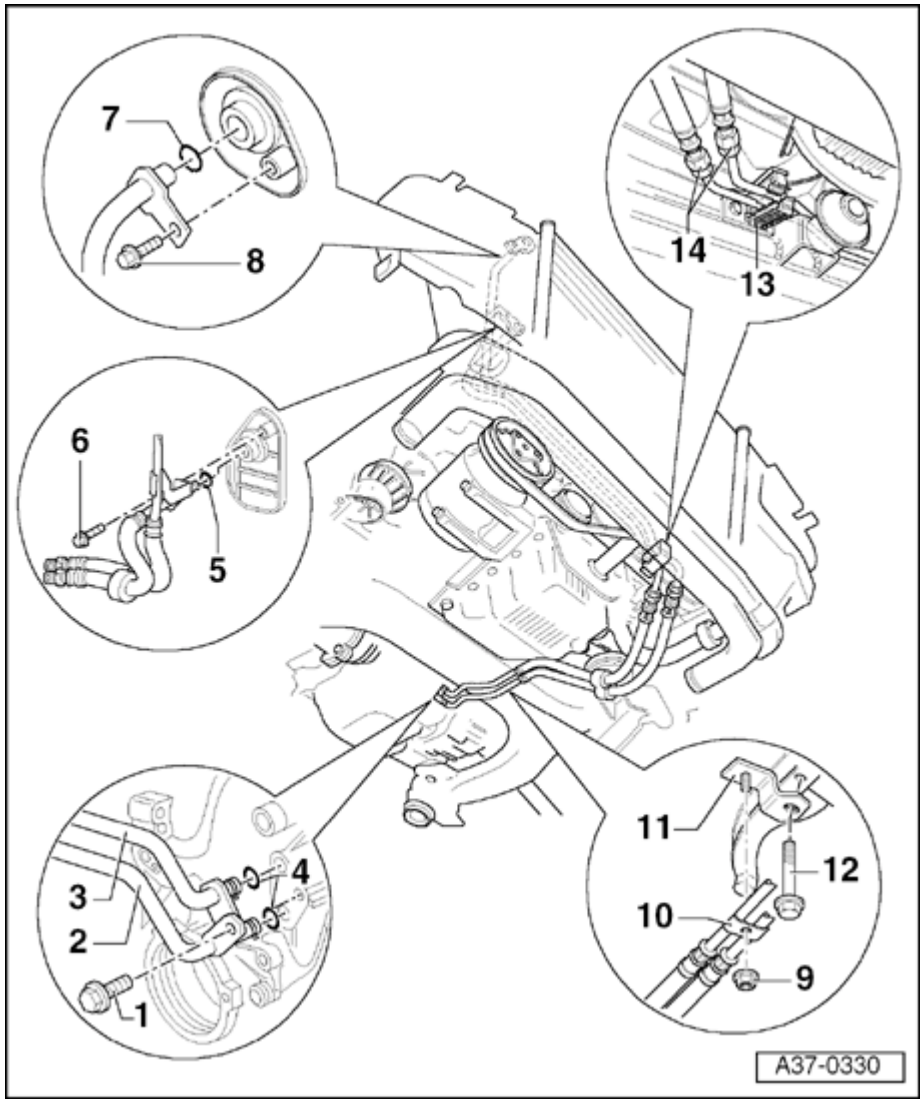
**Removing and installing ATF lines for 4 cylinder gasoline engines ⇒ page 37-150**

**Removing and installing ATF lines for 6 cylinder gasoline engines except for 2.7 Liter 5V turbo ⇒ page 37-152**

**Removing and installing ATF lines for 6 cylinder 2.7 Liter 5V turbo ⇒ page 37-154**

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## ATF lines, removing and installing, (vehicles with 4 cyl. engine)

***Notes:***

- *Place VAG1306 drip tray underneath.*

**1 - Bolt (21Nm)**

- Insert line until impact by hand before tightening

**2 - Oil line to cooler**

- Note marking on transmission housing

**3 - Oil line from cooler**

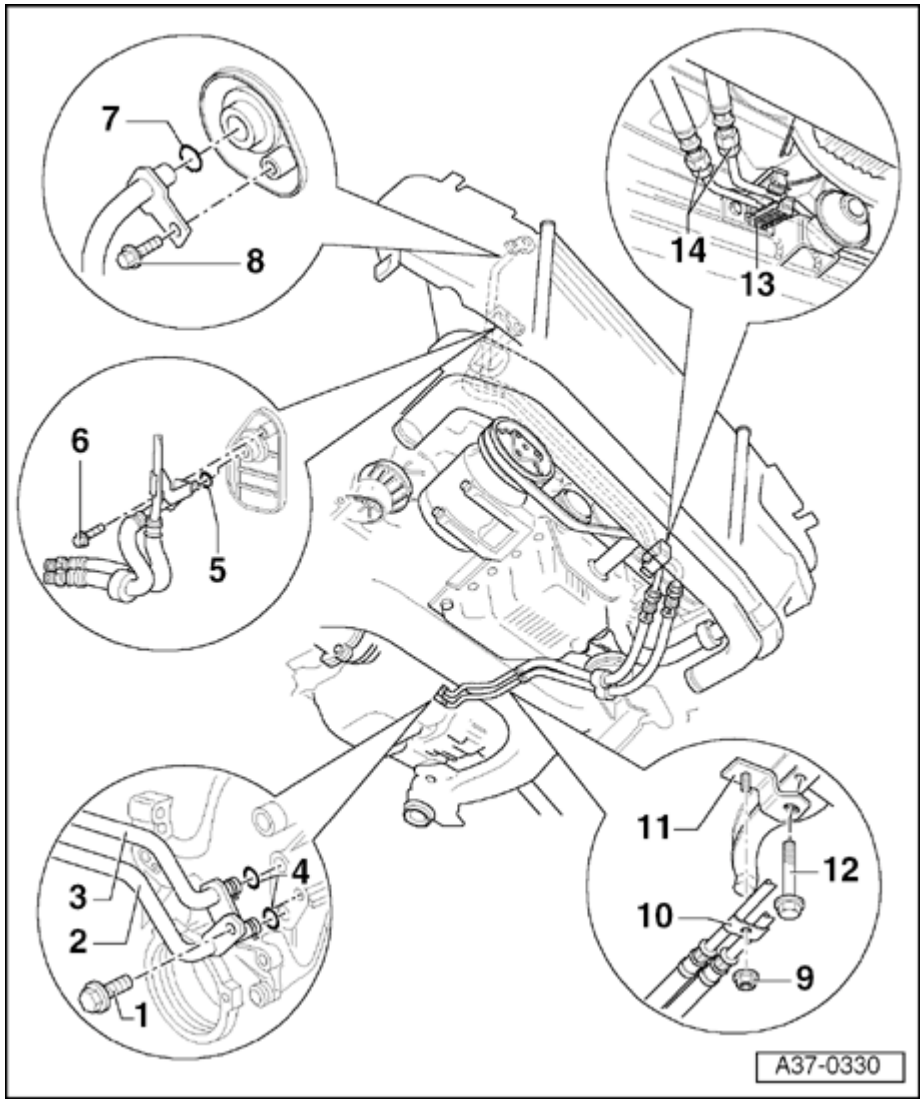
- Note marking on transmission housing

**4 - O-ring**

- Apply ATF when inserting
- Always replace

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**5 - O-ring**

- Apply ATF when inserting
- Always replace

**6 - Bolt (5Nm)**

**7 - O-ring**

- Apply ATF when inserting
- Always replace

**8 - Bolt (5Nm)**

**9 - Nut (5 Nm)**

**10 - Clamp**

**11 - Bracket**

**12 - Bolt (5Nm)**

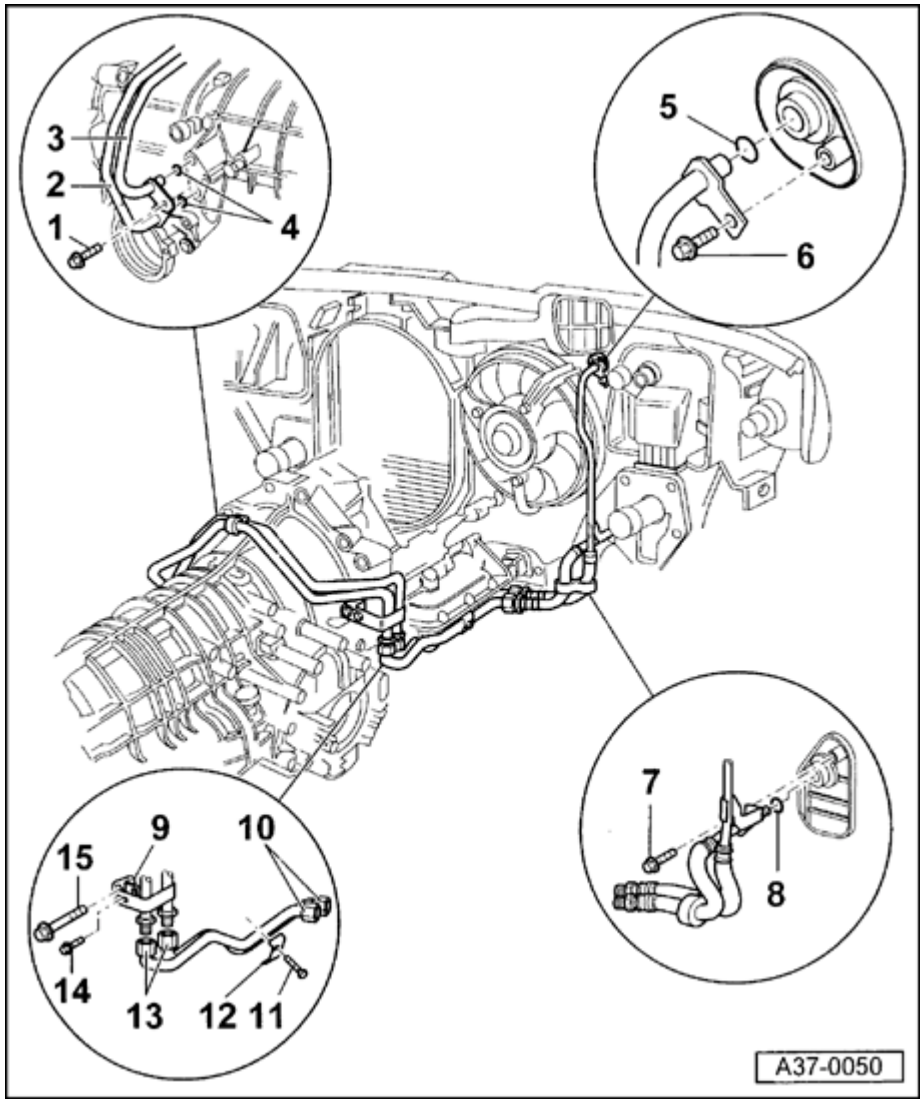
- Does not need to be removed when removing and installing ATF lines

**13 - Clip bracket**

**14 - Union nut, 30 Nm**

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37-152




## ATF lines, removing and installing, (vehicles with 6 cyl. engine)

***Notes:***

- *Place VAG1306 drip tray underneath.*

**1 - Bolt (21Nm)**

- Insert line until impact by hand before tightening

**2 - Oil line from cooler**

- Note marking on transmission housing

**3 - Oil line to cooler**

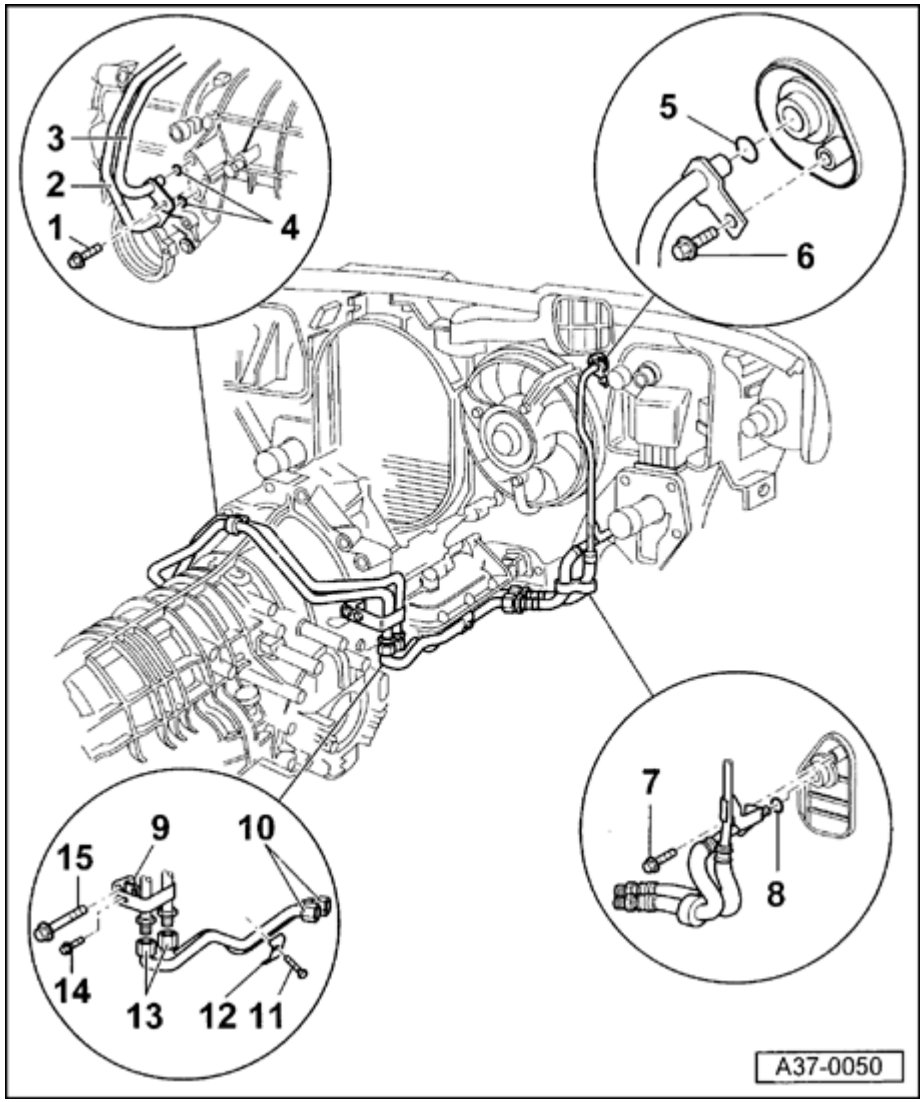
- Note marking on transmission housing

**4 - O-ring**

- Apply ATF when inserting
- Always replace

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37-153




**5 - O-ring**

- Apply ATF when inserting
- Always replace

**6 - Bolt (5Nm)**

**7 - Bolt (5Nm)**

**8 - O-ring**

- Apply ATF when inserting
- Always replace

**9 - Bracket**

**10 - Union nut, 25 Nm**

**11 - Hex bolt, 5 Nm**

**12 - Clamp**

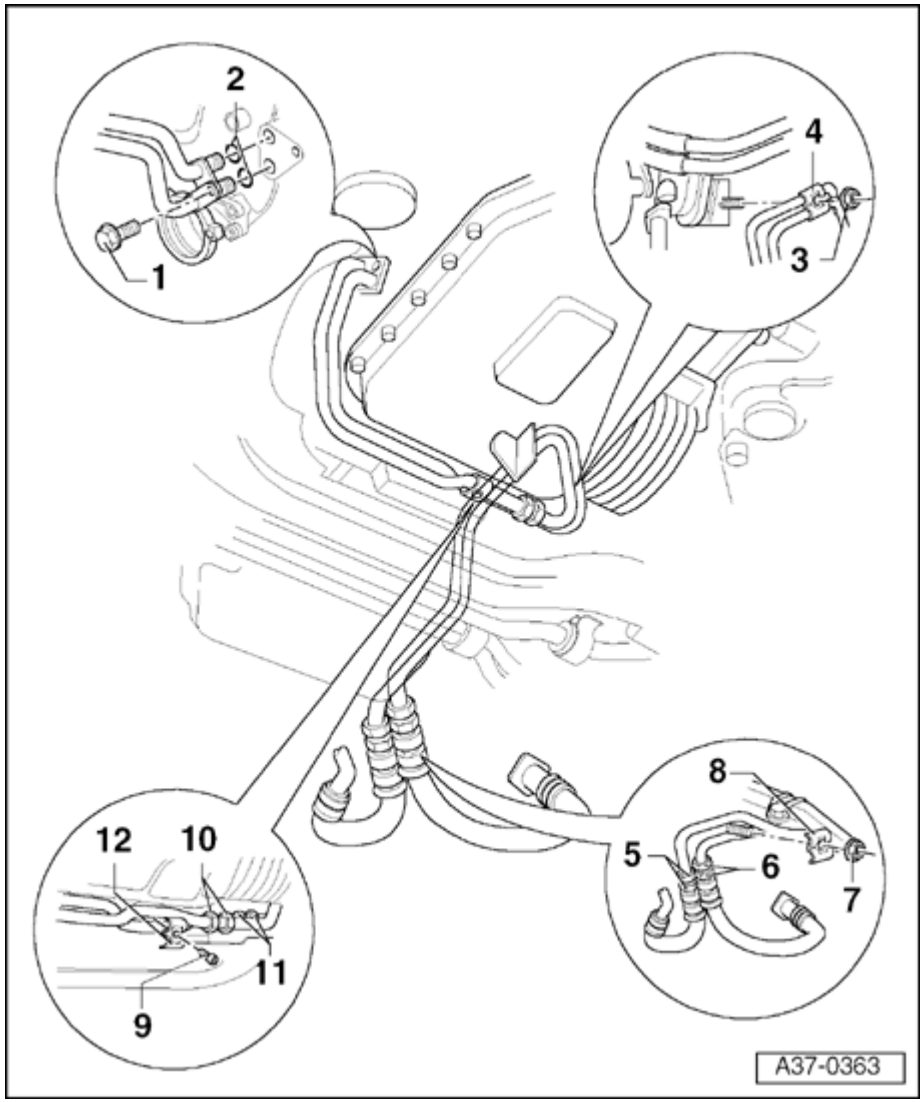
**13 - Union nut, 25 Nm**

**14 - Hex bolt, 10 Nm**

**15 - Hex bolt, 65 Nm**

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37-154




## ATF lines, removing and installing (vehicles with 6 cylinder 2.7 Liter 5V turbo engine)

***Notes:***

- *Place VAG1306 drip tray underneath.*

**1 - Bolt (21Nm)**

- Insert line until impact by hand before tightening

**2 - O-ring**

- Apply ATF when inserting
- Always replace

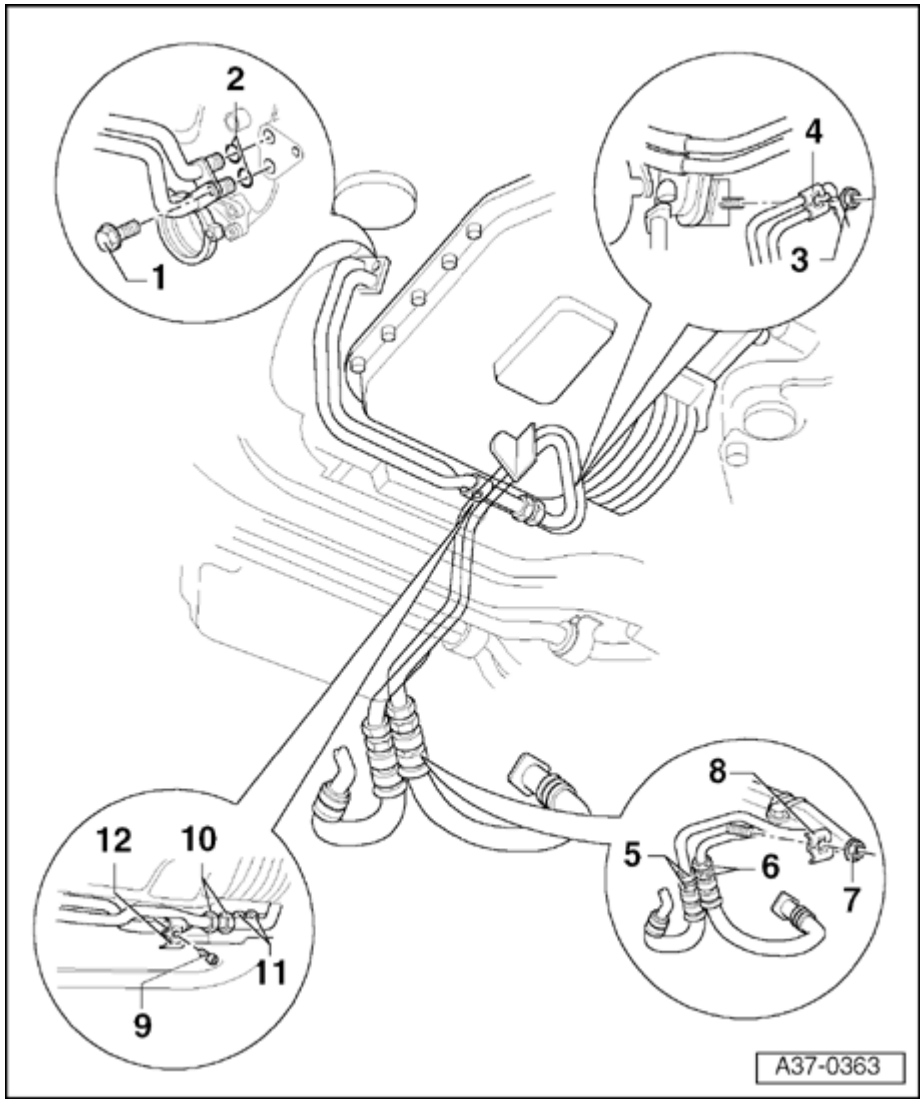
**3 - Nut - 5 Nm**

**4 - Clamp**

**5 - Union nut, 29 Nm**

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**6 - Union nut, 29 Nm**

- Note yellow markings for allocation of lines.

**7 - Nut - 5 Nm**

**8 - Clamp**

**9 - Bolt (5Nm)**

**10 - Union nut, 29 Nm**

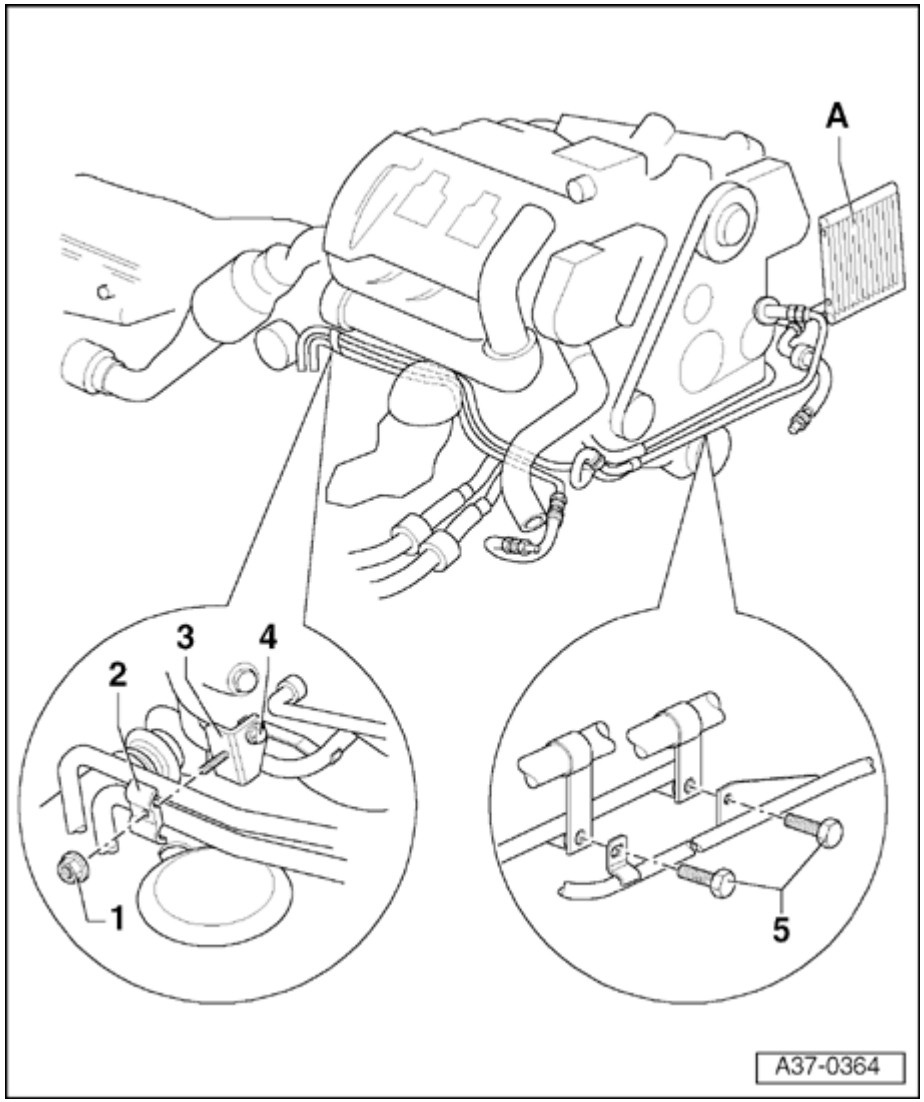
- Note yellow markings for allocation of lines.

**11 - Union nut, 29 Nm**

**12 - Clamp**

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**1 - Nut - 9.5 Nm**

**2 - Clamp**

**3 - Bracket**

**4 - Bolt - 9.5 Nm**

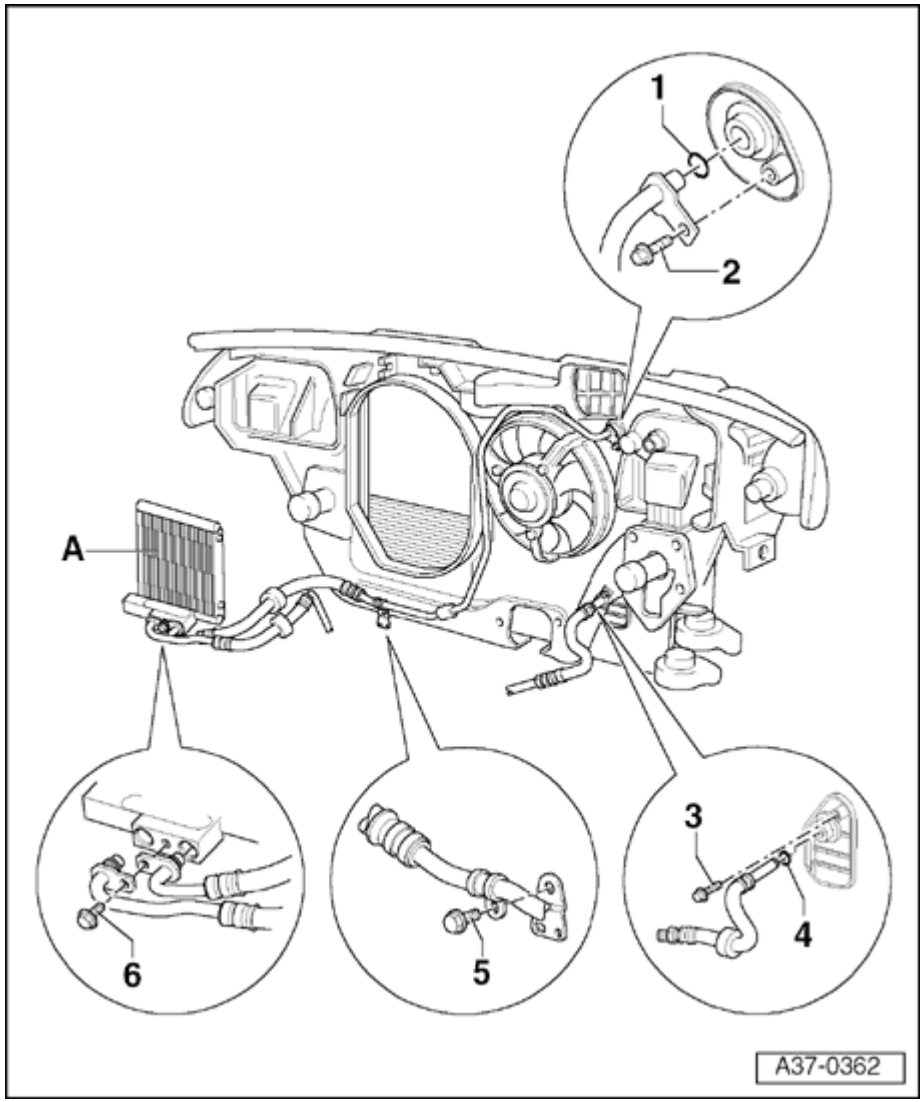
**5 - Bolt - 22 Nm**

A - Auxiliary ATF cooler

- An extra ATF check must be performed after replacing or emptying the auxiliary ATF cooler ⇒ page 37-138

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A - Auxiliary ATF cooler

- An extra ATF check must be performed after replacing or emptying the auxiliary ATF cooler
  ⇒ page 37-138

**1 - O-ring**

- Apply ATF when inserting
- Always replace

**2 - Bolt (5Nm)**

**3 - Bolt (5Nm)**

**4 - O-ring**

- Apply ATF when inserting
- Always replace

**5 - Bolt - 10 Nm**

**6 - Bolt (25Nm)**

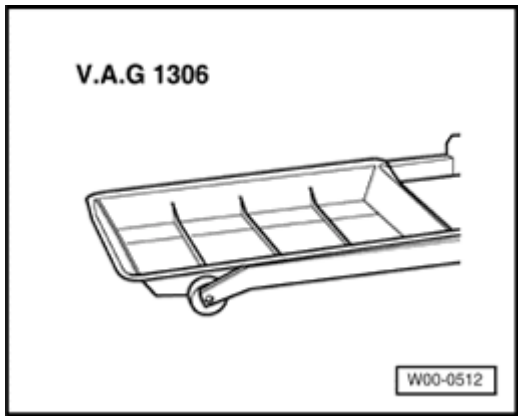
- Before tightening, insert lines by hand up to stop

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## ATF lines and ATF cooler, cleaning

### Special tools and equipment




- VAG1306 drip tray
- Hose, approx. 18 mm
- Compressed air gun, standard
- Protective glasses

***Notes:***

- *Always blow compressed air through oil cooler and ATF lines (max. 10 mbar) before installing a replacement transmission.*
- *When installing ATF lines, insert into transmission or cooler by hand until impact first and then tighten bolts.*

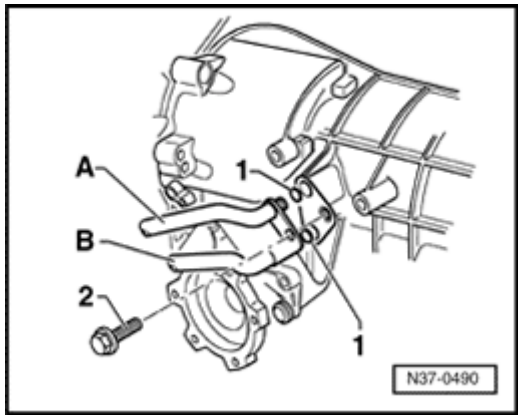
***WARNING!***

***Wear protective glasses.***

- Place VAG1306 drip tray underneath.

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- Remove bolt -2-.
- Disconnect ATF lines from transmission.
- Slide a hose with approx. 18 mm diameter onto ATF line -A- and secure with hose clamp. Place the other end of the hose into an appropriate container.
- Blow through ATF line -B- with compressed air gun.
- Change hose from ATF line -A- to ATF line -B- and repeat procedure.
- Re-secure ATF lines.
- Then check ATF level and top off ⇒ Page 37-133 onward.

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38-1

# Oil pan, oil strainer and valve body, removing and installing

***WARNING!***

***Do not run engine with the oil pan removed or without ATF filling and do not tow vehicle.***

***Notes:***

- *Always replace a soiled or faulty valve body.*
- *Rules of cleanliness for working on automatic transmissions ⇒ page 37-148 .*
- *General repair notes ⇒ page 00-27 .*
- *Coat O-rings and sealing rings with ATF. Other lubricating substances lead to functional problems in the hydraulic transmission control.*

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## Removed parts, overview

***Notes:***

- *There is a distinction made between two types of transmission. Transmissions with hydraulic control E17, the sensor for transmission RPM (inductive sensor) is secured to bottom of valve body. Transmissions with hydraulic control E18/2, the sensor for transmission RPM (hall effect sensor) is secured to transmission housing behind valve body.*

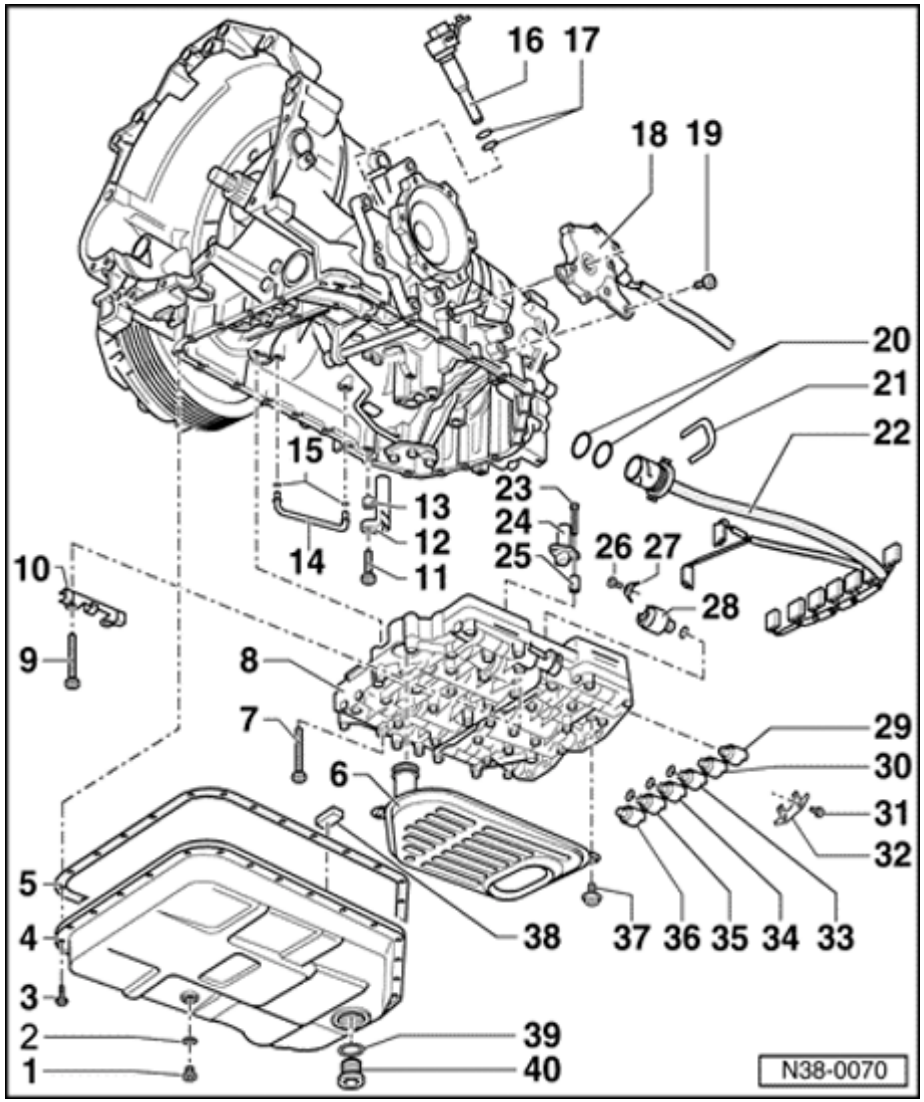
- *Information regarding which transmission is installed can be found in tables ⇒ Page 00-4 onward.*

**Overview of the removed parts for transmission with Park/Neutral Position (PNP) Switch -E17- ⇒ page 38-3**

**Overview of the removed parts for transmission with hydraulic control E18/2 ⇒ page 38-11**

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38-3




**Overview of the removed parts for transmission with Park/Neutral Position (PNP) Switch -E17-**

**1 - Drain plug - 40 Nm**

- 5 mm socket-head bolt
- Remove to drain ATF ⇒ page 38-20

**2 - Seal**

- Always replace

**3 - Bolt - 10 Nm**

- Tighten bolts for oil pan in several stages in diagonal sequence

**4 - Oil pan**

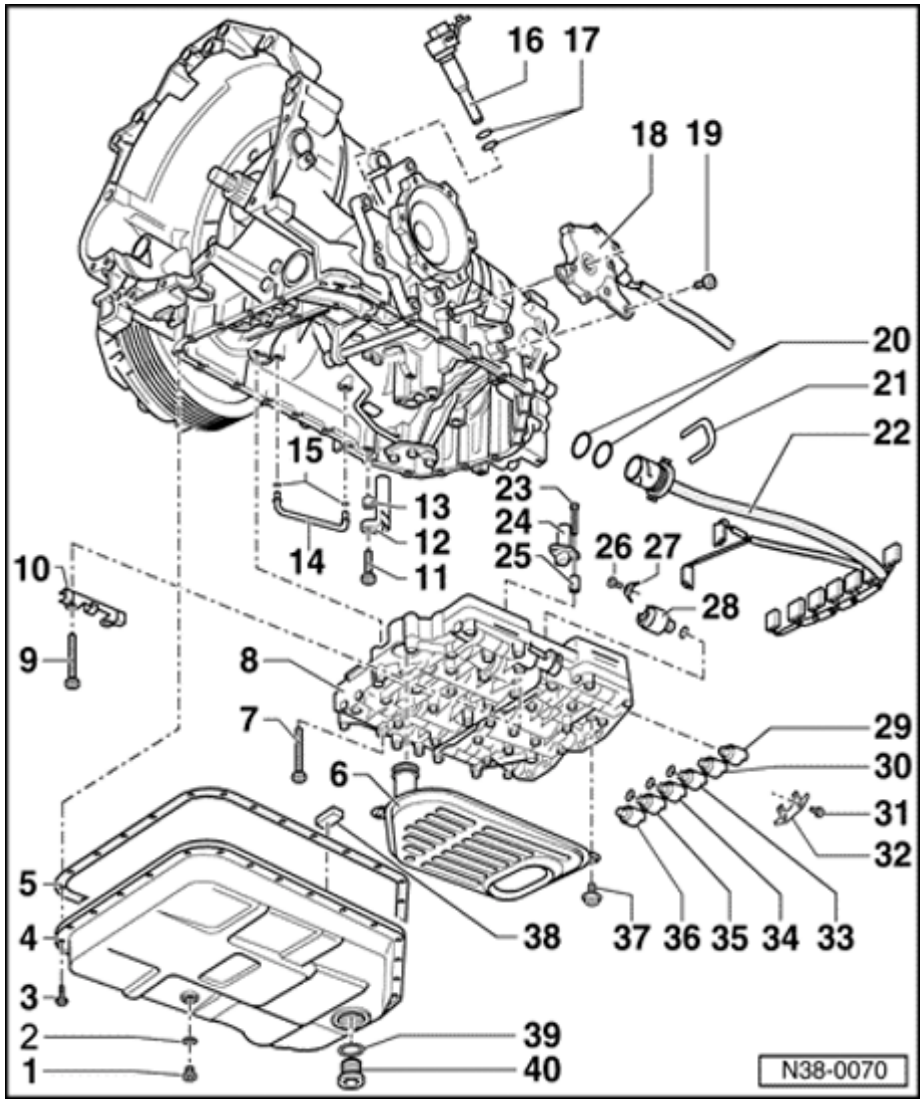
- Removing and installing ⇒ page 38-19

**5 - Gasket**

- Always replace

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38-4




**6 - ATF-strainer**

- Removing and installing ⇒ page 38-21

**7 - Bolt - 8 Nm**

- For mounting valve body: 1 bolt M6 x 30, 16 bolts M6 x 60
- Observe tightening sequence ⇒ page 38-26

**8 - Valve body**

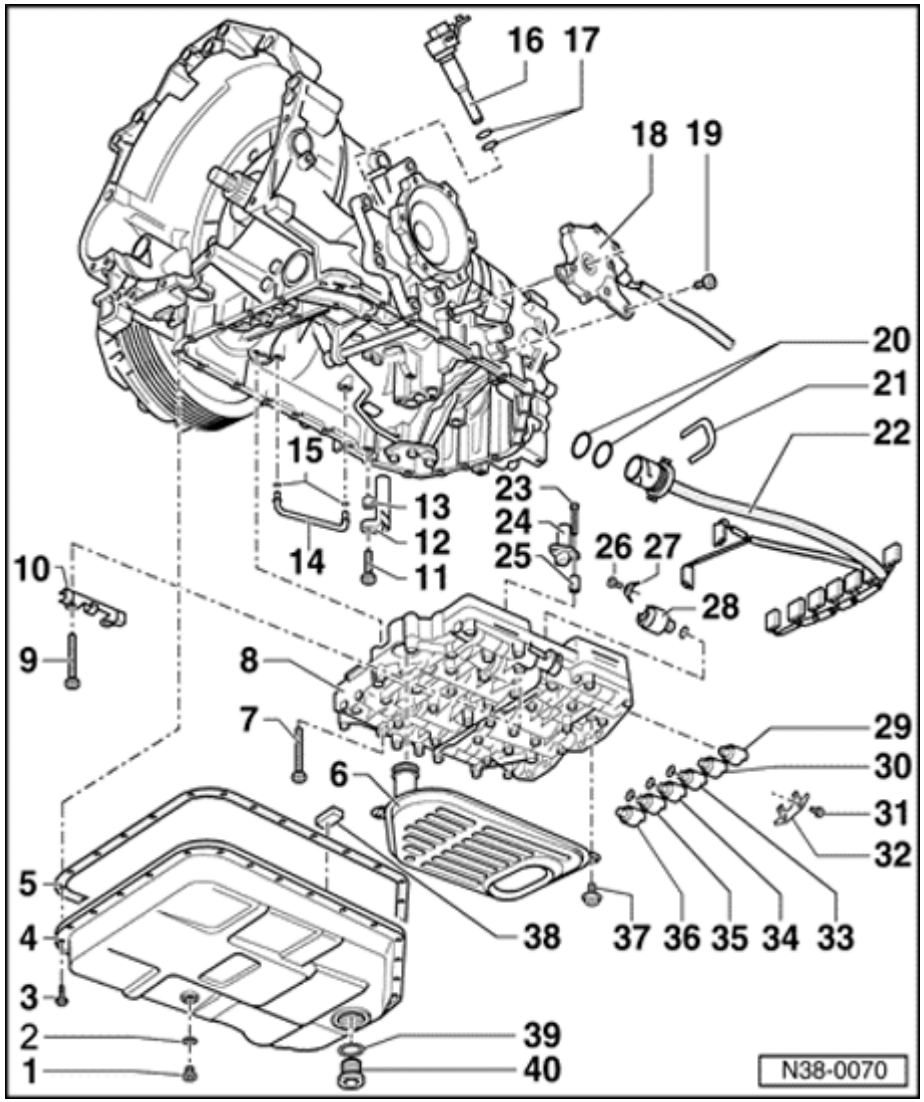
- Removing and installing ⇒ page 38-22
- Allocation according to transmission code letters

⇒ *Parts Catalog*

**9 - Bolt - 8 Nm**

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38-5




**10 - Bracket**

- For wiring harness
- Hook in wiring harness
- Mounted with valve body bolts

**11 - Bolt - 6 Nm**

**12 - Transmission Vehicle Speed Sensor (VSS) -G38-**

- Removing and installing ⇒ page 38-40

**13 - Spacer sleeve**

- Height: 8 mm

**14 - Inner oil line**

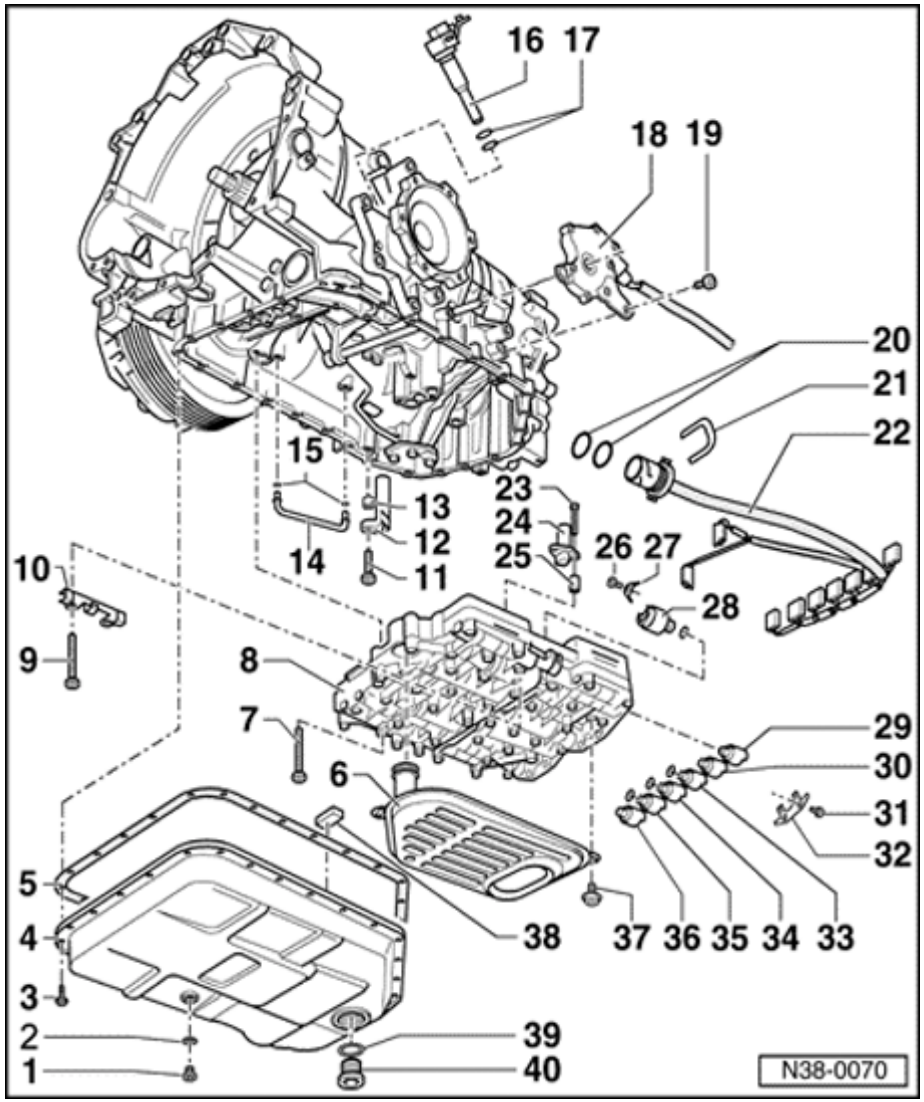
- Always replace
- Removing and installing ⇒ page 38-29

**15 - O-ring**

- Always replace

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38-6




**16 - Speedometer Vehicle Speed Sensor (VSS) -G22-**

- Removing and installing ⇒ page 38-35

**17 - O-ring**

- Always replace
- Coat with Vaseline

**18 - Multi-Function Transmission Range (TR) Switch -F125-**

- Removing and installing ⇒ page 38-33
- Replacing shift rod sealing ring ⇒ page 38-31

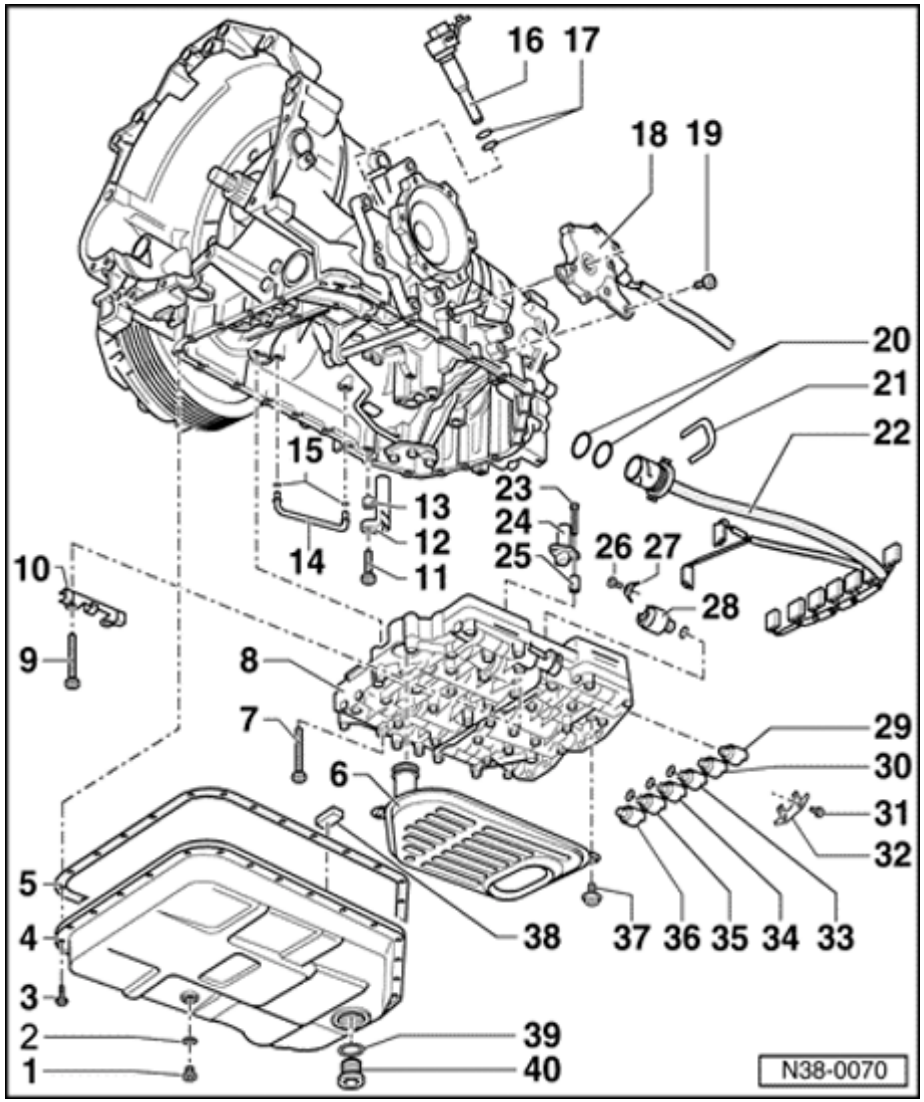
**19 - Bolt - 8 Nm**

**20 - O-ring**

- Always replace

**21 - Locking clamp**

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**22 - Wiring harness**

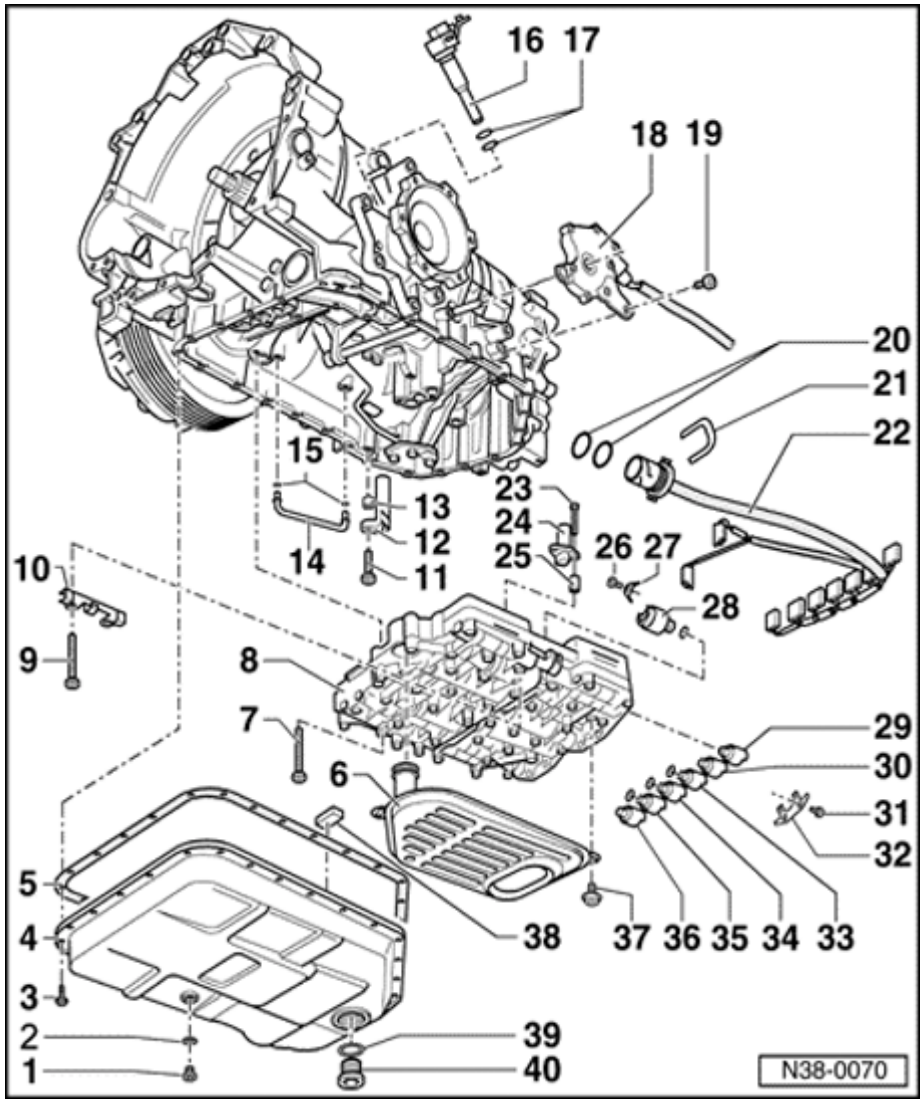
- Always replace ⇒ page 38-42
- Transmission Fluid Temperature Sensor - G93- is integrated into the wiring harness
- Remove and install valve body to install ⇒ page 38-22
- Unhook from bracket for wiring harness, item 10
- Installation position wiring harness connector: Flat part of rear collar points toward oil pan, the tabs at collar are horizontal

**23 - Bolt - 6 Nm**

**24 - Sensor for transmission RPM -G182-**

- Removing and installing ⇒ page 38-36

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**25 - Spacer sleeve**

- Height: 20 mm

**26 - Bolt - 6 Nm**

**27 - Bracket**

- For solenoid valve

**28 - Solenoid Valve 4 -N91-**

- With O-ring
- Remove and install valve body to install ⇒ page 38-22

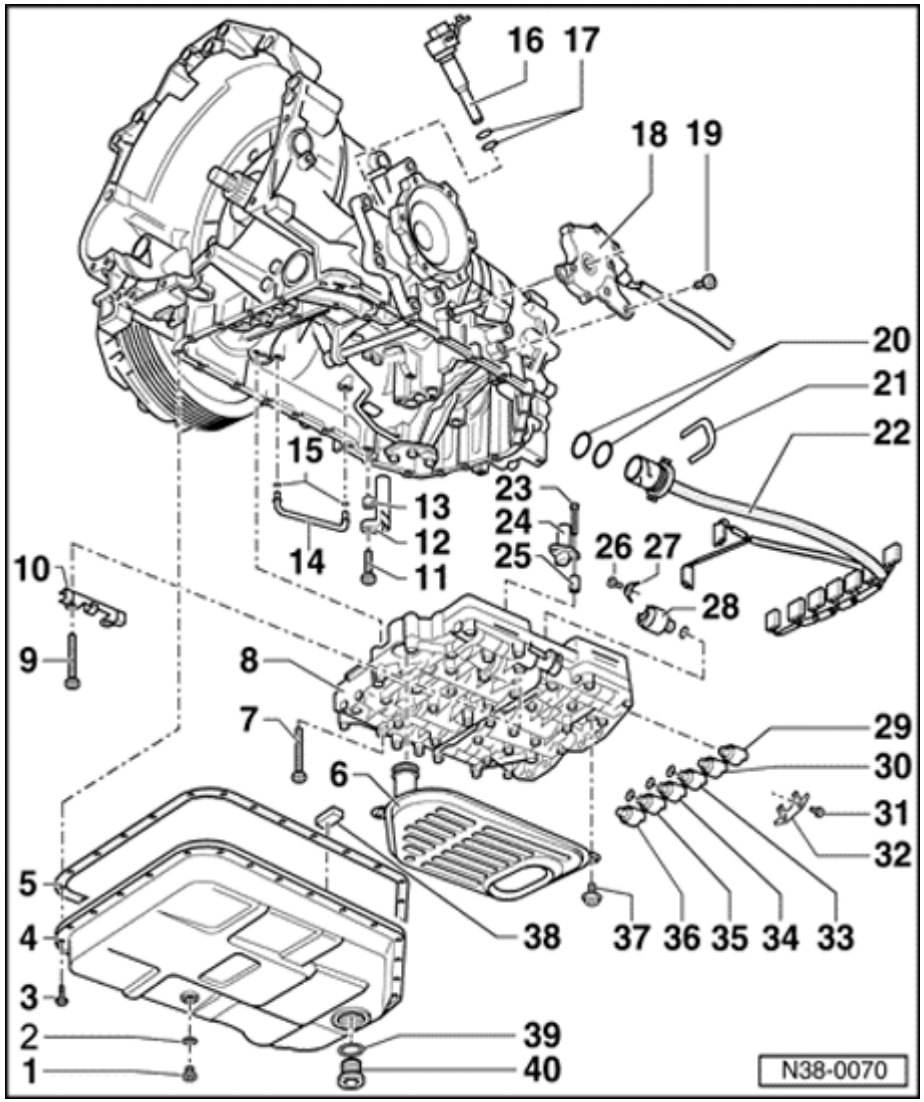
**29 - Solenoid valve 3 -N90-**

- Without O-ring
- Remove and install oil pan to replace ⇒ page 38-19

**30 - Solenoid valve 2 -N89-**

- Without O-ring
- Remove and install oil pan to replace ⇒ page 38-19

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**31 - Bolt - 6 Nm**

**32 - Bracket**

- For solenoid valves

**33 - Solenoid Valve 6 -N93-**

- With O-ring
- Remove and install oil pan to replace ⇒ page 38-19

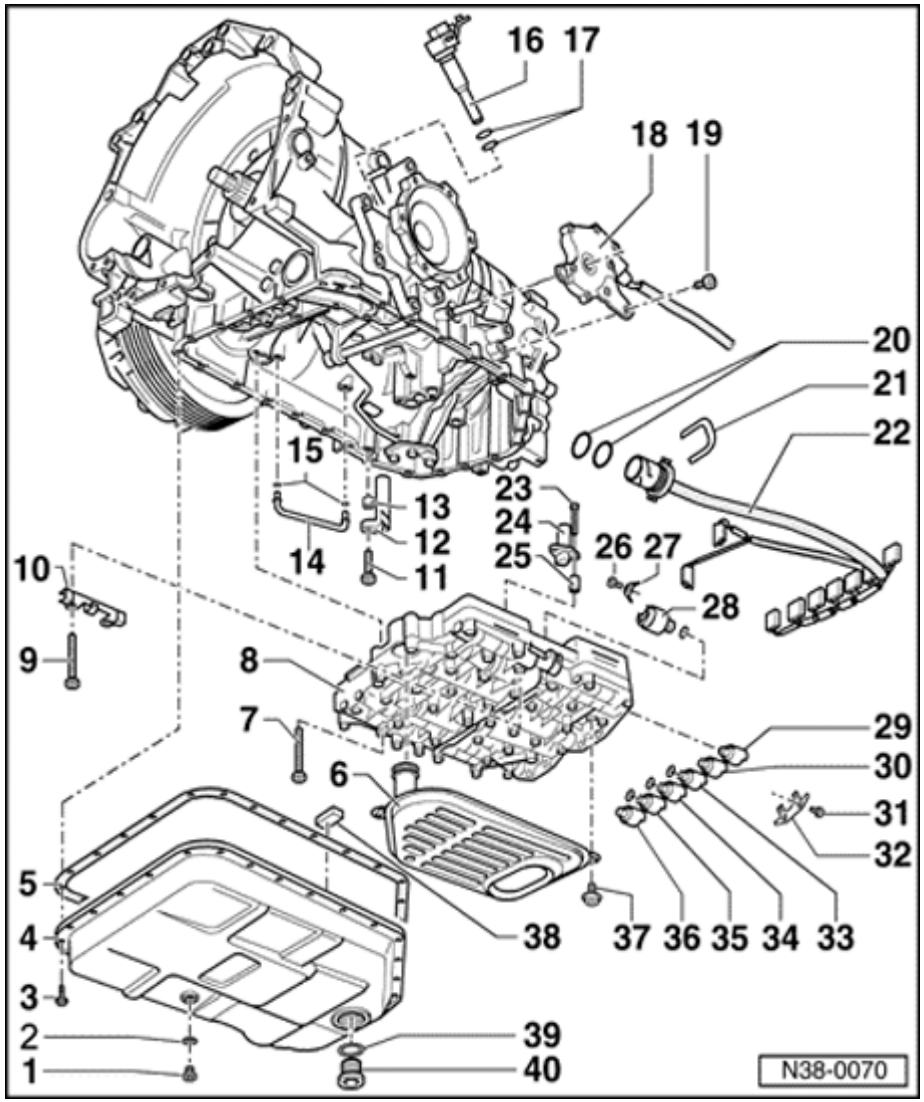
**34 - Solenoid Valve 7 -N94-**

- With O-ring
- Remove and install oil pan to replace ⇒ page 38-19

**35 - Solenoid valve 5 -N92-**

- With O-ring
- Remove and install oil pan to replace ⇒ page 38-19

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**36 - Solenoid valve 1 -N88-**

- Without O-ring
- Remove and install oil pan to replace ⇒ page 38-19 and unbolt guide plate for park locking mechanism
- When installing, do not tighten bolts for guide plate (23 Nm) in selector lever position "P".

**37 - Bolt - 6 Nm**

**38 - Magnet**

- 4 pieces in the oil pan recesses

**39 - O-ring**

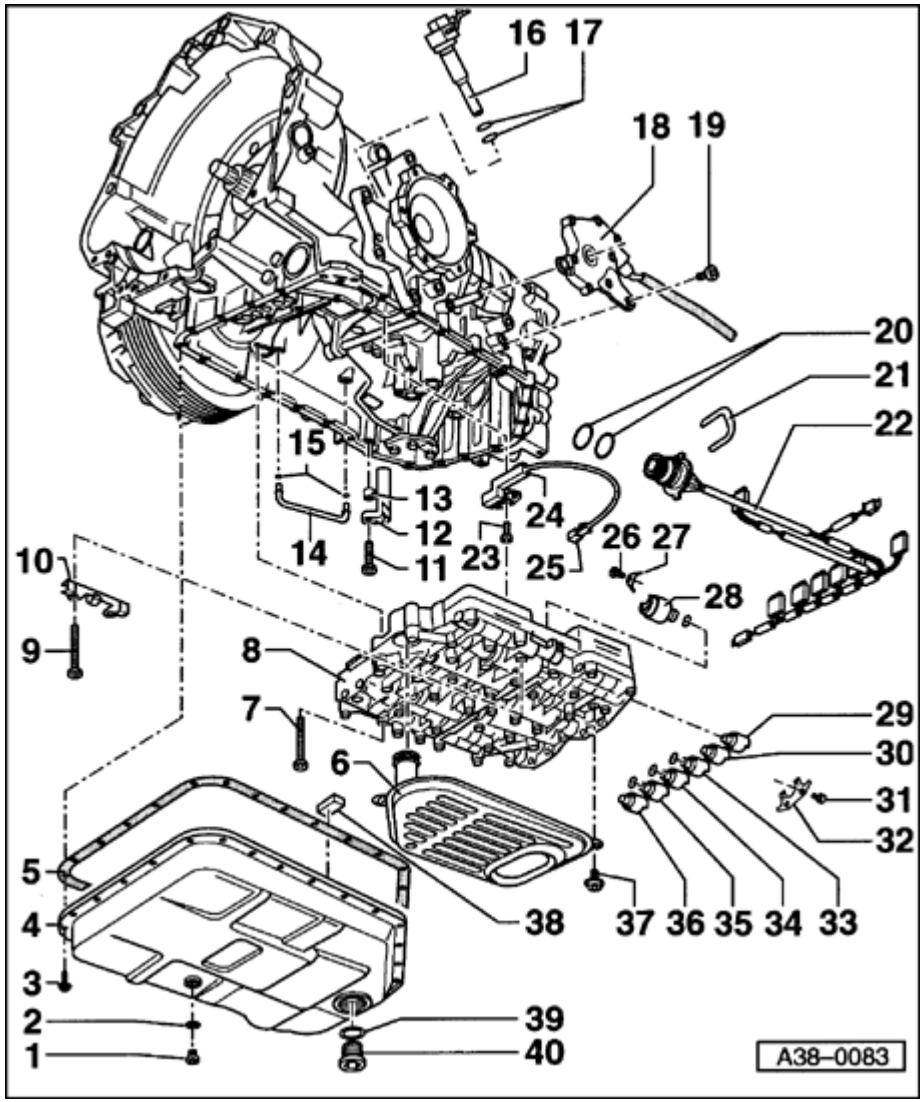
- Always replace

**40 - ATF check plug - 80 Nm**

- 17 mm socket-head bolt

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38-11




**Overview of the removed parts for transmission with hydraulic control E18/2**

**1 - Drain plug - 40 Nm**

- 5 mm socket-head bolt
- Remove to drain ATF ⇒ page 38-20

**2 - Seal**

- Always replace

**3 - Bolt - 10 Nm**

- Tighten bolts for oil pan in several stages in diagonal sequence

**4 - Oil pan**

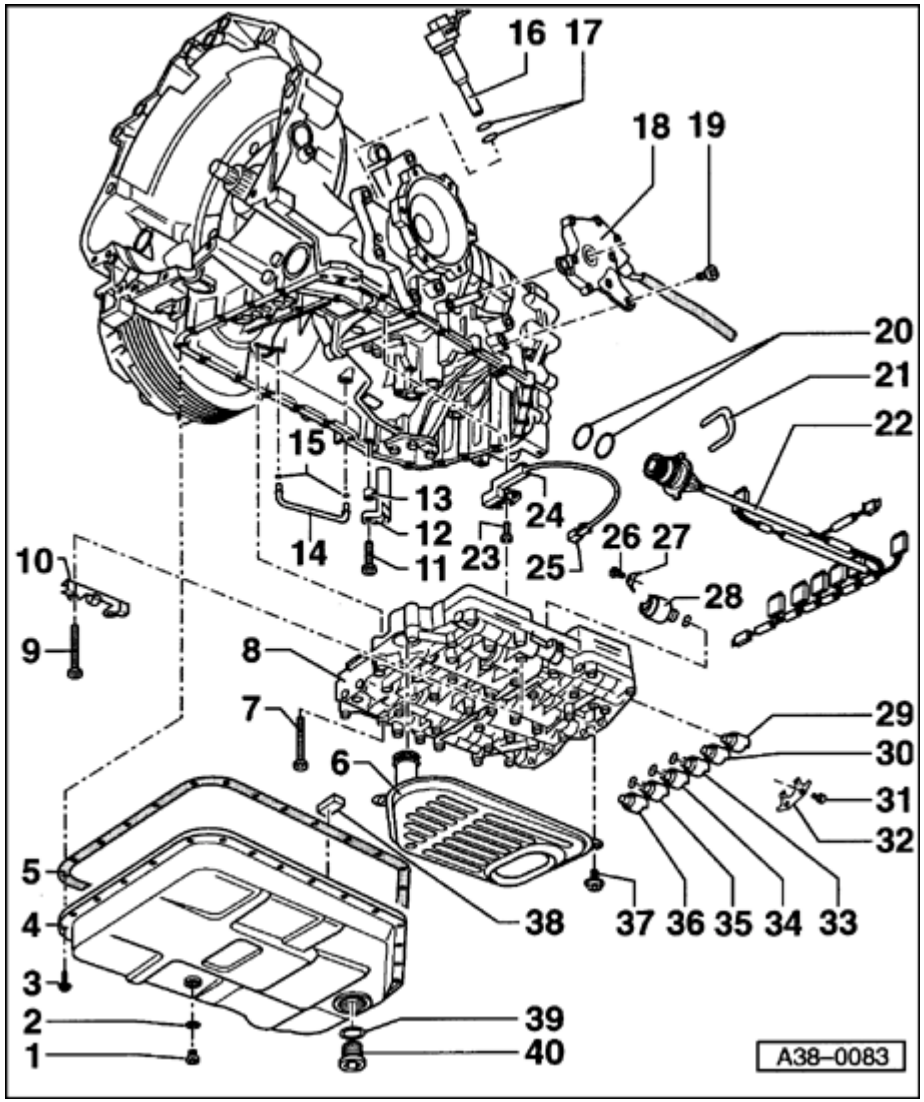
- Removing and installing ⇒ page 38-19

**5 - Gasket**

- Always replace

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38-12




**6 - ATF-strainer**

- Removing and installing ⇒ page 38-21

**7 - Bolt - 8 Nm**

- For mounting valve body: 1 bolt M6 x 30, 16 bolts M6 x 60
- Observe tightening sequence ⇒ page 38-26

**8 - Valve body**

- Removing and installing ⇒ page 38-22
- Allocation according to transmission code letters

⇒ *Parts Catalog*

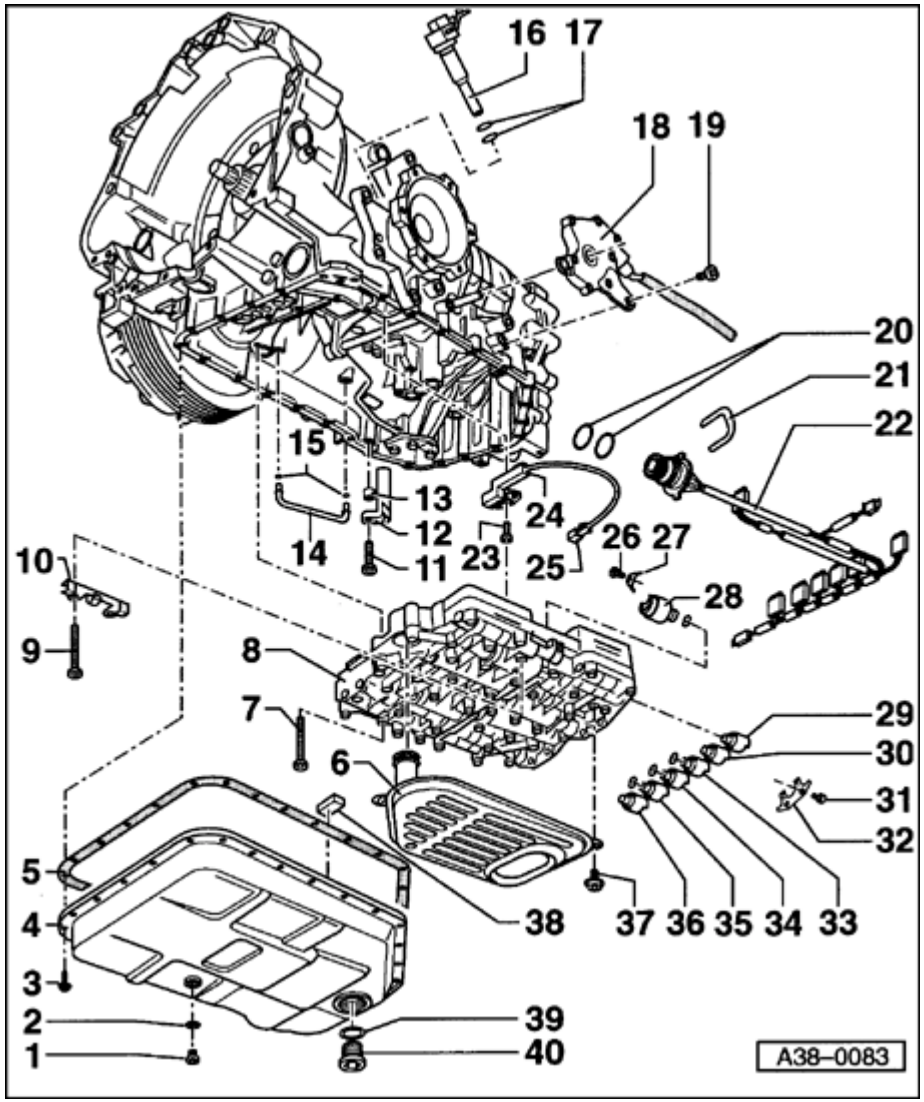
**9 - Bolt - 8 Nm**

**10 - Bracket**

- For wiring harness
- Hook in wiring harness
- Mounted with valve body bolts

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38-13




**11 - Bolt - 6 Nm**

**12 - Transmission Vehicle Speed Sensor (VSS) -G38-**

- Removing and installing ⇒ page 38-40

**13 - Spacer sleeve**

- Height: 8 mm

**14 - Inner oil line**

- Always replace
- Removing and installing ⇒ page 38-29

**15 - O-ring**

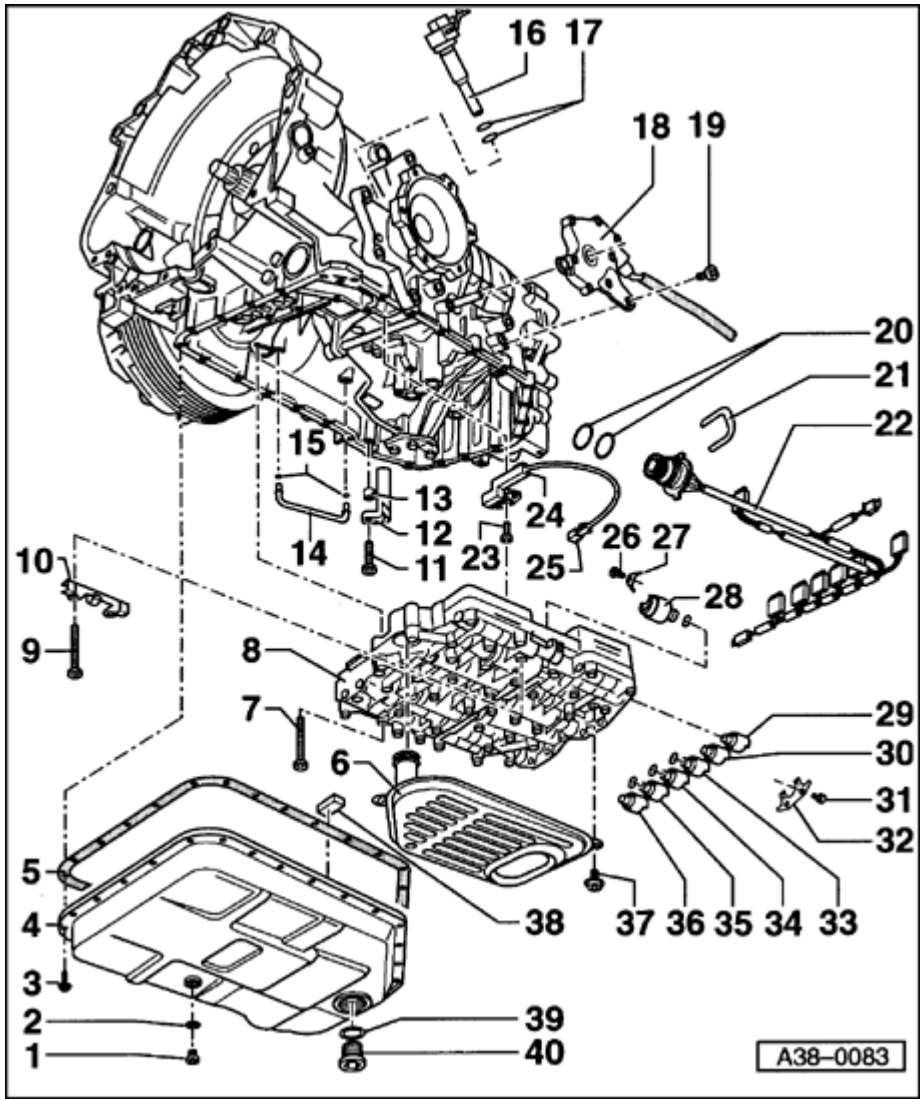
- Always replace

**16 - Speedometer Vehicle Speed Sensor (VSS) -G22-**

- Removing and installing ⇒ page 38-35

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38-14




**17 - O-ring**

- Always replace
- Coat with Vaseline

**18 - Multi-Function Transmission Range (TR) Switch -F125-**

- Removing and installing ⇒ page 38-33
- Replacing shift rod sealing ring ⇒ page 38-31

**19 - Bolt - 8 Nm**

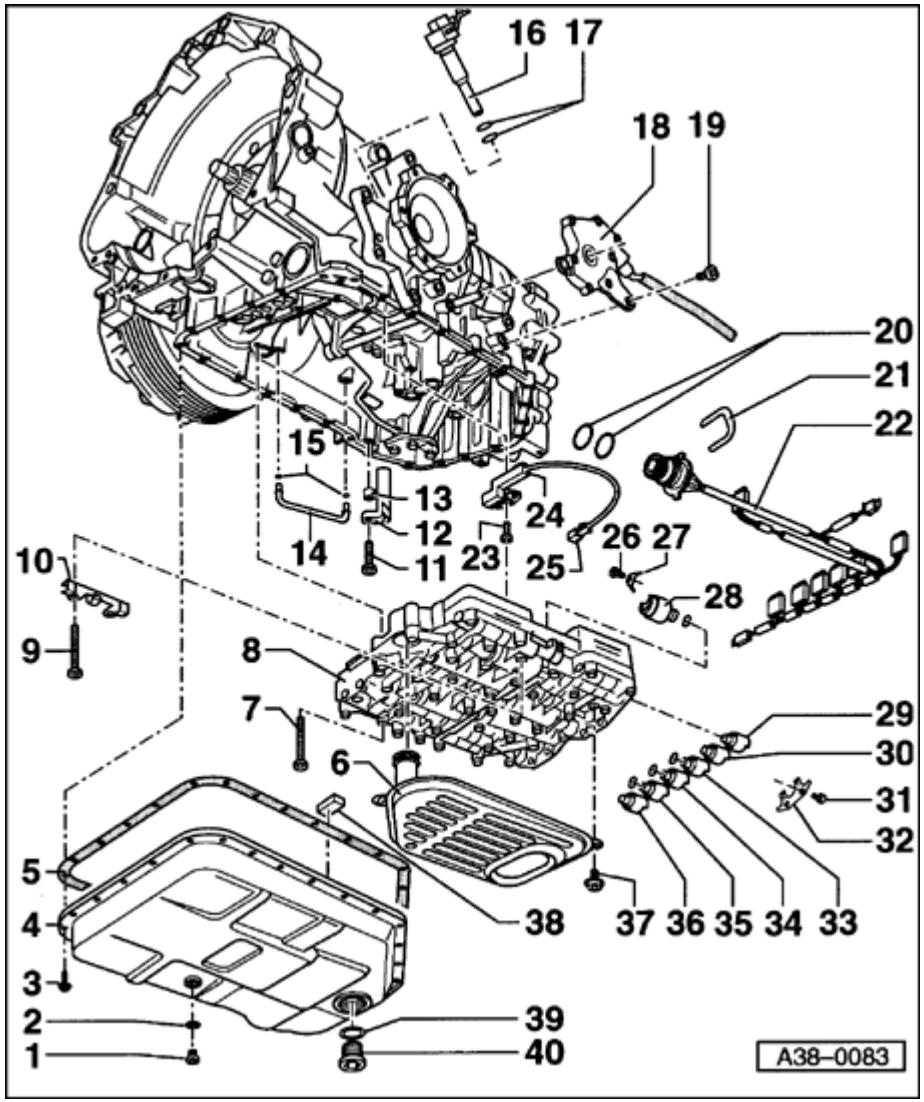
**20 - O-ring**

- Always replace

**21 - Locking clamp**

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38-15




**22 - Wiring harness in transmission**

- Always replace ⇒ page 38-42
- Transmission Fluid Temperature Sensor - G93- is integrated into the wiring harness
- Remove and install valve body to replace ⇒ page 38-22
- Unhook from bracket for wiring harness, item 10
- Installation position wiring harness connector: Flat part of rear collar points toward oil pan, the tabs at collar are horizontal

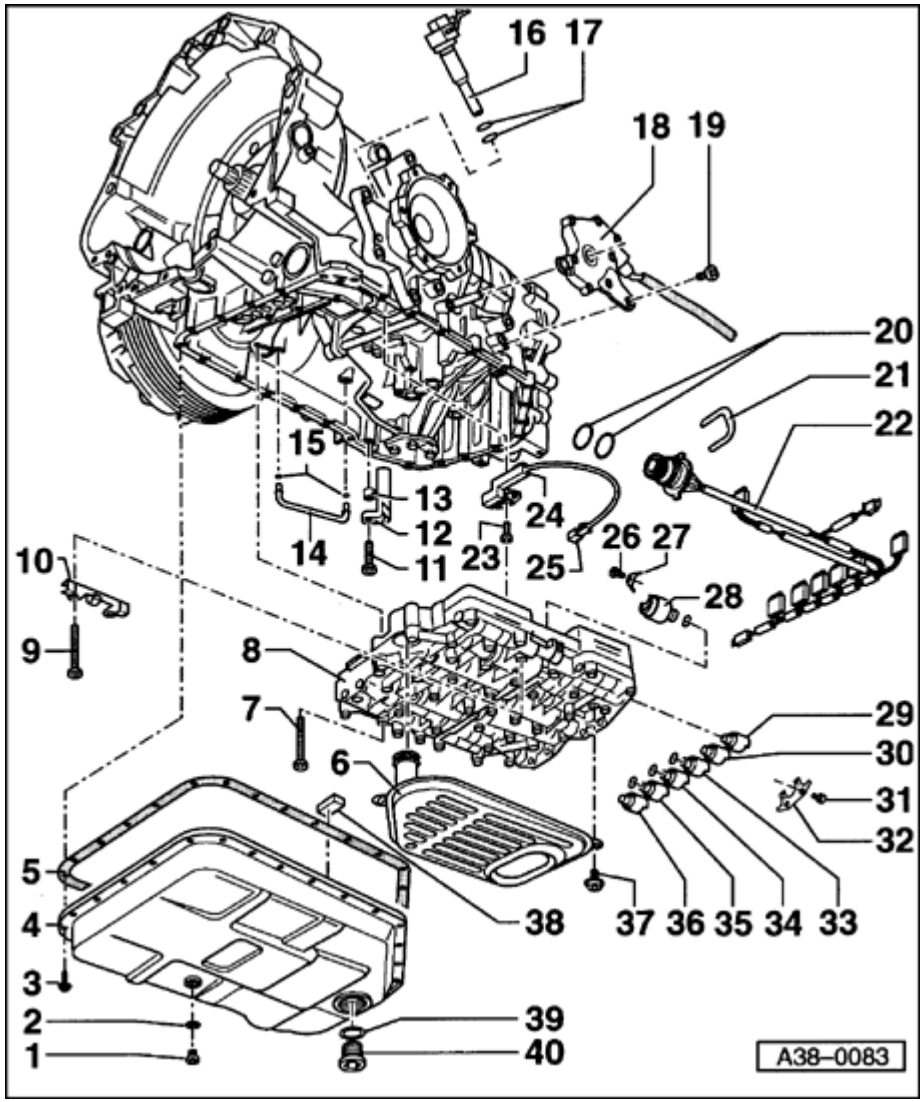
**23 - Bolt - 9 Nm**

**24 - Sensor for transmission RPM -G182-**

- Removing and installing ⇒ page 38-36

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38-16




**25 - Connector**

- Is connected at wiring harness in transmission
- Must be disconnected before removing the valve body

**26 - Bolt - 6 Nm**

**27 - Bracket**

- For solenoid valve

**28 - Solenoid Valve 4 -N91-**

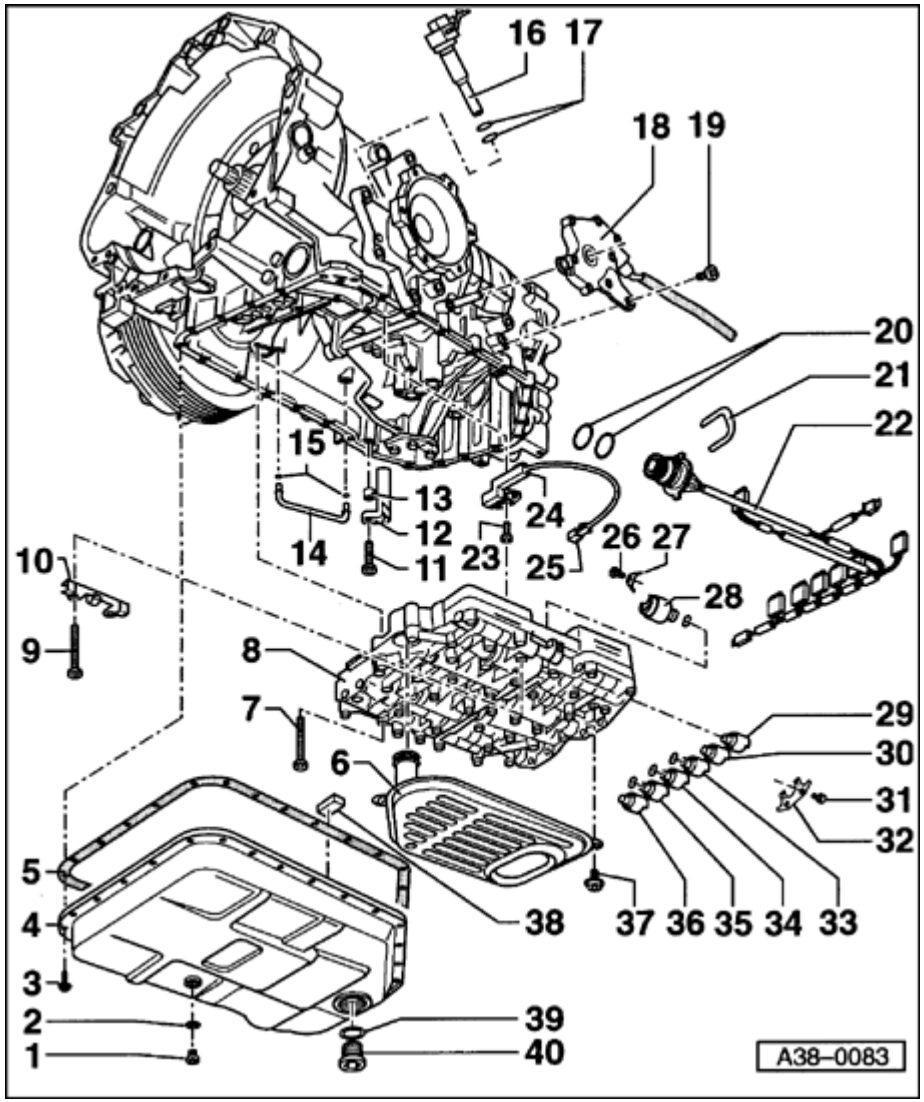
- With O-ring
- Remove and install valve body to replace ⇒ page 38-22

**29 - Solenoid valve 3 -N90-**

- Without O-ring
- Remove and install oil pan to replace ⇒ page 38-19

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38-17




**30 - Solenoid valve 2 -N89-**

- Without O-ring
- Remove and install oil pan to replace ⇒ page 38-19

**31 - Bolt - 6 Nm**

**32 - Bracket**

- For solenoid valves

**33 - Solenoid Valve 6 -N93-**

- With O-ring
- Remove and install oil pan to replace ⇒ page 38-19

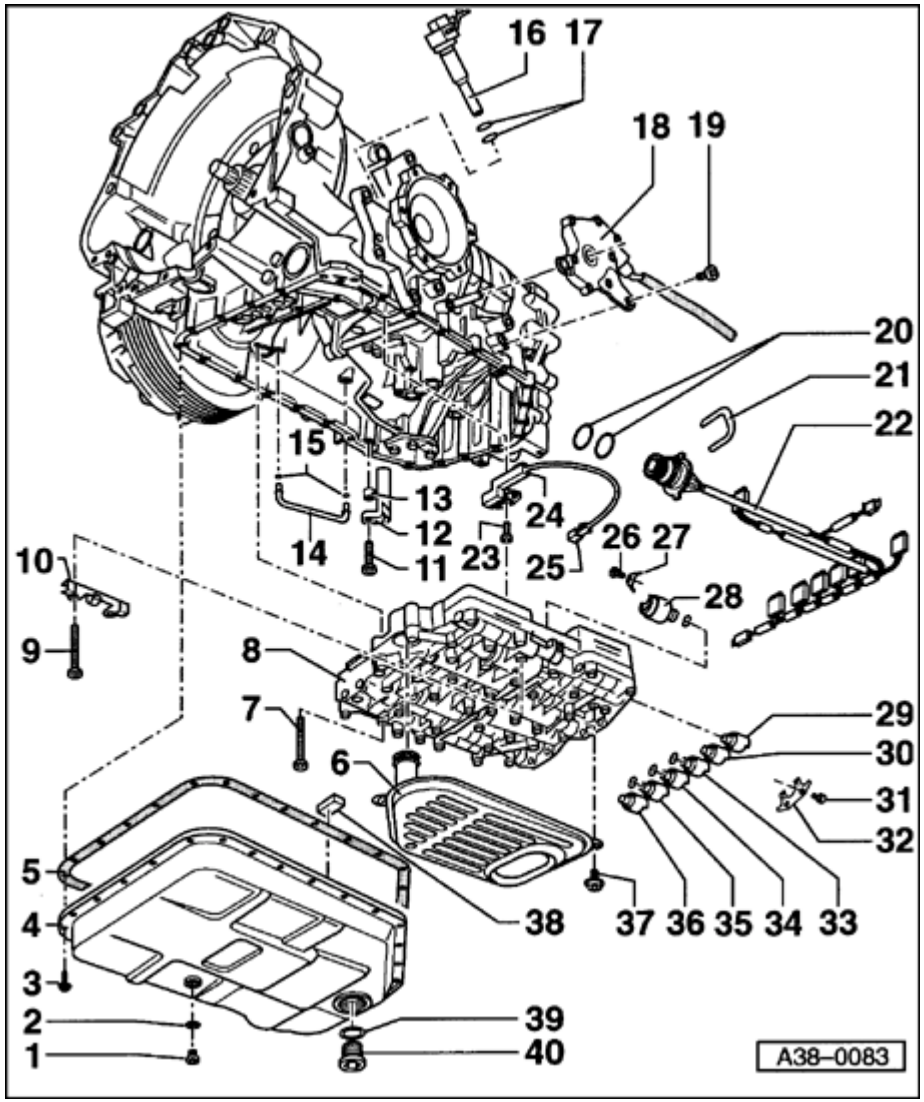
**34 - Solenoid Valve 7 -N94-**

- With O-ring
- Remove and install oil pan to replace ⇒ page 38-19

**35 - Solenoid valve 5 -N92-**

- With O-ring
- Remove and install oil pan to replace ⇒ page 38-19

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**36 - Solenoid valve 1 -N88-**

- Without O-ring
- Remove and install oil pan to replace ⇒ page 38-19 and unbolt guide plate for park locking mechanism
- When installing, do not tighten bolts for guide plate (23 Nm) in selector lever position "P".

**37 - Bolt - 6 Nm**

**38 - Magnet**

- 4 pieces in the oil pan recesses

**39 - O-ring**

- Always replace

**40 - ATF check plug - 80 Nm**

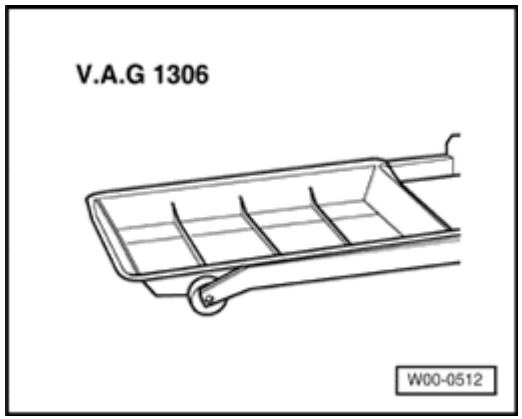
- 17 mm socket-head bolt

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38-19

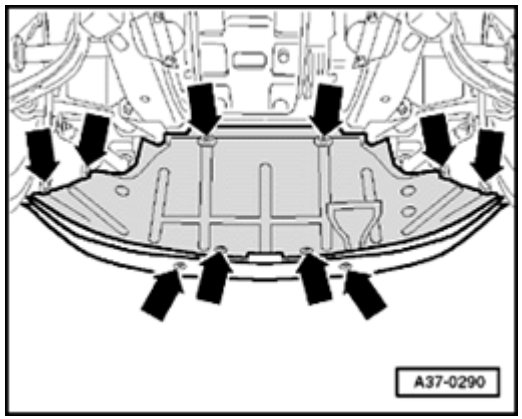
# Oil pan, removing and installing

## Special tools and equipment



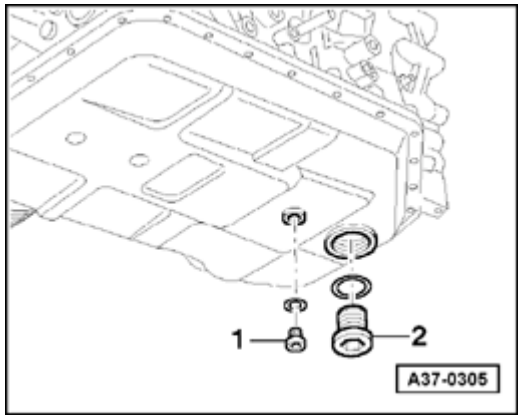

- VAG1306 drip tray

## Removing




- Remove noise insulation panel (arrows).
- Place VAG1306 drip tray under transmission.

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- Remove ATF drain plug -1- and drain ATF.
- Loosen bolts of oil pan in diagonal sequence.

**Installing**

Installation is reverse of removal, noting the following:

- Clean all 4 magnets in oil pan recesses. Ensure full surface contact of the magnets on the oil pan.
- Replace gaskets.

***Note:***

Drain plug and oil seal must both be replaced.

- Fill up ATF ⇒ page 37-140 .

**Tightening torques**

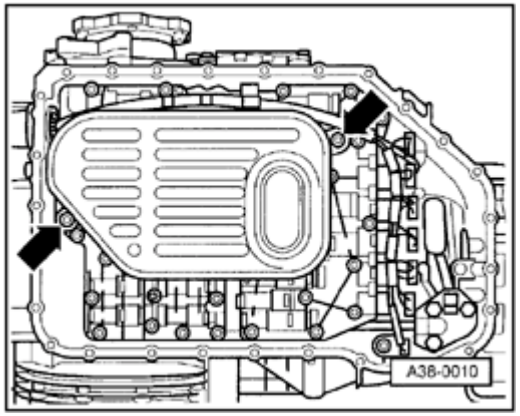
| Component | Nm |
|---|---|
| Drain plug to oil pan | 40 |
| Oil pan to transmission housing<br><br>(diagonally in sequence) | <br><br>10 |

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## Oil strainer, removing and installing

### Removing

- Removing oil pan ⇒ page 38-19 .




- Removing oil strainer bolts (arrows).
- Pull oil strainer off of valve body.

### Installing

- Lightly coat seal on suction collar of oil strainer with ATF.
- Carefully press suction collar of oil strainer into the opening at valve body up to stop.
- Bolt on oil strainer.
- Installing oil pan ⇒ page 38-20 .
- Fill up ATF ⇒ page 37-140 .

### Tightening torque

| Component | Nm |
|---|---|
| Oil strainer to valve body | 6 |

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38-22

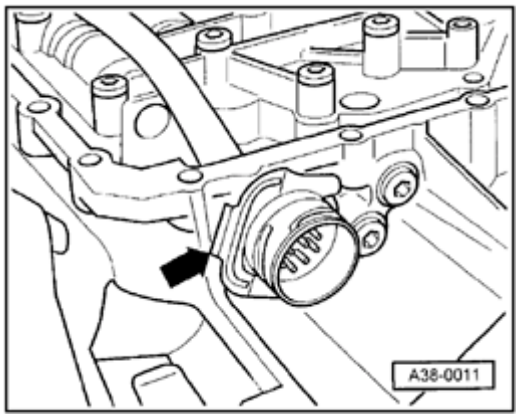
## Valve body, removing and installing

***Notes:***

- *Always replace a soiled or faulty valve body.*
- *General repair notes* ⇒ *page 00-27* .
- *Rules of cleanliness for working on automatic transmissions* ⇒ *page 37-148* .

**Removing**

- Removing oil pan ⇒ page 38-19 .
- Removing oil strainer ⇒ page 38-21 .

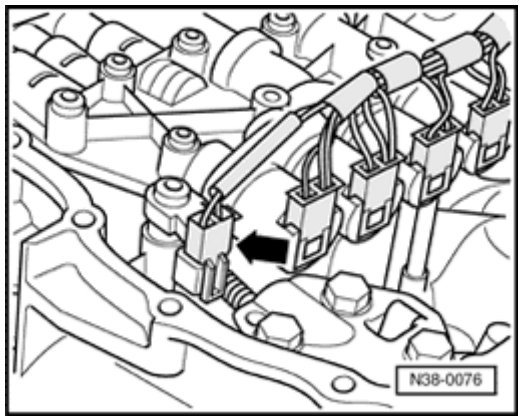



- Disconnect clip for wiring harness connectors (arrow).

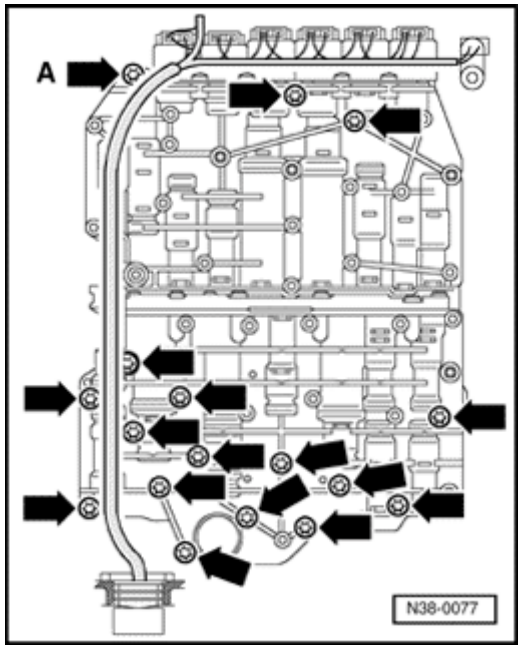
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38-23

**Only for Park/Neutral Position (PNP) Switch - E17-**




- Disconnect harness connector from Transmission Vehicle Speed Sensor (VSS) -G38- (arrow).




- Loosen mounting bolts (arrows) of valve body and remove valve body with wiring harness.

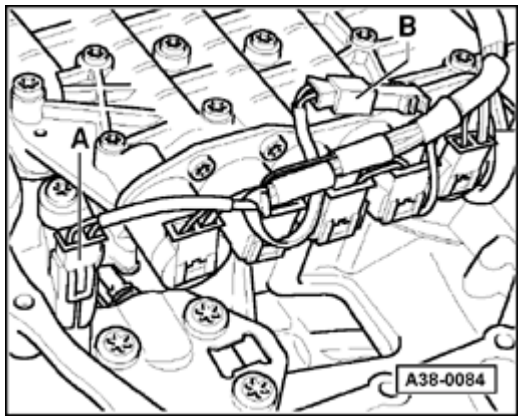
***Notes:***

- *Only the marked mounting bolts (arrows) must be loosened.*
- *When loosening other bolts, the function of the valve body can be influenced or the valve body splits up.*
- *The bolt (arrow) A is shorter and thinner than the other bolts. Observe allocation.*

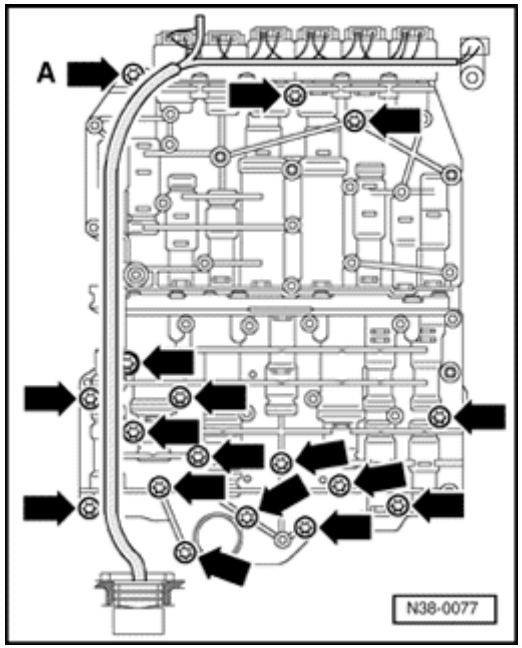
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38-24

**Only for transmission with hydraulic control E18/2**




- Disconnect harness connector from Transmission Vehicle Speed Sensor (VSS) -G38- (-A-).
- Disconnect harness connector from Sensor for transmission RPM - G182- (-B-).




- Loosen mounting bolts (arrows) of valve body and remove valve body with wiring harness.

***Notes:***

- *Only the marked mounting bolts (arrows) must be loosened.*
- *When loosening other bolts, the function of the valve body can be influenced or the valve body splits up.*
- *The bolt (arrow A) is not installed on transmissions with hydraulic control E18/2 and can therefore be disregarded.*

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**All:**

- Remove valve body from transmission while advancing the wiring harness connector.

***Note only for Park/Neutral Position (PNP) Switch -E17-:***

*Do not place the removed valve body on the Sensor for transmission RPM at rear of valve body. Danger of damage.*

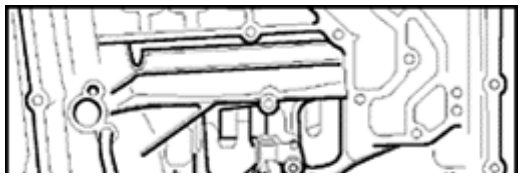
**Installing**

- Lightly coat O-rings of wiring harness connector with ATF.

- Insert wiring harness connector into transmission housing.

  - Installation position: Flat part of rear collar points downward, the tabs at collar are horizontal

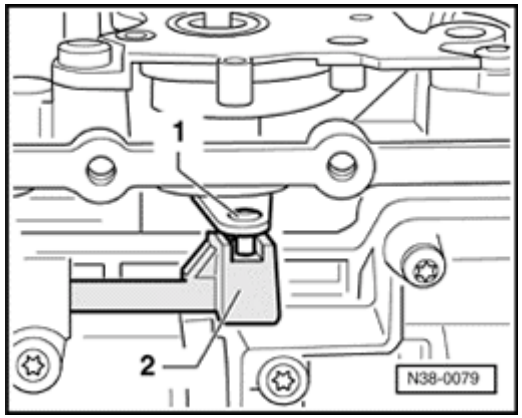
**Only for transmission with hydraulic control E18/2**



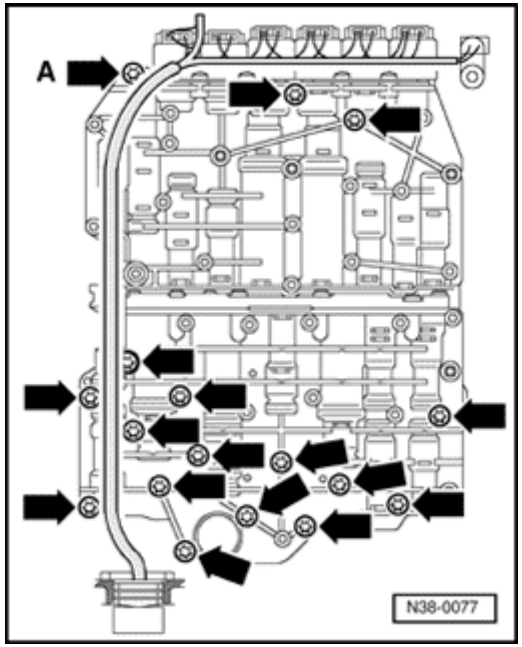
- Route wire with connector -C- according to illustration, so that the wire is not pinched when installing the valve body.

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**All:**




- Set valve body in place without force while placing bolt of notched disc -1- into the groove of the selector register -2-.




- Next, tighten valve body bolts (arrows) by hand.

***Notes:***

*On transmissions with Park/Neutral Position (PNP) Switch -E17-, the bolt (arrow A) is shorter and thinner than the other bolts. Observe allocation.*

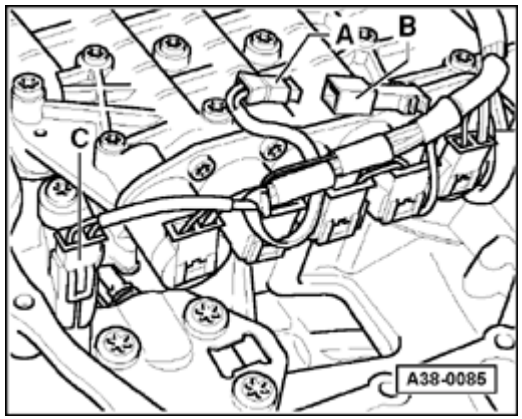
*The bolt (arrow A) is not installed on transmissions with hydraulic control E18/2 and can therefore be disregarded.*

- Then tighten valve body bolts from inside out to final tension.

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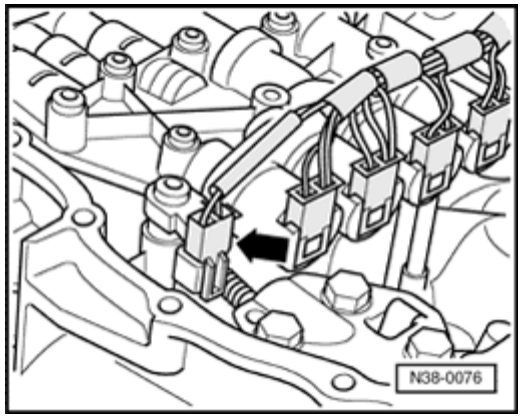
38-27

**Only for transmission with hydraulic control E18/2**



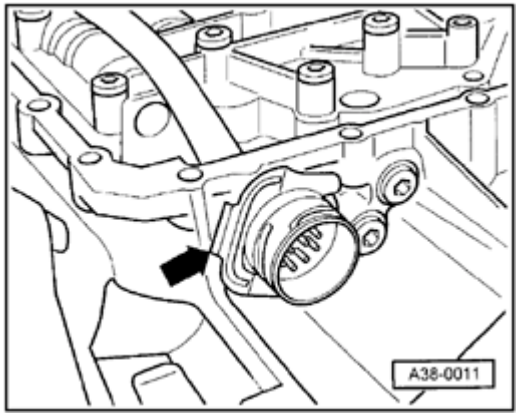

- Pull wiring with connector -B- of Sensor for transmission RPM -G182- between valve body and wiring harness upward.
- Connect connector -B- to connector -A- at wiring harness.
- Connect connector -C- to Transmission Vehicle Speed Sensor (VSS) -G38-.

**Only for Park/Neutral Position (PNP) Switch -E17-**




- Connect connector (arrow) to Transmission Vehicle Speed Sensor (VSS) -G38-.

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**All:**

- Connect clip to wiring harness connector (arrow).
- Installing oil strainer ⇒ page 38-21 .
- Installing oil pan ⇒ page 38-20 .
- Fill up ATF ⇒ page 37-140 .

**Tightening torque**

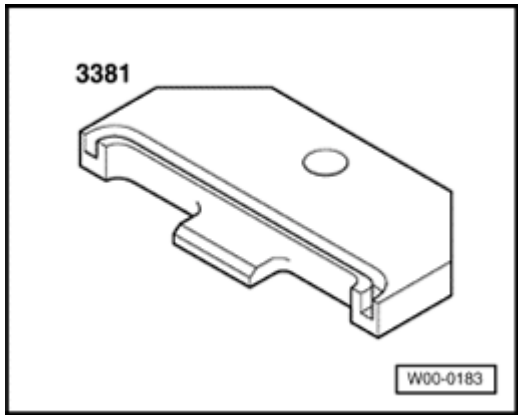
| Component | Nm |
|---|---|
| Valve body to transmission housing (from inside out) | 8 |

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38-29

## Oil line inside transmission, removing and installing

### Special tools and equipment



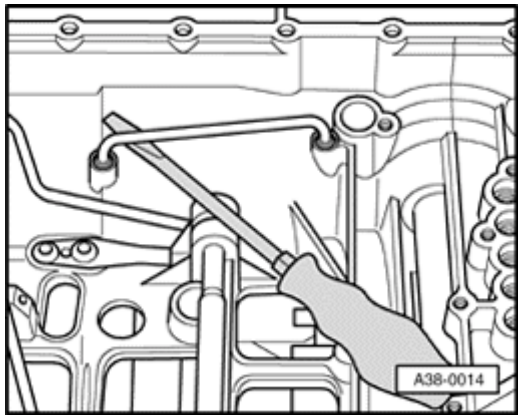

- 3381oil line installer

***Notes:***

- *Faulty O-rings at inner oil line allow ATF to enter the differential, which becomes over-filled and oil escapes at differential vent.*
- *A removed oil line generally must be replaced.*
- *The oil line must only be inserted using 3381oil line installer. Otherwise there is a risk of leaks because of bending of the oil line.*

### Removing

- Removing valve body ⇒ page 38-22 .



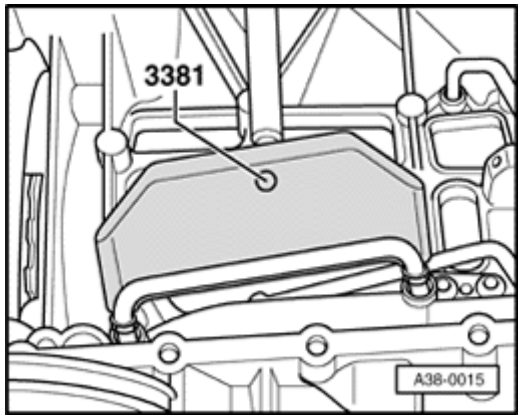

- Lever off inner oil line evenly from transmission housing.

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## Installing

Installation is reverse of removal, noting the following:

- Replace O-rings.




- Insert oil line into 3381 oil line installer.
- Drive oil line into transmission housing by lightly tapping on the 3381 oil line installer up to stop using a plastic mallet.

***Notes:***

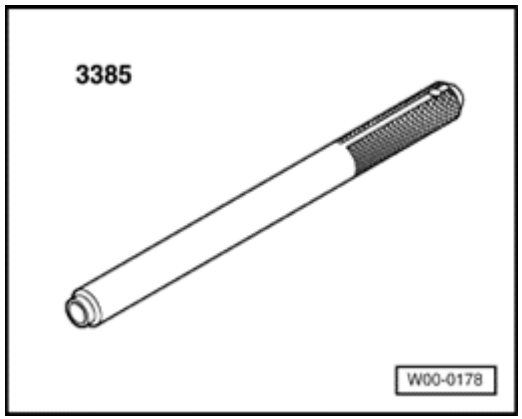
- *The open side of 3381 oil line installer faces toward the outer wall of the transmission.*
- *Do not cant oil line. Drive in both line ends uniformly.*

- Installing valve body ⇒ page 38-25 .
- Fill up ATF ⇒ page 37-140 .
- Checking oil level in front final drive ⇒ page 39-1 .

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## Shift rod seal, replacing

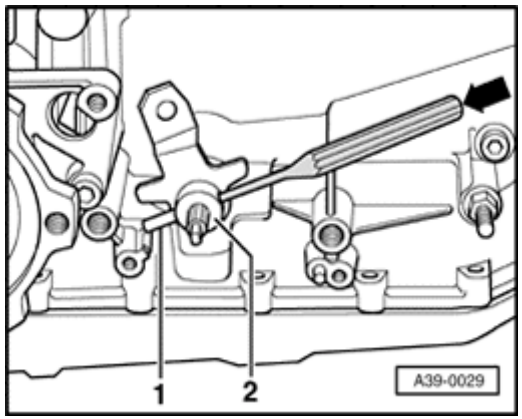
### Special tools and equipment




- 3385 sealing ring installer

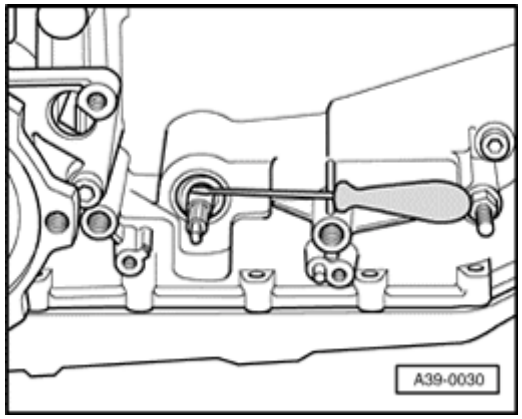
### Removing

- Removing left transmission support ⇒ page 37-125 .
- Removing Multi-Function Transmission Range (TR) Switch -F125- ⇒ page 38-33 .




- Drive out spring dowel sleeve -1- at lever/shift rod -2- in direction of travel toward the front (arrow), until the lever/shift rod can be pulled off the shift rod.

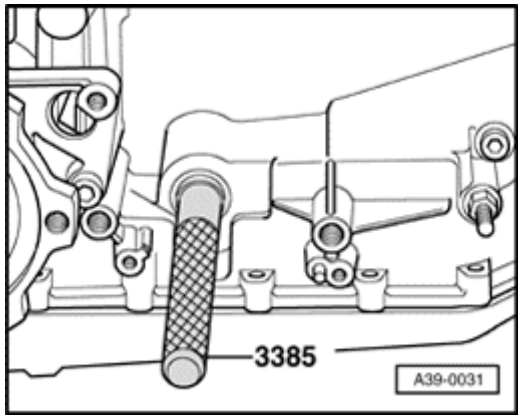
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- Pierce sealing ring using a small screwdriver and pull out.

**Installing**

- Coat outer circumference and gap between sealing lips with ATF.
  - Installation position: The open side of the sealing ring faces the transmission.




- Slide new sealing ring onto 3385 sealing ring installer without canting and drive in up to stop of pressure piece.
- Installing Multi-function switch ⇒ page 38-33 .
- Drive back spring dowel sleeve with transmission not yet removed in opposite direction through the lever.
- Slide transmission shift lever onto shift rod and drive in spring dowel sleeve.
- Installing left transmission support ⇒ page 37-125 .

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38-33

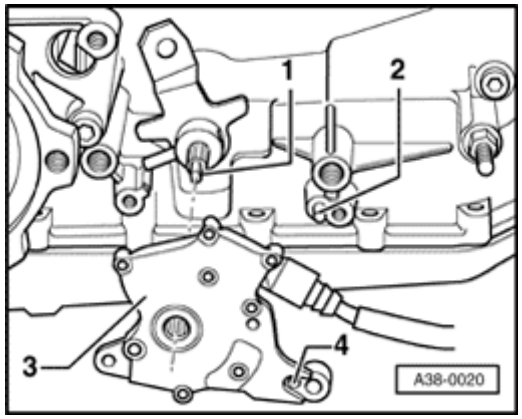
## Multi-Function Transmission Range (TR) Switch -F125-, removing and installing

### Removing

- Removing left transmission support ⇒ page 37-125 .

- Unbolt Multi-Function Transmission Range (TR) Switch -F125- from transmission and pull off from shift rod.

### Installing



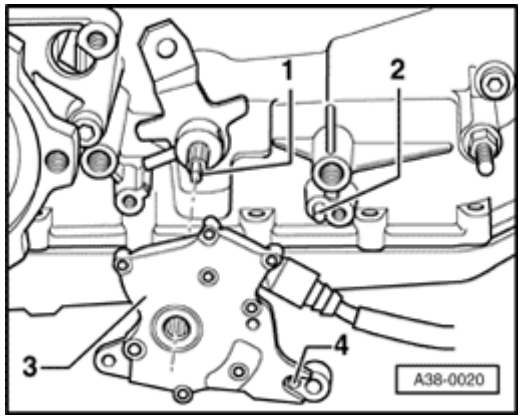

- Connect Multi-Function Transmission Range (TR) Switch -F125- on shift rod. Flap part at splines in switch -3- must align with flat part of shift rod -1-.

***Note:***

*Set Multi-Function Transmission Range (TR) Switch -F125- onto shift rod in centered manner. Do not cant and do not set with force. Risk of damage at switch terminals.*

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38-34




- Rotate switch until the alignment hole -4- at switch housing can be fitted on the alignment pin -2- at transmission housing.
- Installing left transmission support ⇒ page 37-125 .

**Tightening torques**

| Component | Nm |
|---|---|
| multi-function Transmission Range (TR) switch -F125- to transmission | 8 |

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38-35

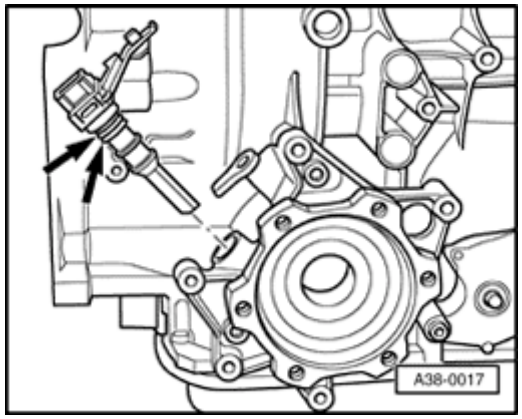
## Speedometer Vehicle Speed Sensor (VSS) -G22-, removing and installing

### Removing

- Disconnect harness connector from Speedometer Vehicle Speed Sensor (VSS) -G22-.

- Push retaining bracket of sensor downward, turn and pull sensor out.

### Installing




- Replace sealing rings (arrows).
- Insert O-rings with grease.
- Insert sensor.
- Engage retaining bracket at mounting bracket for flange shaft.

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38-36

## Sensor for transmission RPM -G182-, removing and installing

***Note:***

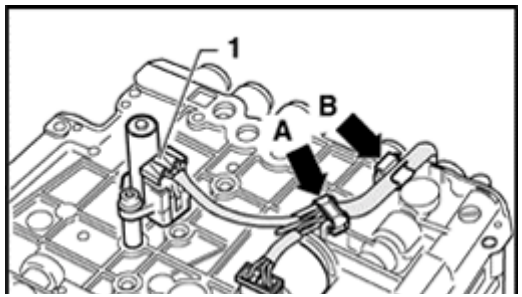
- *There is a distinction made between two types of transmission. Transmissions with hydraulic control E17, the sensor for transmission RPM (inductive sensor) is secured to bottom of valve body. Transmissions with hydraulic control E18/2, the sensor for transmission RPM (hall effect sensor) is secured to transmission housing behind valve body.*

- *Information regarding which transmission is installed can be found in tables ⇒ page 00-4 onward.*

**For transmissions with hydraulic control E17**

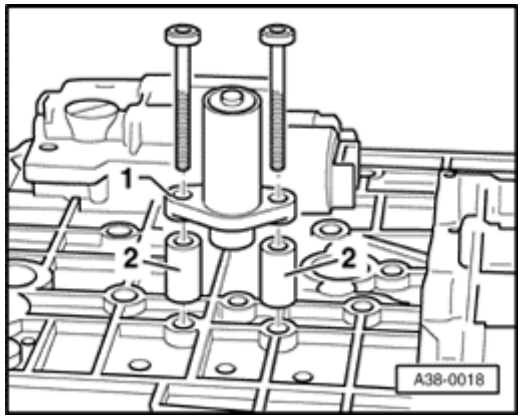
**Removing**

- Removing valve body ⇒ page 38-22 .




- Turn valve body on its back side and loosen connector at Sensor for transmission RPM -1-.

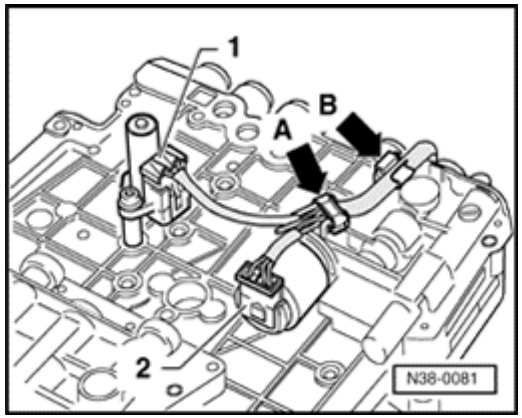
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- Unbolt Sensor for transmission RPM -1- at valve body.

**Installing**

- Tighten Sensor for transmission RPM -1- using spacer sleeves -2- (height: 20 mm) to 7 Nm.
  - Installation position: Sensor-side with the connector terminals points to valve body center.




- Connect connector to Sensor for transmission RPM -1-.
- Installing valve body ⇒ page 38-25 .
- Fill up ATF ⇒ page 37-140 .

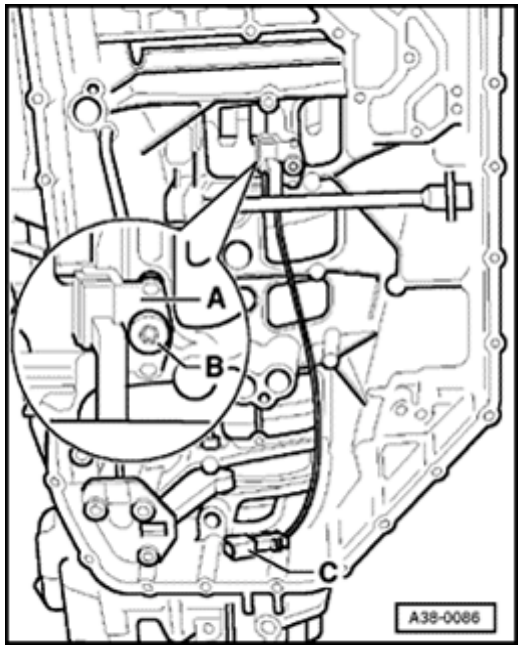
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38-38

**For transmissions with hydraulic control**
**E18/2**

**Removing**

- Removing valve body ⇒ page 38-22 .



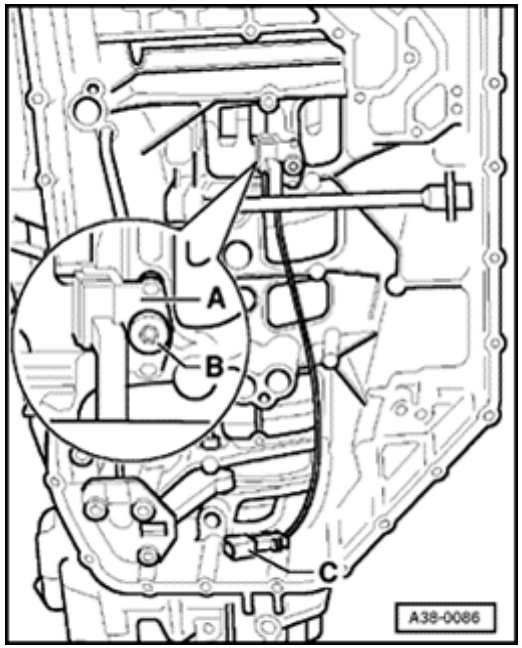

- Unbolt Sensor for transmission RPM -A- from transmission.

**Installing**

- Bolt on Sensor for transmission RPM -A- at transmission via bolt -B-. Tightening torque is 9 Nm.

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**38-39**




- Route wire with connector -C- according to illustration, so that the wire is not pinched when installing the valve body.
- Installing valve body ⇒ page 38-25 .
- Fill up ATF ⇒ page 37-140 .

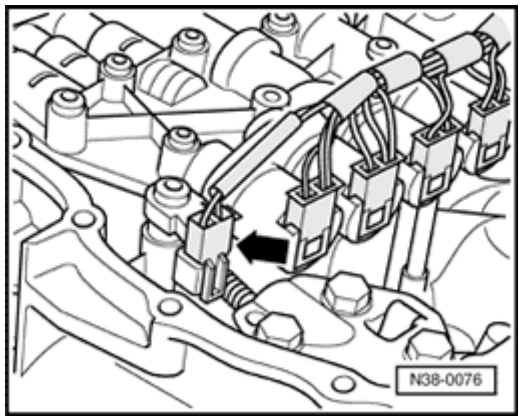
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38-40

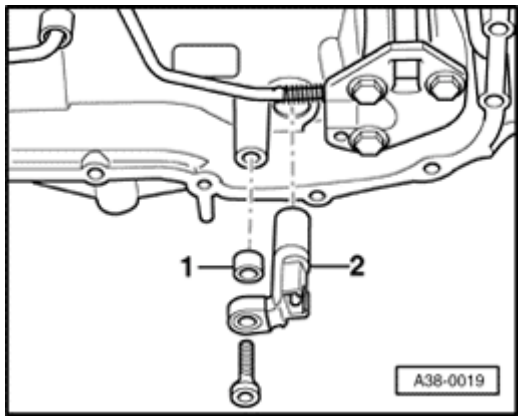
## Transmission Vehicle Speed Sensor (VSS) -G38-, removing and installing

### Removing

- Removing oil pan ⇒ page 38-19 .




- Disconnect harness connector from Transmission Vehicle Speed Sensor (VSS) -G38- (arrow).



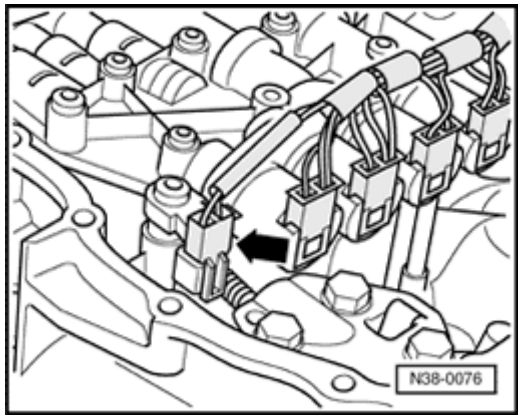

- Remove Transmission Vehicle Speed Sensor (VSS) -2-.

### Installing

- Install and tighten Transmission Vehicle Speed Sensor (VSS) -2- using spacer sleeve -1- (height: 8 mm) to 6 Nm.

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38-41




- Connect connector at Transmission Vehicle Speed Sensor (VSS) - G38-.
- Installing oil pan ⇒ page 38-20 .
- Fill up ATF ⇒ page 37-140 .

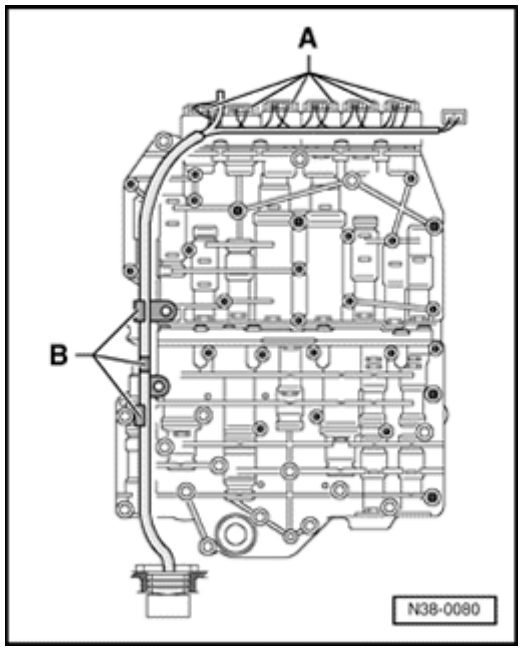
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38-42

## Wiring harness in transmission, removing and installing

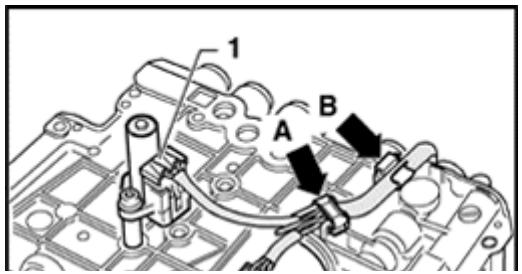
### Removing

- Removing valve body ⇒ page 38-22 .




- Lever out retainer straps of connectors at solenoid valves using a small screwdriver and disconnect connectors -A- in sequence.
- Unhook wiring harness at side retainer straps -B- of valve body.

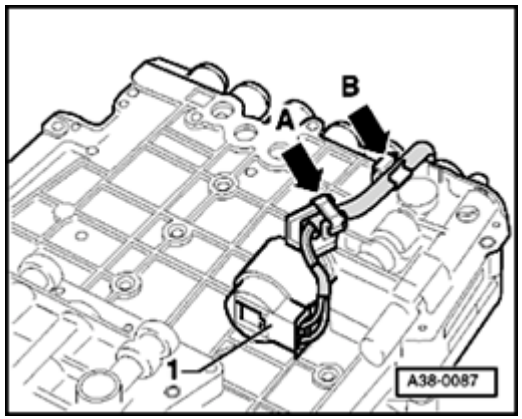
**Only for Park/Neutral Position (PNP) Switch -E17-**




- Turn valve body on its back side and loosen connector at Sensor for transmission RPM -1-.
- Remove retaining clip (arrow A) and unclip wiring harness from retaining clip (arrow B).
- Disconnect connector -2- from Solenoid Valve 4 -N91-.

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38-43




**Only for transmission with hydraulic control E18/2**

- Turn valve body on its back side and loosen connector at Sensor for transmission RPM -1-.
- Remove retaining clip (arrow A) and unclip wiring harness from retaining clip (arrow B).

**Installing, valid for all:**

Installation is reverse of removal, noting the following:

- When installing, connect connectors of wiring harness to the corresponding solenoid valves.
- Clip wiring harness into the respective retaining clips. In case of deviations, the wiring harness can be pinched during installation of the valve body.
- Installing valve body ⇒ page 38-25 .
- Fill up ATF ⇒ page 37-140 .

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## Transmission Fluid Temperature Sensor -G93-, replacing

***Note:***

*Transmission Fluid Temperature Sensor -G93- is integrated in the transmission wiring harness.*

### Removing

- Remove wiring harness in transmission ⇒ page 38-42 .

### Installing

Installation is the reverse of removal. Also carry out the following procedure.

- Replace wiring harness with a new one.

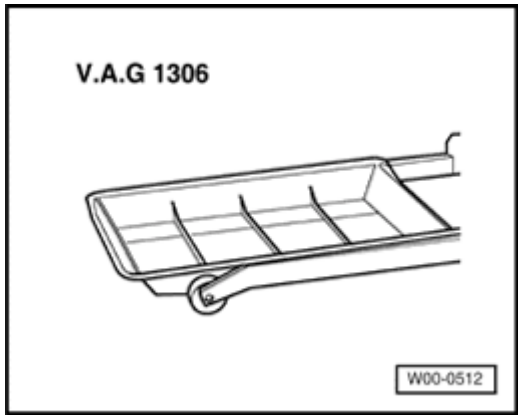
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39-1

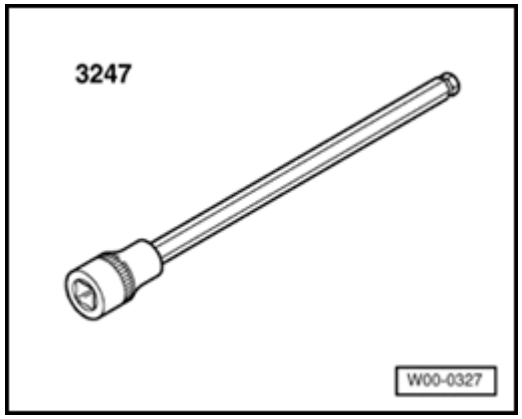
# Gear oil in front final drive

## Gear oil in front final drive, checking

### Special tools and equipment



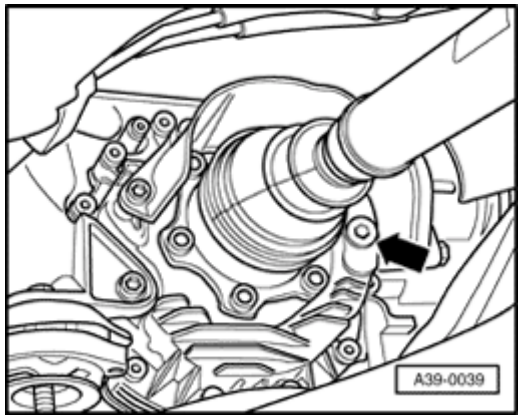

- VAG1306 drip tray




- 3247 plug insert (8mm)

- Perform a short road test to heat up gear oil to approx. 60 ° C.
- Drive the vehicle onto a 4-column lift or over a work pit so that it is absolutely level.
- Switch engine off and let gear oil drip out for 5 minutes.
- Place VAG1306 drip tray underneath.

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- Remove oil filler plug (arrow).

***Note:***

*Loosen locking bolt using an angled socket-head wrench, but do not use 3247 hex ball socket. For improved accessibility it may be necessary to remove the heat shield and drive axle and to set them aside.*

*If 3247 hex ball socket is used for loosening the bolt, it could be destroyed.*

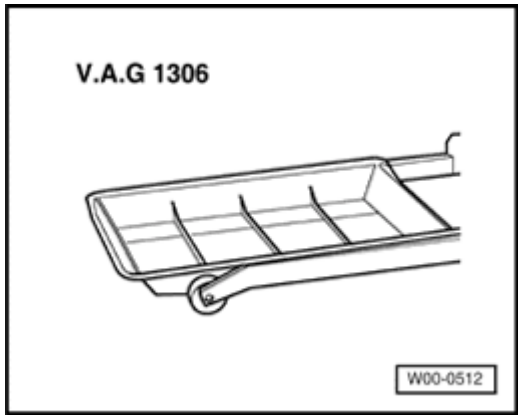
  - ♦ Specification: Oil level should reach lower edge of oil filler hole.

- Let excessive gear oil drain or top up gear oil.
  - ♦ Specification ⇒ page 00-22
- Always replace O-ring for oil filler plug.
- Tighten locking bolt using 3247 hex ball socket (8mm socket) to 30 Nm.

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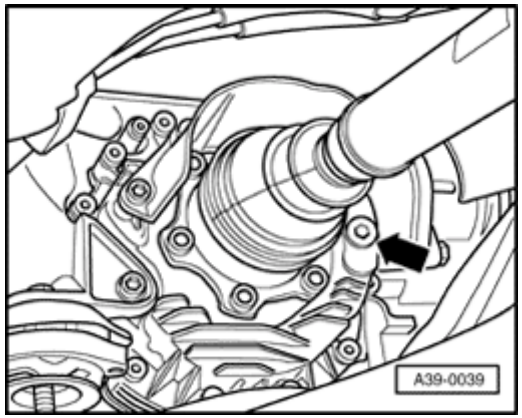
## Gear oil in front final drive, filling up after repair

### Special tools and equipment




- ♦ VAG1306 drip tray

- Drive the vehicle onto a 4-column lift or over a work pit so that it is absolutely level.
- Place VAG1306 drip tray underneath.




- Remove oil filler plug (arrow).

***Note:***

*Loosen locking bolt using an angled socket-head wrench, but do not use 3247 hex ball socket. For improved accessibility it may be necessary to remove the heat shield and drive axle and to set them aside.*

*If 3247 hex ball socket is used for loosening the bolt, it could be destroyed.*

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- Slowly and uniformly fill front final drive over a time period of at least 5 minutes until gear oil escapes at lower edge of oil filler hole.

  - Specification ⇒ page 00-22

***Note:***

*Filling time of at least 5 minutes is essential, so that the internal oil level compensation between differential and retaining area can occur.*

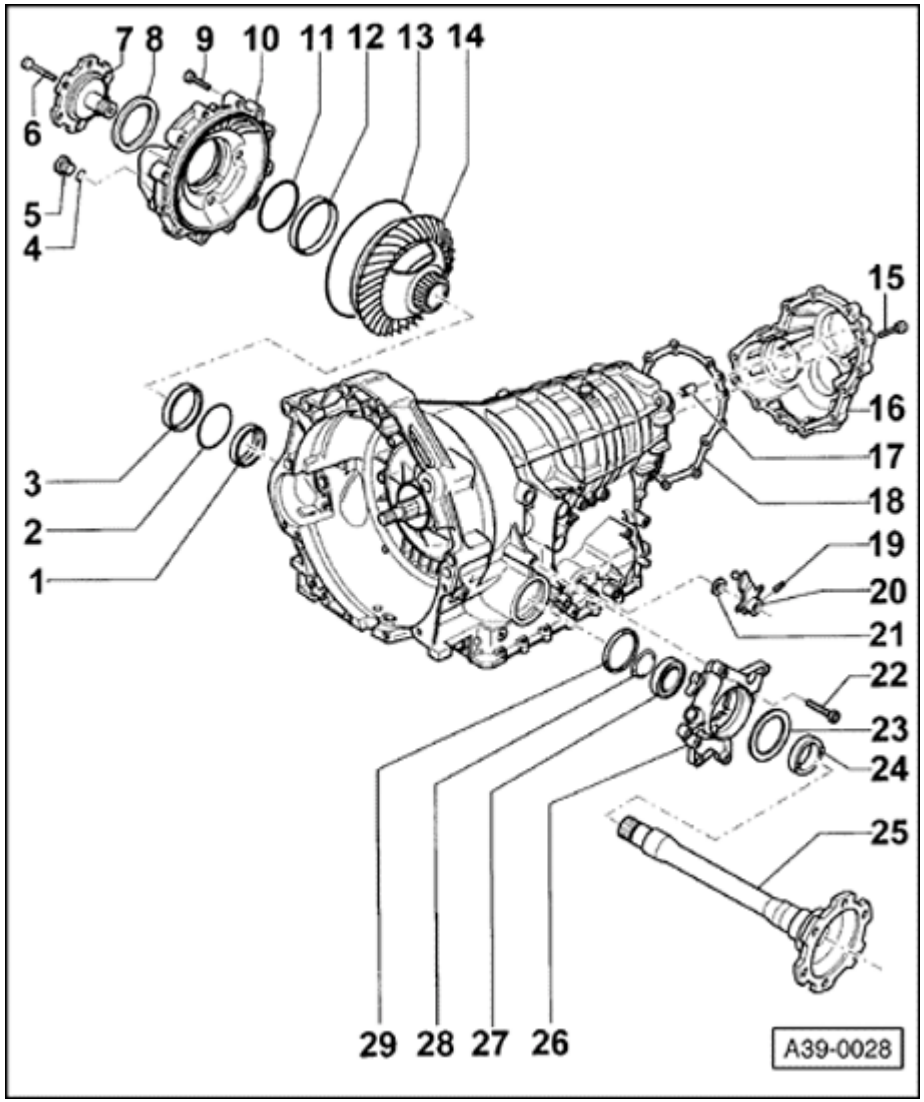
- Install old oil filler plug.

- Perform a short road test to heat up gear oil to approx. 60 ° C.

- Make sure to check oil level in front final drive ⇒ page 39-1 !

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39-5




# Front final drive, servicing

- Transmission installed

***Notes:***

- *General repair notes* ⇒ *page 00-27* .
- *Rules of cleanliness for working on automatic transmissions* ⇒ *page 37-148* .

**1 - Seal**

- Between final drive and transmission housing
- Always replace ⇒ page 39-28

**2 - Adjustment shim**

- Behind tapered roller bearing outer race

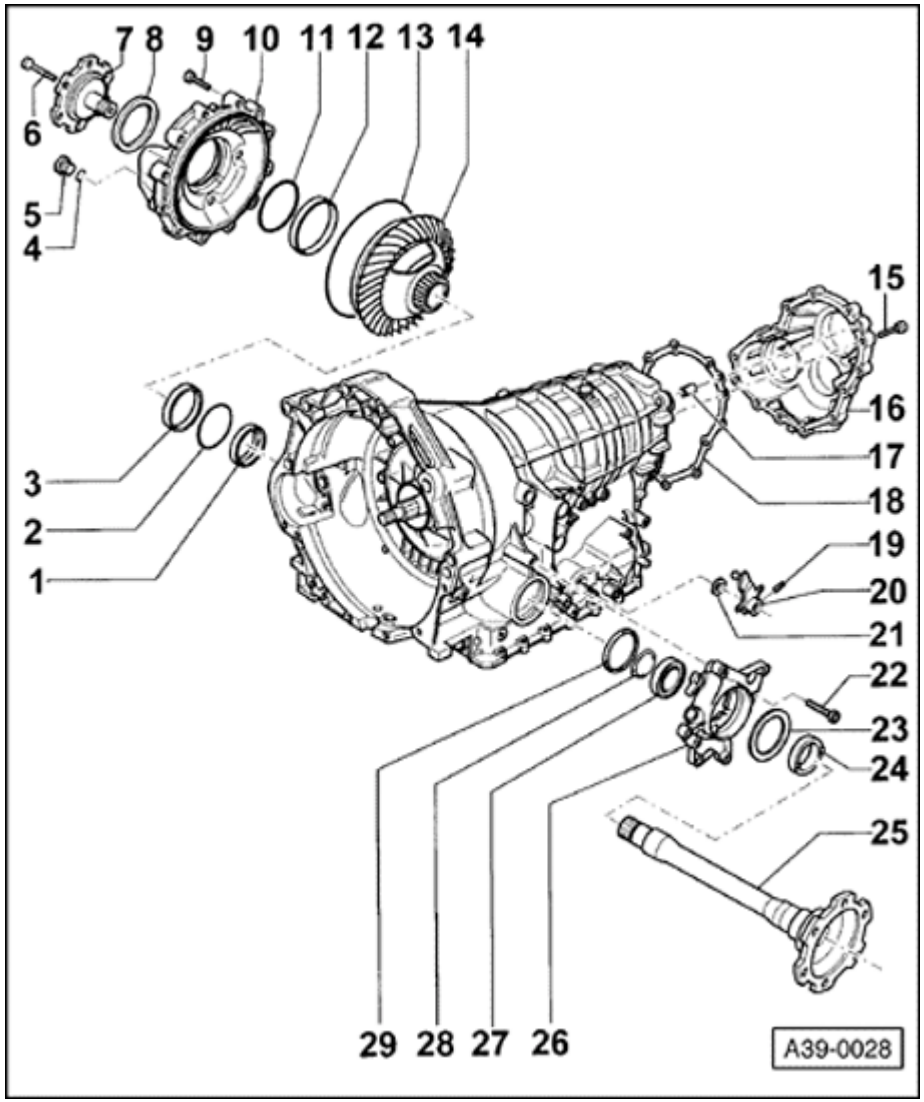
**3 - Tapered roller bearing outer race**

**4 - O-ring**

- Always replace

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39-6




**5 - Locking bolt - 30 Nm**

**6 - Bolt - 23 Nm**

**7 - Right drive flange**

**8 - Seal**

- For right drive flange
- Always replace ⇒ page 39-9

**9 - Bolt - 23 Nm**

- Observe tightening sequence ⇒ page 39-36

**10 - Cover for final drive**

**11 - Adjustment shim**

- Behind tapered roller bearing outer race

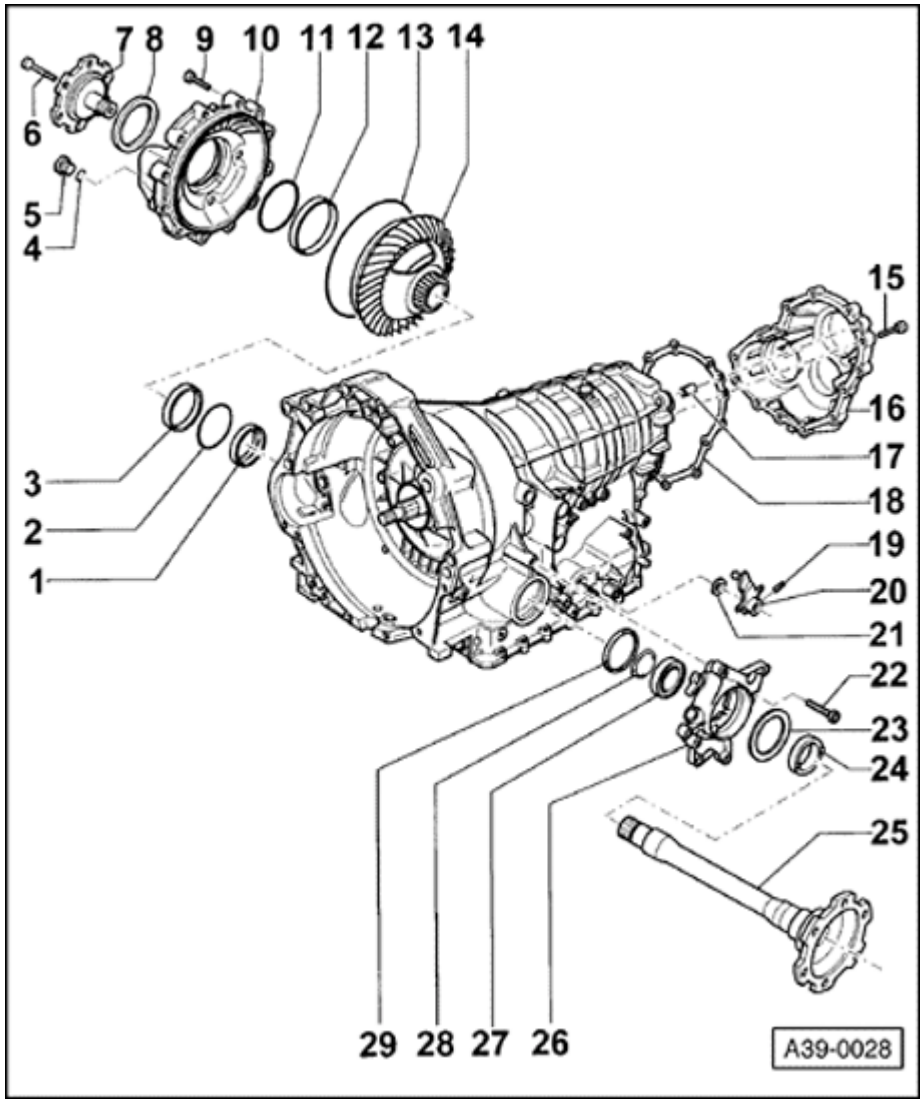
**12 - Tapered roller bearing outer race**

**13 - O-ring**

- Always replace ⇒ page 39-36

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39-7




**14 - Differential**

**15 - Bolt - 23 Nm**

- Observe tightening sequence ⇒ page 39-27

**16 - Cover for front final drive**

- Shown here: Front wheel drive version
- All wheel drive version ⇒ page 39-52 , item 31

**17 - Bushing**

**18 - Gasket**

- Always replace ⇒ page 39-24

**19 - Spring dowel sleeve**

**20 - Lever**

- For shift rod

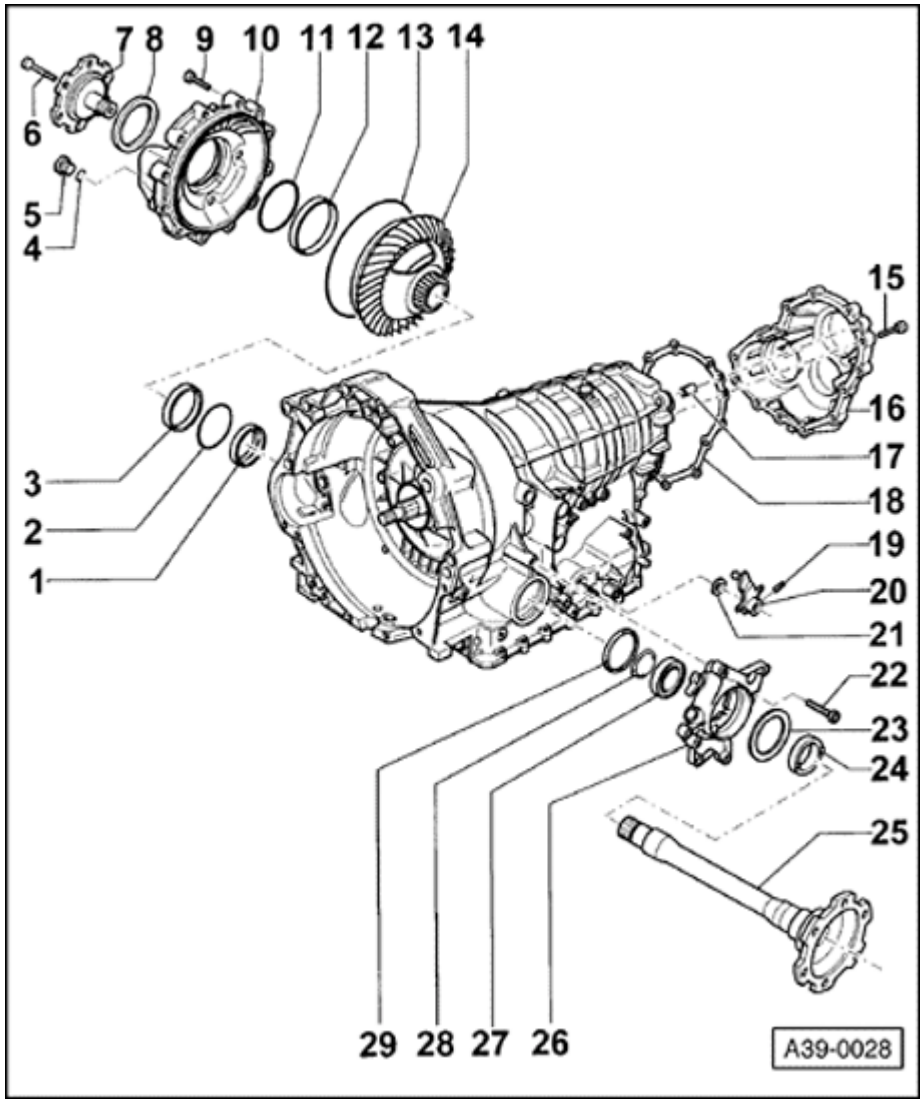
**21 - Seal**

- For shift rod
- Always replace ⇒ page 38-31

**22 - Bolt - 23 Nm**

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39-8




**23 - Seal**

- For left drive flange
- Always replace ⇒ page 39-13

**24 - Drive gear**

- For Speedometer Vehicle Speed Sensor (VSS) -G22-
- Installed position ⇒ page 39-20

**25 - Left drive flange**

- Removing and installing ⇒ page 39-13

**26 - Mounting bracket for drive flange**

**27 - Grooved ball bearing for drive flange**

- Always replace ⇒ page 39-13

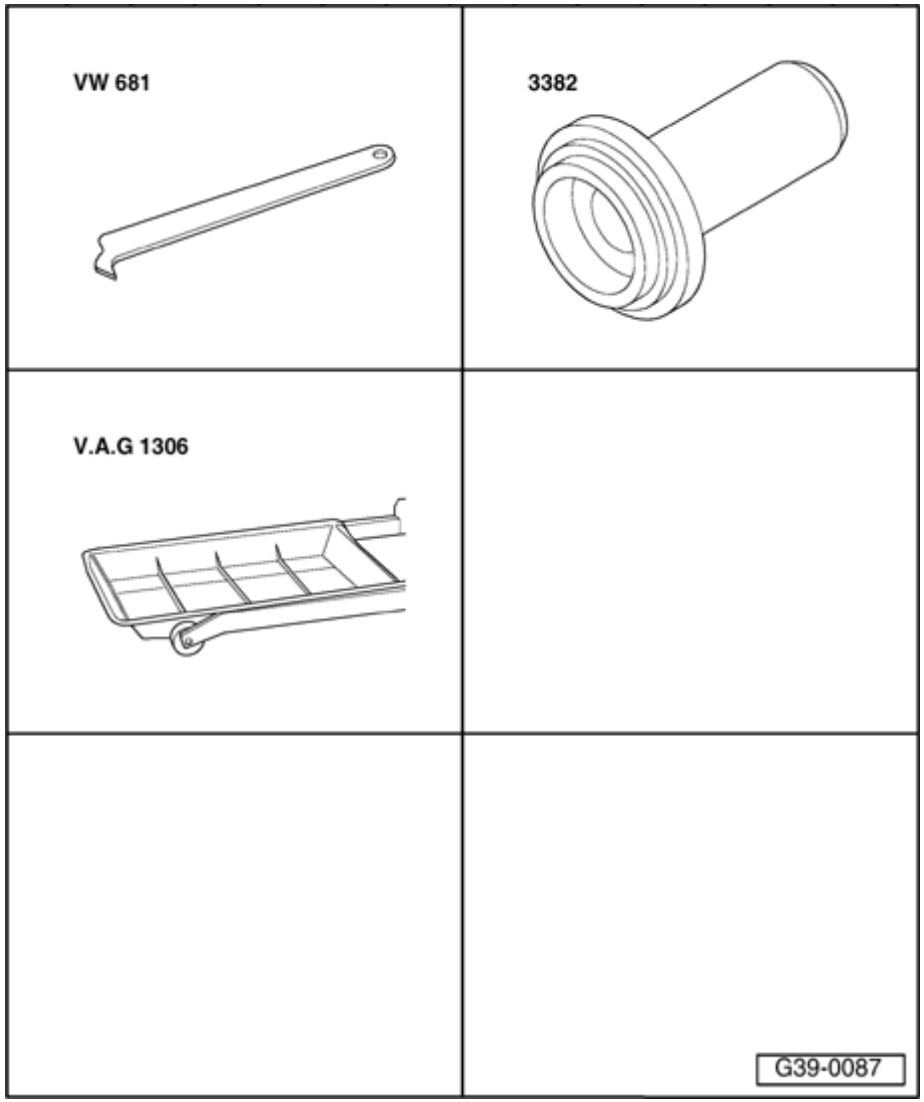
**28 - Snap ring**

**29 - O-ring**

- Square cross section
- Remove and install left drive flange to replace ⇒ page 39-13

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39-9




## Seal for right drive flange, replacing

### Special Tools and equipment

- VW681 extractor lever
- 3382 right seal installer
- VAG1306 drip tray

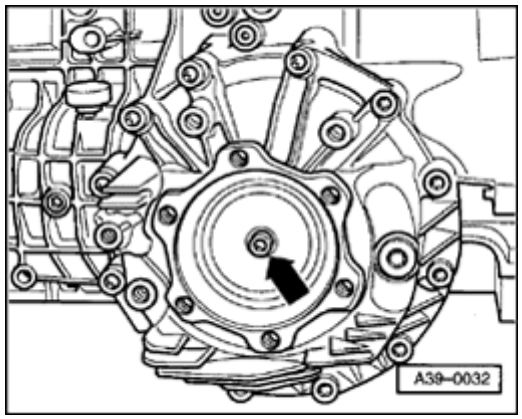
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39-10

**Removing**

- Loosen bolt drive axle/wheel hub while the vehicle is still standing on its wheels.
- Remove wheel.
- Remove heat shield for right drive axle.
- Remove right drive axle:

⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 40; Drive axle, removing and installing*

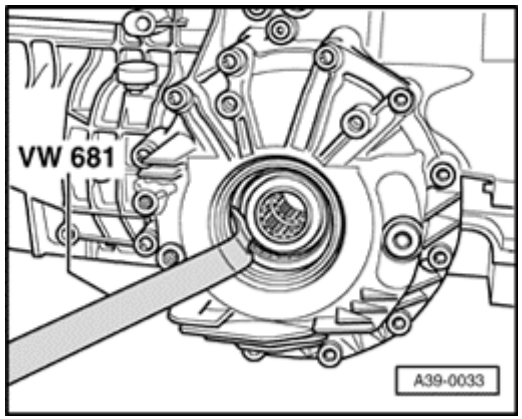



- Remove bolt for flange shaft (arrow) while securing against turning using a drift.
- Place VAG1306 drip tray underneath.

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39-11

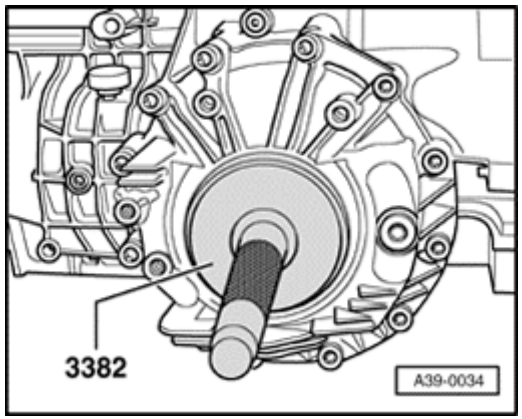
- Remove right drive flange.




- Drive flange seal, pulling out.

**Installing**

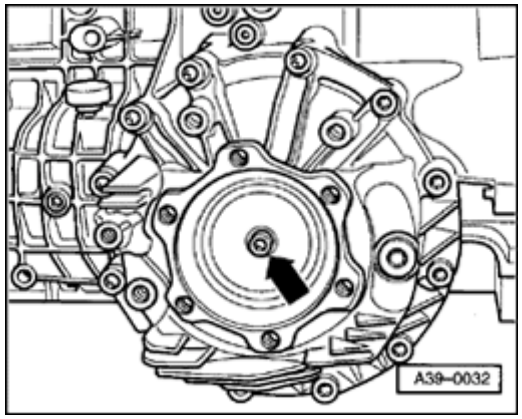
- Coat outer edge of oil seal with gear oil.




- Drive in new seal to stop, without canting.
  - ♦ Installation position: The open side of the seal faces the transmission.
- Install right drive flange.

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39-12




- Install bolt for drive flange (arrow, 23 Nm) while securing drive flange against turning, using a drift.
- Install drive axle.

⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 40; Drive axle, removing and installing*

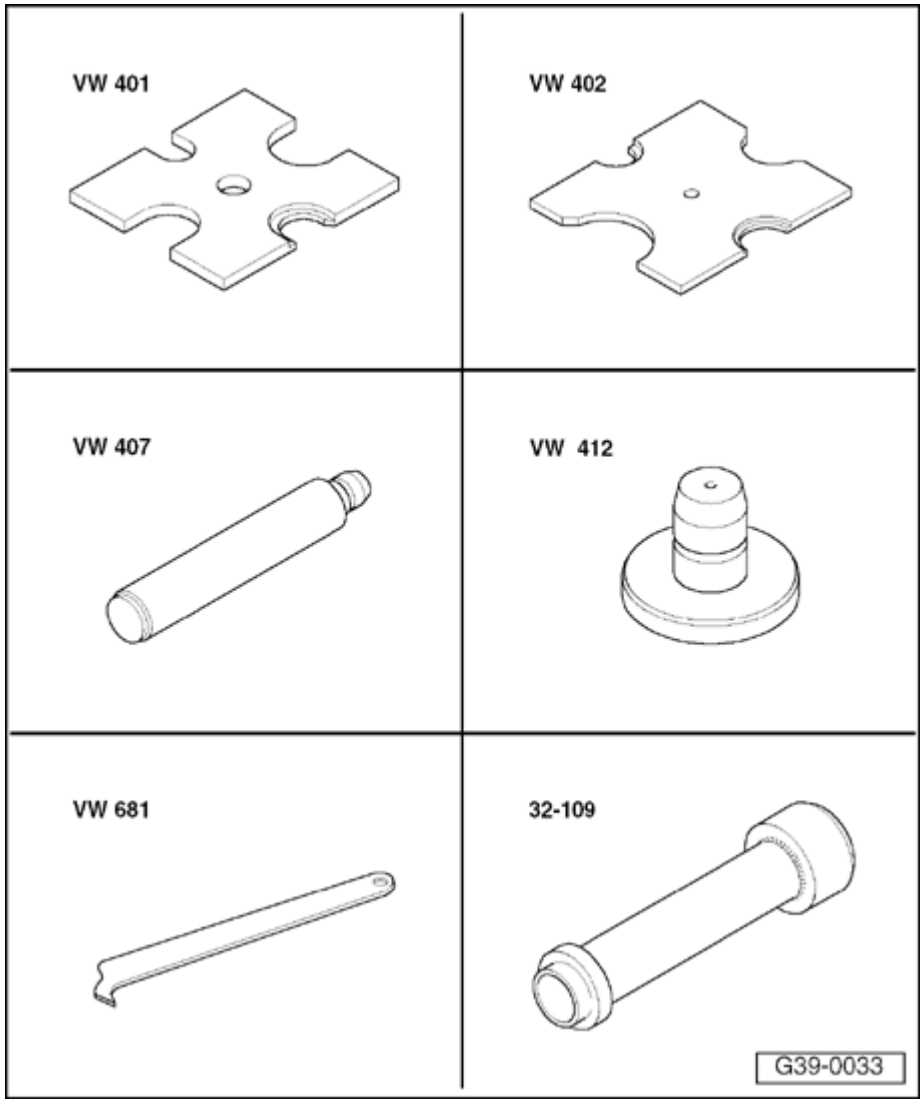
- Install heat shield for right drive axle.
- Checking oil level in front final drive ⇒ page 39-1 .

**Tightening torques**

| Component | Nm |
|---|---|
| Drive flange to transmission | 23 |
| Drive axle to drive flange M10 | 77 |
| Driveshaft to drive flange M8 | 39 |
| Heat shield for driveshaft to transmission | 23 |

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39-13



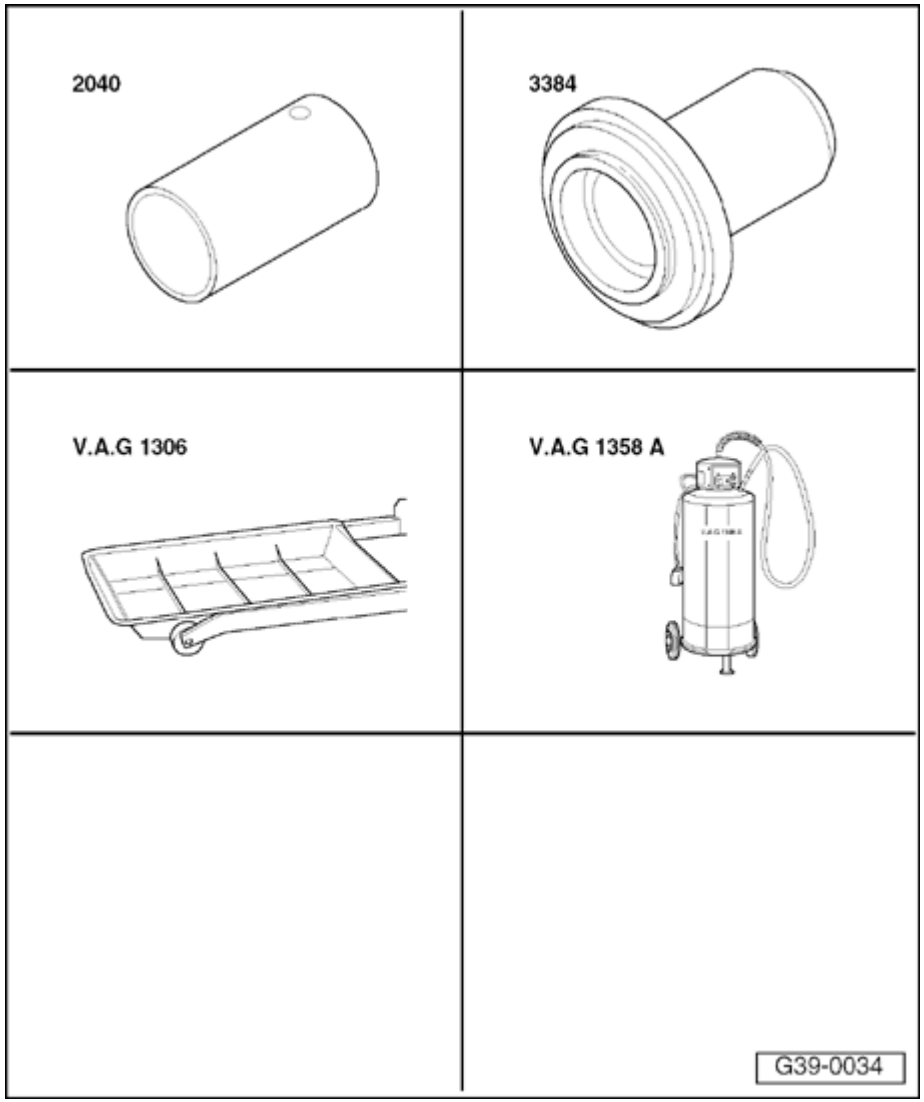

## Seal and grooved ball bearing for left drive flange, replacing

### Special Tools and equipment

- VW401 thrust plate
- VW402 thrust plate
- VW407 punch
- VW412 punch
- VW681 extractor lever
- 32-109 driving sleeve

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**39-14**




- 2040 press tube
- 3384 assembly mandrel
- VAG1306 drip tray
- VAG1358A - oil siphoning unit

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39-15

**Remove left drive flange**

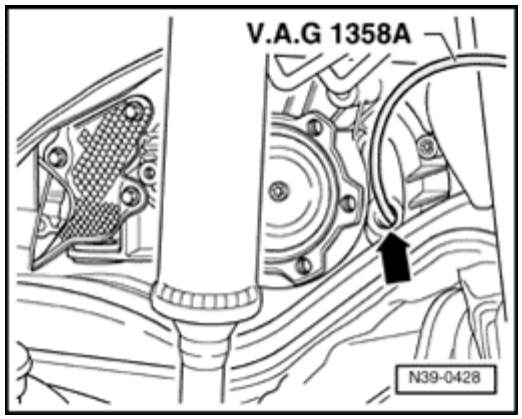
- Loosen bolt drive axle/wheel hub while the vehicle is still standing on its wheels.

- Remove wheel.

- Removing left drive axle:

⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 40; Drive axle, removing and installing*

- Place VAG1306 drip tray underneath.




- Remove oil filler plug (arrow) and syphon off at least 0.5 L gear oil from final drive using VAG1358A.

***Note:***

*Oil must be syphoned from final drive, otherwise there is a risk that the gear oil could mix with the ATF.*

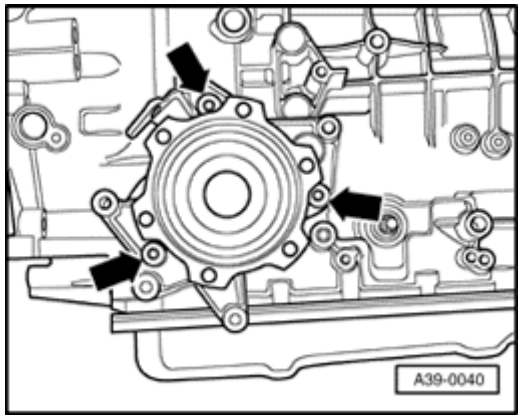
- Remove heat shield for left drive axle.
- Remove Speedometer Vehicle Speed Sensor (VSS) ⇒ page 38-35 .
- Remove harness connector bracket from mounting bracket for drive

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flange.

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**39-16**




- Remove drive flange mounting bracket (arrows).
- Pull out drive flange.

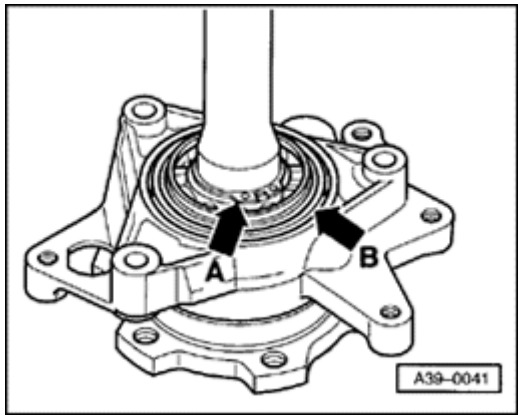
***Note:***

*The left drive flange can be pulled out between body and subframe with the transmission installed if the drive flange mounting bracket is turned approx. 60° to the right against the installed position.*

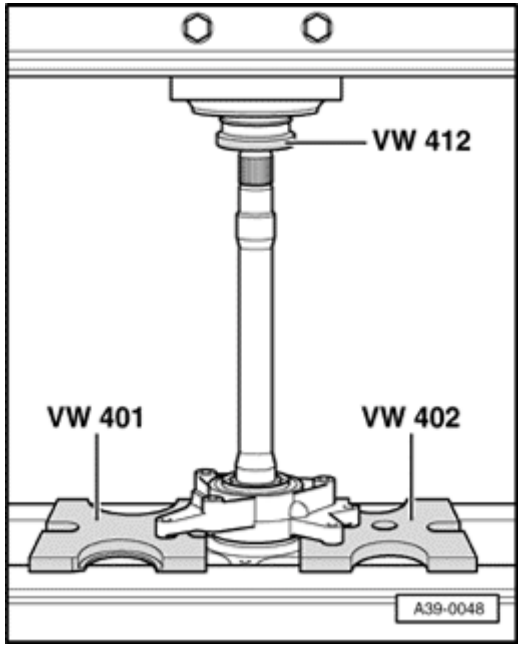
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39-17

**Removing seal**



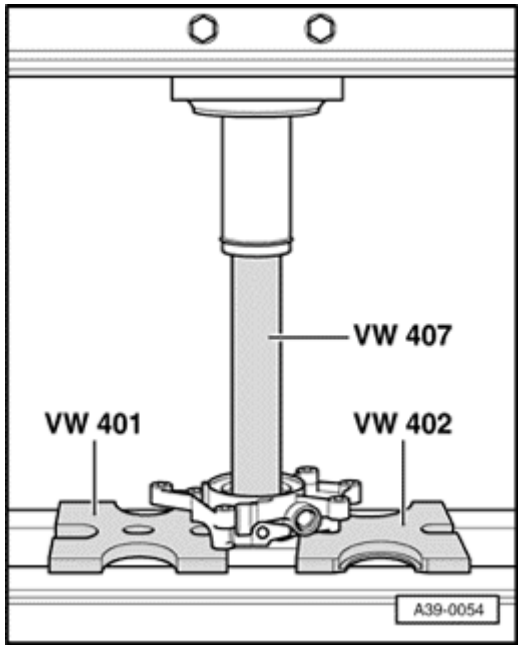

- Remove circlip for grooved ball bearing (arrow A).




- Press drive flange out of drive flange mounting bracket.
- Remove drive flange seal using VW681 extractor lever.

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**Removing grooved ball bearing**

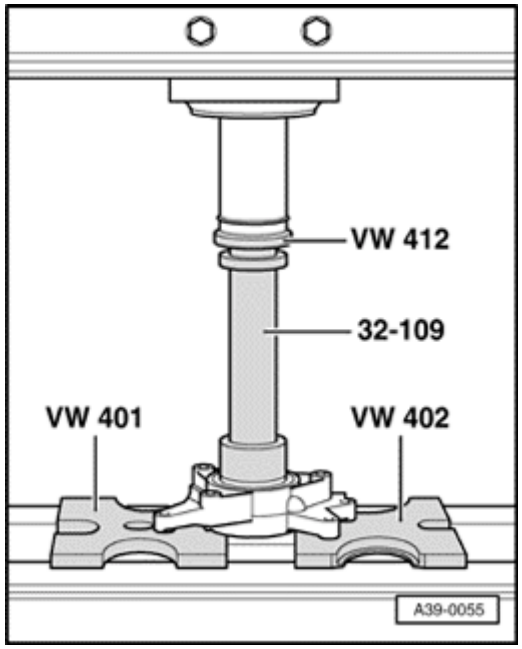



- Press grooved ball bearing out of mounting bracket.

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39-19

**Installing grooved ball bearing**

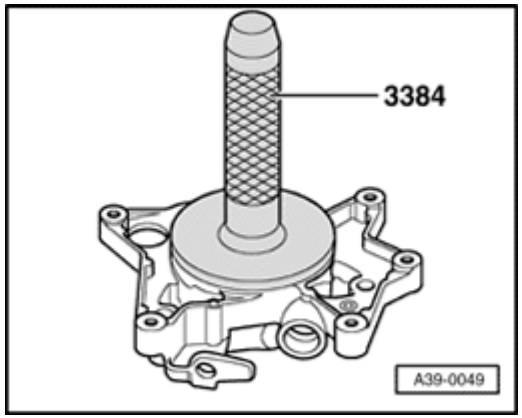



- Press new grooved ball bearing into mounting bracket.

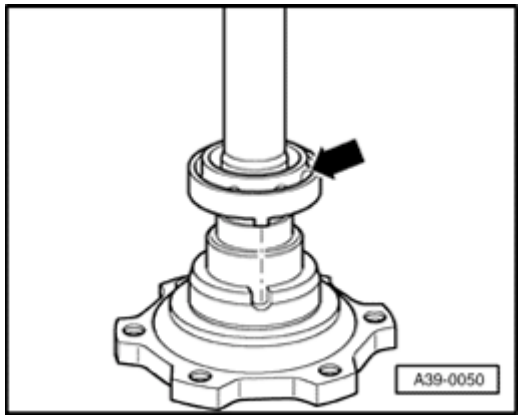
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**Installing seal**

- Coat outer edge and sealing lip of oil seal with gear oil.




- Drive in new seal to stop, without canting.
  - Installation position: The open side of the seal faces the transmission.

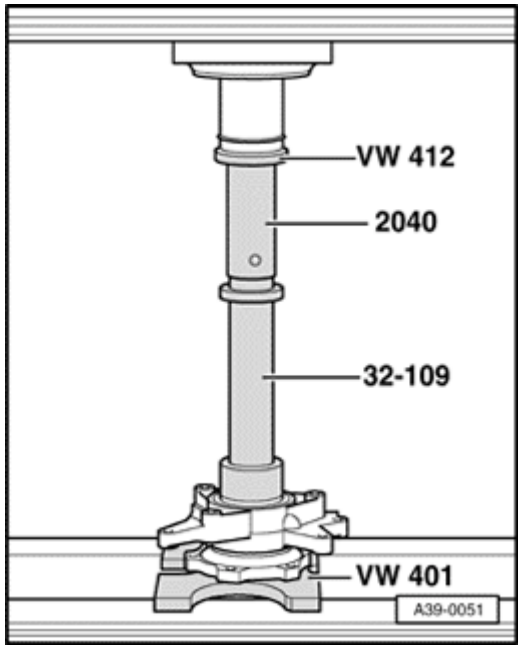



- Set Speedometer Vehicle Speed Sensor (VSS) -G22- on drive flange (arrow).
  - Installation position: The carriers at drive wheel must engage in grooves of drive flange

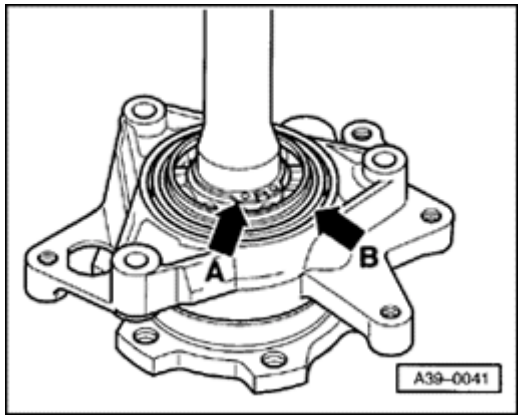
***Note:***

*If necessary, coat contact surface with grease to affix drive wheel in installation position.*

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- Press mounting bracket with grooved ball bearing onto drive flange.

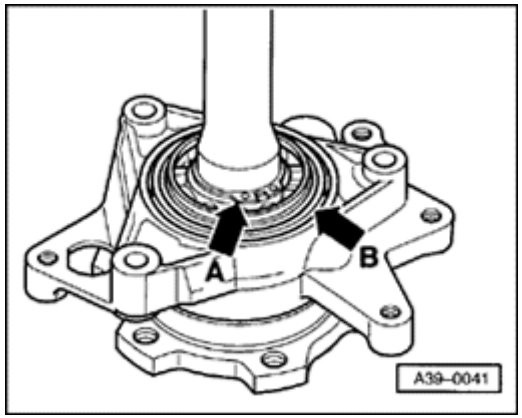



- Insert circlip (arrow A).

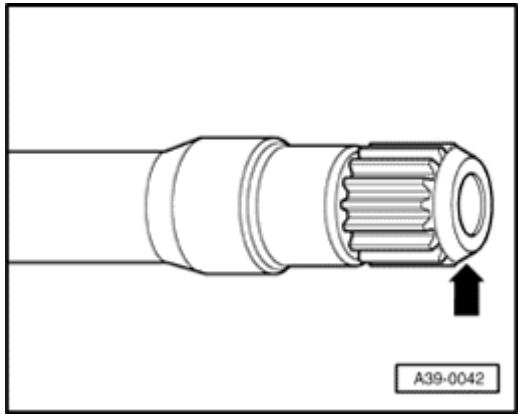
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39-22

**Installing left drive flange.**




- Replace O-ring (arrow B) in drive flange mounting bracket.




- Check drive flange for sharp edges on transmission side of flange end and if necessary, deburr.
- Insert left drive flange into transmission.

***Note:***

*When sliding in, left drive flange must be carefully guided by hand to prevent damage to the double seal in transmission.*

- Install drive axle.

⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 40; Drive axle, removing and installing*

- Install heat shield for left drive axle.
- Checking oil level in front final drive ⇒ page 39-1 .

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### Tightening torques

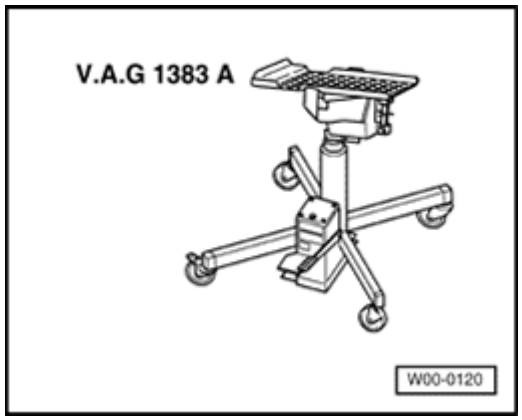
| Component | Nm |
|---|---|
| Mounting bracket for left drive flange at transmission | 23 |
| Drive axle to drive flange M10 | 77 |
| Driveshaft to drive flange M8 | 39 |
| Heat shield for driveshaft to transmission | 23 |

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39-24

## Seal for front final drive, replacing

### Special tools and equipment




- VAG1383A engine/transmission hoist

### Removing

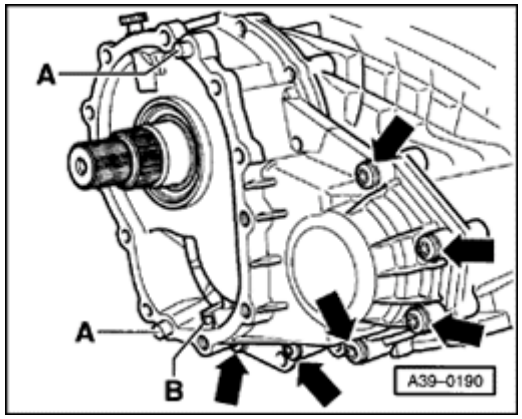
- Remove right front exhaust pipe:

⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system.*

- Remove heat shield for selector lever cable.

**All Wheel Drive (AWD) vehicles:**

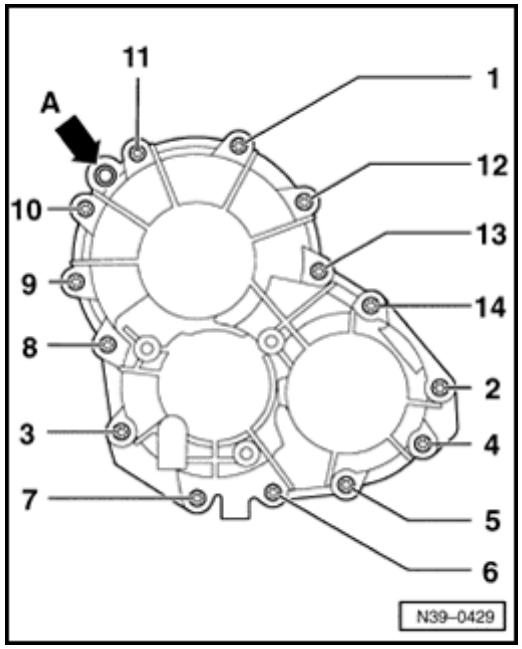
- Remove center differential ⇒ page 39-56 .




- Remove bolts (arrows) at intermediate flange for front final drive.

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**Front Wheel Drive (FWD) vehicles:**

- Remove bolts at cover for front final drive opposite of shown tightening sequence.
- Place VAG1383A engine/gearbox jack with universal mount underneath.

***WARNING!***

- ***Slowly and carefully remove cover for front final drive from transmission housing. The spur gears can otherwise fall out of the transmission.***
- ***Do not reinstall spur gears that have fallen to the ground. The transmission must be swapped in this case.***

**All:**

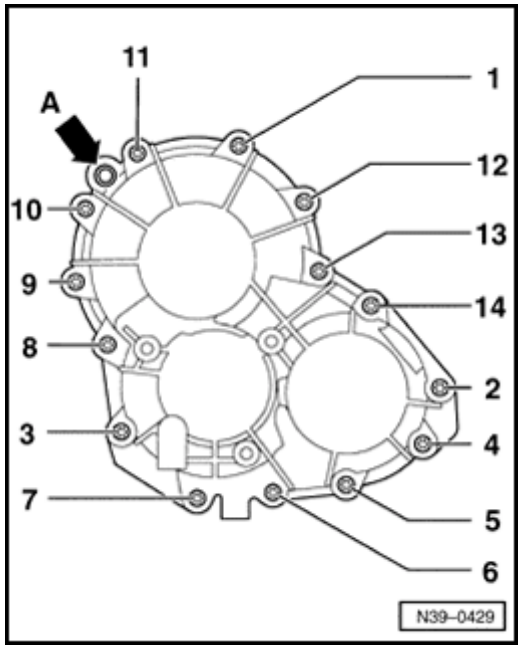
- Lift off cover i.e. intermediate flange for front final drive.

***Notes:***

- *Do not remove spur gears for front final drive. Secure spur gears so they do not fall out.*
- *If the spur gears for front final drive were removed, the wheel marking must face outward (away from transmission) for re installation.*

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39-26




**Installing**

- Make sure centering sleeve -A-is correctly seated before installing.
- Install gasket
- Set on cover i.e. intermediate flange for front final drive.

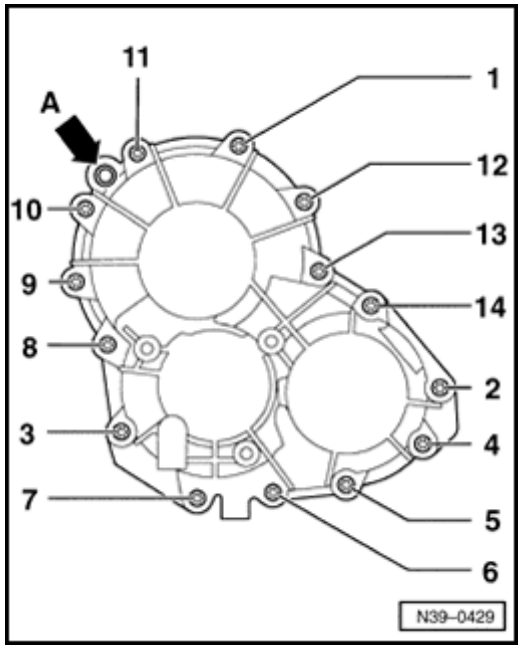
**All Wheel Drive (AWD) vehicles:**

***Note:***

*If installing the intermediate flange to the output shaft carelessly, the sealing lips of the seal can be damaged.*

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39-27




**All:**

Tightening sequence:

- 1. Stage: Tighten bolts 1 to 3 by hand

***Note:***

*When tightening bolts by hand, make sure the housing gap between cover and transmission housing decreases evenly around circumference.*

- 2. Stage: Tighten bolts 1 to 14 in mentioned sequence to tightening torque.

- Check ATF level and top off ⇒ page 37-133 .

**All Wheel Drive (AWD) vehicles:**

- Install center differential ⇒ page 39-58 .

**Tightening torques**

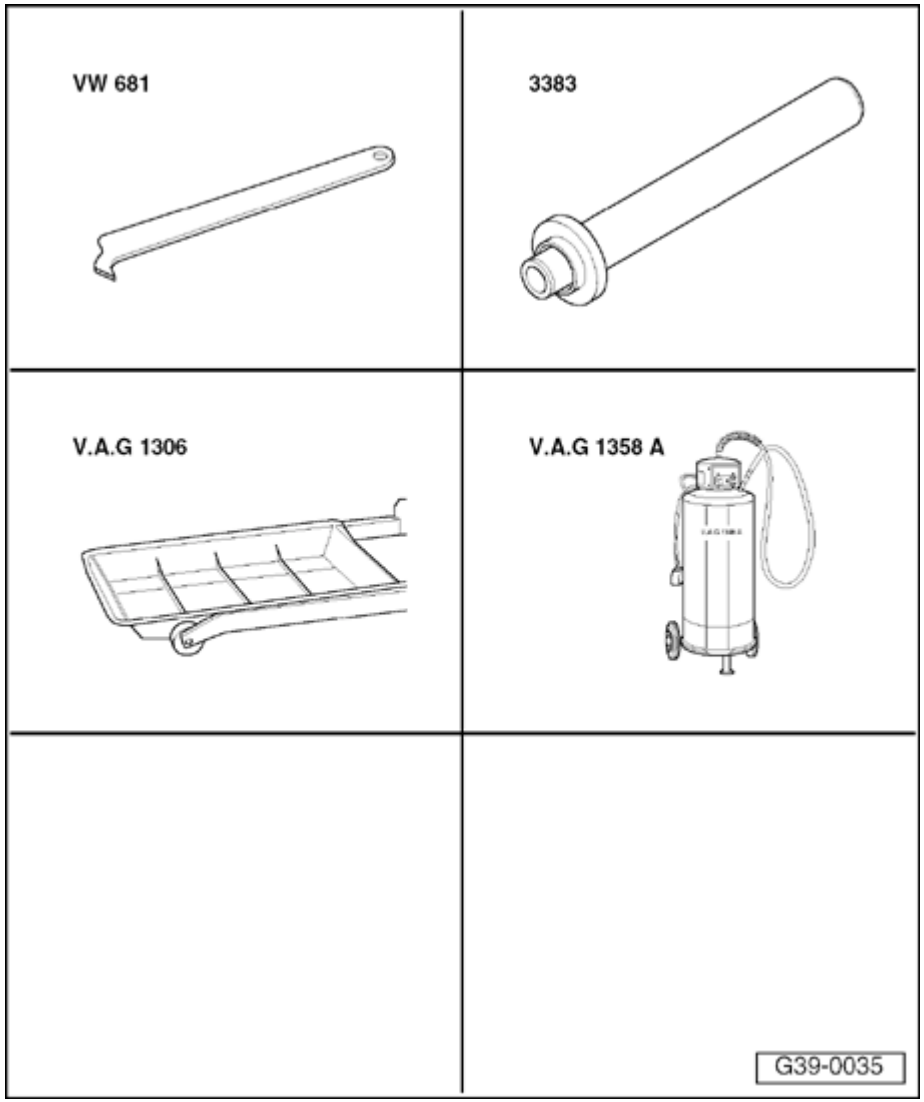
| Component | Nm |
|---|---|
| Cover for front final drive to transmission housing | 23 |
| Intermediate flange for front final drive to transmission housing | 23 |
| | |

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| | |
|---|---|
| Center differential to transmission housing | 23 |

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## Final drive to transmission housing seal, replacing

### Special Tools and equipment

- VW681 extractor lever
- 3383 double seal installer
- VAG1306 drip tray
- VAG1358A - oil siphoning unit

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***Notes:***

- *A faulty seal lets ATF or gear oil escape into the converter housing via the center vent of the shaft seal (between the two sealing lips).*
- *In addition, a faulty seal can let ATF escape into the center differential. It over-fills and oil escapes at the differential vent.*

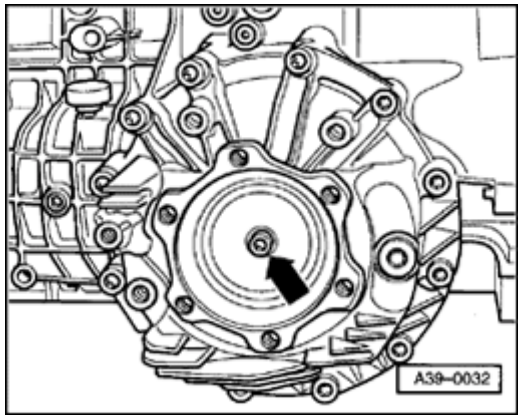
**Removing**

- Loosen bolt drive axle/wheel hub while the vehicle is still standing on its wheels.
- Remove front wheels.
- Remove heat shield for right drive axle.
- Remove drive axles:

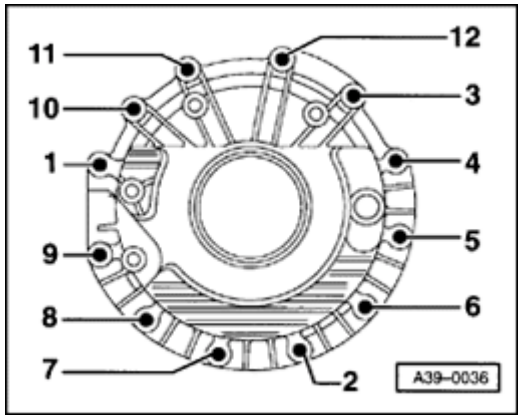
⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 40; Drive axle, removing and installing*

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39-30

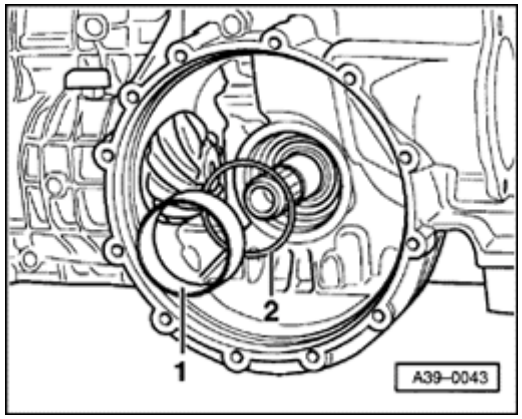



- Remove bolt for flange shaft (arrow) while securing against turning using a drift.
- Using VAG1358A oil siphoning unit, siphon gear oil from the final drive.
- Place VAG1306 drip tray underneath.
- Remove right drive flange.
- Remove right transmission support ⇒ page 37-125 .




- Remove bolts for final drive cover opposite of shown tightening sequence and remove cover.
- Pull out differential and remove.

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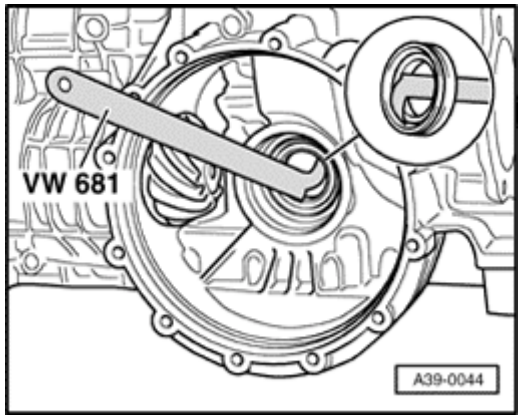



- Remove tapered roller bearing outer race of differential -1- and shim -2- which is behind it from transmission housing by hand.

***Note:***

*Shim is pre-determined and must not be exchanged for a shim with another thickness.*

- Remove left drive flange ⇒ page 39-13 .




- Pull out seal.

***Note:***

*Extractor lever must be positioned behind both sealing lips of the seal. Do not position at outer circumference of seal, otherwise the contact surface in transmission housing will be damaged. When levering out, carefully guide extractor lever.*

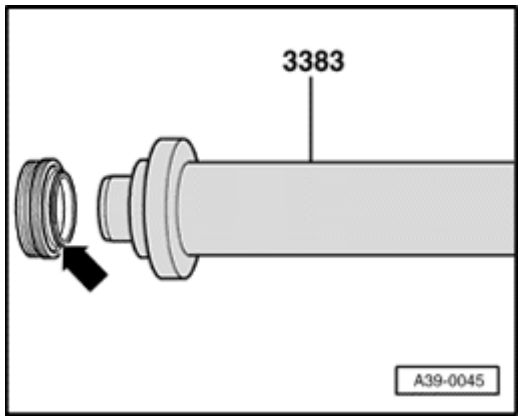
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39-32

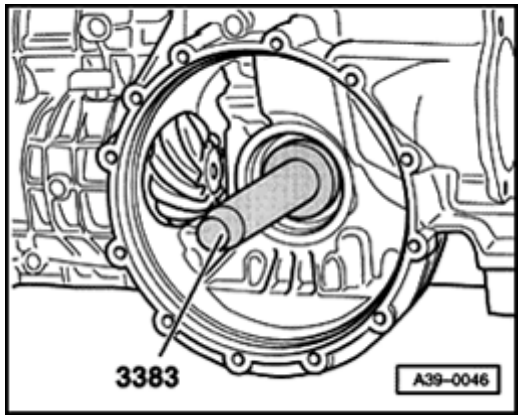
**Installing**

- Check seal seat in transmission housing for damage; rework if necessary.

- Coat outer circumference and sealing lip of seal with ATF.




- Slide seal onto 3383 double seal installer so that the projecting sealing lip (arrow) of seal faces tool.

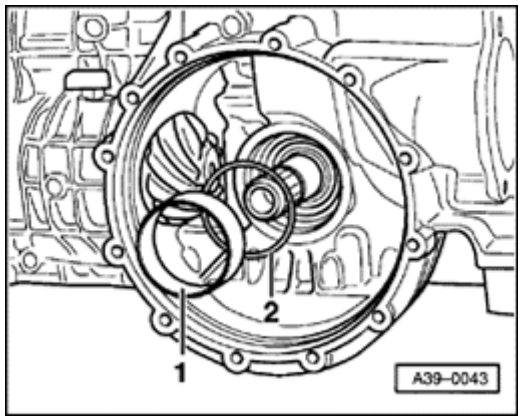



- Drive in new seal to stop.

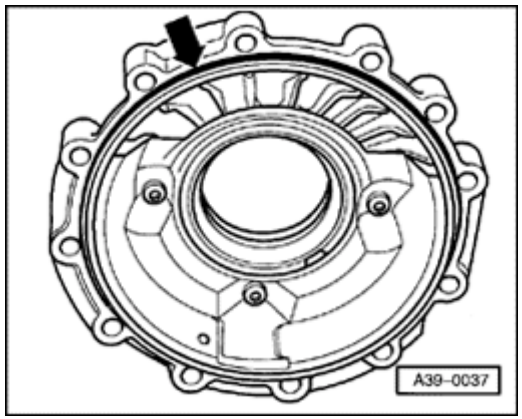
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39-33

- Install left drive flange ⇒ page 39-22 .



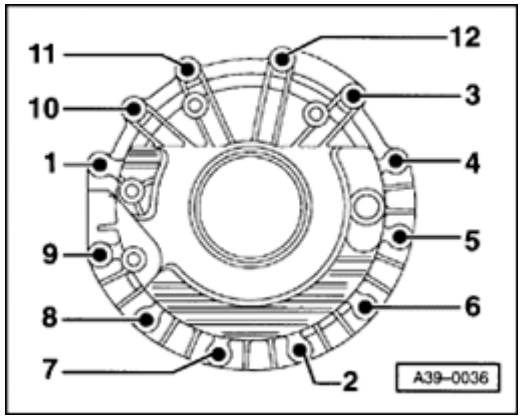

- Insert adjustment shim -2- and tapered roller bearing outer race for differential -1- into transmission housing up to stop by hand.




- Replace O-ring (arrow).
- Insert differential into transmission housing.

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39-34




- Install cover for final drive.

Tightening sequence:

- 1. Stage: Tighten bolts 1 to 3 by hand
- 2. Stage: Tighten bolts 1 to 12 in mentioned sequence to tightening torque.

- Install right drive flange.
- Install right transmission support ⇒ page 37-125 .
- Installing drive axles:

⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 40; Drive axle, removing and installing*

- Top-up and check gear oil in front final drive ⇒ page 39-1 .

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### Tightening torques

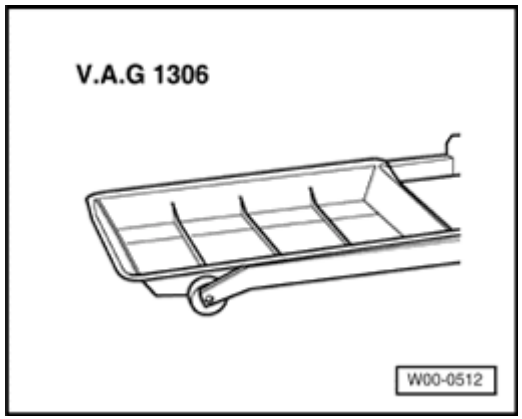
| Component | Nm |
|---|---|
| Cover for front final drive to transmission housing | 23 |
| Mounting bracket for left drive flange at transmission | 23 |
| Drive flange to transmission | 23 |
| Drive axle to drive flange M10 | 77 |
| Driveshaft to drive flange M8 | 39 |
| Heat shield for driveshaft to transmission | 23 |

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39-36

## O-ring at cover for final drive, replacing

### Special tools and equipment




- VAG1306 drip tray

### Removing

- Loosen bolt drive axle/wheel hub while the vehicle is still standing on its wheels.
- Remove right wheel.
- Remove heat shield for right drive axle.
- Remove right front exhaust pipe:

⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system.*

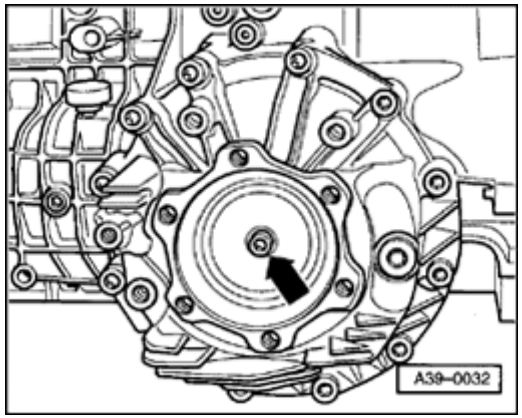
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39-37

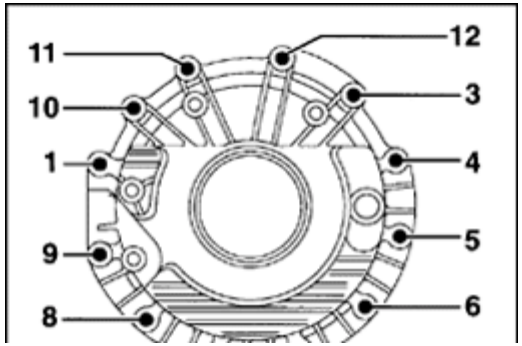
- Remove right drive axle:

⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 40; Drive axle, removing and installing*

- Remove right transmission support ⇒ page 37-125 .




- Remove bolt for flange shaft (arrow) while securing against turning using a drift.
- Place VAG1306 drip tray underneath.
- Remove right drive flange.

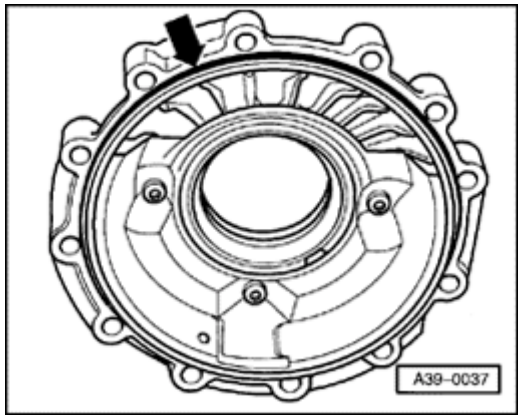



- Remove bolts for final drive cover opposite of shown tightening sequence and remove cover.

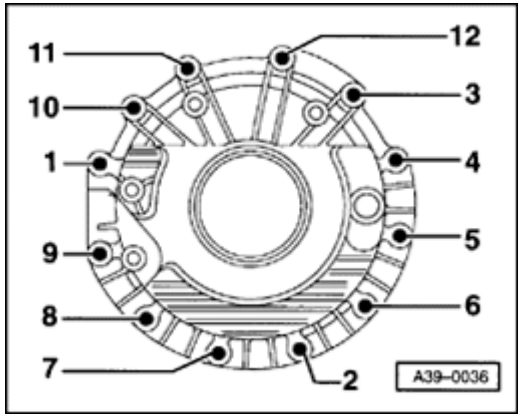
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39-38

**Installing**




- Replace O-ring (arrow).




- Install cover for final drive.

Tightening sequence:

- 1. Stage: Tighten bolts 1 to 3 by hand
- 2. Stage: Tighten bolts 1 to 12 in mentioned sequence to tightening torque.

- Install right drive flange.

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- Install right transmission support ⇒ page 37-125 .

- Install drive axle.

⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 40; Drive axle, removing and installing*

- Top-up and check gear oil in front final drive ⇒ page 39-1 .

**Tightening torques**

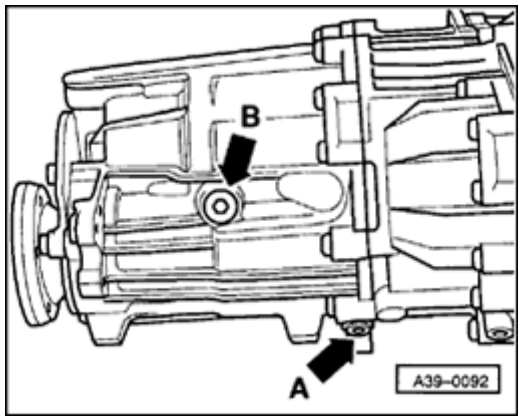
| Component | Nm |
|---|---|
| Cover for front final drive to transmission housing | 23 |
| Drive flange to transmission | 23 |
| Heat shield for driveshaft to transmission | 23 |

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# Gear oil in center differential

## Gear oil in center differential, checking and topping off




- If necessary, loosen or remove relevant parts of the exhaust system to gain access to oil filler plug (arrow B):

⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*

- Remove oil filler plug (arrow).
  - ♦ Specification: Oil level should reach lower edge of oil filler hole.
- If necessary, top up gear oil. Specification ⇒ page 00-24 .
- Always replace oil filler plug.
- Install new oil filler plug.
- Secure or re-install exhaust system free of stress:

⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*

### Tightening torque

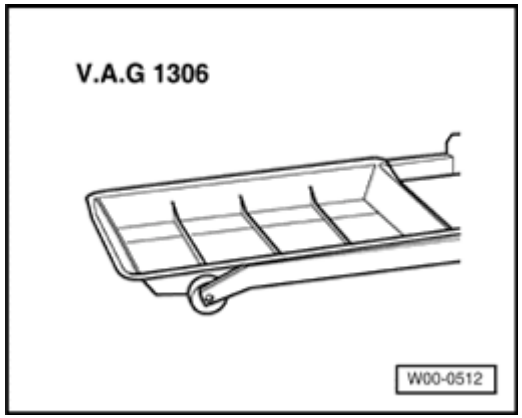
| Component | Nm |
|---|---|
| Oil filler plug | 35 |

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## Gear oil in center differential, changing or topping off after repair

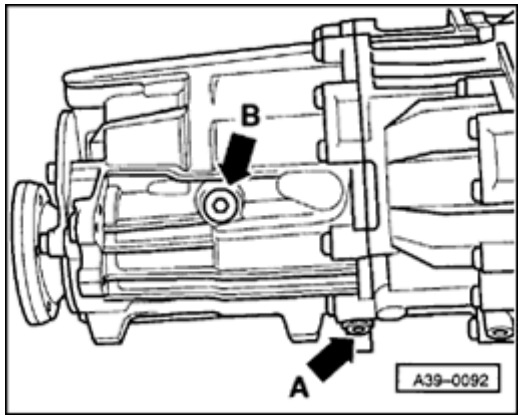
### Special tools and equipment




- VAG1306 drip tray

### Draining gear oil

- Place VAG1306 drip tray underneath.

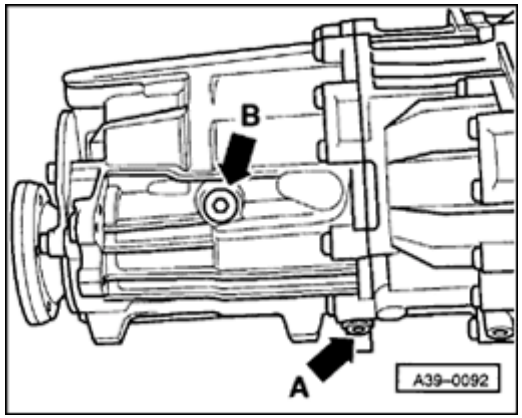



- Removing drain plug (arrow A) and draining gear oil.
- Always replace drain plug.
- Install new drain plug (arrow A) again.

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**Filling up gear oil**




- If necessary, loosen or remove relevant parts of the exhaust system to gain access to oil filler plug (arrow B):

⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*

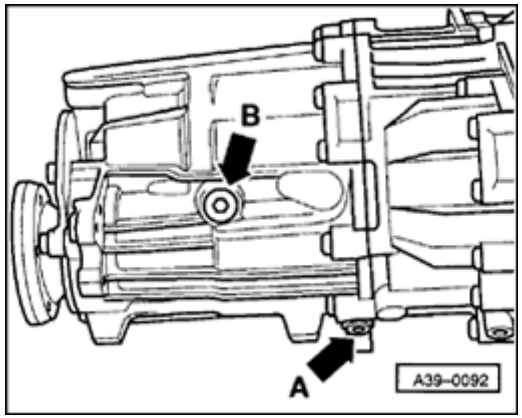
***Note:***

*There is a distinction made between two cases:*

*-A Center differential was not removed*

*-B Center differential was removed*

**A - Center differential was not removed (e.g. after removing and installing drive flange)**




- Remove oil filler plug (arrow B).
- Top up transmission fluid to lower edge of oil filler hole. Specification and capacity ⇒ page 00-24 .
- Install old oil filler plug.

***Note:***

*If it was necessary to loosen or remove the exhaust system, this must be re-secured or re-installed for the road test. It must be removed and installed again for the final oil level check.*

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39-43

- Road test vehicle (15 minutes pure driving).

***Note:***

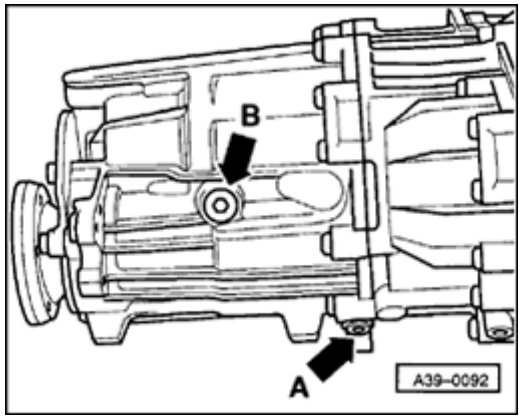
*During road test, gear oil will enter output cover and Torsen differential; oil level in center differential housing will drop.*

- Fill transfer housing with gear oil and check oil level ⇒ page 39-40 .

**B - Center differential was removed and disassembled**

- Add 200 ml. gear oil to output cover.

- Assemble center differential and install ⇒ page 39-58 .




- Remove oil filler plug (arrow B).
- Add 600 ml. gear oil to center differential housing.
- Always replace oil filler plug.
- Install new oil filler plug.

***Note:***

*Oil level does not need to be re-checked.*

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**All:**

- Secure or re-install exhaust system free of stress:

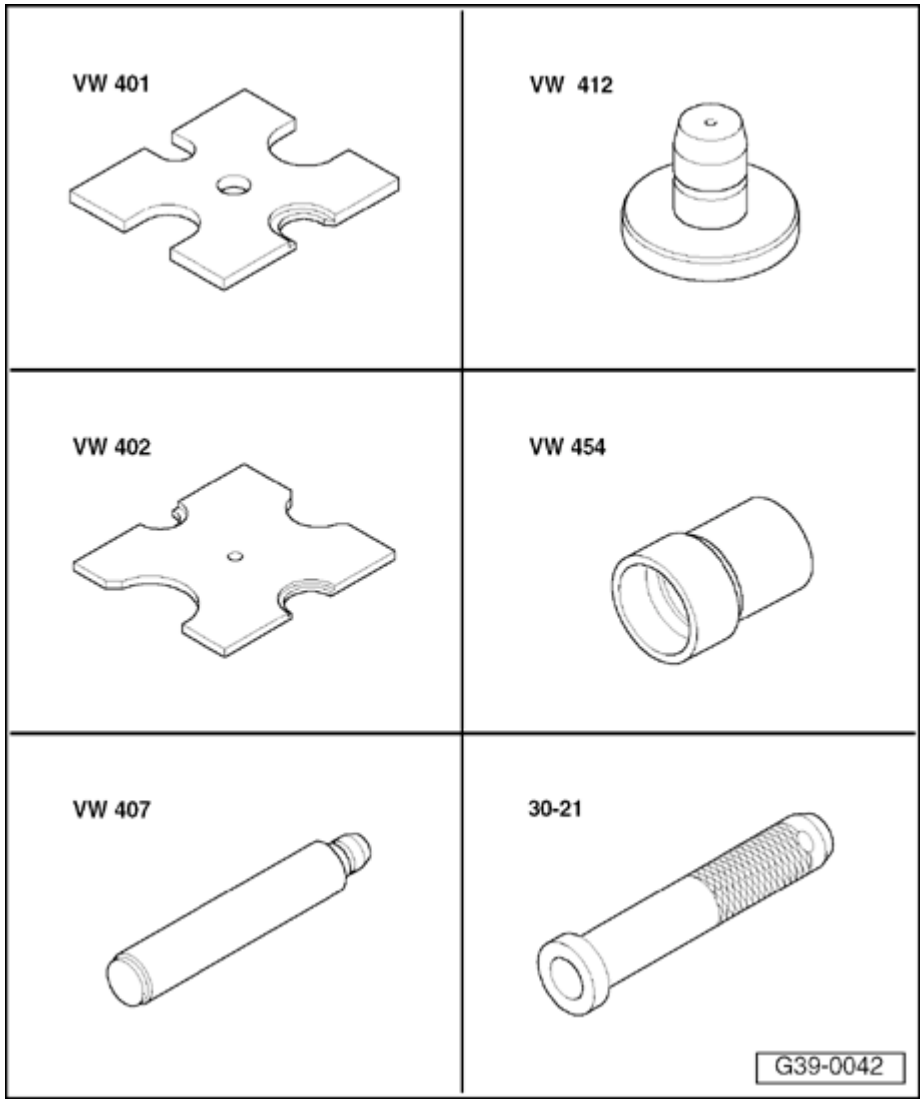
⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*

**Tightening torques**

| Component | Nm |
|---|---|
| Oil drain plug | 20 |
| Oil filler plug | 35 |

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39-45




# Center differential, servicing

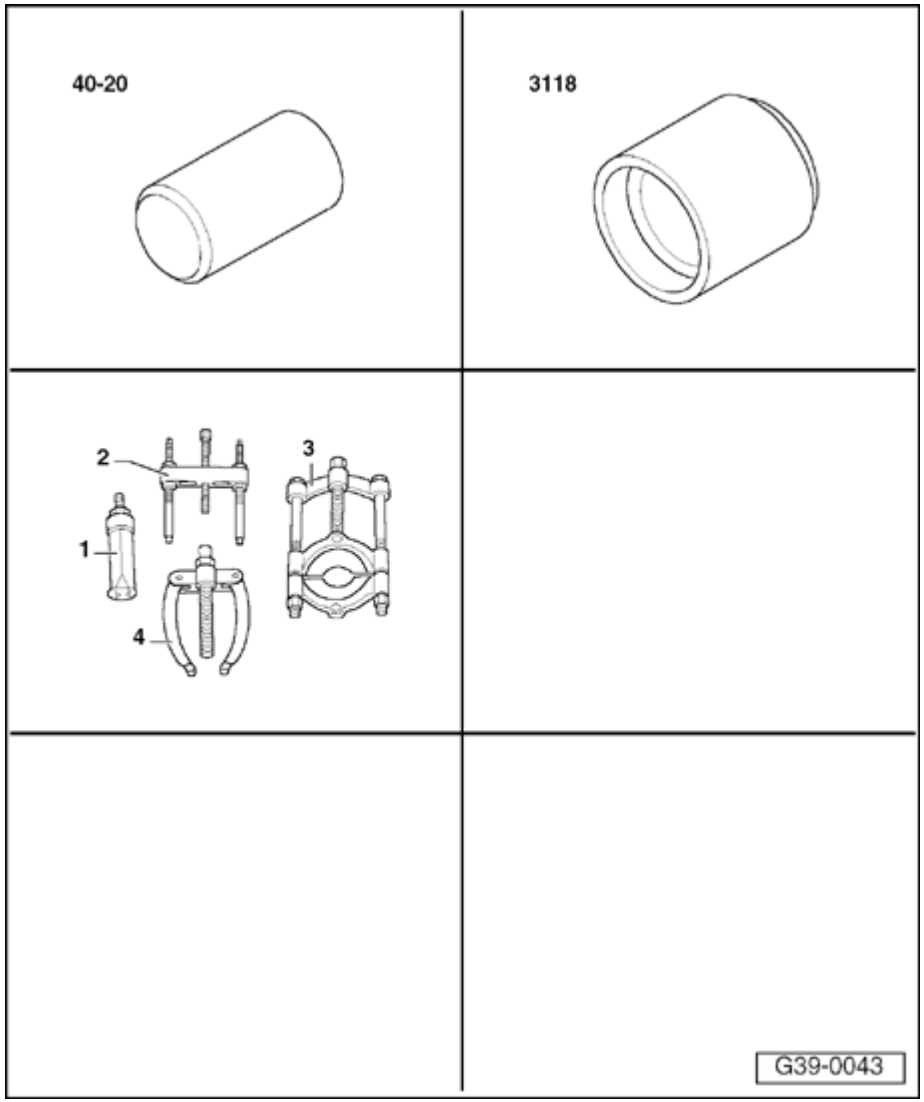
**Transmission installed**

**Special tools and equipment**

- VW401 thrust plate
- VW412 punch
- VW402 thrust plate
- VW454 thrust tube
- VW407 punch
- 3021 protractor

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**39-46**




- 4020 press tube
- 3118 press support
- Item 3 Kukko 17/2 separating tool

***WARNING!***

***Do not run engine with the center differential removed or without gear oil and do not tow vehicle.***

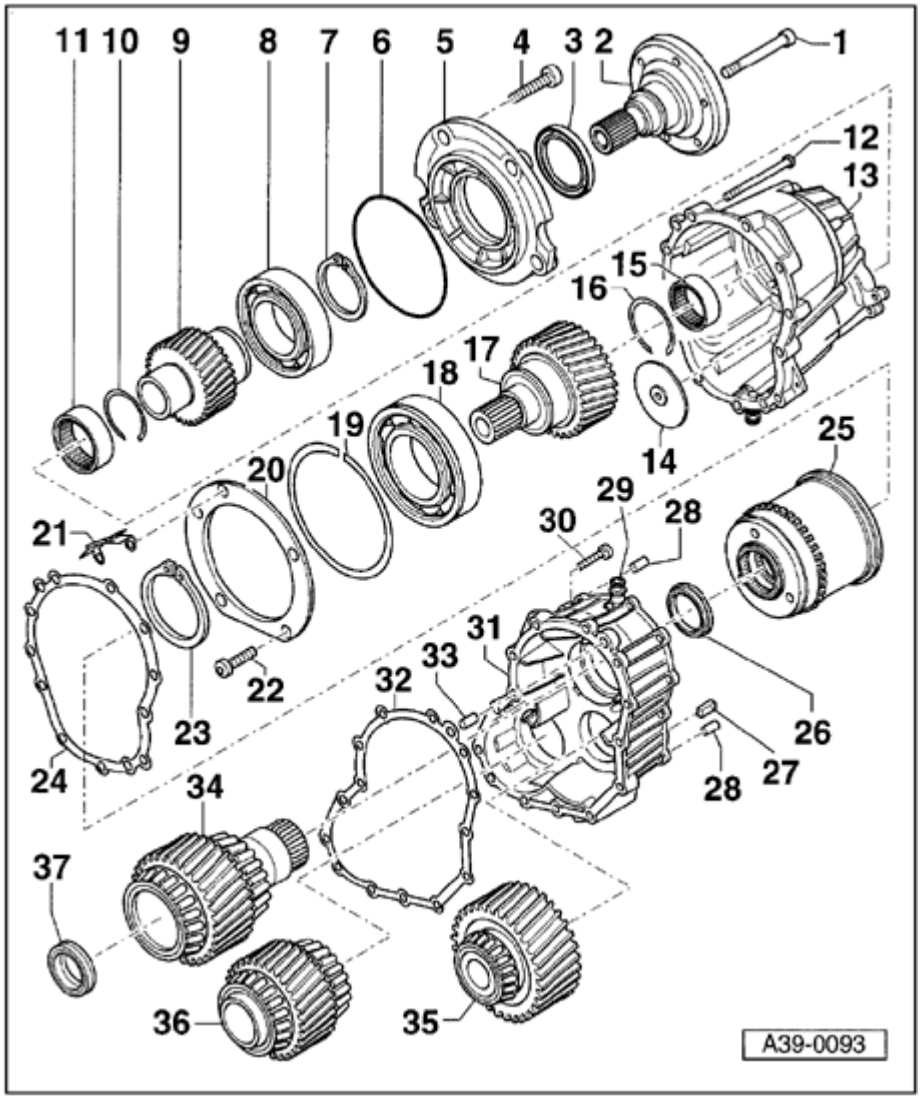
***Notes:***

- *Rules of cleanliness for working on automatic transmissions* ⇒ page 37-148 .
- *General repair notes* ⇒ page 00-27 .

The parts listed in the following illustration can be removed with the transmission installed.

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39-47




**1 - Socket head bolt - 25 Nm**

**2 - Rear drive flange**

**3 - Seal**

- Always replace ⇒ page 39-61

**4 - Bolt - 23 Nm**

- 4x

**5 - Housing cover**

**6 - O-ring**

- Coat with transmission fluid

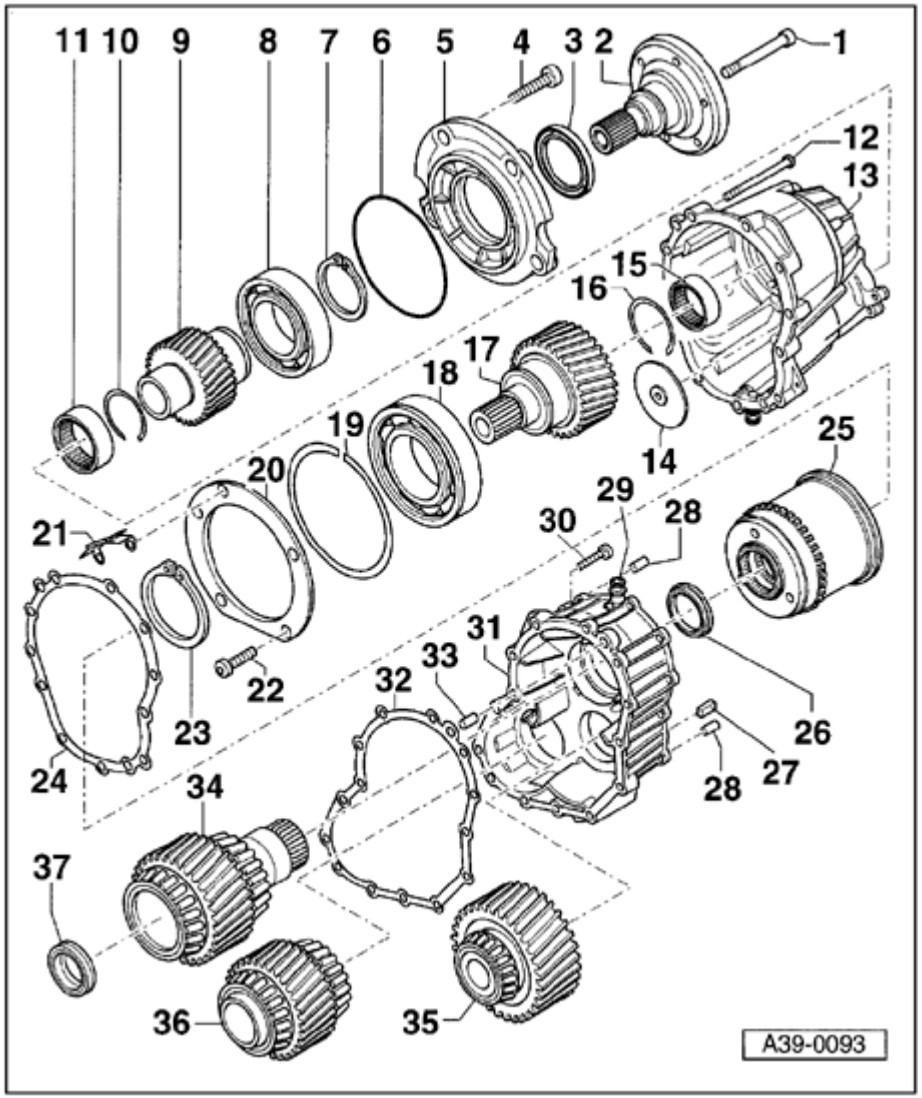
**7 - Snap ring**

**8 - Grooved ball bearing**

- For spur gear 1
- Pressing off ⇒ Fig. 1 , ⇒ page 39-54
- Pressing on ⇒ Fig. 2 , ⇒ page 39-54

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**9 - Spur gear 1**

- For rear gear set
- If damaged, only replace together with spur gear 2 -Item 17 - Always replace
- To remove and install, pull out of center differential housing toward rear together with -item 7 - and -item 8 -

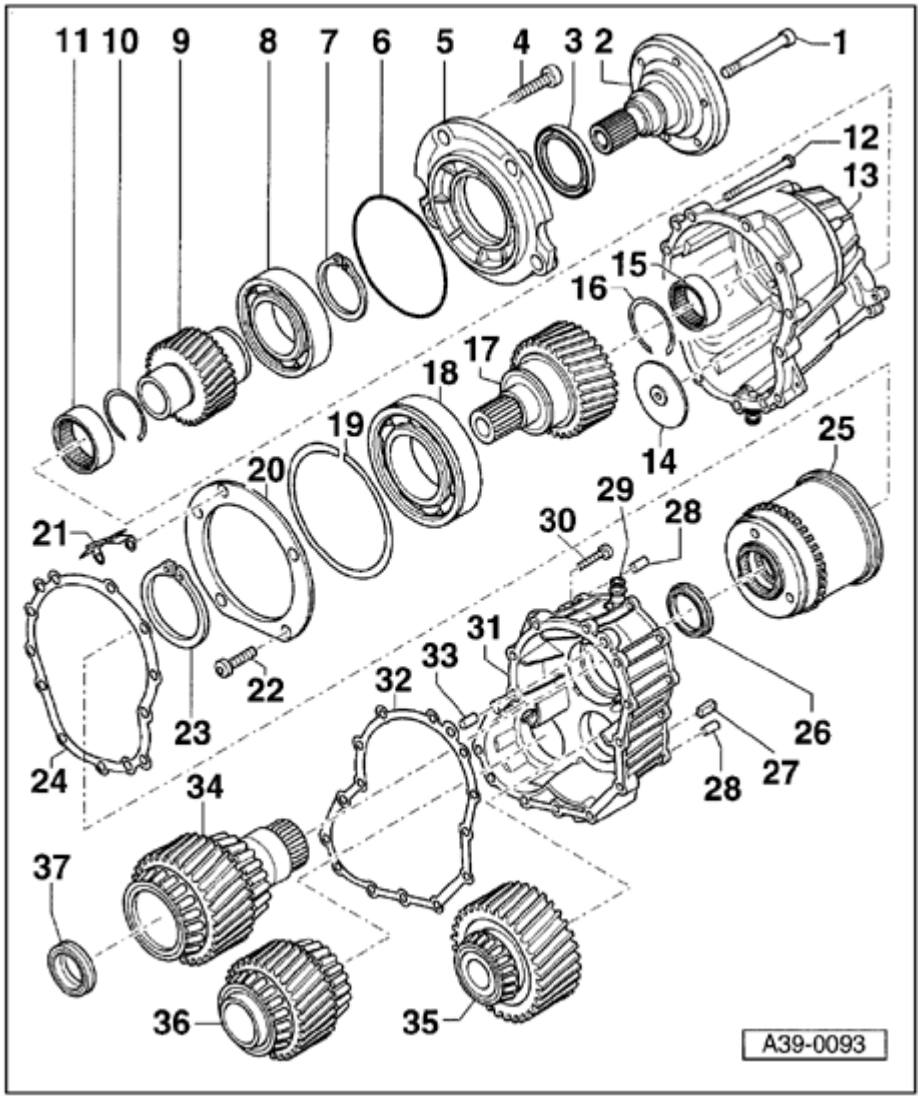
**10 - Snap ring**

**11 - Needle bearing**

- For spur gear 1
- Only remove for replacement
- To insert, heat up transfer gear housing to approx. 100 ° C and drive out needle bearing toward rear using drift (Warning! Wear protective gloves)
- Drive in to stop using 3021 protractor

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**12 - Bolt - 23 Nm**

- Loosen or tighten in stages and in diagonal sequence

**13 - Center differential housing**

**14 - Tension nut**

- For rear drive flange -Item no. 2 -

**15 - Needle bearing**

- For spur gear 2
- Only remove for replacement
- Always replace ⇒ page 39-69

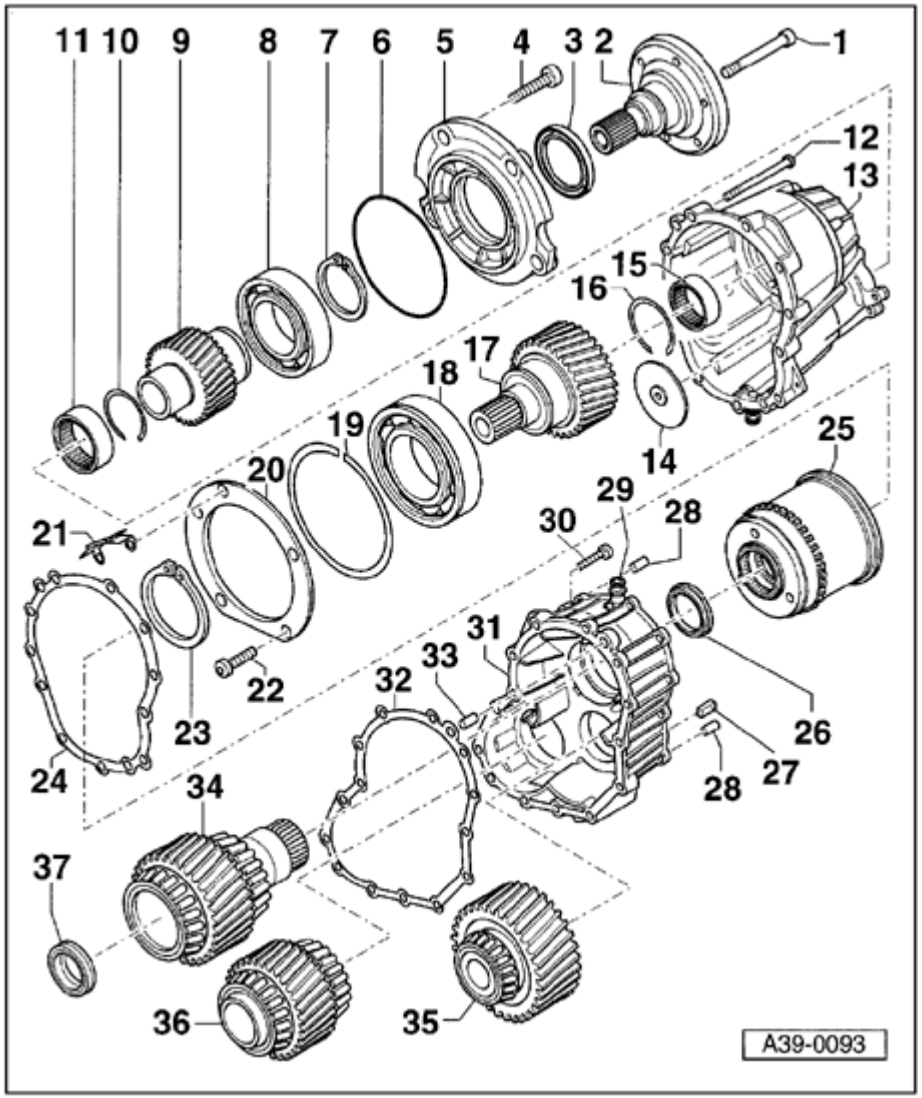
**16 - Snap ring**

**17 - Spur gear 2**

- For rear gear set
- If damaged, only replace together with spur gear 1 -item 9 -
- To remove and install, remove center differential housing ⇒ page 39-56 and pull out together with -item 18 , 19 , 23 -

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**18 - Grooved ball bearing**

- For spur gear 2
- Pressing off ⇒ Fig. 3 , ⇒ page 39-55
- Pressing on ⇒ Fig. 4 , ⇒ page 39-55

**19 - Snap ring**

- For securing grooved ball bearing -item 18 - in center differential housing

**20 - Washer**

- For grooved ball bearing -item 18 -
- Before installing, clip on guide plate -item 21 -

**21 - Alignment plate**

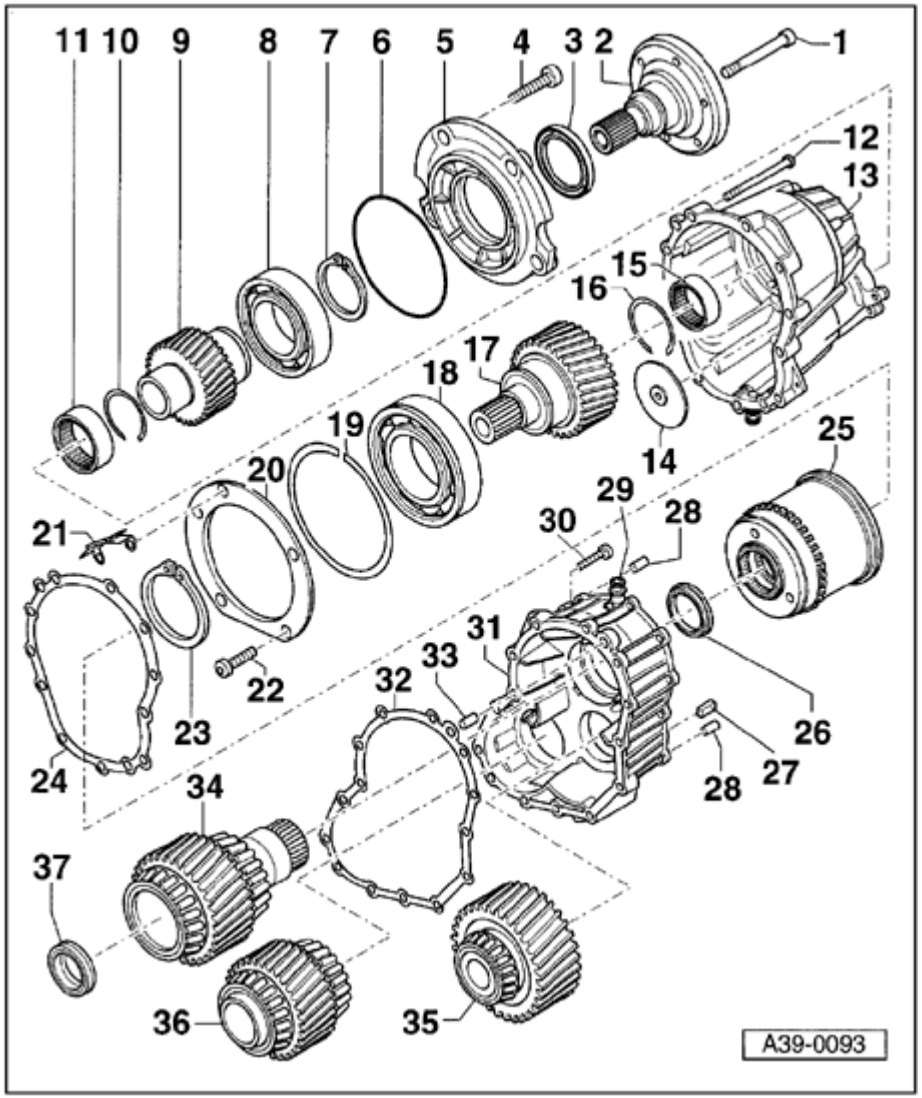
**22 - Bolt 10 Nm**

**23 - Snap ring**

- For securing grooved ball bearing -item 18 - on spur gear 2 - item 17 -

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**24 - Gasket**

- Always replace ⇒ page 39-56

**25 - Torsen differential**

- If damaged replace as complete unit
- Removing and installing ⇒ page 39-56

**26 - Seal**

- Always replace ⇒ page 39-65

**27 - Magnet**

- Removing and installing ⇒ page 39-56

**28 - Bushing**

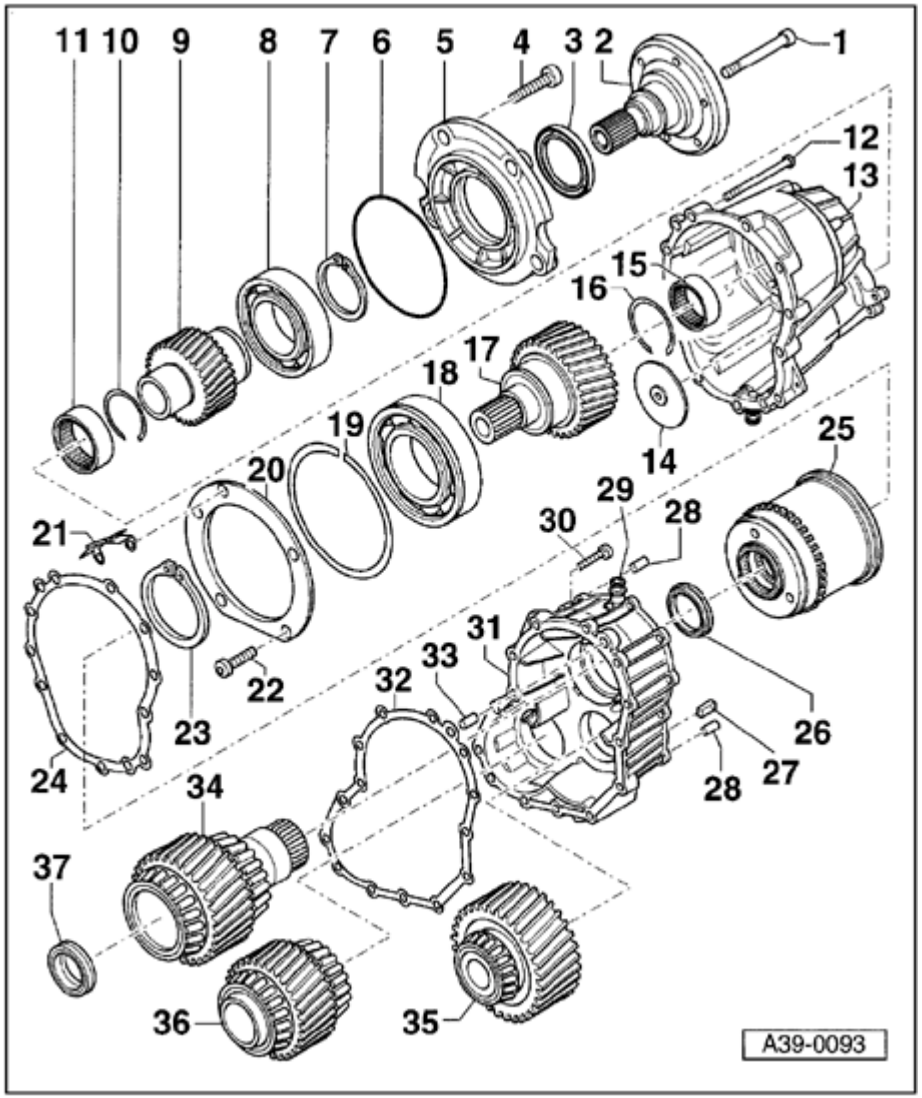
- 2x

**29 - Breather**

- For transfer gear
- With cap installed
- Installation position: Without cover, breather must project 10 to 11 mm out of housing

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**30 - Bolt - 23 Nm**

- Observe tightening sequence ⇒ page 39-27

**31 - Intermediate flange for front final drive**

**32 - Gasket**

- Always replace ⇒ page 39-24

**33 - Bushing**

**34 - Drive pinion**

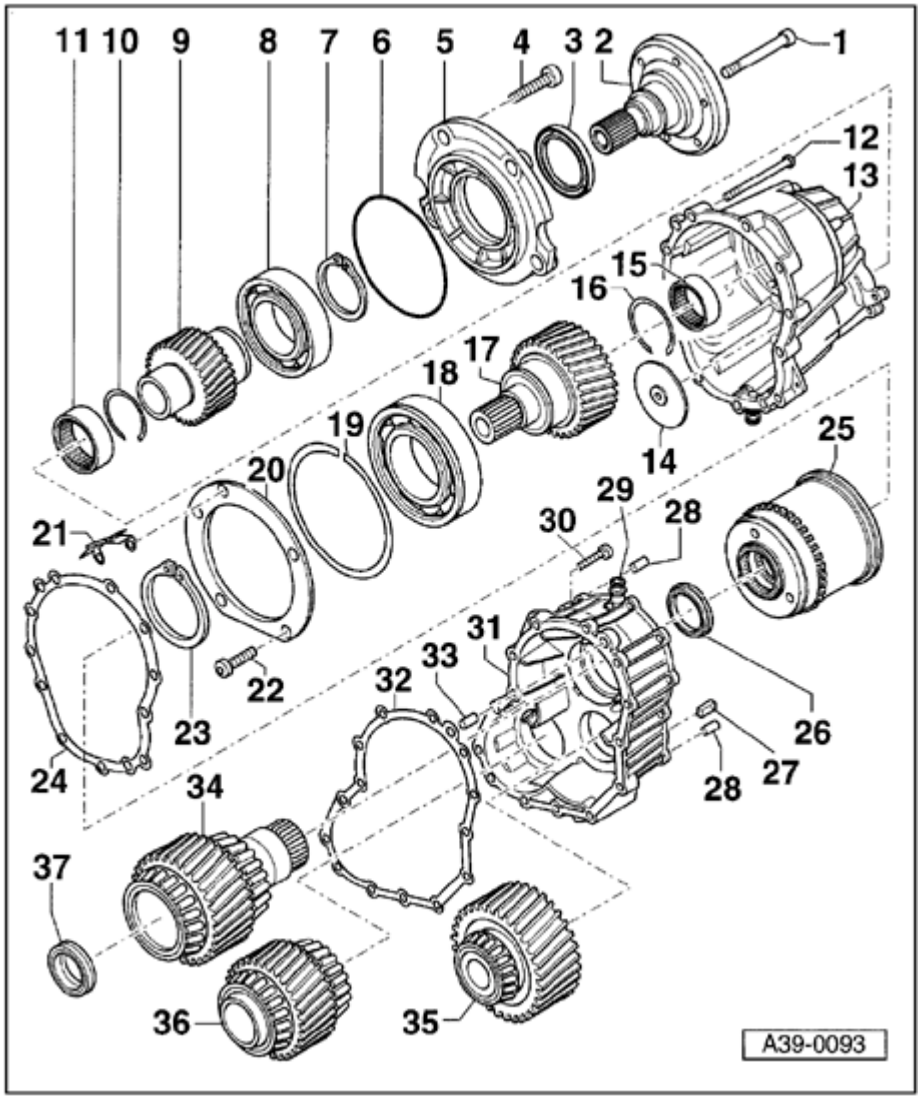
- For front final drive
- Removing and installing ⇒ page 39-67

**35 - Intermediate pinion**

- For front final drive
- Installation position: gear identification faces toward transfer gear

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39-53




**36 - Output pinion**

- For front final drive
- Installation position: gear identification faces toward transfer gear

**37 - Seal**

- Always replace ⇒ page 39-67

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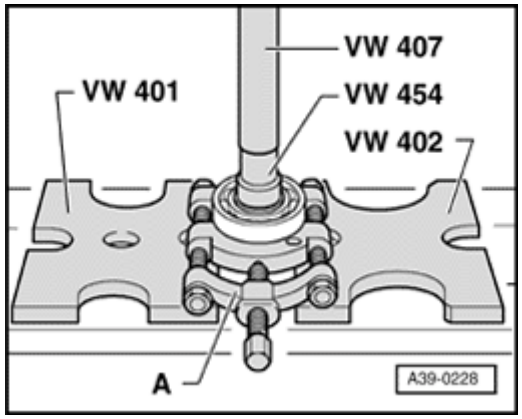



**Fig. 1 Press off grooved ball bearing for spur gear 1**

A - Separating device 22-115 mm, e.g. Kukko 17/2 separating tool

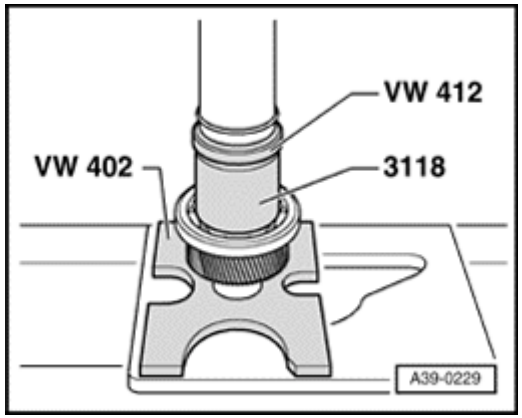



**Fig. 2 Press on grooved ball bearing for spur gear 1**

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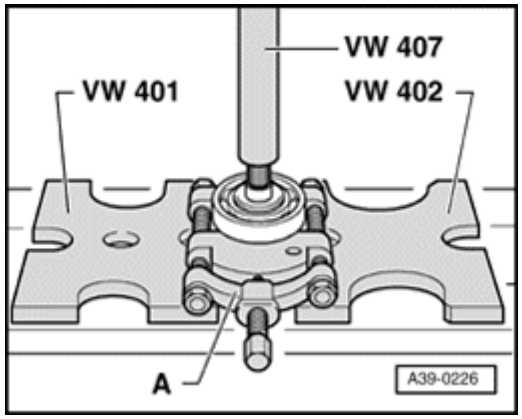



**Fig. 3 Press off grooved ball bearing for spur gear 2**

A - Separating device 22-115 mm, e.g. Kukko 17/2 separating tool

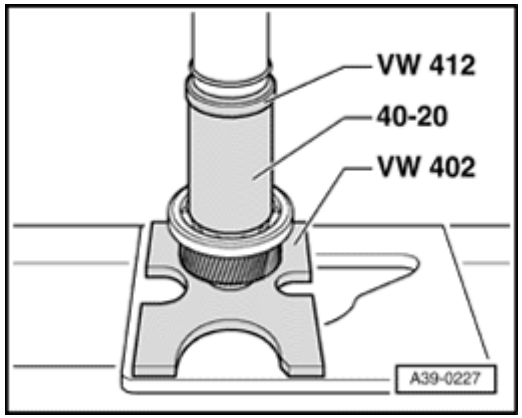



**Fig. 4 Press on grooved ball bearing for spur gear 2**

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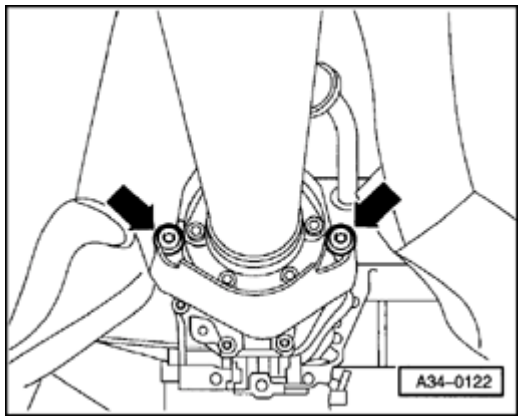
39-56

## Center differential, removing and installing

### Removing

- Remove front exhaust pipes:

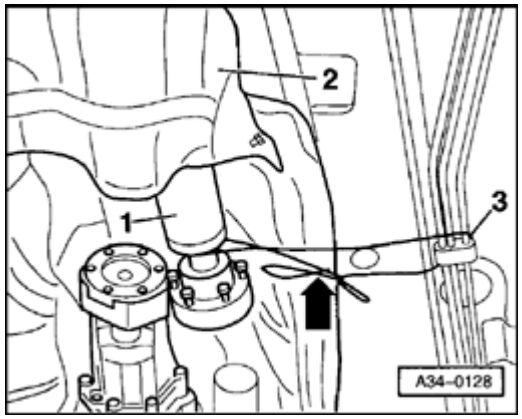
⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*



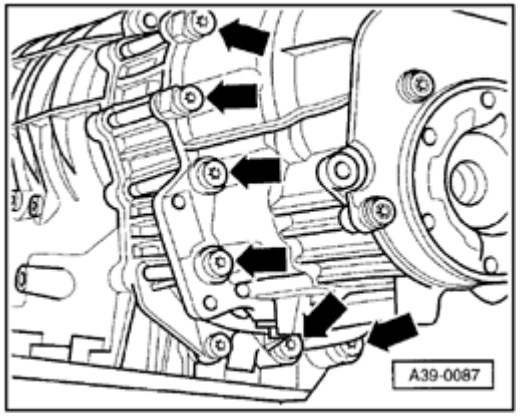

- Unbolt heat shield for driveshaft from cover for Torsen differential (arrows).

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- Unbolt driveshaft -1- from transmission and let rest on heat shield -2- ⇒ page 39-79 , Driveshaft, removing and installing.
- Secure driveshaft using wire (arrow) at bracket -3- of fuel lines.
- Drain center differential gear oil ⇒ page 39-40 .



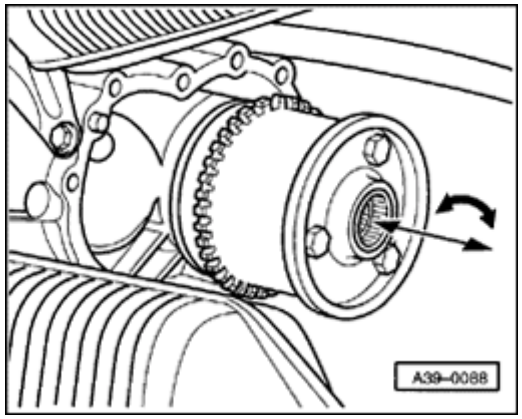

- Loosen mounting bolts (arrows) for center differential housing in diagonal sequence and remove.

***WARNING!***

***Carefully pull center differential housing off of transmission toward rear. The Torsen differential could otherwise fall out of the transmission.***

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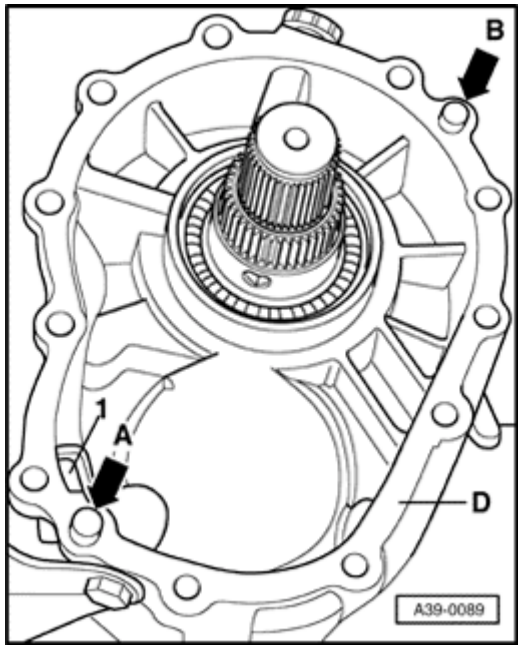
**39-58**




- Pull Torsen differential off output shaft toward rear.

**Installing**

Installation is reverse of removal, noting the following:




- Check for alignment bushing (arrow A) and (arrow B).
- Install gasket

***Note:***

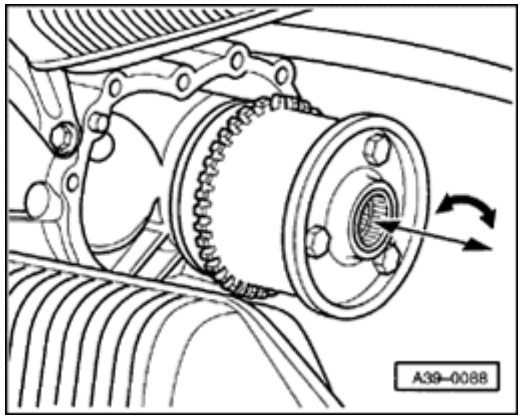
*Lightly coat sealing surface -D- with gear oil to prevent the seal from slipping.*

- Slide cleaned magnet into cast holding pocket -1- in intermediate flange.

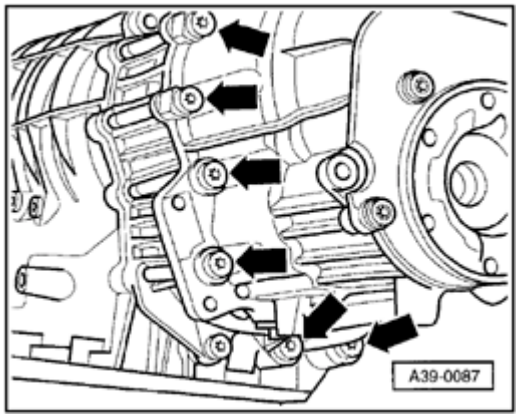
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- Add 200 ml. gear oil to output housing ⇒ (comparable to gear oil, topping up on removed and disassembled center differential ⇒ page 39-43 ).




- Install Torsen differential onto splines of output shaft and bottom spur gear while turning slowly.
- Check whether installed Torsen differential can be turned by hand.




- Install fully assembled transfer housing with installed spur gears and rear drive flange onto transmission flange.
- Insert bolts for transfer housing and tighten to final tightening torque in diagonal sequence in several stages.
- Bolt driveshaft to transmission flange ⇒ page 39-79 , Driveshaft, removing and installing.
- Fill transfer housing with gear oil and check oil level ⇒ page 39-40 .

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39-60

### Tightening torques

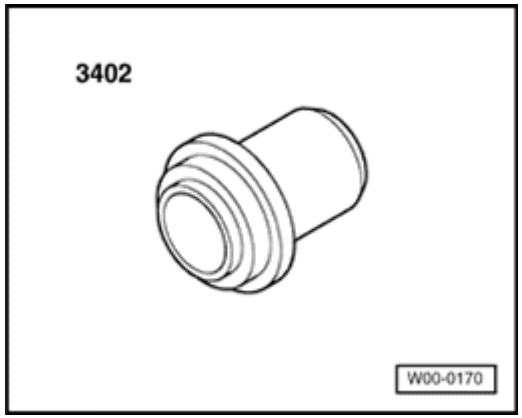
| Component | Nm |
|---|---|
| Center differential housing to transmission housing | 23 |
| Heat shield for driveshaft to transmission | 23 |

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39-61

## O-ring for driveshaft output flange, replacing

### Special tools and equipment

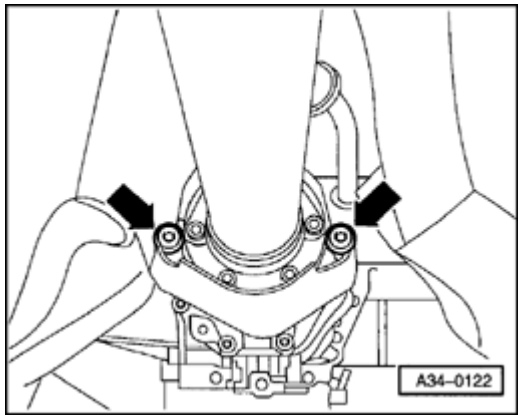



- 3402 pressure piece

### Removing

- Remove front exhaust pipes:

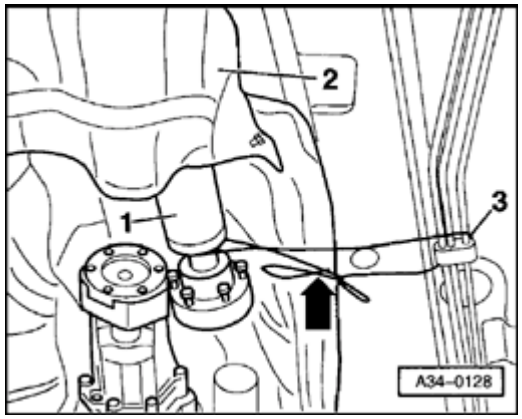
⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*



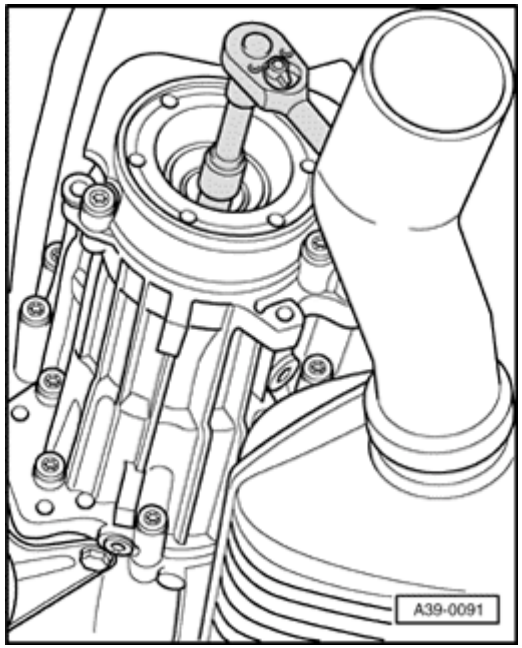

- Unbolt heat shield for driveshaft from cover for Torsen differential (arrows).

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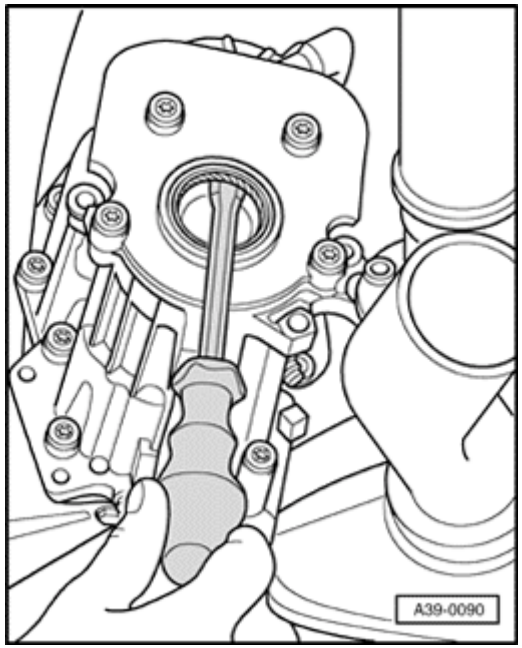

- Unbolt driveshaft -1- from transmission and let rest on heat shield -2- ⇒ page 39-79 , Driveshaft, removing and installing.
- Secure driveshaft using wire (arrow) at bracket -3- of fuel lines.
- Drain center differential gear oil ⇒ page 39-40 .




- Unbolt output flange while securing output flange against turning using a drift.
- Pull out output flange.

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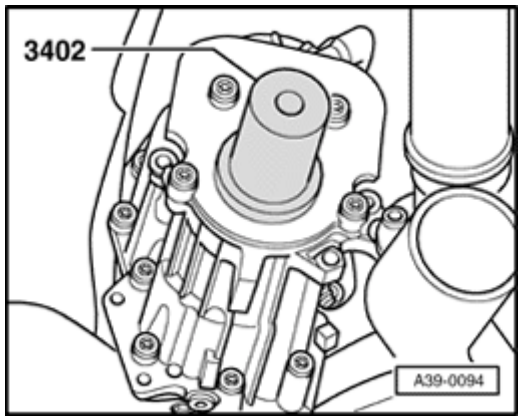
39-63




- Remove O-ring using appropriate screwdriver.

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39-64




## Installing

Installation is reverse of removal, noting the following:

- Drive O-ring in to stop using 3402 pressure piece.
- Secure output flange with socket-head bolt.
- Bolt driveshaft to transmission flange ⇒ page 39-79 , Driveshaft, removing and installing.
- Fill transfer housing with gear oil and check oil level ⇒ page 39-40 .

## Tightening torques

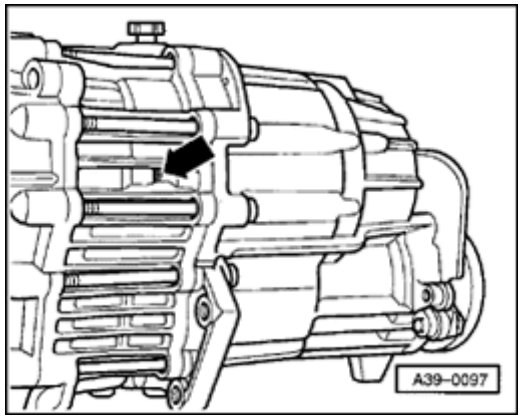
| Component | Nm |
|---|---|
| Socket-head bolt for rear drive flange | 25 |
| Heat shield for driveshaft to transmission | 23 |

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39-65

## Seal in intermediate flange for front final drive, replacing

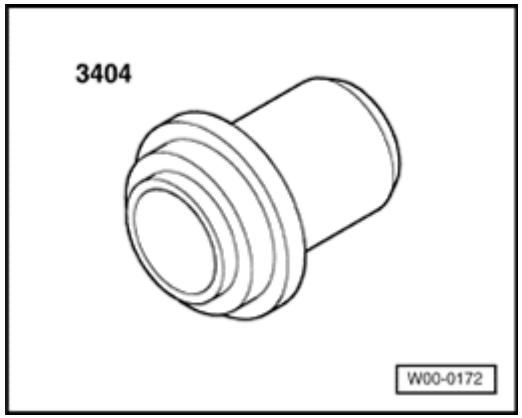
***Note:***




*An inspection opening is provided on the left side of the intermediate flange to check for oil leaks (arrow) for the seal in drive pinion and the seal in intermediate flange.*

*If oil escapes at this inspection opening, this double seal must be replaced.*

**Special tools and equipment**




- 3404 thrust piece

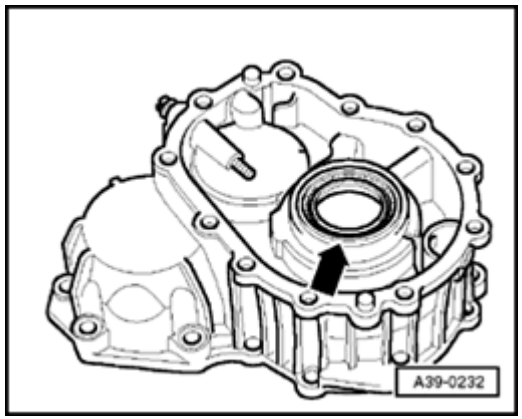
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**Removing**

- Remove center differential ⇒ page 39-56 .

- Remove intermediate flange for front final drive.

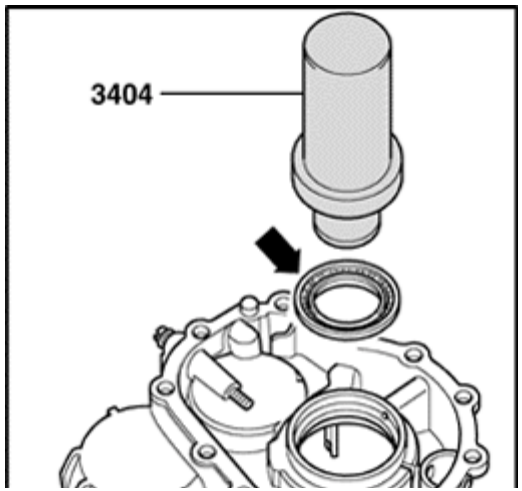



- Drive seal (arrow) out in direction of transfer gear using mandrel.

**Installing**

Installation is reverse of removal, noting the following:

- Check seal seat in transmission housing for damage; rework if necessary.




- Slide seal onto 3404 thrust piece so that the larger and projecting outer ring (arrow) of seal faces tool.
- Drive in seal up to 3404 thrust piece stop.

***Note:***

*If installing the intermediate flange to the output shaft carelessly, the sealing lip of the seal can be damaged.*

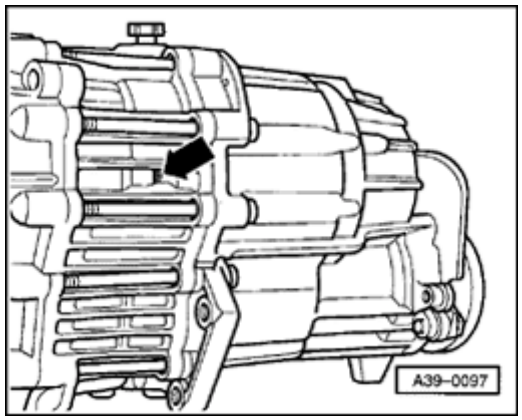
- Install center differential ⇒ page 39-58 .

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39-67

## Seal in drive pinion, replacing

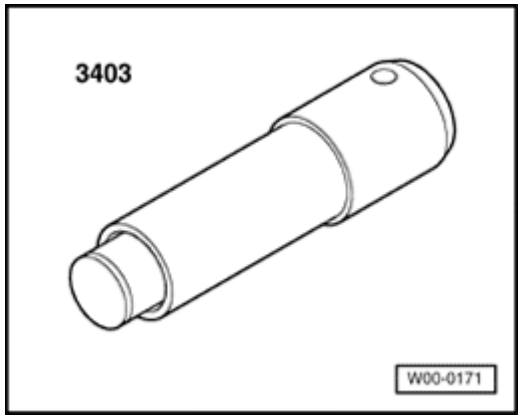
***Note:***




*An inspection opening is provided on the left side of the intermediate flange to check for oil leaks (arrow) for the seal in drive pinion and the seal in intermediate flange.*

*If oil escapes at the inspection opening, this seal must be replaced.*

**Special tools and equipment**




- 3403 thrust piece

**Removing**

- Remove center differential ⇒ page 39-56 .
- Remove intermediate flange for front final drive.
- Carefully pull off drive pinion from driveshaft.

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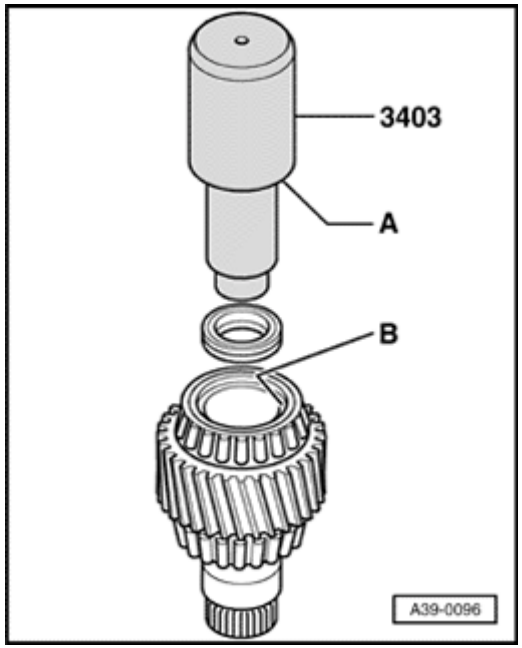
***WARNING!***

***Do not reinstall spur gears that have fallen to the ground. The transmission must be replaced in this case.***

- Drive out seal using drift.

**Installing**

Installation is reverse of removal, noting the following:




- Slide seal onto 3403 thrust piece.
- Drive seal in up to 3403 thrust piece stop.

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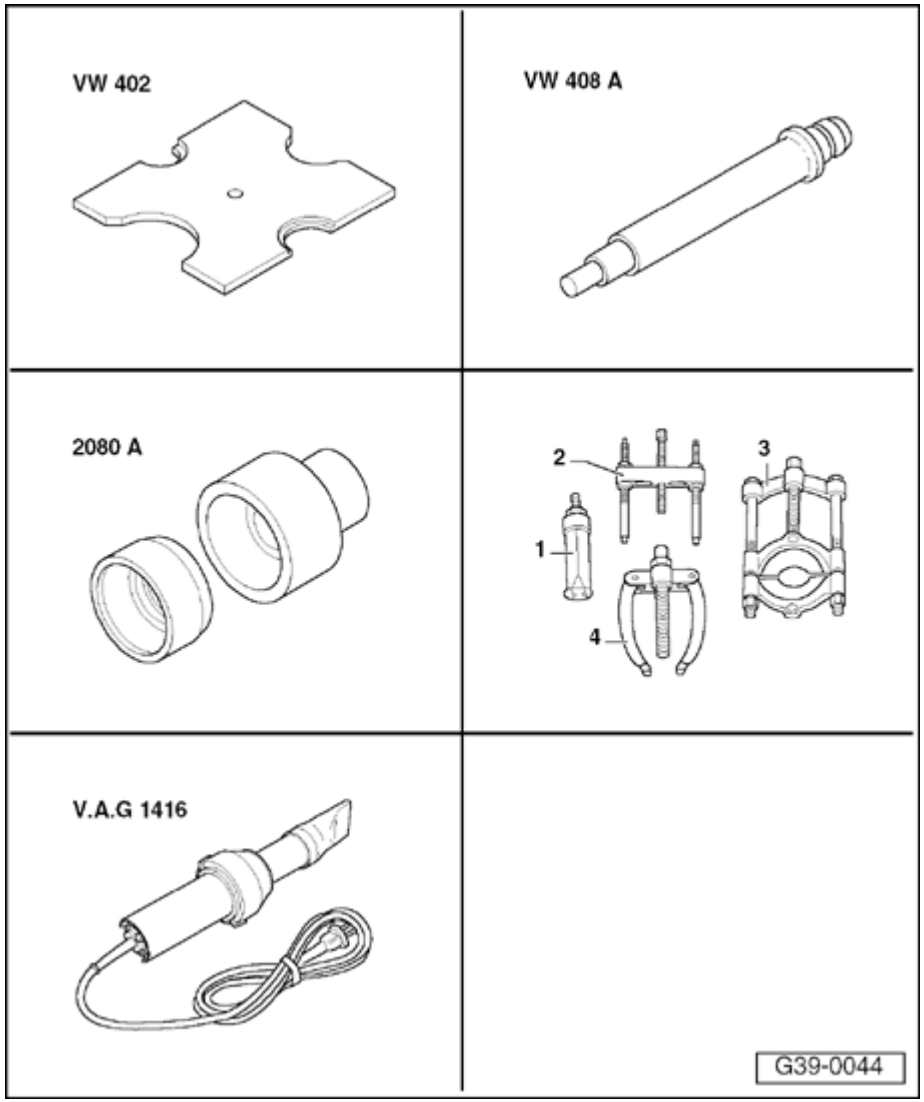
- Completely cover splines on end of shaft (arrow) with insulating tape without creasing or overlapping the tape, to prevent damage to seal when sliding on drive pinion.
- Install drive pinion on center of output shaft. (Installed position ⇒ page 39-53 )

***Note:***

*If installing the intermediate flange on the output shaft carelessly, the sealing lips of the seal can be damaged.*

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## Needle bearing for spur gear 2, replacing

### Special tools and equipment

- VW402 thrust plate
- VW408A punch
- Press sleeve for 2080A sleeve
- Item 1 Kukko 21/4 extractor
- Item 3 Kukko 22/1 support
- VAG1416 hot air blower

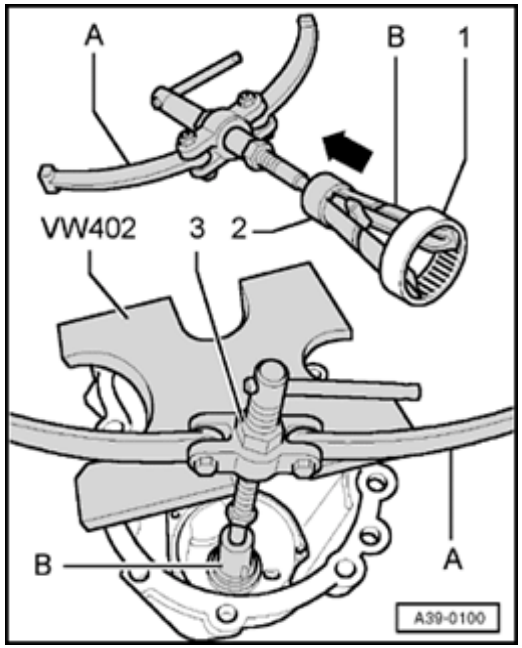
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39-70

**Removing**

- Remove center differential ⇒ page 39-56 .

***Note:***



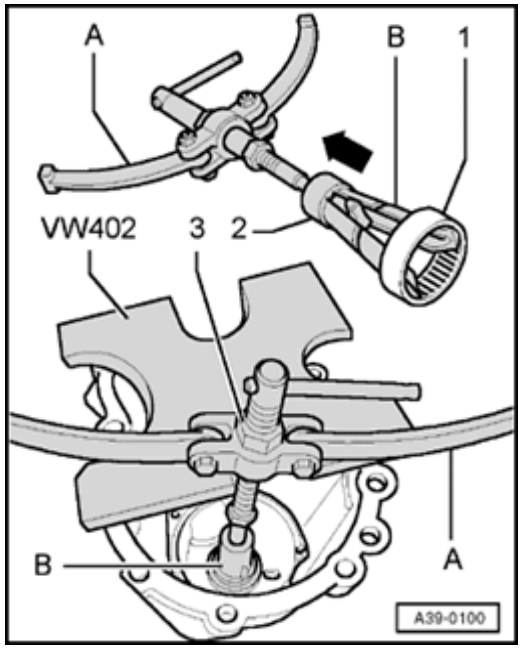

*The upper part of the illustration shows how the pulling hooks of extractor -B- must be inserted into needle bearing -1-.*

- Slide centering sleeve -2- of extractor -B- approx. 4 mm in direction of arrow in order to be able to open pulling hooks of extractor far enough.

A - Support e.g. Kukko 22/1

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- Spread extractor -B- into upper lip of needle bearing -1- and secure extractor at nut.
- Install retainer -A- on extractor -B- as illustrated.
- Support retainer -A- using VW402 thrust plate and pre-tension at nut 3 of retainer.
- Using commercially available hot air blower, quickly heat up outside of transfer housing in vicinity of needle bearing seat to approx. 100 ° C.

***WARNING!***

***Wear protective gloves!***

- Quickly pull out needle bearing.

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**Installing**

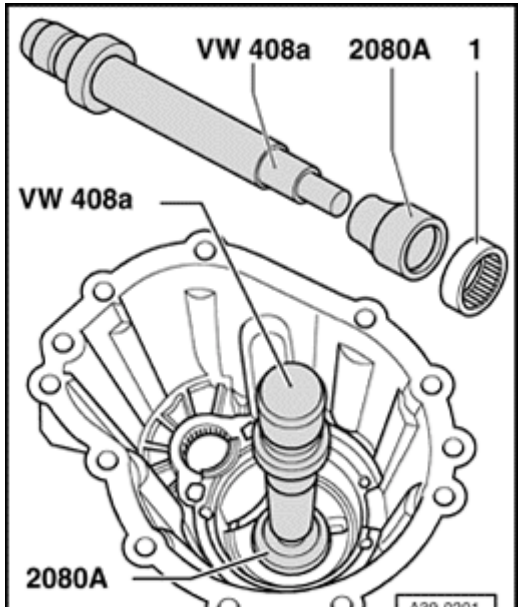
Installation is the reverse of removal. Also carry out the following procedure.

- Check needle bearing seat in transfer housing for damage, rework if necessary.

- Using commercially available hot air blower, uniformly heat up outside of transfer housing in vicinity of needle bearing seat to approx. 100 ° C.

***WARNING!***

***Wear protective gloves!***




- Place 2080A sleeve onto new needle bearing -1-.
- Drive needle bearing into transfer housing up to stop using VW408A punch.

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# Driveshaft, servicing

## Important notes

**A distinction is made between two driveshafts:**

- Driveshaft made of steel
- Driveshaft made of carbon fiber

Only carbon fiber driveshafts were installed up to November 1997.

Only steel driveshafts were installed from November 1997.

**If the driveshaft is replaced, make sure a driveshaft with the same part number is installed. A carbon fiber driveshaft must not be replaced by a steel driveshaft and vice versa !**

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**Specific notes for carbon fiber driveshafts:**

***WARNING!***

***Driveshaft made of carbon fiber***

- ***do not impact / do not hit***
- ***do not drop***

***If the surface is damaged, driveshaft must be replaced***

***Do not bend the driveshaft, maximum permissible bending angle is 25 °. Otherwise the universal joint may be damaged.***

***Only store and move driveshaft fully extended.***

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**39-75**

**Notes for all driveshafts:**

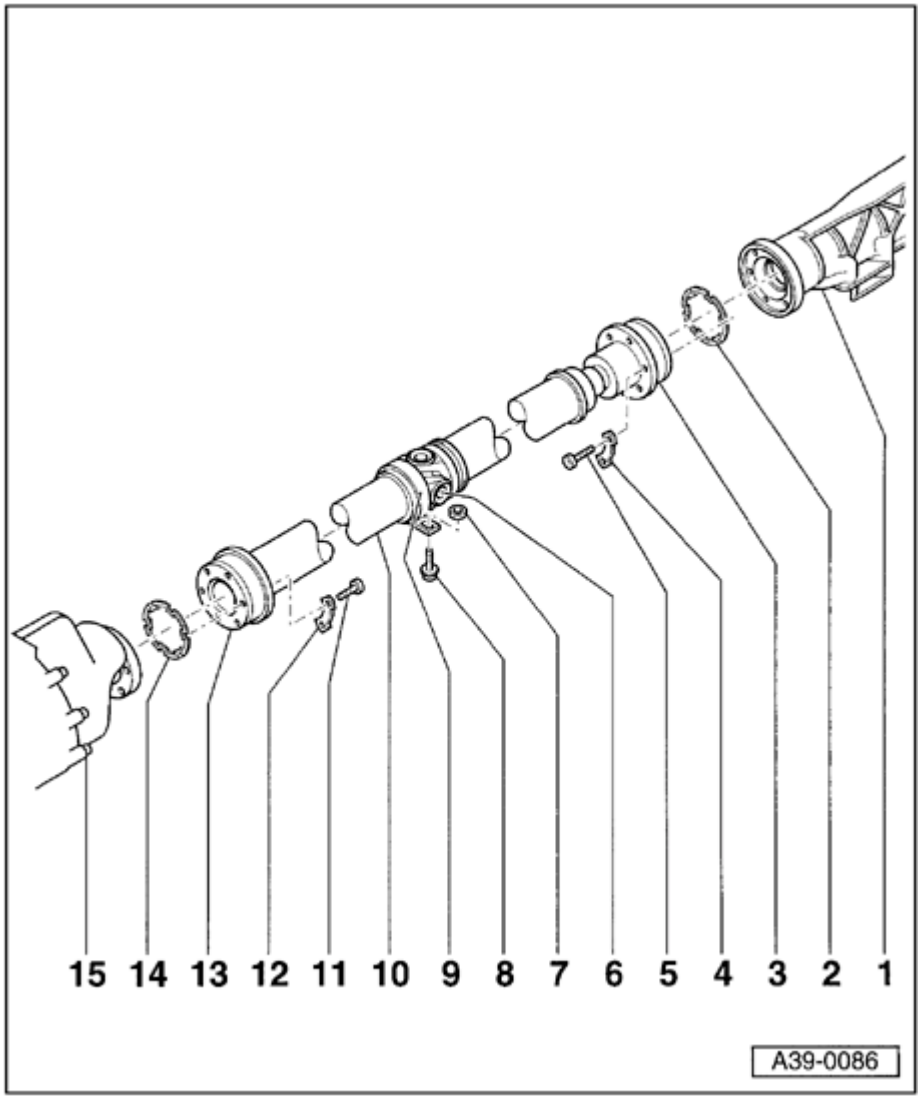
- *General repair notes ⇒ page 00-27 .*
- *Do not bend the driveshaft, maximum permissible bending angle is 25 °. Otherwise the universal joint may be damaged.*
- *Only store and move driveshaft fully extended.*
- *No repair work can be performed on the driveshaft with the exception of removing and installing and adjustment work.*
- *If the driveshaft is only detached at the transmission or from rear final drive, it must be tied up or supported at the constant velocity joints.*
- *Before removing, mark position from joint to flange. Reinstall in identical position otherwise imbalance will be too high which could result in damage to the bearing or in vibration noises.*
- *If there are complaints (noises, vibrations) it is essential to check whether correct adjustment of the driveshaft eliminates the symptoms before the driveshaft is replaced.*

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- *After disconnecting driveshaft from rear final drive, an additional balance washer (thick washer) that may be located between shim and bolt head may not be reinstalled.*

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39-76




**1 - Rear final drive**

**2 - Gasket**

- Always replace
- Remove protective film and attach self-locking side of gasket to drive flange.
- Degrease drive flange

**3 - Constant velocity joint**

- Maximum permissible bending angle 8 °

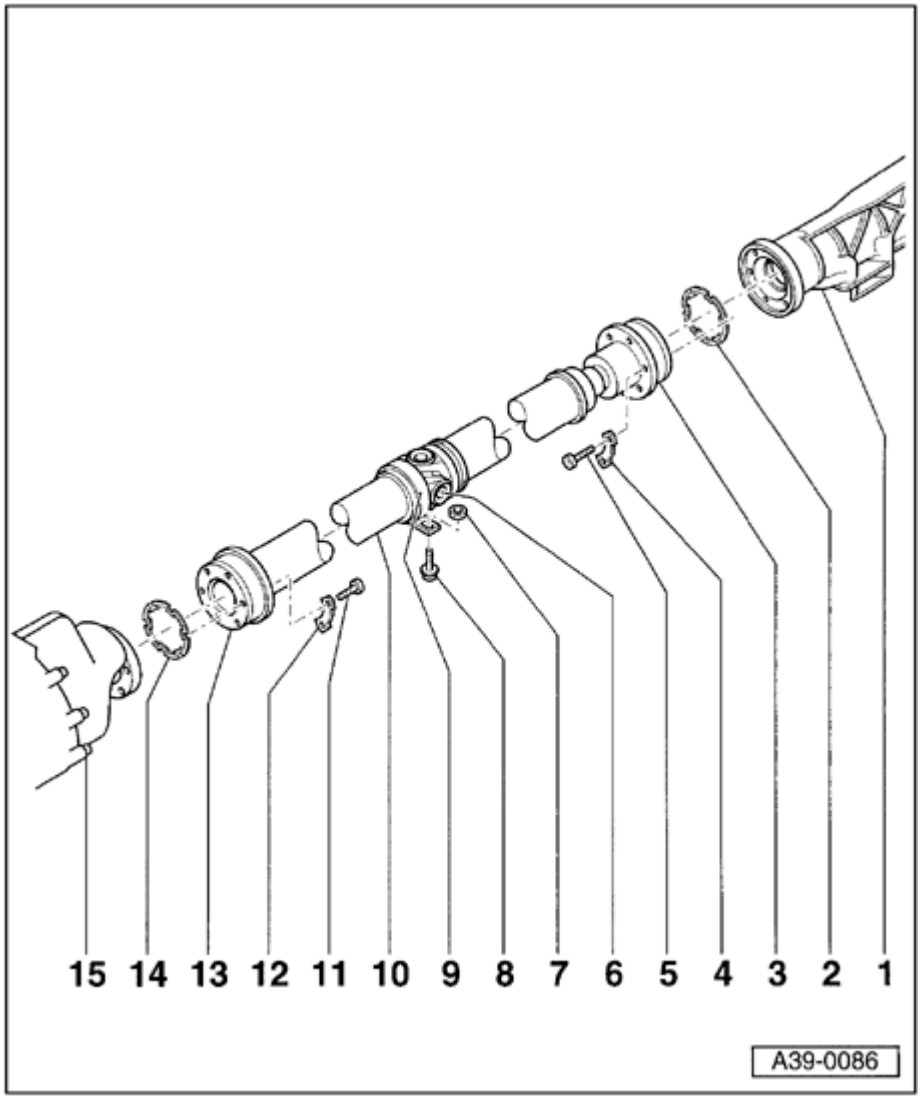
**4 - Backing plate**

**5 - Socket head bolt - 55 Nm**

- Self-locking
- Always replace
- Always clean threaded holes for drive flange bolts (e.g. with thread cutter)

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39-77




**6 - Universal joint**

- Maximum permissible bending angle 25 °

**7 - Adjustment shim**

- Determine thickness ⇒ page 39-90

**8 - Hex-bolt - 23 Nm**

**9 - Center driveshaft bearing**

**10 - Driveshaft**

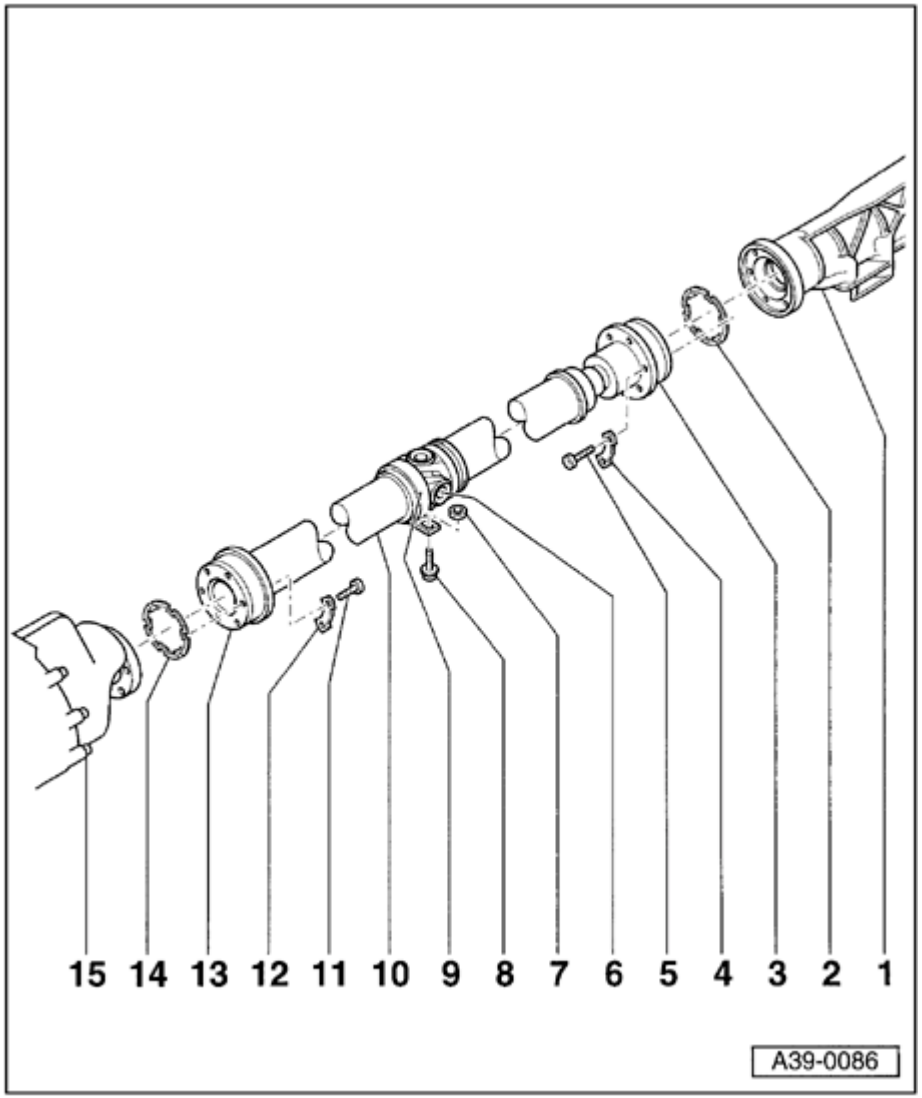
- Adjusting ⇒ page 39-88

**11 - Socket head bolt - 55 Nm**

- Self-locking
- Always replace
- Always clean threaded holes for drive flange bolts (e.g. with thread cutter)

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39-78




**12 - Backing plate**

**13 - Constant velocity joint**

- Maximum permissible bending angle 8 °

**14 - Gasket**

- Always replace
- Remove protective film and attach self-locking side of gasket to drive flange.
- Degrease drive flange

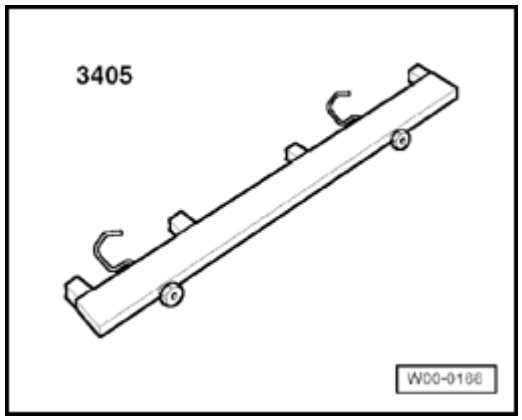
**15 - Transmission**

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39-79

## Driveshaft, removing and installing

### Special tools and equipment




- 3405 alignment fixture

### Removing

- Observe important notes ⇒ page 39-73
- Remove crossmember below exhaust system if installed.
- Remove front exhaust pipes:

⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*

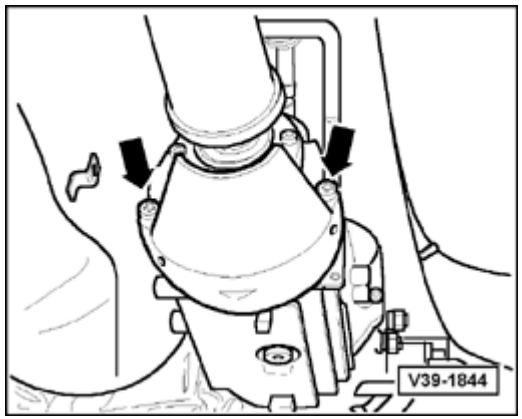
- Remove rear part of exhaust system starting at clamp to gain access to the driveshaft:

⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*

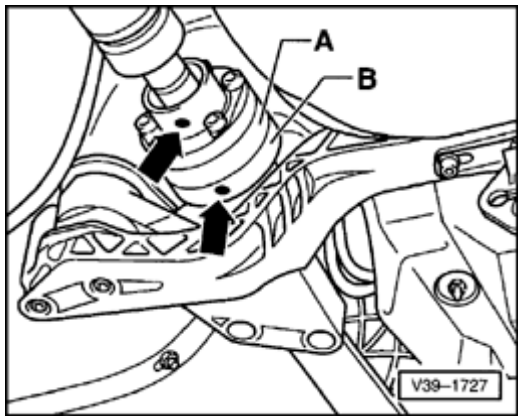
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39-80

- Remove heat shields above driveshaft.




- Unbolt heat shield for driveshaft from cover for Torsen differential (arrows).




- Check whether there is a factory marking (colored dot -arrows-) on driveshaft and at flange/driveshaft at rear final drive. If not, mark location of driveshaft flange -A- to rear final drive -B- with color.

***Note:***

*Only mark location, if same driveshaft is going to be reinstalled.*

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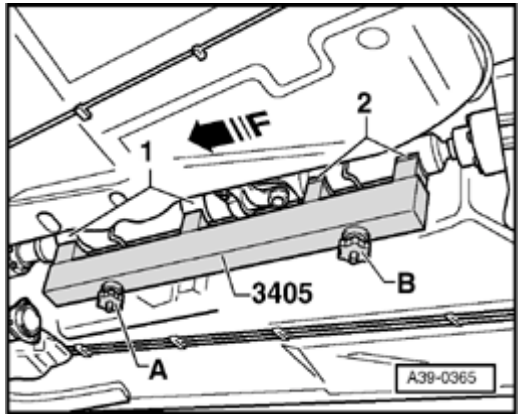
39-81

- Remove mounting bolts for both driveshaft flanges.

- Remove upper three mounting bolts for each driveshaft constant velocity joint.

- Back off mounting bolts for center support slightly.

**Only for carbon fiber driveshafts:**




- Place spacer pieces -2- onto 3405 alignment fixture (distance dimension = 10 mm).

*Spacer pieces are attached to 3405 alignment fixture via a chain.*

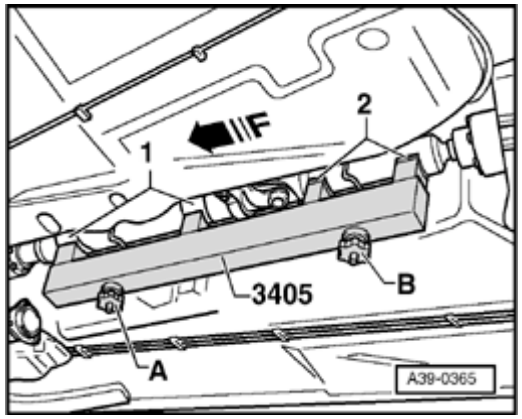
Arrow -A- points in direction of travel.

- Using spacer pieces -2-, hook in 3405 alignment fixture according to illustration.

***WARNING!***

***Assembly tool must rest on both steel rings -1- before tightening plastic nut -A-. If that is not the case, the surface of the carbon fiber driveshaft can be damaged and must be replaced see Important notes*** ⇒ ***Page 39-74***

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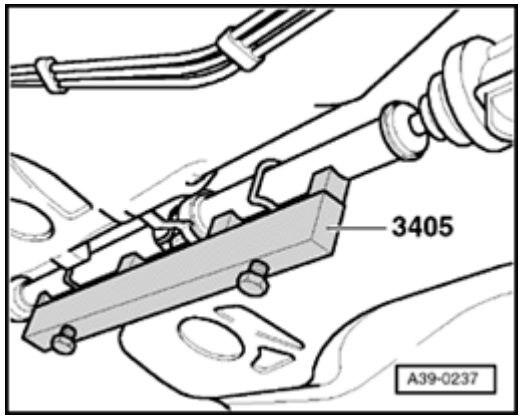



- Carefully tighten plastic nuts -A- and -B-.

***Note:***

*Never set alignment fixture on balance plates.*

**For all driveshafts except for carbon fiber driveshafts:**




- Attach 3405 alignment fixture and tighten plastic nuts.

***Note:***

*Never set alignment fixture on balance plates.*

**For all driveshafts, also for carbon fiber driveshafts:**

- Remove mounting bolts for flanges to transmission and to rear final drive as well as mounting bolts of center support.
- Push driveshaft to rear final drive together. The constant velocity joints can be adjusted axially.
- Guide driveshaft out of transmission flange using assembly tool.

***Note:***

*Only store and move driveshaft fully extended.*

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39-83

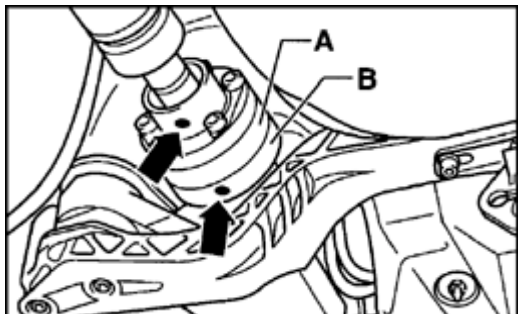
**Installing**

Installation is reverse of removal, noting the following:

- Observe important notes ⇒ page 39-73

***Notes:***

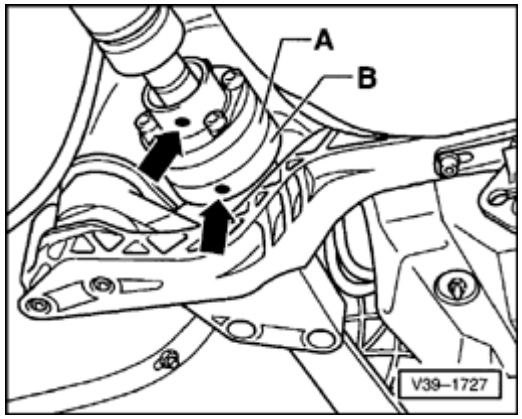
- *After removing driveshaft, always remove any remaining locking fluid from thread holes in the transmission drive flanges and the rear final drive. Otherwise there is a possibility that the new bolts may get jammed when installed and shear when removed.*
- *Cleaning can be performed with a tap.*
- *Replace gaskets on drive flanges (remove protective film and attach gasket to drive flanges). Adhesive surface must be free of grease.*




- *To prevent imbalance, driveshaft flanges -A- and rear final drive flanges -B- must be installed so that the factory color markings or markings which were made afterward are aligned (arrows).*

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39-84




- *If a new driveshaft is installed and the factory color marking on the rear final drive flange is no longer visible, check radial run out at flange/driveshaft ⇒ page 39-86 and adjust color marking at driveshaft to new marking at flange.*
- *After disconnecting driveshaft from rear final drive, an additional balance washer (thick washer) that may be located between shim and bolt head may not be reinstalled.*
- *Replace driveshaft bolts (self-locking).*

- Adjust driveshaft after installing ⇒ page 39-88 .
- Install exhaust system free of stress:

⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*

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39-85

### Tightening torques

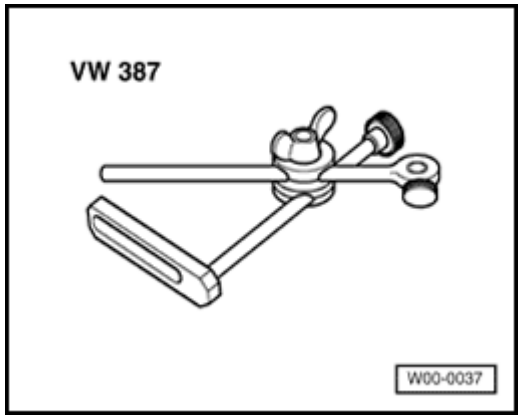
| Component | Nm |
|---|---|
| Driveshaft to transmission<br><br>(Output flange) | 55 |
| Driveshaft to final drive<br><br>(Input flange) | 55 |
| Center driveshaft support to body | 23 |
| Heat shield for driveshaft to transmission | 23 |
| Crossmember to body | 25 |
| Nuts for clamping sleeve | 40 |

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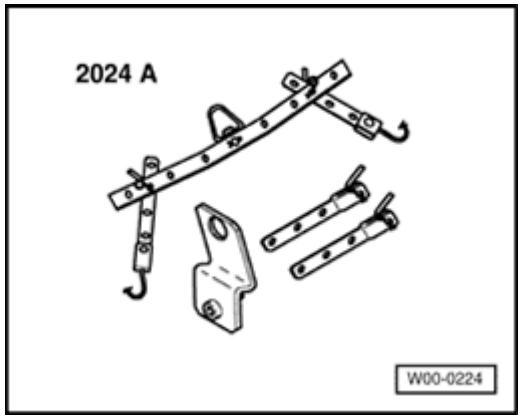
39-86

## Radial play at driveshaft flange, measuring and marking

### Special tools and equipment




- VW387 dial gauge holder




- 2024A Engine Sling
- Dial gage
- Bolt M10 x 85

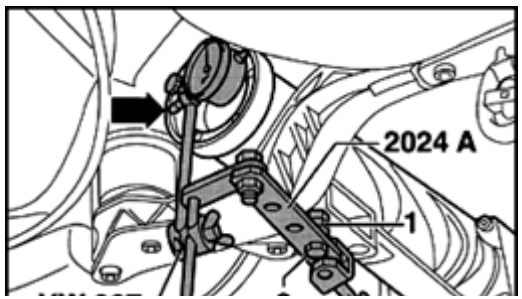
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**39-87**

***Notes:***

- *Always measure radial run-out if torque tube has been removed. Make new color marking and remove old color marking.*
- *If a new driveshaft is installed and the color marking on the drive flange of the rear final drive is no longer visible, location of largest radial run-out must be determined and marked with a color marking.*
- *Align this colored dot with colored dot on driveshaft* ⇒ *page 39-83* .
- *Radial run-out can also be measured with the rear final drive installed, for this the driveshaft must be disconnected from the rear final drive. Observe notes* ⇒ *page 39-73* .

- Remove left front bolt at transmission mount for rear final drive.




- Remove strap from 2024A engine sling and tighten at empty hole using an M10 x 85 mm -2- bolt. Place 5 M12 nuts -1- under strap.
- Bolt VW387 dial gauge holder to strap in this position.
- Set dial indicator onto ground diameter (arrow) in driveshaft flange and set to "0" with 1 mm preload.

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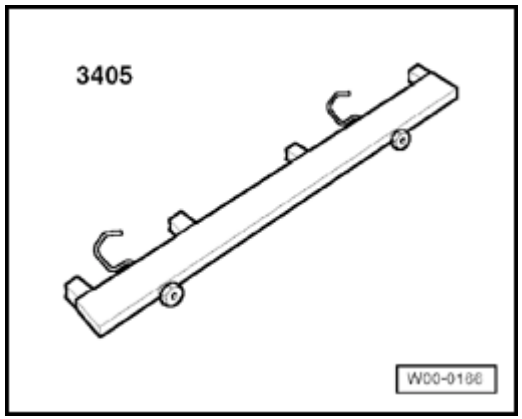
- Turn differential gear via both rear wheels (left and right flanges) at the same time in one direction until drive flange/driveshaft flange has made on complete revolution.
- Mark largest radial run-out on outer edge of flange with colored marking (equivalent to largest distance from turning axis).
- Remove old marking on driveshaft flange.
- Installing driveshaft ⇒ page 39-83 .

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39-88

## Driveshaft, adjusting

### Special tools and equipment




♦ 3405 alignment fixture

- Observe notes ⇒ page 39-73 .

Adjustments must be made very carefully as a poorly adjusted driveshaft is usually the cause of vibrations and humming noises.

- Remove crossmember below exhaust system if installed.
- Remove rear part of exhaust system starting at clamp to gain access to the driveshaft:

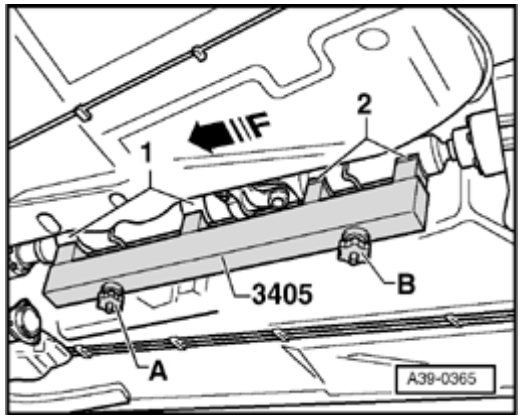
⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*

- Remove heat shields above driveshaft.
- Release mounting bolts for center support slightly.

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39-89

**Only for carbon fiber driveshafts:**




- Place spacer pieces -2- onto 3405 alignment fixture (distance dimension = 10 mm).

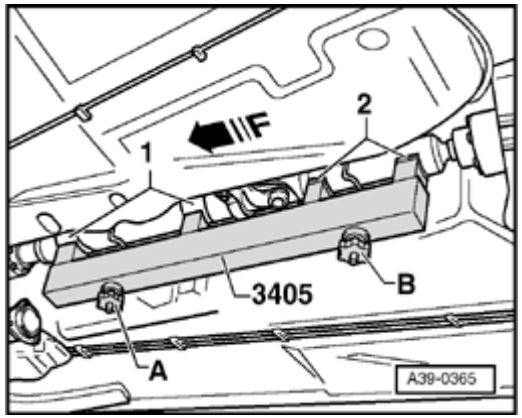
*Spacer pieces are attached to 3405 alignment fixture via a chain.*

Arrow -A- points in direction of travel.

- Using spacer pieces -2-, hook in 3405 alignment fixture according to illustration.

***WARNING!***

***Assembly tool must rest on both steel rings -1- before tightening plastic nut -A-. If that is not the case, the surface of the carbon fiber driveshaft can be damaged and must be replaced see Important notes*** ⇒ ***page 39-74***




- Carefully tighten plastic nuts -A- and -B-.

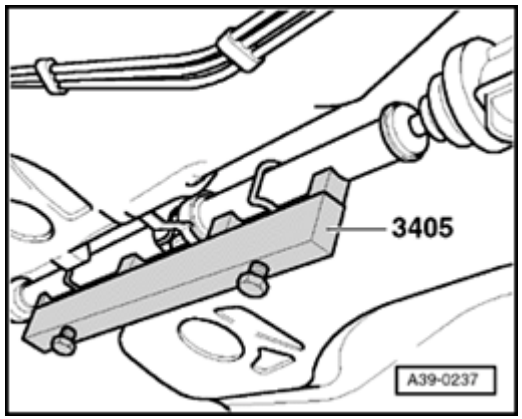
***Note:***

*Never set alignment fixture on balance plates.*

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39-90

**For all driveshafts except for carbon fiber driveshafts:**



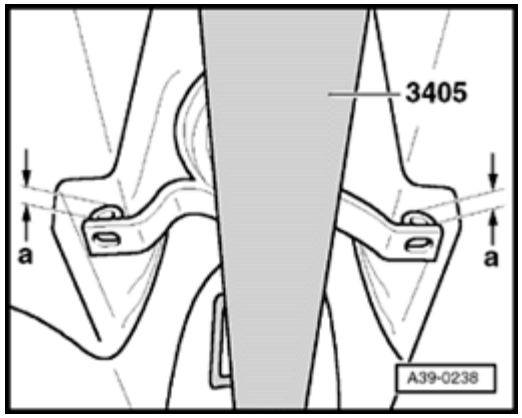

- Attach 3405 alignment fixture and tighten plastic nuts.

***Note:***

*Never set alignment fixture on balance plates.*

**For all driveshafts, also for carbon fiber driveshafts:**

- Remove center support mounting bolts and adjustment shims.




- Align driveshaft center support so that distance -a- (left side) is equal to distance -a- (right side).
- Measure distances -a-.
- Determine adjustment shims according to table. Part numbers

⇒ *Parts-catalog*

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39-91

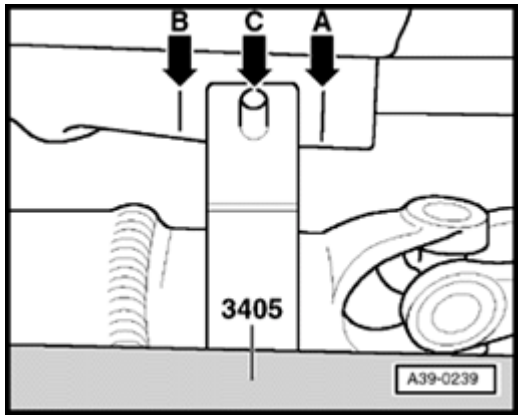
**Available adjustment shims**

| Distance -a- (mm) | Shim thickness (mm) |
|---|---|
| 0 to 3.0 | - |
| 3.1 to 5.0 | 2 |
| 5.1 to 7.0 | 4 |
| 7.1 to 9.0 | 6 |
| 9.1 to 11.0 | 8 |
| 11.1 to 13.0 | 10 |

- Install left and right shims determined from table.

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**Centering driveshaft lengthwise**

- Slide driveshaft with alignment fixture toward rear to stop.
- Mark position of center support on body (arrow A).
- Slide driveshaft with alignment fixture toward front to stop.
- Mark position of center support on body -(arrow B).
- Center driveshaft (arrow C):
  - ♦ Center support must be centered between markings -A- and -B-.
- Install mounting bolts for driveshaft center support and the pre-determined shims and tighten.
- Remove alignment fixture.
- Install heat shield above driveshaft.

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Installation is reverse of removal, noting the following:

- Install exhaust system free of stress:

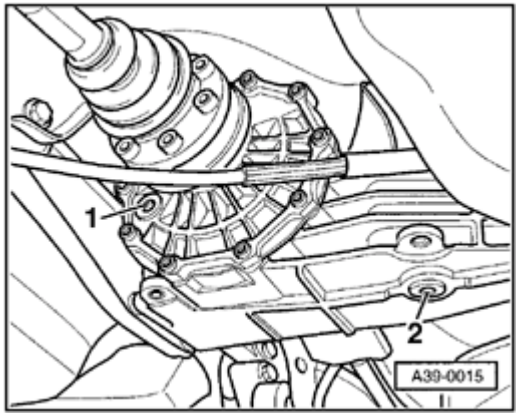
⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*

**Tightening torques**

| Component | Nm |
|---|---|
| Center driveshaft support to body | 23 |
| Crossmember to body | 25 |
| Nuts for clamping sleeve | 40 |

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# Gear oil in rear final drive, checking



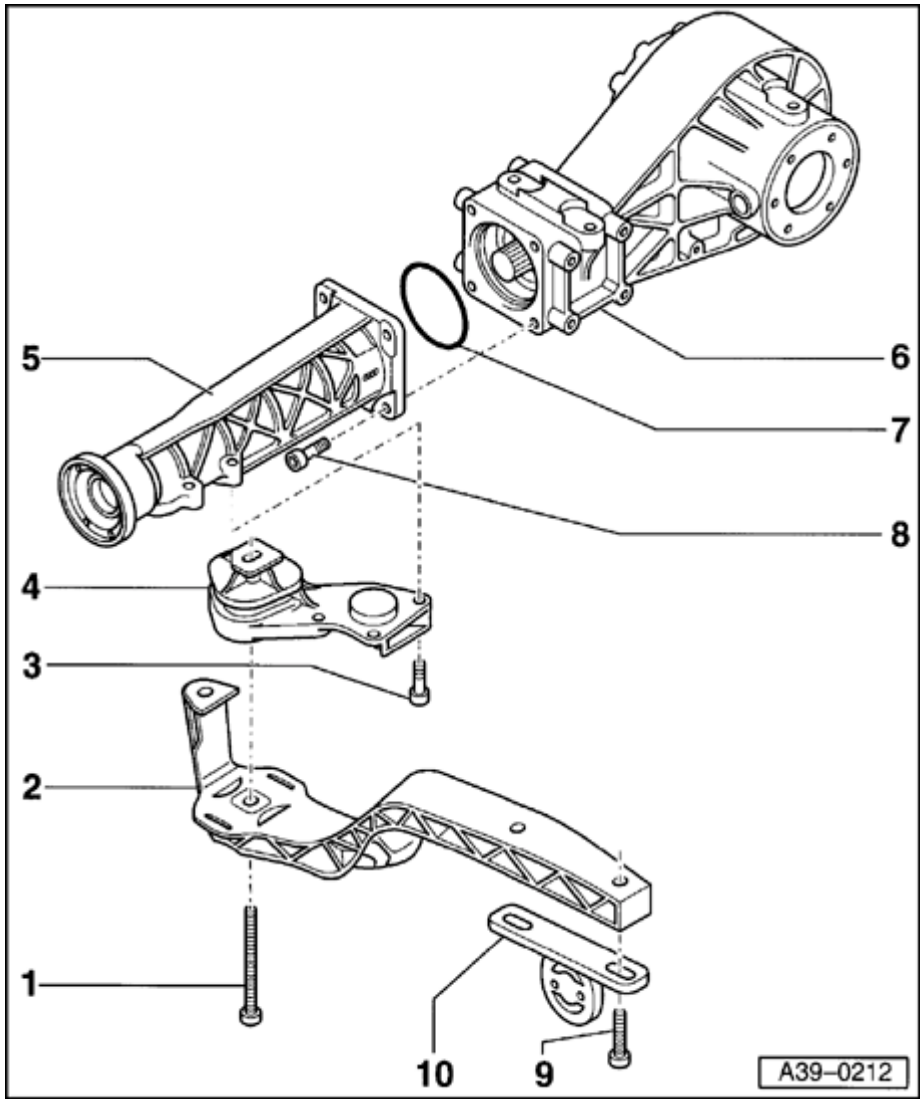

- Unscrew oil filler plug -1- for checking gear oil.
  - Specification: Oil level should reach lower edge of oil filler hole.
- If necessary, top up gear oil. Specification ⇒ page 00-25 .
- Install oil filler plug.

**Tightening torque**

| Component | Nm |
|---|---|
| Oil filler plug | 35 |

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39-95




# Torque tube, removing and installing

## Assembly overview

**1 - Bolt - 40 Nm**

**2 - Front crossmember**

**3 - Bolt - 40 Nm**

**4 - Transmission support**

**5 - Torque tube**

**6 - Rear final drive housing**

**7 - O-ring**

**8 - Bolt - 35 Nm**

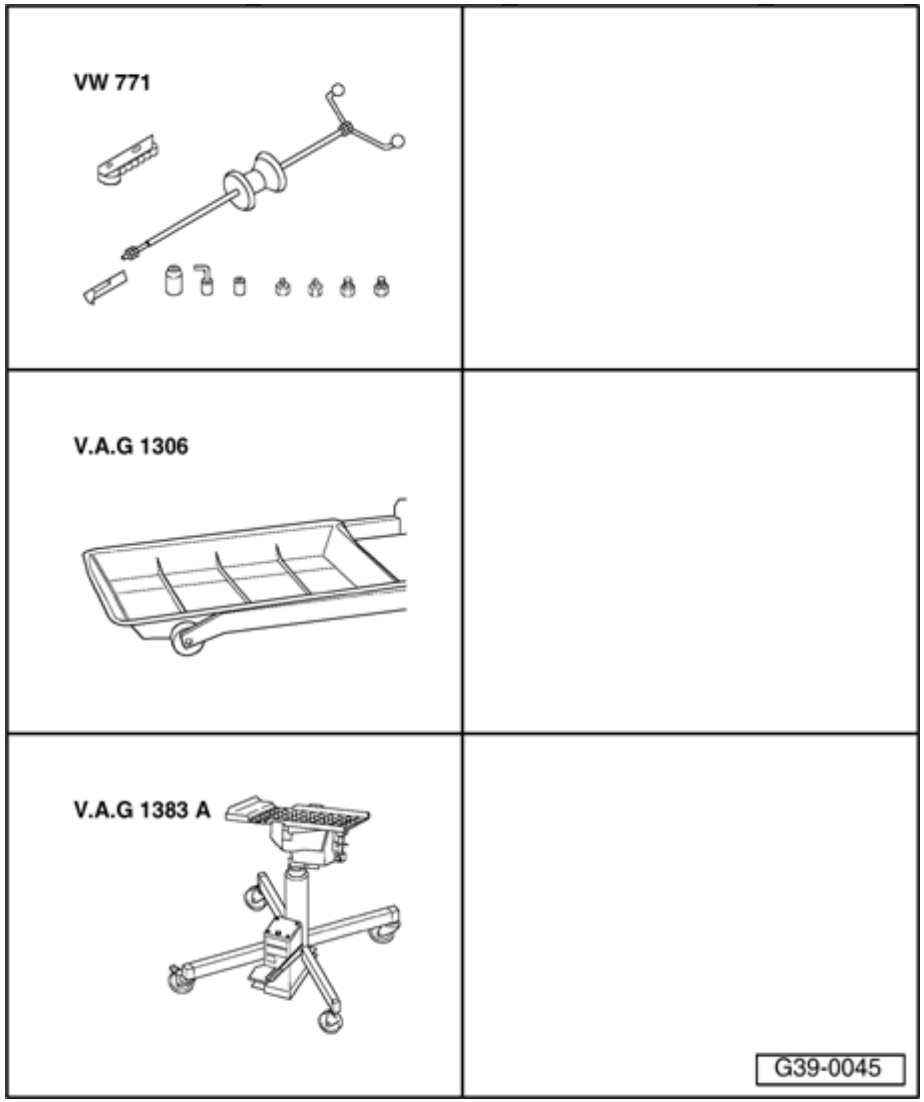
**9 - Bolt - 23 Nm**

**10 - Bracket**

- For exhaust system

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39-96




## Removing

- Rear final drive installed

### Special tools and equipment

- VW 771 slide hammer-complete set with 771/15 threaded piece
- VAG1306 drip tray
- Engine/transmission jack VAG1383A engine/gearbox jack

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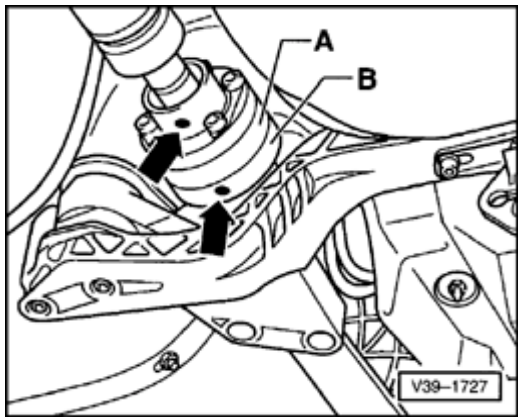
- Place VAG1306 drip tray underneath and drain gear oil.

- Remove rear part of exhaust system behind clamping sleeve(s):

⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*

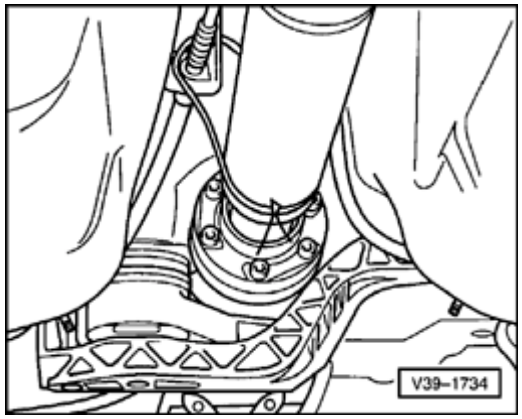
- Remove heat shields above driveshaft.

- Remove heat shield beside final drive.




- Check whether there is a factory marking (color marking) on the driveshaft. If not, mark location of driveshaft flange -A- to rear final drive -B- with color.
- Remove mounting bolts of driveshaft flange.

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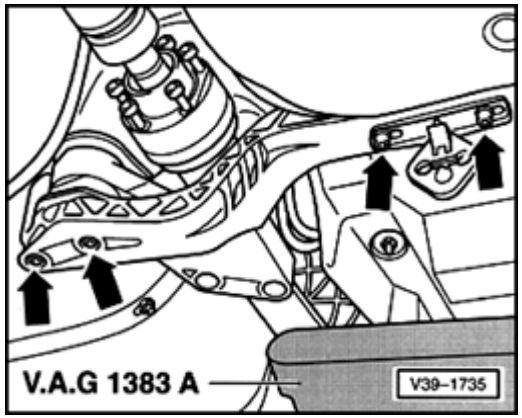



- Tie up driveshaft at mount for parking brake cable using wire.

***Note:***

*If the driveshaft cannot be pressed upward past the flange, tie up driveshaft after lowering final drive. When lowering, secure driveshaft against falling down and note permissible bending angle of driveshaft ⇒ Notes ⇒ page 39-73 .*

- Support final drive using VAG1383A engine/transmission hoist.

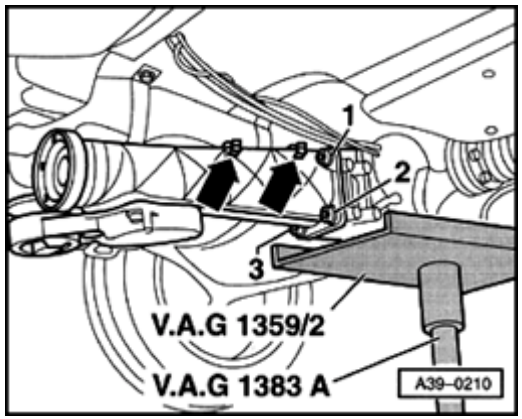



- Remove bolts (arrows) at front crossmember for rear final drive.
- Remove front crossmember.

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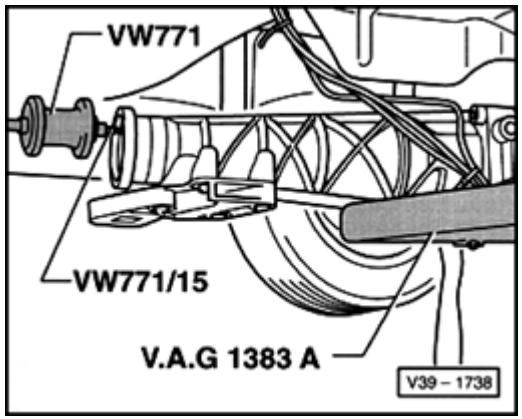
- Lower final drive approx. 10 cm.




- Remove 4 bolts for torque tube 1 to 3.

***Note:***

*The 4. bolt is not visible in the illustration.*




- Pull off flange shaft with torque tube.

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## Installing

Installation is reverse of removal, noting the following:

***Notes:***

- *After removing driveshaft, always remove any remaining locking fluid from thread holes in the transmission drive flanges and the rear final drive. Otherwise there is a possibility that the new bolts may get jammed when installed and shear when removed.*
- *Cleaning can be performed with a tap.*
- *Always replace seal between drive flange and driveshaft (remove protective film and attach seal to drive flange). Adhesive surface must be free of grease.*
- *Replace driveshaft bolts (self-locking).*

- Determine radial run-out at flange/driveshaft if a factory marking is present at the driveshaft ⇒ page 39-86 and adjust color marking at driveshaft to new marking at flange.

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- Install exhaust system free of stress:

⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*

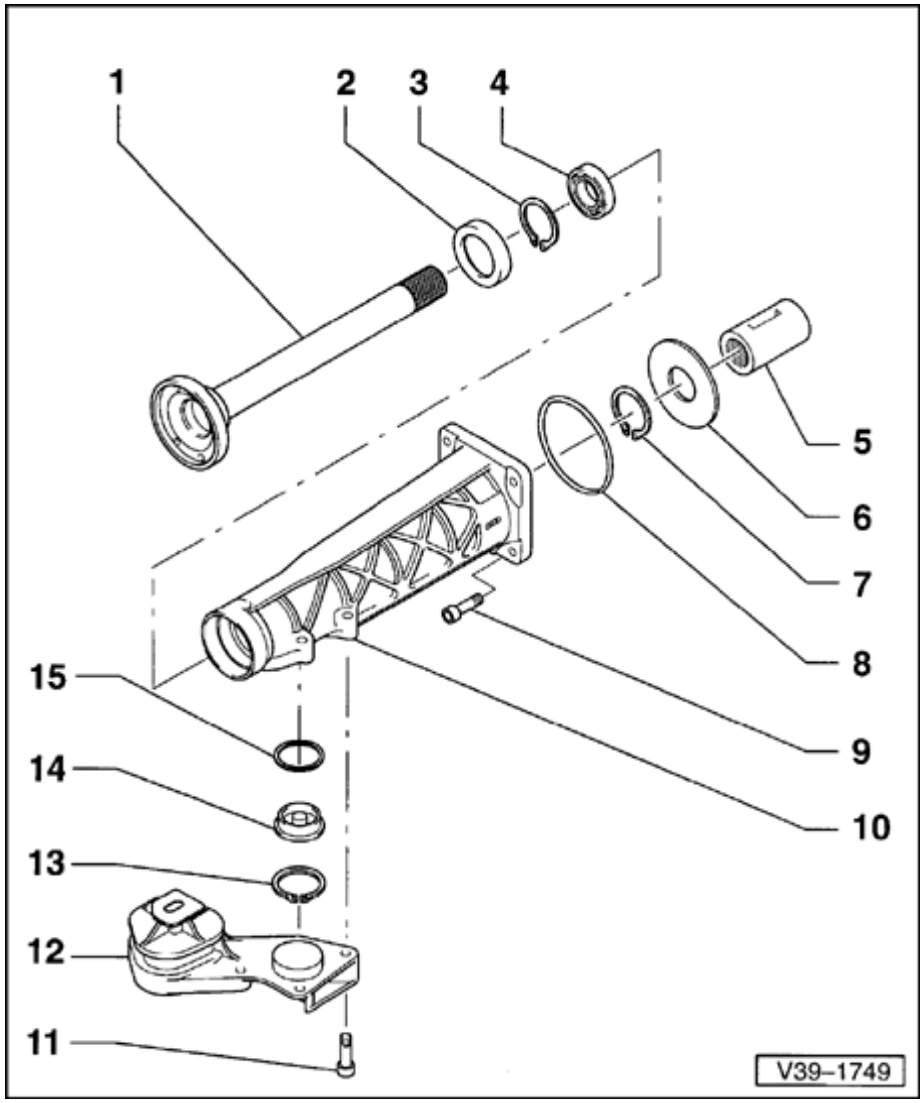
- Top-up and check gear oil in rear final drive ⇒ page 39-94 .

**Tightening torques**

| Component | Nm |
|---|---|
| Torque tube to rear final drive | 35 |
| Driveshaft to final drive<br><br>(Input flange) | 55 |
| Front crossmember for rear final drive to body | 40 |
| Front crossmember for rear final drive with exhaust system bracket to body | 23 |
| Oil filler plug | 35 |
| Nuts for clamping sleeve | 40 |

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39-102




# Torque tube, disassembling, assembling and overview

***Note:***

*Torque tube, removing and installing ⇒ page 39-95 .*

**1 - Drive flange**

- Removing ⇒ page 39-108
- When installing, circlip item 7 - must be inserted into hole in housing at the same time ⇒ page 39-112

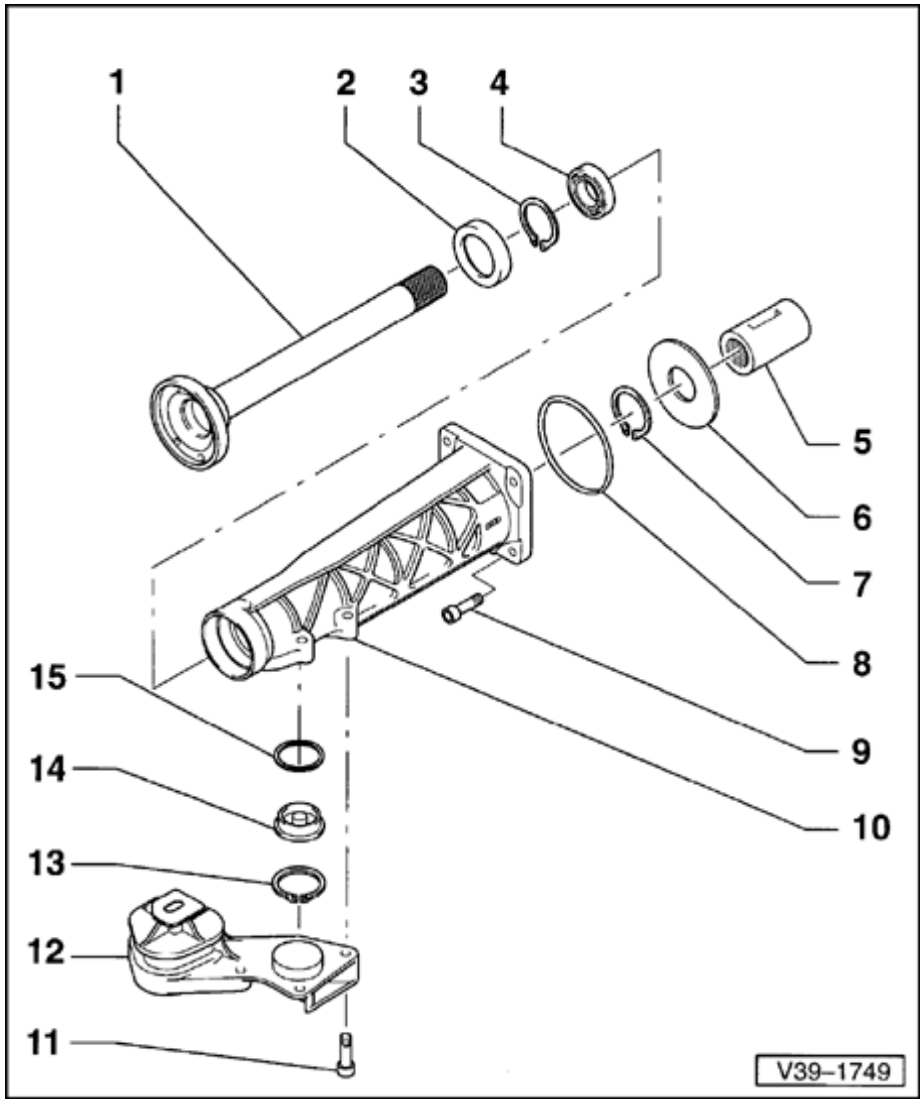
**2 - Seal**

- Levering out ⇒ page 39-109
- Driving in ⇒ page 39-111

**3 - Snap ring**

- Removing ⇒ page 39-109

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**4 - Grooved ball bearing for drive flange**

- Pulling out ⇒ page 39-110
- Pressing in ⇒ page 39-111

**5 - Sleeve**

- Pulling off ⇒ page 39-107
- Pressing on ⇒ page 39-112

**6 - Diaphragm plate**

- Only press out if damaged
- Installing ⇒ page 39-110

**7 - Snap ring**

- Spread for removing flange shaft ⇒ page 39-108

**8 - O-ring**

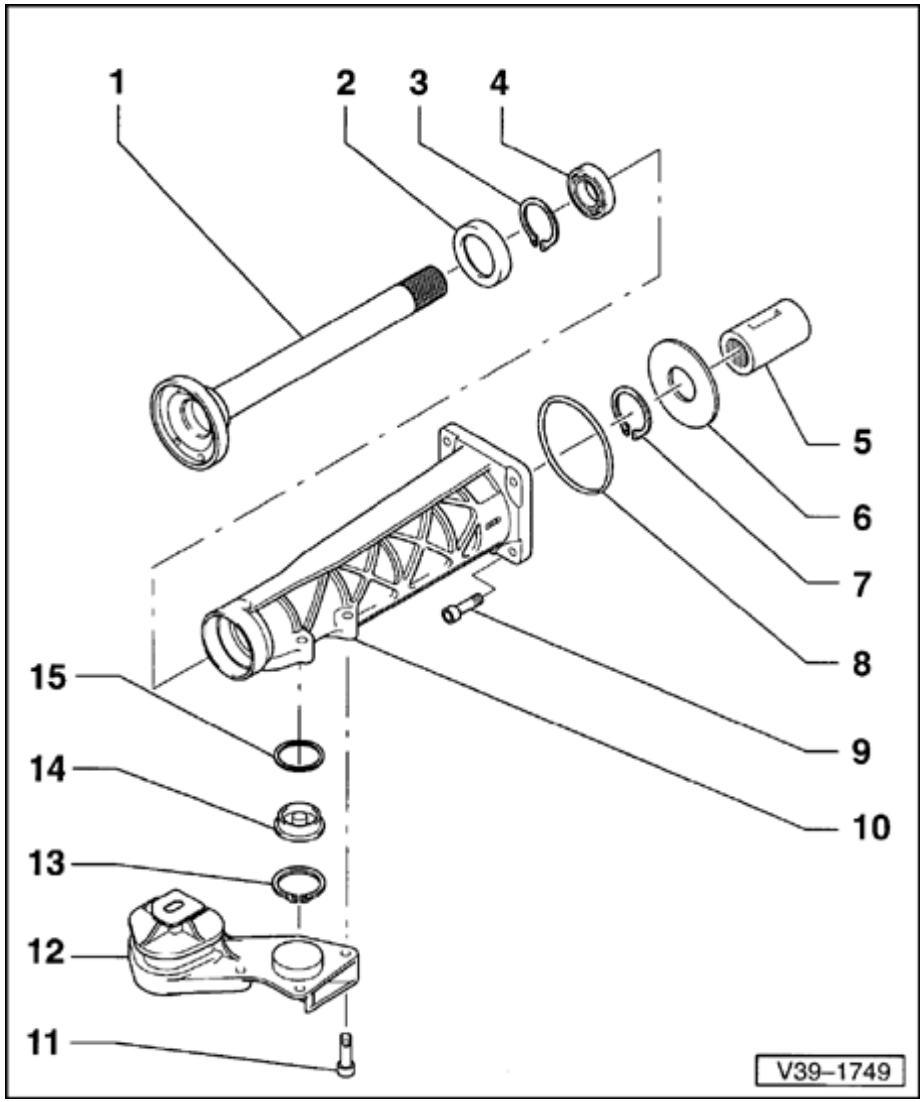
- Always replace

**9 - Bolt - 35 Nm**

- For securing torque tube to rear final drive housing

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39-104




**10 - Torque tube**

**11 - Bolt - 40 Nm**

- For securing final drive mount to torque tube

**12 - Transmission support**

**13 - Snap ring**

- Removing ⇒ page 39-107

**14 - Concealment cap**

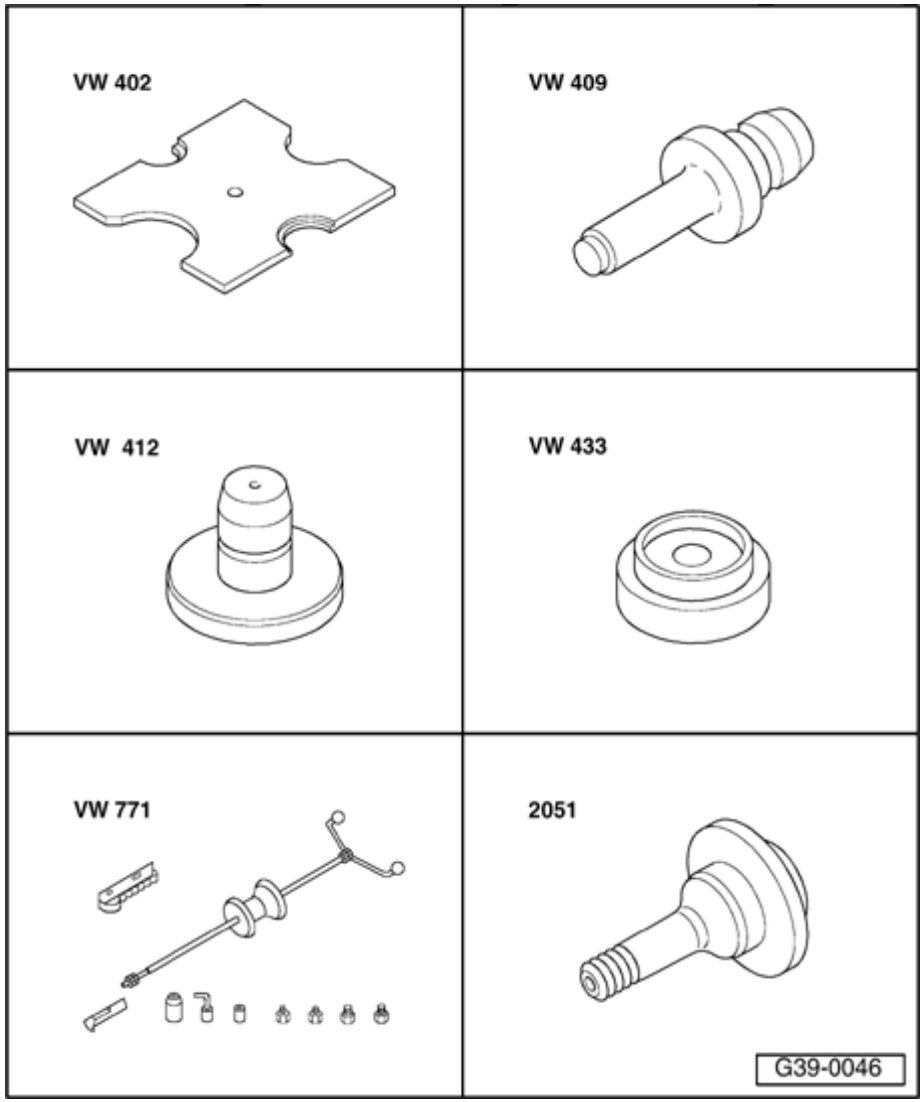
- Removing ⇒ page 39-107

**15 - O-ring**

- Always replace

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39-105



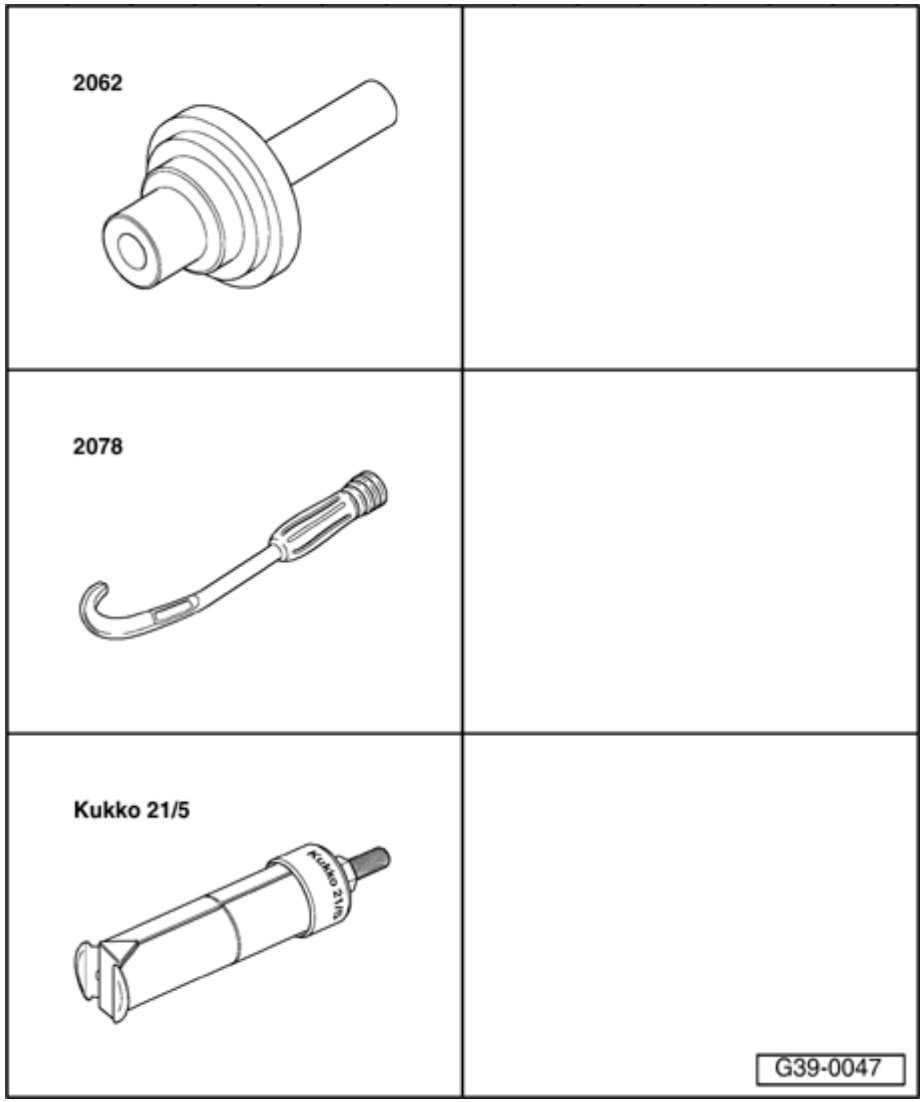

## Torque tube, disassembling and assembling

### Special tools and equipment

- VW402 thrust plate
- VW409 punch
- VW412 punch
- VW433 thrust pad
- VW 771 slide hammer-complete set with 771/15 threaded piece
- 2051 arbor

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**39-106**




- 2062 driver
- 2078 tappet tensioner
- Kukko 21/5 extractor

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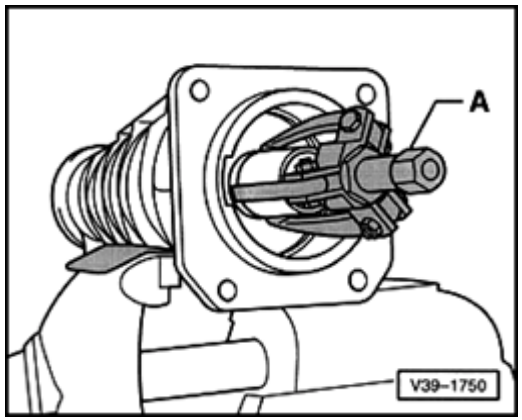
39-107

***Note:***

*Removing and installing torque tube ⇒ page 39-95 .*

**Disassembly**

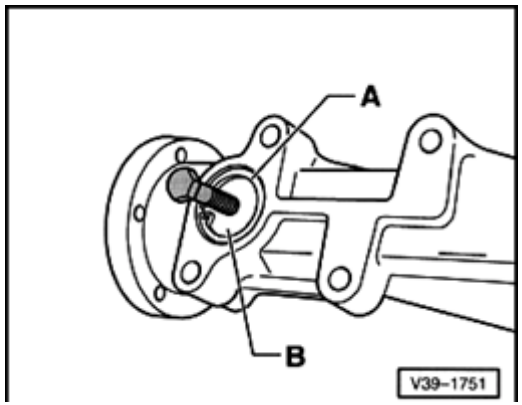
- Clamp torque tube in vise with protective pads.




- Pull off sleeve.

A - Internal puller 30 to 37 mm, e.g. Kukko 21/5 extractor

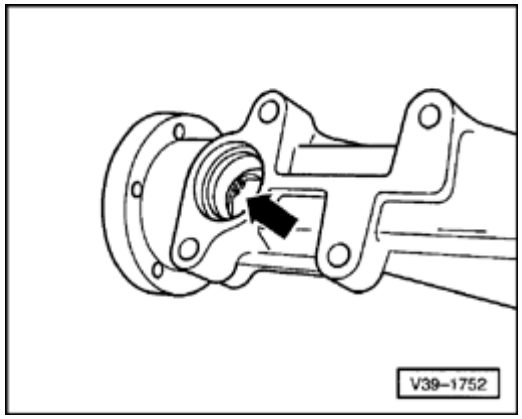
- Remove transmission mount.



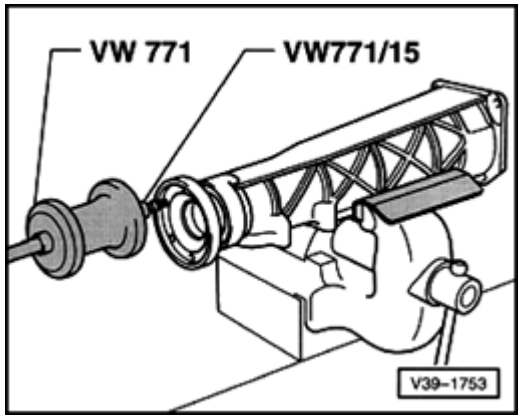

- Remove circlip -A-.
- Thread M8 bolt into threaded hole of cap -B- and pull out cap.

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**39-108**



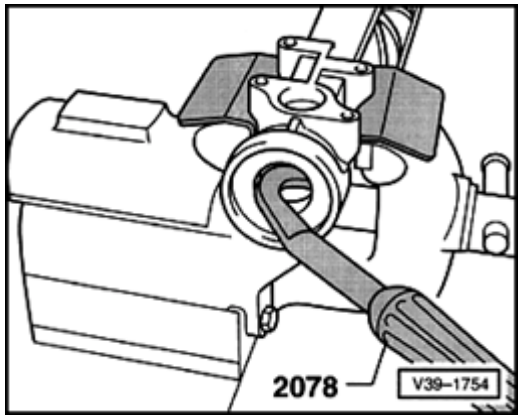

- Expand circlip -arrow- on flange shaft and slide in direction of splines.



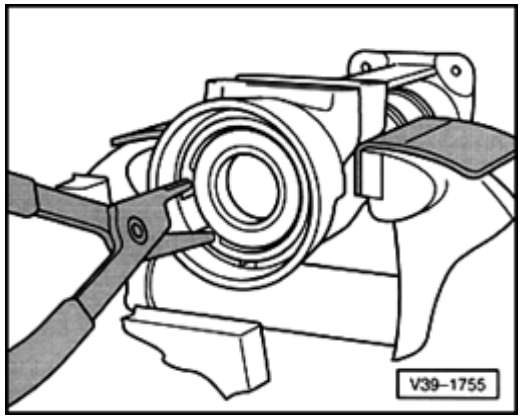

- Remove drive flange.
- Remove circlip from torque tube.

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**39-109**



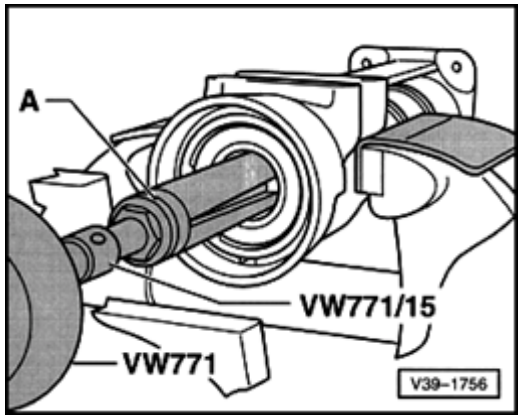

- Pry out gasket.




- Remove circlip.

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39-110




- Pulling out grooved ball bearing for drive flange.

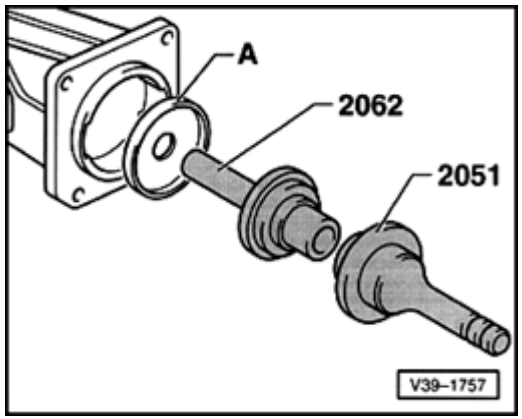
A - Internal puller 30 to 37 mm, e.g. Kukko 21/5 extractor

***Note:***

*The bearing is damaged during removal.*

**Only if the diaphragm plate is damaged:**

- If the diaphragm plate is damaged, press it out together with drive flange.

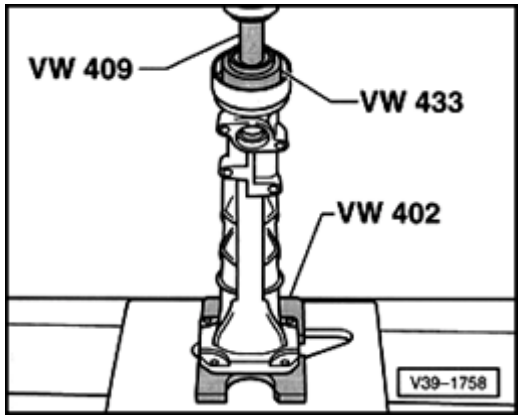



- To install, drive in diaphragm plate -A- up to stop.

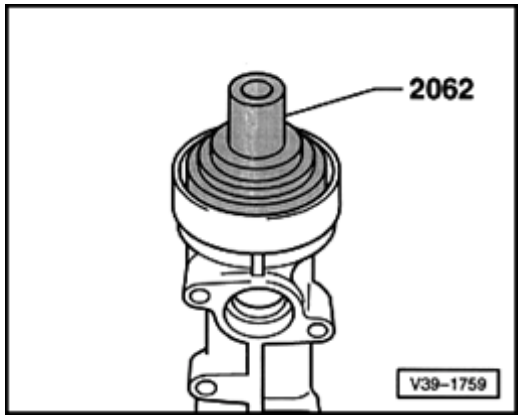
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39-111

## Assembly



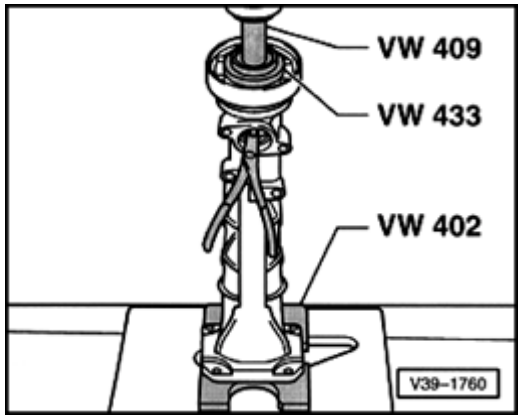

- Press grooved ball bearing into torque tube.
- Insert outer circlip.
- Fill seal between sealing lip and dust lip with multi-purpose grease.



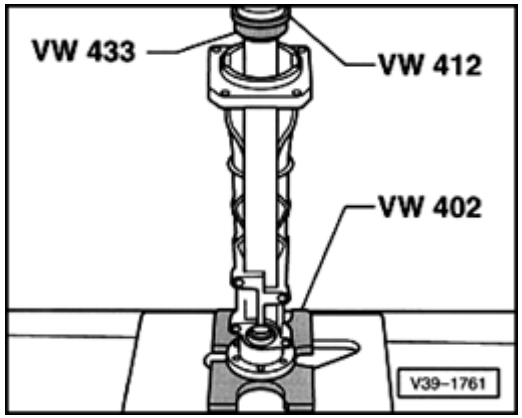

- Drive in seal to stop.

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39-112




- Insert circlip into torque tube and hold using pliers, press in drive flange.
- Insert circlip into groove.



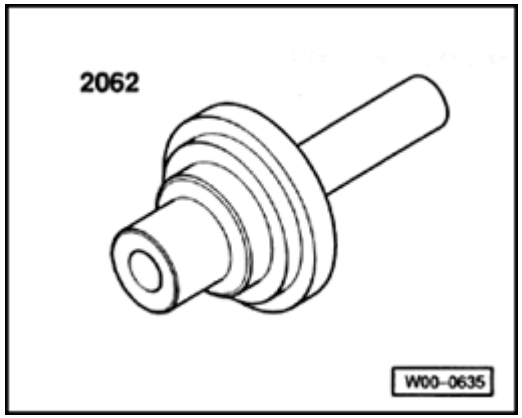

- Press sleeve onto drive flange up to stop.
- Install cap with seal.
- Insert circlip.
- Install final drive mount.
- Position O-ring on torque tube.

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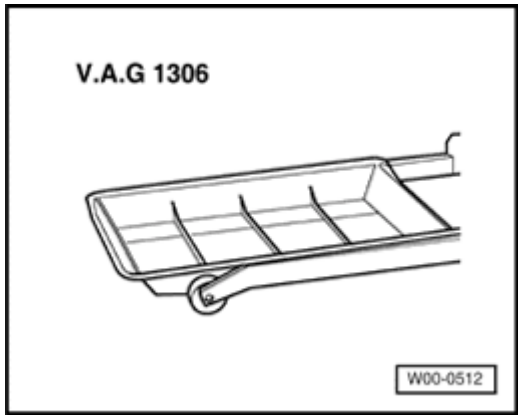
39-113

# Oil seals for flange shafts, replacing

## Special tools and equipment



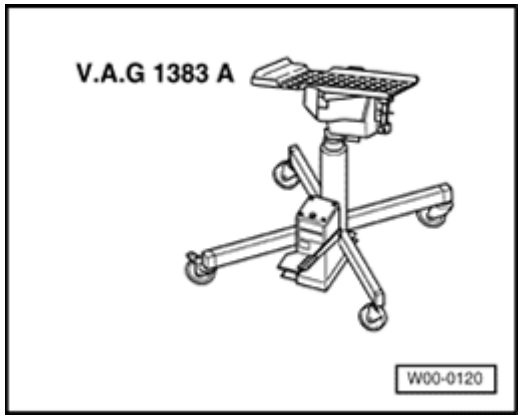

- 2062 driver




- VAG1306 drip tray

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39-114




- VAG1383A engine/transmission hoist

**Removing**

- Rear final drive installed

- Observe general repair notes ⇒ page 00-27 .

***Note:***

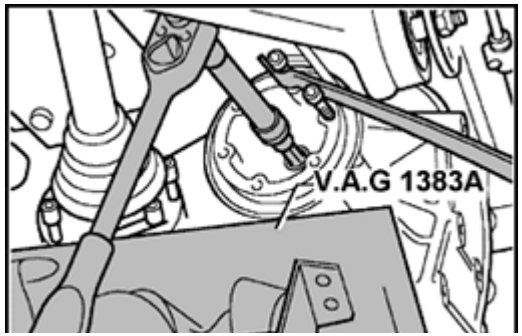
*The exhaust system must only be removed if left seal is replaced.*

- Remove rear part of exhaust system behind clamping sleeve(s):

⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*

- Remove left or right drive axles from rear final drive and lay to side:

⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 42; Component allocation of rear axle (All Wheel Drive (AWD) vehicles); Drive axle, removing and installing*

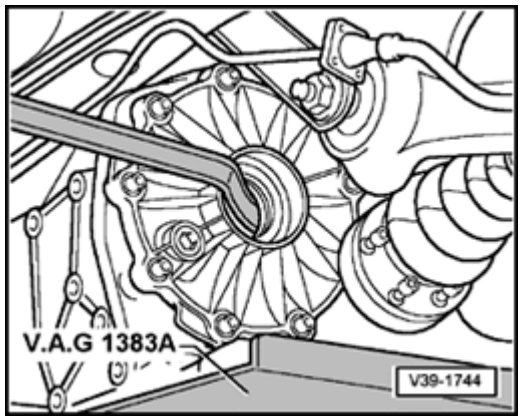



- Remove drive flange. To loosen securing bolt, thread 2 bolts into drive flange and counter hold using tire iron.

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- Place VAG1306 drip tray underneath and drain gear oil.

- Remove drive flange at installed bolts.

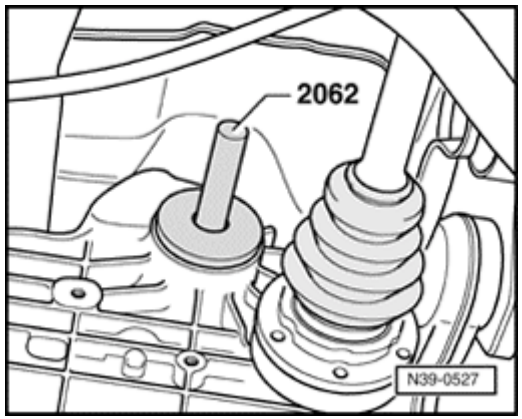



- Pry out drive flange seal using tire iron.

**Installing**

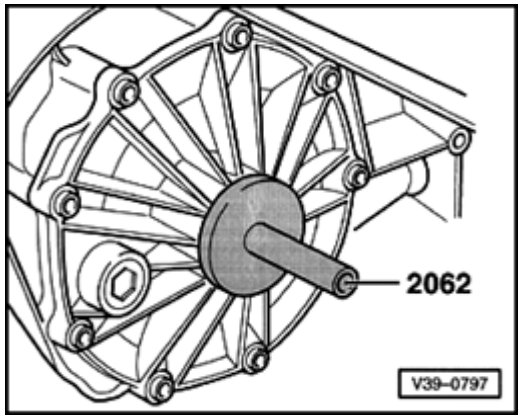
Installation is reverse of removal, noting the following:

- Clean gasket seat.
- Coat outer edge of oil seal with gear oil.
- Fill gap between sealing lip and dust lip with multi-purpose grease.




- Using 2062 driver, press in seal for left drive flange to stop without bending seal.

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- Using 2062 driver, press in seal for right drive flange to stop without bending seal.
- Install driveshaft.

⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 42; Component allocation of rear axle (All Wheel Drive (AWD) vehicles); Drive axle, removing and installing*

- Install exhaust system free of stress:

⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*

- Top-up and check gear oil in rear final drive ⇒ page 39-94 .

**Tightening torque**

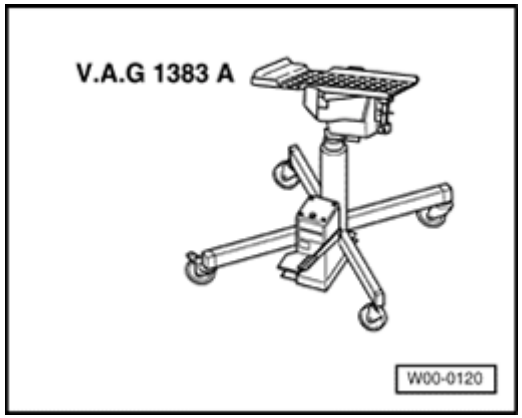
| Component | Nm |
|---|---|
| Drive flange to final drive | 25 |

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39-117

# Rear final drive, removing and installing

## Special tools and equipment




- VAG1383A engine/transmission hoist

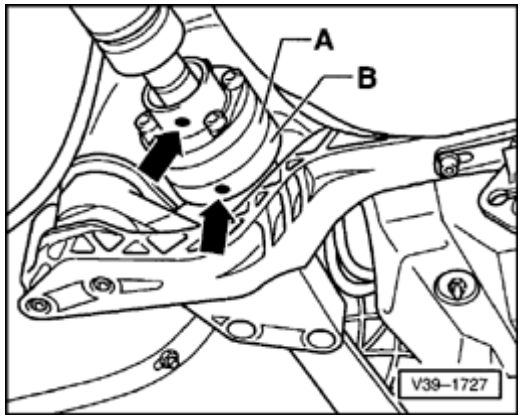
## Removing

- Remove rear part of exhaust system behind clamping sleeve(s):

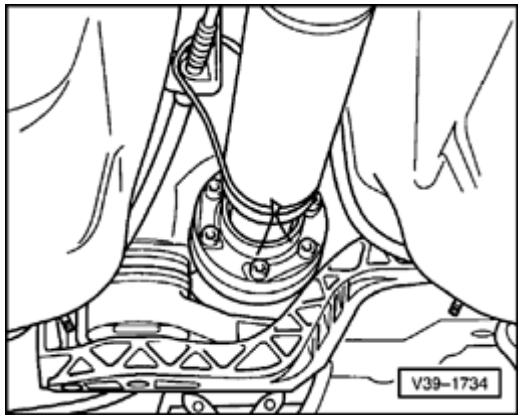
⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*

- Remove heat shields above driveshaft.

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- Check whether there is a factory marking (color marking) on the driveshaft. If not, mark location of driveshaft flange -A- to rear final drive -B- with color.
- Remove mounting bolts of driveshaft flange.




- Tie up driveshaft at mount for parking brake cable using wire.

***Note:***

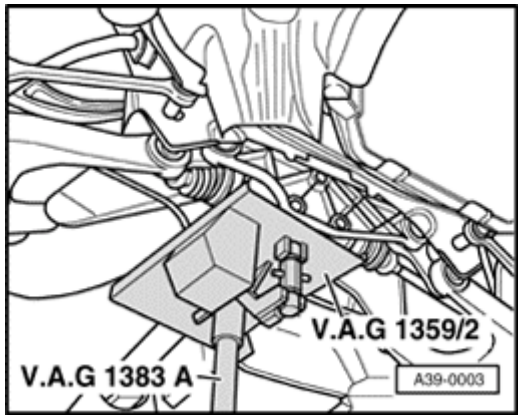
*If the driveshaft cannot be pressed upward past the flange, tie up driveshaft after lowering final drive. When lowering, secure driveshaft against falling down and note permissible bending angle of driveshaft ⇒ Notes ⇒ page 39-73 .*

- Loosen left or right drive axle from rear final drive

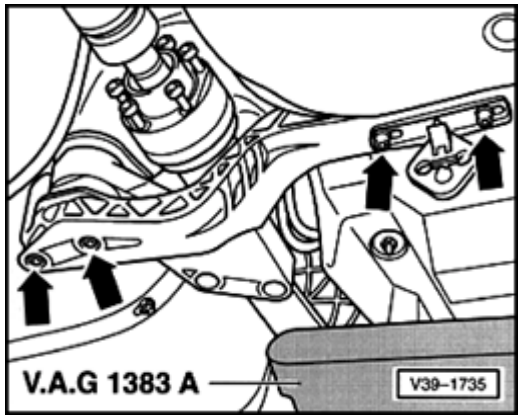
⇒ *Repair Manual, Suspension, Wheels, Steering, Repair Group 42; Component allocation of rear axle (All Wheel Drive (AWD) vehicles); Drive axle, removing and installing*

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**39-119**

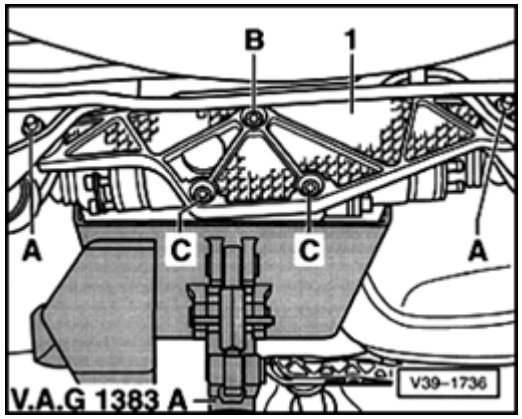



- Support final drive with VAG1383A transmission hoist and VAG1359/2 universal mount.
- Secure final drive using belt.




- Remove bolts (arrows) at front crossmember for rear final drive.
- Remove front crossmember.

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- Remove securing bolts -B- and -C- of rear crossmember at rear final drive.
- Lower final drive using transmission hoist.

***Note:***

*Crossmember -1- does not have to be removed.*

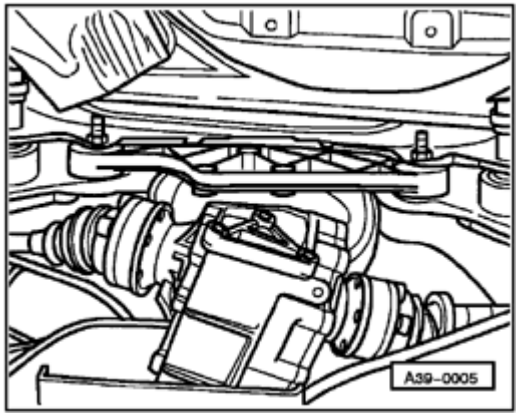
**Installing**

Installation is reverse of removal, noting the following:

***Notes:***

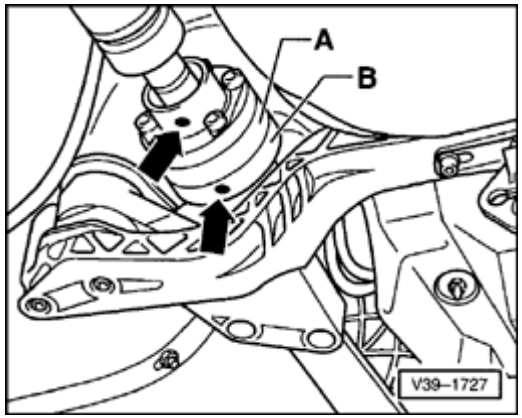
- *Always replace self-locking nuts.*
- *Always clean any remaining locking fluid from thread for drive flange on rear final drive after removing driveshaft. Otherwise there is a risk that the bolts may become cross-threaded when installed and shear when removed again.*
- *Cleaning can be performed with a tap.*
- *Always replace seal between drive flange and driveshaft (remove protective film and attach seal to drive flange). Adhesive surface must be free of grease.*
- *Replace driveshaft bolts (self-locking).*

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- Using transmission hoist, lift up final drive until both drive axles can be flanged on.
- Lightly tighten drive axle securing bolts.
- Lift final drive and bolt to crossmember and final drive mount.
- Bolting in driveshaft ⇒ page 39-83 .

***Notes:***




- *To prevent imbalance, driveshaft flanges -A- and rear final drive flanges -B- must be installed so that the color markings are aligned (arrows).*
- *After disconnecting driveshaft from rear final drive, an additional balance washer (thick washer) that may be located between shim and bolt head may not be reinstalled.*
- *Replace driveshaft bolts (self-locking).*
- Checking gear oil in rear final drive ⇒ page 39-94 .
- Install exhaust system free of stress:

⇒ *Repair Manual, Engine Mechanical, Repair Group 26; removing and installing exhaust system*

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### Tightening torques

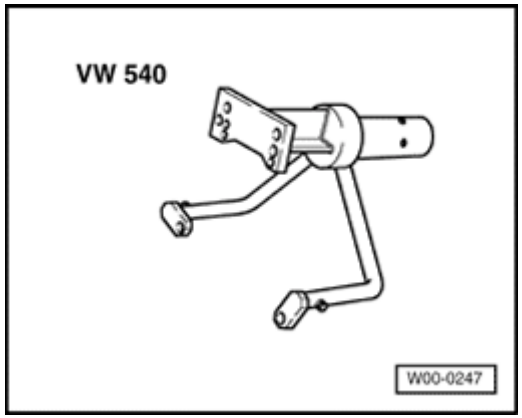
| Component | | Nm |
|---|---|---|
| Driveshaft to final drive<br><br>(Input flange) | | 55 |
| Front crossmember for rear final drive to body | | 40 |
| Front crossmember for rear final drive with exhaust system bracket to body | | 23 |
| Rear crossmember for rear final drive to subframe | | 50 |
| Rear final drive to rear crossmember | | 55 |
| Driveshaft to drive flange | M8 | 40 |
| | M10 | 77 |

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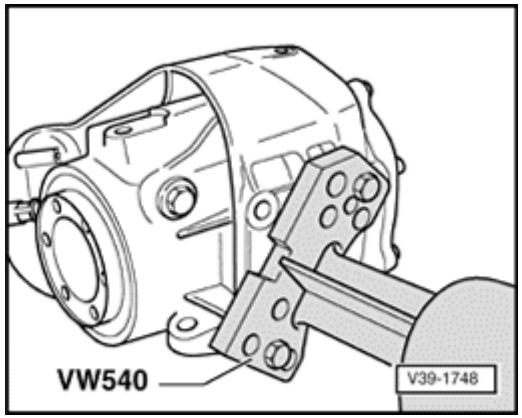
39-123

## Rear final drive, securing to assembly fixture

### Special tools and equipment



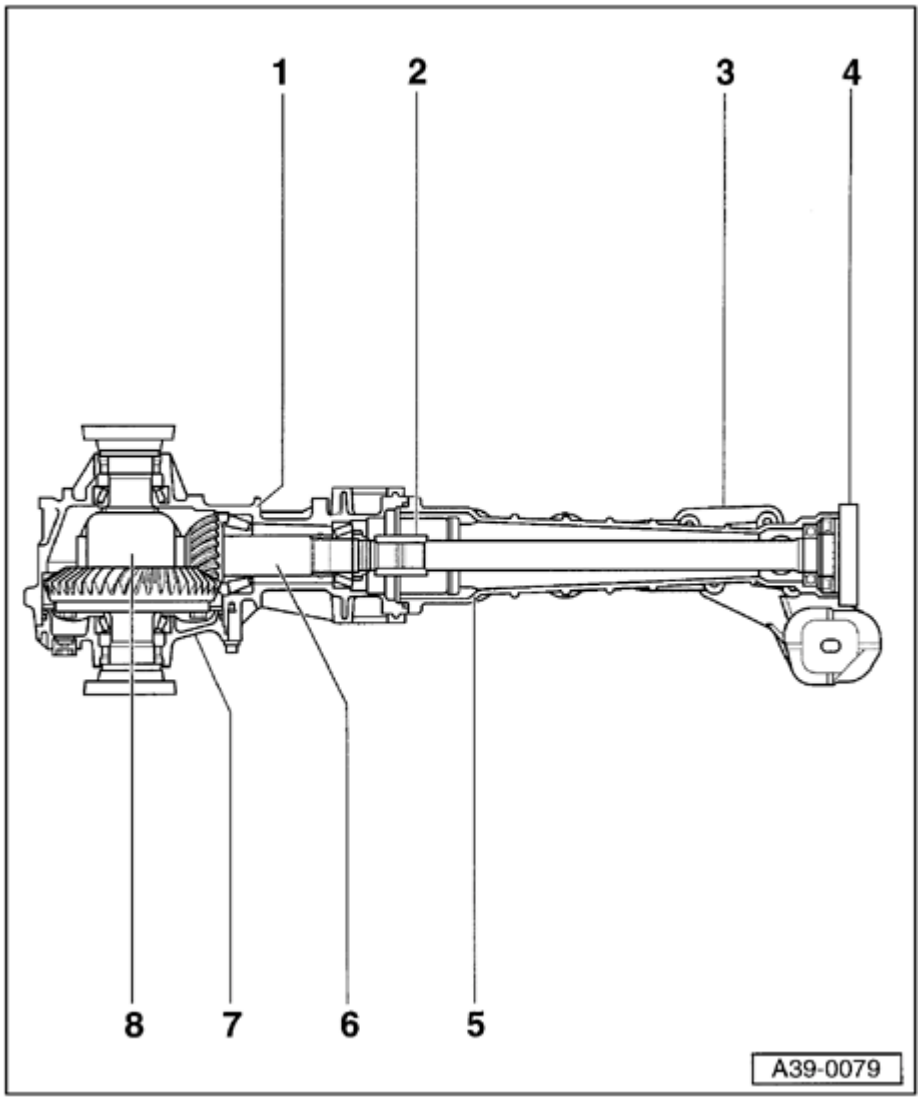

- VW540 holding fixture




- Secure complete rear final drive to assembly fixture using VW540 holding fixture.

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39-124




# Rear final drive, disassembling and assembling

## Overview

***Notes:***

- *Disconnect torque tube from rear final drive with the final drive installed* ⇒ *page 39-95* .
- *Disconnect torque tube from rear final drive with the final drive removed* ⇒ *page 39-126* .

**1 - Final drive housing**

**2 - Sleeve**

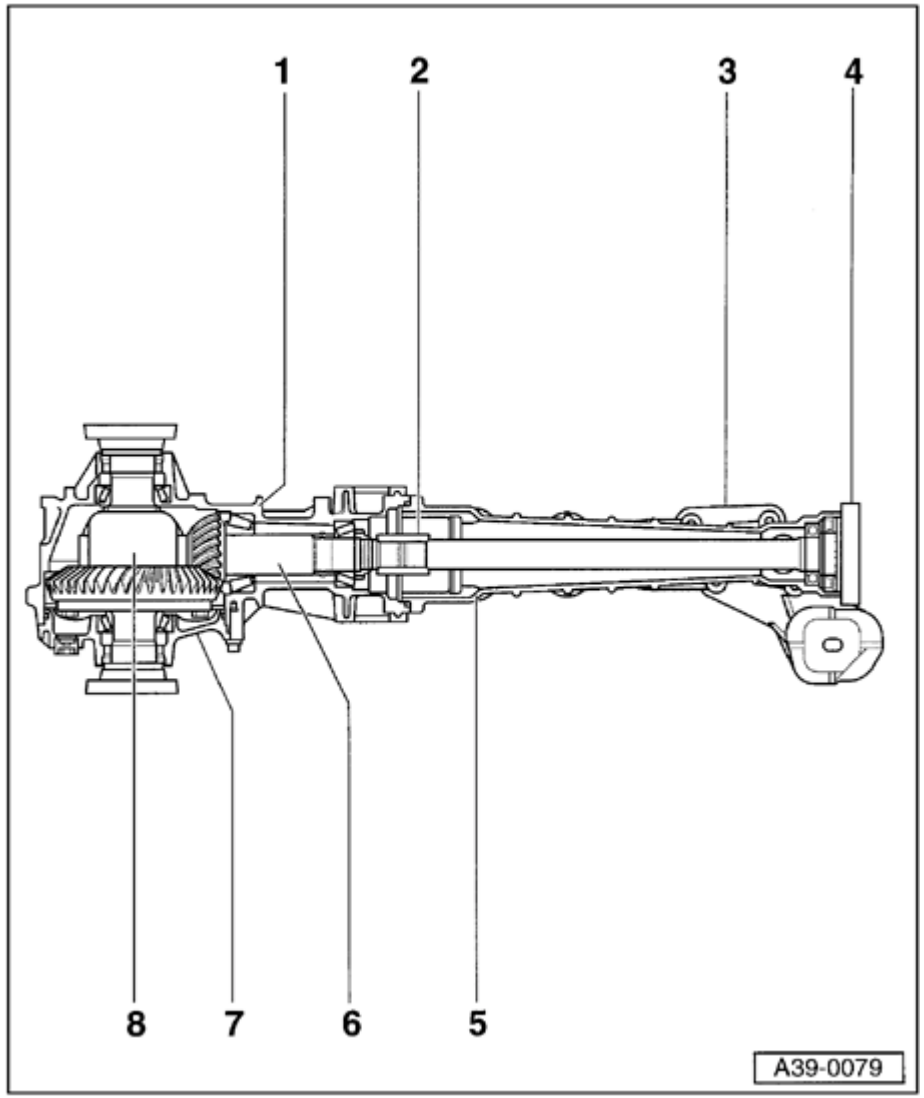
**3 - Transmission support**

**4 - Driveshaft flange**

- Removing ⇒ page 39-108

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39-125




**5 - Torque tube**

- Removing and installing ⇒ page 39-95

**6 - Drive pinion**

- Matched to ring gear
- Removing and installing differential gear ⇒ page 39-152

**7 - Cover for final drive**

**8 - Differential**

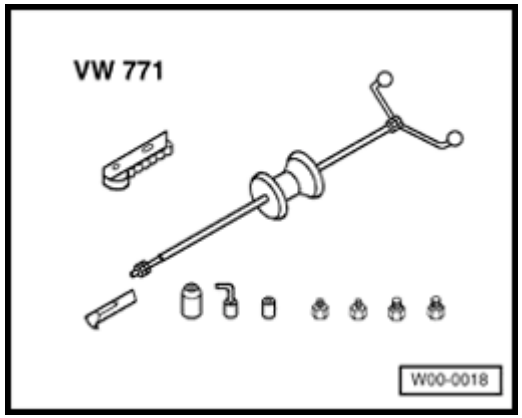
- Remove before removing drive pinion
- Removing and installing ⇒ page 39-128
- Disassembling and assembling ⇒ page 39-136

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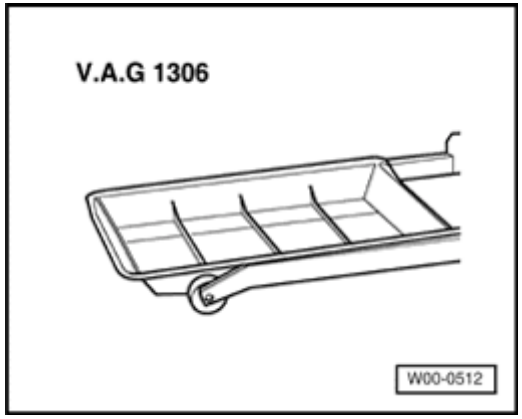
39-126

**Disconnect torque tube from rear final drive.**

**Special tools and equipment**




- ♦ VW 771 slide hammer-complete set with 771/15 threaded piece

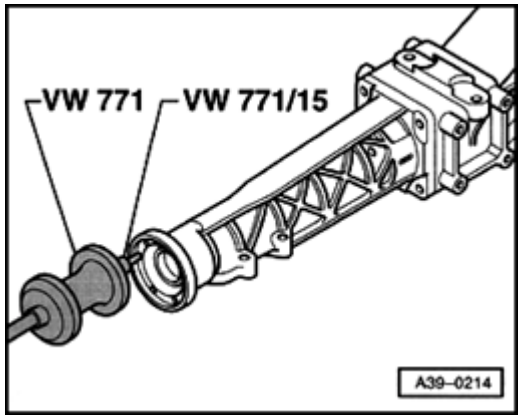



- ♦ VAG1306 drip tray

• Rear final drive removed

- Secure rear final drive to assembly stand ⇒ page 39-123 .
- Place VAG1306 drip tray underneath and drain gear oil.
- Remove bolts for torque tube/housing for final drive.

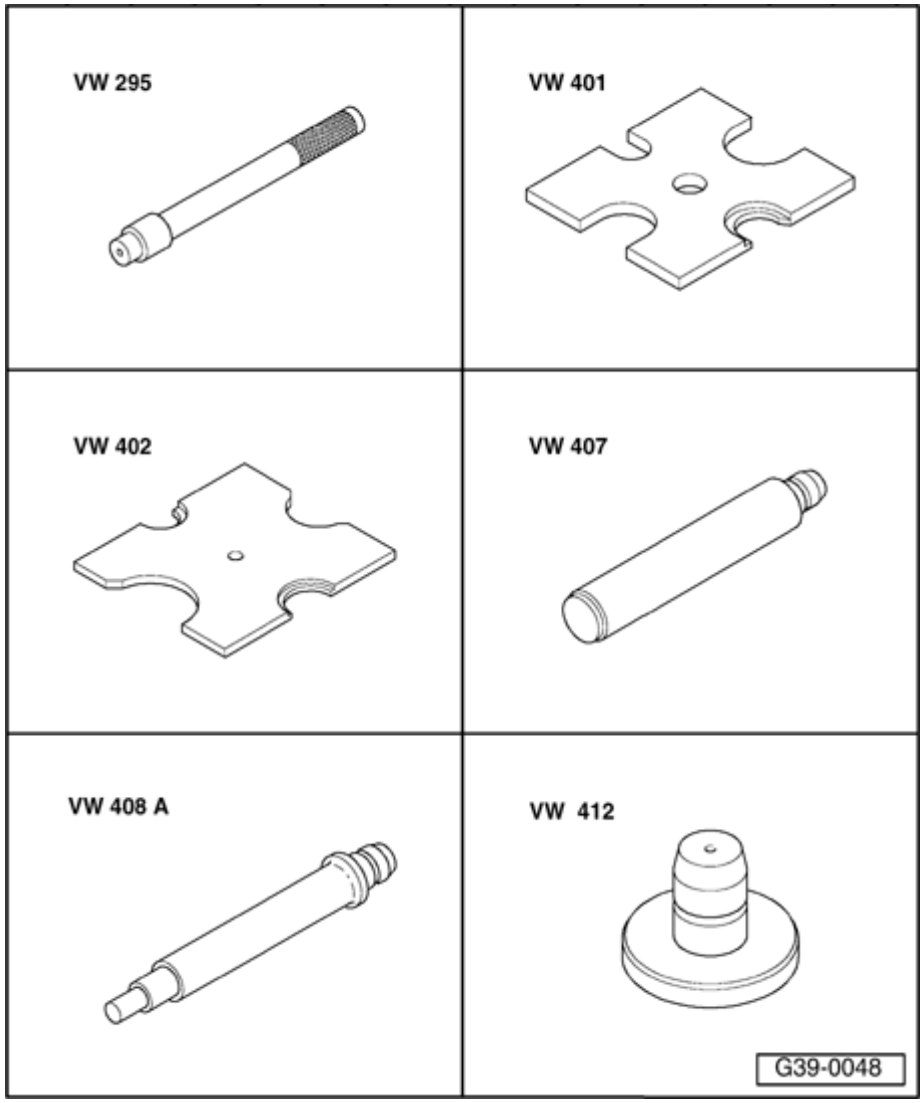
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- Pull torque tube off of drive flange, and intercept it.

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39-136



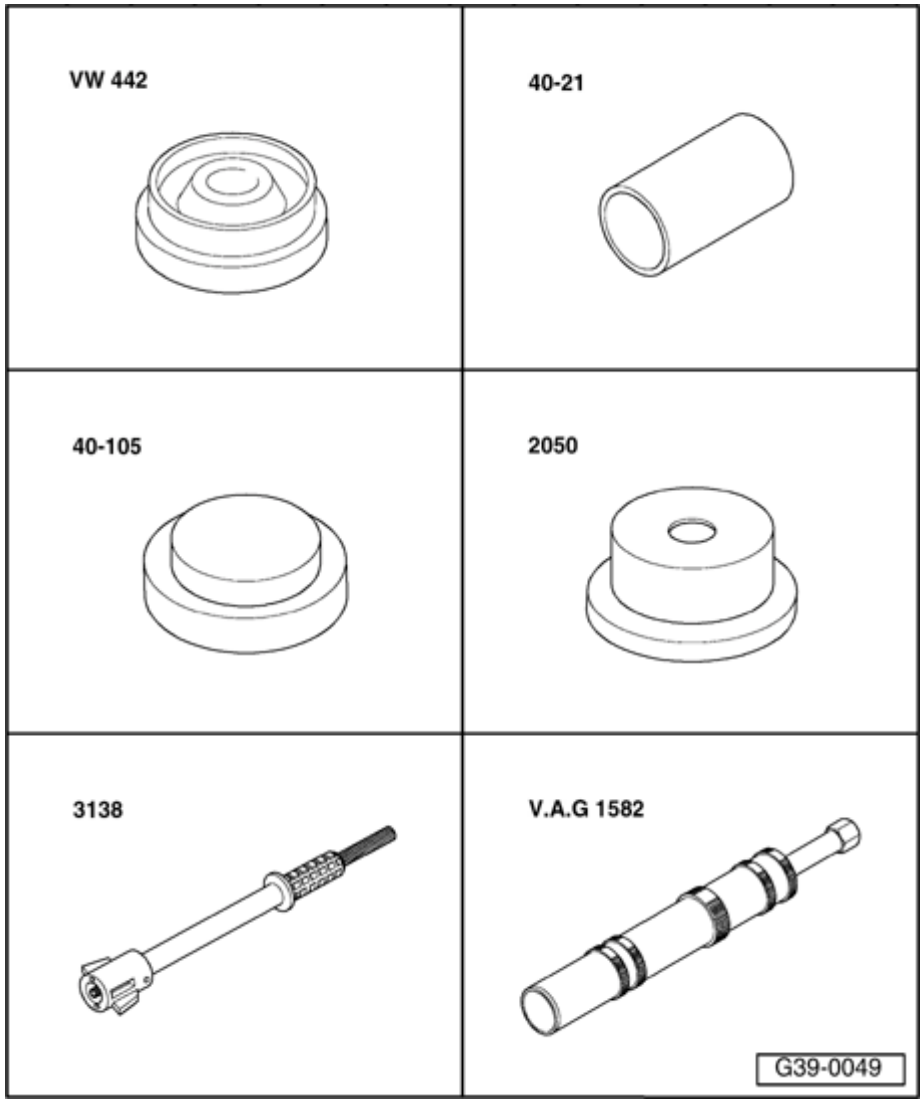

# Differential, disassembling and assembling

## Special tools and equipment

- VW295 needle bearing drift
- VW401 thrust plate
- VW402 thrust plate
- VW407 punch
- VW408A punch
- VW412 punch

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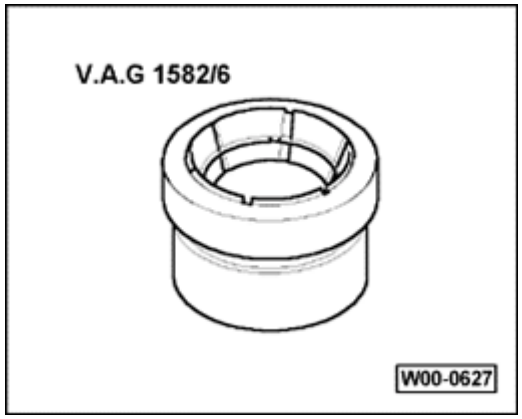
**39-137**



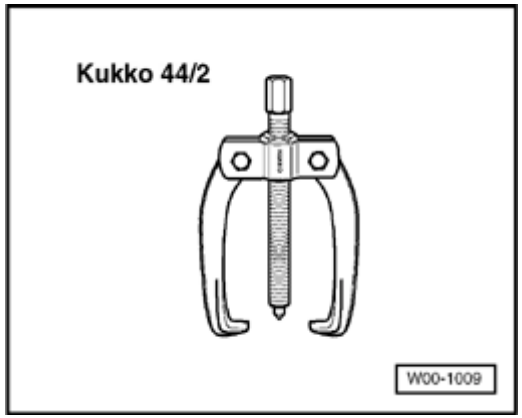

- VW442 thrust pad
- 40-21 sleeve
- 40-105 thrust pad
- 2050 thrust plate
- 3138 drift
- Tapered roller bearing puller VAG1582 taper roller bearing puller

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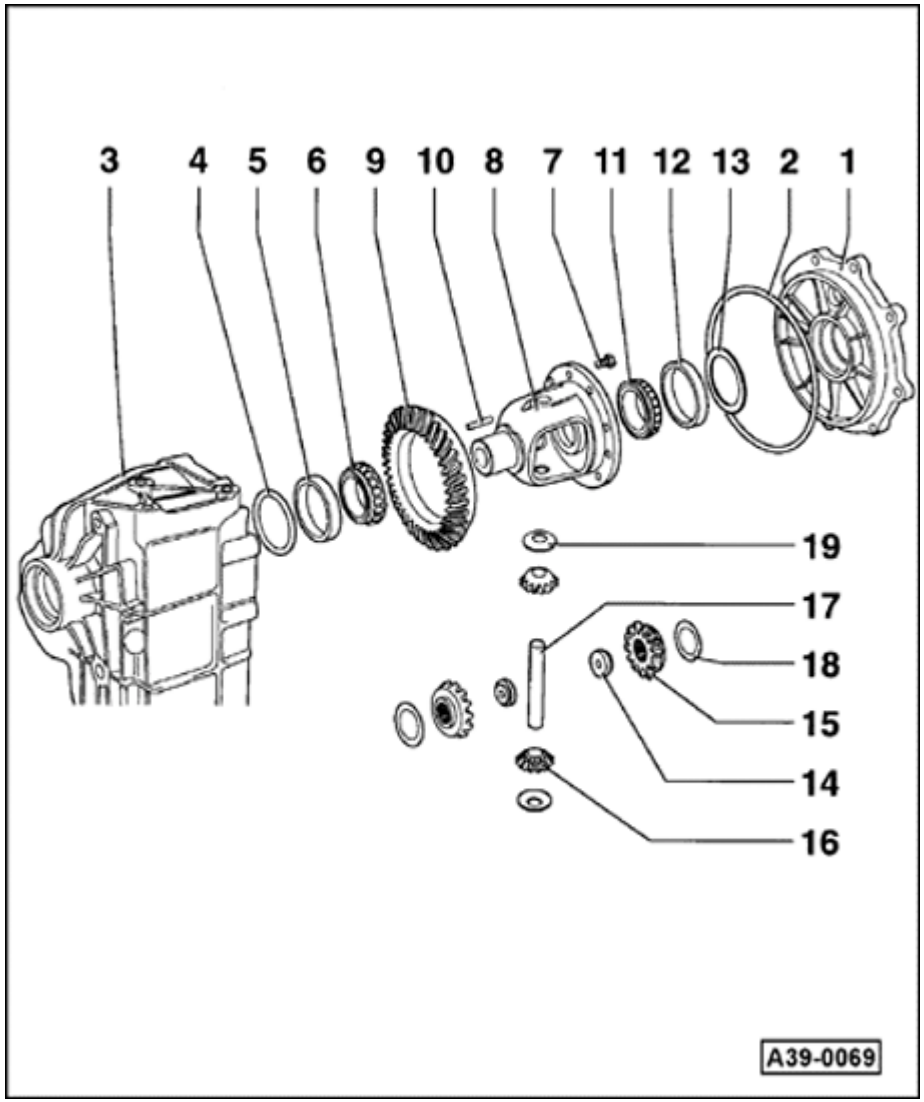

- VAG1582/6 attachment to VAG1582




- Kukko 44/2 two-arm puller

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***Notes:***

- *General repair notes: ⇒ page 00-27 .*
- *Replace both tapered roller bearings together. If possible, use same manufacturer!*
- *Adjustments are required when replacing components marked with 1) ⇒ Adjustment overview ⇒ page 39-170 .*

**1 - Cover for final drive 1)**

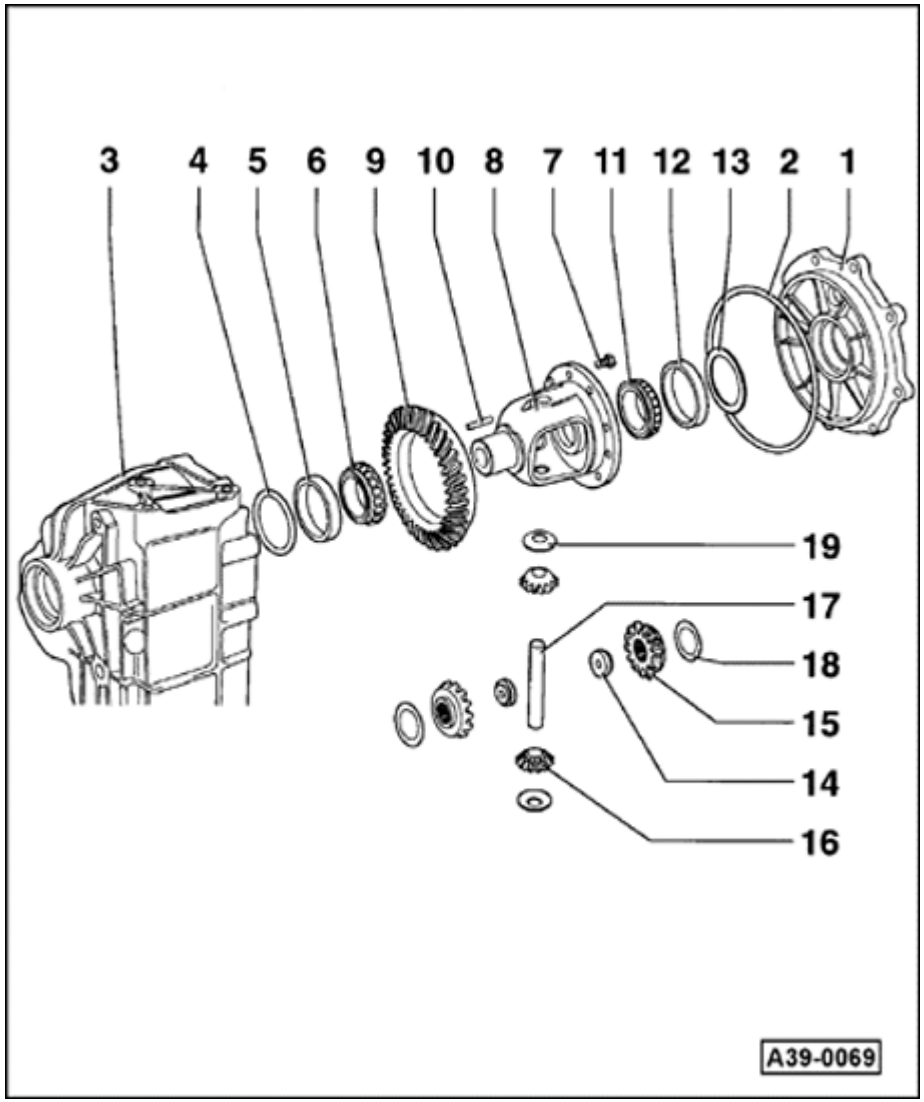
**2 - O-ring**

- Always replace
- Insert with oil

**3 - Final drive housing 1)**

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**4 - Shim "S2"**

- Note thickness
- Adjustment overview ⇒ page 39-170

**5 - Small tapered roller bearing outer race 1)**

- Driving out ⇒ Fig. 1
- Pressing in ⇒ Fig. 2

**6 - Small tapered roller bearing inner race 1)**

- Pulling off ⇒ Fig. 3
- Pressing on ⇒ Fig. 4

**7 - Bolt - tighten to 60 Nm and then tighten an additional 45-5.**

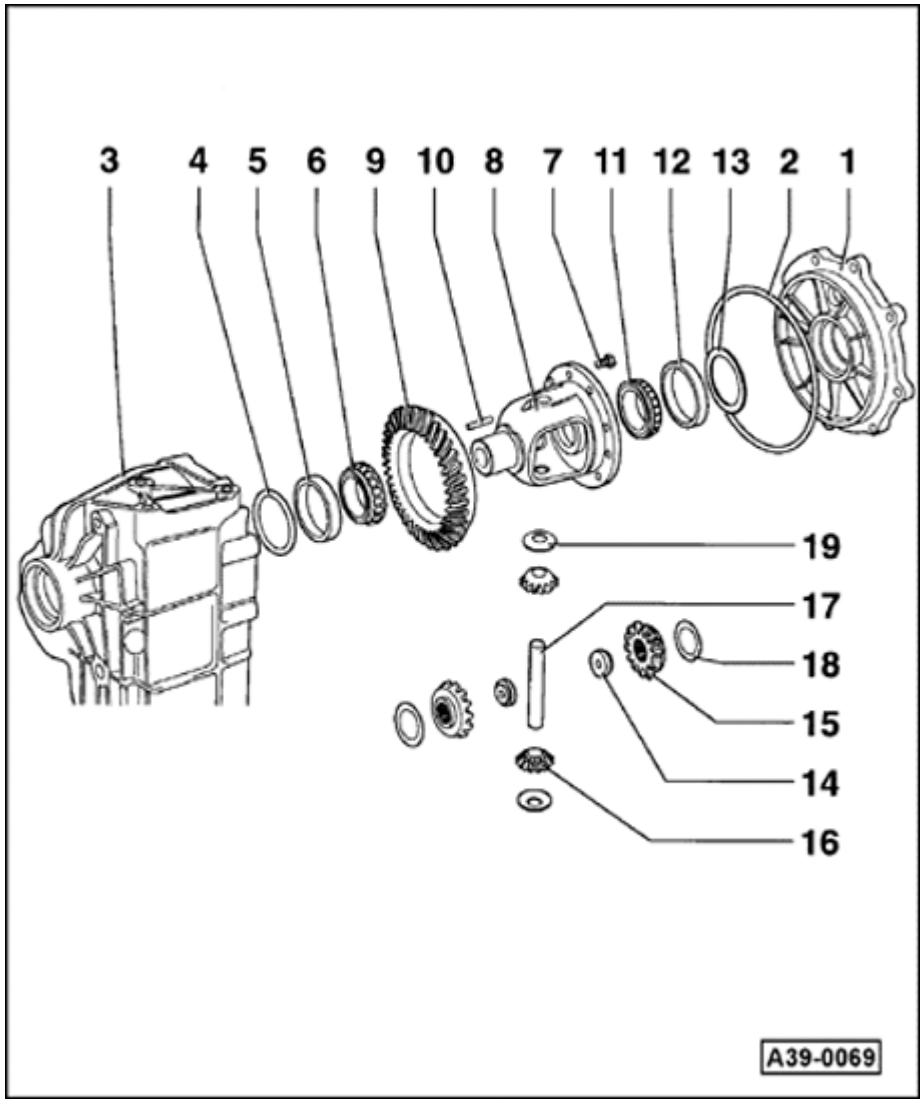
- Always replace
- Allocation

⇒ *Parts-catalog*

- Lightly tighten bolts then tighten diagonally to correct torque.

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**8 - Differential housing** [1)]

**9 - Ring gear** [1)]

- Matched to drive pinion (gear set)
- Application according to transmission code letters

⇒ *Parts-catalog*

- Press off of housing using drift ⇒ Fig. 9
- Install on differential housing ⇒ Fig. 10

**10 - roll pin**

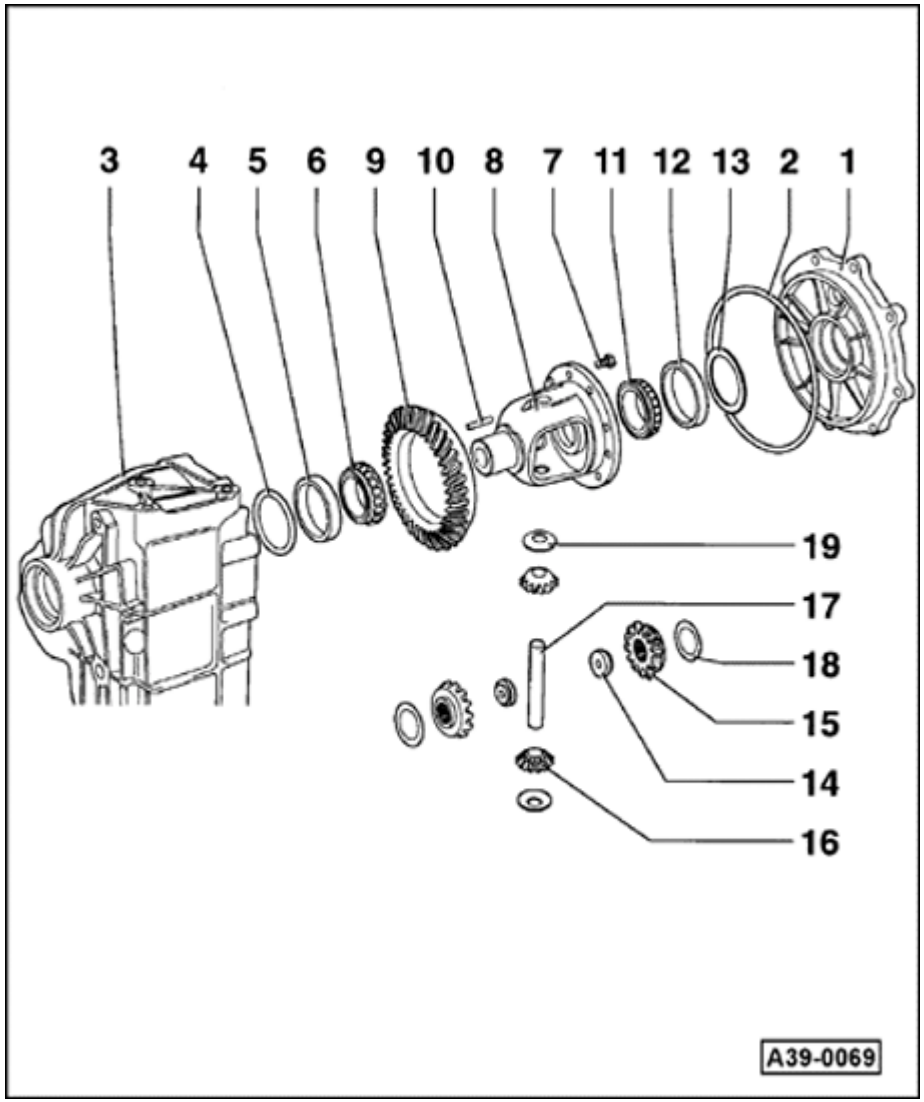
- For securing shaft for differential bevel gears
- Drive in flush

**11 - Large tapered roller bearing inner race** [1)]

- Pulling off ⇒ Fig. 5
- Pressing on ⇒ Fig. 6

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**12 - Large tapered roller bearing outer race** [1)]

- Driving out ⇒ Fig. 7
- Pressing in ⇒ Fig. 8

**13 - Adjustment shim "S1"**

- Note thickness
- List of adjustments ⇒ page 39-170

**14 - Threaded piece**

**15 - Large differential bevel gear**

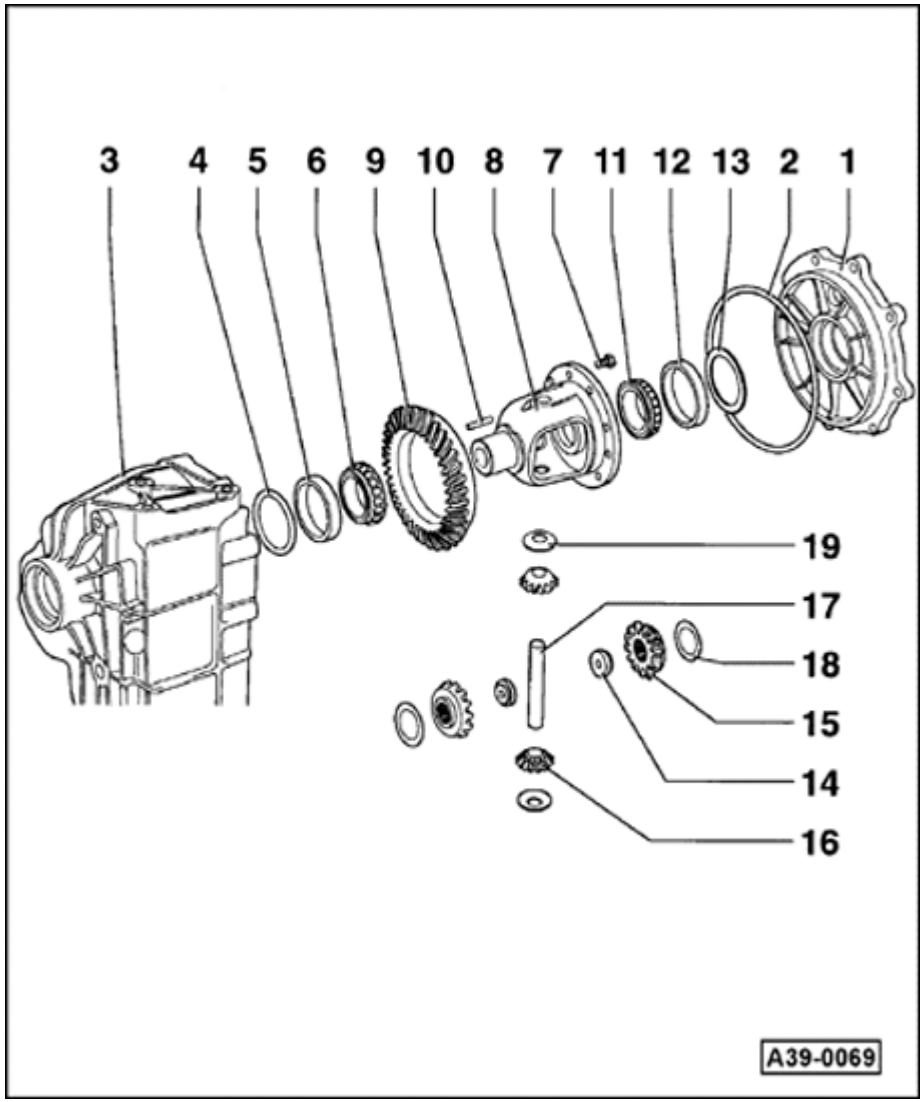
- Installing ⇒ Fig. 11
- Adjusting ⇒ Fig. 12

**16 - Small differential bevel gear**

- Installing ⇒ Fig. 11

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**17 - Shaft for differential bevel gears**

- Drive out using drift
- Drive in carefully so as not to damage thrust washers.
- Secure with locking pin -Item 10 -

**18 - Adjustment shim**

- Re-determine thickness ⇒ Fig. 12

**19 - Thrust washer**

- Check for cracks

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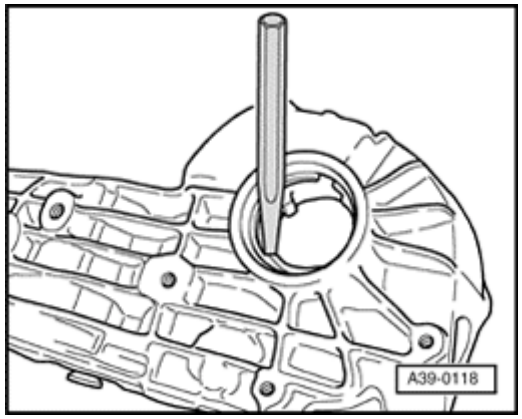



**Fig. 1 Driving small tapered roller bearing outer race out of housing**

- Check adjustment shims for damage after removing.

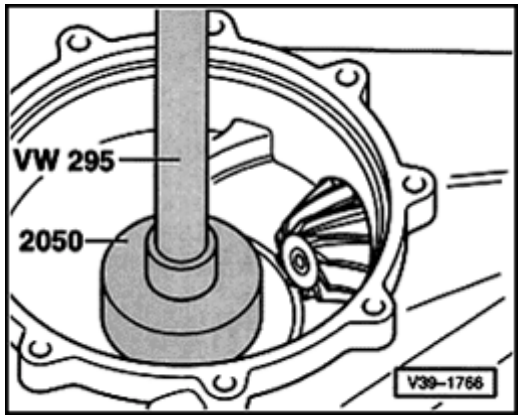



**Fig. 2 Pressing tapered roller bearing outer race into housing**

- Install outer race with VW295 needle bearing drift by tapping lightly using hammer.
- Then drive in to stop, as shown in illustration.

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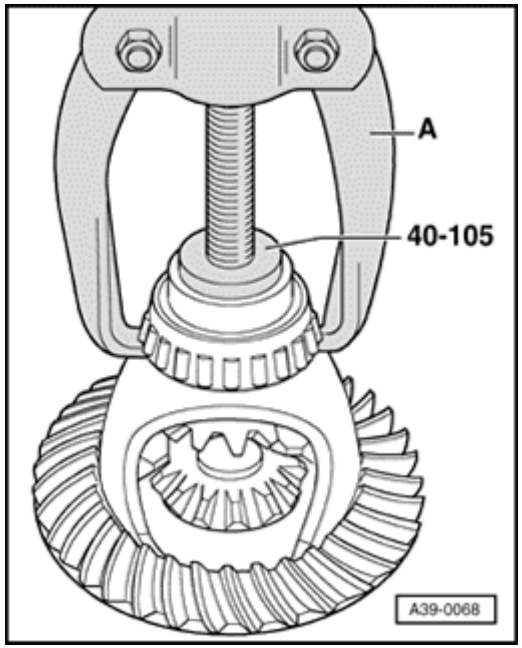



**Fig. 3 Pulling off small tapered roller bearing inner race**

A - Kukko 44/2 two-arm puller

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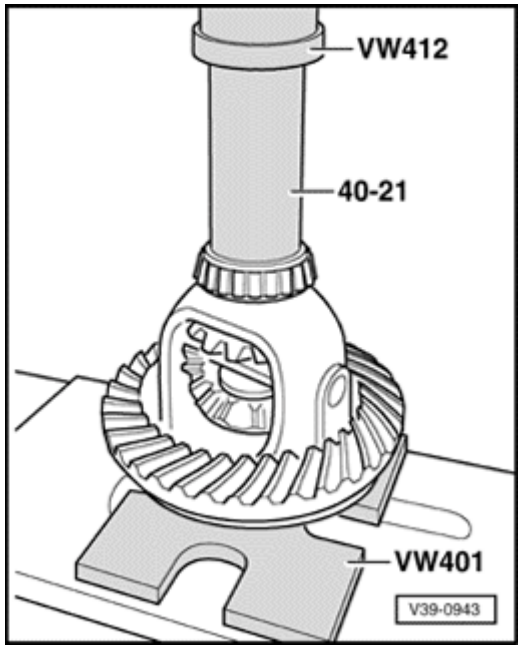



**Fig. 4 Pressing on small tapered roller bearing inner race**

***WARNING!***

***Wear protective gloves!***

- Heat inner race to approx. 100 °C ,position and press on.

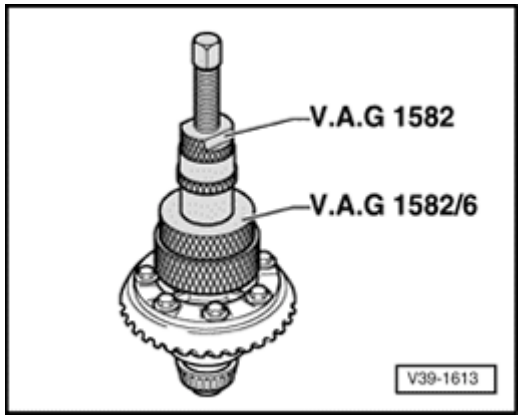



**Fig. 5 Pulling off large tapered roller bearing inner race**

- Before installing removal tool, set 40-105 thrust piece onto differential housing.

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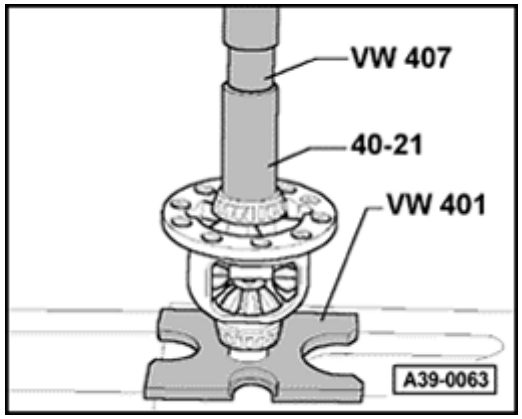



**Fig. 6 Pressing on large tapered roller bearing inner race**

***WARNING!***

***Wear protective gloves!***

- Heat inner race to approx. 100 °C ,position and press on.

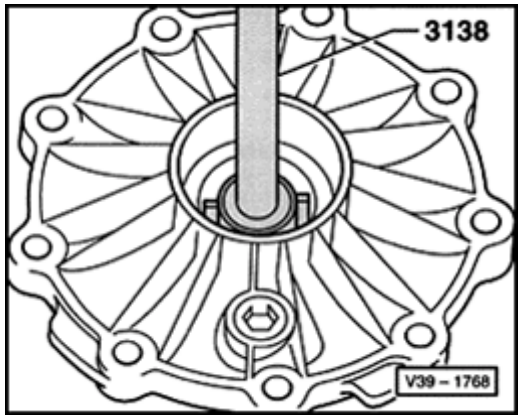



**Fig. 7 Driving large tapered roller bearing outer race out of cover**

- Check adjustment shims for damage after removing.

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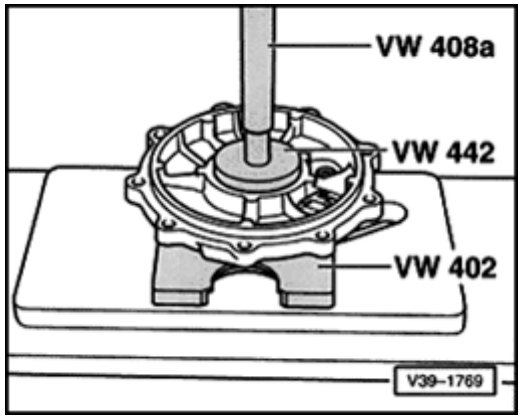



**Fig. 8 Pressing large tapered roller bearing outer race into cover**

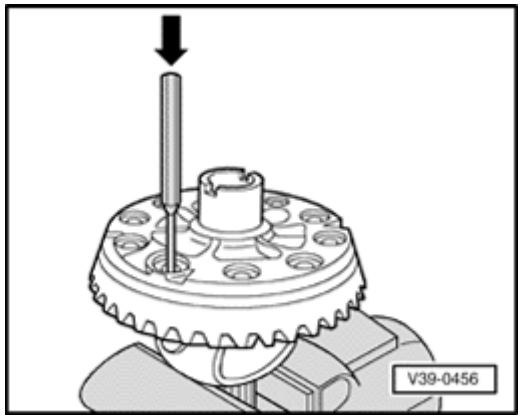



**Fig. 9 Driving out ring gear from housing**

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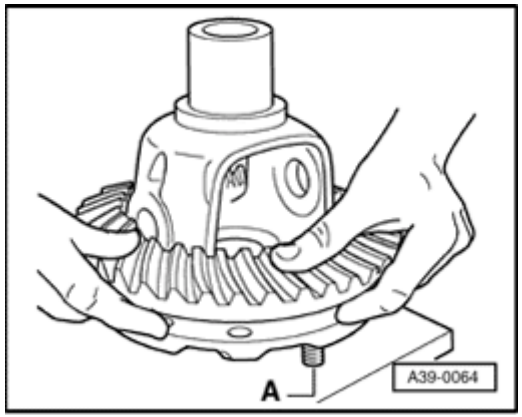



**Fig. 10 Installing ring gear**

***WARNING!***

***Wear protective gloves!***

- When installing ring gear, guide with centering pins -A- (self-made).
- Heat ring gear to approx. 100 ° C and position.

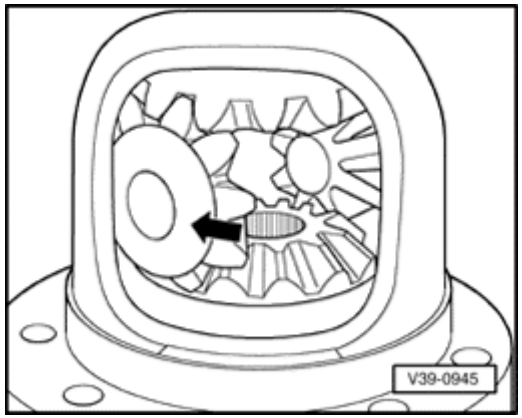



**Fig. 11 Installing small differential bevel gears**

- If the large differential bevel gears were replaced, adjustment shims must be re-determined ⇒ Fig. 12 .
- Insert large differential bevel gears with determined adjustment shims.
- Insert small differential bevel gears at 180 ° from their final position and rotate into place (arrow).
- Install thrust washers and locate.
- Install threaded pieces.
- Drive in differential bevel gear shaft to final position and secure.

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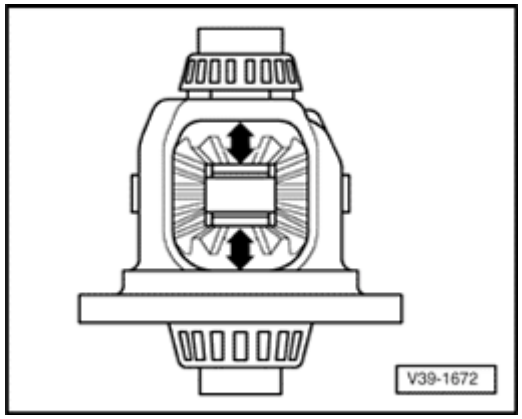



**Fig. 12 Adjusting differential bevel gears**

- Install large differential bevel gears with the thinnest shims (0.5 mm).
- Insert small differential bevel gears 180° from final position together with thrust washers.

***Note:***

*Do not rearrange differential bevel gears and thrust washers again!*

- Drive in shaft for differential bevel gears.
- Press the small differential bevel gears toward the outside.
- Push large differential bevel gears in direction of arrow and check play.
- Determine the largest possible shim that can still be installed for the large differential bevel gears on each side.
  - ♦ Adjustment shims should be the same thickness on both sides.
- Determine adjustment shims according to table. Part numbers

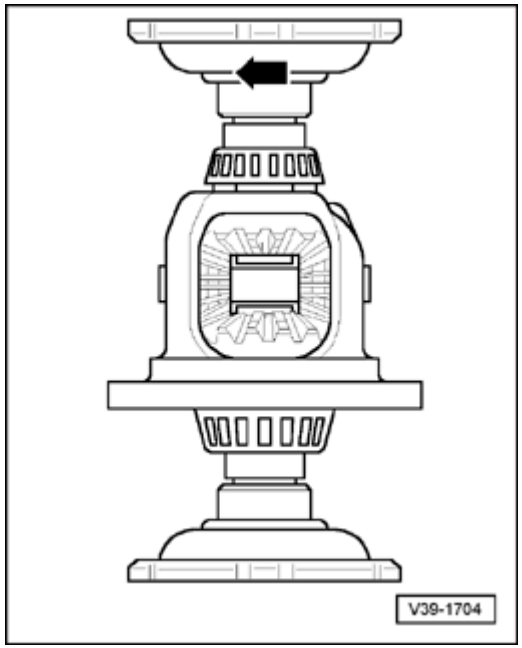
⇒ *Parts-catalog*

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Available adjustment shims:

| Shim thickness (mm) | | |
|---|---|---|
| 0.50 | 0.70 | 0.90 |
| 0.60 | 0.80 | 1.00 |

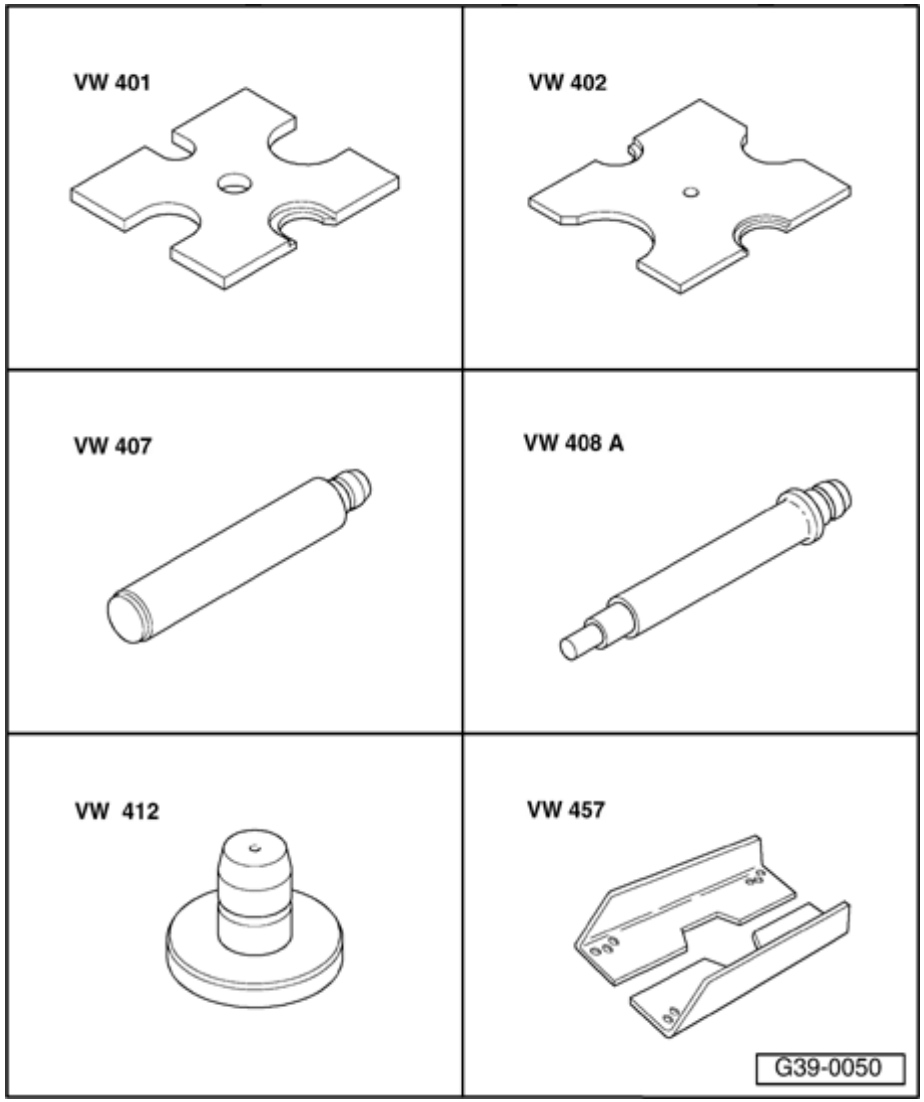
***Note:***




*The adjustment is also correct when no more play can be felt, but the differential bevel gears can just barely be rotated (arrow).*

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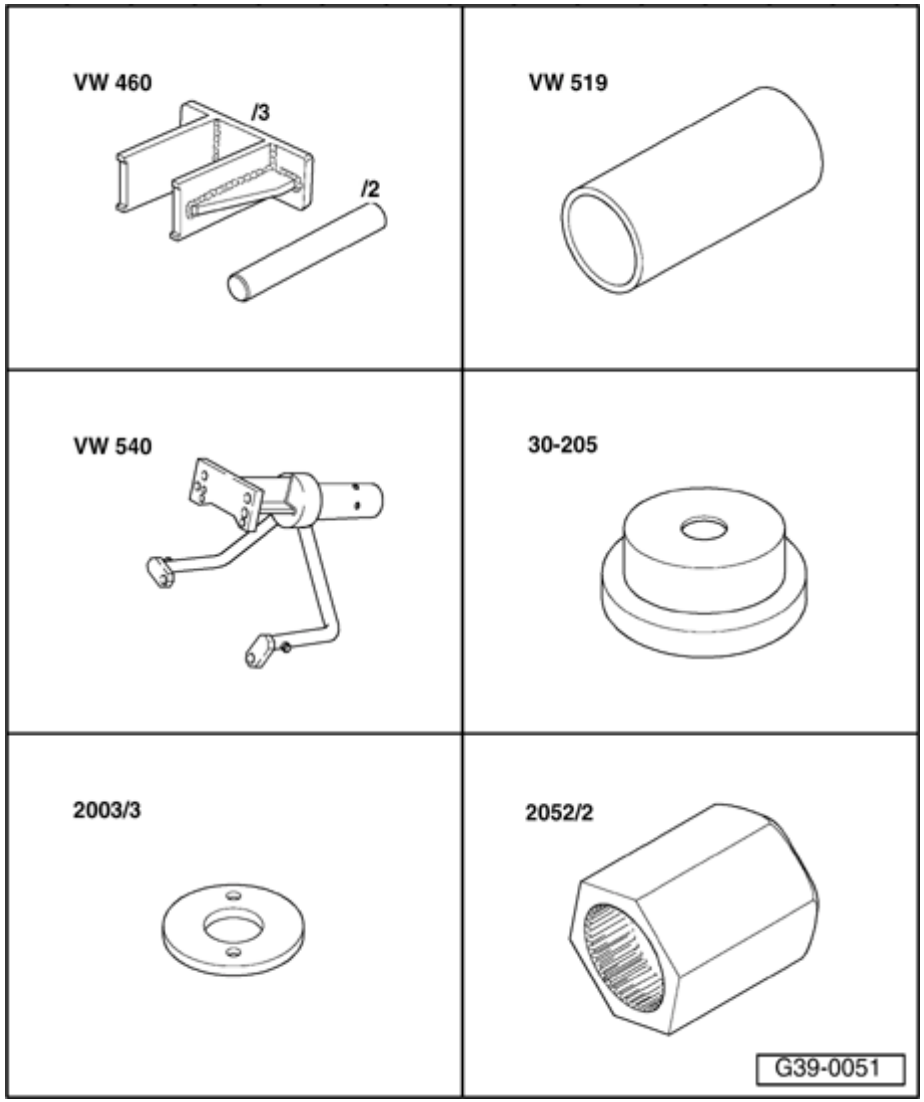

# Drive pinion, removing, installing, disassembling and assembling

**Special tools and equipment**

- VW401 thrust plate
- VW402 thrust plate
- VW407 punch
- VW408A punch
- VW412 punch
- VW457 support channels

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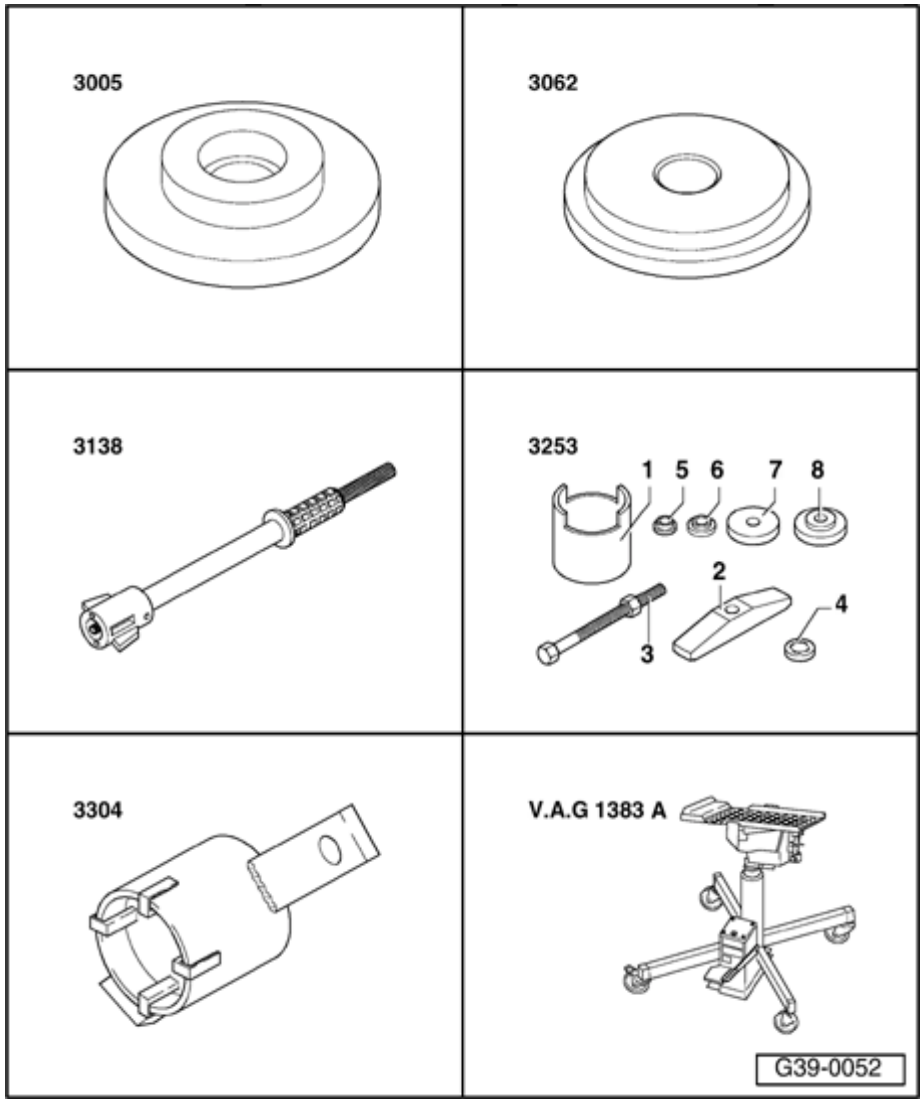
**39-153**




- VW460/2 drift
- VW 519 sleeve
- VW540 holding fixture
- 30-205 thrust pad
- 2003/3 seal installer
- 2052/2 assembly tool for drive pinion

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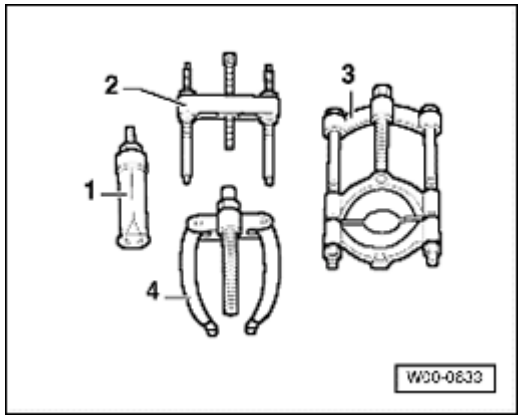
**39-154**




- 3005 thrust pad
- 3062 thrust pad
- 3138 drift
- 3253 wheel bearing assembly set with 3253/3 and 3253/4
- 3304 retainer
- Engine/transmission jack VAG1383A engine/gearbox jack

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- Item 1: Kukko21/7 extractor
- Item 2: Kukko 22/2 support
- Item 3: Kukko 17/2 separator
- Torque gauge 0 - 600 Ncm
- 32 wrench insert hex socket

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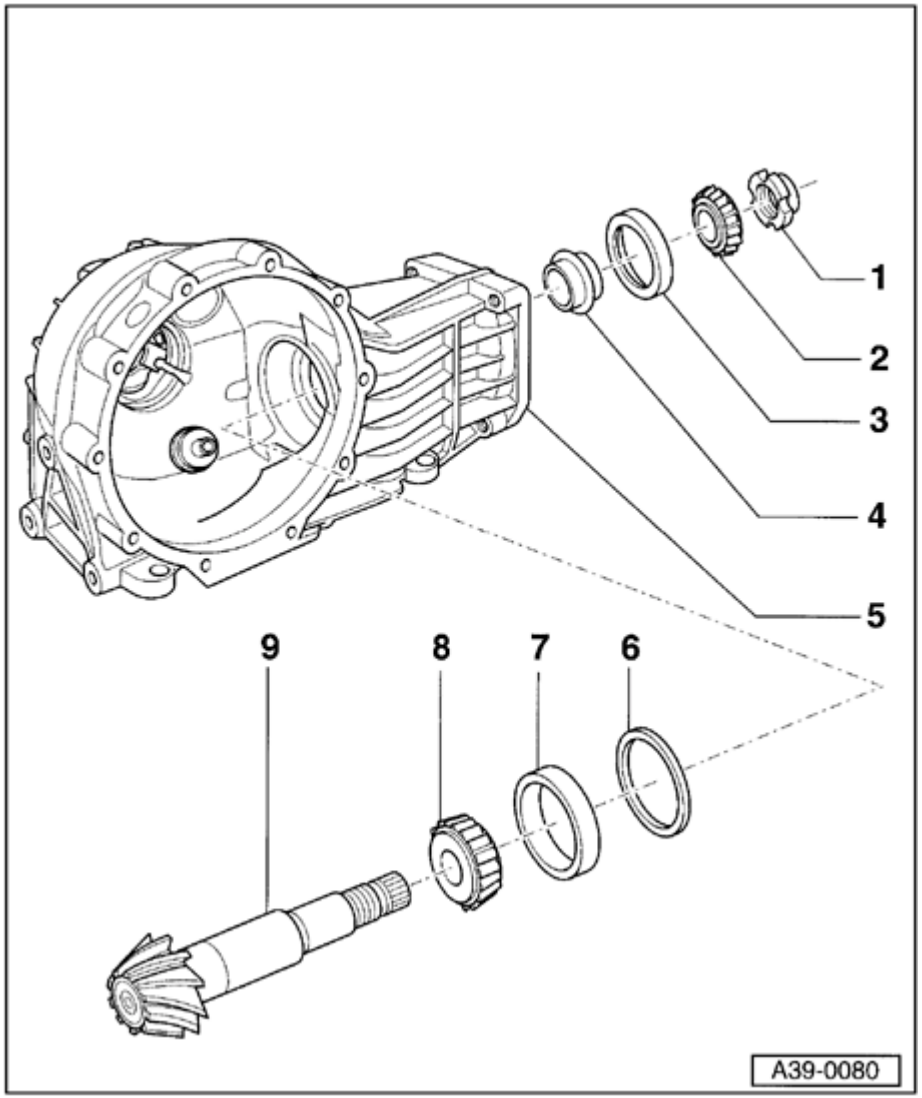
**39-156**

***Notes:***

- *General repair notes ⇒ page 00-27 .*
- *Disconnect torque tube from rear final drive with the final drive installed ⇒ page 39-96 .*
- *Disconnect torque tube from rear final drive with the final drive removed ⇒ page 39-126 .*
- *Replace both tapered roller bearings together. If possible, use same manufacturer!*
- *Do not grease new tapered roller bearings additionally for friction torque measurement. The bearings are already greased with a special oil from the factory.*
- *Removing differential ⇒ page 39-128 .*
- *Adjustments are required when replacing components marked with 1) ⇒ Adjustment overview ⇒ page 39-170 .*

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**1 - Nut**

- Always replace
- Unbolt ⇒ Fig. 1 and Fig. ⇒ 2
- Unbolt ⇒ Fig. 11
- Measuring friction torque ⇒ Fig. 12
- Secure ⇒ Fig. 13

**2 - Small tapered roller bearing inner race 1)**

- Press out drive pinion ⇒ Fig. 3
- Pressing on ⇒ Fig. 10

**3 - Small tapered roller bearing outer race 1)**

- Pulling out ⇒ Fig. 4
- Pressing in ⇒ Fig. 9

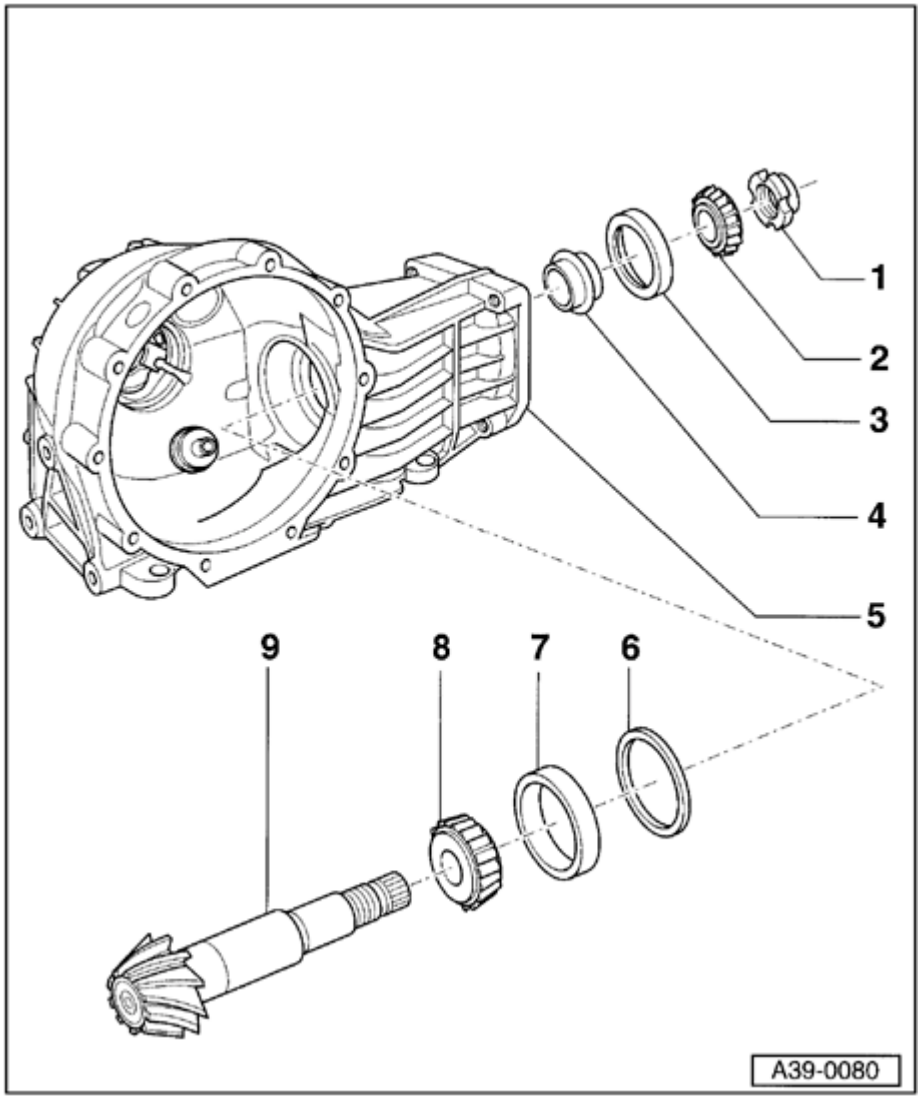
**4 - Spacer sleeve 1)**

- Always replace

**5 - Final drive housing 1)**

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**6 - Shim "S3"**

- Note thickness
- Adjustment overview ⇒ page 39-170

**7 - Large tapered roller bearing outer race 1)**

- Driving out ⇒ Fig. 5
- Pulling in ⇒ Fig. 8

**8 - Large tapered roller bearing inner race 1)**

- Pressing off ⇒ Fig. 6
- Pressing on ⇒ Fig. 7

**9 - Drive pinion 1)**

- Matched to ring gear, always replace together as a set

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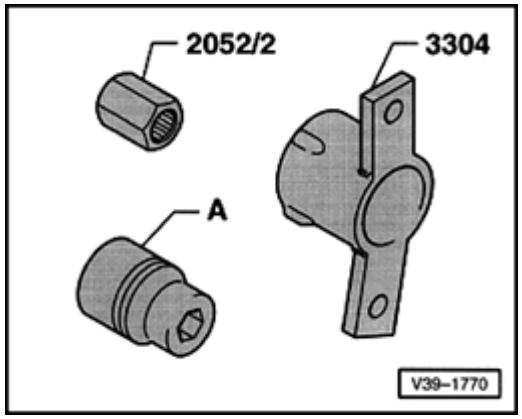



**Fig. 1 Tools for removing and installing drive pinion nut**

A - 32 mm wrench socket

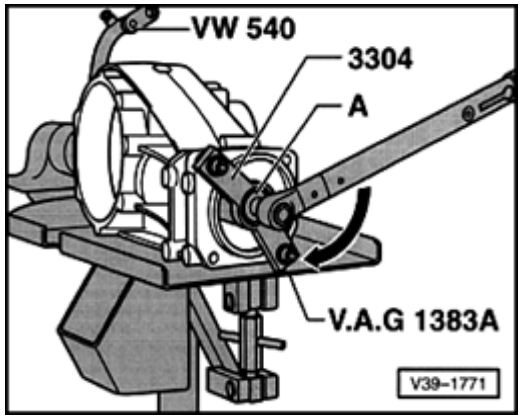



**Fig. 2 Removing drive pinion nut**

- Install 3304 retainer using two hex bolts M8 x 30.
- When nut is removed, final drive must be supported (e.g. using VAG1359/2 universal mount together with VAG1383A transmission hoist).

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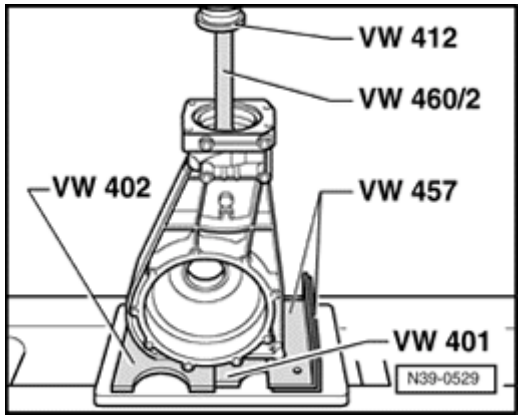



**Fig. 3 Pressing out drive pinion from small tapered roller bearing inner race**

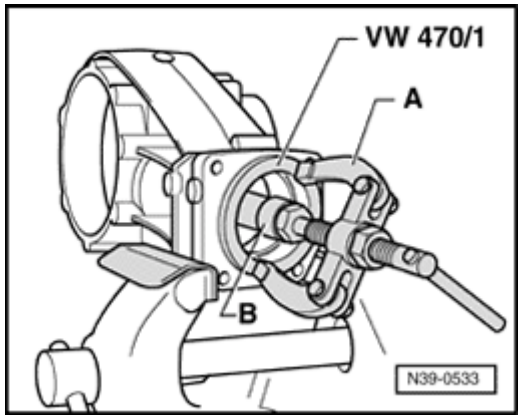



**Fig. 4 Pulling out small tapered roller bearing outer race**

A - Support e.g. Kukko 22/2

B - Internal puller 46 to 58 mm, e.g. Kukko 21/7 extractor

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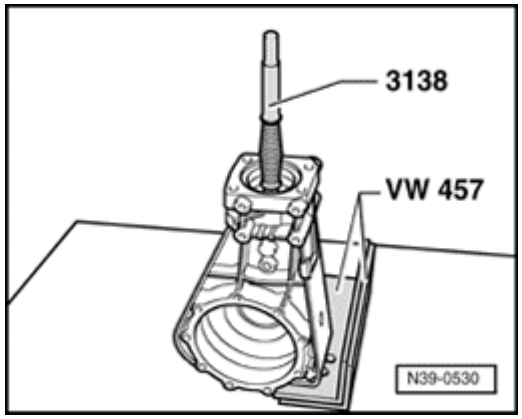



**Fig. 5 Driving out large tapered roller bearing outer race**

- Check adjustment shims for damage after removing.

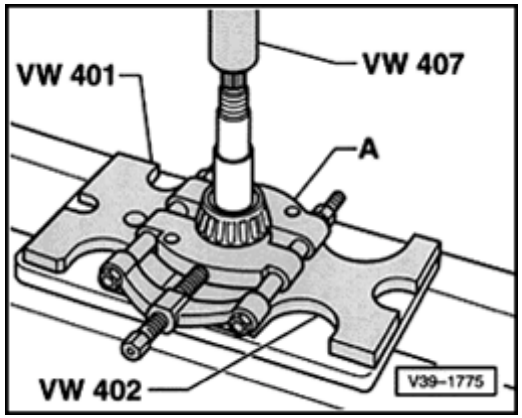



**Fig. 6 Pressing off large tapered roller bearing inner race from drive pinion**

A - Separating device 22-115 mm, e.g. Kukko 17/2 separating tool

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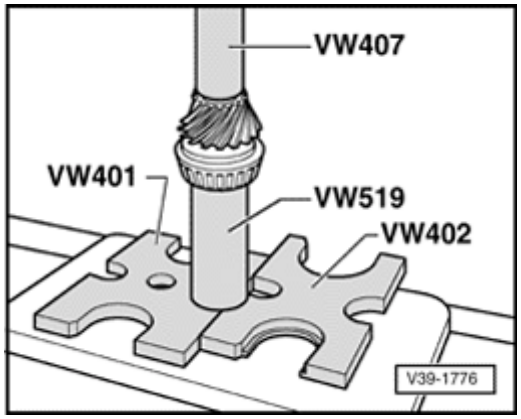



**Fig. 7 Pressing large tapered roller bearing inner race onto drive pinion**

***WARNING!***

***Wear protective gloves!***

- Heat inner race to approx. 100 ° C ,position and press on.

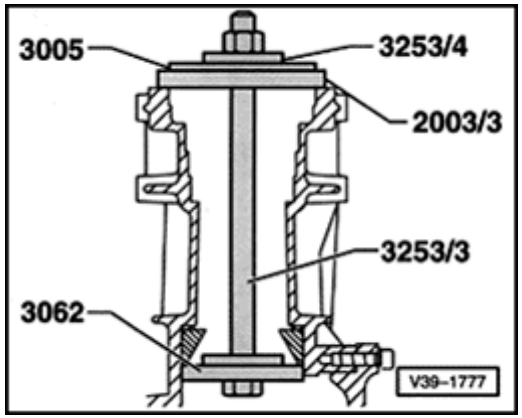



**Fig. 8 Pulling in large tapered roller bearing outer race**

- Insert previously determined adjustment shim "S3" for drive pinion ⇒ page 39-177 .

***Note:***

*On 3253/4 pressure disc, marking "Oben" points toward nut on installation device*

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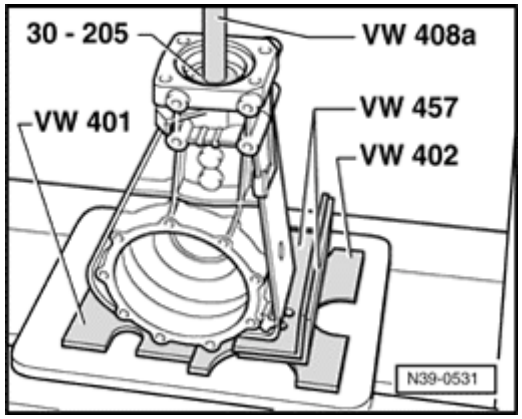



**Fig. 9 Pressing in small tapered roller bearing outer race**

- The outer race must be oiled and installed using VW408A punch and 30-205 thrust pad.

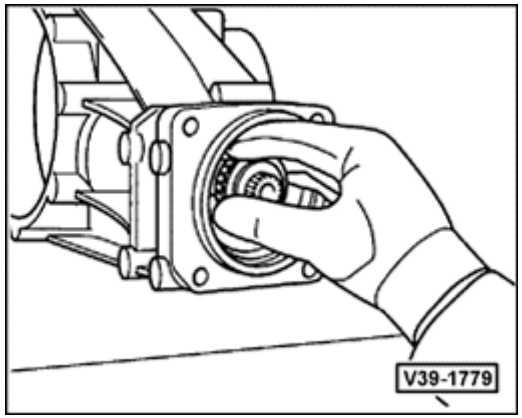



**Fig. 10 Pressing on small tapered roller bearing inner race**

***WARNING!***

***Wear protective gloves!***

- Insert drive pinion with a new spacer sleeve.
- Heat up small tapered roller bearing inner race to approx. 100 °C and insert on drive pinion.
- Press drive pinion upward and insert bearing up to stop using 40-21 sleeve.

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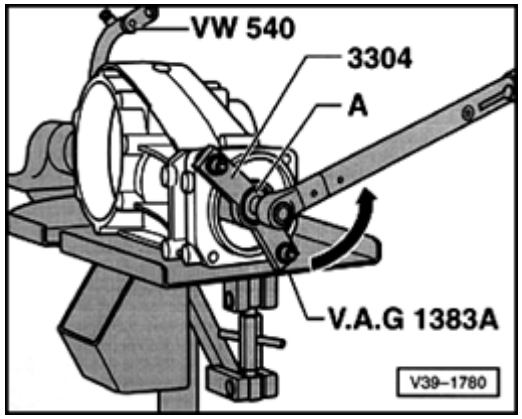



**Fig. 11 Tightening drive pinion nut and adjusting friction torque**

- Install 3304 retainer using two hex bolts M8 x 30.
- When tightening nut, support final drive (e.g. using VAG1359/2 universal mount with VAG1383A transmission hoist).
- Always replace drive pinion nut.
- Tighten nut for drive pinion until no more drive pinion backlash is present.
- Tighten further until specified friction torque is attained; while tightening measure friction torque multiple times ⇒ Fig. 12 .

***Note:***

*If the specified friction torque is surpassed, replace spacer sleeve and repeat adjustment! Any spacer sleeve that has been pressed together too far one time must be replaced.*

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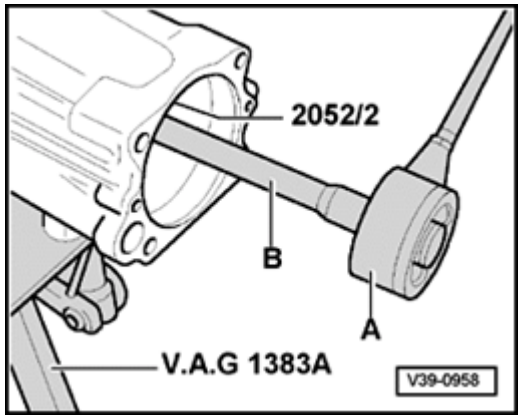



**Fig. 12 Measuring friction torque**

A - Standard torque gauge, 0 to 600 Ncm

B - Extension with 32 mm wrench socket

- Adjust to following friction torque

| New bearings | Run-in bearings 1) |
|---|---|
| 200 to 250 Ncm | 30 to 60 Ncm |

1) have been run in at least 50 km

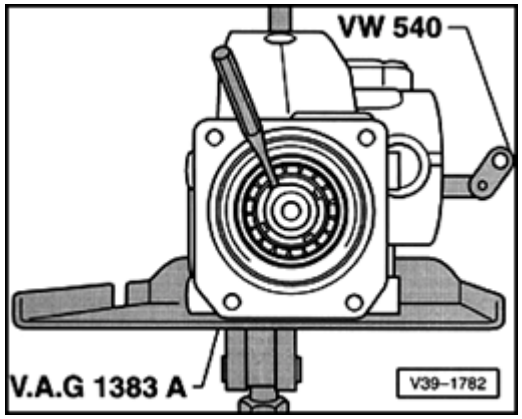



**Fig. 13 Removing drive pinion nut**

- Peen drive pinion nut using mandrel.

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# Drive pinion and ring gear, adjusting

***General notes:***

- *Drive pinion and ring gear must be very carefully adjusted to ensure long service life and smooth running. At the factory, drive pinion and ring gear are adjusted relative to each other to ensure smooth running and low noise in both directions. The location for the smoothest running is determined by moving drive pinion axially whereby ring gear is moved far enough out of the backlash-free position so that the backlash is within specified tolerances.*

- *The goal of the adjustment is to reproduce the setting for the quietest possible running, as obtained on the test machine during production.*

- *The deviation, or tolerance "r" which is based on the master gauge "R0" is measured for the final drive sets supplied as replacement parts and marked on the outer circumference of the ring gear. Every drive pinion set - drive pinion and ring gear - may only be replaced together.*

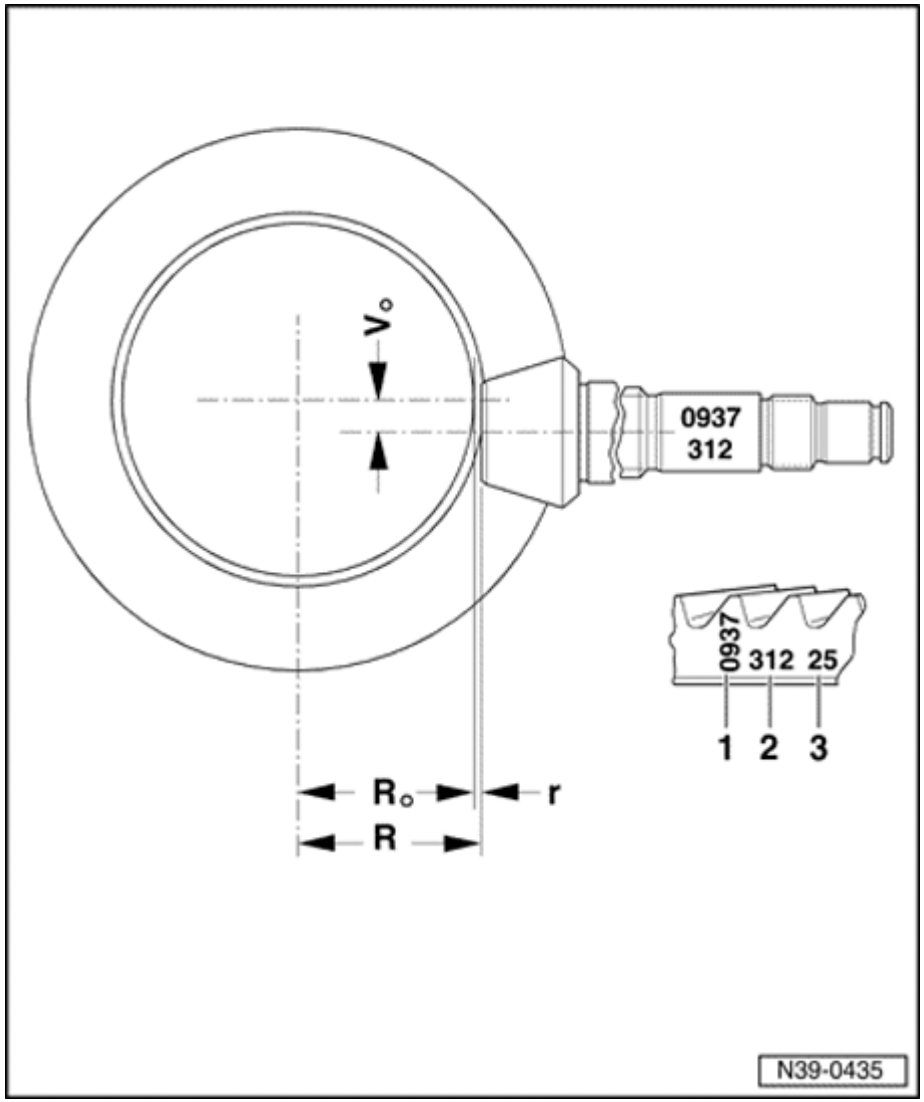
- *Follow general repair notes for tapered roller bearings and shims.*

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- *Make sure that all installation and measurement procedures are performed with the utmost care and cleanliness to ensure a successful result.*

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## Gear set, adjusting and marking

**1 - Identification "0937" means the Oerlikon gear set with a ratio of 37: 9.**

**2 - Pairing number (312) of gear set.**

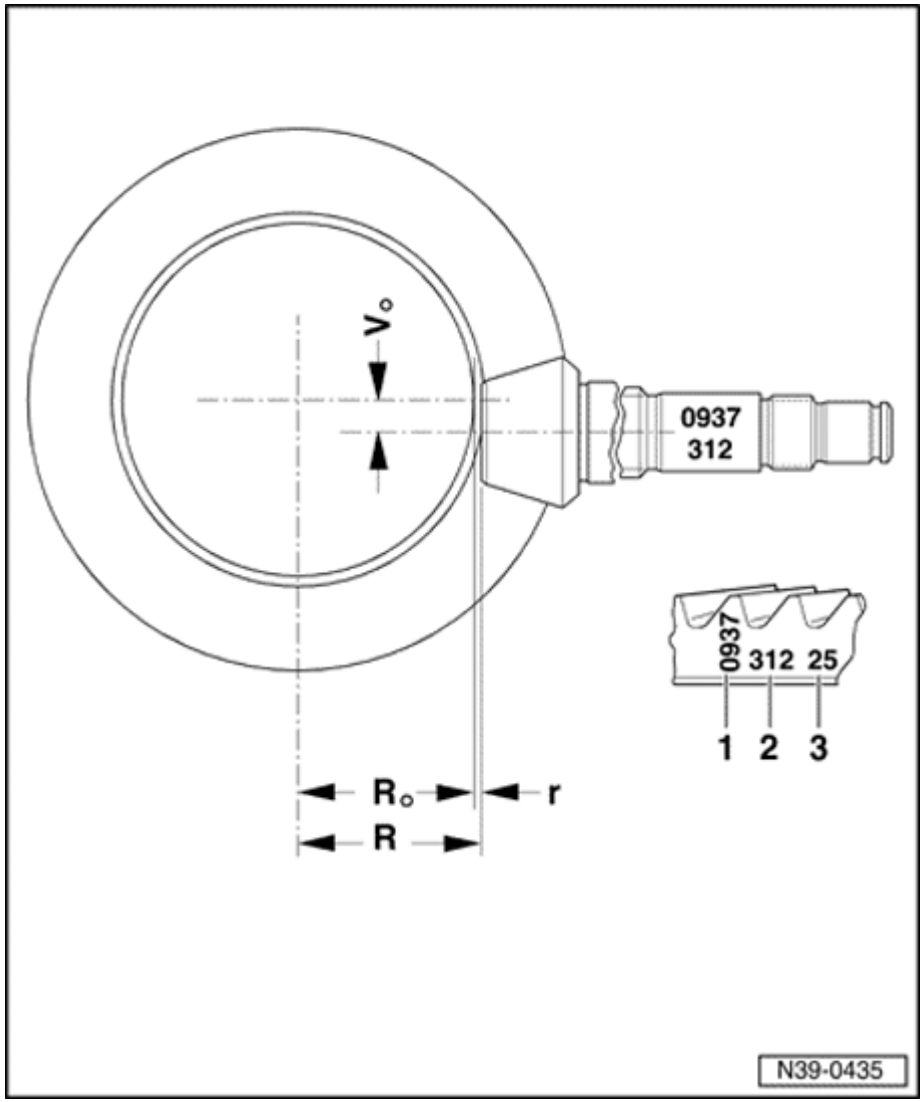
**3 - Dimension "r" is based on the master gauge used on the test bench during production. Dimension "r" is always given in 1/100 mm. Example: "25" means r = 0.25 mm**

**Ro - Length of test machine master gauge used "Ro".**

**Ro - ring gear = 57.50 mm**

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**R - Actual dimension between ring gear axis and face of drive pinion in position of quietest running for this gear set R = Ro + r**

**Vo - Hypoid offset**

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## Gear set, adjustment sequence

If drive pinion and gear ring have to be adjusted, the following sequence is recommended for maximum efficiency:

1.) Determine total shim thickness "Stot"for S1 + S2 for the specified pre-tension of tapered roller bearings for differential.

2.) Determine total shim thickness "S3" so that the drive pinion is installed in the same location as on the test machine during production.

3.) Distribute total shim thickness Stotal S1 + S2, so that the specified backlash between ring gear and drive pinion is maintained.

***Note:***

*Overview of components and adjustment shims*
⇒ *page 39-171* .

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## Adjustment overview

***Note:***

*When working on transmission, drive pinion or gear set only need to be adjusted if components were replaced which directly influence the final drive. Note the follow table to prevent unnecessary adjustments:*

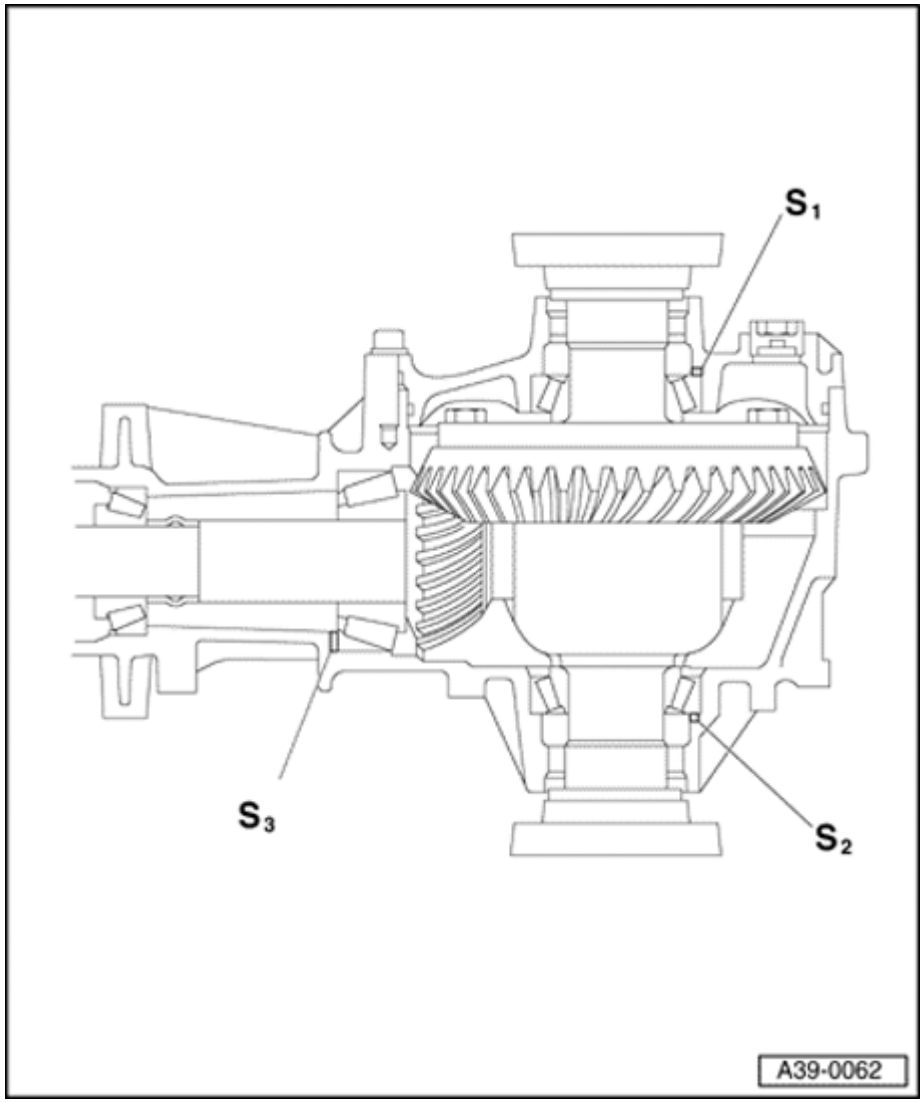
| | Component to be adjusted: | | |
|---|---|---|---|
| **Component replaced:** ▼ | Ring gear "S1"+"S2" 1) ⇒ page 39-186 | Drive pinion "S3" 1) via deviation "r" ⇒ page 39-177 | Backlash Checking ⇒ page 39-192 |
| Final drive housing | X | X | X |
| Differential housing | X | | X |
| Tapered roller bearing for drive pinion | | X | X |
| Tapered roller bearing for differential | X | | X |
| Gear set 2) | X | X | X |
| Cover for final drive | X | | X |

1) Adjustment shims; Installed position ⇒ page 39-171

2) Drive pinion and ring gear; only replace together as a set

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39-171




## Shim location

***Note:***

*Adjustment overview when replacing individual components of differential ⇒ page 39-170 .*

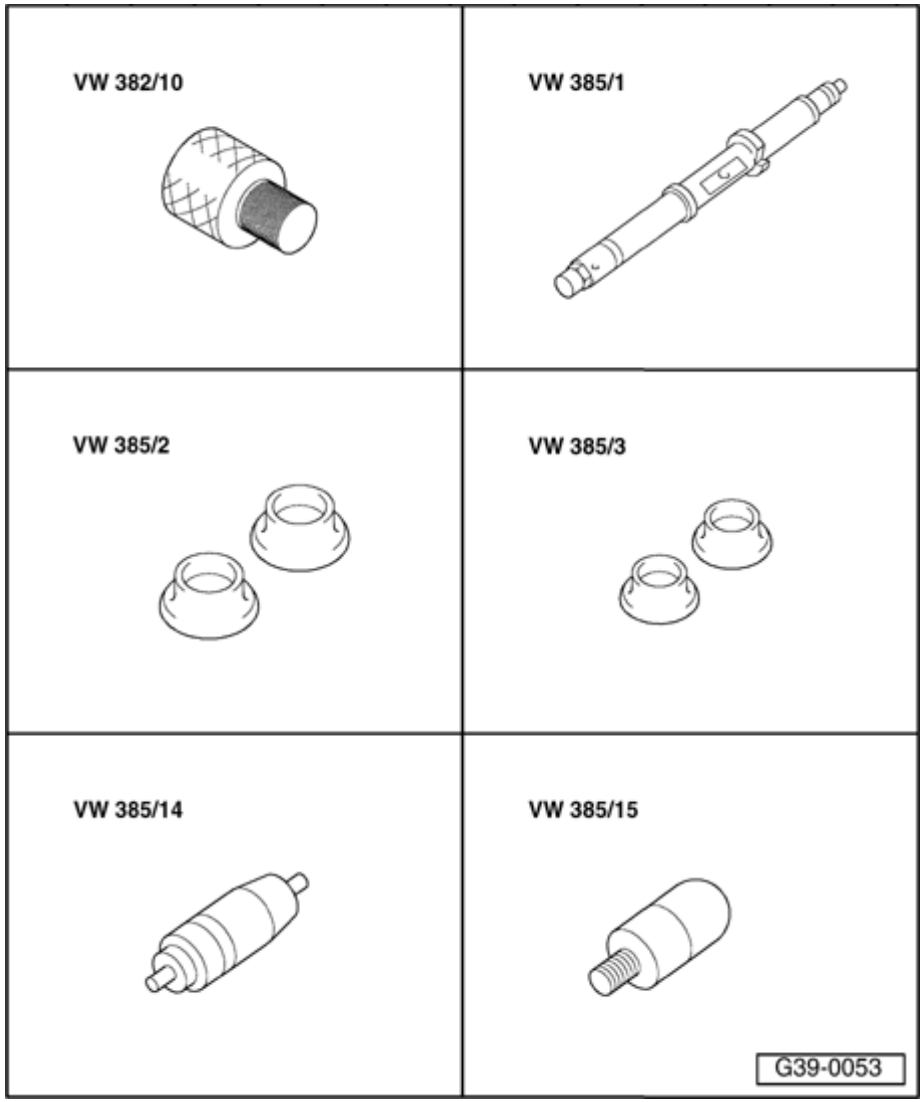
**S1 - Adjustment shim for ring gear in final drive cover**

**S2 - Adjustment shim for ring gear in final drive housing**

**S3 - Adjustment shim for ring gear in final drive housing**

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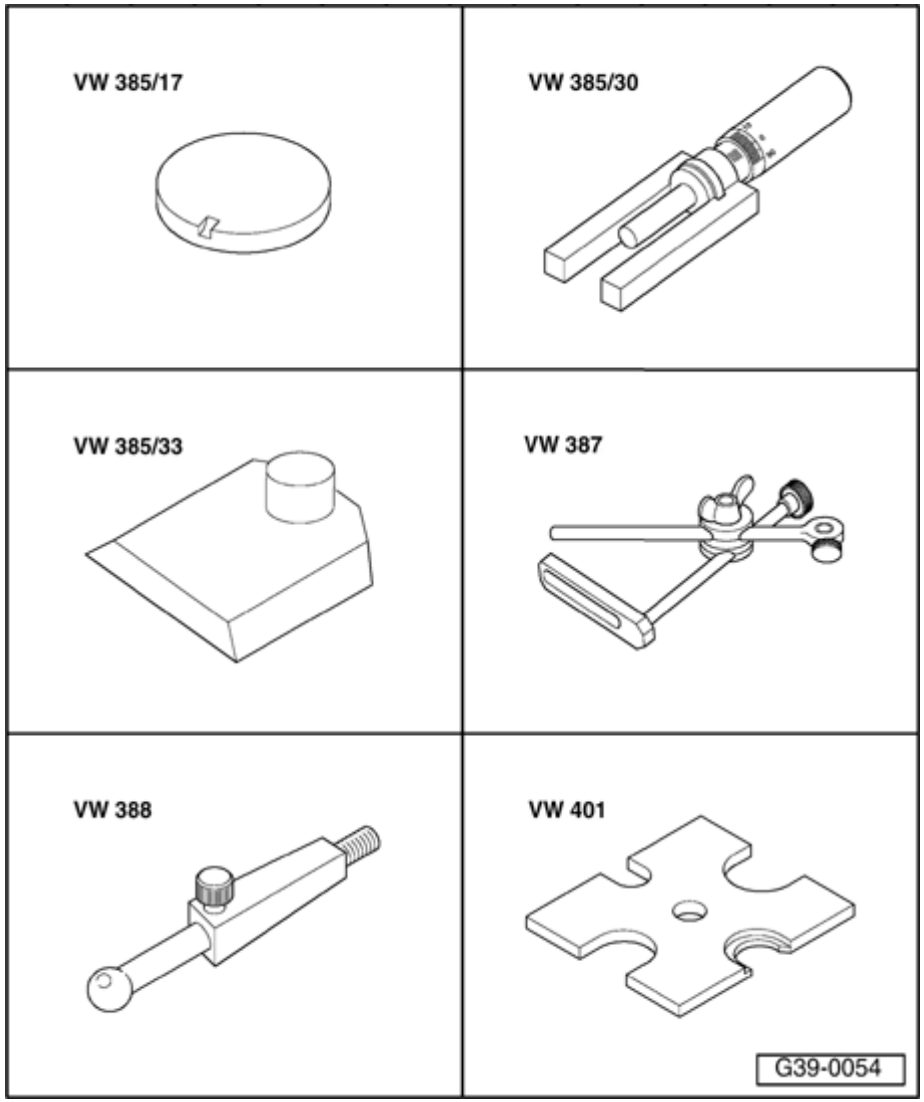



## Special tools and equipment

- VW382/10 extension pin
- VW385/1 measuring bar
- VW385/2 centering disc
- VW385/3 plastic piece
- VW385/14 measuring rod
- VW385/15 extension pin

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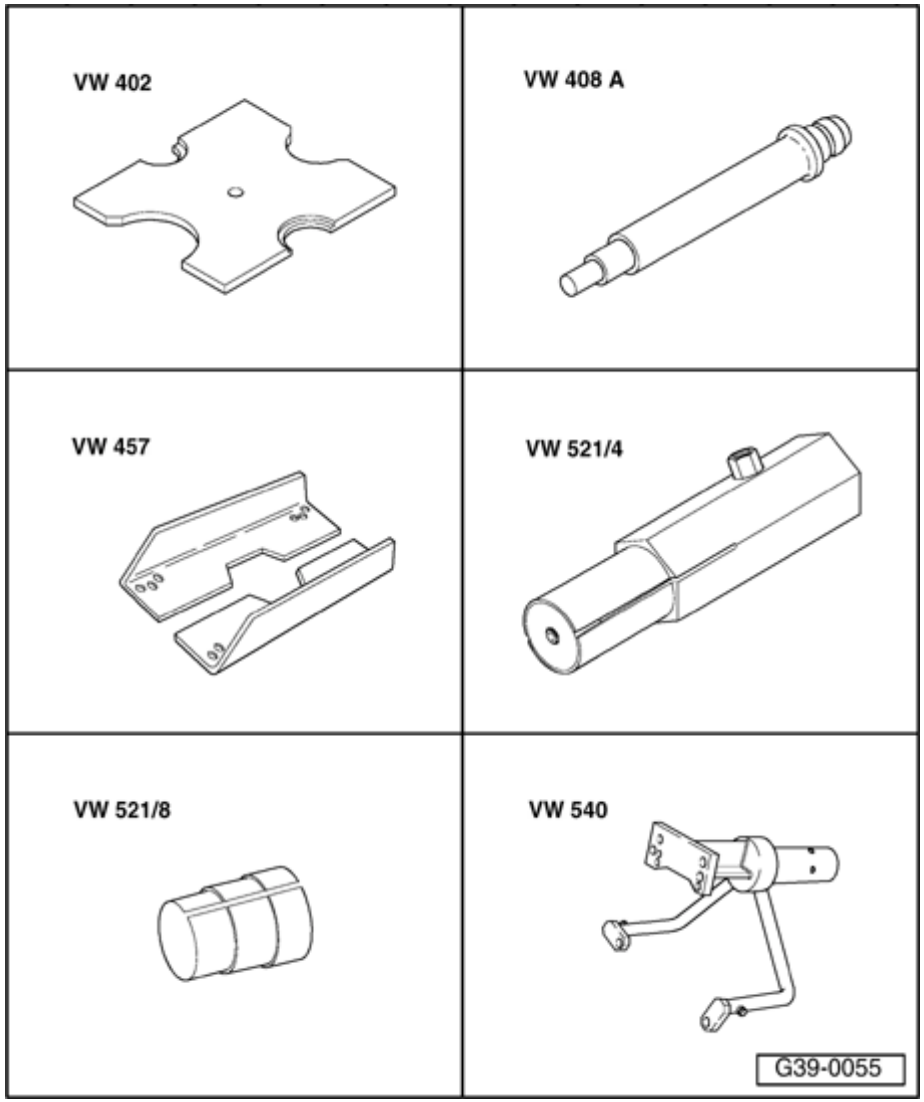
**39-173**




- VW385/17 magnetic plate
- VW385/30 master gauge-adjustable
- VW385/33 end gauge
- VW387 dial gauge holder
- VW388 measuring lever
- VW401 thrust plate

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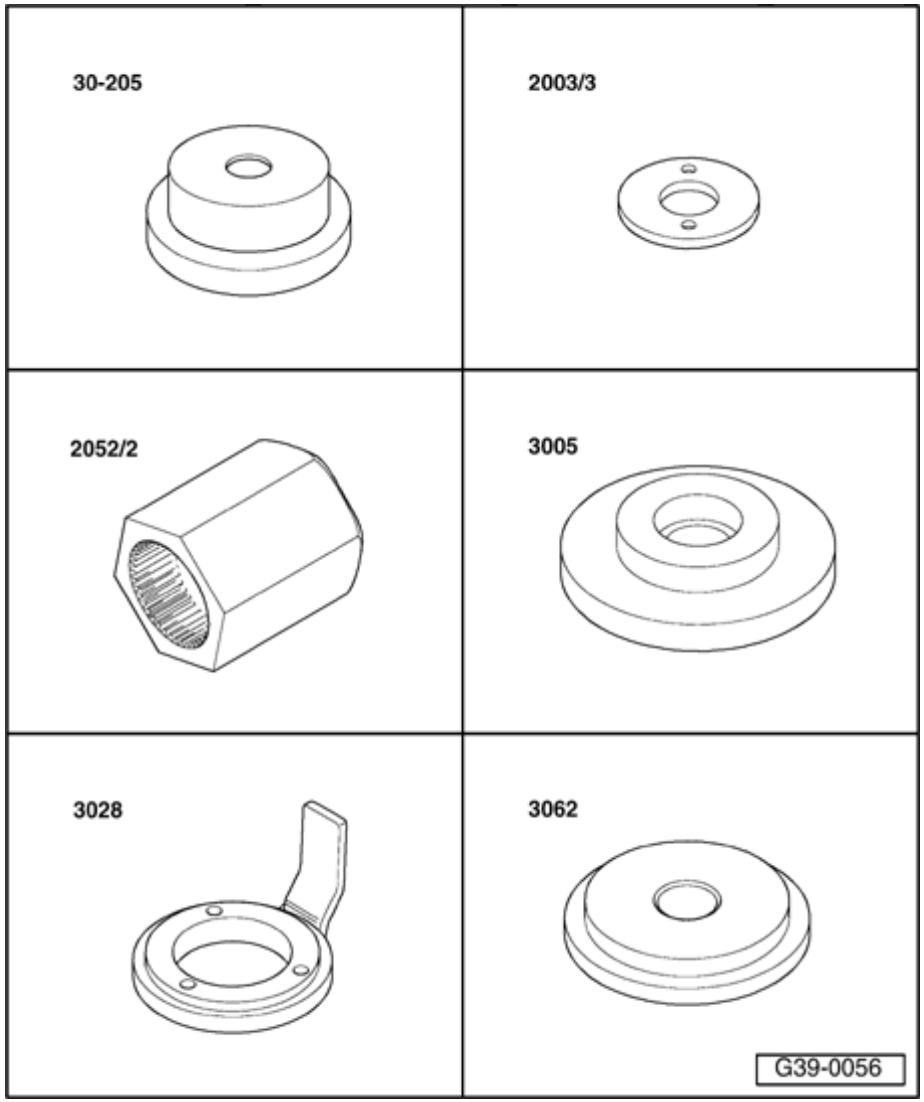
39-174




- VW402 thrust plate
- VW408A punch
- VW457 support channels
- VW521/4 locking sleeve for ring gear
- VW521/8 bushing for ring gear
- VW540 holding fixture

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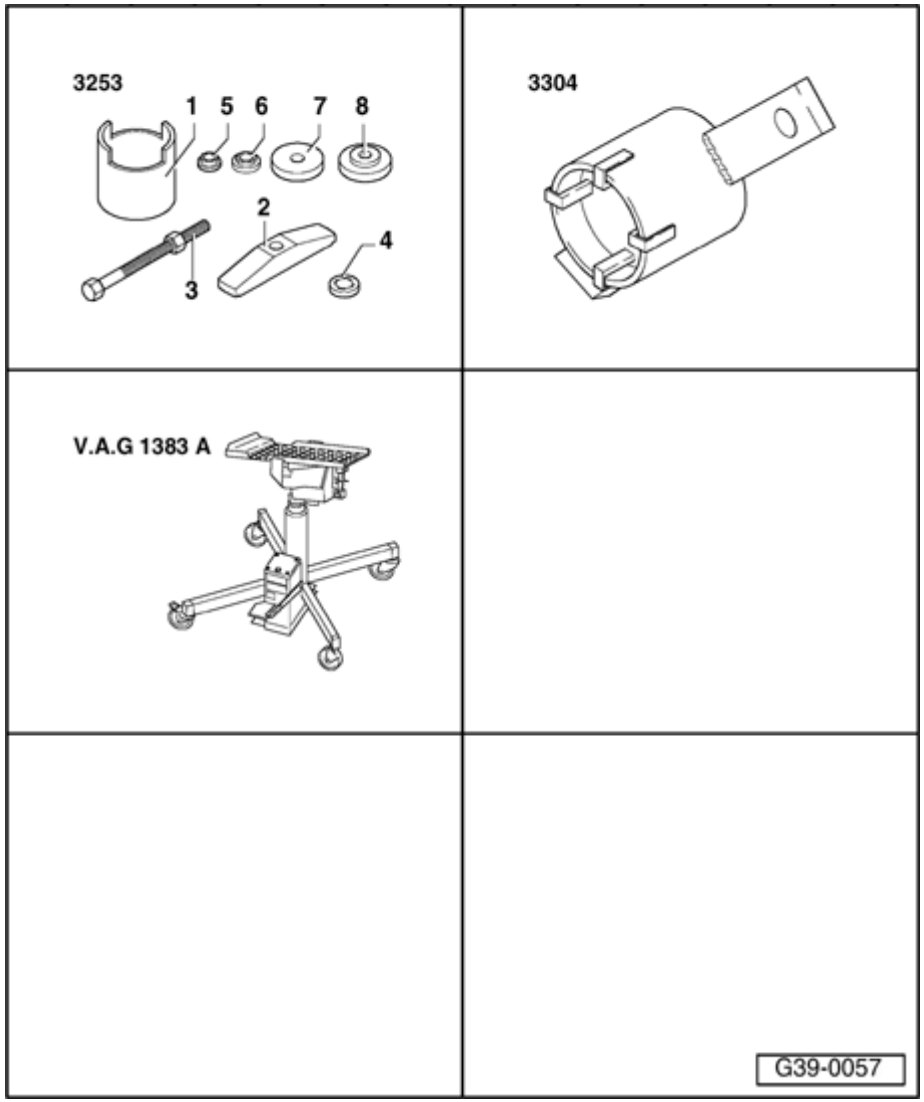
**39-175**




- 30-205 thrust pad
- 2003/3 seal installer
- 2052/2 assembly tool for drive pinion
- 3005 thrust pad
- 3028 retainer
- 3062 thrust pad

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**39-176**




- 3253 wheel bearing assembly set with 3253/3 and 3253/4
- 3304 retainer
- Engine/transmission jack VAG1383A engine/gearbox jack
- Dial gauge extension 30 mm
- Dial gage
- Torque gauge 0 - 600 Ncm

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39-177

## Drive pinion, adjusting

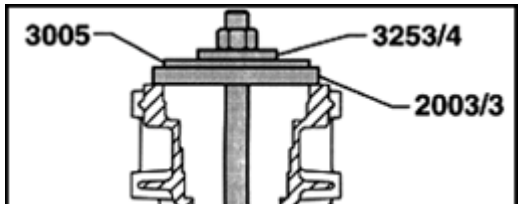
***Notes:***

- *Before adjusting drive pinion, adjust ring gear (determine total shim thickness "S" total" for adjustment shims "S1" + "S2")* ⇒ *page 39-186* .
- *Drive pinion only has to be adjusted again if gear set, tapered roller bearings for drive pinion or final drive housing was replaced. Adjustment overview* ⇒ *page 39-170* .
- *Do not grease new tapered roller bearings additionally for friction torque measurement. The bearings are already greased with a special oil from the factory.*

**Determining Shim "S3"**

(adjust preload of tapered roller bearing for drive pinion)

- Clamp final drive into engine and transmission assembly stand ⇒ page 39-123 .




- Pull large tapered roller bearing outer race into housing.

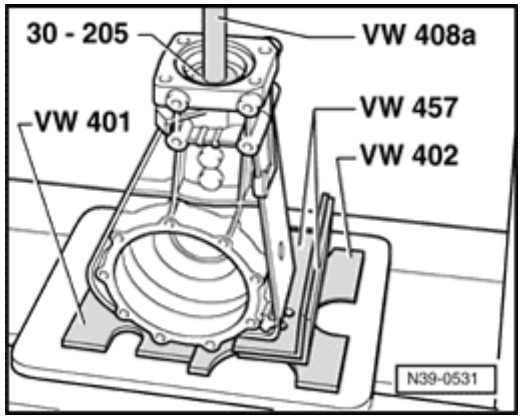
***Note:***

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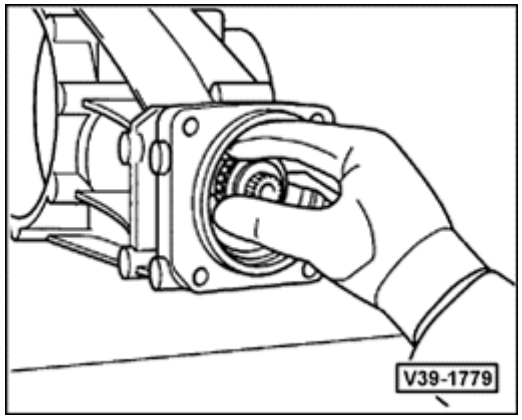
*On 3253/4 pressure disc, marking "Oben" points toward nut on installation device*

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**39-178**




- Pulling small tapered roller bearing outer race into housing.
- The outer race must be oiled and installed using VW408A punch and 30-205 thrust pad.




- Install drive pinion without spacer sleeve.

***WARNING!***

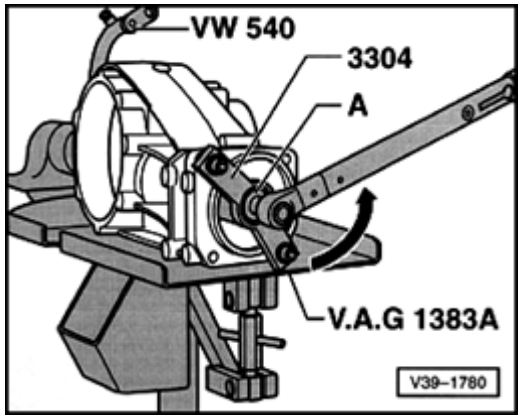
***Wear protective gloves!***

- Heat up small tapered roller bearing inner race to approx. 100 °C and position on drive pinion.

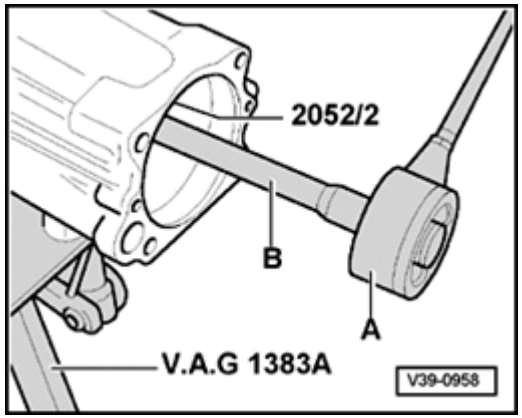
***Notes:***

- *Do not grease new tapered roller bearings additionally for friction torque measurement. The bearings are already greased with a special oil from the factory.*
- *Only install spacer sleeve if friction torque has been adjusted (Shim S3 already determined).*

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- Install 3304 retainer using two hex bolts M8 x 30.
- When tightening nut, support final drive (e.g. using VAG1359/2 universal mount with VAG1383A transmission hoist).
- Always replace drive pinion nut.
- Tighten nut for drive pinion until no more drive pinion backlash is present.
- Increase tightening torque further until specified friction torque is attained; while tightening measure friction torque multiple times.




A - Standard torque gauge, 0 to 600 Ncm

B - Extension with 32 mm wrench socket

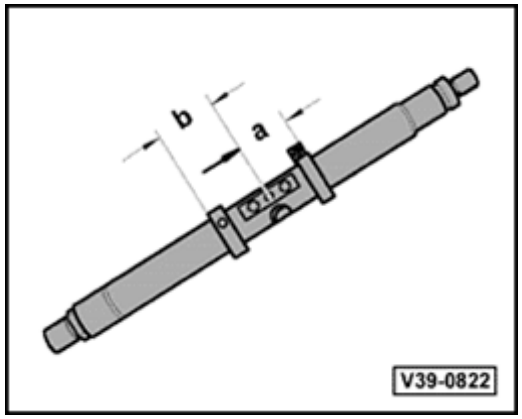
- Adjust to following friction torque

| New bearings | Run-in bearings 1) |
|---|---|
| 200 to 250 Ncm | 30 to 60 Ncm |

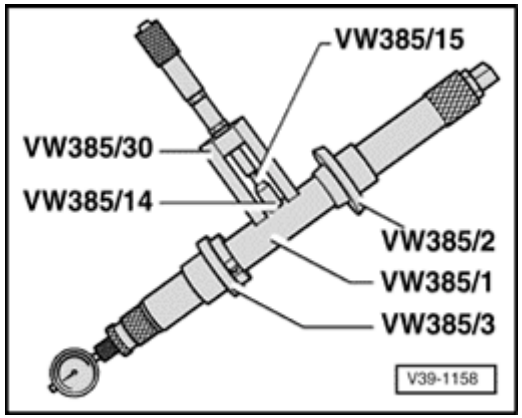
1) have been run in at least 50 km

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39-180




- Adjust adjustment ring of VW385/1 measuring bar.
  - Dimension a = 60 mm
- Adjust sliding adjustment ring.
  - Dimension b = 55 mm



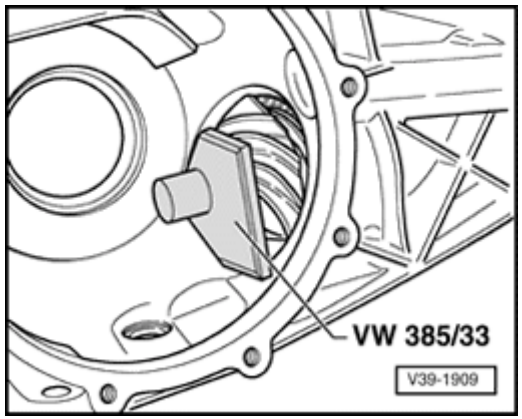

- Assemble measuring bar as shown in illustration.
  - VW385/15 extension pin 9 mm
- Adjust VW385/30 master gauge-adjustable.
  - Ro = 57.50 mm
- Set dial indicator (3 mm measuring range) to 0 with 2 mm preload.

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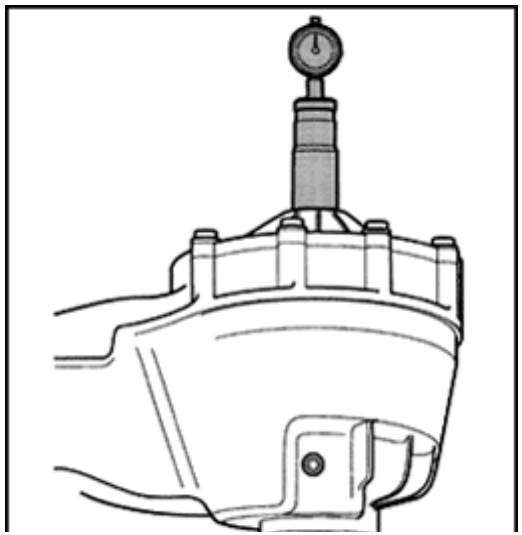
**39-181**

***Note:***

*Turn differential at least 5 rotations in each direction to seat the tapered roller bearings. Otherwise, measurement will result in false readings.*



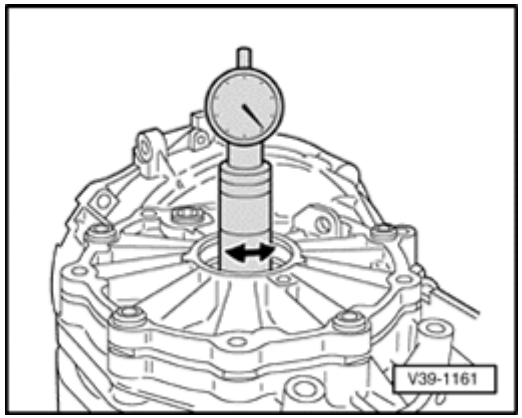

- Position VW385/33 end gauge on drive pinion head.



- Remove master gauge and insert measuring mandrel into housing.
  - VW385/3 plastic piece faces final drive cover
- Install cover for final drive and tighten four bolts.
- Using adjustable ring, pull 2nd centering disc out far enough, so that the mandrel can only just be turned by hand.

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**Determining dimension "e"**

- Turn measuring mandrel until dial indicator plunger tip touches end gauge on pinion shaft head, and measure the maximum run-out (return point). Measured value is dimension "e" (red numbered area).
  - Measured value in the following example: "e" = 1.60 mm

***Note:***

*Dimension "e" is required to determine thickness of S3 shim.*

- After removing universal mandrel, and with VW385/30 master gauge in place, check dial indicator again to see if it indicates 0, with 2 mm preload. If not, repeat measurement.

**Determining thickness of shim "S3"**

**Formula:**

**"S3" = "e" - "r"**

**e = determined value**

**r = deviation (indicated in 1/100 mm on ring gear)**

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**Example:**

| | | |
|---|---|---|
| | determined value "e" | 1.60 mm |
| - | Deviation "r" | 0.42 mm |
| = | Thickness of shim "S3" | 1.18 mm |

- Determine shim as closely as possible according to table. Part numbers

⇒ *Parts-catalog*

**Available shims for S3**

| **Adjustment shim thickness (mm) 1)** | | |
|---|---|---|
| 0.95 | 1.20 | 1.45 |
| 1.00 | 1.25 | 1.50 |
| 1.05 | 1.30 | 1.55 |
| 1.10 | 1.35 | |
| 1.15 | 1.40 | |

1) By using shim tolerances, it is possible to determine the exact shim thickness required, insert two shims if necessary

- Removing universal mandrel.

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- Remove drive pinion and large tapered roller bearing outer race and install together with determined adjustment shim "S3" and spacer sleeve ⇒ Page 39-159 onward.

- Insert small tapered roller bearing inner race and tighten nut for drive pinion until specified friction torque is attained ⇒ Fig. 11 , ⇒ page 39-164 .

***Notes:***

- *Do not grease new tapered roller bearings additionally for friction torque measurement. The bearings are already greased with a special oil from the factory.*

- *Increase torque slowly and measure friction torque multiple times. If the specified friction torque is surpassed, replace spacer sleeve and repeat adjustment! Any spacer sleeve that has been pressed together too far one time must be replaced.*

- Adjust friction torque to following values:

| New bearings | Run-in bearings 1) |
|---|---|
| 200 to 250 Ncm | 30 to 60 Ncm |

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[1)] have been run in at least 50 km

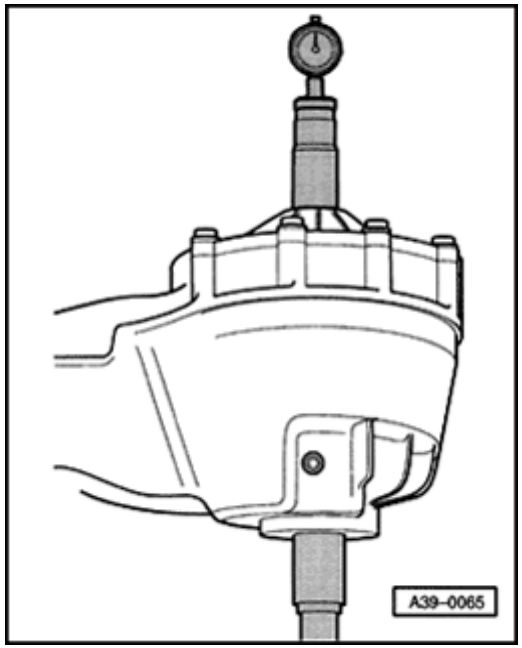
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39-185

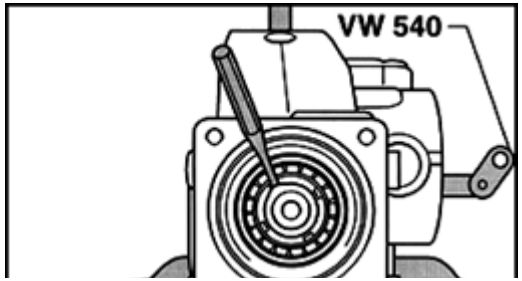
**Perform check measurement**

**Checking dimension "r"**

- Rotate drive pinion at least 5 complete revolutions in both directions.




- Insert universal mandrel and perform check measurement.
  - ♦ If adjustment shims were determined correctly, dial indicator must indicate deviation "r" with a tolerance of ± 0.04 mm (reading counterclockwise in red number display).




- Peen drive pinion nut using mandrel.

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## Ring gear, adjusting

(Adjusting differential)

Procedures after which the ring gear must be adjusted ⇒ Adjustment overview ⇒ page 39-170 .

***Notes:***

- *Tapered roller bearings for differential are low-friction bearings. Therefore friction torque can only be used for check measurement in a limited way. A correct adjustment is only possible by determining the total thickness "Sges".*

- *Do not grease new tapered roller bearings additionally for friction torque measurement. The bearings are already greased with a special oil from the factory.*

### Total shim thickness "Stotal" for adjustment shims "S1" + "S2", determining

(adjust preload of tapered roller bearing for differential)

- Drive pinion removed or ring gear detached from differential housing

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- Pry out drive flange seal using tire iron.

- Remove tapered roller bearings for differential and remove adjustment shims ⇒ page 39-136 .

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- Press tapered roller bearing outer race for left side of differential housing (housing side) together with shim "S2" into differential housing ⇒ Page 39-144 . Use a shim "S2*" with a 1.00 mm thickness for measurement purposes (1 shims with 0.80 and 1 with 0.20 mm).

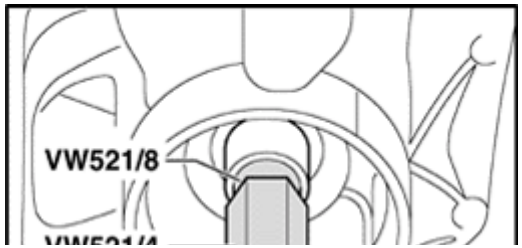
***Note:***

*All measurements are performed with shim S2 with 1.00 mm thickness. The shim will be indicated by "S2*" in the following procedures. After determining backlash, S2* is replaced by final shim S2.*

- Press in tapered roller bearing outer race for right side (cover side) of differential without adjustment shims to stop ⇒ Fig. 8 , ⇒ page 39-136 .

- Insert differential in housing. Ring gear is on the right side (cover side).

- Install cover and tighten bolts to 25 Nm.



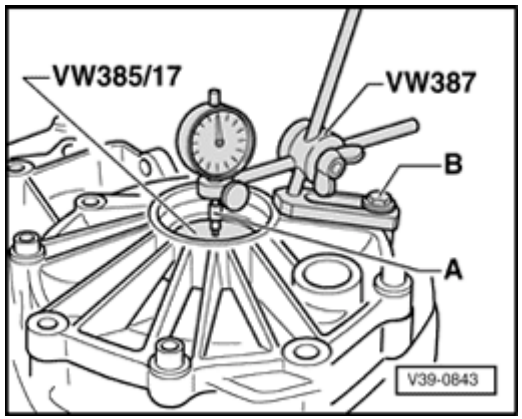

- Install VW521/4 locking sleeve and 521/8 sleeve press tool into differential housing on housing side.
- Rotate cover side of differential housing upward.

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**39-188**

- Turn differential 5 rotations in each direction to seat the tapered roller bearing.

- Place VW385/17 magnetic plate onto differential.

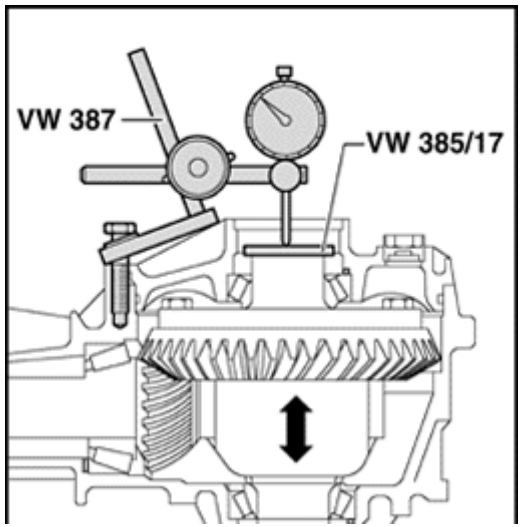



- Install measuring tools.

A - Dial gauge extension approx. 30 mm long

B - Hex bolt M8 x 45

- Set dial gauge extension onto center of VW 385/17 magnetic plate.
- Set dial indicator (3 mm measuring range) to 0 with 2 mm preload.




- Lift the differential without turning it, read play on dial indicator and note.

  - Measured value in the following example: 0.50 mm

***Note:***

*If measurement is repeated, differential must first be rotated 5 complete revolutions in both directions again to seat tapered roller bearing.*

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**39-189**

**Formula:**

**"Stotal" = "S2*" + measured value + bearing preload**

**Example:**

| | | |
|---|---|---|
| | Installed shim(s) "S2*" | 1.00 mm |
| + | Measurement | 0.50 mm |
| + | Bearing preload (constant) | 0.30 mm |
| = | Total shim thickness "Stotal"for shims "S1" + "S2" | 1.80 mm |

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**Determining thickness of shim "S1*"**

***Notes:***

- *"S1*" is used for the initial measurement. After determining backlash, "S1*" is replaced with final shim "S1".*
- *The total shim thickness "Stotal" remains unchanged.*

**Formula:**

**"S1*" = "Stotal" - "S2*"**

**Example:**

| | | |
|---|---|---|
| | Total shim thickness "Stotal"for shims "S1" + "S2" | 1.80 mm |
| - | Installed shim(s) "S2*" | 1.00 mm |
| = | Thickness of shim "S1*" | 0.80 mm |

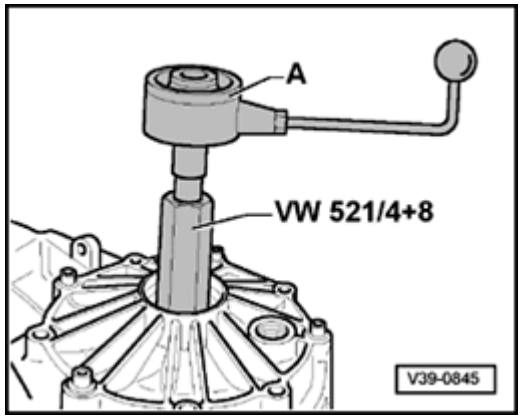
- Determine adjustment shim(s) as closely as possible according to table ⇒ page 39-195 .

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39-191

**Measuring friction torque (check measurement)**

- Drive pinion removed
- Differential installed with shims "S1*" and "S2*"




- Position torque gauge 0 to 600 Ncm -A- on differential.
- Read friction torque.

Friction torque specified values:

| New bearings | Run-in bearings 1) |
|---|---|
| 150 to 300 Ncm | 30 to 60 Ncm |

1) have been run in at least 50 km

***Notes:***

- *Tapered roller bearings for differential are low-friction bearings. Therefore friction torque can only be used for check measurement in a limited way. A correct adjustment is only possible by determining the total thickness "Sges".*
- *Do not grease new tapered roller bearings additionally for friction torque measurement. The bearings are already greased with a special oil from the factory.*
- *For a new adjustment of the gear set, the drive pinion adjustment*

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*should now be checked* ⇒ *page 39-177* .

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39-192

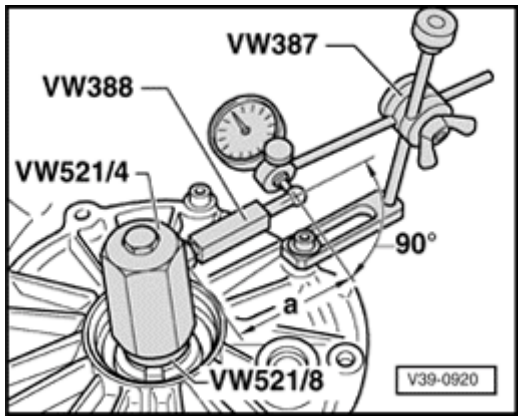
**Adjusting backlash**

(position of ring gear in transmission housing)

- Drive pinion installed with shim S3
- Differential installed with shims "S1*" and "S2*"

- Insert differential into final drive housing, install cover and tighten all bolts to 25 Nm.

- Turn differential 5 rotations in each direction to seat the tapered roller bearing.




- Install measuring tools.
- Use VW382/10 extension pin, 6 mm.
- Set VW388 measuring lever to dimension "a" = 60 mm.
- Determine backlash between teeth flanks as follows:
  - Turn ring gear until it contacts a tooth flank (end of backlash travel).
  - Set dial indicator to 0 with 1 mm preload.

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- Turn ring gear back until it contacts opposite tooth flank (backlash).

- Read backlash and note.

- Turn ring gear an additional 90° in each case and repeat measurement 3 times.

***Note:***

*If measurements vary more than 0.06 mm from each other, ring gear or gear set is not installed correctly. Check installation, replace gear set if necessary.*

**Determining average backlash**

**Example:**

| | | |
|---|---|---|
| | 1. Measurement | 0.28 mm |
| + | 2. Measurement | 0.30 mm |
| + | 3. Measurement | 0.30 mm |
| + | 4. Measurement | 0.28 mm |
| = | Total of measurements | 1.16 mm |

- Result: The average backlash is 1.16 mm / 4 = 0.29 mm

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**Determining thickness of shim "S2"**

**Formula:**

**"S2" = "S2*" - backlash + lift**

**Example:**

| | | |
|---|---|---|
| | Installed shim "S2*" | 1.00 mm |
| - | Average backlash | 0.29 mm |
| + | Lift (constant) | 0.15 mm |
| = | Thickness of shim "S2" | 0.86 mm |

- Determine shim as closely as possible according to table. Part numbers

⇒ *Parts-catalog*

**Available shims for S2**

| **Adjustment shim thickness (mm) 1)** | | |
|---|---|---|
| 0.15 | 0.50 | 1.50 |
| 0.20 | 0.80 | |
| 0.25 | 1.00 | |

1) By using shim tolerances, it is possible to

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determine the exact shim thickness required, insert two shims if necessary

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**Determining thickness of shim "S1"**

**Formula:**

**"S1" = "Stotal" - "S2"**

**Example:**

| | | |
|---|---|---|
| | Total shim thickness "Stotal" for "S1" + "S2" | 1.80 mm |
| - | Thickness of shim "S2" | 0.86 mm |
| = | Thickness of shim "S1" | 0.94 mm |

- Determine shim as closely as possible according to table. Part numbers

⇒ *Parts-catalog*

**Available shims for S1**

| **Thickness of adjustment shims in mm[1)]** | | |
|---|---|---|
| 0.15 | 0.50 | 0.90 |
| 0.20 | 0.60 | 1.00 |
| 0.30 | 0.70 | 1.20 |
| | | |

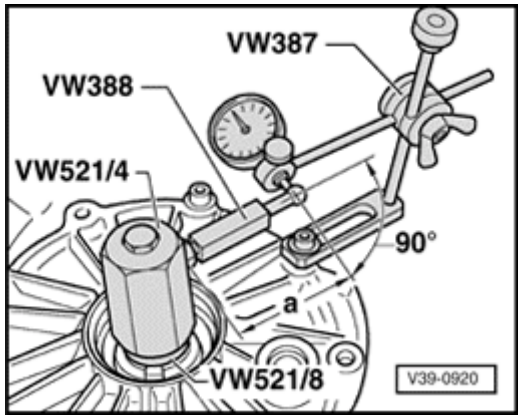
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| | | |
|---|---|---|
| 0.40 | 0.80 | |

1) By using shim tolerances, it is possible to determine the exact shim thickness required, insert two shims if necessary

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## Checking measurement

- Drive pinion installed with shim S3
- Differential installed with shims "S1" and "S2"

- Turn differential 5 rotations in each direction to seat the tapered roller bearing.
- Measure backlash 4 times on circumference.
  - Specification: 0.12 to 0.22 mm

***Notes:***

- *If backlash is outside tolerance, repeat adjustments. Do not change total shim thickness "Stotal" while doing so.*
- *The individual measurement values can deviate a maximum of 0.06 mm from each other*

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