

Workshop Manual

Audi Q3 2012 ➤

Audi Q3 China 2013 ➤

6-speed manual gearbox 0A6

Edition 06.2013



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List of Workshop Manual Repair Groups

Repair Group

00 - Technical data

30 - Clutch

34 - Controls, housing

35 - Gears, shafts

39 - Final drive - front 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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00 – Technical data

1 Identification

(ARL003359; Edition 06.2013)

⇒ ["1.1 Gearbox identification", page 1](#)

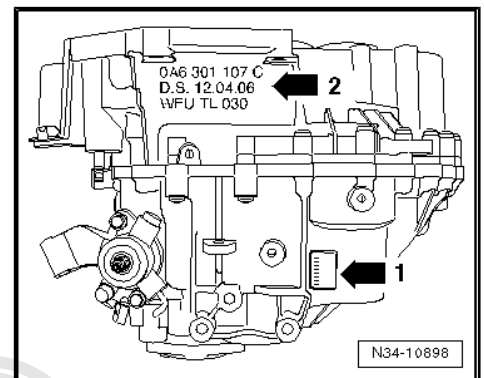
⇒ ["1.2 Bevel box identification", page 2](#)

1.1 Gearbox identification

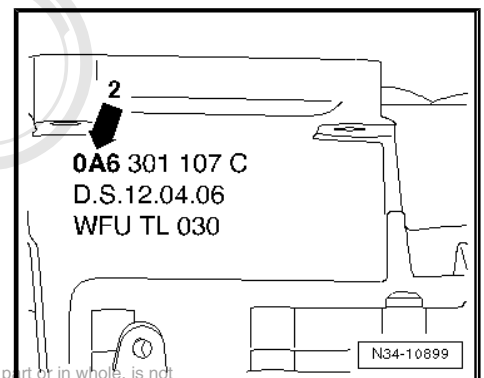
The 6-speed manual gearbox 0A6, front-wheel drive/four-wheel drive is installed in the Audi Q3 2012 ►. Allocation ⇒ [page 3](#).

Location on gearbox

- ◆ Code letters and production date -arrows-



Manual gearbox 0A6 -arrow 2-



Code letters and date of manufacture of gearbox -arrow 1-

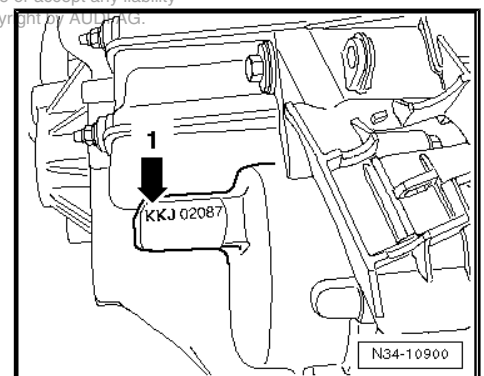
Example:	KKJ	02	08	7
	Code letters	Day	Month	Year of manufacture (2007)

Additional data identify the factory where the unit was built.



Note

- ◆ The code letters for the gearbox are also given on the vehicle data stickers.
- ◆ Location of vehicle data stickers ⇒ Maintenance ; Booklet 820.

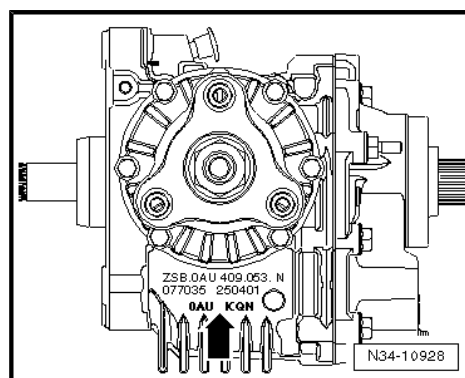




1.2 Bevel box identification

The bevel box 0A6 is used in conjunction with the 6-speed manual gearbox 0A6 (four-wheel drive).

Code letters and part number of bevel box -arrow-



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2 Technical data

⇒ [“2.1 Allocation of gearbox to engine”, page 3](#)

⇒ [“2.2 Capacities”, page 4](#)

⇒ [“2.3 Calculating gear ratios”, page 4](#)

2.1 Allocation of gearbox to engine

⇒ [“2.1.1 Allocation of gearbox to engine - 6-speed manual gearbox 0A6, front-wheel drive”, page 3](#)

⇒ [“2.1.2 Allocation of gearbox to engine - 6-speed manual gearbox 0A6, four-wheel drive”, page 3](#)

2.1.1 Allocation of gearbox to engine - 6-speed manual gearbox 0A6, front-wheel drive

Manual gearbox		6-speed 0A6 (front-wheel drive)		
Code letters		NGJ		
Allocation	Model Engine	Q3 2012 ► 2.0 ltr. TDI 130 kW		
Ratio	Final drive I for 1st/2nd gear	66 : 15 = 4.400		
Z ₂ : Z ₁ = i	Final drive II for 3rd/4th gear	66 : 20 = 3.300		
	Final drive III for reverse gear	66 : 18 = 3.667		
The following data can be found in the ⇒ Electronic parts catalogue . ♦ Production data ♦ Individual gear ratios ♦ Allocation of drive shaft flanges ♦ Allocation of clutch type				

2.1.2 Allocation of gearbox to engine - 6-speed manual gearbox 0A6, four-wheel drive

Manual gearbox		6-speed 0A6, four-wheel drive		
Code letters		NGH		
Allocation	Model Engine	Q3 2012 ► 2.0 ltr. TDI 130 kW		
Ratio	Final drive I for 1st/2nd gear	64 : 15 = 4.267		
Z ₂ : Z ₁ = i	Final drive II for 3rd/4th gear	64 : 21 = 3.048		
	Final drive III for reverse gear	64 : 19 = 3.368		



Manual gearbox	6-speed 0A6, four-wheel drive		
Code letters	NGH		
The following data can be found in the ⇒ Electronic parts catalogue . ◆ Production data ◆ Individual gear ratios ◆ Allocation of drive shaft flanges ◆ Allocation of clutch type ◆ Allocation of bevel box ◆ Rear final drive identification			



Note

The 5th and 6th gear wheels are located on the output shaft.

2.2 Capacities

⇒ ["2.2.1 Capacities - 6-speed manual gearbox 0A6, front-wheel drive", page 4](#)

⇒ ["2.2.2 Capacities - 6-speed manual gearbox 0A6, four-wheel drive", page 4](#)

2.2.1 Capacities - 6-speed manual gearbox 0A6, front-wheel drive

Manual gearbox	6-speed 0A6 (front-wheel drive)
Capacity of manual gearbox	2.3 ltr.
◆ Gear oil specifications ⇒ Electronic parts catalogue	

– Checking gear oil level (manual gearbox) ⇒ [page 134](#)

2.2.2 Capacities - 6-speed manual gearbox 0A6, four-wheel drive

Manual gearbox	6-speed 0A6, four-wheel drive
Gear oil capacity in manual gearbox	2.3 ltr.
Gear oil capacity in bevel box	0.9 ltr.
◆ Gear oil specifications ⇒ Electronic parts catalogue	
◆ Gear oil specifications (bevel box) ⇒ Electronic parts catalogue	

– Checking gear oil level (manual gearbox) ⇒ [page 134](#)

– Checking gear oil level (bevel box) ⇒ [page 212](#)

– Draining and filling gear oil ⇒ [page 213](#)

2.3 Calculating gear ratios

Example:

	6th gear	Final drive
Driving gear	ZG ₁ = 34	ZA ₁ = 22

	6th gear	Final drive
Driven gear	$Z_{G2} = 31$	$Z_{A2} = 72$

$$i = Z_{G2} : Z_{G1} \text{ } ^{1)}$$

$$i_G = \text{gear ratio} = Z_{G2} : Z_{G1} = 31 : 34 = 0.912$$

$$i_A = \text{axle ratio} = Z_{A2} : Z_{A1} = 72 : 22 = 3.273$$

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

1) Z_1 = number of teeth on driving gear, Z_2 = number of teeth on driven gear



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3 Transmission layout

⇒ "3.1 Transmission layout - front-wheel drive", page 6

⇒ "3.2 Transmission layout - four-wheel drive", page 7

3.1 Transmission layout - front-wheel drive

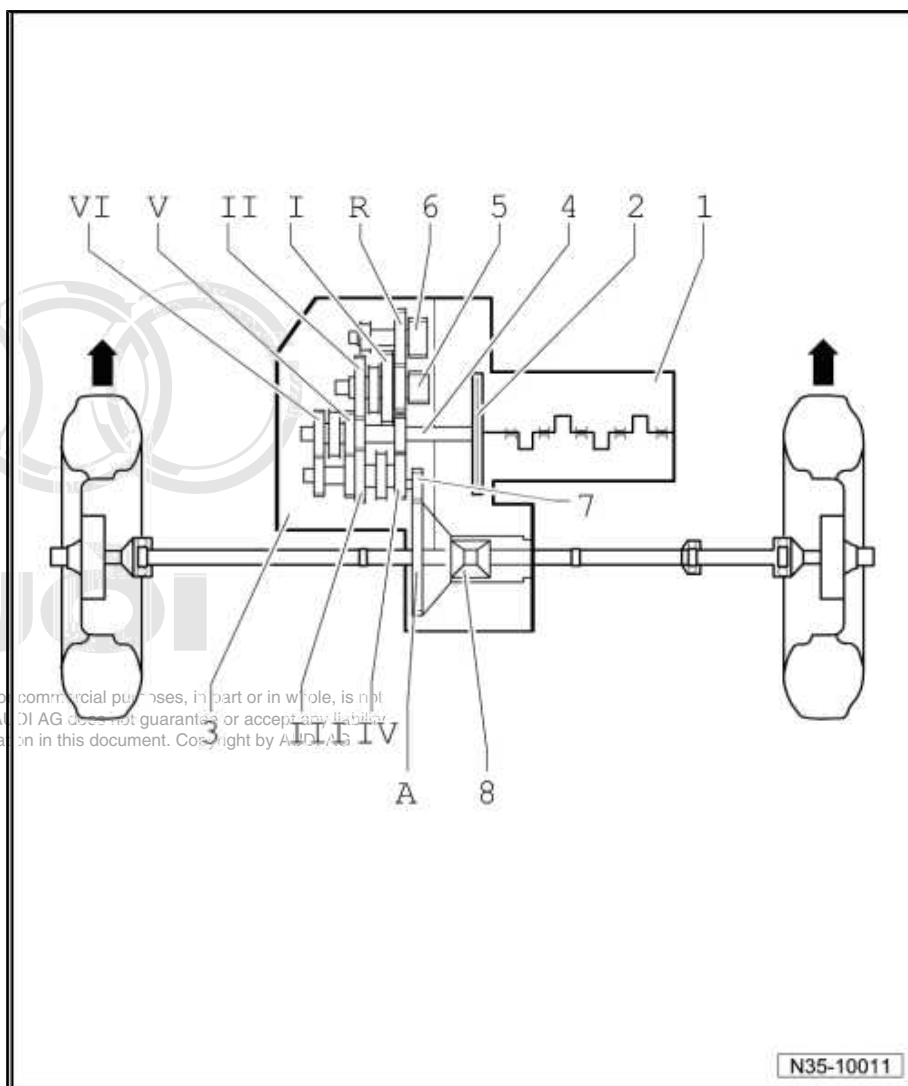
Identification and ratio



Note

-Arrows- point in direction of travel.

- 1 - Engine
- 2 - Clutch
- 3 - Manual gearbox
- 4 - Input shaft
- 5 - Output shaft for 1st/
2nd gear
- 6 - Output shaft for reverse
gear
- 7 - Output shaft for 3rd/
4th gear
- 8 - Differential
- I - 1st gear
- II - 2nd gear
- III - 3rd gear
- IV - 4th gear
- V - 5th gear
- VI - 6th gear
- R - Reverse gear
- A - Final drive



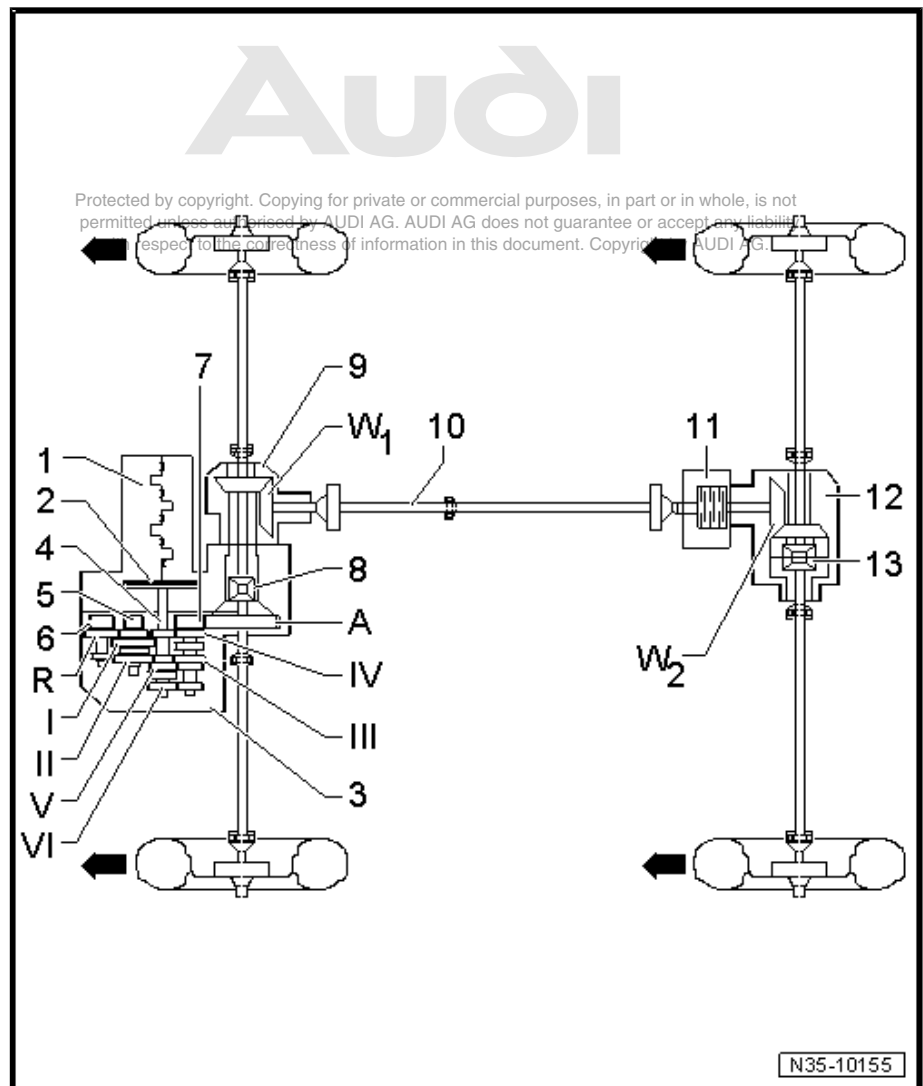
3.2 Transmission layout - four-wheel drive

Identification and ratio



-Arrows- point in direction of travel.

- 1 - Engine
- 2 - Clutch
- 3 - Manual gearbox
- 4 - Input shaft
- 5 - Output shaft for 1st/
2nd gear
- 6 - Output shaft for reverse
gear
- 7 - Output shaft for 3rd/
4th gear
- 8 - Differential
- 9 - Bevel box
- 10 - Propshaft
- 11 - Haldex coupling
- 12 - Rear final drive
- 13 - Differential
- 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 gears
- W2 - Rear bevel gears



4 Safety precautions

⇒ "4.1 Safety precautions when working on vehicles with start/stop system", page 8

4.1 Safety precautions when working on vehicles with start/stop system



WARNING

Risk of injury due to automatic engine start on vehicles with start/stop system.

- ◆ *On vehicles with activated start/stop system (this is indicated by a message in the instrument cluster display), the engine may start automatically on demand.*
- ◆ *Therefore it is important to ensure that the start/stop system is deactivated when performing repairs (switch off ignition, if required switch on ignition again).*



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5 Repair instructions

⇒ [“5.1 General repair instructions”, page 9](#)

⇒ [“5.2 Contact corrosion”, page 13](#)

5.1 General repair instructions

Proper tools and the maximum possible care and cleanliness are essential for satisfactory gearbox repairs. The usual basic safety precautions also naturally apply when carrying out repair work.

A number of generally applicable instructions for the various repair procedures are summarised here. They apply to the work described in this Manual.

Special tools

- ◆ For a complete list of special tools used in this Workshop Manual ⇒ Workshop equipment and special tools .

Gearbox

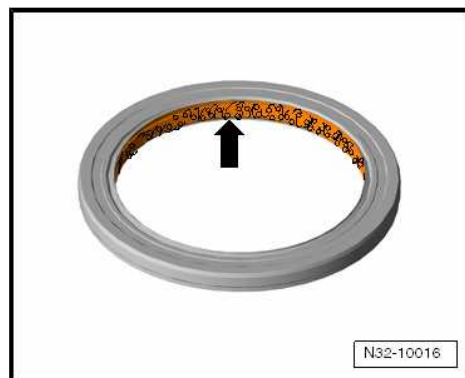
- ◆ Allocate bolts and other components according to gearbox code letters, refer to ⇒ Electronic parts catalogue ⇒ [page 3](#) .
- ◆ Thoroughly clean all joints and connections and the surrounding areas before dismantling.
- ◆ When installing gearbox ensure dowel sleeves are correctly seated.
- ◆ Clean contact surfaces when assembling mounting brackets and waxed components. The contact surfaces must be free of wax and grease.
- ◆ After installing a replacement gearbox and (if necessary) bevel box, check oil level in manual gearbox ⇒ [page 134](#) and bevel box ⇒ [page 212](#) ; capacities ⇒ [page 3](#) , specifications ⇒ Electronic parts catalogue .



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Oil seals, seals, O-rings and gaskets

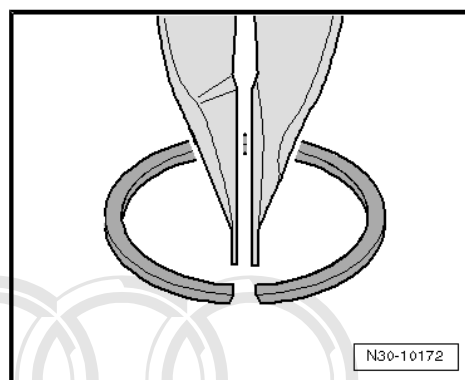
- ◆ Renew oil seals, O-rings and gaskets after removing.
- ◆ After removing gaskets and seals, always inspect the contact surface on the housing or shaft for burrs resulting from removal or for other signs of damage.
- ◆ Thoroughly clean housing joint surfaces before assembling.
- ◆ Before installing oil seals, lightly oil the outer circumference of the seal and fill the space between the sealing lips -arrow- about half full with grease - G 052 128 A1- .
- ◆ The open side of the oil seal should face the side containing the fluid.
- ◆ When installing a new oil seal, position the seal in the housing so that the sealing lip does not contact the shaft in the same place as the old seal (make use of installation depth tolerances).
- ◆ Lightly lubricate O-rings with oil before installation to prevent them being trapped during assembly.
- ◆ After installing new gaskets, O-rings and oil seals, check oil level in manual gearbox ➔ [page 134](#) and bevel box ➔ [page 212](#) .



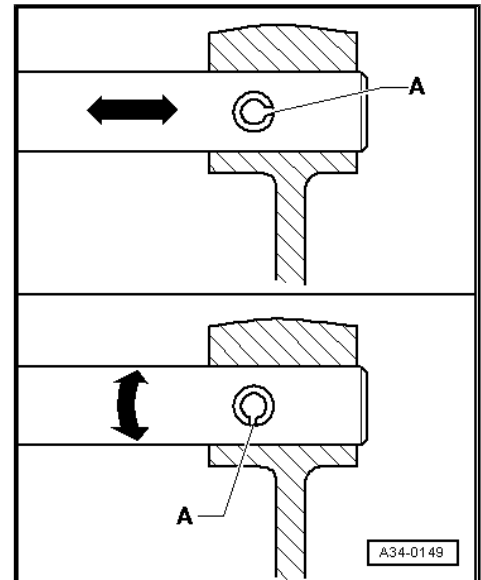
Sealants

- ◆ Thoroughly clean housing contact surfaces before applying sealing paste.
- ◆ Apply sealing paste - AMV 188 001 02- evenly and not too thickly.
- ◆ Breather holes must remain free of sealing paste.

Locking elements

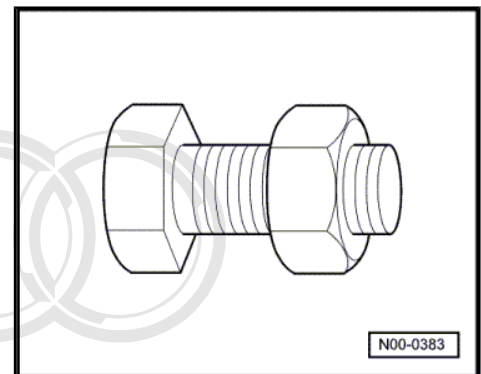


- ◆ Do not over-stretch circlips.
- ◆ Installation position for some circlips: the circlip is fitted so that the narrow part of the gap is at the top. This also gives the pliers a better grip when removing and installing.
- ◆ Renew circlips which have been damaged or over-tensioned after removing.
- ◆ Circlips must be properly seated in the base of the groove.
- ◆ Renew spring pins. Position: the slit -A- should be in line with the line of force -arrow-.



Nuts, bolts

- ◆ Loosen the nuts and bolts in reverse sequence to the specified tightening sequence.
- ◆ Nuts and bolts which secure covers and housings should be loosened and tightened in diagonal sequence and in stages if no tightening sequence is specified.
- ◆ Loosen and tighten particularly sensitive parts in diagonal sequence and in stages, taking care to keep them straight.
- ◆ Renew self-locking nuts and bolts.
- ◆ The tightening torques stated apply to non-oiled nuts and bolts.
- ◆ Use a wire brush to clean the threads of bolts which are secured with locking fluid. Then apply locking fluid - AMV 185 101 A1- to bolt threads before installing.
- ◆ Threaded holes which take self-locking bolts or bolts coated with locking fluid must be cleaned (using a thread tap or similar). Otherwise there is a danger of the bolts shearing off the next time they are removed.
- ◆ For all threaded connections, ensure that (where applicable) the contact surfaces and the nuts and bolts are not coated with wax until after assembly is completed.



Bearings

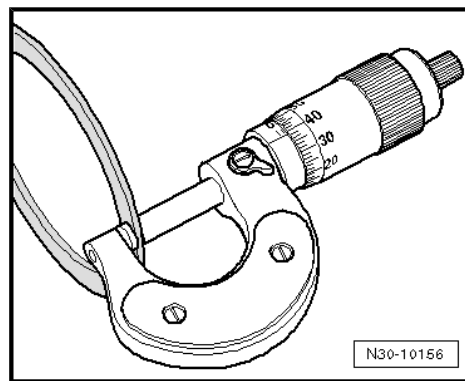
- ◆ Install new tapered roller bearings as supplied; do not lubricate additionally with oil.
- ◆ Lubricate all bearings (except tapered roller bearings) with gear oil before installing in gearbox.
- ◆ Use inductive heater - VAS 6414- to heat inner races of tapered roller bearings to approx. 100°C before installing. Press home onto stop when installing so there is no axial clearance.
- ◆ Do not interchange the outer or inner races of bearings of the same size (the bearings are paired).
- ◆ If required, renew the tapered roller bearings on one shaft together and use new bearings from a single manufacturer.
- ◆ Install needle bearings so the lettering (side with thicker metal) faces towards the installing tool.

Shims

- ◆ Use a micrometer to measure the shims at several points. Different shim thicknesses make it possible to obtain the exact thickness required.
- ◆ Check for burrs and damage.
- ◆ Install only shims which are in perfect condition.

Synchro-rings

- ◆ Do not interchange. When reusing synchro-rings, always fit to the same selector gear.
- ◆ Check for wear; renew if necessary.
- ◆ Lubricate with gear oil before installing.



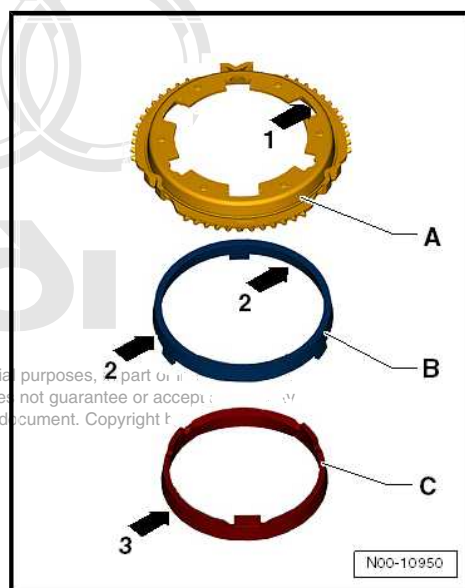
Checking synchro-rings for 1st to 3rd gear

- ◆ Check contact surface -arrow 1- on synchro-ring -A- and contact surface -arrow 3- on inner ring -C- for grooves or scoring.
- ◆ Check coated contact surfaces -arrows 2- on outer ring -B- for damage (flattened sections, missing particles of friction lining).

Gear wheels, synchro-hubs

- ◆ Clean before pressing on.
- ◆ Use inductive heater - VAS 6414- to heat to approx. 100°C before installing. Press home onto stop when installing so there is no axial clearance.

- ◆ Note correct installation position.

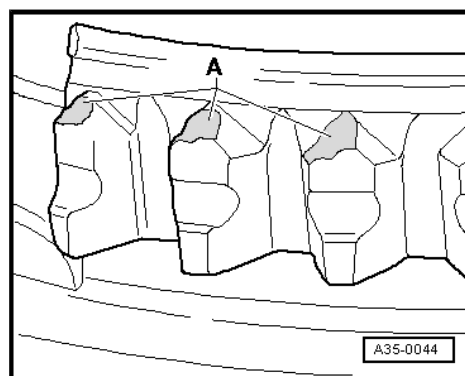


Selector gears and locking collars

- ◆ After installing, check 1st to 6th speed selector gears for minimal axial play and freedom of movement.

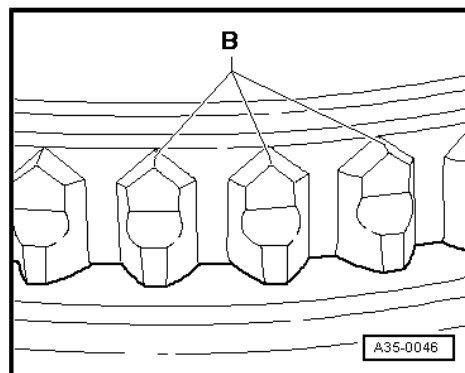
- ◆ Abnormal wear on synchro-ring or selector gear:

A - Worn chamfer on dog teeth of synchro-ring or selector gear.



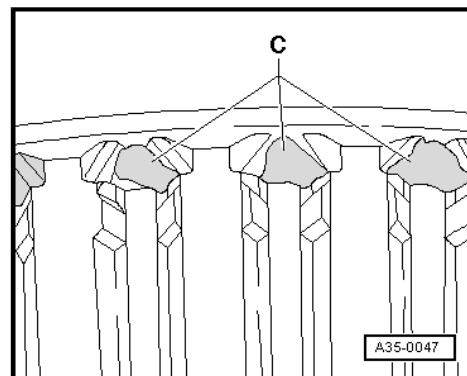
- ◆ In comparison: intact synchro-ring or selector gear:

B - Intact chamfer on dog teeth of synchro-ring or selector gear.



- ◆ Abnormal wear on locking collar:

C - Worn chamfer on internal splines of locking collar.

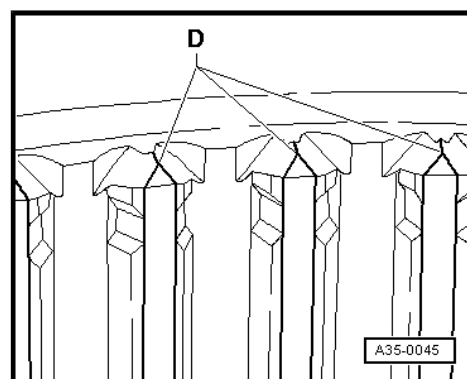


- ◆ In comparison: intact locking collar:

D - Intact chamfer on internal splines of locking collar.

Clutch mechanism, clutch

- ◆ If the clutch pedal does not return to its initial position after releasing it (clutch pedal in rest position), you must bleed the clutch system (further measures ➔ [page 21](#)).
- ◆ Ensure that the pressure plate is kept straight: loosen and tighten bolts consecutively in steps of 90°.
- ◆ If the clutch has burnt out, thoroughly clean the clutch housing, flywheel and parts of the engine facing the gearbox in order to prevent odour.



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- ◆ **Blow off flywheel with compressed air only.**
- ◆ **Clutch pressure plates have an anti-corrosion coating and are greased.** With the exception of the friction surface for the clutch plate, the clutch pressure plate must not be cleaned. Otherwise, the service life of the clutch will be considerably reduced.
- ◆ The friction surface of the clutch pressure plate and the fly-wheel must be cleaned (degreased) thoroughly.

5.2 Contact corrosion

The gearbox housing and clutch housing are made of a magnesium alloy.

Contact corrosion can occur if unsuitable fasteners are used on the vehicle (bolts, nuts, washers etc.).

For this reason, only fasteners with a special surface coating are fitted.

Rubber or plastic parts and adhesives also consist of non-conductive materials.

If you are not sure whether used parts can be re-installed, always fit new parts ➔ Electronic parts catalogue .

Please note:

- ◆ Use only genuine spare parts: these have been fully tested and are compatible with aluminium.
- ◆ We recommend the use of accessories approved by Audi.
- ◆ Damage resulting from contact corrosion is not covered by the warranty.

30 – Clutch

1 Clutch mechanism

- ⇒ [“1.1 Exploded view - pedal cluster”, page 14](#)
- ⇒ [“1.2 Exploded view - clutch hydraulics”, page 16](#)
- ⇒ [“1.3 Exploded view - clutch release mechanism”, page 20](#)
- ⇒ [“1.4 Function check for clutch master cylinder and slave cylinder”, page 21](#)
- ⇒ [“1.5 Removing and installing clutch position sender G476 ”, page 22](#)
- ⇒ [“1.6 Removing and installing over-centre spring”, page 23](#)
- ⇒ [“1.7 Removing and installing clutch pedal”, page 26](#)
- ⇒ [“1.8 Removing and installing mounting bracket”, page 27](#)
- ⇒ [“1.9 Removing and installing clutch master cylinder”, page 31](#)
- ⇒ [“1.10 Removing and installing clutch slave cylinder together with release bearing”, page 33](#)
- ⇒ [“1.11 Removing and installing lines for clutch hydraulics”, page 34](#)
- ⇒ [“1.12 Bleeding clutch hydraulics”, page 36](#)

1.1 Exploded view - pedal cluster



Note

Lubricate all bearings and moving surfaces with grease - G 000 450 02- .

1 - Plenum chamber partition panel

- ☐ With mounting for mounting bracket

2 - Gasket

- ☐ Self-adhesive
- ☐ Renew
- ☐ Bond onto mounting bracket

3 - Mounting bracket

- ☐ For clutch pedal
- ☐ Removing and installing
⇒ [page 27](#)

4 - Bolt

5 - Over-centre spring

- ☐ Removing and installing
⇒ [page 23](#)

6 - Bearing bush

7 - Pivot pin

8 - Clutch pedal

- ☐ Removing and installing
⇒ [page 26](#)

9 - Retaining clip

- ☐ For operating rod on clutch master cylinder

10 - Seal

- ☐ Between clutch master cylinder and mounting bracket
- ☐ Renew

11 - Clutch master cylinder

- ☐ Removing and installing ⇒ [page 31](#)

12 - Clutch position sender - G476-

- ☐ Checking in [Guided Fault Finding](#) ⇒ Vehicle diagnostic tester
- ☐ Removing and installing ⇒ [page 22](#)

13 - Retaining clip

- ☐ To remove and install pipe, pull out clip as far as it will go

14 - Supply hose

15 - Nut

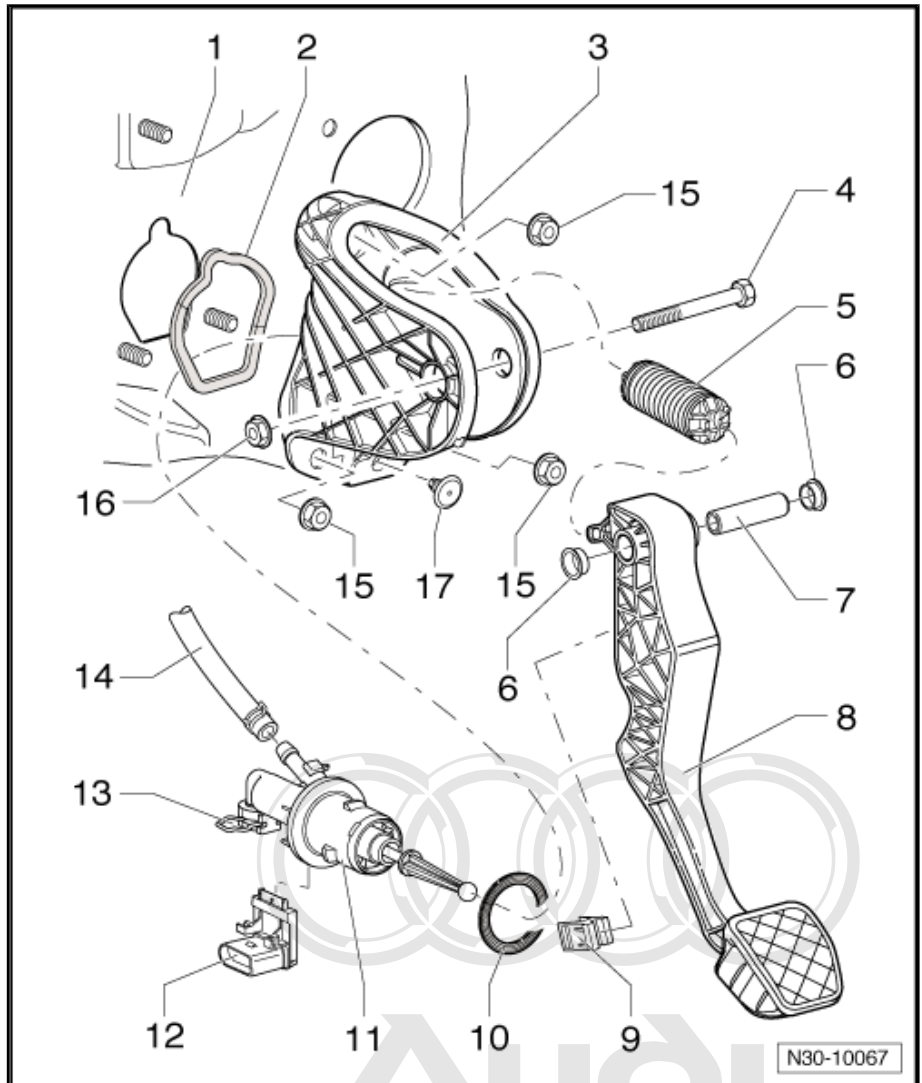
- ☐ Self-locking
- ☐ Renew
- ☐ 20 Nm

16 - Nut

- ☐ Renew
- ☐ 25 Nm

17 - Stop

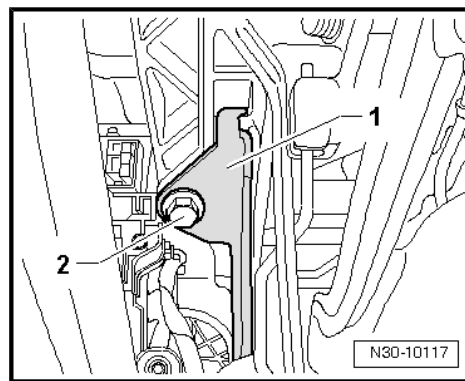
- ☐ For clutch pedal



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Crash bar - tightening torque

- Tighten bolt -2- for crash bar -1- to 20 Nm.



1.2 Exploded view - clutch hydraulics

⇒ ["1.2.1 Exploded view - clutch hydraulics, LHD vehicles", page 16](#)

⇒ ["1.2.2 Exploded view - clutch hydraulics, RHD vehicles", page 18](#)

1.2.1 Exploded view - clutch hydraulics, LHD vehicles

1 - Clutch slave cylinder with release bearing

- ☐ Can only be renewed after removing gearbox
- ☐ Removing and installing
⇒ [page 33](#)

2 - Bleeder connection

3 - Retaining clip

- ☐ To remove and install bleeder connection, pull out retaining clip as far as it will go

4 - Bleeder screw

- ☐ Bleeding clutch system
⇒ [page 36](#)
- ☐ 4.5 Nm

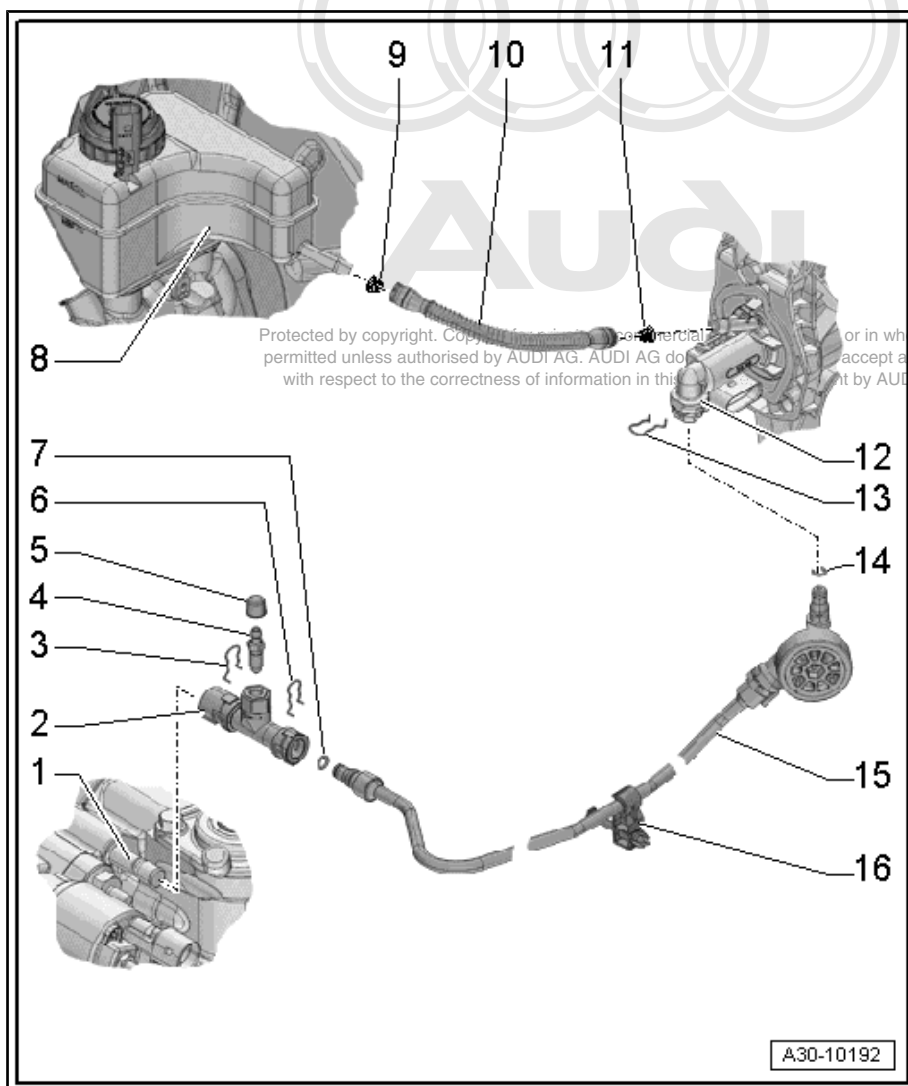
5 - Dust cap

6 - Retaining clip

- ☐ To remove and install pipe, pull out retaining clip as far as it will go

7 - Seal

- ☐ Different versions according to type of connection; for correct version refer to ⇒ Electronic parts catalogue
- ☐ Renew if damaged
- ☐ Push onto pipe connection
- ☐ Lubricate with brake fluid before installing



8 - Brake fluid reservoir

9 - Gasket

- ☐ Must be fitted in supply hose

10 - Supply hose

11 - Gasket

- ☐ Must be fitted in supply hose

12 - Clutch master cylinder

- ☐ Removing and installing ⇒ [page 31](#)

13 - Seal

- ☐ Different versions according to type of connection; for correct version refer to ⇒ Electronic parts catalogue
- ☐ Renew if damaged
- ☐ Push onto pipe connection
- ☐ Lubricate with brake fluid before installing

14 - Retaining clip

- ☐ To remove and install pipe, pull out retaining clip as far as it will go

15 - Pipe/hose assembly

- ☐ With frequency modulator
- ☐ Removing and installing ⇒ [page 34](#)

16 - Bracket

- ☐ Attached to body

Disconnecting and connecting pipe

- Release retaining clip -3- with a screwdriver and pull pipe -1- off connection -4-.

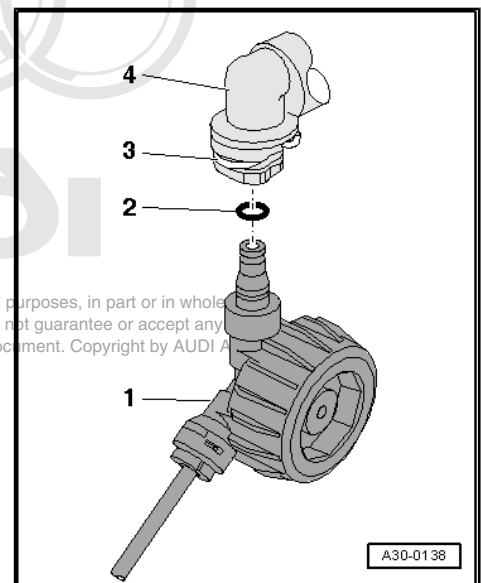
Installing



Note

Renew damaged O-ring -2-.

- Push pipe -1- into connection -4- so that retaining clip -3- snaps into place.
- Pull on pipe to check it is secure.



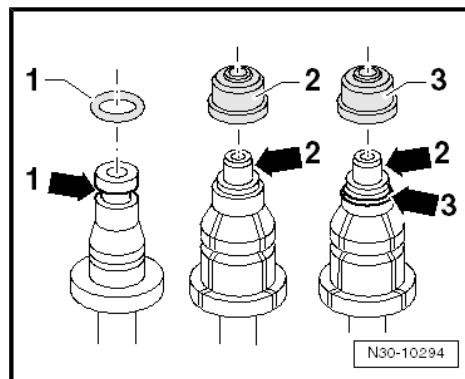
Pipe with seal or O-ring

- ◆ Pipe connection -arrow 1- and O-ring -1-
- ◆ Pipe connection with shoulder -arrow 2- and seal -2-
- ◆ Pipe connection with shoulder -arrow 2-, annular groove -arrow 3- and seal -3-



Note

On the connection with annular groove -arrow 3- the seal must be inserted in the groove.



1.2.2 Exploded view - clutch hydraulics, RHD vehicles

1 - Clutch slave cylinder with release bearing

- ❑ Can only be renewed after removing gearbox
- ❑ Removing and installing
⇒ [page 33](#)

2 - Bleeder connection

3 - Retaining clip

- ❑ To remove and install bleeder connection, pull out retaining clip as far as it will go

4 - Bleeder screw

- ❑ Bleeding clutch system
⇒ [page 36](#)
- ❑ 4.5 Nm

5 - Dust cap

6 - Retaining clip

- ❑ To remove and install pipe, pull out retaining clip as far as it will go

7 - Seal

- ❑ Different versions according to type of connection; for correct version refer to ⇒ Electronic parts catalogue
- ❑ Renew if damaged
- ❑ Push onto pipe connection
- ❑ Lubricate with brake fluid before installing

8 - Brake fluid reservoir

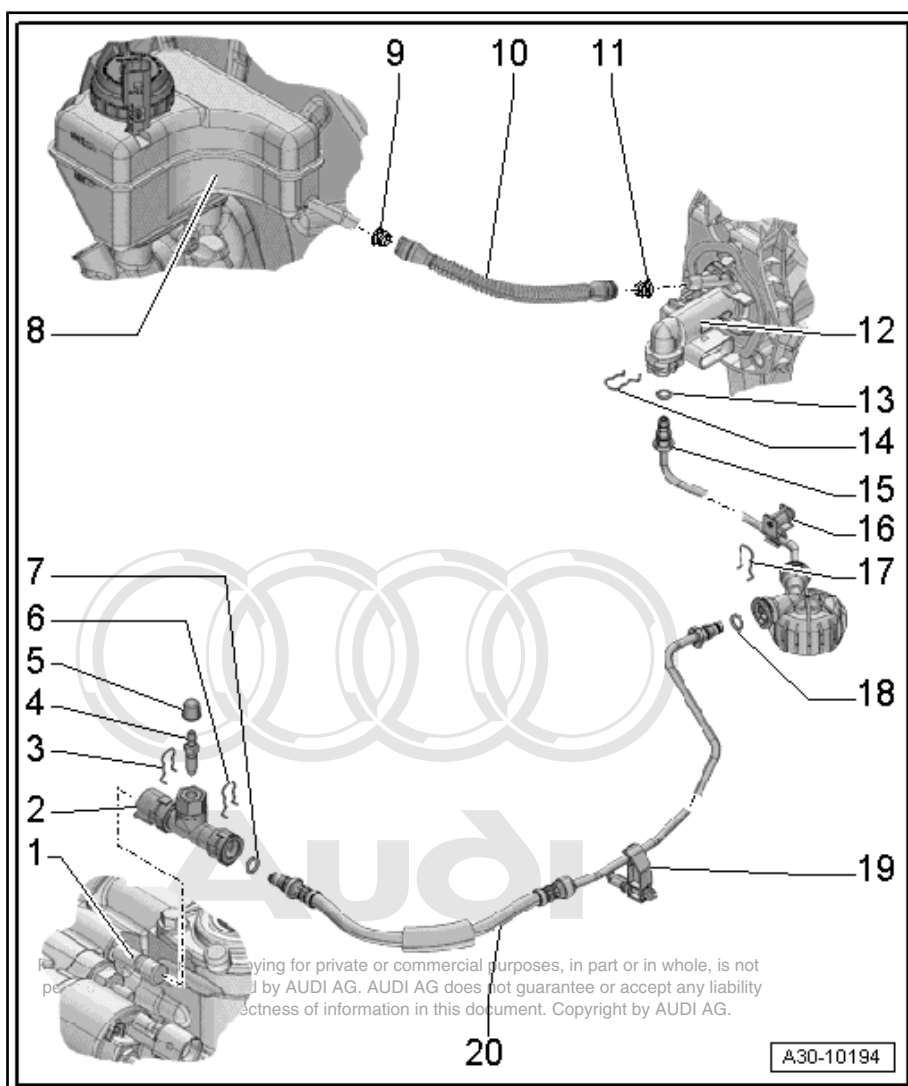
9 - Gasket

- ❑ Must be fitted in supply hose

10 - Supply hose

11 - Gasket

- ❑ Must be fitted in supply hose



12 - Clutch master cylinder

- ☐ Removing and installing ⇒ [page 31](#)

13 - Seal

- ☐ Different versions according to type of connection; for correct version refer to ⇒ Electronic parts catalogue
- ☐ Renew if damaged
- ☐ Push onto pipe connection
- ☐ Lubricate with brake fluid before installing

14 - Retaining clip

- ☐ To remove and install pipe, pull out retaining clip as far as it will go

15 - Pipe

- ☐ With frequency modulator

16 - Bracket

- ☐ Attached to body

17 - Retaining clip

- ☐ To remove and install pipe, pull out retaining clip as far as it will go

18 - Seal

- ☐ Different versions according to type of connection; for correct version refer to ⇒ Electronic parts catalogue
- ☐ Renew if damaged
- ☐ Push onto pipe connection
- ☐ Lubricate with brake fluid before installing

19 - Bracket

- ☐ Attached to body

20 - Pipe/hose assembly

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1.3 Exploded view - clutch release mechanism

1 - Clutch slave cylinder with release bearing

- ☐ Are one unit; can only be renewed together
- ☐ Do not wash out bearing; wipe clean only
- ☐ If bearing is noisy, renew together with slave cylinder
- ☐ Tighten bolts carefully in several small steps and in diagonal sequence; make sure that mounting lugs on slave cylinder do not break off
- ☐ With divided supply line (on some versions)
⇒ [page 20](#)
- ☐ Removing and installing
⇒ [page 33](#)

2 - Bolt

- ☐ 3x
- ☐ Renew after removal
- ☐ 15 Nm

3 - Gearbox

4 - Retaining clip

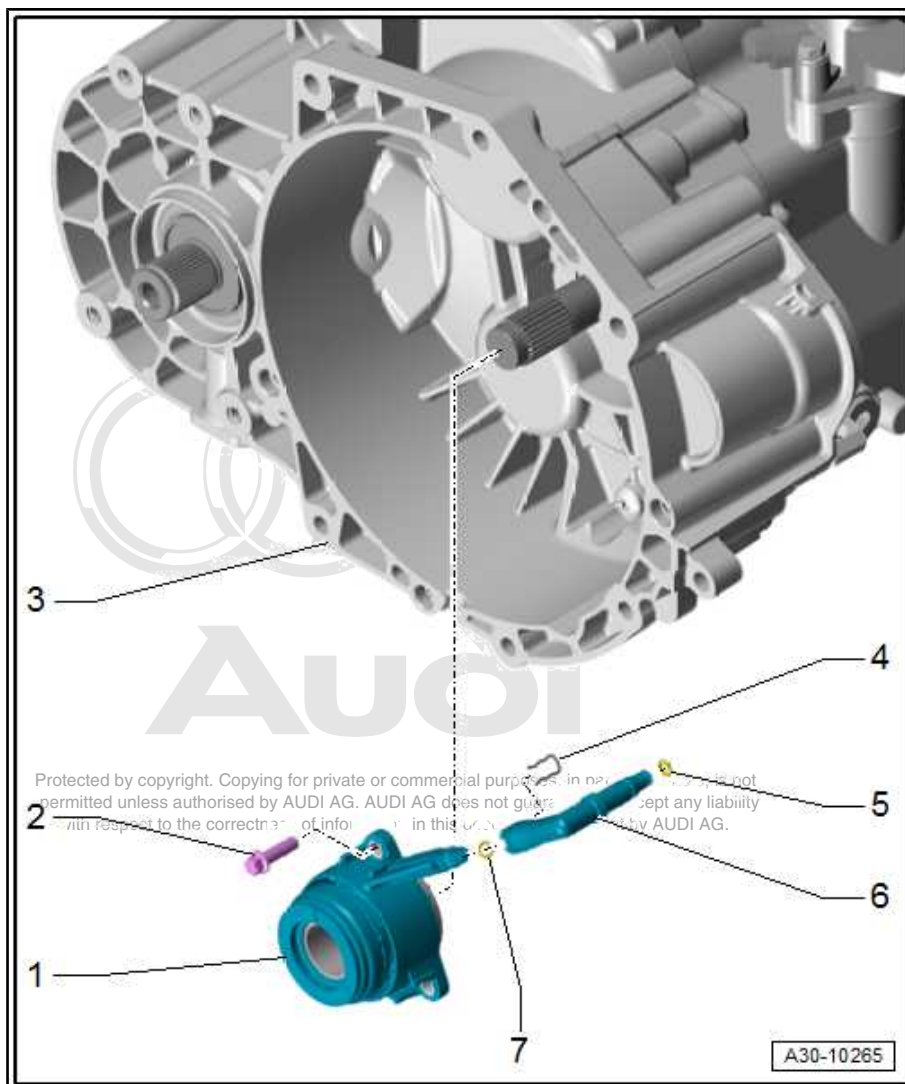
5 - O-ring

- ☐ Renew if damaged
- ☐ Push onto pipe connection
- ☐ Lubricate with brake fluid before installing

6 - Connection

7 - O-ring

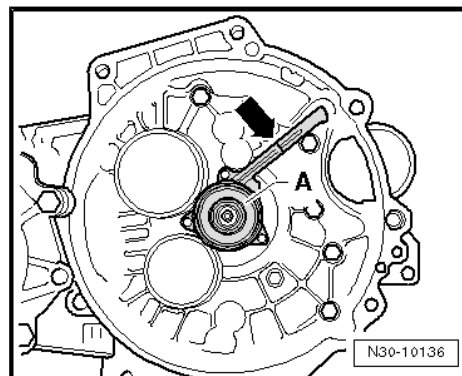
- ☐ Renew if damaged
- ☐ Push onto pipe connection
- ☐ Lubricate with brake fluid before installing



Clutch slave cylinder -A- with divided supply line

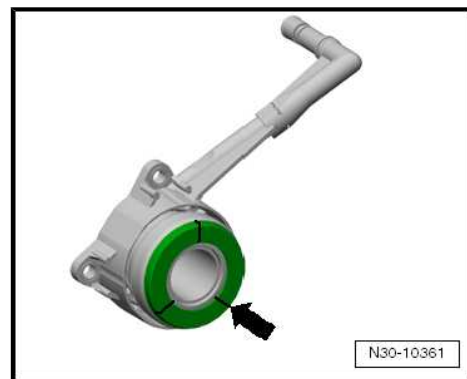
- ◆ Depending on version, supply line for some clutch slave cylinders is divided in area of -arrow-.

For correct version, refer to ⇒ Electronic parts catalogue



Release bearing with additional plastic disc

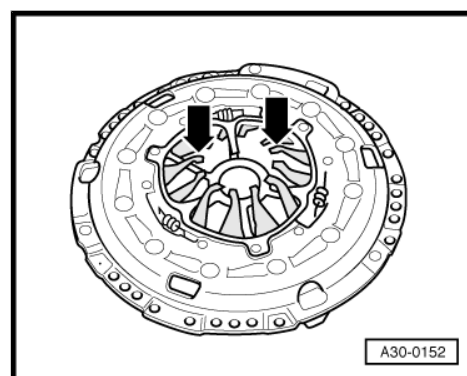
- ◆ Identification: projections -arrow- on plastic disc.



For release bearing with additional plastic disc: tips of diaphragm springs on pressure plate (-arrows-) with slightly lower overall height

- Release bearing with additional plastic disc and pressure plate with tips of diaphragm springs of slightly lower overall height must only be installed together.

For correct version, refer to ➔ Electronic parts catalogue



1.4 Function check for clutch master cylinder and slave cylinder

Before you renew the clutch master cylinder or slave cylinder you must - in the case of the following faults - first carry out the appropriate checks.

Noises when operating the clutch:

- ◆ First check the over-centre spring / clutch pedal switch for noise.
- ◆ If you hear a noise, remove over-centre spring and repeat check.
- ◆ Renew relevant component.

After releasing clutch pedal it still remains depressed / does not return to its initial position.

- ◆ Check whether the clutch pedal returns all the way to its initial position, thereby uncovering the vent opening in the master cylinder.
- ◆ The vent opening is integrated in the clutch master cylinder. It is not visible from the outside.
- ◆ The vent opening must be uncovered, otherwise the permanent self-bleeding function for the hydraulic clutch system will no longer be effective.
- ◆ Make the customer aware that the driver must NOT rest his/her foot on the clutch pedal for long periods of time. This could impair the self-bleeding function of the clutch system as the vent opening in the master cylinder can no longer function.
- ◆ The self-bleeding function of the clutch system can be impaired if the footwell trim or floor mats get trapped or if the driver rests his/her foot on the clutch pedal for long periods of time.

Check the complete hydraulic system for leaks.

- ◆ Check brake fluid level in brake fluid reservoir.
- ◆ Check clutch master cylinder and bleeder connection, as well as the pipe/hose assembly including connections for external leaks (visual inspection).
- ◆ Check joint between engine and gearbox for traces of brake fluid escaping from clutch slave cylinder.
- ◆ If you identify any leaks you must renew the leaking component.
- ◆ Bleed clutch system ➔ [page 36](#) .

Pedal forces:

- ◆ approx. 140 N for complete service life of the clutch

High pedal force:

- ◆ Mechanically defective pressure plate/clutch plate
➔ [page 38](#) .

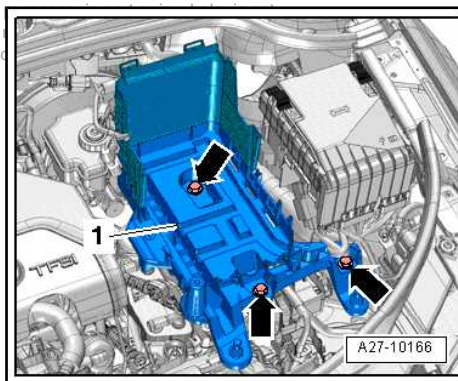
Clutch does not disengage or does not disengage fully:

- ◆ Air in hydraulic system: bleed clutch system ➔ [page 36](#) and check hydraulic system for external and internal leaks.
- ◆ Clutch plate does not move smoothly on input shaft splines (due to corrosion or dirt, etc.).
- ◆ Foreign body in clutch system
- ◆ Mechanically defective pressure plate/clutch plate
➔ [page 38](#) .
- ◆ Wrong components used or components forgotten when carrying out repair work (e.g. intermediate plate or dowel sleeves).

1.5 Removing and installing clutch position sender - G476-

Removing

- Remove battery and battery tray ➔ [Electrical system; Rep. gr. 27](#) ; Battery; Removing and installing battery tray .



- Unclip clutch position sender - G476- at master cylinder -arrow- and remove.
- Unplug electrical connector -4-.



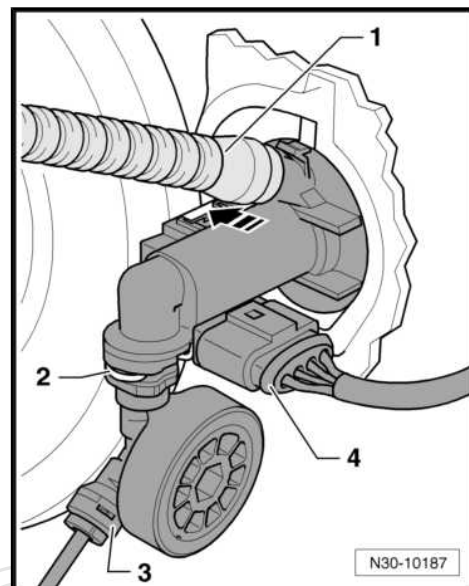
Note

-Items 1, 2, and 3- can be disregarded.

Installing

Installation is carried out in reverse sequence; note the following:

- Install battery tray and battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray .



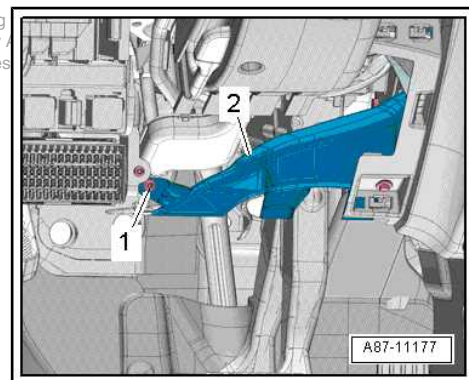
1.6 Removing and installing over-centre spring

Special tools and workshop equipment required

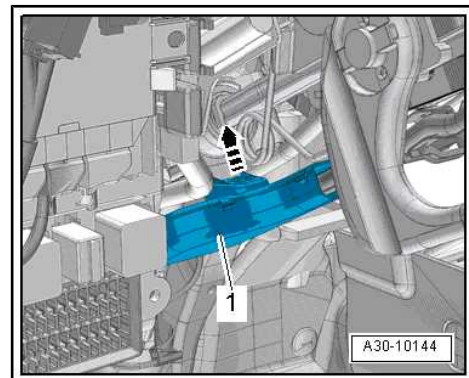
- ◆ Grease - G 000 450 02-

Removing

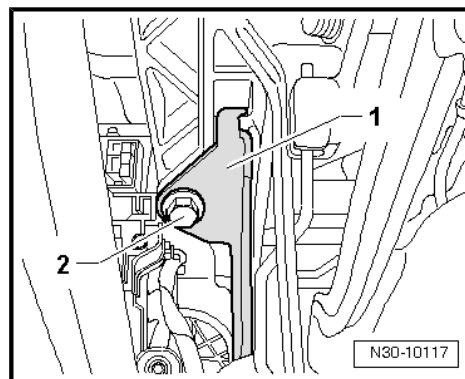
- Move driver's seat to rearmost position.
- Move steering wheel up as far as it will go, making use of full range of steering column adjuster.
- Remove footwell vent on driver's side ⇒ Heating; air conditioning; Rep. gr. 87 ; Air routing; Removing and installing driver side footwell vent .



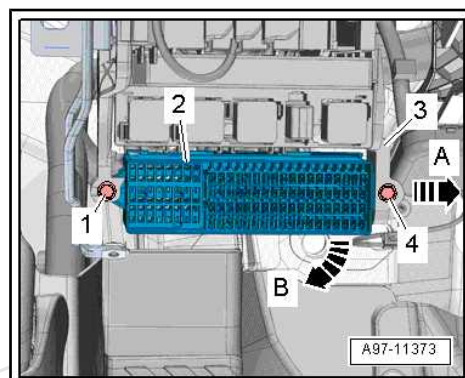
- Release catch -arrow-, detach wiring duct -1- towards the rear and push to one side.



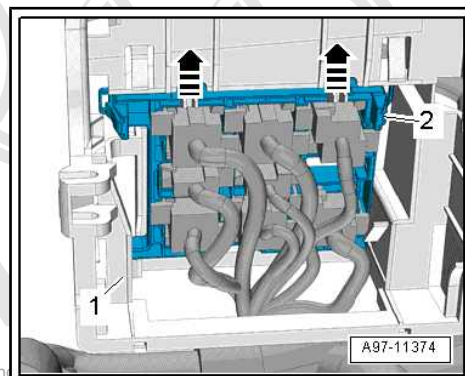
- Remove bolt -2- and detach crash bar -1-.



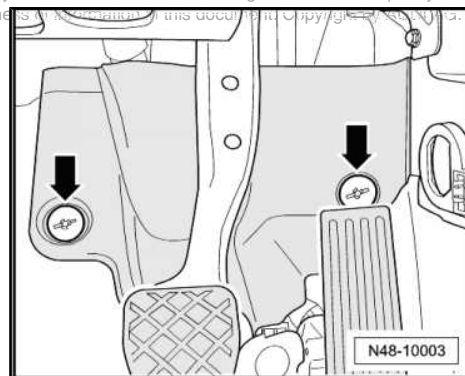
- Unbolt fuse holder C - SC- and place to one side ⇒ Electrical system; Rep. gr. 97 ; Relay carriers, fuse carriers, electronic boxes; Overview of fitting locations - relay carriers, fuse carriers, electronic boxes .



- Disengage relay carrier under dash panel (left-side) and place to one side ⇒ Electrical system; Rep. gr. 97 ; Relay carriers, fuse carriers, electronic boxes; Overview of fitting locations - relay carriers, fuse carriers, electronic boxes .

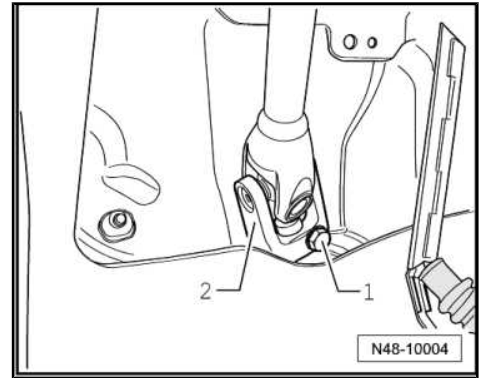


- Remove nuts -arrows- and detach footwell trim.

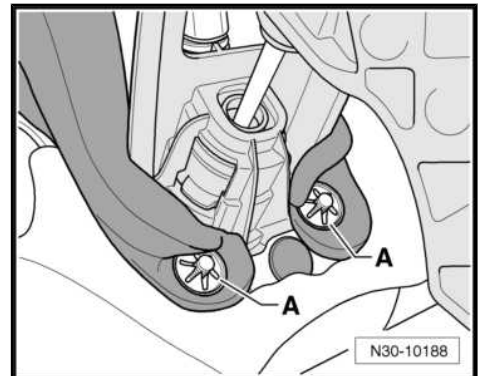


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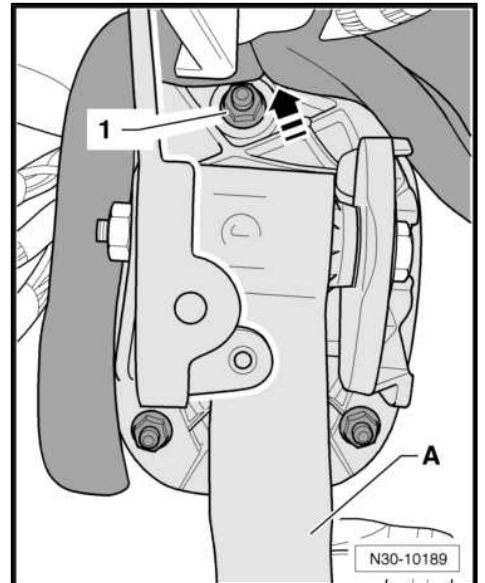
- Remove bolt -1- and pull off universal joint -2- upwards.



- Prise off clamping washers -A- and detach insulation from lower part of mounting bracket.



- Push insulation upwards -arrow- at nut -1- above clutch pedal -A-.



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- Remove nut -2-, pull out bolt -5- and detach clutch pedal -1- from mounting bracket -3-.



Note

The clutch pedal does not have to be detached from the operating rod on the master cylinder.

- Pivot clutch pedal down slightly and take over-centre spring -4- out of mounting bracket.

Installing

Installation is carried out in reverse sequence; note the following:

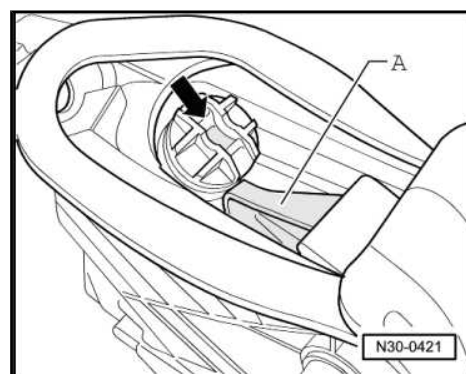
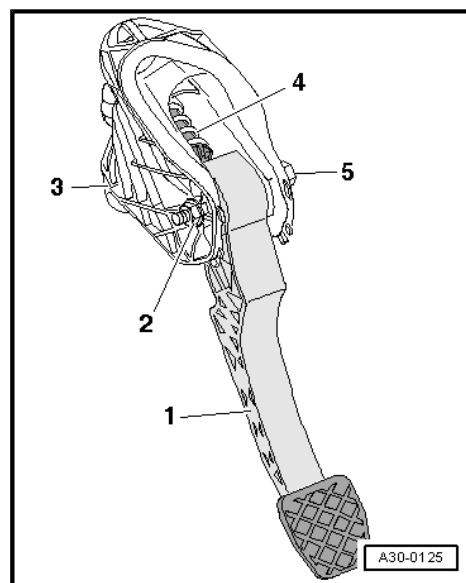
Tightening torques:

- ➔ [“1.1 Exploded view - pedal cluster”, page 14](#) .
- ➔ [Fig. “Crash bar - tightening torque”, page 16](#) .



Note

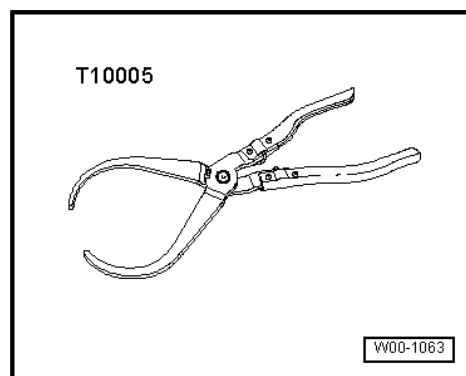
- ◆ *Renew self-locking nut.*
- ◆ *Lubricate all bearings and contact surfaces with grease - G 000 450 02- .*
- Insert over-centre spring in mounting bracket from above.
- The bearing recess -arrow- for the actuator lug -A- on the clutch pedal must be vertical.
- Fit actuator lug on clutch pedal into corresponding socket in over-centre spring.
- Press clutch pedal slightly and secure with bolt.
- Install relay carrier under dash panel (left-side) and relay carrier C-SC- ➔ [Electrical system; Rep. gr. 97](#); [Relay carriers, fuse carriers, electronic boxes; Overview of fitting locations](#) relay carriers, fuse carriers, electronic boxes .
- Install footwell vent on driver's side ➔ [Heating, air conditioning; Rep. gr. 87](#) ; [Air routing; Removing and installing driver side footwell vent](#) .



1.7 Removing and installing clutch pedal

Special tools and workshop equipment required

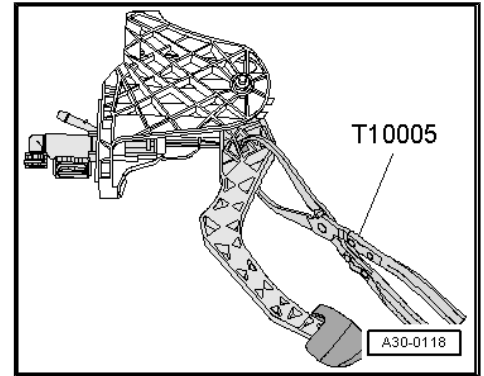
- ◆ Pliers - T10005-



- ◆ Grease - G 000 450 02-

Removing

- Remove over-centre spring ➤ [page 23](#) .
- Release retaining clip on operating rod for clutch master cylinder using pliers - T10005- .
- Remove clutch pedal.



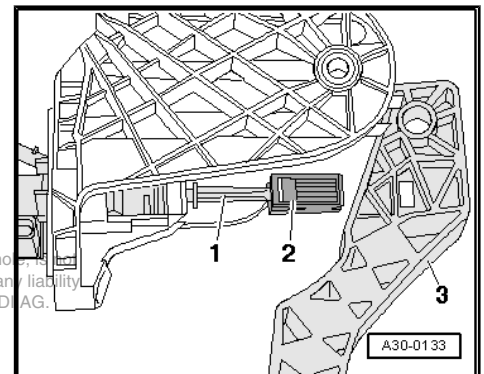
Installing

Installation is carried out in reverse sequence; note the following:



Lubricate all bearings and contact surfaces with grease - G 000 450 02- .

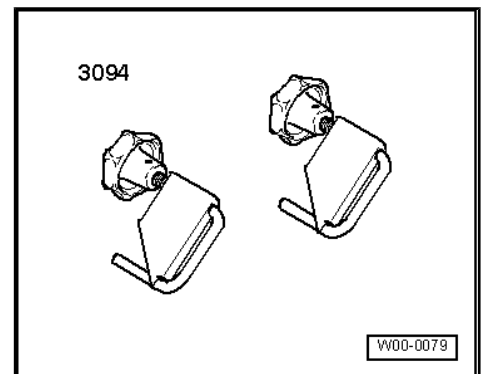
- Install retaining clip **2** on operating rod **1** for master cylinder.
- Press retaining clip into mounting on clutch pedal so that it snaps into place.
- Install over-centre spring ➤ [page 23](#) .



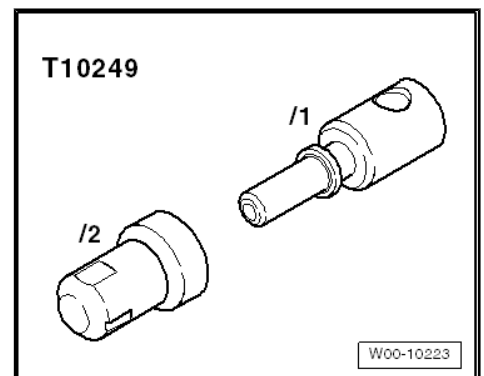
1.8 Removing and installing mounting bracket

Special tools and workshop equipment required

- ◆ Hose clamps, up to 25 mm - 3094-

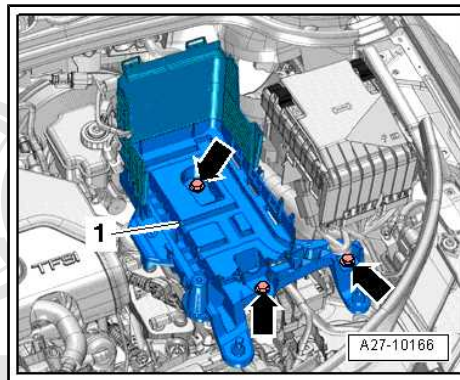


- ◆ Sealing tool - T10249-



Removing

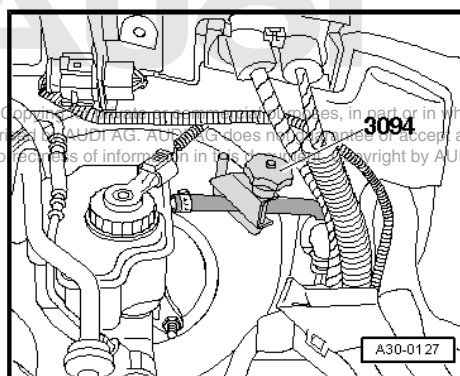
- Remove battery and battery tray ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray .



Note

Place a lint-free cloth below clutch master cylinder to catch escaping brake fluid.

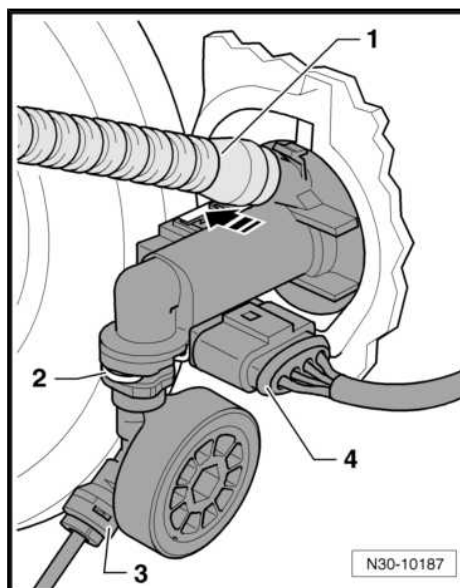
- Using hose clamp -3094- , clamp off supply hose to clutch master cylinder.



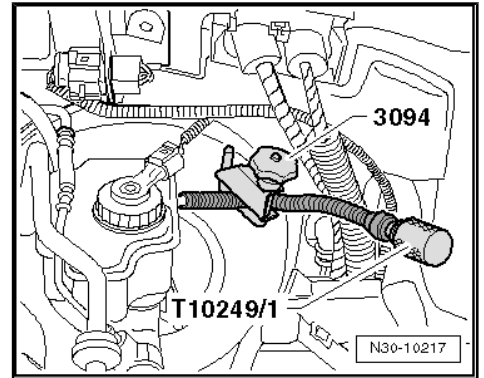
Note

- ◆ In the following steps make sure that no brake fluid escapes onto the longitudinal member or onto the gearbox. If this does happen, clean the affected area thoroughly.
- ◆ Clamping off the supply hose with the hose clamp -3094- will cause a permanent deformation.
- ◆ However, this does not damage the supply hose.
- ◆ After removing the hose clamp -3094- , the supply hose must be returned to its original shape.

- Disconnect supply hose -1- at clutch master cylinder.
- Pull out retaining clip -2- as far as it will go and disconnect pipe from clutch master cylinder.
- Unclip and detach clutch position sender - G476- from clutch master cylinder -arrow-. Electrical connector -4- can remain connected.

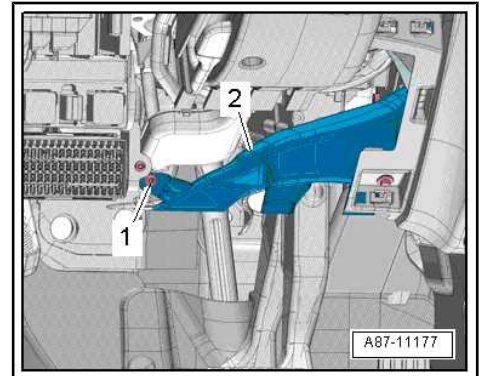


- After disconnecting supply hose, plug supply hose using sealing tool -T10249/1- .

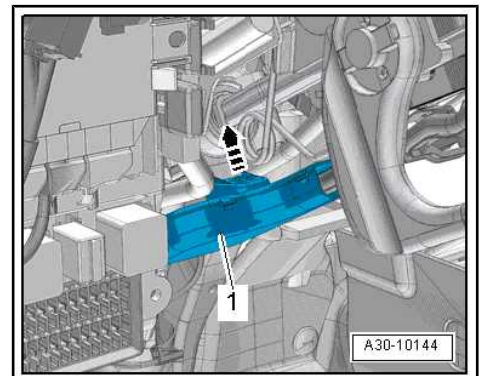


- Move driver's seat to rearmost position.
- Move steering wheel up as far as it will go, making use of full range of steering column adjuster.
- Remove footwell vent on driver's side ⇒ Heating, air conditioning; Rep. gr. 87 ; Air routing; Removing and installing driver side footwell vent .

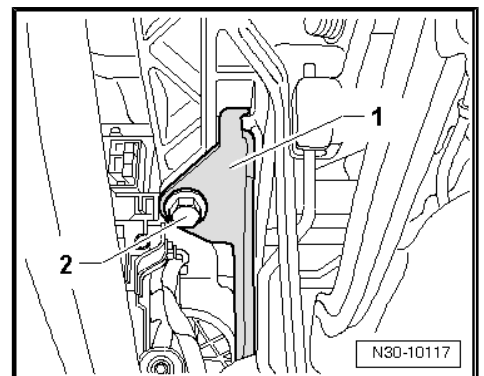
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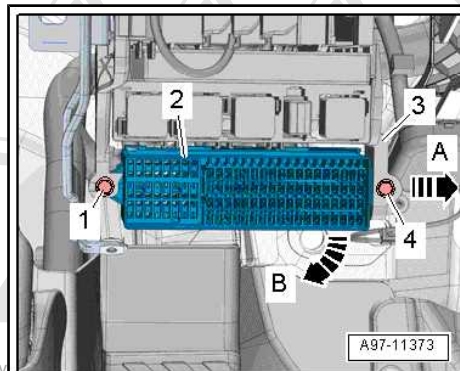
- Release catch -arrow-, detach wiring duct -1- towards the rear and push to one side.



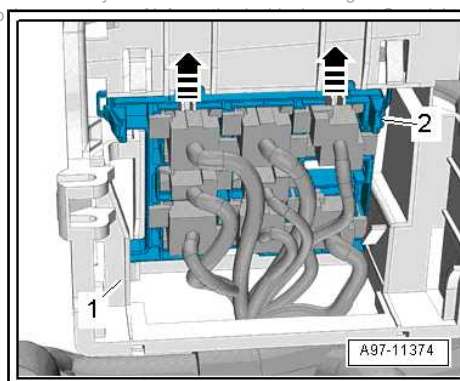
- Remove bolt -2- and detach crash bar -1-.



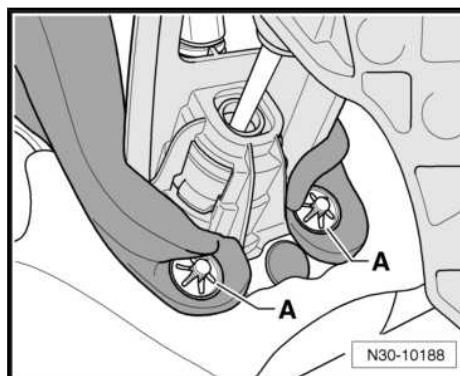
- Unbolt fuse holder C - SC- and place to one side ⇒ Electrical system; Rep. gr. 97 ; Relay carriers, fuse carriers, electronic boxes; Overview of fitting locations - relay carriers, fuse carriers, electronic boxes .



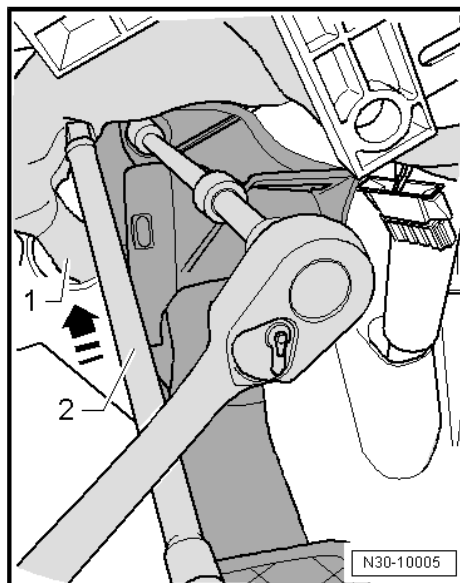
- Disengage relay carrier under dash panel (left-side) and place to one side ⇒ Electrical system; Rep. gr. 97 ; Relay carriers, fuse carriers, electronic boxes; Overview of fitting locations - relay carriers, fuse carriers, electronic boxes .



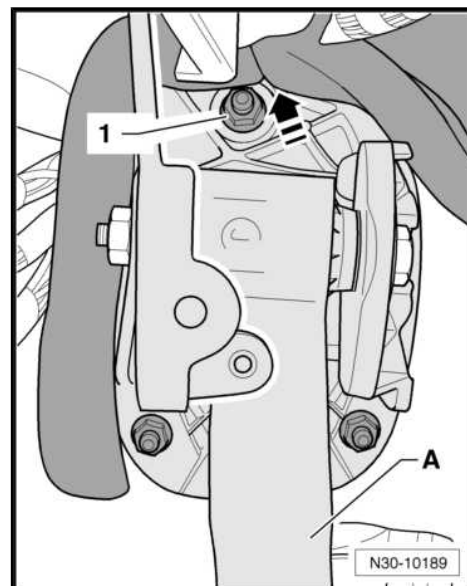
- Prise off clamping washers -A- and detach insulation from lower part of mounting bracket.



- Wrap adhesive tape round universal joint from socket set - V.A.G 1835- .
- Push electrical wiring harness -1- upwards and to the left -arrow- using extension -2- from -V.A.G 1835- .



- Push insulation above clutch pedal -A- upwards -arrow-.
- Remove nut -1-.



 Note

When working in the footwell, put cloths on the floor covering to protect it from possible brake fluid spills.

- Remove nuts -1, 2-.
- Detach mounting bracket -3- and insulation.

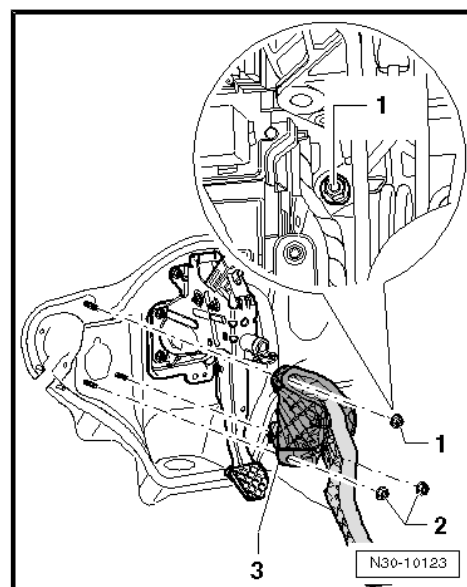
Installing

Installation is carried out in reverse sequence; note the following:

 Note

Renew self-locking nuts.

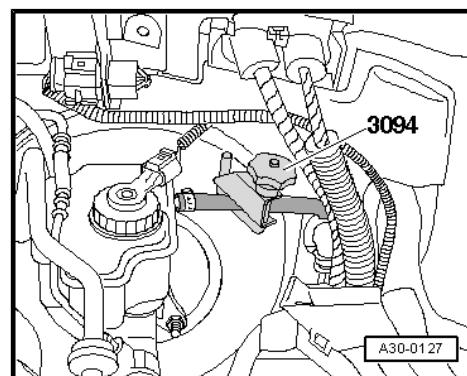
- Connect pipe to connection ⇒ [page 17](#) .



- After removing the hose clamp - 3094- , the supply hose must be returned to its original shape

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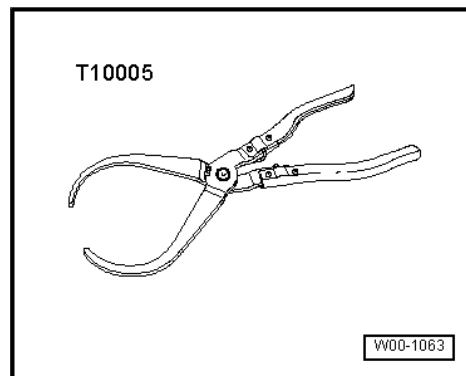
- Install crash bar
⇒ [Fig. "Crash bar - tightening torque"](#) , [page 16](#) .
- Install relay carrier under dash panel (left-side) and relay carrier C - SC- ⇒ Electrical system; Rep. gr. 97 ; Relay carriers, fuse carriers, electronic boxes; Overview of fitting locations - relay carriers, fuse carriers, electronic boxes .
- Install footwell vent on driver's side ⇒ Heating, air conditioning; Rep. gr. 87 ; Air routing; Removing and installing driver side footwell vent .
- Bleed clutch system ⇒ [page 36](#) .
- Install battery tray and battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray .



1.9 Removing and installing clutch master cylinder

Special tools and workshop equipment required

◆ Pliers - T10005-



◆ Spacer, approx. 40 mm long (e.g. 1/2" socket)

Removing

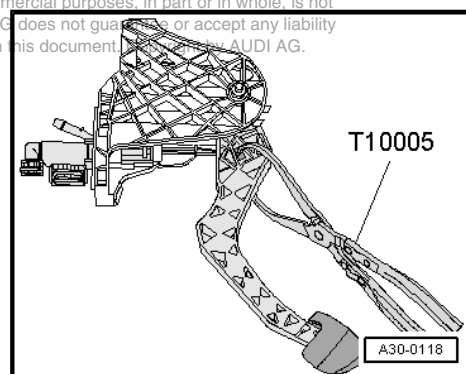


Note

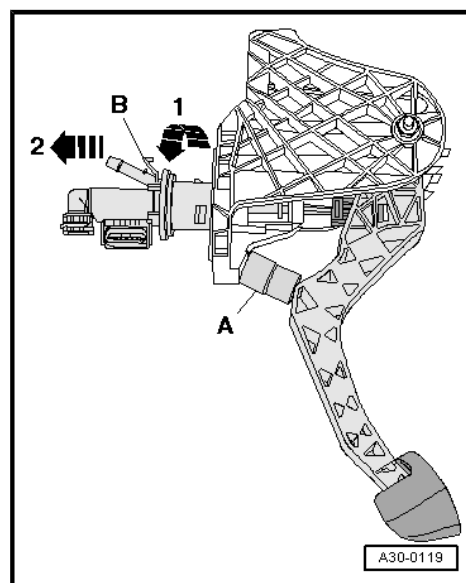
- ◆ *If you suspect a defective clutch master cylinder, perform function test prior to renewing ⇒ [page 21](#) .*
- ◆ *When working in the footwell, put cloths on the floor covering to protect it from possible brake fluid spills.*

- Remove mounting bracket ⇒ [page 27](#) .
- Release retaining clip on operating rod for clutch master cylinder using pliers - T10005- .

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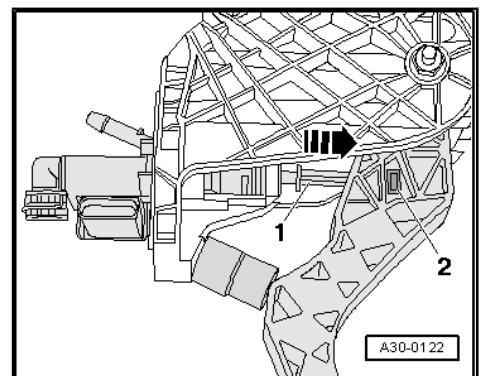
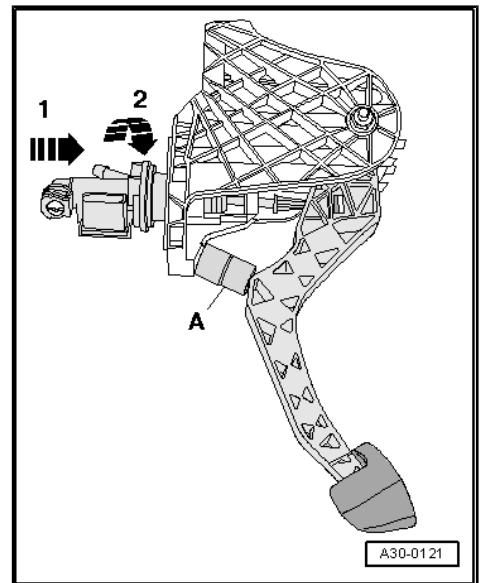
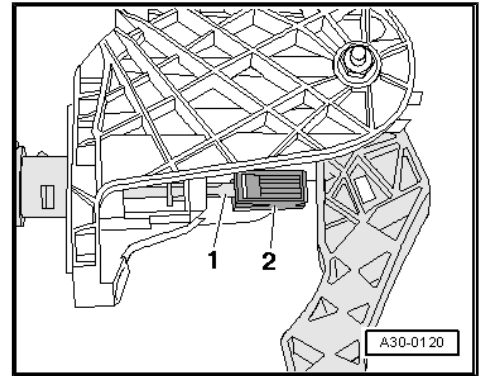


- Insert spacer -A- between clutch pedal and stop, and press clutch pedal forward.
- Release retainer clip -B- and pull clutch master cylinder out of mounting bracket -arrow 1- and -arrow 2-.



Installing

- Clutch pedal in “released” position.
- Install retaining clip -2- on operating rod -1- for clutch master cylinder.
- Insert spacer -A- between clutch pedal and stop, and press clutch pedal forward.
- Secure master cylinder on mounting bracket -arrow 1- and -arrow 2-.
- Press operating rod -1- for master cylinder in direction of -arrow- so that retaining clip -2- snaps into place in clutch pedal.
- Install mounting bracket ⇒ [page 27](#) .



1.10 Removing and installing clutch slave cylinder together with release bearing



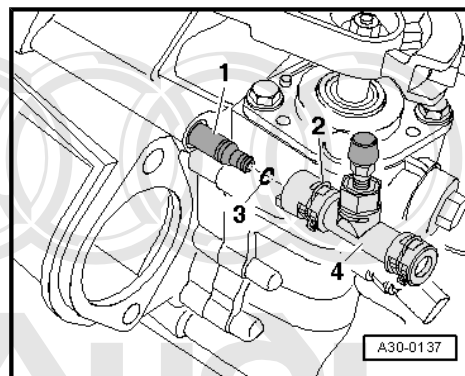
Note

- ◆ *Slave cylinder and release bearing are one unit and can only be renewed together.*
- ◆ *If you suspect a defective clutch slave cylinder, perform function test prior to renewing ⇒ [page 21](#) .*

Removing

- Gearbox removed

- Release retaining clip -2- with a screwdriver and pull bleeder connection -4- off slave cylinder -1-.



- Remove bolts -arrows-.
- Take off slave cylinder together with release bearing -A-.

Installing

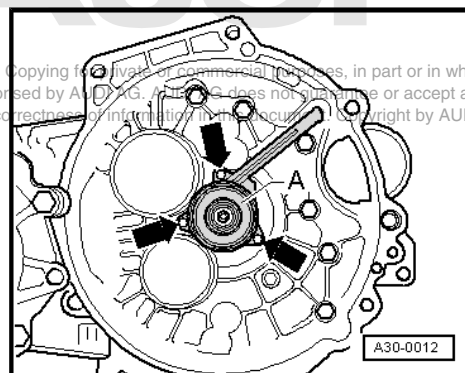
Installation is carried out in reverse sequence; note the following:



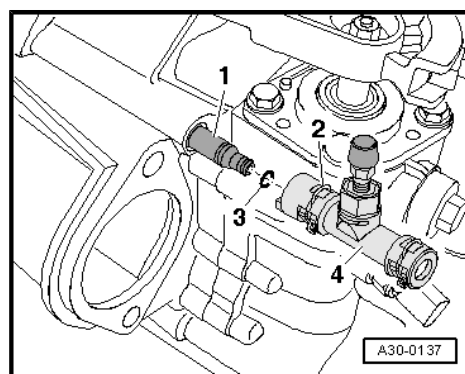
Caution

Risk of damage to clutch slave cylinder.

- ◆ *The bolts must only be tightened in small steps to avoid any risk of breaking off the mounting lugs -arrows- on the clutch slave cylinder.*



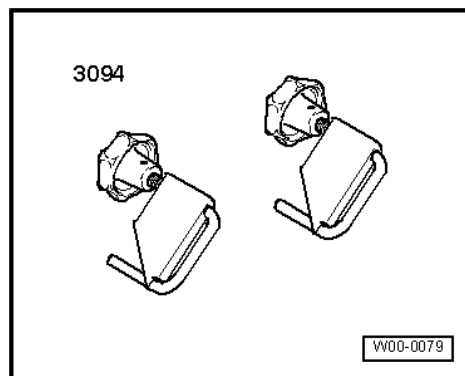
- Check seal -3- for damage and renew if necessary.
- Press bleeder connection -4- onto connection on clutch slave cylinder -1- so that retaining clip -2- snaps into place.
- Pull on bleeder connection to check it is secure.
- Bleed clutch system ➔ [page 36](#) .



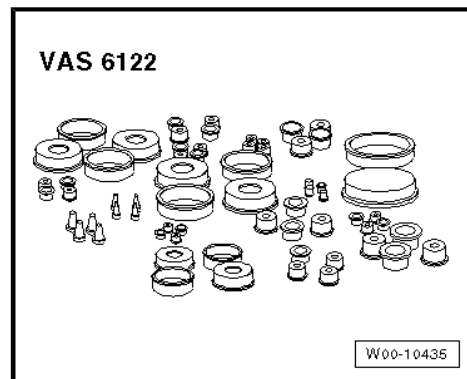
1.11 Removing and installing lines for clutch hydraulics

Special tools and workshop equipment required

- ◆ Hose clamps, up to 25 mm - 3094-

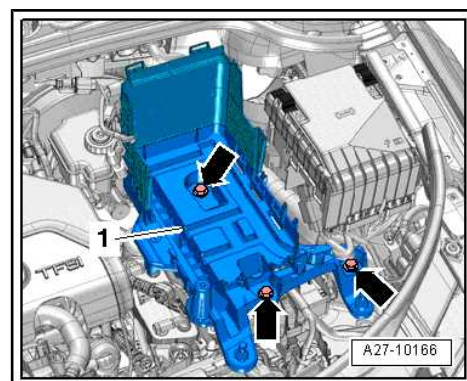


◆ Engine bung set - VAS 6122-



Removing

- Remove battery and battery tray ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray .

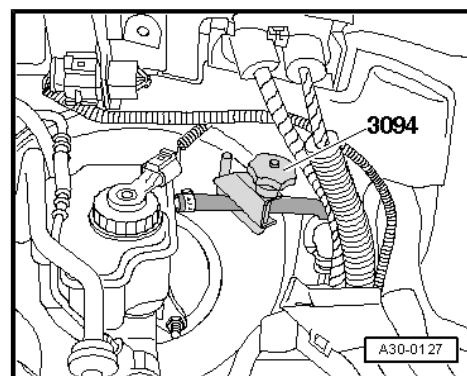


- Using hose clamp -3094- , clamp off supply hose to clutch master cylinder.



Note

- ◆ *In the following steps make sure that no brake fluid escapes onto the longitudinal member or onto the gearbox. If this does happen, clean the affected area thoroughly.*
- ◆ *Clamping off the supply hose with the hose clamp -3094- will cause a permanent deformation.*
- ◆ *However, this does not damage the supply hose.*
- ◆ *After removing the hose clamp -3094- , the supply hose must be returned to its original shape.*



Note

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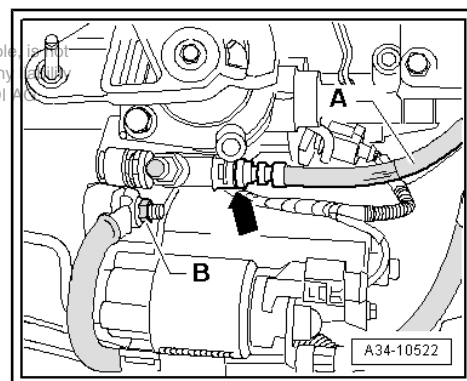
Place a lint-free cloth below clutch master cylinder and bleeder connection to catch escaping brake fluid.

- Pull out retaining clip -arrow- as far as it will go and disconnect pipe -A- from bleeder connection.



Note

-Item B- can be disregarded.



- Seal off open lines and connections with clean plugs from engine bung set - VAS 6122- .

- Release retaining clip -3- and pull pipe -1- off clutch master cylinder -4- and bleeder connection.



Caution

Catch escaping brake fluid.

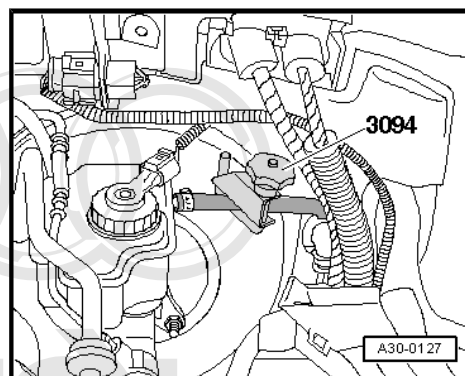
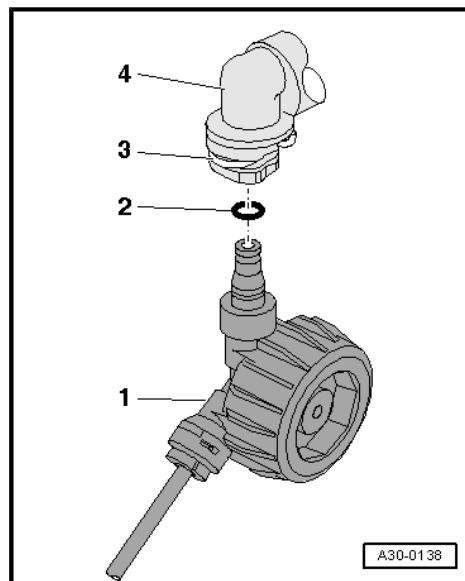
- ◆ *Do not operate clutch pedal after pipe has been disconnected.*

- Move pipe clear and remove.

Installing

Installation is carried out in reverse sequence; note the following:

- Connect pipe ⇒ [page 17](#) .
- After removing the hose clamp - 3094- , the supply hose must be returned to its original shape.
- Bleed clutch system ⇒ [page 36](#) .
- Install battery tray and battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray .

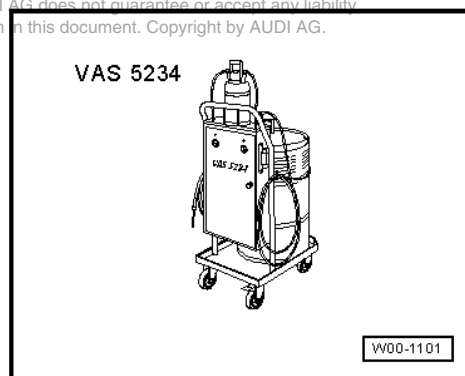


1.12 Bleeding clutch hydraulics

Special tools and workshop equipment required

- ◆ Brake filling and bleeding equipment - VAS 5234 -

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- ◆ Brake fluid specification ⇒ Electronic parts catalogue .

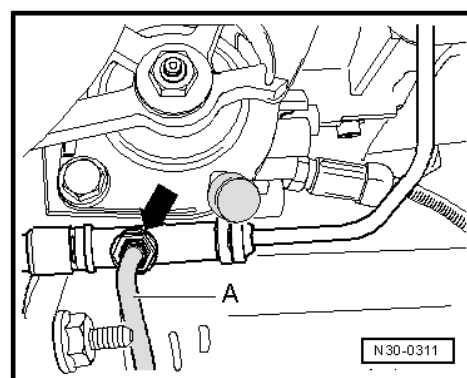
Procedure



Note

- ◆ *The clutch system must be bled after performing work on the hydraulic clutch mechanism.*
- ◆ *When performing the following steps, make sure that no brake fluid escapes onto the gearbox.*
- ◆ *Before bleeding the clutch system, top up the brake fluid reservoir to the "Max." marking with brake fluid.*
- ◆ *The brake fluid in the clutch system should be changed at the same intervals as the brake fluid in the brake system ⇒ Maintenance ; Booklet 820 ; Description of work; Brake fluid: changing (every 2 years) .*

- Remove air cleaner housing ⇒ Rep. gr. 23 ; Air cleaner; Removing and installing air cleaner housing if bleeder screw -arrow- is not otherwise accessible.
- Pull clutch pedal back to rest position.
- Remove dust cap from bleeder screw -arrow-.
- Connect bleeder hose -A- to pressure hose of fluid collector bottle.
- Switch on brake filling and bleeding equipment - VAS 5234- .
- Operating pressure 2.0 bar
- Open bleeder screw.
- Pump clutch pedal rapidly all the way in and out by hand 15 to 20 times (approx. 2 times per second).
- Close bleeder screw.
- Switch off brake filling and bleeding equipment - VAS 5234- and relieve pressure from bleeding equipment.
- Pump clutch pedal all the way in and out 10 times with your foot.
- Check that clutch system is functioning properly.
- Install air cleaner housing ⇒ Rep. gr. 23 ; Air cleaner; Removing and installing air cleaner housing .



Tightening torques

- ◆ ⇒ ["1.2 Exploded view - clutch hydraulics", page 16](#)

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2 Clutch

⇒ ["2.1 Exploded view - clutch unit", page 38](#)

⇒ ["2.2 Identifying different makes of clutch", page 43](#)

⇒ ["2.3 Removing and installing clutch", page 44](#)

2.1 Exploded view - clutch unit

⇒ ["2.1.1 Exploded view - Sachs version clutch", page 38](#)

⇒ ["2.1.2 Exploded view - LuK version clutch", page 41](#)

2.1.1 Exploded view - Sachs version clutch



Note

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The flywheel, pressure plate and clutch plate are matched together; components from another manufacturer must not be installed on the same vehicle.

1 - Flywheel

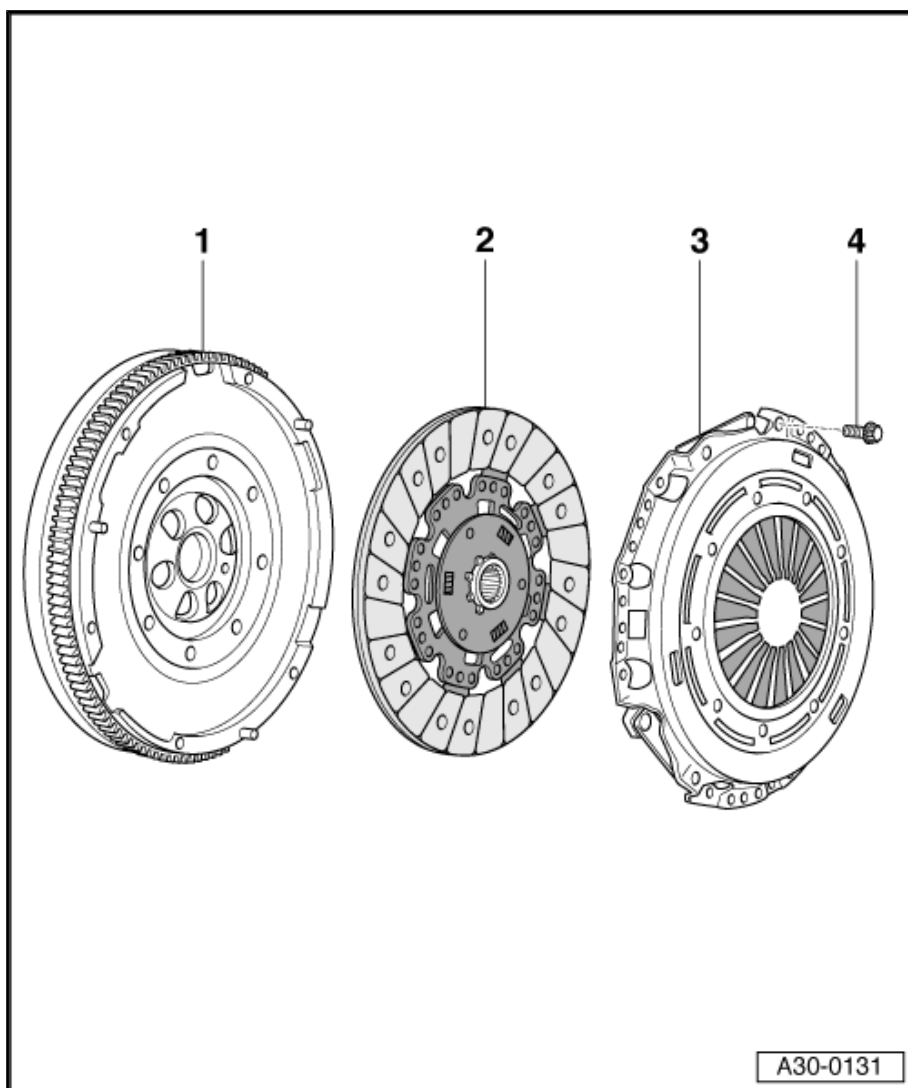
- ☐ Removing and installing
⇒ Rep. gr. 13 ; Cylinder block (gearbox end);
Removing and installing flywheel
- ☐ Ensure that dowel pins fit tightly
- ☐ Contact surface for clutch lining must be free of grooves, oil and grease
- ☐ Observe instructions for removal ⇒ [page 40](#)

2 - Clutch plate

- ☐ Removing and installing
⇒ [page 44](#)
- ☐ Always renew pressure plate as well
- ☐ Installation position
⇒ [page 46](#)
- ☐ For diameter of clutch plate, refer to ⇒ Electronic parts catalogue

3 - Pressure plate

- ☐ With adjustment mechanism
- ☐ Identification
⇒ [page 39](#)
- ☐ Removing and installing
⇒ [page 44](#)
- ☐ Checking ends of diaphragm spring
⇒ [page 39](#)
- ☐ Checking springs and riveting ⇒ [page 40](#)
- ☐ Checking wire ring or sheet-metal ring ⇒ [page 40](#)
- ☐ Always renew clutch plate as well



A30-0131

- ☐ Release bearing with additional plastic disc ⇒ [page 21](#) , pressure plate is matched accordingly ⇒ [page 21](#)
- ☐ For correct version, refer to ⇒ Electronic parts catalogue
- ☐ Contact surface for clutch lining must be free of grooves, oil and grease

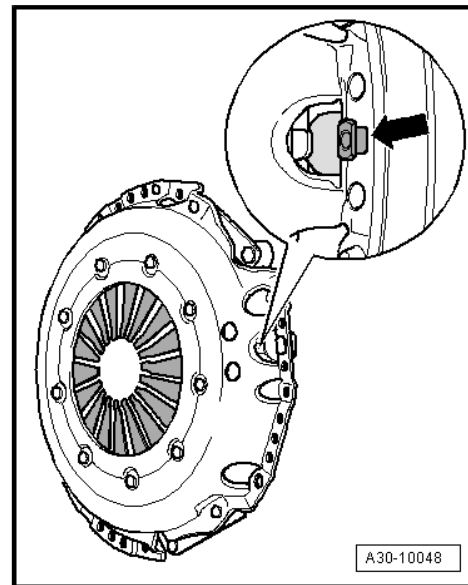
4 - Bolt

- ☐ Loosen and tighten bolts consecutively in steps of 90°
- ☐ M6 - 13 Nm
- ☐ M7 - 20 Nm

Identification of self-adjusting Sachs version clutch

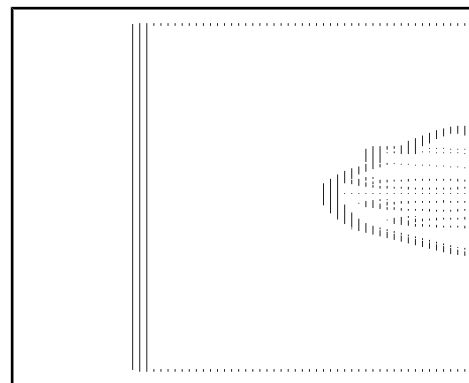
- ◆ Pressure plate with stop mechanism (position sensor)
-arrow-

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Checking ends of diaphragm spring

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



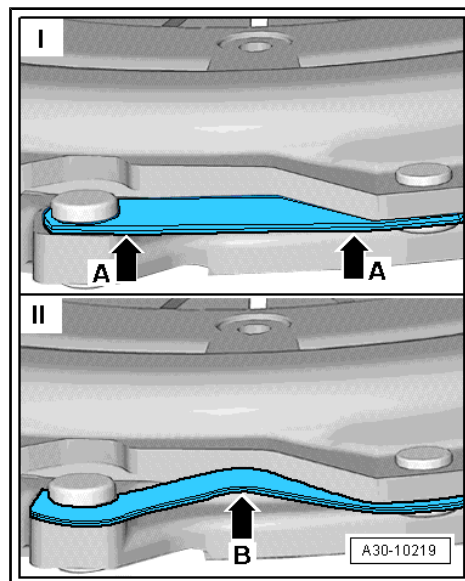
Checking springs and riveting

I - Springs OK

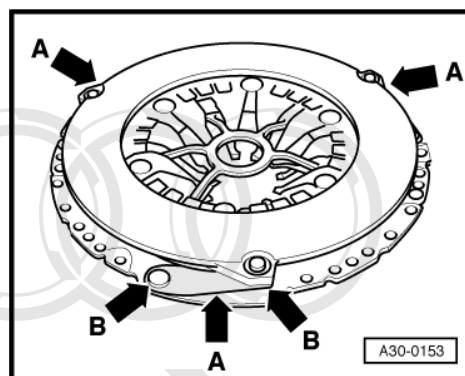
- Slight kinking on the outside -arrows A- is normal on production parts.

II - Springs damaged

- Renew pressure plate if springs are broken or badly bent -arrow B-.

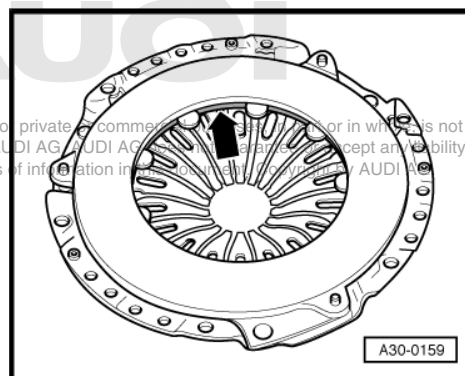


- Check that rivets -arrows B- are secure at all springs -arrows A-.
- Renew pressure plate if rivets -arrows B- are loose.



Checking wire ring or sheet-metal ring

- Check wire ring or sheet-metal ring -arrow- in pressure plate for damage.
- Renew pressure plate if wire ring or sheet-metal ring is broken.



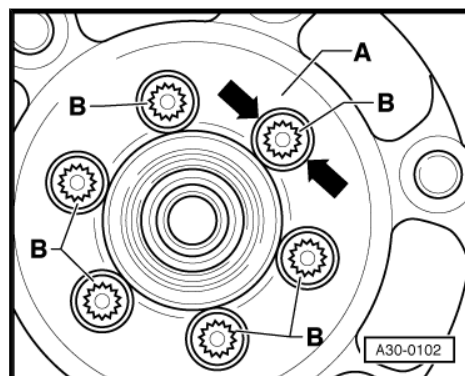
Instructions for removing flywheel



Note

Do not use an impact wrench or pneumatic wrench to remove bolts -B-; this would severely damage the flywheel. The bolts must always be removed by hand.

- Rotate flywheel -A- so that the bolts are aligned centrally behind the holes -arrows-.
- When removing the bolts, make sure that none of the bolt heads contacts the flywheel, as this would damage the flywheel when the bolts are unscrewed further.



2.1.2 Exploded view - LuK version clutch



Note

The flywheel, pressure plate and clutch plate are matched together; components from another manufacturer must not be installed on the same vehicle.

1 - Flywheel

- ☐ Removing and installing
⇒ Rep. gr. 13 ; Cylinder block (gearbox end);
Removing and installing flywheel
- ☐ Ensure that dowel pins fit tightly
- ☐ Contact surface for clutch lining must be free of grooves, oil and grease
- ☐ Observe instructions for removal ⇒ [page 43](#)

2 - Clutch plate

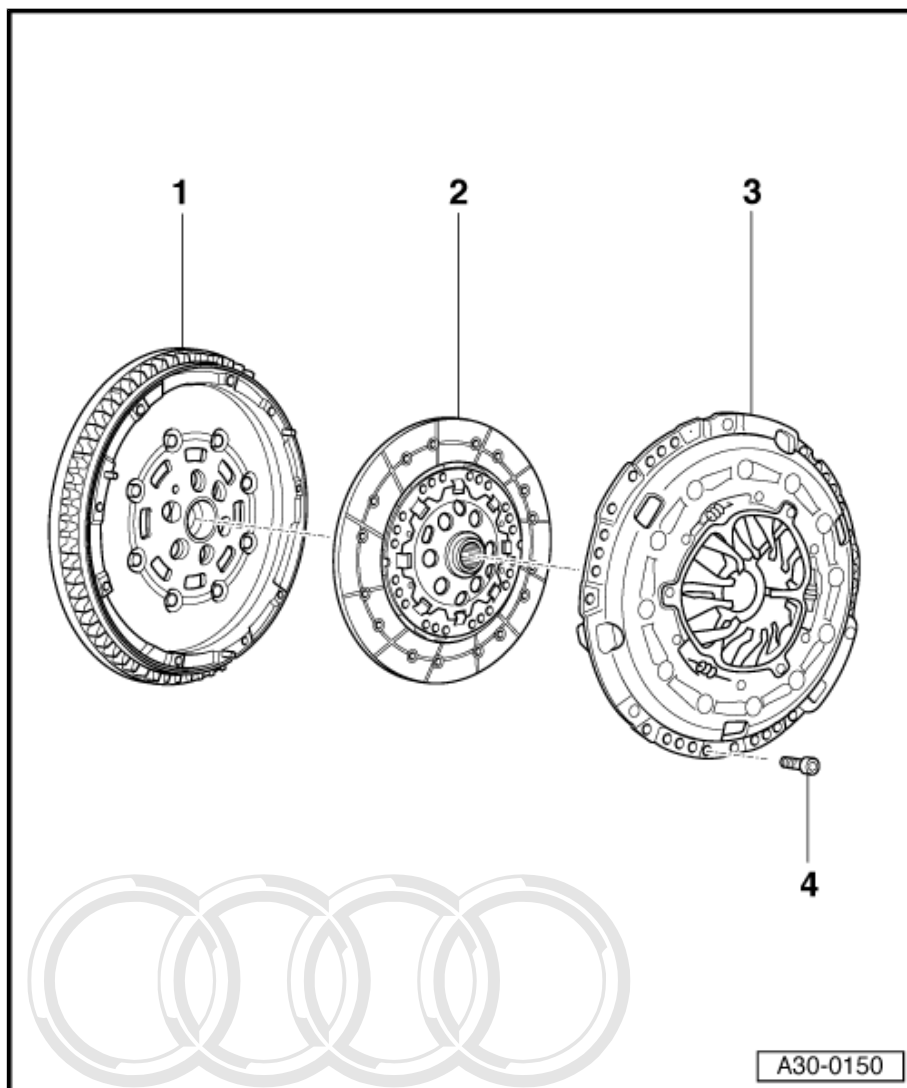
- ☐ Removing and installing
⇒ [page 46](#)
- ☐ Always renew pressure plate as well
- ☐ Installation position: marking "Getriebeseite" (gearbox side) faces towards gearbox
- ☐ For diameter of clutch plate, refer to ⇒ Electronic parts catalogue

3 - Pressure plate

- ☐ Always renew clutch plate as well
- ☐ Removing and installing
⇒ [page 46](#)
- ☐ Checking position of adjuster ring on new pressure plate ⇒ [page 49](#)
- ☐ Checking ends of diaphragm spring ⇒ [page 42](#)
- ☐ Checking spring connection and rivets ⇒ [page 42](#)
- ☐ Checking metal ring ⇒ [page 42](#)
- ☐ Release bearing with additional plastic disc ⇒ [page 21](#) , pressure plate is matched accordingly ⇒ [page 21](#)
- ☐ For correct version, refer to ⇒ Electronic parts catalogue
- ☐ Contact surface for clutch lining must be free of grooves, oil and grease

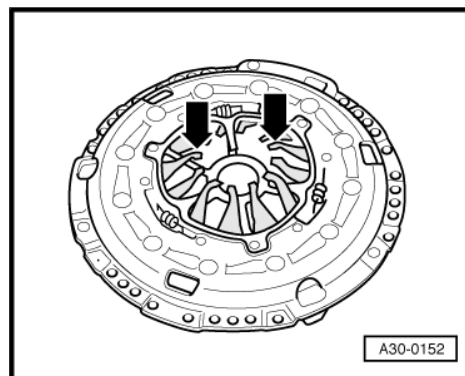
4 - Bolt

- ☐ Loosen and tighten bolts consecutively in steps of 90°
- ☐ M6 - 13 Nm
- ☐ M7 - 20 Nm



Checking ends of diaphragm spring

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



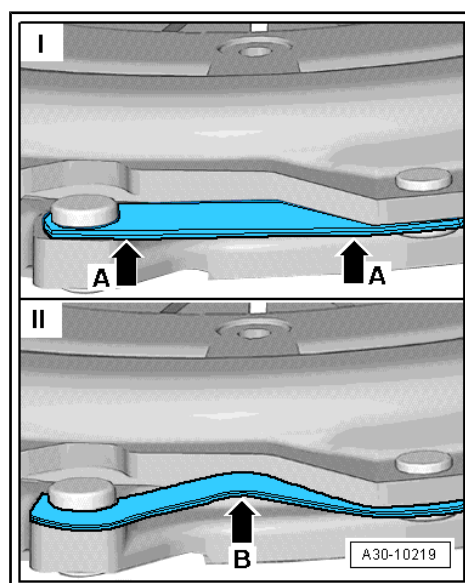
Checking springs and riveting

I - Springs OK

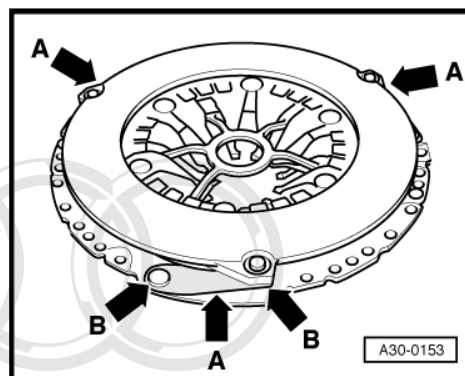
- Slight kinking on the outside -arrows A- is normal on production parts.

II - Springs damaged

- Renew pressure plate if springs are broken or badly bent -arrow B-.

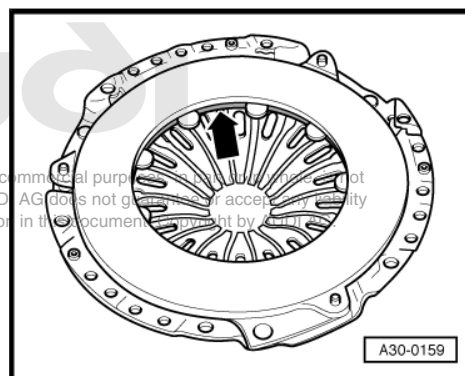


- Check that rivets -arrows B- are secure at all springs -arrows A-.
- Renew pressure plate if rivets -arrows B- are loose.



Checking metal ring

- Check metal ring -arrow- in pressure plate for damage.
- Renew pressure plate if metal ring is broken.



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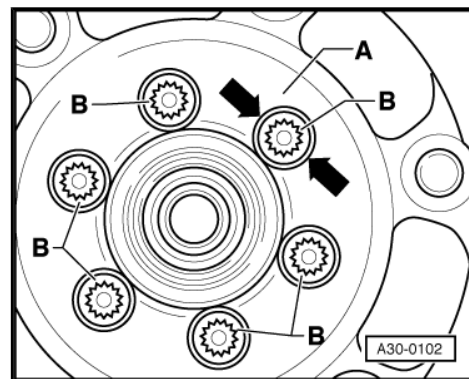
Instructions for removing flywheel



Note

Do not use an impact wrench or pneumatic wrench to remove bolts -B-: this would severely damage the flywheel. The bolts must always be removed by hand.

- Rotate flywheel -A- so that the bolts are aligned centrally behind the holes -arrows-.
- When removing the bolts, make sure that none of the bolt heads contacts the flywheel, as this would damage the flywheel when the bolts are unscrewed further.



2.2 Identifying different makes of clutch

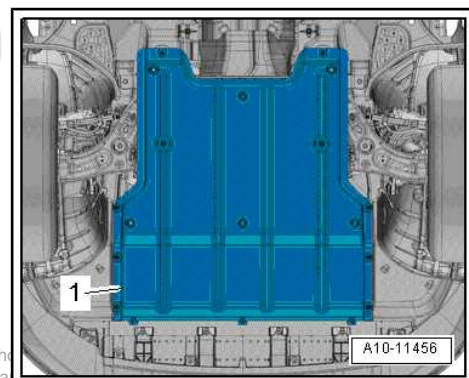


Note

The clutch fitted in the vehicle is supplied by either "Sachs" or "LuK".

With gearbox installed, the clutch version fitted can be distinguished as follows:

- Remove noise insulation -1- ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .

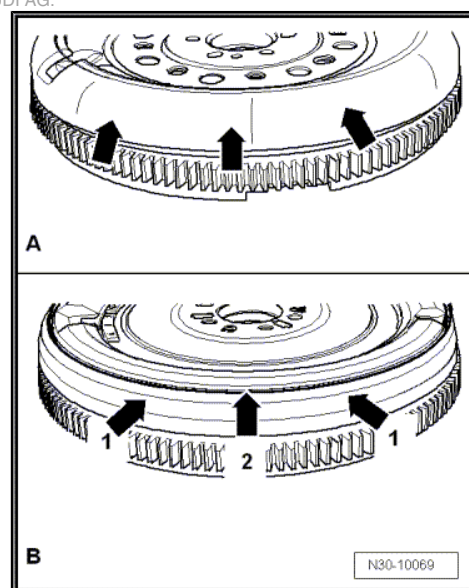


A - round contour -arrows- = Sachs version clutch

Exploded view - Sachs version clutch ⇒ [page 38](#)

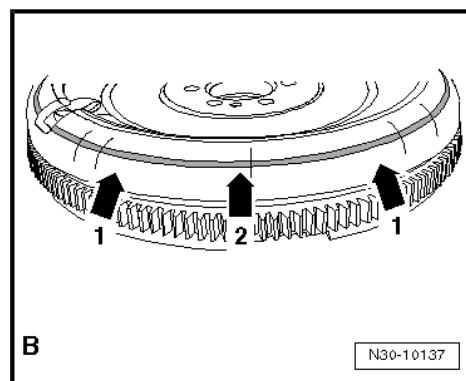
B - square contour -arrows 1- and annular groove -arrow 2- = LuK version clutch

Exploded view - LuK version clutch ⇒ [page 41](#)



Round contour -arrows 1- and annular groove -arrow 2- = LuK version clutch = -B-

Exploded view - LuK version clutch ➔ [page 41](#)



2.3 Removing and installing clutch

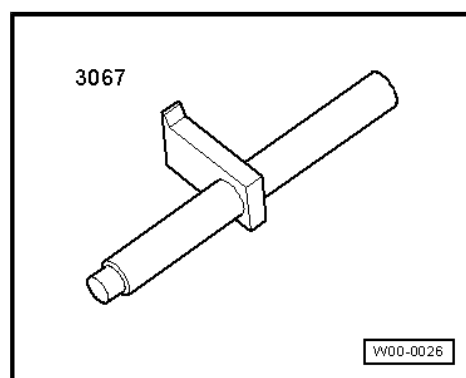
➔ ["2.3.1 Removing and installing Sachs version clutch", page 44](#)

➔ ["2.3.2 Removing and installing LuK version clutch", page 46](#)

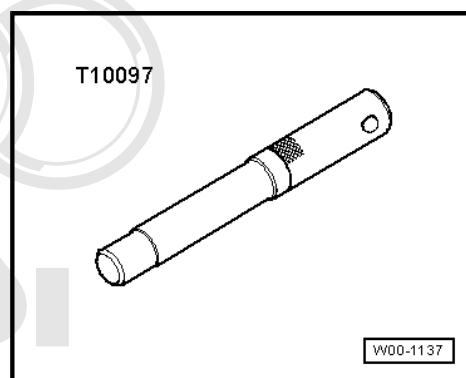
2.3.1 Removing and installing Sachs version clutch

Special tools and workshop equipment required

- ◆ Counterhold tool - 3067-



- ◆ Centring mandrel - T10097-



- ◆ Grease for clutch plate splines - G 000 100-

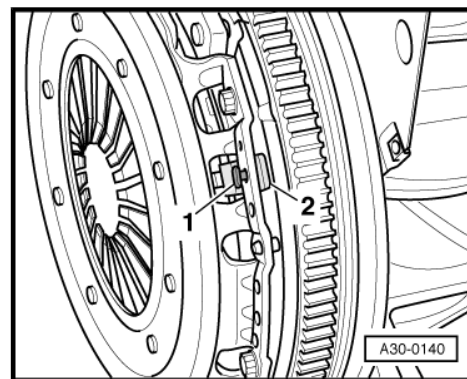
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Removing

- Gearbox removed ⇒ [page 74](#) .

To prevent the pressure plate from becoming distorted during removal (causes clutch grab when driving off), always adhere to the following procedure when unbolting the pressure plate:

- Apply counter-hold tool - 3067- in order to loosen bolts.
- Working clockwise, loosen all six bolts consecutively in steps of 90° ($\frac{1}{4}$ turn) until pressure plate is released.
- Stop -2- with pin -1- should come loose when bolts are slackened.
- If stop does not come loose, push pin towards flywheel.
- Take off pressure plate and clutch plate.



Installing

Installation is carried out in reverse sequence; note the following:

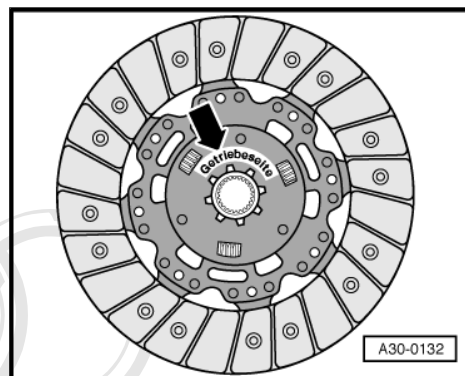


Note

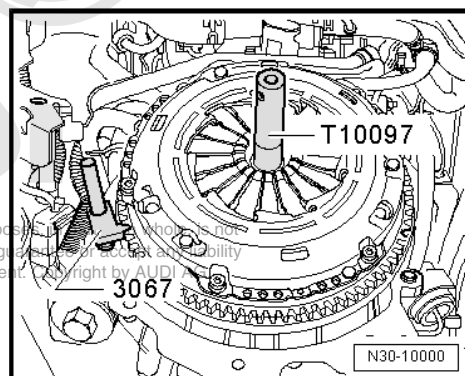
- ◆ The flywheel, pressure plate and clutch plate are matched together; components from another manufacturer must not be installed on the same vehicle.
- ◆ Always renew clutch plate and pressure plate together and select the correct parts according to engine code ⇒ Electronic parts catalogue .
- ◆ If the clutch has burnt out, thoroughly clean the gearbox housing in area of clutch and parts of the engine facing the gearbox in order to prevent odours.
- ◆ Blow off flywheel with compressed air only.
- ◆ Clean input shaft splines and (in the case of a used clutch plate) the hub splines. Remove corrosion and apply only a very thin coating of grease for clutch plate splines - G 000 100- to the splines. Then move clutch plate backwards and forwards on input shaft until hub moves freely on shaft. It is important to remove excess grease.
- ◆ Pressure plates have an anti-corrosion coating and are greased. With the exception of the friction surface for the clutch plate, the pressure plate must not be cleaned. Otherwise, the service life of the clutch will be considerably reduced.
- ◆ The friction surface of the pressure plate and the flywheel must be cleaned (degreased) thoroughly.
- ◆ Clutch plate linings must make full contact with flywheel and friction surface of clutch pressure plate. Only then insert bolts.
- ◆ Check that dowel sleeves for centralising engine/gearbox are in the cylinder block; install if necessary.
- ◆ If the dowel sleeves are not fitted, this will lead to gear-change problems, clutch malfunction and in some cases gearbox noise (gears will make rattling noises).

Installation position of clutch plate

- Marking "Getriebeseite" (gearbox side) and the protruding spring cage face towards gearbox.

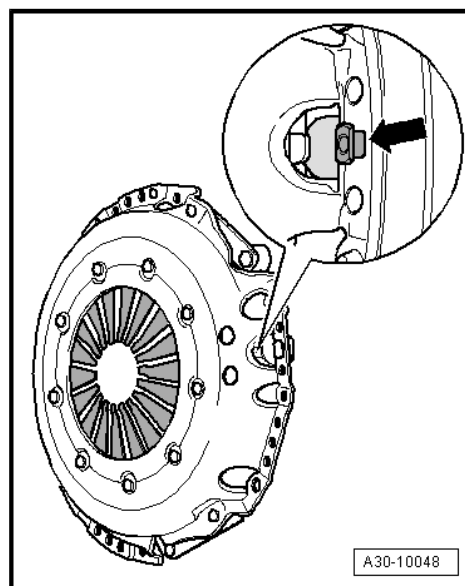


- Use counterhold tool - 3067- .
- Fit pressure plate onto centring pins.
- Use centring mandrel - T10097- to centralise clutch plate.



To prevent the pressure plate from becoming distorted during installation (causes clutch grab when driving off), always adhere to the following procedure when installing the pressure plate:

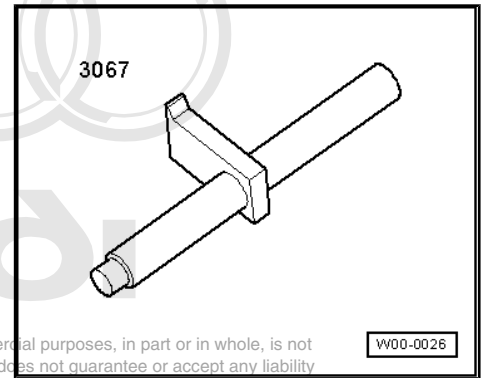
- Make sure that the stop pin (position sensor) -arrow- is free to move.
- Screw in all 6 bolts evenly by hand until bolt heads make contact with pressure plate.
- Working clockwise, tighten all six bolts consecutively in steps of 90° (1/4 turn) until the housing makes contact with the fly-wheel.
- The stop pin -arrow- should then lift away from the pressure plate.
- Working clockwise, tighten all 6 bolts to final torque consecutively. Tightening torque ➔ [Item 4 \(page 39\)](#)



2.3.2 Removing and installing LuK version clutch

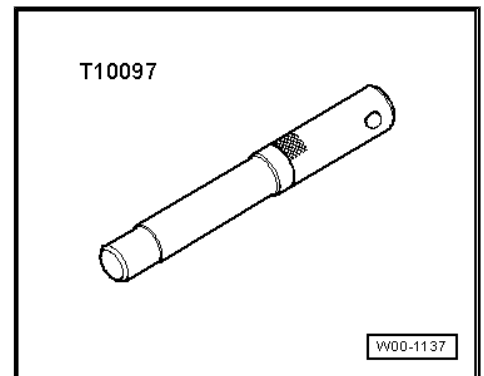
Special tools and workshop equipment required

◆ Counterhold tool - 3067-



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◆ Centring mandrel - T10097-



◆ Grease for clutch plate splines - G 000 100-

Removing

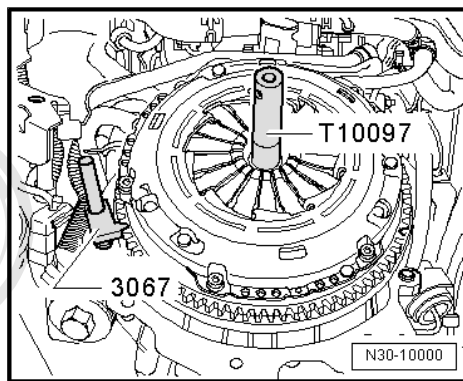
- Gearbox removed ⇒ [page 74](#) .
- Apply counter-hold tool - 3067- in order to loosen bolts.

To prevent the pressure plate from becoming distorted during removal (causes clutch grab when driving off), always adhere to the following procedure when unbolting the pressure plate:

- Working clockwise, loosen all six bolts consecutively in steps of 90° (1/4 turn) until the pressure plate is released.
- Take off pressure plate and clutch plate.

Installing

Installation is carried out in reverse sequence; note the following:



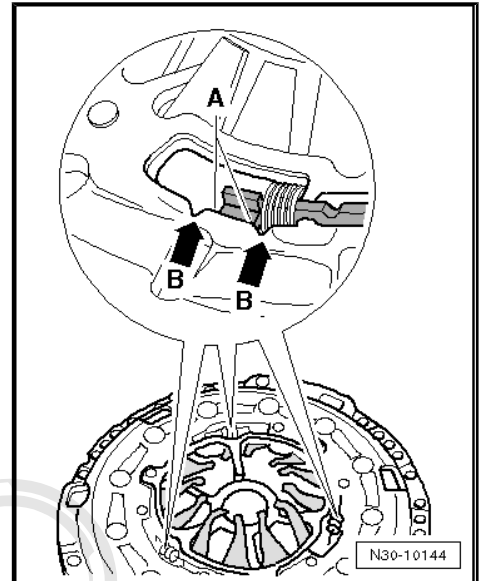
Note

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- ◆ *The flywheel, pressure plate and clutch plate are matched to gether; components from another manufacturer must not be installed on the same vehicle.*
- ◆ *Always renew clutch plate and pressure plate together and select the correct parts according to engine code ⇒ Electronic parts catalogue .*
- ◆ *Checking position of adjuster ring on new pressure plate
⇒ [page 49](#)*
- ◆ *If the clutch has burnt out, thoroughly clean the clutch housing, flywheel and parts of the engine facing the gearbox in order to reduce the smell of burnt linings.*
- ◆ *Blow off flywheel with compressed air only.*
- ◆ *Clean input shaft splines and (in the case of a used clutch plate) the hub splines. Remove corrosion and apply only a very thin coating of grease for clutch plate splines - G 000 100- to the splines. Then move clutch plate backwards and forwards on input shaft until hub moves freely on shaft. It is important to remove excess grease.*
- ◆ *Pressure plates have an anti-corrosion coating and are greased. With the exception of the friction surface for the clutch plate, the pressure plate must not be cleaned. Otherwise, the service life of the clutch will be considerably reduced.*
- ◆ *The friction surface of the pressure plate and the flywheel must be cleaned (degreased) thoroughly.*
- ◆ *Clutch plate linings must make full contact with flywheel and friction surface of clutch pressure plate. Only then insert bolts.*
- ◆ *Check that dowel sleeves for centralising engine/gearbox are in the cylinder block; install if necessary.*
- ◆ *If the dowel sleeves are not fitted, this will lead to gear-change problems, clutch malfunction and in some cases gearbox noise (gears will make rattling noises).*

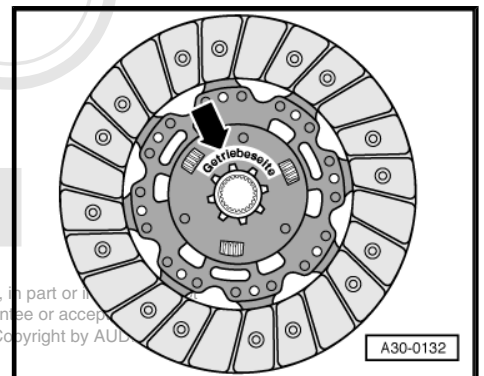
Checking position of adjustment mechanism (new pressure plates only)

- The two edges -A- of the adjuster ring should be located between the two notches -arrows B-.
- If the adjuster ring is in a different position on a new pressure plate, the pressure plate and clutch plate must not be installed.
- The position of the adjuster ring can be outside the notches on used clutches.



Installation position of clutch plate

- The marking "Getriebeseite" (gearbox side) faces towards the gearbox

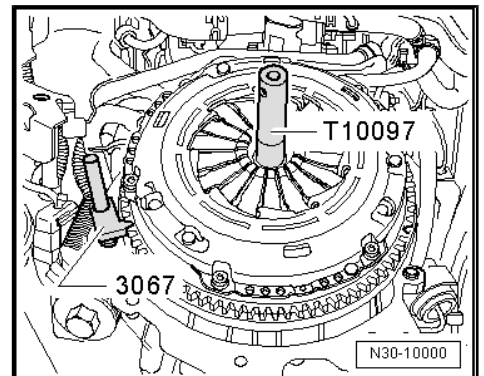


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- Use counterhold tool - 3067- .
- Fit pressure plate onto centring pins.
- Use centring mandrel - T10097- to centralise clutch plate.

To prevent the pressure plate from becoming distorted during installation (causes clutch grab when driving off), always adhere to the following procedure when installing the pressure plate:

- Screw in all 6 bolts evenly by hand until bolt heads make contact with pressure plate.
- Working clockwise, tighten all six bolts consecutively in steps of 90° (1/4 turn) until the housing makes contact with the fly-wheel.
- Working clockwise, tighten all 6 bolts to final torque consecutively. Tightening torque ➔ [Item 4 \(page 41\)](#)



34 – Controls, housing

1 Selector mechanism

- ⇒ [“1.1 Overview - selector mechanism”, page 50](#)
- ⇒ [“1.2 Exploded view - gear knob and cover”, page 52](#)
- ⇒ [“1.3 Assembly overview - gear lever and selector housing”, page 53](#)
- ⇒ [“1.4 Exploded view - selector cables”, page 55](#)
- ⇒ [“1.5 Removing and installing gear knob”, page 59](#)
- ⇒ [“1.6 Removing and installing selector mechanism”, page 60](#)
- ⇒ [“1.7 Removing and installing selector cable”, page 64](#)
- ⇒ [“1.8 Dismantling and assembling selector mechanism”, page 64](#)
- ⇒ [“1.9 Adjusting selector mechanism”, page 68](#)
- ⇒ [“1.10 Checking selector mechanism”, page 70](#)
- ⇒ [“1.11 Renewing selector shaft oil seal”, page 71](#)

1.1 Overview - selector mechanism

- Arrow A- gear selection movement
- Arrow B- gate selection movement



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A - Gear selector cable (gear selection movement)

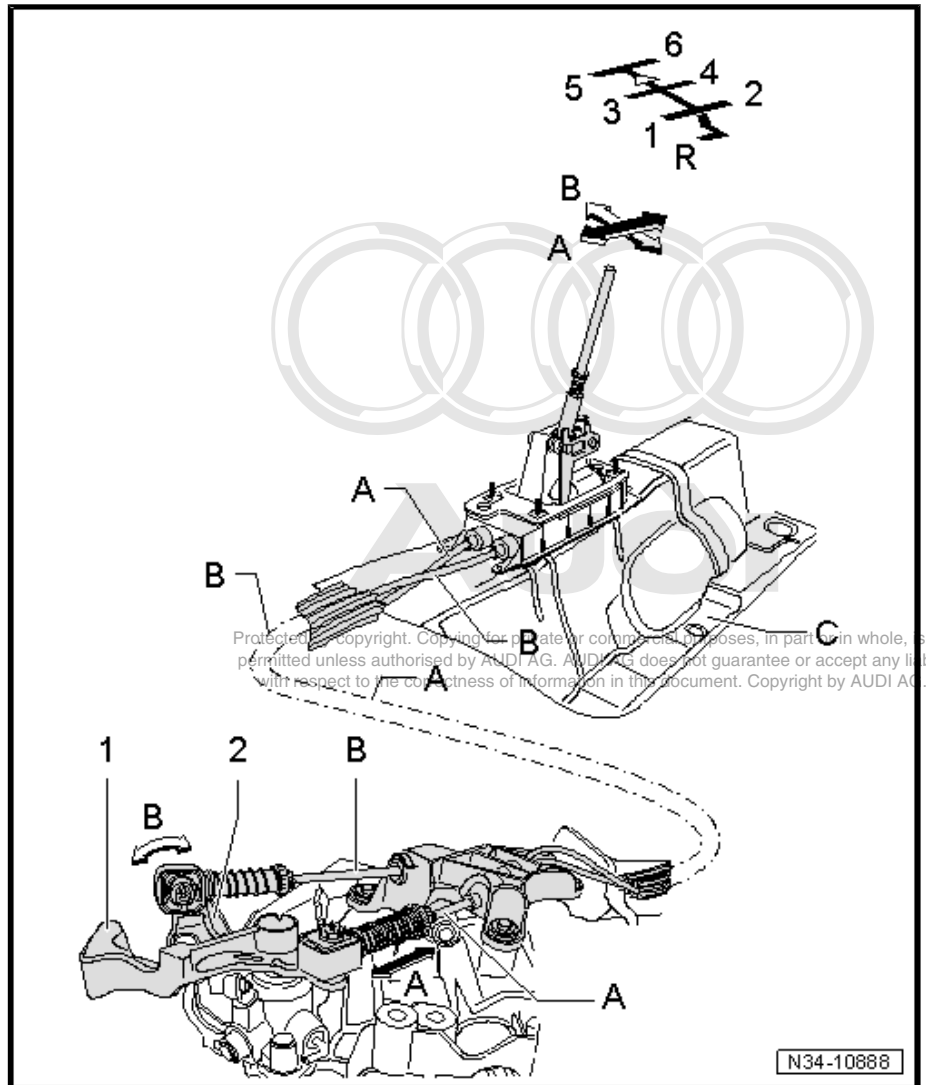
B - Gate selector cable (gate selection movement)

C - Heat shield

- Detach before removing selector mechanism

1 - Gearbox selector lever

2 - Gate relay lever



1.2 Exploded view - gear knob and cover

1 - Gear lever

2 - Noise insulation cover (lower)

3 - Gear knob

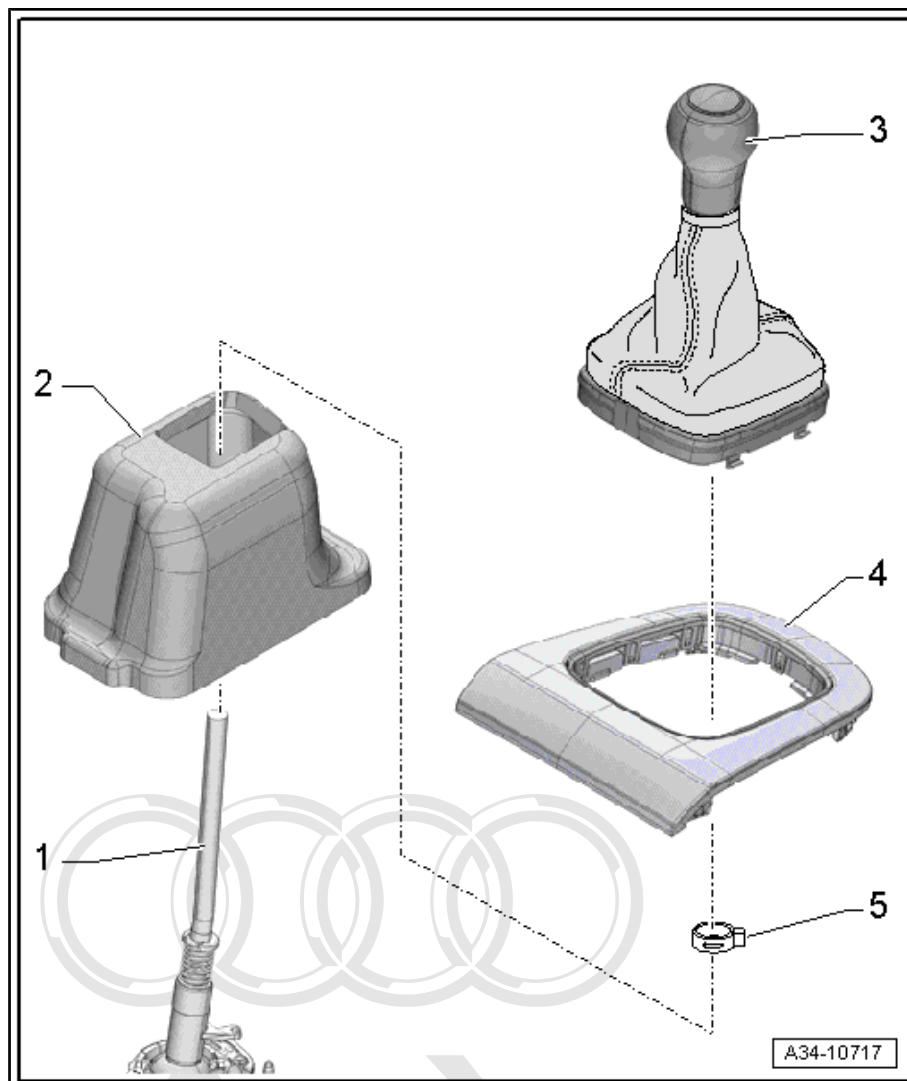
- ☐ With gear lever boot
- ☐ Removing and installing
⇒ [page 59](#)

4 - Cover

- ☐ For centre console

5 - Clip

- ☐ Secures gear knob to gear lever



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1.3 Assembly overview - gear lever and selector housing



Note

Lubricate all bearings and moving surfaces with grease - G 000 450 02- .

1 - Floor plate

- ☐ Bend tabs open to re-move
- ☐ Always renew after re-moving

2 - Gasket

- ☐ Renew

3 - Gear lever

- ☐ Can be removed and in-stalled without removing gear lever guide
⇒ [Item 15 \(page 54\)](#)

4 - Damping washer

- ☐ Push onto gear lever as far as stop -arrow-

5 - Retaining clip

- ☐ Renew

6 - Gate selector cable

- ☐ Lever off gate selector lever
- ☐ Press onto gate selector lever inside selector mechanism
- ☐ Installation position
⇒ [page 50](#)

7 - Bush

8 - Gear selector cable

- ☐ Lever off gear lever guide
- ☐ Press onto gear lever guide inside selector mechanism
- ☐ Installation position ⇒ [page 50](#)

9 - Damper

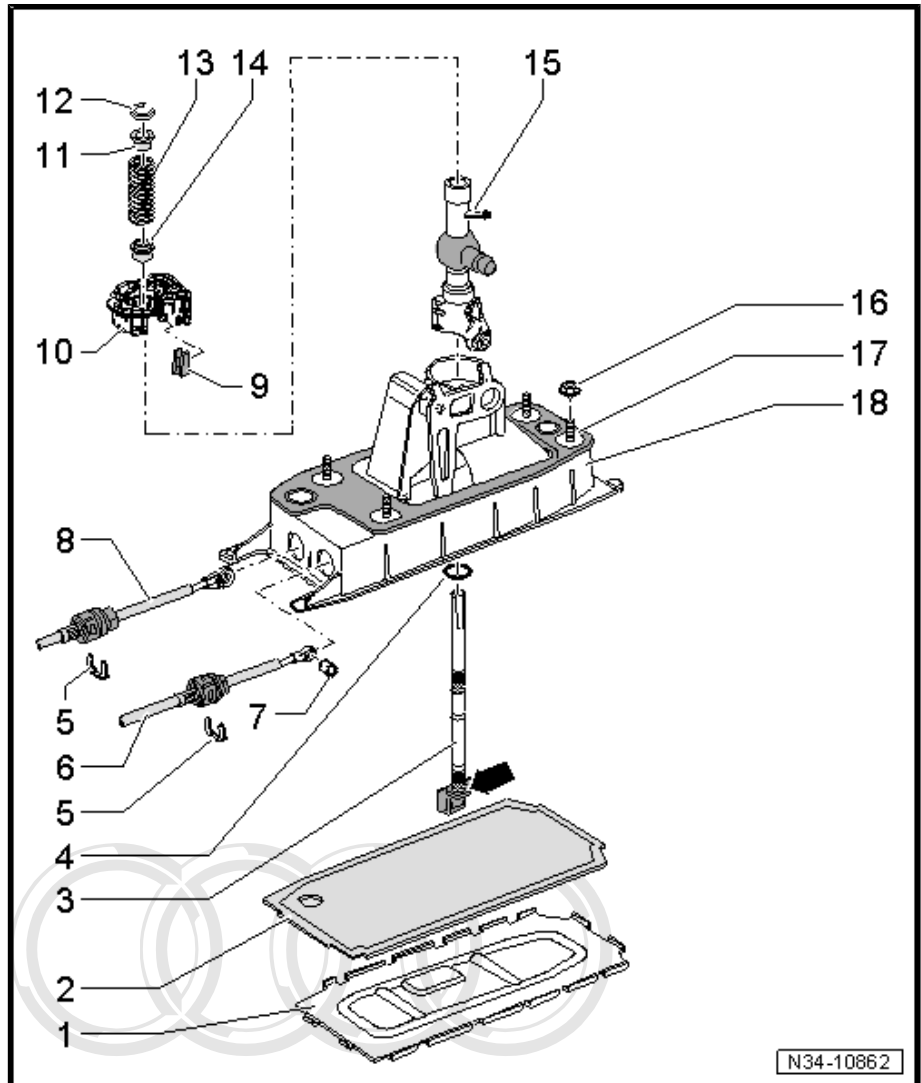
10 - Ball socket

- ☐ Cannot be removed without being damaged
- ☐ Renew

11 - Bush

12 - Securing clip

- ☐ Removing and installing ⇒ [page 54](#)



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13 - Spring

14 - Bush

15 - Gear lever guide

16 - Nut

- ☐ 4x
- M6 - 8 Nm
- M8 - 25 Nm

17 - Gasket

- ☐ Between selector housing and floor
- ☐ Self-adhesive
- ☐ Glue onto selector housing

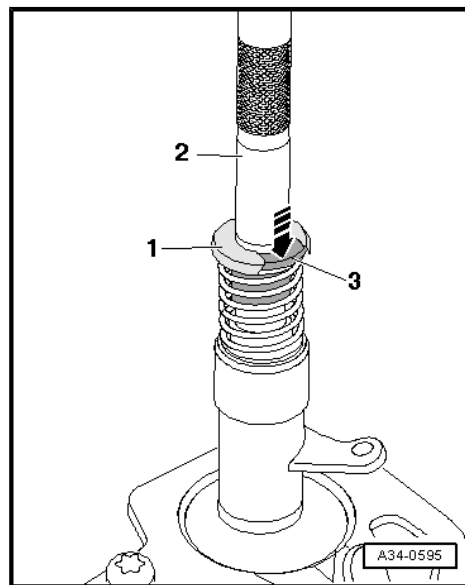
18 - Selector housing

- ☐ With spring and gate selector lever
- ☐ Spring and gate selector lever cannot be removed

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Removing and installing securing clip

- Hold gear lever -2- and press bush -3- in direction of -arrow-.
- Remove securing clip -1-.



1.4 Exploded view - selector cables



Note

Lubricate all bearings and moving surfaces with grease - G 000 450 02-.

1 - Gear selector cable

- ☐ Secure to gate selector cable with cable tie
⇒ [page 57](#)
- ☐ Connect to cable end-piece
⇒ [Item 12 \(page 55\)](#)
- ☐ Installation position
⇒ [page 50](#)

2 - Gate selector cable

- ☐ Connect to cable end-piece
⇒ [Item 14 \(page 56\)](#)
- ☐ Installation position
⇒ [page 50](#)
- ☐ Secure to gear selector cable with cable tie
⇒ [page 57](#)

3 - Bush

4 - Selector housing

5 - Securing clip

- ☐ Take care not to damage selector cable when removing
- ☐ Renew after removal

6 - Securing clip

- ☐ Take care not to damage selector cable when removing
- ☐ Renew after removal

7 - Securing clip

- ☐ Take care not to damage selector cable when removing
- ☐ Renew after removal

8 - Bolt

- ☐ For cable support bracket
- ☐ 3x
- ☐ 20 Nm

9 - Cable support bracket

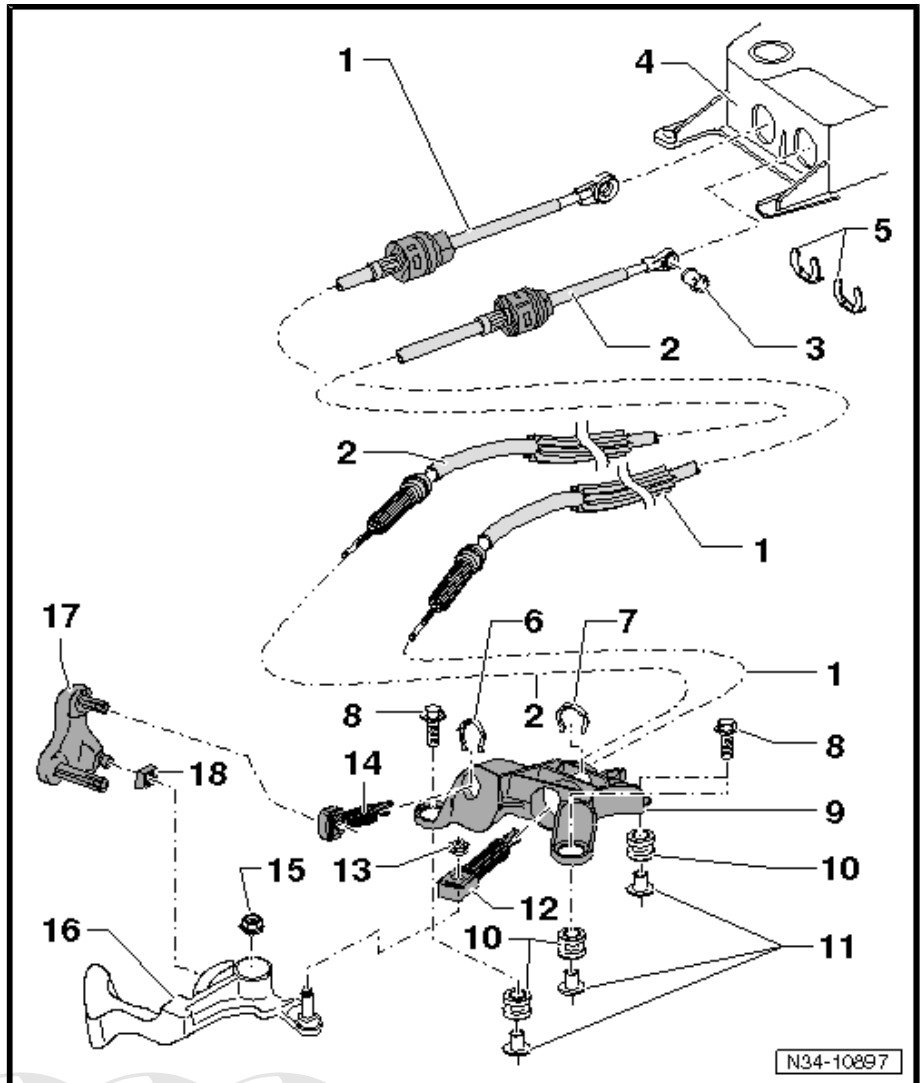
10 - Grommet

- ☐ Mounting for cable support bracket on gearbox

11 - Spacer

12 - Cable end-piece

- ☐ After installing, adjust selector mechanism ⇒ [page 68](#)



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- ☐ Secures gear selector cable to gearbox selector lever
- ☐ Allocation ➔ [page 56](#)

13 - Securing clip

- ☐ Renew after removal
- ☐ Removing ➔ [page 57](#)

14 - Cable end-piece

- ☐ After installing, adjust selector mechanism ➔ [page 68](#)
- ☐ Secures gate selector cable to gate relay lever
- ☐ Allocation ➔ [page 56](#)
- ☐ Removing from gate relay lever ➔ [page 59](#)
- ☐ Pressing onto gate relay lever ➔ [page 59](#)

15 - Nut

- ☐ Renew after removal
- ☐ 23 Nm

16 - Gearbox selector lever

- ☐ With damper weight
- ☐ Installation position ➔ [page 57](#)
- ☐ Installing ➔ [page 57](#)
- ☐ After installing, adjust selector mechanism ➔ [page 68](#)

17 - Gate relay lever

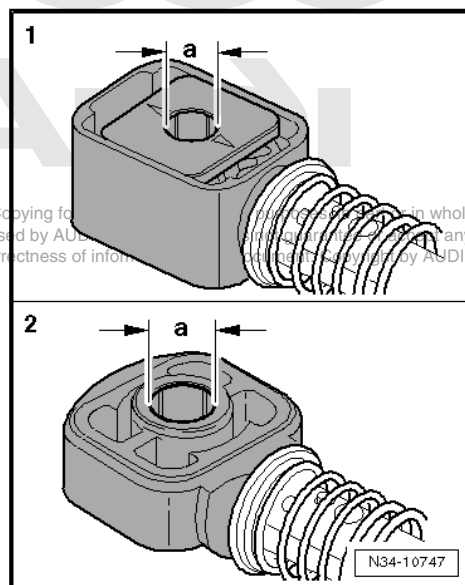
- ☐ Installation position ➔ [page 57](#)
- ☐ Secured with clip ➔ [page 58](#)
- ☐ Remove and install gate relay lever together with cable end-piece ➔ [page 58](#)
- ☐ After installing, adjust selector mechanism ➔ [page 68](#)

18 - Slide block

Identification of cable end-pieces

The holes in the cable end-pieces have different diameters.

Cable end-piece for:	Dimension "a"
-1- Gear selector cable to gearbox selector lever	8.5 mm
-2- Gate selector cable to gate relay lever	10 mm

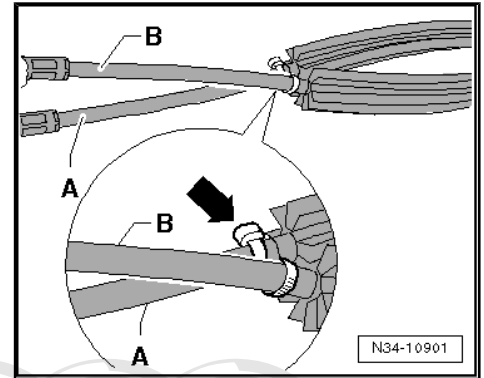


Securing gear selector cable and gate selector cable with cable tie

- Wrap cable tie around selector cables in a figure-of-eight -arrow- and secure cable tie as shown in illustration.

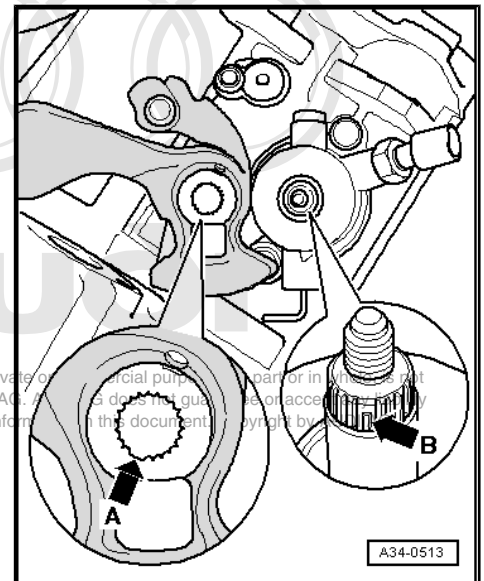
A - Gear selector cable

B - Gate selector cable



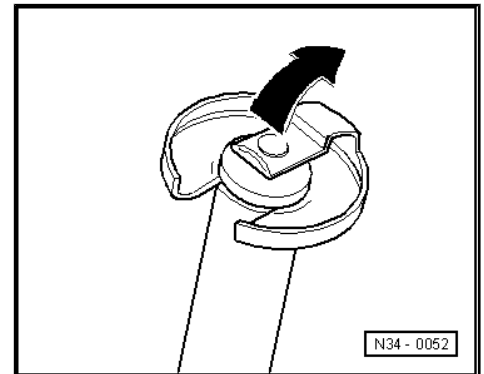
Installing gearbox selector lever

- When installing gearbox selector lever, make sure that the gap in the splines -arrow A- aligns with the wider spline -arrow B- on the selector shaft.



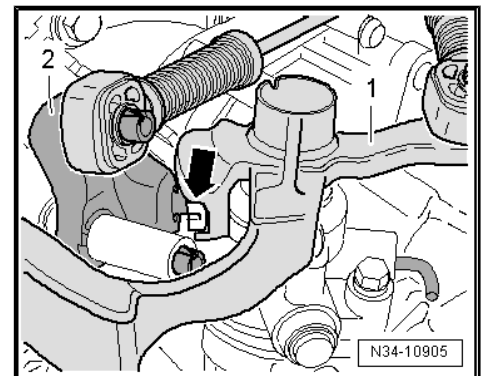
Removing securing clip

- Lift tab in direction of -arrow-.



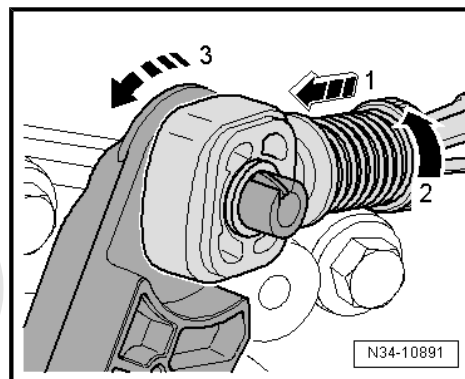
Installation position: gearbox selector lever/gate relay lever

- 1 - Gearbox selector lever with damper weight
- 2 - Gate relay lever locates in guide rail of gearbox selector lever via slide block -arrow-.



Releasing cable end-piece from gate selector cable

- Pull locking mechanism forwards -arrow 1- onto stop and then turn to left -arrow 2- to lock.
- Press gate relay lever forwards -arrow 3- and pull gate selector cable out of cable end-piece.



Detaching and securing gear selector cable at gearbox selector lever

Detaching

- Lift up tab and detach securing clip -1- for gear selector cable from gearbox selector lever -2-.

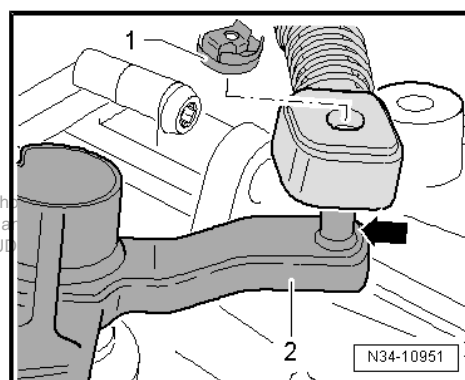
- Pull gear selector cable off pin -arrow-.

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Securing

Note

- ♦ *Renew securing clip for gear selector cable.*
- ♦ *Apply a small amount of grease - G 000 450 02- to pin -arrow-.*
- Push gear selector cable onto gearbox selector lever -2- and secure with securing clip -1-.



Detaching and securing gate relay lever at gearbox selector lever

Detaching

- Remove clip -arrow 1- and take off gate relay lever together with cable end-piece.

Securing

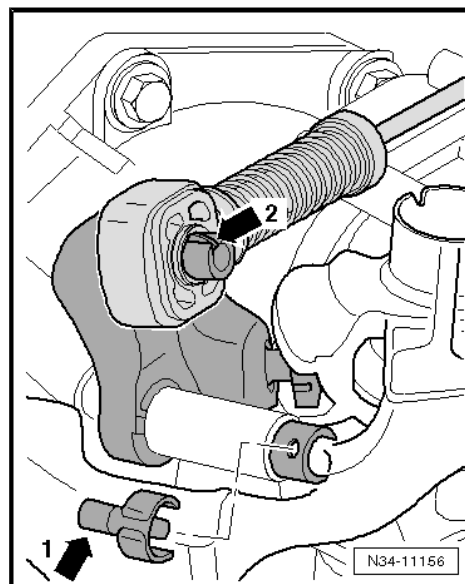
Note

Lubricate all bearings and moving surfaces with grease - G 000 450 02- .

- Insert gate relay lever with cable end-piece as far as stop.
- Press on clip -arrow 1-, making sure it engages securely.

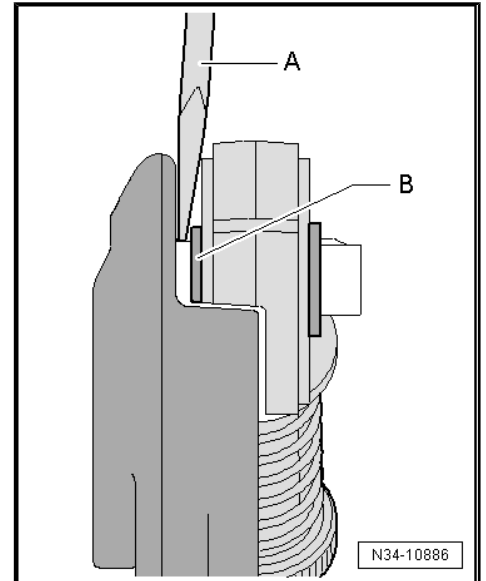
Note

-Arrow 2- can be disregarded.



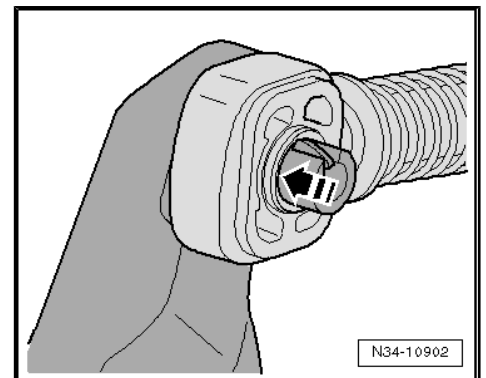
Levering cable end-piece for gate selector cable off gate relay lever

- Gate relay lever removed
- Apply plain slot screwdriver -A- between bush -B- and gate relay lever.



Pressing cable end-piece for gate selector cable onto gate relay lever

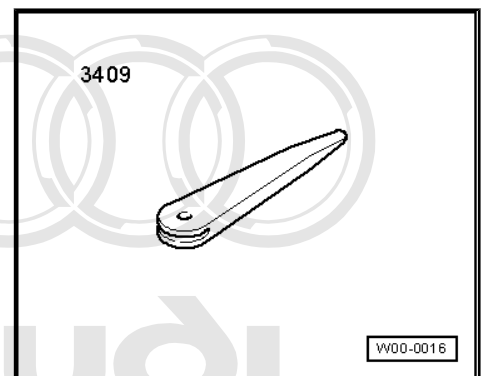
- Gate relay lever removed
- Press on cable end-piece only at bush -arrow-.
- Cable end-piece must move freely on gate relay lever.
- Cable end-piece must be behind detent.
- Ensure that components engage securely.



1.5 Removing and installing gear knob

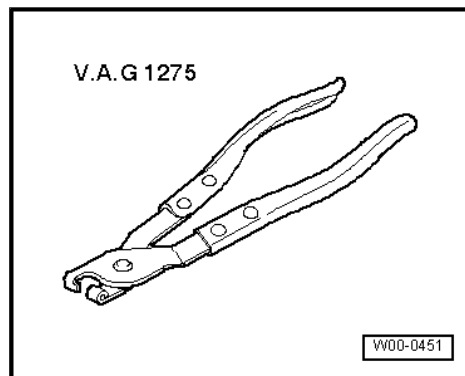
Special tools and workshop equipment required

- ◆ Removal wedge - 3409-



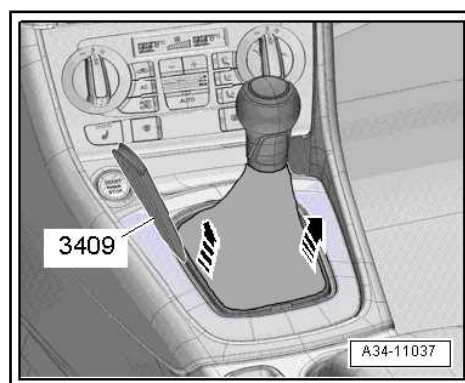
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◆ Hose clip pliers - V.A.G 1275-



Removing

- Using removal wedge - 3409- , carefully pry gear lever boot off cover for centre console -arrows-.

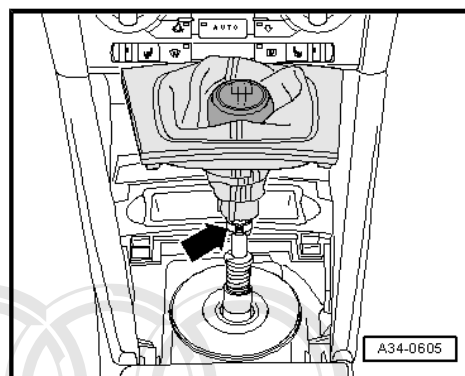


- Pull boot up and over gear knob.
- Open clip -arrow- and pull off gear knob together with boot.

Installing

Installation is carried out in reverse sequence; note the following:

- Push gear knob together with boot onto gear lever as far as stop.
- Secure gear knob to gear lever with clip -arrow-, using hose clip pliers - V.A.G 1275- .



1.6 Removing and installing selector mechanism

Special tools and workshop equipment required

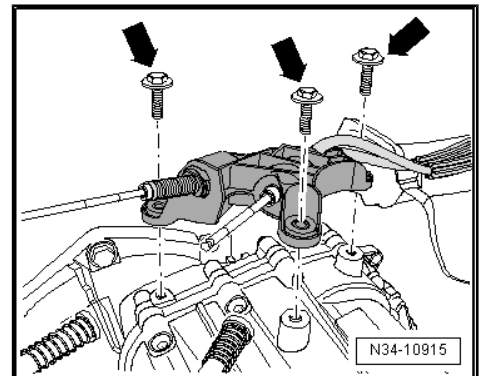
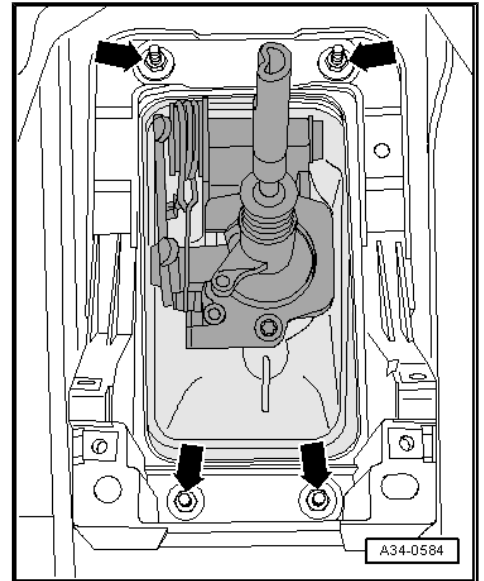
- ◆ Grease ⇒ Electronic parts catalogue

Audi

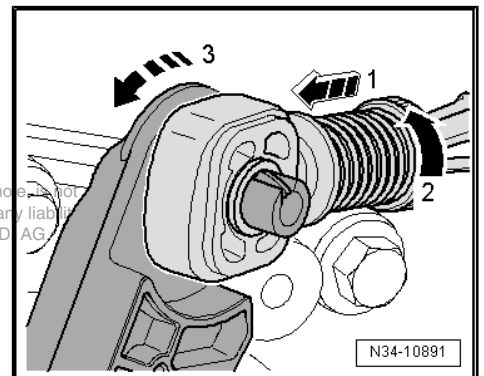
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Removing

- Remove gear knob with gear lever boot ⇒ [page 59](#) .
- Remove centre console insert ⇒ General body repairs, interior; Rep. gr. 68 ; Centre console; Removing and installing centre console insert .
- Lift out noise insulation above selector mechanism.
- Remove nuts -arrows-.
- Remove air cleaner housing ⇒ Rep. gr. 23 ; Air cleaner; Removing and installing air cleaner housing .
- Unscrew bolts -arrows-, remove cable support bracket from gearbox and tie up on left side.

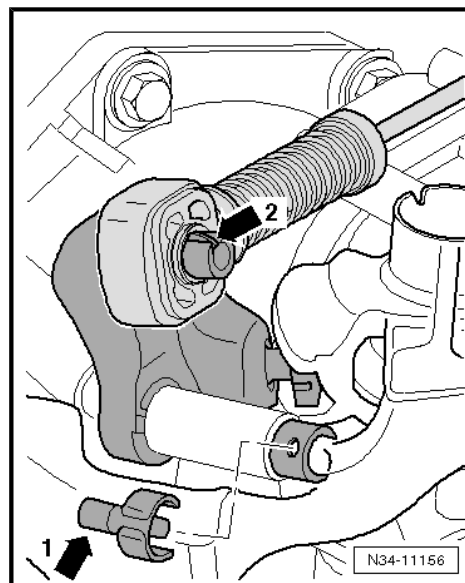


- Pull locking mechanism forwards -arrow 1- onto stop and then turn to left -arrow 2- to lock.
- Press gate relay lever forwards -arrow 3- and pull gate selector cable out of cable end-piece.

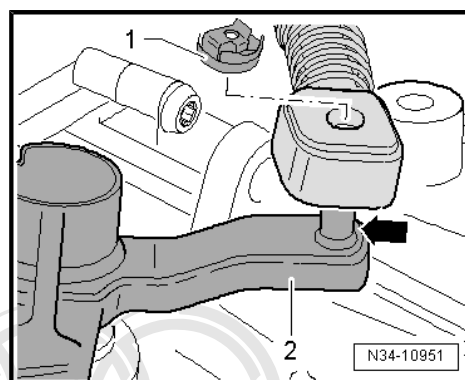


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- Remove clip -arrow 1- and take off gate relay lever together with cable end-piece.



- Detach securing clip -1- for gear selector cable from gearbox selector lever -2-.
- Pull gear selector cable off pin -arrow-.
- Remove propshaft ⇒ Rep. gr. 39 ; Propshaft; Removing and installing propshaft .
- Remove heat shield for underbody ⇒ General body repairs, exterior; Rep. gr. 66 ; Strips / trim panels / extensions; Removing and installing heat shield for floor .
- Swing selector housing down and remove with selector cables.



Installing

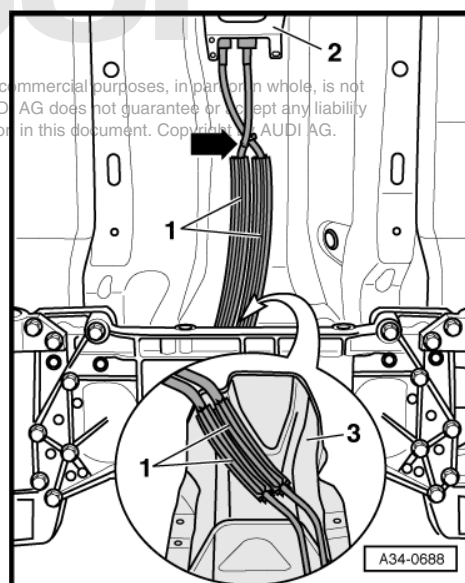
Installation is carried out in reverse sequence; note the following:



Note

Renew securing clip.

- Route cables -1- from selector mechanism -2- to gearbox as follows:
 - After the point where they cross over, the cables must run parallel as far as the cable support bracket.
 - The cables must be routed in the slot provided in heat shield -3-.



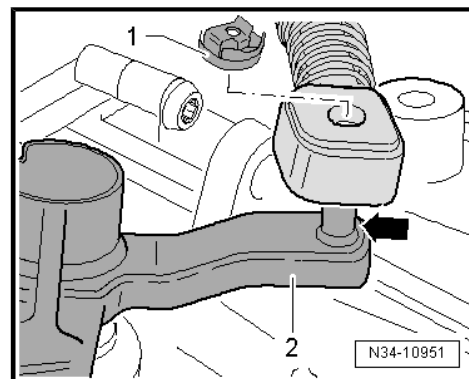
Note

The enlargement shows the heat shield from above.

- Apply a small amount of grease - G 000 450 02- to pin -arrow- of gearbox selector lever -2-.
- Press on securing clip -1- for gear selector cable.
- Lubricate the following areas thoroughly:



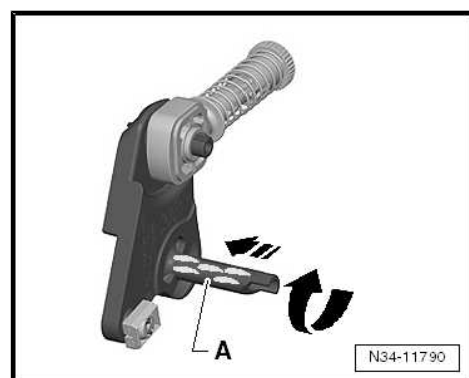
Illustration does not correspond to version in vehicle



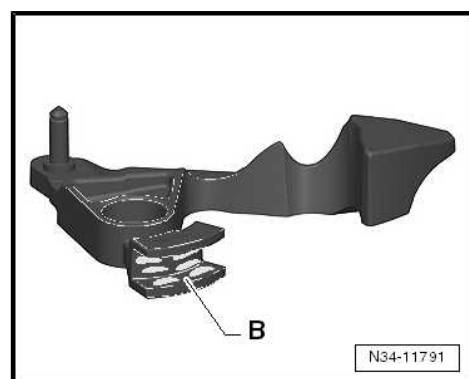
- ◆ Shaft -A- of gate relay lever



-Arrows- can be disregarded.



- ◆ Guide rail -B- of gearbox selector lever into which gate relay lever engages.

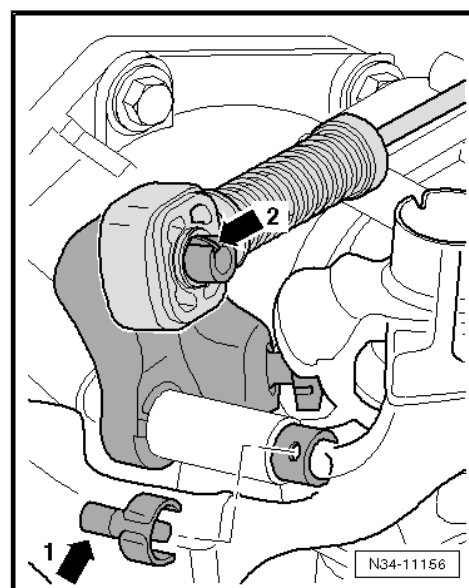


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- Fit gate relay lever and secure with clip -arrow 1-.
- Cable end-piece must be behind detent -arrow 2-.
- Adjust selector mechanism ⇒ [page 68](#) .
- Install heat shield for underbody ⇒ General body repairs, exterior; Rep. gr. 66 ; Strips / trim panels / extensions; Removing and installing heat shield for floor .
- Install air cleaner housing ⇒ Rep. gr. 23 ; Air cleaner; Removing and installing air cleaner housing .
- Install centre console insert ⇒ General body repairs, interior; Rep. gr. 68 ; Centre console; Removing and installing centre console insert .
- Install gear knob with gear lever boot ⇒ [page 59](#) .

Tightening torques

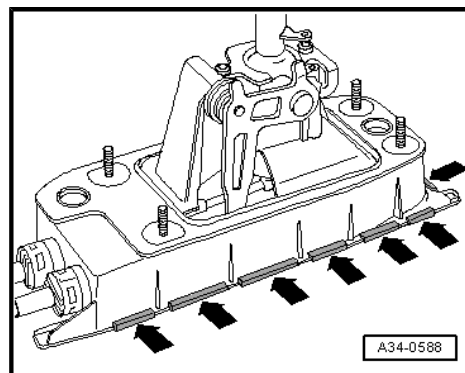
- ◆ ⇒ ["1.3 Assembly overview - gear lever and selector housing", page 53](#) .
- ◆ ⇒ ["1.4 Exploded view - selector cables", page 55](#) .



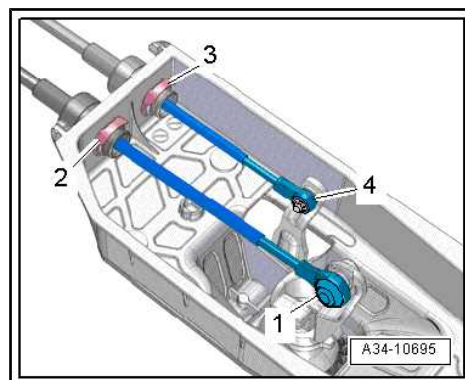
1.7 Removing and installing selector cable

Removing

- Remove selector mechanism ➔ [page 60](#) .
- Open out tabs -arrows- on floor plate all round with screwdriver and remove floor plate.
- Remove gasket from selector housing.

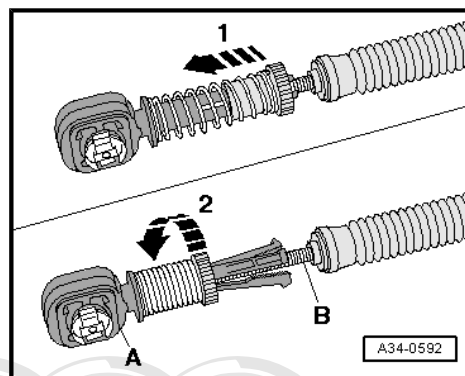


- Detach retaining clips -2, 3-.
- Press off gear selector cable -1- and gate selector cable -4- using a screwdriver.



Release cable end-pieces -A- for gate selector cable and gear selector cable -B- as follows:

- Push locking sleeve forwards as far as stop -arrow 1-.
- Turn locking sleeve clockwise as far as stop -arrow 2- so that it engages.
- Detach cable end-pieces from selector cables.



- Remove securing clips -1- and -2-.
- Detach cable support bracket from selector cables.

Installing

Installation is carried out in reverse sequence; note the following:

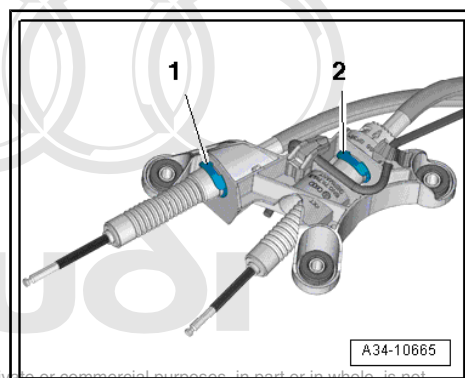


Note

Renew the securing clips and the floor plate including the gasket.

- Install selector mechanism ➔ [page 60](#) .
- Adjust selector mechanism ➔ [page 68](#) .

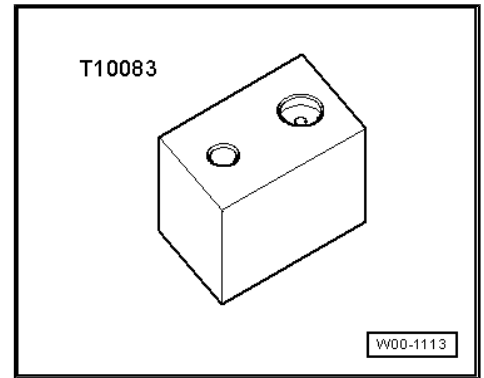
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1.8 Dismantling and assembling selector mechanism

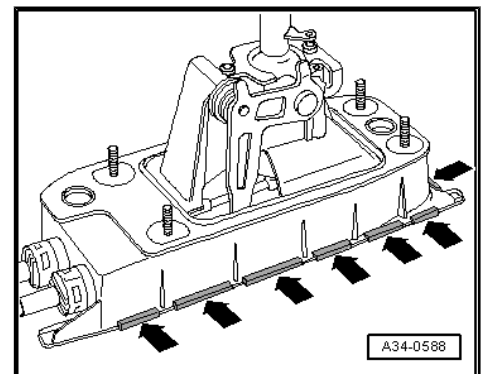
Special tools and workshop equipment required

◆ Thrust block - T10083-

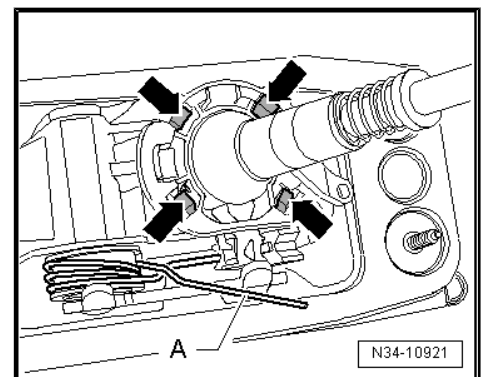


Dismantling

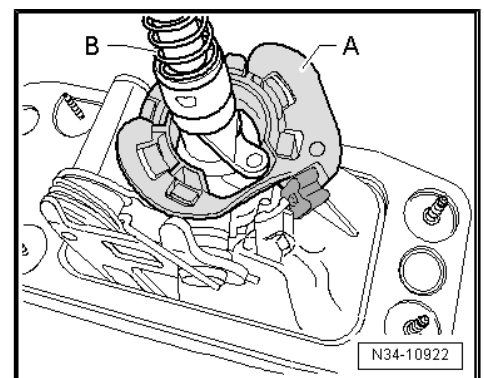
- Remove selector mechanism ➔ [page 60](#) .
- Open out tabs -arrows- on floor plate all round with screwdriver and remove floor plate.
- Remove gasket from selector housing.
- Remove gear selector cable and gate selector cable from selector housing ➔ [page 64](#) .



- Lift top spring arm -A- over tab on gate selector lever.
- Using a screwdriver, press lugs -arrows- on ball socket towards ball on gear lever guide; if necessary, break off lugs.



- **Prise ball socket -A- out of selector housing together with gear lever guide and gear lever -B-.**



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Caution

Risk of damage to guides -A-.

- ◆ *Take care not to break off the guides -A- when performing the following steps.*

- Swivel bottom spring arm onto stop on shoulder of gate selector lever -arrow 1-.

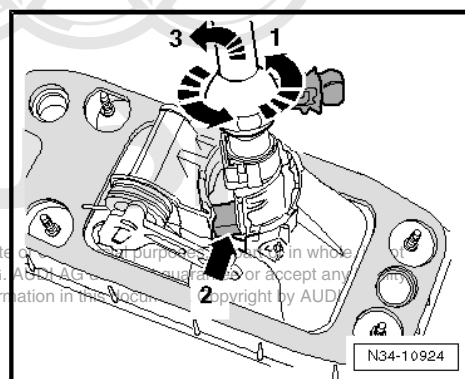
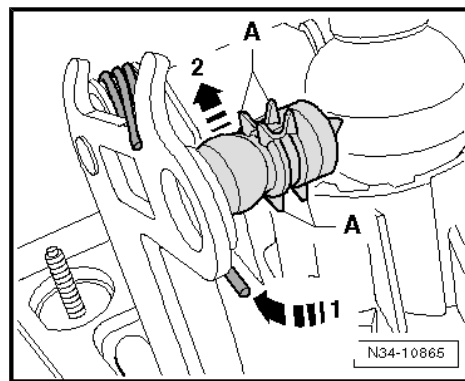


WARNING

Risk of injury

- ◆ *During the following steps, the bottom spring arm can become dislodged and snap downwards off the shoulder of the gate selector lever.*

- Pull gear lever guide upwards as far as stop and at the same time pull ball-head pin out of gate selector lever -arrow 2-.
- Press spring carefully off shoulder of gate selector lever.
- The spring arms will then compress “diagonally”.
- Turn gear lever guide in direction of -arrow 1-.
- The pin -arrow 2- should be positioned in the recess on the selector housing.
- Next, swivel gear lever guide out in direction of -arrow 3- together with gear lever.



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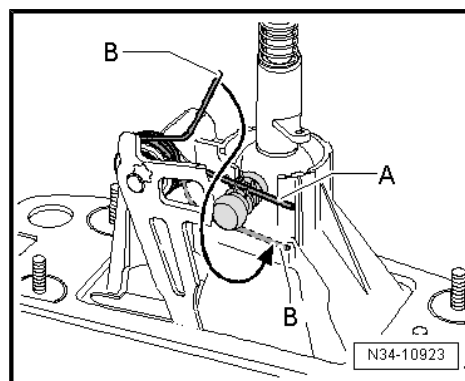
Assembling



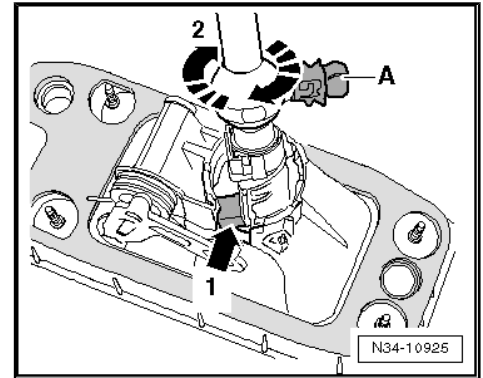
Note

Renew the ball socket and the floor plate including the gasket.

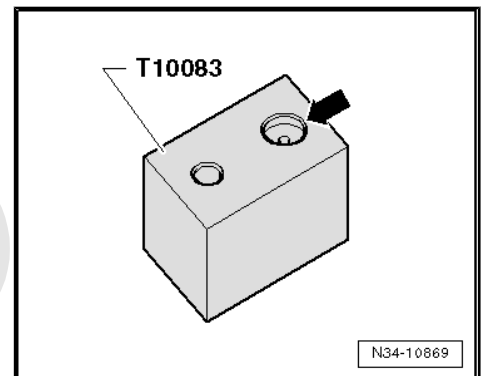
- Release the tension on spring arms -A- and -B-.
- Spring arms -A- and -B- must point in opposite directions. (Shown here with gear lever guide installed.)



- Insert gear lever guide into selector housing together with gear lever.
- Pin -arrow 1- should be positioned just inside recess on selector housing.
- Turn gear lever guide in direction of -arrow 2- until ball-head pin -A- is above recess on selector housing.



- Carefully place selector housing on thrust block - T10083- together with gear lever guide.
- The gear lever guide rests in the larger recess -arrow- in the thrust block - T10083- .
- The gear lever guide should protrude out of the selector housing as far as the stop.



- Insert arm -A- of spring in guide from above.
- Pull arm -B- of spring downwards and insert it next to the guide (towards ball head).

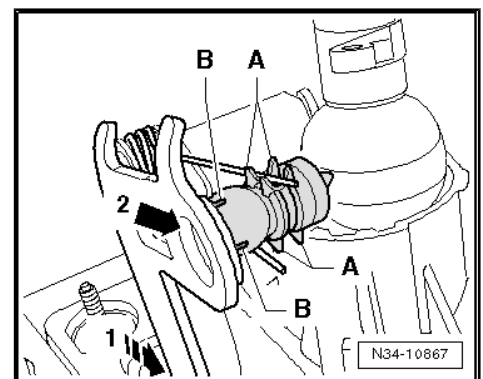
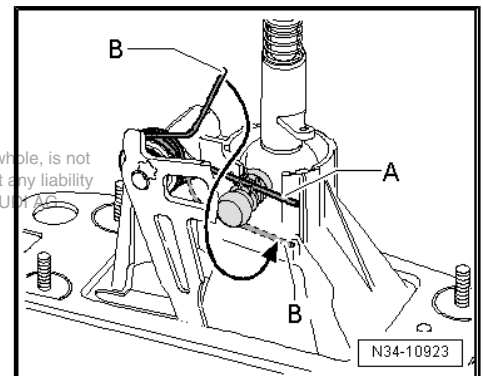


Note

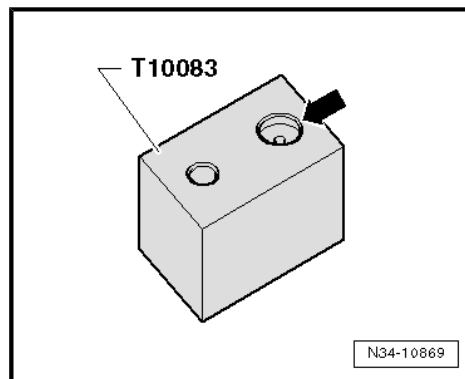
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For illustration purposes, only part of the gate selector lever is shown.

- Carefully take selector housing off thrust block - T10083- together with gear lever guide.
- Move gate selector lever back as far as stop -arrow 1-.
- Grease ball-head pin.
- Press ball-head pin into hole on gate selector lever -arrow 2-.
- Guides -A- and tabs -B- must not be damaged.



- Insert selector housing with gear lever guide in larger recess -arrow- in thrust block - T10083- .
- The gear lever guide should now protrude out of the selector housing as far as the stop.



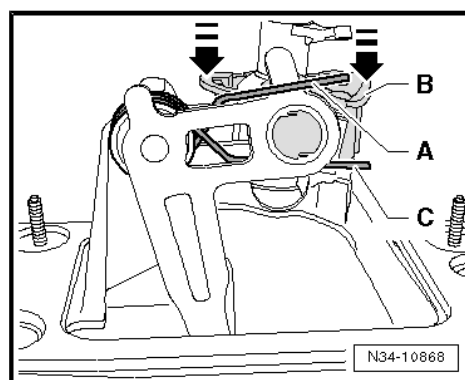
- Lift top spring arm -A- over tab on gate selector lever.



Note

Renew ball socket -B-.

- Grease ball socket and ball of gear lever guide.
- Press ball socket onto ball of gear lever guide as far as stop.
- Remove selector housing from thrust block - T10083- .
- Press ball socket into selector housing in direction of -arrows-.

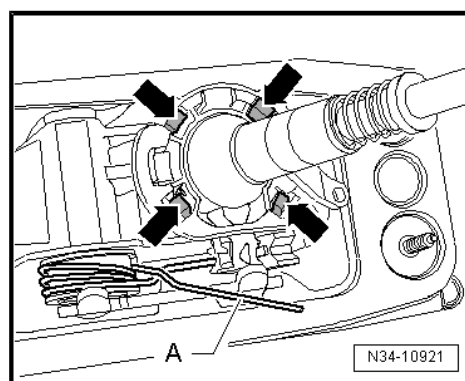


- All four lugs -arrows- must engage.
- Lift top spring arm -A- over tab on gate selector lever and into guide.

- Insert bottom spring arm into guide.

Further assembly is carried out in reverse sequence; note the following:

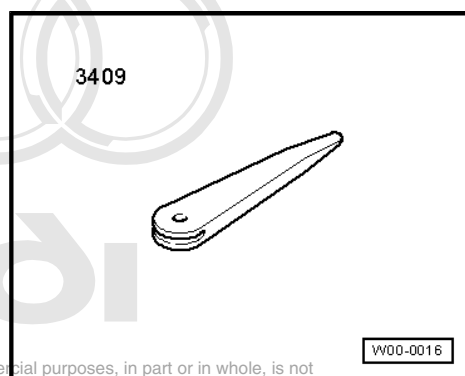
-
- Install gear selector cable and gate selector cable in selector housing ➔ [page 64](#) .
- Install selector mechanism ➔ [page 60](#) .



1.9 Adjusting selector mechanism

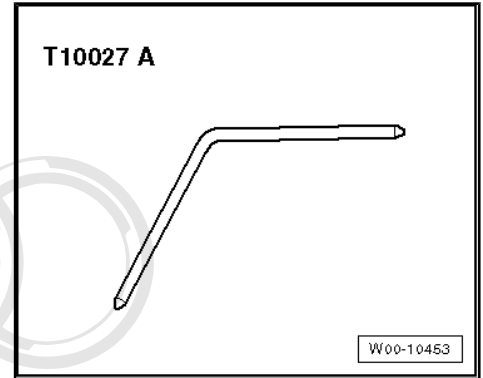
Special tools and workshop equipment required

- ◆ Removal wedge - 3409-



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◆ Locking pin - T10027A-

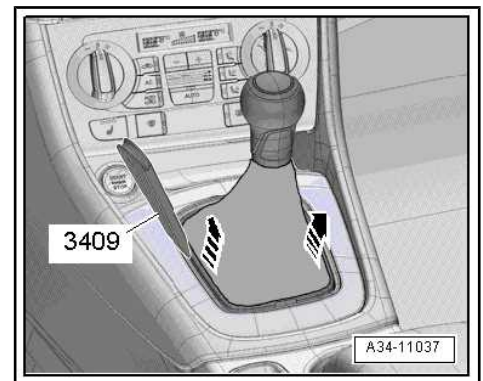


Requirements for adjustment

- Gear selector linkage must be in proper condition and undamaged.
- Selector mechanism must move freely.
- Gearbox, clutch and clutch mechanism must be in proper condition.
- Gearbox in neutral.

Adjusting

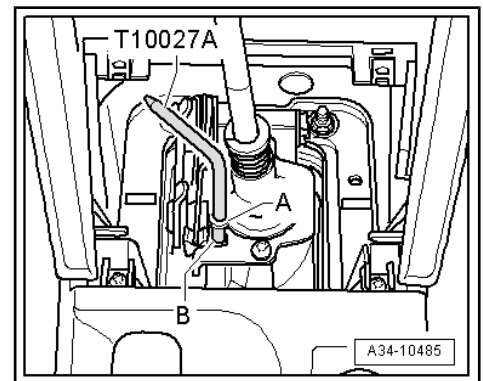
- Using removal wedge - 3409- , carefully pry gear lever boot off cover for centre console -arrows-.
- Pull boot up and over gear knob.
- With gearbox in neutral, move gear lever to the left into 1st/ 2nd gear gate.
- Pull noise insulation slightly to one side.
- Then guide locking pin - T10027A- through hole -A- and into hole -B-.



 Note

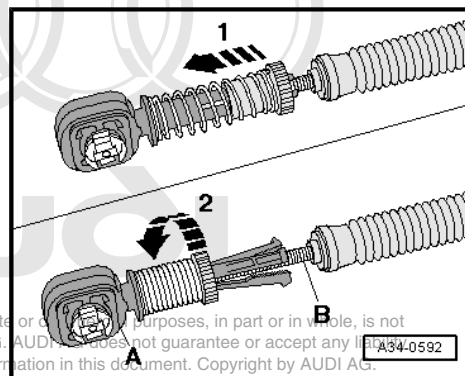
The noise insulation panels are removed to give a better illustration.

- Remove air cleaner housing ⇒ Rep. gr. 23 ; Air cleaner; Removing and installing air cleaner housing .



Release cable end-pieces -A- for gate selector cable and gear selector cable -B- as follows:

- Push locking sleeve forwards as far as stop -arrow 1-.
- Turn locking sleeve clockwise as far as stop -arrow 2- so that it engages.
- It should be possible to move selector cable -B- in the cable end-piece.

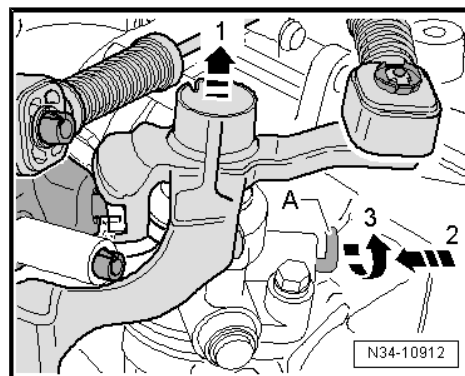


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- Gearbox in neutral.

Lock selector shaft as follows:

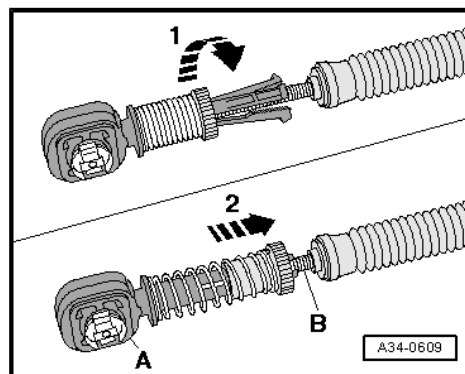
- Pull up selector shaft -arrow 1-.
- Press angled rod -A- inwards towards selector shaft -arrow 2- and at the same time turn upwards -arrow 3- so it engages in selector shaft.
- The selector shaft is then locked and can no longer be moved.



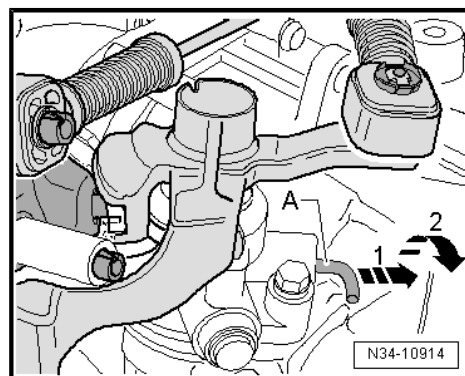
- Check that gate selector cable and gear selector cable -B- are located in cable end-pieces -A- without tension.
- Release locking sleeve -arrow 1-.
- Let locking sleeve slide back as far as stop -arrow 2-.

Note

Cable adjustment is now complete.



- Turn angled rod -A- back to initial position -arrow 2- and pull out of gearbox -arrow 1-.
- Pull locking pin - T10027 A- out of selector mechanism.
- Check gear lever setting ⇒ [page 70](#) .



1.10 Checking selector mechanism

- With the gearbox in neutral, the gear lever should rest in the 3rd/4th gear gate.
- Depress clutch.
- Shift through all gears several times, paying special attention to function of reverse gear detent mechanism.

- The gear lever should return by itself from the reverse gear gate to the 3rd/4th gear gate.

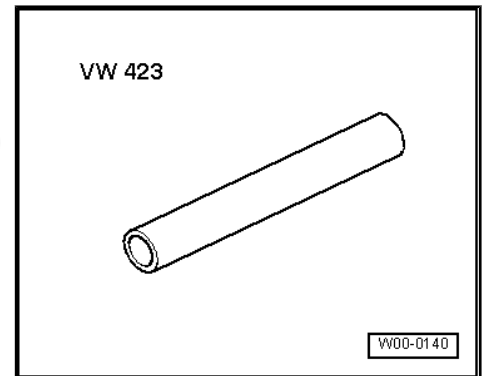
If the gear lever sticks or baulks repeatedly when engaging a gear, perform the adjustment procedure again.

- Install air cleaner housing ⇒ Rep. gr. 23 ; Air cleaner; Removing and installing air cleaner housing .

1.11 Renewing selector shaft oil seal

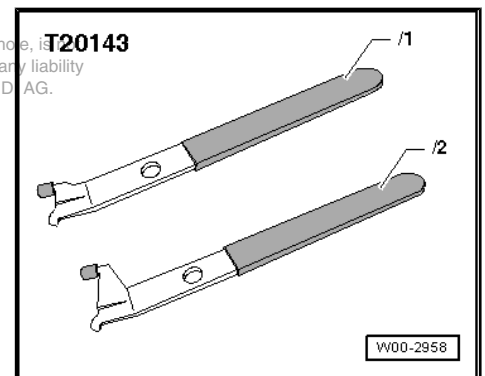
Special tools and workshop equipment required

- ◆ Tube - VW 423-



- ◆ Extractor tool - T20143/1-

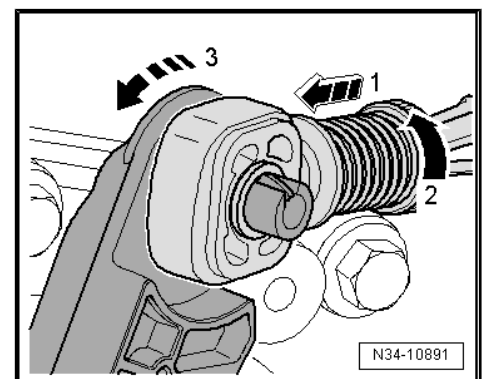
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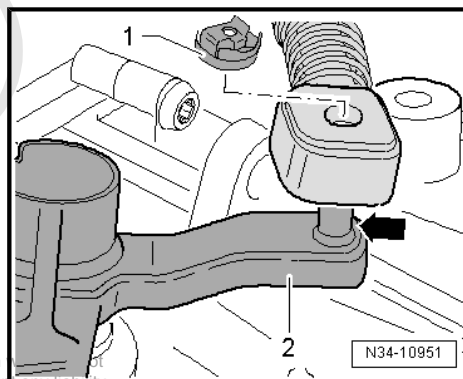
- ◆ Sealing grease - G 052 128 A1-

Procedure

- Remove air cleaner housing ⇒ Rep. gr. 23 ; Air cleaner; Removing and installing air cleaner housing .
- Pull locking mechanism forwards -arrow 1- onto stop and then turn in direction of -arrow 2- to lock.
- Press gate relay lever forwards -arrow 3- and pull gate selector cable out of cable end-piece.



- Detach securing clip -1- for gear selector cable from gearbox selector lever -2-.
- Pull gear selector cable off pin -arrow-.

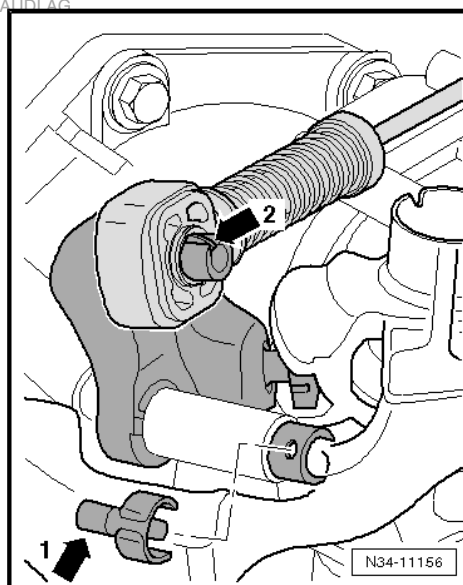


- Remove clip -arrow 1- and take off gate relay lever together with cable end-piece.



Note

- ◆ Do not detach cable end-piece -arrow 2- from gate relay lever until gate relay lever has been removed ➔ [page 59](#).
- ◆ If the gearbox bracket makes it impossible to remove the gate relay lever, guide the slide block out of the gearbox selector lever.

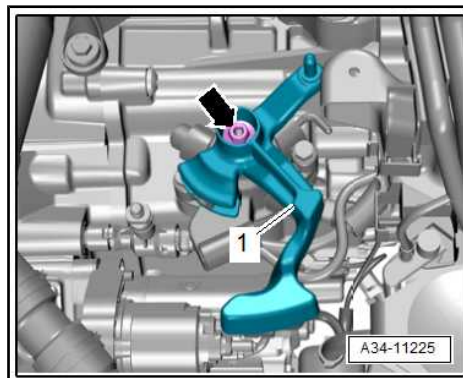


- Remove nut -arrow- from selector shaft and detach gearbox selector lever -1-.

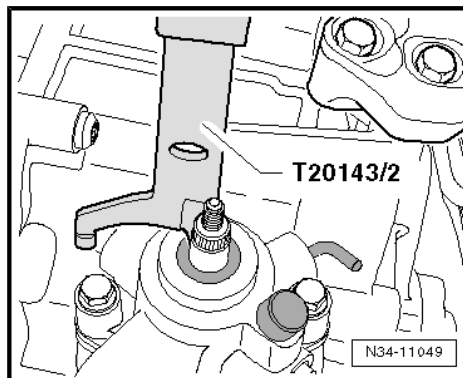


Note

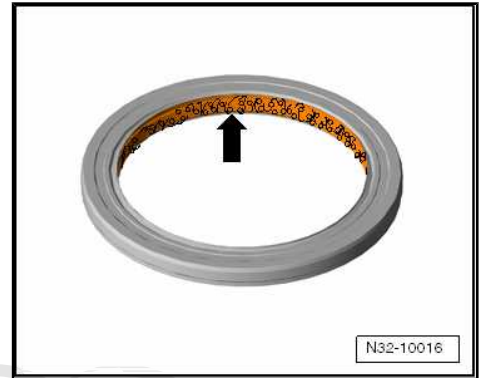
If gearbox selector lever cannot be detached by hand, use a commercially available puller.



- Pull out oil seal with extractor tool - T20143/2- .



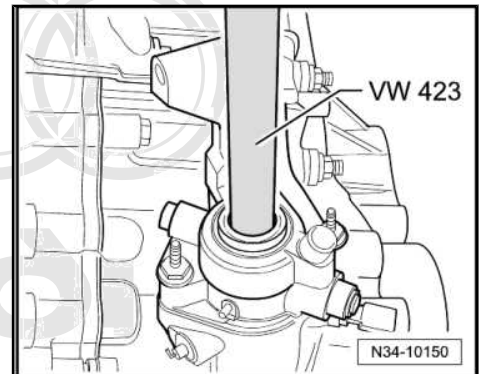
- Lubricate outer circumference of new oil seal with gear oil.
- Pack space between sealing lip and dust lip -arrow- half full with sealing grease - G 052 128 A1- .
- Drive in new oil seal onto stop (take care to keep oil seal straight).



- Drive in oil seal with tube - VW 423- .

Remaining installation steps are carried out in reverse sequence; note the following:

- Install gearbox selector lever ⇒ [page 57](#) .
- Attach gate relay lever ⇒ [page 58](#) .
- Adjust selector mechanism ⇒ [page 68](#) .
- Install air cleaner housing ⇒ Rep. gr. 23 ; Air cleaner; Removing and installing air cleaner housing .



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2 Removing and installing gearbox

⇒ "2.1 Removing gearbox", page 74

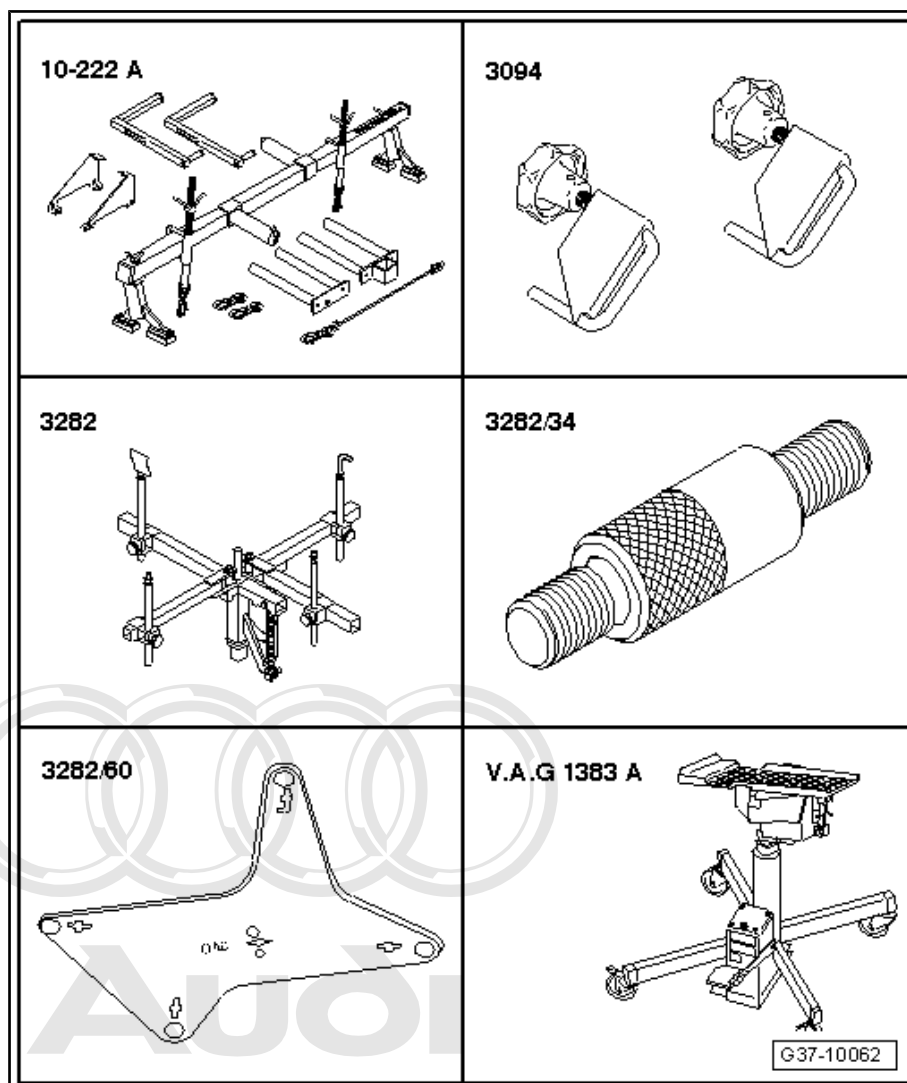
⇒ "2.2 Installing gearbox", page 81

⇒ "2.3 Tightening torques for gearbox", page 84

2.1 Removing gearbox

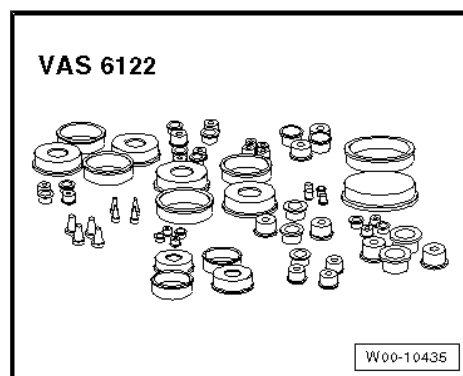
Special tools and workshop equipment required

- ◆ Support bracket - 10 - 222 A-
- ◆ Hose clamps, up to 25 mm - 3094-
- ◆ Gearbox support - 3282-
- ◆ Bolt - 3282/34-
- ◆ Adjustment plate - 3282/60-
- ◆ Engine and gearbox jack - V.A.G 1383 A-



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- ◆ Engine bung set - VAS 6122-



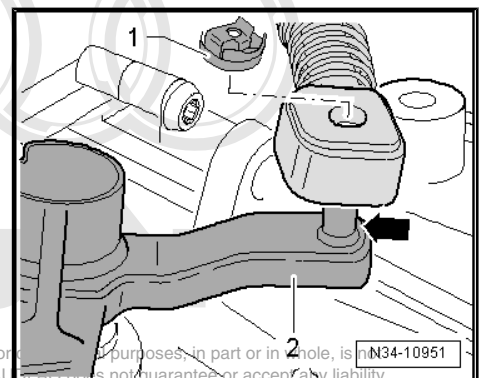
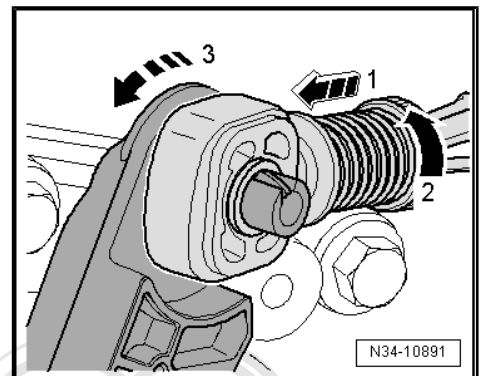
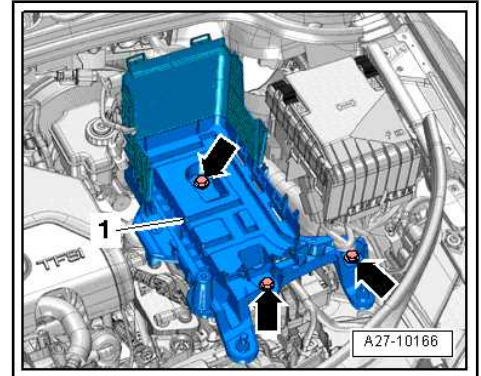
- ◆ Grease for clutch plate splines - G 000 100-
- ◆ Grease - G 000 450 02-

Procedure

Note

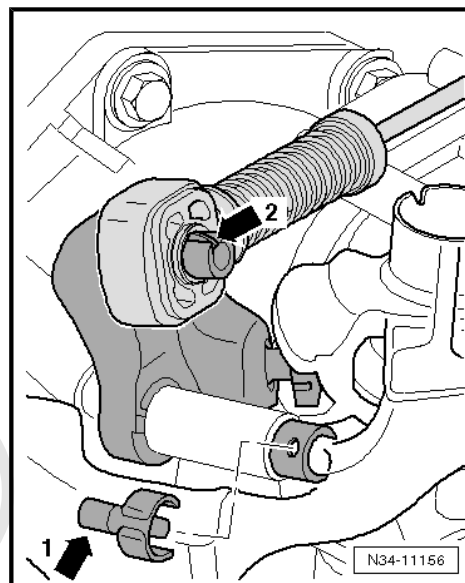
All cable ties which are released or cut open during removal must be fitted in the same position when installing.

- Bring front wheels into straight-ahead position.
- Remove battery and battery tray ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray .
- Remove starter ⇒ Electrical system; Rep. gr. 27 ; Starter; Removing and installing starter
- Vehicles with front-wheel drive: Remove subframe without steering rack ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Removing and installing subframe without steering rack .
- Vehicles with four-wheel drive: Remove subframe with steering rack ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Removing and installing subframe with steering rack .
- Move earth wire on longitudinal member (left-side) clear.
- To avoid damage to the gate selector cable, the cable end-piece must be separated from the gate selector cable before removal.
- Pull locking mechanism forwards -arrow 1- onto stop and then turn to left -arrow 2- to lock.
- Press gate relay lever forwards -arrow 3- and pull gate selector cable out of cable end-piece.
- Detach securing clip -1- for gear selector cable from gearbox selector lever -2- and pull selector cable off pin -arrow-.



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- Remove clip -arrow 1- and take off gate relay lever together with cable end-piece.

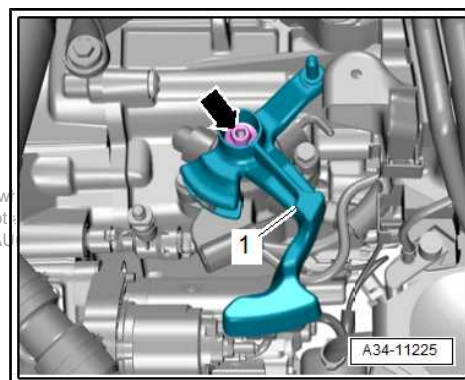


- Remove nut -arrow- from selector shaft and detach gearbox selector lever -1-.



Note

If gearbox selector lever cannot be detached by hand, use a commercially available puller.

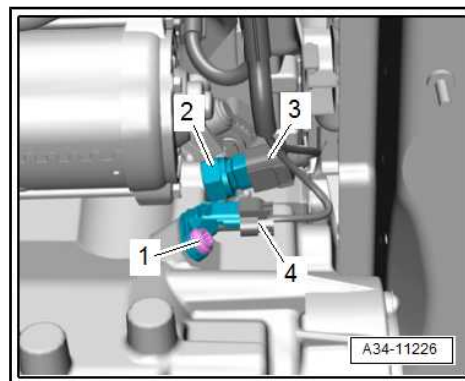


- Unplug electrical connectors -3, 4-.

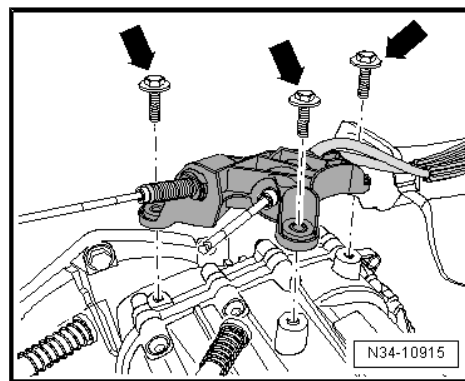


Note

-Items 1 and 2- can be disregarded.



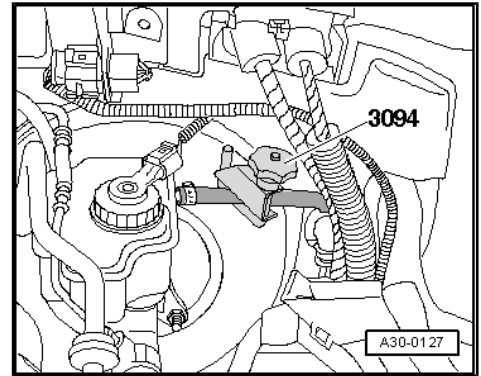
- Unscrew bolts -arrows-, remove cable support bracket from gearbox and tie up on left side.



- Using hose clamp -3094- , clamp off supply hose to clutch master cylinder.

 Note

- ◆ *In the following steps make sure that no brake fluid escapes onto the longitudinal member or onto the gearbox. If this does happen, clean the affected area thoroughly.*
- ◆ *Clamping off the supply hose with the hose clamp -3094- will cause a permanent deformation.*
- ◆ *However, this does not damage the supply hose.*
- ◆ *After removing the hose clamp -3094- , the supply hose must be returned to its original shape.*

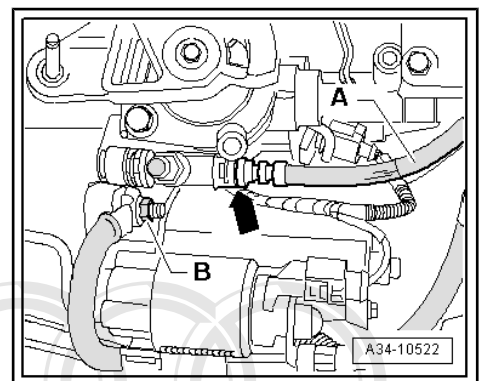


- Place lint-free cloth under bleeder connection.
- Pull out retaining clip -arrow- as far as it will go and disconnect pipe -A- from bleeder connection.

 Note

-Item B- can be disregarded.

- Seal off open lines and connections with clean plugs from engine bung set - VAS 6122- .



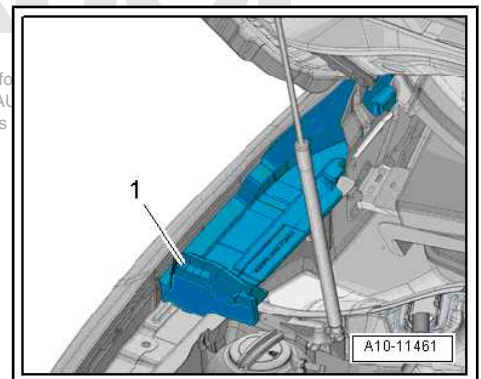
Caution

Catch escaping brake fluid.

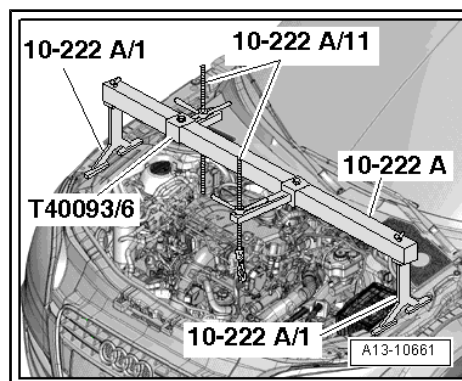
- ◆ ***Do not operate clutch pedal after detaching pipe from bleeder connection for clutch slave cylinder.***

- Unclip sealing element -1- on both sides using removal lever - 80 - 200- .

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- Set up support bracket - 10 - 222 A- with spindles -10 - 222 A /11- on wing mounting flanges, as shown in illustration.
- Engage hook of spindle (left-side) in engine lifting eye.

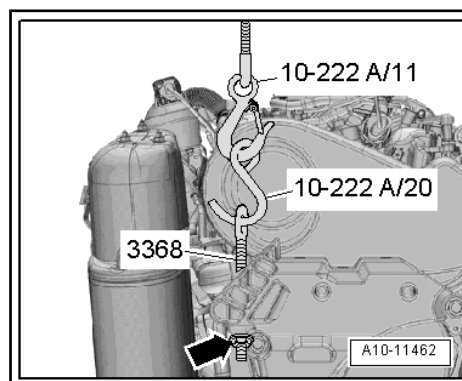


WARNING

Risk of accident if threaded attachment comes loose.

- ◆ *To ensure that the eye-head bolt - 3368- is securely attached, screw on a flange nut or nut with washer -arrow- at least 6 turns.*

- Secure eye-head bolt - 3368- with M10 flange nut or nut with washer to engine support as shown in illustration.
- Hook spindle - 10 - 222 A /11- with adapter - 10 - 222 A /20- (right-side) onto eye-head bolt - 3368-.
- Take up weight of engine/gearbox assembly evenly with both spindles; do not lift.
- Remove wheel spoiler (front left) ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liner; Exploded view - wheel housing liner (front) .
- Disconnect exhaust system at clamp -arrows-.

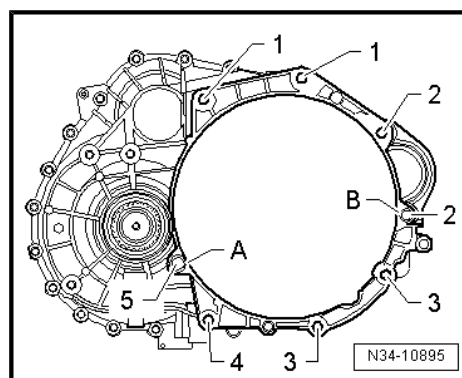
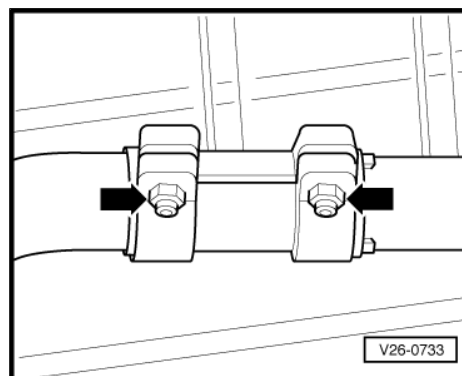


Caution

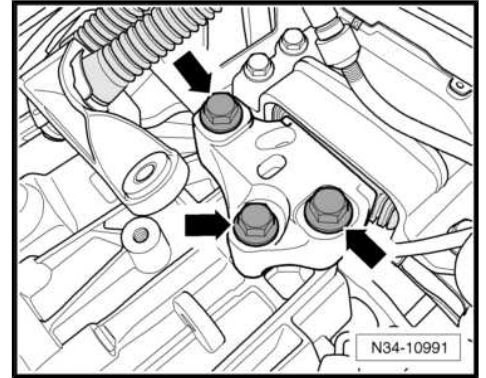
Risk of damage to flexible joint.

- ◆ *The flexible joint in the front exhaust pipe must not be bent further than 10°.*

- Tie up front exhaust pipe.
- Remove bolts -1, 2- securing gearbox to engine.

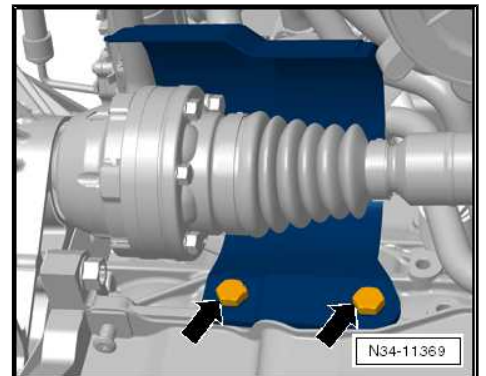


- Remove bolts -arrows- for gearbox mounting.



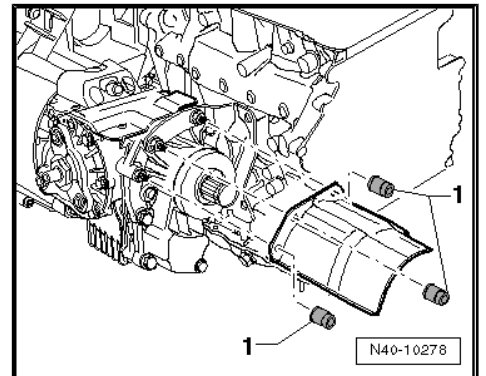
Vehicles with front-wheel drive:

- Remove bolts -arrows- and detach heat shield for drive shaft (right-side).
- Detach drive shaft (right-side) from gearbox and tie up to rear
⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Removing and installing drive shaft .



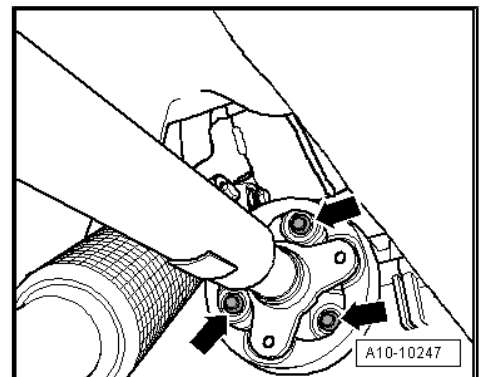
Vehicles with four-wheel drive:

- Remove nuts -1- and detach heat shield for drive shaft (right-side).



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- Mark position of flexible coupling relative to bevel box output flange for re-installation.
- Remove bolts -arrows- securing flexible coupling of propshaft to bevel box (counterhold triangular flange with suitable lever).





Caution

The seal -arrow- in the propshaft flange can be damaged.

- ◆ *Push propshaft towards the rear and to the right as far as possible.*



Note

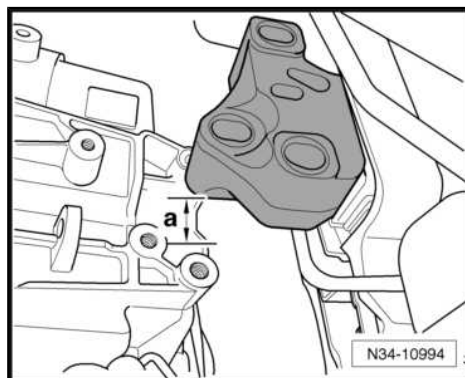
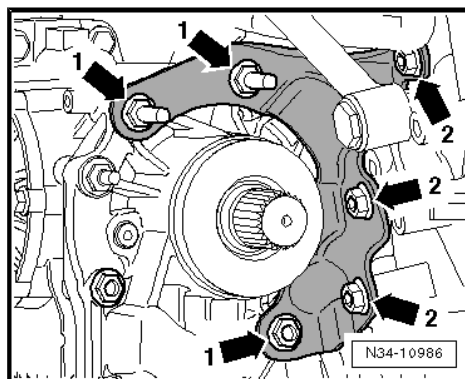
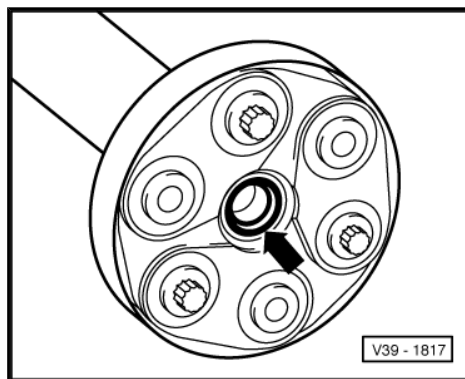
If seal is damaged propshaft must be renewed.

- Tie up propshaft to body.
- Detach drive shaft (right-side) from bevel box and tie up to rear
⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft;
Removing and installing drive shaft .
- Remove bolts -arrows 1- from bracket for bevel box.
- Loosen bolts -arrows 2- on gearbox carrier, but do not remove them.

Continued for all vehicles:

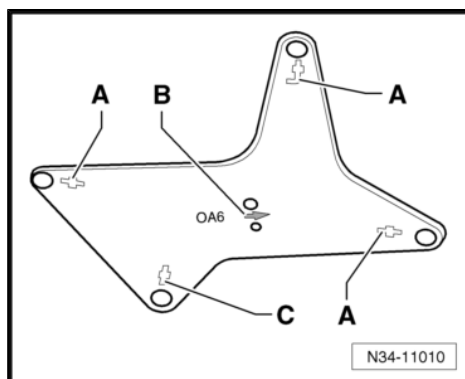
- Detach drive shaft (left-side) from gearbox and tie up to rear
⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft;
Removing and installing drive shaft .
- Adjust spindles of support bracket - 10 - 222 A- to lower gearbox by distance -a-.
- Dimension -a- = 85 mm

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Set up gearbox support - 3282- with adjustment plate - 3282/60- to remove gearbox "0A6".

- Insert gearbox support - 3282- in engine and gearbox jack - V.A.G 1383 A- .
- Align arms of gearbox support according to holes in adjustment plate.
- Screw in support elements -A-, as illustrated on adjustment plate - 3282/60- .
- In place of support element -C-, screw in bolt - 3282/34- .
- Place engine and gearbox jack - V.A.G 1383 A- underneath vehicle.
- Arrow symbol -B- on adjustment plate points to front of vehicle.

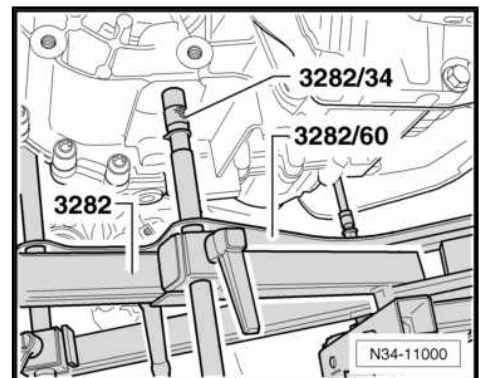
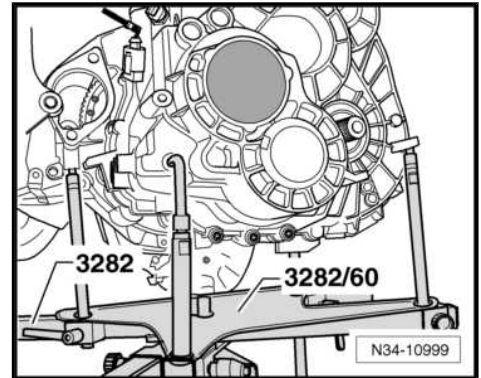


- Align adjustment plate and gearbox parallel to one another.

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- Screw pin - 3282/34- into hole for bolt securing pendulum support to gearbox.

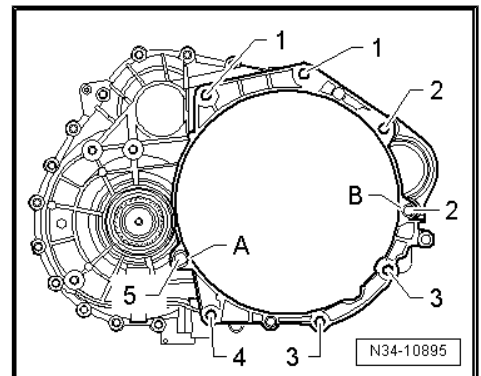


- Remove remaining engine/gearbox securing bolts.
- Push gearbox off dowel sleeves -A, B-.
- Incline gearbox to left via spindle of gearbox support - 3282- .
- Lower gearbox carefully, observing longitudinal member.



Note

Pay attention to all pipes/hoses/wiring when lowering gearbox.



2.2 Installing gearbox



Note

- ◆ *Renew bolts which are tightened by turning through a specified angle.*
- ◆ *Renew self-locking nuts and bolts, and seals, O-rings and gaskets.*
- ◆ *Secure all hose connections with the correct hose clips (as original equipment); refer to ➔ Electronic parts catalogue .*

Tightening torques for installing gearbox: ➔ page 84

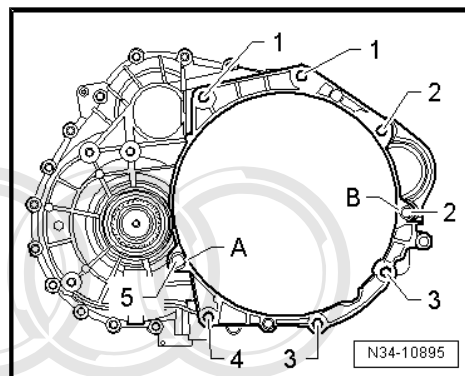
- When fitting a replacement gearbox: attach gearbox selector lever and gate relay lever to new gearbox.
- Place gearbox on gearbox support - 3282- and secure in position.
- Using a thread tap, carefully remove remaining locking fluid from all threaded holes which will accommodate self-locking bolts.

- Clean splines of input shaft and apply a thin coat of grease for clutch plate splines - G 000 100- .
- It should be possible to push the clutch plate back and forth slightly on the input shaft.
- Check that dowel sleeves -A- for centralising engine/gearbox are in the cylinder block; install any missing dowel sleeves.

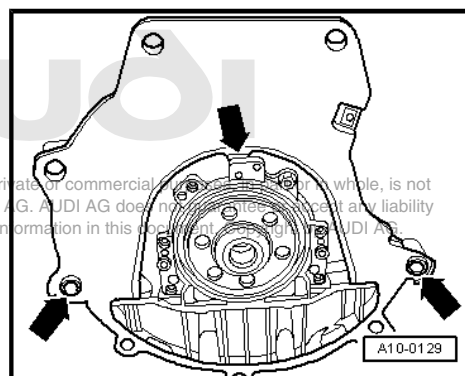


Note

If the dowel sleeves are not fitted, this will lead to gear-change problems, clutch malfunction and in some cases gearbox noise (gears will make rattling noises).



- Make sure that intermediate plate is engaged on sealing flange -top arrow- and fitted onto dowel sleeves -bottom arrows-.
- Check release bearing for wear. If necessary, renew clutch slave cylinder with release bearing ⇒ [page 33](#) .
- Raise gearbox carefully using gearbox support - 3282-.



Caution

Risk of damage due to brake fluid escaping at clutch master cylinder.

- ◆ **Cover connection or bleeder connection with a cloth as brake fluid may escape from connection for clutch master cylinder when pushing gearbox towards engine.**

- Align gearbox with engine and install.

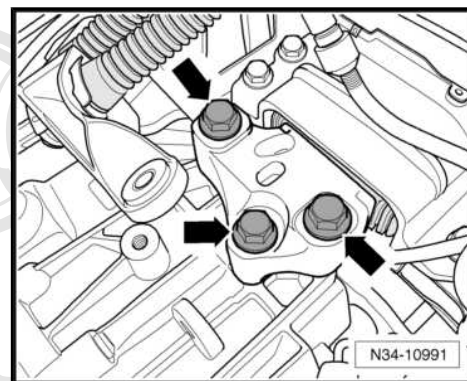
- Align engine/gearbox in installation position. To do so, tighten spindles of support bracket - 10 - 222 A- until gearbox makes contact with gearbox mounting.



Note

The gearbox mounting must be parallel with the gearbox to avoid damaging the threads in the gearbox.

- Check adjustment of assembly mountings ⇒ Rep. gr. 10 ; Assembly mountings; Checking adjustment of assembly mountings .



Caution

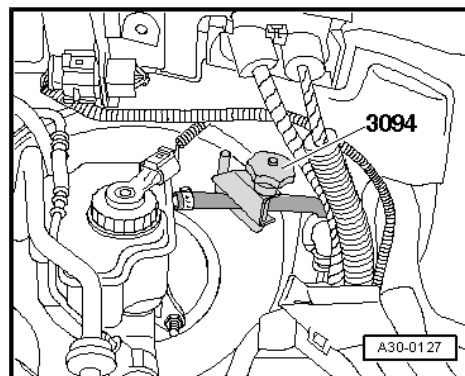
Risk of accident.

- ◆ ***Do not remove support bracket - 10 - 222 A- until all bolts securing the left-hand engine/gearbox mounting have been tightened to the specified torque.***

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- Install bracket for bevel box ⇒ [page 98](#) .
- Attach propshaft to bevel box ⇒ Rep. gr. 39 ; Removing and installing propshaft .
- Install drive shafts ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Removing and installing drive shaft .
- Install heat shield for drive shaft (right-side) ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Exploded view - drive shaft .
- Vehicles with front-wheel drive: Remove subframe without steering rack ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Removing and installing subframe without steering rack .
- Vehicles with four-wheel drive: Remove subframe with steering rack ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Removing and installing subframe with steering rack .
- Connect pipe to bleeder connection ⇒ [page 17](#) .

- After removing the hose clamp - 3094- , the supply hose must be returned to its original shape.
- Bleed clutch system ⇒ [page 36](#) .
- Install cables and cable support bracket on gearbox ⇒ [page 55](#) .
- Install gate relay lever ⇒ [page 58](#) .
- Install starter ⇒ Electrical system; Rep. gr. 27 ; Starter; Removing and installing starter .
- Install earth wire ⇒ Current flow diagrams, Electrical fault finding and Fitting locations.
- Install battery tray and battery ⇒ Electrical system; Rep. gr. 27 ; Battery; Removing and installing battery tray .
- Install wheel housing liner (front) with wheel spoiler on both sides ⇒ General body repairs, exterior; Rep. gr. 66 ; Wheel housing liners; Removing and installing wheel housing liner (front) .
- Fit front wheels ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels and tyres .
- Check gear oil level ⇒ [page 134](#) .



Vehicles with four-wheel drive:

- Check gear oil level in bevel box ⇒ [page 212](#) .

2.3 Tightening torques for gearbox



Note

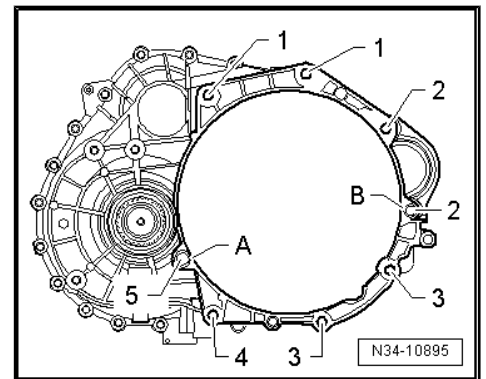
- ◆ ***Tightening torques apply only to lightly greased, oiled, phosphated or black-finished nuts and bolts.***
- ◆ ***Additional lubricant such as engine or gear oil may be used, but do not use graphite lubricant.***
- ◆ ***Do not use parts which have been degreased.***
- ◆ ***Tolerance for tightening torques is ± 15 %.***

Component	Nm
Bolts and nuts	M6 9
	M7 15
	M8 20
	M10 40
	M12 65

Assembly mountings ➔ [page 86](#)

Securing manual gearbox to 2.0 ltr. TDI engine

Item	Bolt	Nm
1	M12x65	80
2 ¹⁾	M12x180	80
3	M10x65	40
4	M10x75	40
5 ²⁾	M12x95	80
A, B	Dowel sleeves for centralising	
• 1) Bolt with stud M8. • 2) Screwed into gearbox from engine side.		



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3 Assembly mountings

⇒ "3.1 Exploded view - assembly mountings", page 86

3.1 Exploded view - assembly mountings

1 - Engine mounting

- ☐ With support arm
- ☐ Removing and installing
⇒ Rep. gr. 10 ; Assembly mountings; Removing and installing engine mounting

2 ... 5 - Bolts

- ☐ Tightening torque ⇒
Rep. gr. 10 ; Assembly mountings; Exploded view - assembly mountings

6 - Pendulum support

- ☐ Removing and installing
⇒ Rep. gr. 10 ; Assembly mountings; Removing and installing pendulum support

7, 8, 9 - Bolts

- ☐ Tightening torque ⇒
Rep. gr. 10 ; Assembly mountings; Exploded view - assembly mountings

10 - Bolt

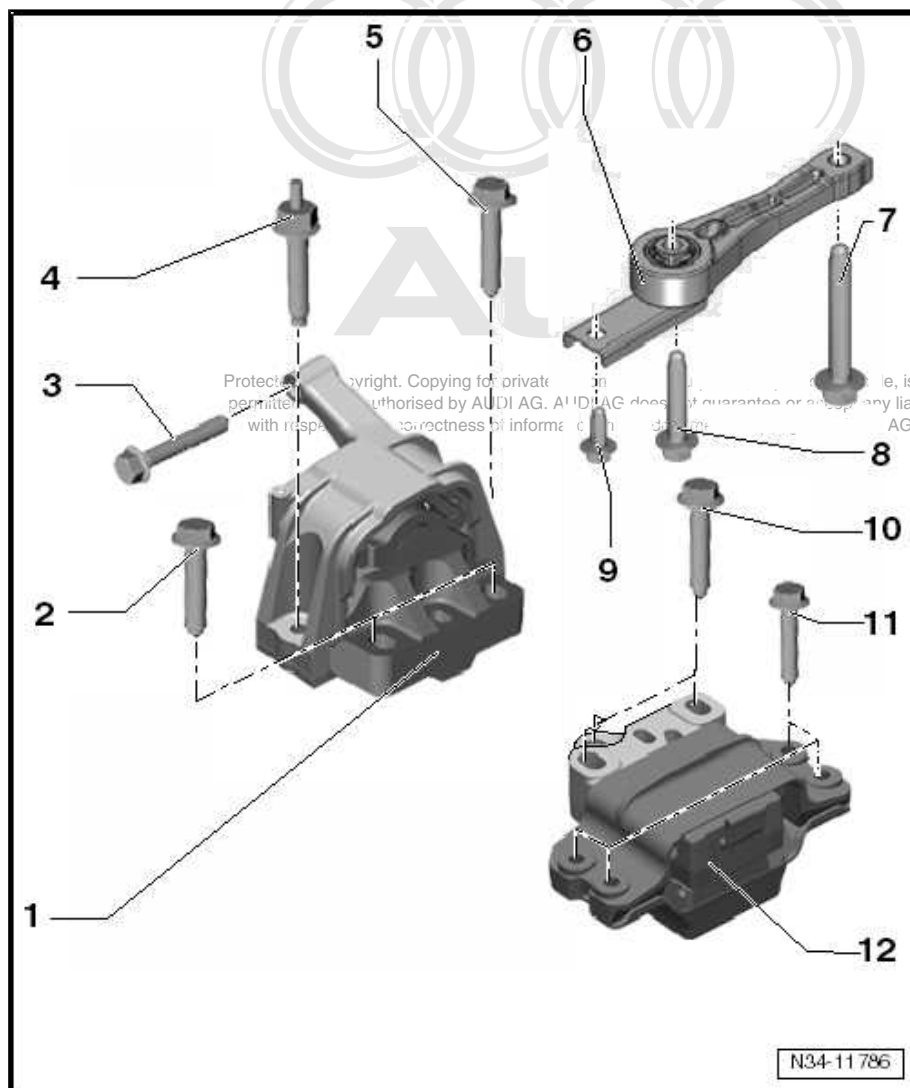
- ☐ Renew after removal
- ☐ 60 Nm +90°

11 - Bolt

- ☐ Tightening torque ⇒
Rep. gr. 10 ; Assembly mountings; Exploded view - assembly mountings

12 - Gearbox mounting

- ☐ Removing and installing ⇒ Rep. gr. 10 ; Assembly mountings; Removing and installing gearbox mounting



4 Bevel box

⇒ [“4.1 Removing bevel box”, page 87](#)

⇒ [“4.2 Installing bevel box”, page 96](#)

4.1 Removing bevel box

⇒ [“4.1.1 Removing bevel box”, page 87](#)

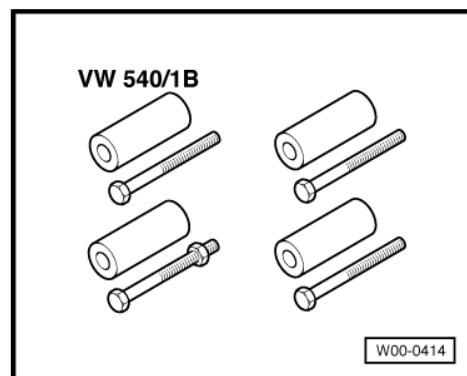
⇒ [“4.1.2 Removing and installing bevel box \(gearbox removed from vehicle\)”, page 94](#)

4.1.1 Removing bevel box

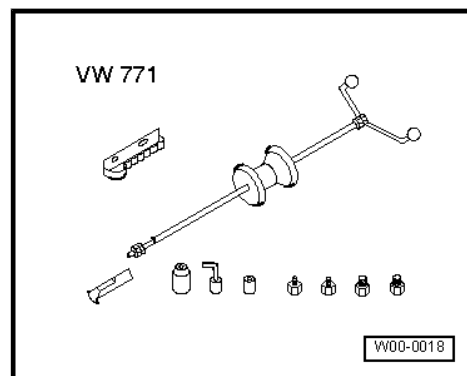
Special tools and workshop equipment required

◆ Engine and gearbox support supplement - VW 540/1 B-

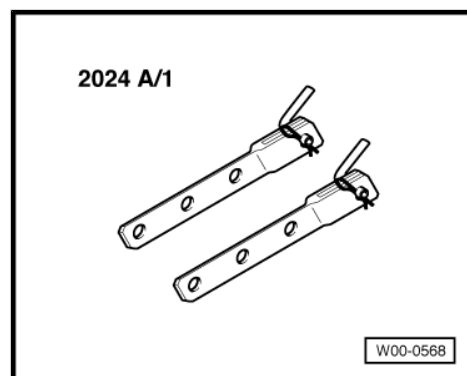
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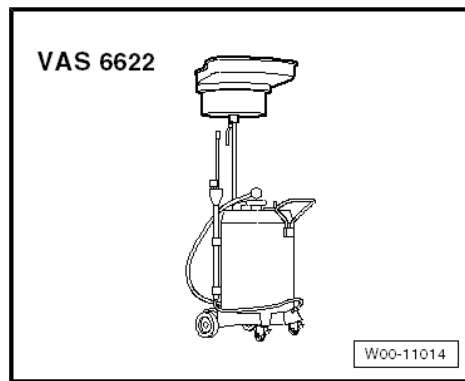
◆ Multi-purpose tool - VW 771-



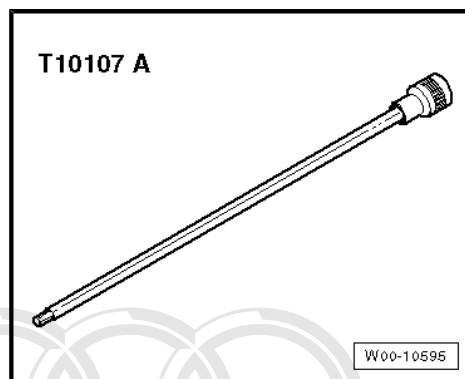
◆ Extension -2024 A /1-



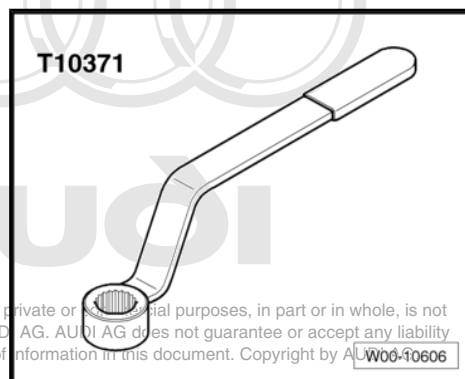
- ◆ Used oil collection and extraction unit - VAS 6622-



- ◆ Socket and extended bit - T10107 A-



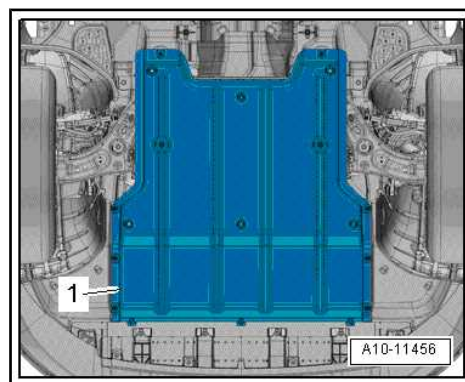
- ◆ Counterhold tool - T10371-



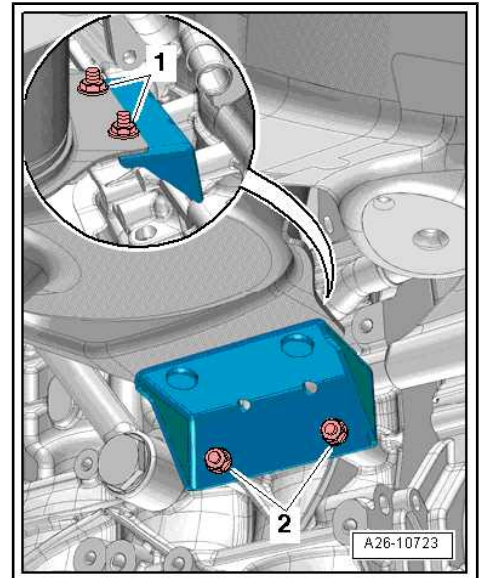
- ◆ Puller - T10472-

Procedure

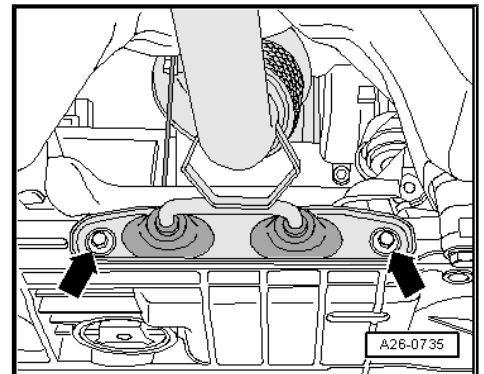
- Remove front wheel (right-side) ⇒ Running gear, axles, steering; Rep. gr. 44 ; Wheels and tyres .
- Remove noise insulation -1- ⇒ General body repairs, exterior; Rep. gr. 66 .



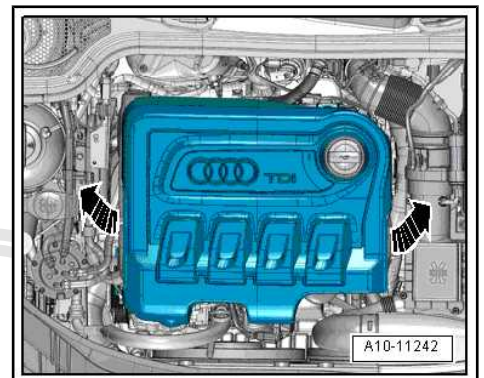
- Remove nuts -1, 2- and detach bracket for particulate filter.



- Remove bolts -arrows- for exhaust pipe bracket.



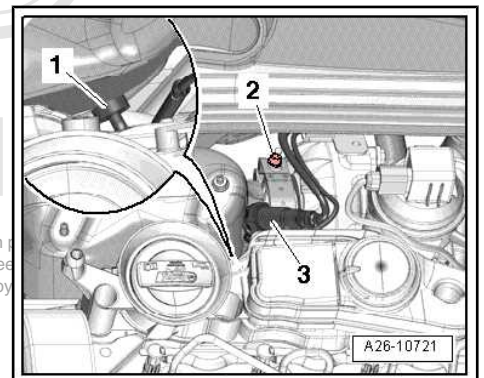
- Remove engine cover panel -arrows-.



- Loosen bolt -2- and remove clamp.

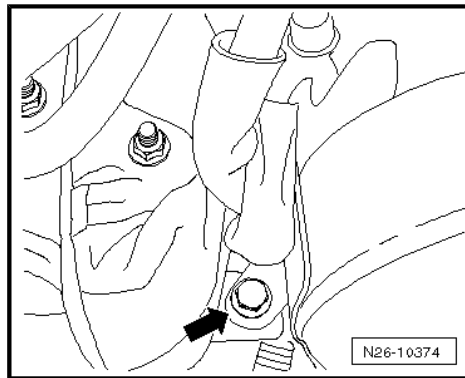


-Items 1 and 3- can be disregarded.



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- Remove bolt -arrow- on upper bracket for particulate filter.
- Tie up particulate filter towards rear.

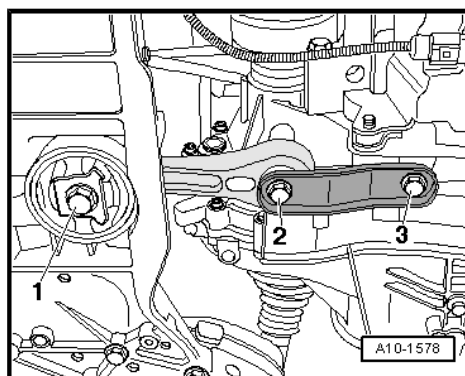


- Remove bolts -2 and 3-.

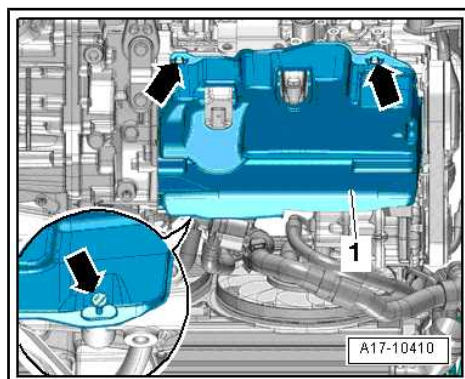


Note

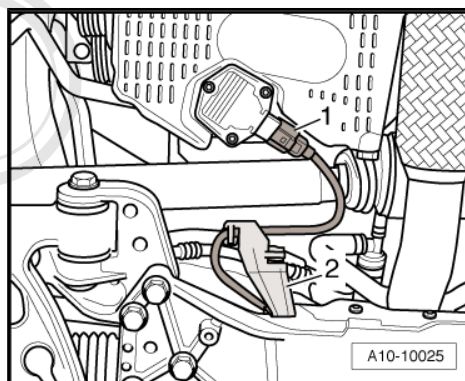
-Item 1- can be disregarded.



- Loosen fasteners -arrows- and remove noise insulation panel -1- for oil pan.

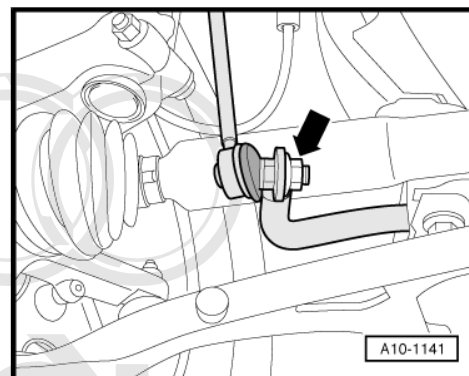


- Unplug electrical connector -1- at oil level and oil temperature sender - G266- .
- Unclip bracket -2- for electrical wiring leading to oil level and oil temperature sender - G266- at subframe.

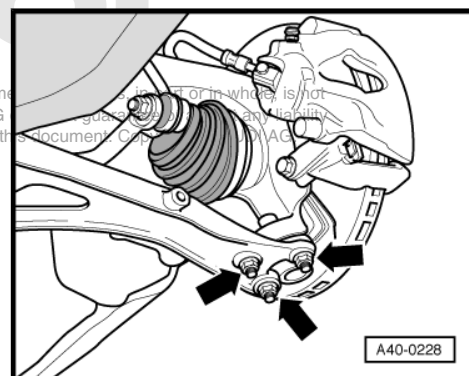


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- Unscrew nut -arrow- for coupling rod on anti-roll bar (right-side).
- If fitted, unscrew nut for bracket for front right vehicle level sender - G289- .



- Remove nuts -arrows- securing swivel joint (right-side).
- Disengage swivel joint (right-side) from wishbone.
- Press off drive shaft (right-side) from bevel box and tie up ➔ Running gear, front-wheel drive and four-wheel drive, Rep. gr. 40 .



Note

Make sure you do not damage surface coating on drive shaft.

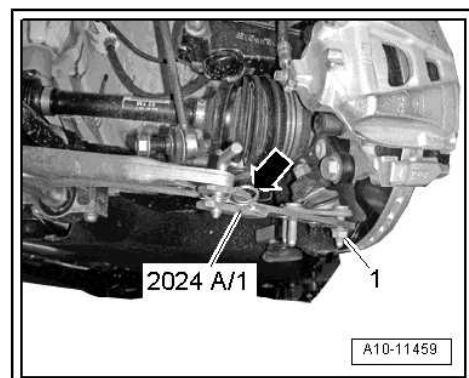
- Swivel suspension strut (right-side) outwards and support with extension -2024 A /1- , as shown in illustration.



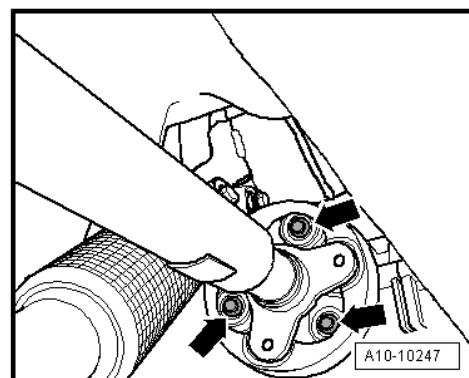
WARNING

Risk of accident if parts of support are not properly secured.

- ◆ *Secure locking pin and swivel joint with retaining clip -arrow- and nut -1-.*



- Mark position of flexible coupling relative to bevel box flange for re-installation.
- Remove bolts -arrows- securing flexible coupling of propshaft to bevel box (counterhold triangular flange with suitable lever).



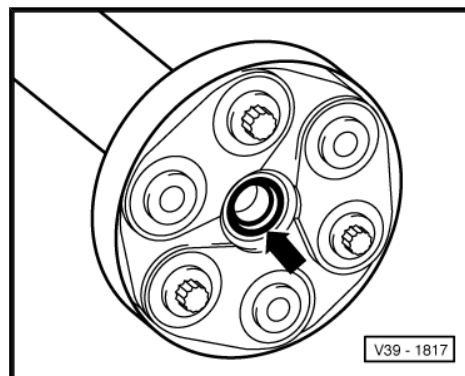
- Push engine/gearbox assembly slightly towards front of vehicle and then pull propshaft off bevel box.



Caution

The seal -arrow- in the propshaft flange can be damaged.

- ◆ *Push propshaft towards the rear and to the right as far as possible.*



Note

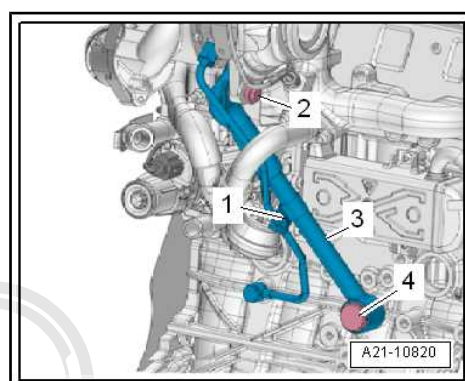
If seal is damaged propshaft must be renewed.



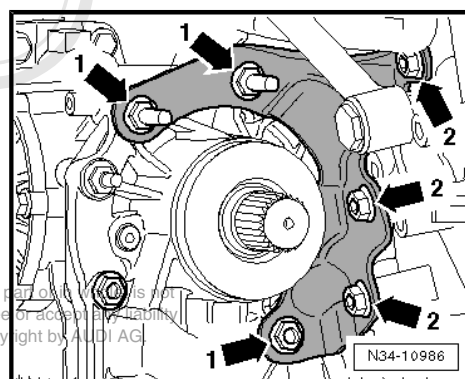
Note

Place a cloth underneath to catch escaping engine oil.

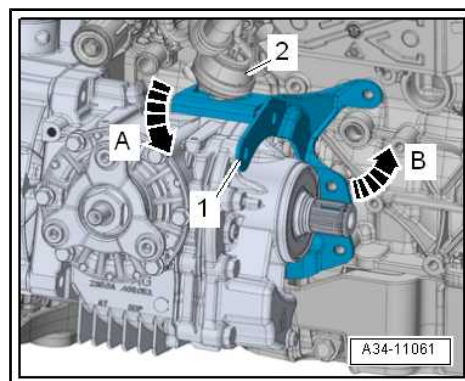
- Remove banjo bolt -4- and bolts -1 and 2- and detach support -3- for turbocharger.



- Remove bolts (-arrows 1 and 2-).

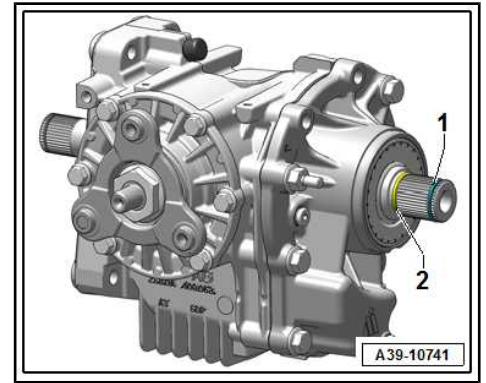


- Press bracket for bevel box -1- downwards in direction of -arrow A- at actuator -2- for exhaust gas recirculation cooler, and detach bracket by turning slightly -arrow B-.

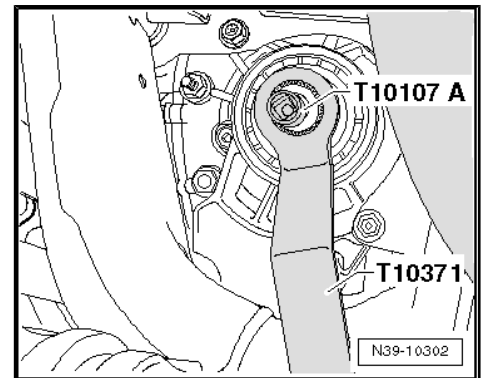


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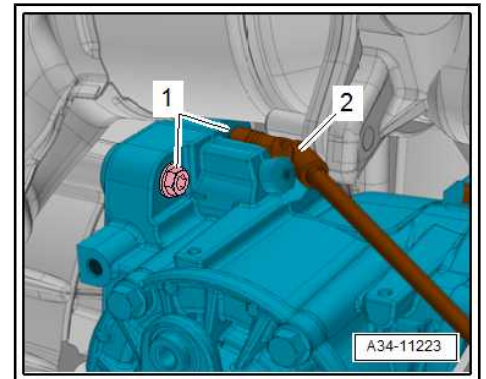
- Detach circlip -1- and O-ring -2- from stub shaft.



- Unscrew bolt for stub shaft using socket and extended bit - T10107 A- (use counterhold tool - T10371- to do so).



- Remove top bolts -1- securing bevel box to gearbox.



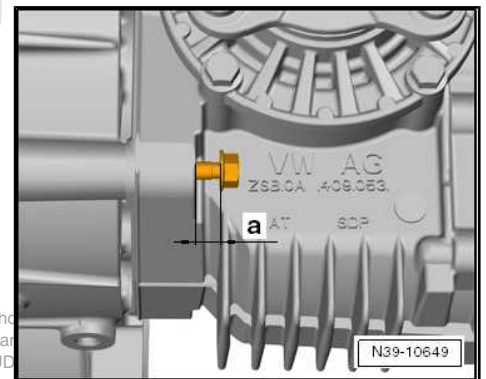
- Loosen bottom bolts -arrows- securing bevel box to gearbox: unscrew only as far as dimension -a-.
- Dimension -a- = 15 mm



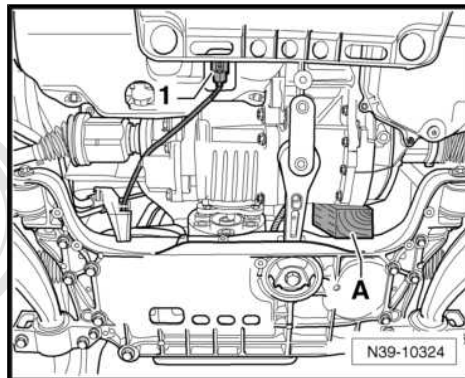
Note

This prevents the gearbox from dropping out when it is slackened with multi-purpose tool - VW 771- .

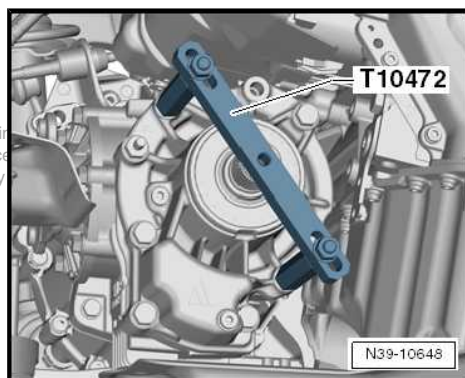
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- Push engine/gearbox assembly by hand towards front and secure in this position with a suitable block of wood -A-.

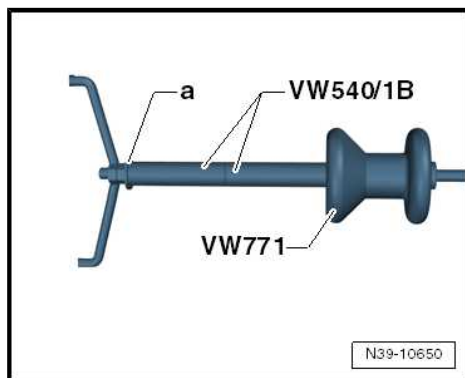


- Attach puller - T10472- to bevel box, as shown in illustration.

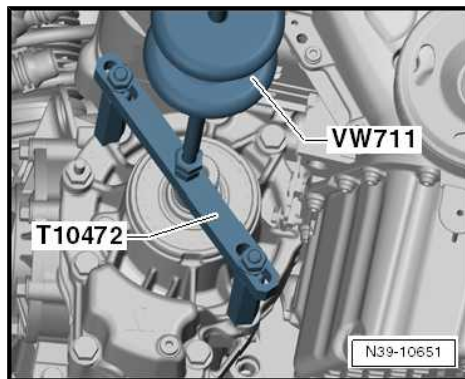


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- Prepare multi-purpose tool - VW 771- with a washer -a- and 2 sleeves from engine and gearbox support supplement - VW 540/1 B- , as shown in illustration.



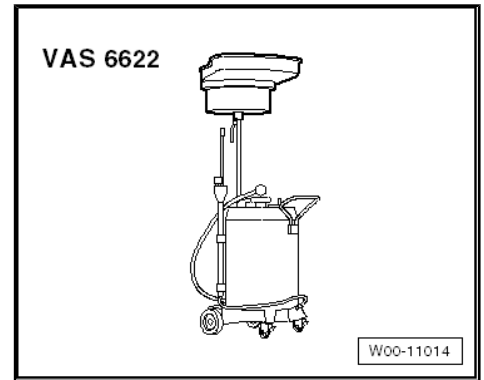
- Secure multi-purpose tool - VW 771- to puller - T10472- and detach bevel box from gearbox.
- Remove multi-purpose tool and puller.
- Remove bottom bolts -arrows- and remove bevel box.



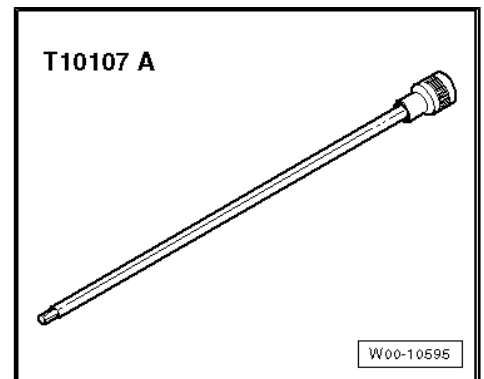
4.1.2 Removing and installing bevel box (gearbox removed from vehicle)

Special tools and workshop equipment required

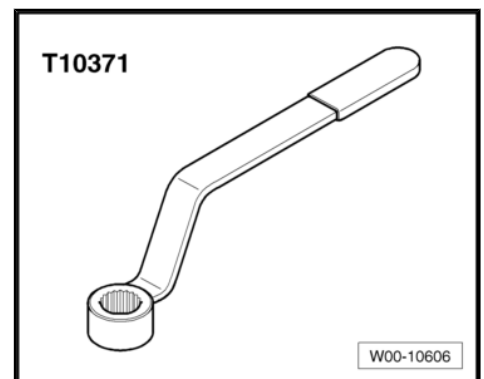
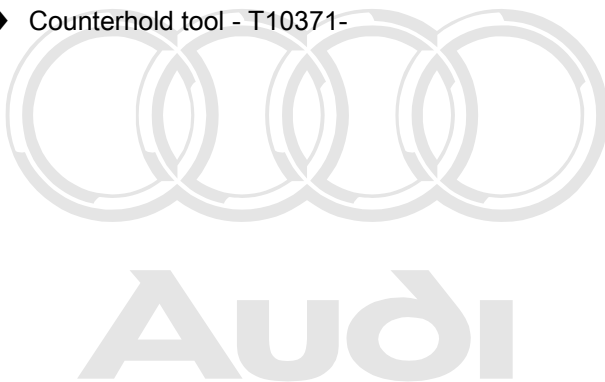
- ◆ Used oil collection and extraction unit - VAS 6622-



- ◆ Socket and extended bit - T10107 A-



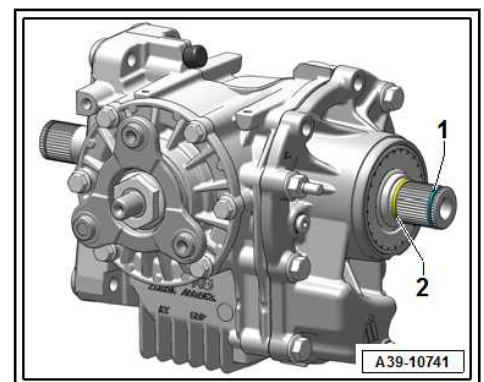
- ◆ Counterhold tool - T10371-



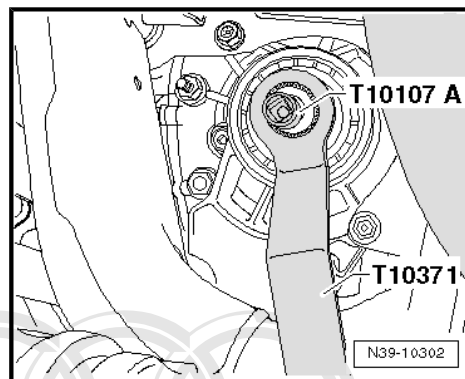
◆ Grease for clutch plate splines - G 000 100-
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Removing

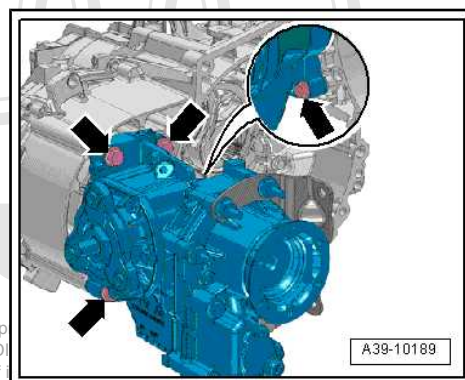
- Gearbox secured to engine and gearbox support
⇒ [page 132](#) .
- Detach circlip -1- and O-ring -2- from stub shaft.



- Place used oil collection and extraction unit - VAS 6622- underneath.
- Unscrew bolt for stub shaft using socket and extended bit - T10107 A- (use counterhold tool - T10371- to do so).



- Remove bolts -arrows- securing bevel box to gearbox.
- Carefully push bevel box away from gearbox, making sure it does not fall down.
- Lubricate splines on differential with grease for clutch plate splines - G 000 100- .
- Push bevel box fully onto gearbox, ensuring that splines of bevel box input shaft and differential are centred when brought together.
- Also bring splines of stub shaft (right-side) and bevel gear in differential into alignment by turning stub shaft if necessary.
- If the teeth are correctly positioned and the components are located centrally, the bevel box will slide against the gearbox onto the stop.



Caution

Risk of irreparable damage to bevel box housing.

- ◆ ***Do not use the securing bolts to pull the bevel box onto the gearbox. This could cause the bevel box to tilt and the securing eyes could break off.***

- Install stub shaft (right-side)
⇒ [“3.2.5 Renewing needle bearings \(polygon bearings\) for stub shaft \(right-side\)”, page 208](#) .

Tightening torques

- ◆ ⇒ [“4.2.2 Tightening torques for bevel box”, page 98](#)
- ◆ ⇒ [“2.1 Exploded view - differential”, page 184](#)

4.2 Installing bevel box

⇒ [“4.2.1 Installing bevel box”, page 96](#)

⇒ [“4.2.2 Tightening torques for bevel box”, page 98](#)

4.2.1 Installing bevel box

Installation is carried out in reverse sequence; note the following:

- Tightening torques ⇒ [page 98](#)



Note

Renew seals, gaskets and self-locking nuts.

- Push bevel box fully onto gearbox, ensuring that splines of bevel box input shaft and differential are centred when brought together.
- If the teeth are correctly positioned and the components are located centrally, the bevel box will slide against the gearbox onto the stop.



Caution

Risk of irreparable damage to bevel box housing.

- ◆ ***Do not use the securing bolts to pull the bevel box onto the gearbox. This could cause the bevel box to tilt and the securing eyes could break off.***

- Tighten bolts -arrows- securing bevel box to gearbox to specified torque ⇒ [page 98](#) .
- Carefully drive in stub shaft (right-side), turning it to avoid damaging bearings.
- Install stub shaft (right-side)
⇒ [“3.2.5 Renewing needle bearings \(polygon bearings\) for stub shaft \(right-side\)”, page 208](#) .
- Install bracket for bevel box ⇒ [page 98](#) .
- Install drive shaft (right-side) ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Removing and installing drive shaft .
- Install heat shield for drive shaft (right-side) ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Exploded view - drive shaft .
- Tighten bolted connections at wishbone and swivel joint to specified torque ⇒ Running gear, axles, steering; Rep. gr. 40 ; Lower wishbone, swivel joint; Exploded view - lower wishbone, swivel joint .
- Tighten bolted connections at coupling rod to specified torque ⇒ Running gear, axles, steering; Rep. gr. 40 ; Subframe; Exploded view - subframe .
- Install front vehicle level sender ⇒ Running gear, axles, steering; Rep. gr. 43 ; Vehicle level senders; Exploded view - front vehicle level sender .

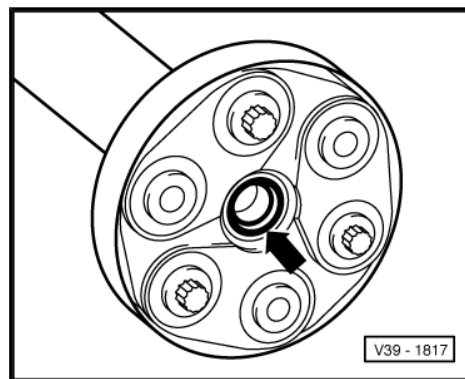


Caution

The seal -arrow- in the propshaft flange can be damaged.

- ◆ *Ensure propshaft is horizontal when pushing it onto centring pin.*

- Secure propshaft ➔ Rep. gr. 39 ; Propshaft; Removing and installing propshaft .
- Fill up gear oil in bevel box ➔ [page 213](#) or check gear oil level in bevel box ➔ [page 212](#) .
- Check gear oil level ➔ [page 134](#) .
- Install noise insulation ➔ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- **Fit front wheel (right-side) ➔ Running gear, axles, steering.**
Rep. gr. 44: Wheels and tyres

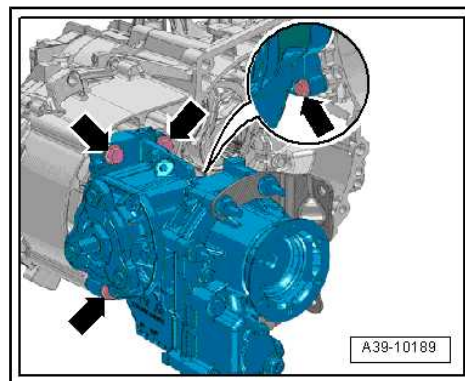


4.2.2 Tightening torques for bevel box

Tightening torque for bevel box to gearbox

- Tighten bolts in stages as follows:

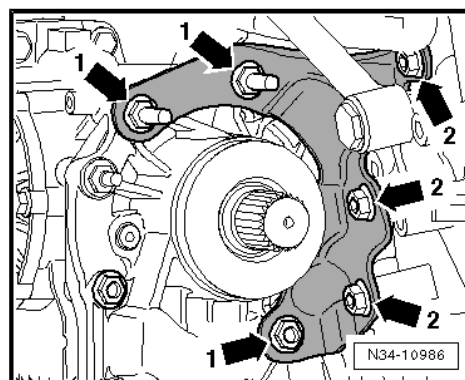
Stage	Bolts	Tightening torque/tightening angle
1.	-arrows-	Screw in by hand until contact is made
2.	-arrows-	40 Nm in diagonal sequence
3.	-arrows-	Turn 90° further in diagonal sequence



Bracket for bevel box - tightening torque and sequence

- Tighten bolts in stages as follows:

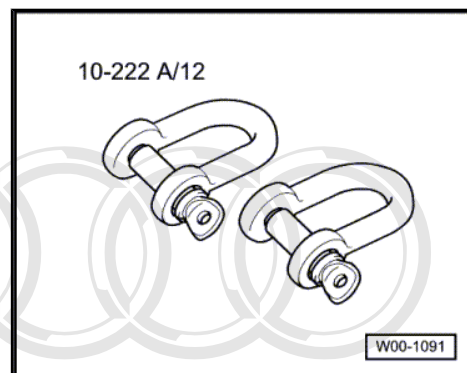
Stage	Bolts	Tightening torque/tightening angle
1.	-Arrows 1, 2-	Screw in by hand until contact is made
2.	-Arrows 2-	8 Nm
2.	-Arrows 1-	8 Nm
2.	-Arrows 2-	40 Nm
3.	-Arrows 1-	40 Nm



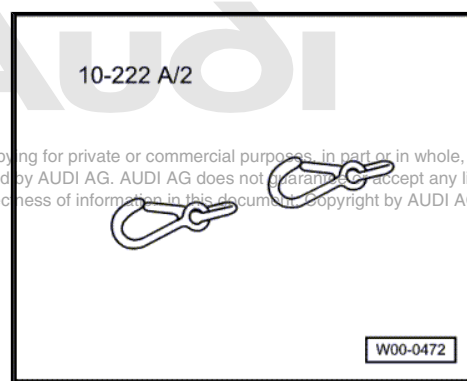
5 Transporting gearbox

Special tools and workshop equipment required

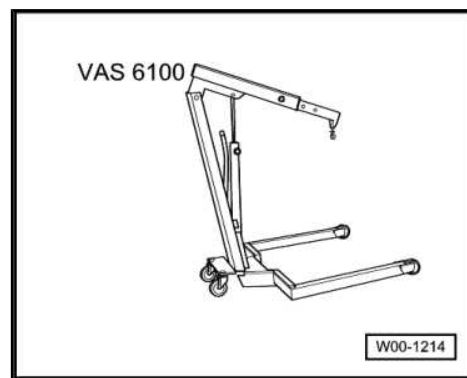
- ◆ Shackle - 10 - 222 A /12-



- ◆ Hook - 10 - 222 A /2-



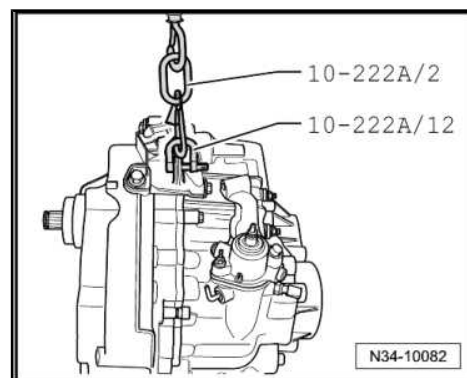
- ◆ Workshop hoist - VAS 6100-



Procedure

Shackle - 3282- may be used in conjunction with hook - 10 - 222 A /12- and a workshop hoist to transport the gearbox and to set up gearbox support - 10 - 222 A /2- .

- Secure shackle - 10 - 222 A /12- to gearbox housing.
- Lift gearbox using workshop hoist and hook - 10 - 222 A /2- .



6 Dismantling and assembling gearbox

⇒ [“6.1 Schematic overview - gearbox”, page 100](#)

⇒ [“6.2 Exploded view - gearbox”, page 102](#)

⇒ [“6.3 Exploded view - selector unit”, page 104](#)

⇒ [“6.4 Exploded view - input shaft, output shafts, differential and selector rods”, page 105](#)

⇒ [“6.5 Exploded view - selector forks”, page 108](#)

⇒ [“6.6 Dismantling and assembling gearbox”, page 109](#)

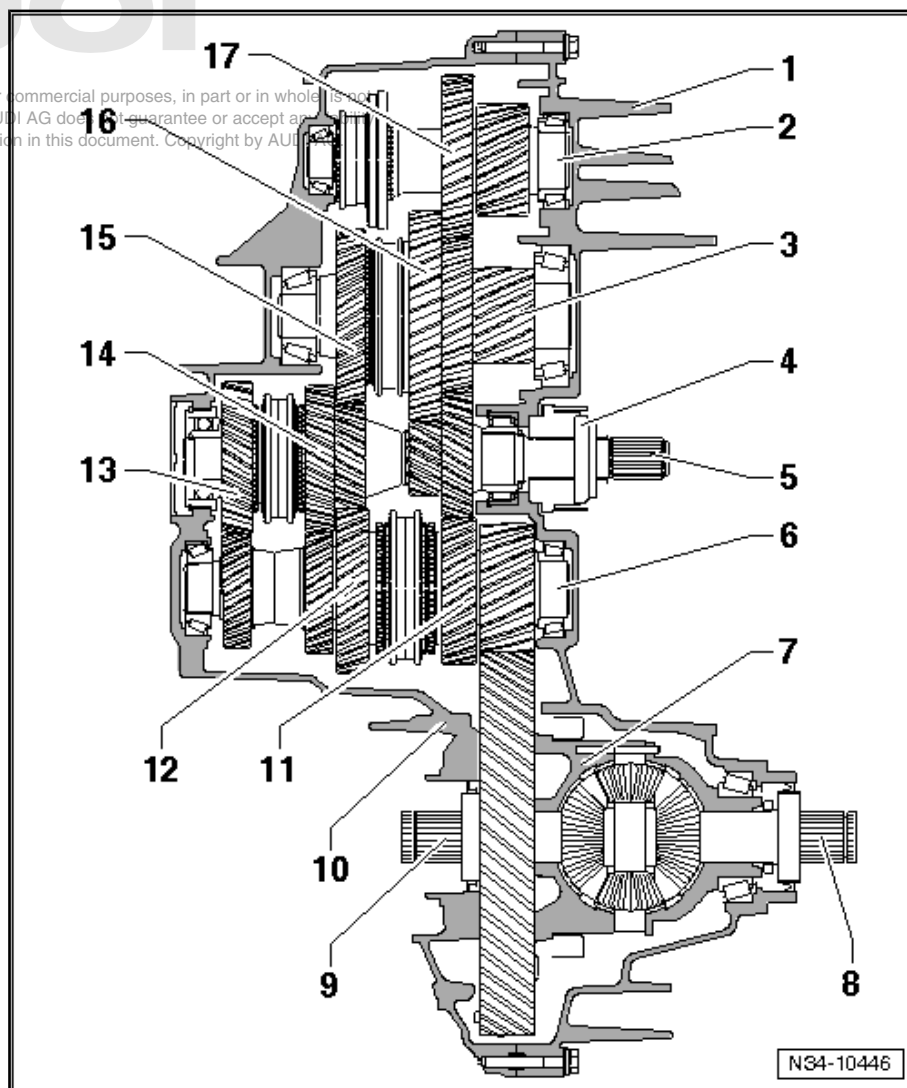
6.1 Schematic overview - gearbox

⇒ [“6.1.1 Schematic overview - gearbox, front-wheel drive”, page 100](#)

⇒ [“6.1.2 Schematic overview - gearbox, four-wheel drive”, page 101](#)

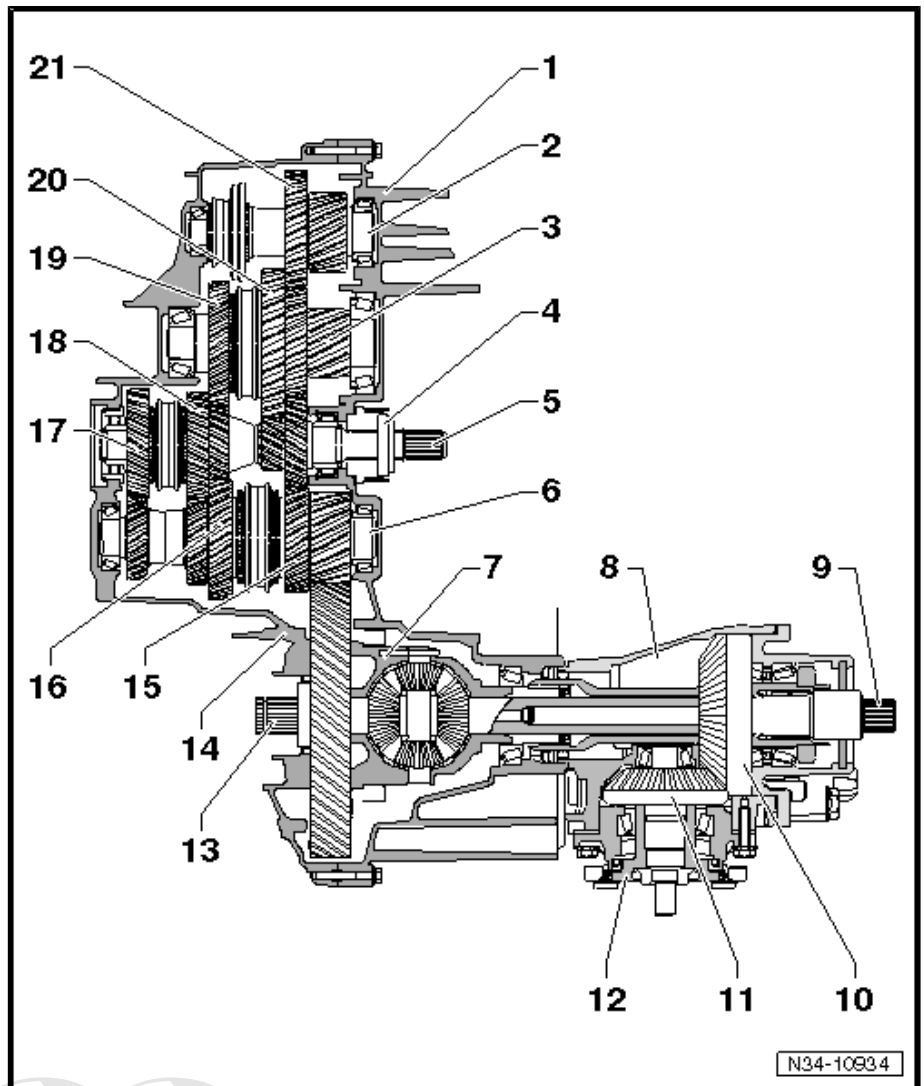
6.1.1 Schematic overview - gearbox, front-wheel drive

- 1 - Clutch housing
- 2 - Output shaft for reverse gear
- 3 - Output shaft for 1st/2nd gear
- 4 - Clutch slave cylinder with release bearing
- 5 - Input shaft
 - ❑ With 5th and 6th speed selector gears
- 6 - Output shaft for 3rd/4th gear
- 7 - Differential
- 8 - Stub shaft (right-side)
- 9 - Stub shaft (left-side)
- 10 - Gearbox housing
- 11 - 4th speed selector gear
- 12 - 3rd speed selector gear
- 13 - 6th speed selector gear
- 14 - 5th speed selector gear
- 15 - 2nd speed selector gear
- 16 - 1st speed selector gear
- 17 - Reverse selector gear



6.1.2 Schematic overview - gearbox, four-wheel drive

- 1 - Clutch housing
- 2 - Output shaft for reverse gear
- 3 - Output shaft for 1st/2nd gear
- 4 - Clutch slave cylinder with release bearing
- 5 - Input shaft
 - With 5th and 6th speed selector gears
- 6 - Output shaft for 3rd/4th gear
- 7 - Differential
- 8 - Bevel box
- 9 - Stub shaft (right-side)
- 10 - Bevel gear with input shaft
- 11 - Shaft bevel gear
- 12 - Output flange
- 13 - Stub shaft (left-side)
- 14 - Gearbox housing
- 15 - 4th speed selector gear
- 16 - 3rd speed selector gear
- 17 - 6th speed selector gear
- 18 - 5th speed selector gear
- 19 - 2nd speed selector gear
- 20 - 1st speed selector gear
- 21 - Reverse selector gear



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6.2 Exploded view - gearbox

1 - Bolt

- ☐ Renew after removal
- ☐ Tightening torque
⇒ [Item 12 \(page 184\)](#)

2 - Stub shaft (left-side)

- ☐ With spring
- ☐ Removing and installing
⇒ ["1.2 Renewing oil seal \(left-side\)", page 178](#)
- ☐ Assembling
⇒ [page 184](#)

3 - Circlip

- ☐ For grooved ball bearing on input shaft

4 - Sealing cap

- ☐ Secure with locking plate ⇒ [page 120](#) or re-tainer ⇒ [page 120](#)

5 - Bolt

- ☐ 5 Nm

6 - Locking plate

7 - Retainer

8 - Bolt

- ☐ 20 Nm

9 - Nuts

- ☐ 20 Nm +90°

10 - Bolt

- ☐ 6 Nm

11 - Gearbox neutral position sender - G701-

- ☐ For vehicles with start/stop system

12 - Reversing light switch - F4-

- ☐ With captive seal
- ☐ 20 Nm

13 - Seal

- ☐ Not fitted on all gearboxes

14 - Bolt

- ☐ Renew after removal
- ☐ Note different types of bolt and tightening torques:

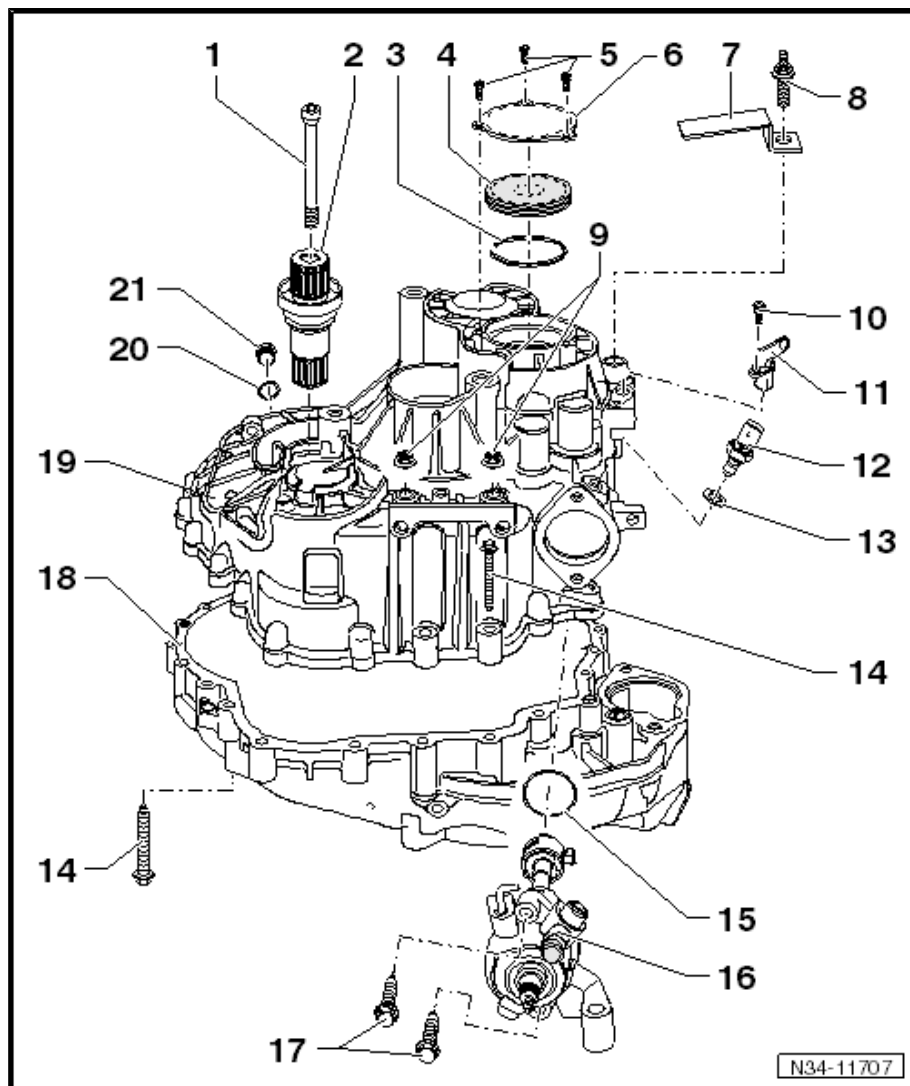
◆ Tighten aluminium bolt, M9 with internal Torx: 15 Nm + 180°

◆ Steel bolt, external hexagon head: 15 Nm +90°

- ☐ Aluminium gearbox with aluminium bolts, M8: use steel bolts as replacement parts
- ☐ Aluminium gearbox markings ⇒ [page 103](#)
- ☐ Correct allocation of replacement steel bolts ⇒ [page 103](#)

15 - O-ring

- ☐ Renew after removal



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16 - Selector unit

- ☐ Exploded view ➔ [page 104](#)
- ☐ Removing and installing (with gearbox installed) ➔ [page 120](#)

17 - Bolts

- ☐ Renew after removal
- ☐ 25 Nm

18 - Clutch housing

- ☐ Aluminium version (bright metal): must only be fitted to an aluminium gearbox housing
- ☐ Magnesium version (matt grey); must only be fitted to a magnesium gearbox housing
- ☐ Clutch housing and gearbox housing markings ➔ [page 103](#)
- ☐ Servicing ➔ [page 129](#)

19 - Gearbox housing

- ☐ Aluminium version (bright metal): must only be fitted to an aluminium clutch housing
- ☐ Magnesium version (matt grey); must only be fitted to a magnesium clutch housing
- ☐ Clutch housing and gearbox housing markings ➔ [page 103](#)
- ☐ Servicing ➔ [page 127](#)

20 - Seal

- ☐ Renew after removal

21 - Oil drain plug

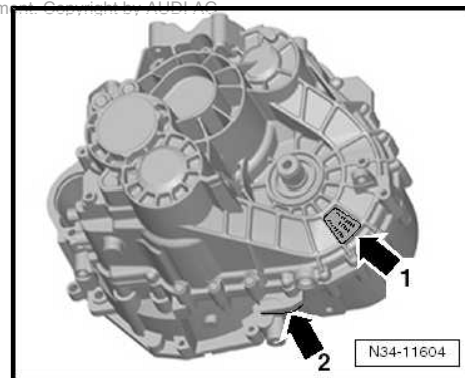
- ☐ Tightening torque ➔ [Item 16 \(page 124\)](#)

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Aluminium gearbox markings

The identification marking “AL Si 9Cu 31 (Fe)-D” can be found near -arrow 1- and -arrow 2- on gearboxes with aluminium housing.

“AL = aluminium”; additional data is only for production.



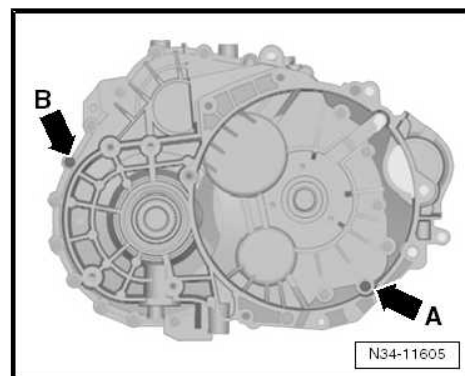
Bolts securing gearbox housing to clutch housing on gearboxes with aluminium housing: aluminium bolts, M8



Caution

Risk of bolts loosening.

- ◆ *Replace M8 aluminium bolts with steel bolts ➔ **Electronic parts catalogue** .*
- ◆ *Ensure correct allocation of steel bolts.*
- ◆ *Use steel bolts, M8x60 in area of dowel sleeves -arrows A, B-.*
- ◆ *For remaining bolted connections, use steel bolts, M8x52.*



6.3 Exploded view - selector unit



Note

Lubricate all bearings and moving surfaces with grease - G 000 450 02- .

1 - Selector unit

- ☐ Consists of selector shaft and selector mechanism cover
- ☐ Components cannot be separated from each other
- ☐ Removing and installing (with gearbox installed) ⇒ [page 120](#)

2 - O-ring

- ☐ Renew after removal
- ☐ Fit in circular slot on selector mechanism cover
- ☐ Lubricate with gear oil before installing

3 - Dowel sleeve

- ☐ For centring selector unit on gearbox housing.

4 - Seal

- ☐ For selector shaft
- ☐ Renewing ⇒ [page 71](#)

5 - Cap

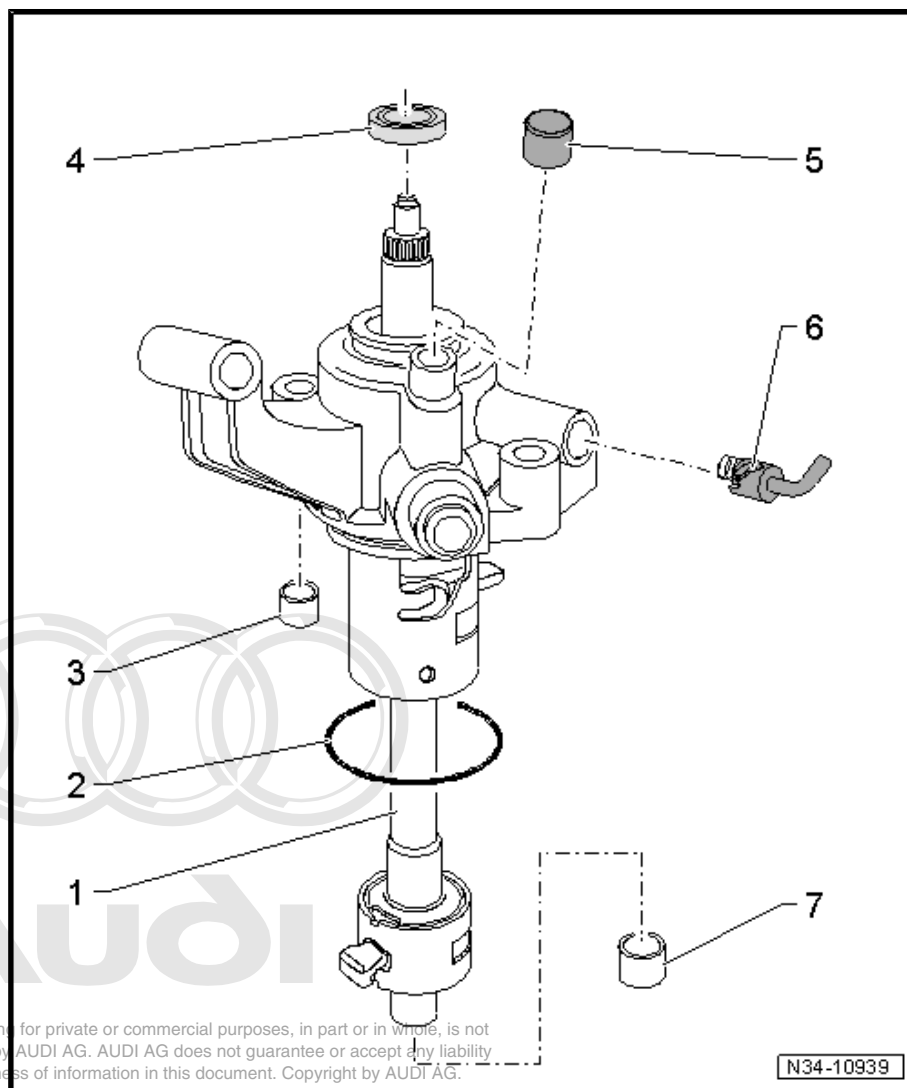
- ☐ For gearbox breather

6 - Angled rod

- ☐ For adjusting selector mechanism ⇒ [page 68](#)
- ☐ Removing ⇒ [page 105](#)
- ☐ Pressing in ⇒ [page 105](#)

7 - Bearing bush

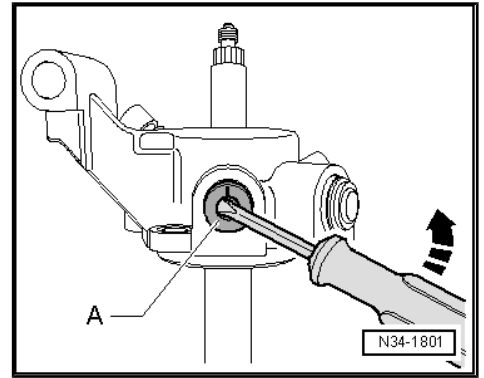
- ☐ For selector shaft
- ☐ Renewing ⇒ [Item 5 \(page 123\)](#)



N34-10939

Removing angled rod -A- from selector mechanism cover

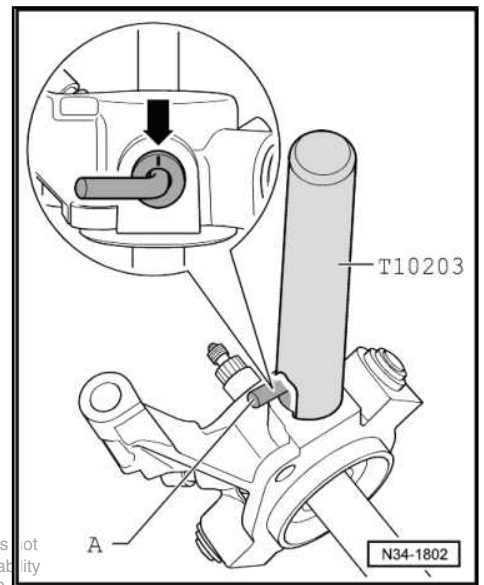
- Remove outer part of angled rod.
- Carefully lever out angled rod with a screwdriver.



Pressing angled rod -A- into selector mechanism cover

Installation position:

- Marking -arrow- points to upper section of selector shaft.



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6.4 Exploded view - input shaft, output shafts, differential and selector rods

1 - Output shaft for reverse gear

- ☐ Installation position
⇒ [page 107](#)
- ☐ Exploded view
⇒ [page 147](#)

2 - Selector fork for reverse gear

- ☐ Installation position
⇒ [page 107](#)

3 - O-rings

- ☐ Installed on some gear-boxes
- ☐ Discontinued shortly after start of production

4 - Output shaft for 1st/2nd gear

- ☐ Installation position
⇒ [page 107](#)
- ☐ Exploded view
⇒ [page 143](#)

5 - Selector rod with selector fork for 1st and 2nd gear

- ☐ Installation position
⇒ [page 107](#)

6 - Output shaft for 3rd/4th gear

- ☐ Installation position
⇒ [page 107](#)
- ☐ Exploded view
⇒ [page 145](#)

7 - Selector rod with selector fork for 3rd and 4th gear

- ☐ Note installation position ⇒ [page 116](#)

8 - Input shaft

- ☐ With 5th and 6th speed selector gears
- ☐ Installation position ⇒ [page 107](#)
- ☐ Exploded view ⇒ [page 135](#)
- ☐ Always renew grooved ball bearing on input shaft after removal ⇒ [Item 18 \(page 136\)](#)

9 - Selector rod with selector fork for 5th and 6th gear

- ☐ Installation position ⇒ [page 107](#)

10 - Bleeder connection

- ☐ Connect to clutch slave cylinder ⇒ [Item 14 \(page 107\)](#)

11 - Clutch housing

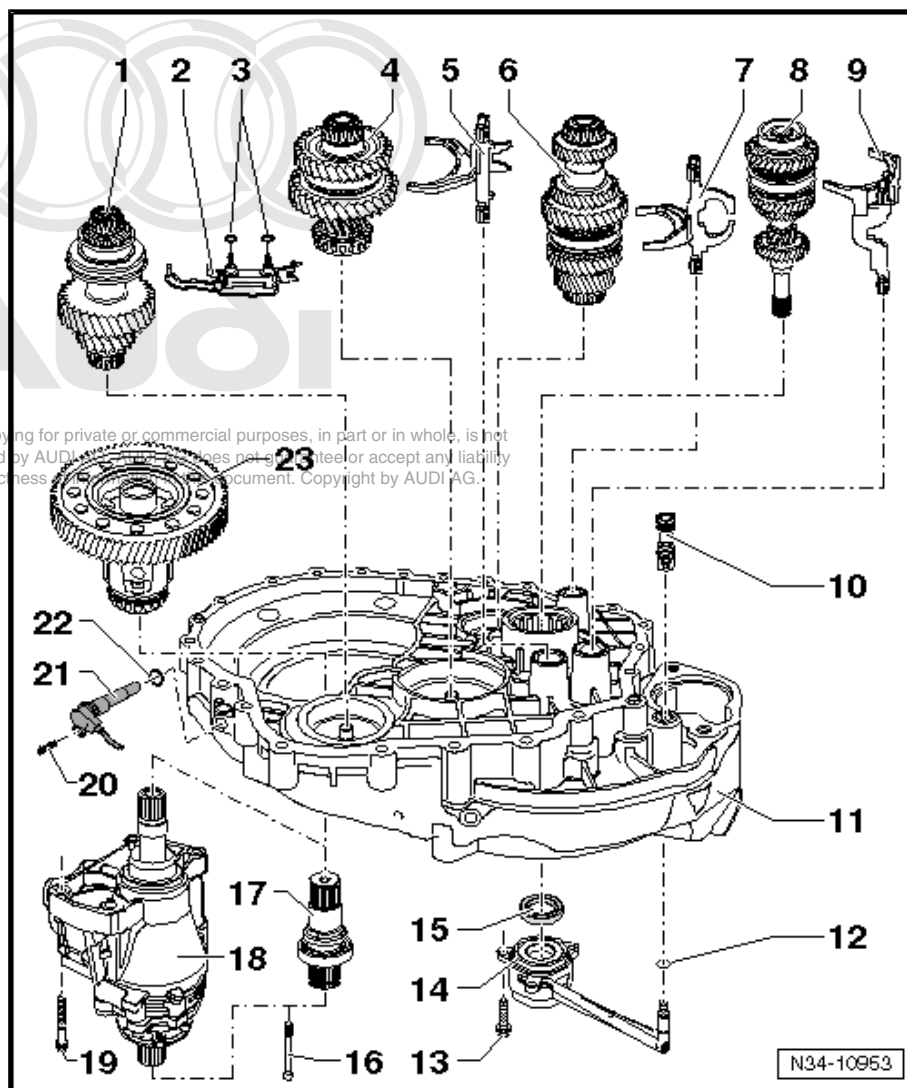
- ☐ Servicing ⇒ [page 129](#)

12 - O-ring

- ☐ Push onto pipe connection
- ☐ Lubricate with brake fluid before installing

13 - Bolt

- ☐ 3x
- ☐ Tightening torque ⇒ [Item 2 \(page 20\)](#)



14 - Clutch slave cylinder with release bearing

- ☐ Removing and installing ⇒ [page 33](#)

15 - Input shaft oil seal

- ☐ Renewing ⇒ [page 182](#)

16 - Bolt

- ☐ Tightening torque ⇒ [Item 12 \(page 184\)](#)

17 - Stub shaft (right-side) with spring

- ☐ Only for vehicles with front-wheel drive
- ☐ Removing and installing ⇒ [1.3 Renewing oil seal \(right-side\) page 180](#)
- ☐ Assembling ⇒ [page 184](#)

18 - Bevel box

- ☐ For vehicles with four-wheel drive
- ☐ Oil seals in bevel box and stub shaft bearings ⇒ [page 195](#)

19 - Bolts

- ☐ 4x
- ☐ Renew after removal
- ☐ Tightening torque ⇒ [Item 23 \(page 185\)](#)

20 - Bolt

- ☐ 12 Nm

21 - Tachograph sender - G75-

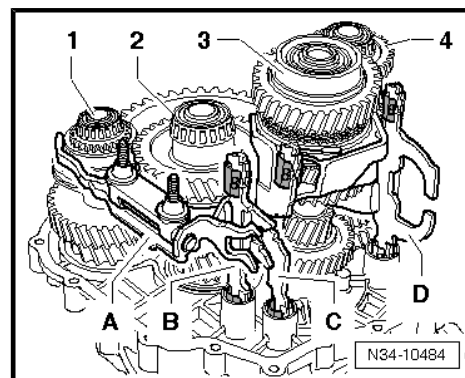
- ☐ Equipment version

22 - O-ring

23 - Differential ⇒ [page 184](#)

Installation position of shafts and selector rods in gearbox

- 1 - Output shaft for reverse gear
- 2 - Output shaft for 1st/2nd gear
- 3 - Input shaft
- 4 - Output shaft for 3rd/4th gear
- A - Reverse gear selector fork
- B - Selector rod for 1st and 2nd gear
- C - Selector rod for 5th and 6th gear
- D - Selector rod for 3rd and 4th gear



6.5 Exploded view - selector forks

1 - Selector rod with selector fork for 1st and 2nd gear

2 - Bearing bush

- ☐ For selector rod
- ☐ Removing from and installing in gearbox housing ➔ [page 127](#)
- ☐ Removing from and installing in clutch housing ➔ [page 129](#)

3 - Damper rubber

- ☐ Installation position ➔ [page 108](#)

4 - Selector rod with selector fork for 3rd and 4th gear

5 - Selector rod with selector fork for 5th and 6th gear

6 - O-ring

- ☐ Installed on some gearboxes
- ☐ Discontinued shortly after start of production
- ☐ Do not reinstall

7 - Mounting bracket

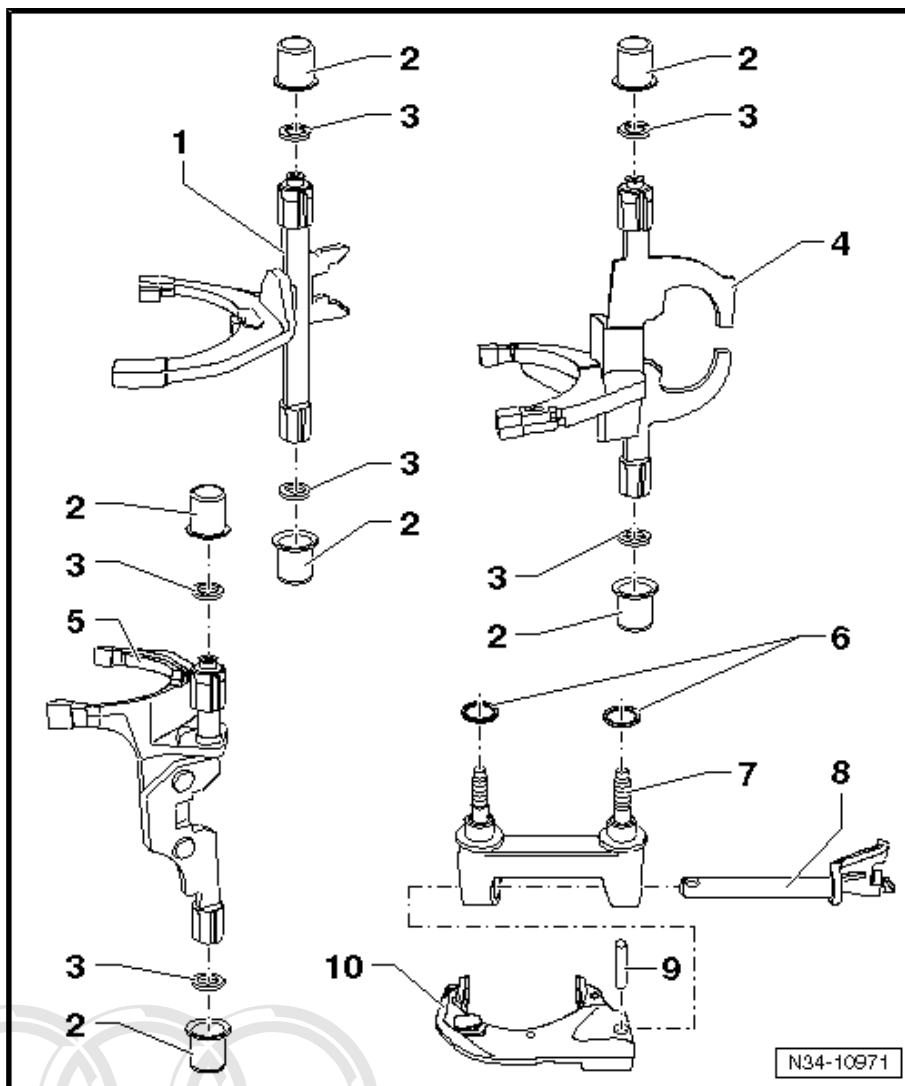
- ☐ For reverse gear selector fork

8 - Pivot pin

9 - Roll pin

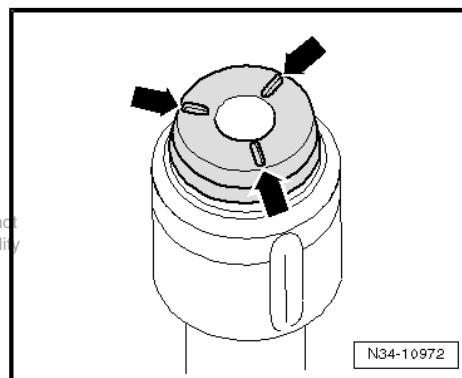
- ☐ Renew after removal
- ☐ Drive out and in with a drift

10 - Reverse gear selector fork



Installation position of damper rubber

Recesses -arrows- point away from selector fork



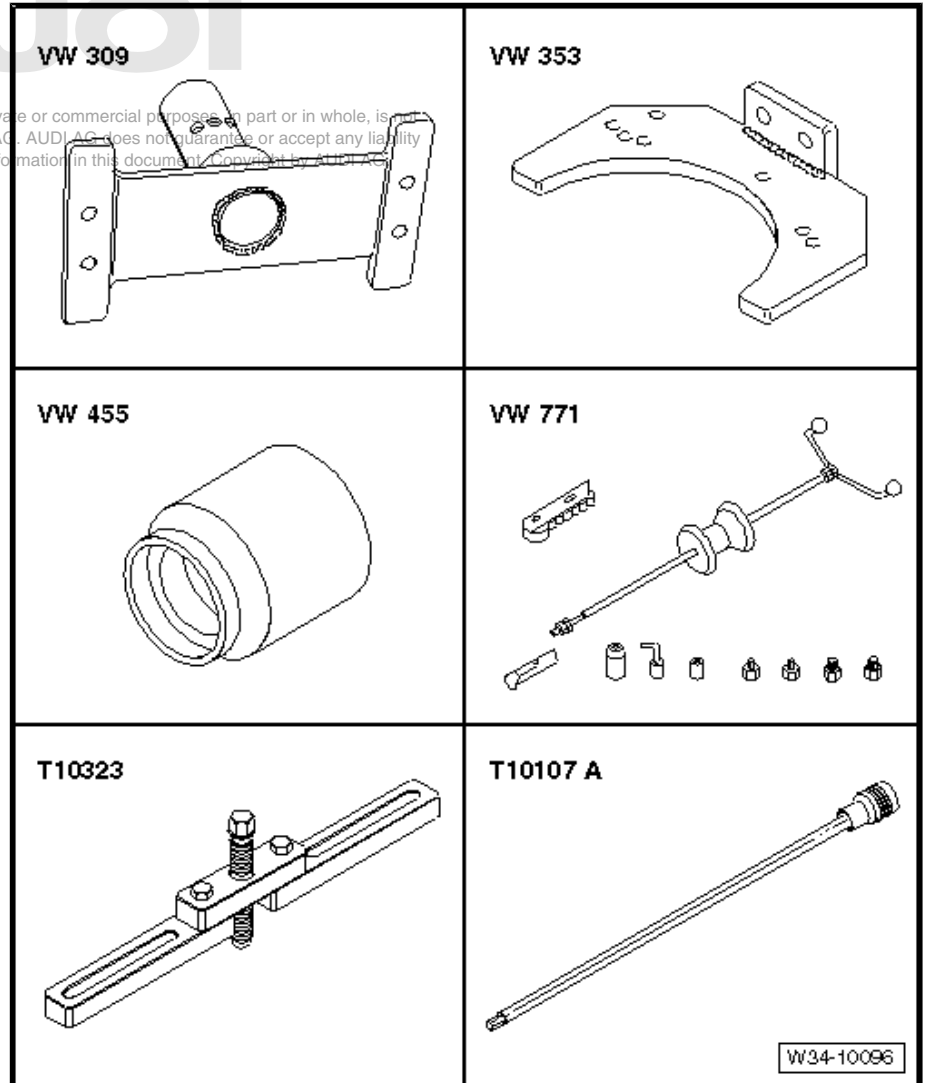
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6.6 Dismantling and assembling gearbox

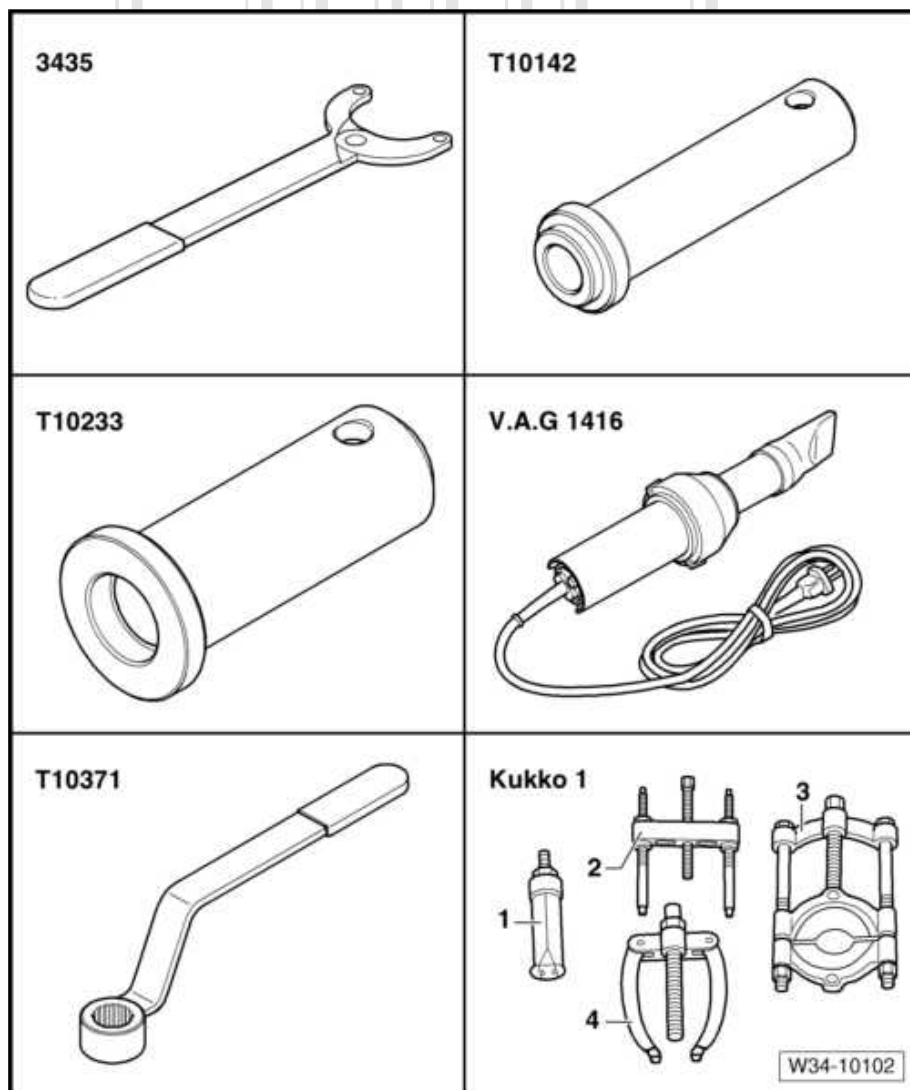
Removing and installing gearbox housing, selector mechanism, input shaft, output shafts, differential, selector rods and bevel box (if fitted)

Special tools and workshop equipment required

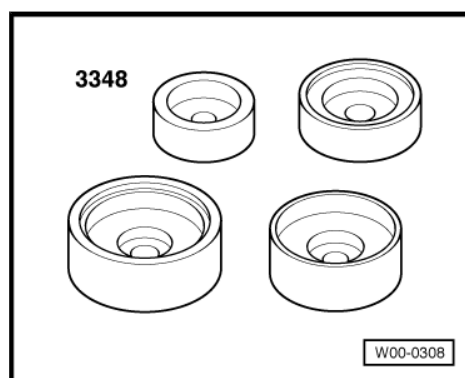
- ◆ Support plate - VW 309-
- ◆ Gearbox support - VW 353-
- ◆ Installing sleeve - VW 455-
- ◆ Multi-purpose tool - VW 771-
- ◆ Adapter - VW 771/44-
- ◆ Support bridge - T10323-
- ◆ Socket and extended bit - T10107 A-



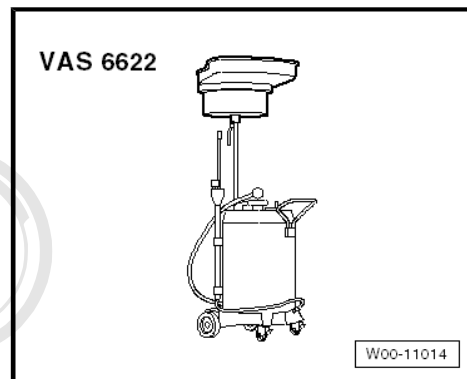
- ◆ Counterhold tool - 3435-
- ◆ Thrust piece - T10042-
- ◆ Counterhold tool - T10371-
- ◆ Thrust piece - T10233-
- ◆ Hot air blower - V.A.G 1416- or similar
- ◆ -1- Internal puller 14.5...18.5 mm, e.g. -Kukko 21/02-
- ◆ -3- Splitter 5...60 mm, e.g. - Kukko 17/0-
- ◆ -4- Counter-support - Kukko 22/1-



- ◆ -3348/2- from assembly tool - 3348-



- ◆ Used oil collection and extraction unit - VAS 6622-



- ◆ Sealing paste - AMV 188 200 03-
- ◆ Grease - G 060 735 A2-

Dismantling

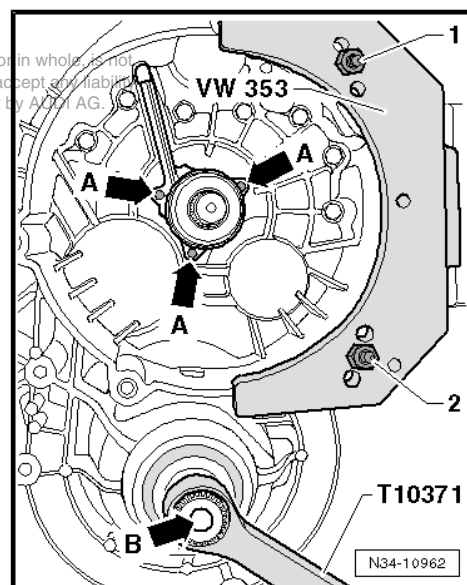
- Secure gearbox to engine and gearbox support [= page 132](#).
- Remove bolts -arrows A- and detach clutch slave cylinder with release bearing.

Gearbox for front-wheel drive:

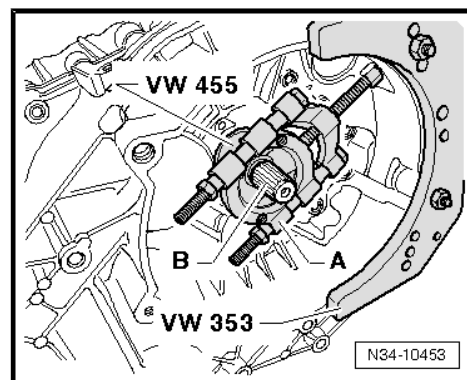
- Unscrew bolt -arrow B- for stub shaft (right-side) with socket and extended bit - T10107 A- (use counterhold tool - T10371-).
- Pull out stub shaft.

Continued for all gearboxes:

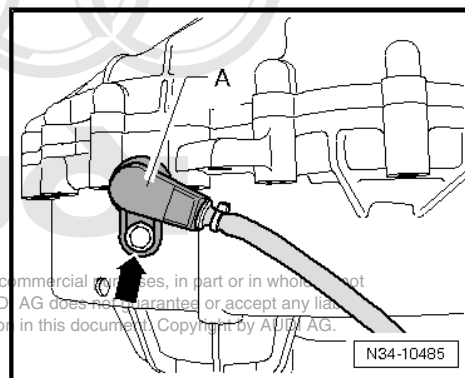
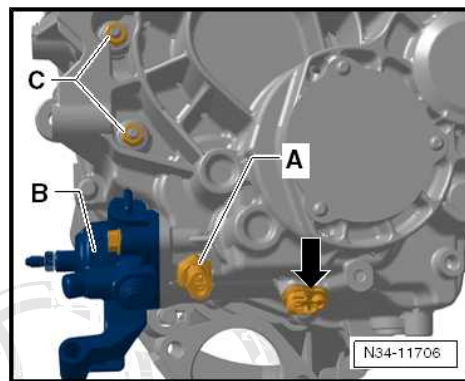
- Place used oil collection and extraction unit - VAS 6622- underneath and drain gearbox oil.



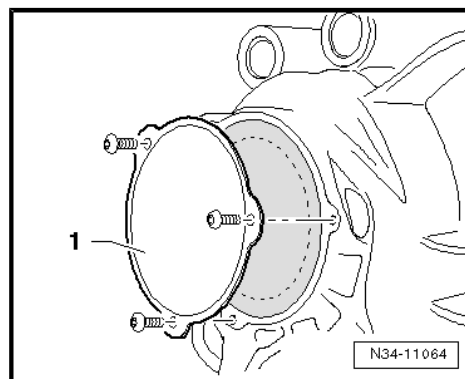
- Lock input shaft -B- by fitting installing sleeve - VW 455- over input shaft on clutch housing.
- Tighten splitter 5...60 mm, e.g. -Kukko 17/0- -item A- behind splines on input shaft.
- The rear side of the splitter must be in contact with installing sleeve - VW 455- (zero play).



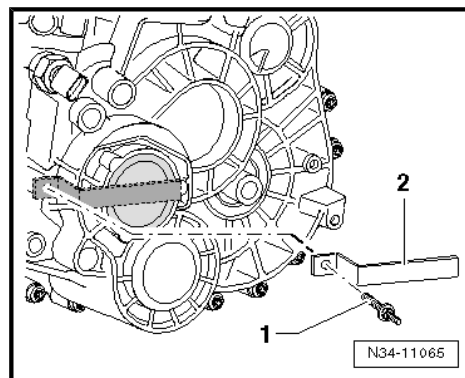
- Gearbox for vehicles with start/stop system: remove gearbox neutral position sender - G701- -arrow-.
- Place selector shaft of selector unit in neutral.
- Remove reversing light switch - F4- -A-.
- Remove bolts for selector unit -B-.
- Pull selector unit out of gearbox housing, at the same time turning selector unit 180°.
- The selector fingers of the selector unit must be guided through the selector rods.
- Remove nuts -C-.
- If fitted: Remove tachograph sender - G75- -item A- -arrow-.



- Sealing cap, version 1: Remove bolts and detach locking plate -1-.



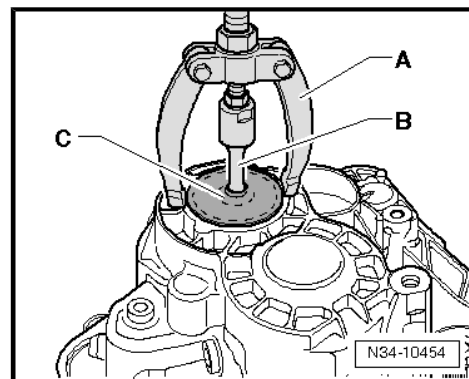
- Sealing cap, version 2: Remove centre hex stud -1- and detach retainer -2-.



- Pierce rubber in centre of sealing cap -C- with a screwdriver.
- Lever sealing cap out of gearbox housing.
- If necessary, pull sealing cap out of gearbox housing.

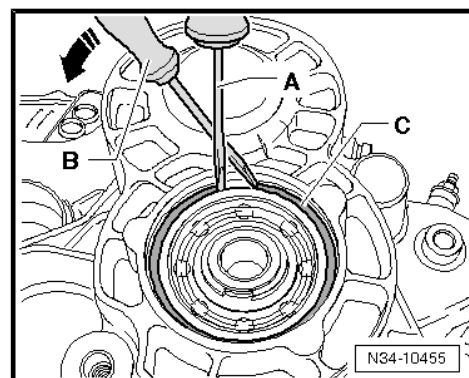
A - Counter-support, e.g. -Kukko 22/1-

B - Internal puller 14.5...18.5 mm, e.g. -Kukko 21/02-



Remove circlip -C- from grooved ball bearing of input shaft as follows:

- Hold one end of circlip with screwdriver -A-.
- Lever other end of circlip out of slot in ball bearing -arrow- with 2nd screwdriver -B-.
- Lever out circlip further by re-applying screwdriver -B-.

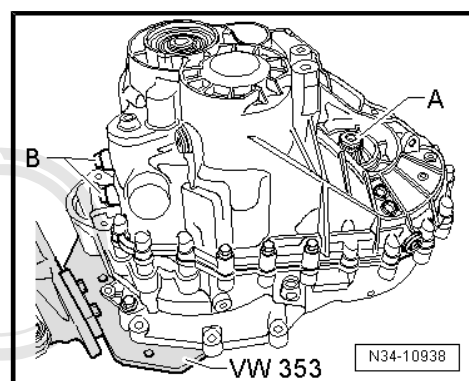


- Unscrew bolt for stub shaft (left-side) -A- with socket and extended bit - T10107 A- (use counterhold tool - T10371-).
- Pull out stub shaft.
- Remove all bolts securing gearbox housing to clutch housing.

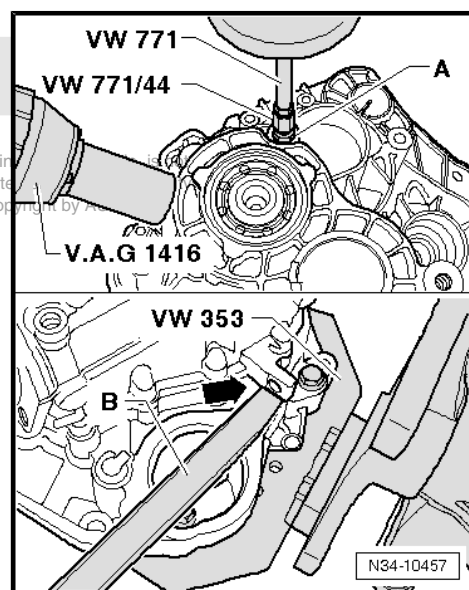


Note

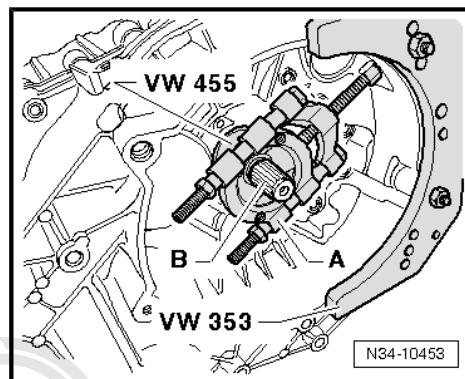
Bolts -B- can be disregarded.



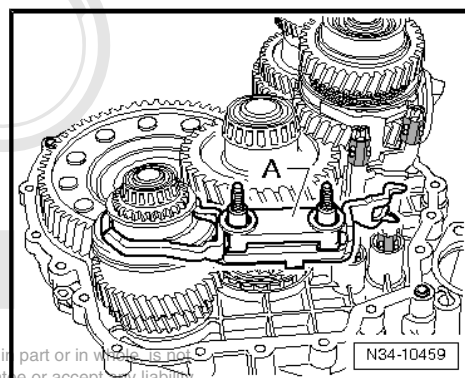
- Screw adapter -VW 771/44- into threaded hole in gearbox housing as far as stop and secure with lock nut -A-.
- Heat gearbox housing, e.g. using hot air blower - V.A.G 1416- in vicinity of bearing seat for grooved ball bearing for input shaft for approx. 10 minutes to approx. 100° C.
- Using multi-purpose tool -VW 771- pull gearbox housing off clutch housing. At the same time, pry gearbox housing away from clutch housing by applying a suitable lever -B- to projecting lug -arrow- on housing.



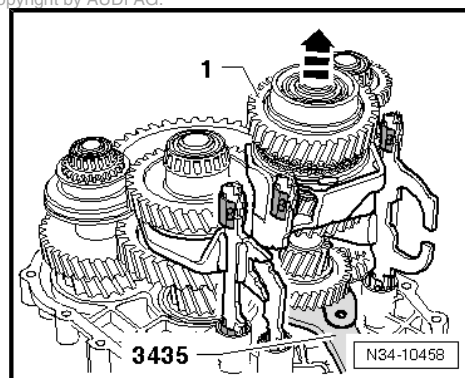
- Remove splitter -A- and installing sleeve - VW 455- from input shaft -B-.



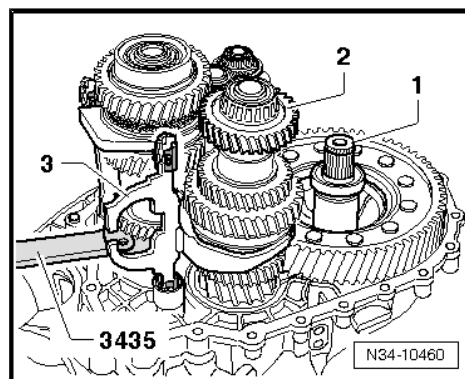
- Remove reverse gear selector fork -A-.
- If necessary, carefully tilt gearbox slightly to side.



- Lift input shaft -1- in direction of -arrow- far enough to insert counterhold tool - 3435- .
- Swing gearbox back to original horizontal position.



- Secure stub shaft -1- to differential so that differential can be lifted during the following steps.
- Remove output shaft for 3rd and 4th gear -2- together with selector rod -3-.
- Carefully tilt gearbox slightly to the side.



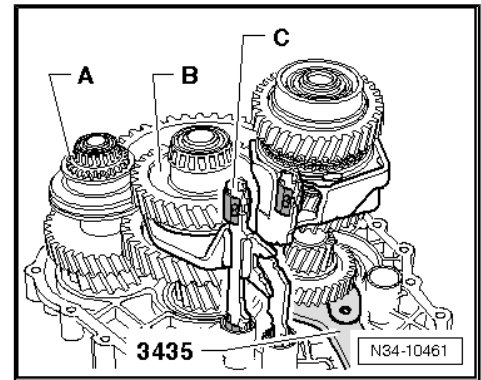
- Press output shaft for 1st and 2nd gears -B- up as far as stop.
- Then swing reverse gear output shaft -A- out.



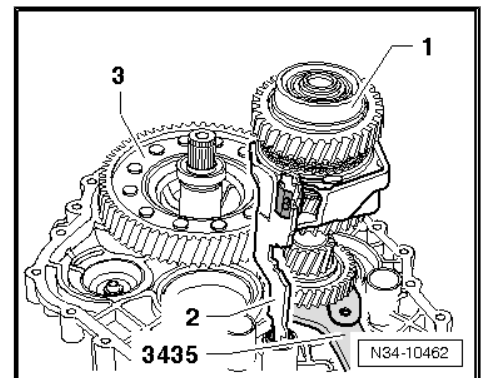
Caution

Gearbox components might come loose inadvertently when the unit is tilted.

- ◆ *Swing gearbox back to original horizontal position.*

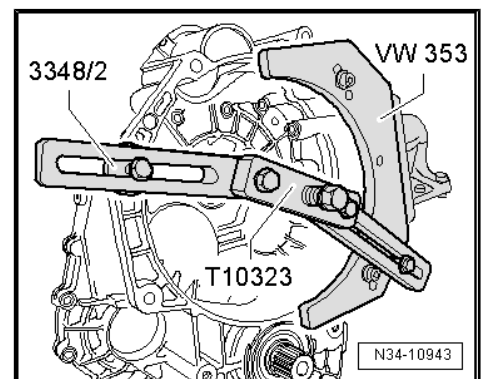


- Then remove output shaft for 1st and 2nd gears -B- together with selector rod -C- from clutch housing.
- Remove input shaft -1- together with selector rod -2-.
- Pull out differential -3- by taking hold of stub shaft.
- Remove input shaft oil seal ⇒ [Item 11 \(page 126\)](#) .

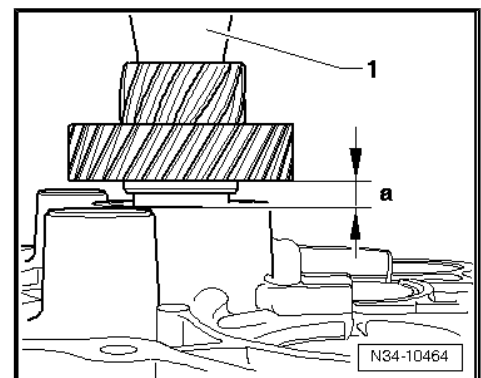


Assembling

- A new grooved ball bearing must be pressed onto the input shaft ⇒ [Item 18 \(page 136\)](#) .
- Secure support bridge - T10323- as shown.



- Now install input shaft in clutch housing together with selector rod for 5th and 6th gears.
- Lift input shaft -1- to dimension -a- by turning spindle of support bridge - T10323- .
- Dimension -a- = 15 mm



- Secure stub shaft (left-side) -A- to differential so that differential can be lifted during the following steps.
- Fit differential.

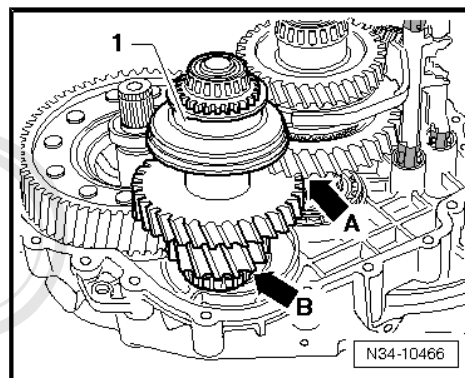
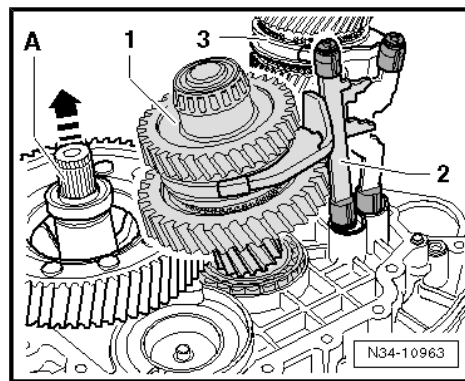


Note

A second mechanic is required for the next steps.

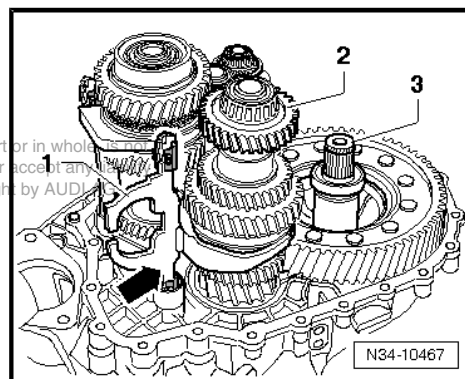
- Have 2nd mechanic lift differential in direction of -arrow-.
- First set output shaft for 1st and 2nd gears -1- together with selector rod -2- in bearing seat and then swing towards input shaft -3-.
- Lift output shaft for 1st and 2nd gears at selector gear -arrow A- and swing towards input shaft (2nd mechanic).
- Guide reverse gear output shaft -1- under teeth of selector gear -arrow A- and then set in bearing seat -arrow B-.

Lower input shaft by approx. 10 mm by turning spindle of support bridge - T10323- .

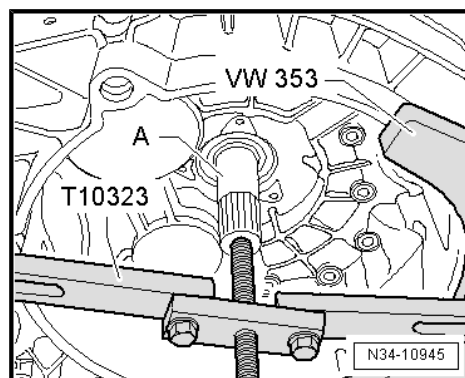


Installation position of selector rod -1- for 3rd and 4th gear:

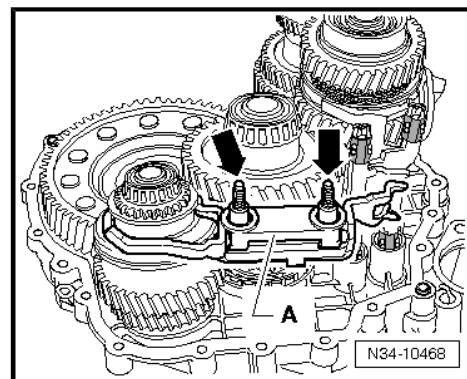
- Shorter arm -arrow- faces clutch housing.
- Insert output shaft for 3rd and 4th gear -2- together with selector rod for 3rd and 4th gear -1-.
- Detach stub shaft (left-side) -3- from differential.



- Lower input shaft -A- via spindle of support bridge - T10323- to a position where it is still slightly under tension (raised approx. 1 mm).

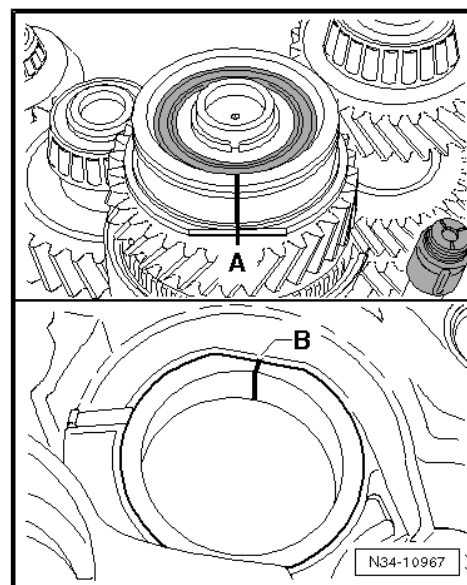


- Fit reverse gear selector fork -A- in locking collar of reverse gear output shaft.
- Studs -arrows- must be vertical before gearbox housing is set in place.



Grooved ball bearing for input shaft will fit into gearbox housing in one position only.

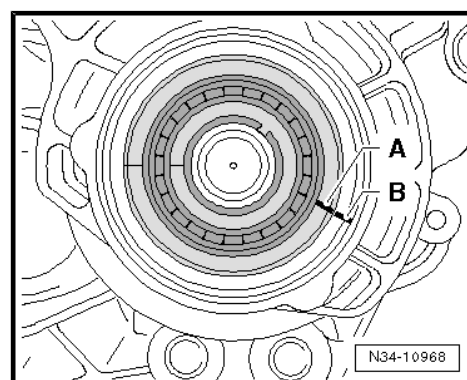
- Flattened sides -A- on grooved ball bearing and bearing mounting -B- in gearbox housing must be aligned.
- Mark flattened sides with paint.
- Transfer markings onto top area of grooved ball bearing and top area of bearing mounting on gearbox housing
⇒ [page 117](#) .
- Heat gearbox housing using e.g. hot air blower - V.A.G 1416- for about 10 minutes to 100 °C in vicinity of seat for grooved ball bearing of input shaft.



Note

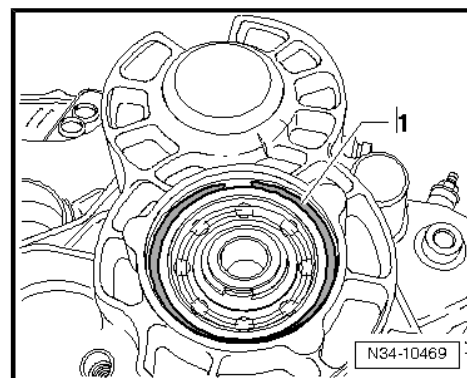
Heating is necessary to ensure that grooved ball bearing is not damaged when installing gearbox housing.

- Apply sealing paste - AMV 188 200 03- evenly to sealing surface of clutch housing.
- Align marking -A- on grooved ball bearing with marking -B- on gearbox housing and fit gearbox housing.
- Observe studs for reverse gear selector fork ⇒ [page 117](#) .
- Make sure the gearbox housing remains straight when fitting it in place; guide it parallel to the clutch housing.

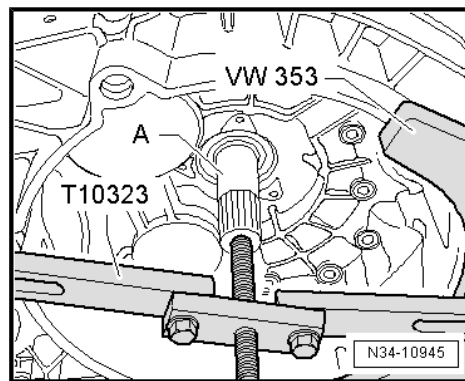


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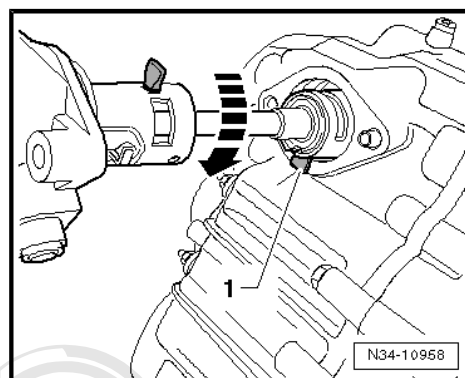
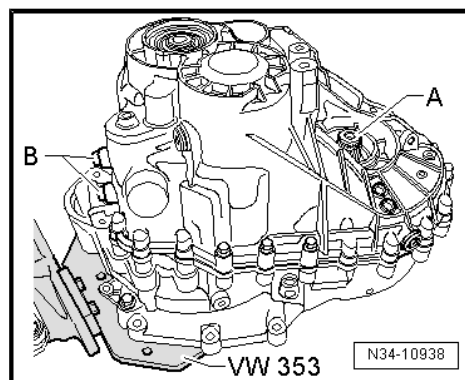
- Install circlip -1- for input shaft grooved ball bearing.



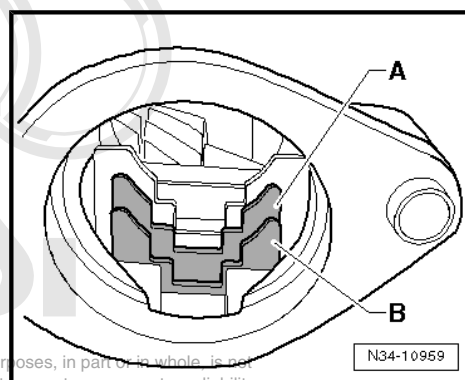
- Remove support bridge - T10323- for input shaft -A-.



- Bolt gearbox housing to clutch housing and tighten bolts to specified torque.
- Note different types of bolt and tightening torques
⇒ [Item 14 \(page 102\)](#) .
- Insert stub shaft (left-side) -A- together with spring, thrust washer and tapered ring.
- Gearbox for vehicles with front-wheel drive: Install stub shaft (right-side): ⇒ [“1.3 Renewing oil seal \(right-side\)”, page 180](#) .
- Turn gearbox in assembly stand so that opening for selector unit faces upwards.
- Bring selector rods into neutral.
- Guide selector unit with selector finger -1- between selector forks.

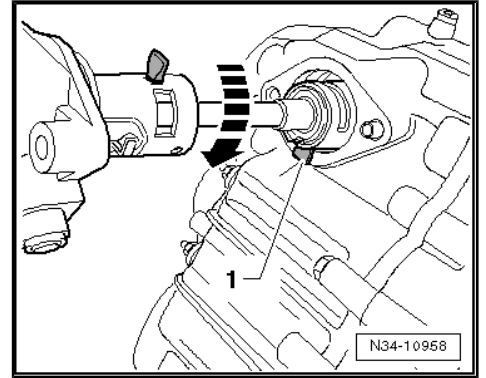


Gear selector forks -A- and -B-

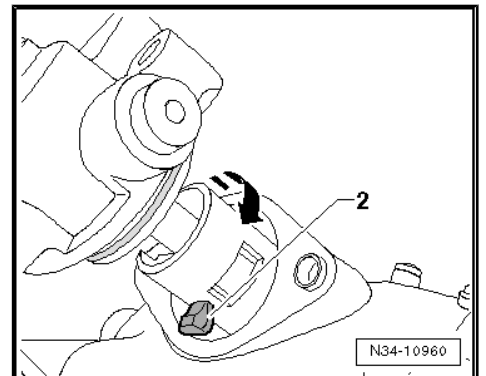


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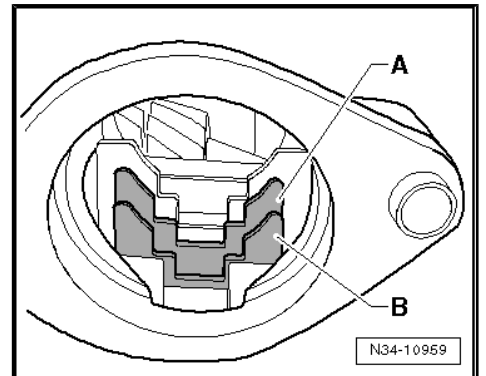
- Turn selector unit in direction of -arrow- until it can be inserted into gearbox housing.



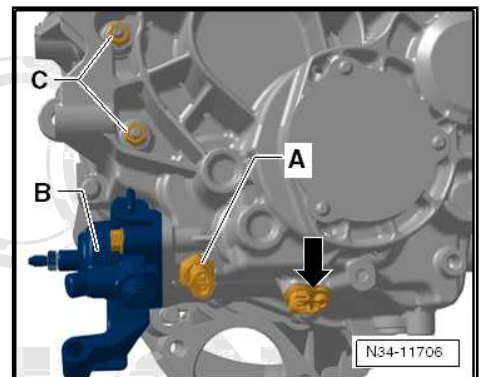
- Then turn selector unit in direction of -arrow- until selector finger -2- is in indicated position.



- Insert selector finger of selector unit into gear selector forks -A- and -B- and at the same time, insert it into gearbox housing as far as stop.
- Selector shaft should move up and down easily (gate selector movement).

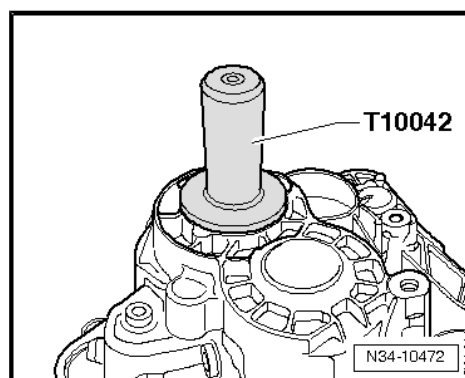
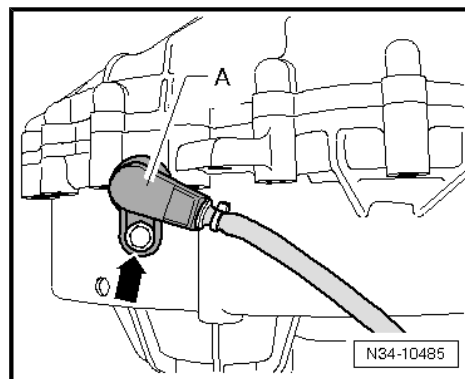


- Tighten selector unit -B-.
- Screw in reversing light switch - F4- -A-.
- Tighten nuts -C-.
- Install gearbox neutral position sender - G701- -arrow-.



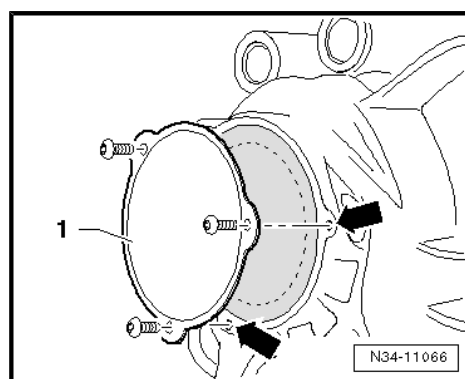
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- If fitted, install tachograph sender - G75- -A- -arrow-.
- Drive in new input shaft oil seal ⇒ [page 182](#) .
- Install clutch slave cylinder with release bearing ⇒ [page 33](#) .
- Gearbox for vehicles with four-wheel drive: Install stub shaft (right-side):
⇒ ["3.2.5 Renewing needle bearings \(polygon bearings\) for stub shaft \(right-side\)", page 208](#) .
- Select all gears.
- Drive sealing cap into gearbox housing as far as stop of thrust piece - T10042- .



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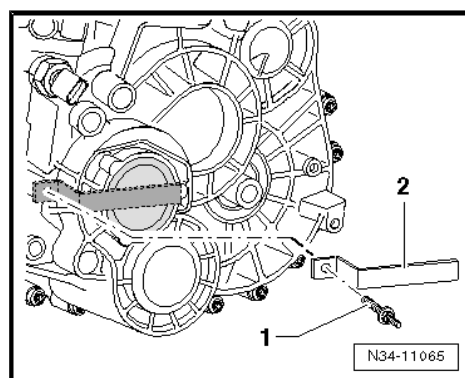
Sealing cap, version 1: Secure locking plate -1- with bolts in threaded holes -arrows-.



- Sealing cap, version 2: Attach retainer -2- with a centre hex stud -1-.
- Fitting location: The retainer must be positioned over centre of sealing cap.

Tightening torques

- ♦ ⇒ ["6.2 Exploded view - gearbox", page 102](#)

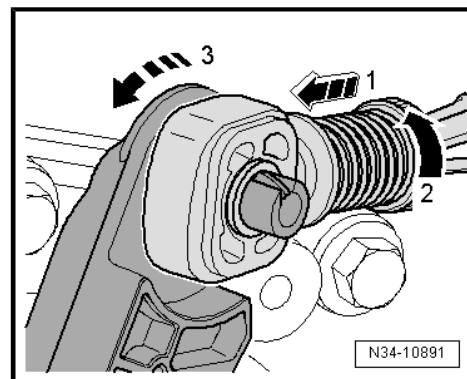


6.7 Removing and installing selector unit with gearbox installed

Removing

- Remove air cleaner housing ⇒ Rep. gr. 23 ; Air cleaner; Removing and installing air cleaner housing .

- Pull locking mechanism forwards -arrow 1- onto stop and then turn to left -arrow 2- to lock.
- Press gate relay lever forwards -arrow 3- and pull gate selector cable out of cable end-piece.

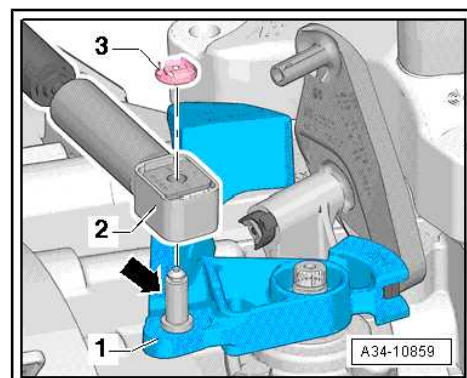


- Detach securing clip -3- for gear selector cable from gearbox selector lever -1- and pull selector cable -2- off pin -arrow-.



Note

- ◆ Do not detach cable end-piece from gate relay lever until gate relay lever has been removed ⇒ [page 59](#).
- ◆ If the gearbox support makes it impossible to remove the gate relay lever, remove the gate selector cable from the gate relay lever. Guide the slide block out of gearbox selector lever.

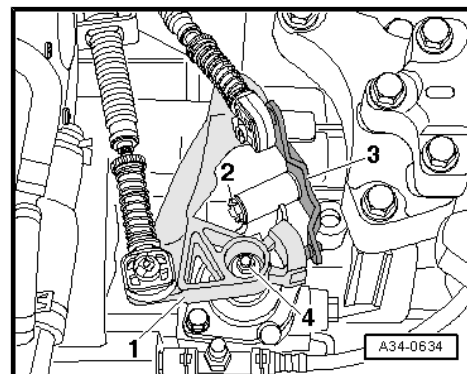


- Remove nut -4- and take out gearbox selector lever -1-.

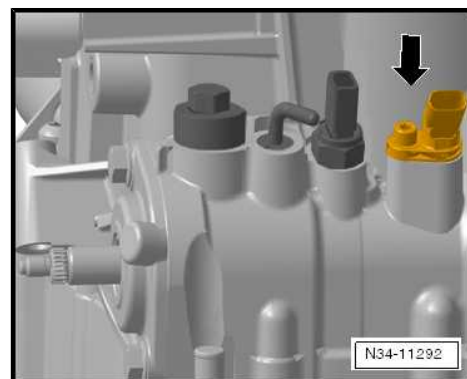


Note

-Items 2 and 3- can be disregarded.



- If fitted: Remove bolt -arrow- and detach gearbox neutral position sender - G701- .



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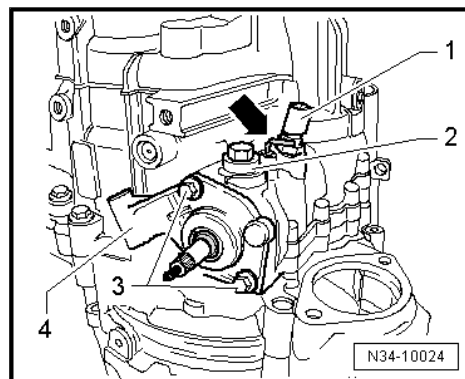
- Put selector shaft in neutral position.



Caution

Make sure that the selector shaft is not locked in position by the angled rod -arrow- when carrying out the following steps.

- Unscrew reversing light switch - F4- -item 1-.
- Remove locking bolt -2-.
- Remove bolts -3-.
- Pull selector shaft with selector mechanism cover -4- out of gearbox housing.



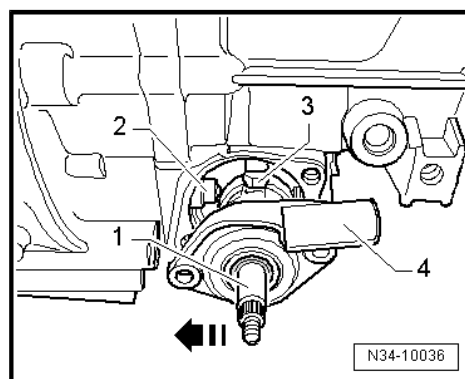
Installing

- Now push selector shaft -1- against stop sleeve -2- in direction of -arrow- and run selector finger -3- down through selector forks and onto stop.
- Selector mechanism cover -4- should be parallel to joint surface on gearbox housing.
- Selector shaft should move up and down easily (gate selector movement).



Note

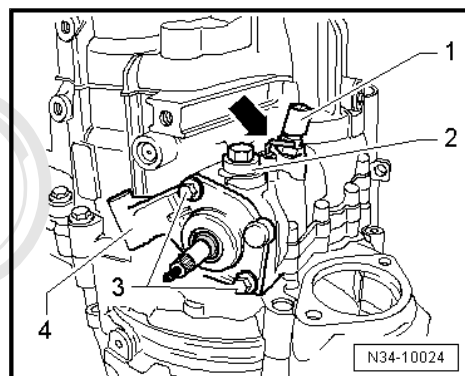
If the selector mechanism cover is not parallel with the joint surface, the selector shaft is not seated in its bottom mounting.



- Tighten bolts -3- for selector mechanism cover -4-.
- Screw in locking bolt -2-; angled rod -arrow- must be released.
- Install reversing light switch - F4- -item 1- and gearbox neutral position sender - G701- .

Remaining installation steps are carried out in reverse sequence; note the following:

- Attach gate relay lever ➔ [page 58](#) .
- Install gearbox selector lever ➔ [page 57](#) .
- Install air cleaner housing ➔ Rep. gr. 23 ; Air cleaner; Removing and installing air cleaner housing .



Tightening torques

- ♦ ➔ ["6.2 Exploded view - gearbox", page 102](#)

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7 Gearbox housing, clutch housing

⇒ ["7.1 Exploded view - gearbox housing", page 123](#)

⇒ ["7.2 Exploded view - clutch housing", page 125](#)

⇒ ["7.3 Servicing gearbox housing", page 127](#)

⇒ ["7.4 Servicing clutch housing", page 129](#)

7.1 Exploded view - gearbox housing



Note

If renewing tapered roller bearings, fit new shims of same thickness as those previously fitted.

1 - Gearbox housing

2 - Seal

- ☐ Renew after removal

3 - Oil filler plug

- ☐ 45 Nm

4 - Bolts

- ☐ Discontinued shortly after start of production
- ☐ Threaded hole for bolt is then closed
- ☐ 35 Nm

5 - Bearing bush

- ☐ For selector shaft
- ☐ Pulling out ⇒ [page 128](#)
- ☐ Driving in ⇒ [page 128](#)

6 - Bearing bushes

- ☐ For selector rod
- ☐ Pulling out ⇒ [page 129](#)
- ☐ Driving in ⇒ [page 129](#)

7 - Shim

☐ For output shaft for 3rd and 4th gear

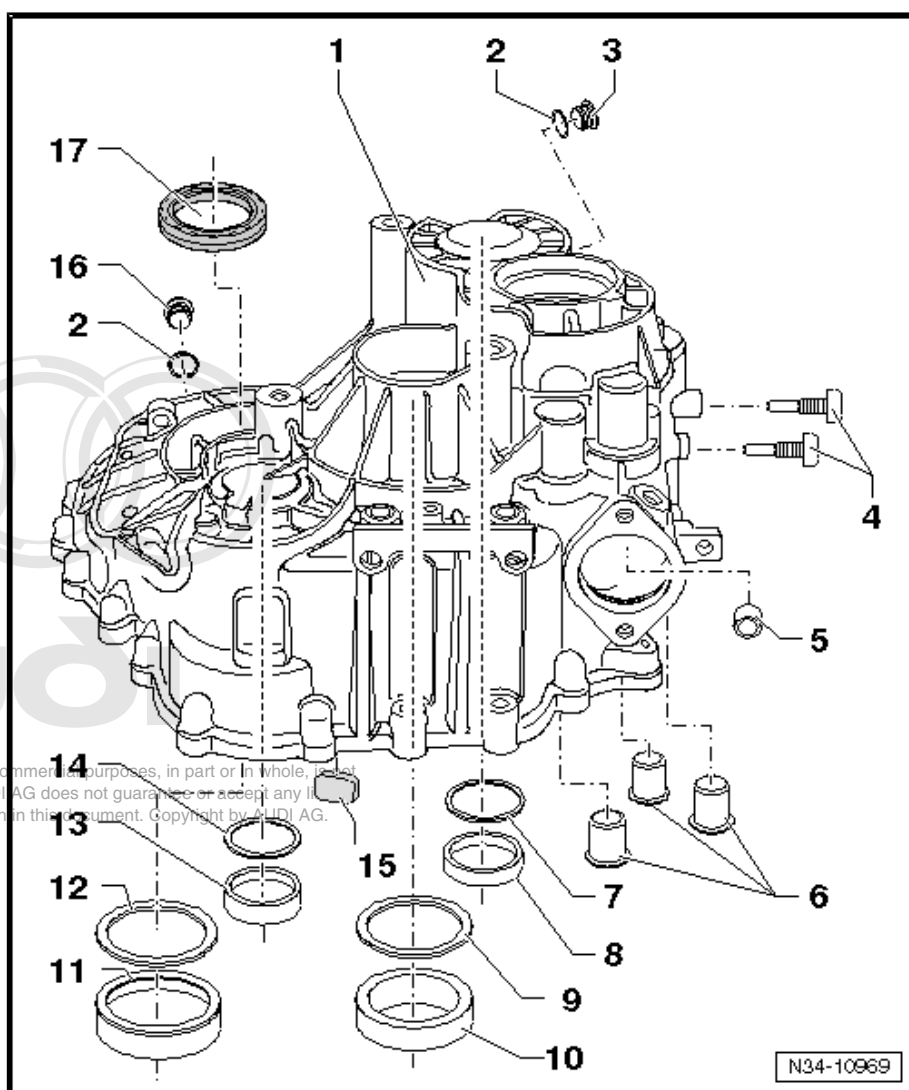
- ☐ Note thickness
- ☐ Will be damaged when removed; renew

8 - Tapered roller bearing outer race

- ☐ For output shaft for 3rd and 4th gear
- ☐ Removing and installing ⇒ [Item 22 \(page 146\)](#)
- ☐ When renewing, install with shim ⇒ [Item 7 \(page 123\)](#) of same thickness

9 - Shim

- ☐ For output shaft for 1st and 2nd gear
- ☐ Note thickness
- ☐ Will be damaged when removed; renew





10 - Tapered roller bearing outer race

- ☐ For output shaft for 1st and 2nd gear
- ☐ Removing and installing ⇒ [Item 25 \(page 145\)](#)
- ☐ When renewing, install with shim ⇒ [Item 9 \(page 123\)](#) of same thickness

11 - Tapered roller bearing outer race

- ☐ For differential
- ☐ Removing and installing ⇒ [Item 3 \(page 184\)](#)
- ☐ If renewed: adjust differential ⇒ [page 191](#)

12 - Shim

- ☐ For differential
- ☐ Adjusting differential ⇒ [page 191](#)

13 - Tapered roller bearing outer race

- ☐ For reverse gear output shaft
- ☐ Removing and installing ⇒ [Item 15 \(page 148\)](#)
- ☐ When renewing, install with shim of same thickness

14 - Shim

- ☐ For reverse gear output shaft
- ☐ Note thickness
- ☐ Will be damaged when removed; renew

15 - Magnet

- ☐ Glue into gearbox housing with sealing paste - AMV 188 200 03-

16 - Oil drain plug

- ☐ 45 Nm

17 - Seal

- ☐ Renewing ⇒ [page 196](#)



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7.2 Exploded view - clutch housing



If renewing tapered roller bearings, fit new shims of same thickness as those previously fitted.

1 - Tapered roller bearing outer race

- ☐ For output shaft for 1st and 2nd gear
- ☐ Removing and installing
⇒ [Item 4 \(page 143\)](#)
- ☐ When renewing, install with shim
⇒ [Item 2 \(page 125\)](#) of same thickness

2 - Shim

- ☐ For output shaft for 1st and 2nd gear
- ☐ Note thickness
- ☐ Will be damaged when removed; renew

3 - Oil deflector plate

- ☐ Installation position:
Shoulder on drilling faces towards output shaft

4 - Tapered roller bearing outer race

- ☐ For output shaft for 3rd and 4th gear
- ☐ Removing and installing
⇒ [Item 4 \(page 145\)](#)
- ☐ When renewing, install with shim
⇒ [Item 5 \(page 125\)](#) of same thickness

5 - Shim

- ☐ For output shaft for 3rd and 4th gear
- ☐ Note thickness
- ☐ Will be damaged when removed; renew

6 - Circlip

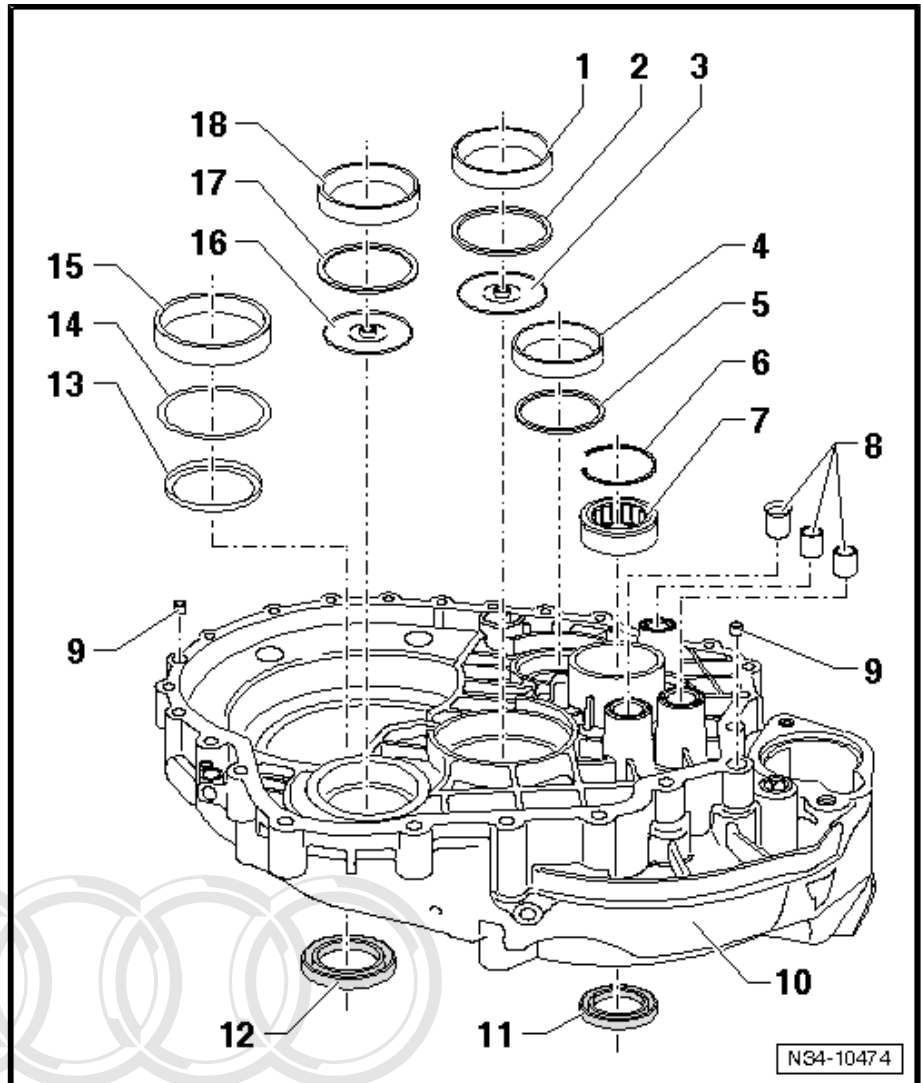
- ☐ Insert in annular groove in clutch housing

7 - Roller bearing

- ☐ For input shaft
- ☐ Removing and installing ⇒ [Item 2 \(page 135\)](#)

8 - Bearing bush

- ☐ For selector rod
- ☐ Pulling out ⇒ [page 130](#)
- ☐ Installing ⇒ [page 131](#)





9 - Dowel sleeve

- ☐ 2x

10 - Clutch housing

11 - Seal

- ☐ For input shaft
- ☐ Renewing ⇒ [page 182](#)
- ☐ When gearbox is dismantled, oil seal can be removed with oil seal extractor lever - VW 681-

12 - Oil seal (right-side)

- ☐ For stub shaft
- ☐ Renewing ⇒ [page 180](#)

13 - Oil deflector plate

- ☐ For differential
- ☐ Installation position: Shoulder on inside diameter faces towards oil seal ⇒ [Item 12 \(page 126\)](#)

14 - Shim

- ☐ For differential
- ☐ Adjusting differential ⇒ [page 191](#)

15 - Tapered roller bearing outer race

- ☐ For differential
- ☐ Removing and installing ⇒ [Item 7 \(page 184\)](#)
- ☐ When renewing, install with shim ⇒ [Item 14 \(page 126\)](#) of same thickness

16 - Oil deflector plate

- ☐ Installation position: Shoulder on drilling faces towards output shaft

17 - Shim

- ☐ For reverse gear output shaft
- ☐ Note thickness

18 - Tapered roller bearing outer race

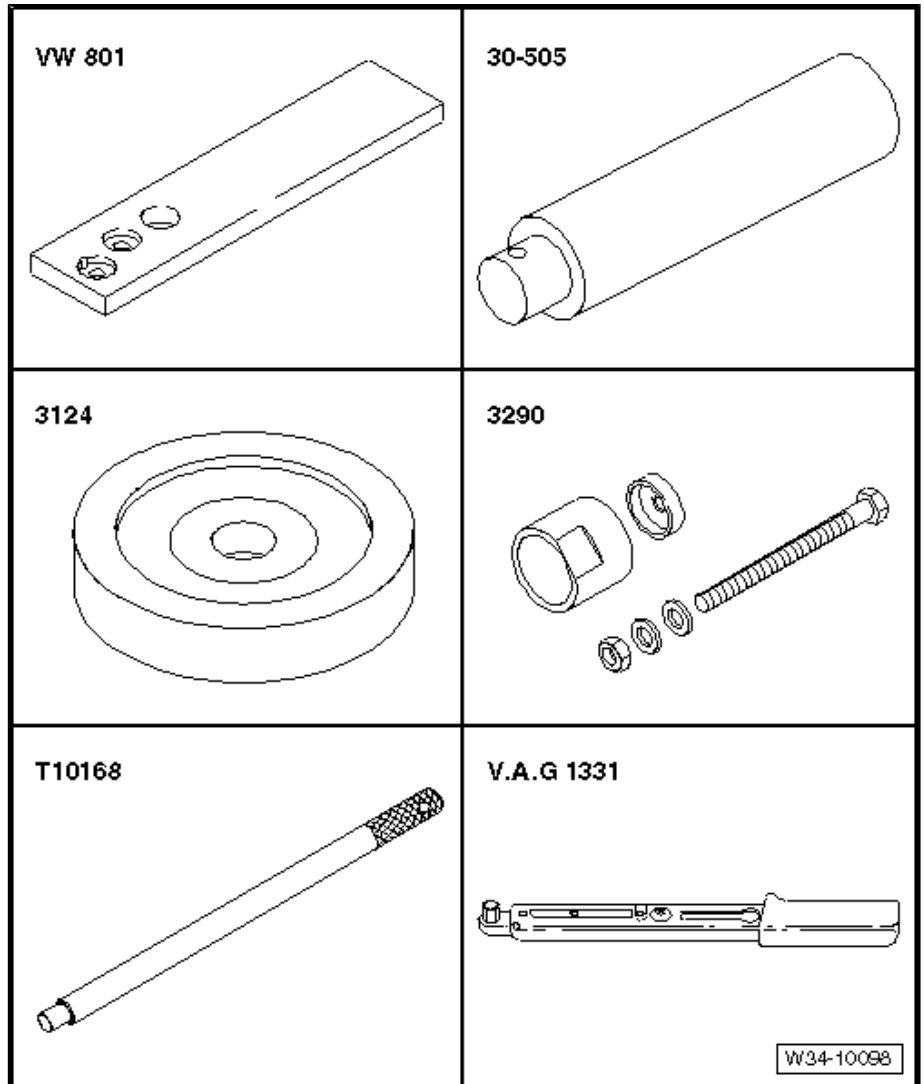
- ☐ For reverse gear output shaft
- ☐ Removing and installing ⇒ [Item 4 \(page 147\)](#)
- ☐ When renewing, install with shim ⇒ [Item 17 \(page 126\)](#) of same thickness

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7.3 Servicing gearbox housing

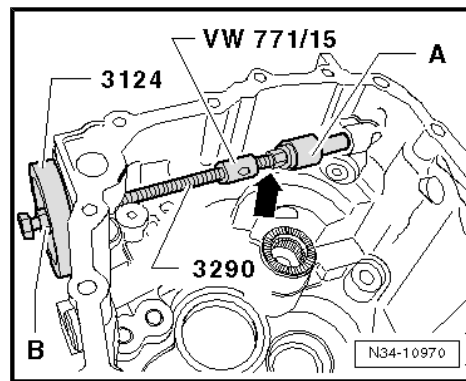
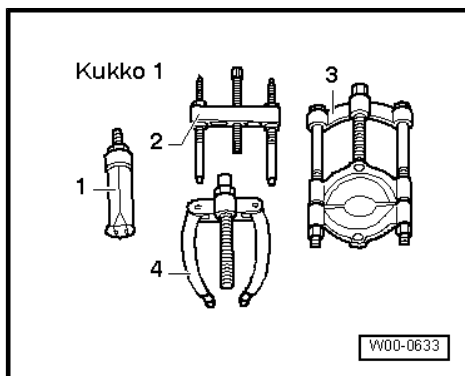
Special tools and workshop equipment required

- ◆ Support plate - VW 801-
- ◆ Mandrel - 30-505-
- ◆ Thrust piece - 3124-
- ◆ Assembly tool - 3290-
- ◆ Drift - T10168-
- ◆ Torque wrench - V.A.G 1331-



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- ◆ -1- Internal puller -
Kukko 21/3-



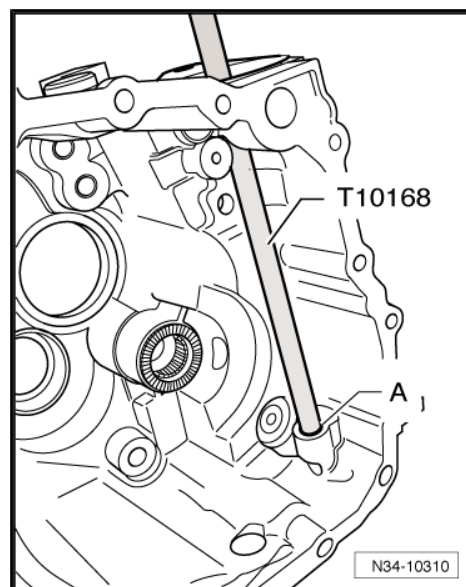
- ◆ Thread adapter of
counter-support -
Kukko 22/1-
- ◆ -4- Counter-support -
Kukko 22/2-
- ◆ Sealing paste - AMV
188 200 03-
- ◆ For other special
tools, please refer to
descriptions for serv-
icing input shaft(s).

Pulling out selector shaft bearing bush

- Use thread adapter
-arrow- from counter-
support -Kukko 22/1-
- Hold spindle of as-
sembly tool - 3290-
tight and turn nut -B-.

A - Internal puller
14.5...18.5 mm, e.g. -
Kukko 21/2-

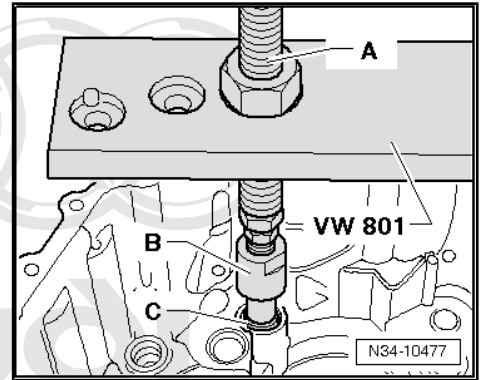
Driving in bearing bush -A- for selector shaft as far as tool stop



Pulling out selector rod bearing bush -C-

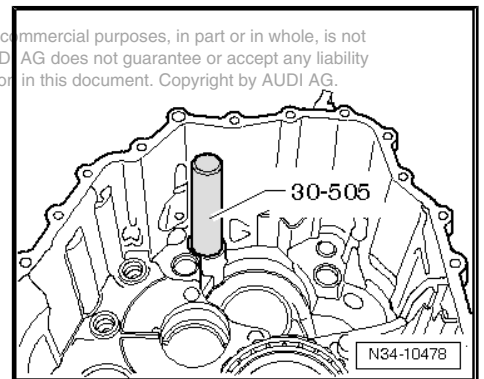
A - Counter-support, e.g. - Kukko 22/2-

B - Internal puller 18.5...23.5 mm, e.g. - Kukko 21/3-



Driving in selector rod bearing bush to stop

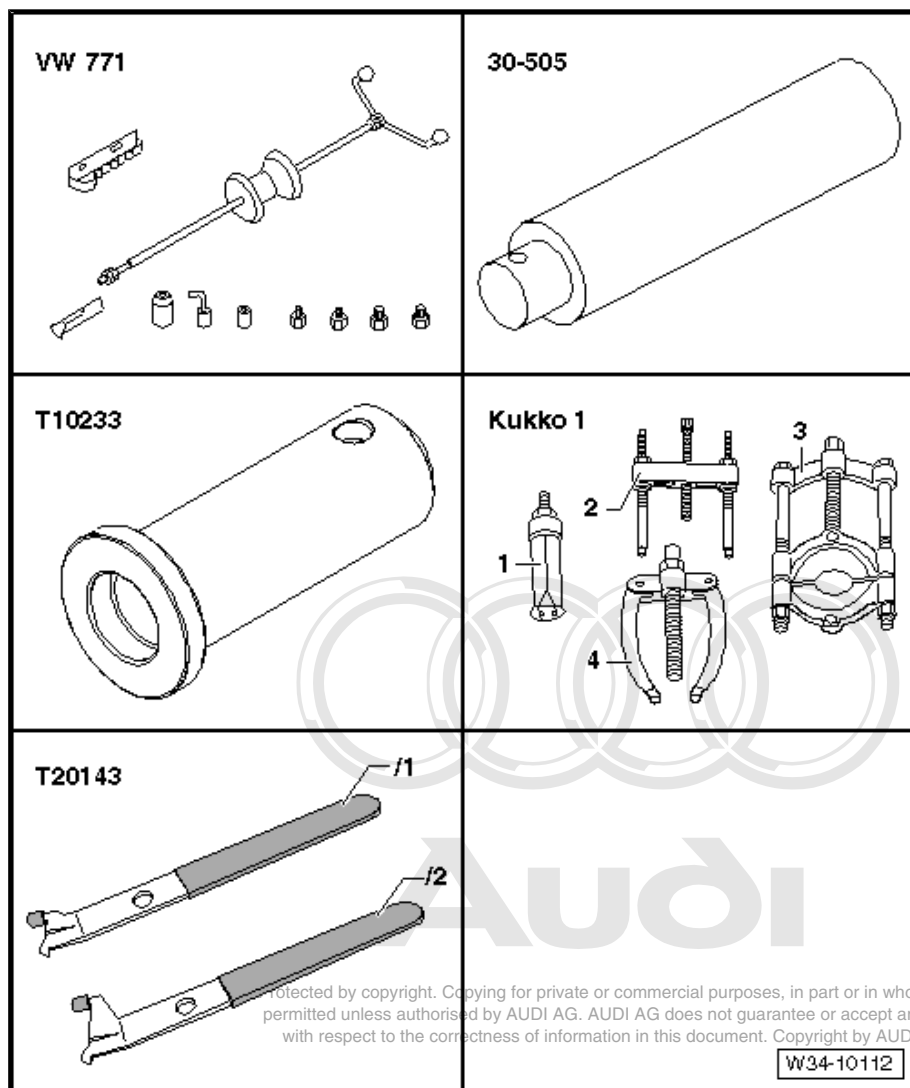
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7.4 Servicing clutch housing

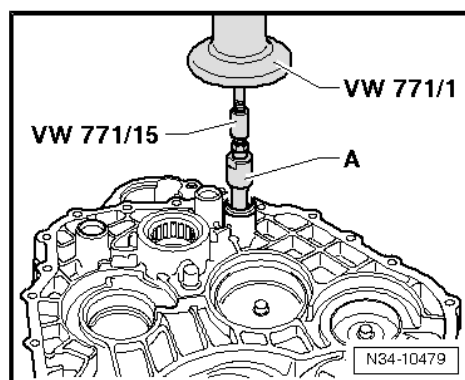
Special tools and workshop equipment required

- ◆ Multi-purpose tool - VW 771-
- ◆ Mandrel - 30-505-
- ◆ Thrust piece - T10233-
- ◆ Extractor tool - T20143/1-
- ◆ -1- Internal puller -Kukko 21/3-
- ◆ For other special tools, please refer to descriptions for repairing input shaft(s).

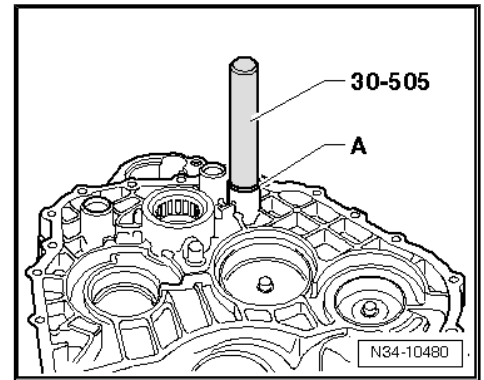


Pulling out bearing bush for selector rod

A - Internal puller 18.5...23.5 mm, e.g. - Kukko 21/3-



Driving in selector rod bearing bush -A- to stop

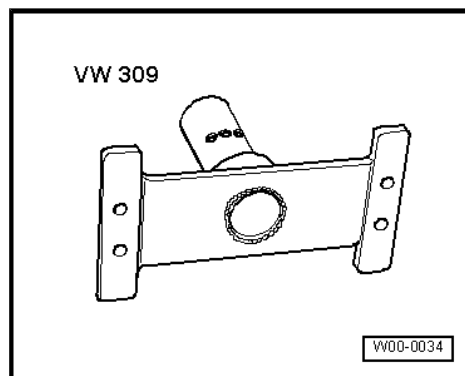


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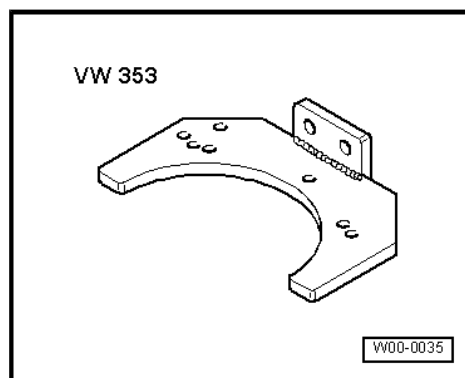
8 Securing to engine and gearbox support

Special tools and workshop equipment required

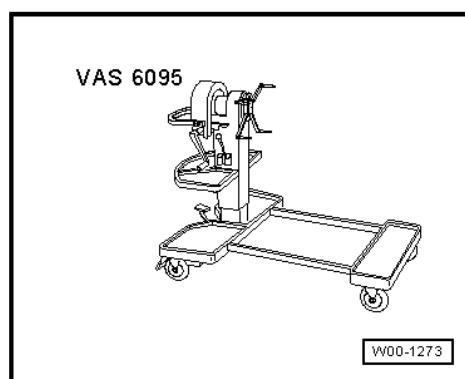
- ◆ Support plate - VW 309-



- ◆ Gearbox support - VW 353-

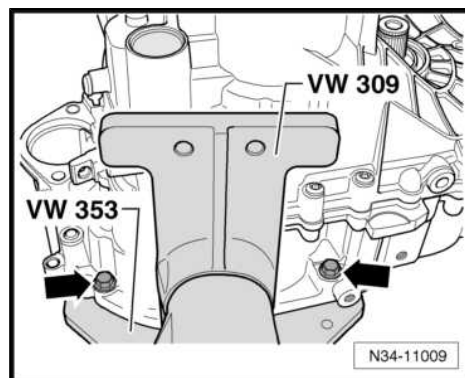


- ◆ Engine and gearbox support - VAS 6095-



Procedure

- Gearbox for vehicles with four-wheel drive: Detach bevel box from gearbox ⇒ [page 94](#) .
- Secure gearbox with gearbox support - VW 353- to support plate - VW 309- -arrows-.

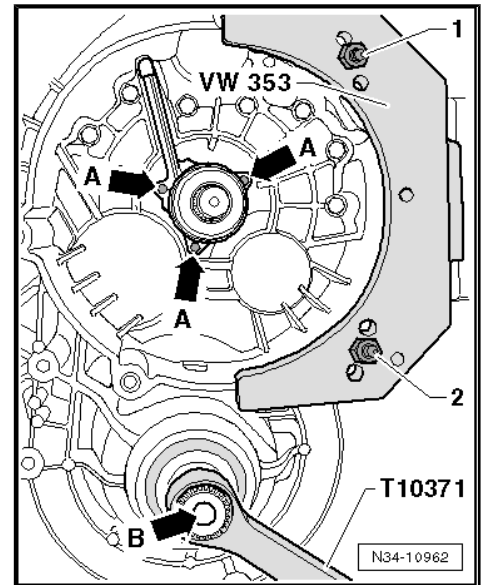


- Use holes -1- and -2- for this purpose.



-Arrows- can be disregarded.

- Insert support plate - VW 309- in engine and gearbox support
- VAS 6095- .



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9 Gear oil

⇒ ["9.1 Checking gear oil level", page 134](#)

9.1 Checking gear oil level

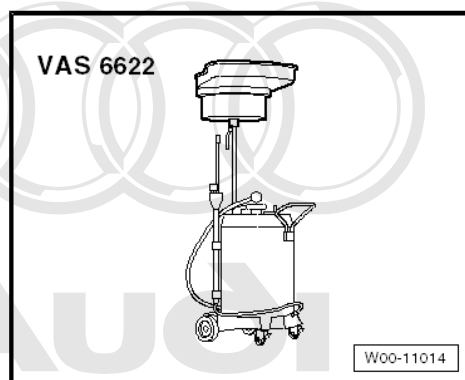


Note

- ◆ The manual gearbox 0A6 (four-wheel drive) and bevel box have separate oil fillings.
- ◆ Checking gear oil level in bevel box ⇒ [page 212](#)

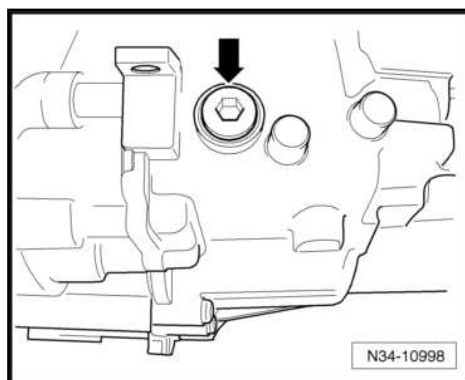
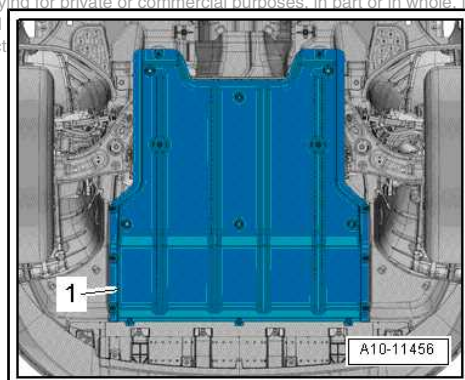
Special tools and workshop equipment required

- ◆ Used oil collection and extraction unit - VAS 6622-



Procedure

- Drive vehicle onto a four-pillar lifting platform or over an inspection pit so it is standing horizontal.
- Remove noise insulation -1- ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Place used oil collection and extraction unit - VAS 6622- below gearbox.
- Remove plug -arrow- for oil filler hole in manual gearbox.
- Specification: oil level up to bottom lip of filler hole
- Top up gear oil if necessary.
- For gear oil specification, refer to ⇒ Electronic parts catalogue .
- Screw in plug -arrow- with new seal, if fitted.
- Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .



Tightening torques

- ◆ ⇒ ["6.2 Exploded view - gearbox", page 102](#)

35 – Gears, shafts

1 Input shaft

⇒ [“1.1 Exploded view - input shaft”, page 135](#)

⇒ [“1.2 Dismantling and assembling input shaft”, page 137](#)

⇒ [“1.4 Renewing input shaft oil seal”, page 182](#)

1.1 Exploded view - input shaft



Note

- ◆ Lubricate all bearings on input shaft with gear oil before installing.
- ◆ Renew grooved ball bearings ⇒ [Item 18 \(page 136\)](#) after removal.

1 - Clutch housing

2 - Roller bearing

- ☐ Pulling out ⇒ [page 138](#)
- ☐ Pressing in
⇒ [page 139](#)
- ☐ Renew together with
roller bearing inner race
⇒ [Item 5 \(page 135\)](#)

3 - Circlip

- ☐ Insert in annular groove
in clutch housing

4 - Circlip

- ☐ Secures inner race for
roller bearing

5 - Inner race for roller bearing

- ☐ Pulling off ⇒ [page 139](#)
- ☐ Pressing on
⇒ [page 140](#)
- ☐ Renewing together with
roller bearing
⇒ [Item 2 \(page 135\)](#)

6 - 4th gear wheel

- ☐ Pressing off
⇒ [page 139](#)
- ☐ Pressing on
⇒ [page 140](#)

7 - Input shaft

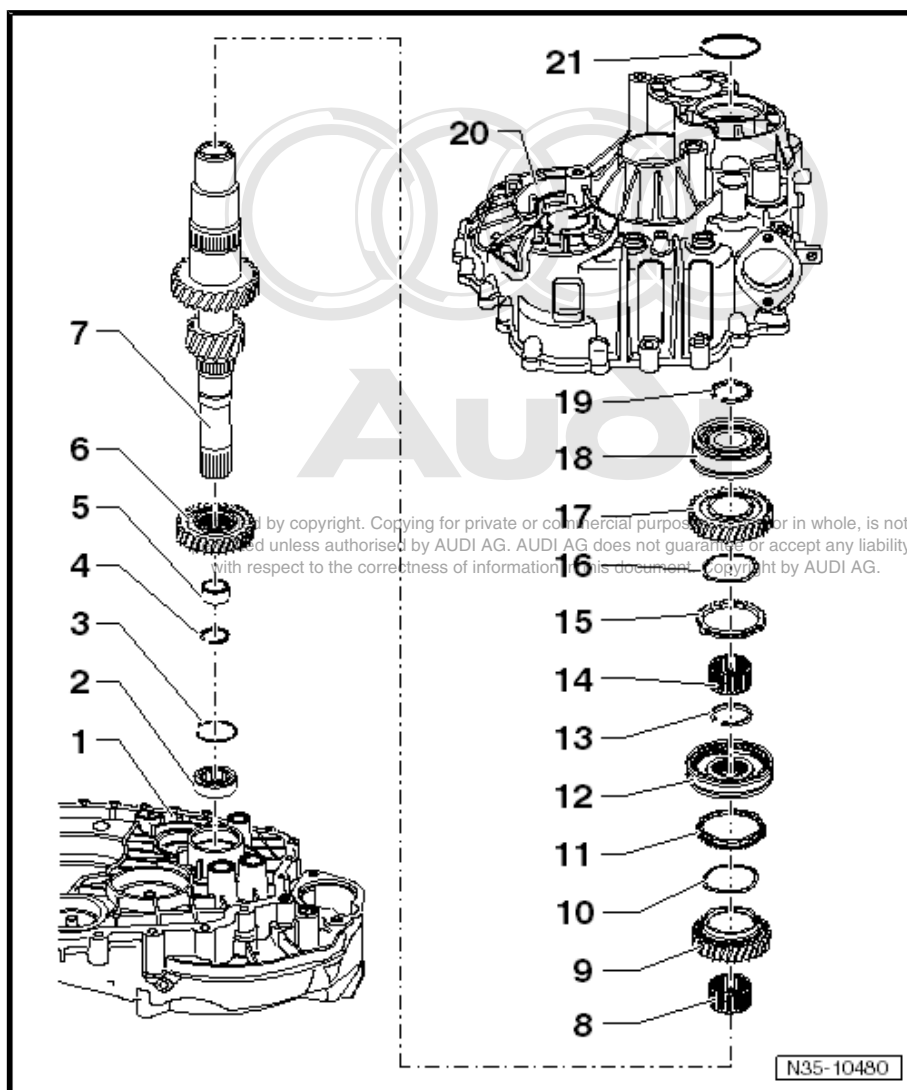
8 - Needle bearing

- ☐ For 5th gear

9 - 5th speed selector gear

10 - Corrugated spring washer

- ☐ In conjunction with brass synchro-ring
- ☐ For correct version, refer to ⇒ [Electronic parts catalogue](#)





11 - 5th gear synchro-ring

- ☐ Brass or steel
- ☐ Checking for wear ⇒ [page 141](#)

12 - Locking collar with synchro-hub for 5th and 6th gear

- ☐ After removing circlip, press off with 5th speed selector gear ⇒ [page 141](#) .
- ☐ Dismantling ⇒ [page 141](#)
- ☐ Assembling locking collar/synchro-hub ⇒ [page 142](#)
- ☐ Installation position ⇒ [page 142](#)
- ☐ Pressing on ⇒ [page 142](#)

13 - Circlip

14 - Needle bearing

- ☐ For 6th gear

15 - 6th gear synchro-ring

- ☐ Brass or steel
- ☐ Checking for wear ⇒ [page 141](#)

16 - Corrugated spring washer

- ☐ In conjunction with brass synchro-ring
- ☐ For correct version, refer to ⇒ Electronic parts catalogue

17 - 6th speed selector gear

18 - Grooved ball bearing

- ☐ Renew after removal
- ☐ After removing circlip, press off with 6th speed selector gear ⇒ [page 140](#) .
- ☐ Installation position ⇒ [page 142](#)
- ☐ Pressing on ⇒ [page 142](#)

19 - Circlip

20 - Gearbox housing

21 - Circlip

- ☐ For grooved ball bearing on input shaft

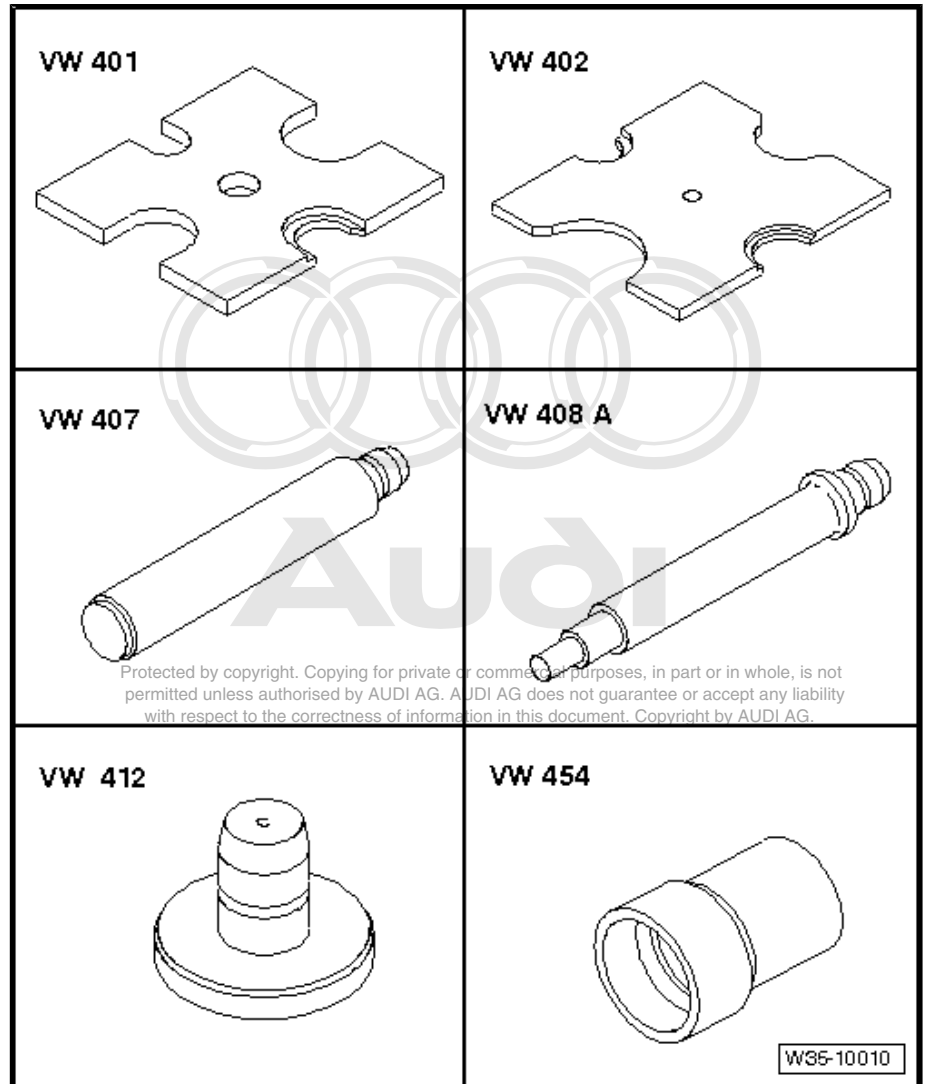


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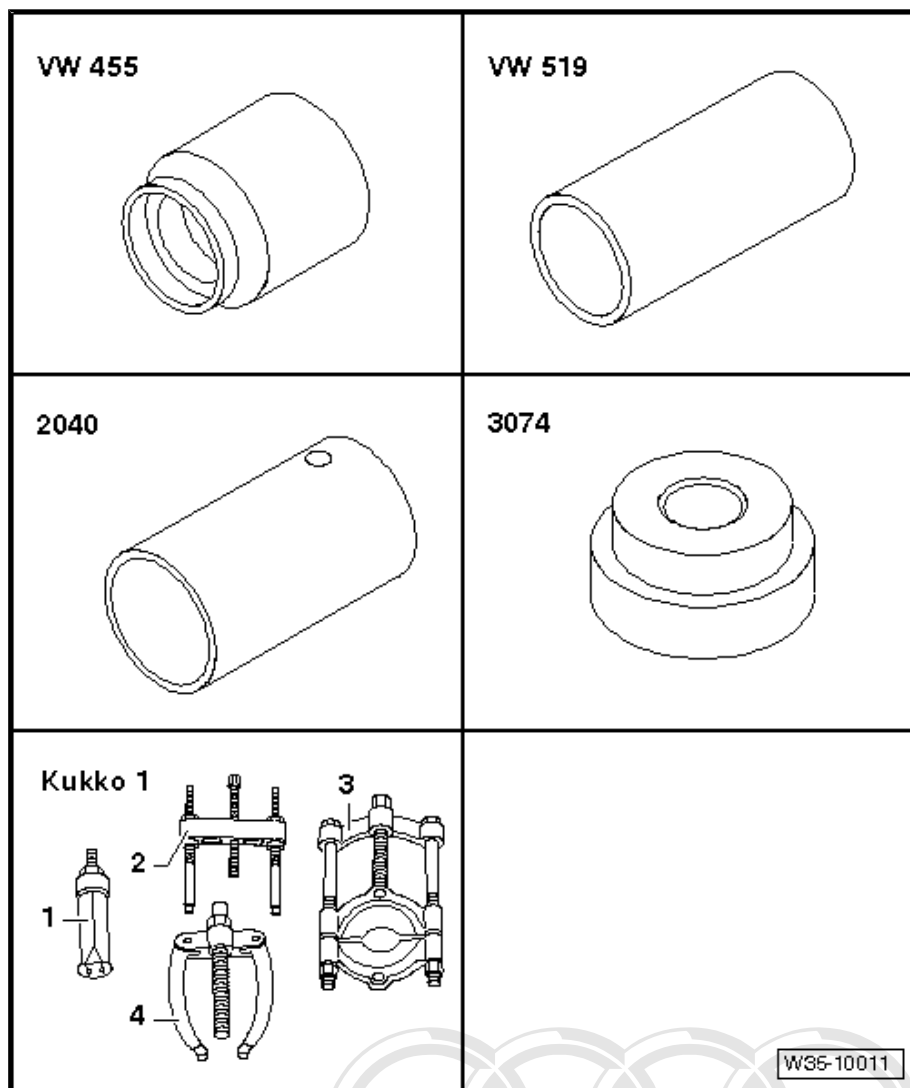
1.2 Dismantling and assembling input shaft

Special tools and workshop equipment required

- ◆ Thrust plate - VW 401-
- ◆ Thrust plate - VW 402-
- ◆ Press tool - VW 407-
- ◆ Press tool - VW 408 A-
- ◆ Press tool - VW 412-
- ◆ Press tool - VW 454-



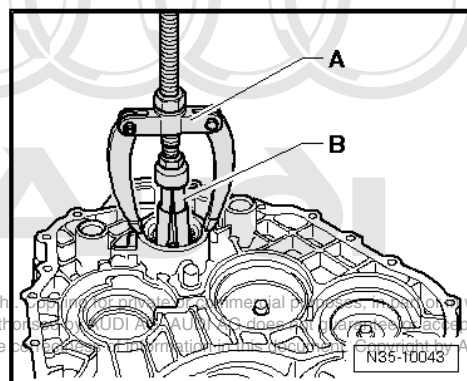
- ◆ Installing sleeve - VW 455-
- ◆ Tube - VW 519-
- ◆ Tube - 2040-
- ◆ Thrust plate - 3074-
- ◆ -1- Internal puller 37...46 mm, e.g. -Kukko 21/6-
- ◆ -2- Puller, e.g. -Kukko 18/1-
- ◆ -3- Splitter 22...75 mm, e.g. -Kukko 17/1- , and 22...115 mm, e.g. -Kukko 17/2-
- ◆ -4- Counter support, e.g. -Kukko 22/2-
- ◆ Feeler gauge



Removing circlip and pulling roller bearing out of clutch housing

A - Counter-support, e.g. -Kukko 22/2-

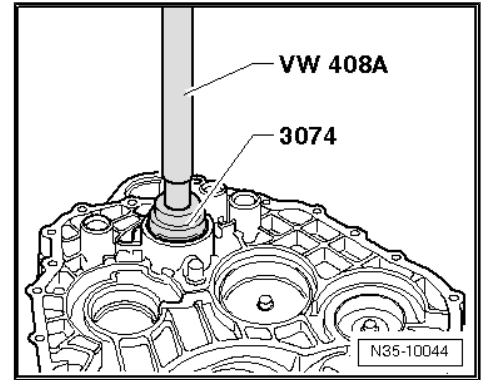
B - Internal puller 37...46 mm, e.g. -Kukko 21/6-



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Pressing roller bearing into clutch housing

- Install circlip for roller bearing.
- Remove circlip for roller bearing.



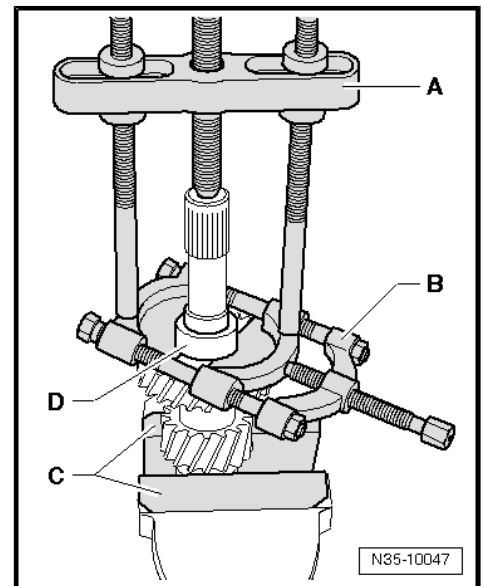
Pulling off roller bearing inner race -D-

- Clamp input shaft in vice with protective jaw covers -C-.
- A - Puller, e.g. -Kukko 18/1-
B - Splitter 12...75 mm, e.g. -Kukko 17/1-



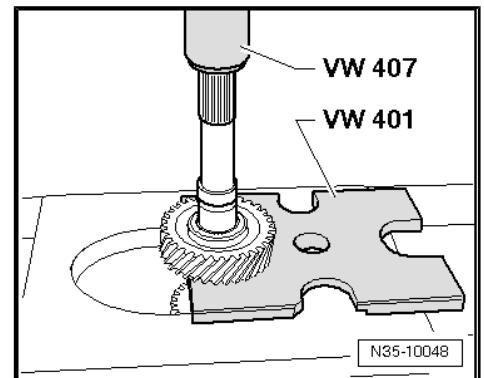
Note

Inner race for roller bearing can also be pressed off together with 4th gear wheel ➔ [page 139](#).

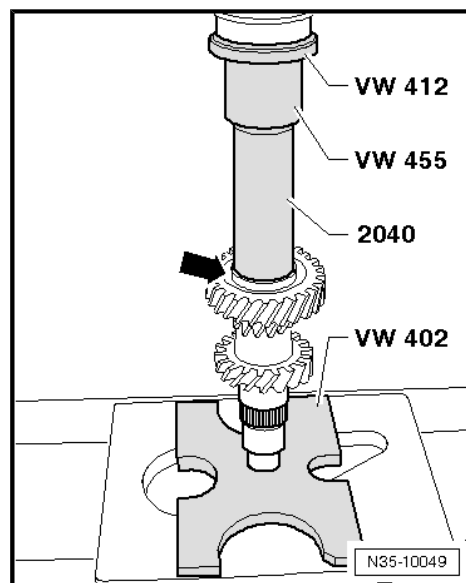


Pressing off 4th gear wheel

Installation position of 4th gear wheel: high collar -arrow- faces pressing tool.

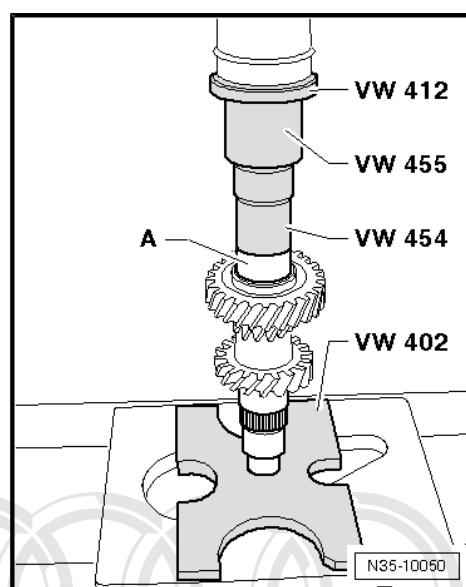


Pressing on 4th gear wheel



Pressing on roller bearing inner race -A-

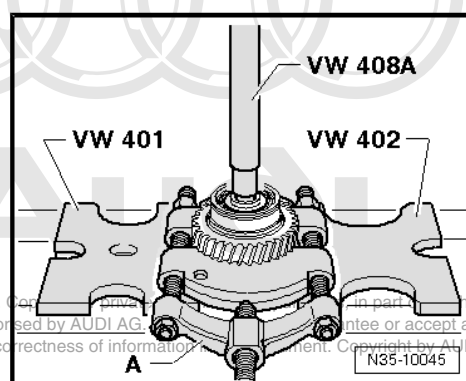
- Fit circlip.



Removing circlip and pressing off grooved ball bearing with 6th speed selector gear

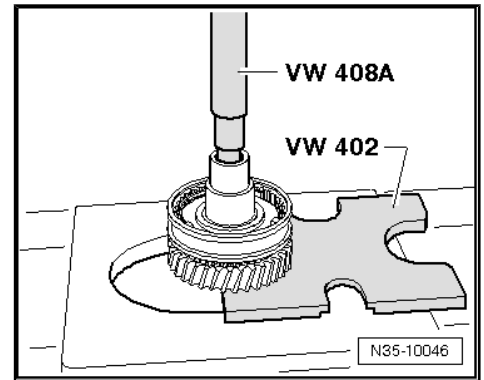
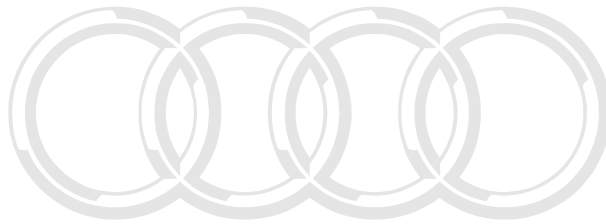
- A - Splitter 22...115 mm, e.g. -Kukko 17/2-

- Remove circlip.



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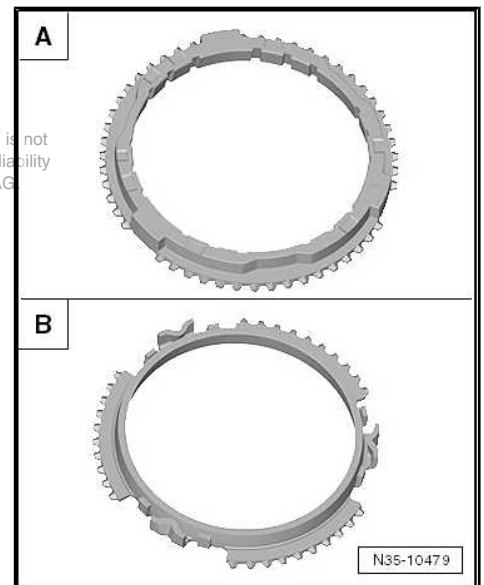
Pressing off 5th and 6th gear synchro-hub/locking collar with 5th speed selector gear



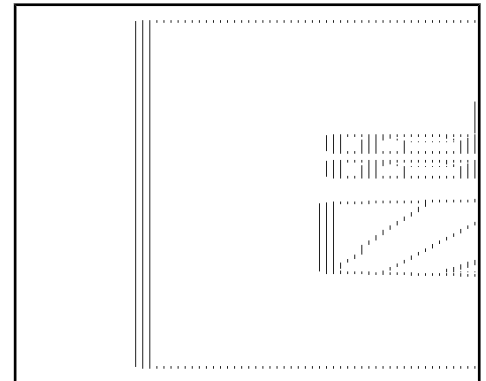
Checking 5th and 6th gear synchro-rings for wear

-A- = Brass synchro-ring		
Gap -a-	Installation depth	Wear limit
5th and 6th gear	1.0 ... 1.7 mm	0.5 mm

-B- = Steel synchro-ring		
Gap -a-	Installation depth	Wear limit
5th and 6th gear	1.3 ... 2.4 mm	0.8 mm

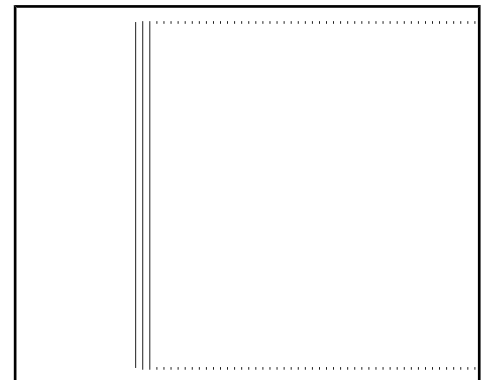


- Press synchro-ring onto cone of selector gear and measure gap dimension -a- with feeler gauge.



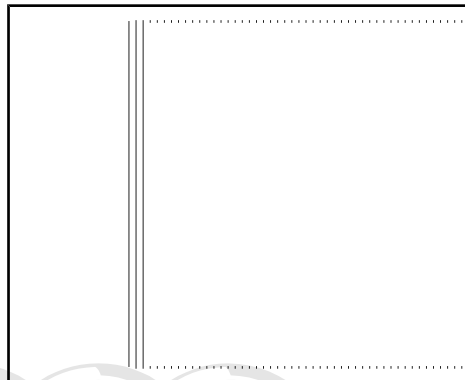
Dismantling and assembling 5th and 6th gear locking collar and synchro-hub

- 1 - Spring
 - 2 - Locking piece
 - 3 - Locking collar
 - 4 - Synchro-hub
- Slide locking collar over synchro-hub.
 - Recesses for locking pieces in synchro-hub and locking collar must align.



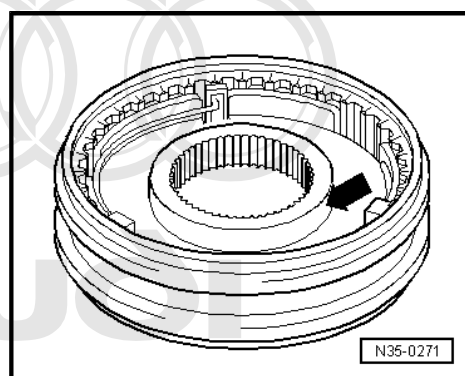
Assembling 5th and 6th gear locking collar/synchro-hub

- Locking collar is pushed over synchro-hub.
- Insert locking pieces and install springs offset at 120°. Angled end of spring must locate in hollow locking piece.



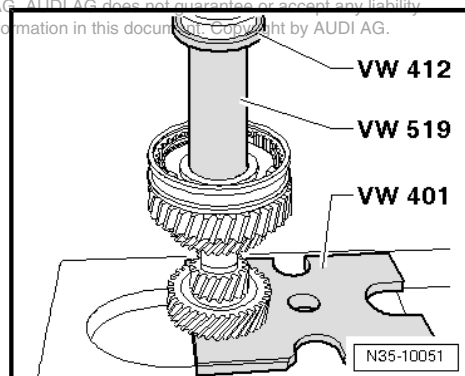
Installation position of 5th and 6th gear locking collar/synchro-hub

- High shoulder of synchro-hub -arrow- faces 5th gear.
- Fit needle bearing.
- Install 5th speed selector gear with corrugated spring washer and synchro-ring.

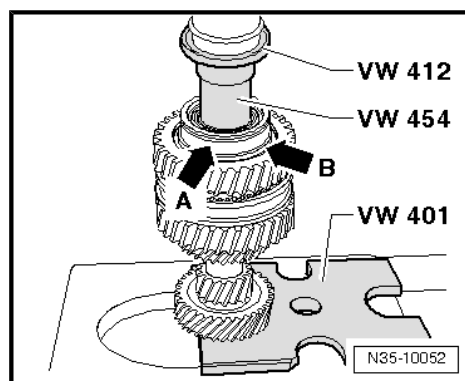


Pressing on 5th and 6th gear locking collar/synchro-hub

- Fit circlip.
- Fit needle bearing.
- Install 6th speed selector gear with corrugated spring washer and synchro-ring.
- Installation position of grooved ball bearing: groove for circlip faces upwards -arrow A- and shoulder -arrow B- must face 6th speed selector gear.



Pressing on grooved ball bearing



2 Output shaft

⇒ [“2.1 Exploded view - output shaft”, page 143](#)

⇒ [“2.2 Dismantling and assembling output shaft”, page 149](#)

2.1 Exploded view - output shaft

⇒ [“2.1.1 Exploded view - output shaft for 1st and 2nd gear”, page 143](#)

⇒ [“2.1.2 Exploded view - output shaft for 3rd and 4th gear”, page 145](#)

⇒ [“2.1.3 Exploded view - output shaft for reverse gear”, page 147](#)

2.1.1 Exploded view - output shaft for 1st and 2nd gear



Note

- ◆ The output shaft is not available as a spare part.
- ◆ If renewing tapered roller bearings, fit new shims of same thickness as those previously fitted.

1 - Clutch housing

2 - Oil deflector plate

3 - Shim

- ☐ Note thickness
- ☐ Will be damaged when removed; renew

4 - Tapered roller bearing outer race

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

5 - Tapered roller bearing inner race

- ☐ Pressing off ⇒ [page 157](#)
- ☐ Pressing on ⇒ [page 157](#)

6 - Dished washer

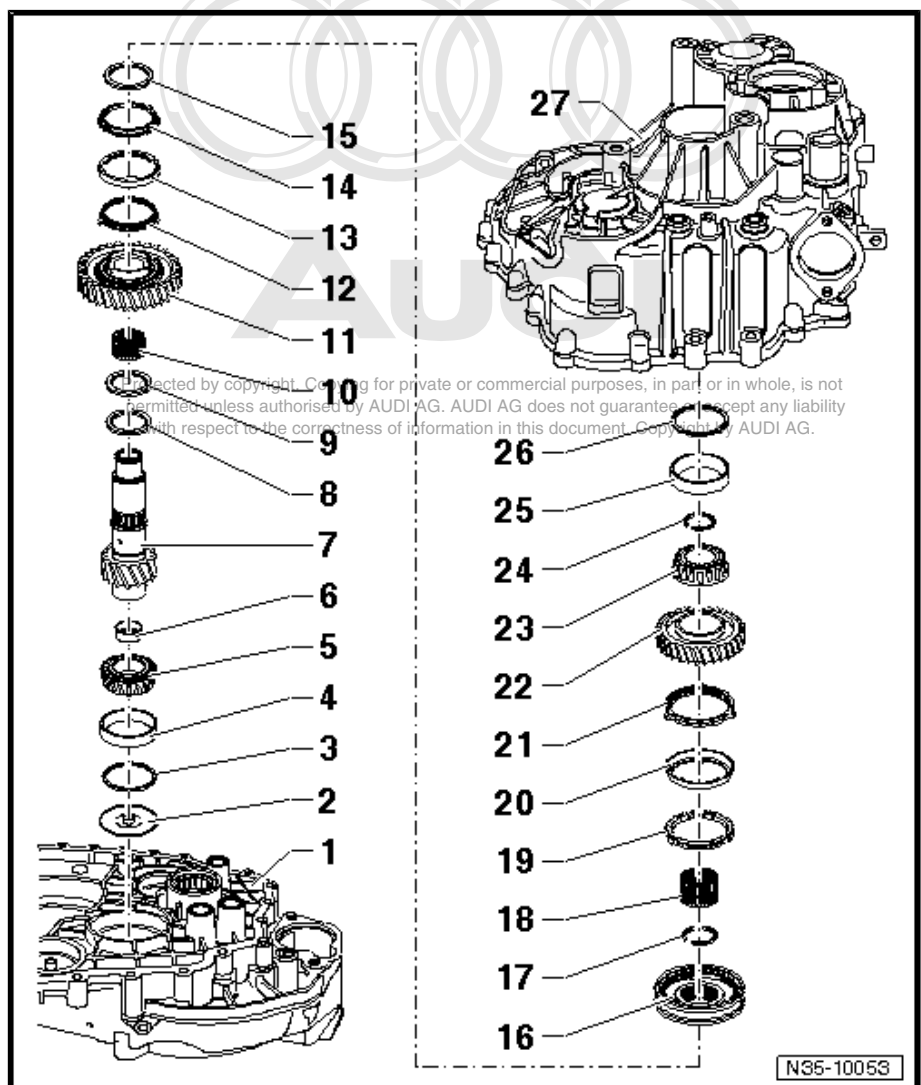
- ☐ Pulling out ⇒ [page 152](#)
- ☐ Pressing in ⇒ [page 152](#)

7 - Output shaft

- ☐ For 1st and 2nd gear

8 - Thrust washer

- ☐ For needle bearing
- ☐ Removing from output shaft ⇒ [page 153](#)
- ☐ Pressing on ⇒ [page 153](#)



9 - Axial needle bearing

- ☐ Installation position
⇒ [page 153](#)

10 - Needle bearing

- ☐ For 1st gear

11 - 1st speed selector gear

- ☐ With idler gear for reverse gear on opposite side

12 - Synchro-ring

- ☐ (Inner ring for 1st gear)
- ☐ Checking for wear ⇒ [page 154](#)
- ☐ Check lugs for scoring
- ☐ Installation position ⇒ [page 154](#)

13 - Outer ring for 1st gear

- ☐ Renew if scored or if there are visible traces of wear
- ☐ Installation position ⇒ [page 154](#)
- ☐ Place on synchro-ring ⇒ [Item 12 \(page 144\)](#)

14 - 1st gear synchro-ring

- ☐ Checking for wear ⇒ [page 154](#)
- ☐ Installation position ⇒ [page 154](#)

15 - Axial needle bearing

- ☐ Installation position ⇒ [page 153](#)

16 - Locking collar with synchro-hub for 1st and 2nd gear

- ☐ Press off together with 1st speed selector gear after removing circlip ⇒ [Item 17 \(page 144\)](#)
⇒ [page 153](#)
- ☐ Dismantling ⇒ [page 154](#)
- ☐ Assembling locking collar/synchro-hub ⇒ [page 154](#)
- ☐ Installation position ⇒ [page 155](#)
- ☐ Pressing on ⇒ [page 155](#)

17 - Circlip

18 - Needle bearing

- ☐ For 2nd gear

19 - 2nd gear synchro-ring

- ☐ Checking for wear ⇒ [page 154](#)
- ☐ Assemble so that the recesses engage on the locking pieces on the locking collar
⇒ [Item 16 \(page 144\)](#)

20 - Outer ring for 2nd gear

- ☐ Renew if scored or if there are visible traces of wear
- ☐ Installation position ⇒ [page 155](#)
- ☐ Insert in synchro-ring ⇒ [Item 19 \(page 144\)](#)

21 - Synchro-ring

- ☐ (Inner ring for 2nd gear)
- ☐ Check lugs for scoring
- ☐ Checking for wear ⇒ [page 154](#)
- ☐ Installation position ⇒ [page 156](#)

22 - 2nd speed selector gear

- ☐ Installation position ⇒ [page 156](#)

23 - Tapered roller bearing inner race

- ☐ Pull off together with 2nd speed selector gear ⇒ [page 152](#)

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- ☐ Pressing on ➔ [page 156](#)

24 - Circlip

25 - Tapered roller bearing outer race

- ☐ Pulling out ➔ [page 156](#)
- ☐ Pressing in ➔ [page 157](#)

26 - Shim

- ☐ Note thickness
- ☐ Will be damaged when removed; renew

27 - Gearbox housing

2.1.2 Exploded view - output shaft for 3rd and 4th gear



Note

- ◆ The output shaft is not available as a spare part.
- ◆ If renewing tapered roller bearings, fit new shims of same thickness as those previously fitted.

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1 - Clutch housing

2 - Shim

- ☐ Note thickness
- ☐ Will be damaged when removed; renew

3 - Tapered roller bearing outer race

- ☐ Pulling out ➔ [page 167](#)
- ☐ Pressing in ➔ [page 167](#)

4 - Tapered roller bearing inner race

- ☐ Pulling off ➔ [page 167](#)
- ☐ Pressing on ➔ [page 167](#)

5 - Output shaft

- ☐ For 3rd and 4th gear

6 - Needle bearing

- ☐ For 4th gear

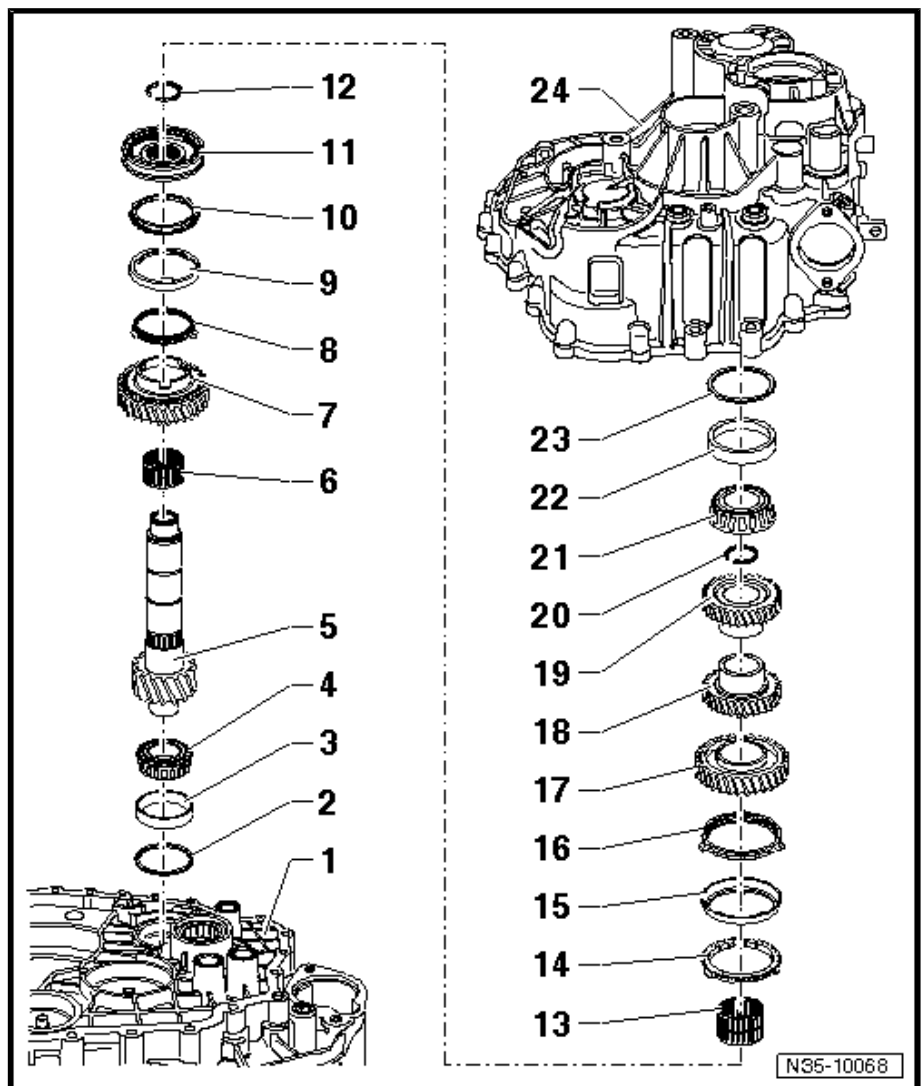
7 - 4th speed selector gear

8 - Synchro-ring

- ☐ (Inner ring for 4th gear)
- ☐ Checking for wear ➔ [page 163](#)
- ☐ Check lugs for scoring
- ☐ Installation position ➔ [page 163](#)

9 - Outer ring for 4th gear

- ☐ Renew if scored or if there are visible traces of wear



- ☐ Installation position ⇒ [page 163](#)
- ☐ Place on synchro-ring ⇒ [Item 8 \(page 145\)](#)

10 - 4th gear synchro-ring

- ☐ Checking for wear ⇒ [page 163](#)
- ☐ Installation position ⇒ [page 163](#)

11 - Locking collar with synchro-hub for 3rd and 4th gear

- ☐ Press off together with 4th speed selector gear after removing circlip ⇒ [Item 12 \(page 146\)](#) ⇒ [page 163](#)
- ☐ Dismantling and assembling ⇒ [page 164](#)
- ☐ Assembling locking collar/synchro-hub ⇒ [page 164](#)
- ☐ Installation position ⇒ [page 164](#)
- ☐ Pressing on ⇒ [page 164](#)

12 - Circlip

13 - Needle bearing

- ☐ For 3rd gear

14 - 3rd gear synchro-ring

- ☐ Checking for wear ⇒ [page 163](#)
- ☐ Assemble so that the recesses engage on the locking pieces on the locking collar ⇒ [Item 11 \(page 146\)](#)

15 - Outer ring for 3rd gear

- ☐ Renew if scored or if there are visible traces of wear
- ☐ Installation position ⇒ [page 165](#)
- ☐ Insert in synchro-ring ⇒ [Item 14 \(page 146\)](#)

16 - Synchro-ring

- ☐ (Inner ring for 3rd gear)
- ☐ Installation position ⇒ [page 165](#)
- ☐ Checking for wear ⇒ [page 163](#)
- ☐ Check lugs for scoring

17 - 3rd speed selector gear

- ☐ Installation position ⇒ [page 165](#)

18 - 5th gear wheel

- ☐ Press off with 3rd speed selector gear ⇒ [page 162](#)
- ☐ Pressing on ⇒ [page 165](#)

19 - 6th gear wheel

- ☐ Pressing off ⇒ [page 162](#)
- ☐ Pressing on ⇒ [page 166](#)

20 - Circlip

21 - Tapered roller bearing inner race

- ☐ Pulling off ⇒ [page 162](#)
- ☐ Pressing on ⇒ [page 166](#)

22 - Tapered roller bearing outer race

- ☐ Pulling out ⇒ [page 166](#)
- ☐ Pressing in ⇒ [page 166](#)

23 - Shim

- ☐ Note thickness
- ☐ Will be damaged when removed; renew

24 - Gearbox housing

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2.1.3 Exploded view - output shaft for reverse gear



Note

- ◆ The output shaft is not available as a spare part.
- ◆ If renewing tapered roller bearings, fit new shims of same thickness as those previously fitted.

1 - Clutch housing

2 - Oil deflector plate

3 - Shim

- ☐ Note thickness
- ☐ Will be damaged when removed; renew

4 - Tapered roller bearing outer race

- ☐ Pulling out ⇒ [page 173](#)
- ☐ Pressing in ⇒ [page 173](#)

5 - Tapered roller bearing inner race

- ☐ Pulling off ⇒ [page 173](#)
- ☐ Pressing on ⇒ [page 173](#)

6 - Dished washer

- ☐ Pulling out ⇒ [page 171](#)
- ☐ Pressing in ⇒ [page 172](#)

7 - Output shaft

- ☐ For reverse gear
- ☐ Bearing of reverse selector gear consists of sleeve bearing or roller bearing ⇒ [Item 8 \(page 147\)](#) and needle bearing ⇒ [Item 9 \(page 147\)](#)
- ☐ Identification ⇒ [page 148](#)

8 - Roller bearing

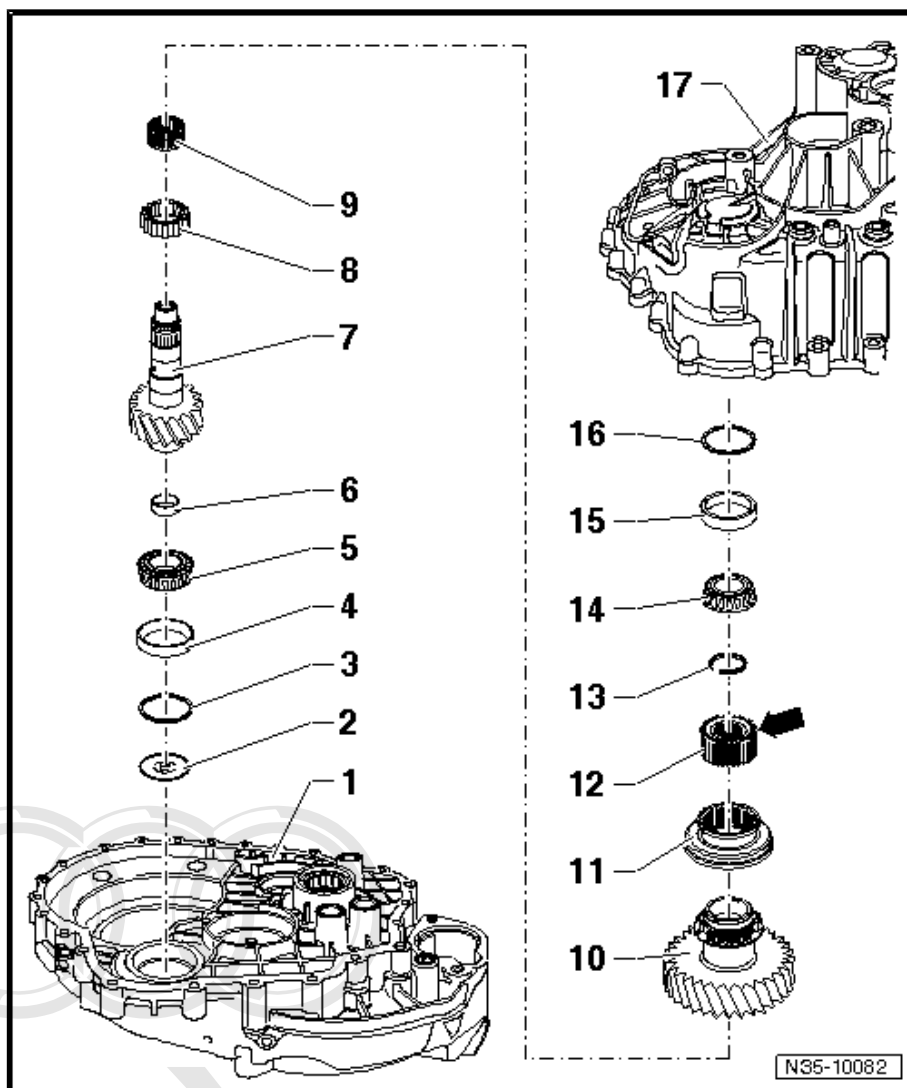
- ☐ For reverse selector gear
- ☐ Not used with all gearboxes, in which case reverse selector gear has sleeve bearing ⇒ [Item 10 \(page 147\)](#)

9 - Needle bearing

- ☐ For reverse selector gear
- ☐ Not used with all gearboxes, in which case reverse selector gear has sleeve bearing ⇒ [Item 10 \(page 147\)](#)

10 - Reverse selector gear

- ☐ Different internal diameter for sleeve bearing and bearing consisting of roller bearing ⇒ [Item 8 \(page 147\)](#) and needle bearing ⇒ [Item 9 \(page 147\)](#)
- ☐ Removing and installing check ring and spring ⇒ [page 174](#)



11 - Reverse gear locking collar

- ☐ With synchro-ring

12 - Reverse gear synchro-hub

- ☐ Press off together with reverse selector gear ⇒ [Item 13 \(page 148\)](#) after removing circlip ⇒ [page 172](#)
- ☐ Installation position: stop -arrow- for reverse gear locking collar faces circlip
- ☐ Pressing on ⇒ [page 172](#)

13 - Circlip

14 - Tapered roller bearing inner race

- ☐ Pressing off ⇒ [page 172](#)
- ☐ Pressing on ⇒ [page 174](#)

15 - Tapered roller bearing outer race

- ☐ Pulling out ⇒ [page 174](#)
- ☐ Pressing in ⇒ [page 174](#)

16 - Shim

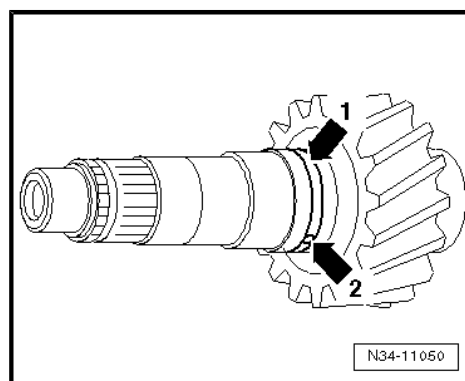
- ☐ Note thickness
- ☐ Will be damaged when removed; renew

17 - Gearbox housing

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Distinguishing bearing types for reverse selector gear

Bearing for reverse selector gear	
Sleeve bearing	Annular groove -arrow 1- in vicinity of hole -arrow 2-
Bearing consisting of roller bearing and needle bearing	No annular groove -arrow 1- in vicinity of hole -arrow 2-



2.2 Dismantling and assembling output shaft

⇒ [“2.2.1 Dismantling and assembling output shaft for 1st and 2nd gear”, page 149](#)

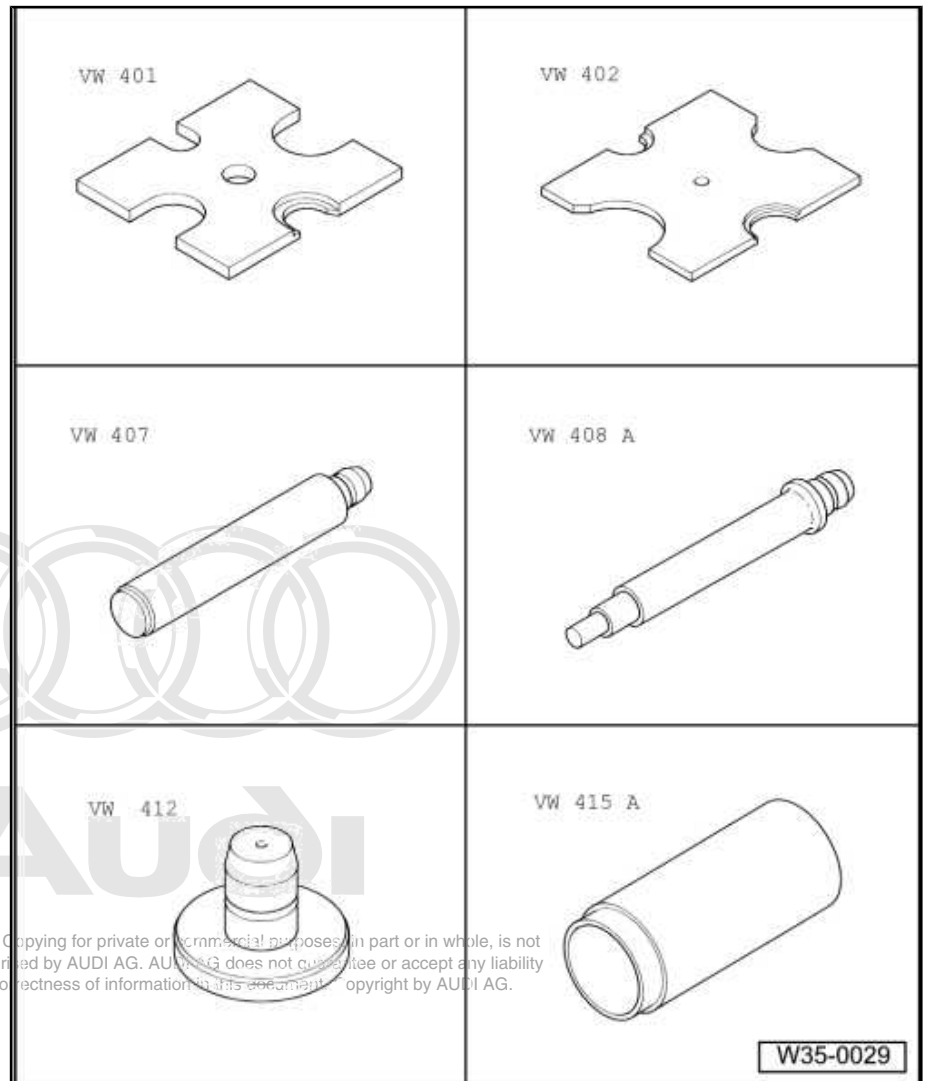
⇒ [“2.2.2 Dismantling and assembling output shaft for 3rd and 4th gear”, page 158](#)

⇒ [“2.2.3 Dismantling and assembling output shaft for reverse gear”, page 167](#)

2.2.1 Dismantling and assembling output shaft for 1st and 2nd gear

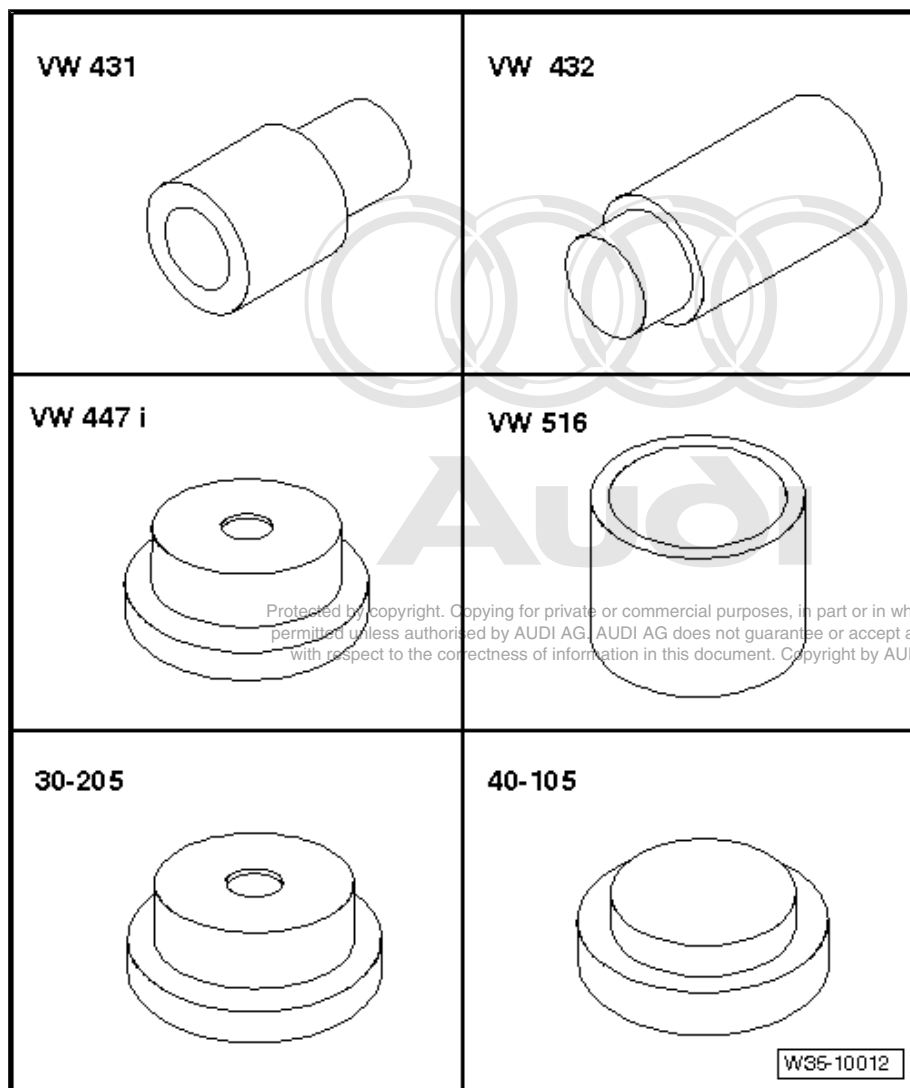
Special tools and workshop equipment required

- ◆ Thrust plate - VW 401-
- ◆ Thrust plate - VW 402-
- ◆ Press tool - VW 407-
- ◆ Press tool - VW 408 A-
- ◆ Press tool - VW 412-
- ◆ Tube - VW 415 A-

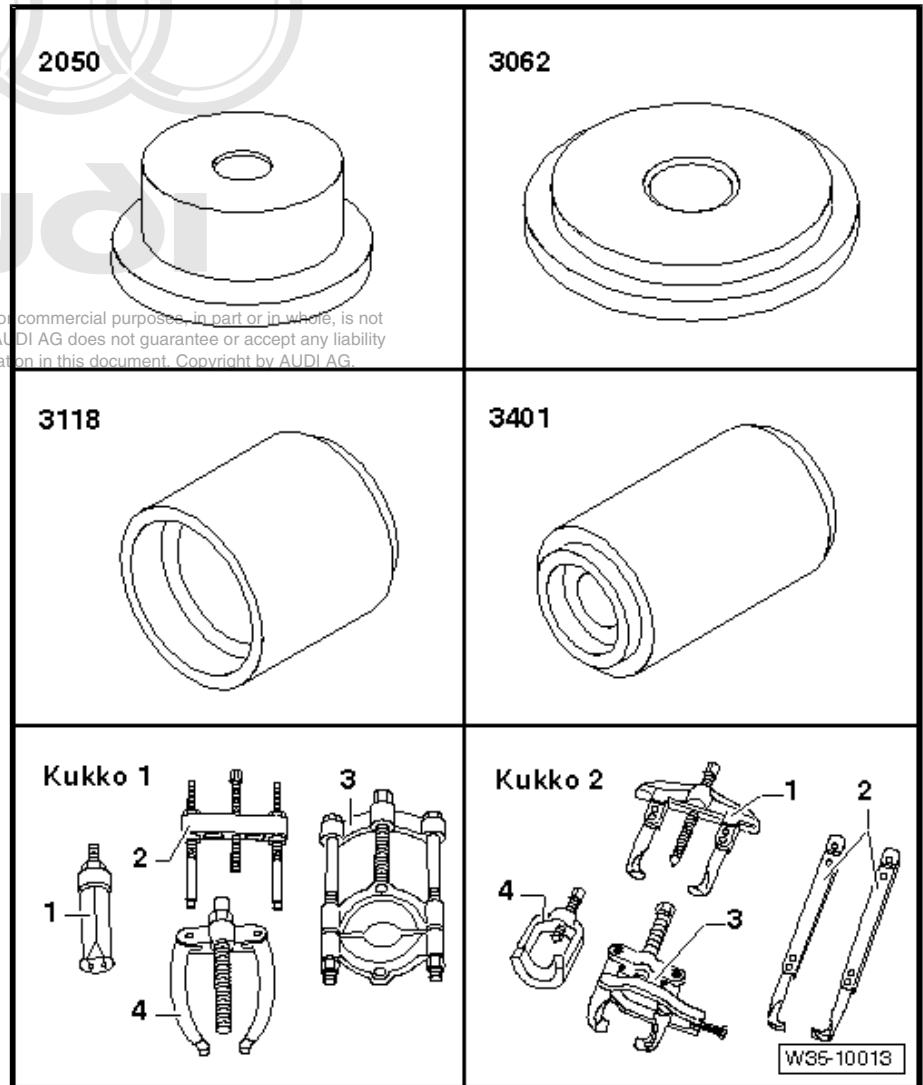


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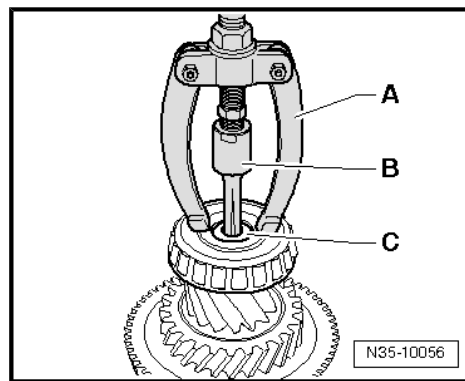
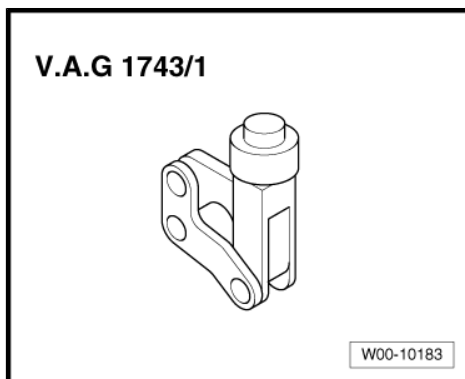
- ◆ Press tool - VW 431-
- ◆ Press tool - VW 432-
- ◆ Thrust plate - VW 447 i-
- ◆ Tube - VW 516-
- ◆ Thrust plate - 30 - 205-
- ◆ Thrust plate - 40 - 105-



- ◆ Thrust piece - 2050-
- ◆ Thrust pad - 3062-
- ◆ Press tool - 3118-
- ◆ Thrust piece - 3401-
- ◆ -1- Internal puller
14.5...18.5 mm, e.g. -Kukko
21/2- , 46...58 mm, e.g. -
Kukko 21/7- and 56...110,
e.g. -Kukko 21/89-
- ◆ -3- Splitter 22...115 mm,
e.g. -Kukko 17/2-
- ◆ -4- Counter support, e.g. -
Kukko 22/1- , -Kukko 22/2-
and -Kukko 22/4-
- ◆ -1- Two arm puller, e. g. -
Kukko 20/10-
- ◆ Feeler gauge



- ◆ Thrust piece - T10266-



Pulling dished washer -C- out of output shaft

A - Counter-support ,
e.g. -Kukko 22/1-

B - Internal puller
14.5...18.5 mm, e.g. -
Kukko 21/2-



Note

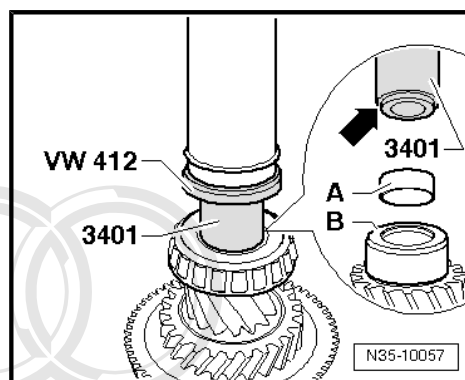
*If the internal puller slips
out of the hole in the
dished washer, use the
next larger size of inter-
nal puller.*

Pressing dished washer -A- into output shaft -B- as far as stop of tool

- Apply thrust piece - 3401- to dished washer -A- with collar -arrow- on dished washer.

The dished washer will then be pressed in to a depth of approx. 2.20 mm.

- Remove circlip.

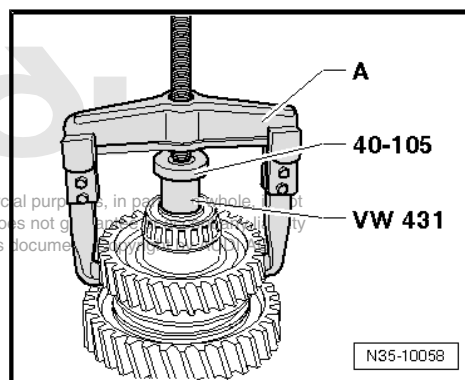


Pulling off tapered roller bearing inner race with 2nd speed selector gear

- Shift locking collar for 1st and 2nd gear to 1st gear.
- Apply puller hooks behind constant mesh teeth of 2nd speed selector gear (not dog teeth).

A - Two-arm puller, e.g. -Kukko 20/10-

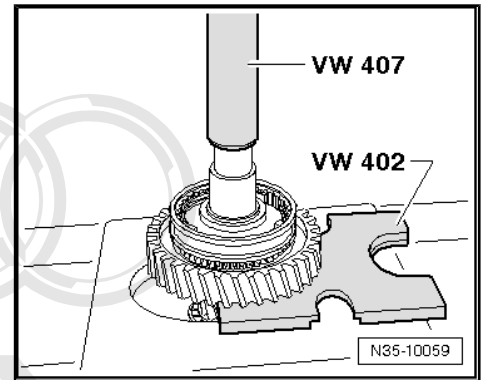
- Remove circlip.



Pressing off 1st and 2nd gear synchro-hub and locking collar with 1st speed selector gear

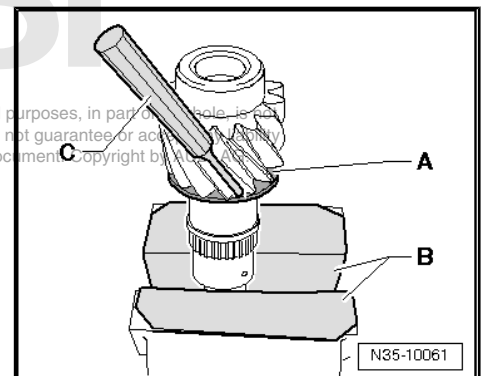


Depending on the fit between the synchro-hub and the output shaft, these parts can be removed by hand in some gearboxes.

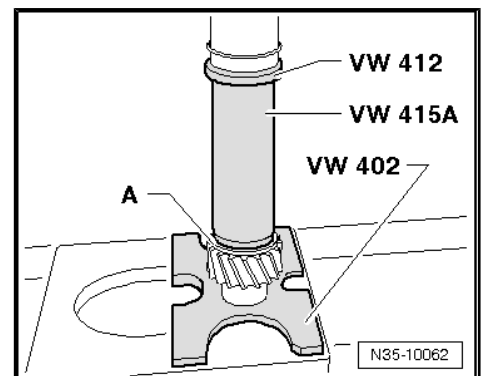


Driving off thrust washer -A- for axial needle bearing

- Clamp output shaft in vice with protective jaw covers -B-.
- Applying a drift -C- on alternate sides, drive thrust washer off output shaft. Take care not to damage gear teeth.

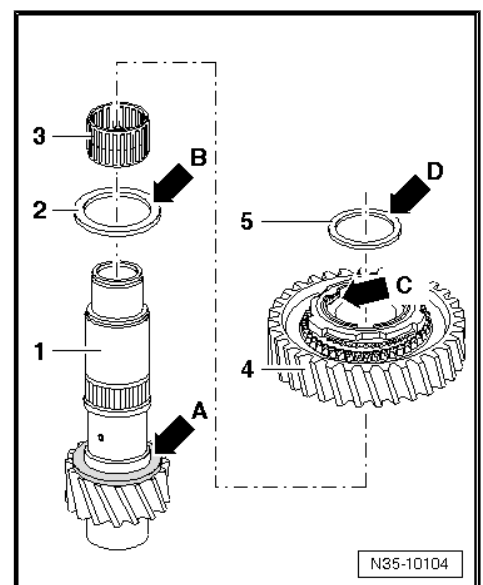


Pressing on thrust washer -A- for axial needle bearing



Installation position of axial needle bearings

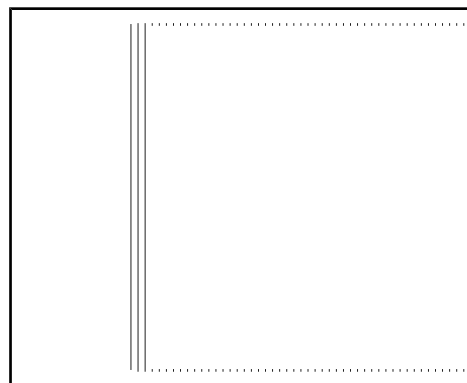
- Fit »larger« axial needle bearing -2- on thrust washer of output shaft -1-.
- The needles must face the thrust washer -arrow A- and the smooth side -arrow B- faces upwards.
- Fit needle bearing -3- and 1st speed selector gear -4-.
- Fit »smaller« axial needle bearing -5- on 1st speed selector gear.
- The needles must face the selector gear -arrow C- and the smooth side -arrow D- faces upwards.



Checking 1st and 2nd gear inner ring for wear

- Press inner ring onto cone on selector gear and measure gap -a- using a feeler gauge.

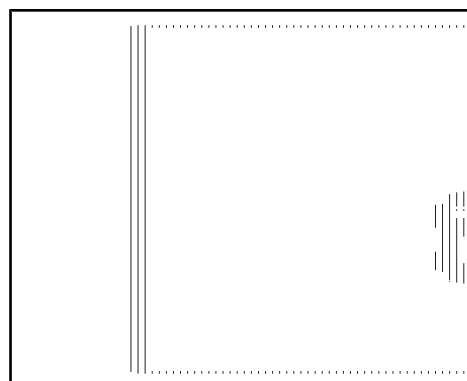
Gap -a-	Installation depth	Wear limit
1st and 2nd gear	0.75 ... 1.25 mm	0.3 mm



Checking 1st and 2nd gear synchro-rings for wear

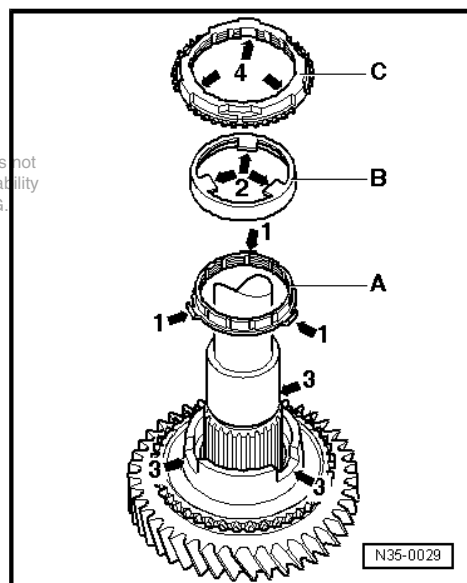
- Press synchro-ring, outer ring and inner ring onto cone on selector gear and measure gap -a- using a feeler gauge.

Gap -a-	Installation depth	Wear limit
1st and 2nd gear	1.0 ... 1.8 mm	0.5 mm



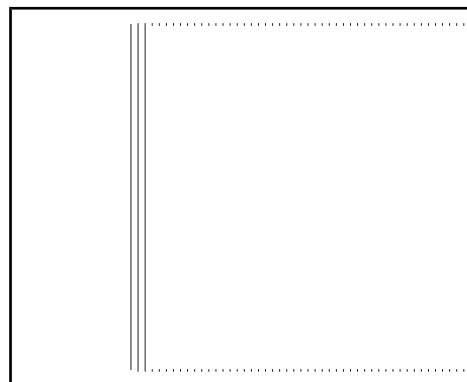
Installation position of outer ring, inner ring and synchro-ring of 1st gear

- Place inner ring -A- on 1st speed selector gear.
- The angled lugs -arrows 1- point towards outer ring -B-.
- Fit outer ring -B-.
- Lugs -arrows 2- engage in slots -arrows 3- on selector gear.
- Fit synchro-ring -C-.
- Slots -arrows 4- engage on lugs -arrows 1- on inner ring -A-.
- Fit smaller axial needle bearing (outer diameter 58.7 mm) -5- on 1st speed selector gear ➔ [page 153](#).



Dismantling and assembling 1st and 2nd gear locking collar and synchro-hub

- Take off springs -1- before dismantling.
- 1 - Spring
- 2 - Locking piece
- 3 - Locking collar »installation position« ➔ [page 155](#)
- 4 - Synchro-hub »installation position« ➔ [page 155](#)
- To assemble, slide locking collar over synchro-hub.
- Installation position: Narrower recesses in synchro-hub align with recesses in locking collar

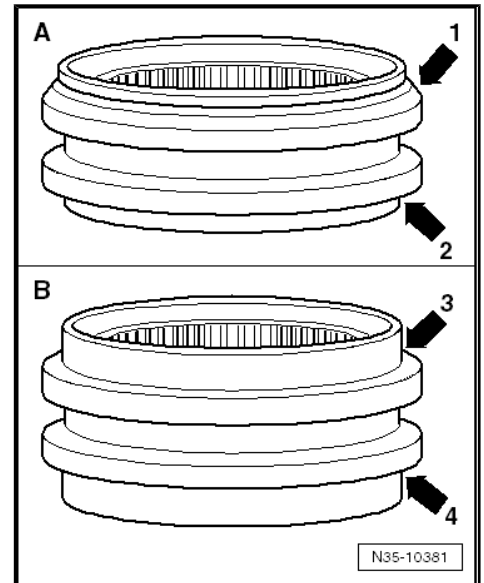


Installation position of locking collar

Different types of locking collars may be fitted:

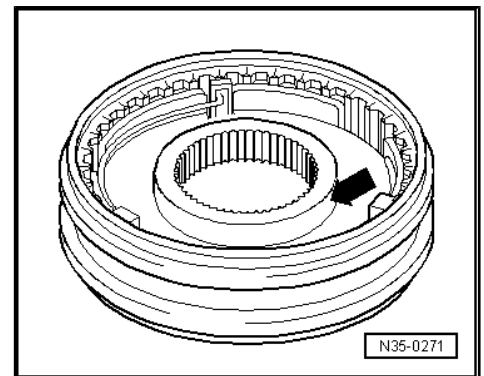
-A-
Chamfer -arrow 1- faces lower shoulder of synchro-hub
Shoulder -arrow 2- faces higher shoulder of synchro-hub
-B-
Locking collar cannot be installed if shoulder -arrow 3- and shoulder -arrow 4- are the same size

- Locking collar is pushed over synchro-hub.
- Insert locking pieces and install springs offset at 120°.
- Angled end of spring must locate in hollow locking piece.



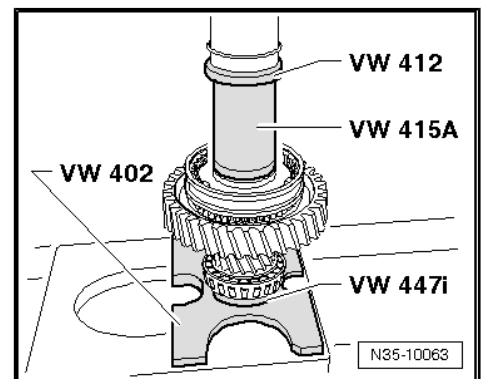
Installation position of 1st and 2nd gear locking collar/synchro-hub

High shoulder of synchro-hub -arrow- faces 2nd speed selector gear.



Pressing on locking collar/synchro-hub of 1st and 2nd gear and installing circlip

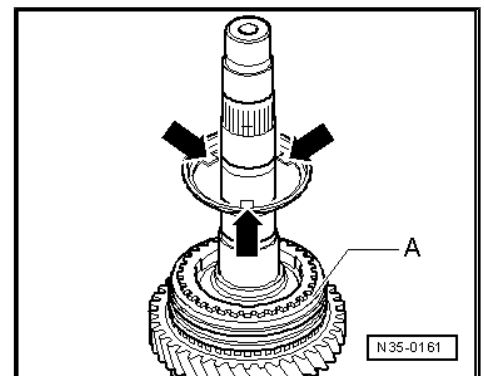
Insert 2nd gear synchro-ring so that notches engage in locking pieces of locking collar => [Item 16 \(page 144\)](#).



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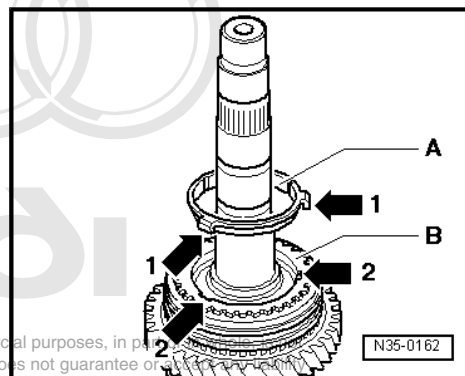
Installation position of outer ring for 2nd gear

Lugs -arrows- face towards synchro-hub/locking collar -A-.



Installation position of synchro-ring -A- (inner ring for 2nd gear)

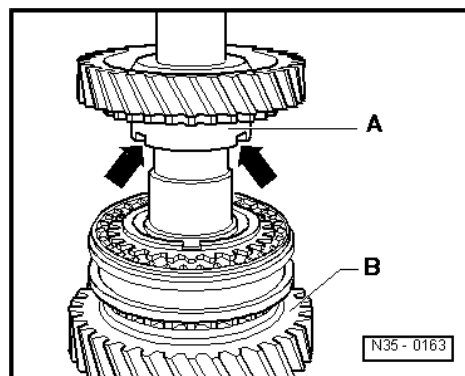
- Lugs -arrows 1- locate in the recesses -arrows 2- in the synchro-ring -B-.
- Fit needle bearing for 2nd speed selector gear.



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Installation position of 2nd speed selector gear

- The higher shoulder -A- faces towards 1st gear -B-. The recesses in the shoulder -arrows- engage on the lugs on the outer ring ➔ [page 155](#) .
- Press on tapered roller bearing inner race for bearing in clutch housing ➔ [page 157](#) .

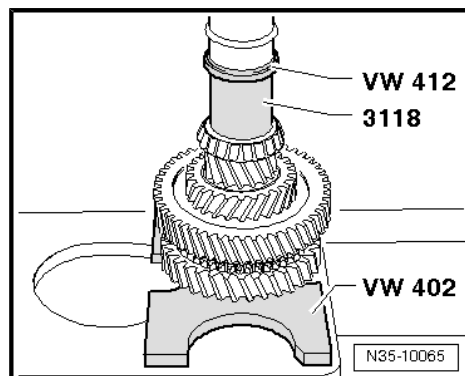


Pressing on tapered roller bearing inner race for bearing in gearbox housing and fitting circlip



Note

Pull off tapered roller bearing inner race for bearing in gearbox housing ➔ [page 152](#)

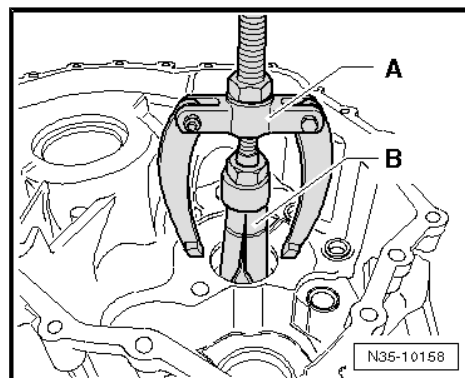


Pulling tapered roller bearing outer race out of gearbox housing

A - Counter-support, e.g. -Kukko 22/2-

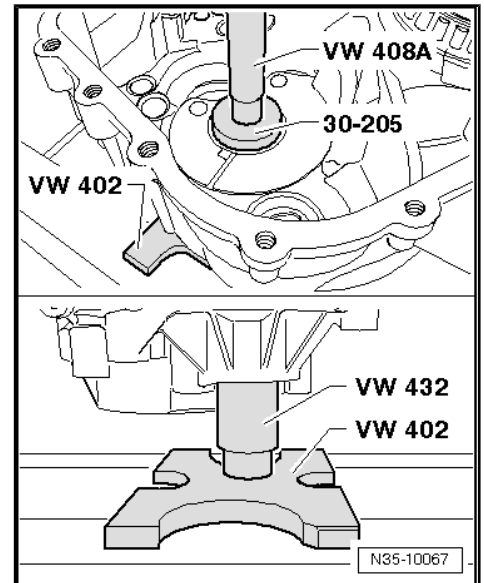
B - Internal puller 46...58 mm, e.g. -Kukko 21/7-

- After pulling out, fit new shim with previous value under outer race.



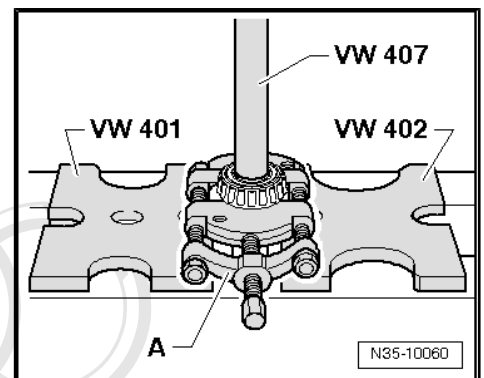
Pressing tapered roller bearing outer race into gearbox housing

- Support gearbox housing with thrust piece - VW 432- directly below bearing mounting.



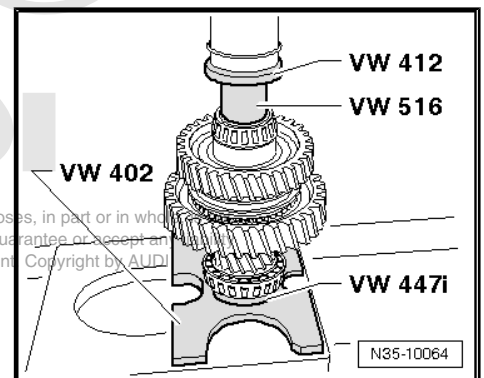
Pressing off tapered roller bearing inner race for bearing in clutch housing

A - Splitter 22...115 mm, e.g. -Kukko 17/2-



Pressing on tapered roller bearing inner race for bearing in clutch housing

- Fit circlip.



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Pulling tapered roller bearing outer race out of clutch housing

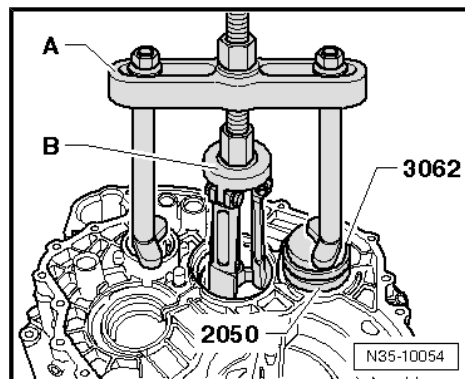
A - Counter-support, e.g. -Kukko 22/4-

B - Internal puller 56...110 mm, e.g. -Kukko 21/89-



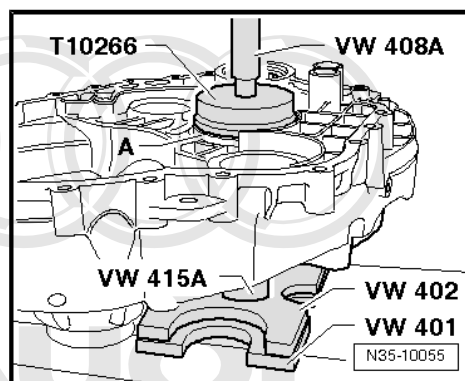
Note

- ◆ *In order to apply internal puller -B-, collar of oil deflector must first be bent over with a drift. Renew damaged oil deflector.*
- ◆ *After pulling out, renew damaged shim.*
- Fit new oil deflector.
- Fit new shim with previous value under outer race.



Pressing tapered roller bearing outer race into clutch housing

- Support clutch housing with tube - VW 415 A- directly below bearing mounting.

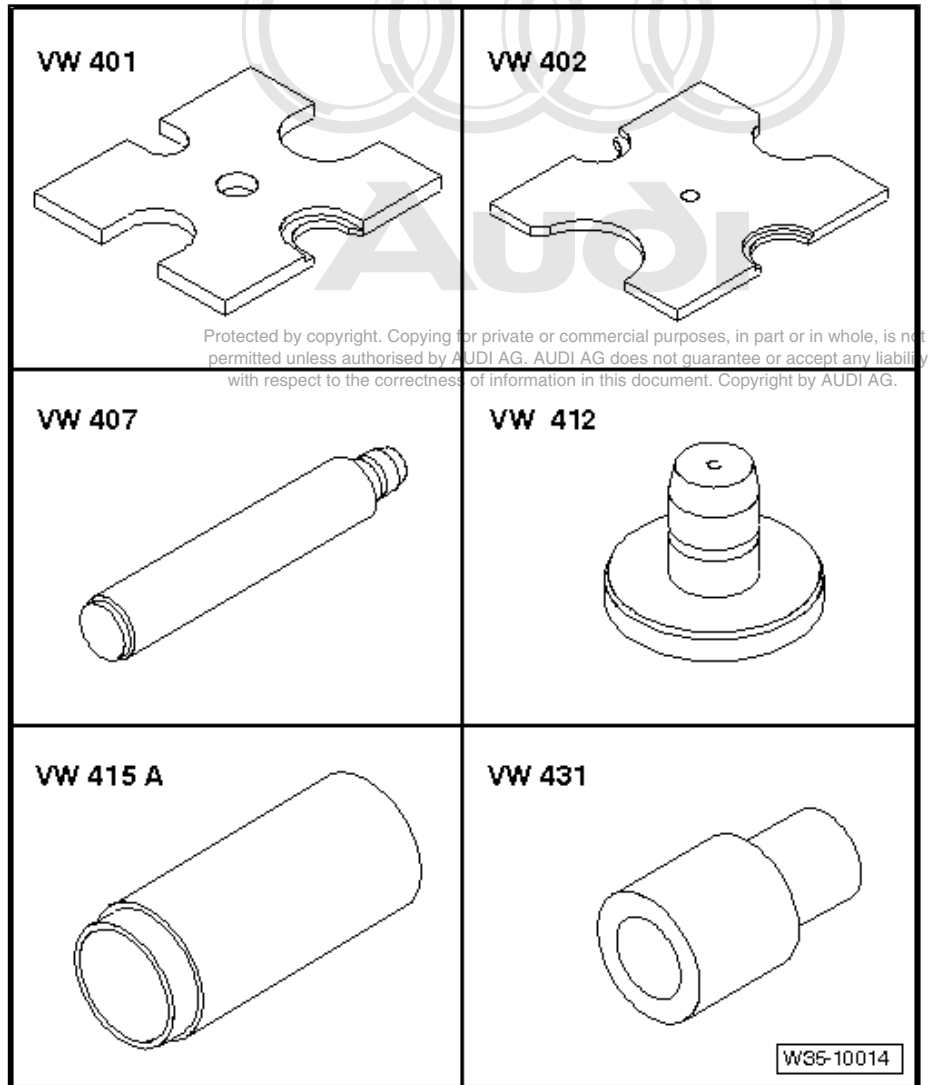


2.2.2 Dismantling and assembling output shaft for 3rd and 4th gear

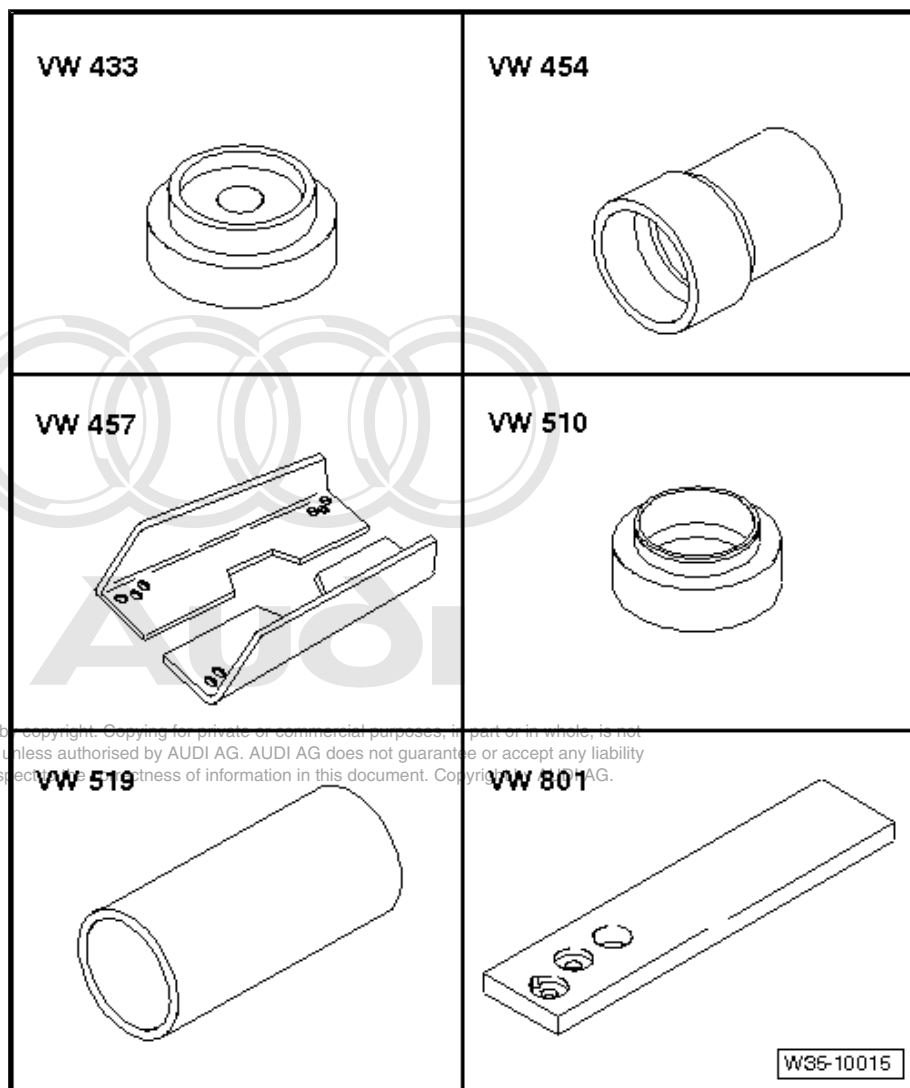
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Special tools and workshop equipment required

- ◆ Thrust plate - VW 401-
- ◆ Thrust plate - VW 402-
- ◆ Press tool - VW 407-
- ◆ Press tool - VW 412-
- ◆ Tube - VW 415 A-
- ◆ Press tool - VW 431-

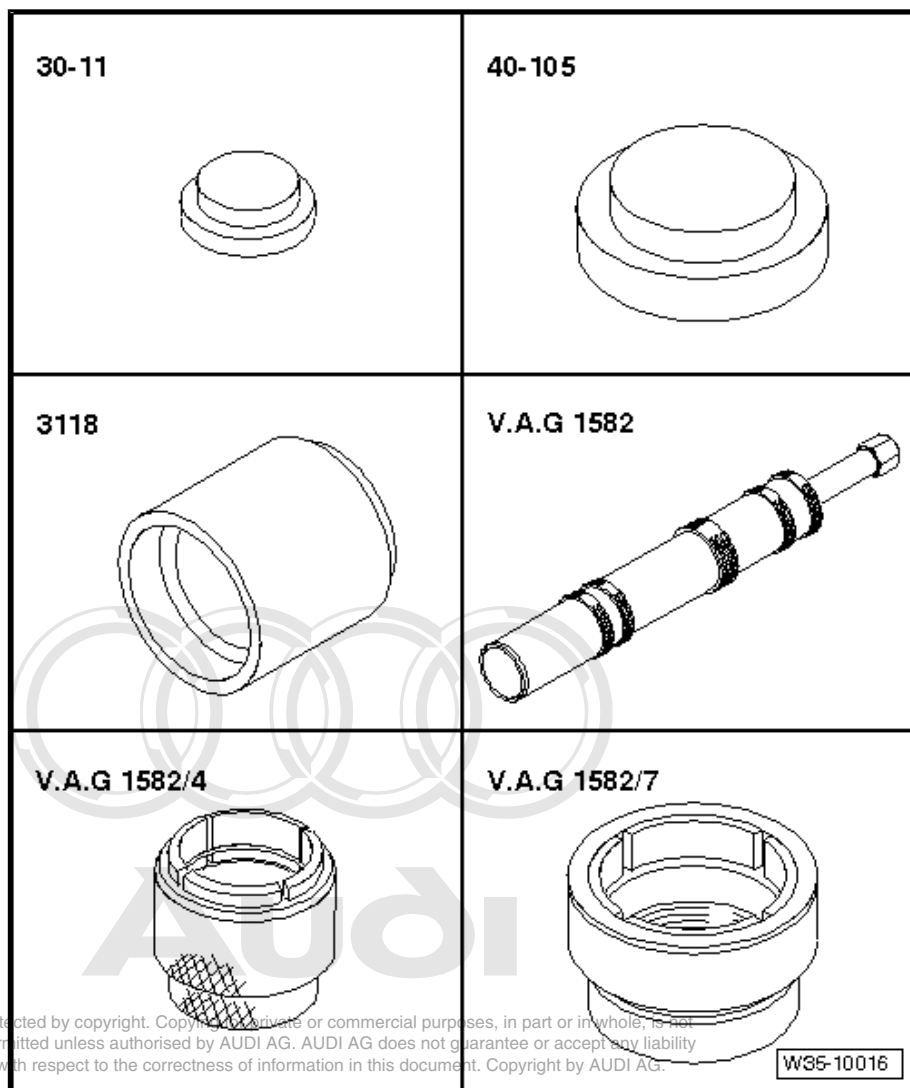


- ◆ Press tool - VW 433-
- ◆ Press tool - VW 454-
- ◆ Support rails - VW 457-
- ◆ Thrust pad - VW 510-
- ◆ Tube - VW 519-
- ◆ Support plate - VW 801-

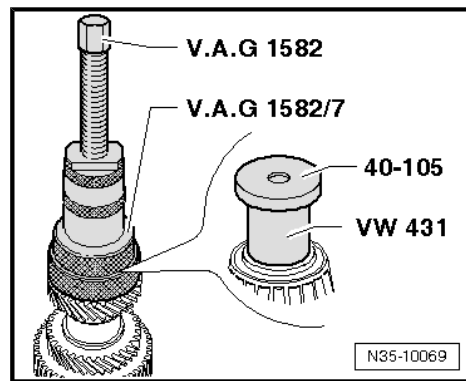
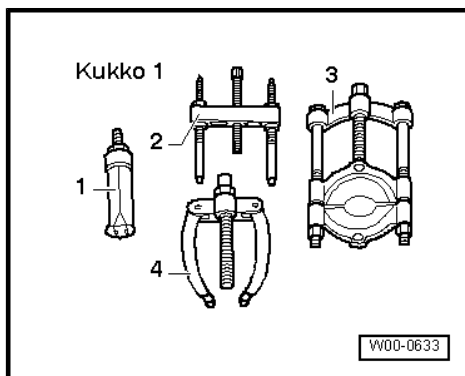


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- ◆ Thrust plate - 30 - 11-
- ◆ Thrust plate - 40 - 105-
- ◆ Press tool - 3118-
- ◆ Tapered roller bearing puller - V.A.G 1582-
- ◆ Adapter - V.A.G 1582/4-
- ◆ Adapter - V.A.G 1582/7-



- ◆ -1- Internal puller
46...58 mm, e.g. -
Kukko 21/7- and
56...70 mm, e.g. -
Kukko 21/8- ,



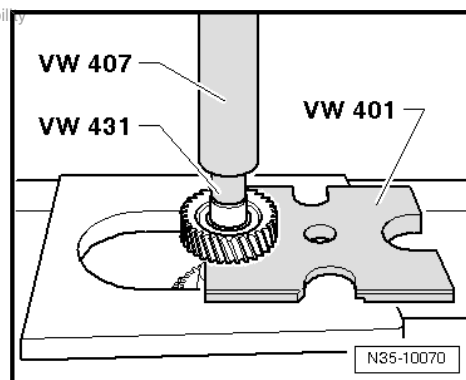
- ◆ -4- Counter support,
e.g. -Kukko 22/2-
- ◆ Feeler gauge

Pulling off tapered roller bearing inner race for bearing in gearbox housing

- Before applying puller, fit press tool - VW 431- in output shaft and place thrust plate - 40-105- on it.
- Remove circlip.

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Pressing off 6th gear wheel



Pressing off 5th gear wheel with 3rd speed selector gear

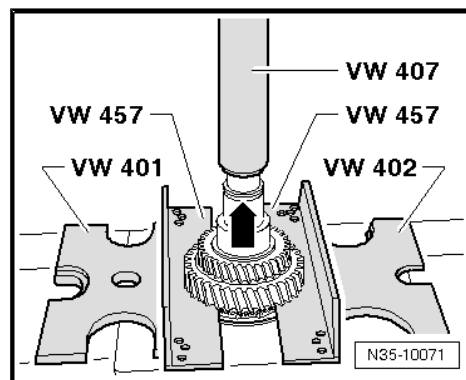
- Place tools beneath 3rd speed selector gear so that no parts will be damaged during pressing.



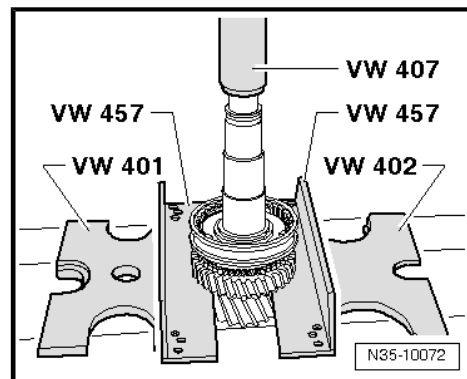
Note

When 5th gear wheel comes close to annular groove for circlip -arrow- during pressing procedure, secure output shaft to prevent it from dropping out.

- Remove circlip.



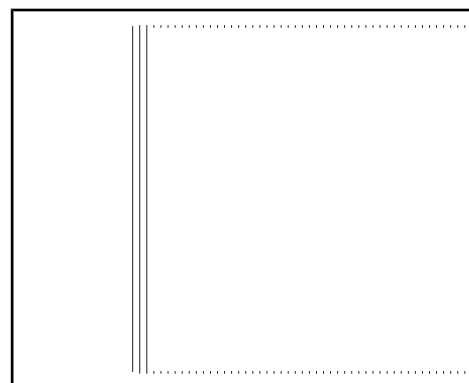
Pressing off 3rd and 4th gear synchro-hub and locking collar with 4th speed selector gear



Checking 3rd and 4th gear inner ring for wear

- Press inner ring onto cone on selector gear and measure gap -a- using a feeler gauge.

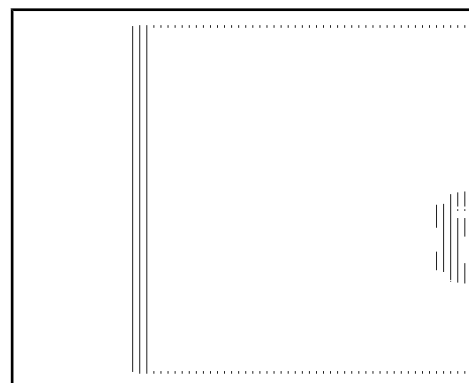
Gap -a-	Installation depth	Wear limit
3rd and 4th gear	0.75 ... 1.25 mm	0.3 mm



Checking 3rd and 4th gear synchro-rings for wear

- Press synchro-ring, outer ring and inner ring onto cone on selector gear and measure gap -a- using a feeler gauge.

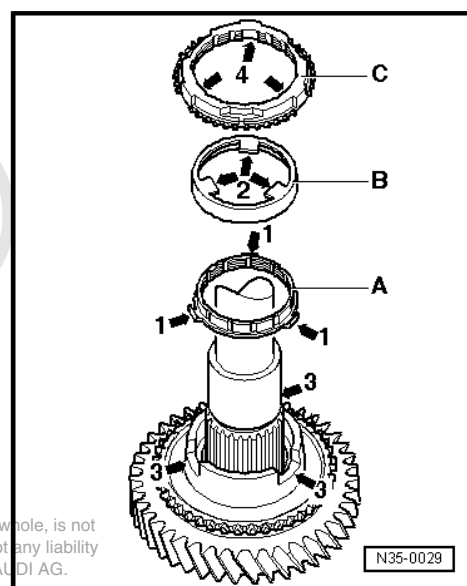
Gap -a-	Installation depth	Wear limit
3rd gear	1.0 ... 1.8 mm	0.5 mm
4th gear	1.0 ... 1.9 mm	0.5 mm



- Install 4th speed selector gear with needle bearing.

Installation position of outer ring, inner ring and synchro-ring for 4th gear

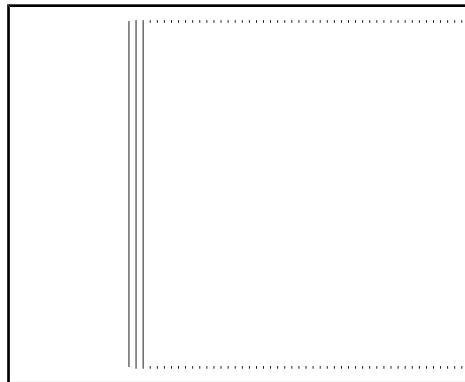
- Place inner ring -A- on 4th speed selector gear.
 - The angled lugs -arrows 1- point towards outer ring -B-.
- Fit outer ring -B-.
 - Lugs -arrows 2- engage in slots -arrows 3- on selector gear.
- Fit synchro-ring -C-.
 - Slots -arrows 4- engage on lugs -arrows 1- on inner ring -A-.



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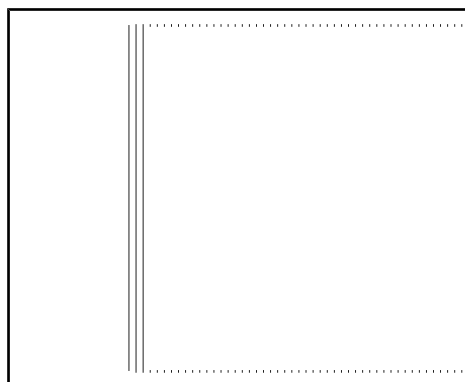
Dismantling and assembling 3rd and 4th gear locking collar and synchro-hub

- Take off springs -1- before dismantling.
- 1 - Spring
- 2 - Locking piece
- 3 - Locking collar
- 4 - Synchro-hub »installation position« ➔ [page 164](#)
- To assemble, slide locking collar over synchro-hub.
- Installation position: Narrower recesses in synchro-hub align with recesses in locking collar



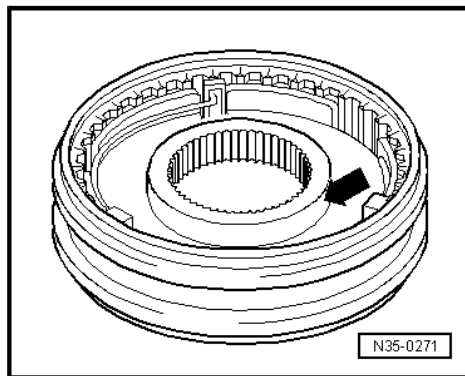
Assembling 3rd and 4th gear locking collar/synchro-hub

- Locking collar is pushed over synchro-hub.
- Insert locking pieces and install springs offset at 120°.
- Angled end of spring must locate in hollow locking piece.



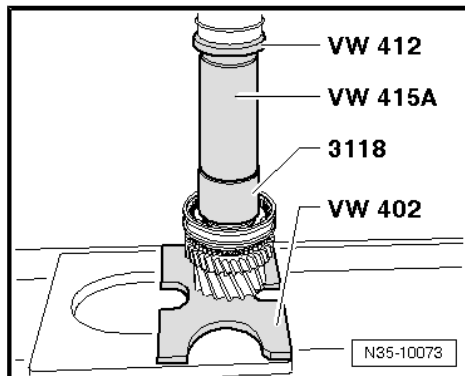
Installation position of 3rd and 4th gear locking collar/synchro-hub

- Higher shoulder of synchro-hub -arrow- faces 4th gear.
- 4th speed selector gear is placed on shaft together with needle bearing and synchro-rings.



Pressing on 3rd and 4th gear locking collar/synchro-hub

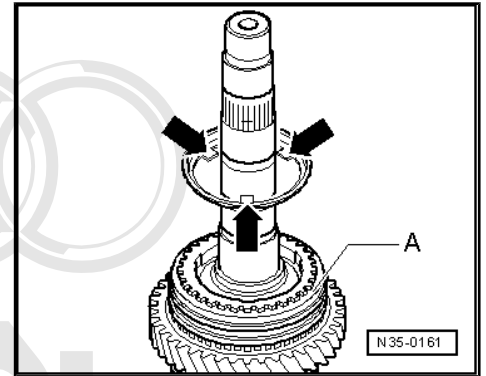
- Fit circlip.



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Installation position of outer ring for 3rd gear

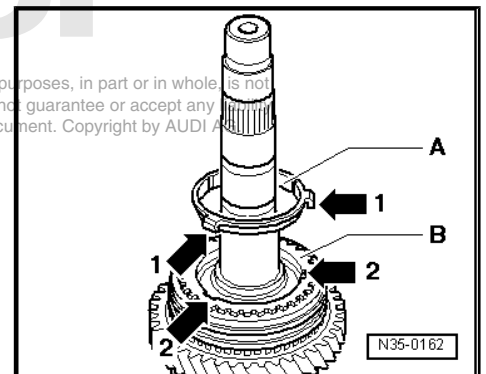
- Lugs -arrows- face towards synchro-hub/locking collar -A-.



Installation position of synchro-ring -A- (inner ring for 3rd gear)

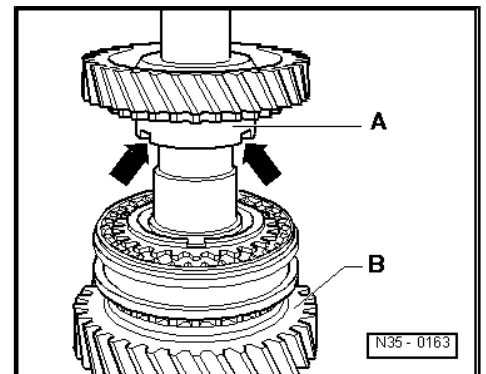
- Lugs -arrows 1- locate in the recesses -arrows 2- in the synchro-ring -B-.

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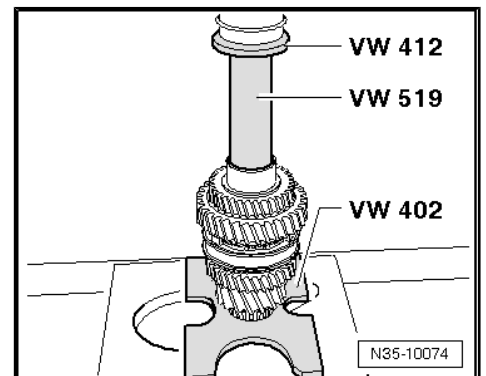
Installation position of 3rd speed selector gear

- The higher shoulder -A- faces towards 4th gear -B-. The recesses in the shoulder -arrows- engage on the lugs on the outer ring ➤ [page 165](#).
- Install 3rd speed selector gear with needle bearing.
- Heat 5th gear wheel to approx. 150° C.



Pressing on 5th gear wheel

- Press on gear wheel quickly so that heat is not immediately transferred to output shaft.
- Heat 6th gear wheel to approx. 150° C.



Pressing on 6th gear wheel

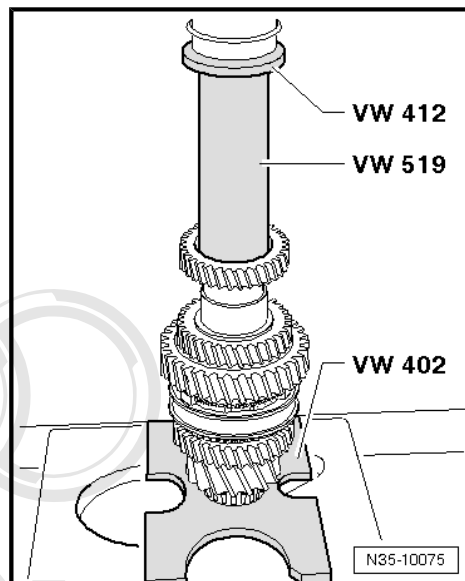
- Fit circlip.



Note

If 5th gear wheel has been pressed on in previous step, wait for output shaft to cool off.

- Press on gear wheel quickly so that heat is not immediately transferred to output shaft.
- Fit locking device for 6th gear wheel.



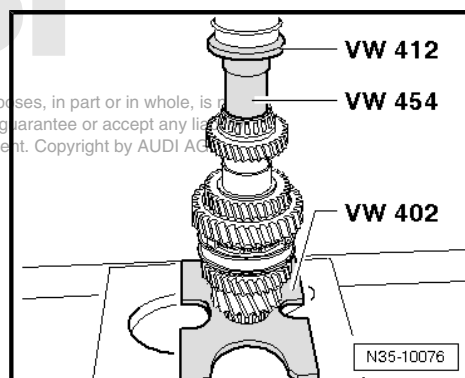
Pressing on tapered roller bearing inner race for bearing in gearbox housing



Note

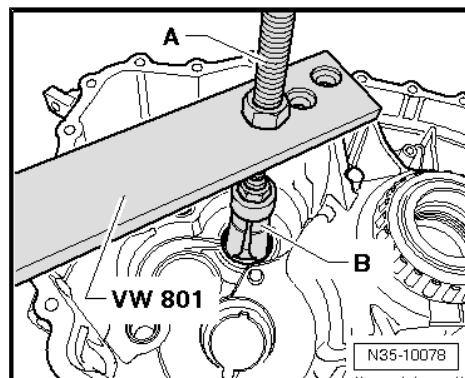
Pull off tapered roller bearing inner race for bearing in gearbox housing ➔ [page 162](#)

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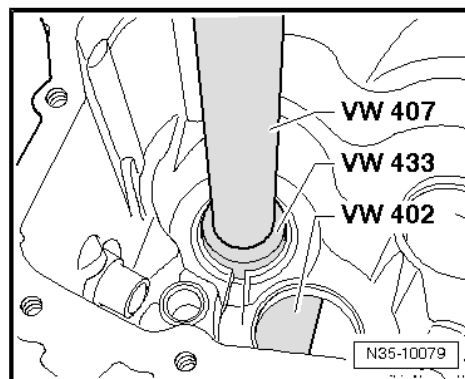


Pulling tapered roller bearing outer race out of gearbox housing

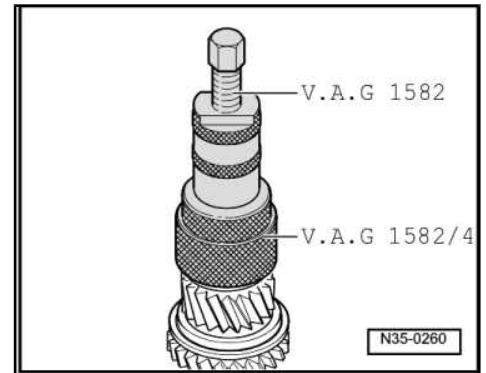
- A - Spindle from counter-support, e.g. -Kukko 22/2-
- B - Internal puller 46...58 mm, e.g. -Kukko 21/7-
- Fit new shim with previous value under outer race.



Pressing tapered roller bearing outer race into gearbox housing

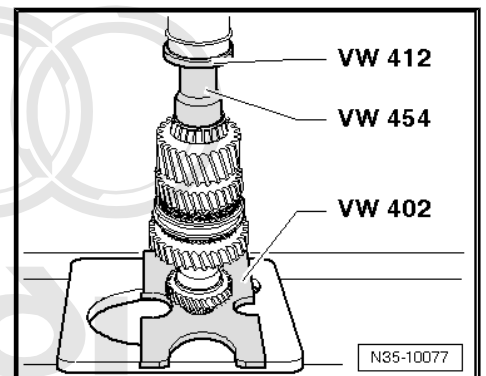


Pulling off tapered roller bearing inner race for bearing in clutch housing



Pressing on tapered roller bearing inner race for bearing in clutch housing

- Before applying puller, place thrust plate - 30-11- on output shaft.

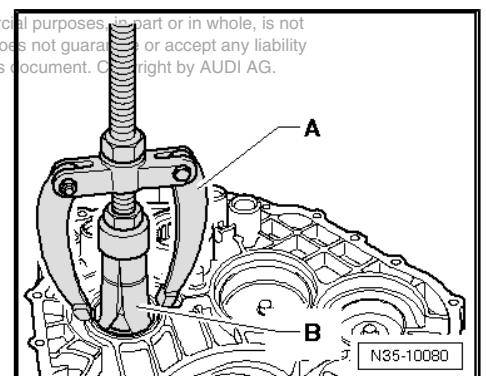


Pulling tapered roller bearing outer race out of clutch housing

A - Counter-support, e.g. -Kukko 22/2-

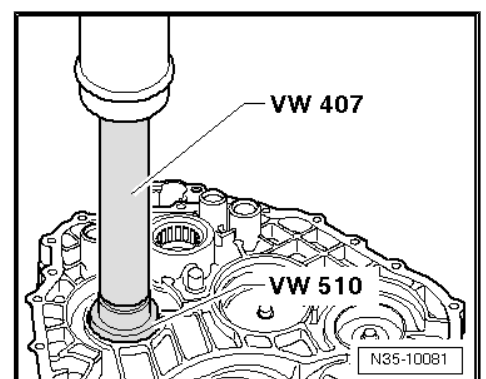
B - Internal puller 56...70 mm, e.g. -Kukko 21/8-

- Fit new shim with previous value under outer race.



Pressing tapered roller bearing outer race into clutch housing

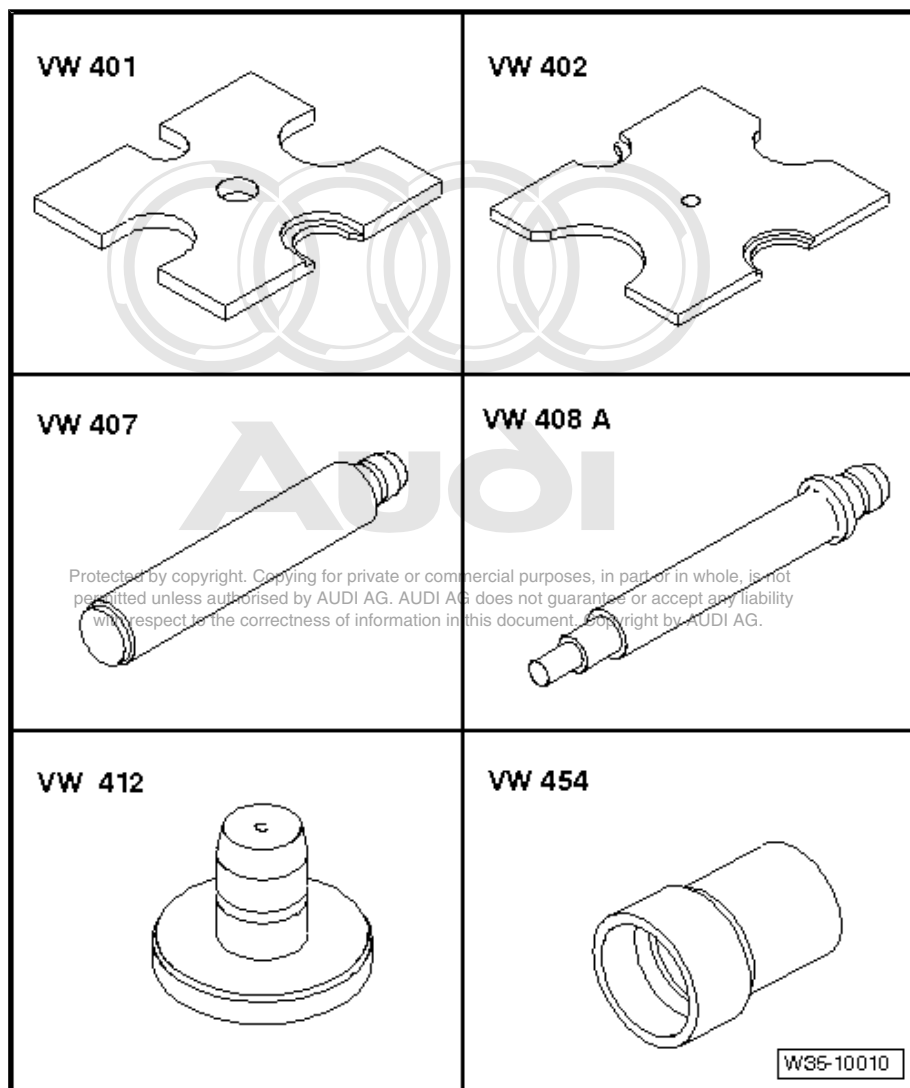
- Support clutch housing with tube - VW 415 A- directly below bearing mounting.



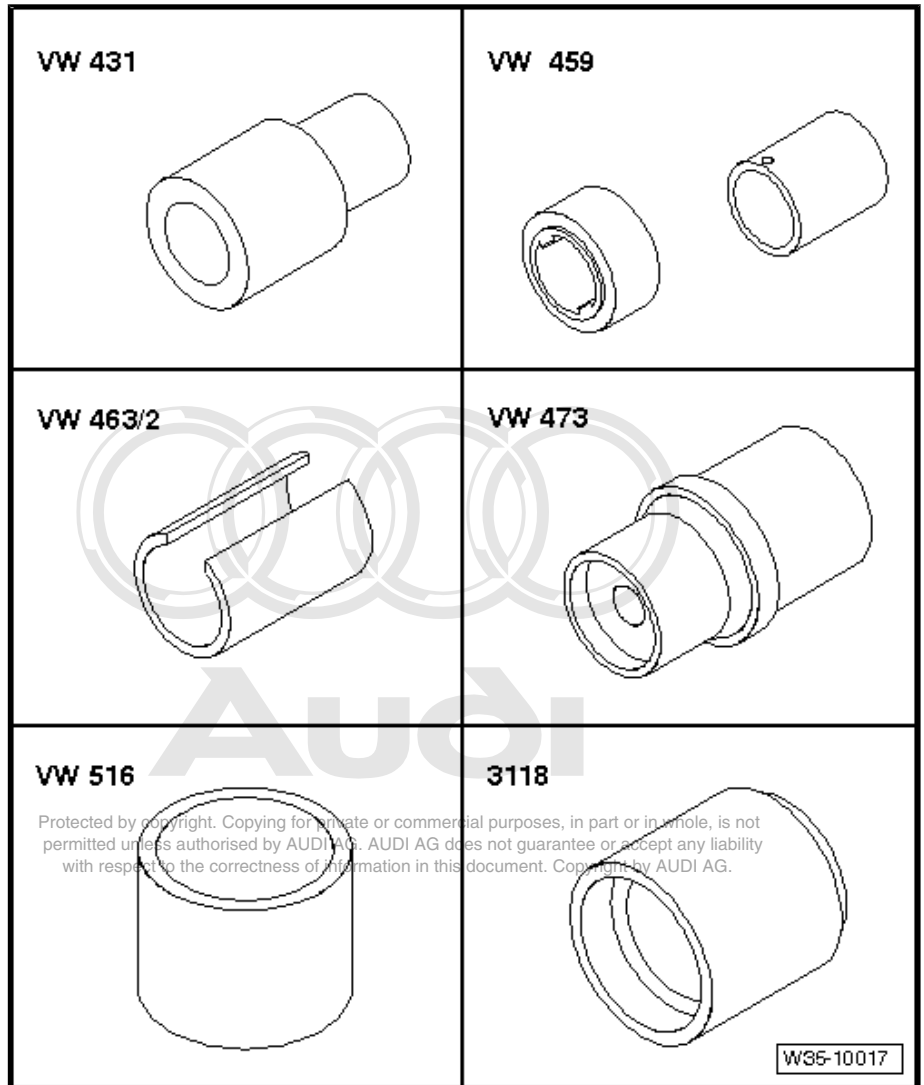
2.2.3 Dismantling and assembling output shaft for reverse gear

Special tools and workshop equipment required

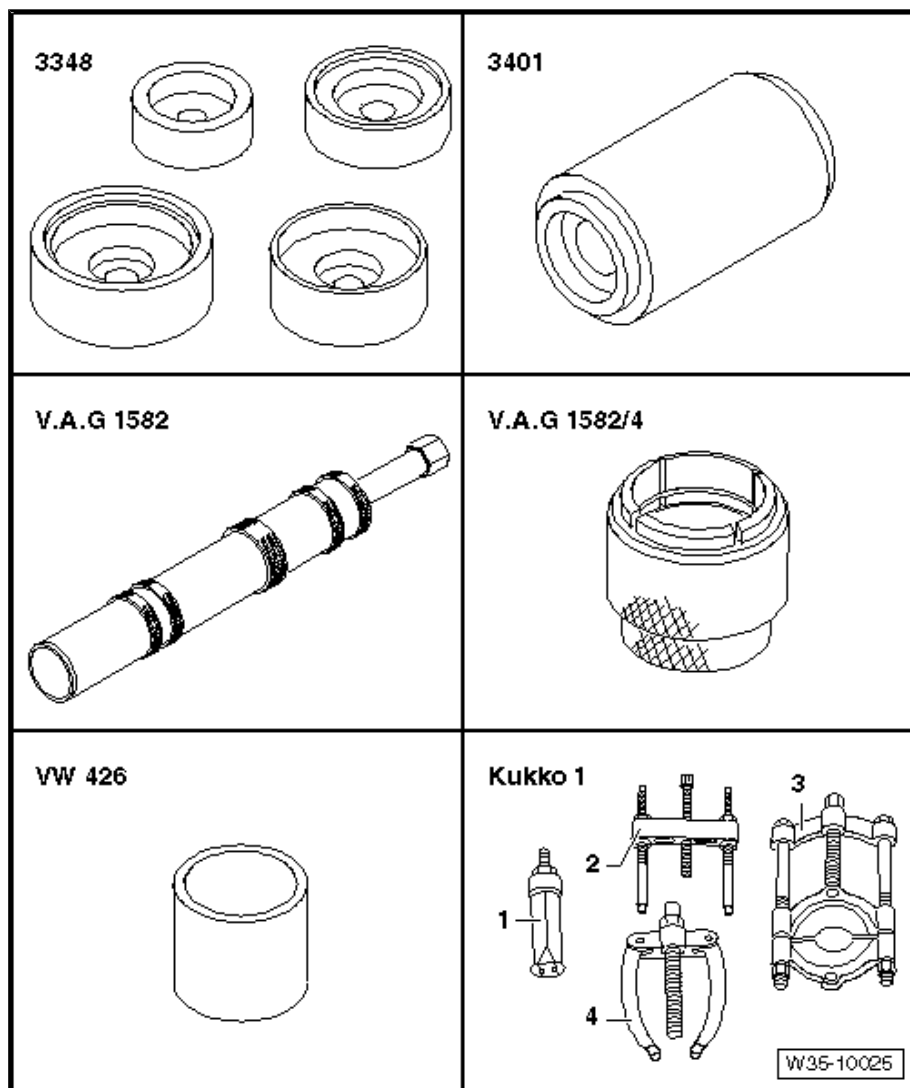
- ◆ Thrust plate - VW 401-
- ◆ Thrust plate - VW 402-
- ◆ Press tool - VW 407-
- ◆ Press tool - VW 408 A-
- ◆ Press tool - VW 412-
- ◆ Press tool - VW 454-



- ◆ Press tool - VW 431-
- ◆ Removal and installing tool - VW 459-
- ◆ Tube - VW 463/2-
- ◆ Press tool - VW 473-
- ◆ Tube - VW 516-
- ◆ Press tool - 3118-

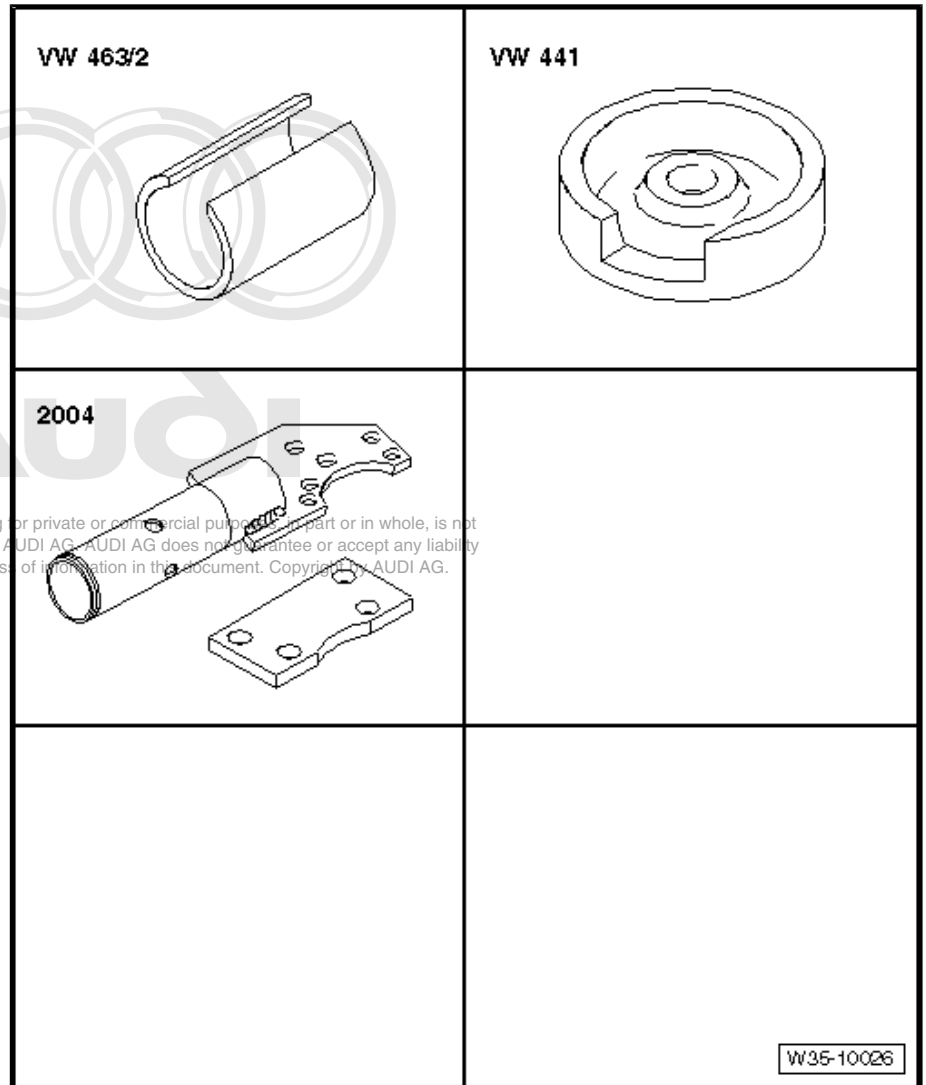


- ◆ Assembly tool - 3348-
- ◆ Thrust piece - 3401-
- ◆ Tapered roller bearing puller - V.A.G 1582-
- ◆ Adapter - V.A.G 1582/4-
- ◆ Tube - VW 426-
- ◆ -1- Internal puller 14.5...18.5 mm, e.g. -Kukko 21/2- , 37...46 mm, e.g. -Kukko 21/6- and 46...58, e.g. -Kukko 21/7-
- ◆ -3- Splitter 22...115 mm, e.g. -Kukko 17/2-
- ◆ -4- Counter support, e.g. -Kukko 22/1-



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- ◆ Tube - VW 463/2-
- ◆ Base plate - VW 441-
- ◆ Gearbox bracket - 2004/1-



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Pulling dished washer -C- out of output shaft

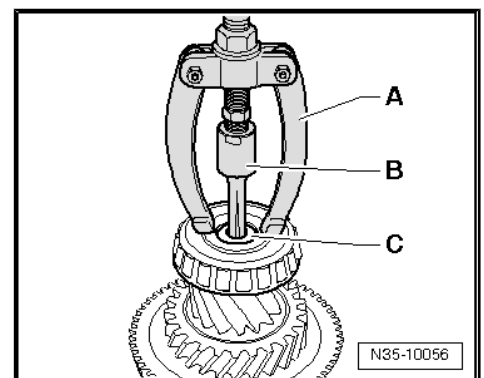
A - Counter-support, e.g. -Kukko 22/1-

B - Internal puller 8...12 mm, e.g. -Kukko 21/2-



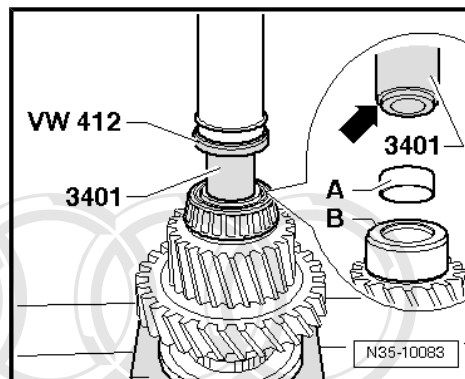
Note

If the internal puller slips out of the hole in the dished washer, use the next larger size of internal puller.



Pressing dished washer -A- into output shaft -B- as far as stop of tool

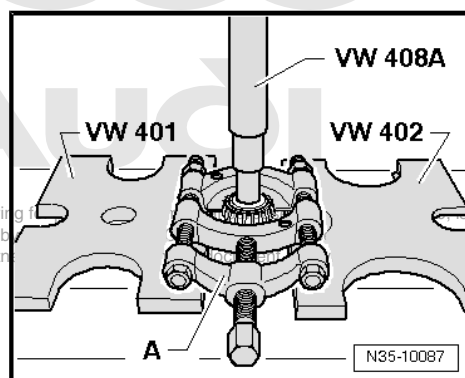
- Apply thrust piece - 3401- to dished washer -A- with collar -arrow- on dished washer.
- The dished washer will then be pressed in to a depth of approx. 2.20 mm.



Pressing off tapered roller bearing inner race for bearing in gearbox housing

A - Splitter 22...115 mm, e.g. -Kukko 17/1-

- Remove circlip.

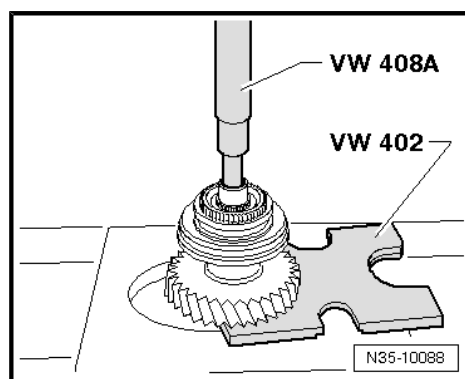


Pressing off reverse gear synchro-hub with reverse selector gear

- Fit reverse selector gear with needle bearing and roller bearing on output shaft.

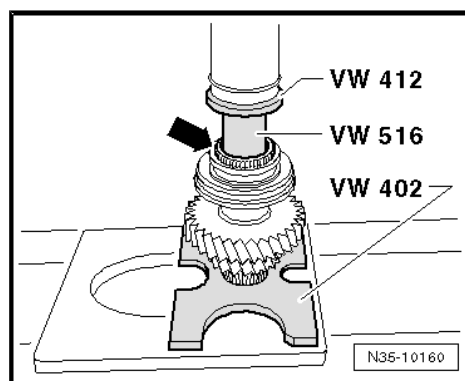
Installation position of reverse gear synchro-hub

- Stop -arrow- faces pressing tool.



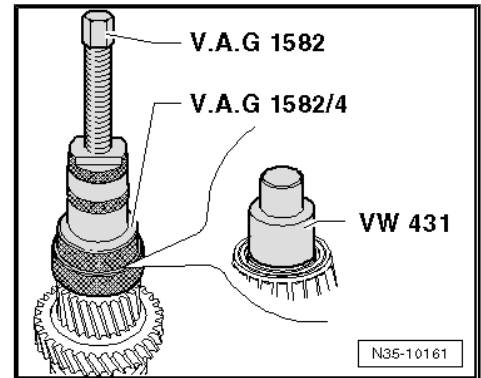
Pressing on reverse gear synchro-hub

- Press on reverse gear synchro-hub.
- Fit circlip.

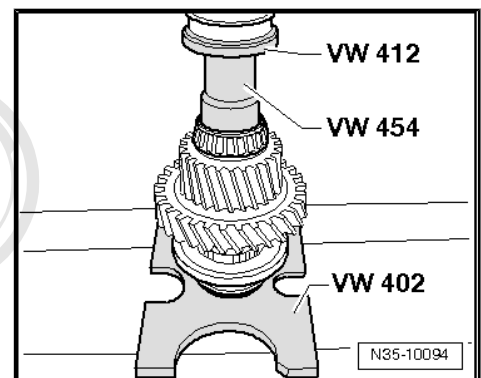


Pulling off tapered roller bearing inner race for bearing in clutch housing

- Before applying puller, place press tool - VW 431- on output shaft.



Pressing on tapered roller bearing inner race for bearing in clutch housing



Pulling tapered roller bearing outer race out of clutch housing

- Place sleeve VW 459/1 over bearing seat with shoulder facing counter-support A.

A - Counter-support, e.g. -Kukko 22/2-

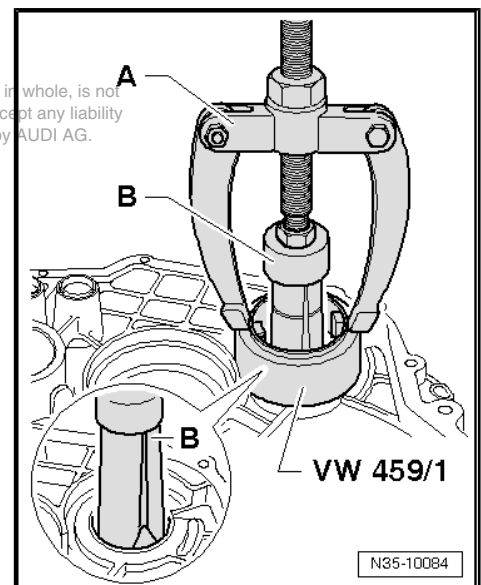
B - Internal puller 46...58 mm, e.g. -Kukko 21/7-



Note

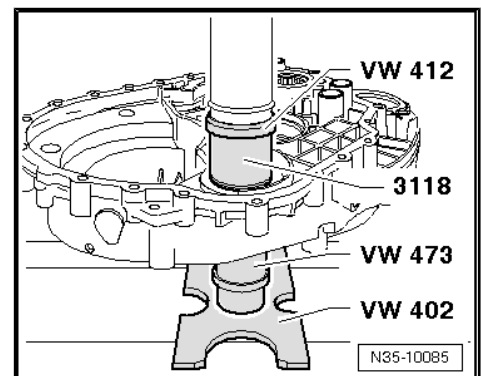
After pulling out, renew damaged shim.

- Fit oil deflector.
- Fit new shim with previous value.



Pressing tapered roller bearing outer race into clutch housing

- Support clutch housing with press tool - VW 473- directly below bearing mounting.

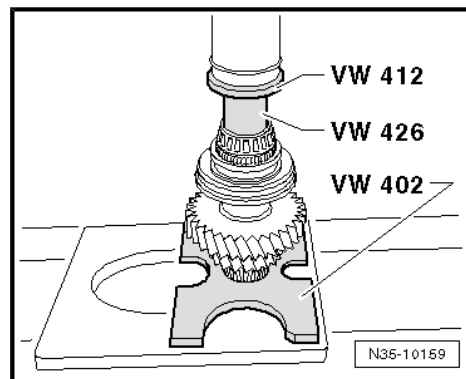


Pressing on tapered roller bearing inner race for bearing in gearbox housing



Note

Pull off tapered roller bearing inner race for bearing in gearbox housing ➔ [page 172](#)



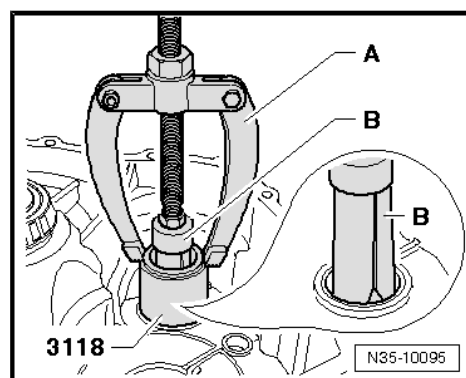
Pulling tapered roller bearing outer race out of gearbox housing

- Shoulder on press tool - 3118- faces towards counter-support -A-.

A - Counter-support, e.g. -Kukko 22/2-

B - Internal puller 37...46 mm, e.g. -Kukko 21/6-

- Fit new shim with previous value under outer race.



Pressing tapered roller bearing outer race into gearbox housing

- Support gearbox housing with tube - VW 463/2- directly below bearing mounting.

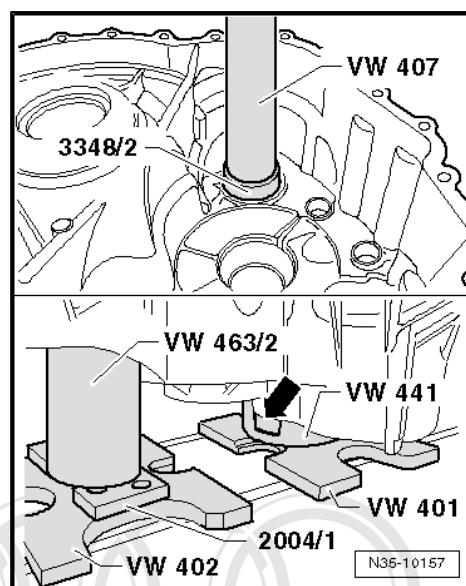


Caution

Risk of damage to rib on housing

- ◆ Apply tube - VW 463/2- in such a way that it does not contact rib on housing.

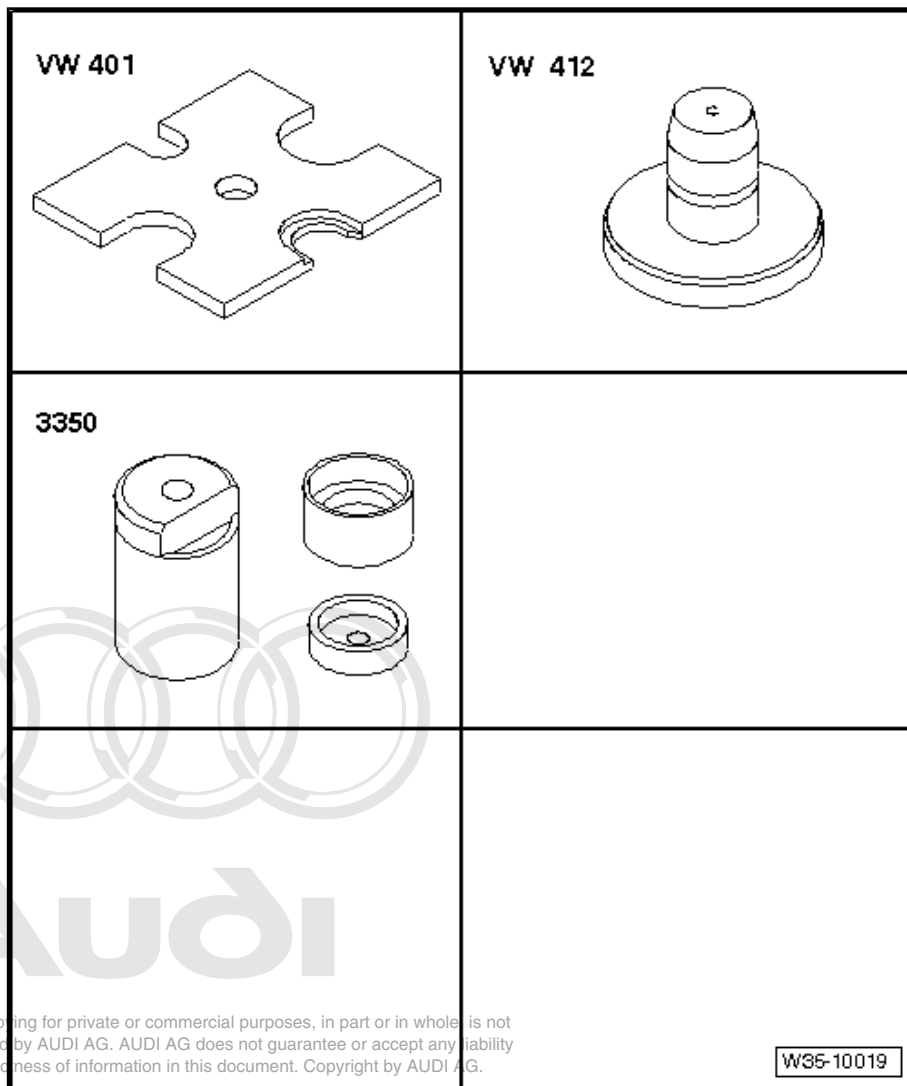
- Opening in base plate - VW 441- -arrow- faces towards tube - VW 463/2- .



2.2.4 Removing and installing check ring and spring on reverse selector gear

Special tools and workshop equipment required

- ◆ Thrust plate - VW 401-
- ◆ Press tool - VW 412-
- ◆ Assembly tool - 3350-



Removing

- Using a drift, carefully drive check ring -A- off reverse selector gear -C-.

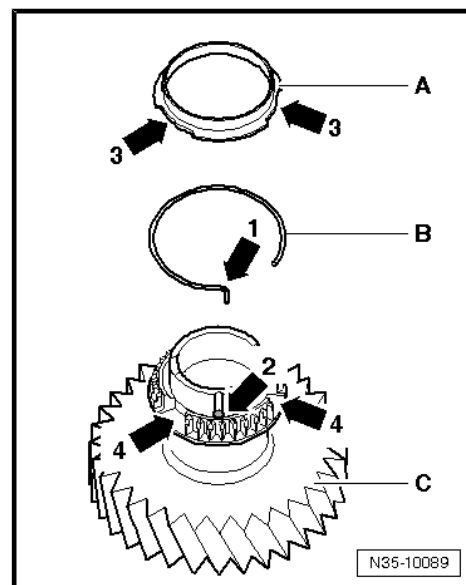


Note

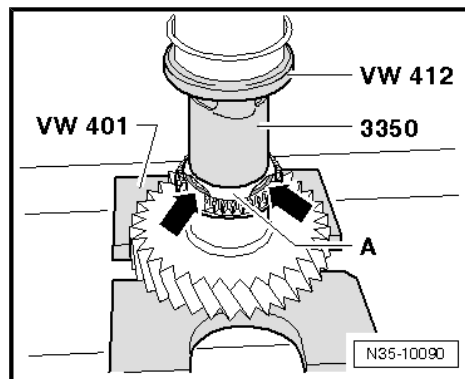
Secure spring -B- to prevent it springing away.

Installing

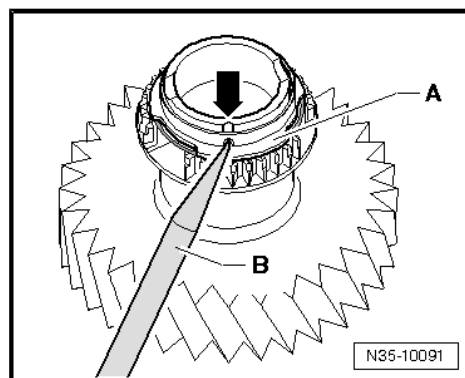
- First insert spring -B- in selector gear -C-.
- The bent end of the spring -arrow 1- must be hooked into the hole -arrow 2- in the selector gear.
- Then fit check ring -A- on selector gear.
- Notches in check ring -arrows 3- and in selector gear -arrows 4- must be aligned.



- Then carefully press check ring -A- onto selector gear. Keep spring compressed -arrows- while pressing on check ring.



- Finally, secure check ring -A- on selector gear using a blunt punch -B-.
- For this step, apply punch at groove -arrow- in selector gear.



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39 – Final drive - front differential

1 Oil seals

⇒ ["1.1 Overview of fitting locations - oil seals", page 177](#)

⇒ ["1.2 Renewing oil seal \(left-side\)", page 178](#)

⇒ ["1.3 Renewing oil seal \(right-side\)", page 180](#)

⇒ ["1.4 Renewing input shaft oil seal", page 182](#)

1.1 Overview of fitting locations - oil seals

1 - Gearbox

2 - Oil seal

- ☐ For input shaft
- ☐ Renewing ⇒ [page 182](#)

3 - Oil seal (right-side)

- ☐ Renew

4 - Oil seal

- ☐ For selector shaft
- ☐ Renewing ⇒ [page 71](#)

5 - Oil seal

- ☐ For stub shaft on out-side of bevel box
- ☐ For four-wheel drive ve-hicles
- ☐ Renewing ⇒ [page 196](#)
- ☐ Renew together with -item 11- ⇒ [page 200](#)

6 - Stub shaft (right-side)

- ☐ For four-wheel drive ve-hicles
- ☐ Removing and installing ⇒ [page 208](#)

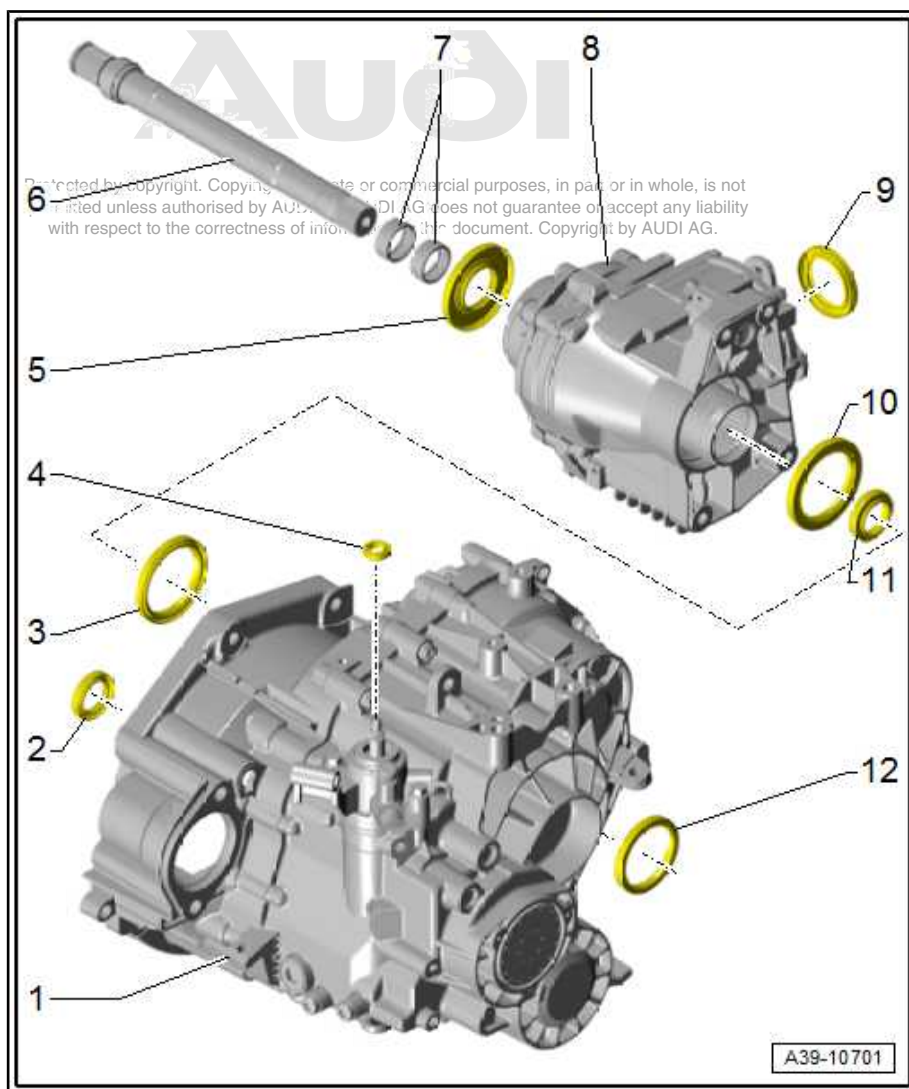
7 - Needle bearing (polygon bearing)

- ☐ Does not turn easily when stub shaft is re-moved; this does not in-dicate a fault
- ☐ Acoustic check can only be performed when in-stalled
- ☐ Check for damage such as cracking in outer race
- ☐ Renewing ⇒ [page 208](#)

8 - Bevel box

9 - Oil seal

- ☐ For output flange of propshaft
- ☐ For four-wheel drive vehicles
- ☐ Renewing ⇒ [page 203](#)





10 - Oil seal

- ☐ On bevel box between gearbox and bevel box
- ☐ For four-wheel drive vehicles
- ☐ Renewing ➔ [page 199](#)

11 - Oil seal

- ☐ For stub shaft (right-side) in bevel box
- ☐ For four-wheel drive vehicles
- ☐ Renew together with -item 5- ➔ [page 200](#)

12 - Oil seal (left-side)

- ☐ For stub shaft (left-side)
- ☐ Renewing ➔ ["1.2 Renewing oil seal \(left-side\)", page 178](#)

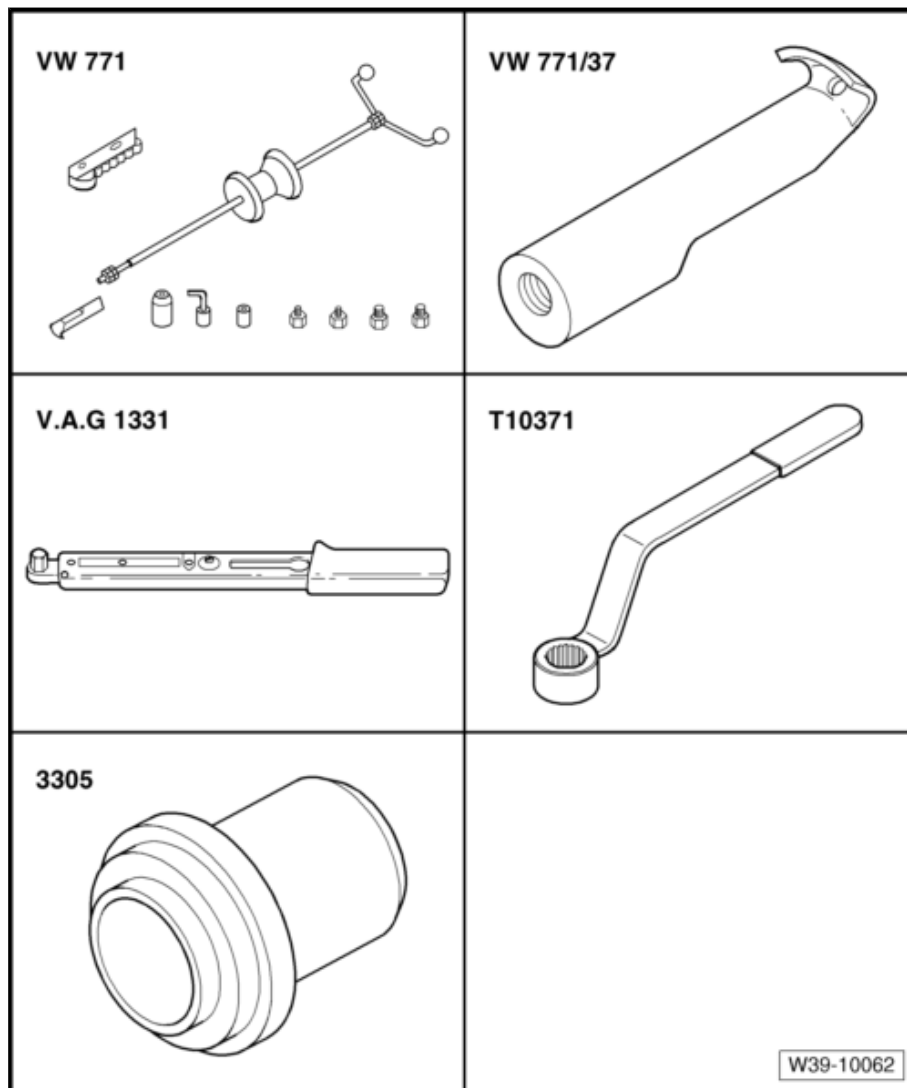


1.2 Renewing oil seal (left-side)

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Special tools and workshop equipment required

- ◆ Multi-purpose tool - VW 771-
- ◆ Extractor tool - VW 771/37-
- ◆ Torque wrench - V.A.G 1331-
- ◆ Counterhold tool - T10371-
- ◆ Thrust piece - 3305-
- ◆ Sealing grease - G 052 128 A1-
- ◆ Grease - G 000 100-



Procedure

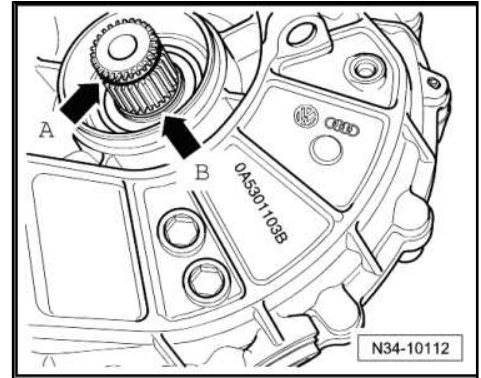
- Gearbox in vehicle

- Detach drive shaft (left-side) from gearbox and tie to one side
⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft;
Removing and installing drive shaft .

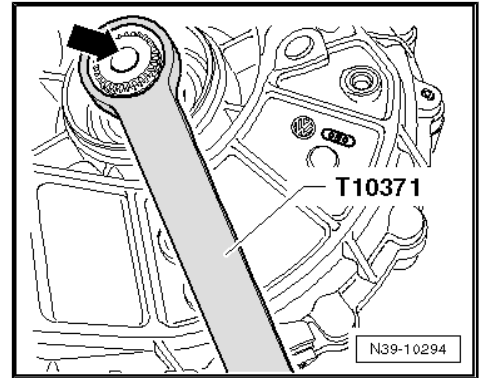
 Note

Make sure you do not damage surface coating on drive shaft.

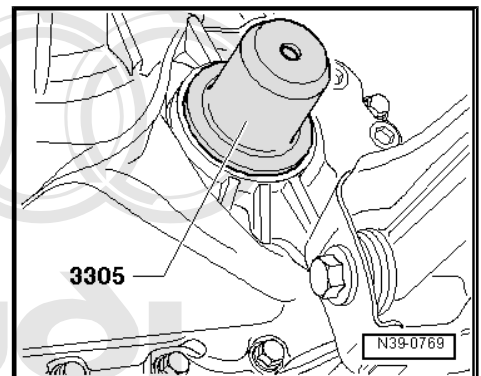
- Remove circlip -arrow A- and O-ring -arrow B- from stub shaft.



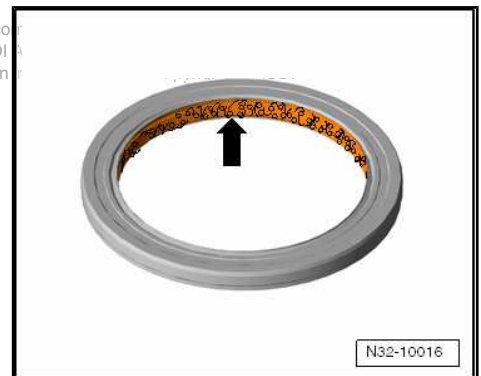
- Unscrew bolt for stub shaft -arrow-; to do so, use counterhold tool - T10371- .
- Pull out stub shaft.
- Pull out stub shaft oil seal using multipurpose tool - VW 771- and extractor tool - VW 771/37- .



- Lightly oil new seal around outside circumference and drive in as far as stop, taking care to keep seal straight.



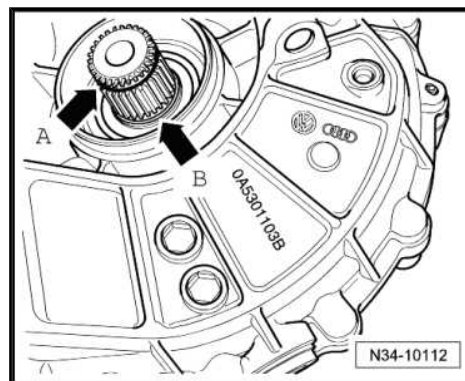
- Pack space between sealing lip and dust lip -arrow- half full with sealing grease - G 052 128 A1-.



- Use counterhold tool - T10371- to tighten bolt for stub shaft.
- Install new circlip -arrow A- and new O-ring -arrow B-.
- Grease splines of stub shaft.
- Install drive shaft (left-side) ⇒ Running gear, axles, steering;
Rep. gr. 40 ; Drive shaft; Removing and installing drive shaft .
- Check gear oil level ⇒ [page 134](#) .

Tightening torques

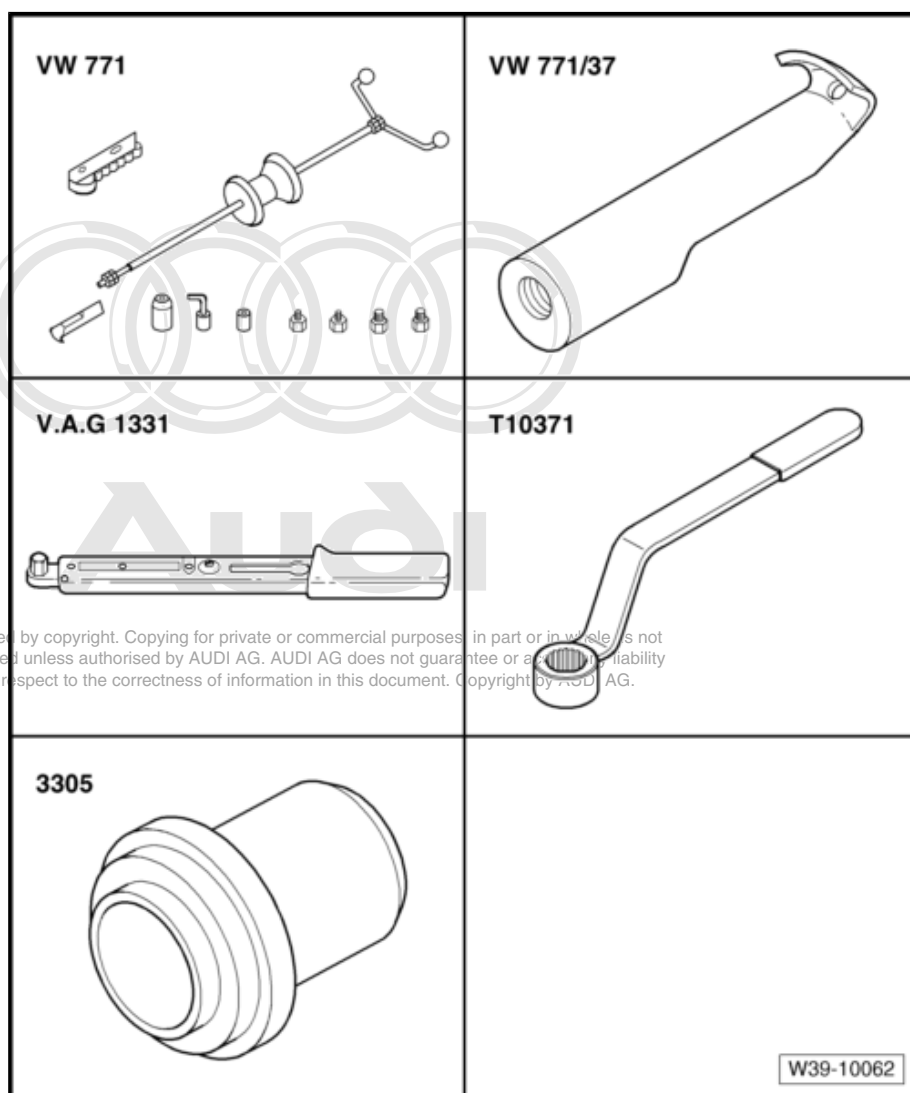
- ♦ ⇒ [“2.1 Exploded view - differential”, page 184](#)



1.3 Renewing oil seal (right-side)

Special tools and workshop equipment required

- ♦ Multi-purpose tool - VW 771-
- ♦ Extractor tool - VW 771/37-
- ♦ Torque wrench - V.A.G 1331-
- ♦ Counterhold tool - T10371-
- ♦ Press tool - 3305-
- ♦ Sealing grease - G 052 128 A1-
- ♦ Grease - G 060 735 A2-



Procedure

- Gearbox in vehicle

Vehicles with front-wheel drive:

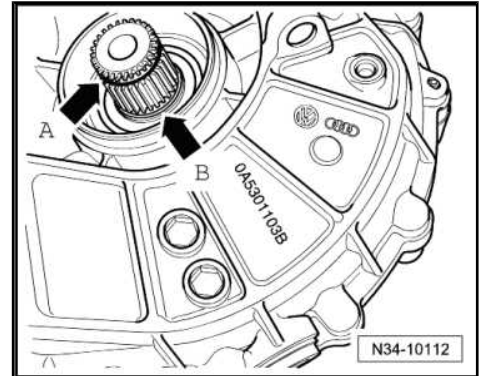
- Detach drive shaft (right-side) from gearbox and tie up ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Removing and installing drive shaft .



Note

Make sure you do not damage surface coating on drive shaft.

- Remove circlip -arrow A- and O-ring -arrow B- from stub shaft.



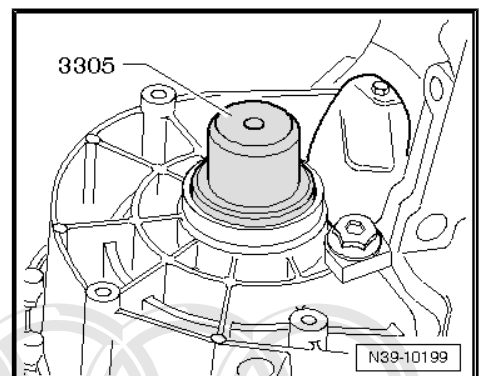
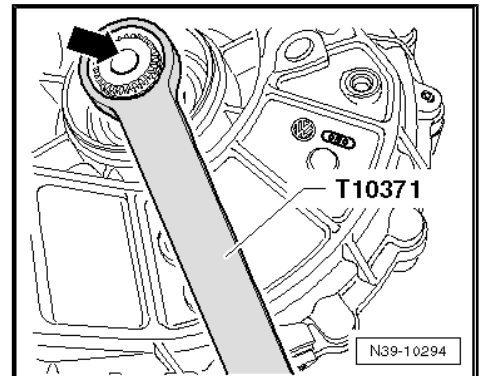
- Unscrew bolt for stub shaft -arrow-; to do so, use counterhold tool - T10371- .
- Pull out stub shaft.

Vehicles with four-wheel drive:

- Remove bevel box ➔ [page 87](#) .

Continued for all vehicles:

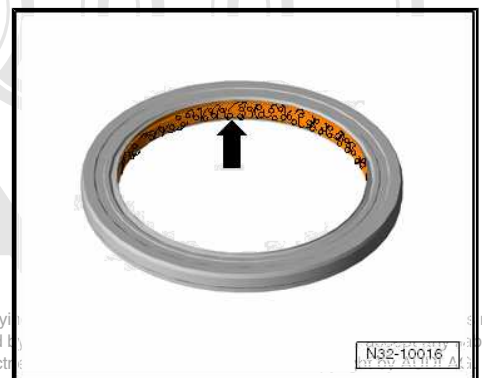
- Pull out stub shaft oil seal using multipurpose tool - VW 771- and multipurpose tool - VW 771/37- .
- Lightly oil new oil seal around outside circumference and drive in until it is flush, taking care to keep oil seal straight.
- Oil seal must be flush with seat (do not drive seal in too deep).



- Pack space between sealing lip and dust lip -arrow- half full with sealing grease - G 052 128 A1- .

Vehicles with front-wheel drive:

- Insert stub shaft (right-side) together with spring, thrust washer and tapered ring.



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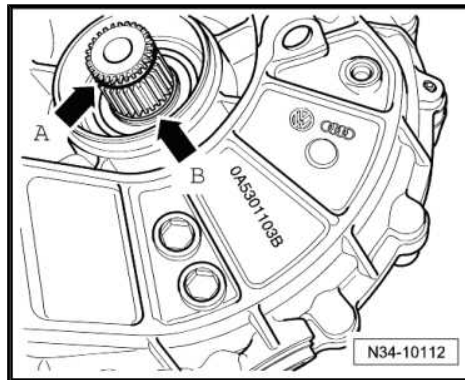
- Use counterhold tool - T10371- to tighten bolt for stub shaft.
- Fit circlip -arrow A- and O-ring -arrow B-.
- Grease splines of stub shaft with grease - G 000 100- .
- Attach drive shaft (right-side) to gearbox ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Removing and installing drive shaft .

Vehicles with four-wheel drive:

- Install bevel box ⇒ [page 96](#) .

Continued for all vehicles:

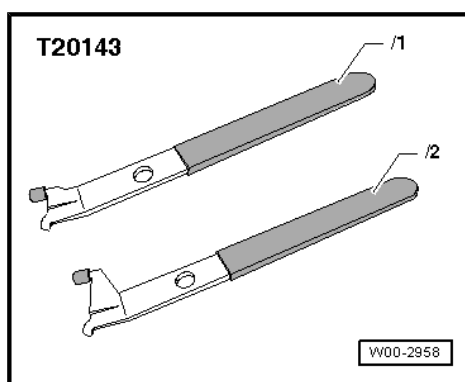
- Check gear oil level ⇒ [page 134](#) .



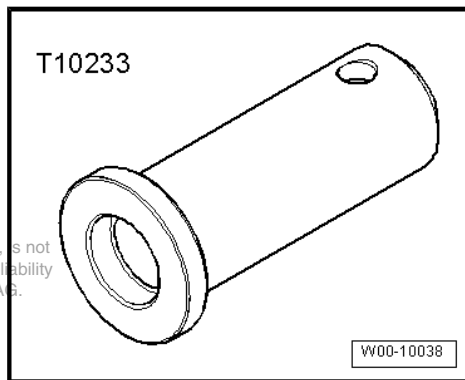
1.4 Renewing input shaft oil seal

Special tools and workshop equipment required

- ◆ Extractor tool - T20143/1-



- ◆ Thrust piece - T10233-



- ◆ Sealing grease - G 052 128 A1-

Procedure

- Gearbox removed ⇒ [page 74](#) .
- Remove clutch slave cylinder with release bearing ⇒ [page 33](#) .

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- Pry out input shaft oil seal using extractor tool - T20143/1- .

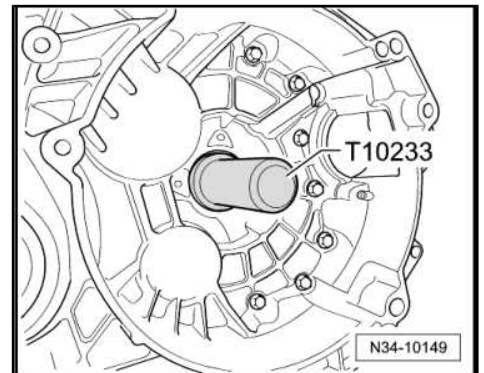
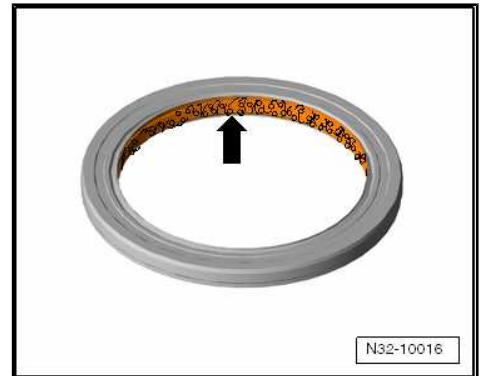
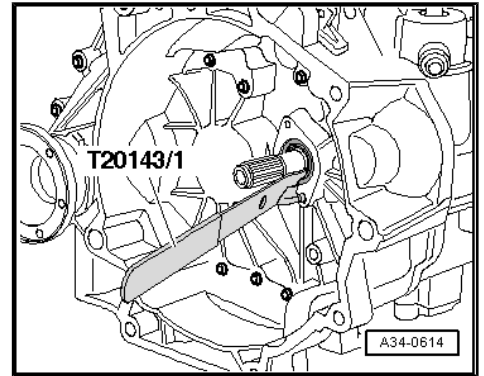


Note

Take care not to damage contact surface for oil seal on input shaft.

- Pack space between sealing lip and dust lip -arrow- half full with sealing grease - G 052 128 A1- .
- Lightly lubricate outer circumference of oil seal with gear oil.

- Drive in oil seal until flush using thrust piece - T10233- .
- Install clutch slave cylinder with release bearing ⇒ [page 33](#) .



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2 Differential

⇒ "2.1 Exploded view - differential", page 184

⇒ "2.2 Dismantling and assembling differential", page 186

⇒ "2.3 Adjusting differential", page 191

2.1 Exploded view - differential

1 - Gearbox housing

2 - Shim

- ☐ For differential
- ☐ Always 0.65 mm thick

3 - Tapered roller bearing outer race

- ☐ Pulling out ⇒ [page 188](#)
- ☐ Pressing in ⇒ [page 189](#)

4 - Tapered roller bearing inner race

- ☐ Pulling off ⇒ [page 189](#)
- ☐ Pressing on ⇒ [page 189](#)

5 - Differential cage

- ☐ With splines -arrow- for bevel box in four-wheel drive vehicles

6 - Tapered roller bearing inner race

- ☐ Pulling off ⇒ [page 189](#)
- ☐ Pressing on ⇒ [page 189](#)

7 - Tapered roller bearing outer race

- ☐ Pulling out ⇒ [page 189](#)
- ☐ Pressing in ⇒ [page 190](#)

8 - Shim

- ☐ For differential
- ☐ Determining thickness ⇒ [page 191](#)
- ☐ Will be damaged when removed; renew

9 - Oil deflector plate

- ☐ Installation position: shoulder on inside diameter faces clutch housing

10 - Clutch housing

11 - Oil seal

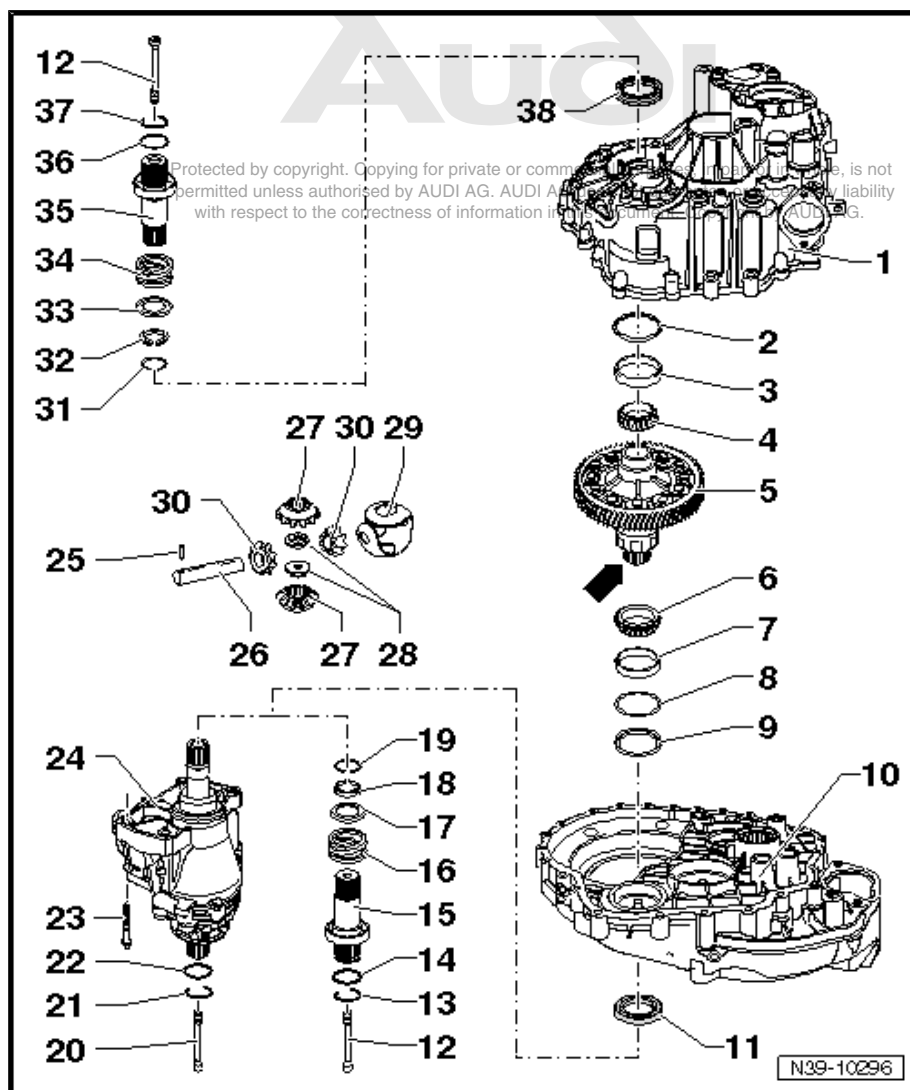
- ☐ Renewing ⇒ [page 180](#)

12 - Bolt

- ☐ 35 Nm

13 - Circlip

- ☐ Only for vehicles with front-wheel drive



- ☐ Fit in annular groove in stub shaft
- ☐ Renew after removal

14 - O-ring

- ☐ Only for vehicles with front-wheel drive
- ☐ Renew after removal
- ☐ Fit in annular groove in stub shaft

15 - Stub shaft (right-side)

- ☐ Only for vehicles with front-wheel drive

16 - Spring

- ☐ Only for vehicles with front-wheel drive

17 - Thrust washer

- ☐ Only for vehicles with front-wheel drive
- ☐ Installation position: lip faces spring

18 - Tapered ring

- ☐ Only for vehicles with front-wheel drive
- ☐ Installation position: Taper towards differential cage

19 - Circlip

- ☐ Only for vehicles with front-wheel drive
- ☐ Fit in annular groove in stub shaft
- ☐ Renew after removal

20 - Countersunk bolt

- ☐ 35 Nm

21 - Circlip

- ☐ Only for vehicles with four-wheel drive
- ☐ Fit in annular groove in stub shaft
- ☐ Renew after removal

22 - O-ring

- ☐ Only for vehicles with four-wheel drive
- ☐ Renew after removal
- ☐ Fit in annular groove in stub shaft

23 - Bolt

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- ☐ 4x
- ☐ Renew after removal
- ☐ 40 Nm + 90°

24 - Bevel box

- ☐ For vehicles with four-wheel drive
- ☐ Oil seals in bevel box and stub shaft bearings ➔ [page 195](#)

25 - Spring pin

- ☐ For securing differential pinion pin
- ☐ Removing ➔ [page 190](#)
- ☐ Installing ➔ [page 190](#)

26 - Differential pinion pin

- ☐ Drive out with drift
- ☐ Installing ➔ [page 191](#)

27 - Sun wheel

- ☐ Installing ➔ [page 191](#)

28 - Threaded piece

- ☐ Installing ⇒ [page 191](#)

29 - One-piece thrust washer

- ☐ Lubricate with gear oil before installing
- ☐ Fit in differential cage ⇒ [page 190](#)

30 - Planet pinion

- ☐ Removing and installing ⇒ [page 191](#)

31 - Circlip

- ☐ Fit in annular groove in stub shaft
- ☐ Renew after removal

32 - Tapered ring

- ☐ Installation position: Taper towards differential cage

33 - Thrust washer

- ☐ Installation position: lip faces spring

34 - Spring for stub shaft (left-side)

- ☐ Installed behind stub shaft (left-side)

35 - Stub shaft (left-side)

36 - O-ring

- ☐ For stub shaft (left-side)
 - ☐ Renew after removal
 - ☐ Fit in annular groove in stub shaft
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37 - Circlip

- ☐ Fit in annular groove in stub shaft
- ☐ Renew after removal

38 - Oil seal

- ☐ For stub shaft (left-side)
- ☐ Renewing ⇒ [page 196](#)

2.2 Dismantling and assembling differential

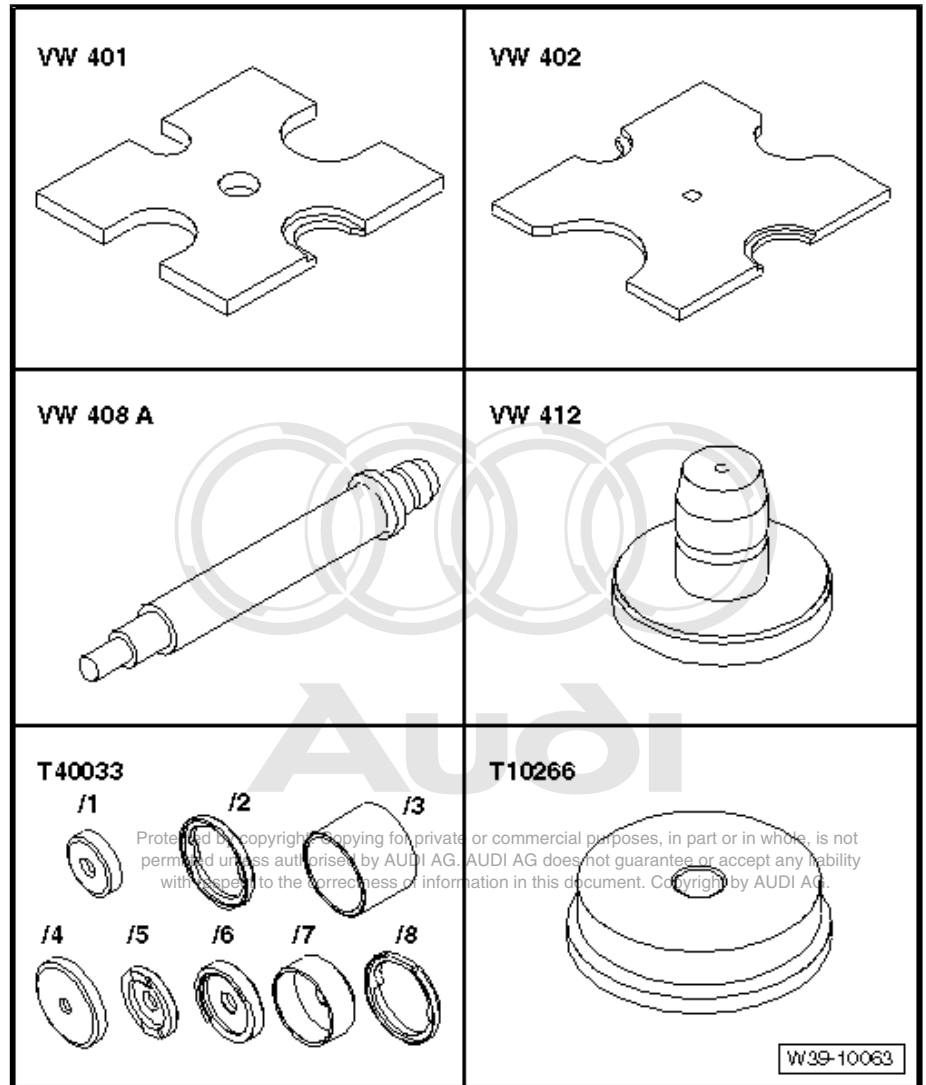


Note

- ◆ *Heat tapered roller bearing inner race to 100°C before installing.*
- ◆ *Always renew both tapered roller bearings together.*
- ◆ *If differential cage is renewed, adjust differential*
⇒ [page 191](#) .

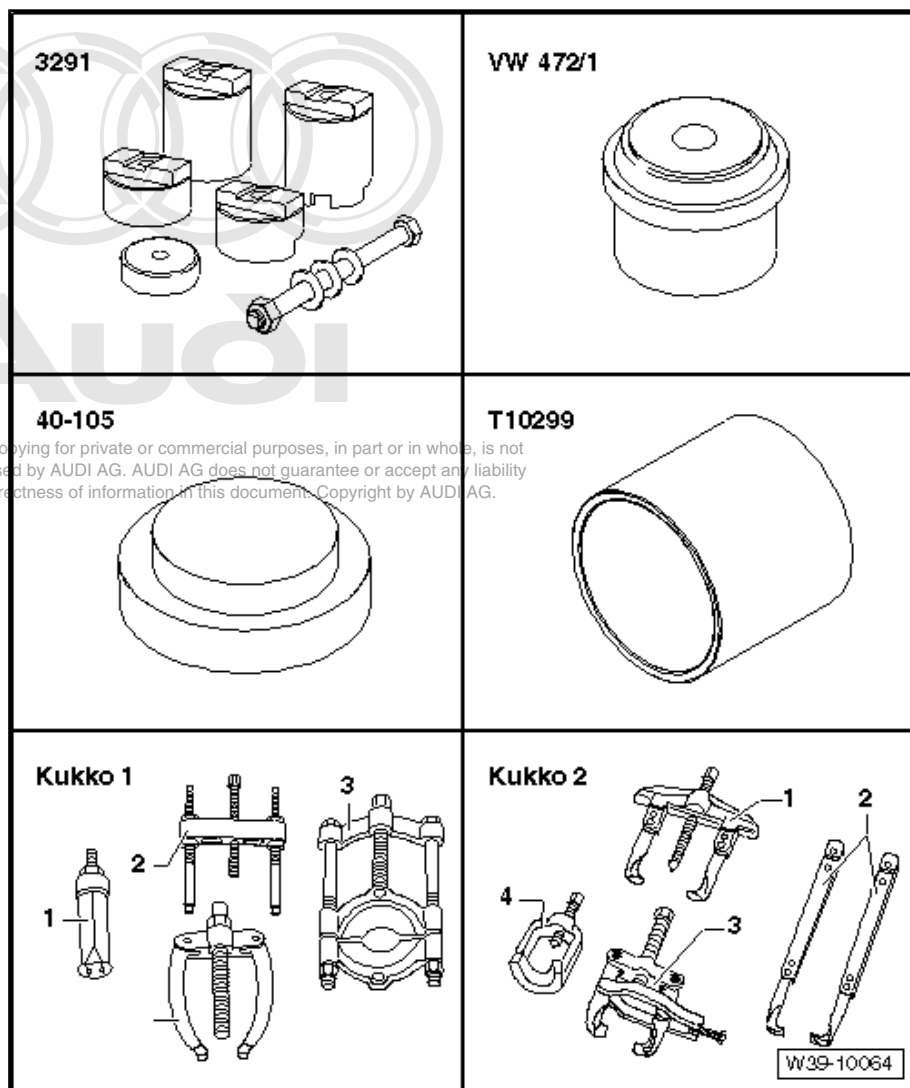
Special tools and workshop equipment required

- ◆ Thrust plate - VW 401-
- ◆ Thrust plate - VW 402-
- ◆ Press tool - VW 408 A-
- ◆ Press tool - VW 412-
- ◆ Assembly tool - T40033/3-
- ◆ Thrust piece - T10266-



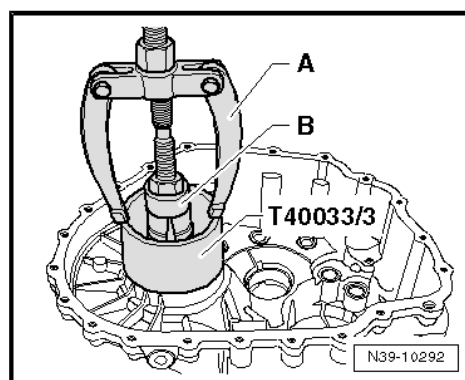
- ◆ Assembly tool - 3291/2-
- ◆ Press tool with spacer sleeve - VW 472/1-
- ◆ Thrust plate - 40 - 105-
- ◆ Pressure sleeve - T10299-
- ◆ -1- Internal puller 56...70 mm, e.g. -Kukko 21/8-
- ◆ -4- Counter support, e.g. -Kukko 22/2-
- ◆ -1- Two arm puller, e. g. -Kukko 20/10-

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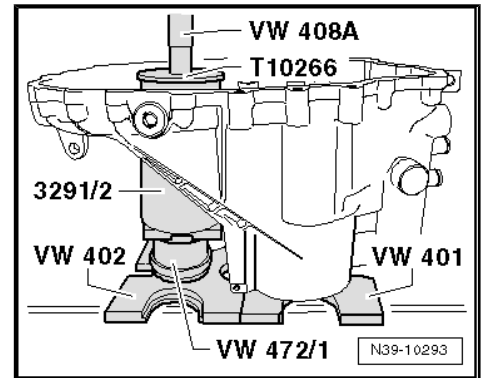
Pulling tapered roller bearing outer race out of gearbox housing

- A - Counter-support, e.g. -Kukko 22/2-
- B - Internal puller 56...70 mm, e.g. -Kukko 21/8-



Pressing tapered roller bearing outer race into gearbox housing

- Support gearbox housing with assembly tool - 3291/2- directly below bearing mounting.



Pulling off tapered roller bearing inner race for bearing in gearbox housing and for bearing in clutch housing

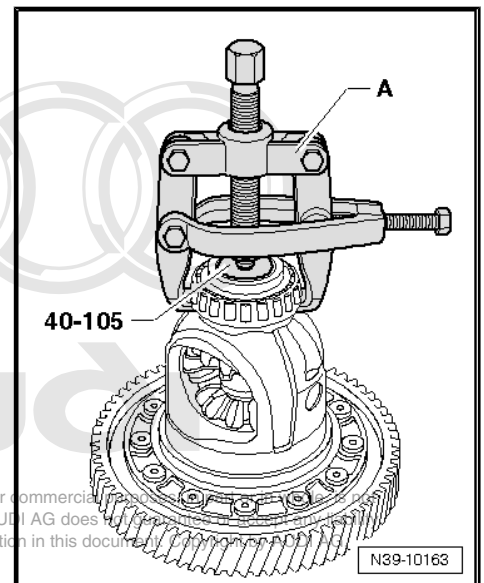


Note

The procedure for pulling the tapered roller bearing inner races off the differential cage is the same for both bearings.

- Clamp puller -A- near flat sides of differential cage behind inner race.

A - Two-arm puller, e.g. -Kukko 20/10-

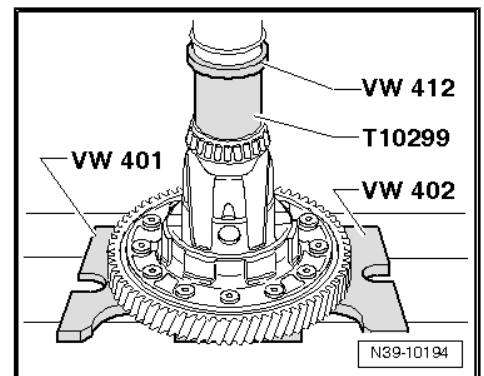


Pressing on tapered roller bearing inner race for bearing in gearbox housing and for bearing in clutch housing



Note

The procedure for pressing the tapered roller bearing inner races onto the differential cage is the same for both bearings.



Pulling tapered roller bearing outer race out of clutch housing

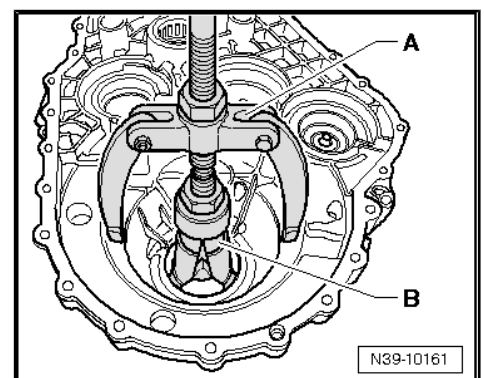
A - Counter-support, e.g. -Kukko 22/2-

B - Internal puller 56...70 mm, e.g. -Kukko 21/8-



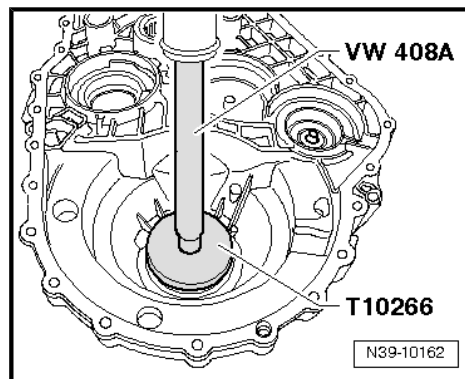
Note

After pulling out, renew damaged shim.



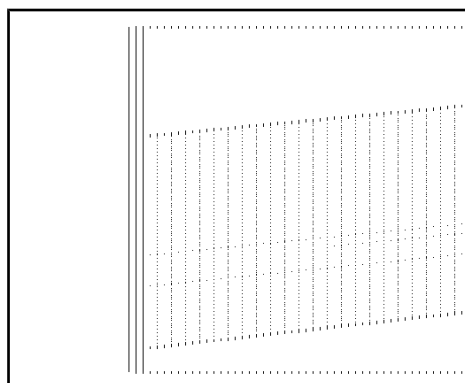
Pressing tapered roller bearing outer race into clutch housing

- First fit oil deflector plate and shim.
- Installation position of oil deflector plate: Shoulder on inside diameter faces towards oil seal



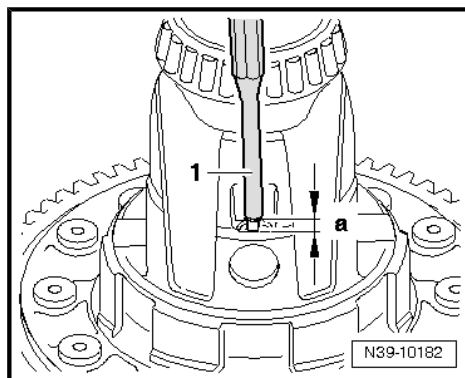
Removing spring pin for differential pinion pin

- Cover tapered roller bearing inner race to avoid damage and keep metal particles out of the bearing.
- Drive out spring pin with chisel, inserting chisel into annular groove.



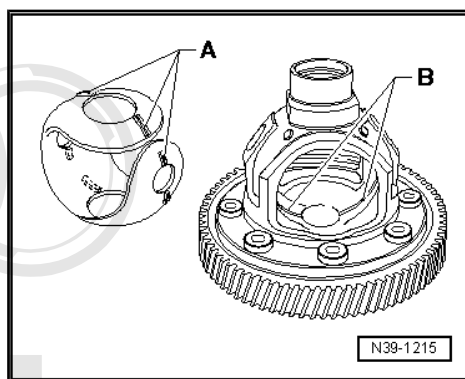
Installing spring pin for differential pinion pin

- Align drilling in differential pinion pin with drilling in differential cage.
- Drive in spring pin using drift -1- until dimension -a- = 3 ± 0.5 mm is attained.



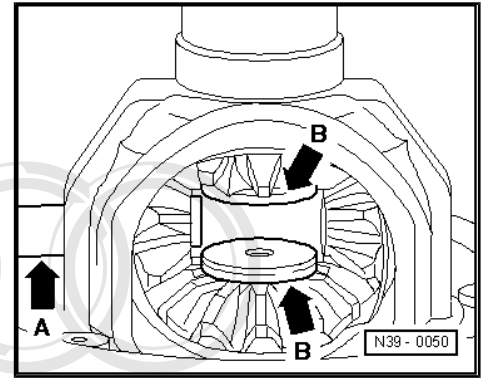
Installing one-piece thrust washer

- Lubricate one-piece thrust washer with gear oil.
- Install one-piece thrust washer so that ribs -A- engage in grooves -B- in differential cage.



Installing differential bevel gears and differential pinion pin

- Lubricate one-piece thrust washer with gear oil and install
⇒ [page 190](#) .
- Install both sun wheels and secure in position (e.g. with stub shaft).
- Fit planet pinions (180° apart) and pivot into position.
- Push differential pinion pin -arrow A- in as far as first planet pinion.
- Fit threaded pieces -arrows B- in sun wheels.
- Installation position: Stepped shoulder towards sun wheel
- Drive differential pinion pin into final position and secure with spring pin ⇒ [page 190](#) .



2.3 Adjusting differential

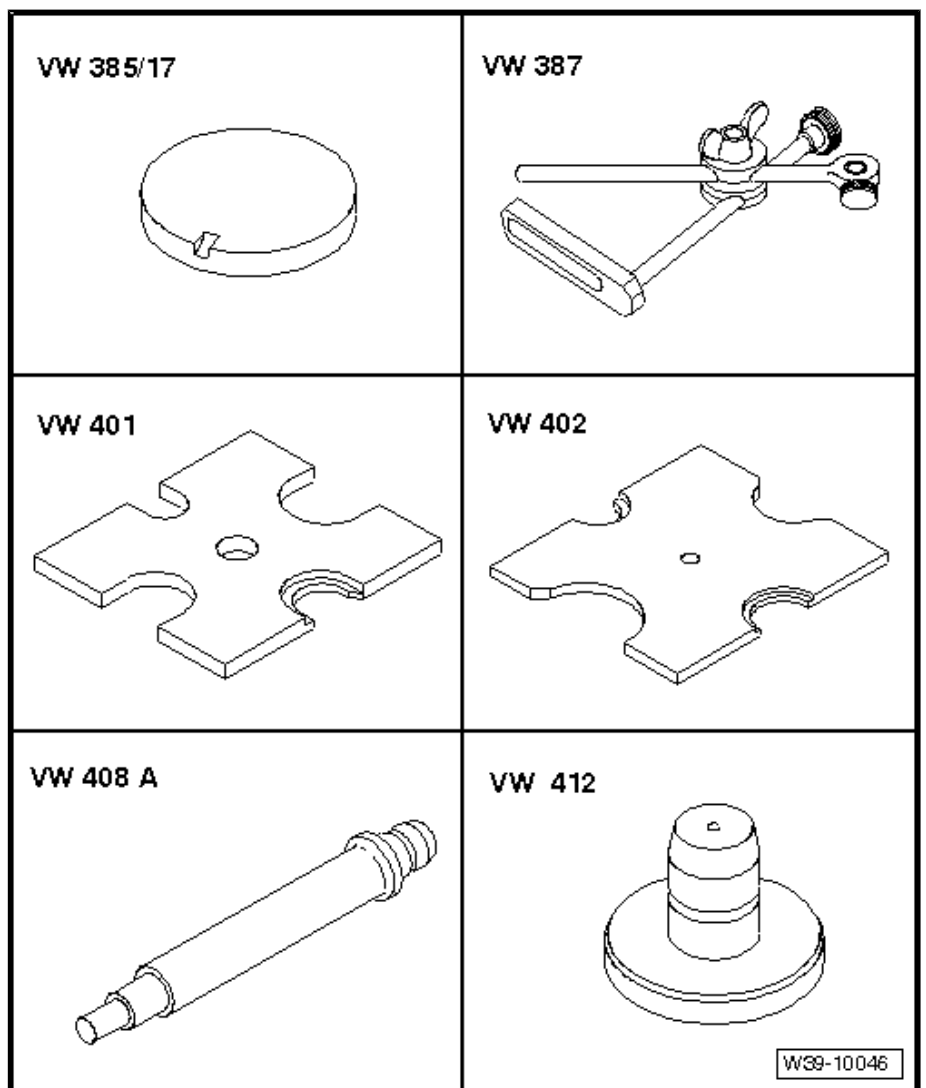
The differential must be re-adjusted if:

- ◆ Differential cage is renewed.

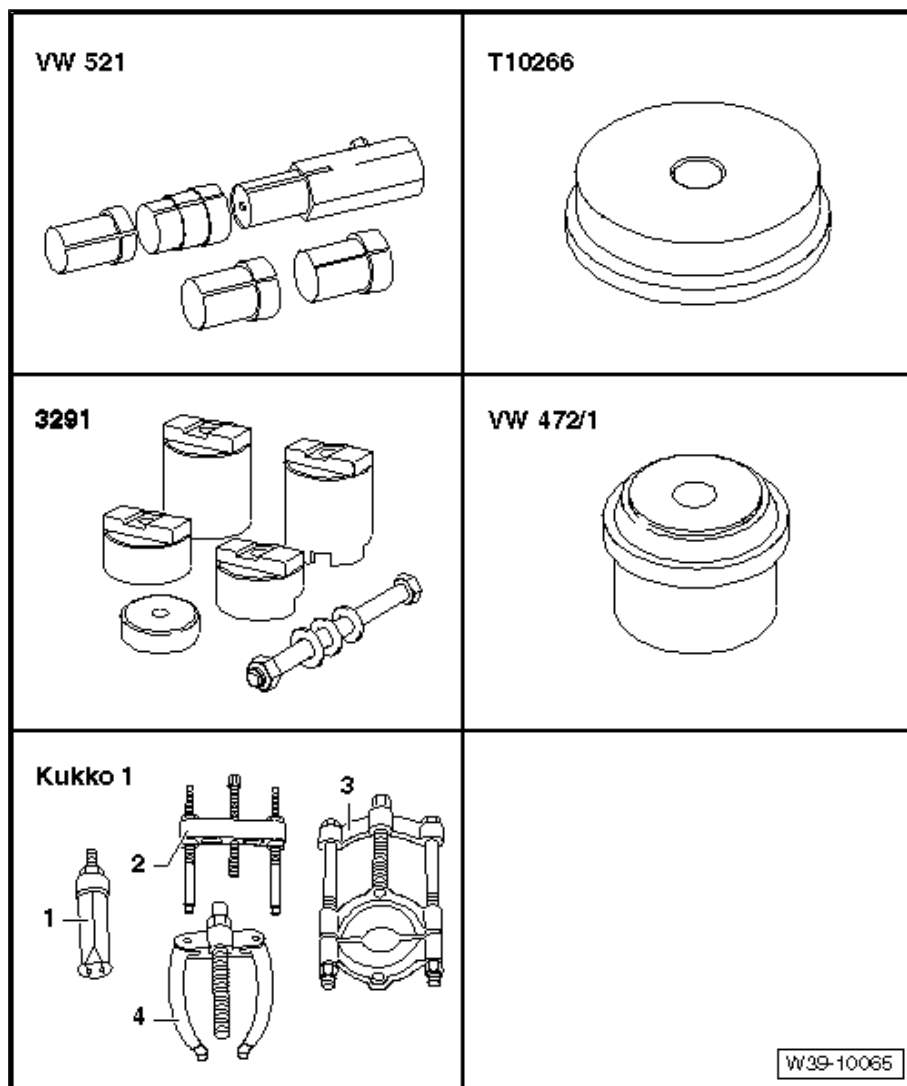
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Special tools and workshop equipment required

- ◆ End measuring plate - 385/17-
- ◆ Universal dial gauge bracket - VW 387-
- ◆ Thrust plate - VW 401-
- ◆ Thrust plate - VW 402-
- ◆ Press tool - VW 408 A-
- ◆ Press tool - VW 412-

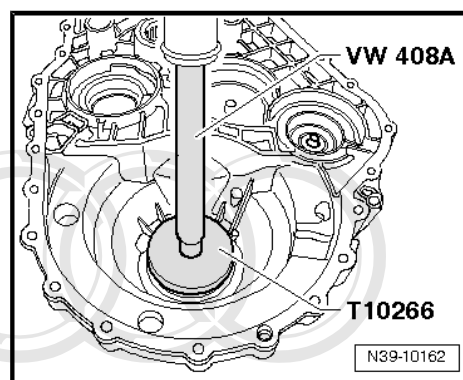


- ◆ Crown wheel adjusting tool - VW 521-
- ◆ Thrust piece - T10266-
- ◆ Assembly tool - 3291/2-
- ◆ Press tool with spacer sleeve - VW 472/1-
- ◆ -1- Internal puller 56...70 mm, e.g. -Kukko 21/8-
- ◆ -4- Counter support, e.g. -Kukko 22/2-



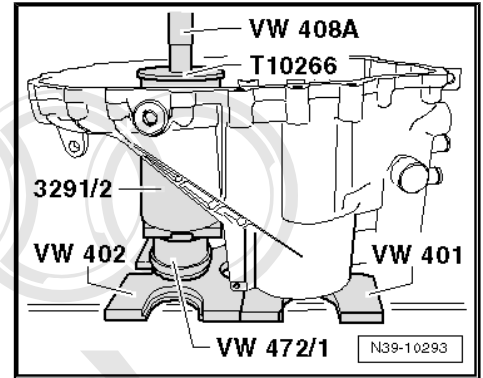
Procedure

- Press tapered roller bearing outer race without shim into clutch housing.

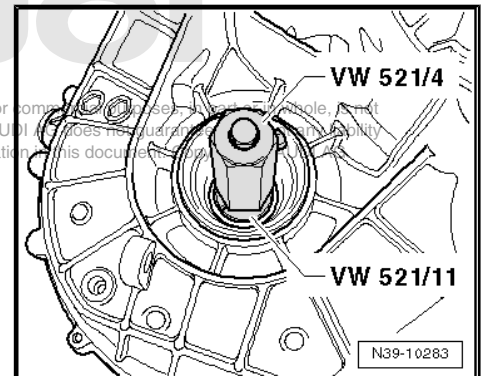


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- Press tapered roller bearing outer race with 0.65 mm thick shim into gearbox housing.
- Install differential in clutch housing.
- Fit gearbox housing and tighten 5 bolts to specified torque.



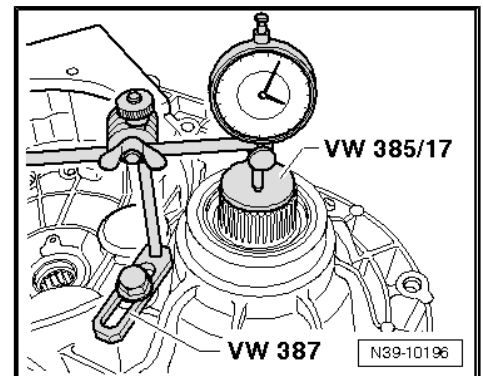
- Secure special tool crown wheel adjusting tool - VW 521/4- with crown wheel adjusting tool - VW 521/13- to differential cage on gearbox housing side.
- Secure universal dial gauge bracket - VW 387- to clutch housing and set dial gauge to "0" with 1 mm preload.
- Swing round gearbox in assembly stand so that clutch housing faces upwards.



- Press differential towards clutch housing; hold in this position and turn eight times.
- Move differential up and down using special tool -VW 521/4- and note play indicated on dial gauge (in this example: 0.70 mm).

Select required shim from table ➔ [page 194](#) .

- It is important to perform the measurement as shown in the illustration. Otherwise the measured value will be incorrect.



Determining thickness of shim

- Take off gearbox housing.
- Pull tapered roller bearing outer race out of clutch housing.

A - Counter-support, e.g. -Kukko 22/2-

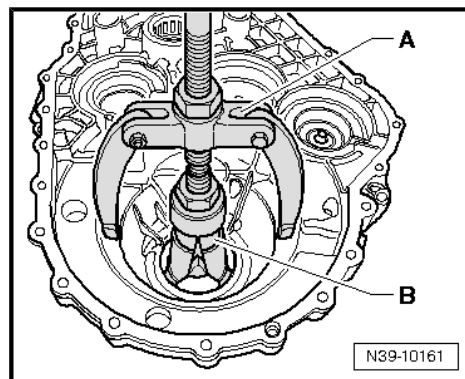
B - Internal puller 56...70 mm, e.g. -Kukko 21/8-

- First fit oil deflector plate in clutch housing.



Note

Observe installation position of oil deflector plate; shoulder on inner diameter faces seal.



- Then fit shim of determined thickness (in example, 0.95 mm).

The following shims are available:

Bearing clearance	Shim
Measured value (mm)	Thickness (mm)
0.359 ... 0.430	0.65
0.431 ... 0.480	0.70
0.481 ... 0.530	0.75
0.531 ... 0.580	0.80
0.581 ... 0.630	0.85
0.631 ... 0.680	0.90
0.681 ... 0.730	0.95
0.731 ... 0.780	1.00
0.781 ... 0.830	1.05
0.831 ... 0.880	1.10
0.881 ... 0.930	1.15
0.931 ... 0.980	1.20
0.981 ... 1.030	1.25
1.031 ... 1.080	1.30
1.081 ... 1.130	1.35
1.131 ... 1.250	1.40

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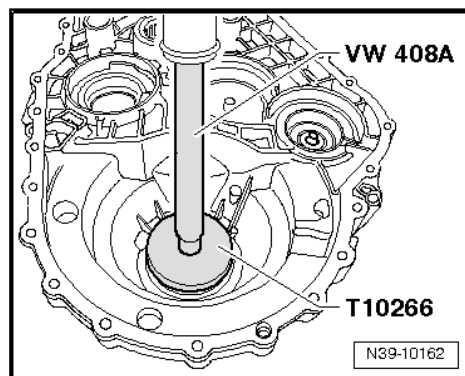


Note

Select correct shims from ⇒ *Electronic parts catalogue*.

If the size of the shim required is larger than those listed in the table, install two shims amounting to the correct value.

- Press in outer race again and secure gearbox housing.



3 Bevel box

⇒ [“3.1 Exploded view - bevel box”, page 195](#)

⇒ [“3.2 Renewing oil seals for bevel box”, page 196](#)

3.1 Exploded view - bevel box

1 - Oil seal

- ☐ On bevel box between gearbox and bevel box
- ☐ Renewing ⇒ [page 199](#)

2 - Oil seal

- ☐ For stub shaft (right-side)
- ☐ In bevel box
- ☐ Renew together with -item 4- ⇒ [page 200](#)

3 - Screw plug

- ☐ With captive seal
- ☐ Renew after removal
- ☐ 15 Nm

4 - Sealing cap

- ☐ Drive in as far as stop using spacer tube - VW 540 1B- .

5 - Oil seal (right-side)

- ☐ For stub shaft on outside of bevel box
- ☐ Renewing ⇒ [page 196](#)
- ☐ Renew together with -item 2- ⇒ [page 200](#)

6 - Bevel box

- ☐ Removing and installing (gearbox removed from vehicle) ⇒ [page 94](#)

7 - Cap

- ☐ For bevel box breather

8 - Breather pipe

- ☐ For bevel box breather
- ☐ Press in onto stop

9 - Circlip

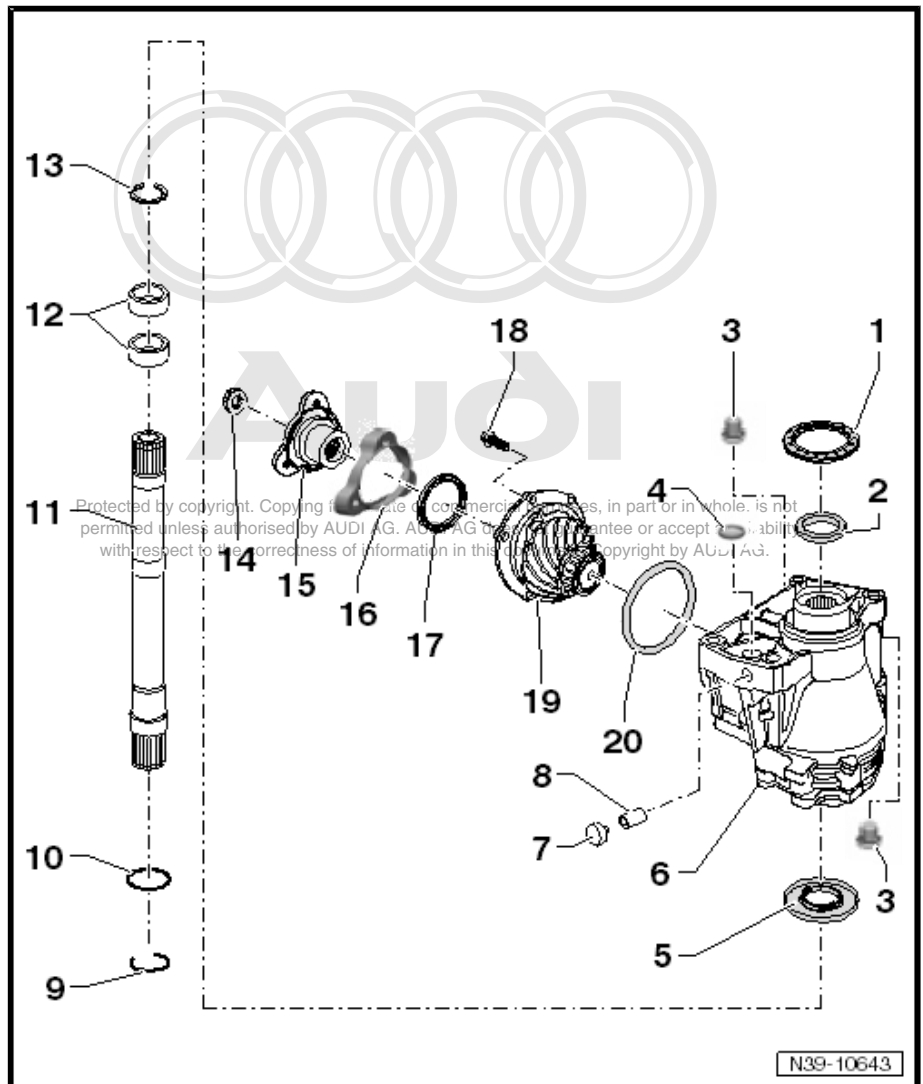
- ☐ Renew after removal
- ☐ Fit in annular groove in stub shaft

10 - O-ring

- ☐ Renew after removal
- ☐ Fit in annular groove in stub shaft

11 - Stub shaft (right-side)

- ☐ Removing and installing
⇒ [“3.2.5 Renewing needle bearings \(polygon bearings\) for stub shaft \(right-side\)”, page 208](#)



12 - Needle bearing (polygon bearing)

- ☐ Does not turn easily when stub shaft (right-side) is removed; this does not indicate a fault
- ☐ Acoustic check can only be performed when installed
- ☐ Check for damage such as cracking in outer race
- ☐ Renewing ⇒ [page 208](#)

13 - Circlip

- ☐ Renew after removal
- ☐ For needle bearings (polygon bearings)
- ☐ Fit in annular groove in stub shaft

14 - Nut

- ☐ Removing ⇒ [page 206](#)
- ☐ Renew
- ☐ Install with locking fluid; for locking fluid refer to ⇒ Electronic parts catalogue
- ☐ Installing ⇒ [page 208](#)
- ☐ 480 Nm

15 - Output flange

- ☐ For bevel box

16 - Cap

- ☐ Must engage with output flange

17 - Oil seal

- ☐ For output flange on bevel box
- ☐ Renewing ⇒ [page 203](#)

18 - Bolt

- ☐ Tighten diagonally
- ☐ 25 Nm

19 - Pinion housing

- ☐ With shaft bevel gear and taper roller bearing inner race
- ☐ Components are not available as replacement parts
- ☐ Carefully prise off and drive in on alternate sides
- ☐ Observe bolt holes; pinion housing fits only in one position

20 - O-ring

- ☐ To renew, unscrew bolts ⇒ [Item 18 \(page 196\)](#) and carefully lever off pinion housing at projecting webs on outside edge
- ☐ Do not remove hexagon nut ⇒ [Item 14 \(page 196\)](#) and output flange ⇒ [Item 15 \(page 196\)](#)

3.2 Renewing oil seals for bevel box

⇒ [“3.2.1 Renewing oil seal \(right-side\)”, page 196](#)

⇒ [“3.2.2 Renewing oil seal between gearbox and bevel box \(on bevel box\)”, page 199](#)

⇒ [“3.2.3 Renewing oil seals for stub shaft \(right-side\)”, page 200](#)

⇒ [“3.2.4 Renewing oil seal for output flange”, page 203](#)

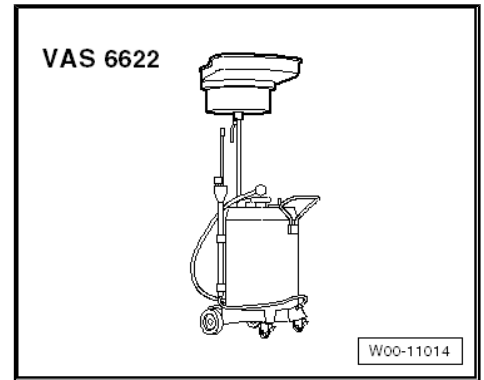
⇒ [“3.2.5 Renewing needle bearings \(polygon bearings\) for stub shaft \(right-side\)”, page 208](#)

3.2.1 Renewing oil seal (right-side)

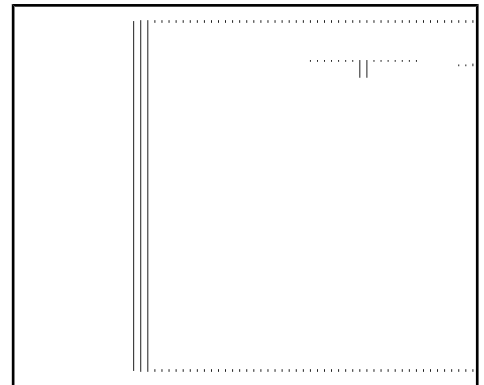
Special tools and workshop equipment required

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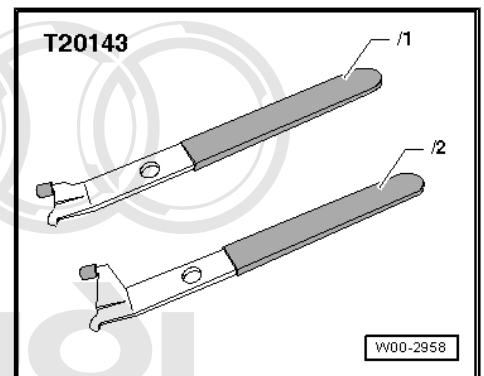
- ◆ Used oil collection and extraction unit - VAS 6622-



- ◆ Thrust piece - T10143-



- ◆ Extractor tool - T20143-



- ◆ Sealing grease - G 052 128 A1-

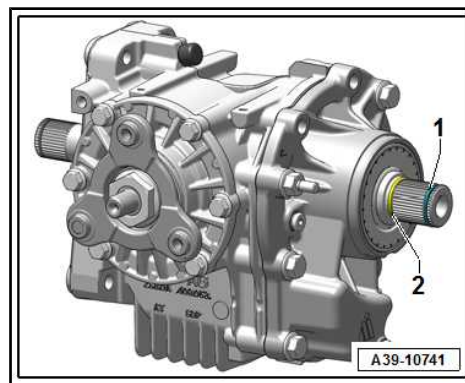
- ◆ Grease for stub shaft splines ⇒ **Electronic parts catalogue**

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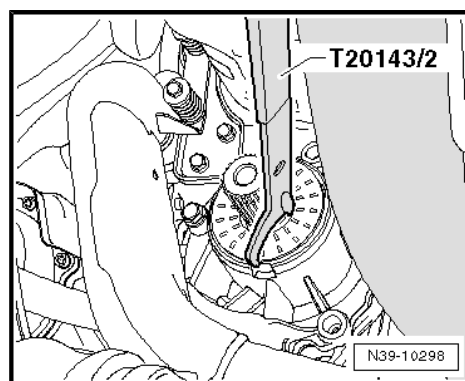
Procedure

- Bevel box must be installed.
- Remove drive shaft (right-side) ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Removing and installing drive shaft .

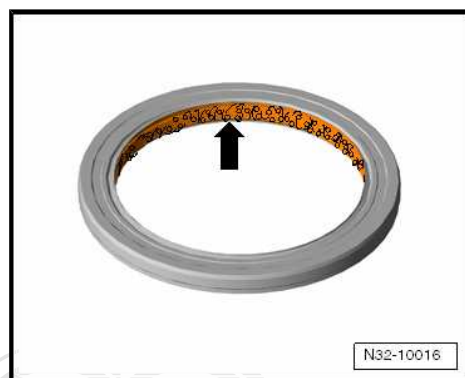
- Detach circlip -1- and O-ring -2- from stub shaft.



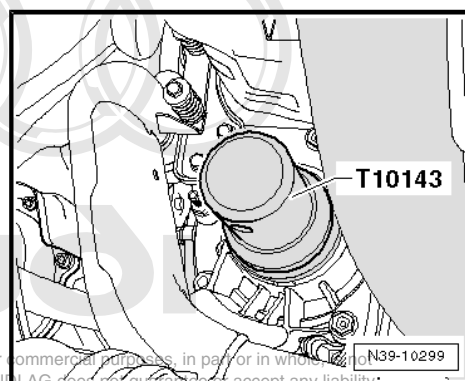
- Place used oil collection and extraction unit - VAS 6622- below bevel box.
- Pry out oil seal.



- Lubricate outer circumference of new oil seal with gear oil.
- Pack space between sealing lip and dust lip -arrow- half full with sealing grease - G 052 128 A1- .

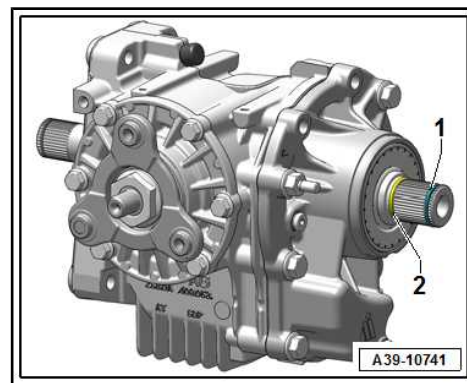


- Drive in oil seal onto stop (take care to keep oil seal straight).



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- Fit new circlip -1- and new O-ring -2-.
- Grease splines of stub shaft.
- Install drive shaft (right-side) ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Removing and installing drive shaft .
- Install heat shield for drive shaft (right-side) ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Exploded view - drive shaft .
- Check gear oil level ⇒ [page 212](#) .



3.2.2 Renewing oil seal between gearbox and bevel box (on bevel box)

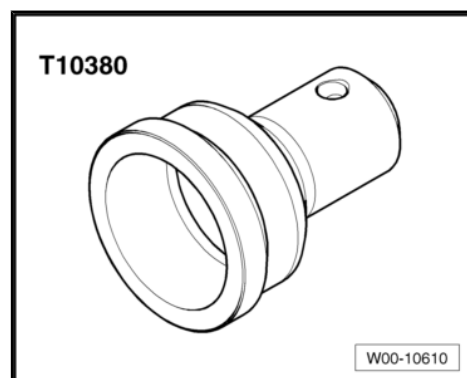
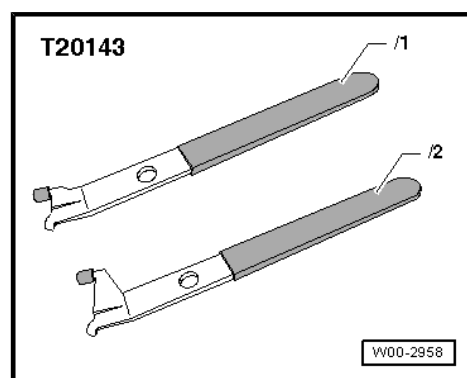
Special tools and workshop equipment required

- ◆ Extractor tool - T20143-



- ◆ Thrust piece -T10380-

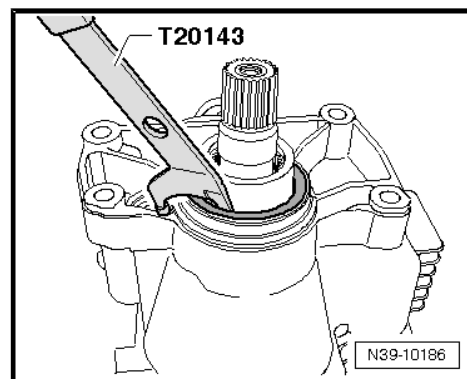
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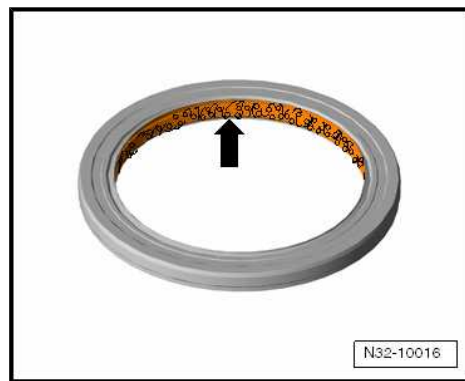
- ◆ Sealing grease - G 052 128 A1-

Procedure

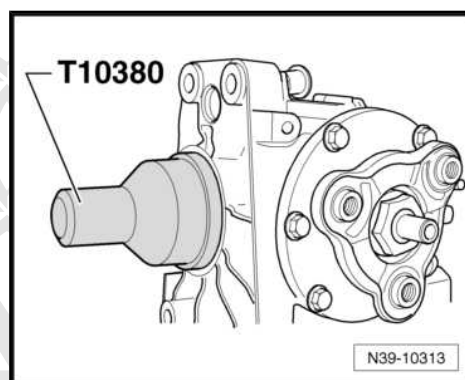
- Bevel box removed ⇒ [page 87](#) .
- Pull oil seal out of bevel box using extractor tool - T20143/1- or - T20143/2- .



- Lubricate outer circumference of new oil seal with gear oil.
- Pack space between sealing lip and dust lip -arrow- half full with sealing grease - G 052 128 A1- .



- Drive in oil seal as far as stop using thrust piece - T10380- .

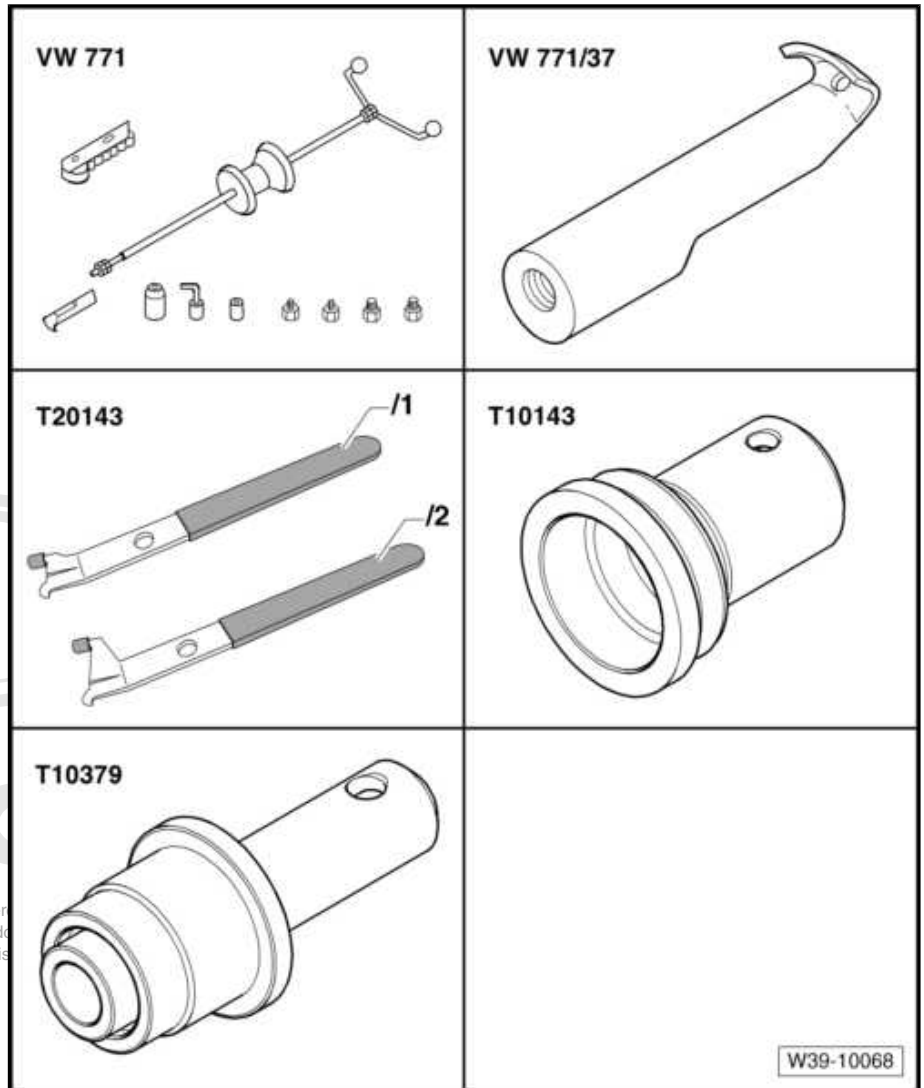


3.2.3 Renewing oil seals for stub shaft (right-side)

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Special tools and workshop equipment required

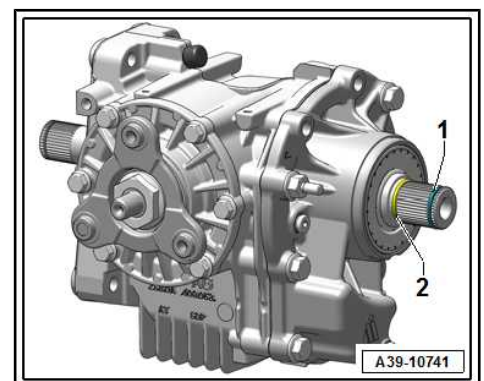
- ◆ Multi-purpose tool - VW 771-
- ◆ Extractor tool - VW 771/37-
- ◆ Extractor tool - T20143-
- ◆ Thrust piece - T10143-
- ◆ Thrust piece - T10379-
- ◆ Grease for stub shaft ➔ Electronic parts catalogue
- ◆ Sealing grease - G 052 128 A1-



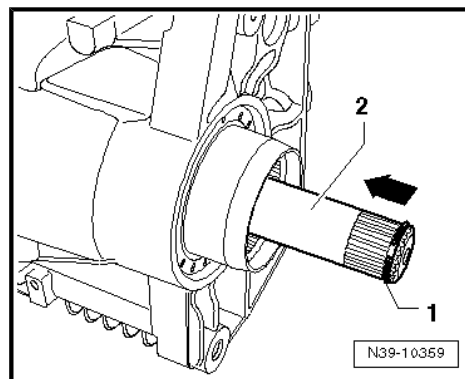
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Procedure

- Bevel box removed ➔ [page 87](#) .
- Detach circlip -1- and O-ring -2- from stub shaft.

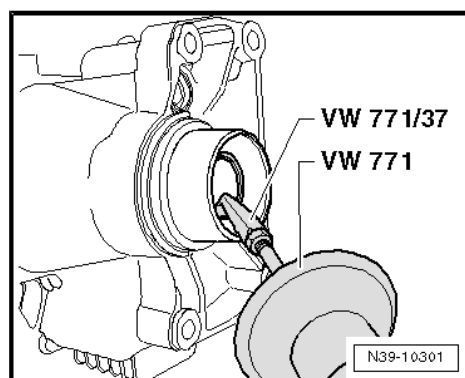


- Detach circlip -1- from stub shaft -2-.
- Carefully drive out stub shaft using plastic hammer -arrow-.



- Pull out stub shaft oil seal on gearbox side.

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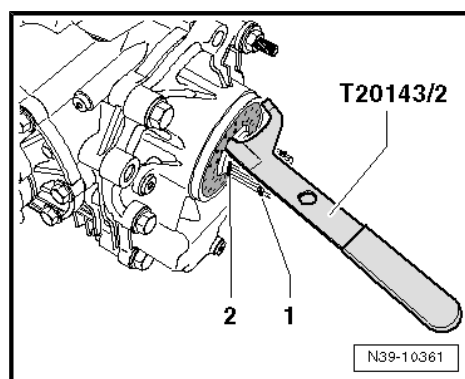


- Lever out stub shaft oil seal on drive shaft side.

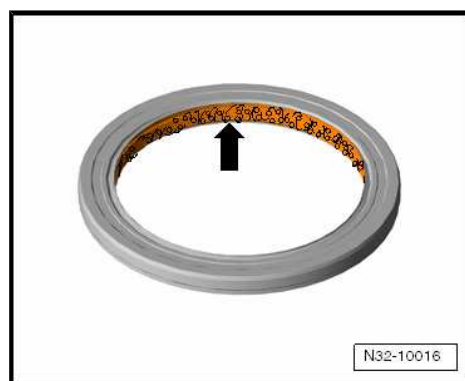


Note

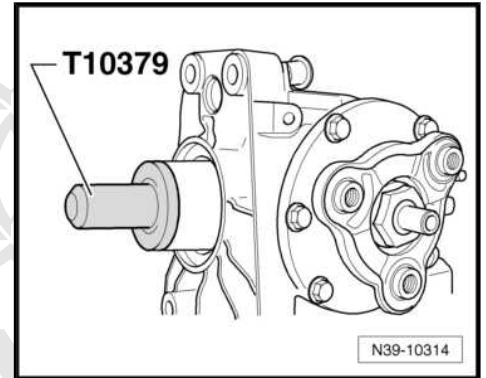
-Items 1 and 2- can be disregarded.



- Lubricate outer circumference of new oil seal with gear oil.
- Pack space between sealing lip and dust lip -arrow- half full with sealing grease - G 052 128 A1- .

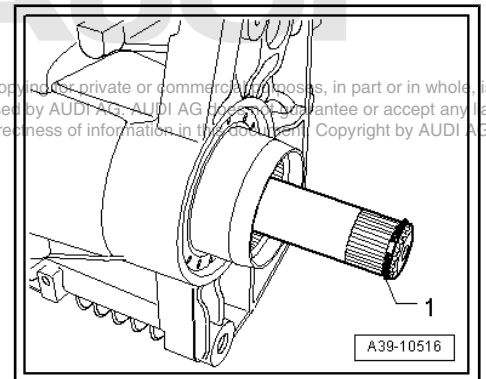


- Drive in oil seal on gearbox side as far as stop.

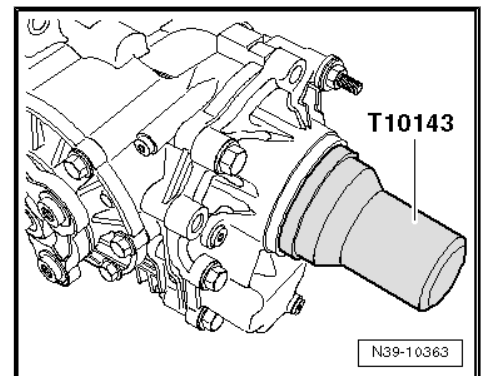


- Carefully drive stub shaft into bevel box as far as stop using plastic hammer.
- Fit new circlip -1- on stub shaft on gearbox side.

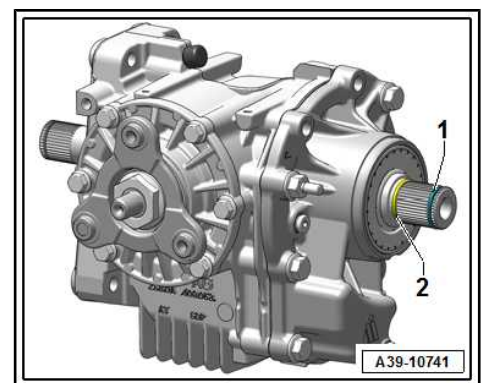
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- Drive in oil seal on drive shaft side as far as stop.



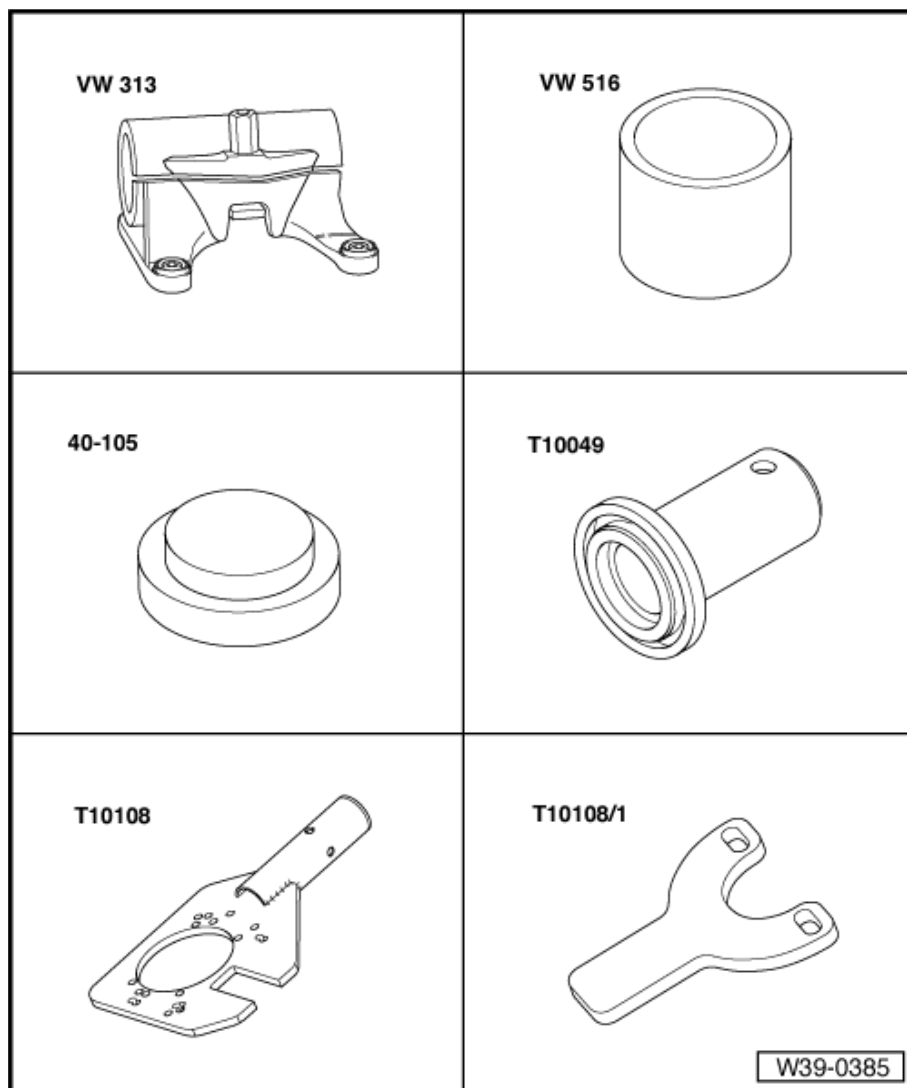
- Fit new circlip -1- and new O-ring -2-.
- Grease splines of stub shaft.



3.2.4 Renewing oil seal for output flange

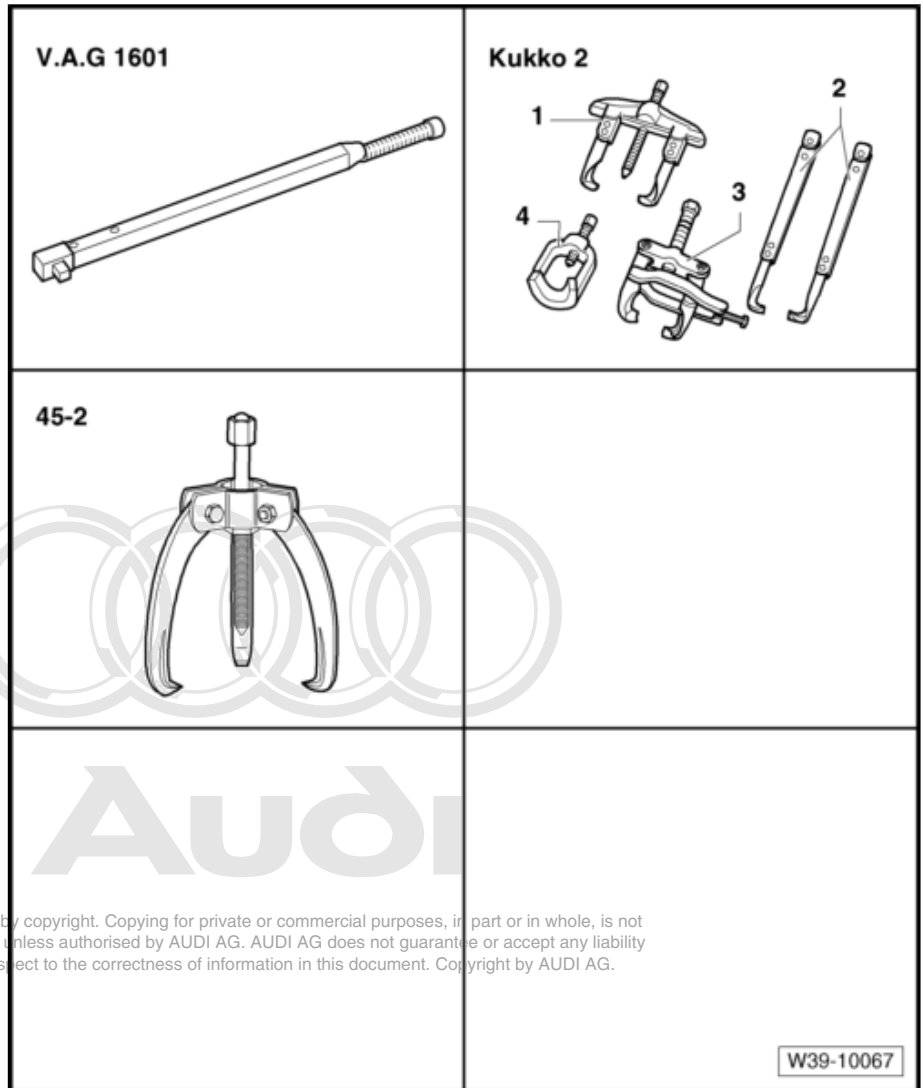
Special tools and workshop equipment required

- ◆ Support clamp - VW 313-
- ◆ Tube - VW 516-
- ◆ Thrust plate - 40 - 105-
- ◆ Thrust piece - T10049-
- ◆ Gearbox support - T10108-
- ◆ Support plate - T10108/1-

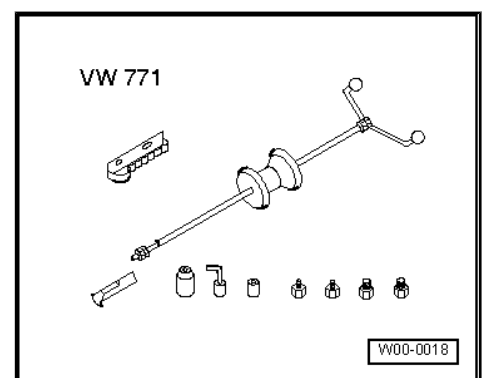


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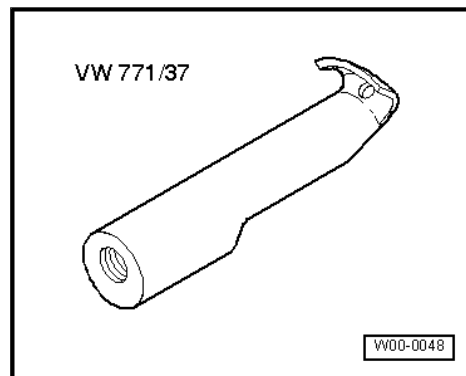
- ◆ Torque wrench - V.A.G 1601-
- ◆ -1- Two-arm puller -Kukko 20/10-
- ◆ Three-arm puller -Kukko 45-2-



- ◆ Multi-purpose tool - VW 771-



◆ Extractor tool - VW 771/37-



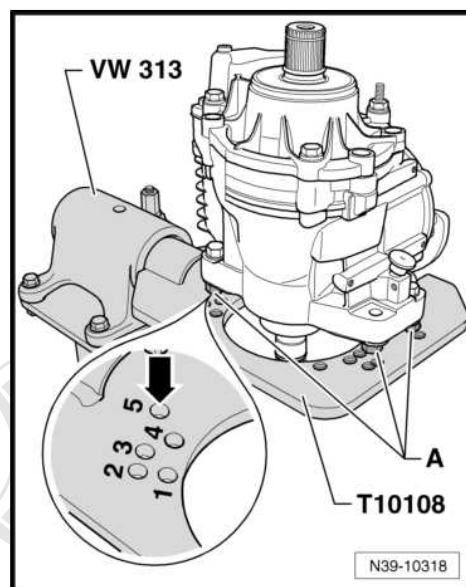
- ◆ Sealing grease - G 052 128 A1-
- ◆ Locking fluid ⇒ Electronic parts catalogue
- ◆ Bolt M10x30 (2x)
- ◆ Nuts M12x10 (4x)

Procedure

- Bevel box removed ⇒ [“4.1 Removing bevel box”, page 87](#) .
- Locate bevel box on hole marked -5- -arrow- in gearbox support - T10108- .

A - Nuts M12 x 10 (4x): Place between bevel box and gearbox support - T10108- . Nuts function as spacers.

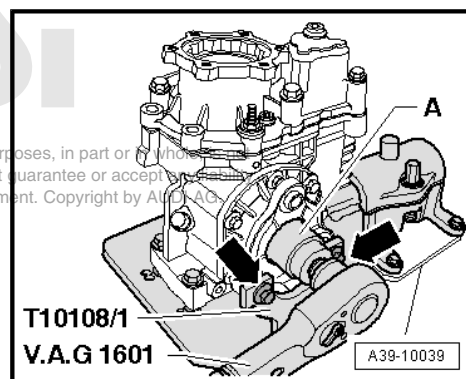
- Then align bevel box with hole opposite and secure.
- Drain gear oil out of bevel box ⇒ [page 213](#) .



- Lock output flange for bevel box in position using support plate - T10108/1- and bolts M10x30 (2x) -arrows-.
- Unscrew hexagon nut for output flange.

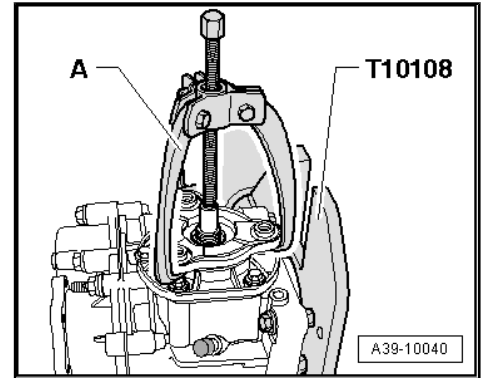
A - 36 mm socket for 3/4" drive

- Swing bevel box so that output flange points upwards.

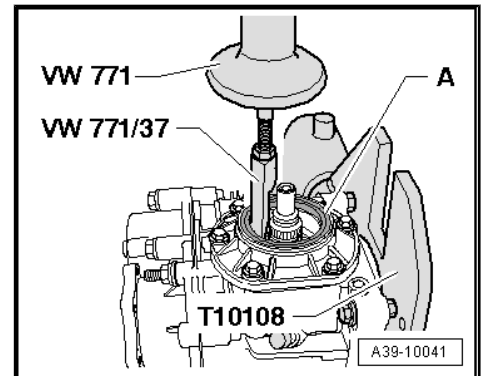


- Pull output flange off shaft bevel gear of bevel box.

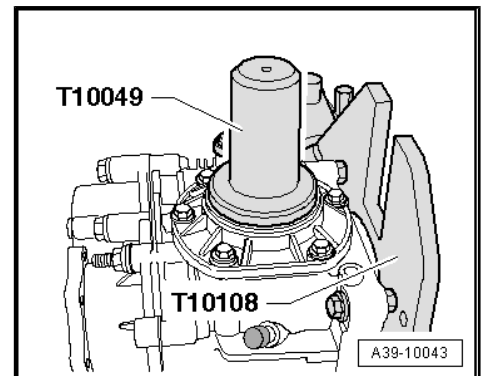
A - Three-arm puller, e.g. -Kukko 45-2-



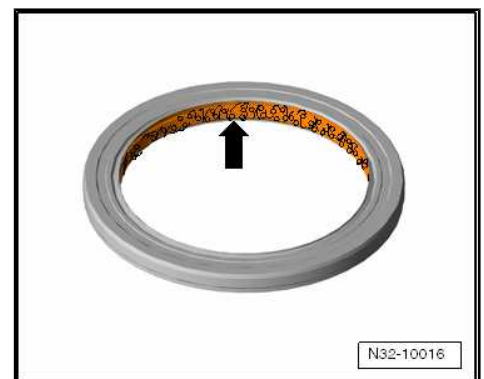
- Pull out oil seal -A- for output flange.
- Clean residual locking fluid from thread of shaft bevel gear.



- Lubricate outer circumference of new oil seal with gear oil.
- Drive in oil seal as far as stop using thrust piece - T10049- .

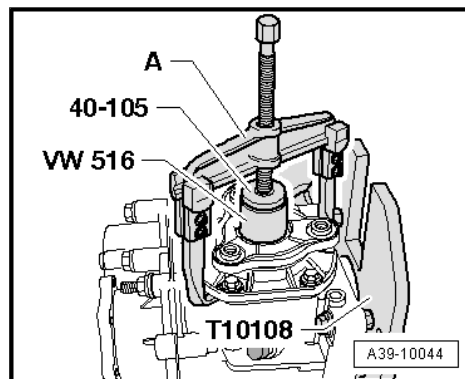


- Pack space between sealing lip and dust lip half-full with sealing grease - G 052 128 A1- .



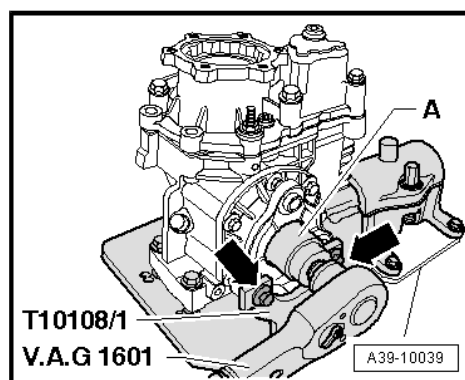
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- Apply puller hooks to underside of pinion housing and draw in output flange.
- A - Two-arm puller, e.g. -Kukko 20/10-
- Coat thread of new nut for output flange with locking fluid.



Tightening new hexagon nut for output flange to specified torque

- ◆ Tightening torque ⇒ [Item 14 \(page 196\)](#)
- A - 36 mm socket for 3/4" drive
- Fill up gear oil after installing bevel box ⇒ [page 213](#) .

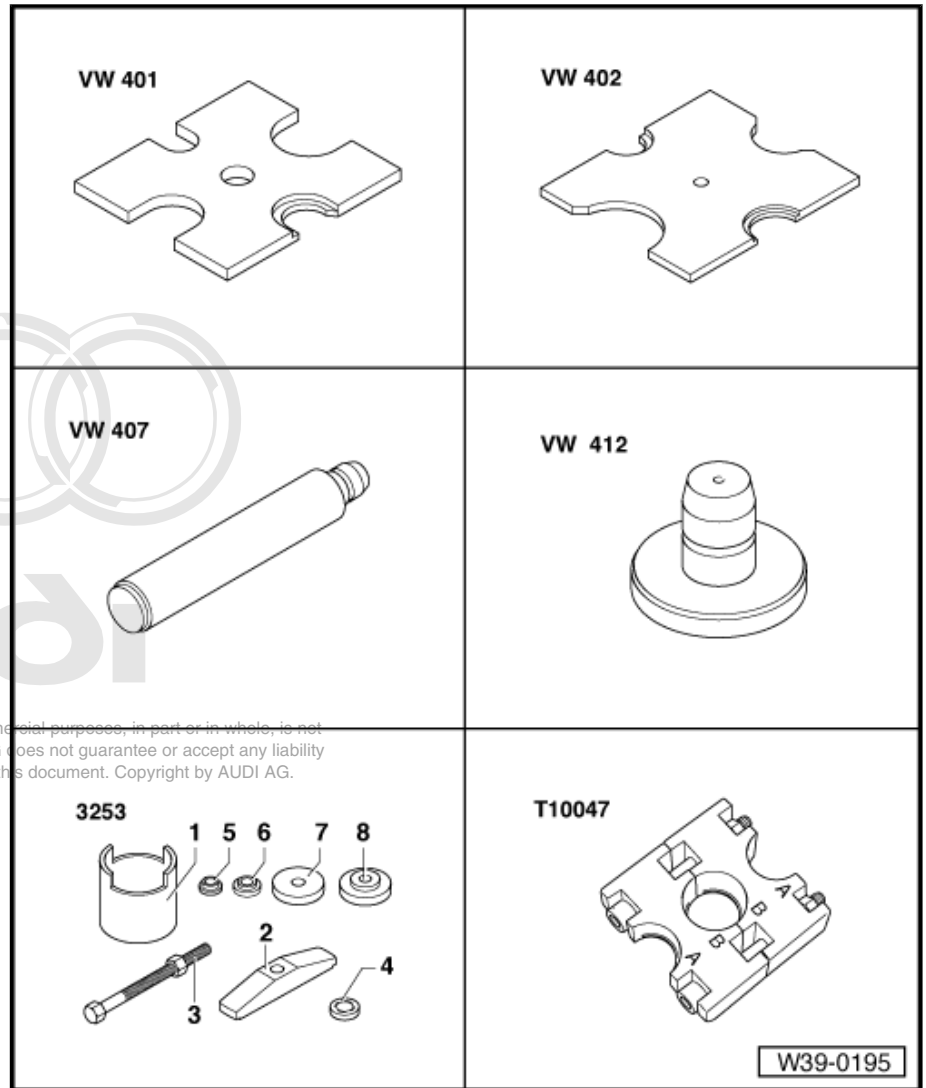


3.2.5 Renewing needle bearings (polygon bearings) for stub shaft (right-side)

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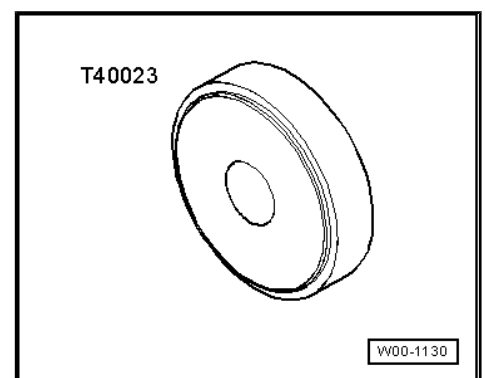
Special tools and workshop equipment required

- ◆ Thrust plate - VW 401-
- ◆ Thrust plate - VW 402-
- ◆ Press tool - VW 407-
- ◆ Press tool - VW 412-
- ◆ -3253/5- from assembly tool - 3253/5-
- ◆ Clamp - T10047-

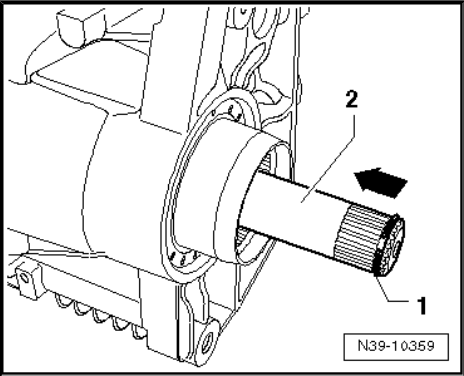
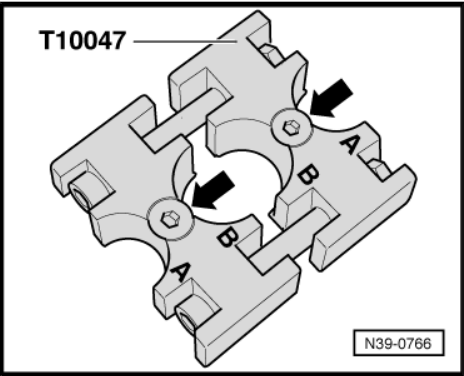
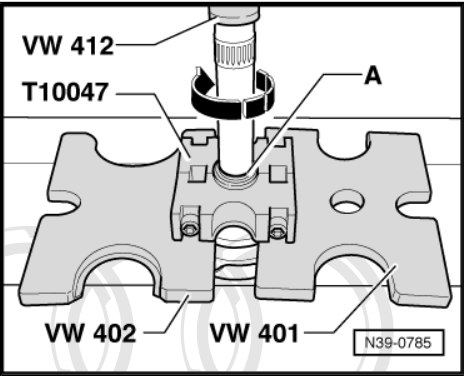
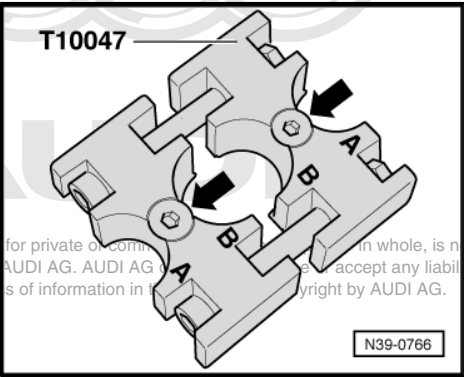


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- ◆ Thrust piece - T40023-

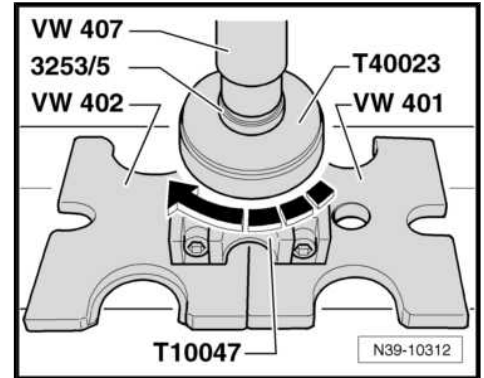


Procedure

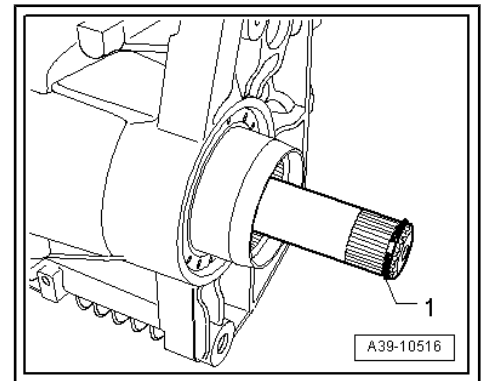
- Bevel box removed ➔ [page 87](#) .
 - Detach circlip -1- from stub shaft -2-.
 - Carefully drive out stub shaft -2- using plastic hammer -arrow-.
- 
- Assemble assembly tool - T10047- , as shown in illustration.
 - Marks "B" on both parts of tool face each other.
 - The stepped shoulders -arrows- must then be below the bearing.
 - Screw parts together as far as stop.
- 
- Remove circlip -A-.
 - Rotate shaft when pressing off -arrow- to prevent contact surface of needle bearings on shaft from being damaged.
- 
- Assemble assembly tool - T10047- , as shown in illustration.
- 

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- Rotate shaft when pressing on -arrow- to prevent contact surface of needle bearings on shaft from being damaged.
- Secure needle bearings in position with new circlip.
- Carefully drive stub shaft into bevel box as far as stop using plastic hammer.



- Fit new circlip -1- on stub shaft.



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4 Gear oil

⇒ "4.1 Checking gear oil level", page 212

⇒ "4.2 Draining and filling gear oil", page 213

4.1 Checking gear oil level



Note

- ◆ The bevel box is secured to the side of the gearbox and has a separate self-contained oil filling.
- ◆ For gear oil specifications, refer to ⇒ Electronic parts catalogue .

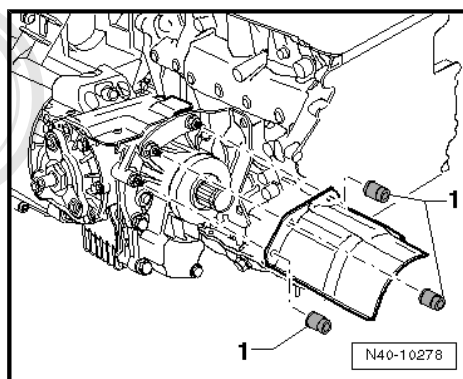
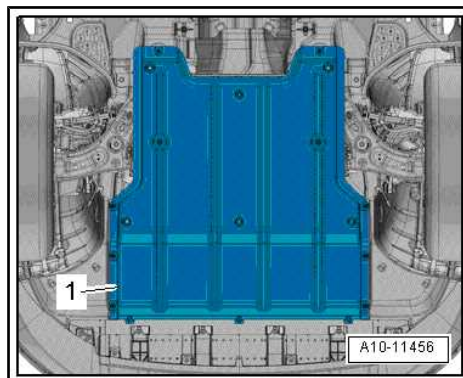
Procedure



Note

Renew screw plug for oil filler hole.

- Vehicle must be absolutely horizontal (on a four-pillar lifting platform or over an inspection pit).
- Engine not running.
- Remove noise insulation -1- ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- If fitted, remove nuts -1- and detach heat shield for drive shaft (right-side).



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 Note

Place a cloth below to catch escaping gear oil.

- Remove screw plug -1- from oil filler hole.
- Specification: gear oil level up to bottom lip of filler hole.
- Top up gear oil as necessary ⇒ [page 213](#) .

 Note

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- ◆ **Carefully remove any traces of escaped oil on bevel box.**
- ◆ *-Item 2- can be disregarded.*

- Install heat shield for drive shaft (right-side) ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Exploded view - drive shaft .
- Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .

Tightening torques

- ◆ Oil filler plug ⇒ [Fig. "Tightening torques"](#) , [page 217](#)

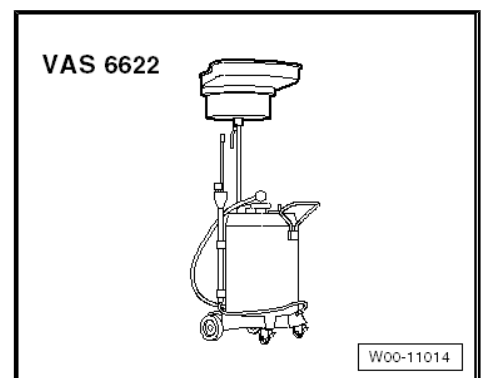
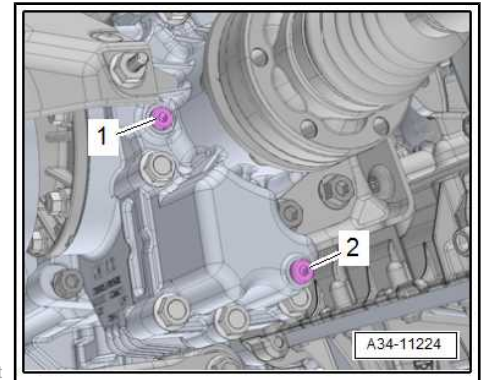
4.2 Draining and filling gear oil

 Note

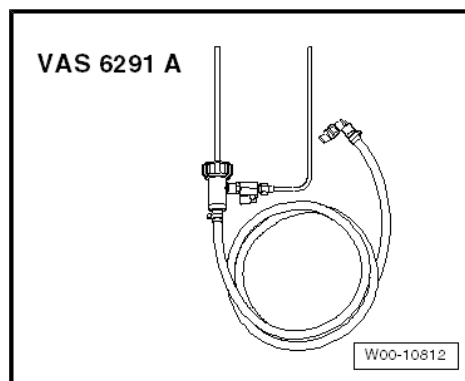
- ◆ *The gear oil in the bevel box only needs to be drained if repairs are required. An oil change is not normally required.*
- ◆ *For gear oil specifications, refer to ⇒ Electronic parts catalogue .*

Special tools and workshop equipment required

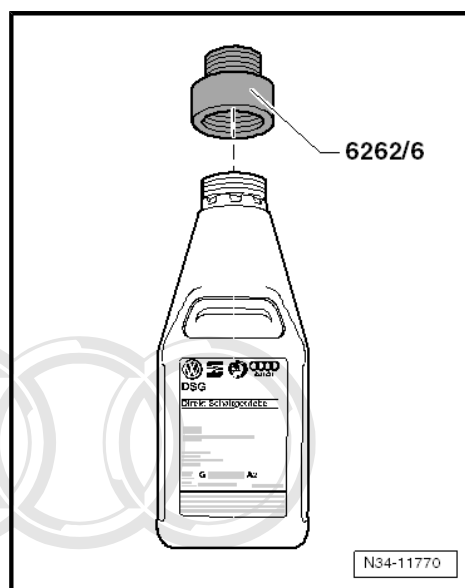
- ◆ Used oil collection and extraction unit - VAS 6622-



- ◆ Charging device for Haldex coupling 2 - VAS 6291 A- with adapter -VAS 6291/3-



- ◆ For some oil containers, an additional adapter - VAS 6262/6- must be used.



- ◆ Safety goggles
- ◆ Protective gloves (acid resistant)

Draining

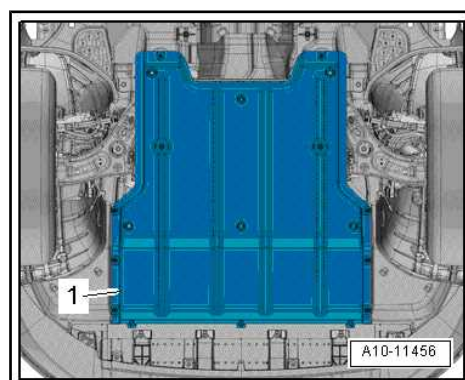


Note

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Renew oil drain plug and oil filler plug.

- Vehicle must be absolutely horizontal (on a four-pillar lifting platform or over an inspection pit).
- Engine not running.
- Remove noise insulation -1- ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .



- Place used oil collection and extraction unit - VAS 6622- below gearbox.



WARNING

Hot gear oil can cause burns.

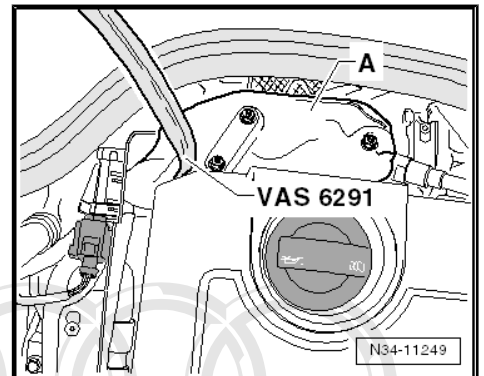
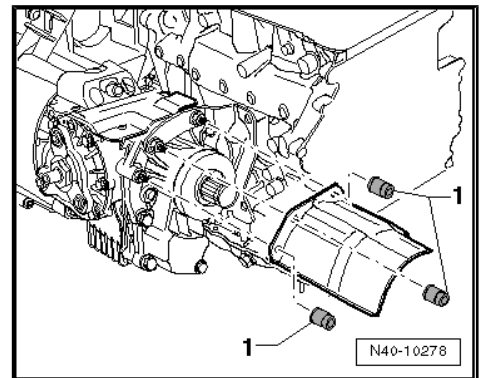
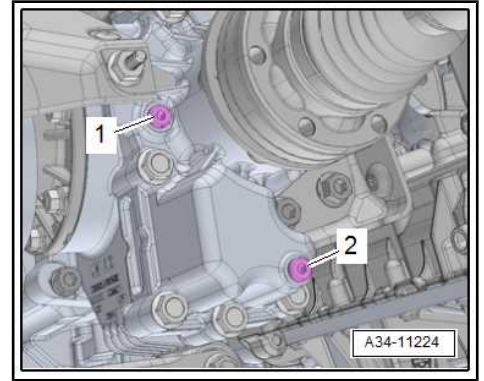
- ◆ *Wear safety goggles.*
- ◆ *Wear protective gloves (acid resistant).*

- Remove oil drain plug -2- and allow gear oil to drain off.
- Tighten new oil drain plug.

Filling

- If fitted, remove nuts -1- and detach heat shield for drive shaft (right-side).
- Route hose for charging device for Haldex coupling 2 - VAS 6291 A- through engine compartment.

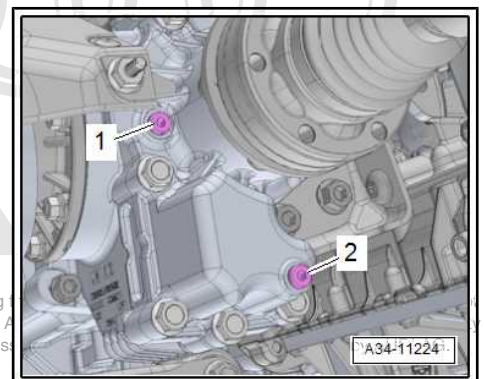
- Vehicles with particulate filter -A-: Guide hose of charging device for Haldex coupling 2 - VAS 6291 A- past particulate filter on right side.



Note

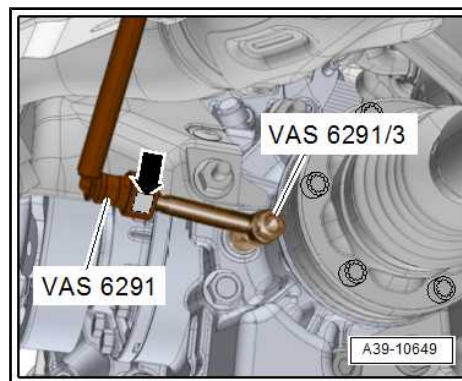
Leave used oil collection and extraction unit - VAS 6622- in position below gearbox to catch escaping gear oil.

- Remove screw plug -1- from oil filler hole.



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- Screw in adapter -VAS 6291/3- as far as stop.
- Connect elbow joint of charging device for Haldex coupling 2 - VAS 6291 A- to adapter -VAS 6291/3- , making sure it engages.
- The hose must not hang down.

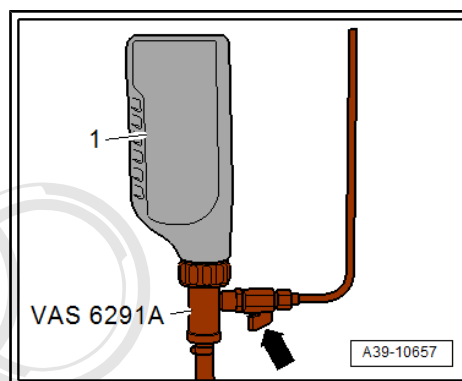


- Make sure that valve -arrow- is closed.
- Screw oil container -1- onto charging device for Haldex coupling 2 - VAS 6291 A- .

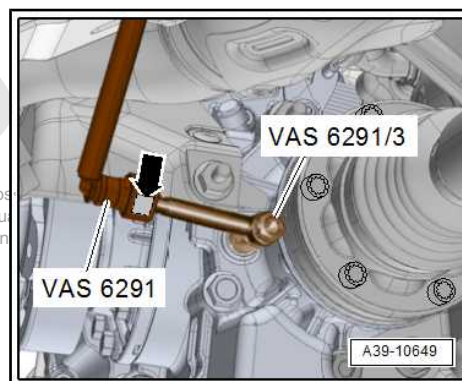


Note

For some oil containers, an additional adapter -VAS 6262/6- must be used.



- Open valve -arrow- and hold up oil container as shown in illustration.
- The bevel box will now be filled.
- When bevel box is filled correctly oil will emerge at adapter -VAS 6291/3- .
- When gear oil comes out at adapter - VAS 6291/3- , put down oil container so that excess oil can drain back into container.
- When oil stops flowing back, detach charging device for Haldex coupling 2 - VAS 6291 A- .
- Screw in »old« oil filler plug and tighten lightly.
- Start engine, engage a gear and allow gearbox to turn for approx. 2 minutes.
- Switch off engine and remove oil filler plug.
- Check oil level and fill gear oil up to bottom lip of filler hole again if necessary.
- Tighten new oil filler plug.



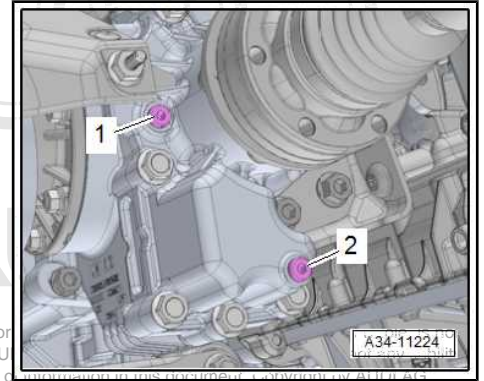
Note

Carefully remove any traces of escaped oil on bevel box.

- Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 ; Noise insulation; Removing and installing noise insulation .
- Install heat shield for drive shaft (right-side) ⇒ Running gear, axles, steering; Rep. gr. 40 ; Drive shaft; Exploded view - drive shaft .

Tightening torques

- 1 - Oil filler plug
 - Renew
 - 15 Nm
- 2 - Oil drain plug
 - Renew
 - 15 Nm



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