



Audi

Repair Manual Audi R8 2007 >

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R tronic Transmission

Edition 02.2011

erWin

List of Workshop Manual Repair Groups

Repair Group

- 00 - General, Technical Data
- 30 - Clutch
- 34 - Controls, Housing
- 35 - Gears, Shafts
- 39 - Final Drive, Differential



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Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.

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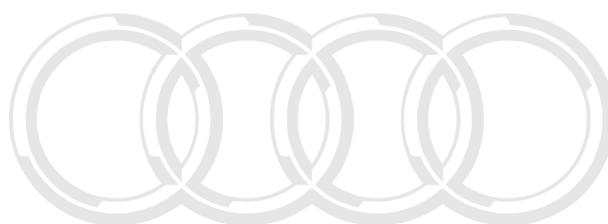
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00 – General, Technical Data

1 General Information

(Edition 02.2011)

- ⇒ [“1.1 Safety Precautions”, page 1](#)
- ⇒ [“1.2 Clean Working Conditions”, page 2](#)
- ⇒ [“1.3 Repair Information”, page 2](#)
- ⇒ [“1.4 Basic Transmission”, page 8](#)
- ⇒ [“1.5 Contact Corrosion”, page 8](#)
- ⇒ [“1.6 Manual/Automatic R tronic Transmission”, page 9](#)
- ⇒ [“1.7 Transmission Identification”, page 9](#)
- ⇒ [“1.8 Front Final Drive Identification”, page 10](#)
- ⇒ [“1.9 Towing”, page 10](#)

1.1 Safety Precautions

Observe the following to avoid personal injury and vehicle damage:



WARNING

There is a risk of injury and accident from accidentally engaging a gear when the engine is running.

- ◆ *Before performing work with the engine running, place the selector lever in the “P” position and engage the parking brake.*

To prevent personal injury and damage or destruction of electrical and electronic components, observe the following:

- ◆ Connect and disconnect test equipment only when the ignition is turned off.



Caution

Risk of destroying electronic components when disconnecting the battery.

- ◆ *Observe measures for disconnecting battery.*
- ◆ *Only disconnect the battery with ignition switched off.*

- Disconnect the battery. Refer to ⇒ Electrical Equipment; Rep. Gr. 27 ; Removal and Installation .

If testing equipment must be used during a road test, observe the following:



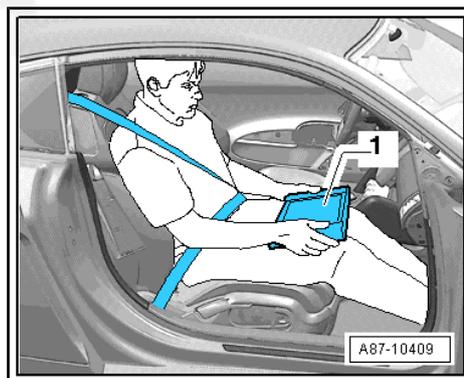
WARNING

There is an accident risk if testing equipment shifts position or is not secured sufficiently during a road test.

Risk of passenger airbag deploying in an accident.

- *Operating testing equipment while driving causes it to shift position.*
- *There is an increased risk of injury due to unsecured testing equipment.*
- ◆ *Move the front passenger seat as far back as possible.*
- ◆ *Only use the Vehicle Diagnosis and Service System - VAS 5052- or Diagnosis System - VAS 5053- .*
- ◆ *Testing equipment -1- must lie flat on the passenger's thighs and be operated by that person, as shown in the illustration.*

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1.2 Clean Working Conditions

- ◆ Always clean connection places and surrounding areas with engine or brake cleaner before loosening and dry cleaned places.
- ◆ Immediately seal open lines and connections with clean plugs or protective caps.
- ◆ Place removed parts on a clean surface and cover. Only use lint-free cloths for this!
- ◆ Carefully cover or plug unpacked components if repairs cannot be performed immediately.
- ◆ Only install clean components: Remove the replacement parts from their packaging just prior to installing them.
- ◆ Protect the disconnected connectors from dirt and moisture and only connect when they are dry.

1.3 Repair Information

For the transmission to be repaired successfully and to function correctly, the greatest possible care and cleanliness and proper tools are required. The usual basic safety precautions also, naturally apply when carrying out vehicle repairs.

A series of generally applicable notes for individual repair procedures have been gathered here which otherwise would be listed

several times in many places in the repair manual. They apply to this repair manual.

Guided Fault Finding, Vehicle Diagnosis and Test Instruments

- ◆ Try to determine the exact cause of the fault before servicing a transmission. Use Guided Fault Finding, Vehicle Diagnosis and Test Instruments. ⇒ Vehicle diagnostic tester.

Special Tools and Equipment

For a complete list of special tools used in the Repair Manual refer to ServiceNet under Special Tools and Equipment.

Transmission

- ◆ Do not run engine or tow the vehicle when the oil pan is removed or when there is no transmission fluid.
- ◆ Fill the transmission with transmission fluid after performing a repair. Capacities
 ⇒ ["3.2 Transmission Capacities", page 12](#) , specifications electronic parts catalog ETKA.
- ◆ When replacing a transmission, always check the transmission fluid level and add if necessary. Refer to
 ⇒ ["1.2 Transmission Fluid, Checking and Filling", page 52](#) ; capacities, refer to
 ⇒ ["3.2 Transmission Capacities", page 12](#) , specifications, refer to the electronic parts catalog ETKA.
- ◆ During installation, make sure that the alignment bushings are fitted correctly.

Sealant

- ◆ Thoroughly clean the housing joint surfaces before applying the sealing compound.
- ◆ Apply sealing compound - AMV 188 001 02- evenly and not too thickly.
- ◆ Do not allow any sealing compound to get into the ventilation holes.

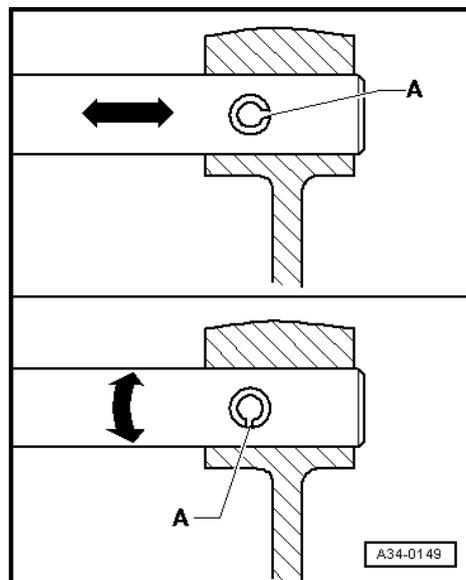
Seals, O-rings, Shaft Seals

- ◆ Replace the seals, the O-rings and the shaft seals.
- ◆ After removing seals, check sealing surfaces on housing or shaft for burrs resulting from removal or damage.
- ◆ Replace the seals, completely remove old seal and clean sealing surfaces.
- ◆ Coat the O-rings with gear oil before inserting to prevent crushing them.
- ◆ Coat the shaft seals lightly with oil on the outer circumference and fill the space between the sealing lip -arrow- halfway with sealing grease. For the correct sealing grease, refer to the electronic parts catalog ETKA.
- ◆ The open side of the shaft seals point toward the fluid to be sealed in.
- ◆ Follow the rules for clean working conditions. refer to [⇒ "1.2 Clean Working Conditions", page 2](#) .
- ◆ After installing, check the transmission oil level and fill, refer to [⇒ "1.2 Transmission Fluid, Checking and Filling", page 52](#) .
With R tronic transmission, also check the R tronic hydraulic unit oil level and fill, refer to [⇒ "2.11 Oil Level in R tronic Hydraulic Unit, Adjusting", page 80](#) .



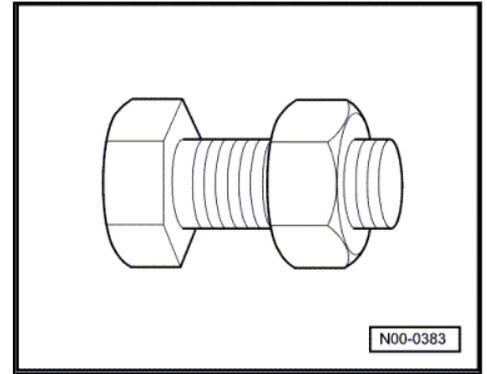
Fasteners

- ◆ Be careful not to overstretch the locking rings. Replace them if necessary.
- ◆ The circlips must fit completely inside the groove.
- ◆ Replace the adapter sleeves. Installed position: Slit -A- should be in line with the line of force -arrow-.



Bolts and Nuts

- ◆ Loosen the bolts opposite the tightening sequence.
- ◆ Nuts and bolts which secure covers and housings should be loosened and tightened crosswise in stages if no tightening sequence is specified.
- ◆ Replace the self-locking nuts.
- ◆ Use a wire brush to clean the threads of bolts that were screwed in with locking compound. Then install the bolts with locking compound. For the correct locking compound, refer to the electronic parts catalog ETKA.
- ◆ The tightening specifications stated apply to non-oiled nuts and bolts.
- ◆ Tightening specification with additional torque: After tightening to the tightening specification, these bolts must be tightened further to the specified angle, for example 40 Nm + 90° (90° corresponds to a quarter turn).



Adjusting Shims



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- ◆ Measure the adjusting shims at several locations with a micrometer. Tolerance variations make it possible to find the exact shim thickness required.
- ◆ Check for burrs and damage.
- ◆ Only install perfect shims that have never been damaged.

Bearings

- ◆ Set needle bearings, ball sleeves and roller sleeves with the inscribed side (greater thickness) facing toward drift.
- ◆ Install the new tapered roller bearings. It is not necessary to oil them.
- ◆ Install all bearings (except the tapered roller bearing) in the transmission with transmission fluid.
- ◆ Heat inner races of tapered roller bearings to approximately 100 °C (212 °F) with the inductive heat unit - VAS 6414- before installing. Press on to the stop when installing, so there is no axial clearance.
- ◆ Warm inner race for needle and roller bearings to 130 °C (266 °F) max.
- ◆ Do not interchange outer and inner bearing races with those from other bearing of the same size. The bearings are paired.
- ◆ Replace all the tapered roller bearings that are on the same shaft. Use tapered roller bearings from the same manufacturer.

Gears, Synchronizer Hubs, Selector Gear Inner Races

- ◆ To install, heat gear wheel inner race to approximately 100 °C (212 °F) with the -VAS 6414- .
- ◆ Heat the gear wheels and synchronizer hubs to approximately 100 °C (212 °F) with the -VAS 6414- before installing. Press on to the stop when installing, so there is no axial clearance.
- ◆ Pay attention to the installed location.

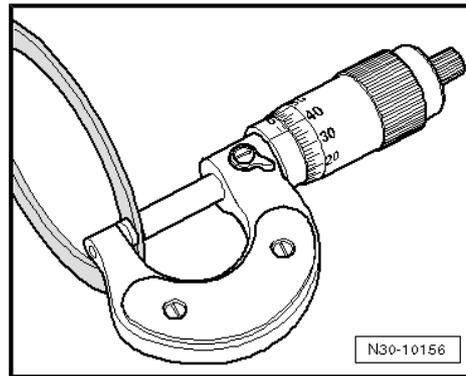
Selector Gears

- ◆ After assembly, check selector gears of 1st through 6th gear for axial play of 0.15 to 0.50 mm or ease of movement.

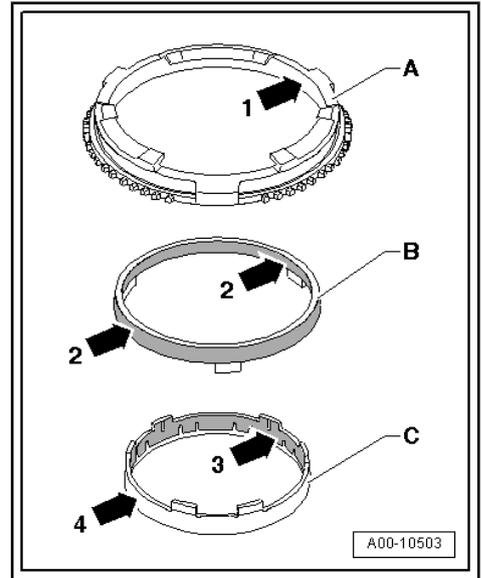
Synchronizer Rings

- ◆ Do not interchange them. When reusing synchronizer rings, always install to the same gear wheel.
- ◆ Check for wear and replace if necessary.
- ◆ Install coated with transmission fluid.

Check the Synchronizer Rings



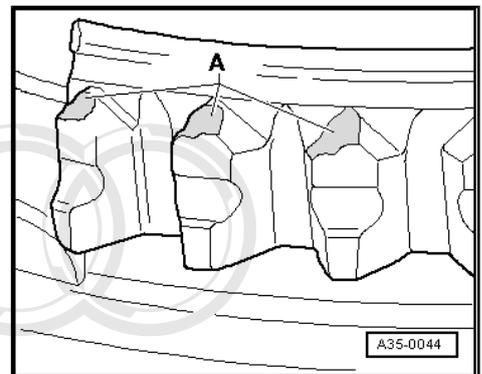
- ◆ Check the coated friction surfaces -arrows 2- on the intermediate ring -B- for damage (flat areas, disintegrating areas or friction surface).
- ◆ Check the inner friction surface -arrow 1- on the synchronizer ring -A- and surfaces of the intermediate ring for grooves and scoring.
- ◆ On intermediate rings -C- with coated friction surfaces -arrow 3-, check coating for damage (disintegrating friction layer).



Damage on the Selector Gears and Locking Collars

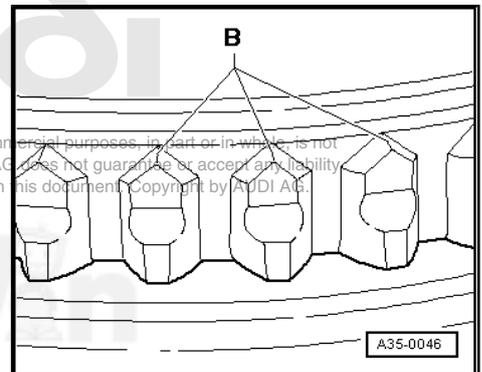
- ◆ Damage to the synchronizer ring or gear wheel:

A - Worn clutch spline on the synchronizer ring or gear wheel, tips worn off



- ◆ For comparison: synchronizer ring or gear wheel not damaged:

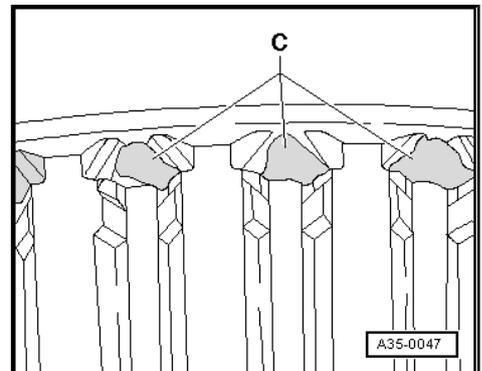
B - Undamaged clutch spline on the synchronizer ring or gear wheel



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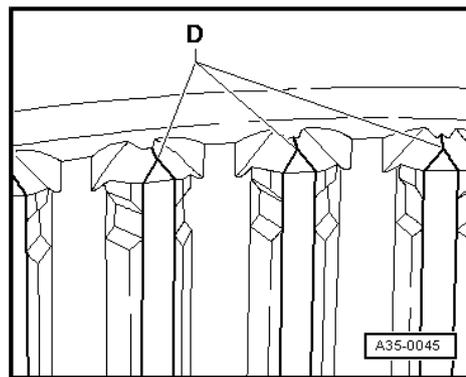
- ◆ Picture of damage on the locking collar:

C - Worn longitudinal inner spline camber on the locking collar, tips no longer there



- ◆ For comparison: locking collar undamaged

D - Undamaged longitudinal inner spline camber on the locking collar



1.4 Basic Transmission

The basic transmission is constructed roughly the same way for the manual transmission and the manual/automatic transmission (R tronic). The transmission and final drive have a shared oil fill. The same oil is used for both transmission types.



Note

Only use the transmission oil available as a replacement part for the 086 transmission. Using other oils can lead to function problems or can even cause the transmission to fail. Refer to the electronic parts catalog ETKA.

Clutch Bleeding

The clutch is bled as usual on the manual transmission, refer to [⇒ "1.1 Clutch System, Manual Transmission, Bleeding", page 17](#).

With the manual/automatic (R tronic) transmission, the clutch is ventilated via the R tronic hydraulic system. Refer to [⇒ "1.2 Clutch System, R tronic, Bleeding", page 18](#).

Front Final Drive

The front final drive axle oil is filled separately.



Note

Use only the axle oil, which is available as a replacement part, for the front final drive. Using other oils can lead to function problems or can even cause the front final drive to fail, for the specification refer to the electronic parts catalog ETKA.

Disposal Regulations for Oils and Fluids

Dispose of drained oil properly.

- ◆ Disposing of used oils and fluids improperly endangers the environment.
- ◆ Mixing with solvents, brake fluid and coolant is not permitted.
- ◆ Observe information on oil the packaging.

1.5 Contact Corrosion

Contact corrosion can occur if non-approved fasteners are used on vehicle (bolts, nuts, washers, etc.).

For this reason, only connecting elements with a special surface coating are installed.

In addition, rubber or plastic parts and adhesive are made of materials that do not conduct electricity.

If you are not sure about the suitability of parts, install new parts. Refer to electronic parts catalog ETKA.

 **Note**

- ◆ *We recommend using original replacement parts only. They have been inspected and are compatible with aluminum.*
- ◆ *It is recommended to use Audi accessories.*
- ◆ *Damage resulting from contact corrosion is not covered by the warranty.*

1.6 Manual/Automatic R tronic Transmission

The manual/automatic transmission is also called the “R tronic”. It is constructed like a 6-speed manual transmission. The gears are automatically engaged or can be manually engaged in the Tiptronic position. Clutch pedal is not available.

transmission control module - J217-

The manual/automatic R tronic transmission has a transmission control module installed in the vehicle.

Before working on the manual/automatic R tronic transmission, determine the cause of damage exactly using “Guided Fault Finding”.

Use “Guided Fault Finding” ⇒ Vehicle diagnostic tester.

Selector Mechanism

There is no selector lever cable. The selector lever and gearshift lever positions are transmitted to the transmission control module via the CAN bus from the selector lever sensor system control module - J587- in the shift mechanism.

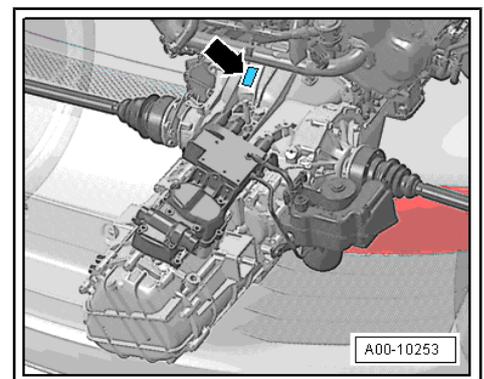
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The transmission does not have a parking lock.

1.7 Transmission Identification

Transmission code allocation, refer to ⇒ [“3.1 Code Letters, Transmission Allocations, Ratios and Equipment”, page 12](#).

The transmission data is on the top of the transmission -arrow- on the type plate.





Example

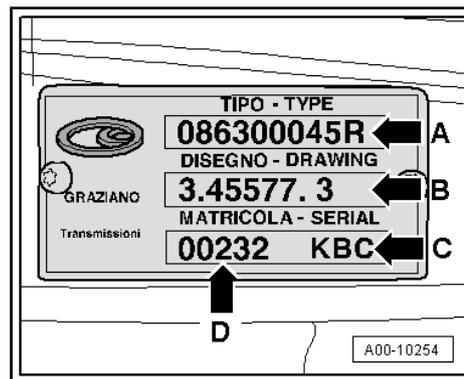
- ◆ -Arrow A-: "086300045R" = basic transmission part number
- ◆ -Arrow B-: "3.45577.3" = Transmission manufacturer production-based serial number
- ◆ -Arrow C-: "KBC" = transmission code
- ◆ -Arrow D-: "00232" = manufacturer serial number



Note

The transmission codes are also listed in the vehicle data label.

If the transmission code is not on the type plate, then allocate the transmission using the electronic parts catalog ETKA.



1.8 Front Final Drive Identification

Allocate using the transmission code, refer to the electronic parts catalog ETKA.

The transmission data is on the side of the front final drive.

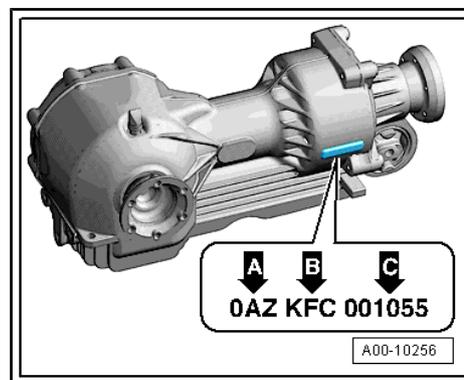
Example

- ◆ -Arrow A-: "0AZ" = transmission type identification
- ◆ -Arrow B-: "KFC" = transmission code
- ◆ -Arrow C-: "001055" = serial number



Note

The transmission code is also on the vehicle data labels.



1.9 Towing

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Risk of transmission damage.

- ◆ **When towing the vehicle, move the gearshift lever or selector lever into "N".**
- ◆ **The vehicle must not be towed more than 50 km and speed should not exceed 50 km/h.**
- ◆ **If the transmission no longer contains any oil because of a malfunction, the vehicle may only be transported on a special transporter or trailer.**



Note

If the battery is too weak or the starter does not work, the vehicle cannot be tow-started.

2 Description and Operation

⇒ [“2.1 Powertrain Overview”, page 11](#)

2.1 Powertrain Overview

1 - Transmission

- ❑ Refer to
⇒ [“5.1 Transmission, Removing”, page 104](#)
- ❑ Refer to
⇒ [“5.2 Transmission, Installing”, page 112](#)
- ❑ Refer to
⇒ [“6.1 Transmission”, page 170](#)

2 - Shift Actuator with R tronic or Shift Unit with Manual Transmission

- ❑ Refer to
⇒ [“5.12 Shift Actuator, R tronic”, page 123](#)
- ❑ Refer to
⇒ [“2.4 Shift Unit on Manual Transmission Overview”, page 67](#)

3 - Engine

4 - Driveshaft

- ❑ Refer to
⇒ [“5.16 Driveshaft”, page 238](#)

5 - Front Final Drive

- ❑ Refer to
⇒ [“5.12 Front Final Drive”, page 234](#)

6 - Transmission Control Module - J217- , with R tronic Transmissions Only

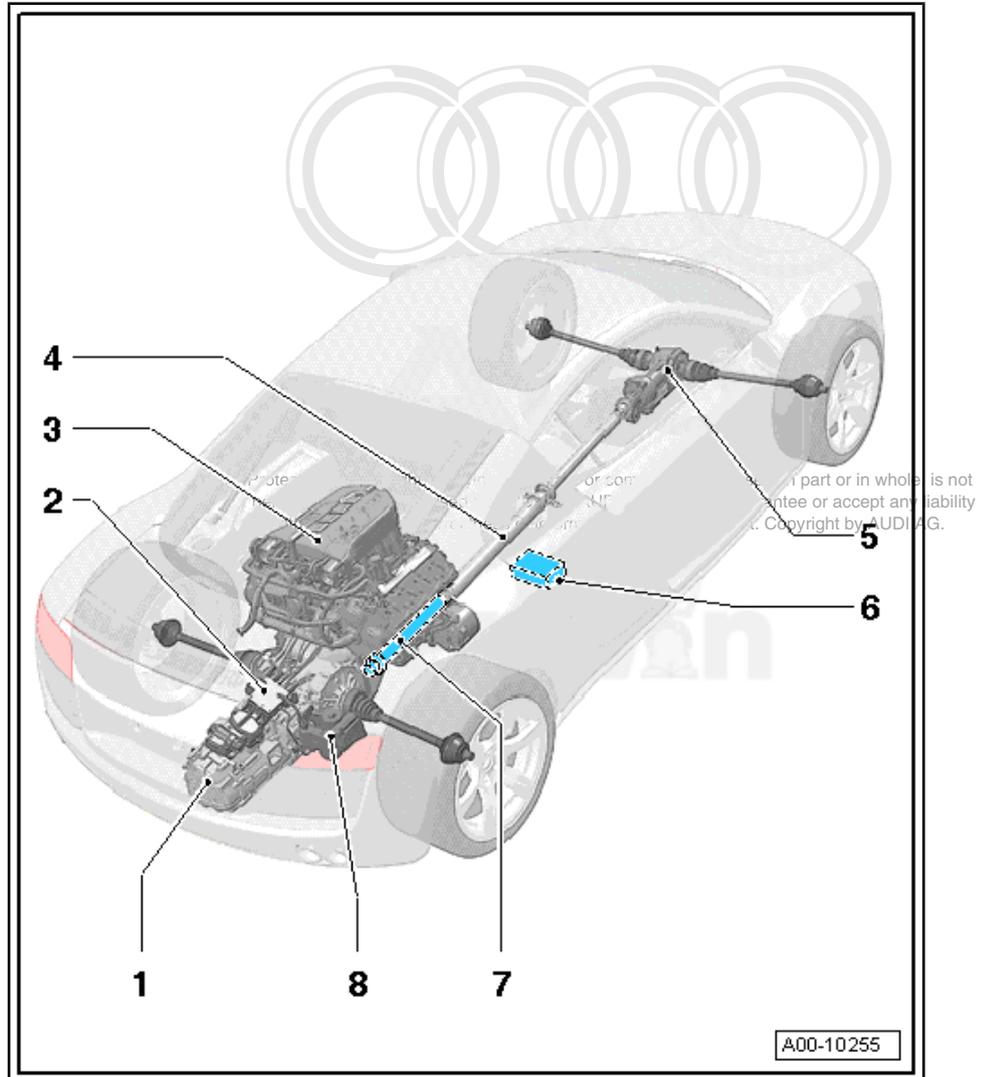
- ❑ Refer to
⇒ [“5.3 Transmission Control Module J217”, page 115](#)

7 - Driveshaft

- ❑ Refer to ⇒ [“5.7 Driveshaft Motor”, page 220](#)
- ❑ Runs through the engine oil pan so it is not visible from outside

8 - R tronic Hydraulic Unit

- ❑ Refer to ⇒ [“2.9 Hydraulic Unit Overview, R tronic”, page 75](#)
- ❑ Only with R tronic





3 Specifications

⇒ [“3.1 Code Letters, Transmission Allocations, Ratios and Equipment”, page 12](#)

⇒ [“3.2 Transmission Capacities”, page 12](#)

⇒ [“3.3 Front Final Drive Capacities”, page 13](#)

3.1 Code Letters, Transmission Allocations, Ratios and Equipment

6-Speed Manual Transmission

6-Speed Manual Transmission		086 AWD		
Transmission	Identification codes	KBA	KLA	KVJ
Allocation	Type	Audi R8 from MY 07	Audi R8 from MY 07	Audi R8 from MY 07
	Engine	8-cylinder FSI 4.2L 4V	10-cylinder FSI 5.2L 4V	10-cylinder FSI 5.2L 4V
The following information can be found in the electronic parts catalog ETKA.				
<ul style="list-style-type: none"> ◆ Axle and gear ratios ◆ Clutch allocation ◆ Front final drive allocation 				

Manual/Automatic Transmission (R tronic)

Manual/Automatic Transmission (R tronic)		086 AWD		
Transmission	Identification codes	KBC	KLB KVK LFS LJM MAZ	LFR MBB
Allocation	Type	Audi R8 from MY 07	Audi R8 from MY 07	Audi R8 from MY 07
	Engine	8-cylinder FSI 4.2L 4V	10-cylinder FSI 5.2L 4V	8-cylinder FSI 4.2L 4V
Note		Transmission without gold contact on the gear recognition sensors (-G604- , -G616-)		
Refer to the electronic parts catalog ETKA for the following information:				
<ul style="list-style-type: none"> ◆ Axle and gear ratios ◆ Clutch allocation ◆ Front final drive allocation 				

3.2 Transmission Capacities

Capacities for 6-Speed Manual Transmission and Manual/Automatic Transmission (R tronic) 086

Capacities	086 AWD
Initial filling Vehicles with transmission fluid cooling	4 liters (includes 0.5 liters for transmission fluid cooling)

Capacities	086 AWD
Vehicles without transmission fluid cooling (R8 GT)	3 liters
Change Vehicles with transmission fluid cooling	3.5 Liters (transmission oil cooler not emptied) 4 liters (transmission oil cooler emptied)
Vehicles without transmission fluid cooling (R8 GT)	3 liters
Change interval	Permanent fill, no change
Lubricant	Transmission fluid specification, refer to the electronic parts catalog ETKA

 **Note**

Only use the oil available as a replacement part in the transmission. Other oils can cause malfunctions or transmission failure.

- Gear Oil Level, Checking and Filling
⇒ "1.2 Transmission Fluid, Checking and Filling", page 52 .

Hydraulic Unit Capacities, for Manual/Automatic Transmission (R tronic) Only

Capacities	R tronic Hydraulic System
Initial filling	0.9 liters
Change	Approximately 0.9 liters
Change interval	Permanent fill, no change
Lubricant	Hydraulic oil, refer to the electronic parts catalog ETKA

 **Note**

Only use the oil available as a replacement part in the hydraulic system. Other oils can cause malfunctions or system failure.

- R tronic hydraulic unit, checking oil level and filling. Refer to "2.11 Oil Level in R tronic Hydraulic Unit, Adjusting", page 80 .

3.3 Front Final Drive Capacities

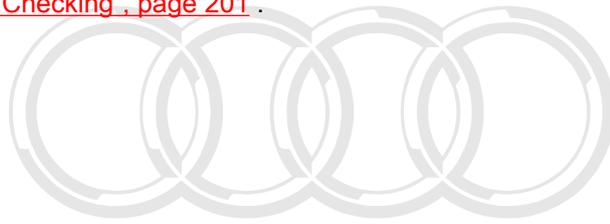
Capacities	Front Final Drive 0AZ
Initial filling	1.4 liters
Change	Approximately 1.3 liters
Change interval	Permanent fill, no change
Lubricant	Gear oil specification, refer to the electronic parts catalog ETKA

 **Note**

Only use the oil available as a replacement part in the front final drive. Other oils can cause malfunctions or front final drive failure.



- Check the axle oil level in the front final drive. Refer to [⇒ "1.1 Front Final Drive Oil Level, Checking", page 201](#).



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4 Removal and Installation

⇒ "4.1 Body Protectors, Installing", page 15

4.1 Body Protectors, Installing

Special tools and workshop equipment required

- ◆ Rear End Protector - VAS 6411-
- ◆ Side Panel Protector - VAS 6412- or
- ◆ Side Panel Protector - VAS 6428-

Procedure

- Wash and dry the affected body parts.

R8 Coupe:

- Place the -VAS 6412- over the left and right rear side panel.
- Place the -VAS 6411- over the side panel protector.



Note

The -VAS 6413- is not needed when working in the engine compartment.

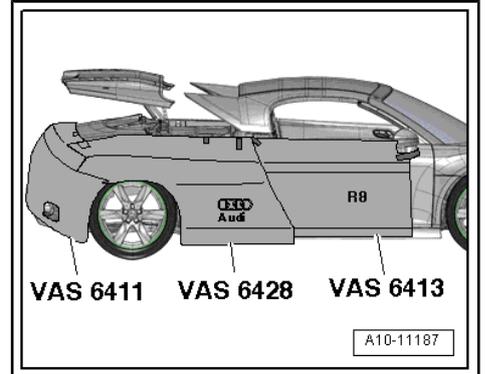
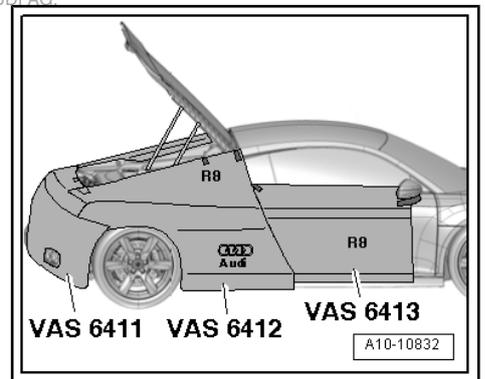
R8 Spyder:

- Place the -VAS 6428- over the left and right rear side panel.
- Place the -VAS 6411- over the side panel protector.



Note

The -VAS 6413- is not needed when working in the engine compartment.





5 Special Tools

Special tools and workshop equipment required

- ◆ Rear End Protector - VAS 6411-
- ◆ Side Panel Protector - VAS 6412- or
- ◆ Side Panel Protector - VAS 6428-



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30 – Clutch

1 General Information

⇒ [“1.1 Clutch System, Manual Transmission, Bleeding”, page 17](#)

⇒ [“1.2 Clutch System, R tronic, Bleeding”, page 18](#)

1.1 Clutch System, Manual Transmission, Bleeding



WARNING

- ◆ *Follow all Safety Precautions and Regulations with working with brake fluid. Refer to ⇒ Brake System; Rep. Gr. 47 ; General Information*
- ◆ *Brake fluid specification, refer to Fluid Capacity Tables Rep. Gr. 03*

Special tools and workshop equipment required

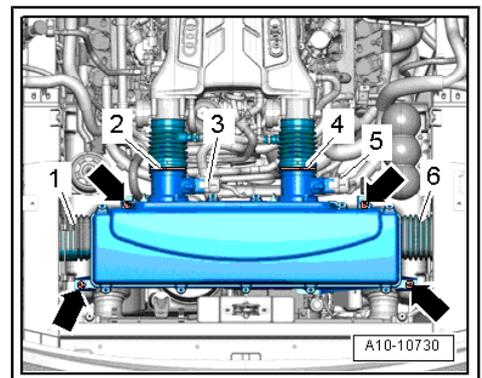
- ◆ Brake Charger/Bleeding Unit - VAS 5234-

Procedure



Note

- ◆ *Bleed the system after working on the hydraulic clutch mechanism.*
 - ◆ *Before bleeding, bring the clutch pedal back to the resting position and fill the brake fluid reservoir to the “MAX” mark with brake fluid.*
 - ◆ *Brake fluid must not come into contact with the transmission. Clean the transmission housing if necessary.*
- Remove the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .



- Remove the cowl panel trim. Refer to ⇒ Body Exterior; Rep. Gr. 50 ; Removal and Installation .



Caution

Danger of damaging the wind cowl.

- Connect the -VAS 5234- to the brake fluid reservoir.

- Cover the opening -arrow- in the transmission with a clean cloth.



Note

This is necessary to prevent brake fluid from entering the clutch housing.

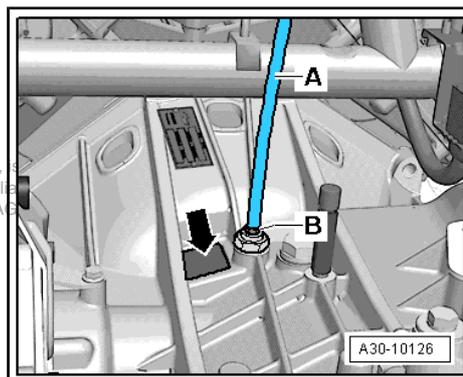
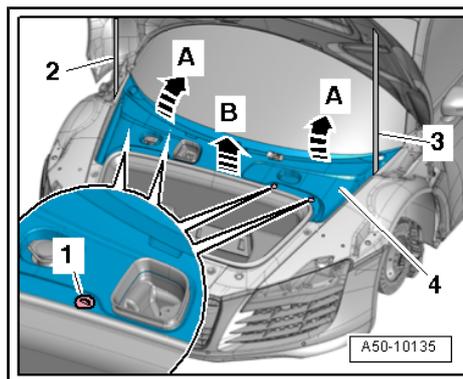
- Remove the cap from the vent screw -B- and connect the bleeder hose -A-.
- Turn on the bleeder unit, open the vent screw -B- and drain approximately 100 cm³ of brake fluid.
- Working pressure 2.5 bar



Note

Make sure the bleeder hose fits correctly.

- Close the vent screw -B-.
- Press the clutch pedal minimum 10 times.
- Open the vent screw -B- and drain approximately 50 cm³ of brake fluid.
- Close the vent screw -B- ⇒ [Item 15 \(page 27\)](#) .
- Remove the bleeder hose and install the cap.
- Remove the -VAS 5234- from the brake fluid reservoir.
- Install the cowl panel trim. Refer to ⇒ Body Exterior; Rep. Gr. 50 ; Removal and Installation .
- Install the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .



1.2 Clutch System, R tronic, Bleeding

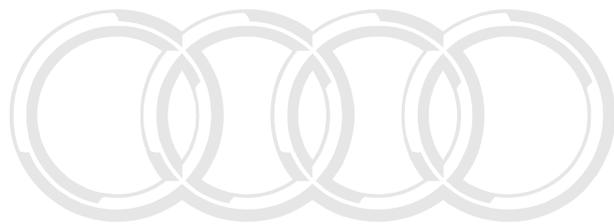
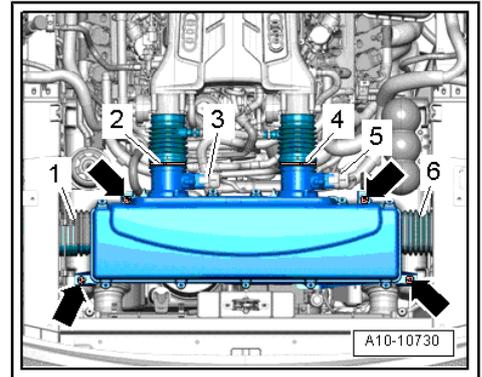
Special tools and workshop equipment required

- ◆ Vehicle tester
- ◆ Oil Collecting and Extracting Device - V.A.G 1782-
- ◆ Protective eyewear
- ◆ Bleeder hose (flexible, transparent hose)
- ◆ Hydraulic fluid: capacity, refer to ⇒ ["3.2 Transmission Capacities", page 12](#) , specification, refer to the electronic parts catalog ETKA.

Procedure

Note

- ◆ *The R tronic shift actuator with the R tronic hydraulic unit are self-bleeding. The clutch slave cylinder is not self-bleeding. If work was performed on the hydraulic system, always bleed the clutch slave cylinder.*
- ◆ *Hydraulic oil must not come into contact with the transmission. Clean the transmission housing if necessary.*
- Remove the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .



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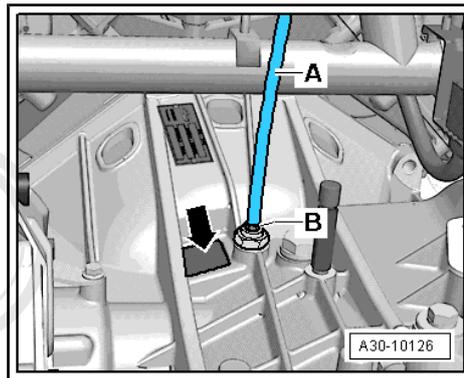


- Cover the opening -arrow- in the transmission with a clean cloth.

**Note**

This is necessary to prevent any hydraulic oil from entering the clutch housing.

- Remove the cap from the vent screw -B- and connect the bleeder hose -A-.
- Insert the end of the vent hose into the drip tray for the -V.A.G 1782- .

**Note**

Do not reuse hydraulic oil removed during bleeding.

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Bleeding Prerequisites

- The engine is off.
- vehicle diagnosis tester is connected.
- The ignition is switched on.
- The parking brake is engaged.
- Using the vehicle diagnosis tester under Guided Functions, go to the 02 - transmission electronics directory and select bleed clutch system.

**Note**

- ◆ *For bleeding, the clutch valve is activated in second cycles so the clutch is opened and closed regularly.*
- ◆ *Make sure the bleeder hose fits correctly.*
- Follow all the instructions given by the vehicle diagnosis tester exactly.

The clutch begins to “pump” and it is opened and closed continually.

- Open the vent screw -B-.
- Hydraulic oil containing bubbles flows out.

As soon as no more visible air bubbles come out:

- Close the vent screw -B-.
- Then let the clutch continue “pumping” for 1 minute, it is opened and closed regularly.

**Note**

If the vehicle diagnosis tester prematurely ends the “bleed clutch system” procedure, then select bleed clutch system again.

- Repeat the bleeding until no more air bubbles come out.
- Install the bleeder screw -B- ⇒ [Item 15 \(page 27\)](#) .
- Remove the bleeder hose -A- and install the vent screw cap.

- R tronic hydraulic unit, checking oil level and filling. Refer to [⇒ "2.11 Oil Level in R tronic Hydraulic Unit, Adjusting", page 80](#) .

Install in reverse order, paying attention to the following:

- Install the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .



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2 Description and Operation

⇒ ["2.1 Clutch Mechanism Overview", page 22](#)

⇒ ["2.2 Manual Transmission Hydraulics Overview", page 24](#)

⇒ ["2.3 Clutch Release Mechanism Overview, Manual Transmission", page 25](#)

⇒ ["2.4 Clutch Release Mechanism Overview, R tronic", page 26](#)

⇒ ["2.5 Clutch Overview", page 28](#)

2.1 Clutch Mechanism Overview



Note

Lubricate the various bearing and contact surfaces with grease - G 000 450 02-.

1 - Clip

- ❑ Remove the clip to remove the hose/line assembly

2 - Rubber Grommet

3 - Clutch Pedal Switch - F36-

- ❑ Refer to ⇒ ["5.4 Clutch Pedal Switch", page 38](#)
- ❑ Can be checked in [Guided Fault Finding](#) ⇒ Vehicle diagnostic tester

4 - Clutch Master Cylinder

- ❑ Refer to ⇒ ["5.5 Clutch Master Cylinder", page 38](#)

5 - Pedal Bracket

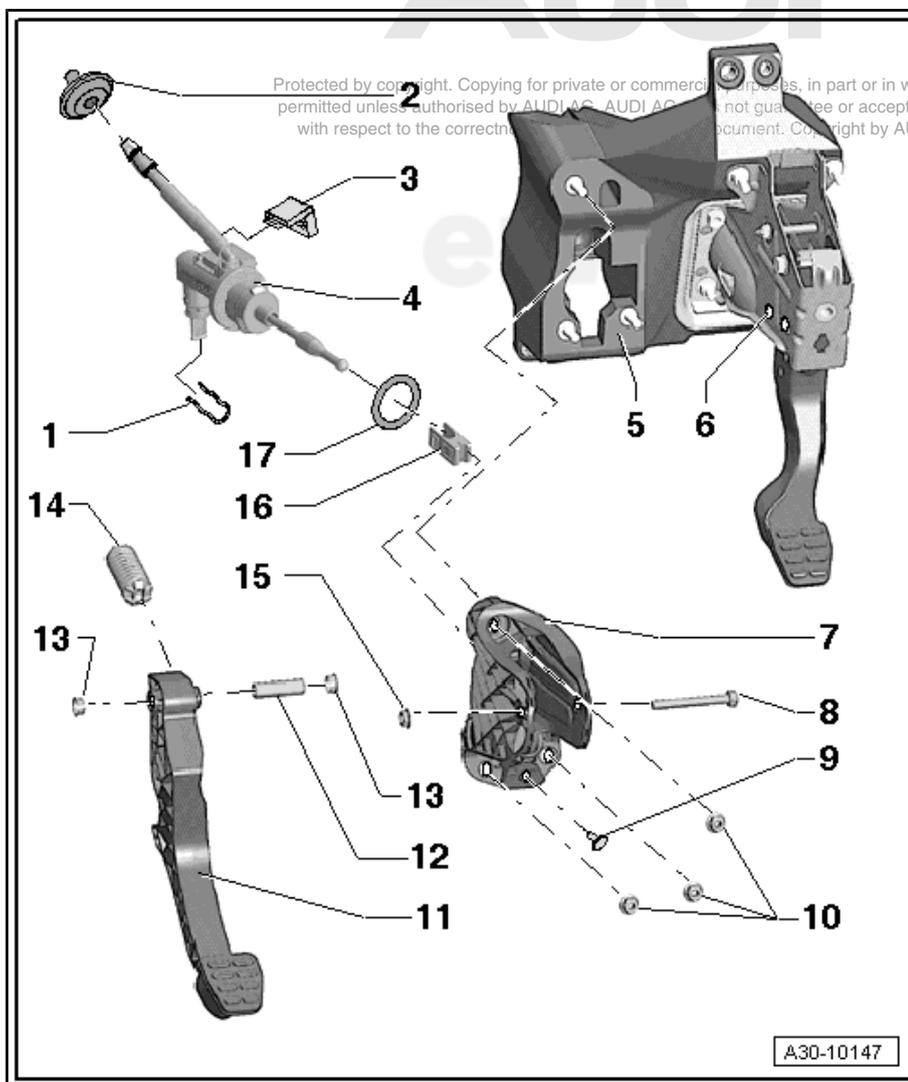
- ❑ Removing and installing, refer to ⇒ Brake System; Rep. Gr. 46 ; Removal and Installation

6 - Brake Pedal Mounting Bracket

- ❑ Removing and installing, refer to ⇒ Brake System; Rep. Gr. 46 ; Removal and Installation

7 - Clutch Pedal Mounting Bracket

- ❑ Refer to ⇒ ["5.3 Clutch Pedal Bracket and Clutch Master Cylinder", page 35](#)



8 - Bolt

9 - Stop

- For the clutch pedal

10 - Nut

- Always replace
- 20 Nm
- Self-locking
- Quantity: 3
- For the mounting bracket to pedal bracket

11 - Clutch Pedal

- Refer to ⇒ [“5.2 Clutch Pedal”, page 33](#)

12 - Mounting Pin

13 - Bushings

14 - Over-Center Spring

- Refer to ⇒ [“5.1 Over-Center Spring”, page 32](#)
- Pay attention to the installed position ⇒ [page 33](#)

15 - Nut

- Always replace
- 22 Nm
- Self-locking

16 - Mounting Clip

- For the clutch master cylinder actuator rod

17 - Seal

- Between the clutch master cylinder and the bracket



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2.2 Manual Transmission Hydraulics Overview

1 - Bracket with Clutch Pedal and Clutch Master Cylinder

- Refer to
⇒ [“2.1 Clutch Mechanism Overview”, page 22](#)
- Refer to
⇒ [“5.3 Clutch Pedal Bracket and Clutch Master Cylinder”, page 35](#)

2 - O-ring

- Always replace
- Install on the line connection
- Install with brake fluid
- Allocation, refer to the electronic parts catalog ETKA

3 - Hose/Line Assembly

- To the clutch master cylinder

4 - O-ring

- Always replace
- Install on the line connection
- Install with brake fluid
- Allocation electronic parts catalog ETKA

5 - Grommet

- For hose/line assembly

6 - Transmission

- Refer to
⇒ [“5.1 Transmission, Removing”, page 104](#)
- Refer to ⇒ [“5.2 Transmission, Installing”, page 112](#)

7 - Hose/Line Assembly

- To the slave cylinder

8 - Clip

9 - Banjo Bolt

- 25 Nm

10 - Seals

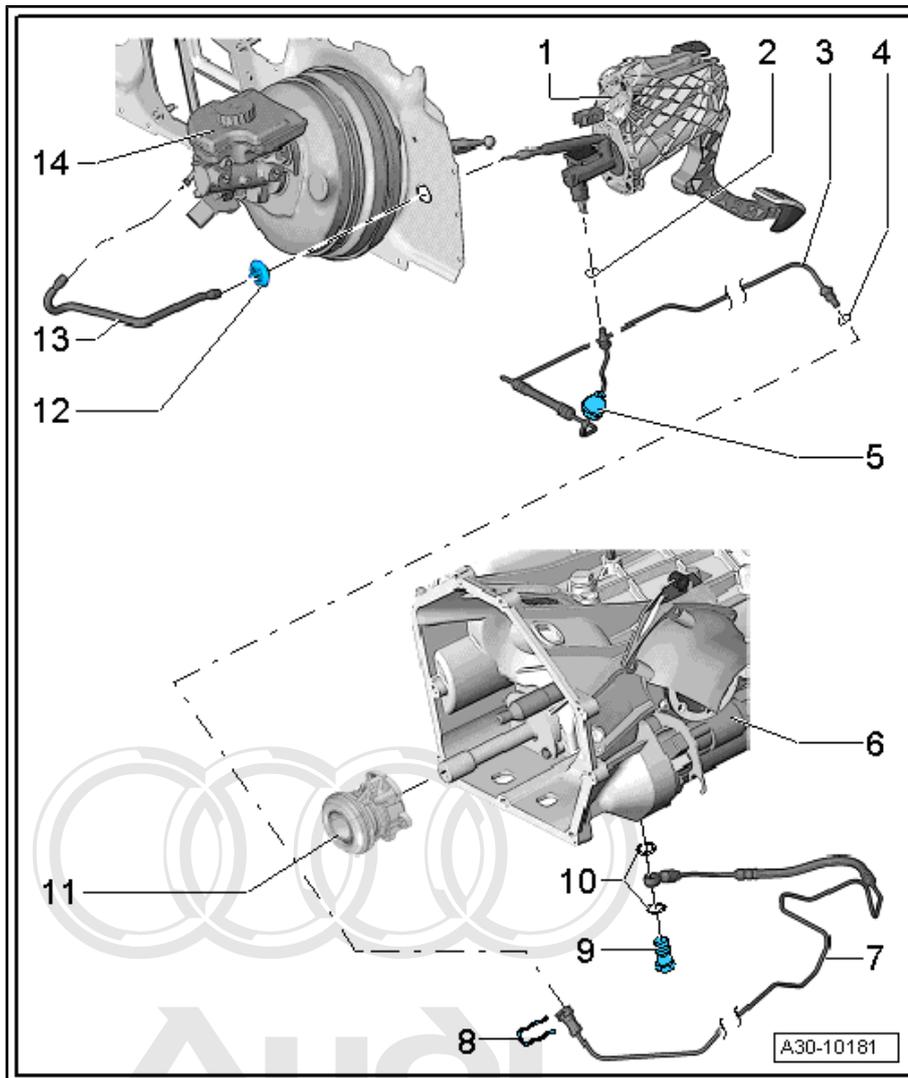
- Always replace

11 - Clutch Slave Cylinder with Release Bearing

- For manual transmission ⇒ [Item 2 \(page 25\)](#)
- For transmission with R tronic ⇒ [Item 2 \(page 26\)](#)

12 - Grommet

- For the return hose



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13 - Supply Hose

14 - Brake Fluid Reservoir

2.3 Clutch Release Mechanism Overview, Manual Transmission

1 - Bolt

- Tighten in 2 steps:
 1. Insert the bolts and tighten by hand.
 2. Tighten the bolts to 10 Nm.

2 - Clutch Slave Cylinder with Release Bearing

- For manual transmission
- Allocation, refer to the electronic parts catalog ETKA
- Refer to [⇒ "5.6 Clutch Slave Cylinder with Release Bearing, Manual Transmission", page 40](#)

3 - O-ring

- Replace
- Coat with transmission fluid

4 - O-ring

- Replace
- Install dry
- Manual transmission version
- Allocation, refer to the electronic parts catalog ETKA

5 - Protective Cap

6 - Vent Bolt

- 20 Nm

7 - Socket Bolt

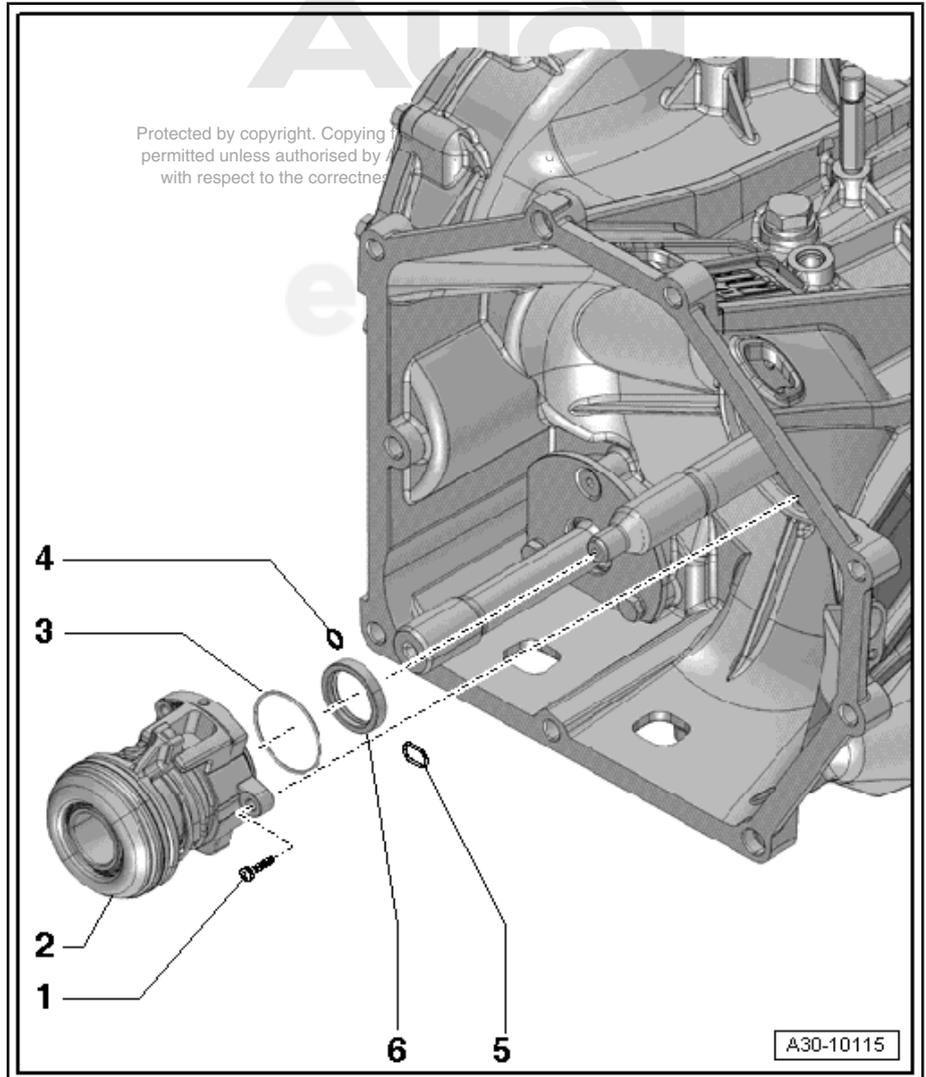
- 30 Nm

8 - O-ring

- Replace
- Coat with brake fluid
- Manual transmission version
- Allocation, refer to the electronic parts catalog ETKA

9 - O-ring

- Replace
- Install dry
- Manual transmission version
- Allocation, refer to the electronic parts catalog ETKA



10 - Shaft Seal

- For the input shaft
- Refer to ⇒ [“5.9 Input Shaft Seal, Manual Transmission”, page 45](#)
- Fill half of volume between sealing lip and dust lip with sealing grease - G 052 128 A1-

2.4 Clutch Release Mechanism Overview, R tronic

1 - Bolt

- Tighten in 2 steps:
 1. Insert the bolts and tighten by hand.
 2. Tighten the bolts to 10 Nm.

2 - Clutch Slave Cylinder with Release Bearing

- For transmission with R tronic
- Make sure the magnets -arrow- fit securely.
- Allocation, refer to the electronic parts catalog ETKA
- Refer to ⇒ [“5.7 Clutch Slave Cylinder with Release Bearing, R tronic”, page 42](#)

3 - Shaft Seal

- For the input shaft
- Refer to ⇒ [“5.10 Input Shaft Seal, R tronic”, page 46](#)
- Fill half of volume between sealing lip and dust lip with sealing grease - G 052 128 A1-

4 - O-ring

- Replace
- Install dry
- For transmission with R tronic
- Allocation, refer to the electronic parts catalog ETKA

5 - Bolt

- 6 Nm

6 - Clutch Position Sensor - G476-

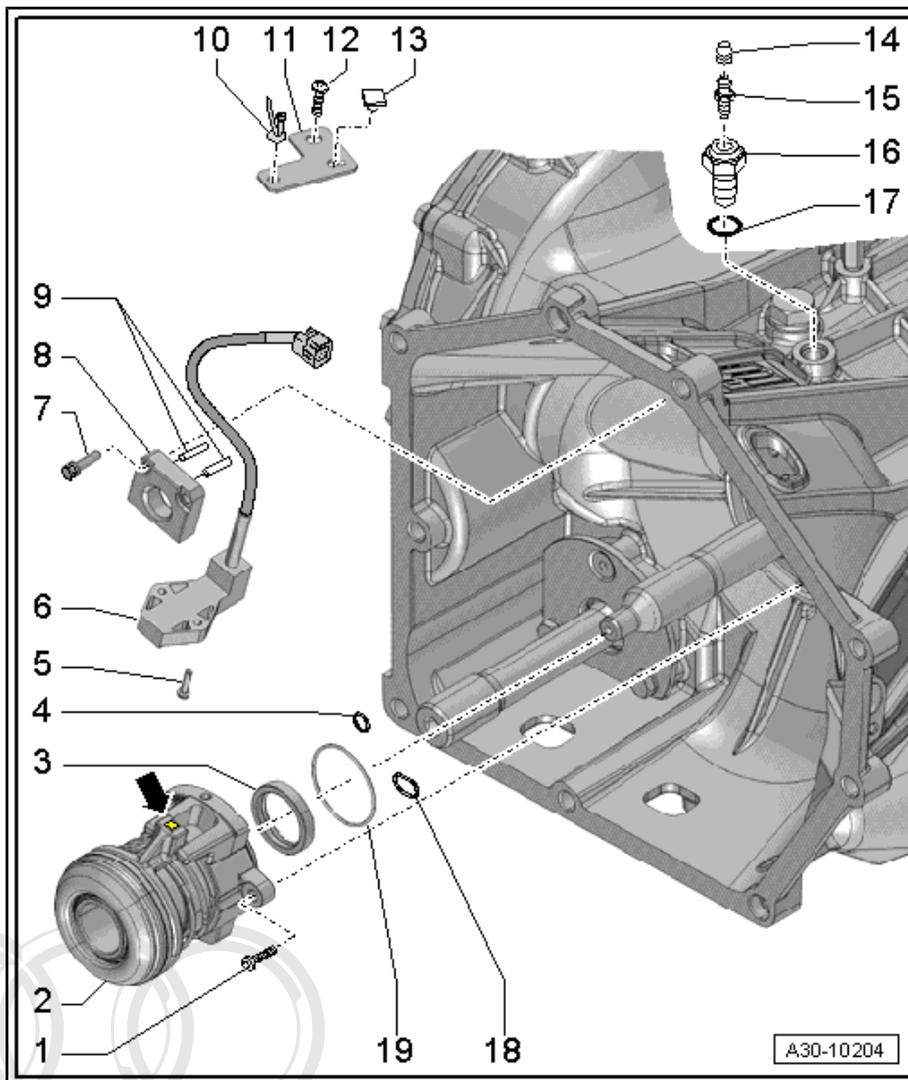
- Refer to ⇒ [“5.8 Clutch Position Sensor, R tronic”, page 44](#)

7 - Bolt

- 6 Nm

8 - Bracket

- For the clutch position sensor



9 - Centering Pin

- Quantity: 2
- Carefully install into the holes in the transmission

10 - Clip

- For the electrical wire

11 - Bracket

12 - Bolt

- 18 Nm

13 - Clip

- For the electrical connector

14 - Protective Cap

15 - Vent Bolt

- 20 Nm

16 - Socket Bolt

- 30 Nm

17 - O-ring

- Replace
- Coat with hydraulic oil
- For transmission with R tronic
- Allocation, refer to the electronic parts catalog ETKA

18 - O-ring

- Replace
- Install dry
- For transmission with R tronic
- Allocation, refer to the electronic parts catalog ETKA

19 - O-ring

- Replace
- Coat with transmission fluid



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2.5 Clutch Overview



Note

It is necessary to remove the transmission in order to be able to work on the clutch, refer to ⇒ [“5.1 Transmission, Removing”, page 104](#) .

1 - Ring Gear

2 - Bolt

- Always replace

8 Nm plus an additional 180° turn



Note

If hex socket bolts with washers are installed, always replace them with hex socket bolts without washers.

- Tighten in a diagonal pattern in small stages

3 - Pressure Plate with Clutch Plates

- The pressure plate with clutch plates are a unit and cannot be separated.

- Installed position: visible friction lining toward the flywheel

- Centering ⇒ [page 48](#)

- Refer to ⇒ [“5.11 Pressure Plate with Clutch Plates”, page 47](#)

- R tronic: Perform “clutch basic setting - R tronic” after removing the clutch. Refer to ⇒ [“4.1 Clutch Basic Setting, R tronic”, page 31](#) .

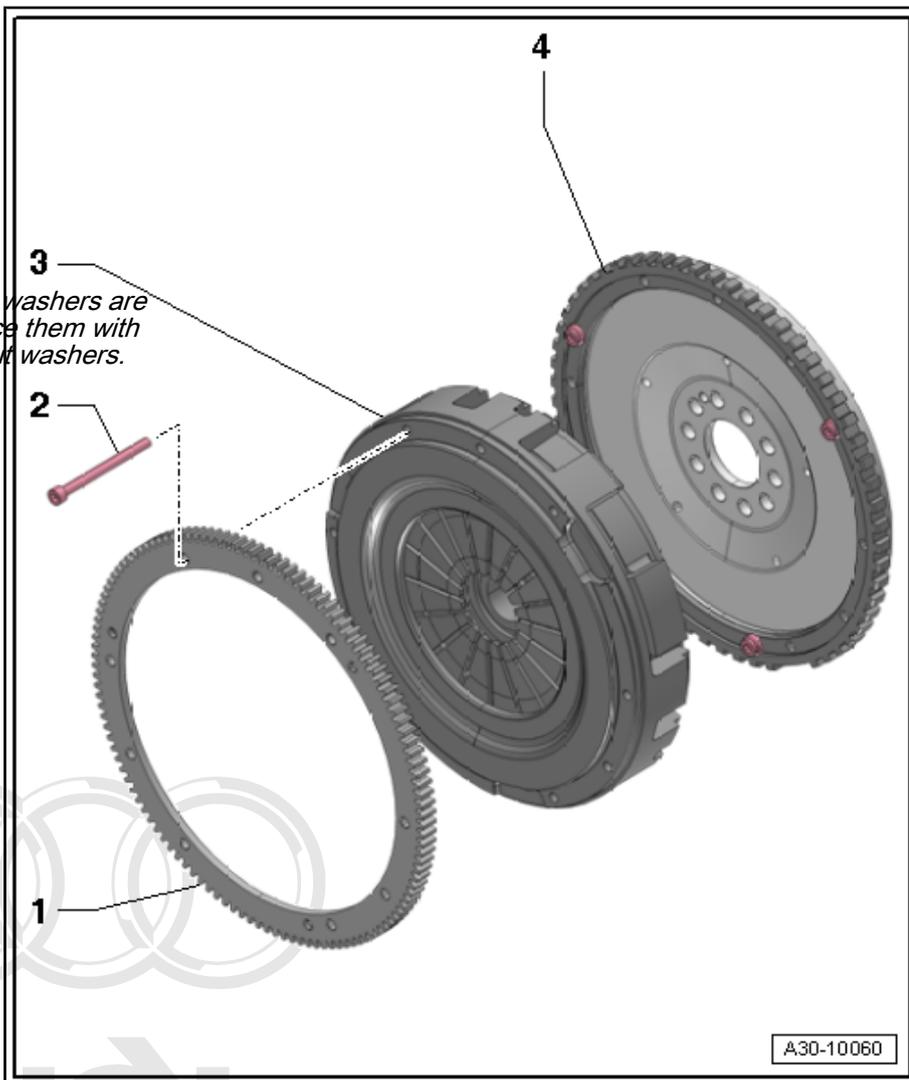
- Check the ends of the diaphragm spring, refer to ⇒ [Fig. “Check the Ends of the Diaphragm Spring” , page 29](#)

- Checking the spring connection and rivet connections, refer to ⇒ [Fig. “Checking the Spring Connections and Rivet Connections” , page 29](#)

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4 - Flywheel

- Make sure it fits securely on the centering pins
- Keep the clutch lining contact surface free of grooves, oil and grease.
- Removing and installing, refer to ⇒ Engine Mechanical; Rep. Gr. 13 ; Removal and Installation

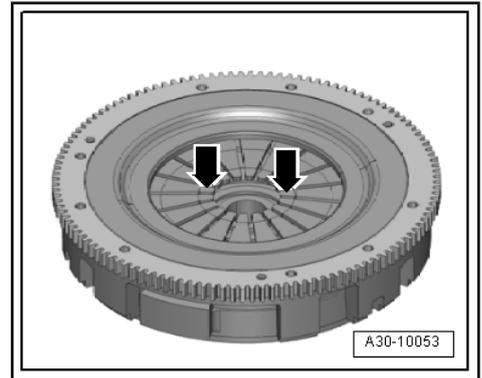


Check the Ends of the Diaphragm Spring

- Wear up to half the thickness of the diaphragm spring -arrows- is permitted.

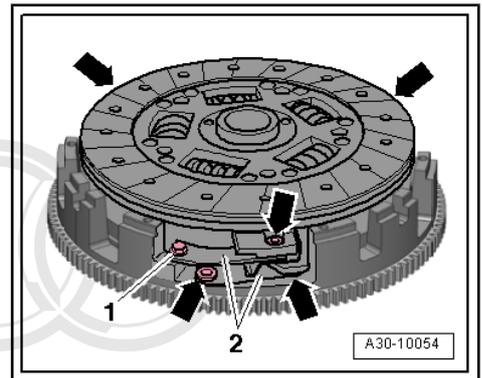
i Note

When repairing, always allocate the clutch pressure plate and clutch plate using the engine code. Refer to the electronic parts catalog ETKA.



Checking the Spring Connections and Rivet Connections

- Check the spring connections -2- for damage and the riveted connections -arrows- for secure seating.
- Make sure the threaded connection -1- fits securely.
- Replace a pressure plate with severely kinked or broken spring connections and loose rivet connections.



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3 Specifications

⇒ ["3.1 Fastener Tightening Specifications", page 30](#)

3.1 Fastener Tightening Specifications

Components	Bolt Size	Nm
Bracket Bolt	-	18
Bracket for the Clutch Position Sensor - G476-	-	6
Clutch Pedal Mounting Bracket Nut ^{1, 2}		
	-	20
	-	22
Clutch Position Sensor	-	6
Clutch Slave Cylinder with Release Bearing	-	10
Hose/Line Assembly to the Slave Cylinder, Banjo Bolt	-	25
Socket Bolt	-	30
Ring Gear ²	-	8 + 180°
Vent Bolt	-	20
<ul style="list-style-type: none"> • ¹ For bolt tightening clarification, refer to ⇒ "2.1 Clutch Mechanism Overview", page 22 and see items -10 and 15- • ² Always replace 		

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4 Diagnosis and Testing

⇒ **“4.1 Clutch Basic Setting, R tronic”, page 31**

4.1 Clutch Basic Setting, R tronic

Special tools and workshop equipment required

- ◆ Vehicle Tester

Perform the clutch basic setting with the following procedures;

- ◆ when used for the first time
- ◆ if the transmission was separated from the engine
- ◆ if the clutch was removed
- ◆ if the control module was replaced
- ◆ if the clutch position sensor - G476- was removed
- ◆ if there are concerns about shift quality
- ◆ if there are concerns about starting driving

Test Conditions

- Vehicle diagnosis tester is connected.
- Perform a road test. A second technician is needed.
- Using the vehicle diagnosis tester under Guided Functions, go to the 02 - transmission electronics directory and select clutch basic setting.
- Follow all the instructions given by the vehicle diagnosis tester exactly so that the basic setting can be completed.



Note

- ◆ *The clutch will be adapted when the vehicle diagnosis tester performs the basic setting. The current clutch slip point and the clutch wear are determined and saved.*
- ◆ *Generally, the clutch adaptation is performed during daily driving according to clutch wear. However, this adaptation can only be reached under certain driving conditions so the clutch basic setting must be performed with the repairs listed above. This ensures the driving and shift quality are adjusted optimally.*

5 Removal and Installation

⇒ ["5.1 Over-Center Spring", page 32](#)

⇒ ["5.2 Clutch Pedal", page 33](#)

⇒ ["5.3 Clutch Pedal Bracket and Clutch Master Cylinder", page 35](#)

⇒ ["5.4 Clutch Pedal Switch", page 38](#)

⇒ ["5.5 Clutch Master Cylinder", page 38](#)

⇒ ["5.6 Clutch Slave Cylinder with Release Bearing, Manual Transmission", page 40](#)

⇒ ["5.7 Clutch Slave Cylinder with Release Bearing, R tronic", page 42](#)

⇒ ["5.8 Clutch Position Sensor, R tronic", page 44](#)

⇒ ["5.9 Input Shaft Seal, Manual Transmission", page 45](#)

⇒ ["5.10 Input Shaft Seal, R tronic", page 46](#)

⇒ ["5.11 Pressure Plate with Clutch Plates", page 47](#)

5.1 Over-Center Spring

Special tools and workshop equipment required

- ◆ Assembly Tool - T10178-
- ◆ Grease - G 000 450 02-

Removing

- Clutch pedal bracket installed inside the vehicle
- Move the driver seat all the way back.
- Remove the instrument panel cover on the driver side. Refer to ⇒ [Body Interior Rep. Gr. 68 - Removal and Installation](#)
- Remove the nut -2- and the bolt -5- and then remove the clutch pedal -1- from the bracket -3-.

Note

The clutch pedal remains engaged in the clutch master cylinder actuator rod.

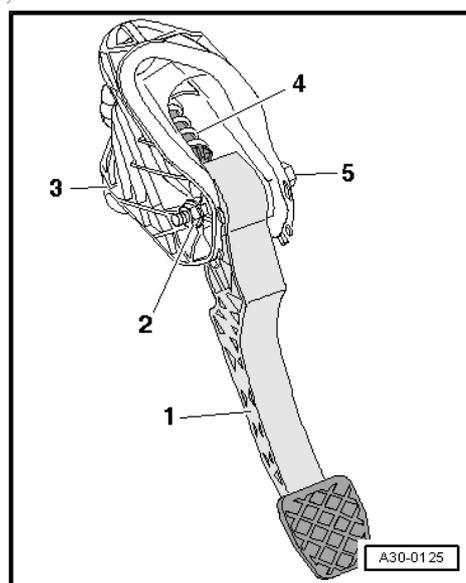
- Move the clutch pedal downward and remove the over-center spring -4-.

Installing the Over-Center Spring

Installation is performed in the reverse order of removal while observing the following:

Note

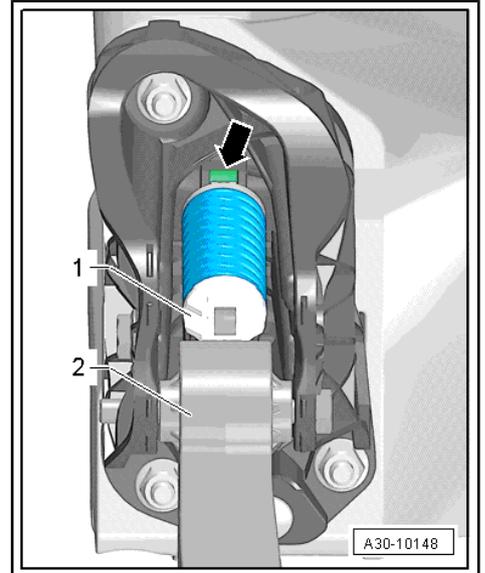
- ◆ *Note the over-center spring installation location ⇒ [page 33](#).*
- ◆ *Lubricate the various bearing and contact surfaces with grease - G 000 450 02-.*
- ◆ *Replace the self-locking nuts.*



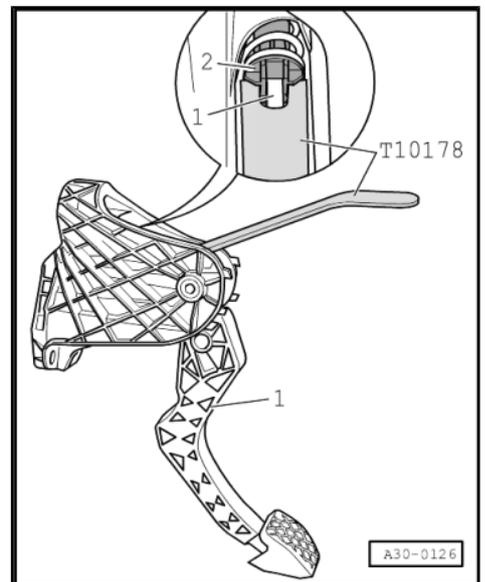
- Install the over-center spring -1- in the bracket from above over the clutch pedal -2-.

Over-Center Spring Installation Location:

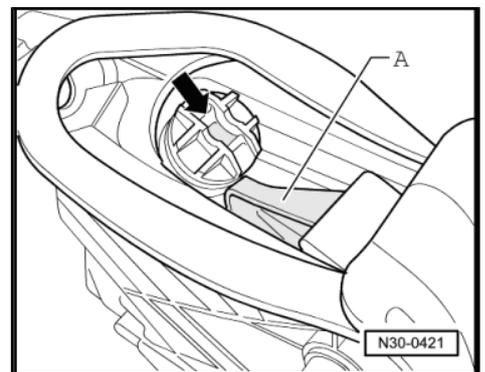
- Insert the over-center spring in the upper mounting point -arrow-.



- Hold the end of the over-center spring -2- in its installed position using the -T10178- .



- The over-center spring mounting cup -arrow- must be vertical.
- Insert the clutch pedal pressure pins -A- in over-center spring mounting cup -arrow-.
- Press the clutch pedal slightly, push the bolt through and tighten the self-locking nut. Tightening specification => [Item 15 \(page 23\)](#)



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The clutch pedal can be pushed against the spring force easier when carefully pulling back on the bottom of the clutch pedal, pivoting the top to the installed position.

- Install the instrument panel cover on the driver side. Refer to => Body Interior; Rep. Gr. 68 ; Removal and Installation .

5.2 Clutch Pedal

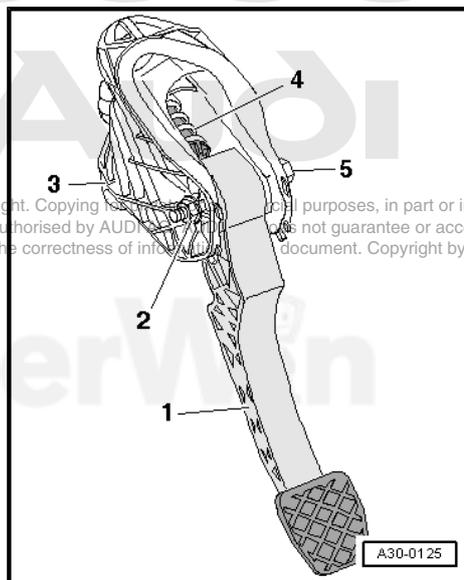
Special tools and workshop equipment required

- ◆ Pliers - T10005-

- ◆ Assembly Tool - T10178-
- ◆ Grease - G 000 450 02-

Removing

- Clutch pedal bracket installed inside the vehicle
- Move the driver seat all the way back.
- Remove the instrument panel cover on the driver side. Refer to ⇒ Body Interior; Rep. Gr. 68 ; Removal and Installation .
- Remove the nut -2- and the bolt -5- and then remove the clutch pedal -1- from the bracket -3-.



- Release actuator rod mounting clip in clutch pedal with - T10005- .
- Remove the clutch pedal and over-center spring.

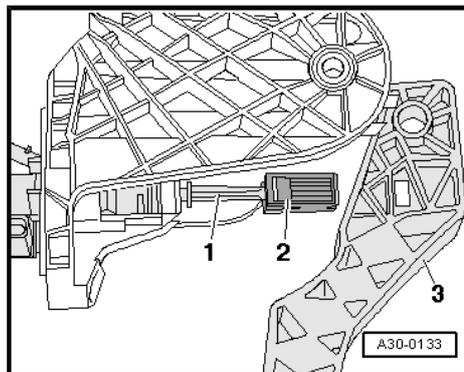
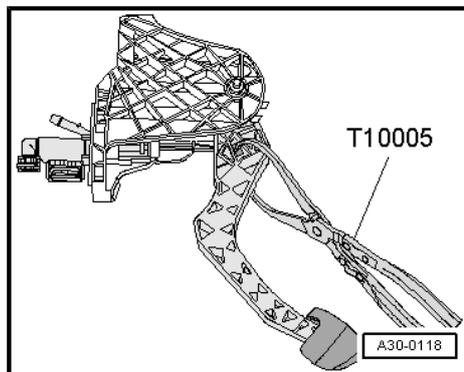
Installing

Installation is performed in the reverse order of removal while observing the following:

Note

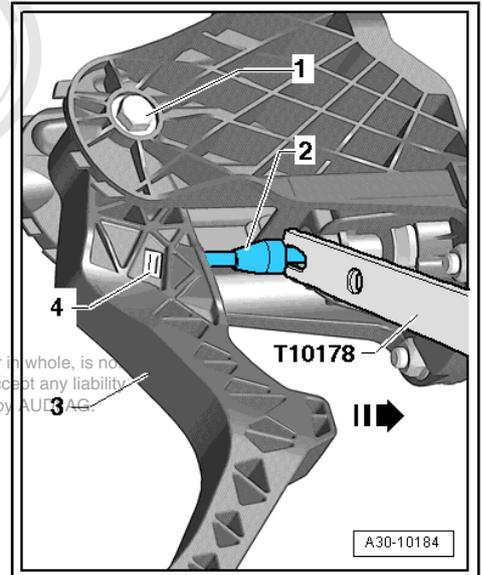
- ◆ *Lubricate the various bearing and contact surfaces with grease - G 000 450 02- .*
- ◆ *Replace the self-locking nuts.*

- Install the clip -2- on the clutch master cylinder actuator rod -1-.

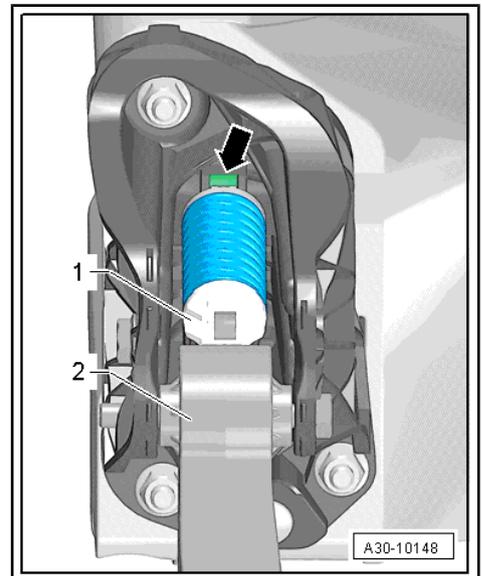


- Secure the clutch pedal -3- in the mounting bracket temporarily with the bolt -1-.
- Block the clutch master cylinder actuator rod -2- using - T10178- .
- Press the clutch pedal -3- until the mounting clip -4- clicks into place.
- Remove the bolt -1- again.

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- Install the over-center spring -1 - => [page 32](#) .
- Install the instrument panel cover on the driver side. Refer to => Body Interior; Rep. Gr. 68 ; Removal and Installation .



5.3 Clutch Pedal Bracket and Clutch Master Cylinder

Special tools and workshop equipment required

- ◆ Hose Clamps Up to 25 mm Dia. - 3094-
- ◆ Locking Tool - T10265-

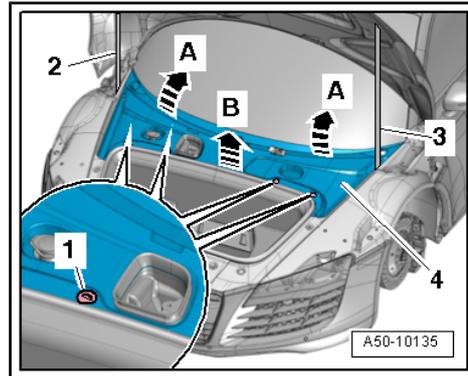
Removing



Note

- ◆ *During the following procedures, make sure no brake fluid enters the plenum chamber or footwell. If it does, clean the area thoroughly.*
- ◆ *Use cloths to protect the components from brake fluid.*

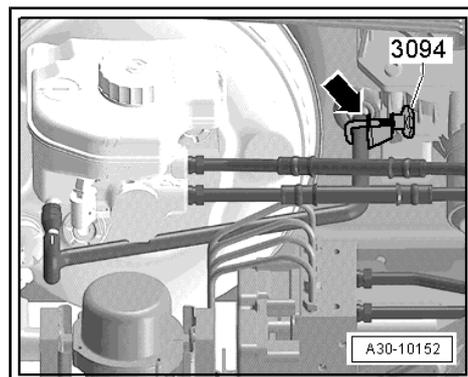
- Remove the cowl panel trim. Refer to => Body Exterior; Rep. Gr. 50 ; Removal and Installation .



- Clamp the supply hose to the clutch master cylinder using -3094- .

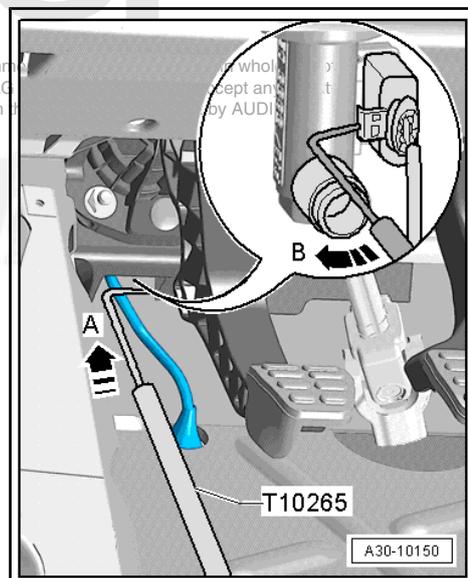
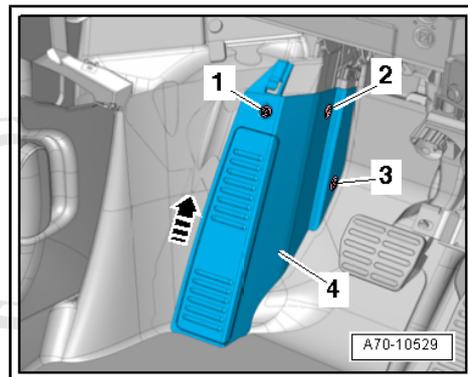
 **Note**

The supply hose may have a slight deformation caused by the -3094- .



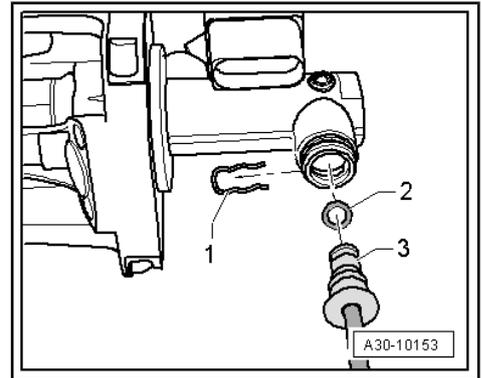
- Remove the supply hose from the clutch master cylinder -arrow-.

- Move the driver seat all the way back and raise the steering wheel to the highest position.
- Remove the instrument panel cover on the driver side. Refer to => Body Interior; Rep. Gr. 68 ; Removal and Installation .
- Remove the bolts -1, 2 and 3-.
- Slide the footrest cover -4- -arrow- until the tab disengages from the footrest bracket opening.
- Remove the footrest cover.
- Fold the floor covering under the clutch pedal to the side and secure it there.
- Disconnect the connector from the clutch pedal switch - F36- using -T10265- as follows:
- Guide the -T10265- in direction of -arrow A- under the clutch master cylinder as illustrated.
- Insert the angled end on the -T10265- into the locking tab.
- Turn the -T10265- in direction of -arrow B-. This releases the connector so it can be removed.



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- Release the clip -1- with a screwdriver and remove the hose/line assembly -3- at the master cylinder.



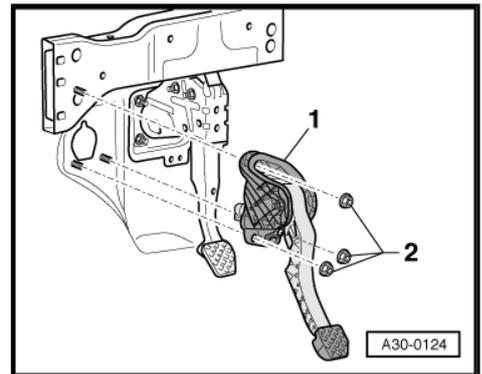
- Remove the nuts -2-.
- Remove the bracket -1-.

Installing

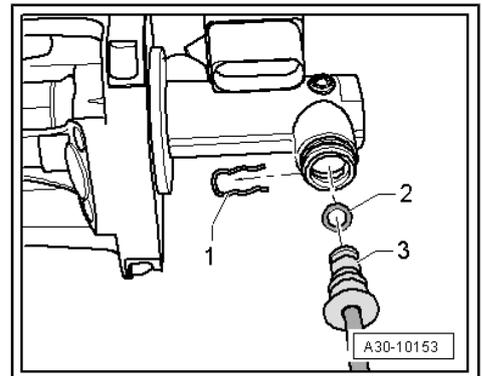
Installation is performed in the reverse order of removal while observing the following:

Note

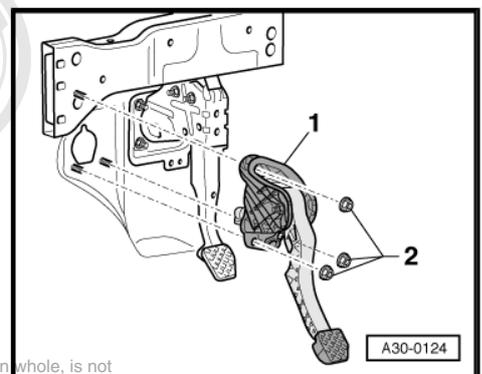
- ◆ *Replace the self-locking nuts.*
- ◆ *Replace the O-rings.*



- Insert the clip -1- into the clutch master cylinder.
- Replace the O-ring -2-. Coat the new O-ring with brake fluid and install it on the hose/line assembly connection -3-.



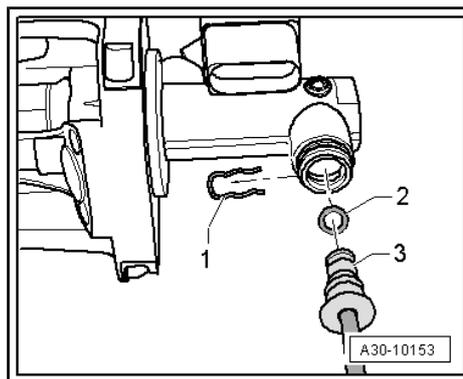
- Insert the bracket -1- and tighten the nuts -2-. Tightening specification; refer to [Item 10 \(page 23\)](#).



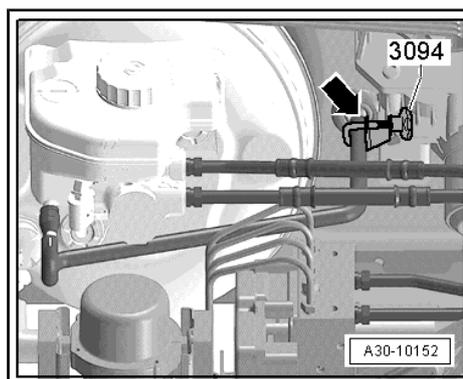
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erWin

- Press the hose/line assembly -3- onto the master cylinder connection until the clip -1- clicks into place.
- Pull on the hose/line assembly to make sure it is secure.
- Connect the connector to the clutch pedal switch.



- Push the supply hose all the way onto the clutch master cylinder supply connection -arrow-. Make sure the rubber grommet fits correctly.
- Remove the -3094- .
- Bend the supply hose onto the clamp by hand.



Note

The supply hose may have a slight deformation caused by the -3094- .

- Bleed the clutch system. Refer to => ["1.1 Clutch System, Manual Transmission, Bleeding", page 17](#) .
- Install the floor covering and foot rest cover on the driver side. Refer to => Body Interior; Rep. Gr. 70 ; Removal and Installation .
- Install the instrument panel cover on the driver side. Refer to => Body Interior; Rep. Gr. 68 ; Removal and Installation .
- Install the cowl panel trim. Refer to => Body Exterior; Rep. Gr. 50 ; Removal and Installation .

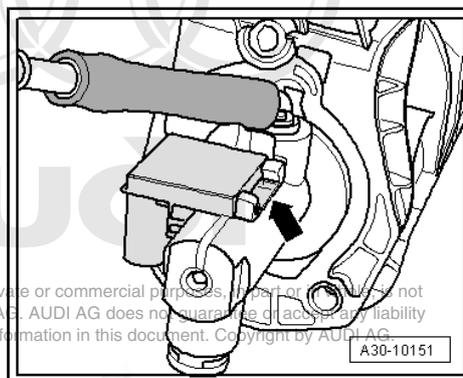
5.4 Clutch Pedal Switch

Removing

- Remove the mounting bracket. Refer to => ["5.3 Clutch Pedal Bracket and Clutch Master Cylinder", page 35](#) .
- Remove the clutch pedal switch - F36- -arrow- from the clutch master cylinder.

Installing

Install in reverse order of removal.



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5.5 Clutch Master Cylinder

It is necessary to remove the bracket first in order to remove the clutch master cylinder. Refer to

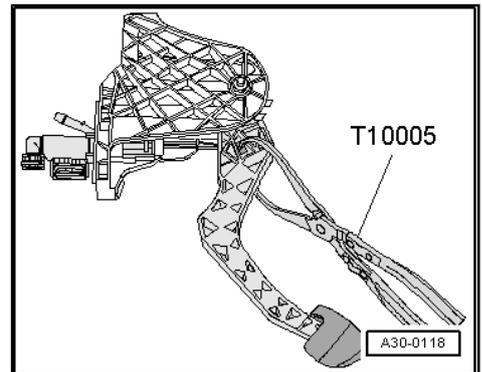
⇒ [“5.3 Clutch Pedal Bracket and Clutch Master Cylinder”, page 35](#) .

Special tools and workshop equipment required

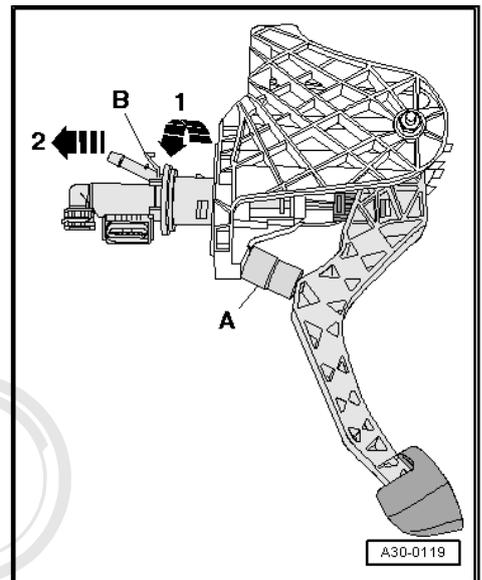
- ◆ Pliers - T10005-
- ◆ Assembly Tool - T10178-
- ◆ Grease - G 000 450 02-

Removing

- Remove the mounting bracket. Refer to [“5.3 Clutch Pedal Bracket and Clutch Master Cylinder”, page 35](#) .
- Release actuator rod mounting clip in clutch pedal with - T10005- .



- Place a spacer -A- between the clutch pedal and the stop and then push the clutch pedal forward.
- Spacer length = approximately 30 mm (for example $\frac{3}{8}$ socket insert)
- Release the master cylinder in the direction of -arrow 1-.
- Remove the master cylinder from the bracket -arrow 2-.

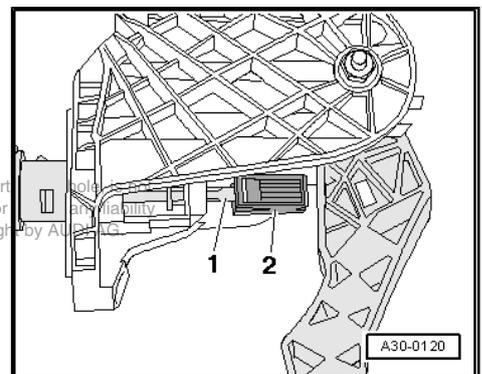


 **Note**

Ignore -B-.

Installing

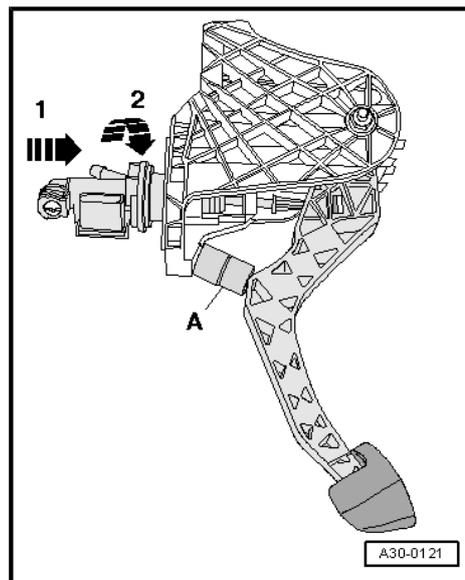
- Install the clip -2- on the clutch master cylinder actuator rod -1-.



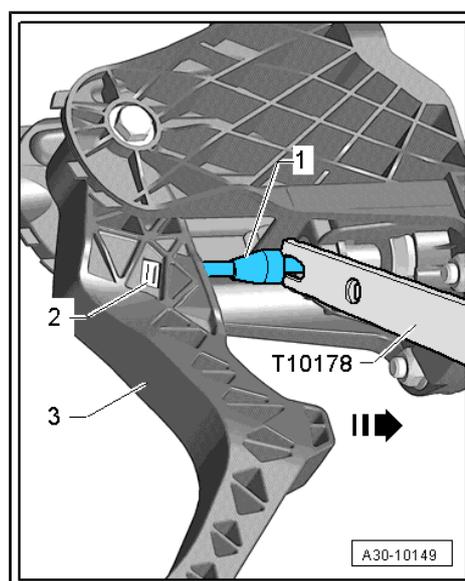
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- Place a spacer -A- between the clutch pedal and the stop and then push the clutch pedal forward.
- ◆ Spacer length = approximately 30 mm (for example $\frac{3}{8}$ socket insert)
- Install the clutch master cylinder on the bracket -arrow 1- and -arrow 2-.



- Block the clutch master cylinder actuator rod -1- using -T10178- .
- Press the clutch pedal -3- until the mounting clip -2- clicks into place.
- Make sure the over-center spring fits correctly ⇒ [page 32](#) .
- Install the bracket. Refer to ⇒ [“5.3 Clutch Pedal Bracket and Clutch Master Cylinder”, page 35](#) .



5.6 Clutch Slave Cylinder with Release Bearing, Manual Transmission



Note

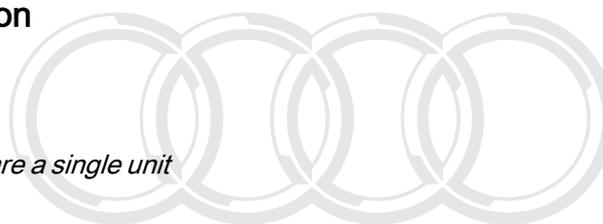
The clutch slave cylinder and the release bearing are a single unit and are replaced together.

Special tools and workshop equipment required

- ◆ Thin Insulating Band

Removing

- Transmission removed.



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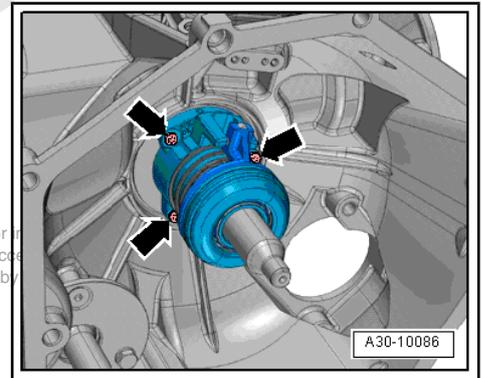
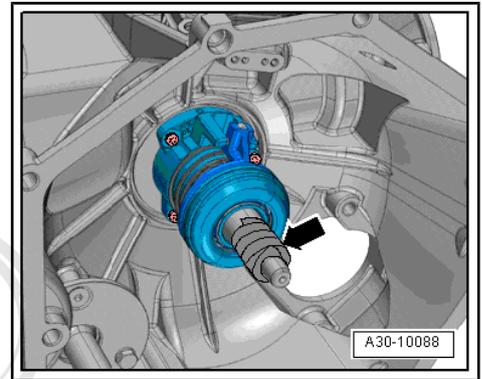




Caution

There is a risk of damaging the input shaft seal.

- ◆ *Wrap the input shaft splines with thin insulating tape -arrow-.*



- Remove the bolts -arrows-.
- Carefully remove the clutch slave cylinder with release bearing.

Installing

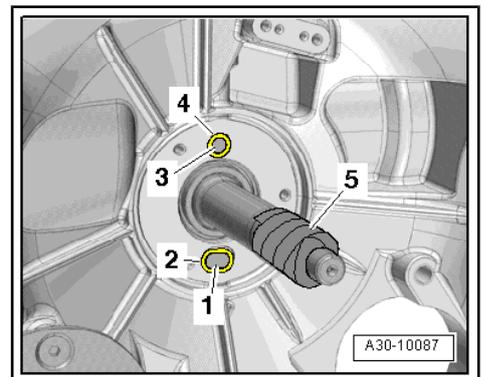
- Tightening specification; refer to [⇒ "2.4 Clutch Release Mechanism Overview, R tronic", page 26](#).

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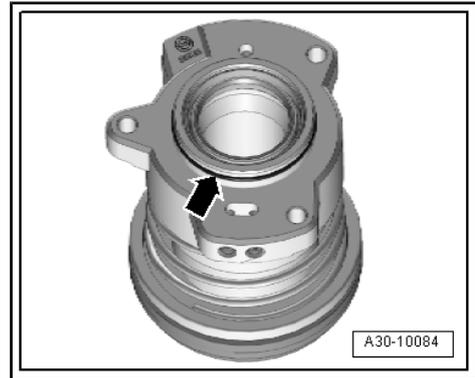


Note

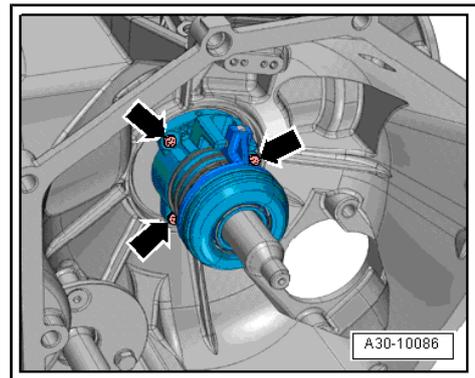
- ◆ *Replace O-rings.*
- ◆ *For the correct O-rings, refer to the electronic parts catalog ETKA.*
- Clean the contact surfaces on the transmission and clutch slave cylinder with release bearing.
- Remove the bleeder screw ⇒ [Item 6 \(page 25\)](#) and clear the hydraulic fluid channels -1- and -3- with compressed air.
- Make sure the input shaft splines are still wrapped with insulating tape -5-.
- Install dry O-rings -2- and -4- into the groove.
- Coat the input shaft seal and transmission centering surfaces with transmission oil.



- Coat the O-ring -arrow- with transmission fluid and then install it into the groove on the clutch slave cylinder.



- Position the clutch slave cylinder with release bearing on the input shaft.
- Tighten the bolts -arrows- in 2 steps => [Item 1 \(page 25\)](#).
- Remove the insulating tape.



5.7 Clutch Slave Cylinder with Release Bearing, R tronic



Note

The clutch slave cylinder and the release bearing are a single unit and are replaced together.

Special tools and workshop equipment required

- ◆ Thin Insulating Band

Removing

- Transmission removed.



Caution

There is a risk of damaging the input shaft seal.

- ◆ *Wrap the input shaft splines with thin insulating tape -arrow-.*

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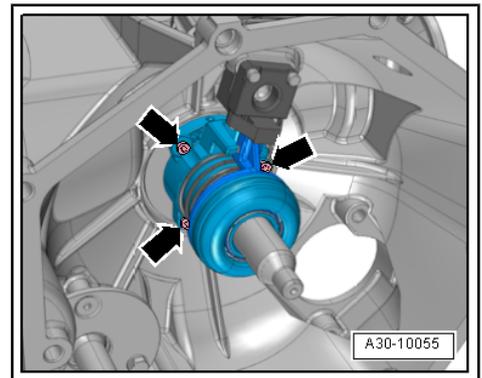
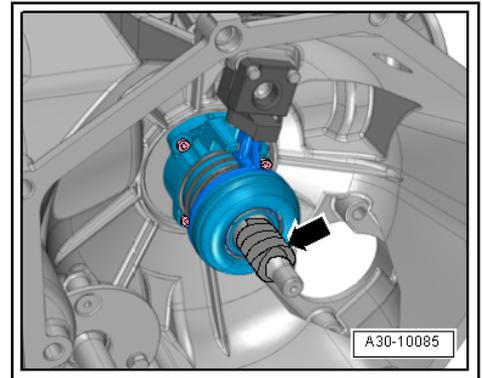
- Remove the bolts -arrows-.
- Carefully remove the clutch slave cylinder with release bearing.

Installing

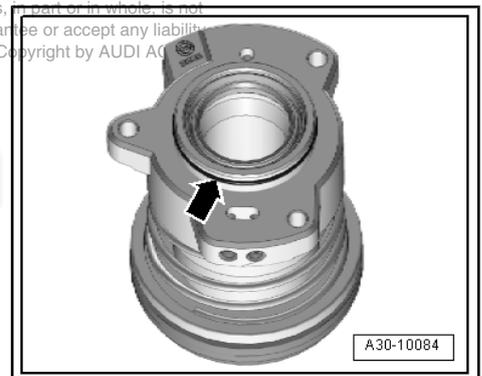
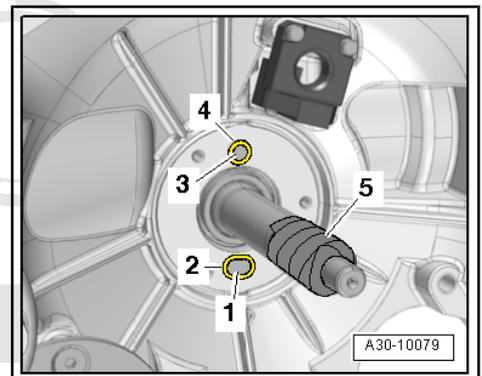
- Tightening specification; refer to ["2.4 Clutch Release Mechanism Overview, R tronic", page 26](#).

Note

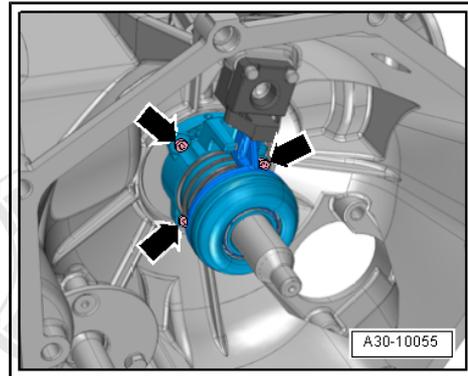
- ◆ Replace O-rings.
- ◆ For the correct O-rings, refer to the electronic parts catalog ETKA.
- Clean the contact surfaces on the transmission and clutch slave cylinder with release bearing.
- Remove the bleeder screw [⇒ Item 15 \(page 27\)](#) and clear the hydraulic fluid channels -1- and -3- with compressed air.
- Make sure the input shaft splines are still wrapped with insulating tape -5-.
- Install dry O-rings -2- and -4- into the groove.
- Coat the input shaft seal and transmission centering surfaces with transmission oil.



- Coat the O-ring -arrow- with transmission fluid and then install it into the groove on the clutch slave cylinder.
- Position the clutch slave cylinder with release bearing on the input shaft.



- Tighten the bolts -arrows- in 2 steps => [Item 1 \(page 26\)](#) .
- Remove the insulating tape.
- Check the fluid level in the R tronic hydraulic unit after installing the transmission. Refer to ["2.11 Oil Level in R tronic Hydraulic Unit, Adjusting"](#), [page 80](#) .



5.8 Clutch Position Sensor, R tronic

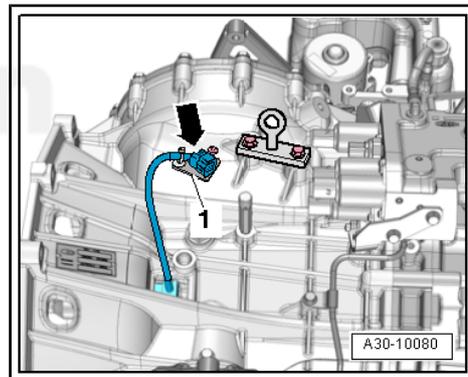
Special tools and workshop equipment required

- ◆ Puller - T10055-

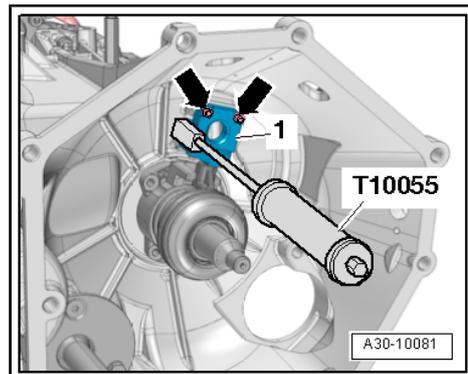
Removing

- Transmission removed.
- Free up the connector -arrow- on the bracket -1-.

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- Remove the bolts -arrows-.
- Remove the clutch position sensor - G476- and bracket -1- from the centering pins using -T10055- .

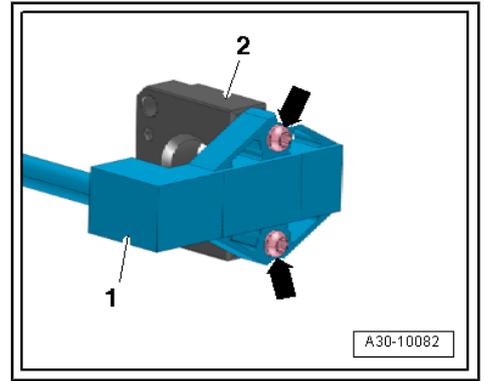


- Remove the bolts -arrows- and remove the clutch position sensor -1- from the bracket -2-.

Installing

Install in reverse order, paying attention to the following:

- For the correct tightening specifications, refer to [≧ "2.4 Clutch Release Mechanism Overview, R tronic", page 26](#)
- Attach the clutch position sensor -1- to the bracket -2- using both bolts -arrows-.
- Guide the clutch position sensor wire through the opening in the transmission.
- Carefully press the clutch position sensor with the bracket onto the centering pins on the transmission.



Note

The two centering pins must be inside the transmission. Install them into the holes inside the transmission if necessary.

- Tighten the bracket first by hand and then to the tightening specification.

5.9 Input Shaft Seal, Manual Transmission

Special tools and workshop equipment required

- ◆ Thrust Piece - T10174-
- ◆ Sealing grease - G 052 128 A1-

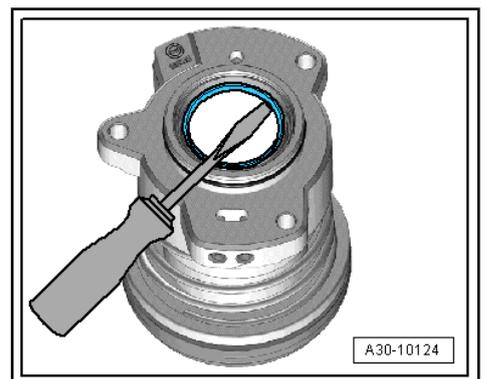
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Removing

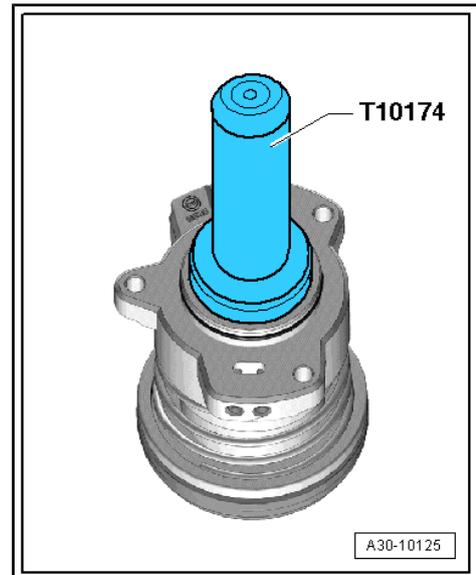
- Transmission removed.
- Remove the clutch slave cylinder with release bearing [≧ "5.6 Clutch Slave Cylinder with Release Bearing, Manual Transmission", page 40](#) .
- Carefully pry the shaft seal out with a screwdriver.

Installing

- Fill the space between the sealing and dust lip half way with sealing grease - G 052 128 A1- .
- Lightly coat the outer circumference of the new shaft seal with oil.



- Drive in shaft seal as far as stop with the -T10174- .
- Install the clutch slave cylinder with release bearing. Refer to [⇒ "5.6 Clutch Slave Cylinder with Release Bearing, Manual Transmission", page 40](#) .



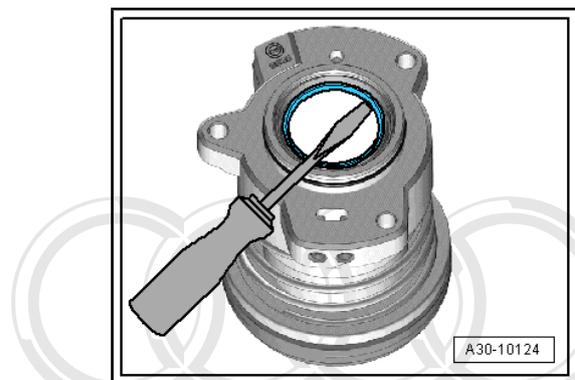
5.10 Input Shaft Seal, R tronic

Special tools and workshop equipment required

- ◆ Thrust Piece - T10174-

Procedure

- Transmission removed.
- Remove the clutch slave cylinder with release bearing. Refer to [⇒ "5.7 Clutch Slave Cylinder with Release Bearing, R tronic", page 42](#) .
- Carefully pry the shaft seal out with a screwdriver.

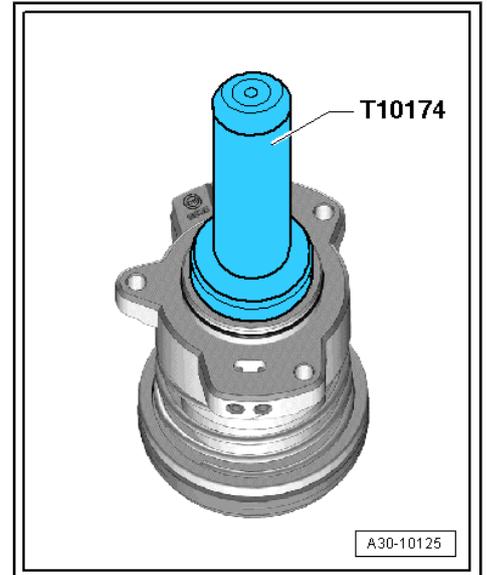


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erWin

- Fill the space between the sealing and dust lip half way with sealing grease - G 052 128 A1- .
- Lightly coat the outer circumference of the new shaft seal with oil.
- Drive in shaft seal as far as stop with -T10174- .
- Install the clutch slave cylinder with release bearing. Refer to [⇒ "5.7 Clutch Slave Cylinder with Release Bearing, R tronic", page 42](#) .



5.11 Pressure Plate with Clutch Plates

Special tools and workshop equipment required

- ◆ Centering Drift - T40151-
- ◆ Grease for clutch disc shaft splines - G 000 100-

Removing

- Transmission removed.
- Secure the pressure plate to the clutch plates with the - T40151- .



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When removing, loosen the bolts as follows so the pressure plate with clutch plates does not distort (causing shuddering on acceleration):

- Loosen all the bolts -arrows- one after the other clockwise in 90° (1/4 turn) steps until the pressure plate with the clutch plates is free.
- Remove the pressure plate with clutch plates.

Installing

Install in reverse order, paying attention to the following:

- For the correct tightening specifications, refer to [⇒ "2.5 Clutch Overview", page 28](#).



Note

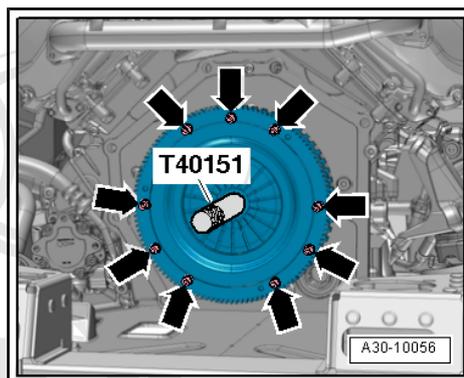
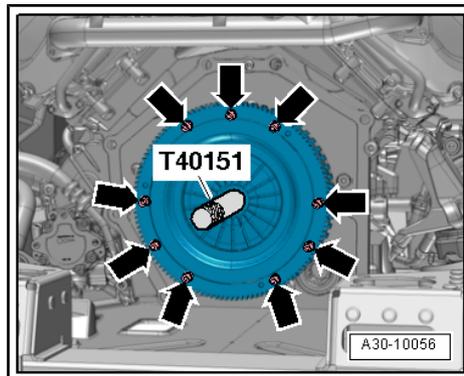
- ◆ Allocate the pressure plate with clutch plates according to the engine code. Refer to the electronic parts catalog ETKA.
 - ◆ To reduce odor caused by a burnt clutch, thoroughly clean the clutch bell housing and the side of the engine facing toward the transmission.
 - ◆ Do not wash the clutch slave cylinder, the release bearing or the flywheel.
 - ◆ Clean the flywheel with compressed air only.
 - ◆ Clean input shaft splines and (on used clutch plates) the hub splines, remove corrosion and apply a very thin coating of lubricant - G 000 100- to the splines. Then move the clutch plate back and forth on the input shaft until the hub moves freely on the shaft. Remove any excess grease.
 - ◆ The pressure plate with clutch plates are a single unit and cannot be separated.
- Installed position: visible friction lining toward the flywheel
- Use the -T40151- to center the pressure plate with the clutch plates.

When installing, tighten the bolts as follows so the pressure plate with clutch plates does not distort (causing shuddering on acceleration):

1. Bring the pressure plate and clutch plate into their installation position using the -T40151-.
2. Install all bolts evenly, by hand, until the bolt heads touch the pressure plate.
3. Tighten all the bolts diagonally in short steps.

R tronic

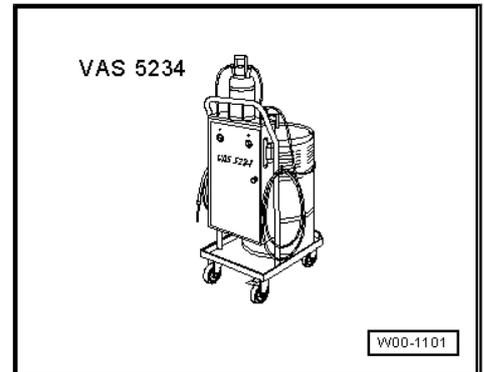
- Perform [clutch basic setting - R tronic](#) after installing the clutch. Refer to [⇒ "4.1 Clutch Basic Setting, R tronic", page 31](#).



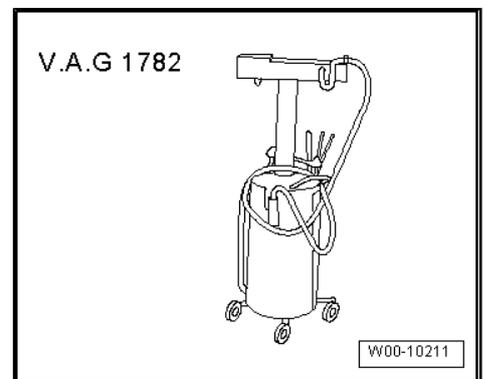
6 Special Tools

Special tools and workshop equipment required

- ◆ Brake Charger/Bleeding Unit - VAS 5234-



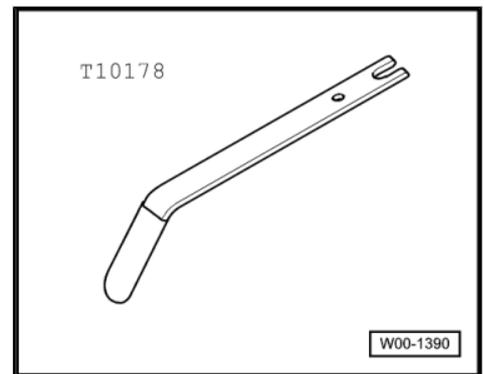
- ◆ Oil Collecting and Extracting Device - V.A.G 1782-



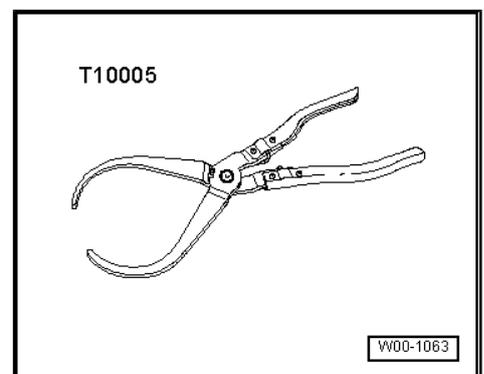
- ◆ Assembly Tool - T10178-



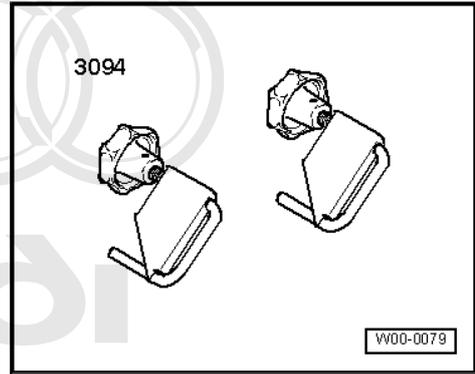
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- ◆ Pliers - T10005-

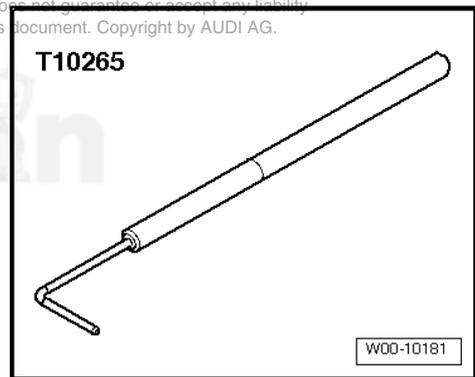


◆ Hose Clamps Up to 25 mm Dia. - 3094-

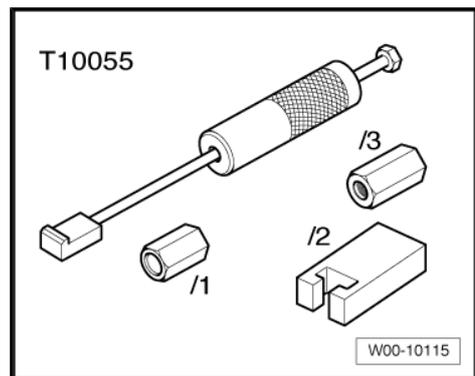


◆ Locking Tool - T10265-

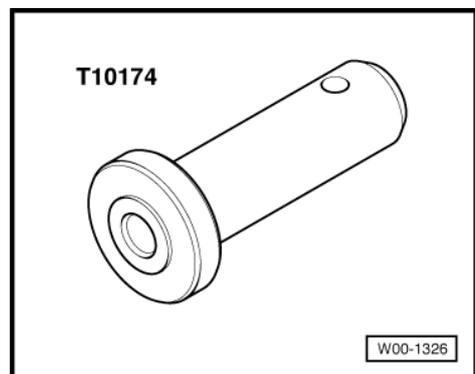
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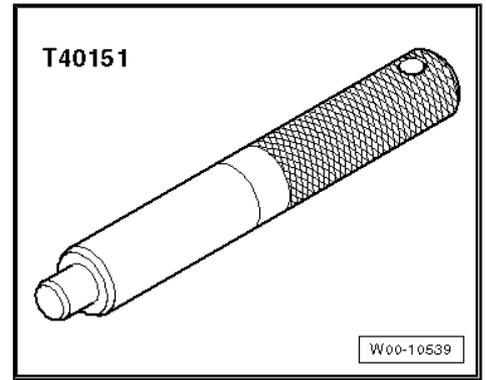
◆ Puller - T10055-



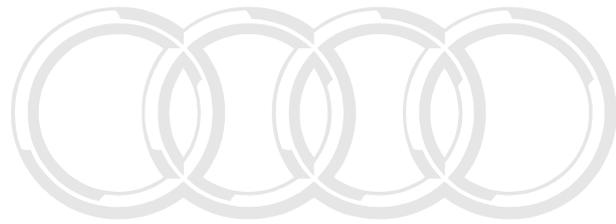
◆ Thrust Piece - T10174-



◆ Centering Drift - T40151-



◆ Vehicle tester



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34 – Controls, Housing

1 General Information

⇒ [“1.1 Oil Level in R tronic Hydraulic Unit”, page 52](#)

⇒ [“1.2 Transmission Fluid, Checking and Filling”, page 52](#)

⇒ [“1.3 Transmission Fluid Level, Checking, Old Transmission”, page 54](#)

⇒ [“1.4 Transmission Fluid Level, Checking and Filling, New Transmission Version”, page 57](#)

⇒ [“1.5 Transmission Fluid Lines and Cooler, Cleaning”, page 58](#)

1.1 Oil Level in R tronic Hydraulic Unit

The hydraulic oil in the hydraulic system does not need to be replaced over the course of the service life (permanently filled). However, the oil level must always be checked and corrected if necessary due to natural oil consumption or repairs to the hydraulic system. A specific oil level is regulated according to system pressure. It is necessary for a definite system pressure to be set when checking or adjusting the oil level.

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WARNING

There is a risk of injury. The pressure in the R tronic hydraulic system may be up to 50 bar.

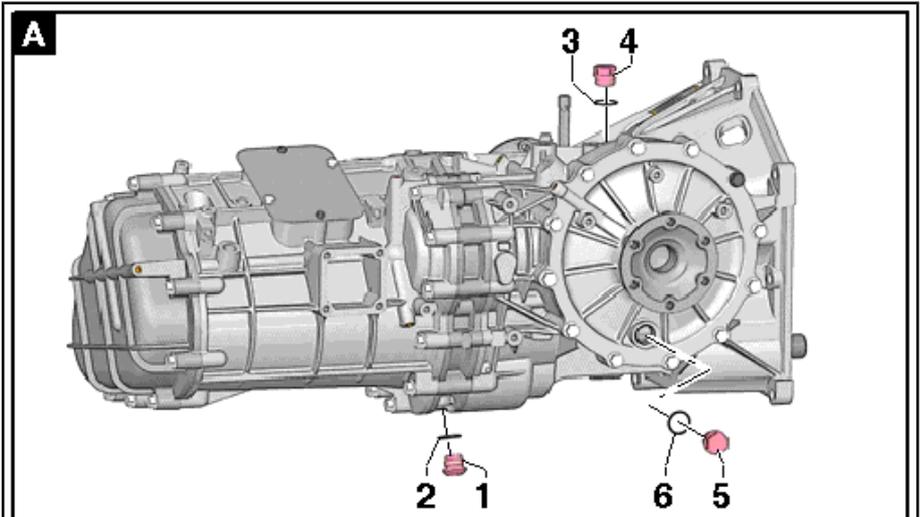
- ◆ *Always reduce the pressure in the system before working on the R tronic hydraulic system. Refer to [“2.12 Hydraulic System, Building System Pressure, R tronic”, page 82](#).*

1.2 Transmission Fluid, Checking and Filling

There is a difference between the old -A- and new -B- transmission versions.

A - Old Transmission Version

- There is no transmission fluid check plug -7- on the old transmission version. The transmission fluid must be drained completely and the specified quantity added.
- The plug -5- may not be used for checking the transmission fluid level (incorrect level).
- Refer to
 => ["1.3 Transmission Fluid Level, Checking, Old Transmission", page 54](#)



1 - Transmission Fluid Drain Plug

- 50 Nm

2 - Seal

- Replace

3 - Transmission Fluid Fill Plug

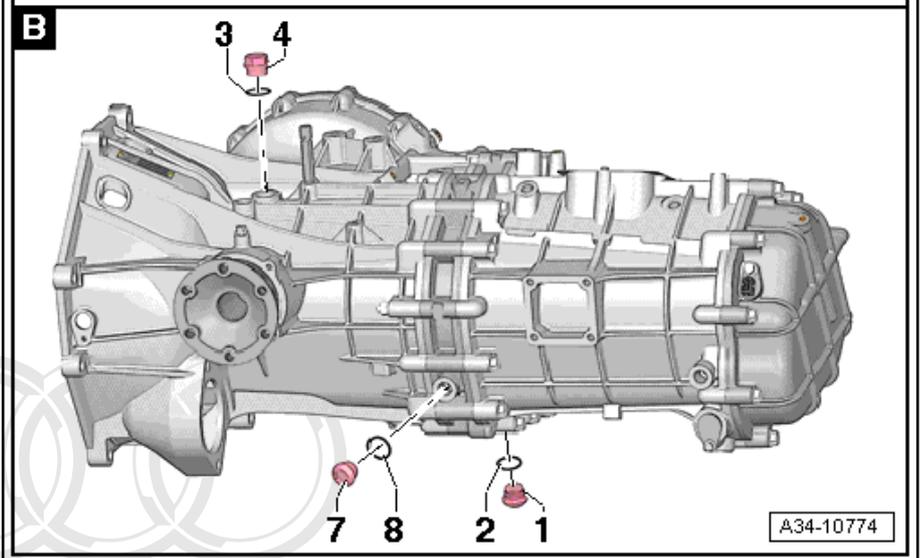
- 50 Nm

4 - Seal

- Replace

5 - Plug

- 50 Nm
- May not be used for checking the transmission fluid level (incorrect



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level).

- Only on old transmission versions

6 - Seal

- Replace

B - New Transmission Version

- The transmission fluid check plug -7- is only on the new transmissions. The transmission fluid level can be adjusted using the transmission fluid check plug.
- Refer to ⇒ ["1.4 Transmission Fluid Level, Checking and Filling, New Transmission Version", page 57](#)

1 - Transmission Fluid Drain Plug

- 50 Nm

2 - Seal

- Replace

3 - Transmission Fluid Fill Plug

- 50 Nm

4 - Seal

- Replace

7 - Oil Check Plug

- 50 Nm
- Only on new transmission versions

8 - Seal

- Replace

1.3 Transmission Fluid Level, Checking, Old Transmission

Special tools and workshop equipment required

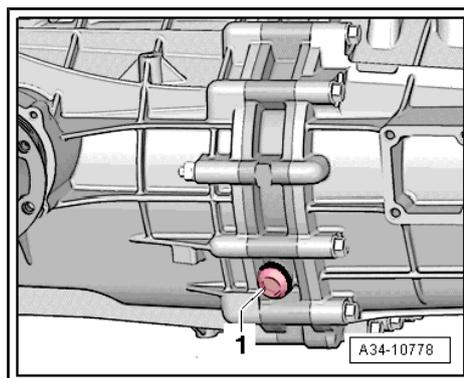
- ◆ Oil Collecting and Extracting Device - V.A.G 1782-

Procedure

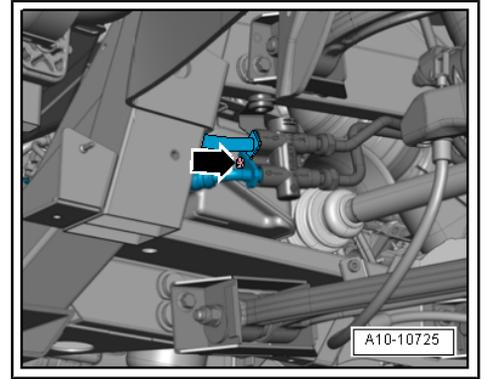
There are differences between the old and new transmission versions. The old transmission does not have a transmission fluid check plug -1- on the left side of the transmission.

- Tightening specifications, refer to ⇒ ["1.2 Transmission Fluid, Checking and Filling", page 52](#)

Additional Steps for Bleeding the Transmission Fluid Cooler:



The transmission fluid thermostat -arrow- opens the transmission fluid system only when the fluid has warmed up to its operating temperature. Flush the transmission fluid cooler with transmission fluid and then bleed it (Transmission fluid lines, transmission fluid cooler and transmission fluid filter assembly overview, refer to ⇒ ["2.14 Transmission Fluid Lines, Transmission Fluid Cooler and Transmission Fluid Filter Overview"](#), page 85). If the lines to the oil cooler were opened, then it will be necessary to first make a short road test with the transmission filled in order to get a correct filling.



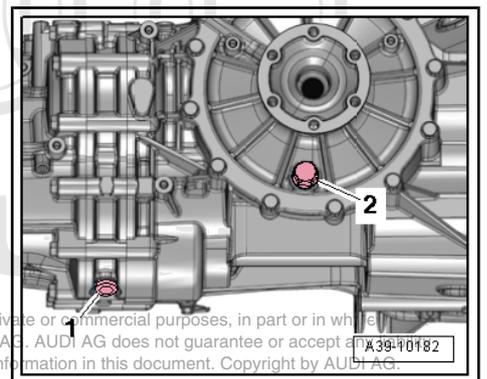
- Perform a road test with the transmission filled before checking the transmission fluid level after performing the following:
 - ◆ After installing a transmission
 - ◆ After removing transmission fluid lines or the transmission fluid cooler
 - ◆ After opening the transmission fluid lines for draining the transmission fluid

Continuation, Checking the Transmission Fluid Level, with a Bled Transmission Fluid Cooler

 **Caution**

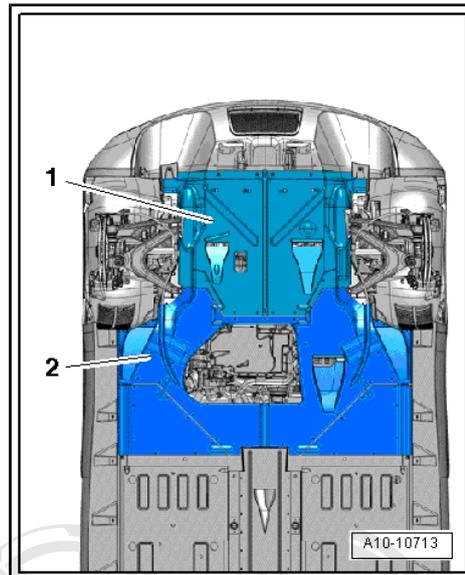
Danger of causing damage to the transmission due to an incorrect transmission fluid level.

- ◆ *The fluid level in the old transmission version cannot be determined using a check plug.*
- ◆ *Do not use the plug -2- on the right side (if equipped) for checking - incorrect fluid level.*
- ◆ *The transmission fluid must be drained completely and the specified quantity added.*
- ◆ *Capacity, refer to ⇒ ["3.2 Transmission Capacities"](#), page 12 , specifications electronic parts catalog ETKA.*

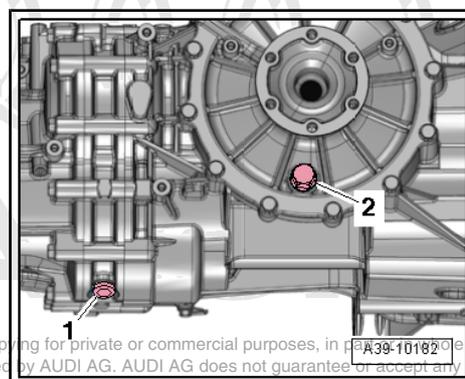


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- Remove the rear noise insulation -1-. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .

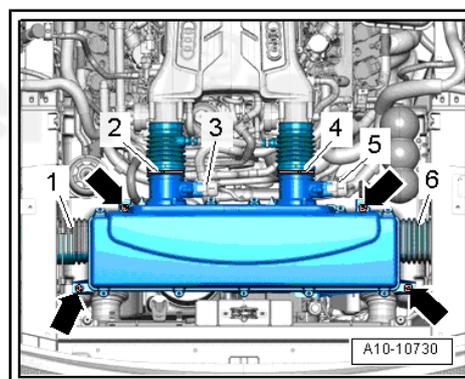


- Place the -V.A.G 1782- underneath.
- Remove the transmission fluid drain plug -1- and drain the transmission fluid.
- Install the transmission fluid drain plug -1-.

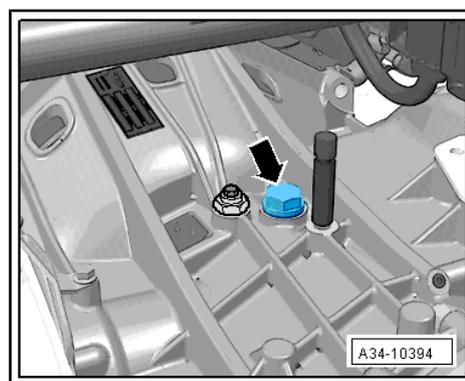


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- Remove the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .



- Open the transmission fluid filler plug -arrow- and fill to the specified transmission fluid capacity.
- Install the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .
- Install the rear noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .



1.4 Transmission Fluid Level, Checking and Filling, New Transmission Version

Special tools and workshop equipment required

- ◆ Oil collecting and extracting device - V.A.G 1782-

Procedure

There are differences between the old and new transmission versions. The new transmission version has a fluid check plug -1- on the left side of the transmission.

- Tightening specifications, refer to [⇒ "1.2 Transmission Fluid, Checking and Filling", page 52](#)



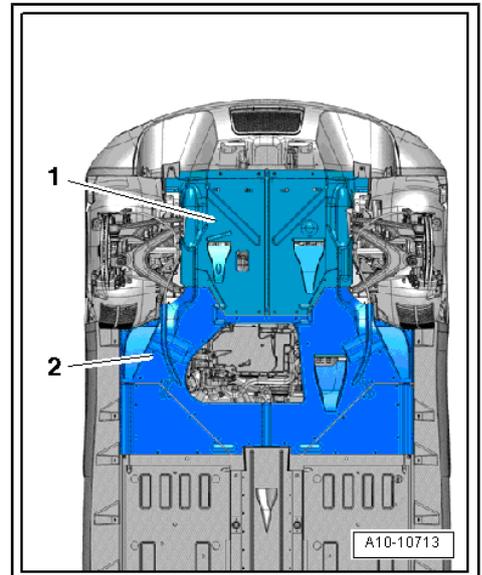
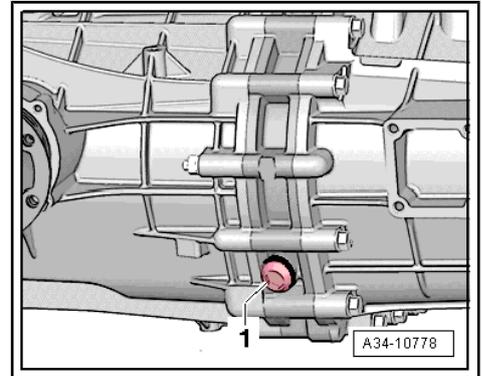
Note

Capacity, refer to [⇒ "3.2 Transmission Capacities", page 12](#), specifications electronic parts catalog ETKA.

- Remove the rear noise insulation -1- Refer to [⇒ Body Exterior; Rep. Gr. 66; Removal and Installation](#).

Vehicles with Transmission Fluid Cooling:

Additional steps for bleeding the transmission fluid cooler:



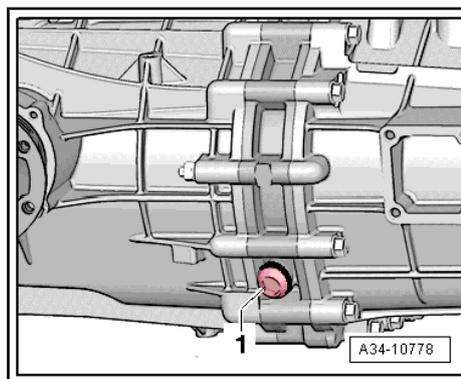
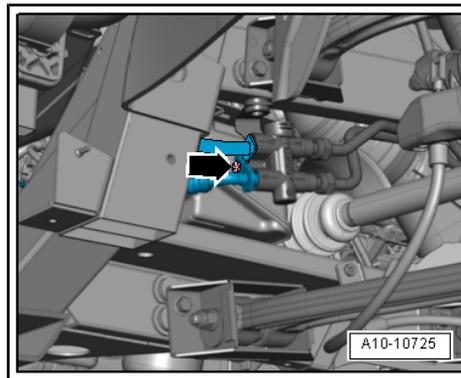


The transmission fluid thermostat -arrow- opens the transmission fluid system only when the fluid has warmed up to its operating temperature. Flush the transmission fluid cooler with transmission fluid and then bleed it (Transmission fluid lines, transmission fluid cooler and transmission fluid filter assembly overview, refer to ⇒ [“2.14 Transmission Fluid Lines, Transmission Fluid Cooler and Transmission Fluid Filter Overview”](#), page 85). If the lines to the oil cooler were opened, then it will be necessary to first make a short road test with the transmission filled in order to get a correct filling.

- Perform a road test with the transmission filled before checking the transmission fluid level after performing the following:
- ◆ After installing a transmission
- ◆ After removing transmission fluid lines or the transmission fluid cooler
- ◆ After opening the transmission fluid lines in connection with a large transmission fluid leak

All Vehicles:

- Place the -V.A.G 1782- underneath.
- Remove the transmission fluid check plug -1-.
- Specified value: the transmission fluid level is correct when the fluid is up to the bottom edge of the transmission fluid check opening.
- Fill the transmission fluid through the fluid check opening.
- Install the transmission fluid check plug -1-.
- Install the rear noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .



1.5 Transmission Fluid Lines and Cooler, Cleaning

Special tools and workshop equipment required

- ◆ Oil Collecting and Extracting Device - V.A.G 1782-
- ◆ Hose diameter approximately 18 mm
- ◆ Compressed air gun, commercially available
- ◆ Protective eyewear

Procedure

Always clean the transmission fluid lines and transmission fluid cooler when the old transmission is removed before installing a replacement transmission.



Note

It is necessary to remove the rear transmission fluid lines from the transmission in order to clean the transmission fluid lines when the transmission is still installed.

- Place the -V.A.G 1782- under the separating point.

- Remove the transmission fluid thermostat. Refer to
⇒ [“5.28 Transmission Fluid Thermostat, Vehicles with Transmission Fluid Cooling”, page 156](#) .



Note

The transmission fluid thermostat is closed when it is cold. It is therefore necessary to remove the temperature thermostat in order to clean the lines.

- Clean the transmission fluid lines and transmission fluid cooler with compressed air (maximum 10 bar).



Note

- ◆ *If heavily contaminated transmission fluid comes out, the transmission fluid lines and cooler must also be flushed with clean transmission fluid. Replace if necessary.*
- ◆ *Transmission fluid lines, removing and installing, refer to
⇒ [“5.29 Transmission Fluid Lines, Front, Vehicles with Transmission Fluid Cooling”, page 157](#) ,
⇒ [“5.30 Transmission Fluid Lines, Rear, Vehicles with Transmission Fluid Cooling”, page 159](#) .*
- Install the front transmission fluid lines. Refer to
⇒ [“5.29 Transmission Fluid Lines, Front, Vehicles with Transmission Fluid Cooling”, page 157](#) .
- Install the rear transmission fluid lines. Refer to
⇒ [“5.30 Transmission Fluid Lines, Rear, Vehicles with Transmission Fluid Cooling”, page 159](#) .

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2 Description and Operation

⇒ [“2.1 Manual/Automatic R tronic Transmission Electrical and Electronic Components”, page 60](#)

⇒ [“2.2 Shift Mechanism Overview, Manual Transmission”, page 63](#)

⇒ [“2.3 Shift Cables Overview, Manual Transmission”, page 66](#)

⇒ [“2.4 Shift Unit on Manual Transmission Overview”, page 67](#)

⇒ [“2.5 Selector Mechanism Overview, R tronic”, page 68](#)

⇒ [“2.6 Hydraulic Lines Overview, R tronic”, page 70](#)

⇒ [“2.7 Shift Actuator Overview, R tronic”, page 71](#)

⇒ [“2.8 Gear Selector Basic Setting”, page 74](#)

⇒ [“2.9 Hydraulic Unit Overview, R tronic”, page 75](#)

⇒ [“2.10 Shift Mechanism, Adjusting, Manual Transmission”, page 78](#)

⇒ [“2.11 Oil Level in R tronic Hydraulic Unit, Adjusting”, page 80](#)

⇒ [“2.12 Hydraulic System, Building System Pressure, R tronic”, page 82](#)

⇒ [“2.13 Transmission Mount Overview”, page 84](#)

⇒ [“2.14 Transmission Fluid Lines, Transmission Fluid Cooler and Transmission Fluid Filter Overview”, page 85](#)

⇒ [“2.15 Transmission Fluid Cooler Overview”, page 87](#)

⇒ [“2.16 Manual Transmission Overview”, page 88](#)

⇒ [“2.17 Reverse Gear Overview”, page 89](#)

⇒ [“2.18 Bearing Housing Overview”, page 91](#)

⇒ [“2.19 Shift Forks and Shift Rails Overview”, page 92](#)

⇒ [“2.20 Transmission, Securing in Engine/Transmission Holder”, page 93](#)

⇒ [“2.21 Input Shaft, Output Shaft, Bearing Housing and Shift Forks Overview”, page 94](#)

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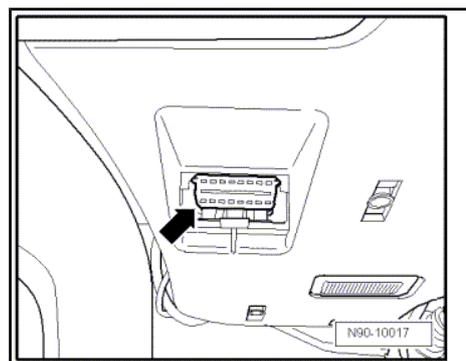
2.1 Manual/Automatic R tronic Transmission Electrical and Electronic Components

Data Link Connector (DLC)

- ◆ Installed location: On the left side, under the instrument panel -arrow-.

Check the following part with [Guided Fault Finding](#) ⇒ Vehicle diagnostic tester.

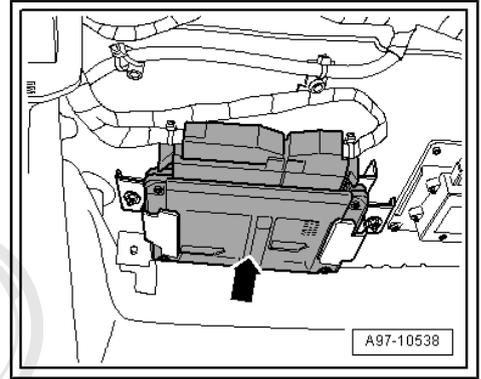
Transmission Control Module - J217-



- ◆ Installed location: Behind the front passenger seat, under the rear shelf -arrow-.

Refer to

⇒ [“5.3 Transmission Control Module J217”](#), page 115 .



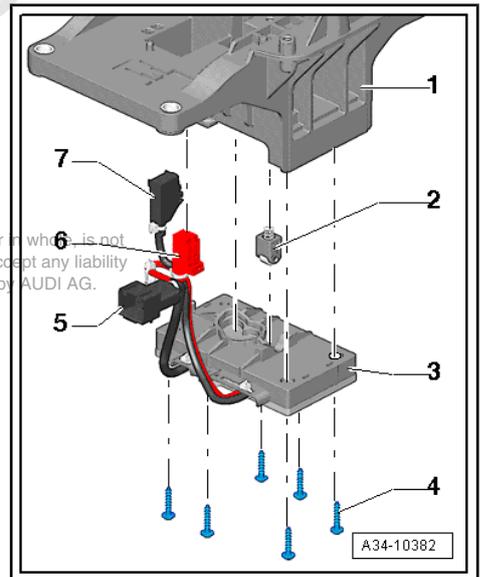
Selector Lever Sensor System Control Module - J587- -3-

- ◆ Installed location: Inside the R tronic gearshift mechanism -1-.

For removing and installing, refer to

⇒ [“2.5 Selector Mechanism Overview, R tronic”](#), page 68 .

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Transmission Input Speed Sensor - G182- , Gear Recognition Sensor - G604- , Gear Recognition Sensor 2 - G616-

1 - Transmission input speed sensor - G182-

- ◆ Installed location: On the back of the transmission.

Refer to ⇒ [“5.19 Transmission Input Speed Sensor”](#), page 143 .

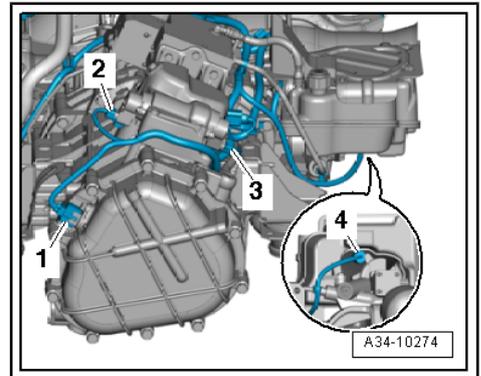
2 - Gear recognition sensor 2 - G616-

3 - Gear recognition sensor - G604-

- ◆ Installed location: On the R tronic shift actuator.

Refer to ⇒ [“5.16 Gear Recognition Sensor”](#), page 133 .

Refer to ⇒ [“5.17 Gear Recognition Sensor 2”](#), page 135 .



 Note

Ignore -4-.

Hydraulic Pressure Sensor - G270- , Clutch Actuator Valve - N255- , Gear Selection 1 - N284- , Gear Selection Valve 2 - N285- , Gear Selection Valve 3 - N286-

- 1 - Gear selection valve 3 - N286-
- 2 - Hydraulic pressure sensor - G270-
- 3 - Gear selection valve 2 - N285-
- 4 - Clutch actuator valve - N255-
- 5 - Gear selection valve 1 - N284-

◆ Installed location: On the R tronic shift actuator.

Refer to

⇒ ["5.14 Clutch Actuator Valve and Gear Selection Valves"](#), page 129 .

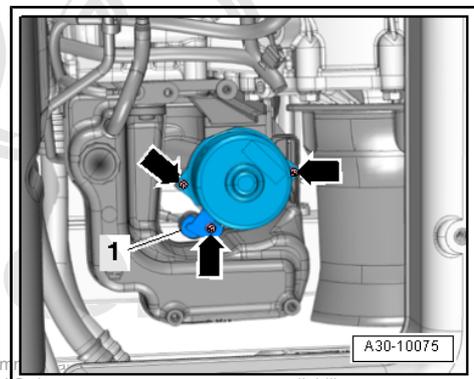
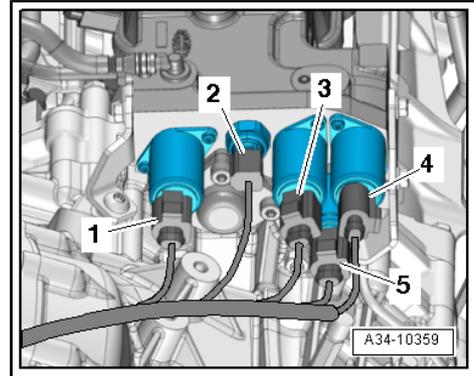
Refer to ⇒ ["5.15 Hydraulic Pressure Sensor"](#), page 132 .

Transmission Hydraulic Pump - V387- motor -1-

◆ Installed location: On the right side of the transmission, on the R tronic hydraulic unit.

**Note**

Ignore -arrows-.



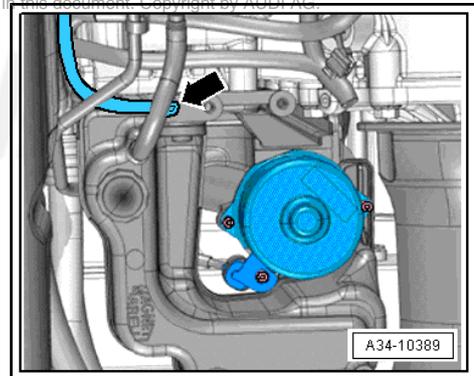
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**Note**

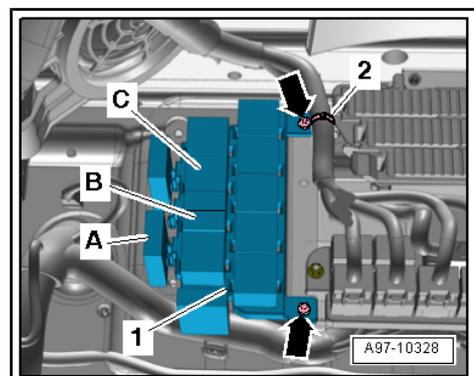
Check the auxiliary ground connection -arrow- at the top of the hydraulic unit bracket because the transmission hydraulic pump is grounded by the metal housing.

Refer to

⇒ ["5.22 Transmission Hydraulic Pump Motor"](#), page 147 .

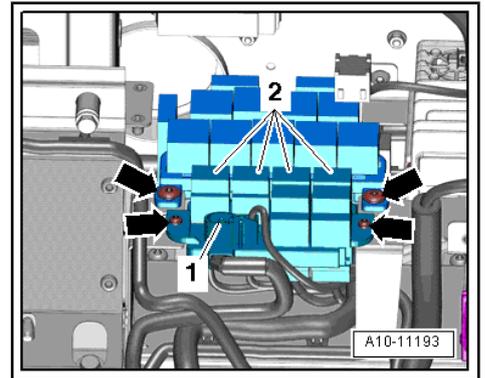
**Transmission Hydraulic Pump Relay - J510- - R8 Coupe**

The transmission hydraulic pump relay is in the relay carrier under the rear shelf. For removing and installing, see ⇒ Wiring diagrams, Troubleshooting & Component locations.



Transmission Hydraulic Pump Relay - J510- - R8 Spyder

The transmission hydraulic pump relay is located behind the rear panel trim panel, removing and installing, see => Wiring diagrams, Troubleshooting & Component locations.

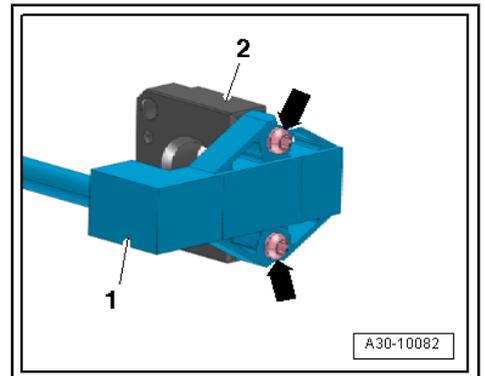


Clutch Position Sensor - G476- -1-

- ◆ Installed location: inside the clutch housing
 => [Item 6 \(page 26\)](#) .



Ignore -2- and -arrows-.



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2.2 Shift Mechanism Overview, Manual Transmission



Lubricate the various bearing and contact surfaces with grease - G 000 450 02- .

**1 - Selector Cable**

- Refer to
⇒ ["5.5 Shift Cable and Selector Cable, Manual Transmission", page 116](#)

2 - Mounting Clip**3 - Selector Bracket****4 - Mounting Pin****5 - Spring Pin****6 - Shift Housing****7 - Bushing****8 - Grommet****9 - Bolt**

- 20 Nm

10 - Mounting Plate**11 - Noise Insulation****12 - Washer****13 - Bolt**

- 10 Nm

14 - Locking Plate**15 - Bolt**

- 10 Nm

16 - Bolt

- 5 Nm

17 - Gearshift Knob

- Installed on the shift lever

18 - Gearshift Lever Guide**19 - Bracket**

- For the center console

20 - Locking Finger

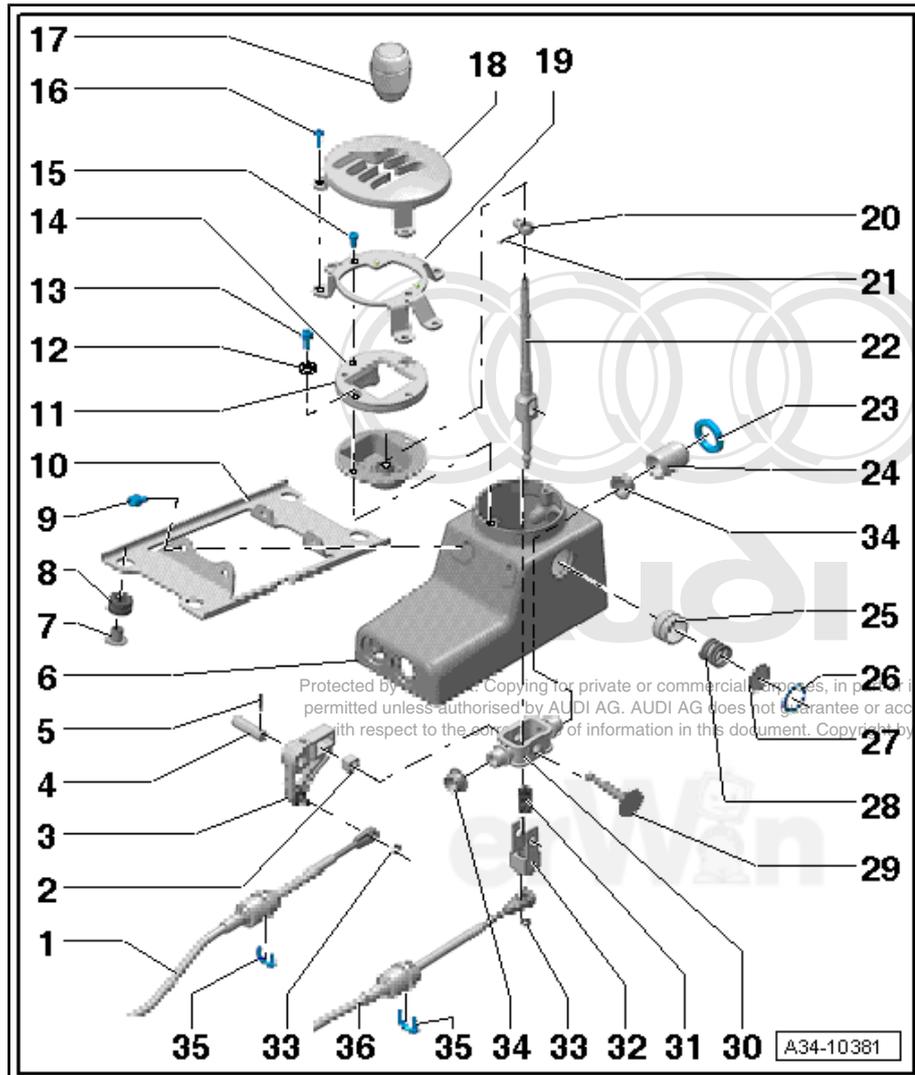
- For reverse gear

21 - Spring Pin**22 - Shift Lever****23 - Nut**

- 55 Nm

24 - Guide Bushing

- Install until the shift lever support ⇒ [Item 30 \(page 65\)](#) has no play
- Secure with the nut ⇒ [Item 23 \(page 64\)](#)



25 - Pressure Cylinder

26 - Locking Ring

27 - Pressure Plate

28 - Spring

29 - Mounting Pin

30 - Shift Lever Support

- Secured in the shift housing without play
- Adjusting with the guide bushing ⇒ [Item 24 \(page 64\)](#) .

31 - Spring

32 - Mount

33 - Lock Washers

- Replace

34 - Bearing Bushing

- For the shift lever support ⇒ [Item 30 \(page 65\)](#)

35 - Clips

36 - Shift Cable

- Refer to ⇒ [“5.5 Shift Cable and Selector Cable, Manual Transmission”, page 116](#)



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2.3 Shift Cables Overview, Manual Transmission

1 - Gearshift Cable

- Black
- Refer to
⇒ ["5.5 Shift Cable and Selector Cable, Manual Transmission", page 116](#)
- Adjusting, refer to
⇒ ["2.10 Shift Mechanism, Adjusting, Manual Transmission", page 78](#)

2 - Selector Cable

- White
- Refer to
⇒ ["5.5 Shift Cable and Selector Cable, Manual Transmission", page 116](#)
- Adjusting, refer to
⇒ ["2.10 Shift Mechanism, Adjusting, Manual Transmission", page 78](#)

3 - Cable Mounting Bracket

4 - Clips

5 - Bolt

- 20 Nm

6 - Cable Retainer

- For the selector relay lever
- Replace after prying out the selector relay lever, refer to
⇒ [Item 13 \(page 67\)](#)
- Release to adjust the shifter, refer to
⇒ ["2.10 Shift Mechanism, Adjusting, Manual Transmission", page 78](#)

7 - Circlip

8 - Cable Retainer

- For the shift relay lever
- Release to adjust the shifter, refer to
⇒ ["2.10 Shift Mechanism, Adjusting, Manual Transmission", page 78](#)

9 - Bolt

- 20 Nm

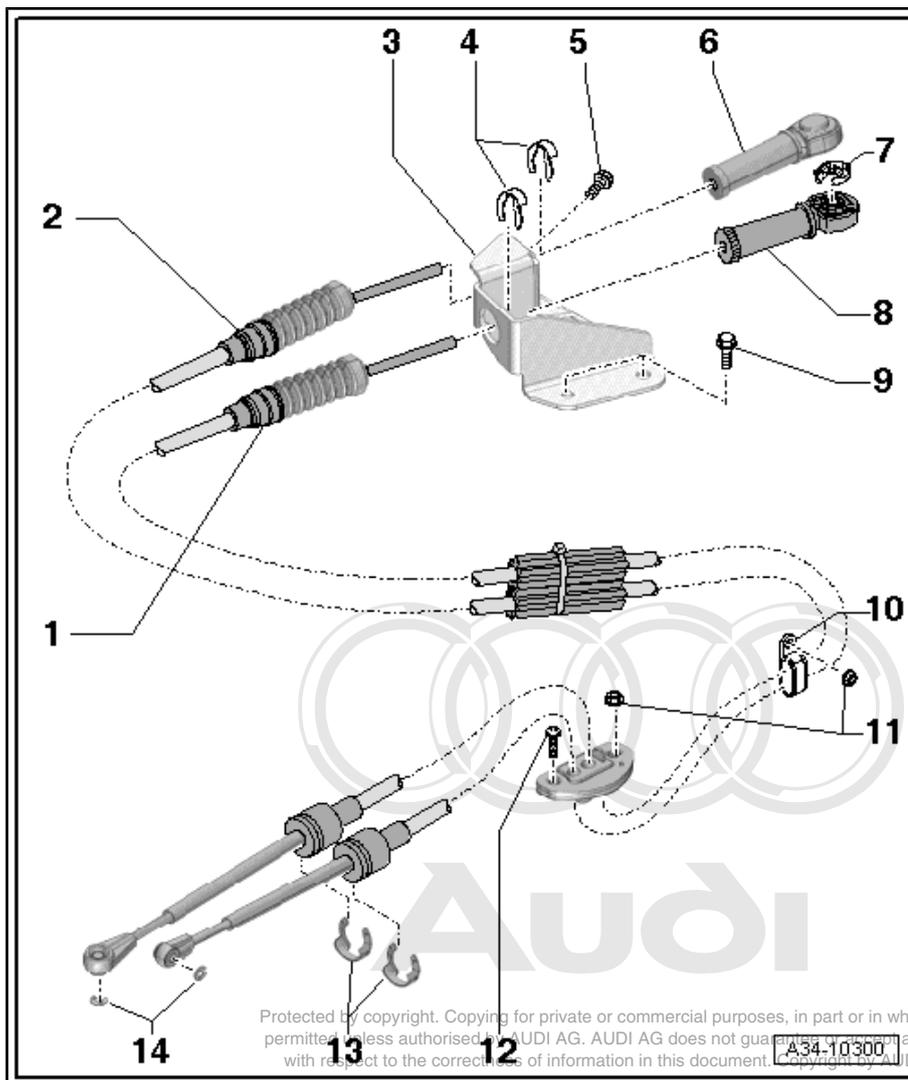
10 - Retaining Clamp

11 - Nuts

- 8 Nm

12 - Bolt

- 8 Nm



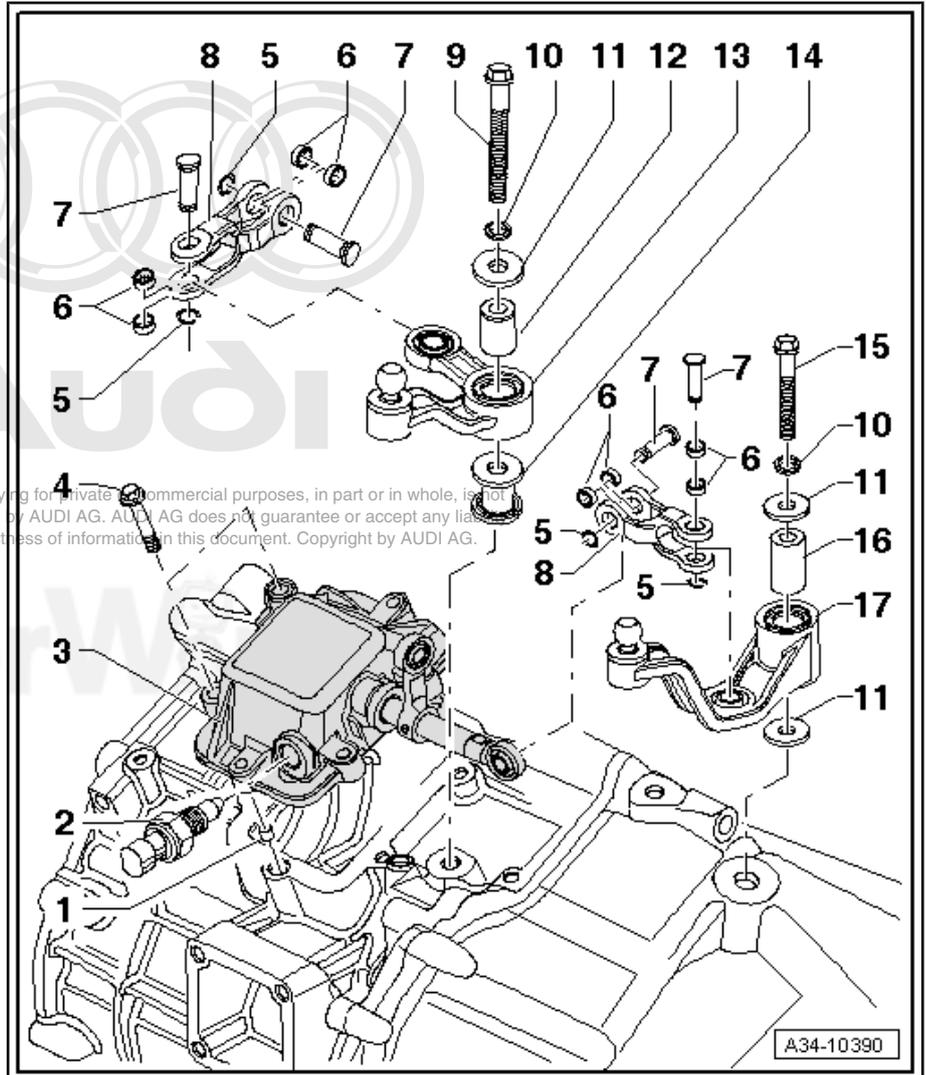
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A34-10300

- 13 - Clips
- 14 - Lock Washers
 - Replace

2.4 Shift Unit on Manual Transmission Overview

- 1 - Centering Bushing
 - Quantity: 2
- 2 - Back-Up Lamp Switch - F4-
 - 20 Nm
- 3 - Shift Unit
 - Mount on the transmission using sealant - AMV 188 001 02-
- 4 - Bolts
 - 10 Nm
 - Install with sealant - AMV 188 001 02-
- 5 - Lock Washers
 - Replace
- 6 - Spacer Rings
- 7 - Bolt
- 8 - Link Fork
- 9 - Bolt
 - 30 Nm
- 10 - Washer
- 11 - Thrust Washer
- 12 - Bearing Sleeve
- 13 - Selector Relay Lever
 - For selector movement
- 14 - Spacer Sleeve
- 15 - Bolt
 - 30 Nm
- 16 - Bearing Sleeve
- 17 - Shift Relay Lever
 - For shifter movement



2.5 Selector Mechanism Overview, R tronic

1 - Selector Lever Handle

- Refer to
⇒ [“5.7 Selector Lever Handle, R tronic”, page 119](#)
- Attached to the selector lever, 8 Nm

2 - Sleeve

- Install in the selector lever handle
- Removing and installing, refer to
⇒ [“5.7 Selector Lever Handle, R tronic”, page 119](#)

3 - Selector Mechanism Cover

- Refer to
⇒ [“5.8 Selector Mechanism Cover, R tronic”, page 119](#)
- Clipped to the cover with 5 retaining tabs.

4 - Sport Program Button - E541-

- Refer to
⇒ [“5.9 Sport Program Button E541, R tronic”, page 120](#)
- Checked by the OBD

5 - Bolt

- 3 Nm

6 - Cover with Selector Lever Transmission Range Display - Y5-

- Refer to ⇒ [“5.10 Selector Lever Transmission Range Display, R tronic”, page 121](#)
- Checked by the OBD

7 - Ball Socket

- Attached to the selector lever ⇒ [Item 8 \(page 68\)](#) with the clamping sleeve ⇒ [Item 11 \(page 68\)](#) .
- Remove the clamping sleeve ⇒ [Item 8 \(page 68\)](#) for removal

8 - Clamp

- Replace

9 - Rubber Grommet

- Clipped into the grooves on the upper section of the housing and on the selector lever

10 - Upper Section of the Housing

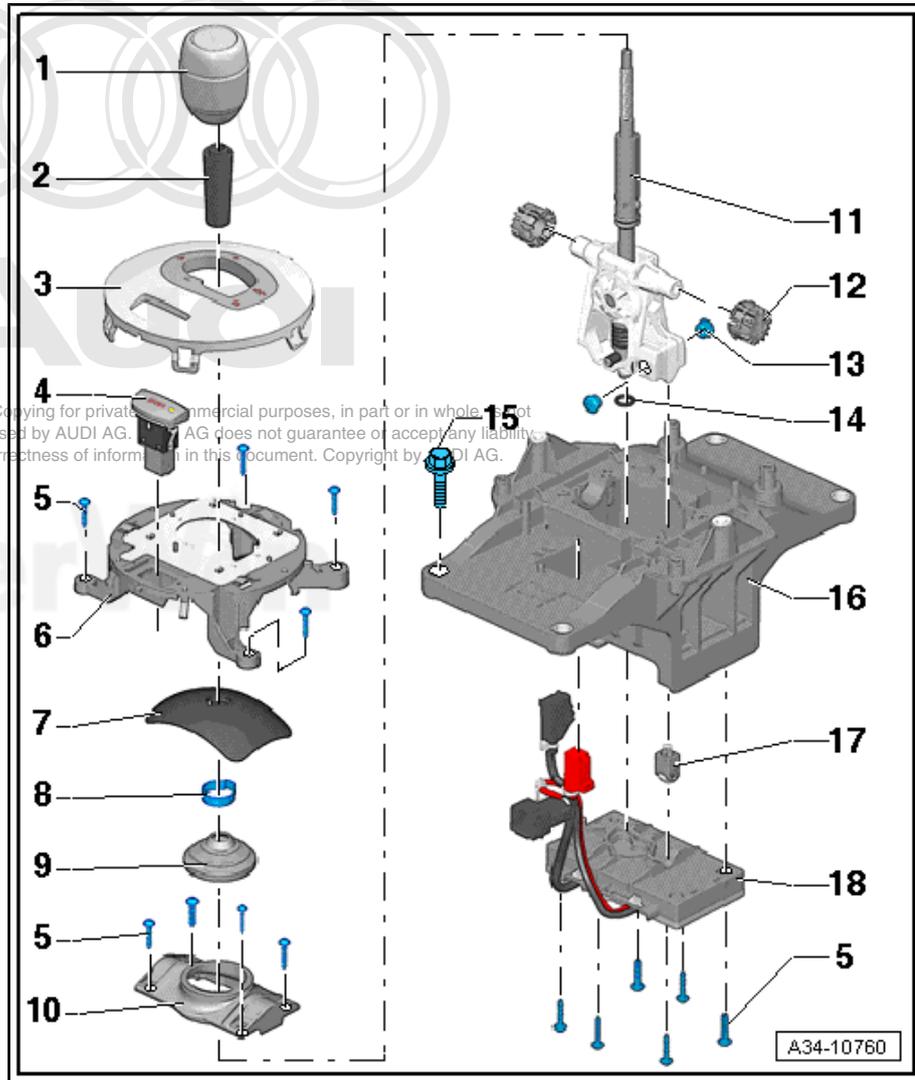
- Install on the shift mechanism housing ⇒ [Item 5 \(page 68\)](#) with four bolts ⇒ [Item 16 \(page 69\)](#)

11 - Selector Lever

- A magnet is installed on the bottom end of the selector lever rod.
- The magnet transmits the selector lever position or shift procedure to the selector lever sensor system control module - J587- .

12 - Bearing Bushing

- Quantity: 2



- Attach to the selector lever with selector mechanism grease (refer to the electronic parts catalog ETKA)
⇒ [Item 11 \(page 68\)](#)

13 - Rubber Stop

- Quantity: 2
- Inserted in the selector lever ⇒ [Item 11 \(page 68\)](#)

14 - O-ring

- Replace if damaged

15 - Bolt

- 18 Nm
- Shift mechanism housing to body

16 - Shift Mechanism Housing

17 - Locking Roller

- Inserted in the bottom of the selector lever ⇒ [Item 11 \(page 68\)](#)
- Install with shift mechanism grease, refer to the electronic parts catalog ETKA

18 - Selector Lever Sensor System Control Module - J587-

- Refer to ⇒ [“5.11 Selector Lever Sensor System Control Module, R tronic”, page 122](#)
- Checked by the OBD

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2.6 Hydraulic Lines Overview, R tronic

1 - Bolt

- For securing the R tronic hydraulic unit to the transmission.
- Tightening specifications, refer to [⇒ "2.9 Hydraulic Unit Overview, R tronic", page 75](#)

2 - R tronic Hydraulic Unit

- Routing, removing and installing, refer to [⇒ "2.9 Hydraulic Unit Overview, R tronic", page 75](#)

3 - Hydraulic Return Hose

Caution
Risk of damaging transmission components.
Always follow the removal instructions.

- Removing and installing, refer to [⇒ "2.9 Hydraulic Unit Overview, R tronic", page 75](#)

4 - Hydraulic Pressure Pipe

- From the R tronic shift actuator to the R tronic hydraulic unit
- Tightening specifications, refer to [⇒ "2.9 Hydraulic Unit Overview, R tronic", page 75](#)
- Refer to [⇒ "5.25 Hydraulic Pressure Line from Shift Actuator to R tronic Hydraulic Unit", page 151](#)

5 - R tronic Shift Actuator

- Tightening specifications, removing and installing, refer to [⇒ "2.7 Shift Actuator Overview, R tronic", page 71](#)

6 - Bolt

- Tightening specifications, refer to [⇒ "2.7 Shift Actuator Overview, R tronic", page 71](#)

7 - Bolt

- 18 Nm

8 - Bolt

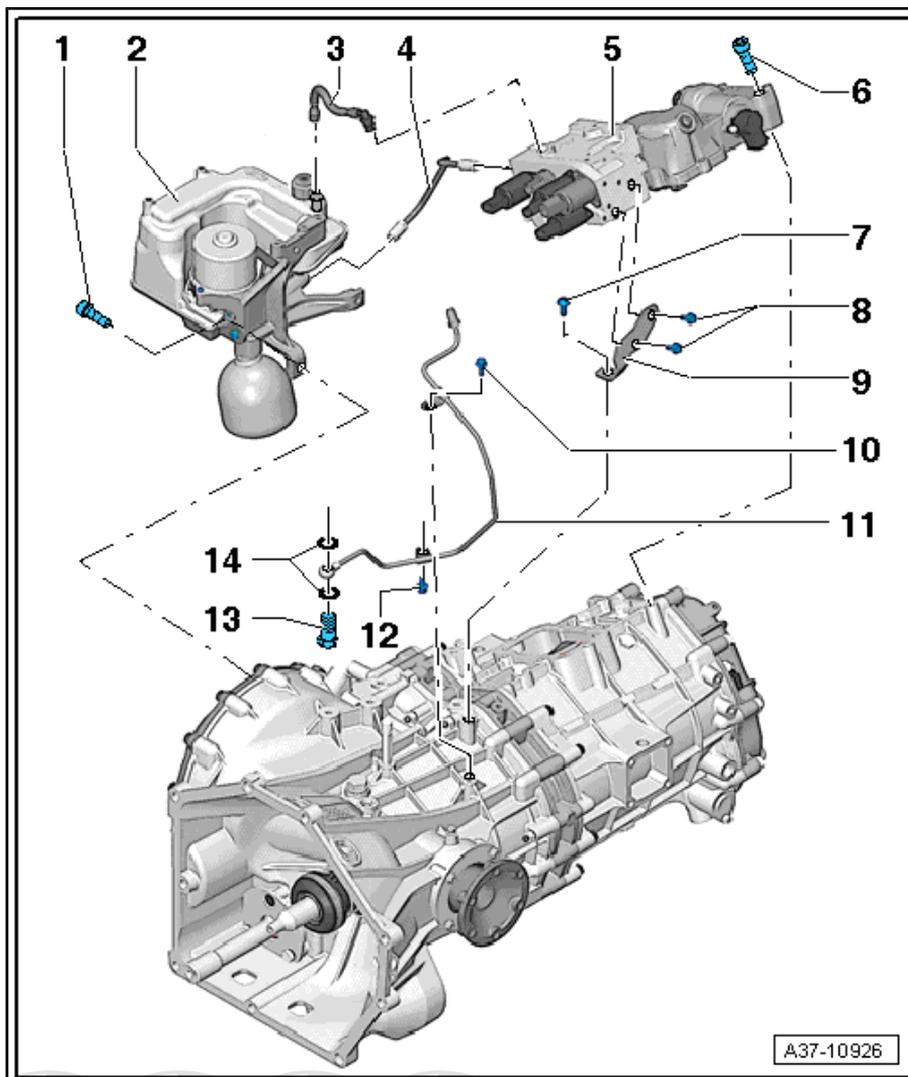
- 10 Nm

9 - Bracket

For the R tronic shift actuator on the transmission

10 - Bolt

- 10 Nm



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11 - Hydraulic Pressure Pipe

- Union nut, 24 Nm
- To the clutch slave cylinder
- It is necessary to bleed the clutch system after opening the hydraulic pressure line. Refer to ⇒ ["1.2 Clutch System, R tronic, Bleeding", page 18](#) .
- Refer to ⇒ [Fig. ""Installation Overview: Hydraulic Line to the Clutch Slave Cylinder"" , page 71](#)

12 - Bolt

- 10 Nm

13 - Banjo Bolt

- 25 Nm
- It is necessary to bleed the clutch system after opening the hydraulic pressure line. Refer to ⇒ ["1.2 Clutch System, R tronic, Bleeding", page 18](#) .

14 - Seals

- Always replace
- For the correct allocation, refer to the electronic parts catalog ETKA

Installation Overview: Hydraulic Line to the Clutch Slave Cylinder

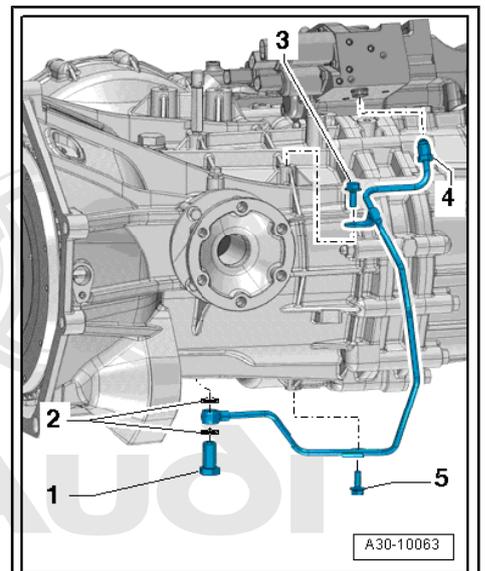
1 - Banjo bolt

2 - Replace the seals. Refer to the electronic parts catalog ETKA, because there are different versions depending on the date of manufacture.

3 - Bolt, secures the hydraulic line to the transmission

4 - Union nut, secures the hydraulic pressure line to the R tronic shift actuator

5 - Bolt, secures the hydraulic line to the transmission



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2.7 Shift Actuator Overview, R tronic



WARNING

There is a risk of injury. The pressure in the R tronic hydraulic system may be up to 50 bar.

Function:

Using the R tronic shift actuator, the gears are shifted like a manual transmission. The selector gate is selected via the gear selection valve 1 - N284- . The selector shaft makes a rotating movement in the shift actuator. Changing the forward/back direction of the selector shaft causes the selector gate to change. The gear selection valve 2 - N285- shifts the odd-numbered gears.



The gear selection valve 3 - N286- engages the even gears and the reverse gear.

1 - Clutch Actuator Valve - N255-

- Removing and installing, refer to [⇒ "5.14 Clutch Actuator Valve and Gear Selection Valves", page 129](#)
- Pay attention to the installed position.
- Depending on the vehicle, different versions are installed, with and without a strainer

2 - Bolt

- 3.6 Nm

3 - Gear Selection Valve 1 - N284-

- Removing and installing, refer to [⇒ "5.14 Clutch Actuator Valve and Gear Selection Valves", page 129](#)
- Depending on the version, a strainer is still installed in front of gear selection valve 1 - N284- (refer to [⇒ Item 30 \(page 74\)](#)). The auxiliary strainer cannot be installed on versions without the strainer.

4 - Bolt

- 3.6 Nm

5 - Gear Selection Valve 2 - N285-

- Removing and installing, refer to [⇒ "5.14 Clutch Actuator Valve and Gear Selection Valves", page 129](#)
- Pay attention to the installed position.
- Depending on the vehicle, different versions are installed, with and without a strainer

6 - Bracket

- For the cover

7 - Bolt

- 22 Nm
- Quantity: 3

8 - End Cover on R tronic Shift Actuator

9 - O-ring

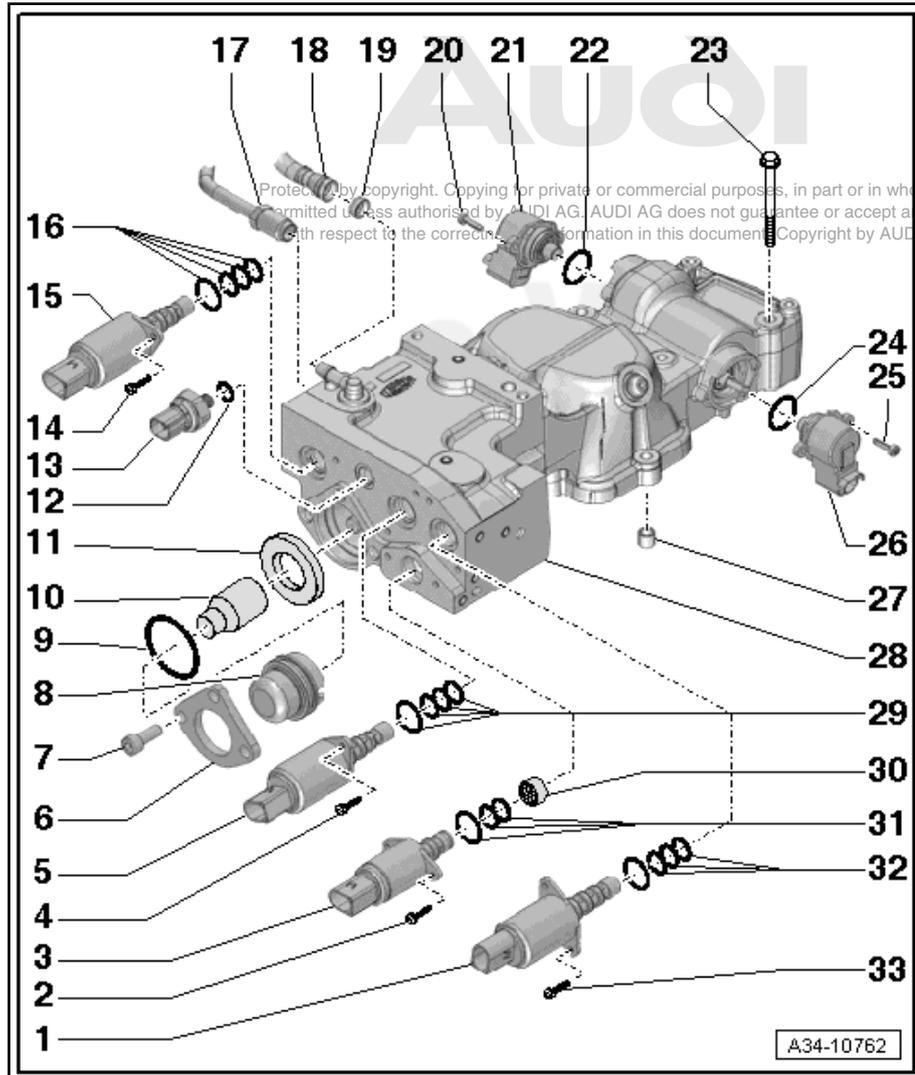
- Replace

10 - Pressure Piston

11 - Shaft Seal

12 - Seal

- Replace



13 - Hydraulic Pressure Sensor - G270-

- 15 Nm
- Refer to ⇒ [“5.15 Hydraulic Pressure Sensor”, page 132](#)

14 - Bolt

- 3.6 Nm

15 - Gear Selection Valve 3 - N286-

- Removing and installing, refer to ⇒ [“5.14 Clutch Actuator Valve and Gear Selection Valves”, page 129](#)
- Pay attention to the installed position.
- Depending on the vehicle, different versions are installed, with and without a strainer

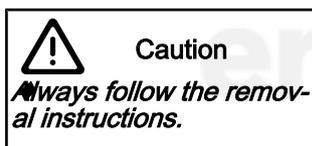
16 - O-ring

- Replace
- Allocation ⇒ [page 131](#)

17 - Hydraulic Pressure Pipe

- From the R tronic shift actuator to the R tronic hydraulic unit
- Different versions are installed depending on the vehicle, tightening specifications, refer to ⇒ [“2.9 Hydraulic Unit Overview, R tronic”, page 75](#)
- Refer to ⇒ [5.25 Hydraulic Pressure Line from Shift Actuator to R tronic Hydraulic Unit”, page 151](#)

18 - Hydraulic Return Hose



- Refer to ⇒ [“5.13 Hydraulic Return Hose”, page 129](#)

19 - Rubber Grommet

- Replace
- Is installed on the shift actuator connectors together with the hydraulic hose
- Only replace the connectors if they are damaged, refer to ⇒ [“2.9 Hydraulic Unit Overview, R tronic”, page 75](#) .

20 - Bolt

- 3.6 Nm

21 - Gear Recognition Sensor - G604-

- Refer to ⇒ [“5.16 Gear Recognition Sensor”, page 133](#)
- Depending on the version, a sensor with or without gold contacts is installed
- If a gear recognition sensor without gold contacts is going to be replaced by a sensor with gold contacts, then gear recognition sensor 2 must also be replaced. Both cable sets for the sensors must be changed to the adapter wiring set - 420 971 164- , refer to the electronic parts catalog ETKA ⇒ [“5.18 Adapter Wiring Set, Gear Recognition Sensors, Installing”, page 137](#) .

22 - O-ring

- Replace

23 - Bolt

- M8 bolts, 24 Nm
- M6 bolts, 10 Nm
- Follow the installation sequence
- Install with sealant - AMV 188 001 02-

24 - O-ring

- Replace

25 - Bolt

- 3.6 Nm

26 - Gear Recognition Sensor 2 - G616-

- Refer to ⇒ [“5.17 Gear Recognition Sensor 2”, page 135](#)
- Depending on the version, a sensor with or without gold contacts is installed
- If gear recognition sensor 2 without gold contacts is going to be replaced by a sensor with gold contacts, then gear recognition sensor must also be replaced. Both cable sets for the sensors must be changed to the adapter wiring set - 420 971 164- , refer to the electronic parts catalog ETKA ⇒ [“5.18 Adapter Wiring Set, Gear Recognition Sensors, Installing”, page 137](#) .

27 - Alignment Sleeve

- Quantity: 2

28 - R tronic Shift Actuator

- Install with sealant - AMV 174 004 01-
- Refer to ⇒ [“5.12 Shift Actuator, R tronic”, page 123](#)
- Additional bracket for the R tronic shift actuator on the transmission, refer to ⇒ [“2.6 Hydraulic Lines Overview, R tronic”, page 70](#) , not shown here
- Refer to the electronic parts catalog ETKA because there are different versions depending on the date of manufacture.

29 - O-ring

- Replace
 - Allocation ⇒ [page 131](#)
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30 - Strainer

- Depending on the vehicle, installed in front of gear selection valve 1. The auxiliary strainer cannot be installed on vehicles without the strainer because the shift actuator is different on the R tronic.

31 - O-ring

- Replace
- Allocation ⇒ [page 131](#)

32 - O-ring

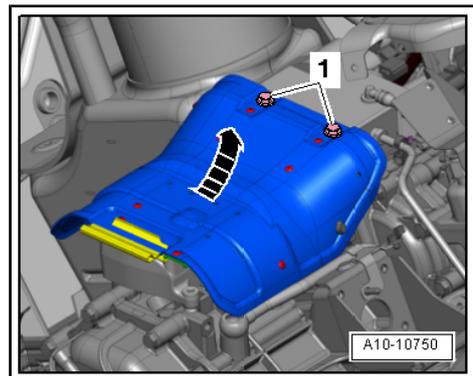
- Replace
- Allocation ⇒ [page 131](#)

33 - Bolt

- 3.6 Nm

Heat Shield Over the R tronic Shift Actuator, Tightening Specifications

- Tighten the bolts -1- to 10 Nm.



2.8 Gear Selector Basic Setting

Special tools and workshop equipment required

- ◆ Vehicle Tester

The gear selector basic setting must be performed with the following work:

- When used for the first time

- If the R tronic shift actuator was removed from the transmission.
- If the gear recognition sensor - G604- was removed
- If the gear recognition sensor 2 - G616- was removed
- If the transmission control module - J217- was replaced
- If “update programming” was performed on the transmission control module - J217-
- If the transmission was repaired
- If the transmission was replaced

Test Conditions:

- Vehicle diagnosis tester is connected.
- The engine is off.
- The ignition is switched on.
- The parking brake is set.
- Using the vehicle diagnosis tester under Guided Functions, go to the 02 - transmission electronics directory and select gear position basic setting.
- Follow all the instructions given by the vehicle diagnosis tester exactly so that the basic setting can be completed.

 **Note**

- ◆ *An adaptation will be performed on the entire shift pattern when the vehicle diagnosis tester performs a basic setting.*
- ◆ *All possible gears are engaged and the respective positions measured in a pressurized and unpressurized state and saved.*

2.9 Hydraulic Unit Overview, R tronic



WARNING

There is a risk of injury. The pressure in the R tronic hydraulic system may be up to 50 bar.

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1 - Hydraulic Pressure Pipe

- Depending on vehicle, there are different versions and tightening specifications
=> [page 78](#)
- Refer to => ["5.25 Hydraulic Pressure Line from Shift Actuator to R tronic Hydraulic Unit", page 151](#)

2 - Bolt

- 24 Nm

3 - O-ring

- Replace

4 - Connectors on the R tronic Shift Actuator

Caution
Replace only if damaged.

- Refer to => ["5.26 Connections on R tronic Shift Actuator", page 153](#)

5 - Rubber Grommet

- Replace

6 - Hydraulic Return Hose

- Replace

Caution
Always follow the removal instructions.

- Refer to => ["5.13 Hydraulic Return Hose", page 129](#)

7 - Rubber Grommet

- Replace

8 - Bracket

- An auxiliary ground (GND) connection is installed on the top left.

9 - Heat Shield

10 - Bolt

- 10 Nm

11 - Bolt

- 6 Nm

12 - Transmission Hydraulic Pump - V387-

- Refer to => ["5.22 Transmission Hydraulic Pump Motor", page 147](#)

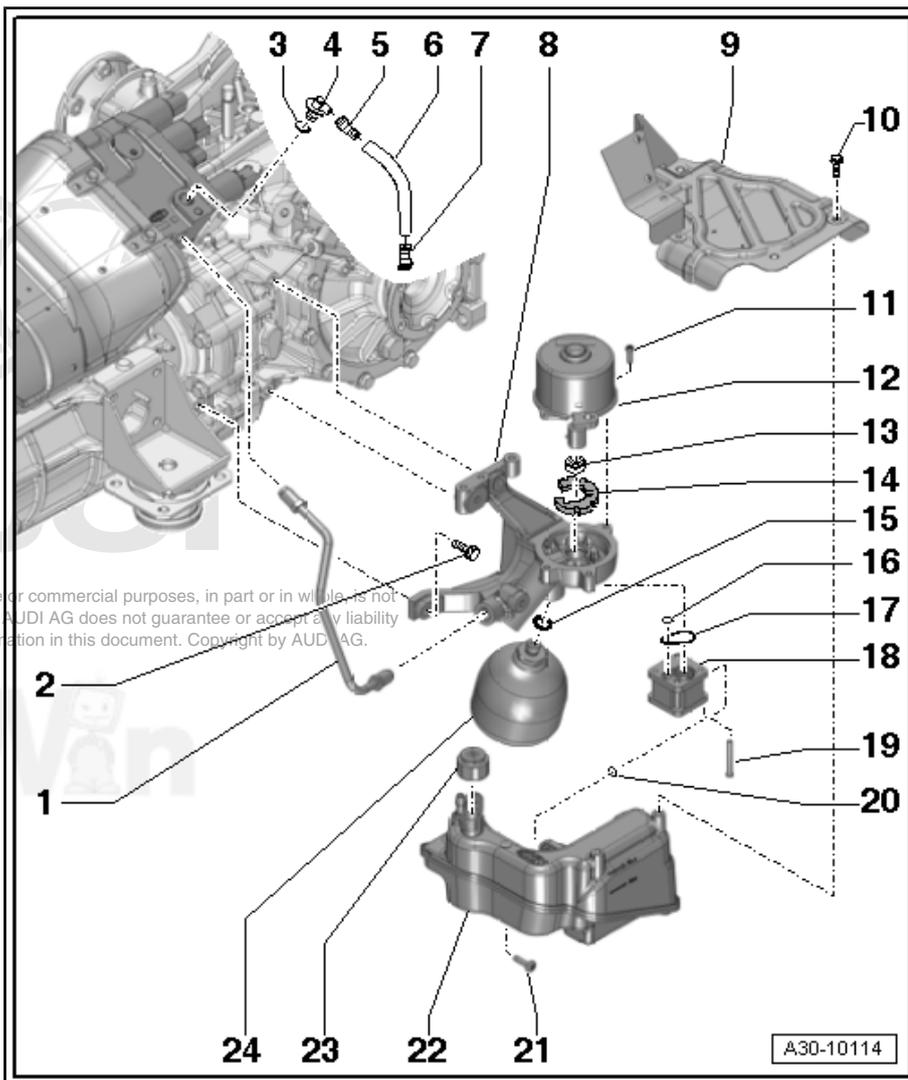
13 - Connecting Piece

14 - Sponge

- Clean before reinstalling

15 - O-ring

- Replace



16 - O-ring

- Replace

17 - Gasket

- Replace

18 - Mechanical Hydraulic Pump

- Refer to ⇒ [“5.23 Mechanical Hydraulic Pump”, page 148](#)

19 - Bolt

- 5.5 Nm

20 - O-ring

- Replace

21 - Bolt

- 10 Nm

22 - Hydraulic Oil Reservoir

- Refer to ⇒ [“5.21 Hydraulic Oil Reservoir”, page 145](#)

23 - Cover

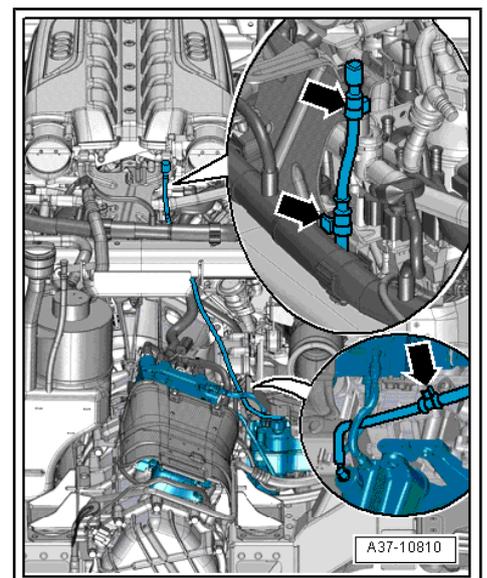
- 1.3 Nm
- Depending on the vehicle, there are different caps installed, with and without a vent hose.
- Leaky caps must be replaced with cap that has a vent hose, refer to the electronic parts catalog ETKA. Cap, removing and installing, refer to ⇒ [“2.11 Oil Level in R tronic Hydraulic Unit, Adjusting”, page 80](#) .
- Routing and attaching the cap vent hose, refer to ⇒ [Fig. “Cap Venting Hose Routing and Attaching”](#) , page 77 .

24 - Pressure Reservoir

- 55 Nm
- Refer to ⇒ [“5.24 Pressure Reservoir”, page 150](#)
- Loosen and tighten using only an open end spanner insert AF 27 mm - T40156- .

Cap Venting Hose Routing and Attaching

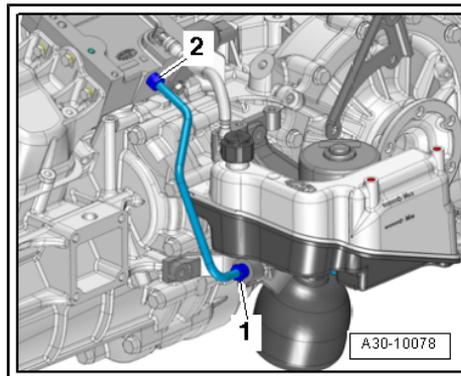
- ◆ The vent hose on the cap must be routed and attached according to the illustration -arrows-.
- ◆ Do not bend the vent hose. Make sure there is enough space between the hose and the exhaust system.



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Hydraulic Pressure Pipe

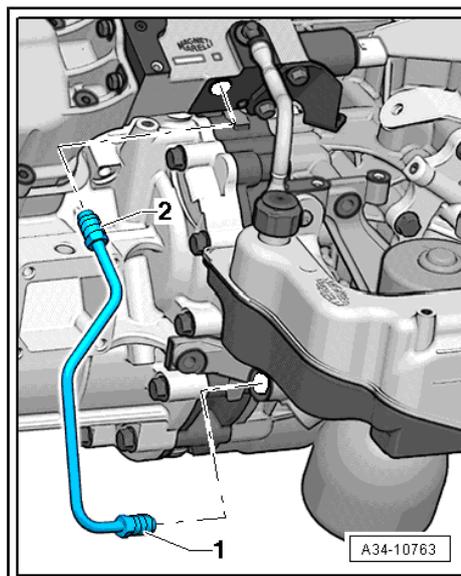
Depending on the vehicle, there are different versions of the line and the threaded connector. Refer to the electronic parts catalog ETKA.



Hydraulic Pressure Pipe without the Brass Adapter

- ◆ Union nut -1- to the R tronic hydraulic unit - 18 Nm
- ◆ Union nut -2- to the R tronic shift actuator - 18 Nm

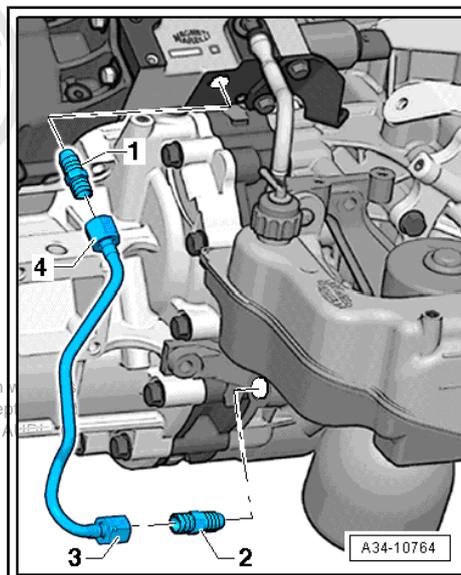
A damaged or leaky hydraulic line can be replaced by a hydraulic line having threaded adapters.



Hydraulic Pressure Pipe with Threaded Adapters

- ◆ Threaded adapter -1- to the R tronic hydraulic unit - 30 Nm
- ◆ Threaded adapter -2- to the R tronic shift actuator - 30 Nm
- ◆ Union nuts -3 and 4- to threaded adapter - 25 Nm

A damaged or leaky hydraulic line with threaded adapters can be only be replaced with a hydraulic line with threaded adapters.



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2.10 Shift Mechanism, Adjusting, Manual Transmission

Special tools and workshop equipment required

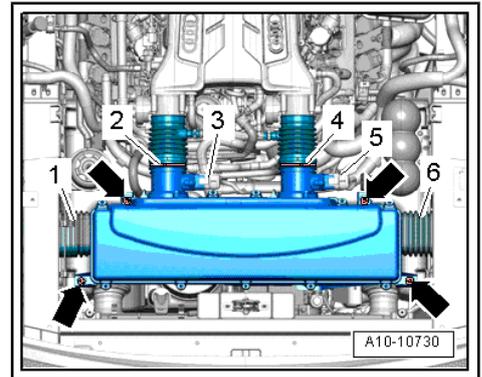
- ◆ Diesel Injection Pump Locking Pin - 3359-

The following points are essential to guarantee correct shifter adjustment:

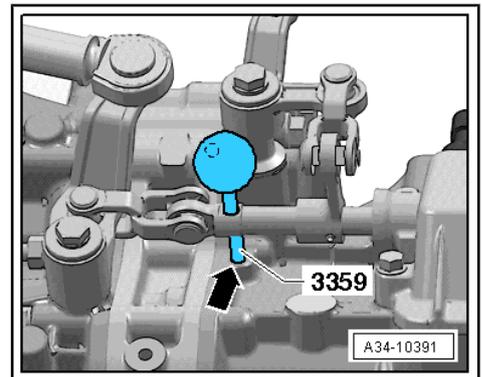
- Operating and transfer elements of shift mechanism must be in proper condition.
- Shift mechanism must move freely.
- The transmission, clutch and clutch mechanism must also be in proper condition.
- Transmission in neutral.

Procedure

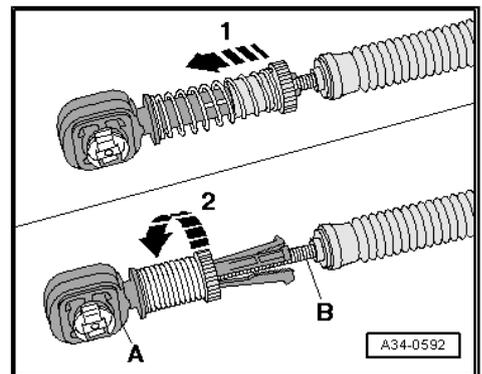
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- Remove the air filter housing. Refer to => Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .



- Guide the -3359- through the selector shaft in the transmission housing -arrow-.



- Push the sleeves on the shift and selector cable all the way forward -arrow 1-.
- Turn the sleeve all the way to the right -arrow 2- until it locks into place.



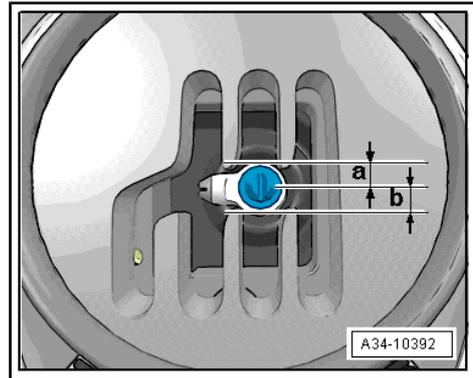
 **Note**

The cables must slide in the cable retainer.

Align the shift lever as follows:

- The shift lever positions itself in the 3rd/4th gear selector gate.

- Align the shift lever so the distance to the shift lever guide -a- and -b- is even.
- Hold shift lever in this position.



A second technician is needed for the following work.

- Make sure the selector and shift cable -B- are inserted into the retainer -A- without tension.
- Loosen the sleeve -arrow 1-.
- Let the sleeve slide all the way -arrow 2-.

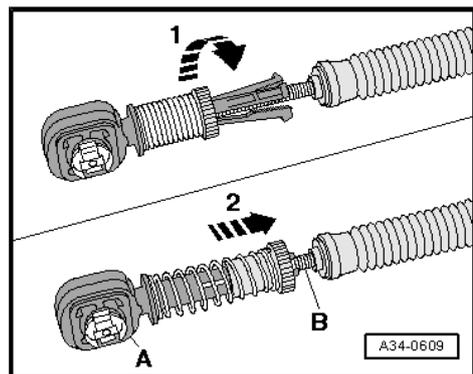
The cable is now adjusted.

- Remove the -3359- from the shift unit.

Checking the Gearshift Lever Adjustment

- The shift lever must rest in the 3rd/4th gear selector lever gate when the transmission is in neutral.
- Press the clutch.
- Shift through all the gears several times. Be sure to check reverse gear to make sure it is working correctly.
- The shift lever must move from the reverse gear selector lever gate into the 3rd/4th gear selector lever gate on its own.

It will be necessary to adjust the gearshift mechanism again if a hook does not appear each time a gear is engaged.



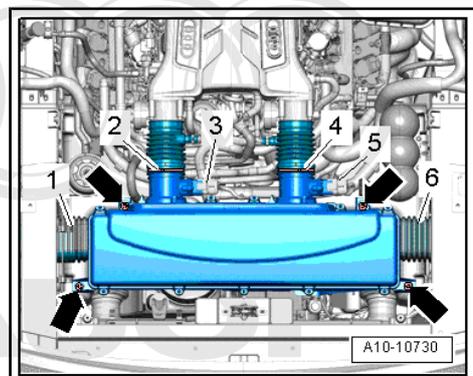
2.11 Oil Level in R tronic Hydraulic Unit, Adjusting

Special tools and workshop equipment required

- ◆ Vehicle Tester

Procedure

- Remove the air filter housing. Refer to => Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .

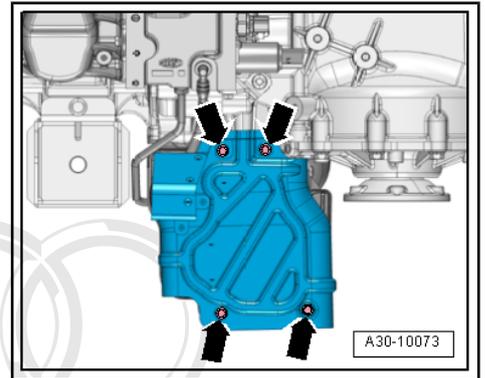


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- Remove the bolts -arrows- and remove the heat shield over the R tronic hydraulic unit.

 **Note**

The illustration shows the installation position with the transmission removed.



Test Conditions

- The engine is off.
- Vehicle Diagnosis Tester is connected.
- The ignition is switched on.
- The parking brake is engaged.
- The vehicle must be absolutely horizontal either on a vehicle hoist or standing over a work pit so that the hydraulic fluid level can be adjusted correctly.



WARNING

There is a risk of injury. The pressure in the R tronic hydraulic system may be up to 50 bar.

- ◆ ***Always reduce the pressure in the system before working on the R tronic hydraulic system. Refer to ⇒ "2.12 Hydraulic System, Building System Pressure, R tronic", page 82 .***

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- Reduce the system pressure in the R tronic hydraulic system. Refer to ⇒ ["2.12 Hydraulic System, Building System Pressure, R tronic", page 82 .](#)
- Follow all the instructions given by the vehicle diagnosis tester for reducing the system pressure exactly.
- Remove the right rear wheel. Refer to ⇒ Wheel and Tire Guide; Rep. Gr. 44 ; Removal and Installation .

 **Note**

The hydraulic oil level is checked from the right rear wheel housing.

Test conditions:

- The hydraulic system is depressurized.
- The visual inspection is done at a system pressure of 0 bar.
- The hydraulic oil level is correct when it matches the “MAX” mark -A-.
- Fill the hydraulic oil level through the sealing cap -1- until the oil level aligns with the “MAX” mark -A-, if necessary. For the correct hydraulic oil, refer to the electronic parts catalog ETKA.

If the hydraulic oil level is correct:

- Install the cap -1-.
- Tightening specification, refer to [⇒ “2.9 Hydraulic Unit Overview, R tronic”, page 75](#).



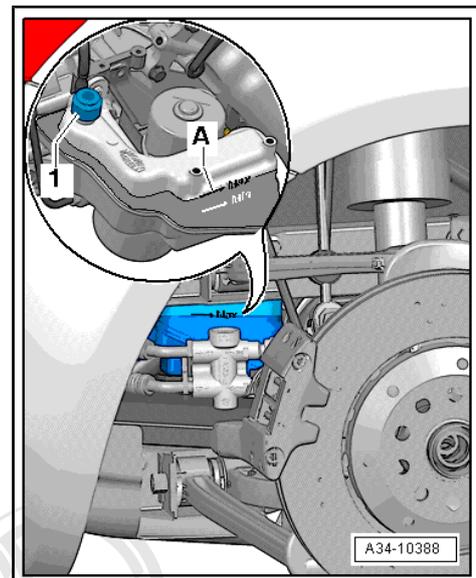
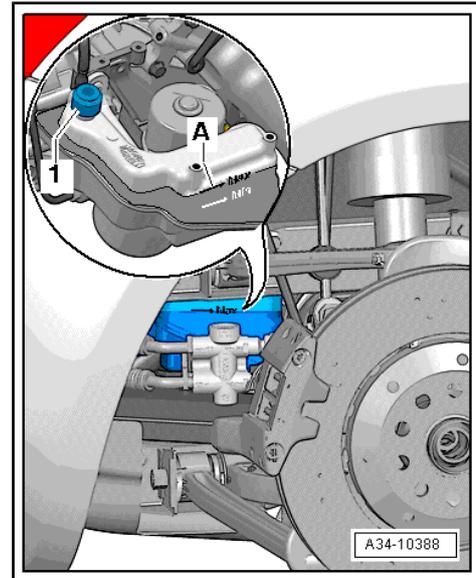
Note

Depending on the vehicle, there are different caps installed, with and without a vent hose.

- Leaky caps -1- must be replaced with a cap having a vent hose. Refer to the electronic parts catalog ETKA. routing and attaching the cap vent hose. Refer to [⇒ Fig. ““Cap Venting Hose Routing and Attaching””, page 77](#).

Install in reverse order of removal paying attention to the following:

- Install the right rear wheel. Refer to ⇒ Wheel and Tire Guide; Rep. Gr. 44 ; Removal and Installation .
- Install the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .



2.12 Hydraulic System, Building System Pressure, R tronic

Special tools and workshop equipment required

- ◆ Vehicle Tester

Test Conditions

- The parking brake is engaged.
- Move the selector lever into “N”
- The engine is off.
- Vehicle diagnosis tester is connected.
- The ignition is switched on.

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 **WARNING**

There is a risk of injury. The pressure in the R tronic hydraulic system may be up to 50 bar.

- ◆ *Always reduce the pressure in the system before working on the R tronic hydraulic system.*

- Select Hydraulic System Decrease Pressure on the vehicle diagnosis tester under Guided Functions in the 02 - Transmission Electronics directory and release the pressure in the hydraulic system.

 **Note**

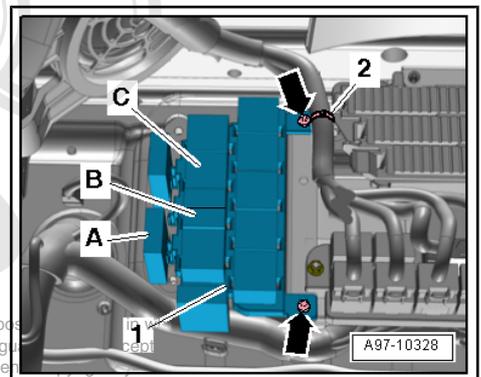
To reduce the system pressure, the clutch valve is activated in second cycle and the transmission hydraulic pump - V387- is deactivated. The pumping reduces the system pressure in stages to 0 bar.

 **WARNING**

There is a risk of injury. The pressure in the R tronic hydraulic system may be up to 50 bar.

To prevent the hydraulic system from repressurizing while working on it, the transmission hydraulic pump must remain deactivated. The instructions for this in the vehicle diagnosis, testing and information system must be followed exactly.

Installed Location Transmission Hydraulic Pump Relay - J510- - R8 Coupe



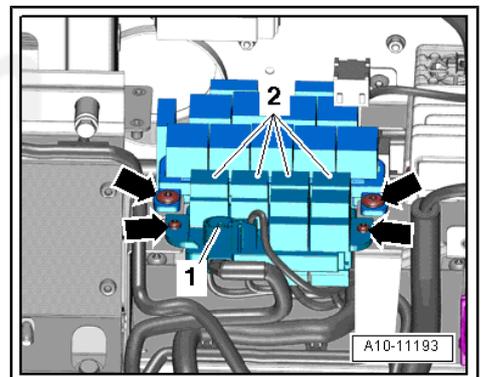
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Transmission Hydraulic Pump Relay - J510- - R8 Spyder

The transmission hydraulic pump relay is in the relay panel under the rear shelf. For removal and installation, see ⇒ Wiring diagrams, Troubleshooting & Component locations.

If the work on the R tronic hydraulic system is finished:

- The hydraulic system is completely closed, it is not possible for hydraulic oil to escape.
- Turn off the ignition.
- Install the transmission hydraulic pump relay, see ⇒ Wiring diagrams, Troubleshooting & Component locations.
- Erase the DTC memory inside the transmission using the vehicle diagnosis tester .



2.13 Transmission Mount Overview

1 - Bolt

2 - Left Transmission Mount

- ❑ Removing and Installing, refer to [⇒ "5.27 Left and Right Transmission Mounts", page 155](#)

3 - Bolt

- ❑ 40 Nm

4 - Left Transmission Support

5 - Spacer

6 - Nut

- ❑ 80 Nm

7 - Bolt

- ❑ 20 Nm

8 - Nut

- ❑ 25 Nm

9 - Nut

- ❑ 80 Nm

10 - Spacer

11 - Right Transmission Support

12 - Bolt

- ❑ 20 Nm

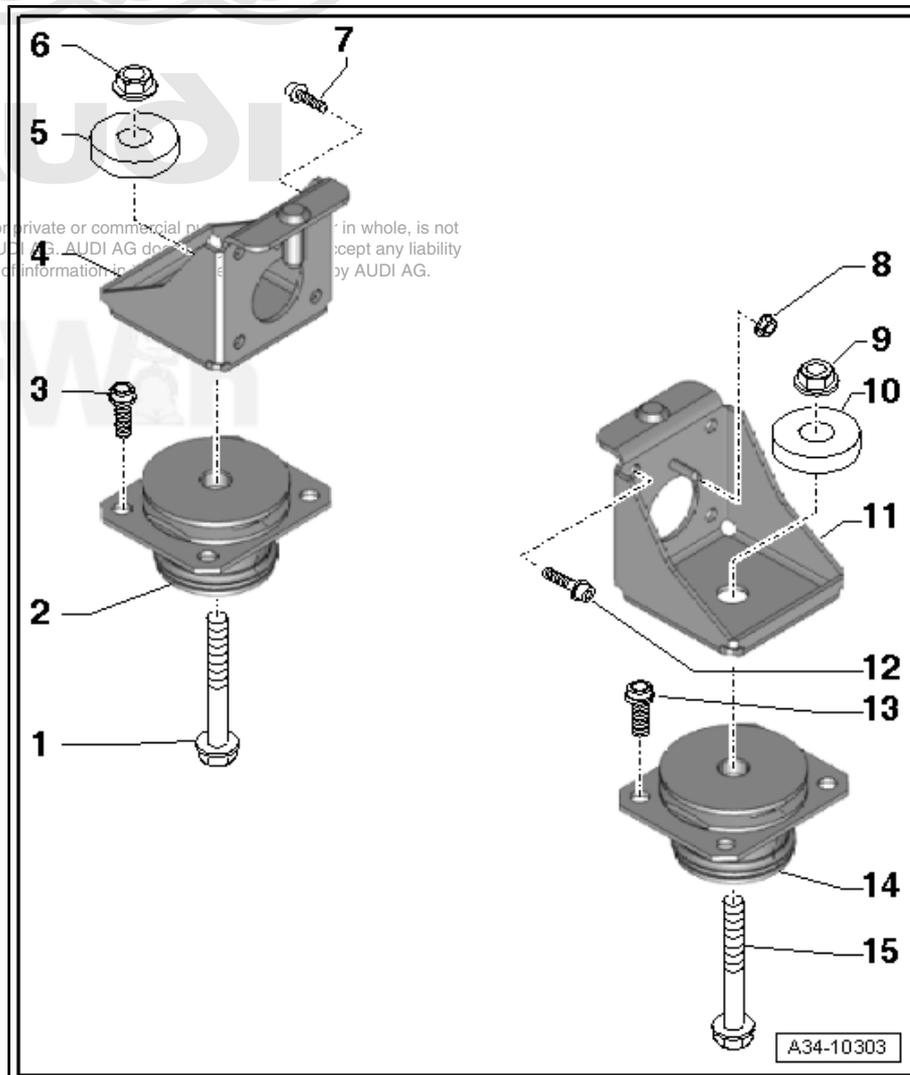
13 - Bolt

- ❑ 40 Nm

14 - Right Transmission Mount

- ❑ Removing and installing, refer to [⇒ "5.27 Left and Right Transmission Mounts", page 155](#)

15 - Bolt



2.14 Transmission Fluid Lines, Transmission Fluid Cooler and Transmission Fluid Filter Overview

Note

A vehicle with transmission fluid cooling is shown in the illustration. Vehicles without transmission fluid cooling have a short circuit wire in place of a transmission fluid cooler. Refer to [Fig. "Rear Transmission Fluid Line, Tightening Specifications - Vehicles without Transmission Fluid Cooling", page 86](#).

1 - Transmission

2 - Seals

- Replace

3 - Banjo Bolt

- 25 Nm

4 - Rear Transmission Fluid Line

- Refer to [⇒ "5.30 Transmission Fluid Lines, Rear, Vehicles with Transmission Fluid Cooling", page 159](#)

5 - Seals

- Replace

6 - Banjo Bolt

- 25 Nm

7 - O-ring

- Replace

8 - Transmission Oil Thermostat

- Refer to [⇒ "5.28 Transmission Fluid Thermostat, Vehicles with Transmission Fluid Cooling", page 156](#)

9 - Bolt

- 20 Nm

10 - Spacer

11 - Grommet

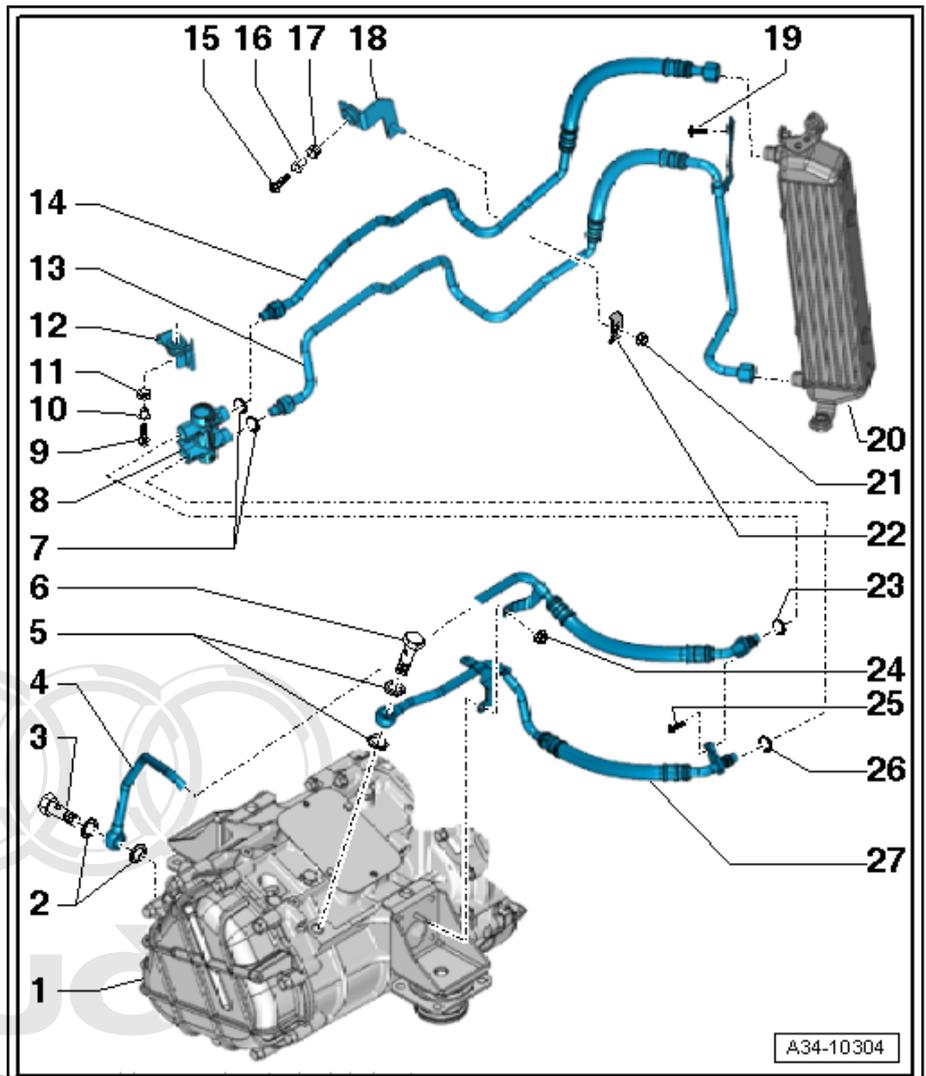
12 - Thermostat Bracket

13 - Front Transmission Fluid Pipe

- Refer to [⇒ "5.29 Transmission Fluid Lines, Front, Vehicles with Transmission Fluid Cooling", page 157](#)
- To the thermostat 20 Nm
- To the transmission fluid cooler 25 Nm

14 - Front Transmission Fluid Line

- Refer to [⇒ "5.29 Transmission Fluid Lines, Front, Vehicles with Transmission Fluid Cooling", page 157](#)
- To the thermostat 20 Nm



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- To the transmission fluid cooler 25 Nm
- 15 - Bolt**
 - 20 Nm
- 16 - Spacer**
- 17 - Grommet**
- 18 - Front Transmission Fluid Pipe Bracket**
- 19 - Bolt**
 - 10 Nm
- 20 - Transmission Oil Cooler**
 - Refer to ⇒ ["5.31 Transmission Oil Cooler", page 160](#)
- 21 - Nut**
 - 5 Nm
- 22 - Clamp**
- 23 - O-ring**
 - Replace
- 24 - Nut**
 - 10 Nm
- 25 - Bolt**
 - 10 Nm
- 26 - O-ring**
 - Replace
- 27 - Rear Transmission Fluid Line**
 - Refer to ⇒ ["5.30 Transmission Fluid Lines, Rear, Vehicles with Transmission Fluid Cooling", page 159](#)

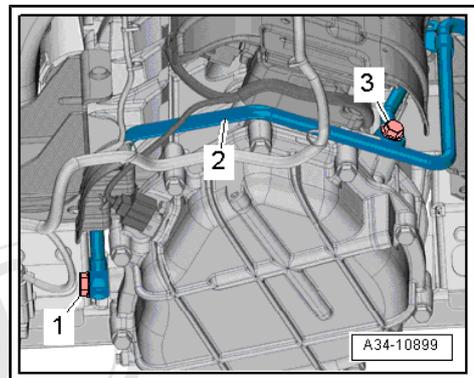
Rear Transmission Fluid Line, Tightening Specifications - Vehicles without Transmission Fluid Cooling



Note

Replace the seals.

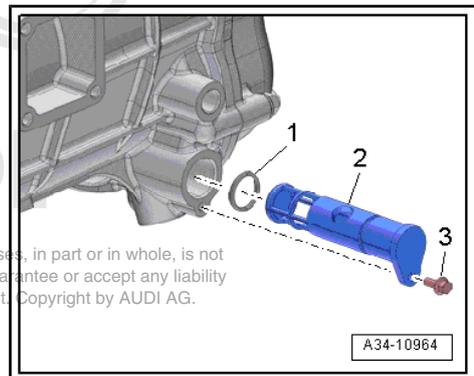
- Tighten the banjo bolts -1 and 3- to 25 Nm.



Transmission Fluid Filter

Installed location: At the back of the transmission on the left side

- 1 - O-ring - replace
- 2 - Transmission fluid filter
- 3 - Bolt - 5.5 Nm



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2.15 Transmission Fluid Cooler Overview

1 - Rear Air Duct

2 - Bolt

- 20 Nm

3 - Bolt

- 20 Nm

4 - Front Transmission Fluid Line

- Return line
- Tightening specification, refer to
 ⇒ ["2.14 Transmission Fluid Lines, Transmission Fluid Cooler and Transmission Fluid Filter Overview"](#), page 85

5 - Front Transmission Fluid Line

- Supply line
- Tightening specification, refer to
 ⇒ ["2.14 Transmission Fluid Lines, Transmission Fluid Cooler and Transmission Fluid Filter Overview"](#), page 85

6 - Plug

- Tightening specification, refer to
 ⇒ ["2.14 Transmission Fluid Lines, Transmission Fluid Cooler and Transmission Fluid Filter Overview"](#), page 85

7 - Transmission Oil Cooler

- Refer to ⇒ ["5.31 Transmission Oil Cooler"](#), page 160

8 - Bolt

- 10 Nm

9 - Grommet

- Quantity: 3

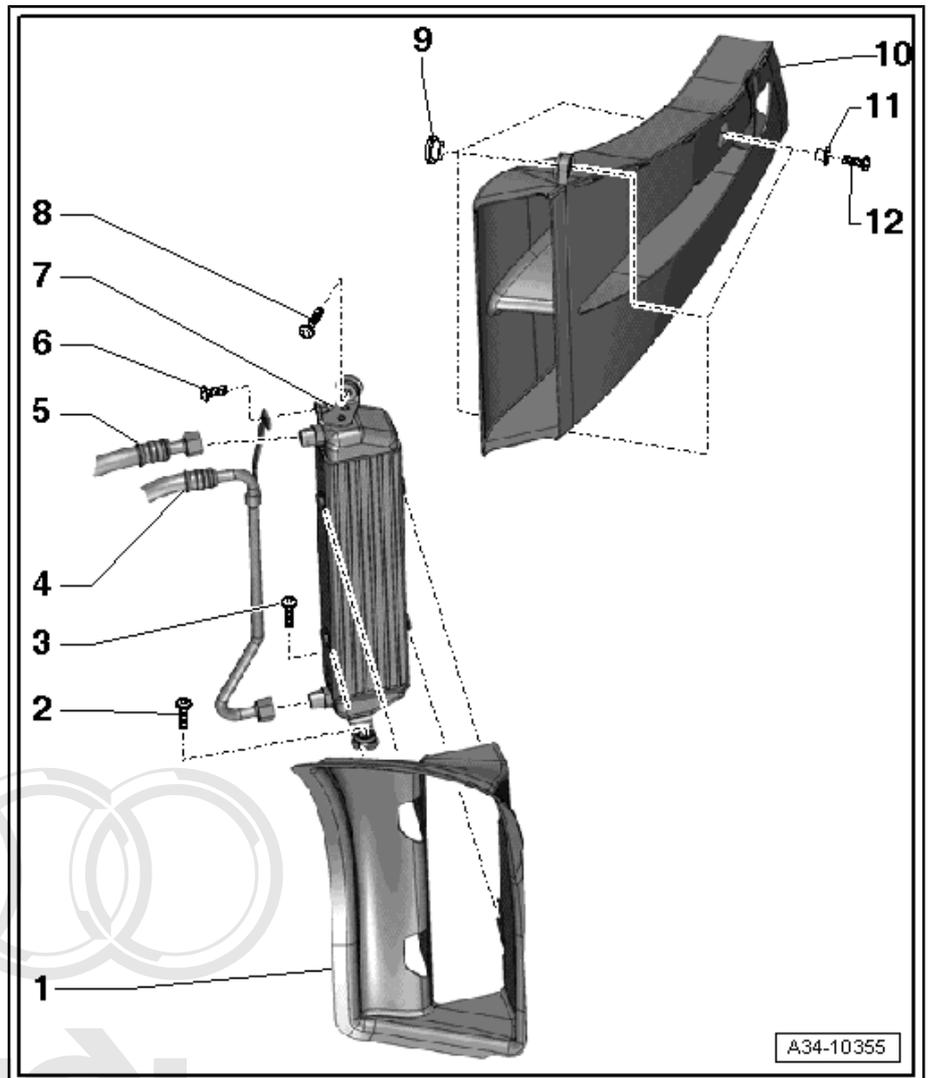
10 - Front Air Duct

11 - Spacer

- Quantity: 3

12 - Bolt

- 10 Nm



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2.16 Manual Transmission Overview

Transmission, disassembling and assembling, refer to
 ⇒ [“2.21 Input Shaft, Output Shaft, Bearing Housing and Shift Forks Overview”, page 94](#) .

1 - Input Shaft

2 - Input Shaft

- ❑ Removing and installing, refer to
 ⇒ [“2.21 Input Shaft, Output Shaft, Bearing Housing and Shift Forks Overview”, page 94](#)
- ❑ Disassembling and assembling, refer to
 ⇒ [“1.1 Input Shaft Overview”, page 187](#)

3 - Output Shaft

- ❑ Removing and installing, refer to
 ⇒ [“2.21 Input Shaft, Output Shaft, Bearing Housing and Shift Forks Overview”, page 94](#)

4 - Rear Helical Gear Axle Drive

5 - Front Helical Gear Axle Drive

6 - Front Final Drive Output Shaft

7 - Pinion

- ❑ For rear final drive

8 - Ring Gear

I - 1st Gear

II - 2nd Gear

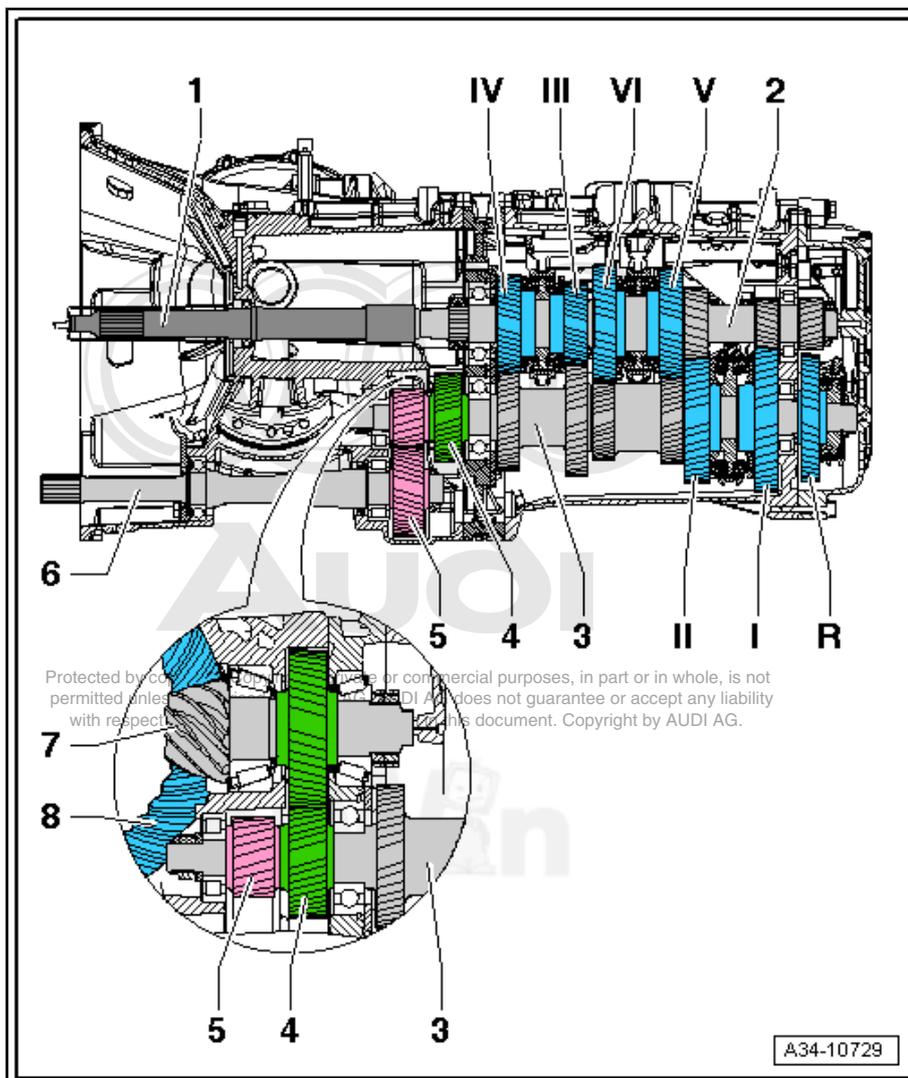
III - 3rd Gear

IV - 4th Gear

V - 5th Gear

VI - 6th Gear

R - Reverse Gear



A34-10729

2.17 Reverse Gear Overview

Reverse gear, removing and installing, refer to
 ⇒ [“6.1 Transmission”, page 170](#) .

1 - Bolt

- 35 Nm
- Quantity: 10

2 - Cover

3 - O-ring

- Replace

4 - Transmission Input Speed Sensor - G182-

- Refer to
 ⇒ [“5.19 Transmission Input Speed Sensor”, page 143](#)

5 - Bolt

- 9 Nm
- Install with sealing compound - AMV 188 001 02-

6 - Stop

- For the reverse gear shift rail
- Install in the end cover, refer to
 ⇒ [Item 2 \(page 89\)](#)
- Install into the end cover using locking compound - D 197 300 A2-

7 - Roller Sleeve

8 - Thrust Washer

With anti-twist mechanism

9 - Reverse Drive Gear

10 - Thrust Washer

With anti-twist mechanism

11 - Roller Sleeve

12 - Transmission Housing

13 - Alignment Sleeve

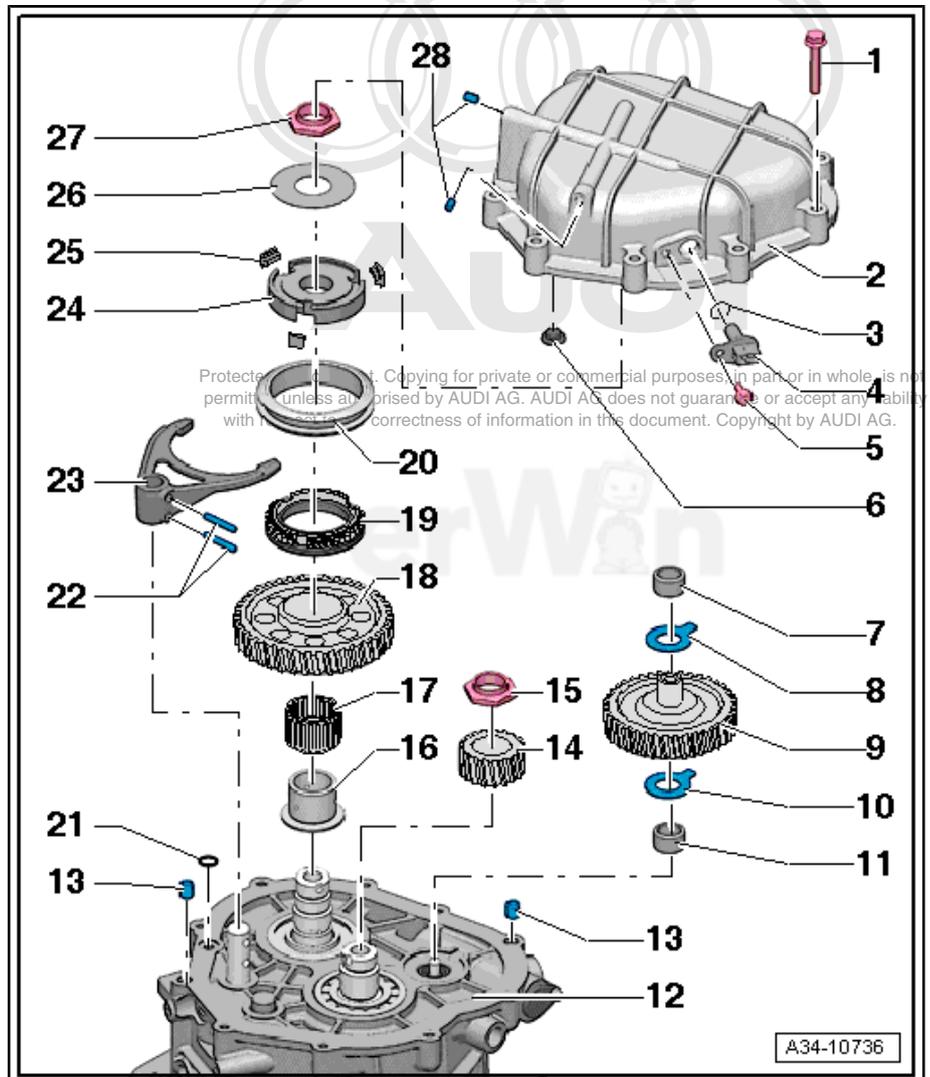
- Quantity: 2

14 - Reverse Gear Wheel

- Mark the top side with color before removing
- Make sure the color indemnification faces upward when installing

15 - Nut

- Replace
- 100 Nm
- Peen the collar, refer to ⇒ [page 179](#)





16 - Inner Race/Needle Bearing

- For reverse gear

17 - Needle Bearing

- For reverse gear

18 - Reverse Gear Wheel

19 - Synchronizer Ring

- For reverse gear

20 - Locking Collar

- For reverse gear
- Installed position: pointed teeth face the gear wheel for reverse gear

21 - O-ring

- Replace

22 - Securing Pin

- Quantity: 2

23 - Shift Fork

- For reverse gear

24 - Synchronizer Hub

- Installed position: the higher inner collar faces the gear wheel for reverse gear

25 - Thrust Piece

- Quantity: 3

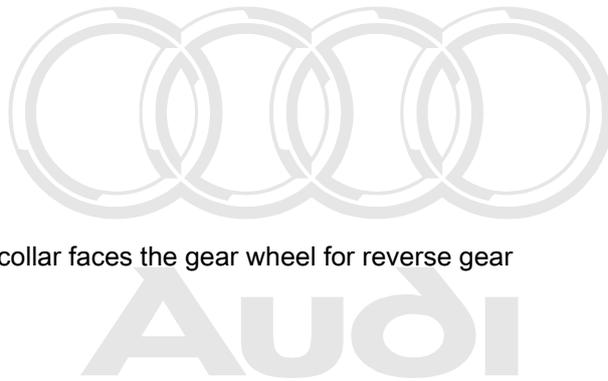
26 - Washer

27 - Nut

- Replace
- 100 Nm
- Peen the collar → [page 179](#)

28 - Drain Plug

- 8 Nm
- Quantity: 2
- Install with sealing compound - AMV 188 001 02-



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2.18 Bearing Housing Overview

1 - Securing Plate

2 - Ball Bearing

- For the output shaft

3 - Locking Ring

- For ball bearing
 ⇒ [Item 2 \(page 91\)](#)

4 - Taper Roller Bearing/Drive Pinion Outer Race

5 - Alignment Sleeves

- Quantity: 2

6 - O-ring

- Replace
- Quantity: 2

7 - Bearing Housing

8 - Seal

- Replace

9 - Transmission Fluid Drain Plug

- Tightening specification
 ⇒ [Item 1 \(page 53\)](#)

10 - Seal

- Replace

11 - Oil Check Plug

- Tightening specification
 ⇒ [Item 7 \(page 54\)](#)
- Not installed on all versions

12 - Ball Sleeve or Bearing Bushing

- Quantity: 2
- Ball sleeve on the manual transmission
- Bearing bushing on the R tronic

13 - Locking Ring

- For ball bearing ⇒ [Item 14 \(page 91\)](#)

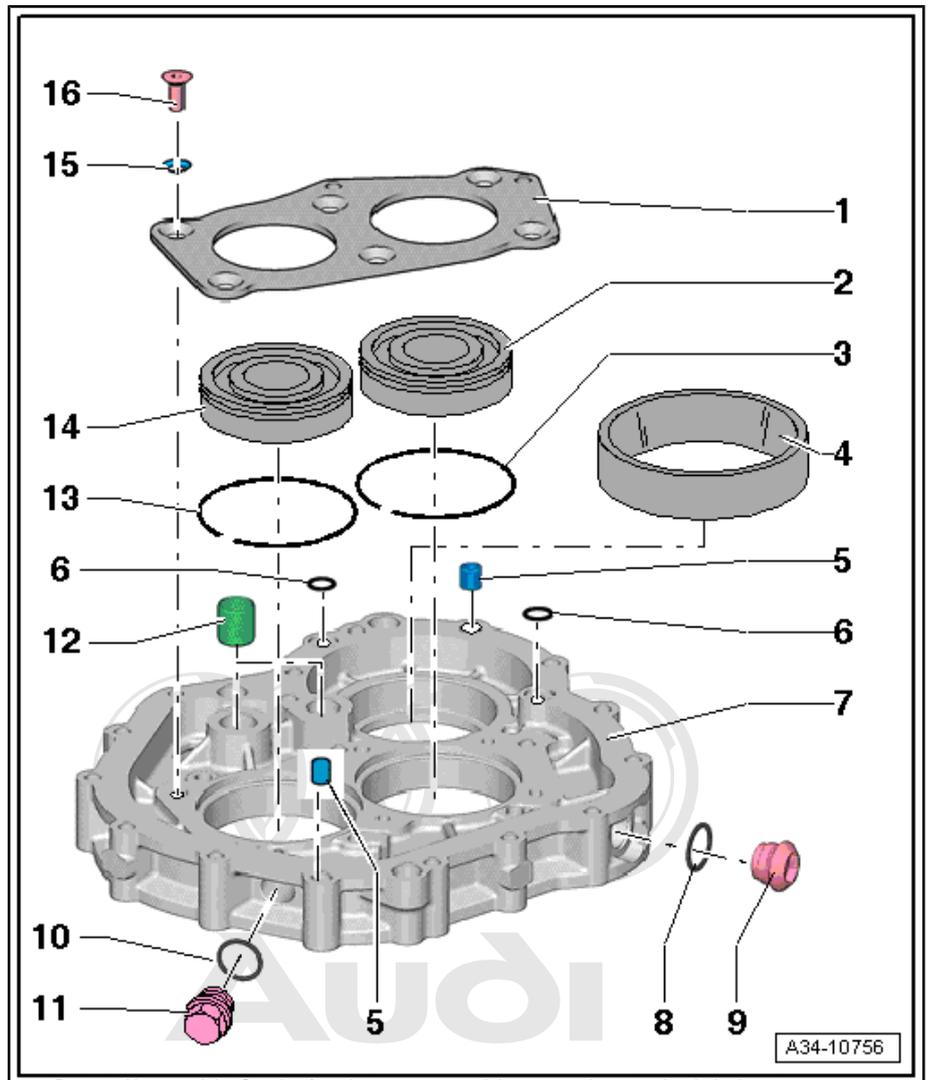
14 - Ball Bearing

- For the input shaft

15 - Washer

16 - Bolt

- 25 Nm
- Quantity: 6



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2.19 Shift Forks and Shift Rails Overview

1 - Gearshift Rod

- For 3rd to 6th gear
- Removing and installing, refer to [⇒ "5.32 Shift Forks, 3rd through 6th Gear", page 161](#)

2 - Shift Fork for 5th and 6th Gears

- Installed position; refer to [⇒ Fig. "Installation Position, Shift Rods and Shift Forks", page 93](#)
- Refer to [⇒ "5.32 Shift Forks, 3rd through 6th Gear", page 161](#)
- Checking for wear, refer to [⇒ Fig. "Checking 3rd to 6th Gear Shift Forks for Wear", page 93](#)

3 - Securing Pin

- Quantity: 2
- Only on transmissions with R tronic

4 - Center Bolt

- 15 Nm
- Secure with locking fluid - D 197 300 A2-
- Only on the manual transmission

5 - Ball Sleeve or Bearing Bushing

- Ball sleeve on the manual transmission
- Bearing bushing on the R tronic

6 - Shift Fork for 3rd and 4th Gears

- Installed position; refer to [⇒ page 93](#)
- Refer to [⇒ "5.32 Shift Forks, 3rd through 6th Gear", page 161](#)
- Checking for wear, refer to [⇒ Fig. "Checking 3rd to 6th Gear Shift Forks for Wear", page 93](#)

7 - Gearshift Rod

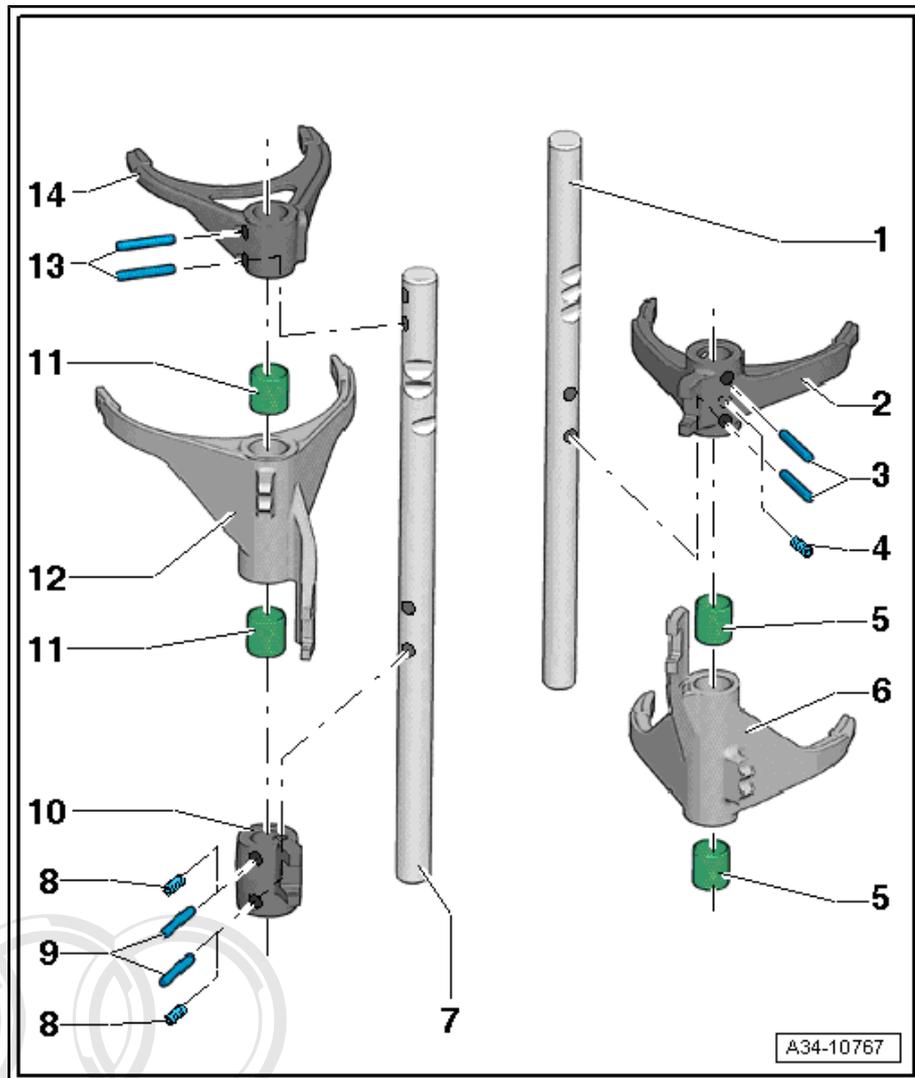
- For 1st, 2nd and reverse gears
- Removing and installing, refer to [⇒ "5.33 Shift Fork, 1st and 2nd Gear", page 168](#)

8 - Centering Bolt

- 15 Nm
- Quantity: 2
- Secure with locking fluid - D 197 300 A2-
- Only on the manual transmission

9 - Securing Pin

- Quantity: 2



- ❑ Only on transmissions with R tronic

10 - Mount

- ❑ Removing and installing, refer to ⇒ [“5.33 Shift Fork, 1st and 2nd Gear”, page 168](#)

11 - Ball Sleeve or Bearing Bushing

- ❑ Ball sleeve on the manual transmission
- ❑ Bearing bushing on the R tronic

12 - Shift Fork for 1st and 2nd Gears

- ❑ Installed position; refer to ⇒ [Fig. “Installation Position, Shift Rods and Shift Forks””, page 93](#)
- ❑ Refer to ⇒ [“5.33 Shift Fork, 1st and 2nd Gear”, page 168](#)

13 - Securing Pin

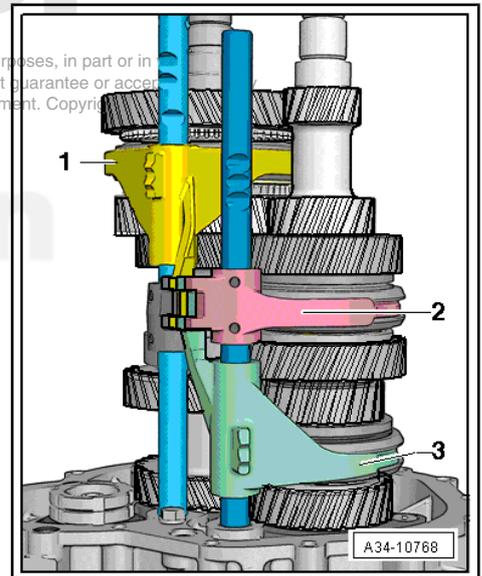
- ❑ Quantity: 2

14 - Reverse Gear Shift Fork

- ❑ Removing and installing, refer to ⇒ [“6.1 Transmission”, page 170](#)

Installation Position, Shift Rods and Shift Forks

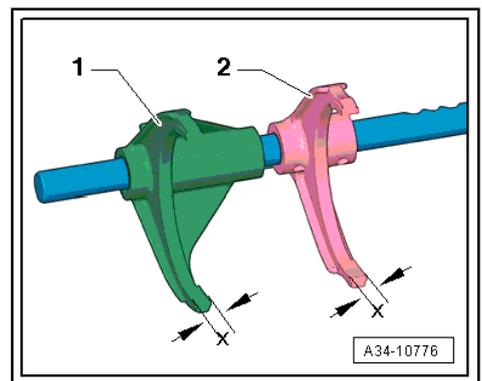
- 1 - Shift fork for 1st and 2nd gears
- 2 - Shift fork for 5th and 6th gears
- 3 - Shift fork for 3rd and 4th gears



Checking 3rd to 6th Gear Shift Forks for Wear

Component	Dimension -x-
-1- shift fork for 3rd and 4th gear	Minimum 9.55 mm
-2- shift fork for 5th and 6th gear	Minimum 9.55 mm

- Replace worn shift forks.



2.20 Transmission, Securing in Engine/ Transmission Holder

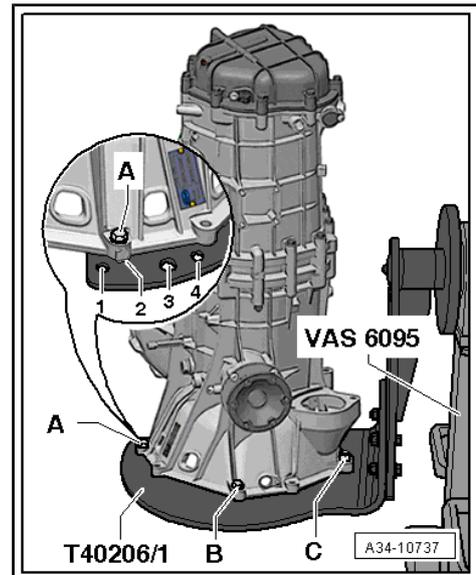
Special tools and workshop equipment required

- ◆ Engine and Transmission Holder - VAS 6095-
- ◆ Transmission Support - T40206/1-



- Mount the transmission to the -T40206/1- as follows:

Plug	Hole Number
A	2
B	7
C	10



2.21 Input Shaft, Output Shaft, Bearing Housing and Shift Forks Overview

1 - Bolt

- 30 Nm
- For the transmission cover

2 - Shift Fork

- For 1st and 2nd gear
- Installed position; refer to
⇒ [Fig. "Installation Position, Shift Rods and Shift Forks", page 93](#)
- Disassembling and assembling; refer to
⇒ ["2.19 Shift Forks and Shift Rails Overview", page 92](#)

3 - Roller Bearing

- Installed inside the transmission housing

4 - Output Shaft

- Refer to
⇒ ["1.2 Output Shaft Overview", page 191](#)

5 - Alignment Sleeves

- Quantity: 2

6 - Bolt

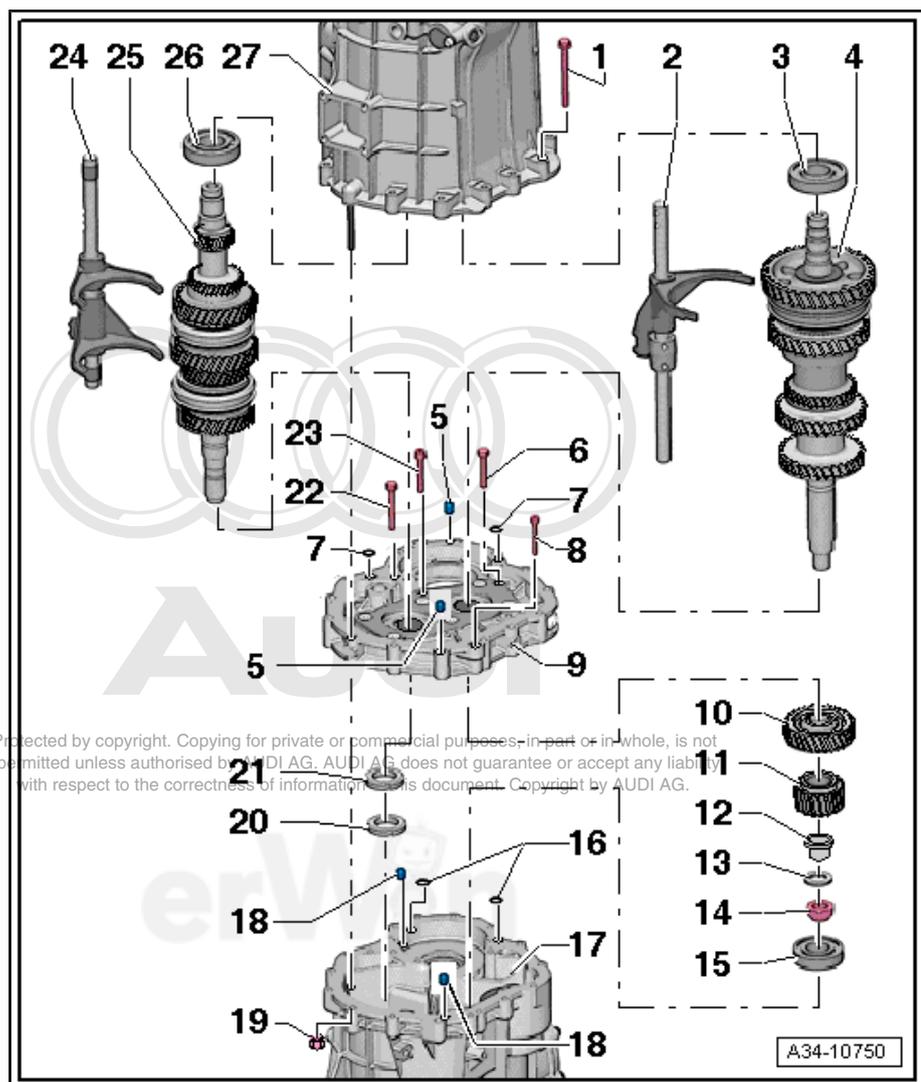
- 30 Nm

7 - O-ring

- Replace
- Quantity: 2

8 - Hex Socket Bolt

- 24 Nm
- Quantity: 3



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- With washer
- Installed countersunk inside the bearing housing

9 - Bearing Housing

- Refer to ⇒ [“2.18 Bearing Housing Overview”, page 91](#)

10 - Drive Gear - Helical Gear for Rear Axle Drive

11 - Drive Gear - Helical Gear for Front Axle Drive

12 - Inner Race

For roller bearing ⇒ [Item 15 \(page 95\)](#)

13 - Washer

14 - Nut

- Replace
- 160 Nm
- Peen the collar

15 - Roller Bearing

- Is installed inside the clutch housing

16 - O-ring

- Replace
- Quantity: 2

17 - Clutch Housing

18 - Alignment Sleeves

- Quantity: 2

19 - Nut

- 30 Nm
- Quantity: 3
- With washer

20 - Grooved Nut

- 100 Nm
- Secure with locking fluid - D 197 300 A2-
- Installed position: the collar faces the bearing housing, refer to ⇒ [Item 9 \(page 95\)](#)

21 - Grooved Nut

- 100 Nm
- Secure with locking fluid - D 197 300 A2-
- Installed position: the collar faces the bearing housing, refer to ⇒ [Item 9 \(page 95\)](#)

22 - Bolt

- 30 Nm

23 - Hex Socket Bolt

- 24 Nm
- With washer

24 - Shift Fork

- For 3rd to 6th gear
- Installed position; refer to ⇒ [Fig. “Installation Position, Shift Rods and Shift Forks”, page 93](#)
- Disassembling and Assembling, refer to ⇒ [“2.19 Shift Forks and Shift Rails Overview”, page 92](#)

25 - Input Shaft

- Refer to ⇒ [“1.1 Input Shaft Overview”, page 187](#)

26 - Roller Bearing

- Installed inside the transmission housing

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27 - Transmission Housing



Audi

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3 Specifications

⇒ **“3.1 Fastener Tightening Specifications”, page 97**

3.1 Fastener Tightening Specifications

Components	Bolt Size	Nm
Back-Up Lamp Switch	-	20
Bearing Housing		
	-	30
Hex Socket Bolt	-	24
Bearing Housing Grooved Nut ⁴	-	100
Bracket for the Center Console	-	10
Bracket for the Cover	-	22
Bracket for the R tronic Shift Actuator on the Transmission		
-Upper Bolts	-	10
-Lower Bolt	-	18
Bracket for Transmission Hydraulic Pump - V387-	-	24
Cable Mounting Bracket	-	20
Clamp Nut	-	5
Clutch Actuator Valve - N255-	-	3.6
Clutch Housing Grooved Nut ⁴	-	100
Cover for Hydraulic Oil Reservoir	-	1.3
Cover with Selector Lever Transmission Range Display - Y5-	-	3
Drain Plug ²	-	8
End Cover	-	35
Front Air Duct	-	10
Front Transmission Oil Line	-	10
Front Transmission Oil Line Bracket	-	20
Front Transmission Oil Line to the Thermostat	-	20
Front Transmission Oil Line to the Transmission Oil Cooler	-	25
Gear Selection Valve 1 - N284-	-	3.6
Gear Selection Valve 2 - N285-	-	3.6
Gear Selection Valve 3 - N286-	-	3.6
Gear Recognition Sensor - G604-	-	3.6
Gear Recognition Sensor 2 - G616-	-	3.6
Heat Shield	-	10
Hydraulic Oil Reservoir	-	10
Hydraulic Pressure Line		
-Bolt	-	10
-Union Nut	-	24
-Banjo Bolt	-	25
Hydraulic Pressure Sensor - G270-	-	15
Left Transmission Support		
-Bolt	-	20
-Nut	-	80
Locking Plate	-	10
Mechanical Hydraulic Pump	-	5.5

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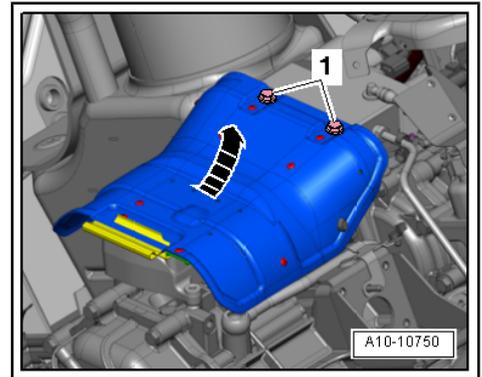


Components	Bolt Size	Nm
Mount ⁴	-	15
Mounting Plate for Selector Housing	-	20
Oil Check Plug (only on new transmission versions)	-	50
Oil Drain Plug	-	50
Oil Fill Plug	-	50
Only on Old Transmission Versions May not be Used for Checking the Oil Level (incorrect oil level)	-	50
Pressure Reservoir	-	55
R tronic Shift Actuator		
	M6	10
	M8	24
Rear Transmission Oil Line (banjo bolt)	-	25
Rear Transmission Oil Line Nut	-	10
Retaining Clamp		
-Nut	-	8
-Bolt	-	8
Reverse Gear Wheel, Nut ³	-	100
Right Transmission Support		
-Bolt	-	20
-Upper Nut	-	25
-Lower Nut	-	80
Roller Bearing Nut ³	-	160
Securing Plate	-	25
Selector Gear for Reverse Gear, Nut ³	-	100
Selector Relay Lever	-	30
Shift Fork for 5th and 6th Gears ⁴	-	15
Selector Lever Handle to the Selector Lever	-	8
Selector Lever Sensor System Control Module - J587-	-	3
Shift Housing, Nut	-	55
Shift Lever Guide	-	5
Shift Mechanism Housing	-	18
Shift Relay Lever	-	30
Shift Unit	-	10
Thermostat Bracket	-	20
Transmission Control Module J217- to Bracket	-	9
Transmission Housing	-	30
Transmission Hydraulic Pump - V387-	-	10
Transmission Input Speed (RPM) Sensor - G182- ²	-	9
Transmission Mounts	-	40
Transmission Oil Cooler ¹		
	-	10
	-	20
Upper Section of the Housing	-	3

Components	Bolt Size	Nm
<ul style="list-style-type: none"> • ¹ For bolt tightening clarification, refer to ⇒ “2.15 Transmission Fluid Cooler Overview”, page 87 and see items -2, 3, 6 and 8- • ² Install with sealing compound - AMV 188 001 02- • ³ Replace • ⁴ Secure with locking fluid - D 197 300 A2- 		

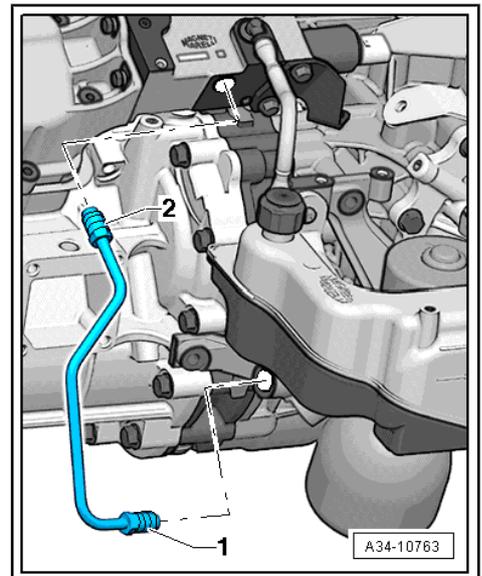
Heat Shield Over the R tronic Shift Actuator, Tightening Specifications

- Tighten the bolts -1- to 10 Nm.



Hydraulic Pressure Pipe Without the Brass Adapter

- ◆ Union nut -1- to the R tronic hydraulic unit - 18 Nm
- ◆ Union nut -2- to the R tronic shift actuator - 18 Nm

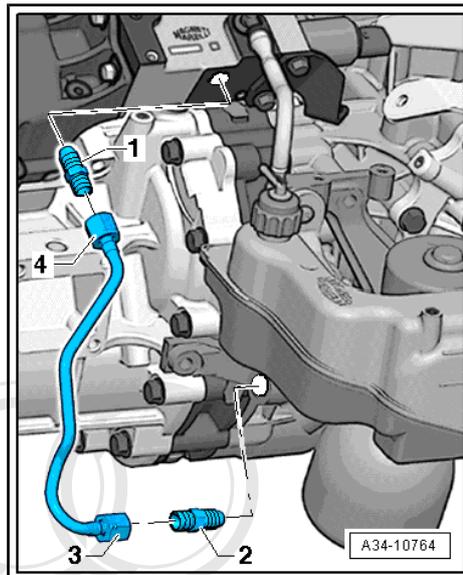


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Hydraulic Pressure Pipe with Threaded Adapters

- ◆ Threaded adapter -1- to the R tronic hydraulic unit - 30 Nm
- ◆ Threaded adapter -2- to the R tronic shift actuator - 30 Nm
- ◆ Union nuts -3 and 4- to threaded adapter - 25 Nm



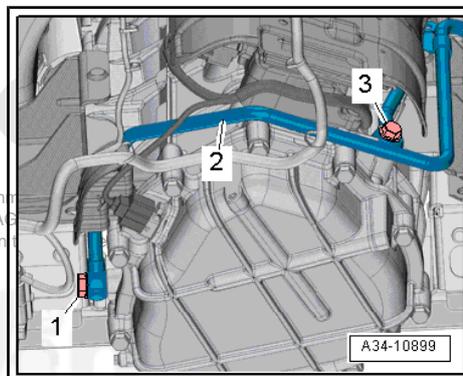
Rear Transmission Fluid Line, Tightening Specifications - Vehicles without Transmission Fluid Cooling

 **Note**

Replace the seals.

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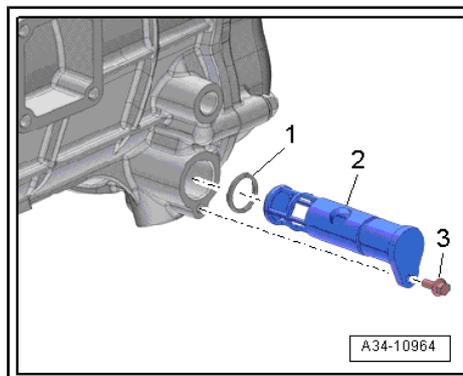
- Tighten the banjo bolts -1 and 3- to 25 Nm.



Transmission Fluid Filter

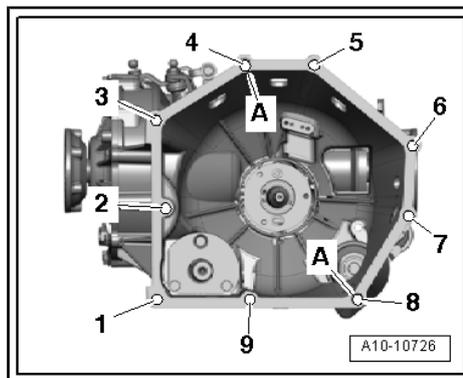
Installed location: At the back of the transmission on the left side

- 1 - O-ring - replace
- 2 - Transmission fluid filter
- 3 - Bolt - 5.5 Nm



Mounting Transmission to Engine

Item	Nut/Bolt	Nm
1, 2, 7, 8	M10	45
3 to 6	M10	65
9	M10 x 175	45
A	Alignment sleeves for centering	



4 Diagnosis and Testing

⇒ **“4.1 Oil Level in R tronic Hydraulic Unit, Checking”, page 101**

4.1 Oil Level in R tronic Hydraulic Unit, Checking

Special tools and workshop equipment required

- ◆ Vehicle Tester

Procedure

- Body protectors, installing, refer to
⇒ **“4.1 Body Protectors, Installing”, page 15**.

Test Conditions

- The vehicle must be absolutely level.
- The engine is off.
- Vehicle diagnosis tester is connected.
- The ignition is switched on.
- The parking brake is engaged.
- Using the vehicle diagnosis tester under Guided Functions, go to the 02 - transmission electronics directory and select read measured values.
- Switch back and forth between “1st gear” and “reverse gear” with the selector lever until the transmission hydraulic pump - V387- starts running.
- The measured value on the vehicle diagnosis tester for the “hydraulic pump relay activation” must change from “0” to “1”.

Note

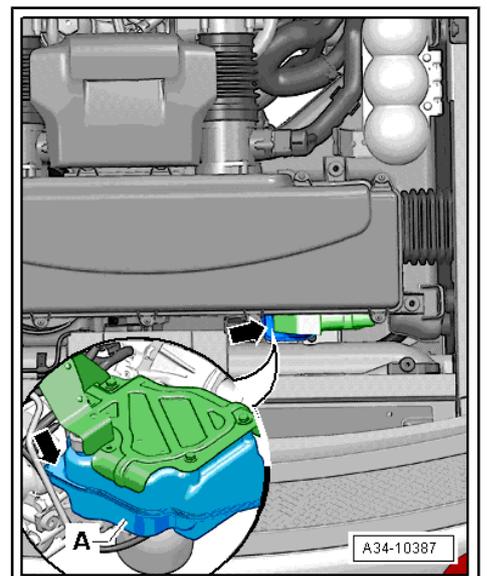
The transmission hydraulic pump - V387- switches off when the system pressure reaches 50 bar.

When the measured value on the vehicle diagnosis tester for the “hydraulic pressure sensor” has reached “50 bar”:

- Check the inspection surface -arrow- on the reservoir -A-.

Note

The inspection surface can be viewed without removing the air filter housing, for example using a flashlight.



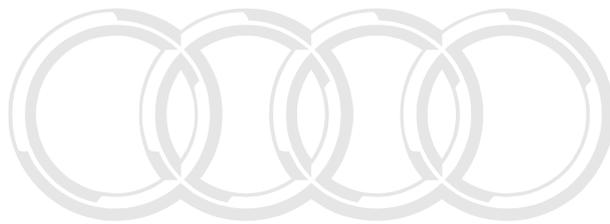
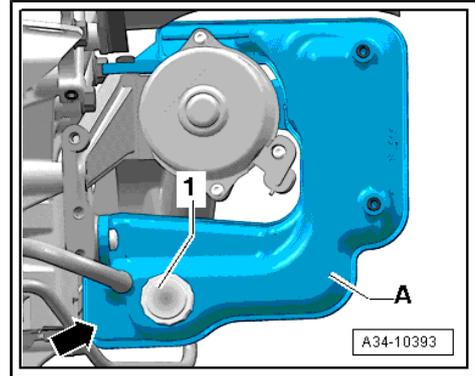


- Specified value: The inspection surface -arrow- on the reservoir -A- must lie completely in the oil. The surface appears green.



Note

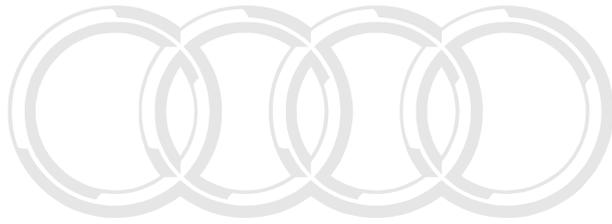
- ◆ *The illustration shows the transmission removed.*
- ◆ *Do not open the cap -1- under any circumstances.*
- If the specified value is reached and the oil level in the hydraulic system is correct, the test can be ended.
- If the specified value is not reached or the surface appears white, the oil level in the R tronic hydraulic unit must be corrected. Refer to [⇒ "2.11 Oil Level in R tronic Hydraulic Unit, Adjusting", page 80](#).



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5 Removal and Installation

- ⇒ [“5.1 Transmission, Removing”, page 104](#)
- ⇒ [“5.2 Transmission, Installing”, page 112](#)
- ⇒ [“5.3 Transmission Control Module J217”, page 115](#)
- ⇒ [“5.4 Shift Mechanism, Manual Transmission”, page 115](#)
- ⇒ [“5.5 Shift Cable and Selector Cable, Manual Transmission”, page 116](#)
- ⇒ [“5.6 Selector Mechanism, R tronic”, page 118](#)
- ⇒ [“5.7 Selector Lever Handle, R tronic”, page 119](#)
- ⇒ [“5.8 Selector Mechanism Cover, R tronic”, page 119](#)
- ⇒ [“5.9 Sport Program Button E541, R tronic”, page 120](#)
- ⇒ [“5.10 Selector Lever Transmission Range Display, R tronic”, page 121](#)
- ⇒ [“5.11 Selector Lever Sensor System Control Module, R tronic”, page 122](#)
- ⇒ [“5.12 Shift Actuator, R tronic”, page 123](#)
- ⇒ [“5.13 Hydraulic Return Hose”, page 129](#)
- ⇒ [“5.14 Clutch Actuator Valve and Gear Selection Valves”, page 129](#)
- ⇒ [“5.15 Hydraulic Pressure Sensor”, page 132](#)
- ⇒ [“5.16 Gear Recognition Sensor”, page 133](#)
- ⇒ [“5.17 Gear Recognition Sensor 2”, page 135](#)
- ⇒ [“5.18 Adapter Wiring Set, Gear Recognition Sensors, Installing”, page 137](#)
- ⇒ [“5.19 Transmission Input Speed Sensor”, page 143](#)
- ⇒ [“5.20 Hydraulic Unit”, page 144](#)
- ⇒ [“5.21 Hydraulic Oil Reservoir”, page 145](#)
- ⇒ [“5.22 Transmission Hydraulic Pump Motor”, page 147](#)
- ⇒ [“5.23 Mechanical Hydraulic Pump”, page 148](#)
- ⇒ [“5.24 Pressure Reservoir”, page 150](#)
- ⇒ [“5.25 Hydraulic Pressure Line from Shift Actuator to R tronic Hydraulic Unit”, page 151](#)
- ⇒ [“5.26 Connections on R tronic Shift Actuator”, page 153](#)
- ⇒ [“5.27 Left and Right Transmission Mounts”, page 155](#)
- ⇒ [“5.28 Transmission Fluid Thermostat, Vehicles with Transmission Fluid Cooling”, page 156](#)
- ⇒ [“5.29 Transmission Fluid Lines, Front, Vehicles with Transmission Fluid Cooling”, page 157](#)
- ⇒ [“5.30 Transmission Fluid Lines, Rear, Vehicles with Transmission Fluid Cooling”, page 159](#)
- ⇒ [“5.31 Transmission Oil Cooler”, page 160](#)
- ⇒ [“5.32 Shift Forks, 3rd through 6th Gear”, page 161](#)
- ⇒ [“5.33 Shift Fork, 1st and 2nd Gear”, page 168](#)

5.1 Transmission, Removing

Special tools and workshop equipment required

- ◆ Pry Lever - Rmv Outside Mirror - 80 - 200-
- ◆ Engine Sling - 2024 A-
- ◆ Hose Clamps Up to 25 mm Dia. - 3094-
- ◆ Oil Collecting and Extracting Device - V.A.G 1782-
- ◆ Shop Crane - VAS 6100-
- ◆ Lifting Eye for Removing Transmission - T40137-
- ◆ Retaining Strap - T40155-

Procedure

 **Note**

- ◆ Remove the transmission upward.
- ◆ When installing, bring all cable ties back to same positions.

 **WARNING**

There is a risk of injury. The pressure in the R tronic hydraulic system may be up to 50 bar.

◆ ***Always reduce the pressure in the system before working on the R tronic hydraulic system. Refer to ⇒ "2.12 Hydraulic System, Building System Pressure, R tronic", page 82 .***

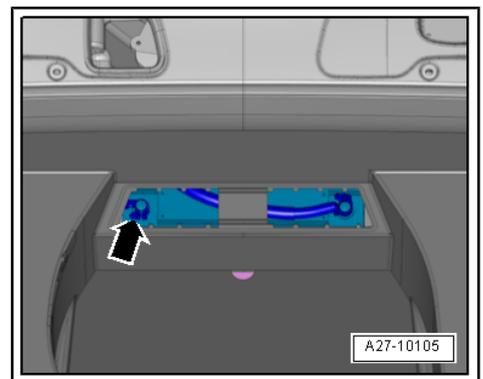
- Reduce the system pressure in the R tronic hydraulic system. Refer to ⇒ "2.12 Hydraulic System, Building System Pressure, R tronic", page 82 .
- Body protectors, installing, refer to ⇒ "4.1 Body Protectors, Installing", page 15 .

 **Caution**

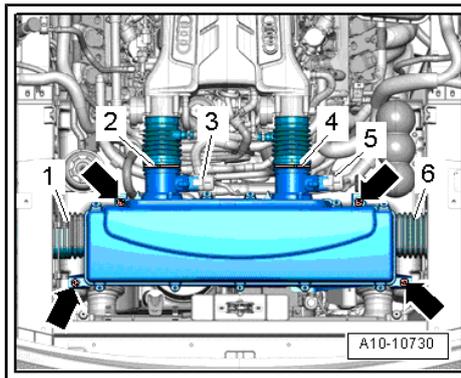
Risk of destroying electronic components when disconnecting the battery.

◆ ***Observe measures for disconnecting battery.***

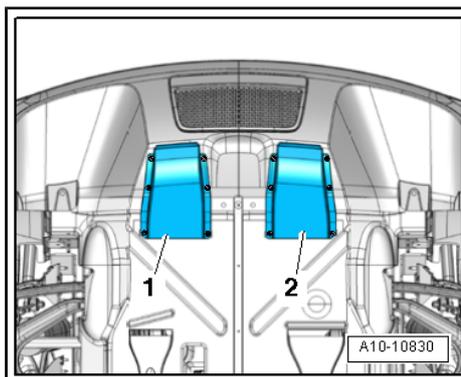
- Turn off the ignition and disconnect the battery ground (GND) cable -arrow-. Refer to ⇒ Electrical Equipment; Rep. Gr. 27 ; Removal and Installation .
- Extract the power steering hydraulic oil from the reservoir using the -V.A.G 1782- .



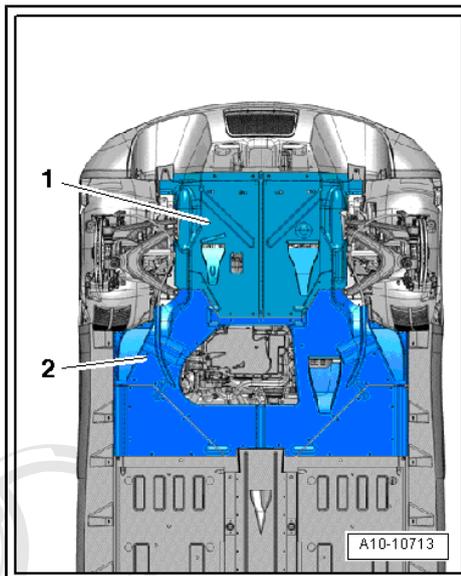
- Remove the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .
- Remove the left and right rear wheels. Refer to ⇒ Wheel and Tire Guide; Rep. Gr. 44 ; Removal and Installation .



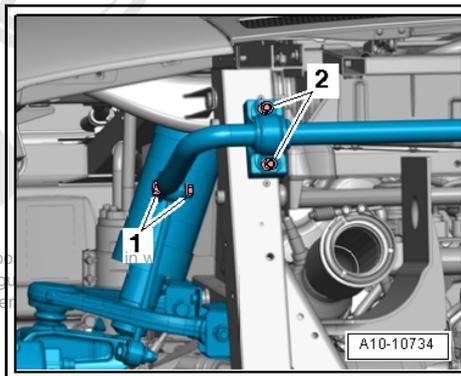
- Remove the air guides -1- and -2-. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Description and Operation .



- Remove the noise insulation -1- and -2-. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .
- Remove the left and right rear wheel housing liners. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .
- Remove the rear bumper cover. Refer to ⇒ Body Exterior; Rep. Gr. 63 ; Removal and Installation .
- Remove the left and right tail lamp. Refer to ⇒ Electrical Equipment; Rep. Gr. 94 ; Removal and Installation .
- Remove the rear bumper. Refer to ⇒ Body Exterior; Rep. Gr. 63 ; Removal and Installation .
- Remove the lock carrier and rear spoiler. Refer to ⇒ Body Exterior; Rep. Gr. 55 ; Removal and Installation .
- Remove the muffler. Refer to ⇒ Engine Mechanical; Rep. Gr. 26 ; Removal and Installation .

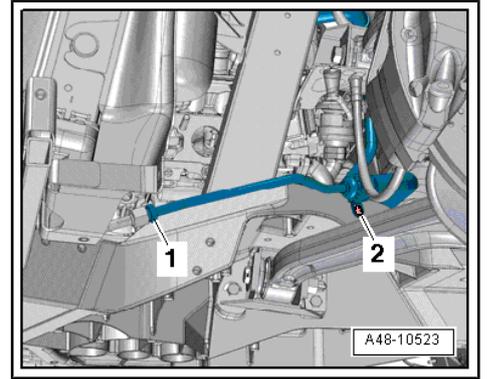


- Remove the left and right bolts -1- and -2- and the stabilizer bar.
- Remove the starter. Refer to ⇒ Electrical Equipment; Rep. Gr. 27 ; Removal and Installation .
- Remove the oil reservoir. Refer to ⇒ Engine Mechanical; Rep. Gr. 17 ; Removal and Installation .
- Place the -V.A.G 1782- under the separating point.



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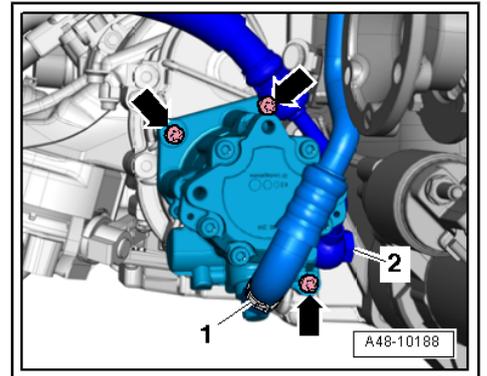
- Disconnect the power steering hydraulic oil pressure line at the threaded connection -1-.
- Remove the bolt -2-.
- Place the -V.A.G 1782- under the separating point.



- Remove the banjo bolt -2- on the power steering pump and the hydraulic oil pressure line.
- Remove the supply hose -1-.

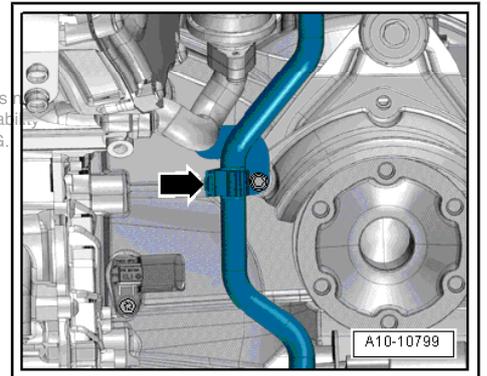
 **Note**

Ignore -arrows-.



- Free up the hydraulic oil line -arrow-.

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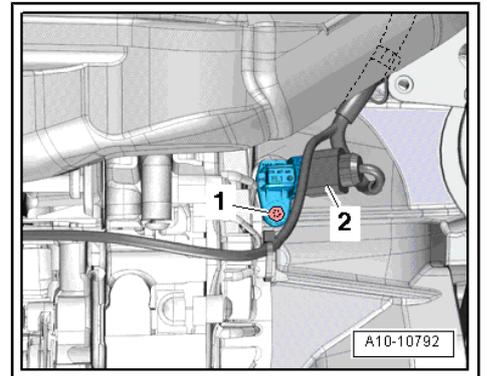
- Disconnect the connector -2- from the engine speed sensor - G28- .

 **Note**

Ignore -1-.

Vehicles with Transmission Fluid Cooling:

- Place the -V.A.G 1782- under the separating point.



- Remove the bolt -arrow- and the transmission oil pipes from the transmission oil thermostat.

 **Note**

Seal the open lines and connections with clean plugs or caps to prevent dirt from getting in.

All Vehicles:

- Remove the bolt -9- that attaches the transmission to the engine and then remove the nuts -1, 7 and 8-.
- Remove the left and right drive axles from the transmission flange shafts. Refer to => Suspension, Wheels, Steering; Rep. Gr. 42 ; Removal and Installation .

Manual Transmission:

 **Note**

To collect escaping brake fluid lay a clean cloth under the separating point.

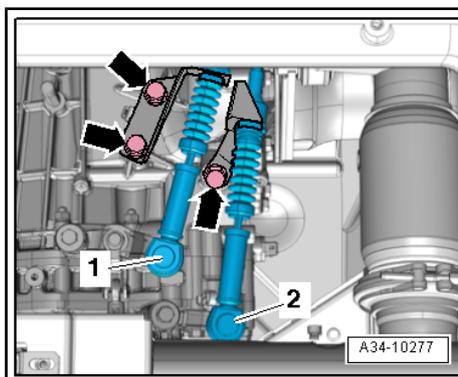
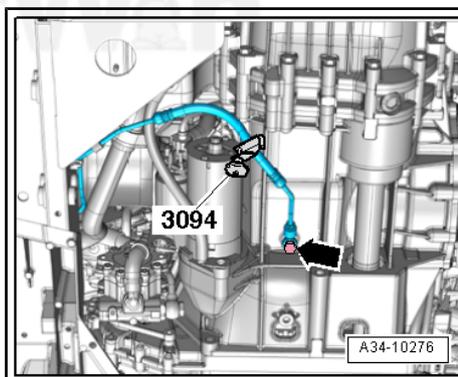
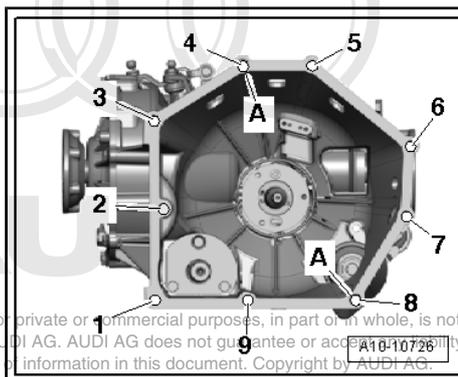
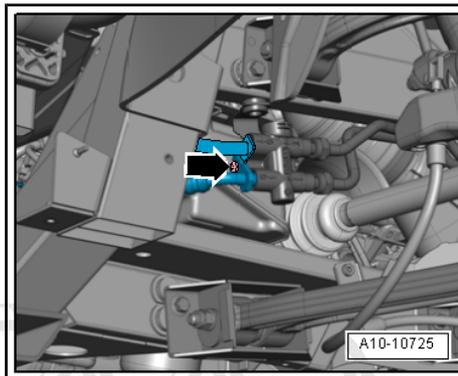
- Clamp off the pipe/hose line with -3094- .
- Remove the banjo bolt -arrow- and move the hose/line assembly to the side.

 **Caution**

There is a risk of contamination from the leaking brake fluid.

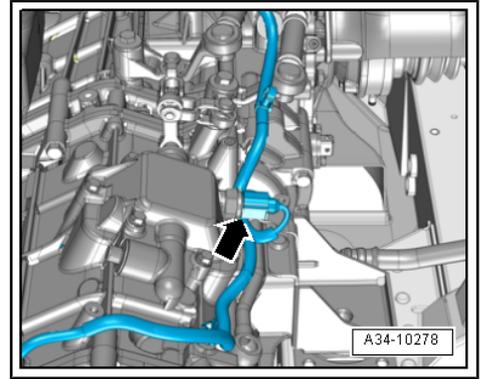
- ◆ *Do not press the clutch pedal if the hose/line assembly is separated from the clutch slave cylinder.*

- Using the -80 - 200- , press the selector lever cable ball stud -1- off the selector relay lever and the shift cable ball socket -2- from the selector shaft lever.
- Secure the shift cables to the top.

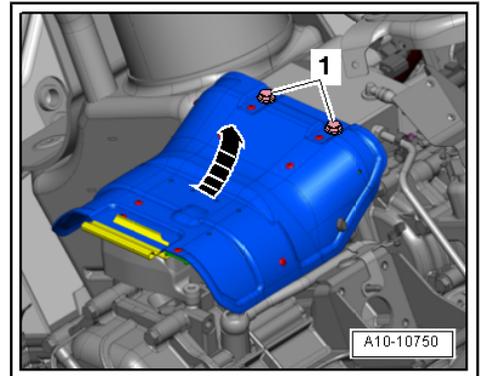


- Disconnect the connector -arrow- from the back-up lamp switch - F4- and free up the electric wire.

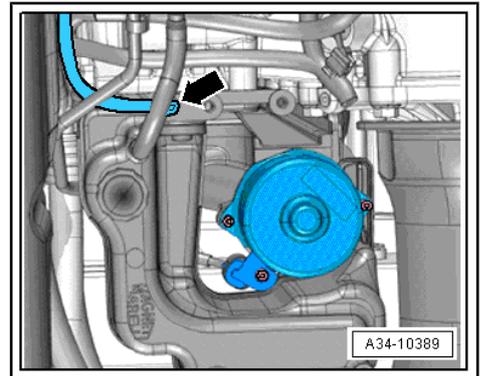
R tronic:



- Remove the bolts -1- and the heat shield -arrow-.



- Remove the ground (GND) connection -arrow- at the top of the hydraulic unit bracket.

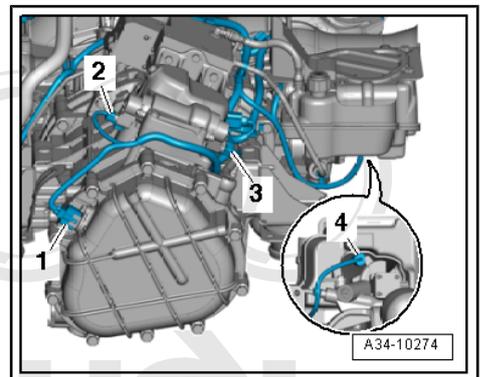


- Disconnect the connectors -1 through 4- and free them up.

Caution

There is a risk of confusing the connectors.

◆ *The connectors on the gear selection valves are color coded to prevent them from getting confused. If the color marking is no longer visible, mark the connectors before disconnecting them.*



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- Disconnect the connectors -1 through 6- and free them up.
- Free up the wiring harness on the transmission and lay it on the engine.
- Remove the bolt -arrow- and move the bracket and connector to the side.

8-cylinder Vehicles Engine:

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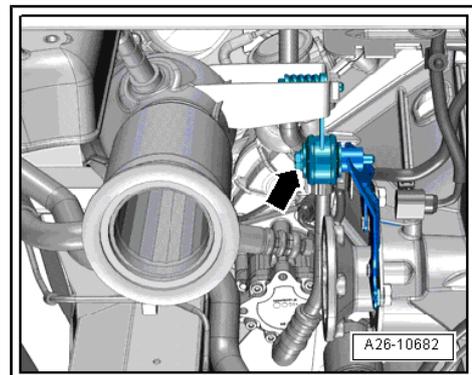
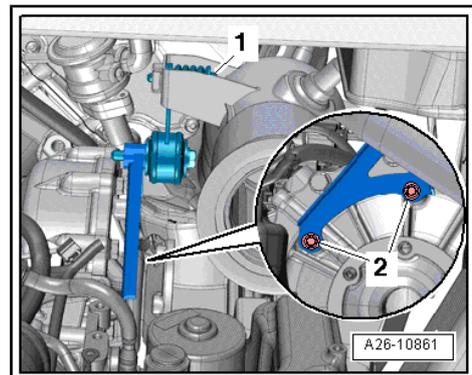
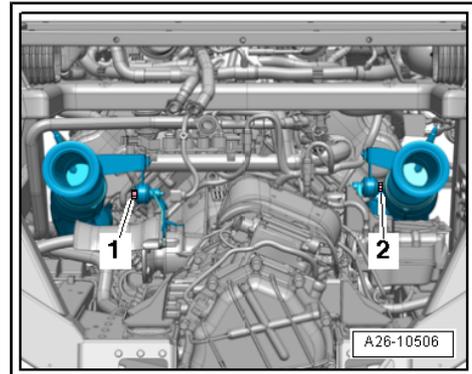
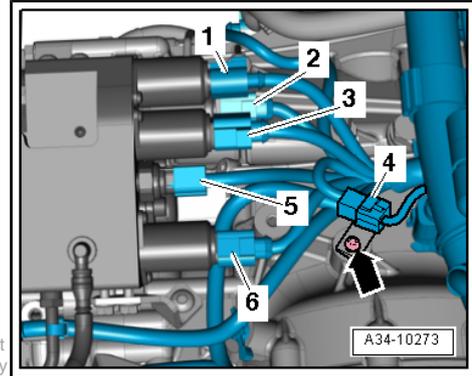
- Remove the bolts -1- and -2- from the catalytic converter brackets.
- Free up the electrical battery positive wire to the starter on the transmission.

10-Cylinder Vehicles Engine:

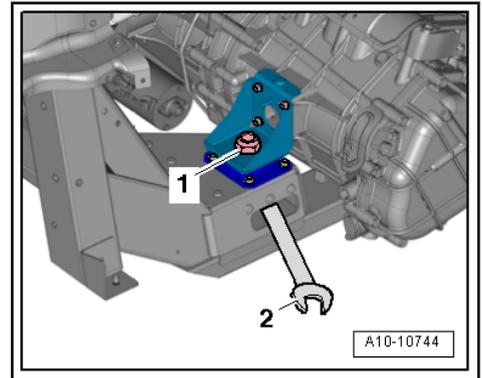
- Remove the bolts -1- and -2- and then remove the exhaust manifold bracket and right catalytic converter.
- Free up the electrical battery positive wire to the starter on the transmission.

- Remove the bolt -arrow- from the exhaust manifold bracket.

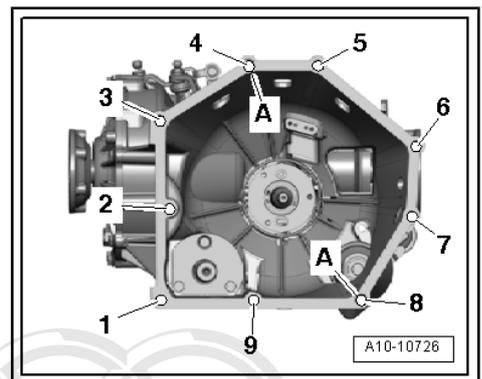
All Vehicles:



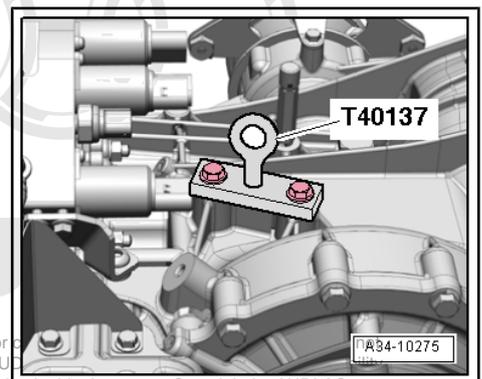
- Remove the nut from the transmission mount -1- while counterholding with an open-end wrench -2-.



- Remove the remaining nuts -2 through 6- from the transmission/engine connection.



- Install the -T40137- and tighten it to 20 Nm.



- Wind the -T40155- around the transmission as illustrated.
- Engage the -2024 A- on the -VAS 6100- and connect it with the -T40137- and -T40155- as shown in the illustration.

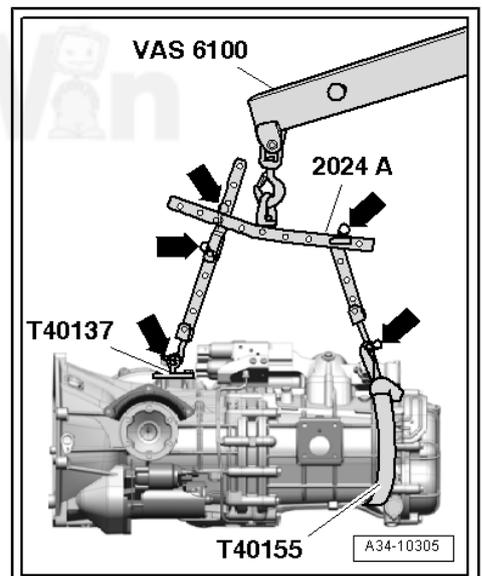
i Note

To determine the transmission center of gravity, the mounting hook rails must be covered as illustrated.

! WARNING

There is the risk of an accident if the support bridge parts are loose.

◆ *Secure the mounting hooks and pins on the engine sling with safety pins -arrows-.*



- Separate the transmission from the engine and raise it up.

5.2 Transmission, Installing

Tightening Specifications



Note

- ◆ *The tightening specifications apply only to lightly greased, oiled, phosphated or blackened nuts and bolts.*
- ◆ *Additional lubricant such as engine oil or transmission fluid may be used, but do not use graphite lubricant.*
- ◆ *Do not use any ungreased parts.*

- ◆ *Tightening specification tolerance $\pm 15\%$.*

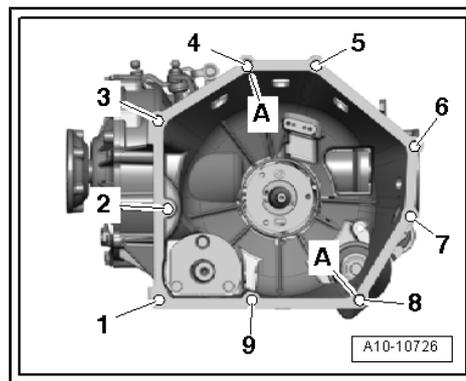
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Mounting Transmission to Engine

Item	Nut/Bolt	Nm
1, 2, 7, 8	M10	45
3 to 6	M10	65
9	M10 x 175	45
A	Alignment sleeves for centering	

Additional tightening specifications

- ⇒ [“2.13 Transmission Mount Overview”, page 84](#) .
- ⇒ [“2.14 Transmission Fluid Lines, Transmission Fluid Cooler and Transmission Fluid Filter Overview”, page 85](#) .
- ⇒ [Fig. “Heat Shield Over the R tronic Shift Actuator, Tightening Specifications”, page 74](#) .



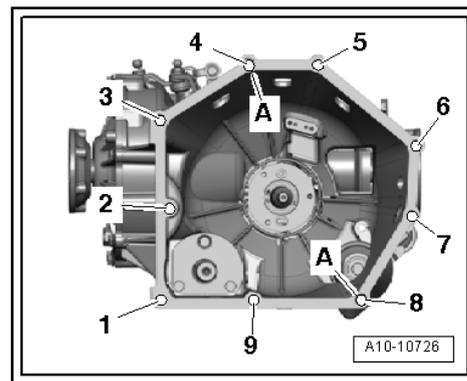
Installing



Note

- ◆ *Replace bolts that were tightened with an additional turn.*
 - ◆ *Replace self-locking nuts and bolts and sealing rings and seals.*
 - ◆ *Secure all hose connections with hose clamps of the same type as those equipped by the factory, refer to the electronic parts catalog ETKA.*
 - ◆ *When installing, bring all cable ties back to same positions.*
- Clean input shaft splines and hub and remove corrosion.
 - Apply the clutch disc shaft spline grease very lightly to the splines; Grease refer to the electronic parts catalog ETKA. Remove any excess grease.

- Make sure the alignment sleeves -A- fit correctly inside the cylinder block.
- When replacing the transmission, install the drive axle heat shield on the new transmission:
- ◆ Left heat shield, refer to
 ⇒ ["2.1 Shaft Seal and Left Flange Shaft Overview", page 202](#)
- ◆ Right heat shield, refer to
 ⇒ ["2.2 Shaft Seal and Right Flange Shaft Overview", page 203](#)
- Lower the transmission without pinching any lines.
- Attach transmission to engine.
- Tighten the left and right transmission mounting bolts.
- Electrical connectors and routing on the transmission. Refer to ⇒ Wiring diagrams, Troubleshooting & Component locations.
- Attach the catalytic converters to the suspended mounts. Refer to ⇒ Engine Mechanical; Rep. Gr. 26 ; Removal and Installation .
- Install the drive axles. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 42 ; Removal and Installation .
- Install the transmission oil pipes on the transmission oil thermostat.
- Install the power steering pressure line. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 48 ; Description and Operation .
- Install the oil reservoir. Refer to ⇒ Engine Mechanical; Rep. Gr. 17 ; Description and Operation .
- Starter, Installing. Refer to ⇒ Electrical Equipment; Rep. Gr. 27 ; Removal and Installation .
- Install the stabilizer bar. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .
- Install the rear muffler. Refer to ⇒ Engine Mechanical; Rep. Gr. 26 ; Removal and Installation .
- Install the rear lock carrier and rear spoiler. Refer to ⇒ Body Exterior; Rep. Gr. 55 ; Removal and Installation .
- Install the rear bumper. Refer to ⇒ Body Exterior; Rep. Gr. 63 ; Removal and Installation .
- Install the tail lamp assembly. Refer to ⇒ Electrical Equipment; Rep. Gr. 94 ; Removal and Installation .
- Install the rear bumper cover. Refer to ⇒ **Body Exterior; Rep. Gr. 63 ; Removal and Installation .**
- Install the rear wheel housing liners. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .
- Be sure to follow the procedure for connecting the battery and afterwards. Refer to ⇒ Electrical Equipment; Rep. Gr. 27 ; Removal and Installation .



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**Caution**

There is a risk of destroying control modules with excess voltage.

- ◆ *Do not use a charger as a starting aid.*

- Fill the power steering fluid reservoir with hydraulic fluid before starting the engine the first time. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 48 ; General Information .

**Note**

Do not let the power steering pump run dry.

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Manual Transmission:

- Install the shift cables. Refer to ⇒ ["5.5 Shift Cable and Selector Cable, Manual Transmission", page 116](#) .
- Adjust the gearshift mechanism. Refer to ⇒ ["2.10 Shift Mechanism, Adjusting, Manual Transmission", page 78](#) .

R tronic:

- Check the R tronic hydraulic unit oil level. Refer to ⇒ ["2.11 Oil Level in R tronic Hydraulic Unit, Adjusting", page 80](#) .
- Install the hose on the cap on the hydraulic oil reservoir as illustrated -arrows-.

**Note**

- ◆ *Depending on the vehicle, there are different caps installed, with and without a vent hose.*
- ◆ *Do not bend the vent hose. Make sure there is enough space between the hose and the exhaust system.*

All Vehicles:

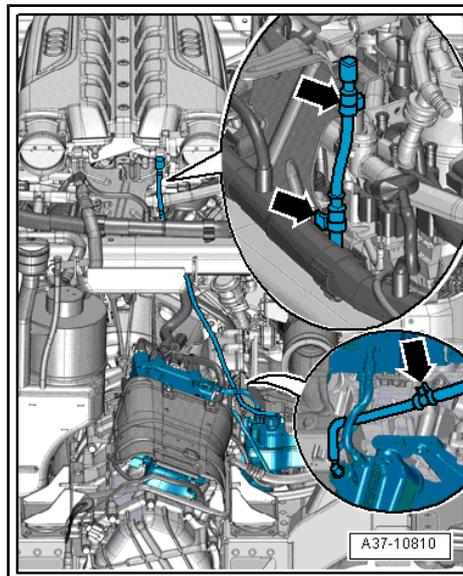
- Bleed the clutch system. Refer to ⇒ ["1.1 Clutch System, Manual Transmission, Bleeding", page 17](#) or ⇒ ["1.2 Clutch System, R tronic, Bleeding", page 18](#) .
- Install the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .
- Gear oil level, checking and filling. Refer to ⇒ ["1.2 Transmission Fluid, Checking and Filling", page 52](#) .

R tronic:

- Perform clutch basic setting. Refer to ⇒ ["4.1 Clutch Basic Setting, R tronic", page 31](#) .

When repairing the transmission or replacing it:

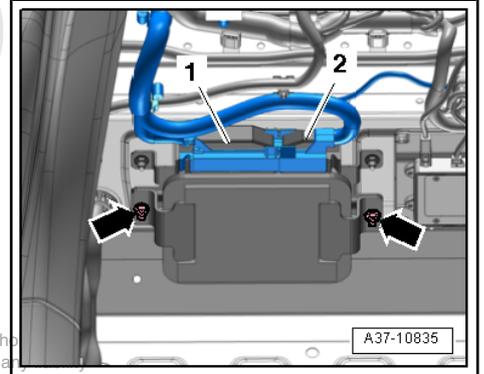
- Perform a basic setting on the gear selector. Refer to ⇒ ["2.8 Gear Selector Basic Setting", page 74](#) .



5.3 Transmission Control Module - J217-

Removing

- Remove the rear shelf. Refer to ⇒ Body Interior; Rep. Gr. 70 ; Description and Operation .
- Disconnect the connectors -1- and -2- from the transmission control module - J217- .
- Remove the nuts -arrows- and the transmission control module.



Installing

Install in reverse order, paying attention to the following:

- Install the rear shelf. Refer to ⇒ Body Interior; Rep. Gr. 70 ; Description and Operation .

If the “Update Programming” for the transmission control module was performed or if the transmission control module was replaced:

- Perform clutch basic setting. Refer to ⇒ [“4.1 Clutch Basic Setting, R tronic”, page 31](#) .
- Perform gear selector basic setting. Refer to ⇒ [“2.8 Gear Selector Basic Setting”, page 74](#) .

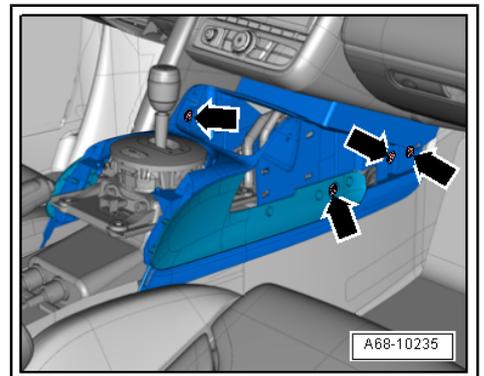
Tightening Specifications

Component	Nm
Transmission control module - J217- to bracket	9

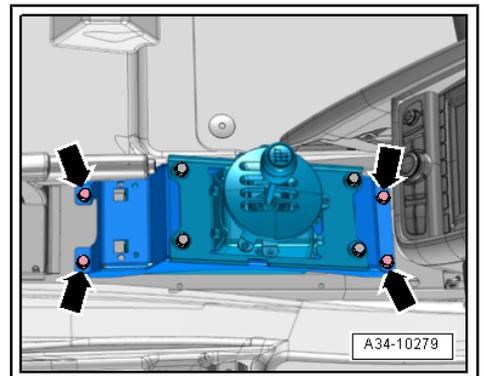
5.4 Shift Mechanism, Manual Transmission

Removing

- Remove the front center console. Refer to ⇒ Body Interior; Rep. Gr. 68 ; Description and Operation .



- Remove the bolts -arrows- and the shift mechanism.





- Remove the lock washers -1 through 4- and the shift cable and selector cable from the gearshift mechanism housing.

Installing

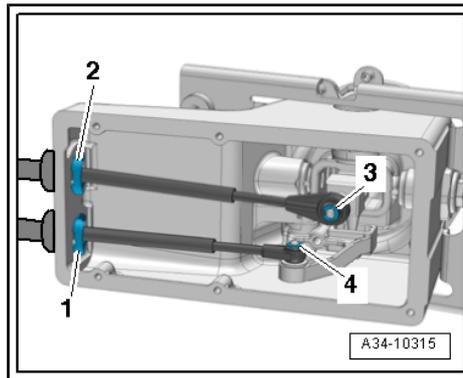
Install in reverse order, paying attention to the following:

- Tightening specification; refer to [⇒ "2.2 Shift Mechanism Overview, Manual Transmission", page 63](#).

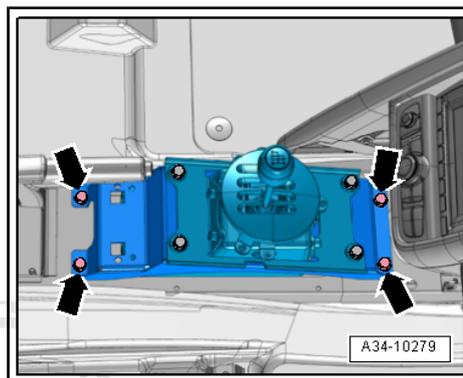


Note

Replace the lock washers -3 and 4-.



- Insert the shift mechanism and tighten the bolts -arrows-.
- Install the front center console. Refer to ⇒ Body Interior; Rep. Gr. 68 ; Description and Operation .
- Adjust the shift mechanism. Refer to [⇒ "2.10 Shift Mechanism, Adjusting, Manual Transmission", page 78](#) .

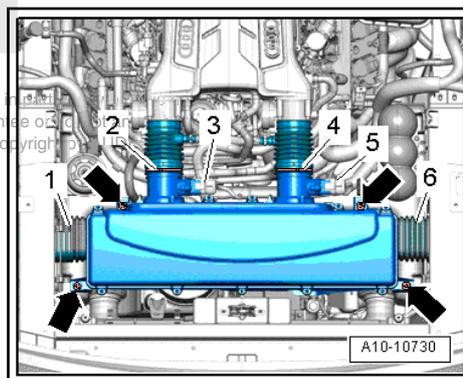


5.5 Shift Cable and Selector Cable, Manual Transmission

Removing

- Remove the shift mechanism. Refer to [⇒ "5.4 Shift Mechanism, Manual Transmission", page 115](#) .
- Remove the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .

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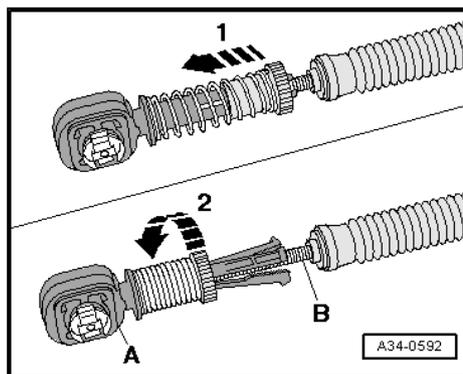
- Push the sleeve forward as far as it will go -arrow 1-.



Note

The procedure is identical when working on a shift cable or selector cable.

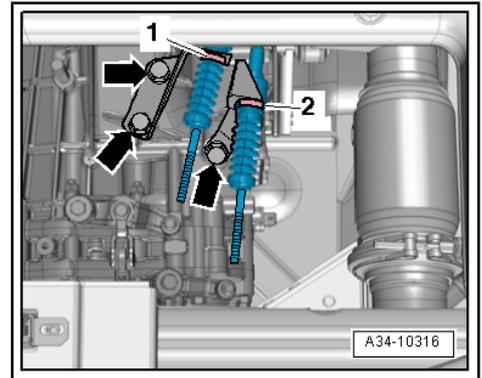
- Turn the sleeve all the way to the right -arrow 2- until it locks into place.
- Remove the cable retainers from the shift or selector cable.



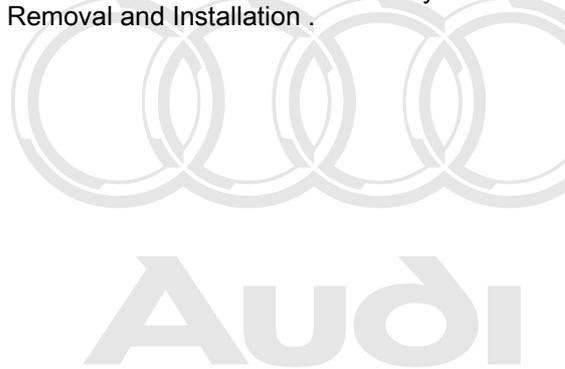
- Remove the lock washers -1 and 2-
- Remove the selector cable from the cable mounting bracket.

i Note

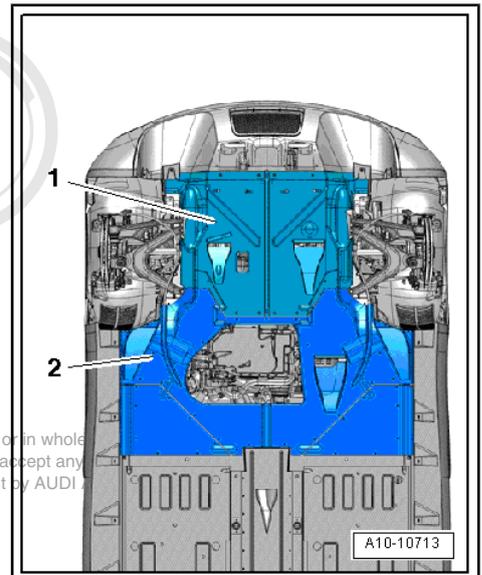
Ignore -arrows-.



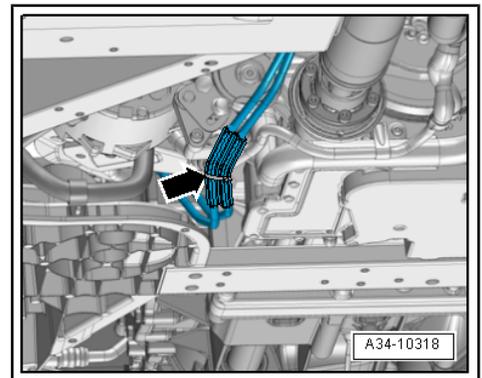
- Remove the front noise insulation -2-. Refer to => Body Exterior; Rep. Gr. 66 ; Removal and Installation .



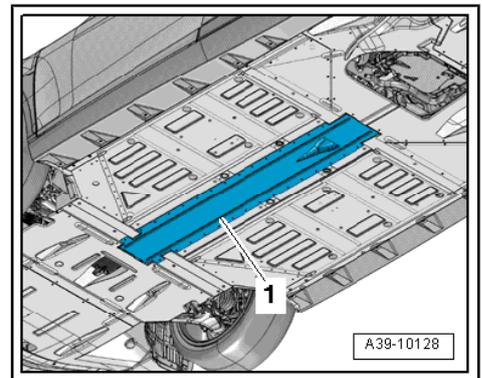
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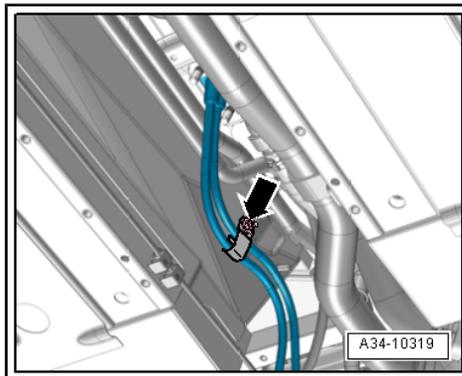
- Free up the shift cables on the generator bracket -arrow-.



- Remove the center tunnel cover -1-.



- Remove the nut -arrow- and the retaining clamp.

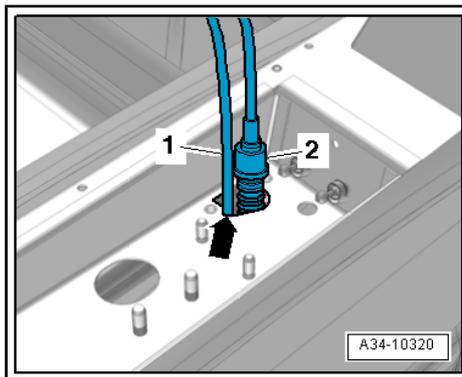
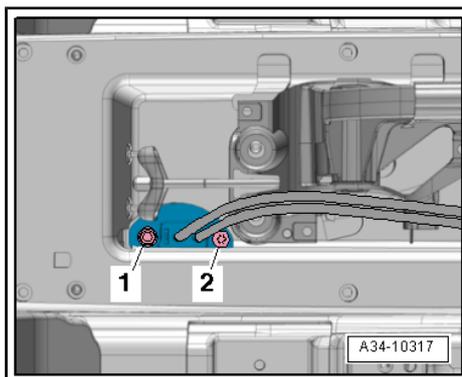


- Remove the nut -1- and bolt -2- and remove the shift cables upward.

Installing

Install in reverse order, paying attention to the following:

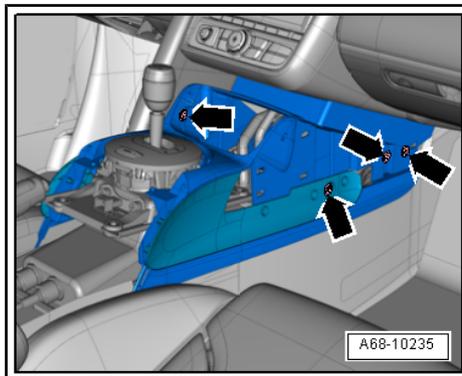
- Tightening specification; refer to [⇒ "2.3 Shift Cables Overview, Manual Transmission", page 66](#) .
- First guide the selector cable -1- (white) in and press it into the front opening -arrow-. Then guide the shift cable -2- (black) in.
- Install the shift mechanism. Refer to [⇒ "5.4 Shift Mechanism, Manual Transmission", page 115](#) .
- Adjust the shift mechanism. Refer to [⇒ "2.10 Shift Mechanism, Adjusting, Manual Transmission", page 78](#) .
- Install the front noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .
- Install the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .



5.6 Selector Mechanism, R tronic

Removing

- Remove the front center console. Refer to ⇒ Body Interior; Rep. Gr. 68 ; Description and Operation .



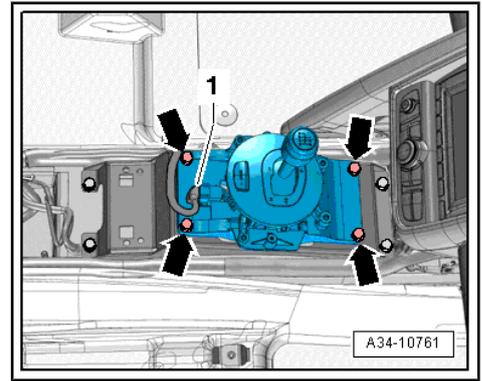
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- Remove the bolts -arrows- and the selector mechanism.
- Disconnect the connector -1-.

Installing

Install in reverse order, paying attention to the following:

- Tightening specifications, refer to [⇒ "2.5 Selector Mechanism Overview, R tronic", page 68](#)
- Install the front center console. Refer to ⇒ Body Interior; Rep. Gr. 68 ; Description and Operation .



5.7 Selector Lever Handle, R tronic

Removing

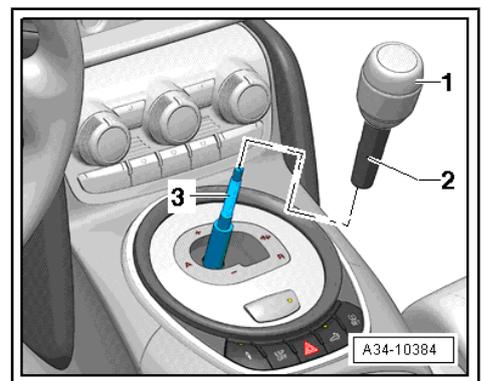
- Remove the selector lever handle -1- and sleeve -2- from the selector lever -3-.



The sleeve and selector lever handle are attached to each other.

Installing

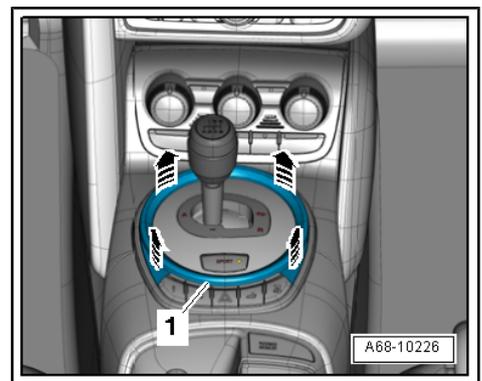
- Install the sleeve -2- on the selector lever handle -1-.
- Install the selector lever handle -1- and sleeve -2- on the selector lever -3-.



5.8 Selector Mechanism Cover, R tronic

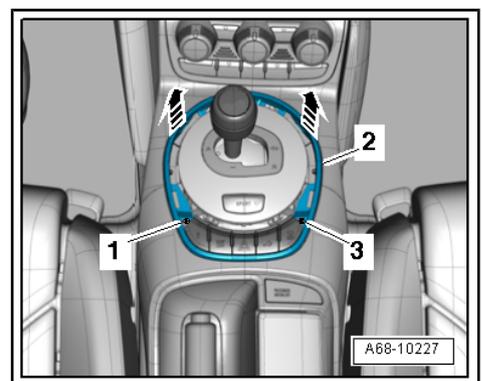
Removing

- Remove the selector lever cover. Refer to ⇒ Body Interior; Rep. Gr. 68 ; Removal and Installation .



- Remove the center console trim. Refer to ⇒ Body Interior; Rep. Gr. 68 ; Description and Operation .

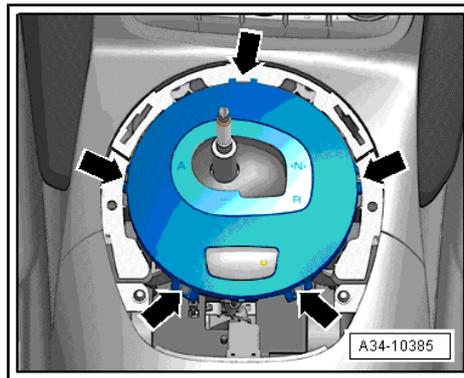
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- Carefully release the five retaining tabs -arrows- on the shift mechanism cover and remove the cover upward.

Installing

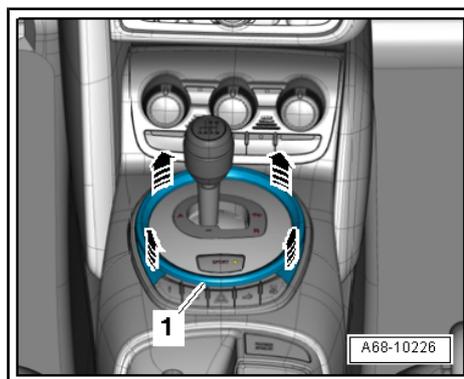
Install in reverse order of removal.



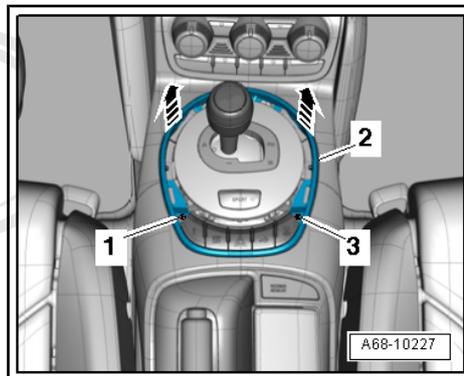
5.9 Sport Program Button - E541- , R tronic

Removing

- Remove the selector lever cover. Refer to ⇒ Body Interior; Rep. Gr. 68 ; Removal and Installation .



- Remove the center console trim. Refer to ⇒ Body Interior; Rep. Gr. 68 ; Description and Operation .



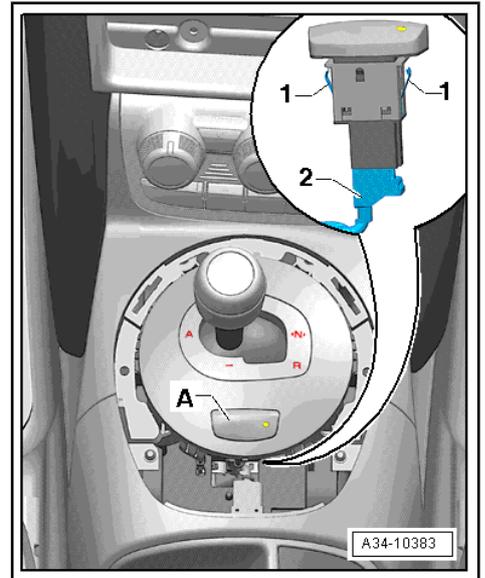
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erWin

- Release the sport program button -A- at both clips -1- from underneath and remove the button upward at the same time.
- Disconnect the connector -2- from the sport program button.

Installing

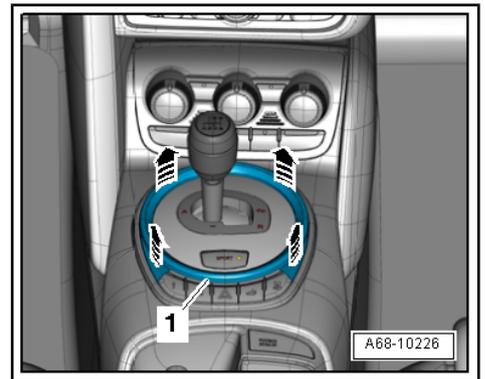
Install in reverse order of removal.



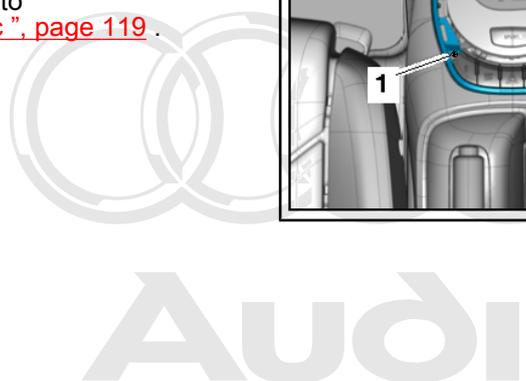
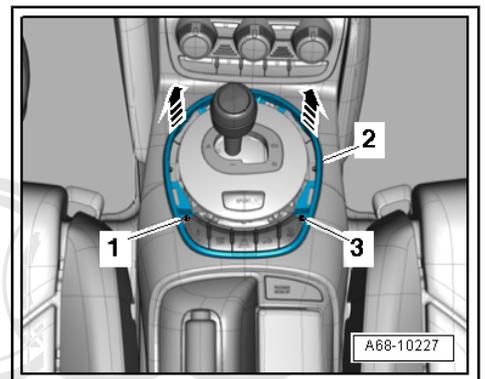
5.10 Selector Lever Transmission Range Display, R tronic

Removing

- Remove the selector lever cover. Refer to ⇒ Body Interior; Rep. Gr. 68 ; Removal and Installation .



- Remove the center console trim. Refer to ⇒ Body Interior; Rep. Gr. 68 ; Description and Operation .
- Remove the selector lever handle. Refer to ⇒ ["5.7 Selector Lever Handle, R tronic", page 119](#) .
- Remove the shift mechanism cover. Refer to ⇒ ["5.8 Selector Mechanism Cover, R tronic ", page 119](#) .



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- Disconnect the connector -1- from the selector lever transmission range display - Y5- -2-.

**Caution**

There is a risk of damaging the selector lever transmission range display circuit board.

Do not bend the selector lever transmission range display circuit board.

*Do not touch electrical components and **wires on the circuit board.***

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- Open the tabs -arrow- on the cover carefully, one after the other, and lift the selector lever transmission range display -2- circuit board.

**Note**

The selector lever transmission range display can also be replaced completely with the cover molding, but the front center console must also be removed for that. Refer to => Body Interior; Rep. Gr. 68 ; Description and Operation .

Installing

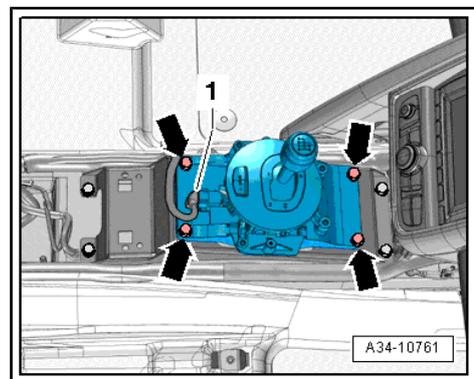
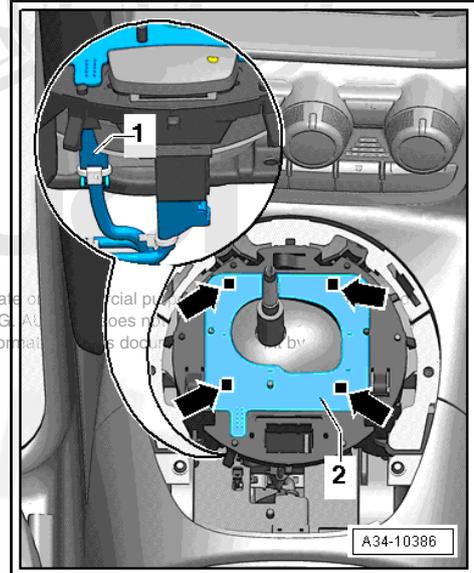
Install in reverse order, paying attention to the following:

- For the correct tightening specifications, refer to => ["2.5 Selector Mechanism Overview, R tronic", page 68](#) .
- Carefully clip the selector lever transmission range display -2- circuit board onto the retaining tabs -arrow- on the cover molding.
- Connect the connector -1- to the selector lever transmission range display -2-.

5.11 Selector Lever Sensor System Control Module, R tronic

Removing

- Remove the selector mechanism. Refer to => ["5.6 Selector Mechanism, R tronic", page 118](#) .
- Disconnect the three electrical connectors to the selector lever sensor system control module - J587- .

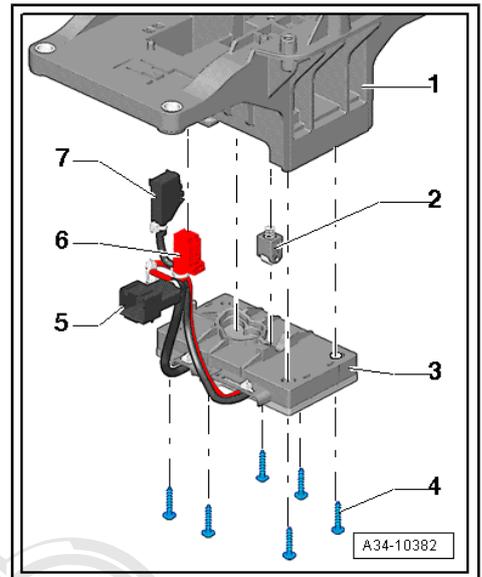


- ◆ Connector -5- to the transmission control module - J217-
- ◆ Connector -6- to the sport program button - E541-
- ◆ Connector -7- to the selector lever transmission range display - Y5-
- Remove all 6 bolts -4-.
- Remove the selector lever sensor system control module - J587- -3- from the shift mechanism housing -1-.

Installing

Install in reverse order, paying attention to the following:

- For the correct tightening specifications, refer to [⇒ "2.5 Selector Mechanism Overview, R tronic", page 68](#) .
- For the correct gearshift mechanism grease, refer to the electronic parts catalog ETKA.
- Grease the roller bearing -2- lightly and make sure it fits securely inside the selector lever.
- Check the O-ring [⇒ Item 14 \(page 69\)](#) at the bottom of the selector lever rod and grease it lightly.
- The magnet on the bottom end of the selector lever rod (the O-ring [⇒ Item 14 \(page 69\)](#) is installed on it) must be installed securely.
- Check the magnet, for example, with a bolt.
- Remove metal shavings or other metallic objects from the magnets.



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- ◆ *The magnet transmits the selector lever position or shift procedure to the selector lever sensor system control module.*
 - ◆ *Shifting is not possible without the magnet or the selector lever sensor system control module cannot recognize the shifting procedure.*
 - When connecting the selector lever sensor system control module, make sure the roller bearing engages correctly.
 - Tighten the bolts -4-.
 - Guide the three electrical connectors on the selector lever sensor system control module through the opening on the shift mechanism housing and connect them.
 - ◆ Connector -5- to the transmission control module
 - ◆ Connector -6- to the sport program button
 - ◆ Connector -7- to the selector lever transmission range display

5.12 Shift Actuator, R tronic

Special tools and workshop equipment required

- ◆ Oil Collecting and Extracting Device - V.A.G 1782-
- ◆ Hand drill with plastic brush insert
- ◆ Protective eyewear
- ◆ Sealant - AMV 174 004 01- , refer to the electronic parts catalog ETKA

Removing



WARNING

There is a risk of injury. The pressure in the R tronic hydraulic system may be up to 50 bar.

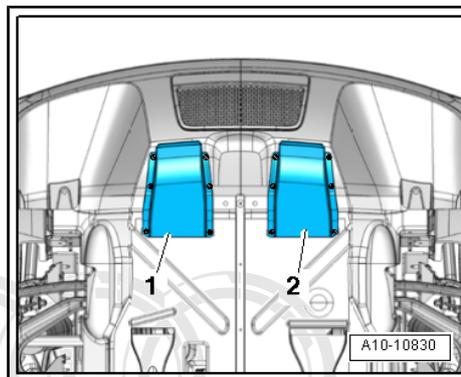
- ◆ *Always reduce the pressure in the system before working on the R tronic hydraulic system. Refer to ⇒ "2.12 Hydraulic System, Building System Pressure, R tronic", page 82 .*



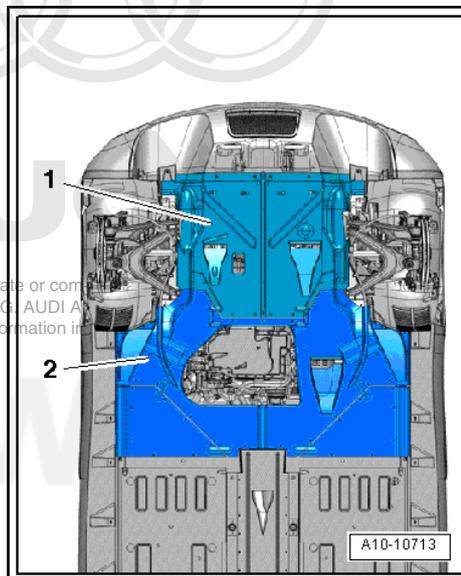
Note

When installing, bring all cable ties back to the same positions.

- Move the selector lever into "N".
- Remove the air guides -1- and -2-. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Description and Operation .

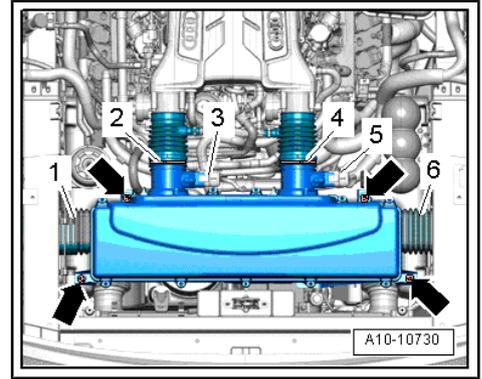


- Remove the rear noise insulation -1-. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .
- Remove the left and right rear wheel housing liners. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .
- Remove the rear bumper cover. Refer to ⇒ Body Exterior; Rep. Gr. 63 ; Removal and Installation .

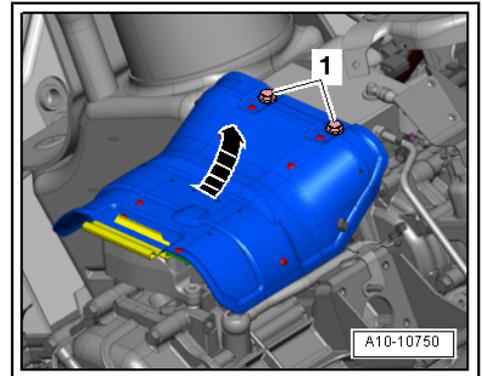


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- Remove the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .



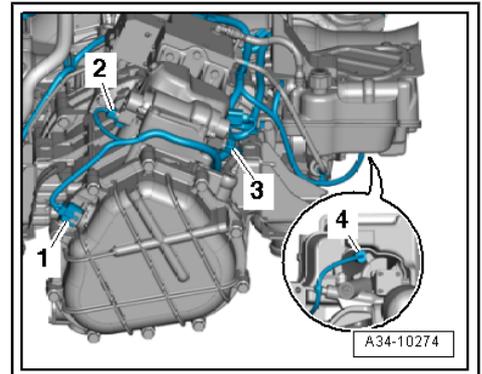
- Remove the bolts -1- and the heat shield -arrow-.



- Disconnect the connectors -2- and -3-.

 **Note**

Ignore -1 and 4-.



 **Caution**

There is a risk of confusing the connectors.

- ◆ *The connectors on the gear selection valves are color coded to prevent them from getting confused. If the color marking is no longer visible, mark the connectors before disconnecting them.*

Color identification:

-1-, color "blue"

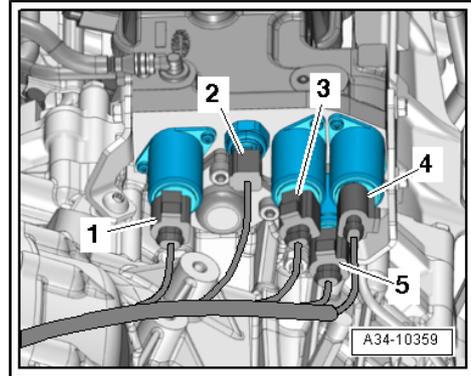
-3-, color "white"

-4-, color "green"

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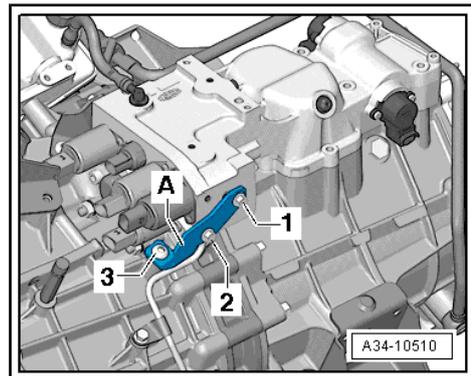
- Disconnect the connectors -1 through 5- on the sensor and on the valves.



- Remove the bolts -1 through 3-.
- Remove the bracket -A-.

 **Note**

To collect escaping hydraulic oil, place a clean cloth under the separating points.



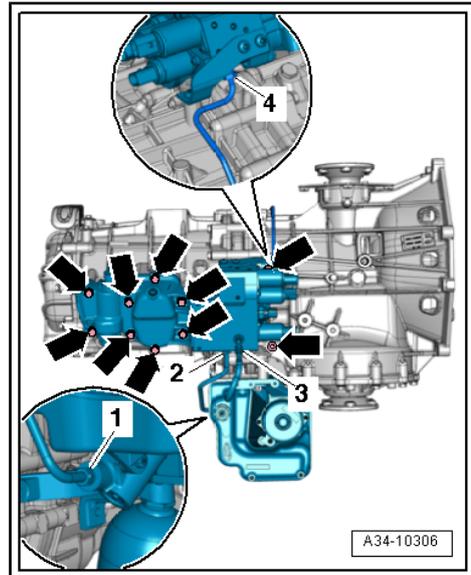
- Loosen the hydraulic line threaded connection -1-.
- Remove the hydraulic line threaded connector -2-.
- Remove the hydraulic line threaded connection -4- from the clutch slave cylinder.

 **Caution**

There is a risk of destroying the hydraulic return line connection.

- ◆ *Only remove the hydraulic return hose using the method described.*

- Remove the hydraulic return hose -3- from the R tronic shift actuator. Refer to ⇒ [“5.13 Hydraulic Return Hose”, page 129](#).
- Remove the bolts -arrows- and the R tronic shift actuator.

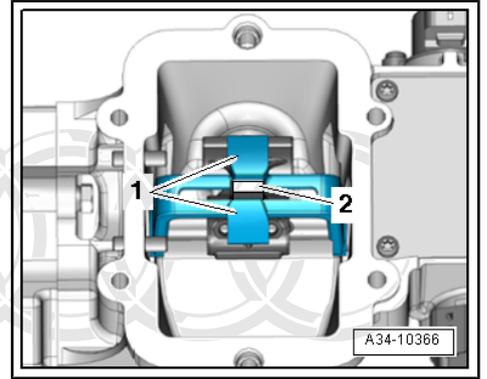


Installing

Tightening Specifications:

- ⇒ [“2.7 Shift Actuator Overview, R tronic”, page 71](#)
- ⇒ [“2.9 Hydraulic Unit Overview, R tronic”, page 75](#)
- ⇒ [“2.6 Hydraulic Lines Overview, R tronic”, page 70](#)
- ⇒ [Fig. “Heat Shield Over the R tronic Shift Actuator: Tightening Specifications”, page 74](#)
- Bracket for the R tronic shift actuator on the transmission. Refer to ⇒ [“2.6 Hydraulic Lines Overview, R tronic”, page 70](#)
- Move the selector rod in the R tronic shift actuator into the position shown.

- The shift finger -2- must be centered between the locking fork -1-.



- Bring the selector rods in the transmission into the position shown.
- The openings in the selector rod yokes -1 through 4- must align.

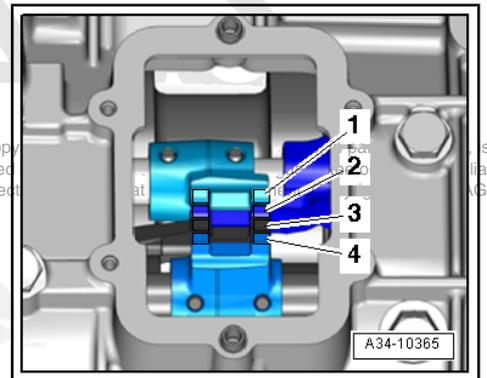
 **Note**

When installing, bring all cable ties back to same positions.

 **Caution**

There is a risk of contaminating the hydraulic system.

- ◆ *Cover open parts of the R tronic shift actuator and transmission.*

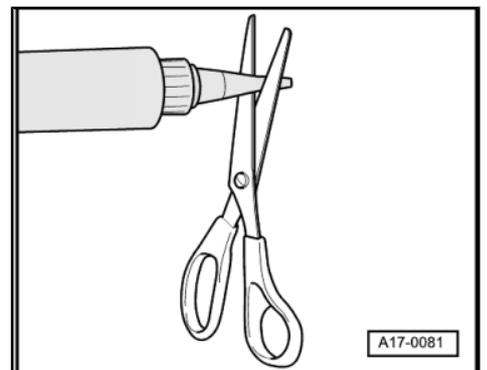


- Remove the sealant residue on the R tronic shift actuator and transmission.
- Clean sealing surfaces; they must be free from oil or grease.
- ◆ Use sealant - AMV 174 004 01- .

 **Note**

Pay attention the expiration date on the sealant.

- Cut off the tip of the sealant tube at the first marking (nozzle diameter approximately 1 mm).



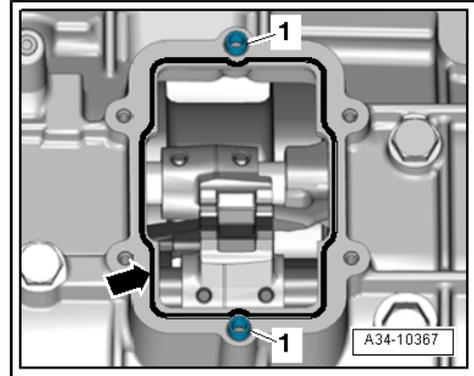
- Make sure both alignment sleeves -1- are installed.

**Caution**

There is a risk of plugging the hydraulic system with excess sealant.

- ◆ *Do not apply the sealant bead thicker than what is specified.*

- Apply the sealant bead -arrow- to the clean transmission sealing surface as shown in the illustration.
- Sealant bead thickness: 1.5 mm.

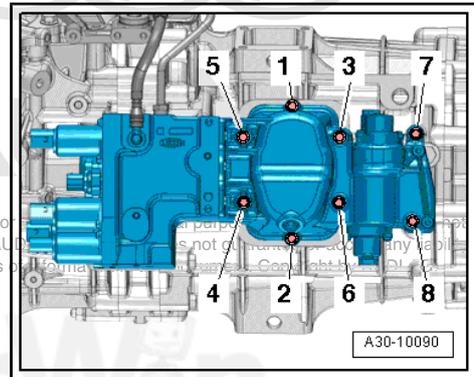
**Note**

Install the R tronic shift actuator within 5 minutes of applying the sealant.

- Install the bolts -1- and -2- with sealant - AMV 174 004 01- and then tighten them hand-tight.
- Install the bolts -3 through 8- with sealant - AMV 174 004 01- and then tighten them by-hand.
- Tighten the bolts to the specification in the following sequence: -1 through 8-.

Install in reverse order of removal paying attention to the following:

- Check the oil level in the R tronic hydraulic unit and fill. Refer to ⇒ ["1.1 Oil Level in R tronic Hydraulic Unit", page 52](#) .
- Bleed the clutch system. Refer to ⇒ ["1.2 Clutch System, R tronic, Bleeding", page 18](#) .
- Install the rear bumper cover. Refer to ⇒ Body Exterior; Rep. Gr. 63 ; Removal and Installation .
- Install the rear wheel housing liners and the front noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .
- Install the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .
- Perform gear selector basic setting. Refer to ⇒ ["2.8 Gear Selector Basic Setting", page 74](#) .



5.13 Hydraulic Return Hose

Removing



Caution

There is a risk of damaging the connectors.

- ◆ *The hydraulic return hose cannot be removed without destroying it.*
- ◆ *If the hydraulic return hose is removed forcefully, the connectors on the R tronic shift actuator and the hydraulic oil reservoir break off.*

Leaks can result if the cut is too deep.

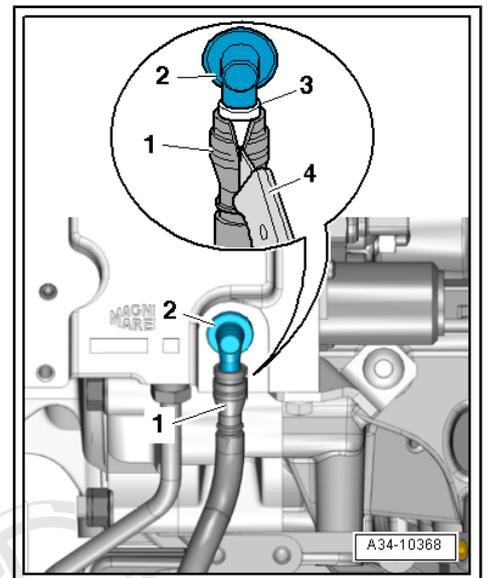
- ◆ *Do not score the connectors when cutting.*

- Cut the sides of the hydraulic return hose -1- at the connectors -2- with a carpet knife -4- as illustrated.
- Remove the hydraulic return hose and rubber grommet -3-.



Note

- ◆ *The connection on the R tronic shift actuator is shown in the illustration.*
- ◆ *Proceed the same way with the connector on the hydraulic oil reservoir.*
- ◆ *If the connectors on the R tronic shift actuator were damaged, it must be replaced. Refer to ⇒ "5.26 Connections on R tronic Shift Actuator", page 153 .*
- ◆ *If the connectors on the hydraulic oil reservoir were damaged, the reservoir must be replaced. Refer to ⇒ "5.21 Hydraulic Oil Reservoir", page 145 .*



Installing

Install the new hose with the rubber grommet all the way on the connector.

5.14 Clutch Actuator Valve and Gear Selection Valves

Removing



WARNING

There is a risk of injury. The pressure in the R tronic hydraulic system may be up to 50 bar.

- ◆ *Always reduce the pressure in the system before working on the R tronic hydraulic system. Refer to ⇒ "2.12 Hydraulic System, Building System Pressure, R tronic", page 82 .*

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- Remove the air filter housing. Refer to => Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .



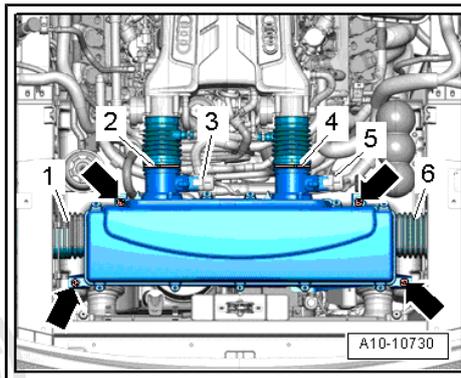
Caution

There is a risk of confusing the connectors.

- ◆ *To prevent the electrical connectors on the gear selection valves and on the hydraulic pressure sensor - G270- from getting mixed up, mark them with colors. If the color marking is no longer visible, mark the connectors before disconnecting them.*

Color identification:

- 1-, color "blue"
- 3-, color "white"
- 4-, color "green"



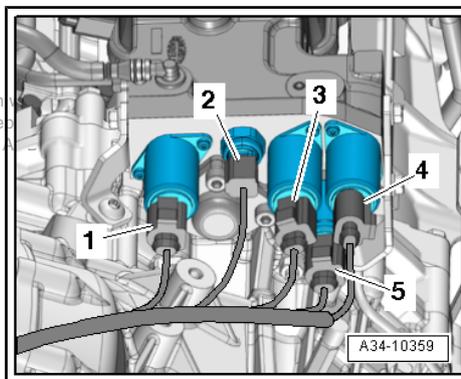
- Disconnect the connectors on the valves that are going to be removed:

- 1 - Gear selection valve 3 - N286-
- 3 - Gear selection valve 2 - N285-
- 4 - Clutch actuator valve - N255-
- 5 - Gear selection valve 1 - N284-



Note

Ignore -2-.



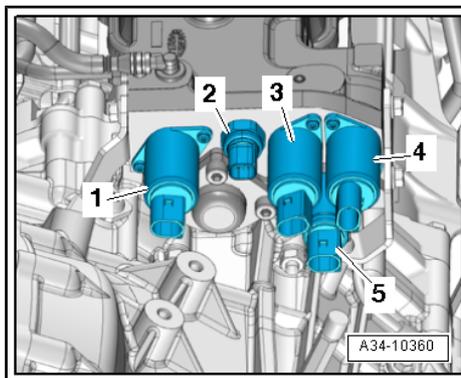
- Remove the bolts on the valve that will be removed and remove the valve from the R tronic shift actuator.

- 1 - Gear selection valve 3 - N286-
- 3 - Gear selection valve 2 - N285-
- 4 - Clutch actuator valve - N255-
- 5 - Gear selection valve 1 - N284-



Note

Ignore -2-.



Installing

- For the correct tightening specifications, refer to => ["2.7 Shift Actuator Overview, R tronic", page 71](#) .

Installation gear selection valve 3 (-1-), gear selection valve 2 (-2-) and clutch actuator valve (-3-):

– Replace the O-rings for -N255- , -N285- , -N286- :

- 1- Black O-ring
- 2- Green O-ring
- 3- Black O-ring
- 4- Green O-ring

i Note

Note the different diameters.

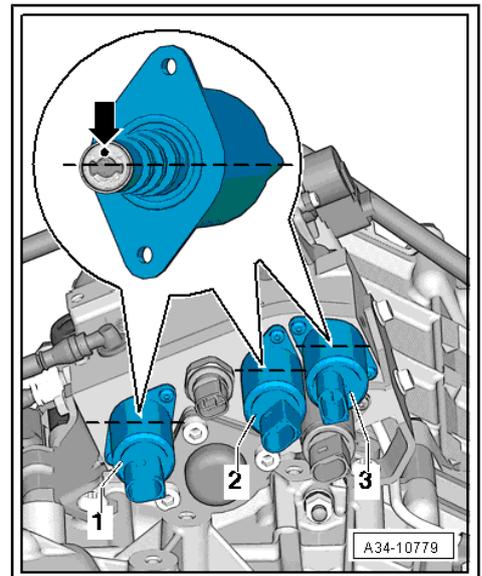
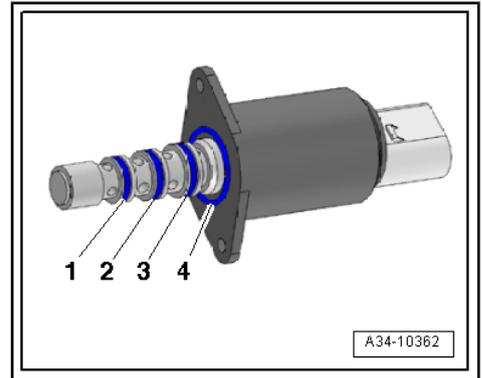
Pay attention the installed positions of the valves -N255- , -N285- , -N286- :

Gear selection valve 3 -1-, gear selection valve 2 -2- and the clutch actuator valve -3- have a damping hole -arrow-.

- The damping hole -arrow- must be above the horizontal center line when the 3 valves are in their installed position.

i Note

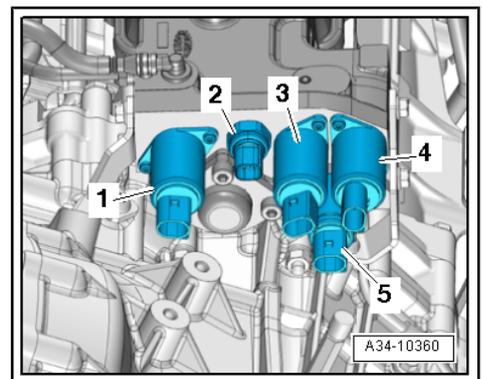
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The horizontal center lines are shown as dashed lines in the illustration.



Installation of the gear selection valve 1 (-5-):

i Note

Depending on the version, a strainer is still installed in front of gear selection valve 1 (refer to ⇒ Item 30 (page 74)). The auxiliary strainer cannot be installed on vehicles without the strainer because the shift actuator is different on the R tronic.



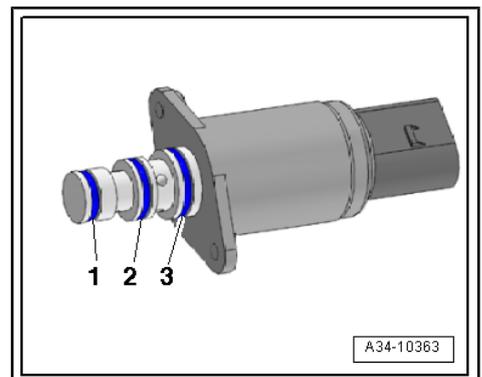
– Replace the gear selection valve 1 O-ring:

- 1- Brown O-ring
- 2- Green O-ring
- 3- Black O-ring

i Note

Note the different diameters.

Install in reverse order of removal.

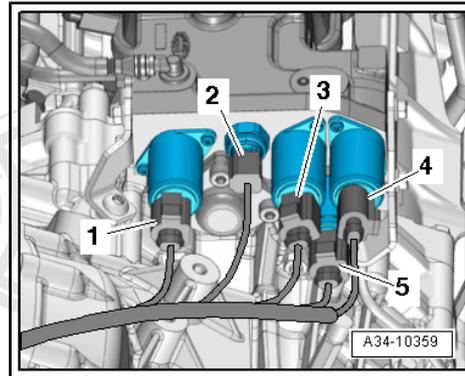


- Connect the connectors according to the color marks.

 **Caution**

Risk of interchanging the connectors.

- ◆ *The transmission will not work correctly if the connectors are interchanged.*
- ◆ *Allocate according to the color marking or marking made during removal.*



- Bleed the clutch system. Refer to ⇒ ["1.1 Clutch System, Manual Transmission, Bleeding"](#), page 17 or ⇒ ["1.2 Clutch System, R tronic, Bleeding"](#), page 18 .
- Install the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .

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5.15 Hydraulic Pressure Sensor

Removing

 **WARNING**

There is a risk of injury. The pressure in the R tronic hydraulic system may be up to 50 bar.

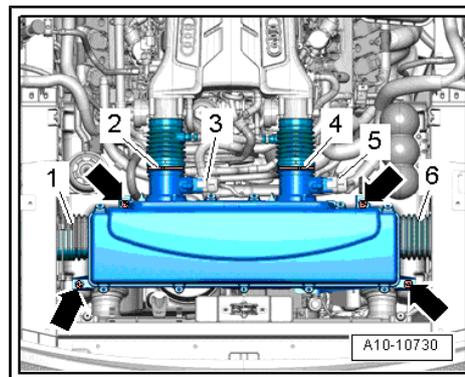
- ◆ *Always reduce the pressure in the system before working on the R tronic hydraulic system. Refer to ⇒ ["2.12 Hydraulic System, Building System Pressure, R tronic"](#), page 82 .*

- Remove the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .

 **Caution**

There is a risk of confusing the connectors.

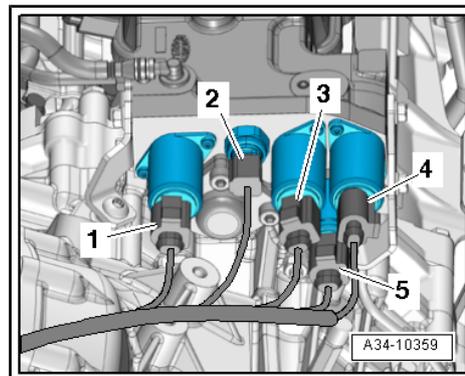
- ◆ *To prevent the electrical connectors on the gear selection valves and on the hydraulic pressure sensor - G270- from getting mixed up, mark them with colors. If the color marking is no longer visible, mark the connectors before disconnecting them.*



- Disconnect the connector -2- from the hydraulic pressure sensor.

 **Note**

Ignore -1, 3, 4 and 5-



- Remove the hydraulic pressure sensor -2-

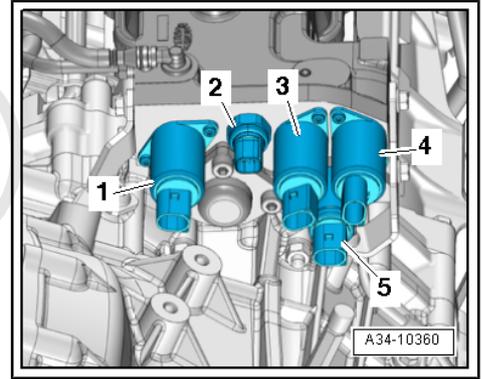
i Note

Ignore -1, 3, 4 and 5-

Installing

Install in reverse order, paying attention to the following:

- Tightening specification; refer to [⇒ "2.7 Shift Actuator Overview, R tronic", page 71](#).



i Note

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- Install the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .

5.16 Gear Recognition Sensor

Removing

- Remove the rear bumper cover. Refer to ⇒ Body Exterior; Rep. Gr. 63 ; Removal and Installation .

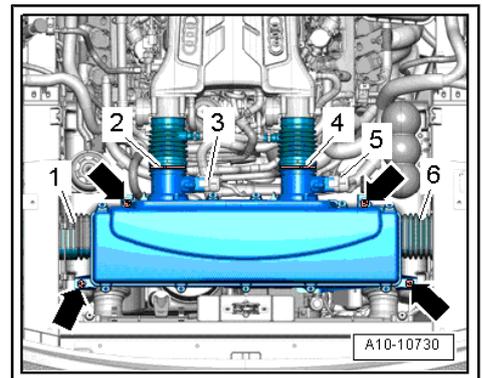


WARNING

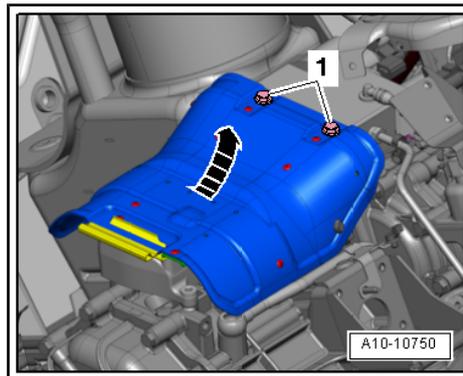
There is a risk of injury. The pressure in the R tronic hydraulic system may be up to 50 bar.

- ◆ *Always reduce the pressure in the system before working on the R tronic hydraulic system. Refer to ⇒ "2.12 Hydraulic System, Building System Pressure, R tronic", page 82* .

- Remove the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .



- Remove the bolts -1- and the heat shield -arrow-.



- Disconnect the connector -1- from the gear recognition sensor - G604- .
- Remove the bolts -2- and the gear recognition sensor -2-.

Installing

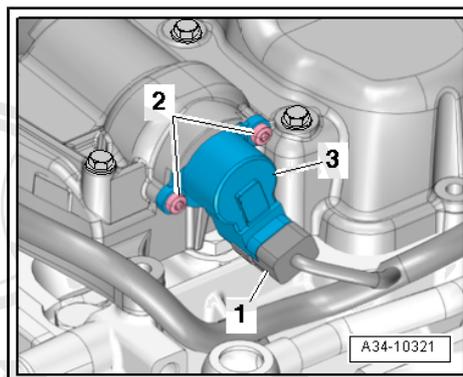
Tightening specifications:

- ⇒ [“2.7 Shift Actuator Overview, R tronic”, page 71](#) .
- ⇒ [Fig. “Heat Shield Over the R tronic Shift Actuator, Tightening Specifications”](#) , page 74 .



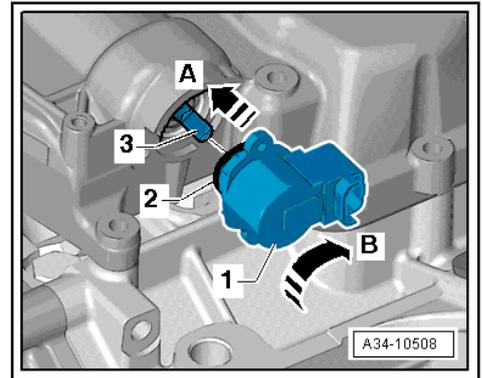
Note

- ◆ *Replace the O-ring.*
- ◆ *If the gear recognition sensor with gold contacts is being replaced by a sensor with gold contacts, then the cable set for the sensor must be replaced with the adapter wire set - 420 971 164- . Refer to the electronic parts catalog ETKA. Refer to .*
⇒ [“5.18 Adapter Wiring Set, Gear Recognition Sensors, Installing”, page 137](#) .



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- Coat the O-ring -2- on the gear recognition sensor with oil.
- Mount the gear recognition sensor -1- on the R tronic shift actuator bolting eyelet in the "9 o'clock position" -arrow A-, as illustrated.
- The actuating pin -3- fits into the mount on the gear recognition sensor.
- Be careful not to crush the O-ring when installing the gear recognition sensor.
- Turn the gear recognition sensor clockwise -arrow B- so the bolts can be installed.



i Note

When turning, the sensor spring force becomes noticeable.

- Install the bolts.

Install in reverse order of removal paying attention to the following:

- Install the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .
- Install the rear bumper cover. Refer to ⇒ Body Exterior; Rep. Gr. 63 ; Removal and Installation .
- Perform gear selector basic setting ⇒ ["2.8 Gear Selector Basic Setting", page 74](#) .

5.17 Gear Recognition Sensor 2

Removing

- Remove the rear bumper cover. Refer to ⇒ [Body Exterior; Rep. Gr. 63 ; Removal and Installation](#) .

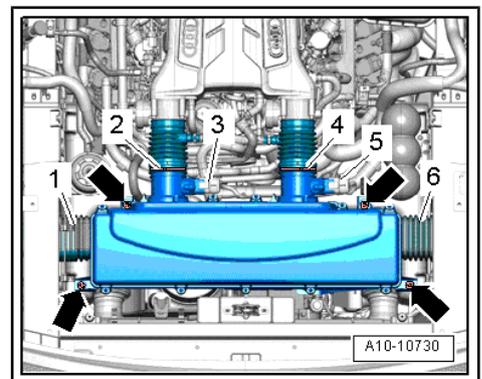


WARNING

There is a risk of injury. The pressure in the R tronic hydraulic system may be up to 50 bar.

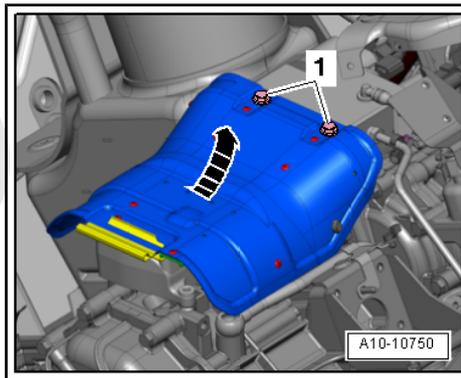
- ◆ *Always reduce the pressure in the system before working on the R tronic hydraulic system. Refer to ⇒ ["2.12 Hydraulic System, Building System Pressure, R tronic", page 82](#) .*

- Remove the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .





- Remove the bolts -1- and the heat shield -arrow-.



- Disconnect the connector -1- from the gear recognition sensor 2 - G616- .

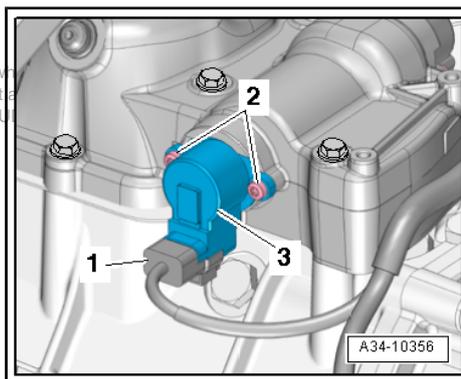
- Remove the bolts -2- and gear recognition sensor 2.

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Installing

Tightening specifications:

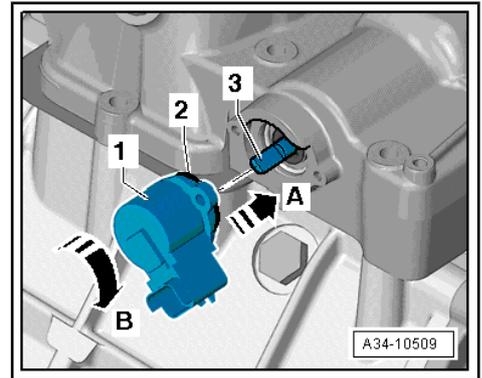
- => [“2.7 Shift Actuator Overview, R tronic”, page 71](#)
- => [Fig. “Heat Shield Over the R tronic Shift Actuator, Tightening Specifications”, page 74](#)



Note

- ◆ Replace the O-ring.
- ◆ If the gear recognition sensor 2 - G616- with gold contacts is being replaced by a sensor with gold contacts, then the cable set for the sensor must be replaced with the adapter wire set - 420 971 164- . Refer to the electronic parts catalog ETKA. Refer to .
=> [“5.18 Adapter Wiring Set, Gear Recognition Sensors, Installing”, page 137](#)

- Coat the O-ring -2- on gear recognition sensor 2 lightly with oil.
- Mount gear recognition sensor 2 -1- on the R tronic shift actuator bolting eyelet in the "11 o'clock position" -arrow A-, as illustrated.
- The actuator pin -3- fits into the bracket on gear recognition sensor 2.
- When pressing on the gear actuation sensor 2, make sure the O-ring is not crushed.
- Turn the gear recognition sensor 2 clockwise -arrow B- so the bolts can be installed.



 **Note**

When turning, the sensor spring force becomes noticeable.

- Install the bolts.
- Install in reverse order of removal paying attention to the following:

- Install the heat shield. Refer to ⇒ [Fig. "Heat Shield Over the R tronic Shift Actuator, Tightening Specifications"](#), page 74 .
- Install the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .
- Install the rear bumper cover. Refer to ⇒ Body Exterior; Rep. Gr. 63 ; Removal and Installation .
- Perform gear selector basic setting. Refer to ⇒ ["2.8 Gear Selector Basic Setting"](#), page 74 .

5.18 Adapter Wiring Set, Gear Recognition Sensors, Installing

Special tools and workshop equipment required

- ◆ Wiring Harness Repair Set - VAS 1978 B-
- ◆ Adapter Wire Set - 420 971 164- , refer to the electronic parts catalog ETKA

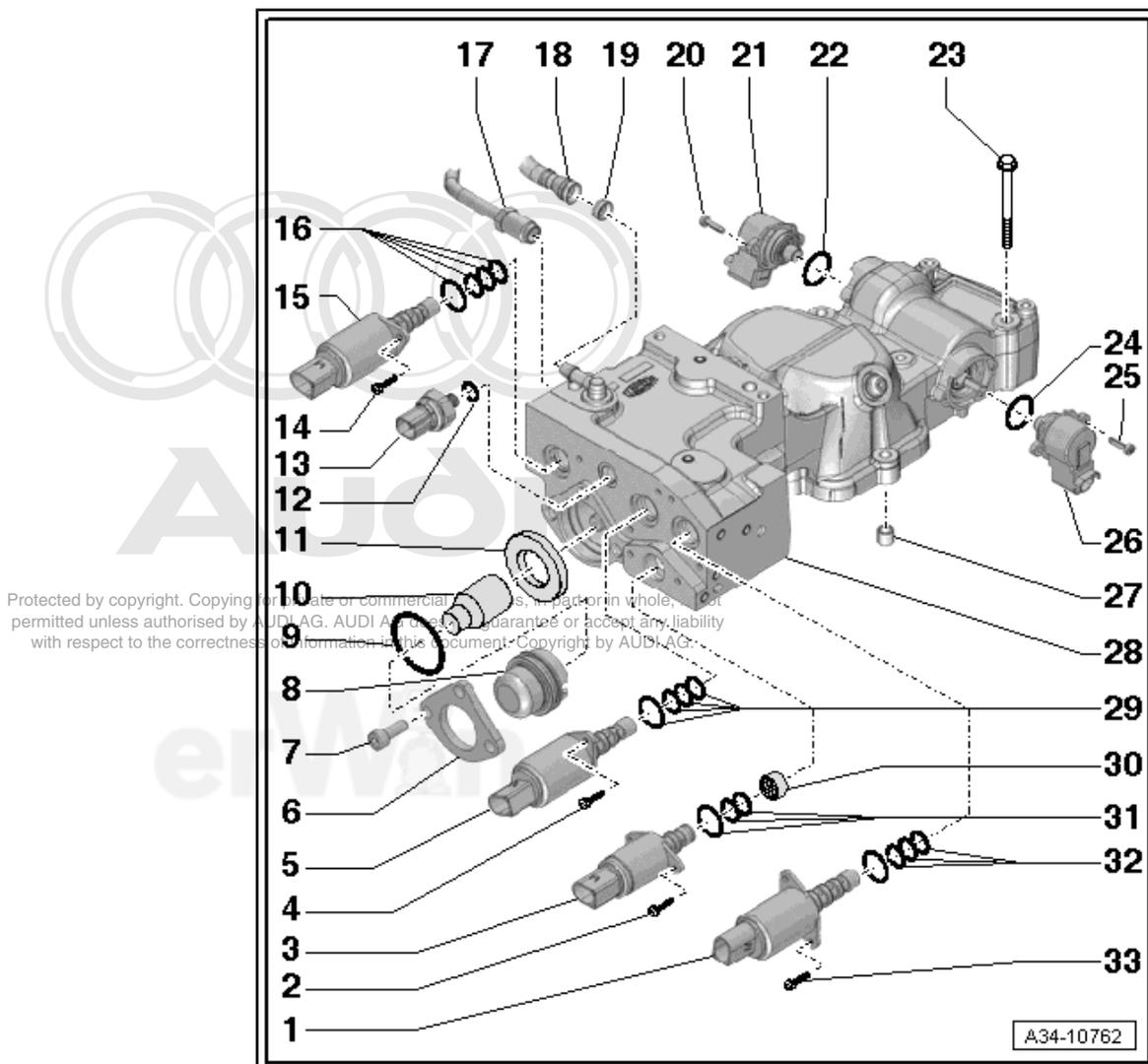
Technical Background

Only gear recognition sensors -21 and 26- (-G604- , -G616-) with gold contacts are being installed as of March 2008, beginning with VIN "WAUZZZ428N005613". Up until now the gear recognition sensors (-G604- , -G616-) had tin-plated contacts.

In the future, replacement sensors will have gold contacts only. Refer to the electronic parts catalog ETKA.

 **Note**

Gold contacts reduce resistance and are less sensitive to corrosion as long as the connector and pin are gold-plated.

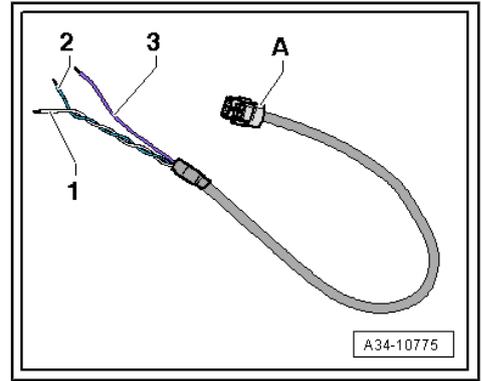


Conditions for Using the Adapter Wire Sets:

- Replacing a transmission with tin-plated contacts on the gear recognition sensors (vehicles before VIN "WAUZZZ428N005613") with a transmission with gold-plated contacts on the gear recognition sensors.
- Replacing gear recognition sensor 2 - G616- and gear recognition sensor - G604- on a transmission with tin-coated contacts on the sensors and wiring harness (vehicles before VIN "WAUZZZ428N005613").
- Wiring harness or connector to one of the gear recognition sensors is damaged.

 **Note**

- ◆ If one of the gear recognition sensors, on a vehicle built prior to VIN "WAUZZZ428N005613" is damaged, then both gear recognition sensors must be replaced (no interchanging). Both adapter wiring harnesses must be installed. The adapter wiring set - 420 971 164- from the electronic parts catalog ETKA generally has gold plated contacts on the connector -A-.
- ◆ Only gear recognition sensors with gold-plated contacts can be ordered from the electronic parts catalog ETKA.
- ◆ If a wiring harness or a connector for the gear recognition sensor on a vehicle built prior to VIN "WAUZZZ428N005613" is damaged, then a different wiring harness, gear recognition sensor 2 and the gear recognition sensor must be replaced.



Replace the Adapter Wiring Sets:

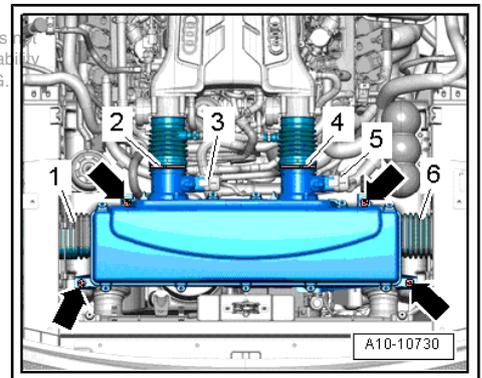
- Remove the rear bumper cover. Refer to ⇒ Body Exterior; Rep. Gr. 63 ; Removal and Installation .

 **WARNING**

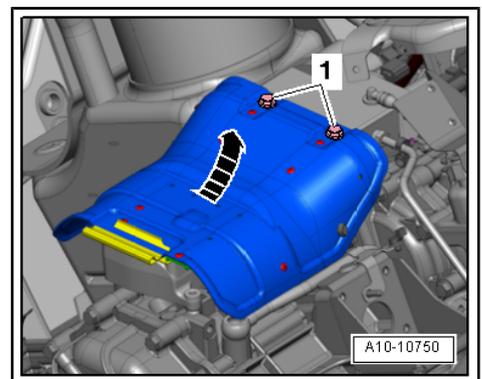
There is a risk of injury. The pressure in the R tronic hydraulic system may be up to 50 bar.

- ◆ *Always reduce the pressure in the system before working on the R tronic hydraulic system. Refer to ⇒ "2.12 Hydraulic System, Building System Pressure, R tronic", page 82 .*

- Remove the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .



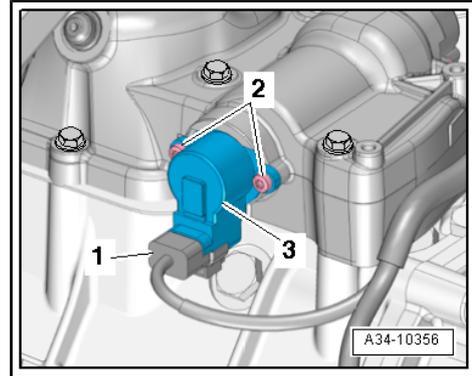
- Remove the bolts -1- and the heat shield -arrow-.



- Disconnect the connector -1- from the gear recognition sensor 2.

 **Note**

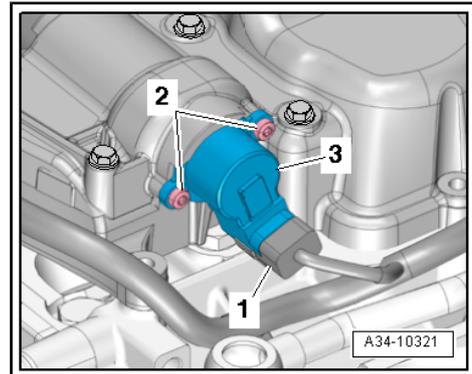
Ignore -2 and 3-.



- Disconnect the connector -1- from the gear recognition sensor.

 **Note**

Ignore -2 and 3-.

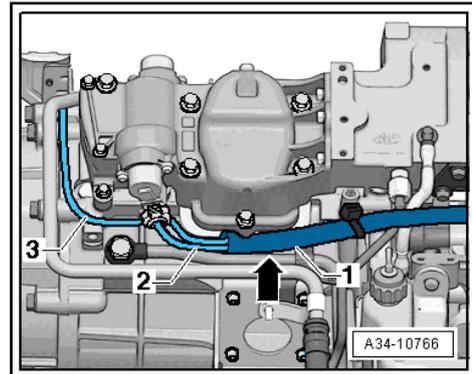


- Remove the cable tie and move the protective hose -1- to the right.
- Specified separating location -arrow-, so that the repair locations are under the R tronic shift actuator heat shield.

 **Caution**

Impairment to the vehicle functions.

- ◆ *The wiring harness -3- for gear recognition sensor 2 must not be interchanged with the wiring harness -2- for the gear recognition sensor during a repair.*



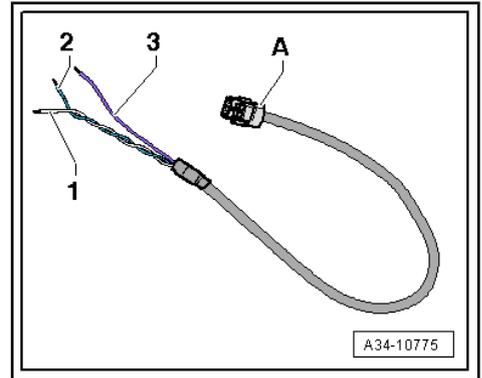
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- First join both twisted signal wires -1- and -2- from the adapter wire set - 420 971 164- with the twisted signal wires on the vehicle wire set.

 **Note**

- ◆ *The signal wires are already twisted on the current vehicle wire set as well as on the adapter wire set - 420 971 164- .*
- ◆ *Pay close attention to the wire pin assignment on the old connector and wire connections.*



 **Caution**

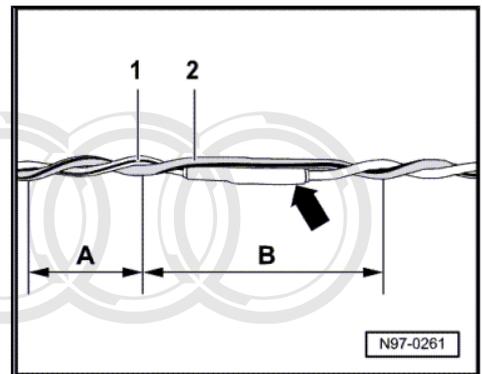
Impairment to the vehicle functions.

- ◆ *Follow the description for repairing the wiring harness exactly. Refer to → **Electrical Equipment - General Information; Rep. Gr. 97 ; Removal and Installation .***
- ◆ *Pay attention to any country specific requirements.*

When repairing, both signal wires leading to the gear recognition sensors must have the same length. The length -A- = 15 +/- 10 mm must be maintained when twisting the wires -1 and 2-.

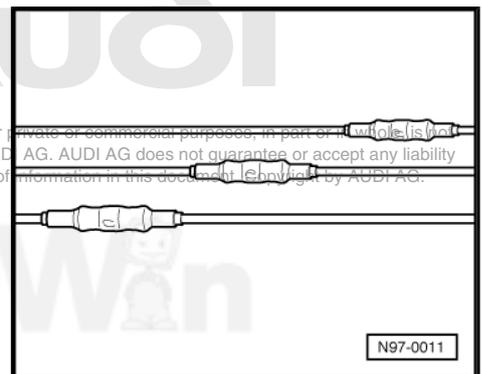
The wire may not be longer than -B- = 80 mm without twisting the wire, for example, near the pinch connector -arrow-.

- Connect the adapter wire set, water-proof, to the vehicle wiring harness; follow the procedure exactly. Refer to ⇒ **Electrical Equipment - General Information; Rep. Gr. 97 ; Removal and Installation .**



 **Note**

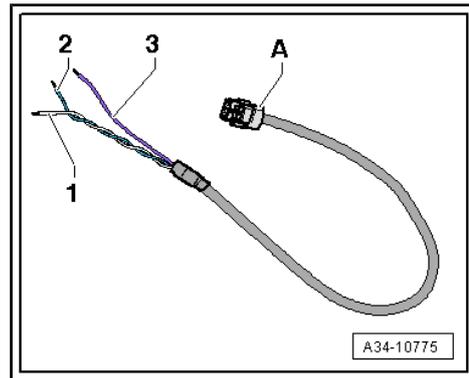
Be careful not to place the pinch connector directly next to the wires being repaired. Arrange the pinch connectors slightly offset so that the number of wiring harnesses does not get too large.



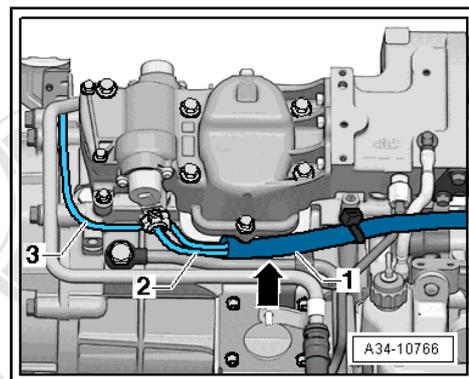
- Shorten and connect the third wire -3- after attaching and twisting the signal wires.

 **Note**

- ◆ *If the repair location was unwrapped before, then this location must be wrapped with yellow adhesive tape after the repair.*
- ◆ *Attach the repair wiring harness with a cable tie. This will prevent rattling noises while driving.*



- Pull the adapter wire set - 420 971 164- -2 and 3- protective cover over the repair locations.

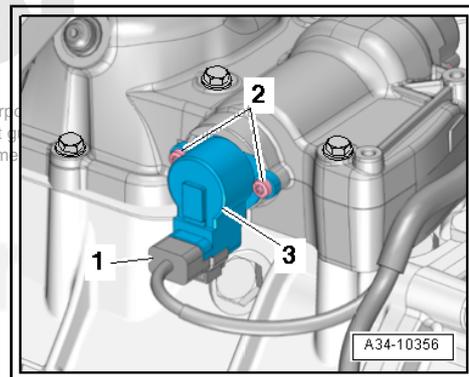


- Connect the connector -1- to gear recognition sensor 2.

 **Note**

Ignore -2 and 3-.

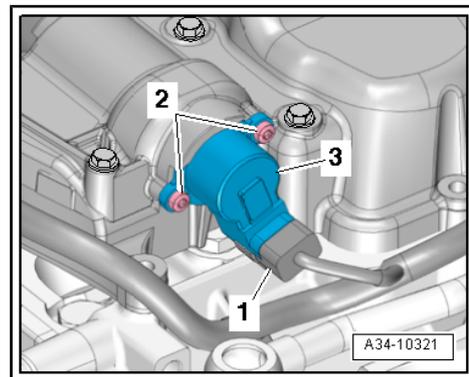
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- Connect the connector -1- to the gear recognition sensor.

 **Note**

Ignore -2 and 3-.

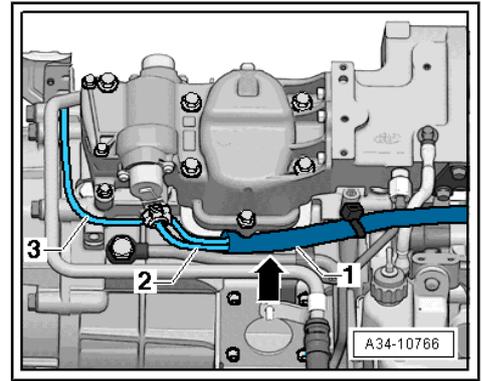


- Route the wires -2 and 3- and secure with cable ties.
- Align the wiring harness so that the repair locations are at the correct position -arrow- and secure with a cable tie.

Install in reverse order of removal paying attention to the following:

- Install the heat shield. Refer to => Fig. [“Heat Shield Over the R tronic Shift Actuator, Tightening Specifications”](#), page 74 .
- Install the air filter housing. Refer to => Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .
- Install the rear bumper cover. Refer to => Body Exterior; Rep. Gr. 63 ; Removal and Installation .
- Perform gear selector basic setting. Refer to => [“2.8 Gear Selector Basic Setting”](#), page 74

Document the repair in the Audi Maintenance booklet under “dealership entries” with a short comment of what was repaired and when, the dealership, stamp and signature.



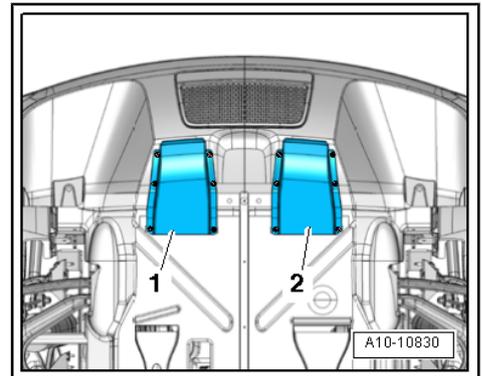
5.19 Transmission Input Speed Sensor

Special tools and workshop equipment required

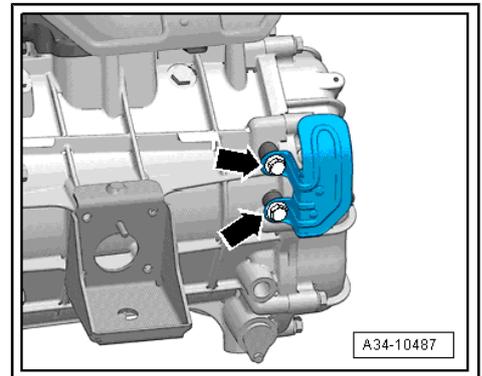
- ◆ Sealing paste - AMV 188 001 02-

Removing

- Remove the air guide -2-. Refer to => Body Exterior; Rep. Gr. 66 ; Description and Operation .



- Remove the bolts -arrows- and then remove the heat shield over the transmission input speed sensor - G182- .

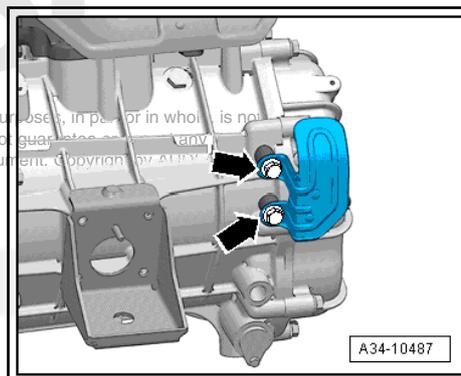
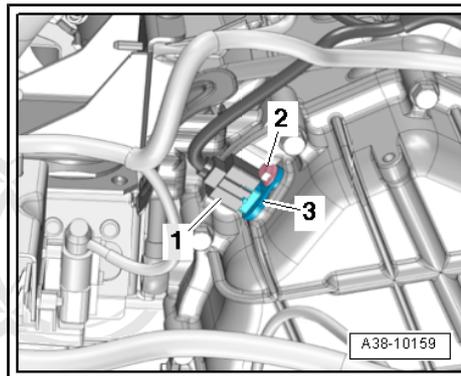


- Disconnect the connector -1-.
- Remove the bolt -2- and then remove the transmission input speed sensor -3- from the transmission.

Installing

Install in reverse order, paying attention to the following:

- Install the transmission input speed sensor -3- with a new O-ring.
- Install the bolt -2- with sealant - AMV 188 001 02- and then tighten it. Tightening specification; refer to [⇒ Item 5 \(page 89\)](#) .
- Connect the connector -1-.
- Tighten the heat shield bolts -arrows- to 10 Nm.

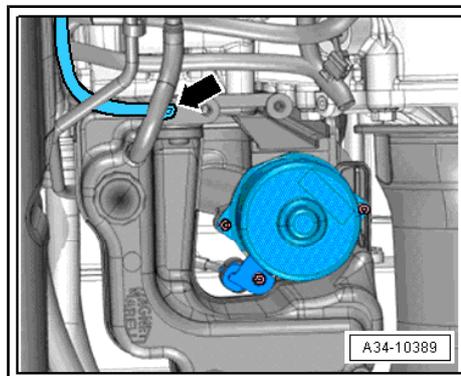


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5.20 Hydraulic Unit

Removing

- Remove the ground (GND) connection -arrow- at the top of the hydraulic unit bracket.
- Remove the hydraulic oil reservoir. Refer to [⇒ "5.21 Hydraulic Oil Reservoir", page 145](#) .
- Remove the hydraulic pressure line. Refer to [⇒ "5.25 Hydraulic Pressure Line from Shift Actuator to R tronic Hydraulic Unit", page 151](#) .

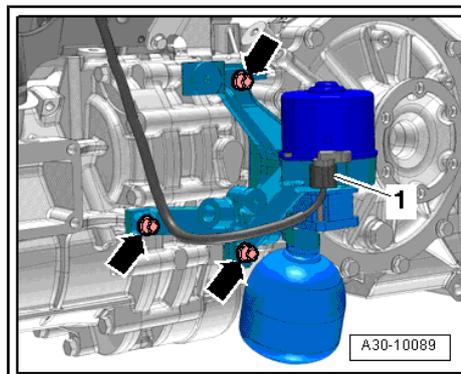


- Disconnect the connector -1-.
- Remove the bolts -arrows- and the hydraulic unit.

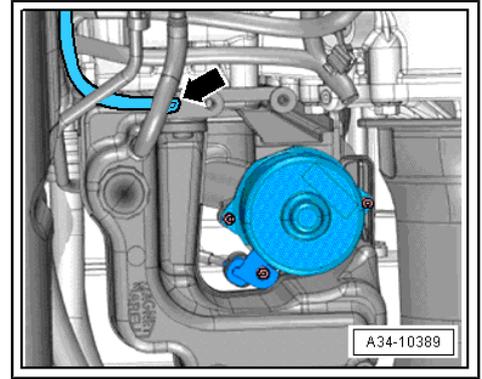
Installing

Install in reverse order, paying attention to the following:

- Tightening specification, refer to [⇒ "2.9 Hydraulic Unit Overview, R tronic", page 75](#) .
- Install the hydraulic pressure line. Refer to [⇒ "5.25 Hydraulic Pressure Line from Shift Actuator to R tronic Hydraulic Unit", page 151](#) .
- Install the hydraulic oil reservoir. Refer to [⇒ "5.21 Hydraulic Oil Reservoir", page 145](#) .



- Attach the ground (GND) connection -arrow- at the top of the hydraulic unit bracket.



5.21 Hydraulic Oil Reservoir

Special tools and workshop equipment required

- ◆ Oil Collecting and Extracting Device - V.A.G 1782-

Removing



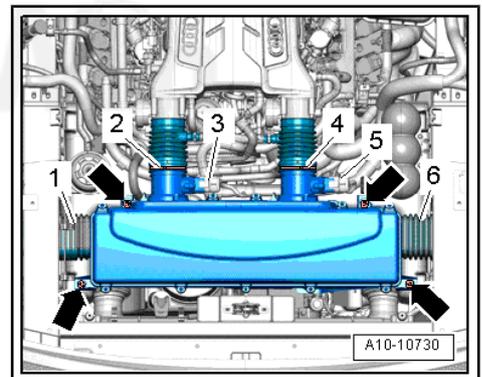
WARNING

There is a risk of injury. The pressure in the R tronic hydraulic system may be up to 50 bar.

- ◆ *Always reduce the pressure in the system before working on the R tronic hydraulic system. Refer to ⇒ "2.12 Hydraulic System, Building System Pressure, R tronic", page 82.*

- Reduce the system pressure in the R tronic hydraulic system. Refer to ⇒ "2.12 Hydraulic System, Building System Pressure, R tronic", page 82 .
- Remove the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .

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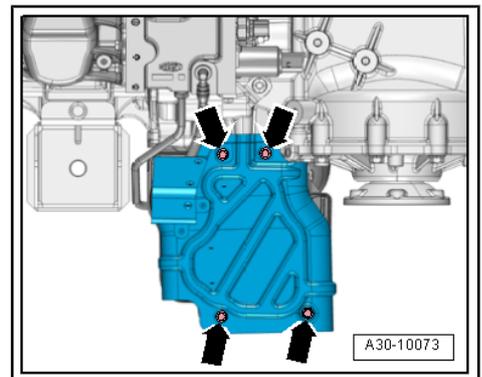


- Remove the bolts -arrows- and the heat shield.



Note

The illustration shows the installation position with the transmission removed.



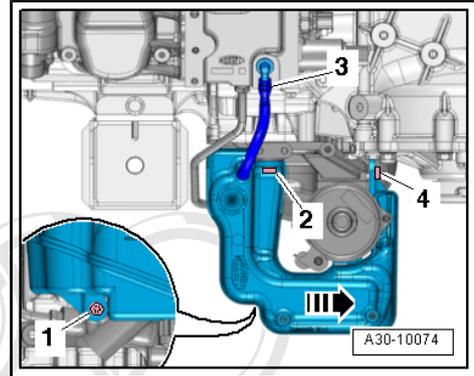
- Open the cover on the hydraulic oil reservoir and extract the oil with the -V.A.G 1782- .

**Caution**

There is a risk of destroying the hydraulic return line connection.

- ◆ *Only remove the hydraulic return hose using the method described.*

- Remove the hydraulic return hose -3 -. Refer to ⇒ ["5.13 Hydraulic Return Hose", page 129](#) .
- Remove the bolts -1, 2 and 4-.
- Press the hydraulic oil reservoir forward slightly -arrow- and remove.

**Note**

The illustration shows the installation position with the transmission removed.

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Installing

Install in reverse order, paying attention to the following:

- Tightening specification, refer to ⇒ ["2.9 Hydraulic Unit Overview, R tronic", page 75](#) .

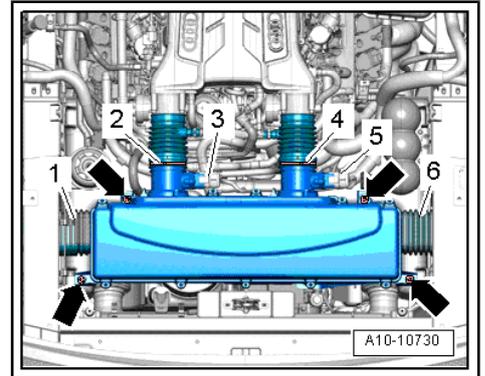
**Note**

- ◆ *Replace the O-ring.*
- ◆ *Secure all hose connections with hose clamps of the same type as those equipped by the factory, refer to the electronic parts catalog ETKA.*
- Replace the hydraulic return hose -3 -. Refer to ⇒ ["5.13 Hydraulic Return Hose", page 129](#) .
- Fill the hydraulic fluid reservoir and then check the level. Refer to the electronic parts catalog ETKA and. Refer to ⇒ ["1.1 Oil Level in R tronic Hydraulic Unit", page 52](#) .
- Install the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .

5.22 Transmission Hydraulic Pump Motor

Removing

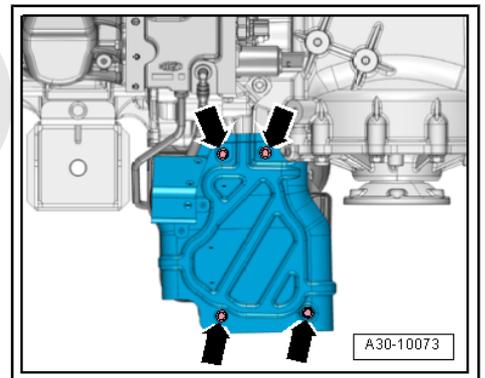
- Remove the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .



- Remove the bolts -arrows- and the heat shield.

i Note

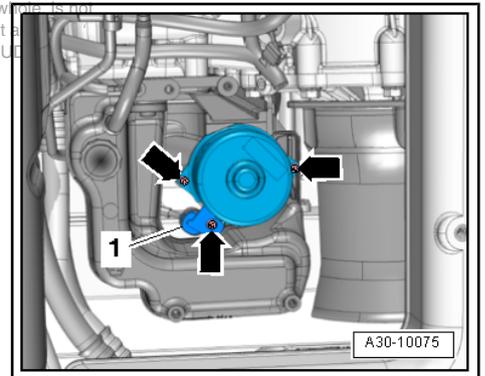
The illustration shows the installation position with the transmission removed.



- Remove the bolts -arrows- and the transmission hydraulic pump - V387- motor.
- Disconnect the connector -1-.

i Note

The illustration shows the installation position with the transmission removed.

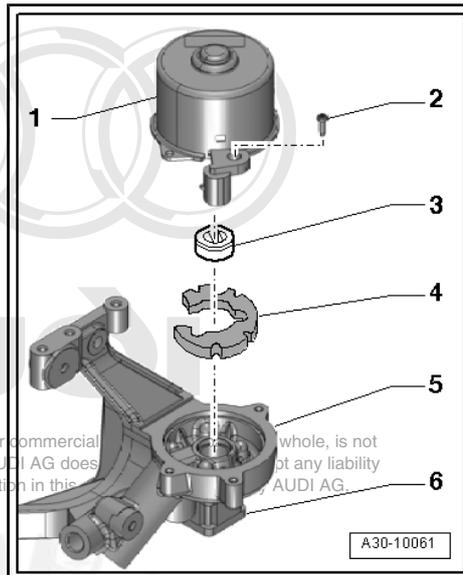


Installing

Install in reverse order, paying attention to the following:

- Tightening specification, refer to ⇒ ["2.9 Hydraulic Unit Overview, R tronic", page 75](#) .

- Insert the connecting piece -3- into the mount for the mechanical hydraulic pump -6-.
- The mechanical hydraulic pump drive must engage in the groove on the connecting piece.
- Clean with a sponge -4-.
- Insert the sponge -4- into the bracket -5-.
- Install the transmission hydraulic pump motor -1- into the bracket.
- The drive on the transmission hydraulic pump motor must engage in the groove on the connecting piece.
- Tighten the bolts -2-.
- Install the air filter housing. Refer to **Fuel Injection and Ignition**; Rep. Gr. 24 ; Removal and Installation.



5.23 Mechanical Hydraulic Pump

Special tools and workshop equipment required

- ◆ Oil Collecting and Extracting Device - V.A.G 1782-

Removing

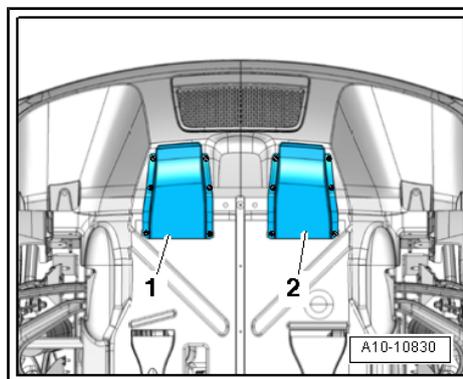


WARNING

There is a risk of injury. The pressure in the R tronic hydraulic system may be up to 50 bar.

- ◆ *Always reduce the pressure in the system before working on the R tronic hydraulic system. Refer to ⇒ "2.12 Hydraulic System, Building System Pressure, R tronic", page 82 .*

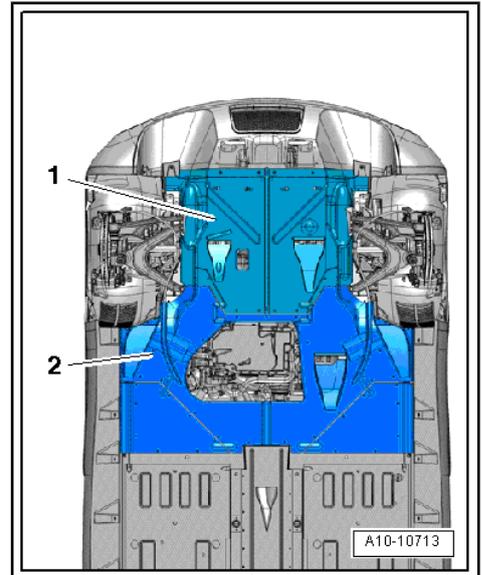
- Reduce the system pressure in the R tronic hydraulic system. Refer to ⇒ "2.12 Hydraulic System, Building System Pressure, R tronic", page 82 .
- Remove the hydraulic oil reservoir. Refer to ⇒ "5.21 Hydraulic Oil Reservoir", page 145 .
- Remove the air guides -1- and -2-. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Description and Operation .



- Remove the rear noise insulation -1-. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .

i Note

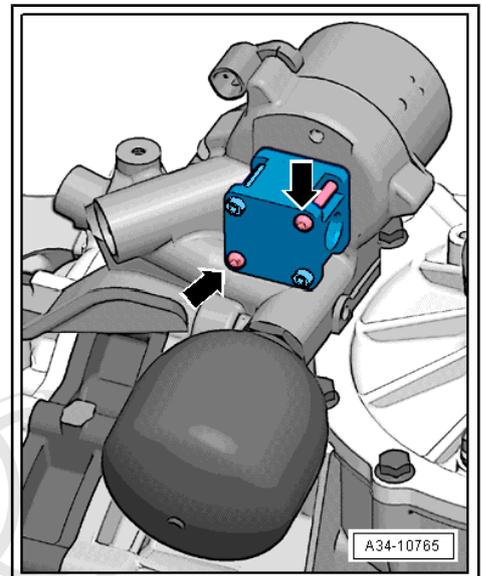
To collect escaping hydraulic oil, lay a clean cloth under the mechanical hydraulic pump.



- Remove the bolts -arrows- and the mechanical hydraulic pump.

i Note

- ◆ *Remove only those bolts identified by the -arrows-. If the other two bolts are loosened, the mechanical hydraulic pump will come apart.*
- ◆ *The illustration shows the installation position with the transmission removed.*



Installing

Install in reverse order, paying attention to the following:

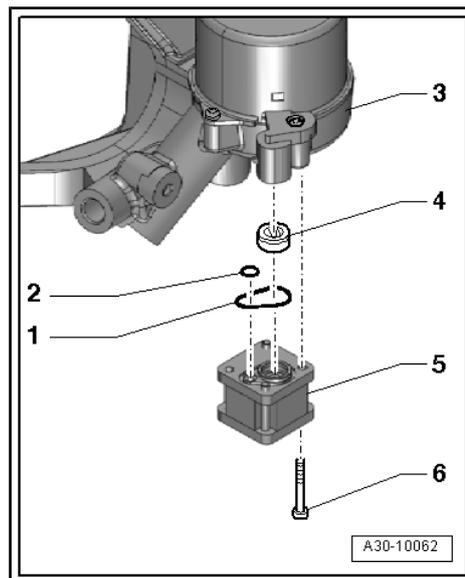
- Tightening specification, refer to ⇒ ["2.9 Hydraulic Unit Overview, R tronic", page 75](#) .

i Note

Replace the seal and the O-ring.

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- Place the O-ring -2- and the seal -1- on the mechanical hydraulic pump -5-.
- Insert the connecting piece -4- into the mount on the hydraulic pump.
- The mount on the mechanical hydraulic pump -5- must engage in the groove on the connecting piece -4-.
- Insert the mechanical hydraulic pump -5- in the bracket -3- from underneath.
- The drive on the transmission hydraulic pump - V387- must engage into the groove on the connecting piece.
- Tighten the bolts -6-.
- Install the rear noise insulation and air guides. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .
- Install the hydraulic oil reservoir. Refer to ⇒ ["5.21 Hydraulic Oil Reservoir", page 145](#) .



5.24 Pressure Reservoir

Special tools and workshop equipment required

- ◆ Open End Spanner Insert AF 27 mm - T40156-

Removing



WARNING

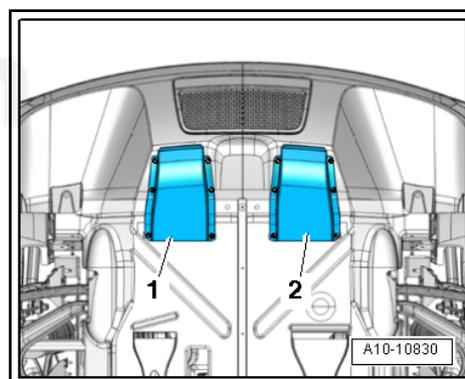
There is a risk of injury. The pressure in the R tronic hydraulic system may be up to 50 bar.

- ◆ *Always reduce the pressure in the system before working on the R tronic hydraulic system. Refer to ⇒ ["2.12 Hydraulic System, Building System Pressure, R tronic", page 82](#) .*

- Reduce the system pressure in the R tronic hydraulic system. Refer to ⇒ ["2.12 Hydraulic System, Building System Pressure, R tronic", page 82](#) .

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- Remove the air guides -1- and -2-. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Description and Operation .



- Remove the rear noise insulation -1-. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .



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 **Note**

To collect escaping hydraulic oil, lay a clean cloth under the pressure reservoir.

- Remove the pressure reservoir -1- and extension -2- using -T40156- .

Installing

Install in reverse order, paying attention to the following:

- Tightening specification, refer to ⇒ ["2.9 Hydraulic Unit Overview, R tronic", page 75](#) .
- Install the pressure reservoir filled with hydraulic oil.
- Tighten the pressure reservoir using only an -T40156- .
- Install the rear noise insulation and air guides. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .
- Check the oil level in the R tronic hydraulic unit. Refer to ⇒ ["4.1 Oil Level in R tronic Hydraulic Unit, Checking", page 101](#) .

5.25 Hydraulic Pressure Line from Shift Actuator to R tronic Hydraulic Unit

Removing

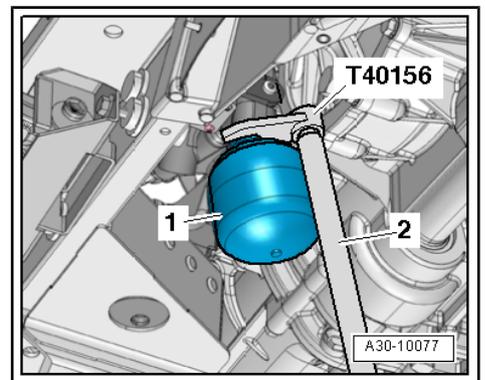
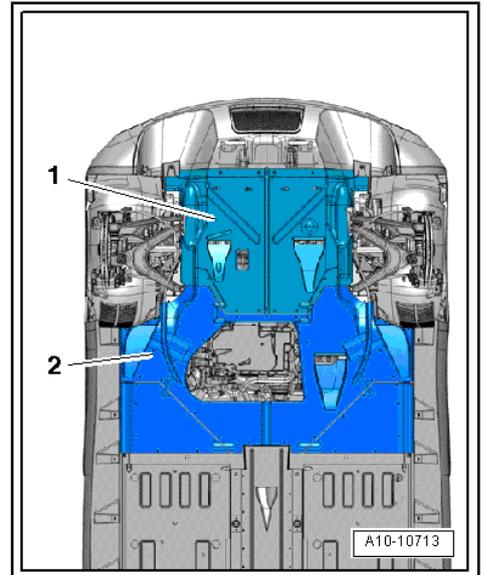


WARNING

There is a risk of injury. The pressure in the R tronic hydraulic system may be up to 50 bar.

- ◆ *Always reduce the pressure in the system before working on the R tronic hydraulic system. Refer to ⇒ ["2.12 Hydraulic System, Building System Pressure, R tronic", page 82](#) .*

- Remove the right rear wheel. Refer to ⇒ Wheel and Tire Guide; Rep. Gr. 44 ; Removal and Installation .





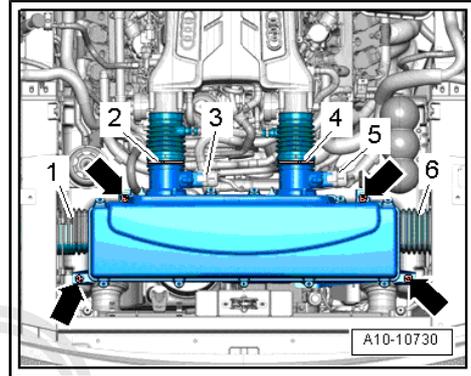
- Remove the air filter housing. Refer to => Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .

Vehicles with a Transmission Fluid Temperature Regulator:



Note

To collect escaping transmission oil, lay a clean cloth under the separating point.



- Remove the bolt -arrow- and the transmission oil lines from the transmission oil thermostat.
- Seal all open lines with clean plugs to stop transmission oil from leaking out.

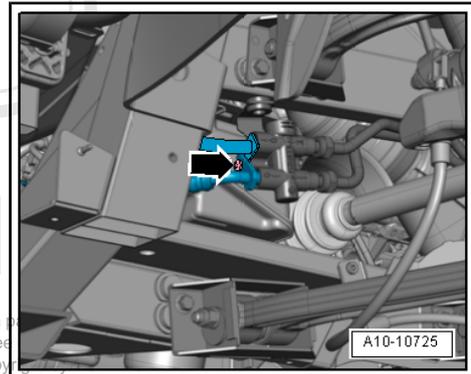
All Vehicles:



Note

To collect escaping hydraulic oil, lay a clean cloth under the separating point.

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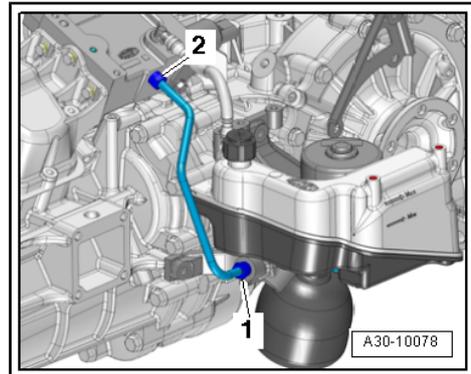


- Remove the union nuts -1- and -2- and the hydraulic pressure line.



Note

The union nut -1- is accessible from the right wheel housing side.



Installing

Install in reverse order, paying attention to the following:

- For the correct tightening specifications, refer to => ["2.9 Hydraulic Unit Overview, R tronic", page 75](#) .



Note

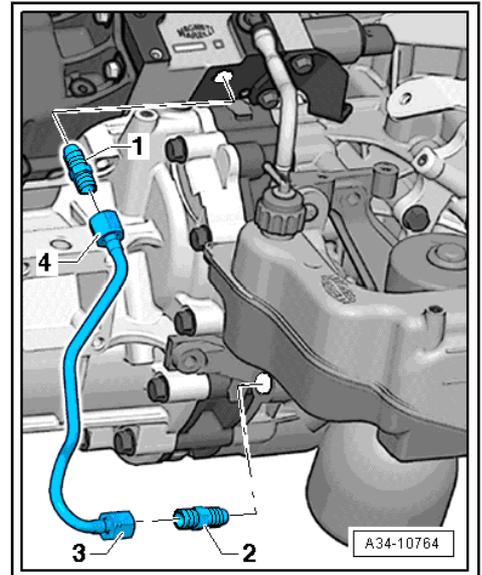
- ◆ *There are different versions, refer to the electronic parts catalog ETKA.*
- ◆ *A damaged or leaky hydraulic line with threaded adapters can be only be replaced with a hydraulic line with threaded adapters.*
- ◆ *A damaged or leaky hydraulic line without threaded adapters can also be replaced with a hydraulic line with threaded adapters.*

Versions with Threaded Adapters:

- Install the threaded adapters -1- and -2- to the tightening specification.

Versions with and without Threaded Adapters:

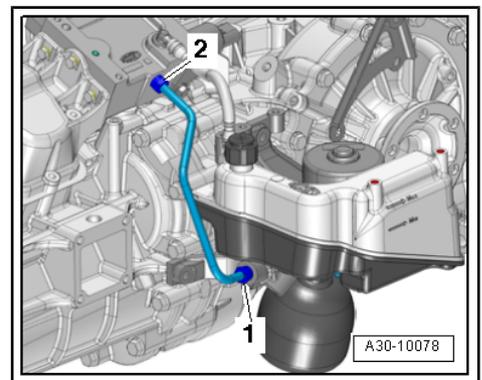
- Insert the hydraulic pressure line.



- Install both union nuts -1- and -2- tighten hand-tight.

 **Note**

- ◆ *Counter the hydraulic pressure line when installing the union nuts so the sealing surfaces fit against each other correctly.*
- ◆ *The hydraulic lines must remain free of tension when tightening the union nuts.*
- Tighten both union nuts -1- and -2- to the tightening specification.



 **Note**

Pay attention to the different tightening specifications.

- Install the transmission oil lines. Refer to [⇒ "2.14 Transmission Fluid Lines, Transmission Fluid Cooler and Transmission Fluid Filter Overview", page 85](#) .
- Check the oil level in the hydraulic unit. Refer to [⇒ "4.1 Oil Level in R tronic Hydraulic Unit, Checking", page 101](#) .
- Install the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .
- Install the right rear wheel. Refer to ⇒ Wheel and Tire Guide; Rep. Gr. 44 ; Removal and Installation .

5.26 Connections on R tronic Shift Actuator

Special tools and workshop equipment required

- ◆ Release Tool - T40161-

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Removing



Caution

The shift actuator can be damaged if the connector on it is removed incorrectly.

- ◆ *Only replace the connectors if they are damaged.*
- ◆ *The connector seat in the R tronic shift actuator can be damaged.*
- ◆ *Remove shavings completely.*

- The hydraulic return hose is removed. Refer to ["5.13 Hydraulic Return Hose", page 129](#).
- Cover the surfaces on the R tronic shift actuator around the connections with adhesive tape.



Note

This prevents the surface from being damaged during removal.

- Mount the -T40161- under the collar on the connection -A-.
- Squeeze the -T40161- with pliers in direction of -arrow-.

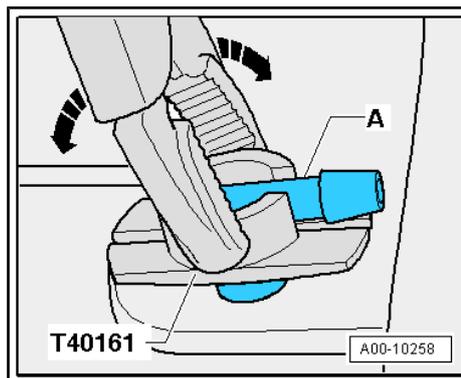
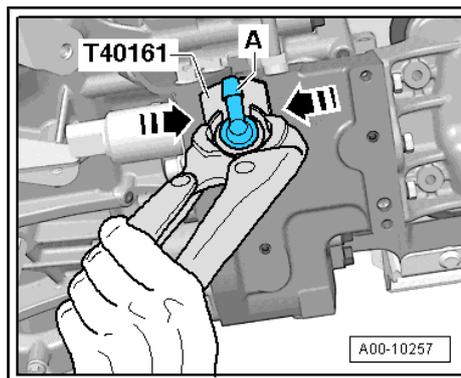


Note

The -T40161- must be positioned under the connector collar so the connector is raised up when the tool is pressed together.

- Hold the -T40161- compressed.
- Remove the connector by prying back and forth in both directions -arrows-.
- Extract the opening on the R tronic shift actuator and clean it so no metal shavings enter the hydraulic system.

Installing

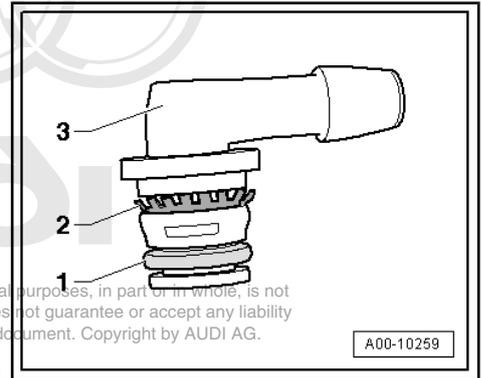


- Always replace the connections -3- on the R tronic shift actuator.

i Note

Seal off the inner opening to prevent shavings and dirt from getting into the R tronic shift actuator.

- Vacuum the opening.
- Seal the inner opening in the R tronic shift actuator (for example with sealing plugs) to prevent dirt from entering.
- Carefully remove any burrs on the upper opening on the R tronic shift actuator.
- Vacuum the opening, clean it and remove the sealing plugs.
- Coat the O-ring -1- on the connector lightly with hydraulic oil.
- The retainer -2- must be installed.



i Note

The retainer tabs -2- must face up so the connector spreads out and is secured after installing in the R tronic shift actuator.

- Press the connector as far as the stop into the opening on the R tronic shift actuator.
- Install the hydraulic return hose. Refer to ⇒ ["5.13 Hydraulic Return Hose", page 129](#).

5.27 Left and Right Transmission Mounts

Special tools and workshop equipment required

- ◆ Engine/Transmission Jack - V.A.G 1383 A-
- ◆ Transmission Support - T10337-

Removing

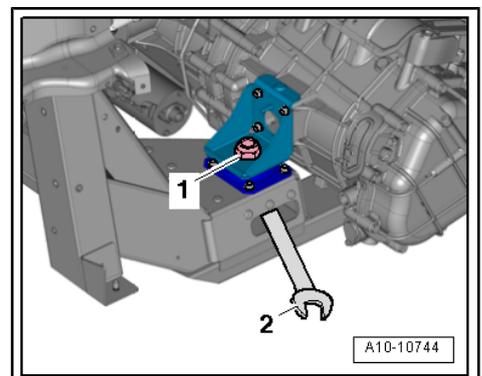
- Remove the rear bumper cover. Refer to ⇒ Body Exterior; Rep. Gr. 63 ; Removal and Installation .
- Remove the left and right transmission mount nuts -1- while counterholding with an open end wrench -2-.
- Remove the spacers.



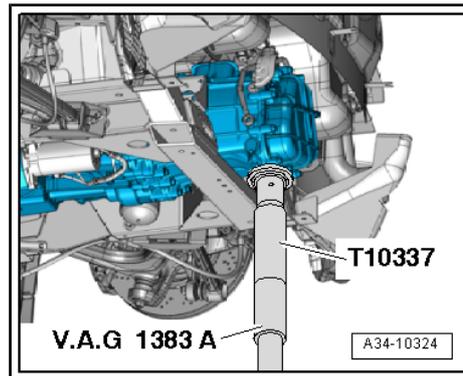
WARNING

There is the risk of an accident.

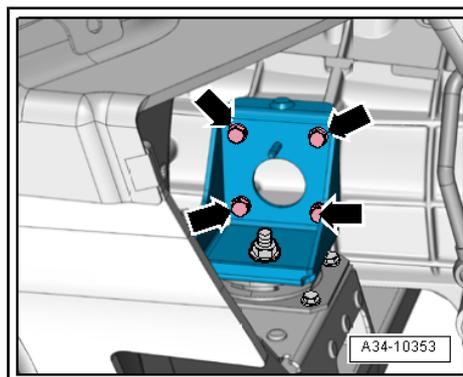
- ◆ *The -V.A.G 1383 A- may only be used during assembly and must not sit unsupervised under the vehicle.*



- Support the transmission with -V.A.G 1383 A- and -T10337- as illustrated.
- Remove the transmission fluid lines from the back of the transmission. Refer to [⇒ "5.30 Transmission Fluid Lines, Rear, Vehicles with Transmission Fluid Cooling", page 159](#) .



- Remove the left and right bolts -arrows- and the transmission supports.

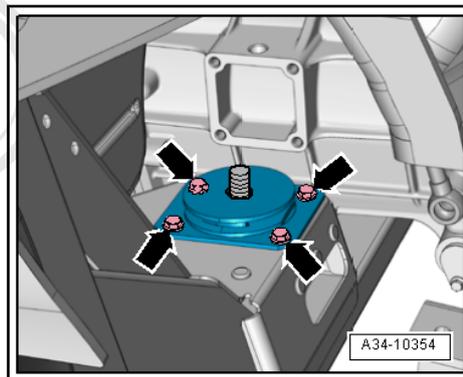


- Remove the left and right bolts -arrows- and the transmission mount.

Installing

Install in reverse order, paying attention to the following:

- For the correct tightening specifications, refer to [⇒ "2.13 Transmission Mount Overview", page 84](#) .
- Install the transmission oil lines. Refer to [⇒ "5.30 Transmission Fluid Lines, Rear, Vehicles with Transmission Fluid Cooling", page 159](#) .
- Install the rear bumper cover. Refer to ⇒ Body Exterior; Rep. Gr. 63 ; Removal and Installation .



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5.28 Transmission Fluid Thermostat, Vehicles with Transmission Fluid Cooling

Special tools and workshop equipment required

- ◆ Oil Collecting and Extracting Device - V.A.G 1782-

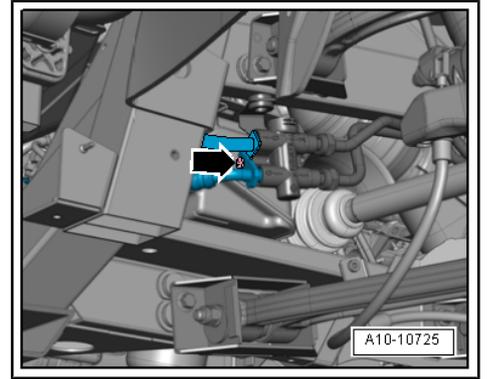
Removing

- Remove the right rear wheel. Refer to ⇒ Wheel and Tire Guide; Rep. Gr. 44 ; Removal and Installation .
- Place the -V.A.G 1782- under the separating point.

- Remove the bolt -arrow- and the transmission oil pipes from the transmission oil thermostat.

 **Note**

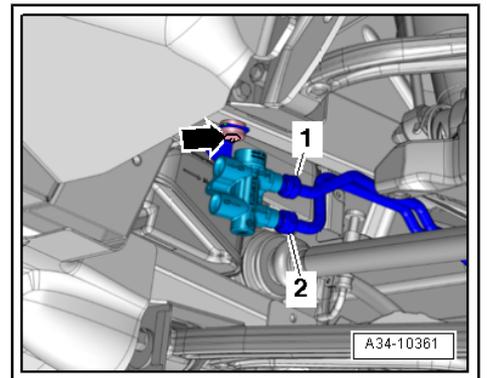
To prevent dirt from entering, seal the open lines and connections with clean plugs or caps.



- Place the -V.A.G 1782- under the separating point.
- Remove the union nuts -1- and -2-.
- Remove the bolt -arrow- and the transmission fluid thermostat.

 **Note**

To prevent dirt from entering, seal the open lines and connections with clean plugs or caps.



Installing

Install in reverse order, paying attention to the following:

- For the correct tightening specifications, refer to [⇒ "2.14 Transmission Fluid Lines, Transmission Fluid Cooler and Transmission Fluid Filter Overview", page 85](#) .
- Install the right rear wheel. Refer to ⇒ Wheel and Tire Guide; Rep. Gr. 44 ; Removal and Installation .
- Gear oil level, checking and filling. Refer to [⇒ "1.2 Transmission Fluid, Checking and Filling", page 52](#) .

5.29 Transmission Fluid Lines, Front, Vehicles with Transmission Fluid Cooling

Special tools and workshop equipment required

- ◆ Oil Collecting and Extracting Device - V.A.G 1782-

Removing

- Remove the right rear wheel. Refer to ⇒ Wheel and Tire Guide; Rep. Gr. 44 ; Removal and Installation .
- Remove the right rear wheel housing liner. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .
- Place the -V.A.G.1782- under the separating point.

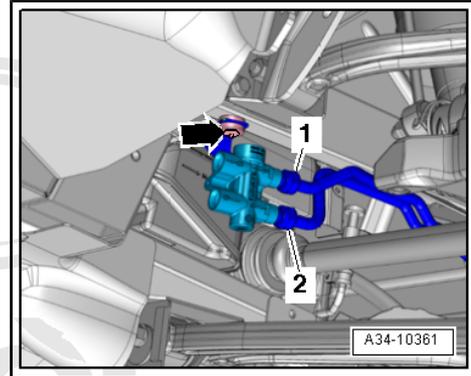
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- Remove the union nuts -1- and -2-.

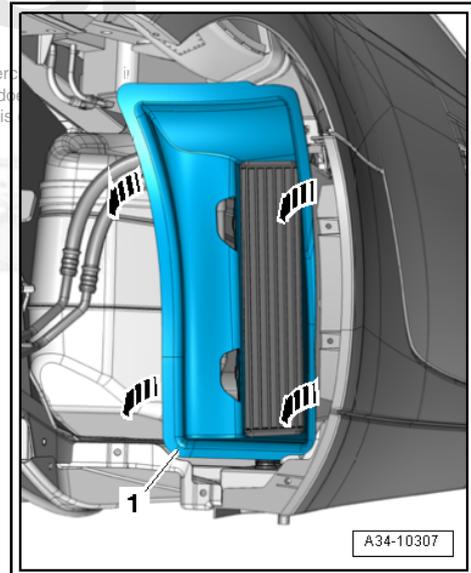
 **Note**

- ◆ *To prevent dirt from entering, seal the open pipes and connections with clean plugs or caps.*
- ◆ *Ignore -arrow-.*



- Remove the air guide -1- -arrows-.

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- Remove the bolt -2-.
- Remove the nut -1- and retaining tab.
- Remove the bolt -2- on the oil line bracket.
- Place the -V.A.G 1782- under the separating point.
- Remove the union nuts -3- and -4- and front transmission fluid lines.

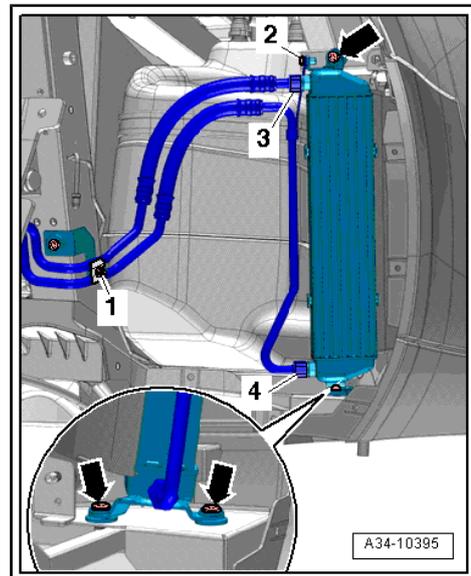
 **Note**

Ignore -arrows-.

Installing

Install in reverse order, paying attention to the following:

- For the correct tightening specifications, refer to ⇒ ["2.14 Transmission Fluid Lines, Transmission Fluid Cooler and Transmission Fluid Filter Overview", page 85](#) .
- Install the right rear wheel housing liner. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .
- Install the right rear wheel. Refer to ⇒ Wheel and Tire Guide; Rep. Gr. 44 ; Removal and Installation .
- Gear oil level, checking and filling. Refer to ⇒ ["1.2 Transmission Fluid, Checking and Filling", page 52](#) .



5.30 Transmission Fluid Lines, Rear, Vehicles with Transmission Fluid Cooling

Special tools and workshop equipment required

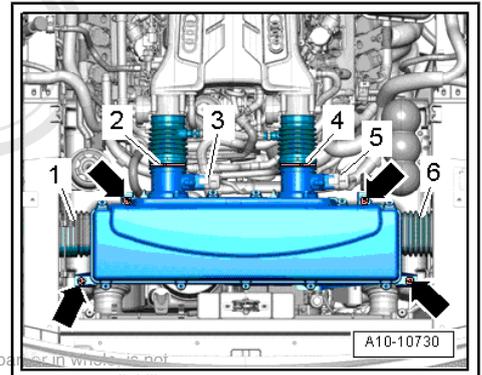
- ◆ Oil Collecting and Extracting Device - V.A.G 1782-

Removing

- Remove the rear bumper cover. Refer to ⇒ Body Exterior; Rep. Gr. 63 ; Removal and Installation .

R tronic:

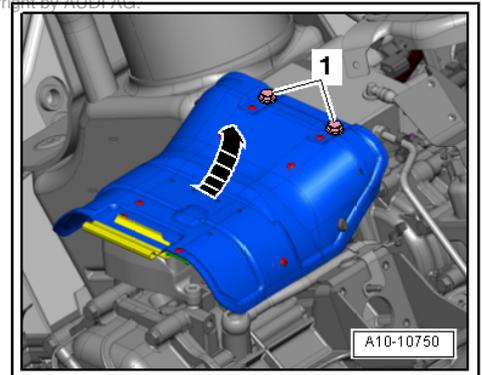
- Remove the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .



- Remove the bolts -1- and the heat shield -arrow-.
- Free up the electrical wires on the transmission fluid lines.

All vehicles:

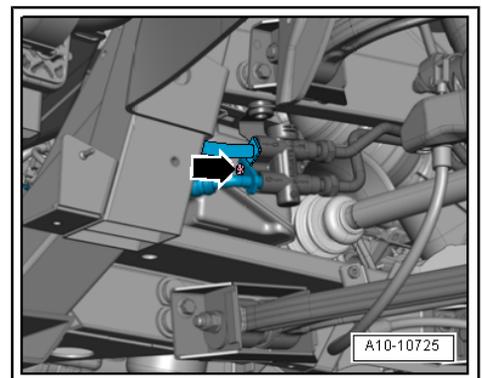
- Place the -V.A.G 1782- under the separating point.



- Remove the bolt -arrow- and the transmission oil pipes from the transmission oil thermostat.

Note

To prevent dirt from entering, seal the open pipes and connections with clean plugs or caps.



- Remove the nut -3-.
- Place the -V.A.G 1782- under the separating point.
- Remove the banjo bolts -1- and -2- and the transmission fluid lines.

**Note**

To prevent dirt from entering, seal the open lines and connections with clean plugs or caps.

Installing

Install in reverse order, paying attention to the following:

Tightening specifications:

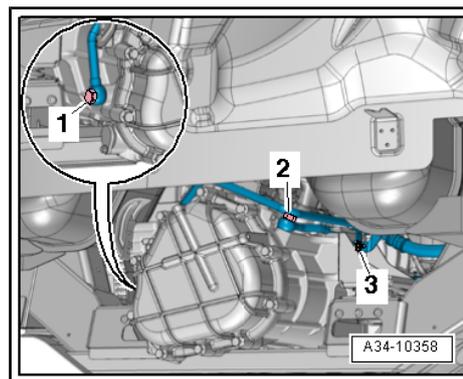
- ⇒ [“2.14 Transmission Fluid Lines, Transmission Fluid Cooler and Transmission Fluid Filter Overview”](#), page 85
- ⇒ [Fig. “Heat Shield Over the R tronic Shift Actuator, Tightening Specifications”](#), page 74

R tronic:

- Install the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .

All Vehicles:

- Install the rear bumper cover. Refer to ⇒ Body Exterior; Rep. Gr. 63 ; Removal and Installation .
- Gear oil level, checking and filling. Refer to ⇒ [“1.2 Transmission Fluid, Checking and Filling”](#), page 52 .



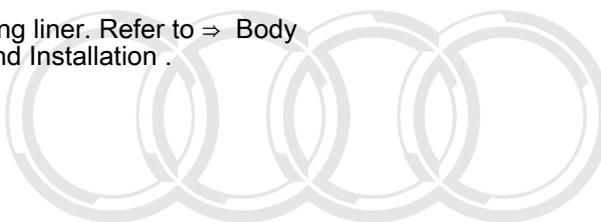
5.31 Transmission Oil Cooler

Special tools and workshop equipment required

- ◆ Oil Collecting and Extracting Device - V.A.G 1782-

Removing

- Remove the right rear wheel. Refer to ⇒ Wheel and Tire Guide; Rep. Gr. 44 ; Removal and Installation .
- Remove the right rear wheel housing liner. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .

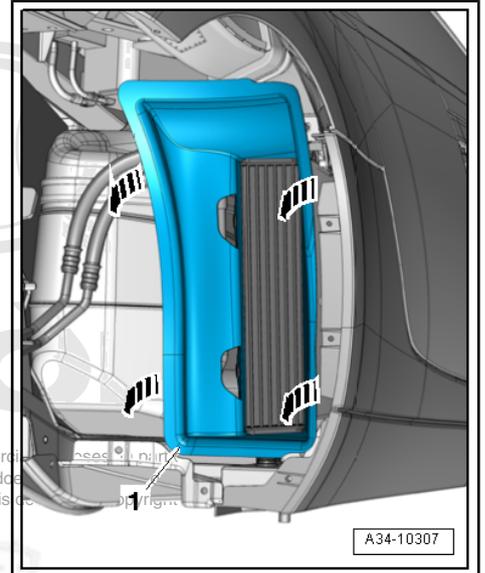


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- Remove the air guide -1- -arrows-.



- Remove the bolt -2-.
- Place the -V.A.G 1782- under the separating point.
- Remove the union nuts -3- and -4- and pull the transmission fluid pipes off the transmission fluid cooler.
- Remove the bolts -arrows- and the transmission oil cooler.

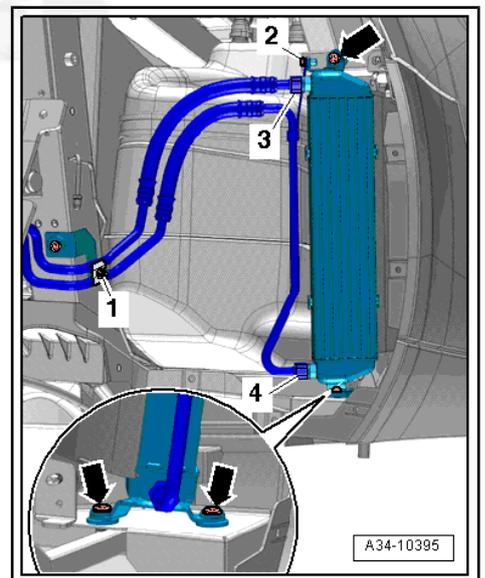
 **Note**

Ignore -1-.

Installing

Install in reverse order, paying attention to the following:

- For the correct tightening specifications, refer to [⇒ "2.14 Transmission Fluid Lines, Transmission Fluid Cooler and Transmission Fluid Filter Overview", page 85](#) .
- Install the right rear wheel housing liner. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .
- Install the right rear wheel. Refer to ⇒ Wheel and Tire Guide; Rep. Gr. 44 ; Removal and Installation .
- Gear oil level, checking and filling. Refer to [⇒ "1.2 Transmission Fluid, Checking and Filling", page 52](#) .



5.32 Shift Forks, 3rd through 6th Gear

Special tools and workshop equipment required

- ◆ Oil Collecting and Extracting Device - V.A.G 1782-
- ◆ Socket 38 mm - T40208-
- ◆ Locking fluid - D 197 300 A2-
- ◆ Sealing paste - AMV 188 001 02-

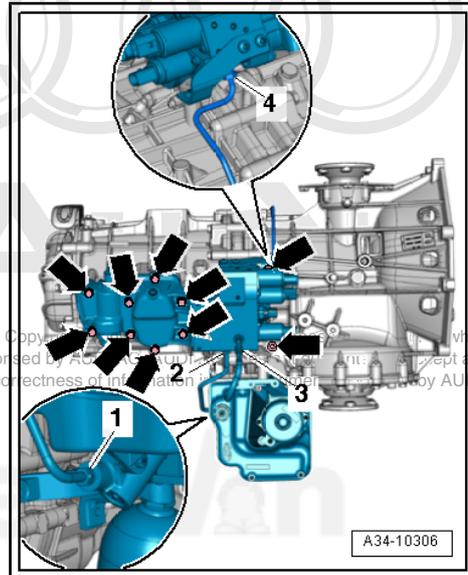
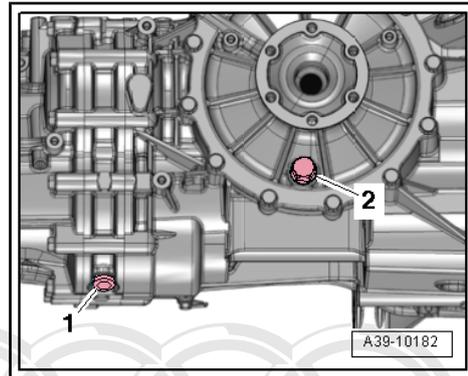
Removing

- Transmission, securing to engine and transmission holder. Refer to [⇒ "2.20 Transmission, Securing in Engine/Transmission Holder", page 93](#) .

- Place the -V.A.G 1782- under the transmission.
- Open the transmission fluid drain plug -1- and drain the transmission fluid.
- Install the transmission fluid drain plug -1- and tighten. Tightening specification => [Item 9 \(page 91\)](#) .

Transmission with R tronic

- Remove the shift actuator for the R tronic. Refer to => ["5.12 Shift Actuator, R tronic", page 123](#) .



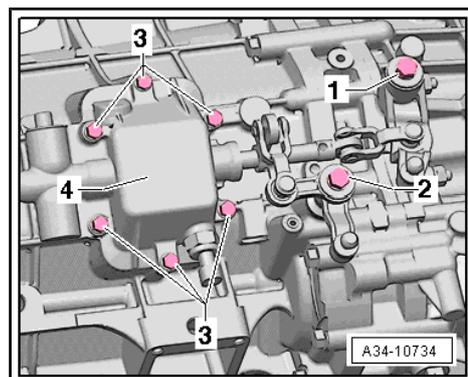
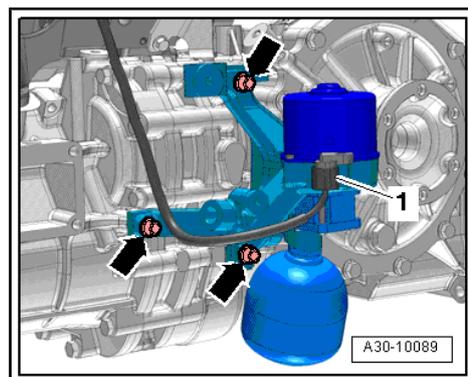
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- Remove both the hydraulic unit and the reservoir. Refer to => ["5.20 Hydraulic Unit", page 144](#) .

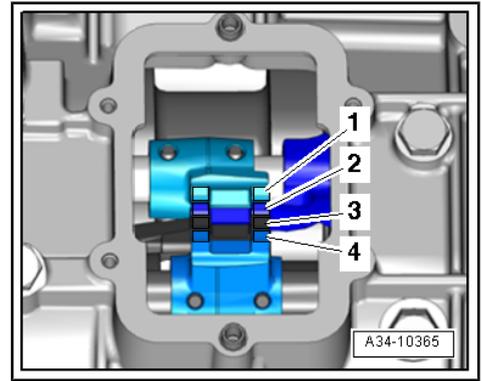
Manual Transmission

- Remove the bolts -1 through 3-.
- Remove both the shift unit -4- and the shift/selector relay lever.

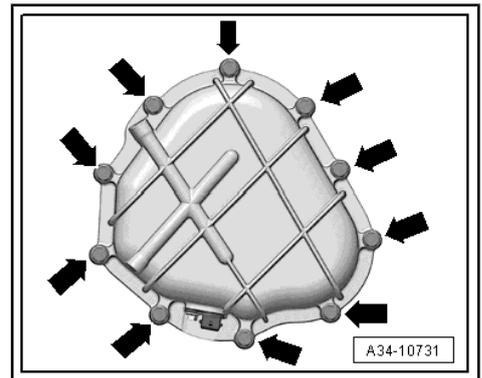
Continuation for All Transmissions



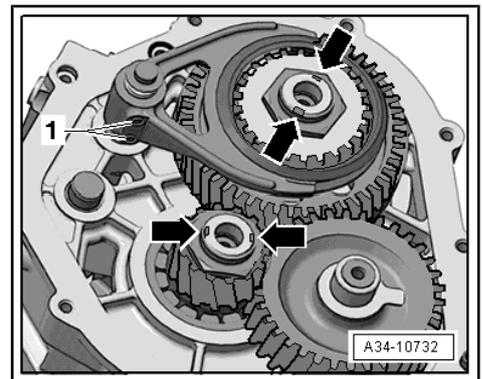
- Engage two gears. Push the selector rods -2 and 3- to the right with a screwdriver.



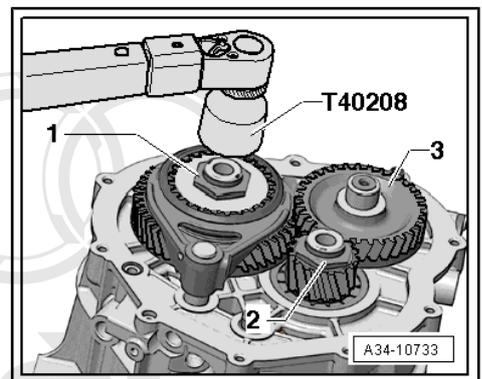
- Remove the bolts -arrow- and remove the end cover.



- Open the peening on both nuts -arrows-.
- Remove the adapter sleeves -1- with a drift.



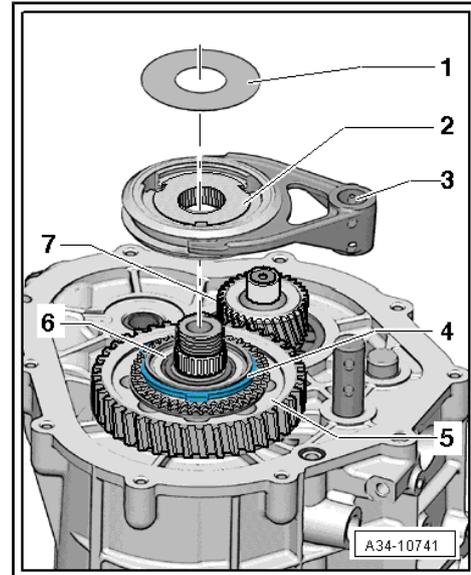
- Remove the nuts -1- and -2- using -T40208- .
- Remove both the reverse drive gear -3- and thrust washers.



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- Remove the washer -1-.
- Remove the locking collar with synchronizer hub -2- and shift fork -3-.
- Remove the synchronizer ring -4-, reverse gear wheel -5- and needle bearing -6-.
- Remove the reverse gear wheel -7-, use an assembly lever if necessary.



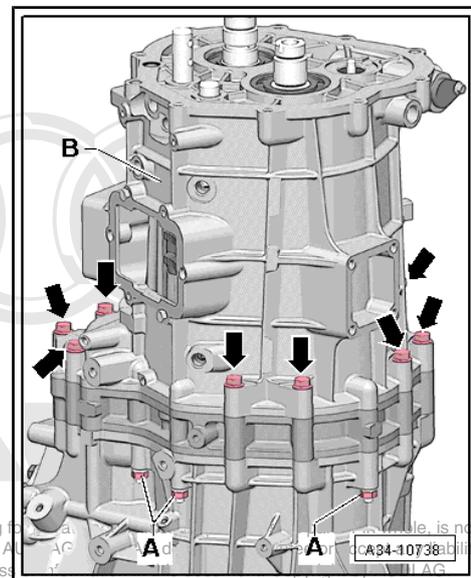
- Remove the nuts -A-.
- Remove the bolts -arrows- and remove the transmission housing -B-.

Remove the 3rd through 6th Gear Shift Fork as Follows:



Note

- ◆ Check the locking collars for wear. Refer to => Fig. "Locking Collar for 3rd to 6th Gears, Checking for Wear", page 190.
- ◆ Replace any worn locking collars. To do this the transmission must be completely disassembled. Refer to => "6.1 Transmission", page 170.
- ◆ Repairing the shift forks alone (as described following) would not be logical.



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Manual Transmission



- Remove the centering bolt -A-.

Transmission with R tronic

- Remove the locking pins -B- with a drift.

Continuation for All Transmissions

- Pull the gearshift rod -1- out of the shift forks -2 and 3- in direction of -arrow-.
- Remove the 5th and 6th gear shift fork -2-.
- Remove the 3rd and 4th gear shift fork -3-.
- Check shift forks for wear and replace if necessary. Refer to => Fig. "Checking 3rd to 6th Gear Shift Forks for Wear", page 93 .

Transmission, Assembling

Install in reverse order, paying attention to the following:

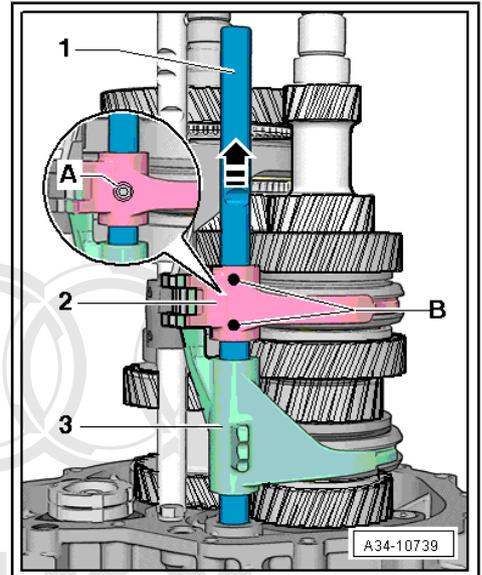
- Clean the separating surfaces on the housing thoroughly.

Manual Transmission

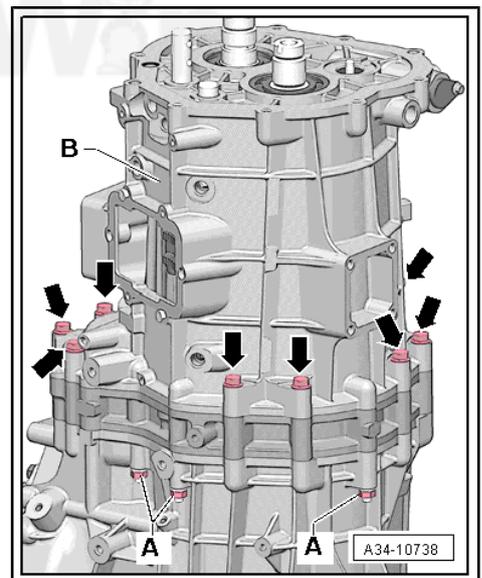
- Install the centering bolt -A- with locking fluid - D 197 300 A2- .
 Tightening specification => Item 4 (page 92)

Transmission with R tronic

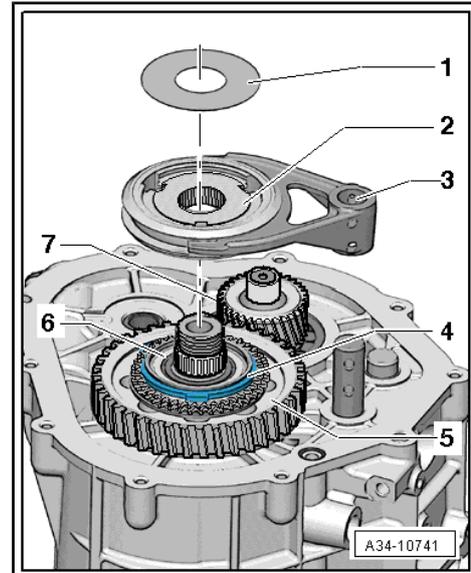
- Install the locking pins -B-.
- Apply sealing paste - AMV 188 001 02- to the housing separating surface.
- Position the transmission housing -B- and tighten the bolts -arrows-. Tightening specification => Item 1 (page 94) .
- Tighten the nuts -A-. Tightening specification => Item 19 (page 95) .



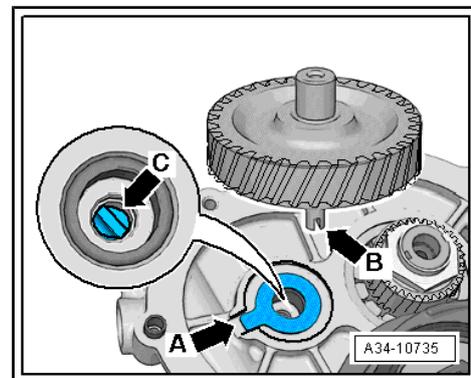
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- Mount the synchronizer ring -4-, reverse gear wheel -5- and needle bearing -6-.
- Install the locking collar with synchronizer hub -2- and shift fork -3-.
- Install the washer -1-.
- Install the reverse gear wheel -7-.

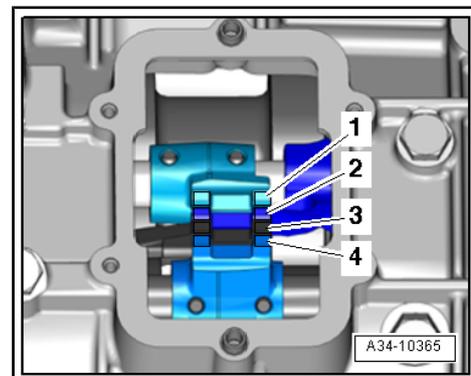


- Place the thrust washer with the anti-twist mechanism -arrow A- into the recess in the transmission.
- Install the reverse gear guide wheel so that the oil pump drive pin -arrow C- fits into the groove on the guide wheel -arrow B-.

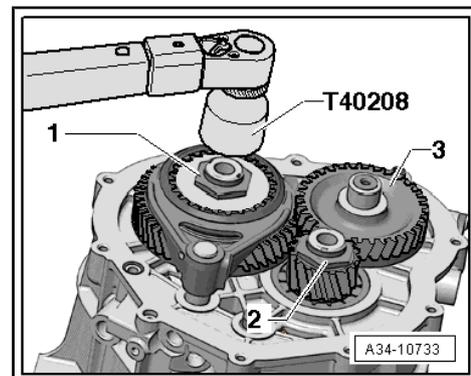


- Engage two gears. Push the selector rods -2 and 3- to the right with a screwdriver.
- Remove both the reverse drive gear -3- and thrust washers.

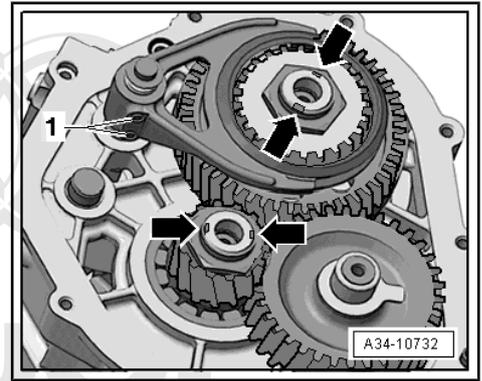
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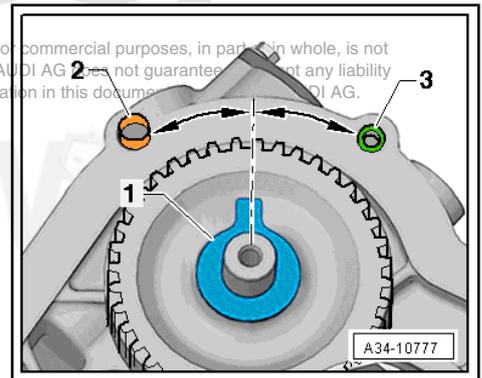
- Tighten the new nut -1- using -T40208-. Tightening specification => [Item 27 \(page 90\)](#).
- Tighten the new nut -2- using -T40208-. Tightening specification => [Item 15 \(page 89\)](#).



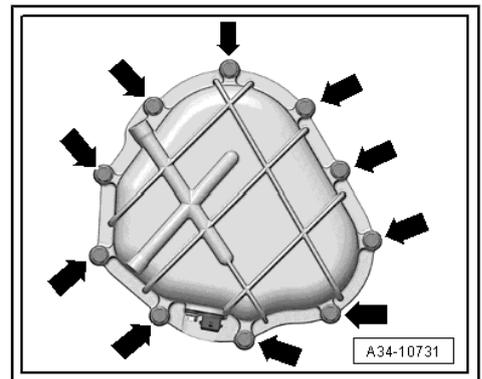
- Peen the nuts -arrows-.
- Install the spring pins -1- with a drift.



- Mount the thrust washer -1- so that the anti-twist mechanism is in the center between the holes -2 and 3.



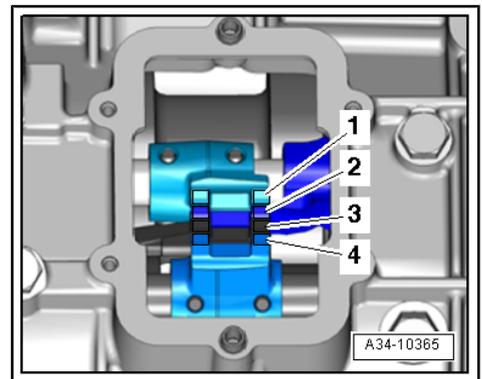
- Apply sealing paste - AMV 188 001 02- to the housing separating surface.
- Mount the end cover and tighten the bolts -arrows-. Tightening specification => [Item 1 \(page 89\)](#).
- Bring the selector rods in the transmission into the position shown.



- The openings in the selector rod yokes -1 through 4- must align.
- Alignment sleeves (quantity: 2) installed.

Manual Transmission

- Apply sealing paste - AMV 188 001 02- to the housing separating surface.

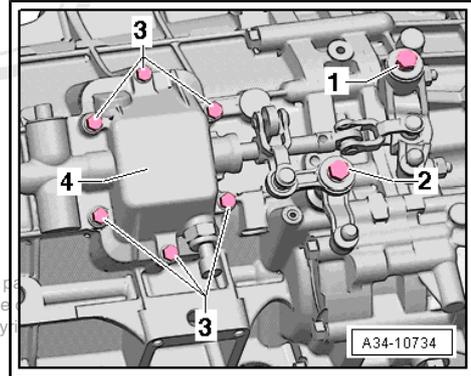




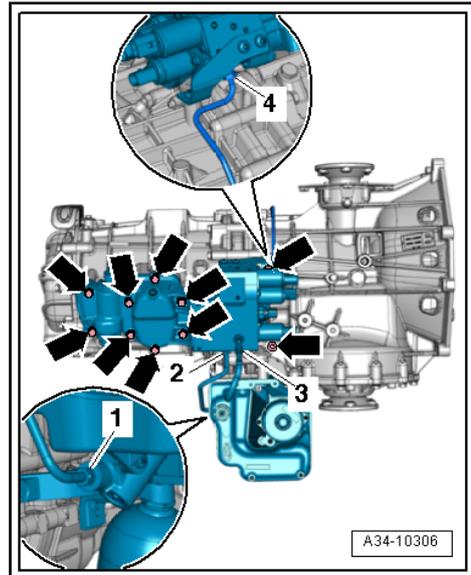
- Bolt -1 through 3- tightening specifications, refer to ⇒ [“2.4 Shift Unit on Manual Transmission Overview”, page 67](#) .
- The transmission shift lever is in the neutral position -4-.
- Install the shift unit -4-.
- Mount the shift/selecter relay lever with the bolts -1 and 2-.

Transmission with R tronic

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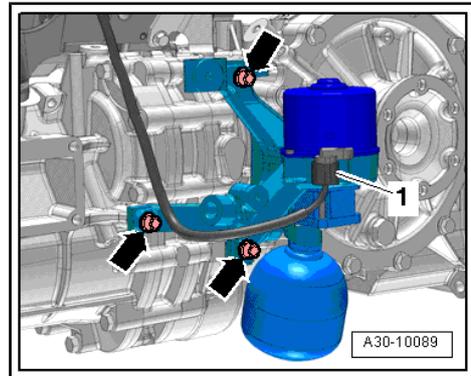
- Install the shift actuator for the R tronic ⇒ [page 126](#) .



- Install the hydraulic unit and reservoir. Refer to ⇒ [“2.9 Hydraulic Unit Overview, R tronic”, page 75](#) .

Continuation for All Transmissions

- Fill the transmission fluid. Refer to ⇒ [“3.2 Transmission Capacities”, page 12](#) .



5.33 Shift Fork, 1st and 2nd Gear



Note

- ◆ For removing and installing the 1st and 2nd gear shift fork proceed exactly as removing and installing the 3rd through 6th shift forks. Refer to ⇒ [“5.32 Shift Forks, 3rd through 6th Gear”, page 161](#) .
- ◆ The 3rd through 6th gear shift forks do not have to be removed in order to remove the 1st and 2nd gear shift forks.

Special tools and workshop equipment required

- ◆ Locking fluid - D 197 300 A2-

Removing

Manual Transmission

- Remove the centering bolts -1-.

Transmission with R tronic

- Remove the locking pins -1- with a drift.

Continuation for All Transmissions

- Pull the gearshift rod -3- out of the yoke -2- in direction of -arrow- and remove the shift fork for 1st and 2nd gear -4-.

Installing

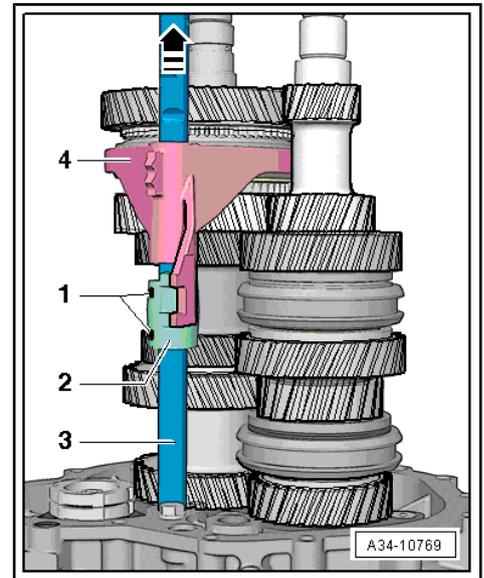
Install in reverse order, paying attention to the following:

Manual Transmission

- Install the centering bolts -1- with locking fluid - D 197 300 A2- .
Tightening specification => [Item 8 \(page 92\)](#) .

Transmission with R tronic

- Install the locking pins -1-.



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6 Disassembly and Assembly

⇒ "6.1 Transmission", page 170

6.1 Transmission

Special tools and workshop equipment required

- ◆ Oil Collecting and Extracting Device - V.A.G 1782-
- ◆ Shop Crane - VAS 6100-
- ◆ -T10356/5- from the Assembly Tool - T10356-
- ◆ Socket 38 mm - T40208-
- ◆ Support - T40211-
- ◆ Puller -Kukko 18/0- or Kukko 18/1
- ◆ Two-Arm Puller Kukko - 20/10-
- ◆ Locking fluid - D 197 300 A2-
- ◆ Sealing paste - AMV 188 001 02-
- ◆ Protective gloves

Disassembly

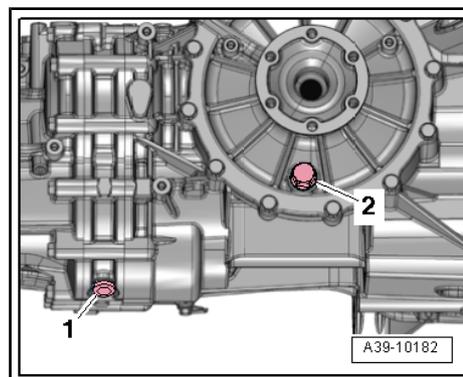
- Transmission, securing to engine and transmission holder.
Refer to
⇒ "2.20 Transmission, Securing in Engine/Transmission Holder", page 93 .
- Place the -V.A.G 1782- under the transmission.
- Open the transmission fluid drain plug -1- and drain the transmission fluid.
- Install the transmission fluid drain plug -1- and tighten. Tightening specification ⇒ [Item 9 \(page 91\)](#) .



Caution

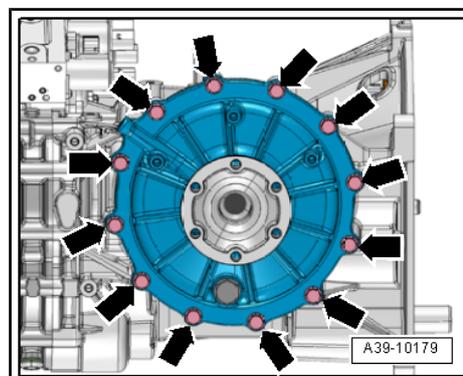
There is a risk of destroying the differential.

- ◆ *When removing the final drive cover, make sure the differential does not fall out.*
- ◆ *Do not install a differential that has fallen onto the floor.*

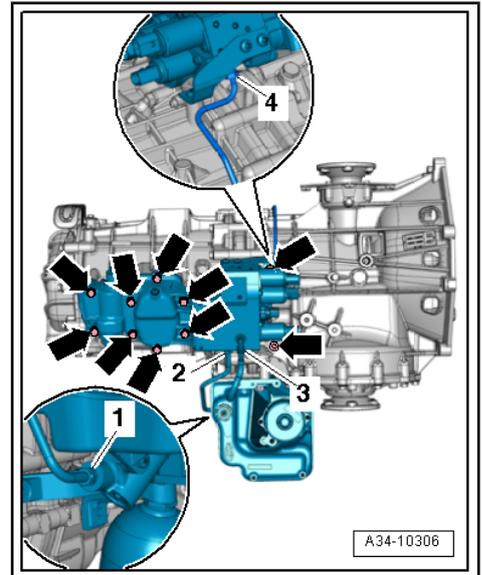


- Remove the bolts -arrows- and the final drive cover with the flange shaft.
- Remove the differential.

Transmission with R tronic

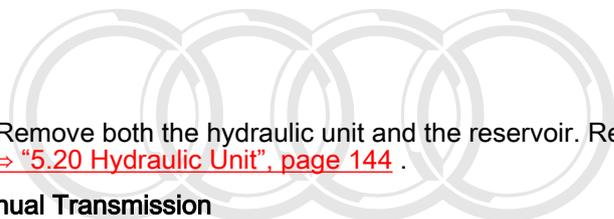


- Remove the shift actuator for the R tronic. Refer to [⇒ "5.12 Shift Actuator, R tronic", page 123](#) .

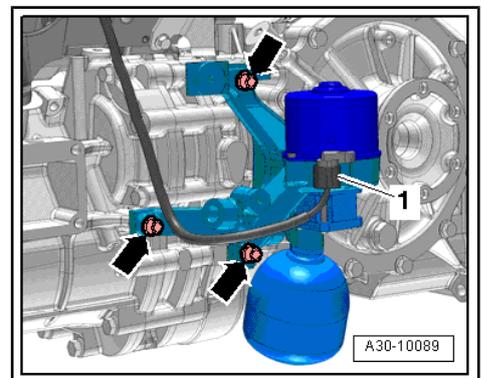


- Remove both the hydraulic unit and the reservoir. Refer to [⇒ "5.20 Hydraulic Unit", page 144](#) .

Manual Transmission

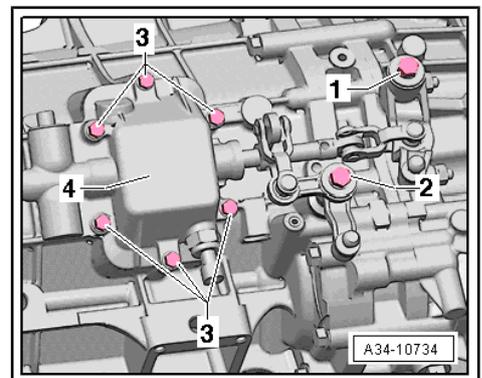


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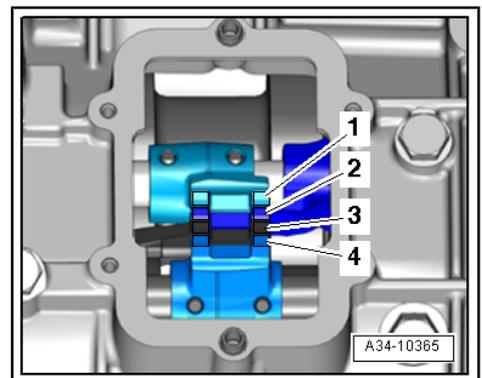


- Remove the bolts -1 through 3-
- Remove both the shift unit -4- and the shift/selector relay lever.

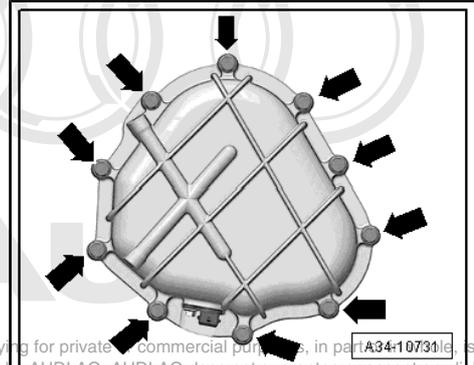
Continuation for All Transmissions



- Engage two gears. Push the selector rods -2 and 3- to the right with a screwdriver.

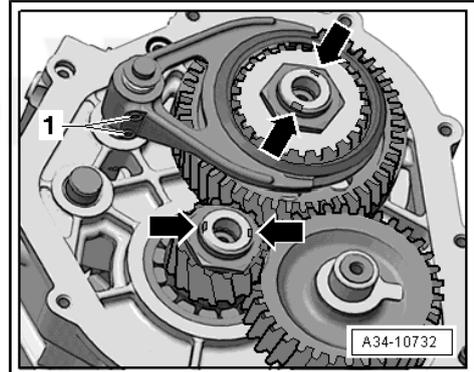


- Remove the bolts -arrow- and remove the end cover.

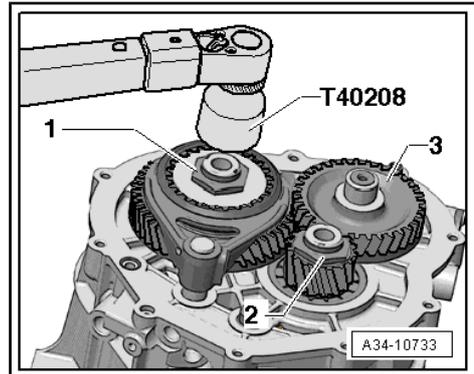


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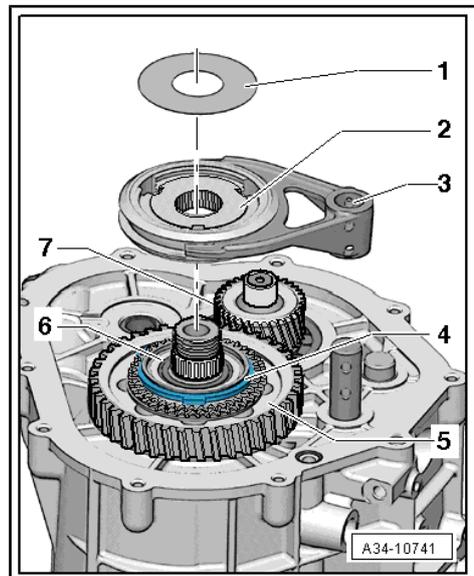
- Open the peening on both nuts -arrows-.
- Remove the adapter sleeves -1- with a drift.



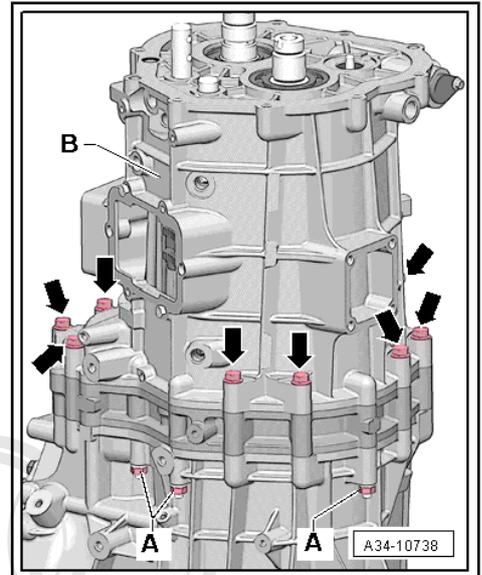
- Remove the nuts -1- and -2- using -T40208- .
- Remove both the reverse drive gear -3- and thrust washers.



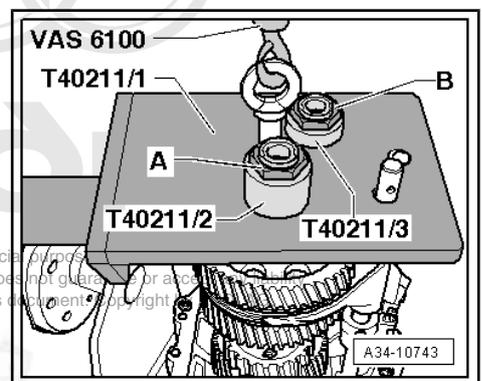
- Remove the washer -1-.
- Remove the locking collar with synchronizer hub -2- and shift fork -3-.
- Remove the synchronizer ring -4-, reverse gear wheel -5- and needle bearing -6-.
- Remove the reverse gear wheel -7-, use an assembly lever if necessary.



- Remove the nuts -A-.
- Remove the bolts -arrows- and remove the transmission housing -B-.

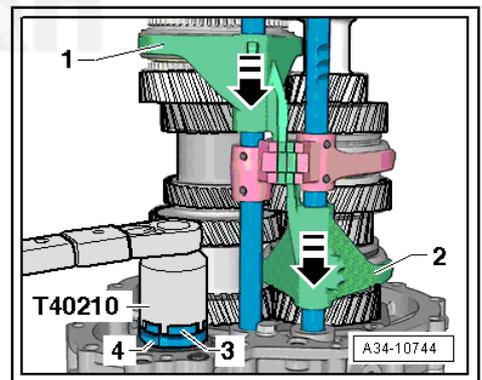


- Mount the -T40211/1- and adapter -T40211/2 and T40211/3-.
- Install the nuts for reverse gear -A- and -B-, which were removed earlier, and tighten them hand-tight.

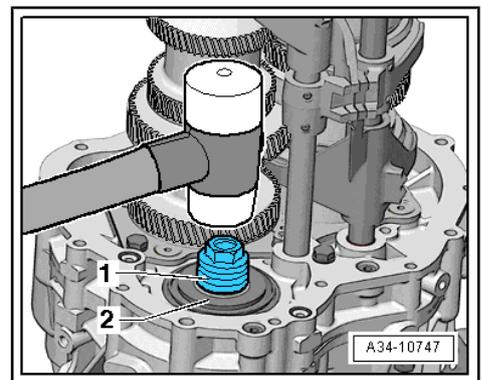


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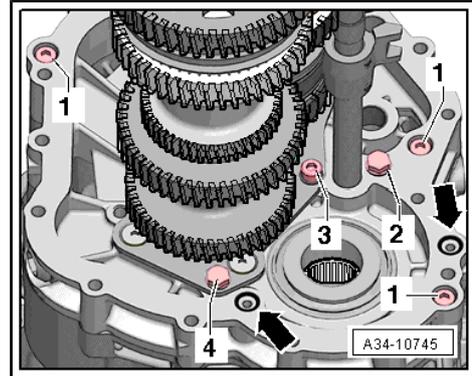
- Engage two gears. Push the shift forks -1- and -2- in direction of -arrow-.
- Remove the drive pinion grooved nuts -3- and -4-.



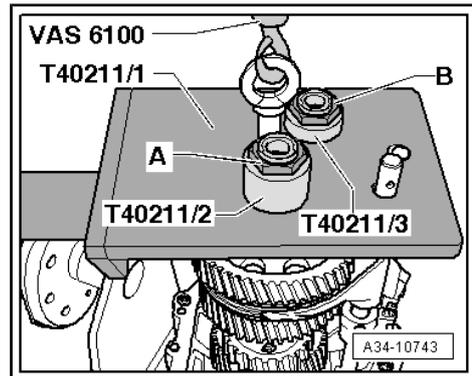
- Remove the drive pinion -1- carefully using a rubber hammer. While doing this, support the drive pinion from underneath.
- Remove the taper roller bearing inner race -2-.



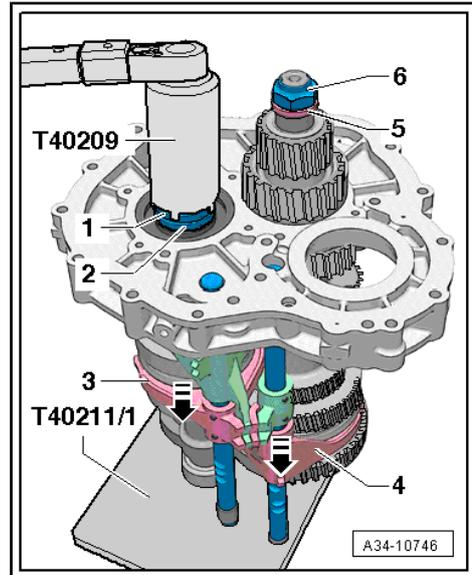
- Remove the bolts -1 through 4-



- Engage the -VAS 6100- to the assembly plate - T40211/1- .
- Lower the gear and secure it to the -VAS 6095- or holding fixture - VW 313- .



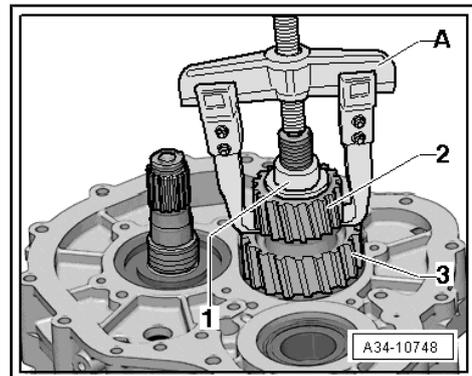
- Engage two gears. Push the shift forks -3- and -4- in direction of -arrow-.
- Remove both grooved nuts.



- Remove the roller sleeve inner race -1- together with the helical gear drive gear -2-.

A - Two-arm puller, for example, Kukko - 20/10-

- Remove the helical gear drive gear -3-.



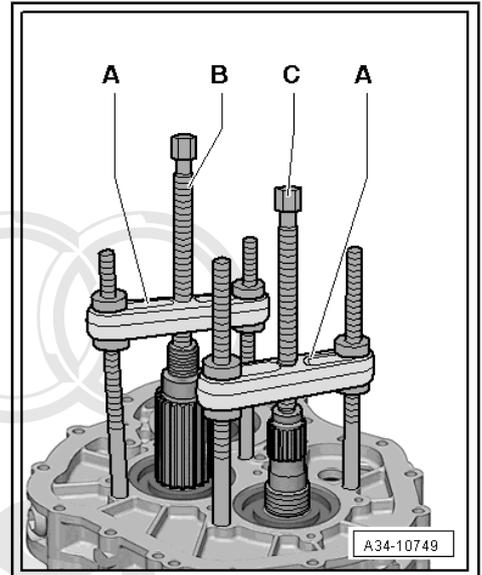
– Mount two pullers -A- on the bearing cover as illustrated.

A - Puller, for example, -Kukko 18/0- or Kukko 18/1

– Remove the bearing cover evenly. Rotate the spindles -B- and -C- maximum 180° while doing this.

Assembling

Install in reverse order, paying attention to the following:



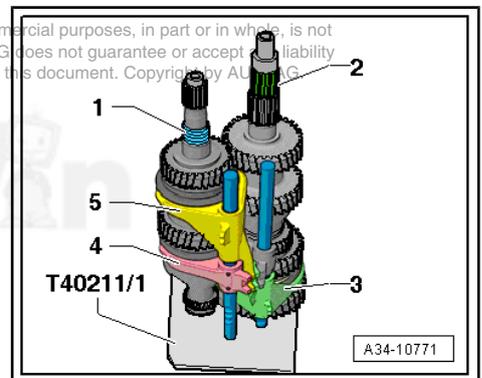
• Check the 3rd to 6th gear shift forks -4 and 5- for wear. Refer to

⇒ Fig. ““Checking 3rd to 6th Gear Shift Forks for Wear””, page 93

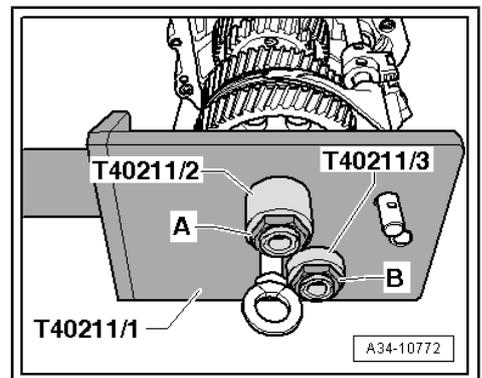
• Check the 3rd to 6th gear locking collars for wear. Refer to ⇒ Fig. ““Locking Collar for 3rd to 6th Gears, Checking for Wear””, page 190

• Clean the separating surfaces on the housing thoroughly.

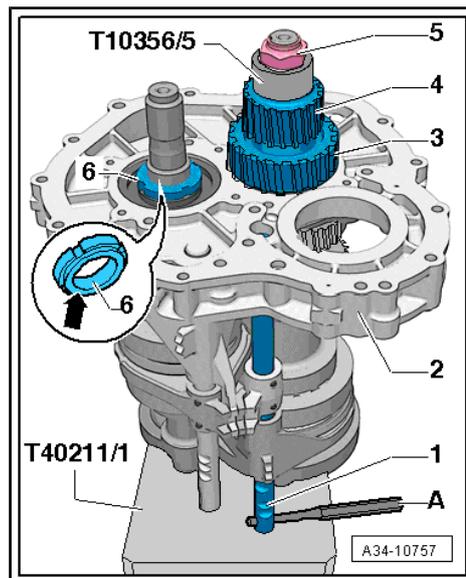
– Install the input shaft -1- and input shaft -2- with the shift forks -3 through 5- into the -T40211/1- .



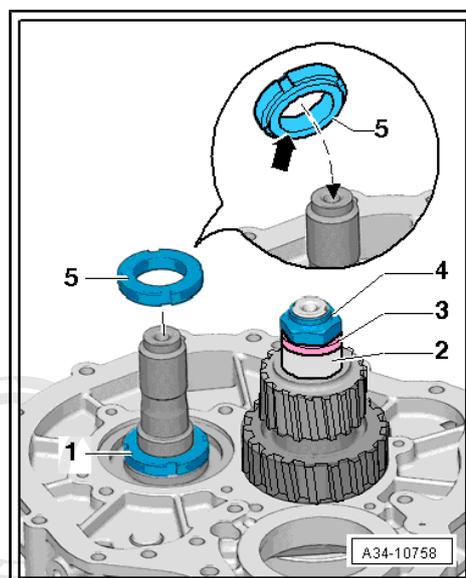
– Secure the both input shafts with the reverse gear nuts -A- and -B- hand tight.



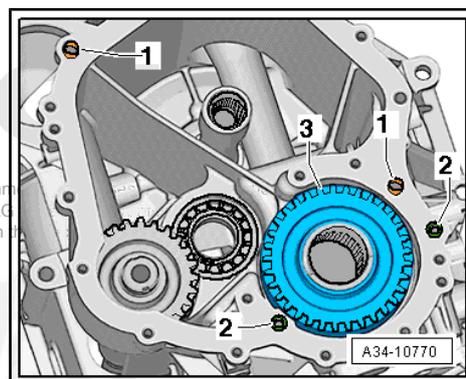
- Secure the gearshift rail -1- with a 5 mm drift -A-.
- Mount the bearing housing -2-. While doing this guide both shift rails into the bearing housing.
- Mount the helical gear wheels -3 and 4- and assembly tool - T10356/5- .
- Always replace the nut -5-.
- Secure the grooved nut -6- with locking fluid - D 197 300 A2- .
- Grooved nut installation position -6-: the collar -arrow- faces the ball bearing.
- Engage two gears to tighten the nuts.
- Install the nut -5- and grooved nut -6- hand-tight.
- Tighten the nuts -5 and 6- evenly 2 turns (alternating 180° additional turn).
- Remove the nut -5- and remove the assembly fixture - T10356/5- .



- Mount the roller bearing inner race -2-, washer -3- and new nut -4-.
- Tighten the grooved nut -1- and the nut -4- evenly (alternating 180° additional turn)
- Tighten and peen the nut -4-. Tightening specification => [Item 14 \(page 95\)](#) .
- Tighten the grooved nut -1-. Tightening specification => [Item 20 \(page 95\)](#) .
- Secure the grooved nut -5- with locking fluid - D 197 300 A2- .
- Grooved nut installation position -5-: the collar -arrow- faces the ball bearing.
- Install the grooved nut -5- and tighten. Tightening specification => [Item 21 \(page 95\)](#) .



- Insert the 2 alignment sleeves -1- and 2 new O-rings -2- into the transmission housing.
- Install the helical gear output gear -3-.
- Apply sealing paste - AMV 188 001 02- to the housing separating surface.



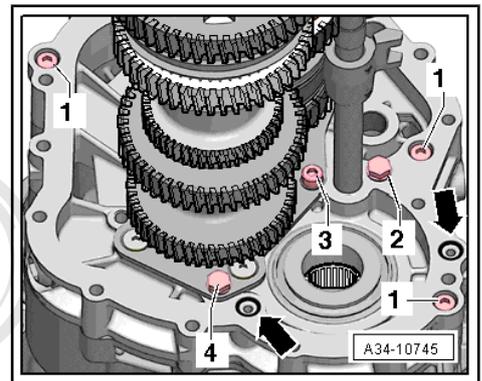
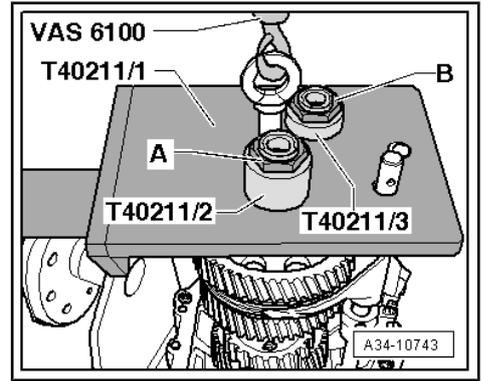
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- Attach the -VAS 6100- to the -T40211/1- and lift the wheel set.

i Note

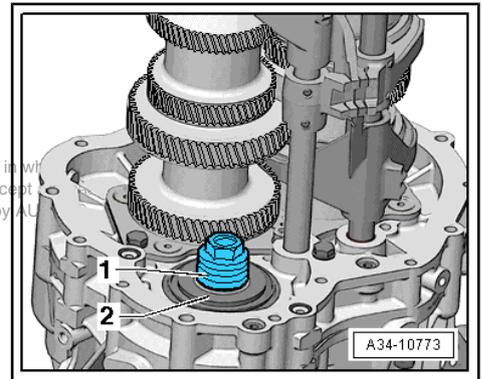
A second technician is needed for the next two steps.

- Align the gear set in the installation position above the transmission housing.
- Slowly lower the -VAS 6100- . While doing this, the second technician needs to guide the gear set into the transmission housing.
- Remove the -VAS 6100- and -T40211/1- .
- Install the bolts -1-. Tightening specification ⇒ [Item 8 \(page 94\)](#) .
- Install the bolt -2-. Tightening specification ⇒ [Item 22 \(page 95\)](#) .
- Install the bolt -3-. Tightening specification ; refer to ⇒ [Item 23 \(page 95\)](#) .
- Install the bolt -4-. Tightening specification ⇒ [Item 6 \(page 94\)](#) .
- Install the new rings -arrows-.

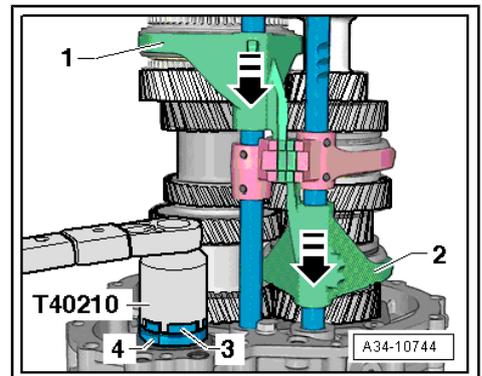


- Warm the tapered roller bearing inner race -2- to maximum 100 °C (212 °F).
- Install the drive pinion -1- and the taper bearing inner race -2-. Wear protective gloves.

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- Engage two gears. Push the shift forks -1- and -2- in direction of -arrow-.
- Install the grooved nuts -3 and 4- with locking fluid - D 197 300 A2- .
- Grooved nuts installation position -3 and 4-: the collar faces the tapered roller bearing.
- Install and tighten the drive pinion grooved nut -4-. Tightening specification ⇒ [page 177](#) .
- Install and tighten the drive pinion grooved nut -3-. Tightening specification ⇒ [page 177](#) .

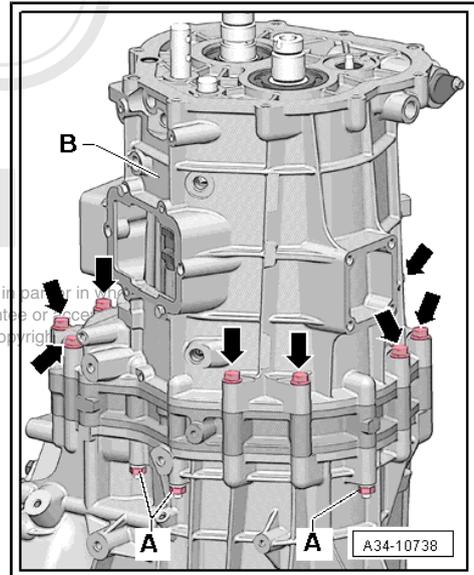


Tightening specification

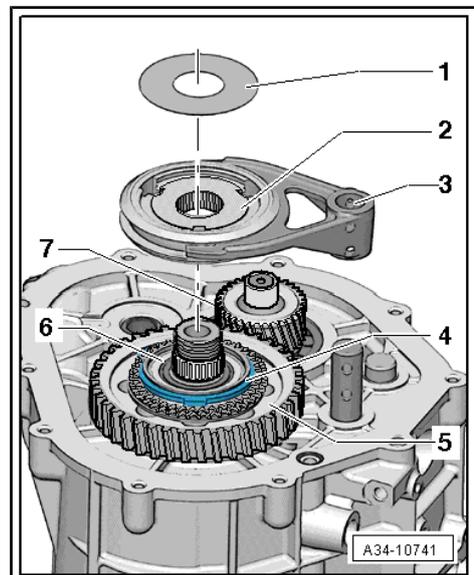
Component	
Grooved nuts -3-	150 Nm
Grooved nuts -4-	150 Nm

- Apply sealing paste - AMV 188 001 02- to the housing separating surface.
- Position the transmission housing -B- and tighten the bolts -arrows-. Tightening specification => [Item 1 \(page 94\)](#) .
- Tighten the nuts -A-. Tightening specification => [Item 19 \(page 95\)](#) .

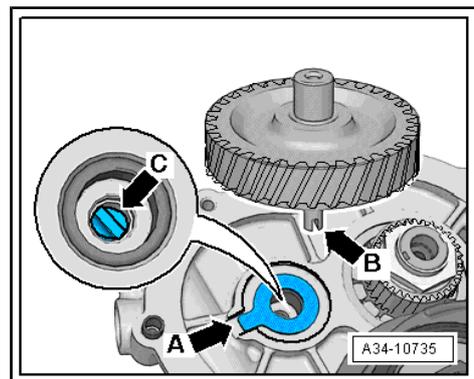
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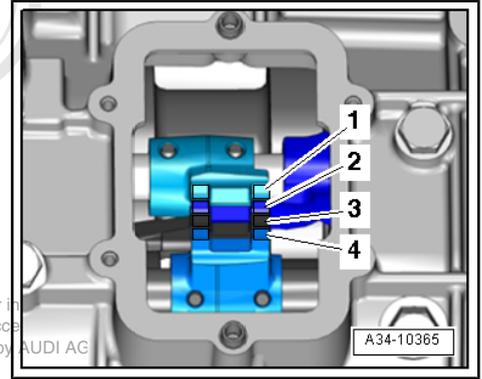
- Mount the synchronizer ring -4-, reverse gear wheel -5- and needle bearing -6-.
- Install the locking collar with synchronizer hub -2- and shift fork -3-.
- Install the washer -1-.
- Install the reverse gear wheel -7-.



- Place the thrust washer with the anti-twist mechanism -arrow A- into the recess in the transmission.
- Install the reverse gear guide wheel so that the oil pump drive pin -arrow C- fits into the groove on the guide wheel -arrow B-.

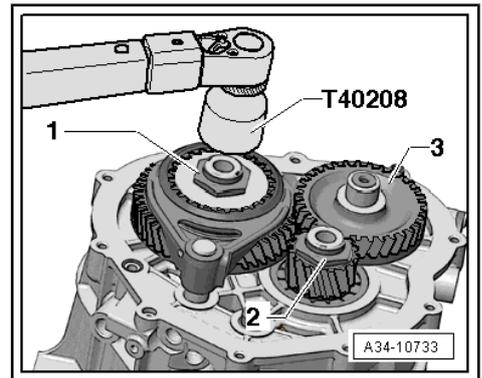


- Engage two gears. Push the selector rods -2 and 3- to the right with a screwdriver.
- Remove both the reverse drive gear -3- and thrust washers.

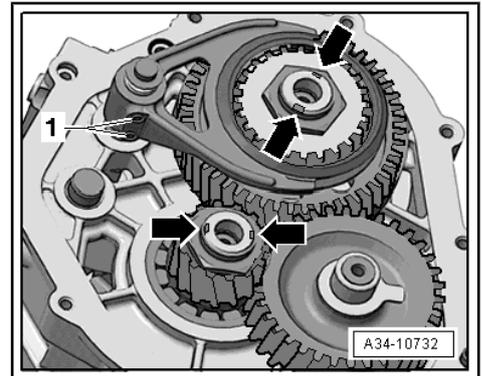


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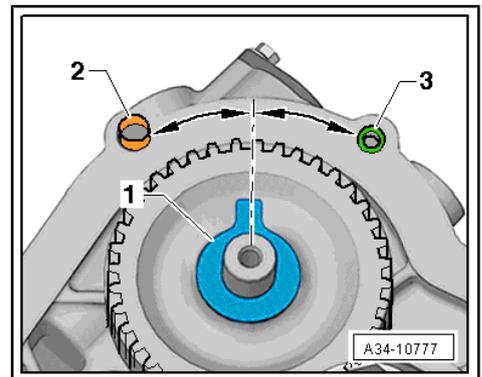
- Tighten the new nut -1- using -T40208-. Tightening specification => [Item 27 \(page 90\)](#).
- Tighten the new nut -2- using -T40208-. Tightening specification => [Item 15 \(page 89\)](#).



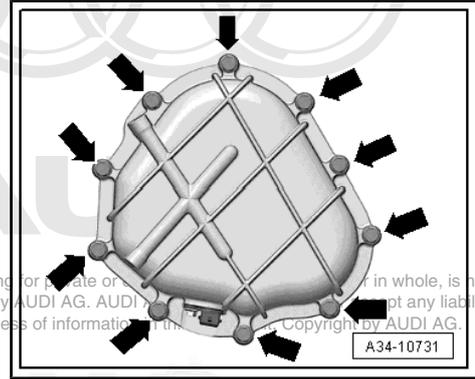
- Peen the nuts -arrows-.
- Install the spring pins -1- with a drift.



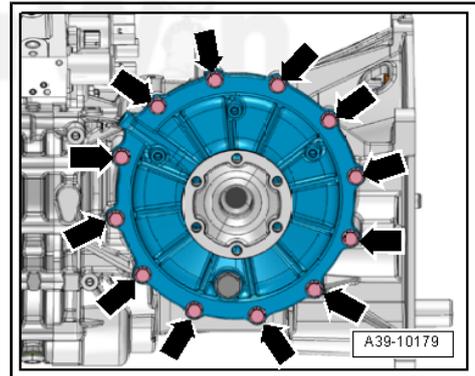
- Mount the thrust washer -1- so that the anti-twist mechanism is in the center between the holes -2- and -3-.



- Apply sealing paste - AMV 188 001 02- to the housing separating surface.
- Mount the end cover and tighten the bolts -arrows-. Tightening specification => [Item 1 \(page 89\)](#) .



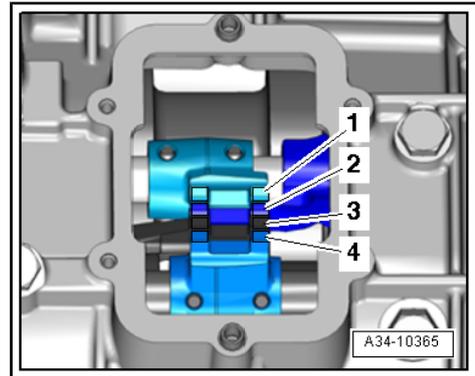
- Install the differential.
- Replace the O-rings => [Item 9 \(page 203\)](#) and => [Item 10 \(page 203\)](#) on the final drive cover.
- Insert the final drive cover with the flange shaft and tighten the bolts -arrows-. Tightening specification; refer to => [Item 2 \(page 203\)](#) .
- Bring the selector rods in the transmission into the position shown.



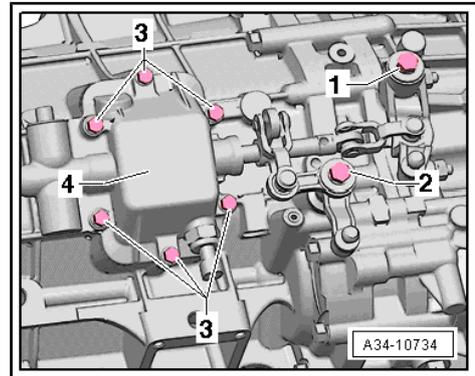
- The openings in the selector rod yokes -1 through 4- must align.
- Alignment sleeves (quantity: 2) installed.

Manual Transmission

- Apply sealing paste - AMV 188 001 02- to the housing separating surface.

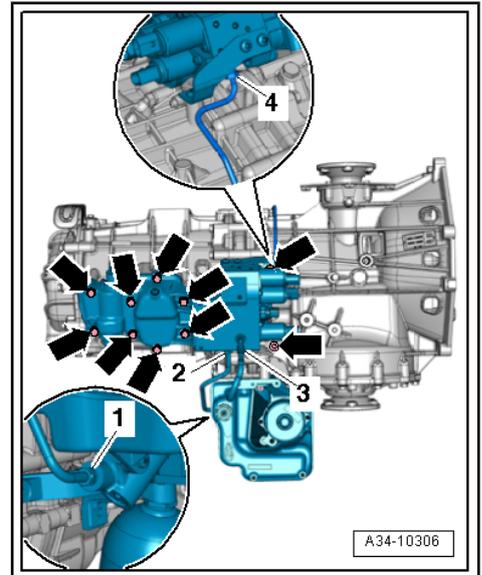


- Bolt -1 through 3- tightening specifications, refer to => ["2.4 Shift Unit on Manual Transmission Overview", page 67](#) .
- The transmission shift lever is in the neutral position -4-.
- Install the shift unit -4-.
- Mount the shift/selector relay lever with the bolts -1 and 2-.



Transmission with R tronic

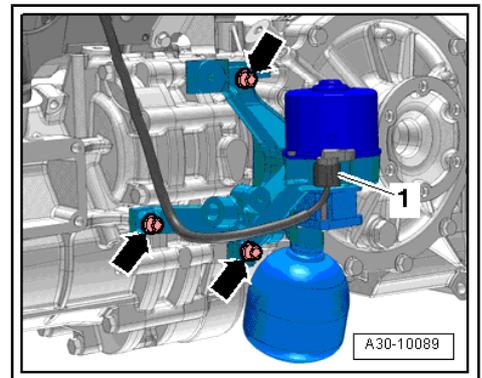
- Install the shift actuator for the R tronic. Refer to [⇒ page 126](#).



- Install the hydraulic unit and reservoir. Refer to [⇒ “2.9 Hydraulic Unit Overview, R tronic”, page 75](#).

Continuation for All Transmissions

- Fill the transmission fluid after installing the transmission. Refer to [⇒ “3.2 Transmission Capacities”, page 12](#).



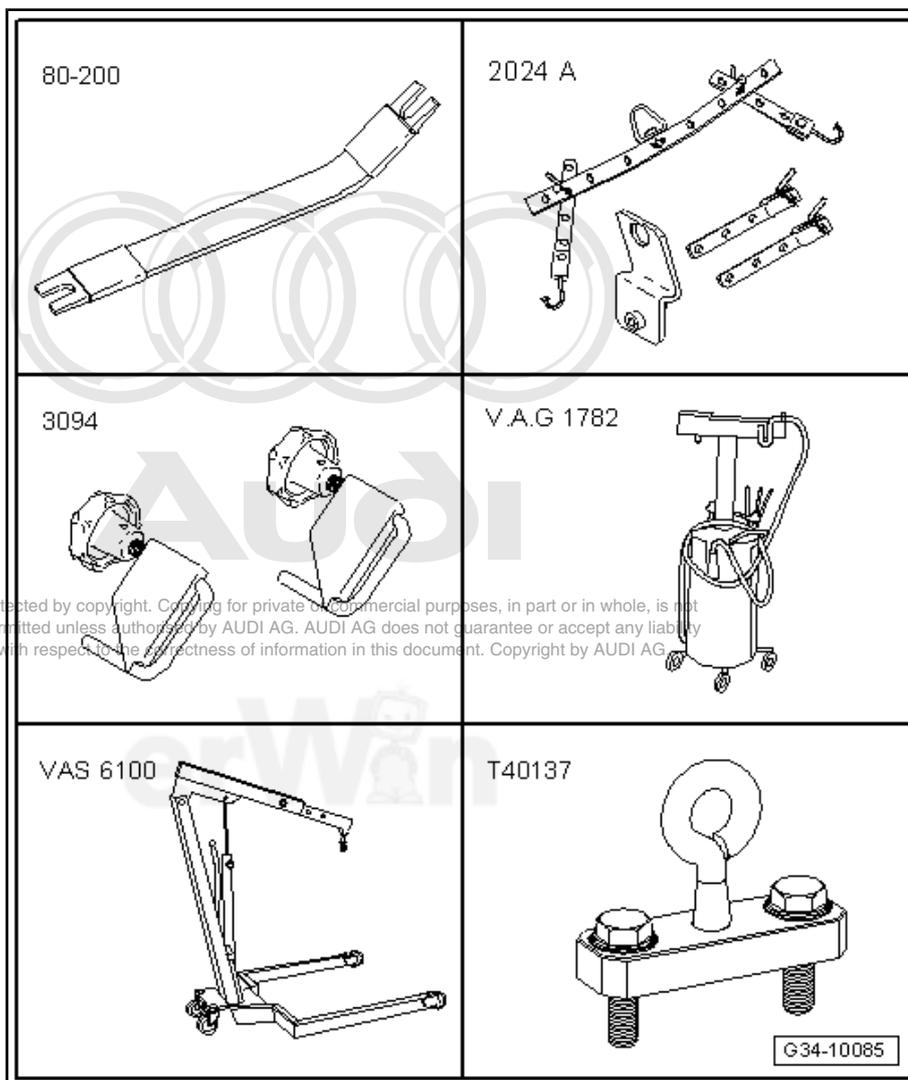
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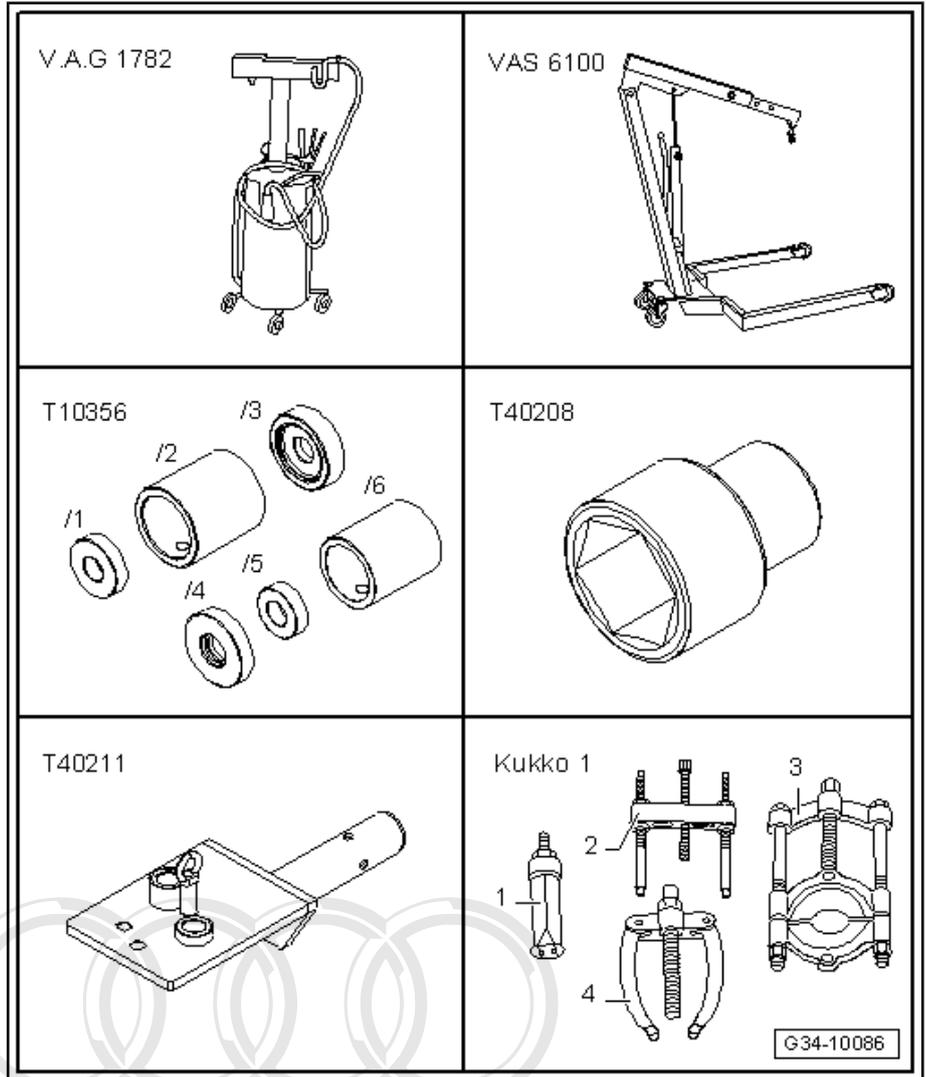
7 Special Tools

Special tools and workshop equipment required

- ◆ Pry Lever - Rmv Outside Mirror - 80 - 200-
- ◆ Engine Sling - 2024 A-
- ◆ Hose Clamps Up to 25 mm Dia. - 3094-
- ◆ Oil Collecting and Extracting Device - V.A.G 1782-
- ◆ Shop Crane - VAS 6100-
- ◆ Lifting Eye for Removing Transmission - T40137-



- ◆ Oil Collecting and Extracting Device - V.A.G 1782-
- ◆ Shop Crane - VAS 6100-
- ◆ -T10356/5- from the Assembly Tool - T10356-
- ◆ Socket 38 mm - T40208-
- ◆ Support - T40211-
- ◆ -2- Puller -Kukko 18/0- or Kukko 18/1

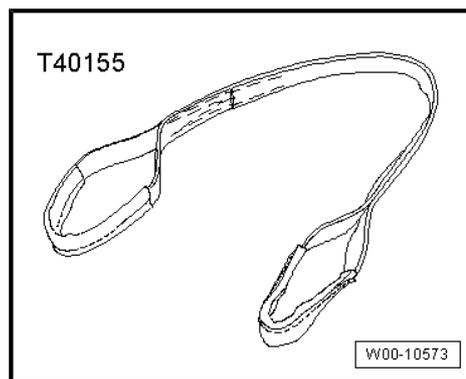


- ◆ Diesel Injection Pump Locking Pin - 3359-

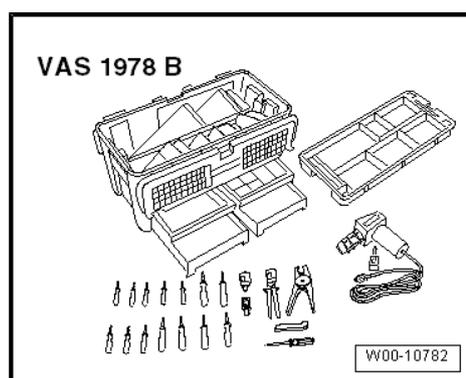
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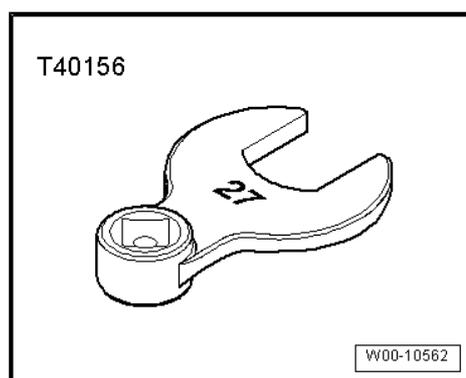
◆ Retaining Strap - T40155-



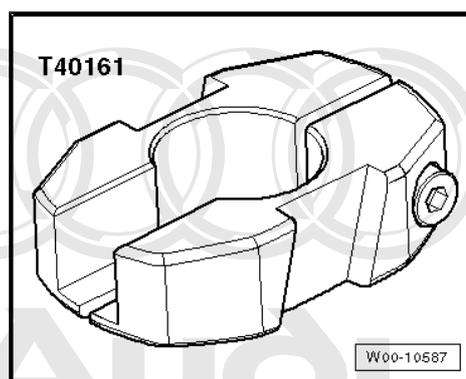
◆ Wiring Harness Repair Set - VAS 1978 B-



◆ Open End Spanner Insert AF 27 mm - T40156-

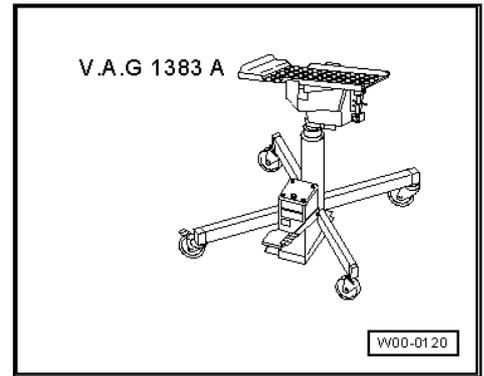


◆ Release Tool - T40161-



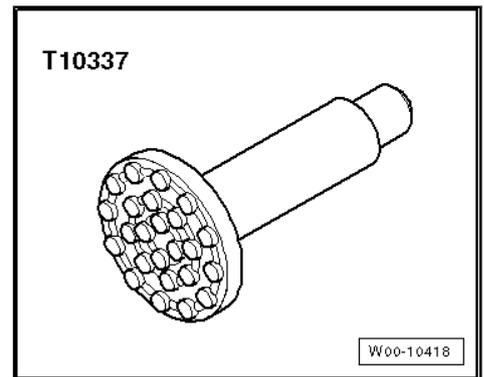
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◆ Engine/Transmission Jack - V.A.G 1383 A-

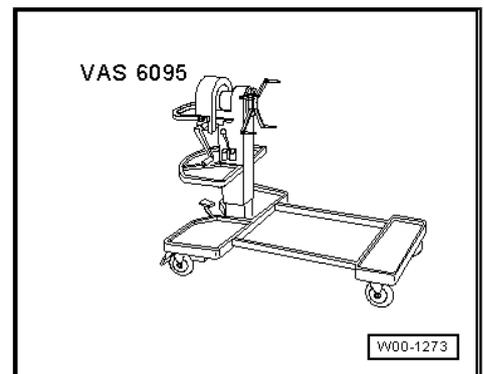


◆ Transmission Support - T10337-

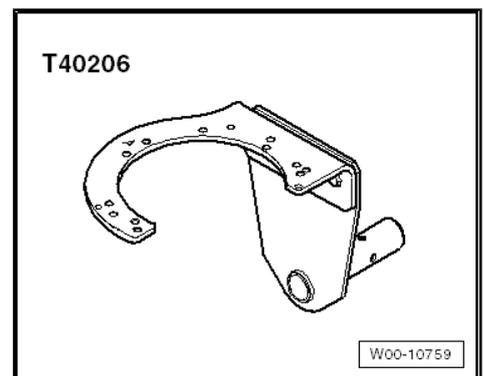
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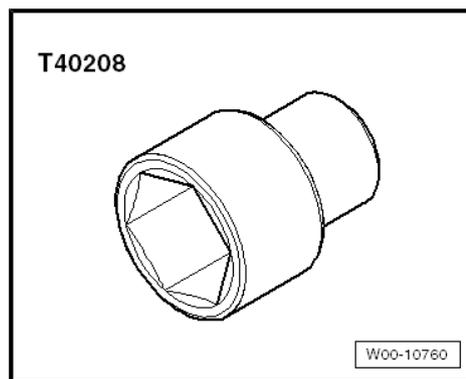
◆ Engine and Transmission Holder - VAS 6095-



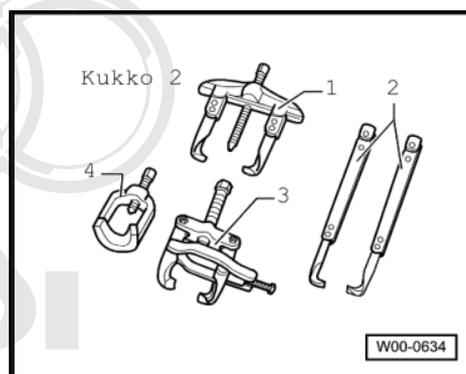
◆ Transmission Support - T40206/1-



◆ Socket 38 mm - T40208-



◆ -1- two-arm puller Kukko - 20/10-



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35 – Gears, Shafts

1 Description and Operation

⇒ [“1.1 Input Shaft Overview”, page 187](#)

⇒ [“1.2 Output Shaft Overview”, page 191](#)

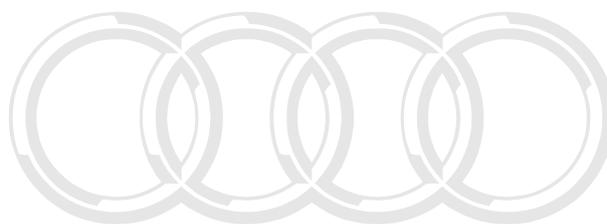
1.1 Input Shaft Overview

Overview:

- ◆ Input shaft, removing and installing, refer to [“6.1 Transmission”, page 170](#)
- ◆ Disassembling and assembling input shaft - assembly sequence, refer to [“2.1 Input Shaft”, page 193](#)

Note

- ◆ *Refer to the technical data when installing new gears or a new input shaft. Refer to the electronic parts catalog ETKA.*
- ◆ *Install all input shaft bearings with transmission fluid.*
- ◆ *After installing, 3rd through 6th gears must have an axial play of 0.15 to 0.50 mm.*
- ◆ *If the synchronizer rings are not to be replaced, make sure they are reallocated to their original gear.*



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erWin

1 - Transmission Cover

2 - Thrust Washer

- Installed position: the rounded side on the inner diameter faces the transmission cover
⇒ [Item 1 \(page 188\)](#)

3 - Roller Bearing

4 - Inner Race

- For roller bearing

5 - Thrust Washer

- Installed position: chamfer faces the bearing housing, refer to
⇒ [Item 6 \(page 188\)](#)

6 - Bearing Housing

- Disassembling and assembling, refer to
⇒ ["2.18 Bearing Housing Overview", page 91](#)

7 - Input Shaft

8 - Transmission Housing

9 - 4th Gear Wheel

10 - Needle Bearing

- For 4th gear
- Quantity: 2

11 - 4th Gear Inner Race

12 - 4th Gear Intermediate Ring

13 - 4th Gear Synchronizer Ring

14 - Locking Collar for 3rd and 4th Gear

- Mark the installation position on the synchronizer hub before removing it
- Checking for wear, refer to
⇒ [Fig. "Locking Collar for 3rd to 6th Gears, Checking for Wear", page 190](#)

15 - Locking Ring

- For 3rd and 4th gears synchronizer hub

16 - Locking Piece

- Quantity: 3

17 - Ball

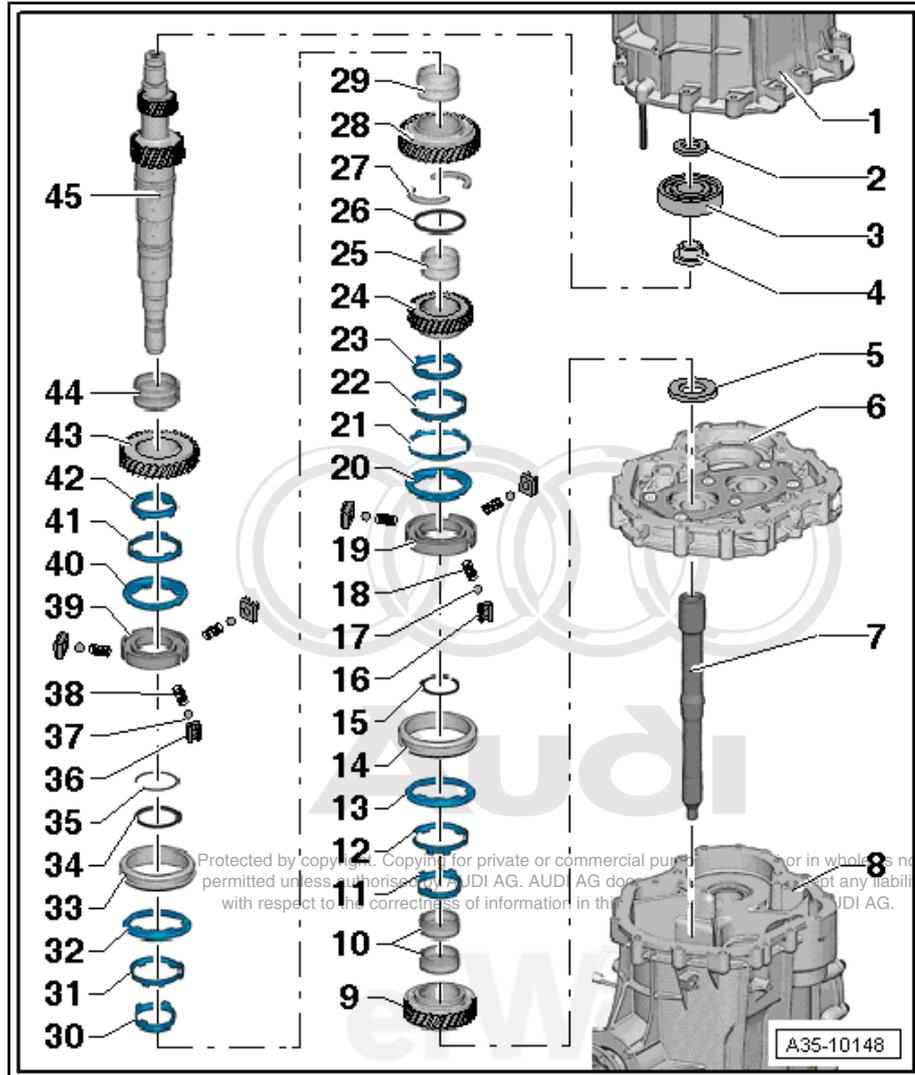
- Quantity: 3

18 - Spring

- Quantity: 3

19 - Synchronizer Hub for 3rd and 4th Gears

- Mark the installation position
- Removing, refer to
⇒ [Fig. "Removing the Synchronizer Hub with the 3rd and 4th Gear Locking Collar", page 193](#)
- Installing, refer to
⇒ [Fig. "Installing the Synchronizer Hub with Locking Collar for 3rd and 4th Gears", page 195](#)



20 - 3rd Gear Synchronizer Ring

21 - large Intermediate Ring

- For 3rd gear

22 - 3rd Gear Intermediate Ring

23 - Small Intermediate Ring

- For 3rd gear

24 - 3rd Gear Wheel

25 - Needle Bearing

- For 3rd gear

26 - Locking Ring

- For the thrust washer ⇒ [Item 27 \(page 189\)](#)
- Removing, refer to ⇒ [Fig. "Removing the Locking Ring -A- and Side Thrust Washers -B-." , page 194](#)
- Installing, refer to
⇒ [Fig. "Installing the Locking Ring -A- and Two-Piece Thrust Washer -B- " , page 195](#)

27 - Two-Piece Thrust Washer

- Removing, refer to ⇒ [Fig. "Removing the Locking Ring -A- and Side Thrust Washers -B-." , page 194](#)
- Installing, refer to
⇒ [Fig. "Installing the Locking Ring -A- and Two-Piece Thrust Washer -B- " , page 195](#)

28 - 6th Gear Wheel

29 - Needle Bearing

- For 6th gear

30 - 6th Gear Inner Race

31 - 6th Gear Intermediate Ring

32 - Synchronizer Ring for 6th Gear

33 - Locking Collar for 5th and 6th Gear

- Mark the installation position on the synchronizer hub before removing it
- Checking for wear, refer to
⇒ [Fig. "Locking Collar for 3rd to 6th Gears, Checking for Wear" , page 190](#)

34 - Thrust Ring

- Installed position refer to
⇒ [Fig. "Installation Position, 5th and 6th Gear Synchronizer Hub Locking Ring -1- and Thrust Ring -2- " , page 195](#)

35 - Locking Ring

- For 5th and 6th gears synchronizer hub
- Installed position, refer to
⇒ [Fig. "Installation Position, 5th and 6th Gear Synchronizer Hub Locking Ring -1- and Thrust Ring -2- " , page 195](#)

36 - Locking Piece

- Quantity: 3

37 - Ball

- Quantity: 3

38 - Spring

- Quantity: 3

39 - Synchronizer Hub for 5th and 6th Gears

- Mark the installation position
- Removing, refer to
⇒ [Fig. "Removing the Synchronizer Hub with the 5th and 6th Gear Locking Collar" , page 194](#)

- Installing, refer to
 ⇒ [Fig. "Pressing on Synchronizer Hub with Locking Collar for 5th and 6th Gears"](#) , page 194

40 - 5th Gear Synchronizer Ring

41 - 5th Gear Intermediate Ring

42 - 5th Gear Inner Race

43 - 5th Gear Wheel

44 - Needle Bearing

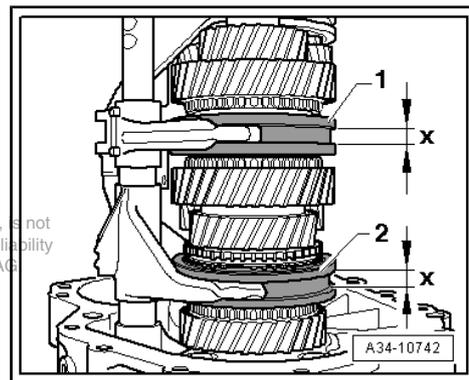
- For 5th gear

45 - Input Shaft

Locking Collar for 3rd to 6th Gears, Checking for Wear

Component	Dimension -x-
-1- locking collar for 5th and 6th gear	Maximum 10.35 mm
-2- locking collar for 3rd and 4th gear	Maximum 10.35 mm

- Replace any worn locking collars. Refer to
 ⇒ ["2.1 Input Shaft"](#) , page 193 .



1.2 Output Shaft Overview

Note

- ◆ Pay attention to the technical data when installing new gears or a new output shaft. Refer to the electronic parts catalog ETKA.
- ◆ Install all input shaft bearings with transmission fluid.
- ◆ After installing, the 1st and 2nd gear wheels must have an axial play of 0.15 to 0.50 mm.
- ◆ If the synchronizer rings are not to be replaced, make sure they are reallocated to their original gear.

1 - Roller Bearing

2 - Inner Race

- For roller bearing
- Removing, refer to
 ⇒ Fig. "Removing the 1st Gear Wheel", page 196
- Installing, refer to
 ⇒ Fig. "Installing the Roller Bearing Inner Race", page 197

3 - Thrust Washer

- Installed position: The chamfer faces the roller sleeve
 ⇒ Item 1 (page 191)

4 - 1st Gear Wheel

- Removing, refer to
 ⇒ Fig. "Removing the 1st Gear Wheel", page 196

5 - Needle Bearing

- For 1st gear

6 - Small Intermediate Ring

- For 1st gear

7 - 1st Gear Intermediate Ring

8 - Large Intermediate Ring

- For 1st gear

9 - 1st Gear Synchronizer Ring

10 - Locking Ring

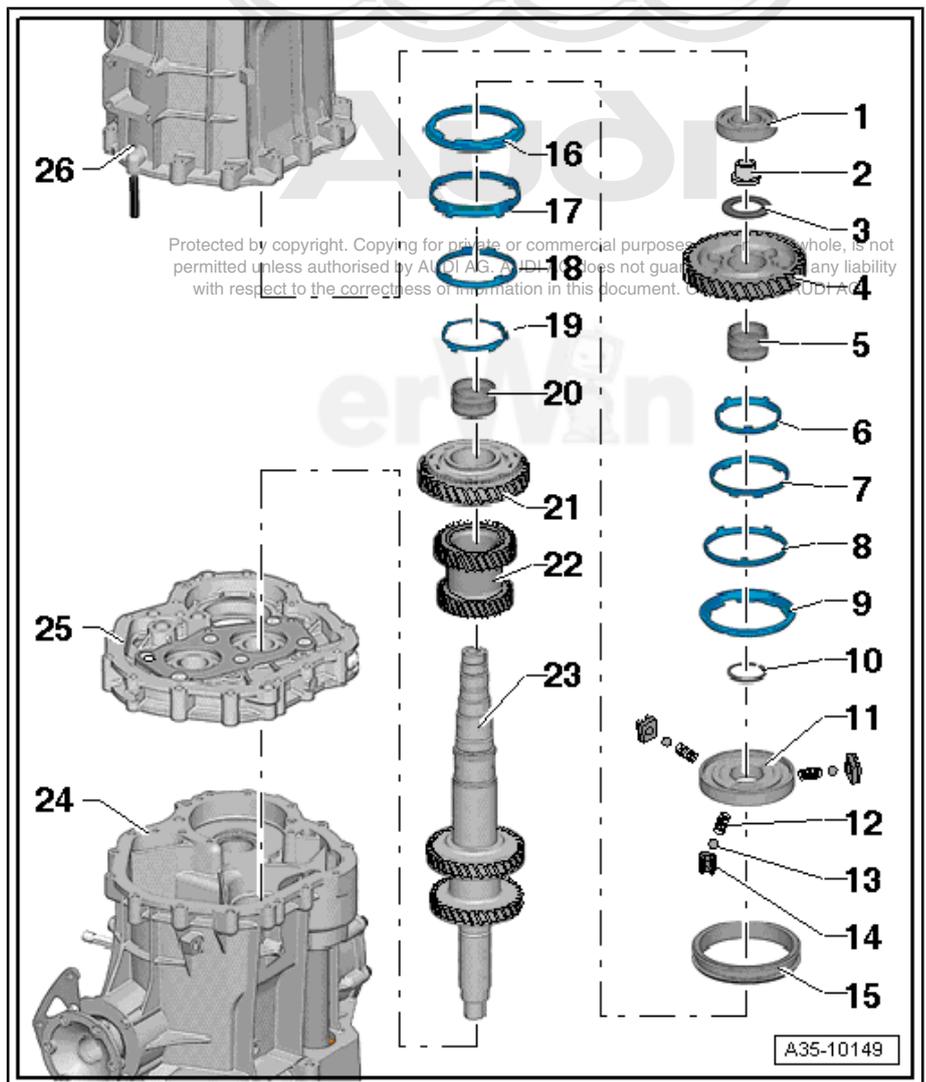
- For 1st and 2nd gear synchronizer hub

11 - Synchronizer Hub for 1st and 2nd Gears

- Installed position: high collar faces the 2nd gear wheel
- Removing, refer to
 ⇒ Fig. "Removing the Synchronizer Hub and 1st and 2nd Gear Locking Collar", page 196
- Installing, refer to
 ⇒ Fig. "Installing the Synchronizer Hub with Locking Collar for 1st and 2nd Gears", page 197

12 - Spring

- Quantity: 3





13 - Ball

- Quantity: 3

14 - Locking Piece

- Quantity: 3

15 - Locking Collar for 1st and 2nd Gear

- Mark the installation position on the synchronizer hub before removing it
- Installed position: chamfer faces the 2nd gear wheel

16 - 2nd Gear Synchronizer Ring

17 - Large Intermediate Ring

- For 2nd gear

18 - 2nd Gear Intermediate Ring

19 - Small Intermediate Ring

- For 2nd gear

20 - Needle Bearing

- For 2nd gear

21 - 2nd Gear Wheel

22 - 5th and 6th Gear Wheel

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- Removing, refer to ⇒ [Fig. "Removing the 3rd and 4th Gear Wheel", page 196](#)
- Installing, refer to ⇒ [Fig. "Installing the 3rd and 4th Gear Wheel", page 197](#)

23 - Output Shaft

Removing and installing, refer to ⇒ ["6.1 Transmission", page 170](#)

24 - Transmission Housing

25 - Bearing Housing

- Disassembling and assembling, refer to ⇒ ["2.18 Bearing Housing Overview", page 91](#)

26 - Transmission Cover

2 Disassembly and Assembly

⇒ [“2.1 Input Shaft”, page 193](#)

⇒ [“2.2 Output Shaft”, page 195](#)

2.1 Input Shaft

Special tools and workshop equipment required

- ◆ Thrust Plate - VW 401-
- ◆ Thrust Plate - VW 402-
- ◆ Thrust Disc - VW 412-
- ◆ Tube 60 mm Dia. - VW 415 A-
- ◆ -T10356/6- from the Assembly Tool - T10356-
- ◆ -T40088/2- from the Assembly Tool - T40088-
- ◆ Inductive Heater - VAS 6414-
- ◆ Protective gloves

Note

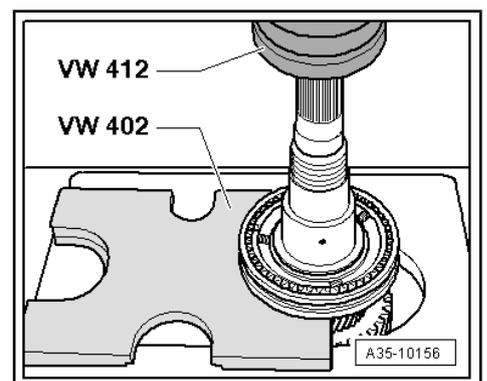
- ◆ *Lubricate all needle bearings and synchronizer rings with transmission fluid before inserting.*
- ◆ *Before installing the roller bearing inner races, warm to a maximum of 100 °C (212 °F) while wearing protective gloves.*
- ◆ *Warm synchronizer ring before pressing off to a maximum of 100 °C (212 °F) while wearing protective gloves.*
- ◆ *Always install the roller bearing inner race and synchronizer hub all the way on so that the gear wheels have the specified axial play.*

- Input shaft removed, refer to
 ⇒ [“6.1 Transmission”, page 170](#) .

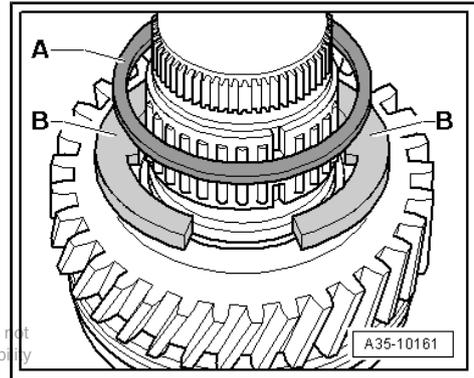
Removing the Synchronizer Hub with the 3rd and 4th Gear Locking Collar

- Mark the installation position.
- Remove the thrust washer, gear wheel, needle bearing and 4th gear synchronizer rings.
- Remove the locking ring.
- Remove the synchronizer hub with the 3rd and 4th gear locking collar.
- Remove the synchronizer ring, gear wheel and 3rd gear needle bearing.

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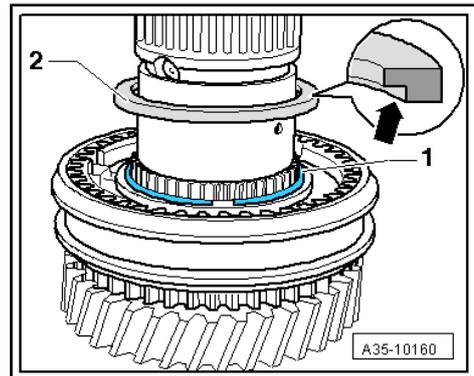
Removing the Locking Ring -A- and Side Thrust Washers -B-



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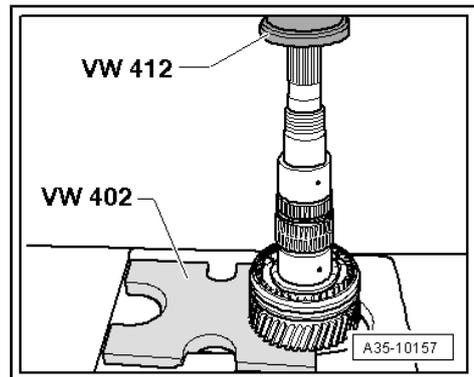
Removing the Thrust Ring -2- and 5th and 6th Gear Synchronizer Hub Locking Ring -1-

- Remove the gear wheel, needle bearing and 6th gear synchronizer rings.



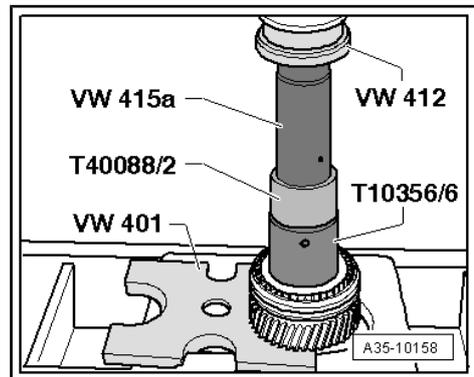
Removing the Synchronizer Hub with the 5th and 6th Gear Locking Collar

- Mark the installation position.
- Remove the synchronizer hub and locking collar with the 5th gear wheel.



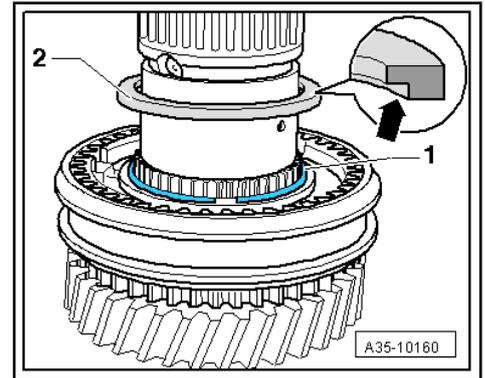
Pressing on Synchronizer Hub with Locking Collar for 5th and 6th Gears

- The -VW 401- must be under the 2nd gear wheel.



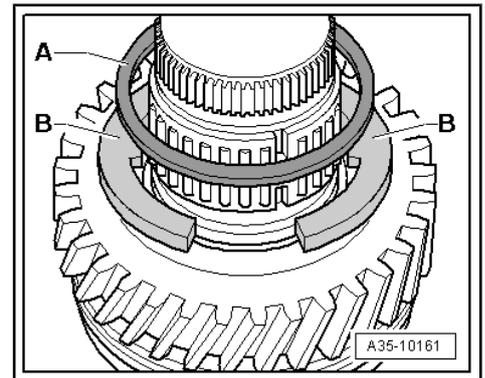
Installation Position, 5th and 6th Gear Synchronizer Hub Locking Ring -1- and Thrust Ring -2-

- The groove -arrow- all the way around faces the locking ring -1-.



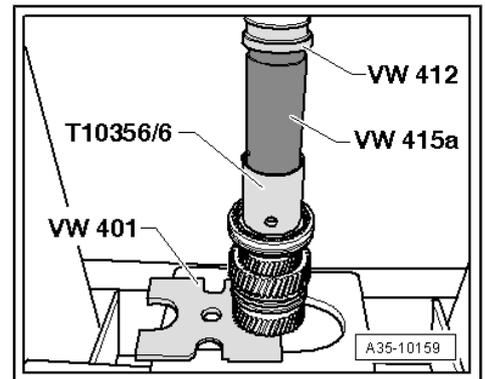
Installing the Locking Ring -A- and Two-Piece Thrust Washer -B-

- Install the synchronizer rings, needle bearings and the 6th gear wheel.
- Install thrust washers -B- so that both tabs fit into the holes in the shaft.
- Install the locking ring -A-.
- Install the needle bearing, the gear wheel and the 3rd gear synchronizer rings.



Installing the Synchronizer Hub with Locking Collar for 3rd and 4th Gears

- The -VW 401- must be under the 2nd gear wheel.
- Install the locking ring.
- Install the synchronizer rings, needle bearing, 4th gear wheel and thrust washer.



2.2 Output Shaft

Special tools and workshop equipment required

- ◆ Thrust Plate - VW 401-
- ◆ Thrust Plate - VW 402-
- ◆ Thrust Disc - VW 412-
- ◆ Tube 60 mm Dia. - VW 415 A-
- ◆ -3292/4- from the Assembly Device - 3292-
- ◆ Assembly Sleeve - T10290-
- ◆ -T40088/2- from the Assembly Tool - T40088-
- ◆ Support - T40211-
- ◆ -1- Two-Arm Puller - Kukko 20/10-
- ◆ -2- Pull Hook 200 mm - Kukko-
- ◆ Inductive Heater - VAS 6414-
- ◆ Protective gloves



Note

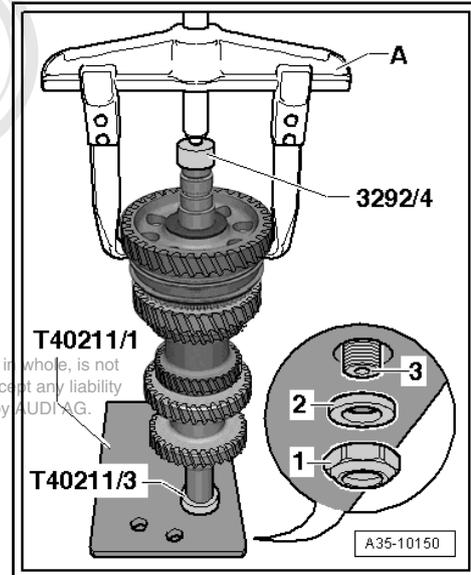
- ◆ Lubricate all needle bearings and synchronizer rings with transmission fluid before inserting.
- ◆ Before installing the roller bearing inner races, warm to a maximum of 100 °C (212 °F) while wearing protective gloves.
- ◆ Warm synchronizer ring before pressing off to a maximum of 100 °C (212 °F) while wearing protective gloves.
- ◆ Always install the roller bearing inner race and synchronizer hub all the way on so that the gear wheels have the specified axial play.

Removing the 1st Gear Wheel

- 1 - Reverse gear nut
- 2 - Washer

A - Two-arm puller, for example, Kukko - 20/10-

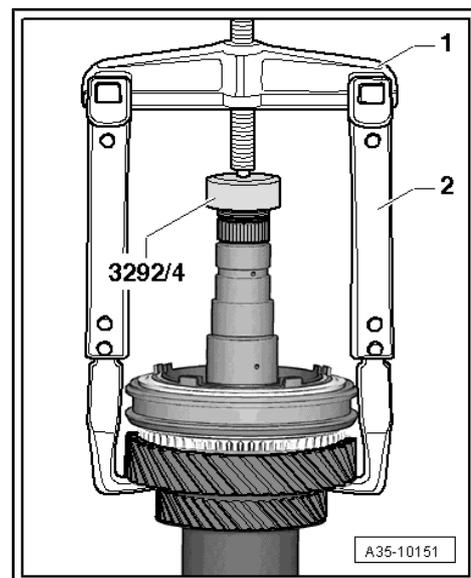
- Attach the output shaft -3-, the washer -2- and the nut -1- to the fitting appliance.
- Remove the roller bearing inner race together with the 1st gear wheel.



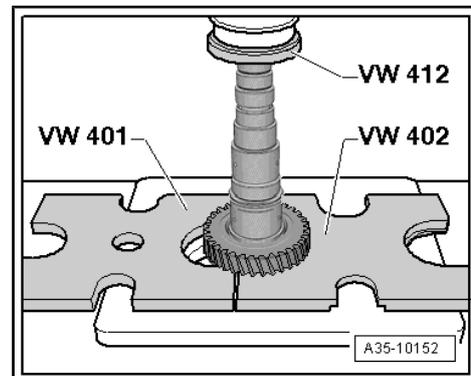
Removing the Synchronizer Hub and 1st and 2nd Gear Locking Collar

- 1 - Two-arm puller, for example, Kukko - 20/10-
- 2 - 200 mm hook

- Mark the installation position.
- Remove the needle bearing and 1st gear synchronizer rings
- Remove the locking ring.
- Remove the synchronizer hub and locking collar with the 2nd gear wheel.



Removing the 3rd and 4th Gear Wheel

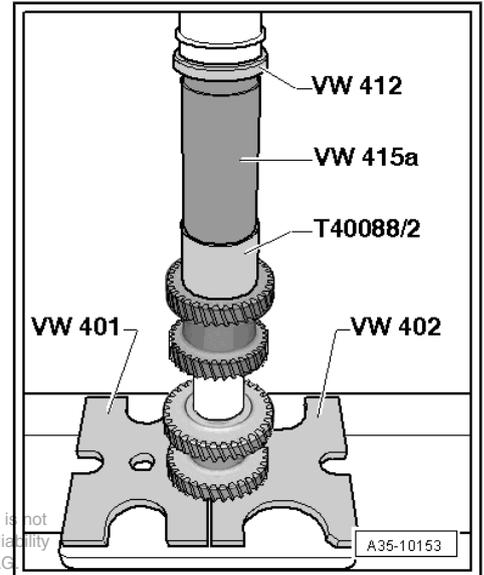


Installing the 3rd and 4th Gear Wheel

- Warm the 3rd and 4th gear wheel to approximately 130 °C (266 °F). Wear protective gloves.



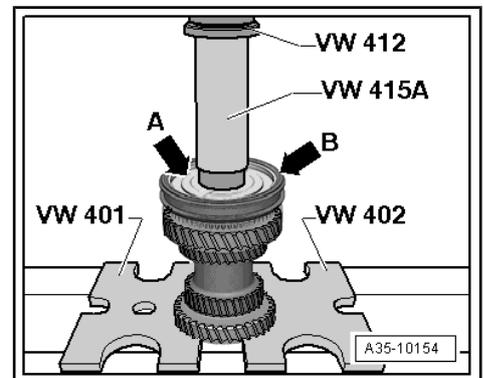
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Installing the Synchronizer Hub with Locking Collar for 1st and 2nd Gears

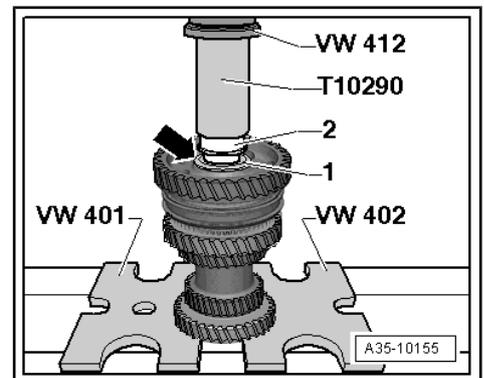
Installed position:

- The low collar on the synchronizer hub -arrow A- faces 1st gear.
- The shoulder on the locking collar -arrow B- faces 1st gear and the chamfer faces 2nd gear.



Installing the Roller Bearing Inner Race

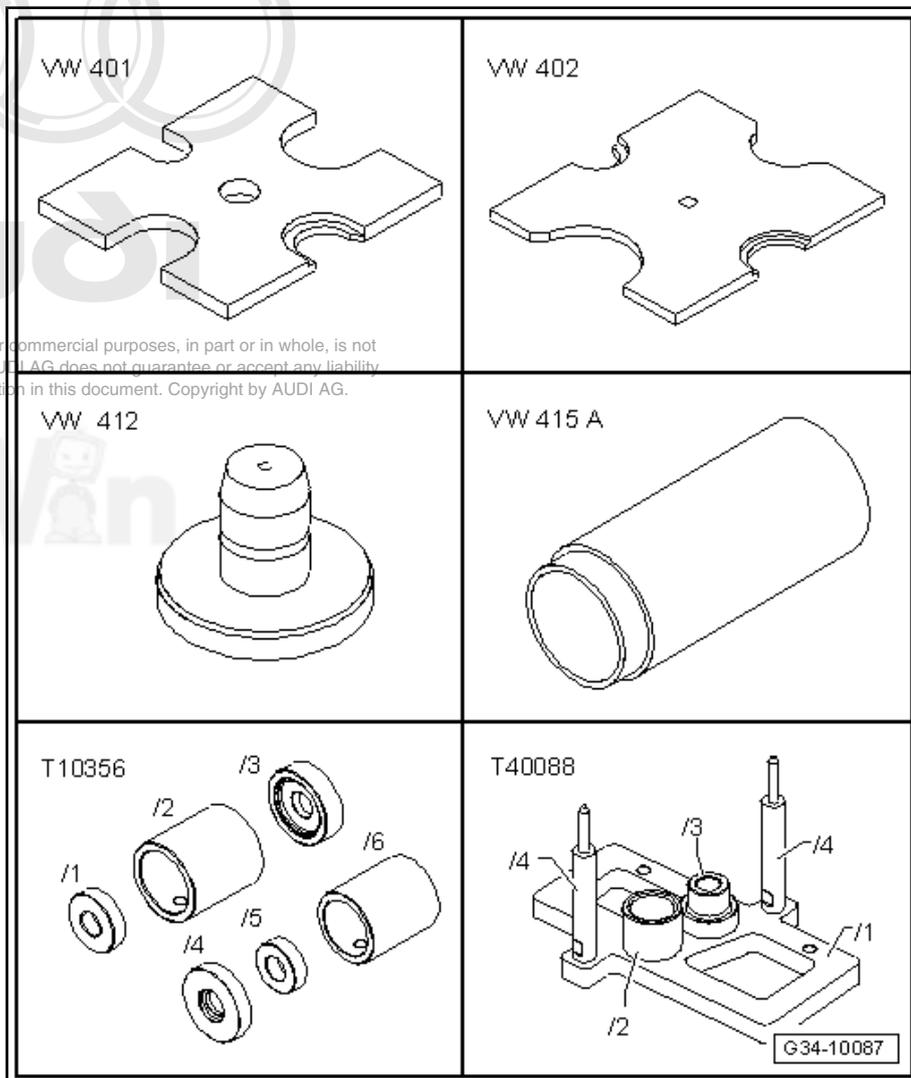
- Install the synchronizer rings, needle bearings and 1st gear wheel.
- Install the thrust washer -1-. The chamfer -arrow- faces the roller sleeve -2-.



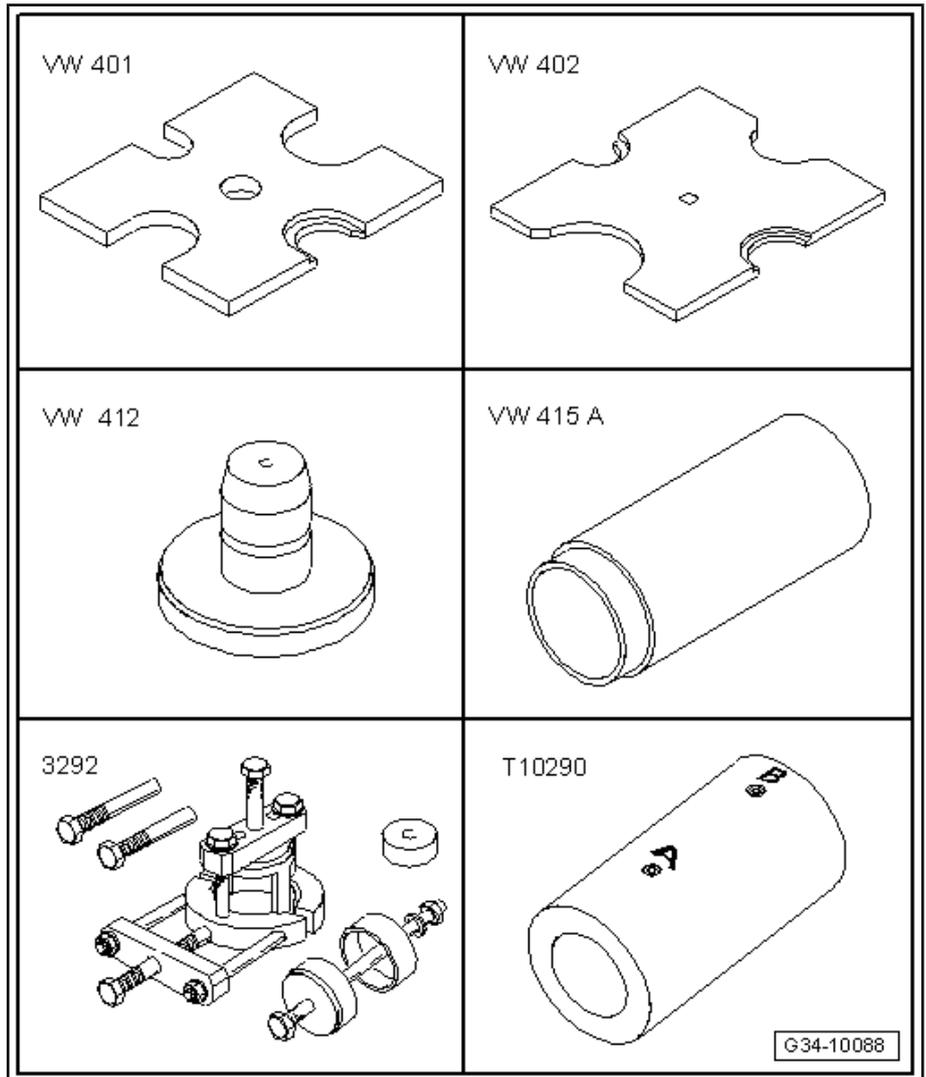
3 Special Tools

Special tools and workshop equipment required

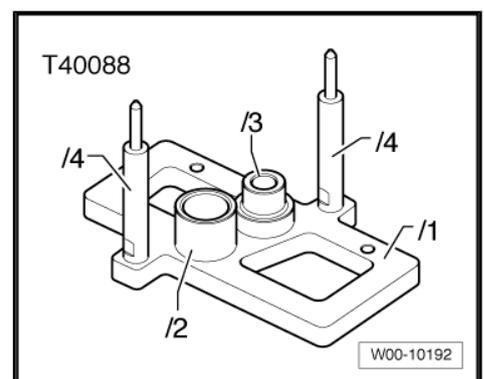
- ◆ Thrust Plate - VW 401-
- ◆ Thrust Plate - VW 402-
- ◆ Thrust Disc - VW 412-
- ◆ Tube 60 mm Dia. - VW 415 A-
- ◆ -T10356/6- from the Assembly Tool - T10356-
- ◆ T40088/2- from the Assembly Tool - T40088-
- ◆ Inductive Heater - VAS 6414-



- ◆ Thrust Plate - VW 401-
- ◆ Thrust Plate - VW 402-
- ◆ Thrust Disc - VW 412-
- ◆ Tube 60 mm Dia. - VW 415 A-
- ◆ -3292/4- from the Assembly Device - 3292-
- ◆ Assembly Sleeve - T10290-



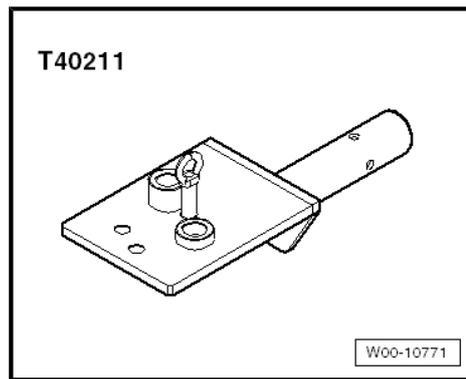
- ◆ -T40088/2- from the Assembly Tool - T40088-



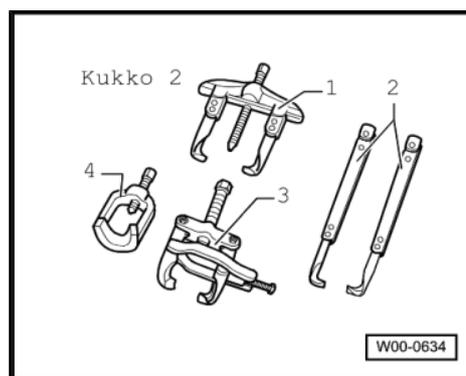
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- ◆ Support - T40211-



- ◆ -1- Two-Arm Puller - Kukko 20/10-



- ◆ -2- Pull Hook 200 mm - Kukko-
- ◆ Inductive Heater - VAS 6414-
- ◆ Protective gloves



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39 – Final Drive, Differential

1 General Information

⇒ [“1.1 Front Final Drive Oil Level, Checking”, page 201](#)

1.1 Front Final Drive Oil Level, Checking

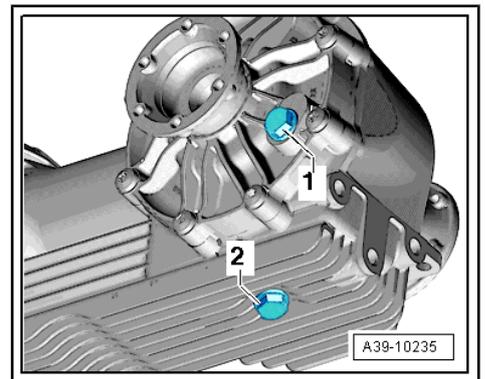
Special tools and workshop equipment required

- ◆ Oil Collecting and Extracting Device - V.A.G 1782-

Procedure

- Place the -V.A.G 1782- underneath.
- Remove the transmission fluid filler plug -1-.
- The oil level is correct when the front final drive is filled to the lower edge of the filler opening.
- Fill the gear oil if necessary. Refer to the electronic parts catalog ETKA.
- Install the oil filler plug -1- with a new seal.

Tightening Specifications	
Transmission fluid filler plug	30 Nm



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2 Description and Operation

⇒ [“2.1 Shaft Seal and Left Flange Shaft Overview”, page 202](#)

⇒ [“2.2 Shaft Seal and Right Flange Shaft Overview”, page 203](#)

⇒ [“2.3 Driveshaft Motor Overview”, page 204](#)

⇒ [“2.4 Transmission Driveshaft Overview”, page 205](#)

⇒ [“2.5 Shaft Seal Overview, Front Final Drive”, page 206](#)

⇒ [“2.6 Front Final Drive Overview”, page 207](#)

⇒ [“2.7 Bonded Rubber Bushing on Front Final Drive Overview”, page 208](#)

⇒ [“2.8 Driveshaft Overview”, page 209](#)

2.1 Shaft Seal and Left Flange Shaft Overview

1 - Left Flange Shaft

- ❑ Refer to
⇒ [“5.1 Left Flange Shaft”, page 213](#)

2 - Shaft Seal

- ❑ For the left flange shaft
- ❑ Refer to
⇒ [“5.2 Left Flange Shaft Seal”, page 214](#)

3 - Flange

- ❑ Removing and installing, refer to
⇒ [“5.2 Left Flange Shaft Seal”, page 214](#)

4 - O-ring

- ❑ Replace

5 - Ball Bearing

- ❑ For the left flange shaft
- ❑ Removing and installing, refer to
⇒ [“5.2 Left Flange Shaft Seal”, page 214](#)

6 - Locking Ring

- ❑ Replace

7 - Bolt

- ❑ 10 Nm

8 - Exhaust Manifold with Catalytic Converter Bracket

9 - Bolt

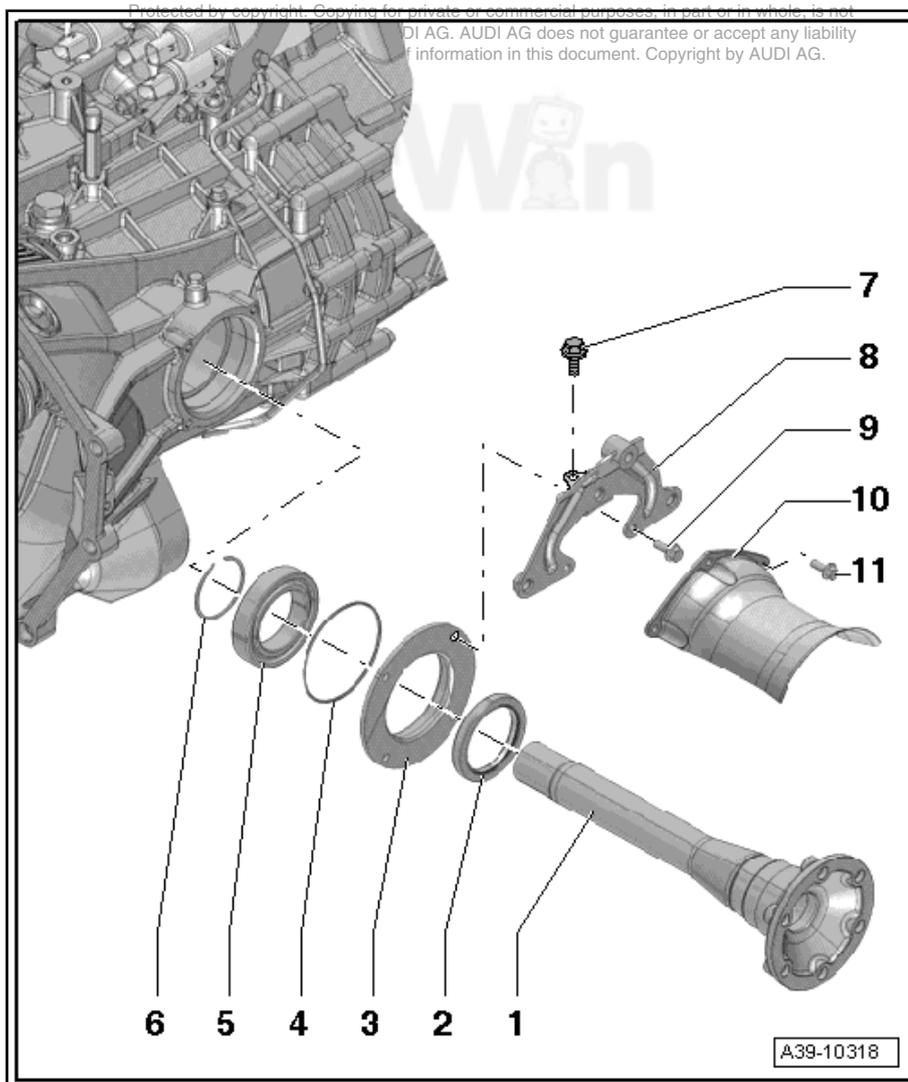
- ❑ 10 Nm

10 - Heat Shield

- ❑ For the left drive axle

11 - Bolt

- ❑ 20 Nm



2.2 Shaft Seal and Right Flange Shaft Overview

1 - Final Drive Cover

- Refer to
 ⇒ [“5.3 Final Drive Cover with Right Flange Shaft”, page 216](#)

2 - Bolt

- 35 Nm

3 - Shaft seal

- For the right flange shaft
- Refer to
 ⇒ [“5.5 Right Flange Shaft Seal”, page 218](#)

4 - Right Flange Shaft

- Refer to
 ⇒ [“5.3 Final Drive Cover with Right Flange Shaft”, page 216](#)
- Refer to
 ⇒ [“5.4 Right Flange Shaft”, page 217](#)

5 - Bolt

- M6 bolts, 10 Nm
- M8 bolts, 25 Nm

6 - Heat Shield

- For the right drive axle
- With angled corners

7 - Bolt

- 20 Nm

8 - Exhaust Manifold with Catalytic Converter Bracket

9 - O-ring

- Replace

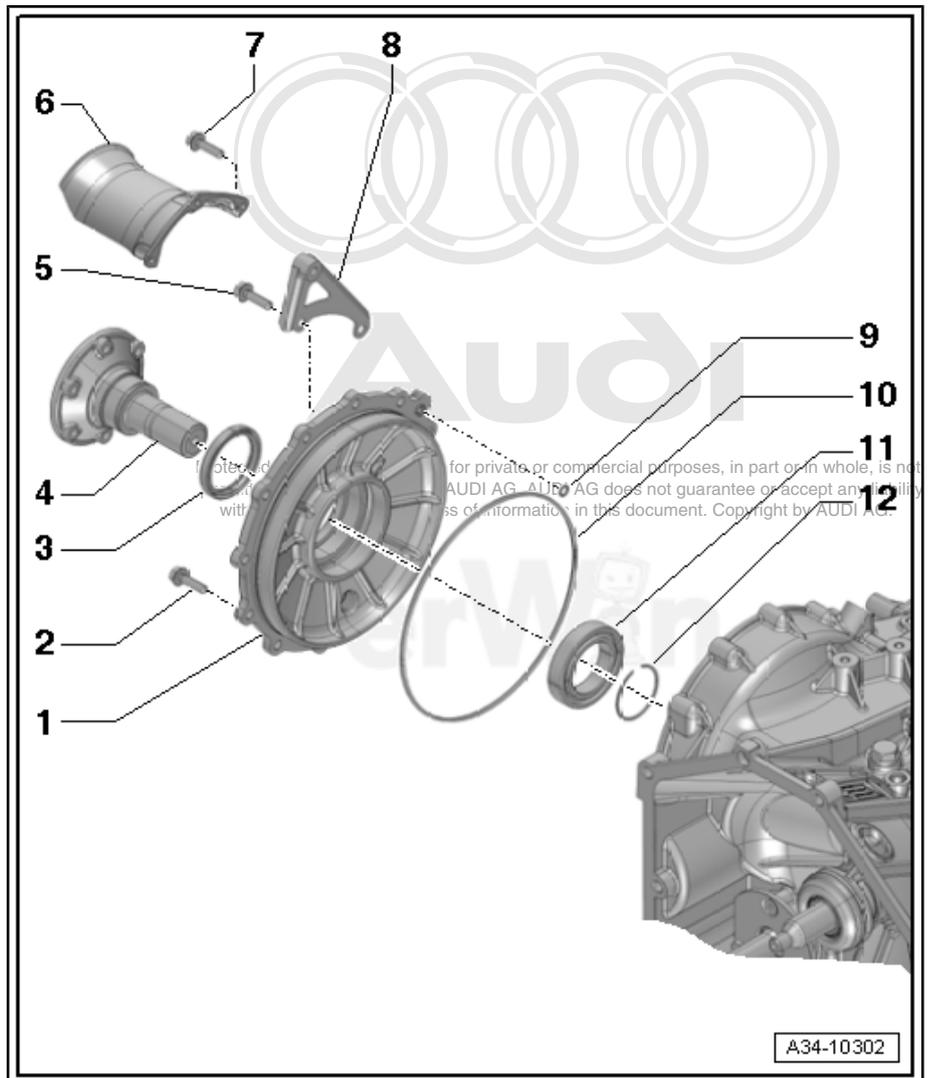
10 - O-ring

- Replace

11 - Ball Bearing

- Removing and Installing, refer to ⇒ [“5.6 Right Flange Shaft Ball Bearing”, page 219](#)

12 - Locking Ring



2.3 Driveshaft Motor Overview

1 - Driveshaft Motor

- Refer to
⇒ [“5.7 Driveshaft Motor”](#), page 220

2 - Driveshaft Motor Rear Ball Bearing

- Refer to
⇒ [“5.9 Driveshaft Motor Ball Bearing”](#), page 228

3 - Locking Ring

4 - Nut

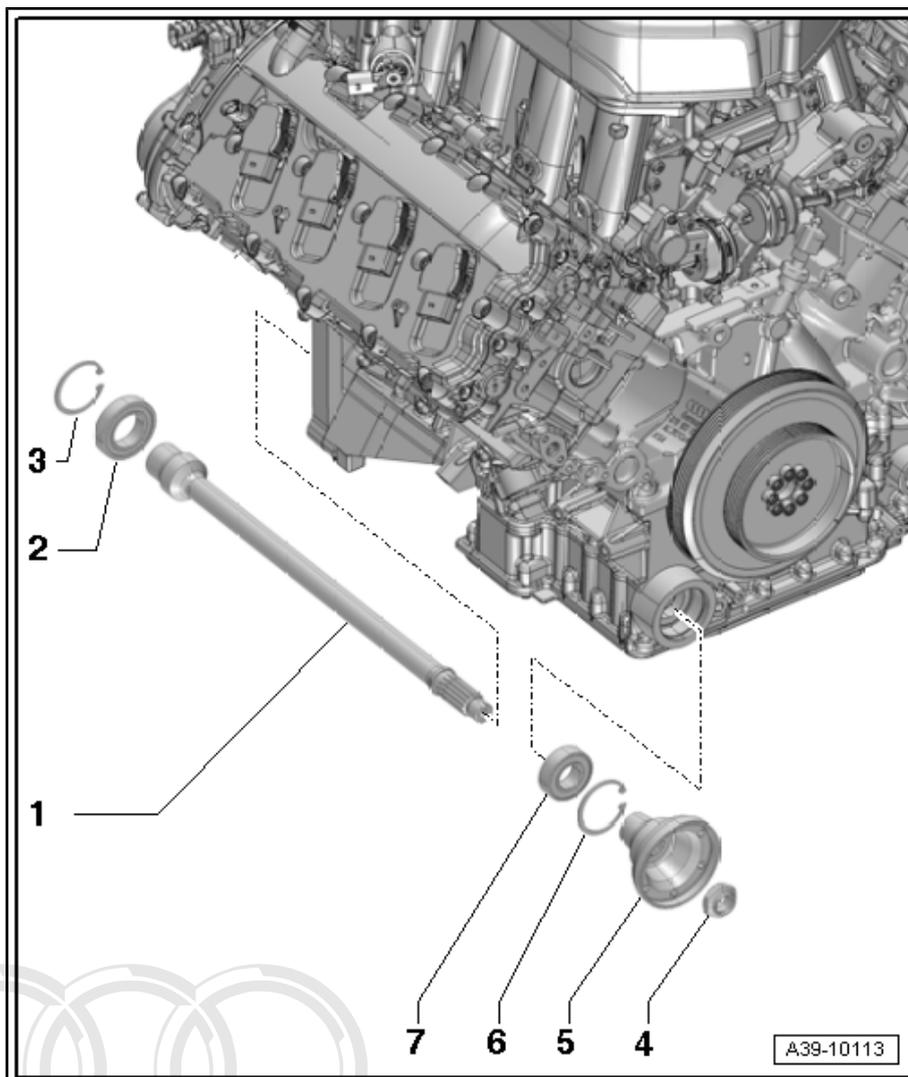
- Replace
- 170 Nm

5 - Driveshaft Motor Flange

6 - Locking Ring

7 - Driveshaft Motor Front Ball Bearing

- Refer to
⇒ [“5.9 Driveshaft Motor Ball Bearing”](#), page 228



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2.4 Transmission Driveshaft Overview

1 - Transmission Driveshaft

- Refer to
 ⇒ ["5.8 Transmission Driveshaft", page 221](#)

2 - Nut

- Replace
- 100 Nm
- Peen after tightening

3 - Spur Gear

- Mark the installed position for installing again later

4 - Thrust Washer

5 - Roller Bearing

- Removing and installing, refer to
 ⇒ ["5.8 Transmission Driveshaft", page 221](#)

6 - Bearing Race

- Installed position: The collar faces the seal

7 - Shaft Seal

- Removing and installing, refer to
 ⇒ ["5.8 Transmission Driveshaft", page 221](#)

8 - Bolt

- 26 Nm

9 - Bolts

- 30 Nm

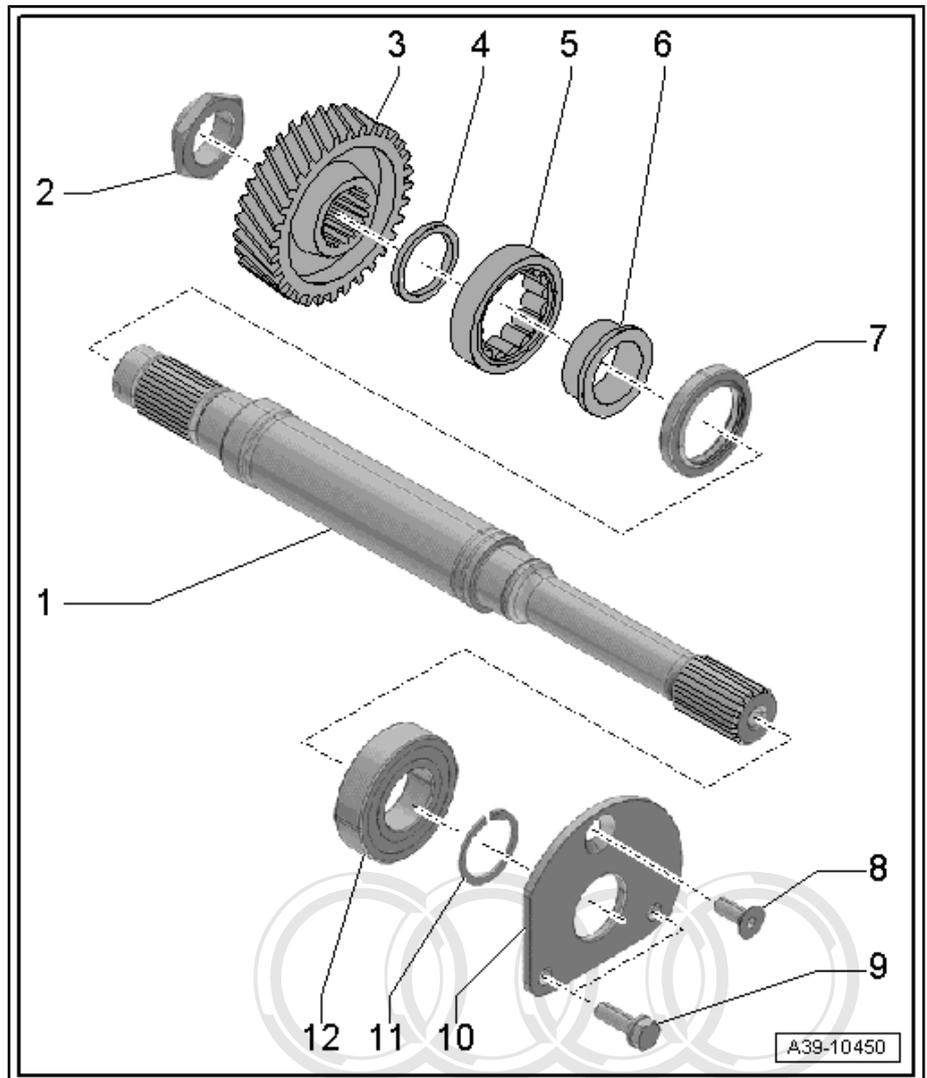
10 - Gear Carrier

11 - Locking Ring

- For ball bearing

12 - Ball Bearing

- Removing and installing, refer to ⇒ ["5.8 Transmission Driveshaft", page 221](#)
- To replace, remove the locking ring -11- and remove the ball bearing from the transmission driveshaft



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2.5 Shaft Seal Overview, Front Final Drive

1 - Front Final Drive

- Removing and installing, refer to
 ⇒ ["5.12 Front Final Drive", page 234](#)

2 - Shaft Seal

- Refer to
 ⇒ ["5.10 Flange Shaft Seals Flange Shafts.", page 230](#)

3 - Flange Shaft

- Removing and installing, refer to
 ⇒ ["5.10 Flange Shaft Seals Flange Shafts.", page 230](#)

4 - Bolt

- 25 Nm
- Insert with locking fluid - AMV 185 101 A1-

5 - Nut

- Replace
- 170 Nm

6 - Driveshaft Flange

- Removing and installing, refer to
 ⇒ ["5.11 Driveshaft Flange Sealing Ring", page 232](#)

7 - Shaft Seal

- Refer to
 ⇒ ["5.11 Driveshaft Flange Sealing Ring", page 232](#)

8 - Shaft Seal

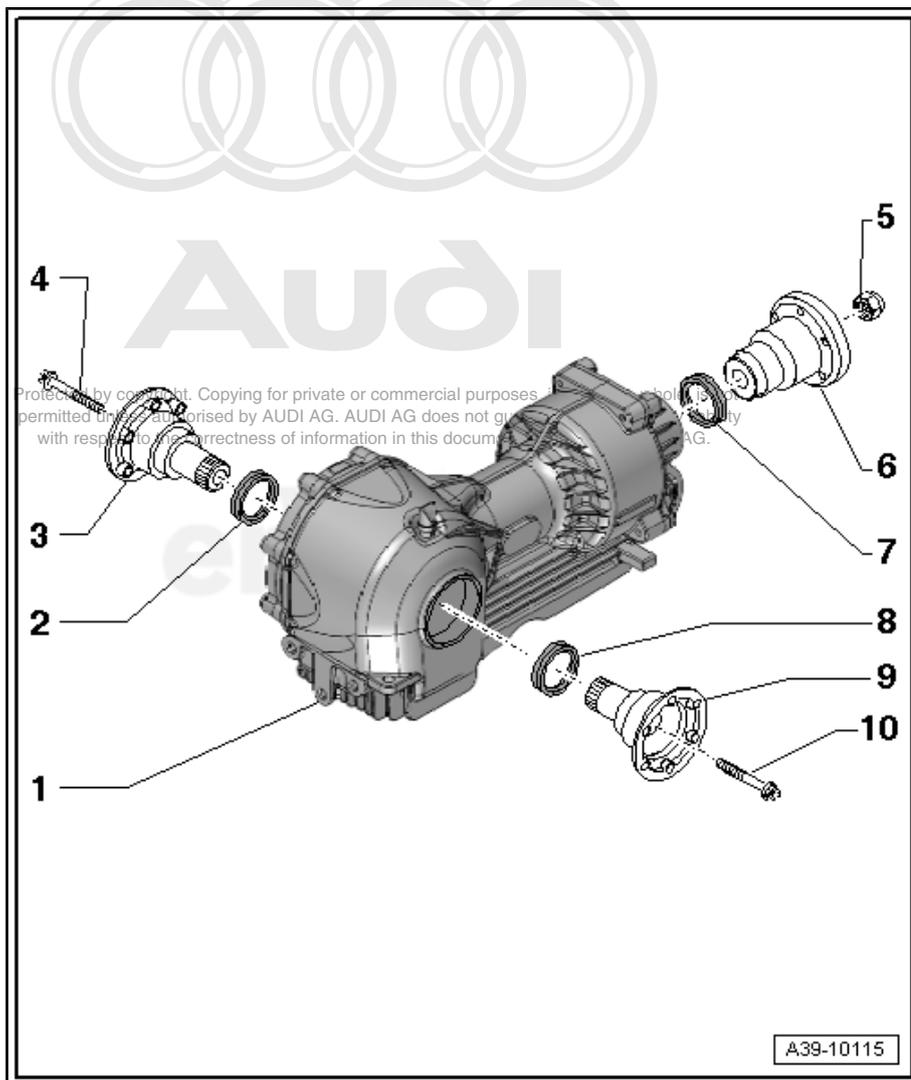
- Refer to ⇒ ["5.10 Flange Shaft Seals Flange Shafts.", page 230](#)

9 - Flange Shaft

- Removing, refer to ⇒ ["5.10 Flange Shaft Seals Flange Shafts.", page 230](#)

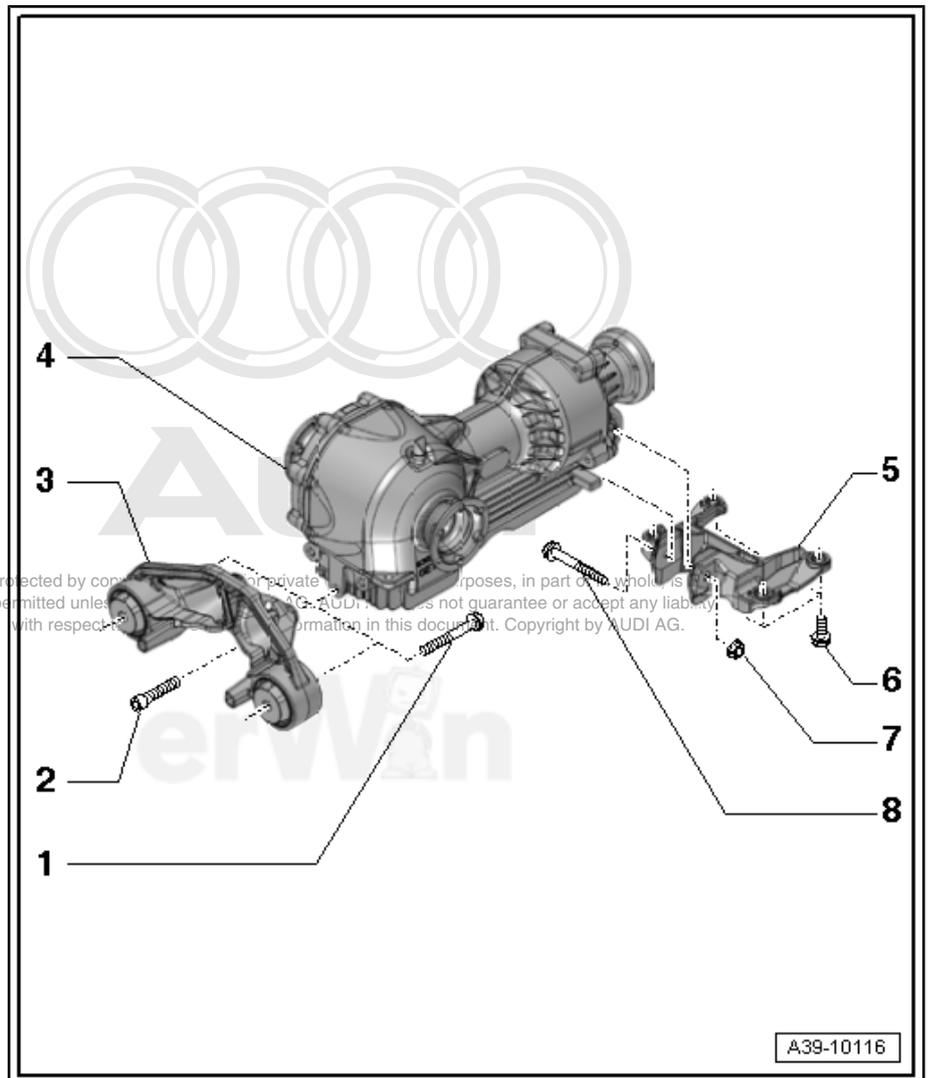
10 - Bolt

- 25 Nm
- Insert with locking fluid - AMV 185 101 A1-



2.6 Front Final Drive Overview

- 1 - Bolt**
 - 95 Nm
- 2 - Bolt**
 - 55 Nm
- 3 - Front Crossmember**
 - Removing and installing, refer to [⇒ "5.14 Crossmember on Front Final Drive", page 236](#)
 - Bonded rubber bushing, removing and installing [⇒ Item 1 \(page 208\)](#)
- 4 - Front Final Drive**
 - Removing and installing, refer to [⇒ "5.12 Front Final Drive", page 234](#)
 - Bonded rubber bushing, removing and installing [⇒ Item 4 \(page 208\)](#)
- 5 - Rear Crossmember**
- 6 - Bolt**
 - 20 Nm
- 7 - Nut**
 - 40 Nm
- 8 - Bolt**



2.7 Bonded Rubber Bushing on Front Final Drive Overview

1 - Bonded Rubber Bushing

- Refer to
⇒ [“5.15 Bonded Rubber Bushing on Front Crossmember”, page 237](#)

2 - Front Crossmember

- Refer to
⇒ [“5.14 Crossmember on Front Final Drive”, page 236](#)

3 - Front Final Drive

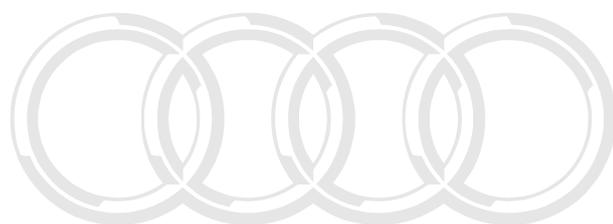
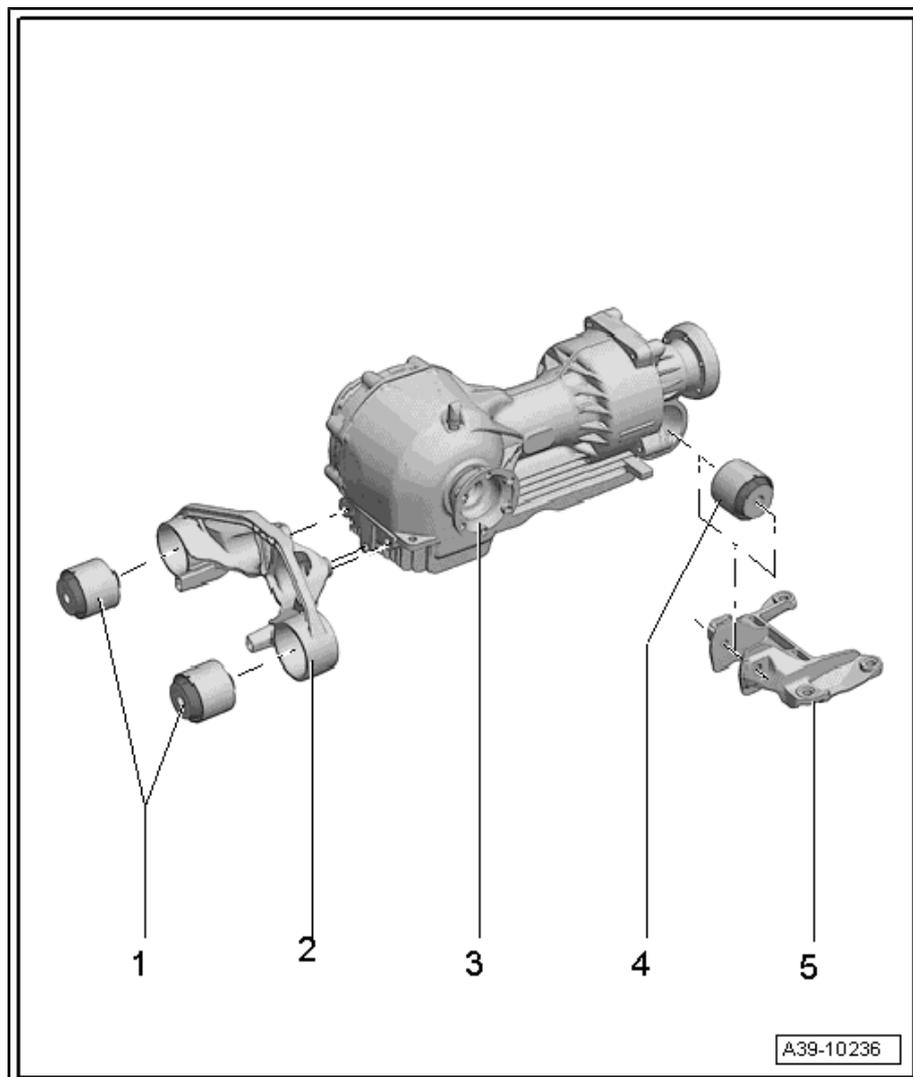
- Refer to
⇒ [“5.12 Front Final Drive”, page 234](#)

4 - Bonded Rubber Bushing

- Refer to
⇒ [“5.13 Bonded Rubber Bushing on Front Final Drive”, page 235](#)

5 - Rear Crossmember

- Removing and Installing
⇒ [Item 5 \(page 207\)](#)



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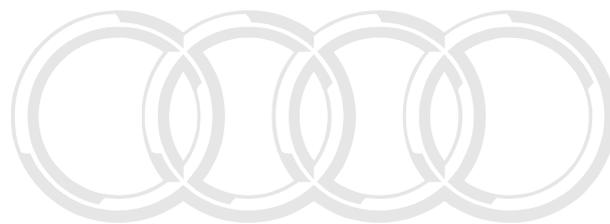
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2.8 Driveshaft Overview



Note

- ◆ *General repair instructions, refer to ["1.3 Repair Information", page 2](#).*
- ◆ *Do not bend the driveshaft. The maximum angle permitted for the universal joint is 25°. Otherwise, it could be damaged.*
- ◆ *Always transport and store driveshaft in extended position.*
- ◆ *No repair work can be carried out on the driveshaft except removing, installing and adjusting.*
- ◆ *If the driveshaft is separated only from the transmission or the rear final drive, the driveshaft must be tied up by the CV joints or otherwise supported.*
- ◆ *Before removing the driveshaft, mark the position of the CV joint on the flange. Install in the same position otherwise the imbalance will be excessive and the bearings could get damaged causing rumbling noises.*
- ◆ *If there are complaints regarding noise or vibration, it is absolutely necessary to see if a precise adjustment will eliminate the complaint before the driveshaft is replaced.*
- ◆ *After removing the driveshaft from the front final drive, do not install the additional balance washer (thicker washer) that may be between the washer and bolt head.*



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1 - Front Final Drive

2 - Driveshaft

□ Refer to
⇒ ["5.16 Driveshaft",
page 238](#)

□ Refer to
⇒ ["5.17 Driveshaft on
Front Final Drive",
page 240](#)

3 - Flange

4 - Lock Plate

5 - Bolt

□ 30 Nm

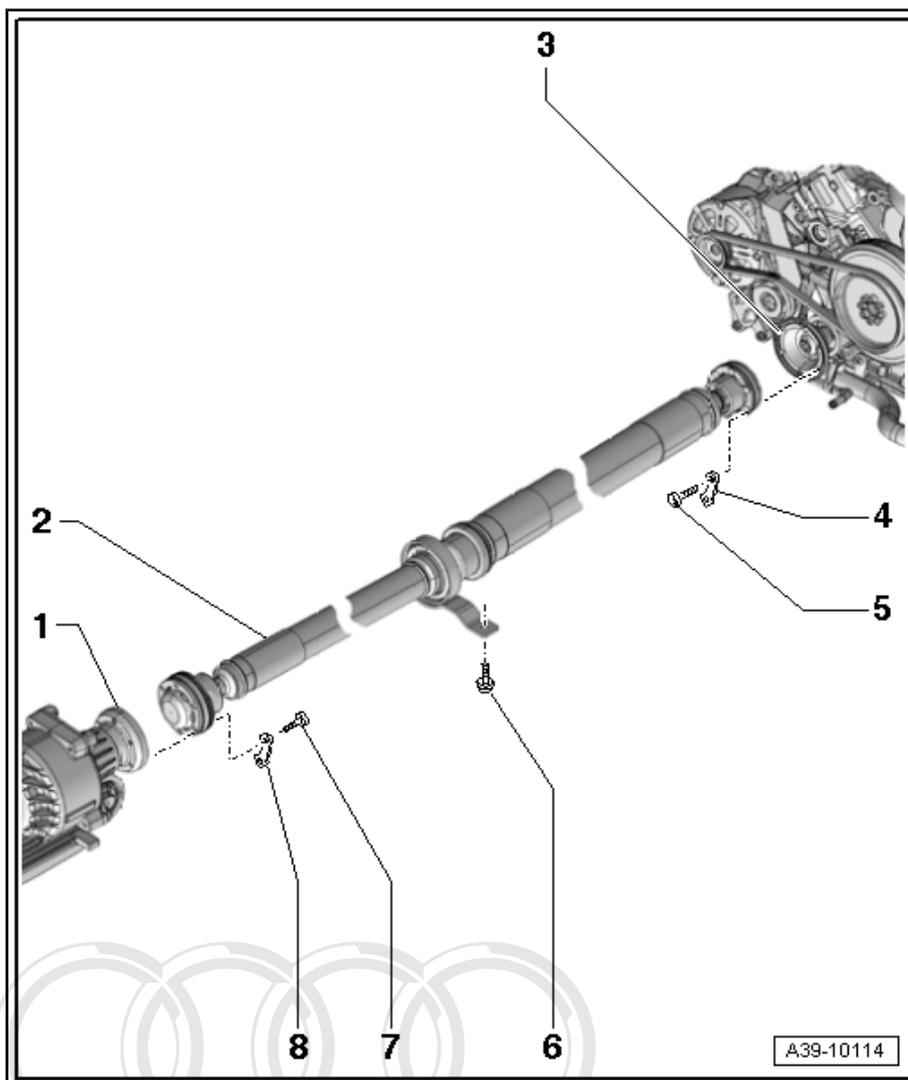
6 - Bolt

□ 20 Nm

7 - Bolt

□ 30 Nm

8 - Lock Plate



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3 Specifications

⇒ [“3.1 Fastener Tightening Specifications”, page 211](#)

3.1 Fastener Tightening Specifications

Components	Bolt Size	Nm
Driveshaft Bracket	-	20
Driveshaft Flange Nut	-	170
Driveshaft Motor, Nut ¹	-	170
Exhaust Manifold with Catalytic Converter Bracket	-	10
Exhaust Manifold with Catalytic Converter Bracket (Left Flange Shaft)	-	10
Exhaust Manifold with Catalytic Converter Bracket (Right Flange Shaft)		
	M6	10
	M8	25
Final Drive Cover	-	35
Flange Shaft ⁴	-	25
Front Crossmember		
To Front Final Drive	-	55
	-	95
Gear Carrier ³		
	-	26
	-	30
Heat Shield for the Left Drive Axle	-	20
Heat Shield for the Right Drive Axle	-	20
Lock Plate	-	30
Rear Cross Member		
	-	20
Nut	-	40
Oil Filler Plug	-	30
Rear Crossmember		
Bolt	-	20
Nut	-	40
Transmission Driveshaft, Nut ^{1, 2}	-	100
<ul style="list-style-type: none"> • ¹ Replace • ² Peen after tightening • ³ For bolt tightening clarification, refer to ⇒ “2.4 Transmission Driveshaft Overview”, page 205 and see items -8 and 9- • ⁴ Insert with locking fluid - AMV 185 101 A1- 		

4 Diagnosis and Testing

⇒ ["4.1 Radial Run-Out on Driveshaft Flange, Measuring and Marking", page 212](#)

4.1 Radial Run-Out on Driveshaft Flange, Measuring and Marking

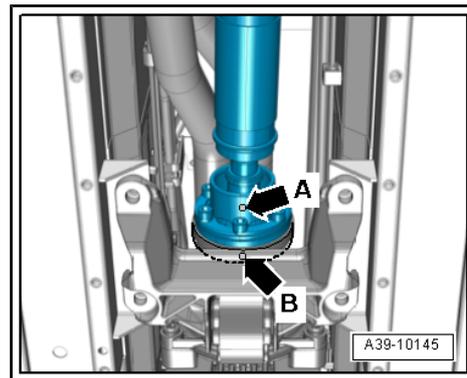
Special tools and workshop equipment required

- ◆ Dial Gauge Holder - VW 387-
- ◆ Dial Gauge

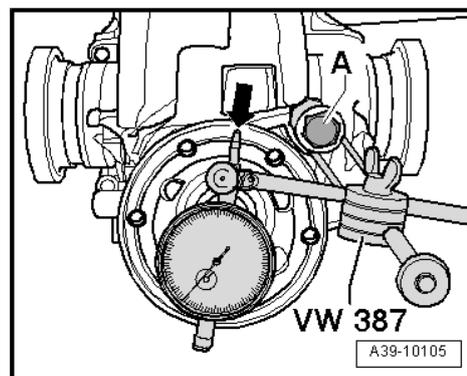


Note

- ◆ Always measure the radial run-out if the flange/driveshaft was removed at the front final drive. Make a new color dot and remove the old one.
- ◆ If a new driveshaft is to be installed and the factory color mark on the rear final drive flange is no longer visible, determine the position of the maximum run-out (corresponds to the maximum distance from the rotational axis) and mark it with a color dot -arrow B-.
- ◆ This color dot -arrow B- is opposite the color dot on the driveshaft -arrow A-.
- ◆ ~~The radial run-out can be measured with the front final drive installed.~~



- Remove the driveshaft from the front final drive. Refer to ["5.17 Driveshaft on Front Final Drive", page 240](#) .
- Remove the bolt -A- from the front final drive and install the -VW 387- in its place.
- Position the dial gauge on the sanded diameter inside the driveshaft flange -arrow- and set with 1 mm pretension to "0".
- Turn both rear wheels at the same time in the same direction so that the flange completes one full revolution.
- Mark the larger radial run-out on the outer flange with a color dot (refer to the largest distance from the axle).
- Then remove the previous marking from the flange.
- Attach the driveshaft. Refer to ["5.17 Driveshaft on Front Final Drive", page 240](#) .



5 Removal and Installation

- ⇒ [“5.1 Left Flange Shaft”, page 213](#)
- ⇒ [“5.2 Left Flange Shaft Seal”, page 214](#)
- ⇒ [“5.3 Final Drive Cover with Right Flange Shaft”, page 216](#)
- ⇒ [“5.4 Right Flange Shaft”, page 217](#)
- ⇒ [“5.5 Right Flange Shaft Seal”, page 218](#)
- ⇒ [“5.6 Right Flange Shaft Ball Bearing”, page 219](#)
- ⇒ [“5.7 Driveshaft Motor”, page 220](#)
- ⇒ [“5.8 Transmission Driveshaft”, page 221](#)
- ⇒ [“5.9 Driveshaft Motor Ball Bearing”, page 228](#)
- ⇒ [“5.10 Flange Shaft Seals Flange Shafts”, page 230](#)
- ⇒ [“5.11 Driveshaft Flange Sealing Ring”, page 232](#)
- ⇒ [“5.12 Front Final Drive”, page 234](#)
- ⇒ [“5.13 Bonded Rubber Bushing on Front Final Drive”, page 235](#)
- ⇒ [“5.14 Crossmember on Front Final Drive”, page 236](#)
- ⇒ [“5.15 Bonded Rubber Bushing on Front Crossmember”, page 237](#)
- ⇒ [“5.16 Driveshaft”, page 238](#)
- ⇒ [“5.17 Driveshaft on Front Final Drive”, page 240](#)

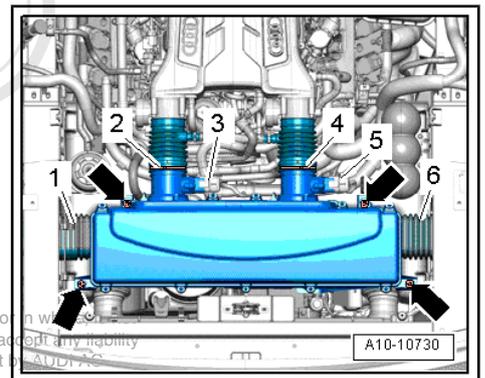
5.1 Left Flange Shaft

Special tools and workshop equipment required

- ◆ Slide Hammer-Complete Set - VW 771-

Removing

- Remove the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .
- Remove the heat shield over the left flange shaft
⇒ [Item 10 \(page 202\)](#) .
- Remove left drive axle. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 42 ; Removal and Installation .



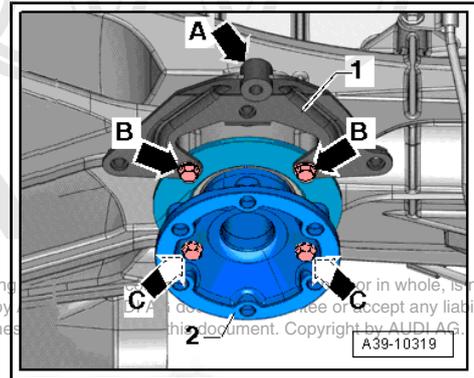
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- Remove the bolts -arrow A and B- and the bracket -1-.
- Remove the bolts -arrows C-.
- Remove the left flange shaft -2-. If necessary, insert the -VW 771- into one of the flange shaft threaded holes and remove it .

Installing

Install in reverse order, paying attention to the following:

- For the correct tightening specifications, refer to ["2.1 Shaft Seal and Left Flange Shaft Overview", page 202](#) .
- Install the drive axle. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 42 ; Removal and Installation .
- Install the heat shield over the left flange shaft ⇒ [Item 10 \(page 202\)](#) .
- Install the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .
- Gear oil level, checking and filling, refer to ⇒ ["1.2 Transmission Fluid, Checking and Filling", page 52](#) .



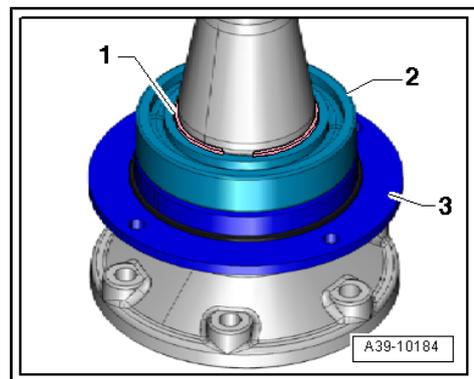
5.2 Left Flange Shaft Seal

Special tools and workshop equipment required

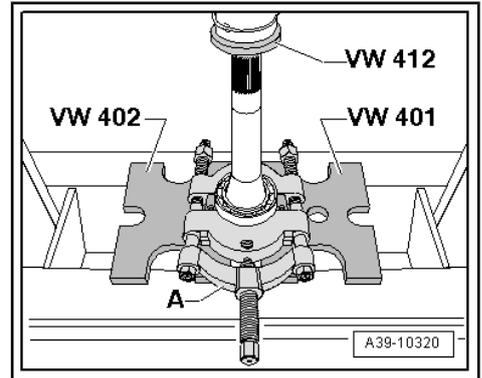
- ◆ Thrust Plate - VW 402-
- ◆ Thrust Disc - VW 412-
- ◆ Tube 60 mm Dia. - VW 415 A-
- ◆ Press Support - 3118-
- ◆ -3301/4- from the Assembly Tool - 3301-
- ◆ Thrust Piece - T10243-
- ◆ Sealing grease - G 052 128 A1-

Removing

- Remove the left flange shaft. Refer to ⇒ ["5.1 Left Flange Shaft", page 213](#) .
- Remove ball bearing locking ring -1- -2-.

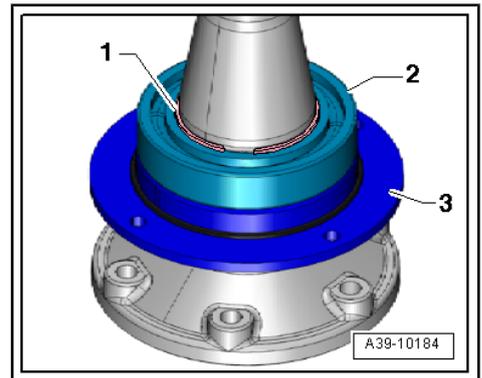
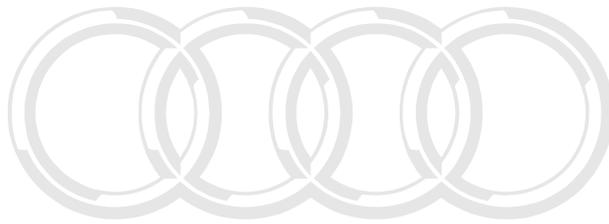


- Removing the left flange shaft ball bearing.
- A - Separating tool, for example -Kukko 17/2-



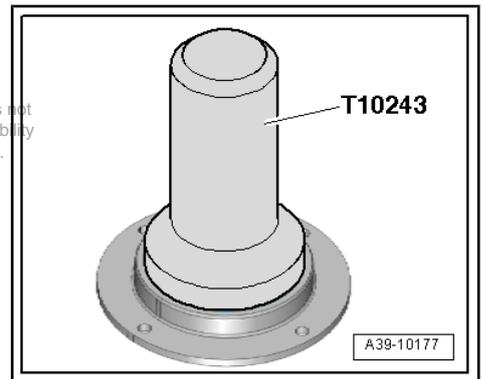
- Remove the flange -3- with shaft seal.
- Remove the old shaft seal.

Installing

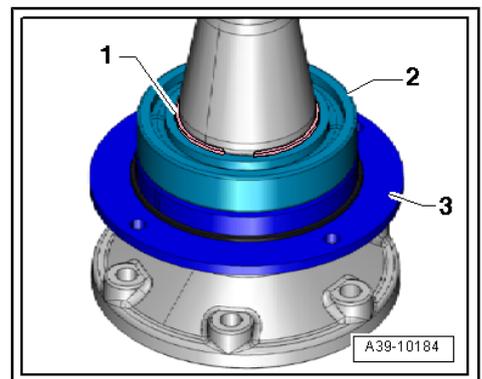


- Lightly lubricate the outer circumference of the shaft seal and install it all the way in with the -T10243- .
- Installed position: The closed side faces outward.
- Fill the space between the sealing and dust lip half way with sealing grease - G 052 128 A1- .

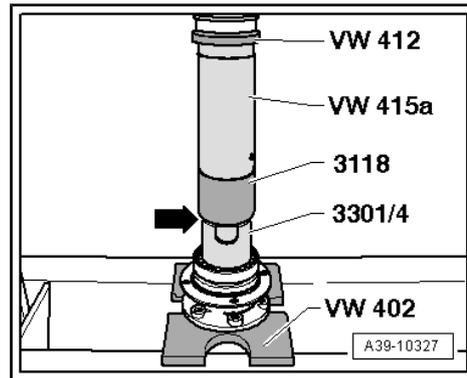
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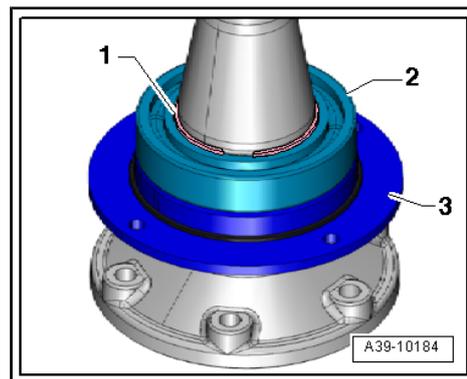
- Install the flange -3-. Replace the O-rings.



- Installing the left flange shaft ball bearing.
- The shoulder on the -3118- -arrow- faces the ball bearing.



- Insert the ball bearing -2- locking ring -1- into the groove in the flange shaft.
- Install the left flange shaft. Refer to [⇒ "5.1 Left Flange Shaft", page 213](#) .



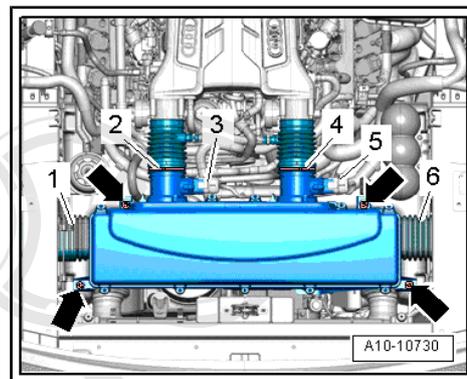
5.3 Final Drive Cover with Right Flange Shaft

Special tools and workshop equipment required

- ◆ Oil Collecting and Extracting Device - V.A.G 1782-

Removing

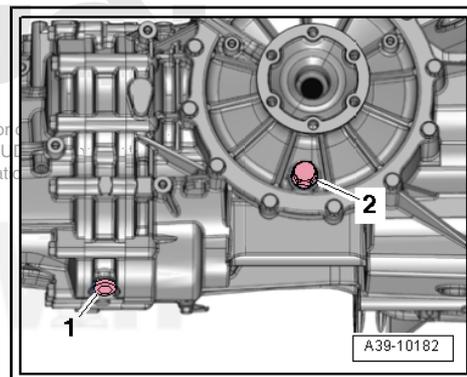
- Remove the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .
- Remove the heat shield for the right drive axle [⇒ Item 6 \(page 203\)](#) .
- Remove the catalytic converter bracket [⇒ Item 8 \(page 203\)](#) .
- Remove right drive axle. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 42 ; Removal and Installation .



- Place the -V.A.G 1782- underneath and drain the transmission fluid -1-.

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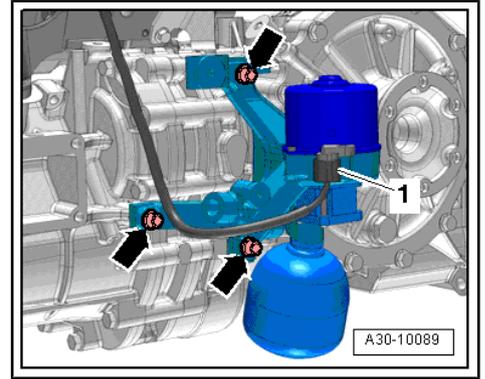
- Remove the hydraulic unit. Refer to [⇒ “5.20 Hydraulic Unit”, page 144](#) .



Caution

There is a risk of destroying the differential.

- ◆ *When removing the final drive cover, make sure the differential does not fall out.*
- ◆ *If the left flange shaft will also be removed, the differential will no longer have a guide and must be removed.*
- ◆ *Do not install a differential that has fallen onto the floor.*

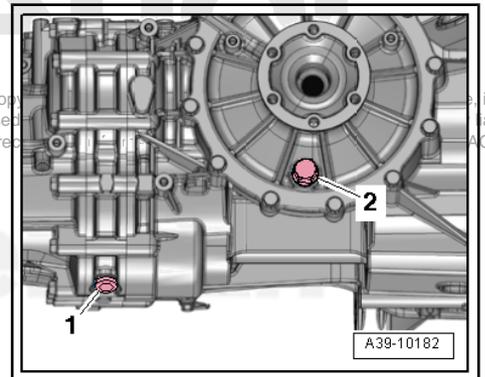
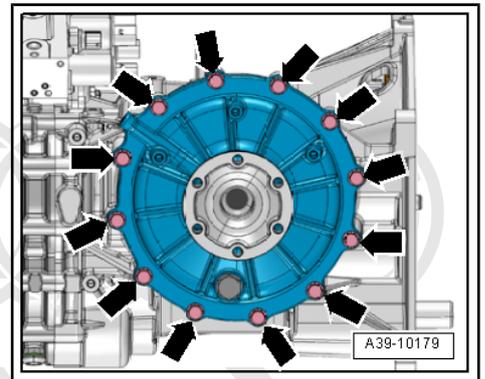


- Remove the bolts -arrows- and the final drive cover with the flange shaft.

Installing

Install in reverse order, paying attention to the following:

- Tightening specification; refer to [⇒ “2.2 Shaft Seal and Right Flange Shaft Overview”, page 203](#) .
- Replace the O-rings [⇒ Item 9 \(page 203\)](#) and [⇒ Item 10 \(page 203\)](#) on the final drive cover.
- Insert the final drive cover with the flange shaft and tighten the bolts -arrows-.
- Install the transmission fluid drain plug -1- and tighten. Tightening specification [⇒ Item 9 \(page 91\)](#) .
- Fill the transmission fluid and check the level. Refer to [⇒ “1.2 Transmission Fluid, Checking and Filling”, page 52](#) .
- Install the right drive axle. Refer to [⇒ Suspension, Wheels, Steering; Rep. Gr. 42 ; Removal and Installation](#) .
- Install the heat shield for the right drive axle [⇒ Item 6 \(page 203\)](#) .
- Install the catalytic converter bracket [⇒ Item 8 \(page 203\)](#) .
- Install the air filter housing. Refer to [⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation](#) .



5.4 Right Flange Shaft

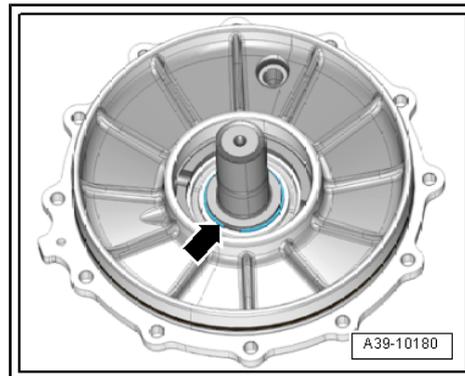
Special tools and workshop equipment required

- ◆ Thrust Plate - VW 401-
- ◆ Thrust Plate - VW 402-
- ◆ Thrust Disc - VW 412-
- ◆ Sleeve - 2010-
- ◆ Press Support - 3118-

Removing

- Remove the final drive cover with the right flange shaft [⇒ “5.3 Final Drive Cover with Right Flange Shaft”, page 216](#) .

- Remove the circlip -arrow-.

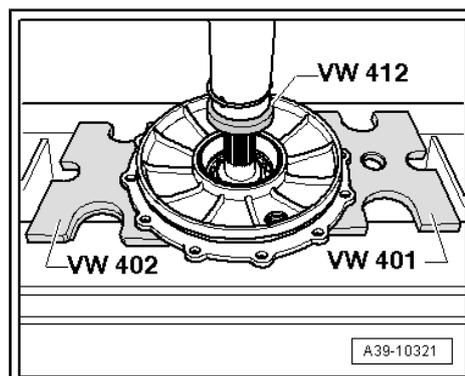


- Remove the right flange shaft.



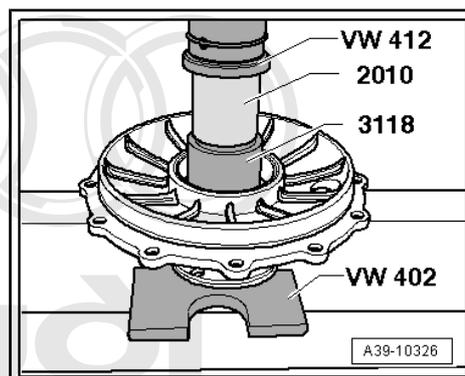
Note

If the right flange shaft seal is being removed, measure the installation depth of the current seal. Refer to => "5.5 Right Flange Shaft Seal", page 218 .

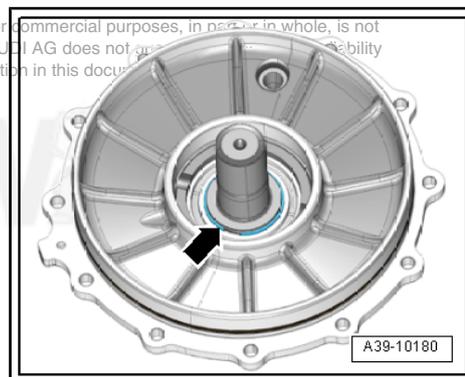


Installing

- If necessary, replace the right flange shaft seal. Refer to => "5.5 Right Flange Shaft Seal", page 218 .
- Install the flange shaft.



- Insert the circlip -arrow- in the flange shaft groove.
- Install the final drive cover with the right flange shaft => page 217 .



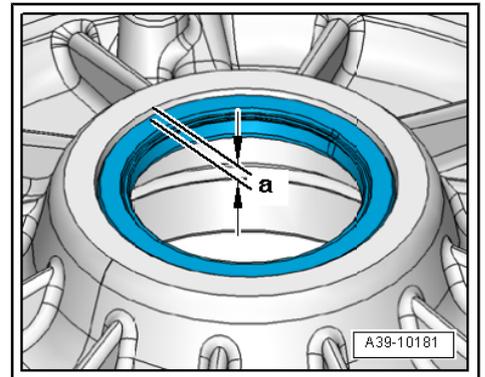
5.5 Right Flange Shaft Seal

Special tools and workshop equipment required

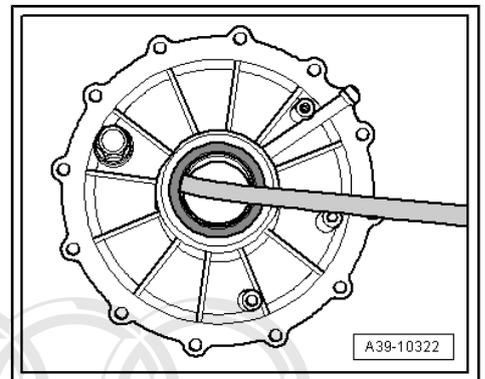
- ◆ Thrust Piece - T40007-
- ◆ Sealing grease - G 052 128 A1-

Procedure

- Remove the right flange shaft. Refer to [⇒ “5.4 Right Flange Shaft”, page 217](#) .
- Measure the installation depth of the current shaft seal to the outer edge of the final drive cover with a depth gauge and make a note of dimension -a-.



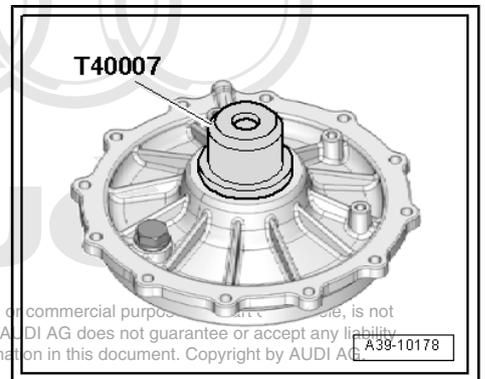
- Pry out the shaft seal.
- Lightly coat the outer circumference of the new shaft seal with oil.



- Press the new shaft seal in up to the dimension “a” that was measured using the -T40007- , measuring at several places on the circumference.
- Installed position: The closed side faces outward.
- Fill the space between the sealing and dust lip half way with sealing grease - G 052 128 A1- .

Install in reverse order of removal paying attention to the following:

- Install the right flange shaft [⇒ page 218](#).



5.6 Right Flange Shaft Ball Bearing

Special tools and workshop equipment required

- ◆ Thrust Plate - VW 402-
- ◆ Thrust Disc - VW 412-
- ◆ Thrust Plate - 2050-
- ◆ Press Support - 3118-
- ◆ -T10030/2- from the Assembly Tool - T10030-

Removing

- Remove the right flange shaft. Refer to [⇒ “5.4 Right Flange Shaft”, page 217](#) .

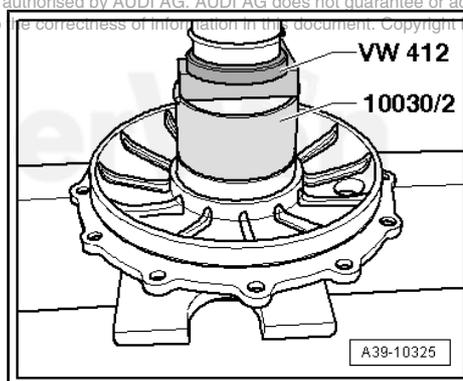
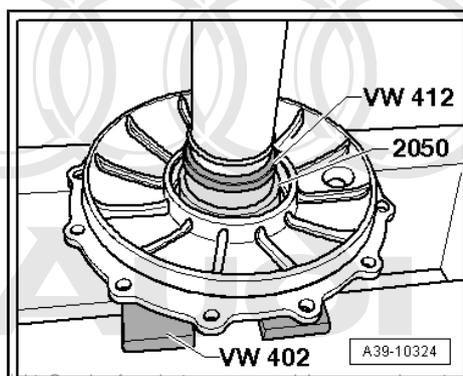
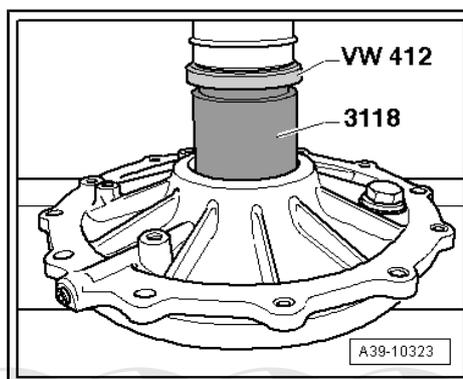
i Note

If the right flange shaft seal is being removed, measure the installation depth of the current seal. Refer to ⇒ [“5.5 Right Flange Shaft Seal”, page 218](#).

- Remove the ball bearing together with the adjustment ring and the tapered roller bearing outer race.

Installing

- Press the ball bearing all the way in.



- Insert the adjustment ring.
- Install the tapered roller bearing outer race all the way.
- If necessary, replace the right flange shaft seal. Refer to ⇒ [“5.5 Right Flange Shaft Seal”, page 218](#).
- Install the flange shaft. Refer to ⇒ [page 218](#) and circlip.
- Install the flange shaft with the final drive cover. Refer to ⇒ [“5.3 Final Drive Cover with Right Flange Shaft”, page 216](#).

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5.7 Driveshaft Motor

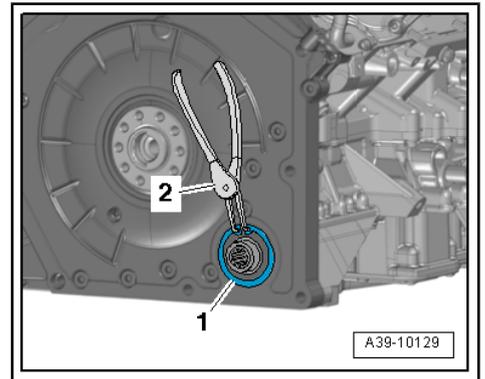
Special tools and workshop equipment required

- ◆ Handle-Hold Dr. Shaft Flange - 3145-

Removing

- Remove the driveshaft. Refer to ⇒ [“5.16 Driveshaft”, page 238](#).
- Transmission, removing, refer to ⇒ [“5.1 Transmission, Removing”, page 104](#).
- Remove the pressure plate and clutch plates. Refer to ⇒ [“5.11 Pressure Plate with Clutch Plates”, page 47](#).

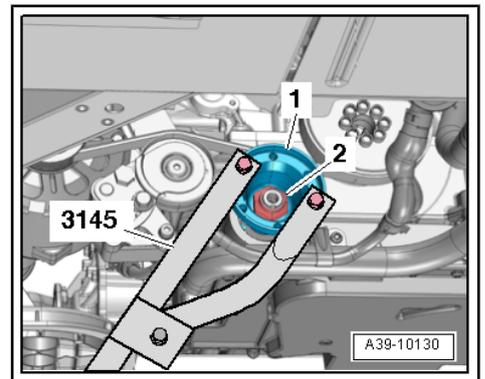
- Remove the flywheel. Refer to ⇒ Engine Mechanical; Rep. Gr. 13 ; Removal and Installation .
- Remove the driveshaft front ball bearing circlip -1- with the inner race securing clamp -2-.



- Counterhold the driveshaft flange -1- using -3145- and remove the nut -2-.
- Remove the driveshaft flange.

 **Note**

If the driveshaft flange cannot be removed, use a commercially-available puller.

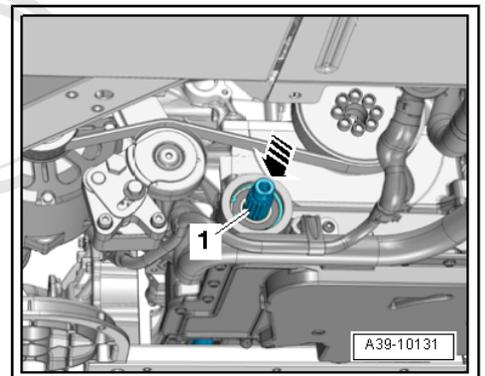


- Remove the driveshaft -1- backwards with a plastic mallet -arrow-.

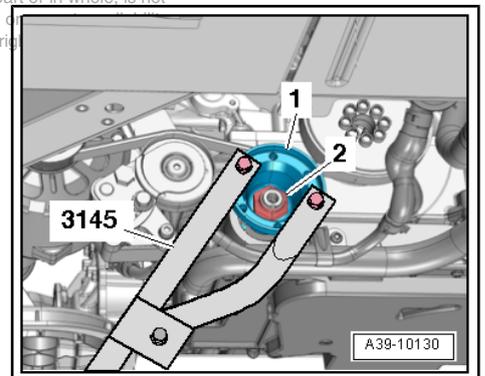
Installing

Install in reverse order, paying attention to the following:

- Tightening specification; refer to ⇒ [“2.3 Driveshaft Motor Overview”, page 204](#) .



- Counterhold the driveshaft flange -1- using -3145- and tighten the nut -2-.
- Peen the nut after tightening it.
- Install the flywheel. Refer to ⇒ Engine Mechanical; Rep. Gr. 13 ; Removal and Installation .
- Install the pressure plate and clutch plate. Refer to ⇒ [“5.11 Pressure Plate with Clutch Plates”, page 47](#) .
- Transmission, installing, refer to ⇒ [“5.1 Transmission, Removing”, page 104](#) .
- Install the driveshaft. Refer to ⇒ [“5.16 Driveshaft”, page 238](#) .



5.8 Transmission Driveshaft

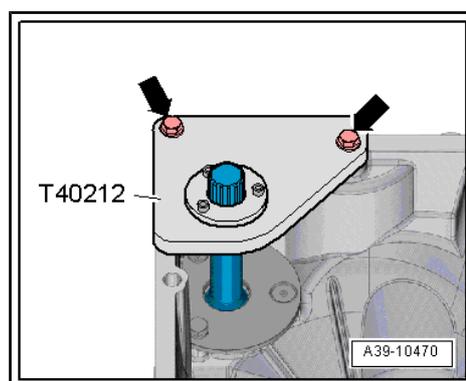
Special tools and workshop equipment required

- ◆ Thrust Piece - T40008-

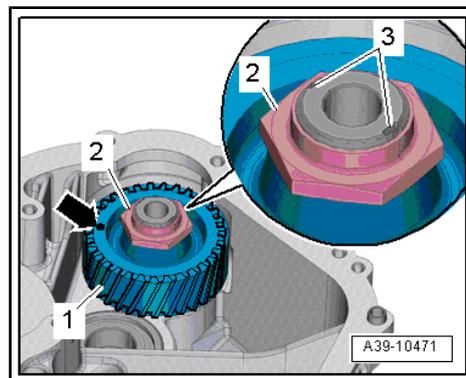
- ◆ Thrust Piece - T40174-
- ◆ Counterhold Tool - T40212-
- ◆ Counterhold Tool - T40224-
- ◆ Subframe Support Assembling Device - T40238-
- ◆ Internal Puller (36 to 46 mm) - Kukko 21/6-
- ◆ Counter Support - Kukko 22/2-
- ◆ M8 x 25 bolt (quantity: 3)
- ◆ M10 x 40 bolt and nut

Removing

- Transmission removed.
- Differential housing removed.
- Attach the -T40212- to the differential housing using an M10 x 40 bolt -arrows- and nut and tighten it to 40 Nm.



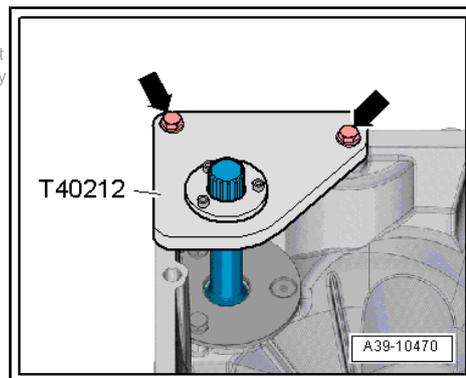
- Turn the differential housing around.
- Remove the nut -2-.



- Turn the differential housing around.

- Remove the -T40212-

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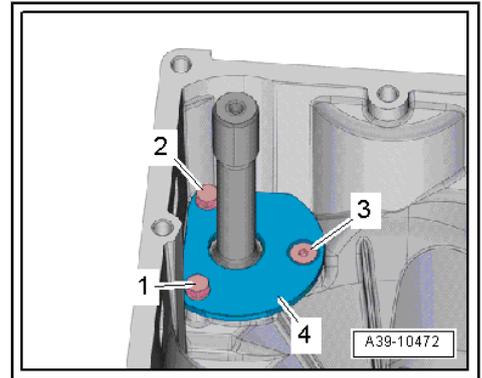


- Remove the bolts -1, 2 and 3- and the gear carrier -4-.
- Turn the differential housing around.

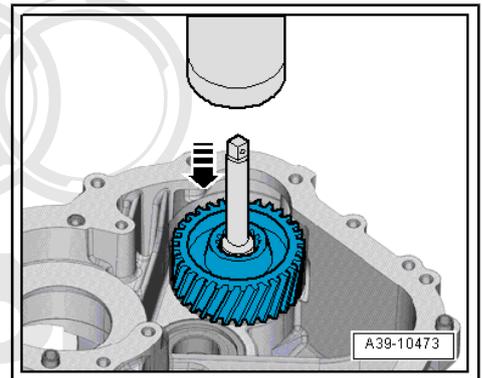
 **Caution**

Danger of personal injury and danger of causing damage to the transmission drive.

◆ *Two technicians must hold the driveshaft from underneath when it is being removed.*

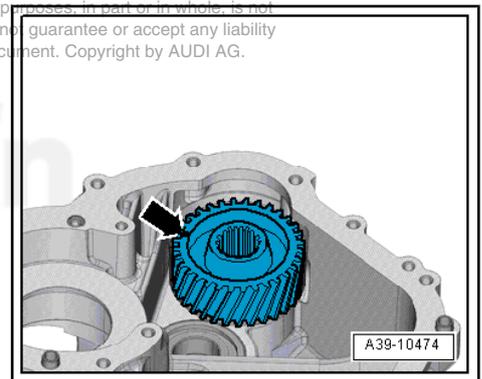


- Remove the driveshaft by hitting it downward using a drift and plastic hammer -arrow-.

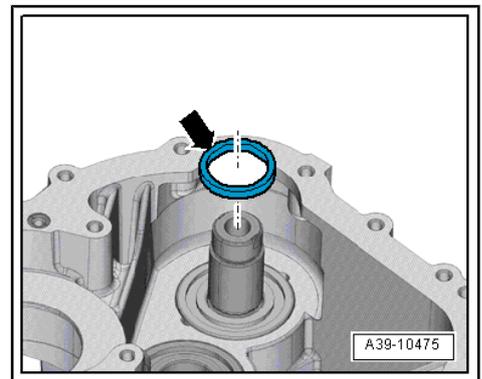


- Mark the installed position of the spur gear with a color dot -arrow- for installing later.
- Remove the spur gear.

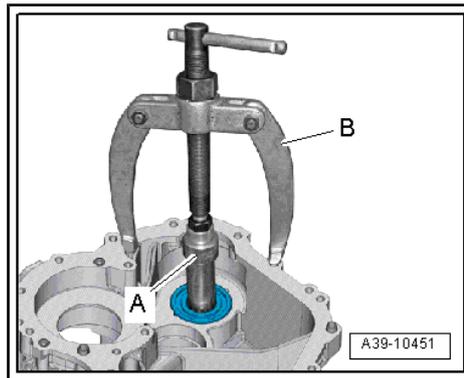
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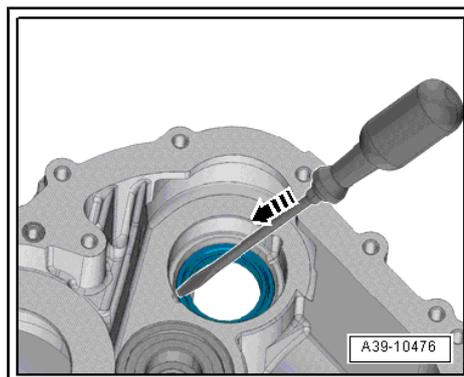
- Remove the thrust washer -arrow-.



- Over the sealing surface with tape to protect it.
- Remove the roller bearing with the Kukko - 22/2- -B- and Kukko - 21/6- -A-.



- Remove the shaft seal with a screwdriver -arrow-.

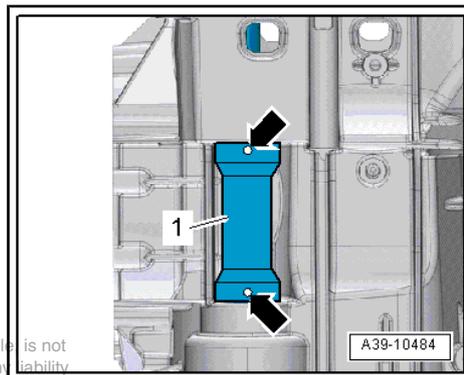


- Remove the dust protection pipe (if equipped) -1- over the driveshaft.



Note

Ignore -arrows-.

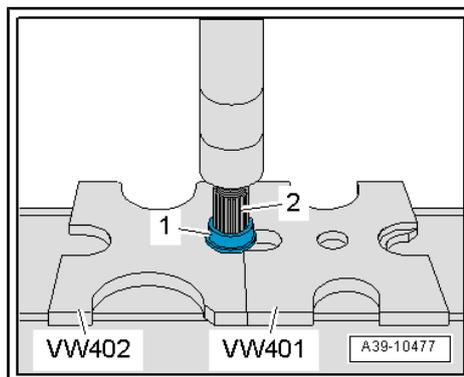


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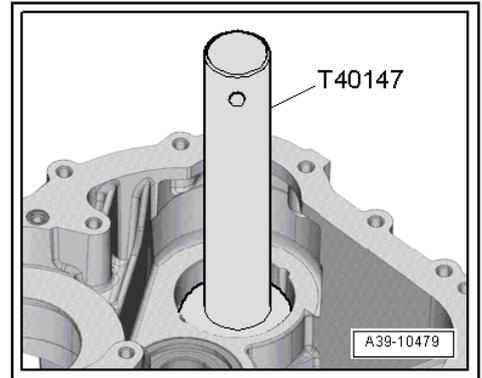
- Remove the roller bearing roller bearing -1- from the driveshaft -2-.

Installing

Vehicles without a dust protection pipe:

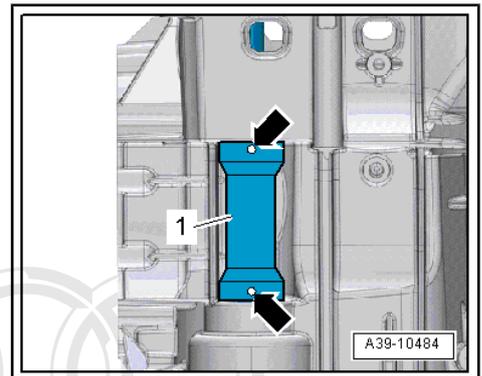


- Install the shaft seal all the way into the differential housing using -T40174- .
- The open side of the shaft seal faces the tool.

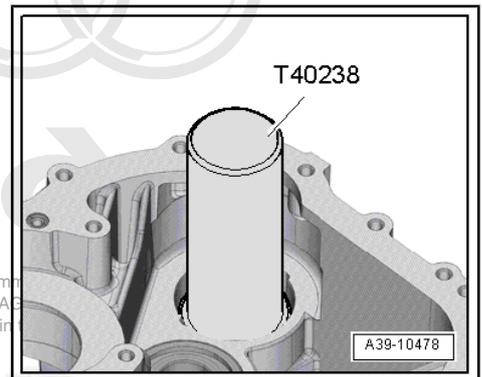


Vehicles with a Dust Protection Pipe over the Driveshaft:

- Install the dust protection pipe -1-.
- The holes -arrows- face downward.

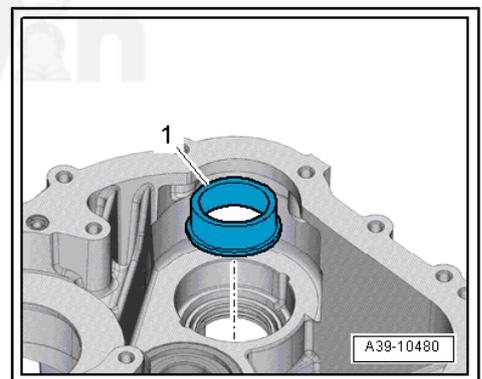


- Install the shaft seal all the way into the differential housing using -T40238- .
- The open side of the shaft seal faces the tool.

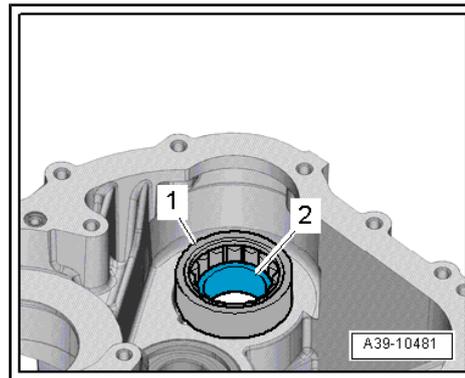


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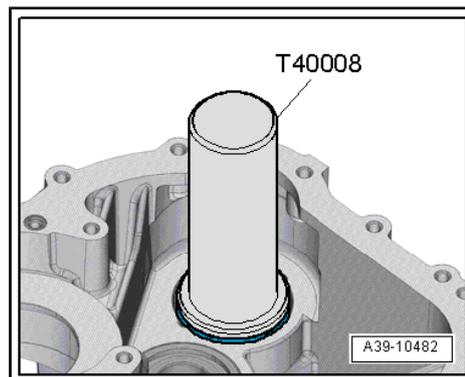
- Place the bearing inner race -1- on the shaft seal.
- The collar on the bearing ring faces the shaft seal.



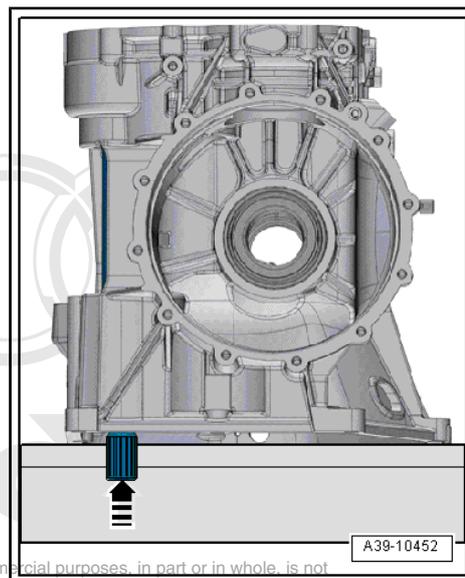
- Mount the roller bearing -1- and insert and hold the bearing inner race -2- into the roller bearing by hand.



- Install the roller bearing all the way into the differential housing using -T40008- while countering the bearing inner race from underneath at the same time.
- A second technician must counterhold the bearing inner race while installing it into the roller bearing.

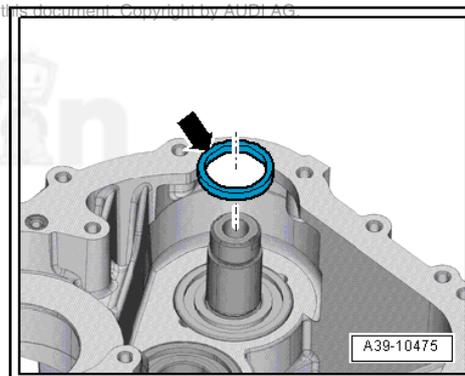


- Insert the driveshaft from the clutch side into the transmission housing and roller bearing -arrow-.



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- Place the thrust washer -arrow- on the spur gear driveshaft.



- Mount the spur gear on the driveshaft.
- Installed position: The color mark -arrow- made earlier during removal must be visible.
- Hold the driveshaft in position.

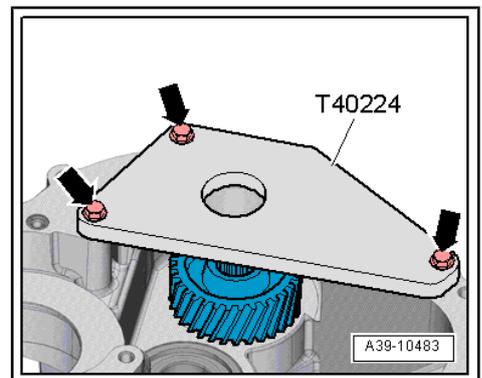
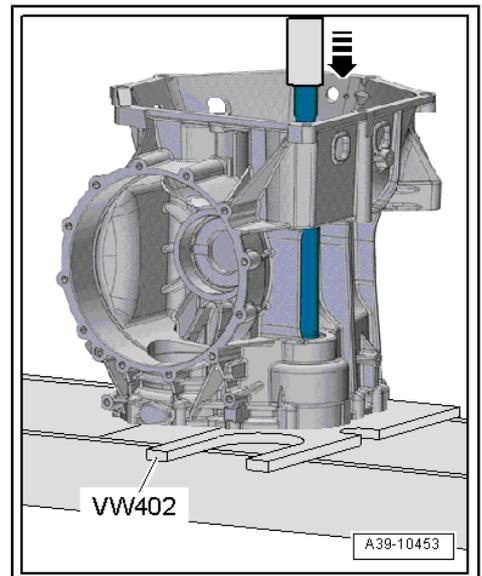
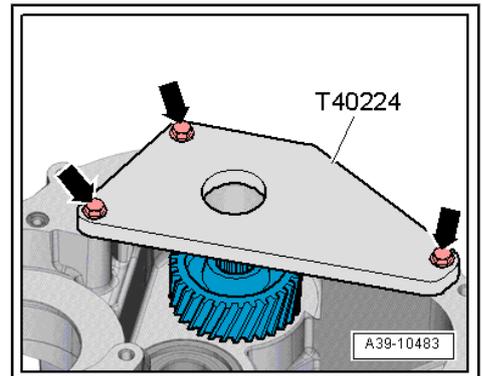
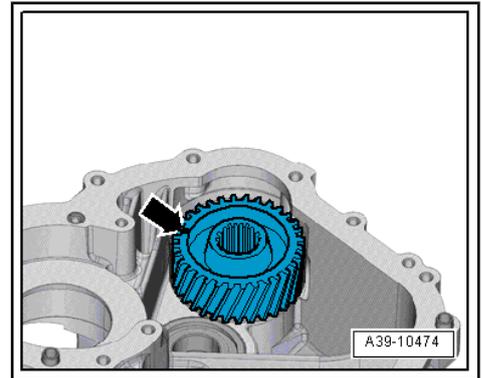
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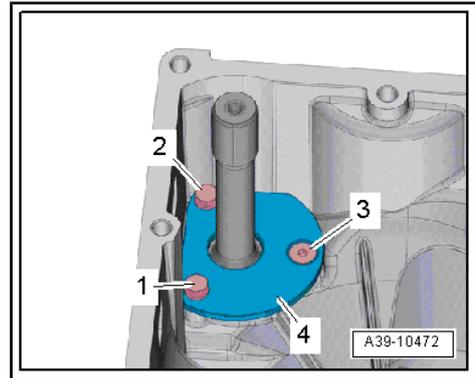
- Tighten the counterhold to the differential housing with three M8 x 25 bolts -arrows- and secure the spur gear with -T40224- .

- Turn the differential housing around.
- Place the differential housing with the pre-installed driveshaft, thrust washer and spur gear on the shop press.
- Install the driveshaft.

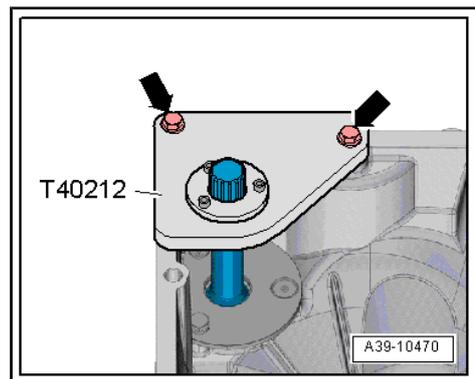
- Remove the -T40224- from underneath.



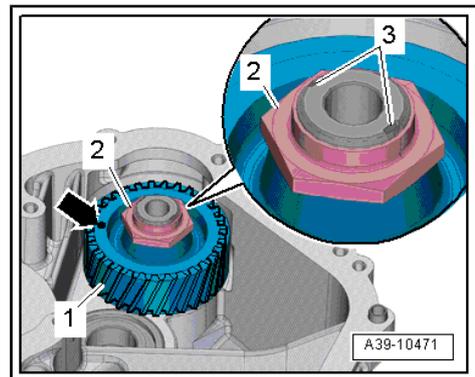
- Remove the bolts -1, 2 and 3- from the gear carrier -4-.



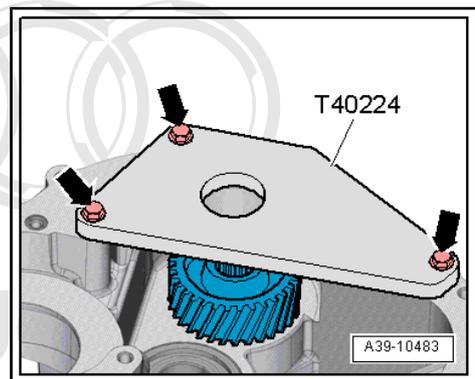
- Attach the -T40212- to the differential housing using M10 x 40 bolts -arrows- and nut and tighten it to 40 Nm.



- Turn the differential housing around.
- Tighten the nut -2- and peen it in two places -3-.



- Remove the -T40224- from underneath.



5.9 Driveshaft Motor Ball Bearing

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Special tools and workshop equipment required

- ◆ Carrier Bearing Inst. Tool - 3350-
- ◆ Puller - T10055-
- ◆ Socket AF 36 mm - T10125-

◆ Internal Puller - Kukko21/4-

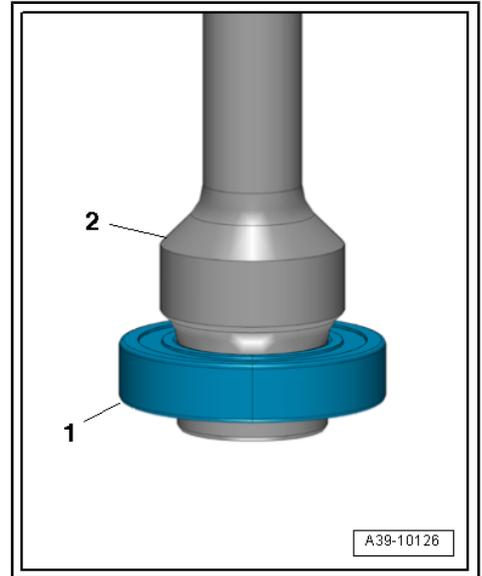
Removing

- Remove the driveshaft motor. Refer to [⇒ "5.7 Driveshaft Motor", page 220](#) .

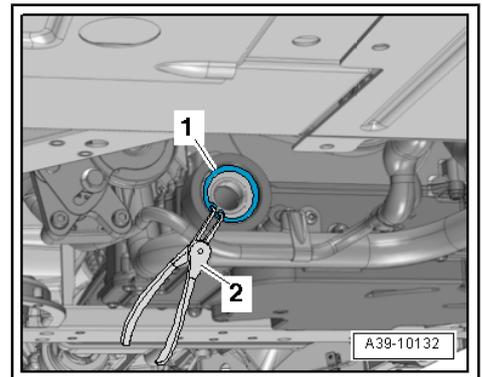
Driveshaft Rear Ball Bearing

- Carefully remove the rear ball bearing -1- from the driveshaft using a plastic mallet.

Driveshaft Front Ball Bearing



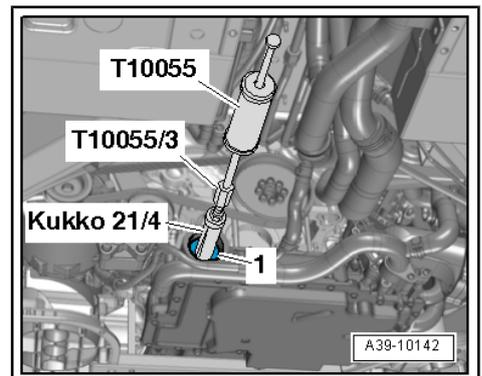
- Remove the front ball bearing circlip -1- with pliers -2-.



- Mount the -T10055- with the adapter - T10055/3- and the -Kukko 21/4- on the driveshaft front ball bearing -1- as illustrated.
- Remove the driveshaft ball bearing.

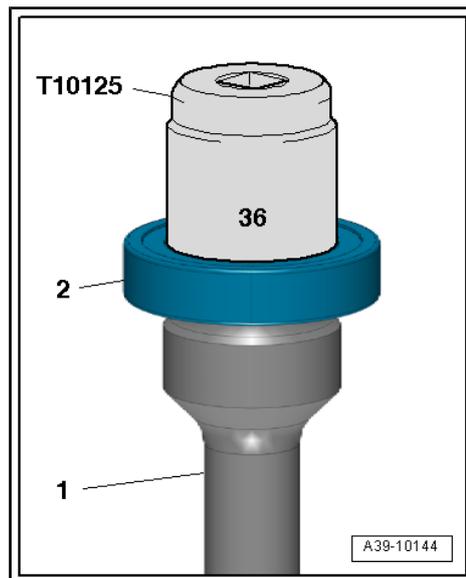
Installing

Driveshaft Rear Ball Bearing

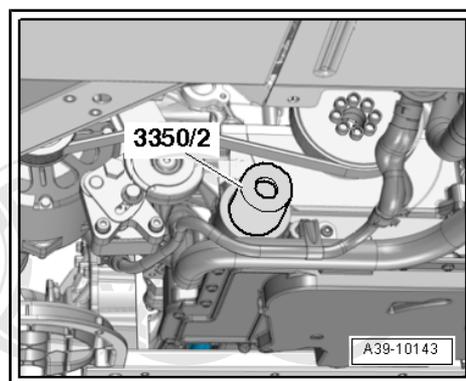


- Install the rear ball bearing -2- all the way into the driveshaft using a -T10125- .

Driveshaft Front Ball Bearing



- Install the front ball bearing on the oil pan upper section (8-cylinder engine) or on the suction module (10-cylinder engine) using -3350/2- .
- Install the driveshaft motor. Refer to [⇒ "5.7 Driveshaft Motor", page 220](#) .



5.10 Flange Shaft Seals Flange Shafts,

Special tools and workshop equipment required

- ◆ Engine/Transmission Jack - V.A.G 1383 A-
- ◆ Puller - T10055-
- ◆ Press Tool, Front Final Drive (side) - T40152-
- ◆ Sealing grease - G 052 128 A1-
- ◆ Locking fluid - AMV 185 101 A1-

Removing

Tightening specifications:

- ⇒ ["2.5 Shaft Seal Overview, Front Final Drive", page 206](#)
- ⇒ ["2.6 Front Final Drive Overview", page 207](#)

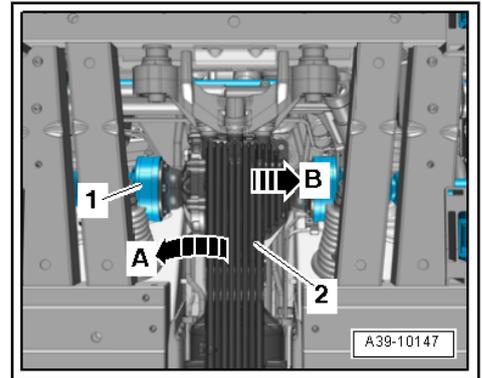


Note

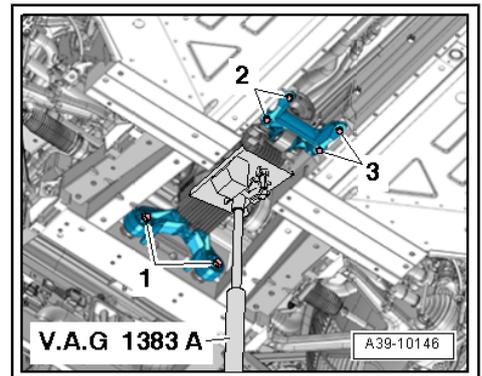
- ◆ *The right and left seals are removed the same way.*
- ◆ *Removing the right seal is described.*

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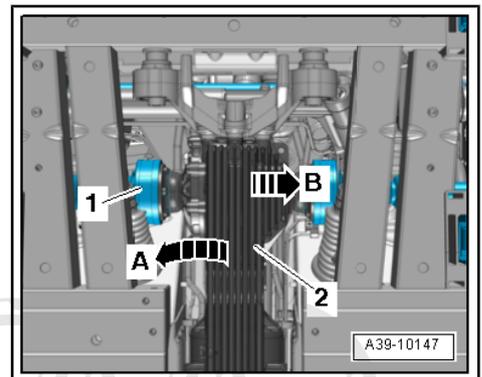
- Remove the drive axle -1- from the right flange shaft. Refer to => Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .
- Place the -V.A.G 1383 A- under the front final drive and support it.



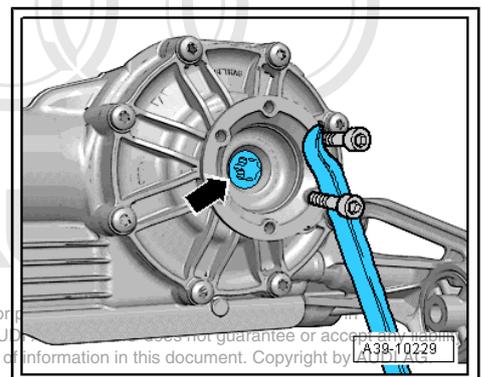
- Remove the bolts -1- from the front crossmember.



- Move the front final drive -2- to the left -arrow B-.
- Move the right drive axle -1- to the rear.

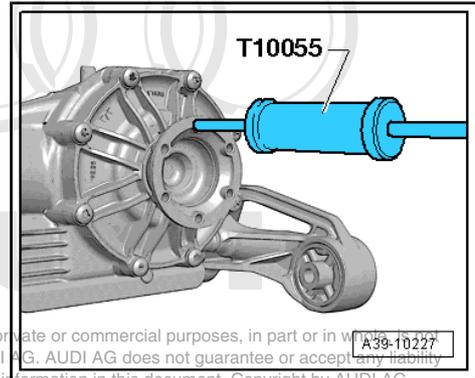


- Remove the flange shaft mounting bolt -arrow- by installing two M8 bolts in the flange shaft and counterholding with a lever.



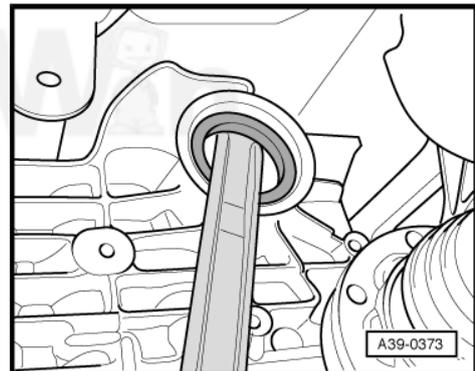
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- Remove the flange shaft using the -T10055- .

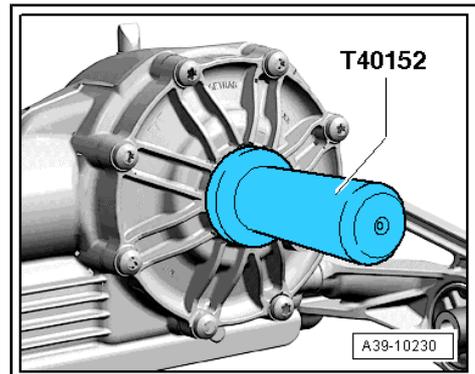


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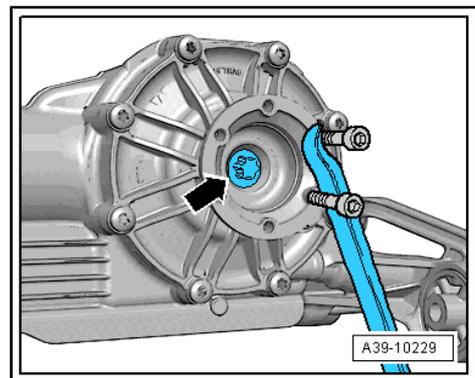
- Pry out sealing ring with a suitable lever.



- Coat outer edge of the seal with axle oil.
- Fill the space between the sealing and dust lip half way with sealing grease - G 052 128 A1- .
- Drive in new sealing ring with the -T40152- to stop, do not tilt sealing ring.



- Install the flange shaft.
- Clean any grease residue on the bolt -arrow- and then coat it lightly with locking fluid - AMV 185 101 A1- .
- Tighten the bolt -arrow- => [Item 4 \(page 206\)](#) .
- Attach the drive axle to the front final drive flange shaft. Refer to => Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .
- Tighten the front crossmember => [Item 1 \(page 207\)](#) .
- Check the axle oil level in the front final drive. Refer to => ["1.1 Front Final Drive Oil Level, Checking", page 201](#) .



5.11 Driveshaft Flange Sealing Ring

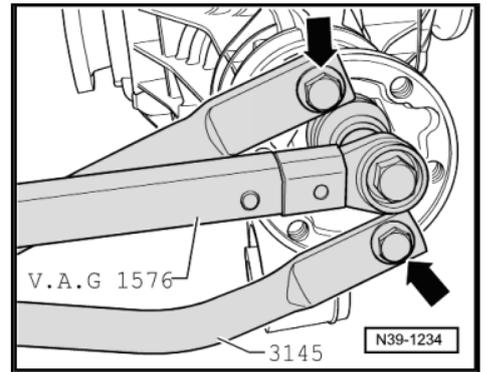
Special tools and workshop equipment required

- ◆ Arbor - VW 434-
- ◆ Seal Driver-Front Wheel Bearing - 3143-
- ◆ Handle-Hold Dr. Shaft Flange - 3145-

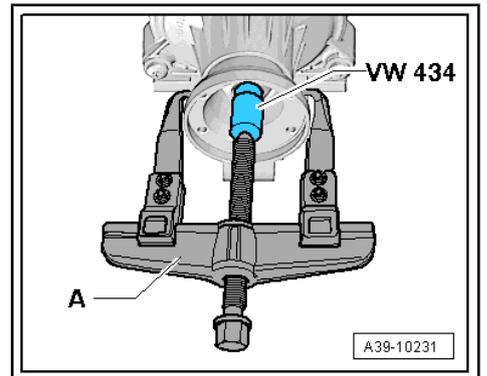
- ◆ Torque Wrench - V.A.G 1576-
- ◆ Pulling Hook - T20143-
- ◆ Press Tool, Front Final Drive (rear) - T40153-
- ◆ -1- Two-Arm Puller - Kukko 20/10-
- ◆ M8 x 25 bolt (quantity: 2)
- ◆ Protective gloves
- ◆ Sealing grease - G 052 128 A1-

Procedure

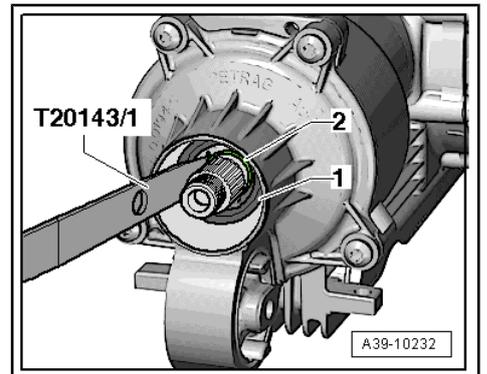
- Front final drive removed, refer to [⇒ "5.12 Front Final Drive", page 234](#) .
- Attach the -3145- to the driveshaft flange -arrows- with two M8 x 25 bolts.
- Remove the nut from the driveshaft flange.



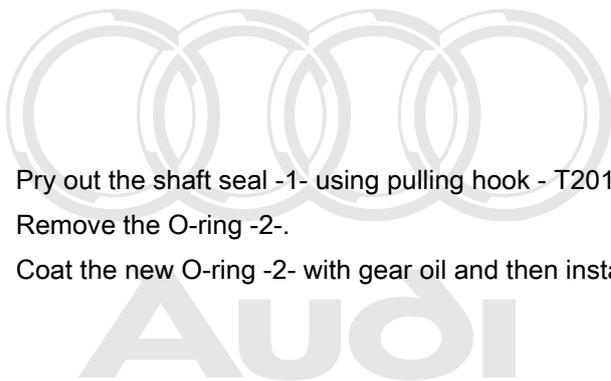
- Remove the driveshaft flange.
- A - Two-arm puller, for example, -Kukko 20/10-



- Pry out the shaft seal -1- using pulling hook - T20143/1- .
- Remove the O-ring -2-.
- Coat the new O-ring -2- with gear oil and then install it.



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- Coat outer edge of the seal with axle oil.
- Fill the space between the sealing and dust lip half way with sealing grease - G 052 128 A1- .
- Install the new shaft seal using the -T40153- . Be careful not to tilt it.

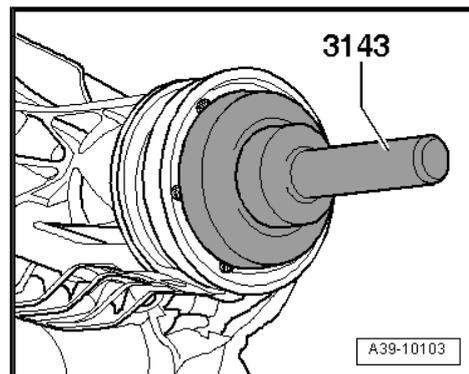
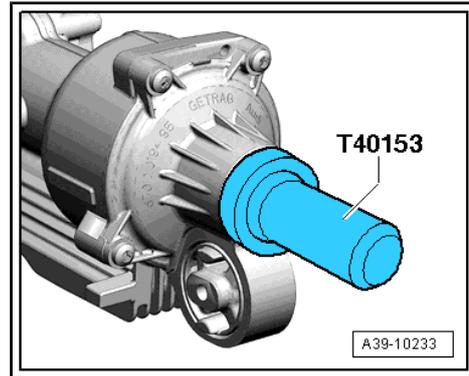


- Warm the driveshaft flange to a maximum of 80 °C (176 °F).

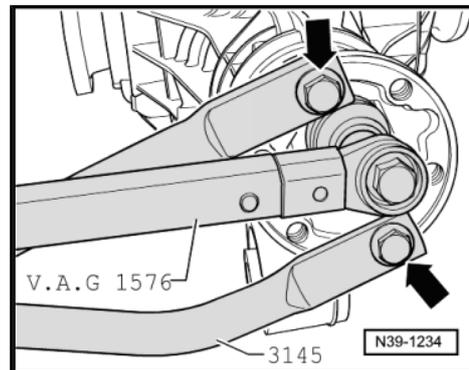


DANGER!
Wear safety gloves.

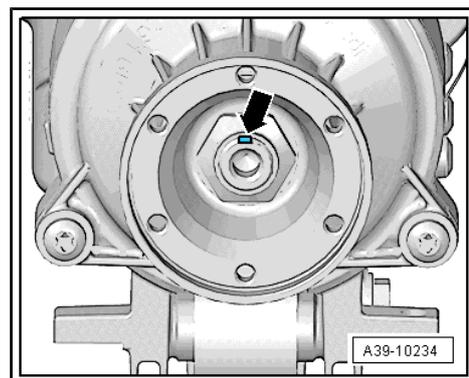
- Remove the driveshaft flange with -3143-



- Install the -3145- on the driveshaft flange with two M8 x 25 bolts -arrows-.
- Tighten the nut on the driveshaft flange. Tightening specification ⇒ [Item 5 \(page 206\)](#) .



- Peen the nut on the driveshaft flange -arrow-.
- Install the front final drive. Refer to ⇒ ["5.12 Front Final Drive", page 234](#) .
- Check the axle oil level in the front final drive. Refer to ⇒ ["1.1 Front Final Drive Oil Level, Checking", page 201](#) .



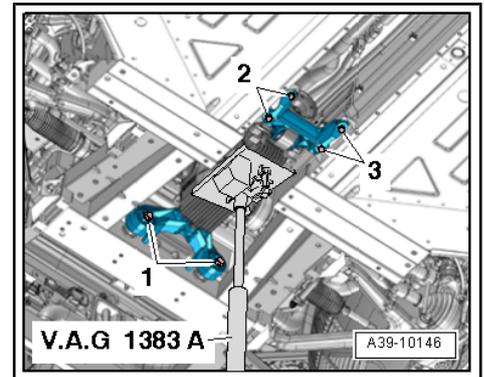
5.12 Front Final Drive

Special tools and workshop equipment required

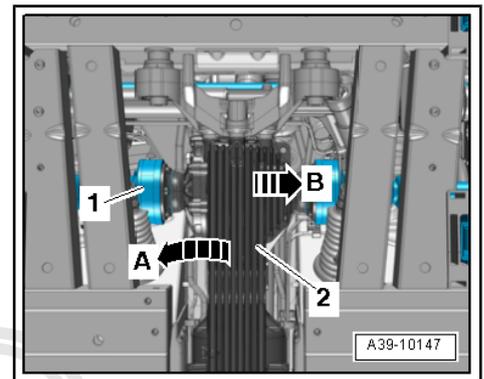
- ◆ Engine/Transmission Jack - V.A.G 1383 A-

Removing

- Remove the driveshaft on the front final drive and secure it at the top. Refer to [⇒ "5.17 Driveshaft on Front Final Drive", page 240](#) .
- Remove the driveshaft from the front final drive flange shaft. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .
- Place the -V.A.G 1383 A- under the front final drive and support it.
- Remove the bolts -2- and -3- from the rear crossmember.
- Remove the bolts -1- connecting the front crossmember to the front final drive.



- Move the front final drive -2- to the left -arrow B-.
- Move the right drive axle -1- to the rear.
- To loosen the left flange shaft from the left drive axle, first lower the right side of the front final drive -arrow A-.
- Secure the front final drive with a strap and continue lowering with the -V.A.G 1383 A- .



Installing

Install in reverse order, paying attention to the following:

- Tightening specification, refer to [⇒ "2.6 Front Final Drive Overview", page 207](#) .



Note

Follow all the information about the driveshaft. Refer to [⇒ "2.8 Driveshaft Overview", page 209](#) .

- Attach the drive axle to the front final drive flange shaft. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .
- Attach the driveshaft. Refer to [⇒ "5.17 Driveshaft on Front Final Drive", page 240](#) .
- Check the axle oil level in the front final drive. Refer to [⇒ "1.1 Front Final Drive Oil Level, Checking", page 201](#) .

5.13 Bonded Rubber Bushing on Front Final Drive

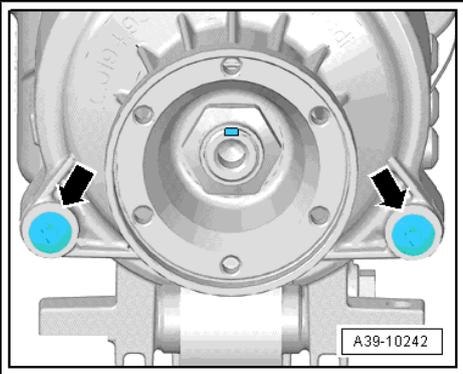
Special tools and workshop equipment required

- ◆ Arbor Thrust Piece - VW 554-
- ◆ Press Tool - 2039-
- ◆ Assembly Tool - 3301-

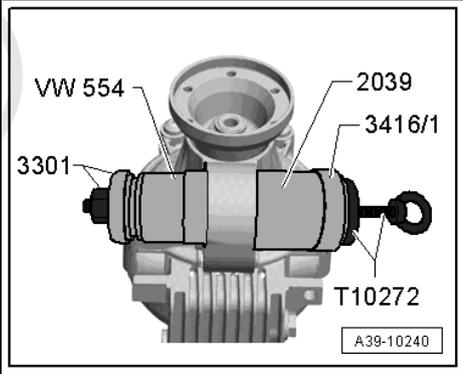
- ◆ -3416/1- from the Rubber Sleeve Tool - 3416-
- ◆ Lifting Device - T10272-
- ◆ -T10356/6- from the Assembly Tool - T10356-

Procedure

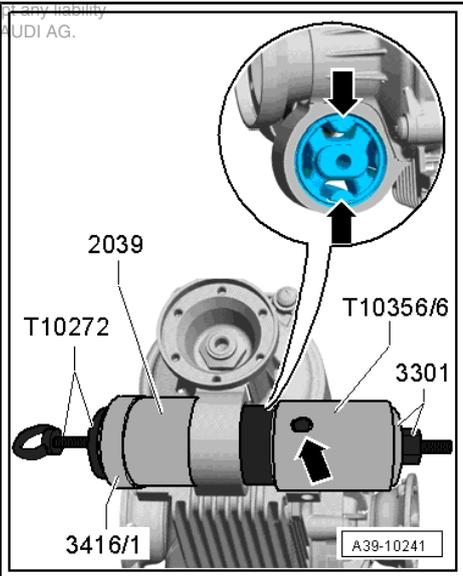
- Remove the front final drive. Refer to
 => ["5.12 Front Final Drive", page 234](#) .
- Remove both lower bolts on the final drive cover -arrows-.



- Remove the rubber bonded bushing.
- Bonded rubber bushing, installing.
 Installed position:



- ◆ Both of the protruding knobs -arrows- are perpendicular to each other.



5.14 Crossmember on Front Final Drive

Special tools and workshop equipment required

- ◆ Engine/Transmission Jack - V.A.G 1383 A-

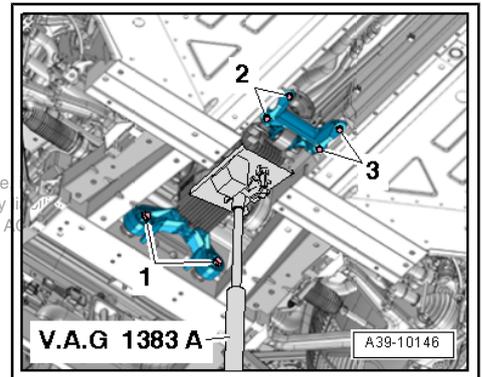
Removing

- Place the -V.A.G 1383 A- under the front final drive and support it.
- Remove the bolts -1- from the front crossmember.

Note

Do not loosen -2- and -3-.

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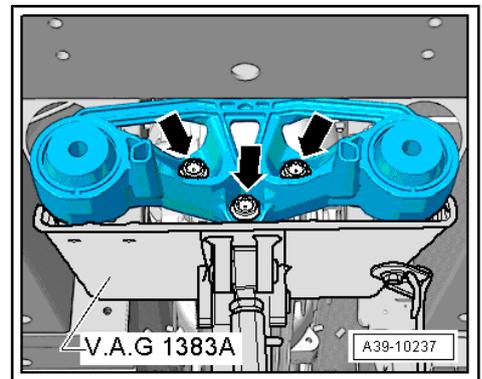


- Lower the front final drive evenly until the bolts -arrows- are accessible.
- Remove the bolts -arrows- and the crossmember.

Installing

Install in reverse order of removal.

- Tightening specification; refer to [⇒ "2.6 Front Final Drive Overview", page 207](#) .



5.15 Bonded Rubber Bushing on Front Crossmember

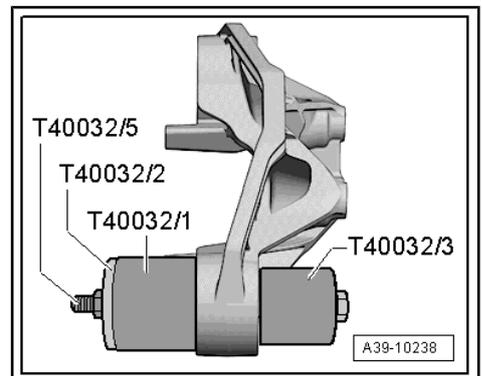
Special tools and workshop equipment required

- ◆ Removal and Assembly Tool - T40032-

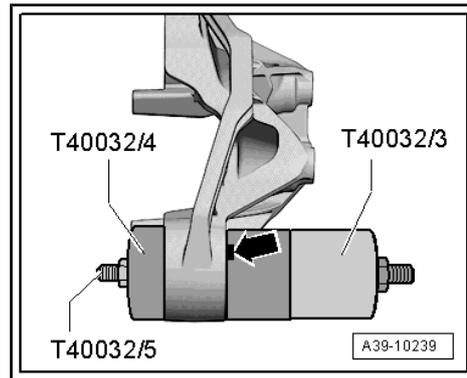
Procedure

- Remove the front crossmember. Refer to [⇒ "5.14 Crossmember on Front Final Drive", page 236](#) .
- Remove the bonded rubber bushing.

Installed position:



- ◆ The notch on the bonded rubber bushing -arrow- faces the direction of travel and points up vertically.



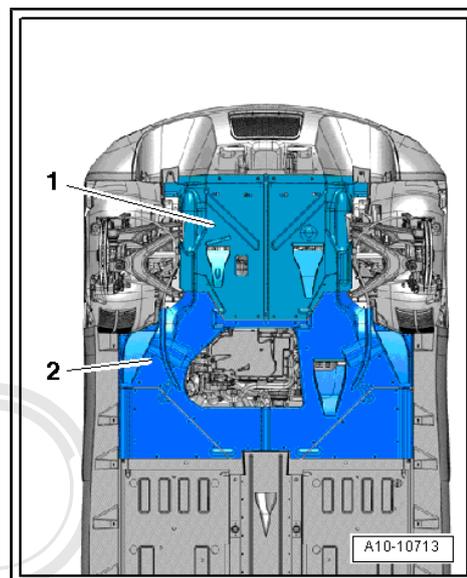
5.16 Driveshaft

Special tools and workshop equipment required

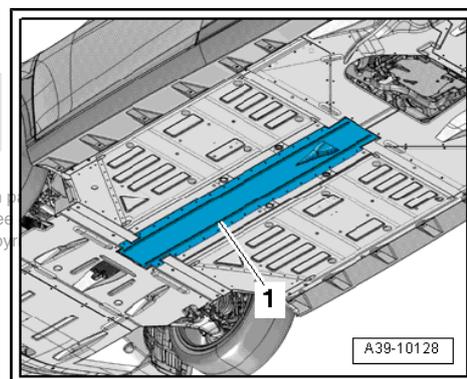
- ◆ Counterhold Tool Touareg V10 - T10172- with Adapter - T10172/7-

Removing

- Remove the front noise insulation -2-. Refer to => Body Exterior; Rep. Gr. 66 ; Removal and Installation .



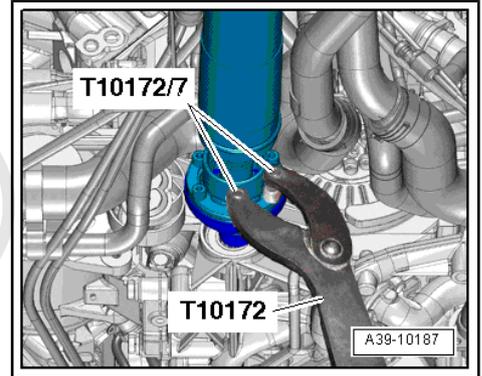
- Remove the center tunnel cover -1-.



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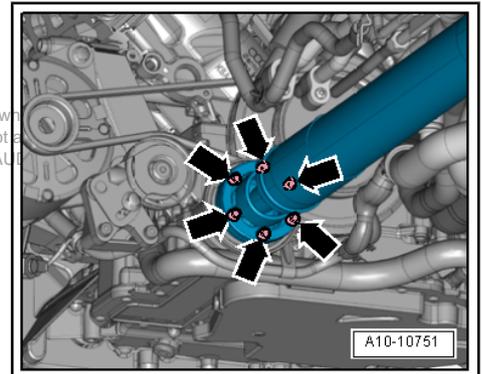
 **Note**

To loosen or tighten the driveshaft bolts -1- use -T10172- and -T10172/7-.



- Remove the bolts -arrows- connecting the driveshaft to the driveshaft.

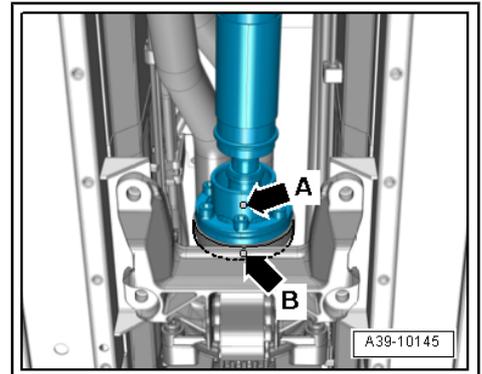
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- Check if there is a factory marking (paint) on the driveshaft. If not, identify position of driveshaft CV joint -arrow A- to driveshaft flange at front final drive -arrow B- with paint.

 **Note**

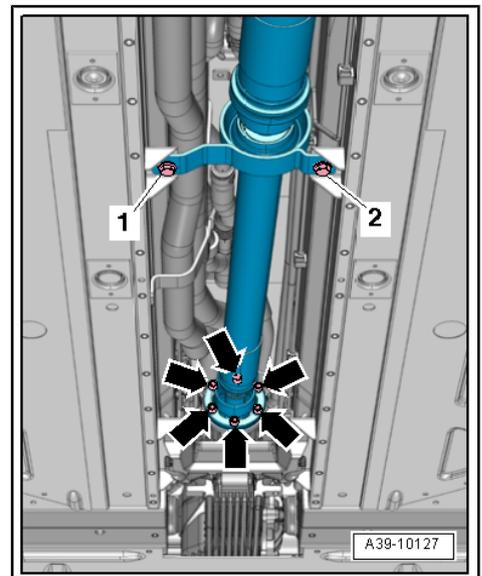
Marking is only necessary if the same driveshaft will be installed.



- Remove the bolts -arrows- that connect the driveshaft to the front final drive.
- Remove the bolts -1- and -2- and the driveshaft.

 **Note**

Always transport and store driveshaft in its extended position.

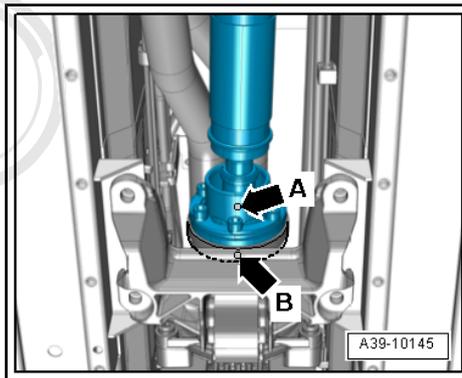


Installing

- Tightening specification, refer to [⇒ "2.8 Driveshaft Overview", page 209](#).

i Note

- ◆ To avoid imbalance, driveshaft and driveshaft flange must be installed on front final drive so that factory markings or markings applied later on driveshaft CV joint -arrow A- and driveshaft flange at front final drive -arrow B- align.
- ◆ If a new driveshaft is installed and the factory marking on the driveshaft flange on the front final drive is no longer visible, measure the radial run-out at the driveshaft flange ⇒ **“4.1 Radial Run-Out on Driveshaft Flange, Measuring and Marking”, page 212** and transfer the color marking on the driveshaft CV joint to the driveshaft flange on the front final drive.



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Install in reverse order of removal paying attention to the following:

- Install the front noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .

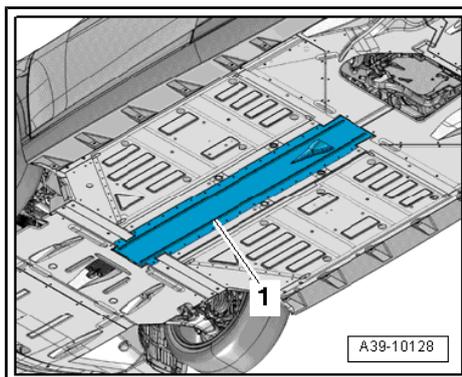
5.17 Driveshaft on Front Final Drive

Special tools and workshop equipment required

- ◆ Counterhold Tool Touareg V10 - T10172- with Adapter - T10172/7-

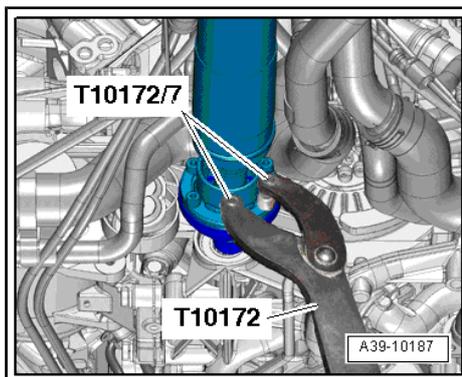
Removing

- Remove the center tunnel cover -1-.

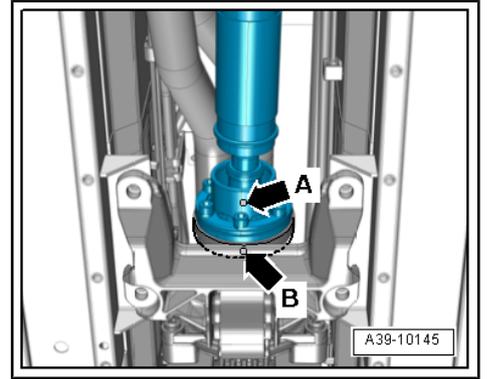


i Note

To loosen or tighten the driveshaft bolts -1- use -T10172- and -T10172/7- .



- Check if there is a factory marking (paint) on the driveshaft. If not, identify position of driveshaft CV joint -arrow A- to driveshaft flange at front final drive -arrow B- with paint.



- Remove the bolts -arrows- that connect the driveshaft to the front final drive.
- Secure the driveshaft above.

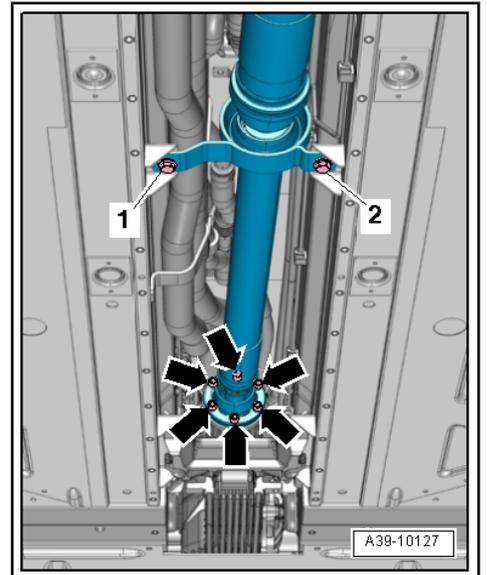
 **Note**

Do not loosen the bolts -1- and -2-.

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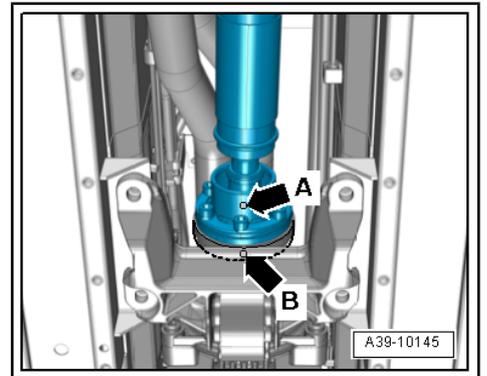
Install in reverse order, paying attention to the following:

- Tightening specification; refer to ["2.8 Driveshaft Overview", page 209](#).



 **Note**

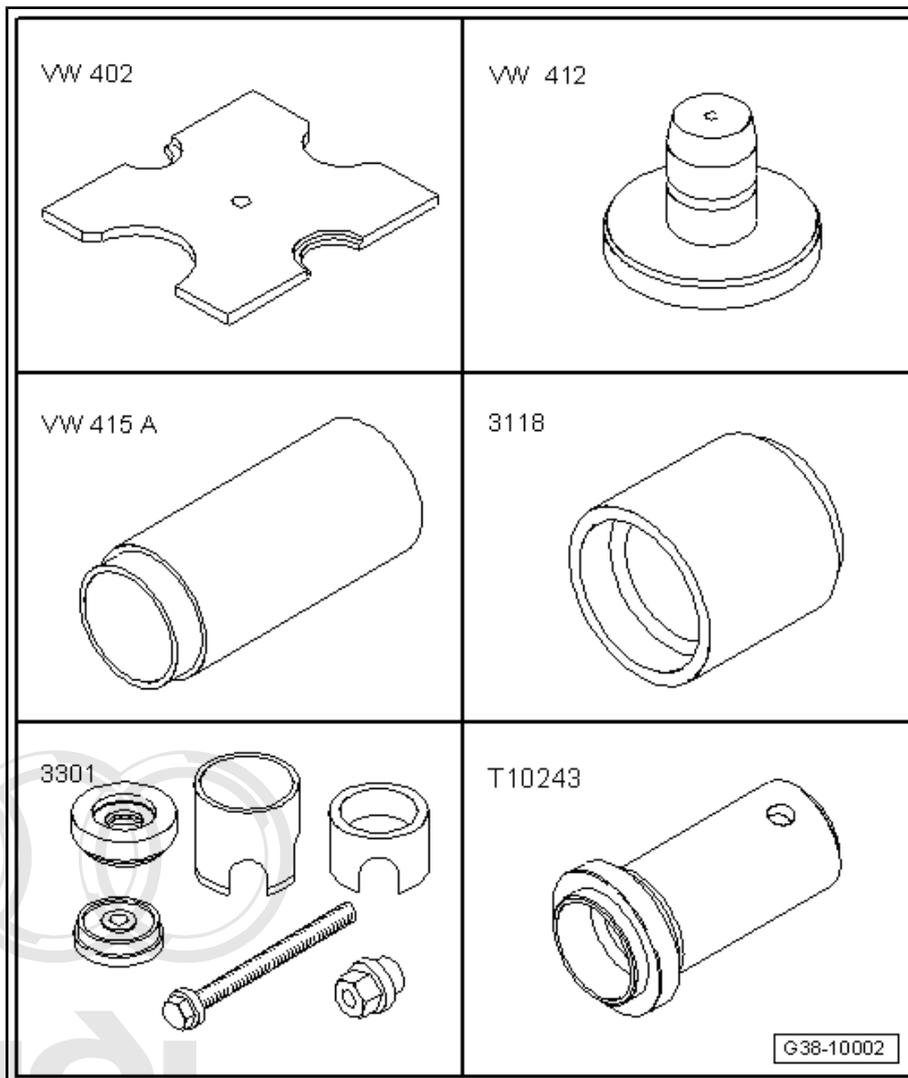
To avoid imbalance, driveshaft and driveshaft flange must be installed on front final drive so that factory markings or markings applied later on driveshaft CV joint -arrow A- and driveshaft flange at front final drive -arrow B- align.



6 Special Tools

Special tools and workshop equipment required

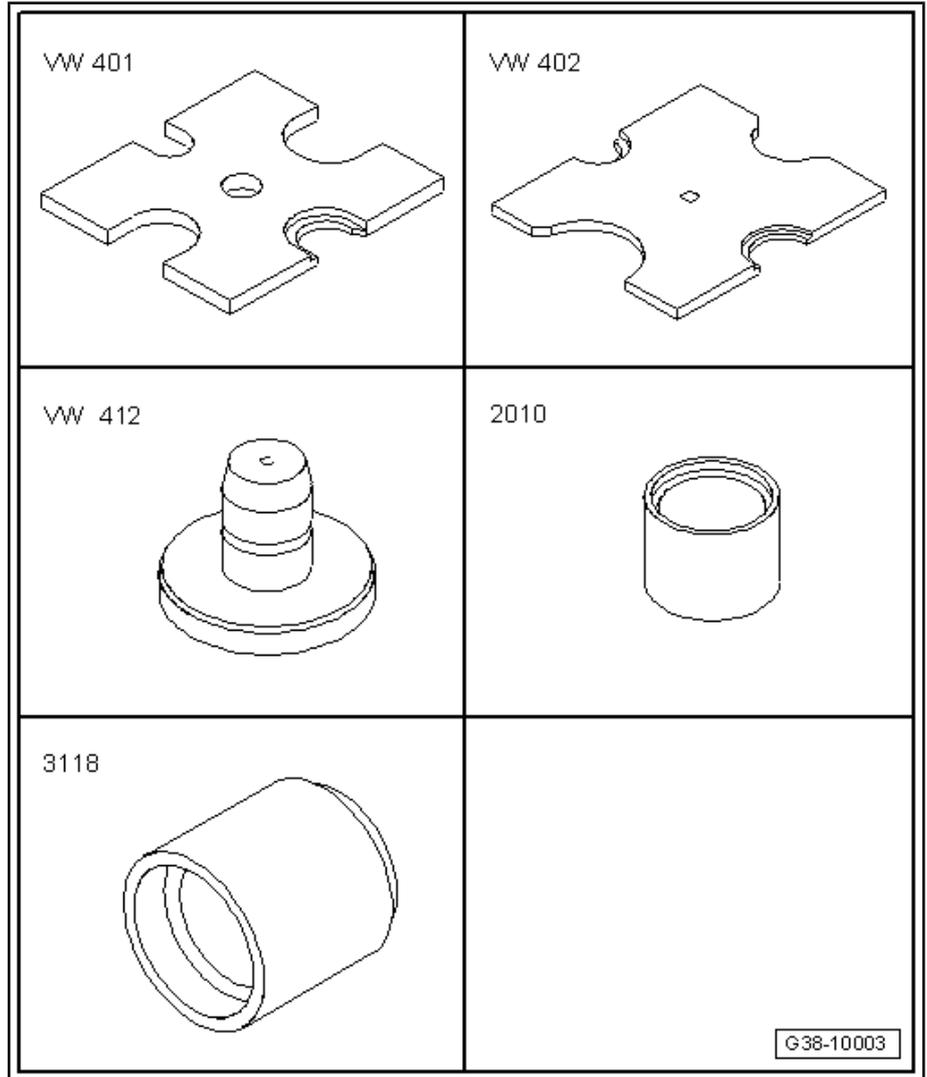
- ◆ Thrust Plate - VW 402-
- ◆ Thrust Disc - VW 412-
- ◆ Tube 60 mm Dia. - VW 415 A-
- ◆ Press Support - 3118-
- ◆ -3301/4- from the Assembly Tool - 3301-
- ◆ Thrust Piece - T10243-



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Special tools and workshop equipment required

- ◆ Thrust Plate - VW 401-
- ◆ Thrust Plate - VW 402-
- ◆ Thrust Disc - VW 412-
- ◆ Sleeve - 2010-
- ◆ Press Support - 3118-



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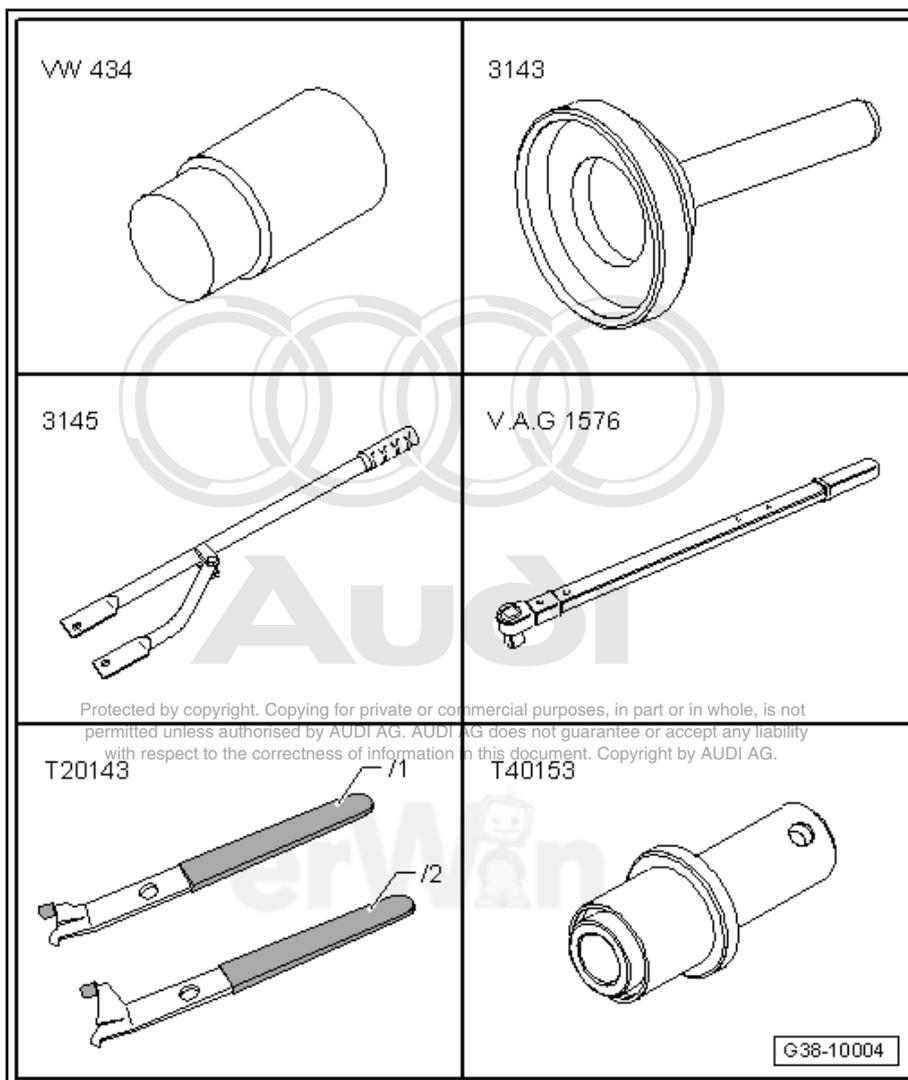
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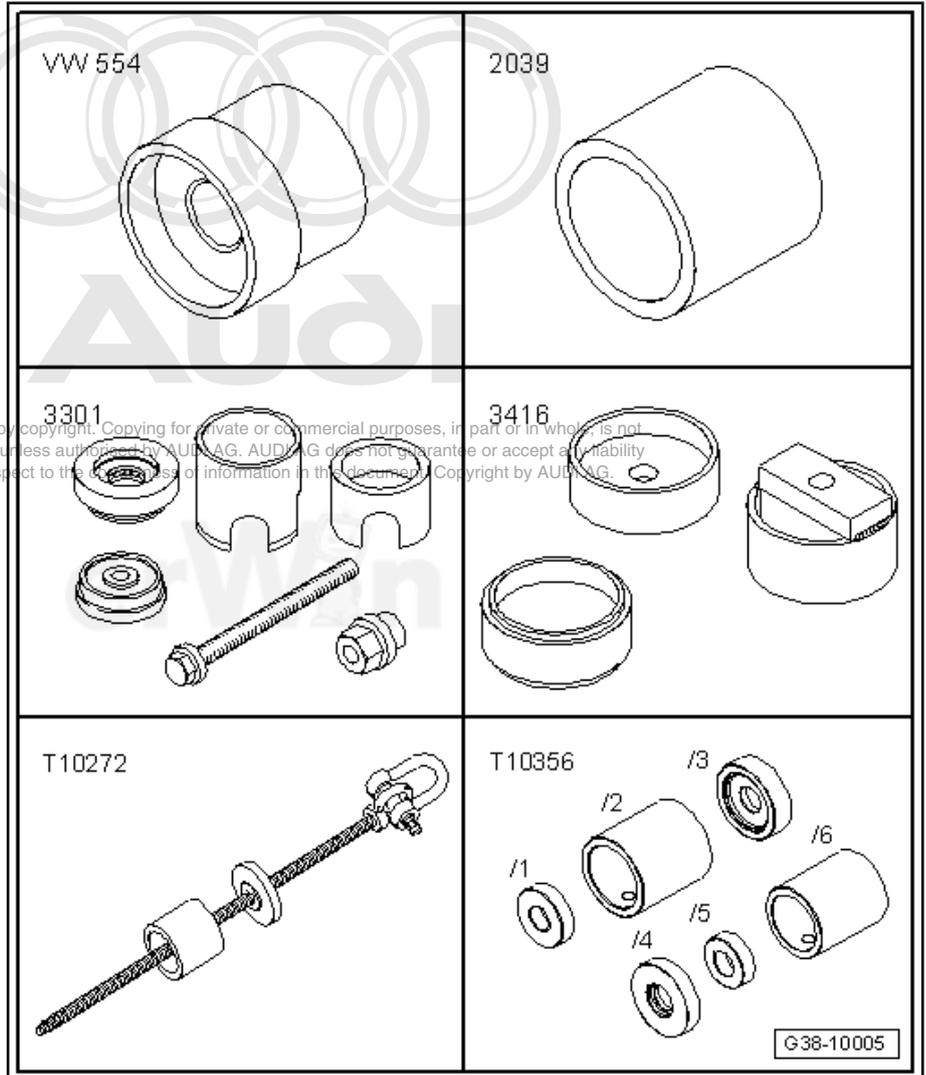
Special tools and workshop equipment required

- ◆ Arbor - VW 434-
- ◆ Seal Driver-Front Wheel Bearing - 3143-
- ◆ Handle-Hold Dr.Shaft Flange - 3145-
- ◆ Torque Wrench - V.A.G 1576-
- ◆ Pulling Hook - T20143-
- ◆ Press Tool, Front Final Drive (rear) - T40153-



Special tools and workshop equipment required

- ◆ Arbor Thrust Piece - VW 554-
- ◆ Press Tool - 2039-
- ◆ Assembly Tool - 3301-
- ◆ -3416/1- from the Rubber Sleeve Tool - 3416-
- ◆ Lifting Device - T10272-
- ◆ -T10356/6- from the Assembly Tool - T10356-

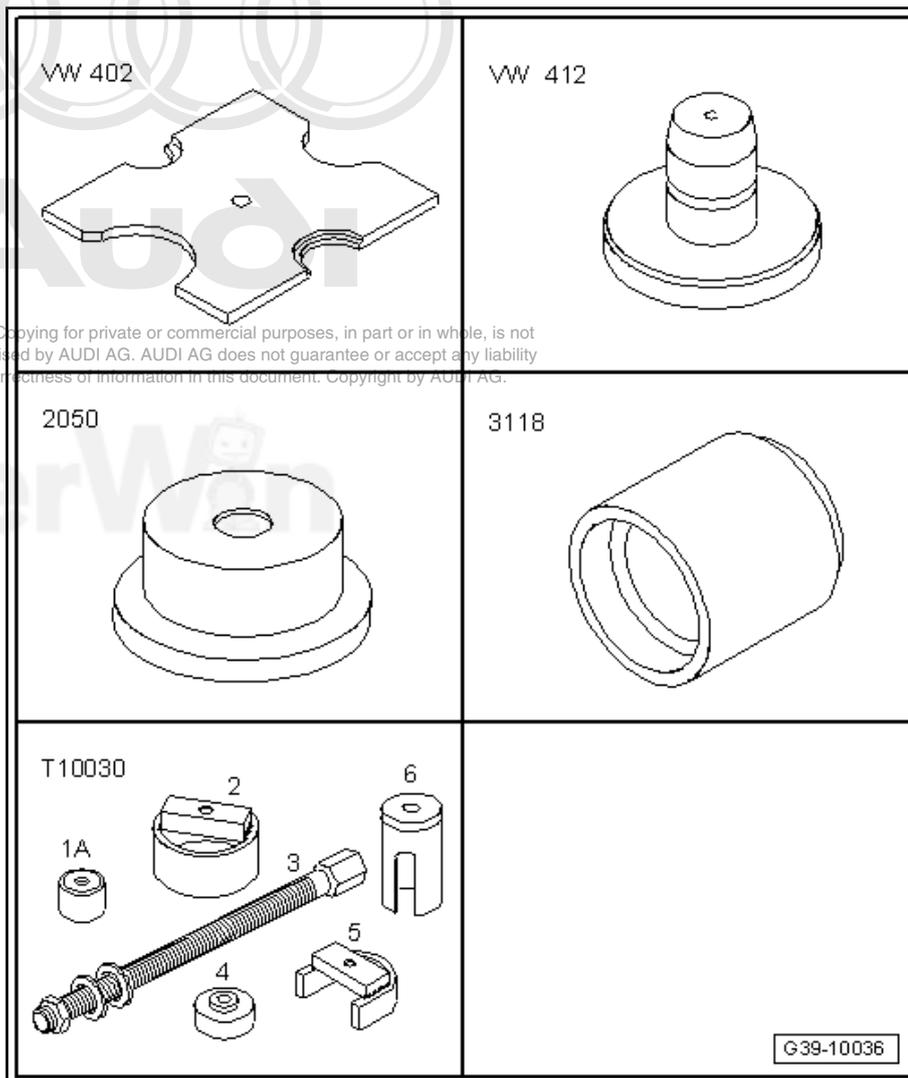




Special tools and workshop equipment required

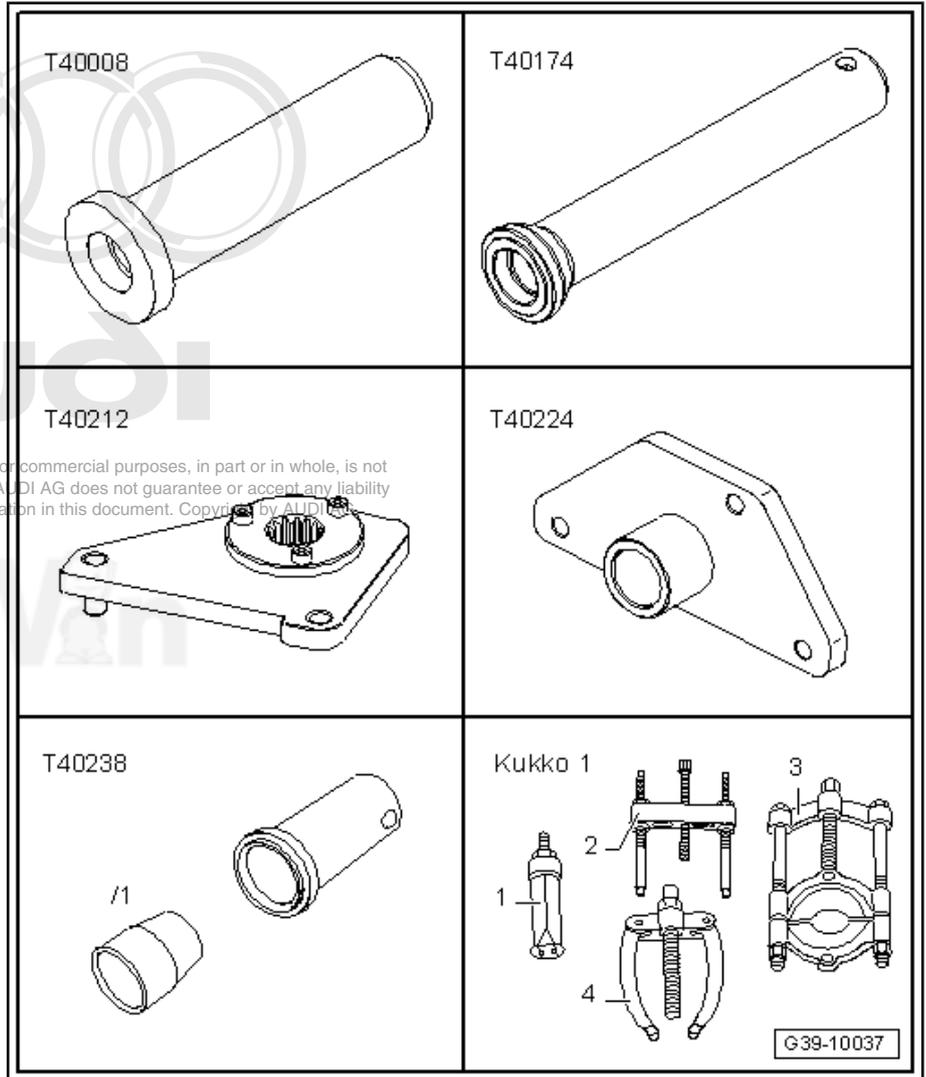
- ◆ Thrust Plate - VW 402-
- ◆ Thrust Disc - VW 412-
- ◆ Thrust Plate - 2050-
- ◆ Press Support - 3118-
- ◆ -T10030/2- from the Assembly Tool - T10030-

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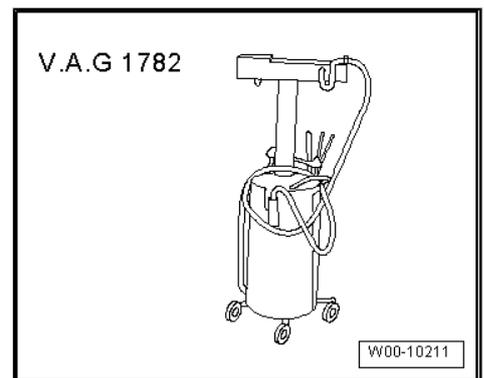


- ◆ Thrust Piece - T40008-
- ◆ Thrust Piece - T40174-
- ◆ Counterhold Tool - T40212-
- ◆ Counterhold Tool - T40224-
- ◆ Subframe Support Assembling Device - T40238-
- ◆ -1- Internal Puller (36 to 46 mm) - Kukko 21/6-
- ◆ -4- Counter Support - Kukko 22/2-

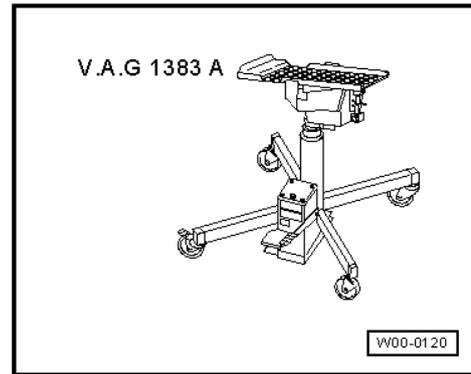
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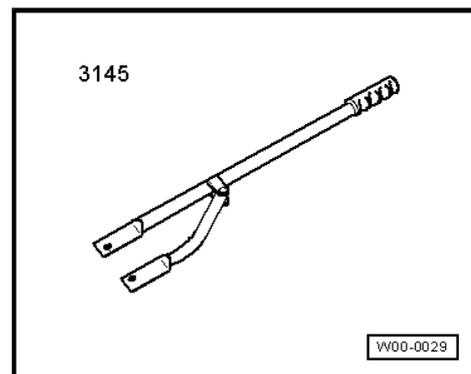
- ◆ Oil Collecting and Extracting Device - V.A.G 1782-



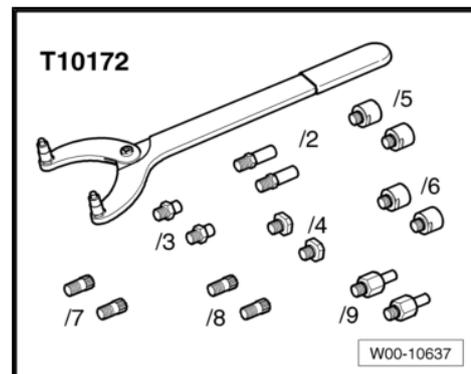
◆ Engine/Transmission Jack - V.A.G 1383 A-



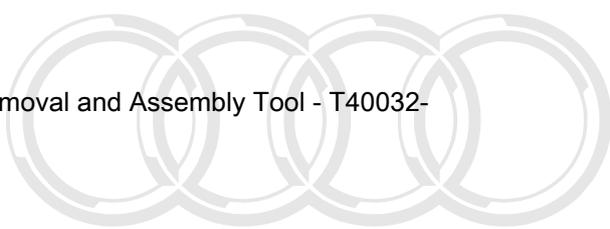
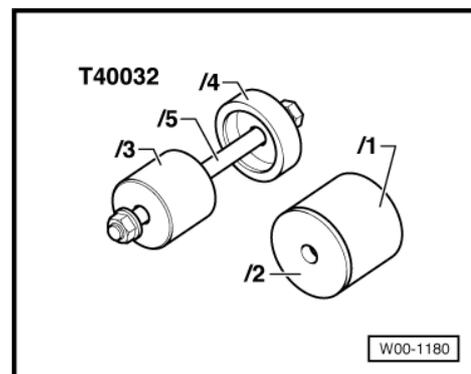
◆ Handle-Hold Dr.Shaft Flange - 3145-



◆ Counterhold Tool Touareg V10 - T10172- with Adapter - T10172/7-



◆ Removal and Assembly Tool - T40032-

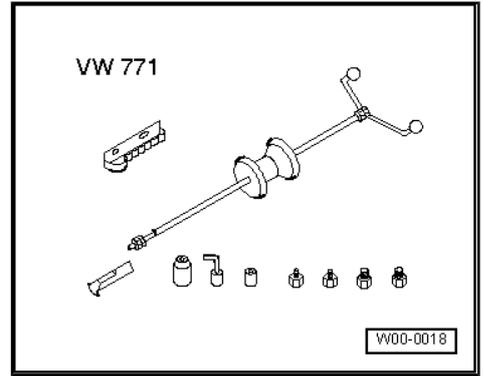


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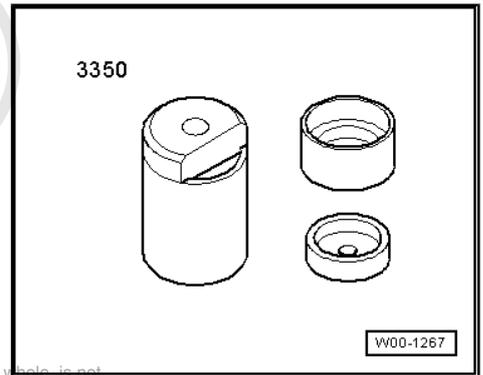
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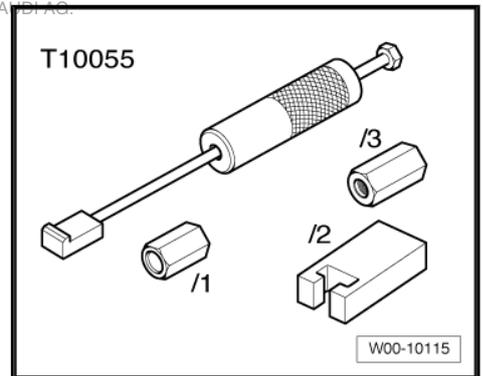
◆ Slide Hammer-Complete Set - VW 771-



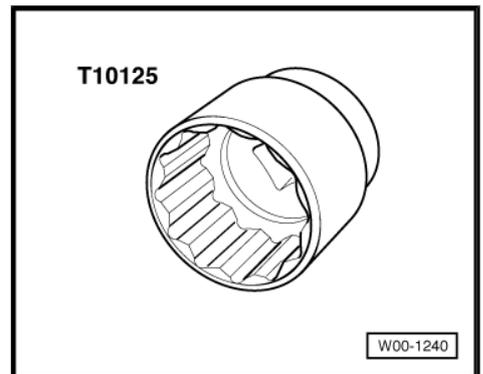
◆ Carrier Bearing Inst. Tool - 3350-



◆ Puller - T10055-

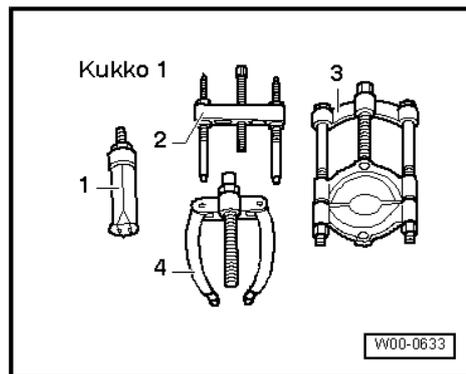


◆ Socket AF 36 mm - T10125-

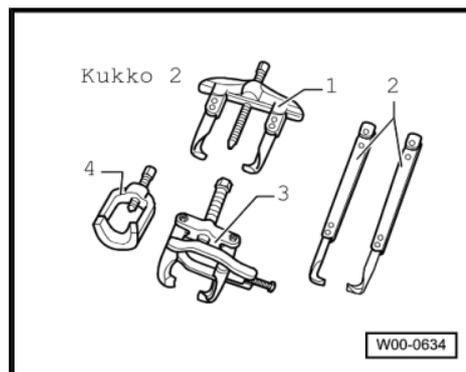


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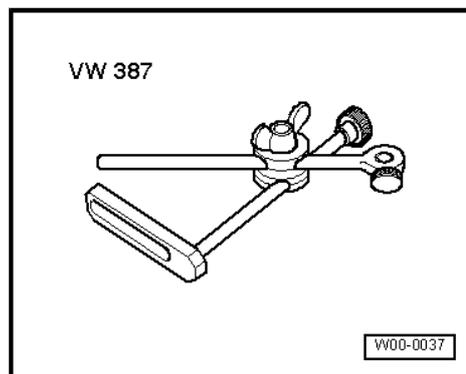
- ◆ -1- Internal Puller - Kukko21/4-



- ◆ -1- Two-Arm Puller - Kukko 20/10-



- ◆ Dial Gauge Holder - VW 387-



- ◆ Not illustrated:
- ◆ Dial Gauge
- ◆ Thrust Piece - T40007-
- ◆ Press Tool, Front Final Drive (side) - T40152-

Edition A005R800821 LF 995764, 02/04/2014 - JLH



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7 Revision History

Re- vi- sion	Date	Job Type	Feedback #	Notes	Editor
3					
2					
1	3/10/2014	Feedback	995764	Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by AUDI AG. AUDI AG does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by AUDI AG.	Jim Harder

Cautions & Warnings

Please read these WARNINGS and CAUTIONS before proceeding with maintenance and repair work. You must answer that you have read and you understand these WARNINGS and CAUTIONS before you will be allowed to view this information.

- If you lack the skills, tools and equipment, or a suitable workshop for any procedure described in this manual, we suggest you leave such repairs to an authorized Audi retailer or other qualified shop. We especially urge you to consult an authorized Audi retailer before beginning repairs on any vehicle that may still be covered wholly or in part by any of the extensive warranties issued by Audi.
- Disconnect the battery negative terminal (ground strap) whenever you work on the fuel system or the electrical system. Do not smoke or work near heaters or other fire hazards. Keep an approved fire extinguisher handy.
- Audi is constantly improving its vehicles and sometimes these changes, both in parts and specifications, are made applicable to earlier models. Therefore, part numbers listed in this manual are for reference only. Always check with your authorized Audi retailer parts department for the latest information.
- Any time the battery has been disconnected on an automatic transmission vehicle, it will be necessary to reestablish Transmission Control Module (TCM) basic settings using the VAG 1551 Scan Tool (ST).
- Never work under a lifted vehicle unless it is solidly supported on stands designed for the purpose. Do not support a vehicle on cinder blocks, hollow tiles or other props that may crumble under continuous load. Never work under a vehicle that is supported solely by a jack. Never work under the vehicle while the engine is running.
- For vehicles equipped with an anti-theft radio, be sure of the correct radio activation code before disconnecting the battery or removing the radio. If the wrong code is entered when the power is restored, the radio may lock up and become inoperable, even if the correct code is used in a later attempt.
- If you are going to work under a vehicle on the ground, make sure that the ground is level. Block the wheels to keep the vehicle from rolling. Disconnect the battery negative terminal (ground strap) to prevent others from starting the vehicle while you are under it.
- Do not attempt to work on your vehicle if you do not feel well. You increase the danger of injury to yourself and others if you are tired, upset or have taken medicine or any other substances that may impair you or keep you from being fully alert.
- Never run the engine unless the work area is well ventilated. Carbon monoxide (CO) kills.
- Always observe good workshop practices. Wear goggles when you operate machine tools or work with acid. Wear goggles, gloves and other protective clothing whenever the job requires working with harmful substances.
- Tie long hair behind your head. Do not wear a necktie, a scarf, loose clothing, or a necklace when you work near machine tools or running engines. If your hair, clothing, or jewelry were to get caught in the machinery, severe injury could result.

Cautions & Warnings

- Do not re-use any fasteners that are worn or deformed in normal use. Some fasteners are designed to be used only once and are unreliable and may fail if used a second time. This includes, but is not limited to, nuts, bolts, washers, circlips and cotter pins. Always follow the recommendations in this manual - replace these fasteners with new parts where indicated, and any other time it is deemed necessary by inspection.
- Illuminate the work area adequately but safely. Use a portable safety light for working inside or under the vehicle. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.
- Friction materials such as brake pads and clutch discs may contain asbestos fibers. Do not create dust by grinding, sanding, or by cleaning with compressed air. Avoid breathing asbestos fibers and asbestos dust. Breathing asbestos can cause serious diseases such as asbestosis or cancer, and may result in death.
- **Finger rings should be removed so that they cannot cause electrical shorts, get caught in running machinery, or be crushed by heavy parts.**
- Before starting a job, make certain that you have all the necessary tools and parts on hand. Read all the instructions thoroughly, do not attempt shortcuts. Use tools that are appropriate to the work and use only replacement parts meeting Audi specifications. Makeshift tools, parts and procedures will not make good repairs.
- Catch draining fuel, oil or brake fluid in suitable containers. Do not use empty food or beverage containers that might mislead someone into drinking from them. Store flammable fluids away from fire hazards. Wipe up spills at once, but do not store the oily rags, which can ignite and burn spontaneously.
- Use pneumatic and electric tools only to loosen threaded parts and fasteners. Never use these tools to tighten fasteners, especially on light alloy parts. Always use a torque wrench to tighten fasteners to the tightening torque listed.
- Keep sparks, lighted matches, and open flame away from the top of the battery. If escaping hydrogen gas is ignited, it will ignite gas trapped in the cells and cause the battery to explode.
- Be mindful of the environment and ecology. Before you drain the crankcase, find out the proper way to dispose of the oil. Do not pour oil onto the ground, down a drain, or into a stream, pond, or lake. Consult local ordinances that govern the disposal of wastes.
- The air-conditioning (A/C) system is filled with a chemical refrigerant that is hazardous. The A/C system should be serviced only by trained automotive service technicians using approved refrigerant recovery/recycling equipment, trained in related safety precautions, and familiar with regulations governing the discharging and disposal of automotive chemical refrigerants.
- Before doing any electrical welding on vehicles equipped with anti-lock brakes (ABS), disconnect the battery negative terminal (ground strap) and the ABS control module connector.
- Do not expose any part of the A/C system to high temperatures such as open flame. Excessive heat will increase system pressure and may cause the system to burst.

Cautions & Warnings

- When boost-charging the battery, first remove the fuses for the Engine Control Module (ECM), the Transmission Control Module (TCM), the ABS control module, and the trip computer. In cases where one or more of these components is not separately fused, disconnect the control module connector(s).
- Some of the vehicles covered by this manual are equipped with a supplemental restraint system (SRS), that automatically deploys an airbag in the event of a frontal impact. The airbag is operated by an explosive device. Handled improperly or without adequate safeguards, it can be accidentally activated and cause serious personal injury. To guard against personal injury or airbag system failure, only trained Audi Service technicians should test, disassemble or service the airbag system.
- Do not quick-charge the battery (for boost starting) for longer than one minute, and do not exceed 16.5 volts at the battery with the boosting cables attached. Wait at least one minute before boosting the battery a second time.
- Never use a test light to conduct electrical tests of the airbag system. The system must only be tested by trained Audi Service technicians using the VAG 1551 Scan Tool (ST) or an approved equivalent. The airbag unit must never be electrically tested while it is not installed in the vehicle.
- Some aerosol tire inflators are highly flammable. Be extremely cautious when repairing a tire that may have been inflated using an aerosol tire inflator. Keep sparks, open flame or other sources of ignition away from the tire repair area. Inflate and deflate the tire at least four times before breaking the bead from the rim. Completely remove the tire from the rim before attempting any repair.
- When driving or riding in an airbag-equipped vehicle, never hold test equipment in your hands or lap while the vehicle is in motion. Objects between you and the airbag can increase the risk of injury in an accident.

I have read and I understand these Cautions and Warnings.