



# Audi

## Repair Manual

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## Audi TT 2007 >

### Manual Transmission

Edition 10.2009

## 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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# erWin

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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# 00 – General, Technical Data

## 1 General Information

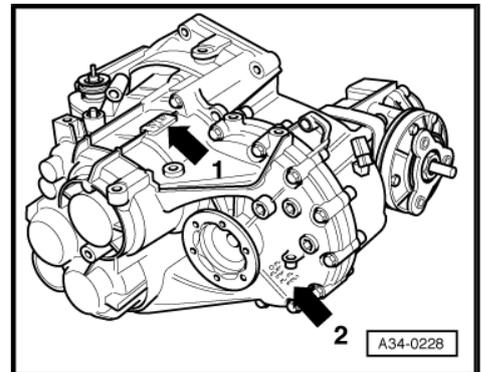
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- ⇒ [“1.2 General Repair Information”, page 2](#)
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- ⇒ [“1.4 Repair Instructions”, page 2](#)
- ⇒ [“1.5 Overall Transmission Ratio i, Calculating”, page 6](#)

### 1.1 Location on Transmission

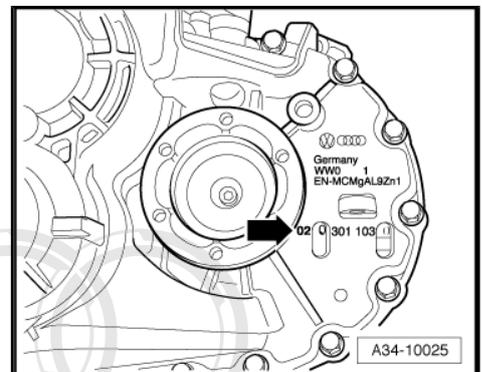
The 6-speed manual transmission 02Q, AWD is installed in the Audi TT from MY 2007. Allocation, refer to [“3.1 Code Letters, Assembly Allocation, Ratios and Capacities”, page 9](#).

#### Location on Transmission

- ◆ Engine code and build date-arrow 1-
- ◆ Manual Transmission 02Q All Wheel Drive-arrow 2-



#### Manual Transmission 02Q AWD -arrow-



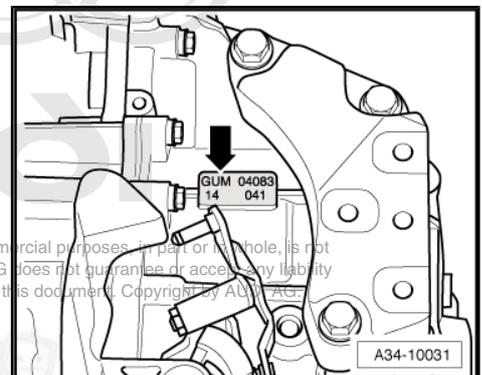
#### Transmission Code Letters and Build Date -arrow-

Example:	GUM	04	08	3
	Code letters	Day	Month	Year 2003 of production

Additional data gives information about the factory.

**i** Note

The transmission code letters are also included on the vehicle data labels.



## 1.2 General Repair Information

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

A number of generally applicable instructions for individual repair operations, which are otherwise mentioned at various points in the Workshop Manual, are summarized here. It applies to this repair manual.

## 1.3 Contact Corrosion

Contact corrosion can occur if non-approved fasteners are used such as 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 the electronic parts catalog ETKA.



### Note

- ◆ *The transmission housing consists of a magnesium alloy.*
- ◆ *We only recommend original replacement parts. They have been checked and are compatible with aluminum.*
- ◆ *It is recommended to use Audi accessories.*



### Caution

***Warranty does not cover contact corrosion damage.***

## 1.4 Repair Instructions

### Special Tools and Equipment

- ◆ Complete list of special tools used in this Workshop Manual, see ServiceNet under Special Tools.

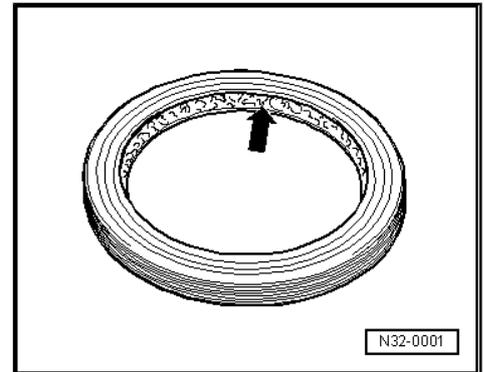
### Transmission

- ◆ Thoroughly clean all connections and the surrounding area before disconnecting.
- ◆ When installing the transmission, **make sure that the alignment sleeves between the engine and transmission are positioned correctly.**  
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- ◆ Allocate bolts and other component using the. Refer to the electronic parts catalog ETKA.
- ◆ When installing mounting brackets, as well as other waxed components, the contacts surfaces must be cleaned. Contact surfaces must be free of grease and wax.
- ◆ After replacement of the manual transmission with a bevel box, check the oil level in the manual transmission. Refer to ⇒ ["1.1 Manual Transmission, Checking Gear Oil Level", page 47](#) and in the bevel box ⇒ ["1.2 Gear Oil in Bevel Box, Checking", page 48](#) .
- ◆ Capacities, refer to ⇒ ["3.1 Code Letters, Assembly Allocation, Ratios and Capaci-](#)

[ties", page 9](#) , Specification, refer to the electronic parts catalog ETKA.

### Shaft Seals, Sealing Rings, O-rings, Seals

- ◆ Always replace shaft sealing rings, O-rings, and seals.
- ◆ After removing gaskets and seals, always inspect the contact surfaces at housing or shaft for burrs resulting from removal, or for other signs of damage.
- ◆ Before installing the shaft seals, lightly oil the outer circumference and fill the space between the sealing lips -arrow- half-way with sealing grease -G 052 128 A1- .
- ◆ The open side of the shaft seals point toward the fluid to be sealed in.
- ◆ When pressing in new shaft seal, make sure the sealing lip does not run on the same point as the sealing lip of the old seal (use insertion depth tolerances).
- ◆ To prevent crushing when installing, lightly lubricate O-rings before inserting.
- ◆ After replacement of seals, O-rings, and shaft sealing rings, check the oil level in the manual transmission. Refer to [⇒ "1.1 Manual Transmission, Checking Gear Oil Level", page 47](#) or in the bevel box [⇒ "1.2 Gear Oil in Bevel Box, Checking", page 48](#) .



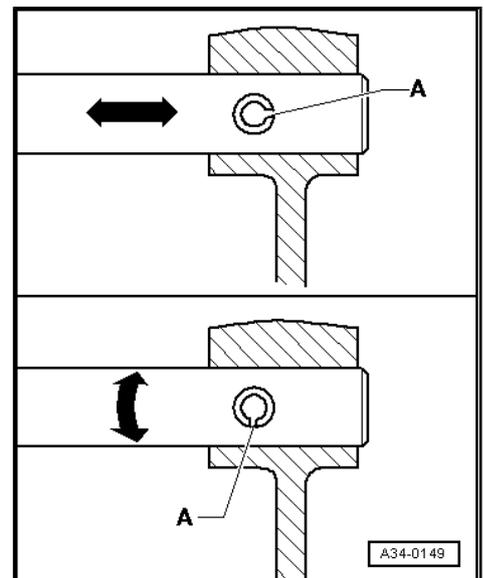
### Sealant

- ◆ Thoroughly clean housing joint surfaces before applying **sealing compounds**.
- ◆ Apply the sealing compound -AMV 188 200 03- evenly and not too thick.
- ◆ Do not allow sealing compound to enter ventilation openings.

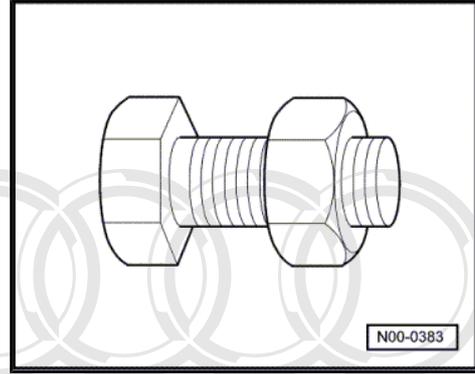
### Fasteners

- ◆ Do not stretch the circlips.
- ◆ Replace damaged or stretched circlips.
- ◆ Circlips must locate properly in the groove.
- ◆ Replace spring pins. Installed position: the slit -A- should be in line with the line of force -arrow-.

### Bolts and Nuts



- ◆ Loosen bolts and nuts in reverse of tightening sequence.
- ◆ Tighten and loosen bolts or nuts for securing covers and housings without tightening sequence in diagonal sequence in stages.
- ◆ Replace self-locking bolts and nuts.
- ◆ The tightening specifications stated apply to non-oiled nuts and bolts.
- ◆ Threaded holes into which self-locking bolts or bolts coated with locking fluid are screwed, must be cleaned (for example tap). Otherwise there is a risk that the bolts will shear the next time they are removed.
- ◆ Ensure with screwed connections that the contact surfaces as well as the visible surfaces of nuts and bolts are waxed after assembly, if necessary.



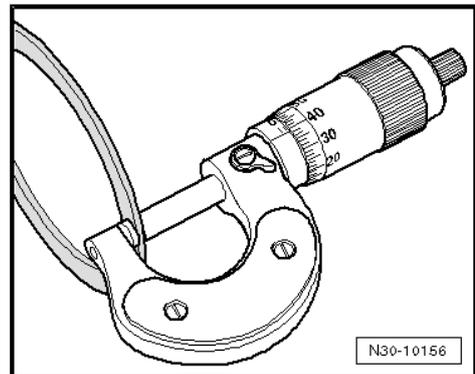
### Mount

- ◆ Install new tapered roller bearing as supplied and do not use additional oil.
- ◆ Install various bearings (removed tapered roller bearings) into transmission, lubricated with gear oil.
- ◆ Heat the inner rings of the 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 that there is no axial clearance.
- ◆ Do not interchange the outer or inner races of bearings of the same size.
- ◆ Tapered roller bearings installed on a shaft must be replaced as a set and use same make of bearings.
- ◆ Install needle bearings with lettered side (thicker metal) towards fitting tool.

### Adjusting Shims

- ◆ Use a micrometer to measure the shims at several points. Tolerance variations make it possible to find the exact shim thickness required.
- ◆ Check for burrs and damage.
- ◆ Only install perfect shims.

### Synchronizer Rings



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- ◆ When reusing synchronizer rings, do not interchange them and always assign them to the same selector gear.
- ◆ Check for wear and replace if necessary.
- ◆ Check the grooves -arrow 1- of synchronizer ring -A- and inner race for flat areas (grooves are worn).
- ◆ For coated synchronizer rings, coating must not be damaged.
- ◆ If an intermediate ring -B- is installed, check the intermediate ring on the outer contact surface -arrow 2- and inner contact surface -arrow 3- for grooves, scoring and blue coloring (from overheating).
- ◆ Check taper of drive gear for grooves and scoring.
- ◆ Coat with gear oil before installing.

### Gears

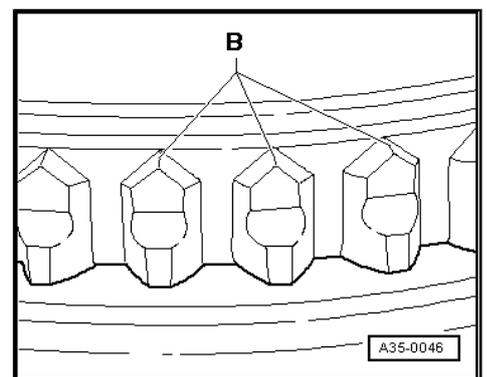
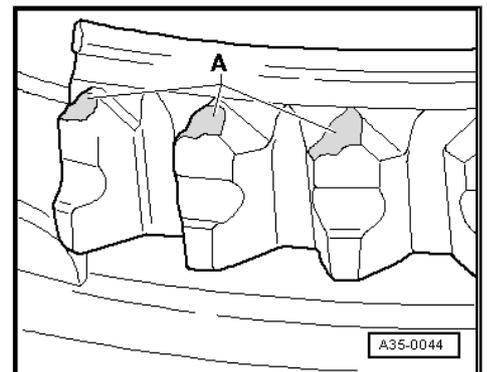
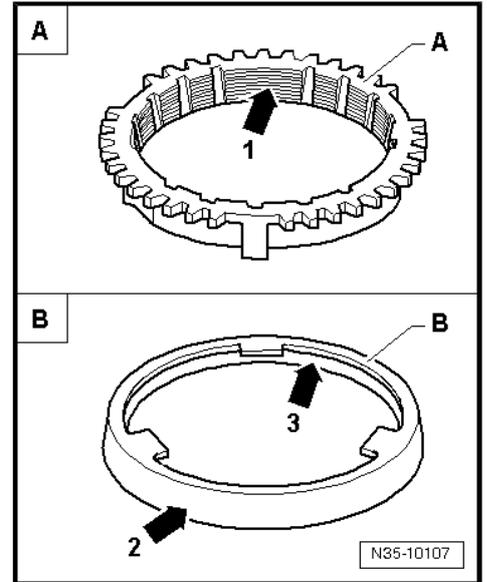
- ◆ Clean prior to pressing on.
- ◆ For installation heat to approximately 100 °C (212 °F) with the inductive heat unit -VAS 6414- and during installation press on to the stop so that there is no axial clearance.

### Selector Gears and Sliding Sleeves

- ◆ After installing, check 1st through 6th gear for minimal amount of axial clearance and for ease of movement.

- ◆ Damage to the synchronizer ring or gear wheel:

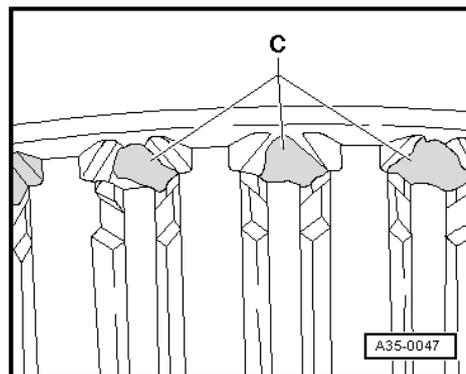
A - Worn clutch spline camber on the synchronizer ring or gear wheel



- ◆ Compare: synchronizer ring or gear wheel not damaged:
- ◆ B - Worn clutch spline camber on the synchronizer ring or gear wheel

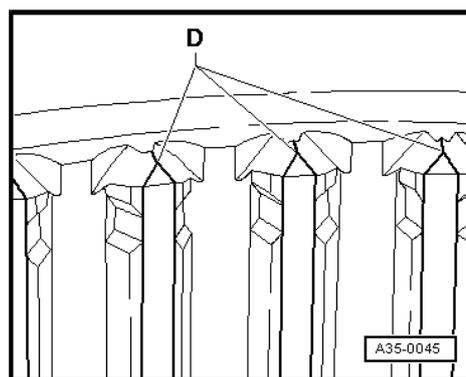
◆ Picture of damage on the locking collar:

C - Worn longitudinal inner spline camber and the locking collar



◆ Comparison: locking collar not damaged:

D - Undamaged longitudinal inner spline camber and the locking collar



### Clutch Mechanism, Clutch

- ◆ If the clutch pedal does not return to the starting position (rest position) after the recoupling procedure, bleed the clutch system (further measures. Refer to [⇒ "1.3 Information Regarding the Removal and Installation of the Clutch Master or Slave Cylinder", page 13](#) ).
- ◆ Do not tilt clutch pressure plate; loosen and tighten one after another in 90° increments.
- ◆ To reduce odor caused by a burnt clutch, thoroughly clean the transmission housing around the clutch as well as the engine on the transmission side.
- ◆ Only use compressed air to blow out the dual-mass flywheel.
- ◆ The clutch pressure plates are corrosion-protected and greased. With the exception of the friction surface on the clutch plate, do not clean the pressure plate. This will shorten the service life of the clutch considerably.
- ◆ The friction surfaces on the pressure plate and on the dual mass flywheel must be cleaned thoroughly (degreased).

## 1.5 Overall Transmission Ratio $i$ , Calculating

Example:

	6th Gear	Final Drive
Driving gear	$ZG_1 = 34$	$ZA_1 = 22$
Driven gear	$ZG_2 = 31$	$ZA_2 = 72$

$$i = ZG_2 : ZG_1 \quad 1)$$

$$i_G = \text{gear ratio} = ZG_2 : ZG_1 = 31 : 34 = 0.912$$

$$i_A = \text{axle ratio} = ZA_2 : ZA_1 = 72 : 22 = 3.273$$

$$i_{\text{total}} = \text{total ratio} = i_G \times i_A = 0.912 \times 3.273 = 2.985$$

1)  $Z_1$  = No. of teeth drive gear,  $Z_2$  = No. of teeth driven gear

## 2 Description and Operation

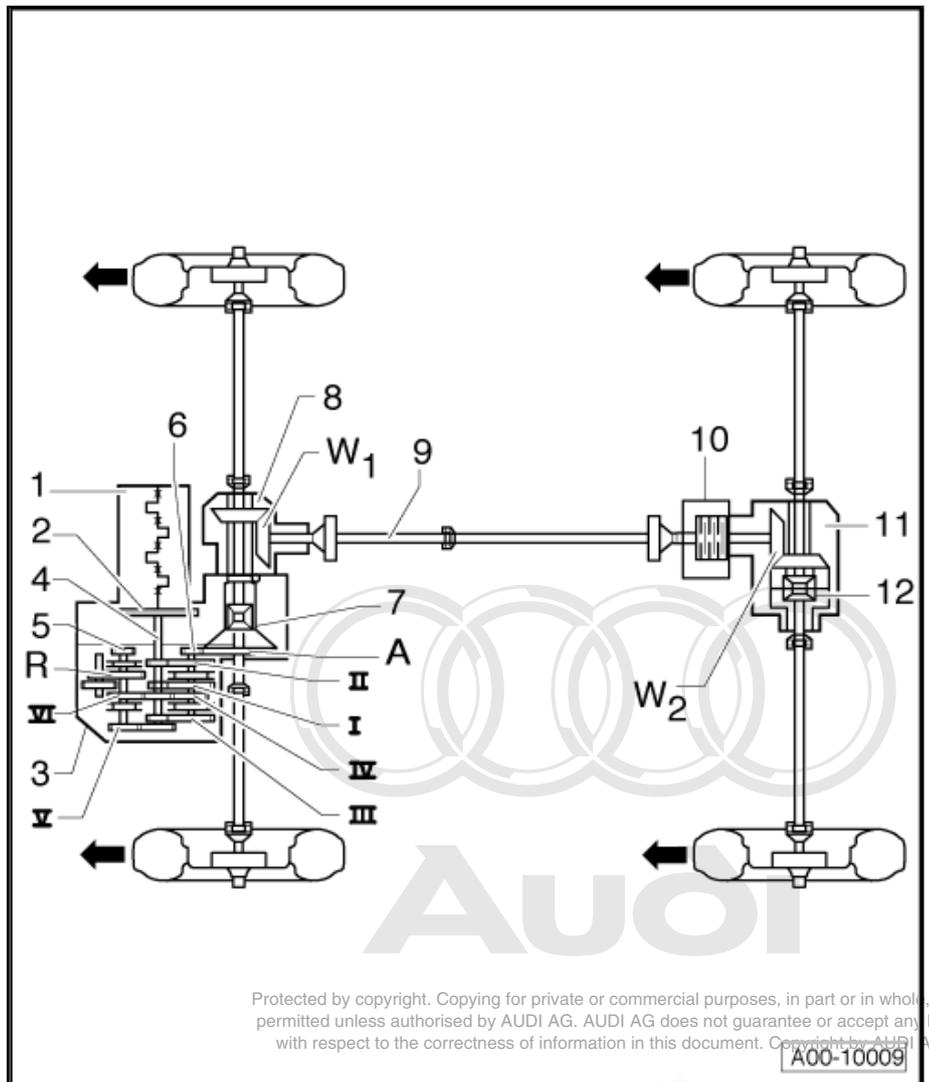
⇒ ["2.1 Powertrain Overview", page 7](#)

### 2.1 Powertrain Overview

#### Designation

Arrows point in direction of travel

- 1 - Engine
- 2 - Clutch
- 3 - Manual Transmission
- 4 - Input Shaft
- 5 - Output Shaft II - 5th/6th Gear/Reverse Gear
- 6 - Output Shaft I - 1st to 4th Gear
- 7 - Differential
- 8 - Bevel Box
- 9 - Driveshaft
- 10 - Haldex Clutch
- 11 - Rear Final Drive
- 12 - Differential



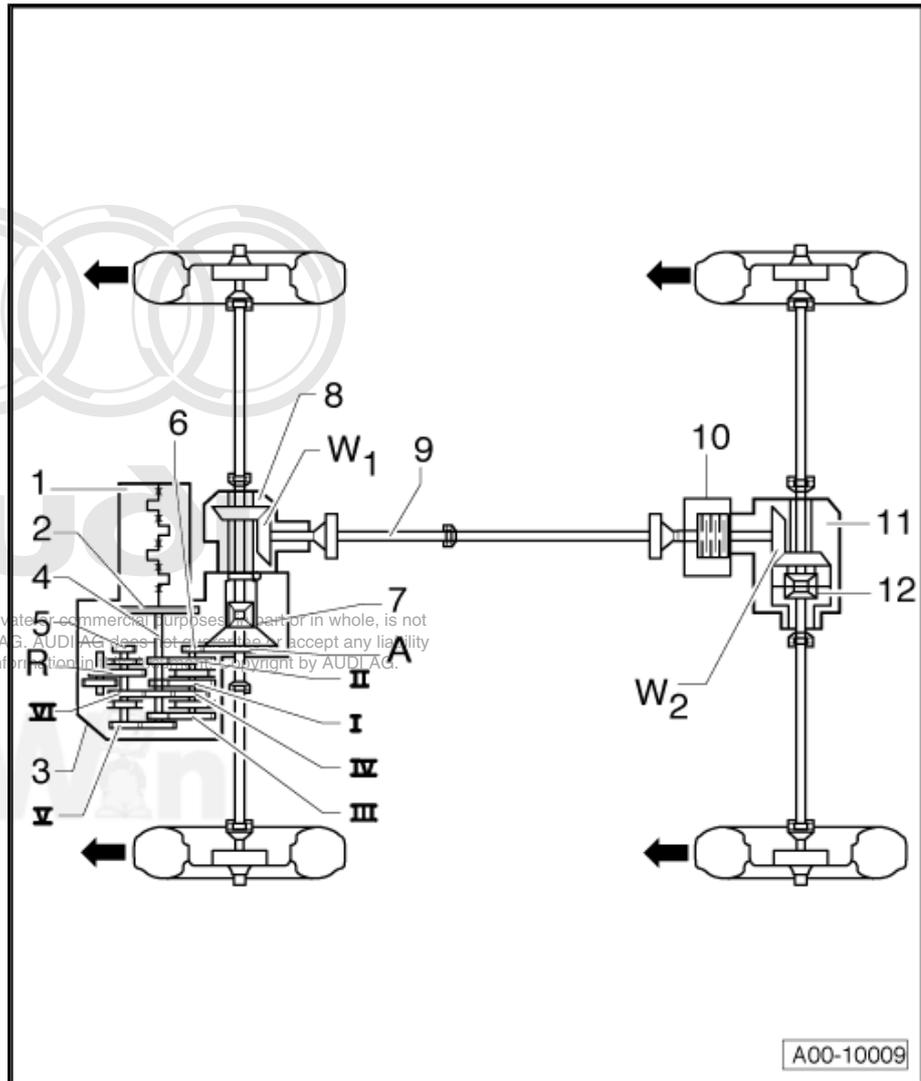
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#### Gear Ratios

Arrows point in direction of travel



- I - 1st Gear
- II - 2nd Gear
- III - 3rd Gear
- IV - 4th Gear
- V - 5th Gear
- VI - 6th Gear
- R - Reverse Gear
- A - Final Drive
- W1 - Front Bevel Drive
- W2 - Rear Bevel Drive



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### 3 Specifications

⇒ "3.1 Code Letters, Assembly Allocation, Ratios and Capacities", page 9

#### 3.1 Code Letters, Assembly Allocation, Ratios and Capacities

Manual Transmission		JLV	JYV	KDP
<b>Code Letters</b>				
Manufactured	from	04.06	11.06	06.07
	to	11.06	05.07	02.08
Allocation	Model	Audi TT from MY 2007	Audi TT from MY 2007	Audi TT from MY 2007
	Engine	3.2l MPI - 184 kW	3.2l MPI - 184 kW	3.2l MPI - 184 kW
Gear ratios $Z_2 : Z_1 = i$	Final drive I for 1st to 4th gear	72 : 17 = 4.235	72 : 17 = 4.235	72 : 17 = 4.235
	Final drive II for 5th/6th gear and reverse gear	72 : 22 = 3.273	72 : 22 = 3.273	72 : 22 = 3.273
	1st gear	47 : 14 = 3.357	47 : 14 = 3.357	47 : 14 = 3.357
	2nd gear	48 : 23 = 2.087	48 : 23 = 2.087	48 : 23 = 2.087
	3rd gear	47 : 32 = 1.469	47 : 32 = 1.469	47 : 32 = 1.469
	4th gear	37 : 34 = 1.088	37 : 34 = 1.088	37 : 34 = 1.088
	5th gear	41 : 37 = 1.108	41 : 37 = 1.108	41 : 37 = 1.108
	6th gear	31 : 34 = 0.912	31 : 34 = 0.912	31 : 34 = 0.912
	Reverse gear	34 : 23 x 14 : 14 = 3.990	34 : 23 x 14 : 14 = 3.990	34 : 23 x 14 : 14 = 3.990
i <sub>total</sub> in highest gear		2.985	2.985	2.985
Capacity in manual transmission		2.3 liters		
Capacity in bevel box		0.9 liters		
Hydraulic		Hydraulic		
Please obtain the following information from the electronic parts catalog ETKA.				
◆ Gear oil specification				
◆ Bevel box axle oil specification				
◆ Drive axle flanges allocation				
◆ Clutch allocation				
◆ Rear final drive allocation				

Manual transmission		KNT	KZN
<b>Code letters</b>			
Manufactured	from	01.08	12.09
	to	12.09	
Allocation	Model	Audi TT from MY 2007	Audi TT from MY 2007
	Engine	3.2l MPI - 184 kW	3.2l MPI - 184 kW
Gear ratios	Final drive I for 1st to 4th gear	72 : 17 = 4.235	72 : 17 = 4.235



Manual transmission			
Code letters		KNT	KZN
Z <sub>2</sub> : Z <sub>1</sub> = i	Final drive II for 5th/6th gear and reverse gear	72 : 22 = 3.273	72 : 22 = 3.273
	1st gear	47 : 14 = 3.357	47 : 14 = 3.357
	2nd gear	48 : 23 = 2.087	48 : 23 = 2.087
	3rd gear	47 : 32 = 1.469	47 : 32 = 1.469
	4th gear	37 : 34 = 1.088	37 : 34 = 1.088
	5th gear	41 : 37 = 1.108	41 : 37 = 1.108
	6th gear	31 : 34 = 0.912	31 : 34 = 0.912
	Reverse gear	34 : 23 x 14 : 14 = 3.990	34 : 23 x 14 : 14 = 3.990
i <sub>total</sub> in highest gear		2.985	2.985
Capacity in manual transmission		2.3 liters	
Capacity in bevel box		0.9 liters	
Hydraulic		Hydraulic	
Please obtain the following information from the electronic parts catalog ETKA.			
<ul style="list-style-type: none"> <li>◆ Gear oil specification</li> <li>◆ Bevel box axle oil specification</li> <li>◆ Drive axle flanges allocation</li> <li>◆ Clutch allocation</li> <li>◆ Rear final drive allocation</li> </ul>			



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## 30 – Clutch

### 1 General Information

⇒ [“1.1 Determining Clutch Manufacturer”, page 11](#)

⇒ [“1.2 Clutch System, Bleeding”, page 12](#)

⇒ [“1.3 Information Regarding the Removal and Installation of the Clutch Master or Slave Cylinder”, page 13](#)

⇒ [“1.4 Clutch Master Cylinder and Clutch Slave Cylinder, Function Test”, page 13](#)

#### 1.1 Determining Clutch Manufacturer

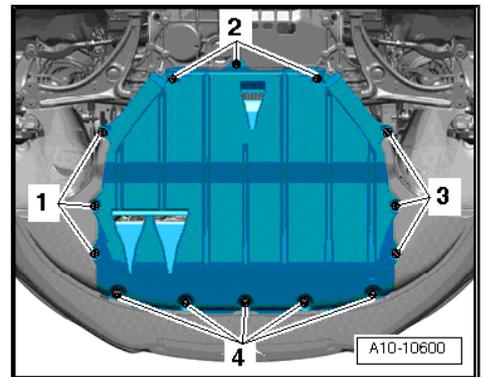


Note

*A clutch could be installed from either of the manufacturers, Sachs or LuK.*

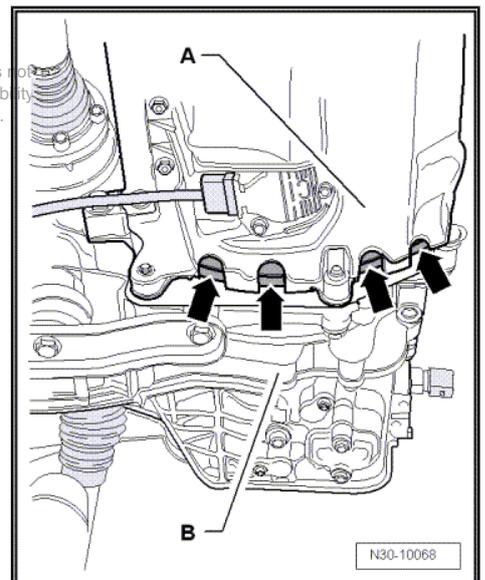
Clutch makes can be differentiated with transmission installed as follows:

- Remove noise insulation in center by loosening fasteners -1 through 4-



Some recesses -arrows- are located between engine -A- and transmission -B- in lower area of engine oil pan.

- Through these recesses, inspect the outer contour of the flywheel.

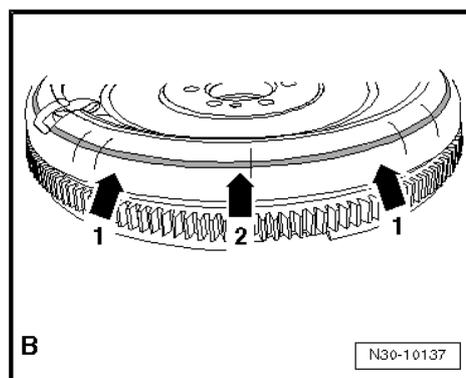
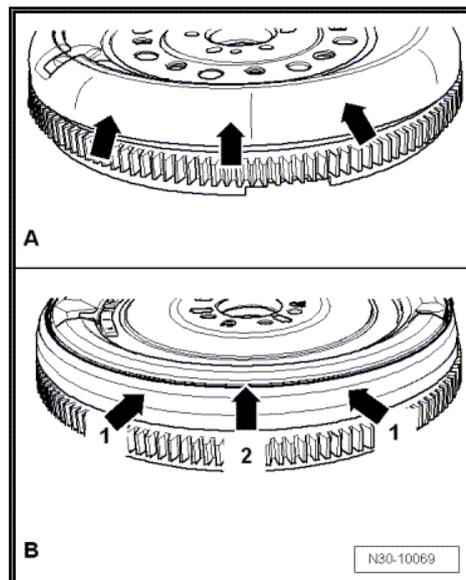


**A - Round Outer Contour -arrows- = Clutch Made by Sachs**

Assembly overview - clutch made by Sachs. Refer to  
⇒ ["2.5 Sachs Clutch Assembly Overview", page 22](#) .

**B - Round Outer Contour -arrows 1- and a Peripheral Depression -arrow 2- = Clutch Made by LuK**

Assembly overview - clutch made by LuK. Refer to  
⇒ ["2.6 LuK Clutch Assembly Overview", page 25](#) .

**Round Outer Contour -arrows 1- and a Peripheral Depression -arrow 2- = Clutch Made by LuK**

Assembly overview - clutch made by LuK. Refer to  
⇒ ["2.6 LuK Clutch Assembly Overview", page 25](#) .

## 1.2 Clutch System, Bleeding

**Note**

- ◆ After working on the hydraulic clutch mechanism, the system must be bled.
- ◆ During the following procedures, make sure that brake fluid does not leak onto the longitudinal member or the transmission.
- ◆ Before bleeding, fill the brake fluid reservoir to the max marking with brake fluid.

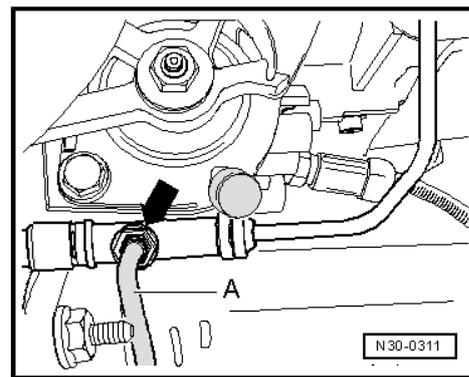
**Special tools and workshop equipment required**

- ◆ Brake Filler/Bleeder Unit -VAS 5234-
- ◆ Brake fluid specifications, refer to ⇒ Brake System; Rep. Gr. 47. ; General Information

**Procedure**

- Tightening specification, refer to ⇒ ["2.3 Hydraulics Assembly Overview", page 19](#)
- Completely remove the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .
- Pull the clutch pedal back to the rest position.
- Connect the -VAS 5234- to the brake fluid reservoir.

- Remove the protective cap on the vent screw -arrow- and connect bleeder bottle hose -A-.
- Switch on brake filler/bleeder unit.
  - Working pressure 2.0 bar positive pressure.
- Now open the vent screw approximately  $\frac{1}{4}$  turn and let 100 cm<sup>3</sup> brake fluid drain out.
- With the vent screw open, press the clutch pedal by hand very quickly 15 to 20 times from one stop to the other (approximately 2 presses per second).
- Close the vent screw.
- Switch the -VAS 5234- off and completely release the pressure on the bleeder unit.
- Now press the clutch pedal slowly 10 times from stop to stop.
- Check clutch system function when doing so.
- Pull off bleeder hose and set protective cap in place.
- Remove the -VAS 5234- from the brake fluid reservoir.
- Install the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .



### 1.3 Information Regarding the Removal and Installation of the Clutch Master or Slave Cylinder

- ◆ If the clutch master or slave cylinder is to be replaced as a result of a suspected defect, it must first be checked for function. Refer to [⇒ "1.4 Clutch Master Cylinder and Clutch Slave Cylinder, Function Test", page 13](#) .
- ◆ If the clutch slave cylinder is removed from the transmission with hose/line assembly connector, do not operate (depress) clutch pedal any more. Otherwise, the pistons are pushed out of the clutch slave cylinder and thus damaged.
- ◆ Carefully actuate the clutch pedal after installing the clutch slave cylinder. If an abnormally difficult pressure point is noticed when depressing the clutch pedal, do not depress the clutch pedal any further. The plunger of the clutch slave cylinder was probably guided past the clutch release lever. Beyond a pedal force of approximately 300 N, clutch slave cylinder is destroyed.

### 1.4 Clutch Master Cylinder and Clutch Slave Cylinder, Function Test

Before replacing master or slave cylinder, you must first carry out the corresponding tests in the event of the following problems.

#### Noises when actuating the clutch:

- ◆ First check the over-center spring and the clutch pedal switch for noises.
- ◆ If noises are heard, remove the over-center spring and repeat the test.
- ◆ Replace affected component.

**Clutch pedal remains on floor or does not return to rest position after recoupling (clutch pedal no longer actuated):**

- ◆ Check whether clutch pedal returns completely to rest position, thus freeing bleeder hole in clutch master cylinder.
- ◆ The bleeder hole is integrated into the clutch slave cylinder. It is not visible from the outside.
- ◆ The clutch hydraulic system can only bleed itself when the bleeder hole is clear.
- ◆ Explain to the customer that they should not rest their foot on the clutch pedal. It can interfere with the self-bleeding function of the clutch system, because the bleeder hole in the clutch slave cylinder can not perform its function.
- ◆ The following can inhibit the self-bleeding function in the clutch system: loose footwell trim or floor mats, a blocked clutch pedal switch or drivers who constantly rest their foot on the clutch pedal.

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**Check the entire hydraulic system for leaks.**

- ◆ Check the brake fluid level in the brake fluid reservoir.
- ◆ Visually inspect the clutch master and slave cylinders as well as hose/line assembly with its connecting points for leaks to outside.
- ◆ If you find you leaks, you must replace the affected component.
- ◆ Bleed the clutch system. Refer to [⇒ "1.3 Information Regarding the Removal and Installation of the Clutch Master or Slave Cylinder", page 13](#) .

**Pedal force:**

- ◆ Approximately 140 N over entire life of clutch

**High pedal force:**

- ◆ Pressure plate/clutch plate mechanical defect. Refer to [⇒ "2.5 Sachs Clutch Assembly Overview", page 22](#) or [⇒ "2.6 LuK Clutch Assembly Overview", page 25](#) .

**Clutch does not disengage or does not disengage completely:**

- ◆ Air in hydraulic system, bleed clutch system. Refer to [⇒ "1.3 Information Regarding the Removal and Installation of the Clutch Master or Slave Cylinder", page 13](#) or check hydraulic system for external and internal leakage
- ◆ Clutch plate is difficult to move on the drive shaft splines (for example: due to rust or dirt)
- ◆ Foreign body in the clutch system
- ◆ Pressure plate/clutch plate mechanical defect. Refer to [⇒ "2.5 Sachs Clutch Assembly Overview", page 22](#) or [⇒ "2.6 LuK Clutch Assembly Overview", page 25](#) .
- ◆ Incorrect components installed or components missing (for example intermediate plate or alignment sleeves) during repair work.

## 2 Description and Operation

⇒ [“2.1 Clutch Mechanism Overview”, page 15](#)

⇒ [“2.2 Pedal Assembly, Master Cylinder Assembly Overview”, page 17](#)

⇒ [“2.3 Hydraulics Assembly Overview”, page 19](#)

⇒ [“2.4 Clutch Release Mechanism, Clutch Slave Cylinder Assembly Overview”, page 21](#)

⇒ [“2.5 Sachs Clutch Assembly Overview”, page 22](#)

⇒ [“2.6 LuK Clutch Assembly Overview”, page 25](#)

### 2.1 Clutch Mechanism Overview



#### Note

*Before replacing the clutch master cylinder or clutch slave cylinder due to a suspected defect. Refer to*

*⇒ [“1.3 Information Regarding the Removal and Installation of the Clutch Master or Slave Cylinder”, page 13](#) must first be observed and a*

*⇒ [“1.4 Clutch Master Cylinder and Clutch Slave Cylinder, Function Test”, page 13](#) must be performed.*

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I -

⇒ [“2.2 Pedal Assembly, Master Cylinder Assembly Overview”](#), page 17

⇒ [“4.2 Over-Center Spring”](#), page 30

⇒ [“4.3 Clutch Pedal”](#), page 32

⇒ [“4.4 Mounting Bracket”](#), page 34

⇒ [“4.5 Clutch Position Sensor”](#), page 36

⇒ [“4.6 Master Cylinder”](#), page 37

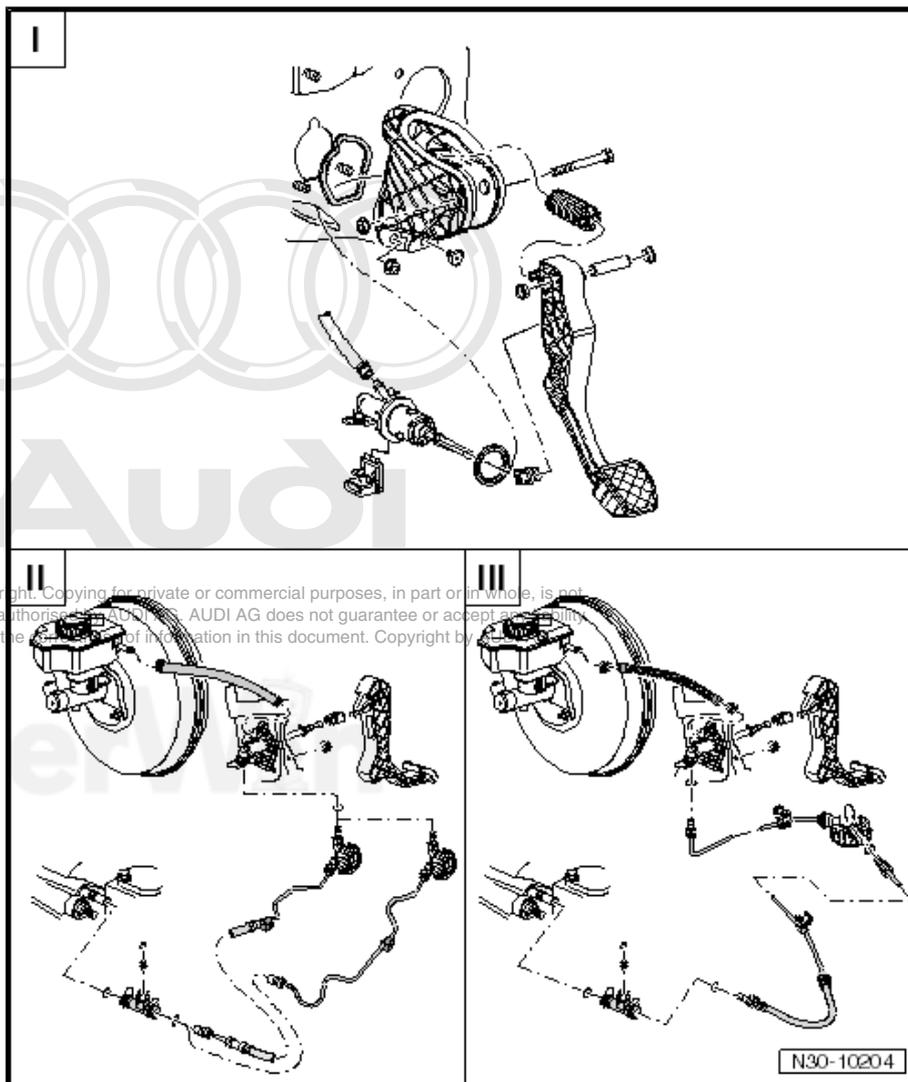
II -

⇒ [“2.3 Hydraulics Assembly Overview”](#), page 19

⇒ [“4.1 Hose/Line Assembly or Plastic Line”](#), page 29

⇒ [“1.2 Clutch System, Bleeding”](#), page 12

III - Hydraulics, RHD , Assembly Overview



## 2.2 Pedal Assembly, Master Cylinder Assembly Overview

### Note

Grease bearing areas and slide surfaces with grease -G 000 450 02- .

#### 1 - Bulkhead

- With mount for mounting bracket

#### 2 - Gasket

- Replace
- Between the bracket and bulkhead
- Self-adhesive
- Glue on mounting bracket

#### 3 - Bracket

- For clutch pedal
- Removing and installing, refer to [⇒ "4.4 Mounting Bracket", page 34](#)

#### 4 - Bolt

#### 5 - Over-Center Spring

- Removing and installing, refer to [⇒ "4.2 Over-Center Spring", page 30](#)

#### 6 - Bushing

#### 7 - Pivot Pin

#### 8 - Clutch Pedal

- Removing and installing, refer to [⇒ "4.3 Clutch Pedal", page 32](#)
- In the case of replacement, recut the clutch pedal cap [⇒ page 18](#)

#### 9 - Mounting Clip

- For the clutch master cylinder actuator rod

#### 10 - Oil Seal

- Replace
- Between the clutch master cylinder and bearing bracket

#### 11 - Clutch Master Cylinder

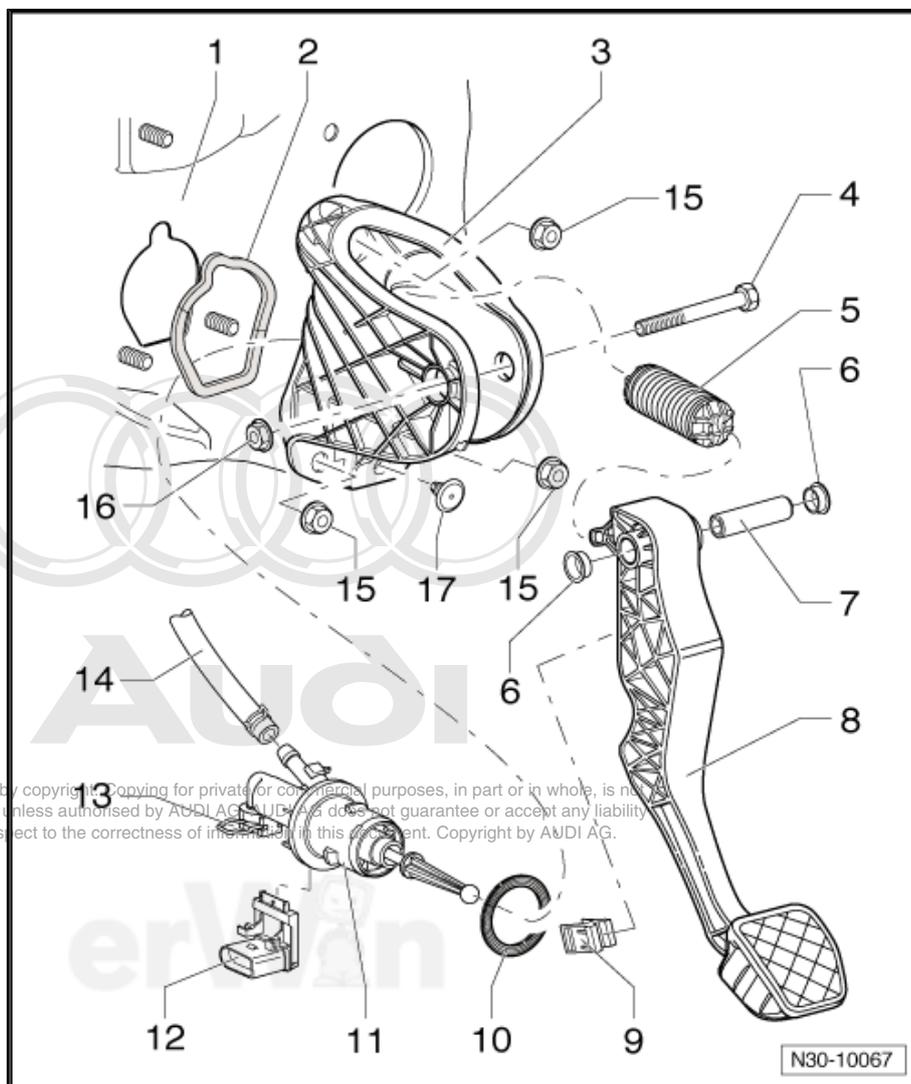
- Removing and installing, refer to [⇒ "4.6 Master Cylinder", page 37](#)

#### 12 - Clutch Position Sensor -G476-

- Removing and installing, refer to [⇒ "4.5 Clutch Position Sensor", page 36](#)
- Check in guided fault finding [⇒ Vehicle diagnosis, testing and information system VAS 5051](#)

#### 13 - Retaining Clip

- To remove and install the hose/line assembly, pull the clip out to the stop



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#### 14 - Supply Hose

- To brake fluid reservoir
- Made of rubber or plastic depending on the version
- Plastic return hose with additional seals ⇒ [page 20](#)

#### 15 - Nut

- Replace
- 20 Nm
- Self-locking
- Quantity: 3
- For the bracket to the bulkhead

#### 16 - Nut

- Replace
- 25 Nm
- Self-locking

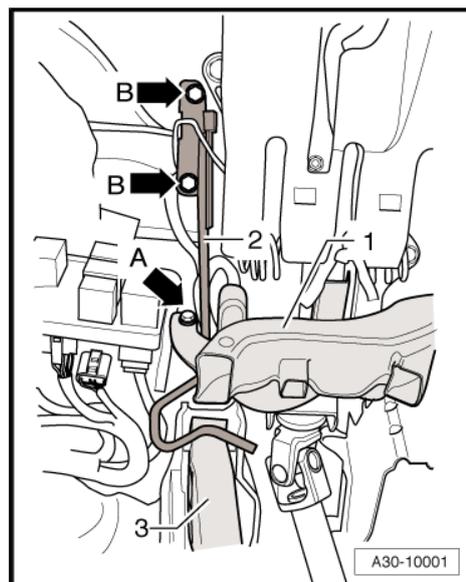
#### 17 - End stop

- For clutch pedal

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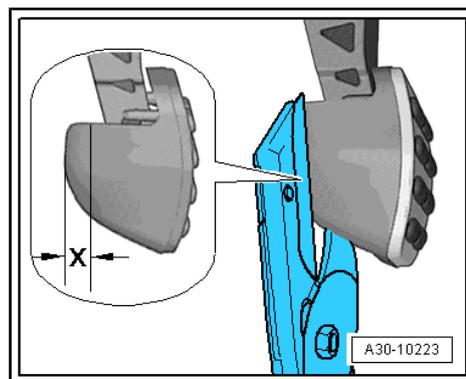
#### Impact Bolster - Tightening Specification

- Insert impact bolster -2- and tighten 1 or 2 screws -B arrows- depending on the version.
- M6: 10 Nm
- M8: 20 Nm



#### Replace Clutch Pedal Cap

- Trim the new clutch pedal cap as shown in the figure.
- Dimension -x- 20 mm



## 2.3 Hydraulics Assembly Overview

### 1 - Brake Fluid Reservoir

### 2 - Spring-Type Clamp

- Not equipped on all vehicles

### 3 - Supply Hose

- Made of rubber or plastic depending on the version
- Plastic return hose with additional seals  
⇒ [page 20](#)

### 4 - Clutch Master Cylinder

- Removing and installing, refer to  
⇒ [“4.6 Master Cylinder”, page 37](#)

### 5 - Clip

- To remove and install the hose/line assembly, pull the clip out to the stop

### 6 - Sealing Ring or O-ring

- Replace damaged sealing rings or O-rings
- Pull onto line connection
- Install with brake fluid
- Seals/O-rings suitable for the line connection material ⇒ [page 20](#)
- Allocation, refer to the electronic parts catalog ETKA

### 7 - Mounting Clip

- To remove and install, disconnect the clutch master cylinder from the clutch pedal. Refer to  
⇒ [“4.3 Clutch Pedal”, page 32](#)

### 8 - Clutch Pedal

- Removing and installing, refer to ⇒ [“4.3 Clutch Pedal”, page 32](#)

### 9 - Nut

- For the bracket to the bulkhead
- Tightening specification -15- ⇒ [page 18](#)

### 10 - Hose/Line Assembly

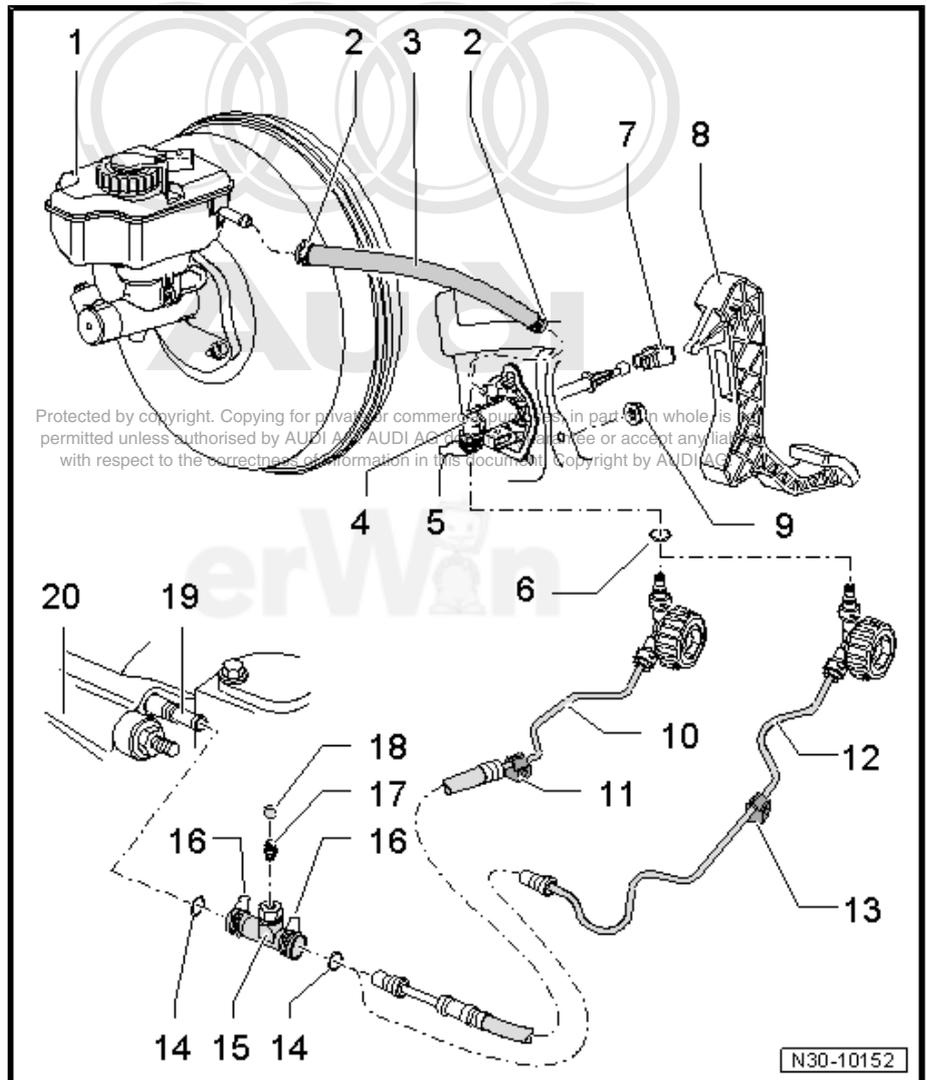
- Removing and installing, refer to ⇒ [“4.1 Hose/Line Assembly or Plastic Line”, page 29](#)
- Equipment depends on version
- Allocation, refer to the electronic parts catalog ETKA

### 11 - Bracket

- For hose/line assembly -10-
- Secured to body
- Bracket differentiation ⇒ [page 21](#)

### 12 - Plastic Line

- Removing and installing, refer to ⇒ [“4.1 Hose/Line Assembly or Plastic Line”, page 29](#)



- Equipment depends on version
- Allocation, refer to the electronic parts catalog ETKA

### 13 - Bracket

- For plastic line -12-
- Secured to body
- Bracket differentiation ⇒ [page 21](#)

### 14 - Sealing Ring or O-ring

- Replace damaged sealing rings or O-rings
- Pull onto line connection
- Install with brake fluid
- Seals/O-rings suitable for the line connection material ⇒ [page 20](#)
- Allocation, refer to the electronic parts catalog ETKA

### 15 - Bleeder

### 16 - Clip

- To remove and install hose/line assembly or bleeder, pull out clip until stop

### 17 -

### Vent Screw

- 4.5 Nm
- Clutch system, bleeding, refer to ⇒ ["1.2 Clutch System, Bleeding", page 12](#)

### 18 - Dust Cap

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### 19 - Clutch Slave Cylinder with Release Bearing

- Can only be replaced when transmission is removed

### 20 - Transmission

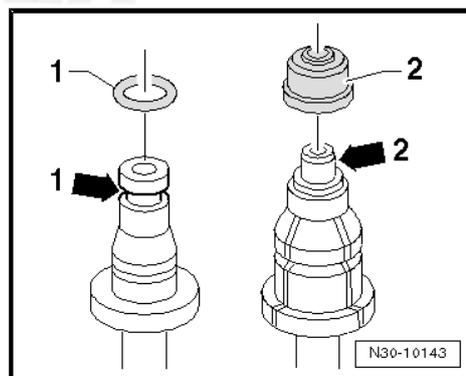
### O-ring or Sealing Ring for the Hose/Line Assembly or Plastic Line

#### 1 - O-ring

- ◆ Line connection with circumferential groove -arrow 1-
- ◆ Check the O-ring for damage and replace if necessary.

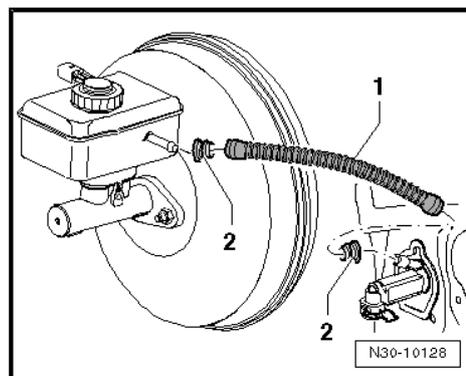
#### 2 - Oil seal

- ◆ Line connection with shoulder -arrow 2-
- ◆ Prior to installation, place sealing ring -2- on the line connection -arrow 2-



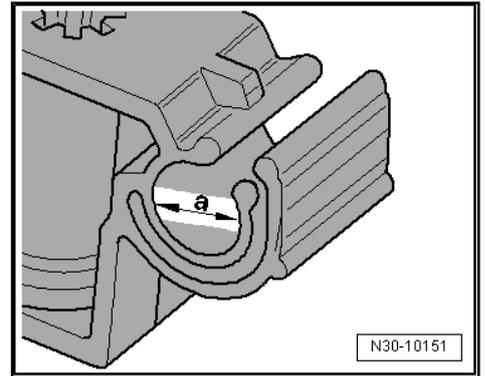
### Vehicles with Plastic Return Hose -1-

- Seals -2- must be located in supply hose.



### Bracket Differentiation

Dimension "a" mm	Line Version
8	Plastic line
6	Hose/line assembly



## 2.4 Clutch Release Mechanism, Clutch Slave Cylinder Assembly Overview

### 1 - Bolt

- Replace
- 12 Nm for metal clutch slave cylinder
- 15 Nm for plastic clutch slave cylinder
- Quantity: 3
- Carefully tighten diagonally in small stages so that the clutch slave cylinder bolting tabs do not break off

### 2 - Clutch Slave Cylinder with Release Bearing

- The clutch slave cylinder and release bearing are one unit and can only be replaced together.
- Do not wash the bearing, just wipe it off.
- If the bearing is noisy, replace it together with the clutch slave cylinder
- Removing and installing, refer to ["4.7 Slave Cylinder with Release Bearing", page 39](#)

### 3 - O-ring

- Replace if damaged
- Pull onto line connection
- Install with brake fluid

### 4 - Retaining Clip

### 5 - Vent Screw

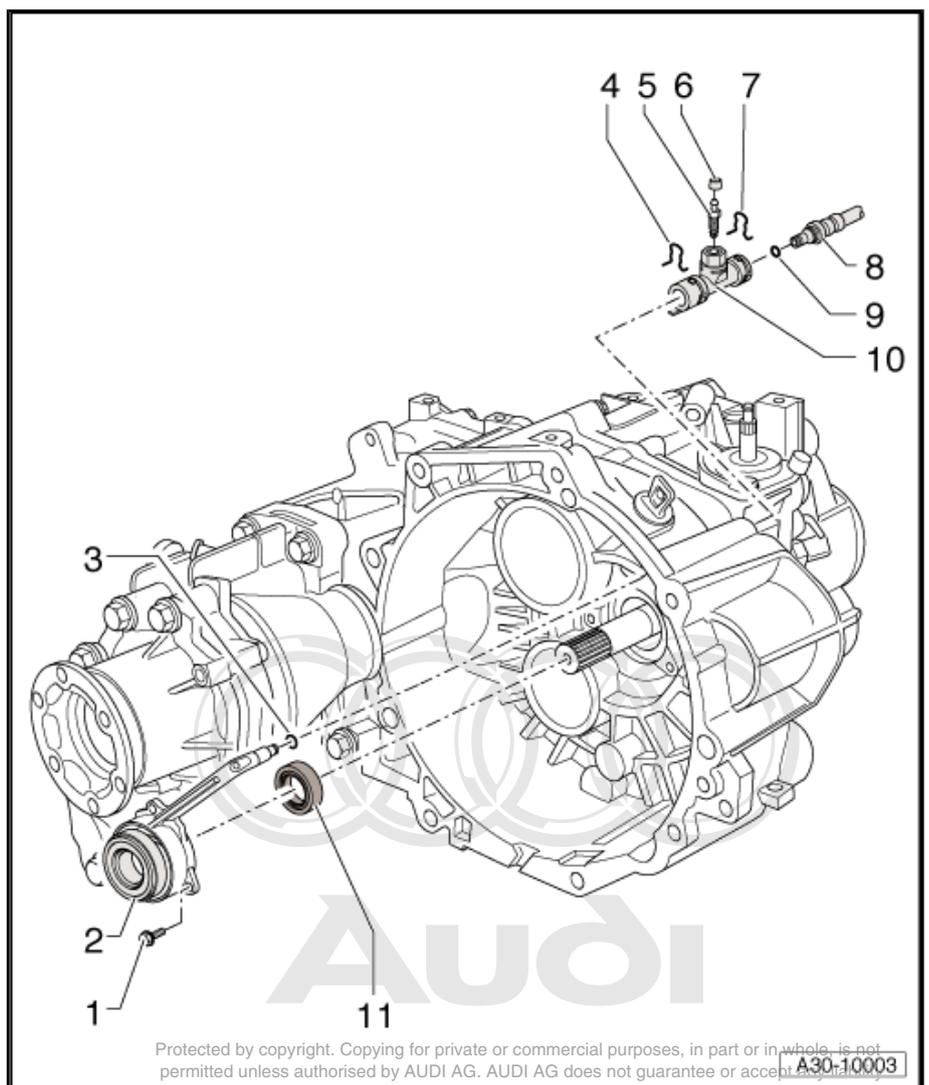
- Tightening specification -17- [⇒ page 20](#)

### 6 - Protective Cap

### 7 - Retaining Clip

### 8 - Hose/line Assembly or Plastic Line

- To the clutch slave cylinder



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- ❑ Removing and installing, refer to ⇒ [“4.1 Hose/Line Assembly or Plastic Line”, page 29](#)

### 9 - O-ring

- ❑ Replace if damaged
- ❑ Pull onto line connection
- ❑ Install with brake fluid

### 10 - Bleeder

- ❑ Removing and installing, refer to ⇒ [“4.7 Slave Cylinder with Release Bearing”, page 39](#)

### 11 - Shaft Seal

- ❑ For input shaft
- ❑ Removing and installing, refer to ⇒ [“4.13 Input Shaft Seal”, page 123](#)

## 2.5 Sachs Clutch Assembly Overview



### Note

*Dual-mass flywheel, pressure plate and clutch plate are allocated to each other and must not be mixed with other manufacturer's components.*

### 1 - Dual-Mass Flywheel

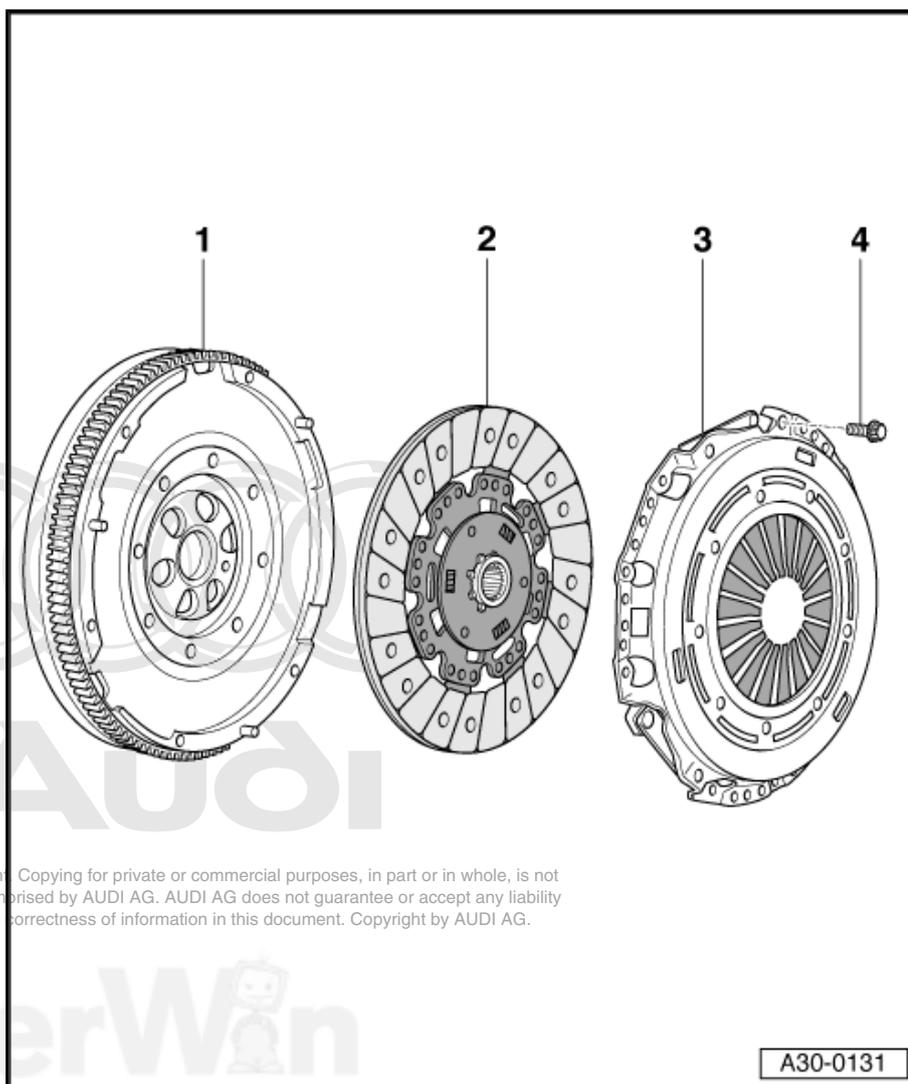
- ❑ Removing and installing, refer to ⇒ Engine Mechanical; Rep. Gr. 13 ; Removal and Installation
- ❑ Make sure centering pins fit securely
- ❑ Contact surface for clutch lining must be free of grooves, oil and grease
- ❑ Observe removal instructions ⇒ [page 24](#)

### 2 - Clutch Plate

- ❑ Removing and installing, refer to ⇒ [“4.8 Sachs Clutch”, page 40](#)
- ❑ Only replace together with pressure plate
- ❑ Installation location ⇒ [page 41](#)
- ❑ Clutch plate diameter, refer to the electronic parts catalog ETKA

### 3 - Pressure Plate

- ❑ With adjustment mechanism
- ❑ Identification ⇒ [page 23](#)
- ❑ Removing and installing, refer to ⇒ [“4.8 Sachs Clutch”, page 40](#)
- ❑ Checking ends of the diaphragm spring ⇒ [page 23](#)



- Check the pull-springs and rivet connections ⇒ [page 23](#)
- Check the wire ring or metal ring ⇒ [page 24](#)
- Only replace together with clutch plate
- Allocation, refer to the electronic parts catalog ETKA
- Contact surface for clutch lining must be free of grooves, oil and grease

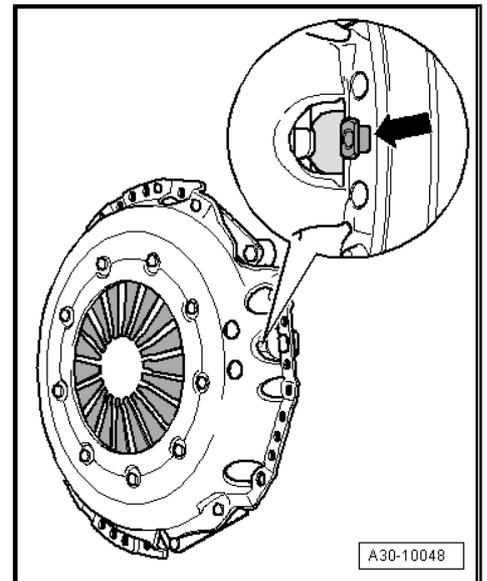
#### 4 - Bolt

- M6 - 13 Nm
- M7 - 20 Nm
- Loosen and tighten one after another in 90° increments

#### Identification of Self-Adjusting Clutch (Sachs)

Pressure plate with stop (locator) -arrow-.

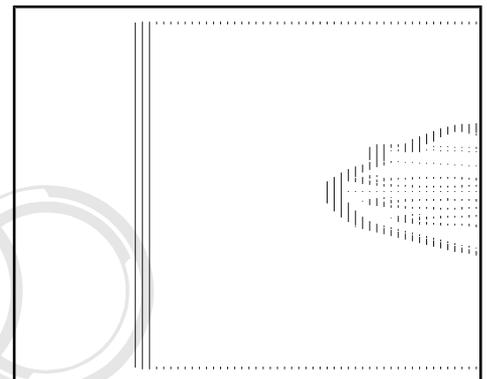
#### Checking Ends of the Diaphragm Spring



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

#### Checking the Pull-Springs and Rivet Connection

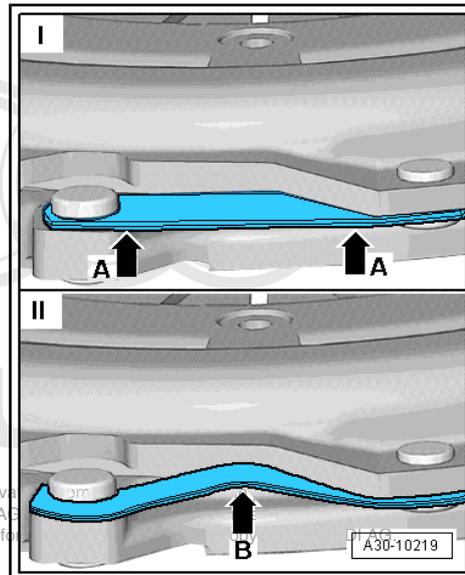
I - Pull-springs OK



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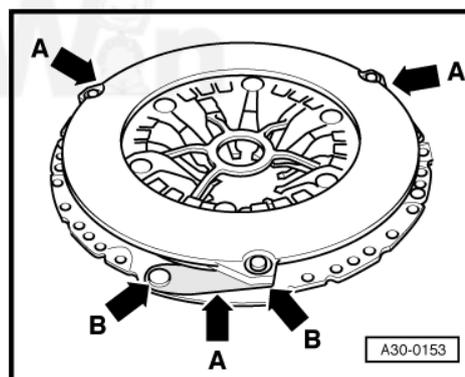
erWin 

- Slight offset in the outer area -arrows A-.
- II - Pull-springs damaged
- The pressure plate must be replaced if the pull-spring is bent or broken off -arrow B-.



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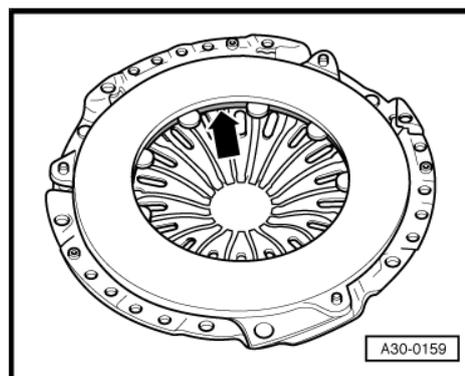
- Make sure the rivet connections -arrows B- fit correctly on all pull-springs -A-.
- Replace any pressure plates that have loose rivet connections -arrow B-.



### Check the Wire Ring or Metal Ring

- Check the wire ring or metal ring inside the pressure plate for damage -arrow-.
- Replace any pressure plates that have a broken wire ring or metal ring.

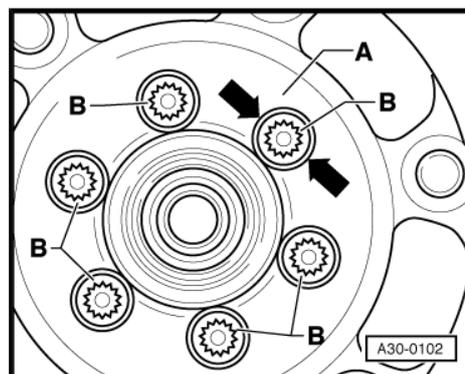
### Removal Instructions for Dual-Mass Flywheel



### Note

*To prevent damaging the dual-mass flywheel when removing, the bolts -B- must not be removed using an air or impact driver. Removal of the bolts is only permissible by hand.*

- Turn the dual-mass flywheel -A- so that the bolts are positioned centrally to the bores -arrows-.
- When removing the bolts, make sure that no bolt head contacts the dual-mass flywheel, otherwise it may be damaged when the bolt is turned further.



## 2.6 LuK Clutch Assembly Overview

### Note

Dual-mass flywheel, pressure plate and clutch plate are allocated to each other and must not be mixed with other manufacturer's components.

#### 1 - Dual-Mass Flywheel

- Removing and installing, refer to ⇒ Engine Mechanical; Rep. Gr. 13; Removal and Installation
- Make sure centering pins fit securely
- Contact surface for clutch lining must be free of grooves, oil and grease
- Observe removal instructions ⇒ [page 27](#)

#### 2 - Clutch Plate

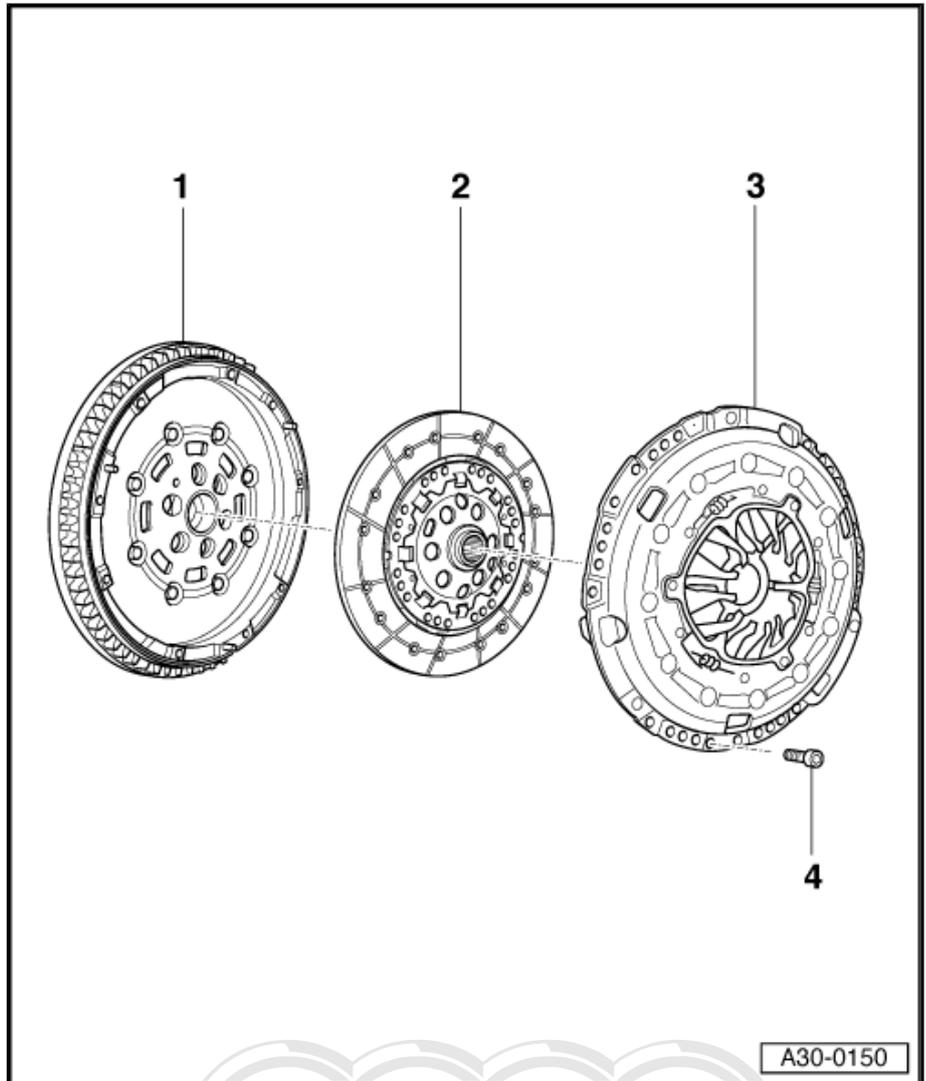
- Removing and installing, refer to ⇒ ["4.9 LuK Clutch", page 42](#)
- Only replace together with SAC pressure plate
- Installation position: the transmission side label faces the transmission
- Clutch plate diameter, refer to the electronic parts catalog ETKA

#### 3 - SAC Pressure Plate

- SAC = Self Adjusting Clutch
- Only replace together with clutch plate
- Removing and installing, refer to ⇒ ["4.9 LuK Clutch", page 42](#)
- Check the adjusting ring position in the case of a new SAC pressure plate ⇒ [page 44](#)
- Checking ends of the diaphragm spring ⇒ [page 23](#)
- Check spring connection and rivet connections ⇒ [page 26](#)
- Check the metal ring ⇒ [page 26](#)
- Contact surface for clutch lining must be free of grooves, oil and grease

#### 4 - Bolt

- M6 - 13 Nm
- M7 - 20 Nm
- Loosen and tighten one after another in 90° increments



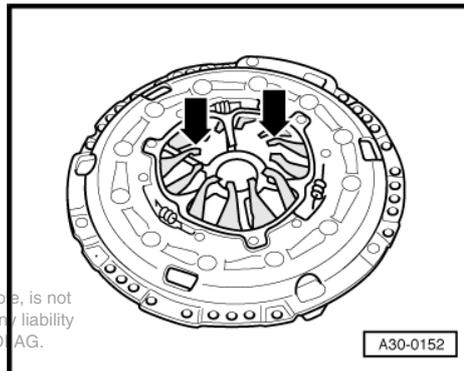
### Checking Ends of the Diaphragm Spring

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

### Checking the Pull-Springs and Rivet Connection

I - Pull-springs OK

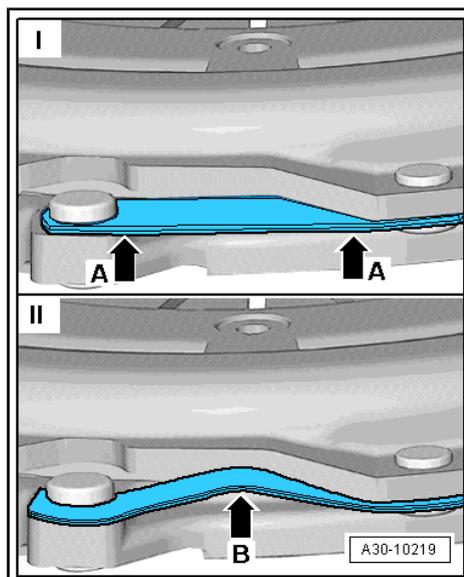
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- Slight offset in the outer area -arrows A-.

II - Pull-springs damaged

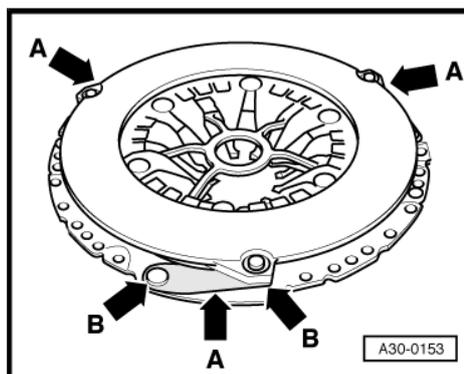
- The pressure plate must be replaced if the pull-spring is bent or broken off -arrow B-.



- Make sure the rivet connections -arrows B- fit correctly on all pull-springs -A-.

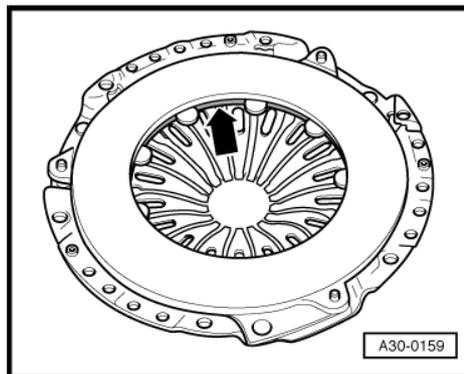
- Replace any pressure plates that have loose rivet connections -arrow B-.

### Checking Metal Ring



- Check the metal ring inside the pressure plate for damage -arrow-.

- Replace any pressure plates that have a broken metal ring.

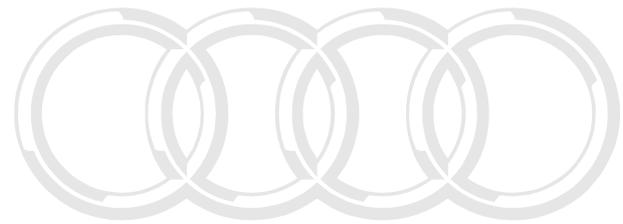
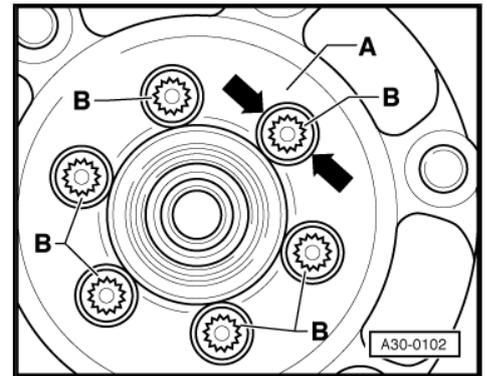


## Removal Instructions for Dual-Mass Flywheel

 **Note**

*To prevent damaging the dual-mass flywheel when removing, the bolts -B- must not be removed using an air or impact driver. Removal of the bolts is only permissible by hand.*

- Turn the dual-mass flywheel -A- so that the bolts are positioned centrally to the bores -arrows-.
- When removing the bolts, make sure that no bolt head contacts the dual-mass flywheel, otherwise it may be damaged when the bolt is turned further.



**Audi**

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### 3 Specifications

⇒ [“3.1 Fastener Tightening Specifications”, page 28](#)

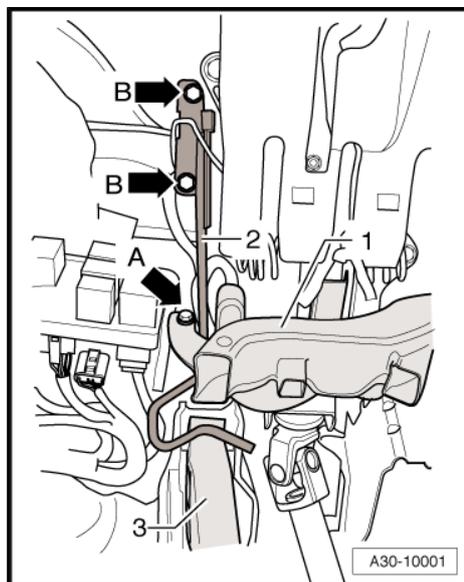
#### 3.1 Fastener Tightening Specifications

Component	Bolt Size	Nm
Bracket for Clutch Pedal, Nut <sup>1,2</sup>		
		20
		25
Clutch Slave Cylinder, Bolt		
Metal		12
Plastic		15
Crash Brace to Mounting Bracket/Steering Column		10
Pressure Plate		
	M6	13
	M7	20
Vent Screw		4.5
<ul style="list-style-type: none"> <li>• <sup>1</sup> Always replace</li> <li>• <sup>2</sup> For bolt tightening clarification, refer to <a href="#">“2.2 Pedal Assembly, Master Cylinder Assembly Overview”, page 17</a> and see items -15 and 16-</li> </ul>		

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#### Impact Bolster - Tightening Specification

- Insert impact bolster -2- and tighten 1 or 2 bolts -B arrows- depending on the version.
- M6: 10 Nm
- M8: 20 Nm



## 4 Removal and Installation

⇒ [“4.1 Hose/Line Assembly or Plastic Line”, page 29](#)

⇒ [“4.2 Over-Center Spring”, page 30](#)

⇒ [“4.3 Clutch Pedal”, page 32](#)

⇒ [“4.4 Mounting Bracket”, page 34](#)

⇒ [“4.5 Clutch Position Sensor”, page 36](#)

⇒ [“4.6 Master Cylinder”, page 37](#)

⇒ [“4.7 Slave Cylinder with Release Bearing”, page 39](#)

⇒ [“4.8 Sachs Clutch”, page 40](#)

⇒ [“4.9 LuK Clutch”, page 42](#)

### 4.1 Hose/Line Assembly or Plastic Line

Special tools and workshop equipment required

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

#### Removing

- Completely remove the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .
- Clamp off the return hose to the clutch master cylinder with a -3094- .



#### Note

- ◆ While performing the following work, make sure that no brake fluid comes into contact with longitudinal member or with transmission. If this happens, these areas must be cleaned thoroughly.
- ◆ Collect any leaking brake fluid with a cloth.

- For removal, use a screwdriver to release securing clip -3- on the clutch master cylinder.
- Remove hose/line assembly -1- or plastic line with O-ring -2- and detach from the bracket.



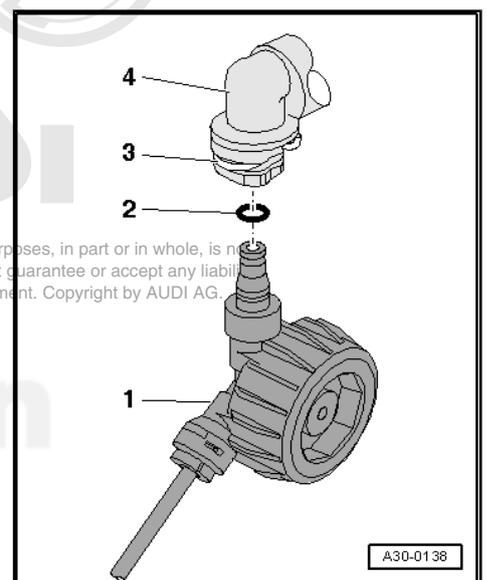
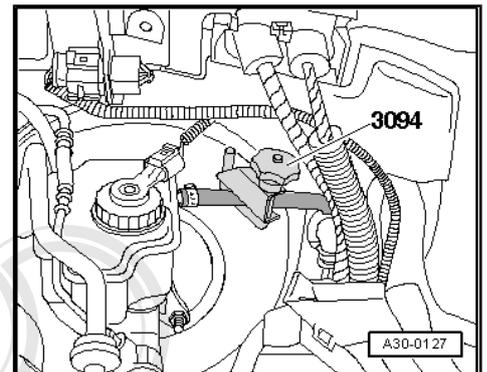
#### Caution

**Do not operate the clutch pedal when the hose/line assembly or plastic line is removed.**



#### Note

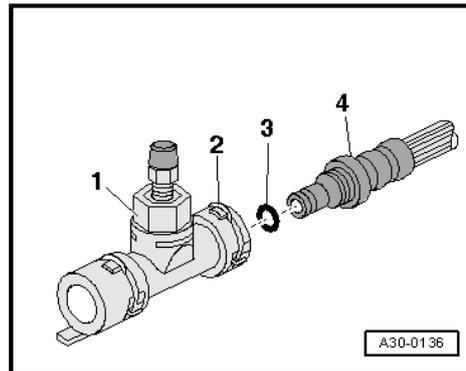
Collect any leaking brake fluid with a cloth.



- For removal, use a screwdriver to release securing clip -2- on the bleeder and remove hose/line assembly -4- or plastic line with O-ring -3- from bleeder -1-.

### Installing

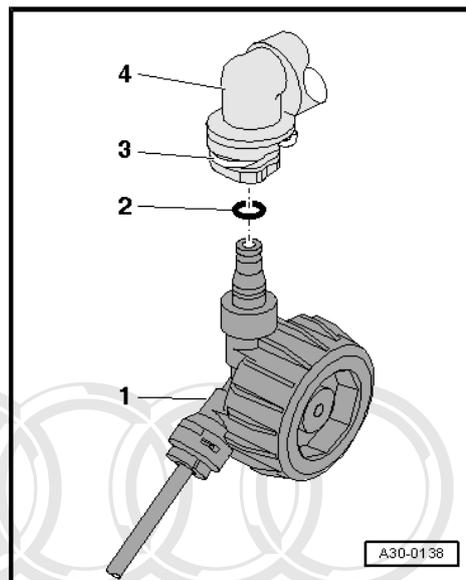
Install in reverse order, paying attention to the following:



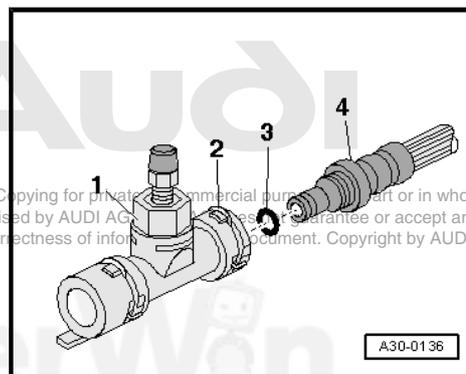
### Note

O-rings -2- or sealing rings - differentiation ⇒ [page 20](#)

- Check O-ring -2- for damage and replace if necessary.
- Press hose/line assembly -1- or the plastic line onto clutch master cylinder connection -4- until securing clip -3- engages audibly.
- Pull on the line to check.



- Check O-ring -3- for damage and replace if necessary.
- Press hose/line assembly -4- or the plastic line onto the bleeder connection until securing clip -2- engages audibly.
- Pull on the line to check.
- Bleed the clutch system. Refer to ⇒ ["1.2 Clutch System, Bleeding", page 12](#) .



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## 4.2 Over-Center Spring

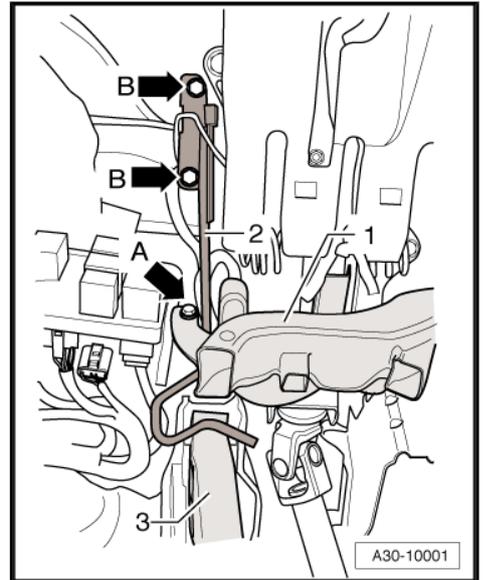
### Special tools and workshop equipment required

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

### Removing

- Mounting bracket for clutch pedal installed in vehicle.
- Move driver seat toward the rear.
- Remove the driver side storage compartment. Refer to ⇒ Body Interior; Rep. Gr. 68 ; Removal and Installation .

- Remove bolt -arrow A- and remove left front footwell vent -1-.
- Unclip wiring guide behind footwell vent -1- and lay aside.
- Remove impact bolster -2- secured with one or two bolts -B arrows- depending on the version.



- Remove clutch pedal -1- from mounting bracket -3-, to do so remove nut -2- and pull out bolt -5-.

 **Note**

*The clutch pedal remains engaged on the clutch master cylinder actuator rod.*

- Swivel clutch pedal slightly downward and remove over-center spring -4- from mounting bracket.

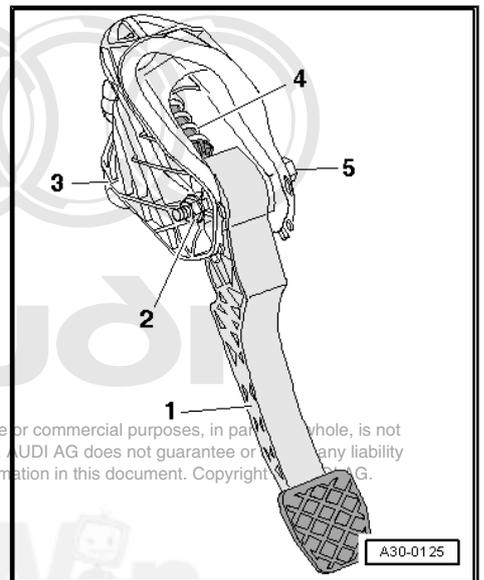
**Installing**

- Tightening specification, refer to ["2.2 Pedal Assembly, Master Cylinder Assembly Overview", page 17](#).

Install in reverse order, paying attention to the following:

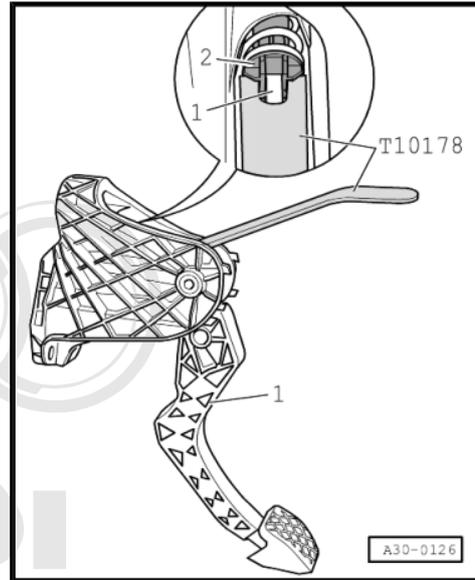
 **Note**

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

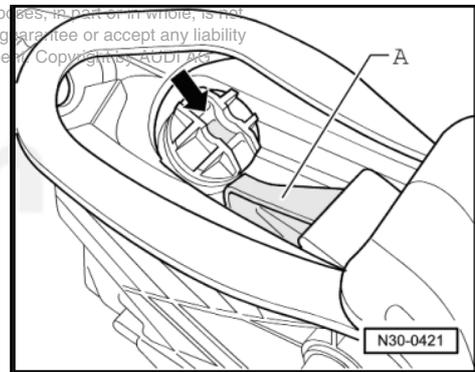




- Place over-center spring -2- in the bearing bracket from above and hold the end of the spring in the installation position with the -T10178- .



- The over-center spring mounting cup -arrow- must be vertical.
- Insert clutch pedal pressure tab -A- in over-center spring mounting cup -arrow-.
- Press on clutch pedal slightly, push bolt through and tighten self-locking nut.
- Install the impact bolster ⇒ [page 18](#) .
- Install the left front footwell vent. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 ; Removal and Installation .
- Install the driver side storage compartment. Refer to ⇒ Body Interior; Rep. Gr. 68 ; Removal and Installation .



### 4.3 Clutch Pedal

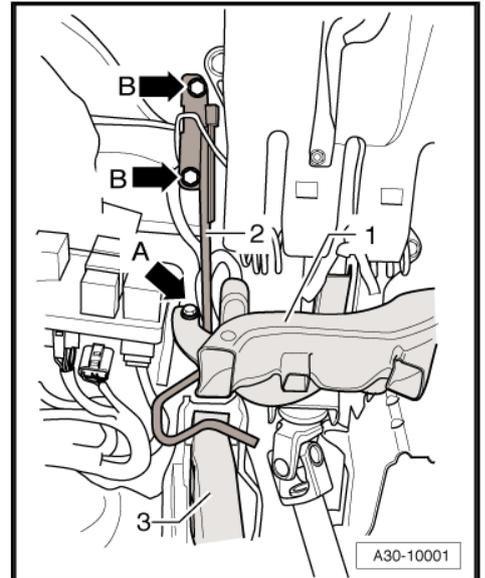
#### Special tools and workshop equipment required

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

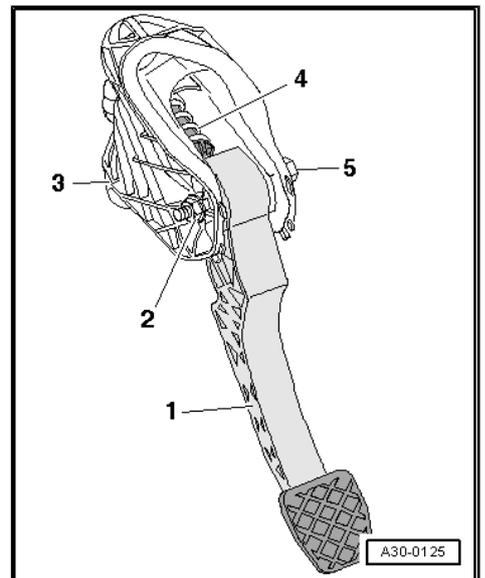
#### Removing

- Mounting bracket for clutch pedal installed in vehicle.
- Move driver seat toward the rear.
- Remove the driver side storage compartment. Refer to ⇒ Body Interior; Rep. Gr. 68 ; Removal and Installation .

- Remove bolt -arrow A- and remove left front footwell vent -1-.
- Unclip wiring guide behind footwell vent -1- and lay aside.
- Remove impact bolster -2- secured with one or two bolts -B arrows- depending on the version.



- Remove clutch pedal -1- from mounting bracket -3-, to do so remove nut -2- and pull out bolt -5-.
- Swivel clutch pedal slightly downward and remove over-center spring -4- from mounting bracket.



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- Disengage the mounting clip of the master cylinder actuator rod using the -T10005-.
- Remove clutch pedal.

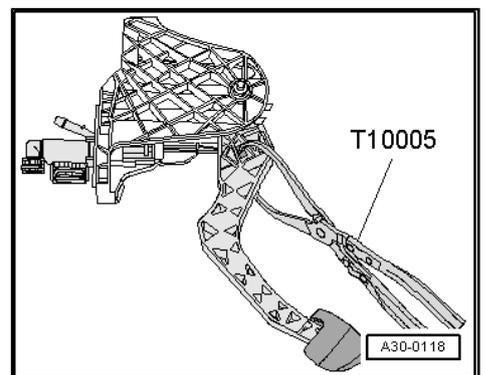
### Installing

- Tightening specification, refer to ["2.2 Pedal Assembly, Master Cylinder Assembly Overview", page 17](#).

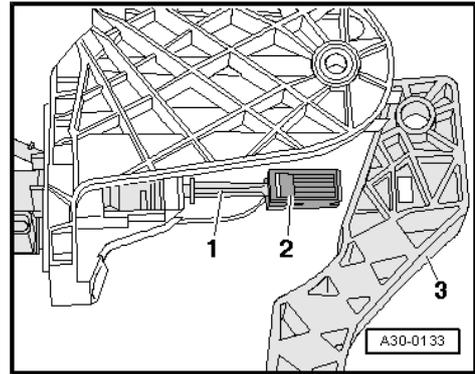
Install in reverse order, paying attention to the following:

### Note

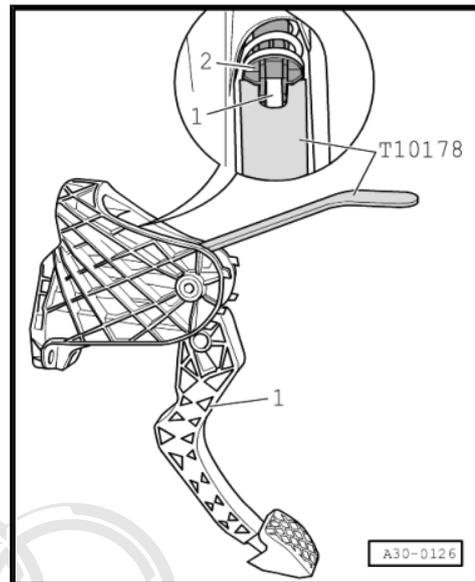
- ◆ *Replace self-locking nut.*
- ◆ *Lubricate the various bearing and contact surfaces with grease -G 000 450 02-.*



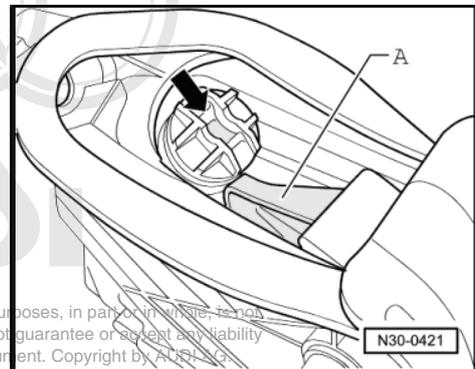
- Attach mounting clip -2- to clutch master cylinder actuator rod -1-.
- Press mounting clip in until it engages audibly in the clutch pedal opening.



- Place over-center spring -2- in the bearing bracket from above and hold the end of the spring in the installation position with the -T10178-.



- The over-center spring mounting cup -arrow- must be vertical.
- Insert clutch pedal pressure tab -A- in over-center spring mounting cup -arrow-.
- Press the clutch pedal up and forward against the force of the over-center spring, slide the bolt through and tighten the self-locking nut.



 **Note**

*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 impact bolster ⇒ [page 18](#) .
- Install the left front footwell vent. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 ; Removal and Installation .
- Install the driver side storage compartment. Refer to ⇒ Body Interior; Rep. Gr. 68 ; Removal and Installation .

#### 4.4 Mounting Bracket

##### Special tools and workshop equipment required

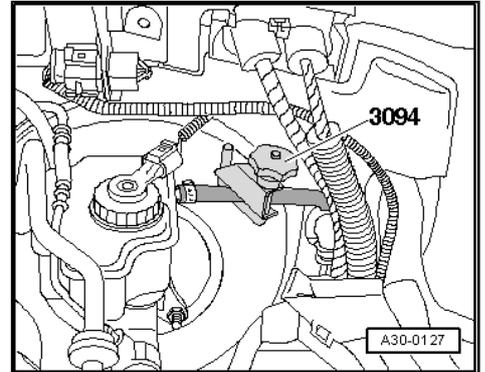
- ◆ Hose Clamps Up to 25 mm Diameter -3094-
- ◆ Hose Clip Pliers -VAS 6340-

## Removing

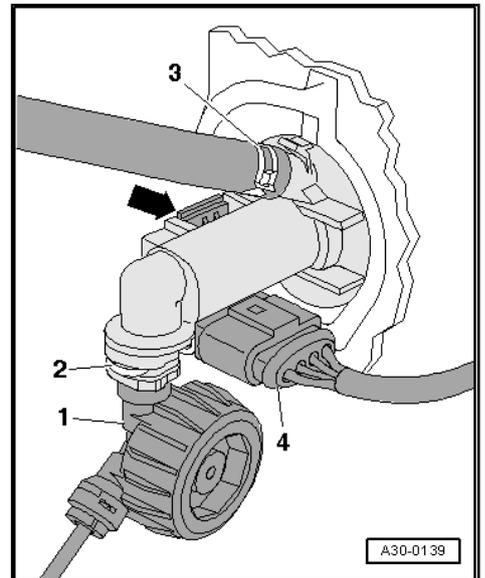
### Note

*While performing the following work, make sure that no brake fluid comes into contact with longitudinal member or with the transmission. If this happens, these areas must be cleaned thoroughly.*

- Clamp off the return hose to the clutch master cylinder with a -3094- .



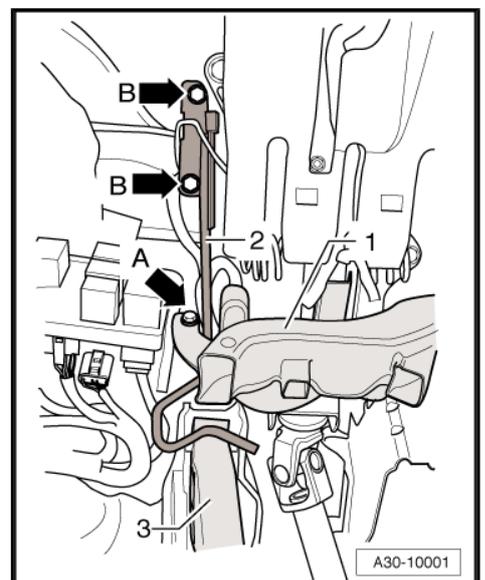
- Remove the return hose from the clutch master cylinder by releasing spring clamp -3- with the -VAS 6340- if necessary.
- Release securing clip -2- with a screwdriver and pull off hose/line assembly -1- or plastic line from the clutch master cylinder.
- Unclip the clutch position sensor -G476- at the clutch master cylinder -arrow- and remove with harness connector -4- still connected.
- Slide driver's seat as far to the rear as possible and set steering wheel to the highest position.
- Remove the driver side storage compartment. Refer to => Body Interior; Rep. Gr. 68 ; Removal and Installation .



- Remove bolt -arrow A- and remove left front footwell vent -1-.
- Unclip wiring guide behind footwell vent -1- and lay aside.
- Remove impact bolster -2- - secured with one or two bolts -B arrows- depending on the version.

### Note

*When performing work in the footwell, place rags on the floor covering to protect it from brake fluid spills.*



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

### Installing

- Tightening specification, refer to  
 ⇒ ["2.2 Pedal Assembly, Master Cylinder Assembly Overview"](#), [page 17](#) .

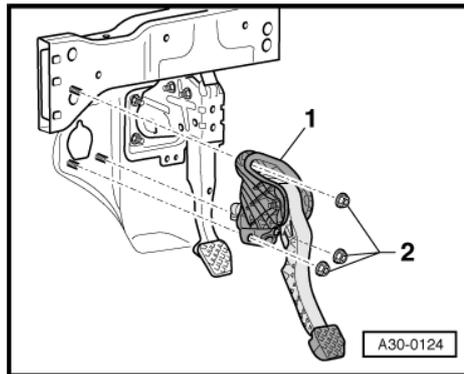
Install in reverse order, paying attention to the following:



### Note

- ◆ *Replace self-locking nuts.*
- ◆ *Secure all hose connections with hose clamps of the same type as those equipped by the factory. Refer to the electronic parts catalog ETKA.*

- Insert mounting bracket -1- and tighten nuts -2-.
- Install the hose/line assembly or plastic line. Refer to  
 ⇒ ["4.1 Hose/Line Assembly or Plastic Line"](#), [page 29](#) .
- Bleed the clutch system. Refer to  
 ⇒ ["1.2 Clutch System, Bleeding"](#), [page 12](#) .
- Install the impact bolster ⇒ [page 18](#) .
- Install the left front footwell vent. Refer to ⇒ Heating, Ventilation and Air Conditioning; Rep. Gr. 87 ; Removal and Installation .
- Install the driver side storage compartment. Refer to ⇒ Body Interior; Rep. Gr. 68 ; Removal and Installation .



## 4.5 Clutch Position Sensor

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### Removing

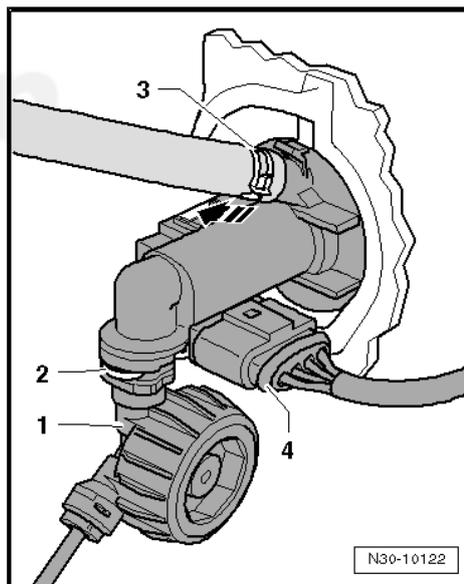
- Disconnect electrical connector -4-.
- Unclip the clutch position sensor -G476- at the clutch master cylinder in direction of the -arrow- and remove it.



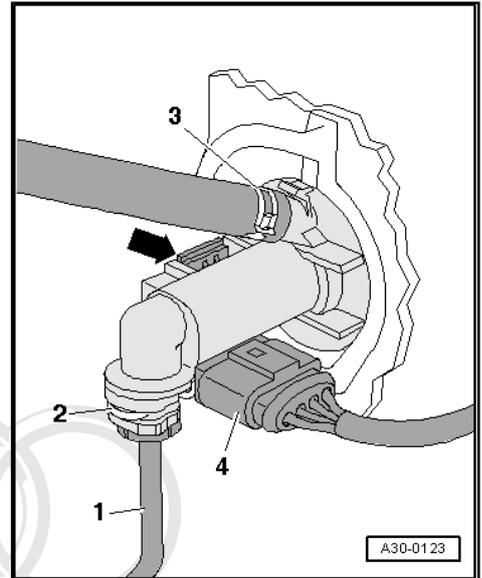
### Note

*Ignore items -1, 2 and 3-.*

### Installing



- Install the clutch position sensor at the clutch master cylinder and engage -arrow-.
- Connect harness connector -4-.



## 4.6 Master Cylinder

### Special tools and workshop equipment required

- ◆ Pliers -T10005-

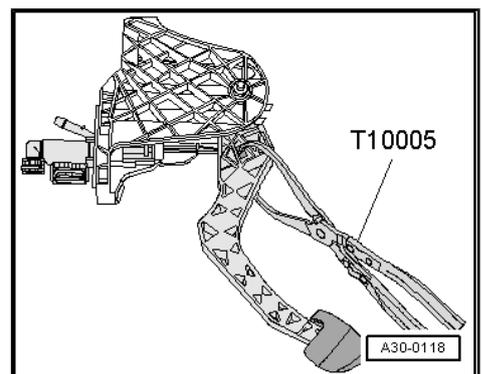
### Removing



#### Note

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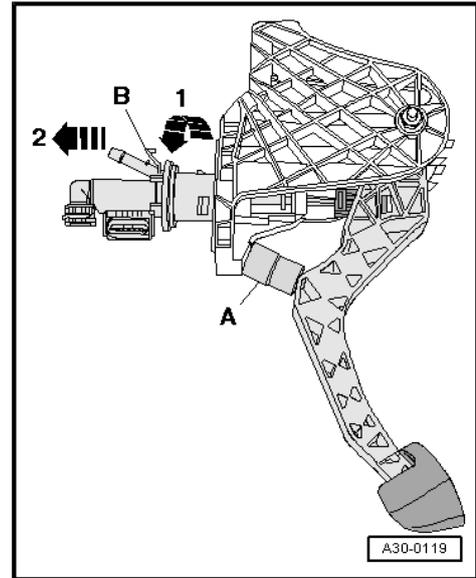
- ◆ *Before replacing the clutch slave cylinder, perform a function test first. Refer to ⇒ "1.3 Information Regarding the Removal and Installation of the Clutch Master or Slave Cylinder", page 13 .*
- ◆ *When performing work in the footwell, place rags on the floor covering to protect it from brake fluid spills.*
- Remove the mounting bracket. Refer to ⇒ "4.4 Mounting Bracket", page 34 .
- Release actuator rod mounting clip in clutch pedal with - T10005- .



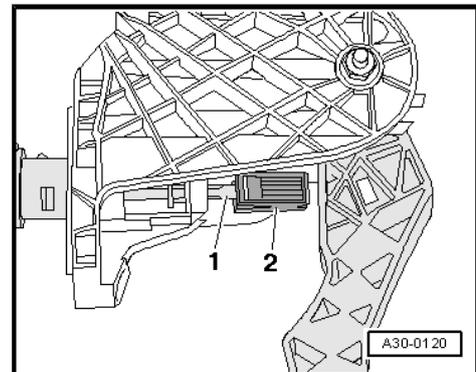
- Place a spacer -A- between the clutch pedal and the stop and press the clutch pedal forward.
- Length of spacer = approximately 40 mm (for example 1/2" socket insert)
- Release retaining clip -B- and pull the clutch master cylinder out of the bearing bracket -arrow 1- and -arrow 2-.

#### Installing

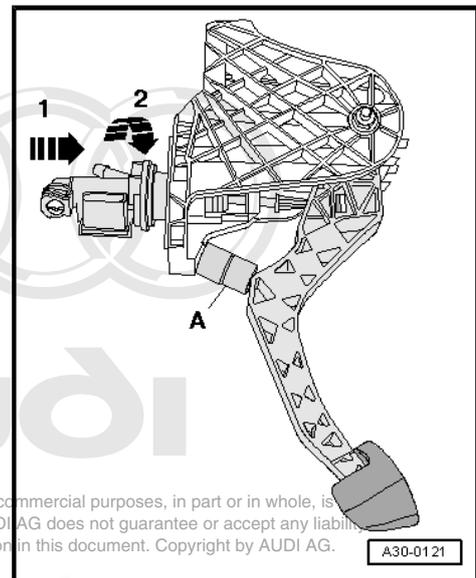
- Move clutch pedal up to stop in rest position.



- Attach mounting clip -2- to clutch master cylinder actuator rod -1-.

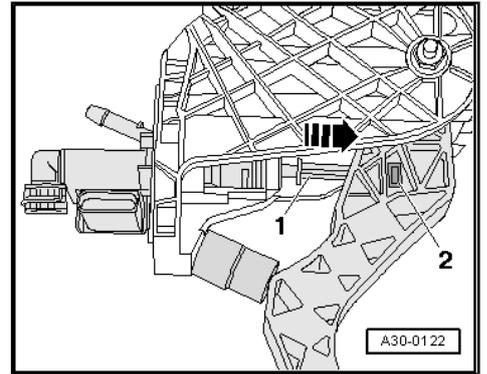


- Place a spacer -A- between the clutch pedal and the stop and press the clutch pedal forward.
- Length of spacer = approximately 40 mm (for example 1/2" socket insert)
- Secure the clutch master cylinder on the bearing bracket -arrow 1- and -arrow 2-.



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- Press clutch master cylinder actuator rod -1- in direction of the -arrow- until mounting clip -2- engages audibly in the clutch pedal.
- Install mounting bracket. Refer to [⇒ "4.4 Mounting Bracket", page 34](#) .



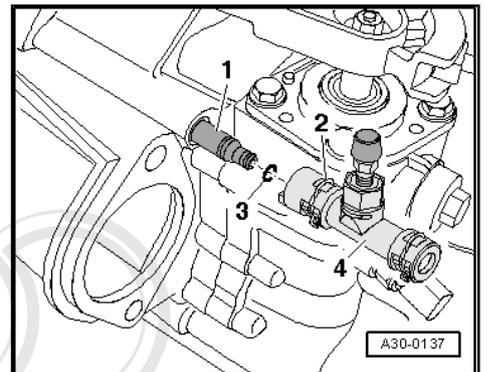
## 4.7 Slave Cylinder with Release Bearing

### Note

*Slave cylinder and release bearing are one unit and can only be replaced together.*

### Removing

- Transmission removed, refer to [⇒ "4.4 Transmission, Removing", page 96](#) .
- Release securing clip -2- with a screwdriver and pull off bleeder -4- from clutch slave cylinder -1-.



- Remove bolts -arrows-.
- Remove the clutch slave cylinder together with release bearing -A-.

### Installing

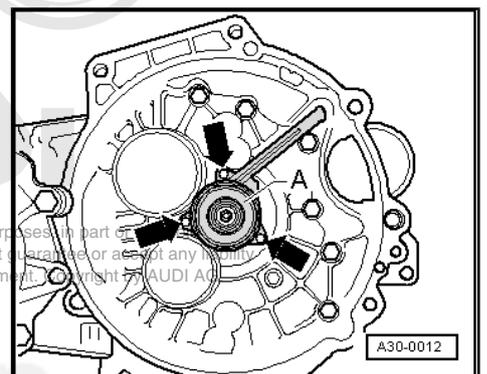
- Tightening specification, refer to [⇒ "2.4 Clutch Release Mechanism, Clutch Slave Cylinder Assembly Overview", page 21](#) .

Install in reverse order, paying attention to the following:



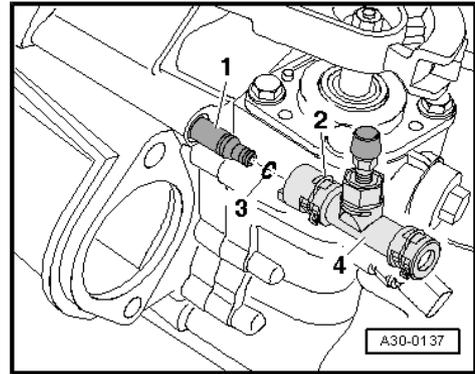
### Caution

*The clutch slave cylinder bolts may only be tightened in small increments. Otherwise, there is the danger that the mounting tabs -arrows- could break off.*



- Tighten the clutch slave cylinder with the release bearing -arrows-.

- Check O-ring -3- for damage and replace if necessary.
- Press bleeder -4- onto clutch slave cylinder connection -1- until securing clip -2- engages audibly.
- Pull on the bleeder to verify.
- Bleed the clutch system. Refer to [⇒ "1.2 Clutch System, Bleeding", page 12](#) .



## 4.8 Sachs Clutch

### Special tools and workshop equipment required

- ◆ Flywheel Retainer -3067-
- ◆ Centering Pin -T10097-
- ◆ Grease for clutch disc shaft splines -G 000 100-

### Removing

- Transmission removed, refer to [⇒ "4.4 Transmission, Removing", page 96](#) .

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

- Insert -3067- to loosen bolts.
- Loosen all 6 bolts clockwise, one after the other and in steps of 90° (1/4 turn) until the pressure plate is free.



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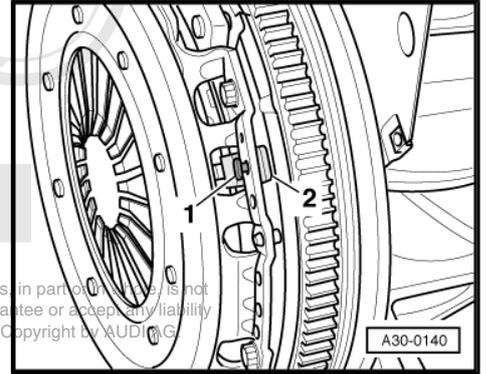


- When removing, stop -2- must loosen together with pin -1-.
- If the stop does not loosen: push the bolt toward the dual mass flywheel.
- Remove the pressure plate and the clutch plate.

### Installing

- Tightening specification, refer to [⇒ "2.5 Sachs Clutch Assembly Overview", page 22](#).

Install in reverse order, paying attention to the following:

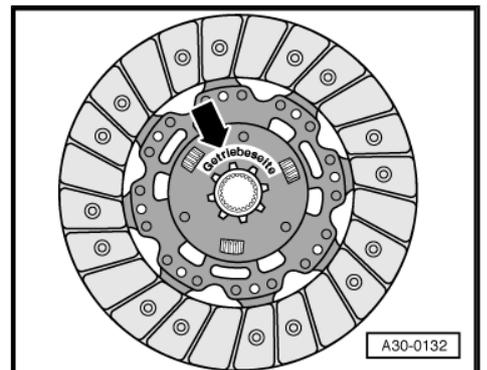


### Note

- ◆ *Dual-mass flywheel, pressure plate and clutch plate are allocated to each other and must not be mixed with other manufacturer's components.*
- ◆ *Only replace the clutch plate and pressure plate together and allocate via engine code, refer to the electronic parts catalog ETKA.*
- ◆ *To reduce odor caused by a burnt clutch, thoroughly clean the transmission housing around the clutch as well as the engine on the transmission side.*
- ◆ *Clean the input shaft splines on a used clutch plate, the hub splines, remove corrosion and apply only a very thin coating of grease -G 000 100- onto the splines. Then move clutch plate back and forth on input shaft until the hub moves freely on the shaft. Excess grease must be removed.*
- ◆ *The clutch pressure plates are corrosion-protected and greased. With the exception of the friction surface on the clutch plate, do not clean the pressure plate. This will shorten the service life of the clutch considerably.*
- ◆ *The pressure plate contact surface and clutch plate lining must make full contact with flywheel. Only then may the securing bolts be installed.*
- ◆ *Only use compressed air to blow out the dual-mass flywheel.*
- ◆ *The friction surfaces on the pressure plate and on the dual mass flywheel must be cleaned thoroughly (degreased).*
- ◆ *Make sure centering sleeves for engine to transmission are installed in cylinder block, install if necessary.*
- ◆ *If alignment sleeves are not installed, difficulty in shifting, clutch problems and possibly noises from the transmission (loose gear chatter) may develop.*

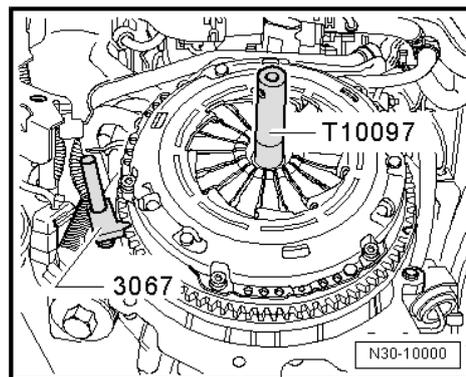
### Installation Position of Clutch Plate

- Marking Getriebeseite -arrow- (transmission side) and the projecting spring cage faces toward transmission.

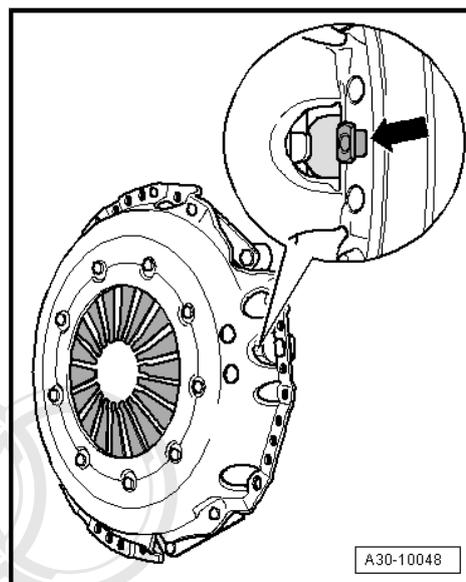


- Insert -3067- .
- Position the pressure plate on the alignment pins.
- To center the clutch plate, use the -T10097- .

Install the pressure plate as follows so that the pressure plate does not distort during installation (causing shuddering during acceleration):



- Make sure that the stop pin (locator) -arrow- can be moved easily.
- Install all 6 bolts evenly, by hand, until the bolt heads contact the pressure plate.
- Tighten all 6 bolts clockwise, one after the other and in steps of 90° (1/4 turn) until the housing contacts the flywheel.
- When doing this, the stop pin -arrow- must lift off from the pressure plate.
- Tighten all 6 bolts clockwise, one after the other to tightening specification. Tightening specification -4- => [page 23](#) .



## 4.9 LuK Clutch

### Special tools and workshop equipment required

- ◆ Flywheel Retainer -3067-
- ◆ Centering Pin -T10097-

- ◆ Grease for clutch disc shaft splines -G.000.100-

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### Removing

- Transmission removed, refer to ["4.4 Transmission, Removing", page 96](#) .

- Insert -3067- to loosen bolts.

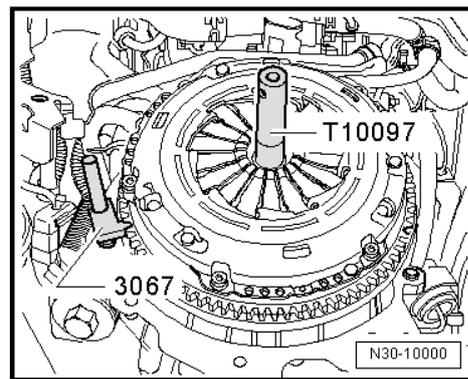
When removing, loosen the bolts as follows, so that the pressure plate does not distort (causing shuddering on acceleration):

- Loosen all 6 bolts clockwise, one after the other and in steps of 90° (1/4 turn) until the pressure plate is free.
- Remove the pressure plate and the clutch plate.

### Installing

- Tightening specification, refer to [⇒ "2.6 LuK Clutch Assembly Overview", page 25](#).

Install in reverse order, paying attention to the following:

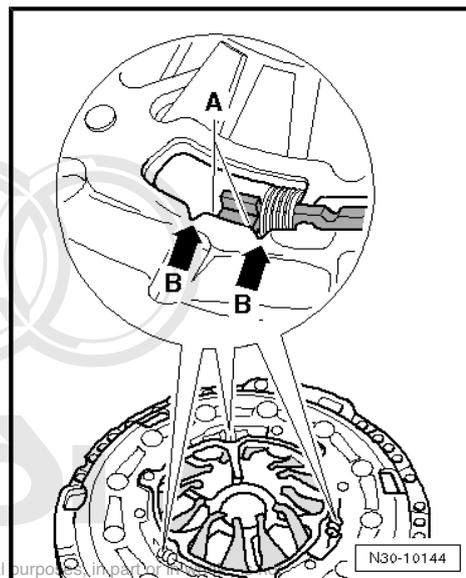


### Note

- ◆ *Dual-mass flywheel, pressure plate and clutch plate are allocated to each other and must not be mixed with other manufacturer's components.*
- ◆ *Only replace the clutch plate and pressure plate together and allocate via engine code, refer to the electronic parts catalog ETKA.*
- ◆ *Check the adjusting ring position in the case of a new pressure plate ⇒ [page 44](#).*
- ◆ *To reduce odor caused by a burnt clutch, thoroughly clean the transmission housing around the clutch as well as the engine on the transmission side.*
- ◆ *Clean the input shaft splines and on a used clutch plate, the hub splines, remove corrosion and apply only a very thin coating of grease -G 000 100- onto the splines. Then move clutch plate back and forth on input shaft until the hub moves freely on the shaft. Excess grease must be removed.*
- ◆ *The clutch pressure plates are corrosion-protected and greased. With the exception of the friction surface on the clutch plate, do not clean the pressure plate. This will shorten the service life of the clutch considerably.*
- ◆ *The pressure plate contact surface and clutch plate lining must make full contact with flywheel. Only then may the securing bolts be installed.*
- ◆ *Only use compressed air to blow out the dual-mass flywheel.*
- ◆ *The friction surfaces on the pressure plate and on the dual mass flywheel must be cleaned thoroughly (degreased).*
- ◆ *Make sure alignment sleeves for engine to transmission are installed in cylinder block, install if necessary.*
- ◆ *If alignment sleeves are not installed, difficulty in shifting, clutch problems and possibly noises from the transmission (loose gear chatter) may develop.*

### Only Check the Position of the Adjustment Mechanism in the Case of new SAC Pressure Plates

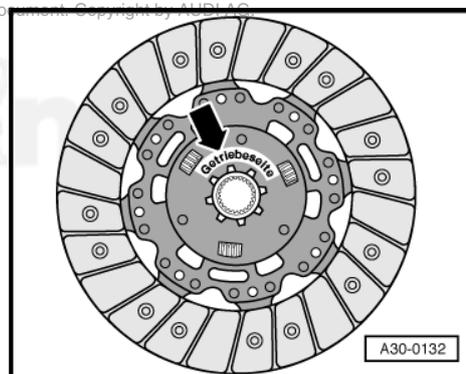
- Both edges -A- of the adjusting ring must be located between both notches -B arrows-.
- If the adjusting ring takes on a different position with new pressure plates, pressure plate and clutch plate must not be installed.
- With used clutches, the adjusting ring may take on a position outside of the notches.



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### Clutch Plate Installation Location

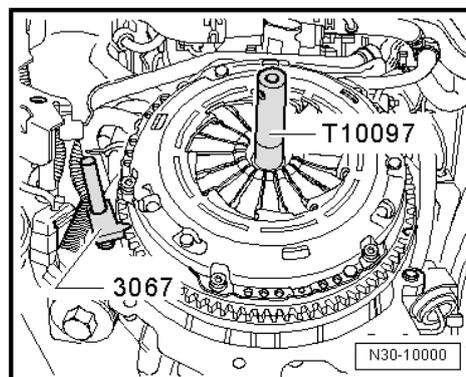
- Marking Getriebeseite -arrow- (transmission side) faces toward transmission.



- Insert -3067- .
- Position the pressure plate on the alignment pins.
- To center the clutch plate, use the -T10097- .

Install the pressure plate as follows so that the pressure plate does not distort during installation (causing shuddering during acceleration):

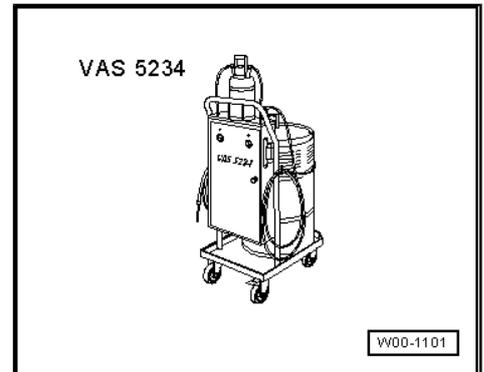
- Install all 6 bolts evenly, by hand, until the bolt heads contact the pressure plate.
- Tighten all 6 bolts clockwise, one after the other and in steps of 90° (1/4 turn) until the housing contacts the flywheel.
- Tighten all 6 bolts clockwise, one after the other to tightening specification. Tightening specification -4- => [page 25](#) .



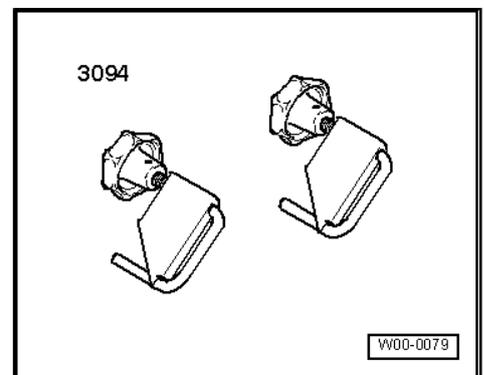
## 5 Special Tools

### Special tools and workshop equipment required

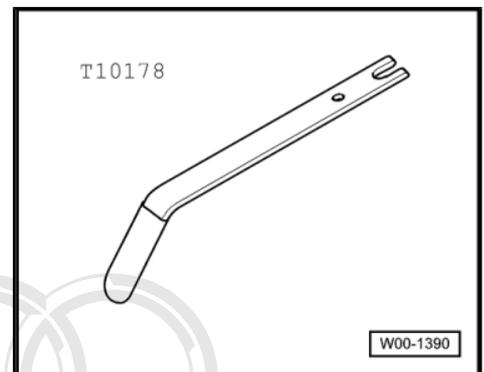
- ◆ Brake Filler/Bleeder Unit -VAS 5234-



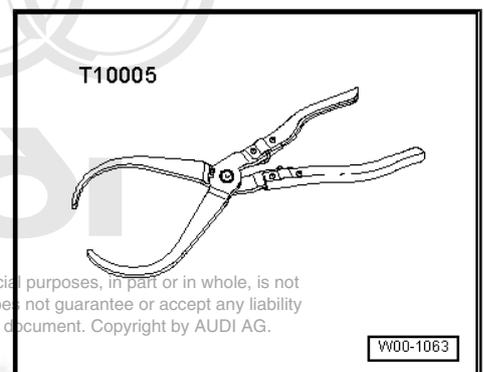
- ◆ Hose Clamps Up to 25 mm Diameter. -3094-



- ◆ Assembly Tool -T10178-

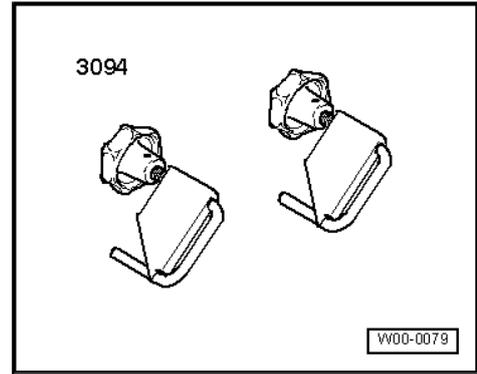


- ◆ Pliers -T10005-

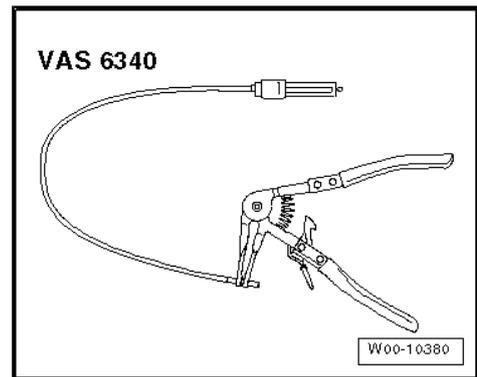


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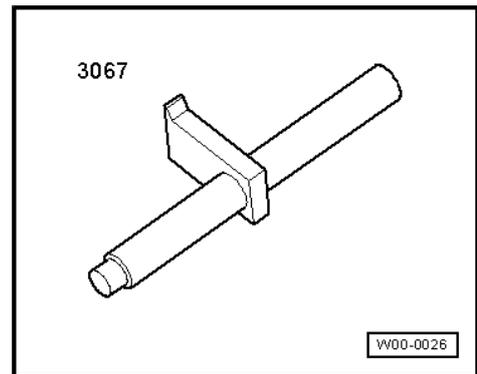
◆ Hose Clamps Up to 25 mm Diameter -3094-



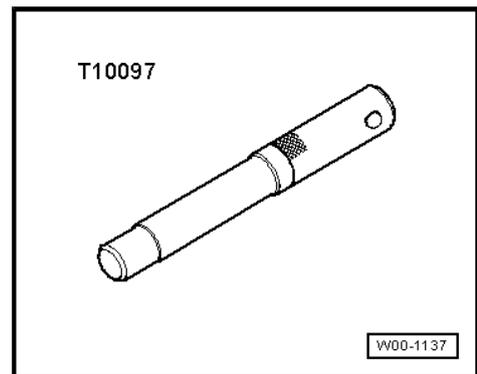
◆ Hose Clip Pliers -VAS 6340-



◆ Flywheel Retainer -3067-



◆ Centering Pin -T10097-



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## 34 – Controls, Housing

### 1 General Information

⇒ [“1.1 Manual Transmission, Checking Gear Oil Level”, page 47](#)

⇒ [“1.2 Gear Oil in Bevel Box, Checking”, page 48](#)

⇒ [“1.3 Gear Oil in Bevel Box, Filling”, page 49](#)

#### 1.1 Manual Transmission, Checking Gear Oil Level



##### Note

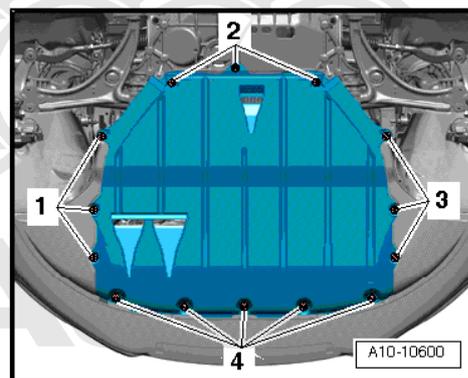
- ◆ *The manual transmission and bevel box have separate supplies.*
- ◆ *Axle oil level in bevel box, checking. Refer to ⇒ [“1.2 Gear Oil in Bevel Box, Checking”, page 48](#).*
- ◆ *Transmission oil specification, refer to the electronic parts catalog ETKA.*

##### Special tools and workshop equipment required

- ◆ Triple Square Socket Driver -3357-
- ◆ Used Oil Collecting and Extracting Device -V.A.G 1782-

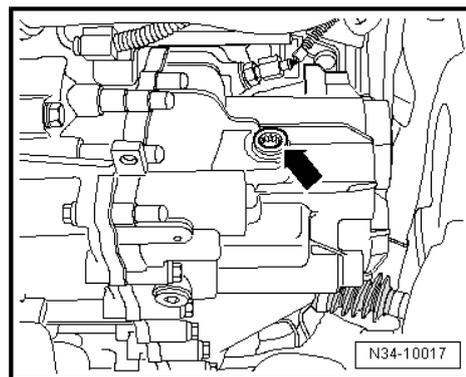
##### Procedure

- Tightening specification, refer to ⇒ [“3.2 Manual Transmission Oil Filler Plug”, page 87](#).
- Drive the vehicle onto a 4-column lift or over a service pit so that it is level.
- Remove noise insulation in center by loosening fasteners -1 through 4-.
- Place the -V.A.G 1782- under the transmission.



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- Remove the bolt -arrow- for the oil filler hole in the manual transmission.
- Target value: the fluid level must reach the lower edge of the oil filler hole.
- Add gear oil if necessary.
- Tighten the bolt for the oil filler hole with a new sealing ring.
- Install the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .



## 1.2 Gear Oil in Bevel Box, Checking



### Note

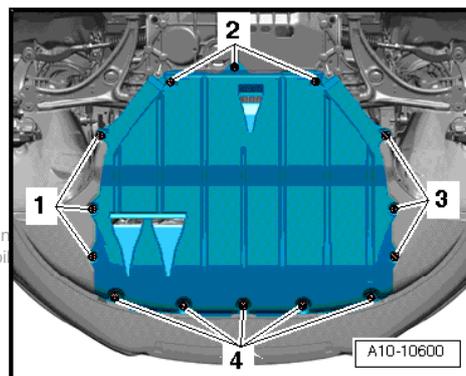
- ◆ *Bevel box is installed to the side of manual transmission and has a separate self-contained oil system.*
- ◆ *Axle oil specification, refer to the electronic parts catalog ET-KA.*

### Special tools and workshop equipment required

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

### Procedure

- Vehicle must be level
- Bevel box must be in installation location.
- Tightening specification, refer to ⇒ ["3.1 Bevel Box Oil Filler Bolt", page 87](#) .
- Remove noise insulation in center by loosening fasteners -1 through 4-
- Place the -V.A.G 1782- under the bevel box.



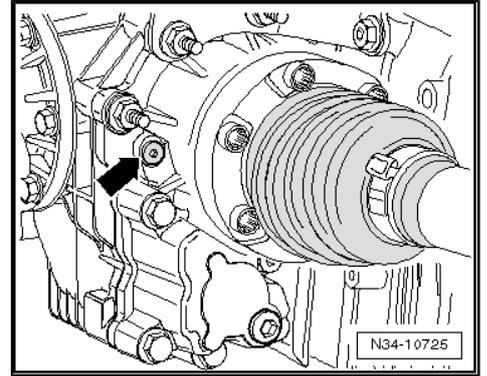
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- Remove oil filler bolt -arrow- in bevel box.
- Target value: the fluid level must reach the lower edge of the oil filler hole.
- Add gear oil if necessary. Refer to [⇒ "1.3 Gear Oil in Bevel Box, Filling", page 49](#) .

 **Note**

*Carefully remove leaking oil on bevel box.*

- Tighten the new oil filler bolt. Tightening specification [⇒ page 87](#)
- Install the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .



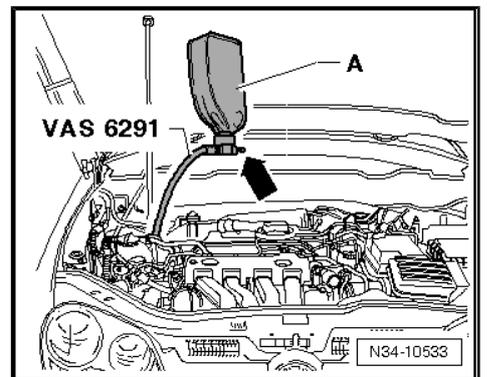
### 1.3 Gear Oil in Bevel Box, Filling

#### Special tools and workshop equipment required

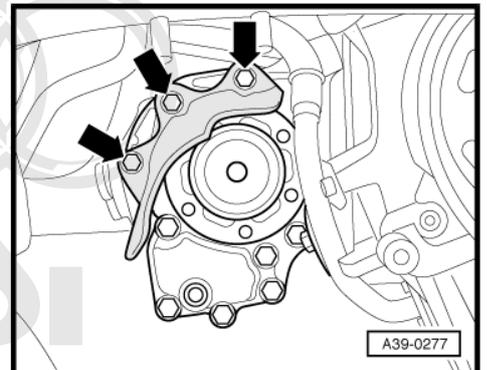
- ◆ Used Oil Collecting and Extracting Device -V.A.G 1782-
- ◆ Charging Device F/haldex 2 Coup. -VAS 6291-

#### Procedure

- Vehicle must be level
- Bevel box must be in installation location.
- Tightening specification, refer to [⇒ "3.1 Bevel Box Oil Filler Bolt", page 87](#) .
- Route the hose of the -VAS 6291- through the engine compartment.



- Remove right drive axle heat shield from bevel box -arrows-.

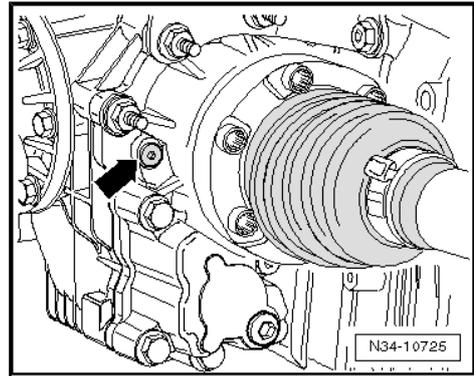


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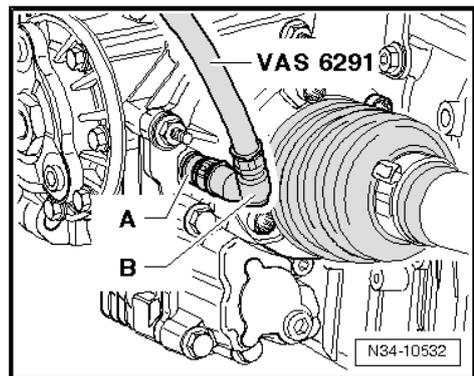
**i** Note

Cover area below oil filler bolt -arrow- with a cloth.

- Place the -V.A.G 1782- under the bevel box.
- Remove oil filler bolt -arrow- in bevel box.

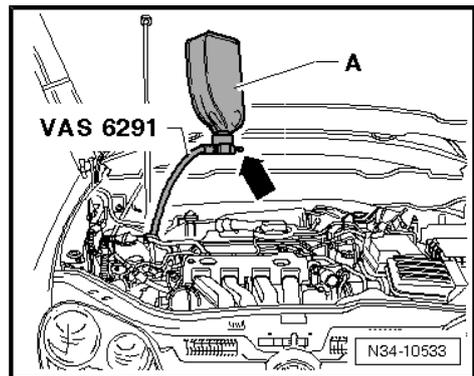


- Disconnect adapter -A- and elbow -B-.
- Install adapter -A- to stop.
- Engage elbow -B- with adapter -A-.
- Hose must not hang through.

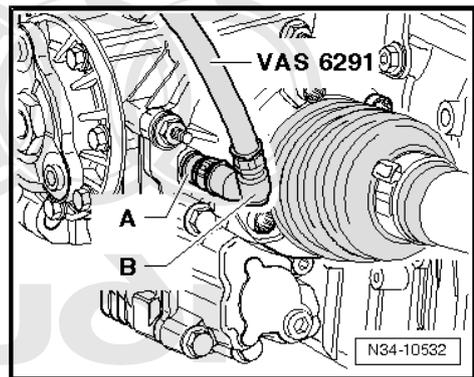


- Make sure valve -arrow- is closed.
- Screw oil container -A- onto the -VAS 6291- .
- Now open valve -arrow- and hold oil container as shown in illustration.

Bevel box is now filled.



- When bevel box is filled correctly, oil escapes at adapter -A-.
- Once oil has escaped at adapter -A-, place oil reservoir on a low surface so some of the excess oil can flow out of the hose back into the oil reservoir.



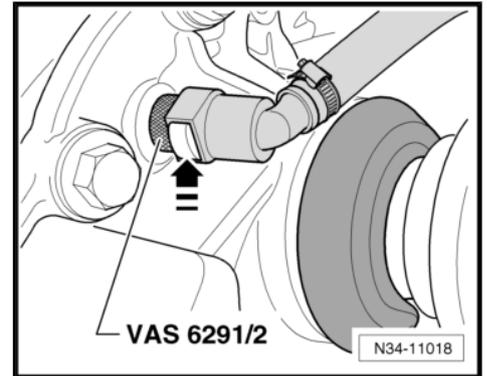
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- When no more oil flow backs, remove the -VAS 6291- by pressing the tab in direction of the -arrow-.
- Make sure there is still oil in the charging device hose.
- Remove the adapter -VAS 6291/2- .
- Insert and tighten the new oil filler bolt. Tightening specification ⇒ [page 87](#)

 **Note**

*Carefully remove leaking oil on bevel box.*

- Install the right drive axle heat shield ⇒ [page 113](#) .
- Install the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .



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## 2 Description and Operation

- ⇒ [“2.1 Selector Mechanism Overview”, page 52](#)
- ⇒ [“2.2 Shift Knob and Covers Assembly Overview”, page 54](#)
- ⇒ [“2.3 Shift Lever and Shift Housing for Vehicles to VIN 8J-7-013000 Assembly Overview”, page 56](#)
- ⇒ [“2.4 Shift Lever and Shift Housing for Vehicles from VIN 8J-7-013001 Assembly Overview”, page 59](#)
- ⇒ [“2.5 Shift Cable and Selector Cable to Model Year 2007 Assembly Overview”, page 61](#)
- ⇒ [“2.6 Transmission Shift Lever and Selector Relay Lever to Model Year 2007 Assembly Overview”, page 63](#)
- ⇒ [“2.7 Shift Cable and Selector Cable from Model Year 2008 Assembly Overview”, page 65](#)
- ⇒ [“2.8 Shift Mechanism, Adjusting”, page 69](#)
- ⇒ [“2.9 Subframe Mount Assembly Overview”, page 72](#)
- ⇒ [“2.10 Transmission Overview”, page 75](#)
- ⇒ [“2.11 Transmission Assembly Overview”, page 76](#)
- ⇒ [“2.12 Transmission Housing and Shift Mechanism Assembly Overview”, page 77](#)
- ⇒ [“2.13 Input Shaft, Output Shafts, Differential, Bevel Box and Selector Rods Assembly Overview”, page 79](#)
- ⇒ [“2.14 Transmission Housing Assembly Overview”, page 81](#)
- ⇒ [“2.15 Clutch Housing Assembly Overview”, page 83](#)
- ⇒ [“2.16 Shift Mechanism Assembly Overview, Transmission Side”, page 85](#)
- ⇒ [“2.17 Shift Forks Assembly Overview”, page 86](#)

### 2.1 Selector Mechanism Overview

- ◆ ⇒ [“2.2 Shift Knob and Covers Assembly Overview”, page 54](#)
- ◆ ⇒ [“4.1 Shift Knob with Shift Lever Boot”, page 90](#)
- ◆ ⇒ [“2.3 Shift Lever and Shift Housing for Vehicles to VIN 8J-7-013000 Assembly Overview”, page 56](#)
- ◆ ⇒ [“2.4 Shift Lever and Shift Housing for Vehicles from VIN 8J-7-013001 Assembly Overview”, page 59](#)
- ◆ ⇒ [“5.1 Selector Mechanism”, page 128](#)
- ◆ ⇒ [“4.2 Selector Mechanism”, page 91](#)
- ◆ ⇒ [“2.5 Shift Cable and Selector Cable to Model Year 2007 Assembly Overview”, page 61](#)
- ◆ ⇒ [“2.6 Transmission Shift Lever and Selector Relay Lever to Model Year 2007 Assembly Overview”, page 63](#)
- ◆ ⇒ [“2.7 Shift Cable and Selector Cable from Model Year 2008 Assembly Overview”, page 65](#)
- ◆ ⇒ [“4.3 Shift Cable and Selector Cable”, page 94](#)
- ◆ ⇒ [“2.8 Shift Mechanism, Adjusting”, page 69](#)

-Arrow A- Gear Movement

-Arrow B- Selection Movement

1 - Shift Cable

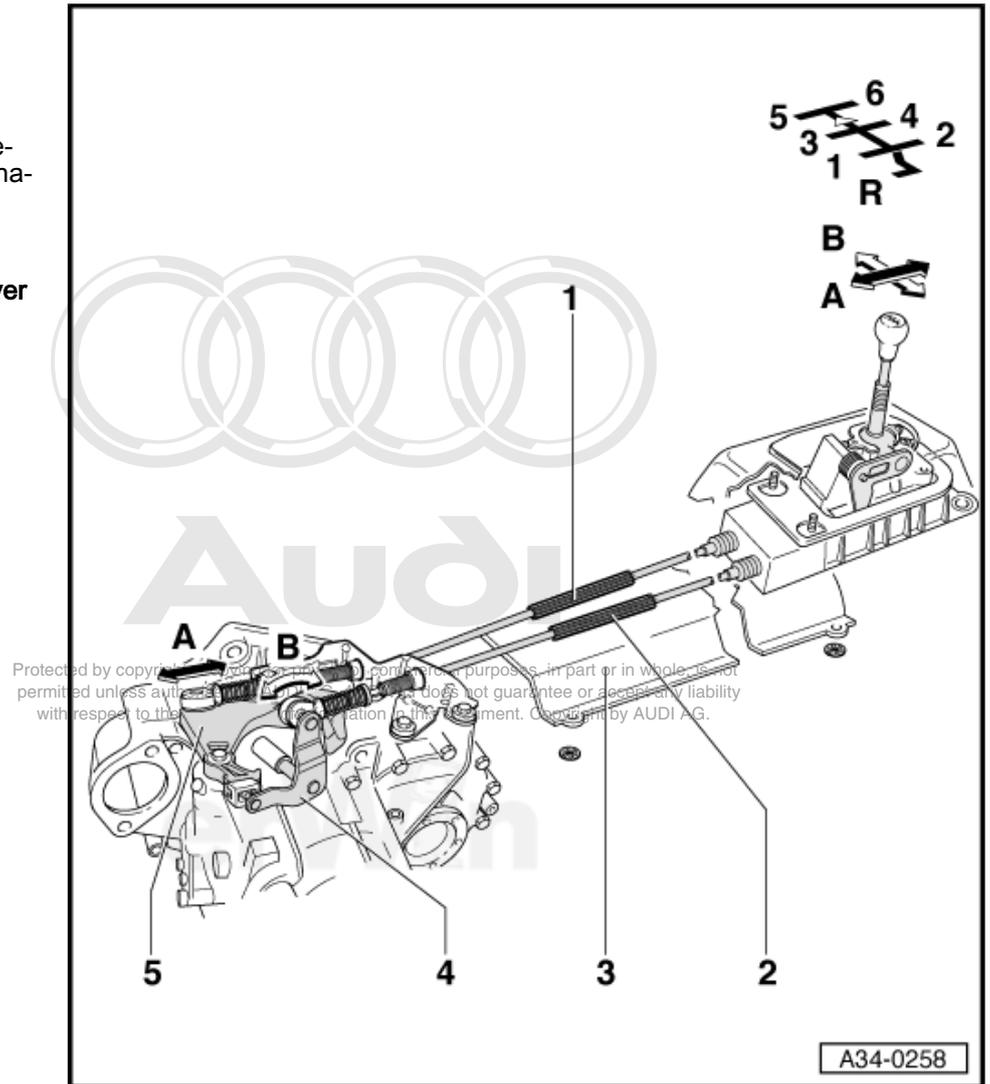
2 - Selector Cable

3 - Heat Shield

- Before removing, re-  
move the shift mecha-  
nism

4 - Selector Relay Lever

5 - Transmission Shift Lever



## 2.2 Shift Knob and Covers Assembly Overview

### 1 - Shift Knob with Shift Lever Boot

- Cannot be separated from each other
- Replace together
- Removing and installing, refer to [⇒ "4.1 Shift Knob with Shift Lever Boot", page 90](#)
- Disconnecting from center console cover [⇒ page 55](#)
- Disconnecting from mounting frame [⇒ page 55](#)

### 2 - Clamp

- To secure shift knob on shift lever
- Securing with hose clip pliers -V.A.G 1275-

### 3 - Center Console Trim

- Removing and installing together with shift knob, refer to [⇒ "4.1 Shift Knob with Shift Lever Boot", page 90](#)
- Disconnecting from shift lever boot [⇒ page 55](#)

### 4 - Mounting Frame

- Disconnecting from center console [⇒ page 55](#)
- Disconnecting from shift lever boot [⇒ page 55](#)

### 5 - Washer

- Quantity: 4

### 6 - Bolt

- 1.5 Nm
- Quantity: 4

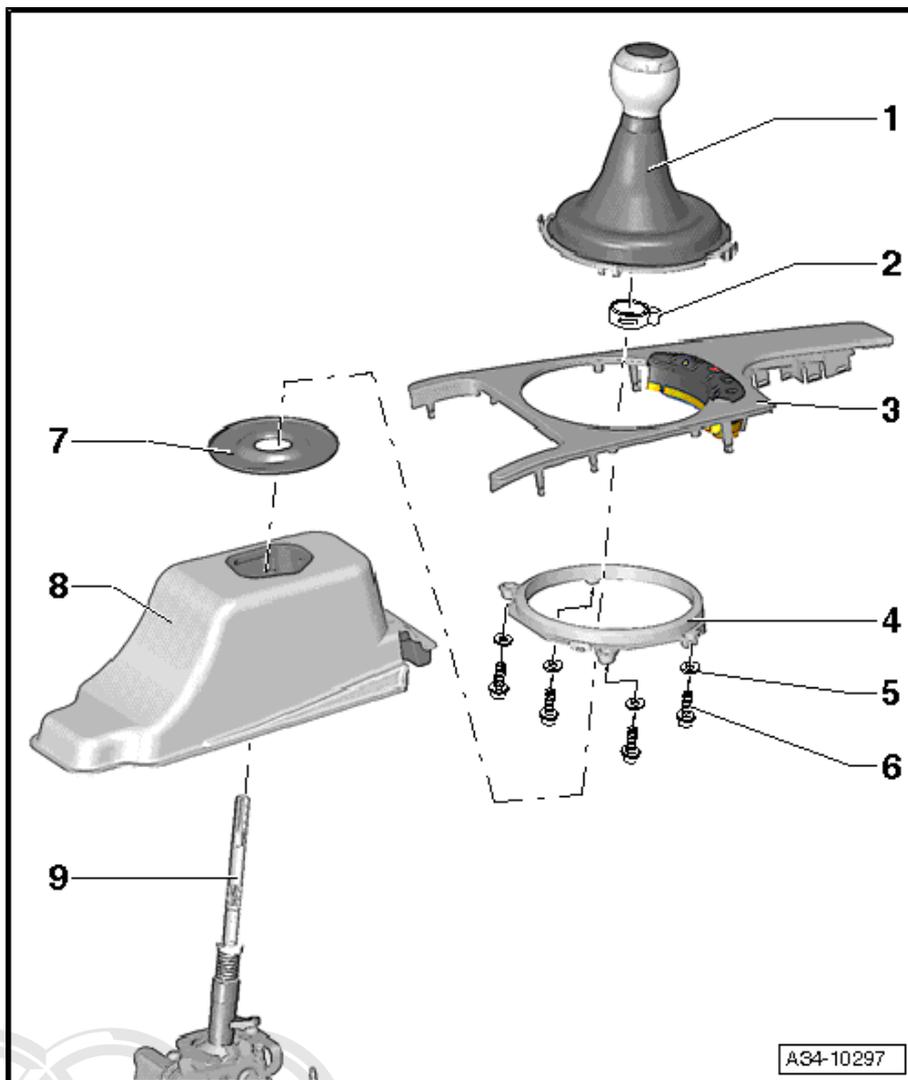
### 7 - Noise Insulation Plate

### 8 - Noise Insulation

### 9 - Selector Lever

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- Adjusting selector mechanism, refer to [⇒ "2.8 Shift Mechanism, Adjusting", page 69](#)

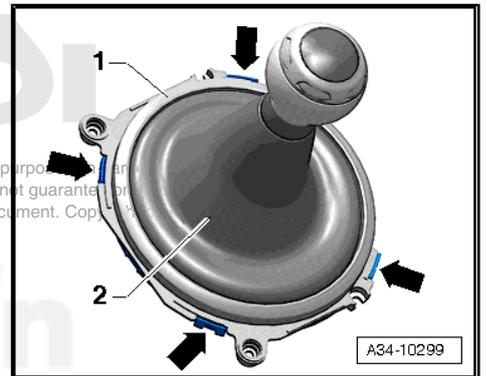
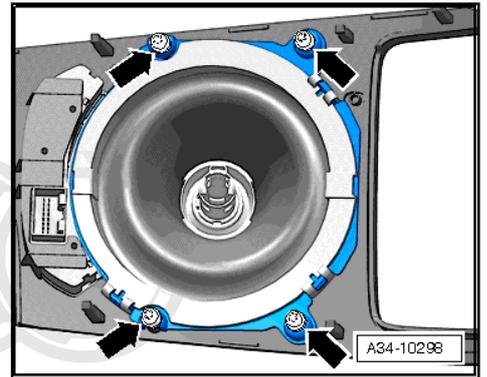


### Disconnect the Center Console Trim and Mounting Frame for the Shift Lever Boot

- Remove bolts -arrows-.
- Trim and mounting frame, disconnecting

### Mounting Frame and Shift Lever Boot, Disconnecting

- Carefully release tabs -arrows- and remove mounting frame -1- from shift lever boot -2-.



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**23 - Selector Cable**

- Removing and installing, refer to ⇒ [“4.3 Shift Cable and Selector Cable”, page 94](#)
- Adjusting, refer to ⇒ [“2.8 Shift Mechanism, Adjusting”, page 69](#)

**24 - Shift Cable**

- Removing and installing, refer to ⇒ [“4.3 Shift Cable and Selector Cable”, page 94](#)
- Adjusting, refer to ⇒ [“2.8 Shift Mechanism, Adjusting”, page 69](#)

**25 - Retaining Washer**

- Replace
- Removing ⇒ [page 57](#)

**26 - Nut**

- 8 Nm
- Quantity: 4

**27 - Bushing**

- Only fits in one position

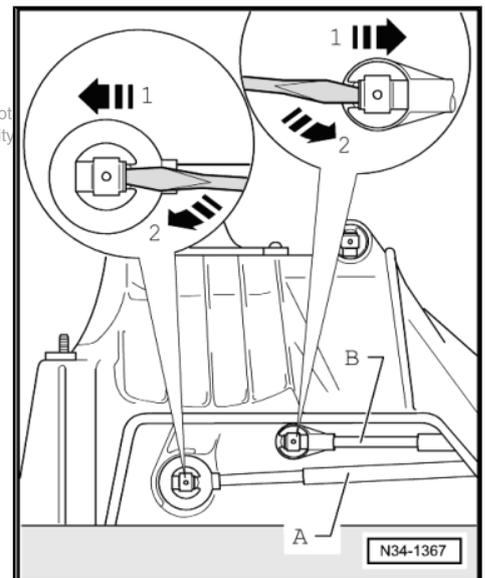
**28 - Retaining Washer**

- Replace

**Remove Shift Cable Lock Washer -A- and Selector Cable -B-.**

- Lift up the tab with a screwdriver -arrow 1- and press off locking washer -arrow 2-.

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### Removing and Installing Lock Washer

- Hold shift lever -2- in position.
- Press spacer bushing -3- in direction of -arrow-.
- Remove the circlip -1-.

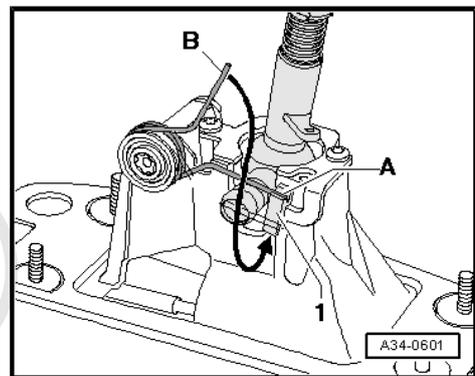
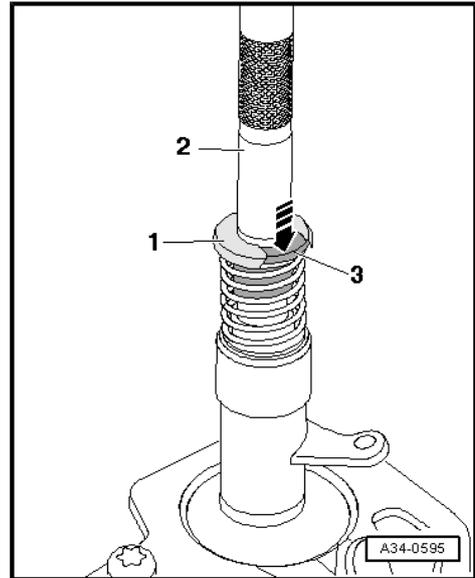
### Installing Spring

- Insert the leg -A- of the spring into the guide -1- from above.
- Pull the leg -B- of the spring downward and lay it into the guide from below.



#### Note

*To improve clarity, the selector bracket is removed.*



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**13 - Spring**

**14 - Bushing**

**15 - Shift Lever Guide**

**16 -  
Nut**

- M6 - 8 Nm
- M8 - 25 Nm
  - Quantity: 4

**17 - Gasket**

- Between shift housing and floor
- Self-adhesive
- Adhere to shift housing

**18 - Shift Housing**

- With spring and selector bracket
- Spring and selector bracket cannot be removed



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## 2.5 Shift Cable and Selector Cable to Model Year 2007 Assembly Overview

### Note

Grease bearing areas and slide surfaces with grease -G 000 450 02- .

#### 1 - Retaining Washer

#### 2 - Control Cable Retainer

- For the selector cable on the selector relay lever
- Allocation ⇒ [page 62](#)
- Release to adjust selector mechanism ⇒ [page 71](#)

#### 3 - Retaining Washer

#### 4 - Control Cable Retainer

- For shift cable to transmission shift lever
- Allocation ⇒ [page 62](#)
- Release to adjust selector mechanism ⇒ [page 71](#)

#### 5 - Bushing

#### 6 - Grommet

#### 7 - Shift Cable

- Removing and installing, refer to ⇒ [“4.3 Shift Cable and Selector Cable”, page 94](#)
- From VIN 8J-7-013001, modified attachment to the shift lever within the shift mechanism -8- ⇒ [page 59](#)
- Adjusting, refer to ⇒ [“2.8 Shift Mechanism, Adjusting”, page 69](#)

#### 8 - Lock Washers

- No longer used from VIN 8J-7-013001 ⇒ [page 59](#)

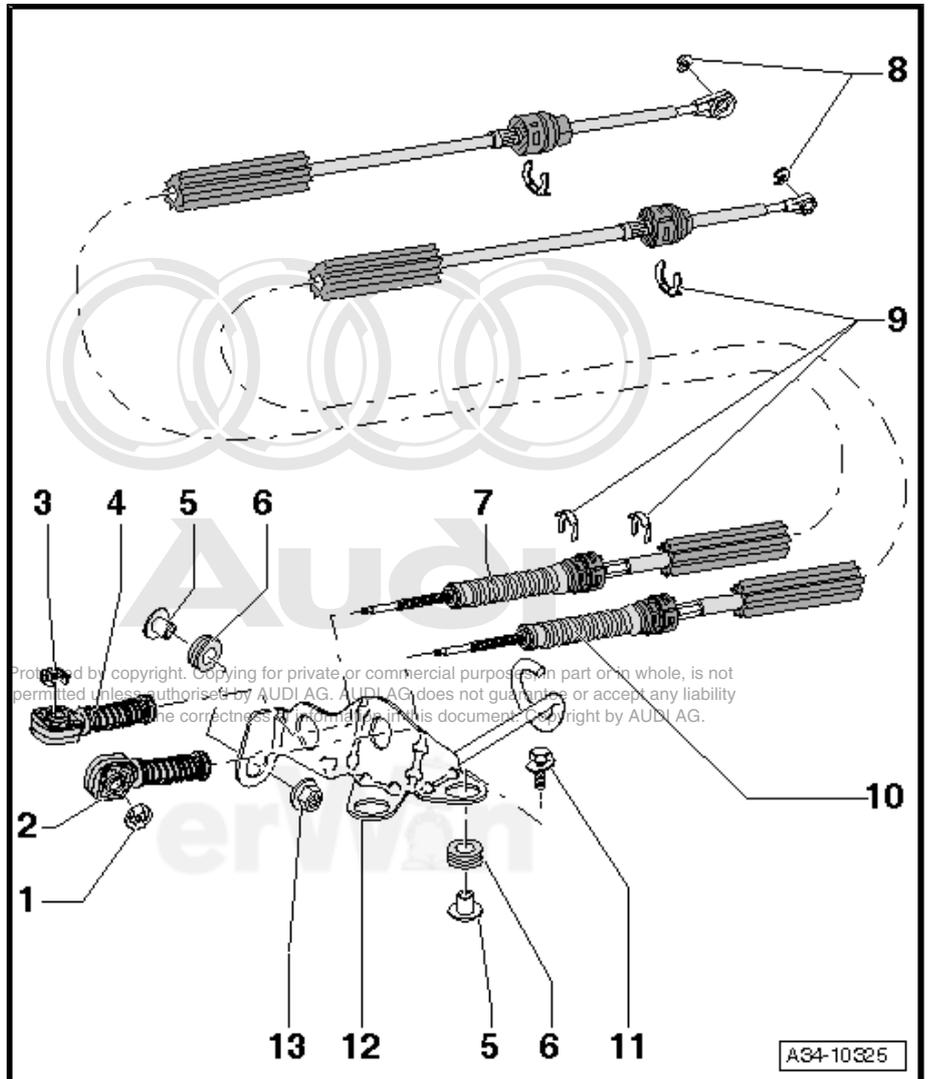
#### 9 - Circlips

#### 10 - Selector Cable

- Removing and installing, refer to ⇒ [“4.3 Shift Cable and Selector Cable”, page 94](#)
- From VIN 8J-7-013001, modified attachment to the selector bracket within the shift mechanism -6- ⇒ [page 59](#)
- Adjusting, refer to ⇒ [“2.8 Shift Mechanism, Adjusting”, page 69](#)

#### 11 - Bolt

- 20 Nm
- Quantity 3



## 12 - Control Cable Mounting Bracket

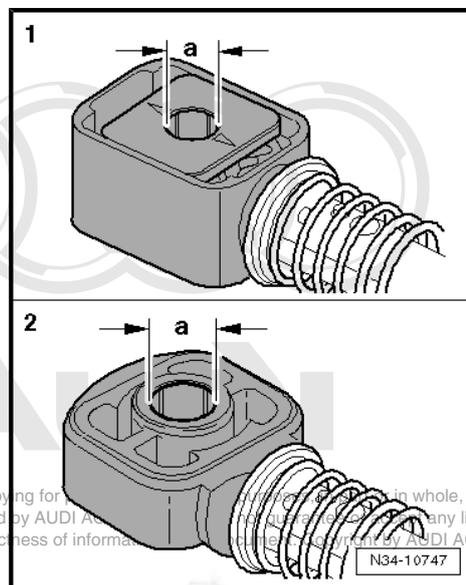
### 13 - Nut

- Only in vehicles with a 4-cylinder engine

### Allocation of Control Cable Retainers

The holes in the control cable retainers have various diameters.

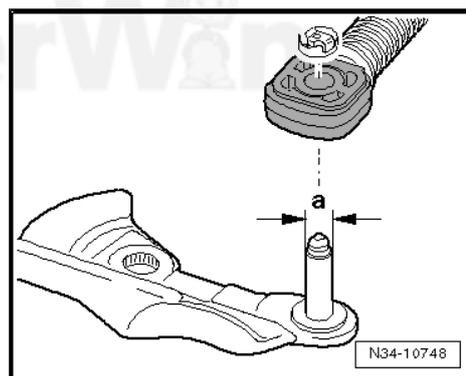
Control Cable Retainer For	Dimension "a"
1. - Shift cable to transmission shift lever from 06/06	8.5 mm
2. - Shift cable to transmission shift lever to 05/06	10 mm
2. - Selector cable to metal selector relay lever	8 mm



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### Starting in 06/2006, Smaller Mounting Pin Diameter for the Shift Cable Retainer

Shift Cable Retainer Mounting Pins	Dimension "a"
Through 05.06	10 mm
From 06.06	8.5 mm



## 2.6 Transmission Shift Lever and Selector Relay Lever to Model Year 2007 Assembly Overview



Note

Grease bearing areas and slide surfaces with grease -G 000 450 02-.

### 1 - Selector Mechanism Cover

- Removing and installing with transmission installed, refer to [⇒ "4.15 Selector Shaft", page 126](#)

### 2 - Selector Shaft

- Removing and installing with transmission installed, refer to [⇒ "4.15 Selector Shaft", page 126](#)

### 3 - Bushing

### 4 - Retaining Washer

- Removing [⇒ page 64](#)

### 5 - Shaft Seal

- Replace, refer to [⇒ "4.14 Selector Shaft Seal", page 124](#)

### 6 - Retaining Washer

### 7 - Control Cable Retainer

- For shift cable to transmission shift lever -4- [⇒ page 61](#)
- Allocation [⇒ page 62](#)

### 8 - Nut

- Replace
- 23 Nm
- Self-locking

### 9 - Transmission Shift Lever

- With balance weight
- Insert so that master spline aligns with shift rod [⇒ page 64](#)
- Installation location [⇒ page 64](#)
- Different diameters of the control cable retainer mounting pin [⇒ page 62](#)

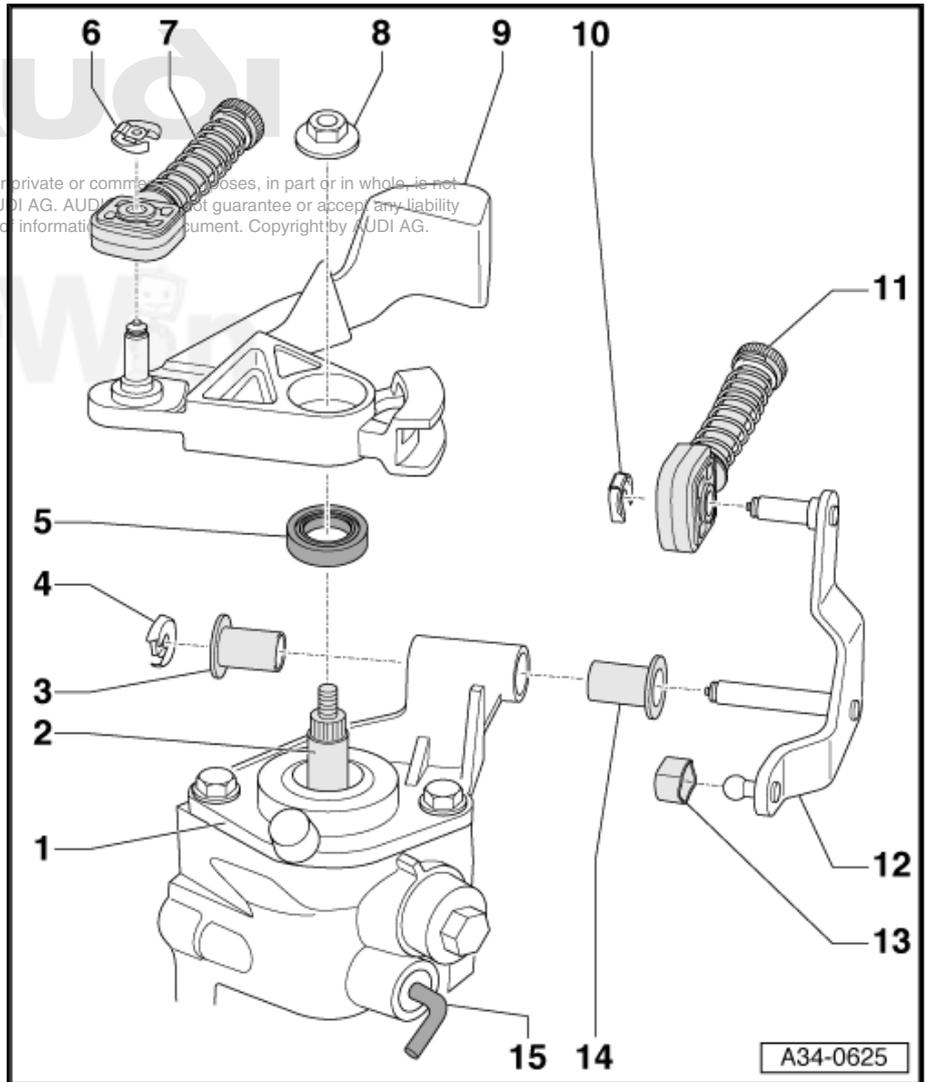
### 10 - Retaining Washer

### 11 - Control Cable Retainer

- For the selector cable on the selector relay lever -2- [⇒ page 61](#)
- Allocation [⇒ page 62](#)
- Release to adjust selector mechanism [⇒ page 71](#)

### 12 - Selector Relay Lever

- Installation location [⇒ page 64](#)



**13 - Slide Shoe**

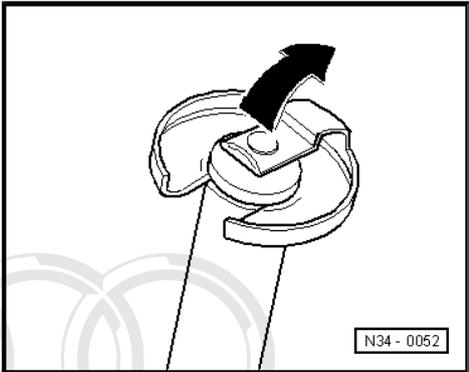
**14 - Bushing**

**15 - Lock Elbow**

- For adjustment of shift mechanism, refer to ⇒ ["2.8 Shift Mechanism, Adjusting", page 69](#)

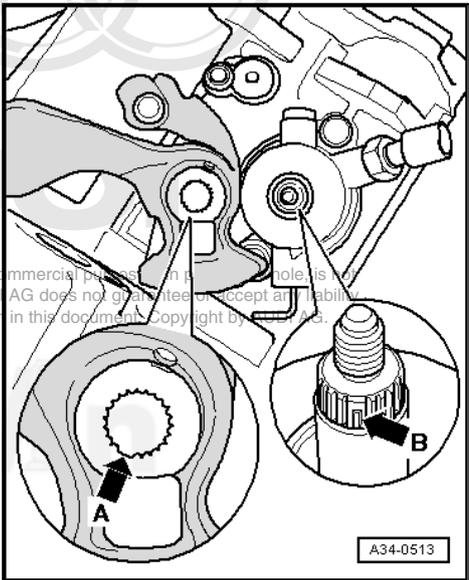
**Remove the Lock Washer for the Selector Relay Lever**

- Lift on the circlip -arrow-.



**Installing the Transmission Shift Lever**

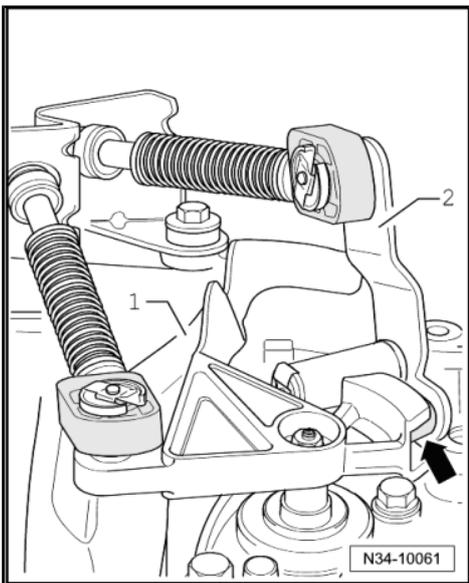
- When positioning the transmission shift lever, make sure the gap -arrow A- is placed over the missing selector shaft teeth -arrow B-.



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**Installation Position of Transmission Shift Lever/Selector Relay Lever**

- 1 - Transmission shift lever with balance weight
- 2 - The selector relay lever engages in the transmission shift lever slide rail via the slide shoe -arrow-.
- Lubricate the slide rail and slide shoe -arrow- with grease -G 000 450 02- .



## 2.7 Shift Cable and Selector Cable from Model Year 2008 Assembly Overview

 **Note**

Grease bearing areas and slide surfaces with grease -G 000 450 02- .

### 1 - Transmission

#### 2 - Clip

- Not installed on all versions
- For selector relay lever from 8/2008
- Remove and secure ⇒ [page 69](#)

#### 3 - Transmission Shift Lever

- Inserting ⇒ [page 66](#)
- Installation location ⇒ [page 67](#)
- Adjust shift mechanism after installation, refer to ⇒ ["2.8 Shift Mechanism, Adjusting"](#), [page 69](#)

#### 4 - Control Cable Retainer

- For shift cable to transmission shift lever
- Allocation ⇒ [page 66](#)
- Disconnect from the shift cable ⇒ [page 67](#)

#### 5 - Retaining Washer

- Replace
- Removing ⇒ [page 67](#)

#### 6 - Nut

- Replace
- 23 Nm
- Self-locking

#### 7 - Retaining Clip

- Replace

#### 8 - Shift Cable

- Remove from the transmission shift lever and attach ⇒ [page 67](#)
- Removing and installing, refer to ⇒ ["4.3 Shift Cable and Selector Cable"](#), [page 94](#)
- Adjusting, refer to ⇒ ["2.8 Shift Mechanism, Adjusting"](#), [page 69](#)

#### 9 - Selector Cable

- Removing and installing, refer to ⇒ ["4.3 Shift Cable and Selector Cable"](#), [page 94](#)
- Adjusting, refer to ⇒ ["2.8 Shift Mechanism, Adjusting"](#), [page 69](#)

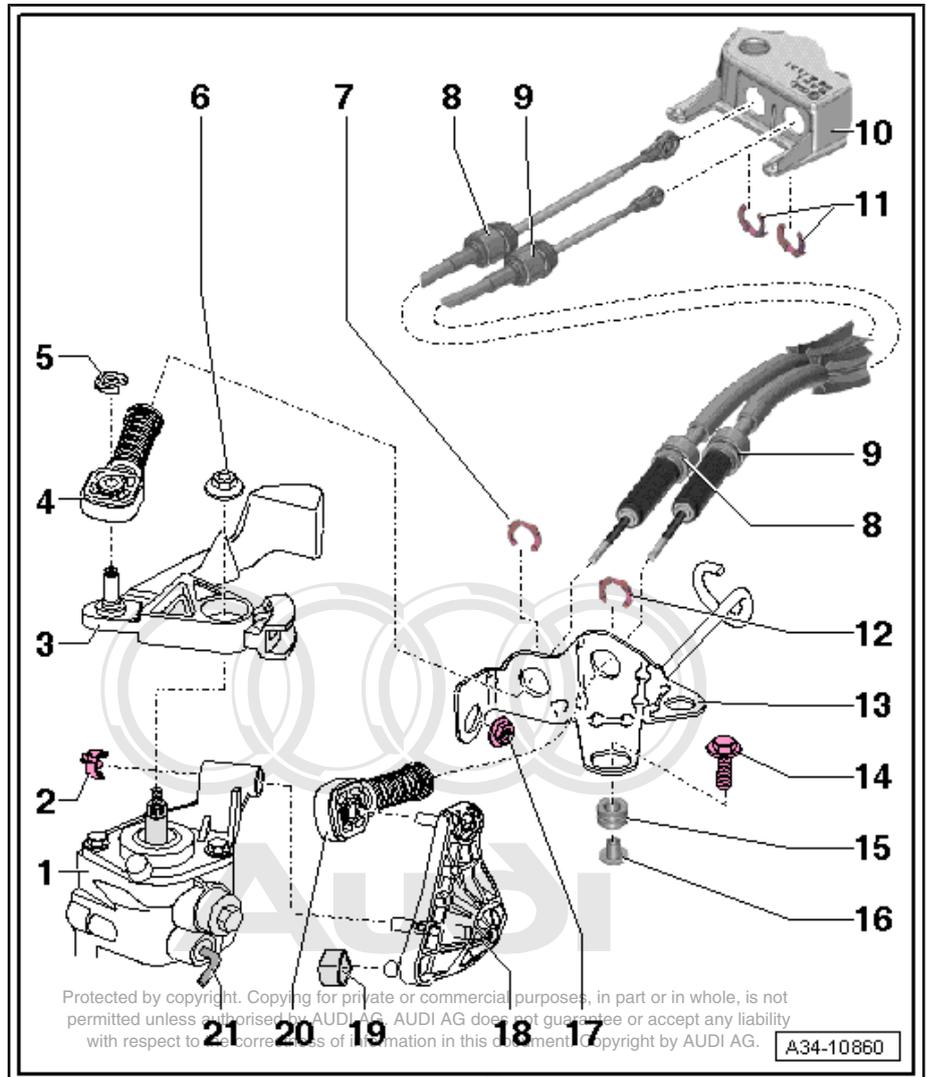
#### 10 - Shift Housing

#### 11 - Circlips

- Replace

#### 12 - Retaining Clip

- Replace



**13 - Control Cable Mounting Bracket**

**14 - Bolt**

- 20 Nm
- Quantity 3

**15 - Grommet**

**16 - Bushing**

**17 - Nut**

- Only in vehicles with a 4-cylinder engine

**18 - Selector Relay Lever**

- Made of plastic
- Different versions; allocation, refer to the electronic parts catalog ETKA
- Installation location [⇒ page 67](#)
- Remove the selector relay lever with catch from the transmission shift lever and attach [⇒ page 68](#)
- Remove the selector relay lever with clip from the transmission shift lever and attach [⇒ page 69](#)

**19 - Slide Shoe**

- Installation location [⇒ page 67](#)

**20 - Control Cable Retainer**

- For the selector cable on the selector relay lever
- Allocation [⇒ page 62](#)
- Disconnect from the selector cable [⇒ page 67](#)

**21 - Lock Elbow**

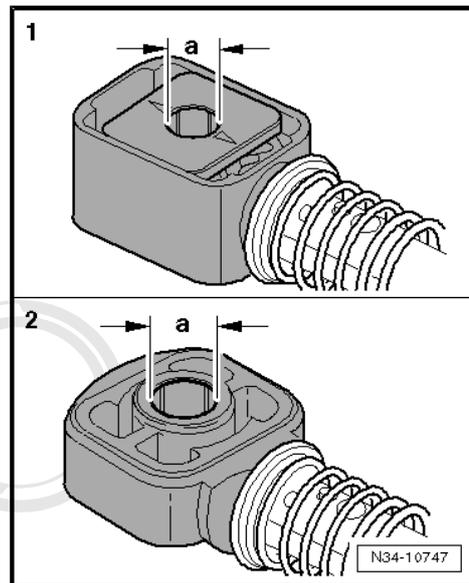
- For adjustment of shift mechanism, refer to [⇒ “2.8 Shift Mechanism, Adjusting”, page 69](#)

**Allocation of Control Cable Retainers**

The holes in the control cable retainers have various diameters.

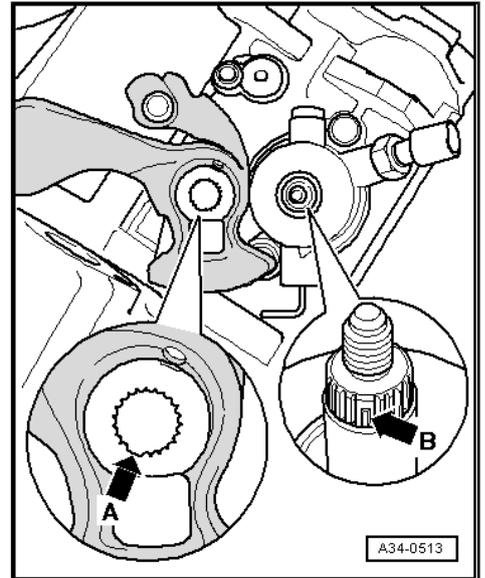
Control Cable Retainer For:	Dimension “a”
-1- Shift cable on transmission shift lever	8.5 mm
-2- Selector cable on selector relay lever	10 mm

**Installing the Transmission Shift Lever**



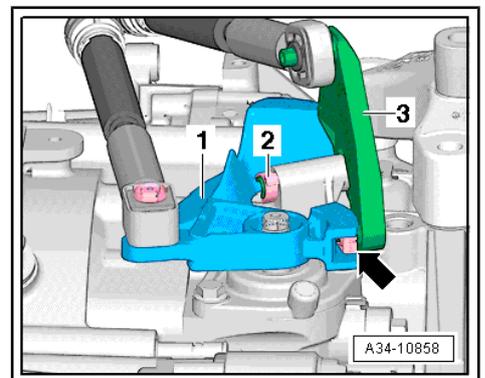
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- When positioning the transmission shift lever, make sure the gap -arrow A- is placed over the missing selector shaft teeth -arrow B-.



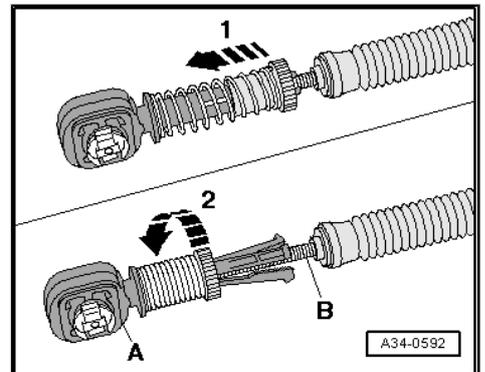
**Installation Position of Transmission Shift Lever/Selector Relay Lever**

- 1 - Transmission shift lever
  - 2 - Clip or catch (depending on the version)
  - 3 - The selector relay lever engages in the transmission shift lever slide rail via the slide shoe -arrow B-.
- Lubricate the slide rail and slide shoe -arrow- with grease -G 000 450 02- .



**Disconnect the Control Cable Retainer from the Shift Cable and Selector Cable**

- Pull the securing mechanism forward to the stop -arrow 1- and then lock to the left -arrow 2-.
- Remove control cable -B- from control cable retainer -A-.



**Remove the Shift Cable from the Transmission Shift Lever and Attach**

**Removal**



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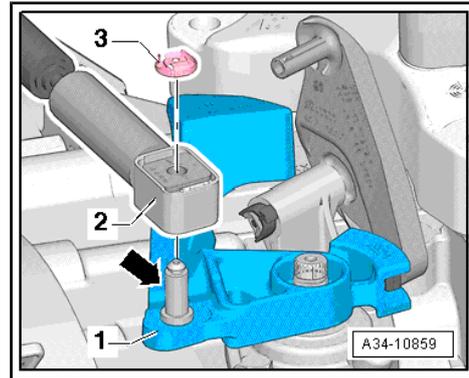


- Remove shift cable lock washer -3- from transmission shift lever -1- by lifting the clip.
- Remove shift cable -2- from the pin -arrow-.

**Securing**

 **Note**

- ◆ *Replace the lock washer for the shift cable.*
  - ◆ *Coat the pin -arrow- with a small amount of grease -G 000 450 02- .*
- Press the shift cable onto transmission shift lever -2- and secure with lock washer -1-.



**Remove the Selector Relay Lever with Catch from the Transmission Shift Lever -arrow 1- and Attach**

**Removal**

- Press in the catch -arrow 1- to the stop and remove the selector relay lever together with the control cable retainer. Move the selector relay lever in the operating direction.

 **Note**

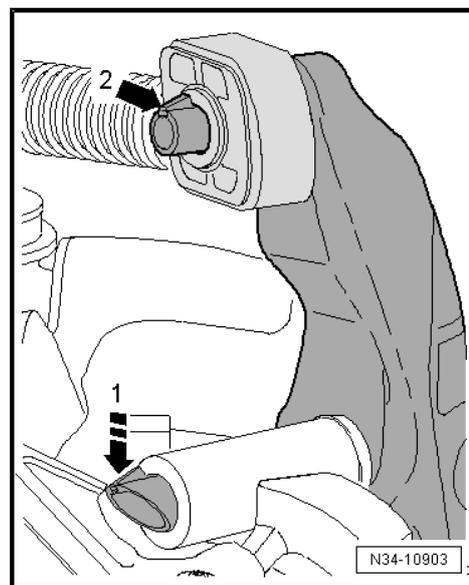
*Ignore -arrow 2-.*

**Securing**

 **Note**

*To install, grease mounting points and contact surfaces with Grease -G 000 450 02- .*

- Press the control cable retainer onto the selector relay lever => [page 69](#)
- Insert the selector relay lever together with the control cable retainer to the stop.
- The catch -arrow 1- secures the selector relay lever.
- The catch -arrow 2- secures the control cable retainer.
- Make sure it engages securely.



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**Remove the Selector Relay Lever "with Clip" from the Transmission Shift Lever -arrow 1- and Attach**

**Removal**

- Remove the clip -arrow 1-, and remove the selector relay lever together with the control cable retainer.

**Securing**

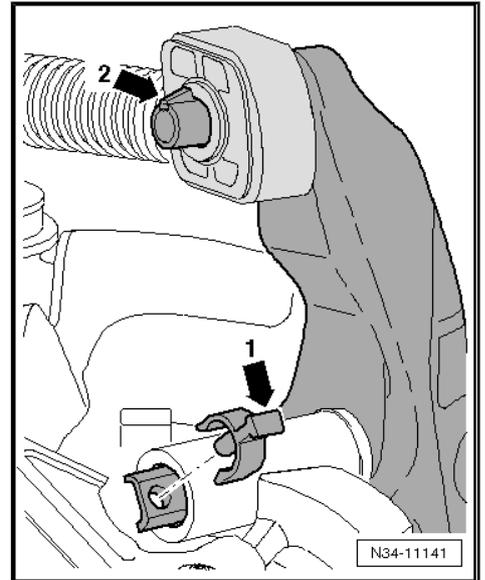
 **Note**

*Grease bearing areas and slide surfaces with grease -G 000 450 02- .*

- Insert the selector relay lever together with the control cable retainer to the stop.
- Press on the clip -arrow 1- while ensuring that it engages securely.

 **Note**

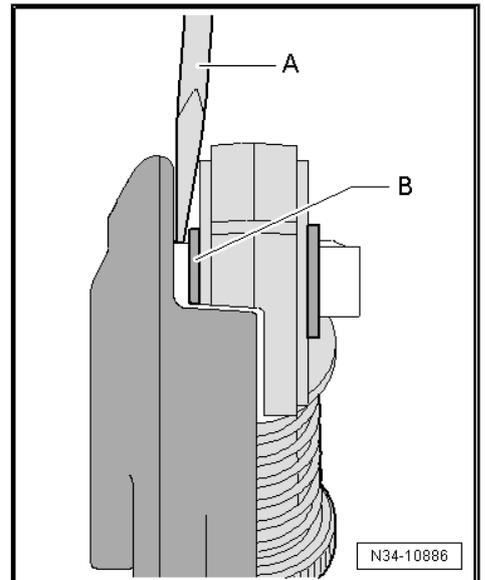
*Ignore -arrow 2-.*



**Pry the Selector Cable Retainer Out of the Selector Relay Lever**

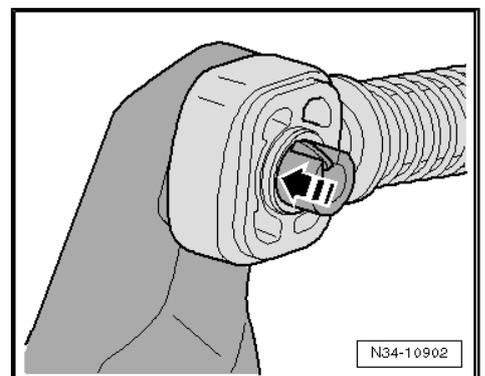
- Selector relay lever removed.
- Apply a flat head screwdriver -A- between bushing -B- and the selector relay lever.

**Press the Selector Cable Retainer onto the Selector Relay Lever**



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- Selector relay lever removed.
- The cable retainer may only be pressed on at the bushing -arrow-.
- The control cable retainer must move freely on the selector relay lever.
- The control cable retainer must be behind the catch.
- Make sure it engages securely.



**2.8 Shift Mechanism, Adjusting**

Special tools and workshop equipment required

◆ Connecting Pin -T10027 A-

**Adjustment Requirements**

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

**Adjusting**

- Open the ashtray.
- Carefully pry trim from center console -arrows-
- Lift trim up over shift knob.

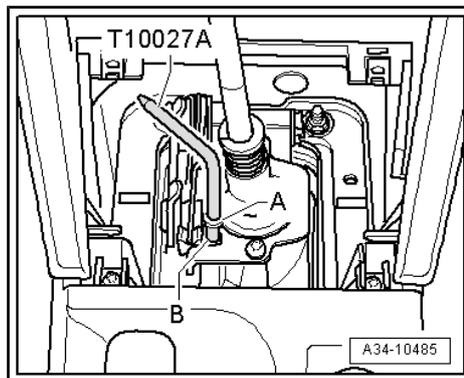


- Move the shift lever in the neutral position toward the left into the 1st/2nd gear shift gate.
- Lift the noise insulation plate.
- Guide the -T10027A- through hole -A- and into hole -B-.

**i Note**

*To improve clarity, the noise insulation is removed in the figure.*

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



Release cable retainer -A- for selector and shift cables -B- as follows:

- Push sleeve forward up to the stop -arrow 1-.
- Turn sleeve to the right up to the stop -arrow 2- so that it engages.

 **Note**

*The cable -B- must be able to move in the cable retainer.*

- Transmission in neutral position.

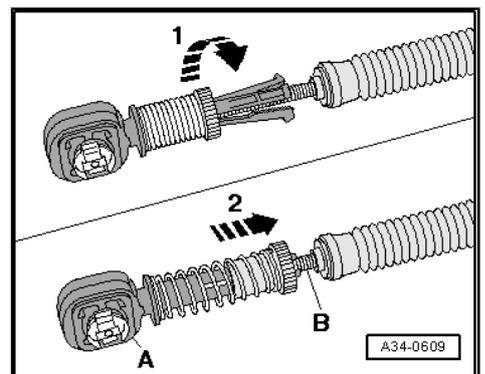
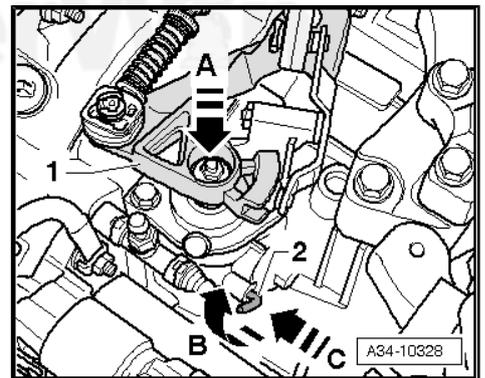
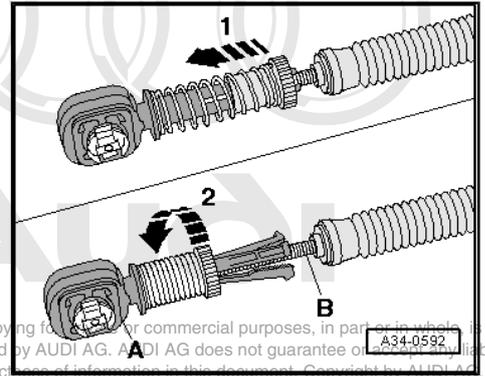
Secure shift rod as follows:

- Press transmission shift lever -1- down in direction of -arrow A-.
- Engage lock elbow -2- by turning slightly in direction of -arrow B- and pressing in direction of -arrow C- at the same time.

This locks the selector shaft; it can no longer be moved.

- Make sure that the selector and shift cable -B- are inserted free of tension in the retainer -A-.
- Loosen the sleeve -arrow 1-.
- Allow the sleeve to slide to the stop -arrow 2-.

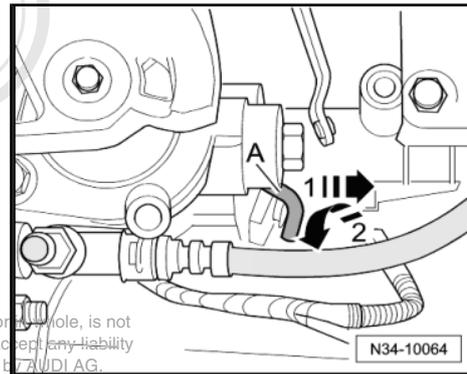
The cable is now adjusted.



- Turn lock elbow -A- back into starting position in direction of -arrow 2- and remove from transmission in direction of -arrow 1-.
- Pull the -T10027 A- out of the selector mechanism.

**Shift lever adjustment, checking**

- The shift lever must be in the 3rd/4th gear shift gate when the transmission is in neutral.
- Actuate clutch.
- Select all gears several times. Pay particular attention to the operation of the reverse gear lock.
- The shift lever must move automatically from the reverse gear shift gate into the 3rd/4th gear shift gate.



If hooking occurs during repeated selection of a gear, the selector mechanism must be adjusted again.

- Install the center console cover and trim.
- Install the air filter housing. Refer to => Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .

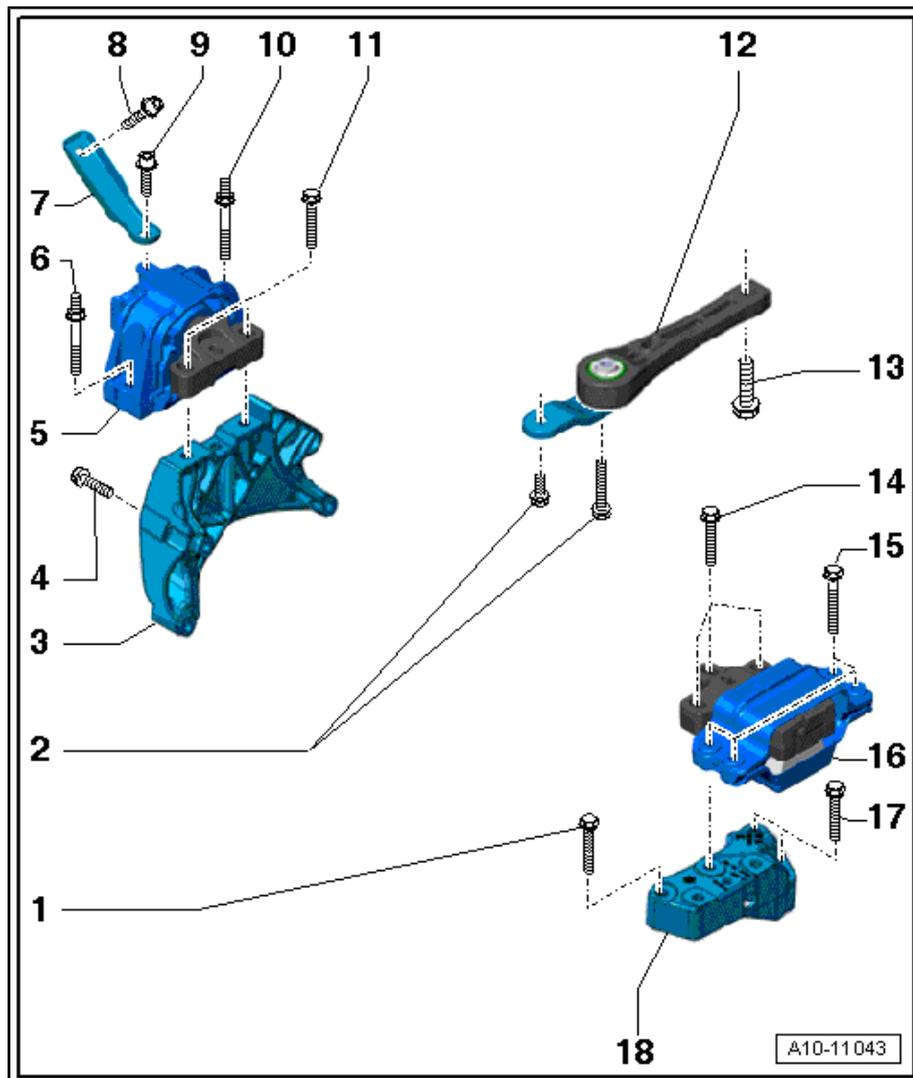
**2.9 Subframe Mount Assembly Overview**

**1 - Bolt**

- Replace
- 60 Nm plus an additional 90° turn
- Transmission console to transmission

**2 - Bolts**

- Pendulum support to transmission





**Caution**

*⚠ In the case of 02Q manual transmissions, threaded inserts (HeliCoil) can be installed in the threads of the pendulum support threaded connection. These threaded inserts are standard as of transmission build date 5/28/07.*

*Difference ⇒ [page 74](#)*

*⚠ Bolts with strength category 10.9 must be used for all transmissions with threaded inserts (Heli-Coil).*

*⚠ In the case of transmissions without threaded inserts, bolts with strength category 8.8 are to be used.*

*⚠ Bolts with strength category 8.8 are listed in the, refer to the electronic parts catalog ETKA to VIN 8J-7-050 000.*

*⚠ Bolts with strength category 10.9 are listed in the, refer to the electronic parts catalog ETKA from VIN 8J-8-000 001.*

*⚠ The bolt tightening specification corresponds to the strength category.*

- Transmission with threaded inserts in connection with bolts of strength category 10.9:
  - 50 Nm plus an additional 90° turn
- Transmission without threaded inserts and bolts with strength category 8.8:
  - Always replace
  - 40 Nm plus an additional 90° turn

**3 - Engine Support**

**4 - Bolt**

- Engine support to engine
- Tightening specification, refer to ⇒ Engine Mechanical; Rep. Gr. 10 ; Description and Operation

**5 - Engine Mount**

**6 - Bolt**

- Engine mount to body
- Tightening specification, refer to ⇒ Engine Mechanical; Rep. Gr. 10 ; Description and Operation

**7 - Connecting Bar**

**8 - Bolt**

- Connecting bar to engine
- Tightening specification, refer to ⇒ Engine Mechanical; Rep. Gr. 10 ; Description and Operation

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**9 - Bolt**

- Connecting bar to body
- Tightening specification, refer to ⇒ Engine Mechanical; Rep. Gr. 10 ; Description and Operation

**10 - Bolt**

- Engine mount to body
- Tightening specification, refer to ⇒ Engine Mechanical; Rep. Gr. 10 ; Description and Operation

**11 - Bolts**

- Engine mount to engine support
- Tightening specification, refer to ⇒ Engine Mechanical; Rep. Gr. 10 ; Description and Operation

**12 - Pendulum Support**

- Removing and installing, refer to ⇒ [“4.10 Pendulum Support”, page 117](#)

**13 - Bolt**

- Replace
- 100 Nm plus an additional 90° turn
- Pendulum support to subframe

**14 - Bolt**

- Replace
- 60 Nm plus an additional 90° turn
- Transmission mount to transmission console

**15 - Bolt**

- Replace
- 40 Nm plus an additional 90° turn
- Transmission mount to body

**16 - Transmission Mount**

- Removing, refer to ⇒ [“4.8 Transmission Mount, Removing”, page 113](#)
- Installing, refer to ⇒ [“4.9 Transmission Mount, installing”, page 116](#)

**17 - Bolt**

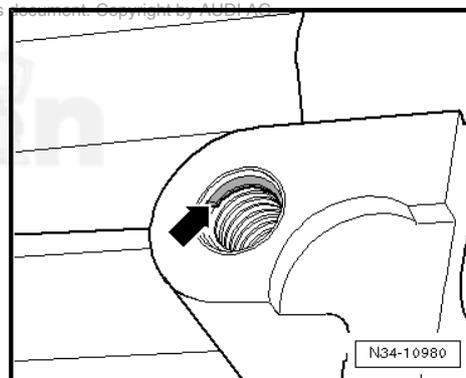
- Transmission console to transmission
- 60 Nm plus an additional 90° turn
- Replace

**18 - Transmission Bracket**

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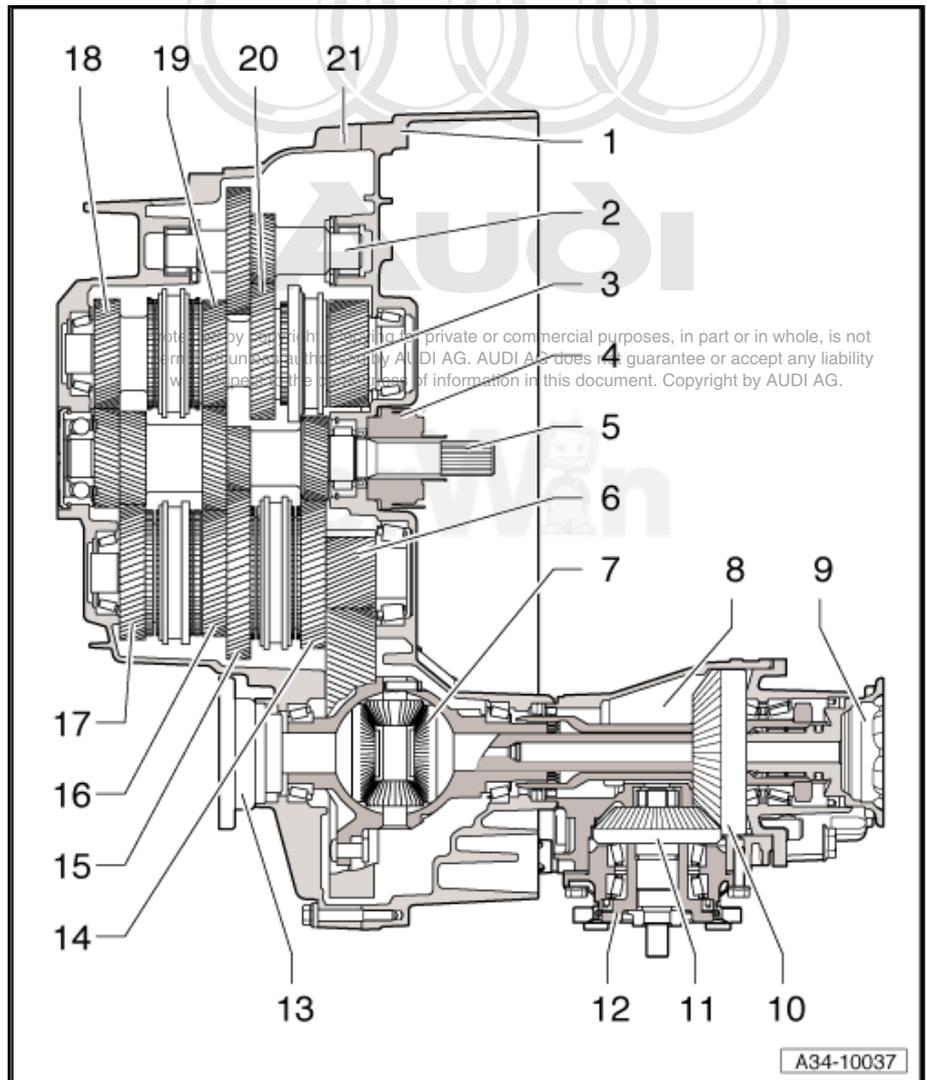
**Transmission with Threaded Inserts (for example HeliCoil) for Securing the Pendulum Support****Note**

- ◆ *The holes for the pendulum support from transmission build date 5/28/07 always have threaded inserts (for example Heli-Coil).*
- ◆ *How to recognize: collar on the first thread -arrow-.*
- ◆ *Different securing bolts and tightening torques -2- ⇒ [page 72](#) .*



## 2.10 Transmission Overview

- 1 - Clutch Housing
- 2 - Reverse Shaft
- 3 - Output Shaft 5th/6th Gear/  
Reverse Gear
- 4 - Clutch Slave Cylinder with  
Release Bearing
- 5 - Input Shaft
- 6 - Output Shaft, 1st to 4th  
Gears
- 7 - Differential
- 8 - Bevel Box
- 9 - Right Drive Flange
- 10 - Head Bevel Gear with In-  
put Shaft
- 11 - Shaft Bevel Gear
- 12 - Output Flange
- 13 - Flange Shaft, Left
- 14 - 2nd Gear Selector Gear
- 15 - 1st Gear Selector Gear
- 16 - 4th Gear Selector Gear
- 17 - 3rd Gear Selector Gear
- 18 - 5th Gear Selector Gear
- 19 - 6th Gear Selector Gear
- 20 - Reverse Gear Selector  
Gear
- 21 - Transmission Housing



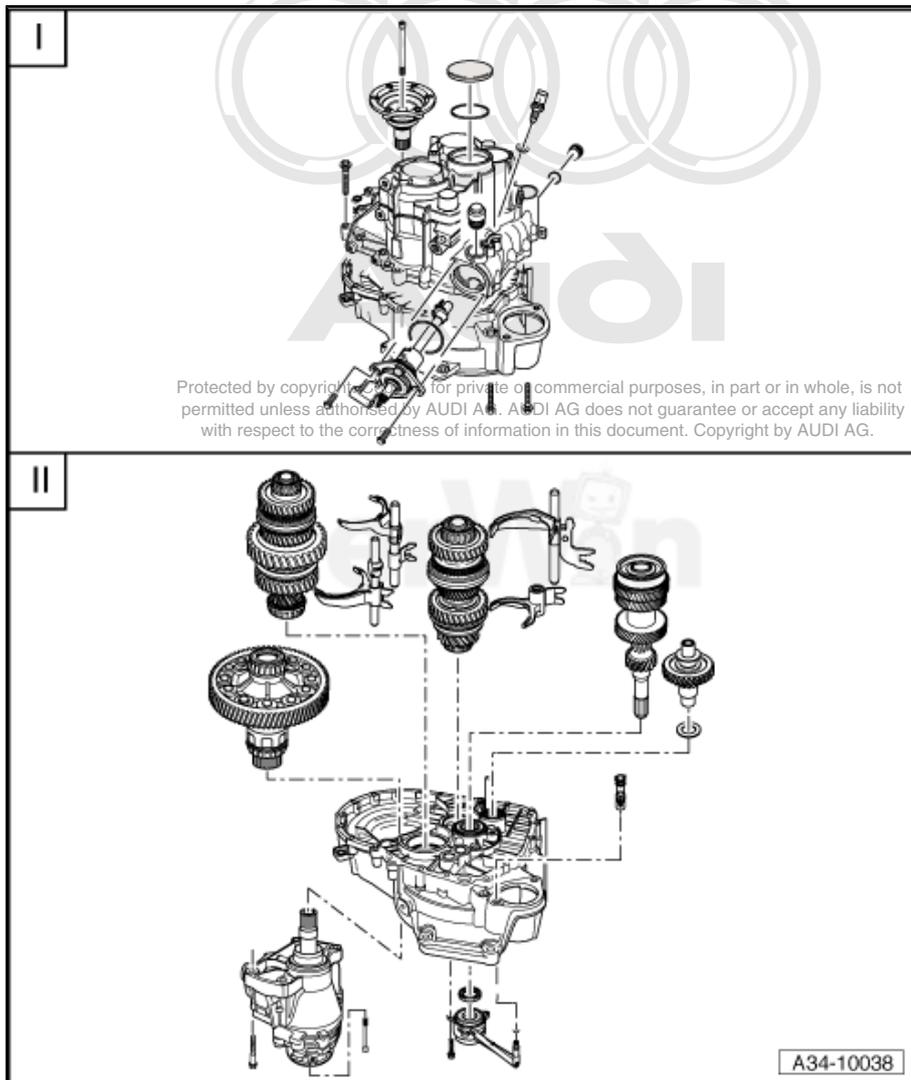
## 2.11 Transmission Assembly Overview

I - Assembly overview - transmission housing and shift mechanism, refer to

⇒ [“2.12 Transmission Housing and Shift Mechanism Assembly Overview”, page 77](#)

II - Assembly overview - input shaft, output shafts, differential, bevel box and selector rods, refer to

⇒ [“2.13 Input Shaft, Output Shafts, Differential, Bevel Box and Selector Rods Assembly Overview”, page 79](#)

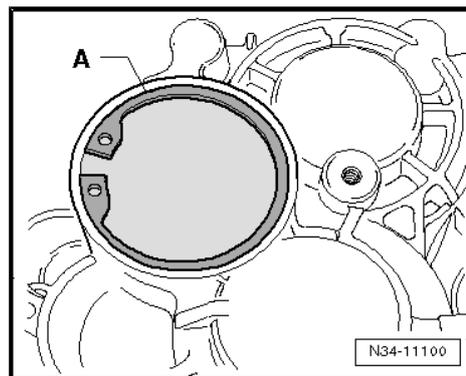


### Input Shaft Cap with Circlip -A-

From transmission build date 1/21/08, the input shaft cap is secured with a circlip -A-.

⇒ [“5.2 Transmission without Circlip A for Cap/Input Shaft”, page 131](#)

⇒ [“5.3 Transmission with Circlip A for the Cap/Input Shaft”, page 142](#)



## 2.12 Transmission Housing and Shift Mechanism Assembly Overview

### 1 - Bolt

- Tightening specification  
-7- ⇒ [page 219](#)

### 2 - Flange Shaft with Spring

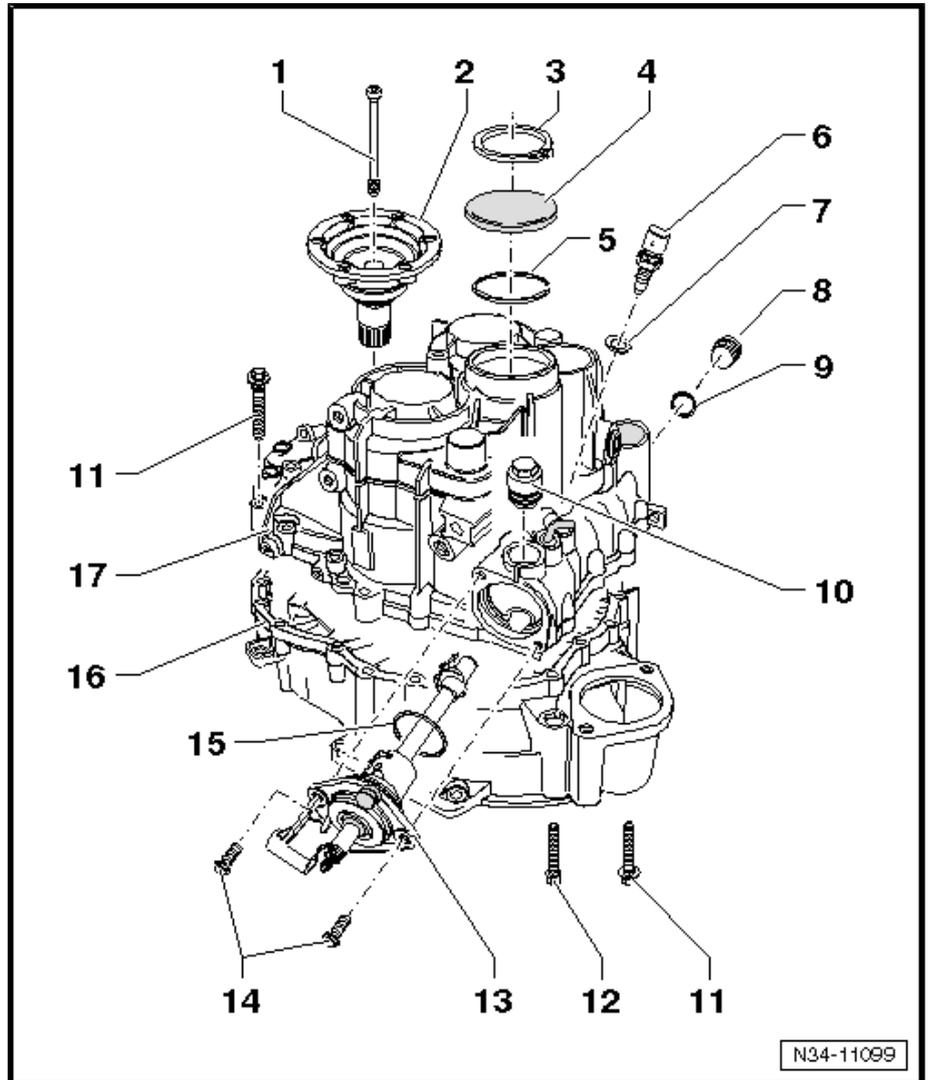
- Removing and installing, refer to  
⇒ [“5.2 Transmission without Circlip A for Cap/Input Shaft”, page 131](#)
- Assembling, refer to  
⇒ [“1.3 Differential Assembly Overview”, page 222](#)

### 3 - Securing Ring

- For the sealing cap -4-\
- Installed from transmission build date 1/21/08

### 4 - Sealing Cap

- Secured with circlip from transmission build date 1/21/08
- Removing and installing without circlip, refer to  
⇒ [“5.2 Transmission without Circlip A for Cap/Input Shaft”, page 131](#)
- Removing and installing with circlip, refer to  
⇒ [“5.3 Transmission with Circlip A for the Cap/Input Shaft”, page 142](#)
- Allocate components, refer to the electronic parts catalog ETKA.



### 5 - Securing Ring

- For the grooved ball bearing/input shaft -1- ⇒ [page 179](#)

### 6 - Backup Light Switch -F4-

- 20 Nm

### 7 - Oil Seal

- Replace

### 8 - Bolt for Oil Drain Bore

- Tightening specification, refer to ⇒ [“3.2 Manual Transmission Oil Filler Plug”, page 87](#)

### 9 - Oil Seal

- Replace

### 10 - Locking Bolt

- 45 Nm
- For selector shaft

### 11 -

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### Bolt

- Replace
- 15 Nm plus an additional 90° turn
- With permanent washer
- Allocation of bolts as replacement parts ⇒ [page 78](#)

### 12 - Bolt

- Replace
- 15 Nm plus an additional 90° turn
- Without washer
- Allocation of bolts as replacement parts ⇒ [page 78](#)

### 13 - Selector Mechanism

- Disassembling and assembling, refer to ⇒ [“2.16 Shift Mechanism Assembly Overview, Transmission Side”, page 85](#)
- Removing with transmission installed, refer to ⇒ [“4.15 Selector Shaft”, page 126](#)

### 14 - Bolt

- Replace
- 20 Nm

### 15 - O-ring

- Replace

### 16 - Clutch Housing

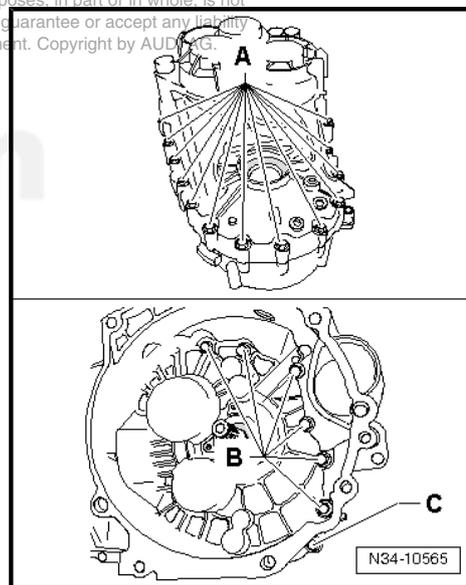
- Servicing, refer to ⇒ [“2.15 Clutch Housing Assembly Overview”, page 83](#)

### 17 - Transmission Housing

- Servicing, refer to ⇒ [“2.14 Transmission Housing Assembly Overview”, page 81](#)

### Allocation of Bolts as Replacement Parts

- A - Bolt with permanent washer
- B - Bolt without washer
- C - Bolt with permanent washer



## 2.13 Input Shaft, Output Shafts, Differential, Bevel Box and Selector Rods Assembly Overview

### 1 - Output Shaft, 1st to 4th Gears

- Disassembling and assembling, refer to ⇒ [“3.2 Output Shaft, 1st to 4th Gears”](#), page 194
- Installation location ⇒ page 80

### 2 - Selector Rod with Shift Fork for 1st and 2nd Gear

- Installation location ⇒ page 80

### 3 - Selector Rod with Shift Fork for 3rd and 4th Gear

- Installation location ⇒ page 80

### 4 - Output Shaft 5th/6th Gear/ Reverse Gear

- Disassembling and assembling, refer to ⇒ [“3.3 Output Shaft for 5th/6th Gear and Reverse Gear”](#), page 202
- Installation location ⇒ page 80

### 5 - Selector Rod with Shift Fork for 5th and 6th Gear

- Installation location ⇒ page 80

### 6 - Reverse Gear Shift Fork

- Installation location ⇒ page 80

### 7 - Input Shaft

- Disassembling and assembling, refer to ⇒ [“3.1 Input Shaft”](#), page 192
- Always replace grooved ball bearings on input shaft -6- ⇒ page 180

### 8 - Reverse Shaft

- With thrust washer

### 9 - Thrust Washer

### 10 - Bleeder

- Connect to clutch slave cylinder -14-

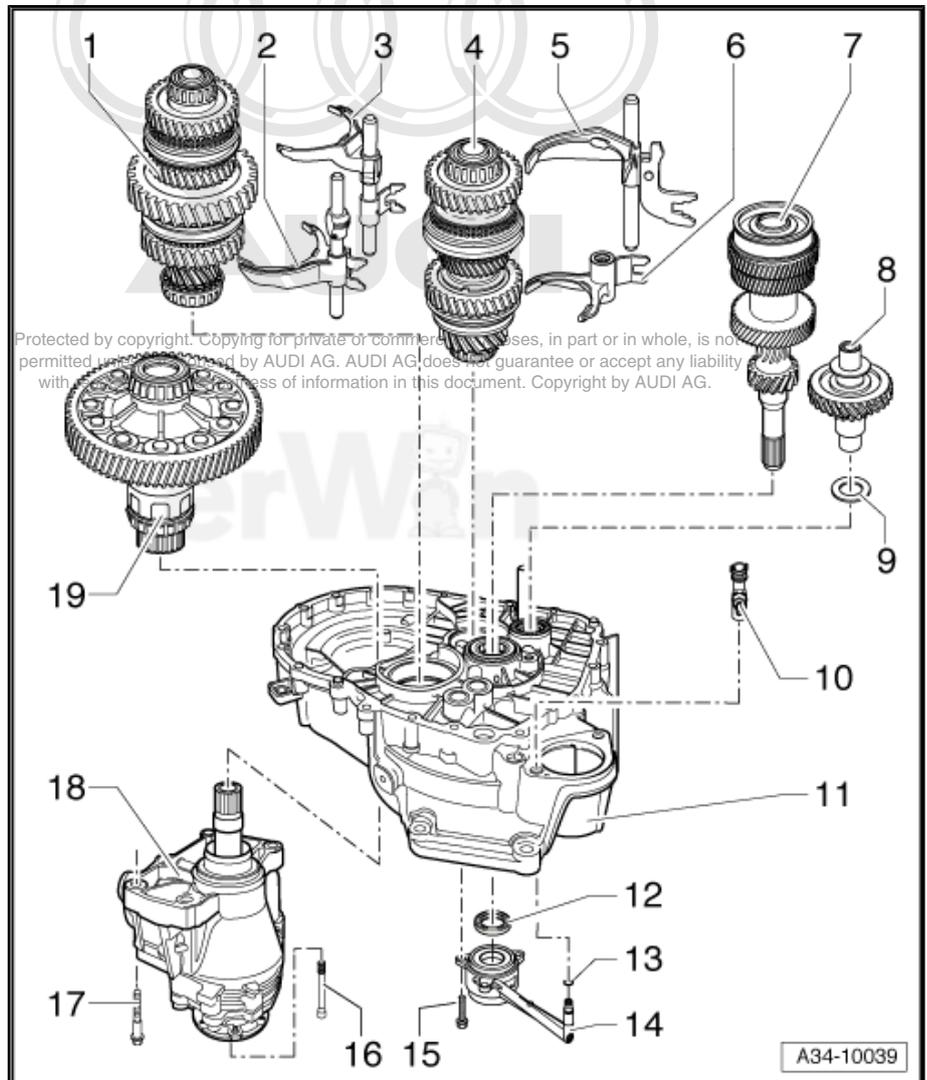
### 11 - Clutch Housing

### 12 - Input Shaft Seal

- Replace, refer to ⇒ [“4.13 Input Shaft Seal”](#), page 123

### 13 - O-ring

- Always replace
- Pull onto line connection
- Coat with brake fluid before installing



#### 14 - Clutch Slave Cylinder with Release Bearing

#### 15 - Bolt

- Tightening specification -1- ⇒ [page 21](#)

#### 16 - Bolt

- Tightening specification -13- ⇒ [page 220](#)

#### 17 - Bolt

- Replace
- 40 Nm
- Quantity: 4

#### 18 - Bevel Box

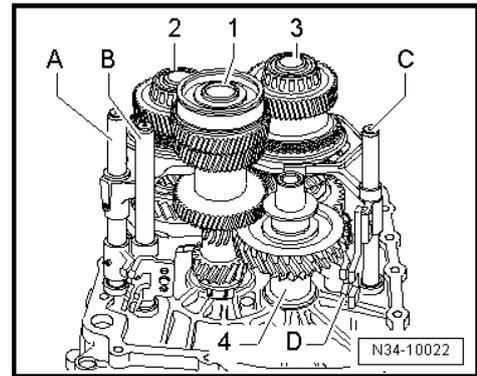
- Removing and installing with transmission installed, refer to ⇒ [“4.11 Bevel Box, Removing”, page 118](#)
- Removing and installing with transmission removed, refer to ⇒ [“5.2 Transmission without Circlip A for Cap/Input Shaft”, page 131](#)

#### 19 - Differential

- Disassembling and assembling, refer to ⇒ [“4.1 Differential”, page 238](#)

#### Installation Position of Shafts and Selector Rods in Transmission

- 1 - Input Shaft
- 2 - Output Shaft, 1st to 4th Gears
- 3 - Output shaft 5th/6th and reverse gear
- 4 - Reverse Shaft
- A - Selector rod for 3rd and 4th gear
- B - Selector rod for 1st and 2nd gear
- C - Selector rod for 5th and 6th gear
- D - Reverse gear shift fork <sup>1)</sup>



<sup>1)</sup> From transmission build date 5/25/09, bearing on the selector rod for the shift fork for 5th and 6th gear -C-. Difference, reverse gear shift forks ⇒ [page 86](#)

## 2.14 Transmission Housing Assembly Overview



### Note

Attaching transmission to assembly stand ⇒ [“4.6 Transmission, Securing to Assembly Stand”, page 107](#)

### 1 - Transmission Housing

- When replacing: adjust the output shaft and differential, refer to ⇒ [“1.4 Adjustment Overview”, page 224](#)
- Changes to the grooved ball bearing/input shaft mount area, refer to ⇒ [page 179](#)
- Allocate components shims, refer to the electronic parts catalog ET-KA.

### 2 - Sealing Cap

- Removing ⇒ [page 153](#)
- Driving in ⇒ [page 153](#)

### 3 - Bolt

- For oil drain plug
- Tightening specification, refer to ⇒ [“3.2 Manual Transmission Oil Filler Plug”, page 87](#)

### 4 - Oil Seal

- Replace

### 5 - Bolt

- For oil filler hole
- Tightening specification, refer to ⇒ [“3.2 Manual Transmission Oil Filler Plug”, page 87](#)

### 6 - Lock Elbow

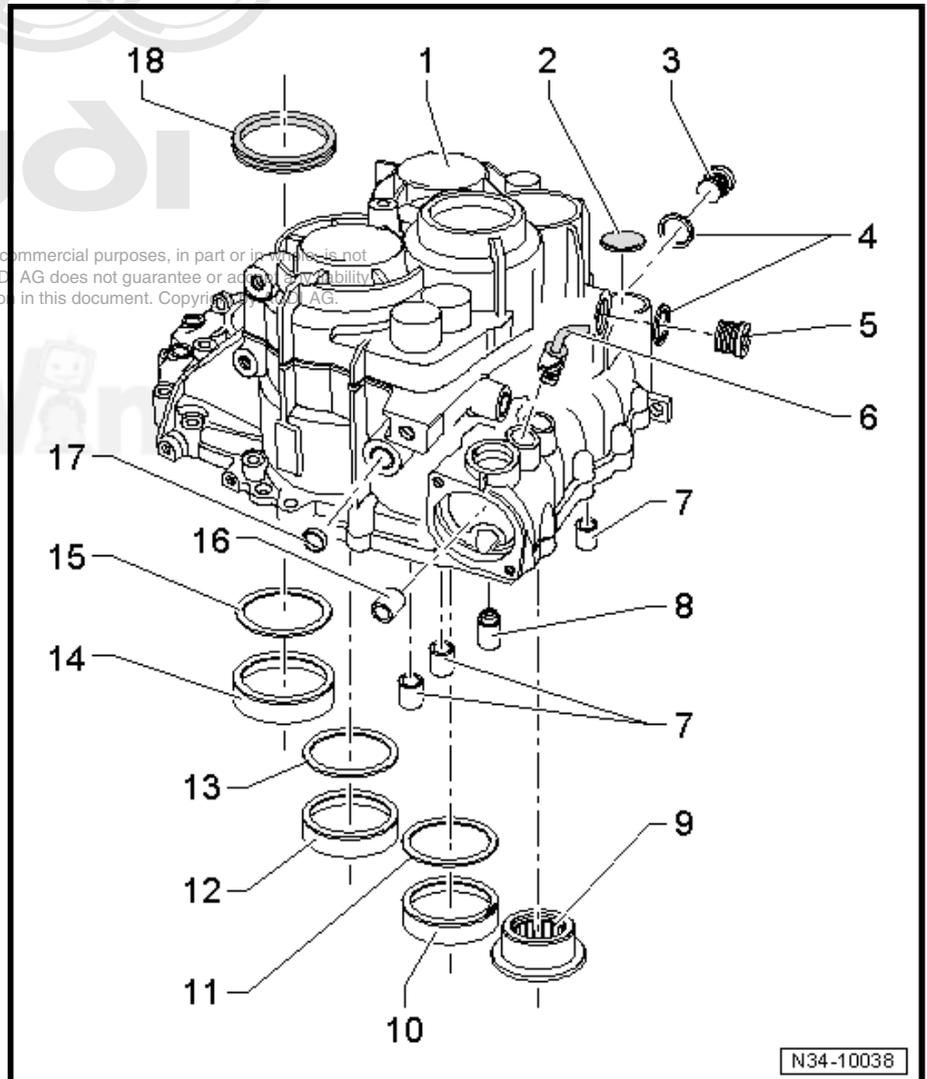
- For adjustment of shift mechanism, refer to ⇒ [“2.8 Shift Mechanism, Adjusting”, page 69](#)
- Can be replaced with non-disassembled transmission
- Removing ⇒ [page 153](#)
- Installation location ⇒ [page 154](#)
- Driving in ⇒ [page 154](#)

### 7 - Bushing for Selector Rods

- Pulling out ⇒ [page 154](#)
- Driving in ⇒ [page 154](#)

### 8 - Lock Sleeve

- Pressing off with transmission disassembled ⇒ [page 155](#)
- Driving off with non-disassembled transmission ⇒ [page 155](#)
- Lock sleeve differentiation ⇒ [page 155](#)
- Lock sleeve with shoulder, driving in ⇒ [page 156](#)



- Lock sleeve without shoulder, driving in ⇒ [page 156](#)

#### 9 - Needle Bearing for Reverse Shaft

- Replace after each disassembly
- Pulling out ⇒ [page 156](#)
- Installing ⇒ [page 156](#)

#### 10 - Taper Roller Bearing Outer Race

- For output shaft 5th/6th gear/reverse gear
- Removing and installing, refer to ⇒ [“3.3 Output Shaft for 5th/6th Gear and Reverse Gear”, page 202](#)
- In the event of replacement: adjust the output shaft for 5th/6th gear/reverse gear, refer to ⇒ [“2.5 Output Shaft for 5th/6th Gear and Reverse Gear, Adjusting”, page 188](#)

#### 11 - Adjustment Shim

- For output shaft 5th/6th gear/reverse gear
- Adjustment overview, refer to ⇒ [“1.4 Adjustment Overview”, page 224](#)

#### 12 - Taper Roller Bearing Outer Race

- For output shaft for 1st to 4th gear
- Removing and installing, refer to ⇒ [“3.2 Output Shaft, 1st to 4th Gears”, page 194](#)
- In the event of replacement: adjust the output shaft for 1st to 4th gear, refer to ⇒ [“2.3 Output Shaft, 1st to 4th Gears, Adjusting”, page 183](#)

#### 13 - Adjustment Shim

- For output shaft for 1st to 4th gear
- Adjustment overview, refer to ⇒ [“1.4 Adjustment Overview”, page 224](#)

#### 14 - Taper Roller Bearing Outer Race

- for the differential
- Removing and installing, refer to ⇒ [“1.3 Differential Assembly Overview”, page 222](#)
- When replacing: adjust the differential, refer to ⇒ [“1.4 Adjustment Overview”, page 224](#)

#### 15 - Adjustment Shim

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- For the differential
- Adjustment overview, refer to ⇒ [“1.4 Adjustment Overview”, page 224](#)

#### 16 - Bushing for Selector Shaft

- Pulling out ⇒ [page 157](#)
- Driving in ⇒ [page 157](#)

#### 17 - Sealing Plug

- Driving out ⇒ [page 157](#)
- Driving in ⇒ [page 157](#)

#### 18 - Left Flange Shaft Seal

- Replace, refer to ⇒ [“3.2 Left Flange Shaft Seal”, page 228](#)

## 2.15 Clutch Housing Assembly Overview

### 1 - Bushing for Selector Rods

- Pulling out ⇒ [page 158](#)
- Driving in ⇒ [page 158](#)

### 2 - Axle for Reverse Gear Shift Fork

- Installed to transmission build date 5/24/09 ⇒ [page 84](#)
- Axle cannot be removed with workshop equipment
- To transmission build date 5/24/09: When using a new clutch housing, a new axle must be pressed in ⇒ [page 159](#)
- No longer used as of transmission build date 5/25/09; then bearing of the reverse gear shift fork together with the 5th/6th gear shift fork ⇒ [page 147](#)
- Allocation, refer to the electronic parts catalog ETKA

### 3 - Needle Bearing for Reverse Shaft

- Replace after each disassembly
- Pulling out ⇒ [page 159](#)
- Installing ⇒ [page 159](#)

### 4 - Alignment Bushing

- Quantity: 2

### 5 - Clutch Housing

- When replacing: adjust the output shaft and differential, refer to ⇒ ["1.4 Adjustment Overview", page 224](#)

### 6 - Input Shaft Seal

- Replace, refer to ⇒ ["4.13 Input Shaft Seal", page 123](#)

### 7 - Shaft Seal

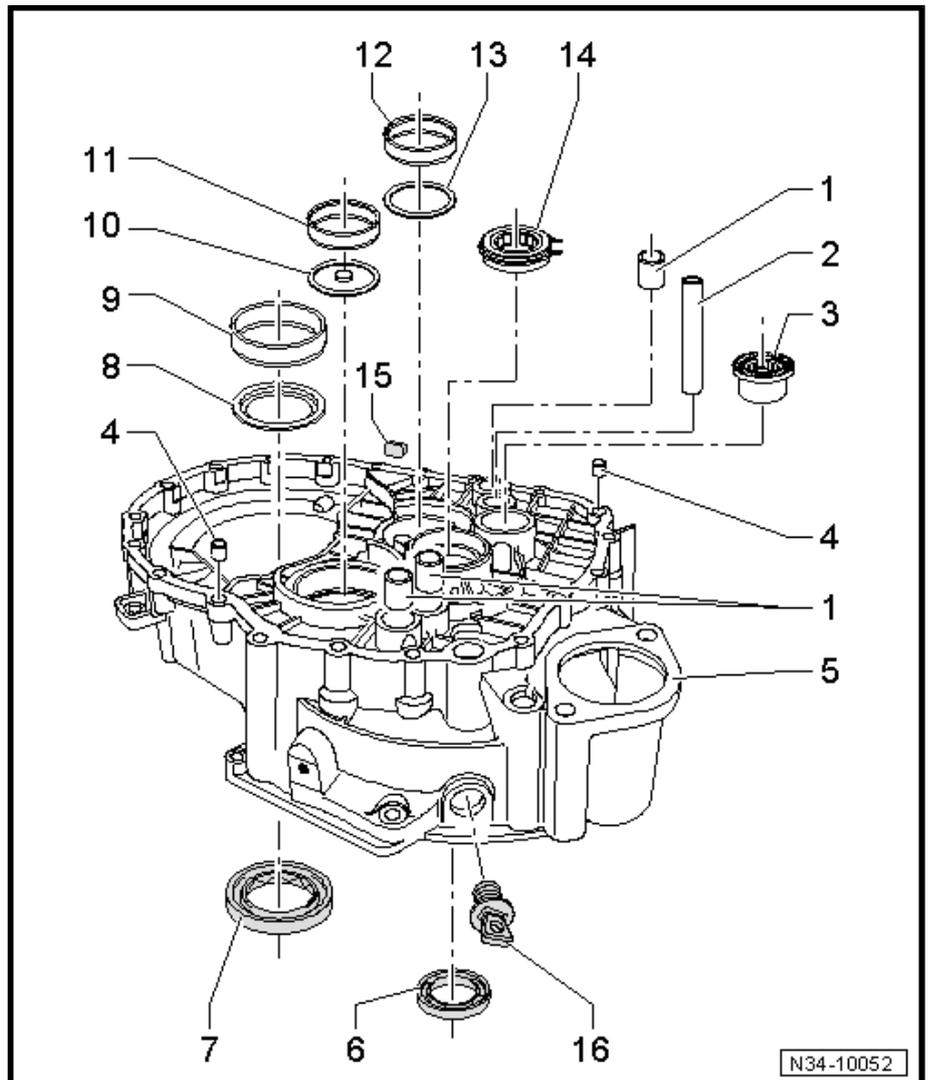
- Between manual transmission and bevel box
- Replace with transmission installed, refer to ⇒ ["3.3 Shaft Sealing Ring for Bevel Box with Manual Transmission Installed, Replacing", page 229](#)
- Can be removed using the sleeve -30 - 21- when the transmission is disassembled.
- Can be driven in to stop on disassembled transmission with thrust piece -T40007-

### 8 - Adjustment Shim

- For the differential
- Installed position: shoulder on inner diameter faces shaft sealing ring -7-

### 9 - Taper Roller Bearing Outer Race

- For the differential
- Removing and installing, refer to ⇒ ["1.3 Differential Assembly Overview", page 222](#)
- When replacing: adjust the differential, refer to ⇒ ["1.5 Differential, Adjusting", page 224](#)



## 10 - Oil Deflector Ring

- ❑ Installed position: shoulder at hole points toward output shaft

## 11 - Taper Roller Bearing Outer Race

- ❑ For output shaft for 1st to 4th gear
- ❑ Removing and installing, refer to ⇒ [“3.2 Output Shaft, 1st to 4th Gears”, page 194](#)
- ❑ In the event of replacement: adjust the output shaft for 1st to 4th gear, refer to ⇒ [“2.3 Output Shaft, 1st to 4th Gears, Adjusting”, page 183](#)

## 12 - Taper Roller Bearing Outer Race

- ❑ For output shaft 5th/6th gear/reverse gear
- ❑ Removing and installing, refer to ⇒ [“3.3 Output Shaft for 5th/6th Gear and Reverse Gear”, page 202](#)
- ❑ In the event of replacement: adjust the output shaft for 5th/6th gear and reverse gear, refer to ⇒ [“2.5 Output Shaft for 5th/6th Gear and Reverse Gear, Adjusting”, page 188](#)

## 13 - Adjustment Shim

- ❑ For output shaft for 5th/6th and reverse gear
- ❑ 0.65 mm thick

## 14 - Roller Bearing

- ❑ For input shaft
- ❑ Removing and installing, refer to ⇒ [“3.1 Input Shaft”, page 192](#)

## 15 - Magnet

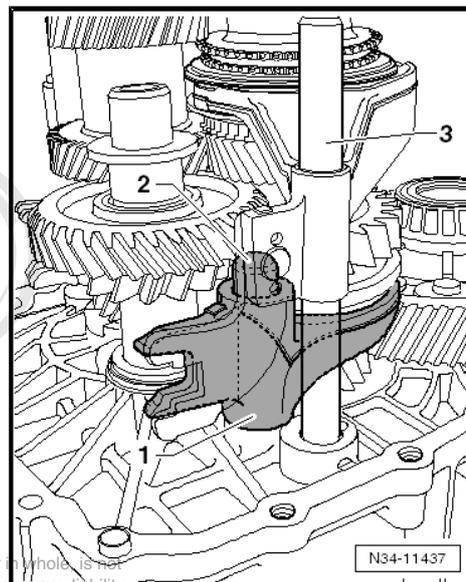
- ❑ Held in place by housing joint surface

## 16 - Cap

- ❑ Installed only on clutch housing for 4-cylinder engine

## Axle for Reverse Gear Shift Fork to Transmission Build Date 5/24/09

- Mount reverse gear shift fork -1- on axle -2- behind 5th/6th gear selector rod -3-.



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## 2.16 Shift Mechanism Assembly Overview, Transmission Side



Grease bearing areas and slide surfaces with grease -G 000 450 02- .

### 1 - Bushing for Selector Shaft

- Removing and installing -16- ⇒ [page 82](#)

### 2 - Selector Shaft

- With shift cover
- Can be removed and installed with transmission installed

### 3 - O-ring

- Replace
- Insert into surrounding groove of shift cover
- Install coated with gear oil

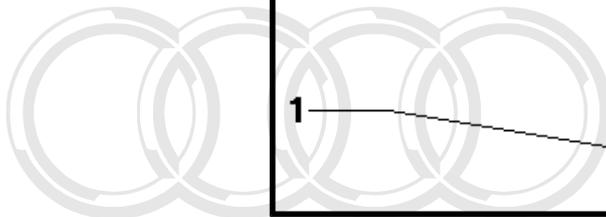
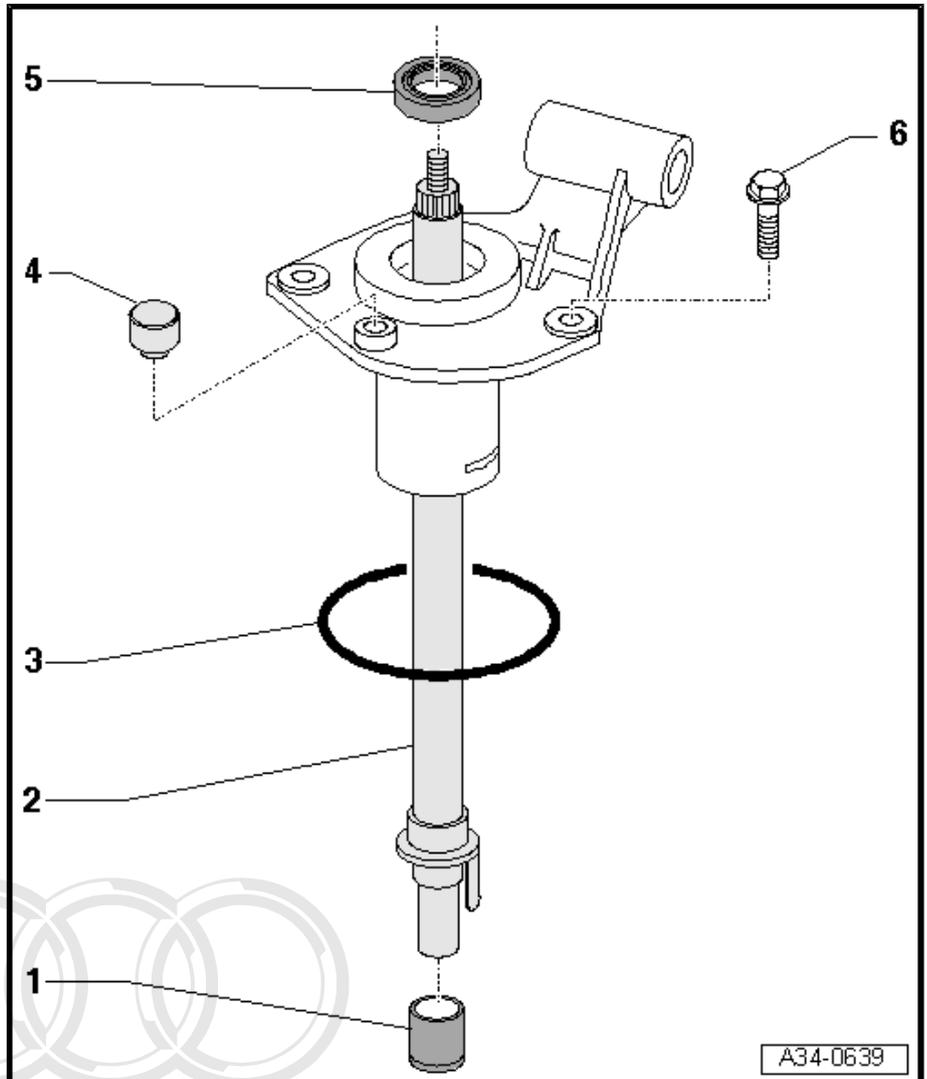
### 4 - Cap for Transmission Breather

### 5 - Selector Shaft Seal

- Replace, refer to ⇒ ["4.14 Selector Shaft Seal", page 124](#)

### 6 - Bolt

- Replace
- 20 Nm



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## 2.17 Shift Forks Assembly Overview

### 1 - Rubber Damper

- Can be pulled out of selector rod and inserted by hand

### 2 - Selector Rod with Shift Fork for 1st and 2nd Gear

### 3 - Selector Rod with Shift Fork for 3rd and 4th Gear

### 4 - Selector Rod with Shift Fork for 5th and 6th Gear

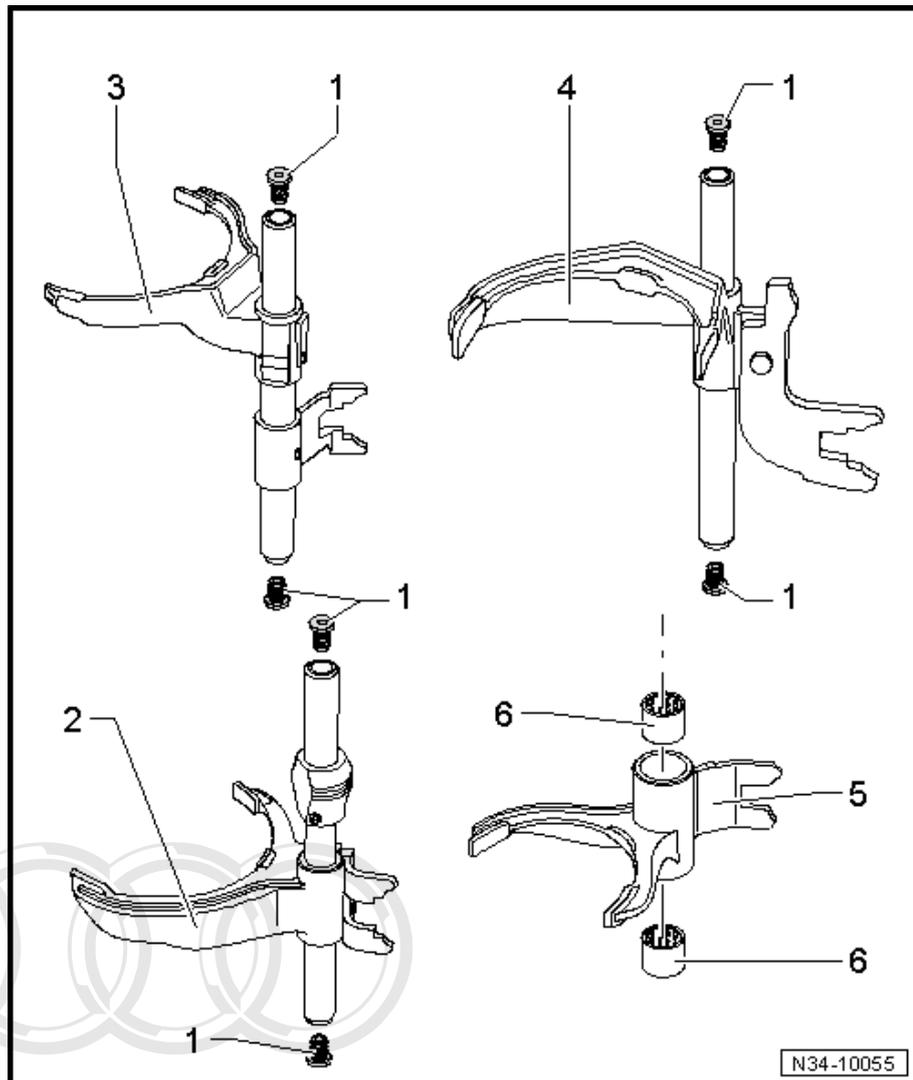
- Also serves as the bearing for the reverse gear shift fork as of transmission build date 5/25/09

### 5 - Reverse Gear Shift Fork

- from transmission manufacture date 06 03 6, ball sleeve -6- has been omitted
- Sliding omission
- Reverse gear shift fork is adapted
- From transmission build date 5/25/09, bearing on the selector rod for the shift fork for 5th and 6th gear
- Reverse gear shift fork differentiation [=> page 86](#)
- Allocation, refer to the electronic parts catalog ETKA

### 6 - Ball sleeve

- No longer used as of transmission build date 3/06/06
- Sliding omission
- Allocation, refer to the electronic parts catalog ETKA
- Pulling out [=> page 152](#)
- Installing [=> page 152](#)

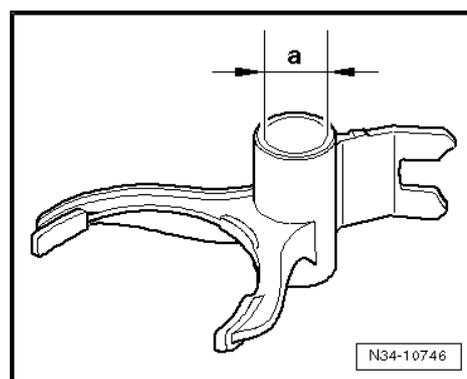


N34-10055

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### Reverse Gear Shift Fork Differentiation

Dimension "a" mm	Transmission Manufacture Date	Reverse Gear Shift Fork	Mounting
24	Through 05 03 6	With ball sleeve	On the axle for the reverse gear shift fork <a href="#">=&gt; page 84</a>
18	From 3/6/06 to 5/24/09	Without ball sleeve	
15	From 5/25/09	Without ball sleeve	Selector rod with shift fork for 5th and 6th gear <a href="#">=&gt; page 147</a>



N34-10746

### 3 Specifications

- ⇒ [“3.1 Bevel Box Oil Filler Bolt”, page 87](#)
- ⇒ [“3.2 Manual Transmission Oil Filler Plug”, page 87](#)
- ⇒ [“3.3 Fastener Tightening Specifications”, page 87](#)

#### 3.1 Bevel Box Oil Filler Bolt

##### Oil Filler Bolt - Tightening Specification

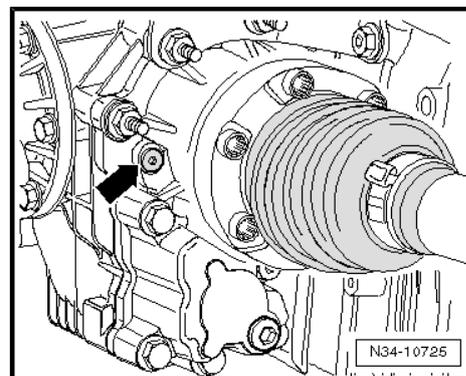


Note

Replace the oil filler bolt -arrow-.

- Tighten the oil filler bolt to 15 Nm.

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#### 3.2 Manual Transmission Oil Filler Plug

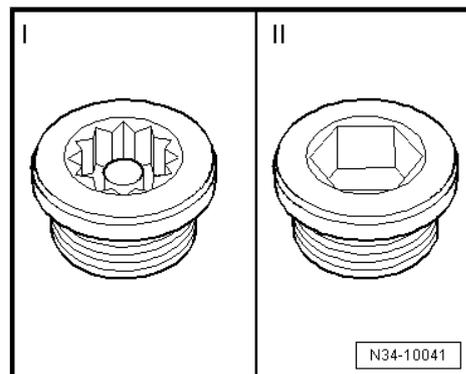
##### Plug for oil filler and drain hole - tightening specifications

I - Bolt for oil filler and drain hole with multi-point socket head

- ◆ 45 Nm

II - Bolt for oil filler and drain hole with hex socket

- ◆ 30 Nm



#### 3.3 Fastener Tightening Specifications

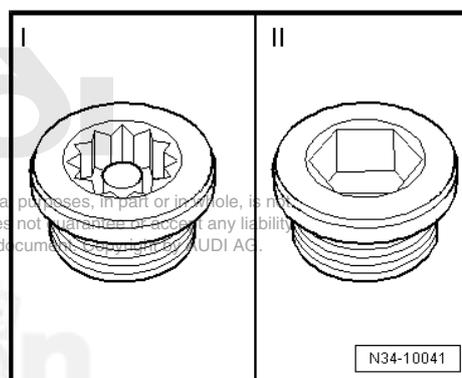
Component	Bolt Size	Nm
Bevel Box <sup>1</sup>		40
Backup Light Switch		20
Clutch Housing <sup>1</sup>		15 + 90°
Control Cable Mounting Bracket to Model Year 2007		20
Control Cable Mounting Bracket from Model Year 2008		20
Cover for Damper		6
Flange Shaft with Spring		33
Oil Filler Plug <sup>1</sup>		15
Pendulum Support <sup>2</sup>		
Transmission with threaded inserts in connection with screws of strength category 10.9:		50 + 90°
Transmission without threaded inserts and bolts with strength category 8.8		40 + 90° <sup>1</sup>
		100 + 90° <sup>1</sup>
Selector Bracket <sup>5</sup>		5
Selector Mechanism <sup>1</sup>		20
Selector Shaft		45

Component	Bolt Size	Nm
Selector Shaft <sup>4</sup>		20
Shielding Plate/Right Drive Axle to Bevel Box		20
Shift Housing, Vehicles to VIN 8J-7-013000, Nut		8
Shift Housing, Vehicles from VIN 8J-7-013001, Nut		
	M6	8
	M8	25
Small Flywheel Cover Plate		10
Transmission Bracket <sup>1</sup>		60 + 90°
Transmission Mount <sup>1,3</sup>		
		40 Nm + 90°
		60 Nm + 90°
Transmission Shift Lever <sup>1</sup>		23

- <sup>1</sup> Always replace
- <sup>2</sup> For bolt tightening clarification, refer to ⇒ [“2.9 Subframe Mount Assembly Overview”, page 72](#) and see items -2 and 13-
- <sup>3</sup> For bolt tightening clarification, refer to ⇒ [“2.9 Subframe Mount Assembly Overview”, page 72](#) and see items -14 and 15-
- <sup>4</sup> For bolt tightening clarification, refer to ⇒ [“2.16 Shift Mechanism Assembly Overview, Transmission Side”, page 85](#) and see items -6-
- <sup>5</sup> For bolt tightening clarification, refer to ⇒ [“2.12 Transmission Housing and Shift Mechanism Assembly Overview”, page 77](#) and see items -10-

#### Different Versions of Oil Filler- and Oil Drain Plugs

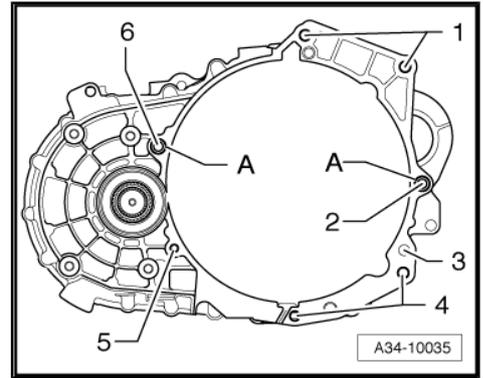
Component	Nm
I - Oil filler- and oil drain plug with multi-point socket head	45
II - Oil filler- and oil drain plug with hex-socket head	30



### Manual Transmission Mount on Engine

Item	Bolt <sup>1</sup>	Nm
1 <sup>2)</sup> , 3 <sup>3)</sup>	M12x55	80
2 <sup>4)</sup>	M12x65	80
	M12x55	80
4 <sup>4)</sup> , 5 <sup>4)5)</sup>	M10x50	40
6 <sup>3)</sup>	M12x80	80
A	Alignment sleeves for centering	

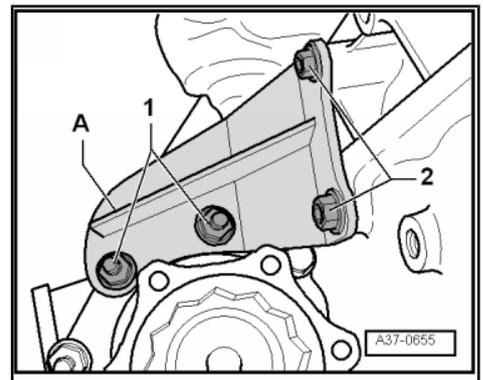
- 1) Replace bolts.
- 2) Bolt with 8 mm threaded pin
- 3) With permanent washer.
- 4) Bolted from the engine side into the transmission.
- 5) The securing clip must be inserted in the engine oil pan



### Bevel Box Bracket -A- Tightening Specification and Sequence

– Tighten bolts in 4 stages as follows:

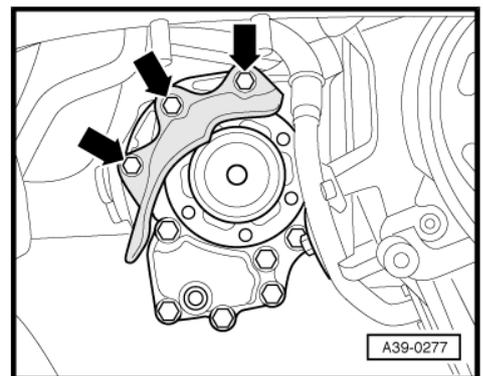
1. Install bolts -1- and -2- hand tight.
2. Pretighten bolts -1- to 3 Nm.
3. Tighten bolts -2- to 35 Nm.
4. Tighten bolts -1- to 45 Nm.



### Right Drive Axle Heat Shield - Tightening Specification

– Tighten bolts -arrows- to 25 Nm.

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## 4 Removal and Installation

- ⇒ ["4.1 Shift Knob with Shift Lever Boot", page 90](#)
- ⇒ ["4.2 Selector Mechanism", page 91](#)
- ⇒ ["4.3 Shift Cable and Selector Cable", page 94](#)
- ⇒ ["4.4 Transmission, Removing", page 96](#)
- ⇒ ["4.7 Transmission, Installing", page 107](#)
- ⇒ ["4.5 Transmission, Transporting", page 106](#)
- ⇒ ["4.6 Transmission, Securing to Assembly Stand", page 107](#)
- ⇒ ["4.8 Transmission Mount, Removing", page 113](#)
- ⇒ ["4.9 Transmission Mount, installing", page 116](#)
- ⇒ ["4.10 Pendulum Support", page 117](#)
- ⇒ ["4.11 Bevel Box, Removing", page 118](#)
- ⇒ ["4.12 Bevel Box, Installing", page 122](#)
- ⇒ ["4.13 Input Shaft Seal", page 123](#)
- ⇒ ["4.14 Selector Shaft Seal", page 124](#)
- ⇒ ["4.15 Selector Shaft", page 126](#)

### 4.1 Shift Knob with Shift Lever Boot



#### Note

*The shift knob is removed together with the shift lever boot and the center console cover.*

#### Special tools and workshop equipment required

- ◆ Trim Removal Wedge -3409-
- ◆ Hose Clip Pliers -V.A.G 1275-

#### Removing

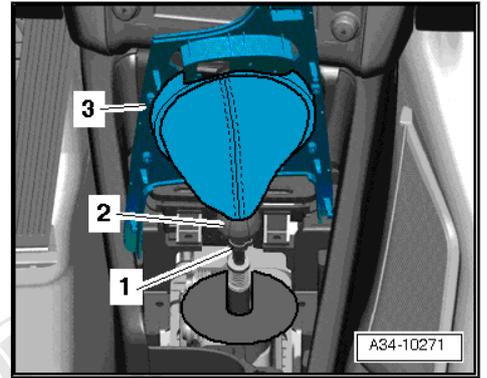
- Open the ashtray.
- Carefully pry trim from center console -arrows-.



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- Disconnect electrical connector on trim.
- Fold trim -3- up over shift knob.
- Open clamping sleeve -1- and remove shift knob -2- together with shift lever boot and trim -3-.
- Disconnect shift lever boot and center console trim -3-  
 => [page 55](#)



### Installing

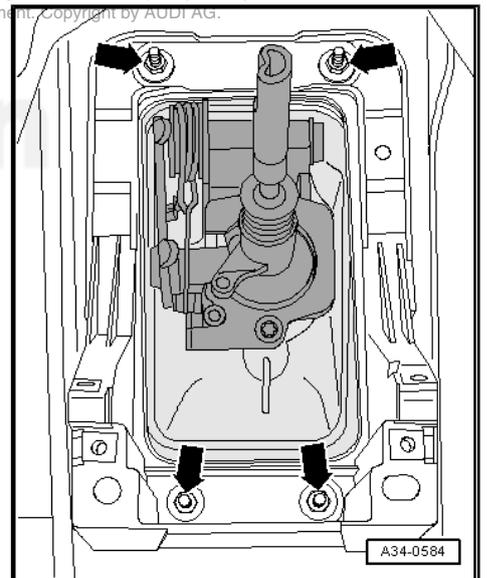
Install in reverse order, paying attention to the following:

- Press shift knob onto shift lever as far as stop.
- Secure shift knob to shift lever with a new clamp -1- using - V.A.G 1275- .

## 4.2 Selector Mechanism

### Removing

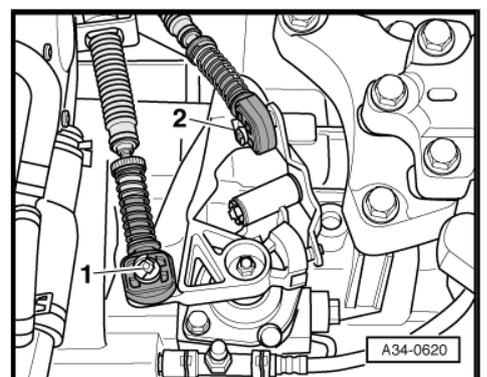
- Remove shift knob with center console trim. Refer to  
 => ["4.1 Shift Knob with Shift Lever Boot", page 90](#) .
- Remove the center console. Refer to => Body Interior; Rep. Gr. 68 ; Removal and Installation .
- Remove the noise insulation over the shift mechanism.
- Remove nuts -arrows-.



- Completely remove the air filter housing. Refer to => Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .
- Remove retaining plate -1- for the shift cable and remove the control cable from the pin.

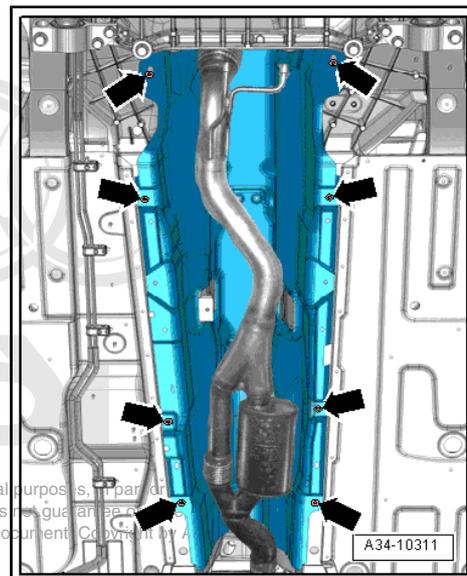
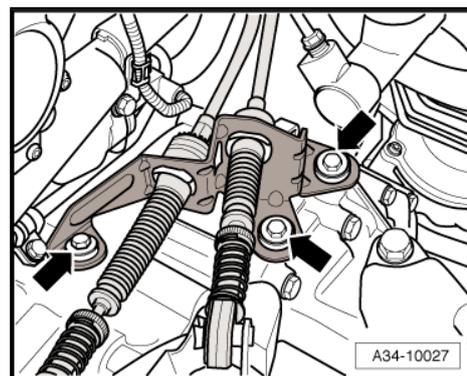
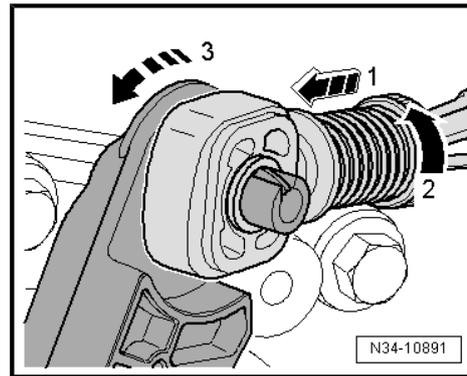
### Metal selector relay lever:

- Remove retaining plate -2- for the selector cable from the selector relay lever and remove the control cable from the pin.



**Plastic selector relay lever:**

- To avoid damage to the selector cable, the control cable retainer must be disconnected from the selector cable before removal.
- Pull the securing mechanism forward as far as the stop in the direction of -arrow 1- and then unlock to the left in the direction of -arrow 2-.
- Then press the selector relay lever forward (direction of -arrow 3-).
- The control cable retainer may only be removed with the selector relay lever removed => [page 69](#)
- Remove the control cable mounting bracket from the transmission. Remove three bolts -arrows- for this purpose.
- Remove the driveshaft. Refer to => Rear Final Drive 02D, 0AV, 0BR and 0BY; Rep. Gr. 39 ; Removal and Installation
- Remove the fasteners -arrows- and remove the heat shield to the back.
- Pivot shift housing downward and remove with shift cables.

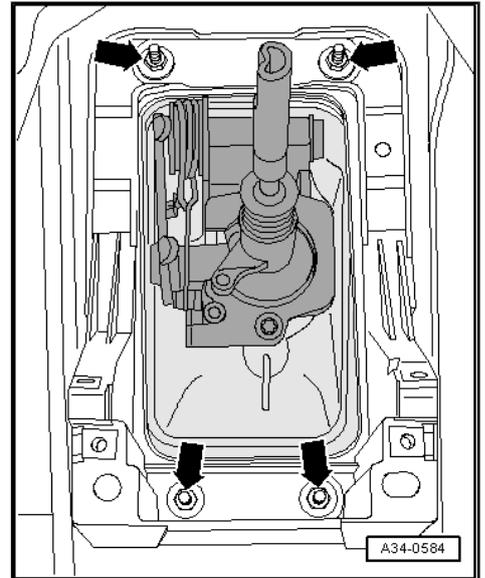


**Installing**

Install in reverse order, paying attention to the following:

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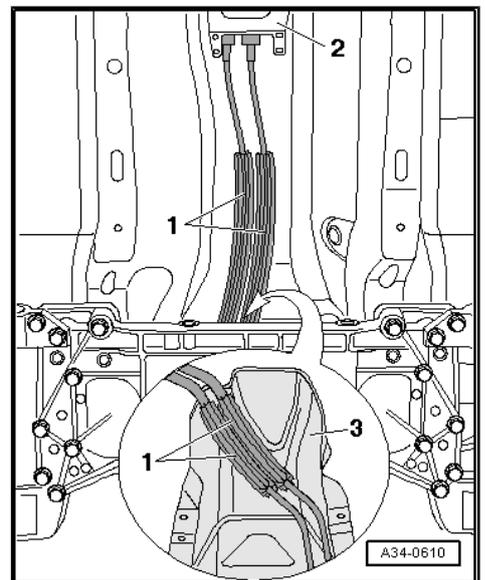
- Insert the shift mechanism and tighten the nuts -arrows-. Tightening specification -16- => [page 60](#) .



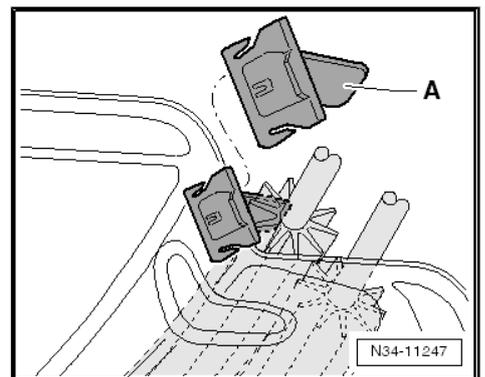
- Route the cables -1- from the shift mechanism -2- to the transmission as follows:
  - The cables must run parallel to each other and must not intersect.
  - The cables must be routed in the provided recesses in the heat shield -3-.

 **Note**

*The enlargement shows the heat shield from above.*



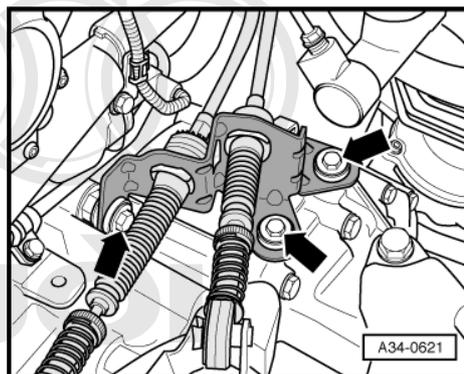
A clip -A- holds the cables and heat shield to each other in place.



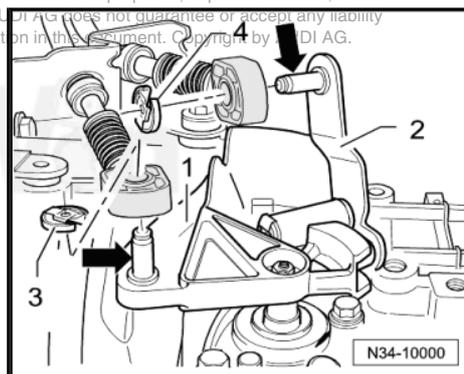
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- Bolt the control cable mounting bracket to the transmission -arrows-. Tightening specification, refer to => ["2.5 Shift Cable and Selector Cable to Model Year 2007 Assembly Overview", page 61](#) .



- Apply a small amount of grease -G 000 450 02- to the transmission shift lever pins -arrows- -1- and selector relay lever -2- if applicable.
- Replace lock washer -3- and, in the case of a metal selector relay lever, lock washer -4- after each disassembly.
- Install the shift cable and secure with lock washer -3-.



**Metal selector relay lever**

- Install the selector cable and secure with lock washer -4-.

**Plastic selector relay lever**

- Insert the selector cable in the control cable retainer.

**Continued for all**

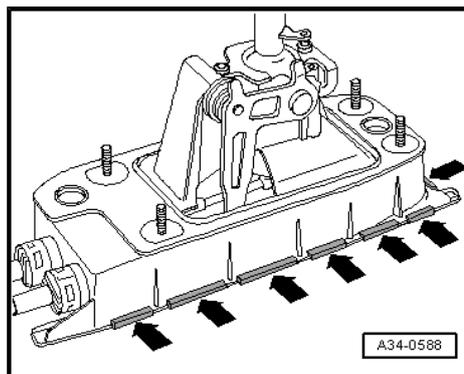
- Adjust the selector mechanism. Refer to => ["2.8 Shift Mechanism, Adjusting", page 69](#) .
- Install the driveshaft. Refer to => Rear Final Drive 02D, 0AV, 0BR and 0BY; Rep. Gr. 39 ; Removal and Installation
- Place the noise insulation over the shift mechanism and install the center console. Refer to => Body Interior; Rep. Gr. 68 ; Removal and Installation .
- Install the shift knob with the shift lever boot. Refer to => ["4.1 Shift Knob with Shift Lever Boot", page 90](#) .
- Install the air filter housing. Refer to => Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .

### 4.3 Shift Cable and Selector Cable

**Removing**

- Remove shift mechanism. Refer to => ["4.2 Selector Mechanism", page 91](#) .
- Bend open the tabs -arrows- of the base plate for selector mechanism with a screwdriver and remove the base plate.
- Remove the gasket.

**Vehicles to 8J-7-013000**



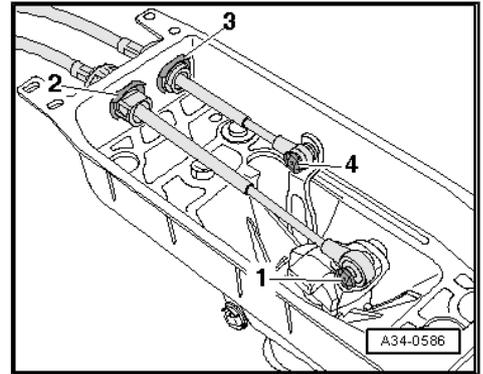
- Remove lock washers -1- and -4- and remove the control cables from the pins.

**Vehicles from VIN 8J-7-013001**

- Pry the shift and selector lever off of the pins.

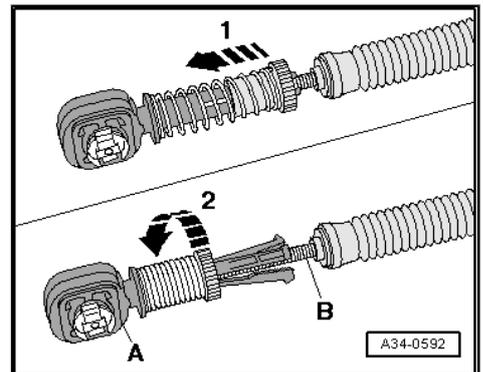
**All Vehicles**

- Remove circlips -2 to 3- and remove shift cable and selector cable from selector mechanism housing.



Release the cable retainer -A- for the selector and shift cables -B- as follows:

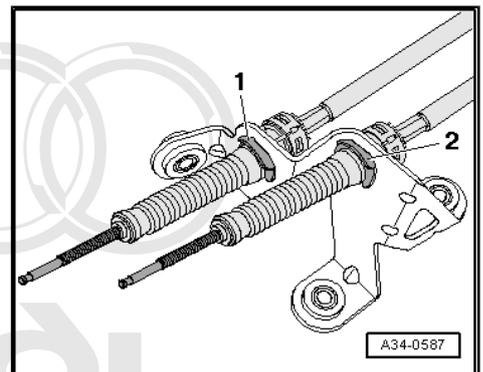
- Push sleeve forward up to the stop -arrow 1-.
- Turn sleeve to the right up to the stop -arrow 2- so that it engages.
- Remove the cable retainers from the cables.



- Pull off the circlips -1- and -2-.
- Remove the control cable mounting bracket from the control cables.

**Installing**

Install in reverse order, paying attention to the following:

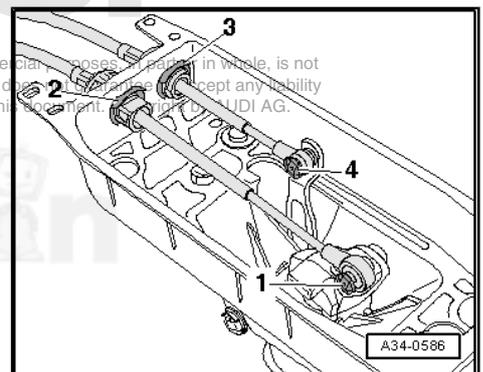


- Secure the shift cable and selector cable to the selector mechanism housing with the circlips -1 to 4-.

**Vehicles from VIN 8J-7-013001**

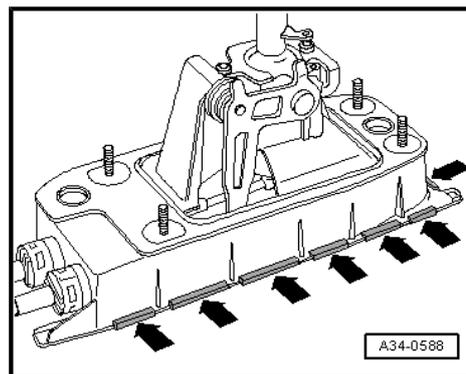
- Press the shift and selector lever onto the pins.

**All Vehicles**



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- Install a new seal and secure a new base plate to the shift mechanism by bending over the tabs -arrows-.
- Install shift mechanism. Refer to [⇒ "4.2 Selector Mechanism", page 91](#) .
- Adjust the selector mechanism. Refer to [⇒ "2.8 Shift Mechanism, Adjusting", page 69](#) .



## 4.4 Transmission, Removing

### Special tools and workshop equipment required

- ◆ Engine Support Bridge -10 - 222 A-
- ◆ Hook -10 - 222 A /10-
- ◆ Hose Clamps Up to 25 mm Diameter. -3094-
- ◆ Transmission Support -3282-
- ◆ Pin -3282/29-
- ◆ Adjustment Plate -3282/33-
- ◆ Engine/Transmission Jack -V.A.G 1383 A-
- ◆ Engine Support Basic Set -T40091-
- ◆ Engine Support Supplement Set -T40093-
- ◆ Adapter -VW 771/40-
- ◆ Bracket -T10338-
- ◆ M10x20 bolt
- ◆ Grease -G 000 450 02-
- ◆ Grease for clutch disc shaft splines -G 000 100-

### Procedure



#### Note

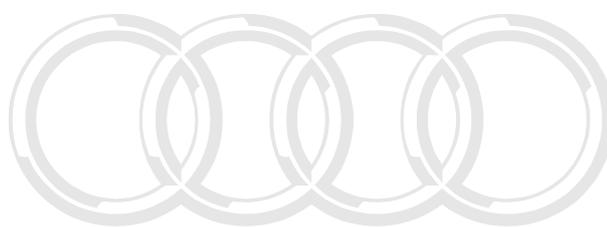
- ◆ *Observe general repair notes. Refer to [⇒ "1.2 General Repair Information", page 2](#) .*
- ◆ *Reinstall cable ties that were loosened or cut off during removal at same locations during installation.*



#### Caution

***Risk of destroying electronic components when disconnecting the battery.***

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

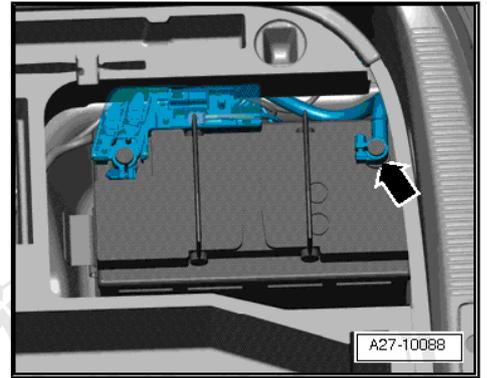


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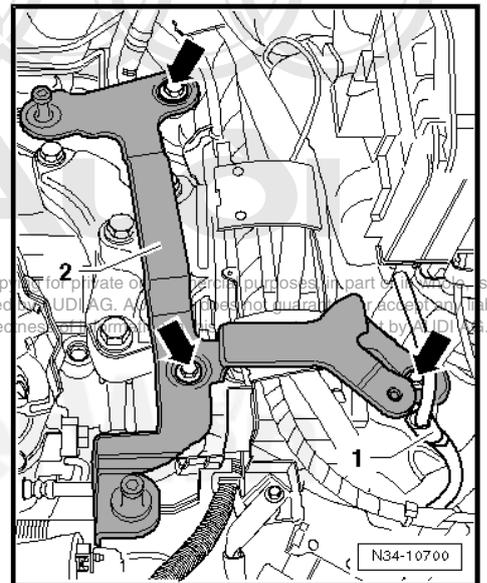
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- With the ignition switched off, disconnect the battery ground (GND) cable. Refer to ⇒ Electrical Equipment; Rep. Gr. 27 ; Removal and Installation .
- Remove the entire air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .



- Remove line -1- from air filter bracket -2-.
- Remove bolts -arrows- and remove air filter bracket.
- Remove the shift cable lock washer -3- from the transmission shift lever -1- and remove the cable from the pins -arrow-.

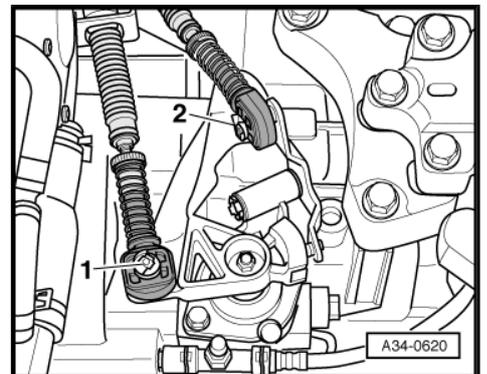


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- Remove lock washer -1- and remove the control cable retainer from the pin.

**Metal selector relay lever**

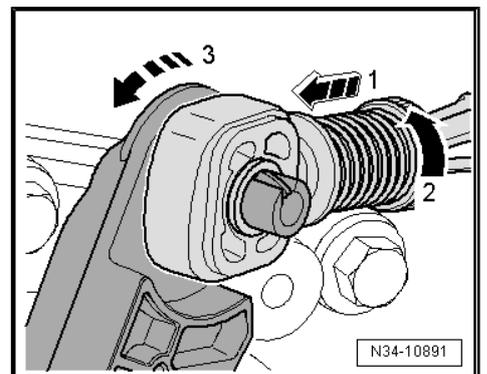
- Remove lock washer -2- and remove the control cable retainer from the selector relay lever.



**Plastic selector relay lever**

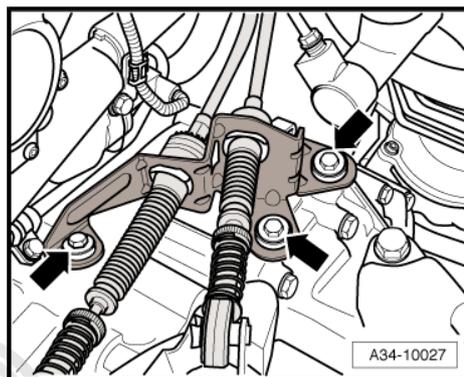
- To avoid damage to the selector cable, the control cable retainer must be disconnected from the selector cable before removal.

- Pull the securing mechanism forward as far as the stop in the direction of -arrow 1- and then unlock to the left in the direction of -arrow 2-.
- Then press the selector relay lever forward (direction of -arrow 3-).
- The control cable retainer may only be removed with the selector relay lever removed ⇒ [page 69](#)



**All Vehicles**

- Remove cable mounting bracket from transmission -arrows- and tie it up off to the side with the cables.

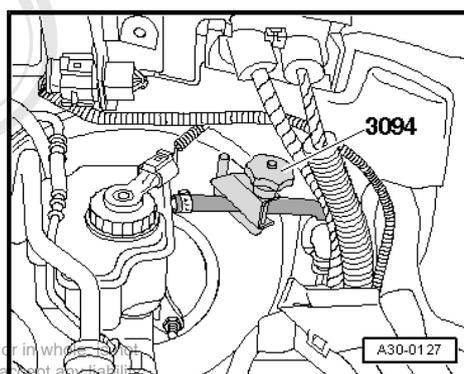


- When a plastic line is installed between the clutch master and slave cylinder, clamp off the return line to the clutch master cylinder with -3094- .



**Note**

- ◆ *During the following procedures, make sure that brake fluid does not leak onto the starter or the transmission. If this happens, these areas must be cleaned thoroughly.*
- ◆ *To prevent dirt from entering, seal open lines and connections with clean plugs or protective caps.*

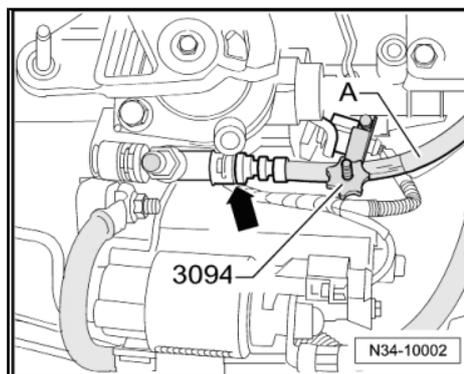


- If a hose/line assembly is installed between the clutch master and slave cylinder, clamp off hose -A- with -3094- .



**Note**

*Pay no attention to -arrow-.*

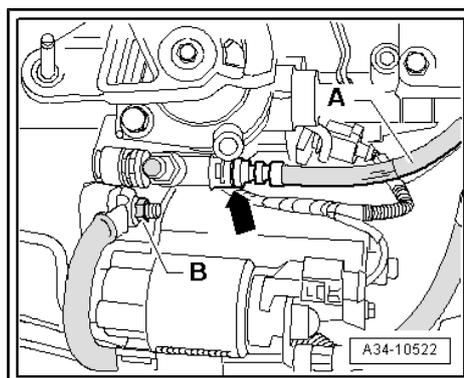


- Pull out the clip -arrow- to the stop.
- Remove the plastic line or hose/line assembly -A- from the bleeder/clutch slave cylinder and seal it off.



**Note**

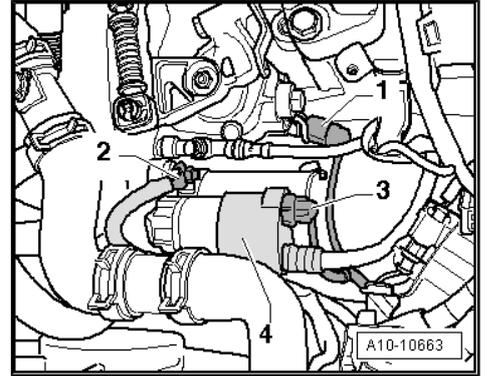
*Disregard item -B-.*



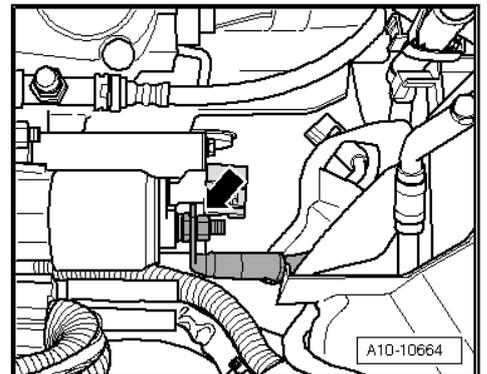
**Caution**

***Clutch pedal must no longer be operated.***

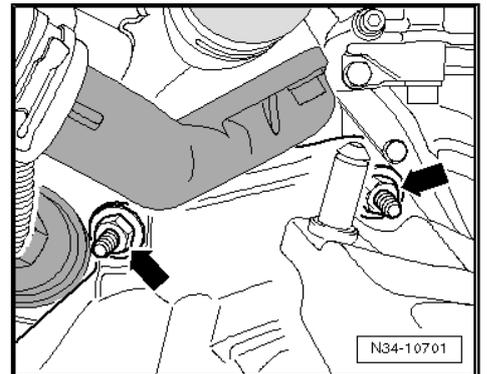
- Disconnect electrical harness connector -1- for back-up light switch -F4- .
- Remove the ground (GND) cable -2-.
- Then remove upper starter mounting bolt under ground (GND) cable -2-.
- Disconnect electrical connector -3-.
- Slide cover -4- back.



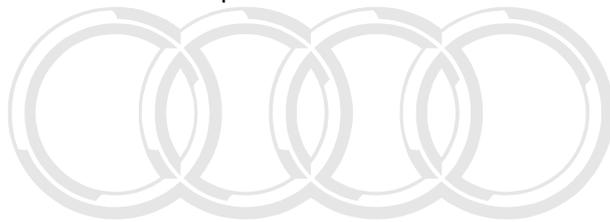
- Disconnect the electrical wire -arrow- from the starter.



- Remove upper engine/transmission bolts -arrows-.



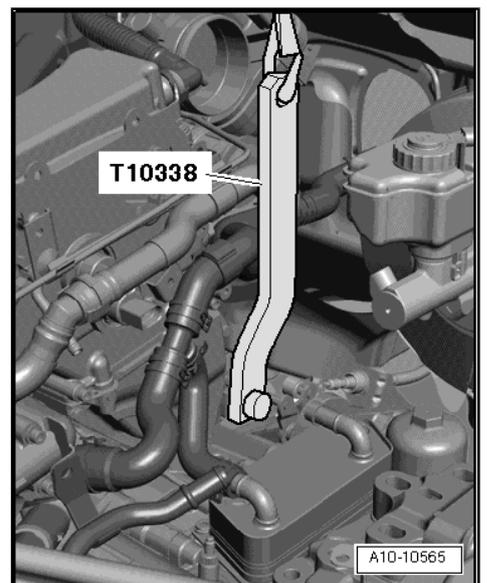
- Install -T10338- on open threaded hole at left rear of engine.



**Audi**

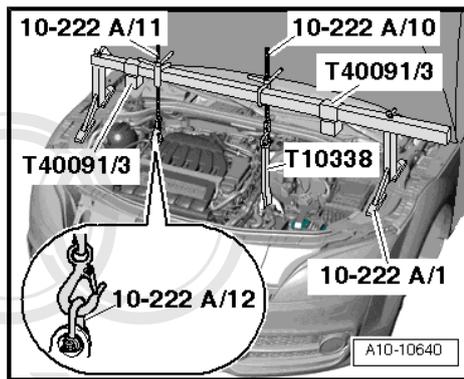
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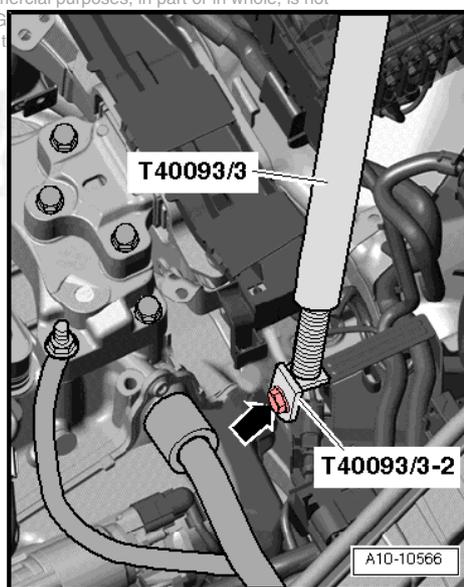
- Position -10 - 222 A- on bolted fender flange with the following tool components:
  - ◆ Bracket for engine -10 - 222 A /1- , qty. 2
  - ◆ Bracket with spindle and hook -10 - 222 A /10- (spindle faces toward rear)
  - ◆ Spindle -10 - 222 A /11- (spindle faces toward front)
  - ◆ Shackle -10 - 222 A /12-
  - ◆ Connectors -T40091/3- , qty. 2
- Engage -10 - 222 A /11- with -10 - 222 A /12- on right engine lifting eye.
- Engage -10 - 222 A /10- on -T10338- .
- Lightly tension the engine/transmission assembly with the spindles.
- Connect -T40093/3- (qty. 2) with left side -T40093/3-2- or right side -T40093/3-3- .
- Disconnect ground (GND) cable from left longmember.
- Remove left and right connecting bolts for front part of long-member.
- Install -T40093/3-2- (left) and -T40093/3-3- (right) on the long-members with the previously removed bolts -arrow-.

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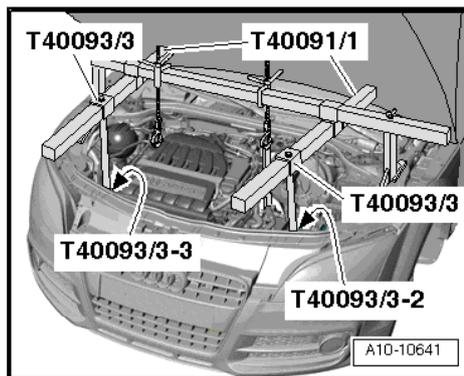


**i** Note

*The left side of the vehicle is shown in the illustration.*



- Insert -T40091/1- in -T40091/3- and -T40093/3- as shown in illustration.



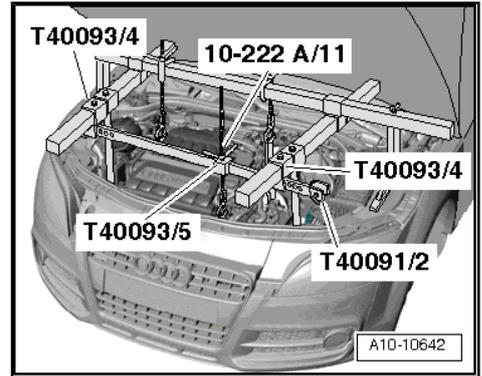
- Slide -T40093/4- onto square tube.
- Slide -T40091/2- with -T40093/5- into both -T40093/4- .



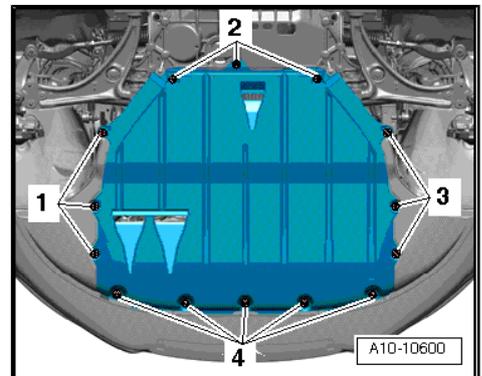
**WARNING**

*Risk of an accident due to loose support bridge parts.*

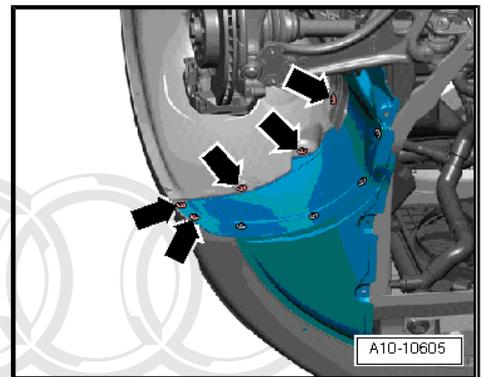
- ◆ *Secure -T40091/2- with pins and splints from -T40093/4- .*
- ◆ *Secure connector and supports with locking bolts.*



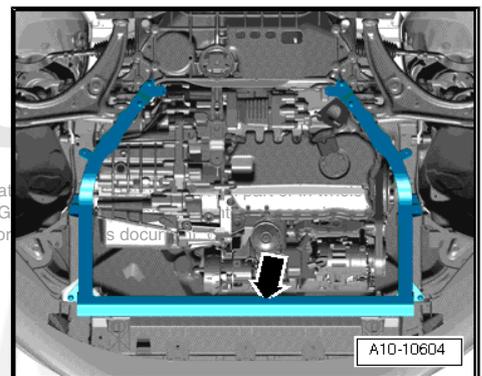
- Install -10 - 222 A /11- on slide and engine lifting eye.
- Tension the engine/transmission assembly by tightening the 3 spindles evenly.
- Remove both front wheels.
- Remove noise insulation in center by loosening fasteners -1 through 4-.



- Remove left and right noise insulation -arrows-.

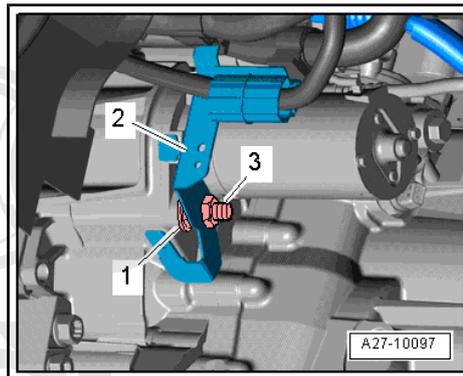


- Remove the noise insulation frame -arrow-. Refer to => Body Exterior; Rep. Gr. 50 ; Removal and Installation .

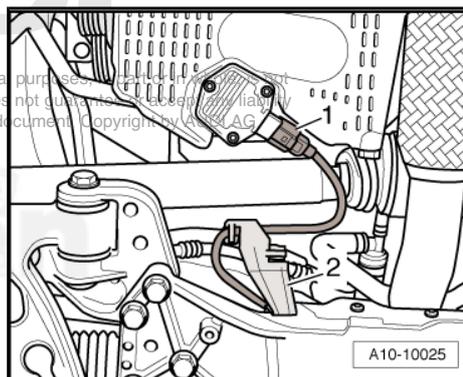


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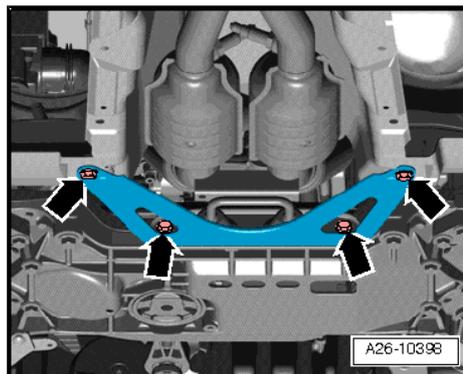
- Remove nut -3- and remove wiring harness bracket -2-.
- Remove starter mounting bolt -1- and starter.



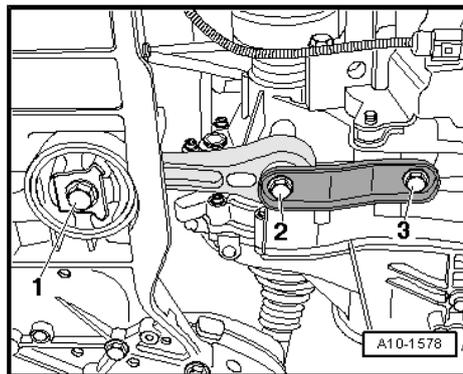
- Disconnect electrical connector -1- on oil level thermal sensor -G266- .
- Unclip bracket -2- for electrical wire to oil level thermal sensor on subframe.



- Remove exhaust system bracket bolts -arrows-.



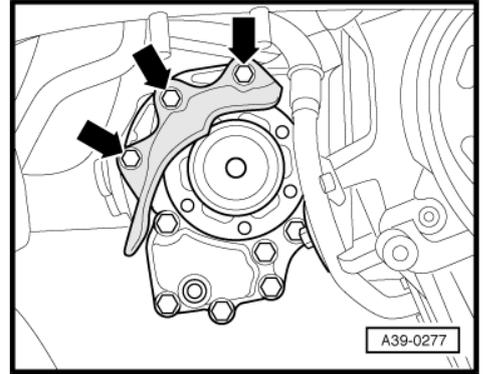
- Remove the bolts -2- and -3-.
- To avoid axle alignment, secure the subframe. Refer to => Suspension, Wheels, Steering; Rep. Gr. 40 ; Description and Operation .
- Remove subframe. Refer to => Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .



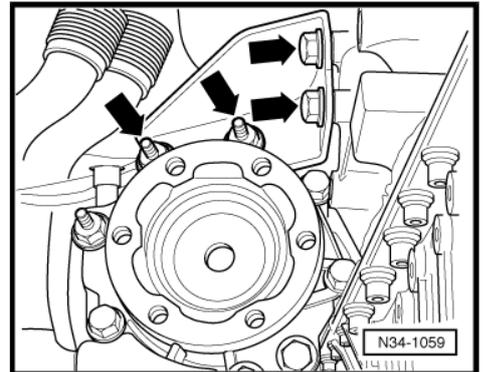
- Remove right drive axle heat shield from bevel box -arrows-.
- Remove the left drive axle from transmission flange shaft .
- Remove the right drive axle from the bevel box flange shaft .
- Raise drive axles and secure with cable ties.

 **Note**

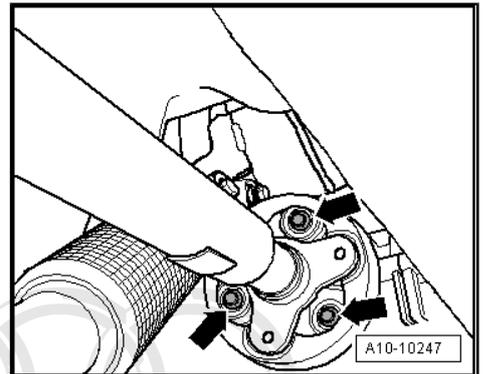
*Make sure drive axle protective coating is not damaged.*



- Remove the bolts -arrows- and remove the bevel box bracket.
- Identify position of flexible disc and bevel box flange to each other.



- Remove driveshaft flexible disc from bevel box -arrows- while counterholding at triangular flange with a lever.

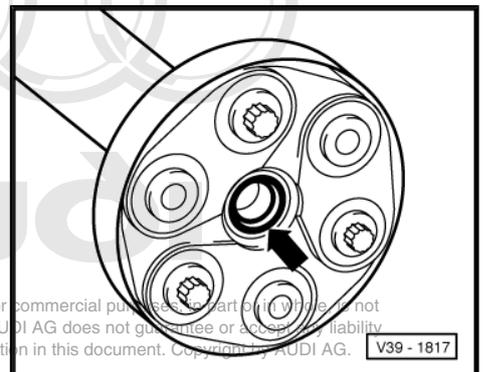


- Press engine/transmission assembly slightly forward (toward front end) and pull off driveshaft from bevel box.

 **Caution**

*Risk of damaging sealing ring -arrow- in driveshaft flange.*

◆ *Press driveshaft horizontally as far back and to the right side of the vehicle as possible.*



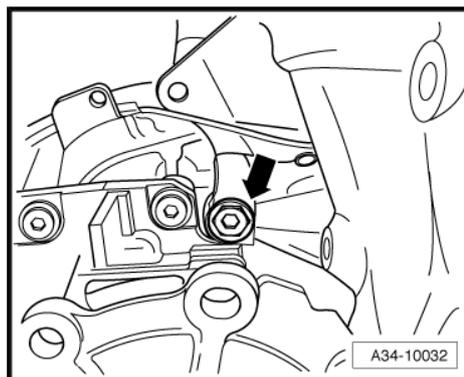
 **Note**

*If seal is damaged, driveshaft must be replaced.*

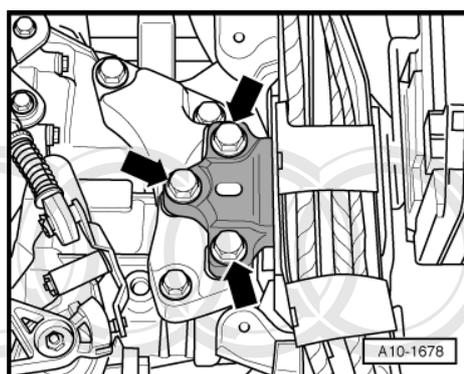
- Tie driveshaft up.

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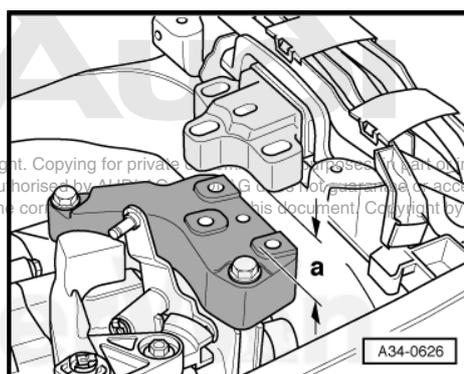
- Remove screw above bevel box -arrow-.



- Remove the bolts -arrows- from the assembly mounting on the transmission.

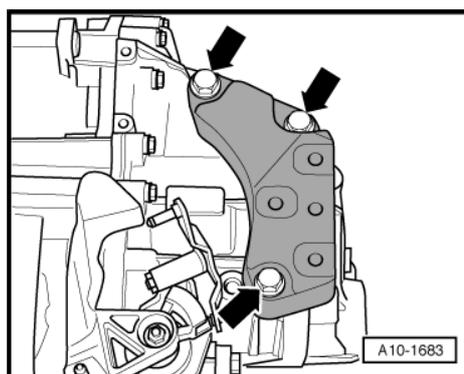


- Lower the transmission by adjusting the spindles of the -10 - 222 A- by dimension -a-.
- Dimension -a- = 70 mm.



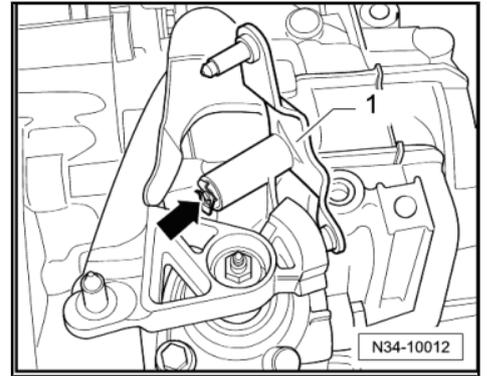
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- Remove transmission bracket from transmission -arrows-.



**Metal selector relay lever -1-:**

- Remove lock washer -arrow- and remove selector relay lever -1-.

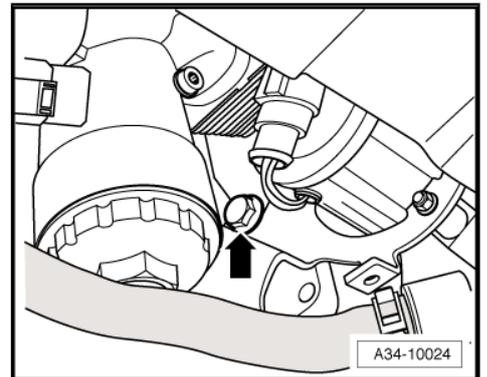


**Plastic selector relay lever -1-**

- Remove the selector relay lever with catch => [page 68](#)
- Remove the selector relay lever with catch => [page 69](#)

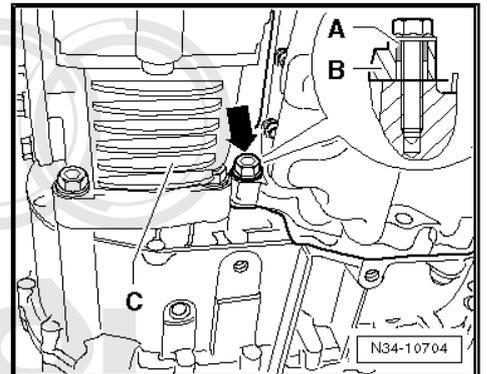
**All Vehicles**

- Remove engine/transmission connecting bolt -arrow- (engine side).



- Remove engine/transmission connecting bolt -arrow- near bevel box -C-.

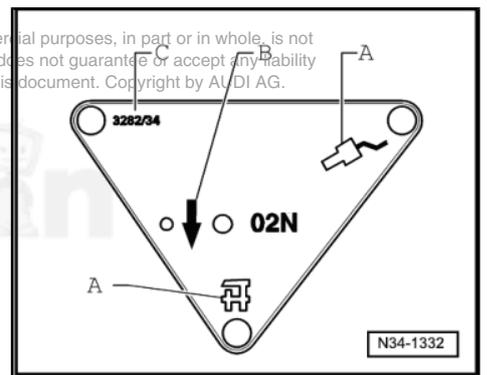
Make sure securing clip -A- for bolt -arrow- in engine oil pan -B- is installed.



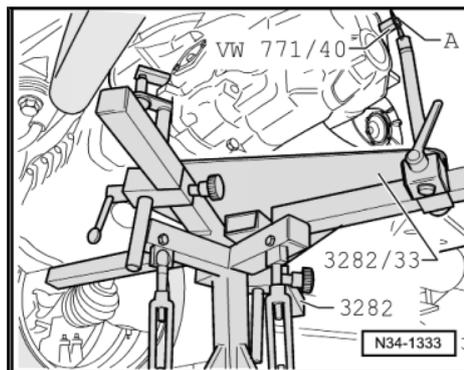
Transmission support -3282- is equipped with -3282/33- to remove transmission "02Q".

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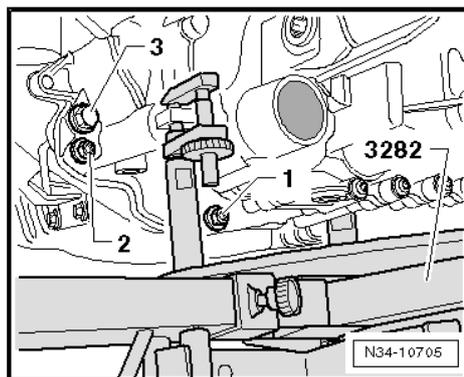
- Place -3282- in -V.A.G 1383 A- .
- Align arms of transmission support according to holes in adjustment plate .
- Install support elements -A- onto adjustment plate as shown.
- Install -3282/29- in place of attachment -C-
- Place -V.A.G 1383 A- under the vehicle with the arrow symbol -B- on the adjustment plate pointing in the direction of travel.
- Align adjustment plate and transmission parallel to one another.
- Screw -3282/29- into hole for mounting bolt of pendulum support on transmission.



- Secure -VW 771/40- in threaded hole of transmission housing as depicted in the illustration.
- Secure the transmission on the -3282- using bolt M10x20 -A-.



- Remove last lower engine/transmission connecting bolts -1 to 3-.

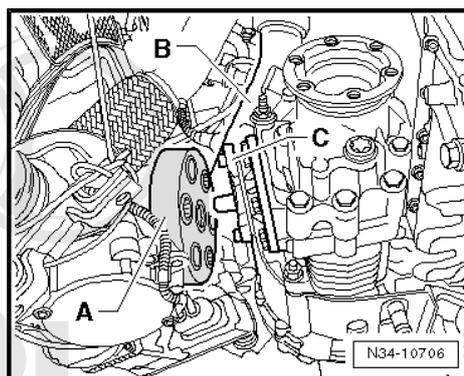


- Press transmission off of engine and turn upward in differential area. Guide the transmission past driveshaft -A- and front exhaust pipe -B- with output flange -C-. Rotate the output flange if necessary.

 **Note**

*Also note area between bevel box and intermediate plate/engine.*

- Press off transmission from alignment sleeves.
- Carefully lower transmission.



 **Note**

*Pay attention to electromechanical steering gear when lowering the transmission.*

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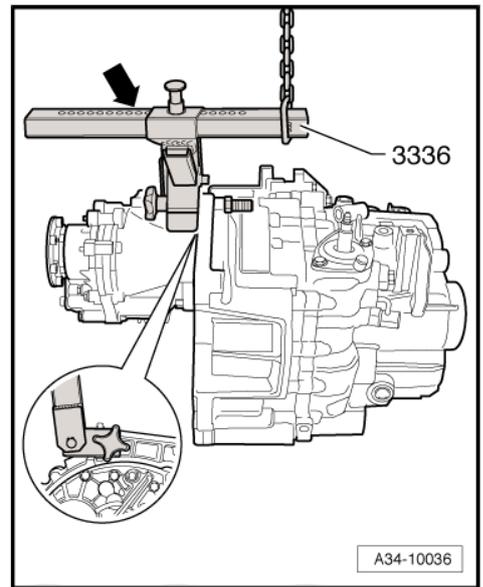
## 4.5 Transmission, Transporting

### Special tools and workshop equipment required

- ◆ Transmission Support Jig -3336-
- ◆ Shop Crane -VAS 6100-

### Procedure

- Secure the -3336- to the clutch housing.
- Adjust support arm on sliding piece with locking pin -arrow-.
- Number of visible holes = 9.
- Lift the transmission with the -VAS 6100- and -3336- .
- Set down the transmission, for example in a transport container.

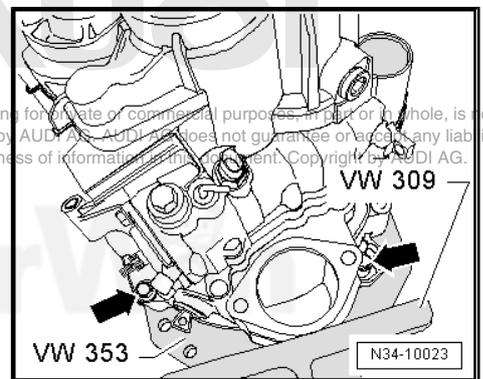


## 4.6 Transmission, Securing to Assembly Stand

### Special tools and workshop equipment required

- ◆ Holding Plate -VW 309-
- ◆ Holding Fixture -VW 313-
- ◆ Transmission Support -VW 353-
- Secure transmission to assembly stand with bolts -arrows-.

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## 4.7 Transmission, Installing

Install in reverse order, paying attention to the following:

 **Note**

- ◆ *When performing repairs, replace self-locking nuts and bolts.*
- ◆ *Always replace bolts that are secured with additional torque as well as sealing rings, seals, and O-rings.*
- ◆ *All cable ties that are opened or cut open during removal must be replaced in the same positions during installation.*
- ◆ *Clean input shaft splines and (in case of used clutch plates) clean hub splines, remove corrosion and apply only a very thin coating of lubricant -G 000 100- on splines. Then move clutch plate back and forth on input shaft until the hub moves freely on the shaft. Excess grease must be removed.*
- ◆ *If the transmission is replaced, modify the transmission shift lever and selector relay lever.*

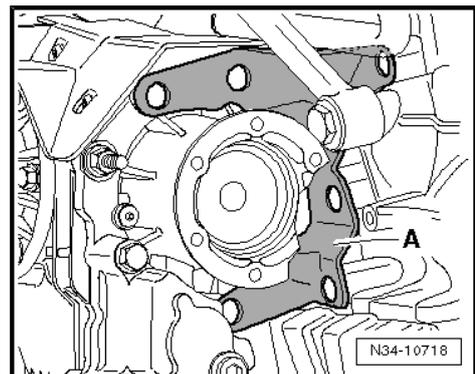
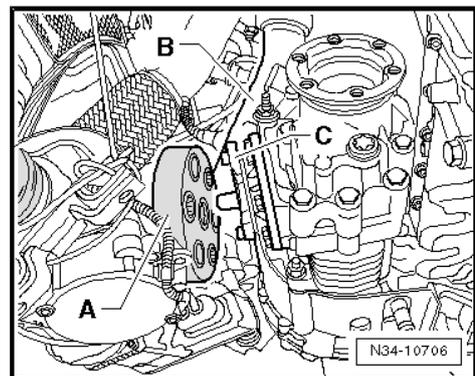
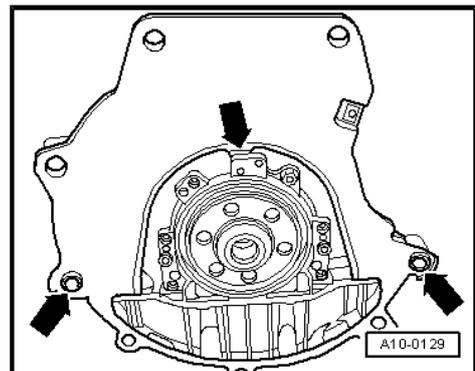
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- All threaded bores, in which self-locking bolts are threaded, must be cleaned of locking fluid residue using a thread tap.
- If there are no alignment sleeves for centering the engine and transmission in the cylinder block, insert them.
- Make sure that intermediate plate is engaged on sealing flange and has been slid on to alignment sleeves -arrows-.
- Check the centralization of the clutch plate. Refer to ["4.9 LuK Clutch", page 42](#) .
- Check the release bearing for wear. Replace the clutch slave cylinder with the release bearing if necessary. Refer to ["2.4 Clutch Release Mechanism, Clutch Slave Cylinder Assembly Overview", page 21](#) .
- Carefully raise transmission with -3282- .
- Align transmission to engine and install.
- Guide the transmission past drive axle -A- and front exhaust pipe -B- with output flange -C-. Rotate the output flange if necessary.

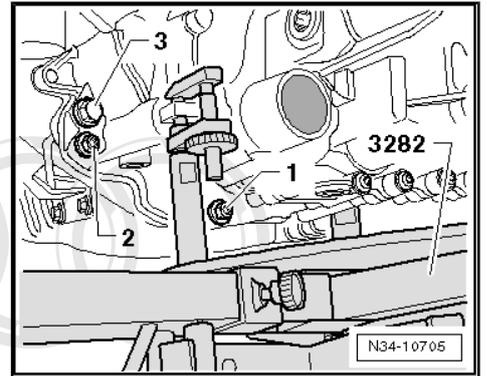
 **Note**

- ◆ *Pay attention to electromechanical steering gear when installing the transmission.*
- ◆ *Pay attention to all lines when installing transmission.*

- If applicable, insert bevel box bracket -A-.



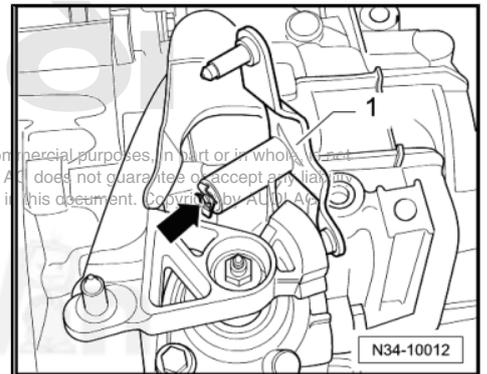
- Insert and tighten lower engine/transmission connecting bolts -1-3-, then tighten all remaining connecting bolts  
 => [page 112](#) .



- Lubricate the bearing areas and sliding surfaces of selector relay lever -1- with grease -G 000 450 02- .

**Metal selector relay lever**

- Insert selector relay lever -1- and secure with the lock washer -arrow-.

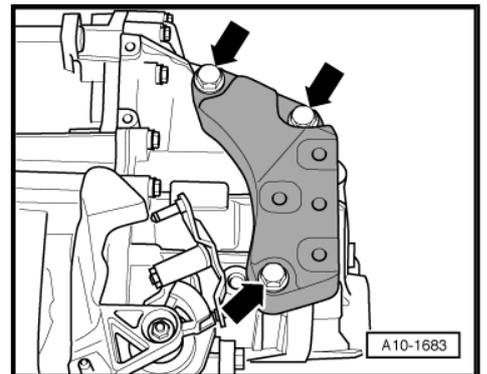


**Plastic selector relay lever -1-**

- Insert the selector relay lever with catch => [page 68](#)
- Insert the selector relay lever with clip => [page 69](#)

**All Vehicles**

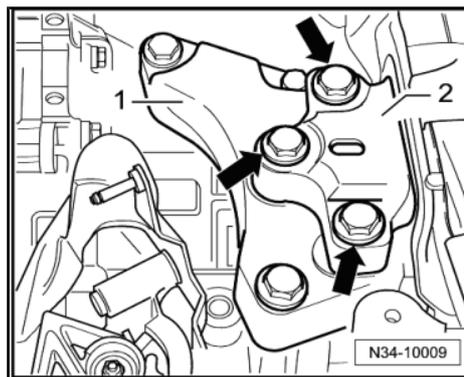
- Install the transmission bracket -arrows-. Refer to  
 => ["2.9 Subframe Mount Assembly Overview"](#), [page 72](#) .



- Align engine/transmission in installed position. To do this, tighten -10 - 222 A- spindles until transmission bracket -1- lies on transmission mount -2-.
- Also place the -V.A.G 1383 A- under the transmission in the area of the differential and raise until the transmission bracket is parallel to the transmission mount.

**Note**

To prevent the threads in the transmission bracket from being damaged, the transmission mount and bracket must be parallel to one another.



- Install the transmission mount. Refer to [⇒ "2.9 Subframe Mount Assembly Overview", page 72](#).

**Note**

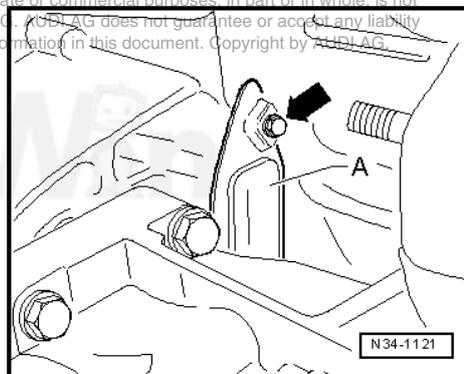
Install engine/transmission mountings stress-free. Refer to ⇒ *Engine Mechanical; Rep. Gr. 10 ; Description and Operation*.

**Caution**

Do not remove -10 - 222 A- until all bolts for left assembly mounting have been tightened to tightening specification.

- Install the bevel box bracket ⇒ [page 113](#).
- If equipped, install small cover plate -A- behind the bevel box -arrow- ⇒ [page 113](#).
- Install the left and right drive axles. Refer to ⇒ *Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation*.
- Install the right drive axle heat shield ⇒ [page 113](#).

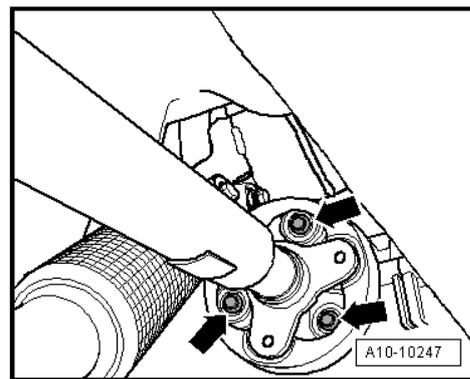
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- Press the engine/transmission assembly to the bulkhead while carefully guiding the bevel box pin into the flange/driveshaft.

 **Note**

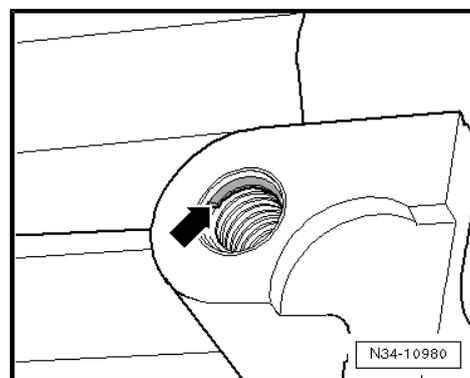
- ◆ *Seal in driveshaft flange must not be damaged when removing and installing transmission. Replace driveshaft if damaged.*
- ◆ *Slip the driveshaft horizontally onto the centering pin.*
- Secure the driveshaft with the flexible disk on the bevel box flange -arrows-. Refer to ⇒ Rear Final Drive 02D, 0AV, 0BR and 0BY; Rep. Gr. 39 ; Removal and Installation .



- :
- Installing the subframe. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .
  - Install pendulum support. Refer to ⇒ ["2.9 Subframe Mount Assembly Overview", page 72](#) .

 **Note**

- ◆ *The holes for the pendulum support on transmissions from 05.28.07 have threaded inserts (for example HeliCoil).*
- ◆ *How to recognize: collar on the first thread -arrow-.*
- ◆ *Note the correct mounting bolts and tightening specifications -2- ⇒ [page 72](#) .*
- Installing the steering gear on the subframe. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 48 ; Removal and Installation .
- Install the exhaust system and cross member. Refer to ⇒ Engine Mechanical; Rep. Gr. 26 ; Removal and Installation .
- Install the fan shroud. Refer to ⇒ Engine Mechanical; Rep. Gr. 19 ; Removal and Installation .
- Install starter. Refer to ⇒ Electrical Equipment; Rep. Gr. 27 ; Removal and Installation .
- Install the hose/line assembly or plastic line. Refer to ⇒ ["4.1 Hose/Line Assembly or Plastic Line", page 29](#) .
- Bleed the clutch system. Refer to ⇒ ["1.2 Clutch System, Bleeding", page 12](#) .
- Install the control cable mounting bracket on the transmission. Refer to ⇒ ["2.5 Shift Cable and Selector Cable to Model Year 2007 Assembly Overview", page 61](#) .



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- Apply a small amount of grease -G 000 450 02- to the transmission shift lever -1- pins -arrow-.
- Slide the shift cable onto the pin -arrow- and secure with lock washer -3-.

#### Metal selector relay lever -2-

- Apply a small amount of grease -G 000 450 02- to the pin -arrow- of selector relay lever -2-.
- Slide the selector cable onto the pin -arrow- and secure with the lock washer -4-.

#### Plastic selector relay lever -2-

- Insert the selector cable in the control cable retainer.

#### Continued for all vehicles

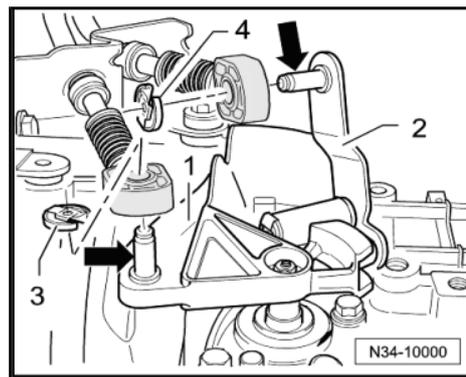
- Adjust shift mechanism. Refer to [⇒ "2.8 Shift Mechanism, Adjusting", page 69](#) .
- Install the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .
- Connect battery. Heed the instructions for work to be performed following battery connection. Refer to ⇒ Electrical Equipment; Rep. Gr. 27 ; Removal and Installation .
- Check transmission fluid level inside the manual transmission. Refer to [⇒ "1.1 Manual Transmission, Checking Gear Oil Level", page 47](#) .
- Axle oil level in bevel box, checking. Refer to [⇒ "1.2 Gear Oil in Bevel Box, Checking", page 48](#) .
- Install the left and right noise insulation -arrows-.
- Install the noise insulation frame. Refer to ⇒ Body Exterior; Rep. Gr. 50 ; Removal and Installation .
- Install the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .
- Install the wheels. Refer to ⇒ Wheel and Tire Guide; Rep. Gr. 44 ; General Information .

#### Transmission Installation Tightening Specifications

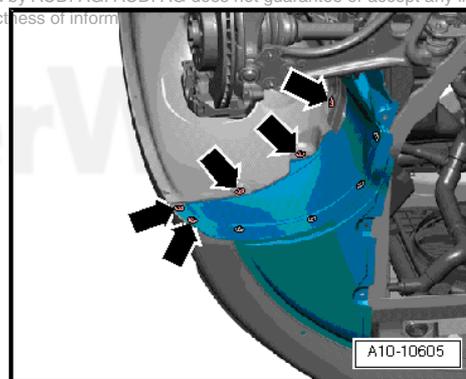


#### Note

- ◆ *The tightening specifications apply only to lightly greased, oiled, phosphated, or black-finished nuts and bolts.*
- ◆ *Additional lubricant such as engine or transmission oil may be used, but do not use graphite lubricant.*
- ◆ *Do not use degreased parts.*
- ◆ *Tolerance for torque specification  $\pm 15\%$ .*



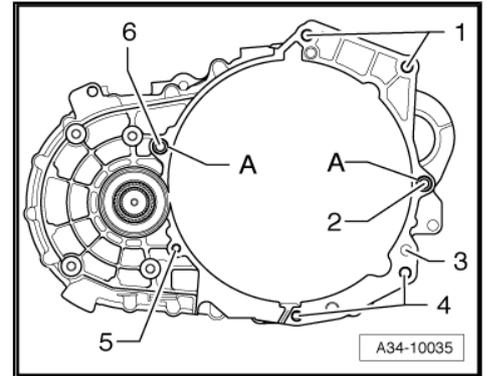
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### Manual Transmission Mount on Engine

Item	Bolt <sup>1</sup>	Nm
1 <sup>2)</sup> , 3 <sup>3)</sup>	M12x55	80
2 <sup>4)</sup>	M12x65	80
	M12x55	80
4 <sup>4)</sup> , 5 <sup>4)5)</sup>	M10x50	40
6 <sup>3)</sup>	M12x80	80
A	Alignment sleeves for centering	

- 1) Replace bolts.
- 2) Bolt with 8 mm threaded pin
- 3) With permanent washer.
- 4) Bolted from the engine side into the transmission.
- 5) The securing clip must be inserted in the engine oil pan

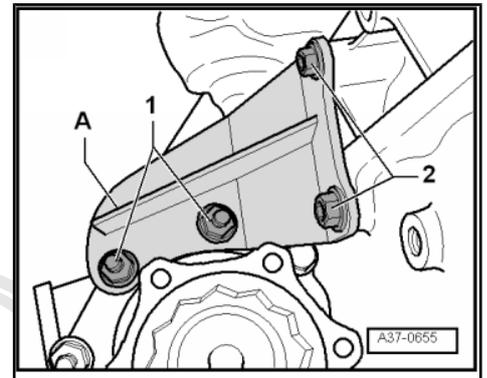


### Additional specification

Component	Nm
Small flywheel cover plate	10

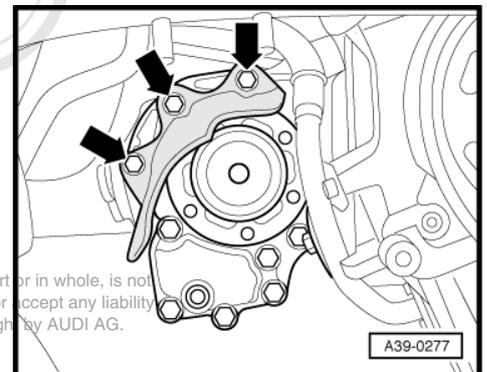
### Bevel box bracket -A- tightening specification and sequence

- Tighten bolts in 4 stages as follows:
  1. Install bolts -1- and -2- hand tight.
  2. Pretighten bolts -1- to 3 Nm.
  3. Tighten bolts -2- to 35 Nm.
  4. Tighten bolts -1- to 45 Nm.



### Right Drive Axle Heat Shield Tightening Specification

- Tighten bolts -arrows- to 25 Nm.



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## 4.8 Transmission Mount, Removing

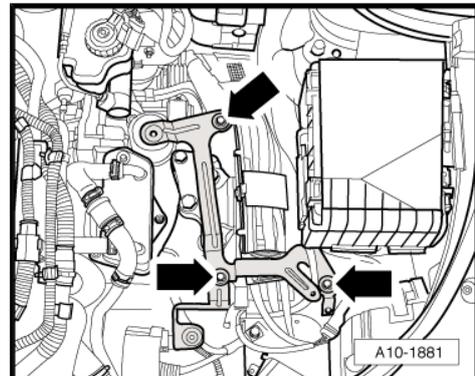
### Special tools and workshop equipment required

- ◆ Engine Support Bridge -10 - 222 A-
- ◆ Bracket -T10338-

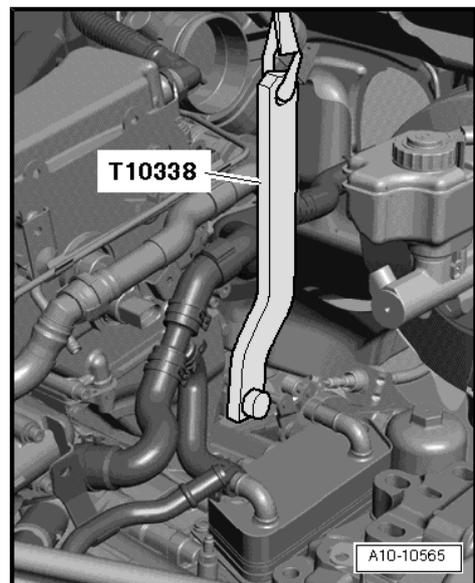
- ◆ Engine Support Basic Set -T40091-
- ◆ Engine Support Supplement Set -T40093-

**Removing**

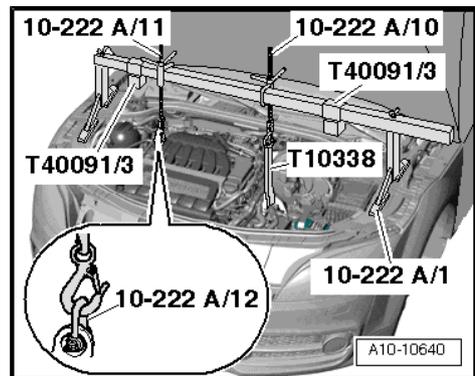
- Remove the entire air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .
- Remove air filter housing bracket -arrows-.



- Install -T10338- on open threaded hole at left rear of engine.



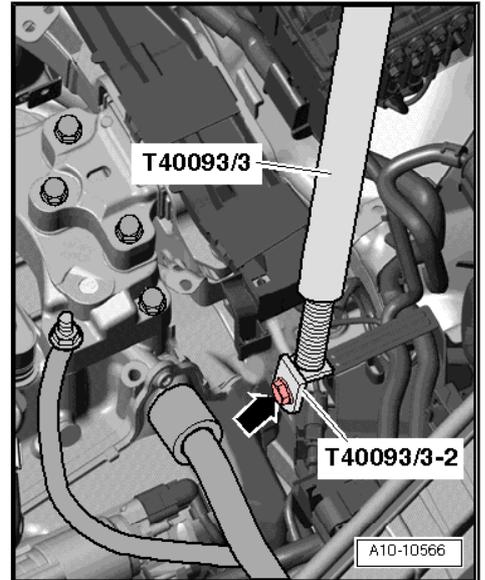
- Position -10 - 222 A- with the following tool components on the upper edges of the web plate:
- ◆ Bracket for engine -10 - 222 A /1- , qty. 2
- ◆ Bracket with spindle and hook -10 - 222 A /10- (spindle faces toward rear)
- ◆ Spindle -10 - 222 A /11- (spindle faces toward front)
- ◆ Shackle -10 - 222 A /12-
- ◆ Connectors -T40091/3- , qty. 2
- Engage -10 - 222 A /11- with -10 - 222 A /12- on right engine lifting eye.
- Engage -10 - 222 A /10- on -T10338- .
- Lightly tension the engine/transmission assembly with the spindles.



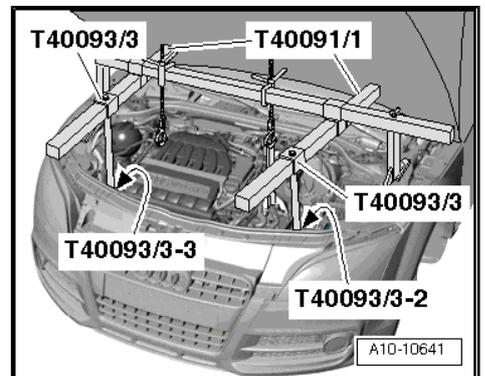
- Install left adapter -T40093/3-2- and right adapter - T40093/3-3- on -T40093/3- .
- Remove ground (GND) wire from left longmember.
- Remove left and right connecting bolt for front part of long-member.
- Install adapters on longmembers with bolts that were removed earlier -arrow-.

**i** Note

*The left side of the vehicle is shown in the illustration.*



- Insert square tube -T40091/1- in connector -T40091/3- and supports -T40093/3- as shown in illustration.

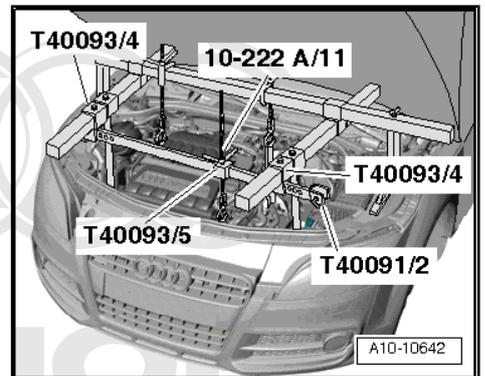


- Slide connector -T40093/4- onto square tube.
- Slide supports -T40091/2- with slide -T40093/5- into both connectors -T40093/4- .

**! WARNING**

*Risk of an accident due to loose support bridge parts.*

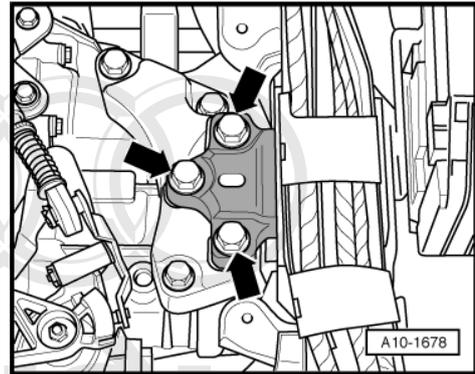
- ◆ *Secure -T40091/2- with pins and splints from -T40093/4- .*
- ◆ *Secure connector and supports with locking screws.*



- Install -10 - 222 A /11- on slide and engine lifting eye.
- Tension the engine/transmission assembly by tightening the 3 spindles evenly.

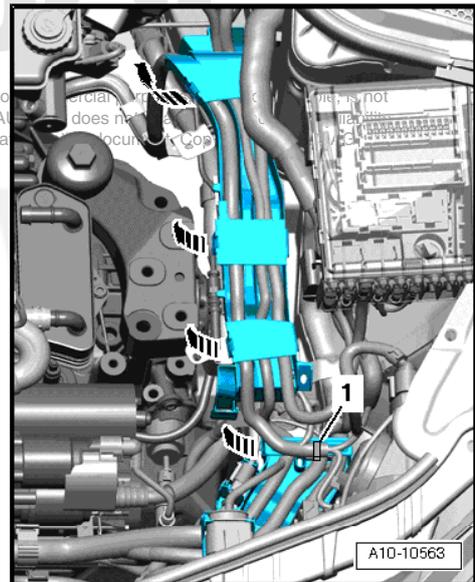
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- Remove bolts -arrows-.



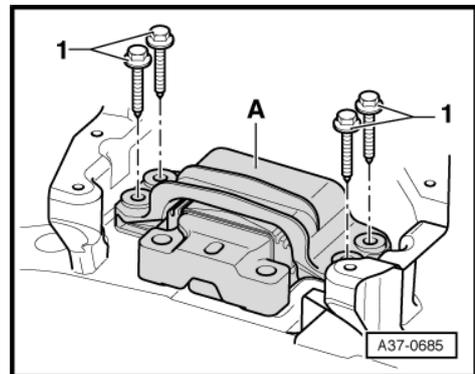
- Open wiring guide bracket -arrows-.
- Cut cable ties -1- and press electrical wires to side.
- Unclip wiring guide.

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- Remove bolts -1- and remove transmission mount -A-.
- Remove -10 - 222 A- from engine.

Install the transmission mount. Refer to [⇒ "4.9 Transmission Mount, installing", page 116](#) .



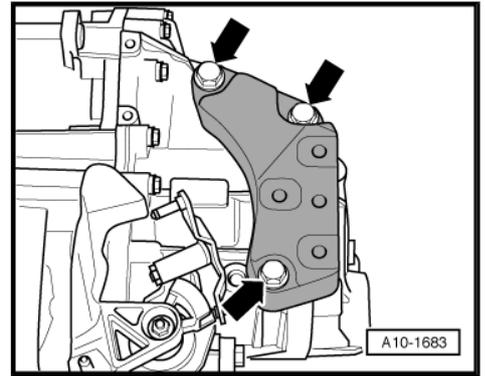
## 4.9 Transmission Mount, installing

### Installing

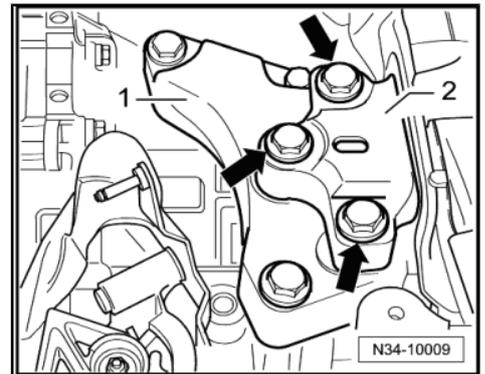
- Tightening specifications, refer to [⇒ "2.9 Subframe Mount Assembly Overview", page 72](#) .

Install in reverse order, paying attention to the following:

- First install transmission bracket on transmission -arrows-.



- Raise transmission with engine support bridge -10 - 222 A- spindle until transmission bracket -1- touches transmission mount support arm -2-.
- Next install bolts -arrows- but only tighten by hand.



#### Caution

*Risk of damaging threads in transmission mount support arm due to bolts inserted crooked.*

- ◆ *Before installing bolts -arrows-, transmission bracket -1- and transmission mount support arm -2- must be absolutely parallel to each other. If necessary, raise rear of transmission with trolley jack.*

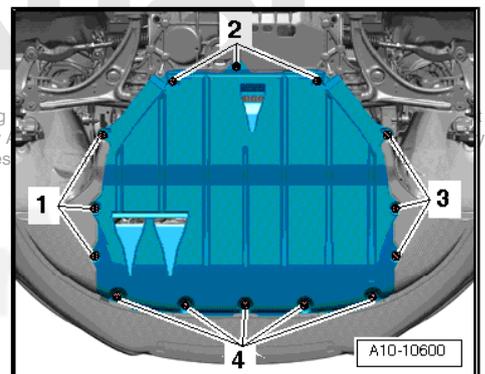
- Only tighten bolts if subframe is installed. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation and subframe mounts are adjusted ⇒ Engine Mechanical; Rep. Gr. 10 ; Description and Operation .
- Remove -10 - 222 A- from engine.
- Install the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .

## 4.10 Pendulum Support

### Removing

- Remove noise insulation in center by loosening fasteners -1 through 4-.

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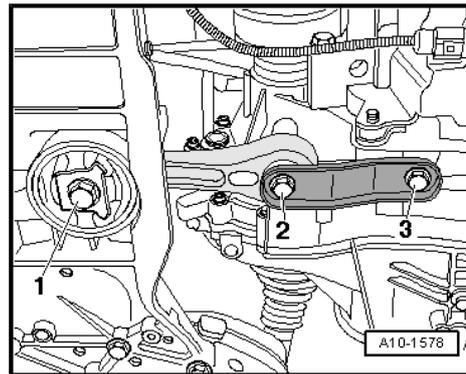


- Remove bolts -1 through 3- and remove pendulum support.

### Installing

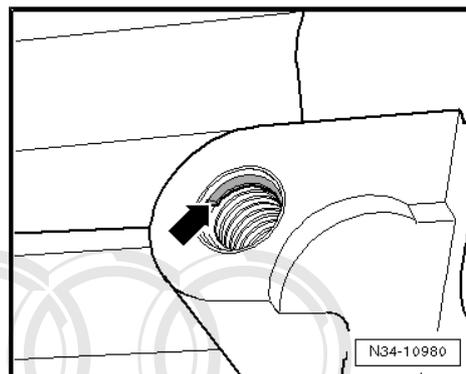
Install in reverse order, paying attention to the following:

- Tightening specifications, refer to  
 => ["2.9 Subframe Mount Assembly Overview", page 72](#) .

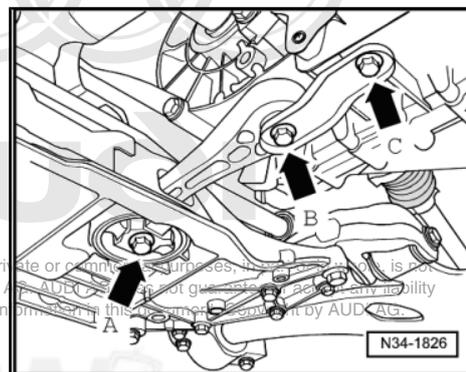


### Note

- ◆ *The holes for the pendulum support on transmissions from 05.28.07 have threaded inserts (for example HeliCoil).*
- ◆ *How to recognize: collar on the first thread -arrow-.*
- ◆ *Note the correct mounting bolts and tightening specifications => [page 72](#) .*



- First tighten pendulum support on transmission -arrow B- and -arrow C- and then on subframe -arrow A-.



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## 4.11 Bevel Box, Removing

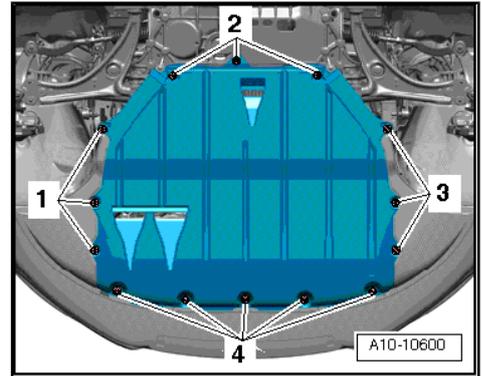
### Special tools and workshop equipment required

- ◆ Socket and Extended Bit -T10107 A- (SW 6 mm)
- ◆ Hex Ball Socket -3247-
- ◆ Bracket -2024 A /1-

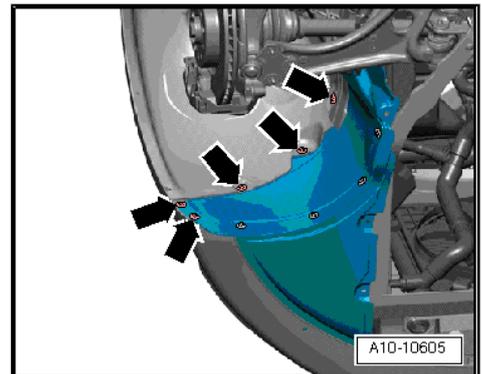
### Removing

- Remove front wheels.

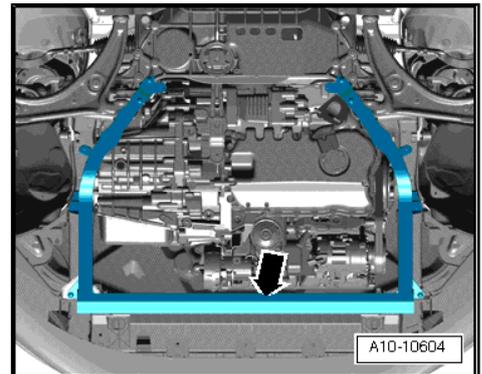
- Remove noise insulation in center by loosening fasteners -1 through 4-



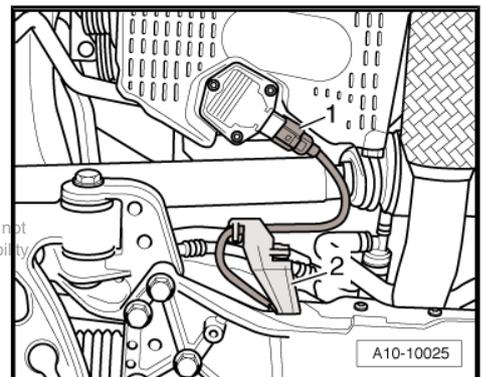
- Remove right noise insulation -arrows-



- Remove noise insulation frame -arrow-. Refer to => Body Exterior; Rep. Gr. 50 ; Removal and Installation .



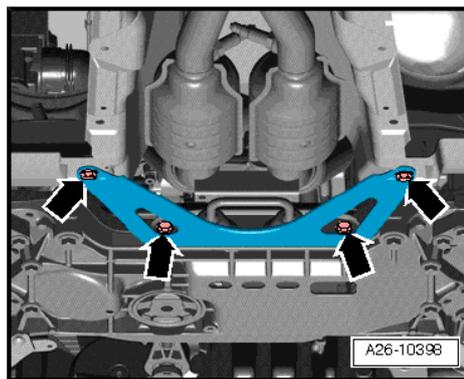
- Disconnect electrical connector -1- on oil level thermal sensor -G266- .
- Unclip bracket -2- for electrical wire to oil level thermal sensor on subframe.



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erWin

- Remove exhaust system bracket bolts -arrows-.

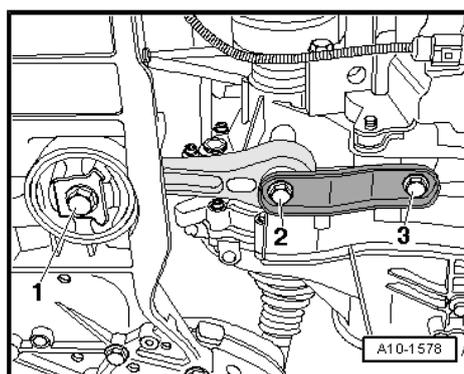


- Remove the bolts -2- and -3-.

 **Note**

*Ignore bolt -1-.*

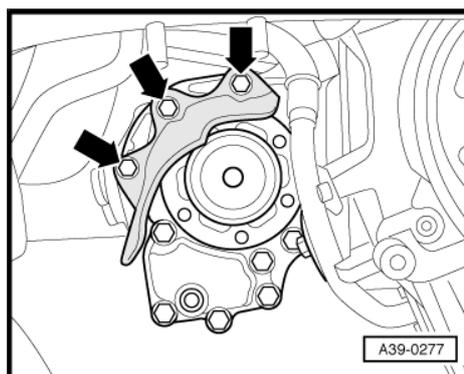
- To avoid axle alignment, secure the subframe. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Description and Operation .
- Remove subframe. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .



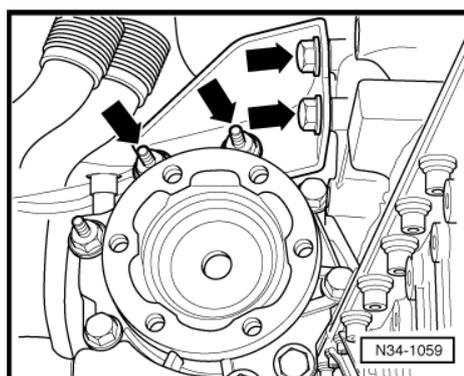
- Remove right drive axle heat shield from bevel box -arrows-.
- Remove the right drive axle from the bevel box flange shaft.
- Raise the drive axle as far as possible and secure with a cable tie.

 **Note**

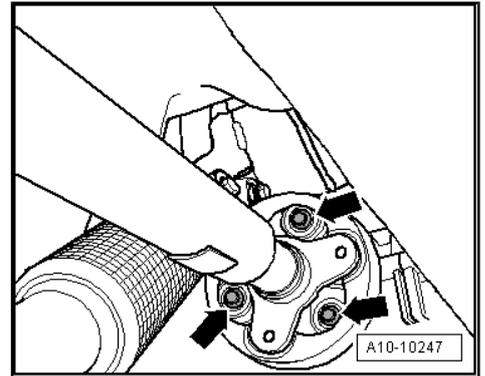
*Ensure drive axle protective coating is not damaged.*



- Remove the bolts -arrows- and remove the bevel box bracket.



- Identify position of flexible disc and bevel box flange to each other.
- Remove driveshaft flexible disc from bevel box -arrows- while counterholding at triangular flange with a lever.

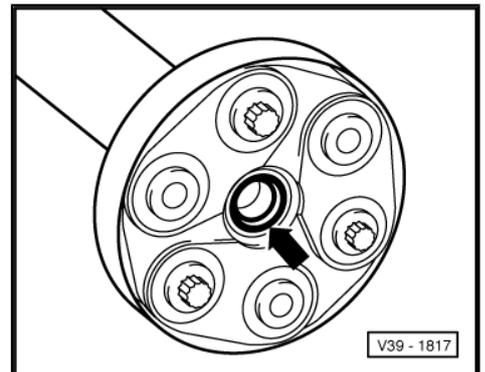


- Press engine/transmission assembly slightly forward (toward front end) and pull off driveshaft from bevel box.

 **Caution**

*Risk of damaging sealing ring -arrow- in driveshaft flange.*

- ◆ *Press driveshaft horizontally as far back and to the right side of the vehicle as possible.*



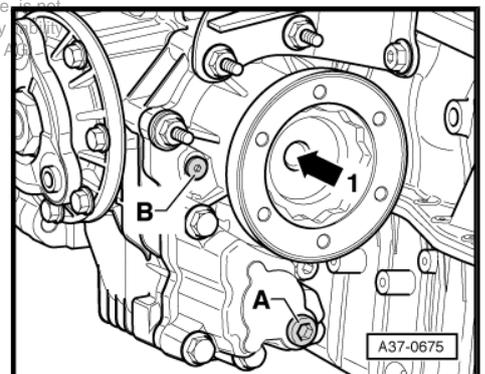
 **Note**

*If seal is damaged, driveshaft must be replaced.*

- Tie driveshaft up.
- Remove the right flange shaft bolt -arrow 1- with the T10107 A- by installing 2 bolts in the flange and counter holding the flange shaft with the assembly lever.

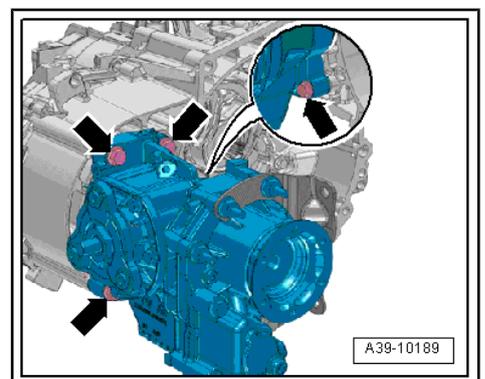
 **Note**

- ◆ *Right flanged shaft remains in bevel box.*
- ◆ *Ignore -A and B-.*



- Remove the bolts for connecting the bevel box to the manual transmission (qty. 4) -arrows-.
- Remove the bevel box from the transmission together with the right flange shaft.

Install bevel gear transfer case. Refer to ⇒ [“4.12 Bevel Box, Installing”, page 122](#) .



## 4.12 Bevel Box, Installing

- Tightening specifications, refer to  
⇒ ["1.2 Flange Shaft and Seals on Bevel Box Assembly Overview", page 220](#) .

Install in reverse order, paying attention to the following:



### Note

*Replace O-rings.*



### Caution

***Risk of damaging sealing ring between transmission and bevel box.***

- ◆ ***Place bevel box on transmission together with right flange shaft while turning shaft.***

- Slide on bevel box completely on manual transmission, while doing this, join splines of input shaft/bevel box centrally with differential.
- With proper tooth position and central guiding, bevel box slips up to stop against manual transmission.
- Tighten bevel box on transmission.

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### Note

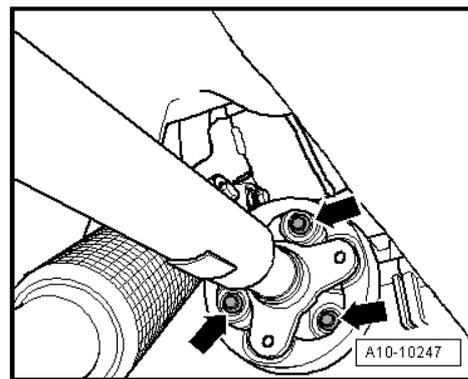
*Do not pull bevel box with mounting bolts against manual transmission, otherwise bevel box is canted and mounting eyelets can break off.*

- Install the bevel box bracket ⇒ [page 113](#) .
- Install the right drive axle heat shield ⇒ [page 113](#) .
- Install the exhaust system and cross member. Refer to ⇒ Engine Mechanical; Rep. Gr. 26 ; Description and Operation .
- Install subframe. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .
- Install the steering gear on the subframe. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 48 ; Removal and Installation .
- Install right drive axle. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .

- Press the engine/transmission assembly to the bulkhead while carefully guiding the bevel box pin into the flange/driveshaft.

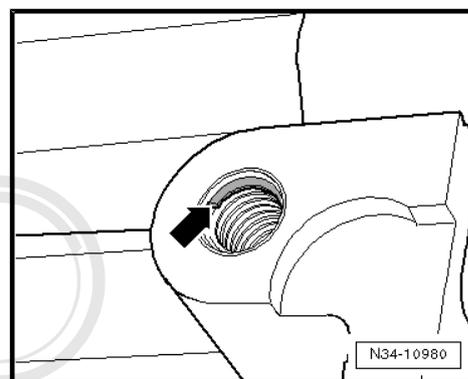
 **Note**

- ◆ *Seal in driveshaft flange must not be damaged when removing and installing transmission. Replace driveshaft if damaged.*
- ◆ *Slip the driveshaft horizontally onto the centering pin.*
- Secure the driveshaft with the flexible disk on the bevel box flange -arrows-. Refer to ⇒ [Rear Final Drive 02D, 0AV, 0BR and 0BY; Rep. Gr. 39 ; Removal and Installation](#) .
- Install pendulum support. Refer to ⇒ ["4.10 Pendulum Support", page 117](#) .



 **Note**

- ◆ *The holes for the pendulum support on transmissions from 05.28.07 have threaded inserts (for example HeliCoil).*
- ◆ *How to recognize: collar on the first thread -arrow-.*
- ◆ *Note the correct mounting bolts and tightening specifications -2- ⇒ [page 72](#) .*
- Axle oil level in bevel box, checking. Refer to ⇒ ["1.2 Gear Oil in Bevel Box, Checking", page 48](#) .
- Check gear oil level in manual transmission. Refer to ⇒ ["1.1 Manual Transmission, Checking Gear Oil Level", page 47](#) .
- Install the noise insulation frame. Refer to ⇒ [Body Exterior; Rep. Gr. 50 ; Removal and Installation](#) .
- Install the noise insulation. Refer to ⇒ [Body Exterior; Rep. Gr. 66 ; Removal and Installation](#) .
- Fill the engine oil. Refer to ⇒ [Maintenance Procedures; Rep. Gr. 03](#) .
- Install the wheels. Refer to ⇒ [Wheel and Tire Guide; Rep. Gr. 44 ; General Information](#) .



## 4.13 Input Shaft Seal

### Special tools and workshop equipment required

- ◆ Pulling Hook -T20143/1-
- ◆ Thrust Piece -T40008-
- ◆ Sealing grease -G 052 128 A1-

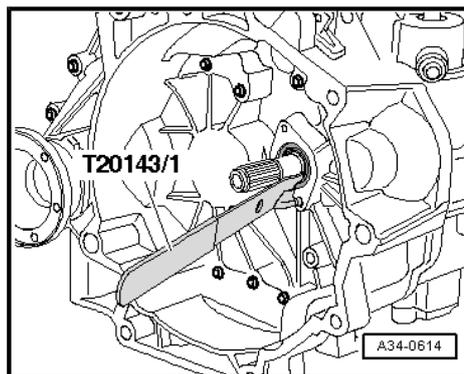
### Procedure

- Transmission removed, refer of ⇒ ["4.4 Transmission, Removing", page 96](#) .
- Remove the clutch slave cylinder with release bearing. Refer to ⇒ ["4.7 Slave Cylinder with Release Bearing", page 39](#) .

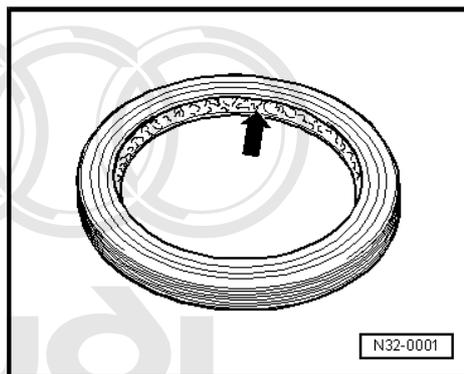
- Pry out the shaft sealing ring for the input shaft using the -T20143/1- .

 **Note**

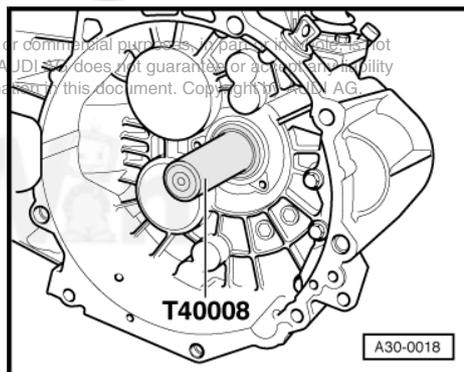
*Do not damage the seal running surface on the input shaft.*



- Fill space between sealing lip and dust lip -arrow- halfway with sealing grease -G 052 128 A1- .
- Lightly oil outer circumference of new shaft seal.



- Drive in the shaft sealing ring using the -T40008- until it is flush.
- Install the clutch slave cylinder with the release bearing. Refer to => ["4.7 Slave Cylinder with Release Bearing", page 39](#) .



## 4.14 Selector Shaft Seal

### Special tools and workshop equipment required

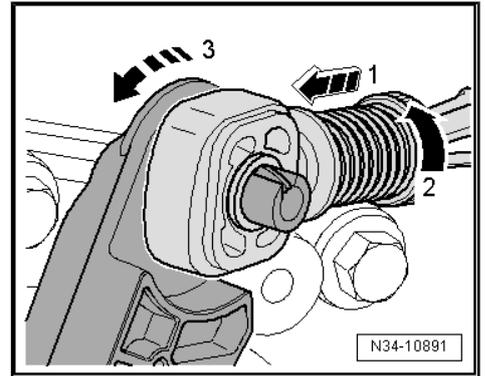
- ◆ Sleeve -VW 423-
- ◆ Pulling Hook -T20143/1-
- ◆ Sealing grease -G 052 128 A1-

### Procedure

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

**Plastic selector relay lever -1-:**

- Pull the securing mechanism forward as far as the stop in the direction of -arrow 1- and then unlock to the left in the direction of -arrow 2-.
- Press the selector relay lever forward in direction of -arrow 3- while pulling the selector cable out of the control cable retainer.
- Remove the selector relay lever with catch to Model Year 2007 => [page 64](#)
- Remove the selector relay lever with catch from Model Year 2008 => [page 69](#)



**Metal selector relay lever**

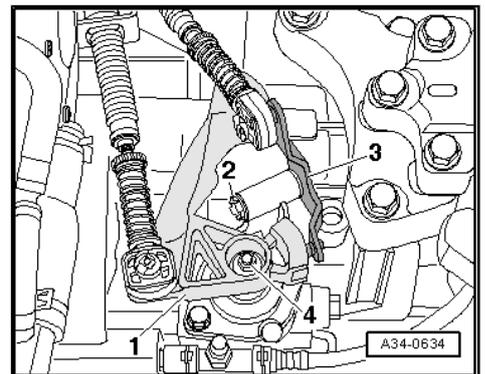
- Pull off securing clip -2- and press selector relay lever -3- to the side and out of the bearing.

**All Vehicles**

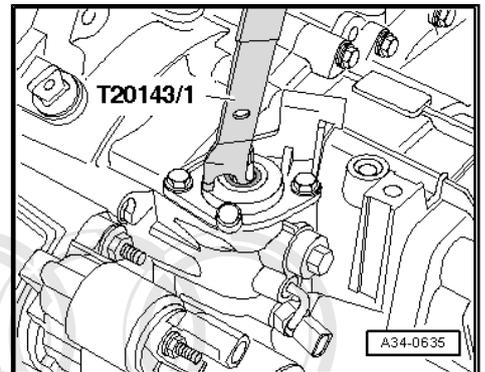


**Note**

*If the selector relay lever cannot be removed due to the transmission bracket, remove the selector cable from the selector relay lever. Remove the slide shoe from the transmission shift lever.*



- Remove nut -4- and remove transmission shift lever -1-.
- Pry out the shaft sealing ring using the -T20143/1- .
- Lightly oil outer circumference of new shaft seal.
- Drive in new shaft seal as far as stop without tilting it.



- Fill area between sealing lip and dust lip -arrow- halfway with sealing grease -G 052 128 A1- .



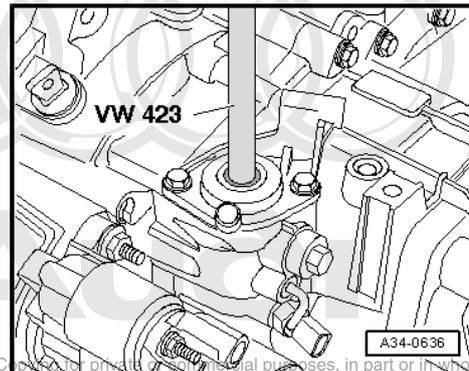
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- Drive in the shaft sealing ring using the sleeve -VW 423- .
- Install the transmission shift lever and selector relay lever. Refer to  
 => ["2.6 Transmission Shift Lever and Selector Relay Lever to Model Year 2007 Assembly Overview"](#), page 63 or  
 => ["2.7 Shift Cable and Selector Cable from Model Year 2008 Assembly Overview"](#), page 65 .

 **Note**

*The transmission shift lever can only be inserted in one position.*

- Install the air filter housing. Refer to => [Fuel Injection and Ignition](#); Rep. Gr. 24 ; Removal and Installation .



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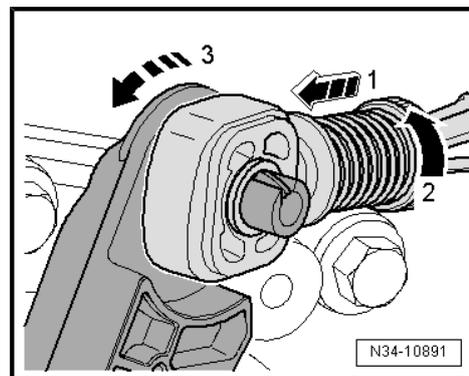
## 4.15 Selector Shaft

### Removing

- Completely remove the air filter housing. Refer to => [Fuel Injection and Ignition](#); Rep. Gr. 24 ; Removal and Installation .

#### Plastic selector relay lever -1-:

- Pull the securing mechanism forward as far as the stop in direction of -arrow 1- and then unlock to the left in direction of -arrow 2-.
- Press the selector relay lever forward in direction of -arrow 3- while pulling the selector cable out of the control cable retainer.
- Remove the selector relay lever with catch to Model Year 2007 => [page 64](#)
- Remove the selector relay lever with catch from Model Year 2008 => [page 69](#)



#### Metal selector relay lever

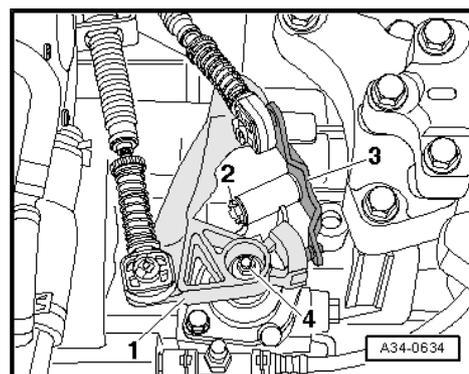
- Pull off lock washer -2- and press selector relay lever -3- to the side and out of the bearing.

#### All Vehicles

 **Note**

*If the selector relay lever cannot be removed due to the transmission bracket, remove the selector cable from the selector relay lever. Remove the slide shoe from the transmission shift lever.*

- Remove nut -4- and remove transmission shift lever -1-.



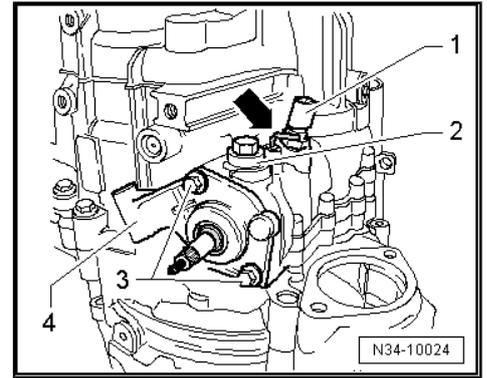
- Move shift shaft to neutral position.



**Caution**

*In the following step, ensure that the selector shaft is not locked by the lock elbow -arrow-.*

- Remove back-up light switch -F4- -1-.
- Remove mounting bolt -2-.
- Remove the bolts -3-.
- Remove selector shaft with shift cover -4- from transmission housing.



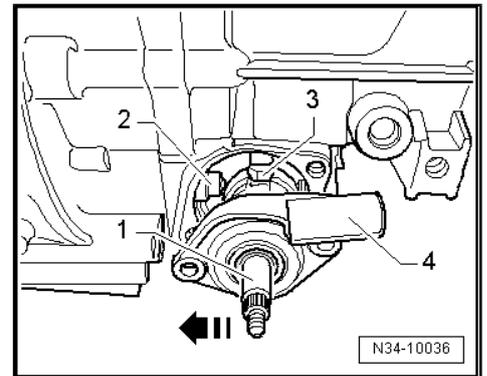
**Installing**

- Tightening specification, refer to  
 ⇒ ["2.12 Transmission Housing and Shift Mechanism Assembly Overview", page 77](#) ,  
 ⇒ ["2.16 Shift Mechanism Assembly Overview, Transmission Side", page 85](#) .
- Press selector shaft -1- against lock sleeve in direction of -2- -arrow- and guide downward with shift finger -3- through shift forks until stop.
- Shift cover -4- must stand parallel to bolting surface on transmission housing during this.
- Selector shaft must be able to be moved easily in selector motion (up- and downward).



**Note**

*If shift cover stands at an angle to bolting surface, selector shaft is not inserted in lower bearing.*



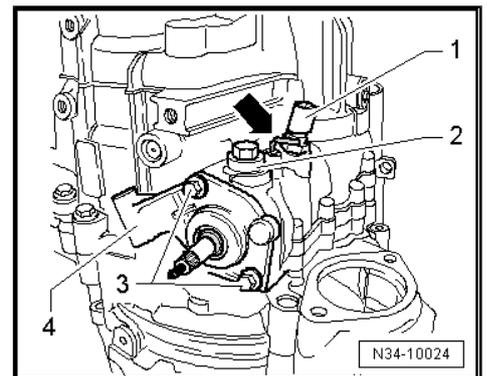
- Tighten the bolts -3- for the shift cover -4-.
- Install lock bolt -2-. Lock elbow -arrow- must not be installed when doing so.
- Install back-up light switch -F4- -1-.
- Install the transmission shift lever and selector relay lever. Refer to  
 ⇒ ["2.6 Transmission Shift Lever and Selector Relay Lever to Model Year 2007 Assembly Overview", page 63](#) or  
 ⇒ ["2.7 Shift Cable and Selector Cable from Model Year 2008 Assembly Overview", page 65](#) .



**Note**

*The transmission shift lever can only be inserted in one position*, 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.

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



## 5 Disassembly and Assembly

⇒ [“5.1 Selector Mechanism”, page 128](#)

⇒ [“5.2 Transmission without Circlip A for Cap/Input Shaft”, page 131](#)

⇒ [“5.3 Transmission with Circlip A for the Cap/Input Shaft”, page 142](#)

⇒ [“5.4 Shift Forks”, page 152](#)

⇒ [“5.5 Transmission Housing”, page 152](#)

⇒ [“5.6 Clutch Housing, Servicing”, page 158](#)

### 5.1 Selector Mechanism

Special tools and workshop equipment required

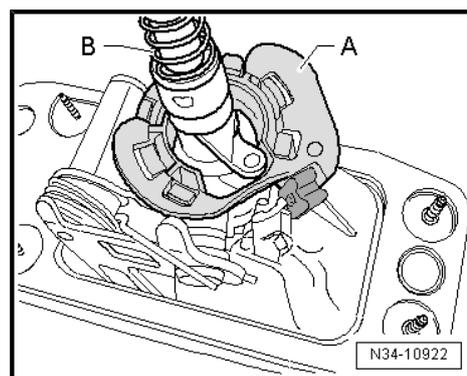
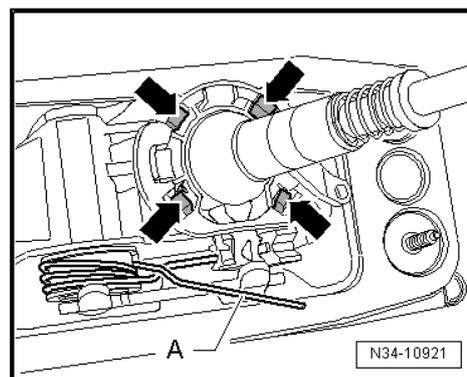
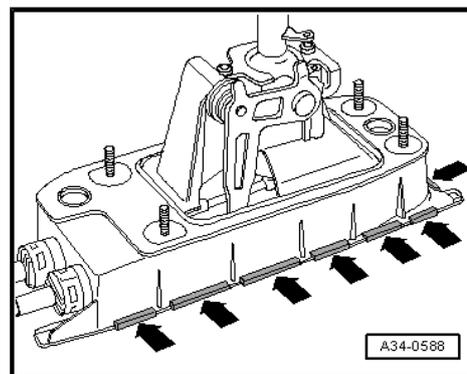
- ◆ Thrust Block -T10083-

#### Disassembling

- Remove the shift mechanism. Refer to  
 ⇒ [“4.2 Selector Mechanism”, page 91](#) .
- Bend open the tabs -arrows- of the base plate with a screwdriver and remove the base plate.
- Remove seal from shift housing.
- Remove shift cable and selector cable from selector housing. Refer to  
 ⇒ [“2.4 Shift Lever and Shift Housing for Vehicles from VIN 8J-7-013001 Assembly Overview”, page 59](#) .
- Raise upper side of spring -A- over selector bracket tab.
- Using a screwdriver, press the bearing shell catches -arrows- in the direction of the shift lever guide bearing; break off the catches if necessary.
- Pry out bearing shell -A- with shift lever guide and shift lever -B- from selector housing.
- Then press bearing shell off shift lever guide bearing and remove.

#### Note

- ◆ *Observe guides -A- in subsequent steps.*
- ◆ *They must not break off.*



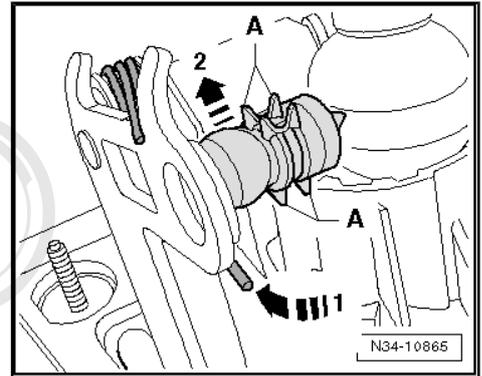
- Swivel lower spring leg -arrow 1- onto the selector bracket shoulder.



**Caution**

*Lower spring leg -arrow 1- can spring down uncontrolled from the selector bracket shoulder during subsequent handling.*

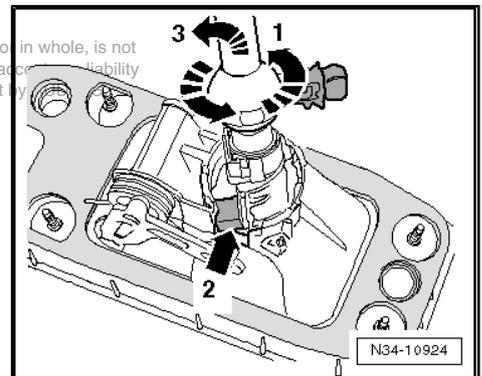
- Now raise the shift lever guide up as far as the stop and remove the ball stud from the selector bracket -arrow 2-.
- Carefully press the spring -arrow 1- off of the selector bracket shoulder.



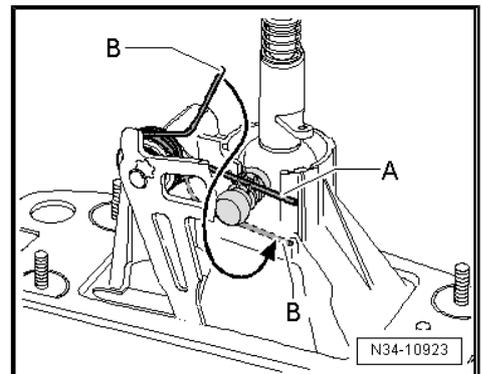
The spring legs are then tensioned diagonally.

- Then turn the shift lever in direction of -arrow 1-.
- The pins -arrow 2- must be in the shift housing opening.
- Then tip the shift lever guide with the shift lever out in the direction of -arrow 3-.

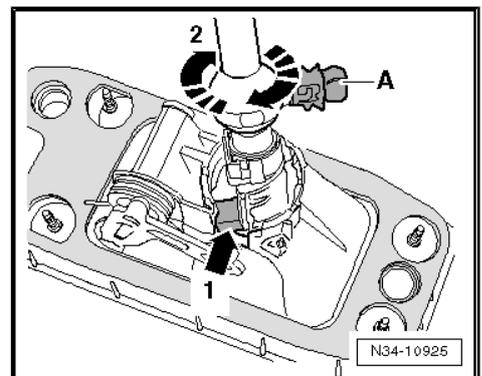
**Assemble Shift Mechanism**



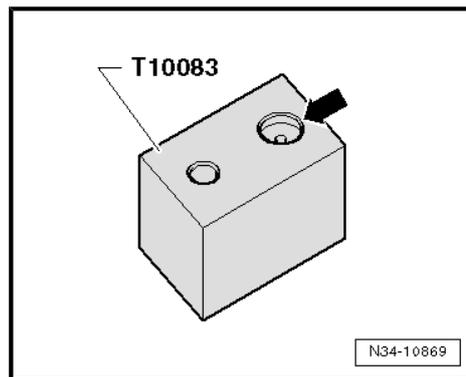
- Release the tension on legs -A- and -B-.
- Sides -A- and -B- must face in the opposite direction. (Shown here with the shift lever guide inserted.)
- Insert the shift lever guide with shift lever in the shift housing.



- The pins -arrow 1- are still located in the shift housing opening.
- Turn the shift lever guide in direction of -arrow 2- until the ball head pin -A- is above the shift housing opening.



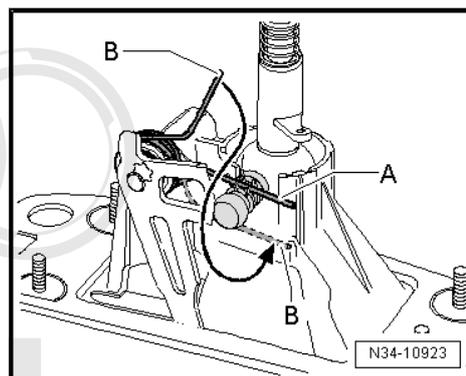
- Place the shift housing with the shift lever guide on the - T10083- .
- The shift lever guide rests in the larger recess -arrow- of the - T10083- .
- The shift lever guide must project out of selector housing as far as stop.



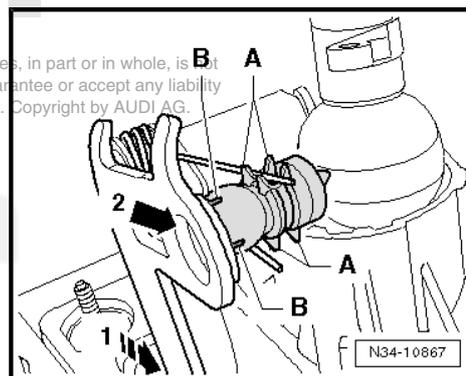
- Insert spring side -A- from above into guide.
- Pull spring side -B- down and insert it near the guide (in direction of ball head).

 **Note**

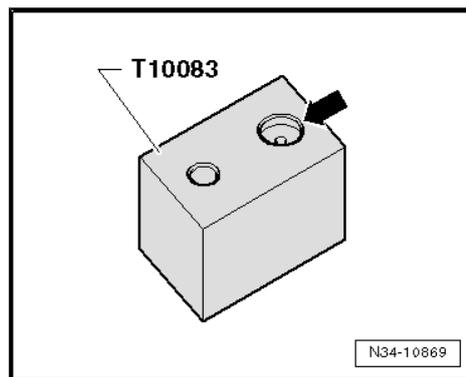
*The selector bracket is only partially shown to provide a better illustration.*



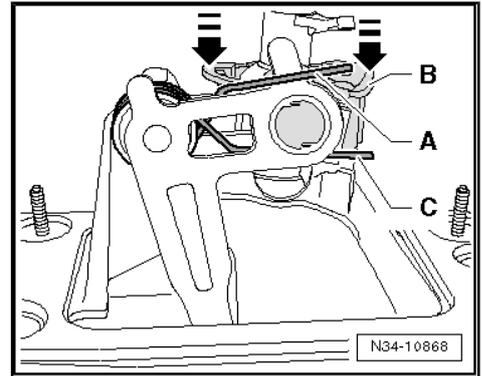
- Carefully remove the shift housing with the shift lever guide from the -T10083- .
- Move the selector bracket in direction of -arrow 1- back to the stop.
- Lubricate ball head pins.
- Press ball head pins into selector bracket -arrow 2-.
- Guides -A- and tabs -B- must not be damaged.



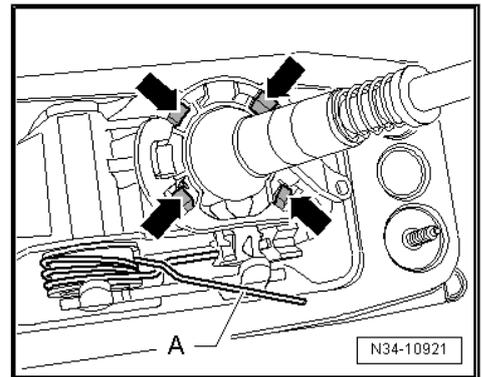
- Place the shift housing with the shift lever guide in the larger depression -arrow- of the -T10083- .
- The shift lever guide must project out of selector housing as far as stop.



- Raise upper side of spring -A- over selector bracket pins.
- Use a new bearing shell -B-.
- Lubricate bearing shell and shift lever guide bearing.
- Press bearing shell onto shift lever guide bearing as far as stop.
- Remove selector mechanism from -T10083- .
- Press bearing shell into selector housing -arrows-.



- All 4 retaining tabs -arrows- must engage.
- Raise upper side of spring -A- over selector bracket pins into guide.
- Insert the lower spring leg into the guide.
- Install the shift lever, shift cable, selector cable and base plate => [page 59](#) .
- Install the selector mechanism. Refer to => ["4.2 Selector Mechanism", page 91](#) .

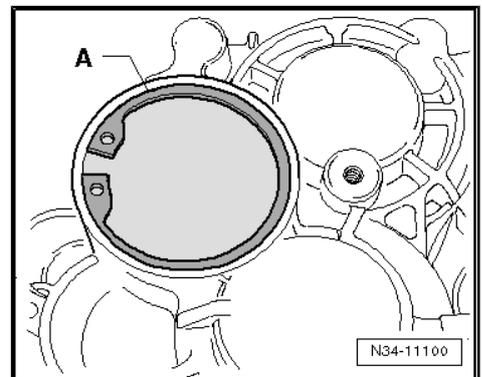


## 5.2 Transmission without Circlip A for Cap/ Input Shaft

Transmission without Circlip -A-.

**Remove and install the transmission housing, shift mechanism, input shaft, output shafts, differential bevel box, and selector rods**

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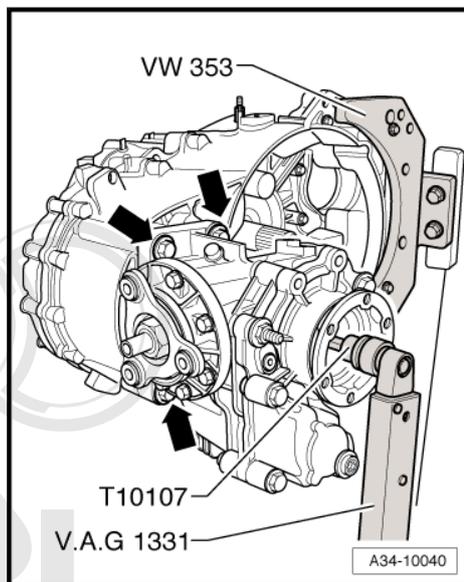
### Special tools and workshop equipment required

- ◆ Holding Plate -VW 309-
- ◆ Holding Fixture -VW 313-
- ◆ Transmission Support -VW 353-
- ◆ Thrust Tube -VW 455-
- ◆ Slide Hammer-Complete Set -VW 771-
- ◆ Kukko 21/1 internal puller
- ◆ Kukko 17/0 separating tool
- ◆ Kukko 22/1 counter-support
- ◆ Bracket -30 - 211 A-
- ◆ Thrust Piece -T10042-
- ◆ Drift -T10169-

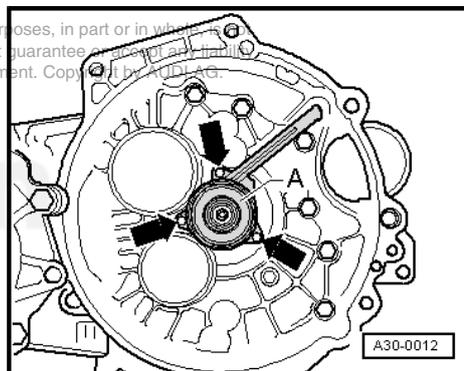
- ◆ Thrust Piece -T40008-
- ◆ Torque Wrench -V.A.G 1331-
- ◆ Heat Gun -V.A.G 1416-
- ◆ Used Oil Collecting and Extracting Device -V.A.G 1782-
- ◆ Extractor Lever -VW 681-
- ◆ Socket and Extended Bit -T10107 A-

**Disassembling**

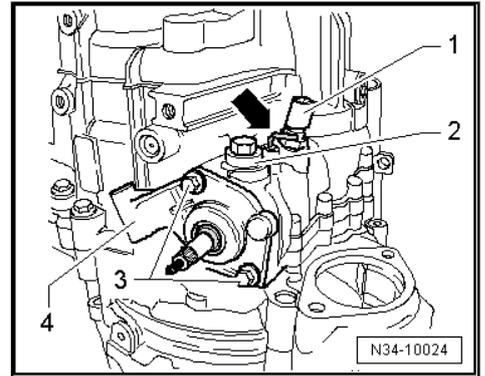
- Transmission removed, refer to  
 ⇒ ["4.4 Transmission, Removing", page 96](#) and secured to the  
 assembly stand  
 ⇒ ["4.6 Transmission, Securing to Assembly Stand",  
 page 107](#) .
- Rotate transmission in assembly stand with oil drain plug  
 downward.
- Place the -V.A.G 1782- under the transmission.
- Drain gear oil from manual transmission.
- Remove the right flange shaft bolt using the -T10107 A- .
- Remove 4 bevel box connecting bolts -arrows- (only 3 shown  
 in illustration) at manual transmission.
- Carefully press bevel box off manual transmission while pro-  
 tecting it against falling through.



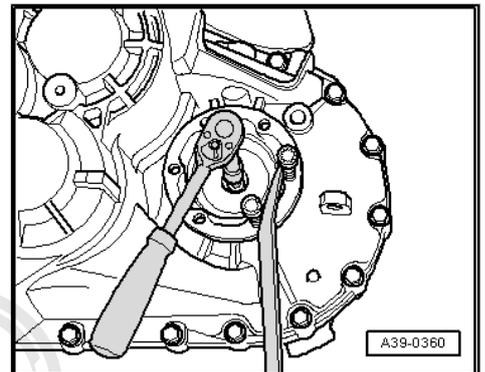
- Remove bolts -arrows- .
- Remove the clutch slave cylinder together with release bearing -A-.



- In the following step, ensure that the selector shaft is not locked by the lock elbow -arrow-.
- Move shift shaft to neutral position.
- Remove mounting bolt -2-.
- Remove the bolts -3-.
- Remove back-up light switch -F4- -1-.
- Pull selector shaft -4- off transmission housing.



- Remove the left flange shaft bolt by installing 2 bolts in the flange and counter holding the flange shaft with the assembly lever.

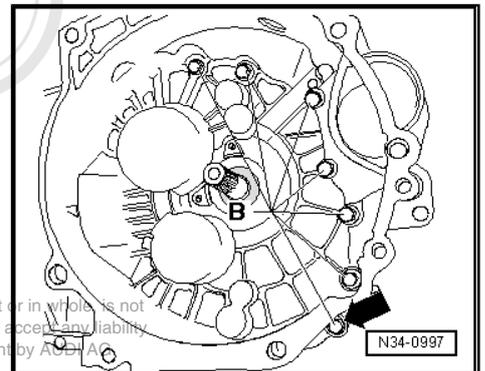


- Remove bolts -B- inside clutch housing for securing clutch housing to transmission housing.

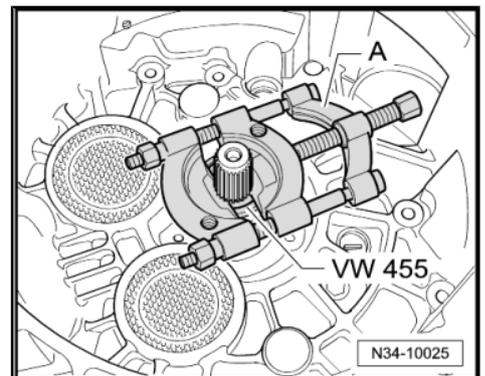
 **Note**

*One bolt -arrow- is located outside of bolting flange.*

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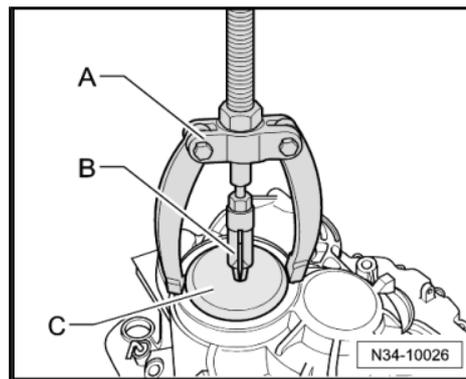
- Secure the input shaft by inserting the -VW 455- over the input shaft, onto the clutch housing.
- Then tension separating tool -A-, for example -Kukko 17/0- tightly behind input shaft splines.
- Back side of separating tool must contact pressing sleeve free of play.



- Knock rubber through in center of cap -C- using a screwdriver.
- Remove cap from transmission housing.

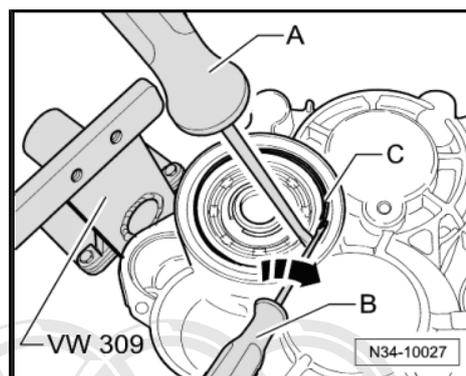
A - Support , for example -Kukko 22/1-

B - Internal puller 8 to 12 mm , for example -Kukko 21/01-

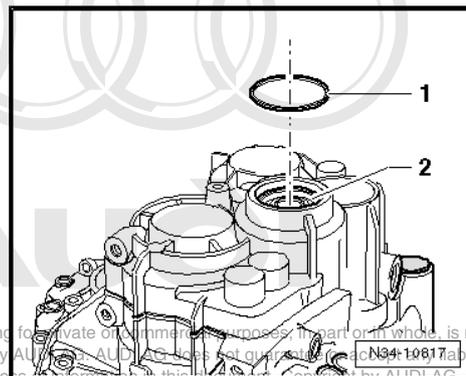


Remove circlip -C- from input shaft grooved ball bearing in the following manner:

- Hold one end of circlip in place using screwdriver -A-.
- With the 2nd screwdriver -B-, pry the other end of the circlip out of the groove of the grooved ball bearing -arrow-.
- By repositioning the screwdriver -B-, pry the circlip further out.

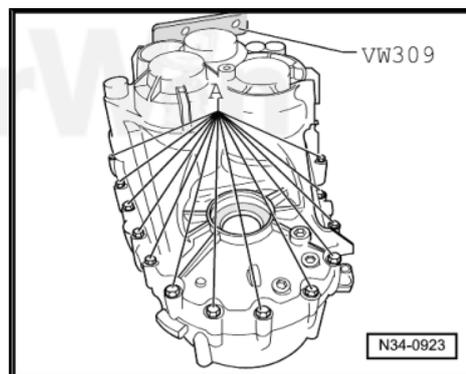


- If present, remove spacer washer -1- from transmission housing -2-.
- If the transmission housing is replaced, check whether the spacer washer needs to be reinstalled => [page 137](#) .



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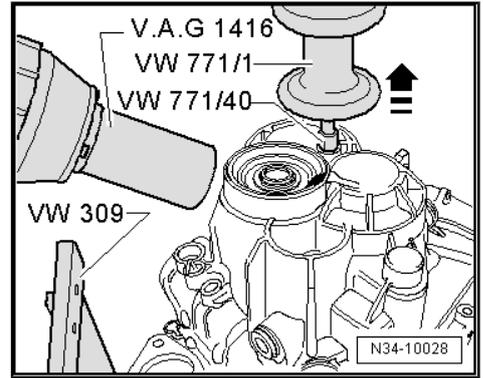
- Remove bolts -A-.



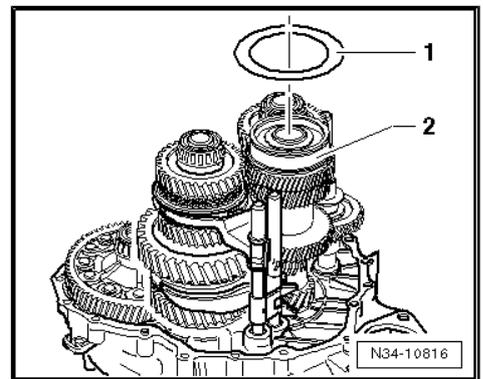
- Screw adapter -VW 771/40- into threaded hole of transmission housing.
- Heat the transmission housing using the hot air blower -V.A.G 1416- in the area of the bearing seat for the grooved ball bearing/input shaft to approximately 100 °C (212 °F) for approximately 10 minutes.
- Pull off transmission housing from clutch housing -arrow- using -VW 771/1- .

 **Note**

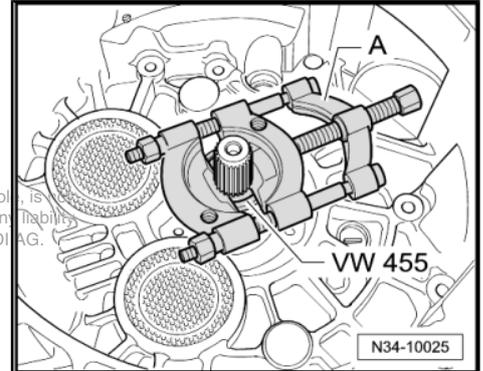
*If necessary, carefully pry up all around and alternating between sides on protruding flange taking care not to damage sealing surfaces.*



- If present, remove spacer washer -1- from grooved ball bearing -2-.
- If the transmission housing is replaced, check whether the spacer washer needs to be reinstalled => [page 137](#) .



- Remove separating tool -A- and -VW 455- from input shaft.
- A 2nd technician is required to remove shafts from clutch housing.

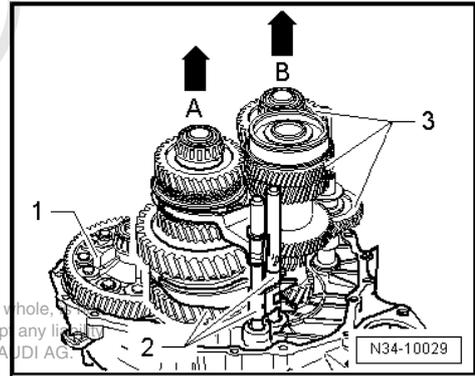


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- Lift differential -1- with the left hand.
- With the right hand, lift output shaft for 1st to 4th gears together with selector rods -2- -arrow A-.
- At the same time, 2nd technician lifts input-, reverse- and output shaft for 5th/6th gear -3- together with selector rods out of clutch housing -arrow B-.

 **Note**

*If necessary, differential can be shifted again in clutch housing after lifting shafts.*



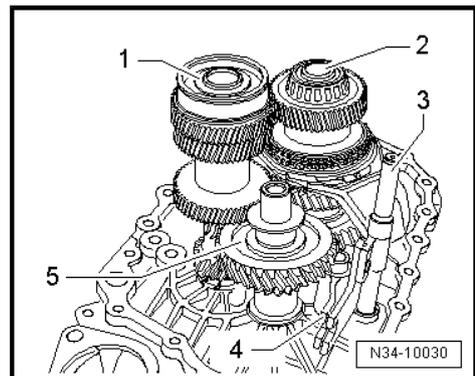
- Drive out sealing ring for input shaft using sleeve -30-21- .

 **Note**

*Grooved ball bearing on input shaft must always be replaced => [Item 6 \(page 180\)](#) .*

**Assembling**

- A new grooved ball bearing must be pressed on to input shaft => [Item 6 \(page 180\)](#) .
- Tightening specifications => ["2.12 Transmission Housing and Shift Mechanism Assembly Overview", page 77](#) .
- First insert input shaft -1-, output shaft for 5th/6th gears -2- together with selector rod -3-, shift fork -4- and reverse shaft -5-.

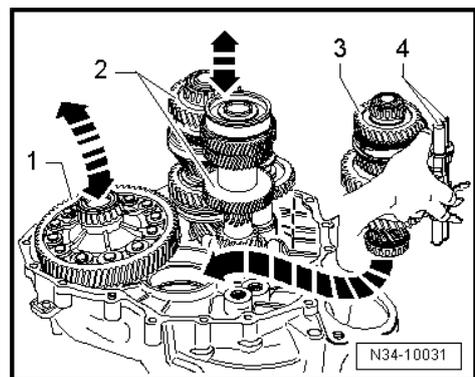


- Insert differential -1-.

 **Note**

*A 2nd technician is required for further installation of shafts into clutch housing.*

- As shown in illustration, take output shaft for 1st to 4th gears -3- with selector rods -4- in right hand.
- Lift the differential slightly with the left hand.
- At the same time, 2nd technician slightly lifts input shaft, output shaft for 5th/6th gears and reverse gear -2- together with reverse shaft.
- Now, insert the output shaft for 1st to 4th gears in direction of -arrow-.
- Places of input shaft, output shafts and final drive gear/differential must engage.
- Together with a 2nd technician, place the shafts and the differential into their bearing seats.

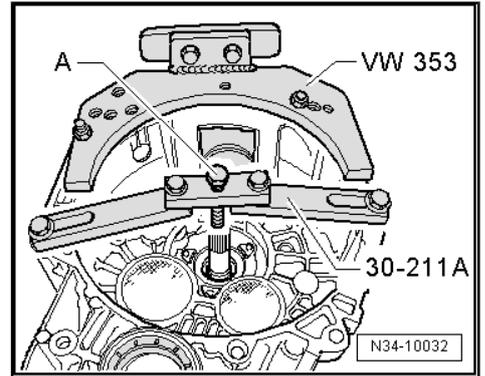


- Fasten the bracket -30 - 211 A- for the input shaft to the clutch housing.

**i** Note

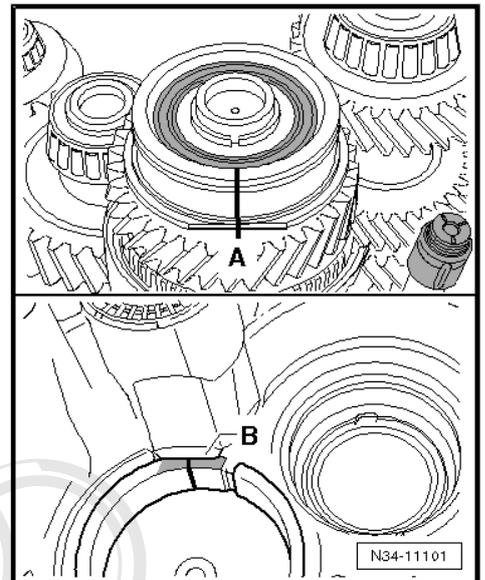
For the sake of illustration, clutch housing is depicted rotated 180°.

- Screw in bolt -A- far enough until input shaft rises slightly.



**i** Note

- ◆ With some transmissions, there are flattened areas -A- on the input shaft grooved ball bearing and on the bearing mount -B-.
- ◆ Check the input shaft grooved ball bearing and the transmission housing.



Input shaft grooved ball bearing and transmission housing	
Without flattened areas on grooved ball bearing -A- and bearing mount -B- => <a href="#">page 137</a>	
With flattened areas on grooved ball bearing -A- and bearing mount -B- => <a href="#">page 138</a>	

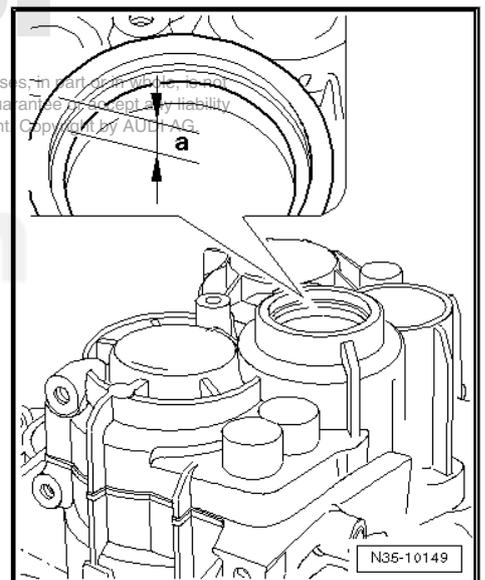
From transmission build date 4.10.06 through approximately 1.21.08

One spacer washer is inserted above and below the input shaft grooved ball bearing -6- => [page 180](#) .

Upper spacer washer	Outer circumference	78.6 mm
Lower spacer washer	Outer circumference	85 mm

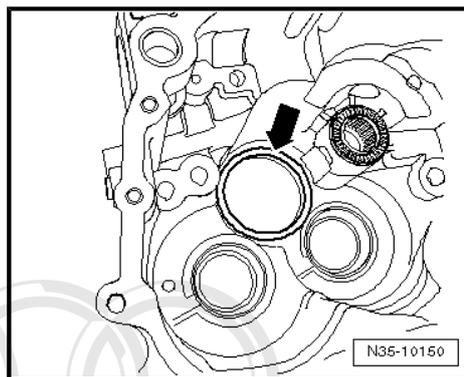
Measure the Shoulder above the Grooved Ball Bearing Mount.

Shoulder Above Grooved Ball Bearing	Dimension "a"	Upper Spacer Washer
Through transmission build date 09 04 6	10 mm	No
From transmission build date 10 04 6	10.7 mm	Yes

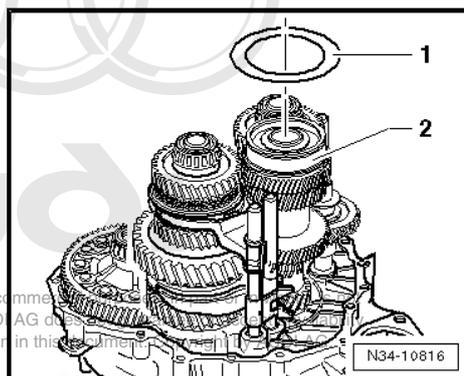


The Area Below the Grooved Ball Bearing Seat in the Transmission Housing has been Changed -arrow-

Area Below the Bearing Seat		Lower Spacer Washer
Through transmission build date 09 04 6	Not deeper.	No
From transmission build date 10 04 6	Slightly deeper.	Yes



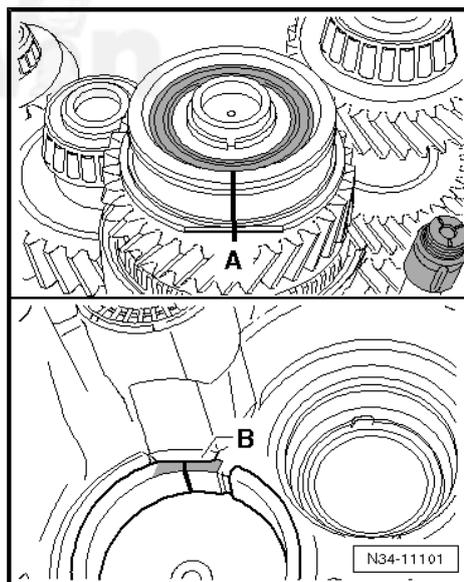
- Place a spacer washer (85 mm outer circumference) -1- on grooved ball bearing -2-.



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In the Case of Transmissions with Flattened Areas -A- on the Grooved Ball Bearing for the Input Shaft and on Bearing Mount -B-

- Do not place any spacer washers above and below the grooved ball bearing.
- Flattened areas -A- on the grooved ball bearing and on bearing mount -B- must align in the transmission housing.
- Mark the flattened areas with color.
- Place a marking on the upper area of the grooved ball bearing and on the upper area of the transmission housing bearing mount (=> next illustration).
- Heat the transmission housing using the hot air blower -V.A.G 1416- in the area of the bearing seat for the grooved ball bearing/input shaft to approximately 100 °C (212 °F) for approximately 10 minutes.



**i** Note

*It is necessary to heat the transmission housing so that the grooved ball bearing is not damaged when the housing is being installed.*

- Align the marking on the grooved ball bearing -A- with the marking on the transmission housing -B- and mount the transmission housing.

**Continuation for all transmissions**

- Heat the transmission housing using the hot air blower -V.A.G 1416- in the area of the bearing seat for the grooved ball bearing/input shaft to approximately 100 °C (212 °F) for approximately 10 minutes.

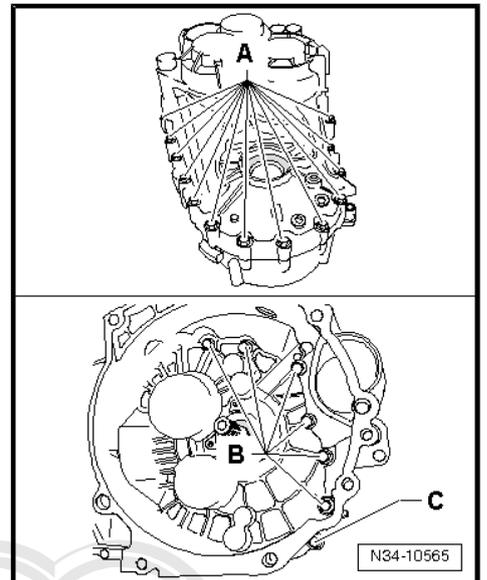
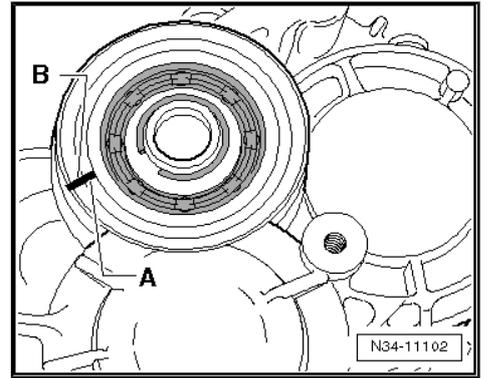


*It is necessary to heat the transmission housing so that the grooved ball bearing is not damaged when the housing is being installed.*

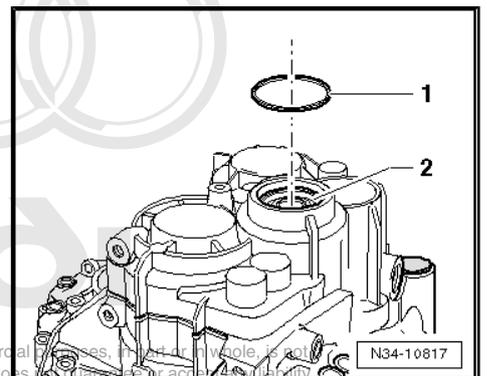
- Apply sealing paste -AMV 188 200 03- evenly onto the sealing surface of the clutch housing.
- Install transmission housing and tighten new bolts -A-, -B- and -C- to tightening specification.

Allocation of bolts:

- A - Bolt with permanent washer
- B - Bolt without washer
- C - Bolt with permanent washer



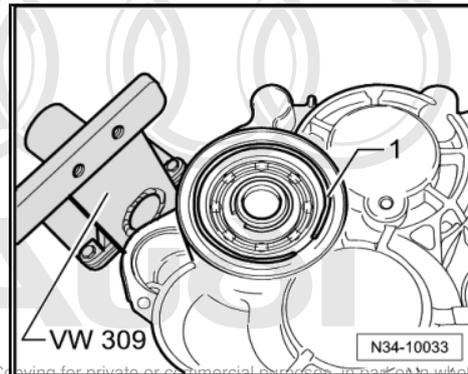
- If a spacer washer was mounted on the grooved ball bearing before installation of the transmission housing, a spacer washer -1- (outer diameter = 78.6 mm) must also be installed after installation of transmission housing -2-. => [page 137](#) .



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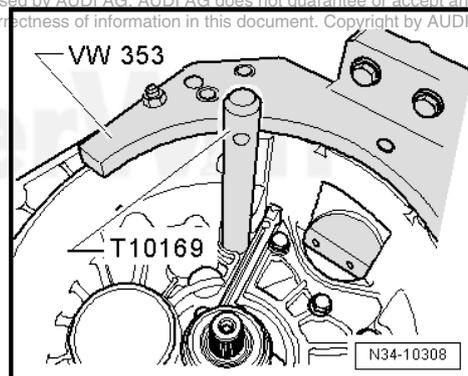


- Install circlip -1- for grooved ball bearing/input shaft.
- Remove -30 - 211 A- for input shaft.



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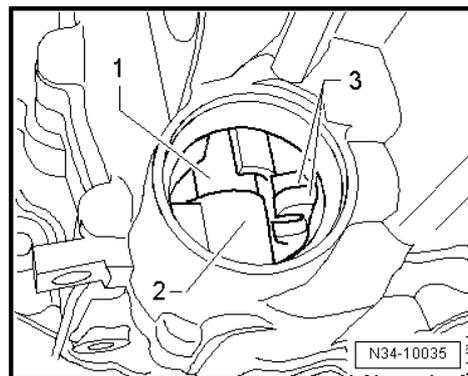
- If lock sleeve for selector shaft has been removed, drive it in now using -T10169- until tool makes contact.
- Turn transmission with opening for selector shaft in assembly stand upward.



- Insert selector shaft -1- into lower mounting -2- and into shift forks -3-.

 **Note**

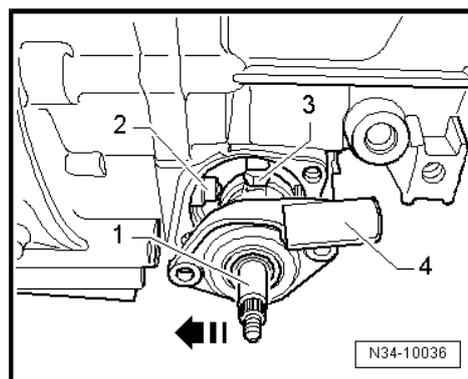
*To improve clarity, the cap is removed.*



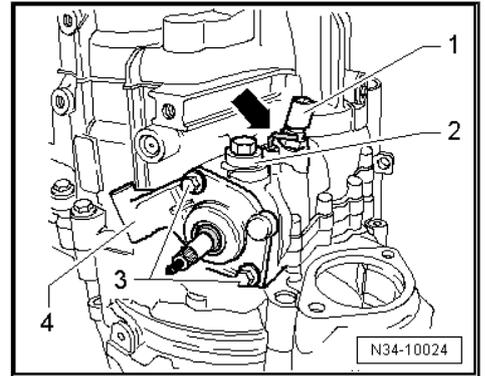
- Now press selector shaft -1- against lock sleeve -2- in direction of -arrow- and guide downward with shift finger -3- through shift forks until stop.
- Shift cover -4- must stand parallel to bolting surface on transmission housing during this.
- Selector shaft must be able to be moved easily in selector motion (up- and downward).

 **Note**

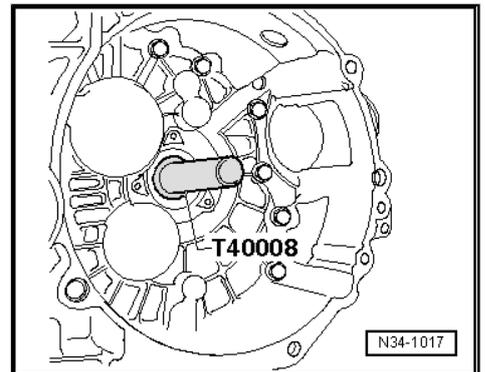
*If shift cover stands at an angle to bolting surface, selector shaft is not inserted in lower bearing.*



- Tighten the bolts -3- for the shift cover -4-.
- Install lock bolt -2-, lock bolt -arrow- must not be installed when doing so.
- Install back-up light switch -F4- -1-.
- Install left flange shaft. Refer to ["1.1 Flange Shaft and Seals on Transmission Assembly Overview", page 219](#).



- Drive in the input shaft sealing ring.
- Install the clutch slave cylinder with release bearing. Refer to ["4.7 Slave Cylinder with Release Bearing", page 39](#).
- Shift through all gears.



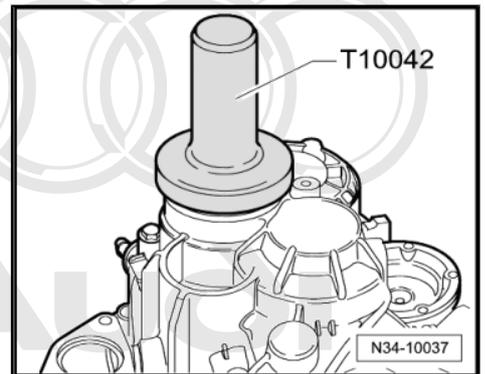
- Drive cap into transmission housing to stop of -T10042-

Install bevel box in manual transmission as follows:

 **Caution**

*Risk of damaging sealing ring between transmission and bevel box.*

◆ *Place bevel box on transmission together with right flange shaft while turning shaft.*

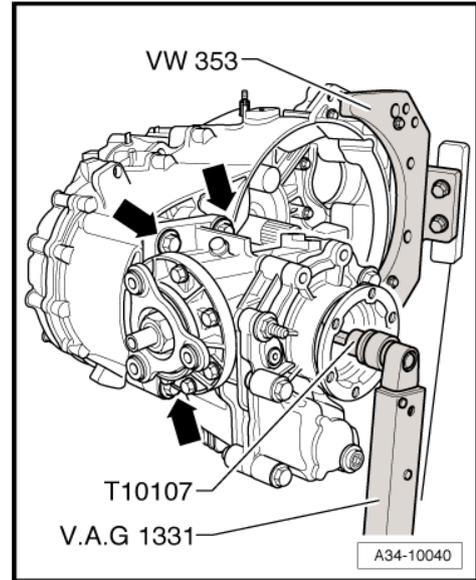
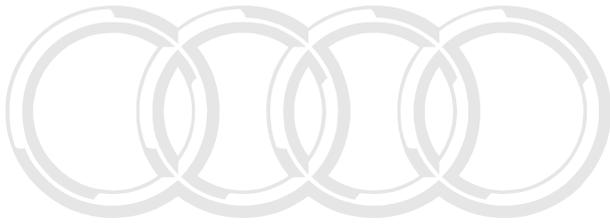


- With manual transmission, lubricate differential splines with grease for clutch disc shaft splines -G 000 100-
- Slide on bevel box completely on manual transmission, while doing this, join splines of input shaft/bevel box centrally with differential.
- With proper tooth position and central guiding, bevel box slips up to stop against manual transmission.

 **Note**

*Do not pull bevel box with mounting bolts against manual transmission, otherwise bevel box is canted and mounting eyelets can break off.*

- Tighten 4 bevel box connecting bolts -arrows- (only 3 shown in illustration) at manual transmission. Tightening specifications -10- => [page 220](#) .
- Install right flange shaft. Refer to => "1.2 Flange Shaft and Seals on Bevel Box Assembly Overview", [page 220](#) .

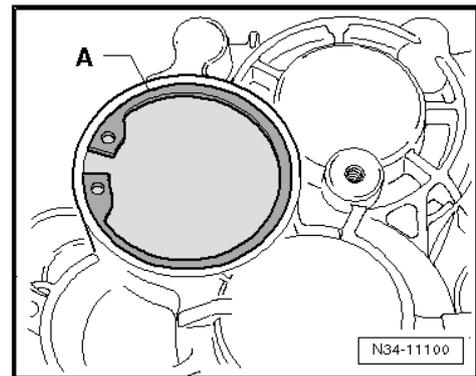


### 5.3 Transmission with Circlip A for the Cap/ Input Shaft

Transmission with Circlip -A-.

**Remove and install the transmission housing, shift mechanism, input shaft, output shafts, differential bevel box, and selector rods**

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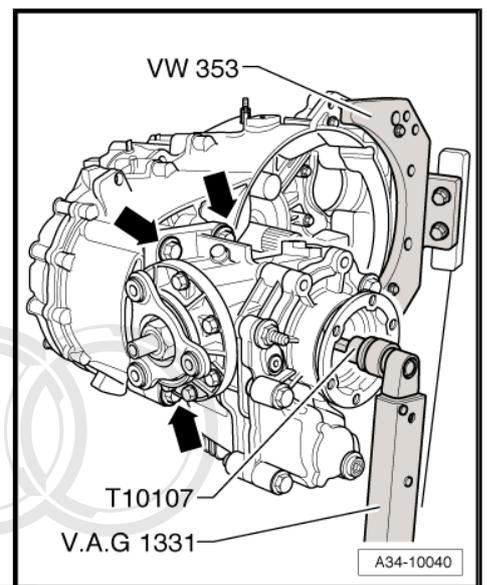
#### Special tools and workshop equipment required

- ◆ Holding Plate -VW 309-
- ◆ Holding Fixture -VW 313-
- ◆ Transmission Support -VW 353-
- ◆ Thrust Tube -VW 455-
- ◆ Slide Hammer-Complete Set -VW 771-
- ◆ Kukko 21/1 internal puller
- ◆ Kukko 17/0 separating tool
- ◆ Kukko 22/1 counter-support
- ◆ Bracket -30-211A-
- ◆ Thrust piece -T10042-
- ◆ Thrust piece -T10143-
- ◆ Thrust piece -T40008-
- ◆ Torque Wrench -V.A.G 1331-
- ◆ Heat gun -V.A.G 1416-
- ◆ Drift -T10169-
- ◆ or Drift -T10362- => [page 155](#)

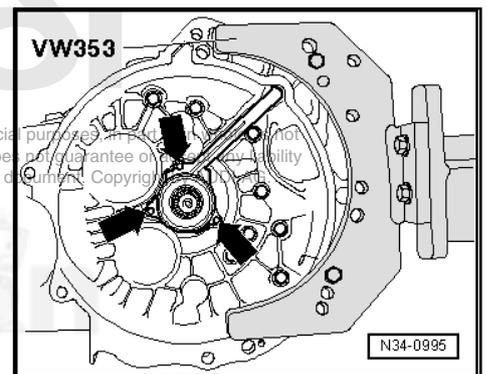
- ◆ Extractor Lever -VW 681-
- ◆ Oil Collecting and Extracting Device -V.A.G 1782-
- ◆ Socket and Key -T10107 A-

### Removing

- Transmission removed, refer to  
 ⇒ ["4.4 Transmission, Removing", page 96](#) and secured to the  
 assembly stand  
 ⇒ ["4.6 Transmission, Securing to Assembly Stand",  
 page 107](#) .
- Rotate transmission in assembly stand with oil drain plug  
 downward.
- Place drip tray underneath.
- Drain gear oil from manual transmission.
- Remove the right flange shaft bolt with the -T10107 A- .
- Remove 4 bevel box connecting bolts -arrows- (only 3 shown  
 in illustration) at manual transmission.
- Carefully press bevel box off manual transmission while pro-  
 tecting it against falling through.

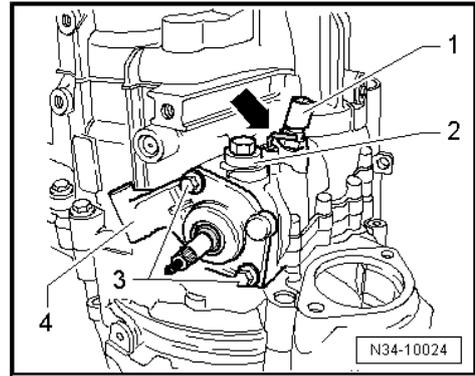


- Remove the clutch slave cylinder with the release bearing  
 -arrows-.

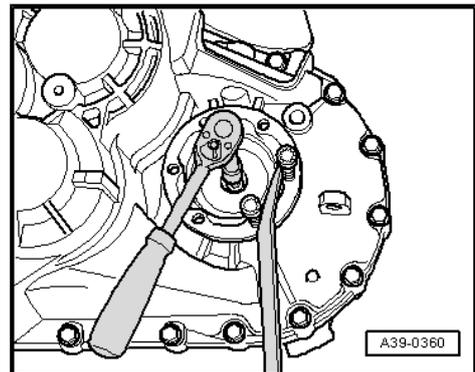


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- In the following step, ensure that the selector shaft is not locked by the lock elbow -arrow-.
- Move shift shaft to neutral position.
- Remove mounting bolt -2-.
- Remove the bolts -3-.
- Remove back-up light switch -F4- -1-.
- Pull selector shaft -4- off transmission housing.



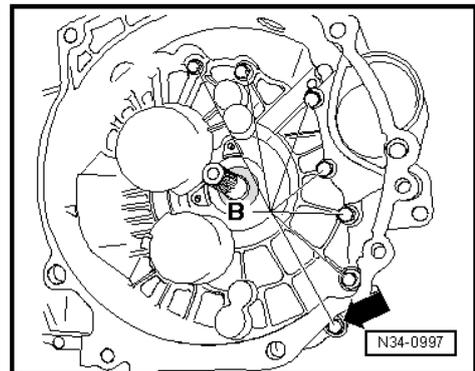
- Remove the left flange shaft bolt by installing 2 bolts in the flange and counter holding the flange shaft with the assembly lever.



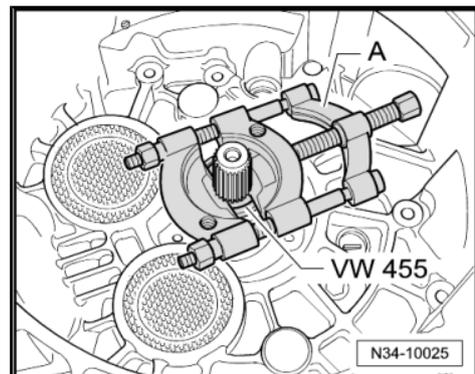
- Remove bolts -B- inside clutch housing for securing clutch housing to transmission housing.

**Note**

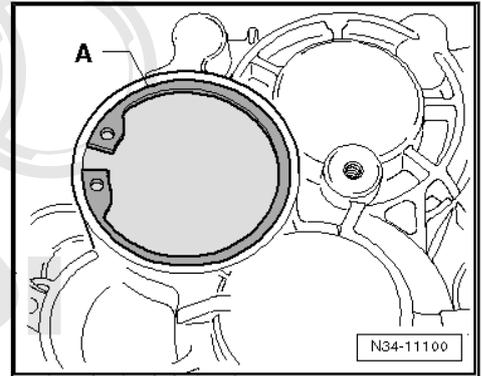
*One bolt -arrow- is located outside of bolting flange.*



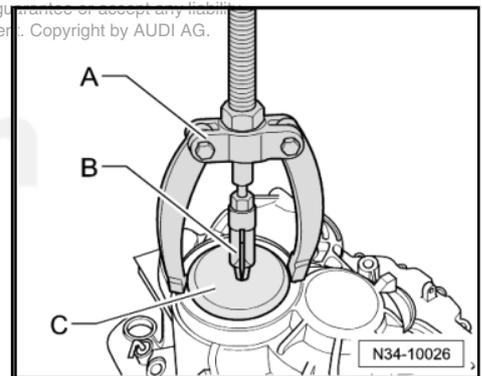
- **Secure the input shaft by inserting the -VW 455- over the input shaft, onto the clutch housing.**
- Then tension separating tool -A-, for example -Kukko 17/0- tightly behind input shaft splines.
- Back side of separating tool must contact pressing sleeve free of play.



- Remove the cap/input shaft circlip -A-.

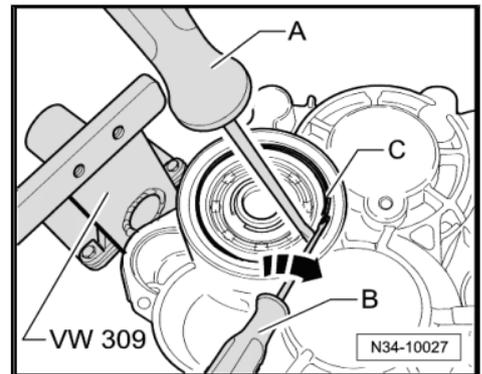


- Knock rubber through in center of cap -C- using a screwdriver
  - Remove cap from transmission housing.
- A - Support , for example -Kukko 22/1-  
 B - Internal puller 8 to 12 mm , for example -Kukko 21/01-

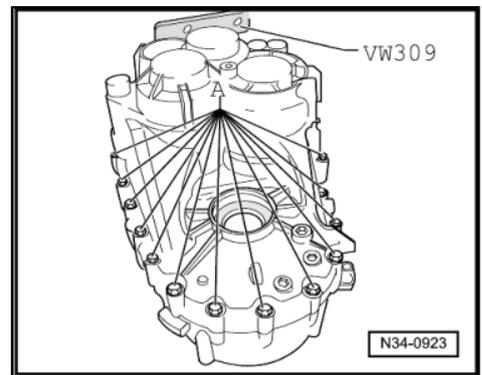


Remove circlip -C- from input shaft grooved ball bearing in the following manner:

- Hold one end of circlip in place using screwdriver -A-.
- With the 2nd screwdriver -B-, pry the other end of the circlip out of the groove of the grooved ball bearing -arrow-.
- By repositioning screwdriver -B-, pry the circlip out further.



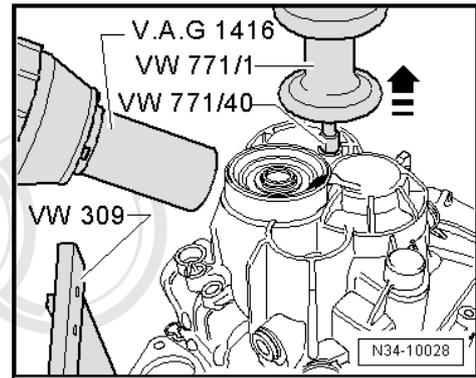
- Remove mounting bolts -A- for transmission housing at clutch housing.



- Screw adapter -VW 771/40- into threaded hole of transmission housing.
- Heat the transmission housing using the -V.A.G 1416- in the area of the bearing seat for the grooved ball bearing/input shaft to approximately 100 °C (212 °F) for approximately 10 minutes.
- Pull off transmission housing from clutch housing -arrow- using slide hammer -VW 771/1- .

 **Note**

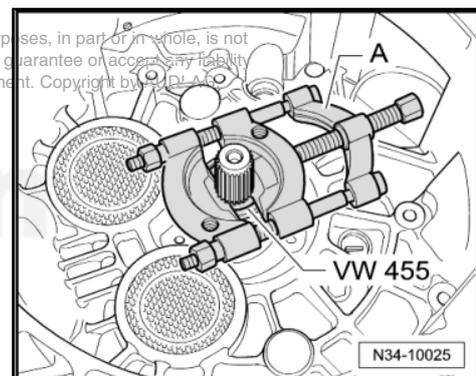
*If necessary, carefully pry up all around and alternating between sides on protruding flange taking care not to damage sealing surfaces.*



- Remove separating tool -A- and -VW 455- from input shaft.

 **Note**

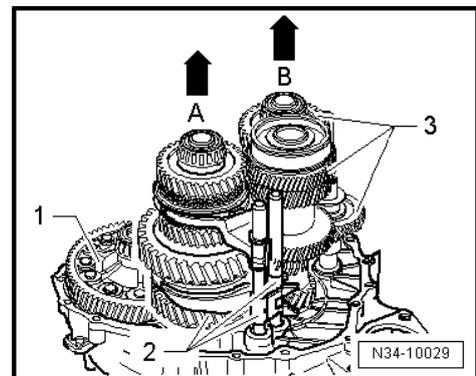
*A 2nd technician is required to remove shafts from clutch housing.*



- Lift differential -1- with the left hand.
- With the right hand, lift output shaft for 1st to 4th gears together with selector rods -2- -arrow A-.
- At the same time, 2nd technician lifts input-, reverse- and output shaft for 5th/6th gear -3- together with selector rods out of clutch housing -arrow B-.

 **Note**

*If necessary, differential can be shifted again in clutch housing after lifting shafts.*



- Pry off the shaft sealing ring for the input shaft with the -VW 681- .

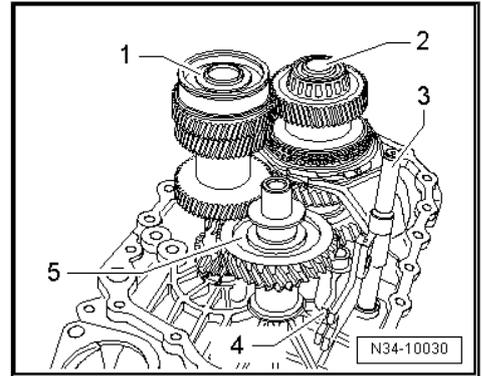
 **Note**

*Grooved ball bearing on input shaft must always be replaced -6- => [page 180](#) .*

### Transmission, Assembling

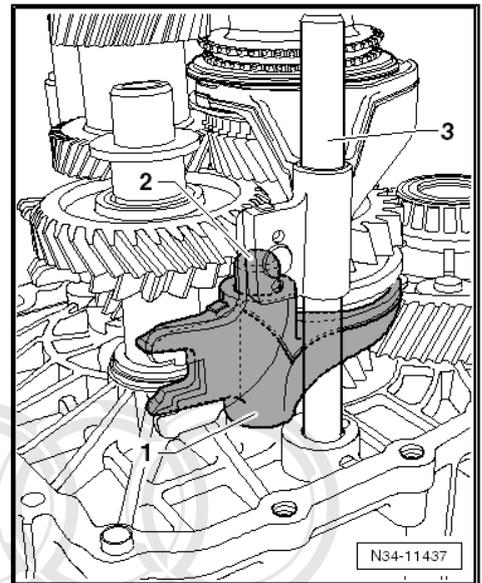
- A new grooved ball bearing must be pressed on to input shaft -6- => [page 180](#) .

- First insert input shaft -1-, output shaft for 5th/6th gears -2- together with selector rod -3-, shift fork -4- and reverse shaft -5-.



**To transmission build date 5/24/09**

- Bearing for reverse gear shift fork:
- Mount reverse gear shift fork -1- on axle -2- behind 5th/6th gear selector rod -3-.

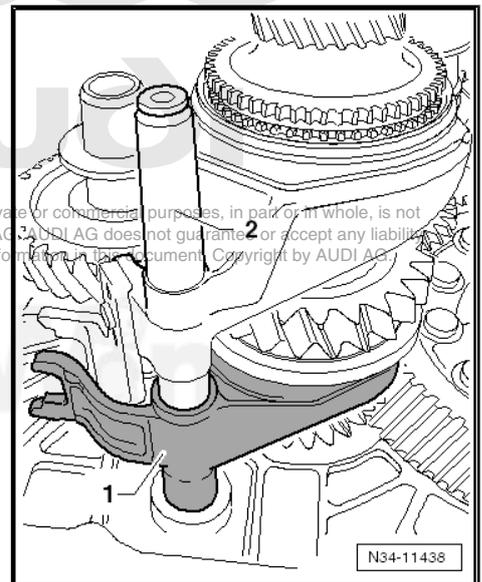


**From Transmission Build Date 5/25/09**

- Bearing for reverse gear shift fork:
- Mount reverse gear shift fork -1- on the selector rod with 5th/6th gear shift fork -2-.

**Continuation for all Transmissions**

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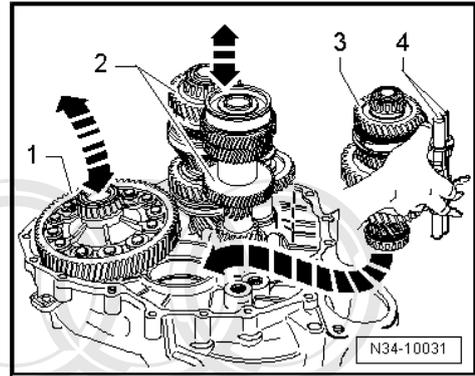


- Insert differential -1-.

 **Note**

A 2nd technician is required for further installation of shafts into clutch housing.

- As shown in illustration, take output shaft for 1st to 4th gears -3- with selector rods -4- in right hand.
- Lift differential slightly with the left hand.
- At the same time, 2nd technician slightly lifts input shaft, output shaft for 5th/6th gears and reverse gear -2- together with reverse shaft.
- Now, insert the output shaft for 1st to 4th gears in direction of -arrow-.
- Places of input shaft, output shafts and final drive gear/differential must engage.
- Together with a 2nd technician, place the shafts and the differential into their bearing seats.
- Fasten the -30-211A- for the input shaft to the clutch housing.



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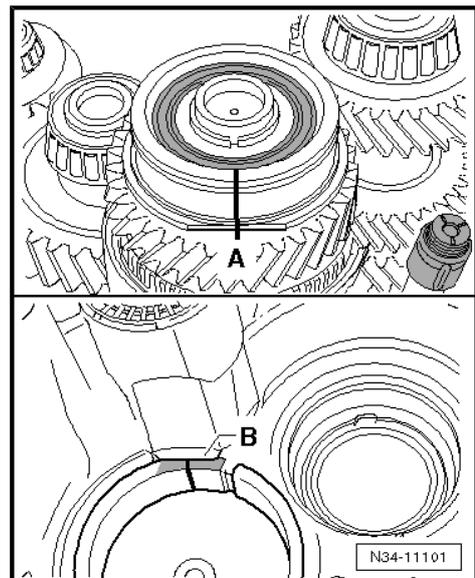
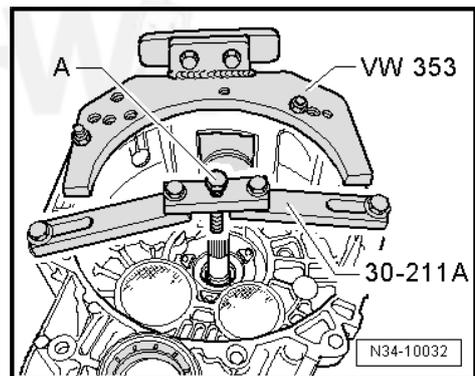
 **Note**

For the sake of illustration, clutch housing is depicted rotated 180°.

- Screw in bolt -A- far enough until input shaft rises slightly.
- The grooved ball bearing/input shaft only fits in one position in the transmission housing.

There is a flattened area on the grooved ball bearing and the bearing mount.

- If flattened areas -A- and -B- are present, do not insert any spacer washers above and below the grooved ball bearing. Refer to ⇒ ["1.1 Grooved Ball Bearing Changes"](#), page 177 .
- Flattened areas -A- on the grooved ball bearing and on bearing mount -B- must align in the transmission housing.
- Mark the flattened areas with color.
- Place a marking on the upper area of the grooved ball bearing and on the upper area of the transmission housing bearing mount (⇒ next illustration).
- Heat the transmission housing using the -V.A.G 1416- in the area of the bearing seat for the grooved ball bearing/input shaft to approximately 100 °C (212° F) for approximately 10 minutes.



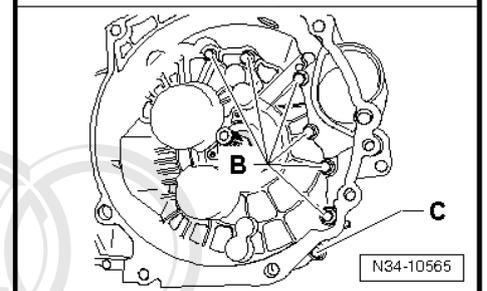
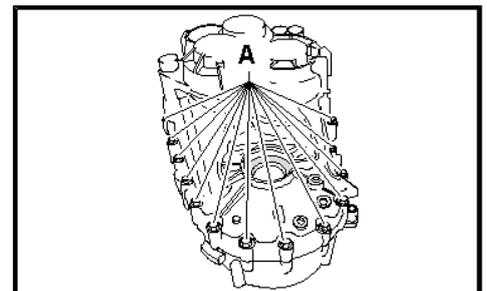
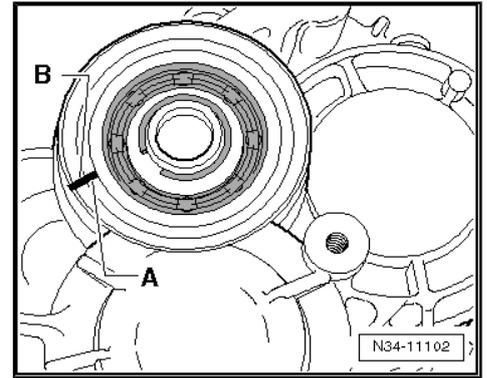
 **Note**

- ◆ *It is necessary to heat the transmission housing so that the grooved ball bearing is not damaged when the housing is being installed.*
- ◆ *Align the marking on the grooved ball bearing -A- with the marking on the transmission housing -B- and mount the transmission housing.*
- ◆ *Apply sealing paste -AMV 188 200 03- evenly onto the sealing surface of the clutch housing.*

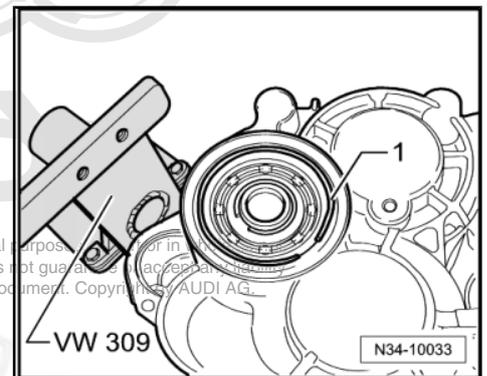
- Install transmission housing and tighten new bolts -A-, -B- and -C- to tightening specification.

Allocation of bolts:

- A - Bolt with permanent washer
- B - Bolt without washer
- C - Bolt with permanent washer



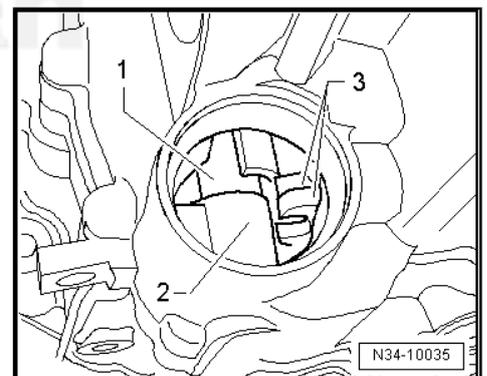
- Install circlip -1- for grooved ball bearing/input shaft.
- Remove -30-211A- for input shaft.
- If selector shaft lock sleeve has been removed, drive it in now as far as stop on tool => [page 155](#) .



- Turn transmission with opening for selector shaft in assembly stand upward.
- Insert selector shaft -1- into lower mounting -2- and into shift forks -3-.

 **Note**

*To improve clarity, the cap is removed.*

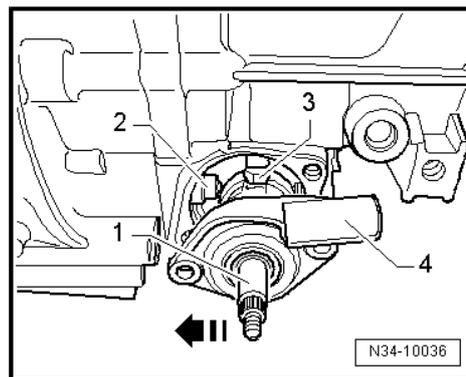


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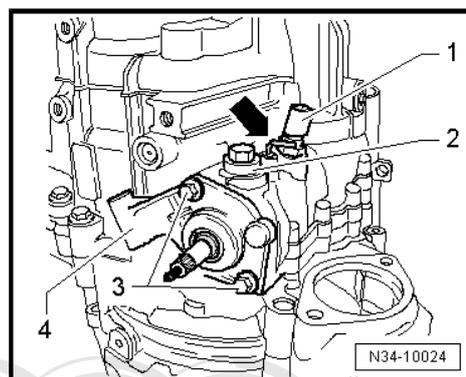
- Now press selector shaft -1- against lock sleeve -2- direction of -arrow- and guide downward with shift finger -3- through shift forks until stop.
- Shift cover -4- must stand parallel to bolting surface on transmission housing during this.
- Selector shaft must be able to be moved easily in selector motion (up- and downward).

**Note**

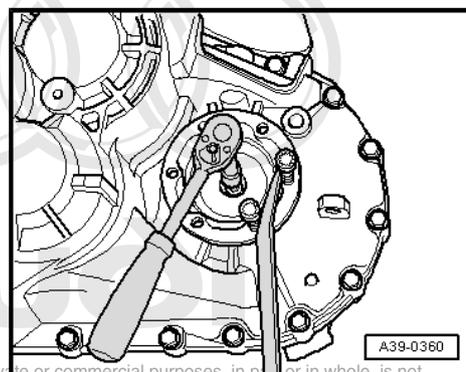
*If shift cover stands at an angle to bolting surface, selector shaft is not inserted in lower bearing.*



- Tighten the bolts -3- for the shift cover -4-.
- Install lock bolt -2-, lock elbow -arrow- must not be installed when doing so.
- Install back-up light switch -F4- -1-.

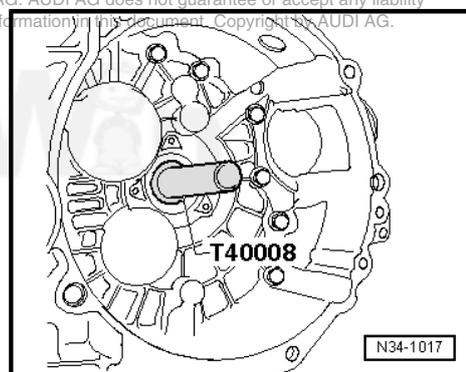


- Install the flange shaft with spring, the thrust washer and tapered ring.

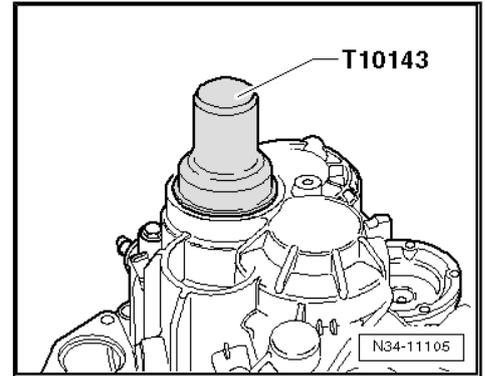


- Drive input shaft seal in flush.
- Install the clutch slave cylinder with release bearing. Refer to ⇒ ["4.7 Slave Cylinder with Release Bearing", page 39](#) .
- Shift through all gears.

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- Drive the cap into the transmission housing as far as the stop.



- Secure the cap with the circlip -A-.

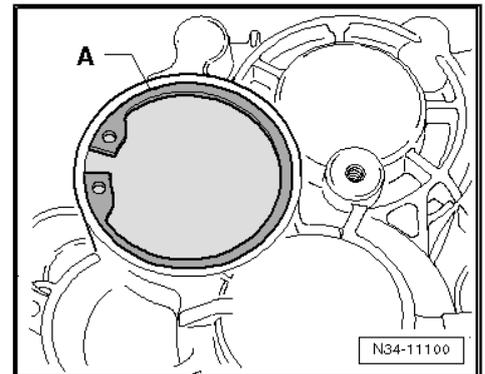
Install bevel box in manual transmission as follows:



**Caution**

*Risk of damaging sealing ring between transmission and bevel box.*

◆ *Place bevel box on transmission together with right flange shaft while turning shaft.*

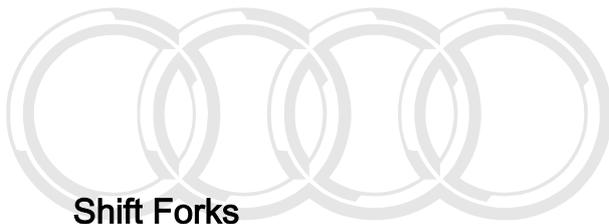
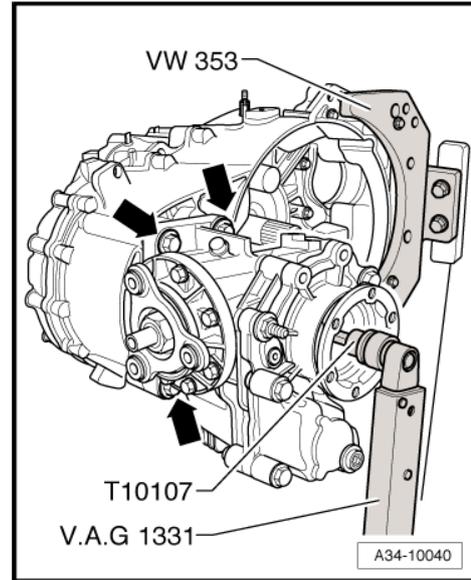


- With manual transmission, lubricate differential splines with grease for clutch disc shaft splines -G 000 100- .
- Slide on bevel box completely on manual transmission, while doing this, join splines of input shaft/bevel box centrally with differential.
- Bring right drive axle splines and differential bevel gear also into alignment, rotate flanged shaft if necessary.
- With proper tooth position and central guiding, bevel box slips up to stop against manual transmission.

 **Note**

*Do not pull bevel box with mounting bolts against manual transmission, otherwise bevel box is canted and mounting eyelets can break off.*

- Tighten 4 bevel box connecting bolts -arrows- (only 3 shown in illustration) at manual transmission. Tightening specifications -10- => [page 220](#) .
- Install right flange shaft. Refer to => "1.2 Flange Shaft and Seals on Bevel Box Assembly Overview", [page 220](#) .



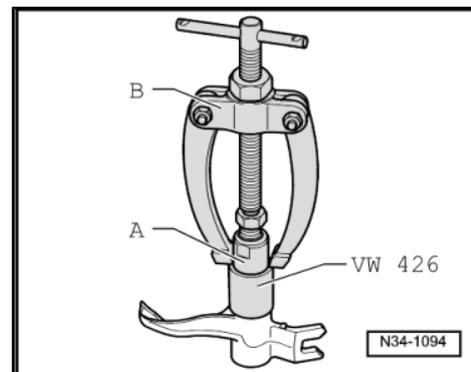
## 5.4 Shift Forks

### Special tools and workshop equipment required

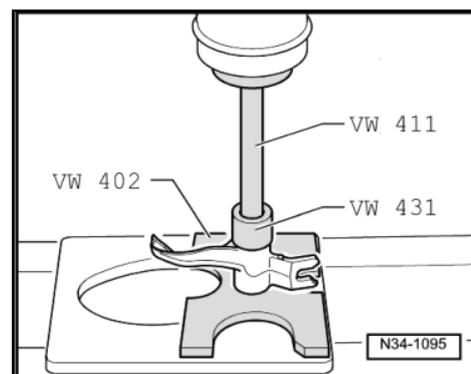
- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 411-
- ◆ Sleeve -VW 423-
- ◆ Thrust Pad 16.5/28 mm Dia. -VW 431-
- ◆ -1- Kukko 21/3 internal puller
- ◆ -4- Kukko 22/1 counter-support

### Pulling Off Ball Sleeve for Reverse Gear Shift Fork

- A - Internal puller 18 to 23 mm , for example -Kukko 21/3-
- B - Support , for example -Kukko 22/1-



### Pressing In Ball Sleeve for Reverse Gear Shift Fork



## 5.5 Transmission Housing

### Special tools and workshop equipment required

- ◆ Guide Pin -VW 436 A-
- ◆ Guide Pin -VW 439-
- ◆ Slide Hammer-Complete Set -VW 771-
- ◆ Holding Fixture -VW 801-
- ◆ Guide Pin -10 - 15-
- ◆ Thrust Pad -3124-
- ◆ Driving Sleeve -VW 244 B-
- ◆ Thrust Plate -VW 401-
- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 407-
- ◆ Sleeve -VW 416 B-
- ◆ Driver -3264-
- ◆ Subframe Support Assm. Device -3290-
- ◆ Drift -T10168-
- ◆ Drift -T10169-
- ◆ Thrust piece -T10203-
- ◆ Kukko 21/2 Internal puller and Kukko 21/4
- ◆ Kukko 22/2 counter-support
- ◆ Drift -T10362-

#### Removing Cap -A-

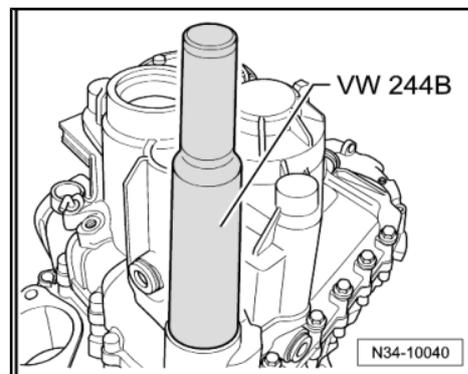
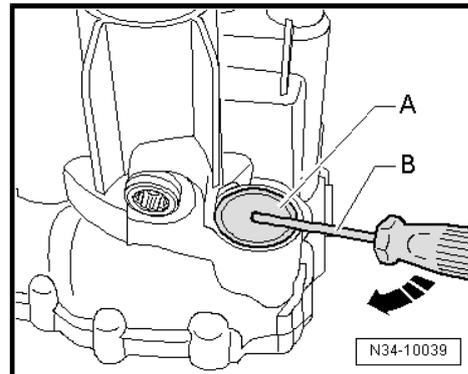
- Knock rubber through at center of sealing cap using a screwdriver -B- and pry out cap in direction of -arrow-.

#### Driving In Sealing Cap

- Drive in sealing cap up to the stop.

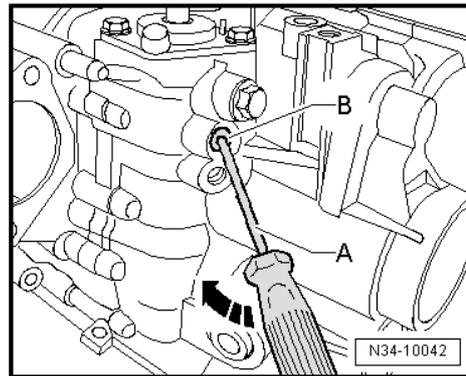
#### Removing Lock Elbow for Selector Shaft

- Break off the pin in released position.



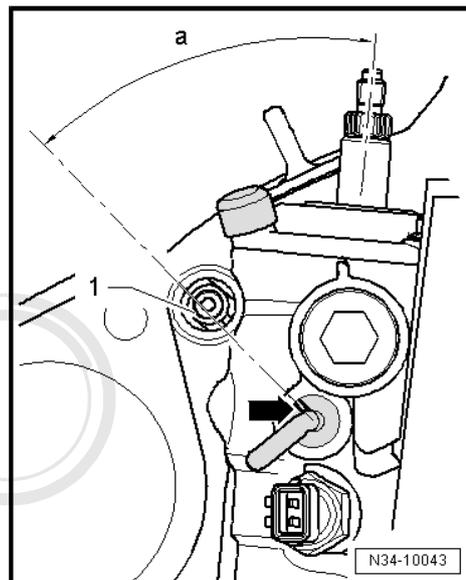
- Guide a screwdriver -A- into hole -B- of the lock elbow.
- Pry out lock elbow -arrow-.

**Installation Position of Lock Elbow**



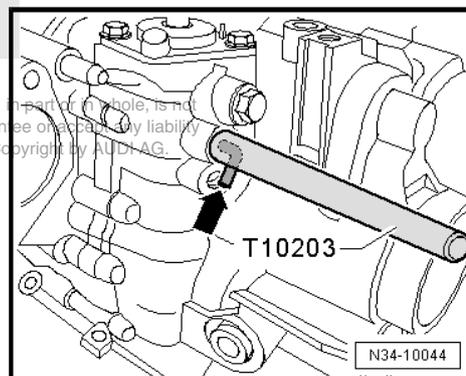
- The marking on the lock elbow -arrow- must point to clutch slave cylinder connection -1-.
- The angle -a- must be approximately 45°.

**Drive in the Lock Elbow for the Selector Shaft.**



- The lock elbow -arrow- must be released for the driving-in procedure.
- Drive in the lock elbow to the tool stop.

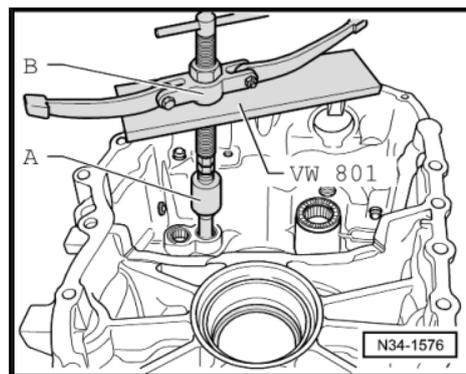
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**Pulling Out Bearing Bushing for Selector Rod**

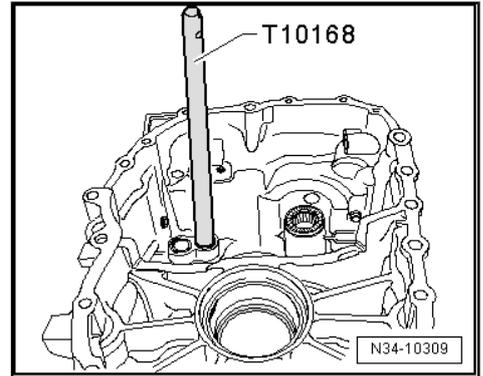
- A - Internal puller 14.5 to 18.5 mm , for example -Kukko 21/2-
- B - Support , for example -Kukko 22/2-

**Driving In Bushing for Selector Rod**



- Drive in bushing for selector rod up to the stop when tool makes contact.

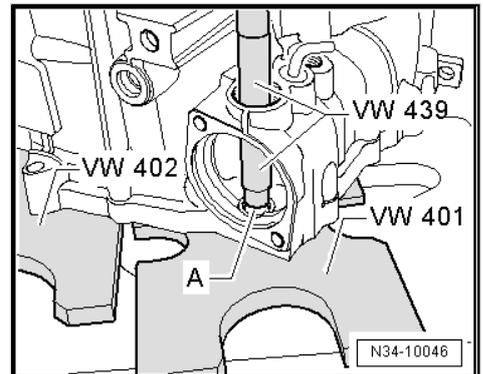
**Pressing Out Lock Sleeve with Transmission Disassembled**



- Arrange transmission housing on -VW 401- and -VW 402- so that alignment bushings in transmission housing are not damaged.
- Press out the lock sleeve -A-.

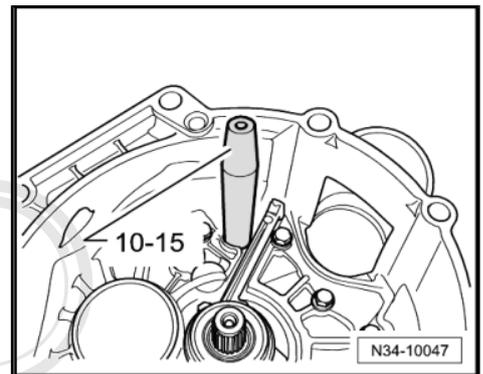
**Driving Out Lock Sleeve with Transmission Assembled**

- Locking bolt and selector shaft removed.
- Rotate transmission so that lock sleeve does not fall into transmission.

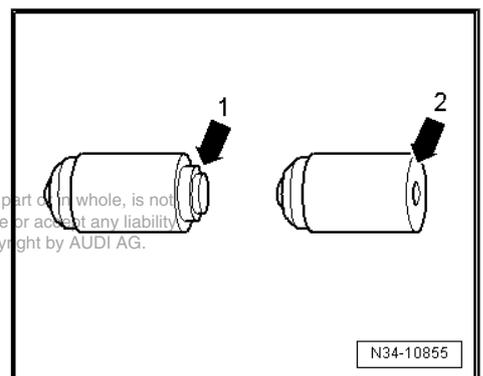


- Drive out the lock sleeve using -10 - 15- .

**Lock Sleeve Differentiation**



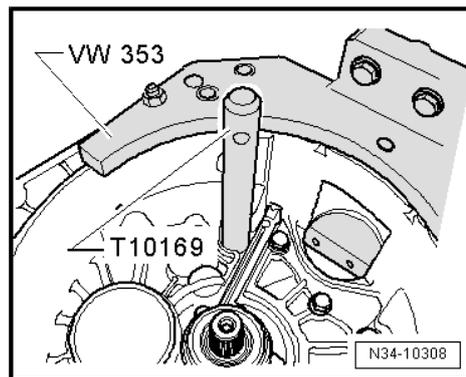
- A lock sleeve with shoulder -arrow 1- => [page 156](#) and without shoulder -arrow 2- => [page 156](#) can be installed.
- Allocate components, refer to the electronic parts catalog ET-KA.



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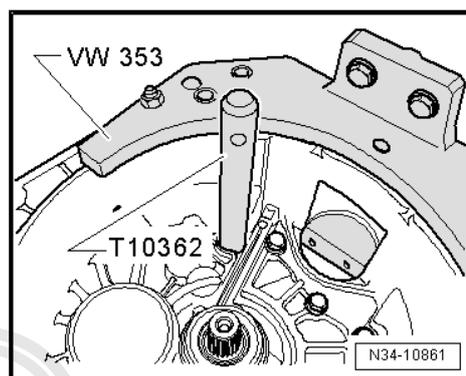
### Drive In Lock Sleeve with Shoulder as Far as Stop on Tool

- Transmission housing fastened to clutch housing.



### Drive In Lock Sleeve without Shoulder as Far as Stop on Tool

- Transmission housing fastened to clutch housing.



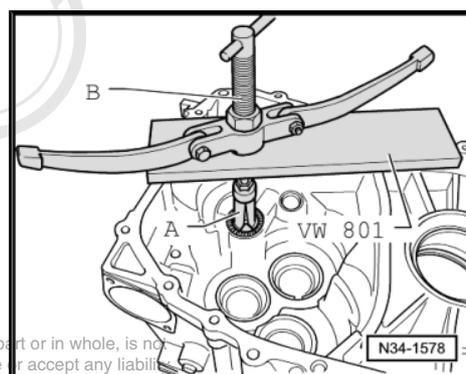
### Pulling Needle Bearing for Reverse Shaft Out of Transmission Housing

- A - Internal puller 23.5 to 30 mm , for example -Kukko 21/4-
- B - Support , for example -Kukko 22/2-

 **Note**

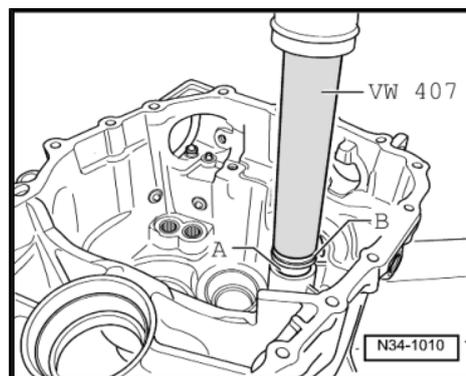
*Needle bearing is destroyed when it is removed and must be replaced.*

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### Press Needle Bearing into Transmission Housing

- During pressing sequence, place thrust washer -B- for reverse shaft onto the needle bearing -A-.
- Support the transmission housing with the -VW 416 B- directly under the bearing mount.

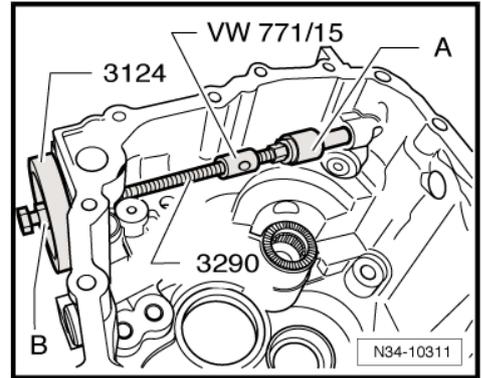


**Pulling Out Bushing for Selector Shaft**

- Hold spindle of assembly tool -3290- firmly in place and screw nut -B-.

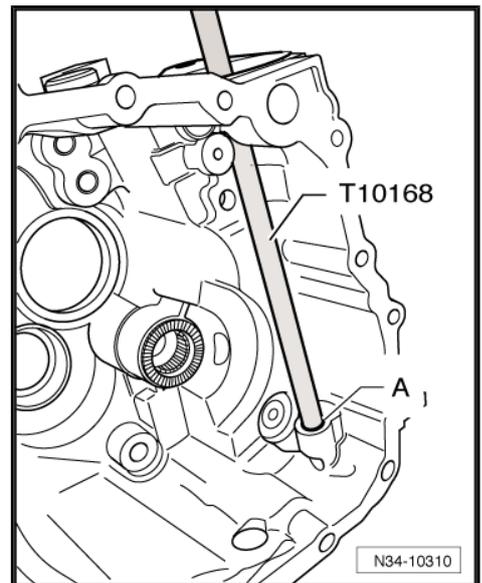
A - Internal puller 14.5 to 18.5 mm , for example -Kukko 21/2-

**Driving In Bushing for Selector Shaft**



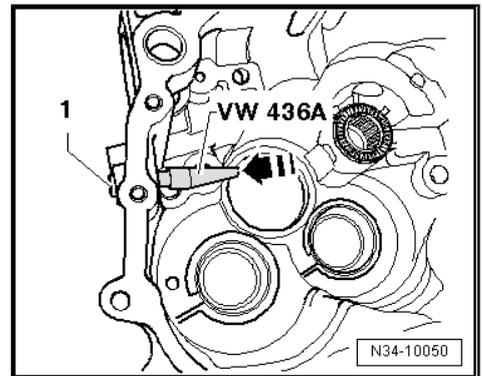
- Drive selector shaft bushing -A- in flush.

**Driving Out Sealing Plug**



Drive the sealing plug -1- from the inner side of the transmission housing toward the outside -arrow-

**Driving In Sealing Plug**

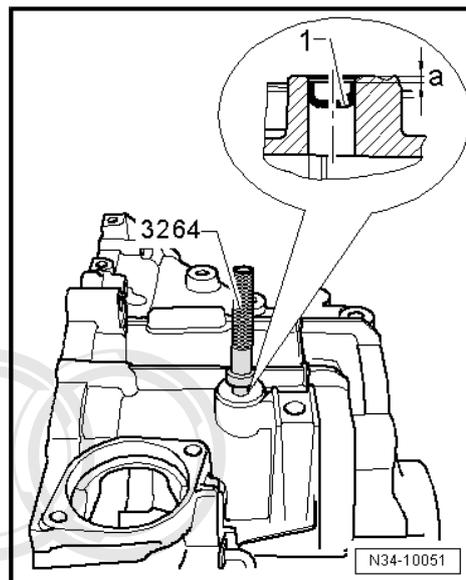


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- Drive in the sealing plug -1- using the -3264- to dimension -a- = approximately 3 mm under the upper edge of housing.



## 5.6 Clutch Housing, Servicing

### Special tools and workshop equipment required

- ◆ Punch -VW 407-
- ◆ Sleeve -30 - 21-
- ◆ Drift -T10168-
- ◆ Thrust Piece -T40008-
- ◆ -1- Kukko 21/2 Internal puller and Kukko 21/4
- ◆ -4- Kukko support 22/1 and 22/2

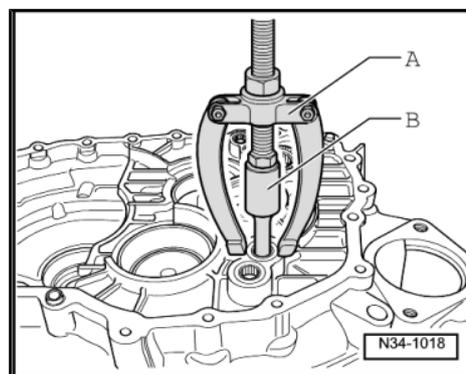
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### Pulling Out Bearing Bushing for Selector Rod

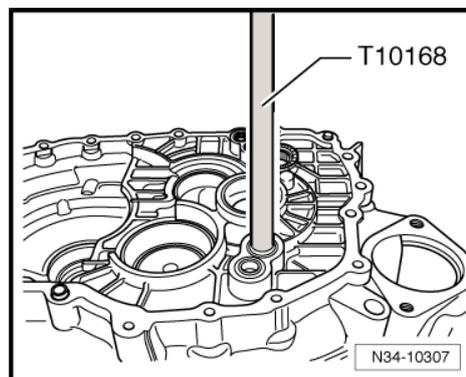
A - Support , for example -Kukko 22/1-

B - Internal puller 14.5 to 18.5 mm , for example -Kukko 21/2-

### Driving In Bushing for Selector Rod



- Drive in bushing up to the stop when tool makes contact



### Pull Needle Bearing Off Clutch Housing

A - Support , for example -Kukko 22/2-

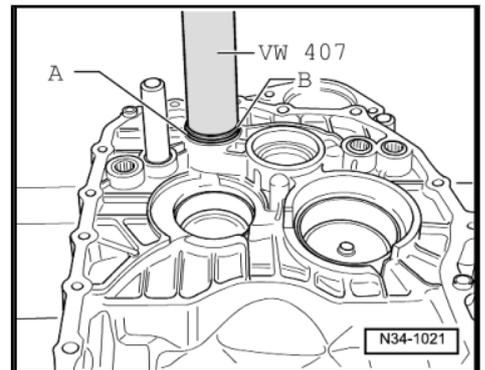
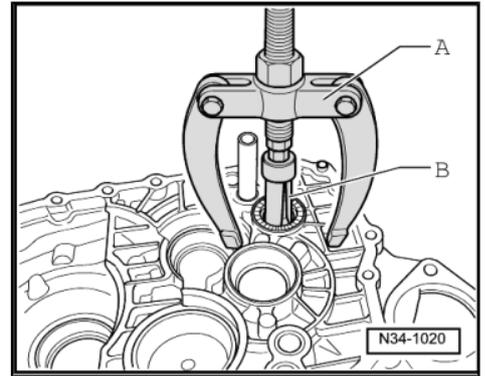
B - Internal puller 23.5 to 30 mm , for example -Kukko 21/4-

 **Note**

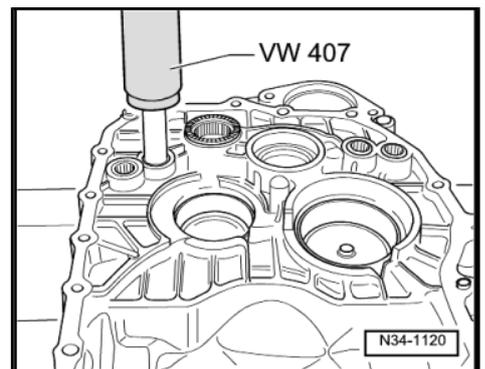
*Needle bearing is destroyed when it is removed and must be replaced.*

### Pressing In Needle Bearing into Clutch Housing

- During pressing sequence, place thrust washer -B- for reverse shaft onto the needle bearing -A-.



### Press Axle for Reverse Gear Shift Fork into Clutch Housing



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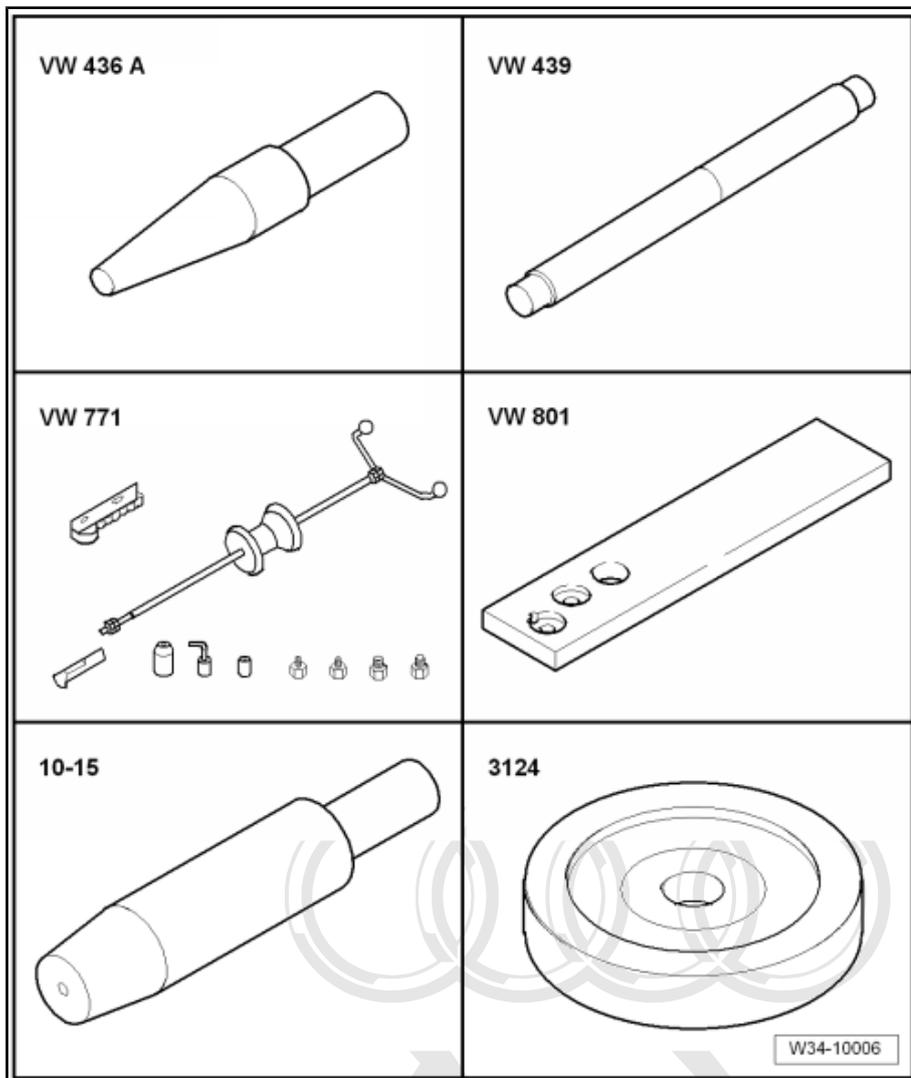
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## 6 Special Tools

### Special tools and workshop equipment required

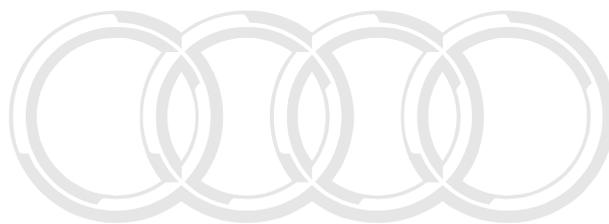
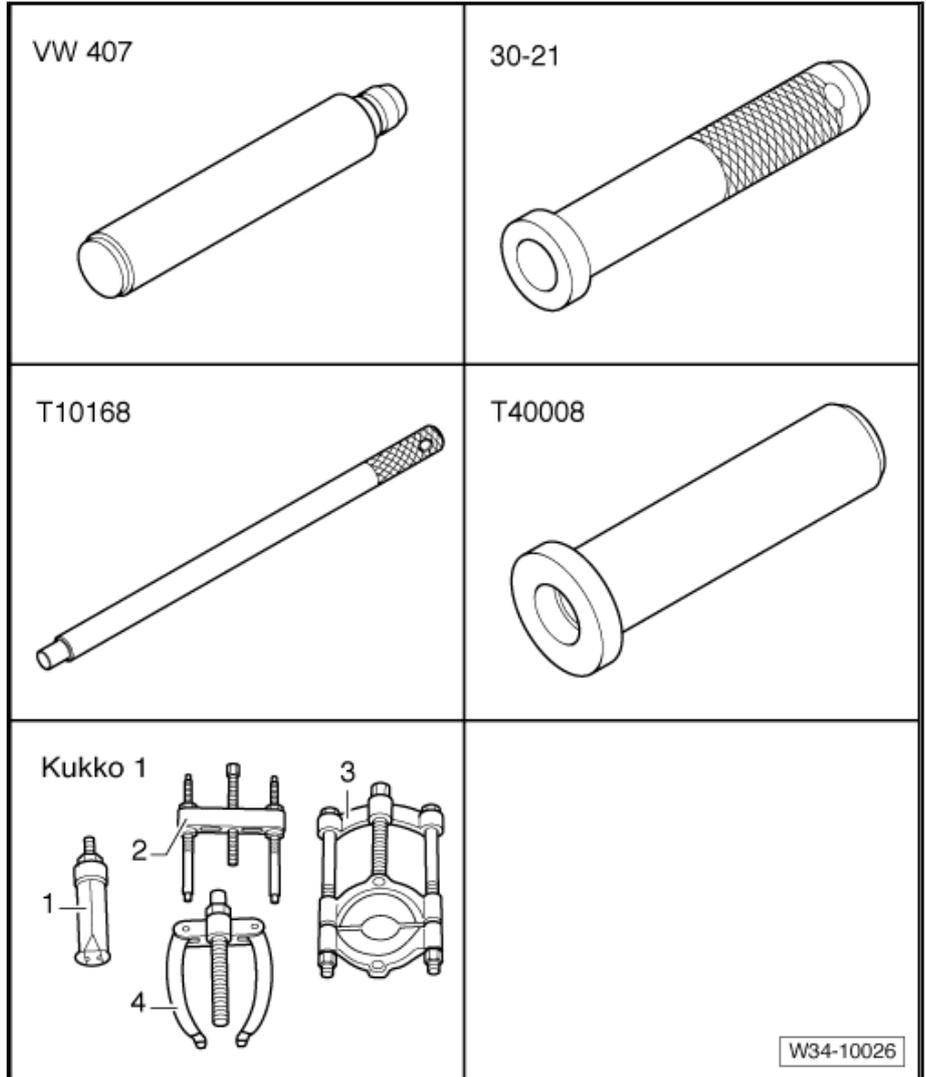
- ◆ Guide Pin -VW 436 A-
- ◆ Guide Pin -VW 439-
- ◆ Slide Hammer-Complete Set -VW 771-
- ◆ Holding Fixture -VW 801-
- ◆ Guide Pin -10 - 15-
- ◆ Thrust Pad -3124-



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**Special tools and workshop equipment required**

- ◆ Punch -VW 407-
- ◆ Sleeve -30 - 21-
- ◆ Drift -T10168-
- ◆ Thrust Piece -T40008-
- ◆ -1- Kukko 21/2 Internal puller and Kukko 21/4
- ◆ -4- Kukko support 22/1 and 22/2

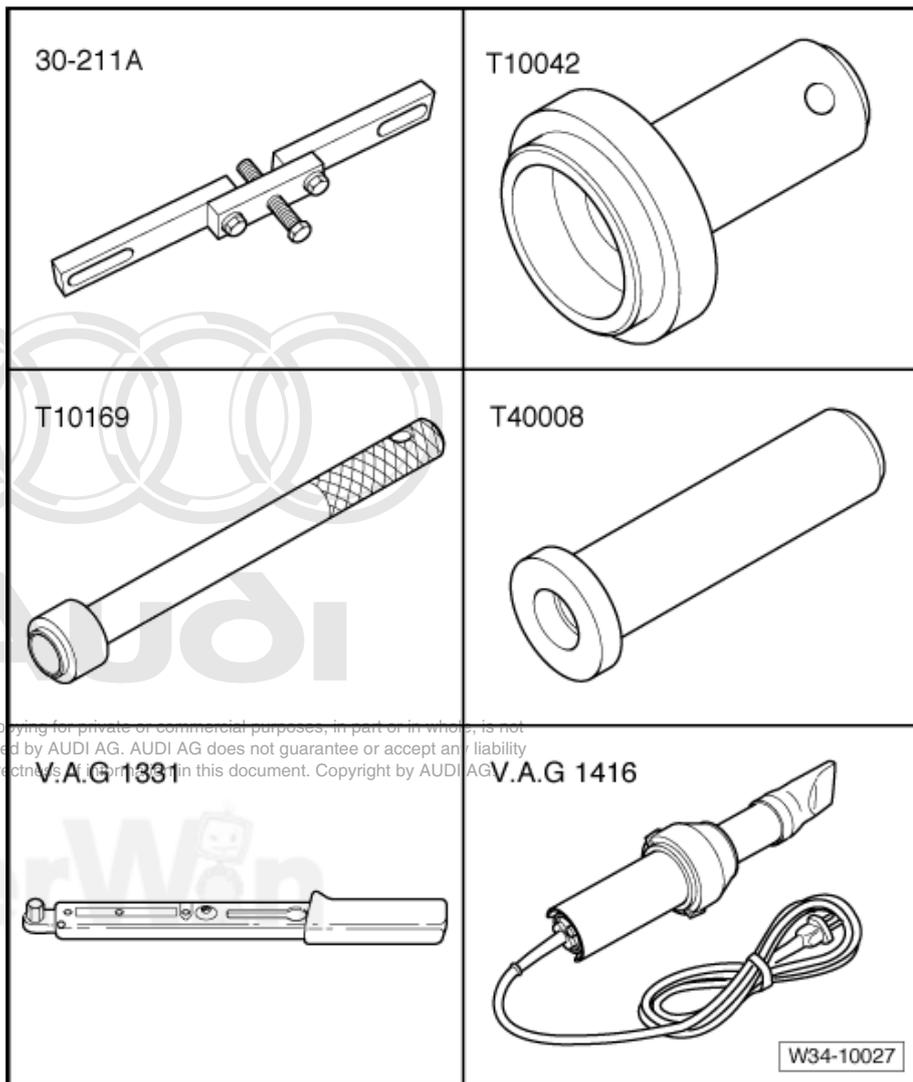


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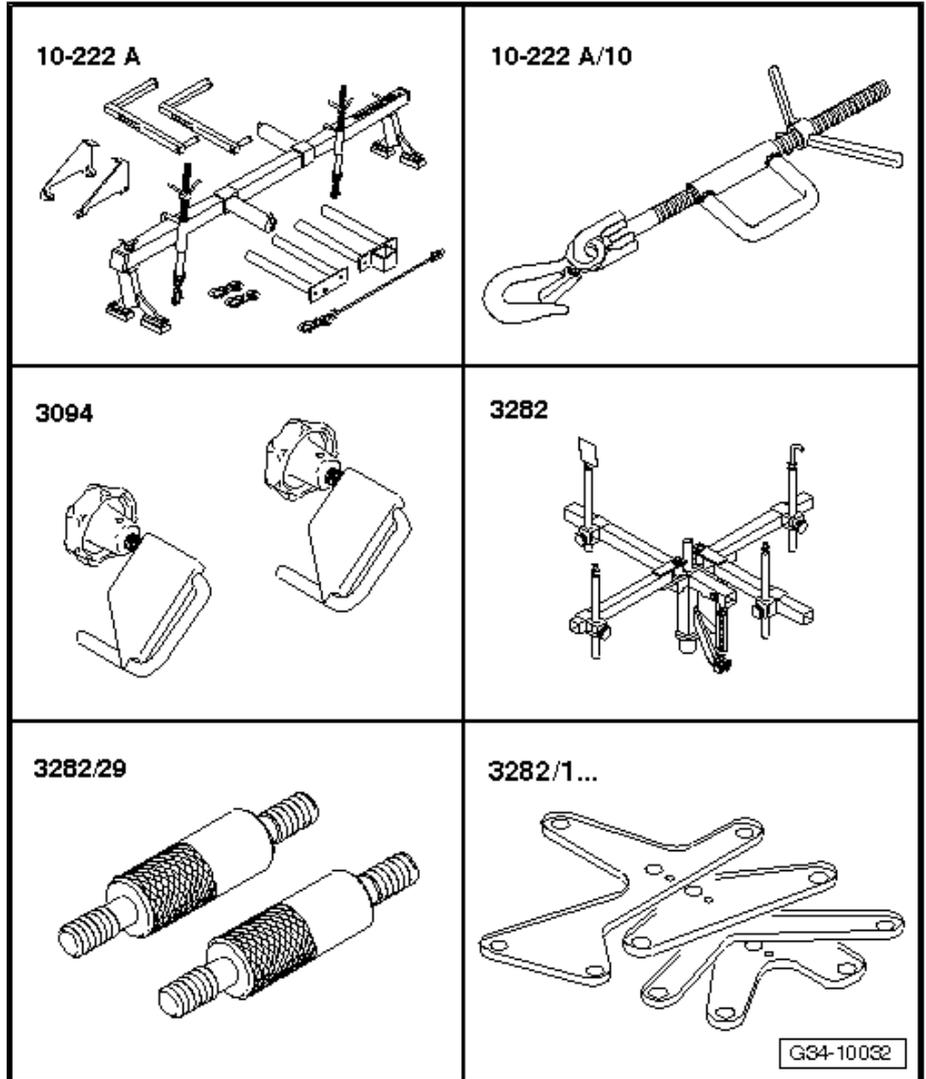
- ◆ Bracket -30 - 211 A-
- ◆ Thrust Piece -T10042-
- ◆ Drift -T10169-
- ◆ Thrust Piece -T40008-
- ◆ Torque Wrench -V.A.G 1331-
- ◆ Heat Gun -V.A.G 1416-



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**Special tools and workshop equipment required**

- ◆ Engine Support Bridge -10 - 222 A-
- ◆ Hook -10 - 222 A /10-
- ◆ Hose Clamps Up to 25 mm Diameter. -3094-
- ◆ Transmission Support -3282-
- ◆ Pin -3282/29-
- ◆ Adjustment Plate -3282/33-

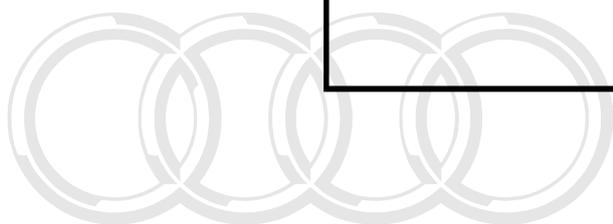
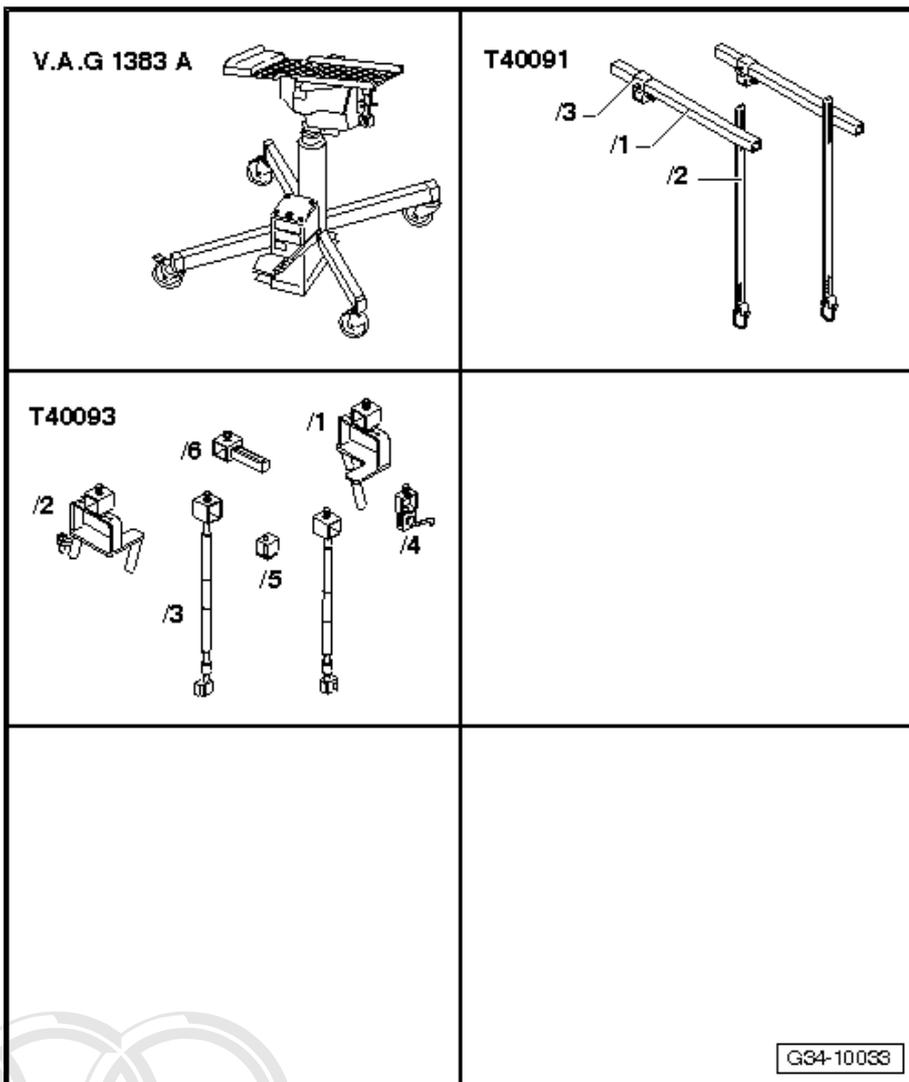


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- ◆ Engine/Transmission Jack -V.A.G 1383 A-
- ◆ Engine Support Basic Set -T40091-
- ◆ Engine Support Supplement Set -T40093-



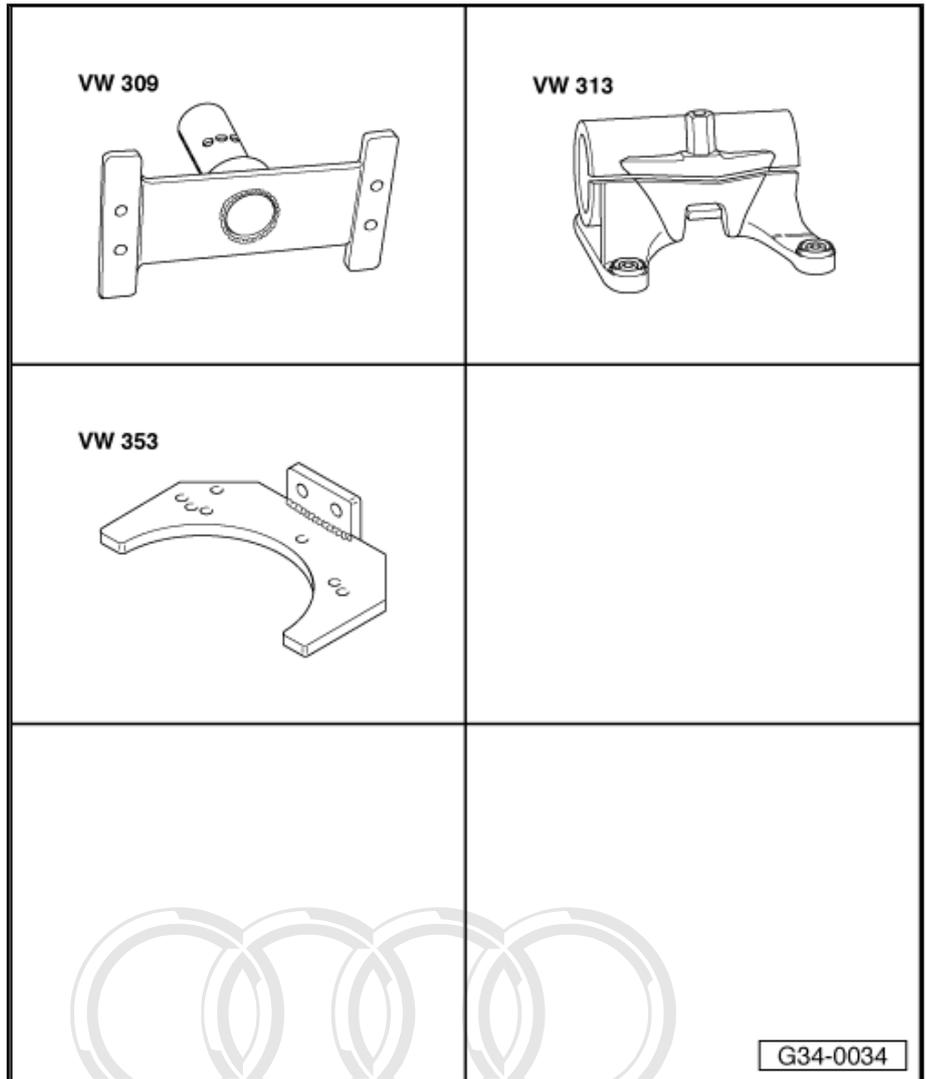
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**Special tools and workshop equipment required**

- ◆ Holding Plate -VW 309-
- ◆ Holding Fixture -VW 313-
- ◆ Transmission Support -VW 353-



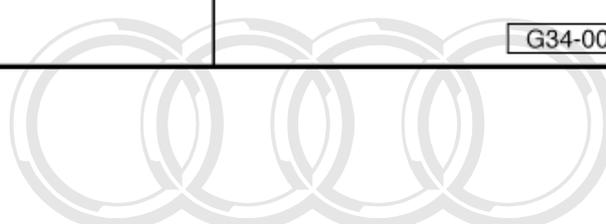
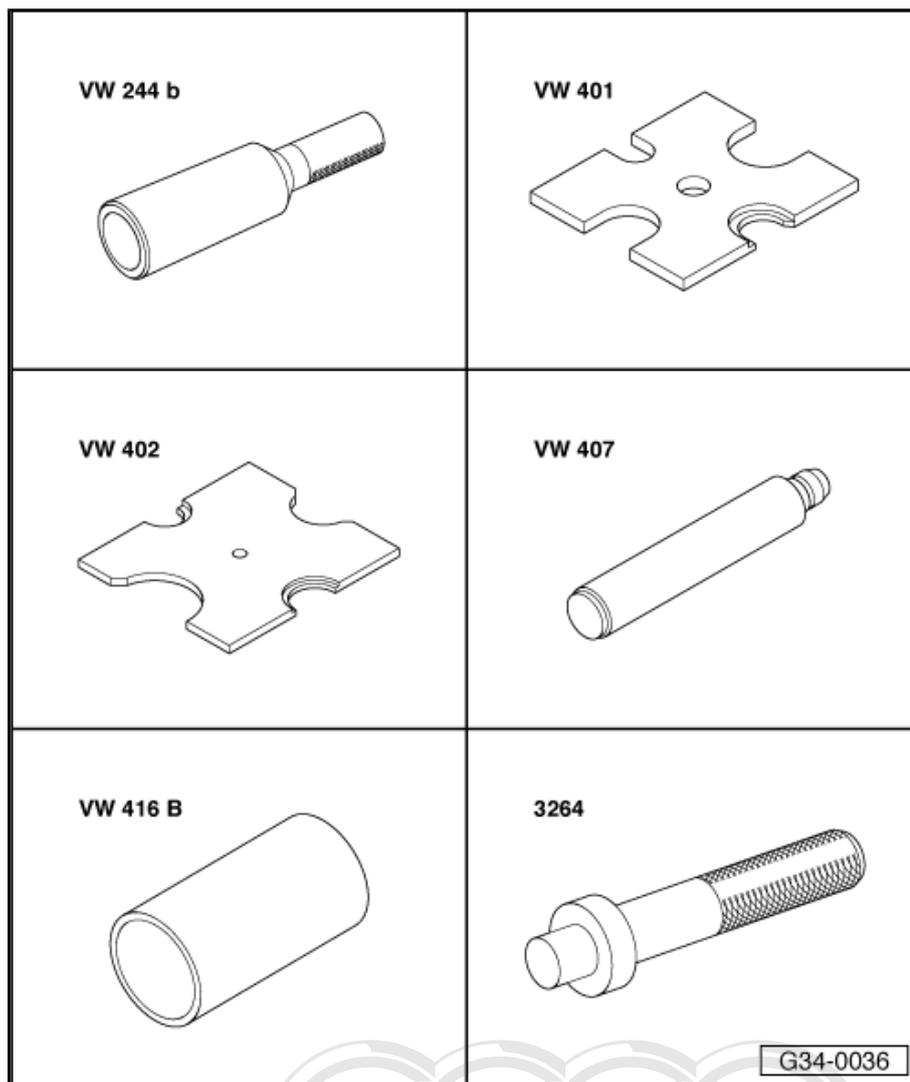
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- ◆ Driving Sleeve -VW 244 B-
- ◆ Thrust Plate -VW 401-
- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 407-
- ◆ Sleeve -VW 416 B-
- ◆ Driver -3264-

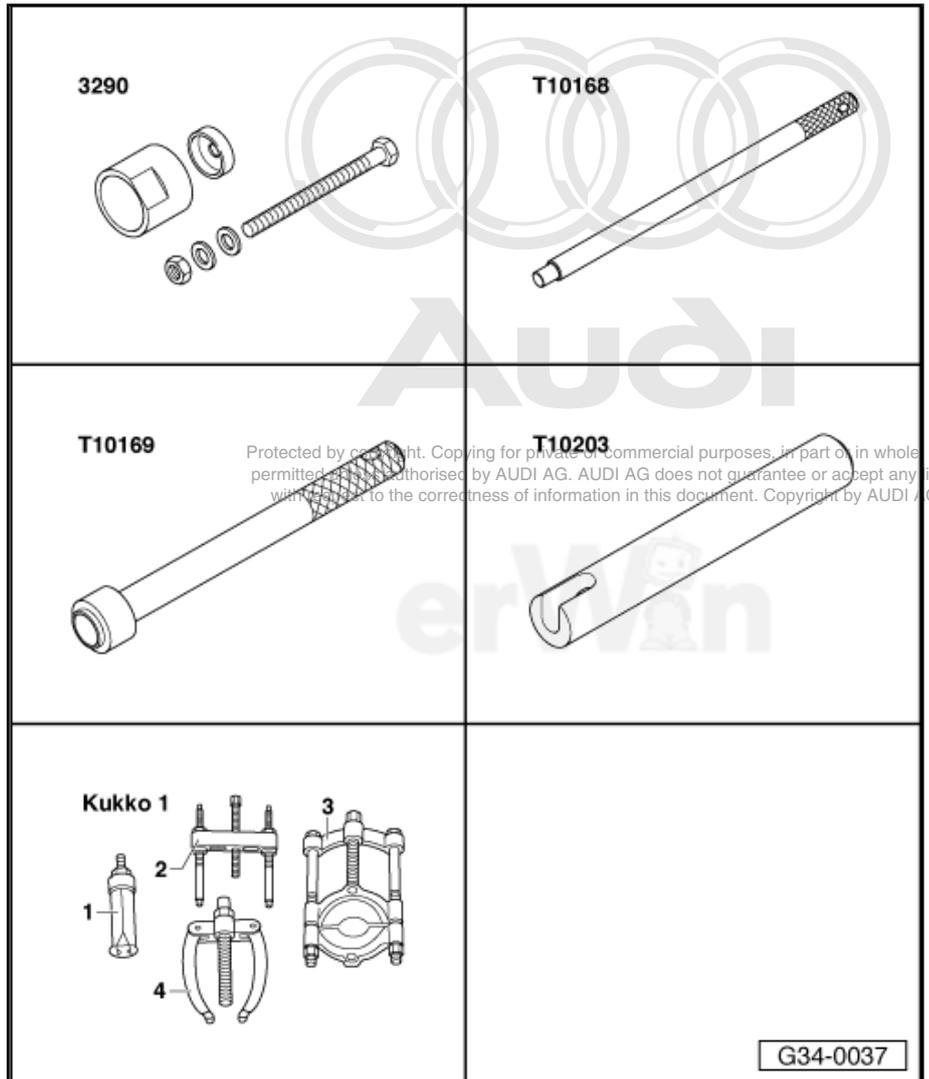


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- ◆ Subframe Support Assm. Device -3290-
- ◆ Drift -T10168-
- ◆ Drift -T10169-
- ◆ Thrust piece -T10203-
- ◆ -1- Kukko 21/2 Internal puller and Kukko 21/4
- ◆ -4- Kukko 22/2 counter-support

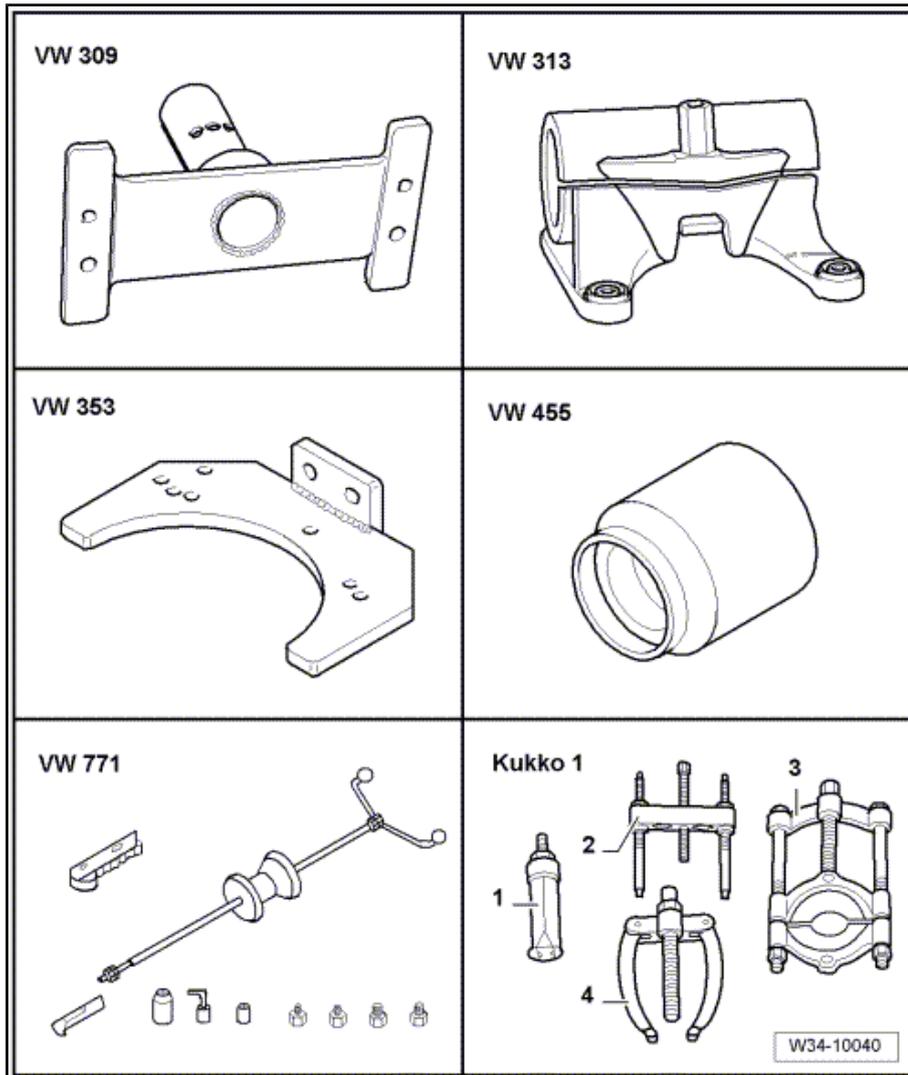


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**Special tools and workshop equipment required**

- ◆ Holding Plate -VW 309-
- ◆ Holding Fixture -VW 313-
- ◆ Transmission Support -VW 353-
- ◆ Thrust Tube -VW 455-
- ◆ Slide Hammer-Complete Set -VW 771-
- ◆ -1- Kukko 21/1 internal puller
- ◆ -3- Kukko 17/0 separating tool
- ◆ -4- Kukko 22/1 counter-support



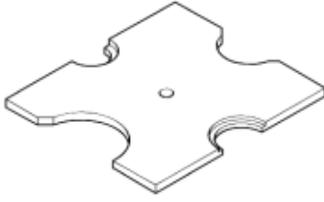
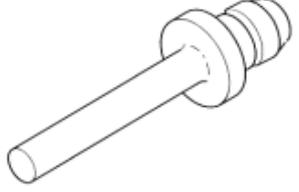
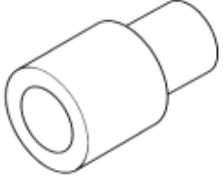
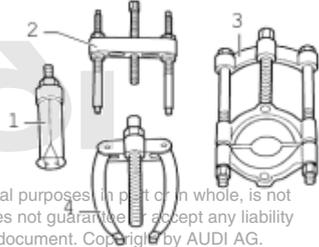
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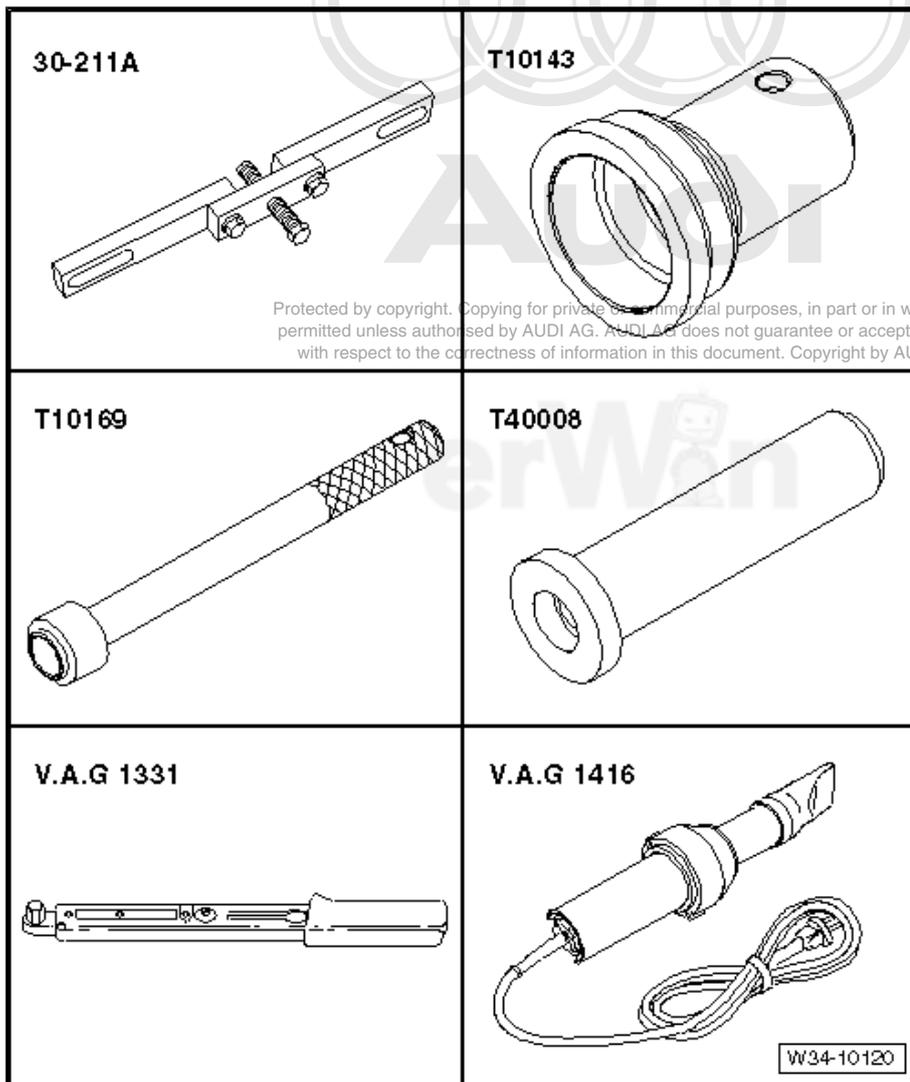
**Special tools and workshop equipment required**

- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 411-
- ◆ Sleeve -VW 423-
- ◆ Thrust Pad 16.5/28 mm Dia. -VW 431-
- ◆ -1- Kukko 21/3 internal puller
- ◆ -4- Kukko 22/1 counter-support

<p>VW 402</p> 	<p>VW 411</p> 
<p>VW 426</p> 	<p>VW 431</p> 
	<p style="text-align: right;"><b>W34-0089</b></p>

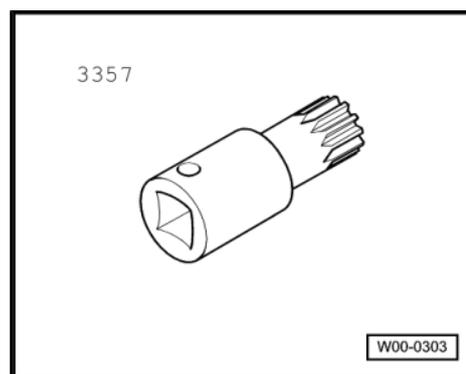
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- ◆ Bracket -30-211A-
- ◆ Thrust piece -T10042-
- ◆ Thrust piece -T10143-
- ◆ Thrust piece -T40008-
- ◆ Torque Wrench -V.A.G 1331-
- ◆ Heat gun -V.A.G 1416-
- ◆ Drift -T10169-
- ◆ or Drift -T10362-  
   ⇒ [page 155](#)

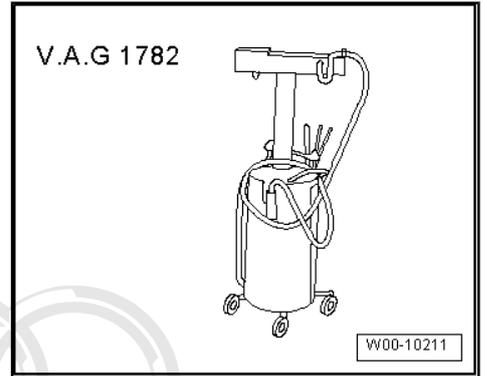


**Special tools and workshop equipment required**

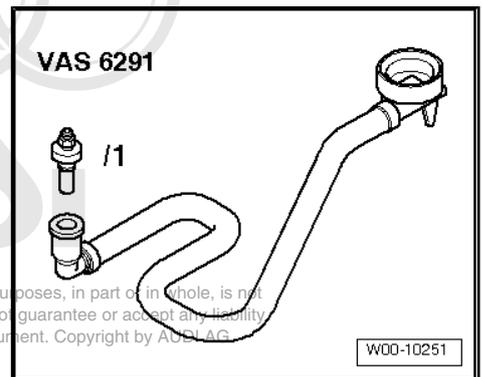
- ◆ Triple Square Socket Driver -3357-



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

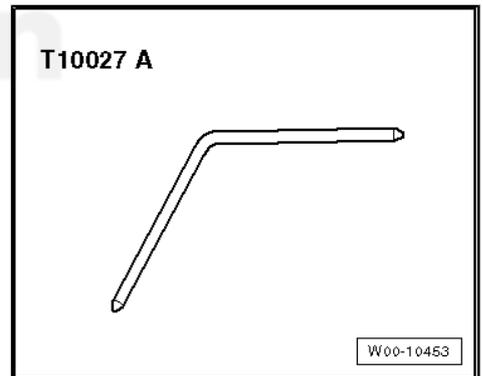


- ◆ Charging Device F/haldex 2 Coup. -VAS 6291-

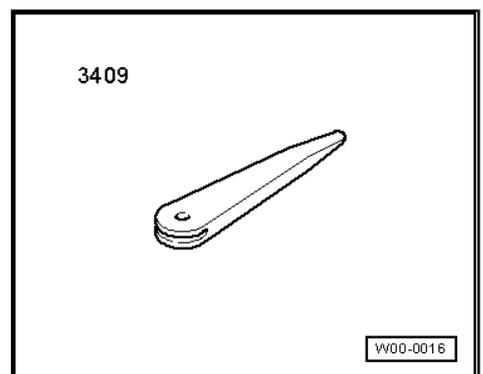


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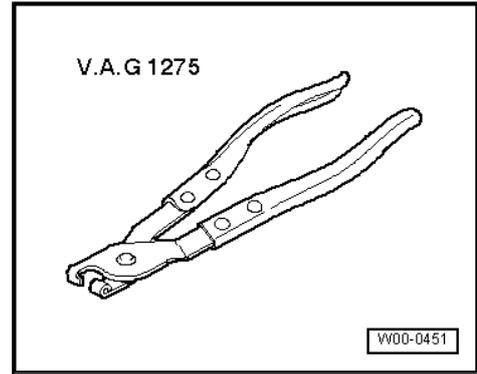
- ◆ Connecting Pin -T10027 A-



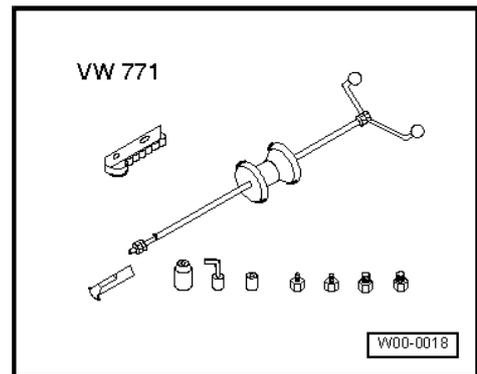
- ◆ Trim Removal Wedge -3409-



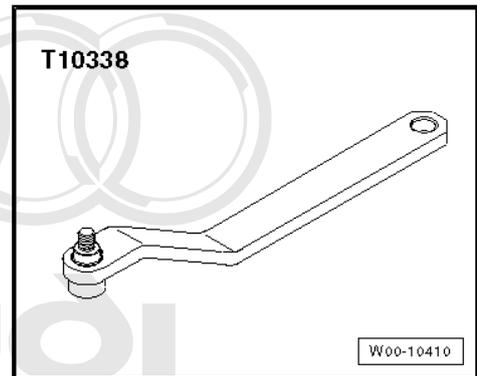
◆ Hose Clip Pliers -V.A.G 1275-



◆ Adapter -VW 771/40-

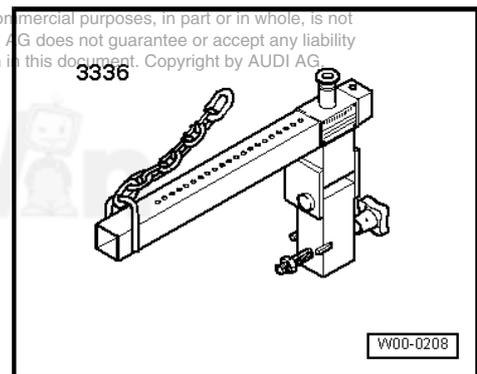


◆ Bracket -T10338-

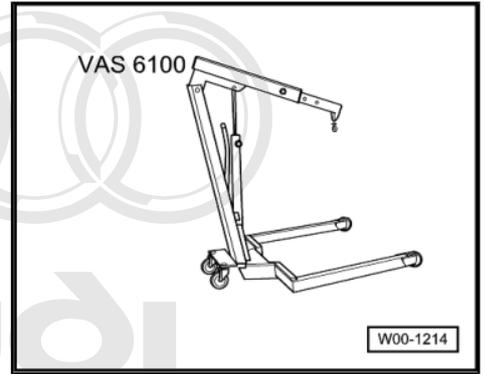


◆ Transmission Support Jig -3336-

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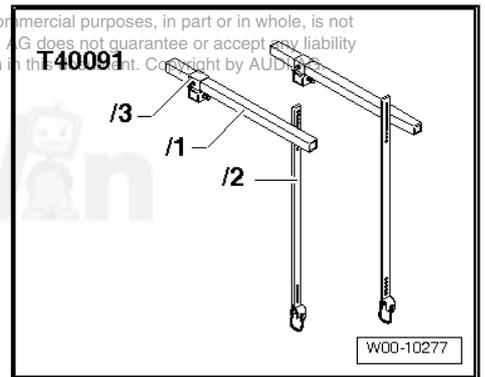


◆ Shop Crane -VAS 6100-

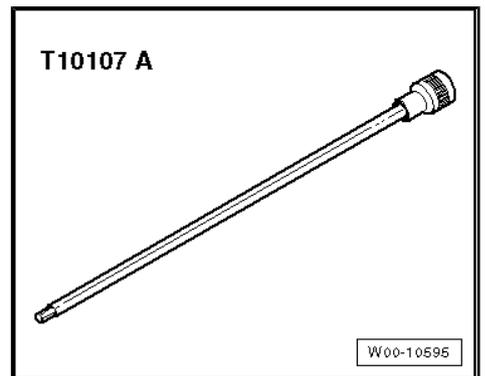


◆ Engine Support Basic Set -T40091-

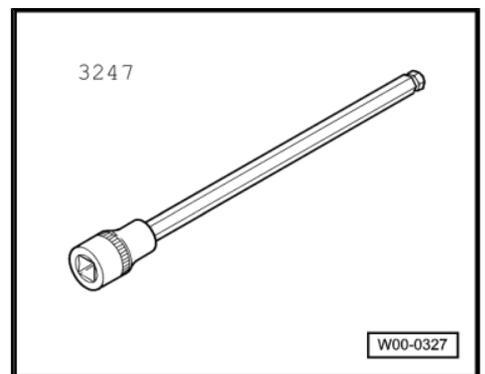
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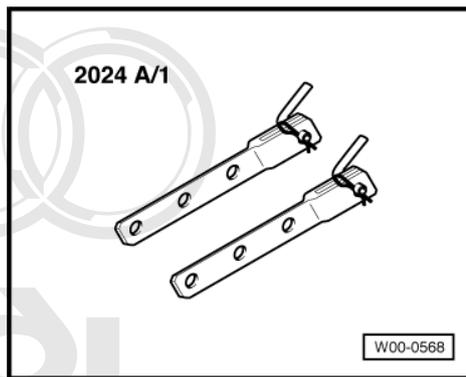
◆ Socket and Extended Bit -T10107 A- (SW 6 mm)



◆ Hex Ball Socket -3247-

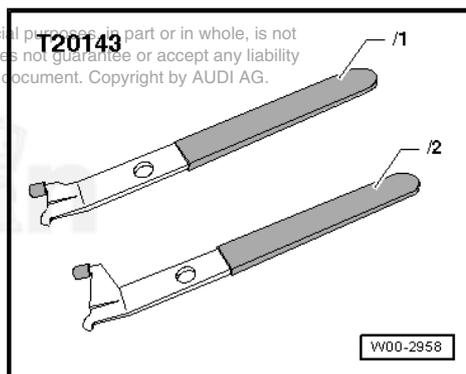


◆ Bracket -2024 A /1-

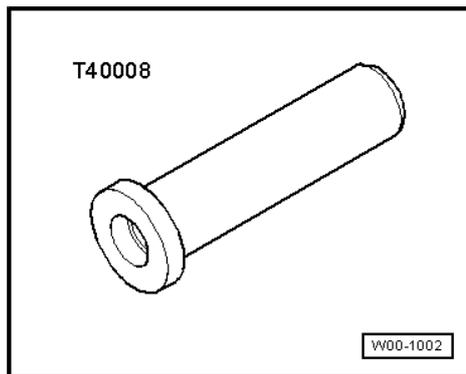


◆ Pulling Hook -T20143/1-

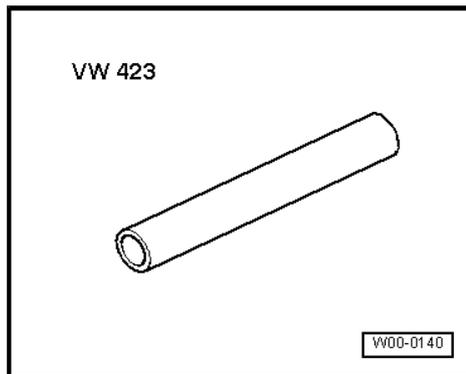
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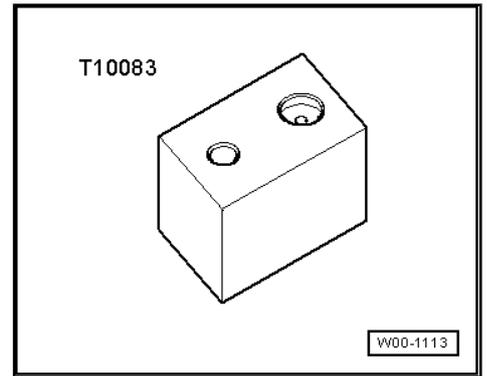
◆ Thrust Piece -T40008-



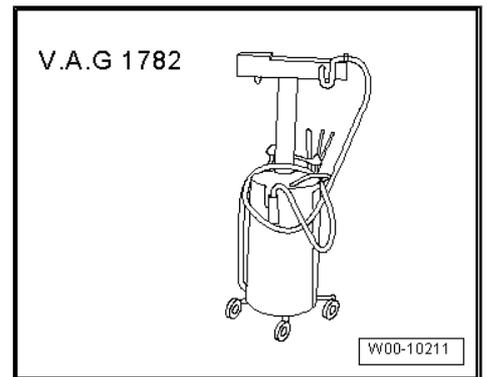
◆ Sleeve -VW 423-



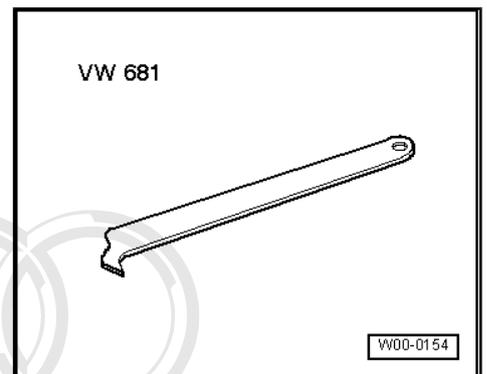
◆ Thrust Block -T10083-



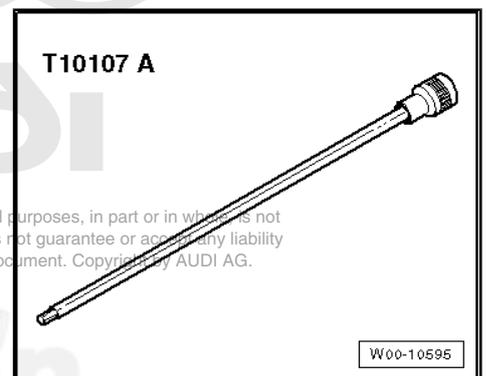
◆ Used Oil Collecting and Extracting Device -V.A.G 1782-



◆ Extractor Lever -VW 681-



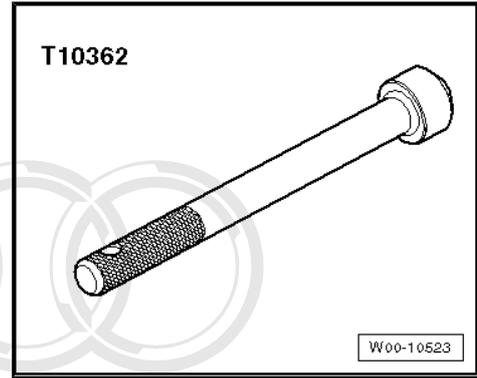
◆ Socket and Extended Bit -T10107 A-



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◆ Drift -T10362-



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erWin

# 35 – Gears, Shafts

## 1 General Information

⇒ [“1.1 Grooved Ball Bearing Changes”, page 177](#)

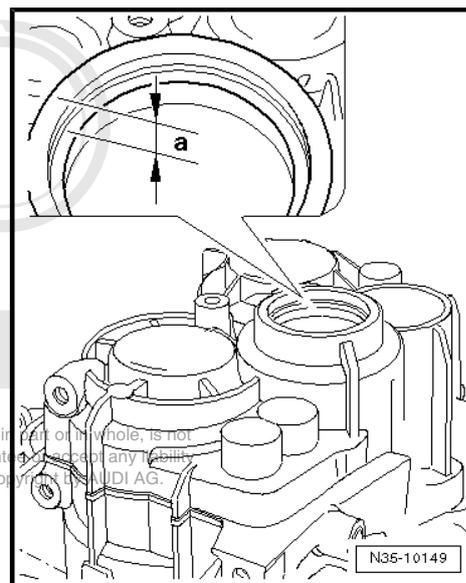
### 1.1 Grooved Ball Bearing Changes

From transmission build date 4.10.06 through approximately 1.21.08

A spacer washer above and below the grooved ball bearing seat -6- ⇒ [page 180](#) .

#### Above the Bearing Seat

Bearing Seat		Spacer Washer Above the Bearing Seat
Through transmission build date 09 04 6	Dimension “a” 10 mm	No
From transmission build date 4.10.06 through approximately 1.20.08	Dimension “a” 10.7 mm	Yes
Approximately from transmission build date 21 01 8	<b>Below the bearing seat</b> flattened area for the grooved ball bearing	<b>No</b>

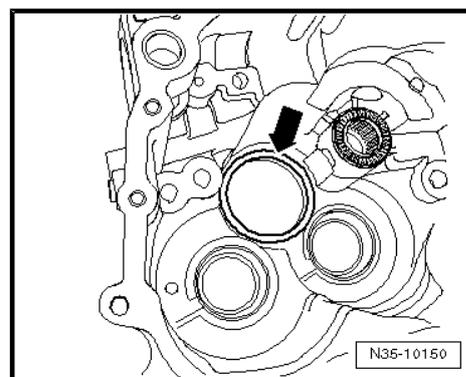


#### Below the Bearing Seat -arrow-:

Slightly deeper from transmission build date 4/10/06 through approximately 1/20/08.

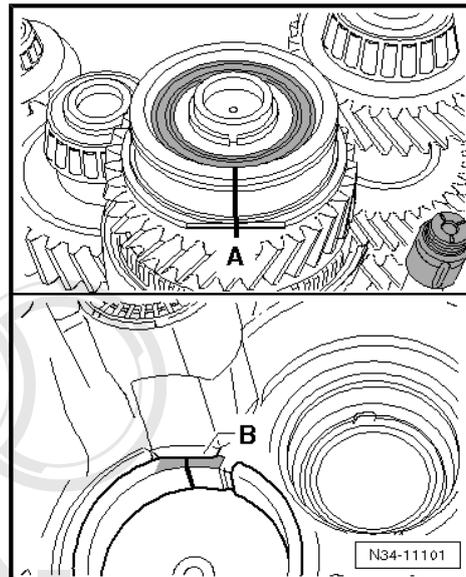
The grooved ball bearing seat -arrow- is slightly deeper in order to accommodate the spacer washer under the bearing -6- ⇒ [page 180](#) .

Below the Bearing Seat		Spacer Washer Under the Bearing Seat
Through transmission build date 4.9.06	Not deeper.	No
From transmission build date 4.10.06 through approximately 1.20.08	Slightly deeper.	Yes
Approximately from transmission build date 21 01 8	Flattened area -B- for the grooved ball bearing -A-	No



Flattened areas on the grooved ball bearing -A- and bearing seat -B- in the transmission housing approximately from transmission build date 2.21.08.

- If the flattened areas are present, do not insert any spacer washers above and below the grooved ball bearing.



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## 2 Description and Operation

⇒ [“2.1 Input Shaft Assembly Overview”, page 179](#)

⇒ [“2.2 Output Shaft for 1st to 4th Gears Assembly Overview”, page 181](#)

⇒ [“2.3 Output Shaft, 1st to 4th Gears, Adjusting”, page 183](#)

⇒ [“2.4 Output Shaft for 5th/6th Gear/Reverse Gear Assembly Overview”, page 187](#)

⇒ [“2.5 Output Shaft for 5th/6th Gear and Reverse Gear, Adjusting”, page 188](#)

### 2.1 Input Shaft Assembly Overview



#### Note

- ◆ *Attach transmission to assembly stand. Refer to ⇒ [“4.6 Transmission, Securing to Assembly Stand”, page 107](#).*
- ◆ *When installing new gears, consult technical data. Refer to ⇒ [“3.1 Code Letters, Assembly Allocation, Ratios and Capacities”, page 9](#).*
- ◆ *Lubricate all bearings with gear oil when inserting on input shaft.*

#### 1 - Securing Ring

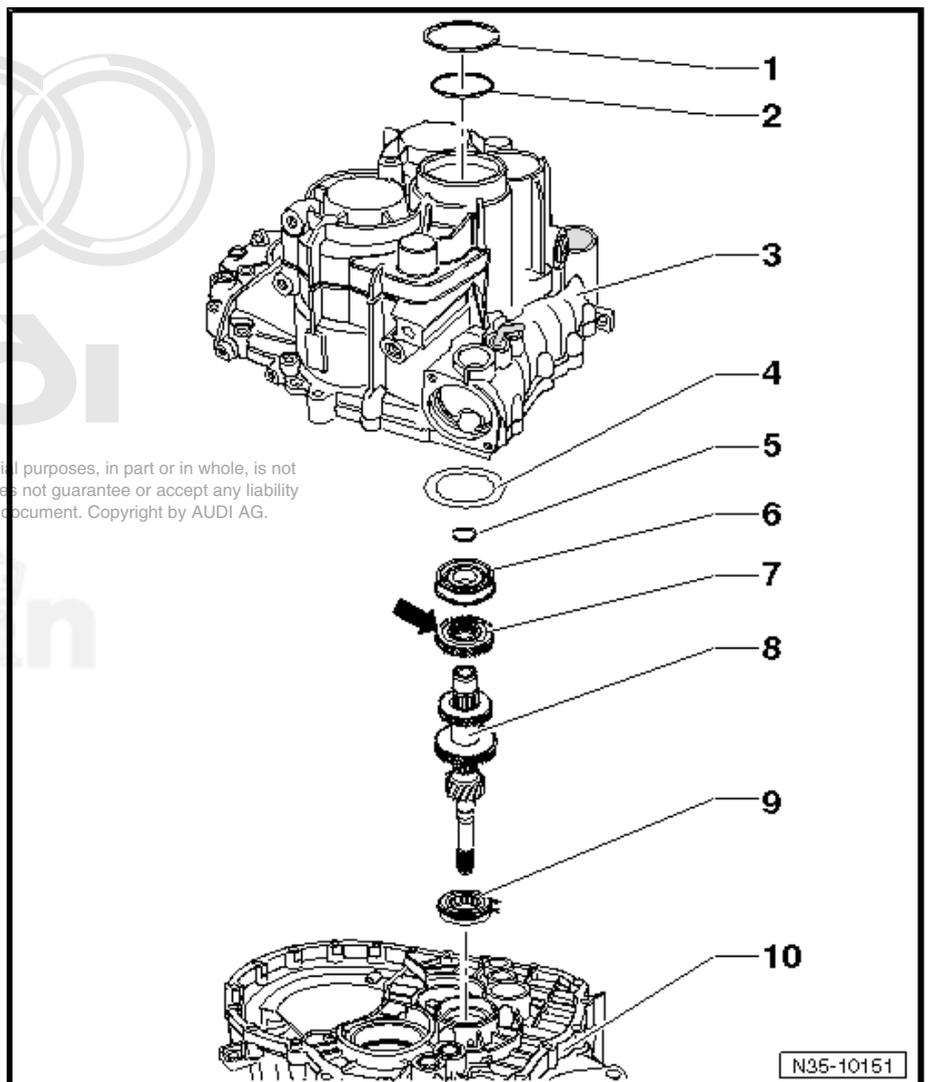
- ❑ For the grooved ball bearing/input shaft -6-
- ❑ Removing and installing, refer to ⇒ [“5.2 Transmission without Circlip A for Cap/Input Shaft”, page 131](#)

#### 2 - Spacer Washer

- ❑ Outer circumference = 78.6 mm
- ❑ Only insert with the changed transmission housing (from transmission production date 4.10.06 through approximately 1.20.08), refer to ⇒ [“1.1 Grooved Ball Bearing Changes”, page 177](#)
- ❑ Allocation, refer to the electronic parts catalog ETKA

#### 3 - Transmission Housing

- ❑ Adapted in the grooved ball bearing seat area -6- and spacer washers -2- and -4- from transmission build date 4/10/06 through approximately 1/20/08, refer to ⇒ [“1.1 Grooved Ball Bearing Changes”, page 177](#)



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[page 177](#) .

- Flattened areas on grooved ball bearing and bearing seat approximately from transmission build date 1.21.08, refer to ⇒ [“1.1 Grooved Ball Bearing Changes”, page 177](#)
- Allocation, refer to the electronic parts catalog ETKA

#### 4 - Spacer Washer

- Outer circumference = 85 mm
- Only insert with the changed transmission housing (from transmission production date 4.10.06 through approximately 1.20.08), refer to ⇒ [“1.1 Grooved Ball Bearing Changes”, page 177](#)
- Allocation, refer to the electronic parts catalog ETKA

#### 5 - Securing Ring

- When replacing grooved ball bearing -6- and input shaft -8-, determine again ⇒ [page 193](#)

#### 6 - Grooved Ball Bearing

- Always replace
- Pulling off ⇒ [page 192](#)
- Installation location ⇒ [page 193](#)
- Pressing on ⇒ [page 193](#)
- Flattened areas on grooved ball bearing and bearing seat approximately from transmission build date 1.21.08, refer to ⇒ [“1.1 Grooved Ball Bearing Changes”, page 177](#)

#### 7 - 5th Gear Toothed Wheel

- Pressing off ⇒ [page 192](#)
- Installed position: the surrounding groove -arrow- points toward the grooved ball bearing -6-
- Pressing on ⇒ [page 192](#)

#### 8 - Input Shaft

- With 3rd/4th and 6th gear wheels

#### 9 - Roller Bearing

- With circlip
- Pulling out ⇒ [page 194](#)
- Installing ⇒ [page 194](#)
- Installed position: the circlip in bearing points to input shaft

#### 10 - Clutch Housing

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## 2.2 Output Shaft for 1st to 4th Gears Assembly Overview

### Note

- ◆ *Attach transmission to assembly stand. Refer to ⇒ [“4.6 Transmission, Securing to Assembly Stand”, page 107](#).*
- ◆ *If output shaft or tapered roller bearings are replaced, an adjustment on output shaft must be performed. Refer to ⇒ [“2.3 Output Shaft, 1st to 4th Gears, Adjusting”, page 183](#).*
- ◆ *When installing new gears or a new output shaft, consult technical data. Refer to ⇒ [“3.1 Code Letters, Assembly Allocation, Ratios and Capacities”, page 9](#).*
- ◆ *Always replace both tapered roller bearings together as a set.*

#### 1 - Clutch Housing

#### 2 - Oil Deflector Ring

#### 3 - Dished Washer

- Pulling out ⇒ [page 195](#)
- Installing ⇒ [page 195](#)

#### 4 - Taper Roller Bearing Outer Race

- Pulling out ⇒ [page 196](#)
- Installing ⇒ [page 196](#)

#### 5 - Tapered Roller Bearing Inner Race

- Pressing off ⇒ [page 197](#)
- Pressing on ⇒ [page 197](#)

#### 6 - Output Shaft

- For 1st to 4th gear
- Adjusting, refer to ⇒ [“2.3 Output Shaft, 1st to 4th Gears, Adjusting”, page 183](#)

#### 7 - Needle Bearing

- For 2nd gear

#### 8 - 2nd Gear Selector Gear

#### 9 - Synchronizer ring

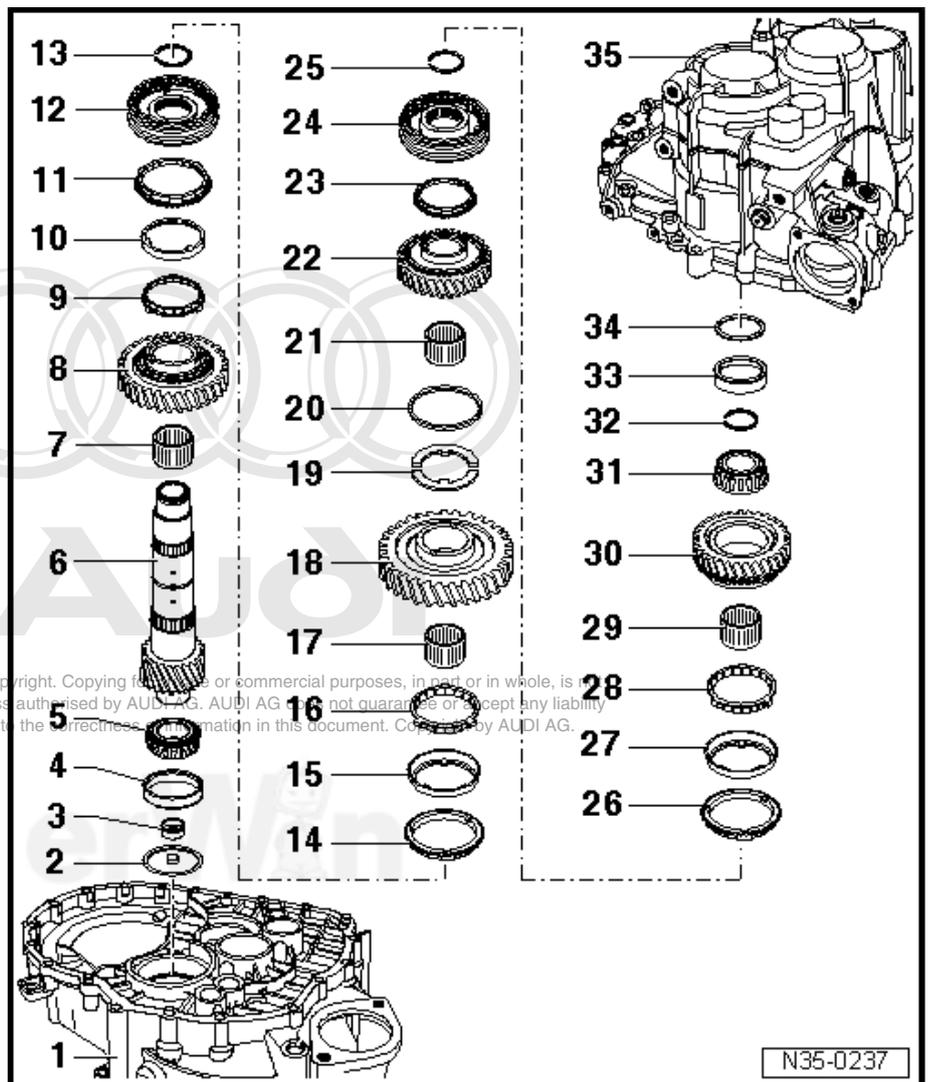
- (Inner race for 2nd gear)
- Checking for wear ⇒ [page 197](#)
- Check tabs for scoring
- Installation location ⇒ [page 198](#)

#### 10 - Outer Race for 2nd Gear

- Install on synchronizer ring -9-
- Replace if grooved or scored
- Installation location ⇒ [page 198](#)

#### 11 - 2nd Gear Synchronizer Ring

- Checking for wear ⇒ [page 198](#)
- Installation location ⇒ [page 198](#)



**12 - Locking Sleeve with Synchronizer Hub for 1st and 2nd Gears**

- After removing circlip -13-, press off gear wheel for 2nd gear ⇒ [page 197](#) .
- Disassembling ⇒ [page 198](#)
- Assembling locking collar/synchronizer hub ⇒ [page 198](#)
- Installation location ⇒ [page 199](#)
- Pressing on ⇒ [page 199](#)

**13 - Securing Ring****14 - Synchronizer Ring for 1st Gear**

- Checking for wear ⇒ [page 198](#)
- Insert so that holes engage in engagement pieces of locking collar -12-

**15 - Outer Race for 1st Gear**

- Insert into synchronizer ring -14-, installation position ⇒ [page 199](#)
- Replace if grooved or scored

**16 - Synchronizer Ring**

- (Inner race for 1st gear)
- Checking for wear ⇒ [page 197](#)
- Check tabs for scoring
- Installation location ⇒ [page 200](#)

**17 - Needle Bearing**

- For 1st gear

**18 - 1st Gear Selector Gear**

- Installation location ⇒ [page 200](#)

**19 - Thrust Washers**

- For 1st and 4th gear
- Quantity: 2
- Insert tab of thrust washer in output shaft hole

**20 - Securing Ring**

- Holds thrust washers -19- in position on output shaft

**21 - Needle Bearing**

- For 4th gear

**22 - 4th Gear Selector Gear****23 - 4th Gear Synchronizer Ring**

- Checking for wear ⇒ [page 201](#)

**24 - Locking Collar with Synchronizer Hub for 3rd and 4th Gear**

- After removing circlip -25-, pull off gear wheel for 4th gear ⇒ [page 196](#) .
- Disassembling ⇒ [page 198](#)
- Installation position of locking collar/synchronizer hub ⇒ [page 200](#)
- Assembling operating sleeve/synchronizer hub ⇒ [page 198](#) and ⇒ [page 199](#)
- Pressing on ⇒ [page 200](#)

**25 - Securing Ring****26 - Synchronizer Ring for 3rd Gear**

- Checking for wear ⇒ [page 198](#)

**27 - Outer Race for 3rd Gear**

- Insert into synchronizer ring -26-, installation position ⇒ [page 199](#)
- Replace if grooved or scored



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### 28 - Synchronizer Ring

- (Inner race for 3rd gear)
- Checking for wear ⇒ [page 197](#)
- Check tabs for scoring
- Installation location ⇒ [page 200](#)

### 29 - Needle Bearing

- For 3rd gear

### 30 - 3rd Gear Selector Gear

- Installation location ⇒ [page 200](#)

### 31 - Tapered Roller Bearing Inner Race

- Pulling off ⇒ [page 196](#)
- Pressing on ⇒ [page 201](#)

### 32 - Securing Ring

- When replacing tapered roller bearing -31- and output shaft -6-, determine again

### 33 - Taper Roller Bearing Outer Race

- Pulling out ⇒ [page 201](#)
- Installing ⇒ [page 202](#)

### 34 - Adjustment Shim

- Determining thickness, refer to ⇒ ["2.3 Output Shaft, 1st to 4th Gears, Adjusting", page 183](#)

### 35 - Transmission Housing

## 2.3 Output Shaft, 1st to 4th Gears, Adjusting

It is necessary to readjust the output shaft when the following components are replaced:

- ◆ Transmission housing
- ◆ Clutch housing
- ◆ Output Shaft, 1st to 4th Gears
- ◆ Tapered roller bearing for output shaft

Adjustment overview, refer to  
 ⇒ ["1.4 Adjustment Overview", page 224](#) .

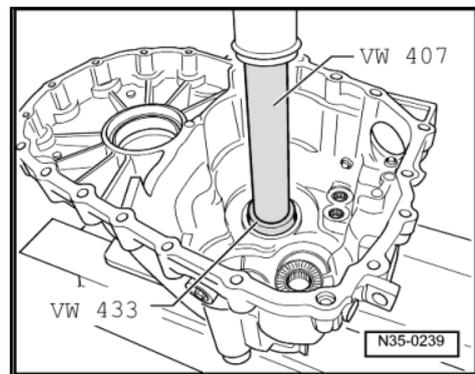
#### Special tools and workshop equipment required

- ◆ Dial Gauge Holder -VW 387-
- ◆ Punch -VW 407-
- ◆ Thrust Pad Con. 8/65 -VW 433-
- ◆ Installation Arbor -VW 792-
- ◆ Holding Fixture -VW 801-
- ◆ Thrust Plate -2050-
- ◆ Dial gauge -VAS 6080-
- ◆ Kukko 21/7 internal puller
- ◆ Kukko 22/2 counter-support

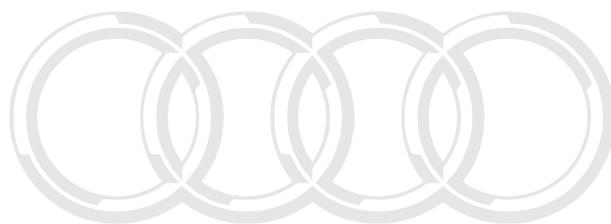
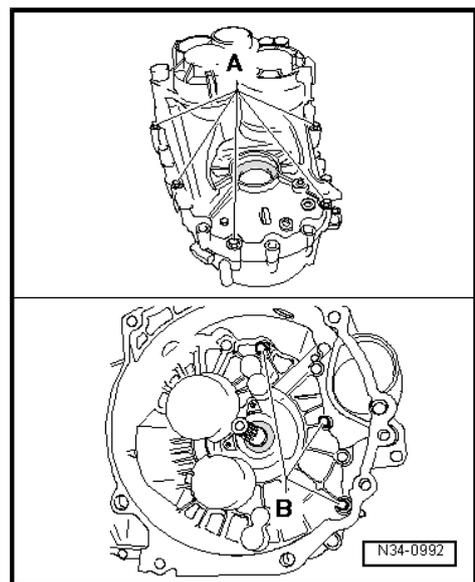
#### Adjusting

- Attach transmission to assembly stand. Refer to  
 ⇒ ["4.6 Transmission, Securing to Assembly Stand", page 107](#) .

- Sealing surfaces of clutch- and transmission housing must be cleaned of sealant.
- For the measurement, only install shaft to be measured.
- Press the tapered roller bearing outer ring with a 1.70 mm adjustment shim into the transmission housing. Support transmission housing directly beneath bearing mount using -2050-.
- Set complete output shaft for 1st to 4th gears into clutch housing.



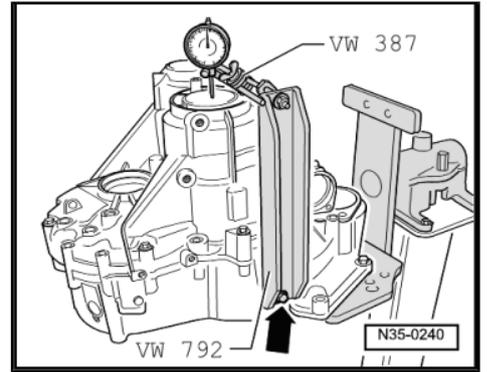
- Install transmission housing and tighten bolts -A- as well as -B- to tightening specification in diagonal sequence.



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- Install measuring tools and secure to clutch housing with bolt -arrow-.
- Set -VAS 6080- (3 mm measuring range) to 0 with 1 mm pre-load.
- Loosen securing bolts for clutch housing/transmission housing in diagonal sequence until bolts clear transmission housing and output shaft.
- Read measured value on dial indicator and note (example: 0.14 mm).



**i Note**

*If no measured value is displayed on the dial gauge when loosening the securing bolts for the clutch housing/transmission housing, install adjustment shim 1.95 mm (part number -084 409 383 AS- ) or if necessary 2.20 mm (part number -084 409 383 BD- ) for the measurement.*

**Determining Shim Thickness**

The specified bearing pre-load is reached when determined measured value (0.14 mm) is subtracted from inserted adjustment shim (1.70 mm) and a constant pre-load value (0.20 mm) is added.

**Example:**

Installed adjustment shim	1.70 mm
- Measured value	0.14 mm
+ Pre-load (constant value)	0.20 mm
<b>Thickness of shim</b>	<b>1.76 mm</b>

- Determine the adjustment shim thickness according to the table; part number, refer to the electronic parts catalog ETKA.

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Thickness of Shims in mm			
1.45	1.70	1.95	2.20
1.50	1.75	2.00	2.25
1.55	1.80	2.05	
1.60	1.85	2.10	
1.65	1.90	2.15	

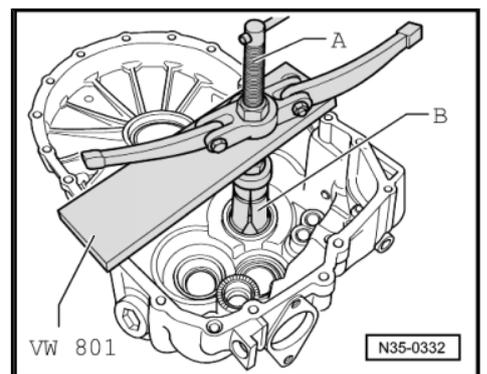
Different shim thicknesses make it possible to select the required thickness precisely.

- Remove the transmission housing and pull the tapered roller bearing outer ring out of the transmission housing.

A - Support , for example -Kukko 22/2-

B - Internal puller 46 to 58 mm , for example -Kukko 21/7-

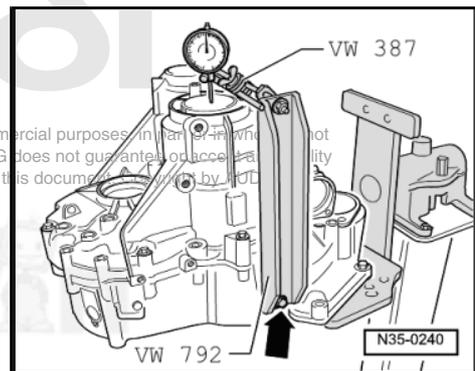
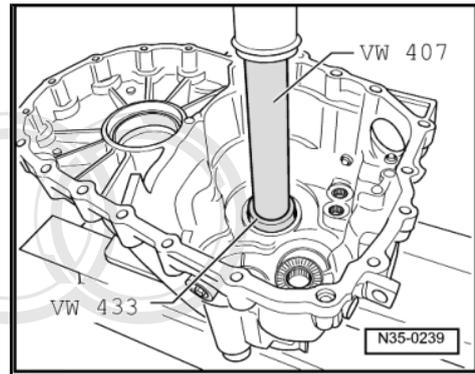
- Remove inserted adjustment shim (1.70 mm thick) from transmission housing.



- Press in the tapered roller bearing outer ring with the determined adjustment shim (1.75 mm as an example). Support transmission housing directly beneath bearing mount using -2050- .

### Checking Measurement

- Determined adjustment shim installed.
- Install measuring tools and secure to clutch housing with bolt -arrow-.
- Set -VAS 6080- (3 mm measuring range) to 0 with 1 mm pre-load.
- Loosen securing bolts for clutch housing/transmission housing in diagonal sequence until bolts clear transmission housing and output shaft.
- For a correctly selected adjustment shim, the dial gauge must now display a value of 0.15 mm to 0.25 mm.



## 2.4 Output Shaft for 5th/6th Gear/Reverse Gear Assembly Overview

### Note

- ◆ *Attach transmission to assembly stand. Refer to ["4.6 Transmission, Securing to Assembly Stand"](#), page 107.*
- ◆ *If output shaft or tapered roller bearings are replaced, an adjustment on output shaft must be performed. Refer to ["2.5 Output Shaft for 5th/6th Gear and Reverse Gear, Adjusting"](#), page 188.*
- ◆ *When installing new gears or a new output shaft, consult technical data. Refer to ["3.1 Code Letters, Assembly Allocation, Ratios and Capacities"](#), page 9.*
- ◆ *Always replace both tapered roller bearings together as a set.*

### 1 - Clutch Housing

### 2 - Adjustment Shim

- 0.65 mm thick

### 3 - Taper Roller Bearing Outer Race

- Pulling out [⇒ page 203](#)
- Installing [⇒ page 203](#)

### 4 - Tapered Roller Bearing Inner Race

- Pulling off [⇒ page 204](#)
- Pressing on [⇒ page 207](#)

### 5 - Output Shaft 5th/6th Gear/Reverse Gear

- Adjusting, refer to ["2.5 Output Shaft for 5th/6th Gear and Reverse Gear, Adjusting"](#), page 188

### 6 - Synchronizer Hub for Reverse Gear

- Pressing off [⇒ page 204](#)
- Installation location [⇒ page 204](#)
- Pressing on [⇒ page 205](#)

### 7 - Securing Ring

### 8 - Locking Collar for Reverse Gear

- With synchronizer ring

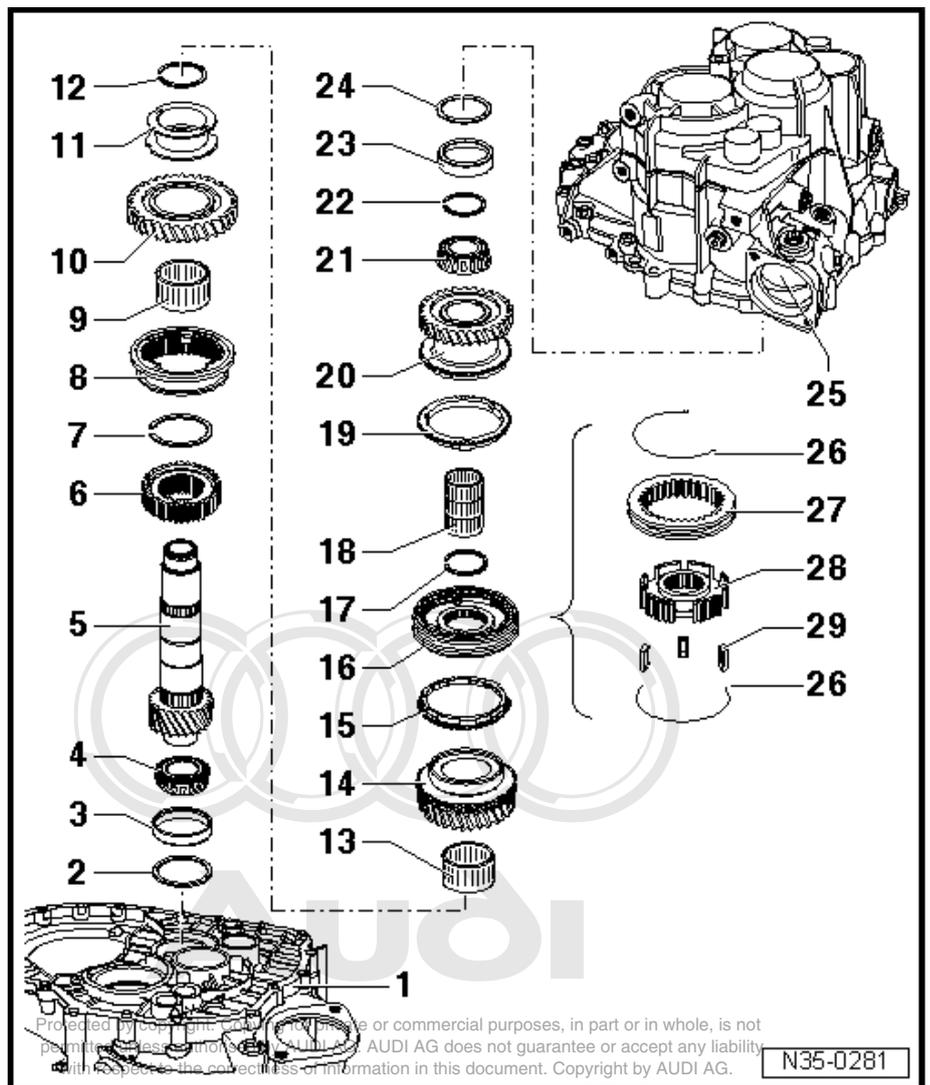
### 9 - Needle Bearing

- For reverse gear wheel

### 10 - Reverse Gear Selector Gear

### 11 - Sleeve

- Pressing off over reverse gear selector gear [⇒ page 204](#)
- Installed position: the wider collar on sleeve points toward reverse gear selector gear
- Pressing on [⇒ page 205](#)



**12 - Securing Ring****13 - Needle Bearing**

- For 6th gear

**14 - 6th Gear Selector Gear****15 - Synchronizer Ring for 6th Gear**

- Checking for wear ⇒ [page 205](#)

**16 - Locking Sleeve with Synchronizer Hub for 5th and 6th Gears**

- After removing circlip -17-, press off gear wheel for 6th gear ⇒ [page 203](#) .
- Disassembling ⇒ [page 205](#)
- Assembling operating sleeve/synchronizer hub ⇒ [page 205](#) and ⇒ [page 206](#)
- Pressing on ⇒ [page 206](#)

**17 - Securing Ring****18 - Needle Bearing**

- For 5th gear

**19 - Synchronizer Ring for 5th Gear**

- Checking for wear ⇒ [page 205](#)

**20 - 5th Gear Selector Gear****21 - Tapered Roller Bearing Inner Race**

- Pulling off ⇒ [page 203](#)
  - Pressing on ⇒ [page 206](#)
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**22 - Securing Ring**

- When replacing tapered roller bearing -21- and output shaft -5-, determine again ⇒ [page 206](#)

**23 - Taper Roller Bearing Outer Race**

- Pulling out ⇒ [page 207](#)
- Installing ⇒ [page 207](#)

**24 - Adjustment Shim**

- Determining thickness, refer to  
⇒ ["2.5 Output Shaft for 5th/6th Gear and Reverse Gear, Adjusting", page 188](#)

**25 - Transmission Housing****26 - Spring**

- Installation location ⇒ [page 206](#)

**27 - Locking Collar****28 - Synchronizer Hub****29 - Locking Pieces (quantity: 3)**

- Installation location ⇒ [page 205](#)

## 2.5 Output Shaft for 5th/6th Gear and Reverse Gear, Adjusting

A new output shaft adjustment is required when the following components have been replaced:

- ◆ Transmission housing
- ◆ Clutch housing
- ◆ Output shaft 5th/6th gear/reverse gear
- ◆ Tapered roller bearing for output shaft

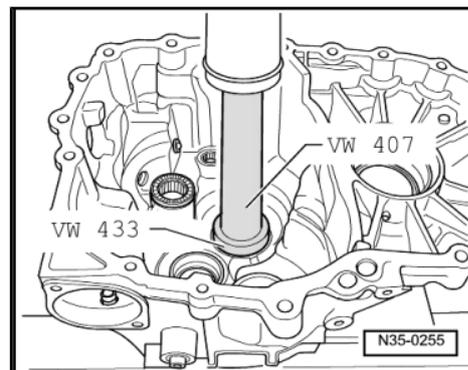
Adjustment overview, refer to  
 ⇒ [“1.4 Adjustment Overview”, page 224](#)

### Special tools and workshop equipment required

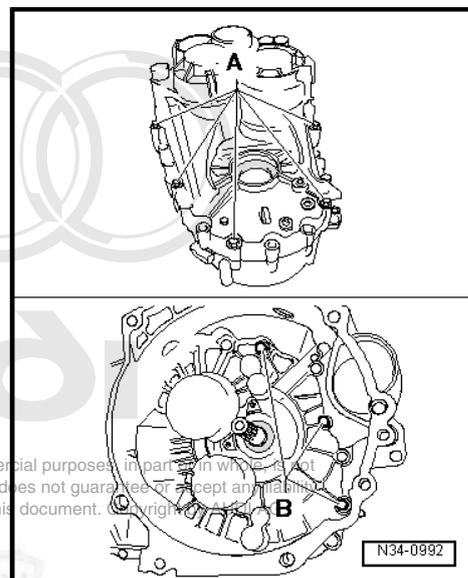
- ◆ Dial Gauge Holder -VW 387-
- ◆ Punch -VW 407-
- ◆ Thrust Pad Con. 8/65 -VW 433-
- ◆ Installation Arbor -VW 792-
- ◆ Holding Fixture -VW 801-
- ◆ Thrust Plate -2050-
- ◆ Dial Gauge -VAS 6080-
- ◆ Kukko 21/7 internal puller
- ◆ Kukko 22/2 counter-support

### Adjusting

- Transmission removed, refer to  
 ⇒ [“4.4 Transmission, Removing”, page 96](#) and secured to the  
 assembly stand  
 ⇒ [“4.6 Transmission, Securing to Assembly Stand”,  
 page 107](#) .
- Sealing surfaces of clutch- and transmission housing must be  
 cleaned of sealant.
- For the measurement, only install shaft to be measured.
- Press the tapered roller bearing outer ring with a 1.70 mm ad-  
 justment shim into the transmission housing. Support trans-  
 mission housing directly beneath bearing mount using -2050- .
- Set the complete output shaft for 5th/6th gear and reverse gear  
 into the clutch housing.

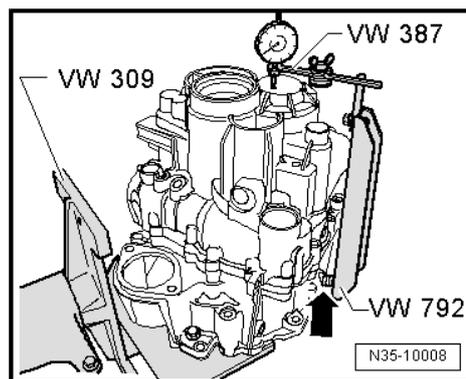


- Install transmission housing and tighten bolts -A- as well as  
 -B- to tightening specification in diagonal sequence.



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- Install measuring tools. Insert washers with a total thickness of 8 mm at securing bolt -arrow- for -VW 792- at clutch housing.
- Set -VAS 6080- (3 mm measuring range) to zero with 1 mm preload.
- Loosen securing bolts for clutch housing/transmission housing in diagonal sequence until bolts clear transmission housing and output shaft.
- Read measured value on dial indicator and note (example: 0.25 mm).



 **Note**

*If no measured value is displayed on the dial gauge when loosening the securing bolts for the clutch housing/transmission housing, install adjustment shim 1.95 mm (part number -084 409 383 AS-) or if necessary 2.20 mm (part number -084 409 383 BD-) for the measurement.*

**Determining Shim Thickness**

The specified bearing pre-load is reached when determined measured value (0.25 mm) is subtracted from inserted adjustment shim (1.70 mm) and a constant pre-load value (0.20 mm) is added.

**Example:**

Installed adjustment shim	1.70 mm
- Measured value	0.25 mm
+ Pre-load (constant value)	0.20 mm
Thickness of shim	1.65 mm

- Determine the adjustment shim thickness according to the table; part number, refer to the electronic parts catalog ETKA.

The following shims are available:

Thickness of Shims in mm			
1.50	1.70	1.90	2.10
1.55	1.75	1.95	2.15
1.60	1.80	2.00	2.20
1.65	1.85	2.05	2.25

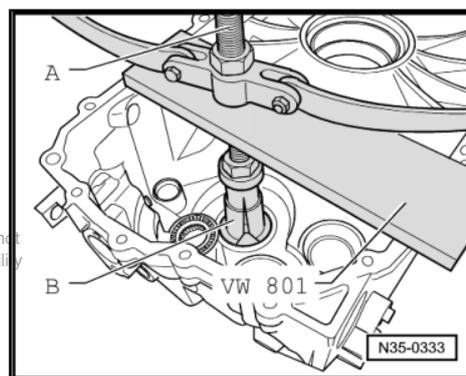
Different shim thicknesses make it possible to select the required thickness precisely.

- Remove the transmission housing and pull the tapered roller bearing outer ring out of the transmission housing.

A - Support, for example -Kukko 22/2-

B - Internal puller 46...58 mm, for example -Kukko 21/7-

- Remove inserted adjustment shim (1.70 mm thick) from transmission housing.

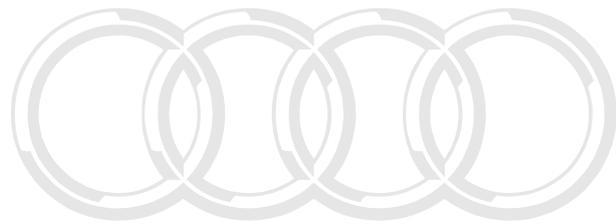
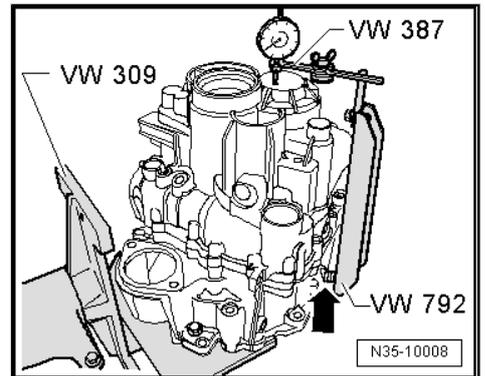
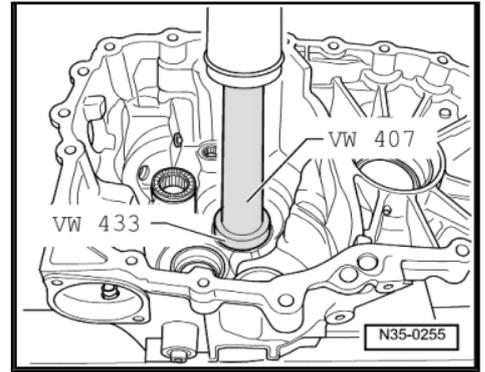


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- Press in the tapered roller bearing outer ring with the determined adjustment shim (1.65 mm as an example). Support transmission housing directly beneath bearing mount using -2050- .

### Checking Measurement

- Determined adjustment shim installed.
- 
- Install measuring tools. Insert washers with a total thickness of 8 mm at securing bolt -arrow- for -VW 792- at clutch housing.
  - Set dial gauge -VAS 6080- (3 mm measuring range) to zero with 1 mm preload.
  - Loosen securing bolts for clutch housing/transmission housing in diagonal sequence until bolts clear transmission housing and output shaft.
  - For a correctly selected adjustment shim, the dial gauge must now display a value of 0.15 mm to 0.25 mm.



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### 3 Disassembly and Assembly

⇒ [“3.1 Input Shaft”, page 192](#)

⇒ [“3.2 Output Shaft, 1st to 4th Gears”, page 194](#)

⇒ [“3.3 Output Shaft for 5th/6th Gear and Reverse Gear”, page 202](#)

#### 3.1 Input Shaft

##### Special tools and workshop equipment required

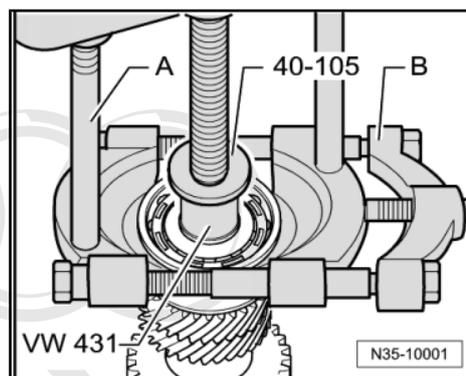
- ◆ Thrust Plate -VW 401-
- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 407-
- ◆ Thrust Disc -VW 412-
- ◆ Thrust Pad 16.5/28 mm Dia. -VW 431-
- ◆ Arbor 50 mm Dia. -VW 432-
- ◆ Thrust Tube -VW 454-
- ◆ Locking Pin -30 - 505-
- ◆ Thrust piece -40 - 105-
- ◆ Press Tube -2040-
- ◆ Kukko 21/5 internal puller
- ◆ Puller 18/1
- ◆ Separating tool 17/1 and 17/2
- ◆ Kukko 22/2 counter-support

##### Removing the Grooved Ball Bearing

- Remove circlip from input shaft.
- Before attaching extractor, place -VW 431- and -40 - 105- on input shaft.
- Attach separating device -B- into surrounding groove for circlip in bearing.

A - Extractor , for example -Kukko 18/1-

B - Separating device 12 to 75 mm , for example -Kukko 17/1-

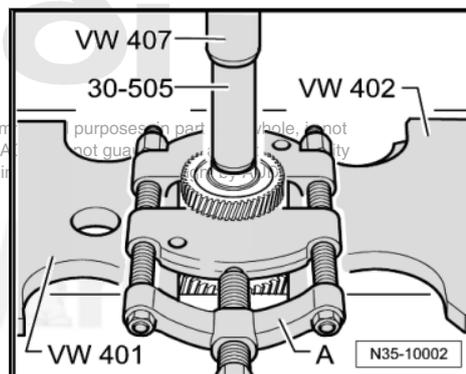


##### Removing the 5th Gear Wheel

A - Separating device 22 to 115 mm , for example -Kukko 17/2-

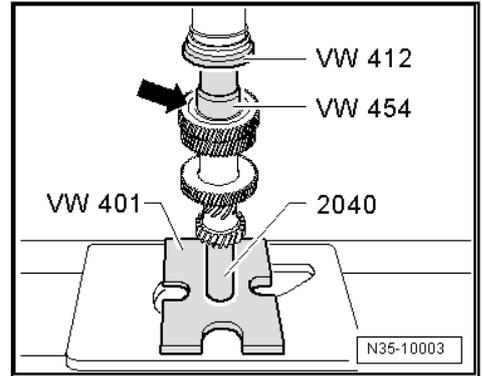
##### Installing 5th Gear Wheel

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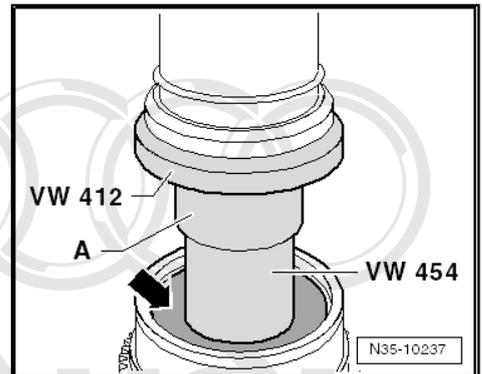
- Groove -arrow- on gear wheel must point upward.

**Press on the Grooved Ball Bearing with the Rubber Ring**



- In the case of a grooved ball bearing with a rubber ring -arrow-, the -VW 454- must be installed so that shoulder -A- points toward the -VW 412- .

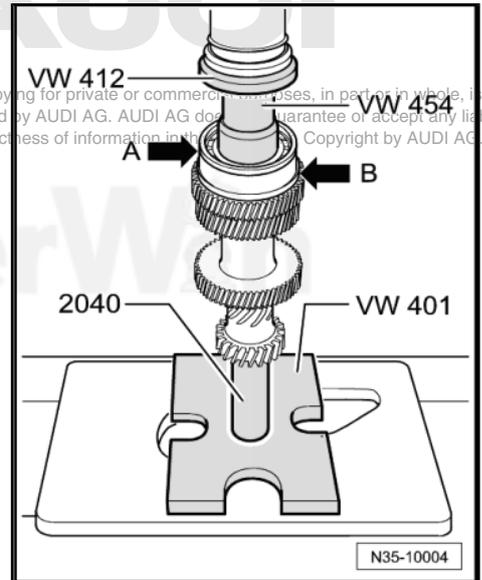
**Grooved Ball Bearing Installed Position**



- Grooved ball bearing installation position: the groove for the circlip points upward -arrow A- and shoulder -arrow B- must point toward the 5th gear toothed wheel.

– Then, determine the circlip => [page 193](#) and install.

**Determining Circlip**

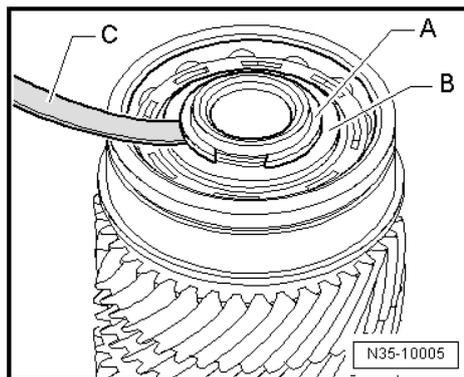


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- Insert a 1.86 mm thick circlip -A- into groove of input shaft and press upward.
- Measure dimension between grooved ball bearing -B- and installed circlip -A- using a feeler gauge -C-.
- Remove circlip inserted for the measurement.
- Determine the circlip according to the table, refer to the electronic parts catalog ETKA.

The following locking rings are available:

Measured Value (mm)	Locking Ring Thickness (mm)	Axial Play (mm)
0.01 to 0.05	1.86	0.01 to 0.05
0.05 to 0.07	1.89	0.01 v 0.05
0.07 to 0.10	1.92	0.01 to 0.05
0.10 to 0.13	1.95	0.01 to 0.05
0.13 to 0.16	1.98	0.01 to 0.05



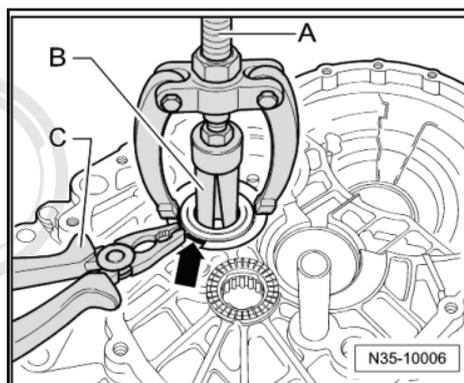
### Pulling Cylindrical Roller Bearing off Clutch Housing

- When pulling circlip -arrow- off from roller bearing, compress it using pliers -C-.

A - Support, for example -Kukko 22/2-

B - Internal puller 30 to 37 mm, for example -Kukko 21/5-

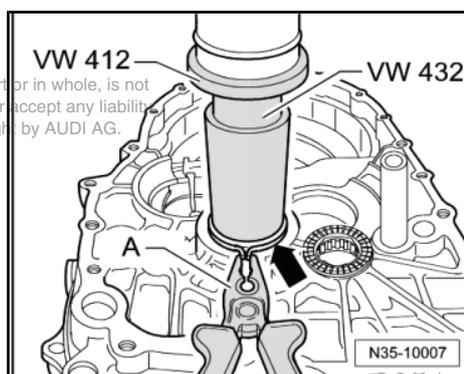
### Pressing Cylindrical Roller Bearing into Clutch Housing



- When pressing circlip -arrow- in for roller bearing, compress it using pliers -A-.

- Remove the pliers before the roller bearing is installed position.

- Circlip must engage into groove of clutch housing.



## 3.2 Output Shaft, 1st to 4th Gears

### Special tools and workshop equipment required

- ◆ Thrust Plate -VW 401-
- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 407-
- ◆ Punch -VW 408A-
- ◆ THRUST Disc -VW 412-
- ◆ Tube 60 mm Dia. -VW 415A-
- ◆ Holding Plate -VW 309-

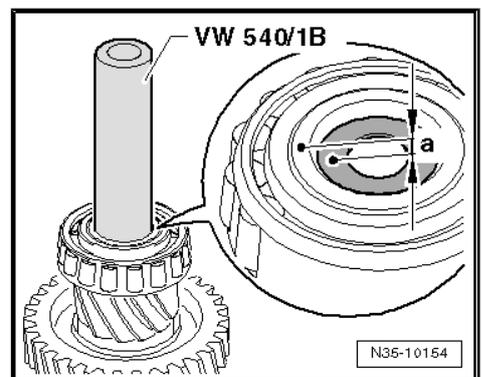
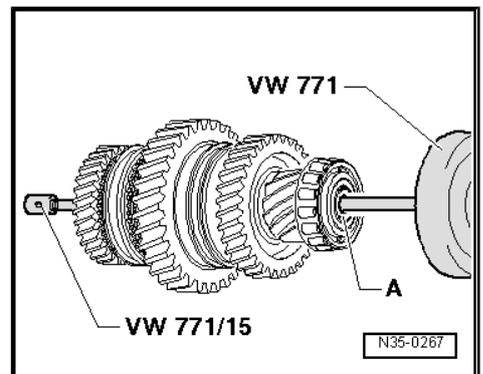
- ◆ Holding Fixture -VW 313-
- ◆ Transmission Support -VW 353-
- ◆ Thrust Pad 16.5/28 mm Dia. -VW 431-
- ◆ Thrust Pad Con. 8/65 -VW 433-
- ◆ Thrust Tube -VW 454-
- ◆ Thrust Pad -VW 512-
- ◆ Tube 42 mm Dia. -VW 516-
- ◆ Sleeve -VW 519-
- ◆ Slide Hammer-Complete Set -VW 771-
- ◆ Holding Fixture -VW 801-
- ◆ Thrust Piece -40 - 105-
- ◆ Spacers -VW 540/1 B-
- ◆ Sleeve -40 - 20-
- ◆ Sleeve -40 - 21-
- ◆ Thrust Plate -2050-
- ◆ Tapered Roller Bearing Puller -V.A.G 1582-
- ◆ Grip -V.A.G 1582/7-
- ◆ Kukko extractor 21/7 and 21/8
- ◆ Puller 18/2
- ◆ Separating tool 17/2
- ◆ Kukko 22/2 counter-support

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**Pull Dished Washer -A- Out of Output Shaft**

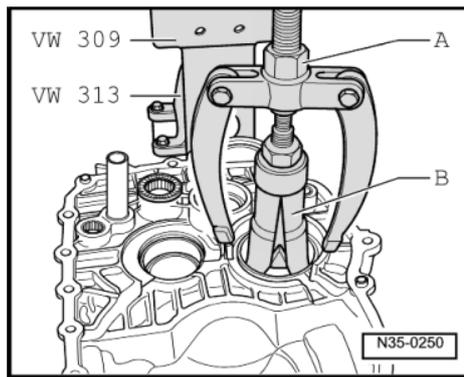
**Pressing Dished Washer in Output Shaft to Stop**

- Dimension -a- = 2 mm



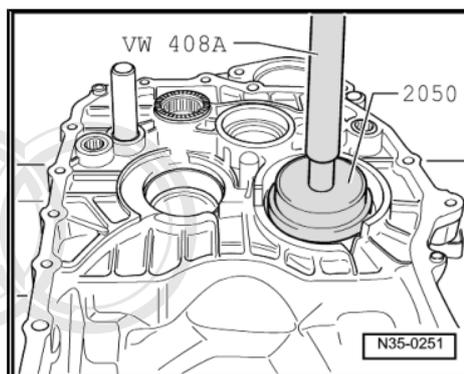
### Pulling Out Tapered Roller Bearing Outer Race

- A - Support , for example -Kukko 22/2-
- B - Internal puller 56 to 70 mm , for example -Kukko 21/8-



### Press the Outer Ring for the Tapered Roller Bearing into the Clutch Housing

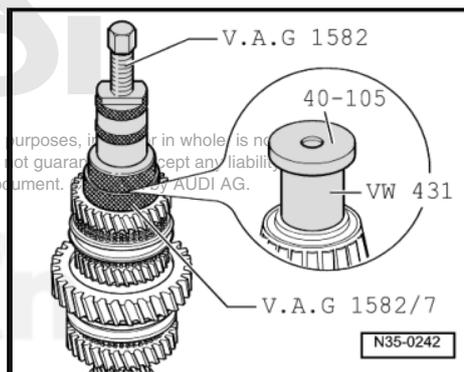
- Support clutch housing directly beneath bearing mount using -40 - 20- .



### Pulling off Inner Race for Tapered Roller Bearing

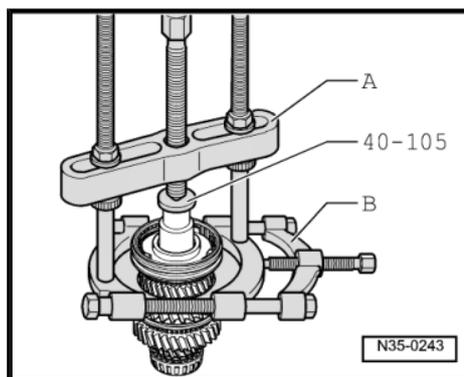
- Remove circlip.
- Before attaching extractor, place -VW 431- and -40 - 105- on input shaft.

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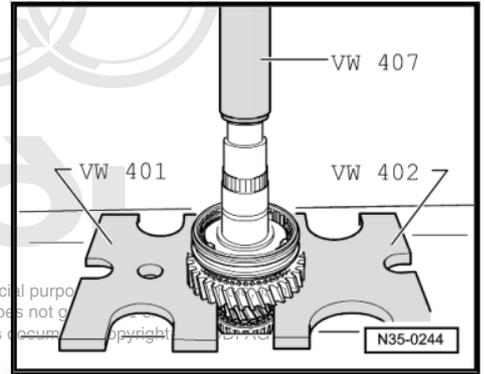
### Pulling Off Synchronizer Hub/Operating Sleeve for 3rd and 4th Gear with Gear Wheel for 4th Gear

- Before pulling off, remove circlip.
- A - Extractor , for example -Kukko 18/2-
- B - Separating device 22 to 115 mm , for example -Kukko 17/2-



### Pressing Off Locking Collar and Synchronizer Hub for 1st and 2nd Gears

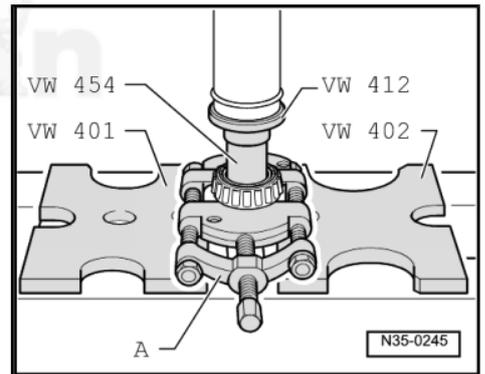
- Remove circlip.
- Press off selector gear and locking collar/synchronizer hub all together.



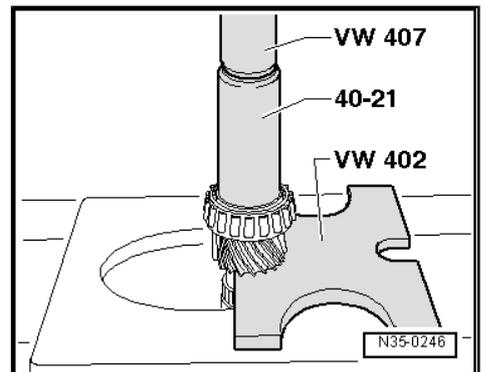
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### Pressing Off Inner Race for Tapered Roller Bearing

A - Separating device 22 to 115 mm , for example -Kukko 17/2-



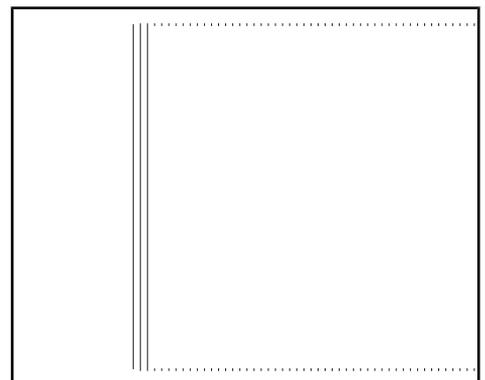
### Pressing on Tapered Roller Bearing Inner Race



### Checking Inner Race for 1st gear, 2nd Gear and 3rd Gear for Wear

- Press inner race onto taper of gear wheel and measure gap dimension -a- using a feeler gauge.

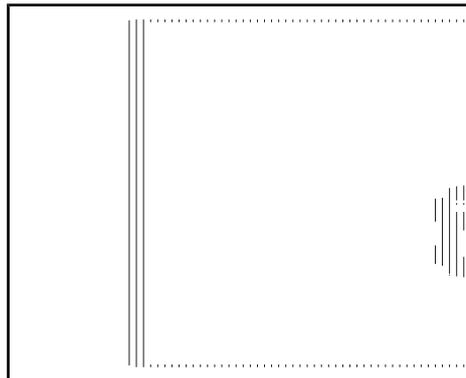
Gap Dimension -a-	Installed Dimension	Wear Limit
1st, 2nd and 3rd gear	0.75 to 1.25 mm	0.3 mm



### Checking Synchronizer Rings for 1st, 2nd and 3rd Gears for Wear

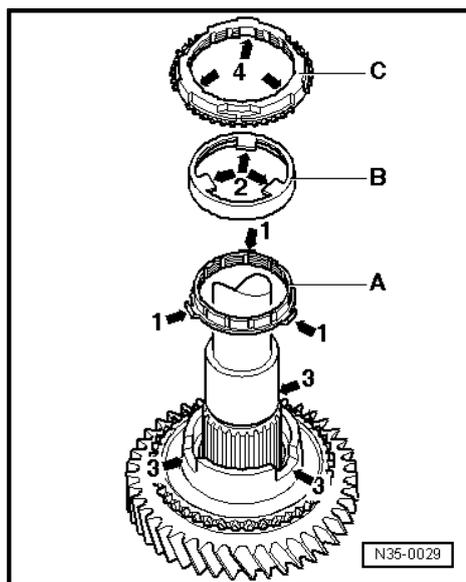
- Press synchronizer ring, outer race and inner race onto taper of gear wheel and measure gap dimension -a- using a feeler gauge.

Gap Dimension -a-	Installed Dimension	Wear Limit
1st, 2nd and 3rd gear	1.2 to 1.8 mm	0.5 mm



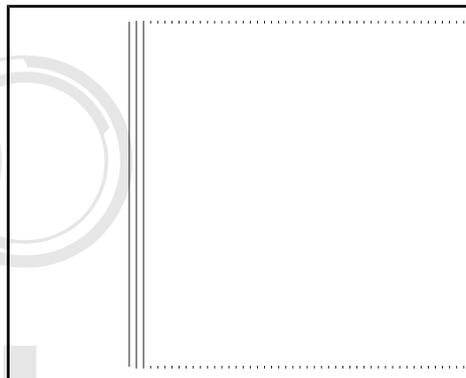
### Installed Position of Outer Race, Inner Race and Synchronizer Ring, 2nd Gear

- Place inner race -A- on the 2 gear wheel.
- The bent tabs -arrow 1- face toward outer race -B-.
- Install outer race -B-.
- The tabs -arrows 2- engage in the gear wheel grooves -arrows 3-.
- Install synchronizer ring -C-.
- The grooves -arrows 4- engage in the tabs -arrows 1- of the inner race -A-.



### Disassembling and Assembling Locking Collar and Synchronizer Hub for 1st and 2nd Gears as well as 3rd and 4th Gears

- Remove the springs to disassemble -1-.
- 1 - Spring
- 2 - Locking piece
- 3 - Locking collar
- 4 - Synchronizer hub
- To assemble, slide locking collar over the synchronizer hub.
- In 3rd and 4th gear, the wide collar on the synchronizer hub and the locking collar face in one direction.
- Installed position: the narrow recesses in the synchronizer hub align with the recesses in the locking collar.

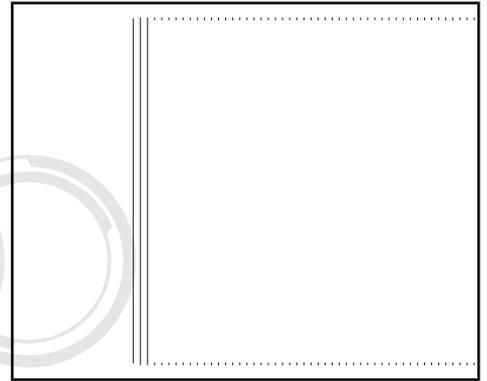


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### Assembling Locking Collar/Synchronizer Hub for 1st and 2nd Gears as well as 3rd and 4th Gears

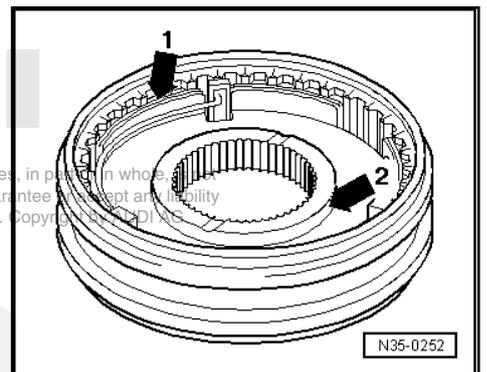
- The locking collar is pushed over the synchronizer hub.
- Insert locking pieces and install the springs 120° offset.
- Spring must engage with angled end into hollow engaging piece.



### Installation Position of Locking Collar/Synchronizer Hub for 1st and 2nd Gear

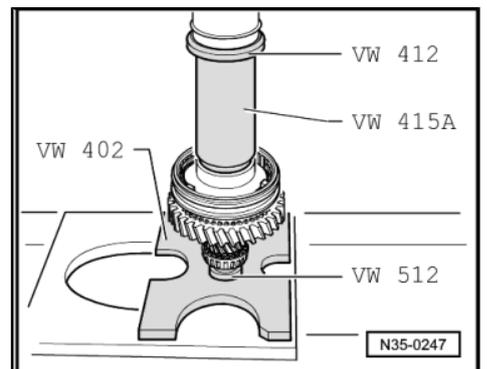
- The identification groove -arrow 1- and thin collar -arrow 2- of synchronizer hub point to 1st gear.

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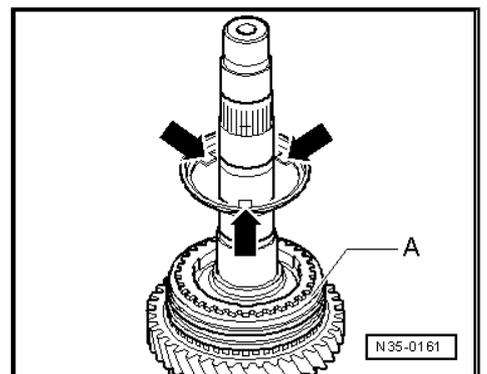
### Pressing on locking Collar/Synchronizer Hub for 1st and 2nd Gear

- Then install circlip.



### Installation Position of Outer Ring for 1st and 3rd Gear

- Tabs -arrows- point to synchronizer hub/locking collar -A-.

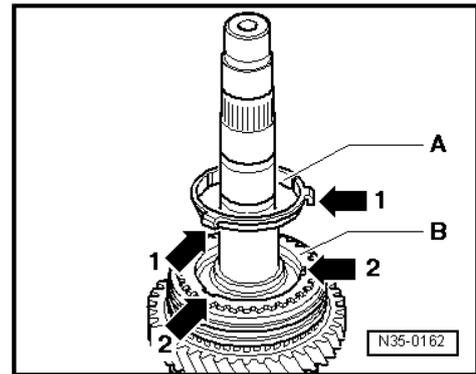


### Installed Position of Synchronizer Ring -A- (inner ring for 1st and 3rd gear)

- Tabs -arrows 1- engage into cut-outs -arrows 2- of synchronizer ring -B-.

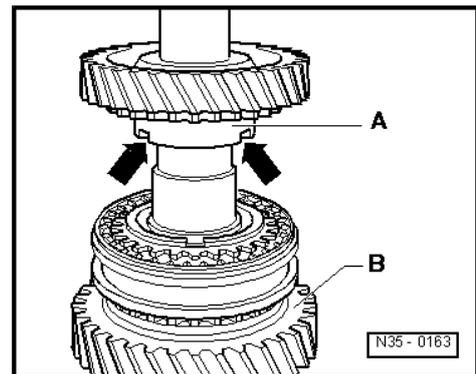


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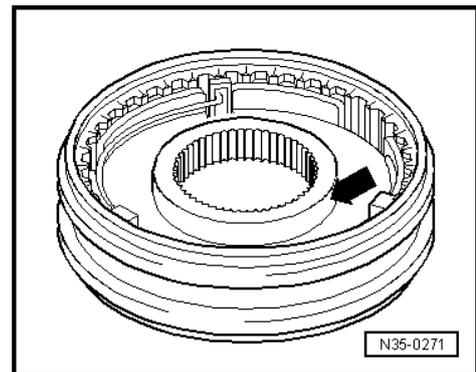
### Installation Position of Selector Gear for 1st and 3rd Gear

- The higher collar -A- points to 2nd and 4th gear -B-. Recesses in collar -arrows- engage into outer race tabs => [page 199](#) .



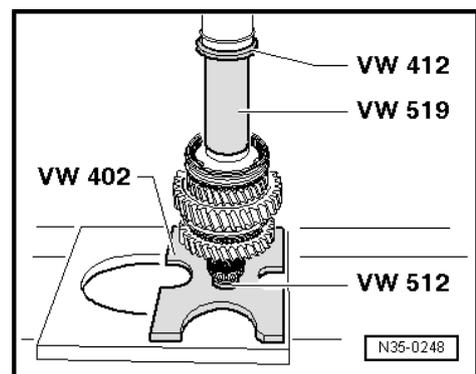
### Installation Position of Locking Collar/Synchronizer Hub for 3rd and 4th Gear

- Wider collar of synchronizer hub -arrow- points to 3rd gear.



### Pressing on Synchronizer Hub with Locking Collar for 3rd and 4th Gears

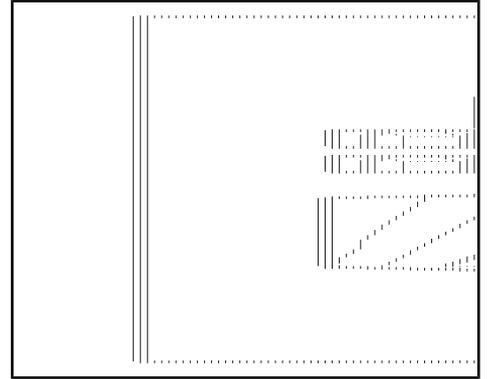
- Then install circlip.



### Checking Synchronizer Ring for 4th Gear for Wear

- Press synchronizer ring onto taper of the gear wheel and measure gap dimension -a- using a feeler gauge.

Gap Dimension -a-	Installed Dimension	Wear Limit
4. gear	1.0 to 1.7 mm	05 mm



### Pressing on Tapered Roller Bearing Inner Race

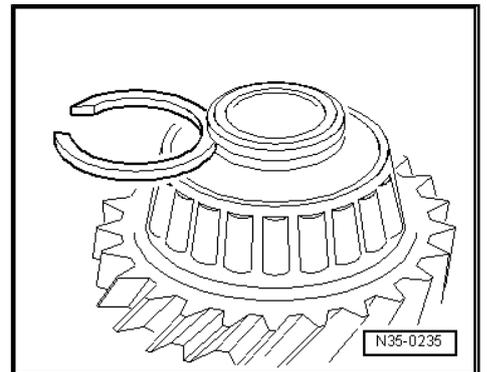
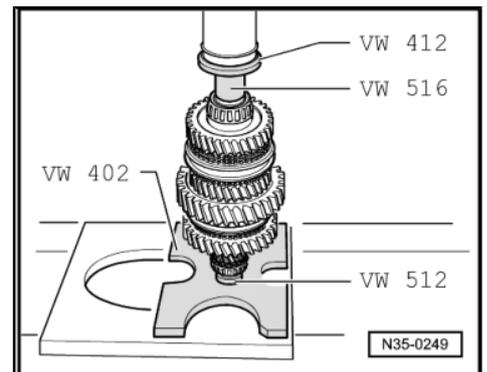
- Determine circlip ⇒ [page 201](#) and install.

#### Determining Circlip

- Determine thickest circlip which can still just be installed and insert it. For the part number, refer to the electronic parts catalog ETKA

The following locking rings are available:

Locking Ring Thickness (mm)		
1.79	1.83	1.86
1.89	1.92	1.95
1.98		

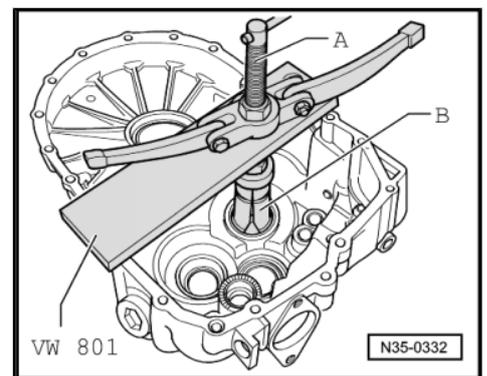


### Pulling Outer Race/Tapered Roller Bearing Out of Transmission Housing

A - Support , for example -Kukko 22/2-

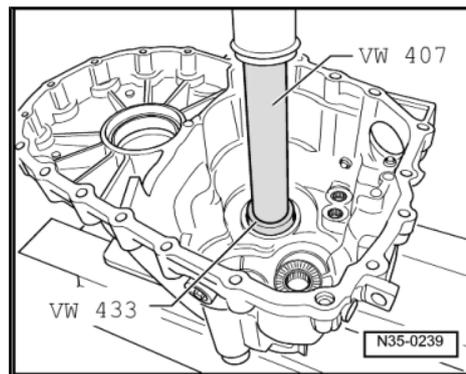
B - Internal puller 46 to 58 mm , for example -Kukko 21/7-

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### Pressing in Tapered Roller Bearing Outer Race into Transmission Housing

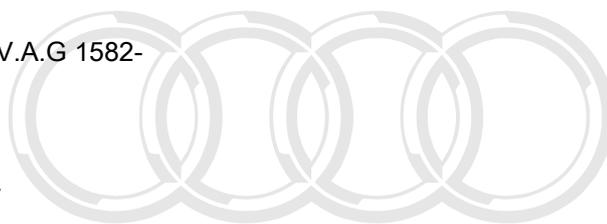
- Install shim under outer race.
- Support transmission housing beneath bearing mount using -2050- .



### 3.3 Output Shaft for 5th/6th Gear and Reverse Gear

#### Special tools and workshop equipment required

- ◆ Thrust Plate -VW 401-
- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 407-
- ◆ Punch -VW 408 A-
- ◆ Thrust Disc -VW 412-
- ◆ Tube 60 mm Dia. -VW 415 A-
- ◆ Thrust Pad 16.5/28 mm Dia. -VW 431-
- ◆ Thrust Tube -VW 455-
- ◆ Thrust Pad -VW 510-
- ◆ Tube 42 mm Dia. -VW 516-
- ◆ Sleeve -VW 519-
- ◆ Thrust Pad -30 - 11-
- ◆ Thrust Piece -40 - 105-
- ◆ Sleeve -40 - 20-
- ◆ Thrust Plate -2050-
- ◆ Tube -3296-
- ◆ Tapered Roller Bearing Puller -V.A.G 1582-
- ◆ Attachment -V.A.G 1582/4-
- ◆ Grip -V.A.G 1582/7-
- ◆ Thrust Pad Con. 8/65 -VW 433-
- ◆ Thrust Tube -VW 454-
- ◆ Support Channels -VW 457-
- ◆ Holding Fixture -VW 801-
- ◆ Kukko 21/7 internal puller
- ◆ Separating tool 17/2
- ◆ Kukko 22/2 counter-support



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### Pulling Out Tapered Roller Bearing Outer Race

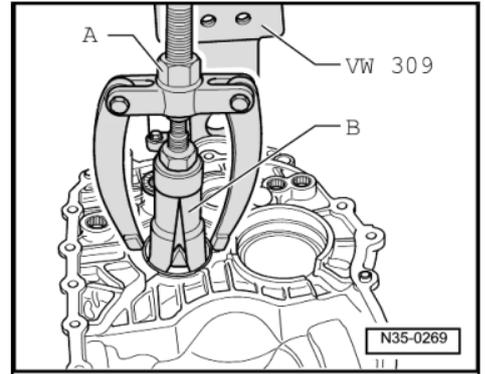
A - Support , for example -Kukko 22/2-

B - Internal puller 46...58 mm , for example -Kukko 21/7-



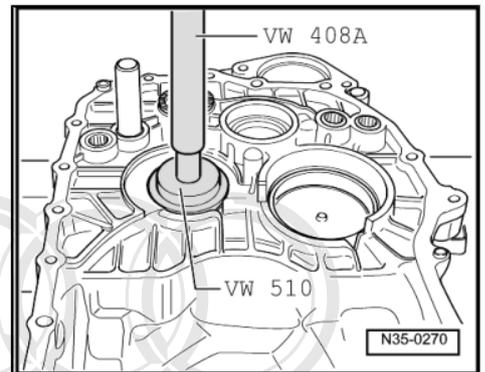
#### Note

*After pulling off, check the adjustment shim for damage and replace if necessary.*



### Press the Outer Ring for the Tapered Roller Bearing into the Clutch Housing

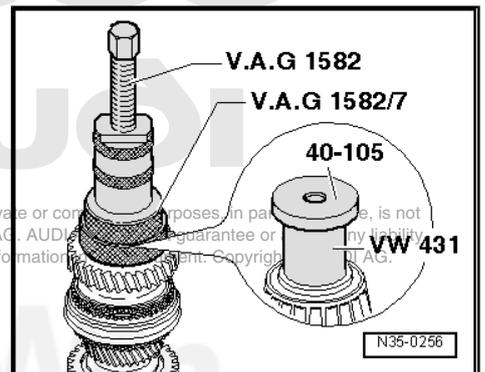
- Place the adjustment shim under the outer ring.
- Support clutch housing directly beneath bearing mount using -40 - 20- .



### Pulling off Inner Race for Tapered Roller Bearing

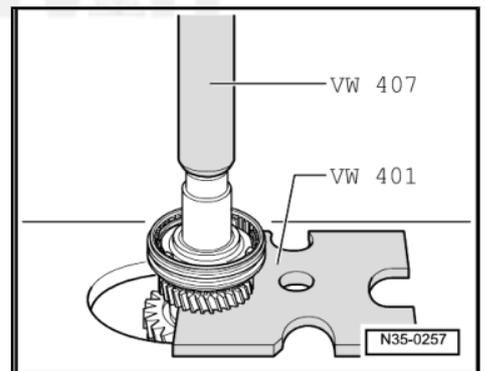
- Remove circlip.
- Before attaching extractor, place -VW 431- and -40 - 105- on output shaft.

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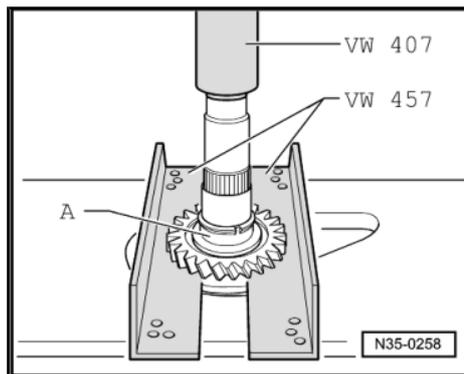
### Pressing Off Synchronizer Hub/Locking Collar for 5th and 6th Gear with Selector Gear for 6th Gear

- Before pressing off, remove circlip.



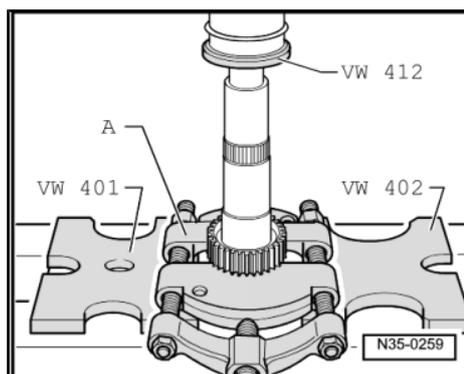
### Pressing Off Sleeve -A- over Reverse Gear Selector Gear

- Before pressing off, remove circlip.



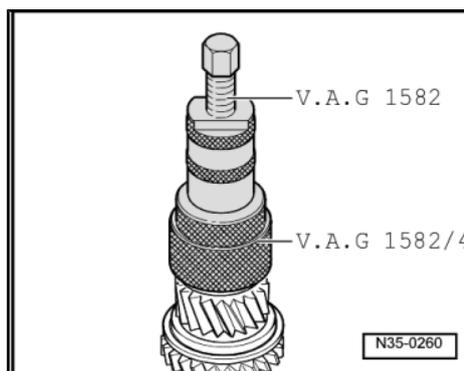
### Pressing Off Synchronizer Hub for Reverse Gear

- Before pressing off, remove circlip.
- A - Separating device 22 to 115 mm , for example -Kukko 17/2-



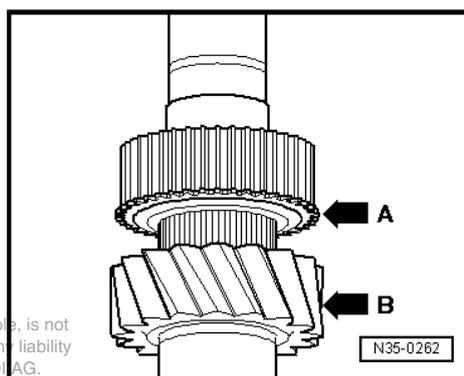
### Pulling Off Inner Race for Tapered Roller Bearing

- Before installing puller, set -30 - 11- onto output shaft.



### Installation Position of Synchronizer Hub for Reverse Gear

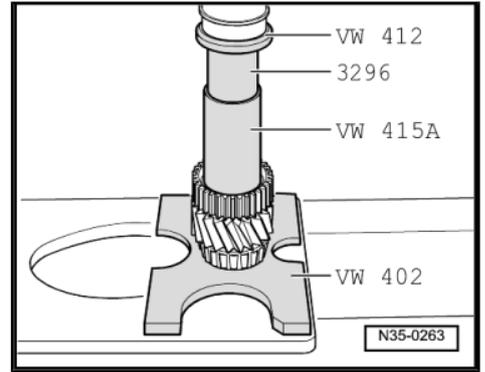
- Stop -arrow A- for reverse gear locking collar points toward output shaft splines -arrow B-.



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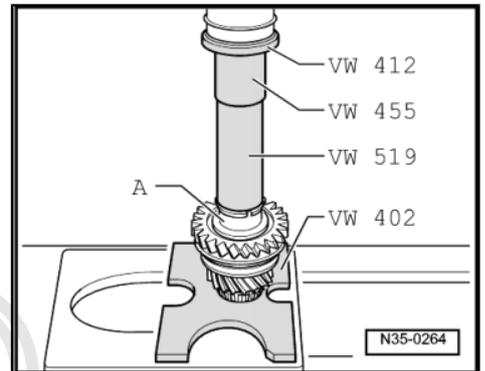
### Pressing on Synchronizer Hub for Reverse Gear

- Then install circlip.



### Press on Sleeve -A-

- Installed position: wide collar points toward reverse gear selector gear.
- Then install circlip.

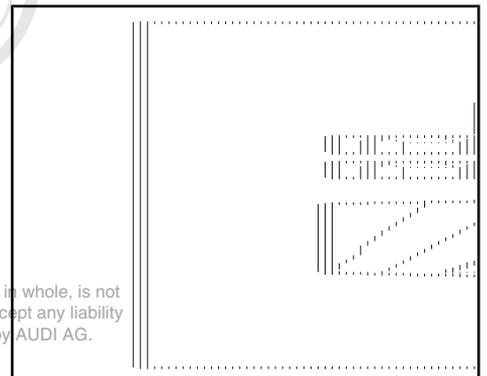


### Checking Synchronizer Ring for 5th and 6th Gears for Wear

- Press synchronizer ring onto taper of the gear wheel and measure gap dimension -a- using a feeler gauge.

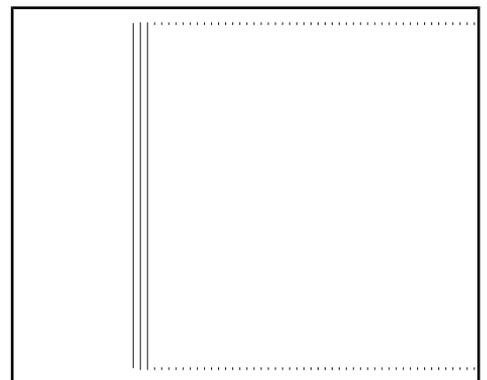
Gap Dimension -a-	Installed Dimension	Wear Limit
5th and 6th gear	1.0 to 1.7 mm	0.5 mm

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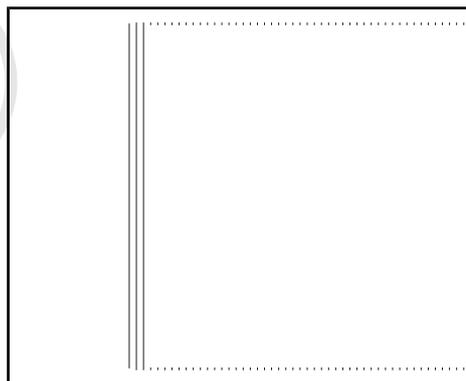
### Disassembling and Assembling Locking Collar and Synchronizer Hub for 5th and 6th Gears

- Remove the springs to disassemble -1-.
- 1 - Spring
- 2 - Locking piece
- 3 - Locking collar
- 4 - Synchronizer hub
- To assemble, slide locking collar over the synchronizer hub.
- Installation position: The narrow locking piece recesses in the synchronizer hub align with the recesses in the locking collar.



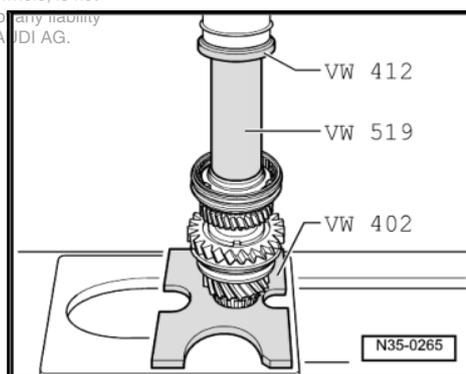
### Assembling Locking Collar/Synchronizer Hub for 5th and 6th Gears

- The locking collar is pushed over the synchronizer hub.
- Insert locking pieces and install the springs 120° offset.
- Spring must engage with angled end into hollow engaging piece.



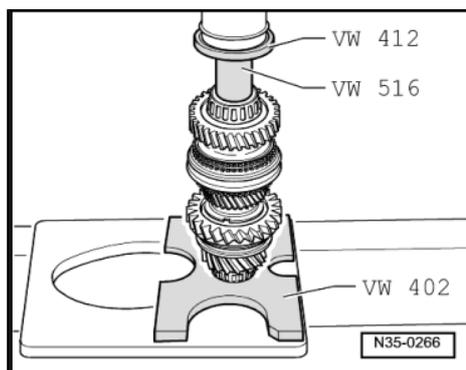
### Pressing on Locking Collar/Synchronizer Hub for 5th and 6th Gears

- Then install circlip.



### Pressing on Tapered Roller Bearing Inner Race

- Then, determine the circlip ⇒ [page 207](#) and install.

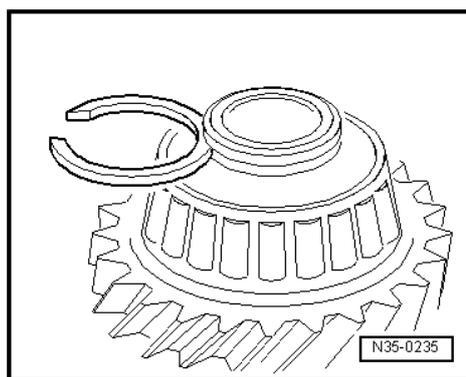


### Determining Circlip

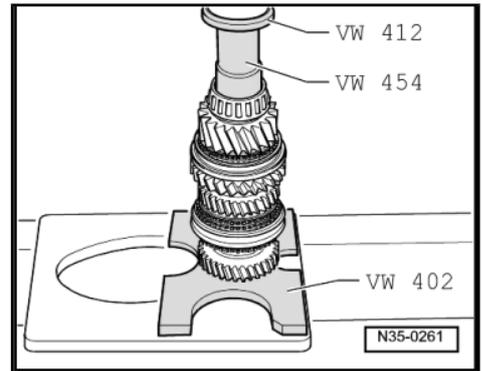
- Determine the thickest circlip which can still just be installed and insert it. For the part number, refer to the electronic parts catalog ETKA

The following locking rings are available:

Locking Ring Thickness (mm)		
1.79	1.83	1.86
1.89	1.92	1.95
1.98		



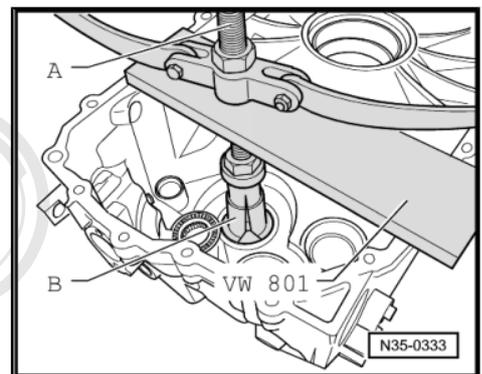
### Pressing on Tapered Roller Bearing Inner Race



### Pulling Outer Race/Tapered Roller Bearing Out of Transmission Housing

A - Support , for example -Kukko 22/2-

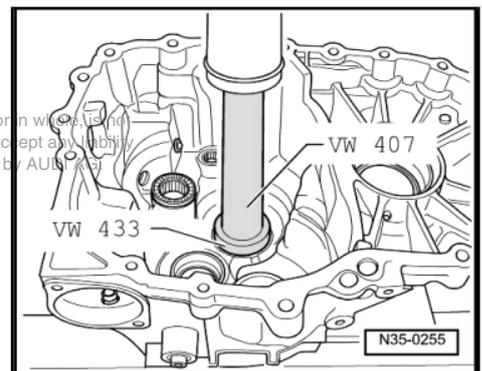
B - Internal puller 46...58 mm , for example -Kukko 21/7-



### Pressing in Tapered Roller Bearing Outer Race into Transmission Housing

- Support the transmission housing with the -2050- under the bearing mount.

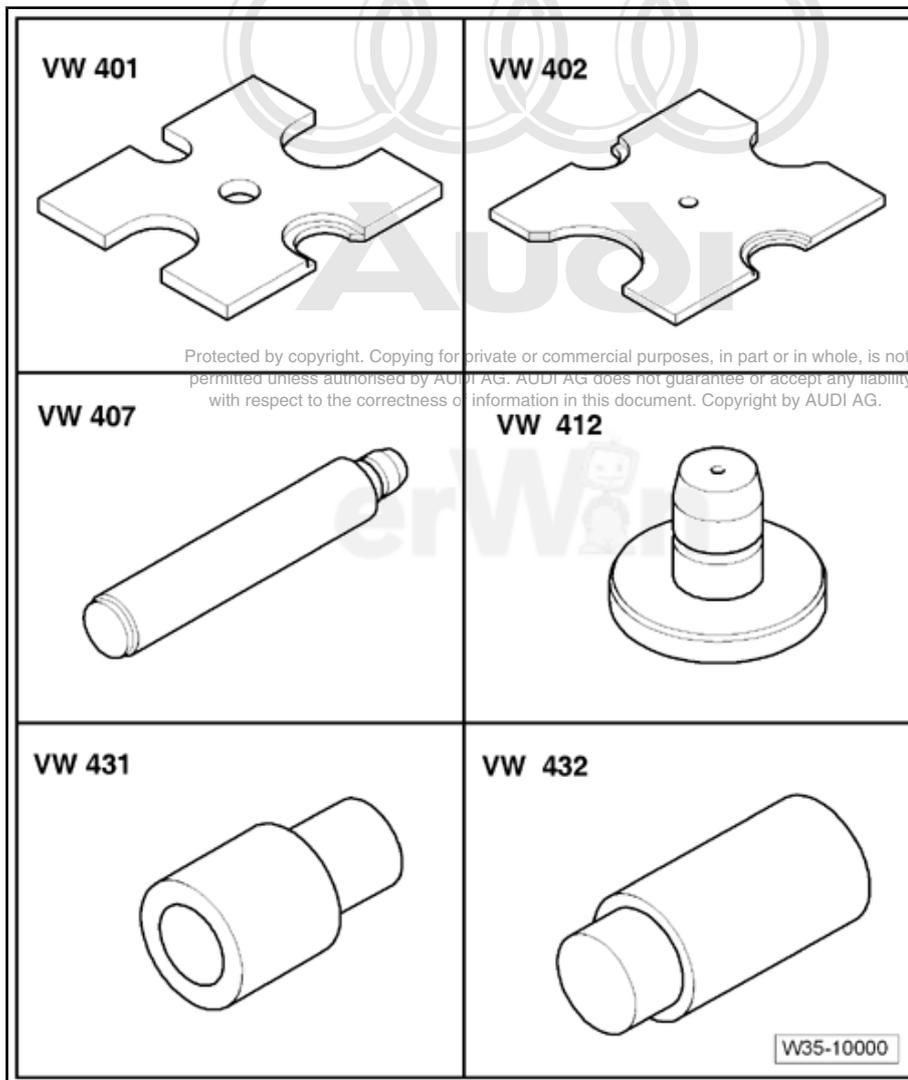
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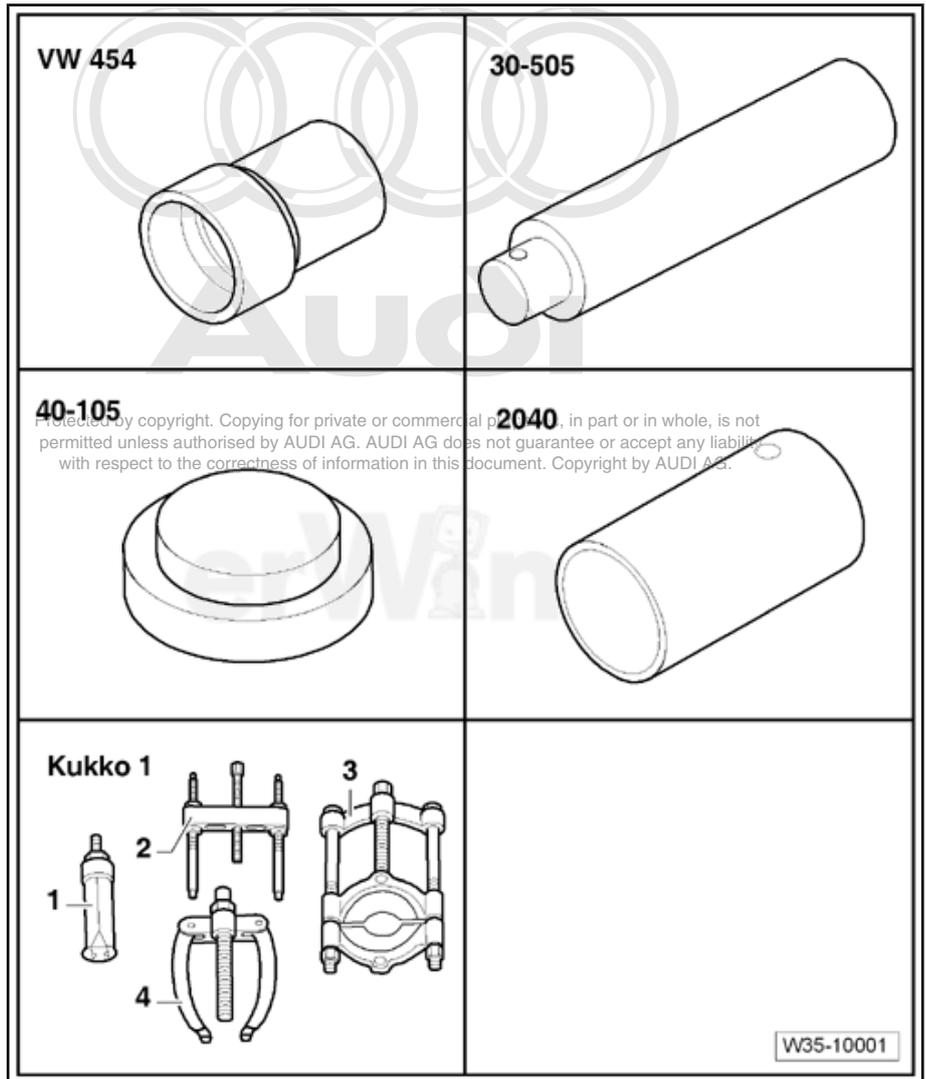
## 4 Special Tools

### Special tools and workshop equipment required

- ◆ Thrust Plate -VW 401-
- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 407-
- ◆ Thrust Disc -VW 412-
- ◆ Thrust Pad 16.5/28 mm Dia. -VW 431-
- ◆ Arbor 50 mm Dia. -VW 432-



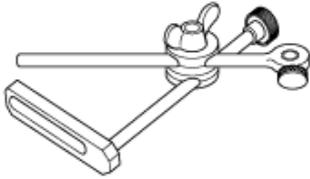
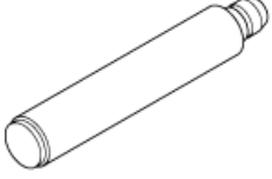
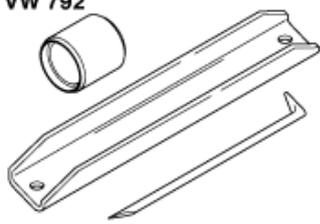
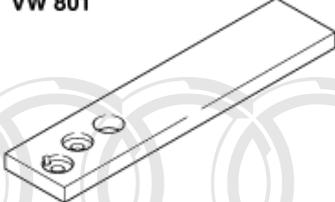
- ◆ Thrust Tube -VW 454-
- ◆ Locking Pin -30 - 505-
- ◆ Thrust piece -40 - 105-
- ◆ Press Tube -2040-
- ◆ -1- Kukko 21/5 internal puller
- ◆ -2- Puller 18/1
- ◆ -3- Separating tool 17/1 and 17/2
- ◆ -4- Kukko 22/2 counter-support





**Special tools and workshop equipment required**

- ◆ Dial Gauge Holder -VW 387-
- ◆ Punch -VW 407-
- ◆ Thrust Pad Con. 8/65 -VW 433-
- ◆ Installation Arbor -VW 792-
- ◆ Holding Fixture -VW 801-
- ◆ Thrust Plate -2050-

<p><b>VW 387</b></p> 	<p><b>VW 407</b></p> 
<p><b>VW 433</b></p> 	<p><b>VW 792</b></p> 
<p><b>VW 801</b></p> 	<p><b>2050</b></p>  <p style="text-align: right;">G35-0013</p>

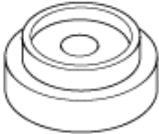
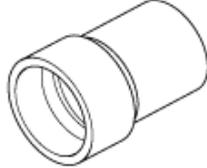
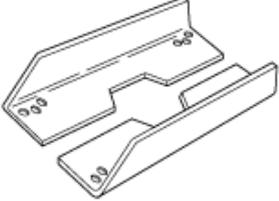
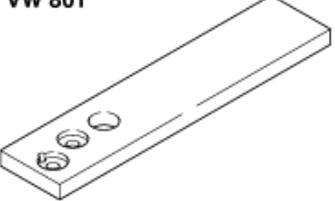
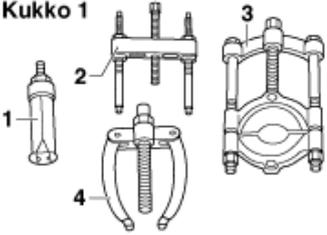


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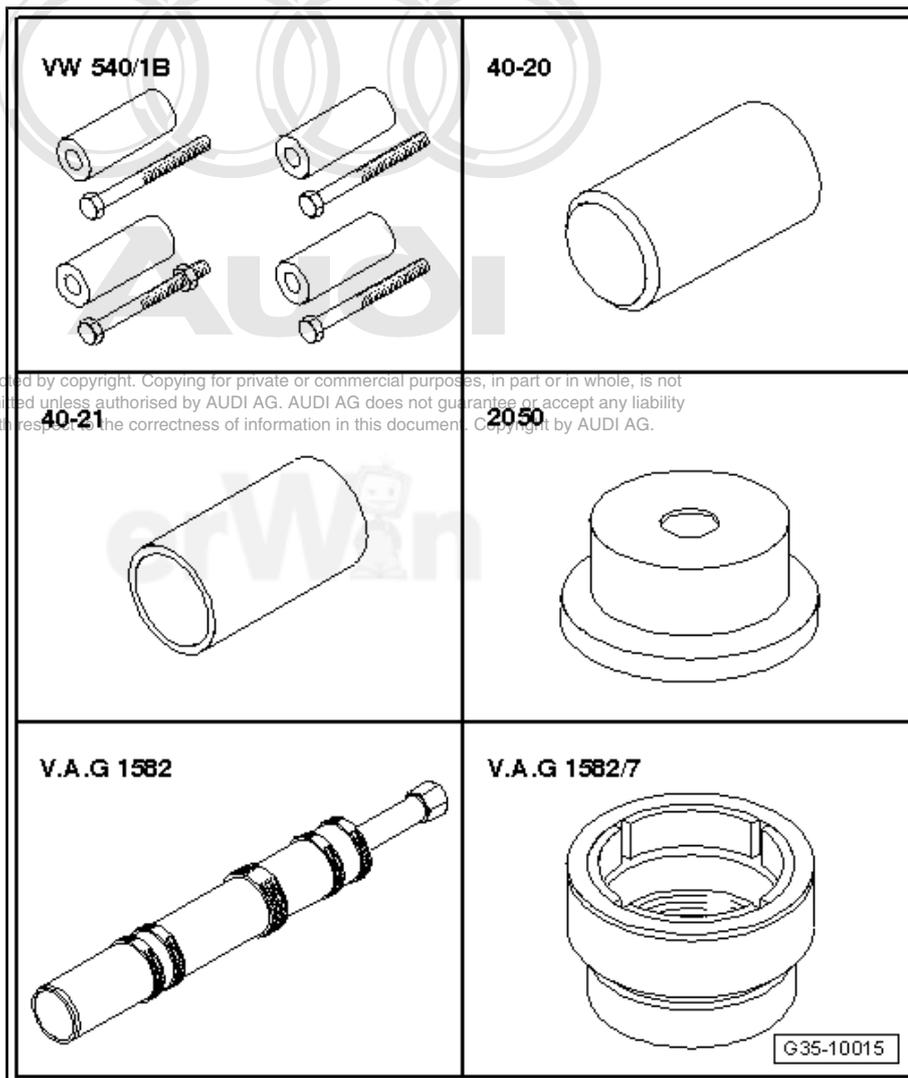


- ◆ Grip -V.A.G 1582/7-
- ◆ Thrust Pad Con. 8/65 -VW 433-
- ◆ Thrust Tube -VW 454-
- ◆ Support Channels -VW 457-
- ◆ Holding Fixture -VW 801-
- ◆ -1- Kukko 21/7 internal puller
- ◆ -3- Separating tool 17/2

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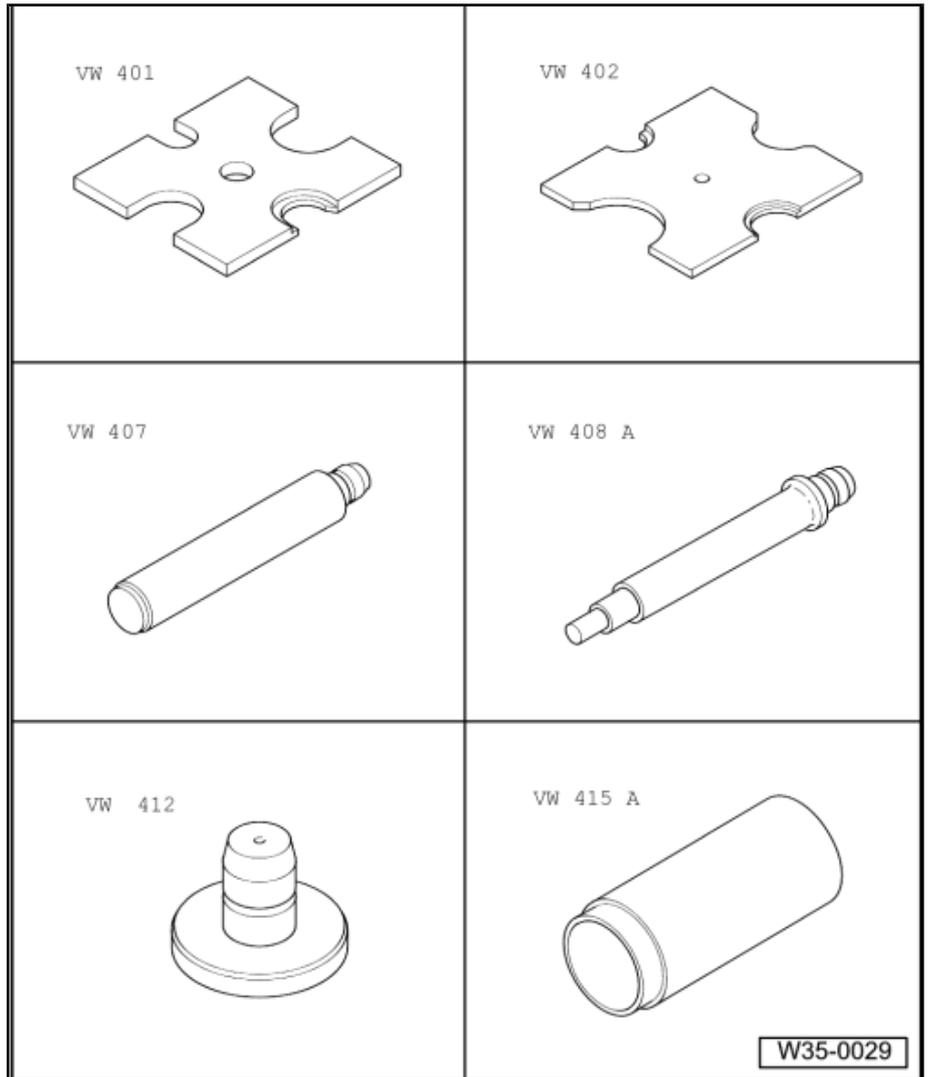
<p><b>V.A.G 1582/7</b></p> 	<p><b>VW 433</b></p> 
<p><b>VW 454</b></p> 	<p><b>VW 457</b></p> 
<p><b>VW 801</b></p> 	<p><b>Kukko 1</b></p>  <p style="text-align: right;"><b>G35-0014</b></p>

- ◆ Spacers -VW 540/1 B-
- ◆ Sleeve -40 - 20-
- ◆ Sleeve -40 - 21-
- ◆ Thrust Plate -2050-
- ◆ Tapered Roller Bearing Puller -V.A.G 1582-
- ◆ Grip -V.A.G 1582/7-



**Special tools and workshop equipment required**

- ◆ Thrust Plate -VW 401-
- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 407-
- ◆ Punch -VW 408 A-
- ◆ Thrust Disc -VW 412-
- ◆ Tube 60 mm Dia. -VW 415 A-



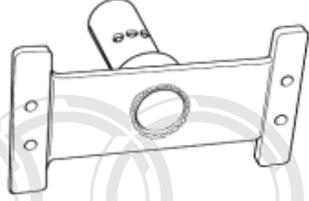
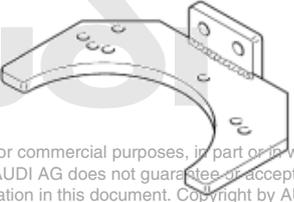
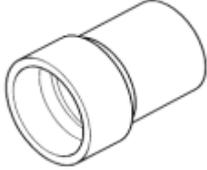
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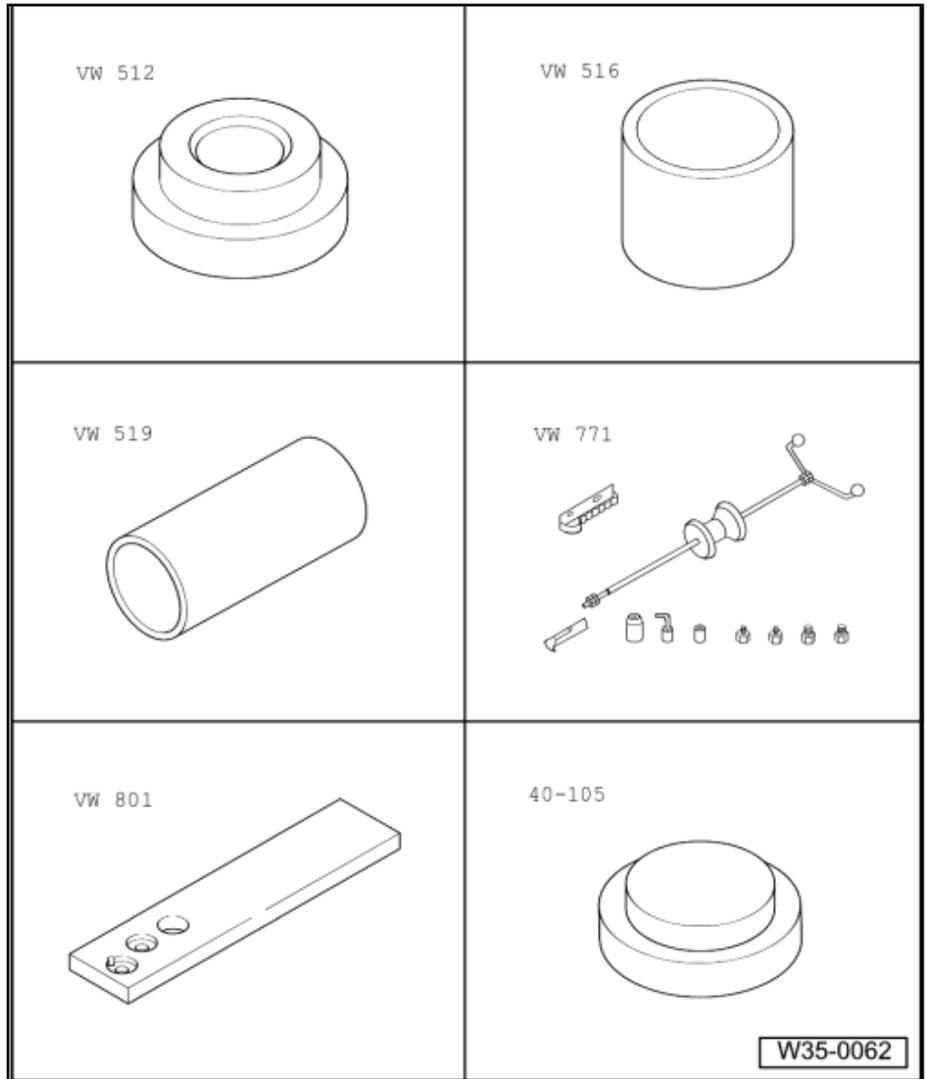
- ◆ Holding Plate -VW 309-
- ◆ Holding Fixture -VW 313-
- ◆ Transmission Support -VW 353-
- ◆ Thrust Pad 16.5/28 mm Dia. -VW 431-
- ◆ Thrust Pad Con. 8/65 -VW 433-
- ◆ Thrust Tube -VW 454-

<p>VW 309</p> 	<p>VW 313</p> 
<p>VW 353</p> 	<p>VW 431</p> 
<p>VW 433</p> 	<p>VW 454</p> 

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W35-0061

- ◆ Thrust Pad -VW 512-
- ◆ Tube 42 mm Dia. -VW 516-
- ◆ Sleeve -VW 519-
- ◆ Slide Hammer-Complete Set -VW 771-
- ◆ Holding Fixture -VW 801-
- ◆ Thrust Piece -40 - 105-



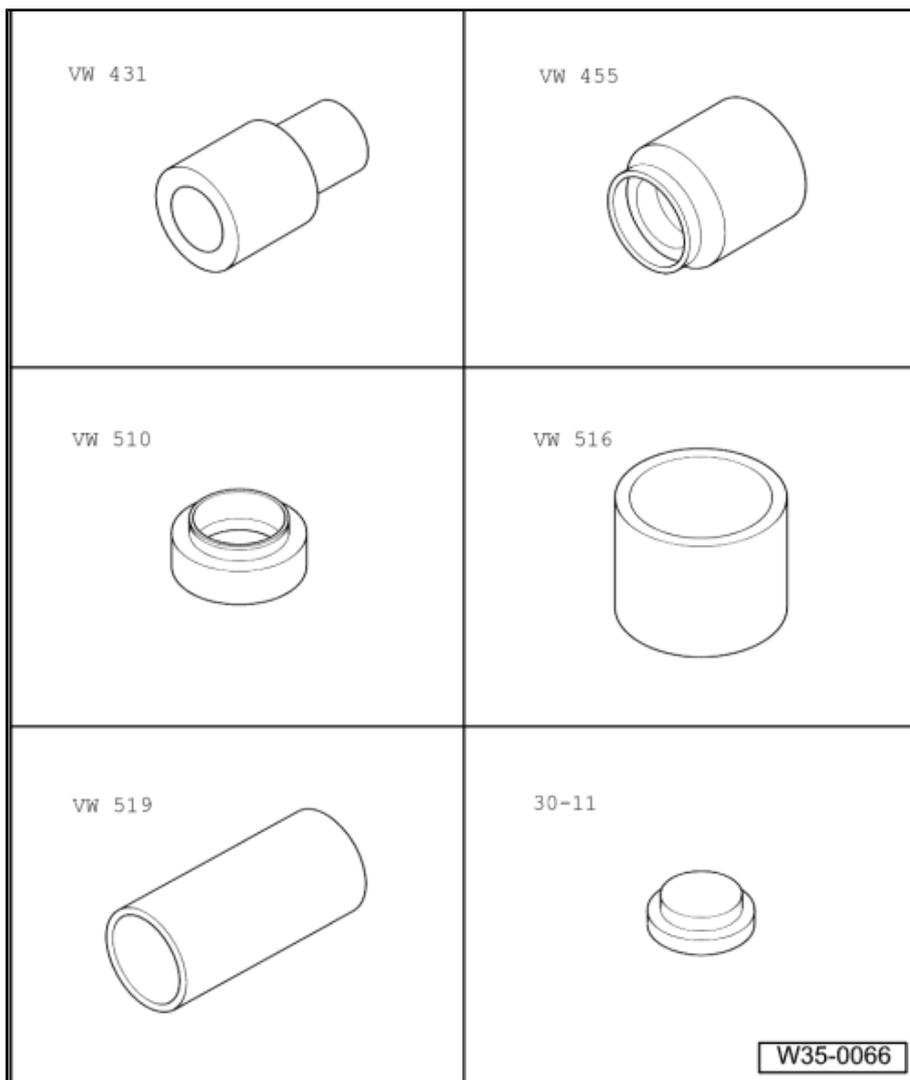
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- ◆ Thrust Pad 16.5/28 mm Dia. -VW 431-
- ◆ Thrust Tube -VW 455-
- ◆ Thrust Pad -VW 510-
- ◆ Tube 42 mm Dia. -VW 516-
- ◆ Sleeve -VW 519-
- ◆ Thrust Pad -30 - 11-

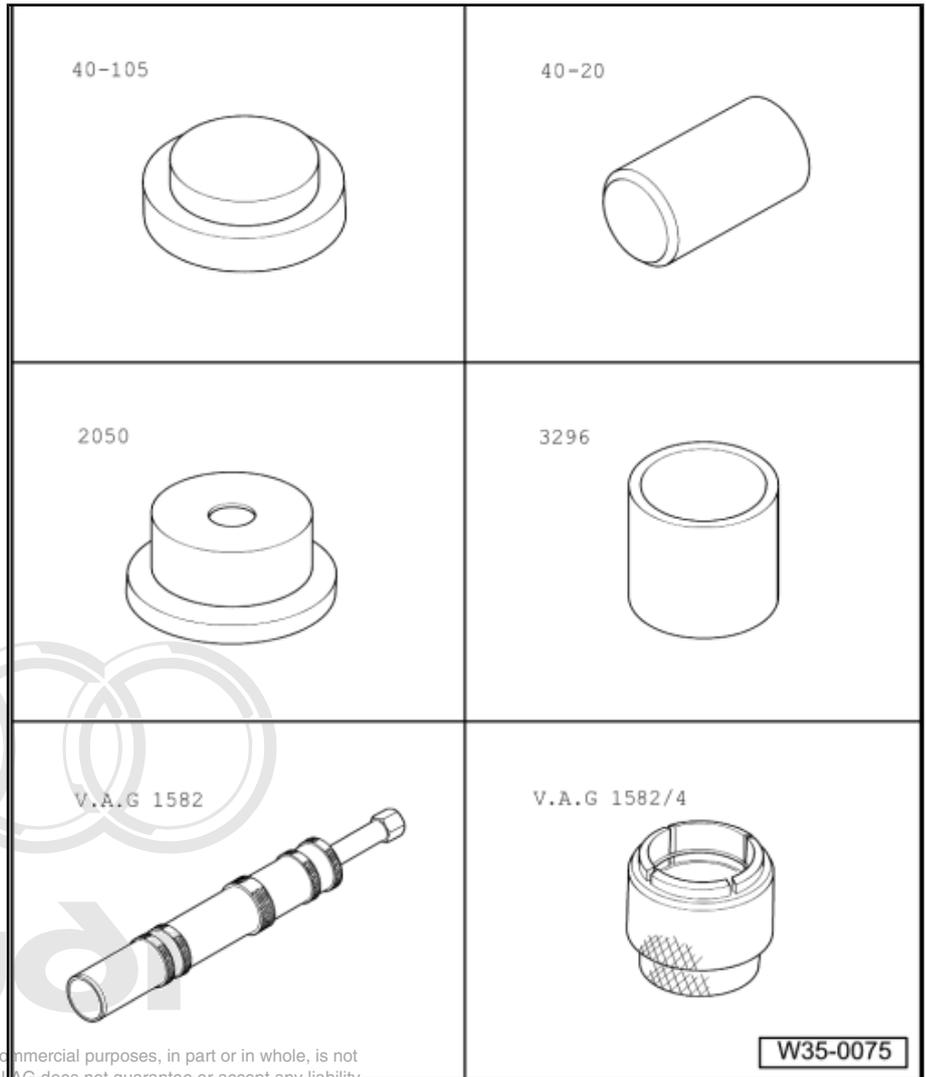


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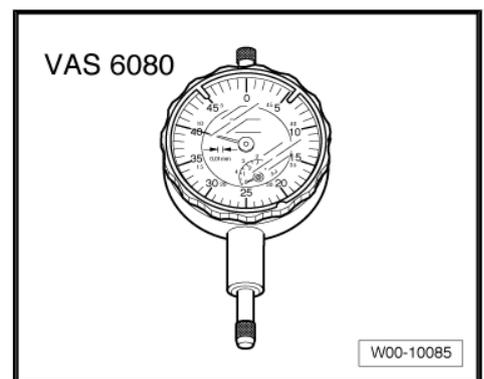
- ◆ Thrust Piece -40 - 105-
- ◆ Sleeve -40 - 20-
- ◆ Thrust Plate -2050-
- ◆ Tube -3296-
- ◆ Tapered Roller Bearing Puller -V.A.G 1582-
- ◆ Attachment -V.A.G 1582/4-



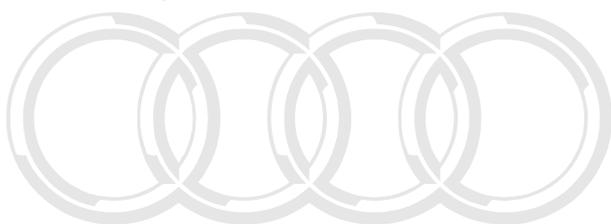
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**Special tools and workshop equipment required**

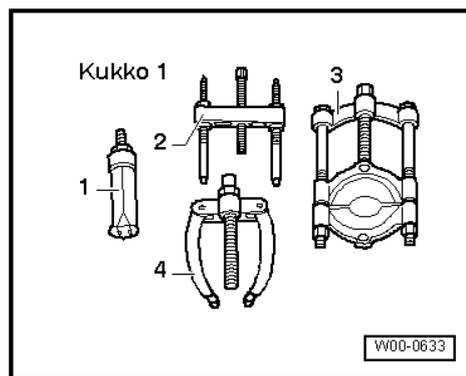
- ◆ Dial gauge -VAS 6080-



- ◆ -1- Kukko 21/7 internal puller



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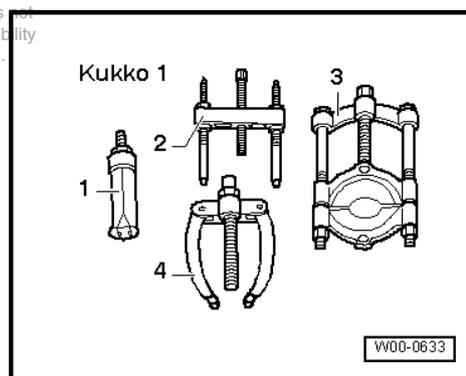


- ◆ -4- Kukko 22/2 counter-support

- ◆ -1- Kukko extractor 21/7 and 21/8

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- ◆ -2- Puller 18/2
- ◆ -3- Separating tool 17/2
- ◆ -4- Kukko 22/2 counter-support

## 39 – Final Drive, Differential

### 1 Description and Operation

⇒ [“1.1 Flange Shaft and Seals on Transmission Assembly Overview”, page 219](#)

⇒ [“1.2 Flange Shaft and Seals on Bevel Box Assembly Overview”, page 220](#)

⇒ [“1.3 Differential Assembly Overview”, page 222](#)

⇒ [“1.4 Adjustment Overview”, page 224](#)

⇒ [“1.5 Differential, Adjusting”, page 224](#)

#### 1.1 Flange Shaft and Seals on Transmission Assembly Overview

##### 1 - Shaft Seal

- Between the bevel box and transmission
- Replace with transmission installed, refer to ⇒ [“3.3 Shaft Sealing Ring for Bevel Box with Manual Transmission Installed, Replacing”, page 229](#)

##### 2 - Selector Shaft Seal

- Replace, refer to ⇒ [“4.14 Selector Shaft Seal”, page 124](#)

##### 3 - Transmission Shift Lever

##### 4 - Nut

- Tightening specification -8- ⇒ [page 63](#)

##### 5 - Left Flange Shaft Seal

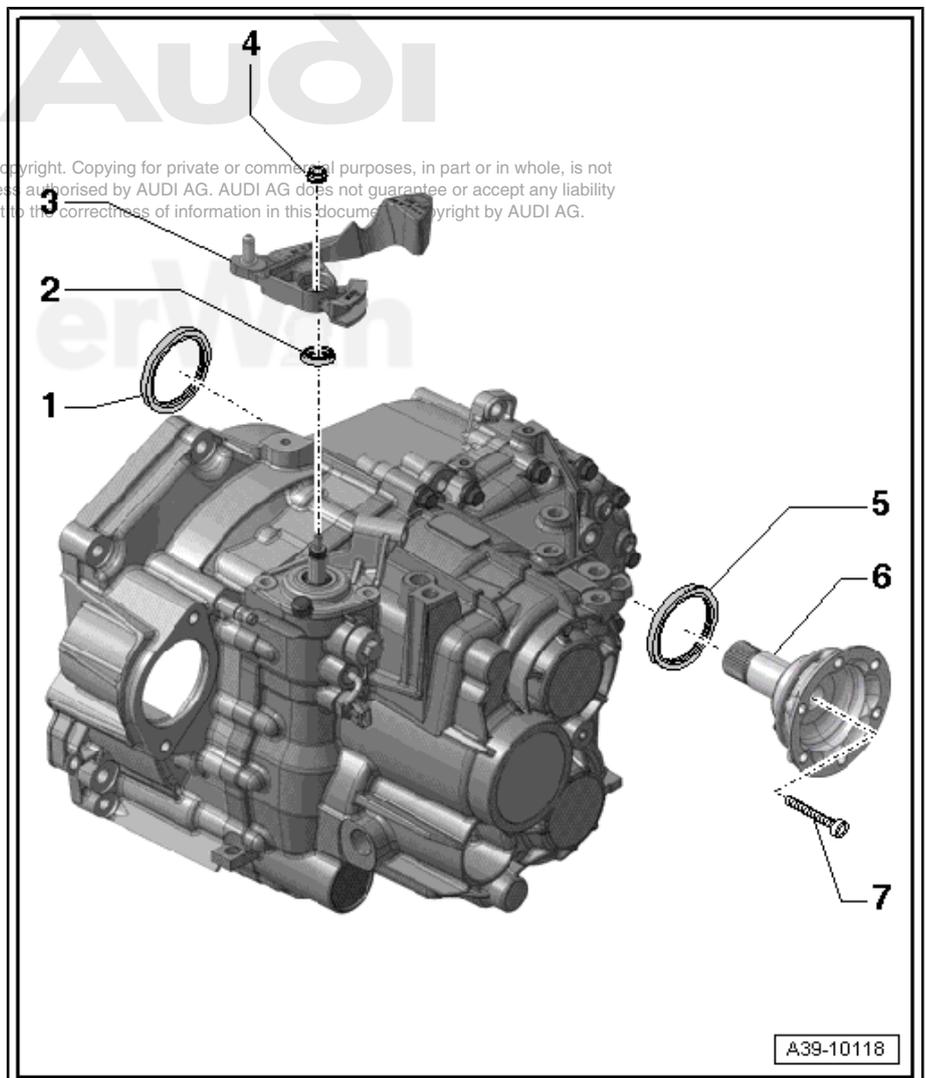
- Replace, refer to ⇒ [“3.2 Left Flange Shaft Seal”, page 228](#)

##### 6 - Flange Shaft, Left

- Removing and installing, refer to ⇒ [“3.1 Left Flange Shaft”, page 228](#)

##### 7 - Bolt

- Replace
- 33 Nm



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## 1.2 Flange Shaft and Seals on Bevel Box Assembly Overview

### 1 - Nut

- Replace
- 480 Nm

### 2 - Bevel Box Output Flange

### 3 - Output Flange Cover Cap

- Replace if damaged

### 4 - Shaft Seal

- For output flange bevel box
- Replace, refer to ⇒ ["3.8 Bevel Box Drive Flange Seal"](#), page 234

### 5 - Seal on Bevel Box

- Between the bevel box and transmission
- Replace, refer to ⇒ ["3.7 Seal between Transmission and Bevel Box"](#), page 233

### 6 - Bevel Box

- Removing and installing, refer to ⇒ ["4.11 Bevel Box, Removing"](#), page 118

### 7 - Drain Plug

- 60 Nm
- For the oil drain hole for the bevel box

### 8 - Shaft Seal

- For the right flange shaft on the outside of the bevel box
- Replace, refer to ⇒ ["3.5 Right Flange Shaft Seat on Outer Bevel Box, Replacing"](#), page 231

### 9 - Drain Plug

- For bevel box oil filler hole
- Tightening specification, refer to ⇒ ["3.1 Bevel Box Oil Filler Bolt"](#), page 87

### 10 - Bolt

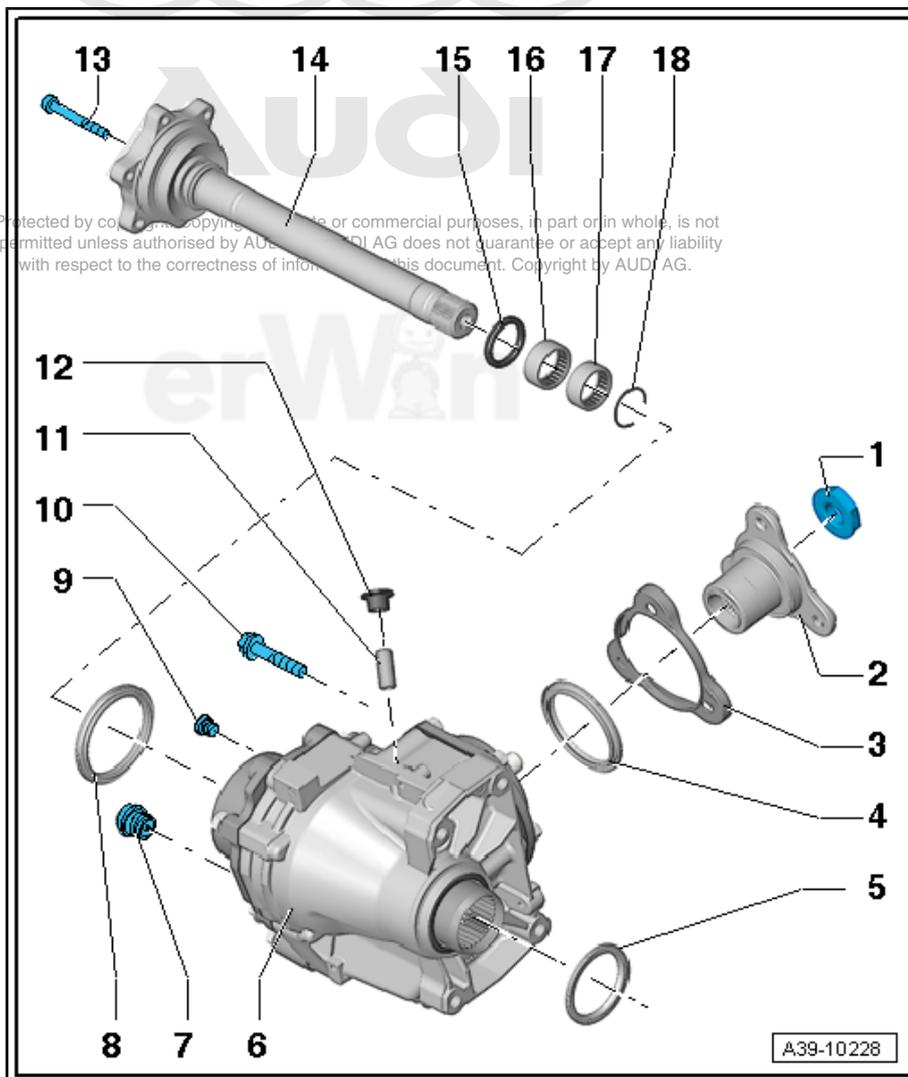
- Replace
- 40 Nm plus an additional 45° turn
- Quantity: 4
- Bevel box to transmission

### 11 - Breather Pipe

### 12 - Ventilation Cap

### 13 - Bolt

- Replace
- 33 Nm



#### 14 - Right Drive Flange

- Removing and installing, refer to ⇒ [“3.4 Right Flange Shaft”, page 230](#)

#### 15 - Oil Seal

- Replace

#### 16 - Needle Bearing (polygon bearing)

- If the flange shaft is difficult to move when it is removed, this is not a fault
- Acoustical test only when installed
- Check for damage, for example for cracks on the out race
- Replace, refer to ⇒ [“3.6 Right Flange Shaft Needle Bearing”, page 232](#)

#### 17 - Needle Bearing (polygon bearing)

- If the flange shaft is difficult to move when it is removed, this is not a fault
- Acoustical test only when installed
- Check for damage, for example for cracks on the out race
- Replace, refer to ⇒ [“3.6 Right Flange Shaft Needle Bearing”, page 232](#)

#### 18 - Securing Ring

- Replace



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## 1.3 Differential Assembly Overview

### Note

- ◆ Attach transmission to assembly stand. Refer to [⇒ "4.6 Transmission, Securing to Assembly Stand", page 107](#).
- ◆ Heat inner race of tapered roller bearing to 100 °C (212 °F) before installing.
- ◆ Always replace both tapered roller bearings together as a set.
- ◆ Adjust differential, refer to [⇒ "1.5 Differential, Adjusting", page 224](#) when replacing tapered roller bearing, differential housing, transmission housing or clutch housing.

#### 1 - Transmission Housing

#### 2 - Adjustment Shim

- For the differential
- Determining thickness, refer to [⇒ "1.5 Differential, Adjusting", page 224](#)

#### 3 - Taper Roller Bearing Outer Race

- Pulling out [⇒ page 240](#)
- Installing [⇒ page 240](#)

#### 4 - Tapered Roller Bearing Inner Race

- Pulling off [⇒ page 239](#)
- Pressing on [⇒ page 239](#)

#### 5 - Differential Housing

- With riveted final drive gear

#### 6 - Tapered Roller Bearing Inner Race

- Pulling off [⇒ page 239](#)
- Pressing on [⇒ page 239](#)

#### 7 - Taper Roller Bearing Outer Race

- Pulling out [⇒ page 238](#)
- Installing [⇒ page 238](#)

#### 8 - Adjustment Shim

- 0.65 mm thick
- Installed position: the shoulder on the inner diameter faces the bevel box -14-

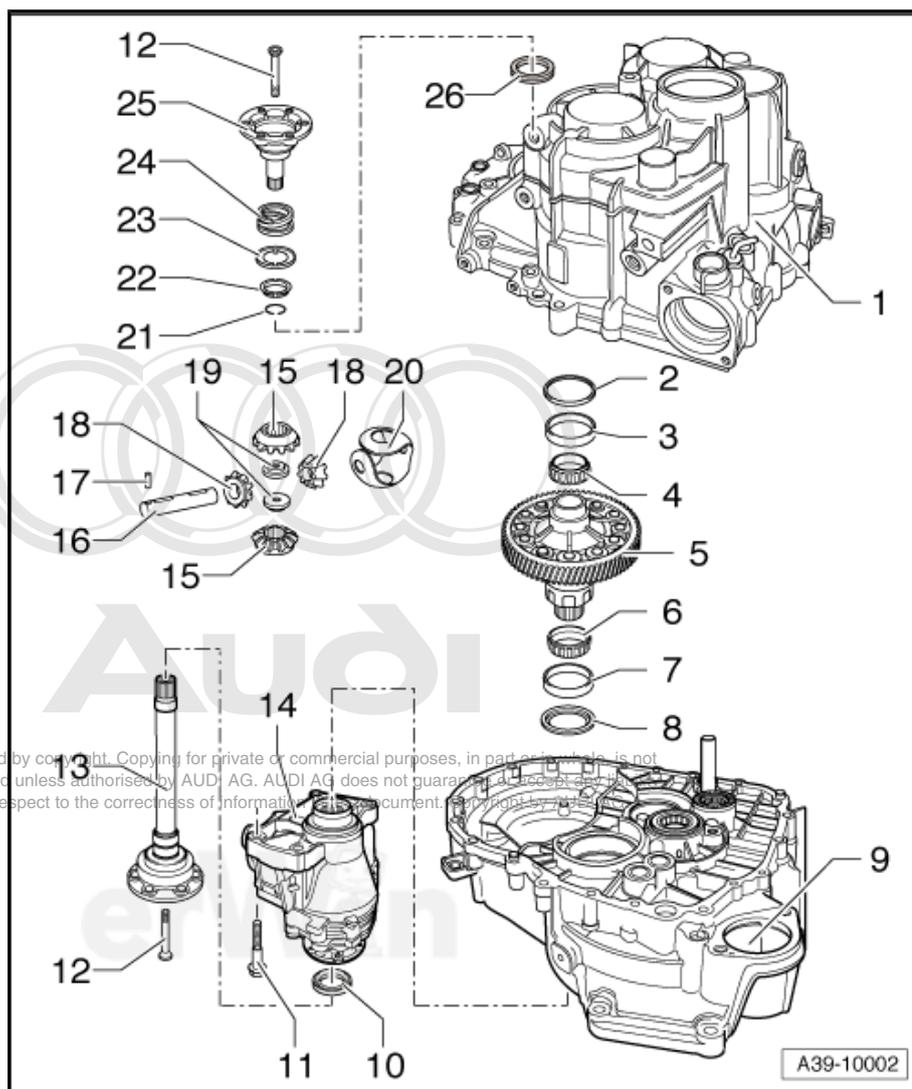
#### 9 - Clutch Housing

#### 10 - Shaft Seal

- For right flange shaft
- Replace with transmission installed, refer to [⇒ "3.5 Right Flange Shaft Seat on Outer Bevel Box, Replacing", page 231](#)

#### 11 - Bolt

- Replace



- 40 Nm

#### 12 - Bolt

- Screw together with threaded piece -19- ⇒ [page 223](#)
- Tightening specification -13- ⇒ [page 220](#)

#### 13 - Right Drive Flange

- Removing and installing, refer to ⇒ ["3.4 Right Flange Shaft", page 230](#)

#### 14 - Bevel Box

- Removing and installing with transmission installed, refer to ⇒ ["4.11 Bevel Box, Removing", page 118](#)
- Removing and installing with transmission removed, refer to ⇒ ["5.2 Transmission without Circlip A for Cap/Input Shaft", page 131](#)

#### 15 - Large Differential Bevel Gear

- Installing ⇒ [page 240](#)

#### 16 - Differential Taper Axle

- Removing ⇒ [page 240](#)
- Installing ⇒ [page 240](#)

#### 17 - Spring Pin

- For securing the axle for the differential bevel gear
- Removing ⇒ [page 240](#)
- Drive new roll pin in flush ⇒ [page 241](#)

#### 18 - Small Differential Bevel Gear

- Removing and installing ⇒ [page 240](#)

#### 19 - Threaded Piece

- Installing ⇒ [page 240](#)

#### 20 - Thrust Washer Union

- Install coated with gear oil

#### 21 - Securing Ring

- Holds tapered ring, thrust washer and compression spring in position with flanged shaft removed

#### 22 - Tapered Ring

- With grooves to engage thrust washer
- Installed position: ball toward the differential housing

#### 23 - Thrust Washer

- Installed position: collar towards spring, tab toward tapered ring

#### 24 - Left Flange Shaft Spring

- installed behind left flange shaft

#### 25 - Flange Shaft, Left

- Removing and installing, refer to ⇒ ["3.1 Left Flange Shaft", page 228](#)

#### 26 - Shaft Seal

- For left flange shaft
- Replace with transmission installed, refer to ⇒ ["3.2 Left Flange Shaft Seal", page 228](#)

## 1.4 Adjustment Overview



### Note

When performing repairs on the transmission, readjustment of the output shaft for 1st to 4th gears, output shaft for 5th/6th gear and reverse gear or differential is only required if components, which have a direct influence on transmission adjustment, have been replaced. Refer to the following table to avoid unnecessary adjustments:

Parts Replaced:	To be Adjusted:		
	Output shaft 1st to 4th gears ⇒ "2.3 Output Shaft, 1st to 4th Gears, Adjusting", page 183	Output shaft for 5th/6th gear and reverse gear ⇒ "2.5 Output Shaft for 5th/6th Gear and Reverse Gear, Adjusting", page 188	Differential ⇒ "1.5 Differential, Adjusting", page 224
Transmission housing	x	x	x
Clutch housing	x	x	x
Output Shaft, 1st to 4th Gears	x		
Output Shaft, 5th, 6th and Reverse Gears		x	
Differential housing			x
Tapered roller bearing for output shaft for 1st to 4th gears	x		
Tapered roller bearing for output shaft for 5th/6th and reverse gears		x	
Differential tapered roller bearing			x

## 1.5 Differential, Adjusting

A new differential adjustment is required when the following components have been replaced:

- ◆ Transmission housing
- ◆ Clutch housing
- ◆ Differential housing
- ◆ Differential tapered roller bearing

List of adjustments, refer to  
⇒ "1.4 Adjustment Overview", page 224 .

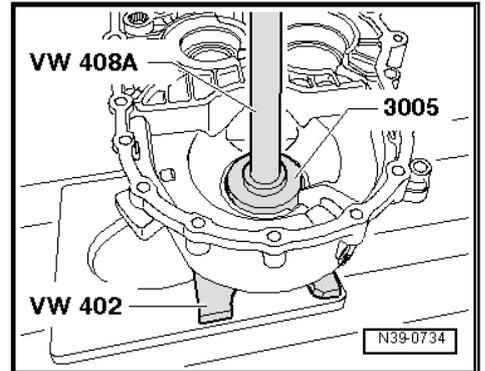
### Special tools and workshop equipment required

- ◆ Transmission Support -VW 353-
- ◆ Magnetic Plate 50 mm Dia. -VW 385/17-
- ◆ Dial Gauge Holder -VW 387-
- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 408 A-
- ◆ Oil Pump Align Plate -3005-
- ◆ Tube -3259-
- ◆ Press Tool -3345-

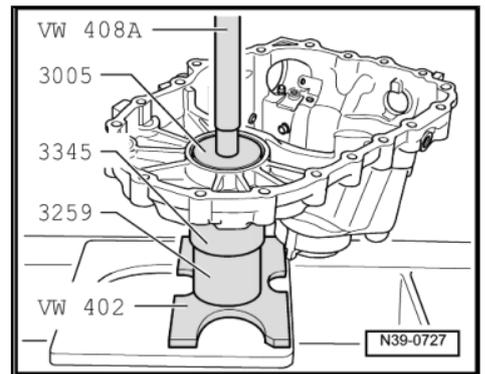
- ◆ Torque Wrench -V.A.G 1331-
- ◆ Dial Gauge -VAS 6080-
- ◆ Kukko 21/7 internal puller
- ◆ Kukko 22/2 counter-support
- ◆ Dial gauge extension 30 mm

**Procedure**

- Press the outer ring for the tapered roller bearing with an adjustment shim into the clutch housing.
- The shoulder on the inner diameter of the -3005- points toward the outer ring.



- Press the outer ring for the tapered roller bearing without an adjustment shim into the transmission housing.
- Insert differential into clutch housing.
- Attach the transmission housing and tighten the 5 bolts to tightening specification -11- => [page 78](#) and -12- => [page 78](#) .
- Press differential in direction of clutch housing and rotate eight times at the same time.
- Press the differential in the direction of the transmission housing and rotate eight times at the same time.



- Install dial gauge and set to 0 with 1 mm pre-load.

A - Dial gauge extension 30 mm

- Move the differential up and down and read the play on the dial gauge and note it (example: 0.70 mm).

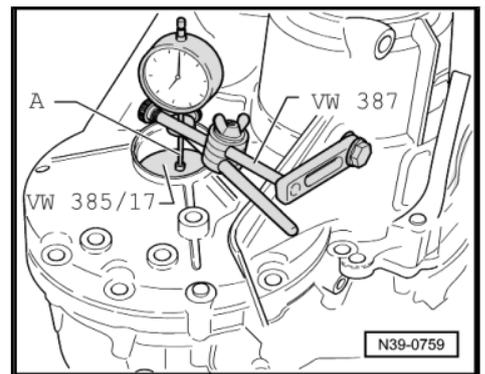
**Determining Shim Thickness**

The specified bearing pre-load is obtained by adding a constant pre-load figure of (0.25 mm) to the reading obtained.

**Example:**

Measured value	0.70 mm
+ Pre-load (constant value)	0.25 mm
Thickness of shim =	0.95 mm

- Remove transmission housing.



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- Pull outer race/tapered roller bearing out of transmission housing.

A - Support , for example -Kukko 22/2-

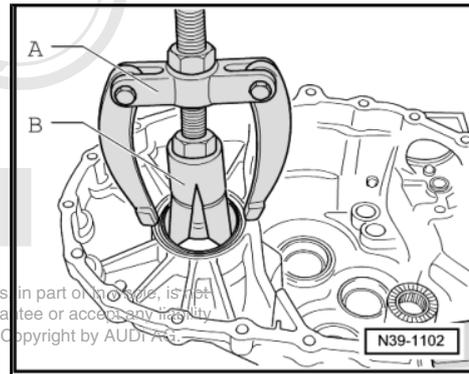
B - Internal puller 46 to 58 mm , for example -Kukko 21/7-

- Determine the adjustment shim thickness according to the table; part numbers. Refer to the electronic parts catalog ETKA.
- Insert shim of correct thickness.

The following shims are available

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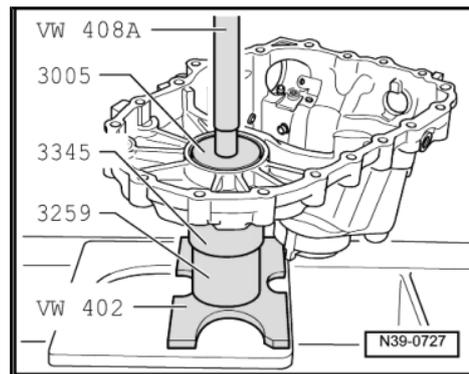
Thickness of Shims in mm			
0.65	0.85	1.05	1.25
0.70	0.90	1.10	
0.75	0.95	1.15	
0.80	1.00	1.20	



Different shim thicknesses make it possible to select the required thickness precisely.

If the measured shim thickness is greater than the one listed in the table, two adjustment shims totaling the correct value can be installed. First the thicker adjustment shim must be inserted for this.

- Press in the outer ring again and fasten the transmission housing. Refer to [⇒ "2.12 Transmission Housing and Shift Mechanism Assembly Overview", page 77](#).



## 2 Specifications

⇒ **“2.1 Fastener Tightening Specifications”, page 227**

### 2.1 Fastener Tightening Specifications

Component	Bolt Size	Nm
Bevel Box <sup>1</sup>		40 + 45°
Bevel Box Output Flange <sup>1</sup>		480
Drain Plug		60
Flange Shaft, Left <sup>1</sup>		33
Right Drive Flange <sup>1</sup>		33
<ul style="list-style-type: none"> <li>• <sup>1</sup> Always replace</li> </ul>		

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## 3 Removal and Installation

⇒ [“3.1 Left Flange Shaft”, page 228](#)

⇒ [“3.2 Left Flange Shaft Seal”, page 228](#)

⇒ [“3.3 Shaft Sealing Ring for Bevel Box with Manual Transmission Installed, Replacing”, page 229](#)

⇒ [“3.4 Right Flange Shaft”, page 230](#)

⇒ [“3.5 Right Flange Shaft Seat on Outer Bevel Box, Replacing”, page 231](#)

⇒ [“3.6 Right Flange Shaft Needle Bearing”, page 232](#)

⇒ [“3.7 Seal between Transmission and Bevel Box”, page 233](#)

⇒ [“3.8 Bevel Box Drive Flange Seal”, page 234](#)

### 3.1 Left Flange Shaft

#### Special tools and workshop equipment required

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

#### Removing

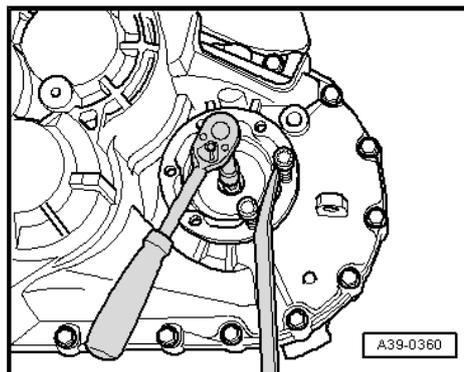
- Remove left drive axle. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .
- Place -V.A.G 1782- under transmission.
- Remove the left flange shaft bolt by installing 2 bolts in the flange and counter holding the flange shaft with the assembly lever.
- Pull out flange shaft with spring.

#### Installing

- Tightening specification, refer to ⇒ [“1.1 Flange Shaft and Seals on Transmission Assembly Overview”, page 219](#) .

Install in reverse order, paying attention to the following:

- Press flange shaft against spring force and tighten.
- Install left drive axle. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .
- Check the transmission oil level in the manual transmission and fill. Refer to ⇒ [“1.1 Manual Transmission, Checking Gear Oil Level”, page 47](#) .



### 3.2 Left Flange Shaft Seal

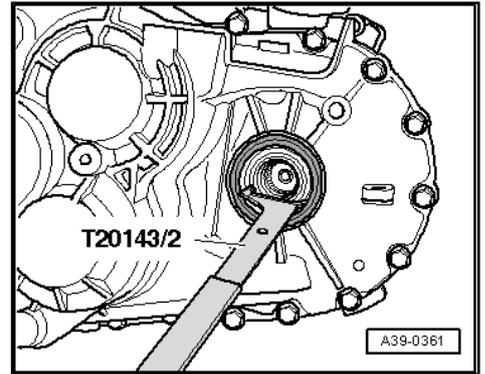
#### Special tools and workshop equipment required

- ◆ Thrust Piece -3305-
- ◆ Pulling Hook T20143/2-
- ◆ Sealing grease -G 052 128 A1-

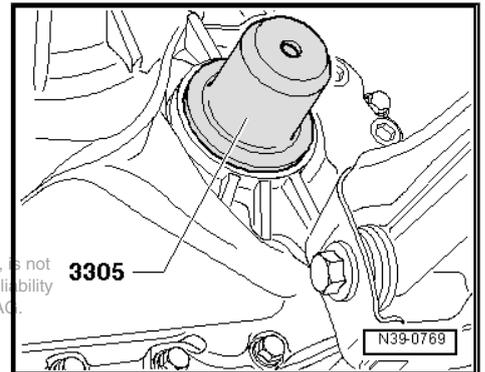
#### Procedure

- Transmission installed.
- Remove left drive flange. Refer to ⇒ [“3.1 Left Flange Shaft”, page 228](#) .

- Pull out flange shaft seal using -T20143/2- .

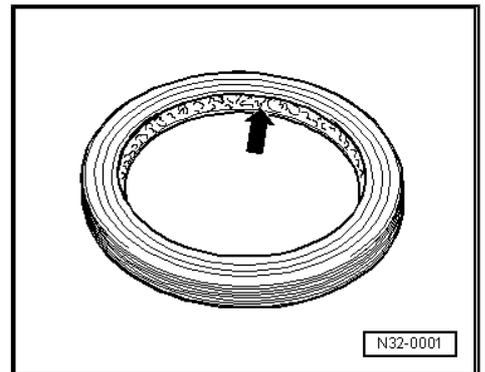


- Lightly oil outer circumference of new shaft seal.
- Drive in new shaft seal as far as stop without tilting it.



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- Fill area between sealing lip and dust lip -arrow- halfway with sealing grease -G 052 128 A1- .
- Install left flange shaft. Refer to [⇒ "3.1 Left Flange Shaft", page 228](#) .
- Check the transmission oil level in the manual transmission and fill. Refer to [⇒ "1.1 Manual Transmission, Checking Gear Oil Level", page 47](#) .



### 3.3 Shaft Sealing Ring for Bevel Box with Manual Transmission Installed, Replacing

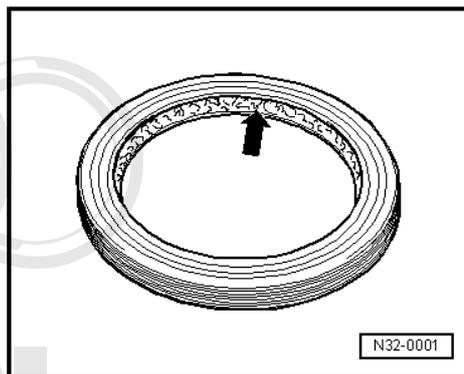
#### Special tools and workshop equipment required

- ◆ Oil Collecting and Extracting Device -V.A.G 1782-
- ◆ Pulling Hook -T20143/2-
- ◆ Thrust Piece -T10243-

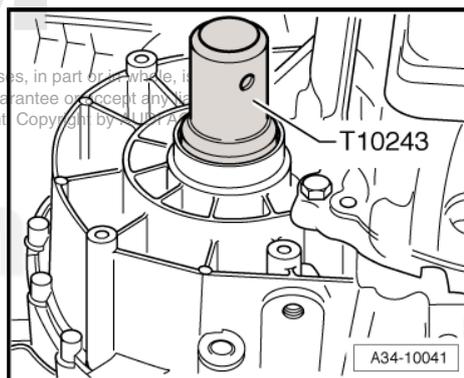
#### Procedure

- The bevel box is removed. Refer to [⇒ "4.11 Bevel Box, Removing", page 118](#) .
- Place drip tray -VAS 6208- underneath.
- Pry the bevel box shaft sealing ring off with the -T20143/2- or extractor lever -VW 681- .

- Fill space between sealing lip and dust lip -arrow- halfway with sealing grease -G 052 128 A1- .
- Lightly oil outer circumference of new shaft seal.



- Drive in the shaft sealing ring to the stop.
- Check the transmission oil level in the manual transmission and fill. Refer to [⇒ "1.1 Manual Transmission, Checking Gear Oil Level", page 47](#) .



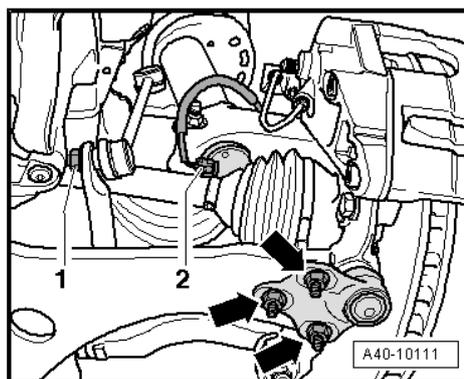
### 3.4 Right Flange Shaft

#### Special tools and workshop equipment required

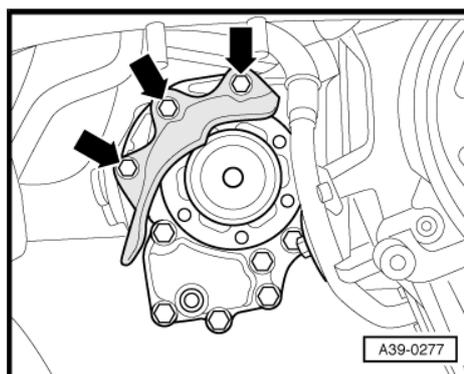
- ◆ Used Oil Collection and Extraction Device -V.A.G 1782-
- ◆ Puller -T10037-
- ◆ Socket and Extended Bit -T10107 A-

#### Removing

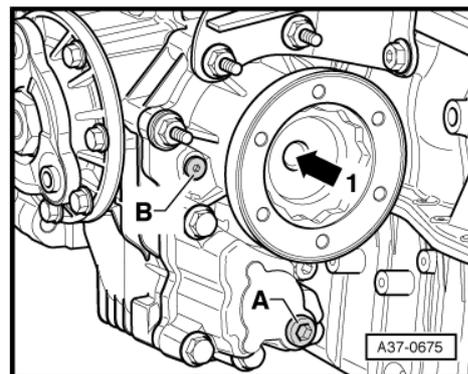
- Mark the installation positions of nuts -arrows- with a felt-tip pen.
- Remove the right drive axle. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .



- Remove right drive axle heat shield from bevel box -arrows-.
- Place -V.A.G 1782- under transmission.



- Remove right flange shaft bolt -arrow 1- with the -T10107 A- by installing 2 bolts in the flange and counter holding the flange shaft with the assembly lever.



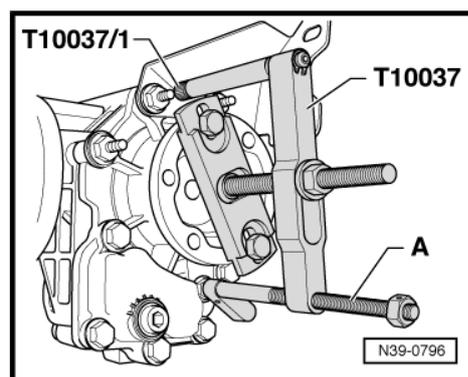
- Install -T10037- on right flange shaft.
- Align -T10037- with knurled nut -T10037- and lower support -A- parallel to flange.
- Pull out flange shaft.

#### Installing

- Tightening specification, refer to [⇒ "1.2 Flange Shaft and Seals on Bevel Box Assembly Overview", page 220](#).

Install in reverse order, paying attention to the following:

- Carefully install the flange shaft, while rotating it at the same time.
- Install flange shaft.
- Install the right drive axle heat shield [⇒ page 113](#).
- Install right drive axle. Refer to [⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation](#).
- Check the transmission oil level in the manual transmission and fill. Refer to [⇒ "1.1 Manual Transmission, Checking Gear Oil Level", page 47](#).



### 3.5 Right Flange Shaft Seat on Outer Bevel Box, Replacing

#### Special tools and workshop equipment required

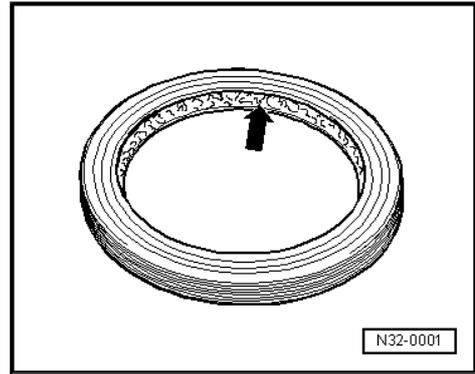
- ◆ Thrust Piece -T10049-

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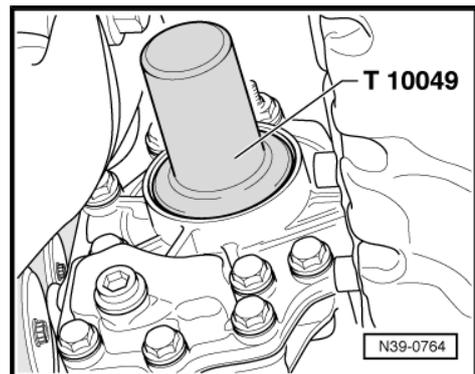
#### Procedure

- Transmission installed.
- Remove right flange shaft. Refer to [⇒ "3.4 Right Flange Shaft", page 230](#).
- Pry out the shaft sealing ring for the flange shaft with an assembly lever.
- Lightly oil outer circumference of new shaft seal.

- Fill area between sealing lip and dust lip -arrow- halfway with sealing grease -G 052 128 A1- .



- Drive in sealing ring to stop using -T10049- .
- Install right flange shaft. Refer to [=> "3.4 Right Flange Shaft", page 230](#) .
- Check the transmission oil level in the bevel box and replenish. Refer to [=> "1.1 Manual Transmission, Checking Gear Oil Level", page 47](#) .



### 3.6 Right Flange Shaft Needle Bearing

#### Special tools and workshop equipment required

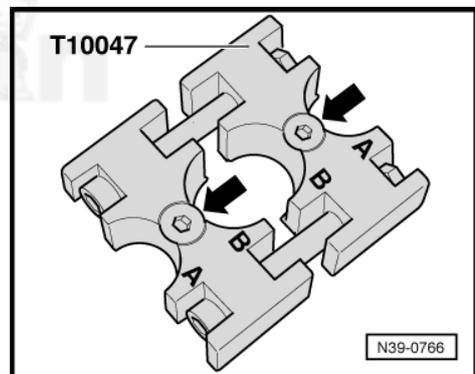
- ◆ Thrust Plate -VW 401-
- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 407-
- ◆ Thrust Disc -VW 412-
- ◆ Alignment Fixture -VAS 3253-
- ◆ Assembly Tool -T10047-

#### Procedure

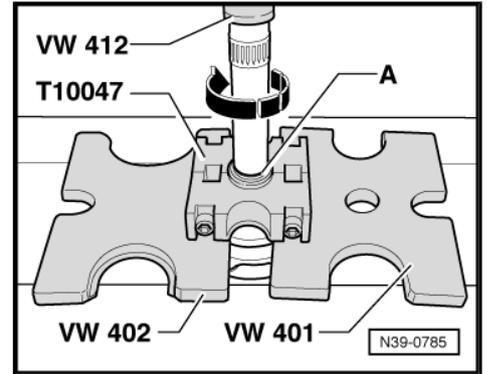
- Remove right flange shaft. Refer to [=> "3.4 Right Flange Shaft", page 230](#) .

- Mount the -T10047- as illustrated.
  - The markings B on both parts face each other
  - The sections -arrows- must then be located under the bearing.
- Bolt the parts together.

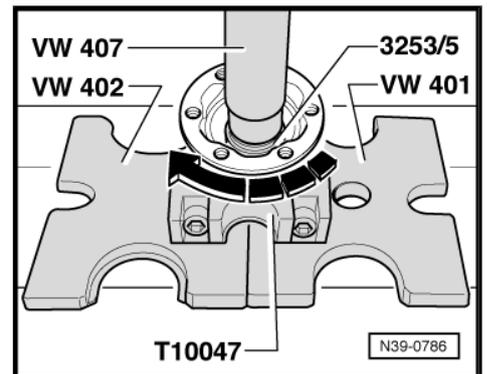
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- Remove the circlip -A-.
- Shaft must be rotated while pressing off -arrow- so that the needle bearing contact surface on shaft is not damaged.



- Shaft must be rotated while pressing on -arrow- so that the needle bearing contact surface on shaft is not damaged.
- Secure the needle bearing with a new circlip.
- Install right flange shaft. Refer to [⇒ "3.4 Right Flange Shaft", page 230](#).



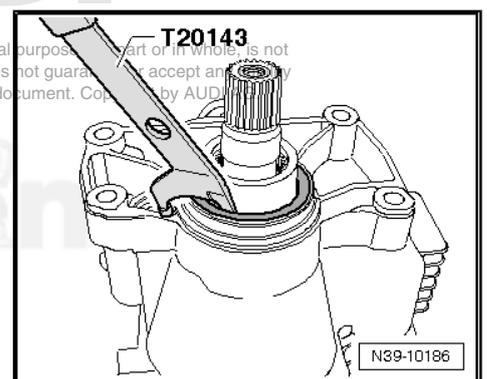
### 3.7 Seal between Transmission and Bevel Box

#### Special tools and workshop equipment required

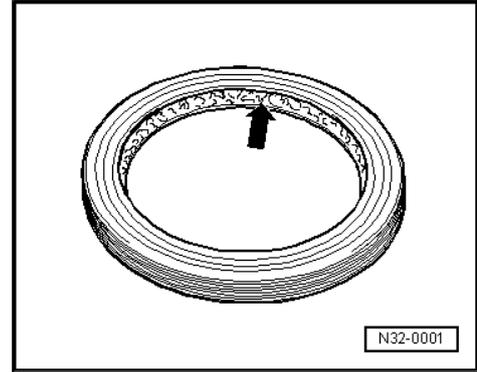
- ◆ Pulling Hook -T20143-
- ◆ Thrust Piece -T10298-

#### Procedure

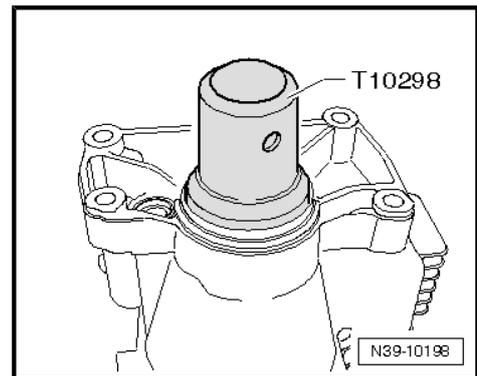
- The bevel box is removed. Refer to [⇒ "4.11 Bevel Box, Removing", page 118](#).
- Pry out sealing ring on bevel box with -T20143/1- or -T20143/2- .
- Lightly oil outer circumference of new shaft seal.



- Fill area between sealing lip and dust lip -arrow- halfway with sealing grease -G 052 128 A1- .



- Drive in shaft seal as far as stop with -T10298- .



### 3.8 Bevel Box Drive Flange Seal

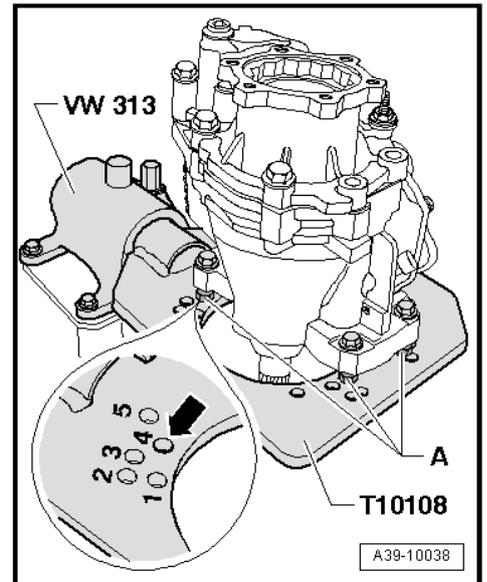
#### Special tools and workshop equipment required

- ◆ Holding Fixture -VW 313-
- ◆ Tube 42 mm Dia. -VW 516-
- ◆ Thrust Piece -40-105-
- ◆ Thrust Piece -T10049-
- ◆ Transmission Holder -T10108-
- ◆ Stop Plate -T10108/1-
- ◆ Tapered Roller Bearing Puller -V.A.G 1582-
- ◆ Attachment -V.A.G 1582/6A-
- ◆ Torque Wrench -V.A.G 1601-
- ◆ Slide Hammer-Complete Set -VW 771-
- ◆ Pulling Hook -VW 771/31-
- ◆ Oil Collecting and Extracting Device -V.A.G 1782-
- ◆ M10 x 30 bolt (quantity 2)
- ◆ M12 x 10 nut (quantity 4)
- ◆ Kukko 20/10 two-arm puller
- ◆ Kukko 45/2 three arm puller

#### Procedure

- Tightening specification, refer to [⇒ "1.2 Flange Shaft and Seals on Bevel Box Assembly Overview", page 220](#) .
- The bevel box is removed. Refer to [⇒ "4.11 Bevel Box, Removing", page 118](#) .

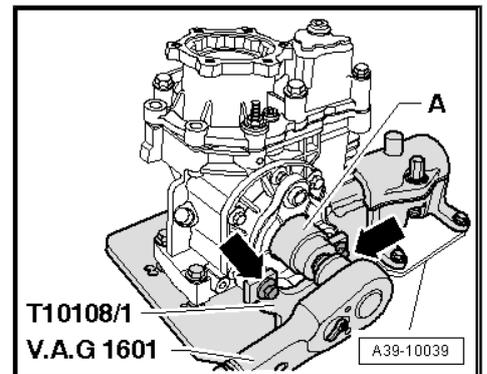
- Place the bevel box on the hole -arrow- marked with the number 4 in the -T10108- while laying the M12 x 10 nut -A- between the bevel box and the transmission holder.
- Then align the bevel box with the remaining 3 holes and secure it with the nut -A-.
- Place the -V.A.G 1782- underneath.
- Drain the axle oil from the bevel box.



- Bevel box output shaft with -T10108/1- , install the 2 M10 x 30 bolts -arrows-.
- Remove the output flange nut.

A - Wrench socket 36 mm  $\frac{3}{4}$ " drive

- Pivot bevel box so that output shaft faces upward.

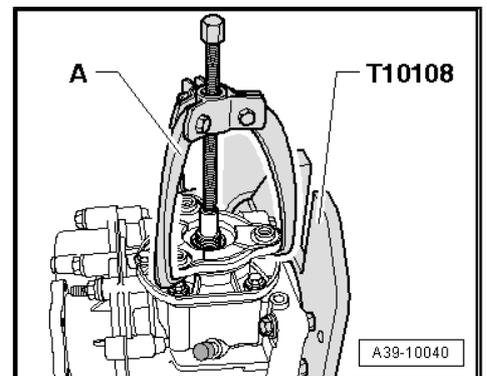


- Remove the output flange form the bevel box shaft bevel gear.
- A - Kukko 45/2 three arm puller

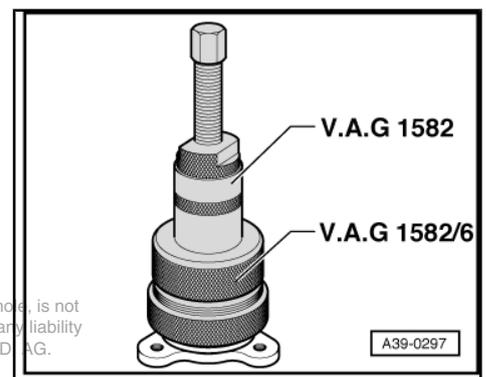
**i** Note

*When removing output shaft, inner race/tapered roller bearing remains on output shaft and must be removed from it .*

- Place the -40 - 105- on the output flange.

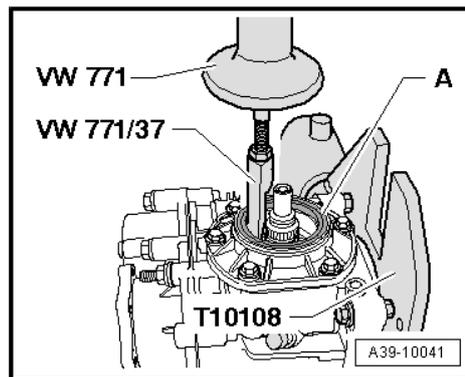


- Remove the inner race of the tapered roller bearing from the output flange using -V.A.G 1582- and -V.A.G 1582/6A- .

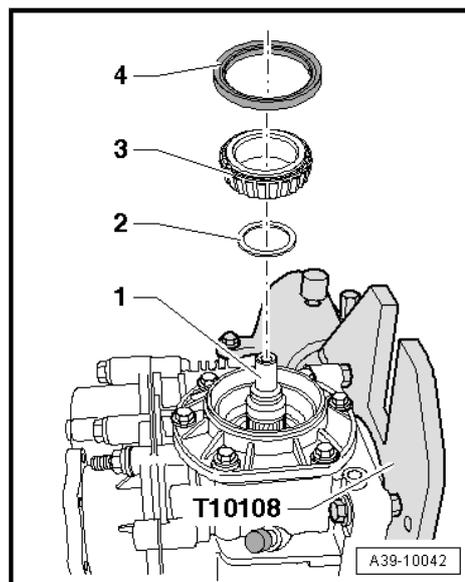


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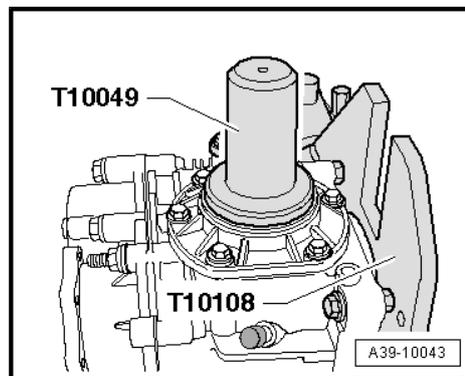
- Remove output shaft seal -A-.
- Clean any remaining locking fluid from the thread on the shaft bevel gear.



- Previous shim -2- for shaft beveled gear preload -1- must be installed.
- Install the taper roller bearing inner race -3- into the outer ring in the bevel box.
- Lightly apply oil to the outer diameter of the new seal -4- for the output flange.

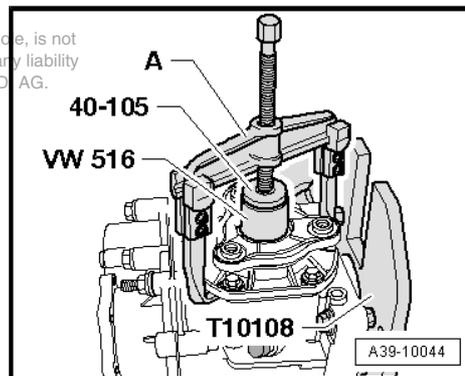


- Drive in shaft seal as far as stop with -T10049- .
- Fill area between sealing lip and dust lip halfway with sealing grease -G 052 128 A1- .

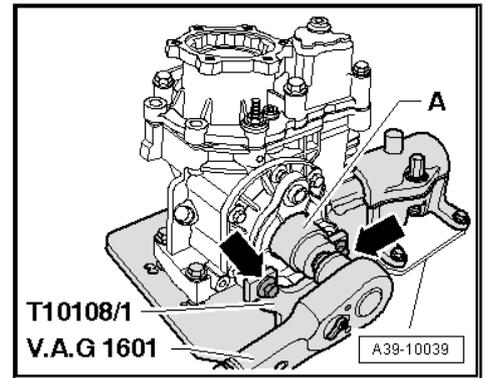


- Pull the output flange in; when doing this mount the pulling hooks at the bottom of the drive pinion housing.

A - Two-arm puller Kukko 20/10



- Coat the new nut for the output flange with locking fluid and then tighten; locking fluid. Refer to the electronic parts catalog ETKA.
- Replenish axle oil after installation of the bevel box. Refer to [⇒ "1.3 Gear Oil in Bevel Box, Filling", page 49](#) .



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erWin 

## 4 Disassembly and Assembly

⇒ "4.1 Differential", page 238

### 4.1 Differential

#### Special tools and workshop equipment required

- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 408 A-
- ◆ Punch -VW 411-
- ◆ Thrust Disc -VW 412-
- ◆ Press Tube -30 - 23-
- ◆ Thrust Piece -40-105-
- ◆ Thrust Pad -3005-
- ◆ Tube -3259-
- ◆ Tube -3296-
- ◆ Assembly Tool -3301-
- ◆ Press Tool -3345-
- ◆ -1- Kukko 21/7 internal puller
- ◆ -2- Kukko 18/1 puller 65-160mm
- ◆ -3- Separating tool 17/1
- ◆ -4- Kukko 22/2 counter-support
- ◆ -3- Kukko puller 204/2

#### Pulling Outer Race/Tapered Roller Bearing Off Clutch Housing

A - Support , for example -Kukko 22/2-

B - Internal puller 46 to 58 mm , for example -Kukko 21/7-

- Tension internal puller -B- between the outer ring for the tapered roller bearing and adjustment shim.

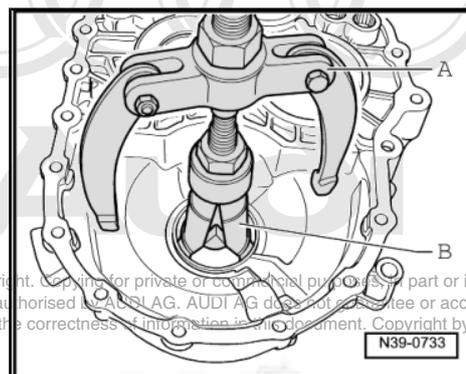


#### Note

*After pulling off, check the adjustment shim for damage and replace if necessary.*

#### Pressing in Outer Race/Tapered Roller Bearing into Clutch Housing

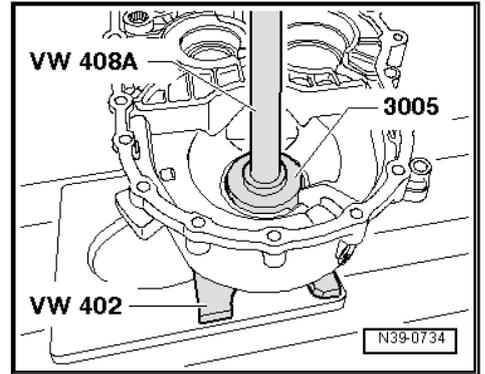
- Insert the adjustment shim beforehand.



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- The shoulder on the inner diameter of the -3005- points toward the outer ring.

### Pulling Off Inner Race for Tapered Roller Bearing

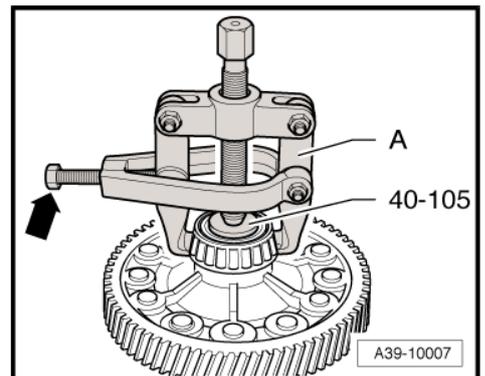


- Place the -40-105- on the differential housing.
- Tension the puller for example -Kukko 204/2- in the area of the flattened sides of the differential housing below the inner ring.

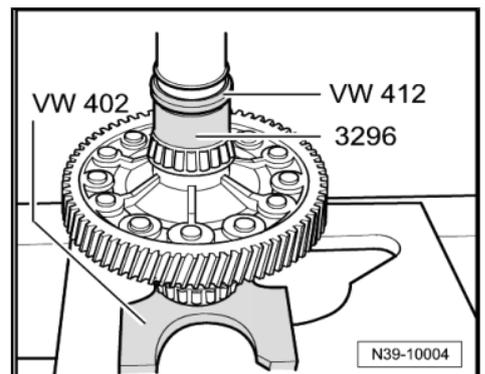


#### Note

*When pulling off inner race, make sure that the hooks do not bend outward; if necessary re-tighten bolt -arrow-.*



### Pressing On Tapered Roller Bearing Inner Race

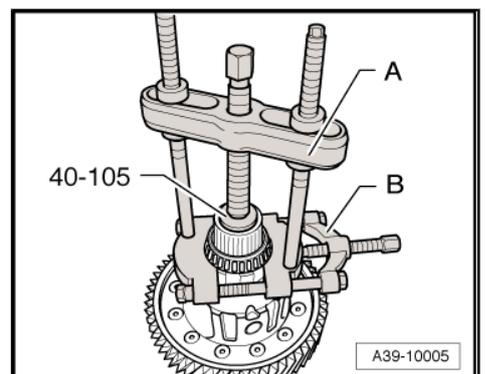


### Pulling Off Inner Race for Tapered Roller Bearing

A - Extractor , for example -Kukko 18/1-

B - Separating device 12 to 75 mm , for example -Kukko 17/1-

### Pressing on Tapered Roller Bearing Inner Race

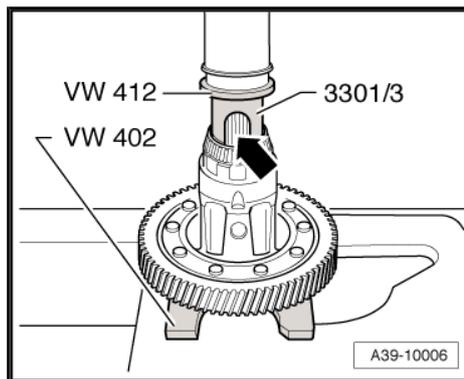


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- Place the sleeve -3301/3- from the -3301- with the notch -arrow- (larger inner diameter) on the inner race for the tapered roller bearing.

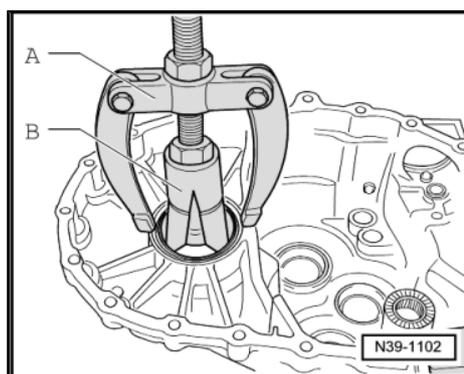


**Pulling Outer Race/Tapered Roller Bearing Out of Transmission Housing**

A - Support , for example -Kukko 22/2-

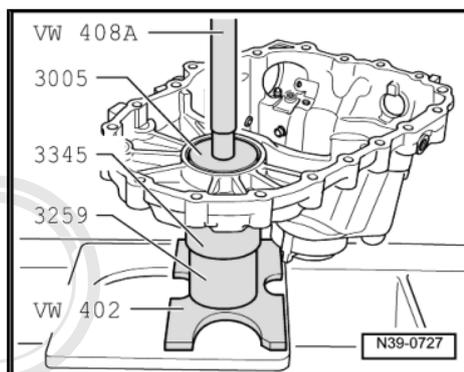
B - Internal puller 46 to 58 mm , for example -Kukko 21/7-

**Pressing in Tapered Roller Bearing Outer Race Into Transmission Housing**



- Support transmission housing directly beneath bearing mount using -3345- .

**Removing the Differential Bevel Gear Axle and Spring Pin**



- First drive roll pin -1- flush into differential bevel gear axle -2-.
- Place differential with roll pin -arrow- facing toward -30 - 23- below press.
- Then press out differential bevel gear axle.

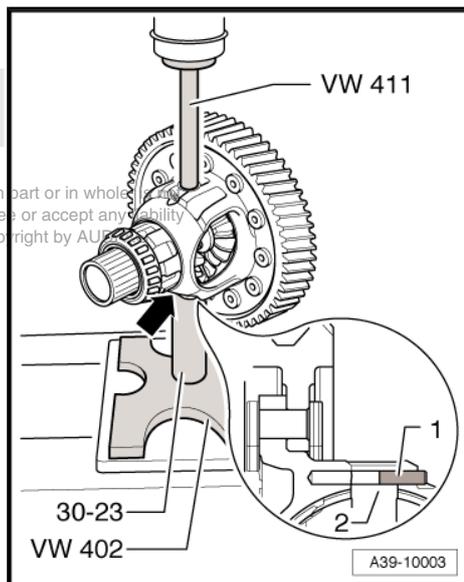
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**i Note**

*Remove sheared of parts of roll pin from differential bevel gear axle if necessary.*

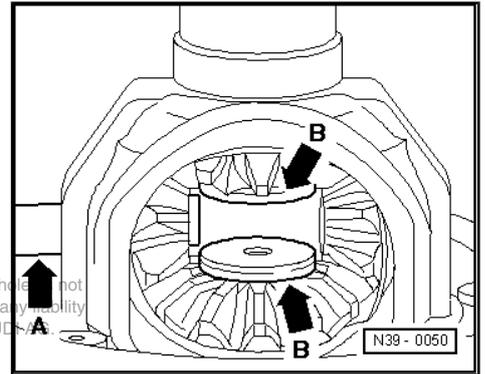
**Installing the Differential Bevel Gears**

- Insert thrust washer union with transmission fluid.
- Insert both large differential bevel gears and secure (for example with flange shaft).
- Insert the small differential planetary gears 180° offset and pivot them into position.



- Press in the differential bevel gear axle -arrow A- up to the first small differential bevel gear.
- Insert threaded pieces -arrows B- in large differential bevel gears.
- Installed position: shoulder faces the differential bevel gear
- Drive differential planetary gear axle into final position and secure with spring pin => [page 241](#) .

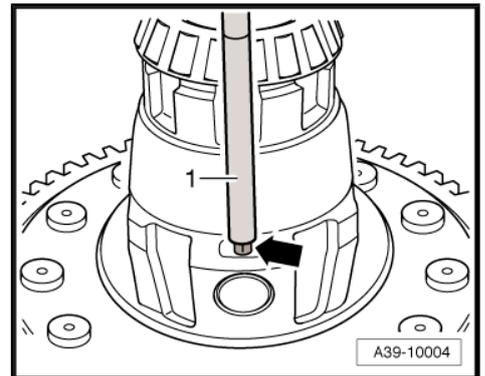
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### Roll Pin, Installing

- Drive new roll pin -arrow- flush into differential bevel gear axle with a drift -1-.

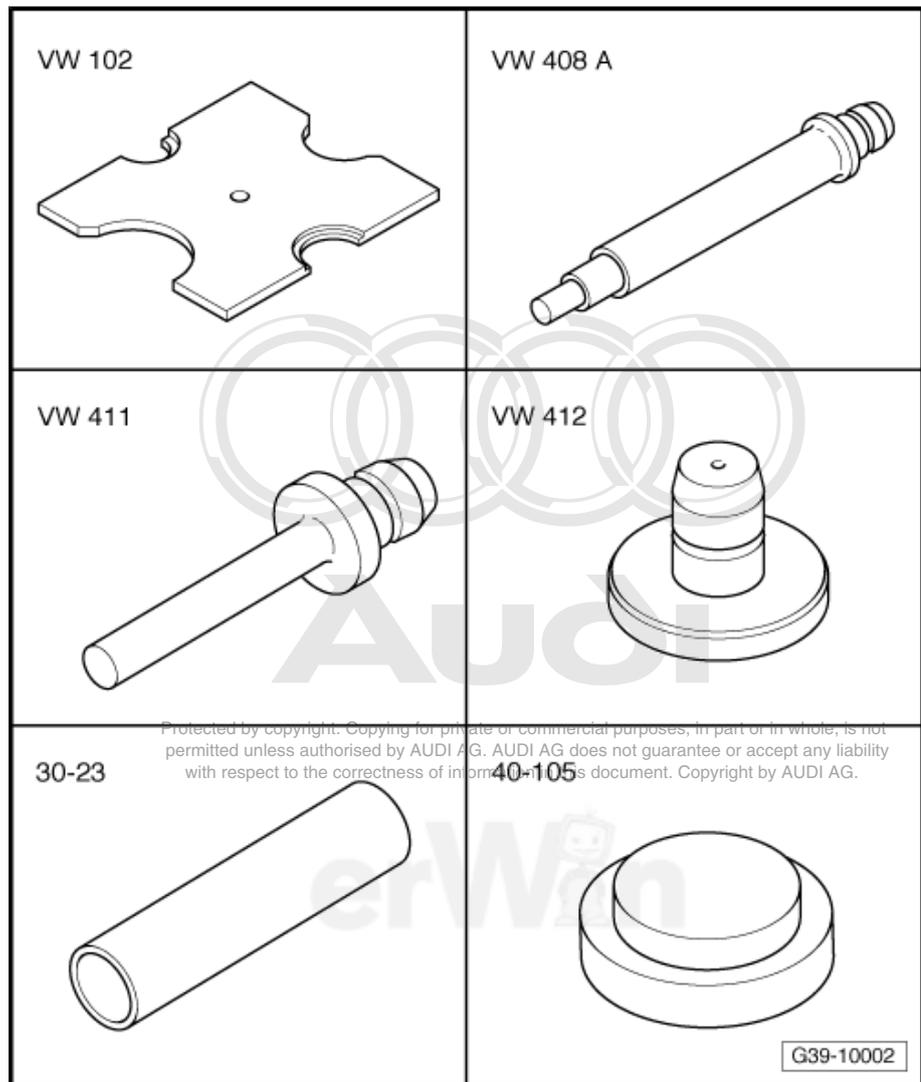
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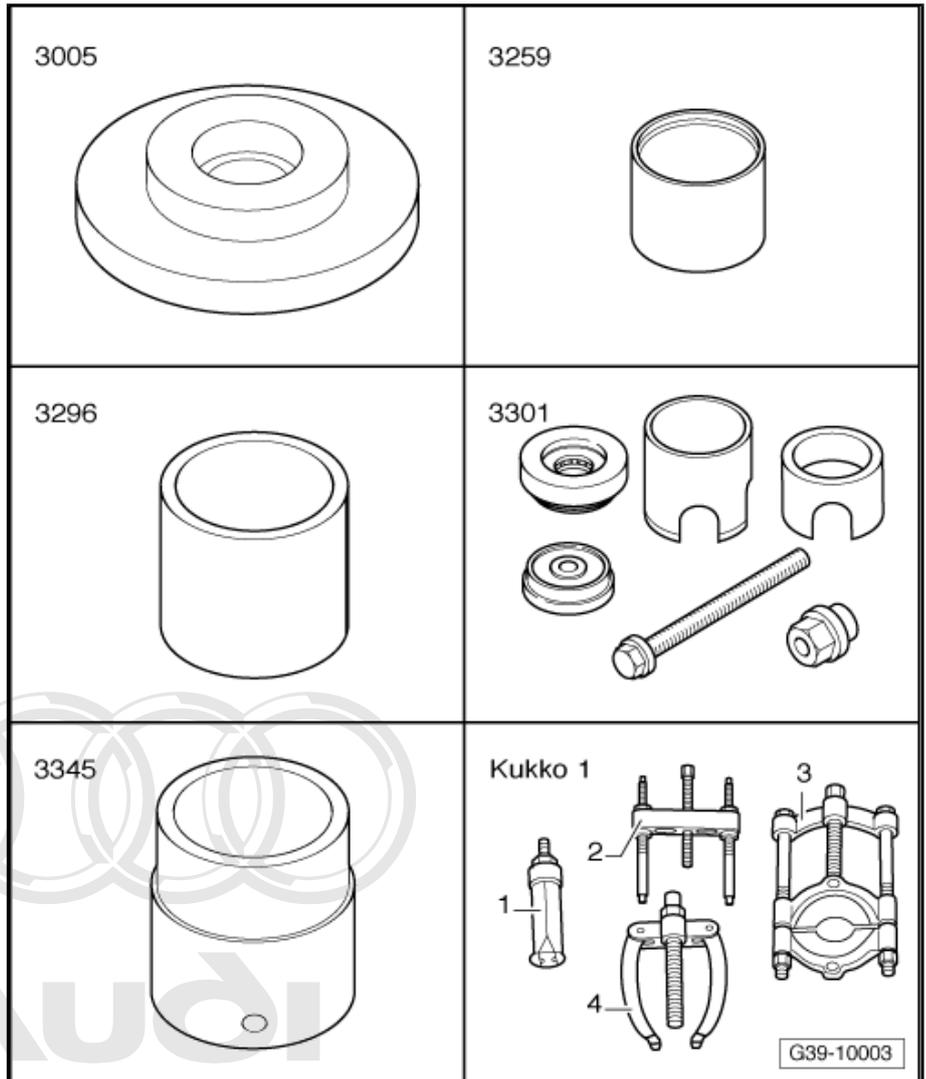
## 5 Special Tools

### Special tools and workshop equipment required

- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 408 A-
- ◆ Punch -VW 411-
- ◆ Thrust Disc -VW 412-
- ◆ Press Tube -30 - 23-
- ◆ Thrust Piece -40-105-



- ◆ Thrust Pad -3005-
- ◆ Tube -3259-
- ◆ Tube -3296-
- ◆ Assembly Tool -3301-
- ◆ Press Tool -3345-
- ◆ -1- Kukko 21/7 internal puller
- ◆ -2- Kukko 18/1 puller 65-160mm
- ◆ -3- Separating tool 17/1
- ◆ -4- Kukko 22/2 counter-support



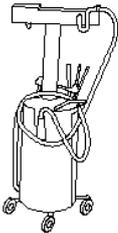
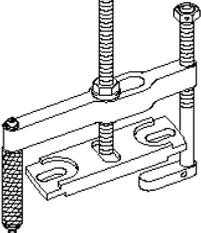
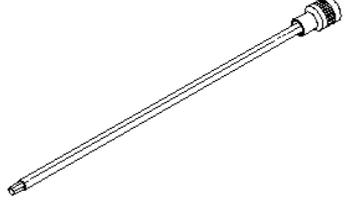
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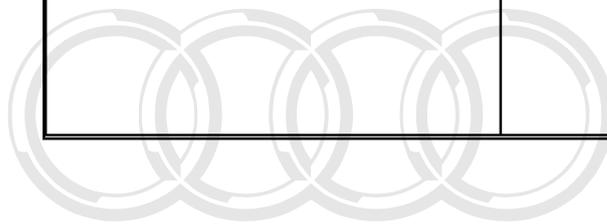




**Special tools and workshop equipment required**

- ◆ Oil collecting and extracting device -V.A.G 1782-
- ◆ Puller -T10037-
- ◆ Socket and Extended Bit - T10107 A-

<p>V.A.G 1782</p> 	<p>T10037</p> 
<p>T10107</p> 	
	<p>G39-0115</p>



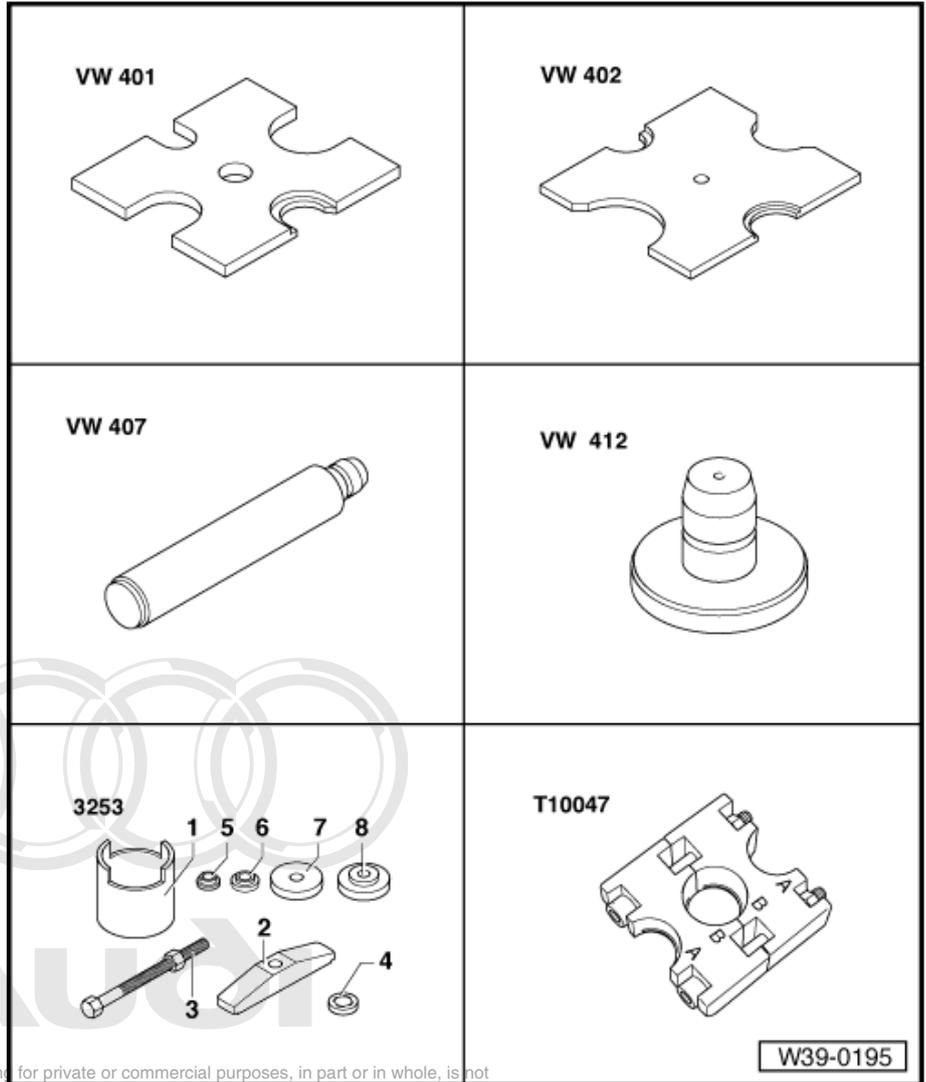
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**Special tools and workshop equipment required**

- ◆ Thrust Plate -VW 401-
- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 407-
- ◆ Thrust Disc -VW 412-
- ◆ Alignment Fixture -VAS 3253-
- ◆ Assembly Tool -T10047-



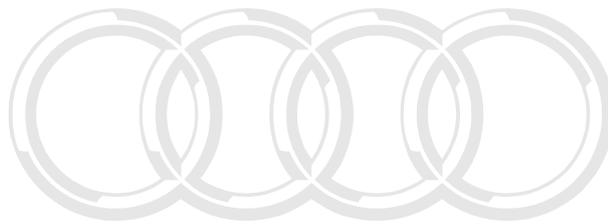
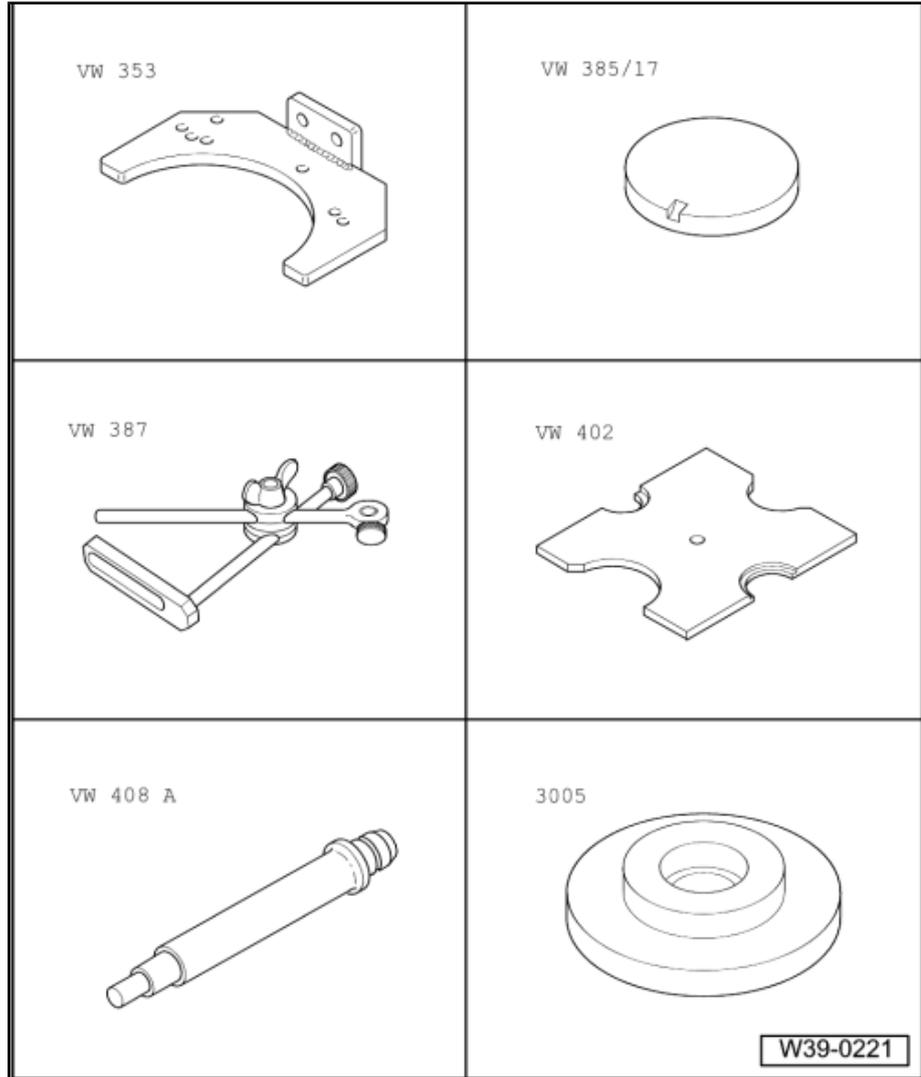
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**Special tools and workshop equipment required**

- ◆ Transmission Support - VW 353-
- ◆ Magnetic Plate 50 mm Dia. -VW 385/17-
- ◆ Dial Gauge Holder - VW 387-
- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 408 A-
- ◆ Oil Pump Align Plate -3005-

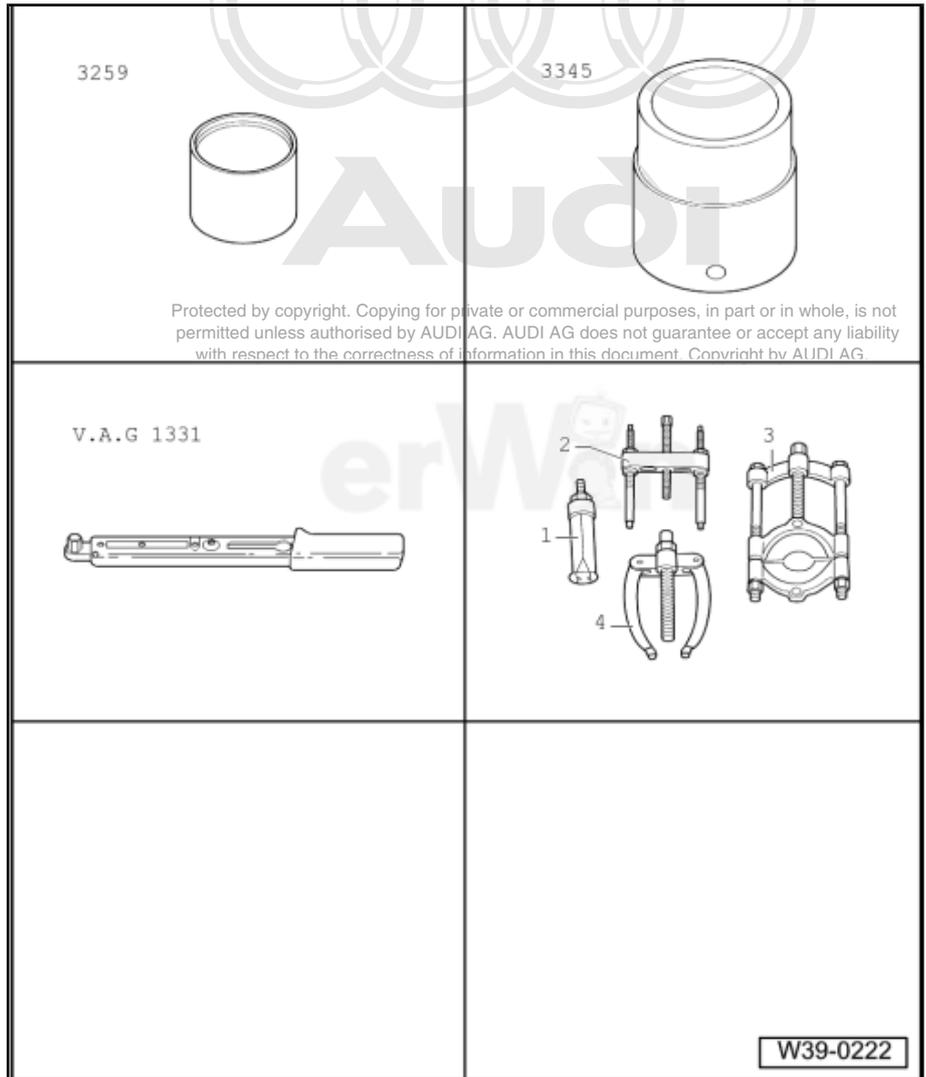


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- ◆ Tube -3259-
- ◆ Press Tool -3345-
- ◆ Torque Wrench -V.A.G 1331-
- ◆ -1- Kukko 21/7 internal puller
- ◆ -4- Kukko 22/2 counter-support





- ◆ Tapered Roller Bearing Puller -V.A.G 1582-

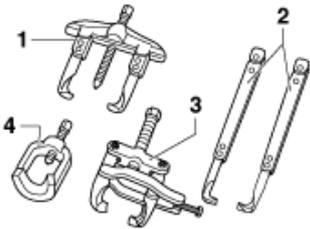
- ◆ Attachment -V.A.G 1582/6A-

- ◆ Torque Wrench -V.A.G 1601-

- ◆ -1- Kukko 20/10 two-arm puller

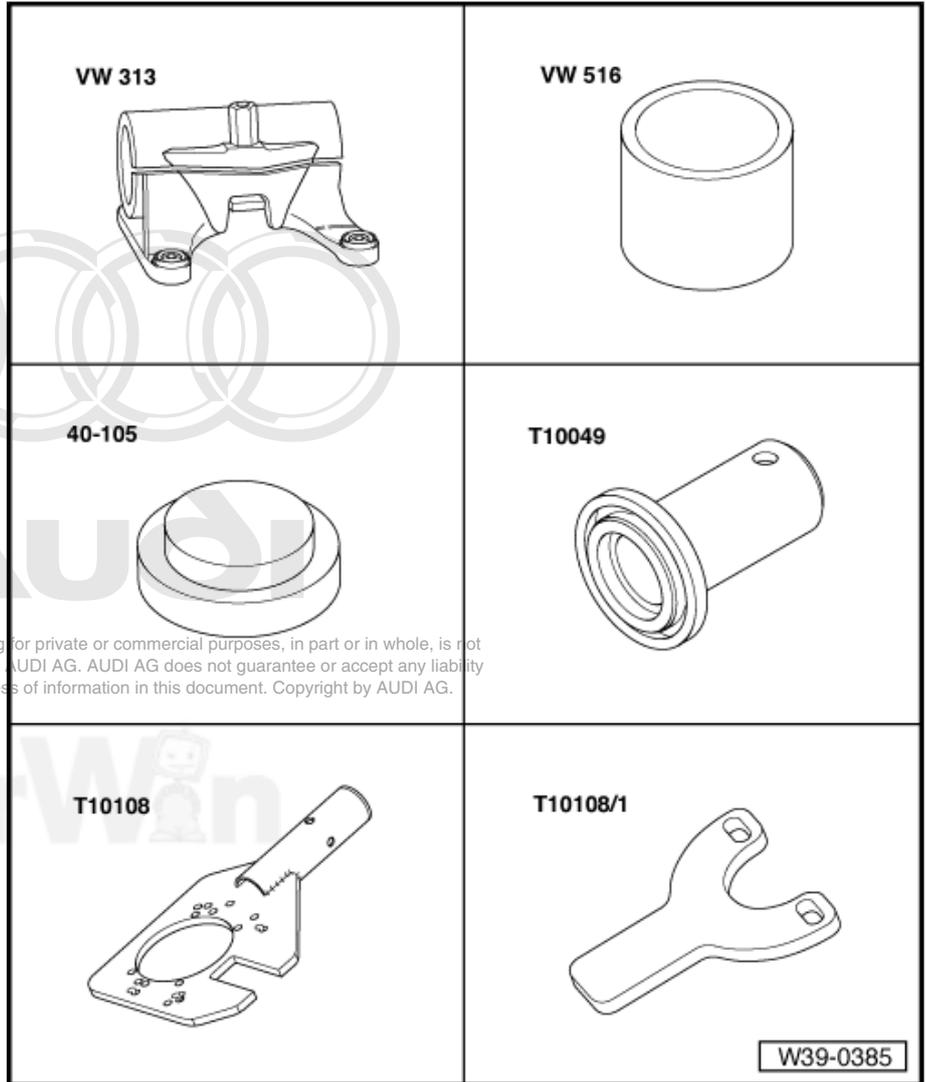
- ◆ Kukko 45/2 three arm puller

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<p>V.A.G 1582</p> 	<p>V.A.G 1582/6</p> 
<p>V.A.G 1601</p> 	
<p>45-2</p> 	<p>W39-0223</p>

**Special tools and workshop equipment required**

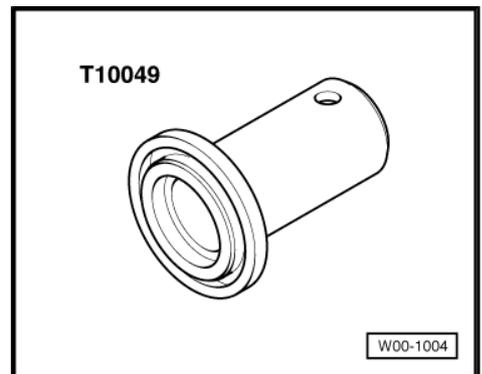
- ◆ Holding Fixture -VW 313-
- ◆ Tube 42 mm Dia. -VW 516-
- ◆ Thrust Piece -40-105-
- ◆ Thrust Piece -T10049-
- ◆ Transmission Holder - T10108-
- ◆ Stop Plate -T10108/1-



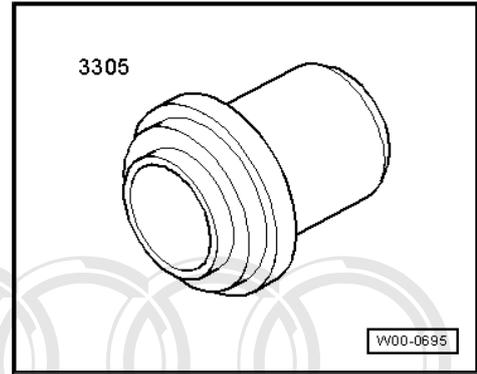
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**Special tools and workshop equipment required**

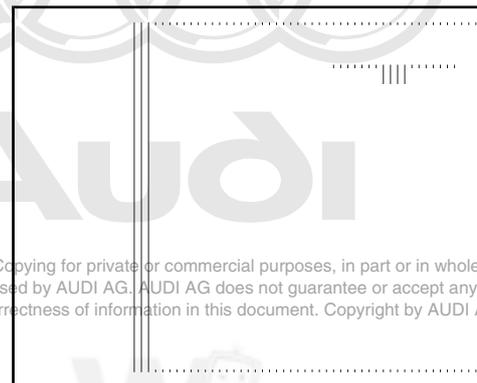
- ◆ Thrust Piece -T10049-



◆ Thrust Piece -3305-

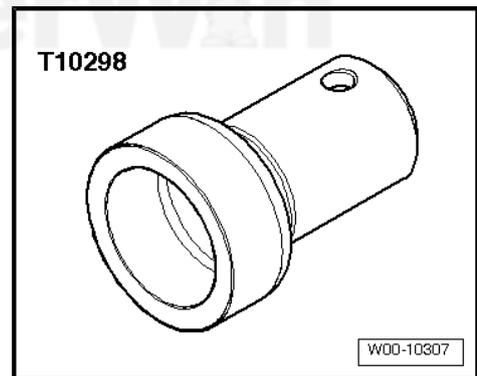


◆ Thrust Piece -T10243-

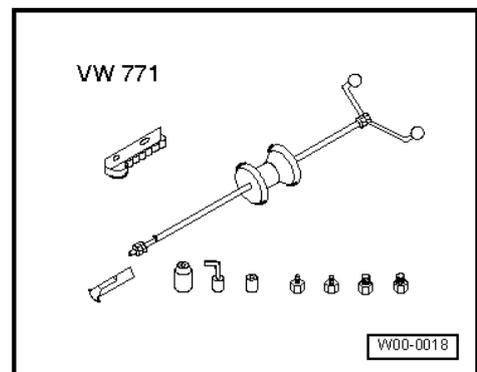


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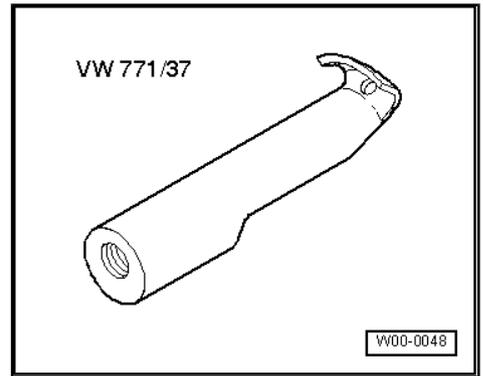
◆ Thrust Piece -T10298-



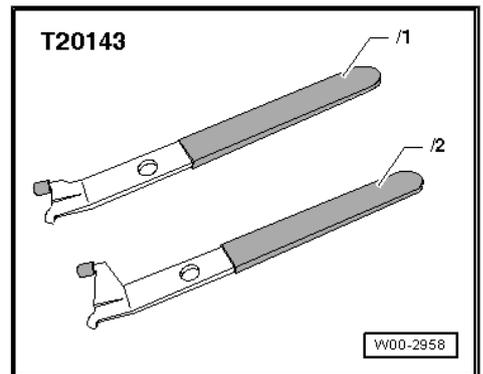
◆ Slide Hammer-Complete Set -VW 771-



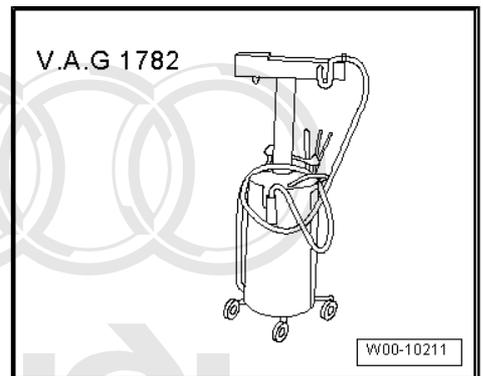
◆ Pulling Hook -VW 771/31-



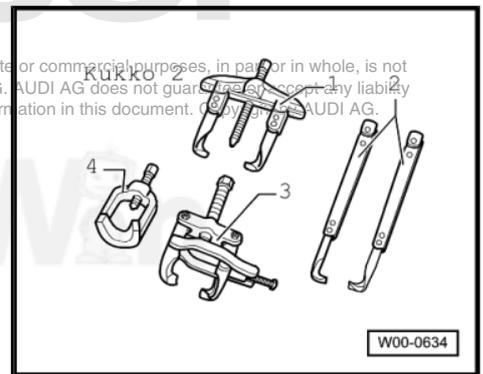
◆ Pulling Hook -T20143/2-



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



◆ -3- Kukko puller 204/2



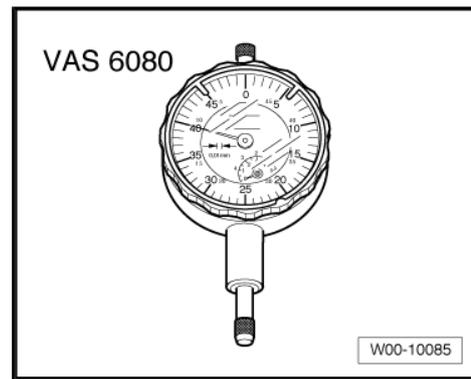
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◆ Dial Gauge -VAS 6080-



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◆ Dial gauge extension 30 mm

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# 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.

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- 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.

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- 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.**