



Audi

Repair Manual Audi TT 2007 >

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Manual Transmission

Edition 06.2009

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

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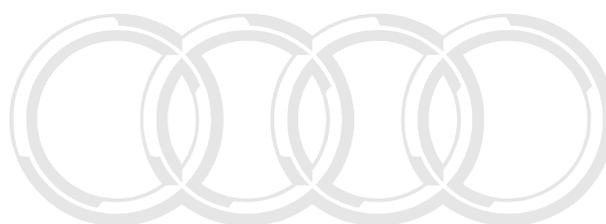
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00 – General, Technical Data

1 General Information

⇒ [“1.1 Contact Corrosion”, page 1](#)

⇒ [“1.2 Repair Information”, page 1](#)

⇒ [“1.3 Transmission Identification”, page 5](#)

1.1 Contact Corrosion

- ◆ The housing components may be made of magnesium or of aluminum.
- ◆ Screws and other components which come into direct contact with the transmission have a surface coating adapted for this.
- ◆ Contact corrosion occurs when incorrect components (bolts, nuts, washers, etc.) are used. The housing components will get damaged.
- ◆ If there is doubt about the suitability of parts, install new parts. Refer to the Electronic Parts Catalog (ETKA).



Caution

Warranty does not cover contact corrosion damage.

1.2 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, naturally 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 Shop Manual, are summarized here. They apply to this repair manual.

Special Tools and Equipment

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

Transmission

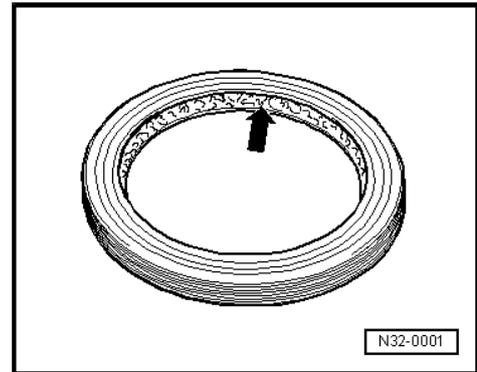
- ◆ Always clean the connection locations and the area around them before loosening.
- ◆ Make sure that the alignment sleeves between the engine and transmission are positioned correctly when installing the transmission.
- ◆ For the correct bolts and other parts, refer to the Electronic Parts Catalog (ETKA).
- ◆ Clean the contact surfaces when installing brackets as well as parts that have been waxed. Contact surfaces must be free of grease and wax.
- ◆ Check the transmission fluid level after replacing the manual transmission and fill if necessary. Refer to [“1.3 Transmission Fluid Level, Checking”, page 41](#) or [“1.1 Gear Oil in Bevel Box, Checking”, page 39](#).

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- ◆ Capacities and specifications, refer to
⇒ ["3.3 Transmission Codes, Allocation, Ratios and Capacities", page 10](#) .

Shaft Seals, Sealing Rings, O-rings, Seals

- ◆ Replace seals, O-rings and gaskets.
- ◆ After removing gaskets, examine contact surface on housing/shaft for burr 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 grease -G 052 128 A1- .
- ◆ The open side of the shaft seals point toward the fluid to be sealed in.
- ◆ Press in the new shaft seal, so that the sealing lip does not run on the same point as the sealing lip of the old shaft seal (use insertion depth tolerances).
- ◆ To prevent crushing when installing, lightly lubricate O-rings before inserting.
- ◆ After replacing seals, O-rings and shaft seals, check the transmission fluid level. Refer to
⇒ ["1.3 Transmission Fluid Level, Checking", page 41](#) or
⇒ ["1.1 Gear Oil in Bevel Box, Checking", page 39](#) .



Sealant

- ◆ Thoroughly clean the housing joint surfaces before applying the sealing compound.
- ◆ Apply the sealing compound -AMV 188 200 03- evenly and not too thick.
- ◆ Do not allow any sealing compound to get into the ventilation holes.



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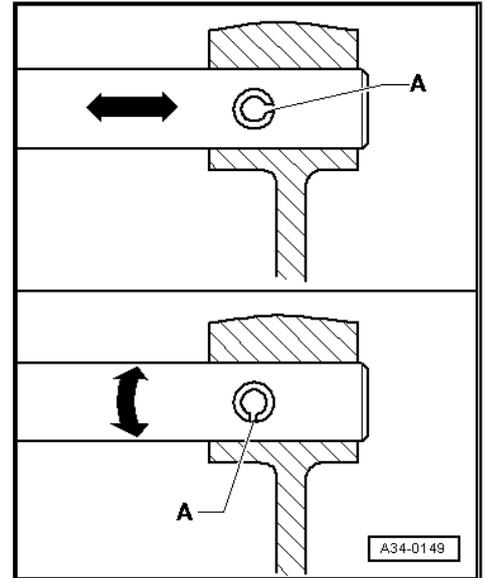
erWin

Fasteners

- ◆ Do not overstretch the circlips.
- ◆ Replace damaged or stretched circlips.
- ◆ The circlips must fit completely inside the groove.
- ◆ Replace the adapter sleeves. Installed position: Slit -A- should in line with the line of force -arrow-.

Bolts and Nuts

- ◆ Loosen the bolts and nuts opposite the tightening sequence.
- ◆ Nuts and bolts which secure covers and housings should be loosened and tightened crosswise and in stages if no tightening sequence is specified.
- ◆ Replace the self-locking nuts and bolts.
- ◆ 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.
- ◆ Make sure the contact surfaces and visible surfaces on the nuts and bolts are waxed after assembling.



Bearings

- ◆ Install the new tapered roller bearings. It is not necessary to oil them.
- ◆ Install all bearings (except the tapered roller bearing) in the transmission with transmission fluid.
- ◆ Heat inner races of taper roller bearings to approximately 100 °C (212 °F) before installing; press in all the way when installing so there is no axial clearance.
- ◆ Do not interchange the outer or inner races of bearings of the same size.
- ◆ Replace all the tapered roller bearings that are on the same shaft. Use tapered roller bearings from the same manufacturer.
- ◆ Install needle bearings with lettered side (thicker metal) racing the fitting tool.

Adjusting Shims

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

Synchronizer Rings

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- ◆ Do not interchange the synchronizer rings. If using them again, allocate them to the same gear wheel.
- ◆ Check for wear and replace if necessary.
- ◆ Check the grooves -arrow 1- on the synchronizer ring -A- and the inner race for flat areas (grooves are worn).
- ◆ The coating on the synchronizer rings 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 on the drive gear for grooves and scoring.
- ◆ Install coated with transmission fluid.

Gear Wheels

- ◆ Clean the gear wheels and warm them to approximately 100 °C (212 °F) before installing.
- ◆ Heat the toothed gears to approximately 100 °C (212 °F) with the inductive heat unit -VAS 6414- before installing. Press on as far as the stop when installing so there is no axial play.

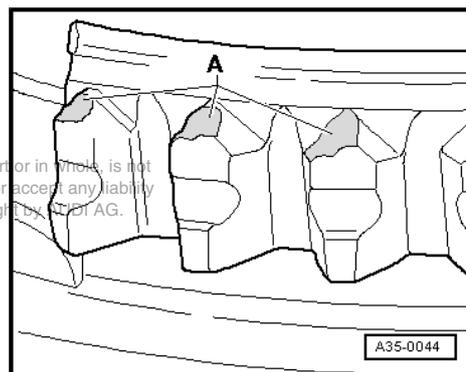
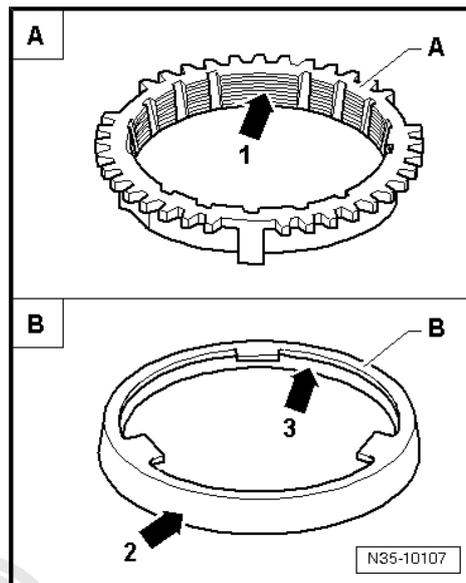
Selector Gears

- ◆ 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:

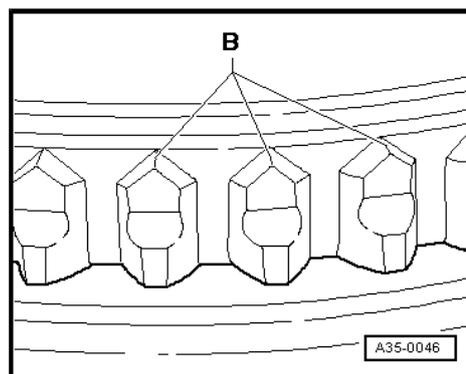
A - Worn clutch spline camber on the synchronizer ring or gear wheel

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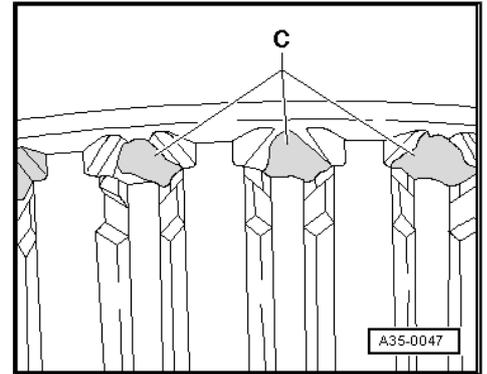
- ◆ For comparison: synchronizer ring or gear wheel not damaged:

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



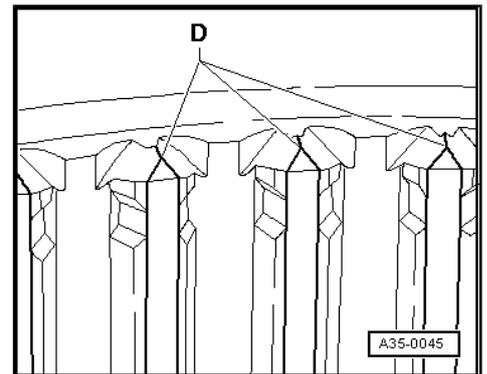
- ◆ Picture of damage on the locking collar:

C - Worn longitudinal inner spline camber and the locking collar



- ◆ For comparison: locking collar undamaged

D - Undamaged longitudinal inner spline camber and the locking collar



Clutch Mechanism

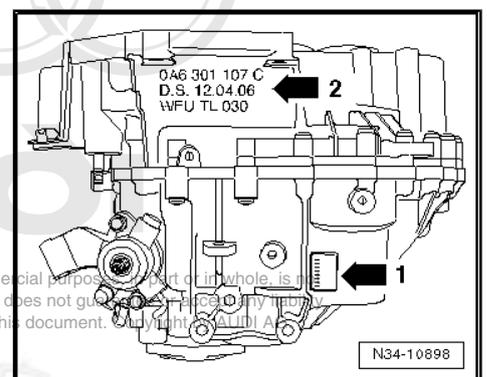
- ◆ Do not tilt clutch pressure plate; loosen and tighten one after another in 90° increments.
- ◆ To reduce odor caused by a burnt clutch, thoroughly clean the clutch housing, the flywheel and the side of the engine facing toward the transmission.
- ◆ Only use compressed air to clean the dual mass flywheel.
- ◆ The pressure plates are corrosion-protected and lubricated. 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).
- ◆ If the clutch pedal does not return to the starting position (rest position) after recoupling it, bleed the clutch system.

1.3 Transmission Identification

The 6-speed manual transmission 0A6 AWD is installed in the Audi TT from MY 07. For the correct allocation, refer to ["3.3 Transmission Codes, Allocation, Ratios and Capacities"](#), page 10 .

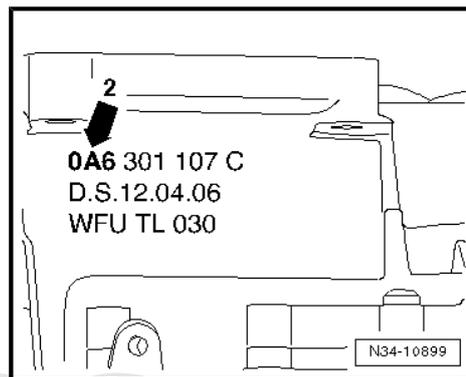
Location on Transmission

- ◆ Engine code and build date -arrow 1-
- ◆ Manual transmission 0A6 AWD -arrow 2-



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Manual Transmission 0A6 AWD -arrow 2-



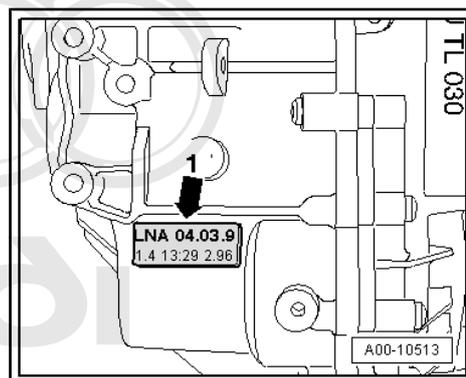
Transmission Code Letters and Build Date -arrow 1-

Example:	LNA	04	03	9
	Identification codes	Day	Month	Year 2007 of production

For additional data and information contact the factory.

 **Note**

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



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2 Description and Operation

⇒ "2.1 Powertrain Overview", page 7

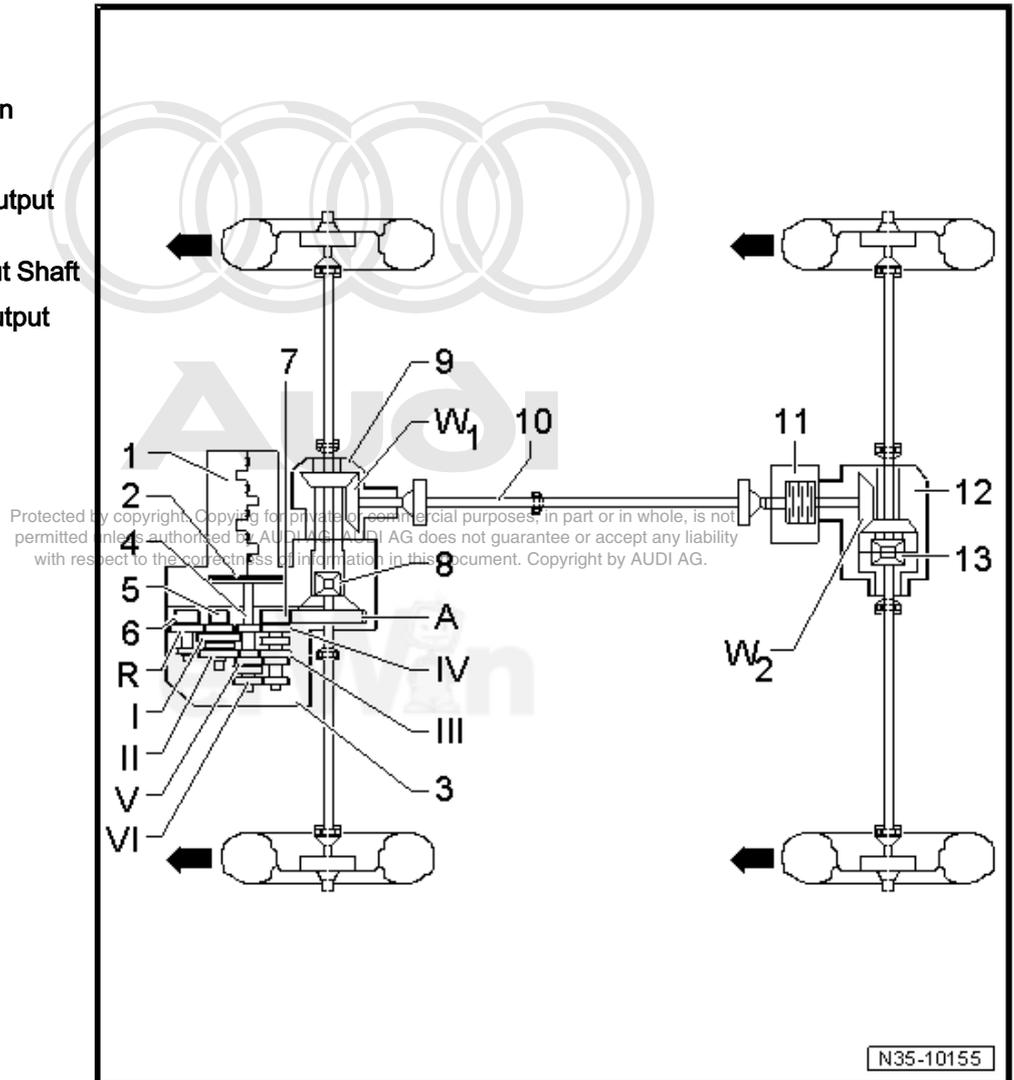
2.1 Powertrain Overview



Note

-Arrows- point in the direction of travel.

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



Ratio

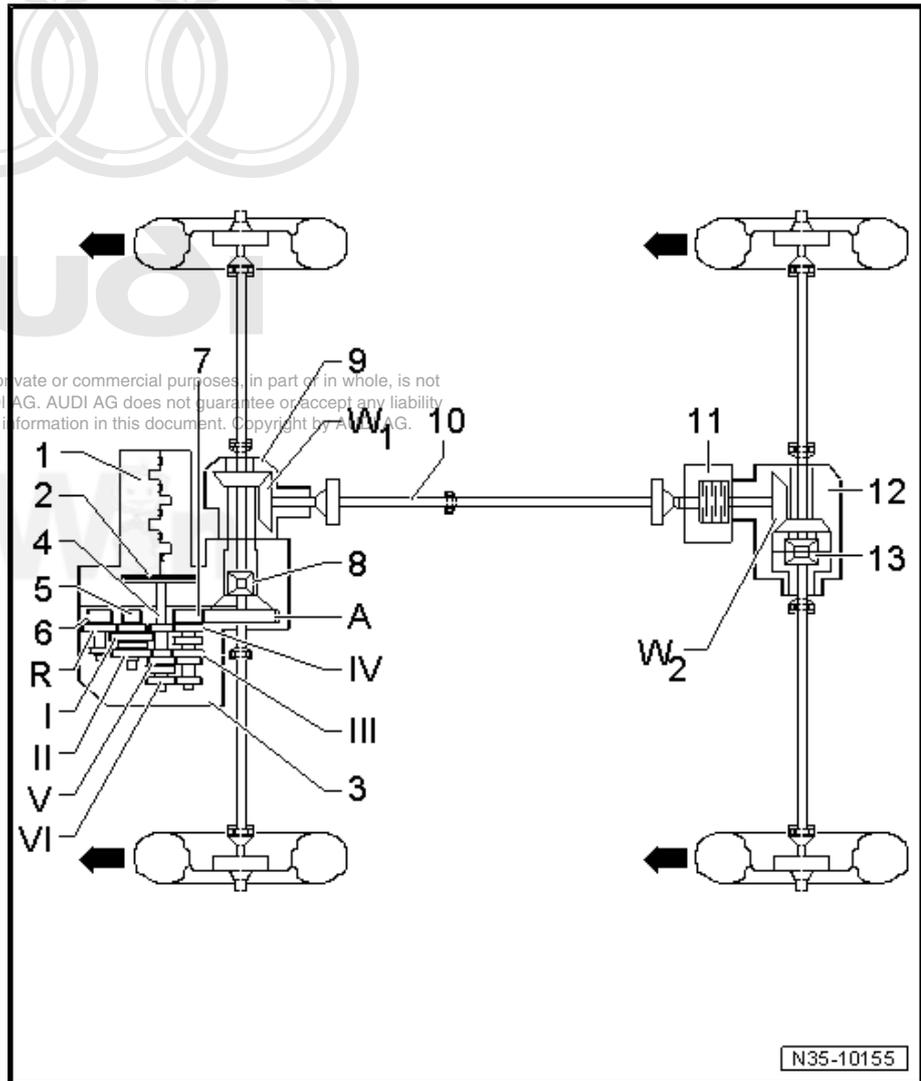


Note

-Arrows- point in the 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 Box
- W2 - Rear Bevel Box

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3 Specifications

⇒ [“3.1 Bevel Box Identification”, page 9](#)

⇒ [“3.2 Bevel Box Code Letters, Transmission Allocation and Capacities”, page 9](#)

⇒ [“3.3 Transmission Codes, Allocation, Ratios and Capacities”, page 10](#)

3.1 Bevel Box Identification

The 0AU or 0A6 bevel box is assigned to the 6-speed, 0A6, AWD manual transmission.

- ◆ Refer to
⇒ [“3.2 Bevel Box Code Letters, Transmission Allocation and Capacities”, page 9](#)

Bevel Box Allocation

Bevel Box Code Letters and Part Number -arrow-

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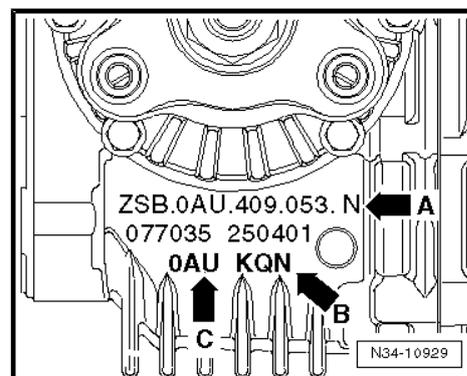
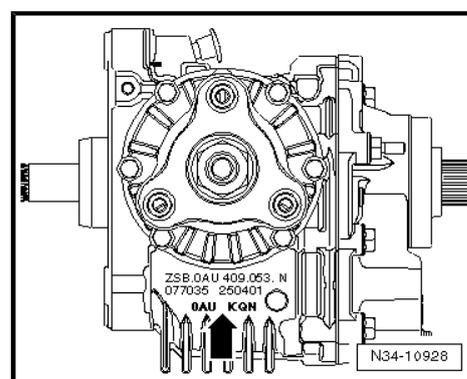
-Arrow A- bevel box part number

-Arrow B- bevel box code letters

-Arrow C- bevel box 0AU or 0A6

- ◆ If there are no code letters present, then use the part number for the allocation. Refer to the Electronic Parts Catalog (ETKA).

Additional data depend on the manufacturing.



3.2 Bevel Box Code Letters, Transmission Allocation and Capacities

Bevel Box	0AU/0A6		
Identification codes	LGS	LGY	LGZ
Manufactured from through	07.08	07.08	07.08
Allocation Type Engine	Audi TT from MY 07 2.5L TFSI - 250 kW	Audi TT from MY 07 2.5L TFSI - 250 kW	Audi TT from MY 07 2.5L TFSI - 250 kW
Capacity	Refer to the Fluid Capacity Tables Rep. Gr. 03		
Refer to the Electronic Parts Catalog (ETKA) for the following information:			
◆ Bevel box axle oil specification			
◆ Manual transmission allocation			



3.3 Transmission Codes, Allocation, Ratios and Capacities

Manual transmission		0A6 AWD		
Identification codes		LNA	MCK	
Manufactured	from through	07.08	03.09	
Allocation	Type Engine	Audi TT from MY 07 2.5L TFSI - 250 kW	Audi TT from MY 07 2.5L TFSI - 250 kW	
Ratio	Final drive I for 1st/2nd gear	64 : 17 = 3.765	64 : 17 = 3.765	
Z ₂ : Z ₁ = i	Final drive II for 3rd/4th gear	64 : 22 = 2.909	64 : 22 = 2.909	
	Final drive III for reverse gear	64 : 20 = 3.200	64 : 20 = 3.200	
Capacity in manual transmission		Refer to the Fluid Capacity Tables Rep. Gr. 03		
Capacity in bevel box		Refer to the Fluid Capacity Tables Rep. Gr. 03		
Clutch mechanism		Hydraulic		
Refer to the Electronic Parts Catalog (ETKA) for the following information:				
<ul style="list-style-type: none"> ◆ The individual gear ratios ◆ Gear oil specification ◆ Bevel box allocation ◆ Driveshaft flanges allocation ◆ Clutch allocation ◆ Rear final drive allocation 				

30 – Clutch

1 General Information

⇒ [“1.1 Clutch System, Bleeding”, page 11](#)

1.1 Clutch System, Bleeding



Note

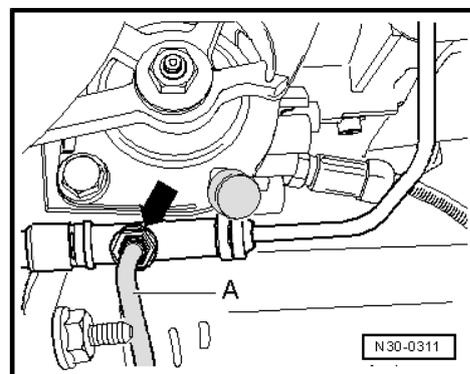
- ◆ *Bleed the system after working on the hydraulic clutch mechanism.*
- ◆ *Make sure no brake fluid gets on the longitudinal member or transmission when performing the following work.*
- ◆ *Before bleeding, fill the brake fluid reservoir to the “max” marking with brake fluid.*

Special tools and workshop equipment required

- ◆ Brake Charger/Bleeder Unit -VAS 5234-
- ◆ Brake fluid specifications, refer to the Fluid Capacity Tables Rep. Gr. 03.

Procedure

- Remove the entire air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .
- Pull the clutch pedal back into its rest position.
- Connect the -VAS 5234- to the brake fluid reservoir.
- Remove the cap from the bleeder screw -arrow- and attach the hose from the bleeder bottle -A-.
- Turn on the bleed unit.
 - Working pressure 2.0 bar
- Open the bleeder screw approximately $\frac{1}{4}$ turn and let 100 cm³ of brake fluid to flow out.
- With the bleeder screw open, press the clutch pedal with hand very quickly 15 to 20 times from one stop to the other (approximately 2 presses per second).
- Close the bleeder screw. Tightening specification, refer to ⇒ [Item 16 \(page 17\)](#) .
- Turn off the -VAS 5234- and let the working pressure come down to 2 bar.
- Slowly press the clutch pedal 10 times and check function of the clutch system.
- Disconnect 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 .



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2 Description and Operation

⇒ "2.1 Clutch Overview, LuK", page 12

⇒ "2.2 Clutch Mechanism Overview", page 14

⇒ "2.3 Clutch Release Mechanism and Clutch Slave Cylinder Overview", page 15

⇒ "2.4 Hydraulics Overview", page 16

⇒ "2.5 Pedal Assembly and Clutch Master Cylinder Overview", page 18

2.1 Clutch Overview, LuK



Note

- ◆ The dual mass flywheel, the pressure plate and the clutch plate are allocated to each other and cannot be interchanged with those made by other manufacturers.
- ◆ Allocate the pressure plate and clutch plate according to the engine codes. Refer to the Electronic Parts Catalog (ETKA).

1 - Dual Mass Flywheel

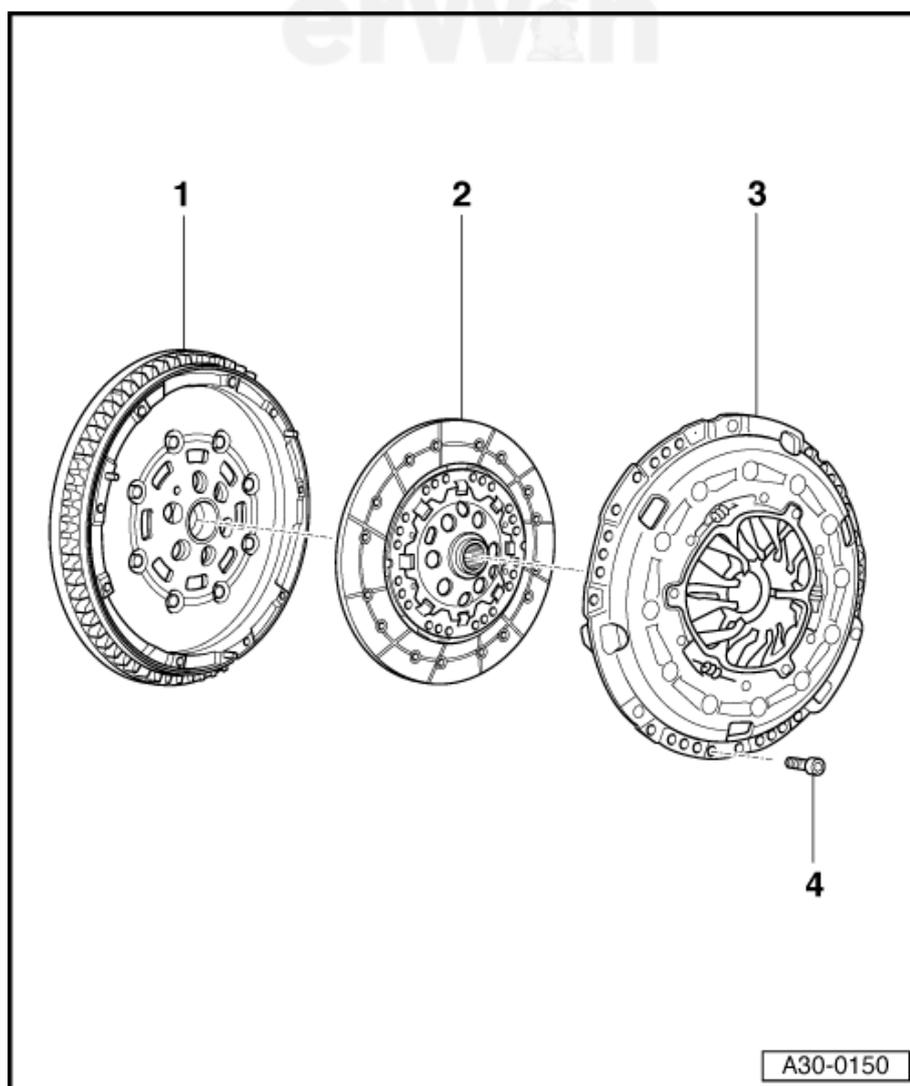
- ❑ Removing and installing, refer to ⇒ Engine Mechanical; Rep. Gr. 13; Removal and Installation
- ❑ Make sure it fits securely on the centering pins
- ❑ Keep the clutch lining contact surface free of grooves, oil and grease.
- ❑ Follow the removal procedure, refer to ⇒ Fig. "Dual Mass Flywheel Removal Specification", page 13

2 - Clutch Plate

- ❑ Removing and installing, refer to ⇒ "4.1 Clutch", page 21
- ❑ Only replace together with the SAC pressure plate
- ❑ Installed position: "Getriebeseite" (transmission side) faces the transmission.
- ❑ For the correct allocation, refer to the Electronic Parts Catalog (ETKA)

3 - SAC Pressure Plate

- ❑ SAC = "self-adjusting clutch"
- ❑ Only replace together with the clutch plate



- Removing and installing, refer to ⇒ [“4.1 Clutch”, page 21](#)
- Checking the adjusting ring position on a new SAC pressure plate. Refer to ⇒ [Fig. “Only Check Position of Adjustment Mechanism with New SAC Pressure Plates”, page 23](#)
- Check the ends of the diaphragm spring. Refer to ⇒ [Fig. “Check the Ends of the Diaphragm Spring”, page 23](#)
- Checking the spring connection and rivet connections. Refer to ⇒ [Fig. “Checking the Spring Connections and Rivet Connections”, page 23](#)

4 - Bolt

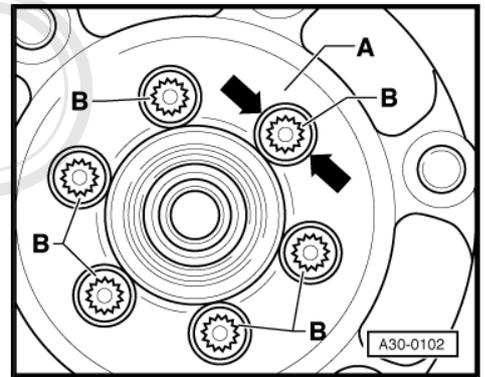
- M6 - 13 Nm
- M7 - 20 Nm
- Loosen and tighten one after another in 90° increments

Dual Mass Flywheel Removal Specification

Note

To prevent damage to the dual mass flywheel when removing, bolts -B- must not be removed using an air-powered or impact wrench. Remove the bolts by hand only.

- Turn the dual mass flywheel -A- until the bolts are centered over the holes -arrows-.
- Make sure bolt heads are not touching the dual mass flywheel when removing them, otherwise the flywheel will damage them while they are being removed.



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2.2 Clutch Mechanism Overview

I -
⇒ [“2.5 Pedal Assembly and Clutch Master Cylinder Overview”, page 18](#)

⇒ [“4.8 Over-Center Spring”, page 33](#)

⇒ [“4.2 Clutch Pedal”, page 24](#)

⇒ [“4.7 Mounting Bracket”, page 31](#)

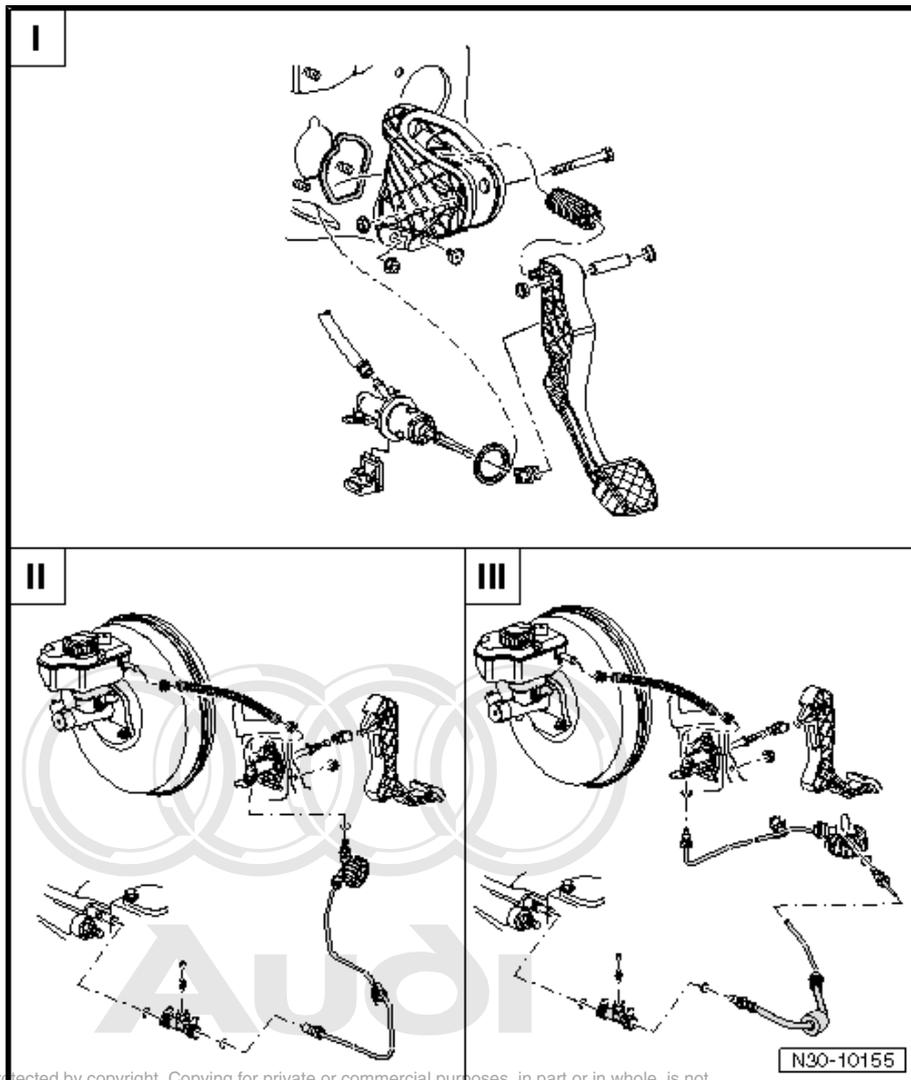
⇒ [“4.3 Clutch Position Sensor G476”, page 27](#)

⇒ [“4.4 Clutch Master Cylinder”, page 27](#)

II -
⇒ [“2.4 Hydraulics Overview”, page 16](#)

⇒ [“4.6 Hose/Line Assembly”, page 30](#)

III - Right Hand Drive Vehicles



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2.3 Clutch Release Mechanism and Clutch Slave Cylinder Overview

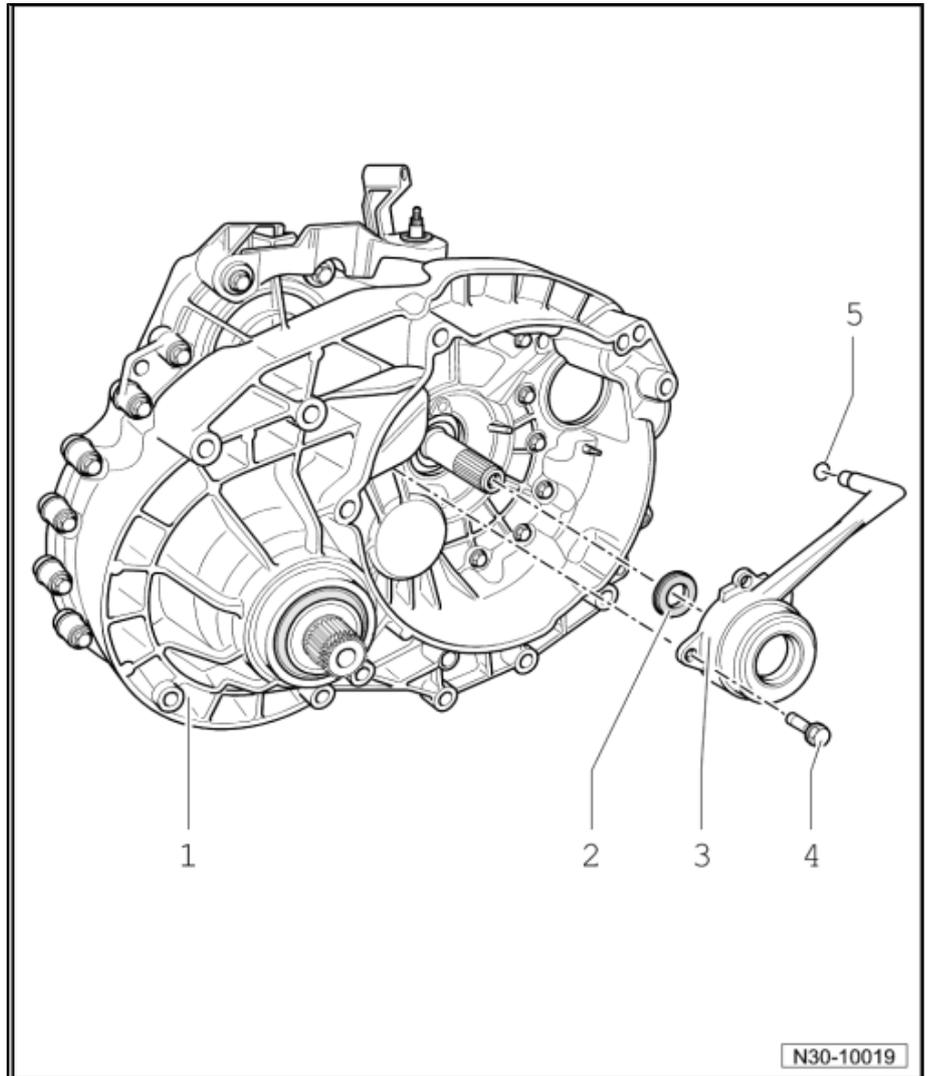
1 - Transmission

2 - Input Shaft Seal

- Removing, refer to [⇒ Fig. "Remove the Input Shaft Seal.", page 99](#)
- Installing, refer to [⇒ Fig. "Install the Input Shaft Seal so that it is Flush.", page 99](#)

3 - Clutch Slave Cylinder with Release Bearing

- Must be replaced together because they are a single unit
- Do not wash the bearing, just wipe it off.
- Replace a loud bearing together with the clutch slave cylinder
- Carefully tighten diagonally and in step so that the tabs on the clutch slave cylinder do not break
- Divided supply line on some slave cylinders, refer to [⇒ Fig. "Slave Cylinder -A- with Divided Supply Line", page 16](#)
- Removing and installing, refer to [⇒ "4.5 Clutch Slave Cylinder with Release Bearing", page 29](#)



4 - Bolt

- 15 Nm
- Always replace
- Quantity: 3

5 - O-ring

- Replace if damaged
- Install on the line connection
- Install with brake fluid



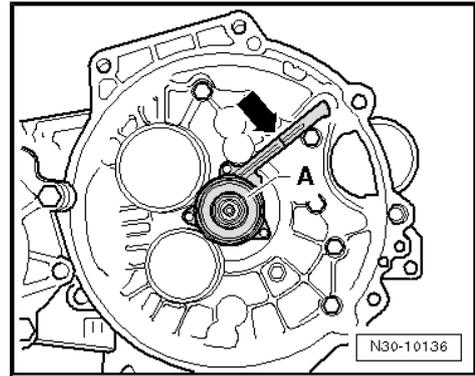
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Slave Cylinder -A- with Divided Supply Line

The supply line is divided in area with -arrows- on some slave cylinders

For the correct allocation, refer to the Electronic Parts Catalog (ETKA)



2.4 Hydraulics Overview

1 - Brake Fluid Reservoir

2 - Gasket

- Quantity: 2
- The seals must be inside the supply hose
 => [Item 3 \(page 16\)](#).

3 - Supply Hose

4 - Mounting Clip

- To remove and install the clutch master cylinder, disconnect from the clutch pedal, refer to
 => ["4.2 Clutch Pedal"](#),
[page 24](#)

5 - Clutch Pedal

- Removing and installing, refer to
 => ["4.2 Clutch Pedal"](#),
[page 24](#)

6 - Clutch Master Cylinder

- Removing and installing, refer to
 => ["4.4 Clutch Master Cylinder"](#),
[page 27](#)

7 - Clamp

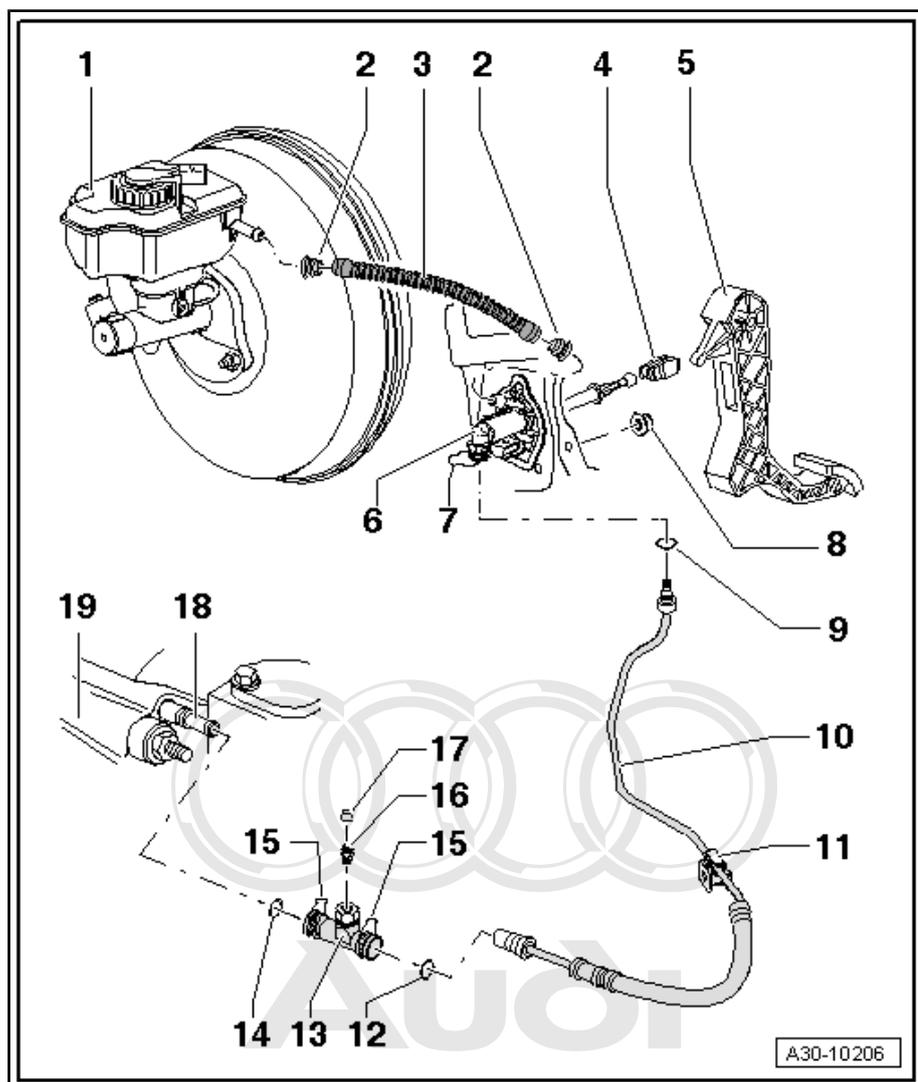
- The clamp must be removed in order to remove/install the hose/line assembly

8 - Nut

- For the bracket to the bulkhead
- Tightening specification
 => [Item 15 \(page 18\)](#)

9 - Sealing Ring or O-ring

- Replace damaged O-rings.
- Install on the line connection
- Install with brake fluid
- Seals/O-rings suitable for the line connection material, refer to
 => [Fig. "O-ring or Hose/Line Assembly Seal"](#),
[page 17](#)



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- For the correct allocation, refer to the Electronic Parts Catalog (ETKA)

10 - Hose/line Assembly

- Removing and installing, refer to ⇒ [“4.6 Hose/Line Assembly”, page 30](#)
- For the correct allocation, refer to the Electronic Parts Catalog (ETKA)

11 - Bracket

- For hose/line assembly ⇒ [Item 10 \(page 17\)](#)
- Attached to the body

12 - Seal or O-ring

- Replace damaged O-rings.
- Install on the line connection
- Install with brake fluid
- Seals/O-rings suitable for the line connection material, refer to ⇒ [Fig. “O-ring or Hose/Line Assembly Seal”, page 17](#)
- For the correct allocation, refer to the Electronic Parts Catalog (ETKA)

13 - Bleeder

14 - Seal or O-ring

- Replace damaged O-rings.
- Install on the line connection
- Install with brake fluid
- Seals/O-rings suitable for the line connection material, refer to ⇒ [Fig. “O-ring or Hose/Line Assembly Seal”, page 17](#)
- For the correct allocation, refer to the Electronic Parts Catalog (ETKA)

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15 - Clamp

- To remove and install the hose/line assembly or bleeder, pull the clip all the way out.

16 - Vent Screw

- 4.5 Nm
- Clutch system, bleeding, refer to ⇒ [“1.1 Clutch System, Bleeding”, page 11](#)

17 - Dust Cap

18 - Clutch Slave Cylinder with Release Bearing

- The gasket can only be replaced when the transmission is removed.
- Removing and installing, refer to ⇒ [“4.5 Clutch Slave Cylinder with Release Bearing”, page 29](#)

19 - Transmission

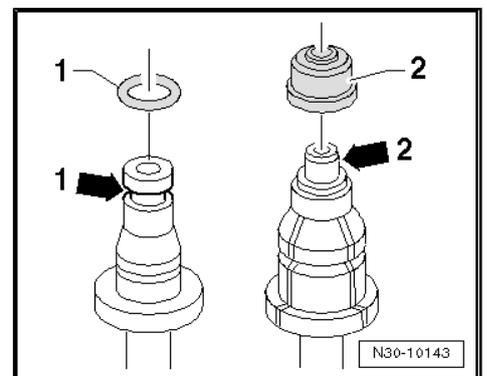
O-ring or Hose/Line Assembly Seal

1 - O-ring

- ◆ Line connection with a groove all the way around -arrow 1-

2 - Seal

- ◆ Line connection with a shoulder -arrow 2-



2.5 Pedal Assembly and Clutch Master Cylinder Overview

1 - Bulkhead

- With a mount for the bracket

2 - Gasket

- Replace
- Between the bracket and bulkhead
- Self-adhesive
- Attached to the bracket

3 - Bracket

- For the clutch pedal
- Removing and installing, refer to [⇒ "4.7 Mounting Bracket", page 31](#)

4 - Bolt

5 - Over-Center Spring

- Removing and installing, refer to [⇒ "4.8 Over-Center Spring", page 33](#)

6 - Bearing Bushing

7 - Mounting Pin

8 - Clutch Pedal

- Removing and installing, refer to [⇒ "4.2 Clutch Pedal", page 24](#)

9 - Mounting Clip

- For the clutch master cylinder actuator rod

10 - Seal

- Replace
- Between the clutch master cylinder and bracket

11 - Clutch Master Cylinder

- Removing and installing, refer to [⇒ "4.4 Clutch Master Cylinder", page 27](#)

12 - Clutch Position Sensor -G476-

- Removing and installing, refer to [⇒ "4.3 Clutch Position Sensor G476", page 27](#)
- Can be checked in "Guided Fault Finding" using the vehicle diagnosis, testing and information system - VAS 5051-

13 - Clip

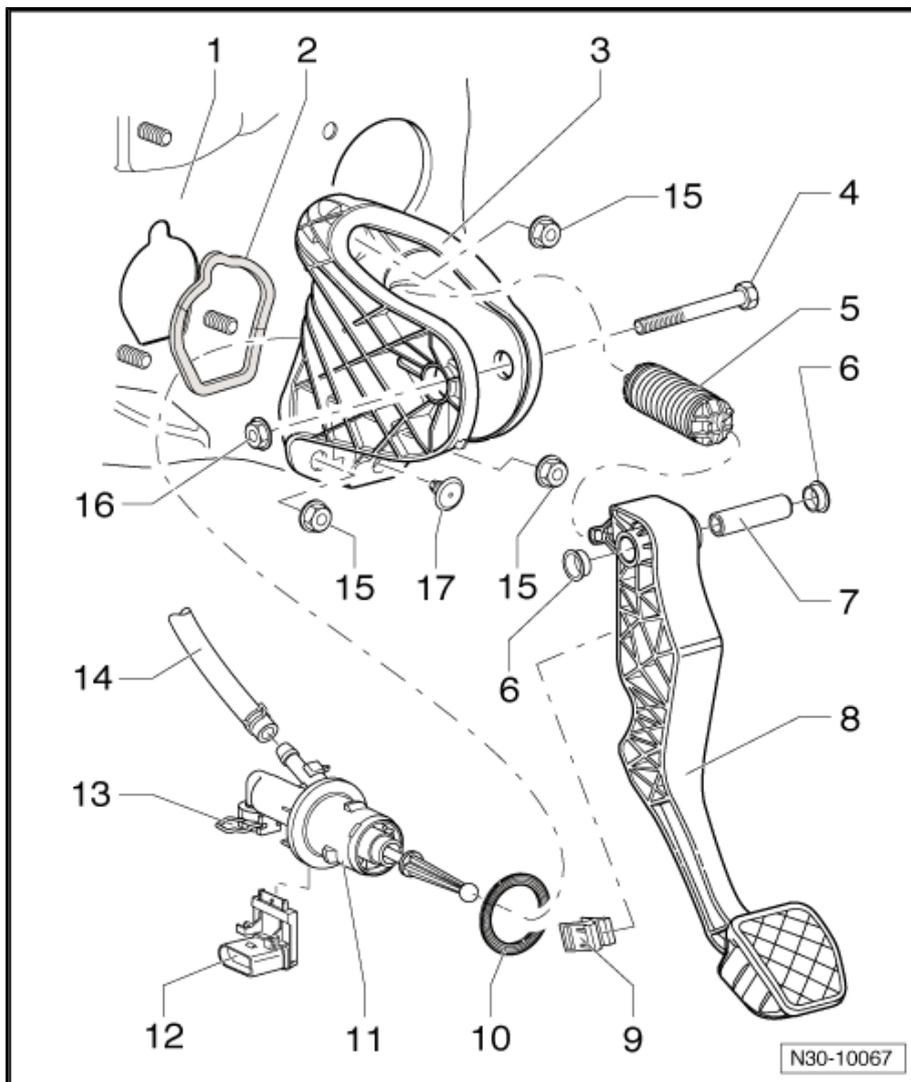
- The clamp must be removed in order to remove/install the hose/line assembly

14 - Supply Hose

- To the brake fluid reservoir

15 - Nut

- 20 Nm
- Replace
- Self-locking



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- Quantity: 3
- For the bracket to the bulkhead

16 - Nut

- 25 Nm
- Replace
- Self-locking

17 - Stop

- For the clutch pedal

Crash Bolster - Tightening Specification

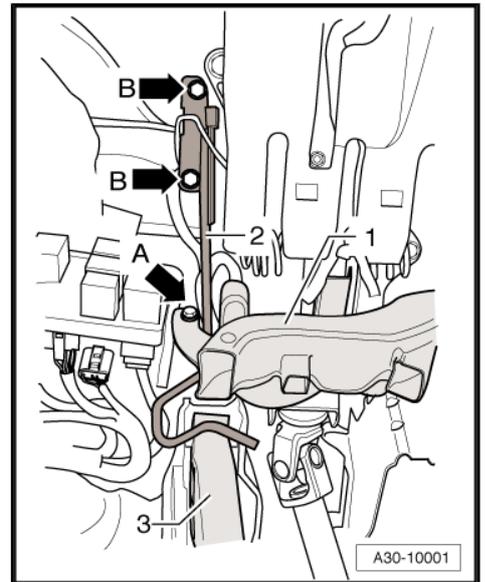
- Install the crash bolster -2- and then tighten the 1 bolt or 2 bolts (depending on the version) -arrows B-.
- M6 10 Nm
- M8 20 Nm



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3 Specifications

⇒ "3.1 Fastener Tightening Specifications", page 20

3.1 Fastener Tightening Specifications

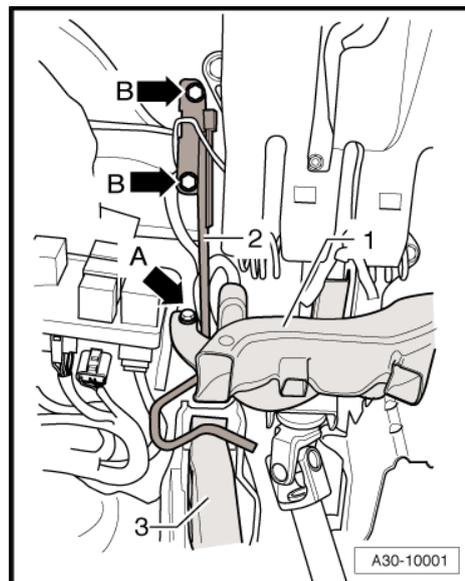
Components	Fastener Size	Nm
Bracket For the clutch pedal ^{1,2}		
-Nut	-	20
-Nut	-	25
Clutch Slave Cylinder with Release Bearing ²	-	15
SAC Pressure Plate		
	M6	13
	M7	20
Vent Screw	-	4.5

• ¹ For bolt tightening clarification, refer to ["2.5 Pedal Assembly and Clutch Master Cylinder Overview", page 18](#) and see items -15 and 16-
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• ² Replace

Crash Bolster - Tightening Specification

- Install the crash bolster -2- and then tighten the 1 bolt or 2 bolts (depending on the version) -arrows B-
- M6 10 Nm
- M8 20 Nm



4 Removal and Installation

⇒ [“4.1 Clutch”, page 21](#)

⇒ [“4.2 Clutch Pedal”, page 24](#)

⇒ [“4.3 Clutch Position Sensor G476 “, page 27](#)

⇒ [“4.4 Clutch Master Cylinder”, page 27](#)

⇒ [“4.5 Clutch Slave Cylinder with Release Bearing”, page 29](#)

⇒ [“4.6 Hose/Line Assembly”, page 30](#)

⇒ [“4.7 Mounting Bracket”, page 31](#)

⇒ [“4.8 Over-Center Spring”, page 33](#)

4.1 Clutch

Special tools and workshop equipment required

- ◆ Flywheel Retainer -3067-
- ◆ Centering Drift -T10372-
- ◆ Torque Wrench 5-50 Nm -V.A.G 1331-
- ◆ Grease for clutch disc shaft splines -G 000 100-



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Removing

- Transmission removed, refer to [⇒ "4.8 Transmission, Removing", page 79](#) .
- Install the -3067- to loosen the bolts.

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

- Remove all six bolts one after the other clockwise in 90° (1/4 turn) increments until the pressure plate is free
- Remove the pressure plate and the clutch plate.

Installing

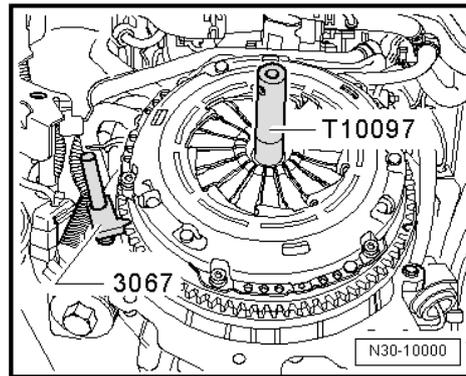
- Tightening specification, refer to [⇒ "2.1 Clutch Overview, LuK", page 12](#) .

Install in reverse order, paying attention to the following:



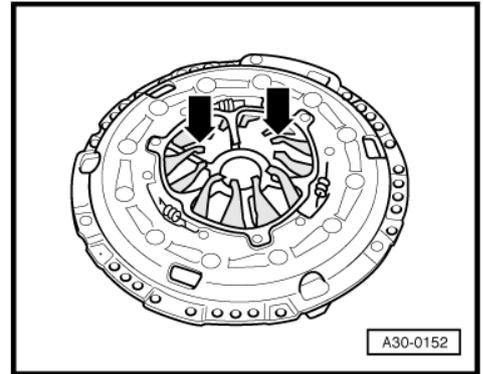
Note

- ◆ *The dual mass flywheel, the pressure plate and the clutch plate are allocated to each other and cannot be interchanged with those made by other manufacturers.*
- ◆ *The clutch plate and pressure plate must be replaced together. Allocate according to the engine code. Refer to the Electronic Parts Catalog (ETKA).*
- ◆ *Checking the adjusting position on the new pressure plate. Refer to [⇒ Fig. "Only Check Position of Adjustment Mechanism with New SAC Pressure Plates", page 23](#) .*
- ◆ *To reduce odor caused by a burnt clutch, thoroughly clean the clutch housing, the flywheel and the side of the engine facing toward the transmission.*
- ◆ *Clean input shaft splines and (on used clutch plates) the hub splines, remove corrosion and apply a very thin coating of lubricant -G 000 100- to the splines. Then move the clutch plate back and forth on the input shaft until the hub moves freely on the shaft. Remove any excess grease.*
- ◆ *The pressure plates are corrosion-protected and lubricated. Only the running surfaces may be cleaned. Otherwise the service life of the clutch will be shortened considerably.*
- ◆ *The pressure plate contact surface and the clutch plate lining must completely touch the flywheel. Install the bolts.*
- ◆ *Make sure the alignment bushings for centering the engine/ transmission are installed inside the cylinder block. Install them if necessary.*
- ◆ *If the alignment sleeves are missing, it will be difficult to shift, there will be clutch problems and the transmission may make noises (loose rattling).*



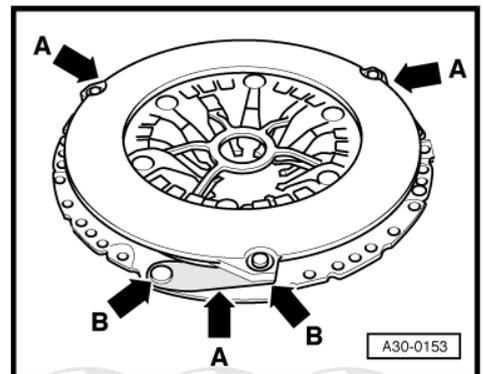
Check the Ends of the Diaphragm Spring

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



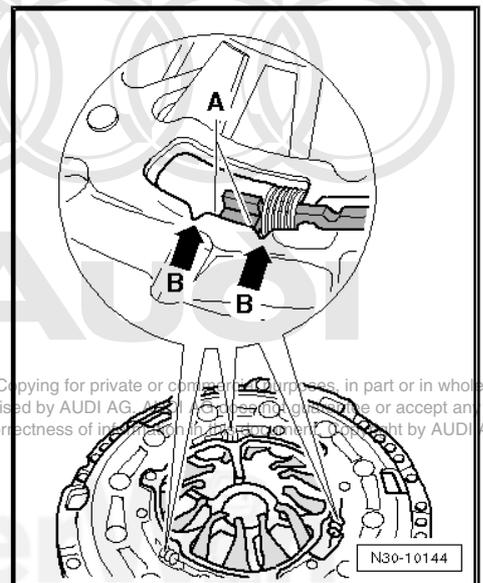
Checking the Spring Connections and Rivet Connections

- Check the spring connections -arrows A- for damage and make sure the rivet connections -arrows B- are tight.
- A pressure plate with severely kinked or broken spring connections or with loose rivet connections must be replaced.



Only Check Position of Adjustment Mechanism with New SAC Pressure Plates

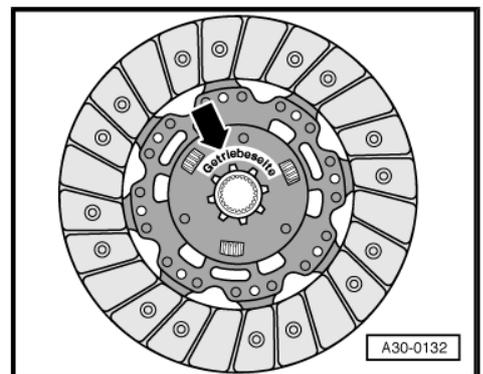
- Both edges -A- of the adjusting ring must be located between both notches -arrows B-.
- If the adjusting ring takes on a different position with new pressure plates, pressure plate and clutch plate must not be installed.
- With used clutches, the adjusting ring may take on a position outside of the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



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Clutch Plate Installed Location

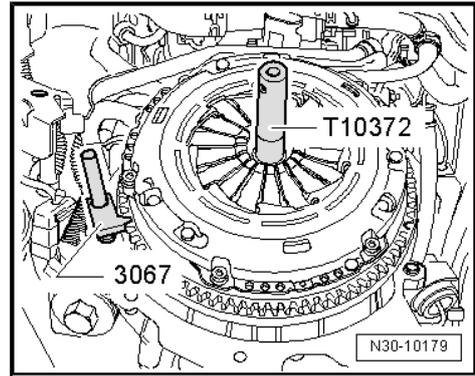
- "Getriebeseite" (transmission side) faces the transmission.



- Insert the -3067- .
- Position the pressure plate on the alignment pins.
- Use the -T10097- to center the clutch plate.

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

- Install all the bolts evenly, by hand, until the bolt heads contact the pressure plate.
- Tighten all six bolts clockwise, one after the other and in 90° (1/4 turn) increments until the housing touches the flywheel.
- Tighten all 6 bolts clockwise one after the other to the final specification. Tightening specification => [Item 4 \(page 13\)](#)



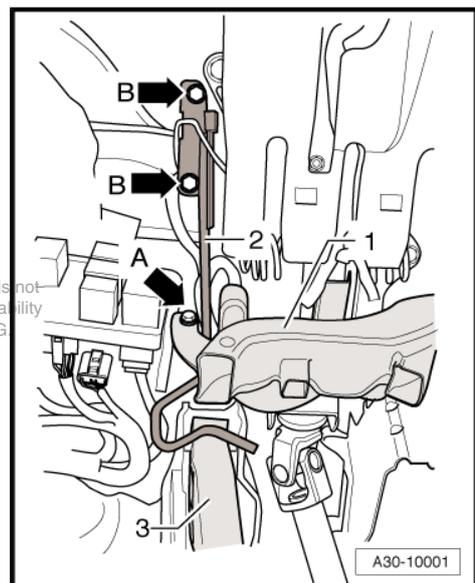
4.2 Clutch Pedal

Special tools and workshop equipment required

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

Removing

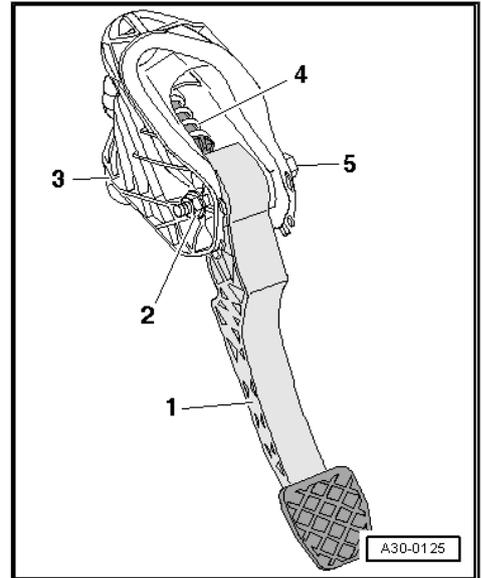
- Clutch pedal bracket installed inside the vehicle
- Move the driver seat all the way back.
- Remove the driver side storage compartment. Refer to => Body Interior; Rep. Gr. 68 .
- Remove bolt -arrow A- and remove left front footwell vent -1-.
- Unclip the cable guide behind the footwell vent -1- and move it to the side.
- Remove the crash bolster -2- - depending on the version, it may have one or two bolts holding it -arrows B-.



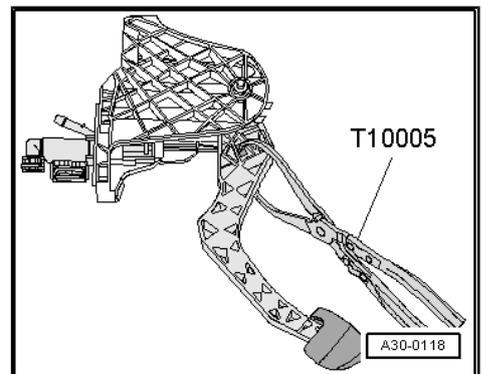
- Remove the nut -2- and the bolt -5- and then remove the clutch pedal -1- from the bracket -3-.

i Note

Ignore -4-.



- Release actuator rod mounting clip in clutch pedal with - T10005- .
- Remove the clutch pedal.



Installing

- Tightening specification, refer to ["2.5 Pedal Assembly and Clutch Master Cylinder Overview", page 18](#) .

Install in reverse order, paying attention to the following:

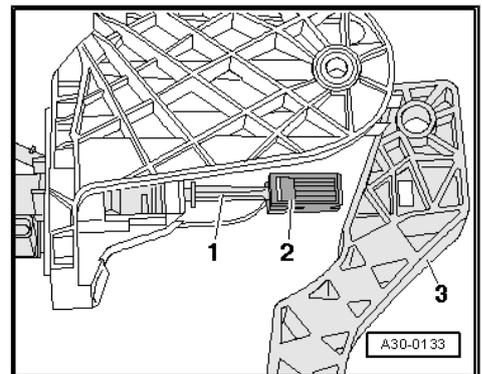
i Note

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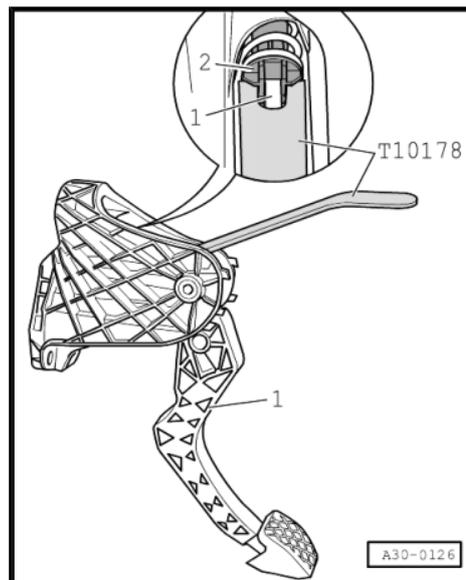
◆ **Replace the self-locking nuts.**

- ◆ *Lubricate all bearing and contact surfaces with grease -G 000 450 02- .*

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



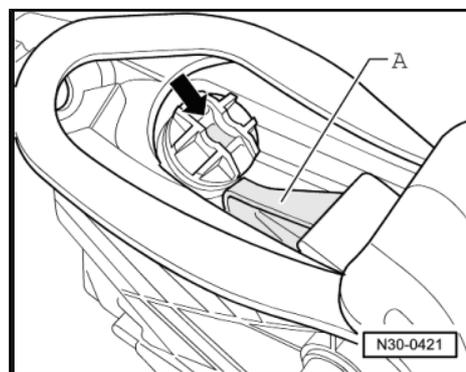
- Install the over-center spring -2- in the bracket from the top. Hold the end of the spring in its installed position with -T10178- when installing the spring.



- The over-center spring mounting cup -arrow- must be vertical.
- Insert the clutch pedal pressure pins -A- in over-center spring mounting cup -arrow-.
- Press clutch pedal up and forward against the force of the over-center spring, slide bolt through and tighten 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 crash bolster. Refer to [⇒ Fig. "Crash Bolster - Tightening Specification", page 19](#).
- Install the left front footwell vent. Refer to Knee Airbag, Servicing in ⇒ Body Interior; Rep. Gr. 69; Removal and Installation (Driver Knee Airbag).
- Install the driver side storage compartment. Refer to ⇒ Body Interior; Rep. Gr. 68.

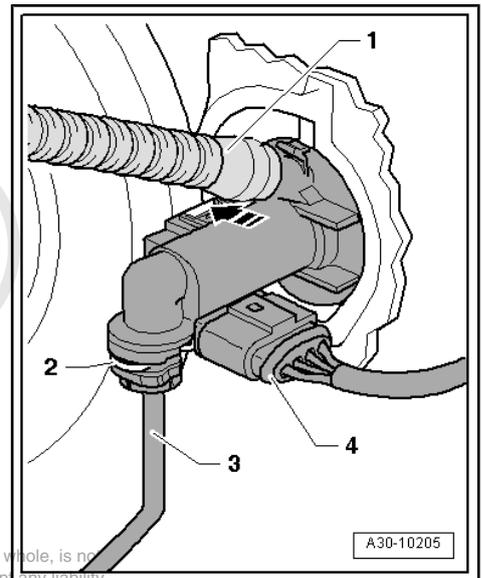
4.3 Clutch Position Sensor -G476-

Removing

- Unclip and remove the clutch position sensor from the clutch master cylinder in direction of -arrow-.
- Disconnect the connector -4-.

i Note

Ignore -1, 2 and 3-.



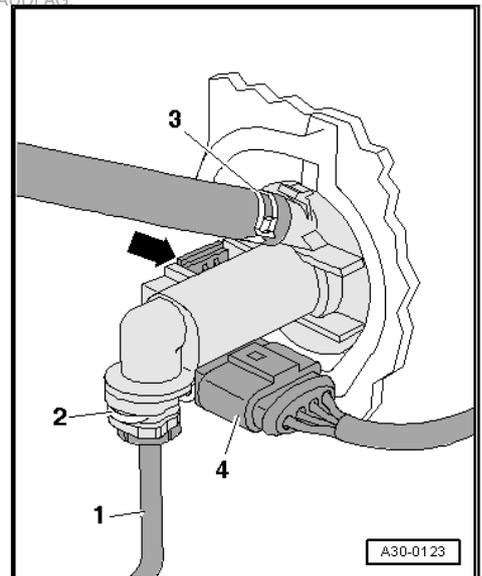
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Installing

- Install the clutch position sensor on the clutch master cylinder -arrow-.
- Connect the connector -4-.

i Note

Ignore -1, 2 and 3-.



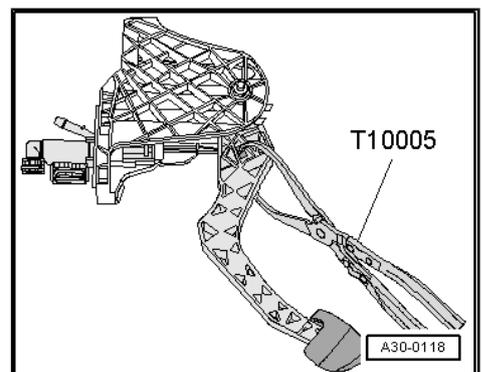
4.4 Clutch Master Cylinder

Special tools and workshop equipment required

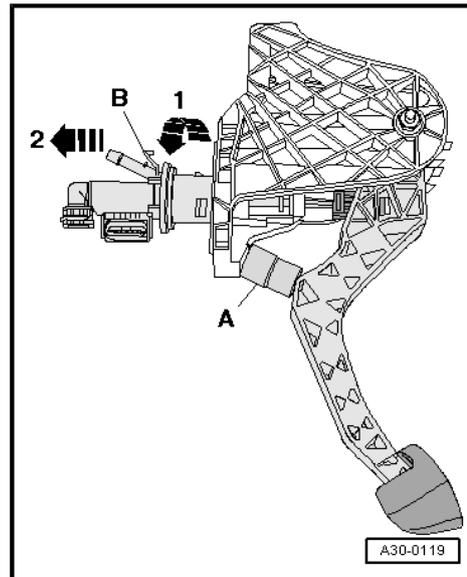
- ◆ Pliers -T10005-

Removing

- Remove the mounting bracket. Refer to ["4.7 Mounting Bracket", page 31](#) .
- Release actuator rod mounting clip in clutch pedal with - T10005- .

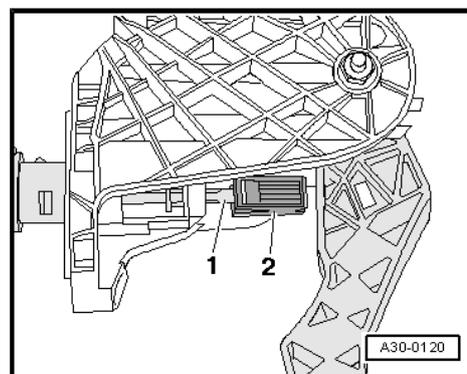


- Place a spacer -A- between the clutch pedal and the stop and then push the clutch pedal forward.
- Spacer length = approximately 40 mm (for example 1/2 socket insert)
- Disengage the securing bracket -B- and remove the clutch master cylinder from the bracket -arrow 1 and arrow 2-.

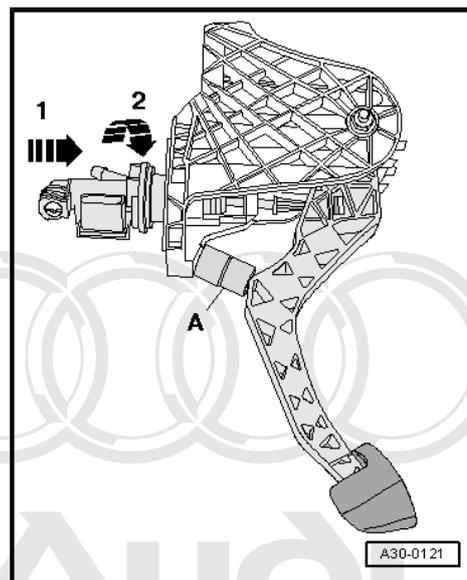


Installing

- Move the clutch pedal up to the stop in its resting position.
- Install the clip -2- on the clutch master cylinder actuator rod -1-.

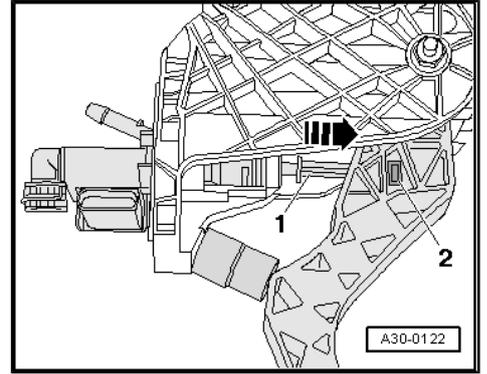


- Place a spacer -A- between the clutch pedal and the stop and then push the clutch pedal forward.
- Spacer length = approximately 40 mm (for example 1/2 socket insert)
- Install the clutch master cylinder on the bracket -arrow 1 and arrow 2-.



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- Press master cylinder actuator rod -1- in direction of -arrow- until mount -2- engages audibly in clutch pedal.
- Install the bracket. Refer to [⇒ "4.7 Mounting Bracket", page 31](#) .



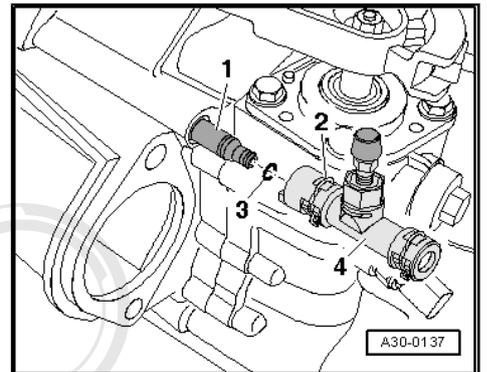
4.5 Clutch Slave Cylinder with Release Bearing

Note

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

Removing

- Transmission removed, refer to [⇒ "4.8 Transmission, Removing", page 79](#) .
- Open the clip -2- with a screwdriver and remove the bleeder valve -4- from the clutch slave cylinder -1-.



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

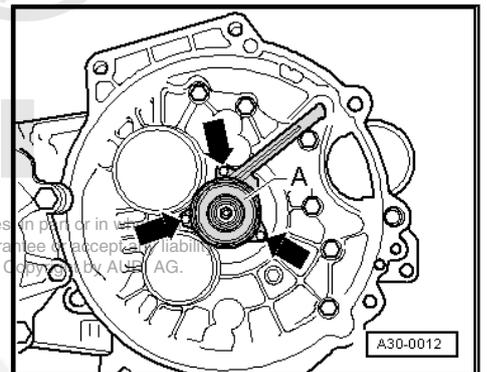
Installing

- Tightening specification, refer to [⇒ "2.3 Clutch Release Mechanism and Clutch Slave Cylinder Overview", page 15](#) .

Install in reverse order, paying attention to the following:

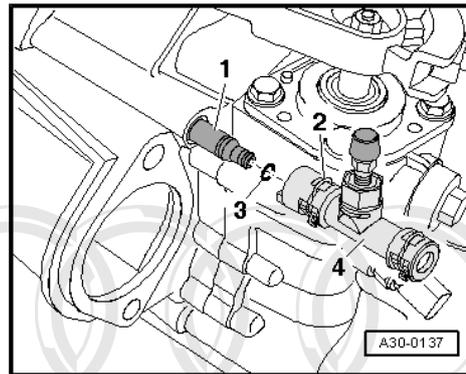
Caution

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 release bearing -arrows-.

- Check the O-ring -3- for damage and replace if necessary.
- Push the bleeder -4- onto the clutch slave cylinder connection -1- until the clip -2- clicks into place.
- To check, pull on the bleeder.
- Bleed the clutch system. Refer to [⇒ "1.1 Clutch System, Bleeding", page 11](#) .



4.6 Hose/Line Assembly

Special tools and workshop equipment required

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

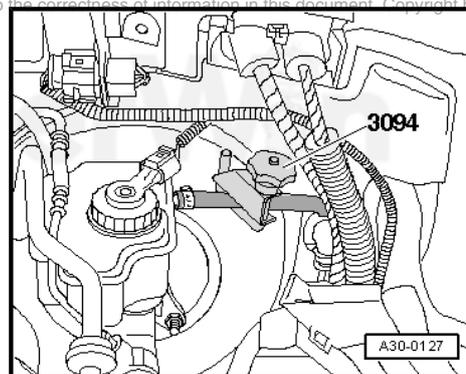
Removing

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

Note

While performing the following work, make sure no brake fluid comes into contact with the longitudinal member or the transmission. If it does, clean the area thoroughly.

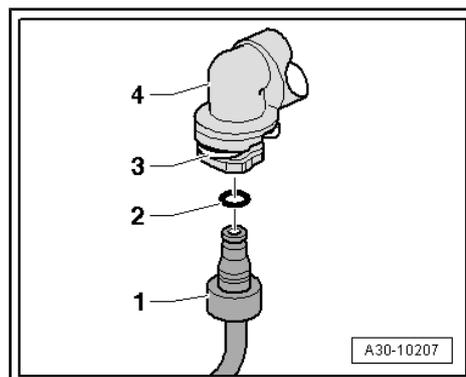
- Clamp the clutch master cylinder supply hose using a -3094- .



Note

Catch any leaking brake fluid with a cloth.

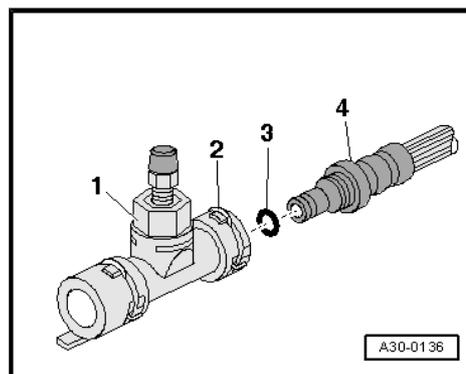
- Open the clip -3- on the clutch master cylinder with a screwdriver.
- Remove the hose/line assembly -1- and disengage it from the bracket.



Note

Catch any leaking brake fluid with a cloth.

- Open the clip -2- on the bleeder -1- with a screwdriver and remove the hose/line assembly -4-.



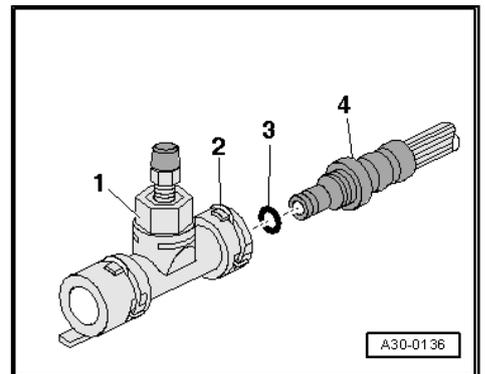
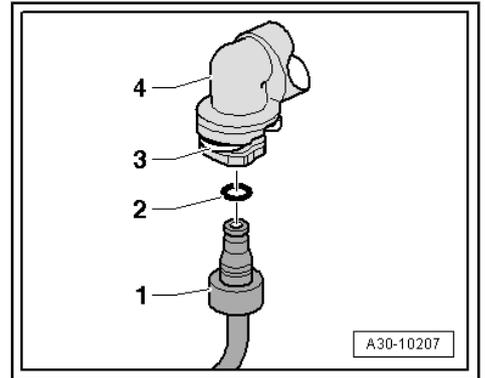
Installing

Install in reverse order, paying attention to the following:

Note

Depending on the date of manufacture, O-rings -2- or seals - difference => Fig. *“O-ring or Hose/Line Assembly Seal”*, page 17

- Check the O-ring -2- for damage and replace if necessary.
- Push the hose/line assembly -1- onto the connection on the clutch master cylinder -4- until the clip -3- clicks into place.
- Pull on the line to make sure it is secure.
- Check the O-ring -3- for damage and replace if necessary.
- Push the hose/line assembly -4- into the bleeder -1- until the clip -2- clicks into place.
- Pull on the line to make sure it is secure.
- Bleed the clutch system. Refer to => *“1.1 Clutch System, Bleeding”*, page 11 .



4.7 Mounting Bracket

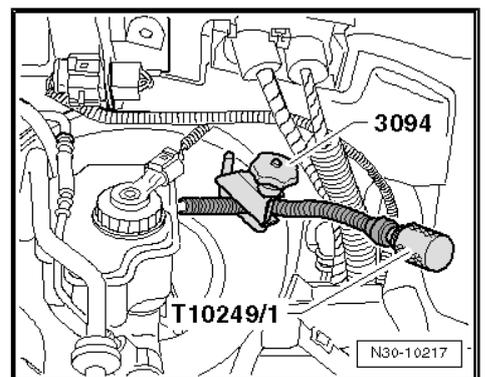
Special tools and workshop equipment required

- ◆ Hose Clamps Up to 25 mm Dia. -3094-
- ◆ Torque Wrench 5-50 Nm -V.A.G 1331-
- ◆ Sealing Tool -T10249-

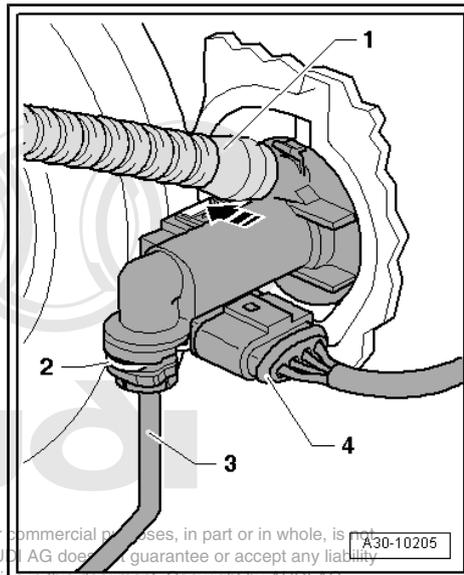
Removing

Note

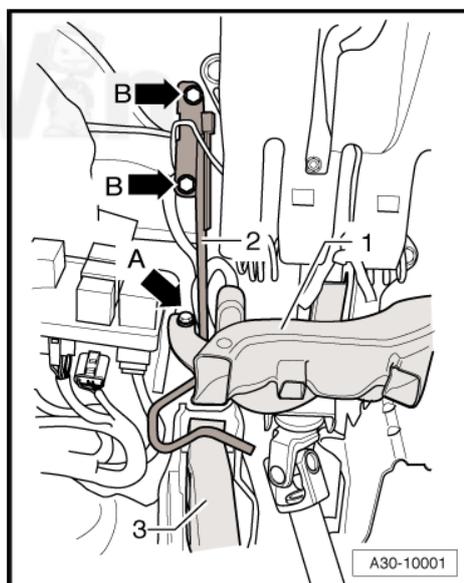
- ◆ *While performing the following work, make sure no brake fluid comes into contact with the longitudinal member of the transmission. If it does, clean the area thoroughly.*
- ◆ *Place a lint-free cloth under the master cylinder.*
- Clamp the clutch master cylinder supply hose using a -3094- .



- Remove the supply hose -1- from the clutch master cylinder.
- Close off the supply hose -1- using sealing tool -T10249/1- (see top illustration).
- Open the clamp -2- and remove the pipe -3-.
- Unclip the clutch position sensor -G476- from the clutch master cylinder -arrow- and remove it with the connector -4- still connected.



- Move the driver seat all the way back and raise the steering wheel to the highest position.
- Remove the driver side storage compartment. Refer to ⇒ Body Interior; Rep. Gr. 68 .
- Remove the bolt -arrow A- and remove left front footwell vent -1-.
- Unclip the cable guide behind the footwell vent -1- and move it to the side.
- Remove the crash bolster -2- - depending on the version, it may have one or two bolts holding it -arrows B-.



 **Note**

When working in the floor area, cover the carpet with a cloth to protect against any leaking brake fluid.

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

Installing

- Tightening specification, refer to [⇒ "2.5 Pedal Assembly and Clutch Master Cylinder Overview", page 18](#).

Install in reverse order, paying attention to the following:

 **Note**

- ◆ Replace the self-locking nuts.
- ◆ Replace the O-rings.
- ◆ Secure all hose connections with the hose clamps of the same type as those equipped by the factory. Refer to the Electronic Parts Catalog (ETKA)

- Insert the bracket -1- and tighten the nuts -2-.

- Install the hose/line assembly. Refer to [⇒ "4.6 Hose/Line Assembly", page 30](#).

- Bleed the clutch system. Refer to [⇒ "1.1 Clutch System, Bleeding", page 11](#).

- Install the crash bolster. Refer to [⇒ Fig. "Crash Bolster Tightening Specification", page 19](#).

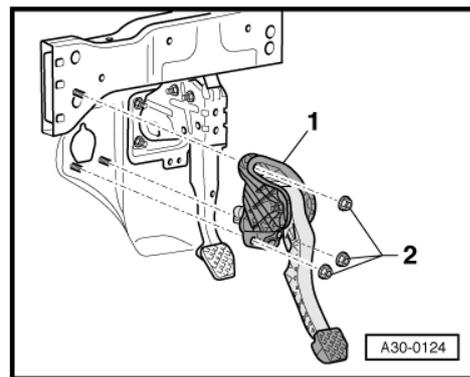
- Install the left front footwell vent. Refer to Knee Airbag, Servicing in ⇒ Body Interior; Rep. Gr. 69 ; Removal and Installation (Driver Knee Airbag).

- Install the driver side storage compartment. Refer to ⇒ Body Interior; Rep. Gr. 68 .

4.8 Over-Center Spring

Special tools and workshop equipment required

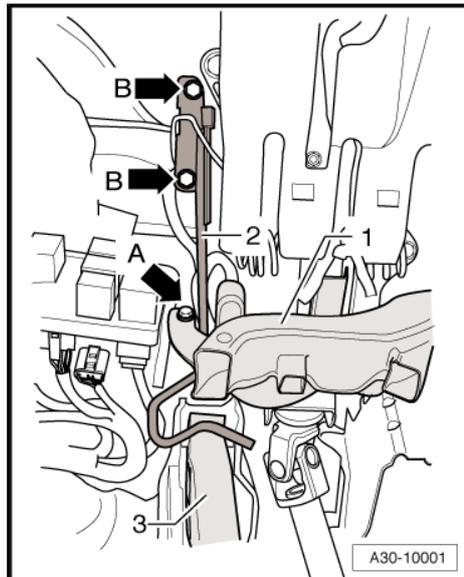
- ◆ Assembly Tool -T10178-
- ◆ Grease -G 000 450 02-



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Removing

- Clutch pedal bracket installed inside the vehicle
- Move the driver seat all the way back.
- Remove the driver side storage compartment. Refer to ⇒ Body Interior; Rep. Gr. 68 .
- Remove the bolt -arrow A- and remove left front footwell vent -1-.
- Unclip the cable guide behind the footwell vent -1- and move it to the side.
- Remove the crash bolster -2- - depending on the version, it may have one or two bolts holding it -arrows B-.



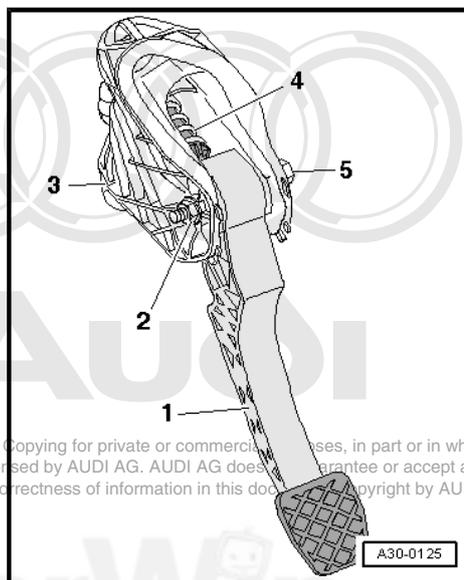
- Remove the nut -2- and bolt -5- and then remove the clutch pedal -1- from the bracket -3-.



Note

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

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



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Installing

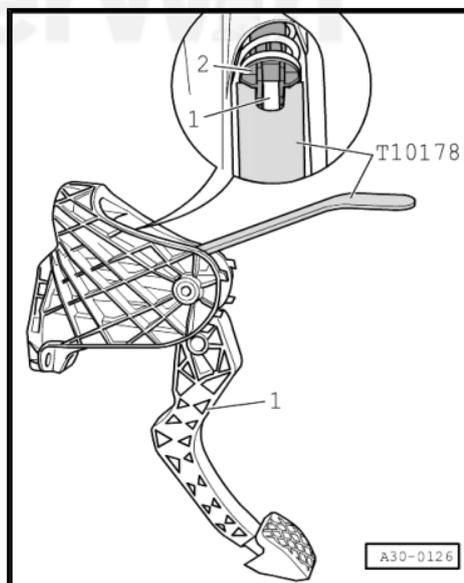
- Tightening specification, refer to ⇒ ["2.5 Pedal Assembly and Clutch Master Cylinder Overview", page 18](#) .

Install in reverse order, paying attention to the following:

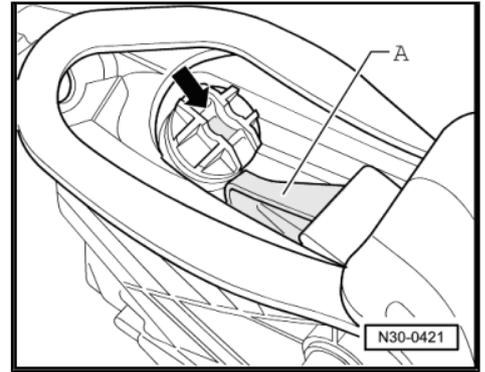


Note

- ◆ *Replace the self-locking nuts.*
- ◆ *Lubricate all bearing and contact surfaces with grease -G 000 450 02- .*
- Install the over-center spring -2- in the bracket from the top. Hold the end of the spring in its installed position using the -T10178- when installing the spring.



- The over-center spring mounting cup -arrow- must be vertical.
- Insert the clutch pedal pressure pins -A- in over-center spring mounting cup -arrow-.
- Press the clutch pedal slightly, push the bolt through and tighten the self-locking nut.
- Install the crash bolster. Refer to [⇒ Fig. "Crash Bolster - Tightening Specification", page 19](#).
- Install the left front footwell vent. Refer to Knee Airbag, Servicing in ⇒ Body Interior; Rep. Gr. 69; Removal and Installation (Driver Knee Airbag).
- Install the driver side storage compartment. Refer to ⇒ Body Interior; Rep. Gr. 68.



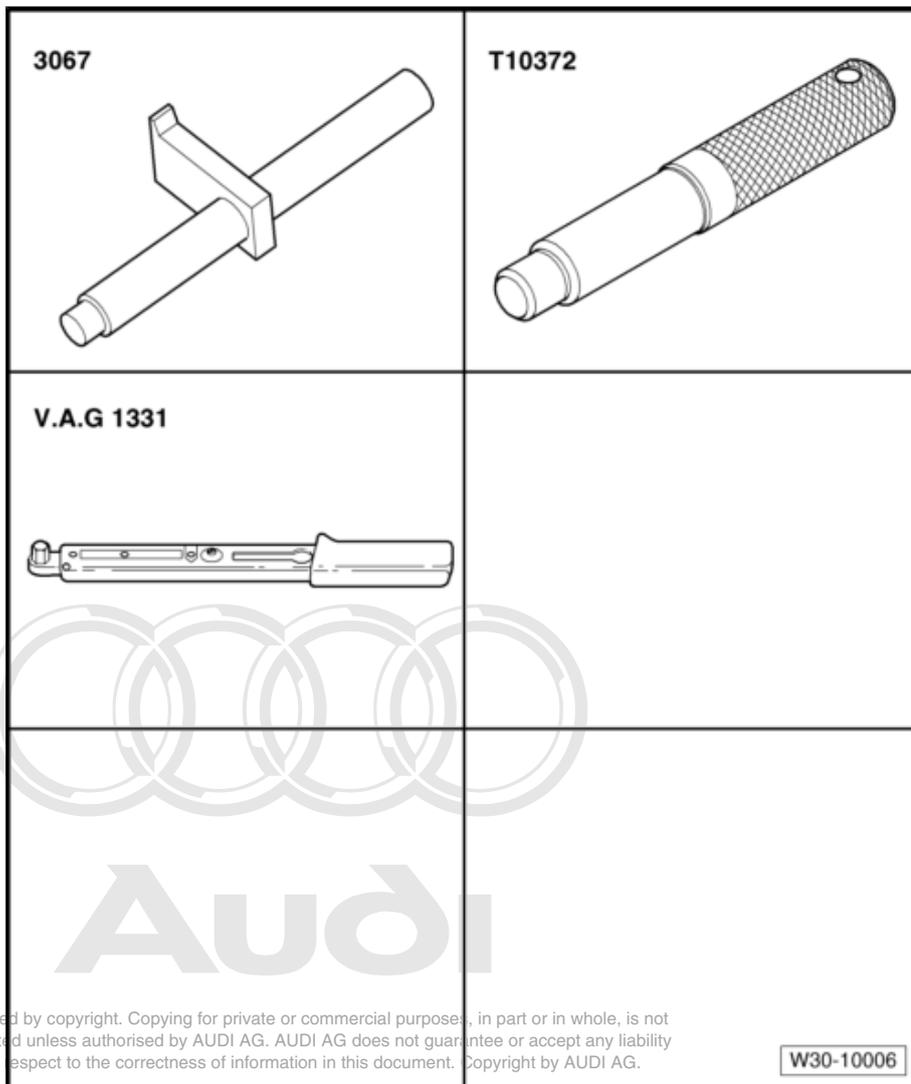
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5 Special Tools

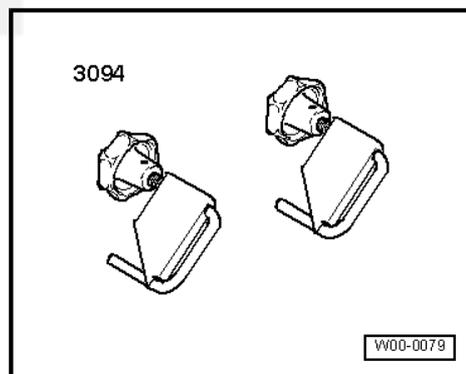
Special tools and workshop equipment required

- ◆ Flywheel Retainer -3067-
- ◆ Centering Drift -T10372-
- ◆ Torque Wrench 5-50 Nm - V.A.G 1331-

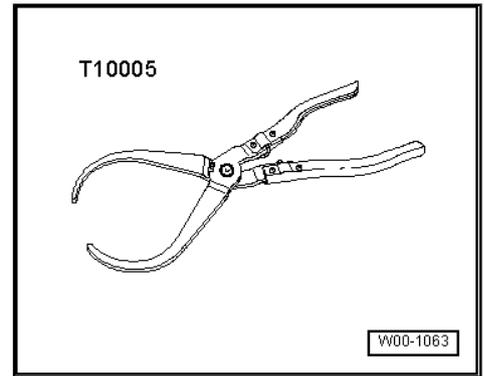


Special tools and workshop equipment required

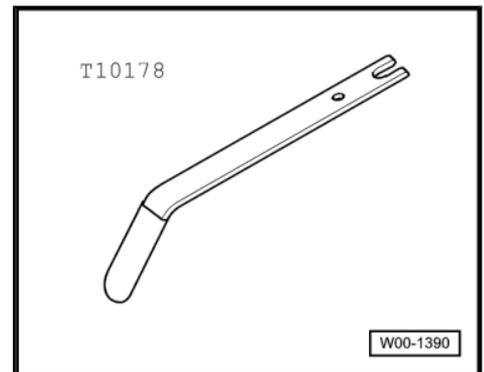
- ◆ Hose Clamps Up to 25 mm Dia. -3094-



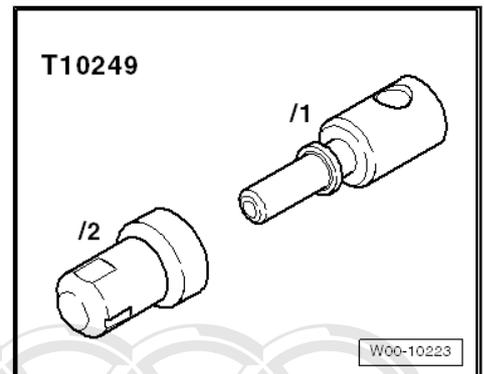
◆ Pliers -T10005-



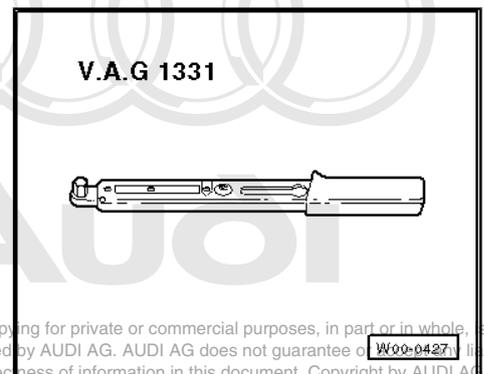
◆ Assembly Tool -T10178-



◆ Sealing Tool -T10249-



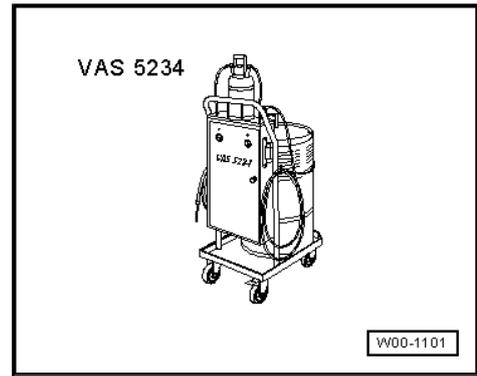
◆ Torque Wrench 5-50 Nm -V.A.G 1331-



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◆ Brake Charger/Bleeder Unit -VAS 5234-



◆ Not illustrated:

◆ Vehicle Diagnosis, Testing and Information System -VAS 5051-



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34 – Controls, Housing

1 General Information

⇒ [“1.1 Gear Oil in Bevel Box, Checking”, page 39](#)

⇒ [“1.2 Gear Oil in Bevel Box, Filling”, page 39](#)

⇒ [“1.3 Transmission Fluid Level, Checking”, page 41](#)

1.1 Gear Oil in Bevel Box, Checking



Note

- ◆ *Bevel box is attached to the side of manual transmission and has a separate self-contained oil system.*
- ◆ *For the correct axle oil specification, refer to the Electronic Parts Catalog (ETKA).*

Special tools and workshop equipment required

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

Procedure

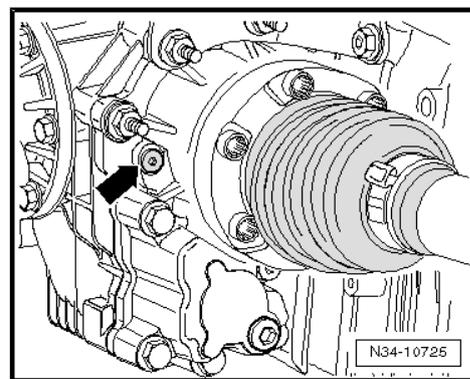
- Vehicle must be level
- Bevel box must be in the installation location.
- Remove the noise insulation in the center. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .
- Place the -V.A.G 1782- under the bevel box.
- Remove the transmission fluid filler plug -arrow- from the bevel box.
- Specified value: Oil level up to bottom edge of oil filler hole
- Add gear oil if necessary. Refer to ⇒ [“1.2 Gear Oil in Bevel Box, Filling”, page 39](#) .



Note

Carefully remove leaking oil on bevel box.

- Tighten the new fluid filler plug. Tightening specification, refer to ⇒ [Fig. “Transmission Fluid Filler Plug - Tightening Specification”, page 44](#) .
- Install the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .



1.2 Gear Oil in Bevel Box, Filling

- Bevel box is attached to the side of manual transmission and has a separate self-contained oil system.
- Vehicle must be level
- Bevel box must be in installation location.

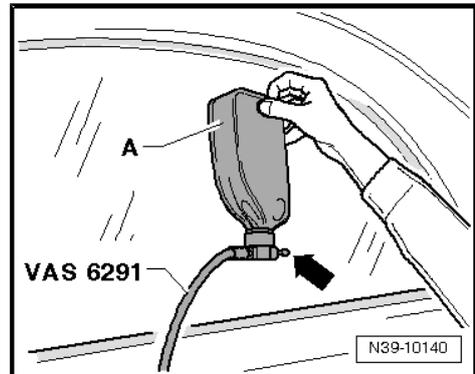
Special tools and workshop equipment required

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

- ◆ Charging Device F/Haldex 2 Coup. -VAS 6291-
- ◆ Adapter -VAS 6291/2-

Procedure

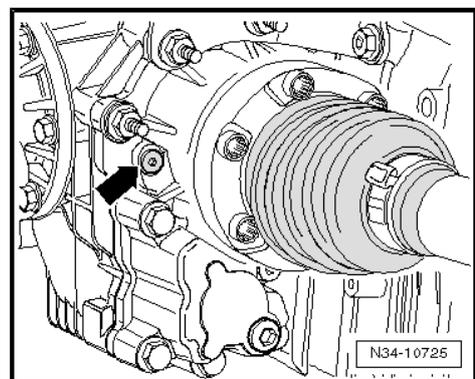
- Route the -VAS 6291- hose behind the right drive axle and out through the right wheel housing.



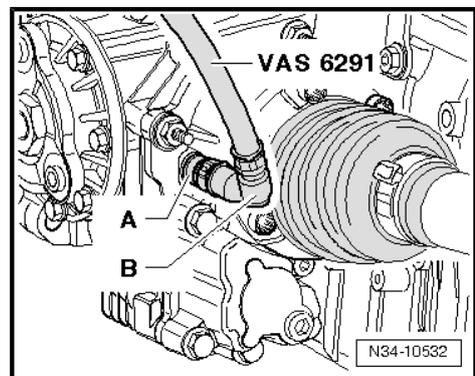
 **Note**

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

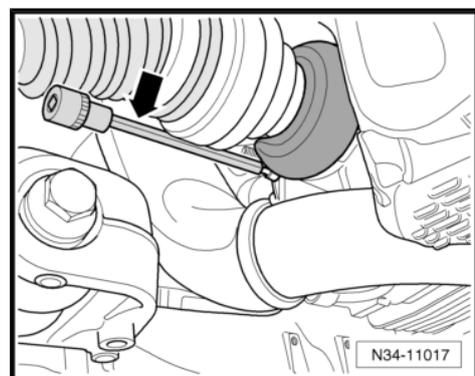
- Place the -V.A.G 1782- under the bevel box.
- Remove the transmission fluid filler plug -arrow- from the bevel box.



- Disconnect the adapter -A- and elbow -B-.
- Screw in the adapter -A- to the stop.



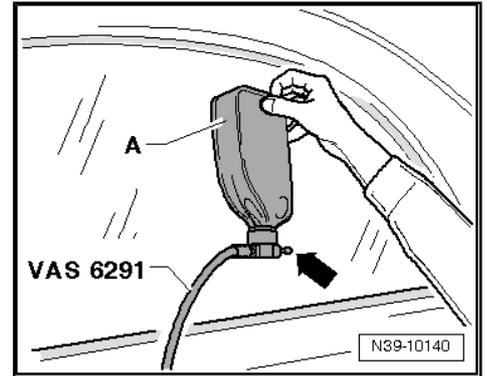
- You can also use a socket wrench.
- Arrow- = 5 mm socket wrench, commercially available
- Lock the elbow -B- using the adapter -A- (see previous illustration).
- The hose must not hang through.



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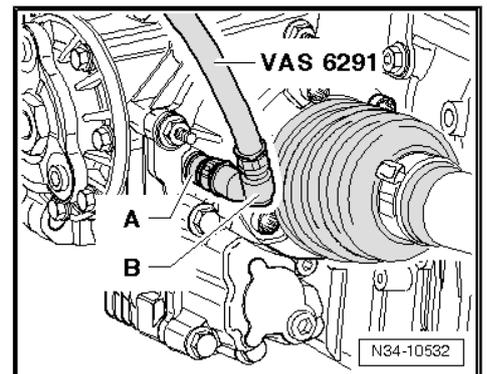


- Close the valve -arrow-.
- Attach the oil fluid container -A- to the -VAS 6291- .
- Open the valve -arrow- and hold the fluid container as illustrated.

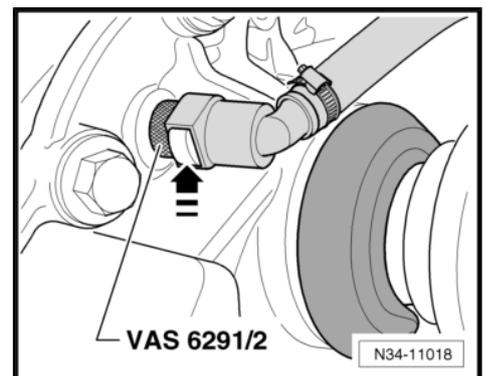


The bevel box is now filled.

- When the bevel box is filled correctly, oil escapes at adapter -A-.
- If the oil still does not leak out, repeat the filling procedure.
- 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.



- When the fluid stops running back, press the button in direction of -arrow- and remove the.
- Remove the -VAS 6291/2- .
- Install and tighten the new fluid filler plug. Tightening specification, refer to [=> Fig. "Transmission Fluid Filler Plug - Tightening Specification", page 44](#) .



 **Note**

Carefully remove leaking oil on bevel box.

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

1.3 Transmission Fluid Level, Checking

 **Note**

- ◆ The manual transmission and bevel box have separate supplies.
- ◆ Axle oil level in bevel box, checking [=> "1.1 Gear Oil in Bevel Box, Checking", page 39](#) .
- ◆ For the correct transmission fluid specification, refer to the *Electronic Parts Catalog (ETKA)*.

Special tools and workshop equipment required

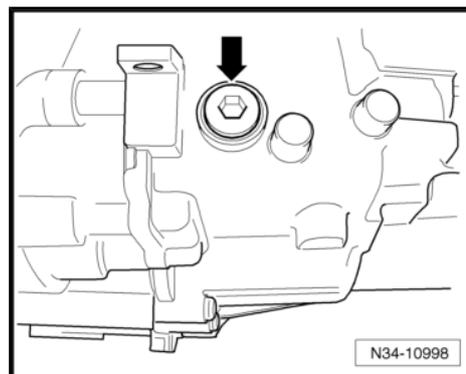
- ◆ Torque Wrench 5-50 Nm -V.A.G 1331-

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Procedure

- Remove the noise insulation in the center. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .
- Remove the plug for checking the transmission fluid level -arrow-.
- Specified value: Oil level up to bottom edge of oil filler hole
- Add transmission fluid if necessary.
- Install the plug -arrow- with a new gasket. Tightening specification, refer to ⇒ [Item 3 \(page 115\)](#) .
- Install the noise insulation. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .



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2 Description and Operation

- ⇒ [“2.1 Assembly Overview”, page 43](#)
- ⇒ [“2.2 Axle Oil in Bevel Box Overview”, page 44](#)
- ⇒ [“2.3 Engine and Transmission Mount Overview”, page 45](#)
- ⇒ [“2.4 Gearshift Knob and Covers Overview”, page 47](#)
- ⇒ [“2.5 Gearshift Lever and Gearshift Housing Overview”, page 49](#)
- ⇒ [“2.6 Gearshift Lever and Selector Relay Lever Overview”, page 51](#)
- ⇒ [“2.7 Gearshift Mechanism Overview”, page 55](#)
- ⇒ [“2.8 Shift Cable and Selector Cable Overview”, page 56](#)
- ⇒ [“2.9 Shift Forks”, page 58](#)
- ⇒ [“2.10 Shift Mechanism, Adjusting”, page 59](#)
- ⇒ [“2.11 Transmission Overview”, page 61](#)
- ⇒ [“2.12 Transmission Housing and Gearshift Unit Overview”, page 62](#)

2.1 Assembly Overview

Assembly sequence

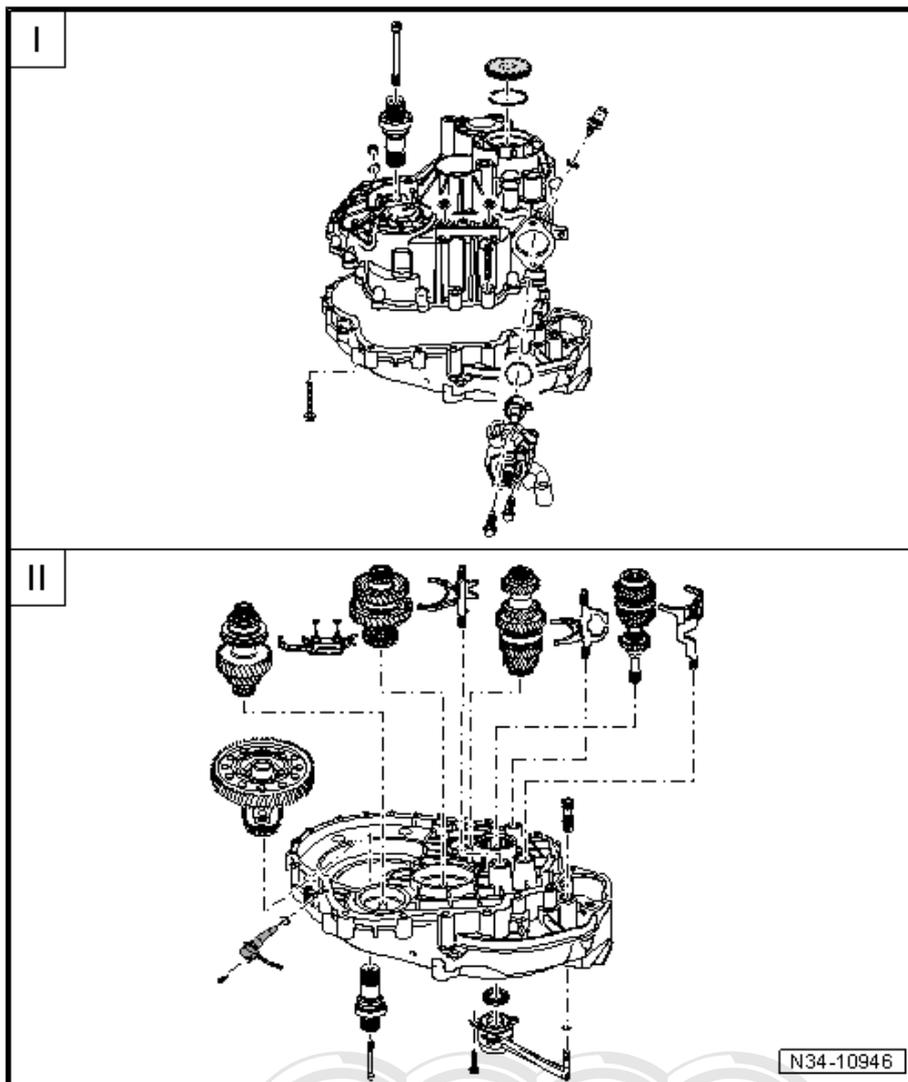
- ⇒ [“5.4 Shift Unit, Input Shaft, Output Shafts, Gearshift Rod, Differential and Bevel Box”, page 104](#)

I - Transmission housing and shift unit, Removing and installing, refer to

⇒ ["2.12 Transmission Housing and Gearshift Unit Overview", page 62](#)

II - Input Shaft, Output Shaft, Differential and Shift Rods, Removing and installing, refer to

⇒ ["4.2 Input Shaft, Output Shaft, Differential and Shift Rods", page 71](#)



2.2 Axle Oil in Bevel Box Overview

Note

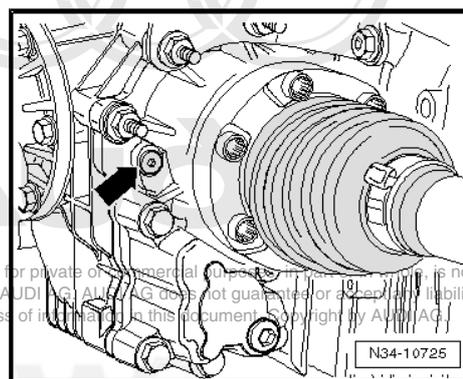
- ◆ The bevel box is attached to the side of the manual transmission and has its own oil system.
- ◆ Transmission fluid level, checking; refer to ["1.3 Transmission Fluid Level, Checking", page 41](#).
- ◆ For the correct transmission fluid specification, refer to the Electronic Parts Catalog (ETKA).

Transmission Fluid Filler Plug - Tightening Specification

Note

Replace the transmission fluid filler plug -arrow-.

- Tighten the transmission fluid filler plug to 15 Nm.



2.3 Engine and Transmission Mount Overview

1 - Bolt

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

2 - Bolt

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

3 - Bolt

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

4 - Bracket

- For the Evaporative Emission (EVAP) canister

5 - Bolt

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

6 - Nut

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

7 - Engine Mount

- Adjustment, checking, refer to ⇒ Engine Mechanical; Rep. Gr. 10 ; Diagnosis and Testing
- Adjusting, refer to ⇒ Engine Mechanical; Rep. Gr. 10 ; Description and Operation
- Removing and installing, refer to ⇒ Engine Mechanical; Rep. Gr. 10 ; Removal and Installation

8 - Connecting Bar

9 - Bolt

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

10 - Bolt

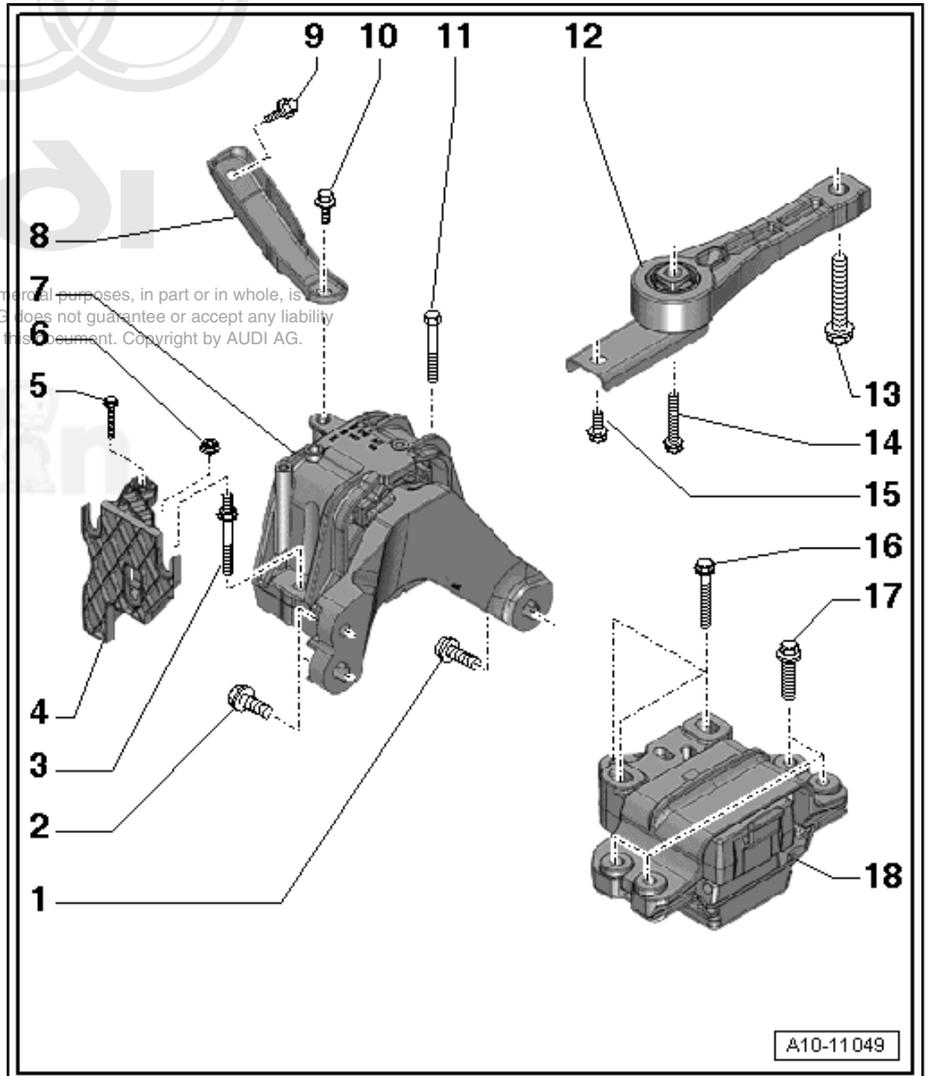
- Connecting bar to engine
- Tightening specification, refer to ⇒ Engine Mechanical; Rep. Gr. 10 ; Description and Operation

11 - Bolt

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

12 - Pendulum Support

- Removing and installing, refer to ⇒ ["4.3 Pendulum Support", page 73](#)





13 - Bolt

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

14 - Bolt

- 60 Nm plus an additional 90° turn
- Always replace
- Pendulum support to transmission

15 - Bolt

- 60 Nm plus an additional 90° turn
- Always replace
- Pendulum support to transmission

16 - Bolt

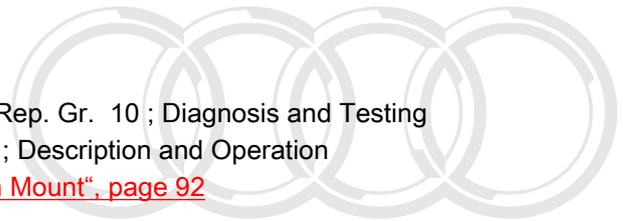
- 60 Nm plus an additional 90° turn
- Always replace
- Transmission mount to transmission

17 - Bolt

- 40 Nm plus an additional 90° turn
- Always replace
- Transmission mount to chassis

18 - Transmission Mount

- Adjustment, checking, refer to ⇒ Engine Mechanical; Rep. Gr. 10 ; Diagnosis and Testing
- Adjusting, refer to ⇒ Engine Mechanical; Rep. Gr. 10 ; Description and Operation
- Removing and installing, refer to ⇒ ["4.11 Transmission Mount", page 92](#)



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2.4 Gearshift Knob and Covers Overview

1 - Shift Knob with Shift Lever Boot

- Cannot be separated from each other
- Replace together
- Removing and installing, refer to ⇒ [“4.7 Shift Knob with Shift Lever Boot”, page 78](#)
- Disconnecting from the center console cover, refer to ⇒ [Fig. “Center Console Trim and Frame/Shift Lever Boot, Disconnecting”, page 48](#)
- Disconnecting from the mounting frame, refer to ⇒ [Fig. “Frame and Shift Lever Boot, Disconnecting”, page 48](#)

2 - Clamp

- For attaching the gearshift knob to the gearshift lever
- Attach using hose clamp pliers - V.A.G 1275-

3 - Center Console Trim

- Removing and installing together with the shift knob, refer to ⇒ [“4.7 Shift Knob with Shift Lever Boot”, page 78](#)

- Disconnecting from shift lever boot, refer to ⇒ [Fig. “Center Console Trim and Frame/Shift Lever Boot, Disconnecting”, page 48](#)

4 - Frame

- Disconnecting from center console, refer to ⇒ [Fig. “Center Console Trim and Frame/Shift Lever Boot, Disconnecting”, page 48](#)
- Disconnecting from shift lever boot, refer to ⇒ [Fig. “Frame and Shift Lever Boot, Disconnecting”, page 48](#)

5 - Washer

- Quantity: 4

6 - Bolt

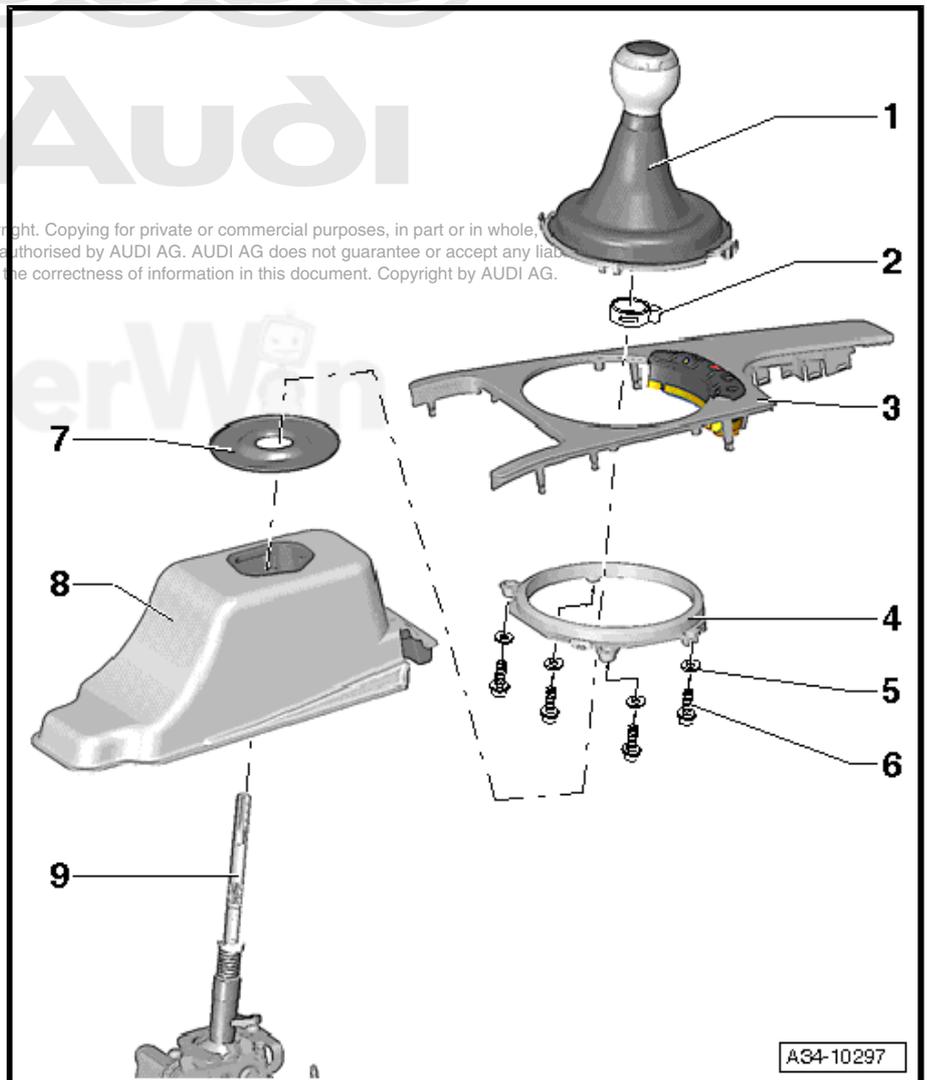
- Quantity: 4
- 1.5 Nm

7 - Upper Noise Insulation

8 - Lower Noise Insulation

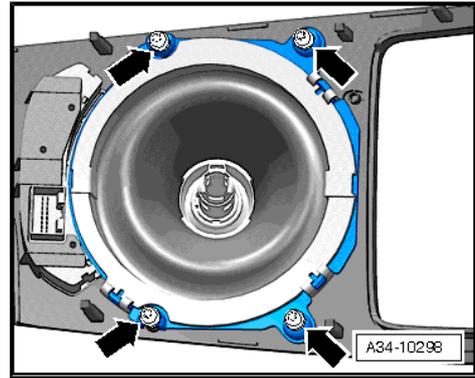
9 - Gearshift Lever

- Selector mechanism, adjusting, refer to ⇒ [“2.10 Shift Mechanism, Adjusting”, page 59](#)



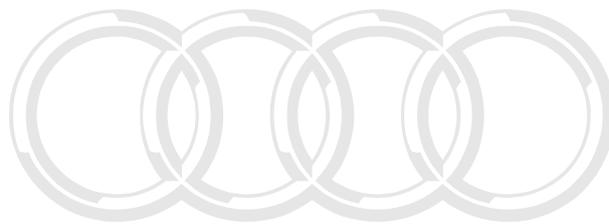
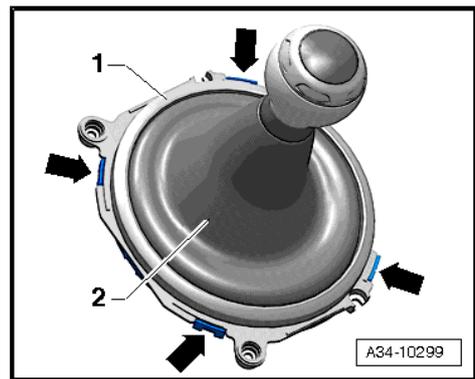
Center Console Trim and Frame/Shift Lever Boot, Disconnecting

- Remove the bolts -arrows-.
- Remove the trim from the frame.



Frame and Shift Lever Boot, Disconnecting

- Unlock the tabs -arrows- carefully and lift the frame -1- off the shift lever boot -2-.



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2.5 Gearshift Lever and Gearshift Housing Overview

Note

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

1 - Base Plate

- Bend the tabs in order to remove
- Replace

2 - Gasket

- Replace

3 - Gearshift Lever

- Can be removed and installed with the shift lever guide -15- still installed

4 - Washer

- Slide out of the shift lever as far as stop -arrow-.

5 - Circle

- Replace

6 - Selector Cable

- Pry off of selector bracket
- Press onto selector bracket inside the shift mechanism
- Installed position, refer to [⇒ "2.7 Gearshift Mechanism Overview", page 55](#)

7 - Bushing

8 - Gearshift Cable

- Pry off of the shift lever guide
- Press onto shift lever guide inside the shift mechanism
- Installed position, refer to [⇒ "2.7 Gearshift Mechanism Overview", page 55](#)

9 - Insulation

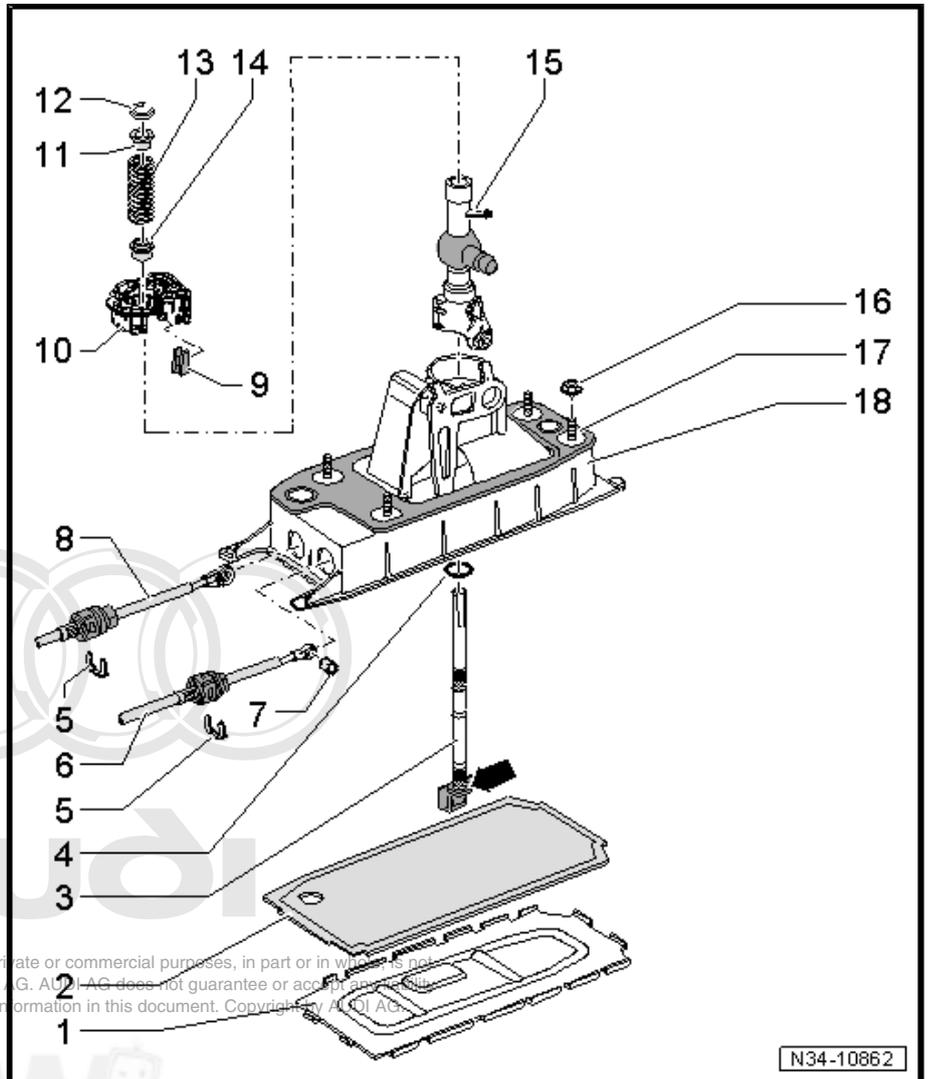
10 - Bearing Shell

- Will get damaged when being removed
- Replace

11 - Bushing

12 - Circle

- Removing and installing, refer to [⇒ Fig. "Removing the Lock Washer", page 50](#)



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13 - Pressure Spring

14 - Bushing

15 - Gearshift Lever Guide

16 - Nut

- 8 Nm

17 - Gasket

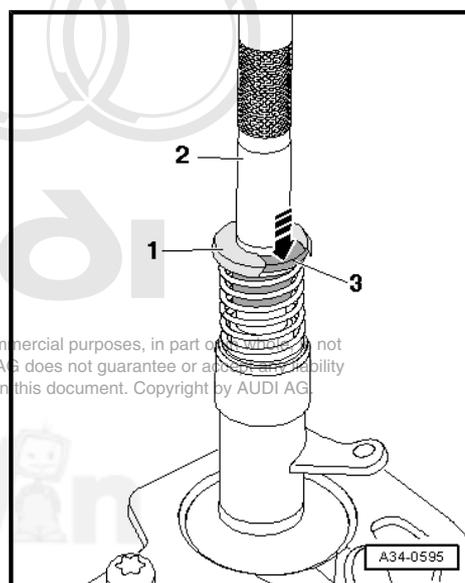
- Between the gearshift housing and the underbody
- Self-adhesive
- Affix to the gearshift housing

18 - Selector Housing

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

Removing the Lock Washer

- Hold the gearshift lever -2- tight.
- Push the spacer -3- in direction of -arrow- and remove the lock washer -1-.



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2.6 Gearshift Lever and Selector Relay Lever Overview

Note

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

1 - Shift Unit

- Servicing, refer to
 ⇒ [“5.3 Shift Unit”,
 page 102](#)

2 - Gearshift Lever

- With a balance weight
- Installing, refer to
 ⇒ [Fig. “Installing the
 Transmission Shift Lev-
 er”, page 52](#)
- Installed position, refer
 to
 ⇒ [Fig. “Selector Lever/
 Selector Relay Lever In-
 stalled Position”,
 page 52](#)
- Adjust the gearshift
 mechanism after instal-
 ling. Refer to
 ⇒ [“2.10 Shift Mecha-
 nism, Adjusting”,
 page 59](#)

3 - Clip

4 - Selector Relay Lever

- Installed position, refer
 to
 ⇒ [Fig. “Selector Lever/
 Selector Relay Lever In-
 stalled Position”,
 page 52](#)
- Removing and securing
 the selector relay lever
 to the gearshift lever.
 Refer to
 ⇒ [Fig. “Removing and
 Securing the Selector
 Relay Lever to the Gearshift Lever”,
 page 54](#)

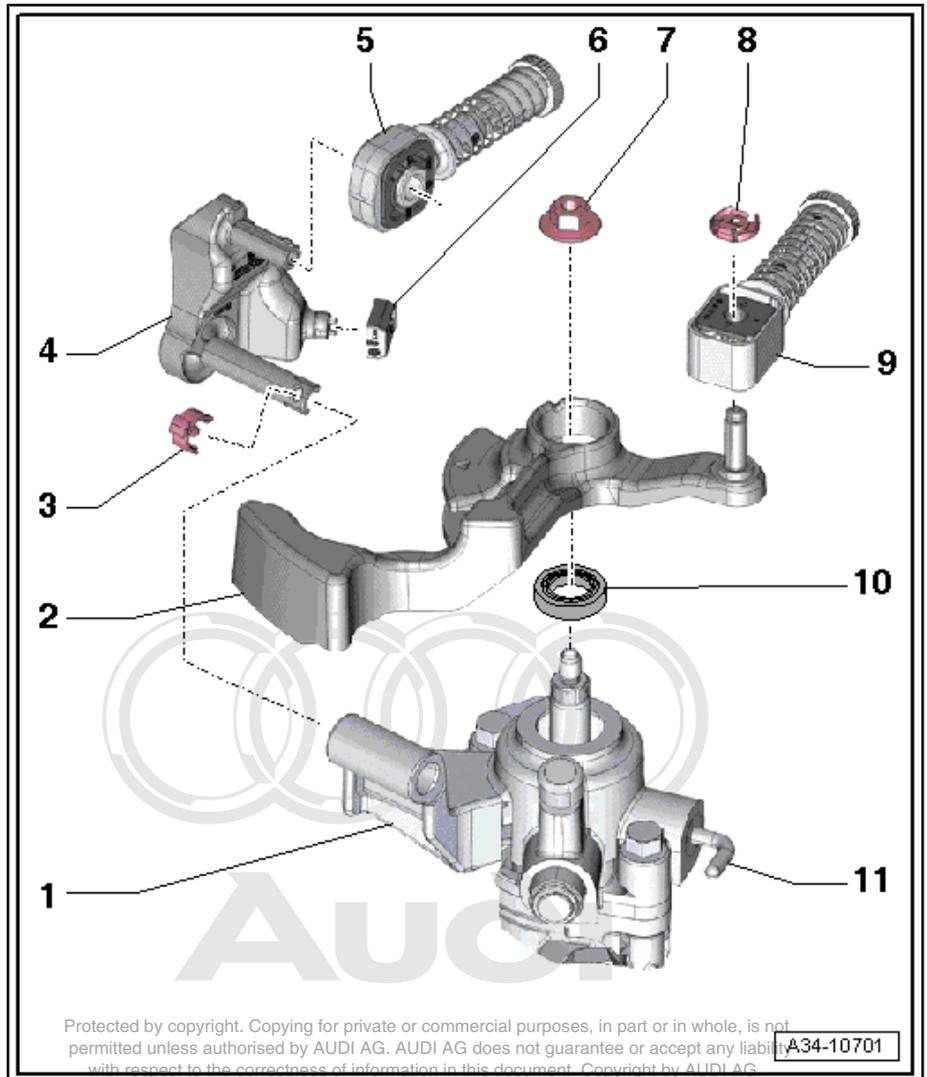
5 - Cable Retainer

- For attaching the selector cable to the selector relay lever
- Allocation, refer to ⇒ [Fig. “Cable Retainer Allocation”, page 53](#)
- Prying off, refer to
 ⇒ [Fig. “Prying the Selector Cable Retainer Out of the Selector Relay Lever”, page 54](#)
- Installing, refer to
 ⇒ [Fig. “Installing the Selector Cable Retainer on the Selector Relay Lever”, page 54](#)
- For adjusting the shift mechanism ⇒ [page 60](#)

6 - Sliding Shoe

7 - Nut

- 23 Nm
- Replace
- Self-locking



8 - Circle

- Replace

9 - Cable Retainer

- For attaching the shift cable to the transmission shift lever
- Allocation, refer to ⇒ [Fig. "Cable Retainer Allocation", page 53](#)
- For adjusting the shift mechanism ⇒ [page 60](#)

10 - Shaft Seal

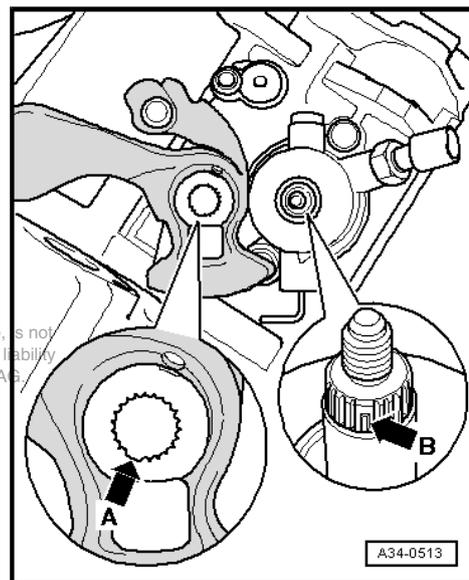
- Removing and installing, refer to ⇒ ["4.5 Selector Shaft Seal", page 76](#)

11 - Locking Pin

- For adjusting the shift mechanism, refer to ⇒ ["2.10 Shift Mechanism, Adjusting", page 59](#)

Installing the Transmission Shift Lever

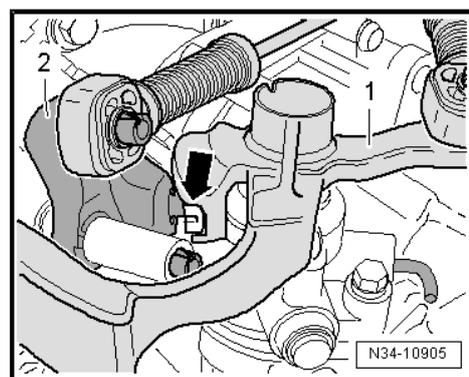
- When positioning the transmission shift lever, make sure the tooth gap -arrow A- is placed over the missing selector shaft teeth -arrow B-.



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Selector Lever/Selector Relay Lever Installed Position

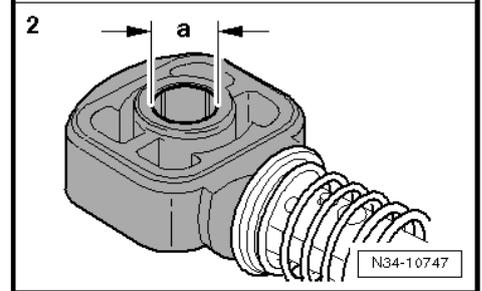
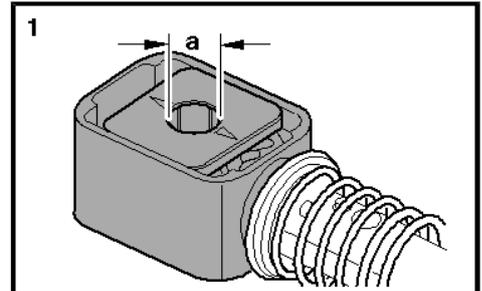
- 1 - Transmission selector lever with balance weight
- 2 - The selector relay lever fits into the sliding rail on the transmission selector lever via the sliding shoe -arrow-.



Cable Retainer Allocation

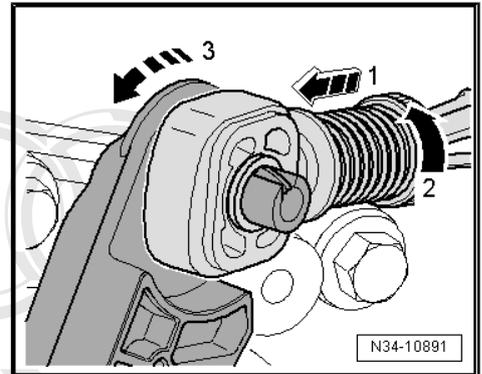
These holes have different diameters.

Cable Retainer For:	Dimension "a"
-1- Shift cable to gearshift lever	8.5 mm
-2- Selector cable to selector relay lever	10 mm



Disconnecting the Cable Retainer from the Selector Cable

- Pull the safety mechanism all the way forward -arrow 1- and then lock it to the left -arrow 2-.
- Move the selector relay lever forward -arrow 3- and remove the selector cable from the retainer.



Removing and Securing the Shift Cable to the Gearshift Lever

Removing

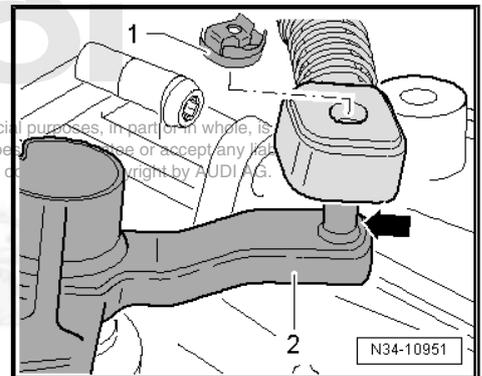
- Lift the clamp and remove the lock washer -1- for the shift cable from the gearshift lever -2-.
- Remove the shift cable from the lug -arrow-.

Securing



Note

- ◆ Replace the lock washer for the shift cable.
- ◆ Coat the pins -arrow- with a small quantity of grease -G 000 450 02-.
- Press the shift cable onto the gearshift lever -2- and secure it with the lock washer -1-.



Removing and Securing the Selector Relay Lever to the Gearshift Lever

Removing

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

Securing

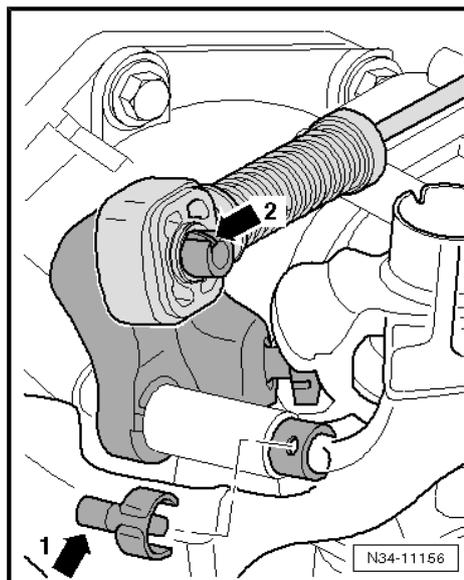
Note

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

- Install the selector relay lever together with the cable retainer all the way in.
- Install the clip -arrow 1- and make sure it is locked into place.

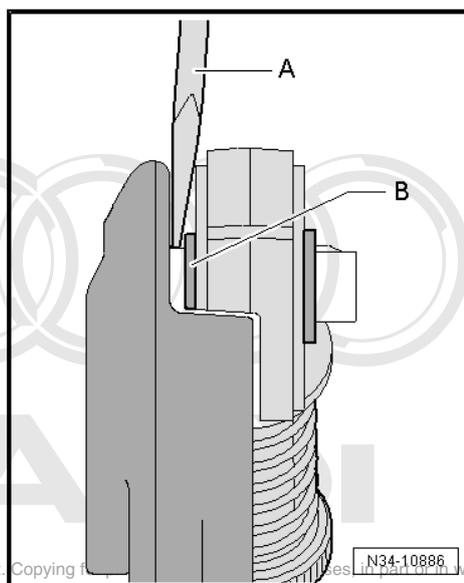
Note

Ignore -arrow 2-.



Prying the Selector Cable Retainer Out of the Selector Relay Lever

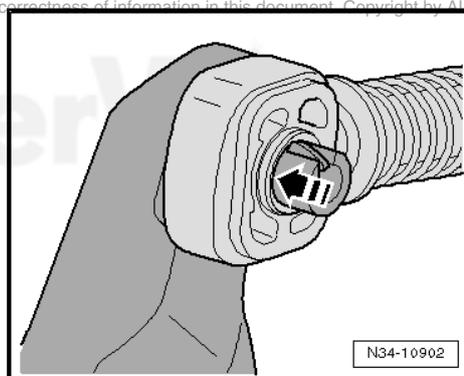
- The selector relay lever is removed.
- Insert a screwdriver -A- between the bushing -B- and the selector relay lever.



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Installing the Selector Cable Retainer on the Selector Relay Lever

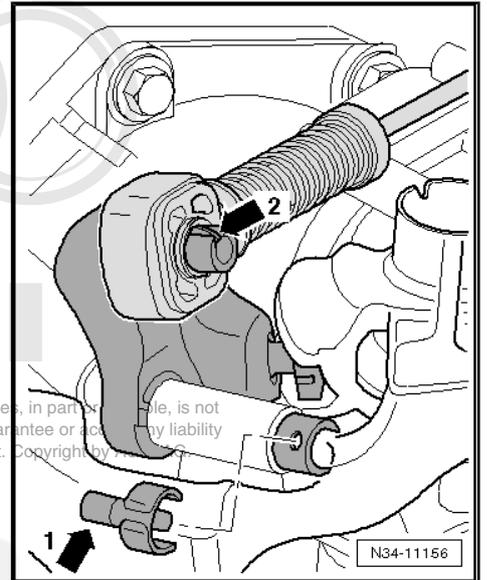
- The selector relay lever is removed.
- The cable retainer may only be installed at the bushing -arrow-.



- The cable retainer must move freely on the selector relay lever.
- The cable retainer must be behind the catch -arrow 2-.
- Make sure it engages securely.

 **Note**

Ignore -arrow 1-.



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2.7 Gearshift Mechanism Overview

-Arrow A- gearshift lever movement

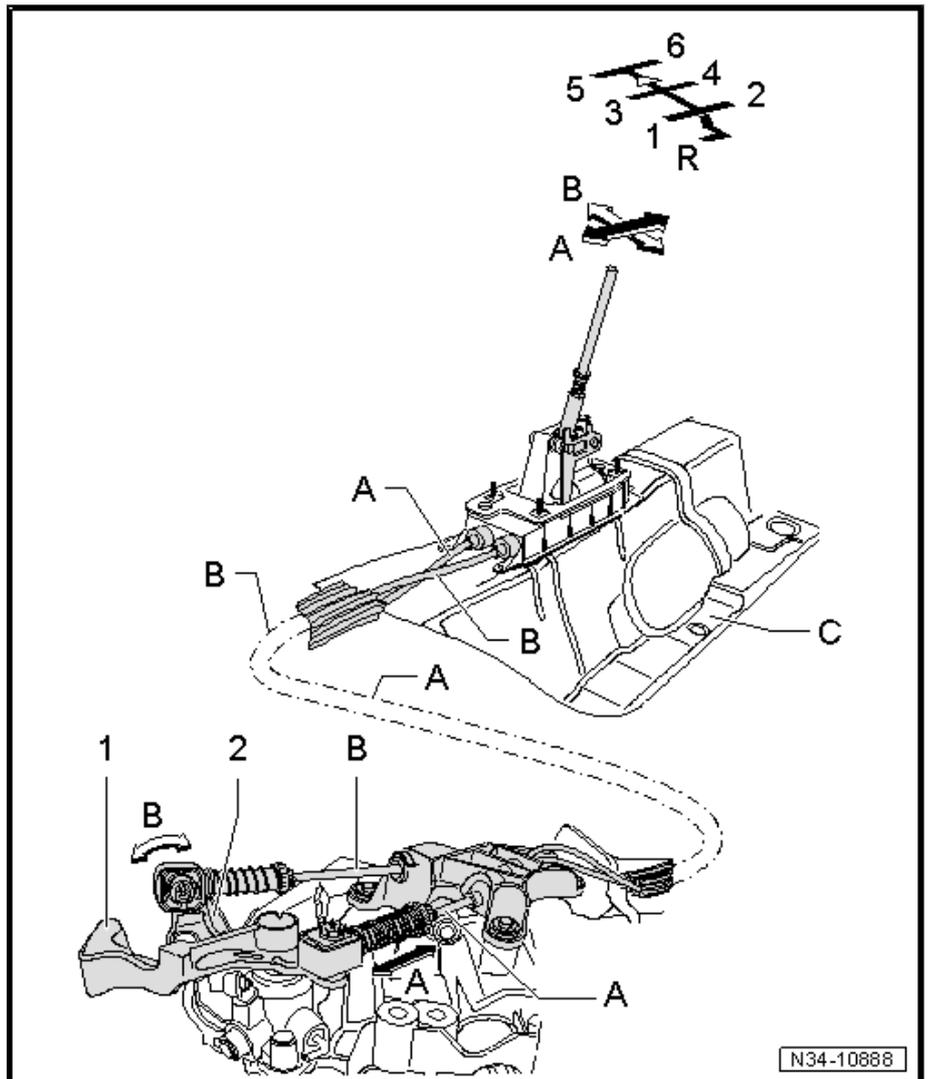
-Arrow B- selector lever movement

A - Gearshift Lever Cable

B - Selector Lever Cable

C - Heat Shield

- ☐ To remove, remove the gearshift mechanism



- 1 - Gearshift Lever
- 2 - Selector Relay Lever

2.8 Shift Cable and Selector Cable Overview



Note

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

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1 - Cable Retainer

- For attaching the selector cable to the selector relay lever
- Allocation, refer to [Fig. "Cable Retainer Allocation", page 53](#)
- For adjusting the shift mechanism [⇒ page 60](#)

2 - Cable Mounting Bracket

3 - Clips

- Replace

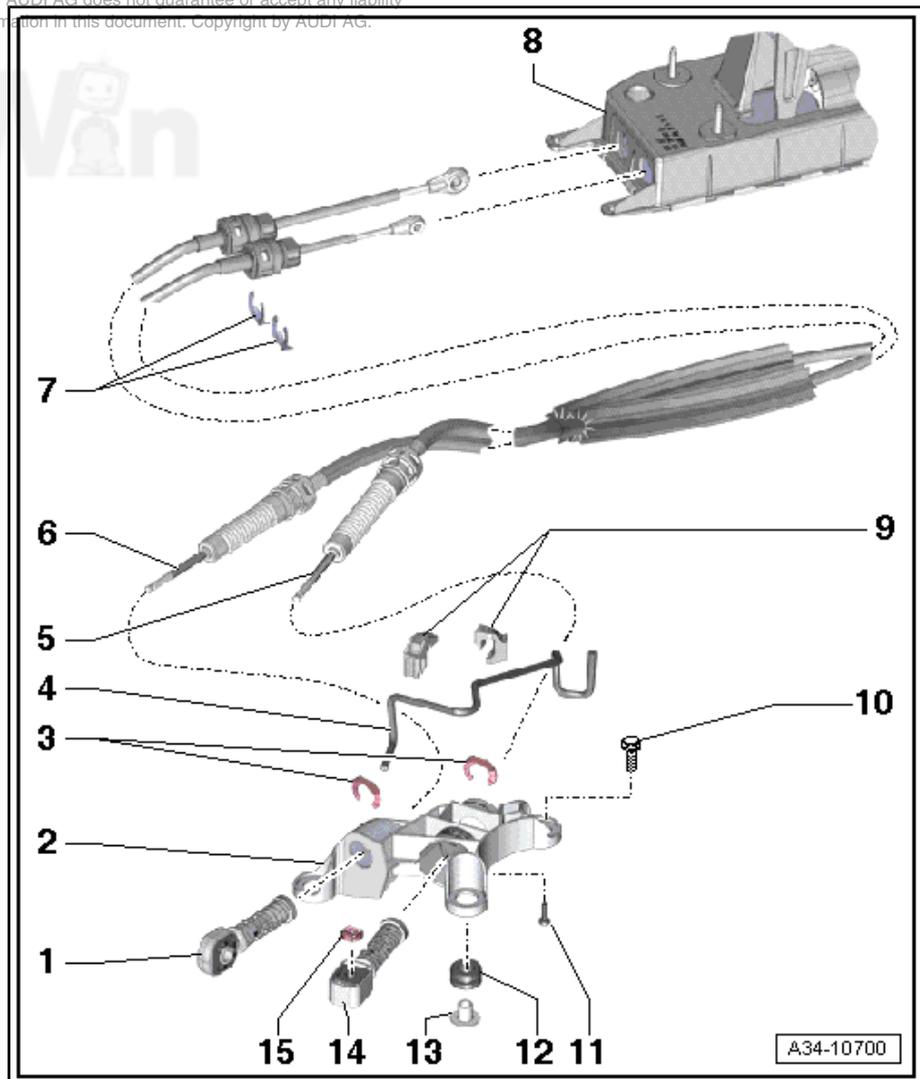
4 - Bracket

5 - Gearshift Cable

- Removing and installing, refer to ["4.6 Shift Cable and Selector Cable", page 77](#)
- Adjusting [⇒ "2.10 Shift Mechanism, Adjusting", page 59](#)

6 - Selector Cable

- Removing and installing, refer to ["4.6 Shift Cable and Selector Cable", page 77](#)
- Adjusting, refer to ["2.10 Shift Mechanism, Adjusting", page 59](#)



7 - Clips

- Replace

8 - Selector Housing

9 - Clips

10 - Bolt

- 20 Nm

11 - Bolt

- 3.5 Nm

12 - Grommet

13 - Bushing

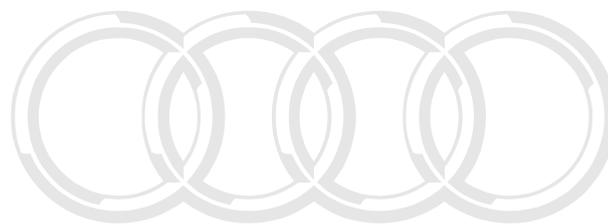
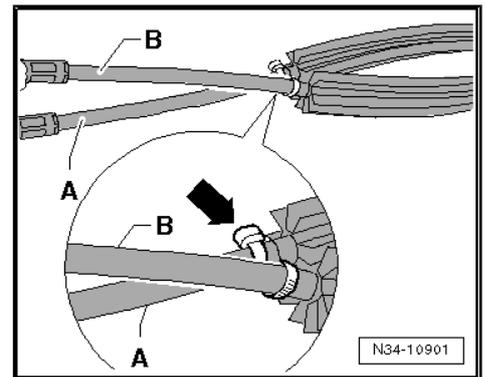
14 - Cable Retainer

- ❑ For attaching the shift cable to the transmission shift lever
- ❑ Allocation, refer to ⇒ [Fig. "Cable Retainer Allocation", page 53](#)
- ❑ For adjusting the shift mechanism ⇒ [page 60](#)

15 - Circle

Attach the Shift Cable and Selector Cable with a Cable Tie

- Wrap the cable tie -arrow- around the shift cable -A- and selector cable -B-.
- Secure the cables as illustrated.



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2.9 Shift Forks

1 - Gearshift Rod and Shift Fork for 1st and 2nd Gear

2 - Bearing Bushing

- For the selector rod
- Removing and installing from the transmission housing, refer to [⇒ "5.5 Transmission Housing", page 114](#)
- Removing and installing from the clutch housing, refer to [⇒ "5.1 Clutch Housing", page 96](#)

3 - Insulation Mat

- Installed position, refer to [⇒ Fig. "Rubber Damper Installation Position", page 58](#)

4 - Gearshift Rod and Shift Fork for 3rd and 4th Gear

5 - Gearshift Rod and Shift Fork for 5th and 6th Gear

6 - O-ring

- Installed in some transmissions
- Discontinued shortly after start of production
- Do not install again

7 - Bracket

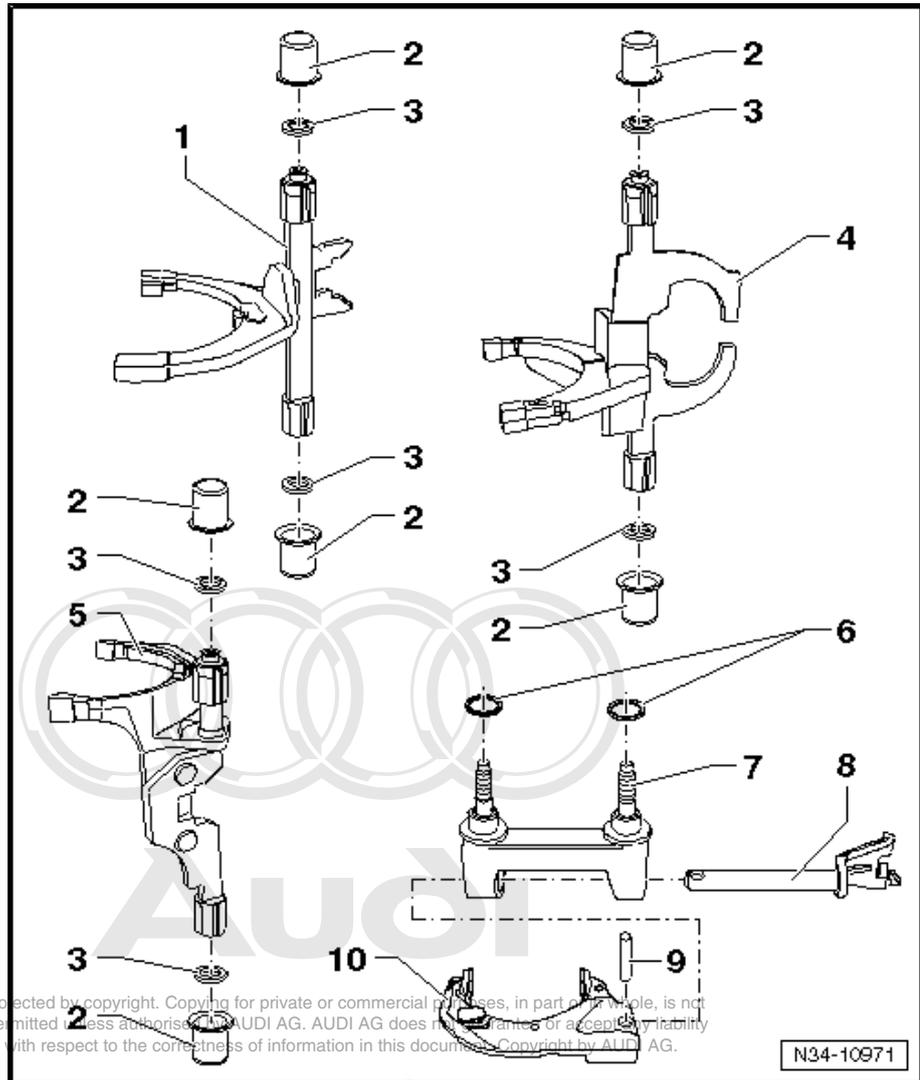
- For the reverse gear shift fork

8 - Mounting Pin

9 - Spring Pin

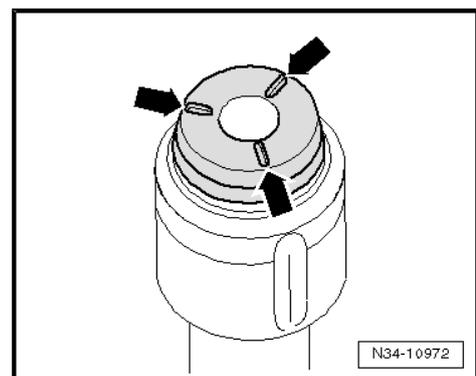
- Always replace
- Remove and install with a drift

10 - Reverse Gear Shift Fork



Rubber Damper Installation Position

The recesses -arrows- point away from the shift fork.



2.10 Shift Mechanism, Adjusting

Special tools and workshop equipment required

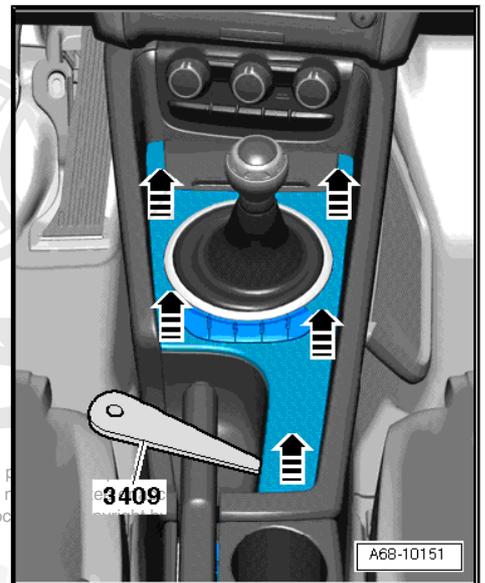
- ◆ Connecting Pin -T10027 A-

Adjusting 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 also be in proper condition.
- Transmission in neutral.

Adjusting

- Open the ashtray.
- Carefully pry the trim off the center console -arrows-.
- Roll the trim up over the shift knob.

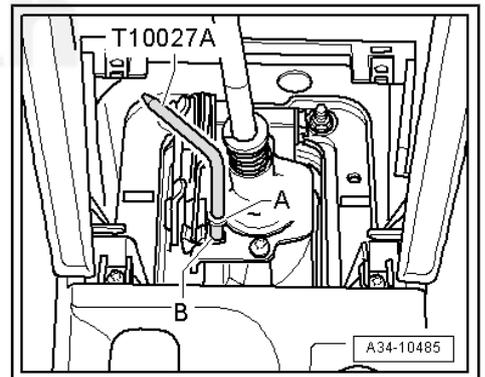


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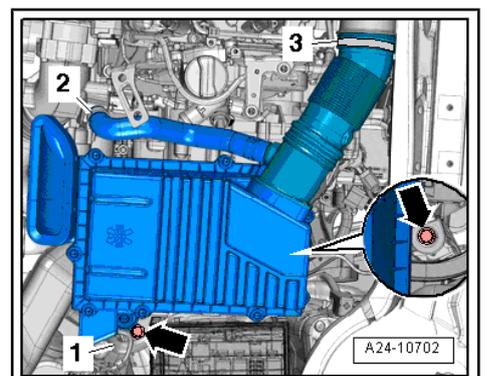
- Move the gearshift lever in neutral to the left and into the gate for 1st/2nd gear.
- Lift the noise insulation plate and install the gearshift lever with -T10027 A-.

Note

The noise insulation is not shown in the illustration.

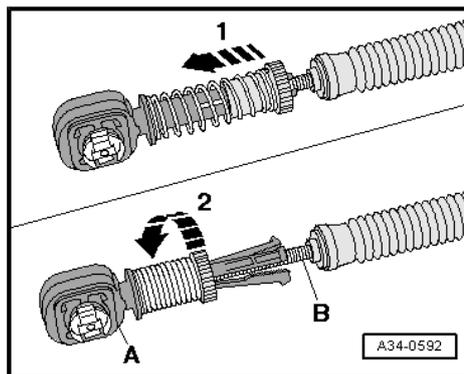


- Remove the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .



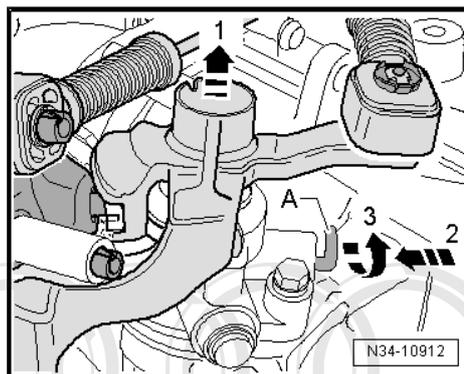
Unlock the cable retainer -A- for the shift cable and the selector cable -B- as follows:

- Push the sleeve all the way forward -arrow 1-. Then turn it all the way to the right -arrow 2- and let it lock into place.
- The shift cable must move easily in the cable retainer.

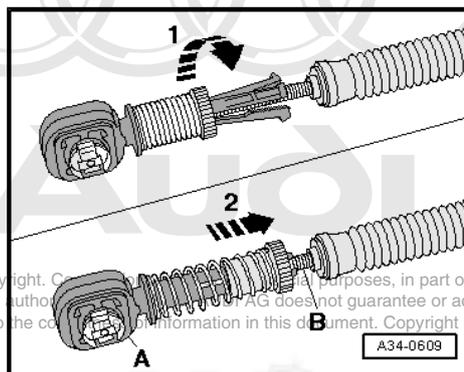


Secure the gearshift shaft as follows:

- Pull the gearshift shaft up -arrow 1-.
- Push the locking pin -A- toward the gearshift shaft at the same time -arrow 2- and turn it upward -arrow 3- until it locks into the gearshift shaft.



- Make sure the shift cable and selector cable -B- are free of tension inside the retainer -A-.
- Loosen the sleeve -arrow 1- and slide it all the way -arrow 2-.
- The cable is now adjusted.

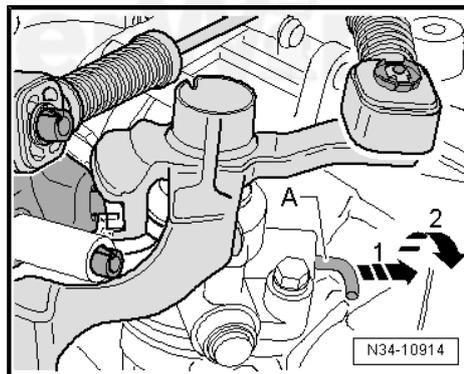


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- Turn the locking pin -A- back to its starting position -arrow 2- and remove it from the transmission -arrow 1-.
- Pull the -T10027 A- out of the gearshift mechanism.

Checking the Gearshift Lever Adjustment

- The shift lever must rest in the 3rd/4th gearshift lever gate when the transmission is in neutral.
- Operate the clutch.
- Move the gearshift lever (selector lever) several times through all the gears. Pay particular attention to the operation of the reverse gear lock

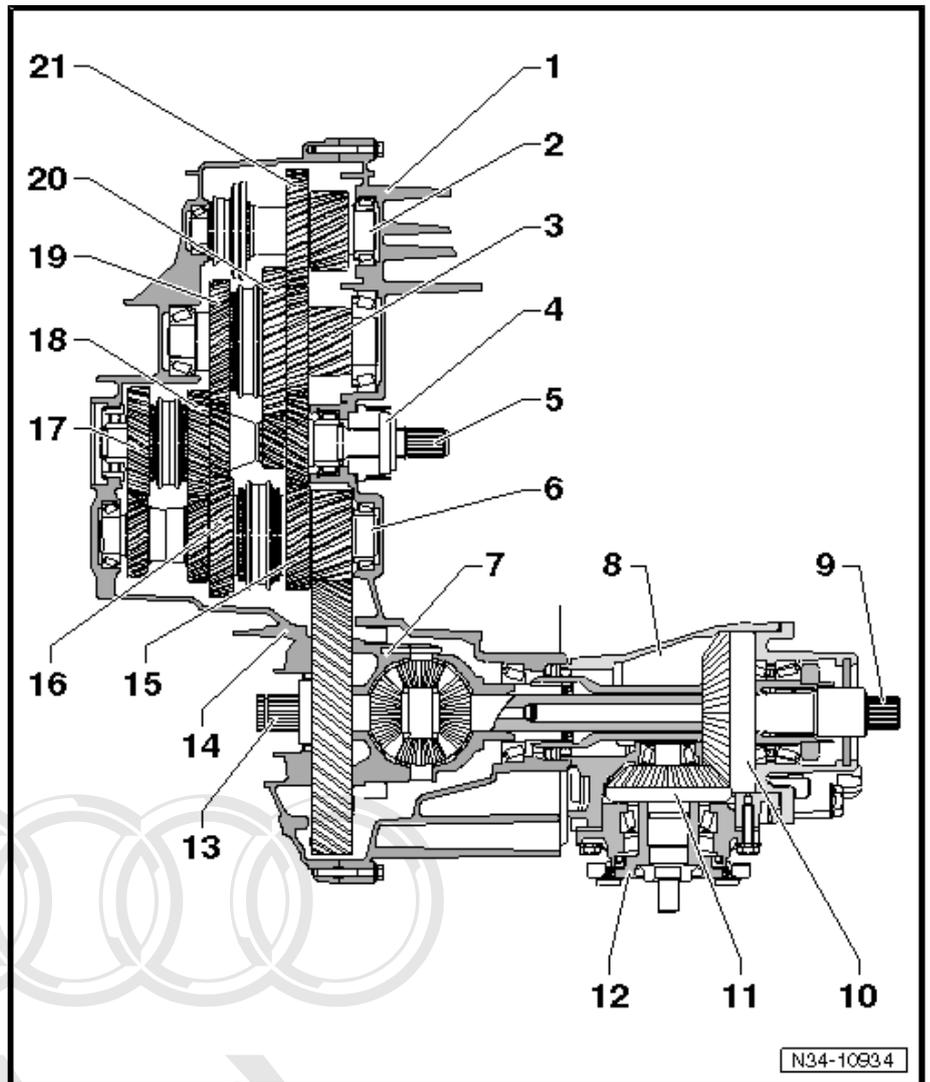


It will be necessary to adjust the gearshift mechanism again if a hook does not appear each time a gear is engaged.

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

2.11 Transmission Overview

- 1 - Clutch Housing
- 2 - Reverse Gear Output Shaft
- 3 - 1st and 2nd Gear Output Shaft
- 4 - Clutch Slave Cylinder with Release Bearing
- 5 - Input Shaft
 - With selector gears for 5th and 6th gear
- 6 - 3rd and 4th Gear Output Shaft
- 7 - Differential
- 8 - Bevel Box
- 9 - Right Stub Shaft
- 10 - Head Bevel Gear with Input Shaft
- 11 - Shaft Bevel Gear
- 12 - Output Flange
- 13 - Left Stub Shaft
- 14 - Transmission Housing
- 15 - 4th Gear Wheel
- 16 - 3rd Gear Wheel
- 17 - 6th Gear Wheel
- 18 - 5th Gear Wheel
- 19 - 2nd Gear Wheel
- 20 - 1st Gear Wheel
- 21 - Reverse Gear Wheel



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2.12 Transmission Housing and Gearshift Unit Overview

1 - Countersunk Bolt

- Tightening specification
⇒ [Item 30 \(page 180\)](#)

2 - Left Stub Shaft with Spring

- Removing and installing, refer to
⇒ [“3.2 Left Stub Shaft Seal, Manual Transmission Installed”, page 186](#)
- Assembling, refer to
⇒ [“1.2 Differential Overview”, page 177](#)

3 - Locking Ring

- For grooved ball bearing/input shaft

4 - Cover

5 - Bolt

- 5 Nm

6 - Securing Plate

- Depending on the date of manufacture, the cover is secured with a locking plate or bracket
⇒ [Item 7 \(page 62\)](#)
⇒ [Fig. “Secure the Sealing Cap:”, page 113](#)

7 - Bracket

- Depending on the date of manufacture, the cover is secured with a locking plate or bracket. Refer to
⇒ [Item 6 \(page 62\)](#) ⇒ [Fig. “Secure the Sealing Cap:”, page 113](#)

8 - Bolt

- 20 Nm

9 - Nut

- 20 Nm plus an additional 90° turn

10 - Back-Up Lamp Switch -F4-

- 20 Nm
- With permanent seal ⇒ [Item 11 \(page 62\)](#)

11 - Seal

12 - Hex Bolt

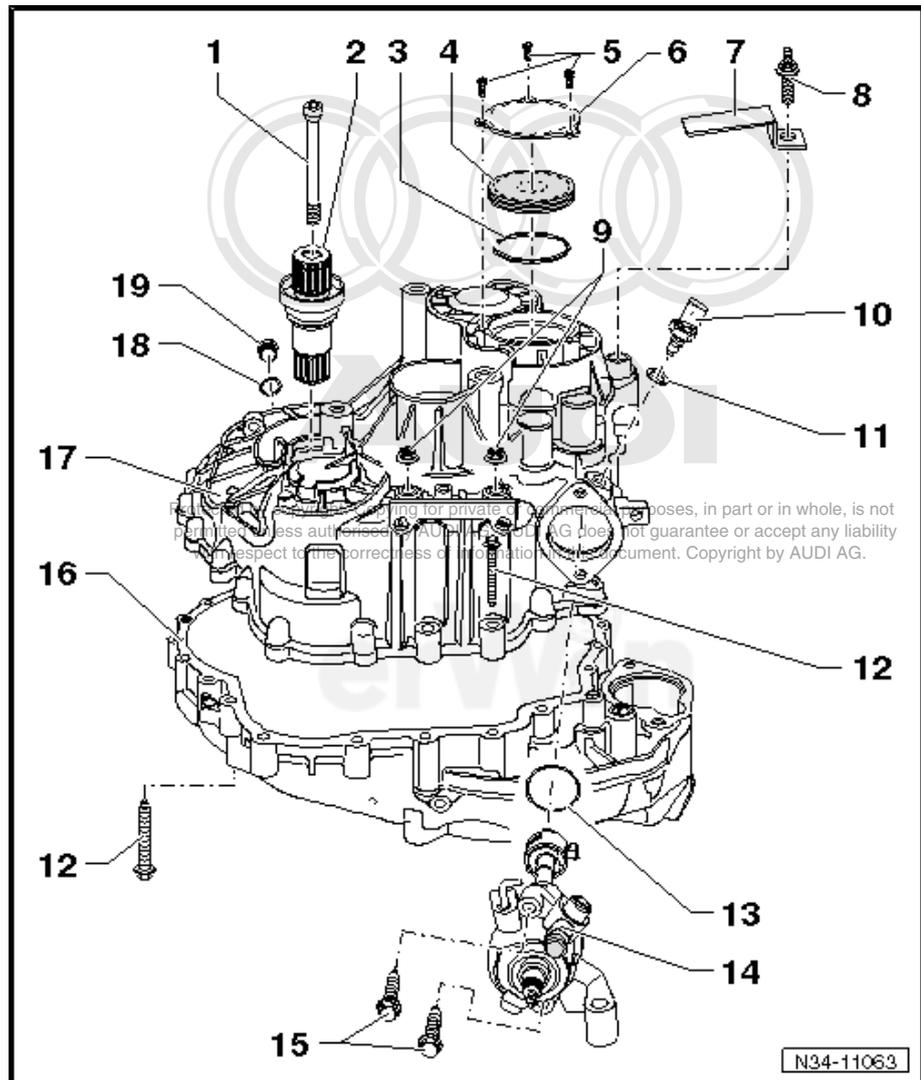
- 8 Nm plus an additional 120° turn
- Always replace

13 - O-ring

- Always replace

14 - Shift Unit

- Servicing, refer to ⇒ [“5.3 Shift Unit”, page 102](#)



15 - Bolt

- 25 Nm
- Always replace

16 - Clutch Housing

- Servicing, refer to ⇒ ["5.1 Clutch Housing", page 96](#)

17 - Transmission Housing

- Servicing, refer to ⇒ ["5.5 Transmission Housing", page 114](#)

18 - Seal

- Always replace

19 - Oil Drain Plug

- 45 Nm



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3 Specifications

⇒ "3.1 Fastener Tightening Specifications", page 64

3.1 Fastener Tightening Specifications

Components	Fastener Size	Nm
Back-Up Lamp Switch	-	20
Bracket to Transmission Housing	-	20
Transmission Housing		
Bolt ¹	-	8 + 120°
Nut	-	20 + 90°
Cable Mounting Bracket ²		
	-	3.5
	-	20
Frame	-	1.5
Gearshift Lever, Nut ¹	-	23
Oil Drain Plug	-	45
Pendulum Support ^{1, 3}		
-Pendulum Support to Transmission	-	60 + 90°
-Pendulum Support to Subframe	-	100 + 90°
Securing Plate	-	5
Selector Housing with Spring and Selector Bracket, Nut	-	8
Shift Unit ¹	-	25
Transmission Fluid Filler Plug	-	45
Transmission Mount ^{1, 4}		
-Transmission Mount to Chassis	-	40 + 90°
-Transmission Mount to Transmission	-	60 + 90°
<ul style="list-style-type: none"> • ¹ Replace • ² For bolt tightening clarification, refer to ⇒ "2.8 Shift Cable and Selector Cable Overview", page 56 and see items -10 and 11- • ³ For bolt tightening clarification, refer to ⇒ "2.3 Engine and Transmission Mount Overview", page 45 and see items -13, 14 and 15- • ⁴ For bolt tightening clarification, refer to ⇒ "2.3 Engine and Transmission Mount Overview", page 45 and see items -16 and 17- 		

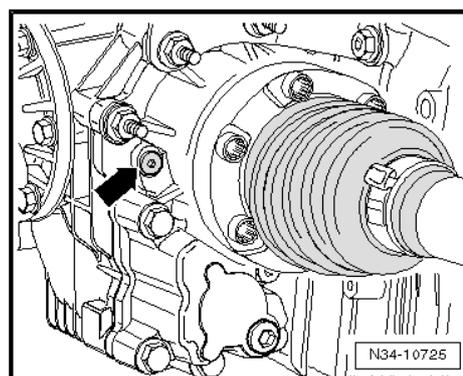
Transmission Fluid Filler Plug - Tightening Specification



Note

Replace the transmission fluid filler plug -arrow-.

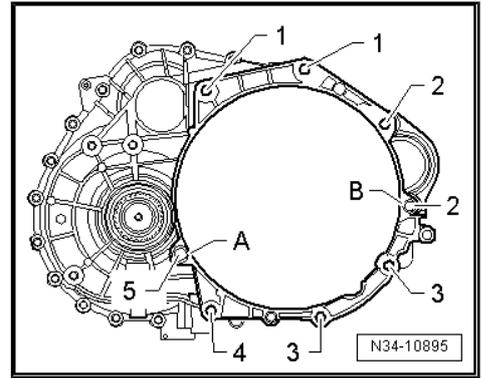
- Tighten the transmission fluid filler plug to 15 Nm.



Mounting Transmission to Engine

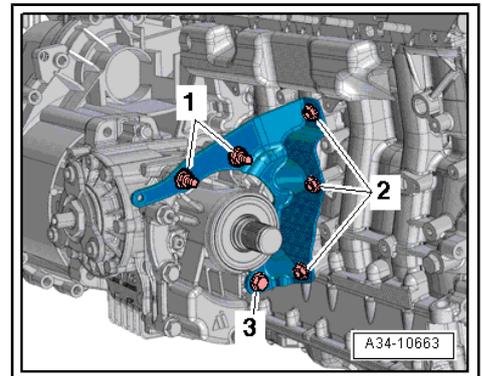
Item	Bolt	Nm
1	M12x65	80
2 ¹⁾	M12 x 180	80
3	M10 x 65	40
4	M10 x 75	40
5 ²⁾	M12 x 95	80
A, B	Alignment sleeves for centering	

- ¹⁾ M8 bolt.
- ²⁾ Installed into the transmission from the engine side.



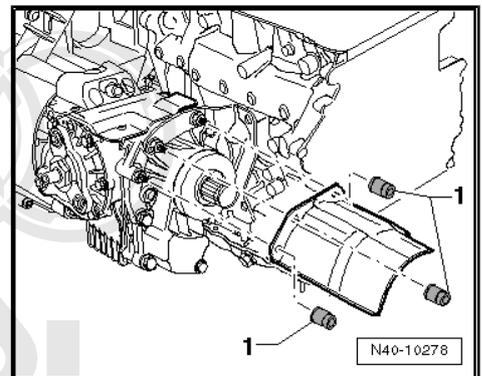
Bevel Box Bracket - Tightening Specification and Sequence

- Tighten bolts in 5 stages as follows:
 1. Install the bolts -1 through 3- hand-tight.
 2. Pre-tighten bolts -2- to 8 Nm.
 3. Pre-tighten the bolts -1 and 3- to 8 Nm.
 4. Tighten the bolts -2- to 40 Nm.
 5. Tighten the bolts -1- and -3- to 40 Nm.



Right Drive Axle Heat Shield - Tightening Specification

- Tighten the nuts -1- to 25 Nm.



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4 Removal and Installation

- ⇒ ["4.1 Bevel Box, Transmission Installed", page 66](#)
- ⇒ ["4.2 Input Shaft, Output Shaft, Differential and Shift Rods", page 71](#)
- ⇒ ["4.3 Pendulum Support", page 73](#)
- ⇒ ["4.4 Selector Mechanism", page 74](#)
- ⇒ ["4.5 Selector Shaft Seal", page 76](#)
- ⇒ ["4.6 Shift Cable and Selector Cable", page 77](#)
- ⇒ ["4.7 Shift Knob with Shift Lever Boot", page 78](#)
- ⇒ ["4.8 Transmission, Removing", page 79](#)
- ⇒ ["4.9 Transmission, Securing in Engine/Transmission Holder", page 87](#)
- ⇒ ["4.10 Transmission, Installing", page 88](#)
- ⇒ ["4.11 Transmission Mount", page 92](#)
- ⇒ ["4.12 Transmission, Transporting", page 94](#)

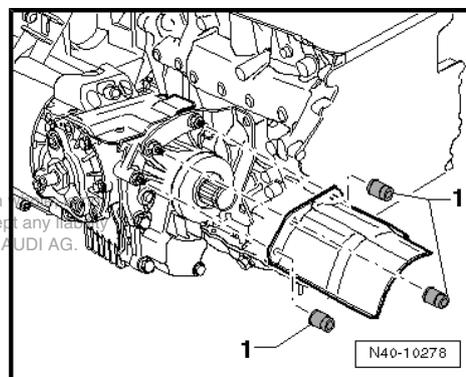
4.1 Bevel Box, Transmission Installed

Special tools and workshop equipment required

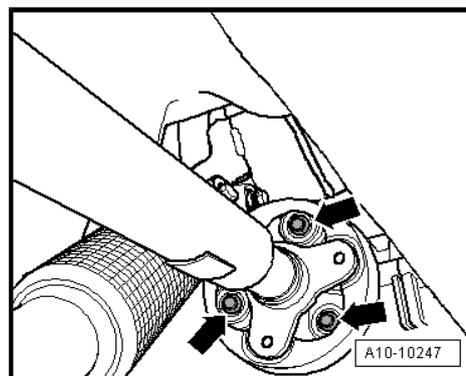
- ◆ Socket and Extended Bit -T10107 A-
- ◆ Counter Hold Tool -T10371-
- ◆ Cover Cap -T10381-

Removing

- Remove the nuts -1- and the right drive axle heat shield.
- Removing right drive axle. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .
- Remove the catalytic converters. Refer to ⇒ Engine Mechanical; Rep. Gr. 26; Removal and Installation.



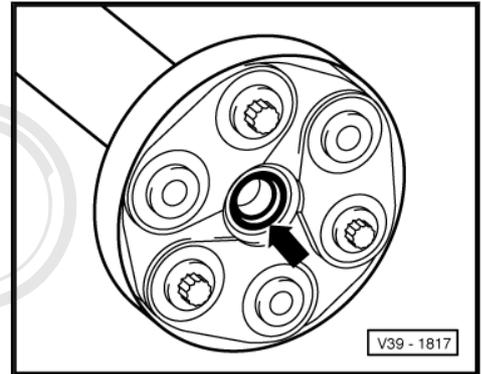
- Mark the position of the flexible disc to the bevel box flange shaft for later use.
- Engage a gear and then remove the bolts -arrows- for the driveshaft flexible disc from the bevel box.



Caution

Danger of causing damage to the shaft seal -arrow- inside the driveshaft flange.

◆ **Push the final drive horizontally as far as possible to the rear.**



Note

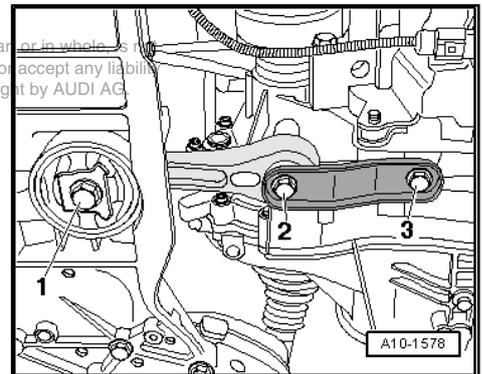
If seal is damaged, driveshaft must be replaced.

- Remove the bolts -2 and 3- for the pendulum support.

Note

Ignore -1-.

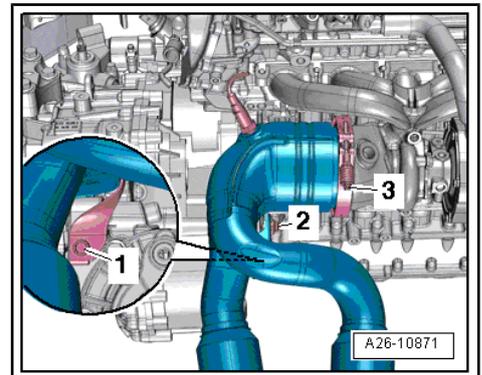
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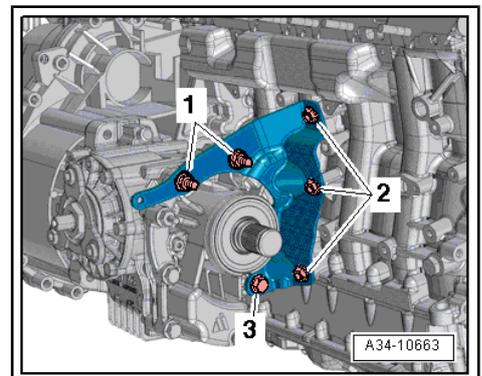
- Remove the bolts -1 and 2- and the primary catalytic converter bracket.

Note

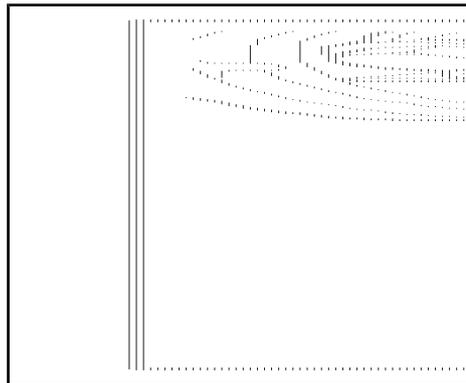
Ignore -3-.



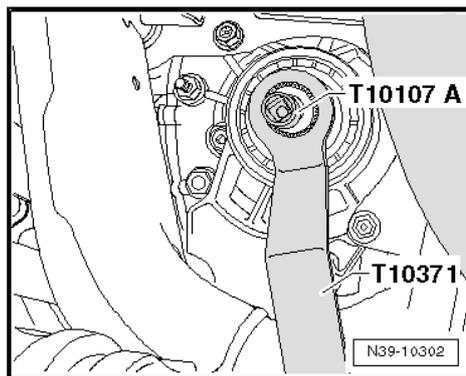
- Remove the bolts -1, 2 and 3- and the bevel box bracket.



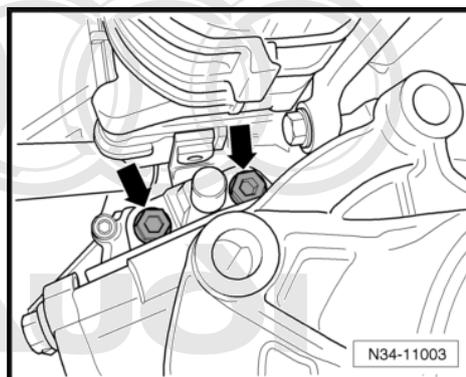
- Remove the locking ring -arrow A- and the O-ring -arrow B- from the right stub shaft.



- Remove the right stub shaft bolt.

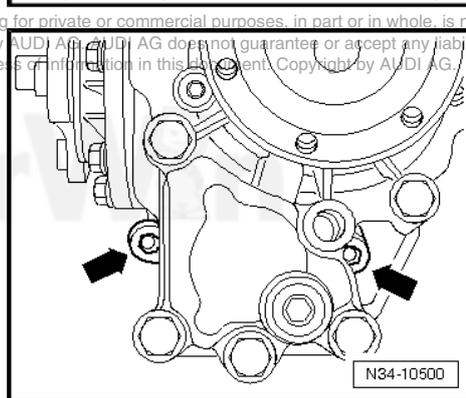


- Remove the upper bolt -arrow- from the bevel box.

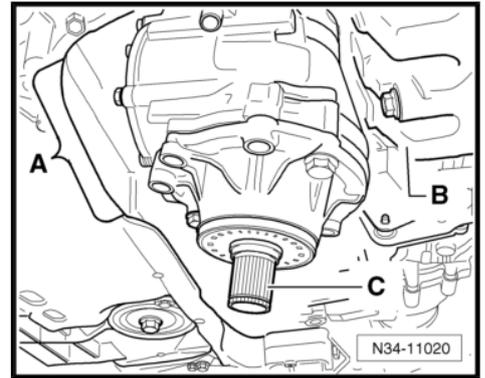


- Remove the upper bolt -arrow- from the bevel box.
- Remove the bevel box carefully from the manual transmission.
- Push the engine/transmission sub-assembly toward the front in order to remove the bevel box.

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- Guide the bevel box into the opening -A- in the engine -B-.
- The stub shaft -C- points downward.



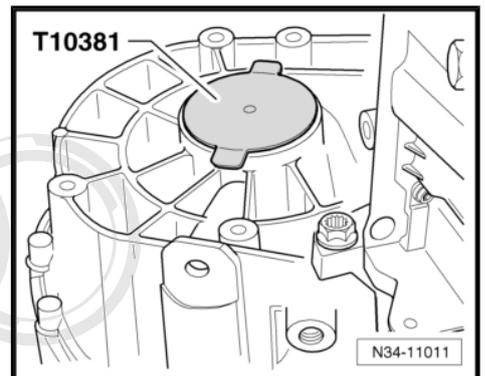
- Install the -T10381- in the transmission.

Installing the Bevel Box

Install in reverse order, paying attention to the following:



Replace the O-rings and locking ring.



Caution

Risk of damaging sealing ring between transmission and bevel box.

- ◆ **Mount the bevel box on the transmission while turning the right stub shaft.**

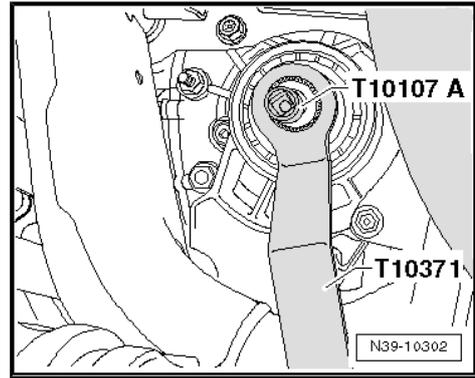
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- Slide on bevel box **completely on manual transmission, while** doing this, join splines of input shaft/bevel box centrally with differential.
- With proper tooth position and central guiding, the bevel box slips up to stop against manual transmission.
- Tighten bevel box on transmission. Tightening specification, refer to [⇒ Item 15 \(page 179\)](#) .



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

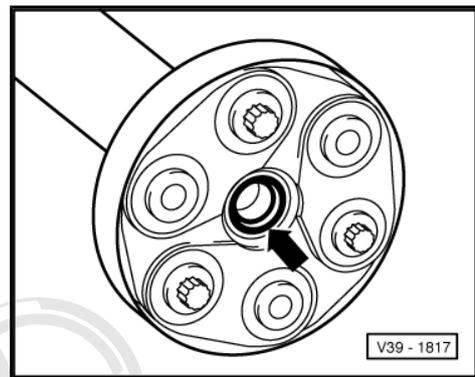
- Tighten the bolt on the right stub shaft. Tightening specification, refer to => [Item 12 \(page 179\)](#) .
- Install bevel box bracket. Refer to => [Fig. "Bevel Box Bracket - Tightening Specification and Sequence"](#) , page 92 .
- Install the turbocharger oil return line. Refer to => Engine Mechanical; Rep. Gr. 21 ; Removal and Installation .
- Install the catalytic converters. Refer to => Engine Mechanical; Rep. Gr. 26 ; Removal and Installation .
- Install right drive axle. Refer to => Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .
- Install the drive axle right heat shield. Refer to => [Fig. "Right Drive Axle Heat Shield - Tightening Specification"](#) , page 92 .



Caution

Danger of causing damage to the shaft seal -arrow- inside the driveshaft flange.

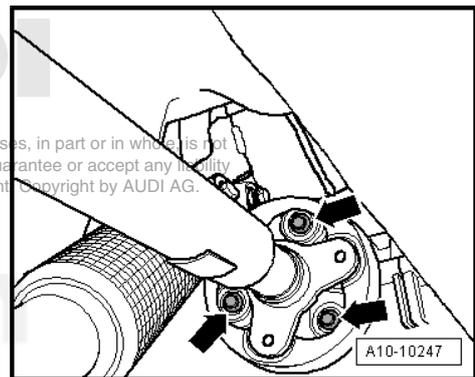
◆ ***Push the final drive horizontally as far as possible to the rear.***



Note

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

- Press the engine/transmission assembly to bulkhead; while doing so, carefully guide pin of the bevel gear transfer case into flange/driveshaft.
- Attach the driveshaft with the flexible disc to the bevel box flange shaft -arrows-. Refer to => Rear Final Drive 02D, 0AV, 0BR and 0BY; Rep. Gr. 39 ; Removal and Installation .
- Install pendulum support. Refer to => ["4.3 Pendulum Support"](#), page 73 .
- Axle oil level in bevel box, checking. Refer to => ["1.1 Gear Oil in Bevel Box, Checking"](#) , page 39 .
- Gear oil level in manual transmission, checking. Refer to => ["1.3 Transmission Fluid Level, Checking"](#) , page 41 .



4.2 Input Shaft, Output Shaft, Differential and Shift Rods

1 - Output Shaft, Reverse Gear, refer to

⇒ [“1.4 Reverse Gear Output Shaft Overview”, page 136](#)

- ❑ Installed position, refer to
 ⇒ [Fig. “Installation Location of Shafts and Gearshift Rods in Transmission”, page 72](#)

2 - Switching Rockers for Reverse Gear

- ❑ Installed position, refer to
 ⇒ [Fig. “Installation Location of Shafts and Gearshift Rods in Transmission”, page 72](#)

3 - Output Shaft 1st and 2nd Gear, refer to ⇒ [“1.2 1st and 2nd Gear Output Shaft Overview”, page 130](#)

- ❑ Installed position, refer to
 ⇒ [Fig. “Installation Location of Shafts and Gearshift Rods in Transmission”, page 72](#)

4 - Gearshift Rod and Shift Fork for 1st and 2nd Gear

- ❑ Installed position, refer to
 ⇒ [Fig. “Installation Location of Shafts and Gearshift Rods in Transmission”, page 72](#)

5 - Output Shaft 3rd and 4th Gear, refer to ⇒ [“1.3 3rd and 4th Gear Output Shaft Assembly Overview”, page 133](#)

- ❑ Installed position, refer to
 ⇒ [Fig. “Installation Location of Shafts and Gearshift Rods in Transmission”, page 72](#)

6 - Gearshift Rod and Shift Fork for 3rd and 4th Gear

- ❑ Pay attention to the installed position, refer to
 ⇒ [Fig. “Installation Position, 3rd and 4th Gear Selector Rod:”, page 110](#)

7 - Input Shaft, refer to ⇒ [“1.1 Input Shaft Overview”, page 129](#)

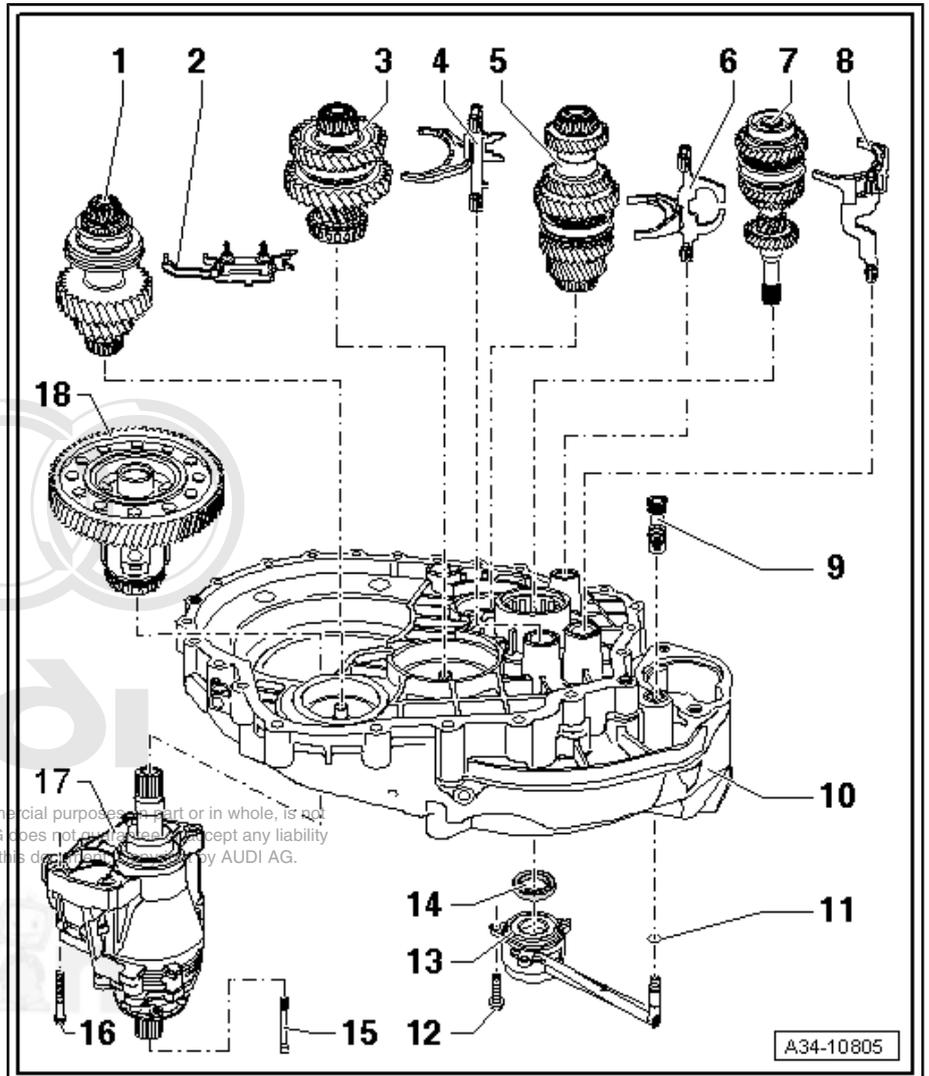
- ❑ with selector gears for 5th and 6th gear
- ❑ Installed position, refer to
 ⇒ [Fig. “Installation Location of Shafts and Gearshift Rods in Transmission”, page 72](#)
- ❑ Always replace the grooved ball bearing on the input shaft ⇒ [Item 16 \(page 130\)](#)

8 - Gearshift Rod and Shift Fork for 5th and 6th Gear

- ❑ Installed position, refer to
 ⇒ [Fig. “Installation Location of Shafts and Gearshift Rods in Transmission”, page 72](#)

9 - Bleeder

- ❑ Attach to the clutch slave cylinder ⇒ [Item 13 \(page 72\)](#)



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10 - Clutch Housing

- ❑ Servicing, refer to ⇒ [“5.1 Clutch Housing”, page 96](#)

11 - O-ring

- ❑ Install on the line connection
- ❑ Coat with brake fluid before installing

12 - Bolt

- ❑ Quantity: 3
- ❑ Tightening specification ⇒ [Item 4 \(page 15\)](#)
- ❑ Removing and installing, refer to ⇒ [“4.5 Clutch Slave Cylinder with Release Bearing”, page 29](#)

13 - Clutch Slave Cylinder with Release Bearing

- ❑ Removing and installing, refer to ⇒ [“4.5 Clutch Slave Cylinder with Release Bearing”, page 29](#)

14 - Input Shaft Seal

- ❑ Removing, refer to ⇒ [Fig. “Remove the Input Shaft Seal.”, page 99](#)
- ❑ Installing, refer to ⇒ [Fig. “Install the Input Shaft Seal so that it is Flush.”, page 99](#)

15 - Countersunk Bolt

- ❑ Tightening specification ⇒ [Item 12 \(page 179\)](#)

16 - Bolt

- ❑ Tightening specification ⇒ [Item 15 \(page 179\)](#)
- ❑ Quantity: 4
- ❑ Always replace

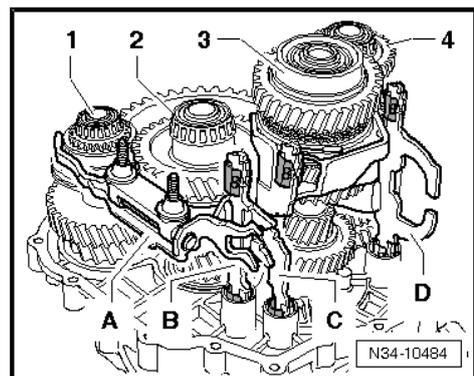
17 - Bevel Box

- ❑ Removing and installing with transmission installed, refer to ⇒ [“4.1 Bevel Box, Transmission Installed”, page 66](#)
- ❑ Removing and installing with transmission removed, refer to ⇒ [“5.4 Shift Unit, Input Shaft, Output Shafts, Gearshift Rod, Differential and Bevel Box”, page 104](#)

18 - Differential, refer to ⇒ [“1.2 Differential Overview”, page 177](#)

Installation Location of Shafts and Gearshift Rods in Transmission

- 1 - Reverse Gear Output Shaft
- 2 - 1st and 2nd Gear Output Shaft
- 3 - Input shaft
- 4 - 3rd and 4th gear output shaft
- A - switching rockers, reverse gear
- B - 1st and 2nd gear gearshift rod
- C - 5th and 6th gear gearshift rod
- D - 3rd and 4th gear gearshift rod

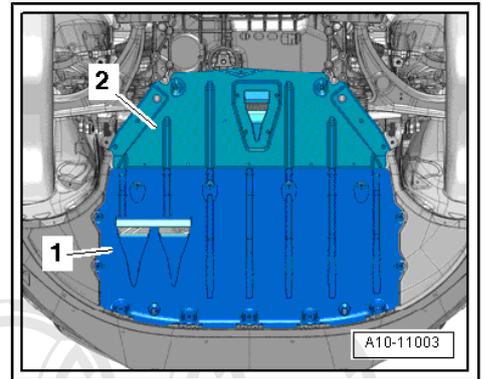


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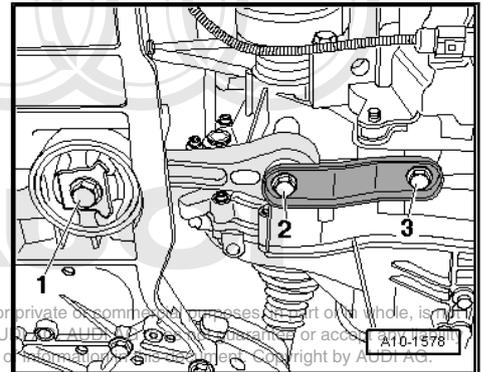
4.3 Pendulum Support

Removing

- Remove the noise insulation -1 and 2-. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .



- Remove the bolts -1, 2 and 3- and the pendulum support.



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Installing

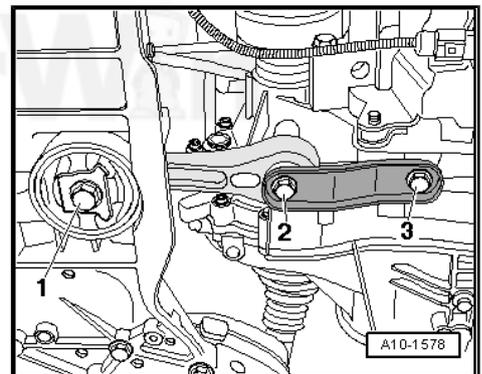
Install in reverse order, paying attention to the following:

- For the correct tightening specifications, refer to ⇒ [“2.3 Engine and Transmission Mount Overview”, page 45](#) .

 **Note**

Replace the pendulum support bolts.

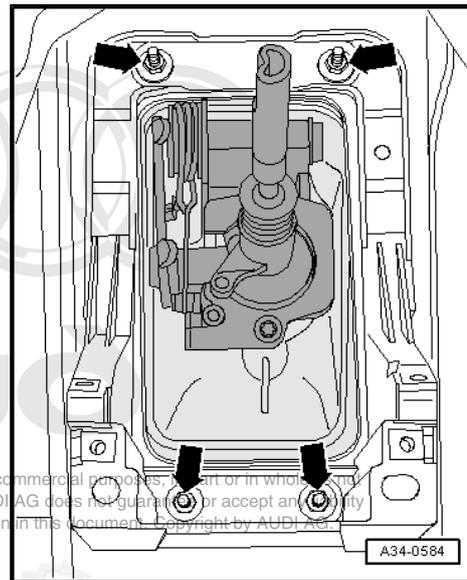
- Tighten the pendulum support bolts -2 and 3- first to the transmission, then tighten the bolt -1- on the subframe.



4.4 Selector Mechanism

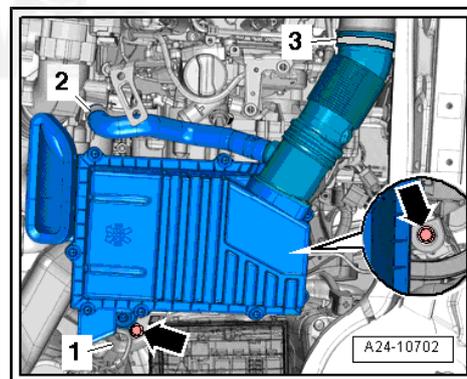
Removing

- Remove the shift knob with the center console trim. Refer to ⇒ ["4.7 Shift Knob with Shift Lever Boot", page 78](#) .
- Remove the center console. Refer to ⇒ Body Interior; Rep. Gr. 68 ; Removal and Installation .
- Remove the noise insulation over the shift mechanism.
- Remove the nuts -arrow-.

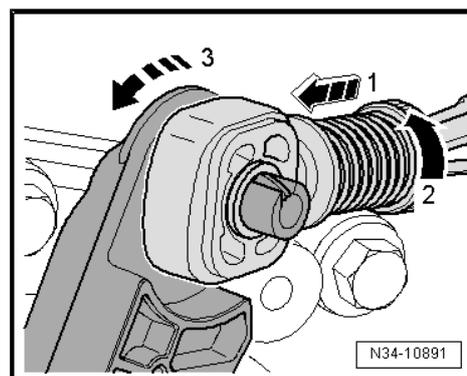


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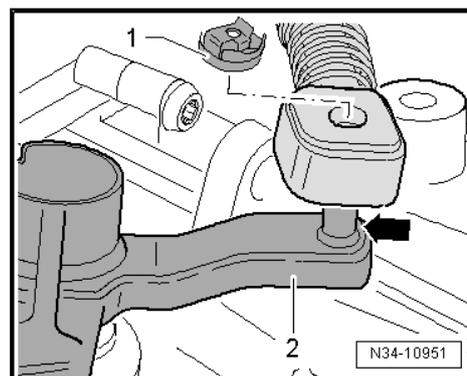
- Remove the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .



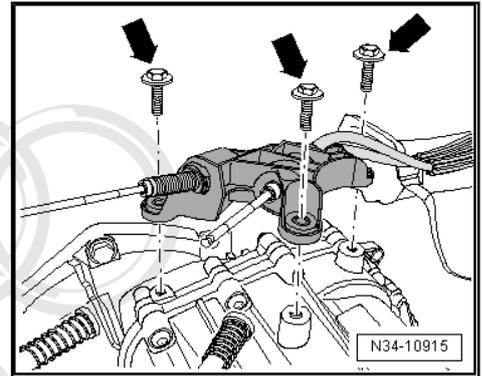
- Pull the safety mechanism all the way forward -arrow 1- and then lock it to the left -arrow 2-.
- Move the selector relay lever forward -arrow 3- and remove the selector cable from the retainer.



- Remove the shift cable lock washer -1- from the gearshift lever -2- and then pull the shift cable off the lug -arrow-.

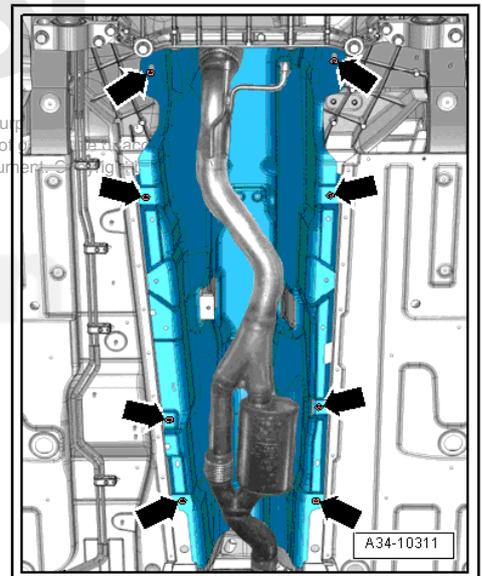


- Remove the bolts -arrows-. Then remove the cable bracket from the transmission and tie it up to the left.
- Remove the driveshaft. Refer to ⇒ Rear Final Drive 02D, 0AV, 0BR and 0BY; Rep. Gr. 39 ; Removal and Installation .



- Remove the bolts and nuts -arrows- and the heat shield.
- Move the gearshift mechanism downward and remove it with the gearshift cables.

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Installing

Install in reverse order, paying attention to the following:

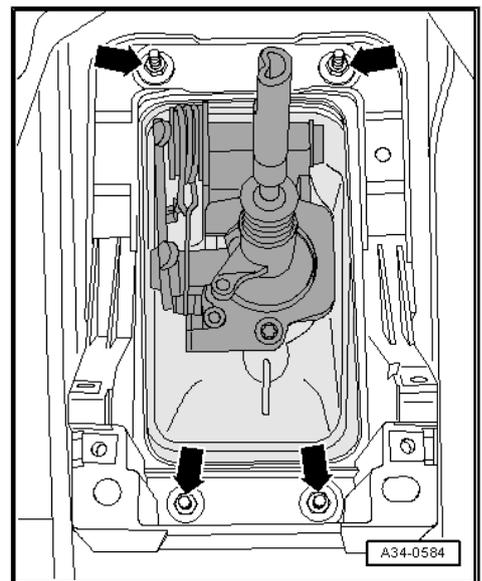
- Tightening specification, refer to
 ⇒ ["2.5 Gearshift Lever and Gearshift Housing Overview", page 49](#) ,
 ⇒ ["2.8 Shift Cable and Selector Cable Overview", page 56](#) .



Note

Replace the lock washer for the shift cable.

- Install the gearshift mechanism and align it parallel to the body, then tighten the nuts -arrows-.
- Attach the shift cable to the gearshift lever. Refer to ⇒ [Fig. "Removing and Securing the Shift Cable to the Gearshift Lever"](#) , page 53 .

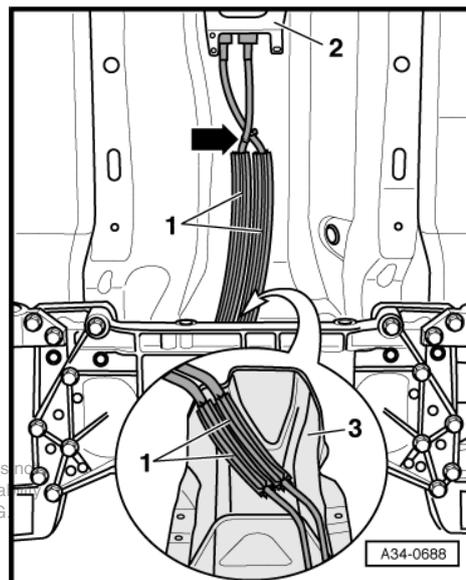


- Route the cables -1- from the gearshift mechanism -2- to the transmission as follows:
- The cables must be routed parallel to each other up to the cable bracket after they cross each other.
- The cables must be routed inside the depression in the heat shield -3-.

**Note**

The heat shield is shown from above in the magnifying glass.

- Secure the shift cable and selector cable with a cable tie -arrow-. Refer to [Fig. "Attach the Shift Cable and Selector Cable with a Cable Tie", page 57](#).
- Adjust the gearshift mechanism. Refer to ["2.10 Shift Mechanism, Adjusting", page 59](#).
- Place the noise insulation over the gearshift mechanism and install the center console. Refer to [Body Interior; Rep. Gr. 68 ; Removal and Installation](#).
- Install the shift lever knob with the shift lever boot. Refer to ["4.7 Shift Knob with Shift Lever Boot", page 78](#).
- Install the air filter housing. Refer to [Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation](#).
- Install the driveshaft. Refer to [Rear Final Drive 02D, 0AV, 0BR and 0BY; Rep. Gr. 39 ; Removal and Installation](#).



4.5 Selector Shaft Seal

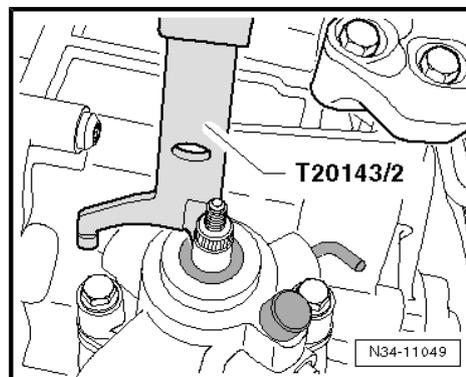
Special tools and workshop equipment required

- ◆ Pulling Hook -T20143/2-
- ◆ Sleeve -VW 423-
- ◆ Torque Wrench 5-50 Nm -V.A.G 1331-

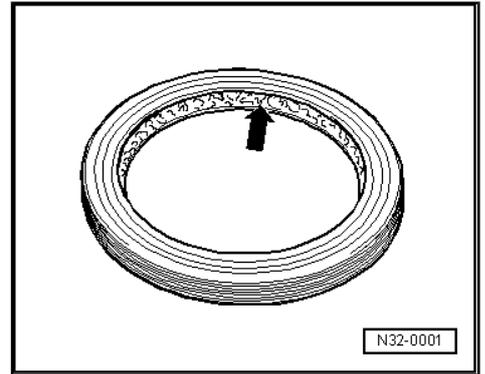
Removing

- Remove the selector relay lever with the cable retainer. Refer to [Fig. "Removing and Securing the Selector Relay Lever to the Gearshift Lever", page 54](#).
- Remove the transmission selector lever [⇒ Item 2 \(page 51\)](#).
- Carefully pry out the selector shaft seal.

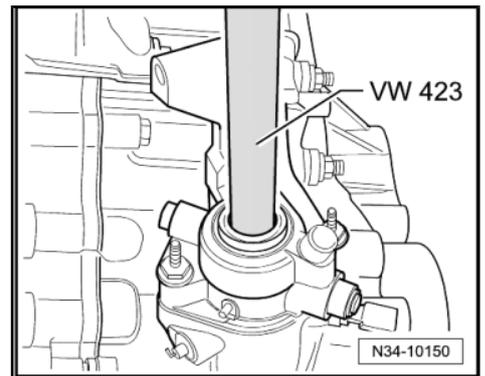
Installing



- Lightly coat the new seal with oil on the outer edge and fill the space between the sealing lips -arrow- halfway with radial shaft seal sealing grease -G 052 128 A1- .



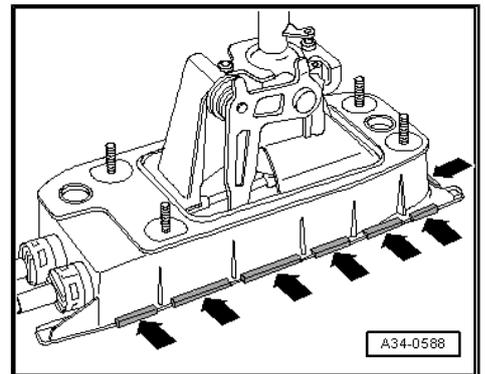
- Install the seal all the way without bending it.
- Lettering arrow on seal must point outward (toward press tool).
- Install the transmission selector lever ⇒ [Item 2 \(page 51\)](#) .
- Install the selector relay lever with the cable retainer. Refer to ⇒ [Fig. "Removing and Securing the Selector Relay Lever to the Gearshift Lever"](#) , [page 54](#) .
- Check the transmission fluid level. Refer to ⇒ ["1.3 Transmission Fluid Level, Checking"](#) , [page 41](#) .



4.6 Shift Cable and Selector Cable

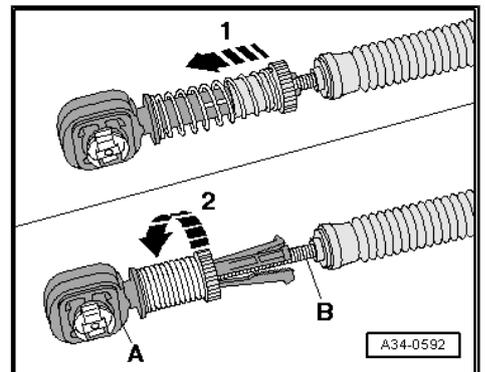
Removing

- Remove the gearshift mechanism. Refer to ⇒ ["4.4 Selector Mechanism"](#) , [page 74](#) .
- Bend open the tabs -arrows- on the base plate with a screwdriver and remove the base plate.
- Remove the seal from the gearshift mechanism.
- Pry the shift cable and selector cable off the lug.
- Remove the lock washers -2 and 3- and pull the shift cable and selector cable off the gearshift mechanism.

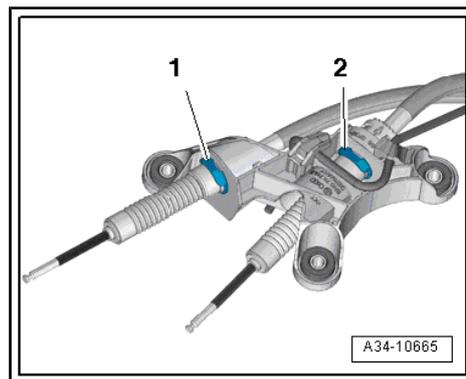


Unlock the cable retainer -A- for the shift cable and selector cable -B- as follows:

- Push the sleeve all the way forward -arrow 1-. Then turn it all the way to the right -arrow 2- and let it lock into place.
- Remove the cable retainers from the cables.



- Remove the clips -1 and 2-
- Remove the cable bracket from the cables.

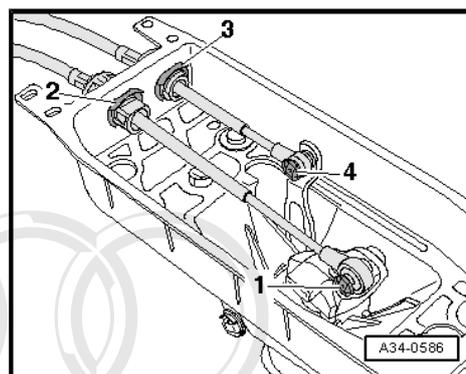


Installing

Note

Remove the seal and the gearshift housing base plate.

- Secure the shift cable and selector cable to the gearshift housing with clips -1 through 4-
- Secure the shift cable and selector cable with a cable tie. Refer to [⇒ Fig. "Attach the Shift Cable and Selector Cable with a Cable Tie", page 57](#) .
- Push the shift cable and selector cable onto the lug.



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

- Install the gearshift mechanism. Refer to [⇒ "4.4 Selector Mechanism", page 74](#) .
- Adjust the gearshift mechanism. Refer to [⇒ "2.10 Shift Mechanism, Adjusting", page 59](#) .

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4.7 Shift Knob with Shift Lever Boot

Note

The gearshift 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 Clamp Pliers -V.A.G 1275-

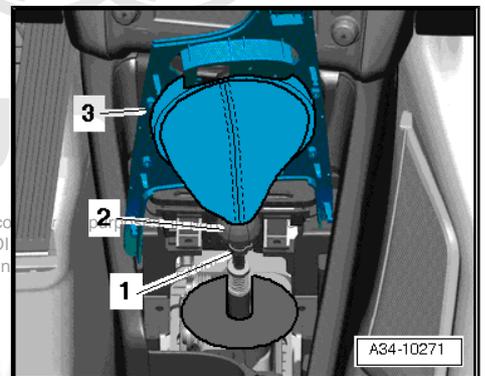
Removing

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



- Disconnect the connector on the trim.
- Remove the trim -3- upward over the gearshift knob -2-.
- Open the clamp -1- and remove the gearshift knob together with the shift lever boot and trim -3-.
- Remove the shift lever boot and the trim on the center console -3-

⇒ Fig. ""Center Console Trim and Frame/Shift Lever Boot Disconnecting"", page 48 .



Installing

Install in reverse order, paying attention to the following:

- Press shift knob all the way onto the shift lever.
- Secure the gearshift knob with a new clamp -1-. Use - V.A.G 1275- .

4.8 Transmission, Removing

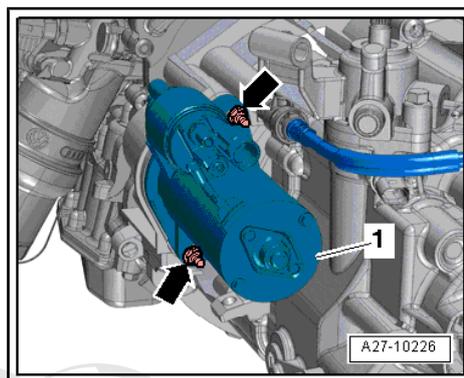
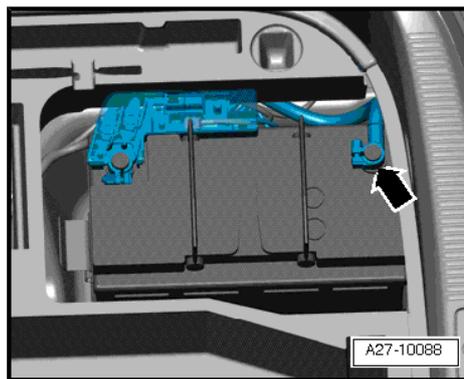
Special tools and workshop equipment required

- ◆ Engine Support Bridge -10 - 222 A-
- ◆ Hose Clamps Up to 25 mm Dia. -3094-
- ◆ Transmission Support -3282-
- ◆ Bolt -3282/34-
- ◆ Adjusting Plate -3282/60-
- ◆ Engine/Transmission Jack -V.A.G 1383 A-
- ◆ Engine Bung Set -VAS 6122-
- ◆ Grease -G 000 450 02-
- ◆ Grease for clutch disc shaft splines -G 000 100-

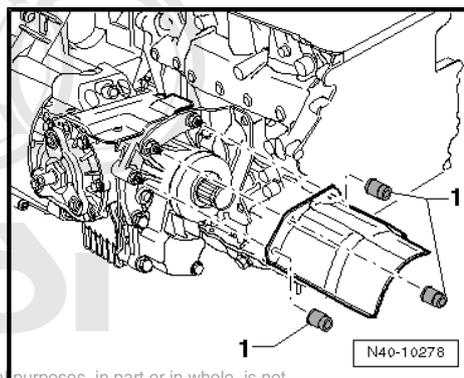
Procedure

 **Caution**
Risk of destroying electronic components when disconnecting the battery.
 ♦ *Observe measures for disconnecting battery.*

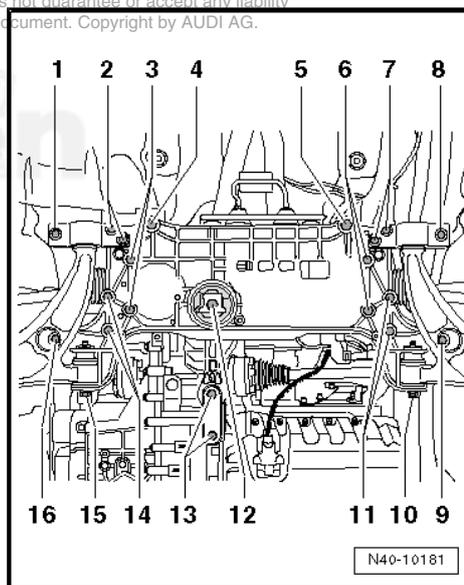
- Turn off the ignition and disconnect the battery Ground (GND) cable -arrow-. Refer to ⇒ Electrical Equipment; Rep. Gr. 27 ; Removal and Installation .
- Remove the starter. Refer to ⇒ Electrical Equipment; Rep. Gr. 27 ; Removal and Installation .



- Remove the nuts -1- and the right drive axle heat shield.
- Remove the left and right drive axle. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .

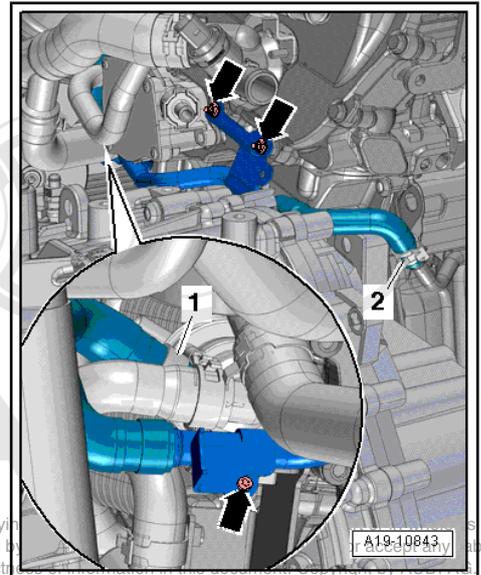


- Remove the steering gear and subframe. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 48 ; Removal and Installation .



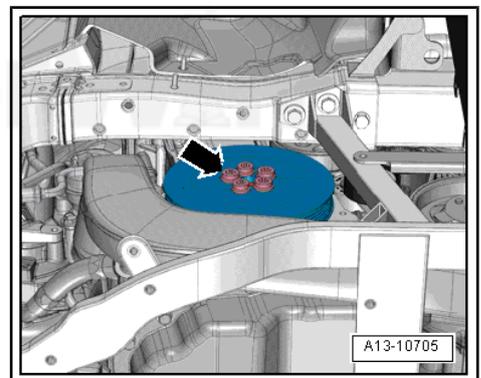
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- Remove the left coolant pipe. Refer to ⇒ Engine Mechanical; Rep. Gr. 19 ; Removal and Installation .



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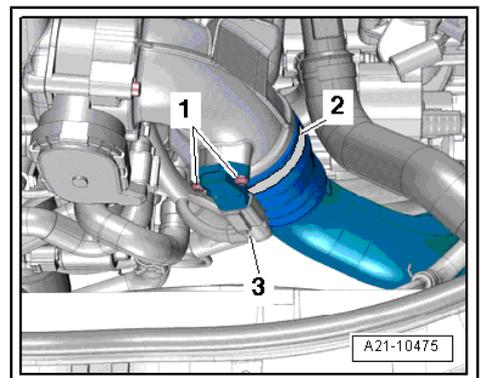
- Remove the vibration damper. Refer to ⇒ Engine Mechanical; Rep. Gr. 13 ; Removal and Installation .



- Loosen the clamp -2-.

i Note

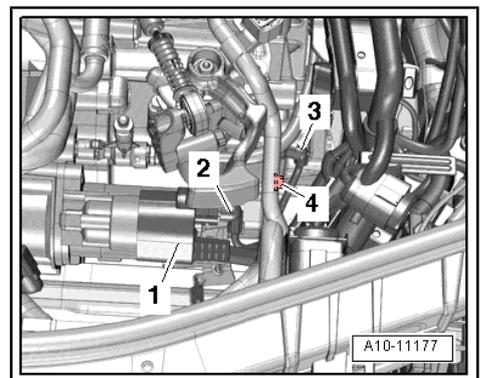
Ignore -1 and 3-.



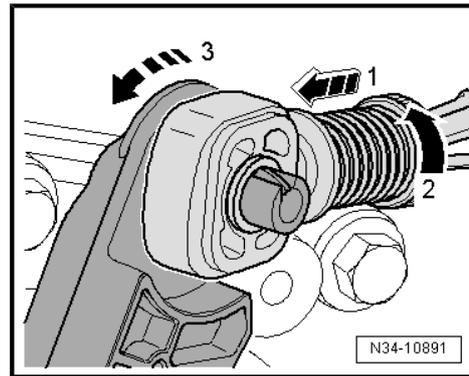
- Remove the GND cable bolt -4-.
- Disconnect the connector -3- from the back-up lamp switch - F4- .

i Note

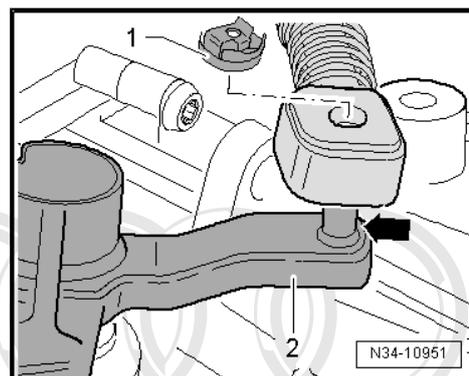
Ignore -1 and 2-.



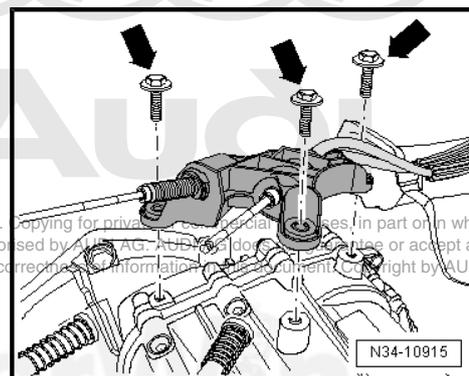
- To avoid damage to the selector cable, the cable retainer must be disconnected from the selector lever before removal.
- Pull the safety mechanism all the way forward -arrow 1- and then lock it to the left -arrow 2-.
- Move the selector relay lever forward -arrow 3- and remove the selector cable from the retainer.



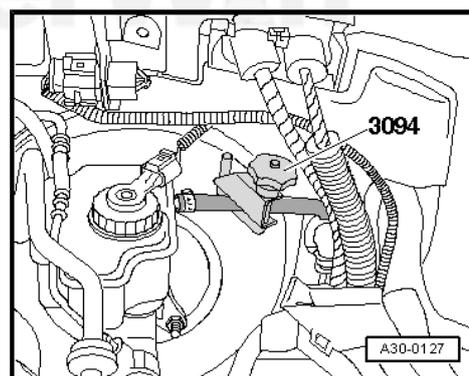
- Remove the shift cable lock washer -1- from the gearshift lever -2- and then pull the shift cable off the lug -arrow-.



- Remove the bolts -arrows-. Then remove the cable bracket from the transmission and tie it up to the left.



- If there is a plastic line between the clutch master cylinder and the clutch slave cylinder, then disconnect the supply hose for the clutch master cylinder using clamp -3094- .



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

i Note

- ◆ Ignore -arrow-.
- ◆ While performing the following work, make sure no brake fluid comes into contact with the starter or the transmission. If it does, clean the area thoroughly.

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- Pull the clamp -arrow- all the way out.
- Remove the plastic line or hose/line assembly -A- from the bleeder/clutch slave cylinder.
- Seal any open lines and connections with a clean plug from the -VAS 6122- .

i Note

Ignore -B-.



Caution

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

- ◆ Do not use the clutch pedal if the line from the clutch slave cylinder bleeder is disconnected.

- Position the -10 - 222 A- with the following tool components on the upper edges of engine compartment:
 - ◆ Bracket for Engine -10 - 222 A /1- , quantity: 2
 - ◆ Adapter -10 - 222 A /3-
 - ◆ 2x Spindle -10 - 222 A /11-
 - ◆ Adapter -10 - 222 A /20-
- One spindle -10 - 222 A /11- in the front and one in the rear.

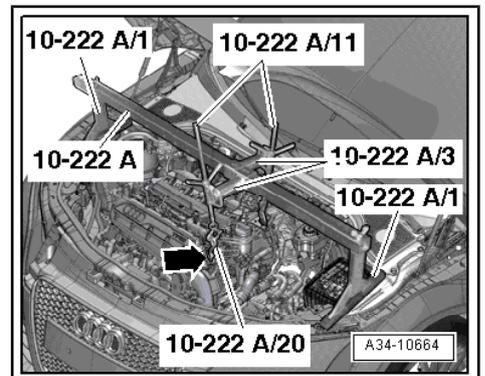
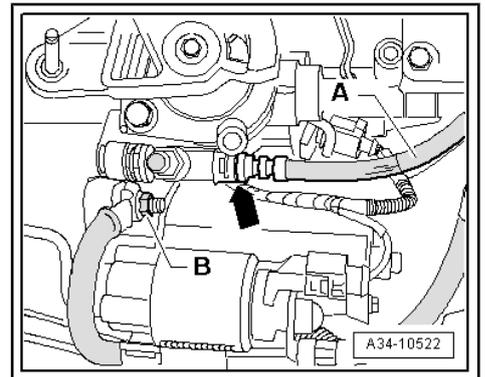
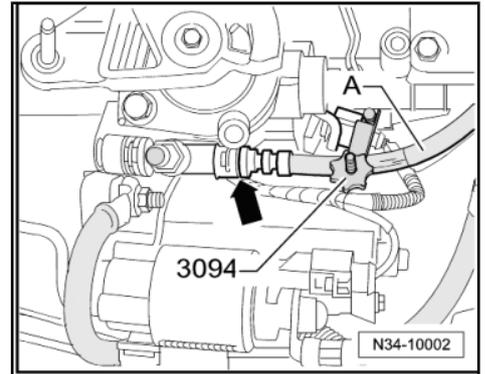


WARNING

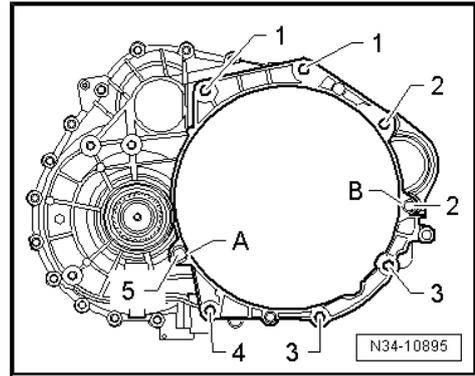
There is the risk of an accident.

- ◆ The mounting hook and locking pin on the lifting tackle must be secured with a plug connector -arrow-.

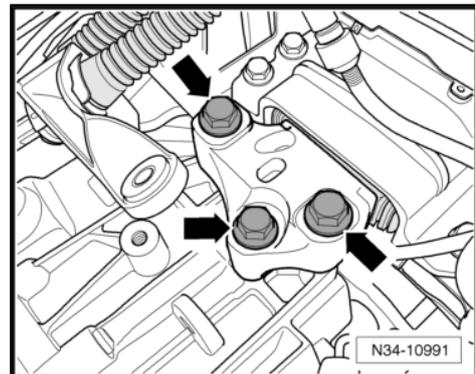
- Attach the front -10 - 222 A /11- with -10 - 222 A /20- to the left front engine lifting eye.
- Attach the rear -10 - 222 A /11- to the left rear engine lifting eye.



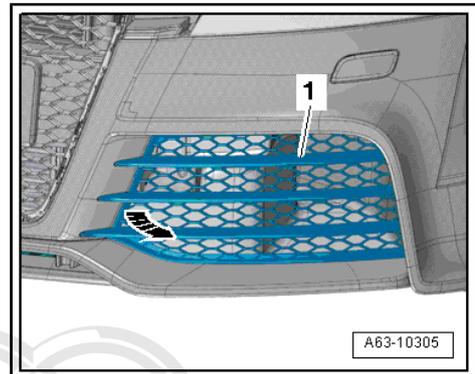
- Remove the engine/transmission connecting bolts -1-.



- Remove the bolts -arrows- from the transmission mount.



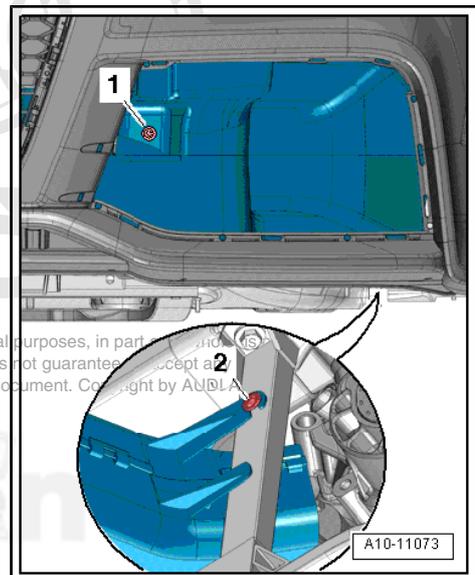
- Remove the air intake grille -1- from the bumper cover -arrow-.



- Remove the bolt -1- and the air guide.

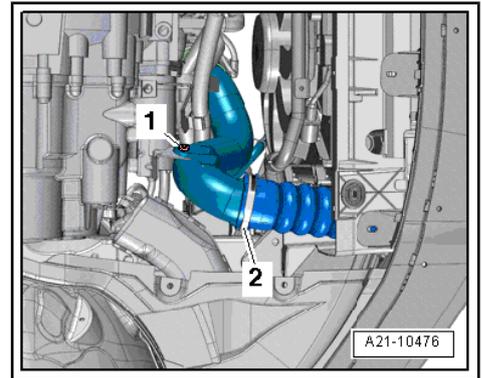
 **Note**

Ignore -2-.

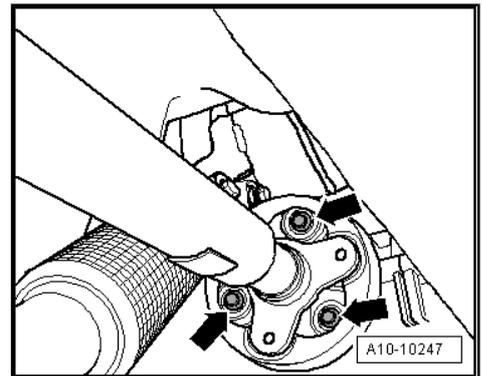


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- Remove the bolt -1-.
- Loosen the hose clamp -2- and remove the air guide pipe.



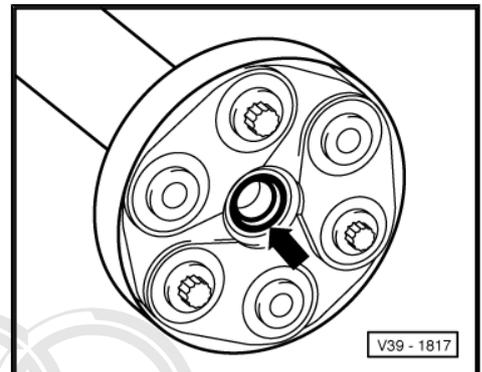
- Mark the position of the flexible disc to the bevel box flange shaft for later use.
- Engage a gear and then remove the bolts -arrows- from the driveshaft flexible disc.



Caution

Danger of causing damage to the shaft seal -arrow- inside the driveshaft flange.

◆ *Push the final drive horizontally as far as possible to the rear.*



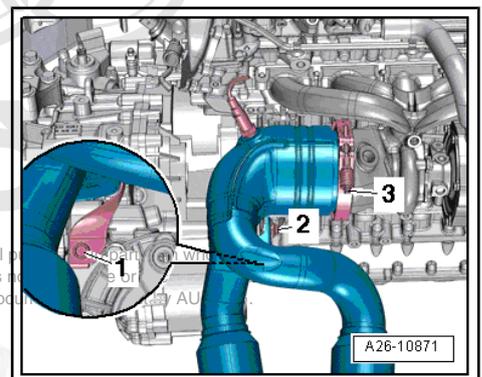
Note

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

- Remove the bolts -1 and 2- and the primary catalytic converter bracket.

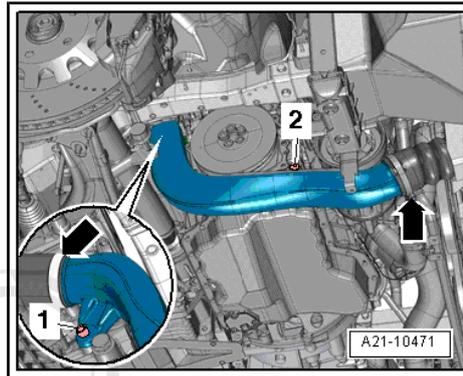
Note

Ignore -3-.

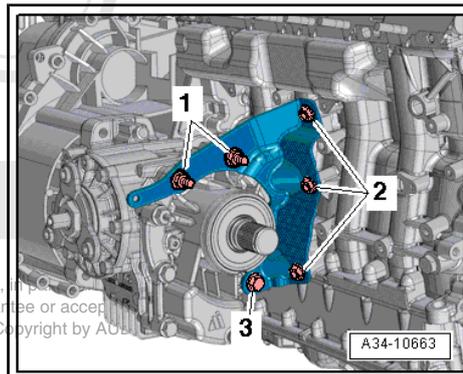


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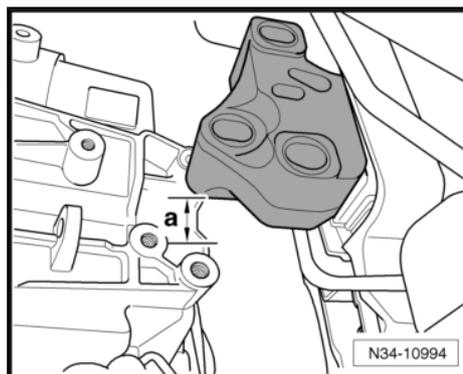
- Remove the bolts -1 and 2-
- Loosen the clamps -arrows- and remove the air guide pipe.



- Remove the bolts -1, 2 and 3- and the bevel box bracket.

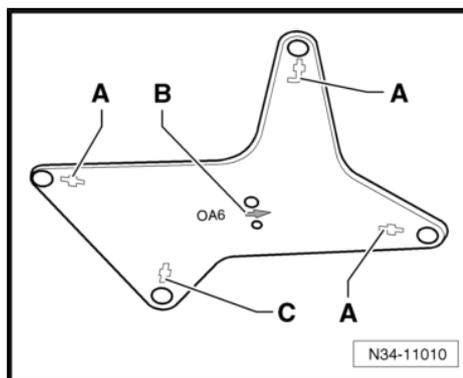


- Turn the spindles on the -10 - 222 A- and lower the transmission to dimension -a-.
- -a- = 80 mm

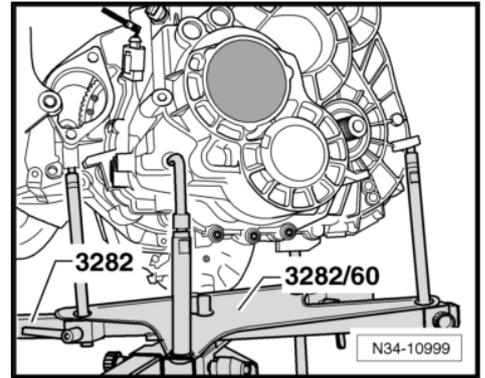


Align the -3282- with the -3282/60- in order to remove the "0A6" transmission.

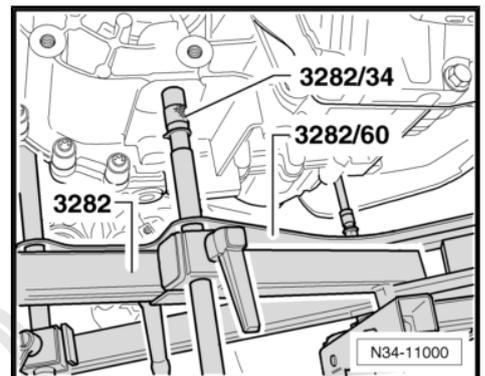
- Install the -3282- in the -V.A.G 1383 A- .
- Align the arms of the transmission support to correspond with the holes in the adjustment plate.
- Install the support elements -A- and illustrated on the -3282/60- .
- Install -3282/34- in place of the mount -C-
- Place the -V.A.G 1383 A- under the vehicle.
- The arrow symbol -B- on the adjusting plate faces direction of travel.



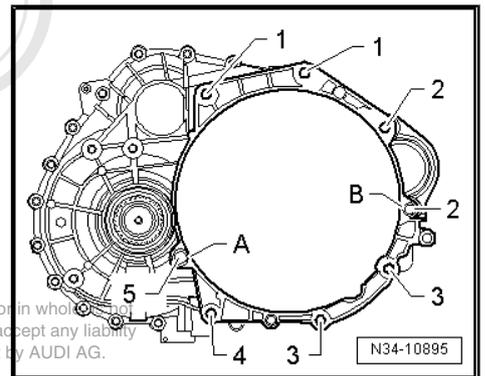
- Align the adjustment plate so that it is parallel to the transmission.



- Install the -3282/34- into the hole in the transmission for the pendulum support bolt.



- Remove the remaining bolts from transmission to engine connection.
- Remove the transmission from the alignment sleeves -A and B-.
- Tilt the transmission toward left by adjusting the spindle on the -3282- .
- Carefully lower the transmission. Pay attention to the longitudinal member at the same time.



i Note

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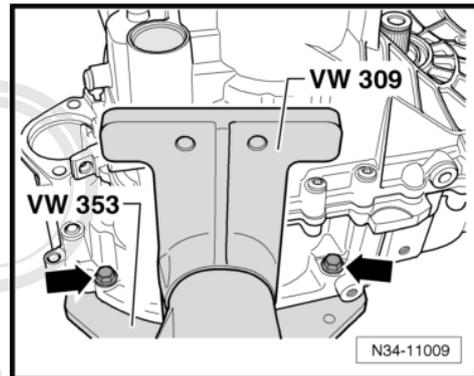
Pay attention to the lines when lowering the transmission.

4.9 Transmission, Securing in Engine/ Transmission Holder

Special tools and workshop equipment required

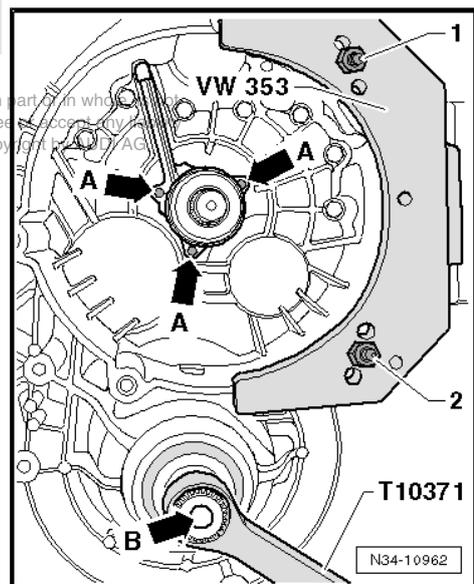
- ◆ Holding Plate -VW 309-
- ◆ Transmission Support -VW 353-
- ◆ Engine and Transmission Holder -VAS 6095-

- Attach the transmission to the -VW 353- with the bolts -arrows-.



- Use holes -1 and 2-.

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4.10 Transmission, Installing

Special tools and workshop equipment required

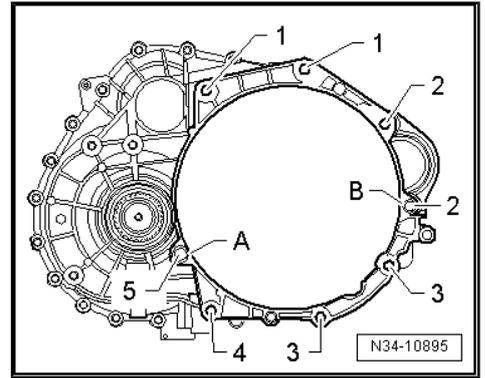
- ◆ Engine Support Bridge -10 - 222 A-

Install in reverse order, paying attention to the following:

Note

- ◆ *Replace the self-locking nuts and bolts during installation.*
 - ◆ *Always replace bolts that are secured with tightening specification as well as seals, gaskets and O-rings.*
 - ◆ *Install any cable ties that were loosened or cut off during removal at their same location.*
 - ◆ *Clean input shaft splines and (on used clutch plates) the hub splines, remove corrosion and apply a very thin coating of lubricant -G 000 100- to the splines. Then move the clutch plate back and forth on the input shaft until the hub moves freely on the shaft. Excess grease must be removed.*
 - ◆ *If the transmission is replaced, transfer transmission shift lever and selector relay lever.*
- Clean all threaded holes with a thread tap to remove any locking fluid residue.

- Check if the alignment sleeves -A and B- for centering the engine/transmission are in the cylinder block and insert them if they are not.
- Make sure the clutch plate is centered. Refer to [⇒ "4.1 Clutch", page 21](#) .
- Check for wear on the release bearing; replace the clutch slave cylinder with release bearing if necessary. Refer to [⇒ "2.3 Clutch Release Mechanism and Clutch Slave Cylinder Overview", page 15](#) .
- Carefully raise the transmission with -3282- .
- Align the transmission with respect to the engine and install.



 **Note**

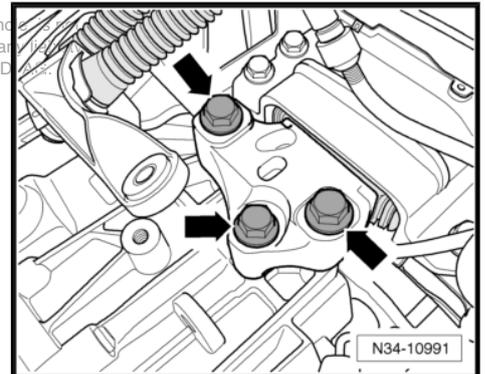
Pay attention to the lines when installing the transmission.

- Install the lower engine/transmission connecting bolts -1 through 5- and tighten them. Then install the remaining bolts [⇒ page 92](#) .
- Align the engine/transmission in its installed position. Tighten the spindles on the 10 - 222 A- until the transmission touches the transmission mount.

 **Note**

The transmission mount and the transmission must be parallel to each other otherwise the tread inside the transmission will get damaged.

- Install the transmission mount. Refer to [⇒ "2.3 Engine and Transmission Mount Overview", page 45](#) .



 **Note**

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

 **Caution**

Risk of accident!

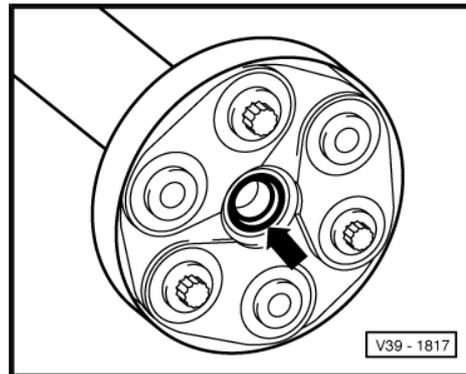
- ◆ **Only remove the -10 - 222 A- when all the subframe mount bolts are tightened to the specification.**

- Install bevel box bracket. Refer to [⇒ Fig. "Bevel Box Bracket - Tightening Specification and Sequence", page 92](#) .
- Install the left and right drive axles. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .
- Install the drive axle right heat shield. Refer to [⇒ Fig. "Right Drive Axle Heat Shield - Tightening Specification", page 92](#) .

**Caution**

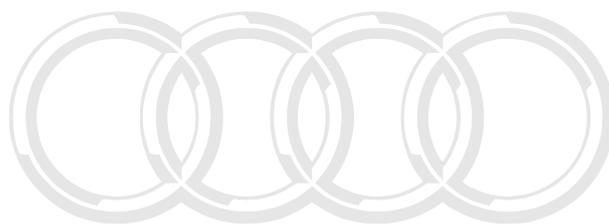
Danger of causing damage to the shaft seal -arrow- inside the driveshaft flange.

- ◆ *Push the final drive horizontally as far as possible to the rear.*

**Note**

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

- Press engine/transmission assembly to bulkhead; while doing so, carefully guide pin of bevel gear transfer case into flange/driveshaft.

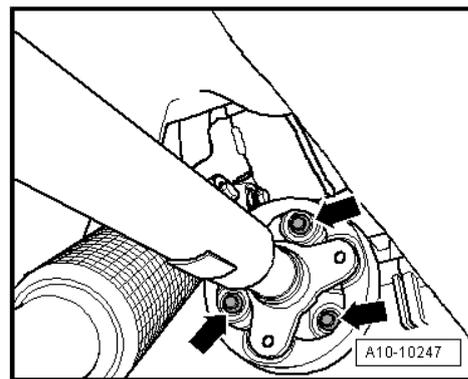


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- Attach the driveshaft with the flexible disc to the bevel box flange shaft -arrows-. Refer to ⇒ Rear Final Drive 02D, 0AV, 0BR and 0BY; Rep. Gr. 39 ; Removal and Installation .
- Install pendulum support. Refer to ⇒ ["2.3 Engine and Transmission Mount Overview", page 45](#) .
- Install the vibration damper. Refer to ⇒ Engine Mechanical; Rep. Gr. 13 ; Removal and Installation .
- Install the left coolant pipe. Refer to ⇒ Engine Mechanical; Rep. Gr. 19 ; Removal and Installation .
- Install the steering gear with subframe. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 48 ; Removal and Installation .
- Install drive axles. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .
- Install the exhaust system and cross brace. 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 the starter. Refer to ⇒ Electrical Equipment; Rep. Gr. 27 ; Removal and Installation .
- Install the hose/line assembly or plastic hose. Refer to ⇒ ["4.6 Hose/Line Assembly", page 30](#) .
- Bleed the clutch system. Refer to ⇒ ["1.1 Clutch System, Bleeding", page 11](#) .
- Install the cable bracket. Refer to ⇒ ["2.8 Shift Cable and Selector Cable Overview", page 56](#) .
- Attach the shift cable to the gearshift level. Refer to ⇒ [Fig. "Removing and Securing the Shift Cable to the Gearshift Lever", page 53](#) .
- Install the selector cable in the cable retainer.
- Adjust the gearshift mechanism. Refer to ⇒ ["2.10 Shift Mechanism, Adjusting", page 59](#) .
- Install the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .
- Observe measures after connecting the battery. Refer to ⇒ Electrical Equipment; Rep. Gr. 27 ; Removal and Installation .
- Install the front section of the wheel housing liner. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .
- 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 ; Removal and Installation .
- Gear oil level in manual transmission, checking. Refer to ⇒ ["1.3 Transmission Fluid Level, Checking", page 41](#) .
- Axle oil level in bevel box, checking. Refer to ⇒ ["1.1 Gear Oil in Bevel Box, Checking", page 39](#) .



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Transmission Installation Tightening Specifications



Note

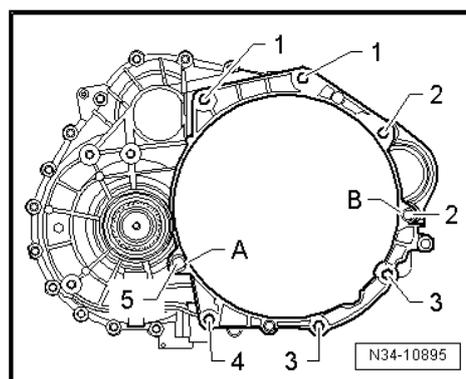
- ◆ *The tightening specifications apply only to lightly greased, oiled, phosphated or blackened nuts and bolts.*
- ◆ *Additional lubricant such as engine or transmission oil may be used, but do not use graphite lubricant.*
- ◆ *Do not use any ungreased parts.*
- ◆ *Tightening specification tolerance +/- 15%.*

Mounting Transmission to Engine

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Item	Bolt	Nm
1	M12x65	80
2 1)	M12 x 180	80
3	M10 x 65	40
4	M10 x 75	40
5 2)	M12 x 95	80
A, B	Alignment sleeves for centering	

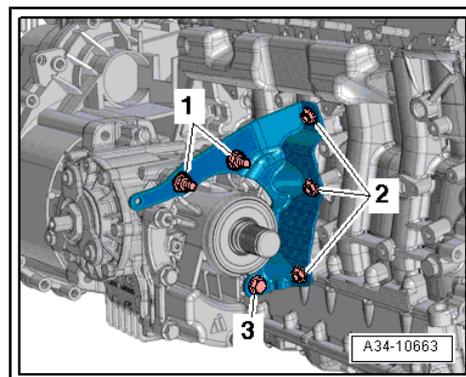
- 1) M8 bolt.
- 2) Installed into the transmission from the engine side.



Bevel Box Bracket - Tightening Specification and Sequence

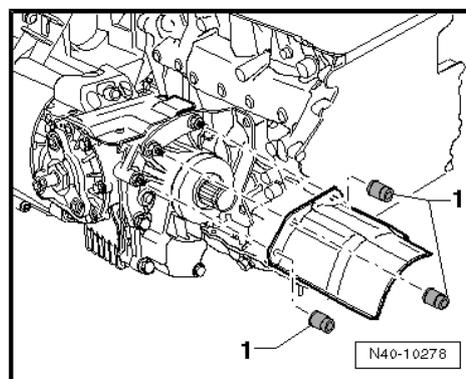
– Tighten bolts in 5 stages as follows:

1. Install the bolts -1 through 3- hand-tight.
2. Pretighten bolts -2- to 8 Nm.
3. Pretighten the bolts -1- and -3- to 8 Nm.
4. Tighten the bolts -2- to 40 Nm.
5. Tighten the bolts -1- and -3- to 40 Nm.



Right Drive Axle Heat Shield - Tightening Specification

– Tighten the nuts -1- to 25 Nm.



4.11 Transmission Mount

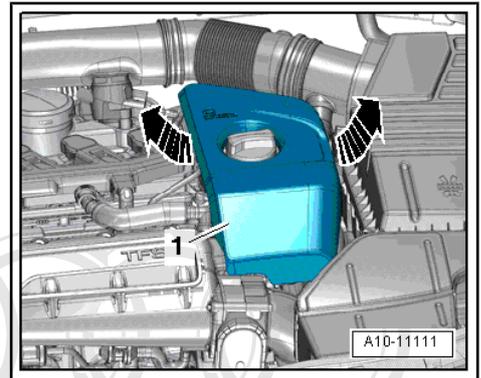
Special tools and workshop equipment required

- ◆ Engine Support Bridge -10-222 A-

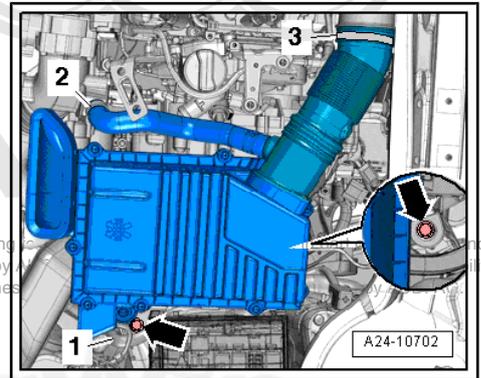
◆ Special Hook -10 - 222 A /20-

Removing

- Remove the engine cover -1- upward -arrows-.

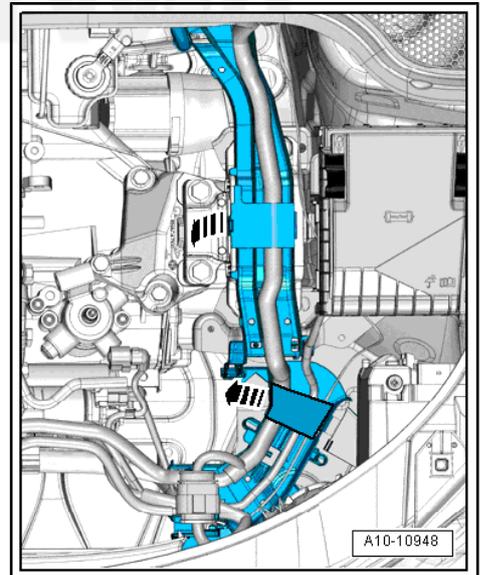


- Remove the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .

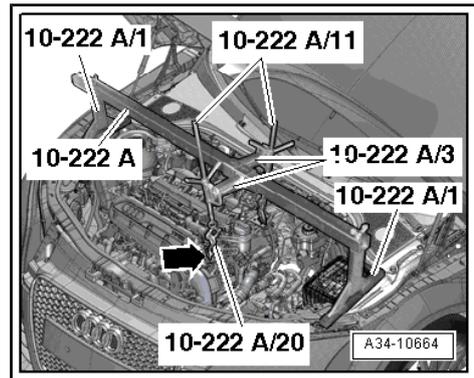


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- Open the retainer for the wiring guide -arrows-.
- Cut the cable tie and move the electric wires to the side.
- Unclip wiring guide.



- Position -10 - 222 A- with the following tool components on the upper edges of engine compartment:
- ◆ Bracket for Engine -10 - 222 A /1- , quantity: 2
- ◆ Adapter -10 - 222 A /3-
- ◆ 2x Spindle -10 - 222 A /11-
- ◆ Adapter -10 - 222 A /20-
- One -10 - 222 A /11- in the front and one in the rear.

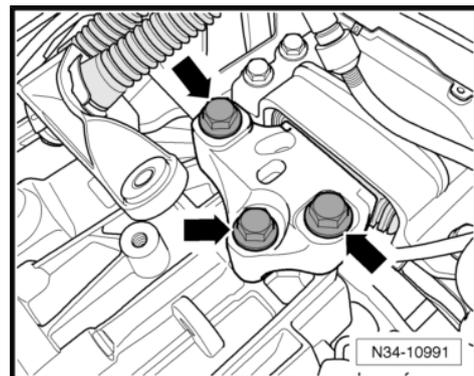
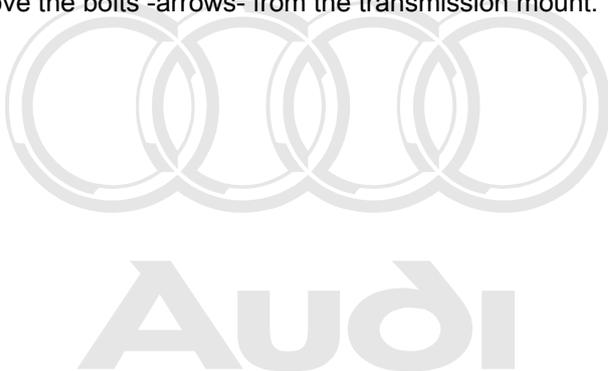


WARNING

There is the risk of an accident.

- ◆ *The mounting hook and locking pin on the lifting tackle must be secured with a plug connector -arrow-.*

- Attach the front -10 - 222 A /11- with -10 - 222 A /20- to the left front engine lifting eye.
- Attach the rear -10 - 222 A /11- to the left rear engine lifting eye.
- Pretension the spindles lightly.
- Remove the bolts -arrows- from the transmission mount.



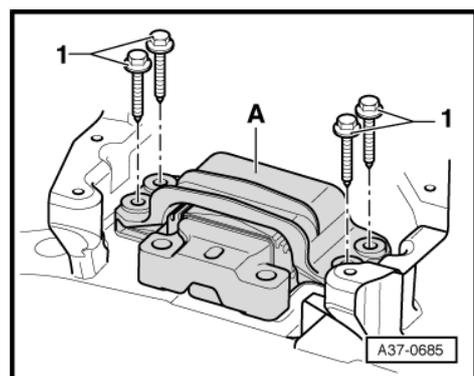
- Remove the bolts -1- and the transmission mount -A-.
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Installing

- For the correct tightening specifications, refer to ⇒ ["2.3 Engine and Transmission Mount Overview", page 45](#) .

Install in reverse order, paying attention to the following:

- Adjust subframe mount. Refer to ⇒ Engine Mechanical; Rep. Gr. 10 ; Description and Operation .
- Install the air filter housing. Refer to ⇒ Fuel Injection and Ignition; Rep. Gr. 24 ; Removal and Installation .



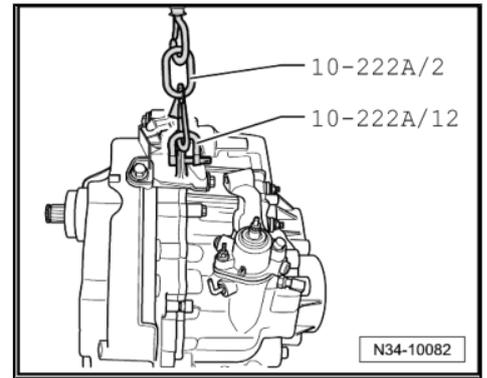
4.12 Transmission, Transporting

Special tools and workshop equipment required

- ◆ Additional Hooks (2) -10-222A/2-
- ◆ Shackle (1 Set=2 Pieces) -10-222A/12-
- ◆ Shop Crane -Load Cap=700-1200kg -VAS 6100-
- ◆ Transmission Support -3282-

To transport the manual transmission and to set up the -3282- , the -10-222A/12- can be used with the -10-222A/2- and the shop crane.

- Attach the -10-222A/12- to the transmission housing.
- Lift the transmission with the shop crane and -10-222A/2- .



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5 Disassembly and Assembly

⇒ ["5.1 Clutch Housing", page 96](#)

⇒ ["5.2 Selector Mechanism", page 99](#)

⇒ ["5.3 Shift Unit", page 102](#)

⇒ ["5.4 Shift Unit, Input Shaft, Output Shafts, Gearshift Rod, Differential and Bevel Box", page 104](#)

⇒ ["5.5 Transmission Housing", page 114](#)

5.1 Clutch Housing

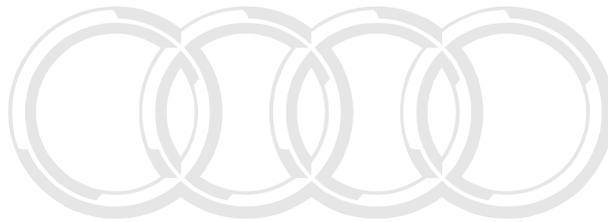
Special tools and workshop equipment required

- ◆ Slide Hammer-Complete Set -VW 771-
- ◆ Locking Pin -30-505-
- ◆ Thrust Piece -T10233-
- ◆ Pulling Hook -T20143/1-
- ◆ Internal Puller -Kukko 21/3-
- ◆ Extractor Lever -VW 681-
- ◆ For additional special tool, refer to the descriptions in servicing the input shaft.



Note

When installing the tapered roller bearing, install new shims which have the same thickness as the previous shims.



Audi

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1 - Outer Race/Tapered Roller Bearing

- For output shaft 1st and 2nd gear
- Removing and installing, refer to [⇒ Item 4 \(page 131\)](#)
- When replacing: Install the shim [⇒ Item 2 \(page 97\)](#), with the same thickness

2 - Adjusting Shim

- For output shaft 1st and 2nd gear
- Pay attention to the thickness
- Will get damaged when being removed, replace

3 - Oil Deflector Ring

- Installed position: The shoulder on the hole faces the output shaft

4 - Outer Race/Tapered Roller Bearing

- For output shaft 3rd and 4th gear
- Removing and installing, refer to [⇒ Item 4 \(page 134\)](#)
- When replacing: Install the shim [⇒ Item 5 \(page 97\)](#), with the same thickness

5 - Adjusting Shim

- For output shaft 3rd and 4th gear
- Pay attention to the thickness
- Will get damaged when being removed, replace

6 - Locking Ring

- Install in the circumferential groove in the clutch housing

7 - Cylindrical Roller Bearing

- For the input shaft
- Removing and installing, refer to [⇒ Item 2 \(page 129\)](#)

8 - Bearing Bushing

- For the selector rod
- Removing, refer to [⇒ Fig. "Removing the Bearing Bushing for the Selector Rod.", page 98](#)
- Installing, refer to [⇒ Fig. "Install the Selector Rod Bushing -A- all the Way.", page 98](#)

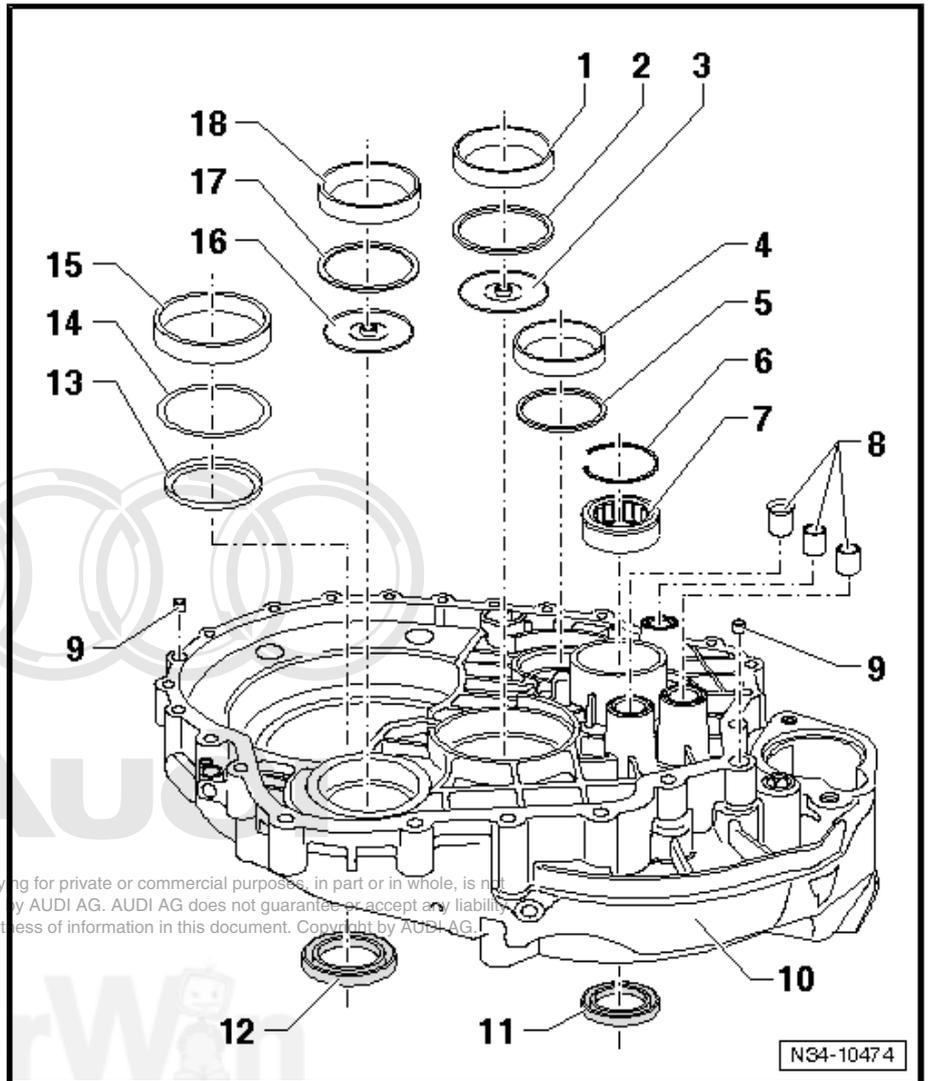
9 - Alignment Sleeve

- Quantity: 2

10 - Clutch Housing

11 - Input Shaft Seal

- Removing with the input shaft installed, refer to [⇒ Fig. "Remove the Input Shaft Seal.", page 99](#)
- With the input shaft removed, removing using -VW 681-
- Installing, refer to [⇒ Fig. "Install the Input Shaft Seal so that it is Flush.", page 99](#)



12 - Seal

- ❑ Replace with transmission installed, refer to [⇒ "3.6 Seal between Manual Transmission and Bevel Box, Manual Transmission Installed", page 194](#)

13 - Washer

- ❑ For the differential
- ❑ Installed position: The shoulder on the inner circumference faces the seal [⇒ Item 12 \(page 97\)](#)

14 - Adjusting Shim

- ❑ For the differential
- ❑ Adjusting the differential, refer to [⇒ "1.3 Differential, Adjusting", page 180](#)

15 - Outer Race/Tapered Roller Bearing

- ❑ For the differential
- ❑ Removing and installing, refer to [⇒ Item 7 \(page 178\)](#)
- ❑ When replacing: Install the shim [⇒ Item 14 \(page 98\)](#) , with the same thickness

16 - Oil Deflector Ring

- ❑ Installed position: The shoulder on the hole faces the output shaft

17 - Adjusting Shim

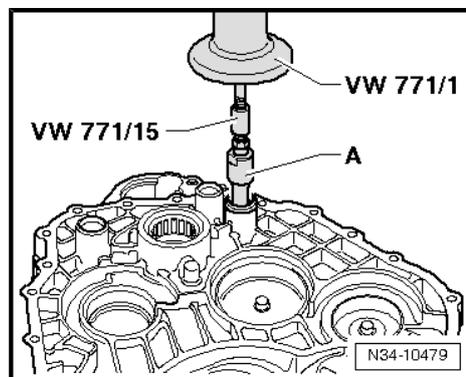
- ❑ For reverse gear output shaft
- ❑ Pay attention to the thickness

18 - Outer Race/Tapered Roller Bearing

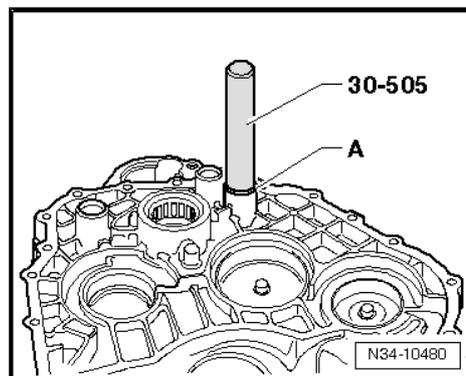
- ❑ For reverse gear output shaft
- ❑ Removing and installing, refer to [⇒ Item 4 \(page 136\)](#)
- ❑ When replacing: Install the shim [⇒ Item 17 \(page 98\)](#) , with the same thickness

Removing the Bearing Bushing for the Selector Rod.

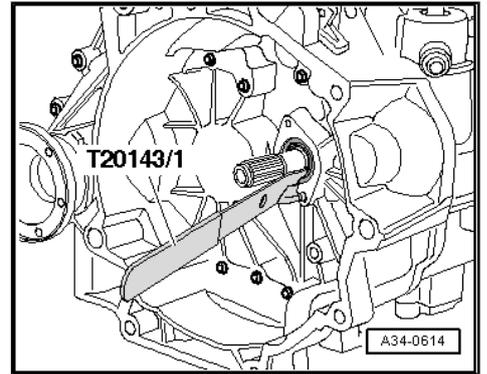
A - For example internal puller -Kukko 21/3- 18.5 to 23.5 mm



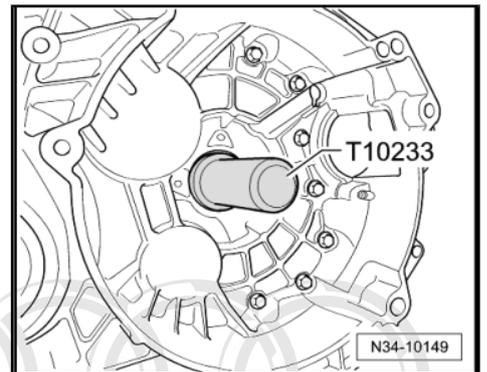
Install the Selector Rod Bushing -A- all the Way.



Remove the Input Shaft Seal.



Install the Input Shaft Seal so that it is Flush.



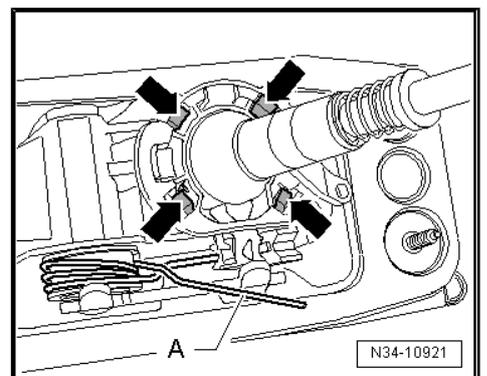
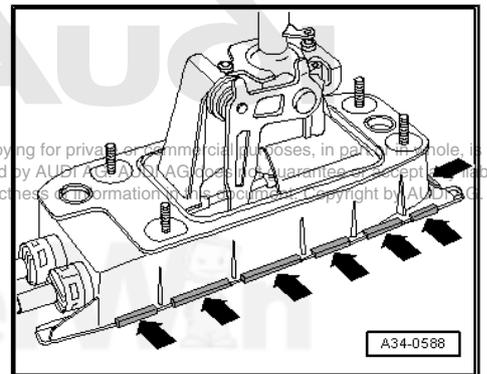
5.2 Selector Mechanism

Special tools and workshop equipment required

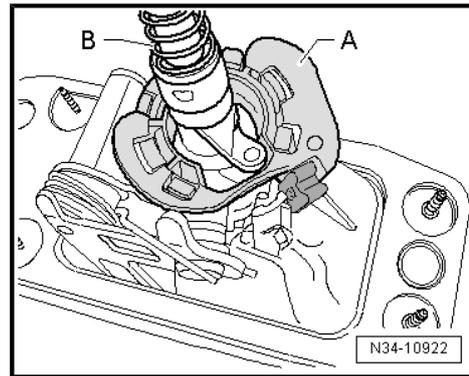
- ◆ Thrust Block -T10083-

Disassembling

- Remove the gearshift mechanism. Refer to [⇒ "4.4 Selector Mechanism", page 74](#) .
- Open the tabs -arrows- with a screwdriver and remove the base plate.
- Remove the seal from the gearshift mechanism.
- Remove the shift cable and the selector cable from the shift housing. Refer to [⇒ "2.5 Gearshift Lever and Gearshift Housing Overview", page 49](#) .
- Lift the upper end -A- of the pressure spring over the tab on the selector bracket.
- Push the tabs -arrows- with a screwdriver toward the bearing ball on the shift lever guide; if necessary, break off the tabs.



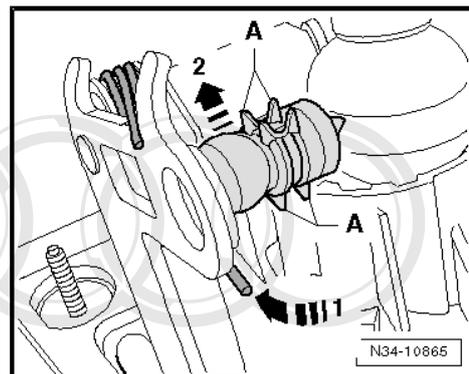
- Pry out the bearing shell -A- with shift lever guide and remove the gearshift lever -B- from the gearshift housing.
- Remove the bearing shell from the bearing ball in the shift lever guide.



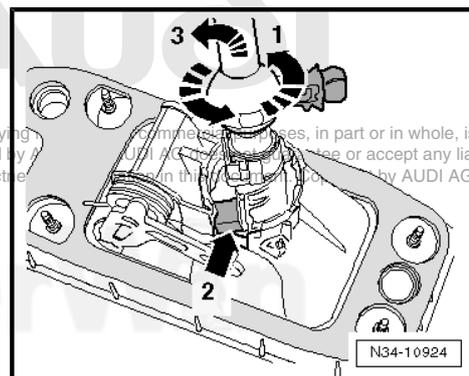
 **Note**

Be careful not to break off the guides -A- in the following work procedures.

- Lift the lower spring end -arrow 1- all the way onto the selector bracket.
- Pull the shift lever guide all the way up and remove the ball stud from the selector bracket -arrow 2-.



- Turn the shift lever guide counter-clockwise -arrow 1-.
- The pins -arrow 2- must be in the shift housing opening.
- Remove the shift lever guide with the gearshift lever -arrow 3-.



Assembling

- For the correct tightening specifications, refer to ["2.5 Gearshift Lever and Gearshift Housing Overview", page 49](#).

 **Note**

Replace the bearing shell ⇒ [Item 10 \(page 49\)](#).



WARNING

Risk of accident!

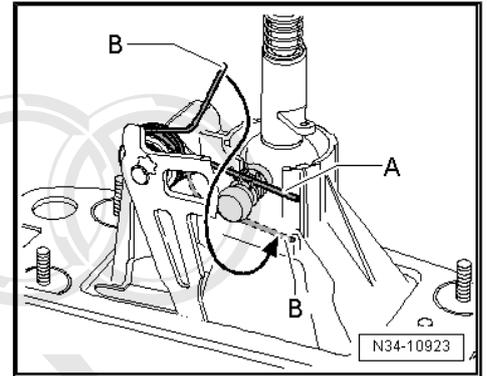
- ◆ *The lower side of the spring -arrow 1 - ⇒ [page 100](#) can spring down uncontrolled from the selector bracket shoulder during subsequent handling.*

- Push the lower spring end off the selector bracket downward.
- The spring sides then twist "diagonally" with a loud noise.

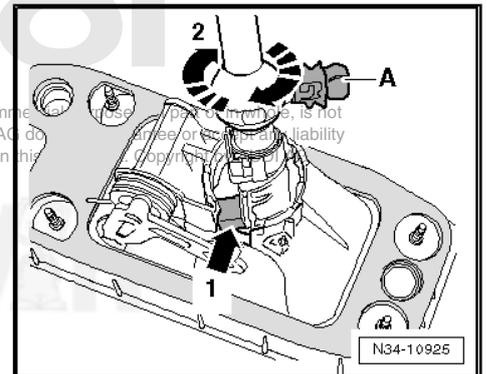
- Turn both spring ends clockwise and release the tension on the spring end -A and B-.
- The spring ends must face in the opposite direction.

 **Note**

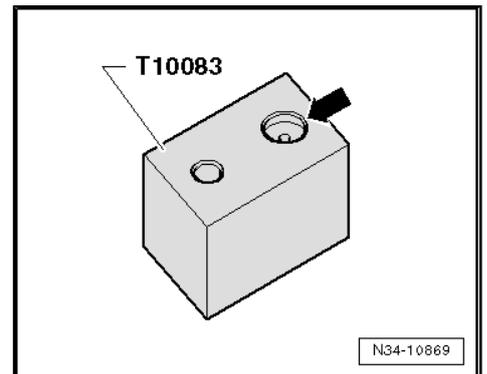
The illustration shows the installation position with the shift lever guide still installed.



- Install the shift lever guide with the gearshift lever in the gearshift housing.
- The pins -arrow 1- are still located in the shift housing opening.
- Turn the shift lever guide clockwise -arrow 2- until the ball stud -A- is above the opening in the gearshift housing.



- Place the shift housing with the shift lever guide into the larger cavity -arrow- in the -T10083- .

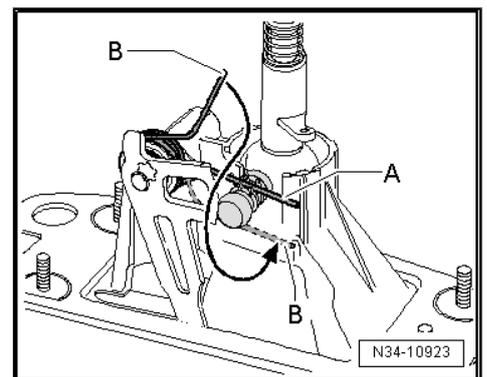


- The shift lever guide must project out of selector housing as far as stop.
- Insert the end -A- of the pressure spring into the guide from the top.
- Pull the end -B- of the pressure spring downward and insert it next to the guide (toward the ball head).

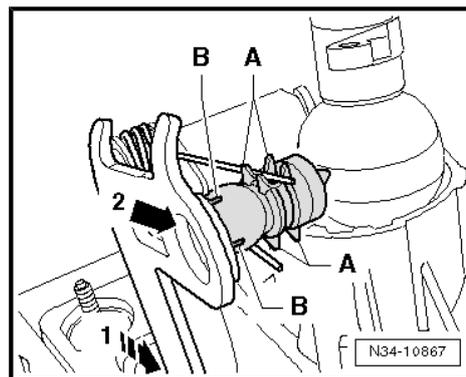
 **Note**

The selector bracket is only shown partially in the illustration.

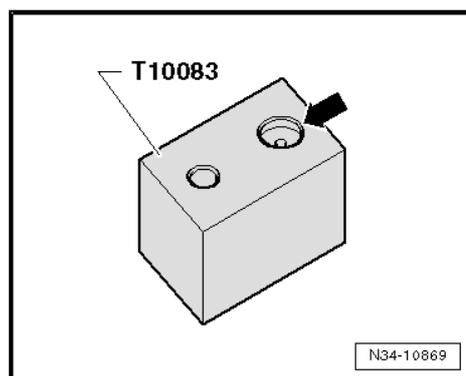
- Carefully remove the shift housing and shift lever guide from the -T10083- .



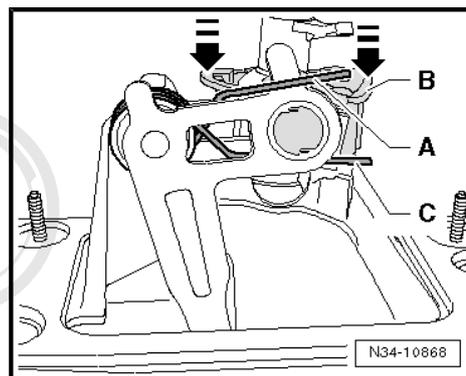
- Move the selector bracket all the way to the back (opposite the holes for the gearshift and selector cable) -arrow 1-.
- Grease the ball stud and push it into the selector bracket -arrow 2-.
- Be careful not to damage the guides -A- and the tabs -B-.



- Place the shift housing with the shift lever guide into the larger cavity -arrow- in the -T10083- .



- The shift lever guide must project out of selector housing as far as stop.
- Lift the upper end -A- of the pressure spring over the tab on the selector bracket.
- Grease the bearing shell -B- and shift lever guide bearing.
- Press the bearing shell all the way onto the shift lever guide bearing.
- Remove the shift housing from the -T10083- .
- Push the bearing shell into the shift housing -arrows-.
- All 4 tabs must lock into place.
- Insert the bottom end -C- of the pressure spring into the guide.
- Pry the upper end -A- of the pressure spring over the pin on the selector bracket.



- Install the gearshift mechanism. Refer to ["4.4 Selector Mechanism" page 74](#).
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5.3 Shift Unit

Special tools and workshop equipment required

- ◆ Thrust Piece -T10203-

1 - Shift Unit

- Consisting of the gear-shift shaft and the gear-shift cover
- The components cannot be separated from each other

2 - O-ring

- Insert in the groove in the shift cover
- Install with transmission fluid
- Always replace

3 - Alignment Sleeve

- For centering the shift unit to the transmission housing

4 - Selector Shaft Seal

- Removing and installing, refer to ⇒ ["4.5 Selector Shaft Seal", page 76](#)

5 - Cap

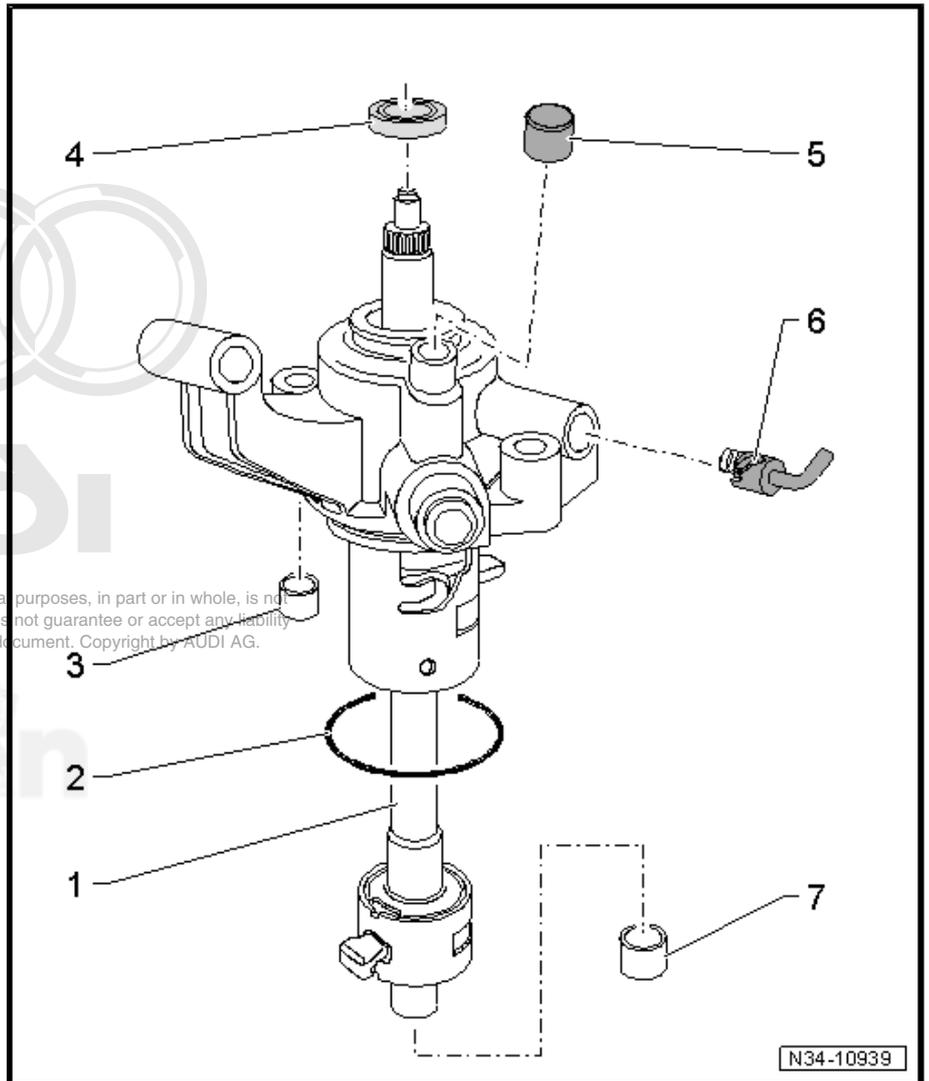
- For the transmission ventilation

6 - Locking Pin

- For adjusting the shift mechanism, refer to ⇒ ["2.10 Shift Mechanism, Adjusting", page 59](#)
- Removing, refer to ⇒ [Fig. "Removing the Locking Pin -A- from Shift Cover.", page 103](#)
- Installing; refer to ⇒ [Fig. "Installing the Locking Pin -A- into Selector Cover.", page 104](#)

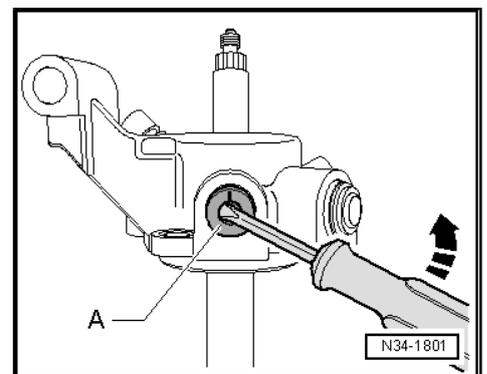
7 - Bearing Bushing

- For the gearshift shaft
- Removing and installing, refer to ⇒ [Item 5 \(page 115\)](#)



Removing the Locking Pin -A- from Shift Cover.

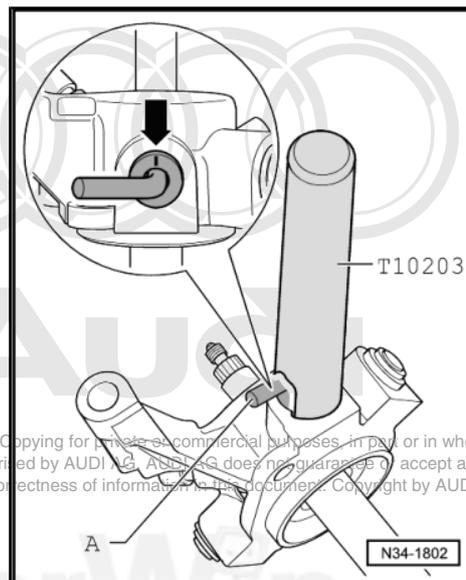
- Remove the outer part of the locking pin
- Then carefully pry out the locking pin with a screwdriver.



Installing the Locking Pin -A- into Selector Cover.

Installed position:

The marking -arrow- faces toward upper section of the gearshift shaft.



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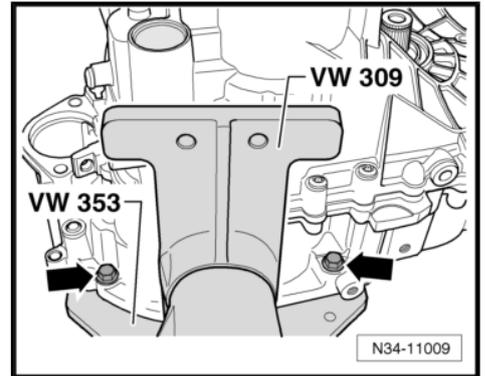
5.4 Shift Unit, Input Shaft, Output Shafts, Gearshift Rod, Differential and Bevel Box

Special tools and workshop equipment required

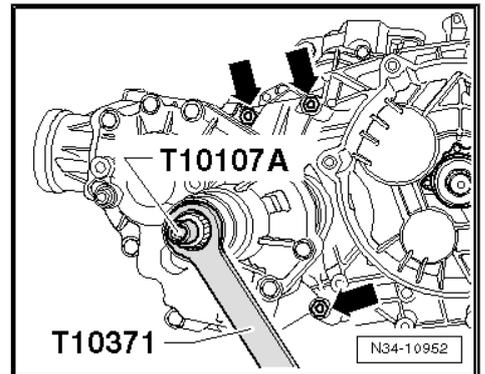
- ◆ Holding Plate -VW 309-
- ◆ Transmission Support -VW 353-
- ◆ Thrust Tube -VW 455-
- ◆ Slide Hammer-Complete Set -VW 771-
- ◆ Adapter -VW 771/44-
- ◆ Support Bridge -T10323-
- ◆ Socket And Extended Bit -T10107 A-
- ◆ Counter-Hold Tool -3435-
- ◆ Thrust Piece -T10042-
- ◆ Counter Hold Tool -T10371-
- ◆ Thrust Piece -T10233-
- ◆ Hot Air Blower -V.A.G 1416-
- ◆ Internal Puller 14.5 to 18.5 mm , for example -Kukko 21/02-
- ◆ Separating Tool 5 to 60 mm , for example, -Kukko 17/0-
- ◆ Counter-Support -Kukko 22/1-
- ◆ Front and Rear Bearing Tool -3348/2-
- ◆ Sealing paste -AMV 188 200 03-
- ◆ Grease -G 060 735 A2-

Removing

- Attach the transmission to the -VW 353- with the bolts -arrows-.



- Remove the right stub shaft bolt with the -T10107 A- ; when doing this, counter-hold the stub shaft.
- Remove the 4 bevel box connecting bolts -arrows- (only 3 shown in illustration) on the manual transmission.
- Carefully push the bevel box off the manual transmission and remove it.

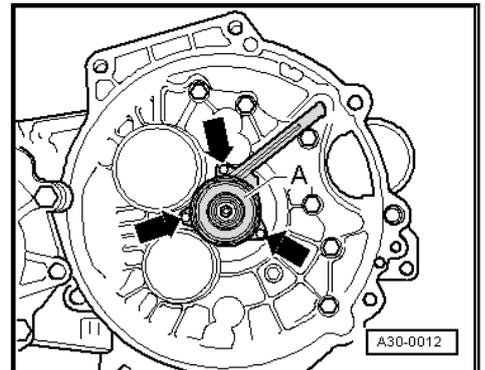


- Remove the bolts -arrows-.
- Remove the clutch slave cylinder with release bearing -A-.
- Place a drip tray under the transmission.

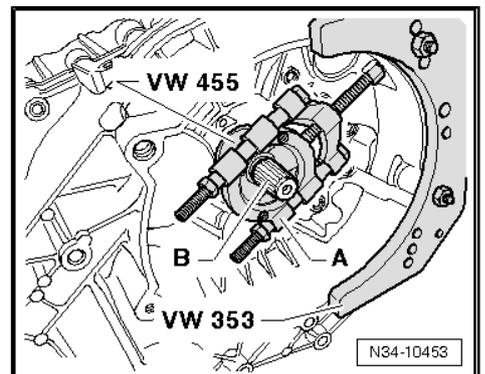
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Drain the transmission fluid.

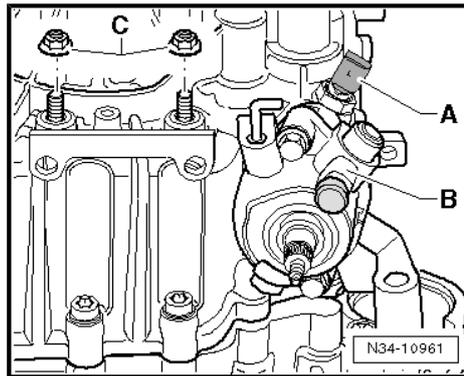
- Remove the clutch housing bolts to the transmission housing.



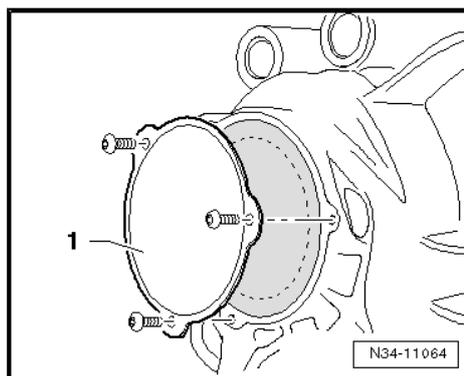
- Mount the -VW 455- over the input shaft on the clutch housing and secure the input shaft -B-.
- Tension the separating tool 5 to 60 mm -A-, for example -Kukko 17/0-, tightly behind the input shaft splines.
- The back of the separating tool must touch the thrust tube free-of-play.



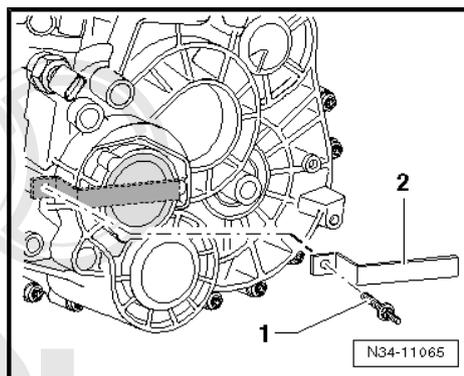
- Move the shift unit selector shaft into the neutral position.
- Remove the back-up lamp switch -F4- -A-.
- Remove the bolts from the shift unit -B- on the transmission housing.
- Remove the shift unit from the transmission housing; while doing this, rotate the shift unit 180° when removing it.
- The shift unit shift fingers must be guided through the selector rods.



- Remove the locking plate -1- (if equipped).



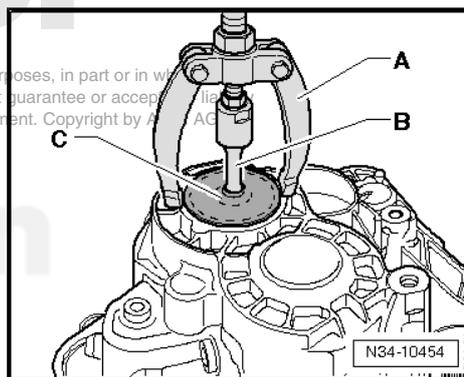
- Remove the bracket -2- (if equipped).



- Push the rubber through the center of the cover -C- using a screwdriver.
- Pry the sealing cap out of the transmission housing.
- If necessary, pull the cap off the transmission housing.

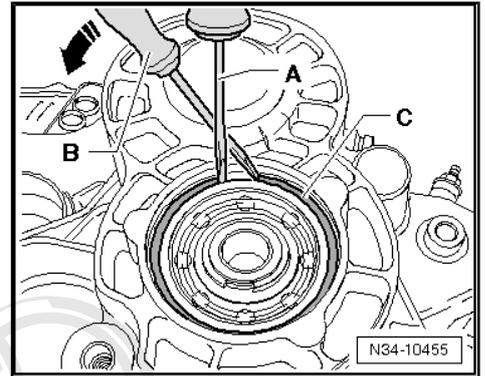
A - Counter-support , for example, -Kukko 22/1-

B - Internal puller 14.5 to 18.5 mm , for example, -Kukko 21/02-



Remove the locking ring -C- from the input shaft grooved ball bearing as follows:

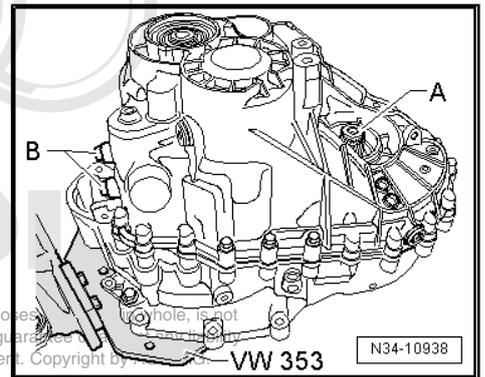
- Hold one end of the locking ring with the screwdriver -A-.
- Pry the other end of the locking ring out of the groove in the grooved ball bearing -arrow- with the second screwdriver -B-.
- Reposition the screwdriver -B- and pry the locking ring out further.



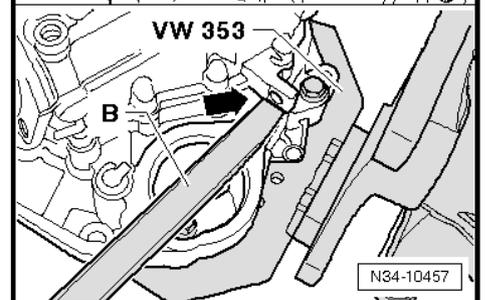
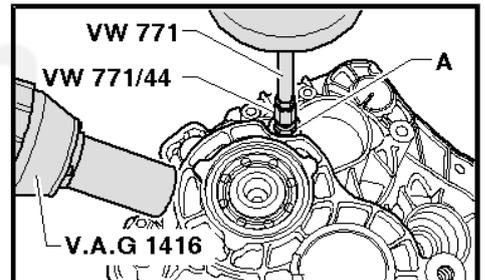
- Counter hold the stub shaft using the -T10371- and remove the bolt from the left stub shaft -A-.
- Remove the stub shaft.
- Remove all the bolts for the transmission housing to clutch housing.

 **Note**

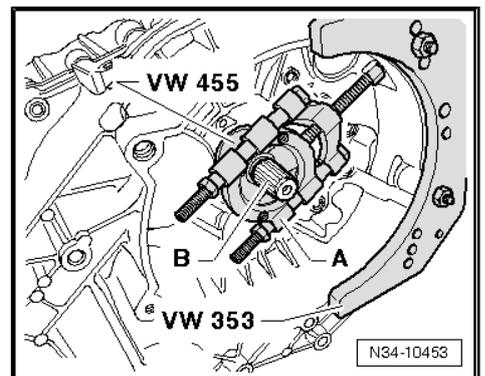
If bolts -B- are present, then these do not need to be removed in order to remove the transmission housing



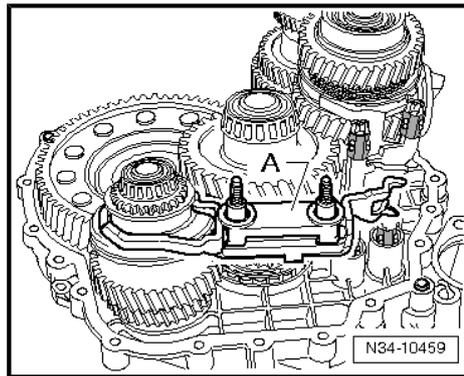
- Install the -VW 771/44- all the way into the threaded bore in the transmission housing and secure it with the nut -A-.
- Heat transmission housing using, for example, the -V.A.G 1416- , in the area of the bearing seat for grooved ball bearing/ input shaft to approximately 100 °C (212 °F) for approximately 10 minutes.
- Separate the transmission housing from the clutch housing using the -VW 771- . At the same time separate the transmission housing on the housing brace -arrow- from the clutch housing with a lever -B-.



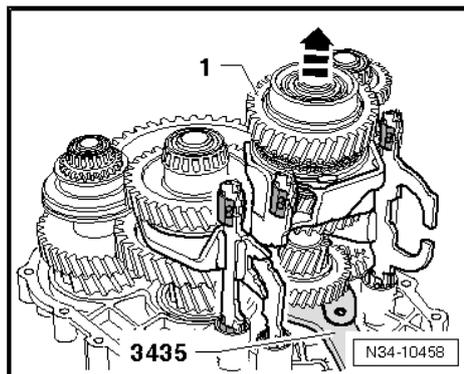
- Remove the separating tool -A- and the -VW 455- from the input shaft -B-.



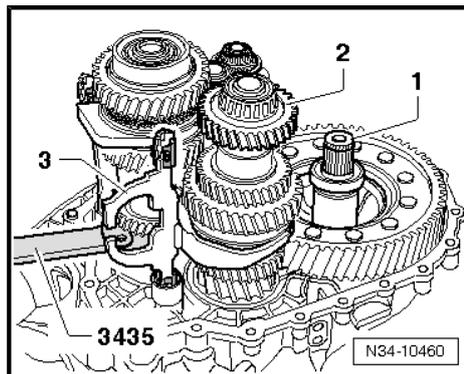
- Remove the switching rockers for reverse gear -A-.



- Carefully bring the transmission into a slightly angled position if necessary.
- Lift the input shaft -1- in direction of -arrow- just enough until it is possible to insert the -3435- .
- Swivel the transmission back into its original horizontal position.

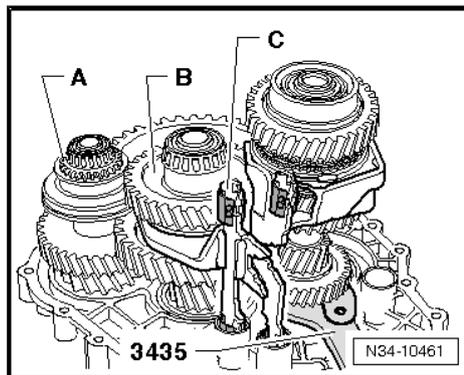


- Attach the stub shaft to the differential -1-; this way the differential can be raised in the following work steps.
- Remove the output shaft for 3rd and 4th gear -2- together with the selector rod -3-.



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- Carefully bring the transmission into a slightly angled position.
- Push the output shaft for 1st and 2nd gear -B- all the way up.
- Then remove the reverse gear output shaft -A-.



Caution

When the transmission is in an angled position, components of the transmission could come loose.

To prevent this, move the transmission back into its original horizontal position.

- Then remove the 1st and 2nd gear output shaft -B- together with the selector rod -C- from the clutch housing.

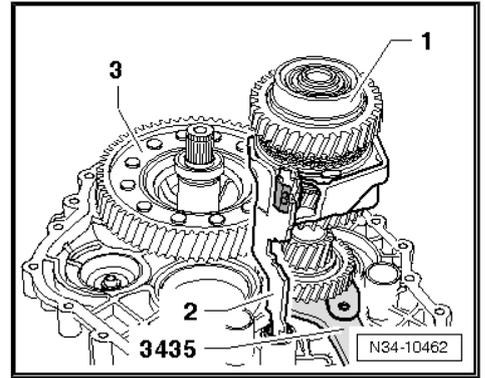
- Remove the input shaft -1- together with the selector rod -2-.
- Remove the differential -3- on the stub shaft.
- Remove the input shaft seal => [Item 11 \(page 97\)](#) .

 **Note**

Always replace the grooved ball bearing on the input shaft. Refer to => ["1.1 Input Shaft Overview", page 129](#)
 => [Item 16 \(page 130\)](#) .

Installing

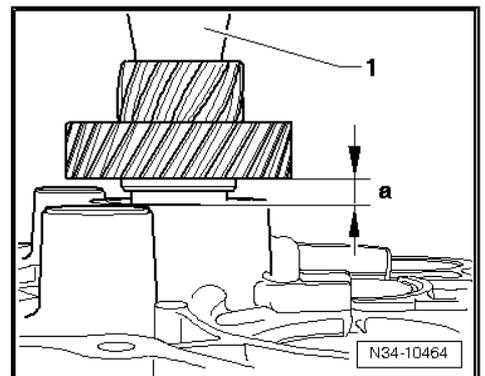
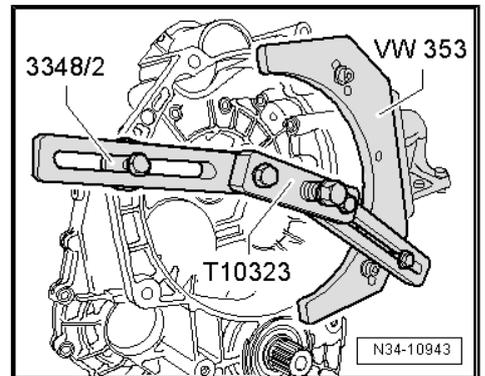
- Press the new grooved ball bearing onto the input shaft. Refer to => ["1.1 Input Shaft Overview", page 129](#)
 => [Item 16 \(page 130\)](#) .
- For the correct tightening specifications, refer to
 => ["2.12 Transmission Housing and Gearshift Unit Overview", page 62](#) .
- Mount the -T10323- as illustrated.



- Install the input shaft -1- together and the selector rod for 5th and 6th gears into the clutch housing.

Turn the spindle on the -T10323- and lift the input shaft -1- to dimension -a-.

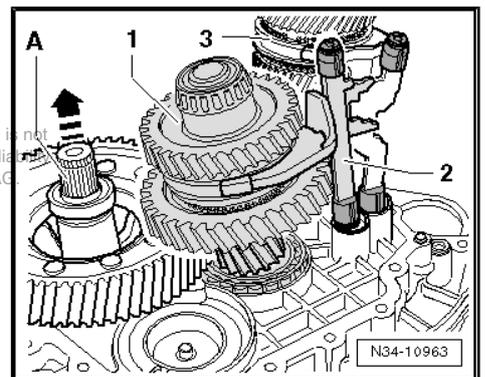
- -a- = 15 mm



- Attach the left stub shaft to the differential -A-; this way the differential can be raised in the following work steps.
- Install the differential.

A second technician is needed to perform the following work.

- Lift the differential in direction of -arrow- (2nd technician).
- First place the 1st and 2nd gear input shaft -1- with the gearshift rod -2- in the bearing seat and then move it toward the input shaft -3-.

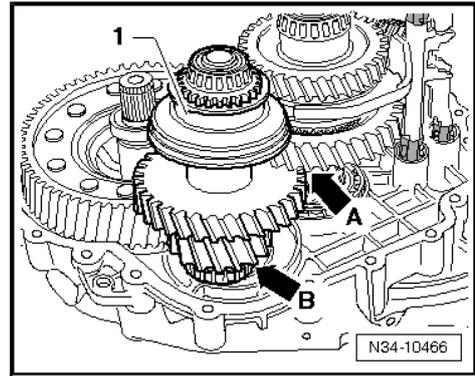




- Lift the 1st and 2nd gear output shaft on the gear wheel -arrow A- and swing it toward the input shaft (2nd technician).
- Guide the reverse gear output shaft -1- under the splines on the gear wheel -arrow A- and place it in the bearing seat -arrow B-.

Turn the spindle on the -T10323- and lower the input shaft approximately 10 mm.

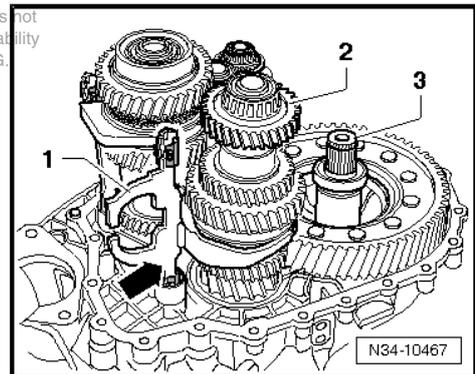
- Install the 3rd and 4th gear output shaft -2- together with the 3rd and 4th gear gearshift rod -1-.



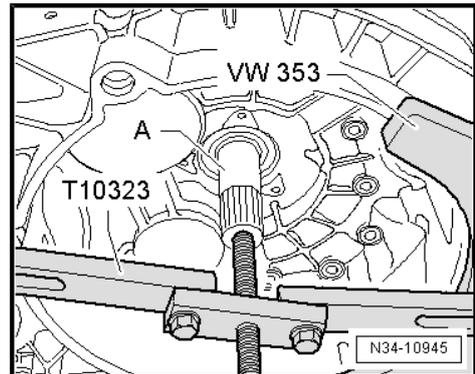
Installation Position, 3rd and 4th Gear Selector Rod:

The shorter brace -arrow- points to the clutch housing.

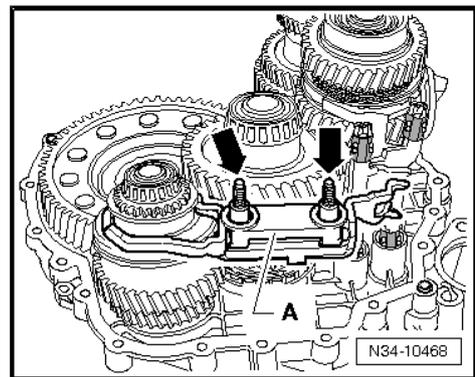
- Remove the left stub shaft -3- from the differential.



- Lower the input shaft just enough -A- by turning the spindle on the -T10323- so that it remains slightly tensioned (lifted approx. 1 mm).



- Place the reverse gear switching rockers -A- into the reverse gear output shaft slide locking collar.
- The stud bolts -arrows- must stand vertical before mounting the transmission housing.



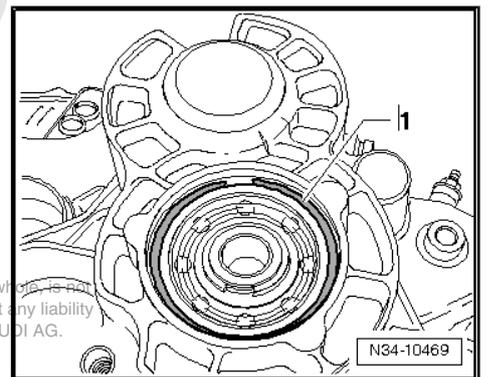
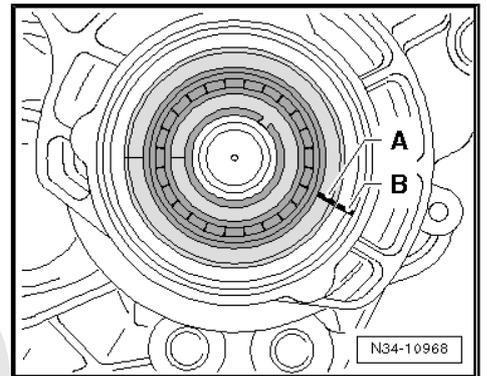
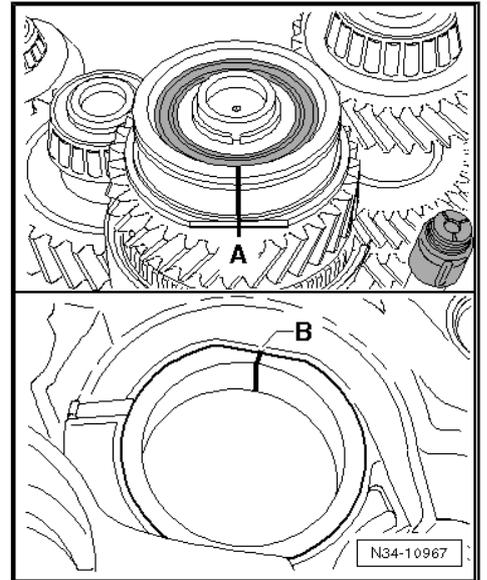
The Grooved Ball Bearing/Input Shaft Only Fits in One Position in the Transmission Housing.

- The flattened sides -A- on the grooved ball bearing and on the bearing mount -B- must align in the transmission housing.
- Mark the flattened side with color.
- Transfer the markings to the upper area of the grooved ball bearing and to the upper area of the transmission housing bearing mount (see the next figure).
- Heat transmission housing using, for example, the -V.A.G 1416- , in area of bearing seat for grooved ball bearing/input shaft to 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.

- Apply sealing paste -AMV 188 200 03- evenly onto the sealing surface of the clutch housing.
- Align the marking on the grooved ball bearing -A- with the marking on the transmission housing -B- and mount the transmission housing.
- Pay attention to the studs for the reverse gear switching rockers ⇒ [page 110](#)
- Do not distort the transmission housing when installing it; hold it parallel to the clutch housing.

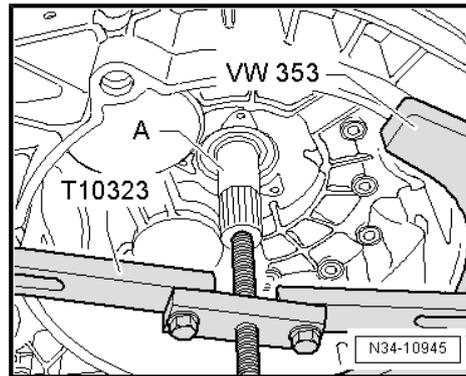


- Install the grooved ball bearing/input shaft locking ring -1-.

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- Remove the -T10323- for the input shaft -A-.

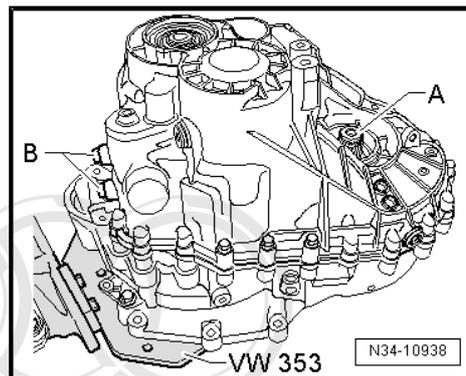


- Bolt together the transmission housing and the clutch housing.

 **Note**

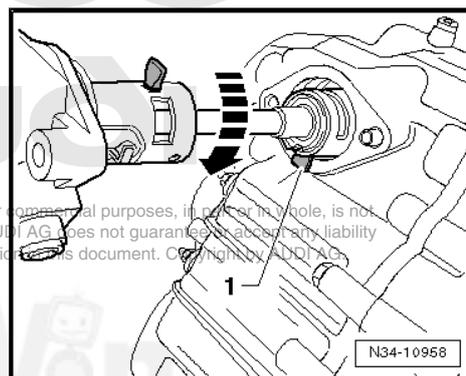
Ignore bolts -B-.

- Install the stub shaft -A- with the spring, thrust washer and tapered ring.
- Tighten the stub shaft bolt; when doing this, counter-hold the stub shaft using the -T10371- .



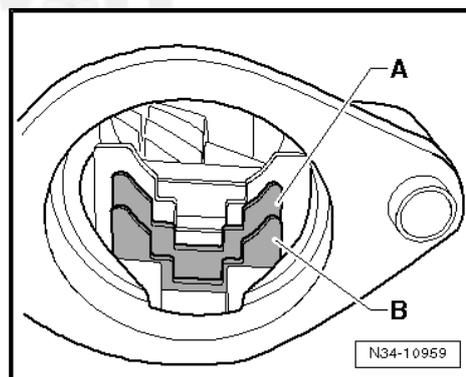
Install the Shift unit as Follows:

- Turn the transmission with the opening for the shift unit in the assembly stand upward.
- Move the selector shafts into the neutral position.
- Guide the shift unit with the shift finger -1- through the switching rockers -A and B- (switching rockers see the next illustration).

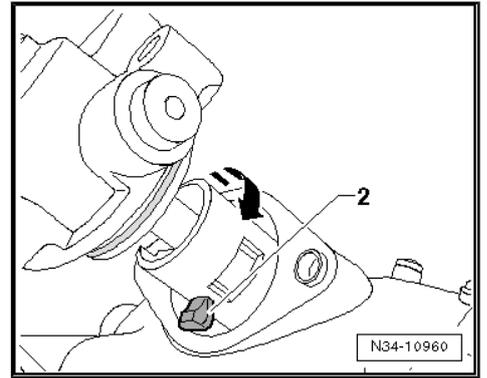


Switching rockers -A and B-

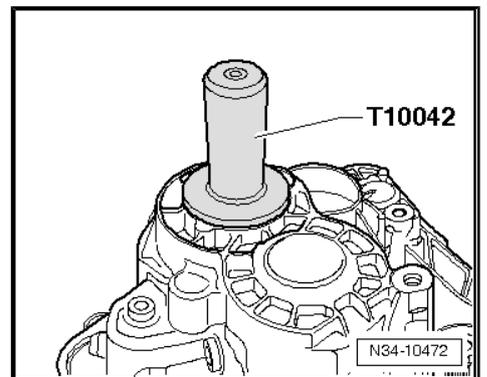
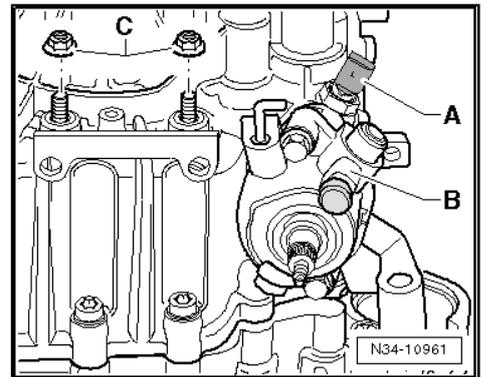
- Rotate the shift unit in direction of -arrow- far enough (see the previous illustration), until it can be guided into the transmission housing.



- Then rotate the shift unit in direction of -arrow- until the shift finger -2- points in the illustrated position.
- Install the shift unit with the shift finger into the switching rockers -A- and -B- (see the previous illustration) and at the same time all the way into the transmission housing.
- It must be possible to move the gearshift shaft easily (forward and backward).



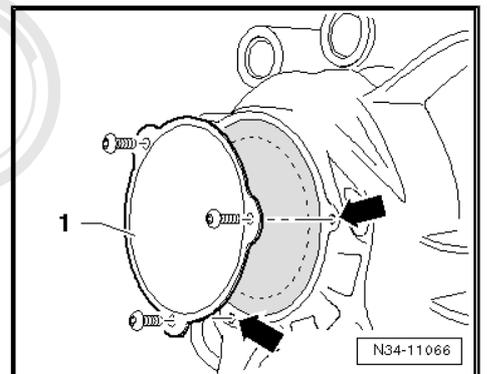
- Tighten the shift unit -B-.
- Install the back-up lamp switch -F4- -A-.
- Install the nuts -C-.
- Drive in the input shaft seal. Refer to [⇒ Fig. ""Install the Input Shaft Seal so that it is Flush."" , page 99](#) .
- Install slave cylinder with release bearing. Refer to [⇒ "4.5 Clutch Slave Cylinder with Release Bearing" , page 29](#) .
- Counter hold the stub shaft using the -T10371- and tighten the bolt on the right stub shaft using the -T10107 A- .
- Move the gearshift lever (selector lever) through all the gears.
- Drive cap into transmission housing to stop of the thrust piece -T10042-



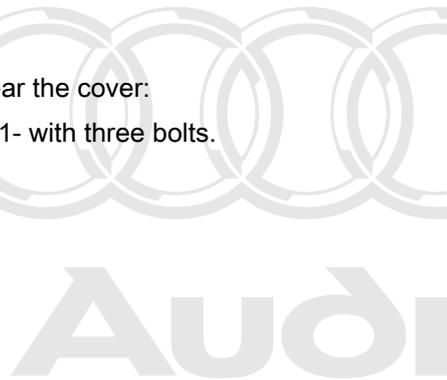
Secure the Sealing Cap:

Threaded holes -arrows- near the cover:

- Install the locking plate -1- with three bolts.



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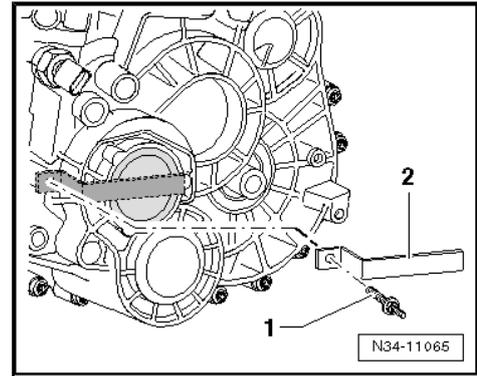
No Threaded Bores in the Area of the Sealing Cap:

- Install the bracket -2- with a double bolt -1-.

Installed position:

- The retaining bracket must be positioned above the center of the sealing cap.

For the correct bolts and other components, refer to Electronic Parts Catalog (ETKA).



5.5 Transmission Housing

Special tools and workshop equipment required

- ◆ Holding Fixture -VW 801-
- ◆ Locking Pin -30-505-
- ◆ Thrust Pad -3124-
- ◆ Subframe Support Assembling Device -3290-
- ◆ Drift -T10168-
- ◆ Torque Wrench 5-50 Nm -V.A.G 1331-
- ◆ Internal Puller -Kukko 21/3-
- ◆ Thread adapter from Support -Kukko 22/1-
- ◆ Counter-Support -Kukko 22/2-
- ◆ Sealing paste -AMV 188 200 03-
- ◆ For additional special tool, refer to the descriptions in servicing the input shaft.

**Note**

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When installing the tapered roller bearing, install new shims which have the same thickness as the previous shims.

1 - Transmission Housing

2 - Seal

- Always replace

3 - Transmission Fluid Filler Plug

- 45 Nm

4 - Bolt

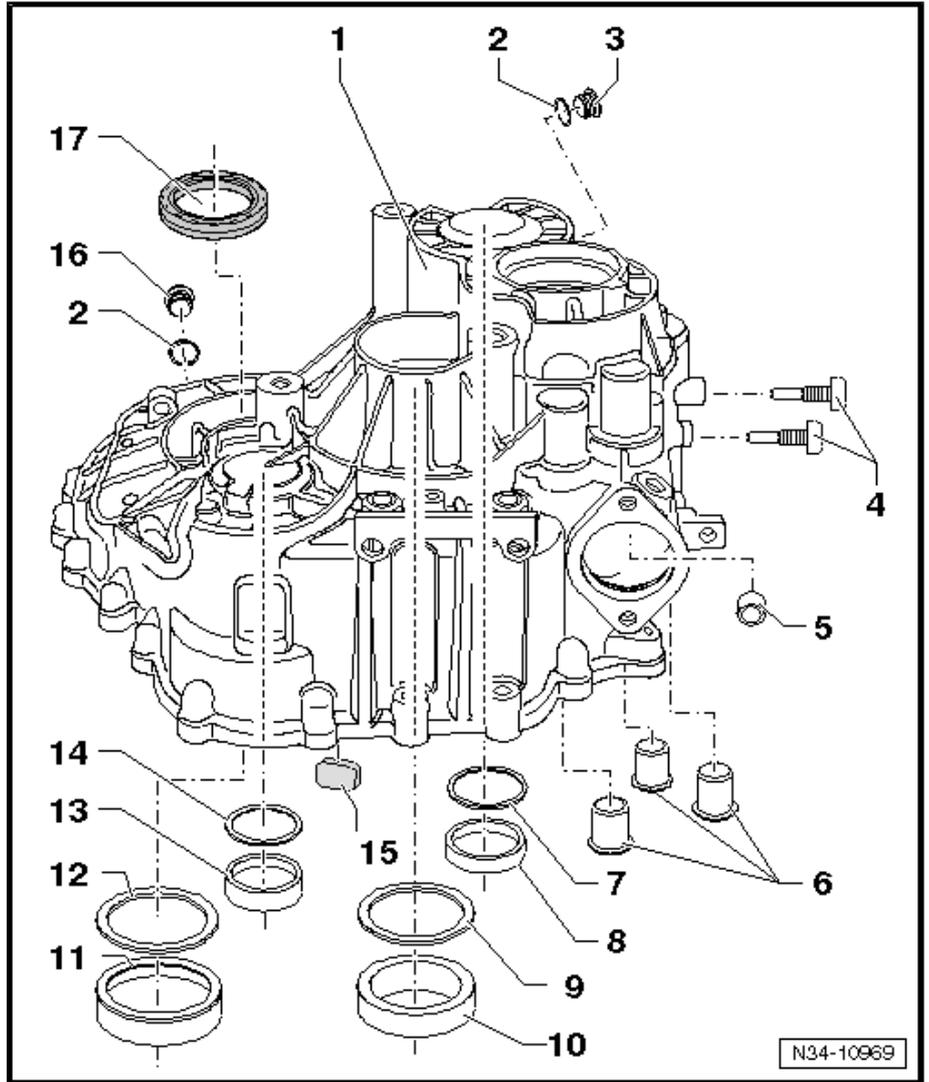
- 35 Nm
- Discontinued shortly after start of production
- The threaded bore for the box is then closed

5 - Bearing Bushing

- For the gearshift shaft
- Removing, refer to [⇒ Fig. "Removing the Selector Shaft Bushing.", page 116](#)
- Installing, refer to [⇒ Fig. "Installing the Gearshift Shaft Bearing Bushing -A- All the Way onto the Tool", page 116](#)

6 - Bearing Bushing

- For the selector rod
- Removing, refer to [⇒ Fig. "Remove the Gearshift Rod Bearing Bushing -C-.", page 117](#)
- Installing, refer to [⇒ Fig. "Installing the Selector Rod Bushing All the Way", page 117](#)



7 - Adjusting Shim

- For output shaft 3rd and 4th gear
- Pay attention to the thickness
- Will get damaged when being removed, replace

8 - Outer Race/Tapered Roller Bearing

- For output shaft 3rd and 4th gear
- Removing and installing, refer to [⇒ Item 22 \(page 135\)](#)
- When replacing: Install the shim [⇒ Item 7 \(page 115\)](#), with the same thickness

9 - Adjusting Shim

- For output shaft 1st and 2nd gear
- Pay attention to the thickness
- Will get damaged when being removed, replace

10 - Outer Race/Tapered Roller Bearing

- For output shaft 1st and 2nd gear
- Removing and installing, refer to [⇒ Item 25 \(page 133\)](#)
- When replacing: Install the shim [⇒ Item 9 \(page 115\)](#), with the same thickness

11 - Outer Race/Tapered Roller Bearing

- For the differential

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- Removing and installing, refer to ⇒ [Item 3 \(page 178\)](#)
- When replacing: adjusting the differential, refer to ⇒ [“1.3 Differential, Adjusting”, page 180](#)

12 - Adjusting Shim

- For the differential
- Adjusting the differential, refer to ⇒ [“1.3 Differential, Adjusting”, page 180](#)

13 - Outer Race/Tapered Roller Bearing

- For reverse gear output shaft
- Removing and installing, refer to ⇒ [Item 15 \(page 137\)](#)
- When replacing: Install the shim, with the same thickness

14 - Adjusting Shim

- For reverse gear output shaft
- Pay attention to the thickness
- will get damaged when being removed, replace

15 - Magnet

- Attach into the transmission housing with sealing paste -AMV 188 200 03-

16 - Oil Drain Plug

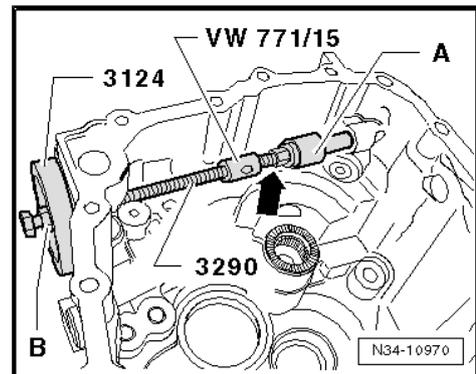
- 45 Nm

17 - Seal

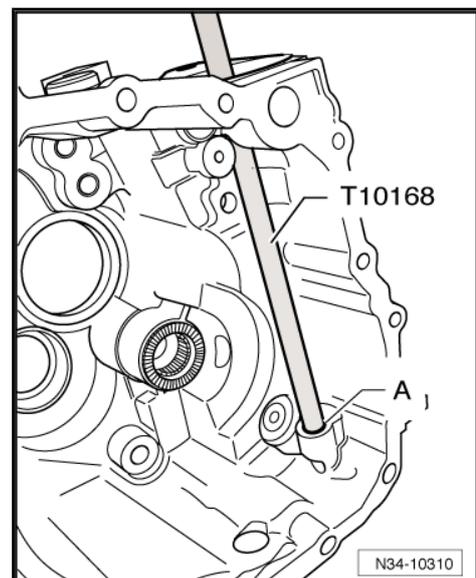
- Replace with transmission installed, refer to ⇒ [“3.2 Left Stub Shaft Seal, Manual Transmission Installed”, page 186](#)

Removing the Selector Shaft Bushing.

- Use the threaded adapter -arrow- taken from the -Kukko 22/1- .
- Hold the spindle on the -3290- and turn the nut -B-.
- A - Internal puller 14.5 to 18.5 mm , for example, -Kukko 21/2-



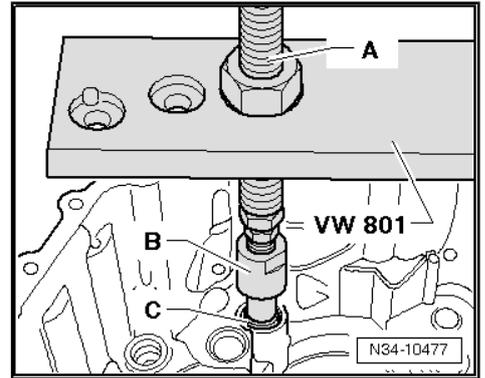
Installing the Gearshift Shaft Bearing Bushing -A- All the Way on to the Tool



Remove the Gearshift Rod Bearing Bushing -C-

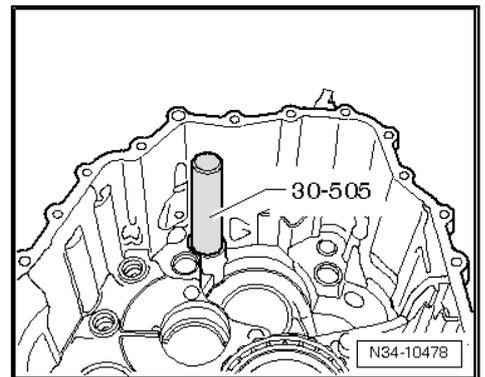
A - For example -Kukko 22/2- .

B - For example -Kukko 21/3- 18.5 to 23.5 mm



Installing the Selector Rod Bushing All the Way

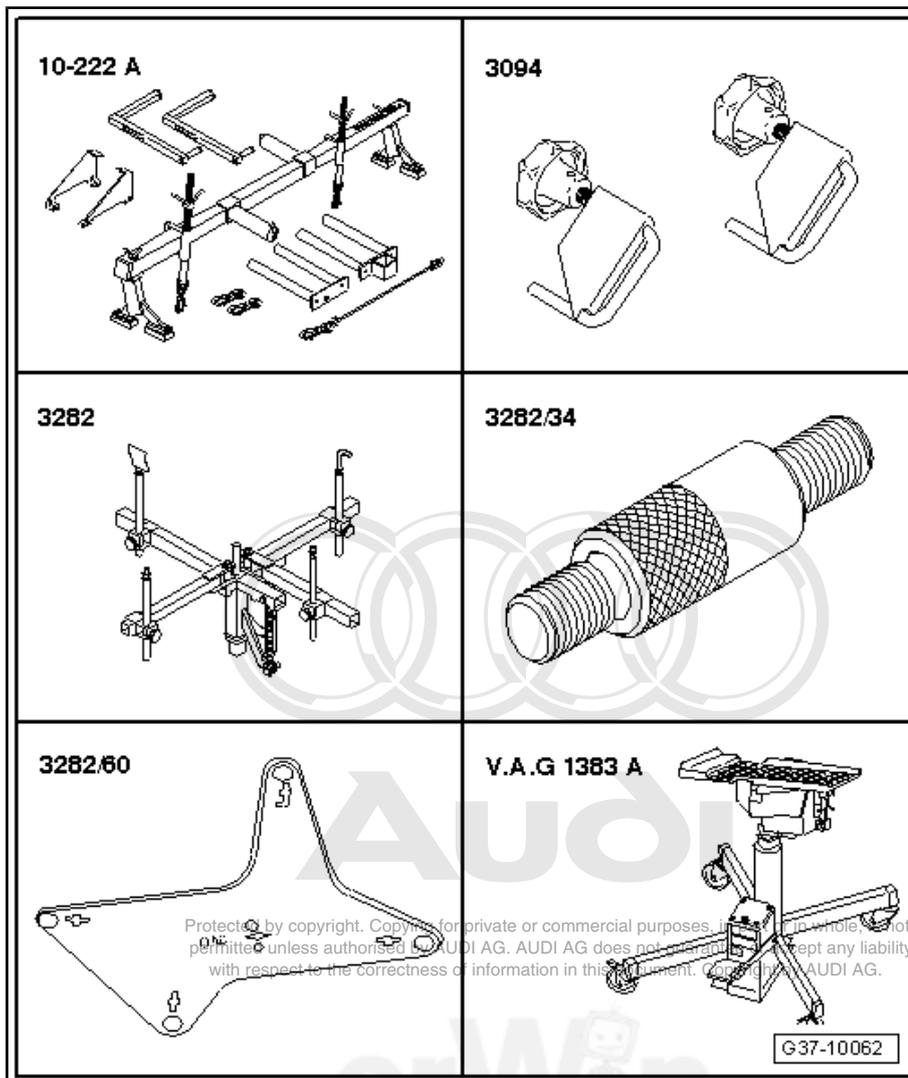
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6 Special Tools

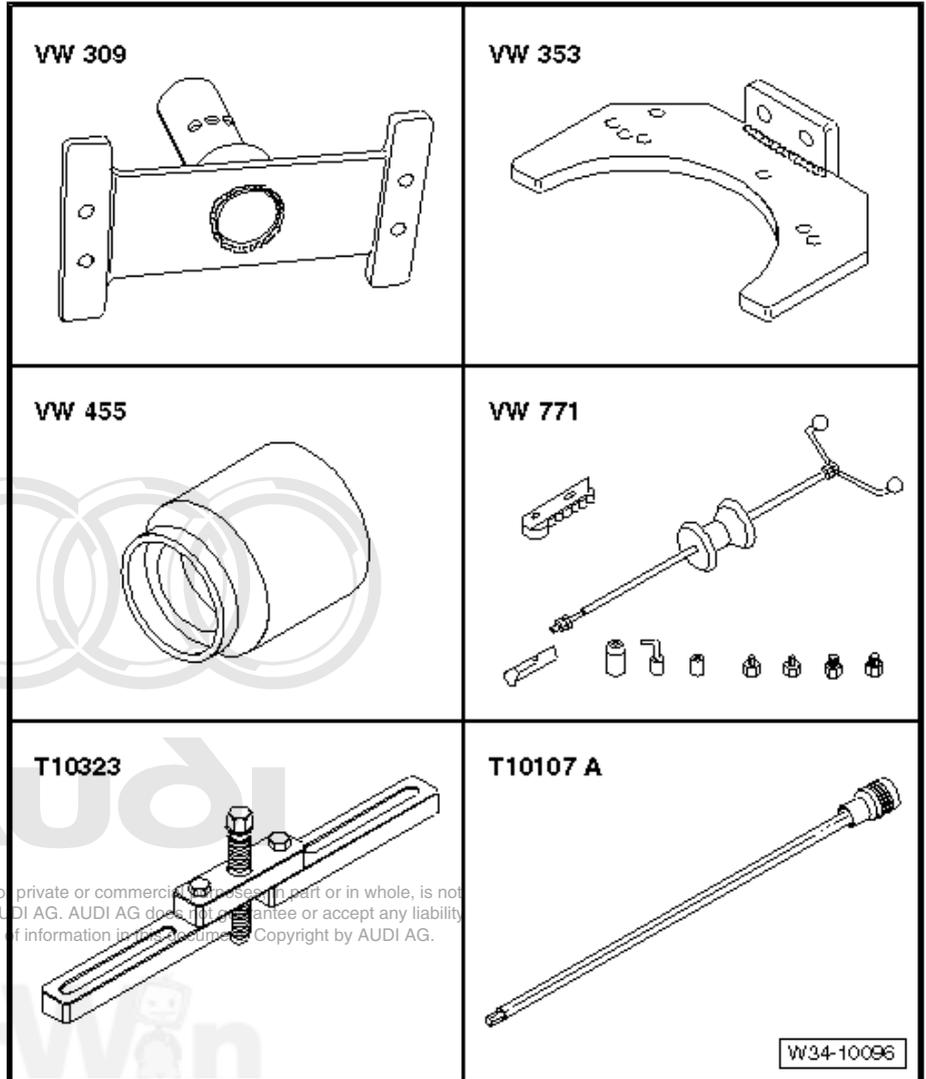
Special tools and workshop equipment required

- ◆ Engine Support Bridge -10-222 A-
- ◆ Hose Clamps Up to 25 mm Dia. -3094-
- ◆ Transmission Support -3282-
- ◆ Bolt -3282/34-
- ◆ Adjusting Plate -3282/60-
- ◆ Engine/Transmission Jack -V.A.G 1383 A-



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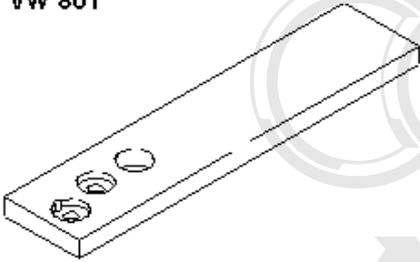
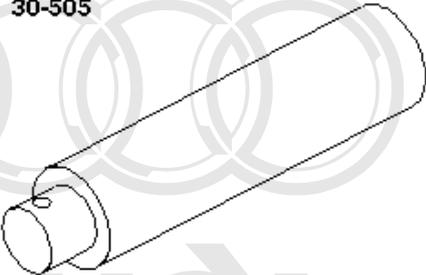
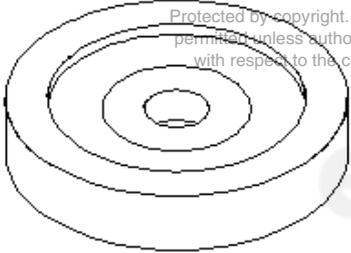
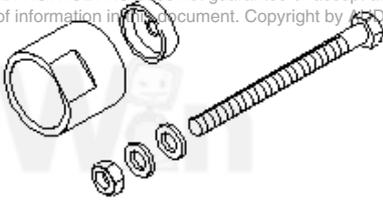
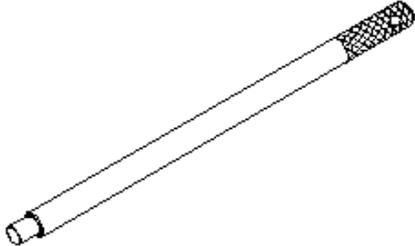
- ◆ Holding Plate -VW 309-
- ◆ Transmission Support - VW 353-
- ◆ Thrust Tube -VW 455-
- ◆ Slide Hammer-Complete Set -VW 771-
- ◆ Adapter -VW 771/44-
- ◆ Support Bridge -T10323-
- ◆ Socket And Extended Bit - T10107 A-



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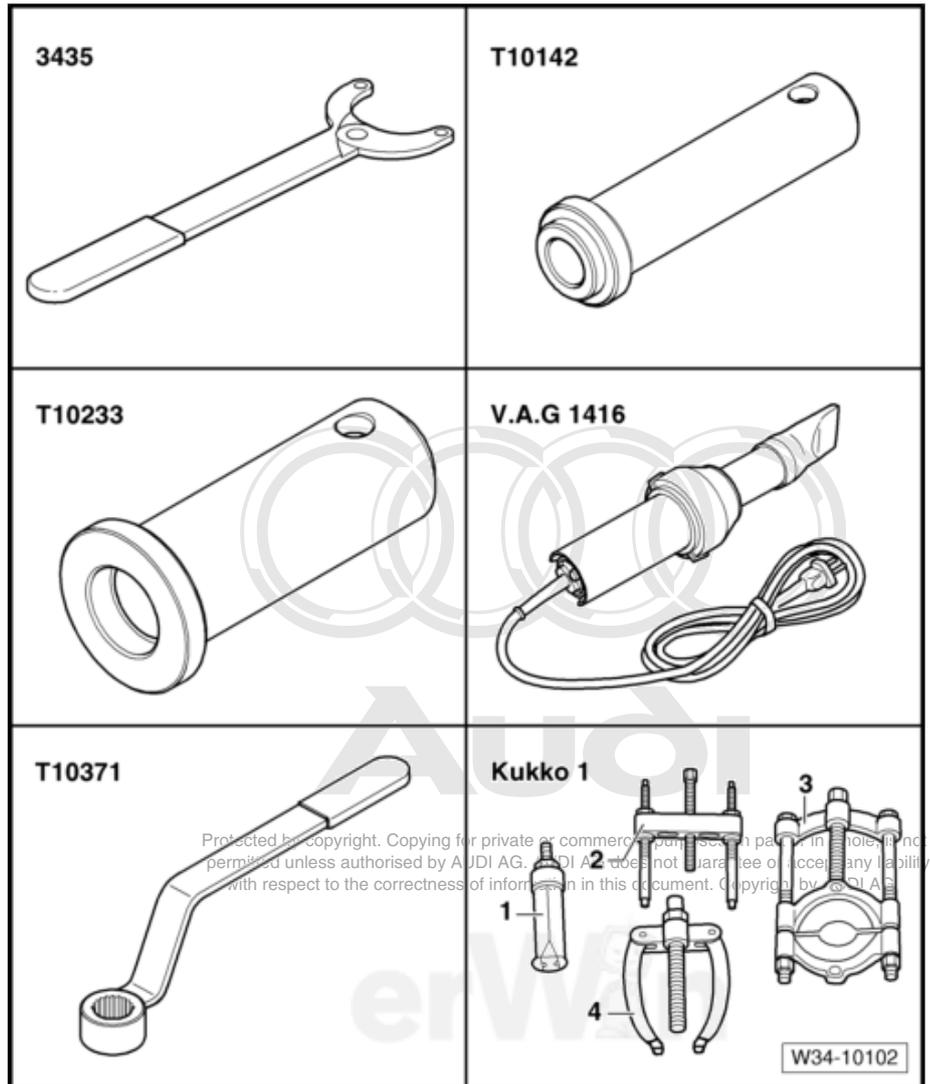


- ◆ Holding Fixture -VW 801-
- ◆ Locking Pin -30-505-
- ◆ Thrust Pad -3124-
- ◆ Subframe Support Assembling Device -3290-
- ◆ Drift -T10168-
- ◆ Torque Wrench 5-50 Nm - V.A.G 1331-

<p>VW 801</p> 	<p>30-505</p> 
<p>3124</p> 	<p>3290</p> 
<p>T10168</p> 	<p>V.A.G 1331</p>  <p style="text-align: right;">W34-10098</p>

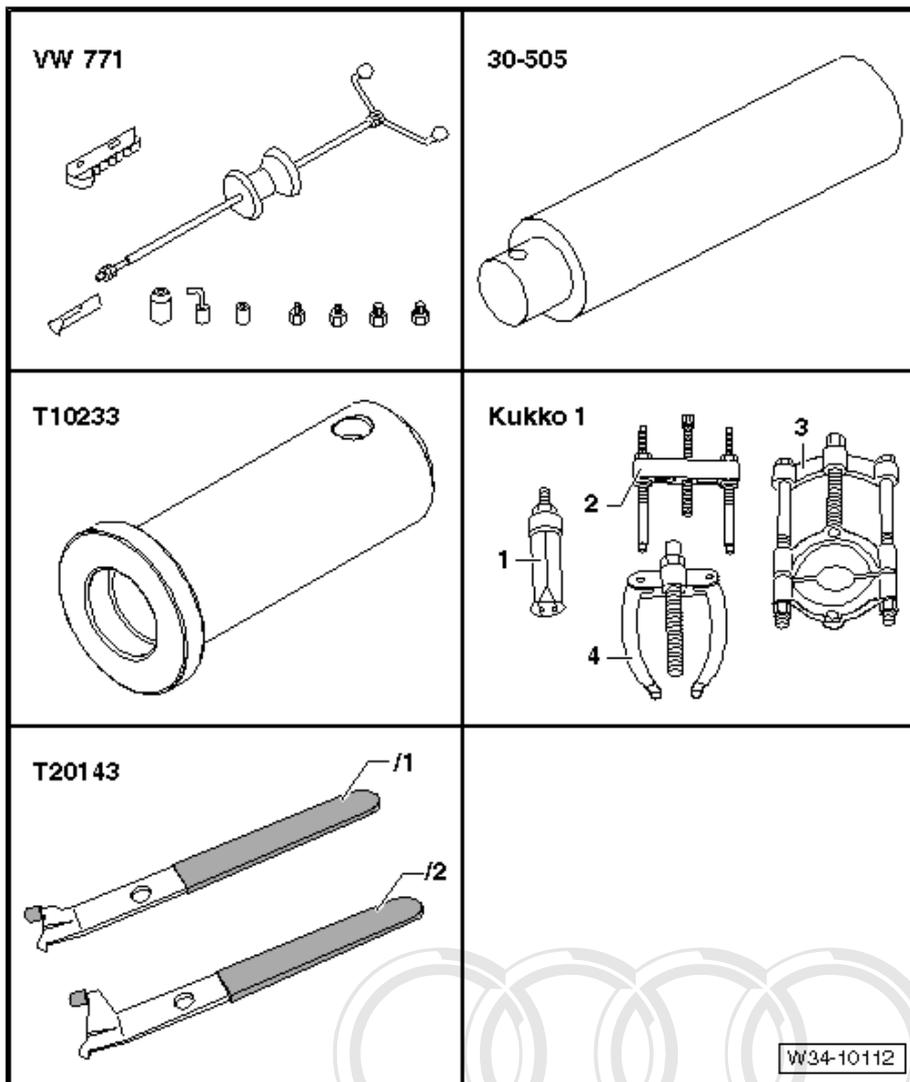
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- ◆ Counter-Hold Tool -3435-
- ◆ Thrust Piece -T10042-
- ◆ Counter Hold Tool - T10371-
- ◆ Thrust Piece -T10233-
- ◆ Hot Air Blower -V.A.G 1416-
- ◆ -1- Internal Puller 14.5 to 18.5 mm , for example - Kukko 21/02-
- ◆ -3- Separating Tool 5 to 60 mm , for example, -Kukko 17/0-
- ◆ -4- Counter-Support -Kukko 22/1-



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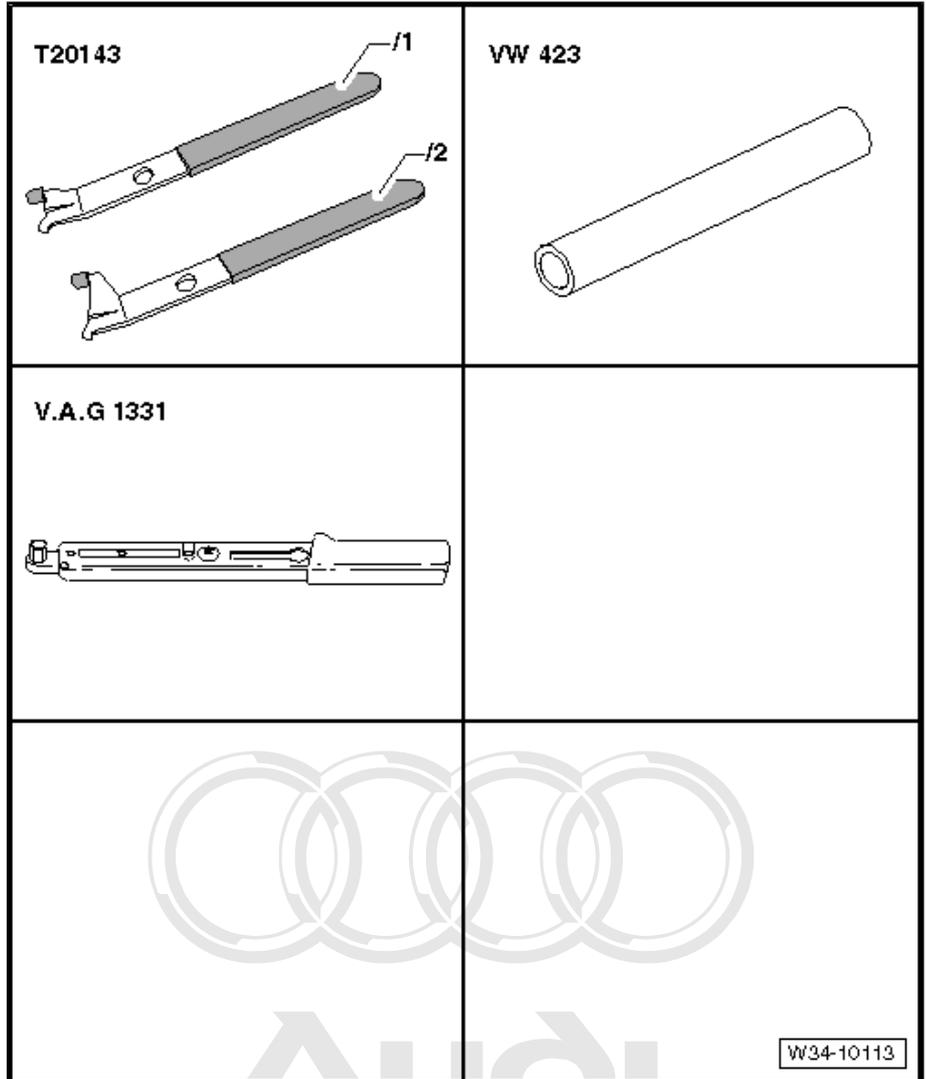
- ◆ Slide Hammer-Complete Set -VW 771-
- ◆ Locking Pin -30-505-
- ◆ Thrust Piece -T10233-
- ◆ Pulling Hook -T20143/1-
- ◆ -1- Internal Puller -Kukko 21/3-



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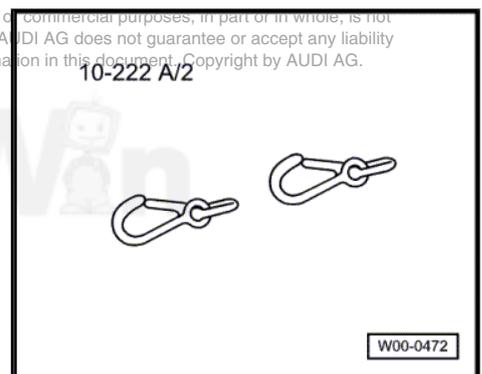


- ◆ Pulling Hook -T20143/2-
- ◆ Sleeve -VW 423-
- ◆ Torque Wrench 5-50 Nm - V.A.G 1331-

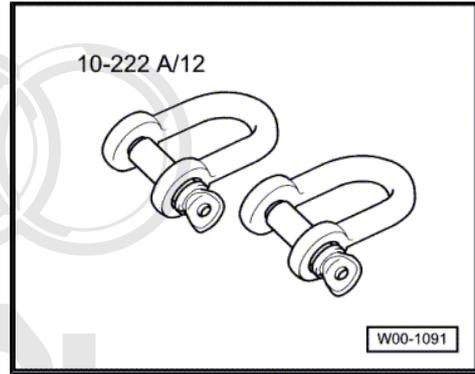


- ◆ Additional Hooks (2) -10-222A/2-

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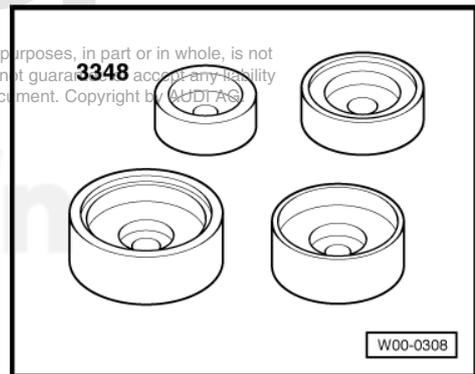


◆ Shackle (1 Set=2 Pieces) -10-222A/12-

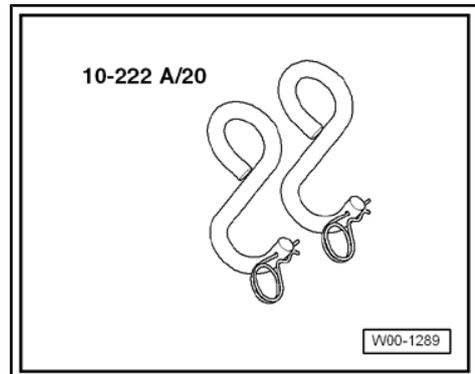


◆ Front and Rear Bearing Tool -3348/2-

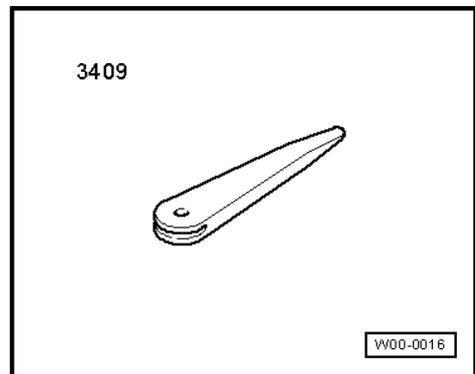
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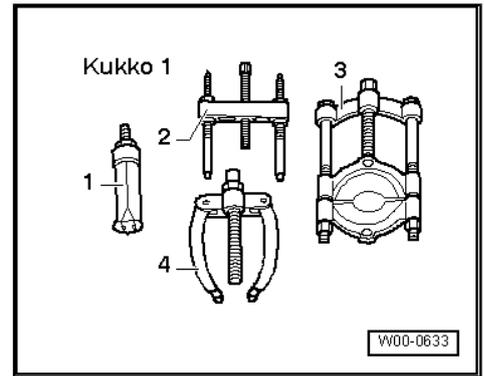
◆ Special Hook -10 - 222 A /20-



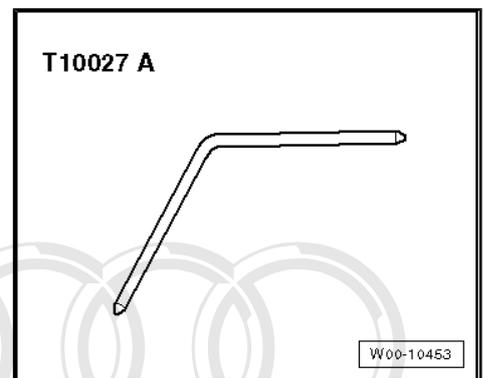
◆ Trim Removal Wedge -3409-



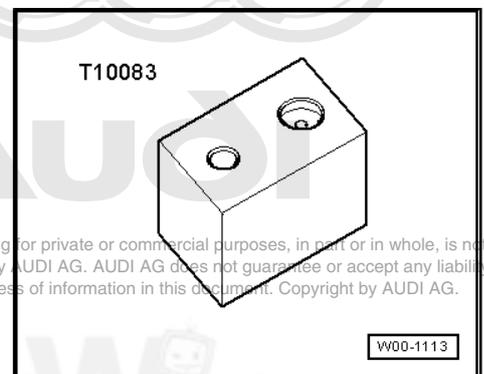
- ◆ -1- Internal Puller -Kukko 21/3-



- ◆ Thread adapter from Support -Kukko 22/1-
- ◆ -4- Counter-Support -Kukko 22/2-
- ◆ Connecting Pin -T10027 A-

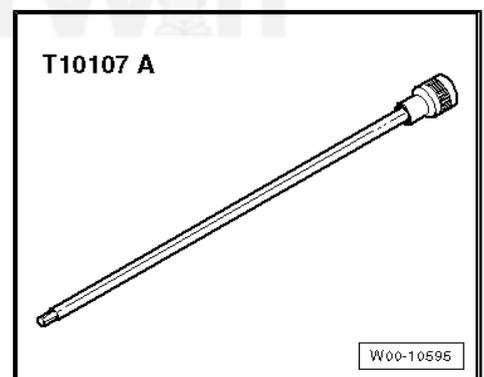


- ◆ Thrust Block -T10083-

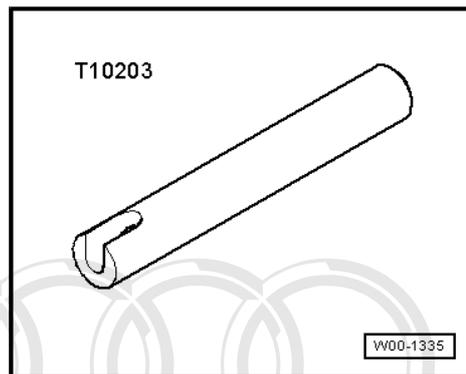


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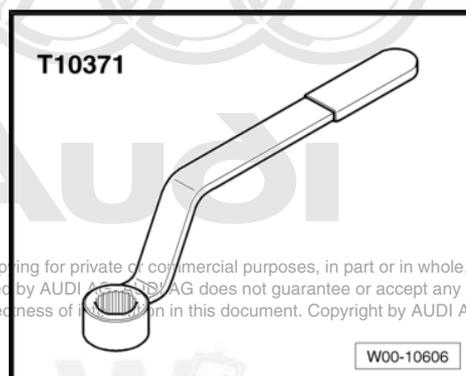
- ◆ Socket and Extended Bit -T10107 A-



◆ Thrust Piece -T10203-

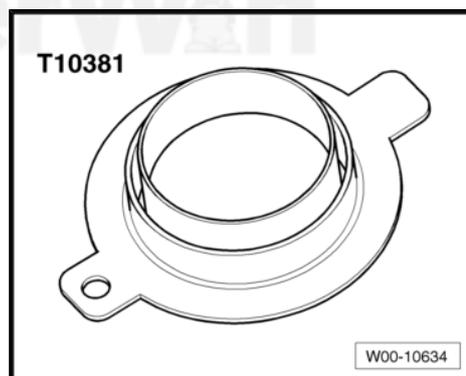


◆ Counter Hold Tool -T10371-

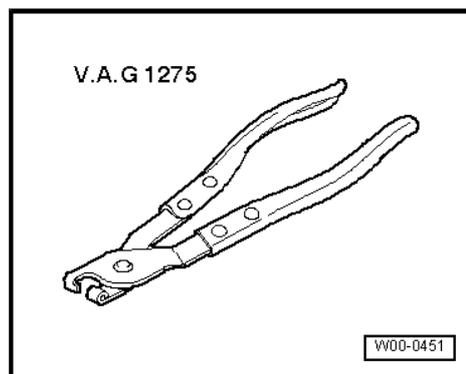


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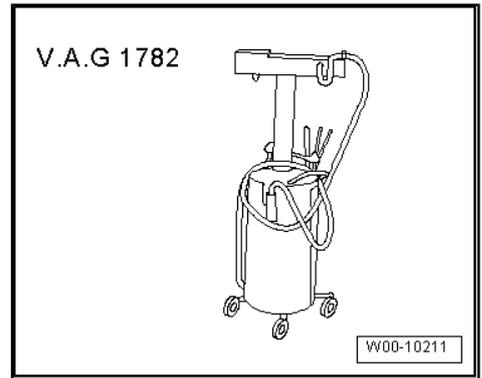
◆ Cover Cap -T10381-



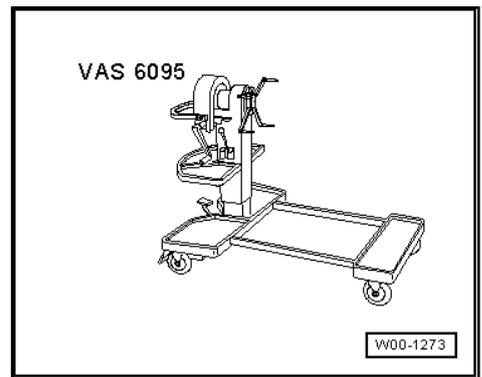
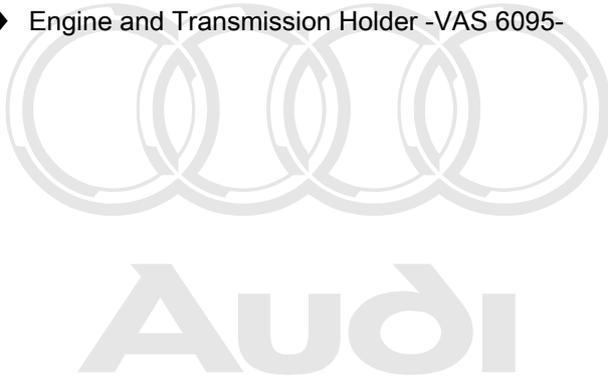
◆ Hose Clamp Pliers -V.A.G 1275-



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

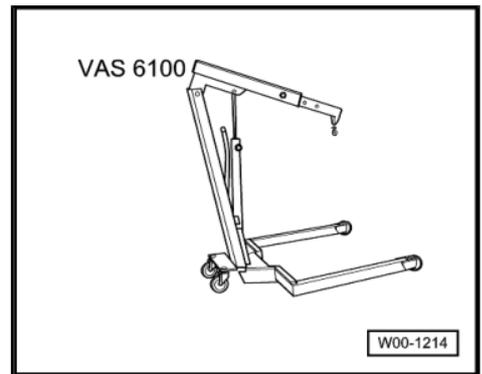


◆ Engine and Transmission Holder -VAS 6095-

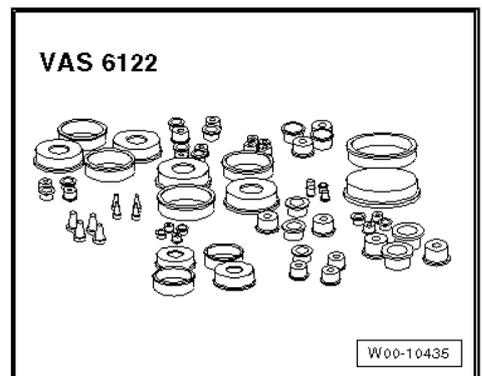


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◆ Shop Crane - Load Cap=700-1200kg -VAS 6100-

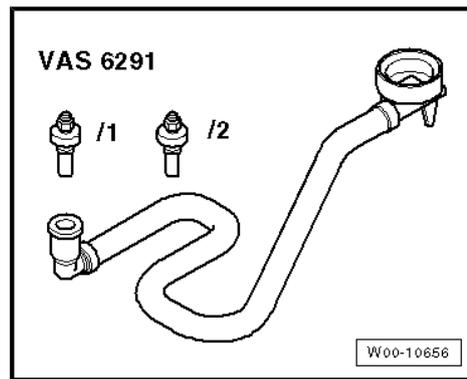


◆ Engine Bung Set -VAS 6122-





- ◆ Charging Device F/Haldex 2 Coup. -VAS 6291-



- ◆ Adapter -VAS 6291/2-
- ◆ Not illustrated:
- ◆ Hose Clamp Pliers -V.A.G 1275-
- ◆ Extractor Lever -VW 681-



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35 – Gears, Shafts

1 Description and Operation

⇒ "1.1 Input Shaft Overview", page 129

⇒ "1.2 1st and 2nd Gear Output Shaft Overview", page 130

⇒ "1.3 3rd and 4th Gear Output Shaft Assembly Overview", page 133

⇒ "1.4 Reverse Gear Output Shaft Overview", page 136

1.1 Input Shaft Overview

Input shaft, disassembling and assembling, refer to
⇒ "3.1 Input Shaft", page 140 .

Note

- ◆ Install all input shaft bearings with transmission fluid.
- ◆ Always replace the grooved ball bearing ⇒ Item 16 (page 130)

1 - Clutch Housing

2 - Cylindrical Roller Bearing

- Removing, refer to
⇒ Fig. "Remove the Seal and Remove the Roller Bearing from the Clutch Housing.", page 140
- Installing, refer to
⇒ Fig. "Pressing Cylindrical Roller Bearing into Clutch Housing.", page 140
- Replace together with the inner race/cylindrical roller bearing
⇒ Item 5 (page 129)

3 - Locking Ring

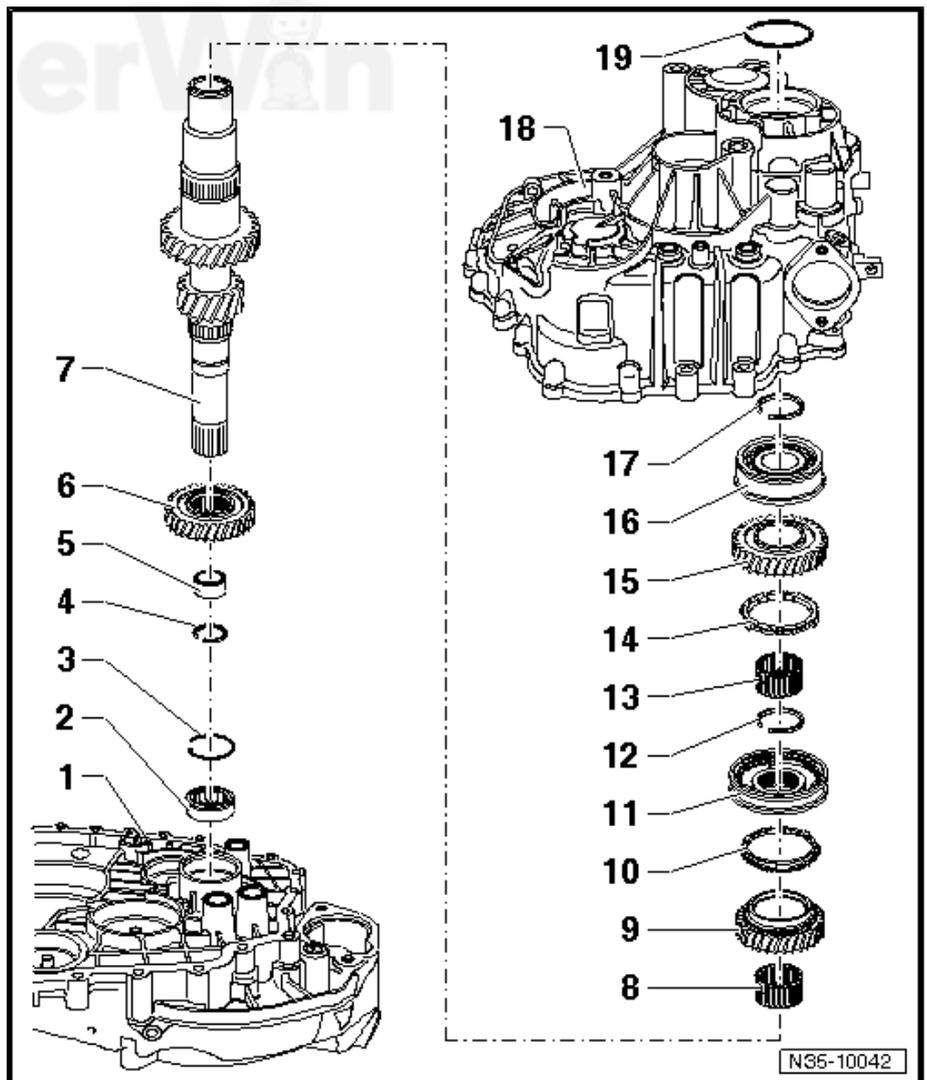
- Install in the circumferential groove in the clutch housing

4 - Locking Ring

- Secures the inner race/cylindrical roller bearing

5 - Inner Race/Roller Bearing

- Removing, refer to
⇒ Fig. "Remove the Roller Bearing Inner Race -D-", page 141
- Installing, refer to
⇒ Fig. "Removing the Roller Bearing Inner Race -A-", page 142
- Replace together with



the roller bearing
⇒ [Item 2 \(page 129\)](#)

6 - 4th Gear Wheel

- Removing, refer to ⇒ [Fig. "Removing 4th Gear Wheel.", page 141](#)
- Installing, refer to ⇒ [Fig. "Installing 4th Gear Wheel.", page 141](#)

7 - Input Shaft

8 - Needle Bearing

- For 5th gear

9 - 5th Gear Wheel

10 - 5th Gear Synchronizer Ring

- Checking for wear, refer to
⇒ [Fig. "Checking 5th Gear Synchronizer Ring and 6th Gear Synchronizer Ring for Wear.", page 142](#)

11 - Locking Collar with Synchronizer hub for 5th and 6th Gears

- After removing the circlip, remove the 5th gear wheel, refer to
⇒ [Fig. "Remove the 5th and 6th Gear Synchronizer Hub/Locking Collar with the 5th Gear Wheel.", page 142](#)
- Disassembling, refer to
⇒ [Fig. "Disassembling and Assembling Locking Collar and Synchronizer Hub for 5th and 6th Gears.", page 143](#)
- Assembling locking collar/synchronizer hub, refer to
⇒ [Fig. "Assembling Locking Collar/Synchronizer Hub for 5th and 6th Gears.", page 143](#)
- Installed position, refer to
⇒ [Fig. "Installation Position of Locking Collar/Synchronizer Hub for 5th and 6th Gear.", page 143](#)
- Installing, refer to
⇒ [Fig. "Pressing on Locking Collar/Synchronizer Hub for 5th and 6th Gears.", page 143](#)

12 - Locking Ring

13 - Needle Bearing

- For 6th gear

14 - Synchronizer Ring for 6th Gear

- Checking for wear, refer to
⇒ [Fig. "Checking 5th Gear Synchronizer Ring and 6th Gear Synchronizer Ring for Wear.", page 142](#)

15 - 6th Gear Wheel

16 - Grooved Ball Bearing

- Always replace
- After removing the circlip, remove the 6th gear wheel, refer to
⇒ [Fig. "Remove the Seal and Remove the Grooved Ball Bearing with the 6th Gear Wheel.", page 142](#)
- Installed position ⇒ [page 143](#)
- Installing, refer to ⇒ [Fig. "Installing the Grooved Ball Bearing.", page 144](#)

17 - Locking Ring

18 - Transmission Housing

19 - Locking Ring

- For grooved ball bearing/input shaft

1.2 1st and 2nd Gear Output Shaft Overview

1st and 2nd gear output shaft, disassembling and assembling,
refer to ⇒ ["3.2 1st and 2nd Gear Output Shaft", page 145](#) .

 **Note**

- ◆ *The output shaft is not available as a replacement part.*
- ◆ *When installing the tapered roller bearing, install new shims which have the same thickness as the previous shims.*

1 - Clutch Housing

2 - Oil Deflector Ring

3 - Adjusting Shim

- Pay attention to the thickness
- Will get damaged when being removed, replace

4 - Outer Race/Tapered Roller Bearing

- Removing, refer to ⇒ [Fig. "Removing the Outer Race/Tapered Roller Bearing from the Clutch Housing."](#), page 151
- Installing, refer to ⇒ [Fig. "Installing Outer Race/Tapered Roller Bearing into the Clutch Housing"](#), page 151

5 - Inner Race / Tapered Roller Bearing

- Removing, refer to ⇒ [Fig. "Removing the Inner Race/Tapered Roller Bearing in the Clutch Housing."](#), page 151
- Installing, refer to ⇒ [Fig. "Installing the Inner Race/Tapered Roller Bearing in the Clutch Housing."](#), page 151

6 - Dished Washer

- Removing, refer to ⇒ [Fig. "Remove the Dished Washer -C- from the Output Shaft"](#), page 145
- Installing, refer to ⇒ [Fig. "Install the Dished Washer -A- all the Way into the Output Shaft -B-."](#), page 146

7 - Output Shaft

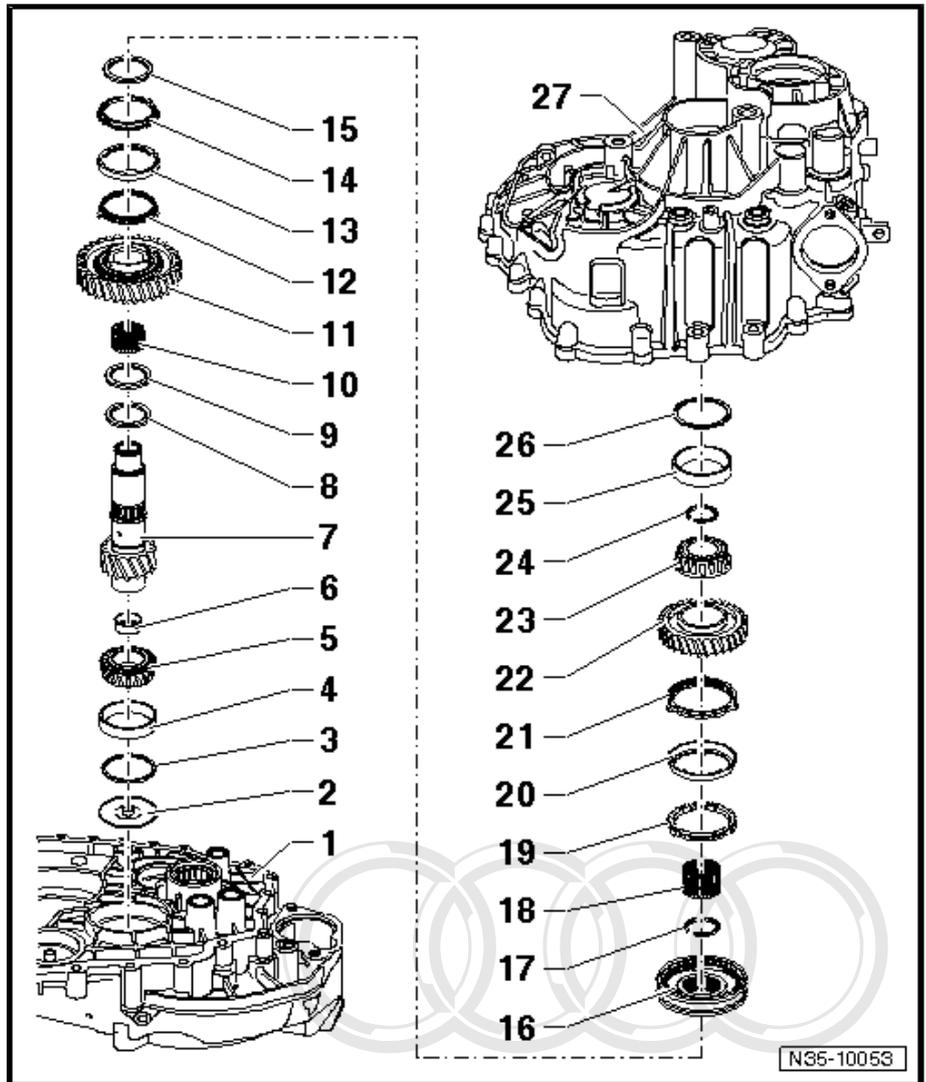
- For 1st and 2nd gear

8 - Thrust Washer

- For the needle bearing
- Remove from the output shaft, refer to ⇒ [Fig. "Removing the Axial Needle Bearing Thrust Washer -A-."](#), page 146
- Installing, refer to ⇒ [Fig. "Installing the Axial Needle Bearing Thrust Washer -A-."](#), page 147

9 - Axial Needle Bearing

- Installed position, refer to ⇒ [Fig. "Installation Position Axial Needle Bearing."](#), page 147



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10 - Needle Bearing

- For 1st gear

11 - 1st Gear Wheel

- With intermediate gear for reverse gear on the opposite side

12 - Synchronizer Ring

- (Inner race for 1st gear)
- Checking for wear, refer to
⇒ [Fig. "Checking Inner Race for 1st Gear and 2nd Gear for Wear.", page 147](#)
- Check for scoring
- Installed position, refer to
⇒ [Fig. "Installed Position of Outer Race, Inner Race and Synchronizer Ring, 1st Gear", page 148](#)

13 - 1st Gear Outer Race

- Replace if there are grooves or scoring
- Installed position, refer to
⇒ [Fig. "Installed Position of Outer Race, Inner Race and Synchronizer Ring, 1st Gear", page 148](#)
- Install on the synchronizer ring ⇒ [Item 12 \(page 132\)](#)

14 - 1st Gear Synchronizer Ring

- Checking for wear, refer to
⇒ [Fig. "Checking 1st Gear and 2nd Gear Synchronizing Rings for Wear", page 147](#)
- Installed position, refer to
⇒ [Fig. "Installed Position of Outer Race, Inner Race and Synchronizer Ring, 1st Gear", page 148](#)

15 - Axial Needle Bearing

- Installed position, refer to ⇒ [Fig. "Installation Position Axial Needle Bearing", page 147](#)

16 - Locking Collar with Synchronizer Hub for 1st and 2nd Gears

- After removing the circlip, remove with the 1st gear wheel, refer to ⇒ [Item 17 \(page 132\)](#),
⇒ [Fig. "Removing the 1st and 2nd Gear Locking Collar/Synchronizer Hub Together with the 1st Gear Wheel.", page 146](#)
- Disassembling, refer to
⇒ [Fig. "Disassembling and Assembling Locking Collar and Synchronizer Hub for 1st and 2nd Gear.", page 148](#).
- Assembling locking collar/synchronizer hub, refer to
⇒ [Fig. "Disassembling and Assembling Locking Collar and Synchronizer Hub for 1st and 2nd Gear.", page 148](#)
- Installed position, refer to
⇒ [Fig. "Installation Position of Locking Collar/Synchronizer Hub for 1st and 2nd Gear.", page 149](#)
- Installing, refer to
⇒ [Fig. "Pressing on Locking Collar/Synchronizer Hub for 1st Gear and 2nd Gear and Installing the Circlip.", page 149](#)

17 - Locking Ring**18 - Needle Bearing**

- For 2nd gear

19 - 2nd Gear Synchronizer Ring

- Checking for wear, refer to
⇒ [Fig. "Checking 1st Gear and 2nd Gear Synchronizing Rings for Wear", page 147](#)
- Insert it so that the holes engage into engagement pieces of locking collar ⇒ [Item 16 \(page 132\)](#)

20 - 2nd Gear Outer Race

- Replace if there are grooves or scoring
- Installed position, refer to ⇒ [Fig. "Installation Position, 2nd Gear Outer Race.", page 149](#)
- Insert into synchronizer ring ⇒ [Item 19 \(page 132\)](#).

21 - Synchronizer Ring

- (Inner race for 2nd gear)
- Check for scoring

- Checking for wear, refer to
 ⇒ [Fig. "Checking Inner Race for 1st Gear and 2nd Gear for Wear.", page 147](#)
- Installed position, refer to
 ⇒ [Fig. "Installed Position: Synchronizer Ring -A- \(2nd gear inner race\)", page 149](#)

22 - 2nd Gear Wheel

- Installed position, refer to ⇒ [Fig. "Installation Position, 2nd Gear Wheel", page 150](#)

23 - Inner Race / Tapered Roller Bearing

- Removing with the 2nd gear wheel, refer to
 ⇒ [Fig. "Remove the Inner Race/Tapered Roller Bearing with the 2nd Gear Wheel.", page 146](#)
- Installing, refer to
 ⇒ [Fig. "Installing the Inner Race/Tapered Roller Bearing in the Transmission Housing and Mounting the Circlip.", page 150](#)

24 - Locking Ring

25 - Outer Race/Tapered Roller Bearing

- Removing, refer to
 ⇒ [Fig. "Removing the Outer Race/Tapered Roller Bearing from the Transmission Housing.", page 150](#)
- Installing, refer to
 ⇒ [Fig. "Installing the Outer Race/Tapered Roller Bearing into the Transmission Housing.", page 150](#)

26 - Adjusting Shim

- Pay attention to the thickness
- Will get damaged when being removed, replace

27 - Transmission Housing

1.3 3rd and 4th Gear Output Shaft Assembly Overview

1st and 2nd gear output shaft, disassembling and assembling, refer to ⇒ ["3.3 3rd and 4th Gear Output Shaft", page 152](#).



Note

- ◆ *The output shaft is not available as a replacement part.*
- ◆ *When installing the tapered roller bearing, install new shims which have the same thickness as the previous shims.*

1 - Clutch Housing

2 - Adjusting Shim

- Pay attention to the thickness
- Will get damaged when being removed, replace

3 - Outer Race/Tapered Roller Bearing

- Removing, refer to [⇒ Fig. "Removing the Outer Race/Tapered Roller Bearing from the Clutch Housing.", page 158](#)
- Installing, refer to [⇒ Fig. "Installing the Outer Race/Tapered Roller Bearing in the Clutch Housing", page 158](#)

4 - Inner Race / Tapered Roller Bearing

- Removing, refer to [⇒ Fig. "Removing the Inner Race/Tapered Roller Bearing in the Clutch Housing.", page 157](#)
- Installing, refer to [⇒ Fig. "Installing the Inner Race/Tapered Roller Bearing in the Clutch Housing.", page 157](#)

5 - Output Shaft

- For 3rd and 4th gear

6 - Needle Bearing

- For 4th gear

7 - 4th Gear Wheel

8 - Synchronizer Ring

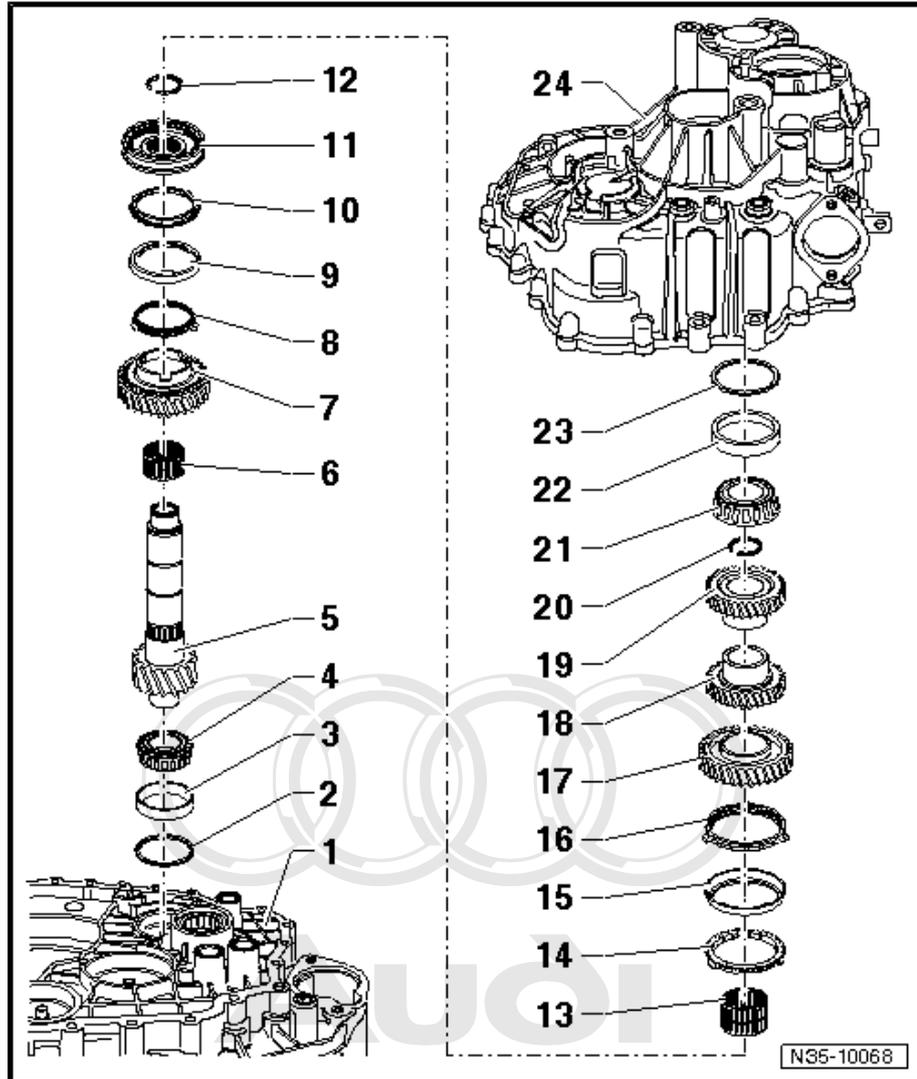
- (Inner race for 4th gear)
- Checking for wear, refer to [⇒ Fig. "Checking Inner Race for 3rd Gear and 4th Gear for Wear.", page 153](#)
- Check for scoring
- Installed position, refer to [⇒ Fig. "Installation Position of Outer Race, Inner Race and Synchronizer Ring, 4th Gear", page 154](#)

9 - Outer Race for 4th Gear

- Replace if there are grooves or scoring
- Installed position, refer to [⇒ Fig. "Installation Position of Outer Race, Inner Race and Synchronizer Ring, 4th Gear", page 154](#)
- Install on the synchronizer ring [⇒ Item 8 \(page 134\)](#)

10 - 4th Gear Synchronizer Ring

- Checking for wear, refer to [⇒ Fig. "Checking 3rd Gear and 4th Gear Synchronizing Rings for Wear", page 153](#)
- Installed position, refer to [⇒ Fig. "Installation Position of Outer Race, Inner Race and Synchronizer Ring, 4th Gear", page 154](#)



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11 - Locking Sleeve with Synchronizer Hub for 3rd and 4th Gears

- After removing circlip ⇒ [Item 12 \(page 135\)](#) , remove with the 4th gear wheel
 ⇒ [Fig. "Removing the 3rd and 4 Gear Locking Collar/Synchronizer Hub Together with the 4th Gear Wheel." , page 153](#)
- Disassembling and Assembling, refer to
 ⇒ [Fig. "Disassembling and Assembling Locking Collar and Synchronizer Hub for 3rd and 4th Gear." , page 154](#)
- Assembling locking collar/synchronizer hub, refer to
 ⇒ [Fig. "Assembling Locking Collar/Synchronizer Hub for 3rd and 4th Gears." , page 154](#)
- Installed position, refer to
 ⇒ [Fig. "Installation Position of Locking Collar/Synchronizer Hub for 3rd and 4th Gear." , page 155](#)
- Installing, refer to
 ⇒ [Fig. "Pressing on Locking Collar/Synchronizer Hub for 3rd and 4th Gears." , page 155](#)

12 - Locking Ring

13 - Needle Bearing

- For 3rd gear

14 - 3rd Gear Synchronizer Ring

- Checking for wear, refer to
 ⇒ [Fig. "Checking 3rd Gear and 4th Gear Synchronizing Rings for Wear" , page 153](#)
- Insert it so that the holes engage into engagement pieces of locking collar ⇒ [Item 11 \(page 134\)](#)

15 - 3rd Gear Outer Race

- Replace if there are grooves or scoring
- Installed position, refer to ⇒ [Fig. "Installation Position, 3rd Gear Outer Race." , page 155](#)
- Insert into synchronizer ring ⇒ [Item 14 \(page 135\)](#) .

16 - Synchronizer Ring

- (3rd gear inner race)
- Installed position, refer to
 ⇒ [Fig. "Installed Position: Synchronizer Ring -A- \(3rd gear inner race\)" , page 155](#)
- Checking for wear, refer to
 ⇒ [Fig. "Checking Inner Race for 3rd Gear and 4th Gear for Wear." , page 153](#)
- Check for scoring

17 - 3rd Gear Wheel

- Installed position, refer to ⇒ [Fig. "Installation Position, 3rd Gear Wheel" , page 156](#)

18 - 5th Gear Wheel

- Removing with the 3rd gear wheel, refer to
 ⇒ [Fig. "Removing the 5th Gear Wheel and the 3rd Gear Wheel." , page 153](#)
- Installing, refer to ⇒ [Fig. "Installing the 5th Gear Wheel." , page 156](#)

19 - 6th Gear Wheel

- Removing, refer to ⇒ [Fig. "Removing the 6th Gear Wheel." , page 152](#)
- Installing, refer to ⇒ [Fig. "Installing the 6th Gear Wheel." , page 156](#)

20 - Locking Ring

21 - Inner Race / Tapered Roller Bearing

- Removing, refer to
 ⇒ [Fig. "Removing the Inner Race/Tapered Roller Bearing in the Transmission Housing." , page 152](#)
- Installing, refer to
 ⇒ [Fig. "Installing the Inner Race/Tapered Roller Bearing in the Transmission Housing." , page 156](#)

22 - Outer Race/Tapered Roller Bearing

- Removing, refer to
 ⇒ [Fig. "Removing the Outer Race/Tapered Roller Bearing from the Transmission Housing." , page 157](#)
- Installing, refer to
 ⇒ [Fig. "Installing the Outer Race/Tapered Roller Bearing into the Transmission Housing." , page 157](#)

23 - Adjusting Shim

- Pay attention to the thickness
- Will get damaged when being removed, replace

24 - Transmission Housing

1.4 Reverse Gear Output Shaft Overview

Reverse gear output shaft, disassembling and assembling, refer to ⇒ [“3.4 Reverse Gear Output Shaft”, page 159](#) .



Note

- ◆ *The output shaft is not available as a replacement part.*
- ◆ *When installing the tapered roller bearing, install new shims which have the same thickness as the previous shims.*

1 - Clutch Housing

2 - Oil Deflector Ring

3 - Adjusting Shim

- Pay attention to the thickness
- Will get damaged when being removed, replace

4 - Outer Race/Tapered Roller Bearing

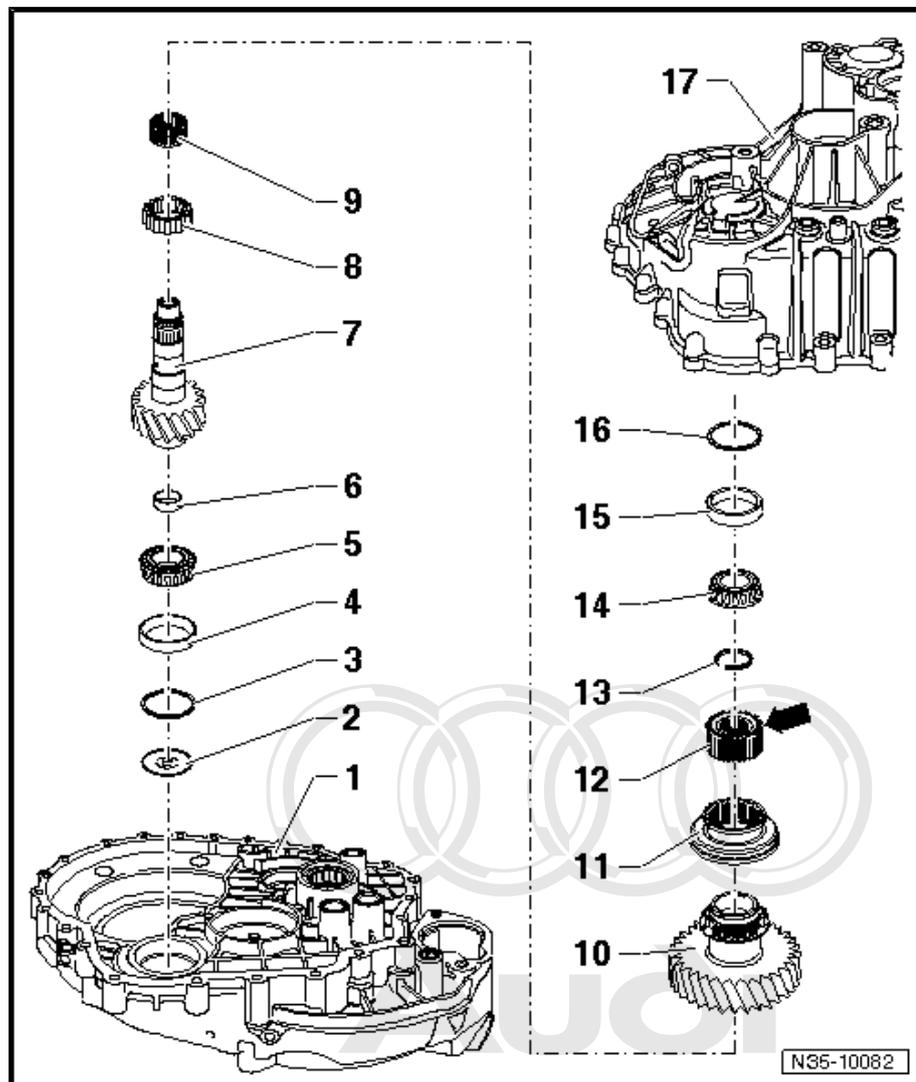
- Removing, refer to ⇒ [Fig. “Removing the Outer Race/Tapered Roller Bearing from the Clutch Housing.”, page 161](#)
- Installing, refer to ⇒ [Fig. “Installing Outer Race/Tapered Roller Bearing into the Clutch Housing.”, page 161](#)

5 - Inner Race / Tapered Roller Bearing

- Removing, refer to ⇒ [Fig. “Removing the Inner Race/Tapered Roller Bearing in the Clutch Housing.”, page 161](#)
- Installing, refer to ⇒ [Fig. “Installing the Inner Race/Tapered Roller Bearing in the Clutch Housing.”, page 161](#)

6 - Dished Washer

- Removing, refer to ⇒ [Fig. “Remove the Dished Washer -C- from the Output Shaft” , page 159](#)
- Installing, refer to ⇒ [Fig. “Install the Dished Washer -A- All the Way into the Output Shaft -B-.”, page 160](#)



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7 - Output Shaft

- For reverse gear
- Bearing for drive gear for reverse gear wheel as a plain bearing, or with a roller bearing
 ⇒ [Item 8 \(page 137\)](#) and needle bearing ⇒ [Item 9 \(page 137\)](#)
- Difference, refer to ⇒ [Fig. "The Different Bearings for the Reverse Gear Wheel", page 138](#)

8 - Roller Bearing

- For reverse gear wheel
- Not available on all transmissions, then plain bearing for reverse gear wheel ⇒ [Item 10 \(page 137\)](#)

9 - Needle Bearing

- For reverse gear wheel
- Not available on all transmissions, then plain bearing for reverse gear wheel ⇒ [Item 10 \(page 137\)](#)

10 - Reverse Gear Wheel

- Different internal diameters for plain bearing, the roller bearing ⇒ [Item 8 \(page 137\)](#) and the needle bearing ⇒ [Item 9 \(page 137\)](#)
- Stop ring and spring, removing and installing, refer to
 ⇒ ["2.1 Reverse Gear Wheel Stop Ring and Spring", page 139](#)

11 - Reverse Gear Locking Collar

- With synchronizer ring

12 - Reverse Gear Synchronizer Hub

- After removing the circlip, refer to ⇒ [Item 13 \(page 137\)](#) press off with reverse gear wheel
 ⇒ [Fig. "Removing the Synchronizer Hub/Reverse Gear and the Reverse Gear Wheel.", page 160](#)
- Installed position: The stop -arrow- for the reverse gear slide locking collar faces the circlip.
- Installing, refer to ⇒ [Fig. "Pressing on Synchronizer Hub for Reverse Gear.", page 160](#)

13 - Locking Ring

14 - Inner Race / Tapered Roller Bearing

- Removing, refer to
 ⇒ [Fig. "Removing the Inner Race/Tapered Roller Bearing in the Transmission Housing.", page 160](#)
- Installing, refer to
 ⇒ [Fig. "Installing the Inner Race/Tapered Roller Bearing in the Transmission Housing.", page 162](#)

15 - Outer Race/Tapered Roller Bearing

- Removing, refer to
 ⇒ [Fig. "Removing the outer Race/Tapered Roller Bearing from the Transmission Housing.", page 162](#)
- Installing, refer to
 ⇒ [Fig. "Installing the Outer Race/Tapered Roller Bearing into the Transmission Housing.", page 162](#)

16 - Adjusting Shim

- Pay attention to the thickness
- Will get damaged when being removed, replace

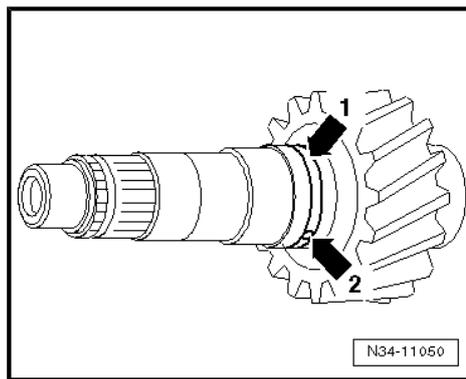
17 - Transmission Housing

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The Different Bearings for the Reverse Gear Wheel

Reverse Gear Wheel Bearings	
Plain bearing	Groove all the way around -arrow 1- near the hole -arrow 2-
Roller bearing and needle bearing	No groove all the way around -arrow 1- near the hole -arrow 2-



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2 Removal and Installation

⇒ "2.1 Reverse Gear Wheel Stop Ring and Spring", page 139

2.1 Reverse Gear Wheel Stop Ring and Spring

Special tools and workshop equipment required

- ◆ Thrust Plate -VW 401-
- ◆ Thrust Disc -VW 412-
- ◆ Carrier Bearing Inst. Tool -3350-

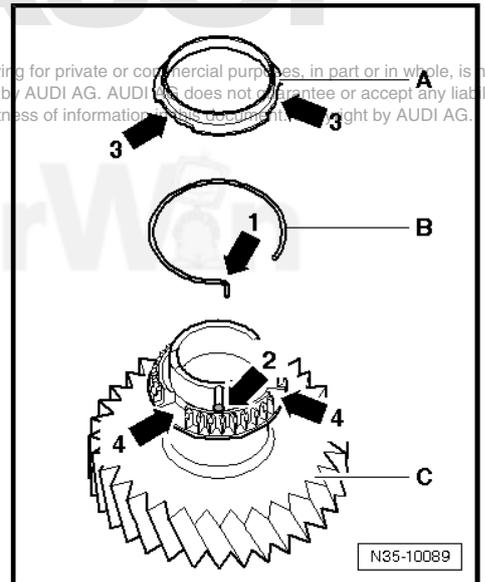
Removing

- Remove the stop ring -A- from the reverse gear wheel -C- using a drift.

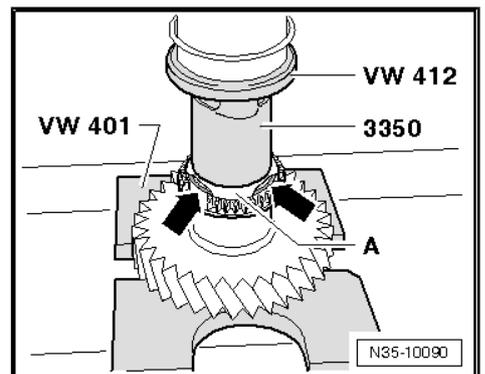
When doing this, secure the spring -B- from jumping away.

Installing

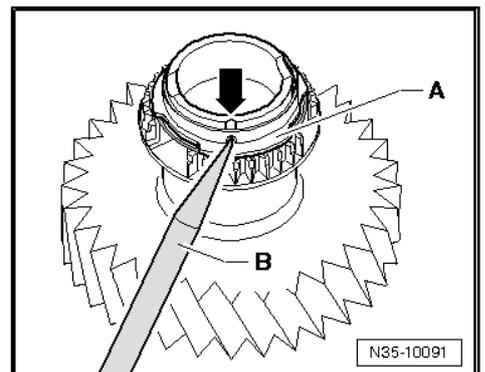
- First install the spring -B- in the gear wheel -C-.
- The bent end of spring -arrow 1- must be hooked into hole -arrow 2- of the gear wheel.
- Then install the stop ring -A- on the gear wheel.
- The recesses in the stop rings -arrows 3- and in the gear wheel - 4- must align with each other.



- Carefully install the stop ring -A- onto the gear wheel. Hold the spring -arrows- compressed when doing this.



- Then secure the stop ring -A- on the gear wheel with a blunt center punch -B-.
- When doing this, place the center punch in the groove -arrow- in the gear wheel.



3 Disassembly and Assembly

⇒ "3.1 Input Shaft", page 140

⇒ "3.2 1st and 2nd Gear Output Shaft", page 145

⇒ "3.3 3rd and 4th Gear Output Shaft", page 152

⇒ "3.4 Reverse Gear Output Shaft", page 159

3.1 Input Shaft

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-
- ◆ Thrust Tube -VW 454-
- ◆ Thrust Tube -VW 455-
- ◆ Sleeve -VW 519-
- ◆ Press Tube -2040-
- ◆ Thrust Pad -3074-
- ◆ -1- Internal Puller 37 to 46 mm , for example -Kukko 21/6-
- ◆ -2- Puller , for example -Kukko 18/1-
- ◆ -3- Separating Tool 22 to 75 mm , for example, -Kukko 17/1-
- ◆ -3- Separating Tool 22 to 115 mm , for example, -Kukko 17/2-
- ◆ -4- Counter-Support , for example -Kukko 22/2-
- ◆ Feeler gauge

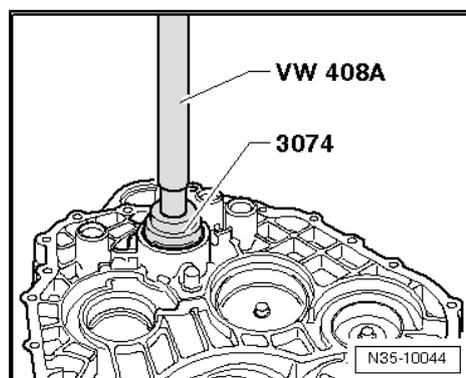
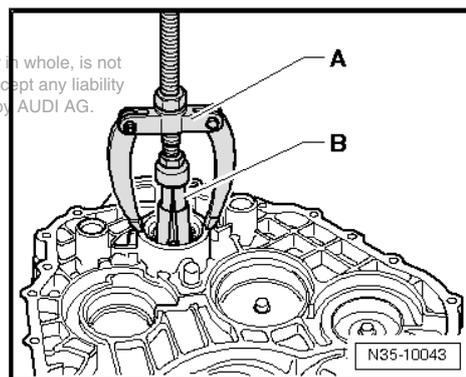
Remove the Seal and Remove the Roller Bearing from the Clutch Housing.

A - For example counter-support -Kukko 22/2-

B - For example internal puller 37 to 46 mm -Kukko 21/6-

Pressing Cylindrical Roller Bearing into Clutch Housing.

- Install the cylindrical roller bearing seal.
- Remove the cylindrical roller bearing seal.

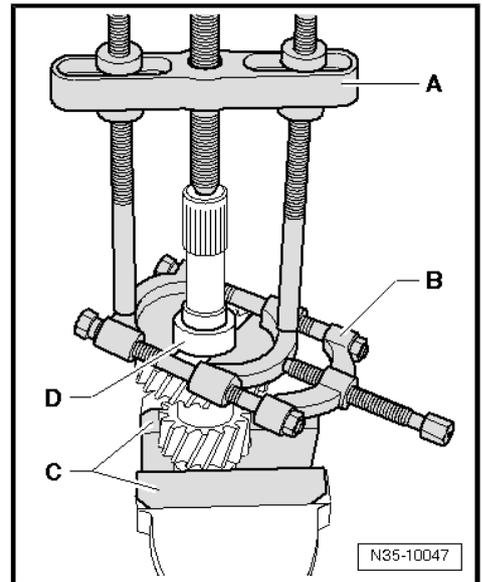


Remove the Roller Bearing Inner Race -D-

- Clamp the input shaft in a vise. Use jaw protectors -C-.
- A - Puller , for example, -Kukko 18/1-
- B - Separating tool 12 to 75 mm , for example, -Kukko 17/1-

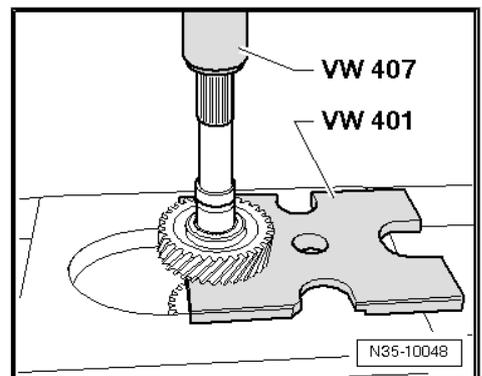
i Note

The cylindrical roller bearing inner race can also be removed with the 4th gear wheel. Refer to [⇒ Fig. "Removing 4th Gear Wheel.", page 141](#)

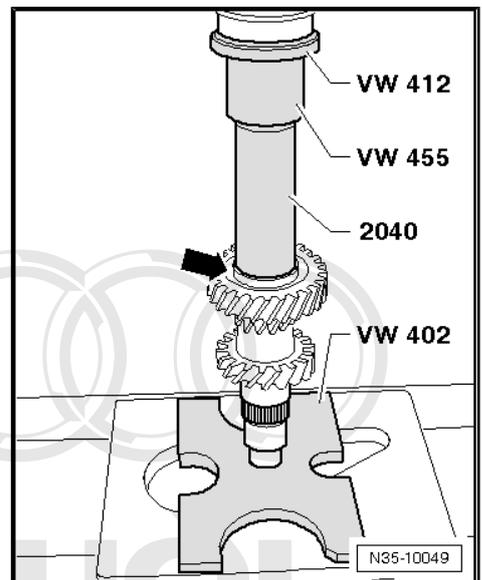


Removing 4th Gear Wheel.

- 4th gear wheel installation position: the high inner collar -arrow- faces the pressing tool.



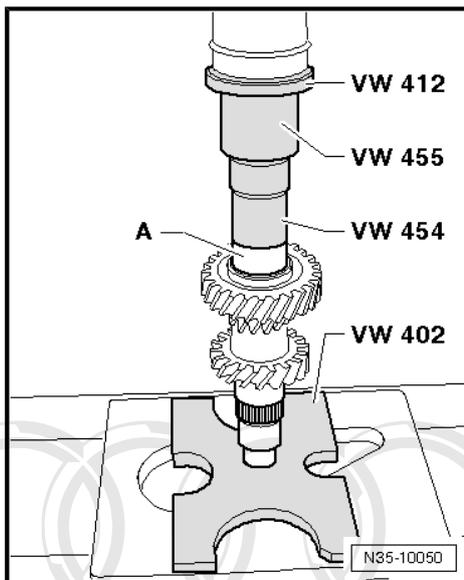
Installing 4th Gear Wheel.



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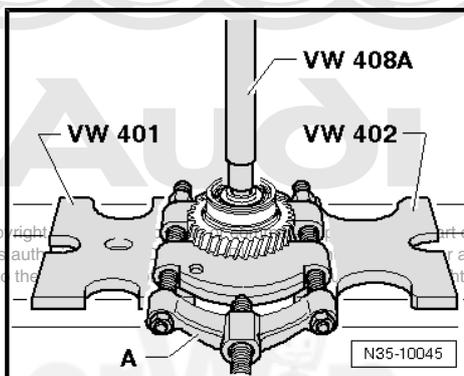
Removing the Roller Bearing Inner Race -A-

- Install the locking ring.



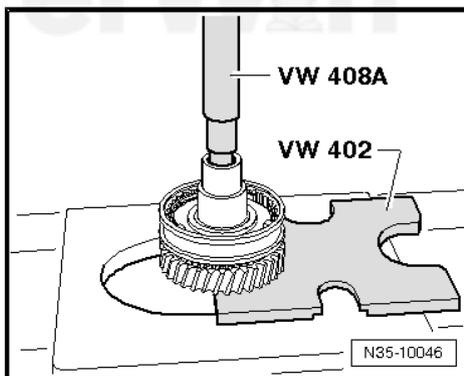
Remove the Seal and Remove the Grooved Ball Bearing with the 6th Gear Wheel.

- A - For example separating tool 22 to 115 mm -Kukko 17/2-
- Remove the locking ring.



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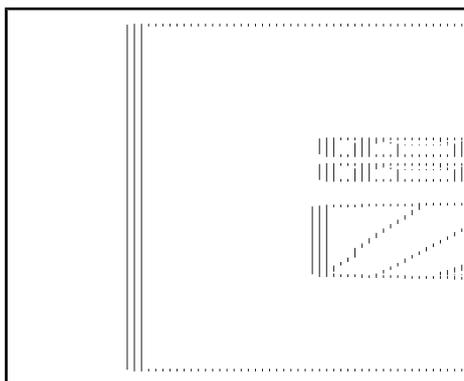
Remove the 5th and 6th Gear Synchronizer Hub/Locking Collar with the 5th Gear Wheel.



Checking 5th Gear Synchronizer Ring and 6th Gear Synchronizer Ring for Wear.

- Press the synchronizer ring onto the taper of the gear wheel and measure the gap dimension -a- with a feeler gauge.

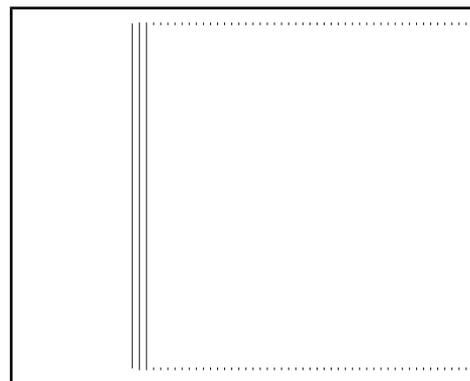
Gap Dimension -a-	Installed Dimension	Wear Limit
5th and 6th gear	1.0 to 1.9 mm	0.5 mm



Disassembling and Assembling Locking Collar and Synchronizer Hub for 5th and 6th Gears.

- 1 - Spring
 - 2 - Locking piece
 - 3 - Locking collar
 - 4 - Synchronizer hub
- Slide the locking collar over the synchronizer hub.

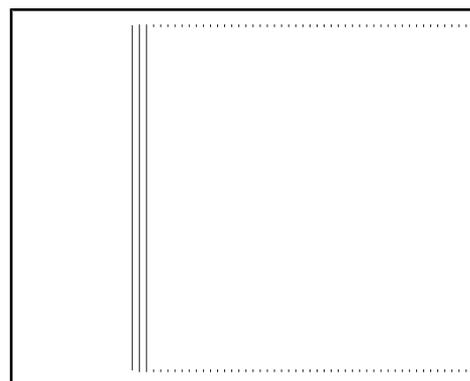
The notches for the locking pieces on the synchronizer hub and locking collar must line up with each other.



Assembling Locking Collar/Synchronizer Hub for 5th and 6th Gears.

The locking collar is pushed over the synchronizer hub.

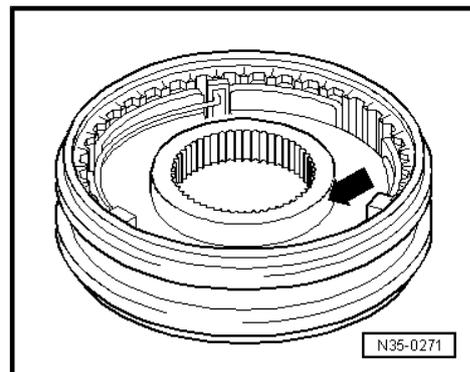
- Install the locking pieces and springs offset by 120°. The angled end of the spring must engage into the hollow locking piece.



Installation Position of Locking Collar/Synchronizer Hub for 5th and 6th Gear.

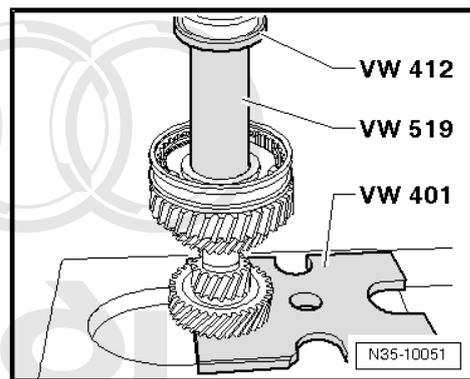
The high inner collar of the synchronizer hub -arrow- points to 5th gear.

- Install the needle bearing.
- Install 5th gear wheel and synchronizer ring.



Pressing on Locking Collar/Synchronizer Hub for 5th and 6th Gears.

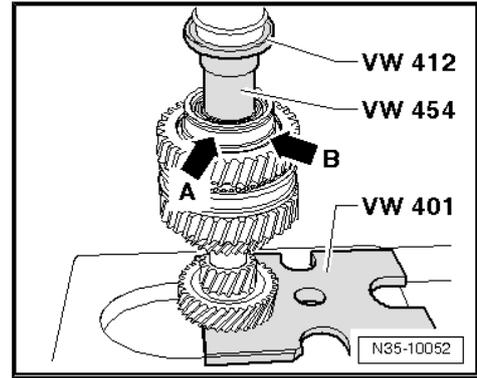
- Install the locking ring.
- Install the needle bearing.
- Install the 6th gear wheel and synchronizer ring.
- Grooved ball bearing installation position: the groove for the seal points upward -arrow A- and the shoulder -arrow B- must point to the 6th gear wheel.



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Installing the Grooved Ball Bearing.



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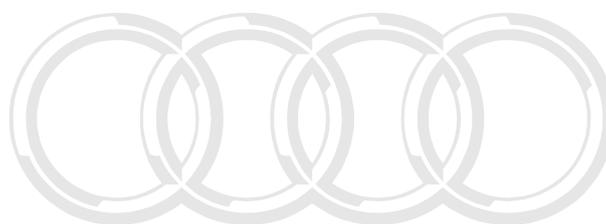
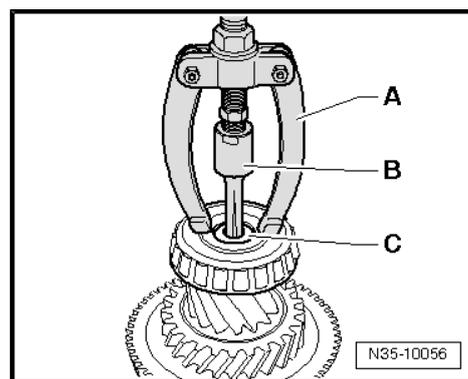
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3.2 1st and 2nd Gear Output Shaft

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-
- ◆ Arbor 50 mm Dia. -VW 432-
- ◆ Thrust Pad -VW 447 i-
- ◆ Tube 42 mm Dia. -VW 516-
- ◆ Thrust Pad -30 - 205-
- ◆ Thrust Piece -40 - 105-
- ◆ Thrust Plate -2050-
- ◆ Thrust Pad -3062-
- ◆ Press Support -3118-
- ◆ Thrust Piece -3401-
- ◆ Internal Puller 14.5 to 18.5 mm , for example -Kukko 21/2-
- ◆ Internal Puller 46 to 58 mm , for example -Kukko 21/7-
- ◆ Internal Puller 56 to 110 mm , for example -Kukko 21/89-
- ◆ Separating Tool 22 to 115 mm , for example -Kukko 17/2-
- ◆ Counter-Support , for example -Kukko 22/1-
- ◆ Counter-Support , for example -Kukko 22/2-
- ◆ Counter-Support , for example -Kukko 22/4-
- ◆ Two-Arm Puller , for example -Kukko 20/10-
- ◆ Thrust Piece -T10266-
- ◆ Feeler gauge



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Remove the Dished Washer -C- from the Output Shaft

A - Counter-support , for example, -Kukko 22/1-

B - Internal puller 14.5 to 18.5 mm , for example, -Kukko 21/2-



Note

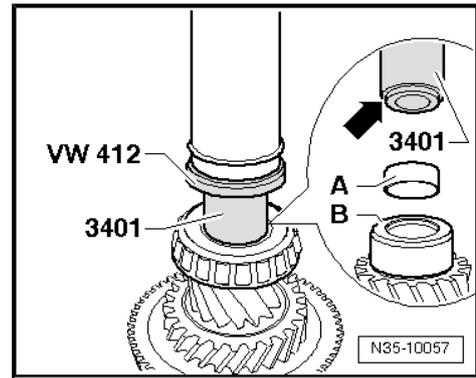
If the internal puller comes out of the hole in the dished washer, then use the next larger internal puller.

Install the Dished Washer -A- all the Way into the Output Shaft -B-.

- Mount the -3401- with the shoulder -arrow- on the dished washer -A-.

Press-in depth for the dished washer is approximately 2.20 mm.

- Remove the locking ring.

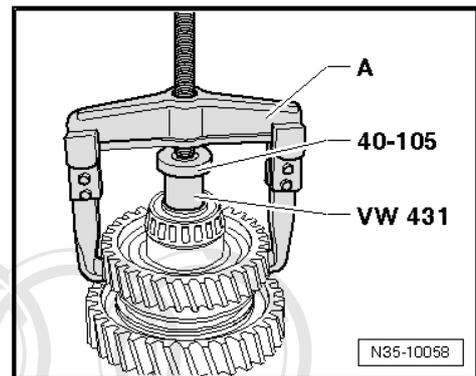


Remove the Inner Race/Tapered Roller Bearing with the 2nd Gear Wheel.

- Switch the locking collar 1st / 2nd gear to 1st gear.
- Attach the pulling hooks under the splines (not selector splines) for the 2nd gear wheel.

A - For example two-arm puller -Kukko 20/10-

- Remove the locking ring.



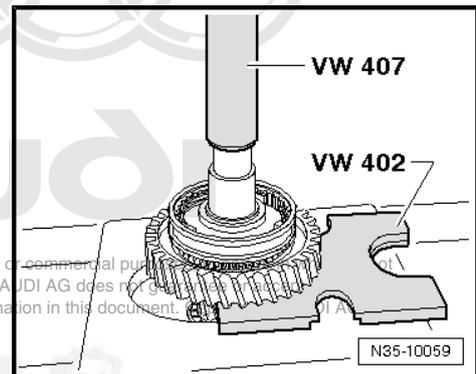
Removing the 1st and 2nd Gear Locking Collar/Synchronizer Hub Together with the 1st Gear Wheel.



Note

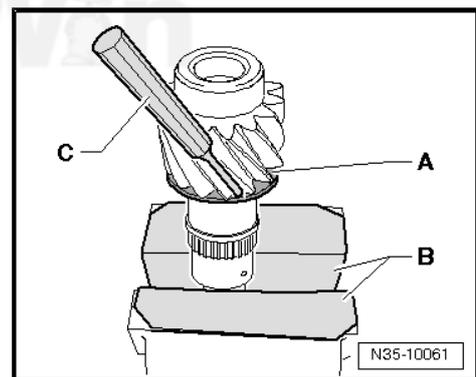
Due to the fit between the synchronizer hub and the output shaft, these components can be removed by hand on some transmissions.

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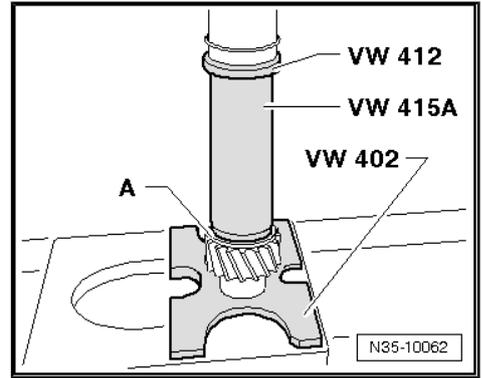


Removing the Axial Needle Bearing Thrust Washer -A-.

- Clamp the output shaft in a vise. Use jaw protectors -B-.
- Remove the thrust washer alternating between sides from the output shaft using a drift -C- being careful not to damage the splines.

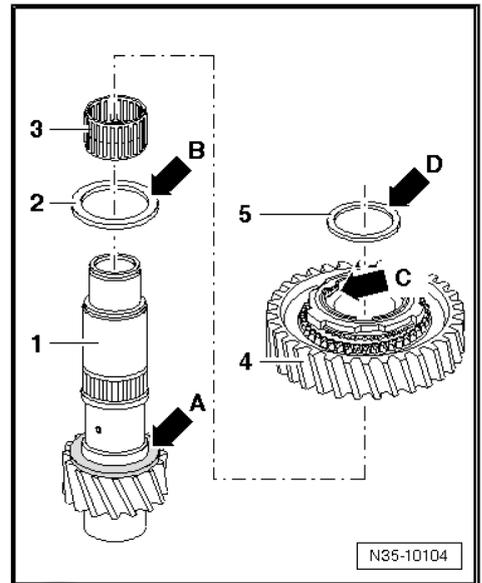


Installing the Axial Needle Bearing Thrust Washer -A-



Installation Position Axial Needle Bearing.

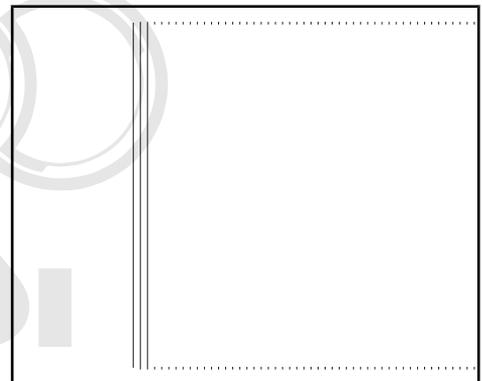
- Place the larger axial needle bearing -2- on the output shaft thrust washer -1-.
- The needles must point upward toward the thrust washer -arrow A- and the flat side -arrow B-.
- Install the needle bearing -3- and 1st gear wheel -4-.
- Install the smaller axial needle bearing -5- on the 1st gear wheel.
- The needles must point upward toward the gear wheel -arrow C- and the flat side -arrow D-.



Checking Inner Race for 1st Gear and 2nd Gear for Wear.

- Press the inner race onto the taper on the gear wheel and measure the gap dimension -a- with a feeler gauge.

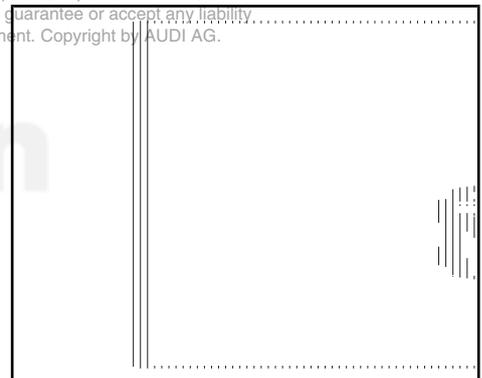
Gap Dimension -a-	Installed Dimension	Wear Limit
1st and 2nd gear	0.75 to 1.25 mm	0.3 mm



Checking 1st Gear and 2nd Gear Synchronizing Rings for Wear

- Install the synchronizer ring, outer race and inner race onto taper of selector gear and then measure the gap dimension -a- with a feeler gauge.

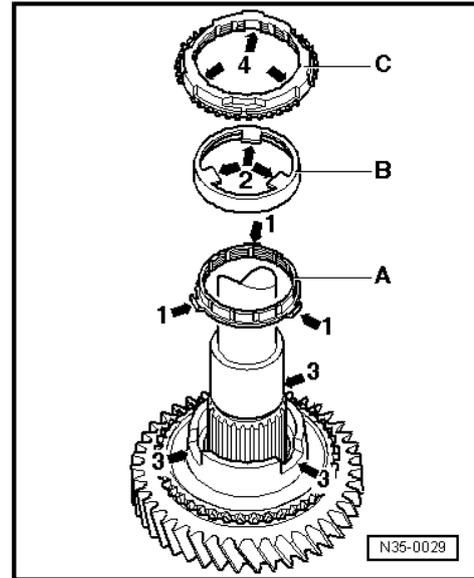
Gap Dimension -a-	Installed Dimension	Wear Limit
1st and 2nd gear	1.0 to 1.8 mm	0.5 mm



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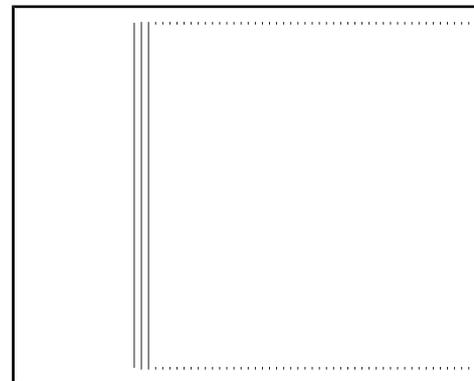
Installed Position of Outer Race, Inner Race and Synchronizer Ring, 1st Gear

- Install the inner race -A- on the 1st gear wheel.
- The angled tabs -arrows 1- face the outer race -B-.
- Install the outer race -B-.
- The tabs -arrows 2- must lock into the retainers -arrows 3- in the gear wheel.
- Install the synchronizer ring -C-.
- The retainers -arrows 4- lock in the braces -arrows 1- on the inner race -A-.
- Mount the smaller axial needle bearing (outer diameter: 58.7 mm) -5- on the 1st gear wheel
 => [Fig. "Installation Position Axial Needle Bearing.", page 147](#).



Disassembling and Assembling Locking Collar and Synchronizer Hub for 1st and 2nd Gear.

- Remove the springs -1- for disassembling.
- 1 - Spring
- 2 - Locking piece
- 3 - Locking collar installed position, refer to
 => [Fig. "Installation Position of Locking Collar/Synchronizer Hub for 1st and 2nd Gear.", page 149](#)
- 4 - Synchronizer hub installed position, refer to
 => [Fig. "Installation Position of Locking Collar/Synchronizer Hub for 1st and 2nd Gear.", page 149](#)
- Slide the locking collar over the synchronizer hub.
- Installed position: The narrow recesses in the synchronizer hub align with the recesses in the locking collar.

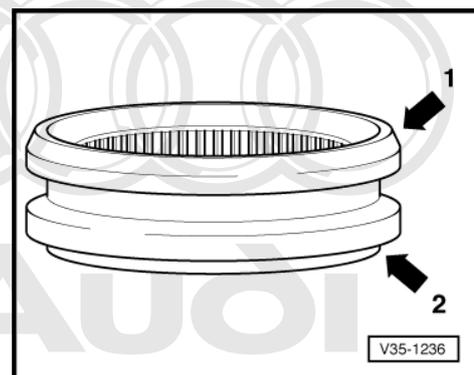


Locking Collar Installed Position

The chamfer -arrow 1- faces the lower inner collar of synchronizer hub

The shoulder -arrow 2- faces the higher collar on the synchronizer hub

- The locking collar is pushed over the synchronizer hub.
- Install the locking pieces and springs offset by 120°.
- The angled end of the spring must engage into the hollow locking piece.

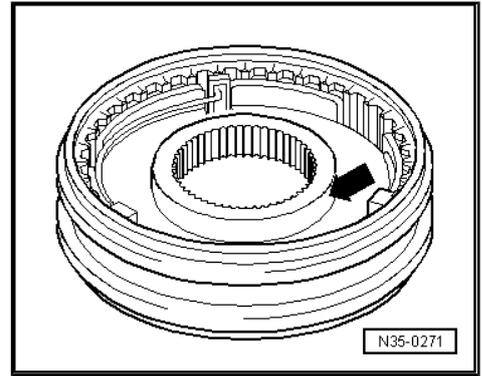


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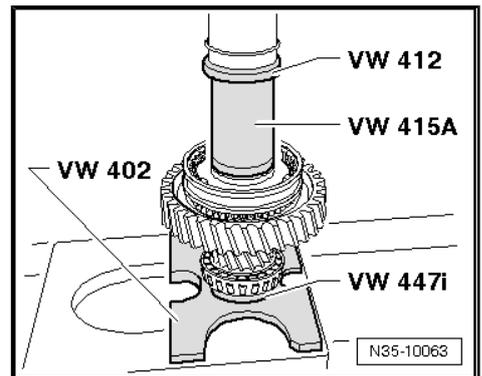
Installation Position of Locking Collar/Synchronizer Hub for 1st and 2nd Gear.

The high inner collar of synchronizer hub -arrow- faces the 2nd gear wheel.



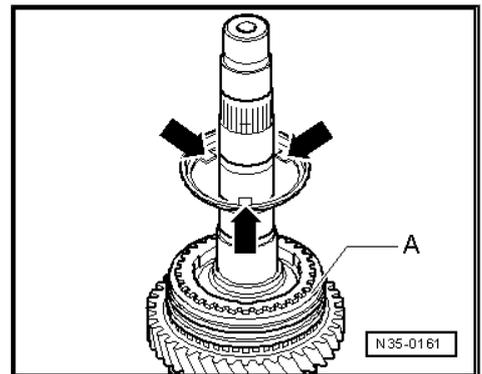
Pressing on Locking Collar/Synchronizer Hub for 1st Gear and 2nd Gear and Installing the Circlip.

Insert the 2nd gear synchronizer ring so that cut-outs engage in engagement pieces of locking collar => [Item 16 \(page 132\)](#) .



Installation Position, 2nd Gear Outer Race.

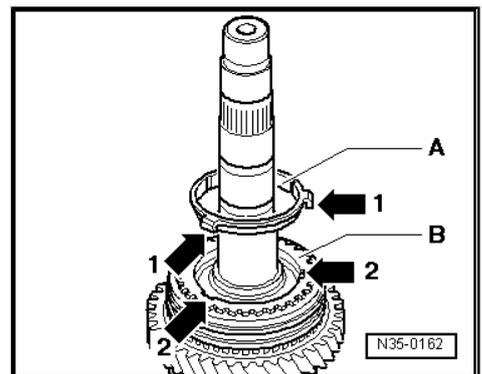
The tabs -arrows- face the synchronizer hub/locking collar -A-.



Installed Position: Synchronizer Ring -A- (2nd gear inner race)

The tabs -arrows 1- engage into the holes -arrows 2- inside the synchronizer ring -B-.

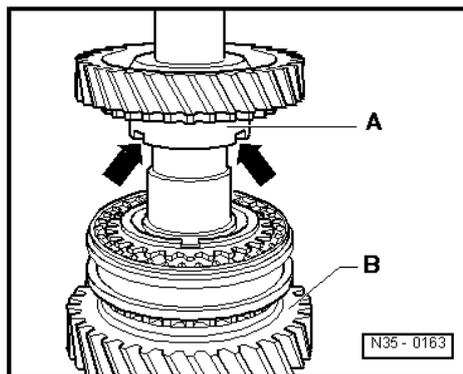
- Install the needle bearing for the 2nd gear wheel



Installation Position, 2nd Gear Wheel

The higher collar -A- faces toward 1st gear -B-. The notches in the collar -arrows- lock into the tabs on the outer race. Refer to => Fig. "Installation Position, 2nd Gear Outer Race.", page 149

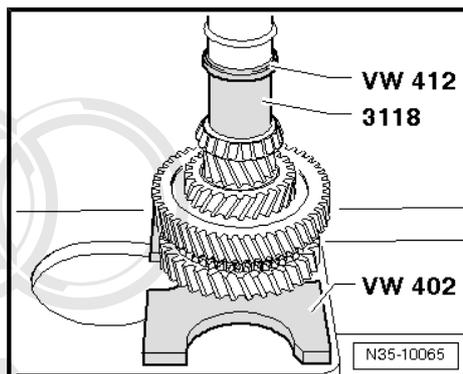
- Install the inner race/tapered roller bearing in the clutch housing. Refer to => Fig. "Installing the Inner Race/Tapered Roller Bearing in the Clutch Housing.", page 151



Installing the Inner Race/Tapered Roller Bearing in the Transmission Housing and Mounting the Circlip.

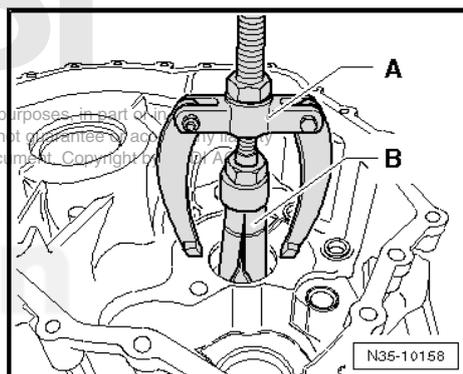
Note

Inner race/tapered roller bearing in transmission housing, removing. Refer to => Fig. "Remove the Inner Race/Tapered Roller Bearing with the 2nd Gear Wheel.", page 146



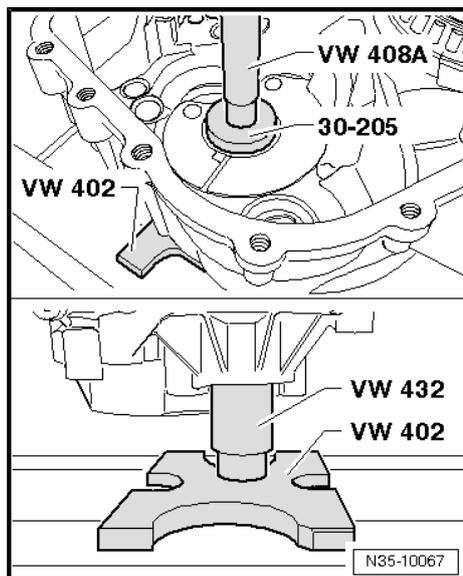
Removing the Outer Race/Tapered Roller Bearing from the Transmission Housing.

- A - Counter-support, for example, -Kukko 22/2-
- B - Internal puller 46 to 58 mm, for example, -Kukko 21/7-
- After removing, install the new shim with the former size under the outer race.



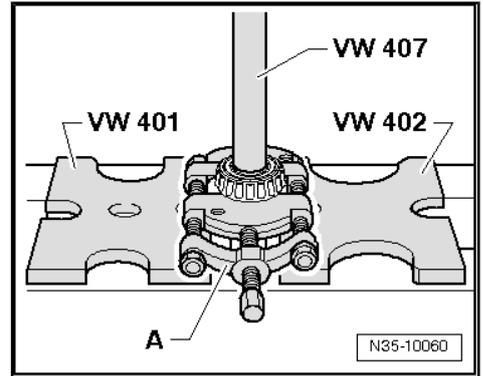
Installing the Outer Race/Tapered Roller Bearing into the Transmission Housing.

- Support the transmission housing under the bearing mount using the -VW 432-.



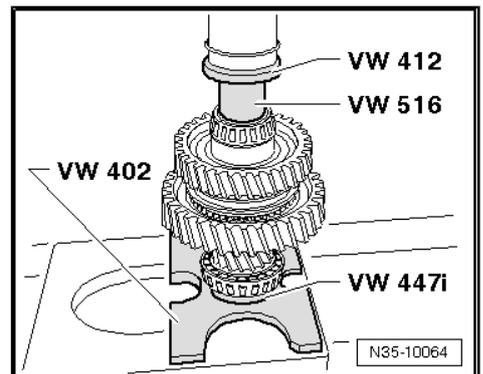
Removing the Inner Race/Tapered Roller Bearing in the Clutch Housing.

A - Separating tool 22 to 115 mm , for example, -Kukko 17/2-



Installing the Inner Race/Tapered Roller Bearing in the Clutch Housing.

- Install the locking ring.



Removing the Outer Race/Tapered Roller Bearing from the Clutch Housing.

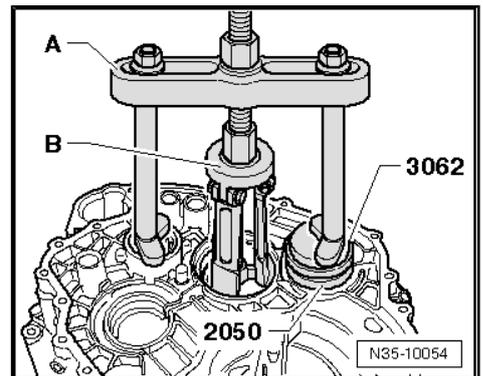
A - Counter-support , for example, -Kukko 22/4-

B - Internal puller 56 to 110 mm , for example, -Kukko 21/89-

Note

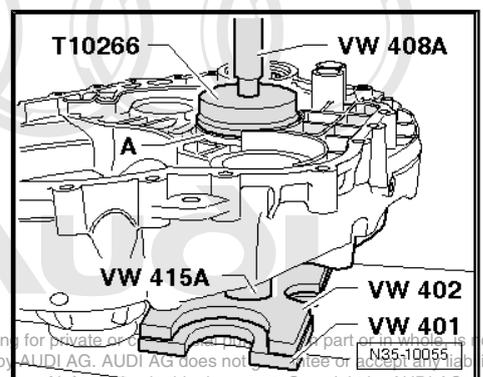
- ◆ *To be able to mount the internal puller -B- the oil deflector collar must be changed using a drift. Replace the damaged oil deflector ring.*
- ◆ *After removing, replace the damaged shim.*

- Install the new oil deflector
- Install the new shim with the former size under the outer race.



Installing Outer Race/Tapered Roller Bearing into the Clutch Housing

- Support the clutch housing with the -VW 415 A- directly under the bearing mount.



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3.3 3rd and 4th Gear Output Shaft

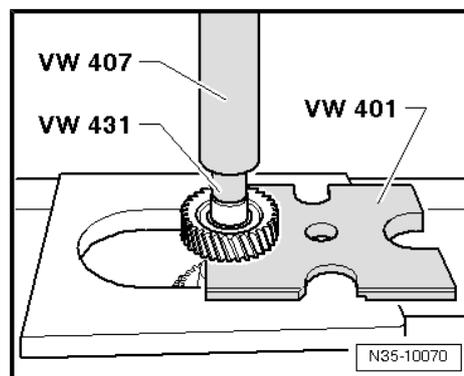
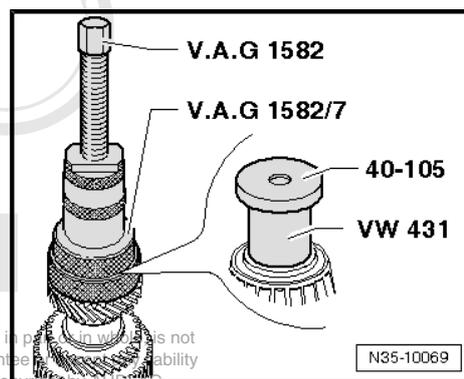
Special tools and workshop equipment required

- ◆ Thrust Plate -VW 401-
- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 407-
- ◆ Thrust Disc -VW 412-
- ◆ Tube 60 mm Dia. -VW 415 A-
- ◆ Thrust Pad 16.5/28 mm Dia. -VW 431-
- ◆ Thrust Pad Con. 8/65 -VW 433-
- ◆ Thrust Tube -VW 454-
- ◆ Support Channels -VW 457-
- ◆ Thrust Pad -VW 510-
- ◆ Sleeve -VW 519-
- ◆ Holding Fixture -VW 801-
- ◆ Thrust Pad -30 - 11-
- ◆ Thrust Piece -40 - 105-
- ◆ Press Support -3118-
- ◆ Tapered Roller Bearing Puller -V.A.G 1582-
- ◆ Attachment to VAG1582 -V.A.G 1582/4-
- ◆ Grip -V.A.G 1582/7-
- ◆ Internal Puller 46 to 58 mm , for example -Kukko 21/7-
- ◆ Internal Puller 56 to 70 mm , for example -Kukko 21/8-
- ◆ Counter-Support , for example -Kukko 22/2-
- ◆ Feeler gauge

Removing the Inner Race/Tapered Roller Bearing in the Transmission Housing.

- Mount the -VW 431- in the output shaft and lay the -40-105- on top of it before installing the puller.
- Remove the locking ring.

Removing the 6th Gear Wheel.



Removing the 5th Gear Wheel and the 3rd Gear Wheel.

- Place the tools under the 3rd gear wheel so that no other components can get damaged during removal.



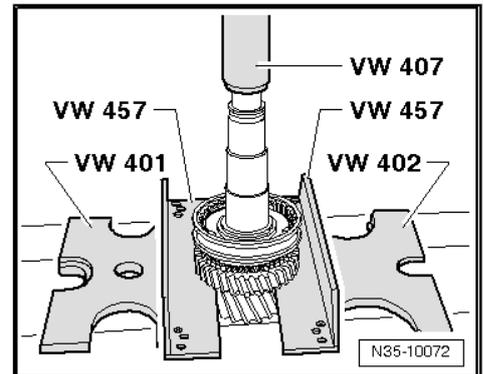
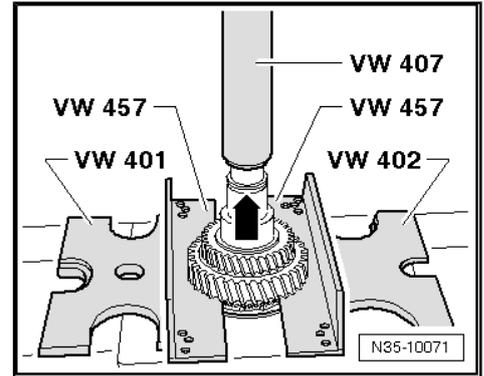
Note

When removing, if the 5th gear wheel is just in front of the -arrow-, then secure the output shaft from falling down.

- Remove the locking ring.

Removing the 3rd and 4 Gear Locking Collar/Synchronizer Hub Together with the 4th Gear Wheel.

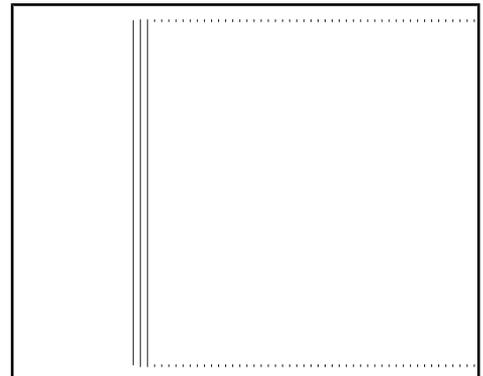
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Checking Inner Race for 3rd Gear and 4th Gear for Wear.

- Press the inner race onto taper on the gear wheel and measure the gap dimension -a- with a feeler gauge.

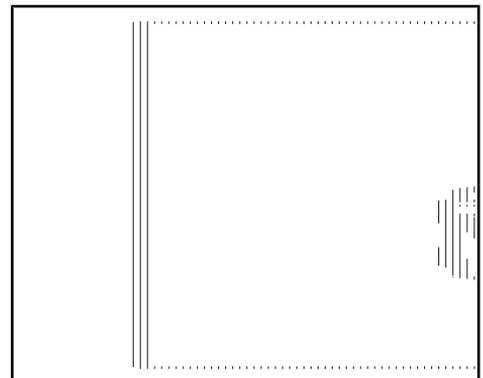
Gap Dimension -a-	Installed Dimension	Wear Limit
3rd and 4th gear	0.75 to 1.25 mm	0.3 mm



Checking 3rd Gear and 4th Gear Synchronizing Rings for Wear

- Install the synchronizer ring, outer race and inner race onto taper of selector gear and then measure the gap dimension -a- with a feeler gauge.

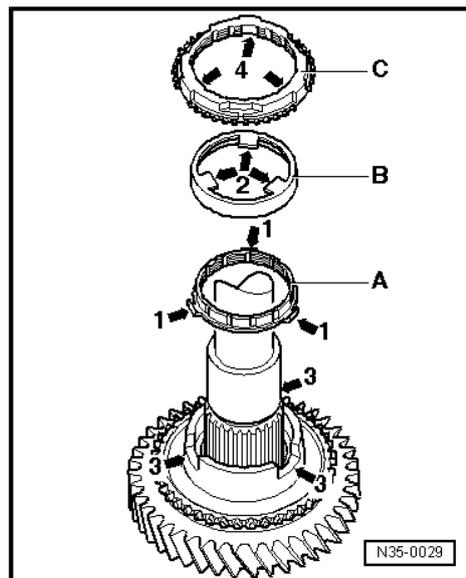
Gap Dimension -a-	Installed Dimension	Wear Limit
3rd gear	1.0 to 1.8 mm	0.5 mm
4th gear	1.0 to 1.9 mm	0.5 mm



- Install the 4th gear wheel with needle bearing.

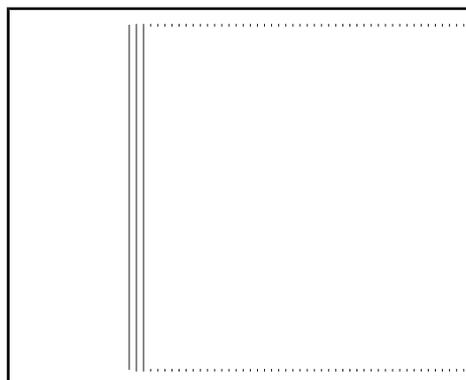
Installation Position of Outer Race, Inner Race and Synchronizer Ring, 4th Gear

- Install the inner race -A- on the 4th gear wheel.
- The angled tabs -arrows 1- face the outer race -B-.
- Install the outer race -B-.
- The tabs -arrows 2- must lock into the retainers -arrows 3- in the gear wheel.
- Install the synchronizer ring -C-.
- The retainers -arrows 4- lock in the braces -arrows 1- on the inner race -A-.



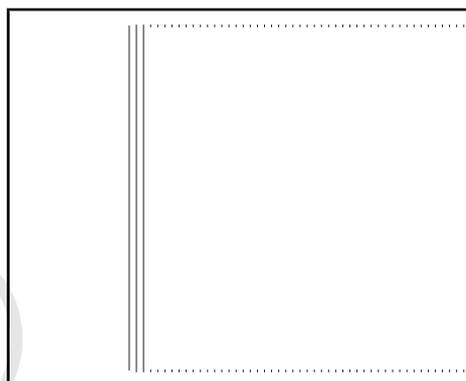
Disassembling and Assembling Locking Collar and Synchronizer Hub for 3rd and 4th Gear.

- Remove the springs -1- for disassembling.
- 1 - Spring
- 2 - Locking piece
- 3 - Locking collar
- 4 - Synchronizer hub installed position, refer to [⇒ Fig. "Installation Position of Locking Collar/Synchronizer Hub for 3rd and 4th Gear." , page 155](#)
- Slide the locking collar over the synchronizer hub.
- Installed position: The narrow recesses in the synchronizer hub align with the recesses in the locking collar.



Assembling Locking Collar/Synchronizer Hub for 3rd and 4th Gears.

- The locking collar is pushed over the synchronizer hub.
- Install the locking pieces and springs offset by 120°.
- The angled end of the spring must engage into the hollow locking piece.



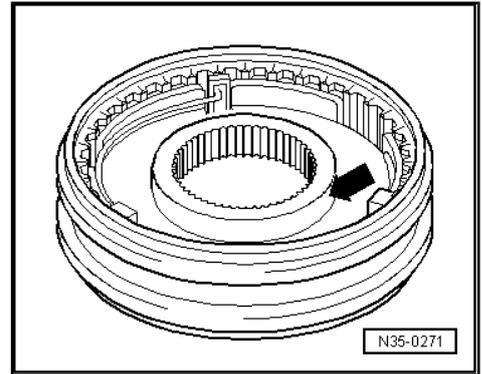
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Installation Position of Locking Collar/Synchronizer Hub for 3rd and 4th Gear.

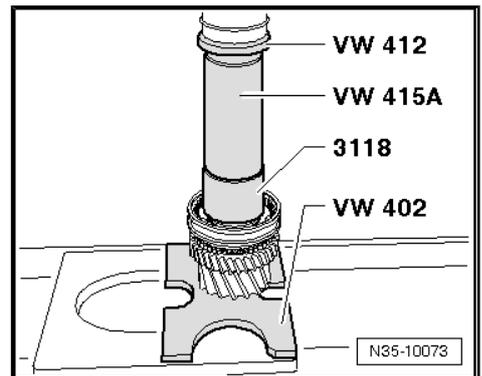
The taller collar of synchronizer hub -arrow- faces 4th gear.

- The 4th gear wheel is mounted on the shaft with the needle bearing and the synchronizer rings.



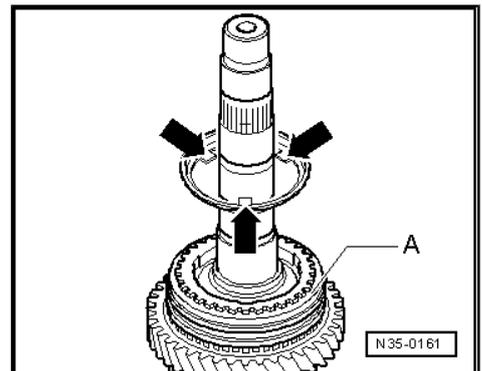
Pressing on Locking Collar/Synchronizer Hub for 3rd and 4th Gears.

- Install the locking ring.



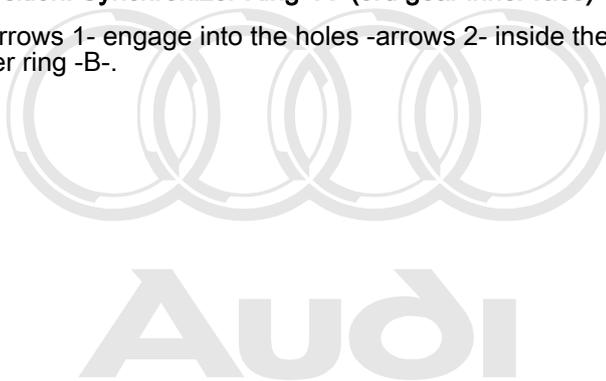
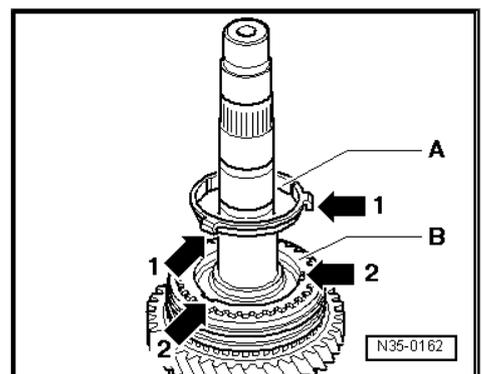
Installation Position, 3rd Gear Outer Race.

The tabs -arrows- face the synchronizer hub/locking collar -A-.



Installed Position: Synchronizer Ring -A- (3rd gear inner race)

The tabs -arrows 1- engage into the holes -arrows 2- inside the synchronizer ring -B-.



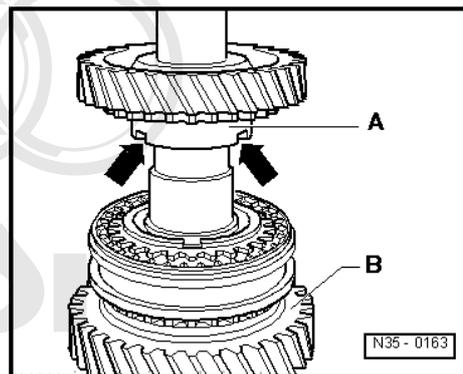
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Installation Position, 3rd Gear Wheel

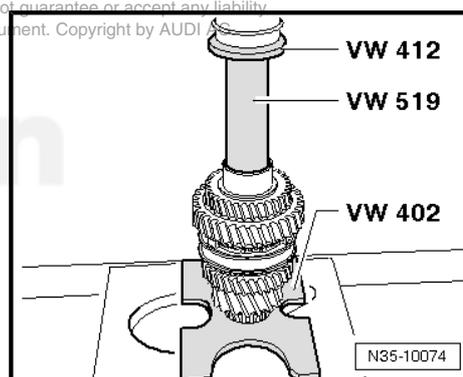
The higher collar -A- faces toward 4th gear -B-. The notches in the collar -arrows- lock into the tabs on the outer race. Refer to => Fig. "Installation Position, 3rd Gear Outer Race.", page 155

- Install the 3rd gear wheel with the needle bearing.
- Heat the 5th gear wheel to approximately 150 °C (302 °F).



Installing the 5th Gear Wheel.

- Press gear wheel on quickly so that heat is not also transferred onto output shaft.
- Heat the 6th gear wheel to approximately 150 °C (302 °F).



Installing the 6th Gear Wheel.

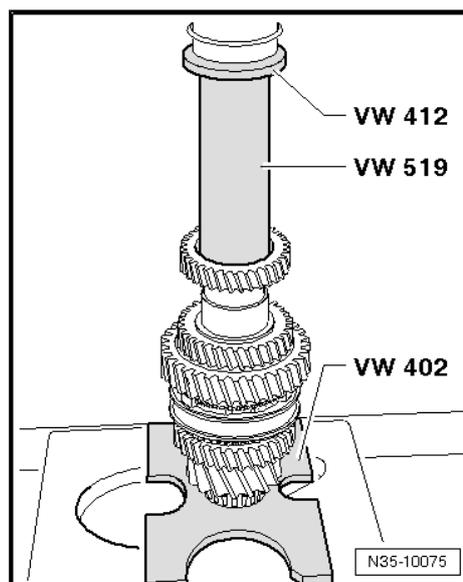
- Insert the circlip.



Note

If, in the previous step, the 5th gear wheel has been mounted, allow the output shaft to cool down.

- Press gear wheel on quickly so that heat is not also transferred onto output shaft.
- Install the circlip for the 6th gear wheel.



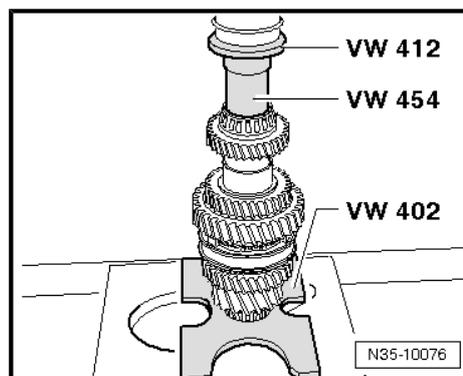
Installing the Inner Race/Tapered Roller Bearing in the Transmission Housing.



Note

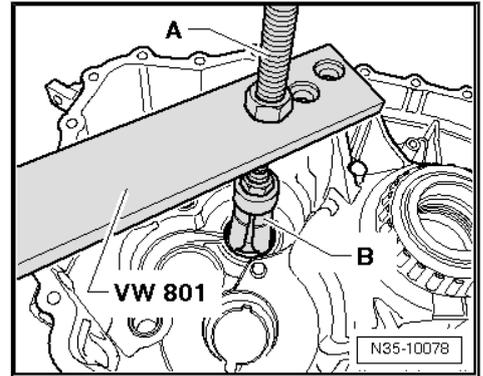
Inner race/tapered roller bearing in transmission housing, removing, refer to

=> Fig. "Removing the Inner Race/Tapered Roller Bearing in the Transmission Housing.", page 152

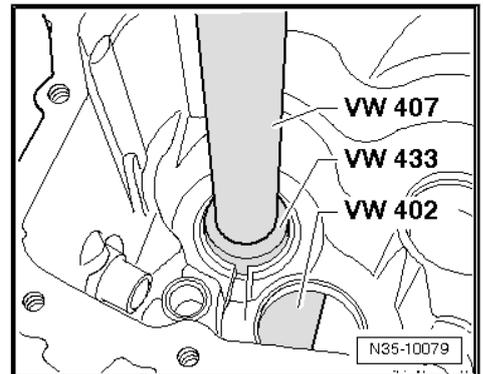


Removing the Outer Race/Tapered Roller Bearing from the Transmission Housing.

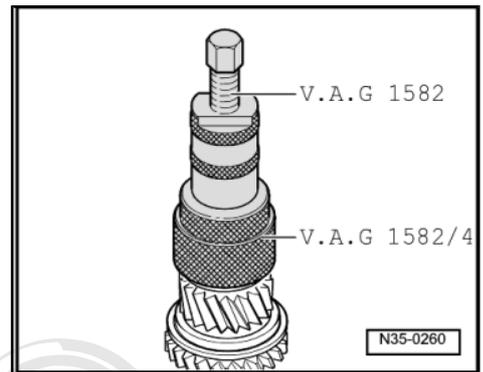
- A - Counter-support spindle, for example -Kukko 22/2-
- B - Internal puller 46 to 58 mm , for example, -Kukko 21/7-
- Install the new shim with the former size under the outer race.



Installing the Outer Race/Tapered Roller Bearing into the Transmission Housing.

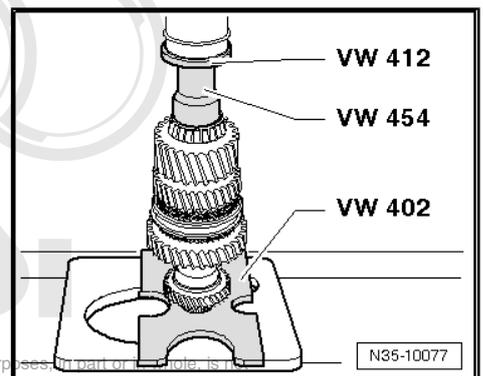


Removing the Inner Race/Tapered Roller Bearing in the Clutch Housing.



Installing the Inner Race/Tapered Roller Bearing in the Clutch Housing.

- Mount the -30-11- on the output shaft before removing the puller.



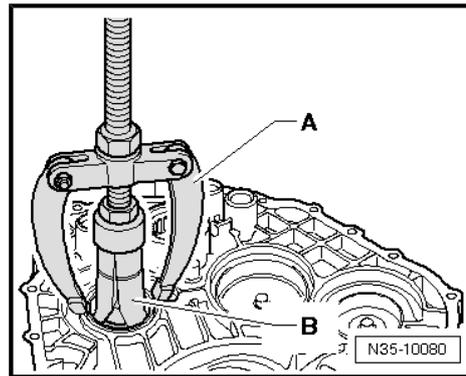
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Removing the Outer Race/Tapered Roller Bearing from the Clutch Housing.

A - Counter-support , for example, -Kukko 22/2-

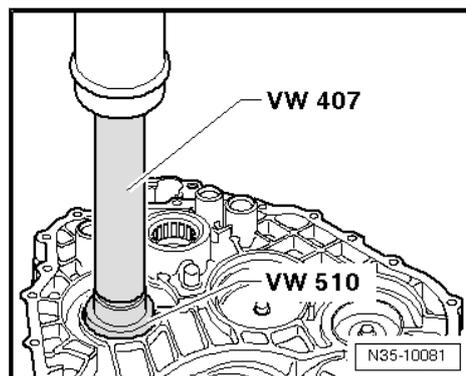
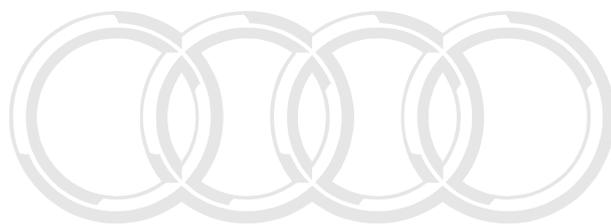
B - Internal puller 56 to 70 mm , for example, -Kukko 21/8-

- Install the new shim with the former size under the outer race.



Installing the Outer Race/Tapered Roller Bearing in the Clutch Housing

- Support the clutch housing with the -VW 415 A- directly under the bearing mount.



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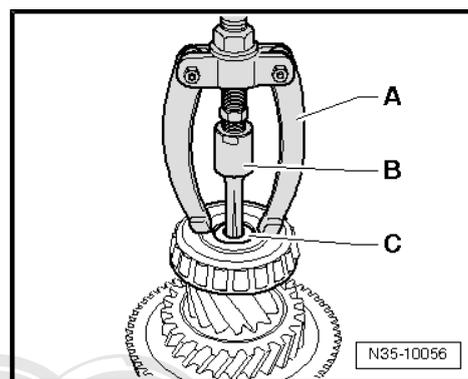
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3.4 Reverse Gear Output Shaft

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-
- ◆ Thrust Tube -VW 454-
- ◆ Thrust Pad 16.5/28 mm Dia. -VW 431-
- ◆ Press Appliance -VW 459-
- ◆ Split Tube -VW 463/2-
- ◆ Thrust Piece -VW 473-
- ◆ Tube 42 mm Dia. -VW 516-
- ◆ Press Support -3118-
- ◆ Front and Rear Bearing Tool -3348-
- ◆ Thrust Piece -3401-
- ◆ Tapered Roller Bearing Puller -V.A.G 1582-
- ◆ Attachment to VAG1582 -V.A.G 1582/4-
- ◆ Tube Trans. Drive Shaft -VW 426-
- ◆ Internal Puller 14.5 to 18.5 mm , for example -Kukko 21/2-
- ◆ Internal Puller 37 to 46 mm , for example -Kukko 21/6-
- ◆ Internal Puller 46 to 58 mm , for example -Kukko 21/7-
- ◆ Separating Tool 22 to 115 mm , for example, -Kukko 17/2-
- ◆ Counter-Support , for example -Kukko 22/1-
- ◆ Pipe -VW 463/2-
- ◆ Base Block -VW 441-
- ◆ Transmission Holder -2004/1-



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Remove the Dished Washer -C- from the Output Shaft

A - Counter-support , for example, -Kukko 22/1-

B - Internal puller 8 to 12 mm , for example, -Kukko 21/2-



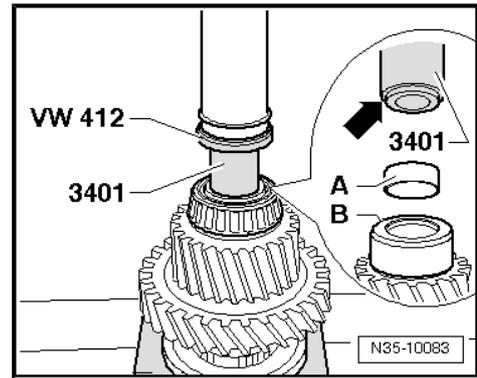
Note

If the internal puller comes out of the hole in the dished washer, then use the next larger internal puller.

Install the Dished Washer -A- All the Way into the Output Shaft -B-.

- Mount the -3401- with the shoulder -arrow- on the dished washer -A-.

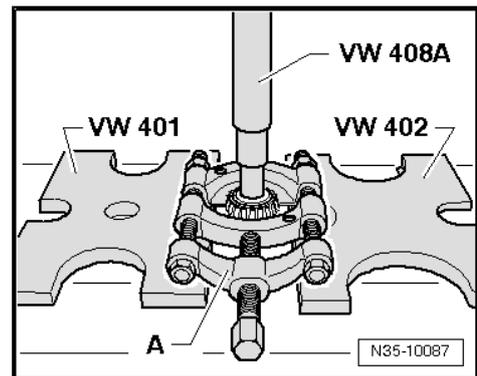
Press-in depth for the dished washer is approximately 2.20 mm.



Removing the Inner Race/Tapered Roller Bearing in the Transmission Housing.

A - Separating tool 22 to 115 mm , for example, -Kukko 17/1-

- Remove the locking ring.

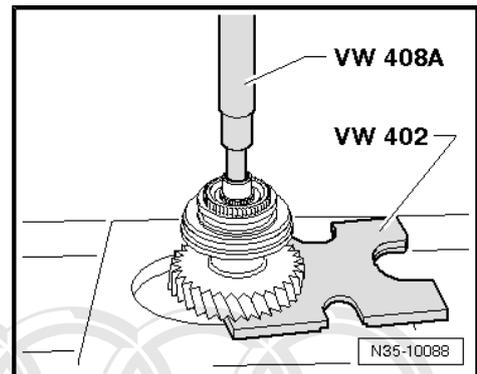


Removing the Synchronizer Hub/Reverse Gear and the Reverse Gear Wheel.

- Mount the reverse gear wheel with the needle and roller bearings on the output shaft.

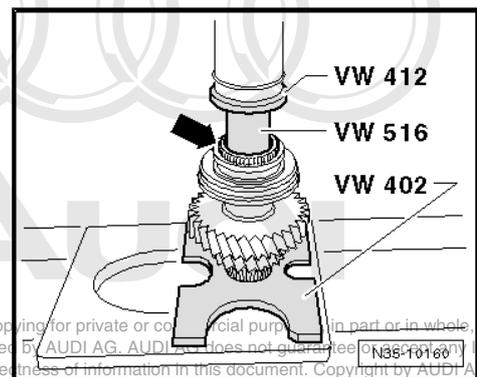
Installation Position of Synchronizer Hub for Reverse Gear.

- The stop -arrow- faces the pressing tool.



Pressing on Synchronizer Hub for Reverse Gear.

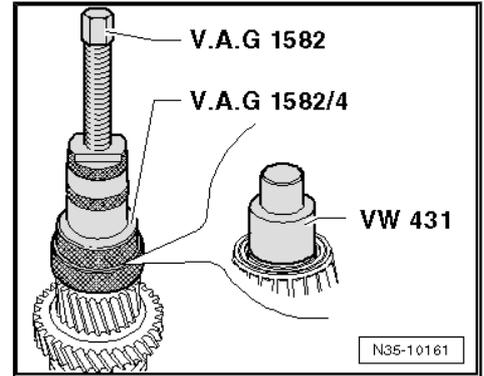
- Pressing on synchronizer hub for reverse gear.
- Install the locking ring.



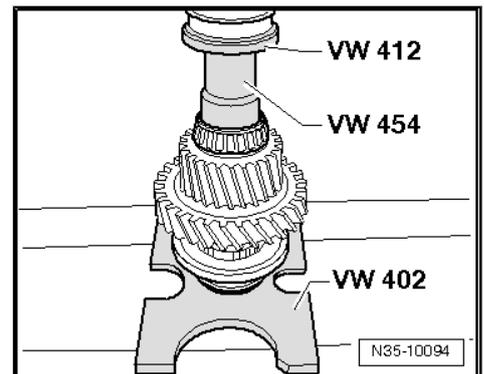
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Removing the Inner Race/Tapered Roller Bearing in the Clutch Housing.

- Before installing puller, set -VW 431- onto output shaft.



Installing the Inner Race/Tapered Roller Bearing in the Clutch Housing.



Removing the Outer Race/Tapered Roller Bearing from the Clutch Housing.

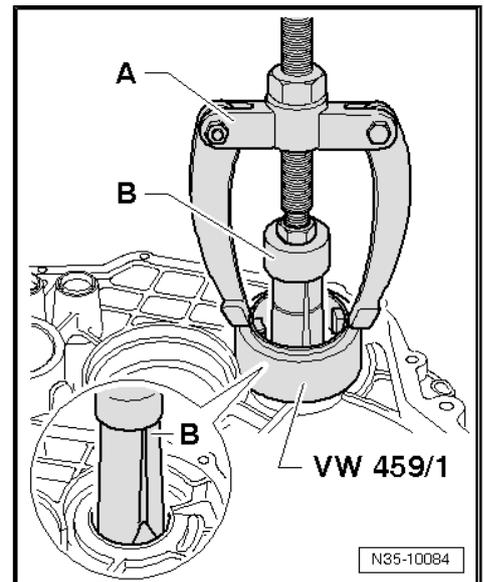
- Mount the sleeve -VW 459/1- over the bearing seat with collar facing the counter-support -A-.

A - Counter-support , for example, -Kukko 22/2-

B - Internal puller 46 to 58 mm , for example, -Kukko 21/7-

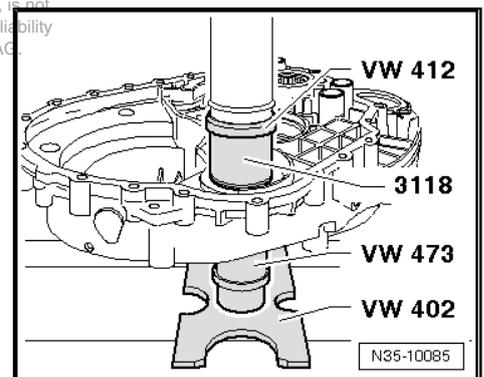
After removing, replace the damaged shim.

- Install the oil deflector.
- Install the new shim with the former size.



Installing Outer Race/Tapered Roller Bearing into the Clutch Housing

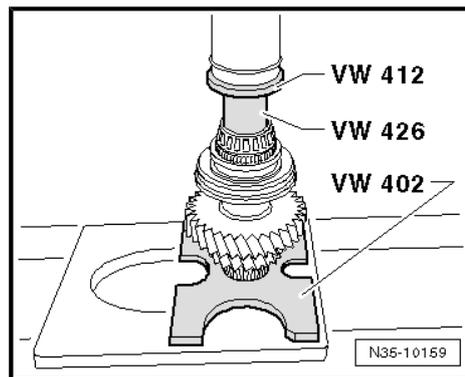
- Support clutch housing directly beneath bearing mount using -VW 473- .



Installing the Inner Race/Tapered Roller Bearing in the Transmission Housing.

 **Note**

Inner race/tapered roller bearing in transmission housing, removing, refer to
 ⇒ Fig. "Removing the Inner Race/Tapered Roller Bearing in the Transmission Housing.", page 160



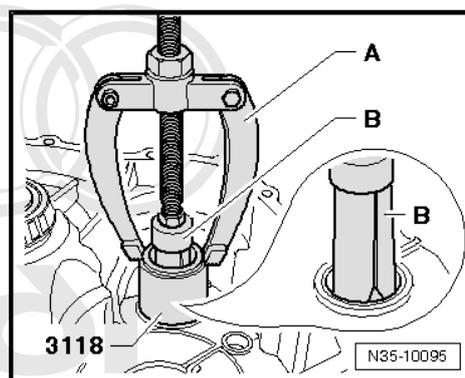
Removing the outer Race/Tapered Roller Bearing from the Transmission Housing.

The collar on the -3118- faces the counter-support -A-.

A - Counter-support, for example, -Kukko 22/2-

B - Internal puller 37 to 46 mm, for example, -Kukko 21/6-

- Install the new shim with the former size under the outer race.

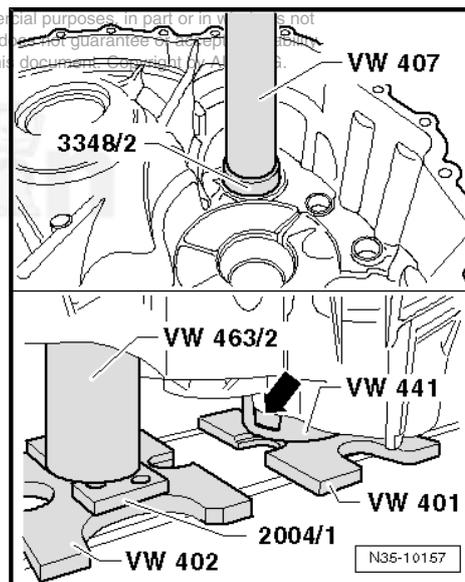


Installing the Outer Race/Tapered Roller Bearing into the Transmission Housing.

- Support transmission housing beneath bearing mount using -VW 463/2-.

When positioning the -VW 463/2- be careful of the housing rib.

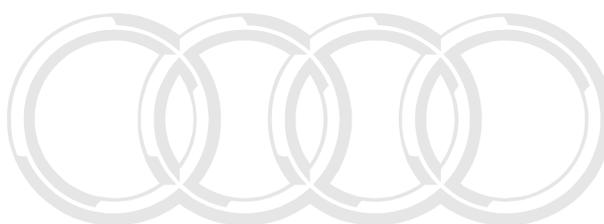
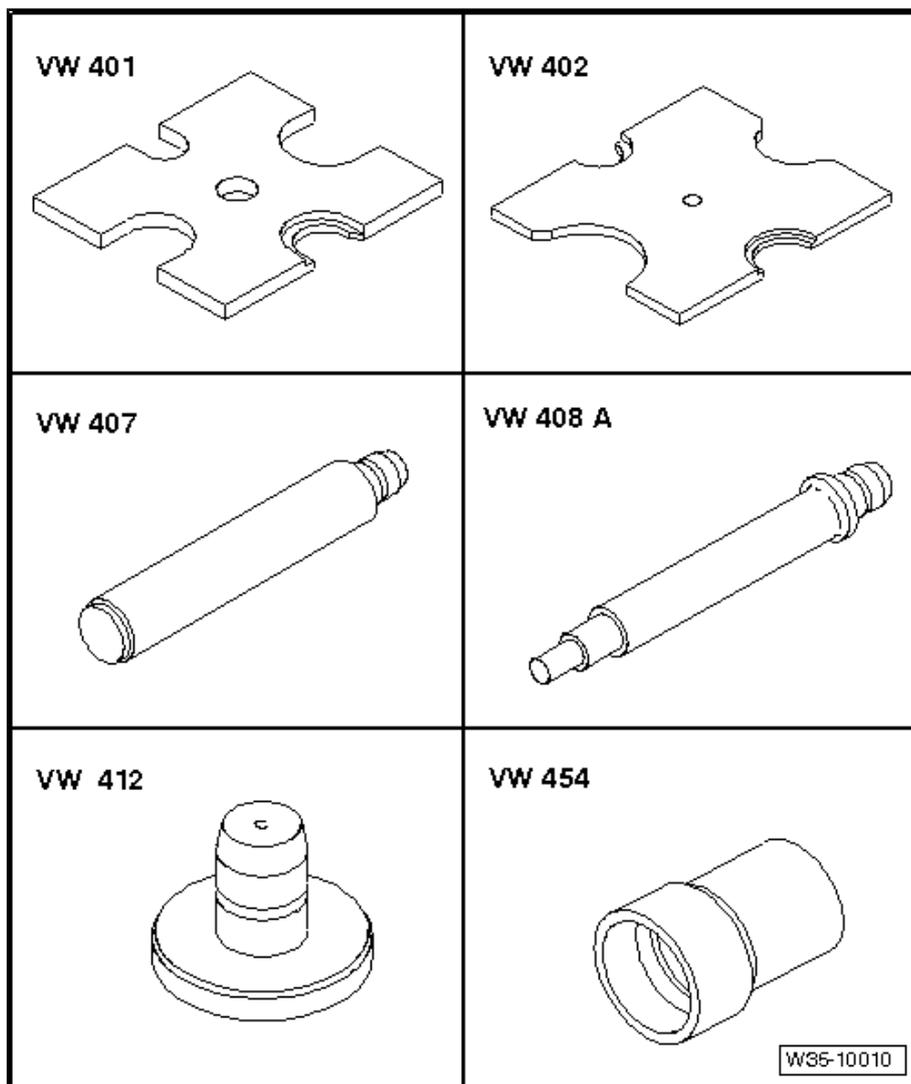
The perforation in the -VW 441- -arrow- faces the -VW 463/2-.



4 Special Tools

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-
- ◆ Thrust Tube -VW 454-

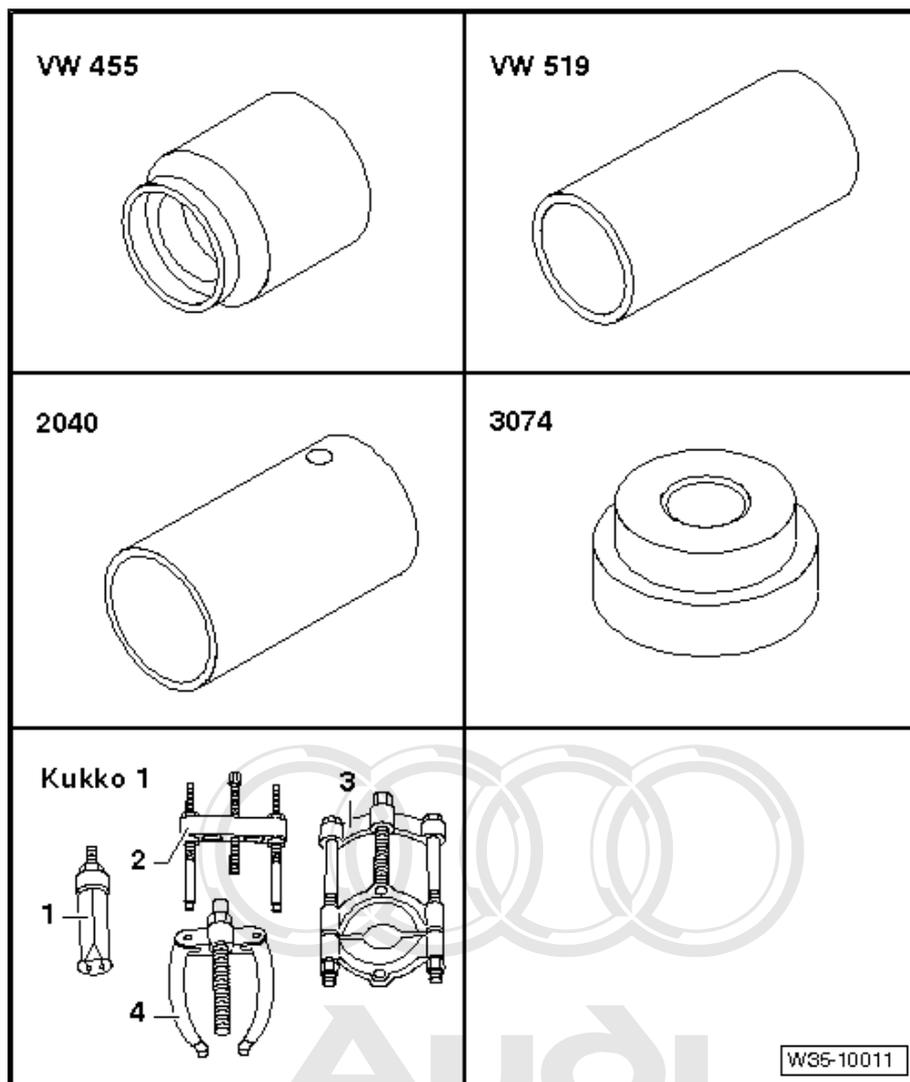


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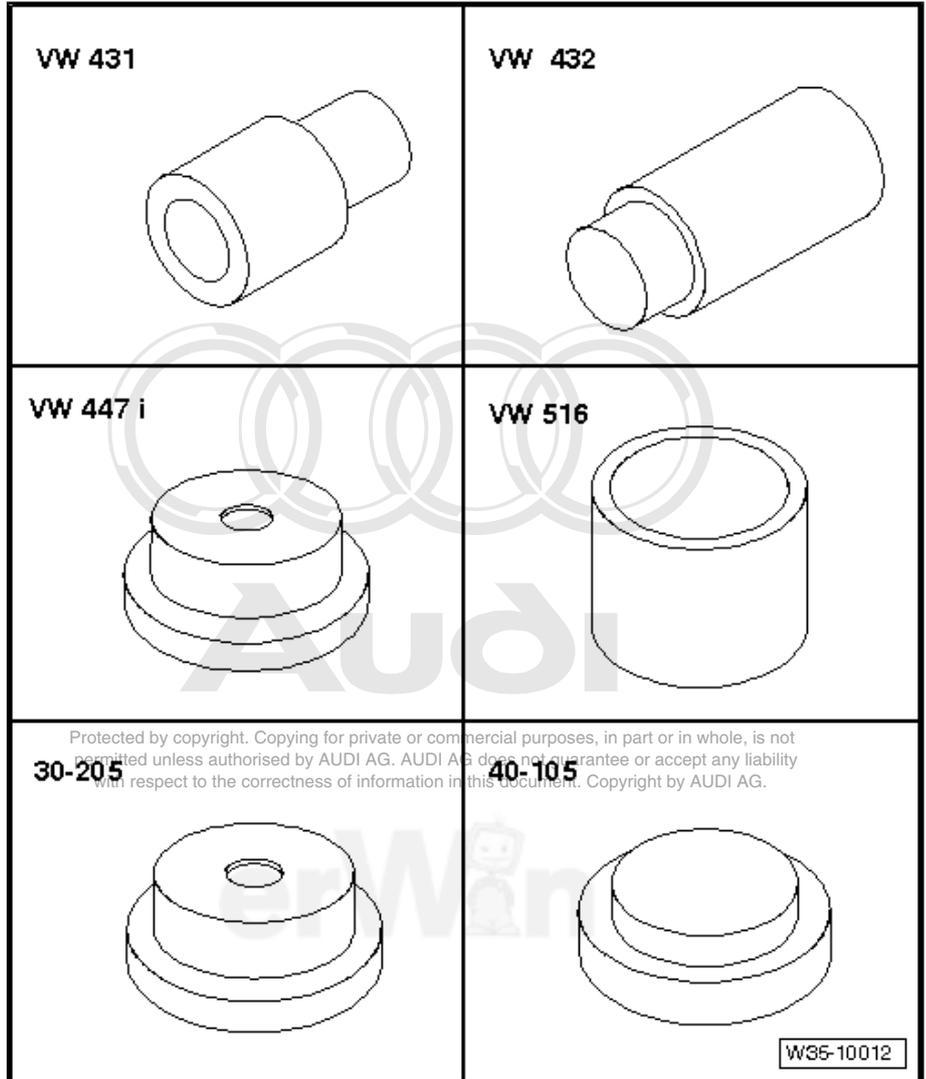
- ◆ Thrust Tube -VW 455-
- ◆ Sleeve -VW 519-
- ◆ Press Tube -2040-
- ◆ Thrust Pad -3074-
- ◆ -1- Internal Puller 37 to 46 mm , for example -Kukko 21/6-
- ◆ -2- Puller , for example - Kukko 18/1-
- ◆ -3- Separating Tool 22 to 75 mm , for example, -Kukko 17/1-
- ◆ -3- Separating Tool 22 to 115 mm , for example, - Kukko 17/2-
- ◆ -4- Counter-Support , for example -Kukko 22/2-



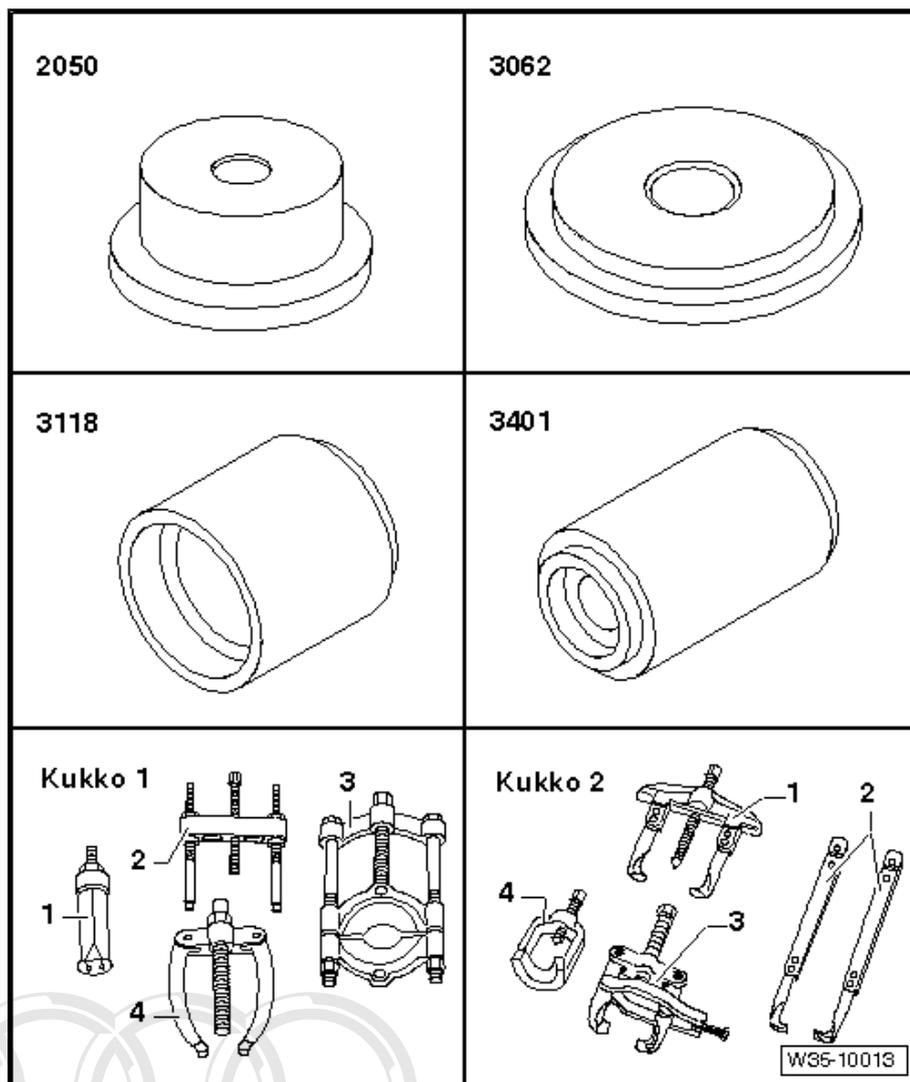
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- ◆ Thrust Pad 16.5/28 mm Dia. -VW 431-
- ◆ Arbor 50 mm Dia. -VW 432-
- ◆ Thrust Pad -VW 447 i-
- ◆ Tube 42 mm Dia. -VW 516-
- ◆ Thrust Pad -30 - 205-
- ◆ Thrust Piece -40 - 105-



- ◆ Thrust Plate -2050-
- ◆ Thrust Pad -3062-
- ◆ Press Support -3118-
- ◆ Thrust Piece -3401-
- ◆ -1- Internal Puller 14.5 to 18.5 mm , for example - Kukko 21/2-
- ◆ -1- Internal Puller 46 to 58 mm , for example -Kukko 21/7-
- ◆ -1- Internal Puller 56 to 110 mm , for example -Kukko 21/89-
- ◆ -3- Separating Tool 22 to 115 mm , for example, - Kukko 17/2-
- ◆ -4- Counter-Support , for example -Kukko 22/1-
- ◆ -4- Counter-Support , for example -Kukko 22/2-
- ◆ -4- Counter-Support , for example -Kukko 22/4-
- ◆ -1- Two-Arm Puller , for example -Kukko 20/10-



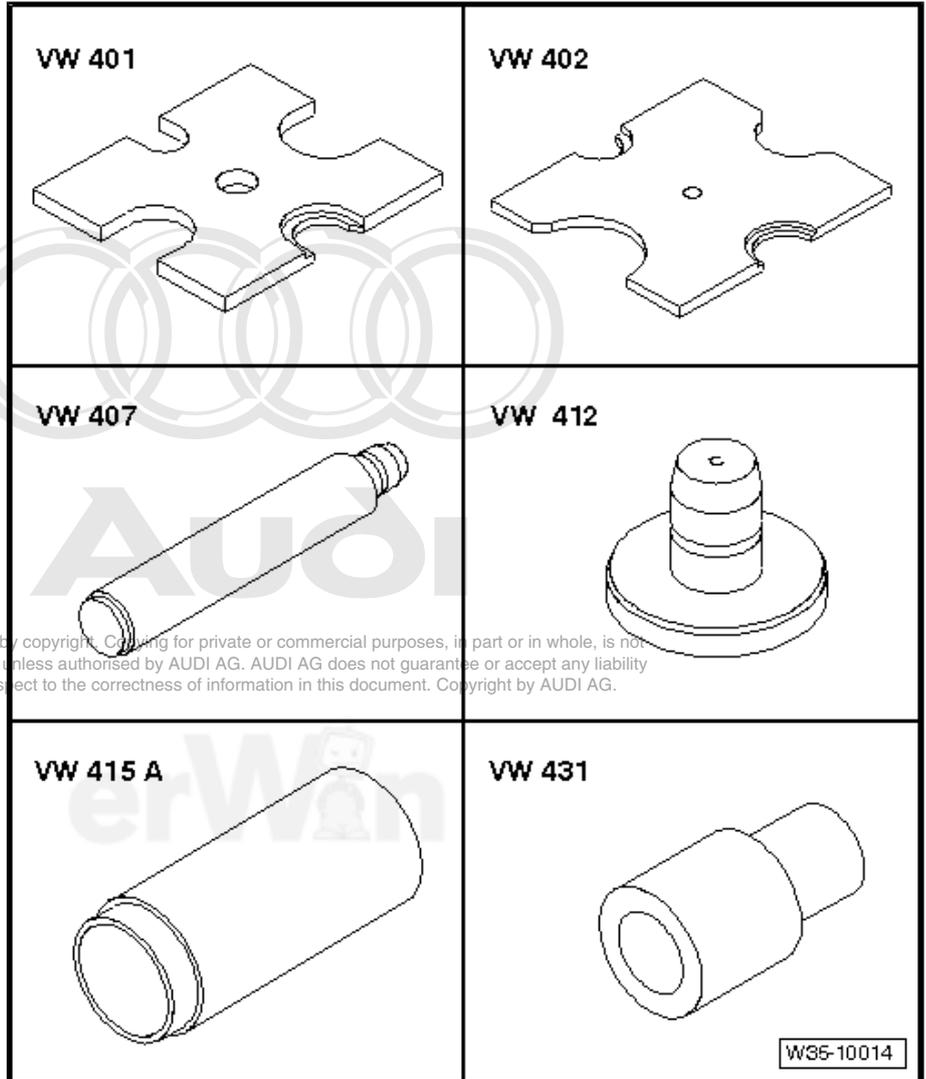
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Special tools and workshop equipment required

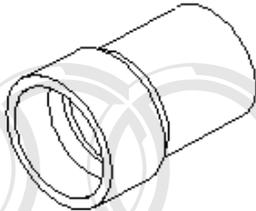
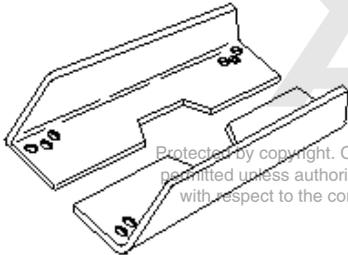
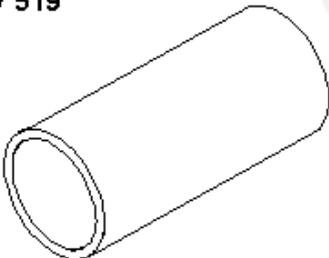
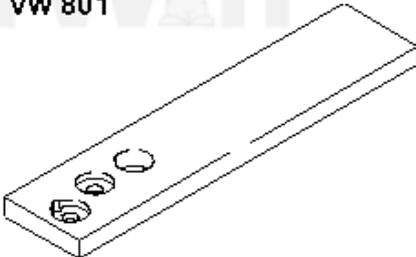
- ◆ Thrust Plate -VW 401-
- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 407-
- ◆ Thrust Disc -VW 412-
- ◆ Tube 60 mm Dia. -VW 415 A-
- ◆ Thrust Pad 16.5/28 mm Dia. -VW 431-



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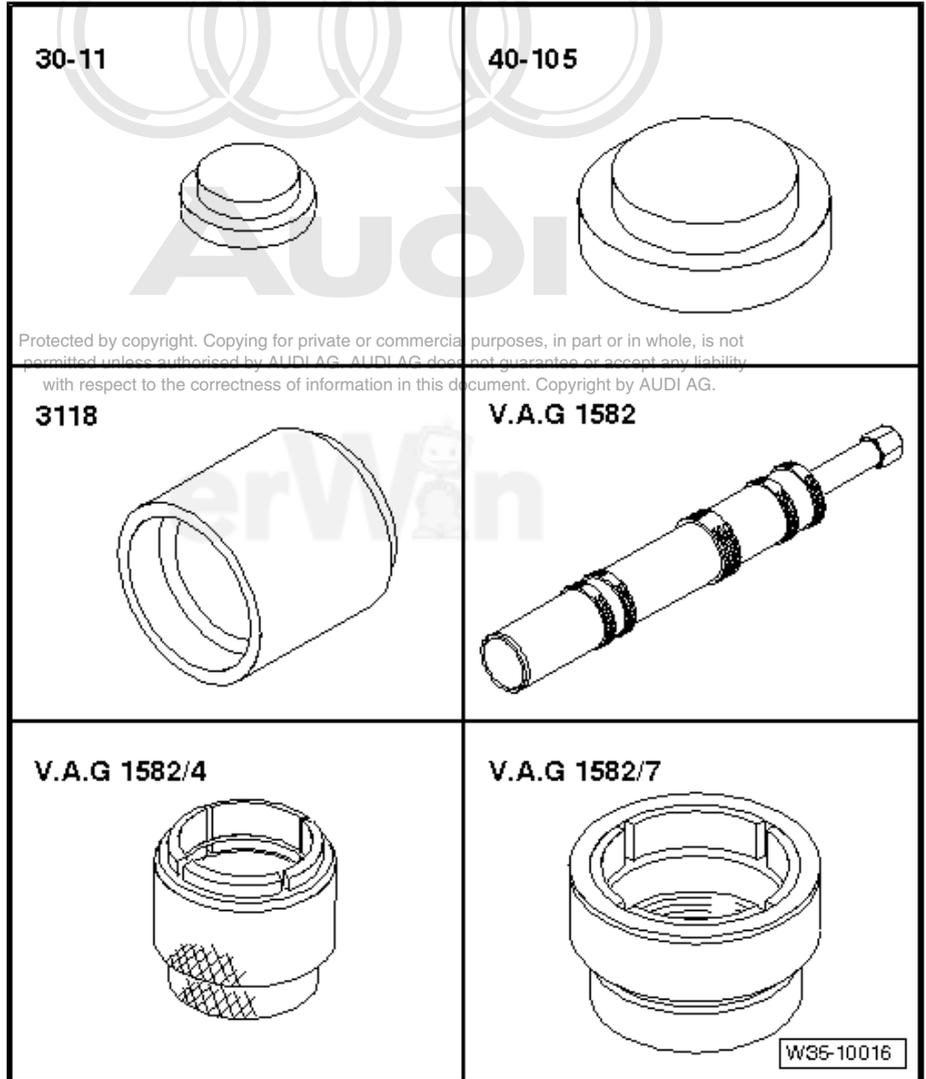


- ◆ Thrust Pad Con. 8/65 -VW 433-
- ◆ Thrust Tube -VW 454-
- ◆ Support Channels -VW 457-
- ◆ Thrust Pad -VW 510-
- ◆ Sleeve -VW 519-
- ◆ Holding Fixture -VW 801-

<p>VW 433</p> 	<p>VW 454</p> 
<p>VW 457</p> 	<p>VW 510</p> 
<p>VW 519</p> 	<p>VW 801</p>  <p>W35-10015</p>

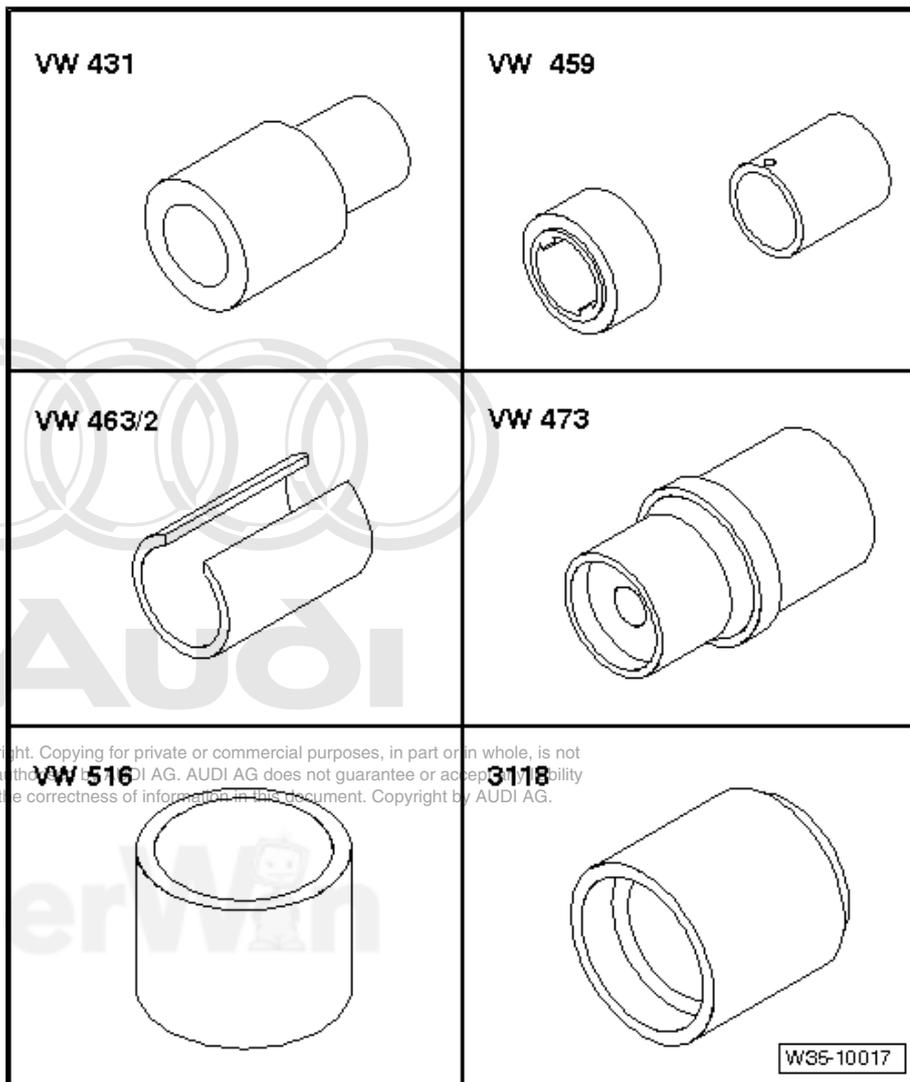
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- ◆ Thrust Pad -30 - 11-
- ◆ Thrust Piece -40 - 105-
- ◆ Press Support -3118-
- ◆ Tapered Roller Bearing Puller -V.A.G 1582-
- ◆ Attachment to VAG1582 - V.A.G 1582/4-
- ◆ Grip -V.A.G 1582/7-





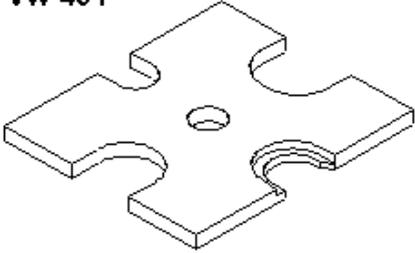
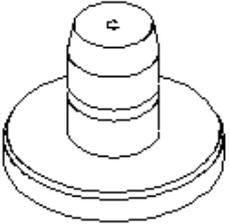
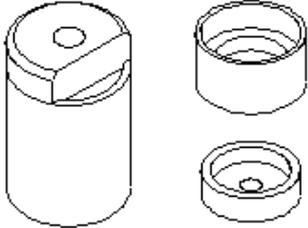
- ◆ Thrust Pad 16.5/28 mm Dia. -VW 431-
- ◆ Press Appliance -VW 459-
- ◆ Pipe -VW 463/2-
- ◆ Thrust Piece -VW 473-
- ◆ Tube 42 mm Dia. -VW 516-
- ◆ Press Support -3118-



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Special tools and workshop equipment required

- ◆ Thrust Plate -VW 401-
- ◆ Thrust Disc -VW 412-
- ◆ Carrier Bearing Inst. Tool -3350-

<p>VW 401</p> 	<p>VW 412</p> 
<p>3350</p> 	
	<p style="text-align: right;">W35-10019</p>



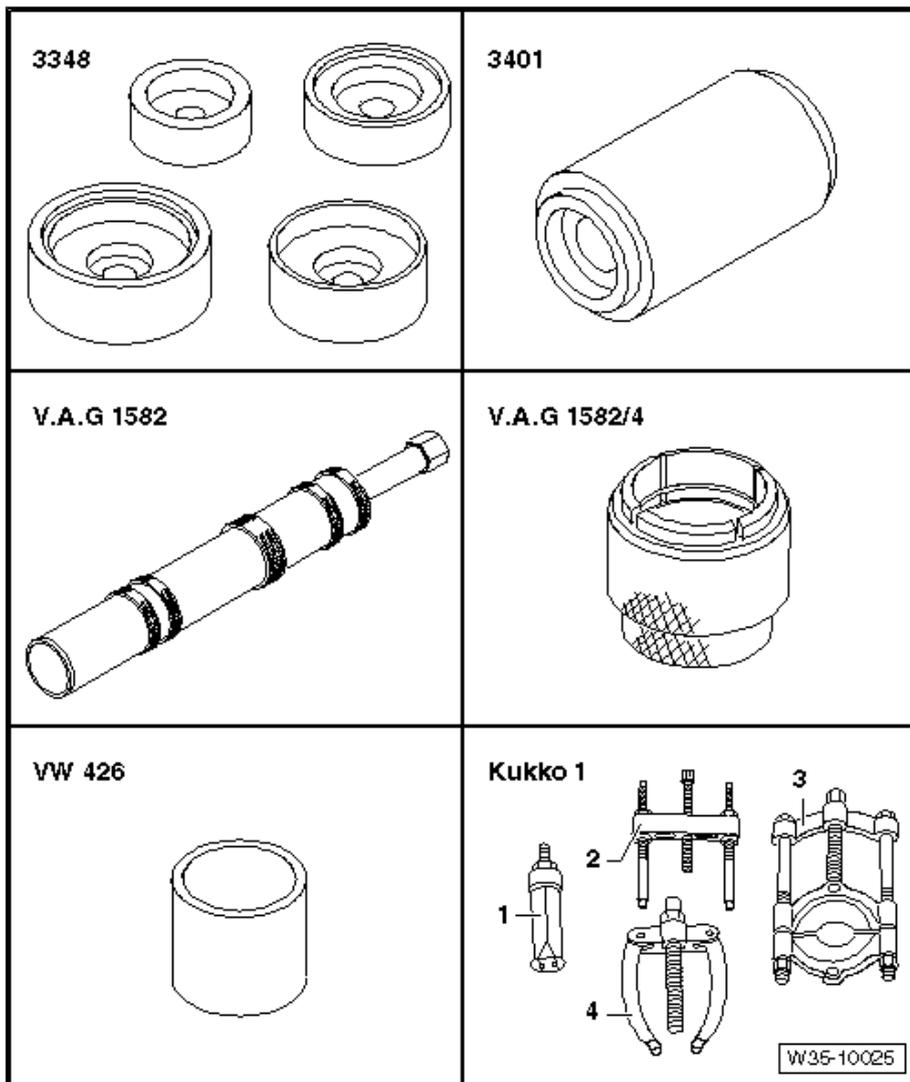
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- ◆ Front and Rear Bearing Tool -3348-
- ◆ Thrust Piece -3401-
- ◆ Tapered Roller Bearing Puller -V.A.G 1582-
- ◆ Attachment to VAG1582 - V.A.G 1582/4-
- ◆ Tube Trans. Drive Shaft - VW 426-
- ◆ -1- Internal Puller 14.5 to 18.5 mm , for example -Kukko 21/2-
- ◆ -1- Internal Puller 37 to 46 mm , for example -Kukko 21/6-
- ◆ -1- Internal Puller 46 to 58 mm , for example -Kukko 21/7-
- ◆ -3- Separating Tool 22 to 115 mm , for example, -Kukko 17/2-
- ◆ -4- Counter-Support , for example -Kukko 22/1-

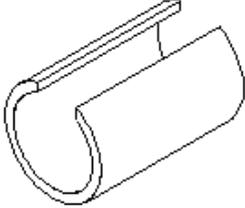
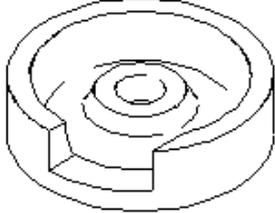
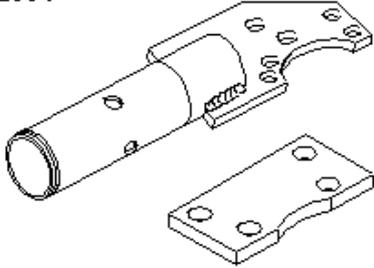


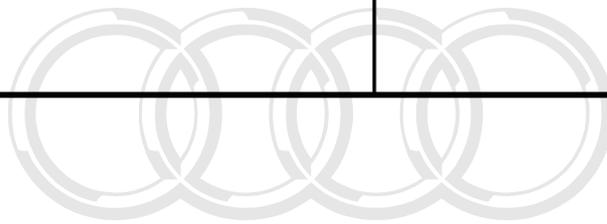
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- ◆ Split Tube -VW 463/2-
- ◆ Base Block -VW 441-
- ◆ Transmission Holder -2004/1-

<p>VW 463/2</p> 	<p>VW 441</p> 
<p>2004</p> 	
	<p style="text-align: right;">W35-10026</p>



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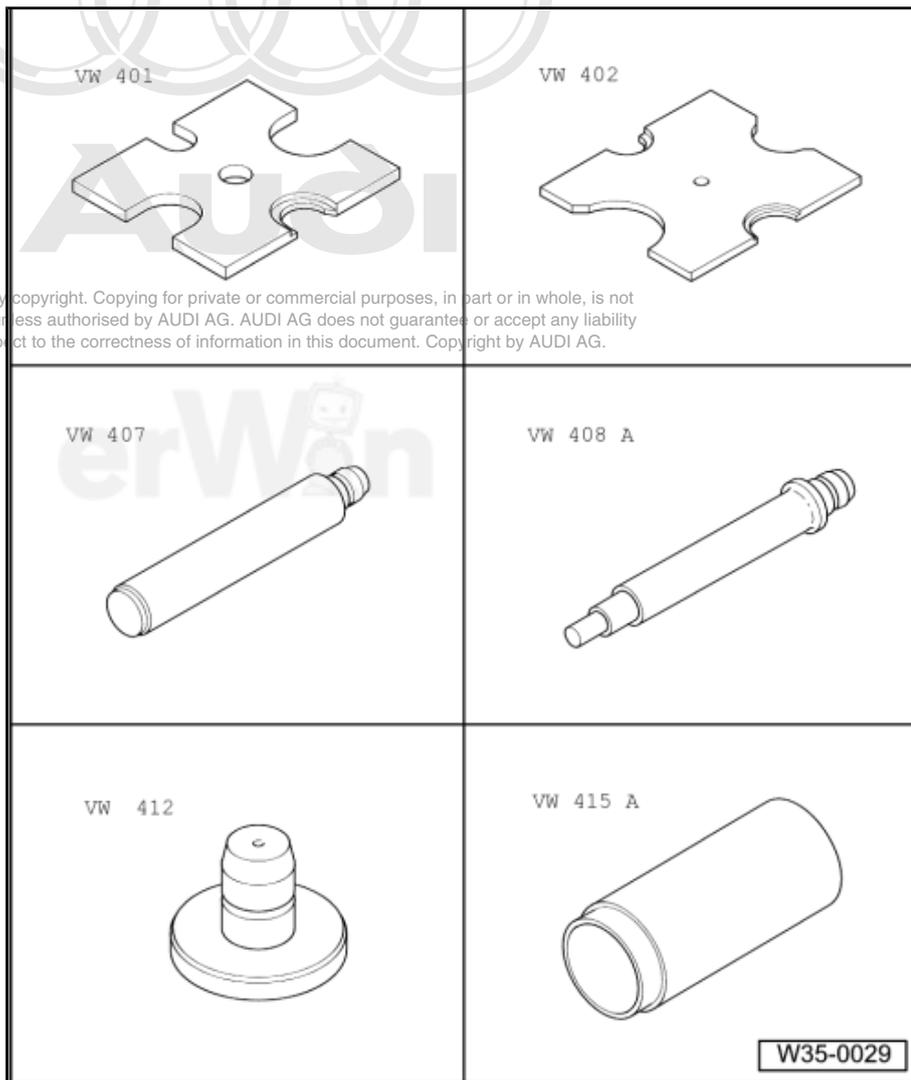
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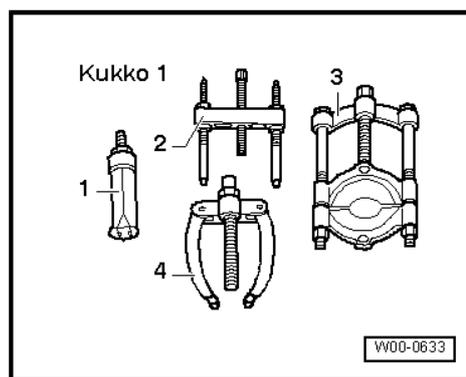
Special tools and workshop equipment required

- ◆ 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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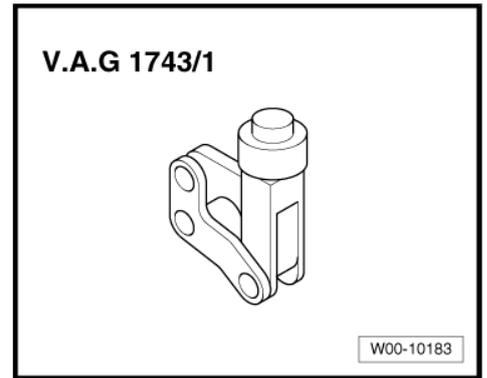


- ◆ -1- Internal Puller 46 to 58 mm , for example -Kukko 21/7-



- ◆ -1- Internal Puller 56 to 70 mm , for example -Kukko 21/8-
- ◆ -4- Counter-Support , for example -Kukko 22/2-
- ◆ Feeler gauge

◆ Thrust Piece -T10266-



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39 – Final Drive, Differential

1 Description and Operation

⇒ [“1.1 Bevel Box Seals and Stub Shaft Mounting Bracket in Bevel Box Overview”, page 176](#)

⇒ [“1.2 Differential Overview”, page 177](#)

⇒ [“1.3 Differential, Adjusting”, page 180](#)

1.1 Bevel Box Seals and Stub Shaft Mounting Bracket in Bevel Box Overview

1 - Seal

- Between bevel box and manual transmission
- Replace with bevel box removed, refer to ⇒ [“3.5 Seal between Bevel Box and Manual Transmission”, page 193](#)

2 - Seal

- For the right stub shaft to the manual transmission
- Replace with bevel box removed, refer to ⇒ [“3.7 Stub Shaft Seals, Bevel Box Removed”, page 195](#)

3 - Bevel Box

- Removing and installing with transmission installed, refer to ⇒ [“4.1 Bevel Box, Transmission Installed”, page 66](#)
- Removing and installing with transmission removed, refer to ⇒ [“5.4 Shift Unit, Input Shaft, Output Shafts, Gearshift Rod, Differential and Bevel Box”, page 104](#)

4 - Seal

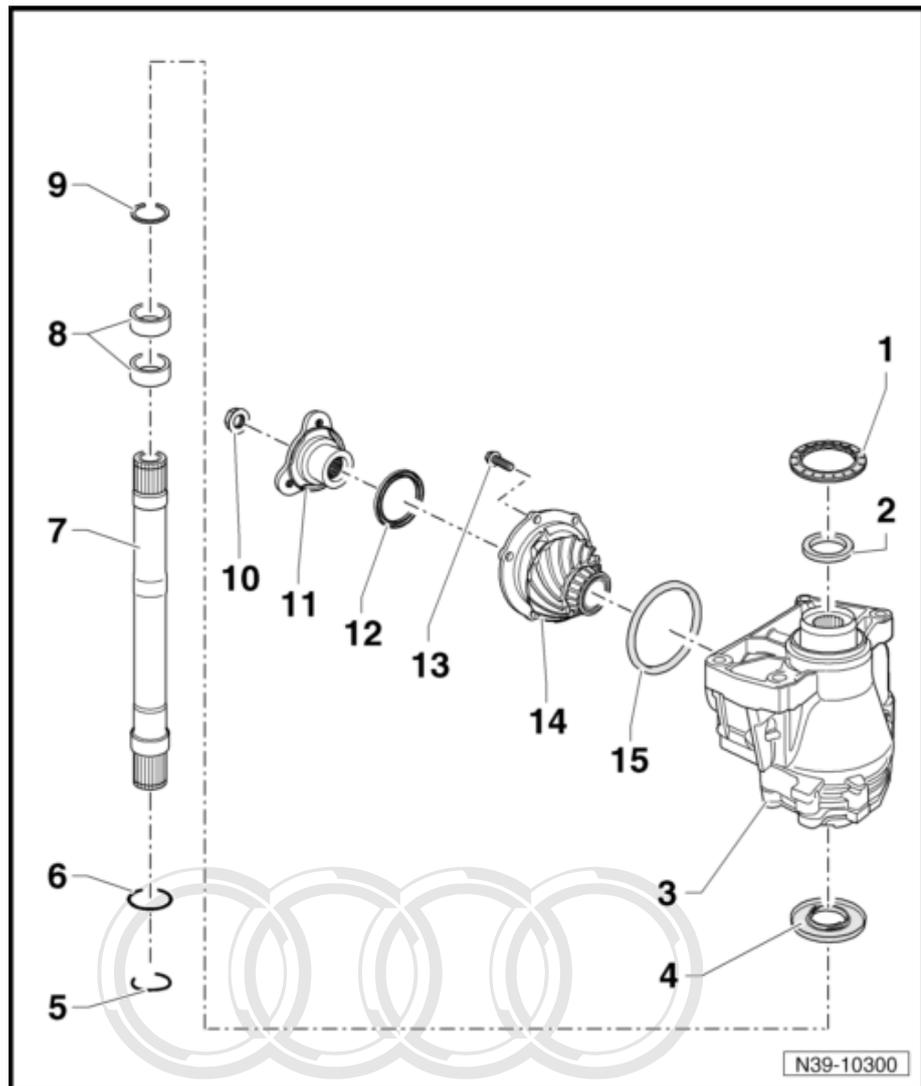
- For the right stub shaft to the drive axle
- Replace with the bevel box installed, refer to ⇒ [“3.4 Right Stub Shaft Seal, Bevel Box Installed”, page 191](#)

5 - Locking Ring

- Always replace
- Insert in the groove running around the stub shaft

6 - O-ring

- Always replace
- Insert in the groove running around the stub shaft



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7 - Right Stub Shaft

- Removing and installing, refer to ⇒ [“3.3 Needle Bearing on Bevel Box Stub Shaft”, page 188](#)

8 - Needle Bearing (polygon bearing)

- Removing and installing, refer to ⇒ [“3.3 Needle Bearing on Bevel Box Stub Shaft”, page 188](#)

9 - Locking Ring

- Always replace

10 - Nut

- 480 Nm
- Removing ⇒ [page 185](#)
- Install with locking fluid -D 000 600-
- Installing, refer to
⇒ [Fig. “Tightening the New Output Flange Hex Nut to the Tightening Specification.”, page 186](#)

11 - Output Flange

- Removing and installing, refer to
⇒ [“3.1 Bevel Box Output Flange Seal, Bevel Box Removed”, page 184](#)

12 - Seal

- Removing and installing, refer to
⇒ [“3.1 Bevel Box Output Flange Seal, Bevel Box Removed”, page 184](#)

13 - Bolt

- 25 Nm
- Tighten in a diagonal sequence

14 - Pinion Housing

- With shaft bevel gear
- Carefully install alternating sides
- Pay attention to the threaded inserts; the drive pinion housing fits only in one position.

15 - O-ring

- To replace, remove the bolts ⇒ [Item 13 \(page 177\)](#) and carefully pry the drive pinion housing out at the tabs protruding all the way around.
- Do not remove the hex nut ⇒ [Item 10 \(page 177\)](#) and output flange ⇒ [Item 11 \(page 177\)](#)

1.2 Differential Overview

Differential, disassembling and assembling, refer to
 ⇒ [“4.1 Differential”, page 197](#) .



Note

- ◆ Heat the inner race / tapered roller bearing to 100 °C (212 °F) before installing.
- ◆ Replace both tapered roller bearings together.
- ◆ Adjust the differential when replacing the differential housing. Refer to
 ⇒ [“1.3 Differential, Adjusting”, page 180](#) .

1 - Transmission Housing

2 - Adjusting Shim

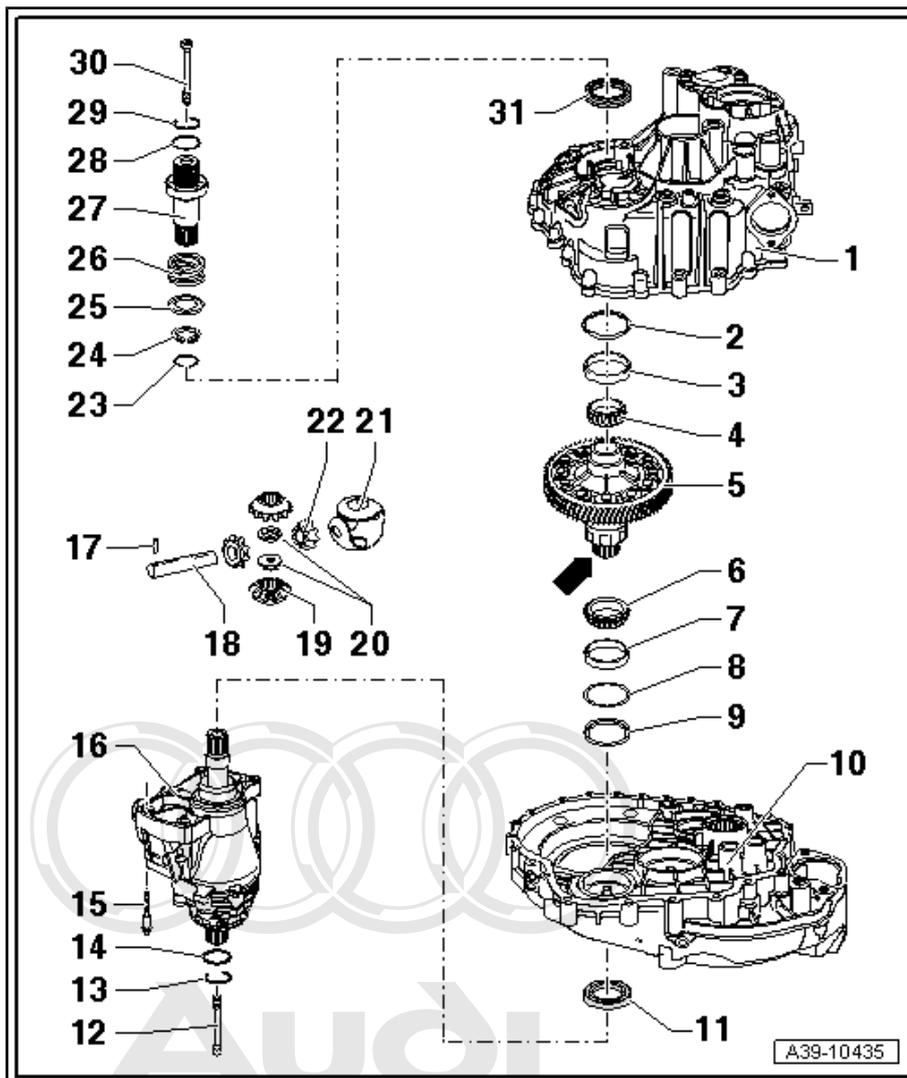
- For the differential
- Always 0.65 mm thick

3 - Outer Race/Tapered Roller Bearing

- Removing, refer to [⇒ Fig. "Removing the Outer Race/Tapered Roller Bearing from the Transmission Housing.", page 197](#)
- Installing, refer to [⇒ Fig. "Installing the Outer Race/Tapered Roller Bearing into the Transmission Housing.", page 197](#)

4 - Inner Race / Tapered Roller Bearing

- Removing, refer to [⇒ Fig. "Removing the Inner Race/Tapered Roller Bearing in the Transmission Housing and Bearing in the Clutch Housing.", page 198](#)
- Installing, refer to [⇒ Fig. "Installing the inner Race/Tapered Roller Bearing in the Transmission Housing and Bearing in the Clutch Housing.", page 198](#)



5 - Differential Housing

- AWD with splines -arrow- for the bevel box

6 - Inner Race / Tapered Roller Bearing

- Removing, refer to [⇒ Fig. "Removing the Inner Race/Tapered Roller Bearing in the Transmission Housing and Bearing in the Clutch Housing.", page 198](#)
- Installing, refer to [⇒ Fig. "Installing the inner Race/Tapered Roller Bearing in the Transmission Housing and Bearing in the Clutch Housing.", page 198](#)

7 - Outer Race/Tapered Roller Bearing

- Removing, refer to [⇒ Fig. "Removing the outer Race/Tapered Roller Bearing from the Clutch Housing.", page 198](#)
- Installing, refer to [⇒ Fig. "Installing Outer Race/Tapered Roller Bearing into the Clutch Housing.", page 198](#)

8 - Adjusting Shim

- For the differential
- To select the correct thickness, refer to [⇒ "1.3 Differential, Adjusting", page 180](#)
- Will get damaged when being removed, replace

9 - Washer

- Installed position: The shoulder on inner diameter faces the clutch housing.

10 - Clutch Housing

11 - Seal

- Replace with transmission installed, refer to
 ⇒ [“3.6 Seal between Manual Transmission and Bevel Box, Manual Transmission Installed”, page 194](#)

12 - Countersunk Bolt

- 35 Nm

13 - Locking Ring

- Always replace
- Insert in the groove running around the stub shaft

14 - O-ring

- Always replace
- Insert in the groove running around the stub shaft

15 - Bolt

- 40 Nm plus an additional 90° turn
- Always replace
- Quantity: 4

16 - Bevel Box

- Removing and installing with transmission installed, refer to
 ⇒ [“4.1 Bevel Box, Transmission Installed”, page 66](#)
- Removing and installing with transmission removed, refer to
 ⇒ [“5.4 Shift Unit, Input Shaft, Output Shafts, Gearshift Rod, Differential and Bevel Box”, page 104](#)
- Replacing the bevel box seals, refer to
 ⇒ [“1.1 Bevel Box Seals and Stub Shaft Mounting Bracket in Bevel Box Overview”, page 176](#)
- Replacing the polygon bearing on the stub shaft, refer to
 ⇒ [“1.1 Bevel Box Seals and Stub Shaft Mounting Bracket in Bevel Box Overview”, page 176](#)

17 - Adapter Sleeve

- For securing the axle for differential bevel gears
- Removing, refer to ⇒ [Fig. “Removing the Spring Pin for the Differential Bevel Gear Axle”, page 199](#)
- Installing, refer to ⇒ [Fig. “Installing the Spring Pin for the Differential Bevel Gear Axle”, page 199](#)

18 - Differential Taper Axle

- Remove using a drift
- Installing, refer to
 ⇒ [Fig. “Installing the Differential Planetary Gears and Differential Bevel Gear Axle”, page 199](#)

19 - Large Differential Bevel Gear

- Installing, refer to
 ⇒ [Fig. “Installing the Differential Planetary Gears and Differential Bevel Gear Axle”, page 199](#)

20 - Threaded Piece

- Installing, refer to
 ⇒ [Fig. “Installing the Differential Planetary Gears and Differential Bevel Gear Axle”, page 199](#)

21 - Thrust Washer Union

- Install with transmission fluid
- Installing in the differential housing, refer to ⇒ [Fig. “Inserting the Thrust Washer Union.”, page 199](#)

22 - Small Differential Bevel Gear

- Removing and installing, refer to
 ⇒ [Fig. “Installing the Differential Planetary Gears and Differential Bevel Gear Axle”, page 199](#)

23 - Locking Ring

- Always replace
- Insert in the groove running around the stub shaft

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**24 - Tapered Ring**

- Installed position: differential housing taper

25 - Thrust Washer

- Installed position: Collar toward spring

26 - Left Stub Shaft Spring

- Left rear stub shaft installed

27 - Left Stub Shaft**28 - O-ring**

- Always replace
- For the left stub shaft
- Insert in the groove running around the stub shaft

29 - Locking Ring

- Always replace
- Insert in the groove running around the stub shaft

30 - Countersunk Bolt

- 35 Nm

31 - Seal

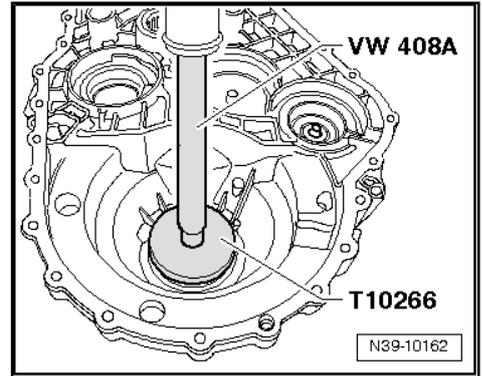
- For the left stub shaft
- Replace with transmission installed, refer to
⇒ ["3.2 Left Stub Shaft Seal, Manual Transmission Installed", page 186](#)

1.3 Differential, Adjusting

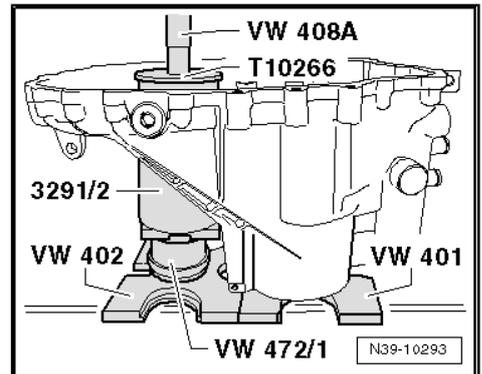
Special tools and workshop equipment required

- ◆ Magnetic Plate 50 mm Dia. -385/17-
- ◆ Dial Gauge Holder -VW 387-
- ◆ Thrust Plate -VW 401-
- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 407-
- ◆ Thrust Disc -VW 412-
- ◆ Crown Wheel Adjustment Device -VW 521-
- ◆ Thrust Piece -T10266-
- ◆ Assembling Device -3291/2-
- ◆ Thrust Pad -VW 472/1-
- ◆ Internal Puller 56 to 70 mm -Kukko 21/8-
- ◆ Counter-Support -Kukko 22/2-
- It is necessary to adjust the differential if the differential housing was replaced.

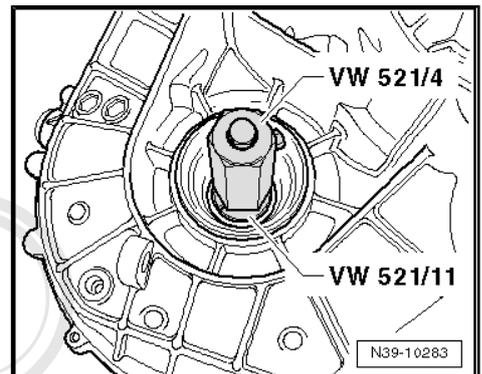
- Installing the outer race/tapered roller bearing without adjustment shim into the clutch housing.



- Install the tapered roller bearing outer race with a 0.65 mm adjustment shim into the transmission housing.
- Insert differential into clutch housing.
- Position the transmission housing and tighten the 5 bolts to the tightening specification.



- Mount the locking sleeve -VW 521/4- on the differential housing (transmission housing side) with the shell -VW 521/13- .
- Mount the -VW 387- on the clutch housing and set the gauge with 1 mm pretension to "0".
- Swivel the transmission in the assembly stand with the clutch housing upward.



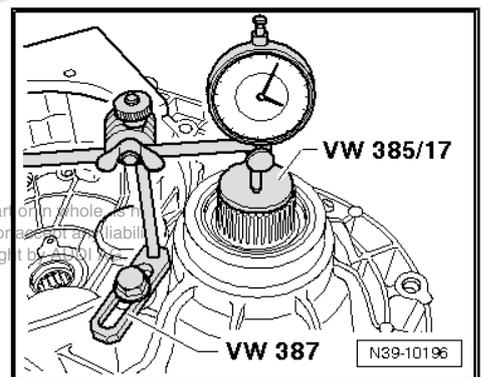
- Press differential in direction of clutch housing and rotate eight times at the same time.
- Move the differential up and down, and read the play on the dial gauge -VW 521/4- and note. Example: to 0.70 mm).

Determine shim according to table; refer to [page 182](#) .

- The measurement must be performed as shown in the illustration otherwise the measured value will be wrong.

Determining Shim Thickness

- Remove the transmission housing.



- Remove the tapered roller bearing outer race from the clutch housing.

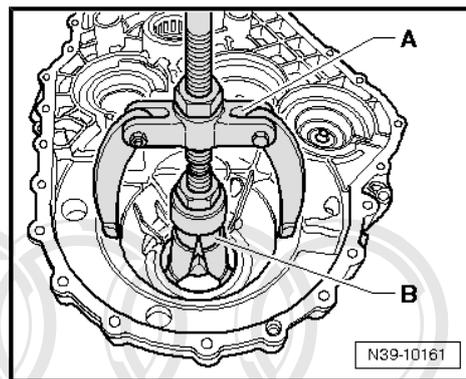
A - Counter-support , for example, -Kukko 22/2-

B - Internal puller 56 to 70 mm , for example, -Kukko 21/8-

- First place the washer into the clutch housing.

 **Note**

Note installation position of the washer, shoulder on the inner diameter points toward seal.



- Then place the shim in the determined thickness (in the example: 0.95 mm).

The following adjusting shims are available:

Bearing Play	Adjusting Shim
Measured value (mm)	Thickness (mm)
0.65 to 0.675	0.65
0.676 to 0.725	0.70
0.726 to 0.775	0.75
0.776 to 0.825	0.80
0.826 to 0.875	0.85
0.876 to 0.925	0.90
0.926 to 0.975	0.95
0.976 to 1.025	1.00
1.026 to 1.075	1.05
1.076 to 1.125	1.10
1.126 to 1.175	1.15
1.176 to 1.225	1.20
1.226 to 1.275	1.25
1.276 to 1.325	1.30
1.326 to 1.375	1.35
1.376 to 1.425	1.40

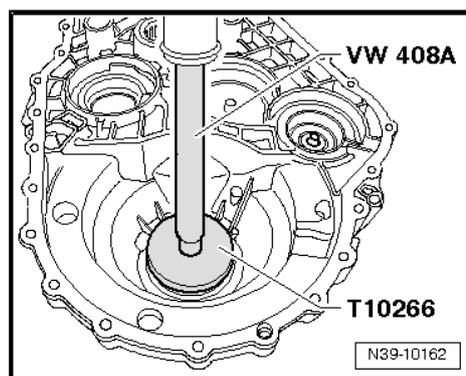
 **Note**

Allocate adjustment shims, refer to the Electronic Parts Catalog (ETKA).

If the measured shim thickness is larger than those listed in the Table, then install two adjusting shims that add up to the necessary thickness.

Tolerance variations make it possible to find the exact shim thickness required.

- Install the outer race again and tighten the transmission housing.



2 Specifications

⇒ **"2.1 Fastener Tightening Specifications", page 183**

2.1 Fastener Tightening Specifications

Components	Fastener Size	Nm
Bevel Box		
-Countersunk Bolt	-	35
-Bolt ³	-	40 + 90°
Left Stub Shaft, Countersunk Bolt	-	35
Output Flange to Bevel Box, Nut ²	-	480
Pinion Housing ¹	-	25
<ul style="list-style-type: none"> • ¹ Tighten in a diagonal sequence • ² Install with locking fluid - D 000 600- • ³ Replace 		

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3 Removal and Installation

⇒ [“3.1 Bevel Box Output Flange Seal, Bevel Box Removed”, page 184](#)

⇒ [“3.2 Left Stub Shaft Seal, Manual Transmission Installed”, page 186](#)

⇒ [“3.3 Needle Bearing on Bevel Box Stub Shaft”, page 188](#)

⇒ [“3.4 Right Stub Shaft Seal, Bevel Box Installed”, page 191](#)

⇒ [“3.5 Seal between Bevel Box and Manual Transmission”, page 193](#)

⇒ [“3.6 Seal between Manual Transmission and Bevel Box, Manual Transmission Installed”, page 194](#)

⇒ [“3.7 Stub Shaft Seals, Bevel Box Removed”, page 195](#)

3.1 Bevel Box Output Flange Seal, Bevel Box Removed

Special tools and workshop equipment required

- ◆ Holding Fixture -VW 313-
- ◆ Tube 42 mm Dia. -VW 516-
- ◆ Thrust Piece -40-105-
- ◆ Thrust Piece -T10049-
- ◆ Transmission Support -T10108-
- ◆ Stop Plate -T10108/1-
- ◆ Torque Wrench -V.A.G 1601-
- ◆ -1- Two-Arm Puller -Kukko 20/10-
- ◆ Three-Arm Puller -Kukko 45-2-
- ◆ Slide Hammer-Complete Set -VW 771-
- ◆ Additional Part for VW 771 -VW 771/37-
- ◆ Sealing grease -G 052 128 A1-
- ◆ 2 bolts M 10 x 30
- ◆ 2 nuts M 12 x 10

Removing

- The bevel box is removed. Refer to [⇒ “4.1 Bevel Box, Transmission Installed”, page 66](#) .



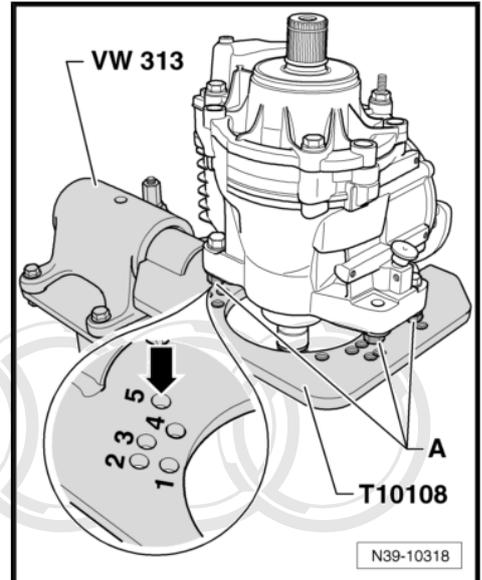
Note

Bevel box output flange seal can only be replaced with the bevel box removed.

- Mount the bevel box on the hole marked with the number -5- -arrow- in the -T10108- .

A - Insert nut M 12 x 10 (quantity: 4) between bevel box and -T10108- . The nuts act as spacers.

- Align the bevel box to the hole that is opposite it and secure.
- Place a drip tray underneath.
- Drain the oil from bevel box.

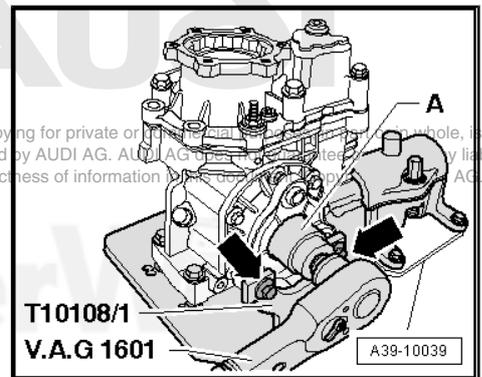


- Secure bevel box output flange with stop plate -T10108/1- and install bolts M 10 x 30 -arrows-.

- Remove the nut from the output flange.

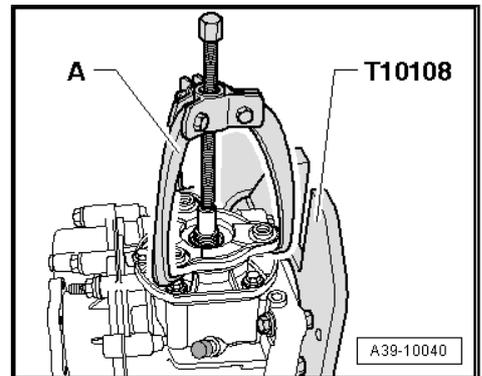
A - Socket attachment SW 36 for 3/4 inch drive

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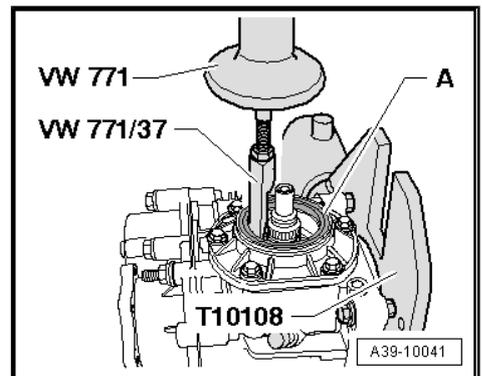


- Pivot bevel box so that the output shaft faces upward.
- Remove the output shaft from bevel box shaft bevel gear.

A - Three-arm puller , for example, -Kukko 45-2-

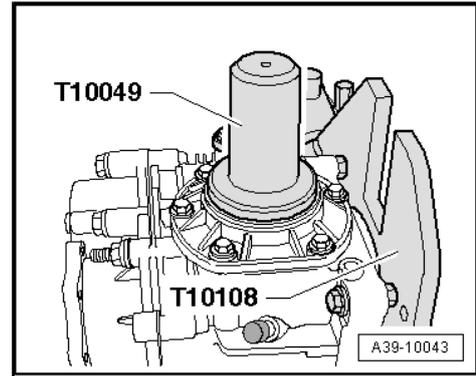


- Remove output shaft seal -A-.
- Clean any locking fluid residue on the thread on the shaft bevel gear.

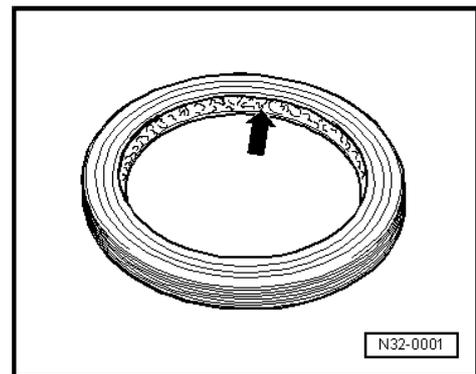


Installing

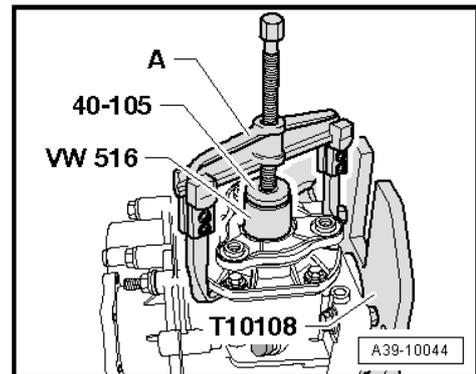
- Lightly coat the outer circumference of the new shaft seal with oil.
- Install the new sealing ring using -T10049- .



- Fill the space between the sealing and dust lip half way with sealing grease -G 052 128 A1- .



- Pull in output flange with two arm puller -A-.
- A - Two-arm puller , for example, -Kukko 20/10-
- Position pulling hook on the underside of the drive pinion housing.
- Coat threads of new hex head nut with locking compound D 000 600.

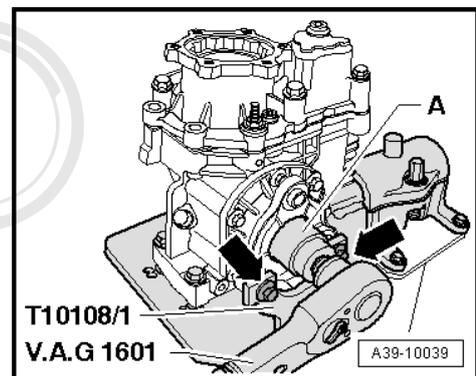


Tightening the New Output Flange Hex Nut to the Tightening Specification.

Tightening specification ⇒ [Item 10 \(page 177\)](#)

A - Socket attachment SW 36 for 3/4 inch drive

- Install the bevel box. Refer to ⇒ [page 69](#) .
- Check axle oil in the bevel box. Refer to ⇒ ["1.2 Gear Oil in Bevel Box, Filling", page 39](#) .



3.2 Left Stub Shaft Seal, Manual Transmission Installed

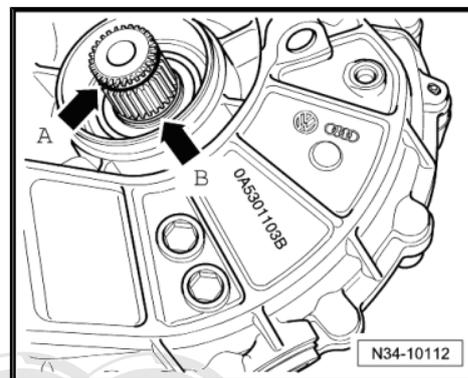
Special tools and workshop equipment required

- ◆ Slide Hammer-Complete Set -VW 771-
- ◆ Pulling Hook -VW 771/37-
- ◆ Torque Wrench 5-50 Nm -V.A.G 1331-

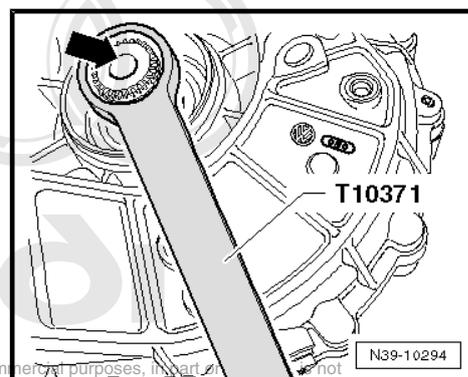
- ◆ Counter Hold Tool -T10371-
- ◆ Thrust Piece -3305-
- ◆ Radial shaft seal sealing grease -G 052 128 A1-
- ◆ Grease -G 000 100-
- ◆ Used Oil Collecting and Extracting Device -V.A.G 1782-

Removing

- Lift the vehicle.
- Remove the noise insulation below engine/transmission. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .
- Remove left drive axle. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .
- Remove the circlip -arrow A- and the O-ring -arrow B- from the stub shaft.



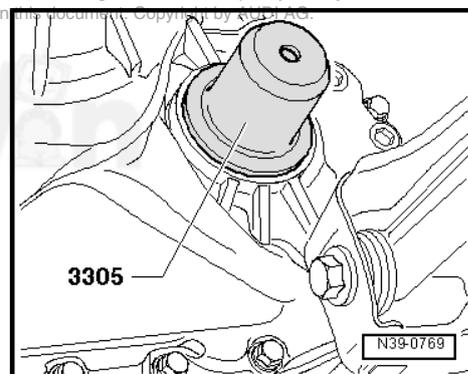
- Counter hold the stub shaft with the -T10371- and remove the bolt -arrow-.
- Place the -V.A.G 1782- under the transmission.
- Remove the stub shaft.
- Remove the stub shaft using the -VW 771- and pulling hook - VW 771/37- .



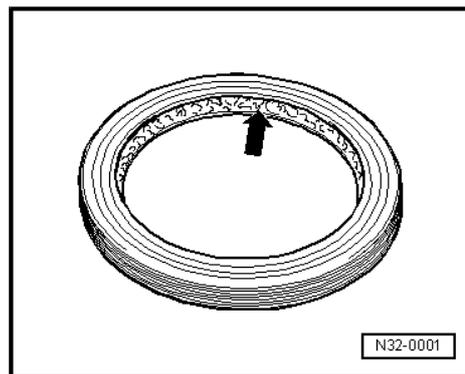
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Installing

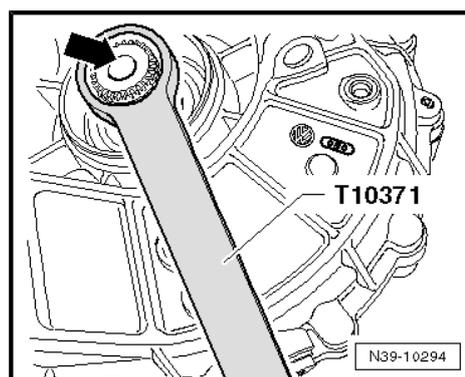
- Lightly lubricate the new seal on the outer circumference and install it all the way in without bending it.



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



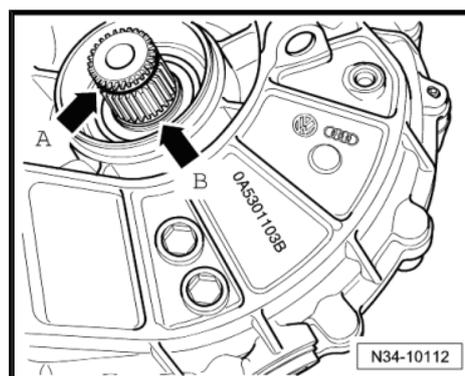
- Counter hold the stub shaft with the -T10371- and tighten the bolt -arrow- to the tightening specification
=> [Item 30 \(page 180\)](#) .



- Then install the new circlip -arrow A- and the new O-ring -arrow B-.

Lubricate the stub shaft splines with grease -G 000 100-

- Install left drive axle. Refer to => Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .
- Check transmission fluid level inside the manual transmission. Refer to
=> ["1.3 Transmission Fluid Level, Checking", page 41](#) .
- Install the noise insulation below the engine/transmission. Refer to => Body Exterior; Rep. Gr. 66 ; Removal and Installation .



3.3 Needle Bearing on Bevel Box Stub Shaft

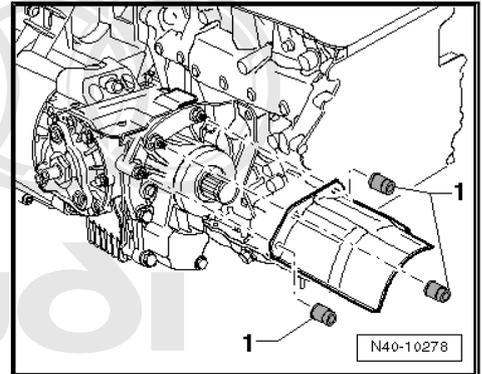
Special tools and workshop equipment required

- ◆ Thrust Plate -VW 401-
- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 407-
- ◆ Thrust Disc -VW 412-
- ◆ Subframe Support Assembling Device -3253/5-
- ◆ Assembly Tool -T10047-
- ◆ Torque Wrench 5-50 Nm -V.A.G 1331-
- ◆ Thrust Ring -VW 470-
- ◆ Socket And Extended Bit -T10107 A-
- ◆ Counter Hold Tool -T10371-
- ◆ Thrust Piece -T40023-
- ◆ -3- Separating Tool 22 to 75 mm , for example, -Kukko 17/1-

- ◆ Drip Tray -V.A.G 1306-
- ◆ Grease -G 000 100-

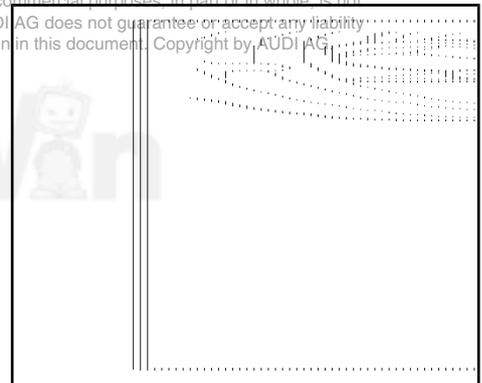
Removing

- Lift the vehicle.
- Remove the noise insulation below engine/transmission. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .
- Remove the nuts -1- and then remove the right drive axle heat shield from the bevel box.
- Removing right drive axle. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .

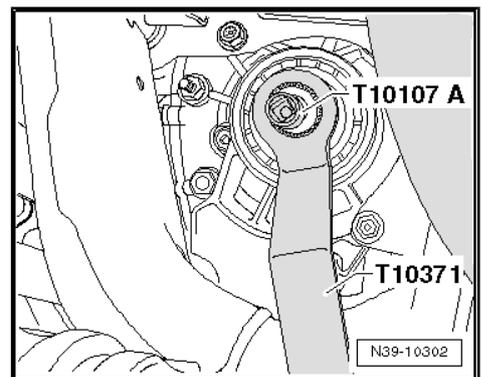


- Remove the circlip -arrow A- and the O-ring -arrow B- from the stub shaft.
- Place the -V.A.G 1306- under the transmission.

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- Remove the right stub shaft bolt.



– Remove the stub shaft:

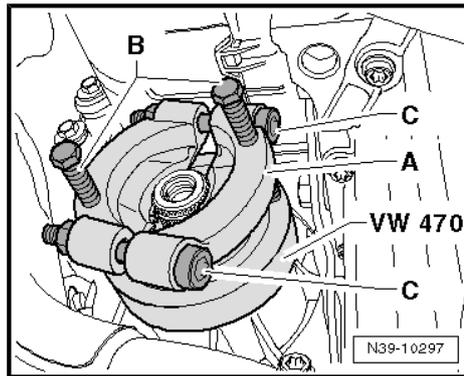
A - Puller from the separating tool 12 to 75 mm , for example - Kukko 17/1-

B - M10 X 90 bolts.

C - M12 x 80 hex socket head bolt with M12 nuts

- Mount the thrust shell for drive pinion bearing -VW 470- with the shoulder onto the bevel box.
- Tension the puller-A- in the seal groove.
- Do not damage the stub shaft splines.
- Remove the stub shaft by removing the bolts -B- alternating from side to side.

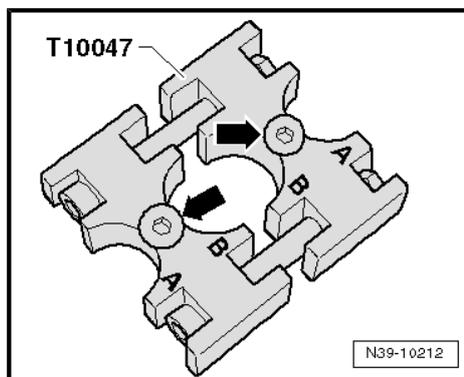
The bolts -B- are supported on the -VW 470- .



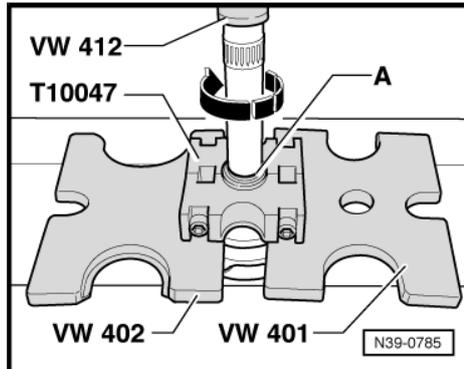
Now assemble the -T10047- as follows:

- Arrange both parts of the tool so that the marks “B” face each other.
- The depressions -arrows- must be under the bearing.
- Attach both halves.

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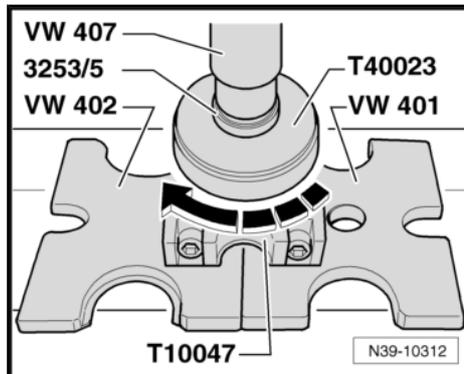


- Pry out needle bearing circlip -A-.
- To prevent the running surface of the bearing on the shaft from being damaged, rotate the shaft while pressing -arrow-.

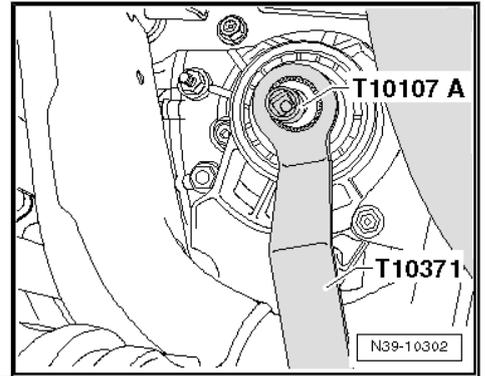


Installing

- Mount the -T10047- (see the previous illustration N39-10212).
- To prevent the running surface of the bearing on the shaft from being damaged, rotate the shaft while pressing -arrow-.
- Secure needle bearing with a new circlip.
- Carefully install the stub shaft into the bevel box using a plastic hammer.



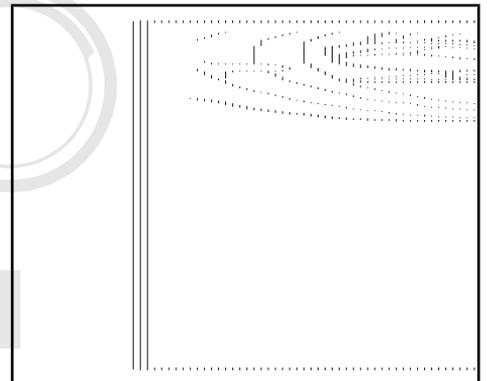
- Secure the stub shaft with the countersunk bolt and tighten the bolt to the tightening specification, [⇒ Item 12 \(page 179\)](#) .



- Then install the new circlip -arrow A- and the new O-ring -arrow B-.

Lubricate the stub shaft splines with grease -G 000 100-

- Install right drive axle. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .

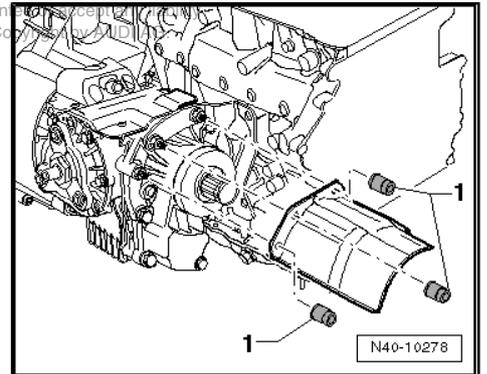


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- Install the drive axle right heat shield. Refer to [⇒ Fig. "Right Drive Axle Heat Shield - Tightening Specification", page 92](#) .

- Check axle oil in the bevel box. Refer to [⇒ "1.2 Gear Oil in Bevel Box, Filling", page 39](#) .

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



3.4 Right Stub Shaft Seal, Bevel Box Installed

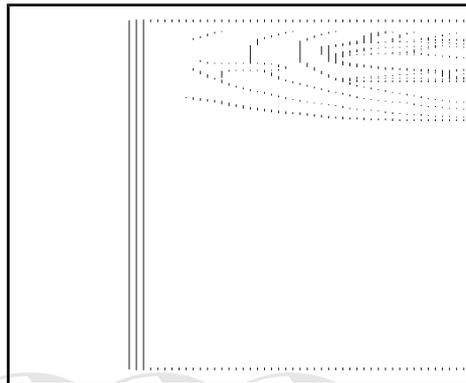
Special tools and workshop equipment required

- ◆ Thrust Piece -T10143-
- ◆ Pulling Hook -T20143-
- ◆ Oil Collecting and Extracting Device -V.A.G 1782-
- ◆ Radial shaft seal sealing grease -G 052 128 A1-
- ◆ Grease -G 000 100-

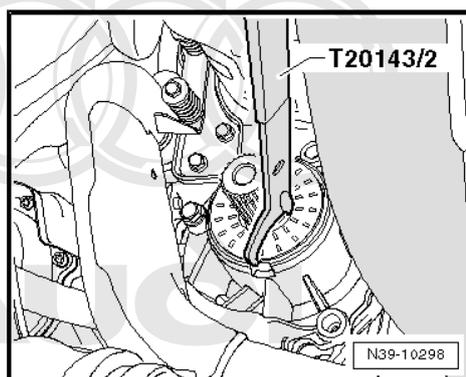
Removing

- Lift the vehicle.
- Remove the noise insulation below engine/transmission. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .

- Removing right drive axle. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .
- Remove the circlip -arrow A- and the O-ring -arrow B- from the stub shaft.
- Place a drip tray under the bevel box.

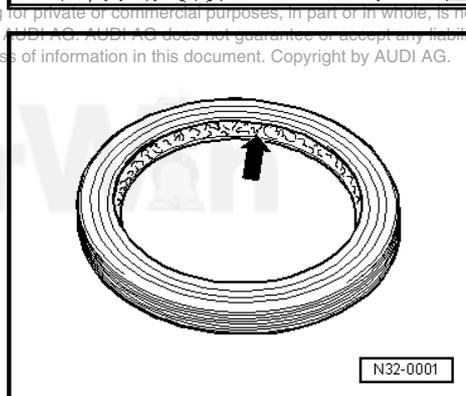


Pry out the sealing ring.

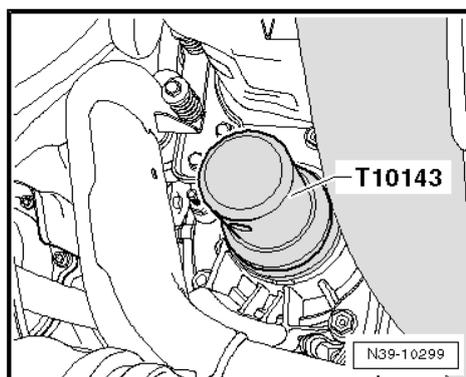


Installing

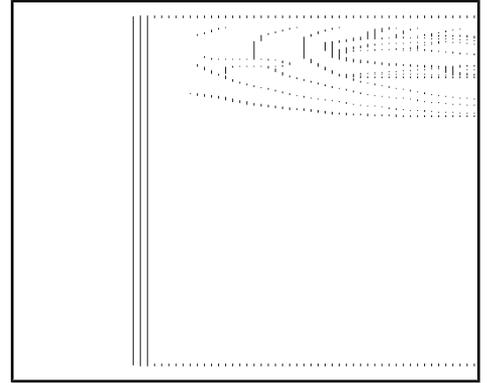
- Fill the space between the sealing and dust lip -arrow- half way with sealing grease -G 052 128 A1- .



- Lightly lubricate the new seal on the outer circumference and install it all the way in without bending it.
- Check axle oil in the bevel box. Refer to ⇒ ["1.1 Gear Oil in Bevel Box, Checking", page 39](#) .



- Install the circlip -arrow A- and the O-ring -arrow B-.
- Lubricate the stub shaft splines with grease -G 000 100- .
- Install the right drive axle. Refer to ⇒ Suspension, Wheels, Steering; Rep. Gr. 40 ; Removal and Installation .
- Install the noise insulation below the engine/transmission. Refer to ⇒ Body Exterior; Rep. Gr. 66 ; Removal and Installation .

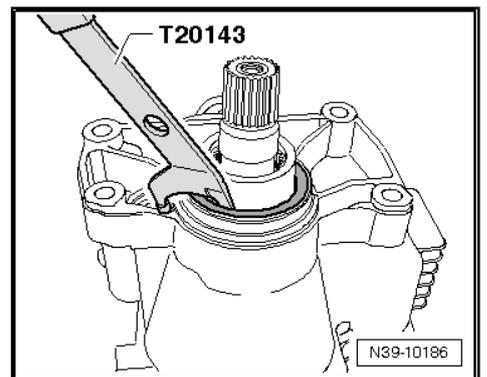


3.5 Seal between Bevel Box and Manual Transmission

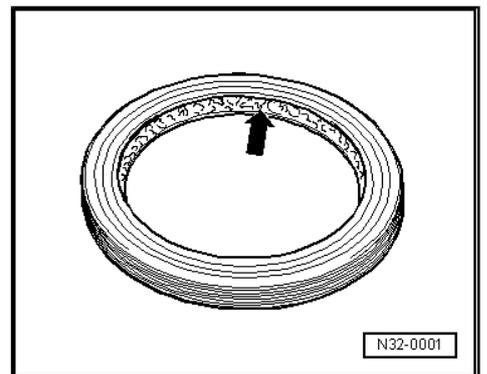
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Special tools and workshop equipment required

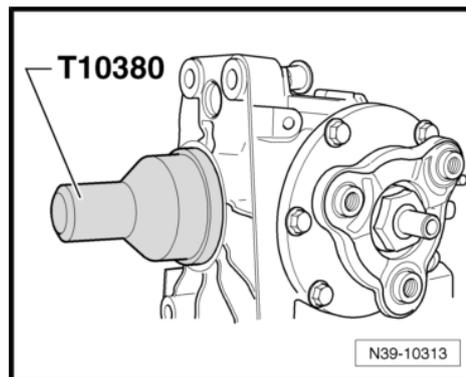
- ◆ Pulling Hook -T20143-
- ◆ Thrust Piece -T10380-
- The bevel box is removed. Refer to ⇒ [“4.1 Bevel Box, Transmission Installed”, page 66](#) .
- Pry out the seal using the -T20143/2- .



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



- Drive in seal until stop.
- Install the bevel box. Refer to ⇒ [page 69](#) .
- Check axle oil in the bevel box. Refer to ⇒ [“1.1 Gear Oil in Bevel Box, Checking”, page 39](#) .
- Check transmission fluid level inside the manual transmission. Refer to ⇒ [“1.3 Transmission Fluid Level, Checking”, page 41](#) .



3.6 Seal between Manual Transmission and Bevel Box, Manual Transmission Installed

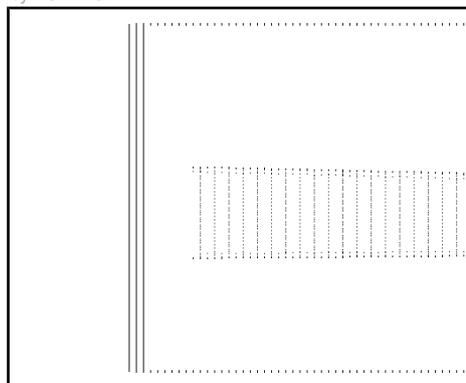
Special tools and workshop equipment required

- ◆ Thrust Piece -T10049-
- ◆ Pulling Hook -T20143-
- ◆ Oil Collecting and Extracting Device -V.A.G 1782-
- ◆ Radial shaft seal sealing grease -G 052 128 A1-

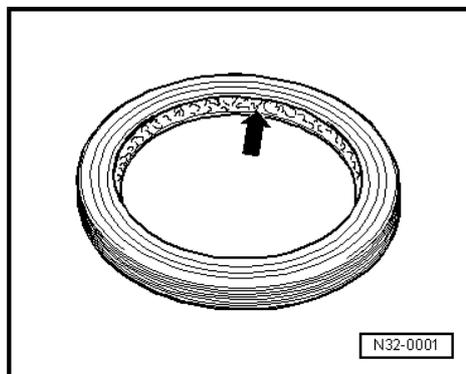
Procedure

- The bevel box is removed. Refer to ⇒ [“4.1 Bevel Box, Transmission Installed”, page 66](#) .
- Place a drip tray under the transmission.
- Pry the bevel box seal out of the clutch housing.

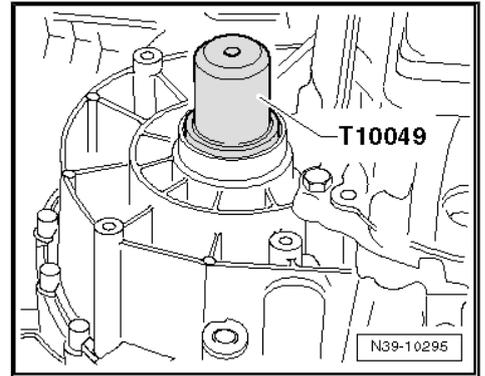
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- Lightly coat the new seal with oil on the outer edge and fill the space between the sealing lips -arrow- halfway with radial shaft seal sealing grease -G 052 128 A1- .



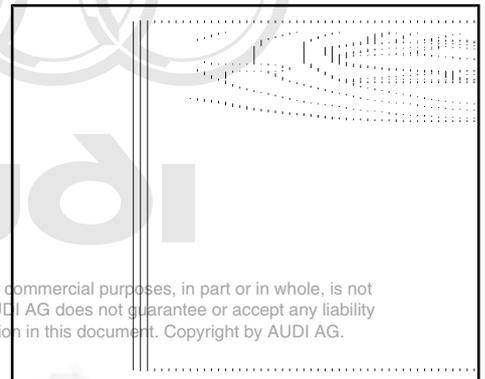
- Install the bevel box seal into the clutch housing all the way without bending it.
- Install the bevel box. Refer to [⇒ page 69](#) .
- Check transmission fluid level inside the manual transmission. Refer to [⇒ "1.3 Transmission Fluid Level, Checking", page 41](#) .
- Check axle oil in the bevel box. Refer to [⇒ "1.1 Gear Oil in Bevel Box, Checking", page 39](#) .



3.7 Stub Shaft Seals, Bevel Box Removed

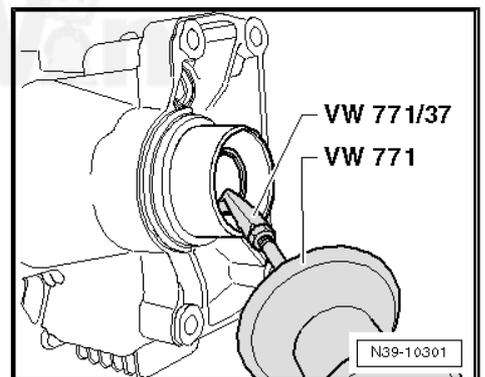
Special tools and workshop equipment required

- ◆ Slide Hammer-Complete Set -VW 771- and Additional Part for VW 771 -VW 771/37-
- ◆ Pulling Hook -T20143-
- ◆ Thrust Piece -T10143-
- ◆ Thrust Piece -T10379-
- The bevel box is removed. Refer to [⇒ "4.1 Bevel Box, Transmission Installed", page 66](#) .
- Remove the circlip -arrow A- and the O-ring -arrow B- from the stub shaft.
- Carefully remove the stub shaft from the bevel box.

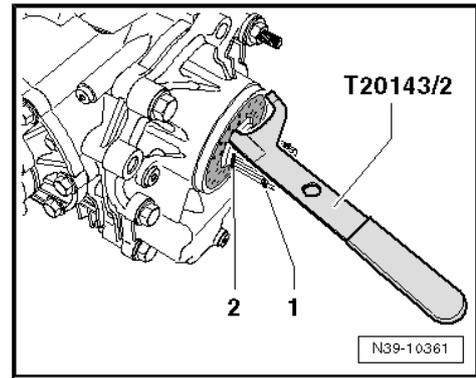


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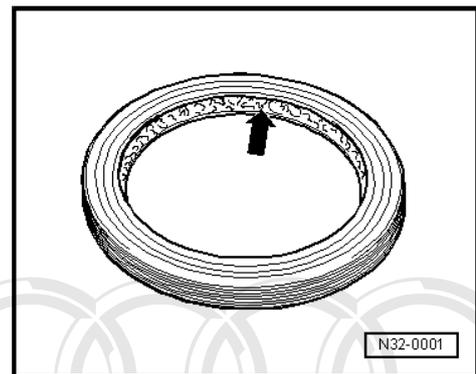
- Remove the stub shaft seal on the transmission side.



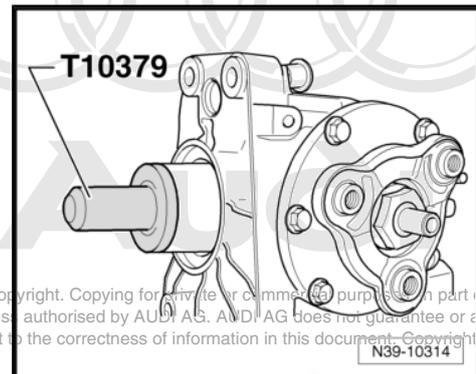
Pry out the stub shaft seal on the drive axle side.



- Fill the space on the seals between the sealing and dust lip -arrow- halfway with sealing grease -G 052 128 A1- .
- Lightly oil new seals on outer circumference.

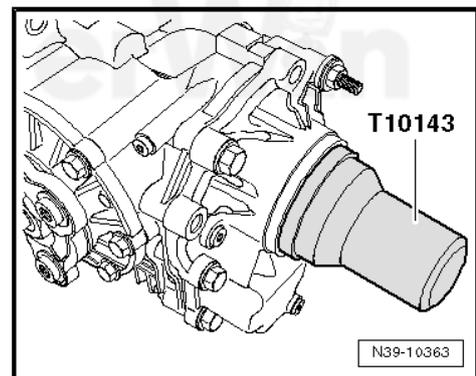


- Install the seal on the transmission side all the way.



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- Install the seal on the drive axle side all the way.
- Carefully install the stub shaft into the bevel box using a plastic hammer.
- Install the bevel box. Refer to [⇒ page 69](#) .
- Check axle oil in the bevel box. Refer to [⇒ "1.1 Gear Oil in Bevel Box, Checking", page 39](#) .



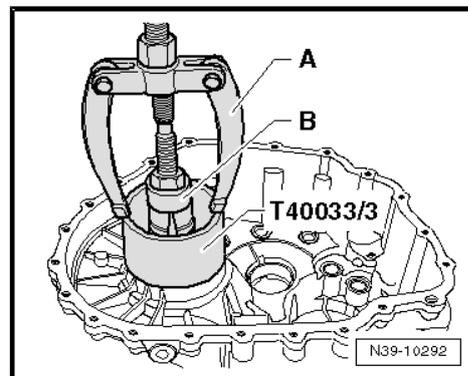
4 Disassembly and Assembly

⇒ ["4.1 Differential", page 197](#)

4.1 Differential

Special tools and workshop equipment required

- ◆ Thrust Plate -VW 401-
- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 408 A-
- ◆ Thrust Disc -VW 412-
- ◆ Subframe Support Assembling Device -T40033/3-
- ◆ Thrust Piece -T10266-
- ◆ Assembling Device -3291/2-
- ◆ Thrust Pad -VW 472/1-
- ◆ Thrust Piece -40 - 105-
- ◆ Pressure Sleeve -T10299-
- ◆ Internal Puller 56 to 70 mm -Kukko 21/8-
- ◆ Counter-Support -Kukko 22/2-
- ◆ Two-Arm Puller -Kukko 20/10-



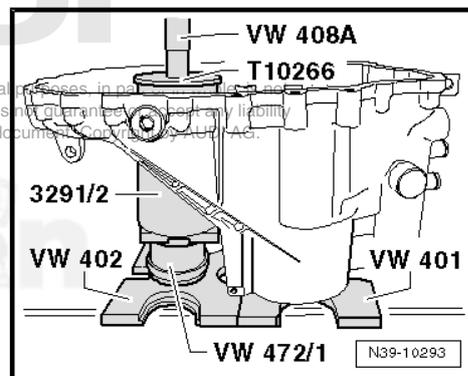
Removing the Outer Race/Tapered Roller Bearing from the Transmission Housing.

A - Counter-support , for example, -Kukko 22/2-

B - Internal puller 56 to 70 mm , for example, -Kukko 21/8-

Installing the Outer Race/Tapered Roller Bearing into the Transmission Housing.

- Support the transmission housing with the -3291/2- directly under the bearing mount.



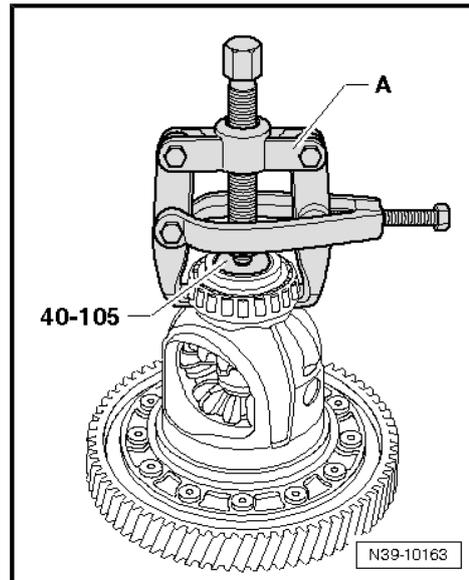
Removing the Inner Race/Tapered Roller Bearing in the Transmission Housing and Bearing in the Clutch Housing.

 **Note**

Both tapered roller bearing inner races are removed from the differential housing in the same way.

- Tension the puller -A- in area of flattened side of differential housing below inner race.

A - For example two-arm puller -Kukko 20/10-

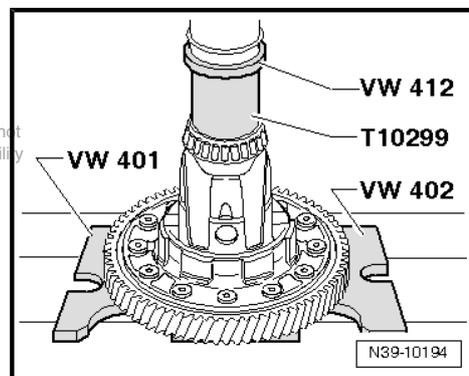


Installing the inner Race/Tapered Roller Bearing in the Transmission Housing and Bearing in the Clutch Housing.

 **Note**

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Both differential housing tapered roller bearing inner races are installed in the same way.



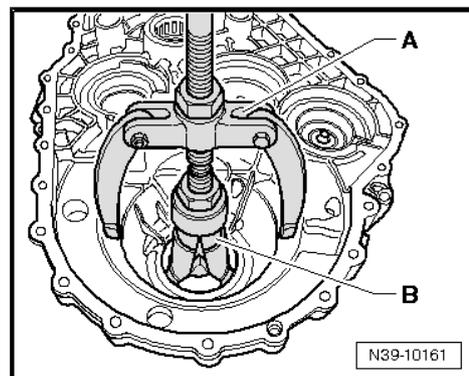
Removing the outer Race/Tapered Roller Bearing from the Clutch Housing.

A - Counter-support , for example, -Kukko 22/2-

B - Internal puller 56 to 70 mm , for example, -Kukko 21/8-

 **Note**

After removing, replace the damaged shim.

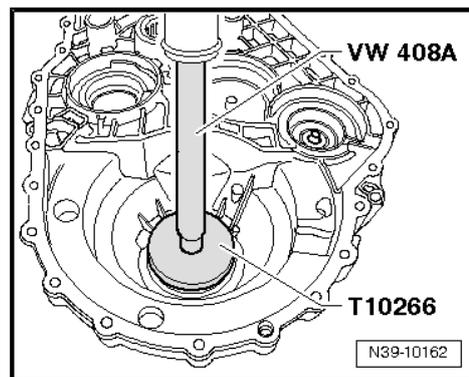


Installing Outer Race/Tapered Roller Bearing into the Clutch Housing.

- Install the washer and the shim beforehand.

 **Note**

Note installation position of washer, shoulder on inner diameter points toward seal.



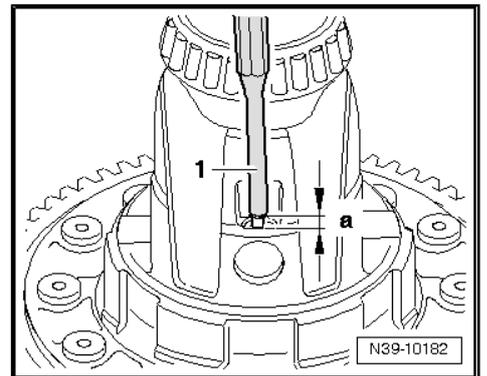
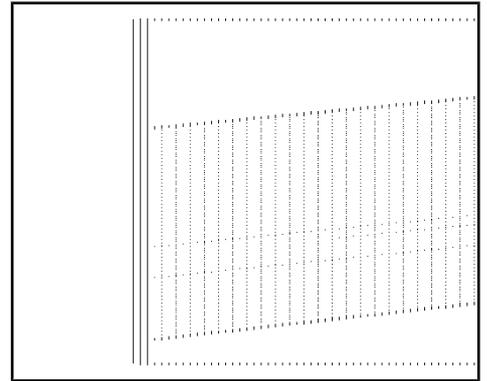
Removing the Spring Pin for the Differential Bevel Gear Axle

- Cover the inner race/tapered roller bearing in order to prevent possible damage and entry of shavings.
- Remove the adapter sleeve using a chisel.

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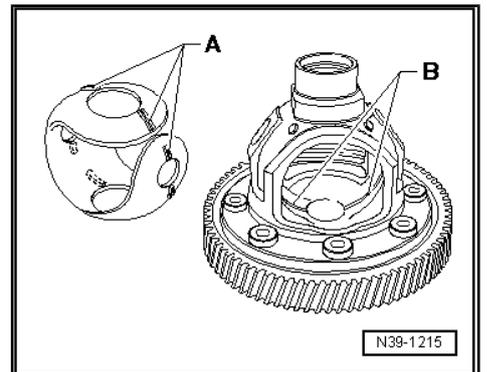
Installing the Spring Pin for the Differential Bevel Gear Axle

- Align the hole in the differential bevel gear axle to the hole in the differential housing.
- Install the adapter sleeve to dimension $a = 3 \pm 0.5$ mm using a drift -1-.



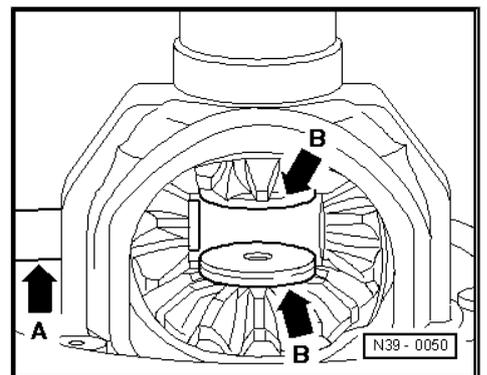
Inserting the Thrust Washer Union.

- Coat the thrust washer union with transmission fluid.
- Install the thrust washer union so that the ridge -A- fits into the groove -B- in the differential housing.



Installing the Differential Planetary Gears and Differential Bevel Gear Axle

- Install the thrust washer union with transmission fluid. Refer to [⇒ Fig. "Inserting the Thrust Washer Union.", page 199](#)
- Insert both large differential bevel gears and secure (for example, with stub shaft).
- Insert the small differential planetary gears 180° offset and pivot them into position.
- Press the differential bevel gear -arrow A- up to the first small differential bevel gear.
- Install the threaded piece -arrows B- into the large differential bevel gear.



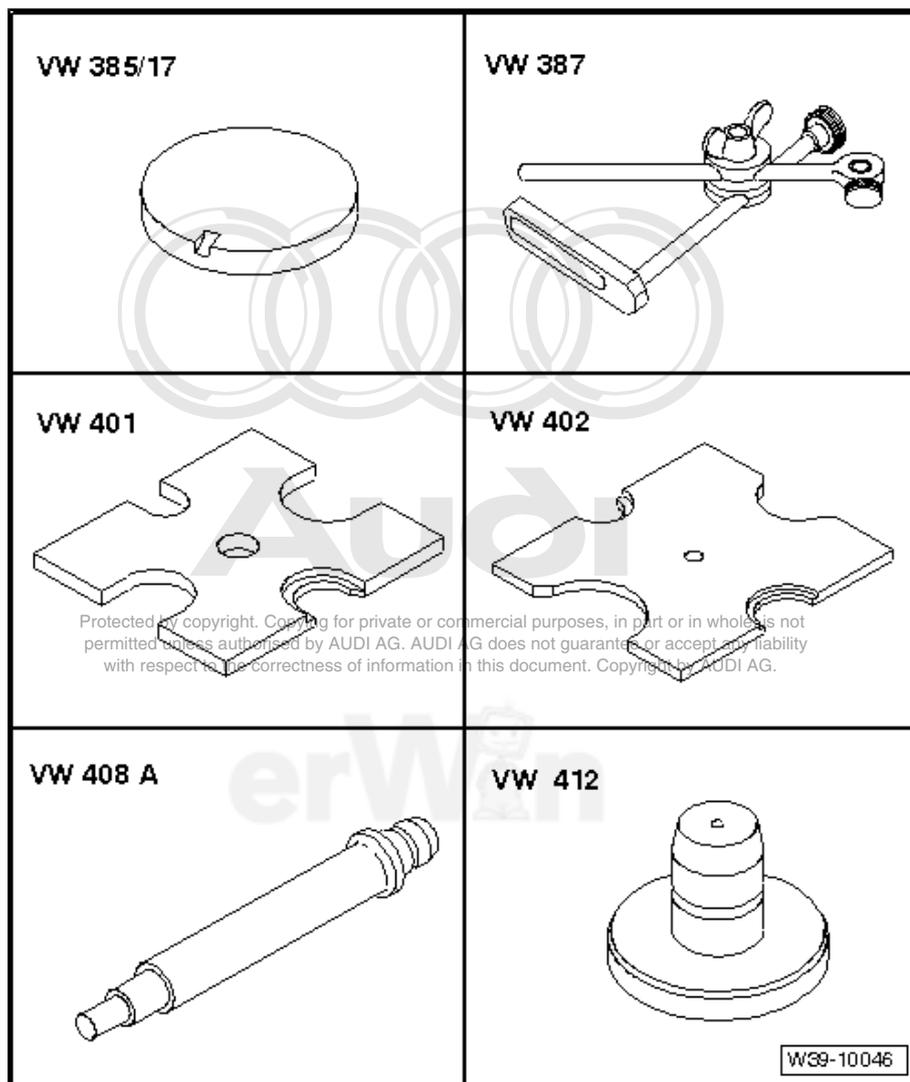
Installed position: Collar toward the differential bevel gear

- Drive differential planetary gear axle into final position and secure with spring pin. Refer to [⇒ Fig. "Installing the Spring Pin for the Differential Bevel Gear Axle", page 199](#).

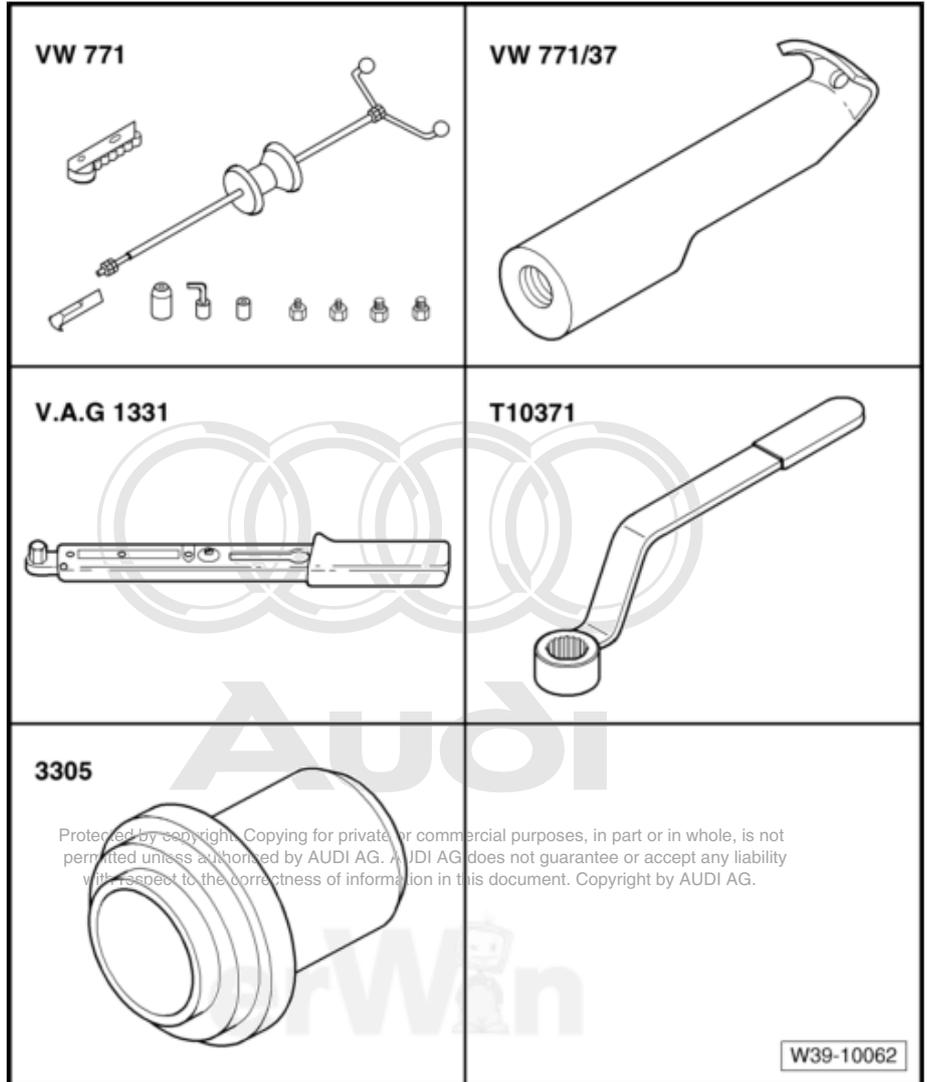
5 Special Tools

Special tools and workshop equipment required

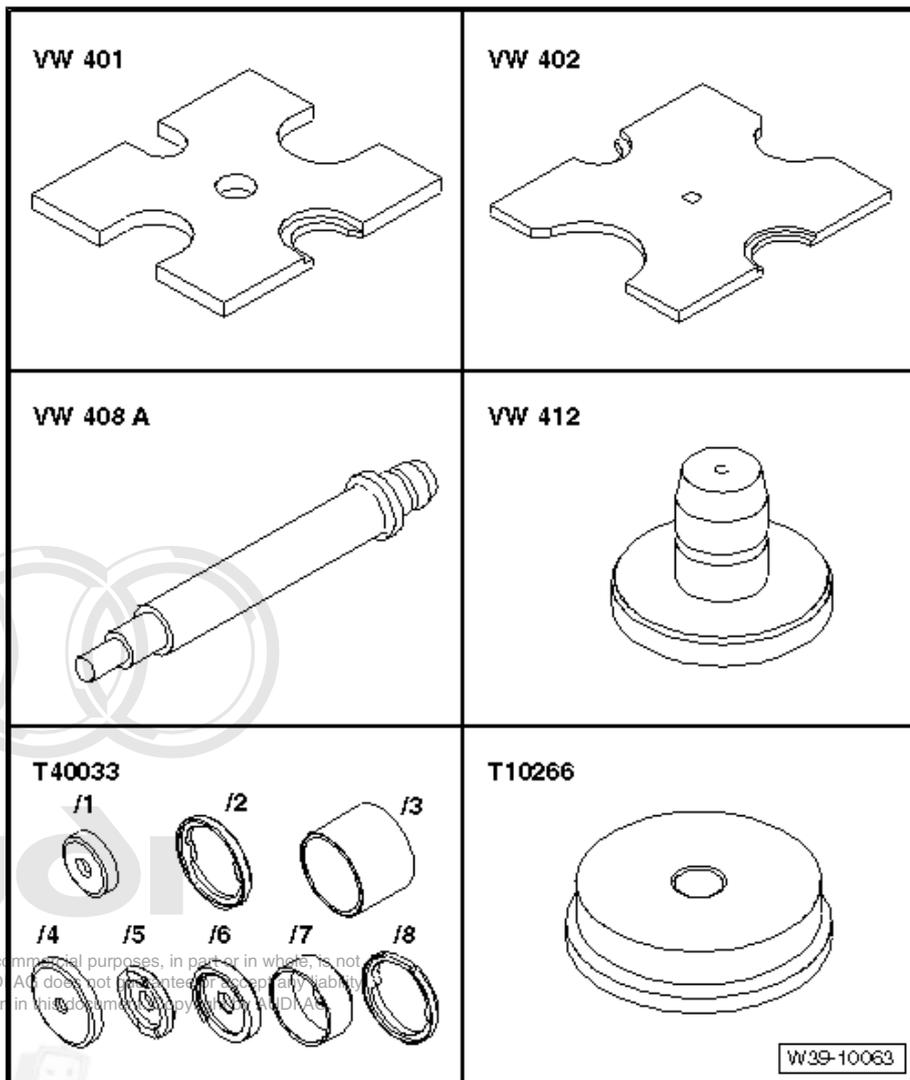
- ◆ Magnetic Plate 50 mm Dia. -385/17-
- ◆ Dial Gauge Holder -VW 387-
- ◆ Thrust Plate -VW 401-
- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 407-
- ◆ Thrust Disc -VW 412-



- ◆ Slide Hammer-Complete Set -VW 771-
- ◆ Pulling Hook -VW 771/37-
- ◆ Torque Wrench 5-50 Nm - V.A.G 1331-
- ◆ Counter Hold Tool - T10371-
- ◆ Thrust Piece -3305-

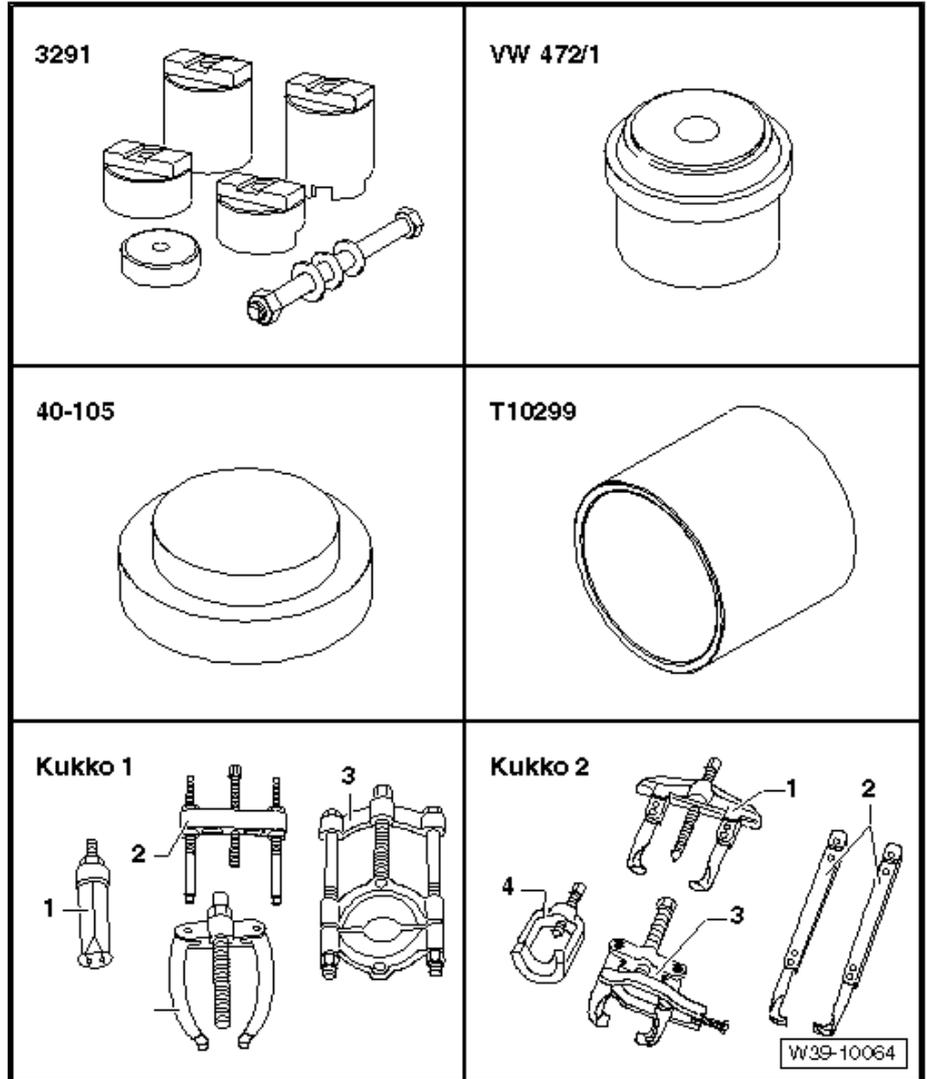


- ◆ Thrust Plate -VW 401-
- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 408 A-
- ◆ Thrust Disc -VW 412-
- ◆ Subframe Support Assembling Device -T40033/3-
- ◆ Thrust Piece -T10266-



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- ◆ Assembling Device -3291/2-
- ◆ Thrust Pad -VW 472/1-
- ◆ Thrust Piece -40 - 105-
- ◆ Pressure Sleeve -T10299-
- ◆ -1- for example Internal Puller 56 to 70 mm -Kukko 21/8-
- ◆ -4- for example Counter-Support -Kukko 22/2-
- ◆ -1- for example Two-Arm Puller -Kukko 20/10-



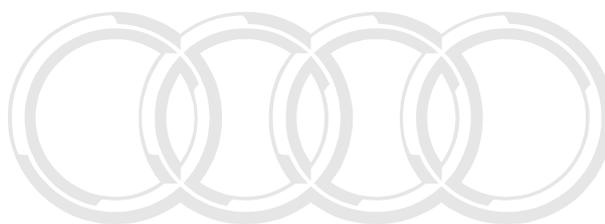
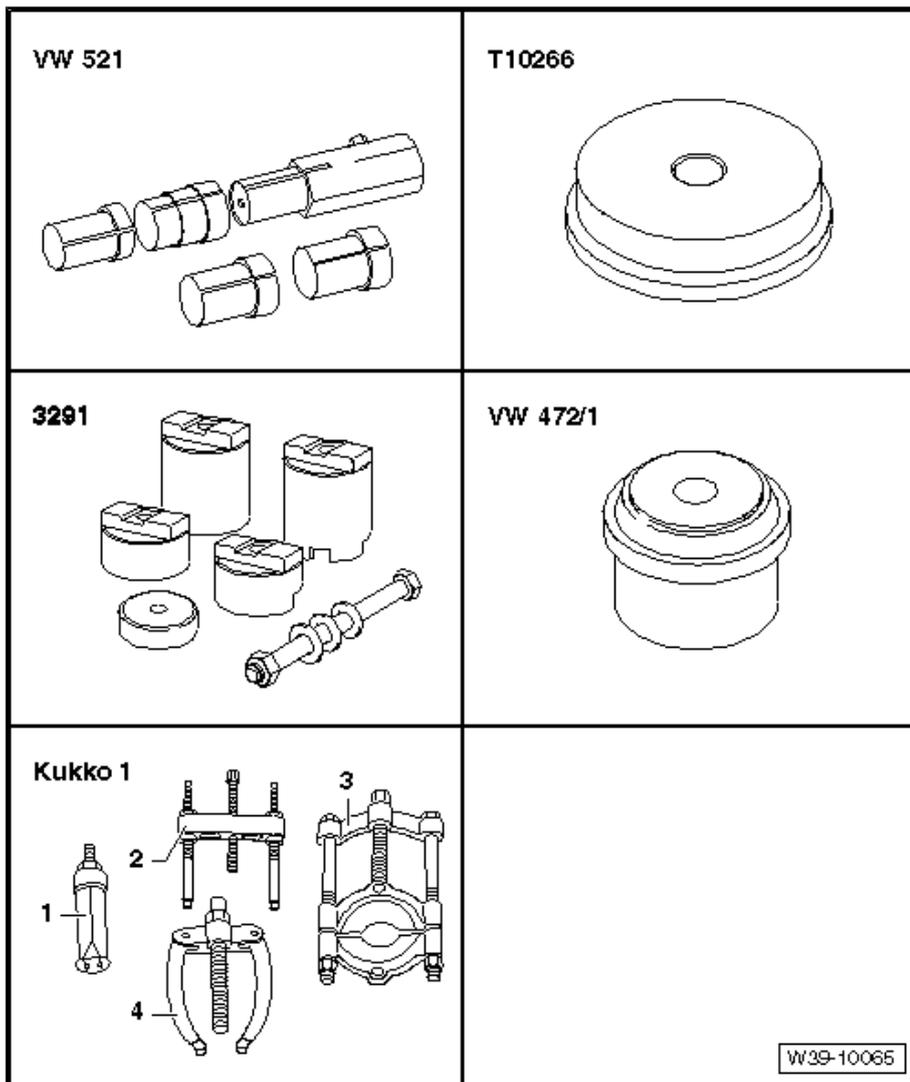
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- ◆ Crown Wheel Adjustment Device -VW 521-
- ◆ Thrust Piece -T10266-
- ◆ Assembling Device -3291/2-
- ◆ Thrust Pad -VW 472/1-
- ◆ -1- for example Internal Puller 56 to 70 mm -Kukko 21/8-
- ◆ -4- for example Counter-Support -Kukko 22/2-

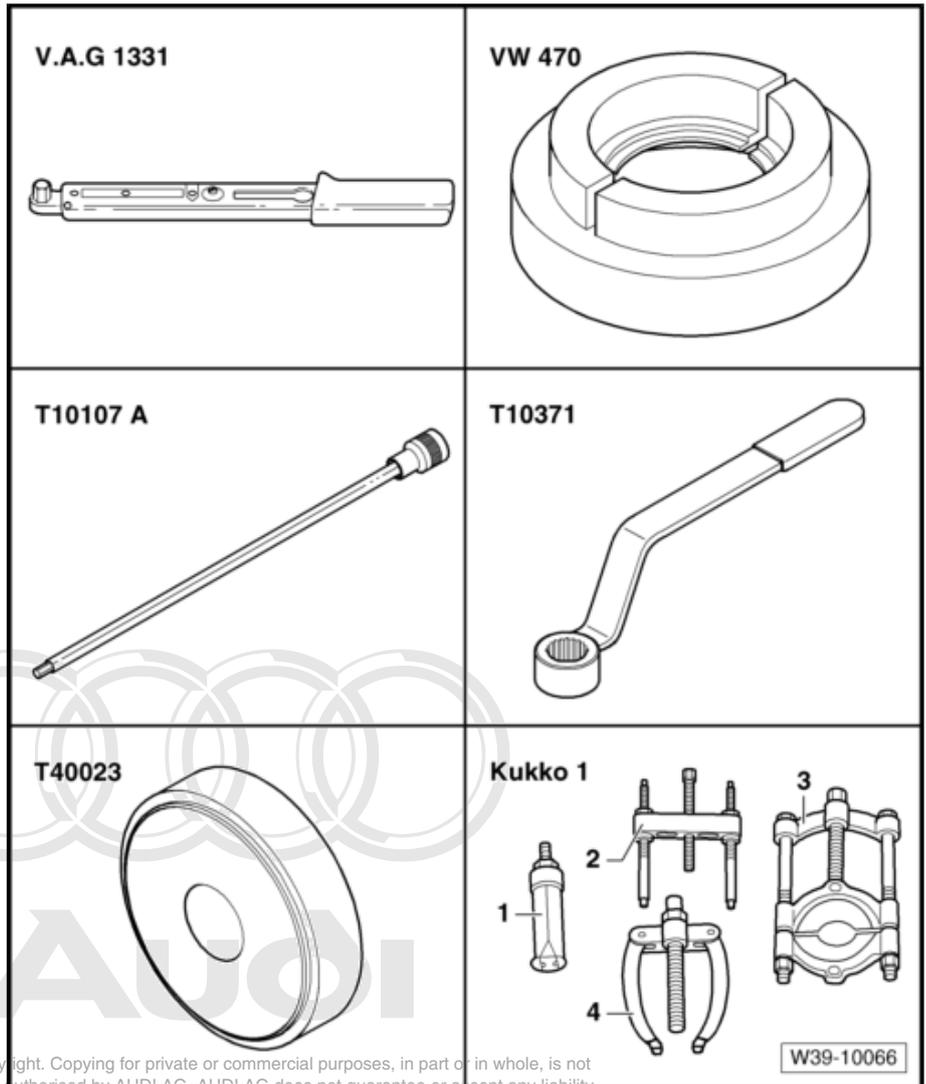


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- ◆ Torque Wrench 5-50 Nm - V.A.G 1331-
- ◆ Thrust Ring -VW 470-
- ◆ Socket And Extended Bit - T10107 A-
- ◆ Counter Hold Tool - T10371-
- ◆ Thrust Piece -T40023-
- ◆ -3- Separating Tool 22 to 75 mm , for example, -Kukko 17/1-
- ◆ Grease -G 000 100-

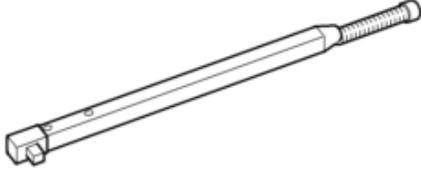
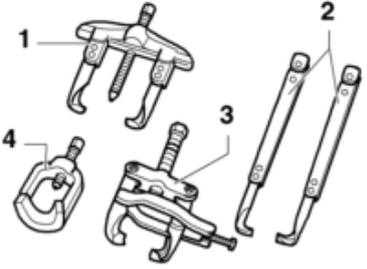
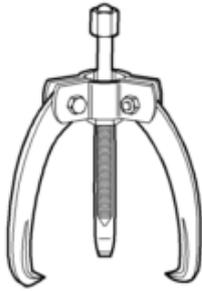
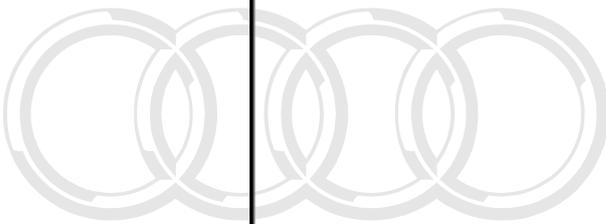


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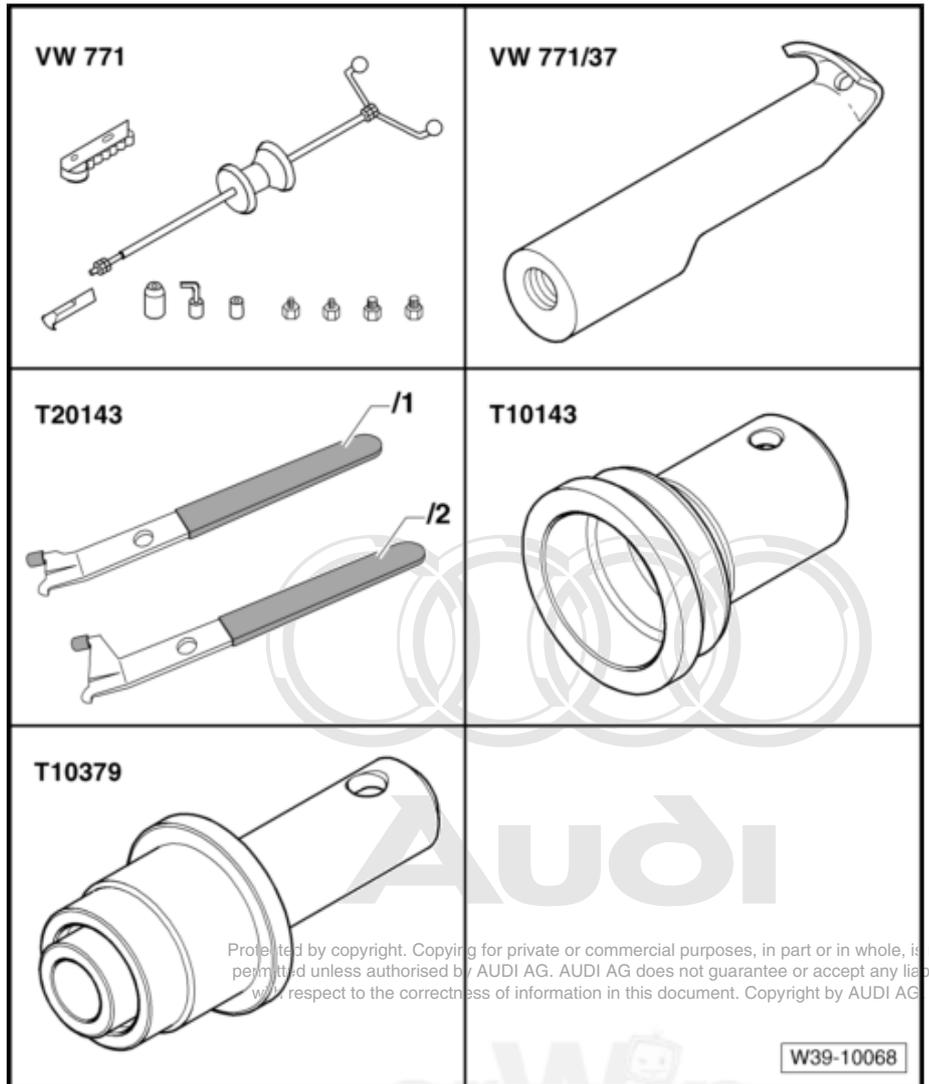
- ◆ Torque Wrench -V.A.G 1601-
- ◆ -1- Two-Arm Puller -Kukko 20/10-
- ◆ Three-Arm Puller -Kukko 45-2-

<p>V.A.G 1601</p> 	<p>Kukko 2</p> 
<p>45-2</p> 	
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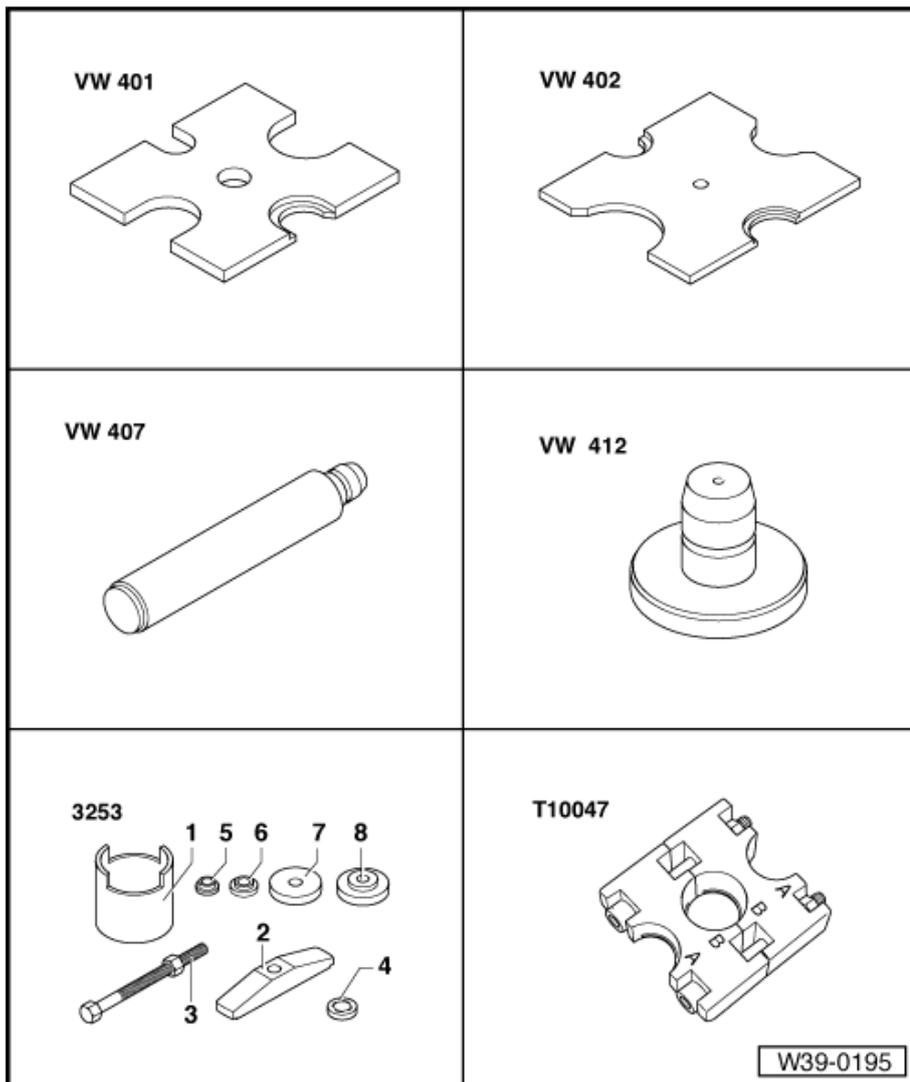
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- ◆ Slide Hammer-Complete Set -VW 771- and Additional Part for VW 771 - VW 771/37-
- ◆ Pulling Hook -T20143-
- ◆ Thrust Piece -T10143-
- ◆ Thrust Piece -T10379-



- ◆ Thrust Plate -VW 401-
- ◆ Thrust Plate -VW 402-
- ◆ Punch -VW 407-
- ◆ Thrust Disc -VW 412-
- ◆ Subframe Support Assembling Device -3253/5-
- ◆ Assembly Tool -T10047-

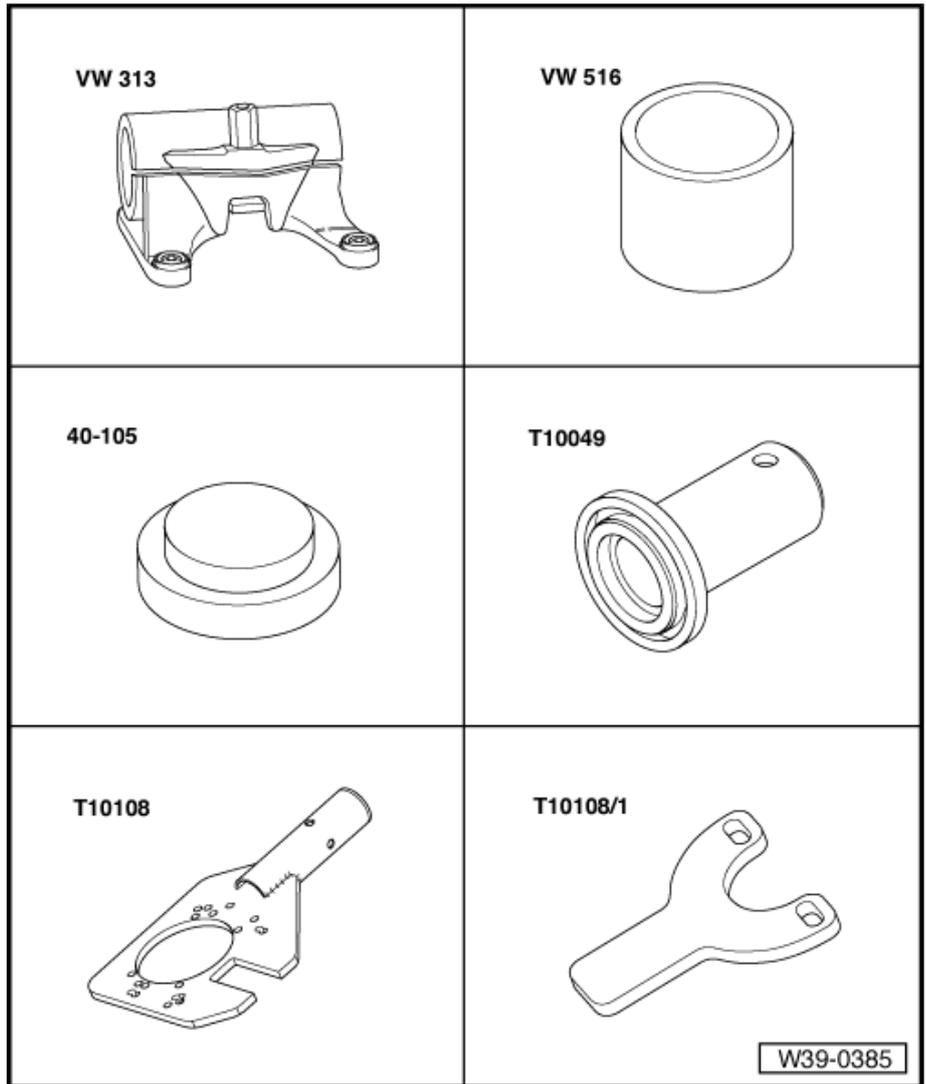


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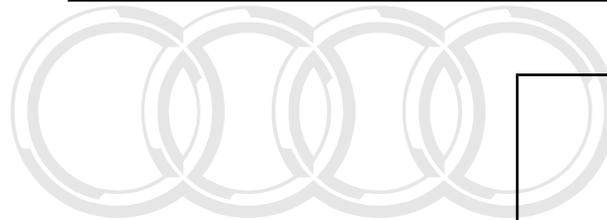
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- ◆ Holding Fixture -VW 313-
- ◆ Tube 42 mm Dia. -VW 516-
- ◆ Thrust Piece -40-105-
- ◆ Thrust Piece -T10049-
- ◆ Transmission Support - T10108-
- ◆ Stop Plate -T10108/1-

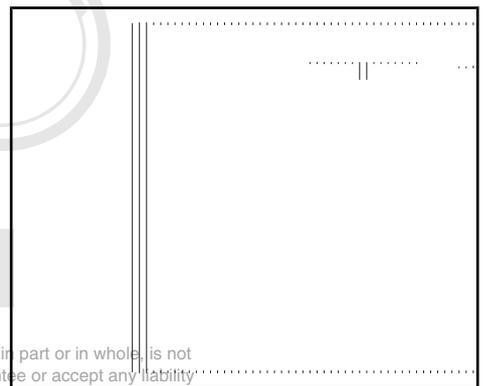


- ◆ Thrust Piece -T10143-



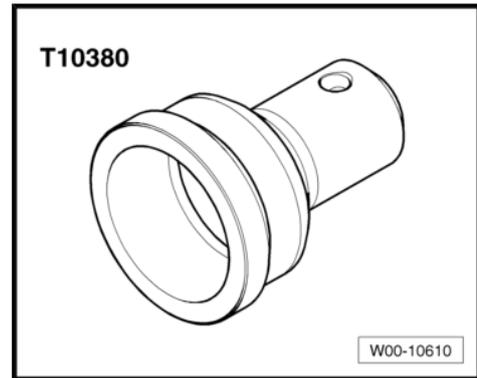
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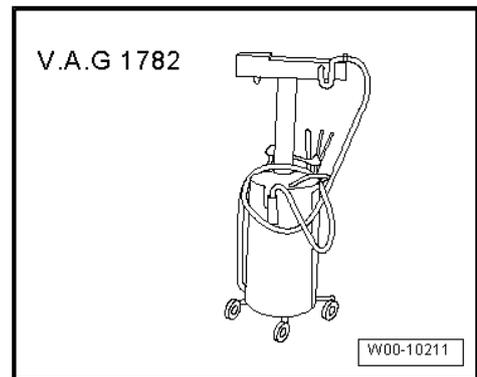


◆ Thrust Piece -T10380-



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

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◆ Not illustrated:

◆ Drip Tray -V.A.G 1306-

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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.

Cautions & Warnings

- Do not re-use any fasteners that are worn or deformed in normal use. Some fasteners are designed to be used only once and are unreliable and may fail if used a second time. This includes, but is not limited to, nuts, bolts, washers, circlips and cotter pins. Always follow the recommendations in this manual - replace these fasteners with new parts where indicated, and any other time it is deemed necessary by inspection.
- Illuminate the work area adequately but safely. Use a portable safety light for working inside or under the vehicle. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled fuel or oil.
- Friction materials such as brake pads and clutch discs may contain asbestos fibers. Do not create dust by grinding, sanding, or by cleaning with compressed air. Avoid breathing asbestos fibers and asbestos dust. Breathing asbestos can cause serious diseases such as asbestosis or cancer, and may result in death.
- Finger rings should be removed so that they cannot cause electrical shorts, get caught in running machinery, or be crushed by heavy parts.
- Before starting a job, make certain that you have all the necessary tools and parts on hand. Read all the instructions thoroughly, do not attempt shortcuts. Use tools that are appropriate to the work and use only replacement parts meeting Audi specifications. Makeshift tools, parts and procedures will not make good repairs.
- Catch draining fuel, oil or brake fluid in suitable containers. Do not use empty food or beverage containers that might mislead someone into drinking from them. Store flammable fluids away from fire hazards. Wipe up spills at once, but do not store the oily rags, which can ignite and burn spontaneously.
- Use pneumatic and electric tools only to loosen threaded parts and fasteners. Never use these tools to tighten fasteners, especially on light alloy parts. Always use a torque wrench to tighten fasteners to the tightening torque listed.
- Keep sparks, lighted matches, and open flame away from the top of the battery. If escaping hydrogen gas is ignited, it will ignite gas trapped in the cells and cause the battery to explode.
- Be mindful of the environment and ecology. Before you drain the crankcase, find out the proper way to dispose of the oil. Do not pour oil onto the ground, down a drain, or into a stream, pond, or lake. Consult local ordinances that govern the disposal of wastes.
- The air-conditioning (A/C) system is filled with a chemical refrigerant that is hazardous. The A/C system should be serviced only by trained automotive service technicians using approved refrigerant recovery/recycling equipment, trained in related safety precautions, and familiar with regulations governing the discharging and disposal of automotive chemical refrigerants.
- Before doing any electrical welding on vehicles equipped with anti-lock brakes (ABS), disconnect the battery negative terminal (ground strap) and the ABS control module connector.
- Do not expose any part of the A/C system to high temperatures such as open flame. Excessive heat will increase system pressure and may cause the system to burst.

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Cautions & Warnings

- When boost-charging the battery, first remove the fuses for the Engine Control Module (ECM), the Transmission Control Module (TCM), the ABS control module, and the trip computer. In cases where one or more of these components is not separately fused, disconnect the control module connector(s).
- Some of the vehicles covered by this manual are equipped with a supplemental restraint system (SRS), that automatically deploys an airbag in the event of a frontal impact. The airbag is operated by an explosive device. Handled improperly or without adequate safeguards, it can be accidentally activated and cause serious personal injury. To guard against personal injury or airbag system failure, only trained Audi Service technicians should test, disassemble or service the airbag system.
- Do not quick-charge the battery (for boost starting) for longer than one minute, and do not exceed 16.5 volts at the battery with the boosting cables attached. Wait at least one minute before boosting the battery a second time.
- Never use a test light to conduct electrical tests of the airbag system. The system must only be tested by trained Audi Service technicians using the VAG 1551 Scan Tool (ST) or an approved equivalent. The airbag unit must never be electrically tested while it is not installed in the vehicle.
- Some aerosol tire inflators are highly flammable. Be extremely cautious when repairing a tire that may have been inflated using an aerosol tire inflator. Keep sparks, open flame or other sources of ignition away from the tire repair area. Inflate and deflate the tire at least four times before breaking the bead from the rim. Completely remove the tire from the rim before attempting any repair.
- When driving or riding in an airbag-equipped vehicle, never hold test equipment in your hands or lap while the vehicle is in motion. Objects between you and the airbag can increase the risk of injury in an accident.

I have read and I understand these Cautions and Warnings.



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