

Workshop Manual Audi Q3 2012 ➤

6-speed manual gearbox 0BB, front-wheel drive

Edition 11.2011



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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 - 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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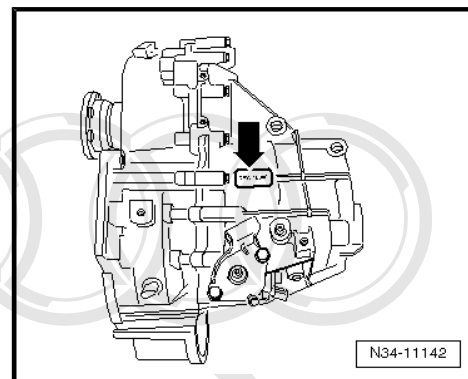
00 – Technical data

1 Gearbox identification

The 6-speed manual gearbox 0BB, front-wheel drive is installed in the Audi Q3 2012 ►. Allocation ⇒ [page 1](#).

Location on gearbox

- ◆ Code letters and production date -arrow-



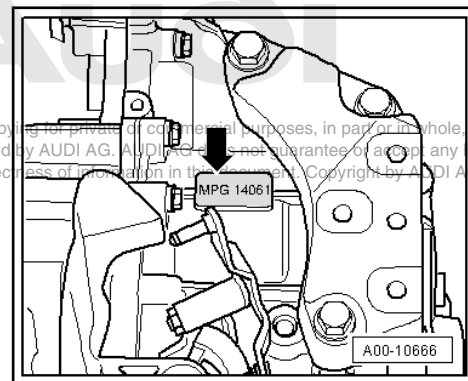
Code letters and production date of gearbox -arrow-

Example:	NFZ	14	06	1
	Code letters	Day	Month	Year of manufacture (2011)

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.



1.1 Code letters, allocation, transmission ratios, capacities

Manual gearbox		6-speed 0BB, front-wheel drive		
Code letters		NFZ		
Manufactured	from to	12.11		
Allocation	Model Engine	Q3 2012 ► 2.0 ltr. TDI 100/103 kW Start/stop		
Ratio	Final drive I for 1st to 4th gear	71 : 18 = 3.944		
$i = Z_2 : Z_1$	Final drive II for 5th/6th gear and reverse gear	71 : 23 = 3.087		
Capacity of manual gearbox		2.3 ltr.		



Manual gearbox	6-speed 0BB, front-wheel drive		
Code letters	NFZ		
The following data can be found in the ⇒ Electronic parts catalogue . ◆ Individual gear ratios ◆ Gear oil specification ◆ Bevel box gear oil specification ◆ Allocation of drive shaft flanges ◆ Allocation of clutch type ◆ Rear final drive identification			



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2 Transmission layout

Identification and ratio

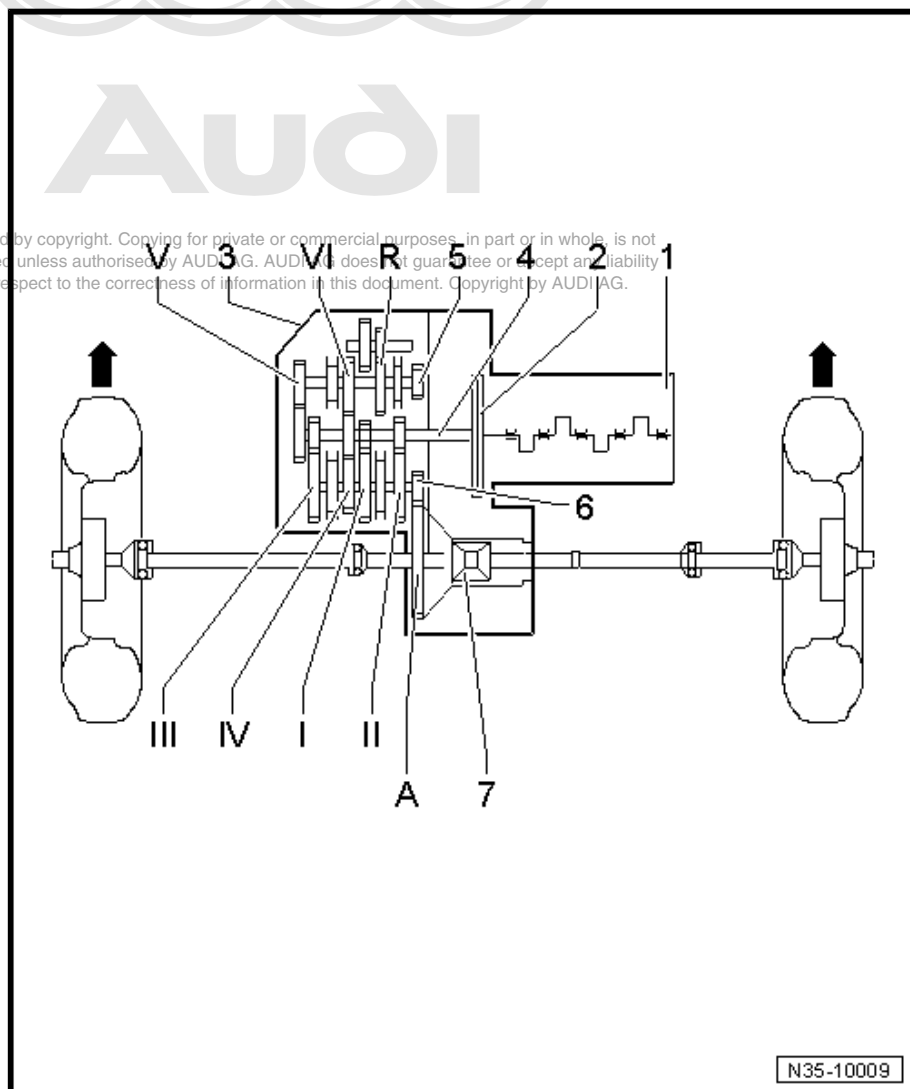


Note

Arrows point in direction of travel.

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

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2.1 Calculating ratio „i“

Example:

	6th gear	Final drive
Drive gear	ZG ₁ = 33	ZA ₁ = 23
Driven gear	ZG ₂ = 46	ZA ₂ = 71

$$i = ZG_2 : ZG_1 \text{ ¹⁾ }$$

$$i_G = \text{gear ratio} = ZG_2 : ZG_1 = 33 : 46 = 0.717$$

$$i_A = \text{axle ratio} = ZA_2 : ZA_1 = 71 : 23 = 3.087$$



$$i_{ov} = \text{overall ratio} = i_G \times i_A = 0.717 \times 3.087 = 2.215$$

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



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3 General repair instructions

Overview

- ◆ ⇒ „3.1 Safety precautions for vehicles with start/stop system“, page 5
- ◆ ⇒ „3.2 Contact corrosion!“, page 5
- ◆ ⇒ „3.3 Repair instructions“, page 5

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.

3.1 Safety precautions for 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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3.2 Contact corrosion!

- ◆ The gearbox casing is made of a magnesium alloy.
- ◆ Bolts and other components which are in direct contact with the gearbox casing are surface treated for compatibility with magnesium.
- ◆ If the incorrect components are used (bolts, nuts, washers etc.), this will cause contact corrosion. The gearbox housing will be damaged.
- ◆ If you are not sure whether used parts can be re-installed, always fit new parts ⇒ Electronic parts catalogue .

 **Caution**

Damage caused by contact corrosion is not covered under warranty.

3.3 Repair instructions

Special tools

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

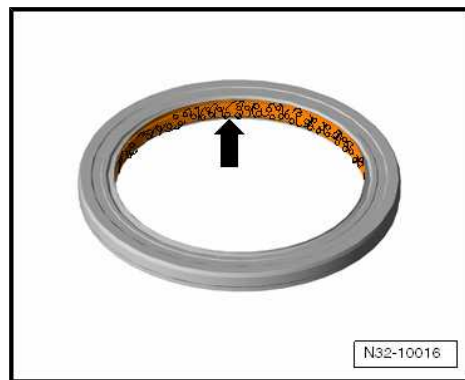
Gearbox

- ◆ Allocate bolts and other components according to gearbox code letters, refer to ⇒ Electronic parts catalogue
⇒ „2 Transmission layout“, 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.
- ◆ When installing a replacement gearbox, check the oil level in the gearbox ⇒ [page 79](#) ; capacities ⇒ [page 1](#) ; specification ⇒ Electronic parts catalogue .

Oil seals, seals, O-rings and gaskets

- ◆ Always renew oil seals, O-rings and gaskets.
- ◆ 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.
- ◆ Check oil level in gearbox after installing new gaskets, O-rings and oil seals ⇒ [page 79](#) .



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.

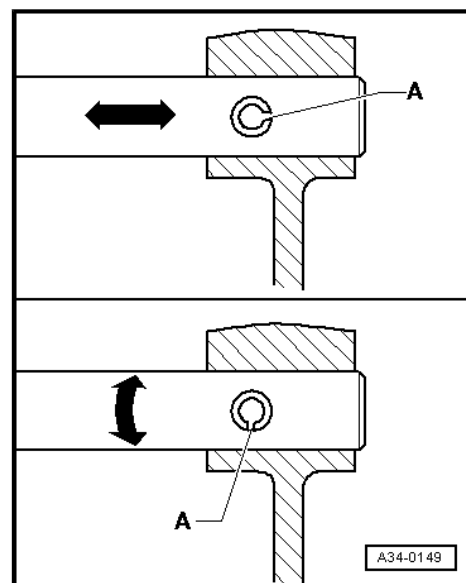
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Locking elements

- ◆ Do not over-stretch circlips.
- ◆ Always renew circlips which have been damaged or over-stretched.
- ◆ 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 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 64 14- 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.

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Synchro-rings

- ◆ Do not interchange synchro-rings. When reusing always fit to the same selector gear.
- ◆ Check for wear; renew if necessary.
- ◆ Check the grooves -arrow 1- on synchro-ring -A- and on inner ring for wear (flattened sections in grooves).
- ◆ Make sure that the coating of coated synchro-rings is not damaged.
- ◆ If an intermediate ring -B- is fitted, check the outer contact surface -arrow 2- and inner contact surface -arrow 3- of the intermediate ring for »scoring«, »visible traces of wear« and »blue discolouration (caused by overheating)«.
- ◆ Check cone on selector gear for scoring and visible traces of wear.
- ◆ Lubricate synchro rings with gear oil before installing.

Gear wheels

- ◆ 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.

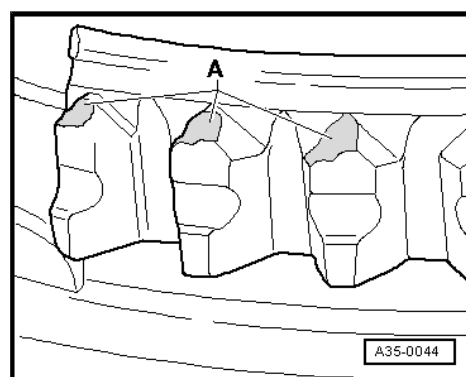
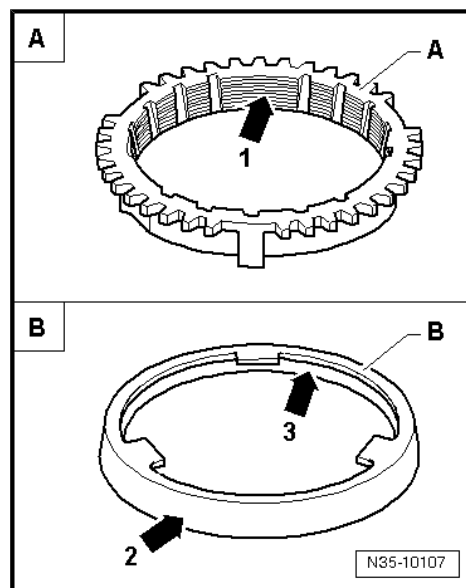
Selector gears and locking collars

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

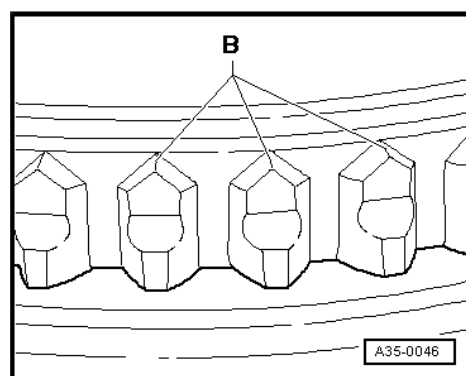
- ◆ Abnormal wear on synchro-ring or selector gear:

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



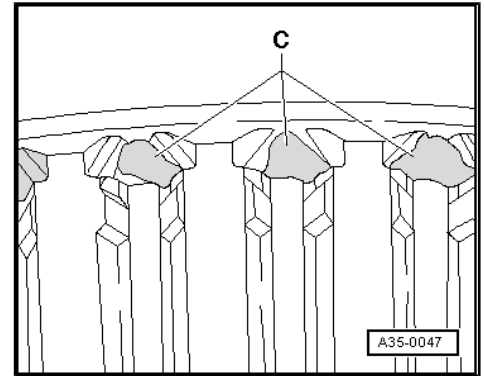
- ◆ In comparison: intact synchro-ring or selector gear:

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.

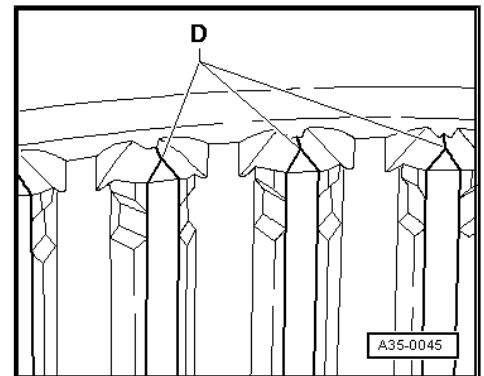
Clutch actuation, clutch

- ◆ 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 [⇒ „1.5 Notes on removing and installing clutch master cylinder and slave cylinder“, page 21](#)).

- ◆ Ensure that the pressure plate is kept straight: loosen and tighten bolts in a diagonal sequence and in several gradual stages.

- ◆ 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.

- ◆ Only blow out dual-mass flywheel with compressed air.



30 – Clutch

1 Exploded view - pedal cluster, clutch master cylinder

Overview

- ◆ ⇒ „1.1 Removing and installing over-centre spring“, page 12
- ◆ ⇒ „1.2 Removing and installing clutch pedal“, page 15
- ◆ ⇒ „1.3 Removing and installing mounting bracket“, page 16
- ◆ ⇒ „1.4 Removing and installing clutch position sender G476“, page 20
- ◆ ⇒ „1.5 Notes on removing and installing clutch master cylinder and slave cylinder“, page 21
- ◆ ⇒ „1.6 Function check for clutch master cylinder and slave cylinder“, page 21
- ◆ ⇒ „1.7 Removing and installing clutch master cylinder“, page 22



Note

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



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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 16](#)

4 - Bolt

5 - Over-centre spring

- ☐ Removing and installing
⇒ [page 12](#)

6 - Bearing bush

7 - Pivot pin

8 - Clutch pedal

- ☐ Removing and installing
⇒ [page 15](#)

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 22](#)

12 - Clutch position sender -G476-

- ☐ Checking in [Guided Fault Finding](#) ⇒ Vehicle diagnostic tester
- ☐ Removing and installing ⇒ [page 20](#)

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

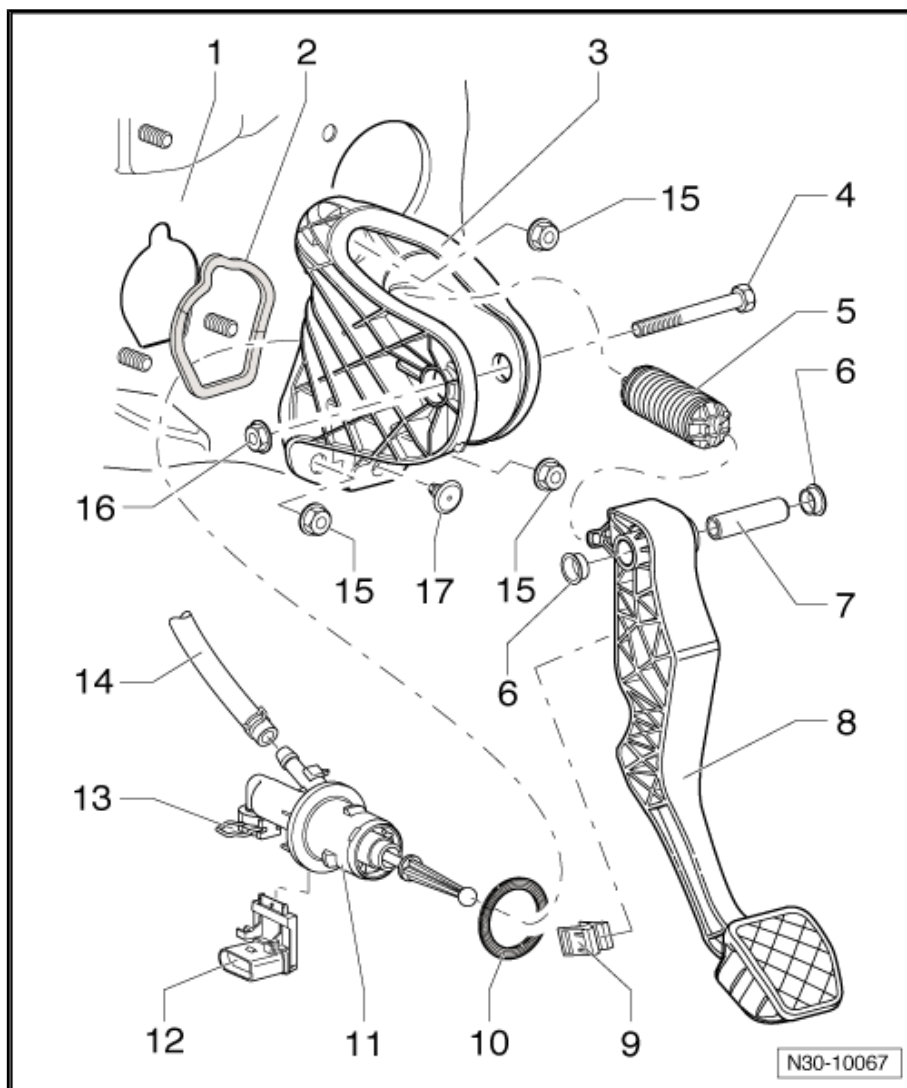
16 - Nut

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- ☐ Renew
- ☐ 25 Nm

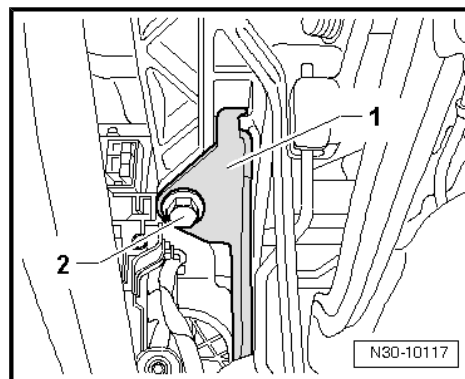
17 - Stop

- ☐ For clutch pedal



Crash bar - tightening torque

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



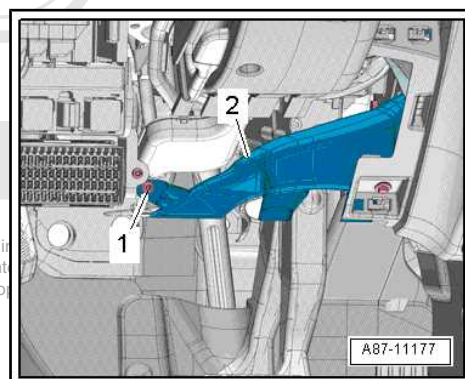
1.1 Removing and installing over-centre spring

Special tools and workshop equipment required

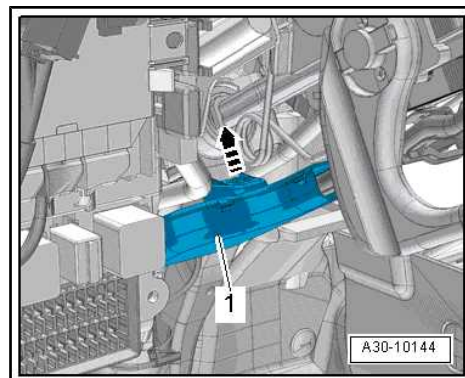
- ◆ Grease -G 000 450 02-

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 ⇒ Air conditioning system; Rep. gr. 87 .

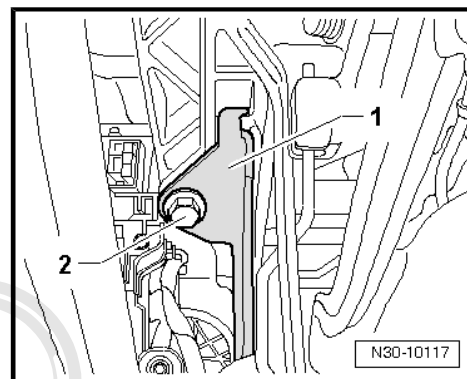


- Release catch -arrow-, detach wiring duct -1- towards the rear and push to one side.

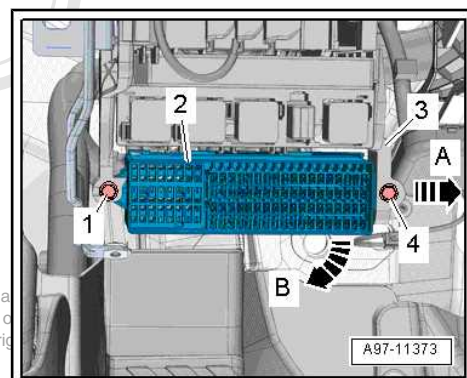


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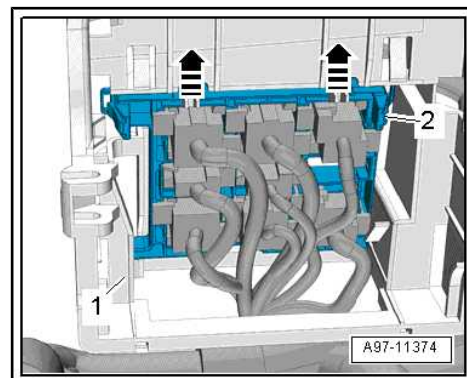
- Remove bolt -2- and detach crash bar -1-.



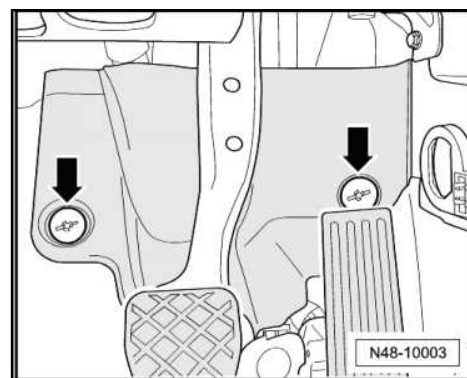
- Unbolt fuse holder C -SC- ⇒ Electrical system; Rep. gr. 97 and place to one side.



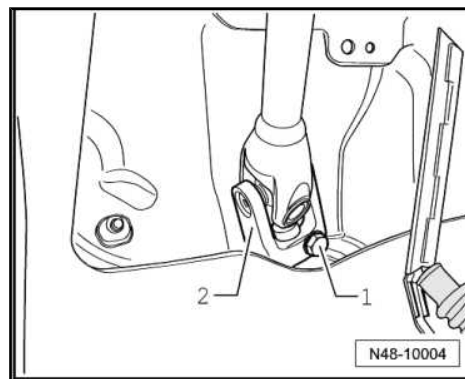
- Disengage relay carrier on left under dash panel ⇒ Electrical system; Rep. gr. 97 and place to one side.



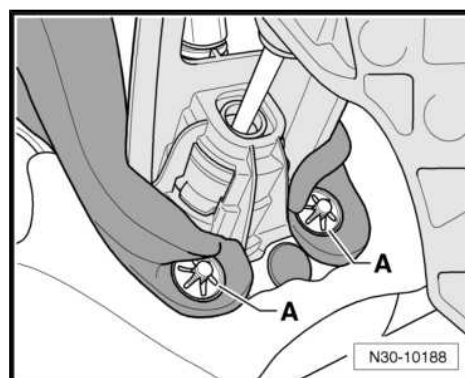
- Remove nuts -arrows- and detach footwell trim.



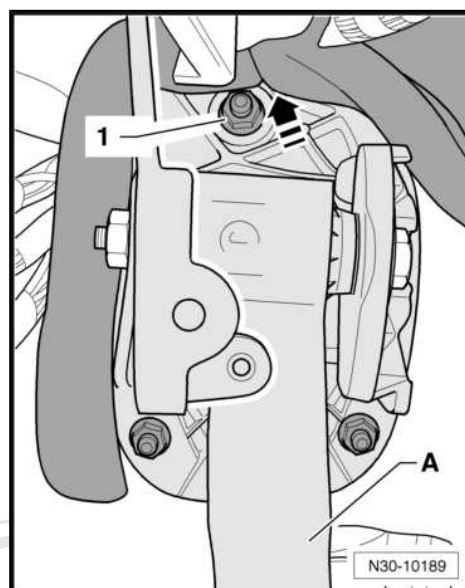
- Remove bolt -1- and pull off universal joint -2- upwards.



- 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.

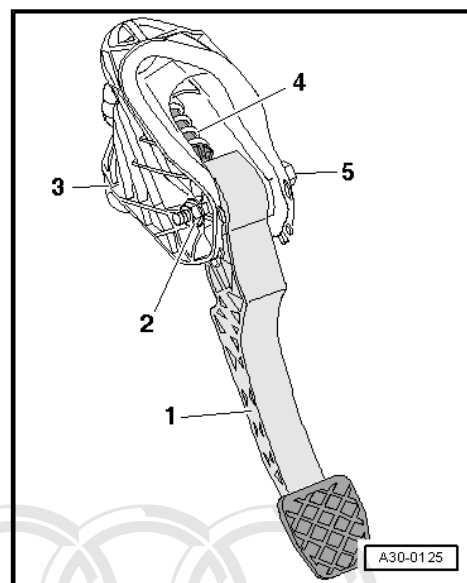
- Pivot clutch pedal down slightly and take over-centre spring -4- out of mounting bracket.

Installing

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

Tightening torques:

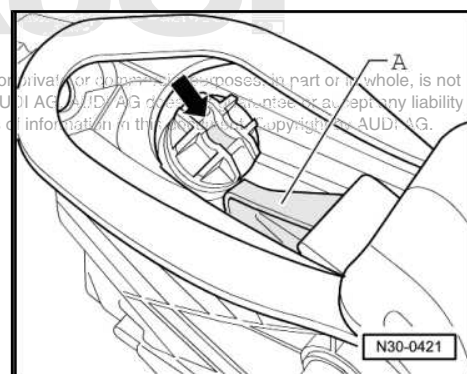
- ⇒ „1 Exploded view - pedal cluster, clutch master cylinder“, page 10 .
- ⇒ Fig. „Crash bar - tightening torque“ , page 12 .



 Note

- ◆ *Renew self-locking nut.*
- ◆ *Lubricate all bearings and contact surfaces with grease -G 000 450 02- .*

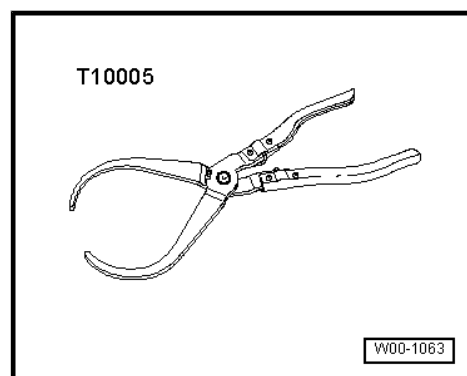
- Insert over-centre spring in mounting bracket from above.
- The bearing recess -arrow- for the actuator lug -A- on the clutch pedal must be vertical.
- Fit actuator lug on clutch pedal into corresponding socket in over-centre spring.
- Press clutch pedal slightly and secure with bolt.
- Install relay carrier on left under dash panel and fuse holder C -SC- ⇒ Electrical system; Rep. gr. 97 .
- Install footwell vent on driver's side ⇒ Air conditioning system; Rep. gr. 87 .



1.2 Removing and installing clutch pedal

Special tools and workshop equipment required

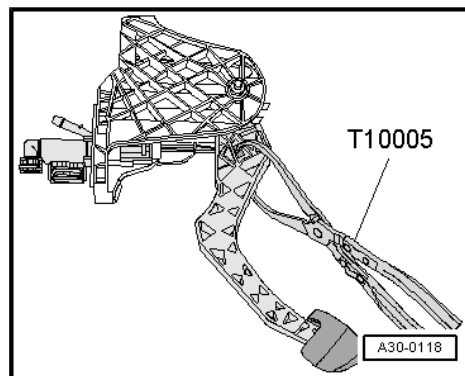
- ◆ Pliers -T10005-



- ◆ Grease -G 000 450 02-

Removing

- Remove over-centre spring ⇒ [page 12](#) .
- Release retaining clip on operating rod for clutch master cylinder using pliers -T10005- .
- Remove clutch pedal.



Installing

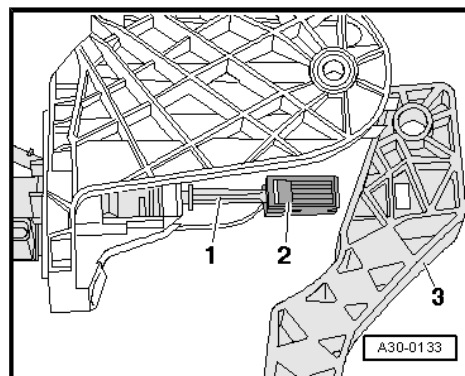
Installation is carried out in reverse sequence; note the following:



Note

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

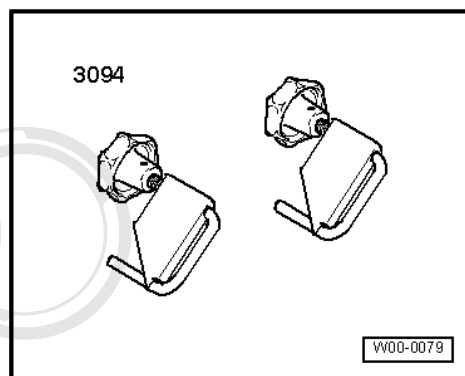
- Install retaining clip -2- on operating rod -1- for master cylinder.
- Press retaining clip into mounting on clutch pedal so that it snaps into place.
- Install over-centre spring ⇒ [page 12](#) .



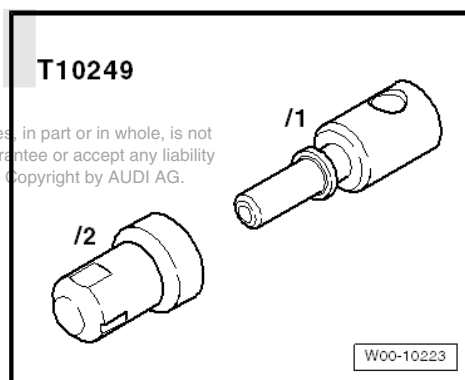
1.3 Removing and installing mounting bracket

Special tools and workshop equipment required

- ◆ Hose clamps, up to 25 mm -3094-



- ◆ Sealing tool -T10249-



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Removing

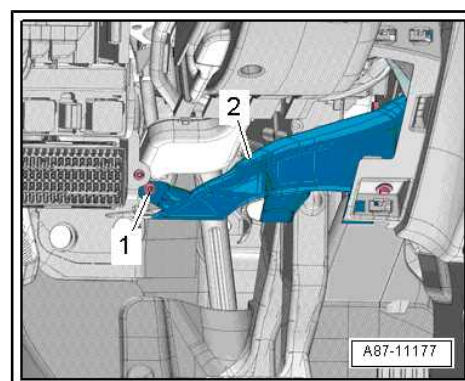
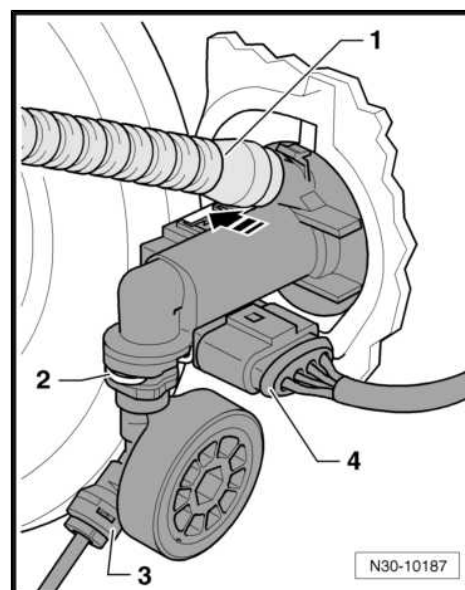
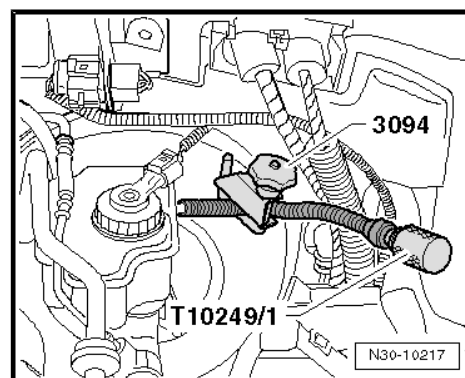
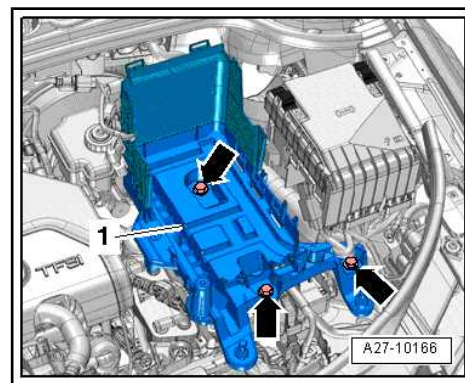
- Remove battery and battery tray ⇒ Electrical system; Rep. gr. 27 .



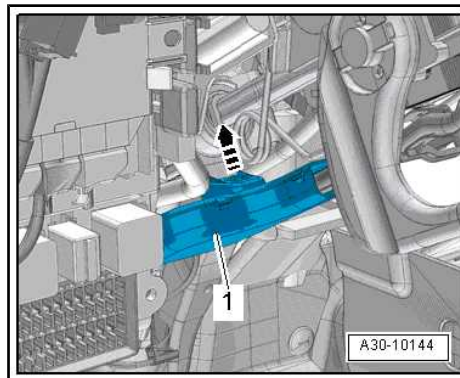
Note

In the following steps make sure that no brake fluid escapes onto the longitudinal member or onto the gearbox below. If this does happen, clean the affected area thoroughly.

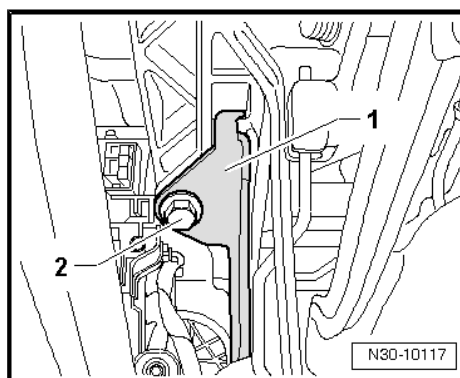
- Place lint-free cloth under clutch master cylinder.
- Using hose clamp -3094- , clamp off supply hose to clutch master cylinder.
- After disconnecting supply hose, plug supply hose using sealing tool -T10249/1- .
- Disconnect supply hose -1- at clutch master cylinder.
- Pull out retaining clip -2- 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.
- 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 ⇒ Air conditioning system; Rep. gr. 87 .



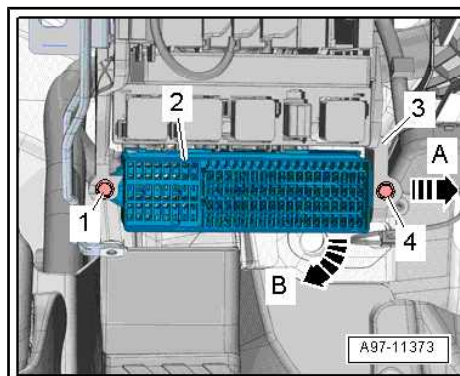
- Release catch -arrow-, detach wiring duct -1- towards the rear and push to one side.



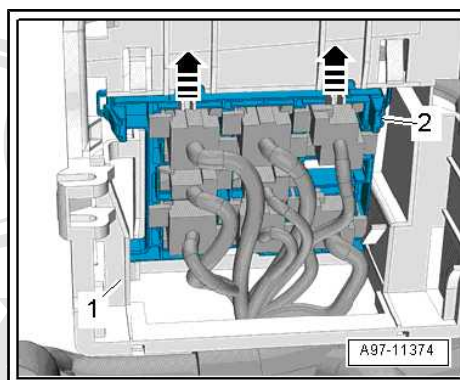
- Remove bolt -2- and detach crash bar -1-.



- Unbolt fuse holder C -SC- ⇒ Electrical system; Rep. gr. 97 and place to one side.

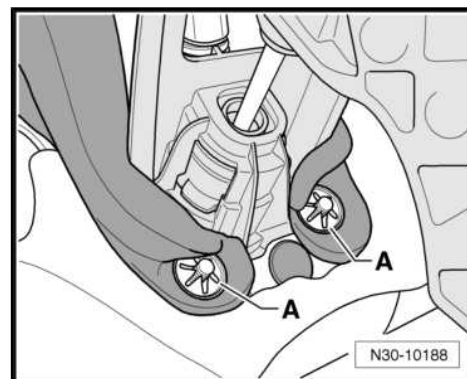


- Disengage relay carrier on left under dash panel ⇒ Electrical system; Rep. gr. 97 and place to one side.



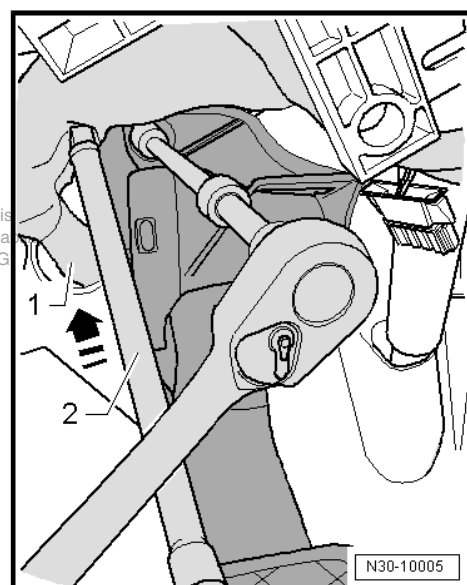
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- Prise off clamping washers -A- and detach insulation from lower part of mounting bracket.

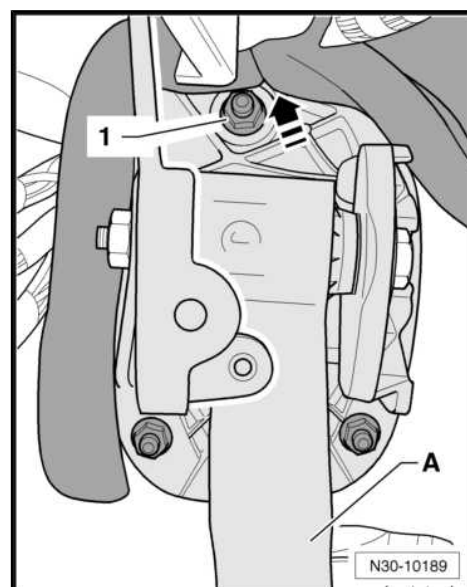


- Wrap adhesive tape round universal joint from socket set - V.A.G 1835- .
- Push wiring harness -1- upwards and to the left -arrow- using extension -2- from -V.A.G 1835- .

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- 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

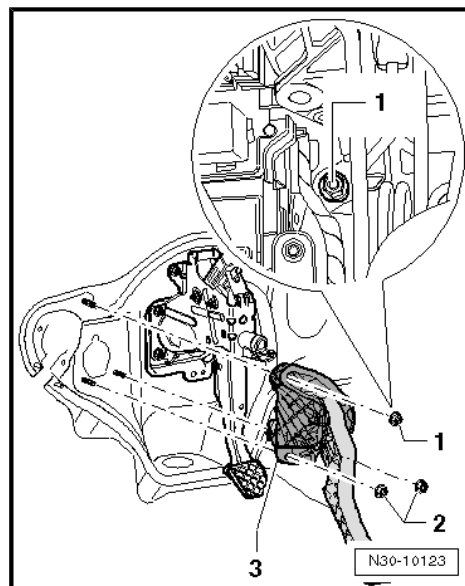
Installation is carried out in reverse sequence; note the following:



Note

Renew self-locking nuts.

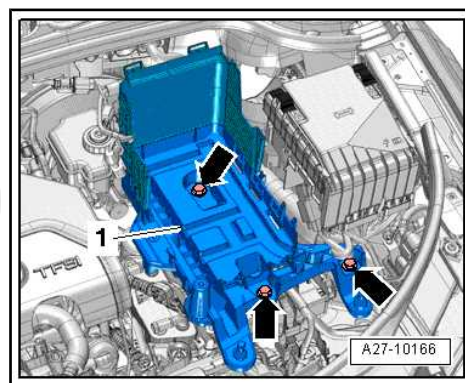
- Connect pipe to connection ⇒ [page 26](#) .
- Install crash bar
⇒ [Fig. „Crash bar - tightening torque“ , page 12](#) .
- Install relay carrier on left under dash panel and fuse holder C -SC- ⇒ Electrical system; Rep. gr. 97 .
- Install footwell vent on driver's side ⇒ Air conditioning system; Rep. gr. 87 .
- Bleed clutch system ⇒ [page 21](#) .
- Install battery tray and battery ⇒ Electrical system; Rep. gr. 27 .



1.4 Removing and installing clutch position sender -G476-

Removing

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



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

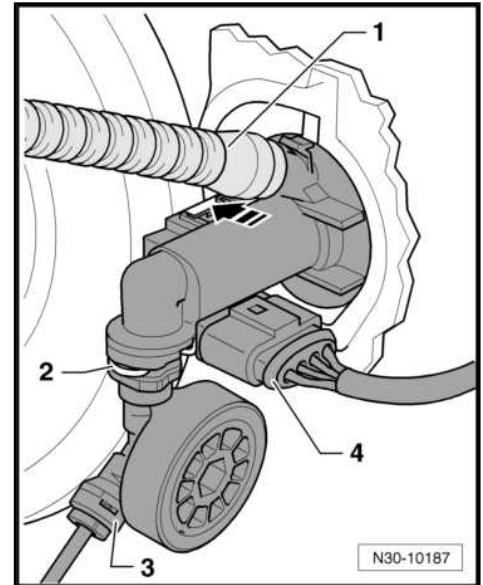
 Note

-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 .



1.5 Notes on removing and installing clutch master cylinder and slave cylinder

- ◆ Before renewing the clutch master cylinder or slave cylinder on the assumption that it is defective you must first carry out a function check
⇒ „1.6 Function check for clutch master cylinder and slave cylinder“, page 21 .
- ◆ If the slave cylinder is removed from gearbox with the pipe/ hose assembly still attached, make sure you do not press the clutch pedal. Otherwise, the piston will be pressed out of the slave cylinder and be destroyed.
- ◆ After installing the slave cylinder, carefully press the clutch pedal. If you feel an unusually strong point of resistance when depressing the clutch pedal, you must not press it down further. The plunger of the slave cylinder is likely to have been guided past the clutch release lever. The slave cylinder would then be destroyed once pedal force exceeds approx. 300 N.

1.6 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, if the clutch pedal switch jams or if the driver rests his 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 slave cylinder as well as the pipe/hose assembly including connections for external leaks (visual inspection).
- ◆ If you identify any leaks you must renew the leaking component.
- ◆ Bleed clutch system ⇒ [page 21](#) .

Pedal forces:

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

High pedal force:

- ◆ Mechanically defective pressure plate/clutch plate
⇒ [page 34](#) .

Clutch does not disengage or does not disengage fully:

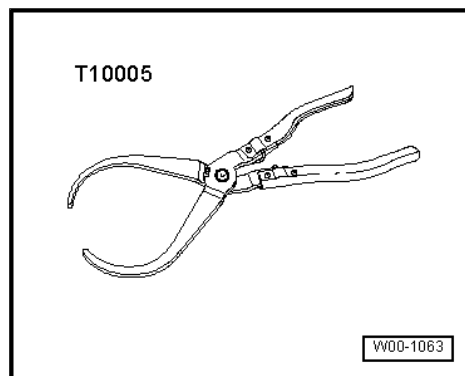
- ◆ Air in hydraulic system: bleed clutch system ⇒ [page 21](#) and check hydraulic system for external and internal leaks.
- ◆ Clutch plate does not move smoothly on input shaft splines (due to corrosion or dirt, etc.)
- ◆ Foreign body in clutch system
- ◆ Mechanically defective pressure plate/clutch plate
⇒ [page 34](#) .
- ◆ Wrong components used or components forgotten when carrying out repair work (e.g. intermediate plate or dowel sleeves).

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1.7 Removing and installing clutch master cylinder

Special tools and workshop equipment required

- ◆ Pliers -T10005-



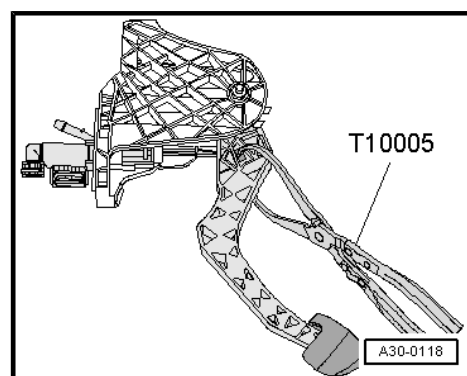
- ◆ Spacer, approx. 40 mm long (e.g. 1/2" socket)

Removing

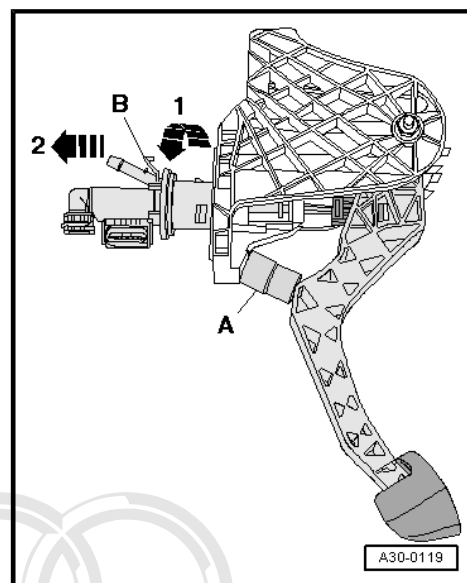


Note

- ◆ If you suspect a defective clutch master cylinder, perform function test prior to renewing
⇒ „1.5 Notes on removing and installing clutch master cylinder and slave cylinder“, 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 16](#).
- Release retaining clip on operating rod for clutch master cylinder using pliers -T10005-.

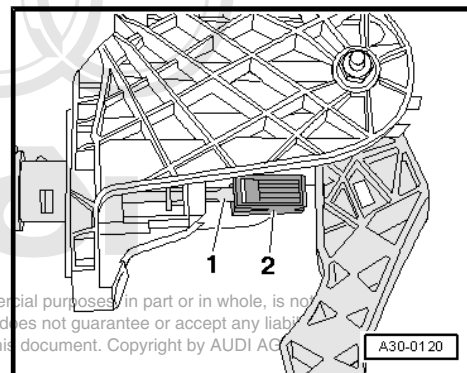


- Insert spacer -A- between clutch pedal and stop, and press clutch pedal forward.
- Release retainer clip -B- and pull clutch master cylinder out of mounting bracket -arrow 1- and -arrow 2-.



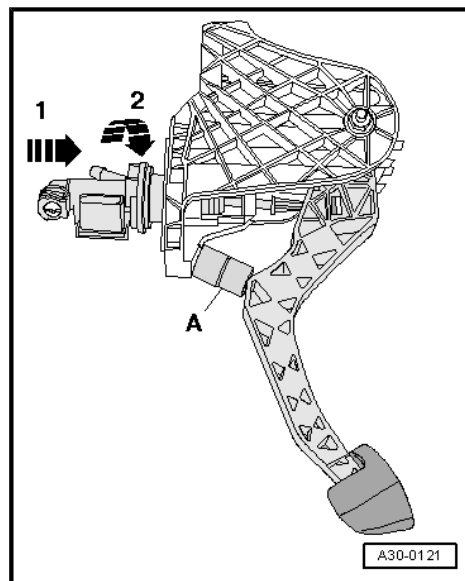
Installing

- Clutch pedal in „released“ position.
- Install retaining clip -2- on operating rod -1- for clutch master cylinder.

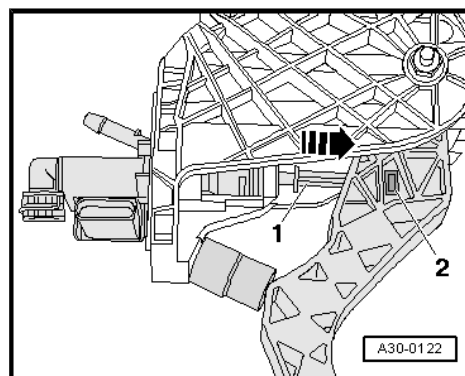


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- Insert spacer -A- between clutch pedal and stop, and press clutch pedal forward.
- Secure master cylinder on mounting bracket -arrow 1- and -arrow 2-.



- 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 16](#) .



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2 Exploded view - hydraulics (LHD)

Overview

- ◆ ⇒ „2.1 Removing and installing pipe“, page 26
- ◆ ⇒ „2.2 Bleeding clutch system“, page 28

1 - Clutch slave cylinder with release bearing

- ☐ Can only be renewed after removing gearbox
- ☐ Removing and installing ⇒ page 32

2 - Bleeder connection

3 - Retaining clip

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

4 - Bleeder screw

- ☐ 4.5 Nm
- ☐ Bleeding clutch system ⇒ page 28

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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 - Seal

- ☐ Must be fitted in supply hose

10 - Supply hose

11 - Seal

- ☐ Must be fitted in supply hose

12 - Clutch master cylinder

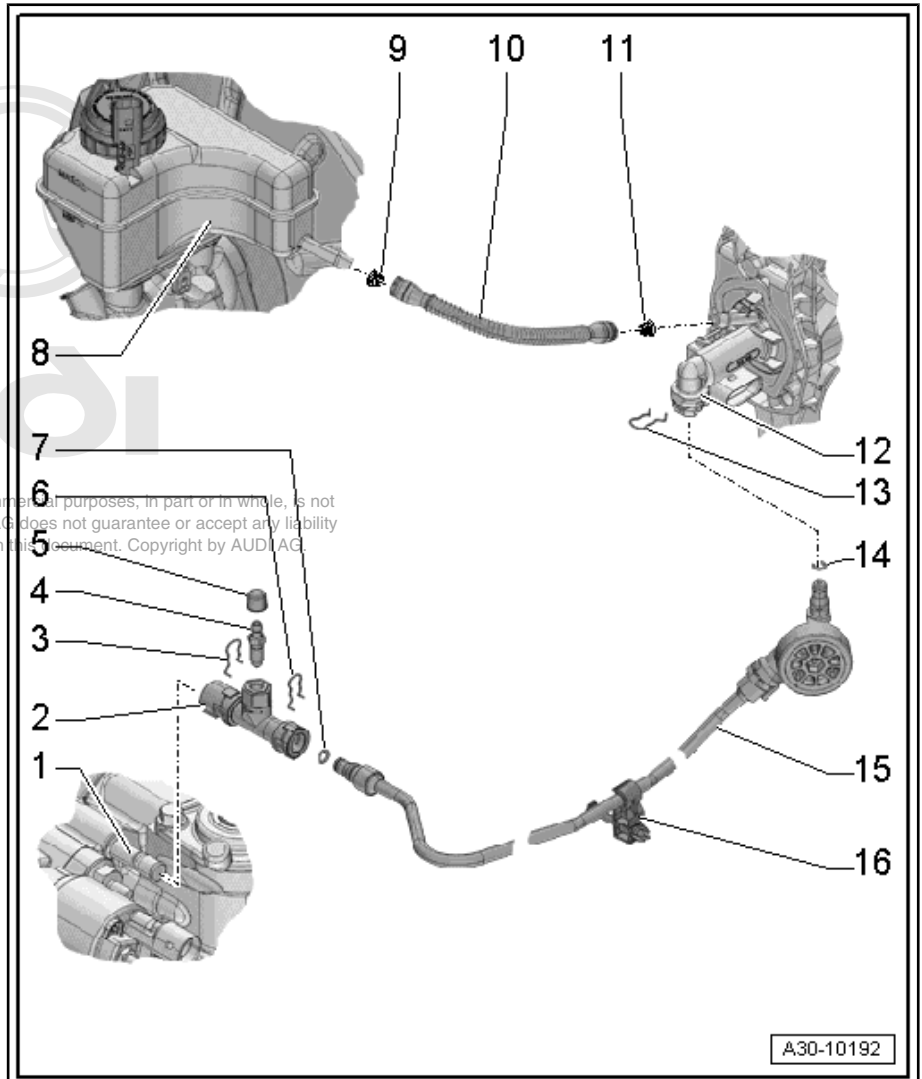
- ☐ Removing and installing ⇒ page 22

13 - Retaining clip

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

14 - 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

15 - Pipe

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

16 - Bracket

- ☐ Attached to body

Disconnecting and connecting pipe

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

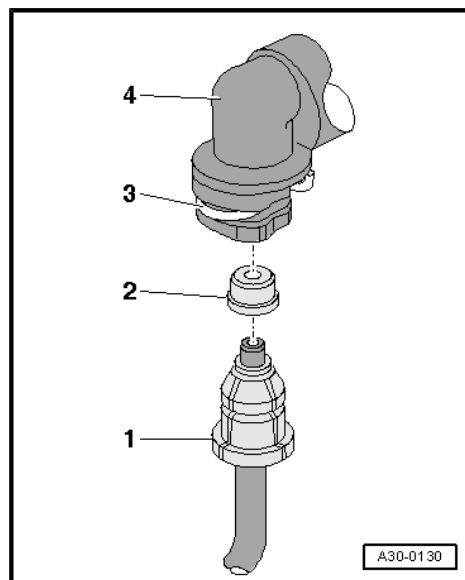
Installing



Note

Renew seals -2- if damaged.

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



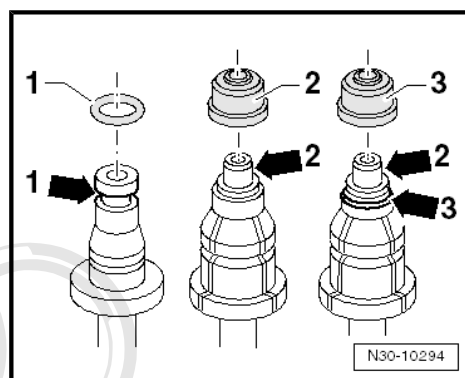
Pipe with seal or O-ring

- ♦ 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

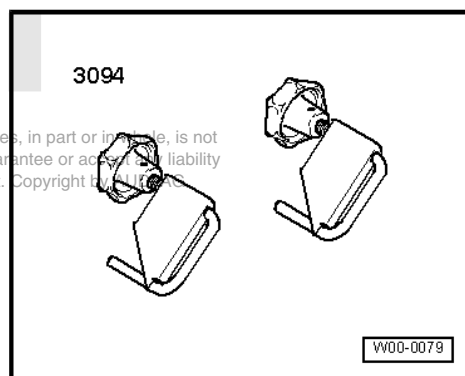
On the connection with annular groove -arrow 3- the seal must be inserted in the groove.



2.1 Removing and installing pipe

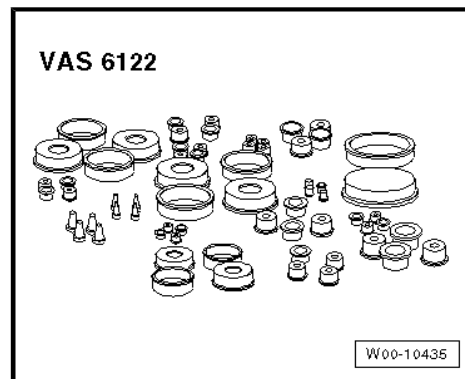
Special tools and workshop equipment required

- ♦ Hose clamps, up to 25 mm -3094-



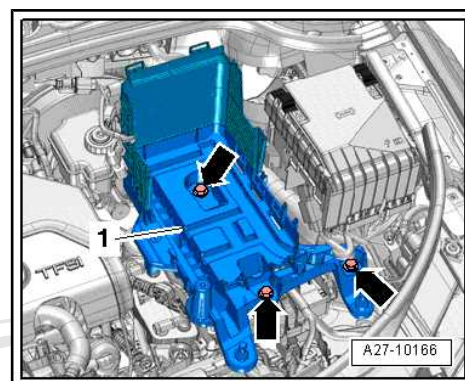
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◆ Engine bung set -VAS 6122-



Removing

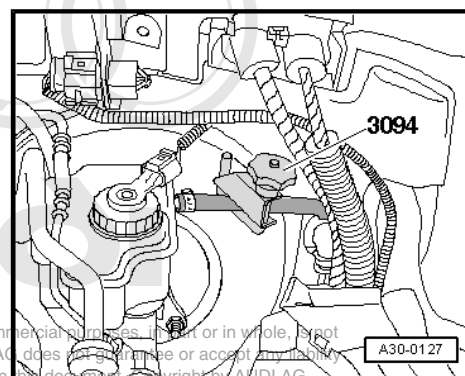
- Remove battery and battery tray ⇒ Electrical system; Rep. gr. 27 .



Note

In the following steps make sure that no brake fluid escapes onto the longitudinal member or onto the gearbox below. If this does happen, clean the affected area thoroughly.

- Place lint-free cloth under clutch master cylinder.
- Using hose clamp -3094- , clamp off supply hose to clutch master cylinder.



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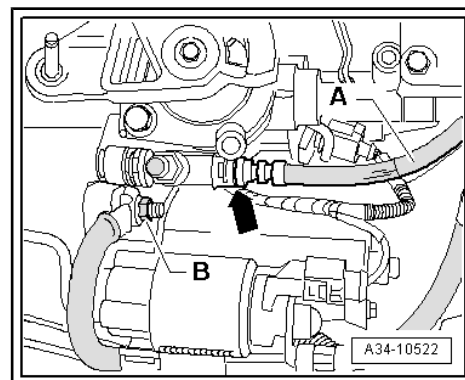
- Place lint-free cloth under bleeder connection.
- Pull out retaining clip -arrow- as far as it will go and disconnect pipe -A- from bleeder connection.



Note

-Item B- can be disregarded.

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



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



Caution

Catch escaping brake fluid.

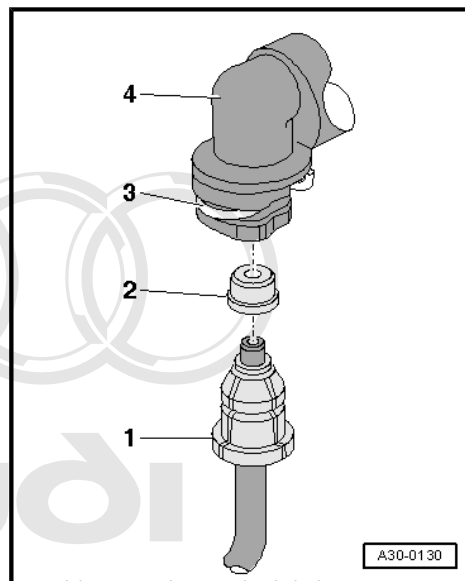
- ◆ *Do not operate clutch pedal after pipe has been disconnected.*

- Move pipe clear and remove.

Installing

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

- Connect pipe ⇒ [page 26](#) .
- Bleed clutch system ⇒ [page 28](#) .
- Install battery tray and battery ⇒ [Electrical system; Rep. gr. 27](#) .

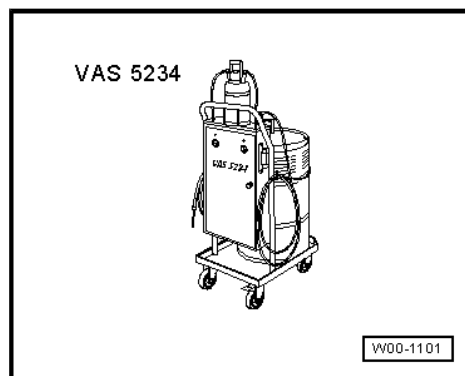


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2.2 Bleeding clutch system

Special tools and workshop equipment required

- ◆ Brake filling and bleeding equipment -VAS 5234-



- ◆ Brake fluid specification ⇒ [Rep. gr. 47](#) .

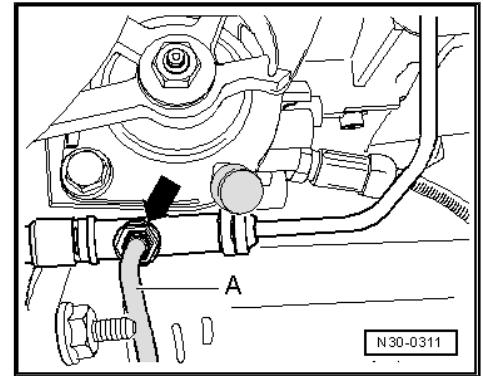
Procedure



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) .*
- Tightening torque
⇒ [„2 Exploded view - hydraulics \(LHD\)“, page 25](#)

- Remove air cleaner housing ⇒ Rep. gr. 23 if bleeder screw -arrow- is not otherwise accessible.
- Pull clutch pedal back to rest position.
- Remove 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 .



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3 Exploded view - hydraulics (RHD)

1 - Clutch slave cylinder with release bearing

- ☐ Can only be renewed after removing gearbox
- ☐ Removing and installing ⇒ [page 32](#)

2 - Bleeder connection

3 - Retaining clip

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

4 - Bleeder screw

- ☐ 4.5 Nm
- ☐ Bleeding clutch system ⇒ [page 28](#)

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 - Seal

- ☐ Must be fitted in supply hose

10 - Supply hose

11 - Seal

- ☐ Must be fitted in supply hose

12 - Clutch master cylinder

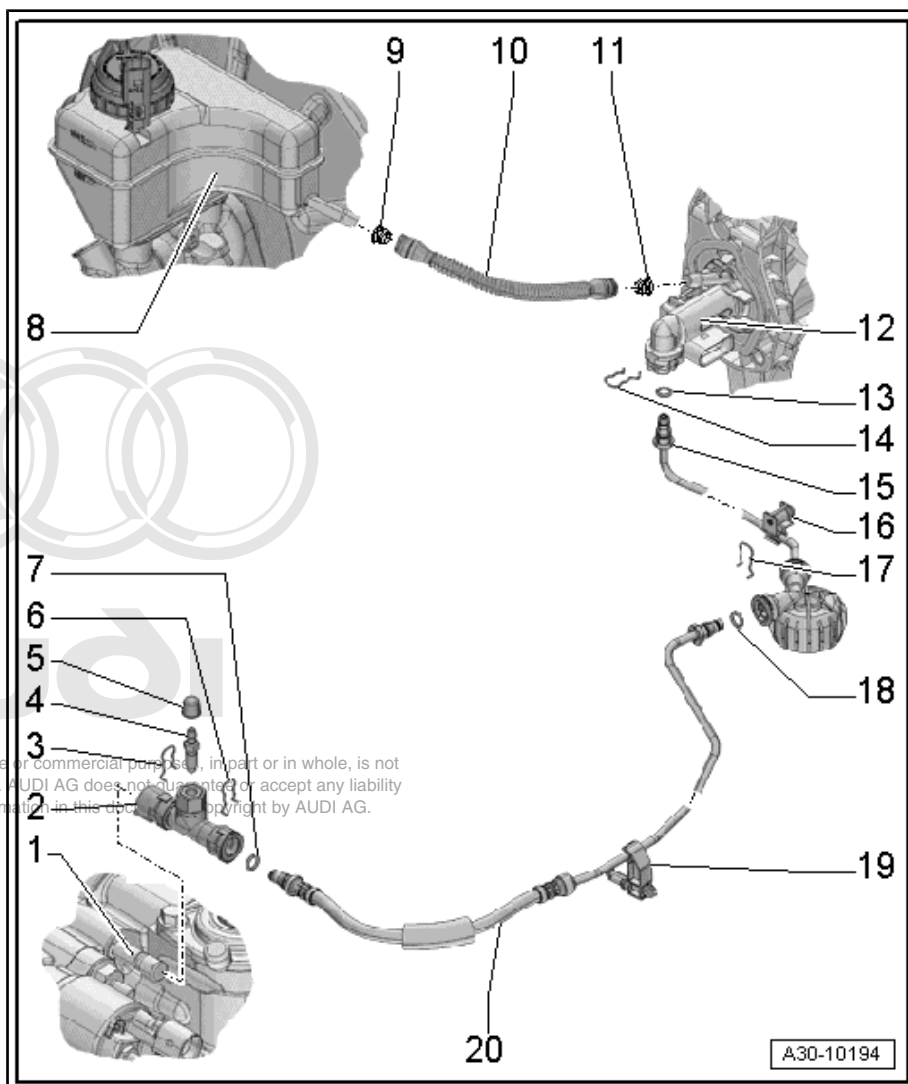
- ☐ Removing and installing ⇒ [page 22](#)

13 - Retaining clip

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

14 - 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



15 - Pipe

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



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4 Exploded view - clutch release mechanism, slave cylinder

1 - Clutch slave cylinder with release bearing

- ☐ Slave cylinder and release bearing are one unit and can only be renewed together
- ☐ Do not wash out bearing; wipe clean only
- ☐ If bearing is noisy, renew together with slave cylinder
- ☐ Removing and installing ⇒ [page 32](#)

2 - Bolt

- ☐ 3x
- ☐ Renew
- ☐ Tighten bolts carefully in several small steps and in diagonal sequence; make sure that mounting lugs on slave cylinder do not break off
- ☐ 12 Nm for metal clutch slave cylinder (with no locking fluid)
- ☐ 15 Nm for plastic clutch slave cylinder (with locking fluid)

3 - Retaining clip

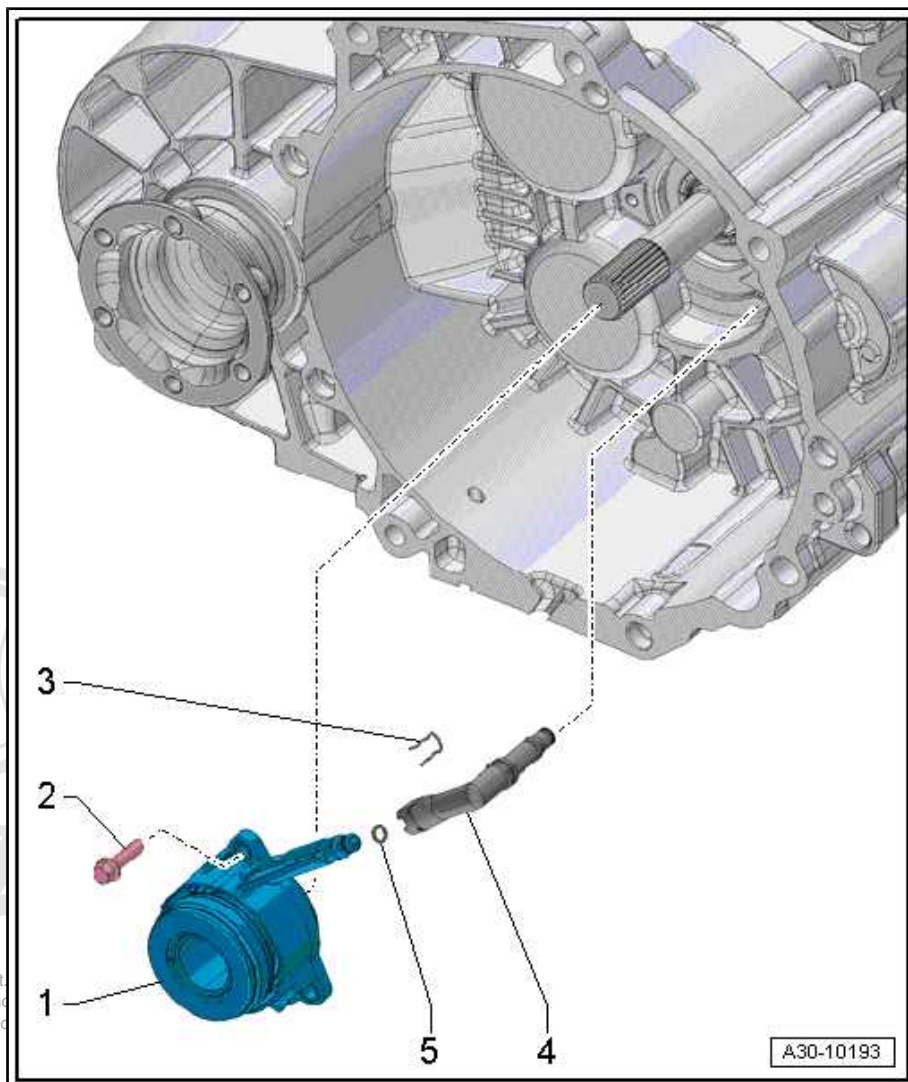
- ☐ To remove and install pipe, pull out retaining clip as far as it will go

4 - Pipe

- ☐ To clutch master cylinder
- ☐ Removing and installing ⇒ [page 26](#)

5 - 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



4.1 Removing and installing clutch slave cylinder together with release bearing

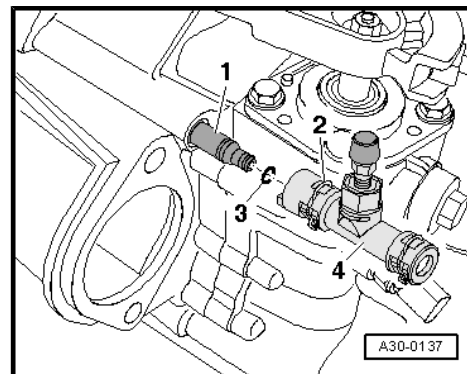


Note

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

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

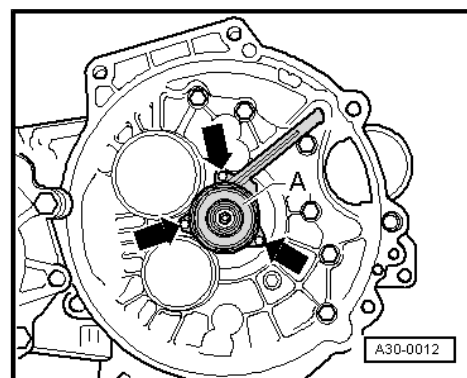
Installation is carried out in reverse sequence; note the following:



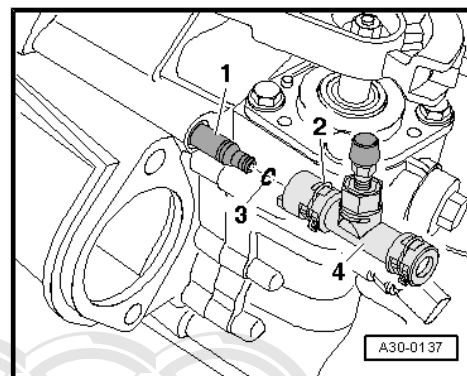
Caution

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 28](#) .



5 Exploded view - clutch unit

1 - Dual-mass flywheel

- ☐ Removing and installing
⇒ Engine, mechanics;
Rep. gr. 13
- ☐ Ensure that dowel pins
fit tightly
- ☐ Contact surface for
clutch lining must be
free of grooves, oil and
grease
- ☐ Observe instructions for
removal ⇒ [page 35](#)

2 - Clutch plate

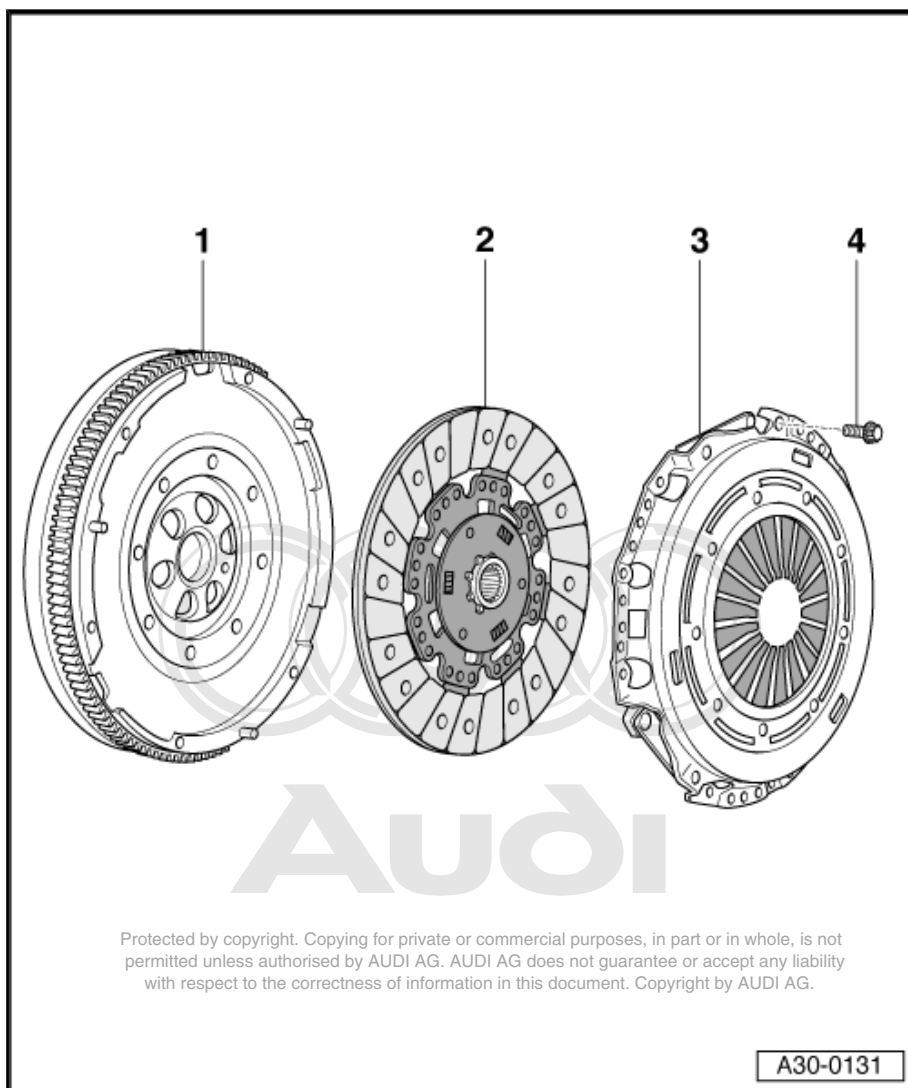
- ☐ Removing and installing
⇒ [page 35](#)
- ☐ Always renew pressure
plate as well
- ☐ Installation position
⇒ [page 35](#)
- ☐ For diameter of clutch
plate, refer to ⇒ Elec-
tronic parts catalogue

3 - Pressure plate

- ☐ With adjustment mech-
anism
- ☐ Removing and installing
⇒ [page 35](#)
- ☐ Checking ends of dia-
phragm spring
⇒ [page 35](#)
- ☐ Checking spring con-
nections and rivets
⇒ [page 35](#)
- ☐ Always renew clutch
plate as well
- ☐ For correct version, refer to ⇒ Electronic parts catalogue

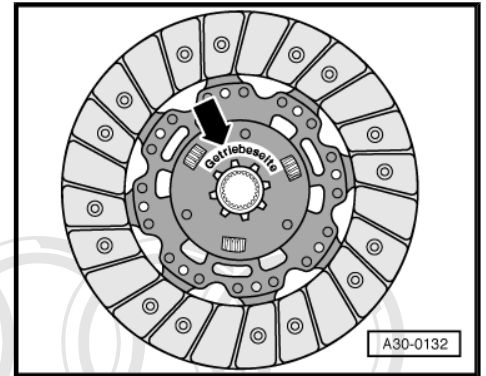
4 - Bolt

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



Installation position of clutch plate

- Marking „Getriebeseite“ (gearbox side) faces towards gearbox



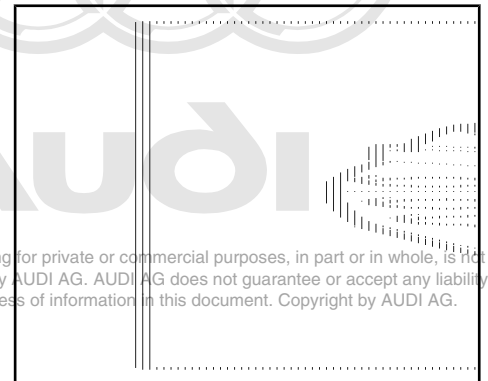
Checking ends of diaphragm spring

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



Note

If required, pressure plate and clutch plate must always be renewed together. Select the correct pressure plate and clutch plate according to engine code ⇒ Electronic parts catalogue.



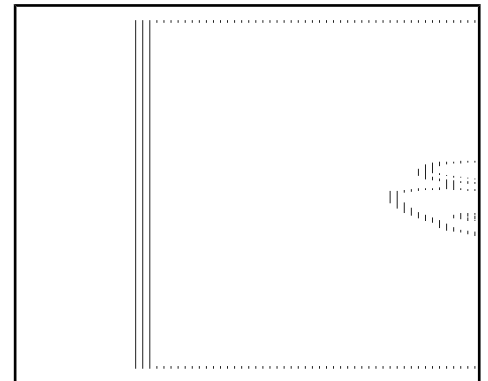
Checking spring connections and rivets

- Check spring connections between pressure plate and cover for cracks and make sure rivet fastenings are seated tightly.
- Renew pressure plate if spring connections are damaged or rivets are loose -arrows-.



Note

If required, pressure plate and clutch plate must always be renewed together. Select the correct pressure plate and clutch plate according to engine code ⇒ Electronic parts catalogue.



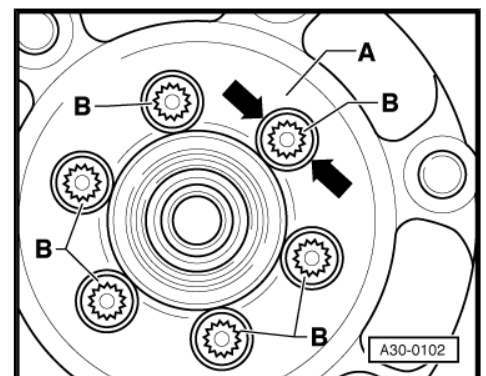
Instructions for removing dual-mass flywheel



Caution

Take care not to damage dual-mass flywheel.

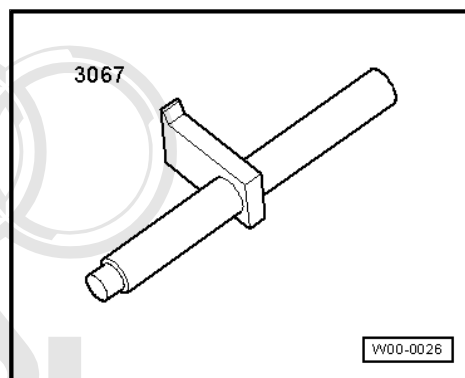
- ◆ Remove bolts -B- by hand. Do not use a pneumatic wrench or impact wrench.
- ◆ When removing bolts, take care that the bolt heads do not come into contact with the dual-mass flywheel.
- ◆ Rotate dual-mass flywheel -A- so that bolts -B- are aligned centrally behind the holes -arrows-.



5.1 Removing and installing clutch

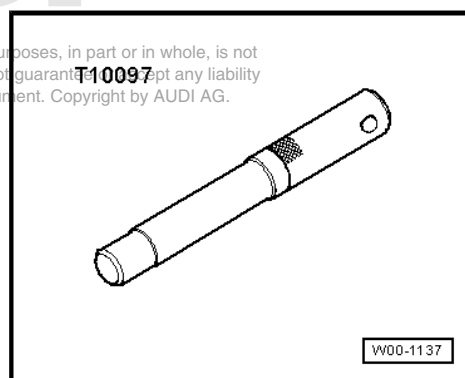
Special tools and workshop equipment required

◆ Counterhold tool -3067-



◆ Centring mandrel -T10097-

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◆ Grease for clutch plate splines -G 000 100-

Removing

- Gearbox removed

Refer to general repair instructions ⇒ [page 5](#) .

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:

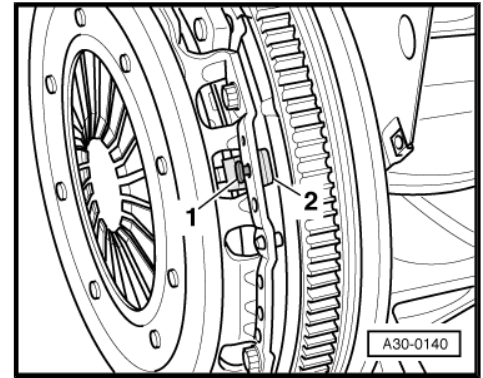
- Apply counter-hold tool -3067- in order to loosen bolts.

- Working clockwise, loosen all six bolts consecutively in steps of 90° (1/4 turn) until the pressure plate is released.
- Stop -2- with pin -1- should come loose when the bolts are slackened.
- If the stop does not come loose, push the pin -1- towards the dual-mass flywheel.
- Take off pressure plate and clutch plate.

Installing

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

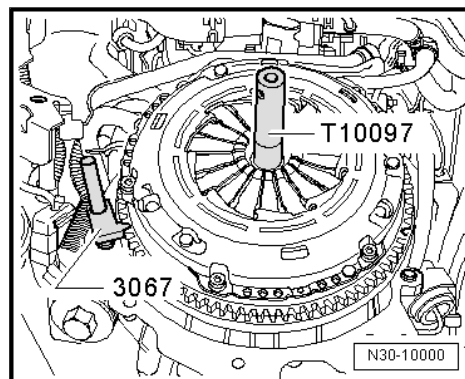
- Tightening torque ⇒ „5 Exploded view - clutch unit“, page 34



Note

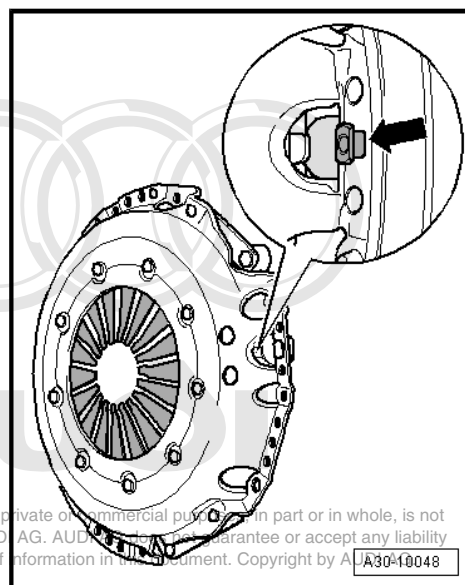
- ◆ Always renew clutch plate and pressure plate together and select the correct parts according to engine code ⇒ Electronic parts catalogue .
- ◆ The dual-mass flywheel, clutch pressure plate and clutch plate are matched together; components from another manufacturer must not be installed on the same vehicle.
- ◆ Renew clutch plate and pressure plate if riveted fastening is damaged or loose.
- ◆ Clean input shaft splines and (in the case of used clutch plates) 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.
- ◆ Clutch 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 clutch pressure plate and the dual-mass 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.
- ◆ 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.
- ◆ 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).
- Note installation position of clutch plate ⇒ page 35 .

- Use counterhold tool -3067- .
- Position pressure plate on centring pins.
- Use centring mandrel -T10097- to centre 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 clutch pressure plate.
- Tighten all 6 bolts consecutively in clockwise direction and in steps of 90° until the housing makes contact with flywheel.
- The stop pin -arrow- should then lift away from the clutch pressure plate.
- Tighten all 6 bolts to final torque consecutively in clockwise direction.



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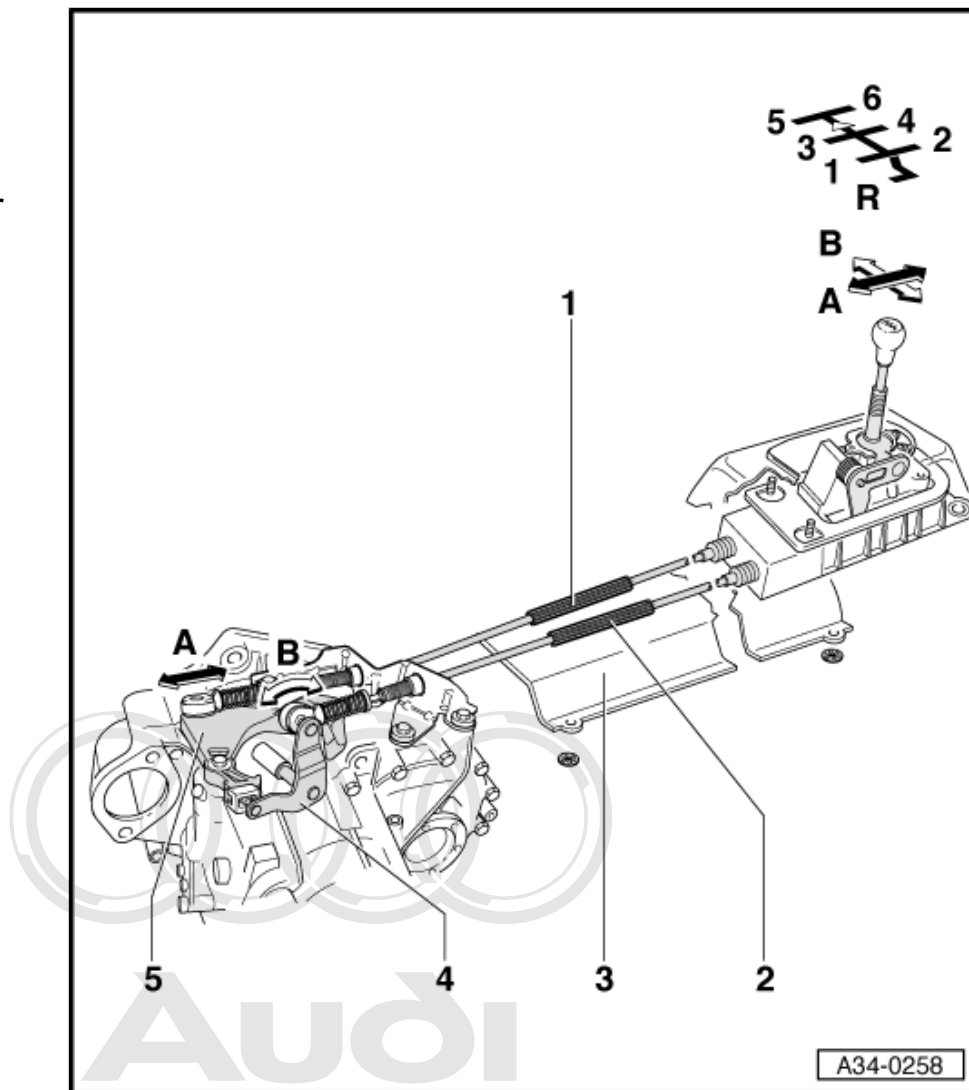
34 – Controls, housing

1 Overview - selector mechanism

-Arrow A- gear selection movement

-Arrow B- gate selection movement

- 1 - Gear selector cable
- 2 - Gate selector cable
- 3 - Heat shield
- 4 - Gate relay lever
- 5 - Gearbox selector lever



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2 Exploded view - selector mechanism

Overview

- ◆ ⇒ „2.1 Removing and installing gear knob with gear lever boot“, page 42
- ◆ ⇒ „2.2 Dismantling and assembling selector mechanism“, page 43
- ◆ ⇒ „2.3 Removing and installing selector mechanism“, page 47

Gear knob with gear lever boot

1 - Gear lever

2 - Noise insulation cover (lower)

3 - Gear knob

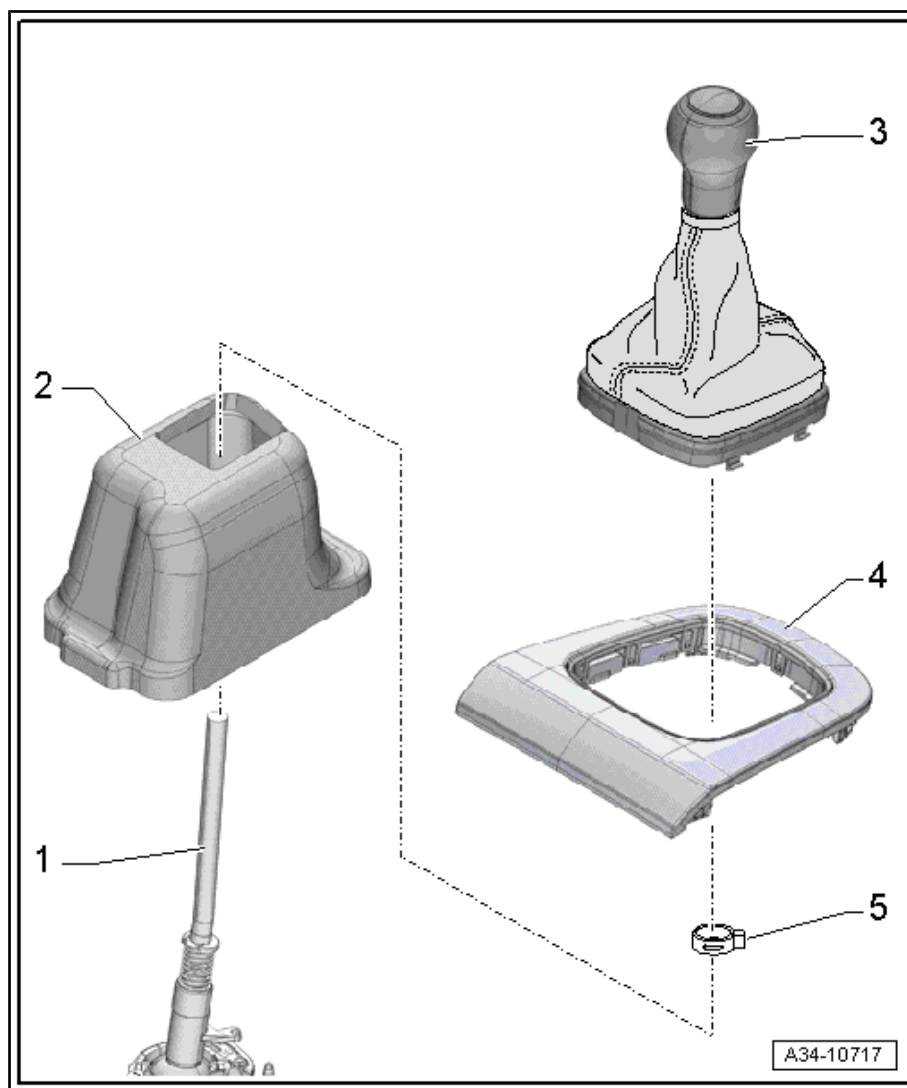
- ☐ With gear lever boot
- ☐ Removing and installing
⇒ page 42

4 - Cover

- ☐ For centre console

5 - Clamp

- ☐ Secures gear knob to gear lever



Selector mechanism



Note

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

1 - Floor plate

- ☐ Bend tabs open to remove
- ☐ Always renew after removing

2 - Gasket

- ☐ Renew

3 - Gear lever

- ☐ Can be removed and installed without removing gear lever guide
⇒ [Item 15 \(page 41\)](#)

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 39](#)

7 - Bush

8 - Gear selector cable

- ☐ Lever off gear lever guide
- ☐ Press onto gear lever guide inside selector mechanism

- ☐ Installation position ⇒ [page 39](#)

9 - Damper

10 - Ball socket

- ☐ Cannot be removed without being damaged
- ☐ Renew

11 - Bush

12 - Securing clip

- ☐ Removing and installing ⇒ [page 42](#)

13 - Spring

14 - Bush

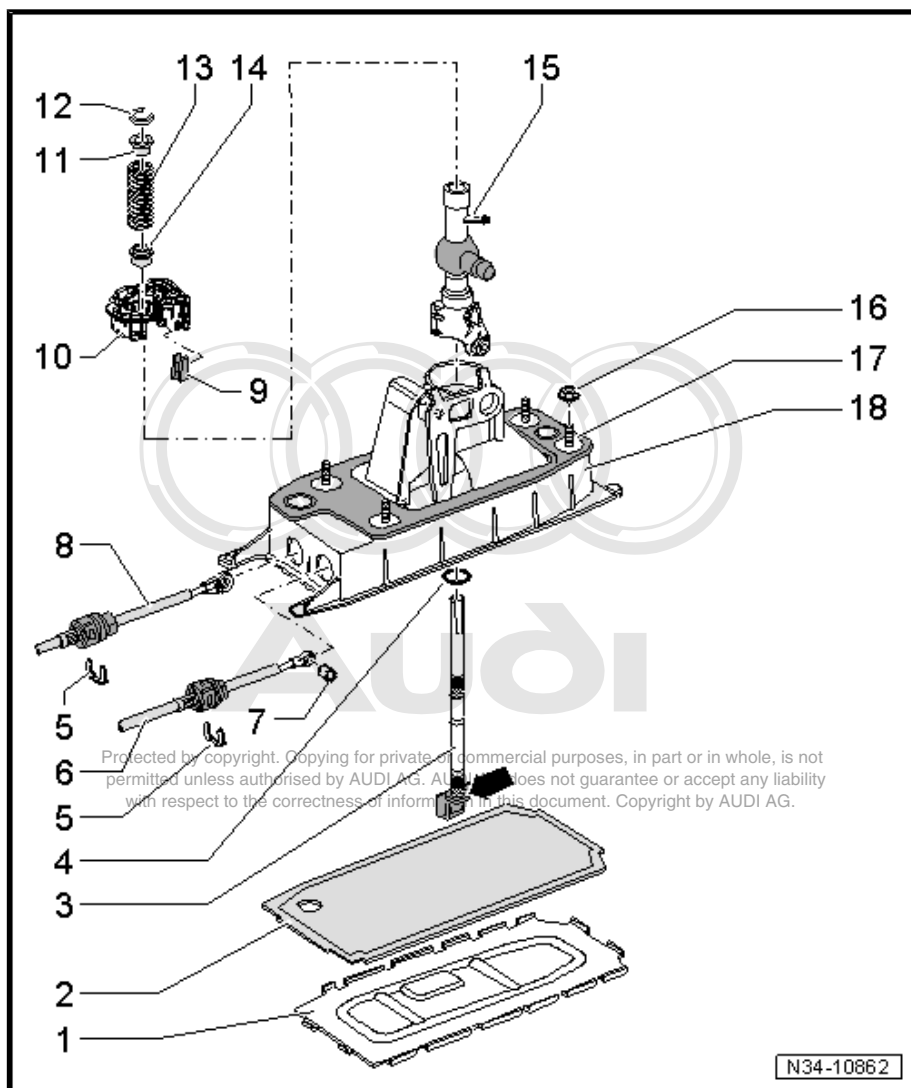
15 - Gear lever guide

16 - Nut

- ☐ 4x
- M6 - 8 Nm
- M8 - 25 Nm

17 - Gasket

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



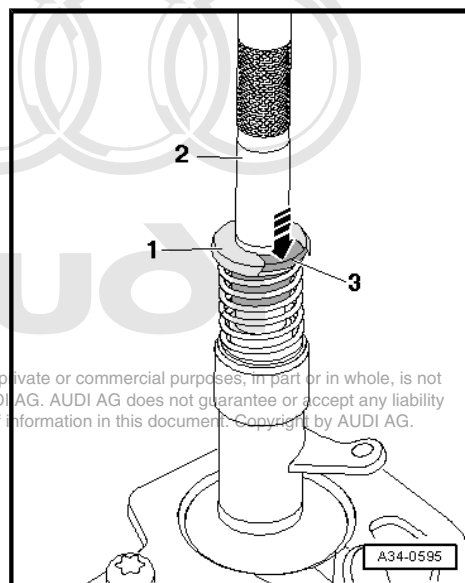
- ☐ Glue onto selector housing

18 - Selector housing

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

Removing and installing securing clip

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

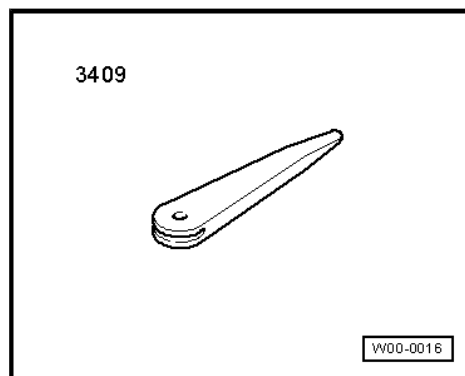


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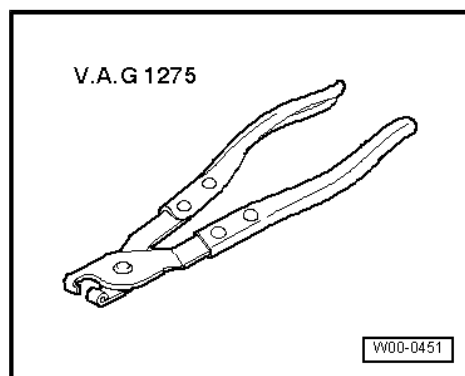
2.1 Removing and installing gear knob with gear lever boot

Special tools and workshop equipment required

- ◆ Removal wedge -3409-

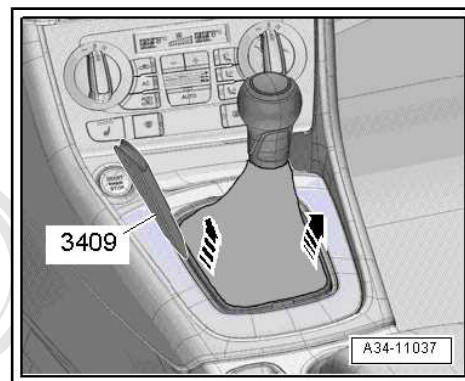


- ◆ Hose clip pliers -V.A.G 1275-



Removing

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

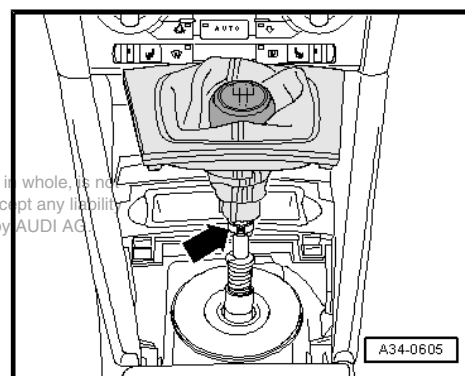


- Pull boot up and over gear knob.
- Open clip -arrow- and pull off gear knob together with boot.

Installing

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

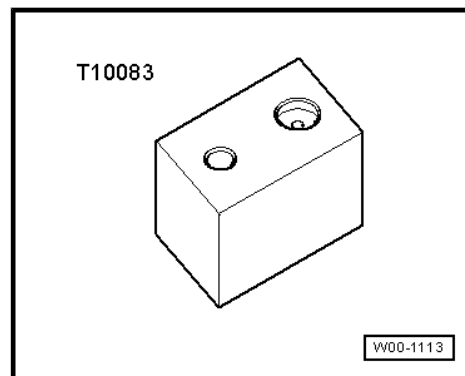
- Push gear knob together with boot onto gear lever as far as stop.
- Secure gear knob to gear lever with clip -arrow-, using hose clip pliers -V.A.G 1275- .



2.2 Dismantling and assembling selector mechanism

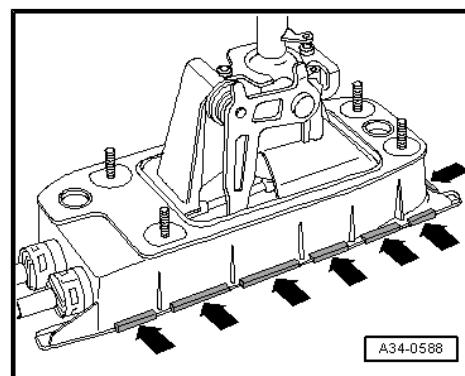
Special tools and workshop equipment required

- ◆ Thrust block -T10083-

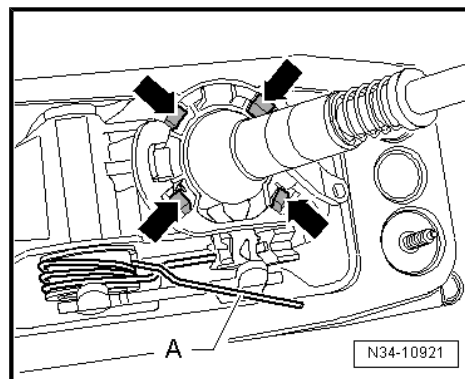


Dismantling

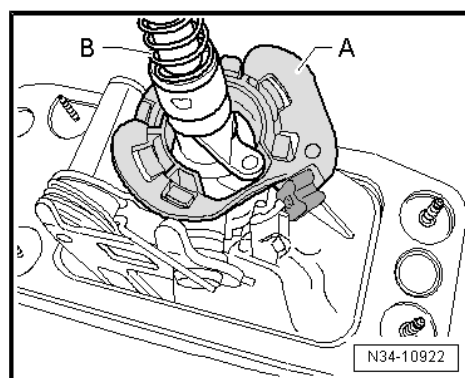
- Remove selector mechanism ⇒ [page 47](#) .
- Open out tabs -arrows- on floor plate all round with screwdriver and remove floor plate.
- Remove gasket from selector housing.
- Remove gear selector cable and gate selector cable from selector housing ⇒ [page 54](#) .



- 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-.
- Press ball socket -A- off ball on gear lever guide and remove.



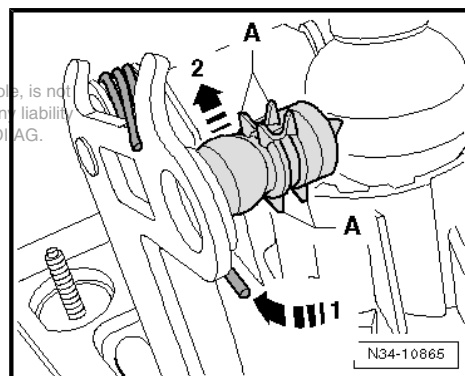
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Risk of damage to guides -A-.

- ◆ *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-.



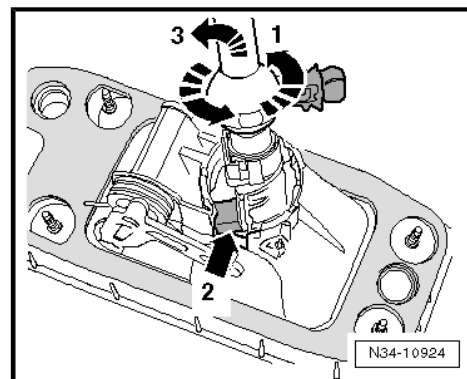
WARNING

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.



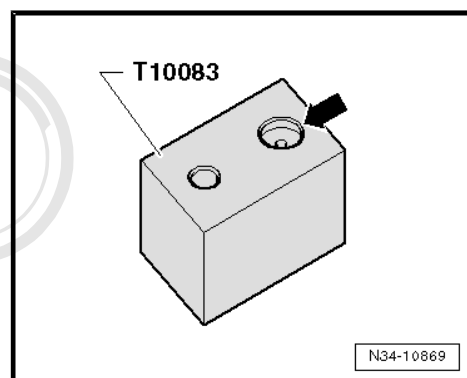
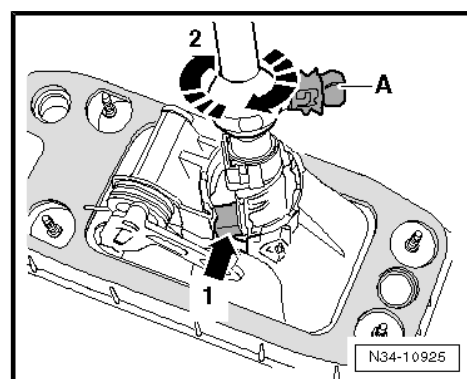
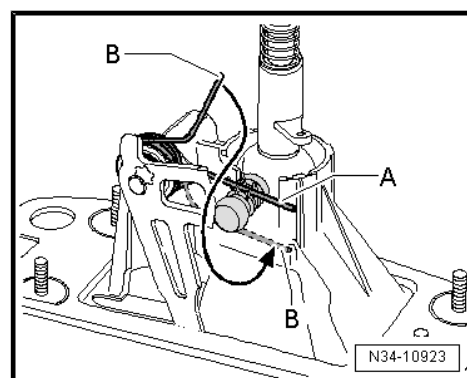
Assembling



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.



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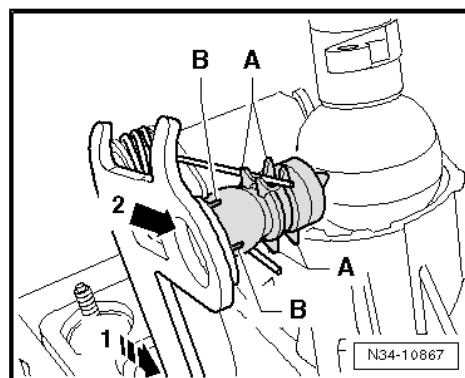
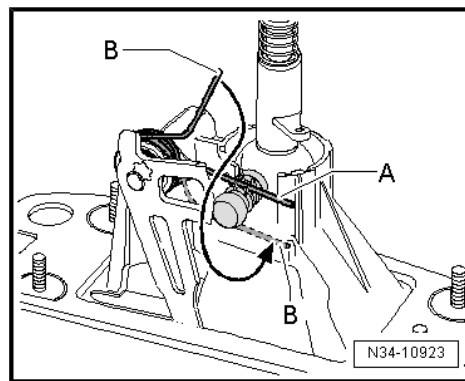
- Insert arm -A- of spring in guide from above.
- Pull arm -B- of spring downwards and insert it next to the guide (towards ball head).



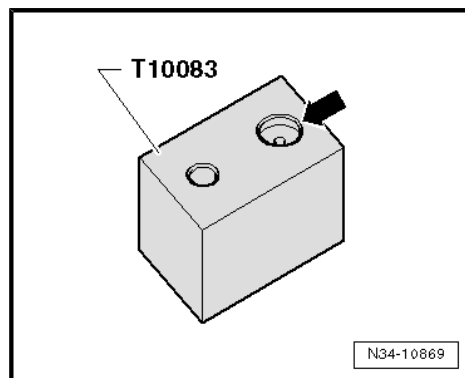
Note

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.



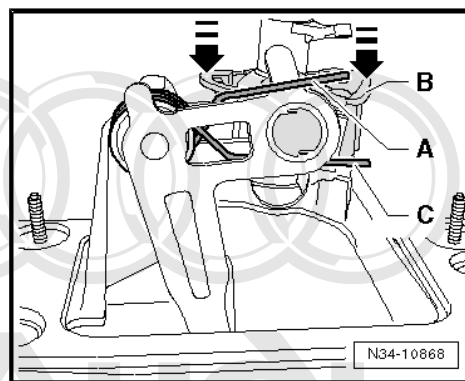
- Lift top spring arm -A- over tab on gate selector lever.



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-.

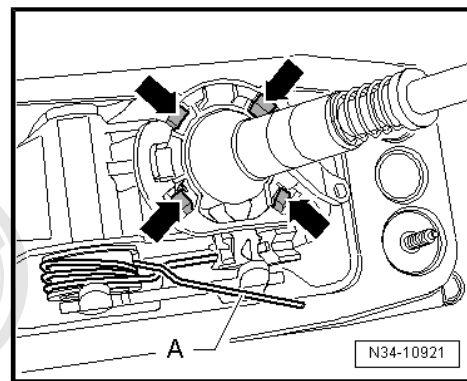


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- All four lugs -arrows- must engage.
- Lift top spring arm -A- over tab on gate selector lever and into guide.
- Insert bottom spring arm into guide.

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

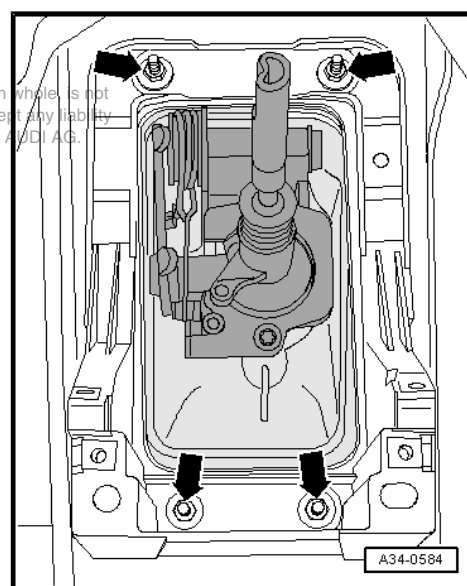
- Install gear selector cable and gate selector cable in selector housing ⇒ [page 54](#).
- Install selector mechanism ⇒ [page 47](#).



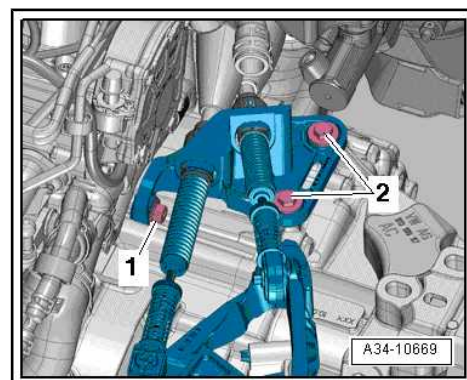
2.3 Removing and installing selector mechanism

Removing

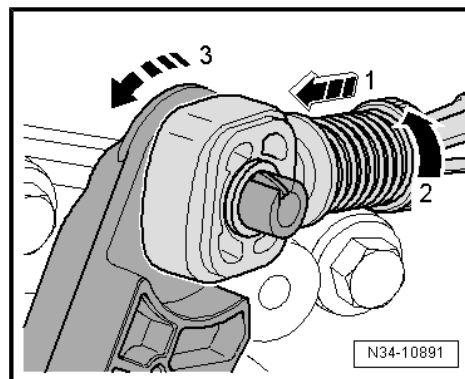
- Remove gear knob with gear lever boot ⇒ [page 42](#).
- Remove centre console insert ⇒ [General body repairs, interior; Rep. gr. 68](#).
- Lift out noise insulation above selector mechanism.
- Remove nuts -arrows-.
- Remove air cleaner housing ⇒ [Rep. gr. 23](#).



- Unscrew nut -1- and bolts -2- and place cable support bracket to one side together with cables.



- 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.



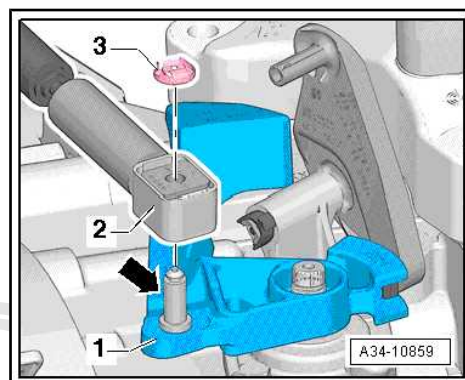
- Detach securing clip -3- for gear selector cable from gearbox selector lever -1- and pull selector cable -2- off pin -arrow-.



Note

Do not detach cable end-piece from gate relay lever until gate relay lever has been removed ⇒ [page 54](#) .

- Remove heat shield for centre tunnel ⇒ General body repairs, exterior; Rep. gr. 66 .
- Swing selector housing down and remove with selector cables.



Installing

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

Tightening torques:

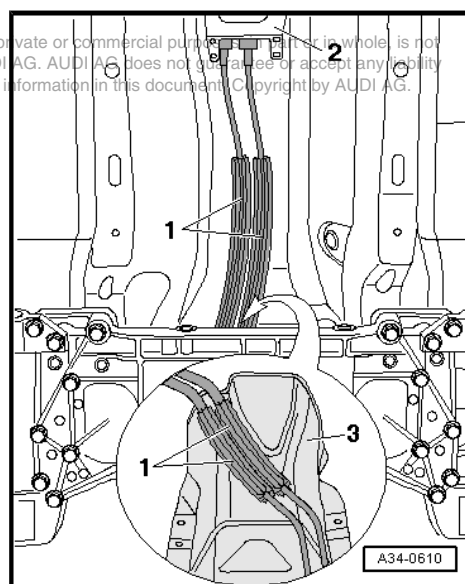
- ⇒ „2 Exploded view - selector mechanism“, [page 40](#) .
- ⇒ „3 Exploded view - gear selector cable and gate selector cable“, [page 50](#) .

- Route cables -1- from selector mechanism -2- to gearbox as follows:
- The cables must run parallel and must not be crossed.
- The cables must be routed in the slot provided in heat shield -3-.

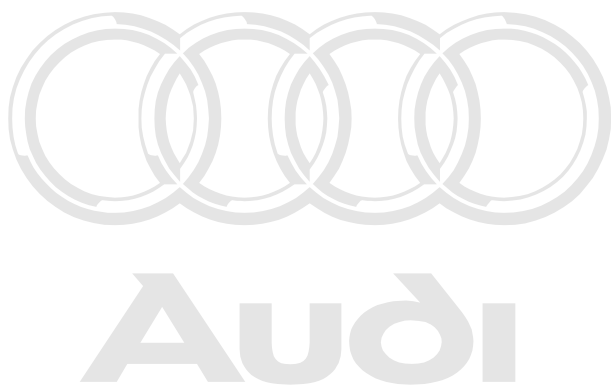
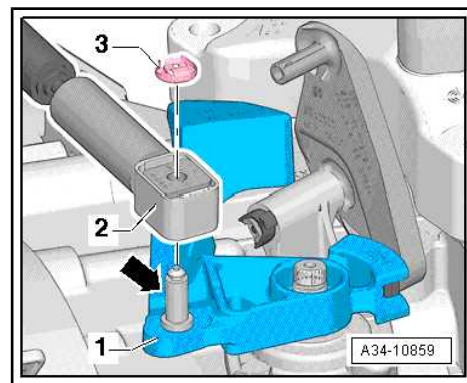


Note

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 -1- and, if necessary, to gate relay lever.
- Adjust selector mechanism ⇒ [page 55](#) .
- Install heat shield for centre tunnel ⇒ General body repairs, exterior; Rep. gr. 66 .
- Install air cleaner housing ⇒ Rep. gr. 23 .
- Install centre console insert ⇒ General body repairs, interior; Rep. gr. 68 .
- Install gear knob with gear lever boot ⇒ [page 42](#) .



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3 Exploded view - gear selector cable and gate selector cable

Overview

- ♦ ⇒ „3.1 Removing and installing gear selector cable and gate selector cable“, page 54
- ♦ ⇒ „3.2 Adjusting selector mechanism“, page 55



Note

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

1 - Gearbox

2 - Clip

- ☐ For gate relay lever
- ☐ Detaching and fitting ⇒ page 53

3 - Gearbox selector lever

- ☐ Fitting ⇒ page 52
- ☐ Installation position ⇒ page 52
- ☐ After installing, adjust selector mechanism ⇒ page 55

4 - Cable end-piece

- ☐ Secures gear selector cable to gearbox selector lever
- ☐ Allocation ⇒ page 51
- ☐ Detaching from gear selector cable ⇒ page 52

5 - Securing clip

- ☐ Removing ⇒ page 53
- ☐ Always renew after removing

6 - Nut

- ☐ Self-locking
- ☐ Renew
- ☐ 23 Nm

7 - Retaining clip

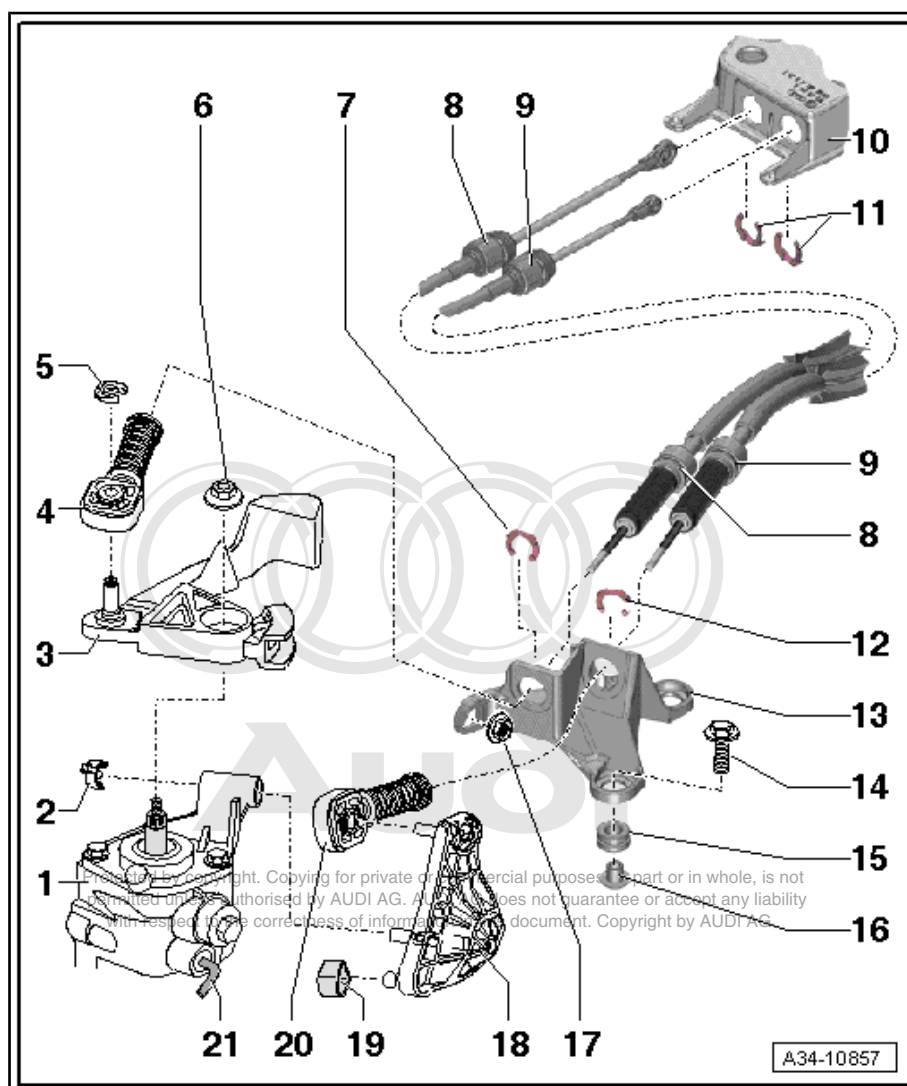
- ☐ Renew

8 - Gear selector cable

- ☐ Detaching and securing at gearbox selector lever ⇒ page 53
- ☐ Removing and installing ⇒ page 54
- ☐ Adjusting ⇒ page 55

9 - Gate selector cable

- ☐ Removing and installing ⇒ page 54
- ☐ Adjusting ⇒ page 55



10 - Selector housing

11 - Retaining clips

- ☐ Renew

12 - Retaining clip

- ☐ Renew

13 - Cable support bracket

14 - Bolt

- ☐ 20 Nm

15 - Grommet

16 - Bush

17 - Nut

- ☐ 20 Nm

18 - Gate relay lever

- ☐ Installation position ⇒ [page 52](#)
- ☐ Detaching and securing at gearbox selector lever ⇒ [page 53](#)

19 - Slide block

- ☐ Installation position ⇒ [page 52](#)

20 - Cable end-piece

- ☐ Secures gate selector cable to gate relay lever
- ☐ Allocation ⇒ [page 51](#)
- ☐ Detaching from gate selector cable ⇒ [page 52](#)

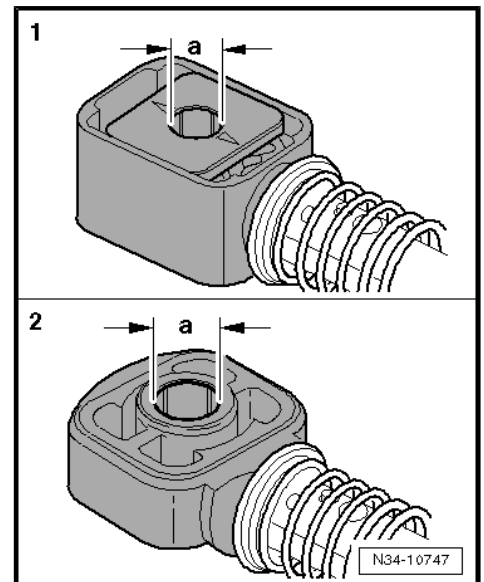
21 - Angled rod

- ☐ For adjusting selector mechanism ⇒ [page 55](#)

Identification of cable end-pieces

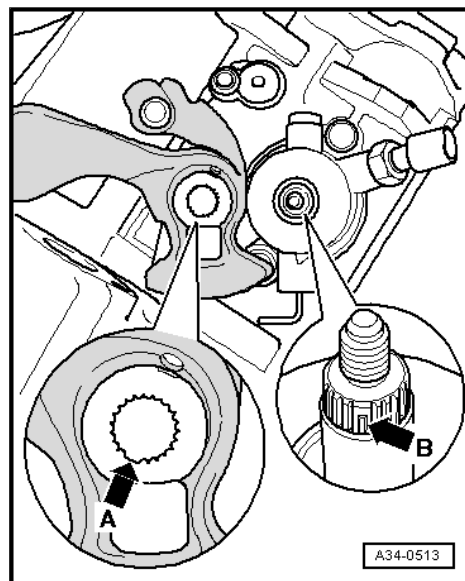
The holes in the cable end-pieces have different diameters.

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



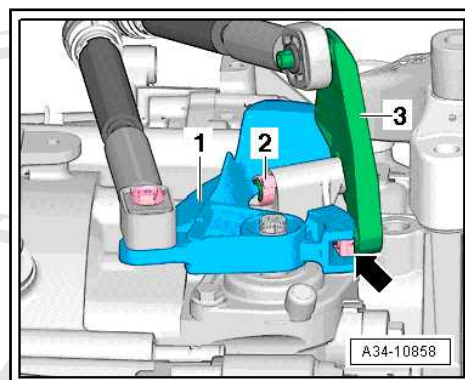
Installing gearbox selector lever

- 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.



Installation position: gearbox selector lever/gate relay lever

- 1 - Gearbox selector lever
- 2 - Clip
- 3 - Gate relay lever engages in guide rail of gearbox selector lever via slide block -arrow B-.

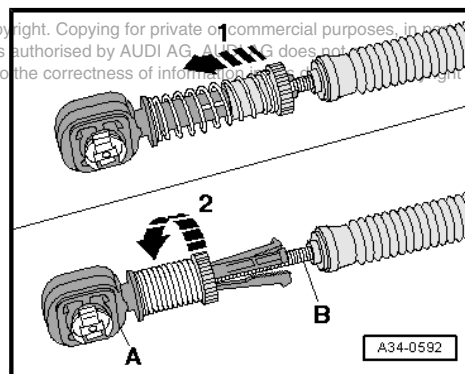


Note

Lubricate guide rail and slide block -arrow- with grease -G 000 450 02-.

Detaching cable end-pieces from gear selector cable and gate selector cable

- Pull locking mechanism forwards -arrow 1- onto stop and then turn to left -arrow 2- to lock.
- Take cable -B- out of cable end-piece -A-.



Detaching and securing gear selector cable at gearbox selector lever

Detaching

- Lift up tab and detach securing clip -3- for gear selector cable from gearbox selector lever -1-.
- Pull gear selector cable -2- off pin -arrow-.

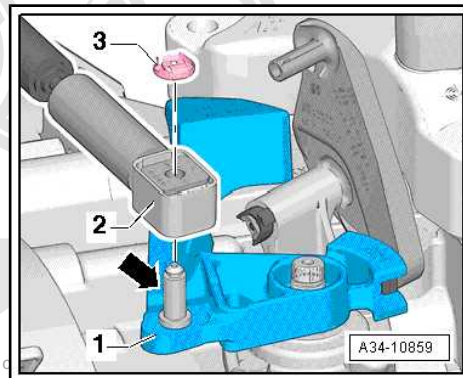
Securing



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 -2- onto gear selector lever -1- and secure with securing clip -3-.



Detaching and securing gate relay lever at gearbox selector lever

Detaching

- 2nd gear engaged
- Remove clip -arrow 1- and take off gate relay lever together with cable end-piece.



Note

-Arrow 2- can be disregarded.

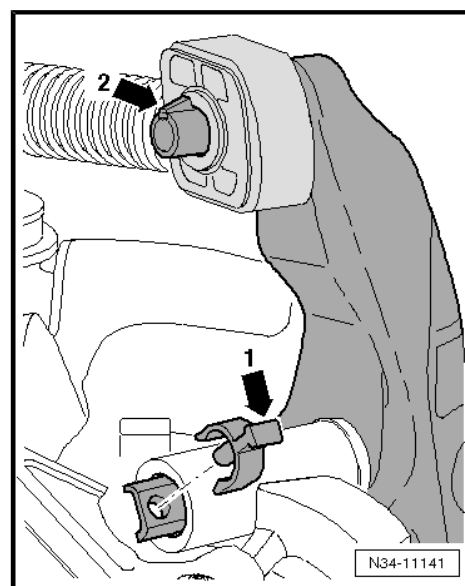
Securing



Note

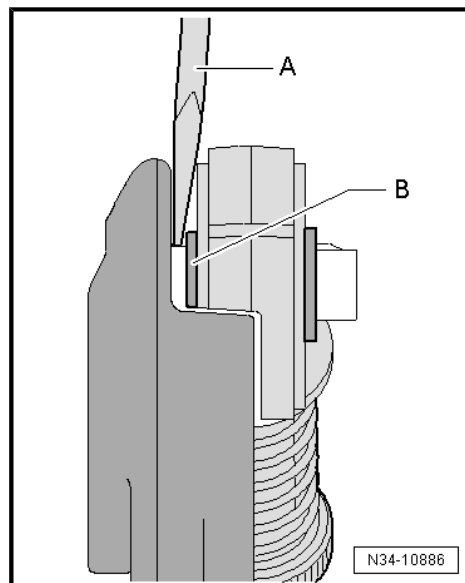
Lubricate all bearings and moving surfaces with grease -G 000 450 02-.

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



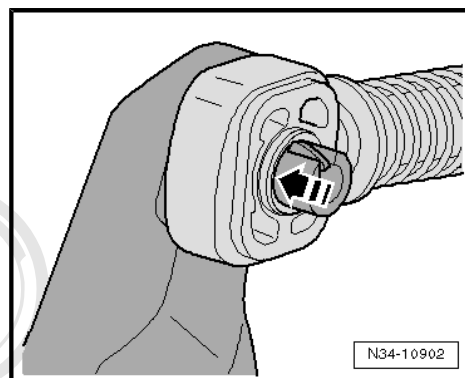
Levering cable end-piece for gate selector cable off gate relay lever

- 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

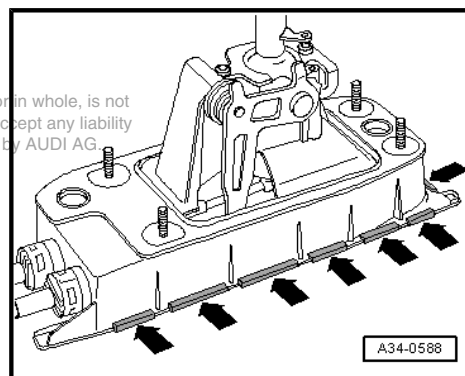
- Gate relay lever removed
- Press on cable end-piece only at bush -arrow-.
- Cable end-piece must move freely on gate relay lever.
- Cable end-piece must be behind detent.
- Ensure that components engage securely.



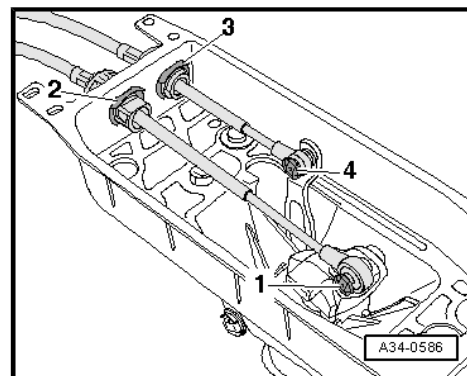
3.1 Removing and installing gear selector cable and gate selector cable

Removing

- Remove selector mechanism ⇒ [page 47](#) .
- Open out tabs -arrows- on floor plate all round with screwdriver and remove floor plate.
- Remove gasket from selector housing.

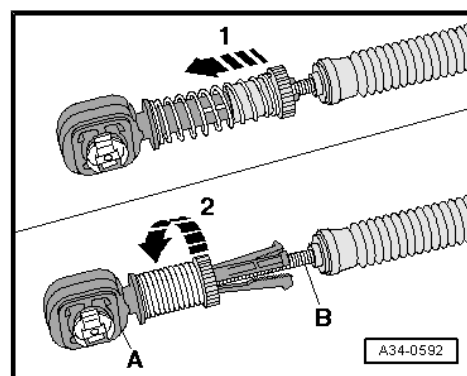


- Detach securing clips -1 ... 4- and remove gear selector cable and gate selector cable from selector housing.



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.
- Detach cable end-pieces from selector cables.



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

Installing

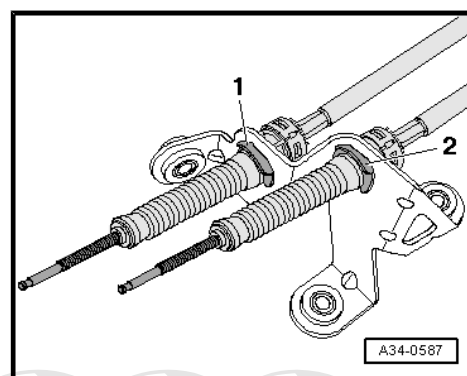
Installation is carried out in reverse sequence; note the following:



Note

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

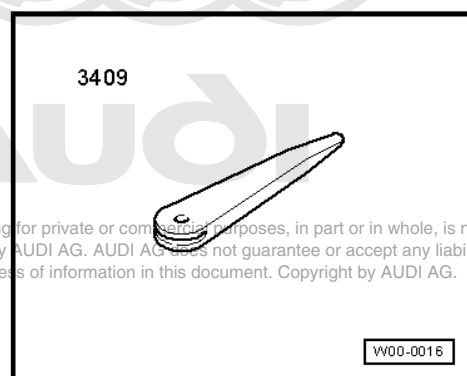
- Install selector mechanism ⇒ [page 47](#) .
- Adjust selector mechanism ⇒ [page 55](#) .



3.2 Adjusting selector mechanism

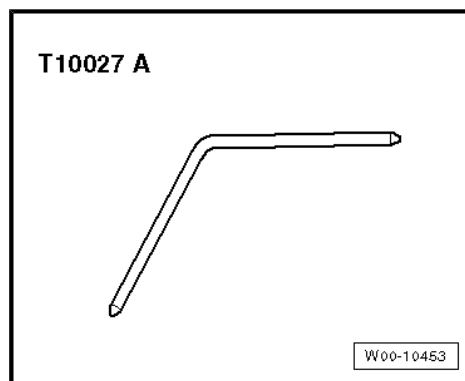
Special tools and workshop equipment required

- ◆ Removal wedge -3409-



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◆ Locking pin -T10027A-

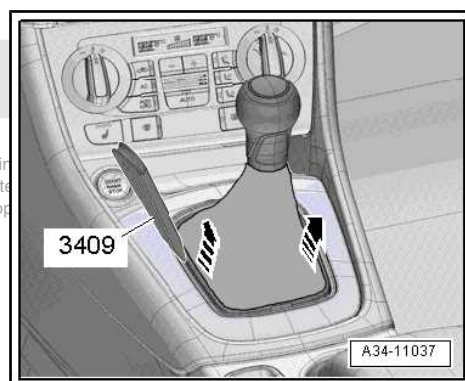


Requirements for adjustment

- 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.



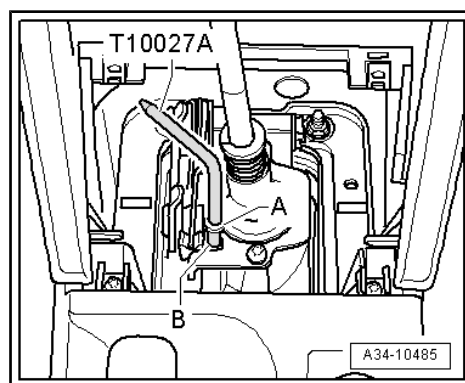
- Pull noise insulation slightly to one side.
- Then guide locking pin -T10027A- through hole -A- and into hole -B-.



Note

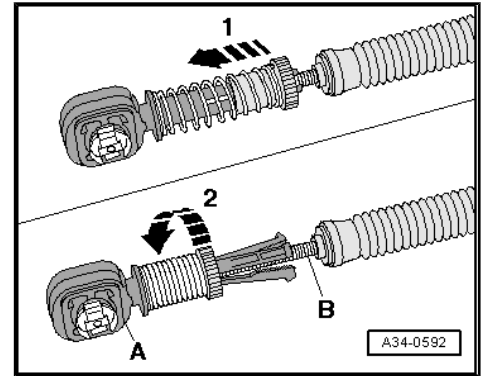
The noise insulation panels are removed to give a better illustration.

- Remove air cleaner housing ⇒ Rep. gr. 23 .



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

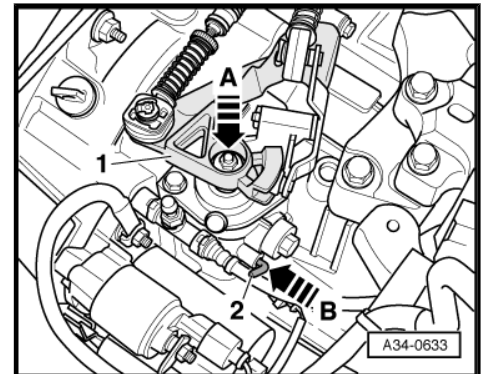
- Push locking sleeve forwards as far as stop -arrow 1-.
- Turn locking sleeve clockwise as far as stop -arrow 2- so that it engages.
- It should be possible to move selector cable -B- in the cable end-piece.



- Gearbox in neutral.

Lock selector shaft as follows:

- Press gearbox selector lever -1- down -arrow A- into 1st/2nd gear gate, and at the same time press angled rod -2- into gearbox -arrow B- (turning slightly as necessary) until it engages.
- The selector shaft is then locked and can no longer be moved.



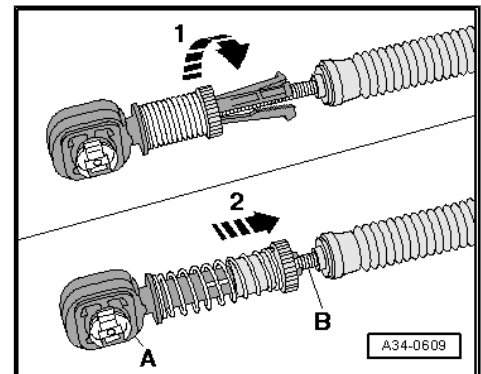
- Check that gate selector cable and gear selector cable -B- are located in cable end-pieces -A- without tension.
- Release locking sleeve -arrow 1-.
- Let locking sleeve slide back as far as stop -arrow 2-.



Note

Cable adjustment is now complete.

- Pull angled rod just far enough out of gearbox to release selector mechanism.
- Pull locking pin -T10027A- out of selector mechanism.
- Check gear lever setting ⇒ [page 57](#).



3.3 Checking gear lever setting

- 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.

4 Removing and installing gearbox

Overview

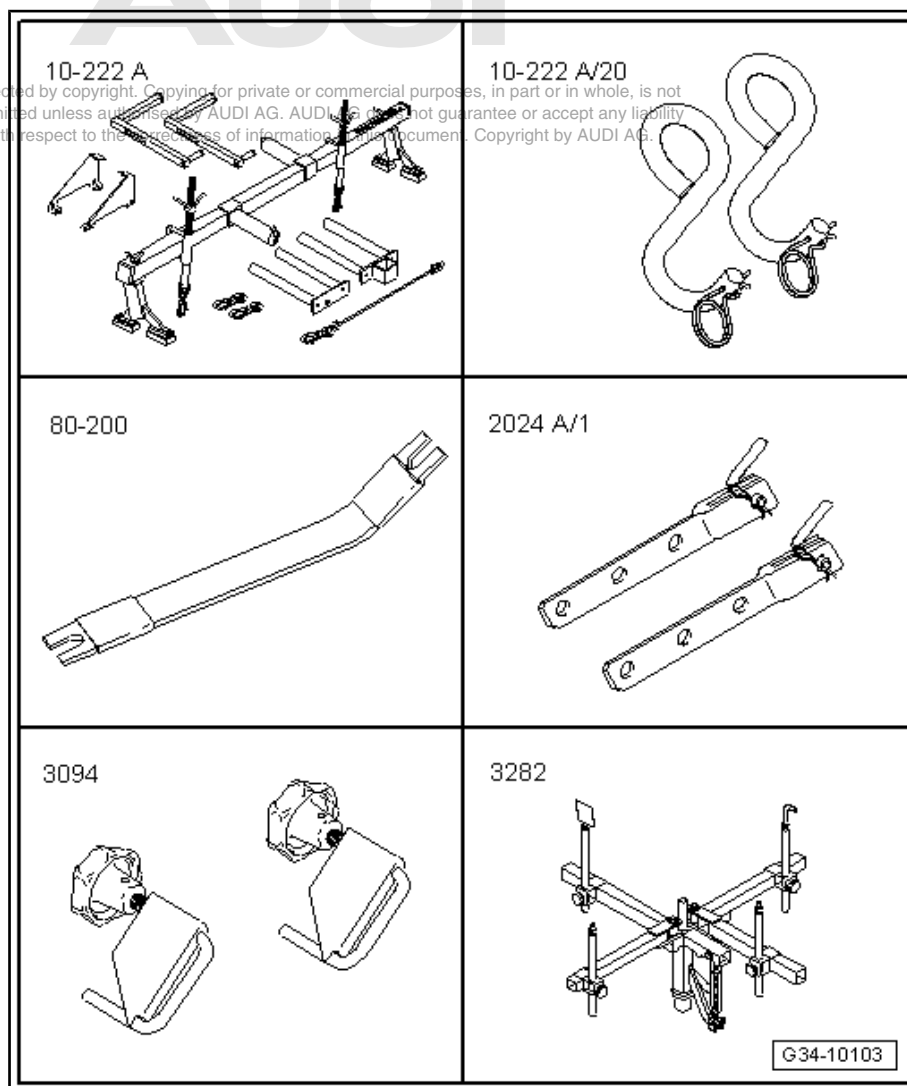
◆ ⇒ „4.1 Removing gearbox in vehicles with 2.0 ltr. TDI engine“, page 58

◆ ⇒ „4.2 Installing gearbox“, page 68

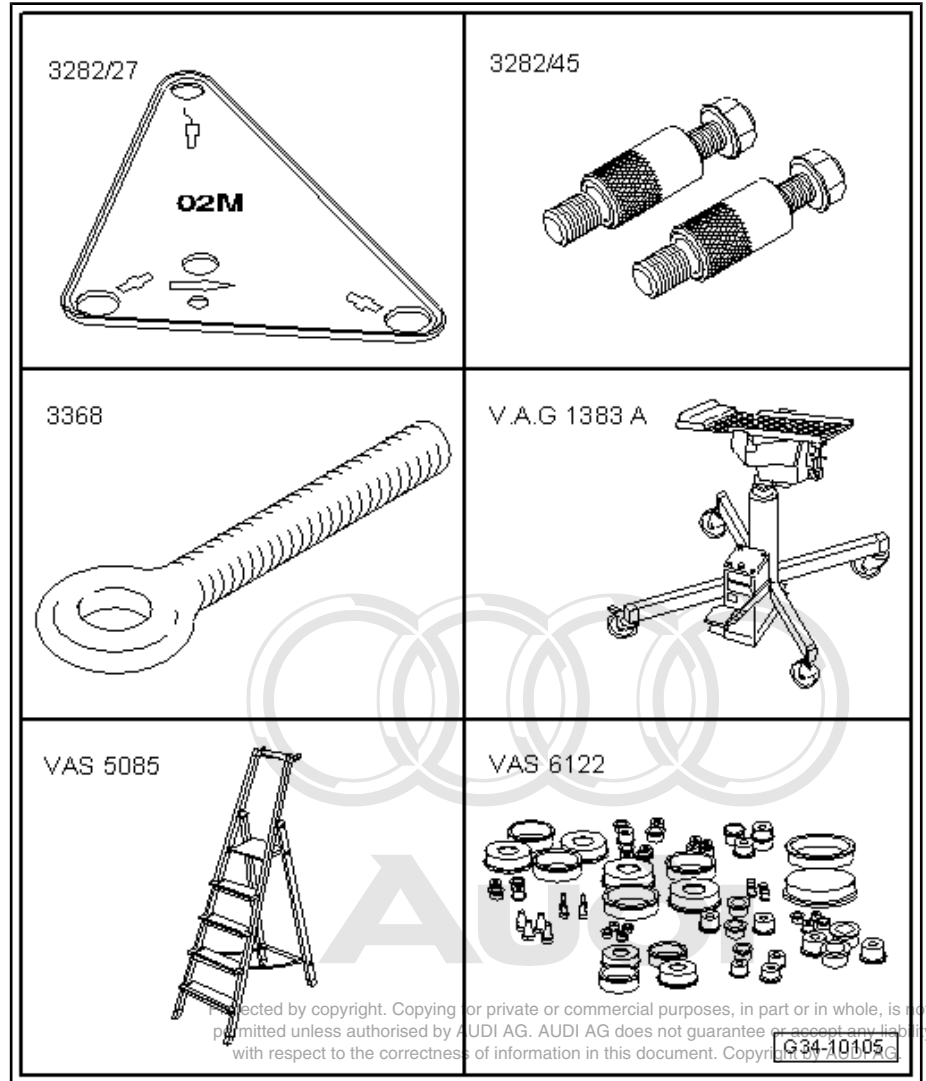
4.1 Removing gearbox in vehicles with 2.0 ltr. TDI engine

Special tools and workshop equipment required

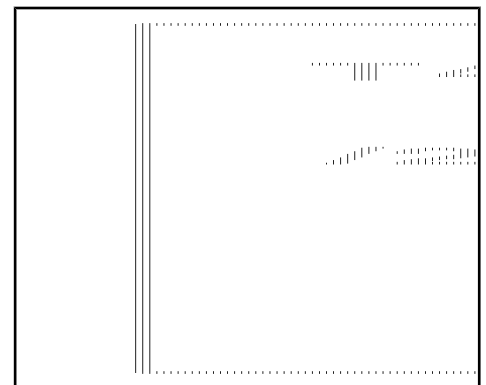
- ◆ Support bracket -10 - 222 A-
- ◆ Adapters -10 - 222 A /20-
- ◆ Removal lever -80 - 200-
- ◆ Extension -2024 A /1- of lifting tackle -2024 A-
- ◆ Hose clamps, up to 25 mm -3094-
- ◆ Gearbox support -3282-



- ◆ Adjustment plate -3282/27-
- ◆ Bolt -3282/45-
- ◆ Eye-head bolt -3368-
- ◆ Engine and gearbox jack - V.A.G 1383 A-
- ◆ Stepladder -VAS 5085-
- ◆ Engine bung set -VAS 6122-



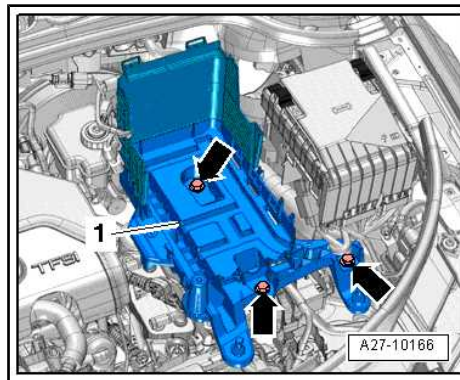
- ◆ -T40093/6- from engine support supplement set -T40093-



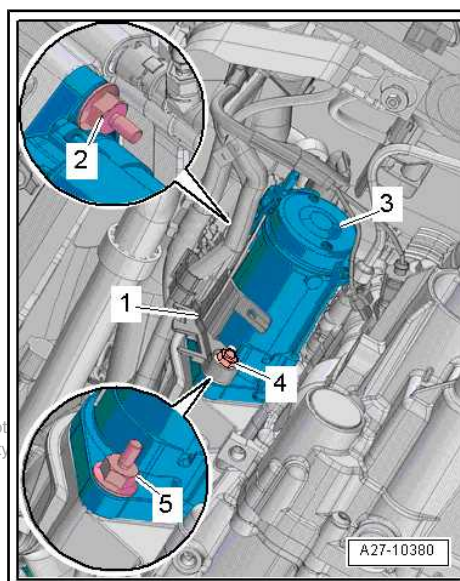
- ◆ Grease for clutch plate splines -G 000 100-
- ◆ Grease -G 000 450 02-
- ◆ Universal grease -G 052 735-
- ◆ Flange nut M10 or nut with washer
- ◆ Nut M10, approx. 5 mm thick

Procedure

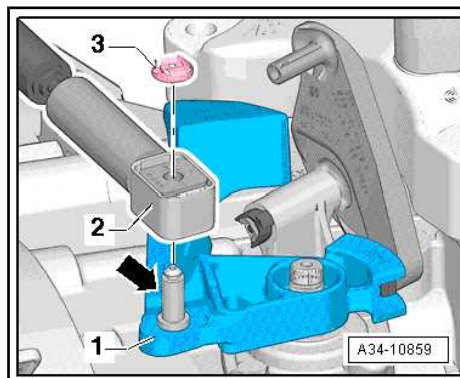
- Switch off ignition.
- Remove battery and battery tray ⇒ Electrical system; Rep. gr. 27 .



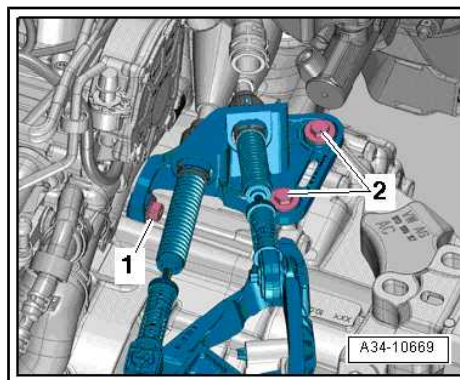
- Remove starter ⇒ Electrical system; Rep. gr. 27 .
- Remove flange shaft (right-side) ⇒ [page 177](#) .



- Remove gate relay lever ⇒ [page 53](#) .
- Detach securing clip -3- from gearbox selector lever -1- and pull gear selector cable -2- off pin -arrow-.



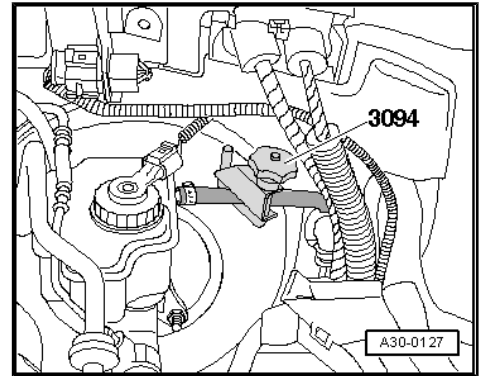
- Unscrew nut -1- and bolts -2- and place cable support bracket to one side together with cables.



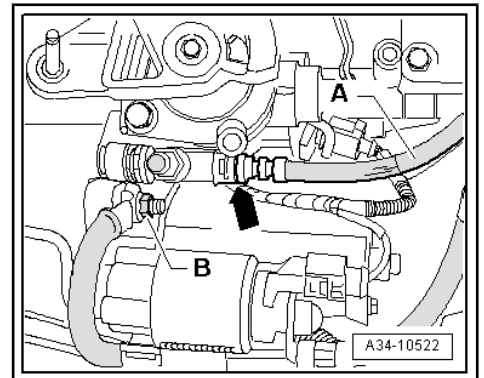
 Note

In the following steps make sure that no brake fluid escapes onto the longitudinal member or onto the gearbox below. If this does happen, clean the affected area thoroughly.

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



- 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- .

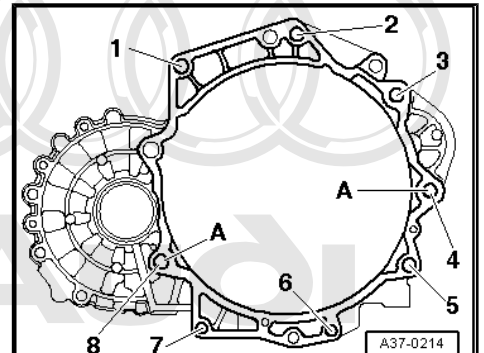


Caution

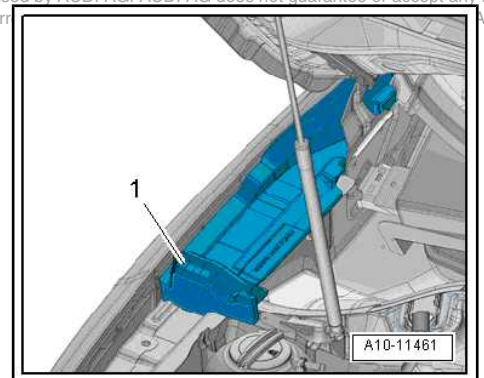
Catch escaping brake fluid.

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

- Remove bolts -1, 2- securing gearbox to engine.

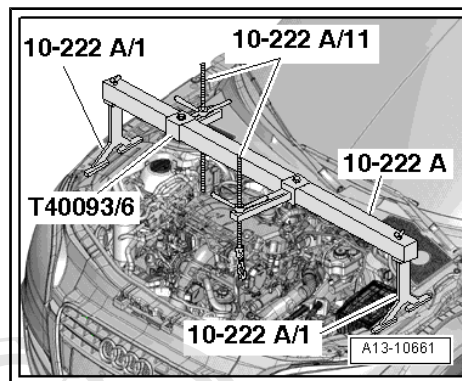


- Unclip sealing element -1- on both sides using removal lever -80 - 200- .



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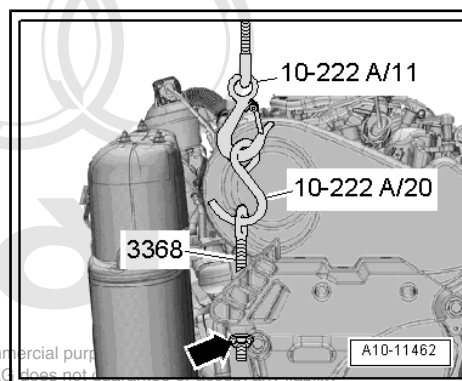
- Set up support bracket -10 - 222 A- with spindles -10 - 222 A / 11- on wing mounting flanges, as shown in illustration.
- Engage hook of spindle (left-side) in engine lifting eye.



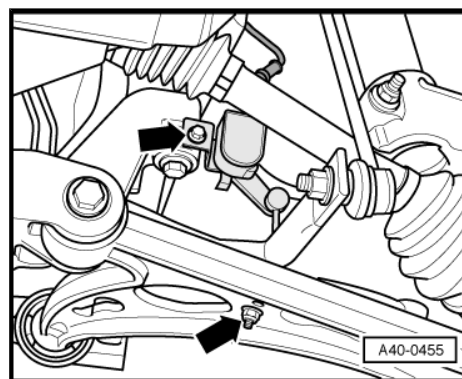
WARNING

Risk of accident if threaded attachment comes loose.

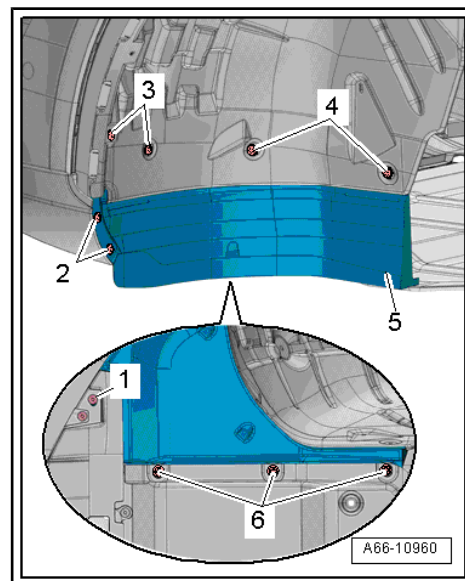
- ◆ *To ensure that the eye-head bolt -3368- is securely attached, screw on a flange nut or nut with washer -arrow- at least 6 turns.*



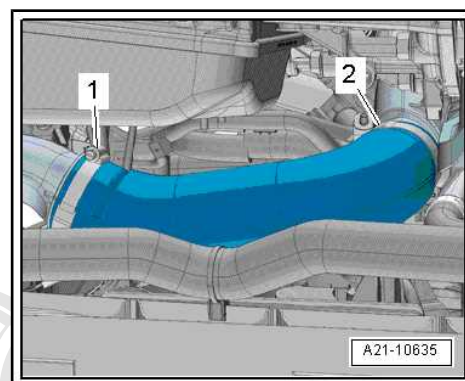
- Secure eye-head bolt -3368- with M10 flange nut or nut with washer to engine support as shown in illustration.
- Hook spindle -10 - 222 A / 11- with adapter -10 - 222 A / 20- (right-side) onto eye-head bolt -3368- .
- Take up weight of engine/gearbox assembly evenly with both spindles; do not lift.
- If fitted, remove front left vehicle level sender -G78- -arrows-.



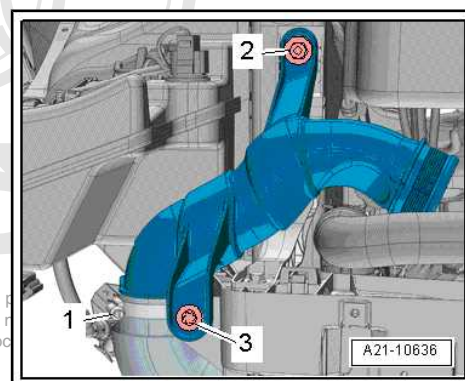
- Remove front wheel spoiler (left-side) ⇒ General body repairs, exterior; Rep. gr. 66 .
- Remove front wheel (left-side) ⇒ Wheels and tyres; Rep. gr. 44 .



- Release hose clips -1- and -2- and remove air hose.
- Seal off open lines and connections with clean plugs from engine bung set -VAS 6122- .



- Unscrew nut -2- and bolt -3-.
- Release hose clip -1- and detach air pipe.
- Seal off open lines and connections with clean plugs from engine bung set -VAS 6122- .

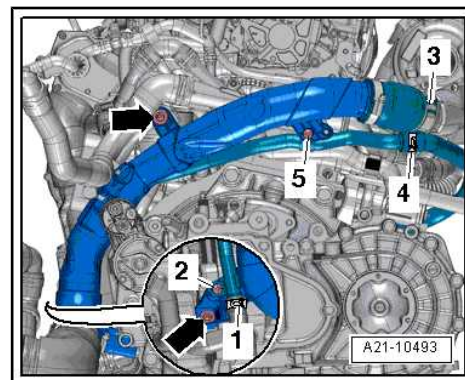


- Remove bolts -2, 5- and -arrows-.
- Move electrical wiring and hoses clear at air pipe (left-side) using removal lever -80 - 200- .
- Release hose clip -3- and detach air pipe (left-side) from below.



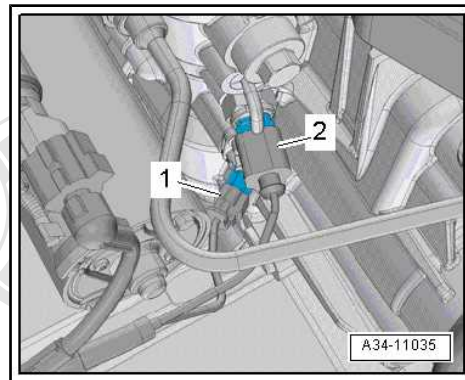
Note

-Items 1 and 4- can be disregarded.

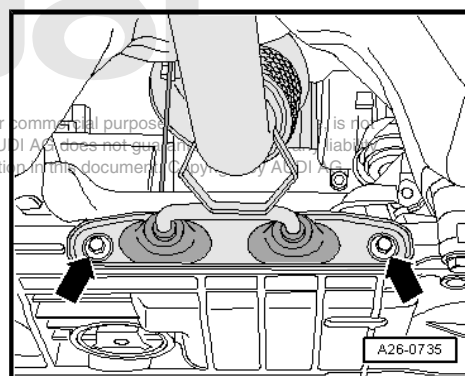


– Unplug electrical connectors:

- 1 - Gearbox neutral position sender -G701-
- 2 - Reversing light switch -F4-



– Remove bolts -arrows- for exhaust pipe bracket from sub-frame.



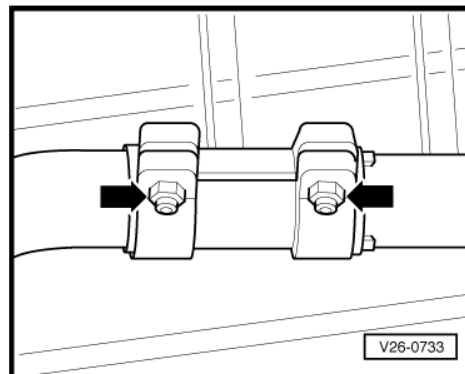
– Disconnect exhaust system at clamp -arrows-.



Caution

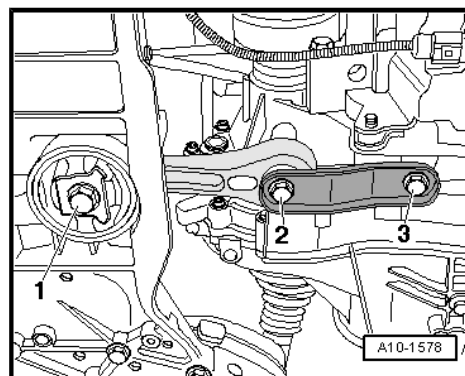
Risk of damage to flexible joint.

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

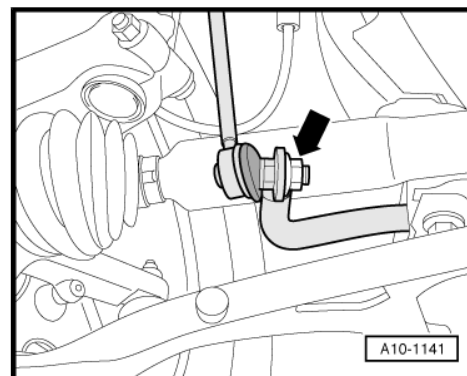


– Tie up front exhaust pipe.

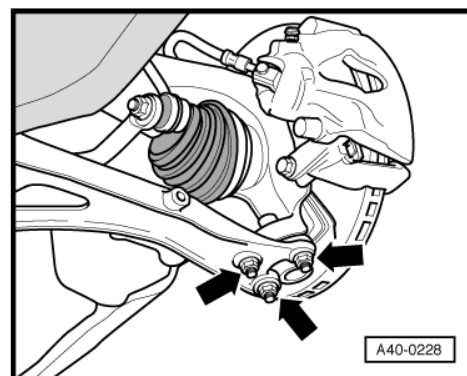
– Remove bolts -1, 2, 3- and detach pendulum support.



- Unscrew nut -arrow- for coupling rod on anti-roll bar (left-side).



- Remove nuts -arrows- securing swivel joint (left-side).
- Disengage swivel joint (left-side) from wishbone.
- Separate drive shaft (left-side) from gearbox.

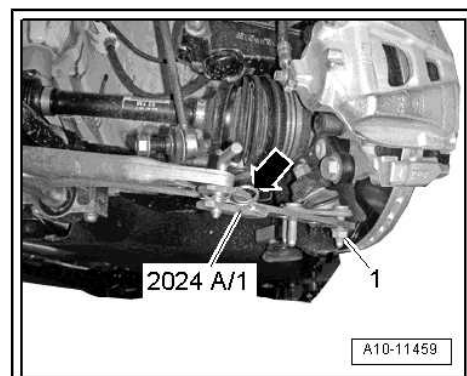


- Swivel suspension strut (left-side) outwards and support with extension -2024 A /1- as shown in illustration.

 **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-.*

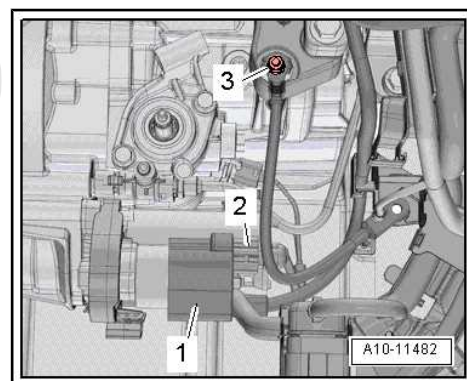


- Swivel drive shaft (left-side) towards front.

- Remove nut -3- and detach earth wire.

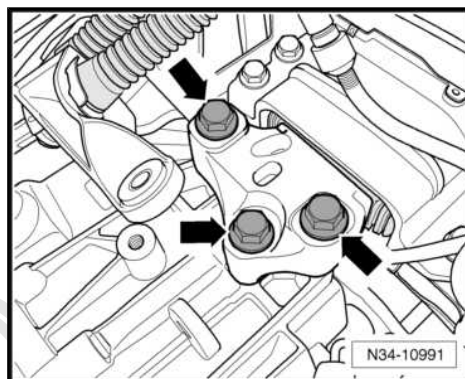
 **Note**

-Items 1 and 2- can be disregarded.

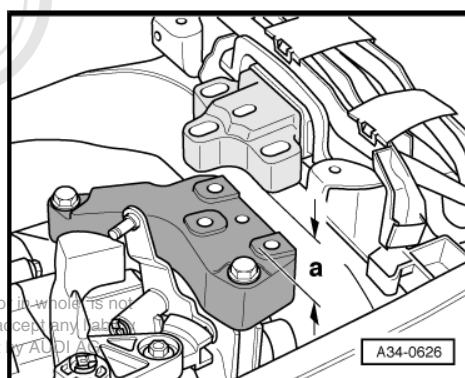


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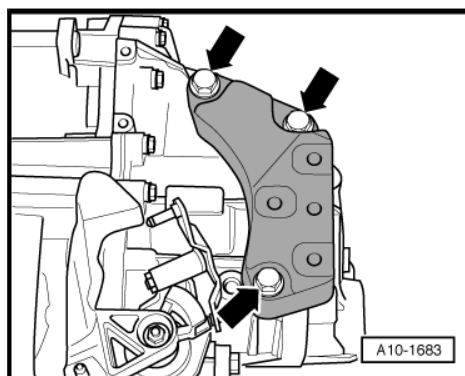
- Remove bolts -arrows- from gearbox mounting.



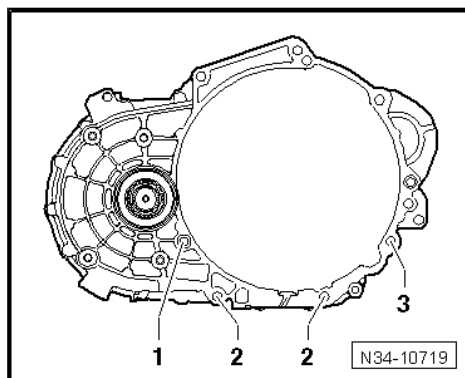
- Adjust spindles of support bracket -10 - 222 A- to lower gearbox by distance -a-.
- Dimension -a- = 60 mm



- Remove bolts -arrows- and detach gearbox support from gearbox.

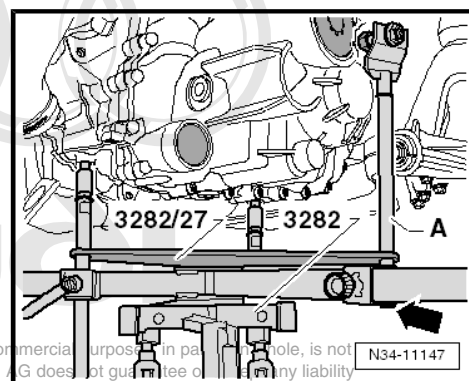
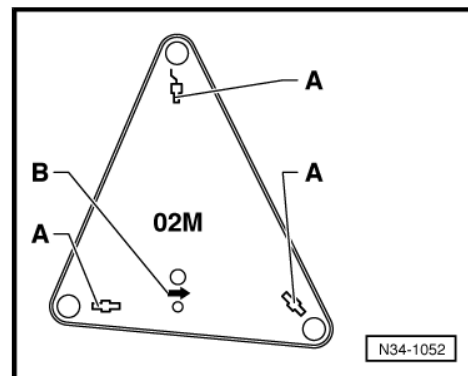


- Remove bolts -2- and -3- securing gearbox to engine.



To remove gearbox „0BB“ set up gearbox support -3282- with adjustment plate -3282/27- .

- Insert gearbox support -3282- in engine and gearbox jack - V.A.G 1383A- .
- Align arms of gearbox support according to holes in adjustment plate.
- Screw in support elements -A-, as illustrated on adjustment plate.
- Place engine and gearbox jack -V.A.G 1383A- underneath vehicle.
- The arrow symbol -B- on the adjustment plate points in the direction of travel.
- Align adjustment plate parallel with gearbox.
- Pin -A- should be flush with underside of guide of gearbox support -arrow-.



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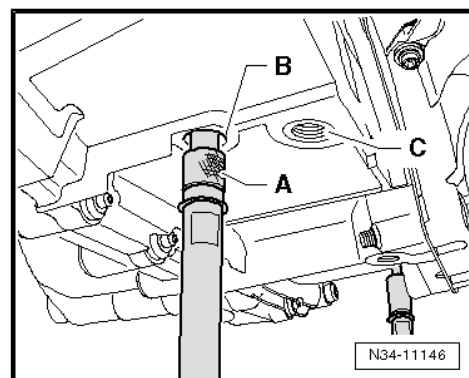
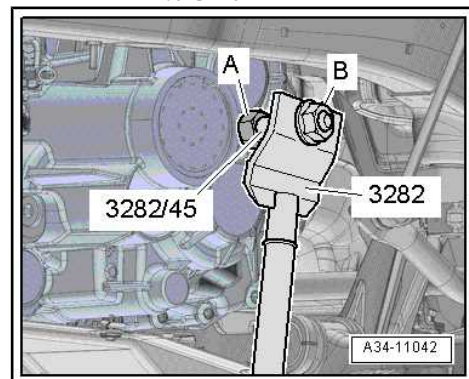
- Screw bolt -3282/45- into threaded hole in gearbox housing as shown in illustration.



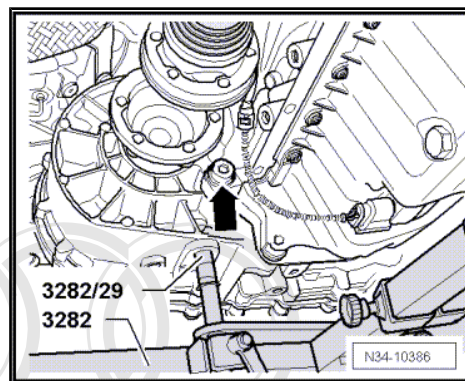
Note

The bolt -3282/45- cannot be screwed in completely, so use an M10 nut -item A- (approx 5 mm thick) as a spacer.

- Secure gearbox to gearbox support -3282- with flange nut -B-.
- Insert pin -A- of gearbox support -3282- into attachment point -B- next to rear threaded hole -C- for pendulum support.



- Remove last engine/gearbox securing bolt -arrow-.
- Press gearbox off engine (dowel sleeves).
- Carefully lower gearbox.



4.2 Installing gearbox



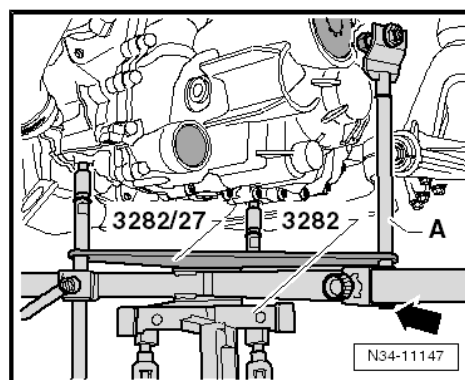
Note

- ◆ *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 .*
- ◆ *Re-attach all cable ties at the same locations when re-installing.*
- ◆ *Using a thread tap, carefully remove remaining locking fluid from all threaded holes which will accommodate self-locking bolts.*

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Tightening torques for installing gearbox: ⇒ [page 71](#)

- 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.
- 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.

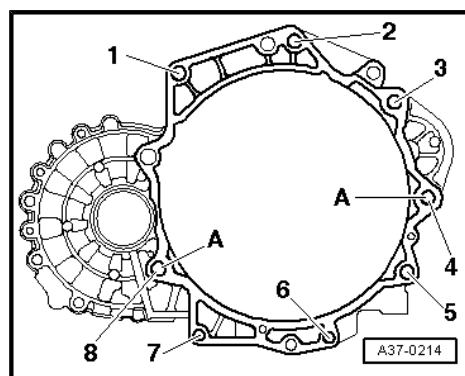


- Check that dowel sleeves -A- for centralising engine/gearbox are in the cylinder block; install any missing dowel sleeves.

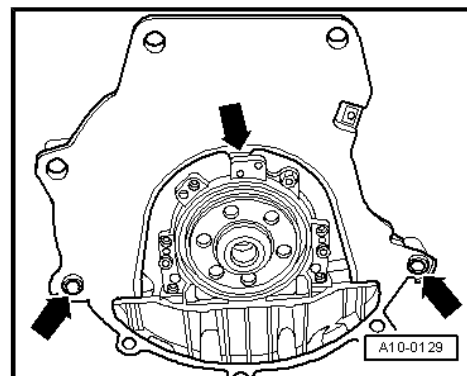


Note

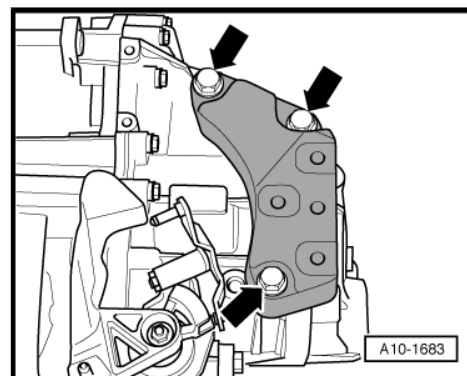
If the dowel sleeves are not fitted, this will lead to gear-change problems, clutch malfunction and in some cases gearbox noise (gears will make rattling noises).



- 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 32](#) .
- Raise gearbox carefully using gearbox support -3282- .
- Align gearbox with engine and install.



- Install gearbox support with new bolts -arrows-.



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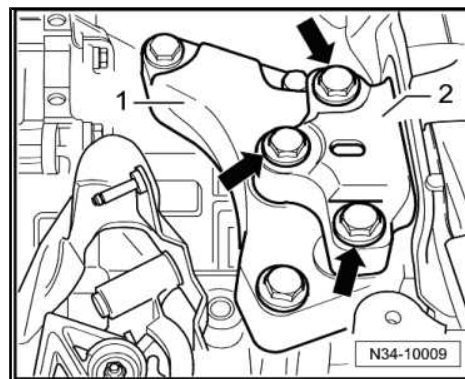
- Align engine/gearbox assembly in installation position; to do so, tighten spindles of support bracket -10 - 222 A- until gearbox support -1- makes contact with gearbox mounting -2-.



Caution

The threads in the gearbox support can be damaged if the bolts are not inserted straight.

- ◆ *Before fitting the bolts -arrows-, the gearbox support and the gearbox mounting must be aligned so they are exactly parallel. To do this, place engine and gearbox jack -V.A.G 1383 A- below gearbox (near differential) and lift until gearbox support is parallel with gearbox mounting.*



- Check adjustment of assembly mountings ⇒ Engine, mechanics; Rep. gr. 10 .



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.*

- Install flange shaft (right-side) ⇒ [page 177](#) .
- Install drive shafts, wishbone, swivel joint, coupling rod and front left vehicle level sender -G78- ⇒ Running gear, front-wheel drive and four-wheel drive; Rep. gr. 40 .
- Install pendulum support ⇒ [page 78](#) .
- Install front exhaust pipe and bracket for exhaust system ⇒ Engine, mechanics; Rep. gr. 26 .
- Install air pipe and air hose ⇒ Engine, mechanics; Rep. gr. 21 .
- Fit front wheel (left-side) ⇒ Wheels and tyres; Rep. gr. 44 .
- Install wheel spoiler ⇒ General body repairs, exterior; Rep. gr. 66 .
- Connect pipe to bleeder connection ⇒ [page 26](#) .
- Bleed clutch system ⇒ [page 28](#) .
- Install cables and cable support bracket ⇒ [page 50](#) .
- Install gate relay lever ⇒ [page 53](#) .
- Install starter, earth wire, battery tray and battery ⇒ Electrical system; Rep. gr. 27 .
- Check gear oil level in gearbox ⇒ [page 79](#) .
- Install noise insulation (bottom) ⇒ General body repairs, exterior; Rep. gr. 66 .

Tightening torques



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 $\pm 15\%$.*

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

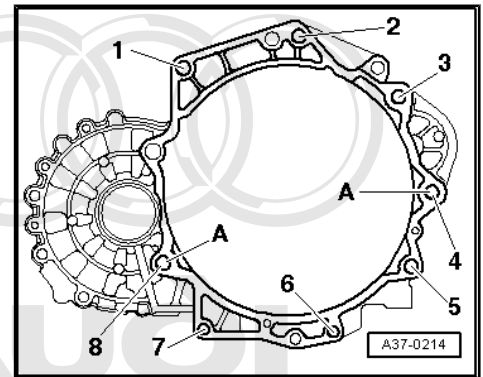
Assembly mountings

⇒ „6 Exploded view - assembly mountings“, page 73

Engine/gearbox securing bolts

Item	Bolt	Nm
1, 2	M12x65	80
3 1) 2)	M12x150	80
4 1) 2)	M12x165	80
5, 6, 7	M10x50	40
8	M12x85	80
A	Dowel sleeves for centralising	
• 1) Bolt with stud M8 • 2) Also secures starter.		

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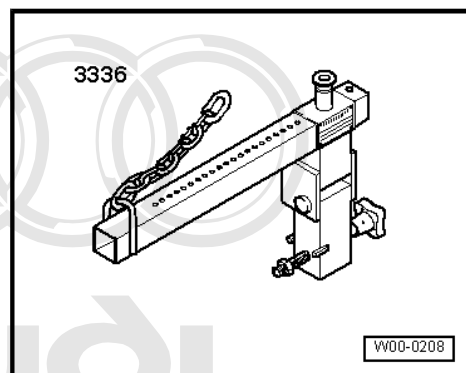
Other tightening torques

Component	Nm
Small cover plate for flywheel	10
Heat shield for drive shaft (right-side) to cylinder block	25
Earth wire to gearbox bracket	23

5 Transporting gearbox

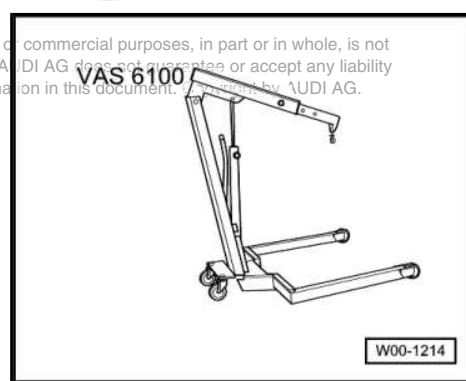
Special tools and workshop equipment required

- ◆ Gearbox lifting tackle -3336-



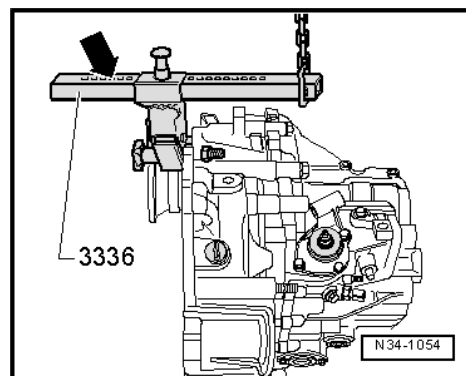
- ◆ Workshop hoist -VAS 6100-

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Procedure

- Bolt gearbox lifting tackle -3336- to clutch housing.
- Set support arm on sliding bracket by means of locking pin -arrow-.
- Number of holes visible = 6
- Take up gearbox with workshop hoist and gearbox lifting tackle -3336-.



6 Exploded view - assembly mountings

Overview

- ◆ [⇒ „6.1 Removing and installing gearbox mounting“, page 75](#)
- ◆ [⇒ „6.2 Removing and installing pendulum support“, page 78](#)

1 - Engine support

2 - Bolt

- ☐ Tightening torque ⇒ Engine, mechanics; Rep. gr. 10

3 - Engine mounting

- ☐ With support arm
- ☐ Removing and installing ⇒ Engine, mechanics; Rep. gr. 10

4 - Bolt

- ☐ Tightening torque ⇒ Engine, mechanics; Rep. gr. 10

5 - Bolt

- ☐ Tightening torque ⇒ Engine, mechanics; Rep. gr. 10

6 - Bolt

- ☐ Tightening torque ⇒ Engine, mechanics; Rep. gr. 10

7 - Pendulum support

- ☐ Removing and installing ⇒ [page 78](#)

8 - Bolt

- ☐ Renew
- ☐ Tightening torque and sequence ⇒ [page 74](#)

9 - Bolt

- ☐ Renew
- ☐ Tightening torque and sequence ⇒ [page 74](#)

10 - Bolt

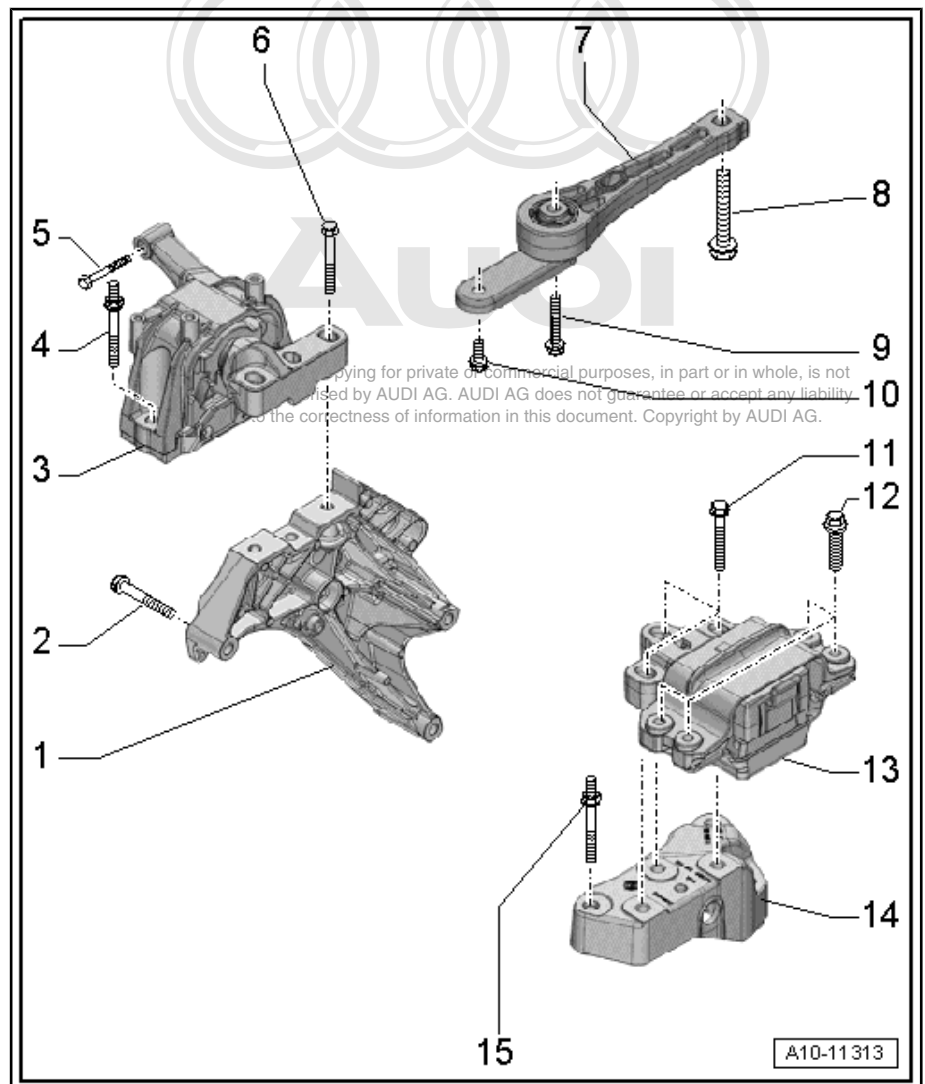
- ☐ Renew
- ☐ Tightening torque and sequence ⇒ [page 74](#)

11 - Bolt

- ☐ Renew
- ☐ 60 Nm + 90°

12 - Bolt

- ☐ Renew
- ☐ 60 Nm + 90°



**13 - Gearbox mounting**

- ❑ Removing and installing ⇒ [page 75](#)

14 - Gearbox support

- ❑ Removing and installing ⇒ [page 75](#)

15 - Bolt

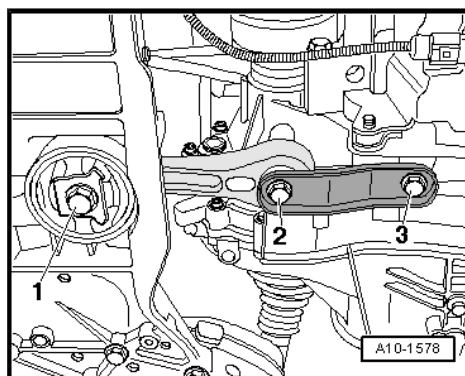
- ❑ Renew
- ❑ 60 Nm + 90°

Installing pendulum support**Note**

Renew bolts which are tightened by turning through a specified angle.

- Tighten bolts in 3 stages in the sequence shown:

Stage	Bolts	Tightening torque/tightening angle
1.	-2, 3-	50 Nm
2.	-1-	100 Nm
3.	-1 ... 3-	Turn 90° further

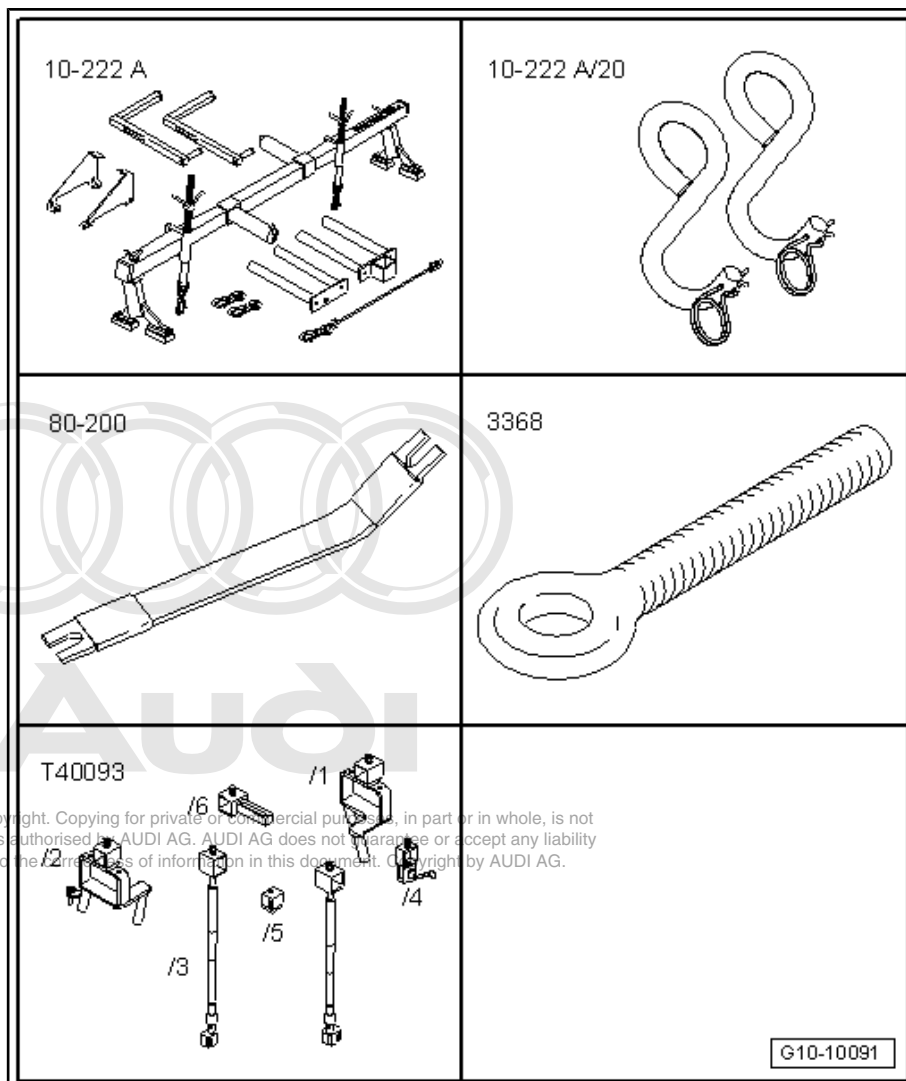


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6.1 Removing and installing gearbox mounting

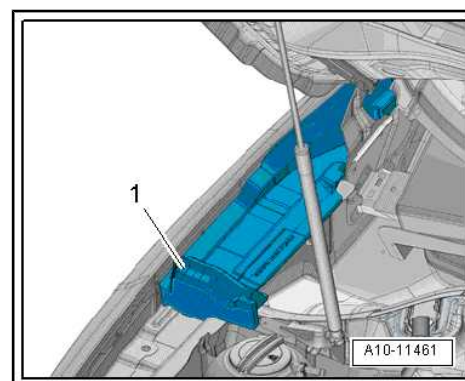
Special tools and workshop equipment required

- ◆ Support bracket -10 - 222 A-
- ◆ Adapters -10 - 222 A /20-
- ◆ Removal lever -80 - 200-
- ◆ Eye-head bolt -3368-
- ◆ -T40093/6- from engine support supplement set - T40093-
- ◆ Flange nut M10 or nut with washer

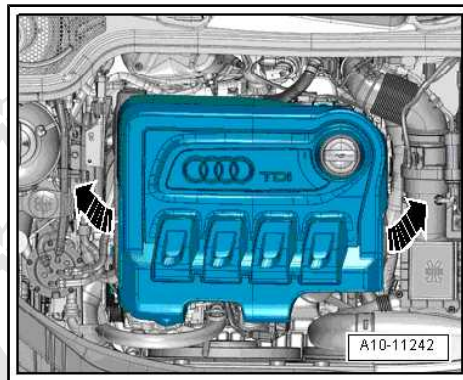


Removing

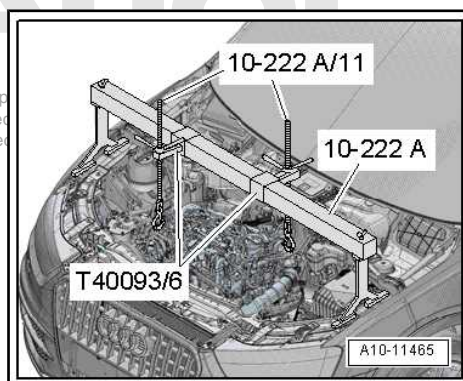
- Unclip sealing element -1- on both sides using removal lever -80 - 200- .



- Remove engine cover panel -arrows-.



- 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.



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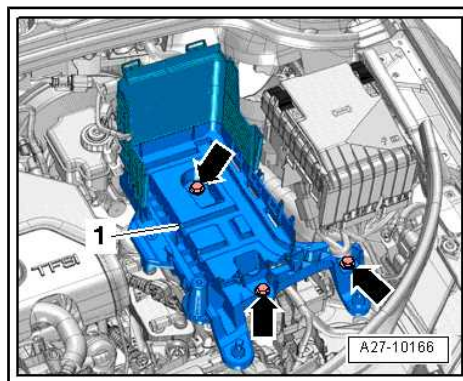
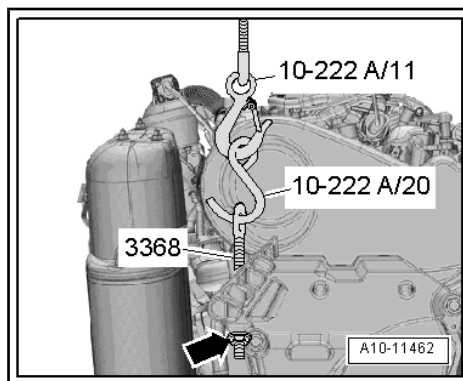


WARNING

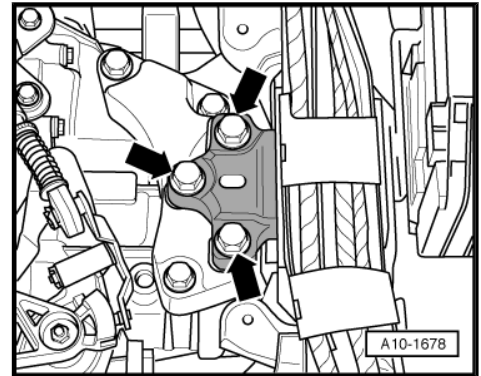
Risk of accident if threaded attachment comes loose.

- ◆ *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 battery and battery tray ⇒ Electrical system; Rep. gr. 27.



- Remove bolts -arrows-.



- Remove bolts -1- and detach gearbox mounting -A-.

Installing

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

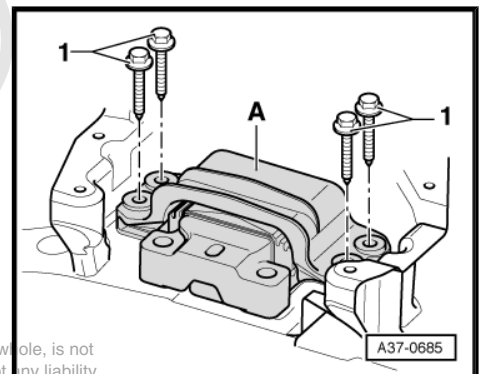
- Tightening torques
⇒ „6 Exploded view - assembly mountings“, page 73



Note

Renew bolts which are tightened by turning through a specified angle.

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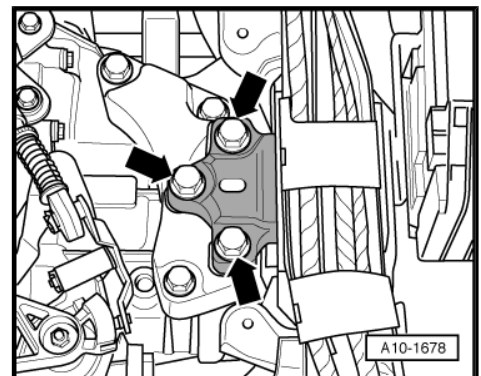
- Secure gearbox mounting -A- to longitudinal member.



Caution

The threads in the gearbox support can be damaged if the bolts are not inserted straight.

- ◆ **Before fitting the bolts -arrows-, the gearbox support and the support arm of the gearbox mounting must be aligned absolutely parallel. If necessary, push the gearbox up at the rear with a trolley jack.**
- ◆ **Do not remove support bracket -10 - 222 A- until all bolts -arrows- securing the engine/gearbox mountings have been tightened to the specified torque.**

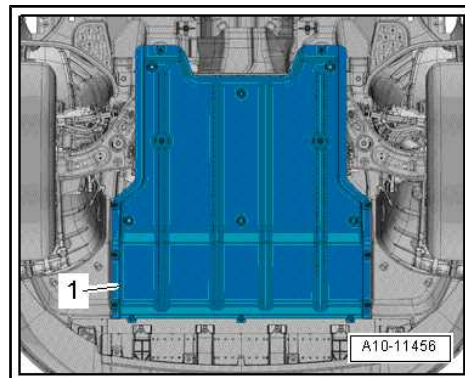


- Pull gearbox up with spindle on support bracket until gearbox support contacts support arm of gearbox mounting.
- Check adjustment of assembly mountings ⇒ Engine, mechanics; Rep. gr. 10 .
- Detach support bracket -10 - 222 A- from engine.
- Install battery tray and battery ⇒ Electrical system; Rep. gr. 27 .

6.2 Removing and installing pendulum support

Removing

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

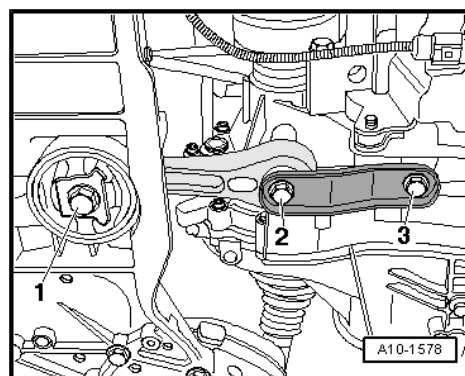


- Remove bolts -1, 2, 3- and detach pendulum support.

Installing

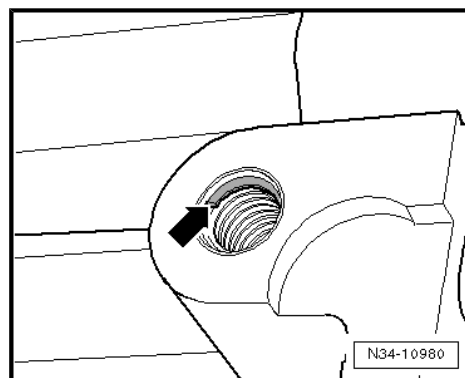
Installation is carried out in reverse sequence; note the following:

- Tightening torques
⇒ [Fig. „Installing pendulum support“ , page 74](#)



Note

- ◆ Thread inserts (e.g. „HeliCoil“) are fitted in the bolt holes for the pendulum support.
- ◆ These can be recognised by the shoulder on the first thread turn -arrow-.
- Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 .



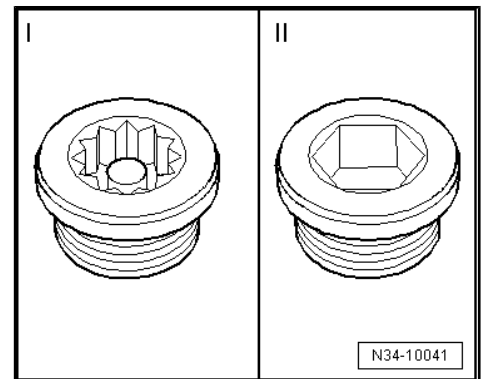
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7 Overview - oil level in manual gearbox

Oil filler plug/drain plug - tightening torques

I - Oil filler/oil drain plug with multi-point socket - 45 Nm

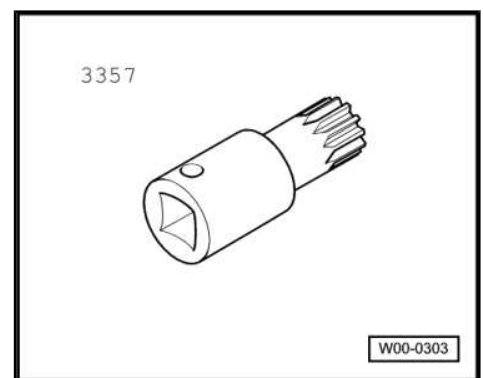
II - Oil filler/oil drain plug with hexagon socket - 30 Nm



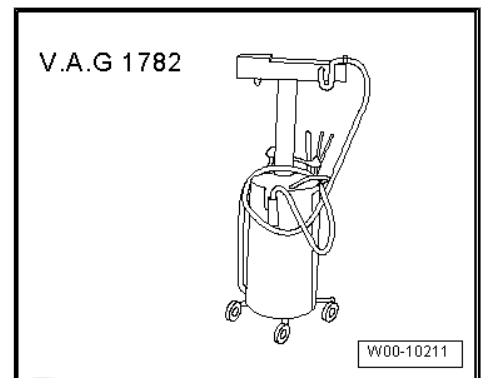
7.1 Checking gear oil level

Special tools and workshop equipment required

- ◆ Multi-point bit -3357-

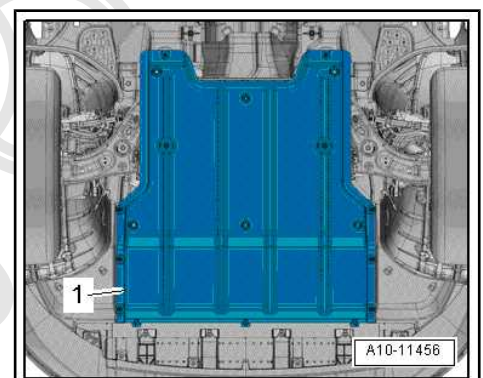


- ◆ Used oil collection and extraction unit -V.A.G 1782-



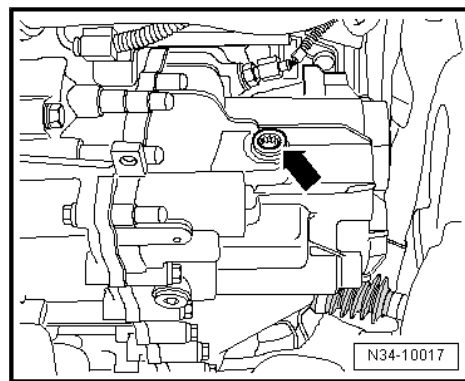
Procedure

- Tightening torque
⇒ „7 Overview - oil level in manual gearbox“, page 79
- 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 .
- Place used oil collection and extraction unit -V.A.G 1782- below gearbox.



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- Remove bolt -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.
- Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 .

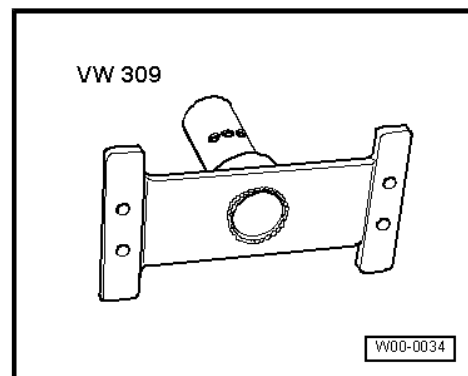


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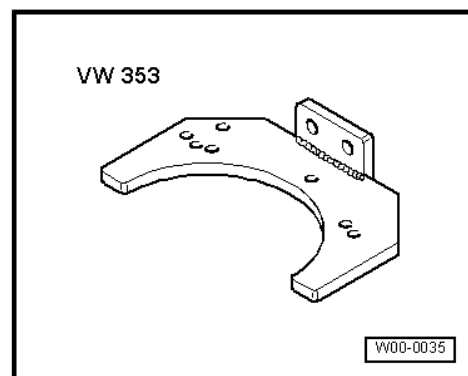
8 Securing gearbox to engine and gearbox support

Special tools and workshop equipment required

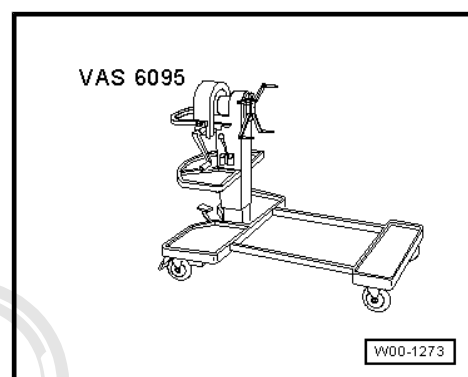
- ◆ Support plate -VW 309-



- ◆ Gearbox support -VW 353-

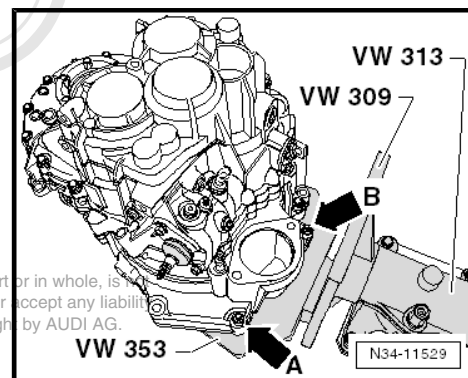


- ◆ Engine and gearbox support -VAS 6095-



Procedure

- Secure gearbox to gearbox support -VW 353- with bolts -arrow A- and -arrow B-.



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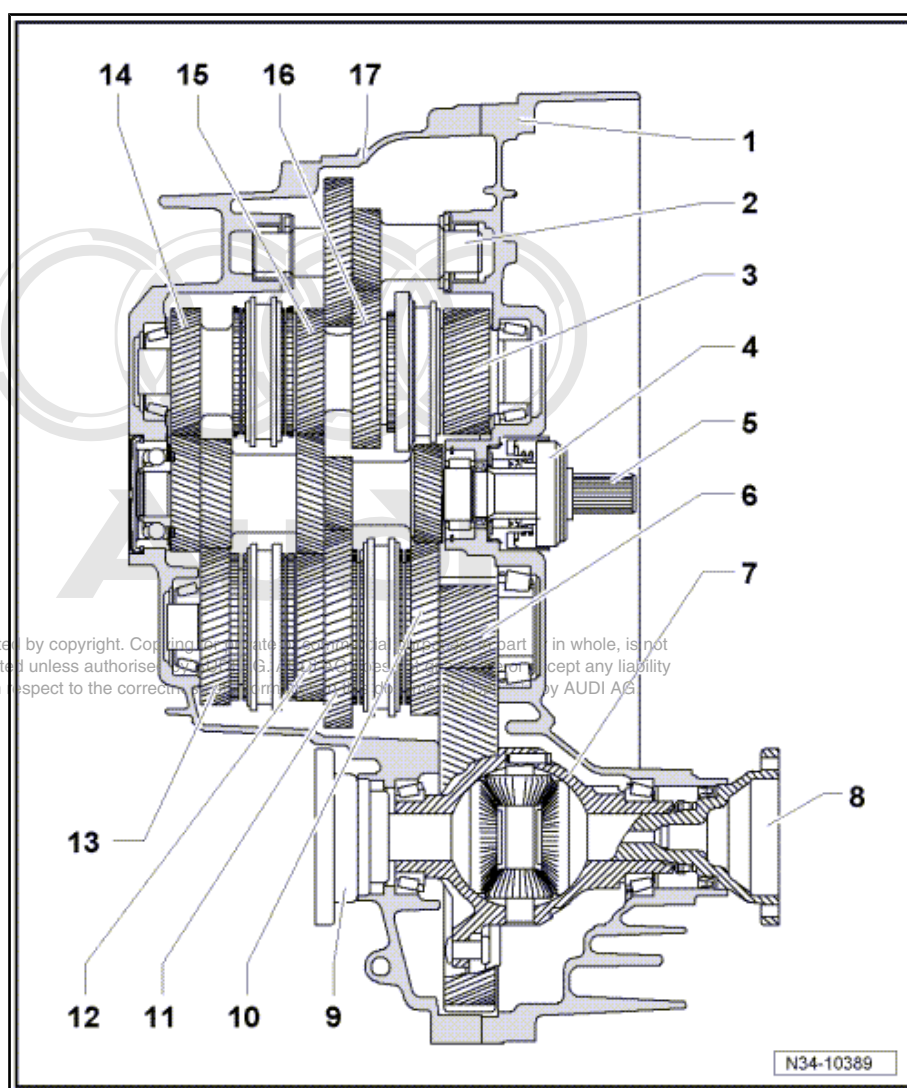
9 Dismantling and assembling gearbox

Overview

- ◆ ⇒ „9.1 General layout of gearbox“, page 82
- ◆ ⇒ „9.2 Overview - dismantling and assembling gearbox“, page 83
- ◆ ⇒ „9.3 Exploded view - gearbox housing and selector unit“, page 84
- ◆ ⇒ „9.4 Exploded view - removing and installing input shaft, output shafts, differential and selector rods“, page 86
- ◆ ⇒ „9.5 Dismantling and assembling sequence“, page 88

9.1 General layout of gearbox

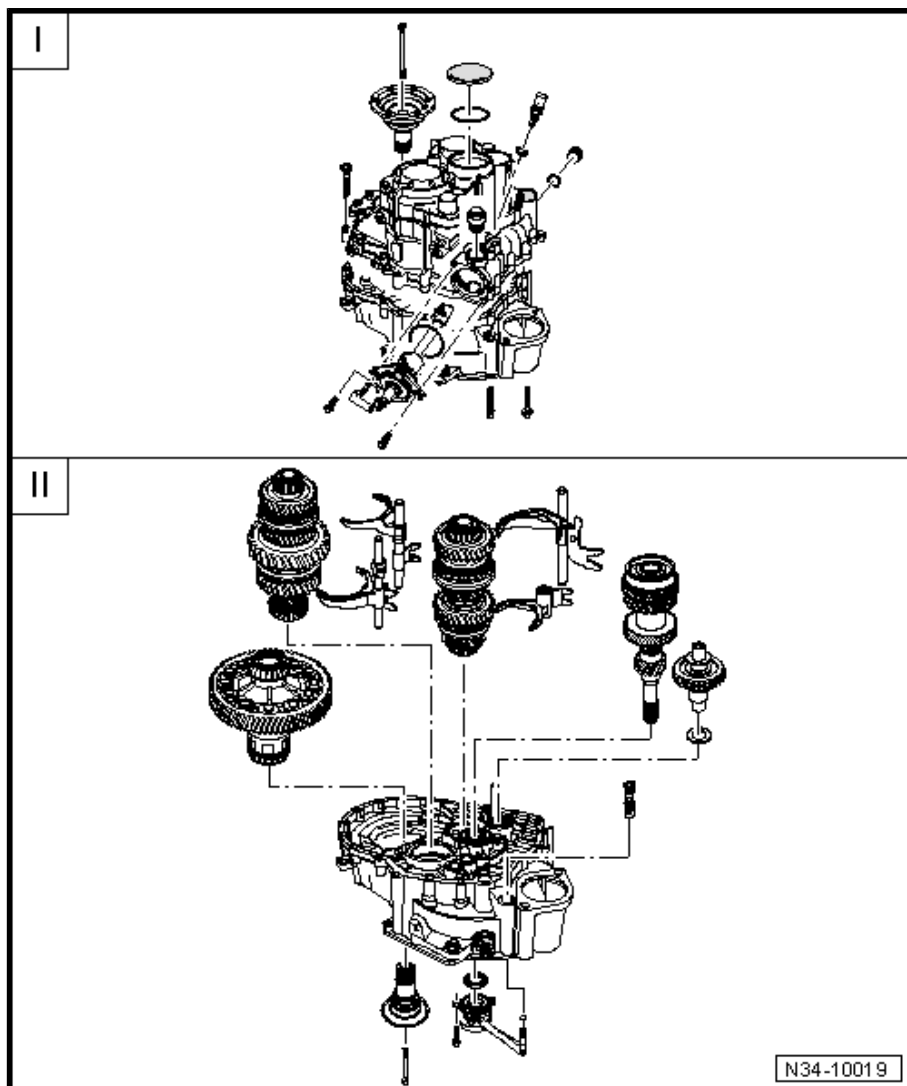
- 1 - Clutch housing
- 2 - Reverse shaft
- 3 - Output shaft for 5th, 6th and reverse gears
- 4 - Slave cylinder with release bearing
- 5 - Input shaft
- 6 - Output shaft for 1st - 4th gear
- 7 - Differential
- 8 - Flange shaft (right-side)
- 9 - Flange shaft (left-side)
- 10 - 2nd speed selector gear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



9.2 Overview - dismantling and assembling gearbox

I - Exploded view - removing and installing gearbox housing and selector unit ⇒ [page 84](#)

II - Exploded view - removing and installing input shaft, output shafts, differential and selector rods ⇒ [page 86](#)



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Sequence for dismantling and assembling ⇒ [page 88](#)

9.3 Exploded view - gearbox housing and selector unit

1 - Countersunk bolt

- ☐ Tightening torque
⇒ [Item 11 \(page 181\)](#)

2 - Flange shaft with spring

- ☐ Removing and installing
⇒ [page 175](#)
- ☐ Assembling
⇒ [page 183](#)

3 - Circlip

- ☐ Only for sheet-metal sealing cap
- ☐ Not fitted on version with plastic sealing cap

4 - Sealing cap

- ☐ Sheet metal or plastic
- ☐ Sheet metal version: secured with circlip
⇒ [Item 3 \(page 84\)](#)
- ☐ Plastic version: circlip
⇒ [Item 3 \(page 84\)](#) not fitted
- ☐ Select correct components from ⇒ Electronic parts catalogue .

5 - Circlip

- ☐ For grooved ball bearing on input shaft
⇒ [Item 1 \(page 125\)](#)

6 - Reversing light switch -F4-

- ☐ 20 Nm
- ☐ With captive seal (fitted shortly after gearbox was first introduced)

7 - Seal

- ☐ Not fitted on all gearboxes

8 - Oil drain plug

- ☐ Tightening torque ⇒ [page 79](#)

9 - Seal

- ☐ Always renew

10 - Bolt

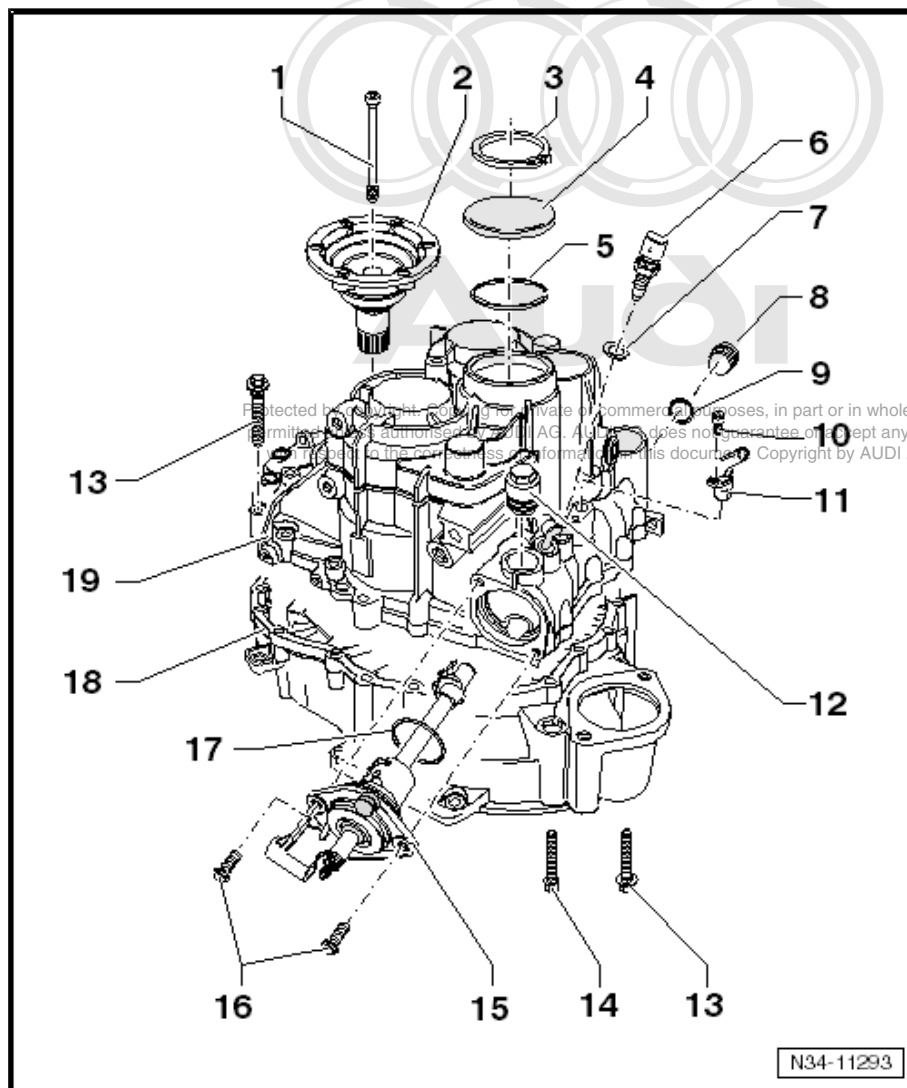
- ☐ 6 Nm

11 - Gearbox neutral position sender -G701-

- ☐ For vehicles with start/stop system

12 - Locking bolt

- ☐ Aluminium - 45 Nm
- ☐ Plastic - 30 Nm
- ☐ For selector shaft



13 - Bolt

- ☐ Always renew; for correct version refer to ⇒ Electronic parts catalogue
- ☐ Note different types of bolt and tightening torques
- ◆ Internal Torx = on gearboxes manufactured up to 06 12 9; aluminium M8 bolt: 8 Nm and turn 180° further
- ◆ Internal Torx = on gearboxes manufactured from 07 12 9 onwards; aluminium M9 bolt: 15 Nm and turn 180° further
- ◆ External hexagon head = steel bolt: 15 Nm and turn 90° further
 - ☐ Correct allocation of replacement steel bolts ⇒ [page 98](#)

14 - Bolt

- ☐ Always renew; for correct version refer to ⇒ Electronic parts catalogue
- ☐ Note different types of bolt and tightening torques
- ◆ Internal Torx = on gearboxes manufactured up to 06 12 9; aluminium M8 bolt: 8 Nm and turn 180° further
- ◆ Internal Torx = on gearboxes manufactured from 07 12 9 onwards; aluminium M9 bolt: 15 Nm and turn 180° further
- ◆ External hexagon head = steel bolt: 15 Nm and turn 90° further
 - ☐ Correct allocation of replacement steel bolts ⇒ [page 98](#)

15 - Selector unit

- ☐ Servicing ⇒ [page 117](#)
- ☐ Removing with gearbox in vehicle:
- ◆ Remove battery and battery tray ⇒ Electrical system; Rep. gr. 27 ; Disconnecting and connecting battery
- ◆ Detach selector cables and gearbox selector lever ⇒ [page 50](#)
- ◆ Unscrew locking bolt ⇒ [Item 12 \(page 84\)](#) , pull out selector mechanism

16 - Bolt

- ☐ 20 Nm
- ☐ Always renew

17 - O-ring

- ☐ Always renew

18 - Clutch housing

- ☐ Servicing ⇒ [page 115](#)

19 - Gearbox housing

- ☐ Servicing ⇒ [page 103](#)

9.4 Exploded view - removing and installing input shaft, output shafts, differential and selector rods

1 - Output shaft for 1st - 4th gear

- ☐ Dismantling and assembling ⇒ [page 135](#)
- ☐ Installation position ⇒ [page 87](#)

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

- ☐ Installation position ⇒ [page 87](#)
- ☐ Servicing ⇒ [page 122](#)

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

- ☐ Installation position ⇒ [page 87](#)
- ☐ Servicing ⇒ [page 122](#)

4 - Output shaft for 5th, 6th and reverse gears

- ☐ Dismantling and assembling ⇒ [page 159](#)
- ☐ Installation position ⇒ [page 87](#)

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

- ☐ Installation position ⇒ [page 87](#)
- ☐ Servicing ⇒ [page 122](#)

6 - Reverse gear selector fork

- ☐ Installation position ⇒ [page 87](#)
- ☐ Servicing ⇒ [page 122](#)

7 - Input shaft

- ☐ Dismantling and assembling ⇒ [page 126](#)
- ☐ Always renew grooved ball bearing on input shaft ⇒ [Item 4 \(page 125\)](#)

8 - Reverse shaft

- ☐ With thrust washer

9 - Thrust washer

10 - Bleeder connection

- ☐ Connect to slave cylinder ⇒ [Item 14 \(page 86\)](#)

11 - Clutch housing

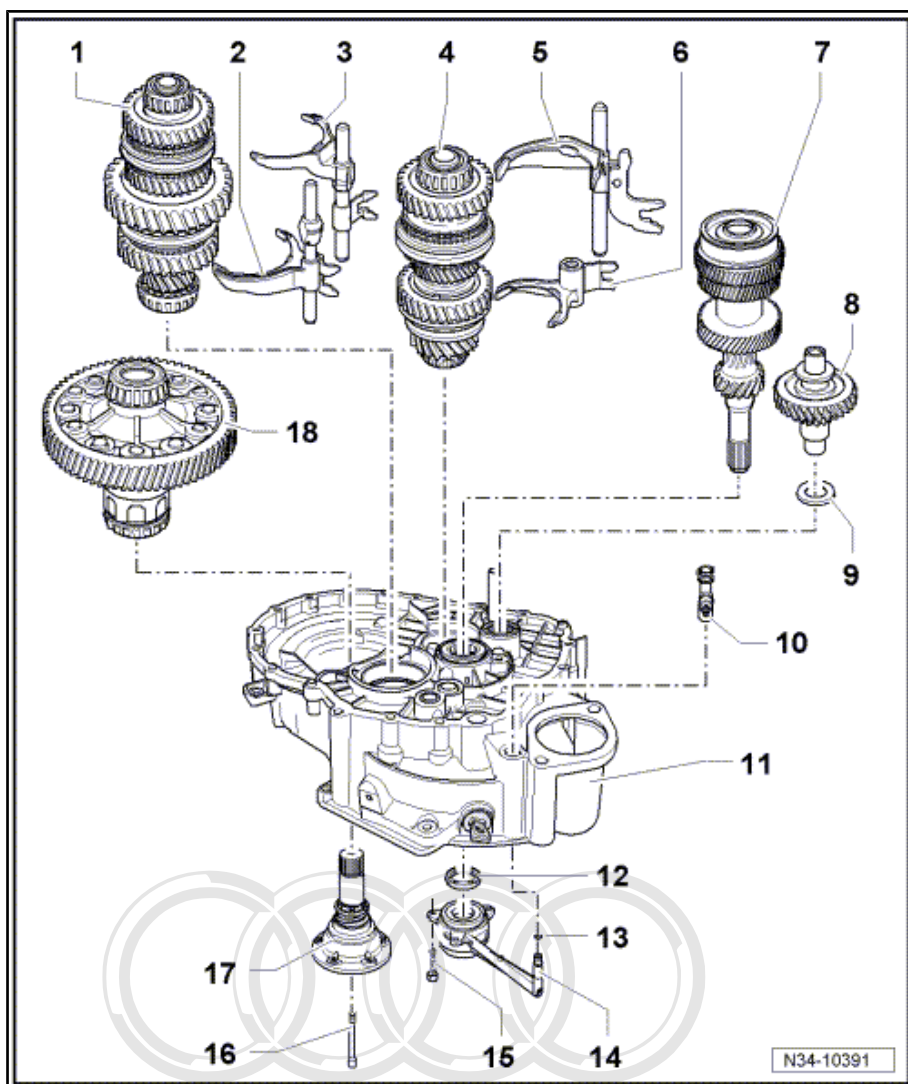
- ☐ Servicing ⇒ [page 115](#)

12 - Input shaft oil seal

- ☐ Renewing ⇒ [page 129](#)

13 - O-ring

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



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14 - Slave cylinder with release bearing

15 - Bolt

- ☐ 3x
- ☐ Always renew
- ☐ Tightening torque [⇒ Item 2 \(page 32\)](#)

16 - Countersunk bolt

- ☐ Tightening torque [⇒ Item 11 \(page 181\)](#)

17 - Flange shaft with spring

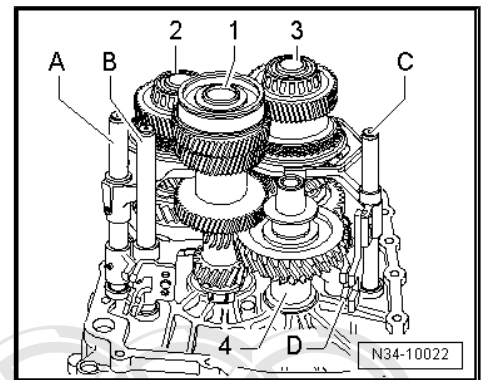
- ☐ Removing and installing [⇒ page 178](#)
- ☐ Assembling [⇒ page 183](#)

18 - Differential

- ☐ Dismantling and assembling [⇒ page 183](#)

Installation position of shafts and selector rods in gearbox

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



- 2) Different versions of reverse gear selector fork [⇒ page 123](#)
- 3) Different mountings for reverse gear selector fork:
- 4) Mounted either on separate shaft for reverse gear selector fork [⇒ page 96](#) or on selector rod for 5th and 6th gear - C - [⇒ page 96](#) .

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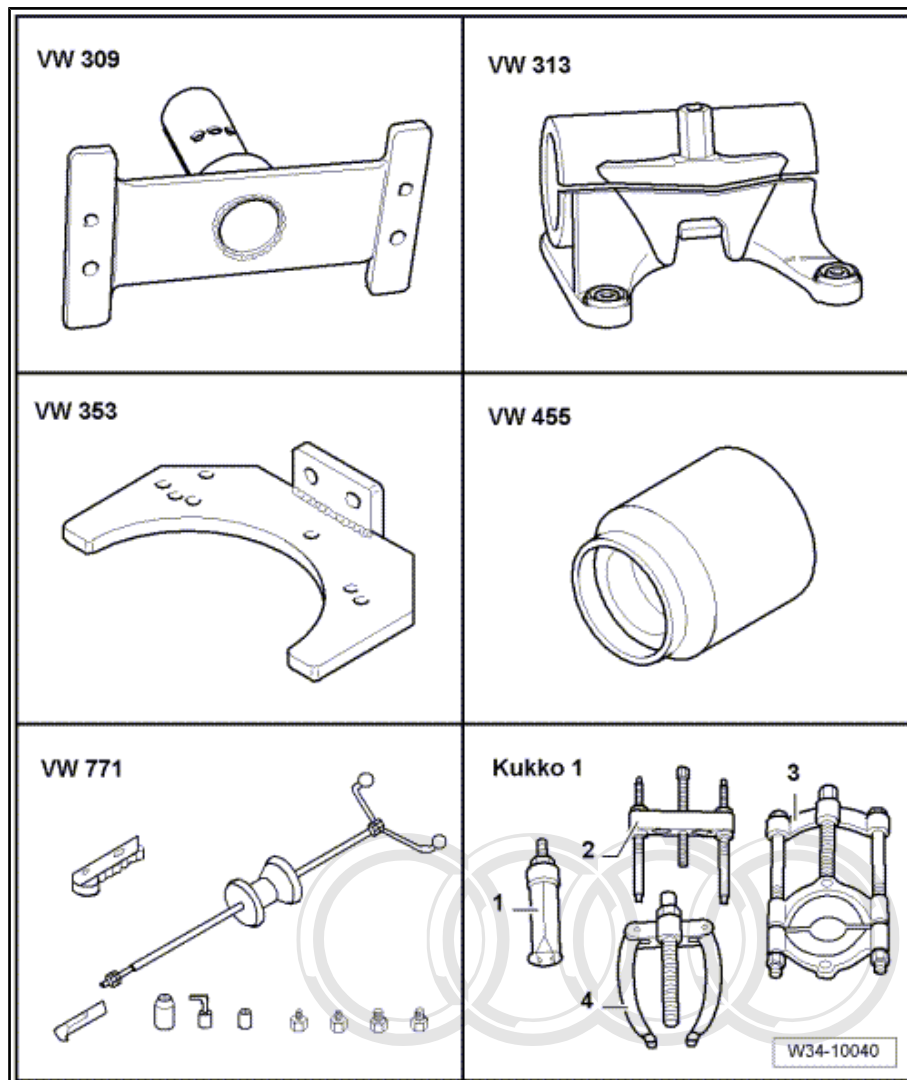
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9.5 Dismantling and assembling sequence

Removing and installing gearbox housing, selector mechanism, input shaft, output shafts, differential and selector rods

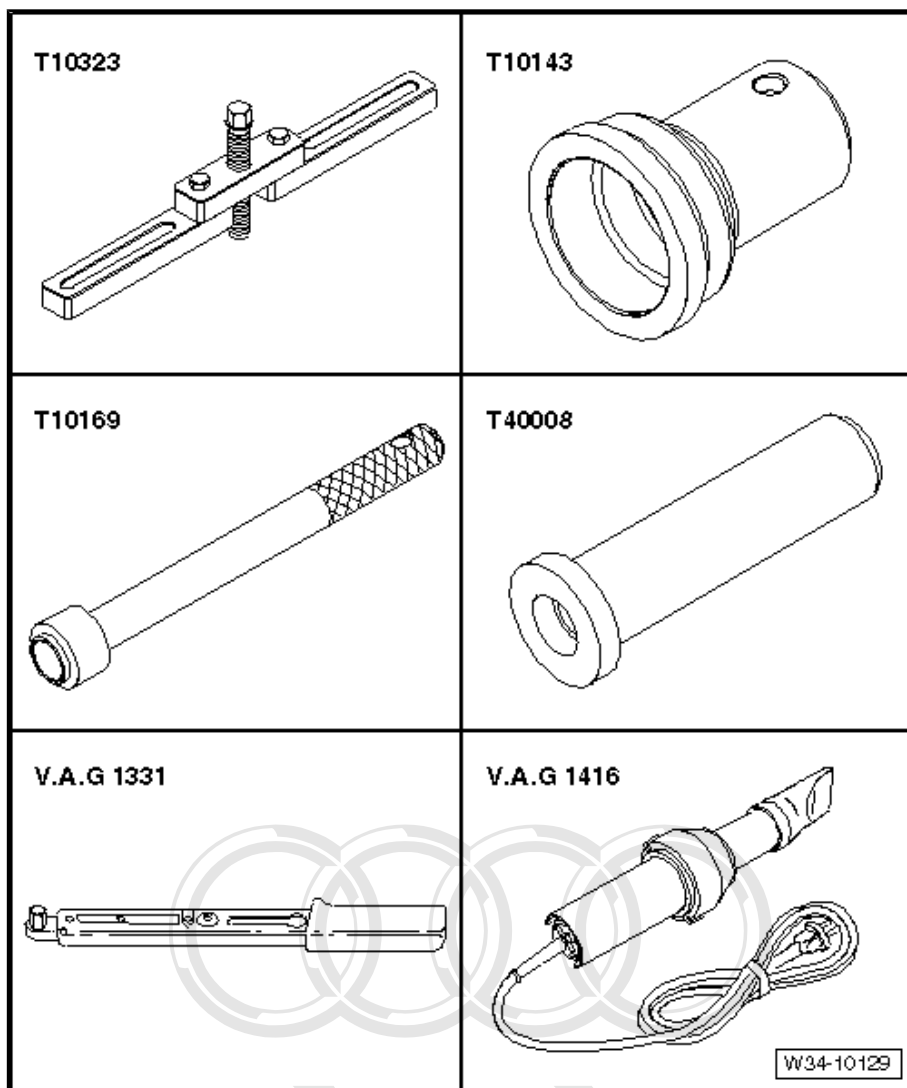
Special tools and workshop equipment required

- ◆ Support plate -VW 309-
- ◆ Support clamp -VW 313-
- ◆ Gearbox support -VW 353-
- ◆ Installing sleeve -VW 455-
- ◆ Multi-purpose tool -VW 771-
- ◆ -1- Internal puller -Kukko 21/01-
- ◆ -3- Splitter -Kukko 17/0-
- ◆ -4- Counter-support -Kukko 22/1-



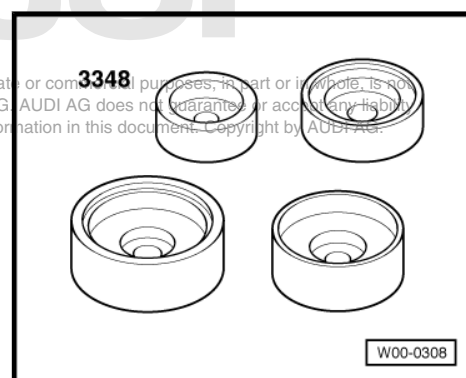
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- ◆ Support bridge -T10323-
- ◆ Thrust piece -T10042-
- ◆ For sheet-metal sealing cap: thrust piece -T10143-
⇒ [page 101](#)
- ◆ For stop sleeve with shoulder: drift -T10169-
⇒ [page 110](#)
- ◆ Thrust piece -T40008-
- ◆ Torque wrench -V.A.G 1331-
- ◆ Hot air blower -V.A.G 1416-
or similar

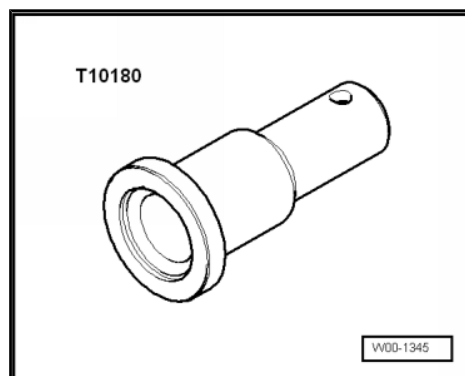


- ◆ Assembly tool -3348/2-

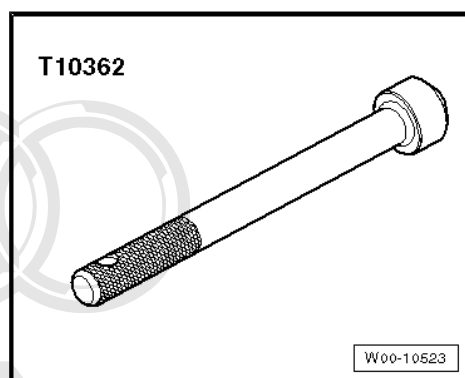
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- ◆ For plastic sealing cap: thrust piece -T10180- ➔ [page 101](#)



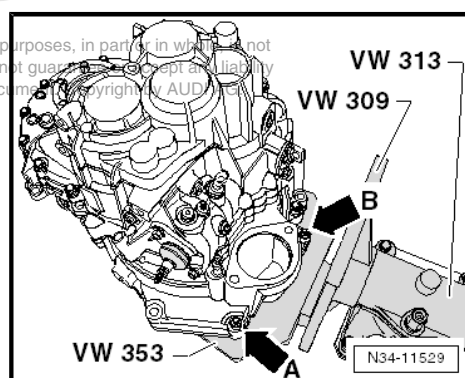
- ◆ For stop sleeve without shoulder: drift -T10362- ➔ [page 110](#)



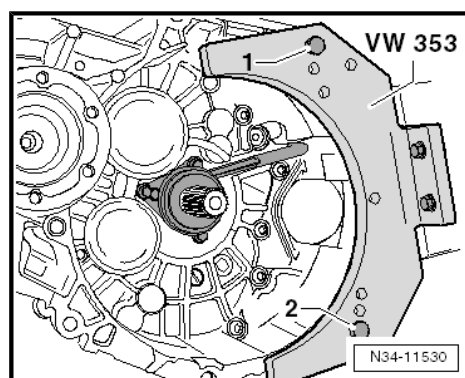
9.5.1 Removing

Gearbox for turbo diesel engine

- Secure gearbox to assembly stand with bolts -arrow A- and -arrow B-.

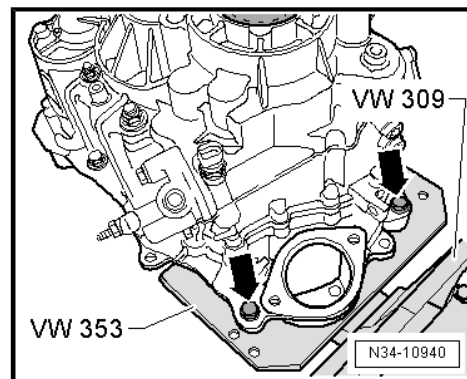


- Take up space between mounting eye -arrow B- and gearbox support -VW 353- with washers (approx. 12 mm).
- Use holes -1- and -2- for attachment.



Gearbox for petrol engine

- Secure gearbox to assembly stand with bolts -arrows-.



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

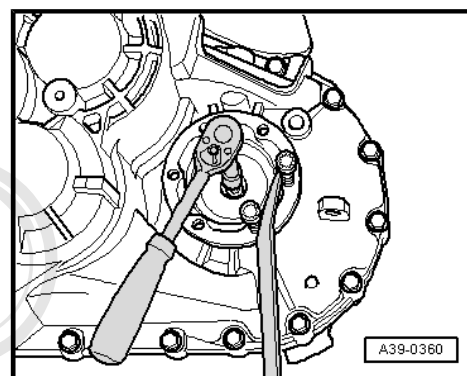
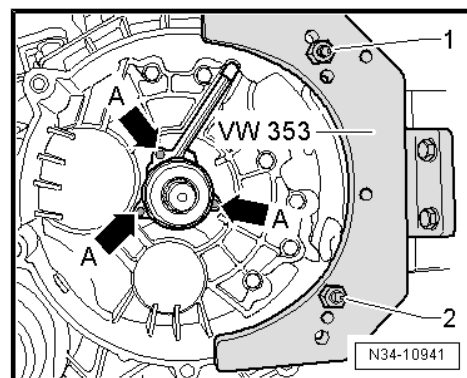


Note

If one of the bolt holes is not flush with the gearbox support, please insert a washer (or washers) between the bolt hole and the gearbox support.

Continued for all vehicles:

- Remove slave cylinder with release bearing (⇒ top illustration -arrows A-).
- Turn gearbox on assembly stand so that oil drain plug faces downwards.
- Place drip tray underneath.
- Drain off gear oil.
- Remove flange shaft on right side (illustration shows flange shaft on left side).

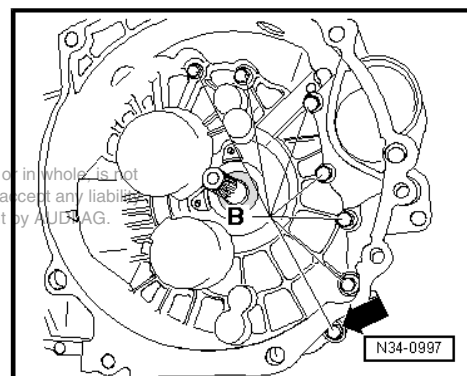


- Remove bolts -B- securing gearbox housing from inside clutch housing.



Note

One of the bolts -arrow- is outside the joint flange.

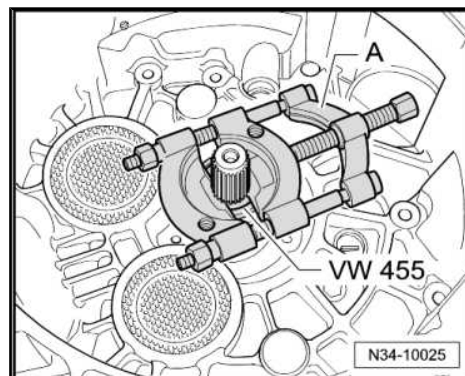


- Lock input shaft.



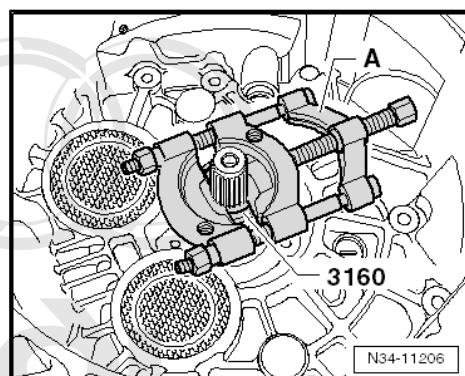
Note

- ◆ Depending on the version, the input shaft splines are of different length.
- ◆ Accordingly, there are two methods of securing the input shaft.
- Either fit installing sleeve -VW 455- over input shaft and against clutch housing



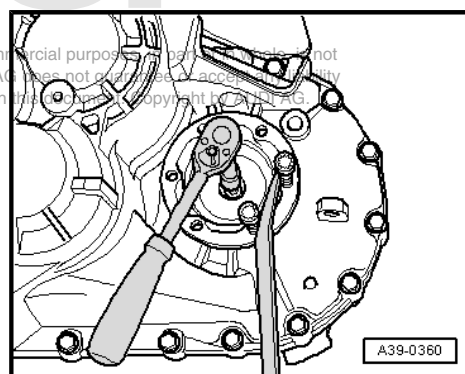
or

- fit sleeve -3160- over input shaft and against clutch housing.
- Tighten splitter -A-, e.g. -Kukko 17/0- behind splines on input shaft.
- The rear side of the splitter must be in contact with installing sleeve (zero play).

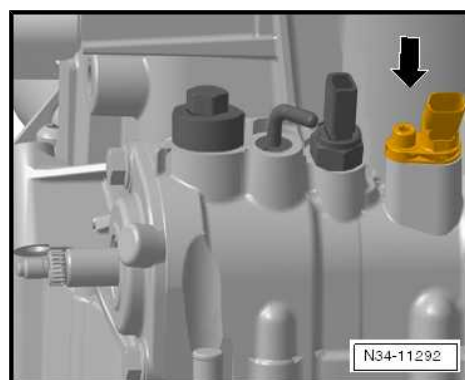


- Remove flange shaft (left-side).

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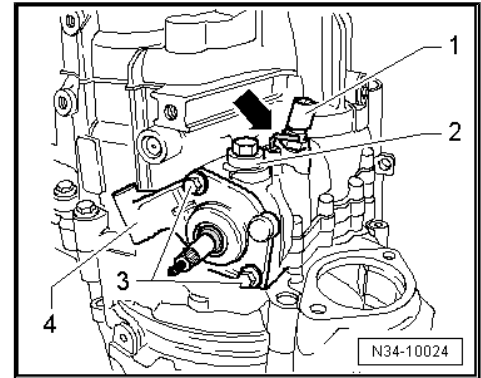


- Gearbox for vehicles with start/stop system: remove gearbox neutral position sender -G701- -arrow-.



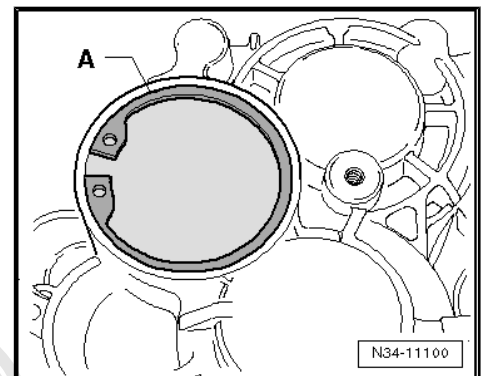
Make sure that the selector shaft is not locked in position by the angled rod -arrow- while carrying out the following steps.

- Put selector shaft in neutral position.
- Unscrew locking bolt -2-.
- Then remove bolts -3-.
- Remove reversing light switch -F4- -1-.
- Pull selector shaft -4- out of gearbox housing.



Metal sealing cap

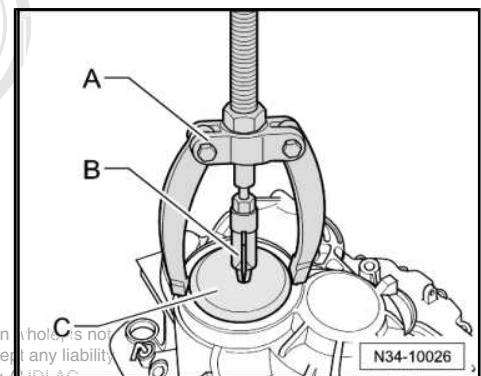
- Remove circlip -A- for input shaft sealing cap.



- Pierce rubber in centre of sealing cap -C- with a screwdriver .
- Pull sealing cap out of gearbox housing.

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

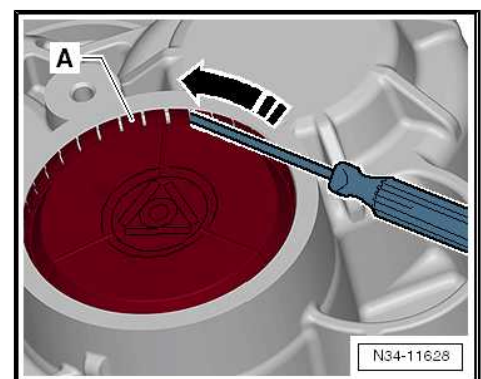
B - Internal puller 8 ... 12 mm , e.g. -Kukko 21/01-



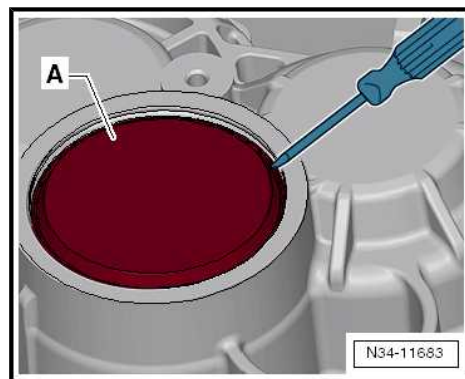
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Plastic sealing cap

Carefully remove all tabs -A-, taking care not to damage gearbox housing.



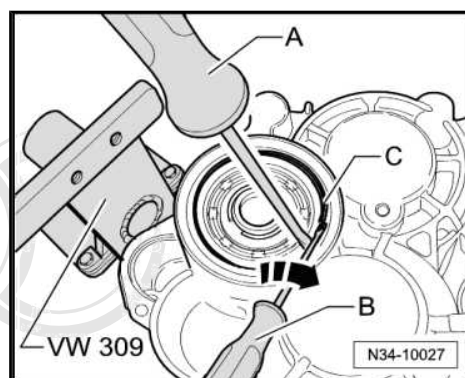
- Lever out sealing cap -A-.
- Make sure that all parts of the sealing cap are completely removed.



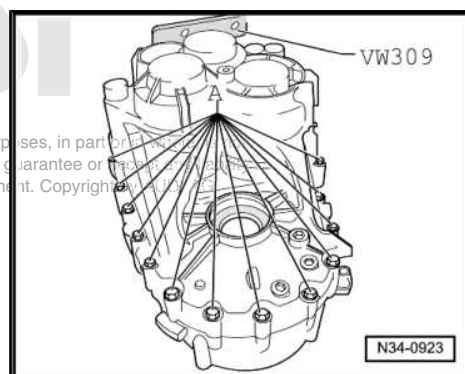
Continued for all vehicles:

Detach circlip -C- from grooved ball bearing on input shaft/gearbox housing as follows:

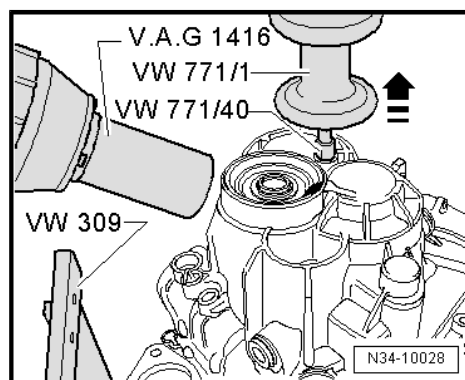
- Hold one end of circlip with screwdriver -A-.
- Lever other end of circlip out of slot in grooved ball bearing in direction of -arrow- with 2nd screwdriver -B-.
- Lever circlip out further by repositioning screwdriver -B-.



- Remove gearbox housing/clutch housing securing bolts -A-.



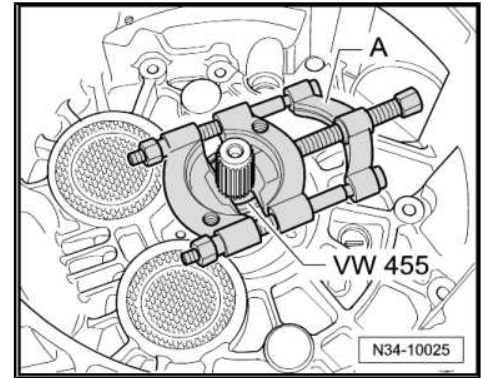
- Screw adapter VW 771/40 into threaded hole in gearbox housing.
- Heat gearbox housing using e.g. hot air blower -V.A.G 1416- in vicinity of bearing seat for grooved ball bearing for input shaft for approx. 10 minutes to approx. 100° C.
- Using multi-purpose tool VW 771/1, pull gearbox housing off clutch housing in direction of -arrow-.



Note

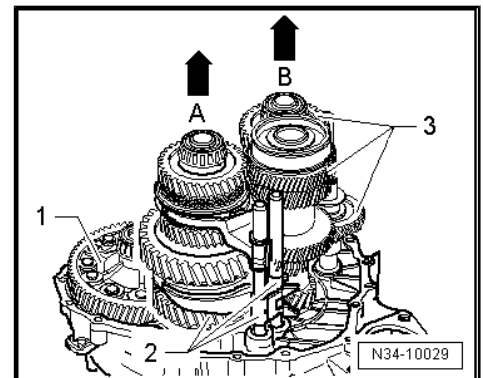
If necessary, carefully apply a lever to the protruding flanges on alternate sides of the gearbox housing, taking care not to damage the sealing surfaces.

- Remove splitter -A- and installing sleeve VW 455 or sleeve -3160- from input shaft.



A second mechanic is required for removing the shafts from the clutch housing.

- Lift up differential -1- with your left hand. With your right hand, lift 1st - 4th gear output shaft together with selector rods -2- -arrow A-.
- At the same time, the second mechanic must lift the input shaft, reverse shaft and 5th/6th gear output shaft -3- out of the clutch housing together with the selector rods -arrow B-.



 Note

If required, the differential can be put back in the clutch housing after lifting the shafts.

- Pry out input shaft oil seal using oil seal extractor lever -VW 681- .

 Note

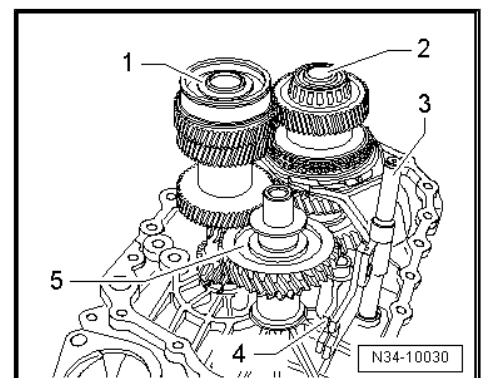
*Always renew grooved ball bearing on input shaft
⇒ [Item 4 \(page 125\)](#) .*

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9.5.2 Installing

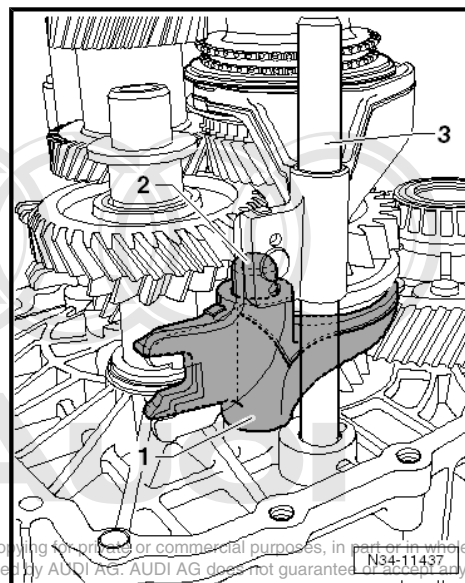
- A new grooved ball bearing has been pressed onto the input shaft ⇒ [Item 4 \(page 125\)](#) .
- Insert input shaft -1-, output shaft for 5th and 6th gear -2- together with selector rod -3-, selector fork -4- and reverse shaft -5-.

Observe different mountings of reverse gear selector fork.



Reverse gear selector fork -1- is fitted on shaft -2- behind selector rod for 5th/6th gear -3-.

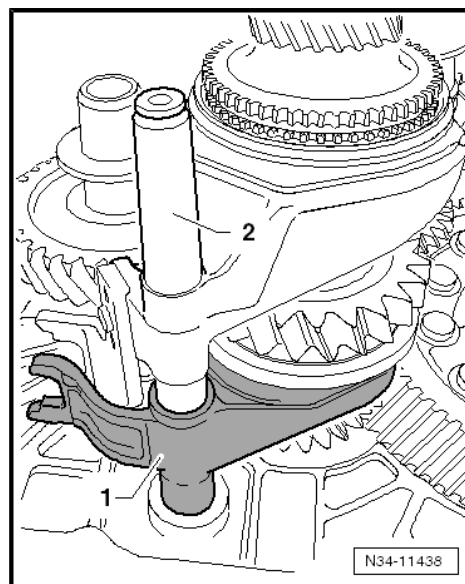
- Reverse gear selector fork -1- is fitted on shaft -2- behind selector rod for 5th/6th gear -3-.



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Reverse gear selector fork -1- is fitted on selector rod with selector fork for 5th/6th gear -2-.

- Reverse gear selector fork -1- is fitted on selector rod with selector fork for 5th/6th gear -2-.



Continued for all vehicles:

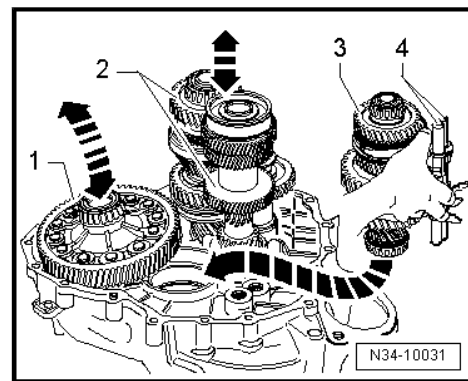
- Then install differential -1-.



Note

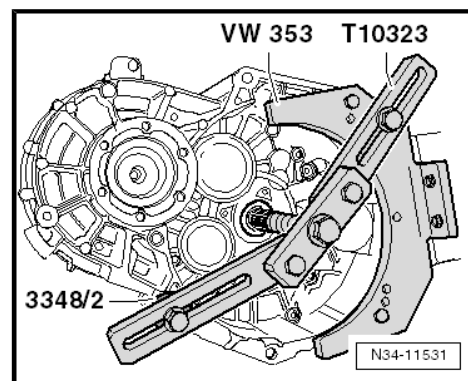
A second mechanic is required for installing the shafts in the clutch housing.

- Take 1st - 4th gear output shaft -3- with selector rods -4- in your right hand as illustrated.
- Lift differential slightly with your left hand.
- At the same time, have the second mechanic lift the input shaft and output shaft for 5th, 6th and reverse gear -2- slightly, together with the reverse shaft.
- Now insert 1st - 4th gear output shaft in direction of -arrow-.
- The teeth of the input shaft, output shafts and final drive gear/differential must mesh.
- Now, together with second mechanic, locate shafts and differential in their bearing seats.



Gearbox for turbo diesel engine

- Secure support bridge -T10323- as shown.



Gearbox for petrol engine

- Secure support bridge -T10323- as shown.

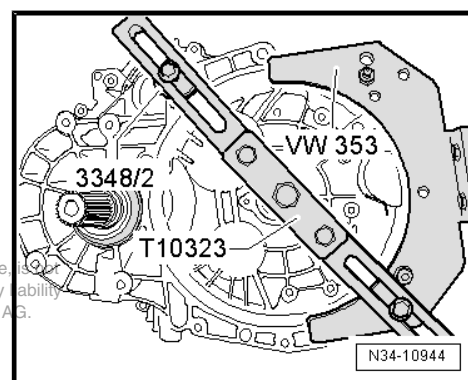
Continued for all vehicles:



Note

Illustration shows clutch housing turned through 180° for clarity.

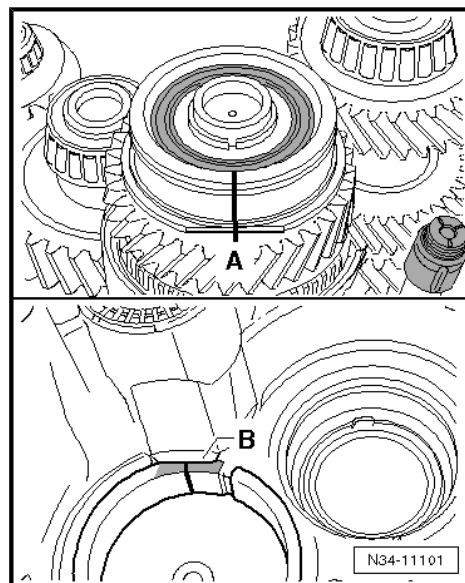
- Screw in bolt of support bridge -T10323- until input shaft lifts slightly.



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

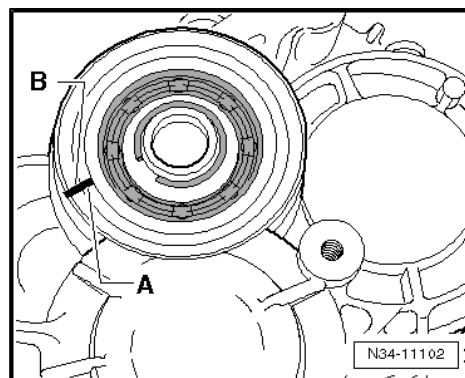
The grooved ball bearing and the bearing mounting are flattened on one side.

- Flattened sides -A- on grooved ball bearing and bearing mounting -B- in gearbox housing must be aligned.
- Mark flattened sides with paint.
- Copy markings onto top area of grooved ball bearing and top area of bearing mounting on gearbox housing (⇒ next illustration).
- 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.



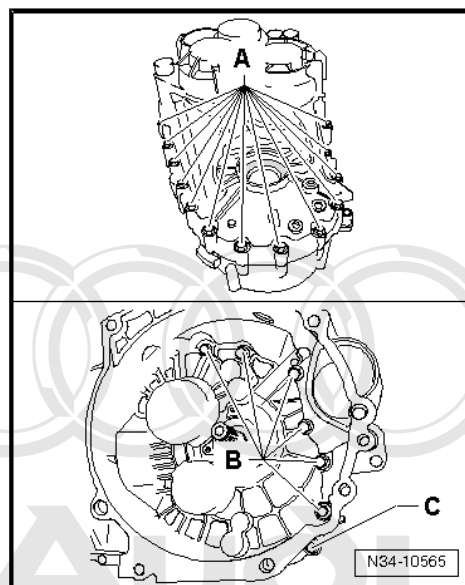
Note

- ◆ *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.*
- Fit gearbox housing and tighten bolts -A-, -B- and -C- to specified torque.



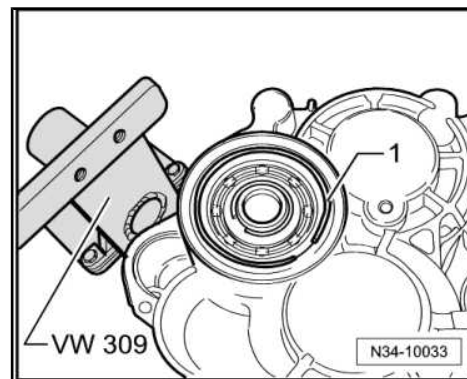
Note different types of bolts if using steel bolts (external hexagon head) as replacement parts:

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



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- Install circlip -1- for input shaft grooved ball bearing.
- Attach support bridge -30 - 211 A- for input shaft.
- If stop sleeve for selector shaft has been removed, drive it in now ⇒ [page 110](#) (drive in until tool reaches stop).
- Turn gearbox on assembly stand so that opening for selector shaft faces up.

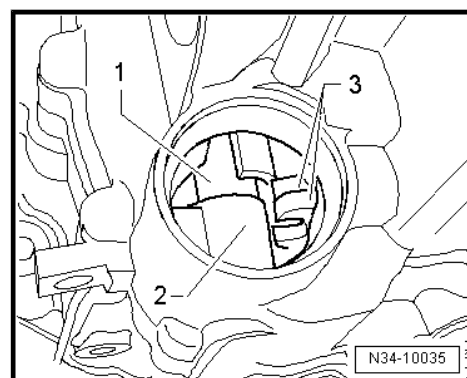


- Insert selector shaft -1- into bottom mounting -2- and into selector forks -3-.



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The sealing cap is removed to give a better illustration.

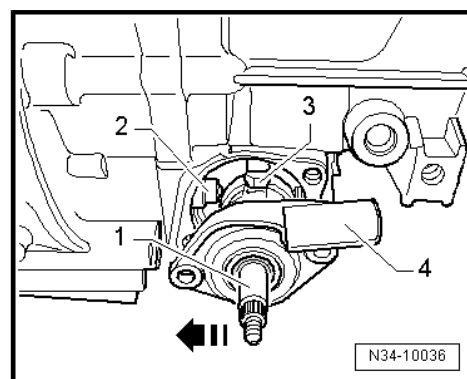


- Now push selector shaft -1- against stop sleeve -2- in direction of -arrow- and run selector finger -3- down through selector forks and onto stop.
- Selector mechanism cover -4- should be parallel to joint surface on gearbox housing.
- Selector shaft should move up and down easily (gate selector movement).

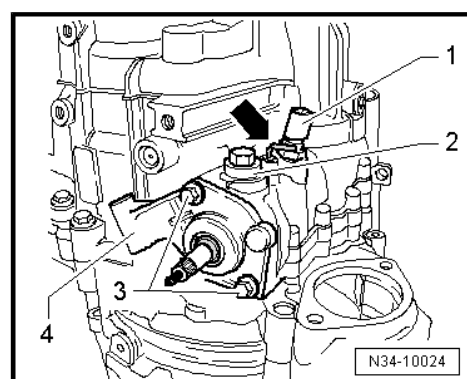


Note

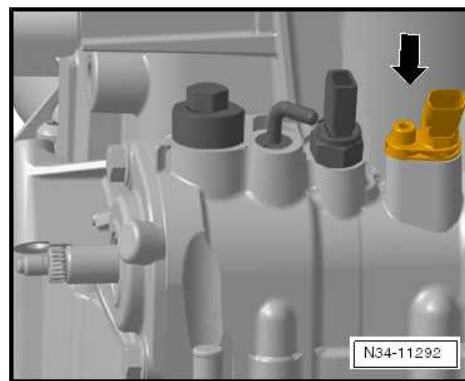
If the selector mechanism cover is not parallel with the joint surface, the selector shaft is not seated in its bottom mounting.



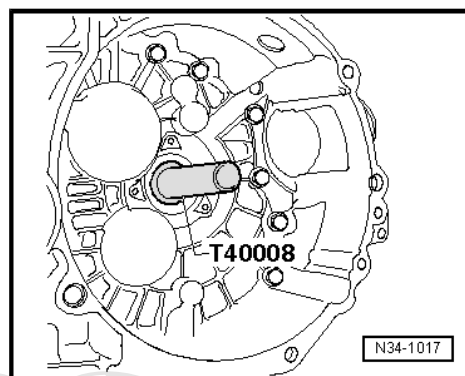
- Tighten bolts -3- for selector mechanism cover -4-.
- Screw in locking bolt -2-; angled rod -arrow- must be released.
- Install reversing light switch -F4- -1-.



- Gearbox for vehicles with start/stop system: fit gearbox neutral position sender -G701- -arrow- and tighten securing bolt to specified torque ⇒ [Item 10 \(page 84\)](#) .



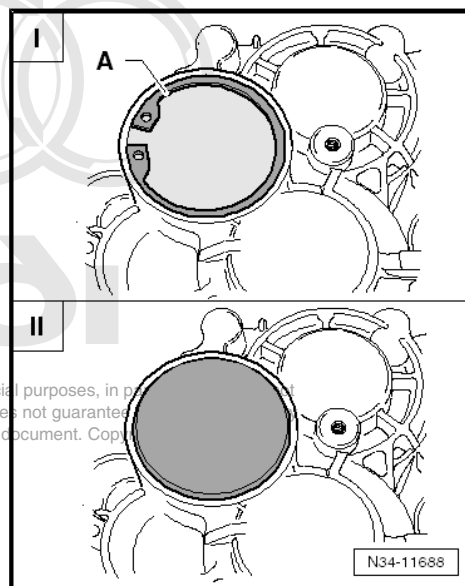
- Drive in input shaft oil seal so it is flush.
- Install slave cylinder with release bearing ⇒ [page 32](#) .
- Select all gears.



Fit sealing cap.

Identification of sealing caps

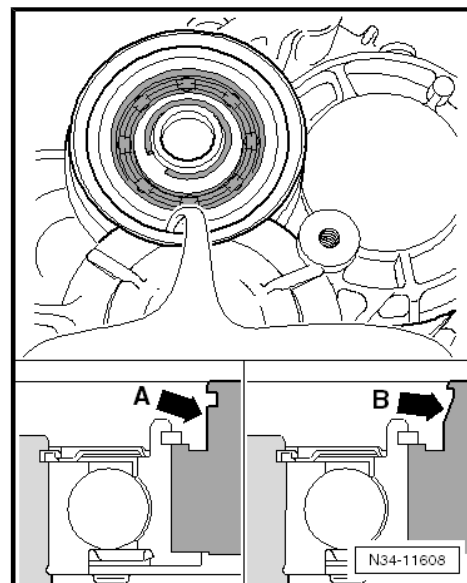
- I- = Sheet metal sealing cap: secured with circlip -A-
- II- = Plastic sealing cap without circlip



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Allocation

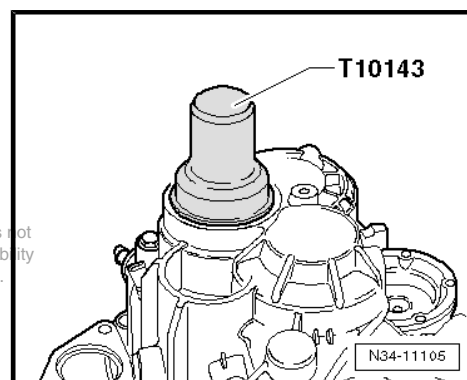
Seat for sealing cap	Sealing cap	Installing
-Arrow A- = vertical	Made of metal	⇒ page 101
-Arrow B- = tapered	Made of plastic	⇒ page 101



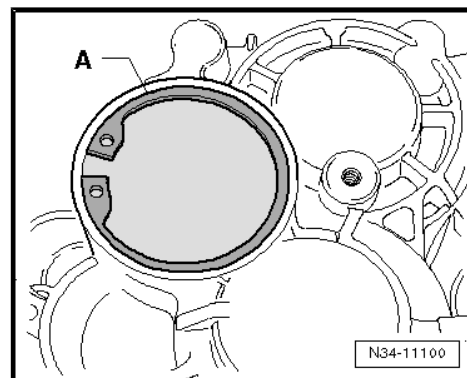
Metal sealing cap

- Drive sealing cap into gearbox housing onto stop.

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- Secure sealing cap with circlip -A-.

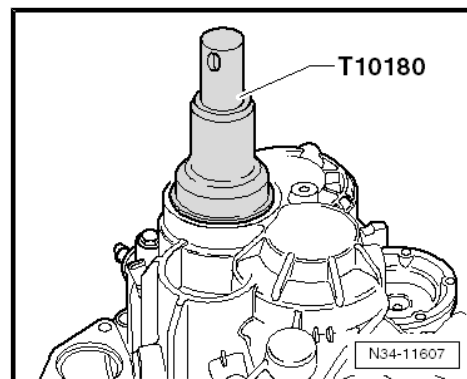


Plastic sealing cap

- Drive sealing cap into gearbox housing onto stop.

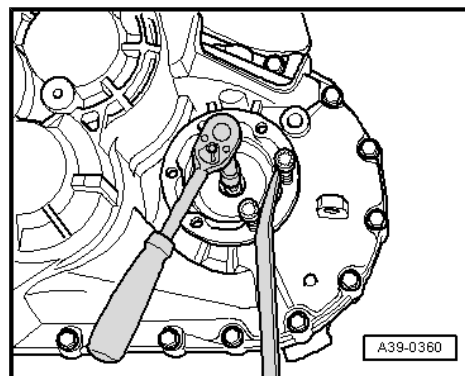
Continued for all vehicles:

- It is important to use the correct type of sealing cap
⇒ [page 101](#) .
- Incorrect installation can cause leakage.
- Sealing cap ⇒ Electronic parts catalogue .





- Install flange shafts together with springs, thrust washers and tapered rings.



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10 Gearbox housing and clutch housing

- ◆ ⇒ „10.1 Exploded view - gearbox housing“, page 103
- ◆ ⇒ „10.2 Servicing gearbox housing“, page 105
- ◆ ⇒ „10.2.1 Exploded view - clutch housing“, page 113
- ◆ ⇒ „10.2.2 Servicing clutch housing“, page 115

10.1 Exploded view - gearbox housing

1 - Gearbox housing

- ☐ If renewed: Adjust output shafts and differential ⇒ [page 180](#)

2 - Sealing cap

- ☐ Removing ⇒ [page 108](#)
- ☐ Driving in ⇒ [page 108](#)

3 - Oil drain plug

- ☐ Tightening torque ⇒ [page 79](#)

4 - Seal

- ☐ If fitted, always renew

5 - Oil filler plug

- ☐ Tightening torque ⇒ [page 79](#)

6 - Angled rod

- ☐ For adjusting selector mechanism ⇒ [page 55](#)
- ☐ Can be renewed without dismantling gearbox
- ☐ Removing ⇒ [page 108](#)
- ☐ Installation position ⇒ [page 109](#)
- ☐ Driving in ⇒ [page 109](#)

7 - Bearing bush

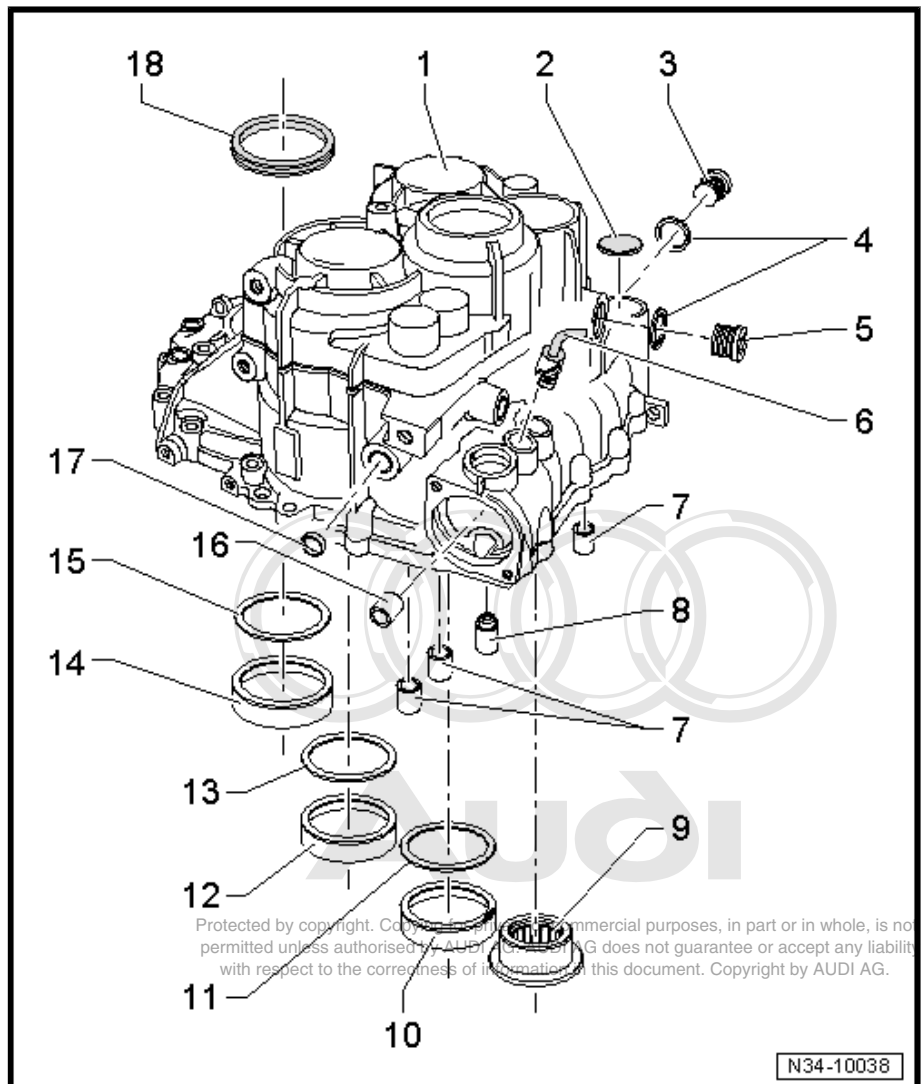
- ☐ For selector shafts
- ☐ Pulling out ⇒ [page 109](#)
- ☐ Driving in ⇒ [page 109](#)

8 - Stop sleeve

- ☐ Pressing out (gearbox dismantled) ⇒ [page 110](#)
- ☐ Driving out (gearbox not dismantled) ⇒ [page 110](#)
- ☐ Identification of different types of stop sleeve ⇒ [page 110](#)
- ☐ Driving in stop sleeve with shoulder ⇒ [page 110](#)
- ☐ Driving in stop sleeve without shoulder ⇒ [page 111](#)

9 - Needle bearing

- ☐ For reverse shaft
- ☐ Always renew after removing
- ☐ Pulling out ⇒ [page 111](#)
- ☐ Pressing in ⇒ [page 111](#)



10 - Tapered roller bearing outer race

- ☐ For 5th/6th and reverse gear output shaft
- ☐ Removing and installing ⇒ [page 159](#)
- ☐ If renewed: Adjust 5th/6th and reverse gear output shaft ⇒ [page 168](#)

11 - Shim

- ☐ For 5th/6th and reverse gear output shaft
- ☐ Table of adjustments ⇒ [page 180](#)

12 - Tapered roller bearing outer race

- ☐ For 1st - 4th gear output shaft
- ☐ Removing and installing ⇒ [page 135](#)
- ☐ If renewed: Adjust 1st - 4th gear output shaft ⇒ [page 152](#)

13 - Shim

- ☐ For 1st - 4th gear output shaft
- ☐ Table of adjustments ⇒ [page 180](#)

14 - Tapered roller bearing outer race

- ☐ For differential
- ☐ Removing and installing ⇒ [page 183](#)
- ☐ If renewed: adjust differential ⇒ [page 180](#)

15 - Shim

- ☐ For differential
- ☐ Table of adjustments ⇒ [page 180](#)

16 - Bearing bush

- ☐ For selector shaft
- ☐ Pulling out ⇒ [page 111](#)
- ☐ Driving in ⇒ [page 112](#)

17 - Sealing plug

- ☐ Driving out ⇒ [page 112](#)
- ☐ Driving in ⇒ [page 112](#)

18 - Oil seal

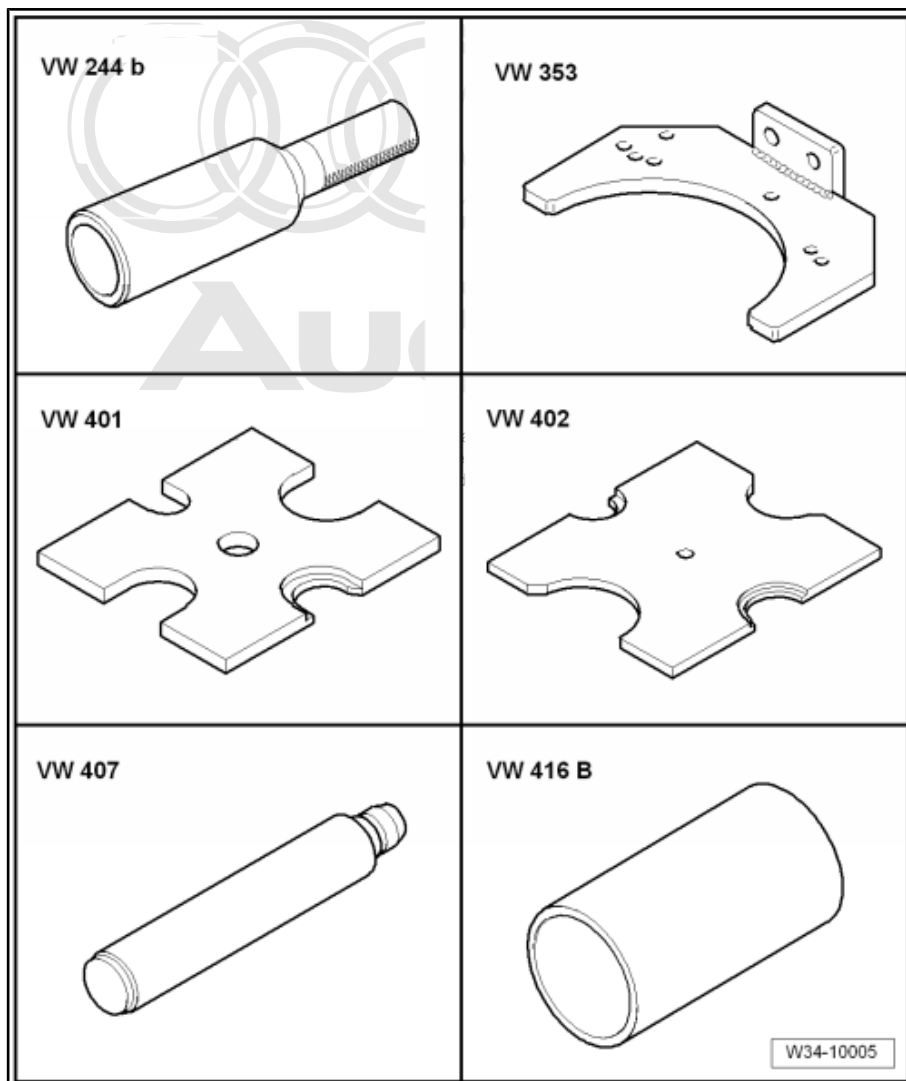
- ☐ Renewing ⇒ [page 173](#)

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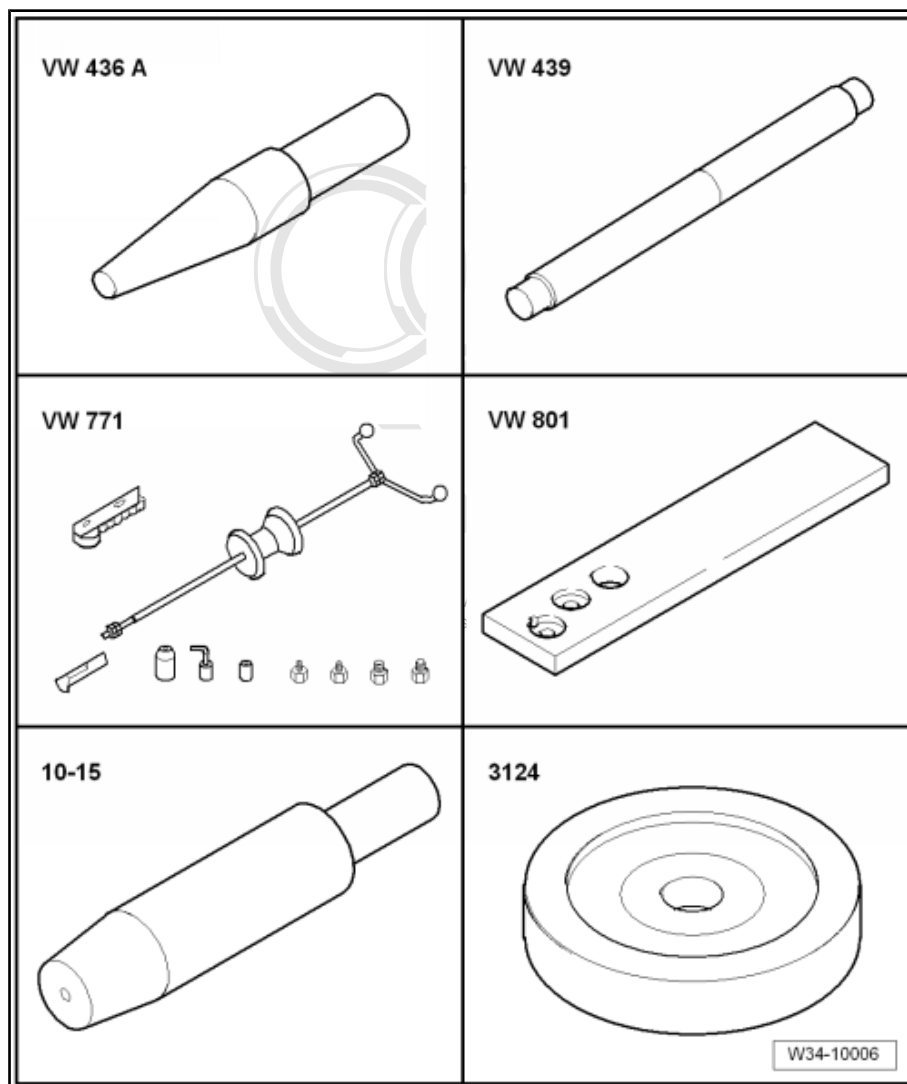
10.2 Servicing gearbox housing

Special tools and workshop equipment required

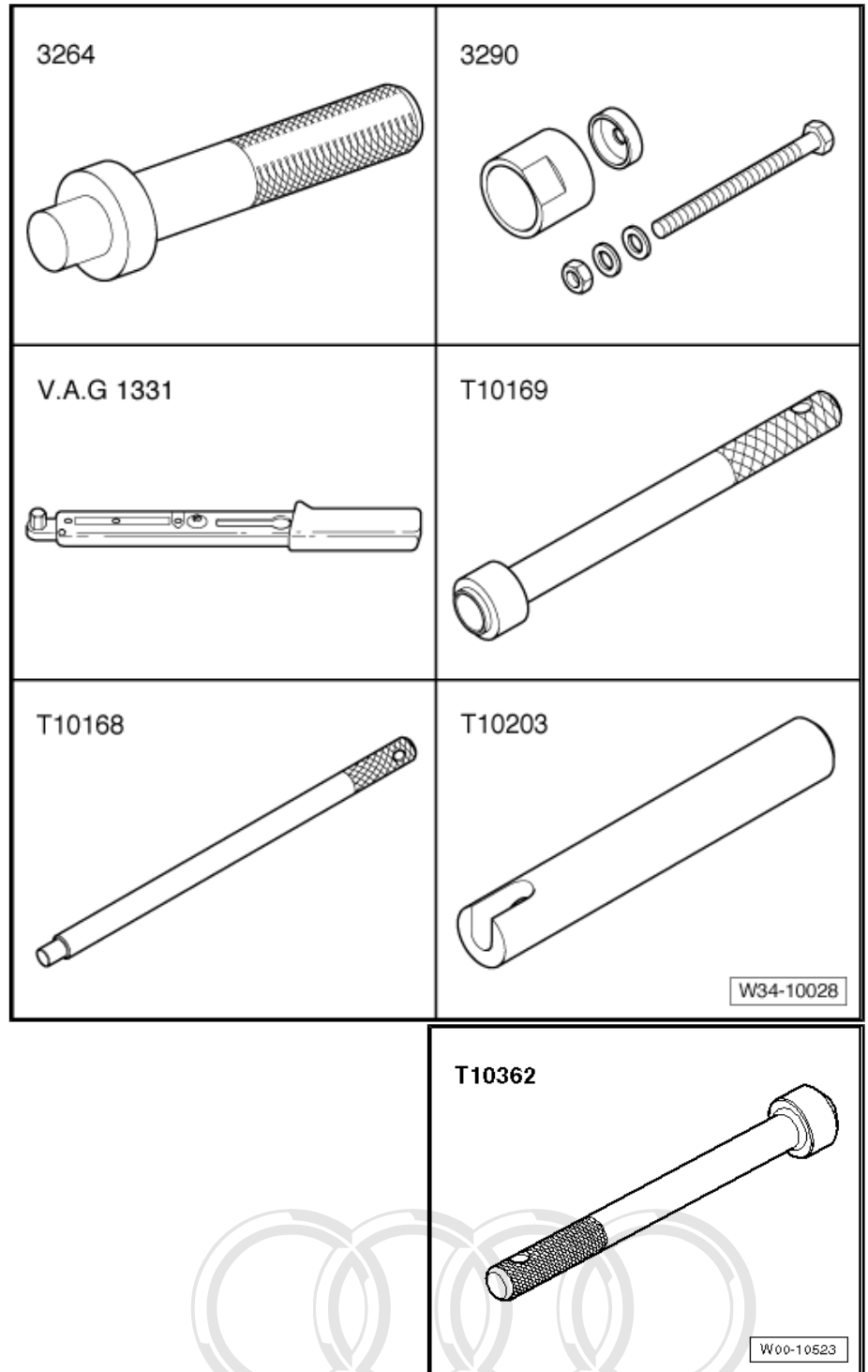
- ◆ Drift sleeve -VW 244B-
- ◆ Gearbox support -VW 353-
- ◆ Thrust plate -VW 401-
- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 407-
- ◆ Tube -VW 416 B-



- ◆ Guide pin -VW 436A-
- ◆ Guide pin -VW 439-
- ◆ Multi-purpose tool -VW 771-
- ◆ Support plate -VW 801-
- ◆ Guide pin -10-15-
- ◆ Thrust piece -3124-

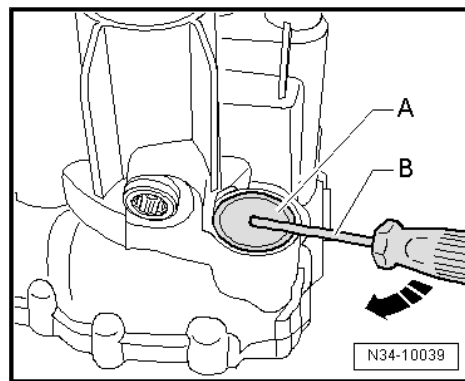
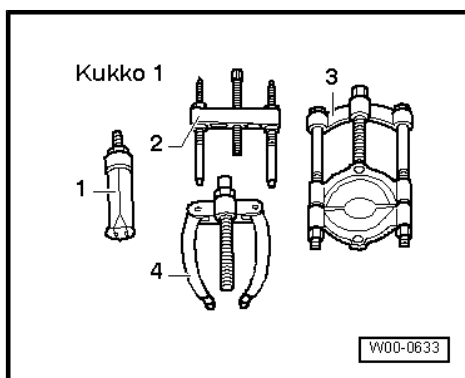

ot
ity

- ◆ Punch -3264-
- ◆ Assembly tool -3290-
- ◆ Torque wrench -V.A.G 1331-
- ◆ Drift -T10168-
- ◆ Thrust piece -T10203-
- ◆ Drift -T10169-
- ◆ Or drift -T10362-
⇒ [page 110](#)



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- ◆ Internal puller -1 -
Kukko 21/2-

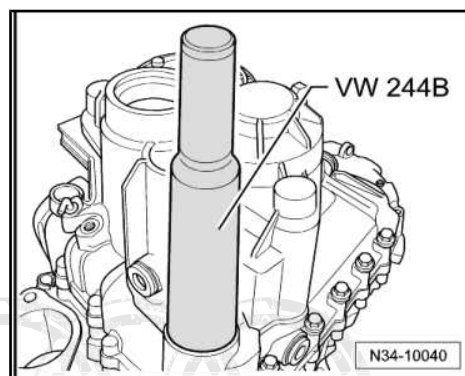


- ◆ Internal puller -1 -
Kukko 21/4-
- ◆ Counter-support -4 -
Kukko 22/2-

Removing sealing cap -A-

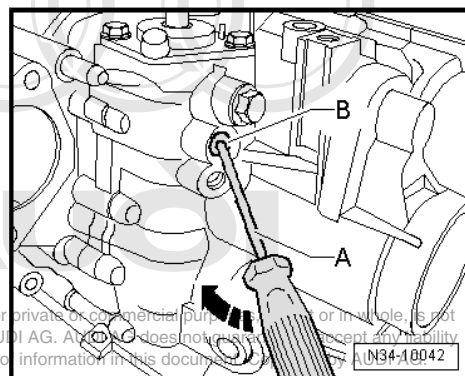
- Pierce rubber in centre of sealing cap with a screwdriver -B- and pry off sealing cap -in direction of arrow-

Driving in sealing cap onto stop



Removing angled rod for selector shaft

- Shear off rod in released position.
- Insert screwdriver -A- in bore for angled rod -B-.
- Lever out angled rod in direction of -arrow-.

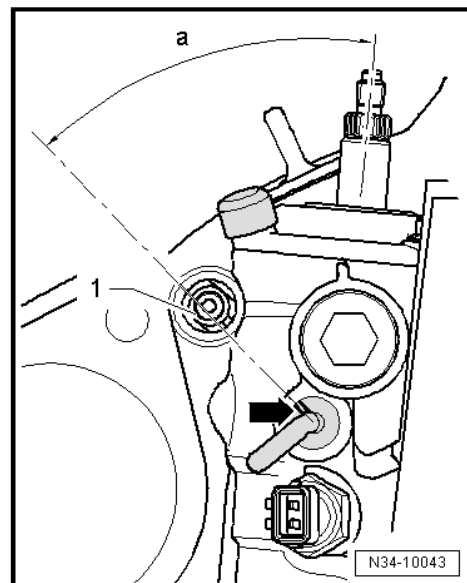


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Installation position of angled rod

- Marking on angled rod -arrow- must face towards connection on slave cylinder -1-.

Dimension -a- must be approx. 45°.

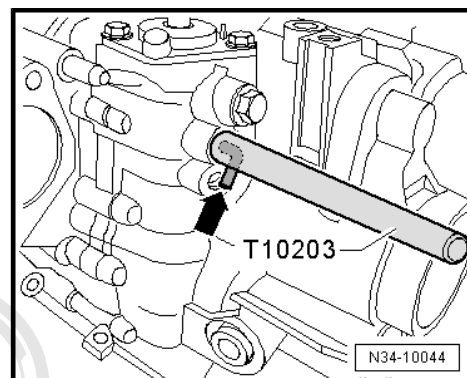


Driving in angled rod -arrow- for selector shaft as far as tool stop



Note

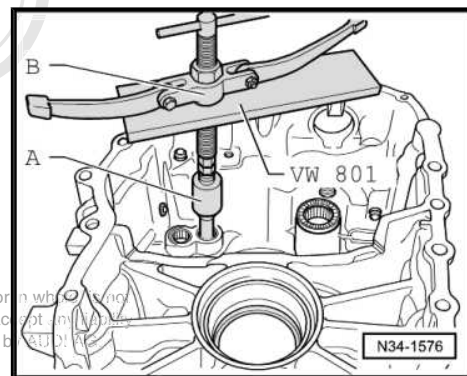
Angled rod must be in released position when driving in.



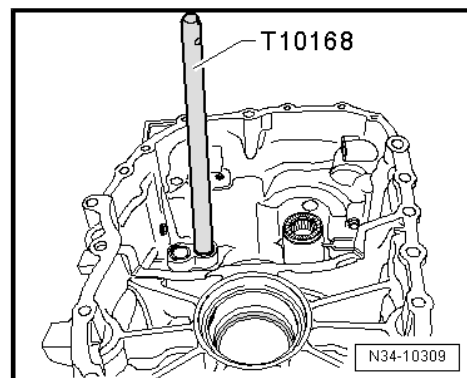
Pulling out bearing bush for selector rod

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

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



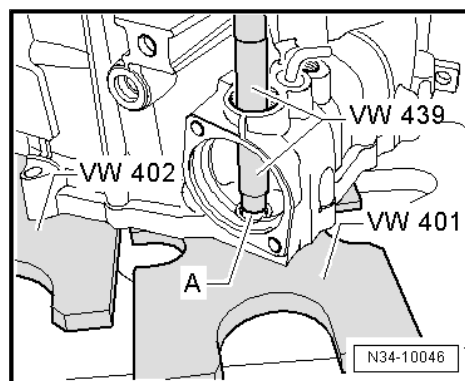
Driving in bearing bush for selector rod (drive in until tool contacts stop)



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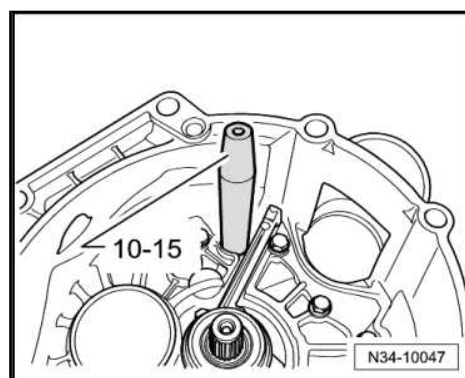
Pressing stop sleeve -A- out of gearbox housing

- Place gearbox housing on thrust plates -VW 401- and -VW 402- so that the dowel sleeves in the gearbox housing do not become damaged.



Driving out stop sleeve (gearbox not dismantled) using guide pin -10-15-

- Locking bolt and selector shaft removed
- Turn gearbox so that stop sleeve does not drop into gearbox.



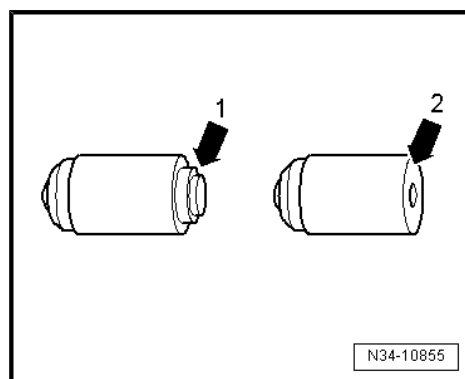
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Identification of different types of stop sleeve

A stop sleeve with shoulder -arrow 1- or without shoulder -arrow 2- may be fitted.

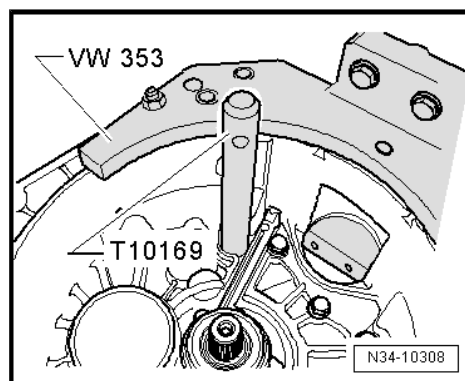
- ◆ ⇒ Fig. „Driving in stop sleeve with shoulder as far as tool stop“ , page 110
- ◆ ⇒ Fig. „Driving in stop sleeve without shoulder as far as tool stop“ , page 111

Select correct components from ⇒ Electronic parts catalogue .



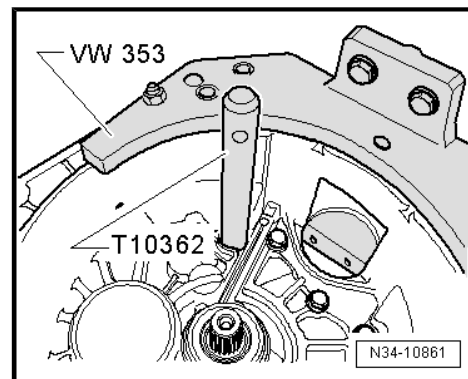
Driving in stop sleeve with shoulder as far as tool stop

- Gearbox housing bolted to clutch housing



Driving in stop sleeve without shoulder as far as tool stop

- Gearbox housing bolted to clutch housing



Pulling needle bearing for reverse shaft out of gearbox housing

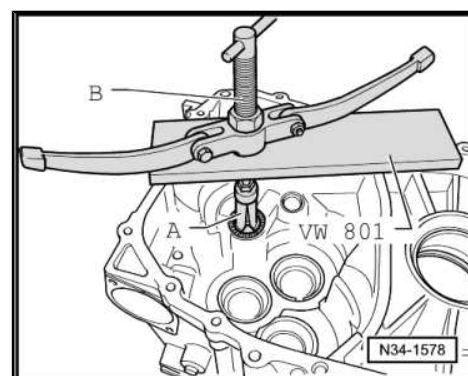
A - Internal puller 23.5 ... 30 mm , e.g. -Kukko 21/4-

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



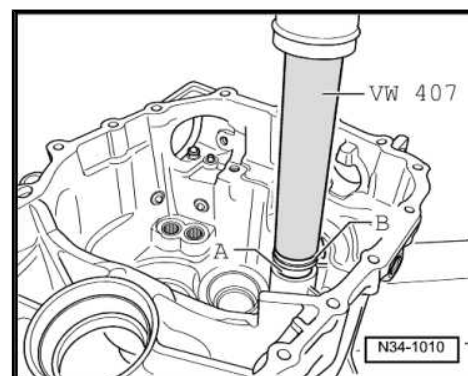
Note

The needle bearing is destroyed during removal and must be renewed.



Pressing needle bearing -A- into gearbox housing

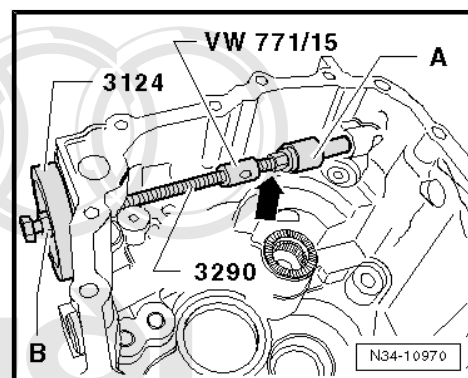
- Before pressing in, place reverse shaft thrust washer -B- onto needle bearing.
- Support gearbox housing with tube -VW 416 B- directly below bearing mounting.



Pulling out selector shaft bush

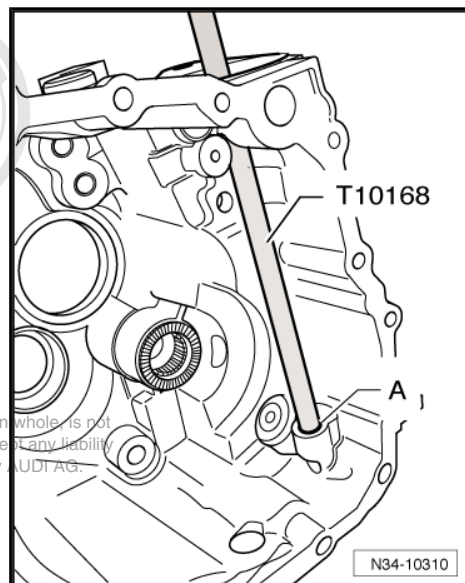
- Use thread adapter of counter-support -Kukko 22/1- -arrow-.
- Hold spindle of assembly tool -3290- tight and turn nut -B-.

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



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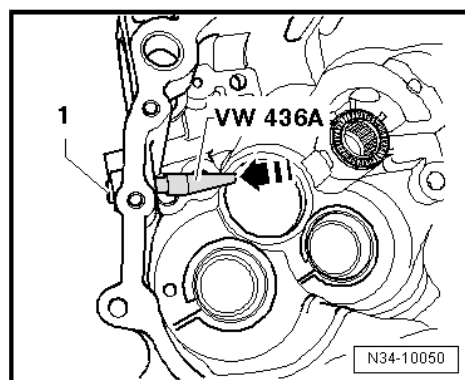
Driving in bearing bush -A- for selector shaft as far as tool stop



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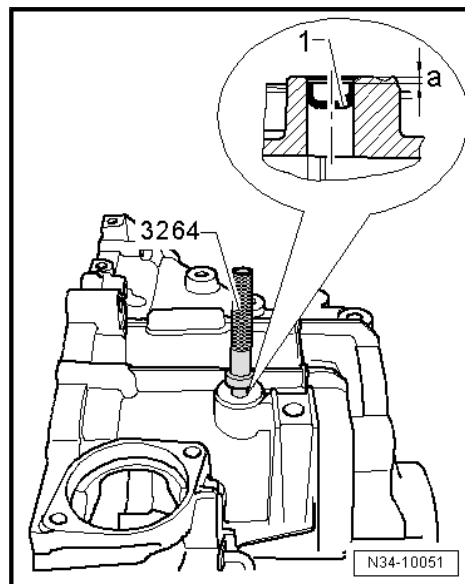
Driving out sealing plug -1-

- Drive out plug -1- from inside of gearbox housing -arrow-.



Driving in sealing plug -1-

- Use punch -3264- to drive in sealing plug to dimension -a- = approx. 3 mm below top edge of housing.



10.2.1 Exploded view - clutch housing

1 - Bearing bush

- ☐ For selector shafts
- ☐ Always renew after removing
- ☐ Pulling out ⇒ [page 115](#)
- ☐ Driving in ⇒ [page 116](#)

2 - Reverse gear selector fork shaft

- ☐ Fitting reverse gear selector fork on shaft ⇒ [page 96](#)
- ☐ Shaft cannot be removed with workshop tools
- ☐ Press in new shaft if a new clutch housing is being fitted ⇒ [page 116](#)
- ☐ If shaft is not fitted, reverse gear selector fork is mounted on selector rod for 5th/6th gear selector fork ⇒ [page 96](#)
- ☐ Select correct components from ⇒ Electronic parts catalogue

3 - Needle bearing

- ☐ For reverse shaft
- ☐ Always renew after removing
- ☐ Pulling out ⇒ [page 116](#)
- ☐ Pressing in ⇒ [page 116](#)

4 - Dowel sleeve

- ☐ 2x

5 - Clutch housing

- ☐ If renewed: Adjust output shafts and differential ⇒ [page 180](#)

6 - Input shaft oil seal

- ☐ Renewing ⇒ [page 129](#)

When gearbox is dismantled, oil seal can be removed with sleeve -30-21- .

7 - Oil seal

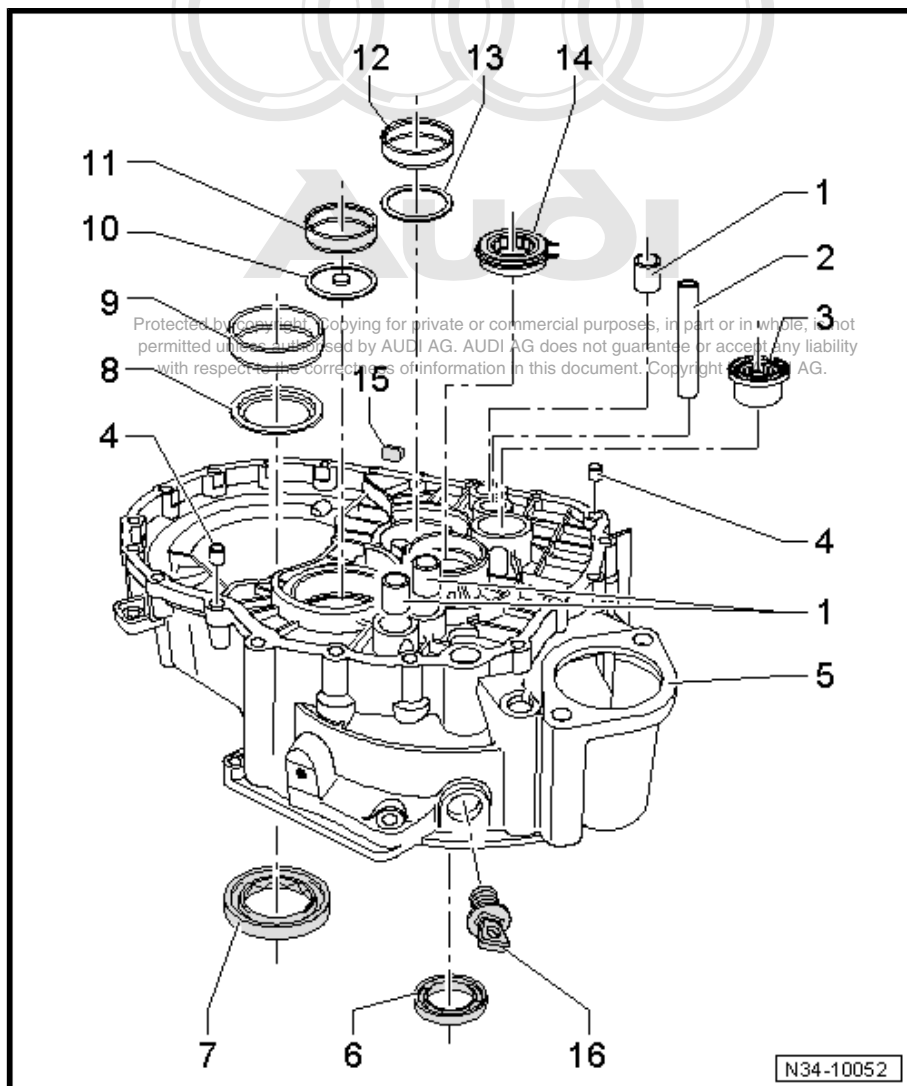
- ☐ Renewing ⇒ [page 173](#)

8 - Oil deflector plate

- ☐ For differential
- ☐ Installation position: Shoulder on inside diameter faces towards oil seal ⇒ [Item 7 \(page 113\)](#)

9 - Tapered roller bearing outer race

- ☐ For differential
- ☐ Removing and installing ⇒ [page 183](#)
- ☐ If renewed: adjust differential ⇒ [page 188](#)



10 - Oil deflector plate

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

11 - Tapered roller bearing outer race

- ☐ For 1st - 4th gear output shaft
- ☐ Removing and installing ⇒ [page 135](#)
- ☐ If renewed: Adjust 1st - 4th gear output shaft ⇒ [page 152](#)

12 - Tapered roller bearing outer race

- ☐ For 5th/6th and reverse gear output shaft
- ☐ Removing and installing ⇒ [page 159](#)
- ☐ If renewed: Adjust 5th/6th and reverse gear output shaft ⇒ [page 168](#)

13 - Shim

- ☐ For 5th/6th and reverse gear output shaft
- ☐ Always 0.65 mm thick

14 - Roller bearing

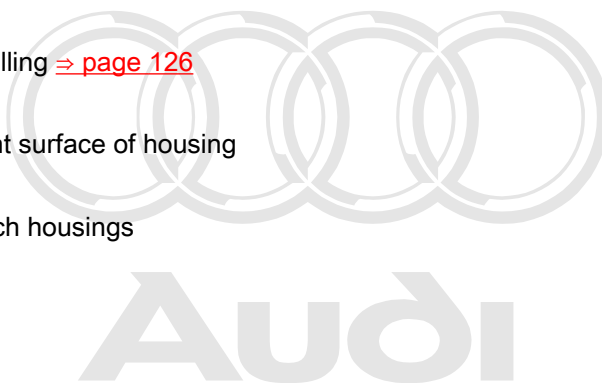
- ☐ For input shaft
- ☐ Removing and installing ⇒ [page 126](#)

15 - Magnet

- ☐ Held in place by joint surface of housing

16 - Cap

- ☐ Not fitted on all clutch housings

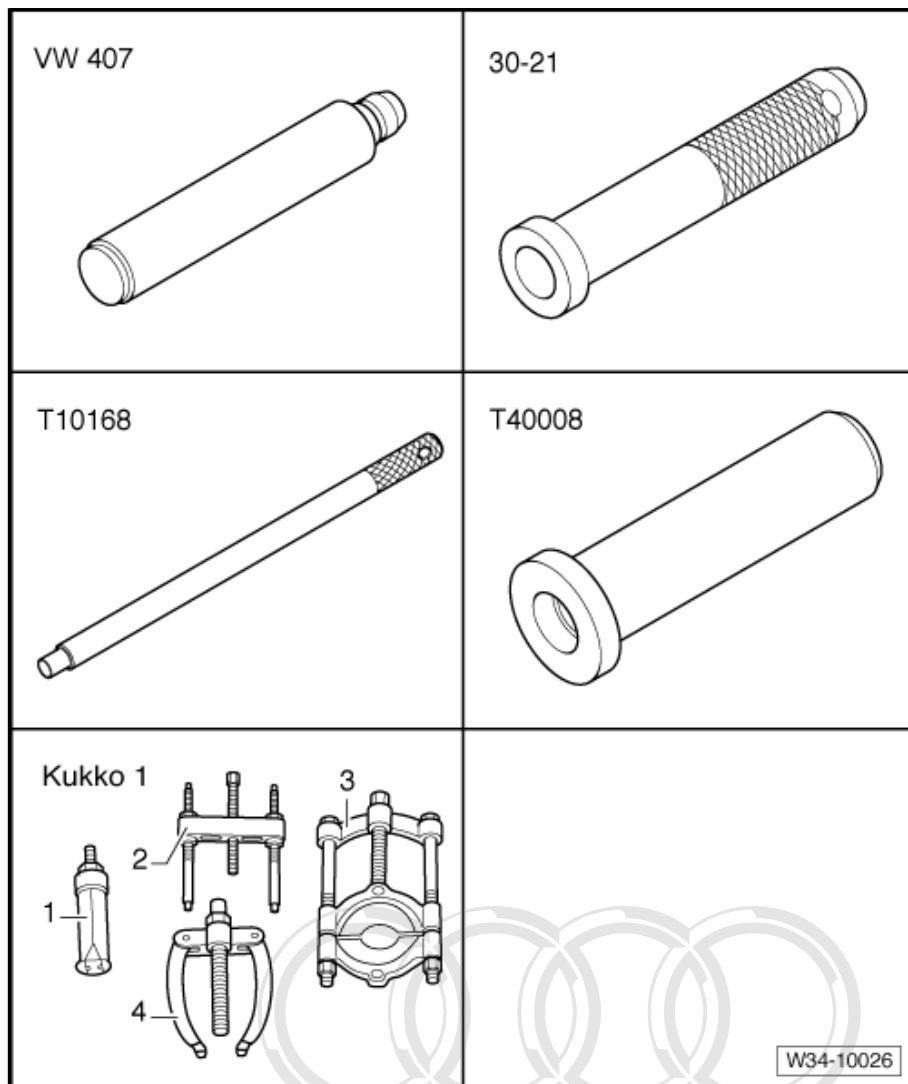


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10.2.2 Servicing clutch housing

Special tools and workshop equipment required

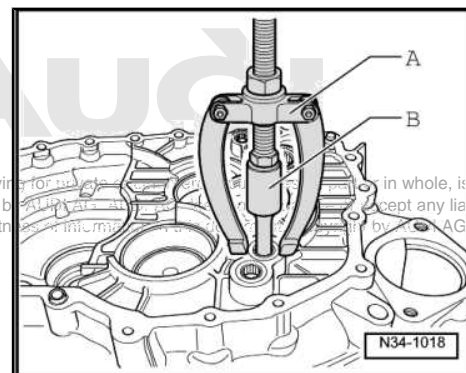
- ◆ Press tool -VW 407-
- ◆ Drift -T10168-
- ◆ Thrust piece -T40008-
- ◆ Internal puller -1 - Kukko 21/2-
- ◆ Internal puller -1 - Kukko 21/4-
- ◆ Counter-support -4 - Kukko 22/2-
- ◆ Sleeve -30-21-
- ◆ Oil seal extractor lever -VW 681-



Pulling out bearing bush for selector rod

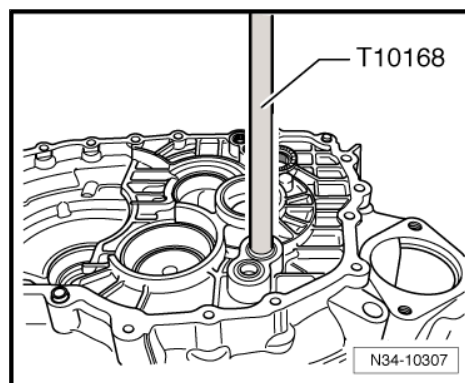
A - Counter-support , e.g. -Kukko 22/1-

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



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Driving in bearing bush for selector rod (drive in until tool contacts stop)



Pulling needle bearing out of clutch housing

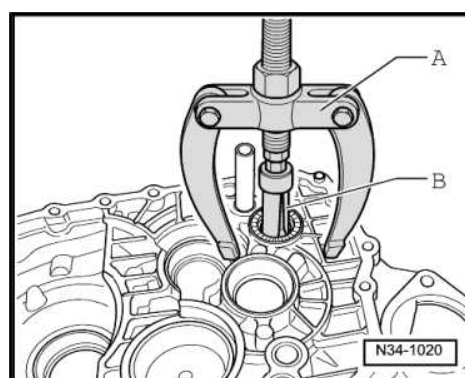
A - Counter-support , e.g. -Kukko 22/2-

B - Internal puller 23.5 ... 30 mm , e.g. -Kukko 21/4-



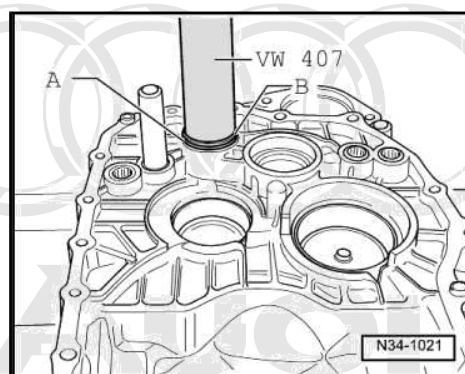
Note

The needle bearing is destroyed during removal and must be renewed.



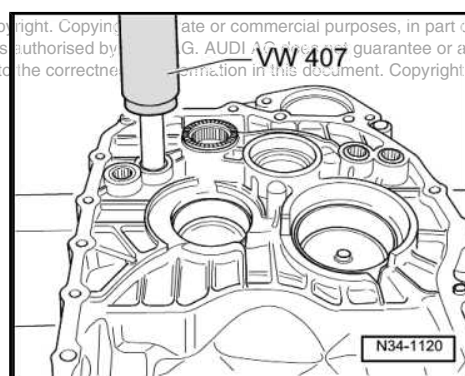
Pressing needle bearing -A- into clutch housing

- Before pressing in, place reverse shaft thrust washer -B- onto needle bearing.



Pressing reverse gear selector fork shaft into clutch housing

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11 Exploded view - selector mechanism in gearbox

Overview:

- ◆ ⇒ „11.1 Renewing oil seal for selector shaft“, page 117
- ◆ ⇒ „11.2 Removing and installing selector shaft“, page 119



Note

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

1 - Bearing bush for selector shaft

- ☐ Removing and installing
⇒ Item 16 (page 104)

2 - Selector shaft

- ☐ With selector mechanism cover
- ☐ Can be removed and installed with gearbox in vehicle

3 - O-ring

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

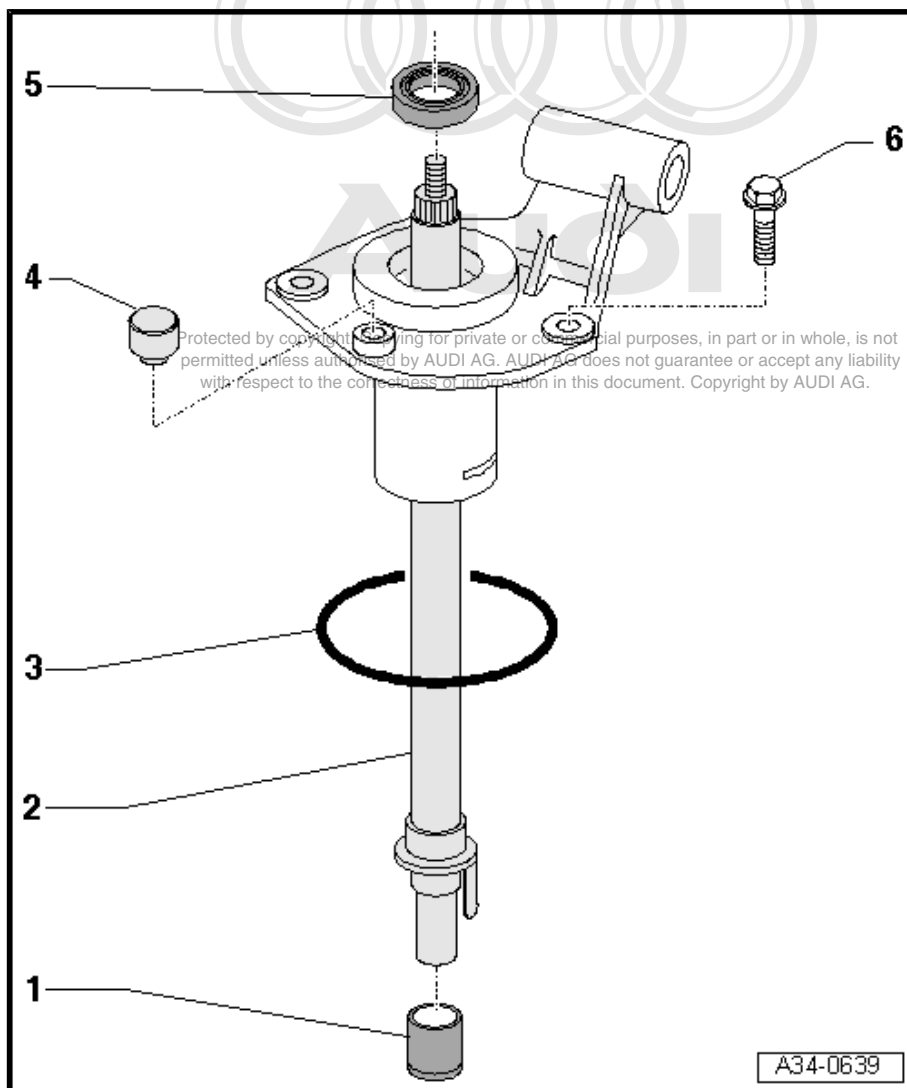
4 - Cap for gearbox breather

5 - Oil seal for selector shaft

- ☐ Renewing ⇒ page 117

6 - Bolt

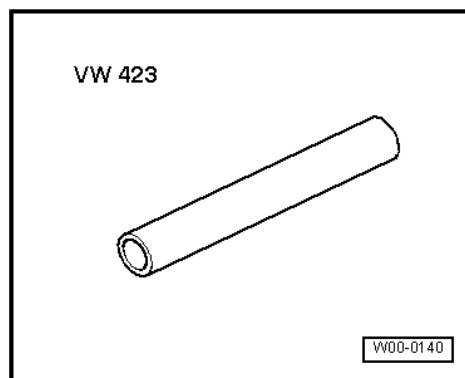
- ☐ Renew
- ☐ 20 Nm



11.1 Renewing oil seal for selector shaft

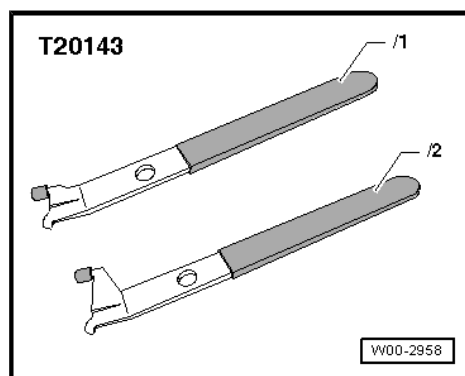
Special tools and workshop equipment required

◆ Tube -VW 423-



◆ Extractor tool -T20143/1-

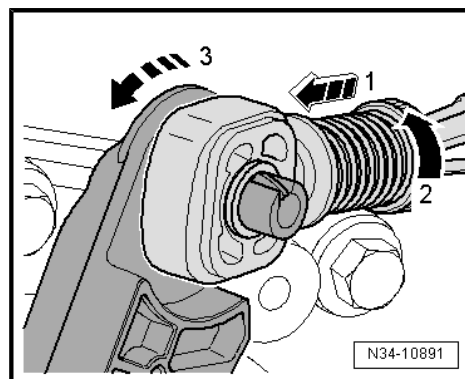
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◆ Sealing grease -G 052 128 A1-

Procedure

- Remove air cleaner housing ⇒ Rep. gr. 23 .
- 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.

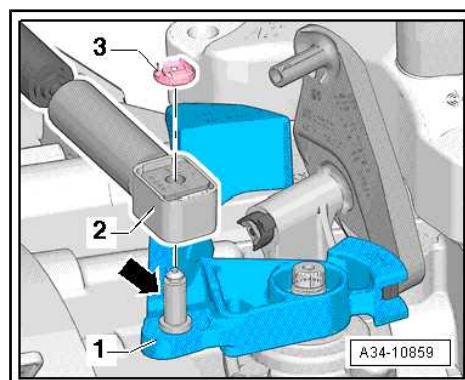


- Detach securing clip -3- for gear selector cable from gearbox selector lever -1- and pull selector cable -2- off pin -arrow-.



Note

- ◆ Do not detach cable end-piece from gate relay lever until gate relay lever has been removed ⇒ [page 54](#) .
- ◆ 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.

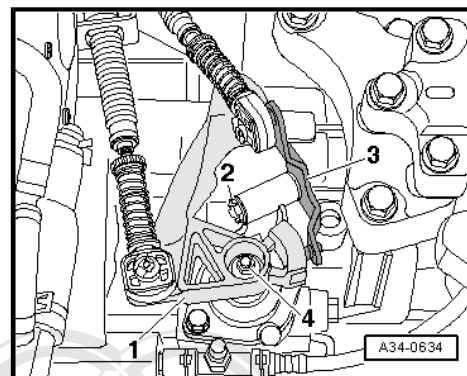


- Remove nut -4- and take out gearbox selector lever -1-.

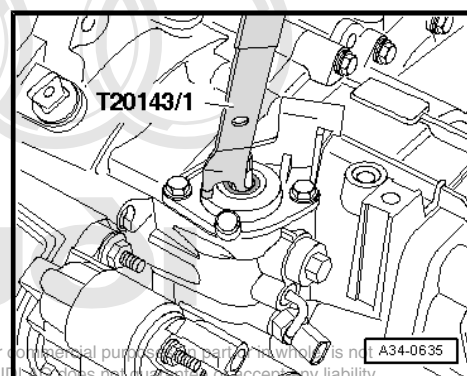


Note

-Items 2 and 3- can be disregarded.



- Pry out oil seal using extractor tool -T20143/1- .



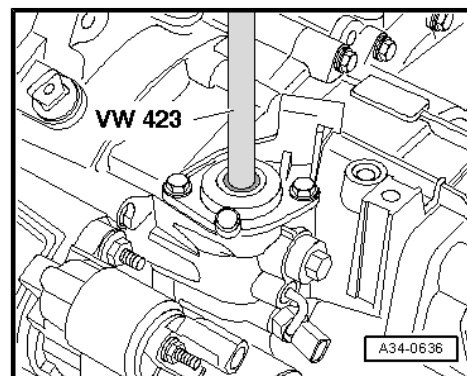
- Lubricate outer circumference of new oil seal with gear oil.
- Drive in new oil seal onto stop (take care to keep oil seal straight).
- Pack space between sealing lip and dust lip -arrow- half full with sealing grease -G 052 128 A1- .



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

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

- Install gate relay lever
⇒ Fig. „Detaching and securing gate relay lever at gearbox selector lever“, page 53 and
⇒ Fig. „Installation position: gearbox selector lever/gate relay lever“, page 52 .
- Install gearbox selector lever
⇒ Fig. „Installing gearbox selector lever“, page 52 .
- Install air cleaner housing ⇒ Rep. gr. 23 .

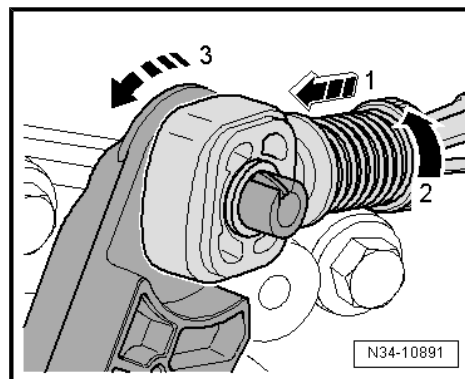


11.2 Removing and installing selector shaft

Removing

- Remove air cleaner housing ⇒ Rep. gr. 23 .

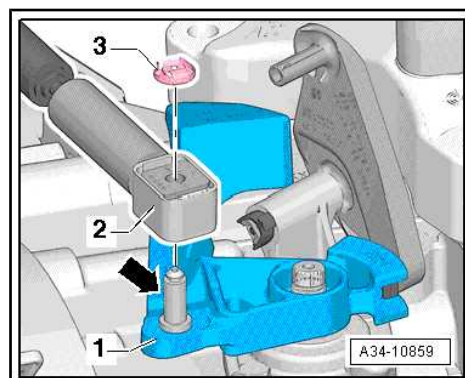
- Pull locking mechanism forwards -arrow 1- onto stop and then turn to left -arrow 2- to lock.
- Press gate relay lever forwards -arrow 3- and pull gate selector cable out of cable end-piece.



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


Note

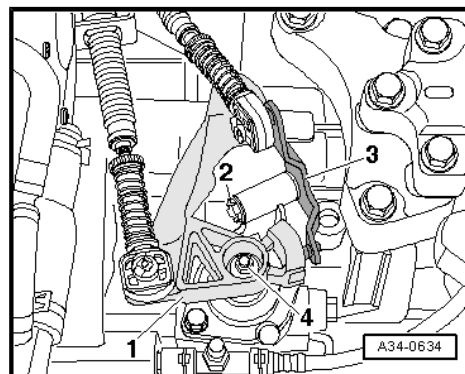
- ◆ Do not detach cable end-piece from gate relay lever until gate relay lever has been removed ⇒ [page 54](#).
- ◆ If the gearbox support makes it impossible to remove the gate relay lever, remove the gate selector cable from the gate relay lever. Guide the slide block out of gearbox selector lever.



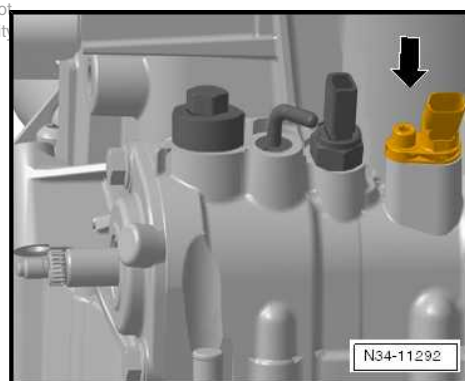
- Remove nut -4- and take out gearbox selector lever -1-.


Note

-Items 2 and 3- can be disregarded.


Gearbox for vehicles with start/stop system:

- Remove gearbox neutral position sender -G701- -arrow-.



Continued for all gearboxes:

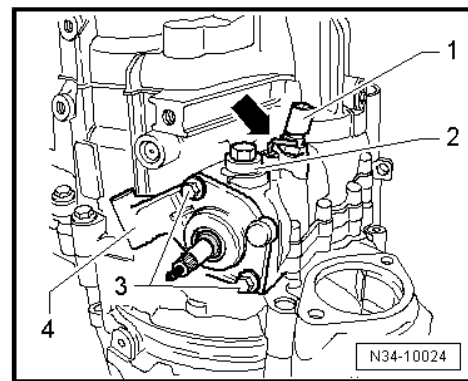
- Put selector shaft in neutral position.



Caution

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

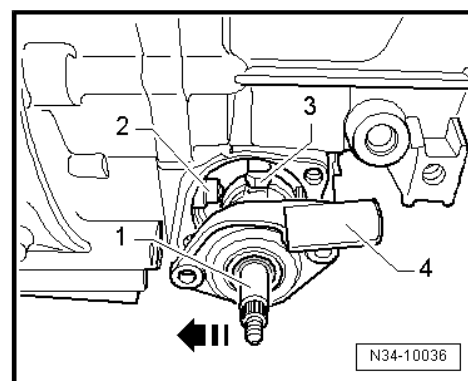
- Unscrew reversing light switch -F4- -item 1-.
- Remove locking bolt -2-.
- Remove bolts -3-.
- Pull selector shaft with selector mechanism cover -4- out of gearbox housing.



Installing

Tightening torques:

- ⇒ „11 Exploded view - selector mechanism in gearbox“, page 117 .
- ⇒ „9.3 Exploded view - gearbox housing and selector unit“, page 84
- 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).



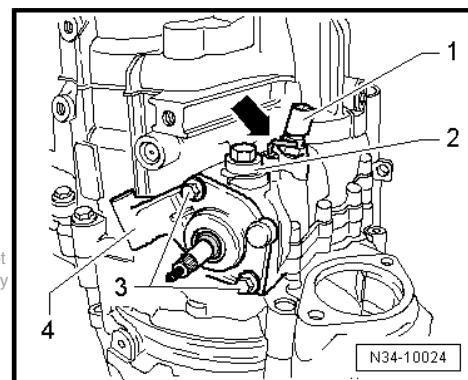
Note

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:

- Install gate relay lever
⇒ Fig. „Detaching and securing gate relay lever at gearbox selector lever“, page 53 and
⇒ Fig. „Installation position: gearbox selector lever/gate relay lever“, page 52 .
- Install gearbox selector lever
⇒ Fig. „Installing gearbox selector lever“, page 52 .
- Install air cleaner housing ⇒ Rep. gr. 23 .



12 Exploded view - selector forks

1 - Damper rubber

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

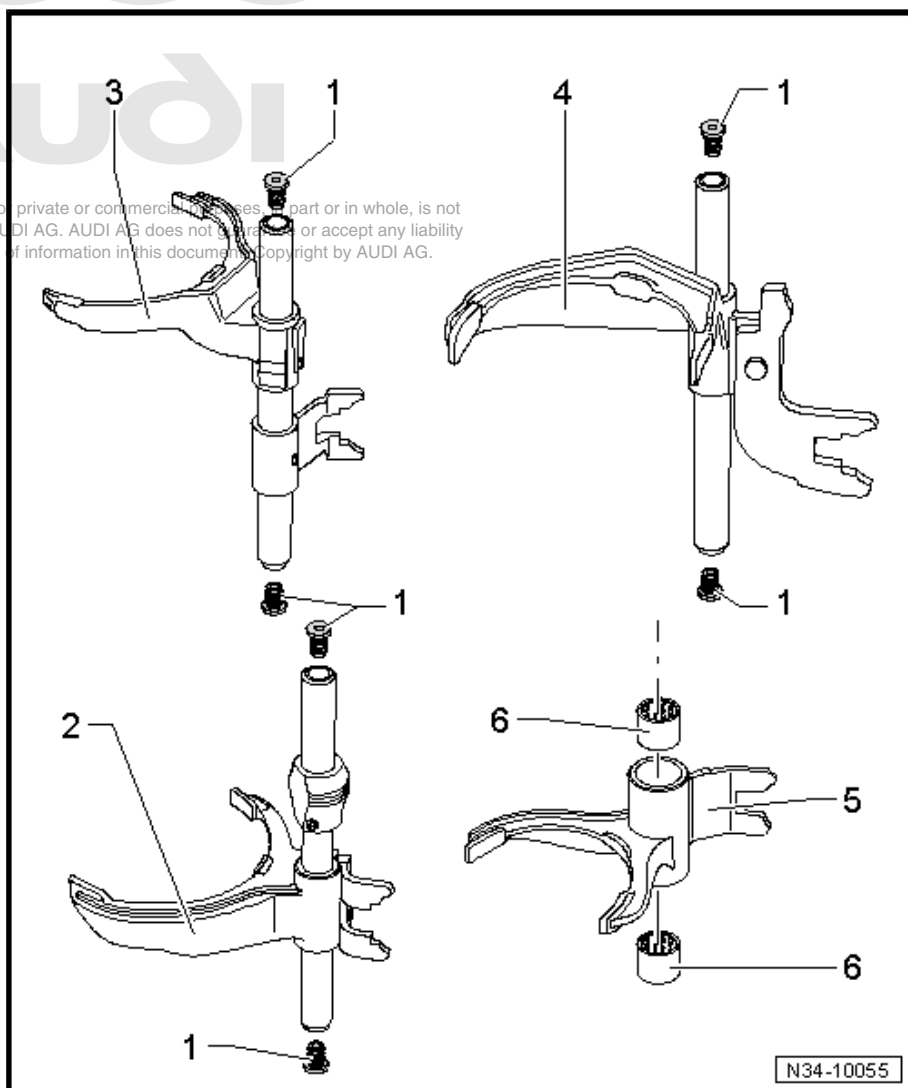
2 - Selector rod with selector fork for 1st and 2nd gear

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

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

5 - Reverse gear selector fork

- ☐ Is mounted on shaft for reverse gear selector fork ⇒ [page 96](#)
- ☐ The ball sleeve ⇒ [Item 6 \(page 122\)](#) is not fitted on all reverse gear selector fork versions
- ☐ Different types of reverse gear selector forks are fitted according to version
- ☐ If shaft for reverse gear selector fork is not fitted, selector fork is mounted on selector rod for 5th/6th gear selector fork ⇒ [page 96](#)
- ☐ Identification of different types of reverse gear selector forks ⇒ [page 123](#)
- ☐ For correct version, refer to ⇒ Electronic parts catalogue



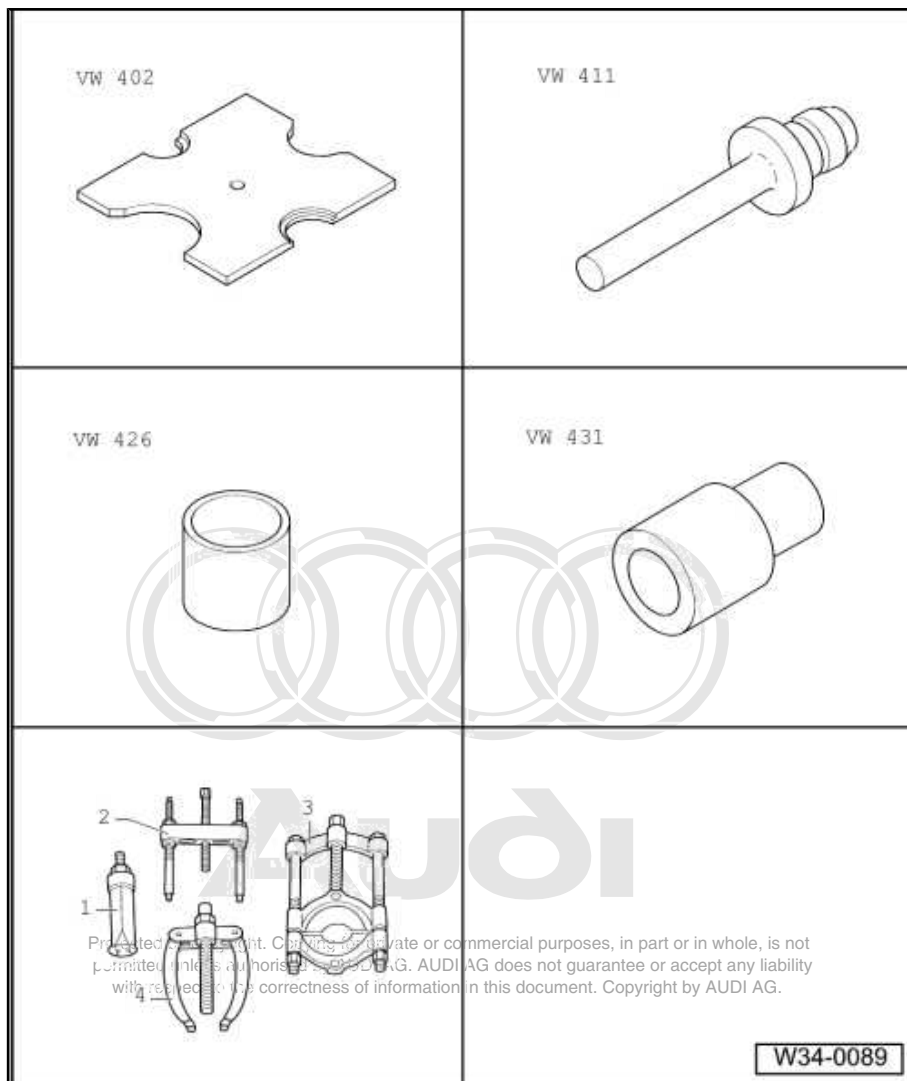
6 - Ball sleeve

- ☐ Not fitted in all reverse gear selector fork versions
- ☐ Pulling out ⇒ [page 124](#)
- ☐ Pressing in ⇒ [page 124](#)
- ☐ Gradually discontinued
- ☐ For correct version, refer to ⇒ Electronic parts catalogue

12.1 Servicing reverse gear selector fork

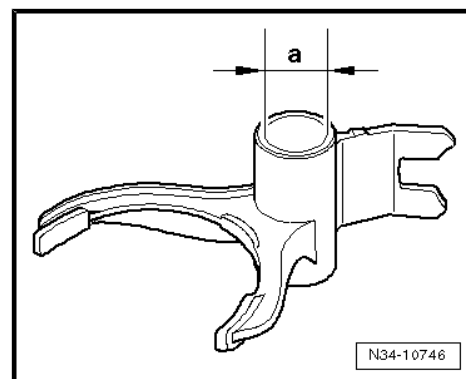
Special tools and workshop equipment required

- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 411-
- ◆ Tube -VW 426-
- ◆ Thrust piece -VW 431-
- ◆ Internal puller -1 - Kukko 21/3-
- ◆ Counter-support -4 - Kukko 22/1-



Identification of different types of reverse gear selector forks

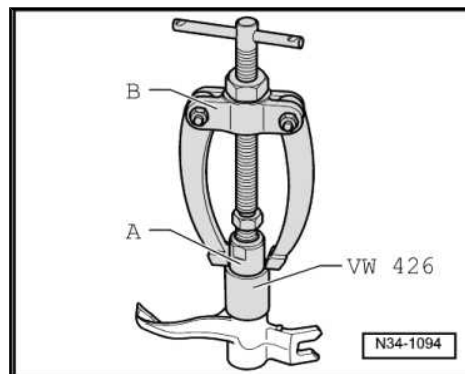
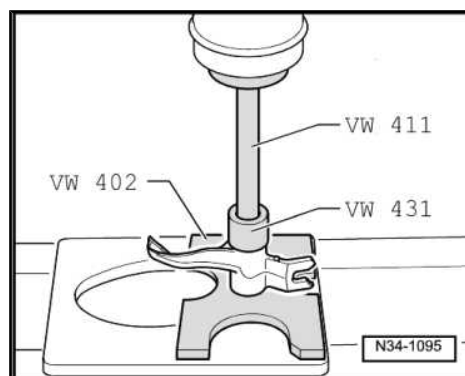
Dimension „a“ (mm)	Reverse gear selector fork	Mounting
24	With ball sleeve	On reverse gear selector fork shaft ⇒ page 96
18	Without ball sleeve	
15	Without ball sleeve	On selector rod with selector fork for 5th and 6th gear ⇒ page 96



Pulling out ball sleeve for reverse gear selector fork

A - Internal puller 18 ... 23 mm , e.g. -Kukko 21/3-

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

**Pressing in ball sleeve for reverse gear selector fork**

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35 – Gears, shafts

1 Input shaft

- ◆ ⇒ „1.1 Exploded view - input shaft“, page 125
- ◆ ⇒ „1.2 Dismantling and assembling input shaft“, page 126
- ◆ ⇒ „1.3 Renewing input shaft oil seal“, page 129

1.1 Exploded view - input shaft



Note

Lubricate all bearings on input shaft with gear oil before installing.

Always renew grooved ball bearing ⇒ [Item 4 \(page 125\)](#)

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1 - Circlip

- ☐ For grooved ball bearing on input shaft
⇒ [Item 4 \(page 125\)](#)

2 - Gearbox housing

3 - Circlip

- ☐ When grooved ball bearing ⇒ [Item 4 \(page 125\)](#) or input shaft ⇒ [Item 6 \(page 125\)](#) are renewed: determine thickness of required circlip ⇒ [page 129](#)

4 - Grooved ball bearing

- ☐ Always renew
- ☐ Pulling off ⇒ [page 127](#)
- ☐ Installation position ⇒ [page 128](#)
- ☐ Pressing on ⇒ [page 128](#)

5 - 5th gear wheel

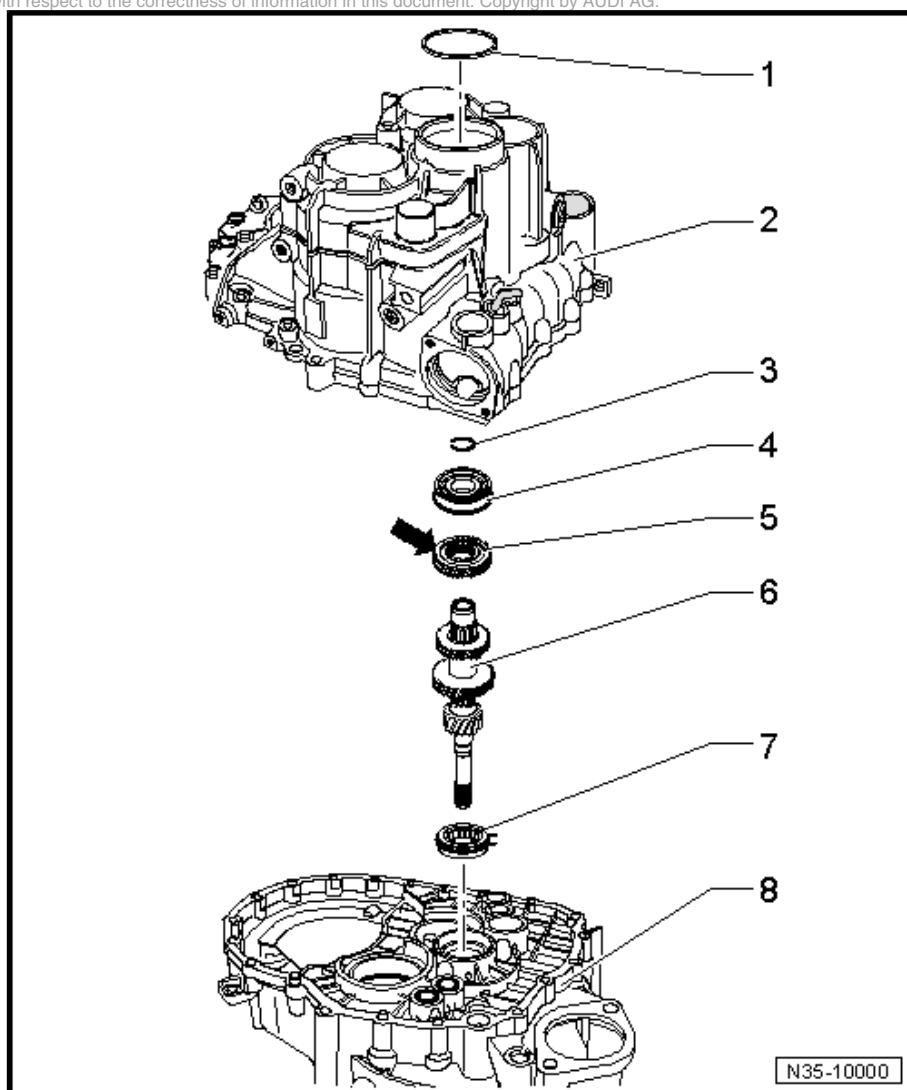
- ☐ Supplied together with input shaft as replacement part
- ☐ Pressing off ⇒ [page 128](#)
- ☐ Installation position: Circular slot -arrow- faces towards grooved ball bearing ⇒ [Item 4 \(page 125\)](#)
- ☐ Pressing on ⇒ [page 128](#)

6 - Input shaft

- ☐ With 3rd/4th and 6th gear wheels

7 - Roller bearing

- ☐ With circlip



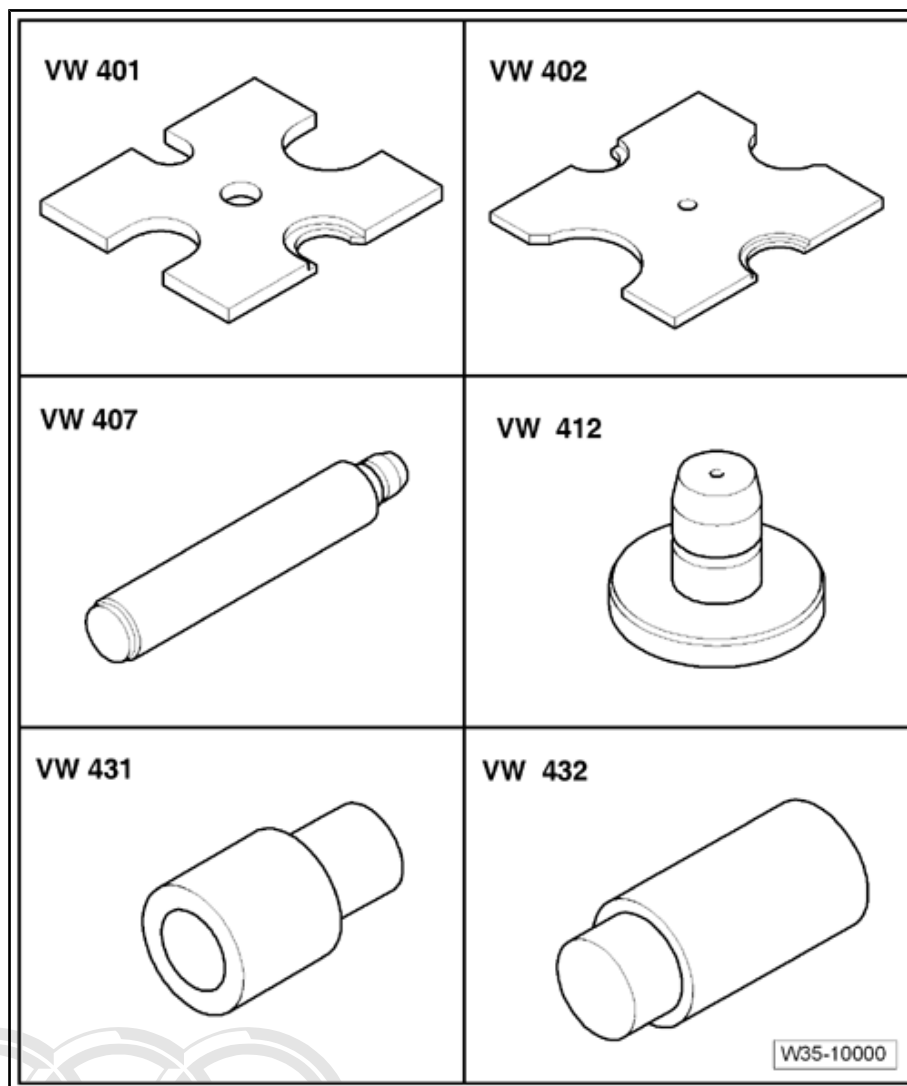
- ☐ Pulling out ⇒ [page 129](#)
- ☐ Pressing in ⇒ [page 129](#)
- ☐ Installation position: Circlip in bearing faces towards input shaft

8 - Clutch housing

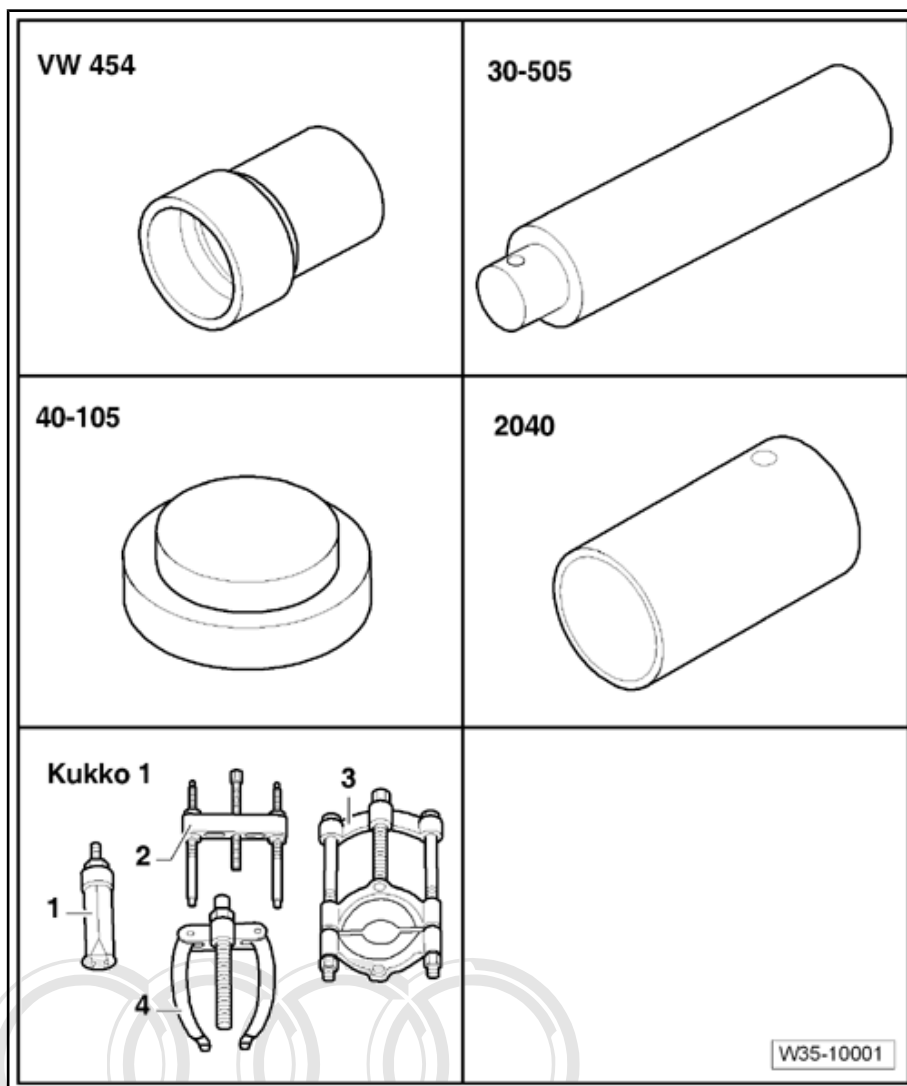
1.2 Dismantling and assembling input shaft

Special tools and workshop equipment required

- ◆ Thrust plate -VW 401-
- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 407-
- ◆ Press tool -VW 412-
- ◆ Thrust piece -VW 431-
- ◆ Press tool -VW 432-



- ◆ Press tool -VW 454-
- ◆ Thrust piece -30-505-
- ◆ Thrust plate -40-105-
- ◆ Tube -2040-
- ◆ Internal puller -1 - Kukko 21/5-
- ◆ Splitter -3 - Kukko 17/1-
- ◆ Splitter -3 - Kukko 17/2-
- ◆ Puller -2 - Kukko 18/1-
- ◆ Counter-support -4 - Kukko 22/2-

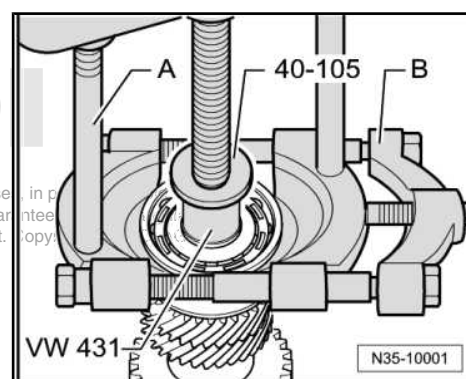


Dismantling input shaft

- Remove circlip for grooved ball bearing.

Pulling off grooved ball bearing

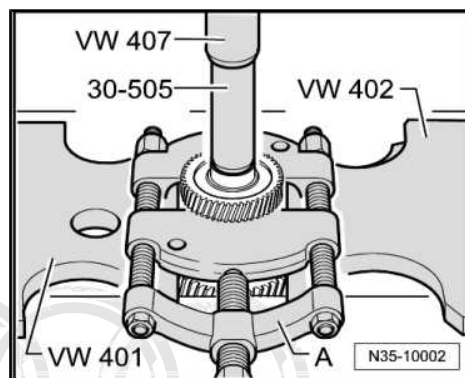
- Before setting up puller, position thrust piece -VW 431- and thrust plate -40-105- on input shaft.
 - Apply splitter -B- at circular slot for circlip in bearing.
- A - Puller , e.g. -Kukko 18/1-
B - Splitter 12...75 mm , e.g. -Kukko 17/1-



Pressing off 5th gear wheel

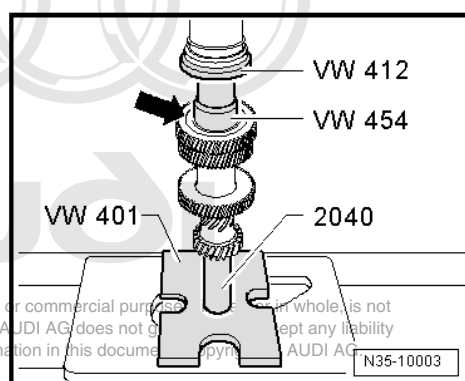
A - Splitter 22...115 mm , e.g. -Kukko 17/2-

Assembling input shaft



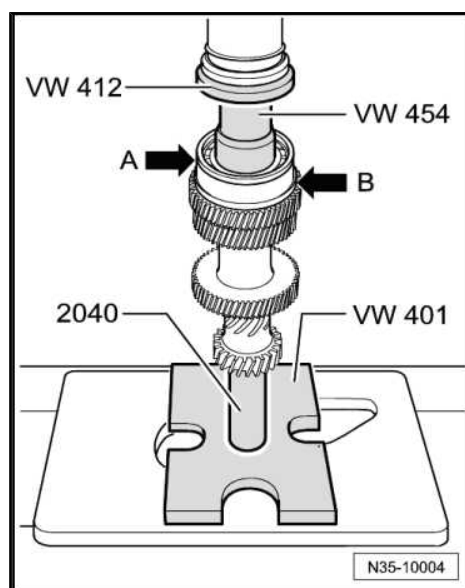
Pressing on 5th gear wheel

Slot -arrow- on gear wheel must face upwards.



Installation position of grooved ball bearing

Groove for circlip faces upwards -arrow A-. Shoulder -arrow B- must then face towards 5th gear wheel.

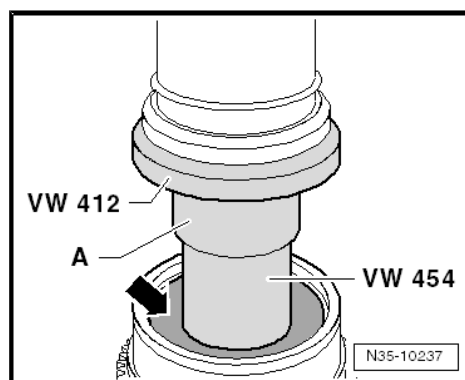


Pressing on grooved ball bearing

Grooved ball bearing with rubber ring -arrow-

Shoulder -A- faces towards press tool -VW 412- .

- Determine thickness of circlip for grooved ball bearing on input shaft (⇒ next illustration) and fit circlip.



Determining thickness of circlip for grooved ball bearing on input shaft

- Install a 1.86 mm thick circlip -A- in slot on input shaft and press circlip upwards.
- Measure gap between grooved ball bearing -B- and fitted circlip -A- using feeler gauge -C-.
- Remove circlip fitted for measurement.
- Select circlip from table.

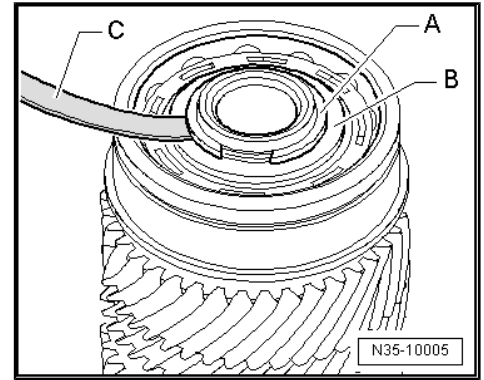


Note

Select circlips from ⇒ *Electronic parts catalogue*.

The following circlips are available:

Measured value (mm)	Circlip thickness (mm)	Axial clearance (mm)
0.01 ... 0.05	1.86	0.01 ... 0.05
0.05 ... 0.07	1.89	0.01 ... 0.05
0.07 ... 0.10	1.92	0.01 ... 0.05
0.10 ... 0.13	1.95	0.01 ... 0.05
0.13 ... 0.16	1.98	0.01 ... 0.05

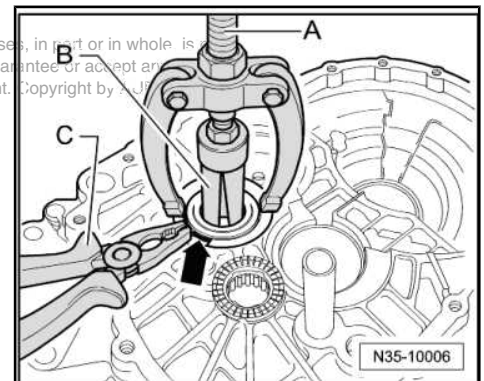


Pulling roller bearing out of clutch housing

- When pulling out, compress circlip -arrow- for roller bearing using pliers -C-.

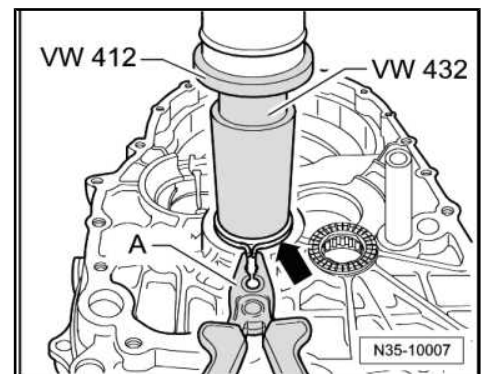
A - Counter-support, e.g. -Kukko 22/2-

B - Internal puller 30 ... 37 mm, e.g. -Kukko 21/5-



Pressing roller bearing into clutch housing

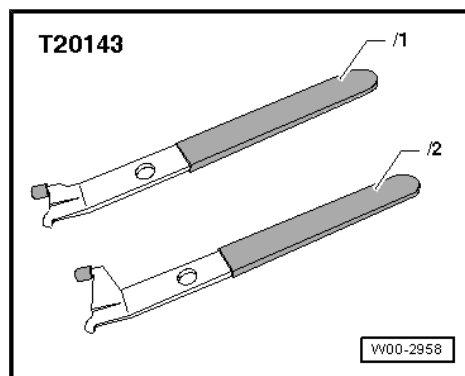
- When pressing in, compress circlip -arrow- for roller bearing using pliers -A-.
- Remove the pliers before the roller bearing is in its final position. The circlip must engage in the groove in the clutch housing.



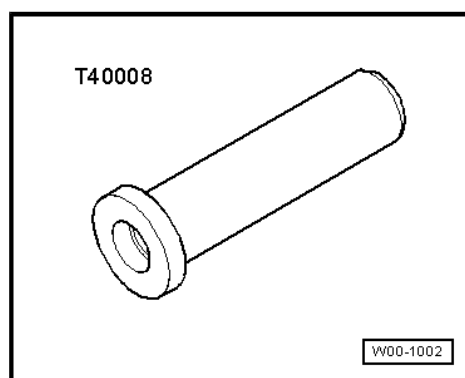
1.3 Renewing input shaft oil seal

Special tools and workshop equipment required

◆ Extractor tool -T20143/1-



◆ Thrust piece -T40008-



◆ Sealing grease -G 052 128 A1-

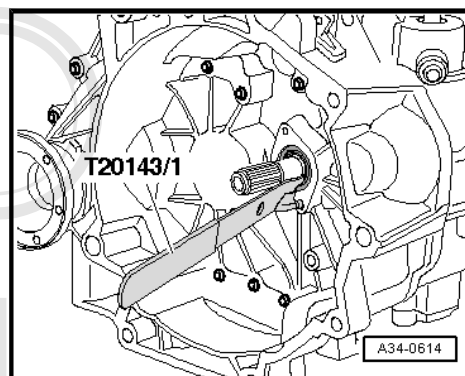
Procedure

- Remove gearbox.
- Remove slave cylinder with release bearing ➔ [page 32](#) .
- Pry out input shaft oil seal using extractor tool -T20143/1- .



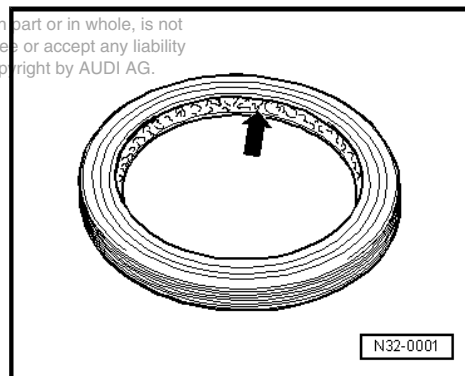
Note

Take care not to damage contact surface for oil seal on input shaft.

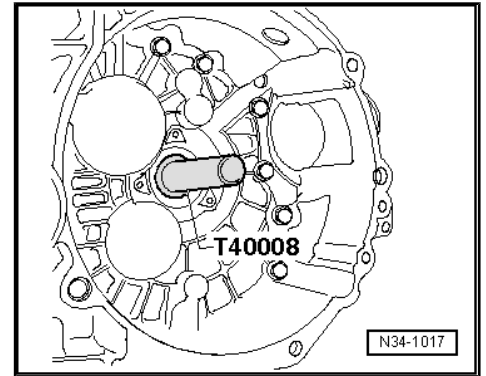


- Pack space between sealing lip and dust lip arrow half-full with sealing grease -G 052 128 A1-.

- Lightly lubricate outer circumference of oil seal with gear oil.



- Drive in oil seal until flush using thrust piece -T40008- .
- Install slave cylinder with release bearing ⇒ [page 32](#) .
- Install gearbox.



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2 Output shaft

- ◆ ⇒ [„2.1 Exploded view - output shaft for 1st - 4th gear“, page 133](#)
- ◆ ⇒ [„2.2 Dismantling and assembling output shaft for 1st - 4th gear“, page 135](#) .
- ◆ ⇒ [„2.3 Adjusting output shaft for 1st - 4th gear“, page 152](#) .
- ◆ ⇒ [„2.4 Exploded view - output shaft for 5th, 6th and reverse gear“, page 157](#)
- ◆ ⇒ [„2.5 Dismantling and assembling output shaft for 5th, 6th and reverse gear“, page 159](#) .
- ◆ ⇒ [„2.6 Adjusting output shaft for 5th, 6th and reverse gear“, page 168](#)

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2.1 Exploded view - output shaft for 1st - 4th gear



Note

- ◆ Carry out output shaft adjustment ⇒ [page 152](#) if the output shaft or tapered roller bearings have been renewed.
- ◆ Always renew both tapered roller bearings together.

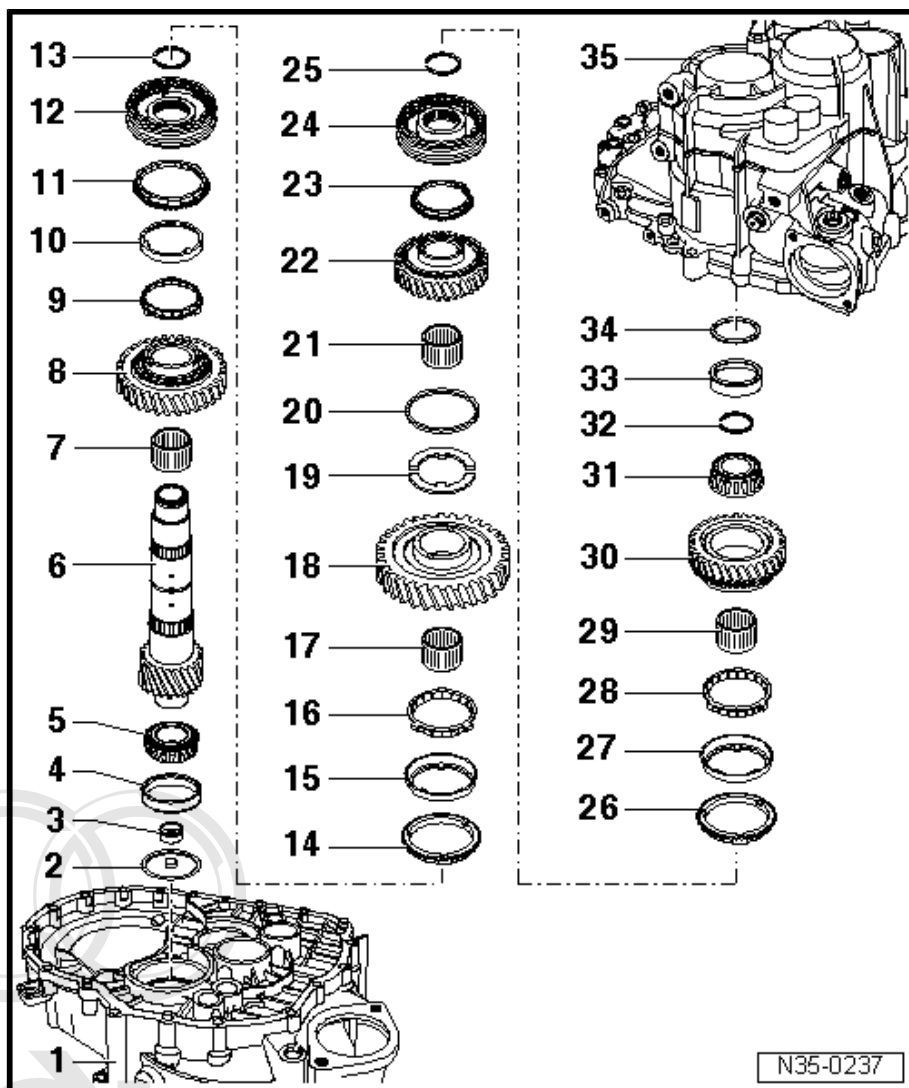
- 1 - Clutch housing
- 2 - Oil deflector plate
- 3 - Dished washer
 - ☐ Pulling out ⇒ [page 139](#)
 - ☐ Pressing in ⇒ [page 139](#)
- 4 - Tapered roller bearing outer race
 - ☐ Pulling out ⇒ [page 140](#)
 - ☐ Pressing in ⇒ [page 140](#)
- 5 - Tapered roller bearing inner race
 - ☐ Pressing off ⇒ [page 139](#)
 - ☐ Pressing on ⇒ [page 140](#)
- 6 - Output shaft
 - ☐ For 1st to 4th gear
 - ☐ Adjusting ⇒ [page 152](#)
- 7 - Needle bearing
 - ☐ For 2nd gear
- 8 - 2nd speed selector gear
- 9 - Synchro-ring (inner ring for 2nd gear)
- 10 - Outer ring for 2nd gear
- 11 - 2nd gear synchro-ring
- 12 - Locking collar with synchro-hub for 1st and 2nd gear

- ☐ Press off together with 2nd speed selector gear after removing circlip ⇒ [Item 13 \(page 133\) ⇒ page 142](#)
- ☐ Dismantling ⇒ [page 144](#)

- ☐ Assembling locking collar/synchro-hub ⇒ [page 144](#)

13 - Circlip

- 14 - 1st gear synchro-ring
- 15 - Outer ring for 1st gear
- 16 - Synchro-ring (inner ring for 1st gear)
- 17 - Needle bearing
 - ☐ For 1st gear
- 18 - 1st speed selector gear



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19 - Thrust washers

- ☐ For 1st and 4th gear
- ☐ 2x
- ☐ Insert lug on thrust washer in hole on output shaft

20 - Securing clip

- ☐ Holds thrust washers ⇒ [Item 19 \(page 133\)](#) in position on output shaft

21 - Needle bearing

- ☐ For 4th gear

22 - 4th speed selector gear**23 - 4th gear synchro-ring**

- ☐ Checking for wear ⇒ [page 150](#)

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

- ☐ Pull off together with 4th speed selector gear after removing circlip ⇒ [Item 25 \(page 134\)](#) ⇒ [page 142](#)
- ☐ Dismantling ⇒ [page 144](#)
- ☐ Installation position: Locking collar/synchro-hub ⇒ [page 145](#)
- ☐ Assembling locking collar/synchro-hub ⇒ [page 144](#)
- ☐ Pressing on ⇒ [page 146](#)

25 - Circlip**26 - 3rd gear synchro-ring****27 - Outer ring for 3rd gear****28 - Synchro-ring (inner ring for 3rd gear)****29 - Needle bearing**

- ☐ For 3rd gear

30 - 3rd speed selector gear**31 - Tapered roller bearing inner race**

- ☐ Pulling off ⇒ [page 140](#)
- ☐ Pressing on ⇒ [page 141](#)

32 - Circlip

- ☐ When tapered roller bearing ⇒ [Item 31 \(page 134\)](#) or output shaft ⇒ [Item 6 \(page 133\)](#) are renewed: determine thickness of required circlip ⇒ [page 141](#)

33 - Tapered roller bearing outer race

- ☐ Pulling out ⇒ [page 141](#)
- ☐ Pressing in ⇒ [page 141](#)

34 - Shim

- ☐ Determining thickness ⇒ [page 152](#)

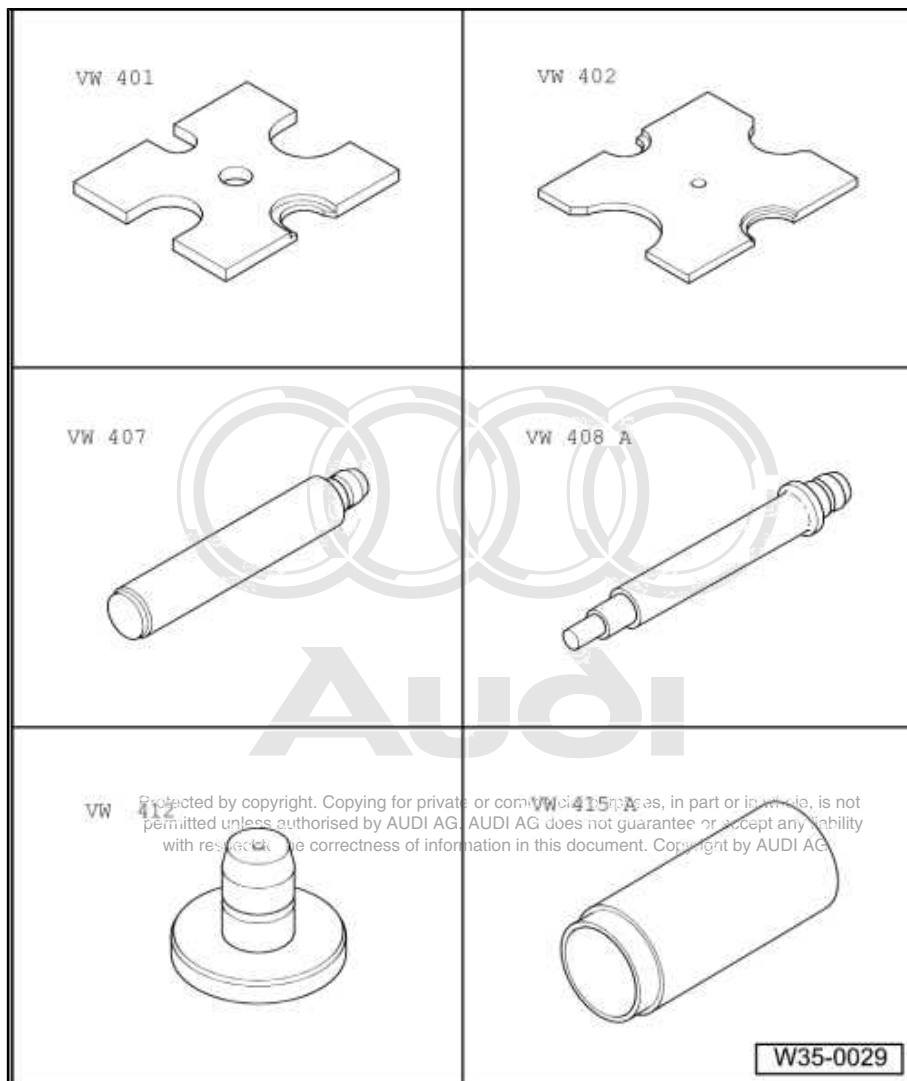
35 - Gearbox housing

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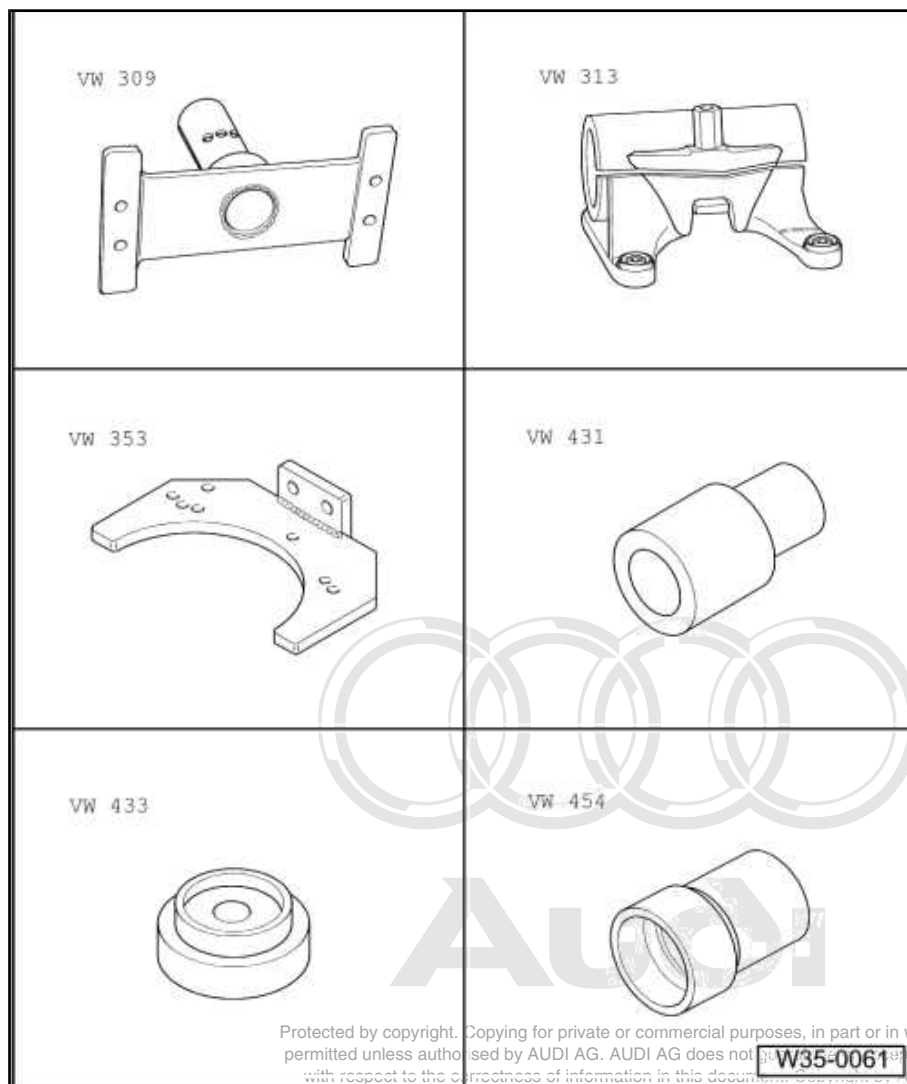
2.2 Dismantling and assembling output shaft for 1st - 4th gear

Special tools and workshop equipment required

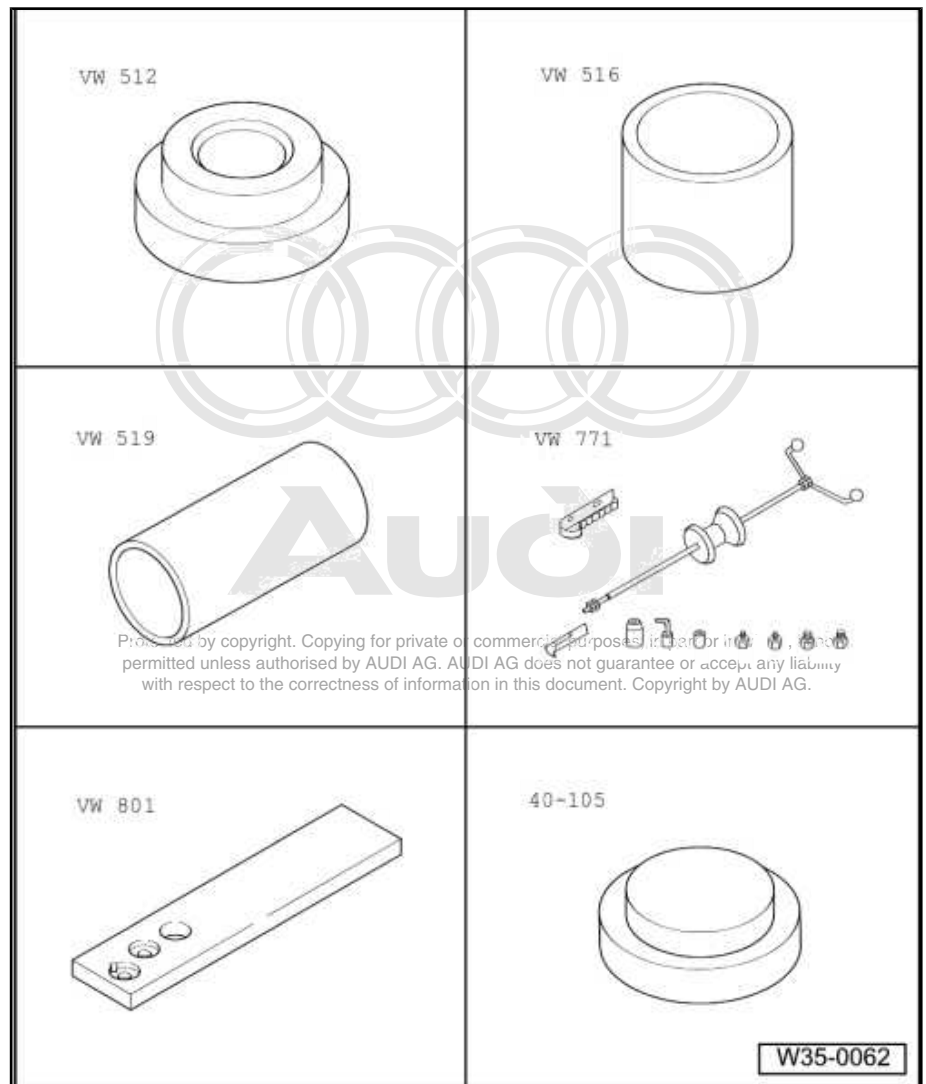
- ◆ Thrust plate -VW 401-
- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 407-
- ◆ Press tool -VW 408A-
- ◆ Press tool -VW 412-
- ◆ Tube -VW 415A-



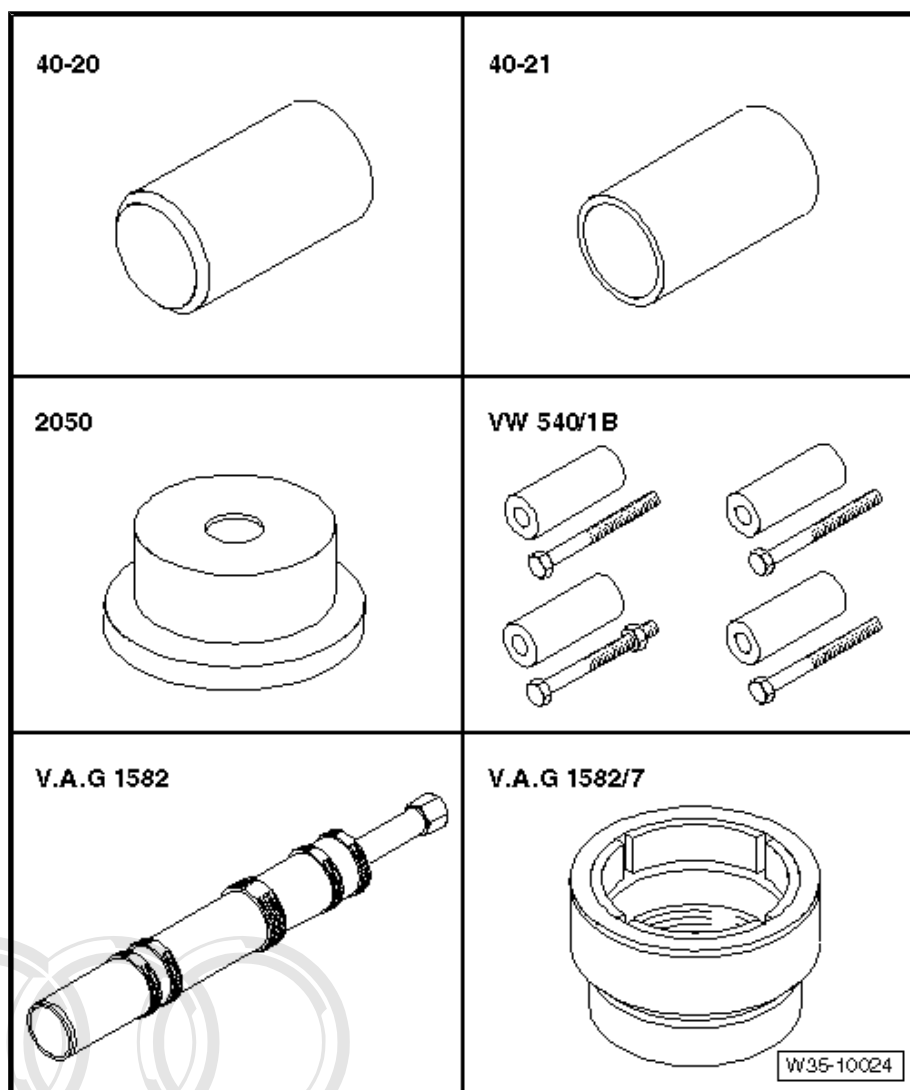
- ◆ Support plate -VW 309-
- ◆ Support clamp -VW 313-
- ◆ Gearbox support -VW 353-
- ◆ Thrust piece -VW 431-
- ◆ Press tool -VW 433-
- ◆ Press tool -VW 454-



- ◆ Thrust pad -VW 512-
- ◆ Tube -VW 516-
- ◆ Tube -VW 519-
- ◆ Multi-purpose tool -VW 771-
- ◆ Support plate -VW 801-
- ◆ Thrust plate -40-105-

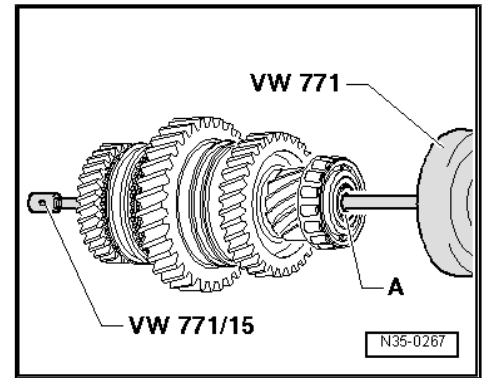
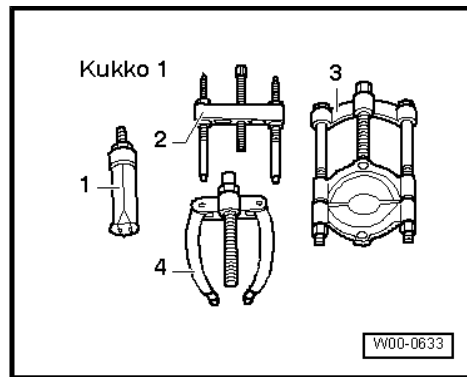


- ◆ Drift sleeve -40-20-
- ◆ Press tool -40-21-
- ◆ Thrust piece -2050-
- ◆ Engine and gearbox support supplement -VW 540/1 B-
- ◆ Tapered roller bearing puller -V.A.G 1582-
- ◆ Adapter -V.A.G 1582/7-



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- ◆ -1- Internal puller -
Kukko 21/7-

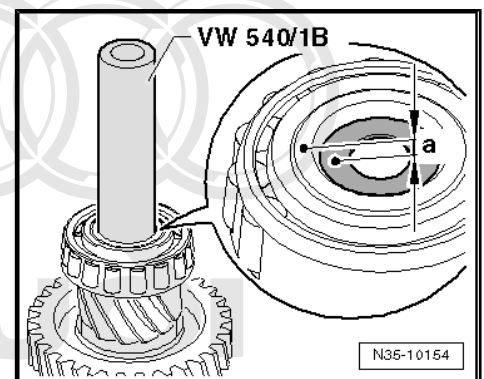


- ◆ -1- Internal puller -
Kukko 21/8-
- ◆ -2- Puller -Kukko
18/2-
- ◆ -3- Splitter -Kukko
17/2-
- ◆ -4- Counter-support -
Kukko 22/2-

**Pulling dished washer
-A- out of output shaft**

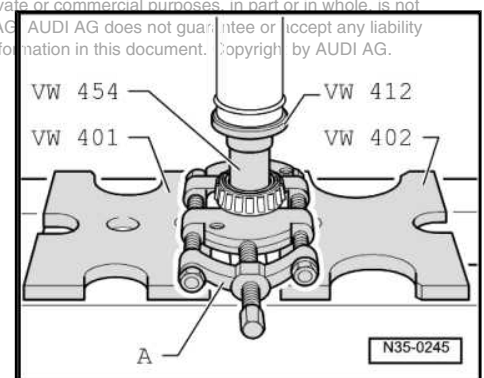
Pressing dished washer into output shaft

Dimension „a“ = 2 mm

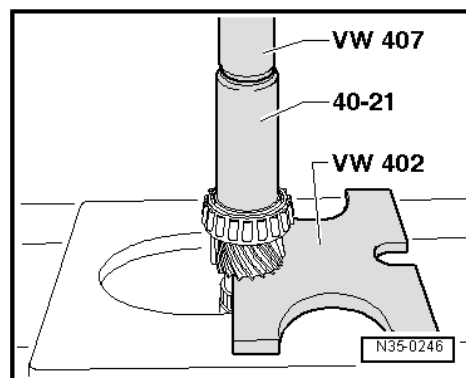


Pressing off tapered roller bearing inner race on clutch housing end

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



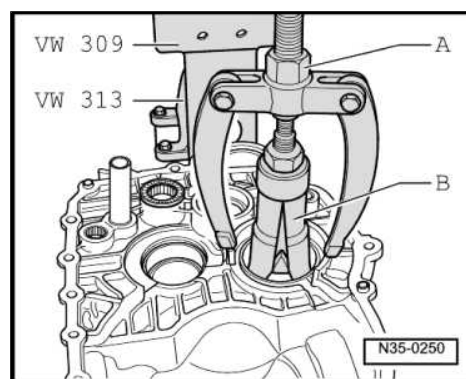
Pressing on tapered roller bearing inner race on clutch housing end



Pulling tapered roller bearing outer race out of clutch housing

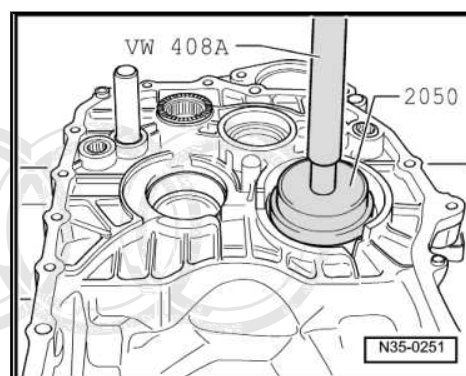
A - Counter-support , e.g. -Kukko 22/2-

B - Internal puller 56 ... 70 mm , e.g. -Kukko 21/8-



Pressing tapered roller bearing outer race into clutch housing

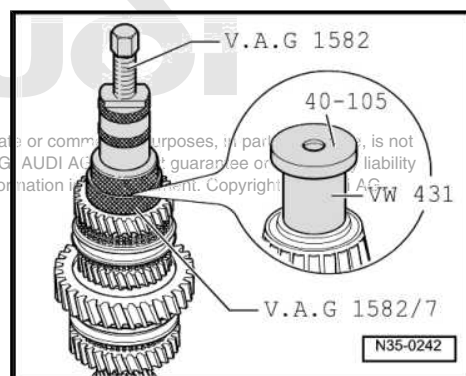
- Support clutch housing with drift sleeve -40-20- directly below bearing mounting.



Pulling off tapered roller bearing inner race on gearbox housing end

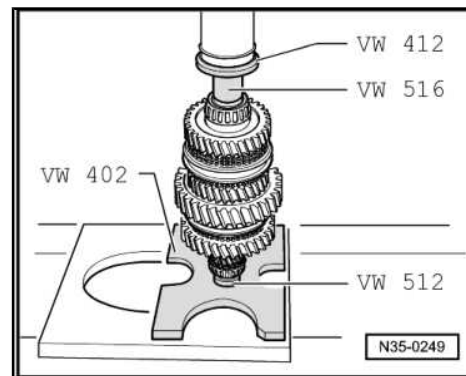
Before applying bearing puller :

- Remove circlip for tapered roller bearing inner race on clutch housing end.
- Insert thrust piece -VW 431- in output shaft and place thrust plate -40-105- on it.



Pressing on tapered roller bearing inner race on gearbox housing end

- Determine thickness of required circlip ⇒ [page 141](#) and install circlip.



Determining thickness of circlip

- Determine the thickest circlip that will just fit and install it.

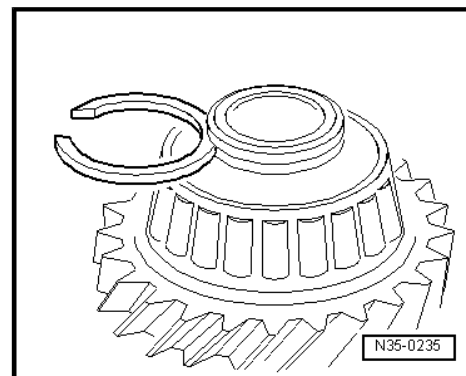


Note

Select circlips from ⇒ *Electronic parts catalogue*.

The following circlips are available:

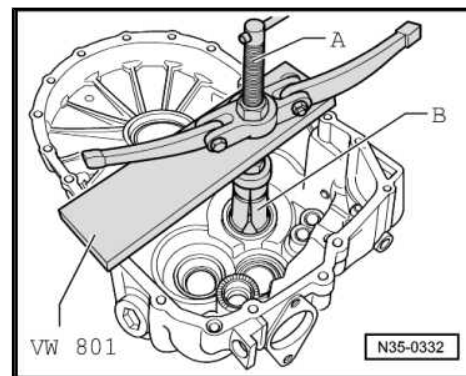
Thickness (mm)			
1.79	1.83	1.86	1.89
1.92	1.95	1.98	



Pulling tapered roller bearing outer race out of gearbox housing

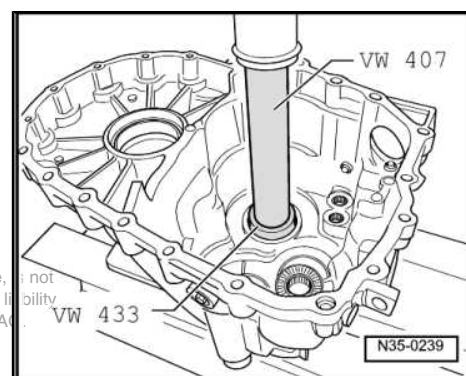
A - Counter-support, e.g. -Kukko 22/2-

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



Pressing tapered roller bearing outer race into gearbox housing

- Fit shim below outer race.
- Support gearbox housing with thrust piece -2050- directly below bearing mounting.



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2.2.1 Dismantling output shaft for 1st - 4th gear



Note

Pulling off tapered roller bearing inner race on clutch housing end
⇒ [page 140](#)

Pulling off 3rd and 4th gear synchro-hub/locking collar with 4th speed selector gear

– First remove circlip.

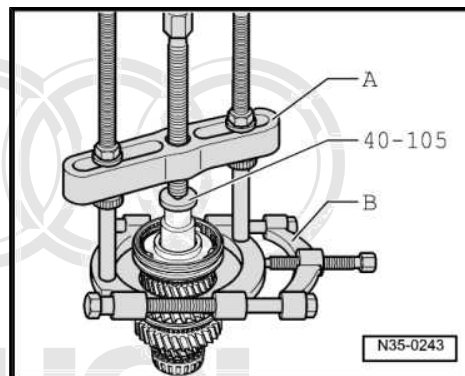
A - Puller , e.g. -Kukko 18/2-

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

– Remove thrust washers for 1st and 4th gear
⇒ [Item 19 \(page 133\)](#) and ⇒ [Item 20 \(page 134\)](#) .

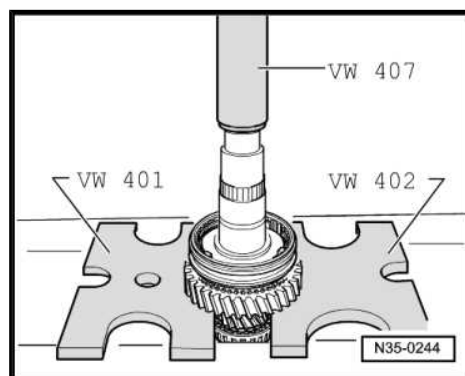
– Detach 1st speed selector gear ⇒ [Item 18 \(page 133\)](#) .

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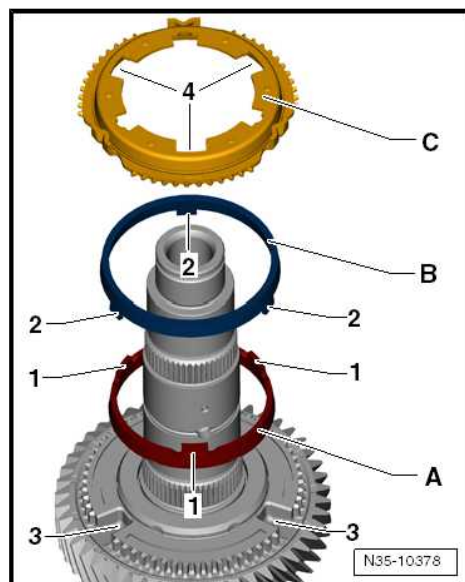
Pressing off 1st and 2nd gear locking collar and synchro-hub

After removing the circlip, press off 2nd speed selector gear and locking collar/synchro-hub together.



Synchromesh for 1st/2nd gear and 3rd gear

Synchro-ring -C-, outer ring -B- and inner ring -A- made of steel.

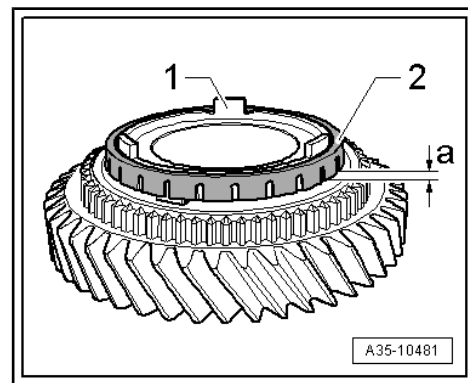


2.2.2 Assembling output shaft for 1st - 4th gear

Checking wear on inner friction surface of 1st and 2nd gear outer ring

- Place inner ring -1- onto cone of selector gear.
- Press outer ring -2- against cone of inner ring. Measure gap -a- with feeler gauge at 3 points spaced 120° apart.
- Note down mean value.

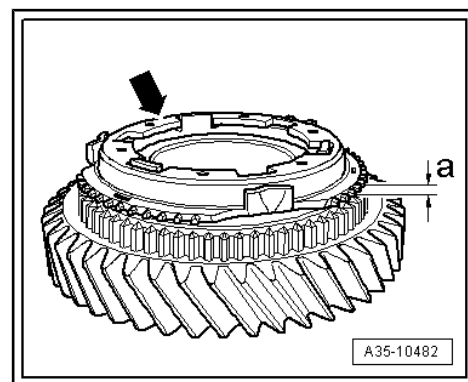
Wear limit: dimension -a-	
1st and 2nd gear	0.4 mm



Checking wear on outer friction surface of 1st gear and 2nd gear outer ring

- Check inner friction surface of synchro-ring -arrow- for grooves or radial scoring and renew if necessary.
- Place inner ring, outer ring and synchro-ring onto cone of selector gear.
- Press down and simultaneously rotate synchro-ring with outer ring to achieve proper seating.
- Measure gap -a- with feeler gauge at 3 points spaced 120° apart.
- Note down mean value.

Wear limit: dimension -a-	
1st and 2nd gear	0.8 mm



- Install 2nd speed selector gear with needle bearing.

Installing outer ring, inner ring and synchro-ring of 2nd gear

- Place inner ring -A- on selector gear.

Lugs -1- face away from selector gear.

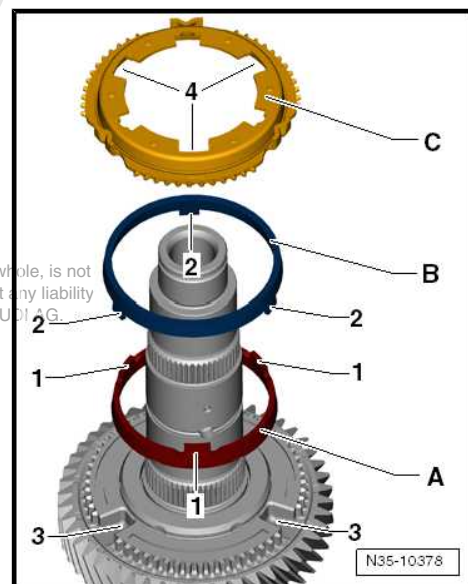
- Fit outer ring -B-.

Lugs -2- engage in slots -3- in selector gear.

- Fit synchro-ring -C-.

Larger recesses -4- engage on lugs -1- on inner ring -A-.

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Dismantling and assembling 1st/2nd gear and 3rd/4th gear locking collar/synchro-hub

- 1 - Spring
 - 2 - Locking piece
 - 3 - Locking collar
 - 4 - Synchro-hub
- Slide locking collar over synchro-hub.

On 3rd and 4th gear the wider collar of the synchro-hub and the shoulder on the locking collar face in the same direction.

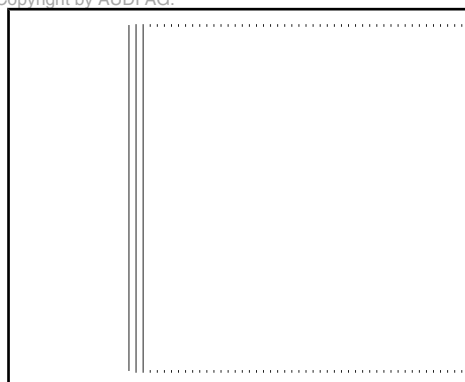
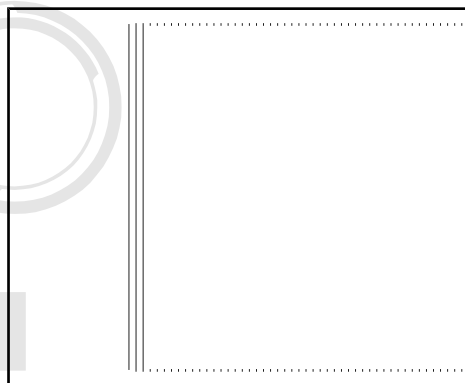
Recesses for locking pieces in synchro-hub and locking collar must align.

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Assembling 1st/2nd gear and 3rd/4th gear locking collar/synchro-hub

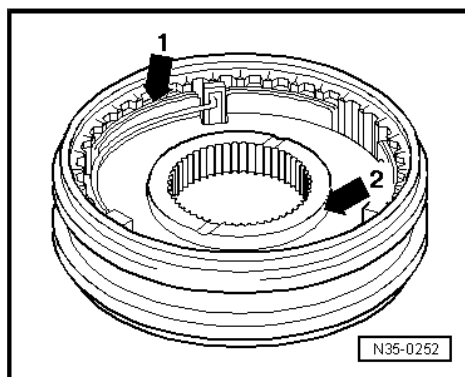
Locking collar is pushed over synchro-hub.

- Insert locking pieces and install springs offset at 120°. Angled end of spring must locate in hollow locking piece.



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

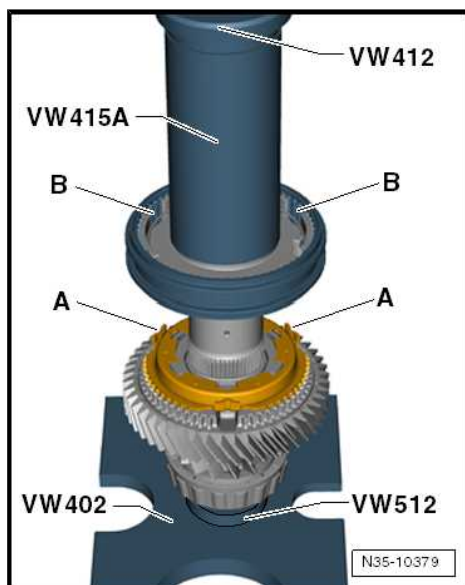
Identification groove -arrow 1- and narrow shoulder -arrow 2- on synchro-hub point towards 1st gear.



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

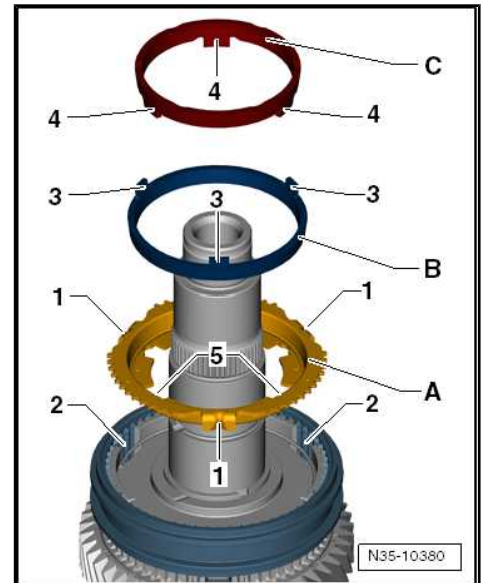
Lugs -A- on synchro-ring engage in recesses -B- in synchro-hub.

- Fit circlip.



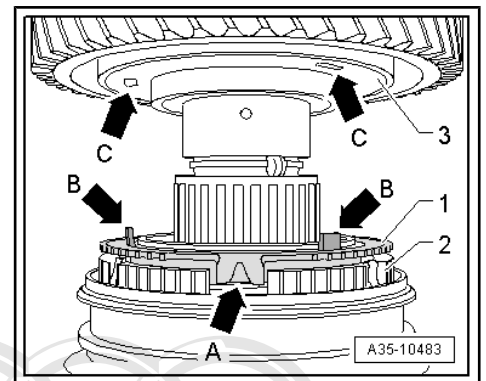
Installing synchro-ring, outer ring and inner ring for 1st gear

- Fit synchro-ring -A- in synchro-hub.
- Lugs -1- engage in slots -2- in synchro-hub.
- Fit outer ring -B- in synchro-ring.
- Lugs -3- face away from synchro-ring.
- Fit inner ring -C- in outer ring.
- Lugs -4- engage in larger recesses -5- on synchro-ring -A-.



Installing 1st speed selector gear with needle bearing

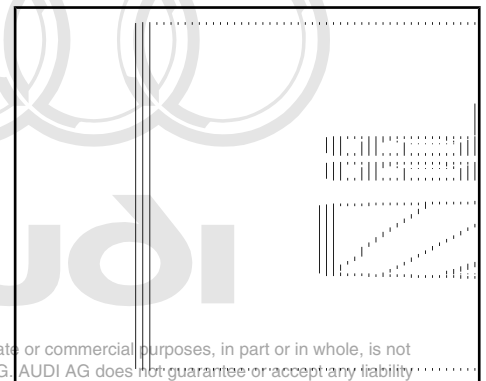
- Lugs -arrow A- on synchro-ring -1- are located in recesses in synchro-hub -2-.
- Lugs -arrows B- on outer ring engage in recesses -arrows C- in selector gear -3-.
- Install thrust washers for 1st and 4th gear
⇒ [Item 19 \(page 133\)](#) and ⇒ [Item 20 \(page 134\)](#) .
- Install 4th speed selector gear with needle bearing.



Checking 4th gear synchro-ring for wear

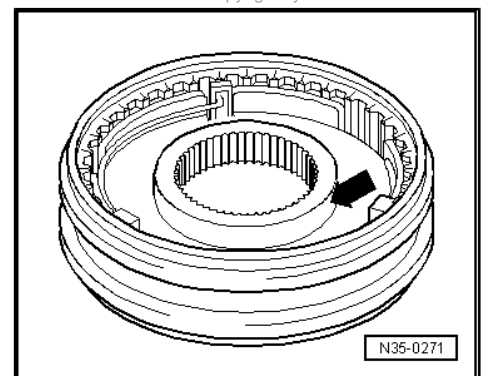
- Press synchro-ring onto cone of selector gear and measure gap dimension -a- with feeler gauge.

Gap -a-	Installation depth	Wear limit
4th gear	1.0 ... 1.7 mm	0.5 mm



Installation position of 3rd and 4th gear locking collar/synchro-hub

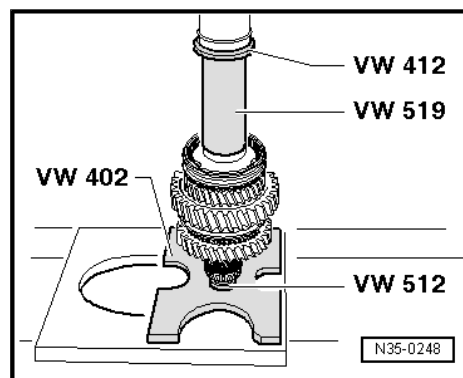
The wider shoulder on the synchro-hub -arrow- faces towards 3rd gear.



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Pressing on 3rd and 4th gear synchro-hub with locking collar

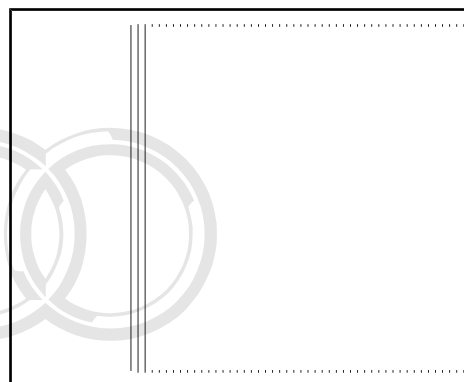
- Turn synchro-ring so that grooves align with locking pieces.
- Fit circlip.



Checking inner ring for 3rd gear 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 gear	0.75 ... 1.25 mm	0.3 mm

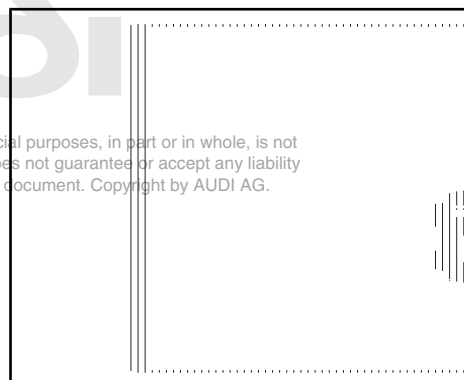


Checking 3rd gear synchro-ring for wear

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

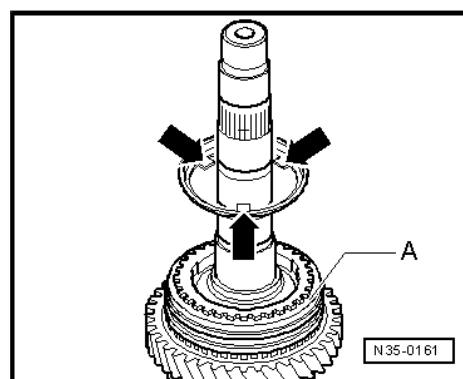
Gap -a-	Installation depth	Wear limit
3rd gear	1.2 ... 1.8 mm	0.5 mm

- Fit synchro-ring for 3rd gear on synchro-hub/locking collar for 3rd and 4th gear



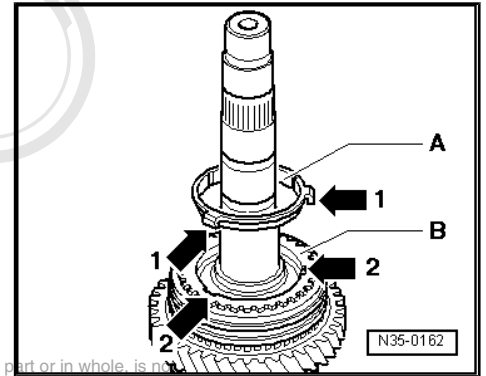
Installation position of outer ring for 3rd gear

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 recesses -arrows 2- in synchro-ring -B-.



Installation position of 3rd speed selector gear

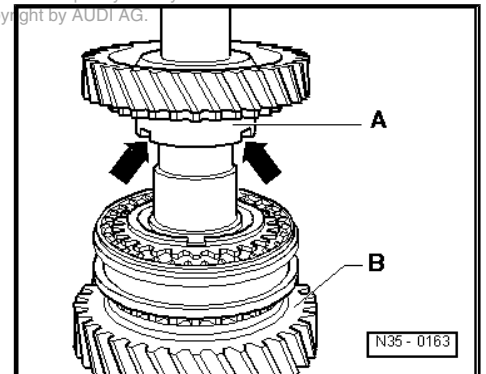
The higher shoulder -A- faces towards 4th gear -B-. The recesses in the shoulder -arrows- engage on the lugs on the outer ring
⇒ [page 146](#) .

- Install 3rd speed selector gear with needle bearing.



Note

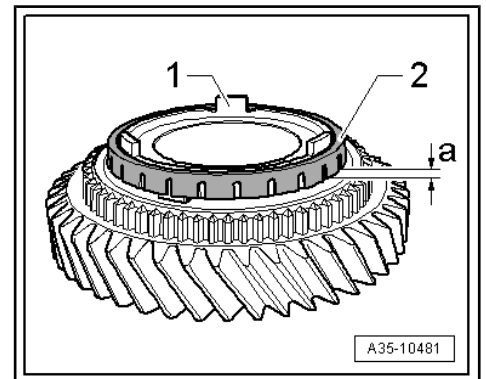
- ◆ Pressing on tapered roller bearing inner race ⇒ [page 141](#)
- ◆ Determining thickness of circlip for tapered roller bearing inner race ⇒ [page 141](#)



2.2.3 Assembling output shaft for 1st - 4th gear - from gearbox manufacturing date 25 05 0 onwards

Checking wear on inner friction surface of 1st, 2nd and 3rd gear outer ring

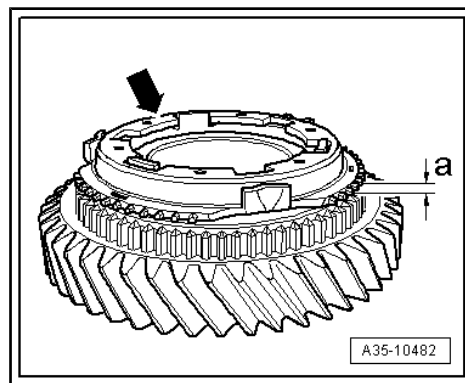
- Place inner ring -1- onto cone of selector gear.
- Press outer ring -2- against cone of inner ring. Measure gap -a- with feeler gauge at 3 points spaced 120° apart.
- Note down mean value.



Wear limit: dimension -a-	
1st, 2nd and 3rd gear	0.4 mm

Checking wear on outer friction surface of 1st, 2nd and 3rd gear outer ring

- Check inner friction surface of synchro-ring -arrow- for grooves or radial scoring and renew if necessary.
- Place inner ring, outer ring and synchro-ring onto cone of inner ring.
- Press down and simultaneously rotate synchro-ring with outer ring to achieve proper seating.
- Measure gap -a- with feeler gauge at 3 points spaced 120° apart.
- Note down mean value.

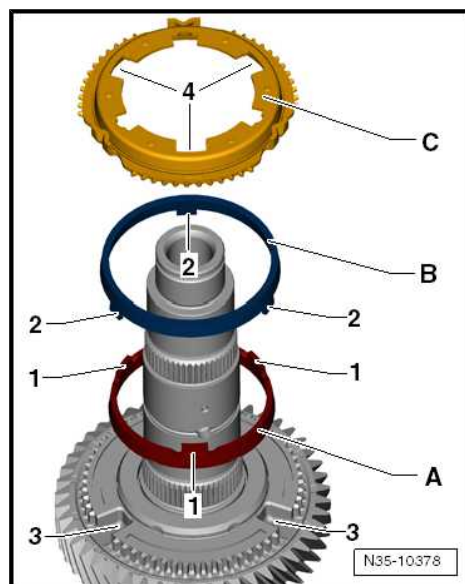


Wear limit: dimension -a-	
1st, 2nd and 3rd gear	0.8 mm

- Install 2nd speed selector gear with needle bearing.

Installing outer ring, inner ring and synchro-ring of 2nd gear

- Place inner ring -A- on selector gear.
- Lugs -1- face away from selector gear.
- Fit outer ring -B-.
- Lugs -2- engage in slots -3- in selector gear.
- Fit synchro-ring -C-.
- Larger recesses -4- engage on lugs -1- on inner ring -A-.



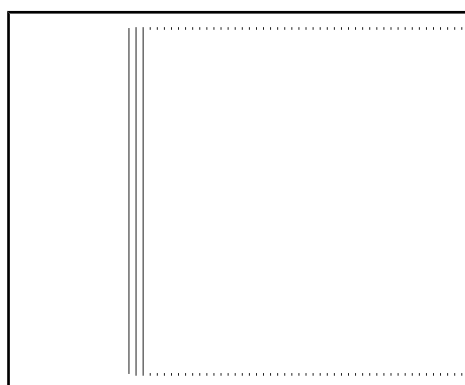
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Dismantling and assembling 1st/2nd gear and 3rd/4th gear locking collar/synchro-hub

- 1 - Spring
 - 2 - Locking piece
 - 3 - Locking collar
 - 4 - Synchro-hub
- Slide locking collar over synchro-hub.

On 3rd and 4th gear the wider collar of the synchro-hub and the shoulder on the locking collar face in the same direction.

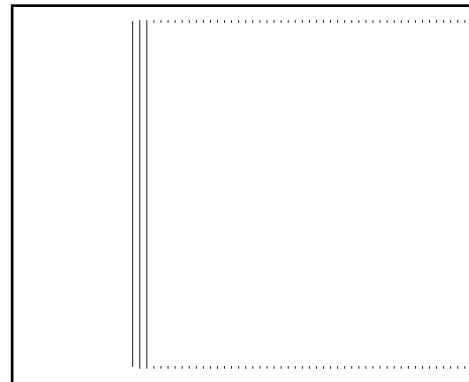
Recesses for locking pieces in synchro-hub and locking collar must align.



Assembling 1st/2nd gear and 3rd/4th gear locking collar/synchro-hub

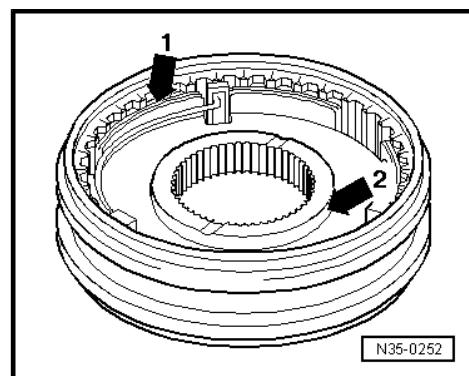
Locking collar is pushed over synchro-hub.

- Insert locking pieces and install springs offset at 120°. Angled end of spring must locate in hollow locking piece.



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

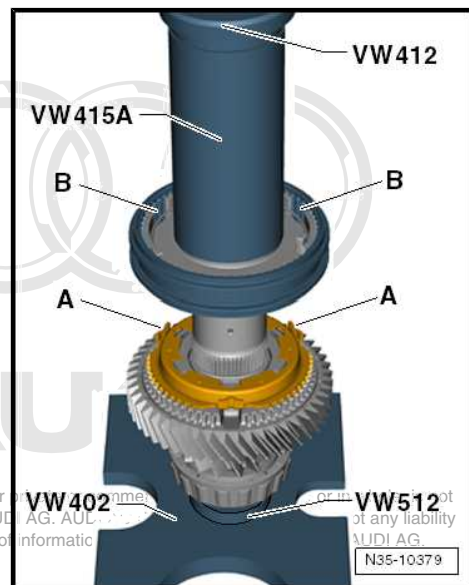
Identification groove -arrow 1- and narrow shoulder -arrow 2- on synchro-hub point towards 1st gear.



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

Lugs -A- on synchro-ring engage in recesses -B- in synchro-hub.

- Fit circlip.



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Installing synchro-ring, outer ring and inner ring for 1st gear

- Fit synchro-ring -A- in synchro-hub.

Lugs -1- engage in slots -2- in synchro-hub.

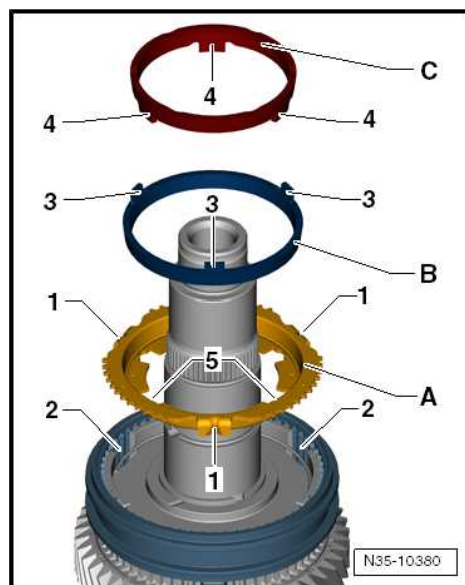
- Fit outer ring -B- in synchro-ring.

Lugs -3- face away from synchro-ring.

- Fit inner ring -C- in outer ring.

Lugs -4- engage in larger recesses -5- on synchro-ring -A-.

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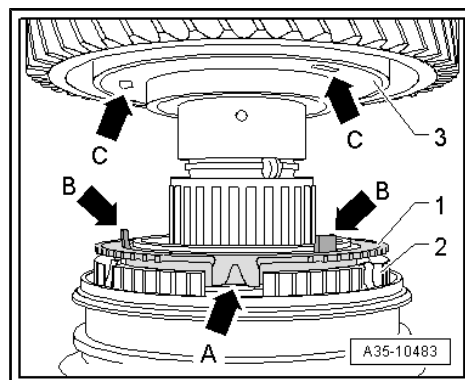


Installing 1st speed selector gear with needle bearing

- Lugs -arrow A- on synchro-ring -1- are located in recesses in synchro-hub -2-.

Lugs -arrows B- on outer ring engage in recesses -arrows C- in selector gear -3-.

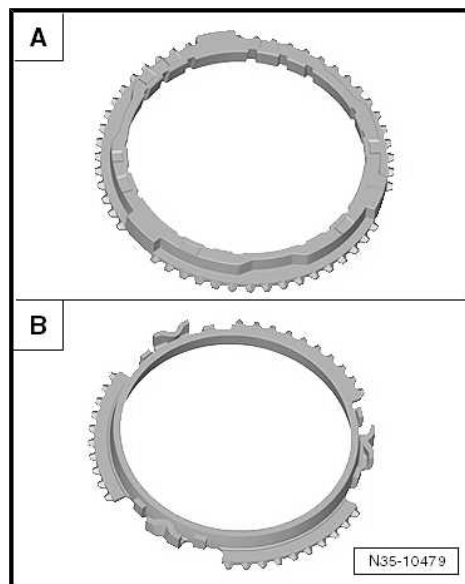
- Install thrust washers for 1st and 4th gear
⇒ [Item 19 \(page 133\)](#) and ⇒ [Item 20 \(page 134\)](#) .
- Install 4th speed selector gear with needle bearing.



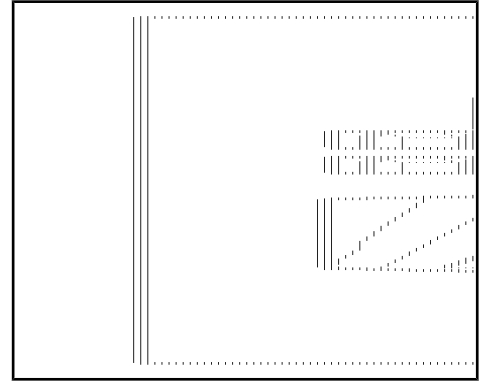
Checking 4th gear synchro-ring for wear

A = Brass synchro-ring		
Gap -a-	Installation depth	Wear limit
4th gear	1.0 ... 1.7 mm	0.5 mm

B = Sheet steel synchro-ring		
Gap -a-	Installation depth	Wear limit
4th gear	1.3 ... 2.4 mm	0.8 mm



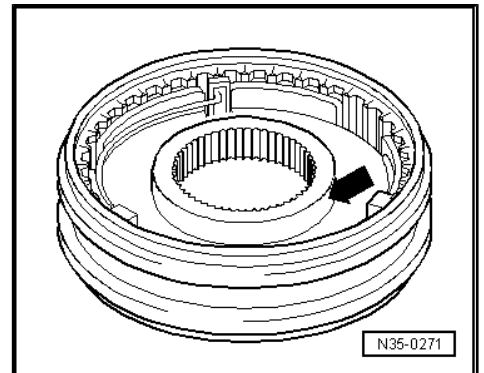
- Press synchro-ring onto cone of selector gear and measure gap dimension -a- with feeler gauge.



Installation position of 3rd and 4th gear locking collar/synchro-hub

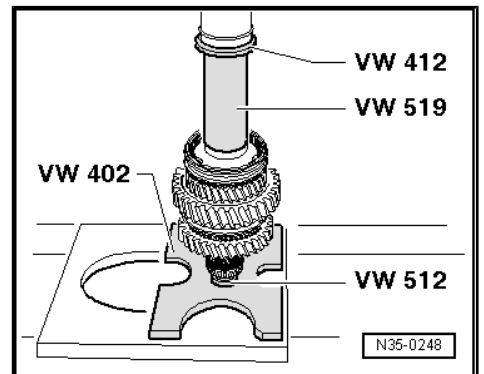
The wider shoulder on the synchro-hub -arrow- faces towards 3rd gear.

- Fit 4th gear synchro-ring on 4th speed selector gear.



Pressing on 3rd and 4th gear synchro-hub with locking collar

- Turn synchro-ring so that grooves align with locking pieces.
- Fit circlip.



Installing synchro-ring, outer ring and inner ring for 3rd gear

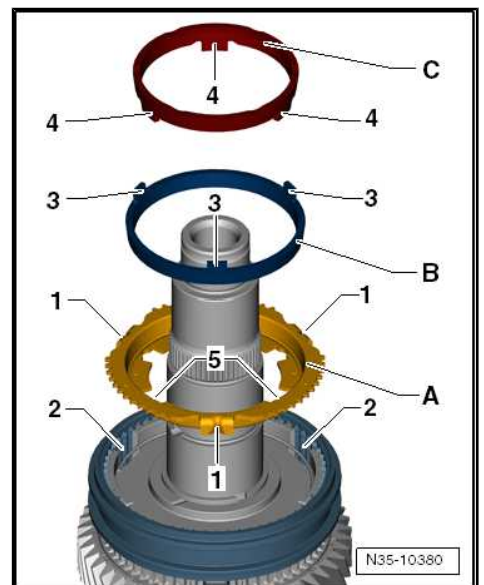
- Fit synchro-ring -A- in synchro-hub.
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- Lugs -1- engage in slots -2- in synchro-hub.

- Fit outer ring -B- in synchro-ring.

Lugs -3- face away from synchro-ring.

- Fit inner ring -C- in outer ring.

Lugs -4- engage in larger recesses -5- on synchro-ring -A-.



Installing 3rd speed selector gear with needle bearing

- Lugs -arrow A- on synchro-ring -1- are located in recesses in synchro-hub -2-.

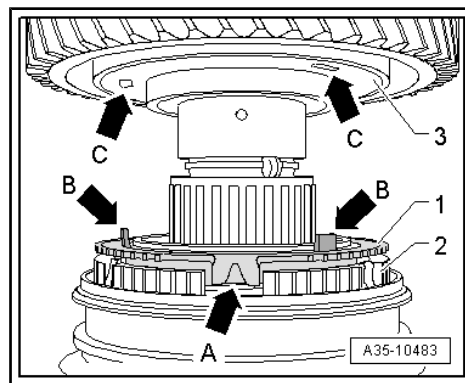
Lugs -arrows B- on outer ring engage in recesses -arrows C- in selector gear -3-.

- Install 3rd speed selector gear with needle bearing.



Note

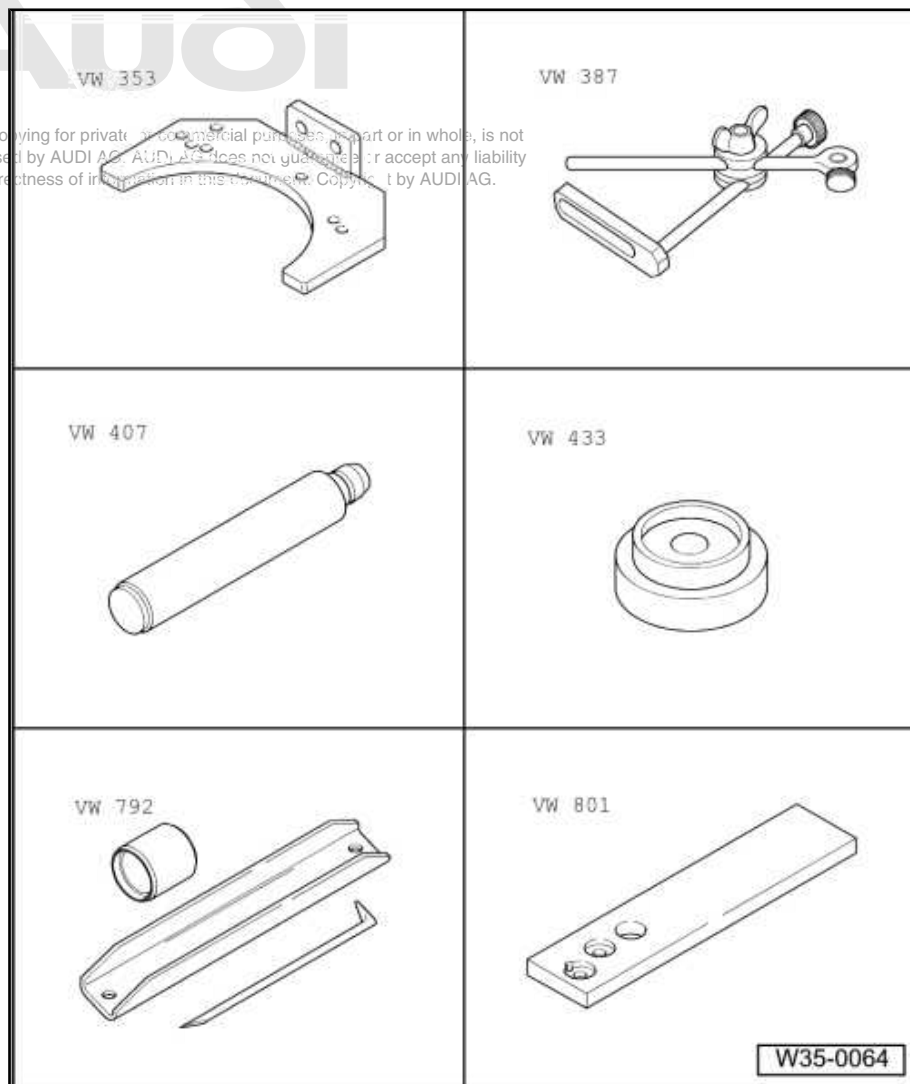
- ◆ Pressing on tapered roller bearing inner race ⇒ [page 141](#)
- ◆ Determining thickness of circlip for tapered roller bearing inner race ⇒ [page 141](#)



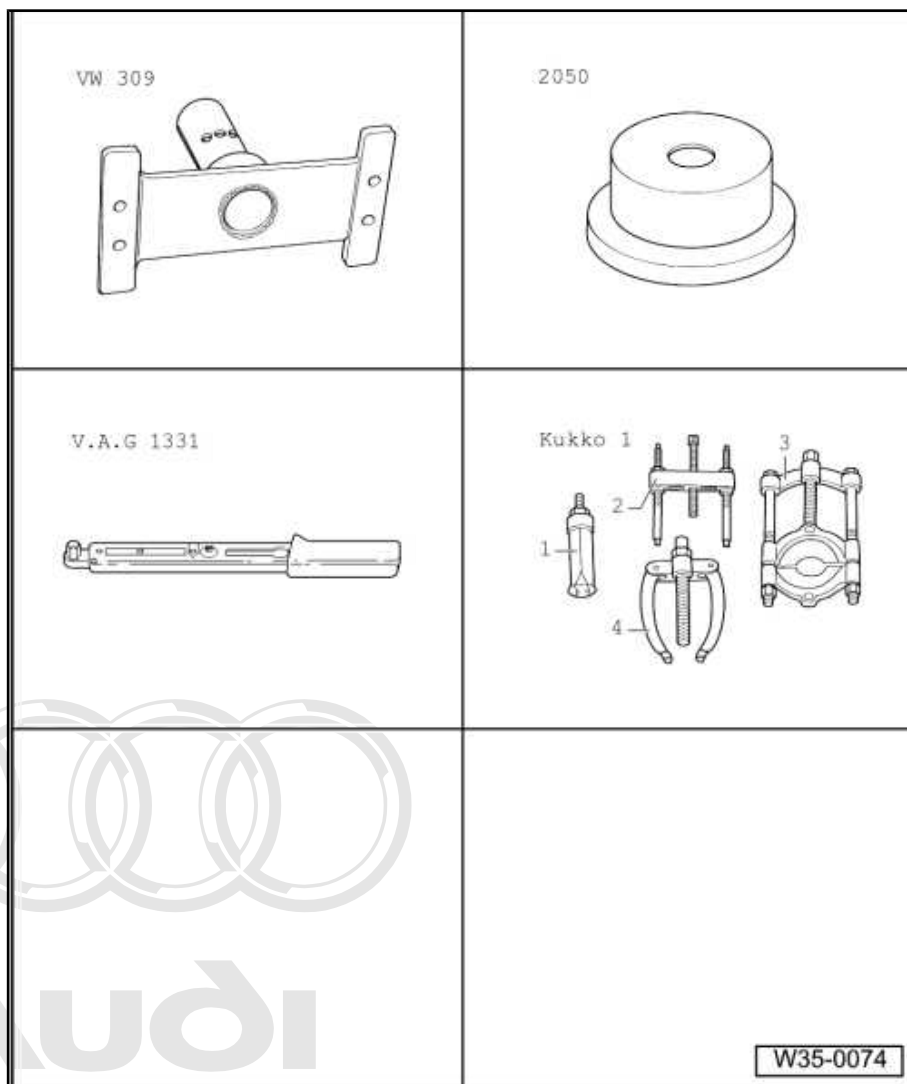
2.3 Adjusting output shaft for 1st - 4th gear

Special tools and workshop equipment required

- ◆ Gearbox support -VW 353-
- ◆ Universal dial gauge bracket -VW 387-
- ◆ Press tool -VW 407-
- ◆ Press tool -VW 433-
- ◆ Assembly device -VW 792-
- ◆ Support plate -VW 801-



- ◆ Support plate -VW 309-
- ◆ Thrust piece -2050-
- ◆ Torque wrench -V.A.G 1331-
- ◆ Internal puller -1 - Kukko 21/7-
- ◆ Counter-support -4 - Kukko 22/2-



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(Determining thickness of output shaft shim)

The output shaft must be re-adjusted when the following components are renewed:

- ◆ Gearbox housing
- ◆ Clutch housing
- ◆ Output shaft for 1st - 4th gear, or
- ◆ Tapered roller bearings for output shaft

Table of adjustments ⇒ [page 180](#)

Requirements:

- Sealing surfaces of clutch and gearbox housings must be free of sealant.
- When taking measurements, install only the output shaft that is to be measured.

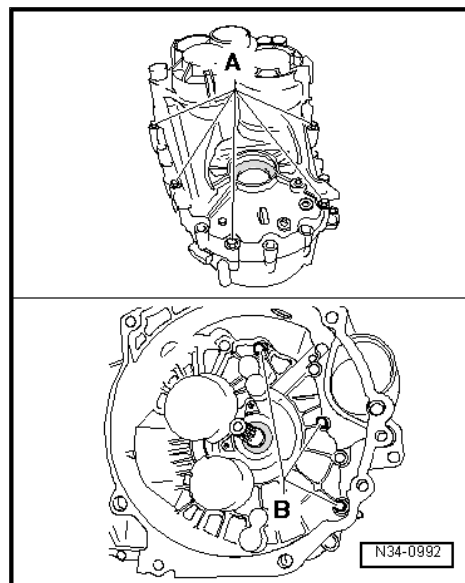
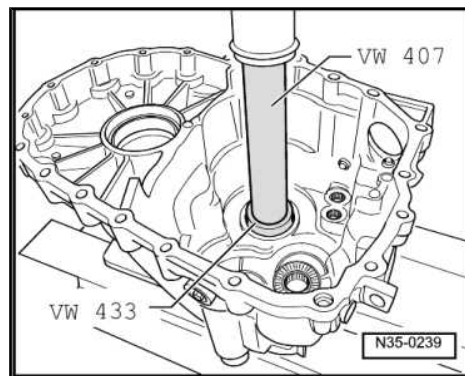
- Press tapered roller bearing outer race with shim (thickness 1.70 mm) into gearbox housing. Support gearbox housing with thrust piece -2050- directly below bearing mounting.
- Fit complete 1st to 4th gear output shaft into clutch housing.



- Fit gearbox housing and tighten bolts -A- and -B- diagonally to correct torque.



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- Set up measuring tools and secure with bolt -arrow- to clutch housing.
- Set dial gauge (3 mm measuring range) to „0“ with 1 mm preload.
- Loosen clutch housing/gearbox housing securing bolts diagonally until output shaft is free to move in gearbox housing.
- Read off play on gauge and note reading (example: 0.14 mm).

 Note

- ◆ *If no reading is shown when clutch housing/gearbox housing securing bolts are loosened:*
- ◆ *Install 1.95 mm shim or, if necessary, 2.20 mm shim for measurement.*
- ◆ *Select correct shims from ⇒ Electronic parts catalogue .*

Determining thickness of shim

The specified bearing preload is obtained as follows:

The measured value (0.14 mm) is subtracted from the thickness of the shim previously installed (1.70 mm).

A constant preload value (0.20 mm) is added to the result.

Example:

Inserted shim	1.70 mm
– Measured value	0.14 mm
+ Preload (constant value)	0.20 mm
Thickness of shim	1.76 mm

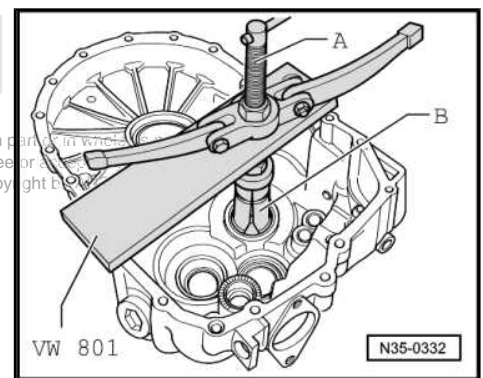
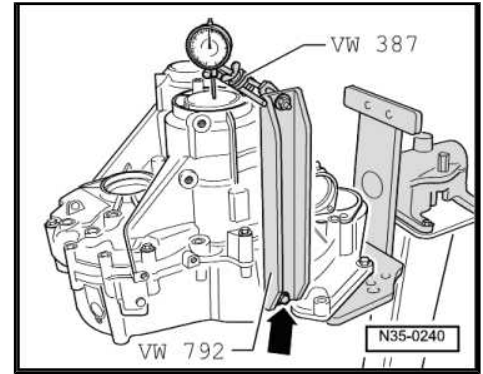
- Select shim of required thickness from table.
- Detach gearbox housing and pull tapered roller bearing outer race out of gearbox housing.
- A - Counter-support , e.g. -Kukko 22/2-
- B - Internal puller 46 ... 58 mm , e.g. -Kukko 21/7-
- Remove inserted shim (1.70 mm thick) from gearbox housing.

Table of shims

	Thickness (mm)	
1.45	1.75	2.05
1.50	1.80	2.10
1.55	1.85	2.15
1.60	1.90	2.20
1.65	1.95	2.25
1.70	2.00	

Tolerance variations make it possible to obtain the exact shim thickness required.

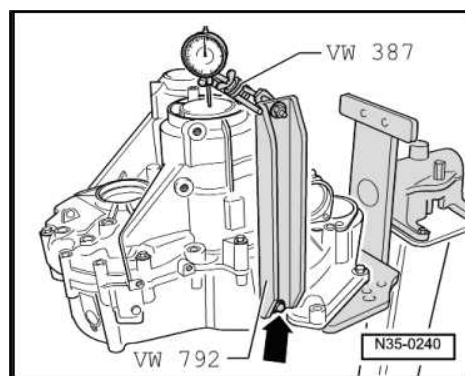
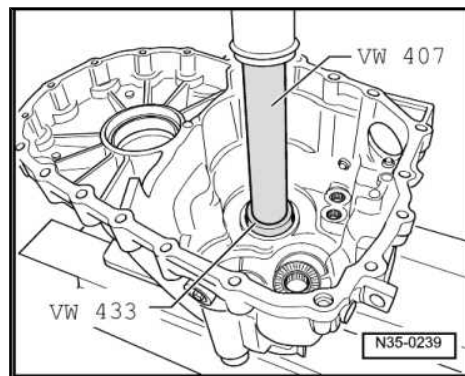
- Determine part number of shim from ⇒ Electronic parts catalogue .



- Press in tapered roller bearing outer race together with the correct shim (in example 1.75 mm). Support gearbox housing with thrust piece -2050- directly below bearing mounting.

Checking adjustment

- Required shim installed (thickness as determined above)
- Set up measuring tools and secure with bolt -arrow- to clutch housing.
- Set dial gauge (3 mm measuring range) to „0“ with 1 mm pre-load.
- Loosen clutch housing/gearbox housing securing bolts diagonally until output shaft is free to move in gearbox housing.
- If the correct shim has been selected, the dial gauge should now indicate a value between 0.15 and 0.25 mm.



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2.4 Exploded view - output shaft for 5th, 6th and reverse gear



Note

- ◆ Carry out output shaft adjustment ⇒ [page 168](#) if the output shaft or tapered roller bearings have been renewed.
- ◆ Always renew both tapered roller bearings together.

1 - Clutch housing

2 - Shim

- ☐ Always 0.65 mm thick

3 - Tapered roller bearing outer race

- ☐ Pulling out ⇒ [page 164](#)
- ☐ Pressing in ⇒ [page 164](#)

4 - Tapered roller bearing inner race

- ☐ Pulling off ⇒ [page 163](#)
- ☐ Pressing on ⇒ [page 163](#)

5 - Output shaft

- ☐ For 5th, 6th and reverse gears
- ☐ Adjusting ⇒ [page 168](#)

6 - Reverse gear synchro-hub

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

7 - Circlip

8 - Reverse gear locking collar

- ☐ With synchro-ring

9 - Needle bearing

- ☐ For reverse selector gear

10 - Reverse selector gear

11 - Sleeve

- ☐ Press off with reverse selector gear ⇒ [page 166](#)
- ☐ Installation position: Wide shoulder of sleeve faces towards reverse selector gear
- ☐ Pressing on ⇒ [page 167](#)

12 - Circlip

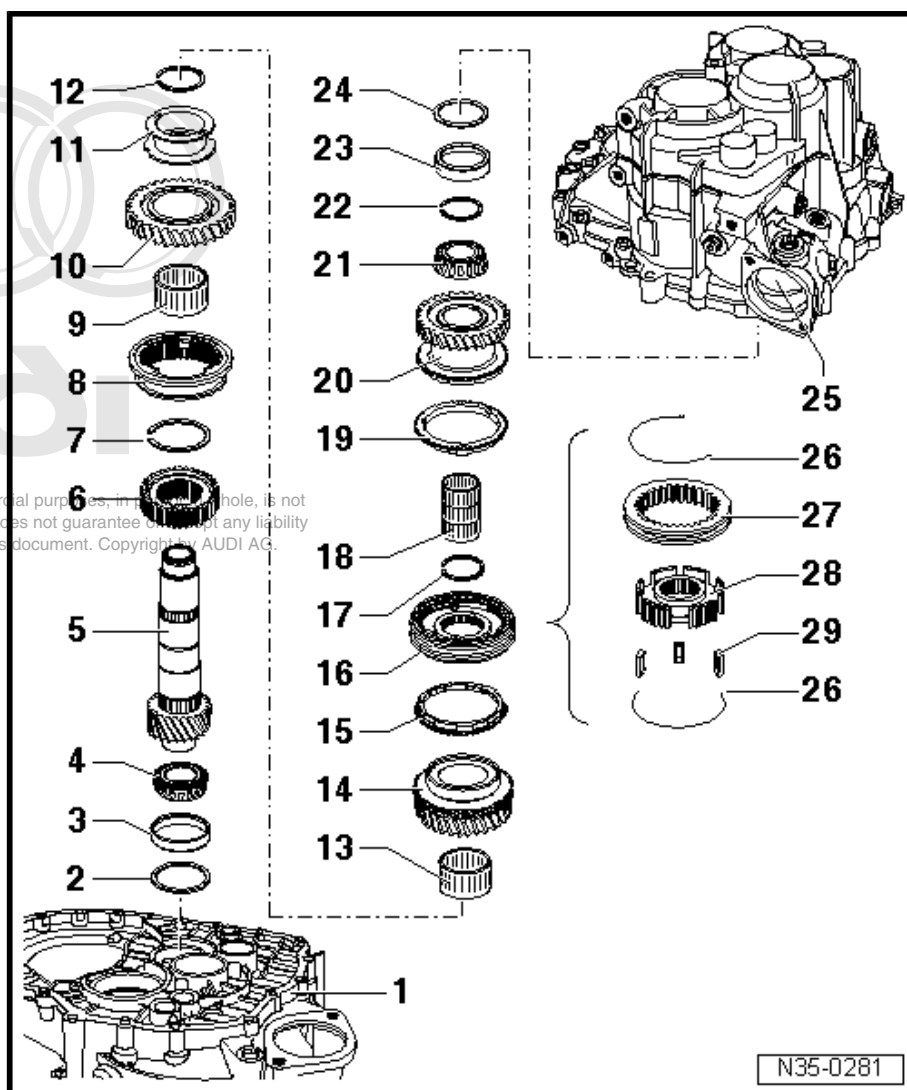
13 - Needle bearing

- ☐ For 6th gear

14 - 6th speed selector gear

15 - 6th gear synchro-ring

- ☐ Checking for wear ⇒ [page 167](#)



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

- ☐ Press off together with 6th speed selector gear after removing circlip ⇒ [Item 17 \(page 158\)](#) ⇒ [page 165](#)
- ☐ Dismantling ⇒ [page 167](#)
- ☐ Assembling locking collar/synchro-hub ⇒ [page 167](#) and ⇒ [page 167](#)
- ☐ Pressing on ⇒ [page 168](#)

17 - Circlip**18 - Needle bearing**

- ☐ For 5th gear

19 - 5th gear synchro-ring

- ☐ Checking for wear ⇒ [page 167](#)

20 - 5th speed selector gear**21 - Tapered roller bearing inner race**

- ☐ Pulling off ⇒ [page 164](#)
- ☐ Pressing on ⇒ [page 164](#)

22 - Circlip

- ☐ When tapered roller bearing ⇒ [Item 21 \(page 158\)](#) or output shaft ⇒ [Item 5 \(page 157\)](#) are renewed: determine thickness of required circlip ⇒ [page 165](#)

23 - Tapered roller bearing outer race

- ☐ Pulling out ⇒ [page 165](#)
- ☐ Pressing in ⇒ [page 165](#)

24 - Shim

- ☐ Determining thickness ⇒ [page 168](#)

25 - Gearbox housing**26 - Spring**

- ☐ Installation position ⇒ [page 167](#)

27 - Locking collar**28 - Synchro-hub****29 - Locking pieces (3x)**

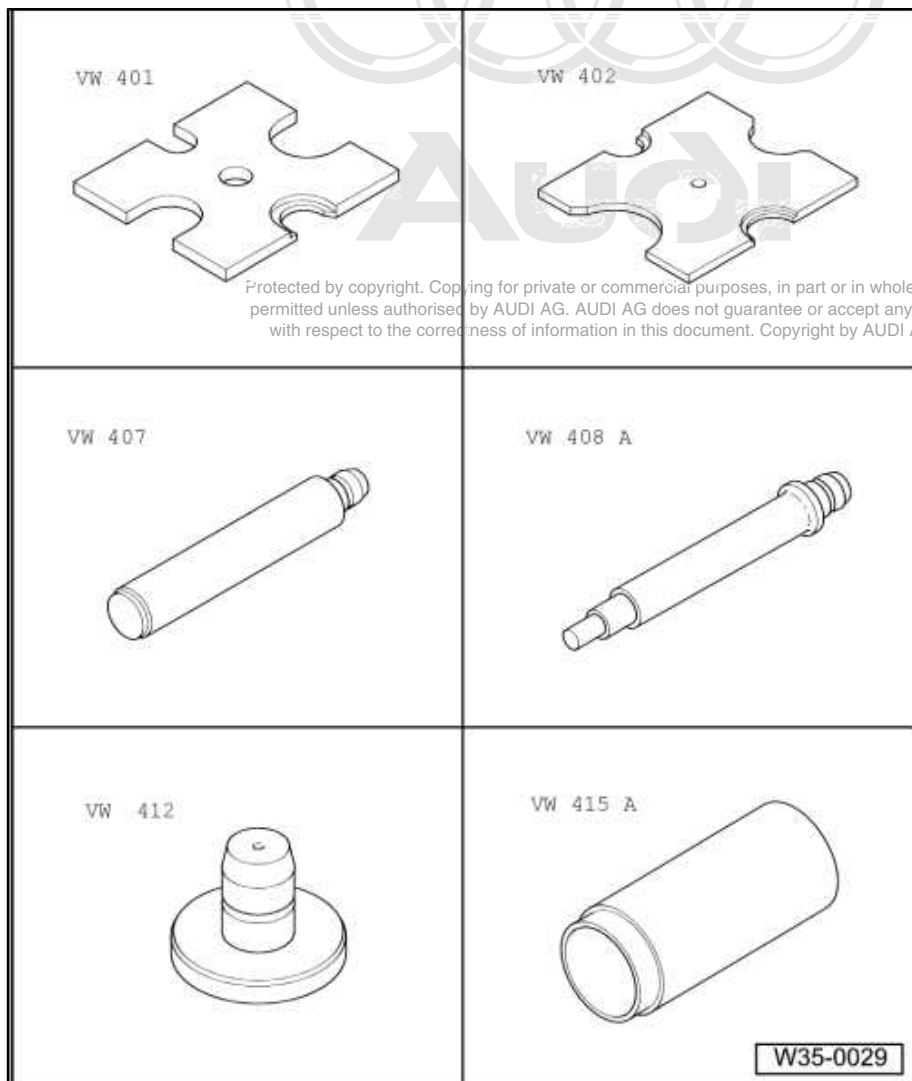
- ☐ Installation position ⇒ [page 167](#)

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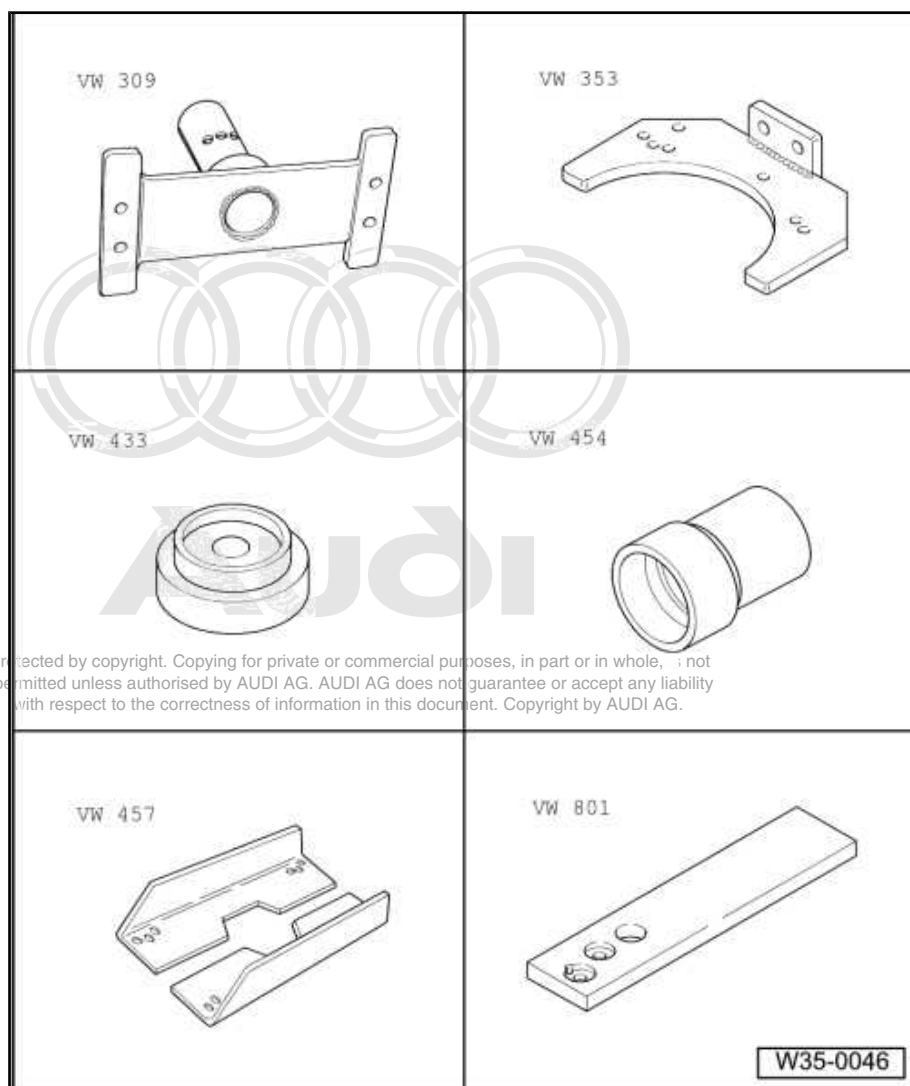
2.5 Dismantling and assembling output shaft for 5th, 6th and reverse gear

Special tools and workshop equipment required

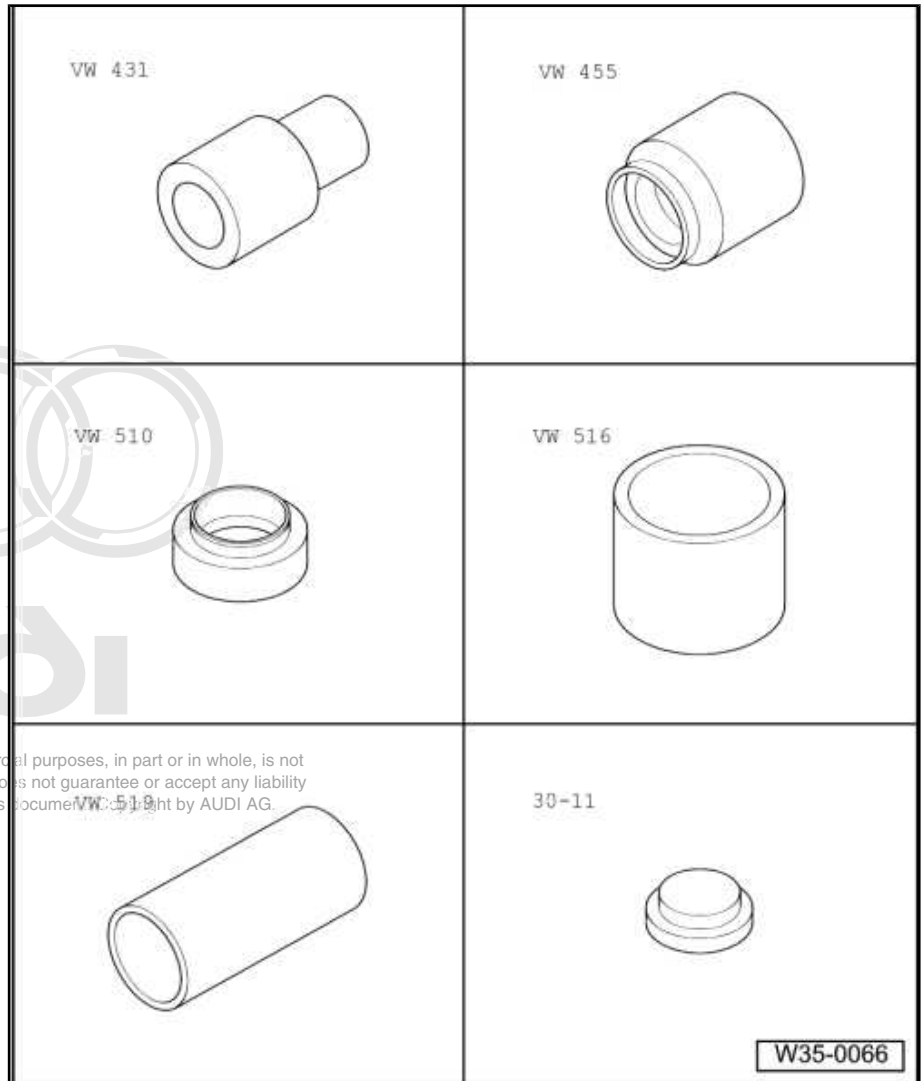
- ◆ Thrust plate -VW 401-
- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 407-
- ◆ Press tool -VW 408A-
- ◆ Press tool -VW 412-
- ◆ Tube -VW 415A-



- ◆ Support plate -VW 309-
- ◆ Gearbox support -VW 353-
- ◆ Press tool -VW 433-
- ◆ Press tool -VW 454-
- ◆ Support rails -VW 457-
- ◆ Support plate -VW 801-

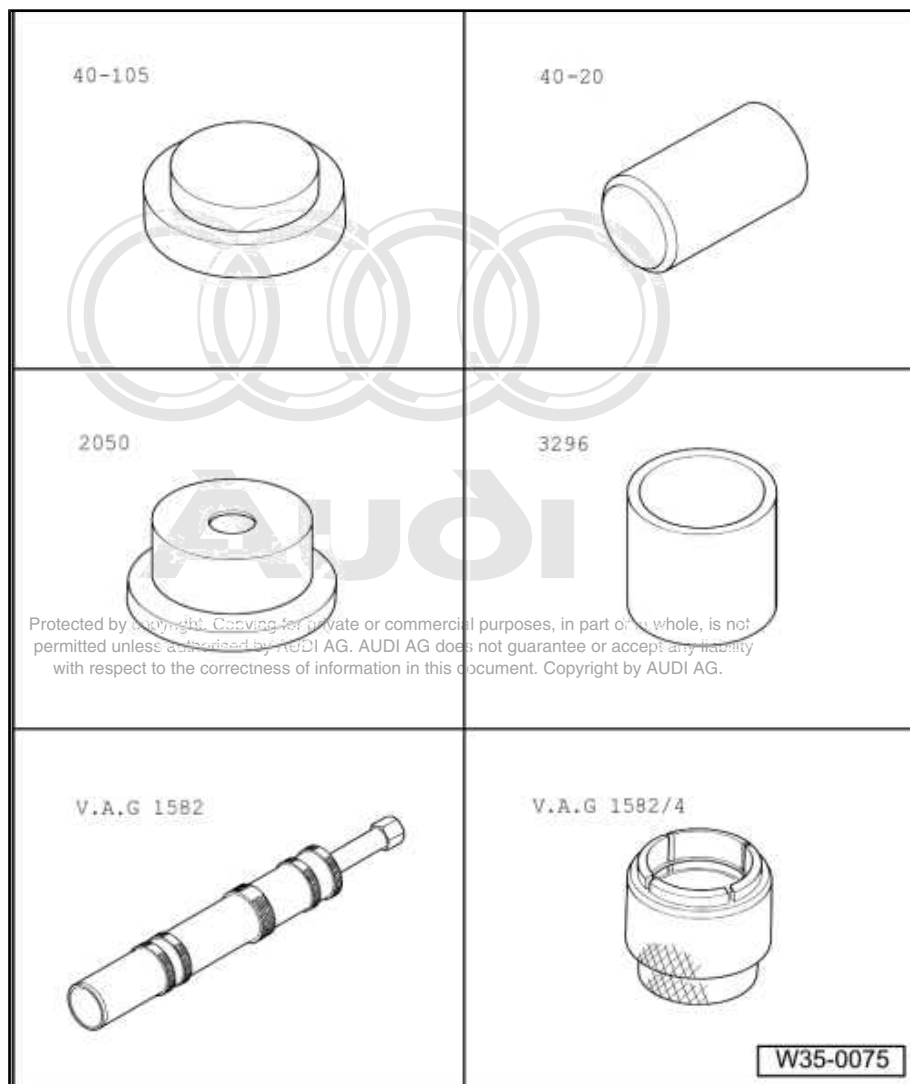


- ◆ Thrust piece -VW 431-
- ◆ Installing sleeve -VW 455-
- ◆ Thrust pad -VW 510-
- ◆ Tube -VW 516-
- ◆ Tube -VW 519-
- ◆ Thrust plate -30-11-

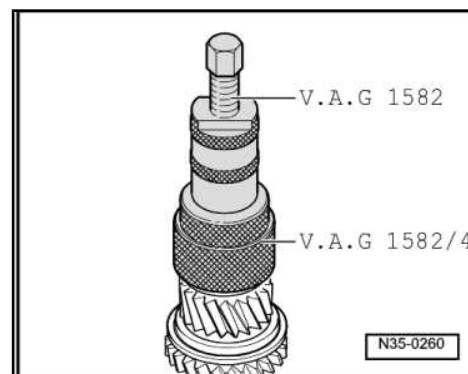
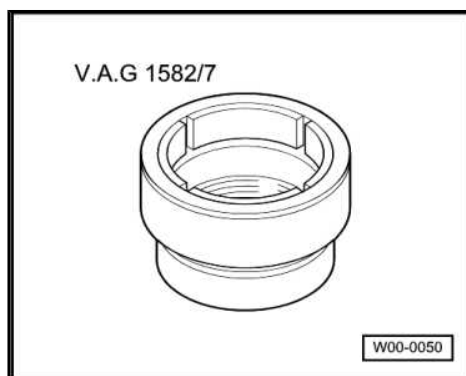


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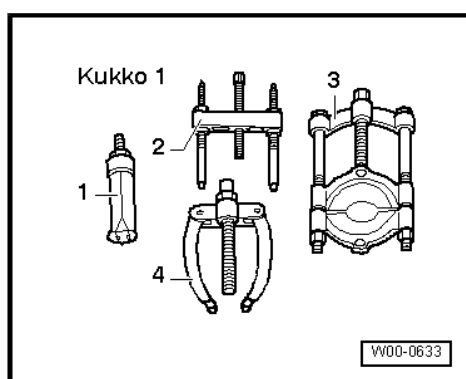
- ◆ Thrust plate -40-105-
- ◆ Drift sleeve -40-20-
- ◆ Thrust piece -2050-
- ◆ Tube -3296-
- ◆ Tapered roller bearing puller -V.A.G 1582-
- ◆ Adapter -V.A.G 1582/4-



- ◆ Adapter -V.A.G 1582/7-



- ◆ Internal puller -1 - Kukko 21/7-



- ◆ Splitter -3 - Kukko 17/2-

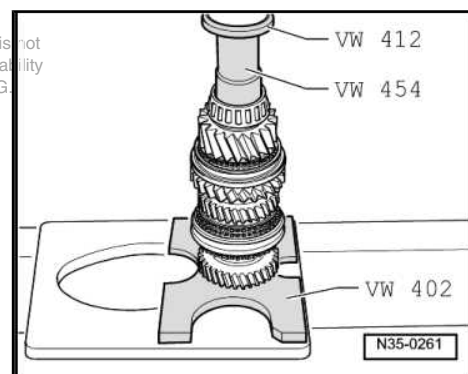
- ◆ Counter-support -4 - Kukko 22/2-

Pulling off tapered roller bearing inner race on clutch housing end

- Before applying puller, place thrust plate -30-11- on output shaft.

Pressing on tapered roller bearing inner race on clutch housing end

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Pulling tapered roller bearing outer race out of clutch housing

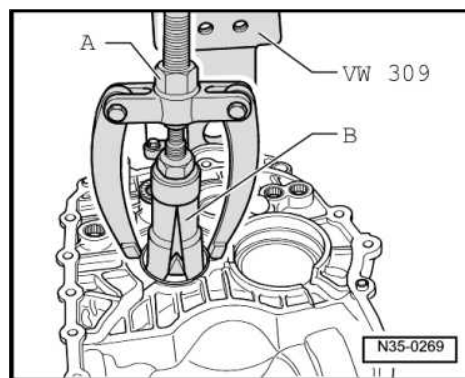
A - Counter-support , e.g. -Kukko 22/2-

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



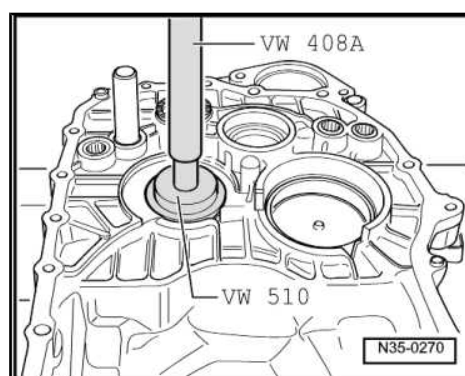
Note

After pulling out, check shim for damage and renew if necessary.



Pressing tapered roller bearing outer race into clutch housing

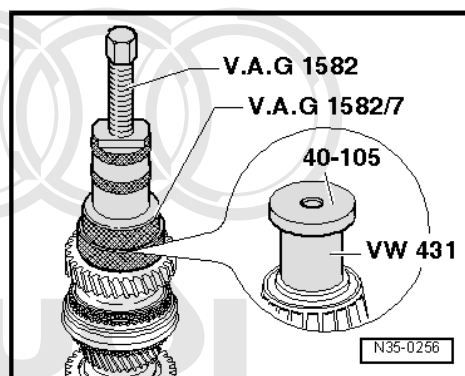
- Fit shim below outer race.
- Support clutch housing with drift sleeve -40-20- directly below bearing mounting.



Pulling off tapered roller bearing inner race on gearbox housing end

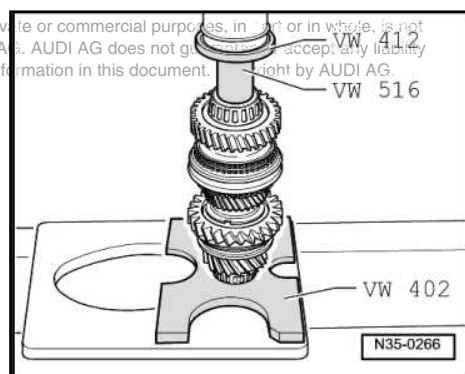
Before applying bearing puller :

- Remove circlip for tapered roller bearing inner race on gearbox housing end.
- Place thrust piece -VW 431- and thrust plate -40-105- on output shaft.



Pressing on tapered roller bearing inner race on gearbox housing end

- Determine thickness of required circlip ⇒ [page 165](#) and install circlip.



Determining thickness of circlip

- Determine the thickest circlip that will just fit and install it.
- Select circlip from table. For part number refer to ⇒ Electronic parts catalogue .

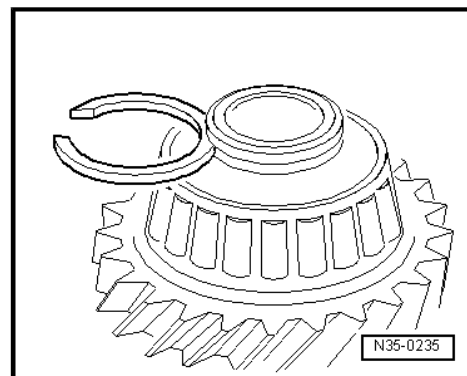
Circlips available

Thickness (mm)		
1.79	1.89	1.98
1.83	1.92	
1.86	1.95	

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-



Pressing tapered roller bearing outer race into gearbox housing

- Support gearbox housing with thrust piece -2050- directly below bearing mounting.

Dismantling output shaft

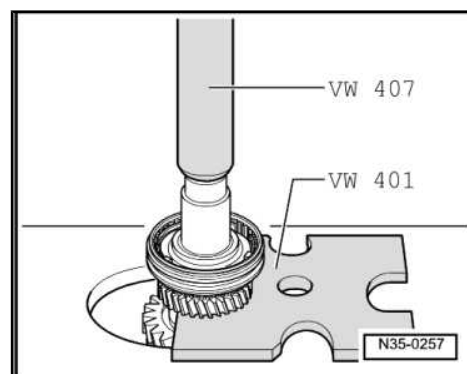
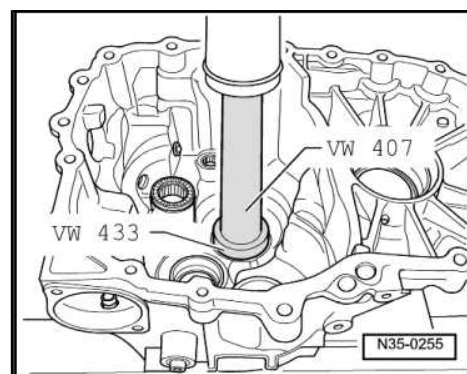
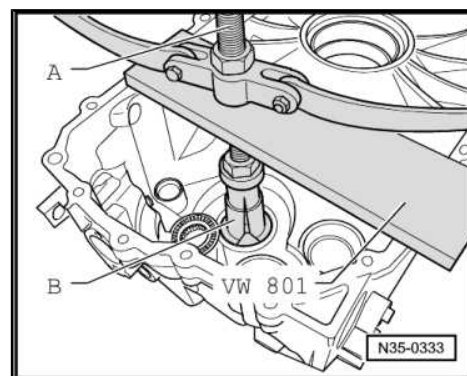


Note

Pulling off tapered roller bearing inner race on gearbox housing end ⇒ [page 164](#)

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

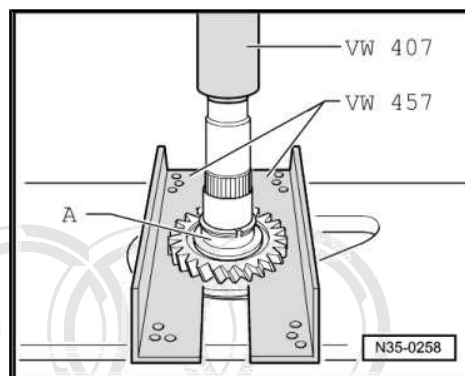
- First remove circlip.



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Pressing off sleeve -A- with reverse selector gear

- First remove circlip.

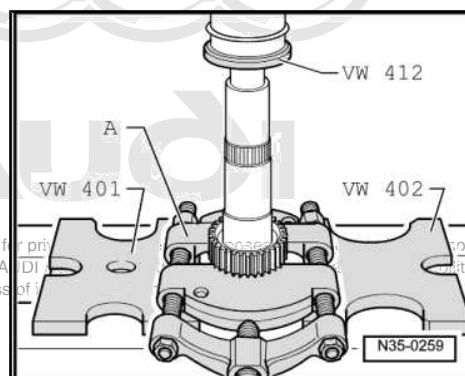


Pressing off reverse gear synchro-hub

- First remove circlip.

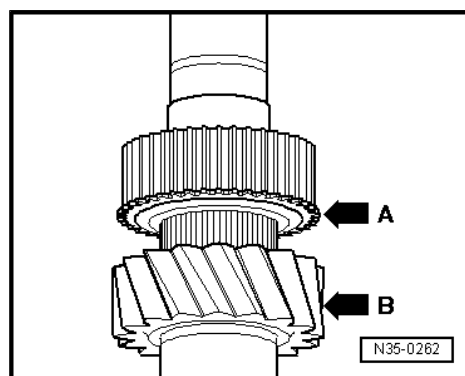
A - Splitter 22...115 mm , e.g. -Kukko 17/2-

Assembling output shaft



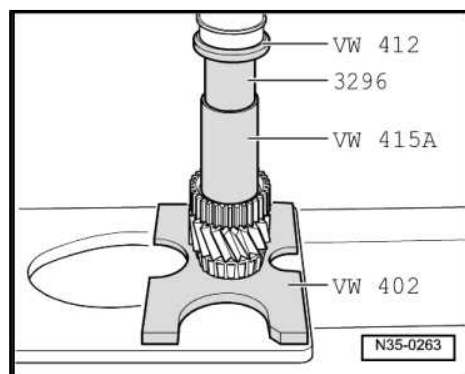
Installation position of reverse gear synchro-hub

Stop -arrow A- for reverse gear locking collar faces towards gear teeth on output shaft -arrow B-.



Pressing on reverse gear synchro-hub

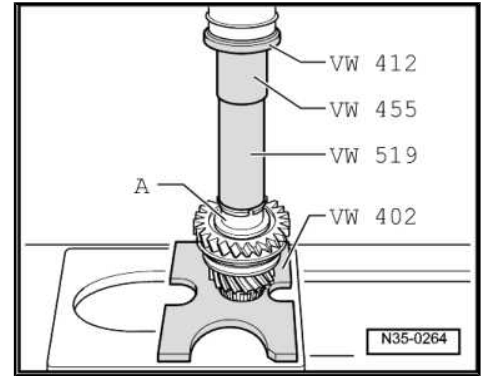
- Fit circlip.
- Fit reverse gear locking collar on reverse gear synchro-hub.
- Install reverse selector gear with needle bearing.



Pressing on sleeve -A-

Installation position: Wide shoulder faces towards reverse selector gear

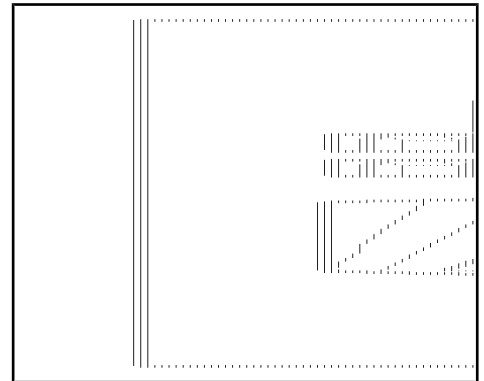
- Fit circlip.



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

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

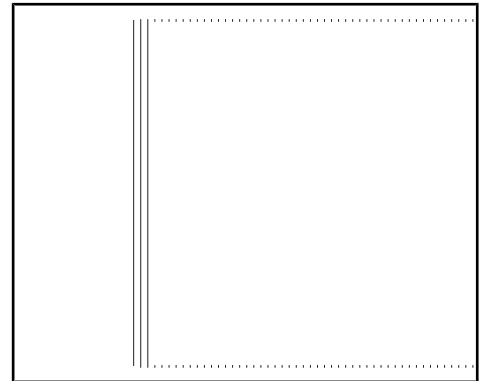
Gap -a-	Installation depth	Wear limit
5th and 6th gear	1.0 ... 1.7 mm	0.5 mm



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.

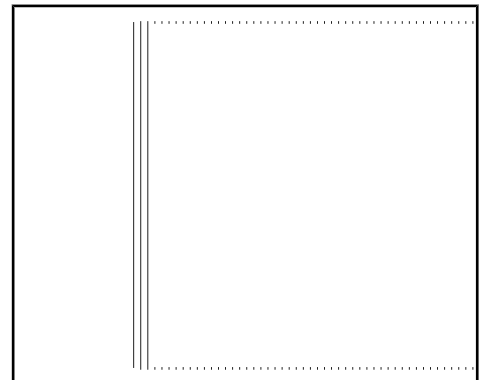
Recesses for locking pieces in synchro-hub and locking collar must align.



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.
- Install 6th speed selector gear with needle bearing.
- Fit 6th gear synchro-ring.

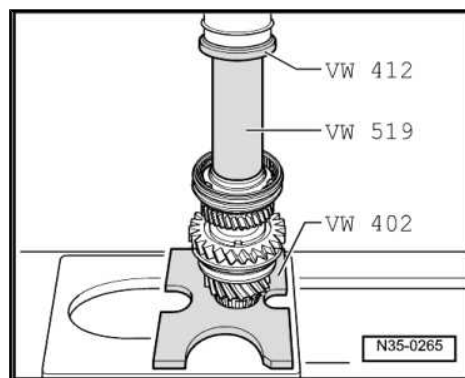


Pressing on 5th and 6th gear locking collar/synchro-hub

On some versions the outer diameter of the locking collar is chamfered.

Installation position: Chamfer on outer diameter of locking collar faces towards 5th speed selector gear.

- Turn synchro-ring so that grooves align with locking pieces.
- Fit circlip.
- Fit 5th gear synchro-ring.
- Install 5th speed selector gear with needle bearing.



Note

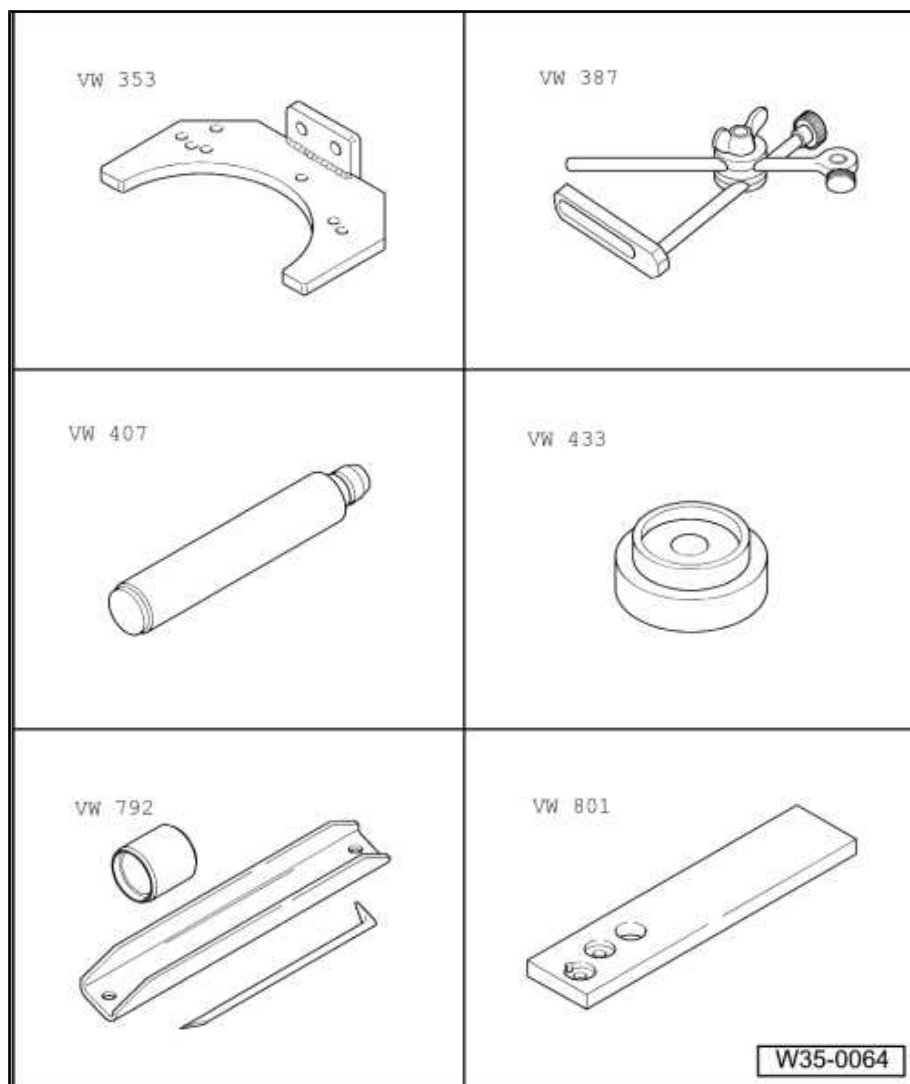
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- ◆ *Pressing on tapered roller bearing inner race on gearbox housing end ⇒ [page 164](#)*
- ◆ *Determining thickness of circlip for tapered roller bearing inner race ⇒ [page 165](#)*

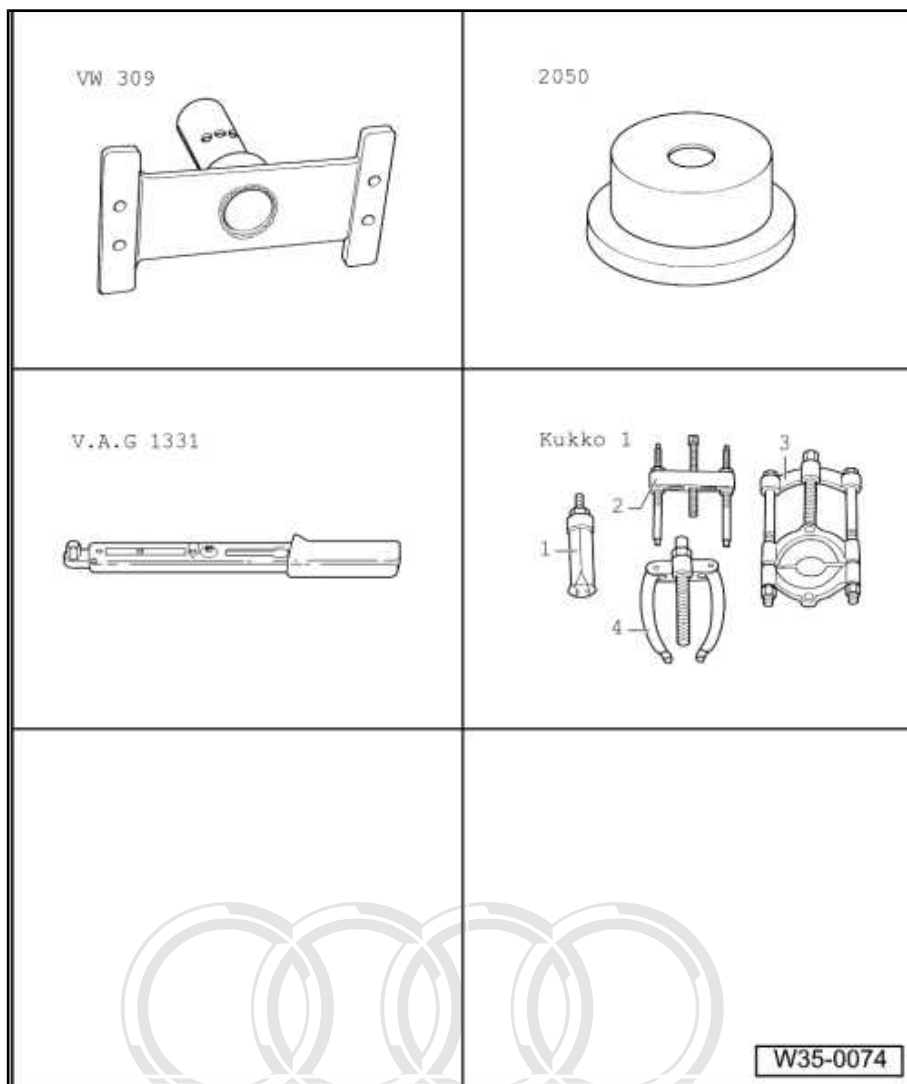
2.6 Adjusting output shaft for 5th, 6th and reverse gear

Special tools and workshop equipment required

- ◆ Gearbox support -VW 353-
- ◆ Universal dial gauge bracket -VW 387-
- ◆ Press tool -VW 407-
- ◆ Press tool -VW 433-
- ◆ Assembly device -VW 792-
- ◆ Support plate -VW 801-



- ◆ Support plate -VW 309-
- ◆ Thrust piece -2050-
- ◆ Torque wrench -V.A.G 1331-
- ◆ Internal puller - 1 - Kukko 21/7-
- ◆ Counter-support -4 - Kukko 22/2-



The output shaft must be re-adjusted when the following components are renewed:

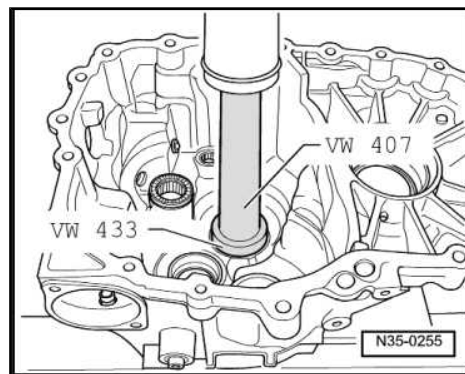
- ◆ Gearbox housing
- ◆ Clutch housing
- ◆ Output shaft for 5th, 6th and reverse gears, or
- ◆ Tapered roller bearings for output shaft

Table of adjustments ⇒ [page 180](#)

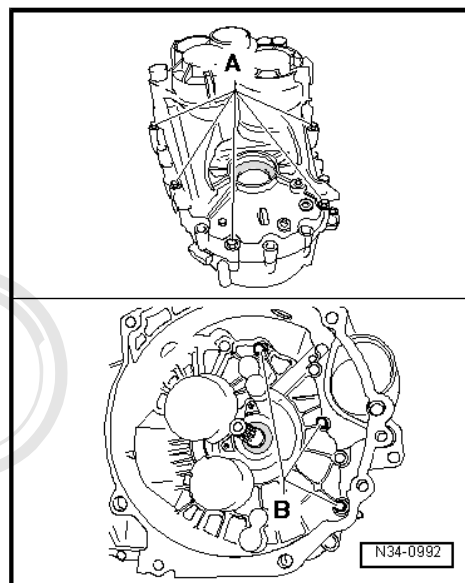
Requirements:

- Sealing surfaces of clutch and gearbox housings must be free of sealant.
- When taking measurements, install only the output shaft that is to be measured.

- Press tapered roller bearing outer race with shim (thickness 1.70 mm) into gearbox housing. Support gearbox housing with thrust piece -2050- directly below bearing mounting.
- Insert complete 5th, 6th and reverse gear output shaft in clutch housing.



- Fit gearbox housing and tighten bolts -A- and -B- diagonally to correct torque.
- Attach measuring equipment.



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- If parts of the housing protrude: Put washers of a total thickness of 8 mm on bolt -arrow- securing assembly device -VW 792- .
- Set dial gauge (3 mm measuring range) to „0“ with 1 mm preload.
- Loosen clutch housing/gearbox housing securing bolts diagonally until output shaft is free to move in gearbox housing.
- Read off play on gauge and note reading (example: 0.25 mm).



Note

- ◆ If no reading is shown when clutch housing/gearbox housing securing bolts are loosened:
- ◆ Install 1.95 mm shim or, if necessary, 2.20 mm shim for measurement.
- ◆ Select correct shims from ⇒ *Electronic parts catalogue* .

Determining thickness of shim

The specified bearing preload is obtained as follows:

The measured value (0.25 mm) is subtracted from the thickness of the shim previously installed (1.70 mm).

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A constant preload value (0.20 mm) is added to the result.

Example:

Inserted shim	1.70 mm
– Measured value	0.25 mm
+ Preload (constant value)	0.20 mm
Thickness of shim	1.65 mm

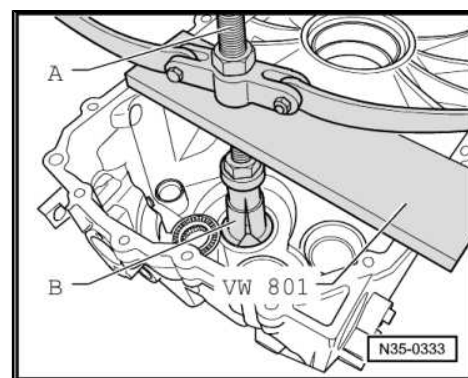
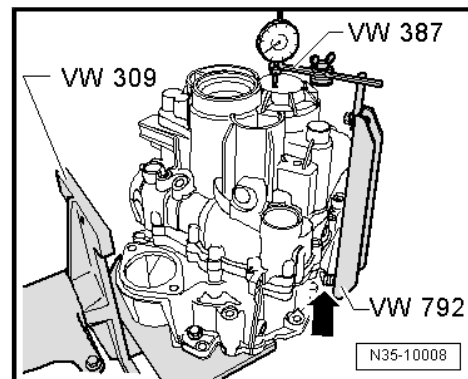
- Select shim of required thickness from table.
- Detach gearbox housing and pull tapered roller bearing outer race out of gearbox housing.
- A - Counter-support , e.g. -Kukko 22/2-
- B - Internal puller 46 ... 58 mm , e.g. -Kukko 21/7-
- Remove inserted shim (1.70 mm thick) from gearbox housing.

Table of shims

	Thickness (mm)	
1.50	1.80	2.10
1.55	1.85	2.15
1.60	1.90	2.20
1.65	1.95	2.25
1.70	2.00	
1.75	2.05	

- For part number refer to ⇒ *Electronic parts catalogue* .

Tolerance variations make it possible to obtain the exact shim thickness required.

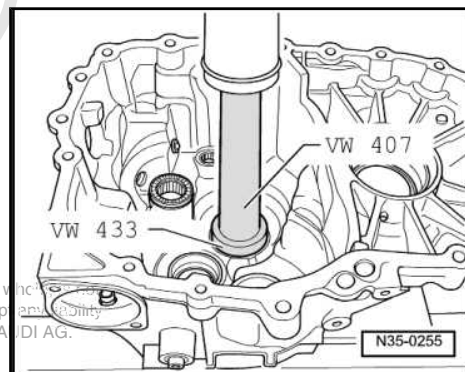


- Press in tapered roller bearing outer race together with the correct shim (in example 1.65 mm). Support gearbox housing with thrust piece -2050- directly below bearing mounting.

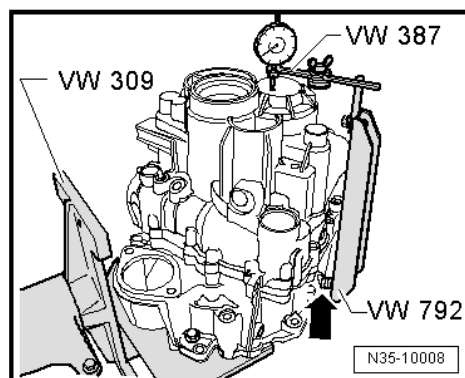
Checking adjustment

- Required shim installed (thickness as determined above)
- Attach measuring equipment.

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- If parts of the housing protrude: Put washers of a total thickness of 8 mm on bolt -arrow- securing assembly device -VW 792- .
- Set dial gauge (3 mm measuring range) to „0“ with 1 mm pre-load.
- Loosen clutch housing/gearbox housing securing bolts diagonally until output shaft is free to move in gearbox housing.
- If the correct shim has been selected, the dial gauge should now indicate a value between 0.15 and 0.25 mm.



39 – Final drive - differential

1 Exploded view - flange shaft and oil seals on gearbox

Overview

- ◆ ⇒ „1.1 Removing and installing flange shaft (left-side)“, page 173
- ◆ ⇒ „1.2 Renewing flange shaft oil seal (left-side)“, page 175
- ◆ ⇒ „1.3 Removing and installing flange shaft (right-side)“, page 177
- ◆ ⇒ „1.4 Renewing oil seal for flange shaft (right-side)“, page 178

1 - Oil seal

- ☐ Between bevel box and gearbox
- ☐ Renewing with manual gearbox installed
⇒ page 117

2 - Oil seal for selector shaft

- ☐ Renewing ⇒ page 117

3 - Gearbox selector lever

4 - Nut

- ☐ Tightening torque
⇒ Item 6 (page 50)

5 - Oil seal for flange shaft (left-side)

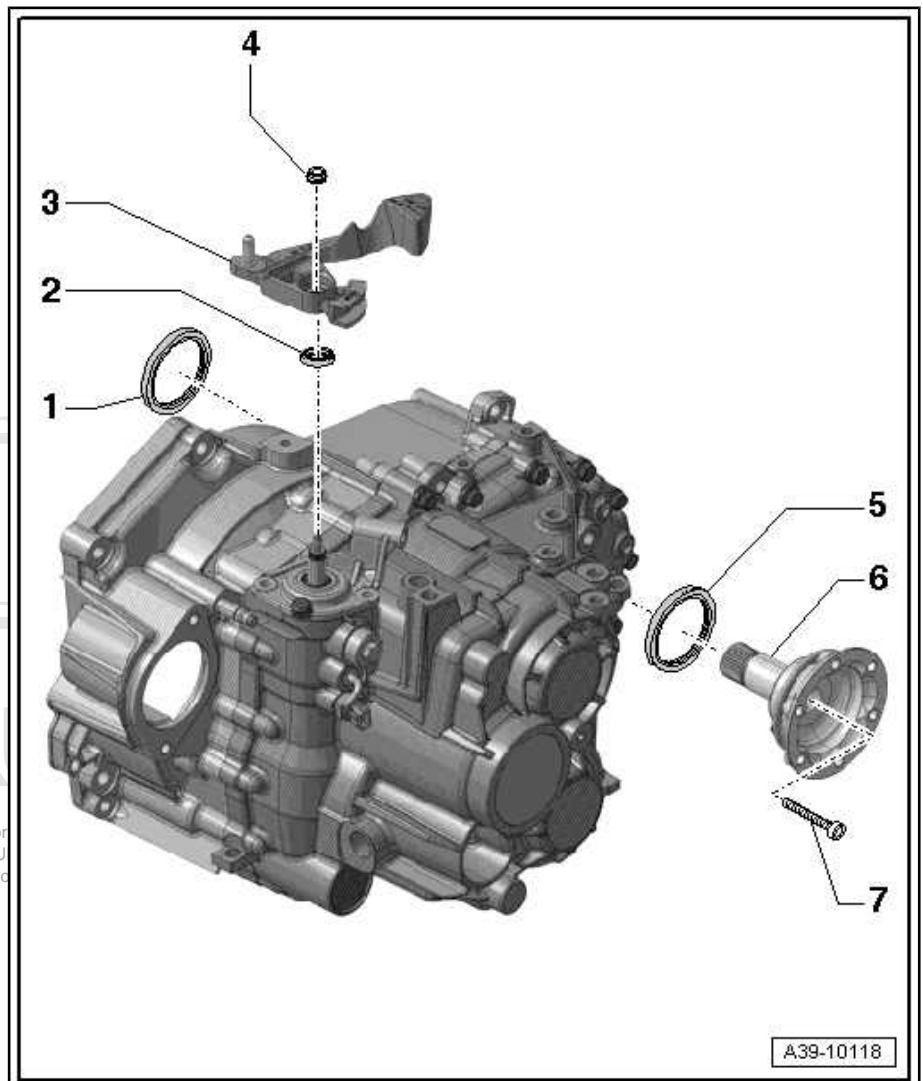
- ☐ Renewing ⇒ page 175

6 - Flange shaft (left-side)

- ☐ Removing and installing
⇒ page 173

7 - Bolt

- ☐ 33 Nm
- ☐ Renew

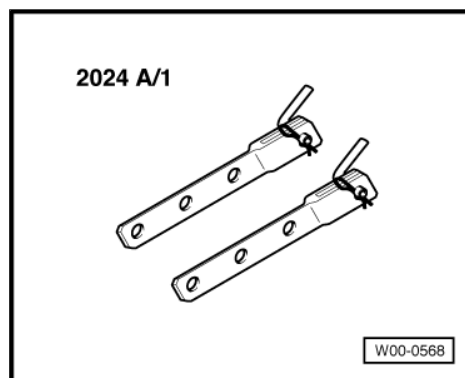


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1.1 Removing and installing flange shaft (left-side)

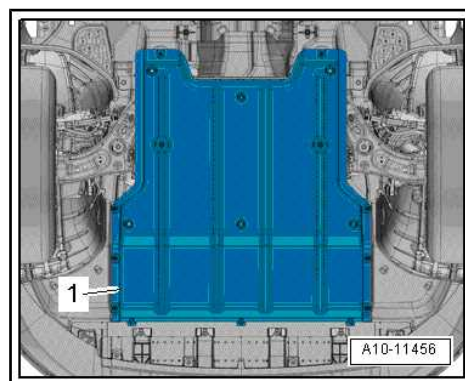
Special tools and workshop equipment required

◆ Extension -2024 A /1-

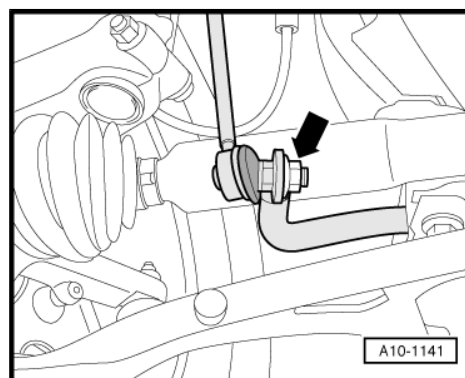


Removing

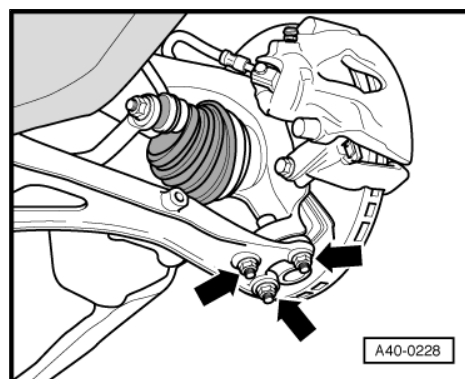
- Remove noise insulation -1- ⇒ General body repairs, exterior; Rep. gr. 66 .
- Remove front wheel (left-side) ⇒ Wheels and tyres; Rep. gr. 44 .



- Unscrew nut -arrow- for coupling rod on anti-roll bar (left-side).



- Remove nuts -arrows- securing swivel joint (left-side).
- If fitted, unscrew nut on bracket for front left vehicle level sender -G78- .
- Disengage swivel joint (left-side) from wishbone.
- Unbolt drive shaft (left-side) from gearbox ⇒ Rep. gr. 40 and tie up.



Note

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



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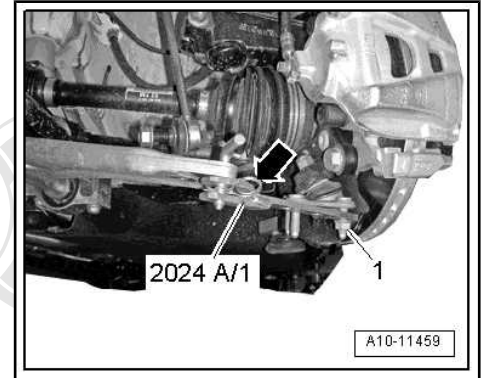
- Swivel suspension strut (left-side) outwards and support with extension -2024 A /1- as shown in illustration.



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-.*



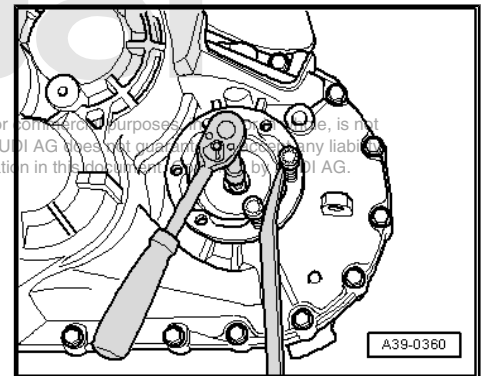
- Remove bolt securing flange shaft (left-side). To do so, screw two bolts into flange and counterhold flange shaft with suitable lever.
- Pull out flange shaft and spring.

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Installing

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

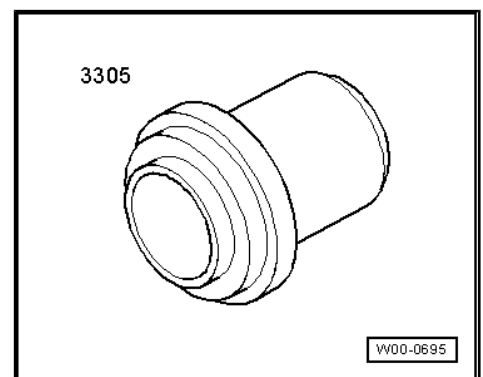
- Tightening torque
⇒ „1 Exploded view - flange shaft and oil seals on gearbox“,
page 173
- Push flange shaft in against spring pressure and secure with bolt.
- Install drive shaft (left-side), wishbone, swivel joint and coupling rod ⇒ Rep. gr. 40 .
- Fit front wheel (left-side) ⇒ Wheels and tyres; Rep. gr. 44 .
- Check gear oil level in manual gearbox and top up as required
⇒ page 79 .
- Install noise insulation ⇒ General body repairs, exterior; Rep. gr. 66 .



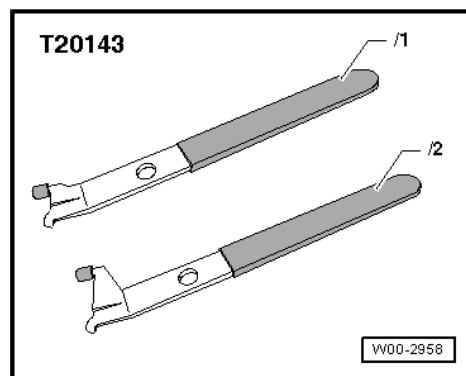
1.2 Renewing flange shaft oil seal (left-side)

Special tools and workshop equipment required

- ◆ Thrust piece -3305-



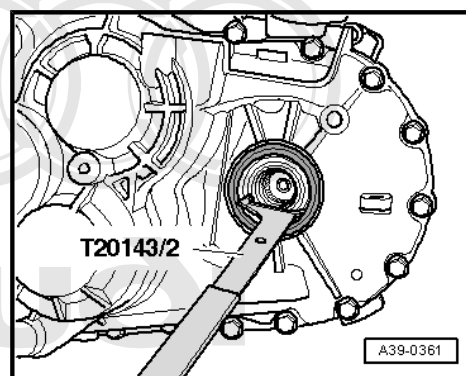
◆ Extractor tool -T20143/2-



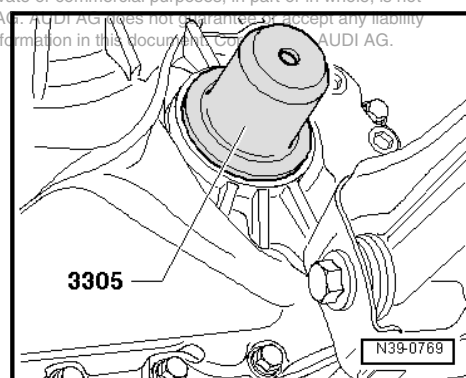
◆ Sealing grease -G 052 128 A1-

Procedure

- Gearbox in vehicle
- Remove flange shaft (left-side) ⇒ [page 173](#) .
- Pull out flange shaft oil seal using extractor tool -T20143/2- .



- Lightly oil outer circumference of new oil seal.
- Drive in new oil seal onto stop (take care to keep oil seal straight).



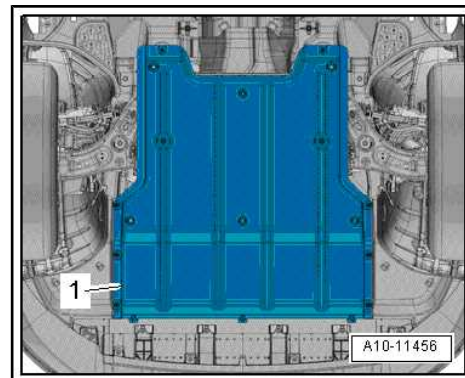
- Pack space between sealing lip and dust lip -arrow- half full with sealing grease -G 052 128 A1- .
- Install flange shaft (left-side) ⇒ [page 173](#) .
- Check gear oil level in gearbox ⇒ [page 79](#) .



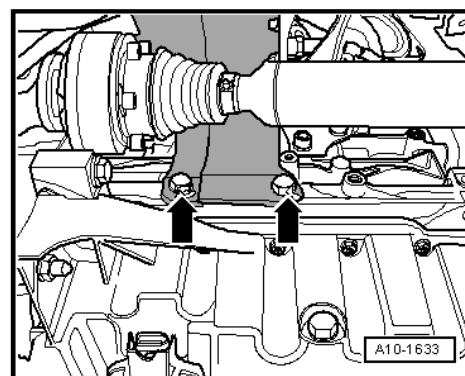
1.3 Removing and installing flange shaft (right-side)

Removing

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



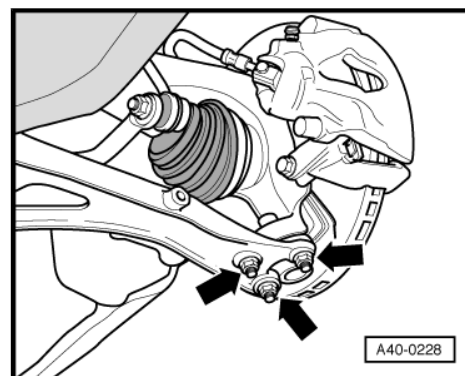
- If fitted, detach heat shield for drive shaft (right-side) -arrows-.



Note

The following work steps are shown on the left side of the vehicle.

- Remove nuts -arrows- securing swivel joint (right-side).
- If fitted, unscrew nut on bracket for front right vehicle level sender -G289- .
- Disengage swivel joint (right-side) from wishbone.
- Unbolt drive shaft (right-side) from gearbox ⇒ Running gear, front-wheel drive and four-wheel drive; Rep. gr. 40 and tie up.



Note

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

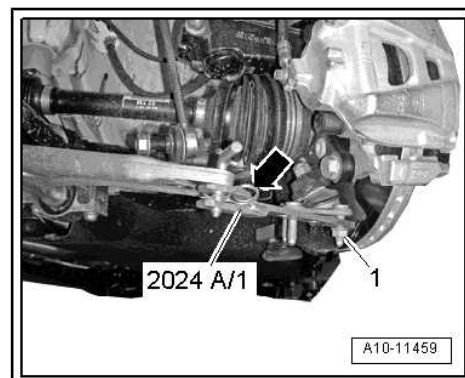
- Swivel suspension strut (right-side) outwards and support with extension -2024 A /1- , as shown in illustration.



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

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

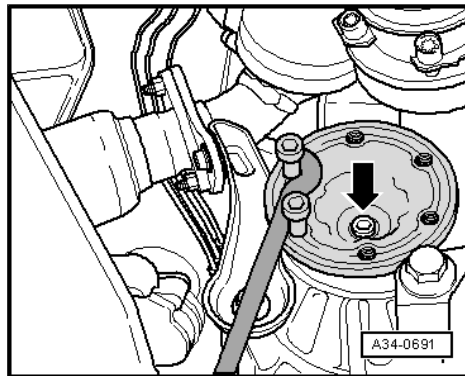


- Remove bolt -arrow- securing flange shaft. To do so, screw two bolts into flange and counterhold flange shaft with suitable lever.
- Place drip tray below gearbox.
- Pull out flange shaft and spring.

Installing

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

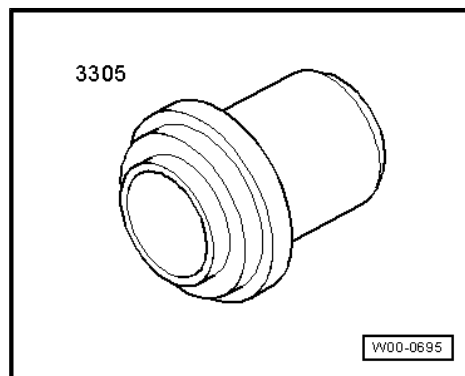
- Tightening torque
⇒ „1 Exploded view - flange shaft and oil seals on gearbox“,
[page 173](#)
- Install drive shaft, heat shield, wishbone and swivel joint ⇒
Running gear, front-wheel drive and four-wheel drive; Rep. gr.
40 .
- Check gearbox oil ⇒ [page 79](#) .
- Install noise insulation ⇒ General body repairs, exterior; Rep.
gr. 66 .



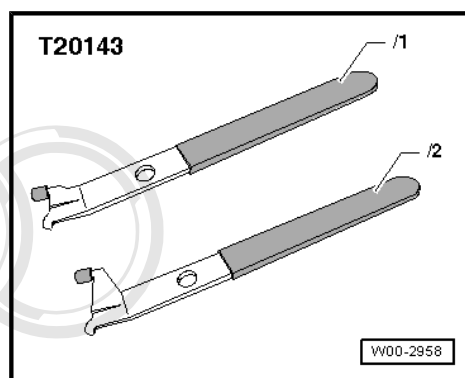
1.4 Renewing oil seal for flange shaft (right-side)

Special tools and workshop equipment required

- ◆ Thrust piece -3305-



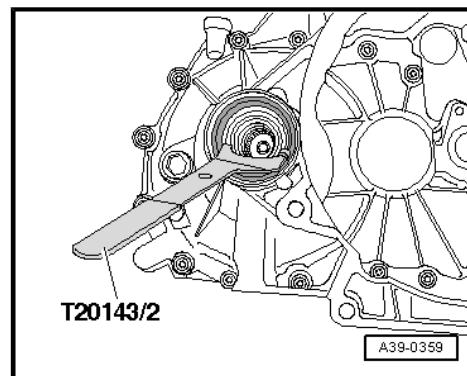
- ◆ Extractor tool -T20143/2-



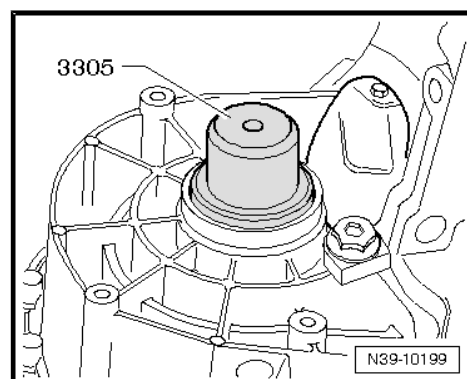
- ◆ Sealing grease -G 052 128 A1-

Removing

- Gearbox in vehicle
- Remove flange shaft (right-side) ⇒ [page 177](#) .
- Pull out flange shaft oil seal using extractor tool -T20143/2- .



- Lightly oil outer circumference of new oil seal.
- Drive in new oil seal onto stop (take care to keep oil seal straight).



- Pack space between sealing lip and dust lip -arrow- half full with sealing grease -G 052 128 A1- .
- Install flange shaft (right-side) ⇒ [page 177](#) .
- Check gear oil level in gearbox ⇒ [page 79](#) .

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2 Table of adjustments



Note

Readjustment of the two output shafts or the differential is only required if components have been renewed which have a direct effect on the adjustment of the gearbox. Refer to the following table to avoid unnecessary adjustment work:

		Components requiring adjustment:		
		Output shaft for 1st - 4th gear ⇒ page 152	Output shaft for 5th, 6th and reverse gears ⇒ page 168	Differential ⇒ page 188
Components renewed:	Gearbox housing	x	x	x
	Clutch housing	x	x	x
	Output shaft for 1st - 4th gear	x		
	Output shaft for 5th, 6th and reverse gears		x	
	Differential cage			x
	Tapered roller bearings for 1st - 4th gear output shaft	x		
	Tapered roller bearings for 5th/6th and reverse gear output shaft		x	
	Tapered roller bearings for differential			x

3 Differential

- ◆ ⇒ „3.1 Exploded view - differential“, page 181
- ◆ ⇒ „3.2 Dismantling and assembling differential“, page 183 .
- ◆ ⇒ „3.3 Adjusting differential“, page 188

3.1 Exploded view - differential

1 - Gearbox housing

2 - Shim

- ☐ For differential
- ☐ Determining thickness
⇒ [page 188](#)

3 - Tapered roller bearing outer race

- ☐ Pulling out ⇒ [page 186](#)
- ☐ Pressing in
⇒ [page 186](#)

4 - Tapered roller bearing inner race

- ☐ Pulling out ⇒ [page 185](#)
- ☐ Pressing in
⇒ [page 185](#)

5 - Differential cage

- ☐ With riveted final drive gear

6 - Tapered roller bearing inner race

- ☐ Pulling out ⇒ [page 185](#)
- ☐ Gearbox with stub shaft (right-side): pressing on
⇒ [page 186](#)
- ☐ Gearbox with flange shaft (right-side): pressing on
⇒ [page 186](#)

7 - Tapered roller bearing outer race

- ☐ Pulling out ⇒ [page 184](#)
- ☐ Pressing in
⇒ [page 185](#)

8 - Oil deflector plate

- ☐ Installation position: Shoulder on inside diameter faces towards oil seal ⇒ [Item 10 \(page 181\)](#)

For correct version, refer to ⇒ Electronic parts catalogue

9 - Clutch housing

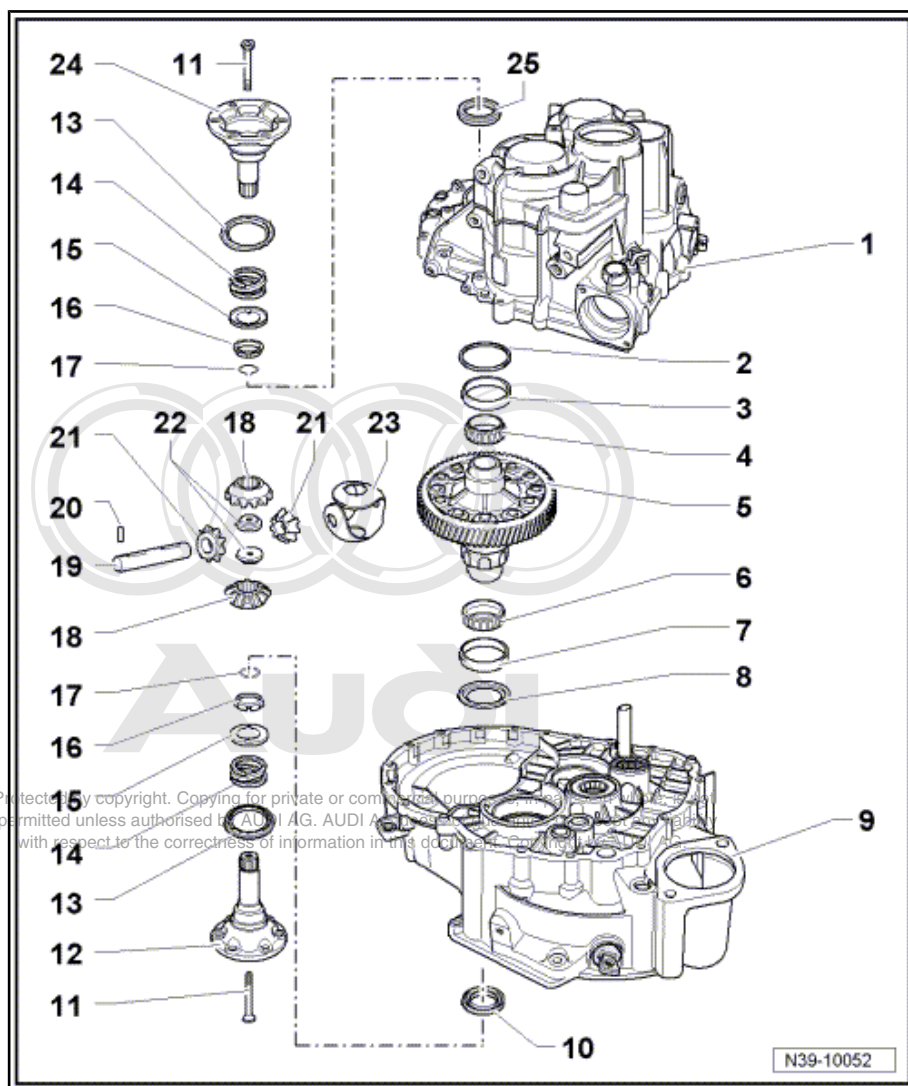
10 - Oil seal

- ☐ For flange shaft ⇒ [Item 12 \(page 181\)](#)
- ☐ Renewing (with gearbox installed in vehicle) ⇒ [page 178](#)

For correct version, refer to ⇒ Electronic parts catalogue

11 - Countersunk bolt, 33 Nm

- ☐ Screws into threaded piece ⇒ [Item 22 \(page 182\)](#)



12 - Flange shaft (right-side)

For correct version, refer to ⇒ Electronic parts catalogue

13 - Protective ring

- ☐ Lever protective ring off flange shaft ⇒ [Item 12 \(page 181\)](#) by applying a screwdriver on alternate sides
- ☐ Press on protective ring by hand as far as stop
- ☐ Protective ring must engage in flange shaft

14 - Spring for flange shaft or stub shaft

- ☐ Installed behind flange shaft or stub shaft

15 - Thrust washer

- ☐ Installation position: Shoulder towards spring, lugs (if provided) towards tapered ring

16 - Tapered ring

- ☐ Installation position: Taper towards differential cage

17 - Circlip

- ☐ Holds tapered ring, thrust washer and spring in position when flange shaft or stub shaft is removed

18 - Sun wheel

- ☐ Installing ⇒ [page 187](#)

19 - Differential pinion pin

- ☐ Drive out with drift
- ☐ Installing ⇒ [page 187](#)

20 - Spring pin

- ☐ For securing differential pinion pin
- ☐ Removing and installing ⇒ [page 187](#)

21 - Planet pinion

- ☐ Removing and installing ⇒ [page 187](#)

22 - Threaded piece

- ☐ Installing ⇒ [page 187](#)

23 - One-piece thrust washer

- ☐ Lubricate with gear oil before installing

24 - Flange shaft**25 - Oil seal**

- ☐ For flange shaft

For correct version, refer to ⇒ Electronic parts catalogue

- ☐ Renewing with gearbox installed ⇒ [page 175](#)

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3.2 Dismantling and assembling differential

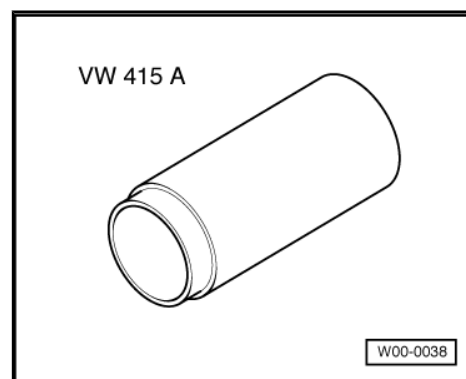
Special tools and workshop equipment required

- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 408 A-
- ◆ Press tool -VW 412-
- ◆ Thrust plate -40-105-
- ◆ Thrust plate -3005-
- ◆ Only for gearbox with stub shaft (right-side)
- ◆ Press tool -VW 473-

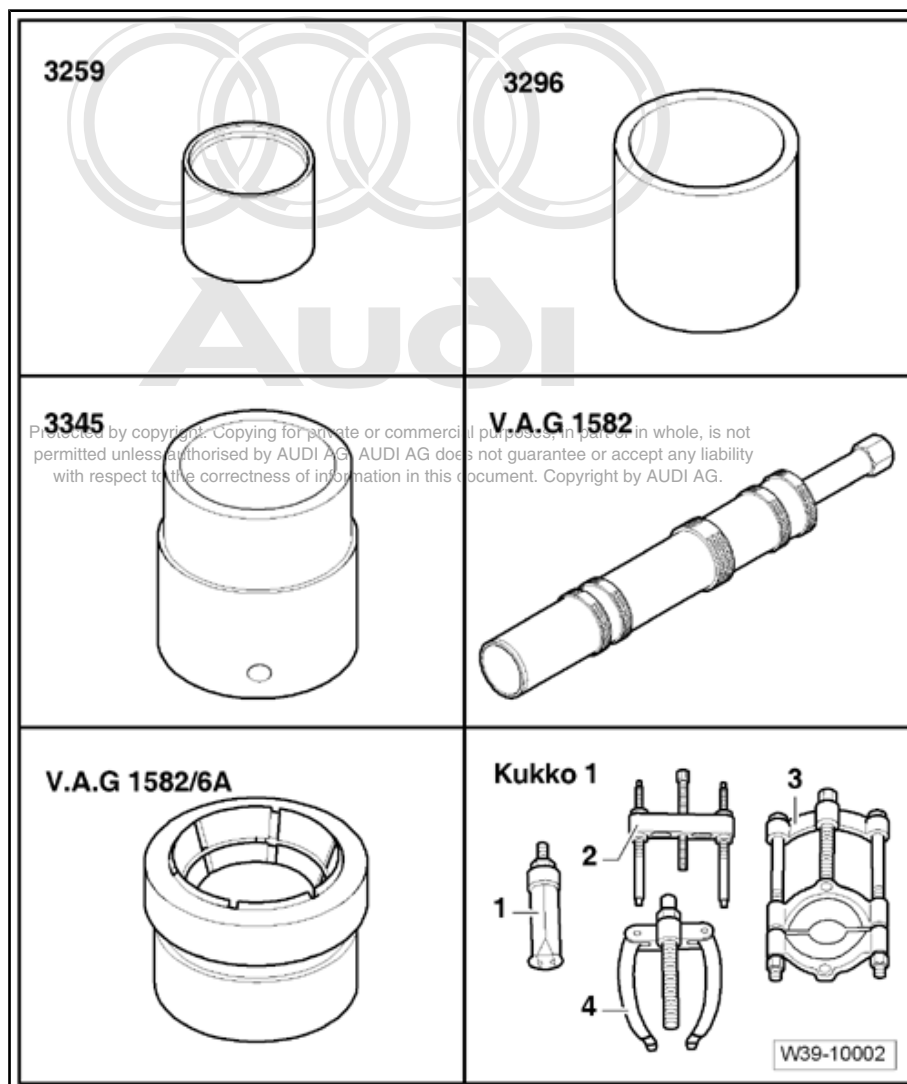


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- ◆ Only for gearbox with flange shaft (right-side)
- ◆ Tube -VW 415 A-



- ◆ Tube -3259-
- ◆ Tube -3296-
- ◆ Tube -3345-
- ◆ Tapered roller bearing puller -V.A.G 1582-
- ◆ Adapter -V.A.G 1582/6A-
- ◆ Internal puller -1 - Kukko 21/7-
- ◆ Puller -2 - Kukko 18/1-
- ◆ Splitter -3 - Kukko 17/1-
- ◆ Counter-support -4 - Kukko 22/2-



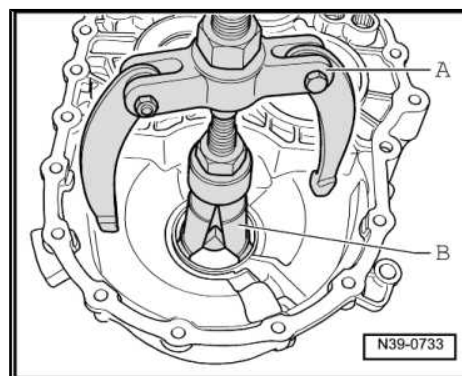
Note

- ◆ Heat tapered roller bearing inner race to 100° C before installing.
- ◆ Always renew both tapered roller bearings together.
- ◆ Adjust differential if tapered roller bearings, differential cage, gearbox housing or clutch housing are renewed
⇒ [page 188](#).

Pulling tapered roller bearing outer race out of clutch housing

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

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



Note

After pulling out, renew oil deflector plate.

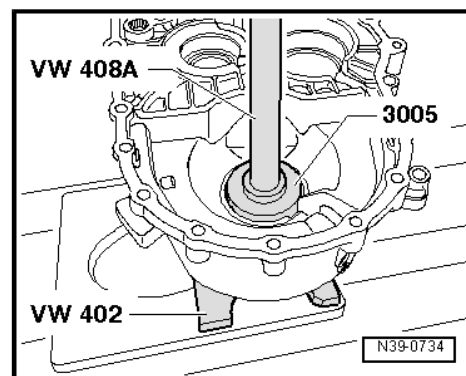
Pressing tapered roller bearing outer race into clutch housing

- First fit oil deflector plate.



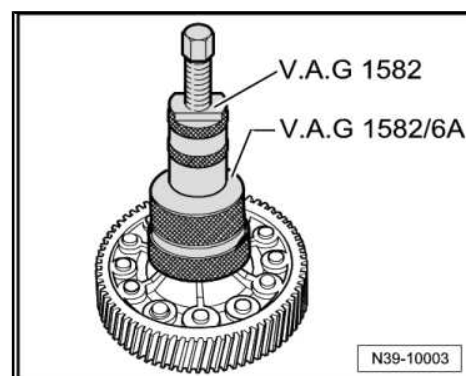
Note

Observe installation position of oil deflector plate; shoulder on inner diameter faces seal.

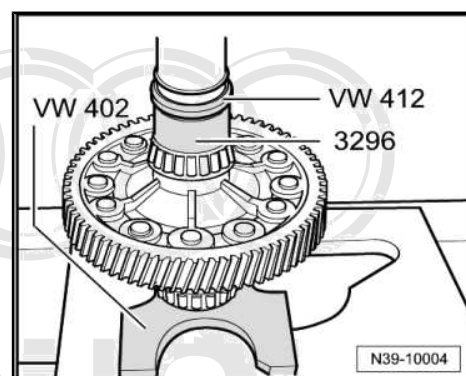


Pulling off tapered roller bearing inner race

- Before applying puller, place thrust plate -40-105- on differential cage.



Pressing on tapered roller bearing inner race

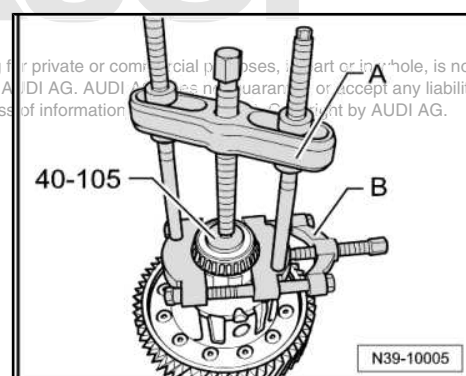


Pulling off tapered roller bearing inner race

A - Puller , e.g. -Kukko 18/1-

B - Splitter 12...75 mm , e.g. -Kukko 17/1-

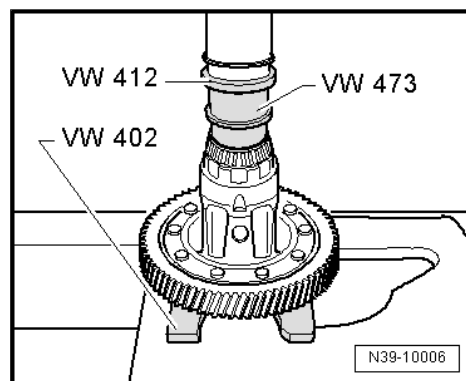
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Gearbox with stub shaft (right-side): pressing on tapered roller bearing inner race

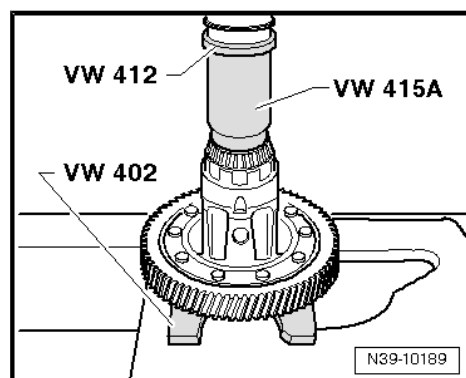
- Place smaller diameter of press tool -VW 473- on tapered roller bearing inner race.

Cage with bearing rollers must rotate freely when pressing on.



Gearbox with flange shaft (right-side): Pressing on tapered roller bearing inner race

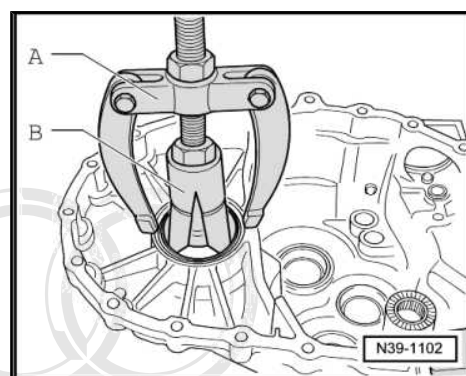
Cage with bearing rollers must rotate freely when pressing on.



Pulling tapered roller bearing outer race out of gearbox housing

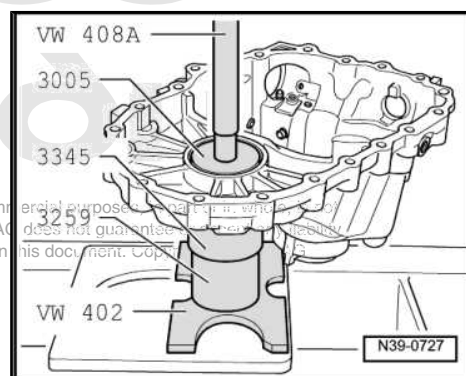
A - Counter-support , e.g. -Kukko 22/2-

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



Pressing tapered roller bearing outer race into gearbox housing

- Support gearbox housing with tube -3345- directly below bearing mounting.



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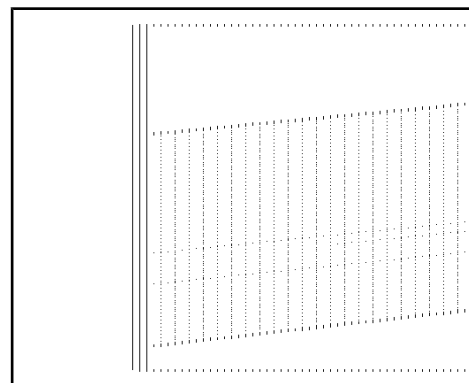
Removing and installing spring pin for differential pinion pin

Removing

- Cover tapered roller bearing inner race to avoid possible damage and ingress of metal particles.
- Drive out spring pin with chisel, inserting chisel into annular groove.

Installing

- Drive fully into differential cage.

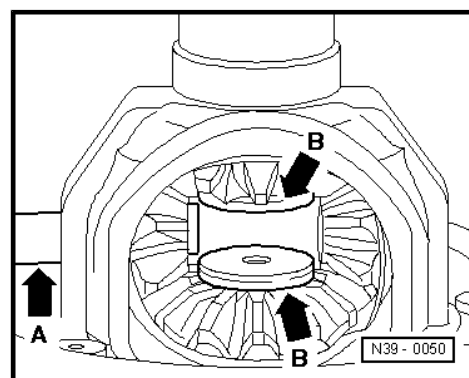


Installing differential bevel gears

- Lubricate one-piece thrust washer with gear oil and install.
- Install both sun wheels and secure (e.g. with flange 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

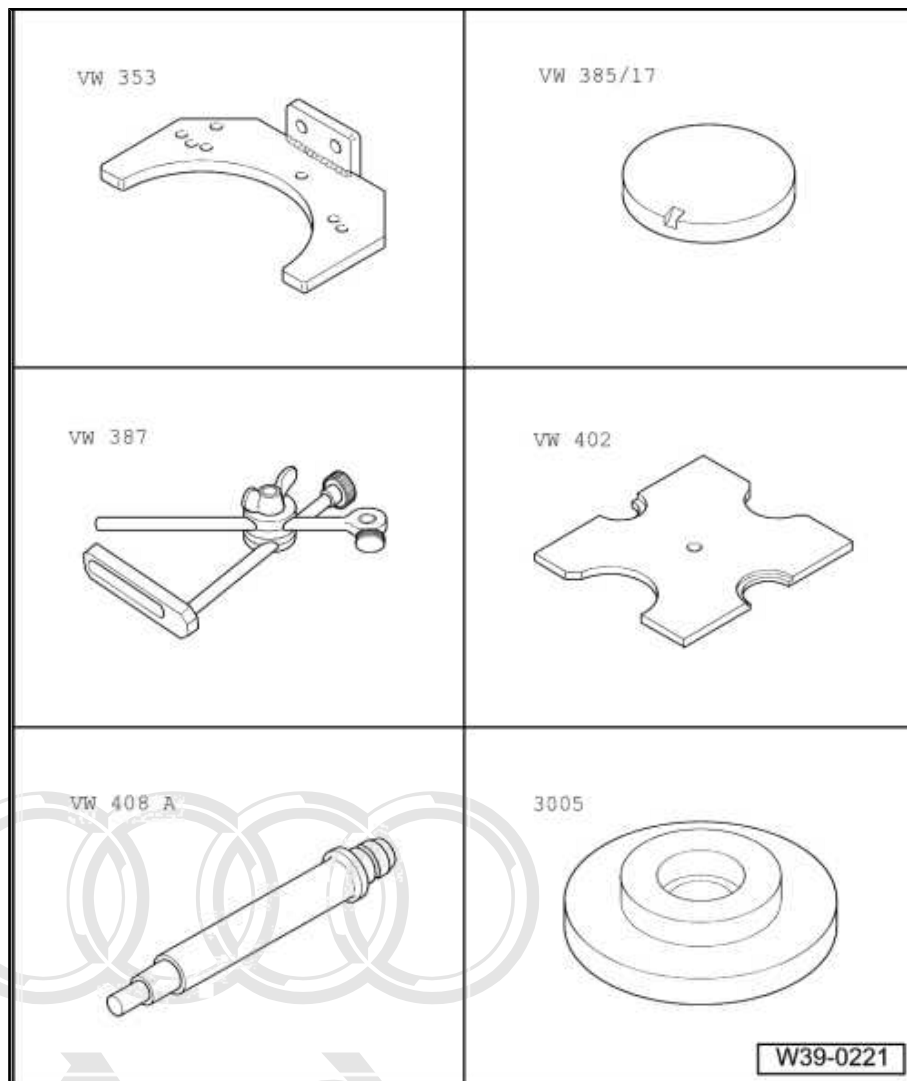
- Drive differential pinion pin into final position and secure with spring pin.



3.3 Adjusting differential

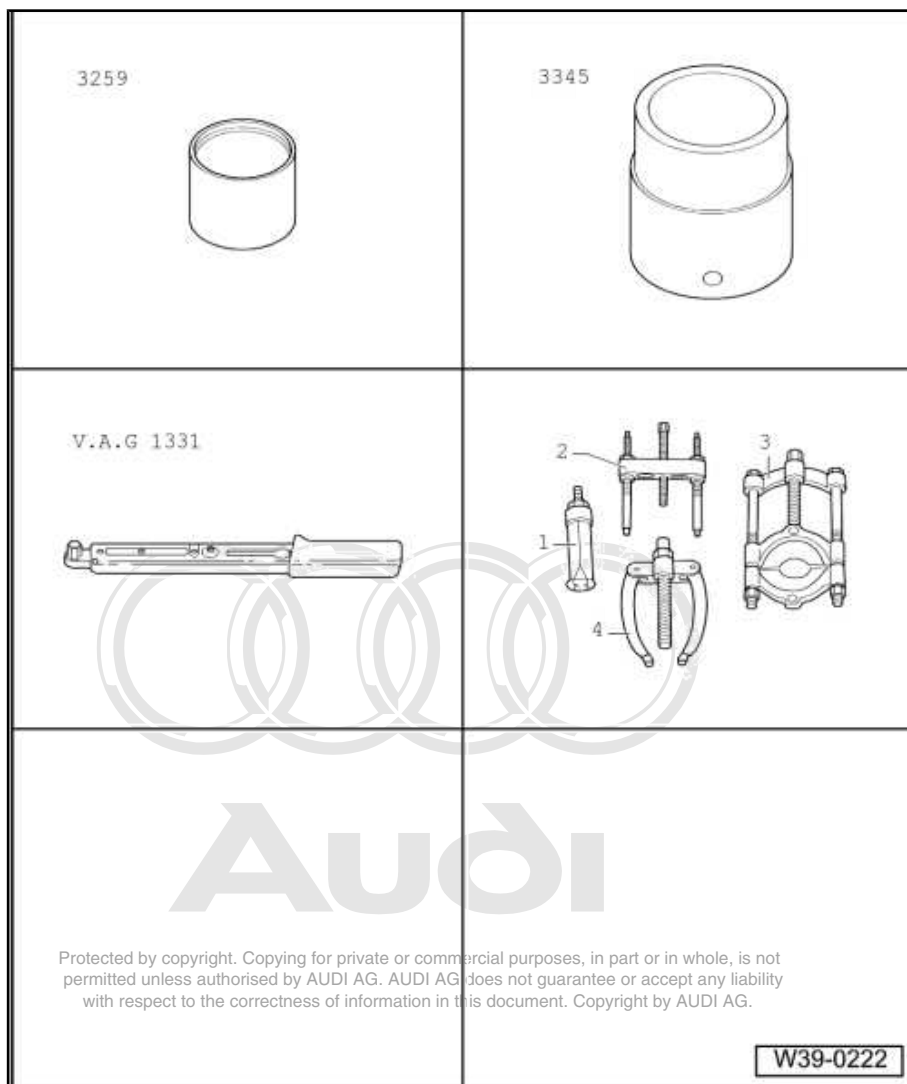
Special tools and workshop equipment required

- ◆ Gearbox support -VW 353-
- ◆ End measuring plate - VW 385/17-
- ◆ Universal dial gauge bracket -VW 387-
- ◆ Thrust plate -VW 402-
- ◆ Press tool -VW 408 A-
- ◆ Thrust plate -3005-



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- ◆ Tube -3259-
- ◆ Tube -3345-
- ◆ Torque wrench -V.A.G 1331-
- ◆ Internal puller 46...58 mm -1 - Kukko 21/7-
- ◆ Counter-support -4 - Kukko 22/2-



The differential has to be readjusted when the following components are renewed:

- ◆ Gearbox housing
- ◆ Clutch housing
- ◆ Differential cage, or
- ◆ Tapered roller bearings for differential

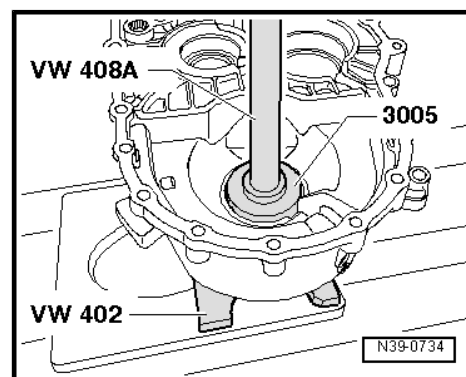
Table of adjustments ⇒ [page 180](#)

- Press tapered roller bearing outer race with oil deflector plate into clutch housing ⇒ [page 184](#).

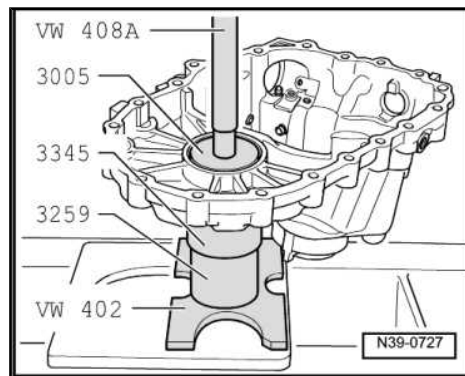


Note

Observe installation position of oil deflector plate; shoulder on inner diameter faces seal.



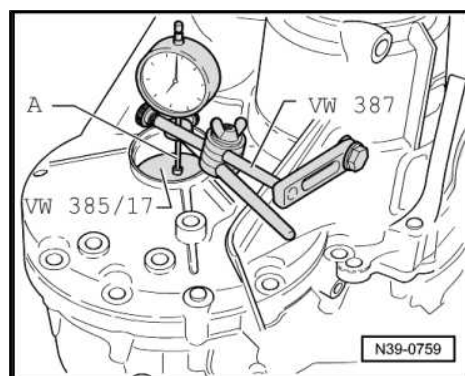
- Press tapered roller bearing outer race without shim into the gearbox housing
- Install differential in clutch housing.
- Fit gearbox housing and tighten 5 bolts to specified torque
⇒ [Item 13 \(page 84\)](#) and ⇒ [Item 14 \(page 85\)](#) .
- Press differential towards clutch housing; hold in this position and turn eight times.
- Press differential towards gearbox housing; hold in this position and turn eight times.



- Attach dial gauge and set to „0“ with a preload of 1 mm.

A - Dial gauge extension, 30 mm

- Move differential up and down and note play indicated on dial gauge (in this example: 0.70 mm).



Determining thickness of shim

The specified bearing preload is obtained by adding a constant figure (0.25 mm) to the reading indicated.

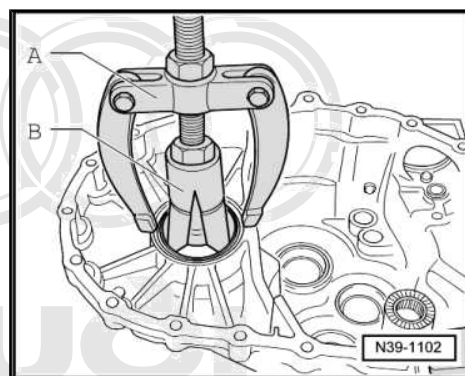
Example:

Measured value	0.70 mm
+ Preload (constant value)	0.25 mm
Thickness of shim =	0.95 mm

- Take off gearbox housing.
- Pull 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-
- Determine part number of shim from ⇒ Electronic parts catalogue .
- Install shims of the calculated thickness, thickest shim first.

The following shims are available:

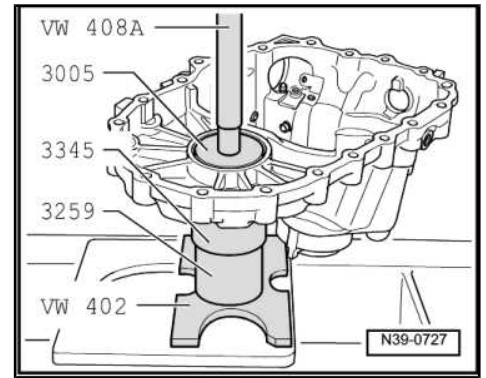
Shim thickness (mm)			
0.65	0.85	1.05	1.25
0.70	0.90	1.10	
0.75	0.95	1.15	
0.80	1.00	1.20	



If the size of the shim required is larger than those listed in the table, install two shims amounting to the correct value. Insert the thicker shim first.

Tolerance variations make it possible to obtain the exact shim thickness required.

- Press outer race in again and tighten gearbox housing to specified torque ⇒ [Item 13 \(page 84\)](#) and ⇒ [Item 14 \(page 85\)](#) .



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